



**Maintenance and Testing Manual**  
For  
**Petroleum Cargo Tanks**  
**“SS” Series (Smart Vent, Under 1 Liter)**  
**16" and 20" Manhole Covers**  
**With 6600 Series Vent**



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Technical Bulletin 5-01

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# SECTION I

## PRODUCT DESCRIPTION

The Knappco 16" and 20" SS Series Manhole Covers (Smart Vent, Under 1 Liter leakage) are designed for use on Petroleum Cargo Tanks that must meet U.S. Department of Transportation 49 CFR 178.345-10 and 178.346-3 requirements for DOT 406 emergency venting and 49 CFR 178.345-5 for manhole strength requirements.

## PRODUCT IDENTIFICATION

The Knappco 16" and 20" SS Series Manhole Covers with the 6600 Series Vent may be identified as follows (See Figure 1):

<b>A.</b>	The fill cover (1) will have the following permanent markings: <b>KNAPPCO P/N 6600</b> <b>DOT 406 &lt;1 LITER</b>
<b>B.</b>	A Decal (2) will be present on the Strongback (3) stating the following: <b>DOT 406 SMART VENT LESS THAN 1 LITER</b>
<b>NOTE:</b>	<b>This new DOT 406 design possesses a motion control device that limits the amount of leakage in an overturn situation. In older designs, the function of the assembly may have been checked quickly by simply stepping on the Strongback to see if it compresses. This design <u>WILL NOT</u> compress immediately. Therefore, this procedure may not be used to verify vent operation.</b>

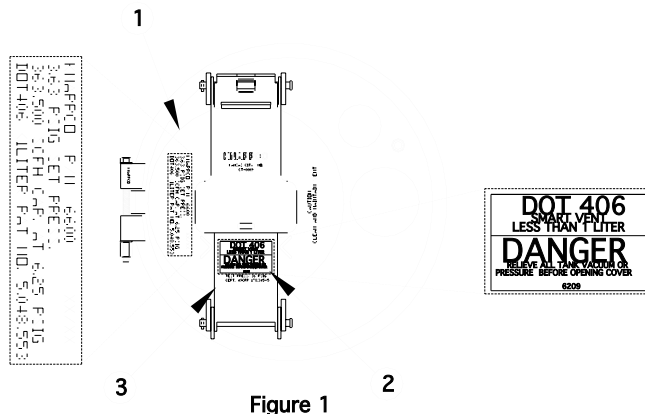


Figure 1

<b>NOTE:</b>	<b>This Maintenance Manual applies only to the Knappco SS Series Manholes with the 6600 Series Vent. If the manhole in question does not have the above-mentioned markings, this manual may not be used. Please contact Knappco for information on other maintenance manuals available for earlier products.</b>
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## **SECTION II**

### **MAINTENANCE, INSPECTION & TESTING SCHEDULE FOR 6600 SERIES EMERGENCY VENTS**

#### **US DOT Information**

<b>Inspection &amp; Test</b>	<b>Interval Period</b>	<b>CFR Section</b>
External Visual Inspection	1 Year	49CFR180.407(d)
Leakage Test	1 Year	49CFR180.407(h)
Pressure Retest	5 Year	49CFR180.407(g)

The maintenance schedule for the Knappco 16" and 20" SS Series Manholes with the 6600 Series Vent is as follows:

<b>1</b>	An external inspection must be performed quarterly (See page 4). <b>NOTE:</b> Knappco advises visual external inspection to be completed monthly.
<b>2.</b>	An internal inspection must be performed yearly (See pages 10-11).  However, if the product fails any portion of the quarterly inspection, it must be internally inspected immediately.
<b>NOTE:</b>	<b>In severe applications, (corrosive environments, wet or cold environments, etc.) the interval between inspections may need to be shortened, depending upon application. If the Manhole cover is covered by snow or ice, the cover must be cleaned and dry prior to inspection.</b>

The following materials will be required to complete the maintenance procedures covered in this bulletin:

- Loctite Brand 290 (Green) thread locker (or equivalent).
- Exxon Brand Ronnex MP Multi-Purpose grease (or equivalent).
- 1" Open End Wrench (or equivalent).

## **IMPORTANT**

**This manhole must be maintained on a regular basis to ensure proper operation. Failure to perform the scheduled maintenance covered in this bulletin may shorten the life of the product.**

# QUARTERLY EXTERNAL INSPECTION PROCEDURES

**WARNING! ALL INTERNAL TANK PRESSURE OR VACUUM MUST BE RELIEVED PRIOR TO SERVICING.**

	Being part of the annual visual inspection, 49CFR180.407(d) mandates that all pressure relief devices, be visually inspected for any corrosion or damage which may prevent the device from operating. If the tank is used to transport product which is harmful or corrosive to the relief device, the device must be removed from the tank for inspection and bench testing.
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1.	Review <b>Figure 2</b> before starting inspection.
2.	Unlatch Latch (4) and lay flat on cover.
3.	Open Fill cover assembly and rest Strongback (3) on clamp ring.
4.	Inspect Sealing Surface (5) of base cover for signs of damage, corroded areas, or any other conditions that may impair the manhole's product retention capability.
5.	Inspect the Fill cover Gasket (6) for any sign of wear or degradation (swelling, cracking). If gasket is worn it will need to be replaced.
6.	Inspect the Normal Vent Assembly (7) for cleanliness and gasket integrity.
7.	Next, inspect the area where the strongback shaft (3) goes into the fill cover. If there is an excess amount of grease on the shaft or the fill cover, this may indicate shaft seal (8) wear. Refer to Internal Inspection Procedures, Page 10, for seal replacement.
8.	Close the Fill cover assembly and re-latch the latch. If the latch does not clamp tightly down onto the Strongback the Fill cover assembly may need to be adjusted (See Fill cover Adjustment Procedures, page 7)

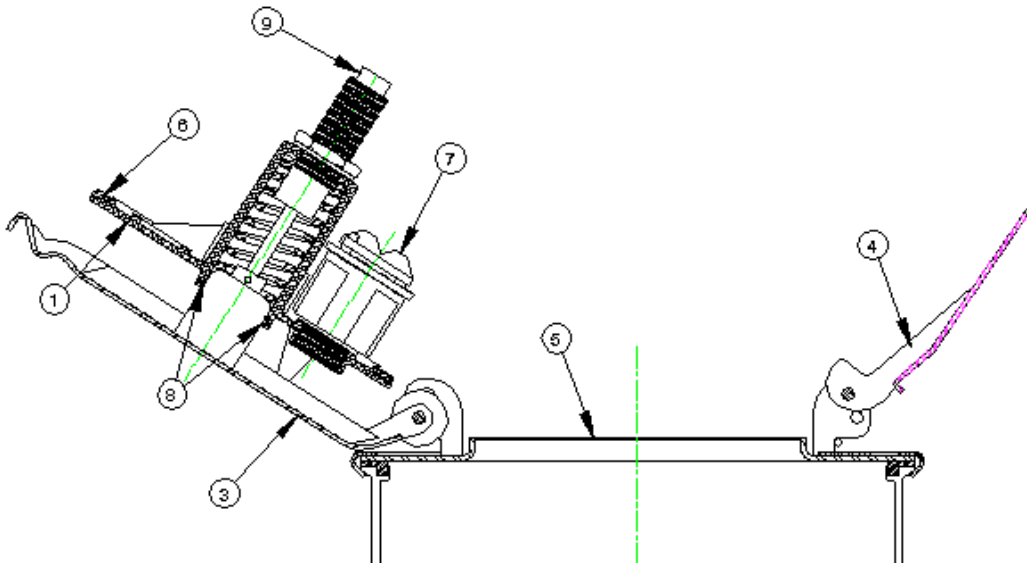


Figure 2

## LEAKAGE TEST

**WARNING! ALL INTERNAL TANK PRESSURE OR VACUUM MUST BE RELIEVED PRIOR TO SERVICING.**

	<p>Annual leakage test is covered by 49CFR180.407(h) which requires tanks to be tested annually at 80% of the tank design pressure or MAWP, whichever is listed on the tank specification or certification plate. Every component must remain in place for the duration of this test, except any re-closing pressure relief device with a set pressure less than the leakage test pressure must be removed or made inoperative during this test. All Knappco Normal Vents, consequently, need to be removed.</p> <p><b>Note: Refer to Figure 2a.</b></p>
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1.	Remove Normal Vent (3) from manhole cover and plug hole with Knappco Plug 5980 (1) and Gasket 3455 (2).
2.	Apply test pressure in accordance to 49CFR108.407(h).
3.	Check all gasket junctions on Emergency Vent and manhole for leaks. If Emergency Vent leaks, adjust as instructed in Section 3 of this manual, then retest the unit. Replace worn or damaged gaskets where needed.

## PRESSURE RETEST

**WARNING! ALL INTERNAL TANK PRESSURE OR VACUUM MUST BE RELIEVED PRIOR TO SERVICING.**

**CAUTION! KNAPPCO RECOMMENDS THAT THE 6600 SERIES COVERS ARE BENCH-TESTED EVERY 12-18 MONTHS.**

	<p>Pressure retest is covered by 49CFR180.407(g). Section 49CFR180.407(g)(1)(ii)(A) mandates all pressure relief devices be removed from the tank for inspection and bench testing to verify the relief device in operating correctly. The pressure retest and the relief device bench test must be performed at least every 5 years. <b>See Figure 2a.</b></p>
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1.	49CFR180.407(g)(1)(vii) requires all closures except pressure relief devices be in place for the duration of the test.
2.	Manholes must remain in place during pressure test.
3.	Open 10" fill cover.
4.	Insert Knappco Retest Fixture (Part No. 5800) (4) to seal the opening. <b>See Figure 2a.</b>
5.	All Knappco and Civacon Vapor Recovery Valves are to remain in place for the test. NOTE: If vapor recovery valves from other manufacturers are installed, refer to the manufacturer's instructions to see if they must be removed.

7.	After preparing the rest of the tank, perform the pressure test in accordance to the regulations. Inspect all parts of the manhole for leakage. Replace or repair parts as needed.
8.	Remove all clamps or plugs from relief valves, or reinstall relief valves, immediately after test is concluded.

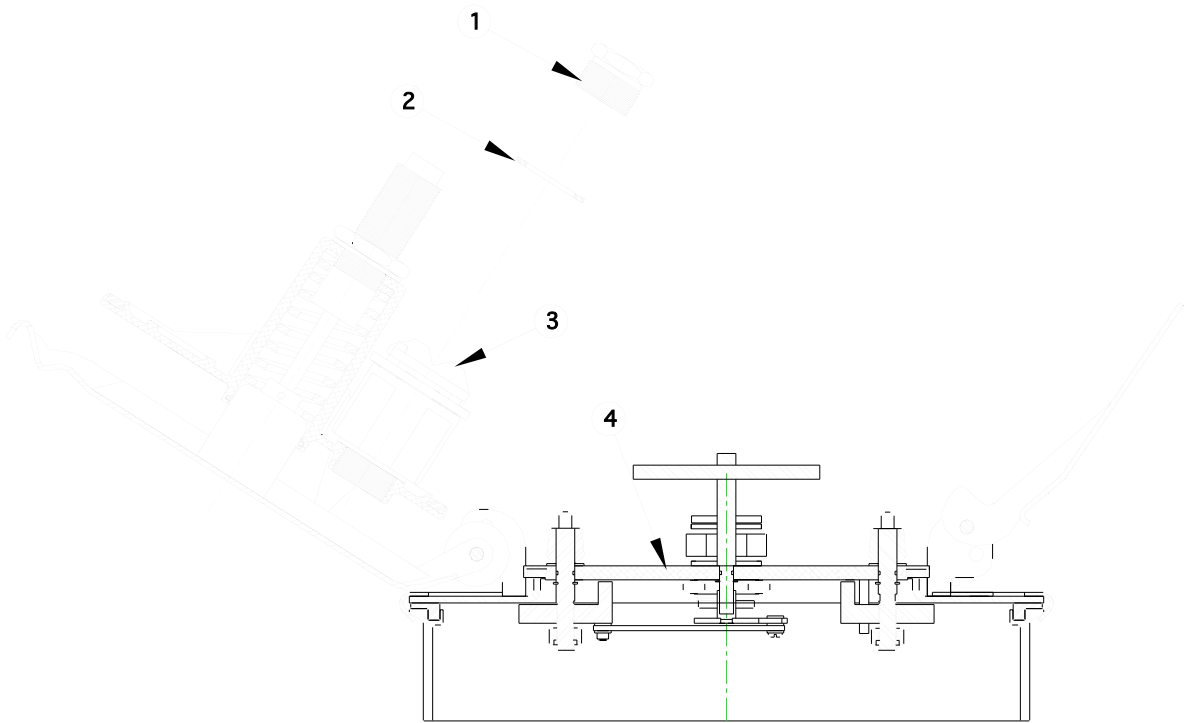


Figure 2a



## SECTION III

### FILL COVER ADJUSTMENT PROCEDURES

**WARNING! ALL INTERNAL TANK PRESSURE OR VACUUM MUST BE RELIEVED PRIOR TO SERVICING.**

1.	Review <b>Figures 3 and 4</b> before performing adjustment.
2.	Open Fill cover assembly and lay flat on Clamp ring (5) as shown.
3.	While holding Motion Control Device (M.C.D.) (10) stationary with Wrench, loosen Jam Nut (11) three full turns. This will allow you to adjust the M.C.D.
4.	Adjusting the M.C.D. in or out will affect the height of the Strongback (3) in relation to the Latch (4). The M.C.D. should be adjusted so that with the Fill cover assembly closed on the cover, the latch should just clear the safety catch portion of the Strongback (12).
<b>NOTE:</b>	<b>For Manholes with the Self Latching feature see Page 8 (Figure 5).</b>
5.	After adjustment is completed, tighten Jam Nut while holding M.C.D. stationary. Apply Loctite Brand 290 threadlocker to top of Jam Nut threads.
6.	Close and re-latch the Latch. The Latch should clamp down tight to the top of the Strongback.
<b>NOTE:</b>	<b>If the Latch does not clamp down tightly or opens easily without effort, repeat steps 1 through 6 until properly adjusted.</b>

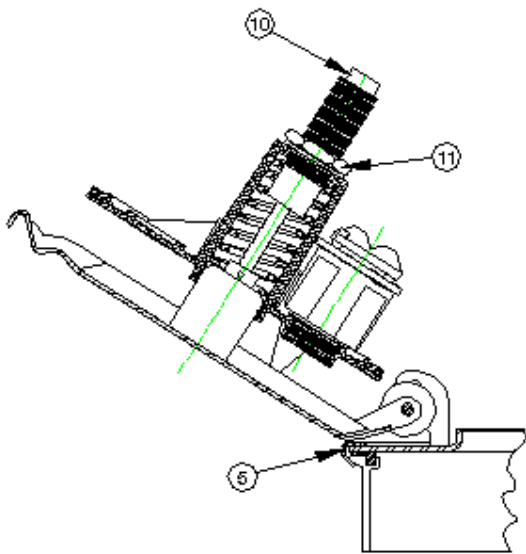


Figure 3

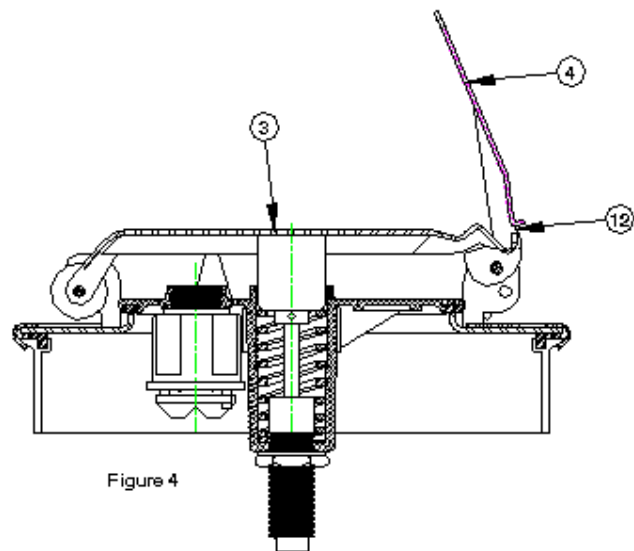
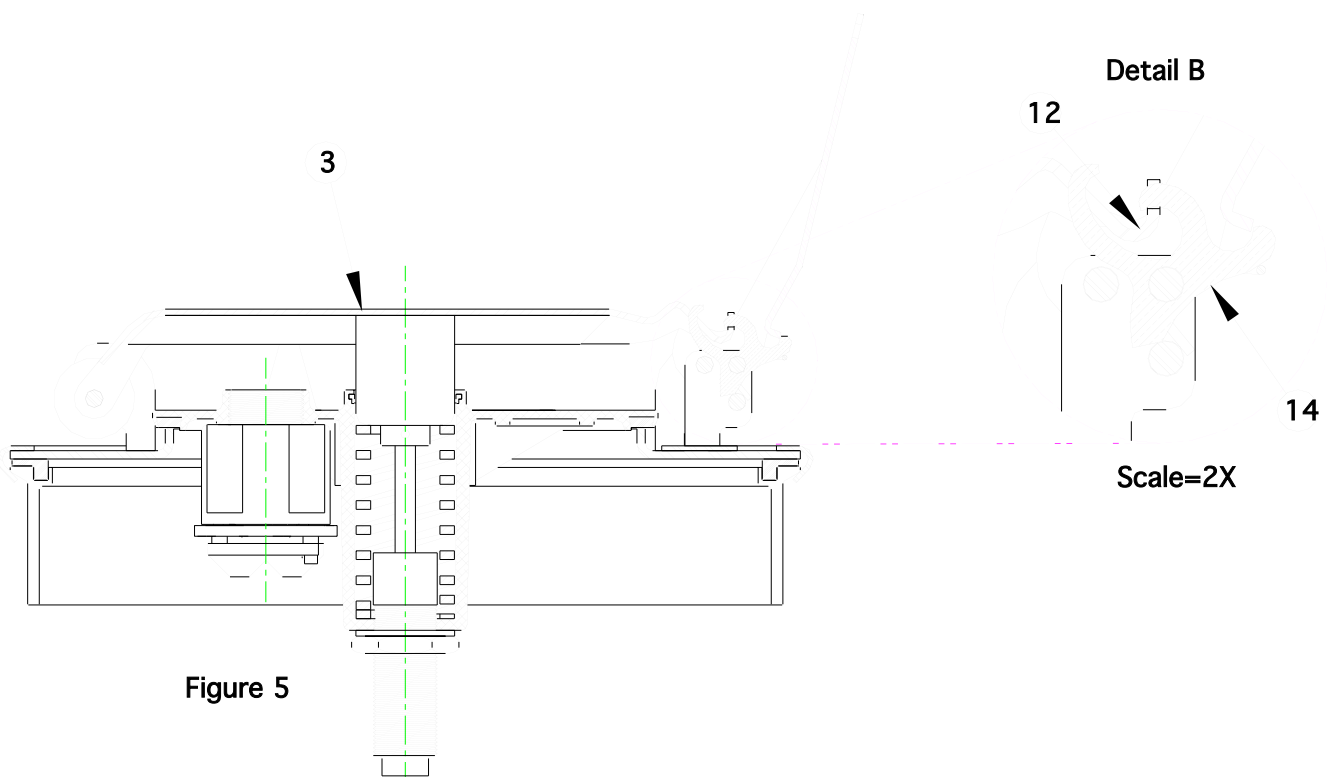


Figure 4

# FILL COVER ADJUSTMENT PROCEDURES (SELF-LATCHING)

**WARNING! ALL INTERNAL TANK PRESSURE OR VACUUM MUST BE RELIEVED PRIOR TO SERVICING.**

<b>1.</b>	Review <b>Figure 5</b> before performing adjustment.
<b>2.</b>	Open Fill cover assembly and loosen jam nut as instructed on Page 7, Step 3.
<b>3.</b>	Adjusting the M.C.D. in or out will affect the height of the Strongback (3) in relation to the Self Latch Hook (14). The M.C.D. should be adjusted so that with the Fill cover assembly closed on the cover, the Self Latch Hook rests on the safety catch portion of the Strongback (12) (See Detail B).
<b>4.</b>	After adjusting, open and close Fill cover assembly repeatedly to ensure the self latching mechanism is working properly.
<b>5.</b>	Re-secure jam nut as instructed on Page 7, Step 5.
<b>6.</b>	Close and re-latch the latch. The latch should clamp down tight to the top of the Strongback.
<b>NOTE:</b>	If the Latch does not clamp down tightly or opens easily without effort, repeat steps 1 through 6 until properly adjusted.





## SECTION V

### YEARLY INTERNAL INSPECTION

1.	Review <b>Figure 7</b> (Page 11) before performing inspection.
2.	While holding Motion Control Device (M.C.D.) (7) stationary with Wrench, remove Jam Nut (1) and Seal Washer (2) and set aside.
3.	Using wrench, screw M.C.D. in towards bottom of Fill cover (3) until Fill cover becomes separated from Strongback (9). Lift Fill cover away and set aside.
4.	Check Spring (6) for any signs of rusting or wear. If so, Spring must be replaced.
5.	Inspect the Motion Control Device (M.C.D.) for signs of wear or fluid leakage paying close attention to the pinned connection between the M.C.D. and the Strongback(9).
<b>NOTE:</b>	<b>If the pinned connection is damaged in any way (worn pin, worn hole in piston rod, bent rod, etc.) or if there are any signs of fluid leakage on the rod, the M.C.D. and the Drive-Lok Pin (21) must be replaced. If the M.C.D. is replaced, do so by driving the Pin (8) out of the strongback. Remove and replace M.C.D. Apply Multi-Purpose grease to rod end of new M.C.D., insert new Drive-Lok Pin(8), and drive pin flush.</b>
6.	Test the operation of the M.C.D. by placing the Strongback/M.C.D. Assembly on a flat surface, applying a constant force of approximately 20-25lbs to the top of the M.C.D. The M.C.D. should compress approximately ½ inch over a duration of 10 seconds. If it does not compress, or compresses immediately without delay, it will need to be replaced.
<b>NOTE:</b>	<b>The M.C.D. is self contained and may not be disassembled or maintained in any way. If the M.C.D. is defective, it MUST be replaced.</b>
7.	Inspect the Strongback (9) for any signs of corrosion. If so, replace.
8.	Check the Seal (4) for any sign of wear that might affect it's sealing ability. If so, replace.
9.	Check the Fill cover (3), paying close attention to the springwell portion that houses the Spring (6) for signs of corrosion. If corrosion is found the Fill cover will need to be replaced.
10.	Place Spring (6) on the Strongback (9). Apply grease to O.D. of Spring and I.D. of springwell of strongback and then place Fill cover (3) over the spring.
<b>NOTE:</b>	<b>Due to spring tolerances, some assemblies may have a Spacer (5) between the Spring and the bottom of the Fill cover. If the assembly has this spacer, when assembling the spacer must be placed in it's original location between the spring and the Fill cover (See Figure 7, page 11). If the spacer is placed in any other location, the Smart Vent may lock up during assembly, causing severe damage to the vent.</b>
11.	Screw the M.C.D. through the Fill cover using the Spanner Wrench. Continue to screw the M.C.D. through until approximately 2 ½" of the M.C.D. is exposed.
<b>NOTE:</b>	<b>When assembling, care must be taken to ensure the Centering Ears (11) on the Fill cover straddle the strongback(9). If the ears are not straddling the strongback when assembled, they may hang up on the bottom of the strongback, causing severe damage to the vent. (See Figure 7, page 9)</b>
12.	Check Seal Washer (2) for signs of wear or degradation. If the seal is cracked or separated from washer material, it must be replaced.
13.	Install Seal Washer (2) and Jam Nut (1) onto M.C.D. and adjust Fill cover Assembly following the steps covered on page 7 (Fill cover Adjustment Procedure).

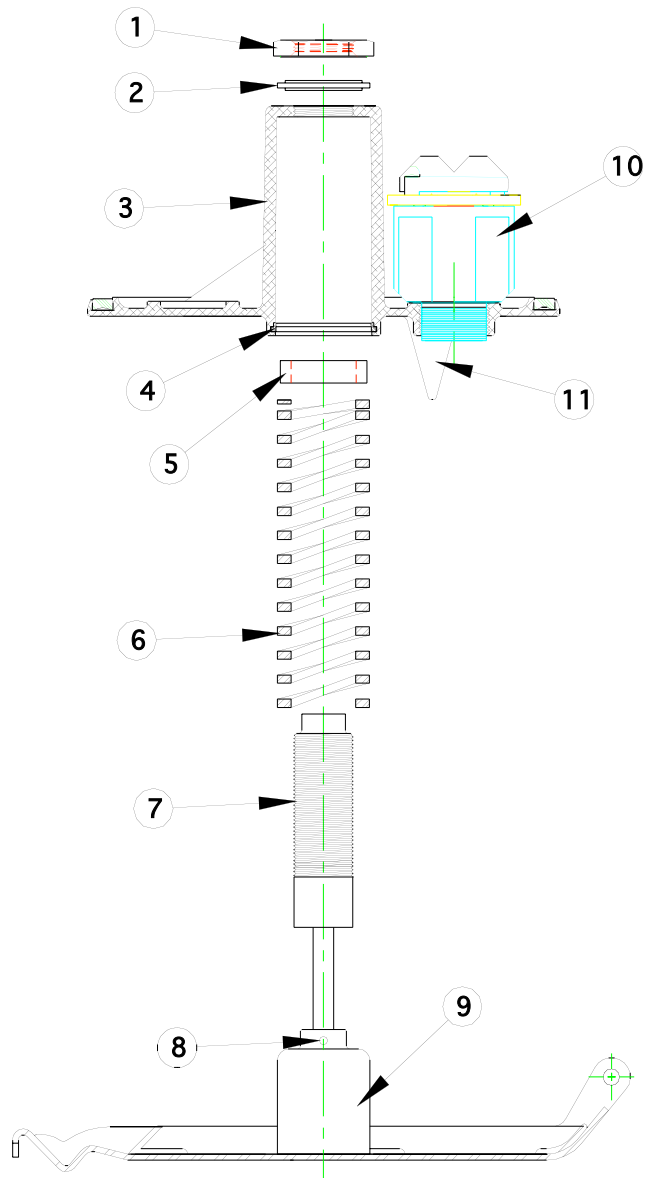


Figure 7