



Prover Leak Detector Kit  
Installation and Operating Manual

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Part Number: 000-109343-DOC Rev A

5225 South 37<sup>th</sup> St. Suite 4 Phoenix, AZ 85040 Phone (602) 233-9885 Fax (602) 233-9887

Website: [www.FlowMD.com](http://www.FlowMD.com)

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## Introduction

The Prover Leak Detector Kit manufactured by Flow Management Devices, LLC (Flow MD)™ will require trained and qualified personal with safety training and common sense to install and operate this equipment. This manual will cover the installation and operation of the leak detector kit in detail.

Specification

1. Standard Material of Construction
  - a. Leak detector kit components use 304 SS and carbon steel materials.
  
2. Technical Specification
  - a. Designed and manufactured in the United States
  - b. Industry standard double chronometry per API 4.6
  - c. Conforms to API 4.2 "Displacement Provers"
  - d. Designed for Class 1 Div 1 environments
  - e. NACE compliant

Relevant Standards-

API MPMS 4.8 "Operation of Prover"

ASME B2D

API 520 Sections (3.8), Equation (3.9)

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## ***Safety Notes-***

Prior to operating the FMD Leak Detector Kit read the user manual completely! Failure to comprehend this material may result in personal injury and damage to the Prover. Warranty may be voided if the instructions are not followed properly.

- Verify that all the connection and mounting hardware are of appropriate strength and length and are torque to the specification
- Pressurize the system slowly and per code to avoid any shock to the Prover and or cause harm to the operators
- Verify that the system is depressurized prior to opening the vent or drain valves
- Use of this equipment for any use other than its intended purpose may result in product damage or personal injury or death

If any one item from above list is not clear, please contact

Flow Management Devices LLC

602-233-9885

### **WARNINGS-**

#### **YOUR SAFETY IS VERY IMPORTANT**

**Moving Parts-** FMD-XXX contains many moving parts that can cause serious injury and dismemberment

- Do not operate with open enclosures and covers (leak detecting test will require open cover)
- Any unauthorized modification to the mechanical parts or improper installation will void the warranty

Leak Detector Kits are available to assist in preventative maintenance.

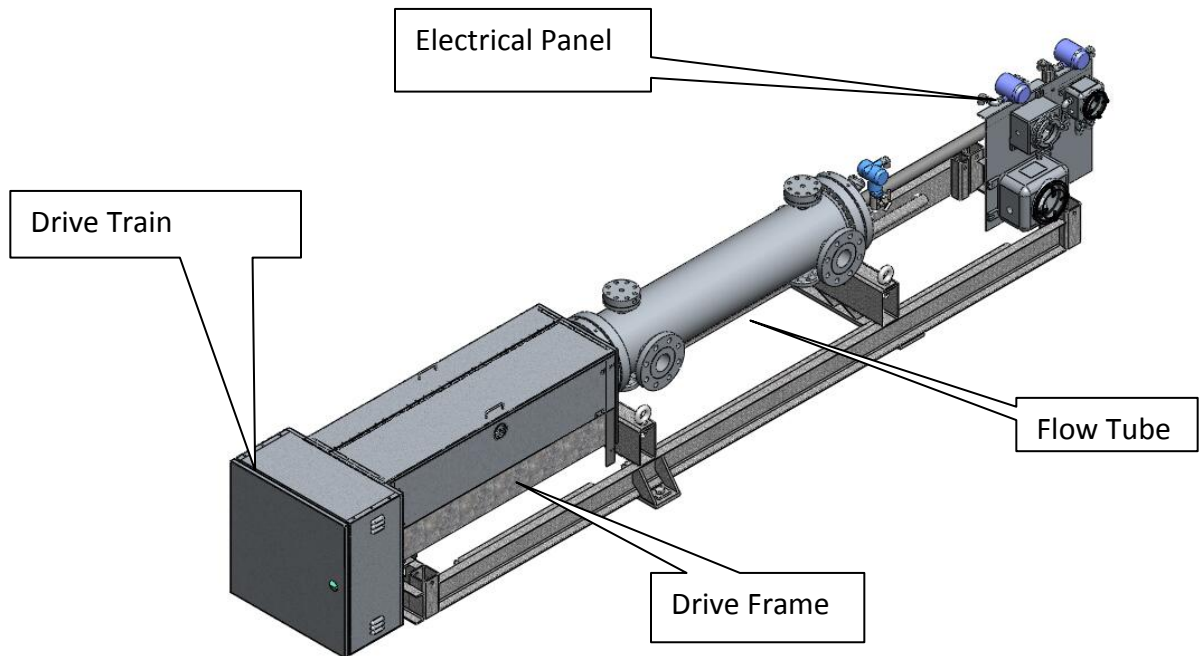
- 1) **Preventive Maintenance-** A schedule of planned maintenance aimed at the prevention of breakdowns and failures. The primary goal of preventive maintenance on an FMD Prover is to help prolong the life of the mechanical parts and to ensure accurate and reliable operation.

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**Figure 1 - FMD-XXX, overall view**

Following, in Figure 2, is a list of Prover sizes. There are five distinct Leak Detector Kits discussed in this manual that cover the Prover sizes listed. The Leak Detector Kit parts numbers are as follows:

- C01-000140-000 (FMD-003, FMD-007)
- C01-000263-000 (FMD-015, FMD-035)
- C01-000336-000 (FMD-C25)
- C01-000222-000 (FMD-060, FMD-090)
- C01-000061-000 (FMD-130, FMD -200)

## FMD Prover Model Numbers

MODEL NUMBER	MAX FLOW RATE GALONS/MIN	MAX FLOW RATE BARRELS/HR	MAX FLOW RATE METERS <sup>3</sup> /HR	DISPLACED VOLUME GALLONS	FLANGE SIZE (STANDARD)
FMD-007	700	1000	150	5	3"
FMD-015	1,500	2,100	330	10	4"
FMD-025	2,500	3,570	560	20	6"
FMD-035	3,500	5,000	790	25	6"
FMD-A35	3,500	5,000	790	25	8"
FMD-060	6,000	8,500	1,350	40	10"
FMD-090	9,000	12,850	2,000	75	12"
FMD-130	13,000	18,500	2,900	90	16"
FMD-200	20,000	28,500	4,500	140	20"

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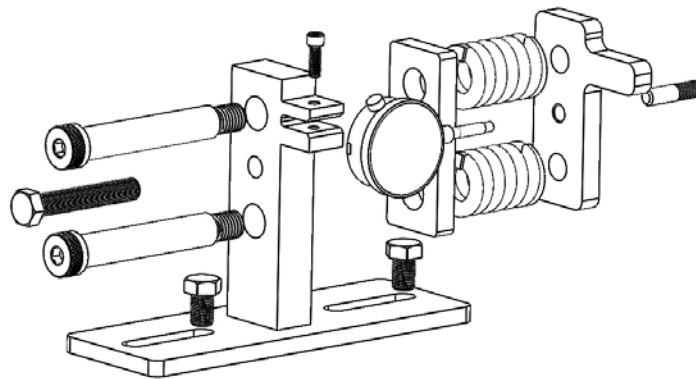
Figure 2 - Prover Model Table

## Overview

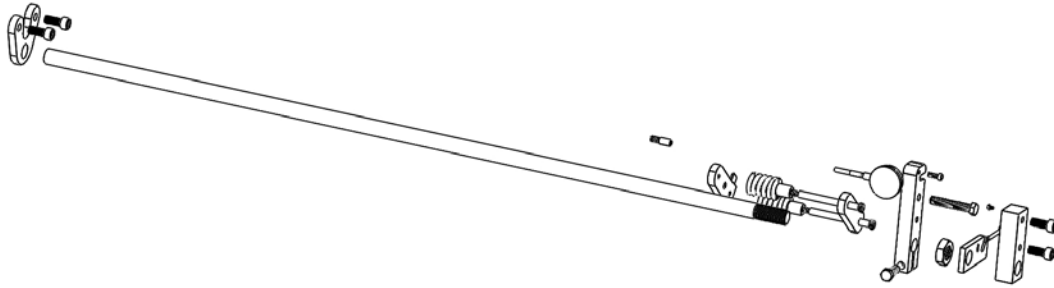
**Differential Pressure Leak Detector**-The purpose of this test is to verify the integrity of piston and poppet seals. The leak detector kit is an option and includes the following:

- Qty 1 each differential pressure gauge
- Qty 2 each braided pressure hose
- Qty 1 each dial indicator
- Qty 1 each indicator extender
- Qty 1 each shaft
- Qty 2 each upstream and downstream attachments
- Qty 1 each leak detector pressure assembly

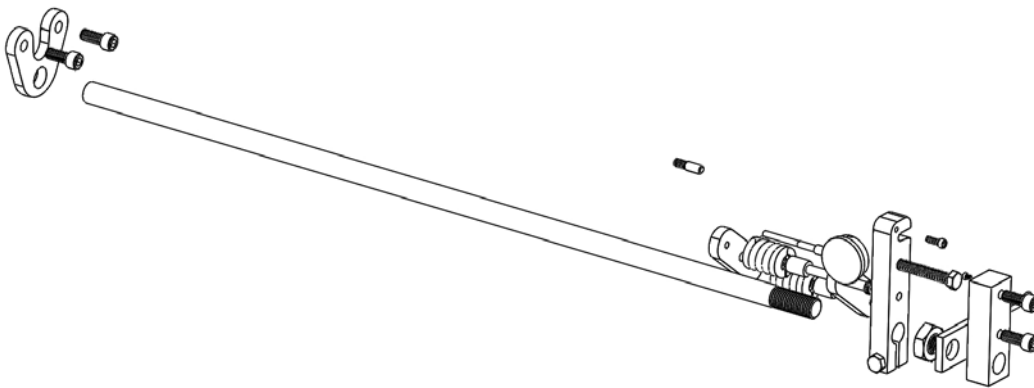
If Prover comes assembled with Leak detector kit, skip to step 2. For installation instructions see the following section. Exploded views of the internally mounted parts for the Prover Leak Detector Kits are shown in the following figures:



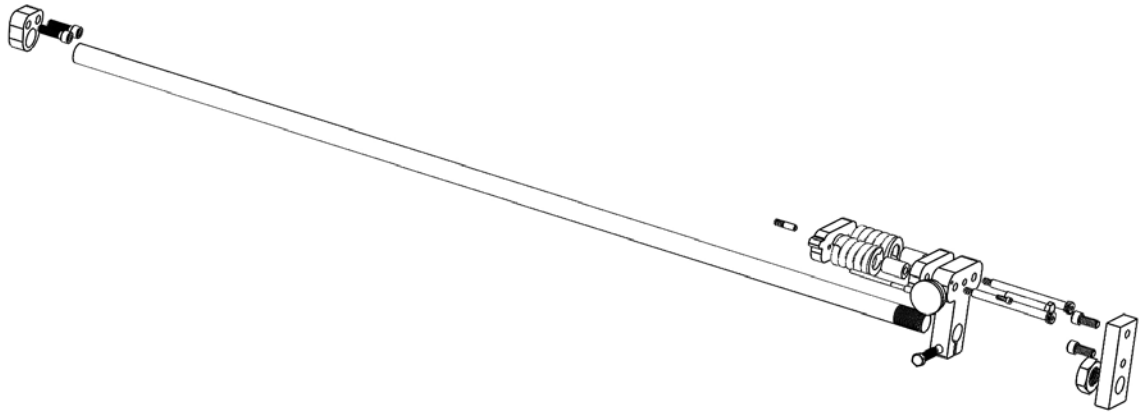
**Figure 3 - C01-000140-000 for FMD-003 and -007**



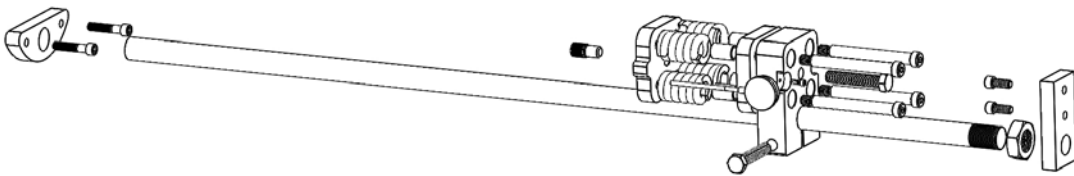
**Figure 4 - C01-000263-000 for FMD-015 and -035**



**Figure 5 - C01-000336-000 for FMD-C25**



**Figure 6 - C01-000222-000 for FMD-060 and 090**



**Figure 7 - C01-000061-000 for FMD-130 and -200**



## Step 1: Installation

### Hardware list

Verify the hardware in the kit. This hardware list is also provided to list replacement hardware pieces if necessary. The hardware kits are listed below:

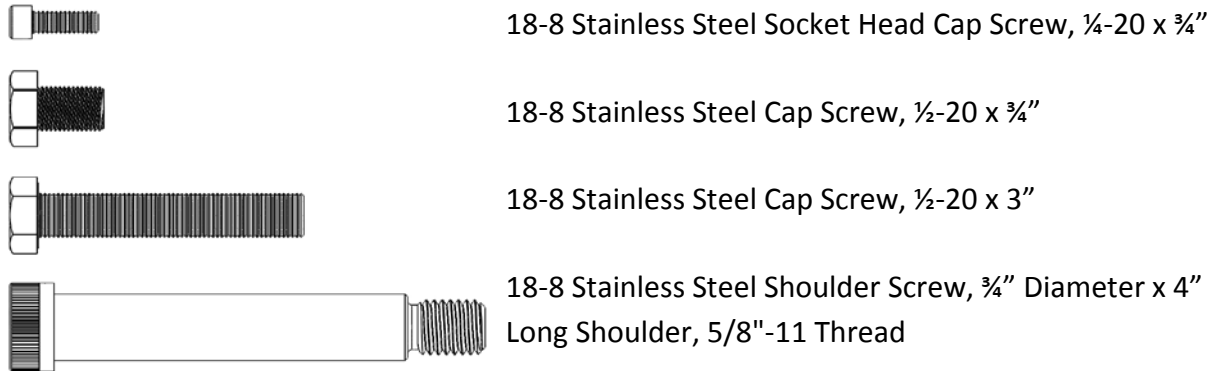


Figure 8 - C01-000140-000 Hardware kit

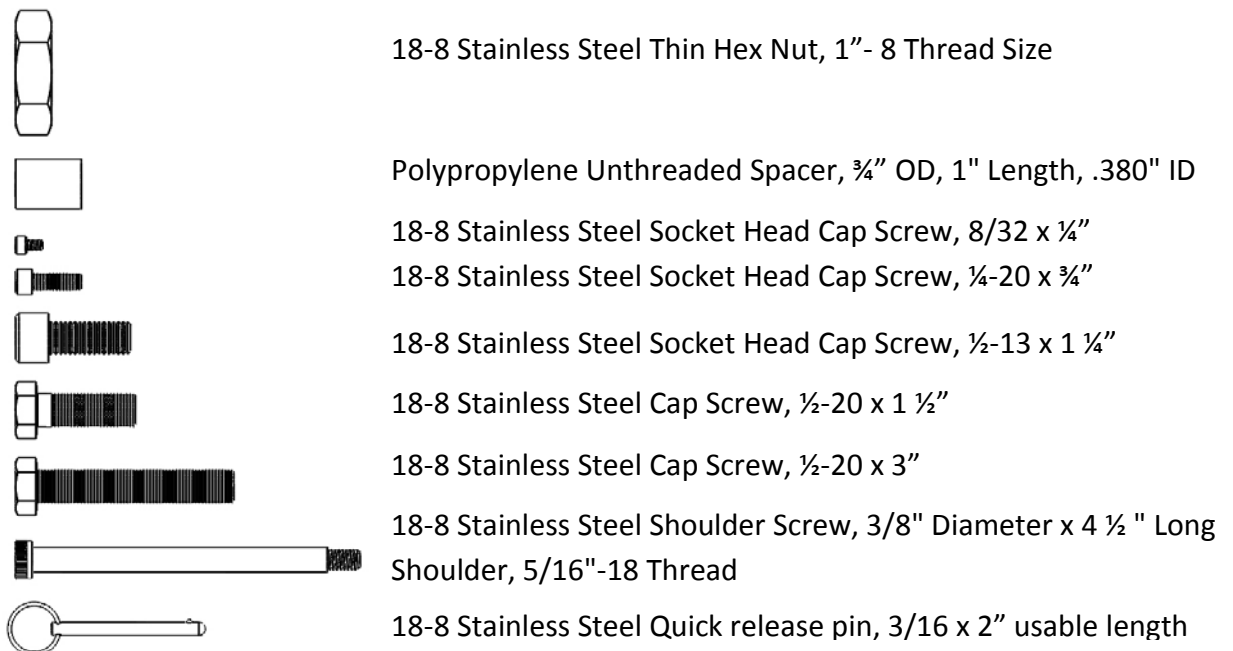
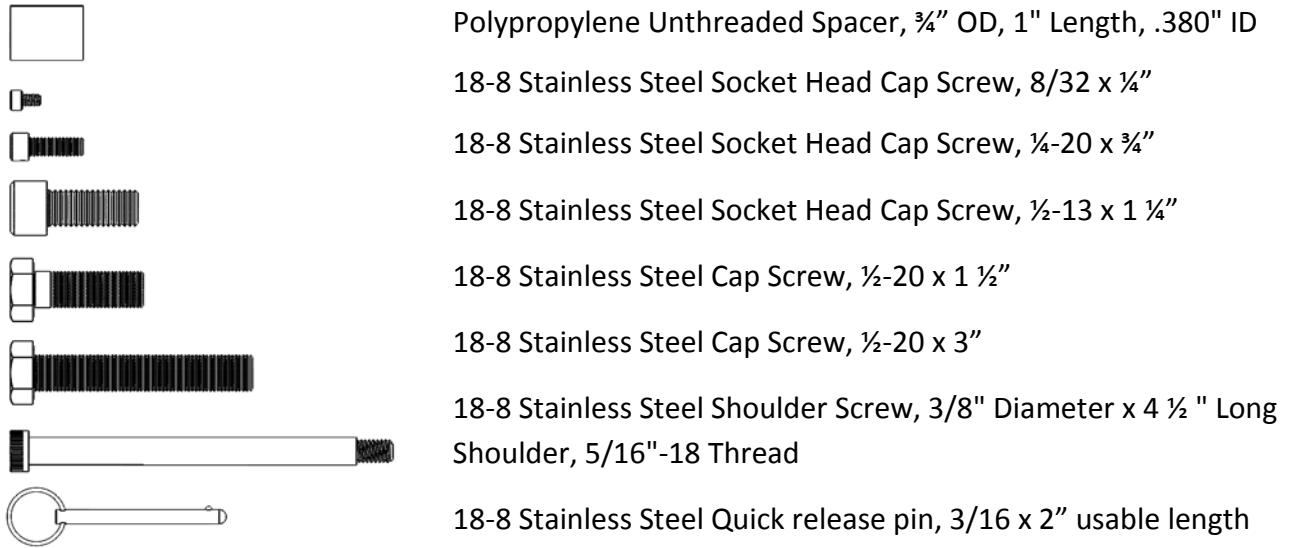
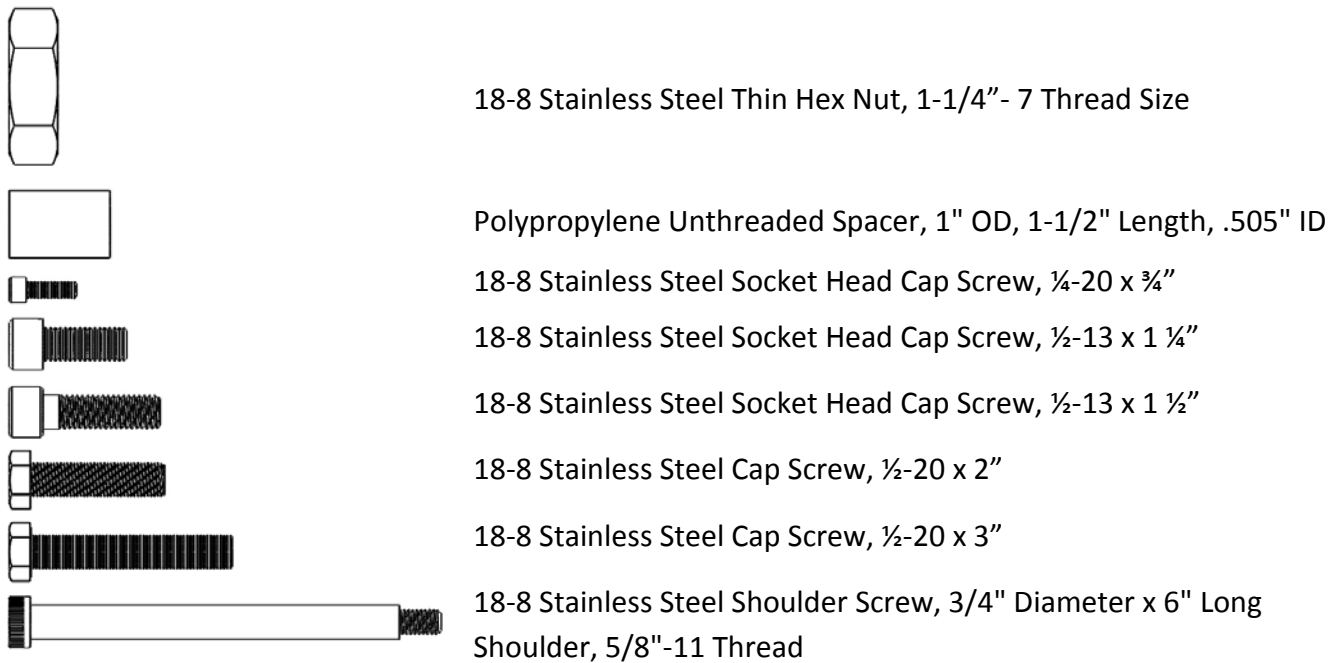


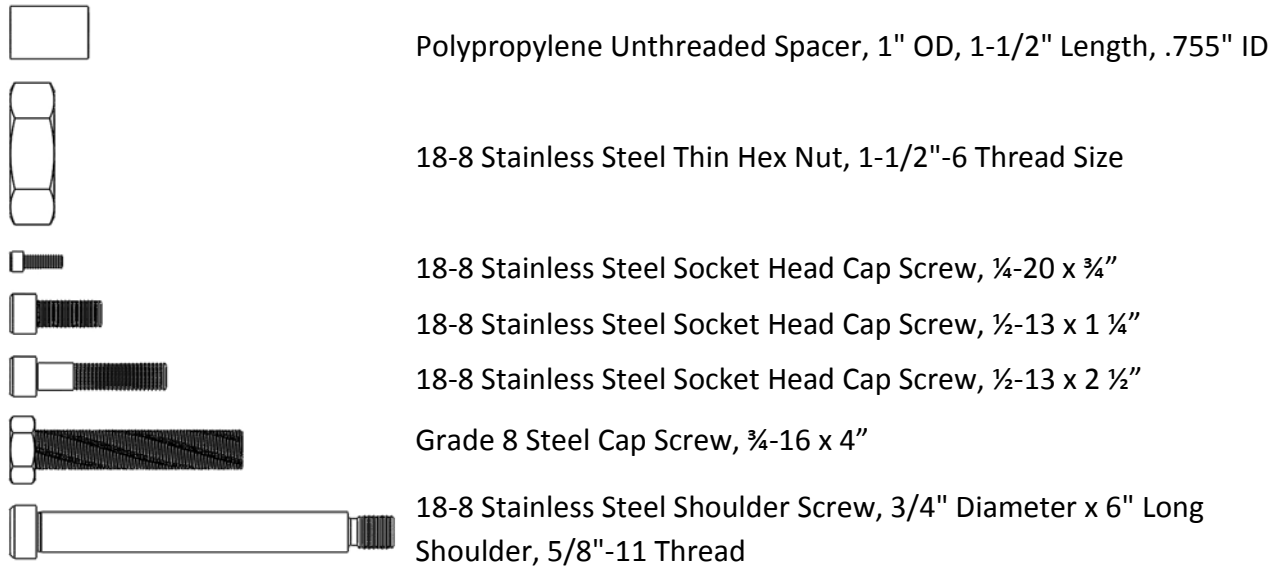
Figure 9 - C01-000263-000 Hardware kit



**Figure 10 C01-000336-000 Hardware kit**



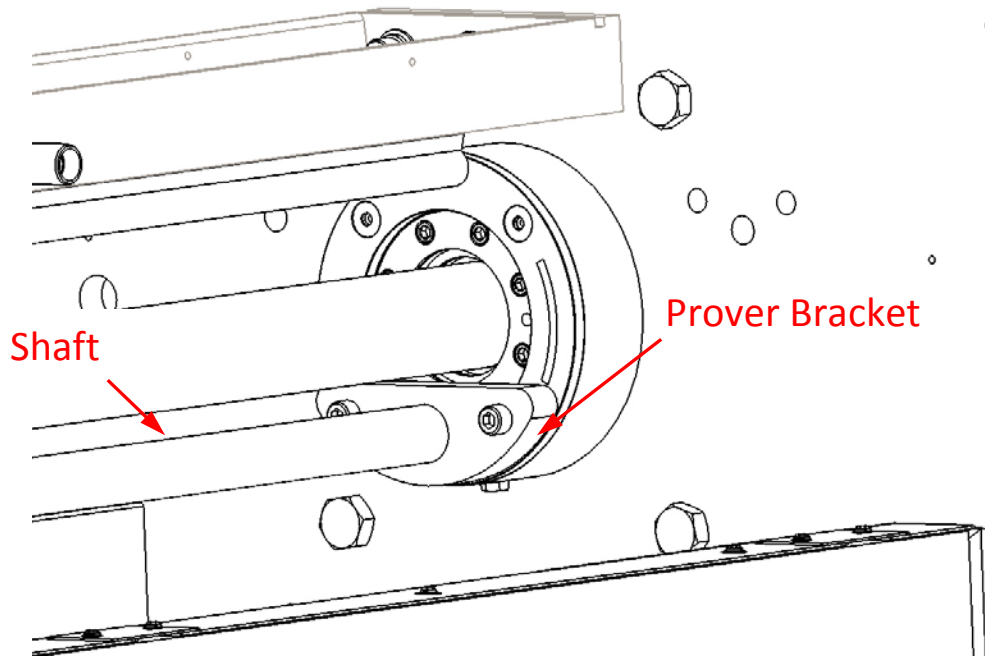
**Figure 11 - C01-000222-000 Hardware kit**



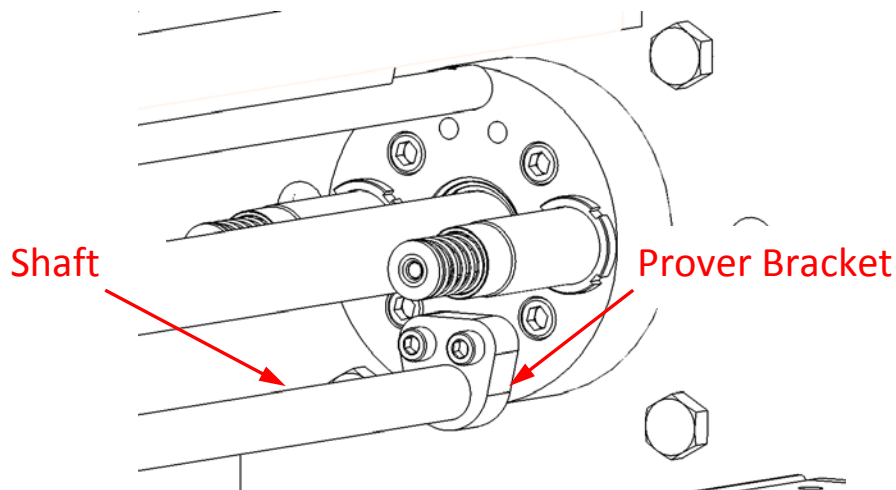
**Figure 12 - C01-000061-000 Hardware kit**

### ***Mount Installation***

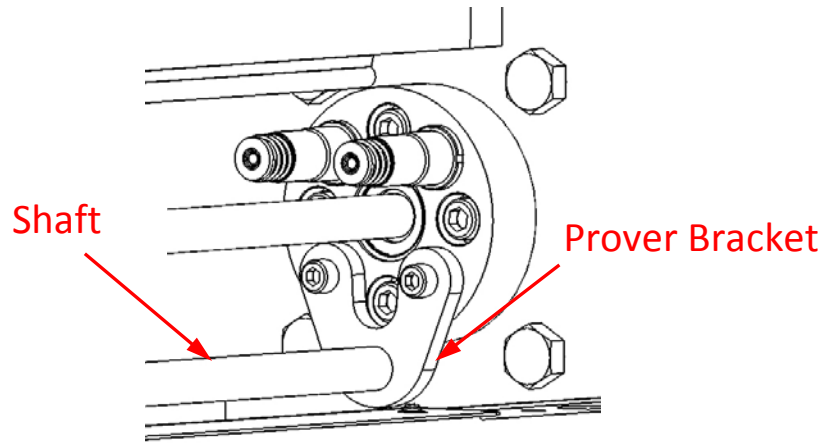
All leak detector kits, with the exception of C01-000140-000, mount to a shaft that is bolted between the Prover and drive plate. Examples of the shaft mounts are shown in the following figures.



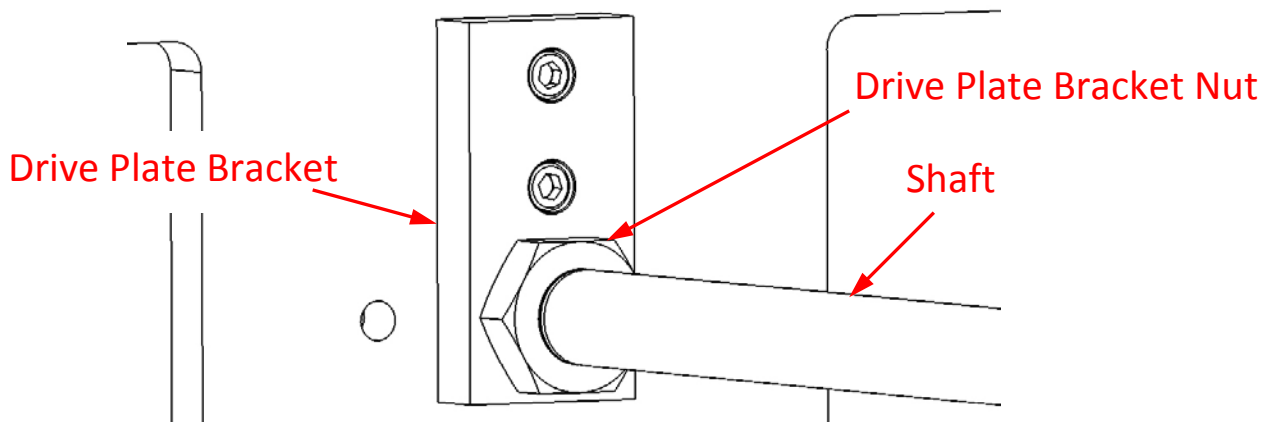
**Figure 13 – Prover Plate Mount, C01-00061-000**



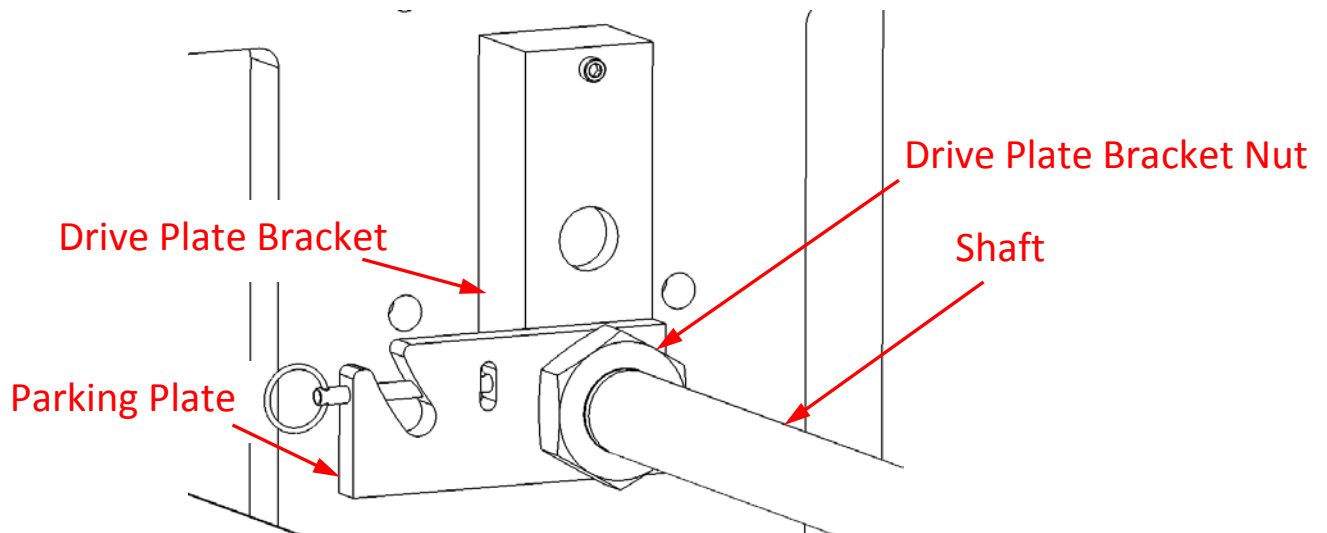
**Figure 14 – Prover Plate Mount for C01-000222**



**Figure 15 – Prover Plate Mount for C01-000263-000 and C01-000336-000**



**Figure 16 – Drive Plate Mount for C01-000061-000 and C01-000222-000**

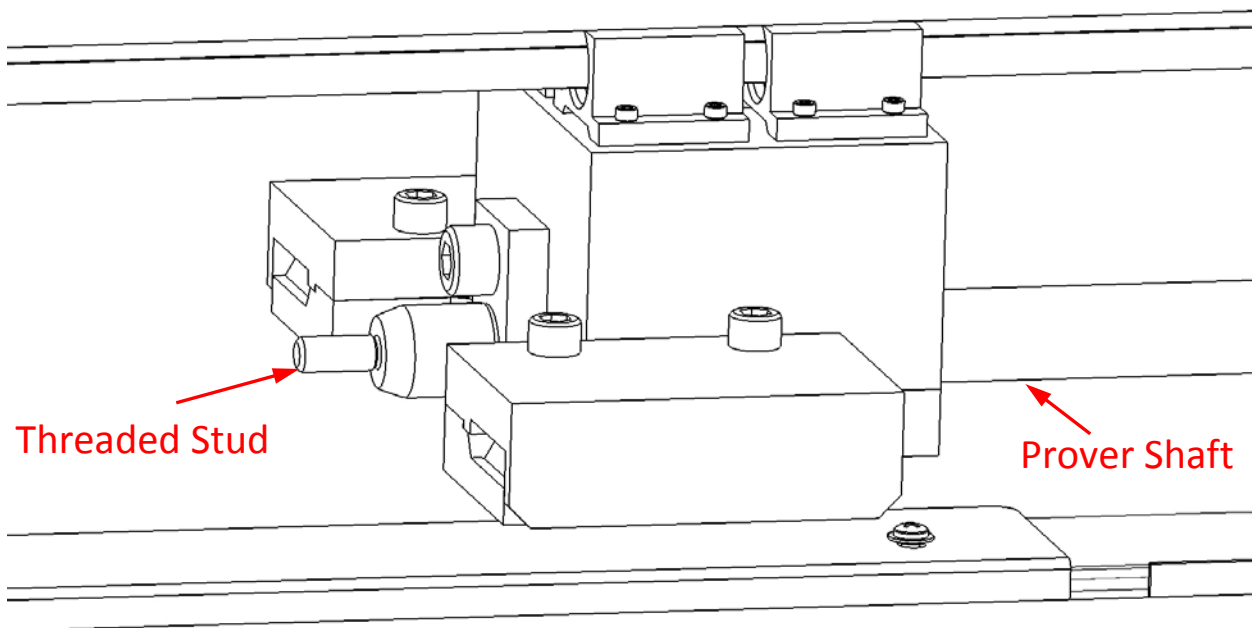


**Figure 17 – Drive Plate Mount for C01-000336-000 and C01-000263-000**

For all Leak Detector Kits except for C01-000140-000 for the FMD-003 and FMD-007, mount the Prover bracket side first with 2 socket head screws (included). Insert the leak detector kit shaft into the Prover Plate mount as shown in Figure 13 Figure 14 or Figure 15, with the leak detector assembly slid onto the shaft and the drive plate end bracket and nut already installed. The leak detector assembly does not need to be tightened down at this stage. Since the only way to install this assembly is from either end of the shaft, both of which will be mounted, the assembly must be on the shaft prior to installation. Bolt the bracket into the drive plate. Rotate the shaft until it fits tightly between both plates and tighten the drive plate bracket nut against the drive plate end bracket. For Leak Detector Kits PN C01-000336-000 and C01-000263-000 the assembly includes a Leak Detector Parking Plate, shown in Figure 17. Verify that the plate is oriented as shown for proper function. The drive plate brackets for these two Leak Detector Kits are bolted in from the back side through the drive plate. The mounted bracket should look like Figure 16 or Figure 17. Check to make sure brackets are bolted flush to the plates.

### ***Leak Detector Installation***

Install the threaded stud at the end of the Prover shaft as shown in Figure 18.



**Figure 18 – Threaded Stud**

### **Stowed Positions**

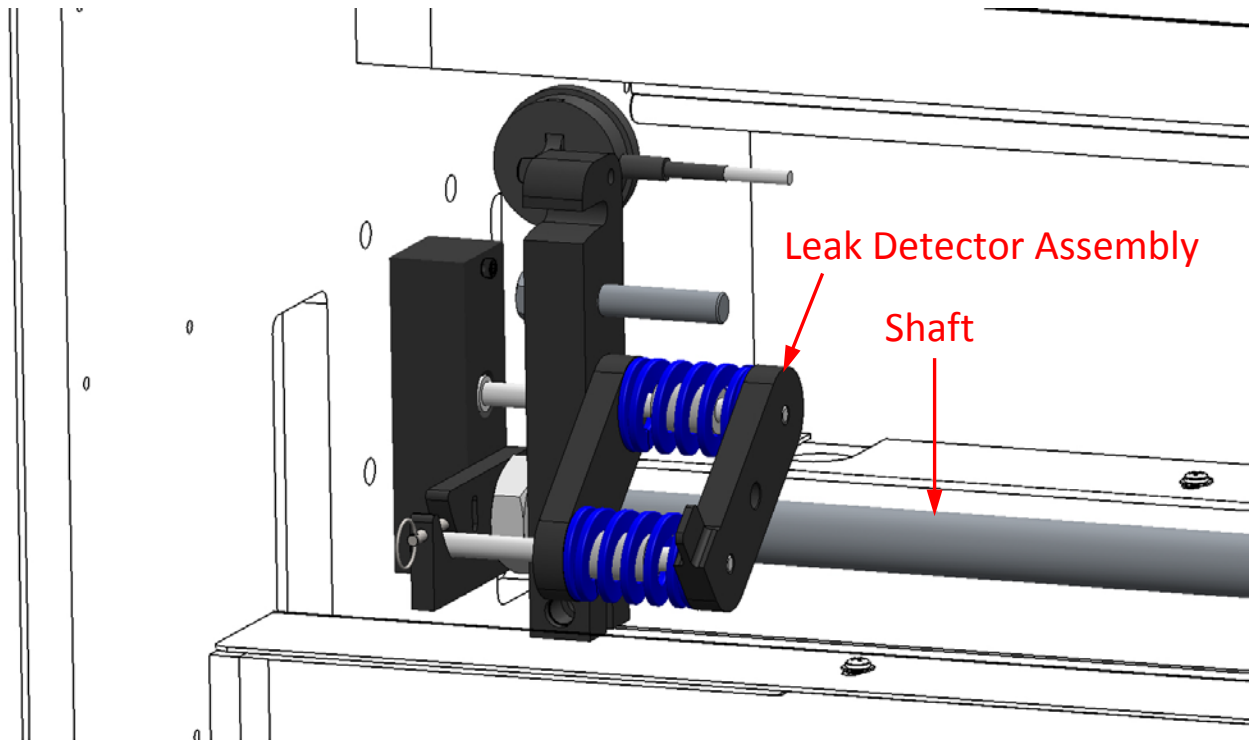
Only Leak detector assemblies C01-000336-000 and C01-000263-000 have a fold down stowage position. Install the Leak Detector Assembly such that the shoulder bolt rests in the pin cavity and insert pin as shown in Figure 19.

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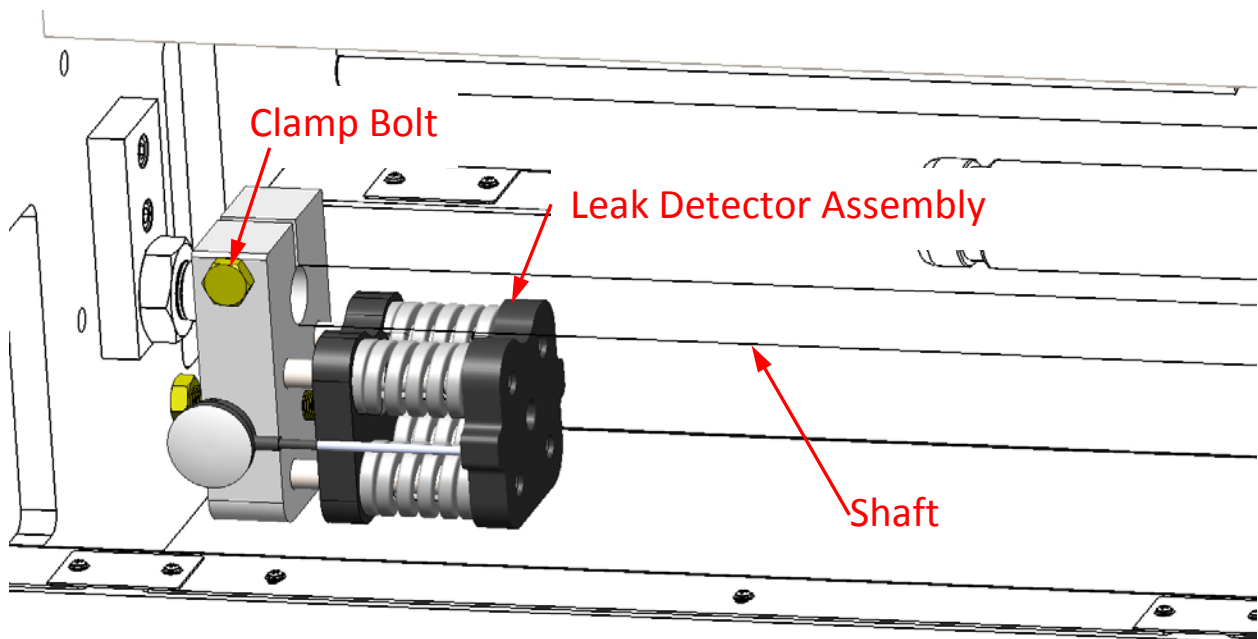
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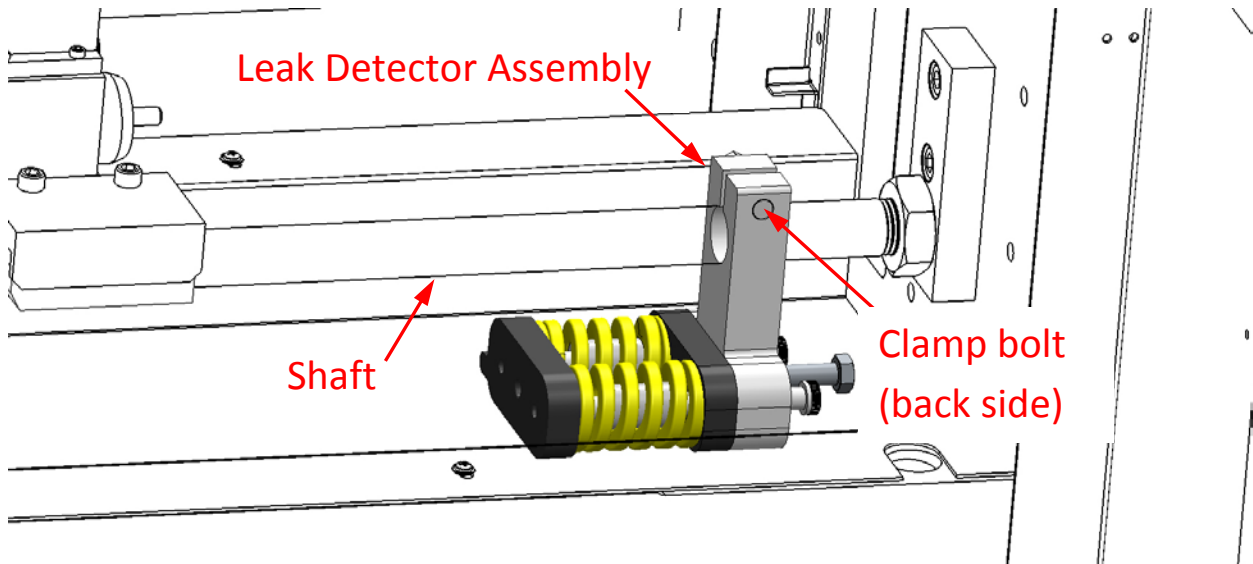


**Figure 19 – Leak Detector Mount C01-000336-000 and C01-000263-000**

For the other shaft mounted Leak Detector Kits, mount the leak detector assembly on the underside of the shaft for the stowed position, as shown in Figure 20 and Figure 21.



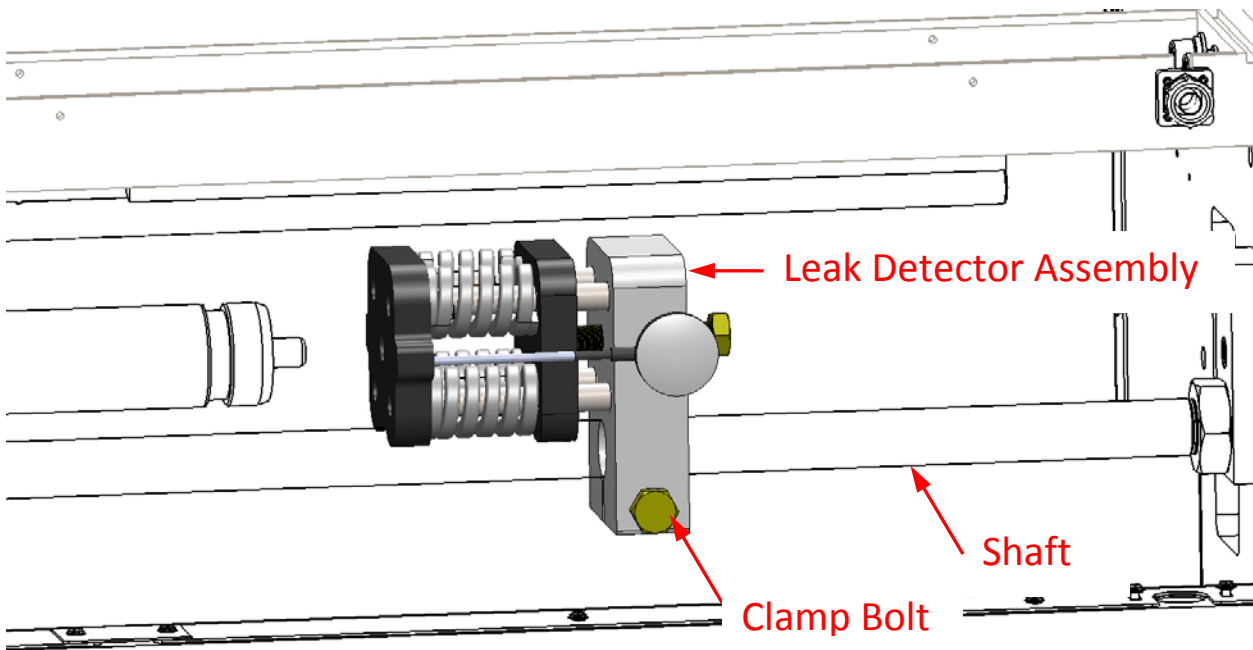
**Figure 20 - Leak Detector Mount C01-000061-000, Stowed Position**



**Figure 21 - Leak Detector Mount C01-000222-000, Stowed Position**

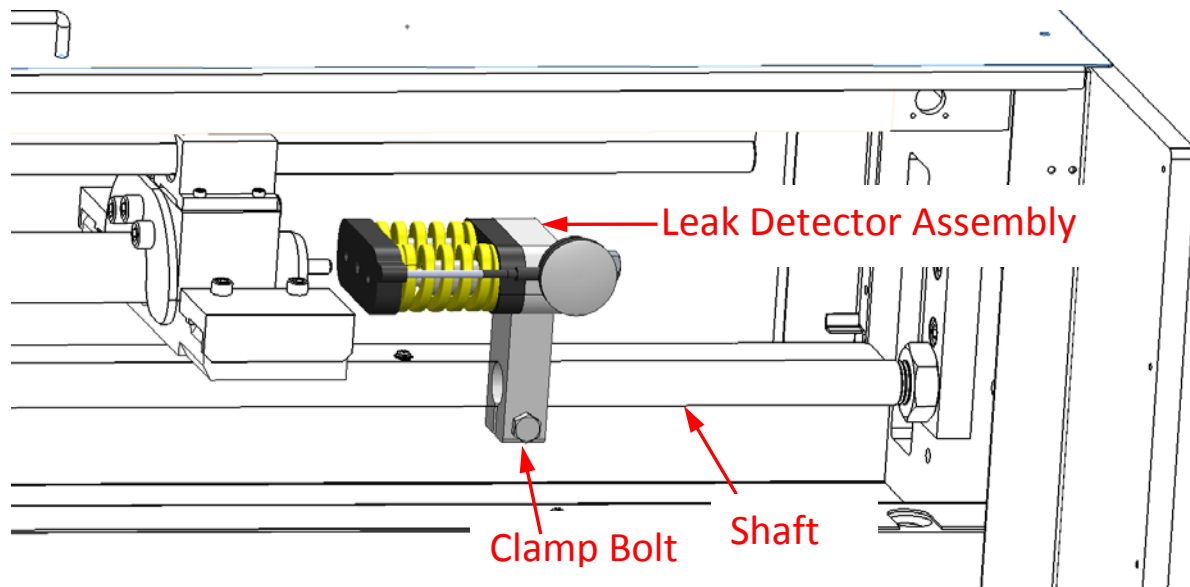
### Active positions

For the active or “in use” position, align the hole in the front of the leak detector assembly with the threaded stud. Determine a position along the shaft at the position desired for leak determination and tighten the retention bolt as shown in Figure 23 and Figure 22.



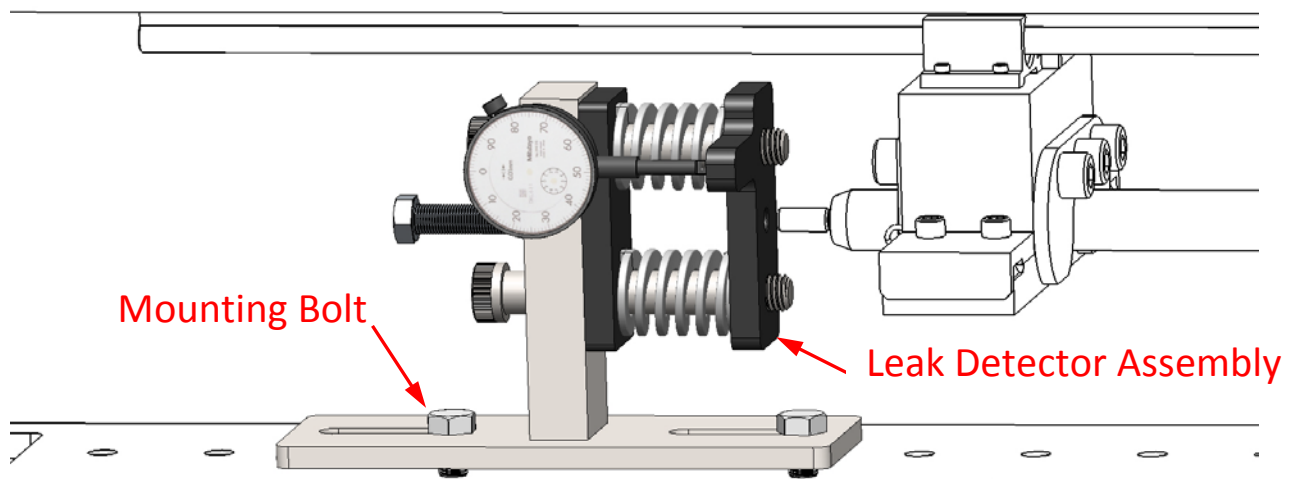
**Figure 22 - Leak Detector Mount C01-000061-000**





**Figure 23 - Leak Detector Kit, Mounted, C01-000222-000**

The Leak Detector Kit for the FMD-003 and FMD-007 is mounted to the tapped holes in the drive end rail instead of a shaft. For this reason there is no stowed position. When a leak detection test is to be performed, mount the leak detector kit in the desired location to the drive end rail using the mounting bolts. Verify the hole in the front end of the Leak Detector Kit lines up with the threaded stud and fine tune the position of the Leak Detector Kit using the slots before completely tightening bolts. The installation of this leak detector kit is shown in Figure 24.



**Figure 24 – Leak Detector Kit, Mounted, C01-000140-000**

## Step 2: Operation

Only qualified and trained personal are authorized to perform maintenance on FMD Provers.

The Flow MD™ Prover Interface Module is a powerful tool for maintenance professionals. Multi level password protected cycle counter will keep track of the number of strokes and it can be programmed for a variety of preventive maintenance functions. Please refer to the PIM manual for detailed information. Components mentioned in the following steps are shown in Figure 25, Figure 26, and Figure 27.

- i. Attach the differential pressure gauge (optional kit) to the upstream and downstream vents via braided pressure hose
- ii. Install the leak detector kit on the unit per figure 5.1.1 A, and B
- iii. Connect the leak detector to upstream shaft per figure 5.1.1 C

Note: Make sure the temperature is stable and the flow tube is clear of any air bubbles

- iv. Using a wrench tighten the pressure bolt against the compression springs until the differential pressure gauge reads about 5 PSI
- v. Make sure that the dial indicator is installed properly. Set the dial indicator to Zero (0) in order to determine any movement in the piston assembly
- vi. After 10 minutes check the differential pressure gauge and the dial indicator for any changes
- vii. If no change, the piston and poppet seal are ok
- viii. Change in pressure and or movement may indicate a damaged seal
- ix. Repeat the test if the result is the same then replace the seals.

WARNING- Make sure that the Leak Detector Assembly has been removed or secured in stow position prior to start of Prover operation. Failure to do so will cause severe damage to the Prover.

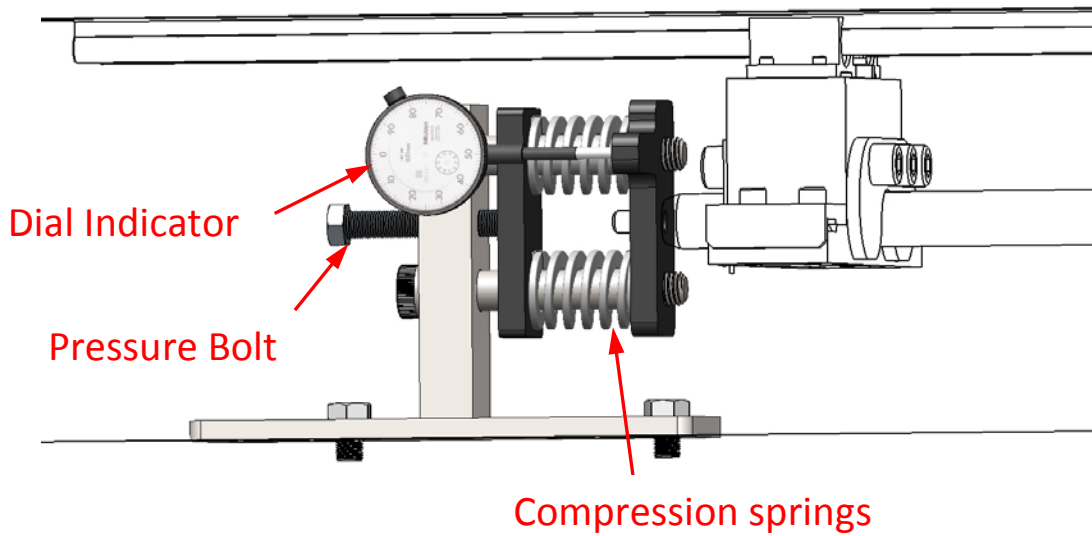


Figure 25 – Activation of Leak Detector Kit C01-000140-000

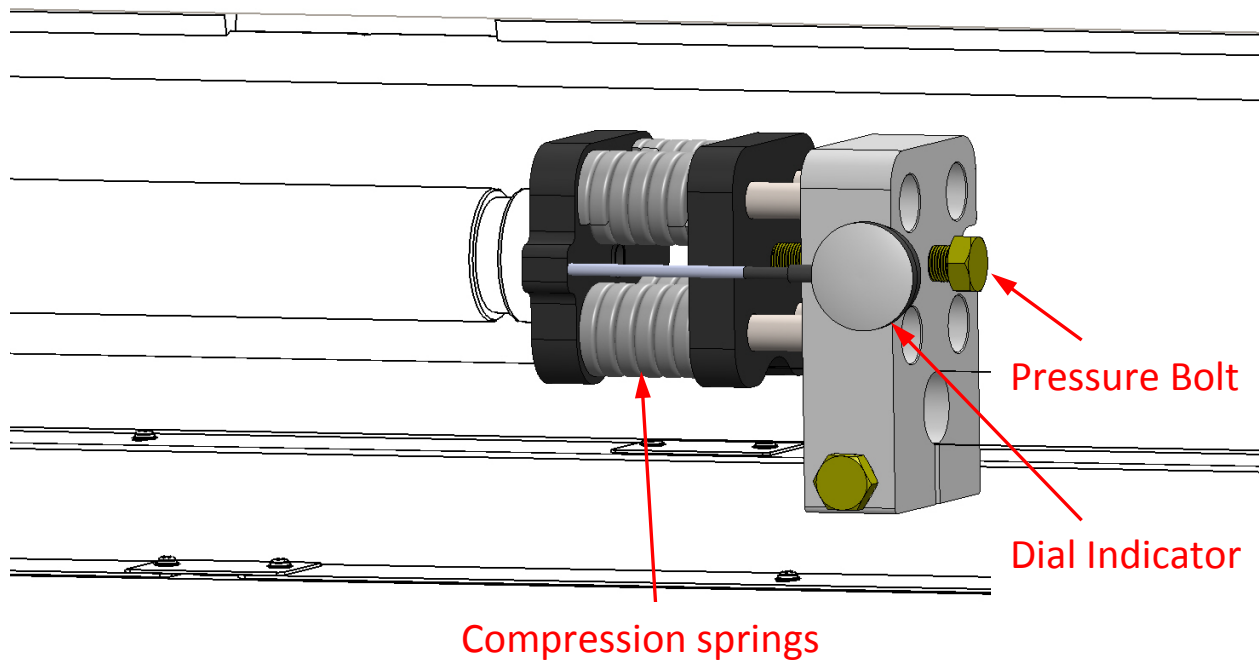
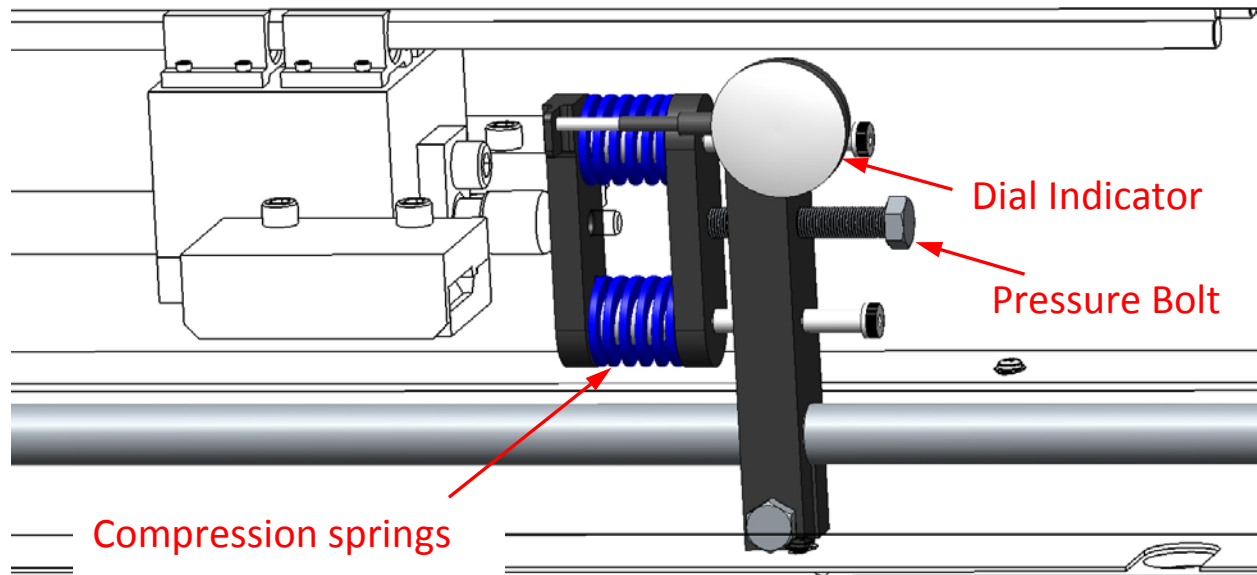


Figure 26 - Activation of Leak Detector Kit C01-000061-000



**Figure 27– Activation of Leak Detector Kit C01-000263-000 and C01-000336-000**

WARNING- PLACE AND SECURE THE LEAK DETECTOR AT UPSTREAM HOME POSITION BEFORE OPERATING THE PROVER

9. Disclaimer notice

The contents of this manual are for informational purposes only and can be modified without notice at any time. Flow Management devices shall not be liable for any subsequent damages including but not limited to: loss of product, profits, etc.

The purchaser and end user are responsible for proper selection, use and maintenance of Flow MD™ products.