

September 2020

# Types C407-12 and C407-16 Internal Valves



## WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion and/or fire causing property damage and personal injury or death.

Fisher™ equipment must be installed, operated and maintained in accordance with federal, state, and local codes and Emerson Process Management Regulator Technologies, Inc. (Emerson) instructions. The installation in most states must also comply with NFPA No. 58 and ANSI Standard K61.1.

Only personnel trained in the proper procedures, codes, standards and regulations of the LP-Gas industry should install and service this equipment.

The internal valve must be closed except during product transfer. A line break downstream of a pump may not actuate the excess flow valve. If any break occurs in the system or if the excess flow valve closes, the system should be shut down immediately.

## Introduction

### Scope of the Manual

This manual provides instructions for the installation, adjustment, maintenance and parts ordering for Types C407-12, C407-16, C407M-12 and C407M-16 threaded internal valves.

### Product Description

The valves are typically used on the inlets and outlets of bobtail and transport trucks and on large stationary storage tanks. They can also be installed as in-line



Figure 1. Type C407-16

Figure 2. Type C407-12  
(1-1/2 NPT) Internal Valves

installations. Designed for propane, butane or NH<sub>3</sub> at ambient temperatures, the valves can be used on other compressed gases, but the user should check with the factory to make sure the valves are suitable for the particular service.

### DOT Internal Self-Closing Stop Valve Requirement

U.S. Department of Transportation (DOT) regulations 49CFR§178.337-8(a)(4) require each liquid or vapor discharge outlet on cargo tanks (except for cargo tanks used to transport chlorine, carbon dioxide, refrigerated liquid and certain cargo tanks certified prior to January 1, 1995) to be fitted with an internal self-closing stop valve. Fisher “C” Series internal valves comply with the internal self-closing stop valve requirement under the DOT regulations.

# Types C407-12 and C407-16

## Specifications

This section lists the specifications for the C407 Series. Factory specification are stamped on the nameplate fastened on the internal valve at the factory.

<p><b>Body Sizes and End Connection Styles</b> Inlet: 1-1/2 or 2-inch NPT external Outlet: 1-1/2 or 2-inch NPT internal</p> <p><b>Number of Outlets</b> Type C407: 1 (straight through)</p> <p><b>Excess Flow Springs</b> <b>Half Coupling Flows:</b> 1-1/2 in. / DN 40: 40, 50 and 80 GPM / 151, 189 and 303 L/min 2 in. / DN 50: 100, 150 and 250 GPM / 379, 568 and 946 L/min <b>Full Coupling Flows:</b> 1-1/2 in. / DN 40: 25, 35 and 65 GPM / 95, 133 and 246 L/min 2 in. / DN 50: 60, 90 and 130 GPM / 227, 341 and 492 L/min</p> <p><b>Maximum Allowable Inlet Pressure<sup>(1)</sup></b> 400 psig / 27.6 bar WOG</p>	<p><b>Temperature Capabilities<sup>(1)</sup></b> -20° to 150°F / -29° to 66°C</p> <p><b>Body Materials</b> <b>Type C407:</b> Cast Steel WCB/WCC</p> <p><b>Approximate Weights</b> 1-1/2 in. / DN 40: 3.3 lbs / 1.5 kg 2 in. / DN 50: 8.8 lbs / 4 kg</p> <p><b>Product Compliance</b> <b>Internal Valves (IEFCV) comply with ANSI / UL® 125 Standard for Safety, and approved by PESO (India)</b> <b>Installation of Internal Valves (IEFCV) in India must comply with: OISD-STD-159 (LPG Tank Trucks: Requirement of Safety on Design/ Fabrication and Fittings), and Petroleum and Natural Gas Regulatory Board Regulations (Technical Standards and Specifications including Safety Standards for LPG Storage, Handling and Bottling Facilities)</b></p>
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1. The pressure/temperature limits in this Instruction Manual and any applicable standard or code limitation should not be exceeded.

## Principle of Operation (See Figure 3)

In view number 1, the valve is held closed by both tank pressure and the valve's closing spring. There is no leakage past the resilient seats in the poppet to the valve outlet.

The valve is opened by moving the operating lever to approximately mid-point in its total 70° travel arc (view number 2). This allows the cam to place the rapid equalization portion of the valve stem in the pilot opening, permitting a larger amount of product to bleed downstream than if the operating lever were moved to the full open position.

When tank and downstream pressure are nearly equal after a few seconds, the excess flow spring pushes open the main poppet (view number 3) and the operating lever can be moved to the full open position.

If tank pressure is greater than the valve's outlet pressure, the main poppet will remain in the closed position. If valve outlet piping is closed off by other

valves, however, product bleeding through the pilot will increase until it nearly equals tank pressure and the main poppet opens.

### Note

**The main poppet will not open if valve outlet piping is not closed off so that the outlet pressure can approach tank pressure.**

Once the main poppet opens, a flow greater than the valve's excess flow spring rating or a sufficient surge in flow forces the main poppet closed against the excess flow spring (view number 4). The pilot valve allows a small amount of product to bleed, but much less than view number 2 where the rapid equalization portion of the stem is placed in the pilot opening. When the operating lever is moved to the closed position, the valve closes completely and seals tightly (view number 1).

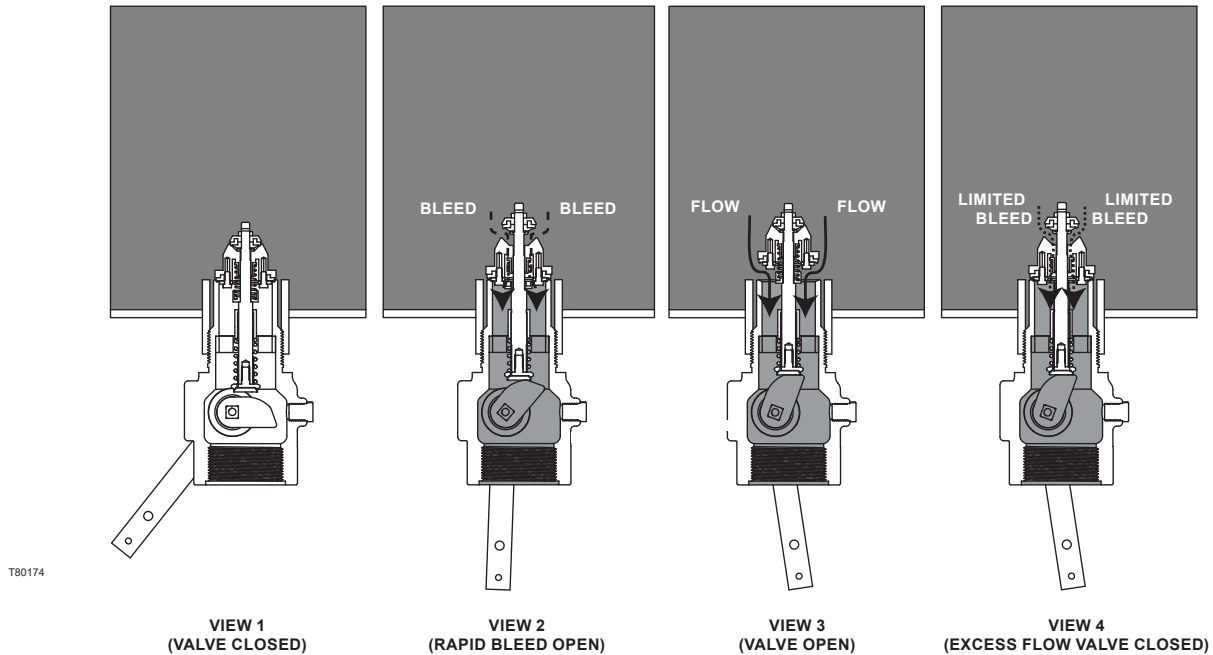


Figure 3. Operational Schematic

## Installation

### Mounting and Piping



#### CAUTION

Excess flow valve closing flow rates are not the same for half and full couplings. Verify the coupling for the desired excess flow rate.

Do not install the valve in any piping tending to restrict the valve inlet because this may prevent the excess flow valve from closing.

Do not install the valve with such extreme torque that the coupling can cut threads into the valve. This could cause valve distortion and affect the internal working parts.

**NPT Connection:** Coat the male threads of the valve with UL® listed sealing compound. Do not use Polytetrafluoroethylene (PTFE) tape as it may cause thread galling to occur.

The internal valves can be installed in either a half or full coupling. Excess flow spring closing flow rates vary in half and full couplings, refer to specifications.

For NPT connections, use an appropriate pipe sealing compound, on the male threads of the internal valve and pipeline. Screw the valve into the coupling hand tight, and then wrench tighten it for approximately two additional turns. Larger size valves may require an additional amount of torque to obtain a leak-free connection.

Keep piping from the valve outlet to the pump full size and as short as possible with a minimum number of bends. Reduction in pipe size to suit smaller pump inlets should be made as close to the pump as possible using forged reducers (swage nipples) or venturi tapers rather than bushings. This assures minimum flow resistance and efficient pump operation.

The valves have a break off section below the inlet pipe thread which is intended to permit the lower valve body to shear off in an accident, leaving the valve seat in the tank.

#### Note

**The break off section is designed to shear in tank / container installations. It may not shear if the valve is installed in a pipeline.**

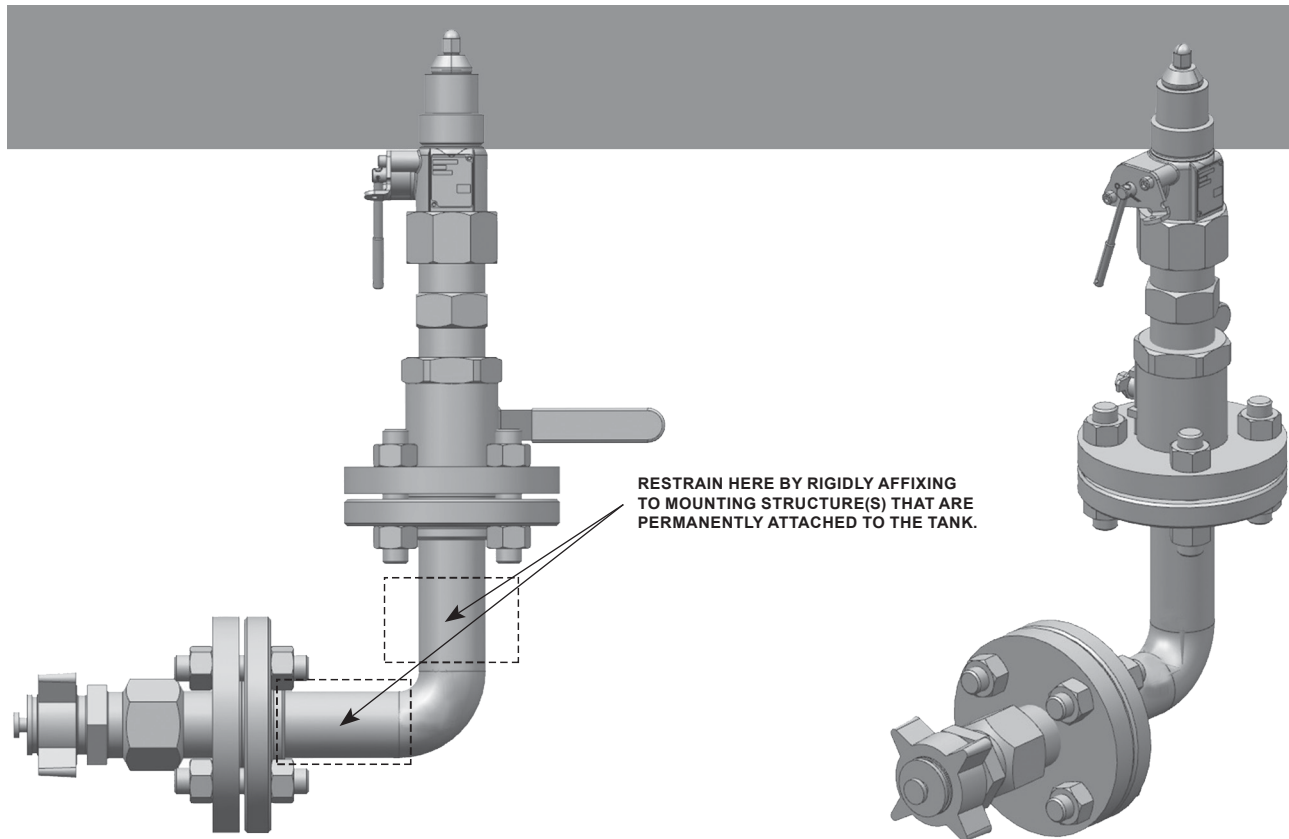


Figure 4. Example of Constrained Mounting for Adequate Support

## CAUTION

The internal valve has a break off section that is designed to shear off in case of an accident, leaving the valve seat protected inside the tank.

Any additional weight, e.g. piping, valves, connections, etc. must not be supported by the internal valve. This additional weight must be rigidly supported by the tank to prevent damaging this break off section. See Figure 4: Example of Rigid Support.

A hydrostatic relief valve does not need to be installed adjacent to the valve since the internal valve relieves excessive line pressure into the tank.

## Selectively Filling Manifolder Tanks

Fisher™ internal valves provide positive shutoff only in one direction, from out of the tank to downstream of the valve. The internal valves are designed to allow gas to flow into a tank when the downstream line pressure exceeds tank pressure. If you want to

selectively fill one or more of the other tanks in a tank manifold system, you must place a positive shutoff valve downstream of the internal valve, otherwise, all tanks will be filled at the same time and at about the same rate.

## Actuators

## CAUTION

The internal valve's closing spring is not designed to overcome drag in the control linkage in order to close the valve. Depending upon the control system used, an external spring (such as Fisher drawing number 1K4434) or positive closing linkage may be needed. Be sure the control system is installed to prevent binding that could cause the valve to stick in the open position.

The remote operating control system for the valve is extremely important and it must be installed to conform with the applicable codes. DOT MC331, for example, most generally applies for trucks.



**Figure 5.** Type P341 Latch/Remote Release Mechanism (for Type C407-12)



**Figure 6.** Type P341 Latch/Remote Release (as installed on Type C407M-12)



**Figure 7.** Type P340 Latch/Remote Release Mechanism (for Type C407-16)

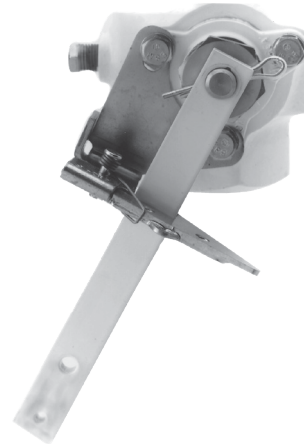
Emerson offers both cable controls and air cylinder systems to operate the C400 Series internal valves. It may also be possible to use cable controls from other manufacturers or to fabricate a linkage mechanism.

Any control system requires thermal protection (fuse links) at the valve, at the remote control point and, if necessary, near the hose connections. The instruction manuals for Fisher™ Controls actuator systems show how to install the fuse links.

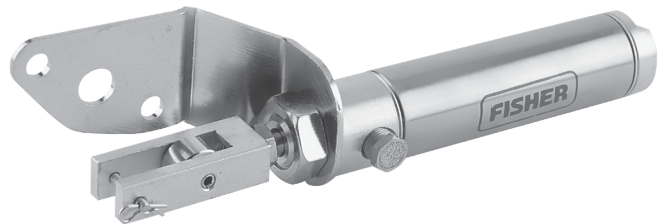
### Note

**Internal Valves and their attached latches, cables or actuators, MUST ALWAYS retain a fuse plug fitting, fusible element or thermal fuse link to allow thermal shut-off.**

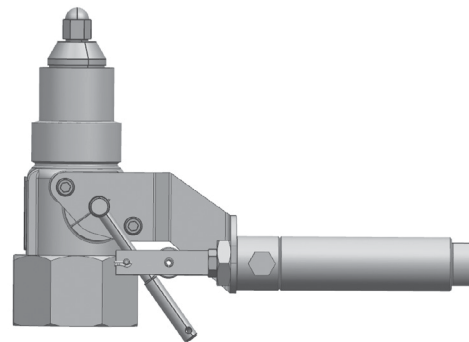
Installation instructions on Types P650, P163A and P164A cable controls are in Instruction Manual



**Figure 8.** Type P340 Latch/Remote Release (as installed on Type C407M-16)



**Figure 9.** Type P389 Pneumatic Cylinder Actuator (for Type C407-12)

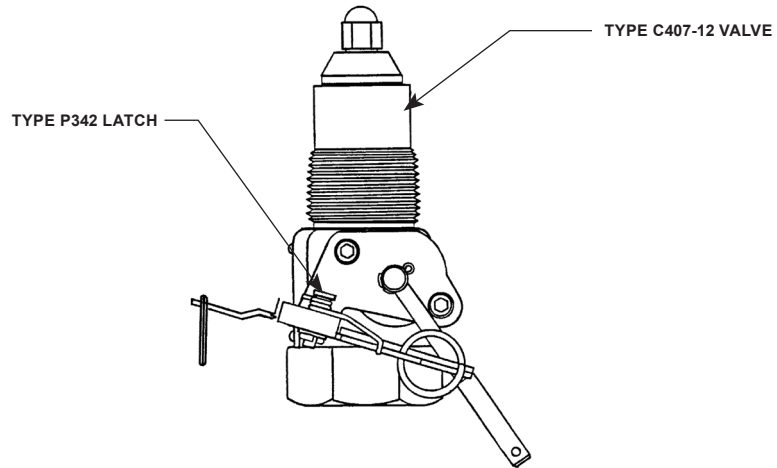


**Figure 10.** Type P389 Pneumatic Cylinder Actuator (as installed on Type C407-12)

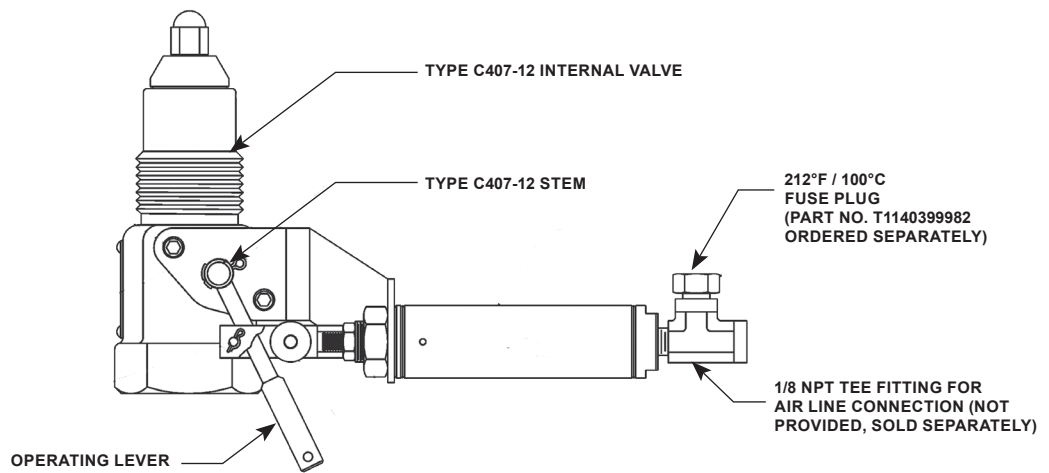
D450012T012. Installation instructions on Type P639A actuators are in Instruction Manual D450162T012. Types P340, P341 and P389 actuator and latch/remote release instructions are in Instruction Manual D450058T012.

The operating linkage must allow the operating lever to move from the fully closed position to within 2° of the fully open position. The linkage should not apply strong force to the lever past the fully open position or else the valve could be damaged.

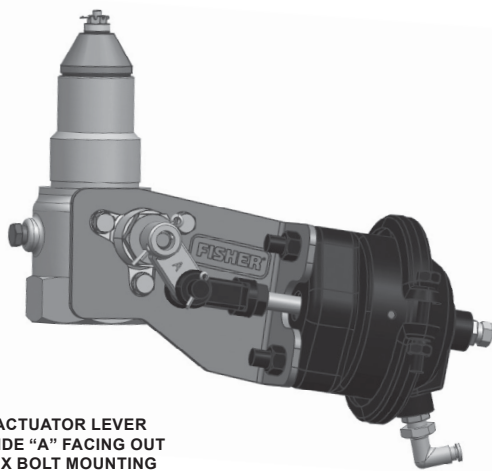
# Types C407-12 and C407-16



**Figure 11.** Optional Type P341 or P342 Bi-directional Latch/Remote-Release Installed in Type C407-12 Internal Valve

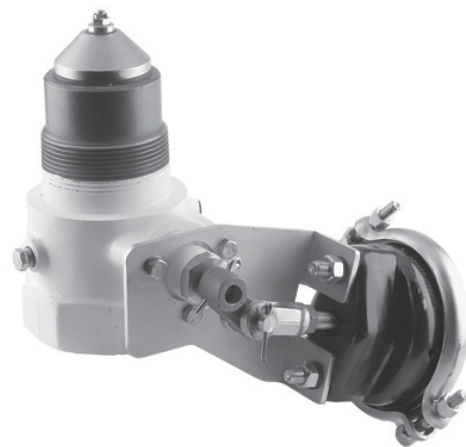


**Figure 12.** Type P389 Installation on Type C407-12 Internal Valve



NOTE: ACTUATOR LEVER WITH SIDE "A" FACING OUT FOR HEX BOLT MOUNTING

**Figure 13.** Type C407-16 with Type P639A Actuator



**Figure 14.** Type P639A Actuator Installation on Type C407-16 Internal Valve

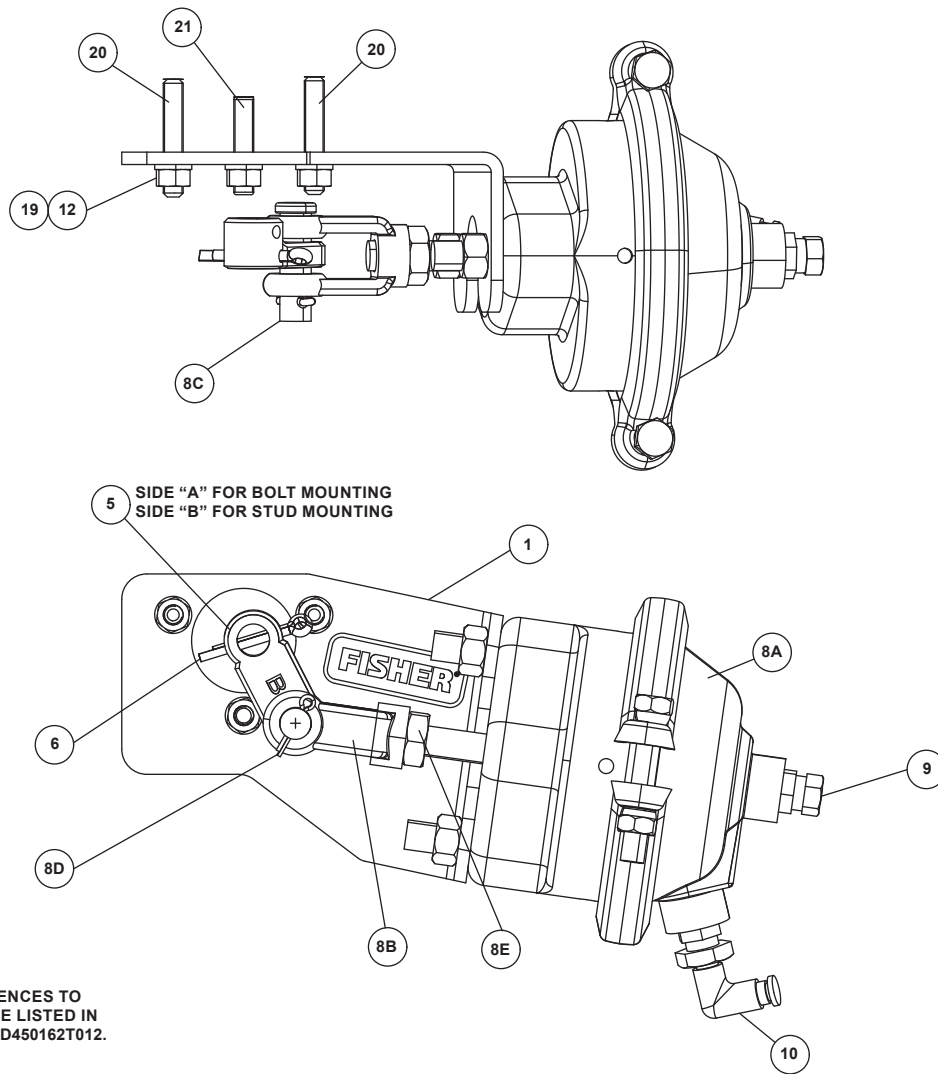


Figure 15. Type P639A for Types C407-16 (2 NPT) Internal Valves

## Excess Flow Operation



### EXPLOSION HAZARD

Restrictions incorporated in the discharge system of a bobtail truck or transport or of a stationary tank (due to pumps, pipe and hose length and dimensions, branching, elbows, reductions in pipe diameter, or a number of other in-line valves or fittings), low operating pressure as a result of ambient temperature or a partially closed valve downstream from the integral excess flow valve, can restrict

the rate of flow through the internal valve below the level necessary to actuate the integral excess flow valve. Therefore, **DO NOT USE** the excess flow function of the internal valve for the purpose of providing protection against the discharge of hazardous materials in the event of a rupture of hose or piping at a point in the discharge system downstream from the first valve, pump, or fitting downstream of the internal valve.

# Types C407-12 and C407-16

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The internal valve is designed with an internal bleed feature for equalization of pressure. After the integral excess flow valve closes, the leakage through the bleed must be controlled or a hazard can be created. For this reason the operator must be familiar with the closure controls for the internal valve and must close the internal valve immediately after the integral excess flow valve closes.

**Failure to follow this warning could result in serious personal injury or death, or property damage from a fire or explosion.**

The internal valve contains an excess flow function, or “integral excess flow valve”, that will close when the flow exceeds the flow rating specified by Emerson. Emerson’s integral excess flow valve installed on a bobtail truck or transport can provide protection against the discharge of hazardous materials during an unloading operation of a bobtail truck or transport in the event that a pump or piping attached directly to the internal valve is sheared off before the first valve, pump or fitting immediately downstream of the internal valve, provided that the cargo tank pressure produces a flow rate greater than the valve’s excess flow rating.

Likewise, if the internal valve is installed on a stationary tank or in the related downstream piping system, the integral excess flow valve can provide protection against an unintentional release of hazardous materials in the event that a pump or piping attached directly to the internal valve is sheared off before the first valve, pump or fitting immediately downstream of the internal valve, provided that the flow of product through the internal valve reaches the rated flow specified by Emerson.

## DOT Passive Shutdown Equipment Requirement



### EXPLOSION HAZARD

**DO NOT USE the excess flow function incorporated into Fisher™ “C” Series internal valves or “F” Series excess flow valves to satisfy the passive shutdown equipment requirement in 49CFR§173.315(n)(2). DO NOT include the excess flow function incorporated into Fisher “C” Series internal valves or “F” Series excess**

**flow valves in a DCE certification under 49CFR§173.315(n)(2). The cargo tank manufacturer must install some other equipment that satisfies the requirement for passive shutdown capability under 49CFR§173.315(n)(2).**

**Failure to follow this warning could result in serious personal injury or death, or property damage from a fire or explosion in the event of an unintentional release of product during an unloading operation.**

DOT regulations 49CFR§173.315(n)(2) require certain cargo tanks transporting propane, anhydrous ammonia and other liquefied compressed gases to be equipped with passive emergency discharge control equipment that will automatically shutoff the flow of product without human intervention within 20 seconds of an unintentional release caused by complete separation of a delivery hose. The design for each passive shutdown system must be certified by a Design Certifying Engineer (DCE) and all components of the discharge system that are integral to the design must be included in the DCE certification. The DCE certification must consider any specifications of the original component manufacturer.

In the case of downstream ruptures in hose or piping, a variety of operating conditions routinely encountered during an unloading operation restrict the rate of flow through the integral excess flow valve and make such a valve unsuitable to serve as the means of passive shutdown required under 49CFR§173.315(n)(2). Such variables include restrictions incorporated in the discharge system (due to pumps, pipe and hose length and dimensions, branching, elbows, reductions in pipe diameter, or a number of other in-line valves or fittings), low operating pressure as a result of ambient temperature or a partially closed valve downstream from the excess flow valve. Due to the variety of conditions, in the case of a hose separation, that can restrict the rate of flow below the level necessary to activate the excess flow valve, the integral excess flow function of Fisher “C” Series internal valves or “F” Series excess flow valves cannot be used to satisfy the passive shutdown equipment requirement under/in 49CFR§173.315(n)(2). Also, a Design Certifying Engineer cannot include the integral excess flow valve of a Fisher “C” Series internal valve or “F” Series excess flow valve as a component of the discharge system in any DCE certification under 49CFR§173.315(n)(2).



## Operation

Since the C400 Series will not open unless the downstream pressure can build-up to equal the inlet pressure, an operating sequence that assures equalization is important.

Follow these points:

1. C400 Series on bobtails and transports should never be open when the truck is in motion. If the control system is not interlocked to prevent this, the operator is responsible to see that the valves are closed.
2. Always open the internal valve before opening any other valves in the line or starting the pump.
3. Move the lever to the half-open position (See Figure 3, view number 2) to equalize pressure. When the main poppet clicks open, move the operating lever fully open.
4. Open other line valves slowly to avoid sudden surges which could slug the excess flow valve shut.
5. If the excess flow valve does close, stop the pump and close the nearest downstream valve. Move the internal valve's operating lever back to the rapid equalizing position and wait for the valve to click open. Then move the operating lever fully open and slowly open the downstream valve.
6. All valves should be completely open when pumping. (Throttling type valves could prevent the excess flow valve from closing when required.)
7. The operator must always be aware of where the remote closure controls are located and know how to operate the controls if an emergency requires valve closure. When pumping is finished, make a habit of closing the internal valve from the remote closure point, thus checking to see that the control actually is capable of closing the valve.
8. The valve should be open when backfilling through the valve to fill the tank.

## Troubleshooting

### Internal Valve Will Not Open

This could be due to leakage downstream, engaging the pump too soon or from excessive wear in the internal valve. If excessive volume is in the downstream system, a longer time is required to equalize the pressures (tank and downstream) before the pump can be engaged. To determine if the valve pilot seat is opening, install a gauge downstream of the valve, operate the valve actuator; if pressure does not build up to the tank pressure, the valve pilot seat is not open. This test should be done with pump off. If the pilot is not opening, it may be plugged with dirt or some internal part may be broken. If by operating the lever manually it can be rotated past the fully open position, there is something wrong internally and the valve must be disassembled.

### Premature Valve Closure

This can be caused from engaging the pump too soon, by an underrated excess flow valve spring, or by an improperly connected internal valve operating lever which does not fully open the valve. The trouble could also be from a valve that has its inlet port obstructed or from sudden line surges. In order to check the valve opening travel, operate the lever manually to the full travel, wait until valve opens (usually about 15 seconds), then engage the pump. If the excess flow closes, the points mentioned above should be investigated.

### Internal Valve Will Not Close

The stub shaft could be binding or the stem could be bent in the valve. Before disassembling the valve, check the actuator mechanism to see that it operates freely by disconnecting it from the valve lever and cycling it several times. Also, operate the valve lever manually. If it sticks in the open position, the packing and bushings should be replaced. This should free the operating mechanism if the valve has not been damaged internally. Refer to the Maintenance section.

### Low Flow Capacity

This could be caused by too small internal valve, too small or long downstream piping, plugged screens, some other restriction in the downstream system, or by the bypass valve sticking in the open position. The bypass valve could also be set too low and be opening prematurely.

# Types C407-12 and C407-16

## Maintenance



### WARNING

**Do not use these internal valves if they leak, fail to work properly or have been damaged or have missing parts. Prompt repairs should be made by a properly trained serviceman. Continued use without repair can create a hazardous or injurious situation.**

A simple preventative maintenance program for the valve and its controls will eliminate a lot of potential problems.

Emerson recommends these steps be conducted once a month. Also refer to the Department of Transportation (DOT) CFR 49 Sections 180.416 and 180 Appendix A and B which specify monthly maintenance and inspections tests for cargo tank service internal valves and their actuation controls.

1. Inspect the operating lever to see that it operates freely and that there is no leakage around the retainer nut. If there is sticking or leakage, replace the packing and bushings. Refer to Replacing Packing.
2. Check for tight closure of the seat disks. Any detected leakage, which is normally caused by disk wear or dirt, scale or debris embedded in the disk, requires that the internal valve be removed from service and repaired. Repair most often requires the replacement of valve disks. To check for leakage:
  - a. Close the internal valve and exhaust downstream pressure. Close the first valve downstream from the internal valve, and note any pressure buildup, using a pressure gauge, between the closed valve and the internal valve. If piping is cold allow it to warm to ambient temperature.
  - b. Refer to CFR 49 Section 180 Appendix B for Meter Creep Test Methods.
3. All operating controls should be inspected and cleaned and oiled. The controls should be checked to see that they fully open—but not over-travel—the internal valve operating lever and operate freely to close the valve.
4. Standard construction internal valves must be removed if the container is to be steam cleaned. Heat can damage the valve's seats and seals.
5. Standard construction internal valves are not designed for water service. Immediately after a container is hydrostatically tested, remove all water and allow the container to thoroughly dry out.

## Disassembly



### WARNING

**Tank pressure must be released before removing the valve from the container. Failure to do so could result in an explosion and/or fire causing property damage and personal injury or death.**

**Downstream pressure must be released before removing the screws holding the gland assembly to the internal valve body. Failure to do so could result in an explosion and/or fire causing property damage and personal injury or death.**

## Type C407-12 (See Figure 16)

### To Replace Packing

1. The packing can be replaced with product in the tank by closing the operating lever (key 16) and blowing down the downstream pressure in the system.
2. Remove the two cap screws (key 17) holding the gland assembly and cover plate to the body.
3. Rotate the entire gland assembly slightly counterclockwise and turn the assembly to the left as it is pulled out of the body.
4. Unscrew the cap screw (key 15R) from the stub shaft (key 15J) and remove the operating lever and cover plate by taking out the cotter pin (key 19).
5. Pushing on the stub shaft will expose the gland parts including the spacer (key 15W) and packing (keys 15F, G and H).
6. Besides the packing, the liner bushings (key 15B) should be replaced.
7. Reassemble in reverse order. Replace cap screw (key 15R) using 35 to 40 in-lbs / 2.95 to 4.52 N•m.
8. Make sure the operating lever can move freely after the new parts are installed. Conduct a leak test under pressure with a soap solution.

## To Replace Seat Disks

1. Remove the valve from the tank and take out the gland assembly, refer to steps 2 and 3 of "Type C407-12, To Replace Packing" section.
2. Holding the stem (key 2) with a 5/8 in. / 15.9 mm socket, unscrew bleed seat (key 13) from the stem.
3. Place the disc holder (key 6) into a vise with a shop towel over the vise. The vise must be tightened lightly and carefully so as not to bend the disc holder.
4. Unscrew the disc retainer (key 8) to reach the main seat disc (key 4) and the bleed seat disc (key 11).
5. Examine both seat discs and replace if necessary.
6. To ease installation, place the bleed seat disc on top of the disc retainer before screwing the disc retainer into the disc holder.
7. If the excess flow spring (key 3) is changed, replace the nameplate or stamp the body with the new type number.
8. Reassemble in reverse order using 35 to 40 in-lbs / 4.0 to 4.5 N•m torque to install the disc retainer. Apply Loctite® No. 242 or equivalent on the stem threads before installing the bleed seat (key 13).

## Type C407-16 (See Figure 17)

### To Replace Packing

1. To replace the packing (keys 15F, G and H) with product in the tank, close the operating lever (key 18) and blow down the downstream pressure in the system.
2. Remove the three cap screws (key 17) holding the bonnet assembly to the body.
3. Rotate the entire bonnet assembly slightly to remove it from the body.
4. Unscrew the cap screw (key 15R) from the stub shaft (key 15J), and remove the operating lever by taking out the cotter pin (key 19).
5. Unscrew the retaining nut (key 15M) from the bonnet. Pushing on the stub shaft (key 15J) will expose the bonnet parts including the packing.

6. Besides the packing, the liner bushings (keys 15B and 15K) should be replaced.
7. Reassemble in reverse order. Replace cap screw (key 15R) using 30 to 35 in-lbs / 3.39 to 3.95 N•m torque.
8. Make sure the operating lever can move freely after the new parts are installed. Conduct a leak test under pressure with a soap solution.

### To Replace Seat Disks

1. Remove the valve from the tank.
2. Remove the cotter pin (key 14) and unscrew the hex nut (key 13).
3. Remove both disk holders (keys 6 and 12) from the stem (key 2).
4. Unscrew the three screws (key 9) holding the disk retainer (key 8) to replace the main seat disk.
5. Examine both seat disks (keys 7 and 11) and replace if necessary.
6. If the excess flow spring (key 3) is changed, replace the nameplate or stamp the body with the new type number.
7. Always replace the sealing washer (key 23).
8. Reassemble in reverse order. Tighten the screws (key 9) using 20 in-lbs / 2.2 N•m torque to install the disc retainer (key 8) properly. Apply medium-strength threadlocker (i.e. Loctite® No. 242) on the stem threads before installing the hex nut (key 13).

## Parts Ordering

When corresponding about this equipment, always reference the equipment type number found on the nameplate.

A replacement Parts List is available for the valves. When ordering replacement parts, reference the complete 11-character part number for each needed part.

# Types C407-12 and C407-16



## WARNING

Use only genuine Emerson replacement parts. Components that are not supplied by Emerson should not, under any circumstances, be used in any Emerson control valve, because they will void your warranty, might adversely affect the performance of the control valve and could give rise to personal injury and property damage.

## Parts List

### Type C407-12 (See Figure 16)

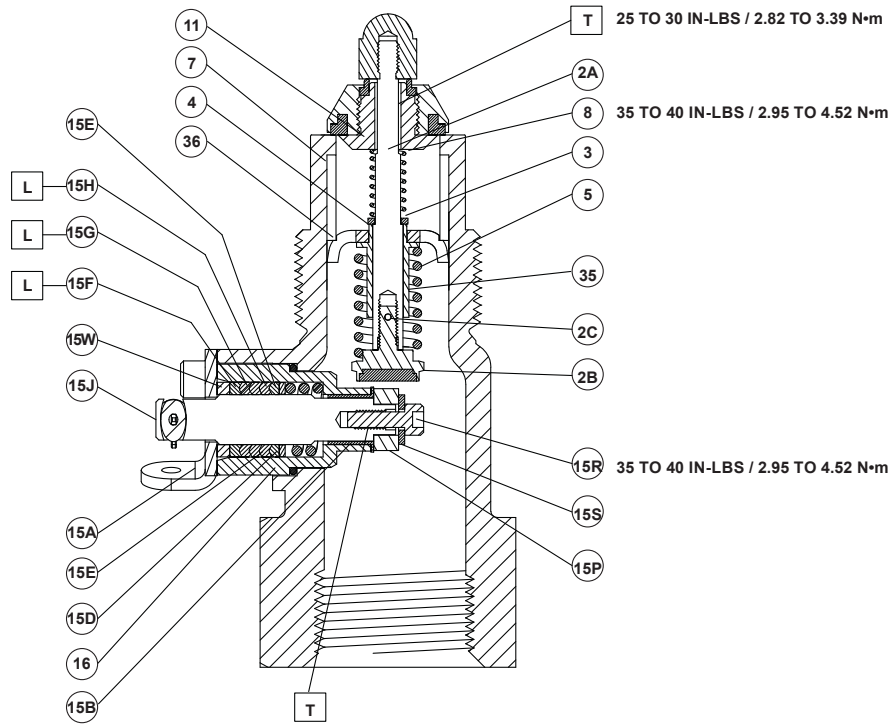
Key	Description	Part Number
1	Body, WCC Steel	ERAA47831A0
2	Stem Assembly, Stainless steel/Tetrafluoroethylene (FTE)	T13460T0012
3	Excess Flow Spring Half Couple Flow Rate 40 GPM / 151 L/min 50 GPM / 189 L/min 80 GPM / 303 L/min	T13414T0012 T13413T0012 T13412T0012
4	Spring Seat, Stainless steel	T13403T0012
5	Closing Spring, Stainless steel	T13463T0012
6	Disk Holder, Stainless steel	T13396T0012
7	Main Disk, Nitrile (NBR)	T13397T0012
8	Disk Retainer, Stainless steel	T13404T0012
11	Bleed Disk, Nitrile (NBR)	T13395T0012
13	Nut, Stainless steel	T13406T0012
15	Gland Assembly	T20850T0022
15A	Gland	T13399T0012
15B	Liner Bushing	T13410T0012
15D	Spring	T12851T0012
15E	Washer	T1207524082
15F*	Male Adaptor	T1207701012
15G*	Packing Ring	T1207801012
15H*	Female Adaptor	T1207901012
15J	Stub Shaft	T20846T0012
15P	Cam	T13398T0012
15R	Cap Screw	1D617032992
15S	Washer	T1173324152
15W*	Spacer	T14154T0012
16*	O-ring, Nitrile (NBR)	T13400T0012
17	Cap Screw (2 required), Stainless steel	T13402T0012
18	Lever, Stainless steel	T13428T0012
19	Cotter Pin, Stainless steel	T13405T0012
20	Nameplate	T13407T0012
21	Drivescrew (2 required), Stainless steel	ERAA05928A0
30	Fuse Link (not shown)	1J157443992
35	Stem Guide, Stainless steel	T13462T0012
36	Guide Bracket, Steel	T20848T0012
56	Cover Plate, Stainless steel	T20849T0012

\* Recommended spare part.

### Type C407-16 (See Figure 17)

Key	Description	Part Number
1	Body WCC Steel (no gauge plug tap installed) WCC Steel (with downstream gauge plug tap installed, key 22)	ERAA05844A0 ERAA47832A0
2	Stem Assembly	T11878000A2
2A	Stem, Stainless steel	T1187935032
2B	Plug Holder, Stainless steel	T1187135132
2B	Wear Plug, PTFE	T1187201012
2C	Groove Pin, Stainless steel	1J1560T0012
3	Excess Flow Spring 100 GPM / 379 L/min 150 GPM / 568 L/min 250 GPM / 946 L/min	T1188637022 T1153537022 T1200537022
4	Spring Seat, Steel	T1153624102
5	Closing Spring, Stainless steel	T1153737022
6	Disk Holder, Stainless steel	T20376T0022
7	Main Disk, Nitrile (NBR)	T1154003202
8	Disc Retainer, Steel	T1154125072
9	Screw (3 required), Steel	1A954828992
10	Disk Retainer, Steel	T1154224102
11	Bleed Disk, Nitrile (NBR)	T11543T0012
12	Disk Holder, Steel	T1154424102
13	Nut, Steel	GE04678T012
14	Cotter Pin, Stainless steel	T1241338992
15	Gland Assembly	-----
15A	Gland, Steel	T2038022012
15B	Liner Bushing, PTFE	T1154506992
15C	Washer, Steel	T1154625072
15D	Packing Spring, Stainless steel	T1154737022
15E	Washer, Steel	T1154825072
15F*	Male Adaptor, PTFE	T1154901012
15G*	Packing Ring, PTFE	T1155001012
15H*	Female Adaptor, PTFE	1H941601012
15J	Stub Shaft, Stainless steel	T2037835072
15K	Liner Bushing, PTFE	T1155106992
15L*	Rod Wiper, Polyurethane	T1155206992
15M	Bonnet, Carbon steel	T1155324102
15P	Cam	T1155521992
15R	Cap Screw, Steel	1B848024052
15S	Washer, Steel	1C225628982
16*	O-ring, Nitrile (NBR)	T1155706562
17	Cap Screw, (3 required)	T12499T0012
18	Lever	T1155919312
19	Cotter Pin	1H837128982
20	Nameplate	T1231236152
21	Drivescrew (2 required), Stainless steel	ERAA05928A0
22	Pipe Plug, Steel, (not included depending on model)	T13718T0012
23.	Washer, Steel	T1188228982
24	Inspection Tag (not shown)	1H839806992
30	Fuse Link (not shown)	1J157443992
33.	Travel Stop, Stainless steel	T1240838072
34.	Washer, Stainless steel	T1221236152
35	Bushing, PTFE	T1221306992
36	Stem Guide, Steel	T12918T0012
54	Inspection Check List (not shown)	T20940T0012
55	Lock Washer, Stainless steel	1C2257K0012

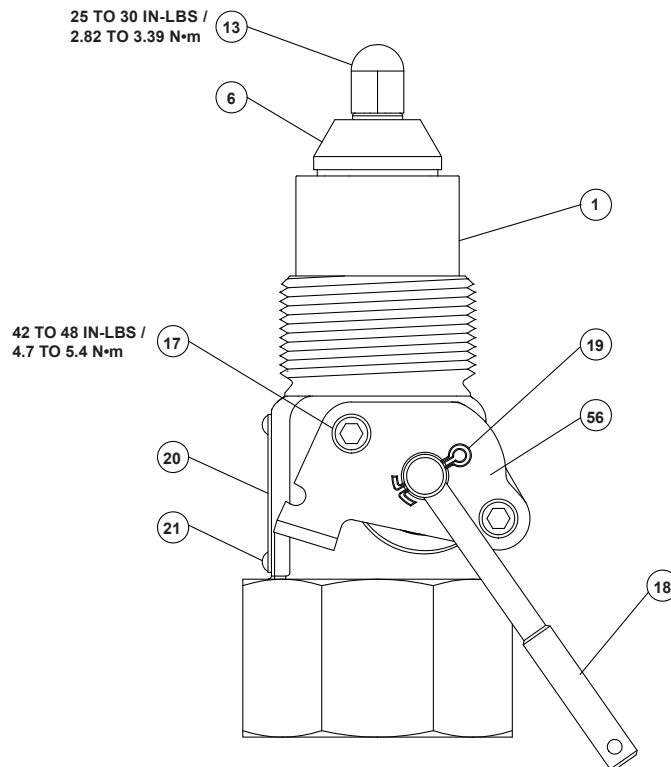
# Types C407-12 and C407-16



□ APPLY LUBRICANT OR THREADLOCKER<sup>(1)</sup>:  
 L = MULTI-PURPOSE PTFE GREASE  
 T = MEDIUM-STRENGTH THREADLOCKER

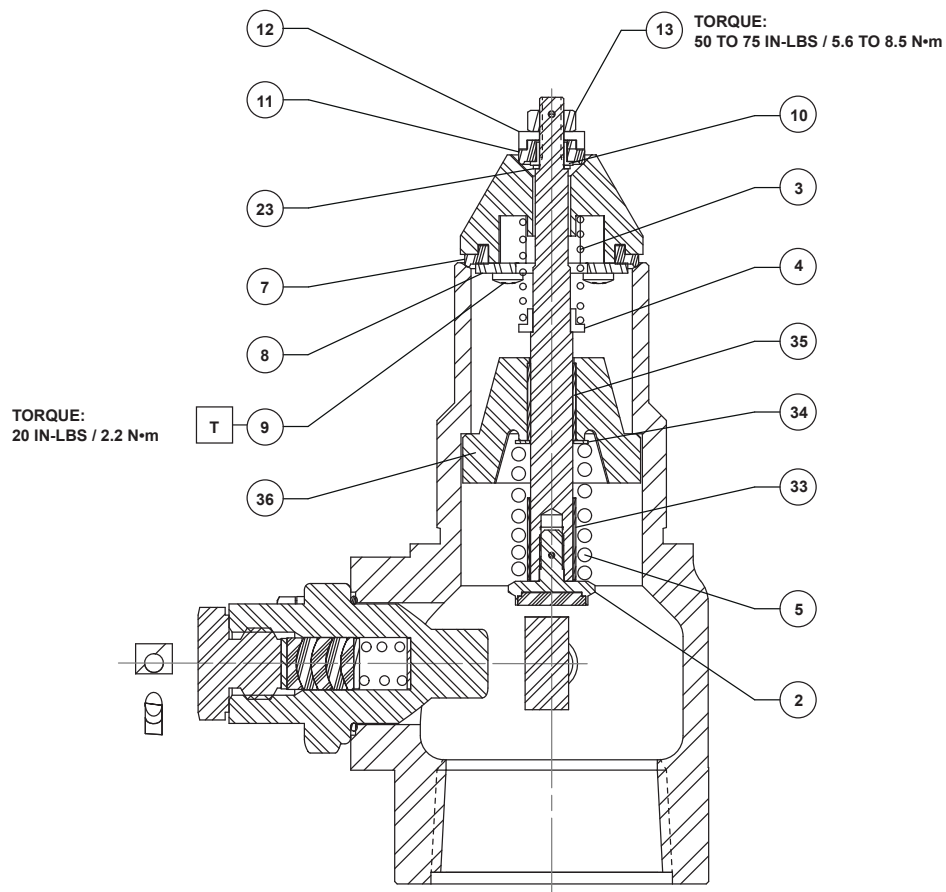
1. Lubricants and threadlockers must be selected such that they meet the temperature requirements.

**Figure 16. Type C407-12 Internal Valve Assembly Drawing**



**Figure 16. Type C407-12 Internal Valve Assembly Drawing (continued)**

# Types C407-12 and C407-16



□ APPLY THREADLOCKER<sup>(1)</sup>;  
T = MEDIUM-STRENGTH THREADLOCKER

1. Threadlockers must be selected such that they meet the temperature requirements.

**Figure 17. Type C407-16 Internal Valve Assembly Drawing**

# Types C407-12 and C407-16

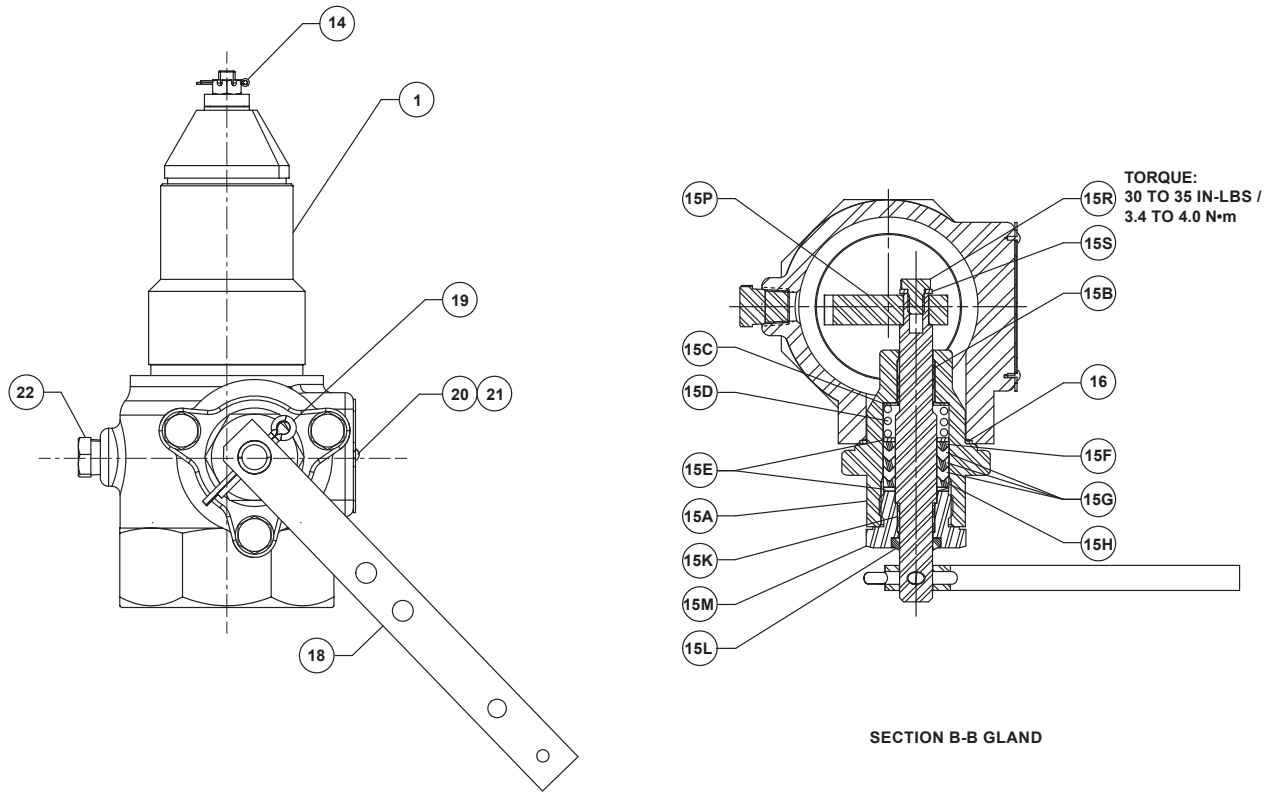


Figure 17. Type C407-16 Internal Valve Assembly Drawing (continued)

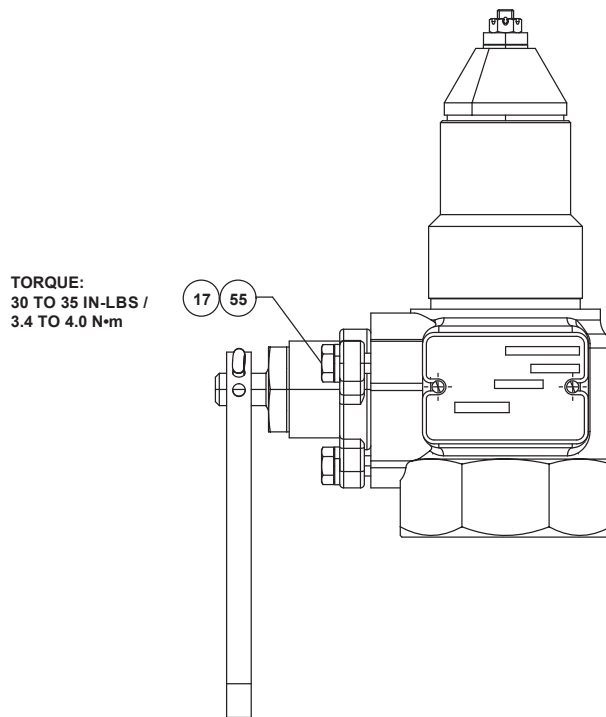


Figure 17. Type C407-16 Internal Valve Assembly Drawing (continued)

# Types C407-12 and C407-16

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