



Prover Leak Detector Kit FMD-007 Installation and Operating Manual

P: 602.233.9885
F: 602.233.9887
E: sales@flowmd.com
W: www.flowmd.com

Table of Contents

Introduction	3
Safety Notes	3
Theory of Operation	3
Tools Required	3
Leak Detector Main Components	4
Configuration (Right/Left Hand)	5
Assembled (Right hand)	6
Storage	7
Operation	8

Introduction

The Prover Leak Detector Kit manufactured by Flow Management Devices, LLC (Flow MD)™ is a maintenance tool to assist in identifying damage/wear to internal sealing components. Use of this device should be performed by only trained and qualified personnel. This manual will cover the installation and operation of the leak detector kit in detail. This leak detection system is intended to give a general idea of the condition of the piston seals. It does not guarantee prover performance.

Safety Notes-

- Lock out/tag out any energy source by qualified personnel.
 - Energy source – Any source of electrical, mechanical, pneumatic, chemical, thermal or other energy.
- Liquids that are compressed gases e.g. propane, ethane etc, can flash off if system is vented or PSV device opens. Prover drive system and leak detector can suddenly move with great force.

Theory of Operation

The leak detector works by measuring the piston displacement and time. The provers piston is pushed downstream effectively generating a pressure differential. Movement of the piston is an indication that liquid has moved from the downstream to upstream end of the prover. Measuring the displacement of the piston and the time it occurs establishes a leak rate. Note: It is assumed that all movement of the piston is a result of leak by the piston inside prover. Leaks elsewhere in the system will falsely indicate a piston seal leak. Temperature must be stable to ensure movement is not due to thermal expansion/contraction.

The basis of the allowable leak rate is determined by considering a leak that is very small (i.e. near the uncertainty of the prover volume) that would occur at a very low flow rate (i.e. turn down ratio > 50). During normal proving operations a leak of this size would be unmeasurable as it is a small fraction of the measurement uncertainty.

Tools Required

- 1) Leak Detector Kit
- 2) Wrench or ratchet
- 3) Means to measure elapsed time. Clock, watch, phone or stopwatch.

Leak Detector Kit Main Components

Verify all components in the kit

ITEM #	PART NUMBERS	DESCRIPTION	QTY.
1	000-105240-COM	BASE LEAK DETECTOR	1
2	000-113379-COM	POST LEAK DETECTOR INDICATOR	1
3	000-113380-COM	PLATE 1 LEAK DETECTOR	1
4	000-113381-COM	PLATE 2 LEAK DETECTOR	1
5	000-113376-COM	SPRING LEAK DETECTOR	2
6	000-101737-HAR	SCREW SWS 3/AXX-3/4 18-8	2
7	000-100821-COM	STARRETT 25-431J	1
8	000-104222-HAR	SCREW PFC 3/8-16 X 1.304	2
9	000-100816-HAR	SCREW HHC 1/2-20X3 18-8 FULL THD	1
10	000-103845-HAR	STUD THREADED 3/8-16 X 1 1/2	1
11	000-113384-HAR	SCREW HHC 1/2-20 X .75 ZNC	2
12	000-113185-HAR	SCREW HHC 5/16-18X2-1/4 316	1
13	000-103209-HAR	NUT HEX 5/16-18 316	1
14	000-102321-HAR	SCREW PNC 1/4-20X1/2 18-8 FLT	1
15	000-100165-HAR	WASHER SAE 1/2 GR8 ZNC	2

**RIGHT HAND CONFIGURATION SHOWN
(FLIP PARTS 3 AND 4 FOR LEFT HAND)**

▲ USE BLUE LOCTITE ON THESE THREADS

▲ THIS PART SCREWS INTO UPSTREAM SHAFT

UNLESS OTHERWISE SPECIFIED:
 ALL DIMENSIONS ARE IN INCHES;
 GENERAL DRAWING TOLERANCES:
 .125 ± .005
 .0625 ± .003
 .03125 ± .0015
 ANGLES ± 5°
 FRACTIONAL ± 1/16"
 SURFACE FINISH 63 MICRO INCH MAX ON
 MACHINED SURFACES
 UNLESS OTHERWISE SPECIFIED
 BREAK CORNER .005 RADIUS
 INTERPRET GEOMETRIC TOLERANCES
 PER ASME Y14.5M-2009

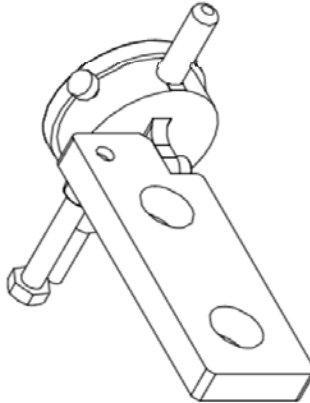
PROPRIETARY AND CONFIDENTIAL
 This document contains trade secrets and
 proprietary information of FlowMD, and may remain
 confidential or subject to other intellectual property
 rights. No part of this document may be
 reproduced, stored in a retrieval system, or
 transmitted in any form or by any means
 electronic, mechanical, photocopying, recording,
 or by any information storage and retrieval system
 without the prior written permission of FlowMD.

DO NOT SCALE DRAWING

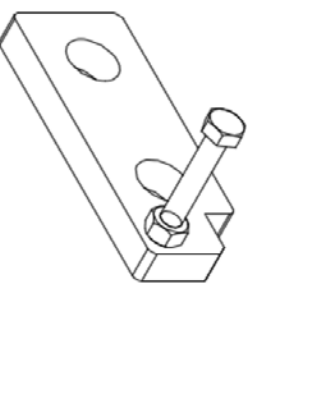
NAME	DATE	FILE
ALYSSA L.	3/5/18	FLOW MANAGEMENT DEVICES
DRAWN		
LAST REVISED		
CHECKED		
BY		
DATE		
REVISION		
DESCRIPTION		
PROJECT		
CONTRACT/TOR/TORNO		
FLOW MANAGEMENT DEVICES		
5225 SOUTH 37TH ST. SUITE 4		
PHOENIX, ARIZONA 85040		
PHONE: (602) 233-8883		
FAX: (602) 233-8887		
www.FlowMD.com		

FLOW MANAGEMENT DEVICES
 KIT LEAK DETECTOR GEN 4 (007)
 C10-000161-000 (007)
 SCALE: 1:3 WEIGHT: SHEET 1 OF 4

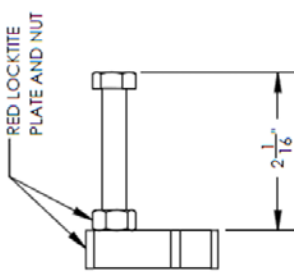
Leak Detector Item 3 detail



RIGHT HAND CONFIGURATION SHOWN
(FLIP PARTS 3 AND 4 FOR LEFT HAND)



DIAL NOT SHOWN FOR CLARITY



RED LOCKTITE
PLATE AND NUT

2 ¹/₁₆"

<p>UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS ARE IN INCHES; GENERAL DRAWING TOLERANCES: X.1 .000 X.1 .005 X.1 .010 X.1 .015 X.1 .020 X.1 .030 X.1 .040 X.1 .050 X.1 .060 X.1 .070 X.1 .080 X.1 .090 X.1 .100 X.1 .120 X.1 .150 X.1 .200 X.1 .250 X.1 .300 X.1 .375 X.1 .450 X.1 .500 X.1 .625 X.1 .750 X.1 .875 X.1 1.000 X.1 1.250 X.1 1.500 X.1 1.750 X.1 2.000 X.1 2.500 X.1 3.000 X.1 3.500 X.1 4.000 X.1 4.500 X.1 5.000 X.1 5.500 X.1 6.000 X.1 6.500 X.1 7.000 X.1 7.500 X.1 8.000 X.1 8.500 X.1 9.000 X.1 9.500 X.1 10.000 X.1 10.500 X.1 11.000 X.1 11.500 X.1 12.000 X.1 12.500 X.1 13.000 X.1 13.500 X.1 14.000 X.1 14.500 X.1 15.000 X.1 15.500 X.1 16.000 X.1 16.500 X.1 17.000 X.1 17.500 X.1 18.000 X.1 18.500 X.1 19.000 X.1 19.500 X.1 20.000 X.1 20.500 X.1 21.000 X.1 21.500 X.1 22.000 X.1 22.500 X.1 23.000 X.1 23.500 X.1 24.000 X.1 24.500 X.1 25.000 X.1 25.500 X.1 26.000 X.1 26.500 X.1 27.000 X.1 27.500 X.1 28.000 X.1 28.500 X.1 29.000 X.1 29.500 X.1 30.000 X.1 30.500 X.1 31.000 X.1 31.500 X.1 32.000 X.1 32.500 X.1 33.000 X.1 33.500 X.1 34.000 X.1 34.500 X.1 35.000 X.1 35.500 X.1 36.000 X.1 36.500 X.1 37.000 X.1 37.500 X.1 38.000 X.1 38.500 X.1 39.000 X.1 39.500 X.1 40.000 X.1 40.500 X.1 41.000 X.1 41.500 X.1 42.000 X.1 42.500 X.1 43.000 X.1 43.500 X.1 44.000 X.1 44.500 X.1 45.000 X.1 45.500 X.1 46.000 X.1 46.500 X.1 47.000 X.1 47.500 X.1 48.000 X.1 48.500 X.1 49.000 X.1 49.500 X.1 50.000 X.1 50.500 X.1 51.000 X.1 51.500 X.1 52.000 X.1 52.500 X.1 53.000 X.1 53.500 X.1 54.000 X.1 54.500 X.1 55.000 X.1 55.500 X.1 56.000 X.1 56.500 X.1 57.000 X.1 57.500 X.1 58.000 X.1 58.500 X.1 59.000 X.1 59.500 X.1 60.000 X.1 60.500 X.1 61.000 X.1 61.500 X.1 62.000 X.1 62.500 X.1 63.000 X.1 63.500 X.1 64.000 X.1 64.500 X.1 65.000 X.1 65.500 X.1 66.000 X.1 66.500 X.1 67.000 X.1 67.500 X.1 68.000 X.1 68.500 X.1 69.000 X.1 69.500 X.1 70.000 X.1 70.500 X.1 71.000 X.1 71.500 X.1 72.000 X.1 72.500 X.1 73.000 X.1 73.500 X.1 74.000 X.1 74.500 X.1 75.000 X.1 75.500 X.1 76.000 X.1 76.500 X.1 77.000 X.1 77.500 X.1 78.000 X.1 78.500 X.1 79.000 X.1 79.500 X.1 80.000 X.1 80.500 X.1 81.000 X.1 81.500 X.1 82.000 X.1 82.500 X.1 83.000 X.1 83.500 X.1 84.000 X.1 84.500 X.1 85.000 X.1 85.500 X.1 86.000 X.1 86.500 X.1 87.000 X.1 87.500 X.1 88.000 X.1 88.500 X.1 89.000 X.1 89.500 X.1 90.000 X.1 90.500 X.1 91.000 X.1 91.500 X.1 92.000 X.1 92.500 X.1 93.000 X.1 93.500 X.1 94.000 X.1 94.500 X.1 95.000 X.1 95.500 X.1 96.000 X.1 96.500 X.1 97.000 X.1 97.500 X.1 98.000 X.1 98.500 X.1 99.000 X.1 99.500 X.1 100.000</p>	<p>DATE: 3/5/18 DRAWN: JULYSS L. LAST REVISED: CHECKED: BY: N/A DATE: N/A</p>	<p>DATE: 3/5/18 DRAWN: JULYSS L. LAST REVISED: CHECKED: BY: N/A DATE: N/A</p>	<p>DATE: 3/5/18 DRAWN: JULYSS L. LAST REVISED: CHECKED: BY: N/A DATE: N/A</p>	<p>DATE: 3/5/18 DRAWN: JULYSS L. LAST REVISED: CHECKED: BY: N/A DATE: N/A</p>	<p>DATE: 3/5/18 DRAWN: JULYSS L. LAST REVISED: CHECKED: BY: N/A DATE: N/A</p>	<p>DATE: 3/5/18 DRAWN: JULYSS L. LAST REVISED: CHECKED: BY: N/A DATE: N/A</p>	<p>DATE: 3/5/18 DRAWN: JULYSS L. LAST REVISED: CHECKED: BY: N/A DATE: N/A</p>	
	<p>UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS ARE IN INCHES; GENERAL DRAWING TOLERANCES: X.1 .000 X.1 .005 X.1 .010 X.1 .015 X.1 .020 X.1 .030 X.1 .040 X.1 .050 X.1 .060 X.1 .070 X.1 .080 X.1 .090 X.1 .100 X.1 .120 X.1 .150 X.1 .200 X.1 .250 X.1 .300 X.1 .375 X.1 .450 X.1 .500 X.1 .625 X.1 .750 X.1 .875 X.1 1.000 X.1 1.250 X.1 1.500 X.1 1.750 X.1 2.000 X.1 2.500 X.1 3.000 X.1 3.500 X.1 4.000 X.1 4.500 X.1 5.000 X.1 5.500 X.1 6.000 X.1 6.500 X.1 7.000 X.1 7.500 X.1 8.000 X.1 8.500 X.1 9.000 X.1 9.500 X.1 10.000 X.1 10.500 X.1 11.000 X.1 11.500 X.1 12.000 X.1 12.500 X.1 13.000 X.1 13.500 X.1 14.000 X.1 14.500 X.1 15.000 X.1 15.500 X.1 16.000 X.1 16.500 X.1 17.000 X.1 17.500 X.1 18.000 X.1 18.500 X.1 19.000 X.1 19.500 X.1 20.000 X.1 20.500 X.1 21.000 X.1 21.500 X.1 22.000 X.1 22.500 X.1 23.000 X.1 23.500 X.1 24.000 X.1 24.500 X.1 25.000 X.1 25.500 X.1 26.000 X.1 26.500 X.1 27.000 X.1 27.500 X.1 28.000 X.1 28.500 X.1 29.000 X.1 29.500 X.1 30.000 X.1 30.500 X.1 31.000 X.1 31.500 X.1 32.000 X.1 32.500 X.1 33.000 X.1 33.500 X.1 34.000 X.1 34.500 X.1 35.000 X.1 35.500 X.1 36.000 X.1 36.500 X.1 37.000 X.1 37.500 X.1 38.000 X.1 38.500 X.1 39.000 X.1 39.500 X.1 40.000 X.1 40.500 X.1 41.000 X.1 41.500 X.1 42.000 X.1 42.500 X.1 43.000 X.1 43.500 X.1 44.000 X.1 44.500 X.1 45.000 X.1 45.500 X.1 46.000 X.1 46.500 X.1 47.000 X.1 47.500 X.1 48.000 X.1 48.500 X.1 49.000 X.1 49.500 X.1 50.000 X.1 50.500 X.1 51.000 X.1 51.500 X.1 52.000 X.1 52.500 X.1 53.000 X.1 53.500 X.1 54.000 X.1 54.500 X.1 55.000 X.1 55.500 X.1 56.000 X.1 56.500 X.1 57.000 X.1 57.500 X.1 58.000 X.1 58.500 X.1 59.000 X.1 59.500 X.1 60.000 X.1 60.500 X.1 61.000 X.1 61.500 X.1 62.000 X.1 62.500 X.1 63.000 X.1 63.500 X.1 64.000 X.1 64.500 X.1 65.000 X.1 65.500 X.1 66.000 X.1 66.500 X.1 67.000 X.1 67.500 X.1 68.000 X.1 68.500 X.1 69.000 X.1 69.500 X.1 70.000 X.1 70.500 X.1 71.000 X.1 71.500 X.1 72.000 X.1 72.500 X.1 73.000 X.1 73.500 X.1 74.000 X.1 74.500 X.1 75.000 X.1 75.500 X.1 76.000 X.1 76.500 X.1 77.000 X.1 77.500 X.1 78.000 X.1 78.500 X.1 79.000 X.1 79.500 X.1 80.000 X.1 80.500 X.1 81.000 X.1 81.500 X.1 82.000 X.1 82.500 X.1 83.000 X.1 83.500 X.1 84.000 X.1 84.500 X.1 85.000 X.1 85.500 X.1 86.000 X.1 86.500 X.1 87.000 X.1 87.500 X.1 88.000 X.1 88.500 X.1 89.000 X.1 89.500 X.1 90.000 X.1 90.500 X.1 91.000 X.1 91.500 X.1 92.000 X.1 92.500 X.1 93.000 X.1 93.500 X.1 94.000 X.1 94.500 X.1 95.000 X.1 95.500 X.1 96.000 X.1 96.500 X.1 97.000 X.1 97.500 X.1 98.000 X.1 98.500 X.1 99.000 X.1 99.500 X.1 100.000</p>							
	<p>CONTACT INFORMATION: FLOW MANAGEMENT DEVICES 5225 SOUTH 37TH ST SUITE 4 PHOENIX, ARIZONA 85040 PHONE: (602) 333-9888 FAX: (602) 333-9887 www.FlowMD.com</p>							
	<p>DO NOT SCALE DRAWING</p>							

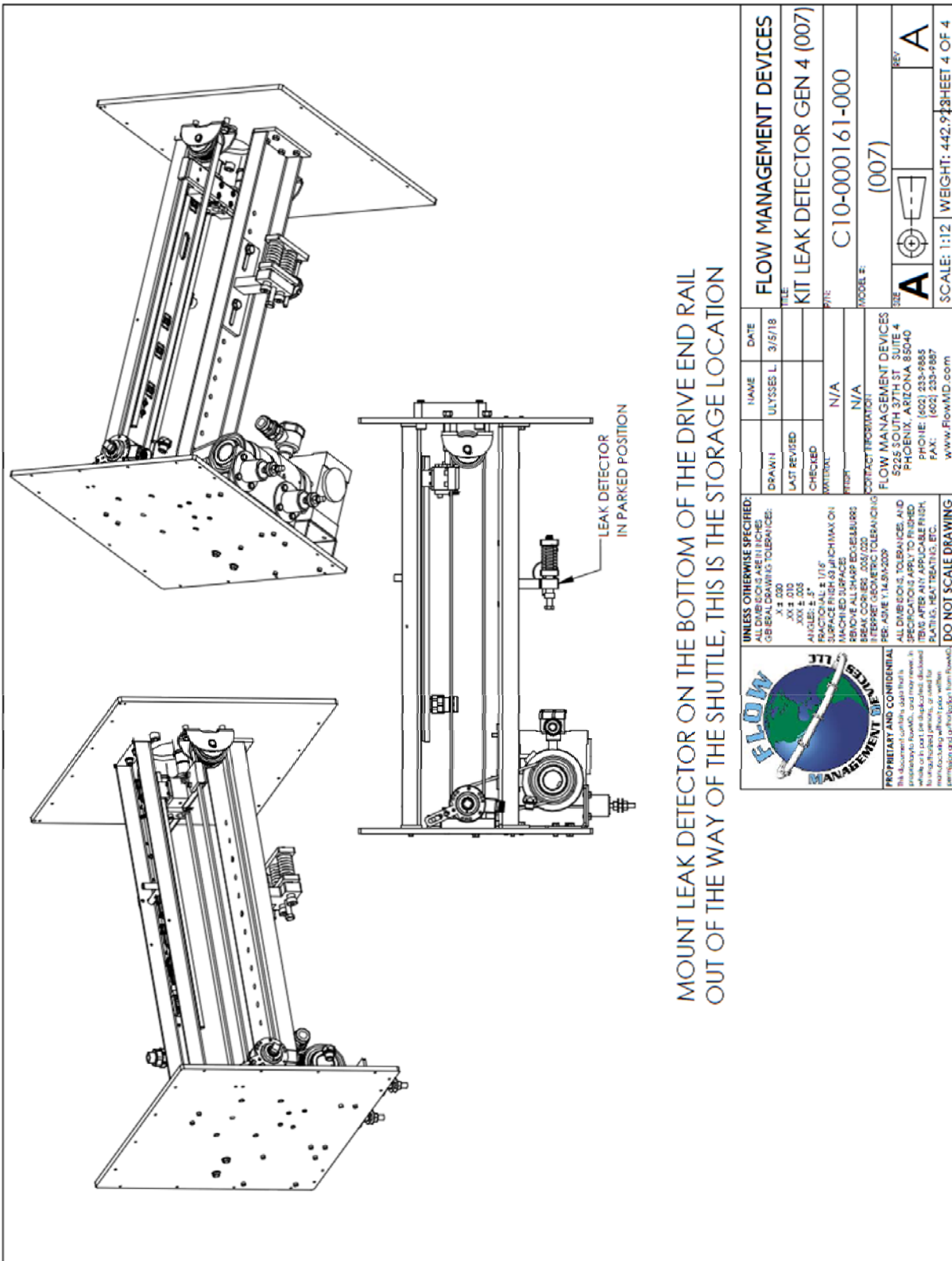
Leak Detector Assembled (Right Hand Configuration)

UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS ARE IN INCHES ORDINATE DRAWING TOLERANCES: XX.X ± .010 XX.X ± .015 XX.X ± .020 ANGLES ± .5° FRACTIONAL ± 1/16" SURFACE FINISH 32 INCH MAX ON REMOVE ALL SHARP EDGES/BURRS REMOVE ALL DIMENSIONAL TOLERANCES PER ASME Y14.5M-2009 ALL DIMENSIONS TOLERANCES AND SPECIFICATIONS APPLY TO FINISHED ITEMS AFTER ANY APPLICABLE FINISH, PLATING, HEAT TREATING, ETC.		DATE: 3/5/18	DESIGNER: ULYSSES L.	DATE: 3/5/18	FLOW MANAGEMENT DEVICES	
DRAWN:	LAST REVISED:	CHECKED:	WITNESSED:	PROJECT:	SIZE:	KIT LEAK DETECTOR GEN 4 (007)
PER: N/A		PART: N/A		MODEL #:	C10-000161-000	
CONTACT INFORMATION:		FLOW MANAGEMENT DEVICES		REV: A		
5225 SOUTH 37TH ST. SUITE 4		PHOENIX, ARIZONA 85040		SCALE: 1:3		
PHONE: (602) 233-9885		FAX: (602) 233-9887		WEIGHT: SHEET 3 OF 4		
WWW.FLOWMD.COM						

DO NOT SCALE DRAWING

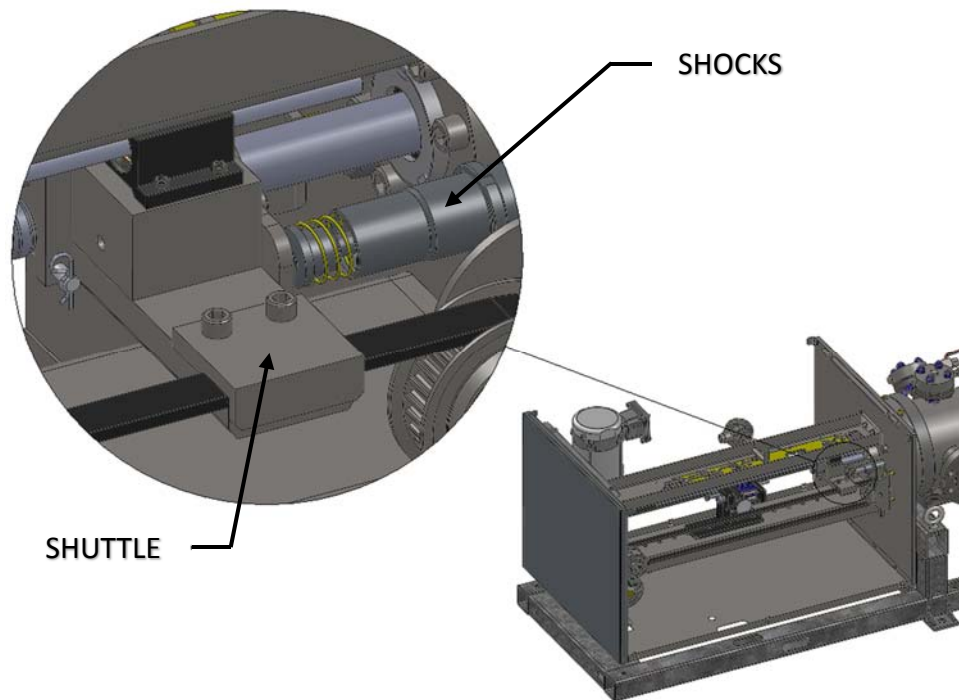
PROPERTY AND CONFIDENTIAL
This drawing is the property of Flow Management Devices, Inc. and may not be reproduced, copied, or used for any other purpose without the written permission and authorization from FlowMD.

Leak Detector Kit (Storage Position)



MOUNT LEAK DETECTOR ON THE BOTTOM OF THE DRIVE END RAIL
OUT OF THE WAY OF THE SHUTTLE, THIS IS THE STORAGE LOCATION

 <p style="font-size: small; margin: 0;"> PROPRIETARY AND CONFIDENTIAL This document, its files, and any other information contained herein, including drawings, specifications, and data, are the property of Flow Management Devices, Inc. and may not be reproduced, distributed, or used in any manner without the express written permission and approval from FlowMD. </p>	UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS ARE IN INCHES (GENERAL DRAWING) TOLERANCES: .X .1 .000 .X .1 .010 .XXX .1 .020 ANGLES: ± .5° FRACTIONAL: ± 1/16" SURFACE FINISH: 32 RA MAX ON MACHINED SURFACES SURFACE TOLERANCE: 1000/1000 BREAK CORNERS: .030/0.020 HORIZONTAL GEOMETRIC TOLERANCES: PER: ASME Y14.5M-2009	NAME ULYSSES L	DATE 3/5/18	FLOW MANAGEMENT DEVICES KIT LEAK DETECTOR GEN 4 (007)	
	DRAWN LAST REVISED CHECKED INTERIOR	N/A N/A	TITLE KIT LEAK DETECTOR GEN 4 (007)	P/N C10-000161-000	DRAWN BY DATE
	CONTACT INFORMATION: FLOW MANAGEMENT DEVICES 5225 SOUTH 37TH ST. SUITE 4 PHOENIX, ARIZONA 85040 PHONE: (602) 333-9885 FAX: (602) 333-9887 www.FlowMD.com	PART NO.	PART NO.	PART NO.	PART NO.
	DO NOT SCALE DRAWING	SCALE: 1:12	WEIGHT: 442.9 LB	SHEET 4 OF 4	REV A



STEP 1:

If possible start with the piston downstream (i.e. shuttle at the shocks), this will allow you to pull the piston upstream to the desired test position.

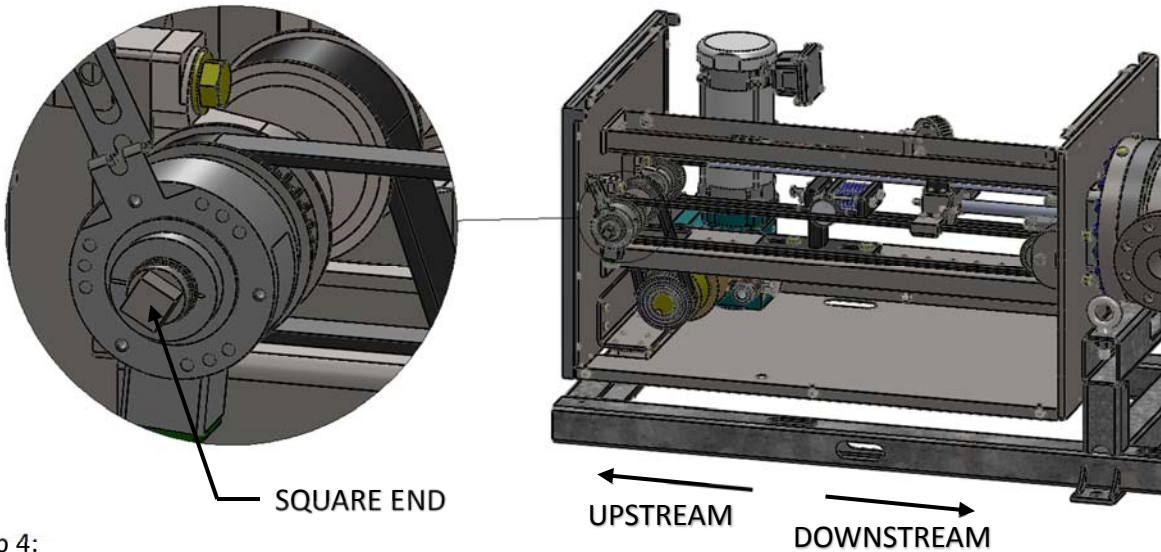
STEP 2:

Disconnect all power to the prover then perform Lock out / tag out procedure to prevent accidental startup of the prover during testing.

Step 3:

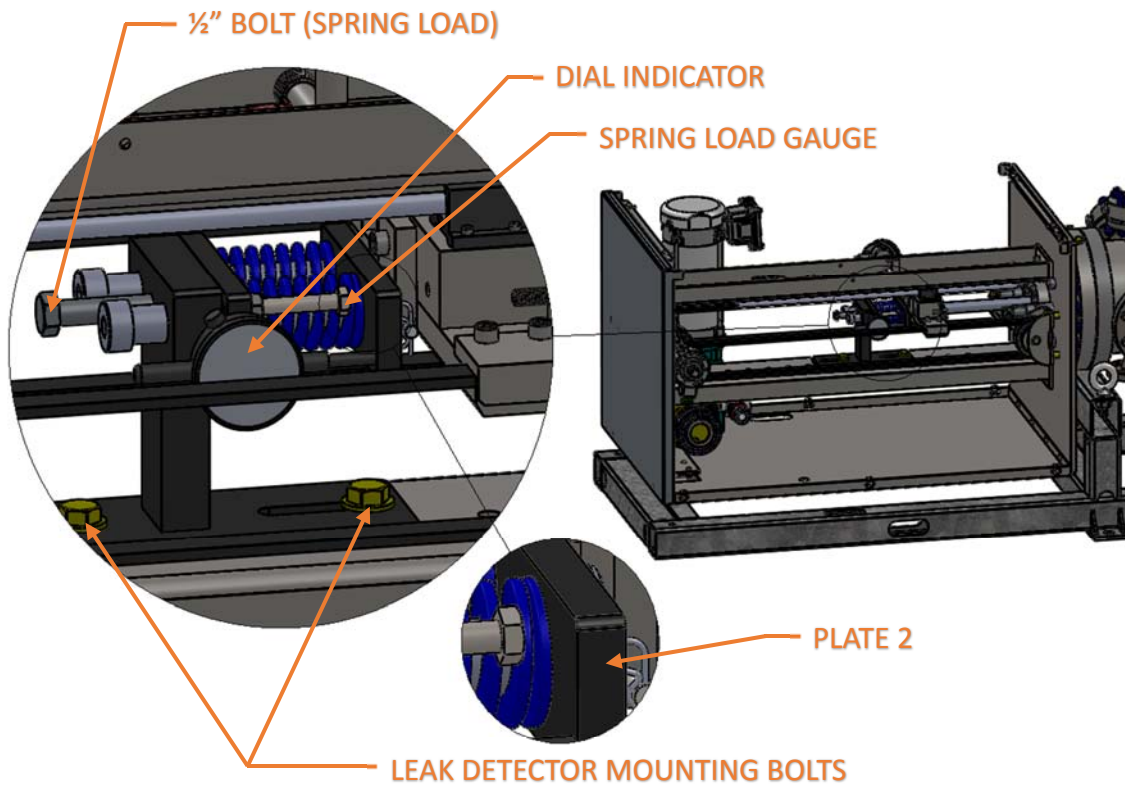
Close all valves and process connections leading into or out of the prover. If there is any leak by these valves, depending on the rate may cause the test to fail which means we cannot determine if there is any leak past the piston or if the leak past the piston is acceptable.

**SAFETY PROCEDURE REMINDER:
LOCK OUT / TAG OUT ELECTRICAL SUPPLY
AND ALL INLET / OUTLET PROCESS CONNECTIONS**



Step 4:

With your wrench on the square end of the shaft move the piston slightly upstream of the desired test position, then move the piston downstream creating a slight pressure differential across the piston. This will help take up any slack in the leak detector.



Step 5:

Mount the leak detector to the top of the C channel (test position) right up against the upstream piston shaft and tighten leak detector to C channel. Tighten the spring load bolt until the spring load gauge just touches plate 2 and zero the dial indicator, the leak detector is now in test mode start timing the test.

Note: Do not tighten spring load bolt anymore once the spring load gauge has made contact with plate 2 or damage to the leak detector/prover may result

Test duration is 10 minutes, at the end of 10 minutes if the dial indicator reads movement equal to or less than .025" this is a pass if movement is over .025" test is a fail and piston maintenance is recommended.

If there are no leaks into or out of the system, the only leak path is past the piston. If there is a leak occurring past the piston the springs will slowly expand, and the piston will travel downstream.

Note: Verify there are no leak paths in or out of the system as this will give a false result

Step 6:

Remove leak detector from top of C channel (test position) and re-attached below C channel in the storage position as shown on page 7.

Note: Never operate prover with the leak detector in the test position damage to the leak detector and prover will result