


<p>Flying Lead Tool (TL0017-1000-00) Cameron Operations & Maintenance Manual</p>		 10642 West Little York, Suite 100 Houston, Texas 77041-4014		
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1. INTRODUCTION

The Flying Lead Tool, in conjunction with a Class 1-4 Torque Tool, is designed to engage, transport, and dock flying leads. The tool comes ready for installation of a Perry Class 1-4 Torque Tool. Adapter kits for other brands are also available.

120 degrees of total pitch and 30 degrees of roll offers the ROV a variety of positions to manipulate and dock the leads. Roll degrees are indicated by radial grooves spaced 5-degrees apart at top of a large steel ring facing the ROV’s camera. The holding torque of the roll feature is rated at 750 ft lbs. The roll angle will begin to change if the torque is too far exceeded, indicating a possible snag in the lead or other undo force. A mechanical stop limits the roll to +/- 15-degrees.

The valves have been preset and tested (prior to being painted. See the provided Function Test (A019-959-004) for factory valve settings). Fittings, hoses, and valve parameters were selected and adjusted to provide proper functionality and ease of control of this tool. Changing the valve settings, fitting angles, hose lengths, etc. may result in loss of performance or damage.

2. PRODUCT SUPPORT CONTACTS

24-hour support hotlines

UK: +44 (0) 7774 632 114	Dave Van Epps - USA	Paul Fletcher - UK
USA: +1 561 346 1522	Support Services Manager	Technical Support Manager
Singapore: +65 9663 8310	+1 713 329 8232 – Direct Line	+44 (0) 1751 434 224 - Direct Line
	dave.vanepps@F-E-T.com	paul.fletcher@F-E-T.com

RRC

Rua S 3 n°560 Lt. 12 Qd. Y
 Macaé - RJ, 27933-420, Brazil
 (055) 22 2757-8600

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3. SAFETY



The FLT is heavy and unsuitable for one-man lift. Use appropriate lifting equipment or assistance. Trying to lift heavy components in an awkward position by hand without the assistance of correct lifting equipment, or lifting any component without adopting the correct stance can lead to serious injury. A transport case is provided for transportation. The case should be used to prevent damage to the unit while in transit.

- Treat the FLT with caution - as with any hydraulic/mechanical assembly on the ROV. Always wear eye protection.
- Only authorized and qualified personnel should work on the system.
- Beware of finger trapping risk. Do not insert fingers inside the tool while it is connected to a hydraulic pressure source. This tool can easily sever fingers.
- Do not attempt to tighten any leaking fittings whilst under pressure. Breakage could result leading to injury from flying components and/or oil jets.
- Take care when inspecting, commissioning, repairing or maintaining the system to avoid jets of oil issuing from open orifices, pipe ends etc. if pressure is applied. Particular care should be taken to protect the eyes.
- Trying to lift heavy components in an awkward position by hand without the assistance of correct lifting equipment, or lifting any component without adopting the correct stance can lead to serious injury.
- Be sure to clean the tool externals and underlying surfaces of oil prior to lifting the tool to reduce the chances of the tool slipping from hands and loss of footing.

Pinch points- The FLT has powerful actuators and broad motions which could cause serious bodily injury.

Heavy loads- The equipment is in excess of 1000 lbs. Any body part under this load can be crushed.

Hydraulic spray- Hydraulic fluid is under high pressure and can spray from the system if a hose ruptures, a fitting is loose, too much pressure is used, etc.

Slip and Fall- Hydraulic fluid is used in this tool. Fitting connections are made and broken. As such, there may be slippery fluid drips or spills.

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4. REFERENCE

Flying Lead Tool (TL0017-1000-00). SK-131042-03.

Class 4 Torque Tool (TX00100-300-00 & TX00100-180-00). SK-131042-01

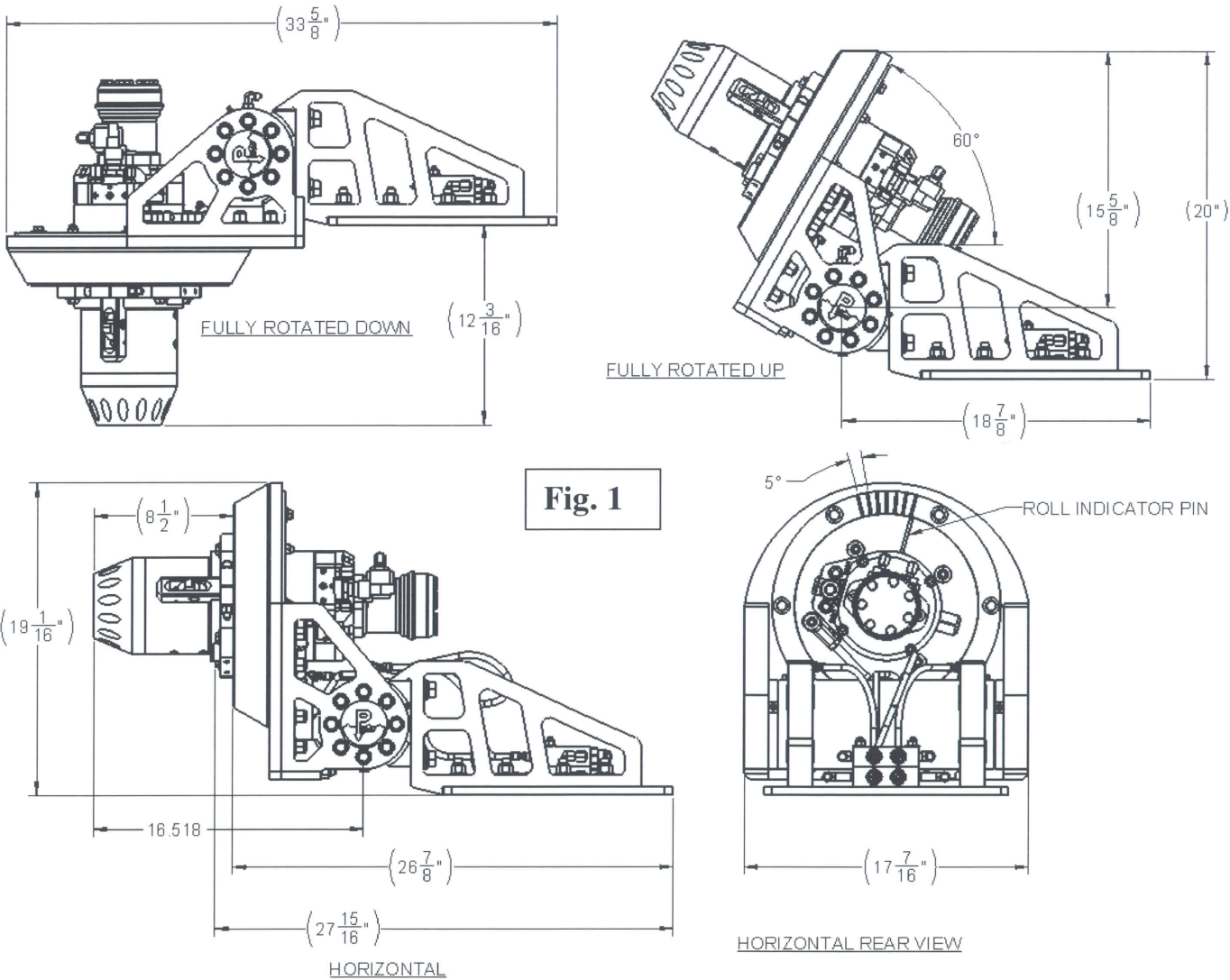
Class 4 Torque Tool Operations & Maintenance Manual (TX0100-950-03). X-288627-01.

Other tools may be found to work with the flying lead tool that are not listed.

5. SPECIFICATIONS

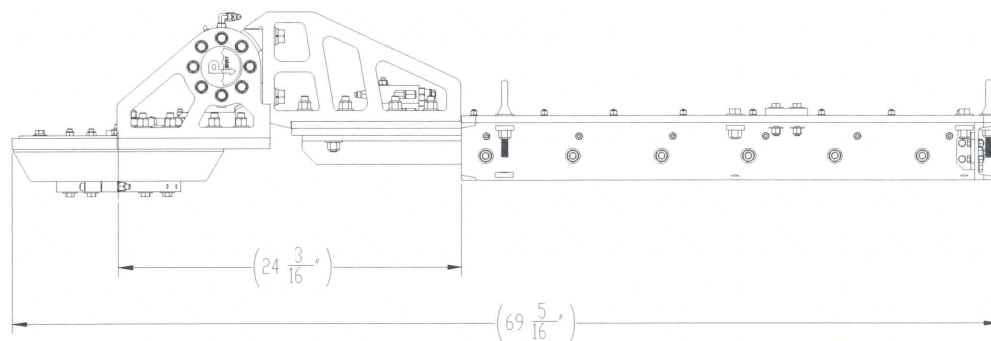
Dry Weight:	171 lbs without torque tool
Submerged Weight:	127 lbs without torque tool
Max Hydraulic Pressure Input:	3000 psi
Max Flowrate Input: N/A	Tool uses inline flow restrictors
Roll:	+/- 15
Pitch From Horizontal Dock Position:	30° Aft, 90° Forward
Dynamic Working Pitch Load (at the end of TT nose):	700 lbs
Dynamic Working Roll Torque:	300 ftlbs
Static Working Roll Torque (Holding):	750ftlbs
Max Static Side Load (at the end of TT nose):	300 lbs
Option: Extending Deck Assembly, Dwg TL0017-5000-00	12-inch stroke

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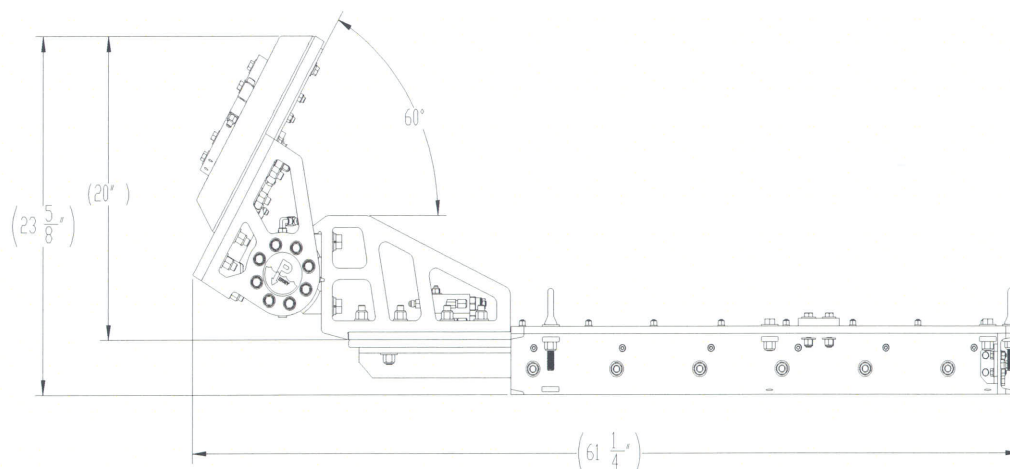


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5.1. FLT MOUNTED ON OPTIONAL DECK EXTENSION



FULLY EXTENDED & ROTATED DOWN



FULLY EXTENDED & ROTATED UP

6. INSTALLING THE FLT

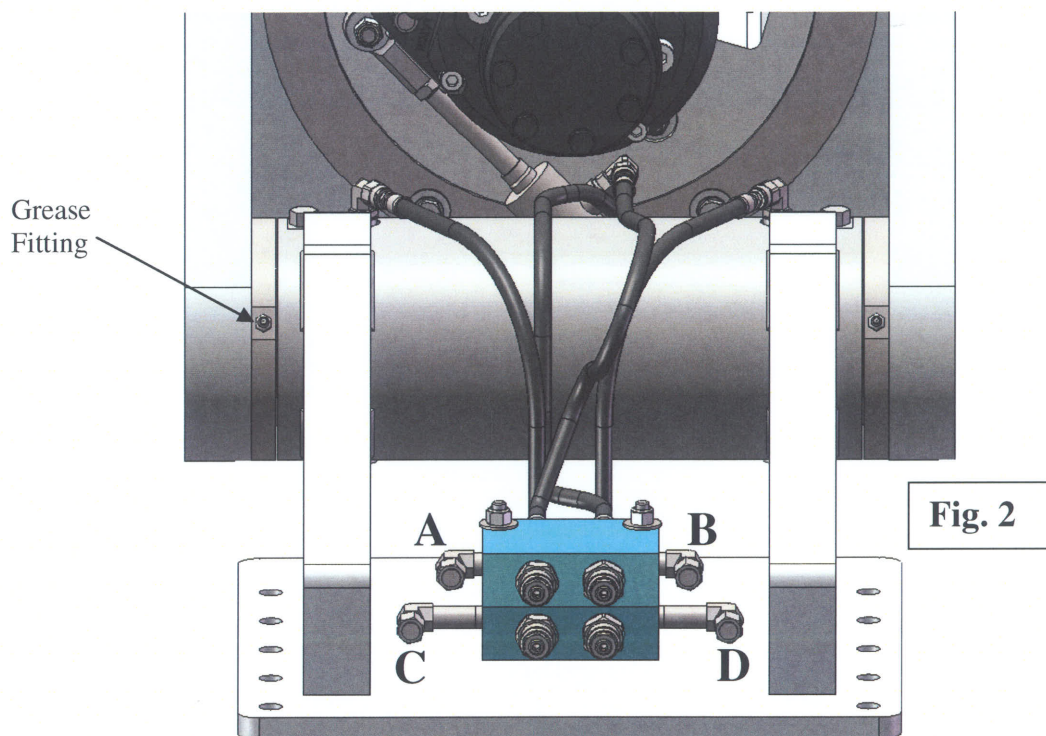
1. Strategically position the FLT on the front of the ROV such that it will not interfere with manipulator operations, cameras, and lights at any position within its operational envelope.
2. Note the bolt hole locations. Create a mounting plate/bracket for mounting the FLT.

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- Once the mounting plate/bracket is installed, mount the FLT to the ROV using all 10 bolts holes and 1/2-13 UNC stainless steel hardware.

BOLT SIZE	TORQUE
1/4"	8.25 ft lbs
3/8"	25 ft lbs
1/2"	45 ft lbs
5/8"	98 ft lbs

- Check all fasteners. Make sure they are torqued to the specifications in the table above.



Attach hydraulics to the FLT's 1/4" JIC valves.

Port A: Roll Counter-Clockwise;

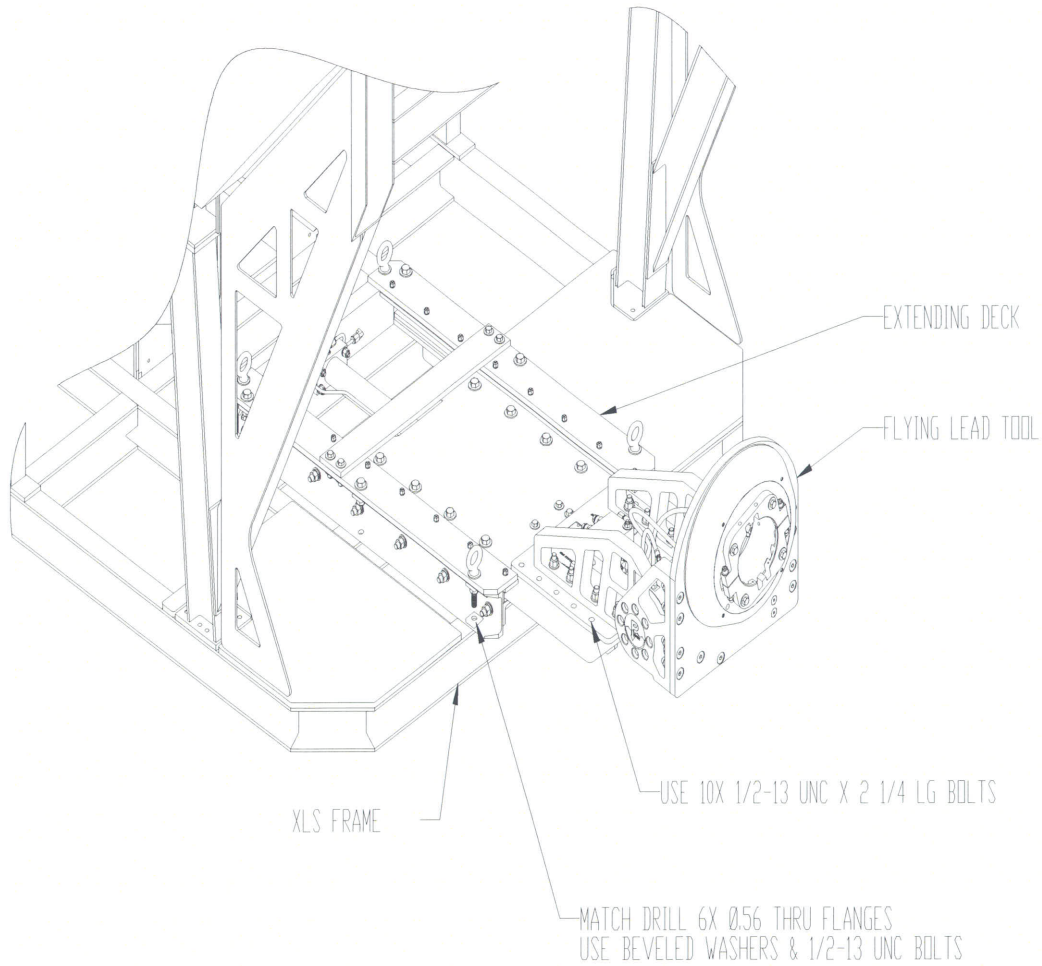
Port B: Roll Clockwise

Port C: Pitch Forward;

Port D: Pitch Aft

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6.1. ISO VIEW OF FLT MOUNTED ON OPTIONAL DECK EXTENSION



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7. TORQUE TOOL INSTALLATION (FOR PERRY TORQUE TOOL)

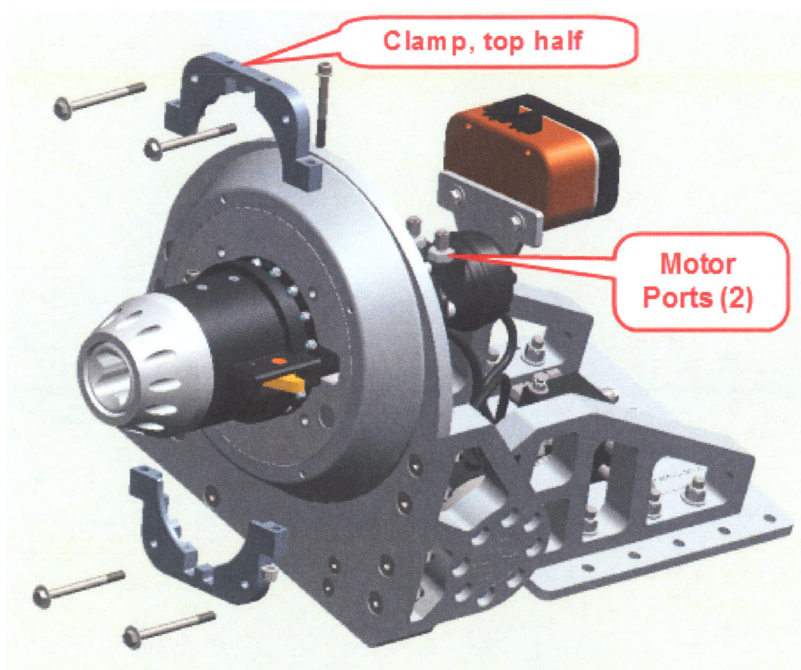


Fig. 3

1. Insert the Torque Tool into the FLT from the rear with the motor ports facing up (Fig 4).

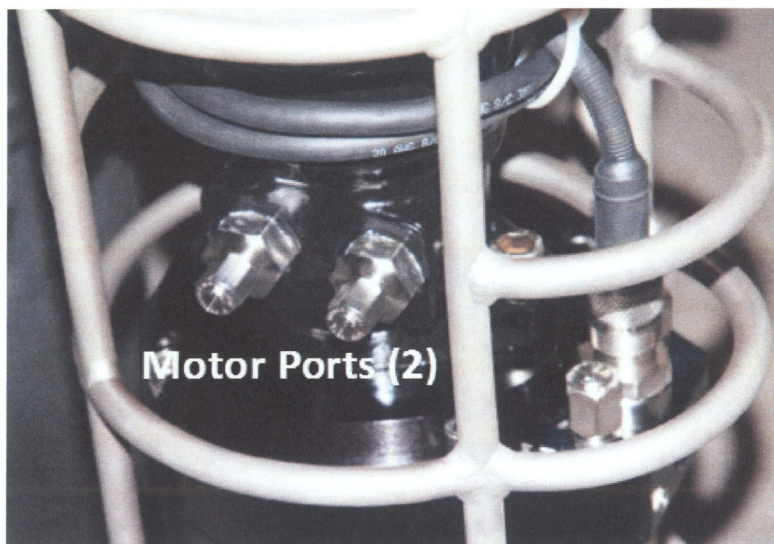


Fig. 4
(install tool in FLT without cage)

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- From the front, install the clamp (item 15 of drawing TL0017-1000-00) on the torque tool (Figures 3 and 5).

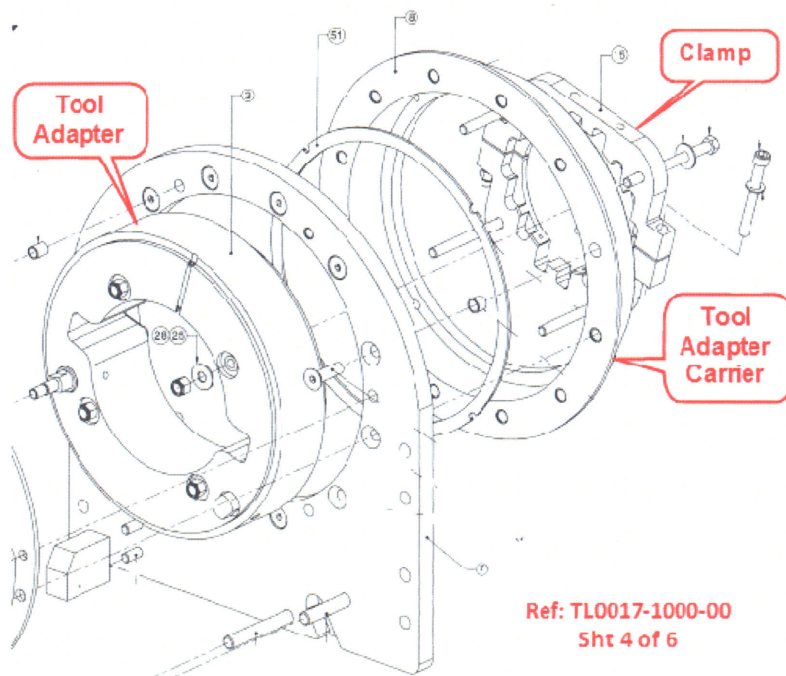


Fig. 5

- Fasten the clamps to the tool adapter per drawing TL0017-1000-00. See also Figure 5.
- Attach hydraulics to the torque tool per the note below. (See also torque tool manual TX0100-950-03).
Use 90° swivel fittings at the motor ports and position them in a “V” so the hoses will go around the motor when the FLT is rotated fully down.

Note: The tool has 4 hose connections (Figures 4 and 6):

- Latch – pressure on this line causes the wing latches to come out. A 1/4” hose is recommended. Releasing pressure causes latches to retract (on springs).
- Drain – needs to be connected to the main return of the ROV system. A 1/4” or 3/8” hose is recommended. Connection is #6 JIC. Do NOT apply pressure to drain port.
- Motor A – connect with a 1/4” hose
- Motor B – connect with a 1/4” hose

If the latch is not needed, then connect the latch port to the drain port and to the casing drain line so that the hydraulic volumes are depth compensated.

We recommend using only input metering with free-flow-return controls to avoid excessive back-pressure.

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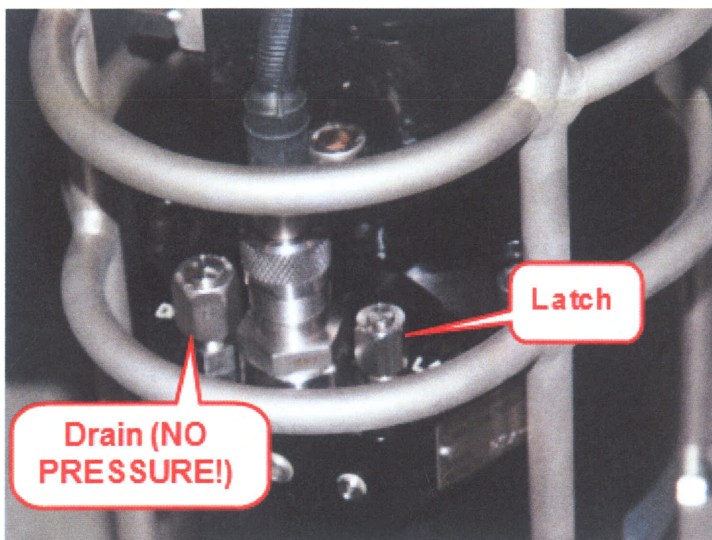


Figure 6

5. When the unit is first connected, set the tool socket side down and drive unloaded for a few minutes while rocking the tool to shift any air pockets. This will drive most air out of the system. There is also a small vent plug on the motor mounting plate.
6. For detailed information on assembled components, refer to DWG TL0017-1000-00, Assembly, Flying Lead Tool, sheets 1-6.

8. FUNCTION TEST

Test the Torque Tool per the following steps.

1. Set hydraulic pressure to 3000psi for the FLT.
2. Activate the roll cylinder (also referred to as a roll actuator) fully in both directions.

The indicator pin should travel fully along the 5° marks (See Figure 7). Check for hose interferences, binding, and leaks. Repeat activation in both directions approximately 4 times to remove air bubbles.

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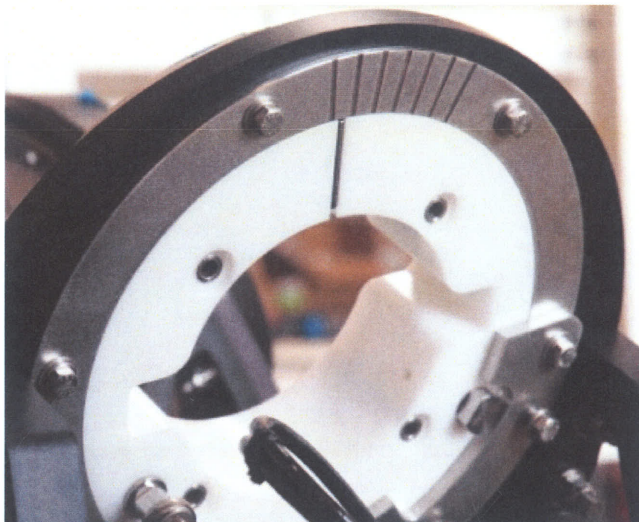


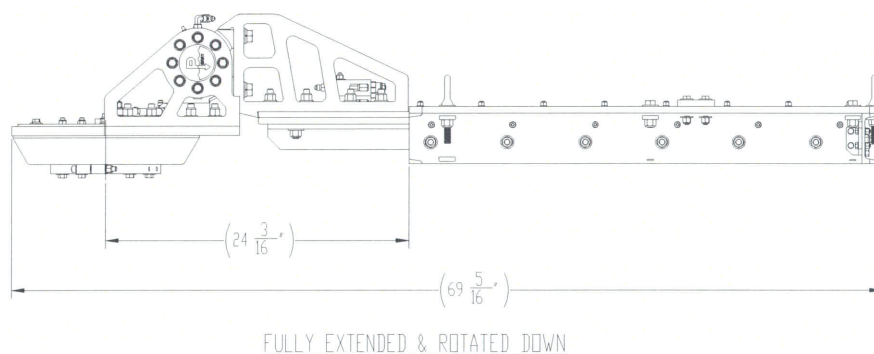
Fig. 7

3. Activate the pitch actuator fully in both directions. The rear of the Torque Tool should not make contact with any part of the FLT during aft travel. Check for any hose interferences, binding, and leaks. Repeat activation in both directions approximately 4 times to remove air bubbles.

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9. MAINTENANCE AND STORAGE

1. Prior to storage, remove the Torque Tool and follow the maintenance steps in the Torque Tool’s Operations and Maintenance Manual.
2. Examine the FLT for relevant physical damage. Any cracked component must be replaced prior to using the FLT again.
3. Clean and paint any area where paint has been scratched or chipped of either of the actuators.
4. Actuate the Roll Cylinder to the fully retracted position to protect the cylinder rod.
5. Actuate the Pitch Actuator fully forward. FLT shown below on optional extension deck.



6. Disconnect the hoses from the ROV (and/or valve block) and cap/plug all ports.
7. Rinse the FLT thoroughly with fresh water. Use compressed air to blow dry.
8. Re-grease the Pitch Actuator shaft and splines by removing the flathead screw from the bottom of each arm and injecting marine grease into the grease fittings (shown in Fig. 2) until about two heaping teaspoons worth of grease comes out of each hole.

9.1. OIL CLEANLINESS TEST

1. Take a sample of oil from the tool.
2. Test cleanliness.
3. Oil should be to NAS 6 or better.
4. If oil does not meet specifications, use the procedure below to flush the tool and refill with Tellus 32 oil.

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9.2. TOOL FLUSHING PROCEDURE

This procedure drains the actuator of oil, flushes the old oil and any air in the system, and refills the actuator with new Tellus 32 oil. This procedure assumes that hydraulic lines to the tool are connected but that pressure in the tool is zero.

1. Remove two plugs located on top of the actuator (Figure 8).

When removed, these plugs allow the ports to act as vents.

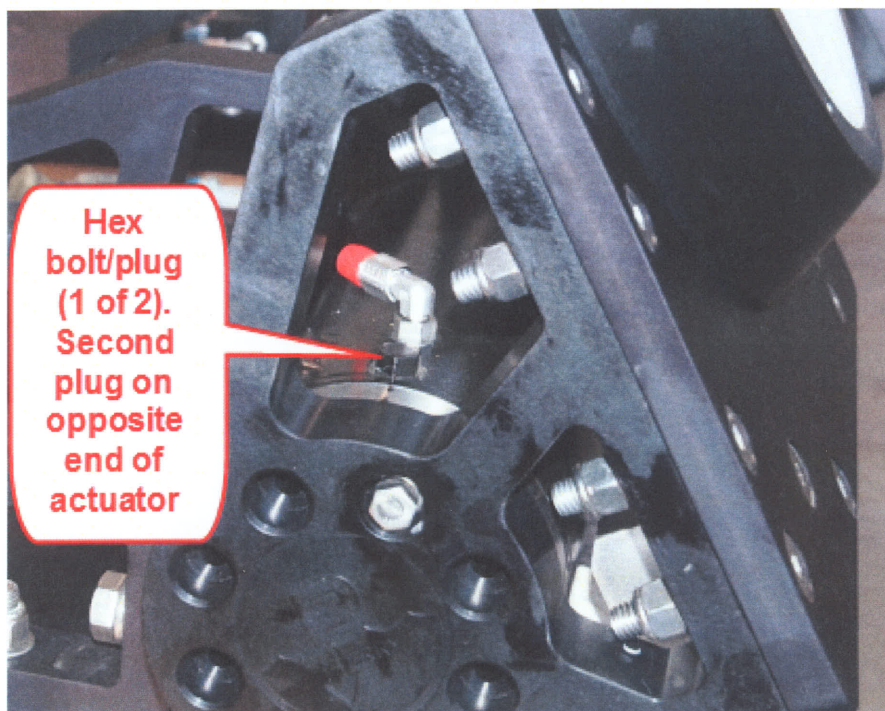


Fig. 8

2. Remove the two drain plugs on the bottom of the actuator (Figure 9).

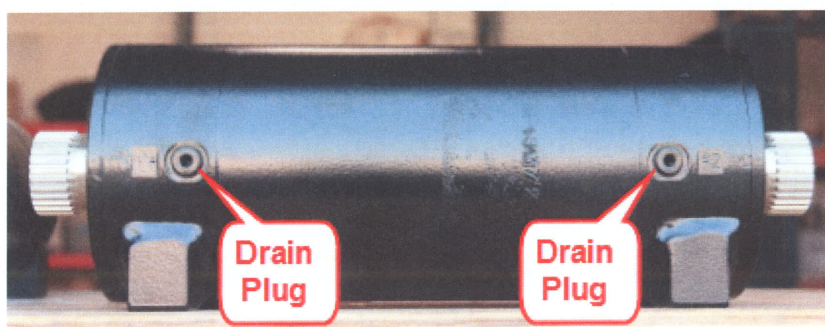


Fig. 9

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3. Allow all fluids to drain.
4. Once actuator is completely drained, reinstall bottom plugs.
5. Refill the actuator with Tellus 32 oil.
Add oil until the oil runs out of the top plugs.
6. Reinstall the top plugs then apply hydraulic power and cycle the tool several times.
Cycling the tool several times will allow any air in the system to bleed into the supply reservoir.
7. Retest oil cleanliness. Flush system again if necessary.

9.3. PRE/POST OPERATIONAL PREVENTIVE MAINTENANCE MATRIX

Action	Prior to/ after use	Prior to/ after shipment	Mobilization	De- mobilization	During Storage (every 6 months)
Wash with fresh water	X			X	
Make good any damage to protective coatings	X		X	X	X (every 6 months)
Check for loose fittings/leaks	X		X	X	
Check for loose fasteners	X	X	X	X	
Preventive Maintenance performed as described above	Date:		Signature:		

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9.4. OPERATIONAL PREVENTIVE MAINTENANCE MATRIX

1. Interval	2. Interval	3. Interval
Weekly	Monthly	
Check unit for operation	Check hose condition	
Check for loose fittings/leaks	Check for loose fittings/leaks	
Check for loose fasteners	Check for loose fasteners	
Maintenance performed as described above	Date:	Signature:

9.5. CORRECTIVE MAINTENANCE CONDITION BASED MAINTENANCE/REFURBISHMENT

Having followed the inspection/maintenance matrices in Preventive Maintenance above, if the condition of any part is considered unfit for further service it should be replaced.

Exceptions are where any protective coating is damaged. In that case, corrosion should be removed as far as practical and the protective coating made good. Leaking or loose fittings should be retightened. If leakage continues, replace the hose or fitting as appropriate.

9.5.1. Assembly/Disassembly

All parts may be dismantled using normal hand tools. Make a note of which parts have been removed, and from where, and ensure all parts are retained. Store and label parts separately to avoid errors during reassembly.

9.5.2. Repair

If a part is found to be faulty, it should be replaced from spares stock rather than attempt a field repair.

9.5.3. Repair of damaged Anodising.

If anodising becomes damaged it can be locally repaired.

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⚠ WARNING

Alodine 1132 is similar to the other conversion coating materials because it contains chromates which are hazardous materials. Therefore, proper precautions, such as the use of appropriate personal protective equipment, need to be taken so that operator exposure to such hazardous materials is minimized.

1. Remove any remaining oxide layer with fine grade wet and dry paper.
2. Clear repair area with solvent cleaner.
3. Apply new coating with Alodine 1132 Prep Pen (photo below).
4. Leave to air dry or can be speed dried with hot air gun.
5. Alodine turns the metal surface an iridescent gold or yellow color.



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