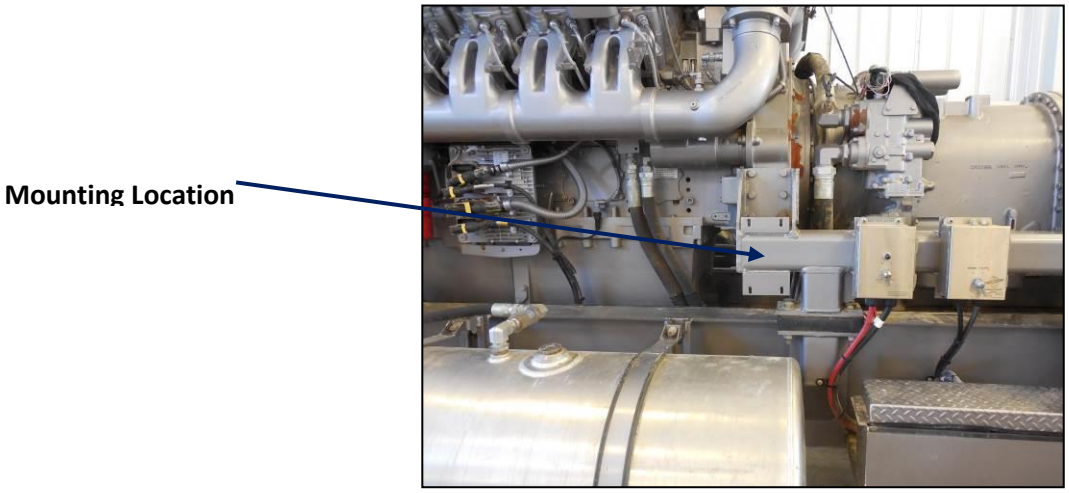
Model Years: 2011+ Frac Truck MTU 4000 Pump Engine		
Puradyn Part #	**Description**	**Qty**
	SYSTEM	
15-70023-3	Kit, Assy-Main M85 W/FPS Manifold- Reversed Oil & Gas Services 1-US, Top Return	1
02-M85X1	Filter, Size 85 XD Additives - (pre-installed)	1
19-00304CSTF-M	Manual, Installation Notes for 01-A1M85X-M, MTU4000 -Equipped Frac Truck	1
19-00134	Manual, M Series Standard Installation	1
	HOSE & FITTINGS	
15-70047	Kit, Assembly Hose- Supply 3/16" W/ -4 ORFS Crimp Fittings MTU4000 Application, Frac Truck	1
15-70048	Kit, Assembly Hose-Return 5/8" W/ -12 ORFS Crimp Fittings MTU 4000 Frac Truck App	1
15-70195	Kit, Bag Return Fitting 1" NPT X -12 ORFS MTU 4000 Frac Truck	1
	SYSTEM MOUNTING HARDWARE	
15-70123	Kit, Bolt MTU 4000 Frac Application	1
	ADDITIONAL SUPPLIES FOR INSTALLATION	
15-00433	Kit, Parts Bag M85 MTU Frac Truck Application	1

The following document is used in conjunction with the **pura**DYN Bypass Oil Filtration System Installation Manual that is included in the system box and as such, should be considered a supplemental source of information. Further, this document covers the installation of a M85 system on a Frac Truck equipped with an MTU 4000 pump engine.

1. OVERVIEW

1.2. **Before Installation:** The M85systemis mounted on the engine sub-frame. This can be seen in the photograph below on the left-side of the frac truck, relative to operator seated position (toward rear of engine).



Before Installation

1.3. **After Installation:** The picture below shows the location of main filter assembly after the completed installation of the M85 system

After Installation

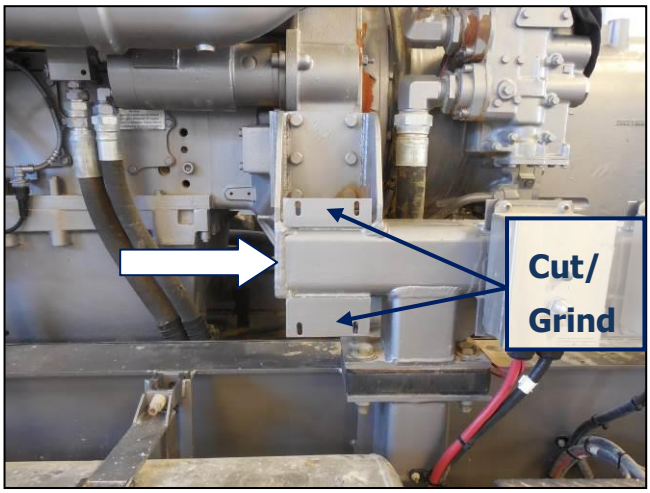
2. INSTALLATION STEPS

2.2. Access Mounting Location & Prepare for Bracket Mounting:

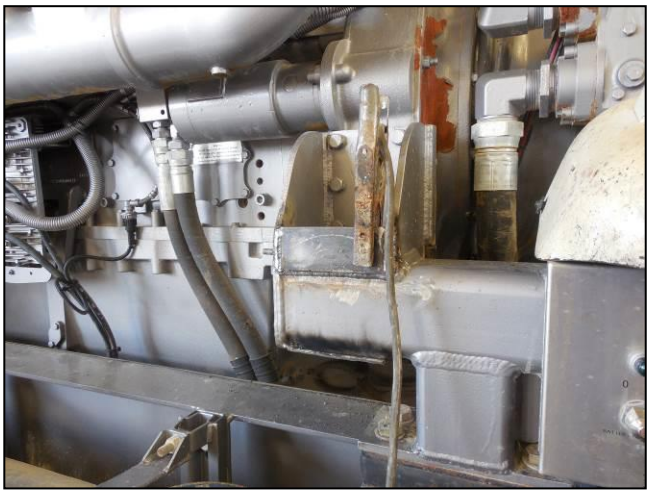
a) To begin the installation of the **pura**DYN system, locate the mounting area along the engine sub-frame, as shown below, and prepare surface area for welding as appropriate **(Picture 1).** Reference "Before Install" photo on previous page for broader view of mounting location.

b) Cut and grind off 1/8" stock upper and lower welded tabs **(Pictures 1, 2).**

c) Weld in (along edges) (2) new 3/8" stock support tabs, measuring 6 ½" x 2 ½" **(Pictures 2-4)**



Picture 1: Mounting Location



Picture 2: Mounting Area Preparation

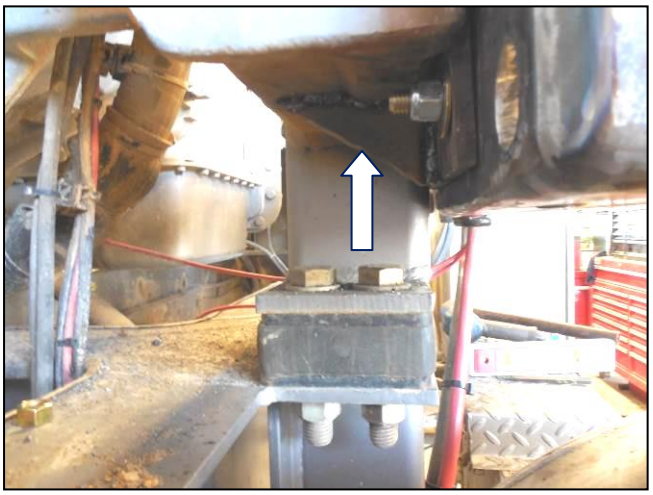
d) Mark (2) hole center locations in new upper support tab, positioned 1 3/8" vertically above tab bottom, and spaced 4 ½" horizontally apart- symmetrically placed **(Picture 4)**

e) Mark (2) hole center locations in new lower support tab plate, offset 6 5/8" vertically from hole center location in upper support tab, and horizontally in-line with hole center locations in upper tab **(Picture 4)**

f) Drill (4) 17/32" holes at marked location using proper safety gear

Picture 3: Reinforcement of mounting location

Picture 4: Marking of Hole Centers for Drilling

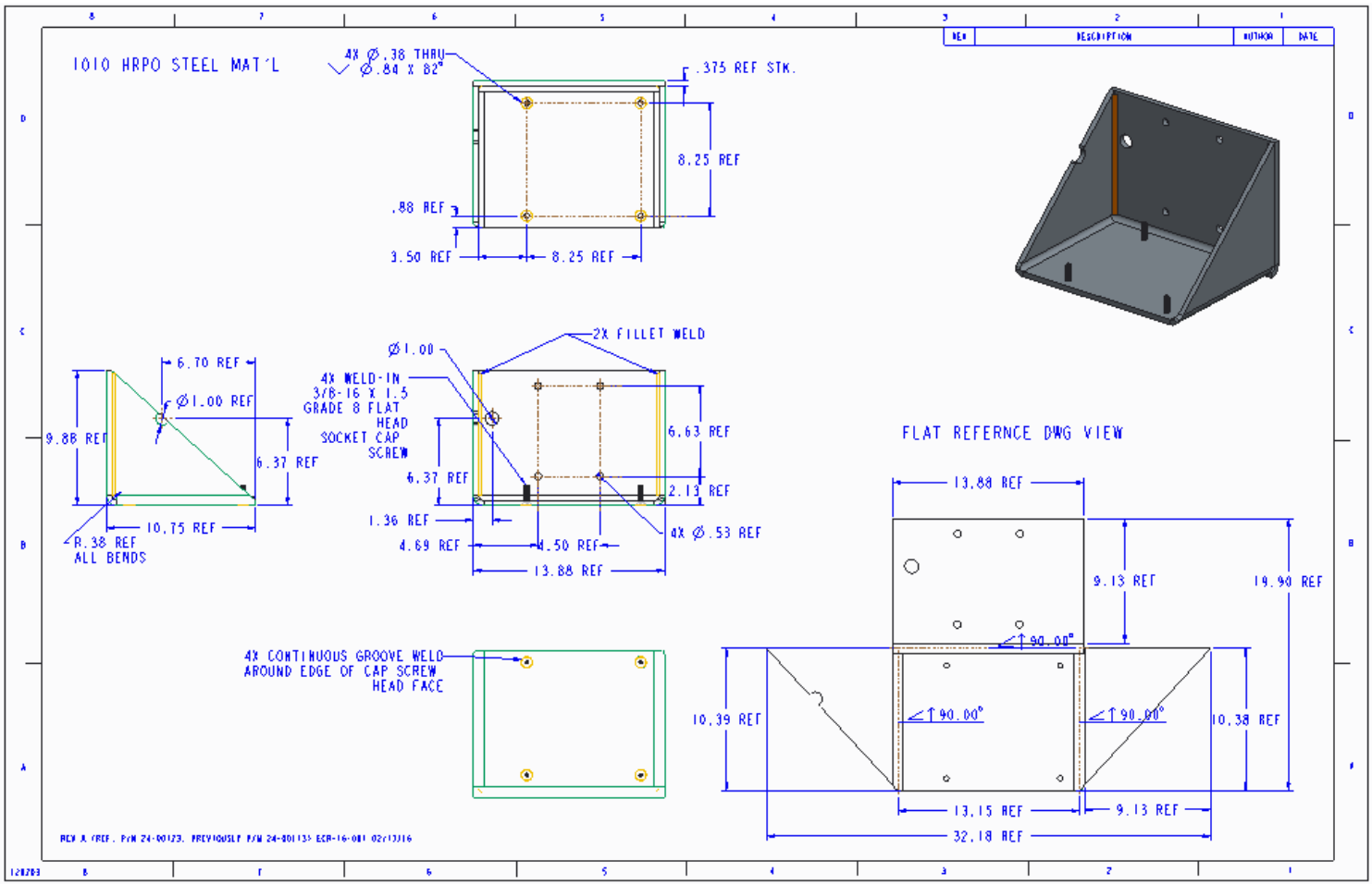


Picture 5: Welding in Support Gusset (Side view)

g) Weld-in 3/8 stock, 2 ½" x 4" triangular gusset along center of lower tab as shown **(Picture 5).**

h) Fabricate mounting bracket, referencing dimensions in drawing below for guidelines **(Picture 6)**

i. *Note: all dimensions in inches*



Picture 6: Reference Drawing for Fabrication of Mounting Bracket

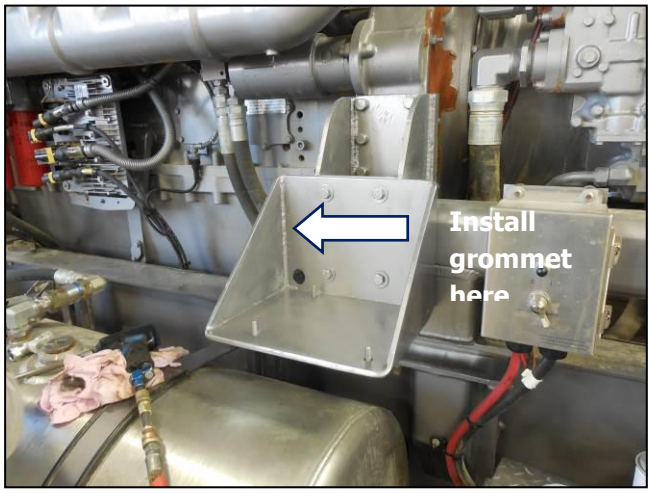
i) Mask 3/8" bolt threads and coat bracket with spray paint (for corrosion resistance), then remove tape; allow to dry "to the touch" before continuing on to next steps

j) Install fabricated mounting bracket using ½" bolt, washer and nut hardware (***not included in kit***), securing to reinforced welded tabs (at mounting location) through drilled 17/32" holes, as shown in **Picture 7**.

k) Install rubber grommet in bracket thru-hole (for supply line routing) as follows **(Pictures 7, 8)**:

i. Apply lube with brush to "thru-hole" of 1" (panel hole size) grommet

ii. Install grommet in 1" supply line thru-hole in filter mounting bracket, with face (larger OD) of grommet mating against inner wall of mounting bracket



Picture 7: Installation of Mounting Bracket

Note*: Current mat'l design not illustrated*

Picture 8: Grommet Prep/Installation

2.3. Install puraDYN System w/ Supplied Bolt Hardware

a) Once the mounting bracket is fully secured, carefully lift and orient system and set on top of mounting bracket, aligning (4) welded studs on mounting bracket with bolt holes on base of system.

i. ***Note:*** *Bypass filter system should be oriented such that system's return fitting (located towards top of filter system) is oriented towards the front of the truck.*

b) Secure system to mounting bracket using 3/8" bolt, washer and nut hardware supplied in part number 15-70123 kit bag to fasten onto mounting bracket's welded studs **(Pictures 9,10)**

Picture 9: Placement of system

***Note**: Current mat'ls design not illustrated*

Picture 10: Securing of system

***Note**: Current mat'ls design not illustrated*

2.4. Install Supply Lines & Fittings

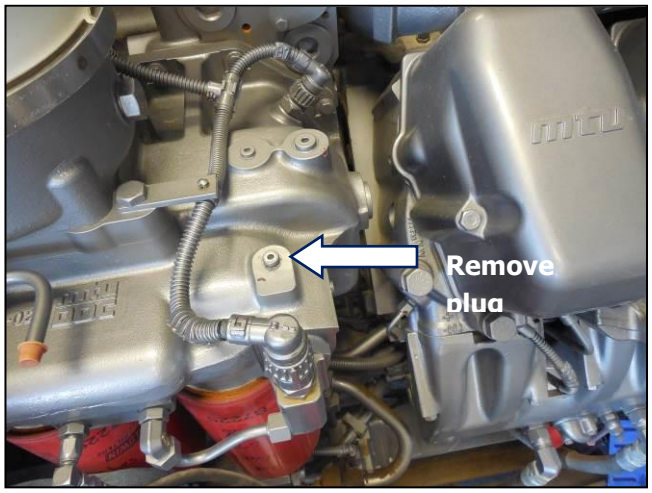
a) Drain old engine oil from Engine Oil Sump, and clean all surfaces thoroughly

b) Locate designated pressurized oil plug, located on top of the engine oil filter housing. This port location will be used as the oil supply (pressure) port to system **(Picture 11)**

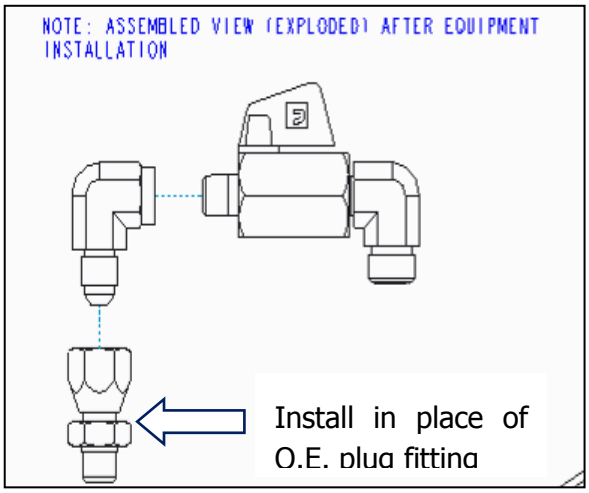
c) Carefully remove the "pressurized oil plug" from the port.

d) Install hydraulic fittings and Heavy Duty Shut-off Valve supplied in Parts Bag part number 15-00433 at designated pressurized oil port, **with Staybond Hydraulic Sealant or Teflon tape applied to all NPT threads**

i. *Note: Arrange fittings as shown in layout below* ***(Picture 12)***



Picture 11: Oil Supply Source- Plug Fitting



Picture 12: Installing HD Shut-off Valve

Note: *Ensure Shut-off Valve is fully open once install is complete*

e) Install the Supply Hose Assembly, inserting through the "bracket thru-hole", while supporting grommet against inner wall of mounting bracket; connect to (#4) ORFS fitting on FPS Metering Jet Assembly **(Picture 13)**.

f) Route the other end of the hose assembly, towards the Shut-off Valve on engine, while securing away from any sharp edges and hot engine components with hose support clamp or supplied tie-wraps.

Picture 13: Installation of Supply Hose Assembly

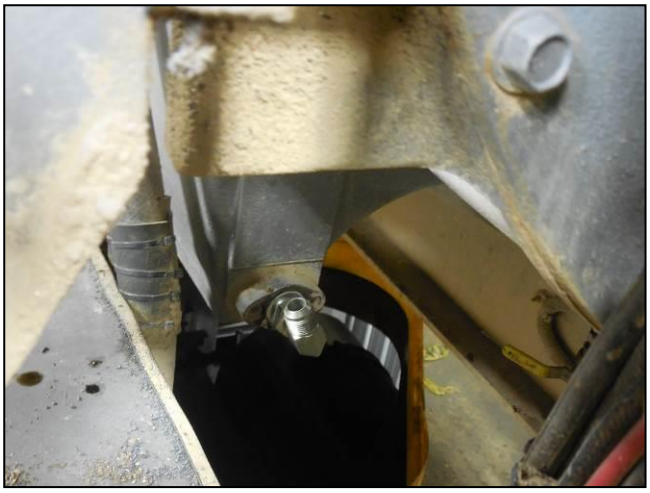
Note*: Current mat'ls design not illustrated*

g) Connect Supply Hose Assembly end to (#4) ORFS end of Shut-off Valve.

2.5. Install Return Hose Assembly & Fittings

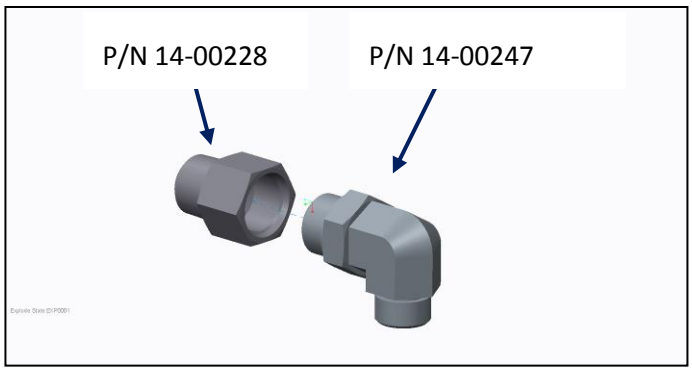
a) Install the Return Fitting Kit (P/N 15-70195), in place of the plug fitting located on lower, rear-face of engine oil sump as follows: **(Pictures 14,15)**

i. Remove O.E. plug fitting and install adapter fitting (P/N 14-00228) from kit bag at designated return port location **with Staybond Hydraulic Sealant or Teflon tape applied to NPT threads**



Picture 14: Lower, Rear of Oil Sump-Return Fitting Location

ii. Install elbow fitting (P/N 14-00247) from kit bag, fastening to adapter fitting

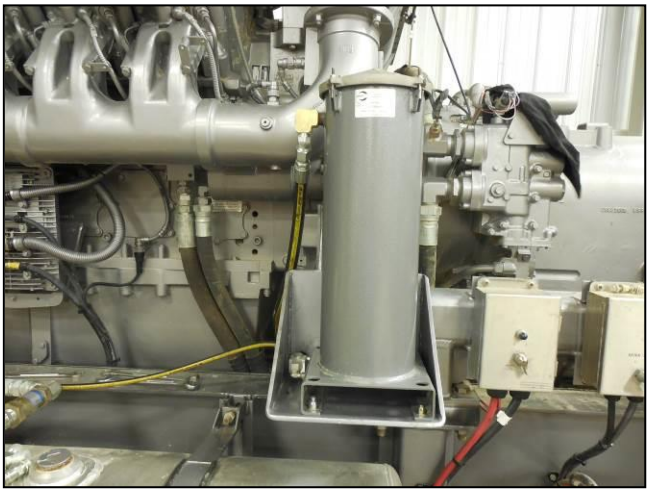


Picture 15: Return Fitting Kit (P/N 15-70195)

iii. ***NOTE:*** *Properly orient the elbow fitting in direction of system before firmly tightening adjustment nut, to avoid any sharp bends in return line routing*

b) Install Return Hose Assembly, connecting side with 45 degree end-fitting to the system's return fitting (located towards the top of system) positioning hose assembly in direction of engine oil sump. Route the other end of the hose assembly downward, towards the installed Return Fitting Kit on the engine oil sump and connect. Make sure to route the hose away from any sharp edges, moving parts or areas with excessive heat. **(Picture 16).**

i. ***IMPORTANT: Return hose routing must follow a continually downward path*** *towards oil sump to allow for proper bypass filtration system function*



Picture 16: Return Hose Install & Orientation

Note*: Current mat'ls design not illustrated*

Check to make sure the fittings and hose are secure. **Refill engine oil** per the MTU service manual and check oil dip stick to verify proper oil level.

Filter Change and Oil Analysis

Replace the **pura**DYN filter element and perform oil analysis at the oil change intervals recommended by your equipment's Original Engine Manufacturer (OEM). As long as the oil analysis confirms that the oil is suitable for continued use, the oil does not need to be changed.

	Before **pura**DYN Installation	Midpoint of First OEM Interval	Each OEM interval
Take Oil Analysis Sample	✓	✓	✓
Change **pura**DYN filter and change/clean full flow filter		✓	✓
Change Oil	✓	If analysis requires	If analysis requires

Oil analysis is a fast, non-invasive way to monitor the condition of your engine or hydraulic oil and is key to evaluating the benefits that result from optimized oil life and extended oil drain intervals. In addition, oil analysis is the only economical way to measure wear or contamination in the engine or equipment and often serves as an indicator of potentially costly problems.

Samples are easily taken from the oil sample valve provided with each unit. Sampling the oil before it enters the puraDYN system enables an accurate assessment of the condition of the equipment. The oil analysis is conducted by an independent laboratory and is reported in a three-tier test that includes: spectrographic metals, wear metals, and contaminant metals (these metals must be monitored to fully evaluate the lubrication)

For extended oil drain practices relative to over the road trucks, Puradyn follows the Technology & Maintenance Council's (TMC) stringent requirements.

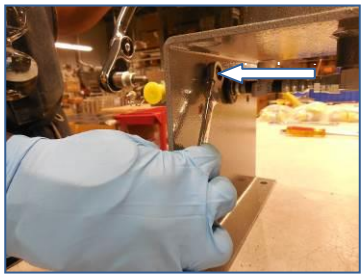
3. TROUBLESHOOTING SECTION

The **pura**DYN system has been engineered in a quality system certified to ISO 9001. It is manufactured from the highest quality materials available with superior workmanship. If, however, your **pura**DYN system is not functioning properly, check the following conditions as indicated:

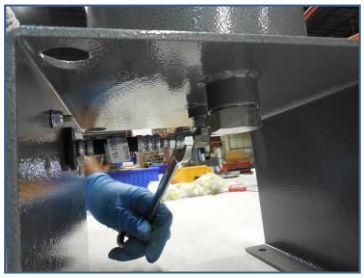
Restricted oil Flow:

- Pressure line may be clogged .....blow line out with high air pressure (**do this first**)
- Shutoff valve maybe closed .....open valve
- Filter may be dirty and clogged.....replace with new filter
- Metering jet screen maybe clogged .....clean screen thoroughly
- If metering jet is clogged .....clean metering jet thoroughly

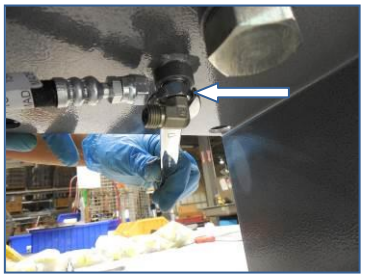
Cleaning the Metering Jet Assembly (M Series Models)



1) Loosen locknut, which secures FPS Manifold Assembly to unit base



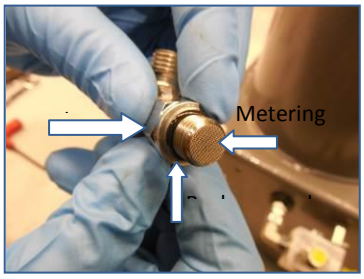
2) Loosen hose fitting, to disconnect 'Inlet Plumbing Hose Assembly'



3) Loosen (adjustment) locknut on 90 Degree fitting, then rotate entire fitting CCW to remove- metering jet screen will drop down

4) Clean port internals & metering jet screen with solvent/fine wire brush; use high-pressure air to blow-out port & screen, clearing any debris

5) Back-off locknut/back-up washer on 90 degree fitting and lubricate external o-ring w/system fluid, also applying a dab on face of fitting- for screen adherence



6) Place screen on face of fitting, centered, against dabbed oil; screw this end of fitting into port- by hand, until back-up washer contacts face of port.

7) Slightly unscrew fitting- as required to align with hose assembly, then use (2) wrenches to hold fitting in place while tightening locknut; reconnect hose assembly

8) Check all fittings for tightness, then re-tighten locknut- securing FPS Manifold Assembly to unit base