



CROSBY J SERIES PRESSURE RELIEF VALVE WITH FISHER™ 4320 WIRELESS POSITION MONITOR INSTALLATION, OPERATION AND MAINTENANCE MANUAL

Before installation, these instructions must be carefully read and understood.



1 INTRODUCTION

1.1 General

NOTICE

Refer to Fisher 4320 Wireless Position Monitor instruction manual for any difficulties with device or calibration.

The Fisher 4320 Wireless Position Monitor is used to monitor the lift of a Crosby J Series Bellows Pressure Relief Valve. This data can be wirelessly transmitted to a control station. The Fisher 4320 wireless position monitor is a true linkage-less non-contacting wireless position transmitter and limit switch. It is a rugged measurement device that provides a precise wireless feedback signal to indicate equipment position with a percent (%) of span plus on/off indication. It is designed to be simple to use, compact and easily mounted. The wireless position monitor periodically reads the position of a measured device and transmits that data over a wireless network.

1.3 Safety Precautions

The protection and safety of equipment, property and personnel depends on the proper operation of the pressure relief valves described in this manual. All Emerson pressure relief valves should be kept in proper working condition in accordance with the manufacturer's written instructions. Periodic testing and maintenance by the user of this equipment is essential for reliable and safe valve operation.

All installation, maintenance, adjustment, repair and testing performed on pressure relief valves should be done by qualified technicians having the necessary skills and training to perform such work. All applicable Codes and Standards, governing regulations and authorities should be adhered to when performing pressure relief valve repair. No repair, assembly, adjustment or testing performed by other than Emerson or its authorized assemblers and representatives shall be covered by the warranty extended by Emerson to its customers. The user should use only original, factory supplied OEM parts in any maintenance or repair activity involving this product.

SAFETY FIRST

To reduce the risk during installation:

- Comply with all information on the product, in this manual and in any local and national codes that apply to this product.
- Do not allow untrained personnel to work with this product.
- Use Emerson parts and work procedures specified in this manual.

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1.2 Scope

Calibration of 4320 could be performed before mounting to the Pressure Relief Valve by using a calibration device that simulates the mounting of the 4320 and the magnet sensor. One can easily calibrate the 4320 by moving the magnetic sensor. For the large T orifice JLT-JBS-E, requires a calibration device simulator due to the length of stroke. Calibration could be also performed during mounting to the pressure relief valve by using calibration plate Emerson provides. This procedure provides the calibration methods required during mounting of the 4320 to Crosby J Series Bellows Pressure relief valve only.

WARNING

The Crosby J Series valve must have bellows when using this position monitor. Avoid personal injury from sudden release of process pressure. Failure to do so may result in injury to personnel or cause damage to the equipment.

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WARNING

Sudden release of pressure may result if the valve assembly is installed where service conditions could exceed the limits on the appropriate nameplates. Never use this equipment for any purpose other than its intended use.

This manual is provided as a general guide for the assembly or retrofit on the pressure relief valves described herein. It is not possible to describe all configurations or variations with such equipment. The user is advised to contact Emerson or its authorized assemblers and representatives for assistance in situations that are not adequately covered or described in this manual. Failure to do so may result in injury to personnel or cause damage to the equipment.

WARNING

Avoid personal injury from sudden release of process pressure. Before performing any maintenance operations:

- Do not remove any component from the valve while the valve is still pressurized.
- Always wear protective gloves, clothing and eyewear when performing any maintenance operations to avoid personal injury.
- Adhere to all safety standards and best practices for operating the equipment.
- Use bypass valves or completely shut off the process to isolate the valve from process pressure. Relieve process pressure on both sides of the valve. Drain the process media from both sides of the valve.
- Use lock-out procedures to be sure that the above measures stay in effect while you work on the equipment.
- The valve may contain process media that is pressurized, even when the valve has been removed from the process.
- Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

Failure to do so may result in injury to personnel or cause damage to the equipment.

The escape of process media indicates that the valve has NOT been properly vented or process pressure is trapped in the valve body. Check with your process or safety engineer for any additional measures that must be taken to protect against process media. Never attempt to remove the pressure relief valve from a system that is pressurized. Never adjust or perform maintenance on the pressure relief valve while in service unless the valve is isolated from the system pressure. If not properly isolated from the system pressure, the pressure relief valve may inadvertently open resulting in serious injury. Remove the pressure relief valve prior to performing any pressure testing of the system.

CAUTION

When the pressure relief valve is under pressure, never place any part of your body near to the outlet/exhaust of the valve. Failure to do so may result in injury to personnel or cause damage to the equipment.

CAUTION

This product is intended for a specific temperature range and other application specifications. Failure to adhere to these specifications could result in the malfunction of the product, property damage or personal injury.

WARNING

If the process media starts to escape from the valve or pilot, stop immediately! Failure to do so may result in injury to personnel or cause damage to the equipment.

The safety of lives and property often depends on the proper operation of the pressure relief valve. The valve must be maintained according to appropriate instructions and must be periodically tested and reconditioned to ensure correct function.

WARNING

Use only genuine Emerson replacement parts. Components that are not supplied by Emerson should not, under any circumstances, be used. Use of components not supplied by Emerson may void your warranty, might adversely affect the performance of the instrument and could cause personal injury or property damage. Failure to do so may result in injury to personnel or cause damage to the equipment.

NOTICE

Contact your Emerson sales office for replacement parts.

Before installation, the Installation and Operational Safety Instructions should be fully read and understood. These Instructions may be requested from the factory or are available at Emerson.com.

2 CALIBRATION PROCEDURE

CAUTION

When the pressure relief valve is under pressure, never place any part of your body near to the outlet/exhaust of the valve. Never use this equipment for any purpose other than its intended use. Failure to do so may result in injury to personnel or cause damage to the equipment.

2.1 Magnetic Sensor Size Selection

To achieve an accurate valve position, the correct magnet size must be selected. Refer to Table 1 for selection.

CAUTION

The magnet material has been specifically chosen to provide a long-term stable magnetic field. However, as with any magnet, care must be taken when handling the magnet assembly. Another high-powered magnet placed in close proximity (less than 25 mm) can cause permanent damage. Potential sources of damaging equipment include, but are not limited to: transformers, DC motors, stacking magnet assemblies. Failure to do so may result in equipment malfunction.

Tip: As a general rule, do not use less than 50% of the magnet assembly for full travel measurement. Performance will decrease as the assembly is increasingly subranged. The linear magnet assemblies have a valid travel range indicated by arrows molded into the piece. This means that the hall sensor (on the back of the 4320 housing) has to remain within this range throughout the entire valve travel. The linear magnet assemblies are symmetrical. Either end may be up.

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2.2 Calibration

Mounting the Fisher 4320 Wireless Position Monitor

1. Install a battery into the Fisher 4320 Wireless Position Monitor.

WARNING

Due to the combustible nature of the lithium content, the power module has special installation, operation, storage and/or shipping requirements. Observe all warnings included with the power module before installing, operating, storing or shipping the 4320 Position monitor. Failure to do so may result in personal injury or property damage from fire or explosion.

CAUTION

When installing components, proper means of electrostatic discharge protection is required. Failure to use a grounding strap or other means of electrostatic discharge protection can result in damage to the electronics.

CAUTION

To avoid static discharge, do not rub or clean the antenna with solvents. Failure to do so may result in personal injury or property damage from fire or explosion.

2. Mount the 4320 to the bracket and lightly tighten screws enough to hold in place. The screws will be tightened once calibration step is complete.
3. Mount the calibration plate and bracket on the pressure relief valve bonnet as shown on Figure 2-2.

Calibration Plate PN	Cap Group
11484327	Group 1
11484328	Group 2
11484329	Group 3

WARNING

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4. Slide the Polytetrafluoroethylene (PTFE) bushing sleeve on the magnet bracket.
5. Secure the Magnet in place under the bend in the Magnet Bracket with 2 screws and lock washers provided with Magnet. Torque force listed in Table 2, Location 1.

6. Position the magnet bracket assembly to the valve stem at the dimension "A" shown in Table 1. Lock in place.
7. Verify dimension "A" by caliper or depth micrometer to ensure it is in tolerance as shown in Table 1.
8. Loosen the Screws on 4320 Bracket and line up the mark on the back of 4320 with the top mark on the magnet. Lock 4320 in place on Bracket with quantity of 4, M6 x 10 mm HEX CAP Screws and Lock Washers with Torque force listed in Table 2, Location 2. Center the magnet assembly inside the 4320 slot by slightly adjusting the magnet bracket, if it is needed. This represents the "0% position", valve closed.

CAUTION

Do not install a magnet assembly that is shorter than the physical travel of the valve. Loss of control will result from the magnet assembly moving outside the range of the index mark in the feedback slot of the 4320 housing. Failure to do so may result in personal injury or property damage.

FIGURE 2-1
4320 and Bracket Assembly



FIGURE 2-2
Magnet Alignment

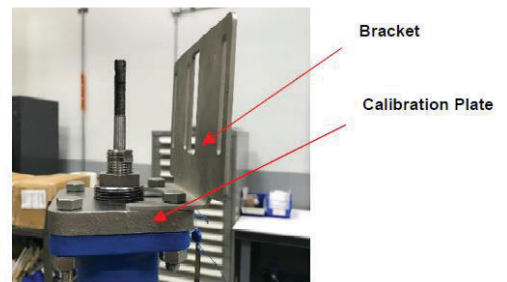


FIGURE 2-3
Measurement for Dim A

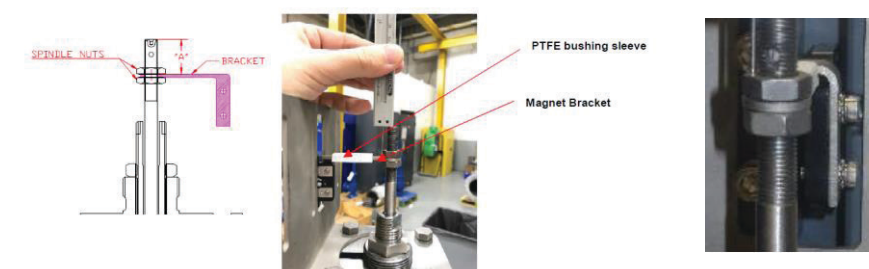
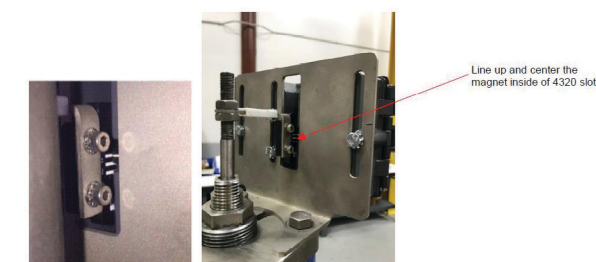


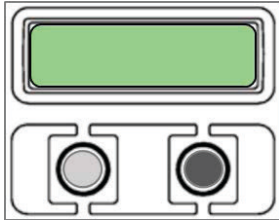
FIGURE 2-4
Measurement for Dim A



Mark valve closed position (0%)

1. On the 4320, press the right button until CALIBRATE appears.

FIGURE 2-5
 Wake up the 4320

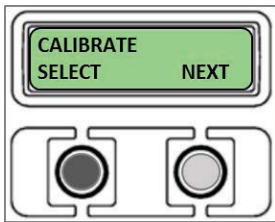


CAUTION

When accessing the pushbuttons or terminals proper means of electrostatic discharge protection is required. Failure to provide appropriate protection can cause the device to malfunction.

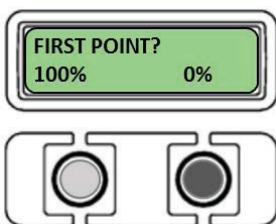
2. Push SELECT, this will allow you to select the first calibration point to be used, 0%.

FIGURE 2-6
 Calibrate Window



3. Push the right button to select 0%.

FIGURE 2-7
 First Point Calibration



4. Once set in position, use the left button to toggle the recording position to MARKED. MARKED indicates that the location has been recorded; UNMARKED indicates that position has not been recorded.

FIGURE 2-8
 First Point Set

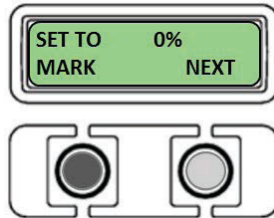
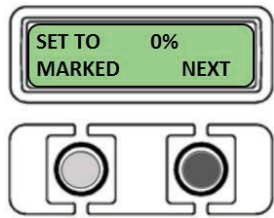


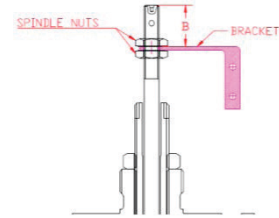
FIGURE 2-9
 First Point Mark



Mark valve full lift (100%)

1. After the 0% position has been MARKED press NEXT to select the second calibration point, 100% valve lift.
2. Loosen the two Spindle Nuts, move the magnet up to the full lift dimension and get the dimension "B" shown in Table 1. Lock in place.
3. Measure dimension B by caliper or depth micrometer to ensure it is in the tolerance as shown in the Table 1.

FIGURE 2-10
 First Point Mark



NOTICE

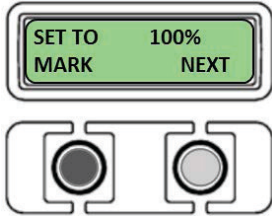
The valve must move from open to closed, or vice versa, in order for the wireless position monitor to be calibrated. Attempting to calibrate the device without moving the valve will result in the action being discarded. The operation of the device will be unchanged.

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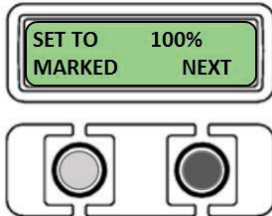
4. Use the left button to toggle the recording position to MARKED.

FIGURE 2-11
Second Point Set



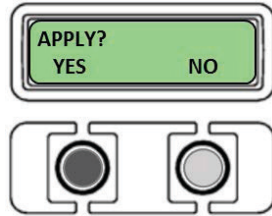
5. Press NEXT to enter the APPLY menu.

FIGURE 2-12
Second Point Mark



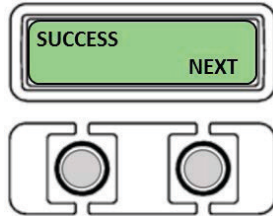
6. Select YES to apply the changes.

FIGURE 2-13
Second Point Mark



7. The following screen will confirm the changes.

FIGURE 2-14
Second Point Mark



8. Click NEXT to finish.

CAUTION

During calibration the valve will move full stroke, and may release pressure or process fluid. Provide a temporary means of control for the pressure release or process fluid. Failure to do so may result in personal injury or property damage.

NOTICE

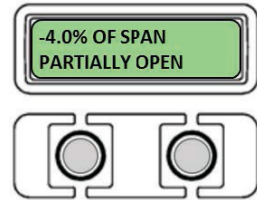
During the calibration procedure, the valve is moved to one position and marked. The valve is then moved to other end of travel and the second position is recorded (marked). Earlier calibration points can be used or discarded. Applying calibration points without changing the valve position will result in the calibration attempt being unused or discarded.

NOTICE

Refer to Fisher 4320 Wireless Position Monitor Instruction Manual for any difficulties with device or calibration.

9. Loosen the two Spindle Nuts, move them down the Spindle and verify the 4320 calibration shows the 0% position on the screen, preferably the reading -4% to -7% is suggested to compensate for any growth when valve is in service. Lock in place and apply Loctite to the two Spindle Nuts by torque force specified in Table 2, Location 3. Verify the screen is still reading between -4% to -7%.

FIGURE 2-15
Verification



NOTICE

In some systems, after installation and start up, external factors such as system vibrations and flow through adjacent piping systems can cause some minor fluctuations in the the 4320 output that are not attributed to the valve disc movement. In such cases, sampling data over a established period can be used to set the noise level attributed to the system. These fluctuations can be ignored and alert levels can be configured only for values that exceed this threshold.

CAUTION

The 0% calibration will not change the 100% setting as long as the 100% calibration is not executed.

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3 MOUNTING FISHER 4320 TO THE J SERIES VALVE

WARNING

Before mounting the 4320 wireless position monitor:

- Always wear protective clothing, gloves and eyewear when performing any installation procedures.
- Check with your process or safety engineer for any additional measures that must be taken to protect against process media.
- Failure to do so may result in injury to personnel or cause damage to the equipment.

3.1 Installation

Before disassembling the pressure relief valve ensure that the valve has been decontaminated from any harmful gasses or fluids and that it is at a safe temperature range for handling. Fluids can be trapped inside of the pressure relief valves.

1. Do not take 4320 off from bracket to avoid additional adjustment. Remove the bracket with 4320 assembly TOGETHER from the valve carefully, then remove the calibration plate.
2. Check the Cap slot to ensure there is no sediments, paints and debris before the cap is installed. Place the Cap on the valve and place the Bracket mounting with 4320 on top of the Cap. Preferred Bracket position is opposite the outlet, over the Nozzle Set Screw.

FIGURE 3-1 Magnet Bracket Assembly



3. Place the cap on the valve with the Fisher 4320 mounting bracket. Preferred bracket position is opposite the outlet, over the nozzle set screw. Tighten the cap Nuts.

FIGURE 3-2 4320 Bracket Assembly



4. Check 4320 reading is still in -4% to -7% range. Tighten the cap Nuts by torque force listed in Table 2, Location 4.

NOTICE

If the reading is out of range (-4% to -7%), loosen the bracket screws, slightly move 4320 up and down until the reading is acceptable. Then secure the 4320 in place on the bracket with the four M6 x 10 mm hex cap screws and lock washers with torque force at Table 2, Location 2 when the adjustment is completed.

Changing the valve position will result in the calibration attempt being unused or discarded.

WARNING

During operation the valve must be allowed to move full stroke freely. Keep all travel areas clear and without obstructions of any kind. Failure to do so may result in injury to personnel or cause damage to the equipment.

FIGURE 3-3 FREE Travel Areas



5. Attach tag (Figure 3-4) to the bracket ensuring the requirement of keeping the magnet travel area free of obstructions is visible.

FIGURE 3-4 High Visibility Tag to attach to mounting bracket.



WARNING

Use only genuine Emerson replacement parts. Components that are not supplied by Emerson should not, under any circumstances, be used. Use of components not supplied by Emerson may void your warranty, might adversely affect the performance of the instrument and could cause personal injury or property damage. Failure to do so may result in injury to personnel or cause damage to the equipment.

6. The 100% position can be verified by removing any spring load and lifting the valve either thru the nozzle bore or at the disc holder in valve outlet until the valve stops. If the 4320 was calibrated per Table 1, the full lift 100% valve open value will be exceeded due to manufacturing tolerances. The Cap will need to be removed to access the Adjusting Bolt to remove spring force and allow sufficient valve travel when lifting. If the screen reading is less than 100% than the Adjusting Bolt will need to be moved out further. The Cap can be reinstalled per listed instructions.
7. Check to be sure the 4320 reading is still in -4% to -7% range before the valve is installed on the system. If after installation any adjustments are required repeat the steps described in this section.

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3.2 Bracket Kits

The type of bracket kit that fits your valve is based on the Orifice Size and Pressure Rating. See Table 1 for reference.

FIGURE 3-5
Bracket Kit Examples



CAP GROUP 1



CAP GROUP 3



CAP GROUP 2

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4 SELECTION TABLES

TABLE 1 MAGNET AND BRACKET KIT SELECTION TABLE

Orifice	Pressure Rating	JBS-E Lift (Inch)	JLT-JBS-E Lift (Inch)	Magnet Part Number (Fisher / Crosby)	"A"	JBS-E "B"	JLT-JBS-E "B"	Cap Group	Bracket Kit PN	Spindle Nut Thread
D	1-4()	0.121	0.151	7MM (GG13859X012 / 11495484)	1	0.879	0.849	Group 1	11469009	0.375-24
D	5-7()	0.121	0.151	7MM (GG13859X012 / 11495484)	1	0.879	0.849	Group 1	11469342	0.375-24
E	1-4()	0.165	0.205	7MM (GG13859X012 / 11495484)	1	0.835	0.795	Group 1	11469009	0.375-24
E	5-7()	0.165	0.205	7MM (GG13859X012 / 11495484)	1	0.835	0.795	Group 1	11469342	0.375-24
F	1-4()	0.207	0.257	7MM (GG13859X012 / 11495484)	1	0.793	0.743	Group 1	11469009	0.375-24
F	5-6()	0.207	0.257	7MM (GG13859X012 / 11495484)	1	0.793	0.743	Group 1	11469342	0.375-24
F	7()	0.207	0.257	7MM (GG13859X012 / 11495484)	1.25	1.043	0.993	Group 2	11469343	0.500-20
G	1-4()	0.265	0.328	19MM (GE43895X012 / 11495480)	0.875	0.61	0.547	Group 1	11469009	0.375-24
G	5-7()	0.265	0.328	19MM (GE43895X012 / 11495480)	1.25	0.985	0.922	Group 2	11469343	0.500-20
H	1-3(),47	0.331	0.41	19MM (GE43895X012 / 11495480)	0.875	0.544	0.465	Group 1	11469009	0.375-24
H	45,5-6()	0.331	0.41	19MM (GE43895X012 / 11495480)	1.25	0.919	0.84	Group 2	11469343	0.500-20
J	1-2()	0.424	0.525	19MM (GE43895X012 / 11495480)	0.875	0.451	0.35	Group 1	11469009	0.375-24
J	3-4(),57	0.424	0.525	19MM (GE43895X012 / 11495480)	1.25	0.826	0.725	Group 2	11469343	0.500-20
J	55-6()	0.424	0.525	19MM (GE43895X012 / 11495480)	1.25	0.826	0.725	Group 2	11469345	0.625-18
K	1-3(), 47	0.507	0.628	19MM (GE43895X012 / 11495480)	1.25	0.743	0.622	Group 2	11469343	0.500-20
K	45, 57	0.507	0.628	19MM (GE43895X012 / 11495480)	1.25	0.743	0.622	Group 2	11469345	0.625-18
K	55-6()	0.507	0.628	19MM (GE43895X012 / 11495480)	1.38	0.873	0.752	Group 3	11469431	0.750-16
L	1-4()	0.631	0.782	25MM (GE02575X012 / 11495485)	1.25	0.619	0.468	Group 2	11469345	0.625-18
L	5-6()	0.631	0.782	25MM (GE02575X012 / 11495485)	1.38	0.749	0.598	Group 3	11469431	0.750-16
M	1-3()	0.709	0.878	25MM (GE02575X012 / 11495485)	1.25	0.541	0.372	Group 2	11469345	0.625-18
M	4-5()	0.709	0.878	25MM (GE02575X012 / 11495485)	1.38	0.671	0.502	Group 3	11469431	0.750-16
N	1-4()	0.779	0.964	25MM (GE02575X012 / 11495485)	1.5	0.721	0.536	Group 3	11469431	0.750-16
P	1-3()	0.945	1.169	50MM (GE02576X012 / 11495486)	1.75	0.805	0.581	Group 3	11469431	0.750-16
P	4-5()	0.945	1.169	50MM (GE02576X012 / 11495486)	1.88	0.935	0.711	Group 3	11469433	0.875-14
Q	1-4()	1.243	1.539	50MM (GE02576X012 / 11495486)	1.93	0.687	0.391	Group 3	11469433	0.875-14
R	1-4()	1.496	1.852	50MM (GE02576X012 / 11495486)	2	0.504	0.148	Group 3	11469433	0.875-14
T	1-4()	1.907	2.361	110MM (GE54617X012 / 1495487)	2.02	0.113	SPECIAL	Group 3	11469433	0.875-14
T2	1-4()	1.974	N/A	110MM (GE54617X012 / 1495487)	2.02	0.046	N/A	Group 3	11469433	0.875-14

Also required is the Fisher 4320 Wireless Position Monitor, part number 11495467.

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TABLE 2 LOCATION, BOLTING AND TORQUE

LOCATION	DESCRIPTION	BOLTING HARDWARE	TORQUE (+/-5%)	
			In-lbs	N•m
1	Magnet to Stem Bracket	M4 Cap Screws	20	2.26
2	Valve Monitor to Bracket	M6-8-1 x 10 mm Cap Screws	50	5.65
3	Stem Jam Nuts	0.375-24 HEX JAM NUT	135	15.3
	Stem Jam Nuts	0.500-20 HEX JAM NUT	160	18.1
	Stem Jam Nuts	0.625-18 HEX JAM NUT	190	21.5
	Stem Jam Nuts	0.750-16 HEX JAM NUT	250	28.3
	Stem Jam Nuts	0.875-14 HEX JAM NUT	400	45.2
4	Mounting Bracket to Cap	0.437-14 BOLT	40 ft-lbs	40
	Mounting Bracket to Cap	0.437-14 HEX NUT	45 ft-lbs	45
	Mounting Bracket to Cap	0.500-13 HEX NUT	60 ft-lbs	60
	Mounting Bracket to Cap	0.562-12 HEX NUT	90 ft-lbs	90

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