

**Model: 02-7866-0100**  
**Two Stage Tail Jack**

01/2015 - Rev. 02

REVISION	DATE	TEXT AFFECTED
OR	06/2005	Original Release
01	06/2007	No change
02	01/2015	Major Revision

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This product can not be modified without the written approval of Tronair, Inc. Any modifications done without written approval voids all warranties and releases Tronair, Inc., its suppliers, distributors, employees, or financial institutions from any liability from consequences that may occur. Only Tronair OEM replacement parts shall be used.

## 1.0 PRODUCT INFORMATION

### 1.1 DESCRIPTION

Two Stage Tail Jack

### 1.2 MODEL & SERIAL NUMBER

Reference nameplate on unit

### 1.3 MANUFACTURER

**TRONAIR, Inc.**  
1 Air Cargo Pkwy East  
Swanton, Ohio 43558 USA

Telephone: (419) 866-6301 or 800-426-6301  
Fax: (419) 867-0634  
E-mail: sales@tronair.com  
Website: www.tronair.com

### 1.4 FUNCTION

The device is intended to lift and act as a counterweight for the tail of an aircraft. This device is used with other hydraulic jacks arranged by position and quantity to provide proper balance, and in conjunction with the correct jack pad. The maximum load on any one jack must not exceed the rated capacity of the jack.

The jacks are not intended for metal forming, metal working, or any purpose other than that stated above.

## 2.0 SAFETY INFORMATION

### 2.1 USAGE AND SAFETY INFORMATION

To insure safe operations please read the following statements and understand their meaning. Also refer to your equipment manufacturer's manual for other important safety information. This manual contains safety precautions which are explained below. Please read carefully.



**WARNING!** — Warning is used to indicate the presence of a hazard that **can cause severe personal injury, death, or substantial property damage** if the warning notice is ignored.

**CAUTION!** — Caution is used to indicate the presence of a hazard that **will or can cause minor personal injury or property damage** if the caution notice is ignored.

### 2.2 WARNING and DANGER SIGNS

See labels on unit.

#### **WARNING!**



**The ram locknuts are user operated safety devices. Failure to utilize these locknuts may result in personal injury or death.**

### 2.3 COMPONENT SAFETY FEATURES

- **Ram Locknut** manually prevents lowering of the ram. The Ram Locknut must be lowered as the aircraft is being lifted.
- **Ram Ball Lock Pin** manually prevents rising of the ram. The Ram Ball Lock Pin is used in conjunction with the Ram Locknut and is locked in place after the Ram Locknut is lowered.
- **Adapter Ball Lock Pin** attaches tail hold down lug on the aircraft to the jack. The Adapter Ball Lock pin is through the jack adapter and tail hold down lug and locked in place before raising and lowering of aircraft.
- **Flow Control Valve** manually controls speed of the rams.
- **Direction Control Valve ("Neutral" Position)** hydraulically prevents raising and lowering of ram.

### 2.4 FUNCTIONAL SAFETY FEATURES

- **Pressure Relief Valve** prevents overload during raising and lowering operations.

### 2.5 FEATURES FOR OPERATOR SAFETY

- Cautions and Instruction Labels located on jack
- Ram Locknut
- Flow Control Valve
- Ball Lock Pin

### 2.6 ENVIRONMENTAL SAFETY FEATURES

The jack is non-polluting. See Appendix for Material Safety Data concerning the recommended hydraulic fluid (MIL-PRF-5606).

**2.0 SAFETY INFORMATION** *(continued)***2.7 NECESSARY PERSONAL PROTECTIVE EQUIPMENT****CAUTION!**

Always wear safety glasses.

**2.8 SAFETY GUIDELINES****CAUTION!**

Do not place hands on top of jack near ram locknuts while lowering jack. Pinch points exist between locknuts, top of jack and threads on ram.

1. **NEVER** put hands between aircraft and jack adapter, as after aircraft has been lowered struts may have hung up.
2. **ALWAYS** lower ram locknut(s) after jack is under load. Be sure ram locknut(s) is seated fully and ball lock pins are in place after jacking.
3. **ALWAYS** raise and lower jacks simultaneously, so that aircraft remains level.
4. **ALWAYS** make sure flow control valve is shut off before moving direction control valve.
5. **NEVER** operate hand pump with the flow control valve closed.

**WARNING!**

The ram locknuts and ball lock pins are user operated safety devices. Failure to utilize these devices may result in personal injury or death.

**2.9 CONDITIONS FOR SAFE USE**

- Use in a clean dry environment on a level surface.
- Operate between -20° C and 50° C (-4° F and 122° F).

**2.10 OPERATOR QUALIFICATIONS**

This jack is intended to be used by the skilled and trained aircraft technician. The operator must be familiar with the jacking procedures for the aircraft to be raised, and the operation of the jack.

**Installation/Maintenance/Dismantling Qualifications:** This jack is to be installed, maintained, and dismantled by qualified technicians familiar with hydraulic systems.

**2.11 ADDITIONAL SAFETY MEASURES**

This jack must be used in accordance with this manual, and in accordance with the aircraft manufacturer's jacking procedures.

**3.0 PREPARATION PRIOR TO FIRST USE**

This product is shipped completely assembled and tested and requires no further assembly before operation. The following sections apply when servicing the unit.

**3.1 GENERAL INSTRUCTIONS**

1. This product should be assembled and/or repaired using good workmanship practices and proper tools. Bolts and elastic stopnuts should be tightened to a torque not to exceed industry standards for Grade '5' bolts.
2. All replacement parts must be the same as or better than the original parts supplied.
3. Dispose of waste per federal and local laws and regulations.
4. No modifications are allowed that will adversely affect the jack's safety performance.
5. The pressure relief valve is not serviceable. It must be replaced as a unit.

**3.2 PRE-USE CHECKS**

1. Refer to the Illustrated Parts List to identify and ensure that all parts are present.
2. Generally check over unit to assure the tightness of all nuts, bolts and fittings.
3. With rams completely collapsed, check hydraulic fluid level.
  - Replenish with MIL-PRF-5606 fluid as required.
  - Fluid Level: 1.5 in (3.8 cm) below vent.

**NOTE:** Refer to fluid manufacturer's (Appendix) Material Safety Data Sheet, and advisory for handling and disposal of fluid.

**3.3 PERSONNEL REQUIREMENTS**

This jack is to be assembled by qualified technicians familiar with hydraulic systems.

**3.4 INSPECTION AND TEST PROCEDURES**

1. Ensure fluid level is within 1.5 in (3.8 cm) from reservoir vent cap.
2. Raise ram to full stroke, and check for leaks.

## 4.0 TRAINING

### 4.1 TRAINING REQUIREMENTS

The employer of the operator is responsible for providing a training program sufficient for the safe operation of the jack.

### 4.2 TRAINING PROGRAM

The employer provided operator training program should cover safety procedures concerning use of the jack in and around the intended aircraft at the intended aircraft servicing location.

### 4.3 OPERATOR TRAINING

The operator training should provide the required training for safe operation of the jack.

**NOTE: Maintenance and Trouble Shooting are to be performed by a skilled and trained technician.**

## 5.0 OPERATION

### 5.1 OPERATING PARAMETERS

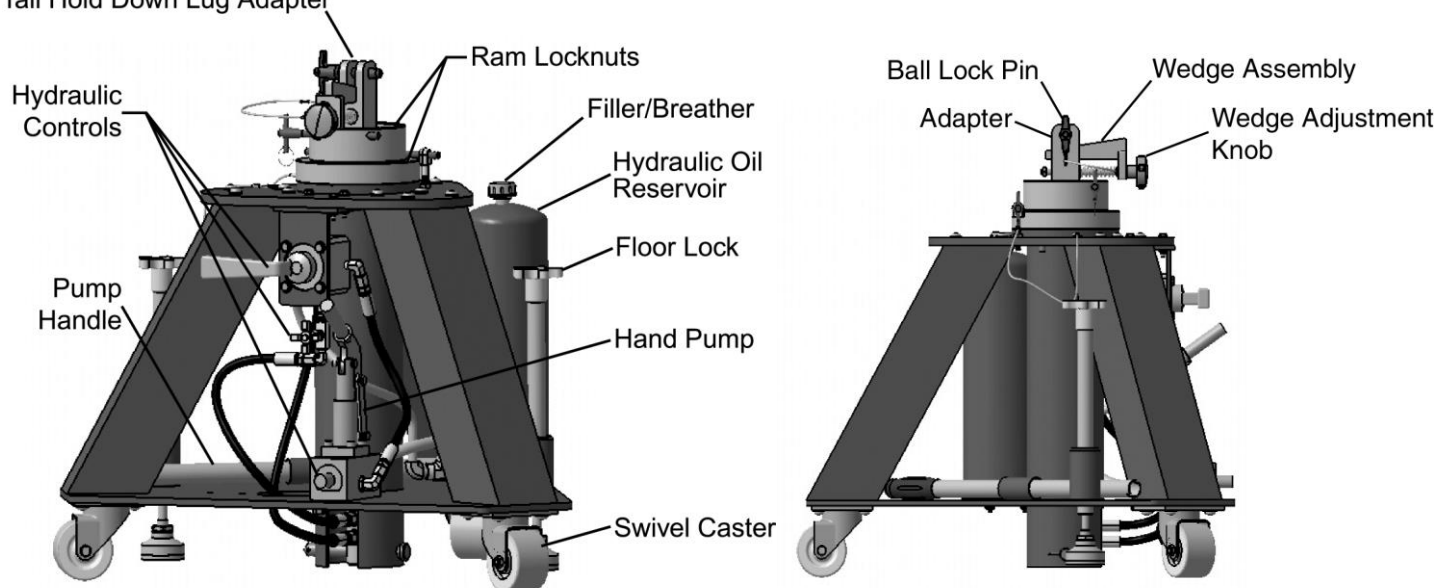
1. The user shall work in accordance with the Operator Manual.
2. At no time shall personnel work in or under the raised aircraft until it is secured by suitable means, i.e. ram locknut and ball lock pins.
3. The employer of the operator shall provide for all necessary training and give information about pumping and translating forces.
4. Operate between -20° C and 50°C (-4° F and 122° F).

### 5.2 NUMERICAL VALUES

- Rated Capacity: 400 lbs (181 kg)
- Minimum Closed Height: 26 13/16 in (68.10 cm)
- Hydraulic Extension: 28 7/16 in (72.23 cm)
- Maximum Height Obtainable: 55 ¼ in (140.33 cm)
- Weight: 470 lbs (213 kg)
- Pressure Relief Setting: 750 + 150/-0 psig (51.7+10.3/-0 bar)

### 5.3 OPERATOR CONTROLS

#### Tail Hold Down Lug Adapter



#### TAIL HOLD DOWN LUG ADAPTER:

**Adapter** supports the aircraft's tail hold down lug

**Wedge Adjust Knob** moves wedge assembly in and out of adapter

**Ball Lock Pin** attaches tail hold down lug on the aircraft to the adapter

**Wedge Assembly** removes up and down movement between the ball lock pin and lug.

## 5.3 OPERATOR CONTROLS *(continued)*

### RAM LOCKNUTS:

**1st Stage Locknut** locks downward movement of the 1<sup>st</sup> stage ram against the 2<sup>nd</sup> stage ram.



#### WARNING!

Pinch points exist between 1<sup>st</sup> stage collar, top of 2<sup>nd</sup> stage ram, and ram threads.

**1st Stage Locking Collar** locks upward movement of the 1<sup>st</sup> stage ram. The collar is threaded over the 1<sup>st</sup> stage locknut and is pinned with a ball lock pin fully inserted through the locking collar.

**2nd Stage Locknut** locks downward movement of the 2<sup>nd</sup> stage ram against the top of jack tripod base.



#### WARNING!

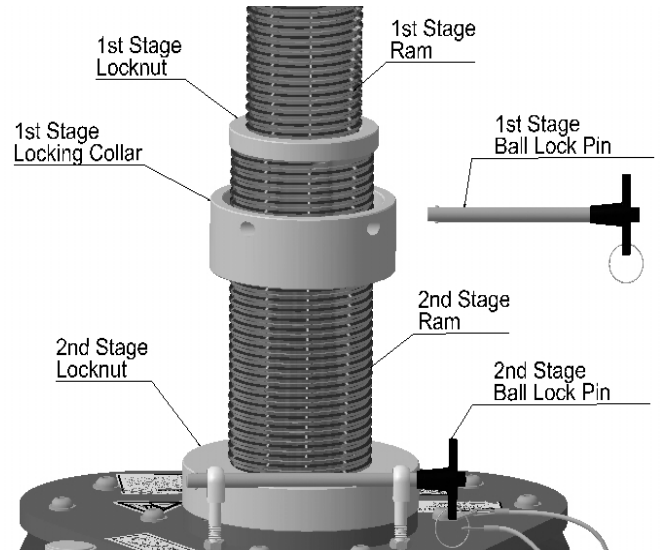
Pinch points exist between 1<sup>st</sup> stage collar, top of jack tripod base, ram threads, and eyebolts when rotating locknut.

**2nd Stage Ball Lock Pin** locks upward movement of the 2<sup>nd</sup> stage ram. Pin is fully inserted through both eyebolts.



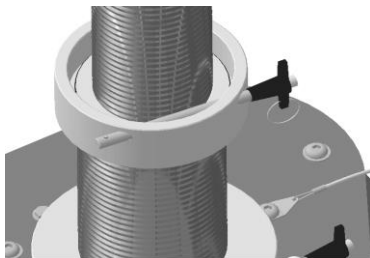
#### WARNING!

The ball lock pins must be fully inserted with ball lock outside collar and eyebolts to prevent pin from bending and unseating. Failure to comply could result in premature failure below certified weight capacity and could cause serious injury including death.

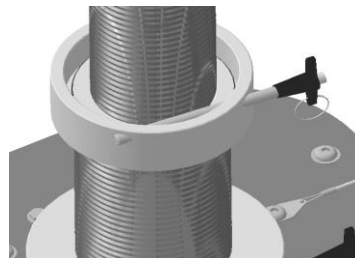


### 1<sup>ST</sup> STAGE LOCKNUT

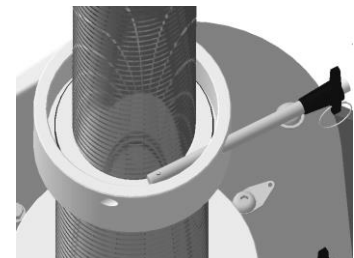
Correct Pin Placement



Incorrect Pin Placement

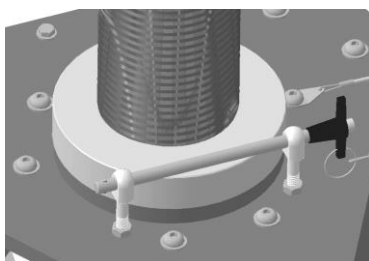


Incorrect Pin Placement

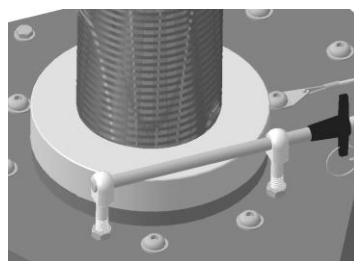


### 2<sup>ND</sup> STAGE LOCKNUT

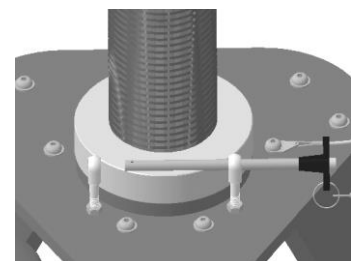
Correct Pin Placement



Incorrect Pin Placement



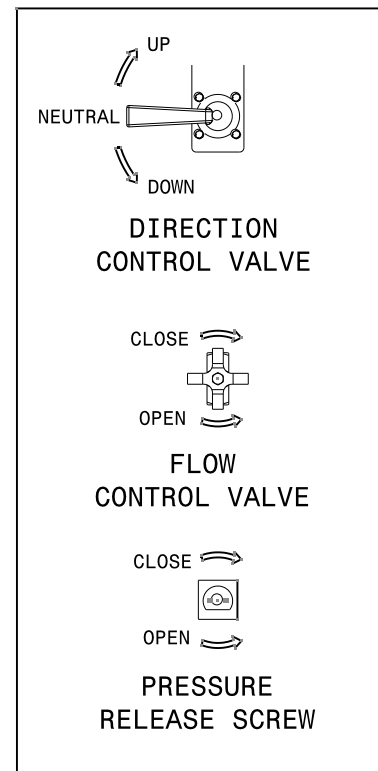
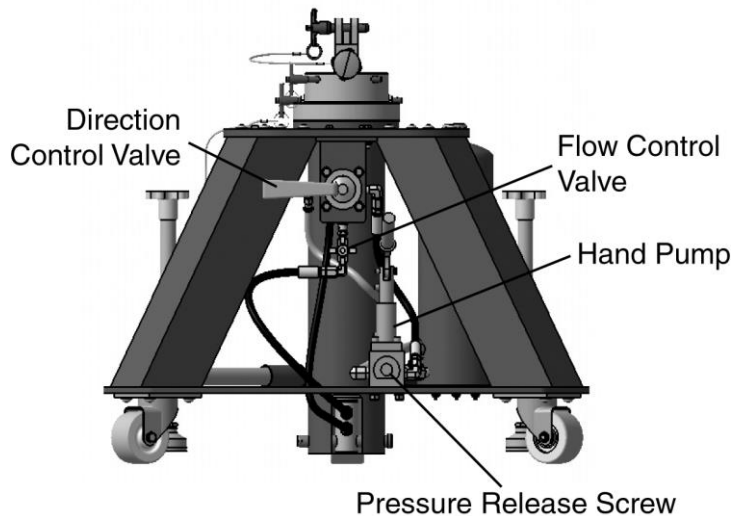
Incorrect Pin Placement



5.3 Operating controls continued on following page.

## 5.3 OPERATOR CONTROLS (continued)

### HYDRAULIC CONTROLS:



**Hand Pump** powers rams up or down.

**Pressure Relief Valve** prevents hydraulic line from being over pressurized. Located in the hand pump's pressure release screw.

**Direction Control Valve** controls direction of rams. The valve has three positions:

- “UP” – powers rams up
- “NEUTRAL” – holds position of rams
- “DOWN” – powers rams down

**Flow Control Valve** controls the speed of rams.

**Pressure Release Screw** allows hand pump to pressurize hydraulic system.

## 5.4 OPERATING INSTRUCTIONS

The user should be familiar with the following statements prior to using the jack(s):



### CAUTION!

1. **NEVER** put hands between aircraft and jack adapter; as after aircraft has been lowered, struts may have hung up.
2. **ALWAYS** lower ram locknut(s) after jack is under load. Be sure ram locknut(s) is seated fully and ball lock pins are in place after jacking.
3. **ALWAYS** raise and lower jacks simultaneously, so that aircraft remains level.
4. **ALWAYS** make sure flow control valve is shut off before moving direction control
5. **NEVER** operate hand pump with the flow control valve closed.

### WARNING!



**When collapsing rams by hand miss-staging may occur and cause pinch points. To collapse ram, add a minimum 50 lb load to the mechanical extension. Keep hands and fingers clear of locking nuts. Failure to adhere to this safety instruction can cause injury.**

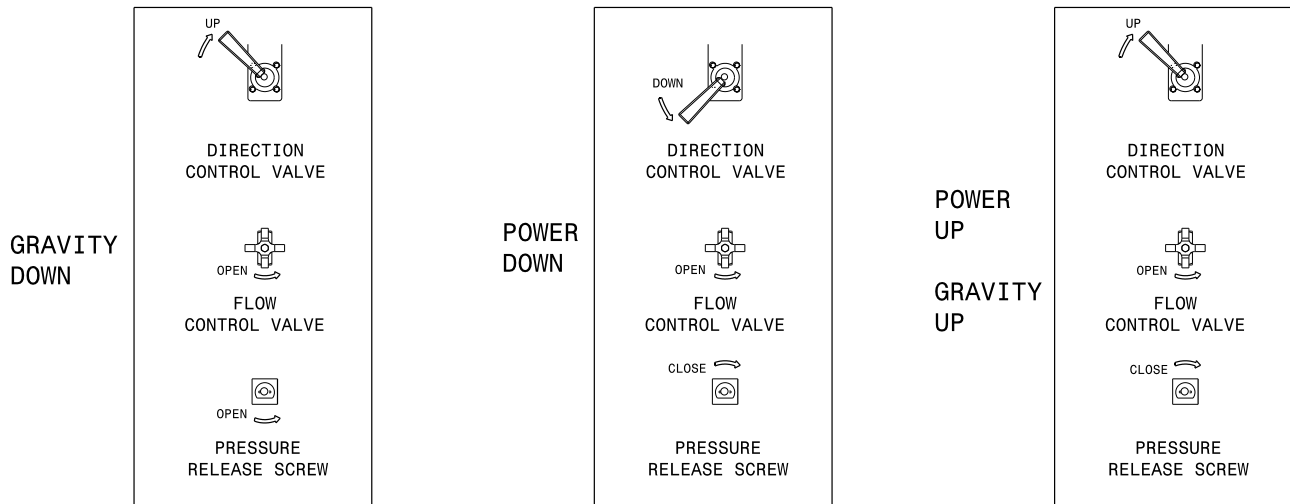
### 5.4.1 Rules For Operating

1. The user shall work in accordance with the Operator and/or Technical Manuals.
2. At no time shall personnel work in or under the raised aircraft until it is secured by suitable means, i.e. ram locknut and ball lock pins.
3. The employer of the operator shall provide for all necessary training and give information about pumping and translating forces.
4. Operate between -20° C and 50°C/-4° F and 122° F.



## 5.4 OPERATING INSTRUCTIONS *(continued)*

### 5.4.2 Jack Controls



#### **Gravity Down - Load is acting downward against the jack:**

1. Move Direction Control Valve to the "UP" position.
2. Slowly "OPEN" the Flow Control Valve.
3. Slowly "OPEN" the Pressure Release Screw.
4. The Pressure Release Screw will control the speed of the rams as load moves the rams downward.

#### **Power Down - Load is acting upward against the jack:**

1. "CLOSE" the Pressure Release Screw.
2. Move Direction Control Valve to the "DOWN" position.
3. Slowly "OPEN" the Flow Control Valve.
4. Operate hand pump to move rams downward.

#### **Power Up - Load is acting downward against the jack:**

1. "CLOSE" the Pressure Release Screw.
2. Move Direction Control Valve to the "UP" position.
3. Slowly "OPEN" the Flow Control Valve.
4. Operate hand pump to move rams upward.

#### **Gravity Up - Load is acting upward against the jack:**

1. "CLOSE" the Pressure Release Screw.
2. Move Direction Control Valve to the "UP" position.
3. Slowly "OPEN" the Flow Control Valve.
4. The Flow Control Valve will control the speed of the rams as load moves the rams upward.

#### **WARNING!**



**In the Gravity Up condition, the load will be uncontrolled if the jack's 1<sup>ST</sup> stage ram is not fully extended. Failure to comply could result in premature failure below certified weight capacity and could cause serious injury including death.**

### 5.4.3 Jack Instructions

#### **To Connect Tail Hold Down Lug:**

1. Remove Ball Lock Pin.
2. Raise jack to Lug.
3. Turn Wedge Knob counter clockwise to back out Wedge Assembly from Jack Adapter.
4. Line up Lug inside Jack Adapter clevis.
5. Install and lock Ball Lock Pin through Jack Adapter and Lug.
6. Turn Wedge Knob clockwise to remove up and down movement between the Ball Lock Pin and Lug.

5.4.3 Jack instructions continued on following page.

5.4.3 Jack Instructions (*continued*)**To Raise Aircraft:**

1. Place jack on a hard, level surface.
2. Raise all jacks simultaneously.
3. Close the Pressure Release Screw.
4. Close the Flow Control Valve.
5. Remove Ball Lock Pins from Ram Locknuts.
6. Position Direction Control Valve to "UP".
7. Slowly open Flow Control Valve and operate Hand Pump.

**CAUTION!**

**Rams will rise up without operating the hand pump when the load condition on the jack is "Gravity Up". Close the Flow Control Valve to stop rams from rising.**

8. Lower Ram Locknuts as aircraft is raised.
9. Close Flow Control Valve after raising aircraft.
10. Position Direction Control Valve to "NEUTRAL".
11. Pin and lock Ram Locknuts in place with Ball Lock Pins.

**To Lower Aircraft:**

1. Lower all jacks simultaneously.
2. Close the Pressure Release Screw.
3. Close the Flow Control Valve.
4. Remove Ball Lock Pins from Ram Locknuts.
5. Raise Ram Locknuts as aircraft is lowered.

**Note: The Ram Locknuts will not loosen if the load condition on the jack is "Gravity Down". Position the Direction Control Valve to "UP", open the Flow Control Valve, and operate hand pump to release and raise Ram Locknuts. Slowly open Pressure Release Screw to lower aircraft.**

6. Slowly position Direction Control Valve to "DOWN".
7. Slowly open Flow Control Valve and operate Hand Pump.

**CAUTION!**

**The Rams will lower without operating the hand pump if the load condition on the jack is "Gravity Down". Position Direction Control Valve to "Neutral" or "UP" to stop rams from lowering.**

8. Close Flow Control Valve after lowering aircraft.
9. Position Direction Control Valve to "NEUTRAL".
10. Pin and lock Ram Locknuts in place with Ball Lock Pins.

**Note: The jack needs to move freely if the aircraft tail jack only is raised or lowered during final leveling.**

1. Turn Floor Locks counter clockwise to unlock jack movement.
2. Place all Swivel Casters parallel with aircraft fuselage.

**6.0 PACKAGING AND STORAGE****6.1 PACKAGING REQUIREMENTS**

Jacks are to be packaged as required to prevent damage to legs or hydraulic equipment during shipment.

**6.2 HANDLING**

Jacks can be rolled by hand on its casters.

**6.3 STRAPPING**

Jacks can be strapped down by suitable means to prevent unwanted movement during shipment.

**6.4 PACKAGING PROTECTION**

No special packaging material for cushioning or suspension is required.

**6.5 LABELING OF PACKAGING**

Packaging should be labeled **DO NOT DROP**.

**6.6 STORAGE ENVIRONMENT**

- Store jacks between -20°C and +50°C/-4° F and 122° F.
- Always store jack with ram all the way down.
- Suitable for outdoor storage by using a full coverage waterproof tarp or canvas.

## 6.7 STORAGE SPACE AND HANDLING FACILITIES

- Minimum Closed Height: 26 13/16 in (68.10 cm)
- Hydraulic Extension: 28 7/16 in (72.23 cm)
- Maximum Height Obtainable: 55 ¼ in (140.33 cm)
- Weight: 470 lbs (213 kg)

## 7.0 TRANSPORTATION

Lifting can be accomplished by crane and strap through top of tripod, or by fork truck under lower tripod support. Approximate weight is 470 lbs (213 kg).

## 8.0 MAINTENANCE

### 8.1 GENERAL

- All maintenance and/or repair work should be done using good workmanship practices and proper tools.
- The work area should be clean and free of dirt.
- When hydraulic seals and backup rings are removed, every effort should be made to avoid the contact of tools with the critical surfaces of parts. Surface deformities could cause degradation of seals and failure.
- It is good practice to replace hydraulic seals once removed. Cut and damaged hydraulic seals normally result in fluid leakage.
- At this time, flush old hydraulic fluid and dirt from overall system and replenish with new, clean hydraulic fluid.
- When refilling the hydraulic system the characteristics of the hydraulic fluid used in the jack and the level of the hydraulic fluid as it is noted on the jack shall be observed.
- Jacks shall be maintained and repaired in accordance with the manufacturers instructions. Qualified persons shall carry out such maintenance and repair.
- No modifications shall be carried out which adversely affect the compliance of the jack with draft standard prEN 1494:1994.

### 8.2 MAINTENANCE SCHEDULE

Check Fluid Level.....	Each Use
Lubricate Casters .....	3 Months
Cleaning .....	Annually Or As Needed
Capacity Test (105%-110% of jack's rated capacity) .....	Annually

**NOTE: Wipe with soft cloth only, do no pressure wash or spray water directly at ram seal.**

#### 8.2.1 Storage/Low Usage:

If jack is unused for 90 days, raise ram to full hydraulic extension, spray ram with DoALL RPM, LPS or equivalent water repellent, BUNA N compatible lubricant.

### 8.3 JACK FUNCTION LOAD TEST

**Note: If function load testing is required:**

1. Take all necessary precautions to prevent injury.
2. Always jack against a load and never against the jack itself.
3. Do not exceed a test load equal to the jack rated capacity plus 10%.

## 9.0 TROUBLE SHOOTING

### 9.1 RAM WILL NOT RISE OR RISES ERRATICALLY

Probable Cause	Corrective Action
High pressure leaks (at joint, plugs or tubing)	Re-tighten or repair
Leaky discharge check valve	Open release valve. Pump rapidly to dislodge Or repair pump
Leaky ram O-ring packing	Replace packing
Leaky release valve	Tighten release valve
Leaky pump O-ring packing	Repair pump
Lack of oil	Refill reservoir with oil (MIL-PRF-5606) Check system for leaks
Sticking inlet check valve	Open release valve. Pump rapidly to dislodge Or repair pump
Ball lock pins installed	See 5.4.3 Jack Instructions - To Raise Aircraft
Flow control valve is closed	See 5.4.3 Jack Instructions - To Raise Aircraft

### 9.2 JACK WILL NOT LOWER

Probable Cause	Corrective Action
Ram lock nut not loosened	Rotate nut as ram is lowered
Broken pump release valve	Repair pump
Bent ram	Replace suspected ram assembly
O-ring (Pinched or rolled)	Replace packing
Flow control Valve is closed	See 5.4.3 Jack Instructions - To Lower Aircraft

## 10.0 PROVISION OF SPARES

### 10.1 SOURCE OF SPARE PARTS

Spare parts may be obtained from the manufacturer:

**TRONAIR**, Inc.

1 Air Cargo Pkwy East  
Swanton, Ohio 43558 USA

Telephone: (419) 866-6301 or 800-426-6301

Fax: (419) 867-0634

E-mail: sales@tronair.com

Website: www.tronair.com

### 10.2 RECOMMENDED SPARE PARTS LISTS

Reference the following page(s) for Replacement Parts and Kits available.

## 11.0 IN-SERVICE SUPPORT

Contact Tronair, Inc. for technical services and information. See Section 1.3 – Manufacturer.

## 12.0 GUARANTEES/LIMITATION OF LIABILITY

Tronair products are warranted to be free of manufacturing or material defects for a period of one year after shipment to the original customer. This is solely limited to the repair or replacement of defective components. This warranty does not cover the following items:

- a) Parts required for normal maintenance
- b) Parts covered by a component manufacturers warranty
- c) Replacement parts have a 90-day warranty from date of shipment

If you have a problem that may require service, contact Tronair immediately. Do not attempt to repair or disassemble a product without first contacting Tronair, any action may affect warranty coverage. When you contact Tronair be prepared to provide the following information:

- a) Product Model Number
- b) Product Serial Number
- c) Description of the problem

If warranty coverage is approved, either replacement parts will be sent or the product will have to be returned to Tronair for repairs. If the product is to be returned, a Return Material Authorization (RMA) number will be issued for reference purposes on any shipping documents. Failure to obtain a RMA in advance of returning an item will result in a service fee. A decision on the extent of warranty coverage on returned products is reserved pending inspection at Tronair. Any shipments to Tronair must be shipped freight prepaid. Freight costs on shipments to customers will be paid by Tronair on any warranty claims only. Any unauthorized modification of the Tronair products or use of the Tronair products in violation of cautions and warnings in any manual (including updates) or safety bulletins published or delivered by Tronair will immediately void any warranty, express or implied.

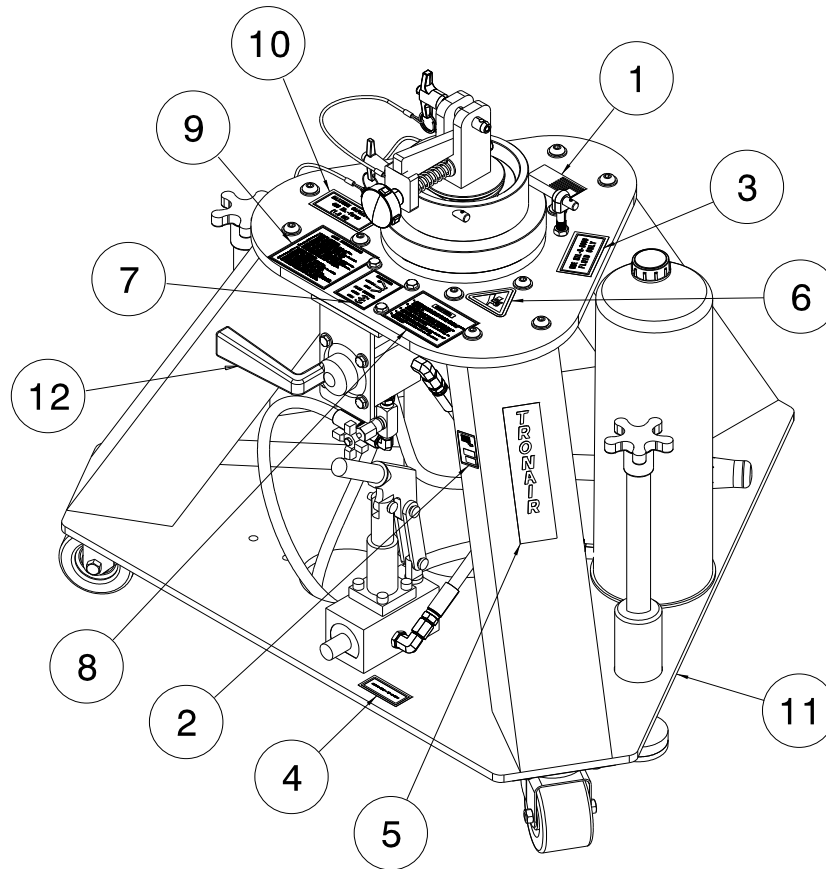
The obligations of Tronair expressly stated herein are in lieu of all other warranties or conditions expressed or implied. **Any unauthorized modification of the Tronair products or use of the Tronair products in violations of cautions and warnings in any manual (including updates) or safety bulletins published or delivered by Tronair will immediately void any warranty, express or implied and Tronair disclaims any and all liability for injury (WITHOUT LIMITATION and including DEATH), loss or damage arising from or relating to such misuse.**

## 13.0 APPENDICES

- APPENDIX I Hydraulic Schematic
- APPENDIX II Hand Pump
- APPENDIX III Safety Data Sheet – MIL-PRF-5606 Hydraulic Fluid
- APPENDIX IV Maintenance Schedule

## Parts List

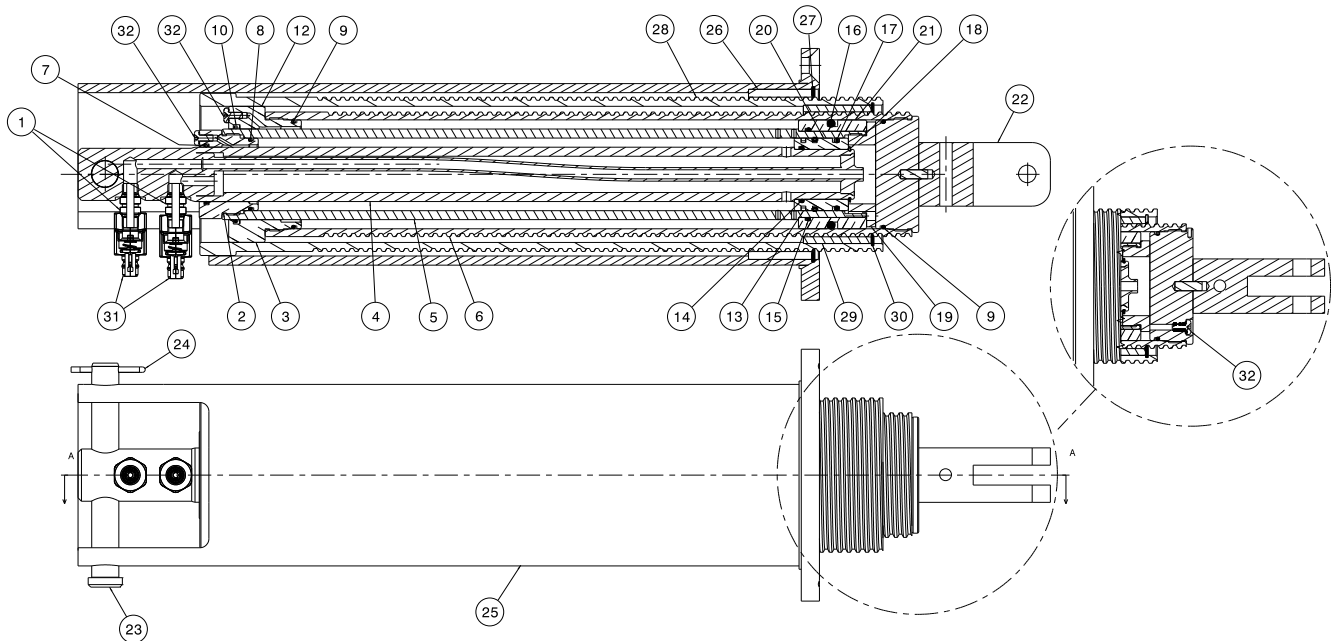
When ordering replacement parts/kits, please specify model, serial number and color of your unit.



Item	Part Number	Description	Qty
1	V-1001	Label, Made in USA	1
2	V-1003	Label, Serial Number	1
3	V-1102	Label, MIL-PRF-5606	1
4	V-1775	Label, Pump Force	1
5	V-1198	Label, Tronair	1
6	V-1999	Label, ISO Hand Crush Force From Above	1
7	V-2092	Label, Hydraulic Controls	1
8	V-2093	Label, Caution	1
9	V-2094	Label, Instruction	1
10	V-2095	Label, 400 lb Capacity	1
11	Z-6123	Assembly, Tripod	1
12	Z-6124	Assembly, Hydraulic	1

## Parts List

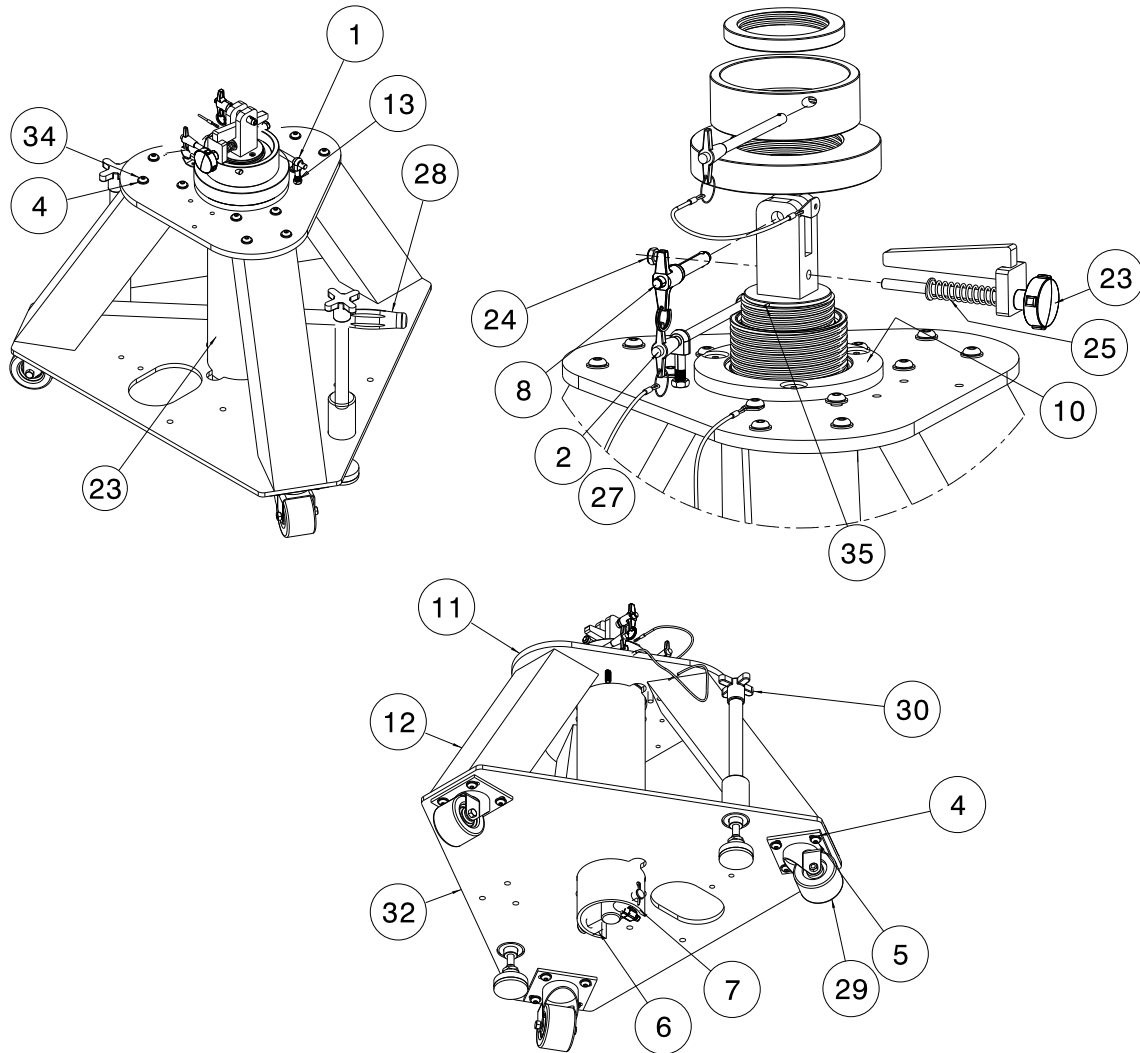
When ordering replacement parts/kits, please specify model, serial number and color of your unit.



Item	Part Number	Description	Qty
1	N-2464-03-S-B	Connector, Straight Thread	2
2	TR-1918	Gland, 1 ½ Rod	1
3	TR-1911	Gland, 2 ½ Rod	1
4	Z-6103	Machining, Ram	1
5	TR-1907	Ram, 2" ID	1
6	TR-1906	Ram, 3" ID	1
7	HC-2000-128	O-Ring, Series 2	1
8	HC-2000-133	O-Ring, Series 2	1
9	HC-2000-149	O-Ring, Series 2	2
10	HC-2000-230	O-Ring, Series 2	1
13	HC-2312-0200	Ring, 2" Piston	2
14	HC-2000-126	O-Ring, Series 2	1
15	HC-2000-142	O-Ring, Series 2	1
16	HC-2000-334	O-Ring, Series 2	1
17	HC-2000-224	O-Ring, Series 2	1
18	G-1395-22	Ring, External Retaining	1
19	HS-1007	Nut, Piston	1
20	R-2199	Piston, 2"	1
21	R-2201	Piston, 3"	1
22	Z-6110	Weldment, Clevis	1
23	G-1302-22	Pin, Clevis	1
24	G-1301-05	Pin, Cotter, 5/32 x 1 ½ Long	1
25	Z-6106	Machining, Main Cylinder	1
26	TR-1919	Ring, Guide	1
27	G-1398-468	Ring, Internal	1
28	TR-1908	Ram, 3.75" ID	1
29	TR-1920	Ring, Guide	1
30	G-1398-381	Ring, Internal	1
31	N-2790-01	Nipple, Quick Disconnect	2
32	G-1535-103004	Screw, Pan HD SS Self-Sealing	3

## Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.



Item	Part Number	Description	Qty
1	H-2838	Rod End, $\frac{3}{8}$ ID x $\frac{3}{8}$ - 16 THD	2
2	G-1524-0665	Pin, T-Handle Ball Lock, SS	1
3	G-1524-0645	Pin, T-Handle Ball Lock, SS	1
4	G-1250-1070N	Flatwasher, $\frac{3}{8}$ Narrow	24
5	G-1154-107214	Screw, Socket Button Head, $\frac{3}{8}$ - 16 x 1 $\frac{1}{2}$ Long	12
8	G-1524-0820	Pin, T-Handle Ball Lock, SS	1
10	G-1152-107212	Screw, Socket Flat head 82°, $\frac{3}{8}$ - 16 x 1 $\frac{1}{4}$ Long	3
11	J-3740	Plate, Top	1
12	J-3725	Leg	3
13	G-1207-1070	Nut, Jam $\frac{3}{8}$ - 16	2
19	TR-1915	Nut, Main Cylinder	1
20	TR-1913	Collar, Locking	1
21	TR-1914	Nut, Last Plunger	1
22	G-1525	Rod, Threaded $\frac{3}{8}$ - 16 x 6 Long	1
23	H-2839	Knob, Torque Limiting, $\frac{3}{8}$ - 16	1
24	G-1203-1070	Jamnut, Elastic, $\frac{3}{8}$ - 16	1



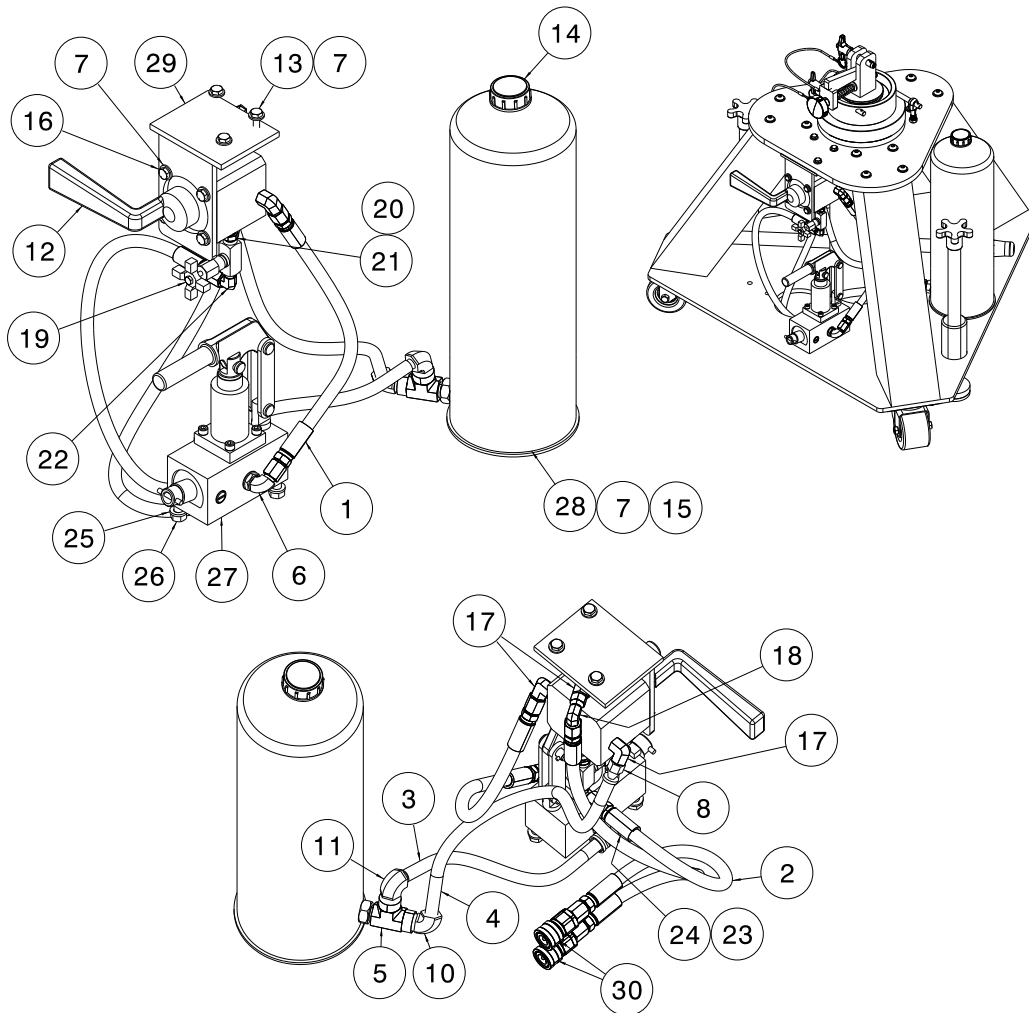
**Parts List**

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
25	G-1526	Spring, compression	1
26	H-1026*07.0	Assembly, Cable	1
27	H-1026*12.0	Assembly, Cable	1
28	H-1009-01	Handle, Assembly	1
29	U-1117	Caster, Seivel	3
30	Z-2964	Assembly, Stabilizer Screw	2
31	Z-6108	Weldment, Wedge	1
32	Z-6114	Weldment, Tripod Support	1
33	Z-6120	Assembly, Cylinder	1
34	G-1154-107212	Screw, Socket Button Head, 3/8 - 16 x 1 1/4 Long	12
35	G-1300-09040	Pin, Roll, 3/32 x 1/2 Long	1

## Parts List

When ordering replacement parts/kits, please specify model, serial number and color of your unit.



Item	Part Number	Description	Qty
1	TF-1043-01*16.0	Assembly, Hose	1
2	TF-1043-01*22.0	Assembly, Hose	2
3	TF-1047-01*09.0	Hose, ¼ ID Push On	1
4	TF-1047-01*16.0	Hose, ¼ ID Push On	1
5	N-2660-01-S-B	Tee, Street, SAE #4	1
6	N-2001-05-S-B	Elbow, Straight Thread	1
7	G-1250-1050N	Flatwasher, ¼ ID Narrow	10
8	N-2026-01-S	Fitting, 37 Flare, .25 Hose Barb	1
10	N-2653-01-S-B	Elbow, 90° Male, ¼ Hose x SAE #4	1
11	N-2653-01-S-B	Elbow, 90° Male, ¼ Hose x SAE #4	1
12	HC-1044-01	Valve, Selector	1
13	G-1100-105010	Bolt, HH GR 5, ¼ - 20 x 1 Long	3
14	H-1045	Breather	1
15	G-1100-105010	Bolt, HH GR 5, ¼ - 20 x 1 Long	3
16	G-1100-105006	Bolt, HH GR 5, ¼ - 20 x ¾ Long	4
17	N-2005-04-S	Elbow, ¼ NPT x ¼ JIC	3
18	N-2002-03-S	Elbow, Swivel Nut #4	1

**Parts List**

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
19	HC-1202-01	Valve, Needle	1
20	N-2009-04-S	Connector, #4 – 4	1
21	N-2030-17-S	Swivel, #4	1
22	N-2005-03-S	Elbow, #4 Male	1
23	N-2410-11	Elbow, 90° Male, ¼ Hose Barbed Fitting	1
25	G-1251-1070R	Lockwasher, ⅜ Regular	2
26	G-1100-107012	Bolt, HH GR 5, ⅜ - 16 x 1 ¼ Long	2
27	HC-2317	Pump, Hydraulic Hand (500 psi)	1
28	HC-2328	Reservoir, Translucent	1
29	Z-6121	Weldment, Valve Bracket	1
30	N-2431-0404	Coupling, Quick Disconnect	2
Not Shown	H-1516-08	Clamp, 2 Ear hose	3



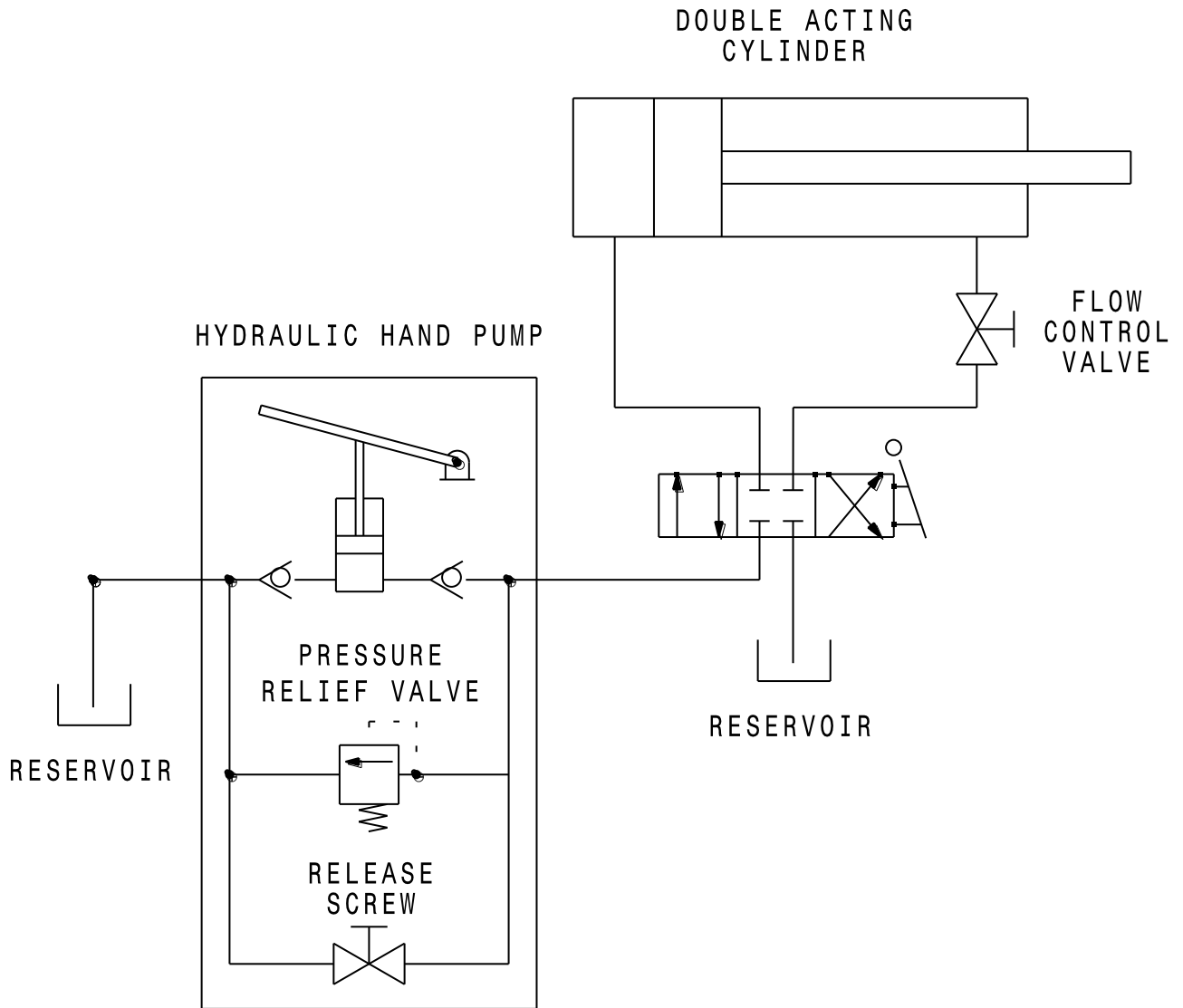


## **APPENDIX I**

### **Hydraulic Schematic**



# Hydraulic Schematic









## **APPENDIX II**

**HC-2317  
Hand Pump**





**Model: HC-2317  
750 psi Hand Pump**

**\*\*\***

**Parts List  
With Illustrations**

01/2015 – Rev. 01

When ordering Replacement Parts/Kits, please specify Model and Serial Number of your Unit.



This product can not be modified without the written approval of Tronair, Inc. Any modifications done without written approval voids all warranties and releases Tronair, Inc., its suppliers, distributors, employees, or financial institutions from any liability from consequences that may occur.

## Parts List

This pump is compatible with MIL-PRF-5606/MIL-PRF-83282 Hydraulic Fluids only.

Reference Parts List Illustration on following page.

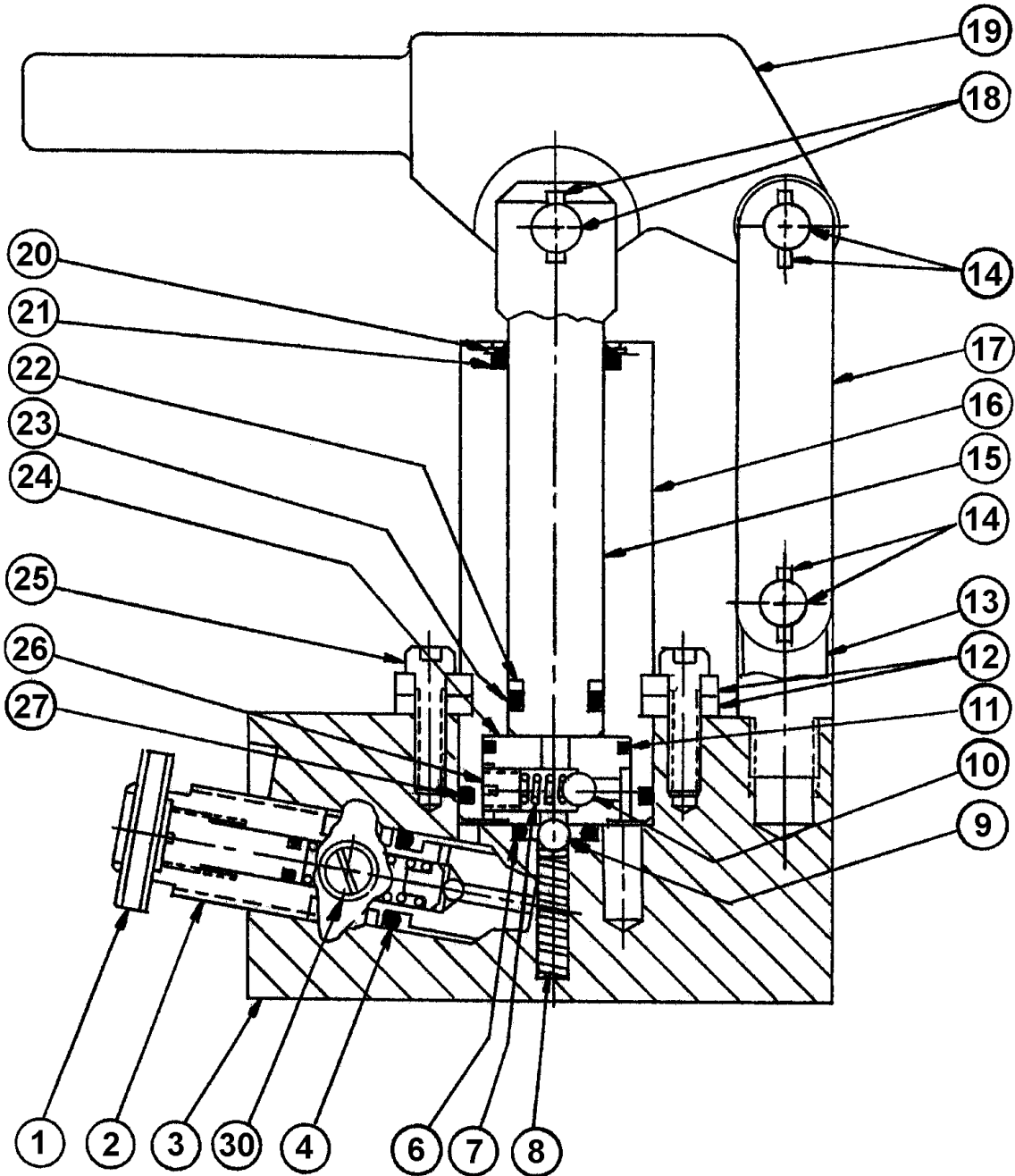
Item	Part Number	Description	Qty
3	5M1-000-001	Body, Pump	1
12	506-000	Half, Flange	4
24	518-000	Screw, Socket Head Cap	4
Not Shown	H-1009-01	Handle	1
	<b>K-1000</b>	<b>Kit, Seal Replacement; consists of:</b>	
4		O-ring, Release Screw	1
6		O-ring, Outlet Check	1
11		O-ring, Valve Body	1
20		Wiper, Rod	1
23		Ring, Backup	1
22		O-ring, Piston	1
27		O-ring, Tube Seal	1
◆ Not Shown		O-ring, Inlet Check	1
◆ Not Shown		O-ring, Guide Shoe	2
◆ Not Shown		Shoe, Piston Guide	1
Not Shown		Tool, Installation	1
	<b>K-1068</b>	<b>Kit, Linkage Replacement; consists of:</b>	
13		Pivot	1
14		Assembly, Linkage Pin	2
17		Strap	2
18		Assembly, Clevis Pin	1
19		Bracket, Pump Handle	1
	<b>K-1069</b>	<b>Kit, Internal Parts Replacement; consists of:</b>	
7		Spring, Inlet Check	1
8		Spring, Outlet Check	1
9		Ball, Outlet Check	1
10		Ball, Inlet Check	1
◆ Not Shown		Ball, Release	1
	<b>K-1777</b>	<b>Kit, Piston/Cylinder Replacement; consists of:</b>	
15		Piston	1
16		Tube	1
24		Assembly, Valve Body (Includes Items 7, 10, 26)	1
	<b>K-5001</b>	<b>Kit, Release Screw Replacement; consists of:</b>	
2		Screw, Release	1
29		Retainer, Screw	1

◆ Although this item is listed in its particular kit, it is not used on HC-2317 pump. These items can be discarded.

**NOTE: Entire pump assembly can be purchased as a kit. See Hydraulic Jack Parts list.**

**Parts List Illustration**

This pump is compatible with MIL-PRF-5606/MIL-PRF-83282 Hydraulic Fluids only.



**WARNING!**



Item 2 is a preset relief valve. Do not disassemble this valve. Replacement parts are available as a preset relief valve assembly.



## **APPENDIX III**

**Safety Data Sheet  
MIL-PRF-5606 Hydraulic Fluid**





## SAFETY DATA SHEET

**SECTION 1 PRODUCT AND COMPANY IDENTIFICATION****PRODUCT**

**Product Name:** MOBIL AERO HFA  
**Product Description:** Base Oil and Additives  
**Product Code:** 201550401020, 490110-00, 970584  
**Intended Use:** Aviation hydraulic oil

**COMPANY IDENTIFICATION**

**Supplier:** EXXON MOBIL CORPORATION  
22777 Springwoods Village Parkway  
Spring, TX. 77253 USA  
**24 Hour Health Emergency** 609-737-4411  
**Transportation Emergency Phone** 800-424-9300 or 703-527-3887 CHEMTREC  
**Product Technical Information** 800-662-4525  
**MSDS Internet Address** <http://www.exxon.com>, <http://www.mobil.com>

**SECTION 2 HAZARDS IDENTIFICATION**

This material is hazardous according to regulatory guidelines (see (M)SDS Section 15).

**CLASSIFICATION:**

Flammable liquid: Category 4.  
Aspiration toxicant: Category 1.

**LABEL:****Pictogram:**

**Signal Word:** Danger

**Hazard Statements:**

H227: Combustible liquid. H304: May be fatal if swallowed and enters airways.

**Precautionary Statements:**

P210: Keep away from flames and hot surfaces. -- No smoking. P273: Avoid release to the environment. P280: Wear protective gloves and eye / face protection. P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P331: Do NOT induce vomiting. P370 + P378: In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish. P403 + P235: Store in a well-ventilated place. Keep cool. P405: Store locked up. P501: Dispose of contents and container in accordance with local regulations.

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**Other hazard information:**

**HAZARD NOT OTHERWISE CLASSIFIED (HNOC):** None as defined under 29 CFR 1910.1200.

**PHYSICAL / CHEMICAL HAZARDS**

Material can accumulate static charges which may cause an ignition. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited. Combustible.

**HEALTH HAZARDS**

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

**ENVIRONMENTAL HAZARDS**

No significant hazards.

**NFPA Hazard ID:** Health: 1 Flammability: 2 Reactivity: 0  
**HMIS Hazard ID:** Health: 1\* Flammability: 2 Reactivity: 0

**NOTE:** This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

**SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS**

This material is defined as a mixture.

**Hazardous Substance(s) or Complex Substance(s) required for disclosure**

Name	CAS#	Concentration*	GHS Hazard Codes
2,6-DI-TERT-BUTYL-P-CRESOL	128-37-0	0.1 - < 1%	H400(M factor 1), H410(M factor 1)
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	5 - < 10%	H304
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	50 - < 70%	H227, H304
HYDROTREATED MIDDLE DISTILLATE (PETROLEUM)	64742-46-7	20 - < 30%	H304
TRIPHENYL PHOSPHATE	115-86-6	0.1 - < 0.25%	H400(M factor 1), H410(M factor 1)

\* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

**SECTION 4 FIRST AID MEASURES**

**INHALATION**

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

#### SKIN CONTACT

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

#### EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

#### INGESTION

Seek immediate medical attention. Do not induce vomiting.

#### NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

### SECTION 5 FIRE FIGHTING MEASURES

#### EXTINGUISHING MEDIA

**Appropriate Extinguishing Media:** Use water fog, foam, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

**Inappropriate Extinguishing Media:** Straight Streams of Water

#### FIRE FIGHTING

**Fire Fighting Instructions:** Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

**Unusual Fire Hazards:** Combustible. Pressurized mists may form a flammable mixture.

**Hazardous Combustion Products:** Aldehydes, Incomplete combustion products, Oxides of carbon, Phosphorus oxides, Smoke, Fume, Sulfur oxides

#### FLAMMABILITY PROPERTIES

**Flash Point [Method]:** >82°C (180°F) [ASTM D-93]

**Flammable Limits (Approximate volume % in air):** LEL: 0.7 UEL: 7.0 [Estimated]

**Autoignition Temperature:** >225°C (437°F)

### SECTION 6 ACCIDENTAL RELEASE MEASURES

#### NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable

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regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

## PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

## SPILL MANAGEMENT

**Land Spill:** Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapor; but may not prevent ignition in closed spaces. Recover by pumping or with suitable absorbent.

**Water Spill:** Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

## ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

<b>SECTION 7</b>	<b>HANDLING AND STORAGE</b>
------------------	-----------------------------

### HANDLING

Avoid contact with skin. Avoid prolonged breathing of mists and heated vapor. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static

accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or GENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

**Static Accumulator:** This material is a static accumulator.

## STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be grounded and bonded. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Substance Name	Form	Limit / Standard		NOTE	Source
2,6-DI-TERT-BUTYL-P-CRESOL	Inhalable fraction and vapor	TWA	2 mg/m <sup>3</sup>	N/A	ACGIH
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT [total hydrocarbon vapor]	Non-Aerosol	TWA	200 mg/m <sup>3</sup>	Skin	ACGIH
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	TWA	5 mg/m <sup>3</sup>	N/A	OSHA Z1
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Inhalable fraction.	TWA	5 mg/m <sup>3</sup>	N/A	ACGIH
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	TWA	5 mg/m <sup>3</sup>	N/A	ACGIH
HYDROTREATED MIDDLE DISTILLATE (PETROLEUM)	Mist.	TWA	5 mg/m <sup>3</sup>	N/A	OSHA Z1
HYDROTREATED MIDDLE DISTILLATE (PETROLEUM)	Inhalable fraction.	TWA	5 mg/m <sup>3</sup>	N/A	ACGIH
TRIPHENYL PHOSPHATE		TWA	3 mg/m <sup>3</sup>	N/A	OSHA Z1
TRIPHENYL PHOSPHATE		TWA	3 mg/m <sup>3</sup>	N/A	ACGIH

**Exposure limits/standards for materials that can be formed when handling this product:** When mists/aerosols can occur the following are recommended: 5 mg/m<sup>3</sup> - ACGIH TLV (inhalable fraction), 5 mg/m<sup>3</sup> - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

### ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions.

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Control measures to consider:  
Use explosion-proof ventilation equipment to stay below exposure limits.

## PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

If prolonged or repeated contact is likely, chemical resistant gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves.

**Eye Protection:** If contact is likely, safety glasses with side shields are recommended.

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

If prolonged or repeated contact is likely, chemical, and oil resistant clothing is recommended.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

## ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

## SECTION 9

## PHYSICAL AND CHEMICAL PROPERTIES

**Note:** Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

## GENERAL INFORMATION

**Physical State:** Liquid  
**Color:** Red

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**Odor:** Characteristic  
**Odor Threshold:** N/D

## IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

**Relative Density (at 15 °C):** 0.88  
**Flammability (Solid, Gas):** N/A  
**Flash Point [Method]:** >82°C (180°F) [ASTM D-93]  
**Flammable Limits (Approximate volume % in air):** LEL: 0.7 UEL: 7.0 [Estimated]  
**Autoignition Temperature:** >225°C (437°F)  
**Boiling Point / Range:** N/D  
**Decomposition Temperature:** N/D  
**Vapor Density (Air = 1):** N/D  
**Vapor Pressure:** [N/D at 20 °C]  
**Evaporation Rate (n-butyl acetate = 1):** N/D  
**pH:** N/A  
**Log Pow (n-Octanol/Water Partition Coefficient):** N/D  
**Solubility in Water:** Negligible  
**Viscosity:** 13.8 cSt (13.8 mm<sup>2</sup>/sec) at 40 °C | 5.1 cSt (5.1 mm<sup>2</sup>/sec) at 100°C [ASTM D 445]  
**Oxidizing Properties:** See Hazards Identification Section.

## OTHER INFORMATION

**Freezing Point:** N/D  
**Melting Point:** N/A  
**Pour Point:** -60°C (-76°F) [ASTM D97]  
**DMSO Extract (mineral oil only), IP-346:** < 3 %wt

## SECTION 10 STABILITY AND REACTIVITY

**REACTIVITY:** See sub-sections below.

**STABILITY:** Material is stable under normal conditions.

**CONDITIONS TO AVOID:** Open flames and high energy ignition sources.

**MATERIALS TO AVOID:** Strong oxidizers

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization will not occur.

## SECTION 11 TOXICOLOGICAL INFORMATION

### INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
<b>Inhalation</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs.

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<b>Ingestion</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
<b>Skin</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	May dry the skin leading to discomfort and dermatitis. Based on assessment of the components.
<b>Eye</b>	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
<b>Sensitization</b>	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
<b>Aspiration:</b> Data available.	May be fatal if swallowed and enters airways. Based on physico-chemical properties of the material.
<b>Germ Cell Mutagenicity:</b> No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
<b>Carcinogenicity:</b> No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
<b>Reproductive Toxicity:</b> No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
<b>Lactation:</b> No end point data for material.	Not expected to cause harm to breast-fed children.
<b>Specific Target Organ Toxicity (STOT)</b>	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

## TOXICITY FOR SUBSTANCES

NAME	ACUTE TOXICITY
2,6-DI-TERT-BUTYL-P-CRESOL	Oral Lethality: LD50 0.89 g/kg (Rat)

## OTHER INFORMATION

### For the product itself:

Repeated and/or prolonged exposure may cause irritation to the skin, eyes, or respiratory tract. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

### Contains:

Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--



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1 = NTP CARC  
2 = NTP SUS

3 = IARC 1  
4 = IARC 2A

5 = IARC 2B  
6 = OSHA CARC

## SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

### ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

### MOBILITY

More volatile component -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

Less volatile component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

### PERSISTENCE AND DEGRADABILITY

#### Biodegradation:

Components -- Expected to be inherently biodegradable

### BIOACCUMULATION POTENTIAL

Majority of components -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

## SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

### DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

### REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

**Empty Container Warning** Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be

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completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

## SECTION 14 TRANSPORT INFORMATION

### LAND (DOT)

**Proper Shipping Name:** COMBUSTIBLE LIQUID, N.O.S. (Distillates (Petroleum), Hydrotreated Light)  
**Hazard Class & Division:** COMBUSTIBLE LIQUID  
**ID Number:** NA1993  
**Packing Group:** III  
**ERG Number:** 128  
**Label(s):** NONE  
**Transport Document Name:** NA1993, COMBUSTIBLE LIQUID, N.O.S. (Distillates (Petroleum), Hydrotreated Light), COMBUSTIBLE LIQUID, PG III

Footnote: This material is not regulated under 49 CFR in a container of 119 gallon capacity or less when transported solely by land, as long as the material is not a hazardous waste, a marine pollutant, or specifically listed as a hazardous substance.

**LAND (TDG):** Not Regulated for Land Transport

**SEA (IMDG):** Not Regulated for Sea Transport according to IMDG-Code

**Marine Pollutant:** No

**AIR (IATA):** Not Regulated for Air Transport

## SECTION 15 REGULATORY INFORMATION

**OSHA HAZARD COMMUNICATION STANDARD:** This material is considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

**Listed or exempt from listing/notification on the following chemical inventories:** AICS, DSL, ENCS, IECSC, KECI, PICCS, TCSI, TSCA

**EPCRA SECTION 302:** This material contains no extremely hazardous substances.

**SARA (311/312) REPORTABLE HAZARD CATEGORIES:** Fire. Immediate Health. Delayed Health.

**SARA (313) TOXIC RELEASE INVENTORY:** This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

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The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	1, 17, 18
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	1, 4, 13, 17, 18
HYDROTREATED MIDDLE DISTILLATE (PETROLEUM)	64742-46-7	1, 4, 17, 18

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

<b>SECTION 16</b>	<b>OTHER INFORMATION</b>
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N/D = Not determined, N/A = Not applicable

**KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):**

H227: Combustible liquid; Flammable Liquid, Cat 4  
 H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1  
 H400: Very toxic to aquatic life; Acute Env Tox, Cat 1  
 H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**

Revision Changes:  
 Section 01: Company Mailing Address information was modified.  
 Section 05: Hazardous Combustion Products information was modified.  
 Section 15: List Citations Table information was modified.  
 Section 15: National Chemical Inventory Listing information was modified.  
 Section 14: Marine Pollutant information was modified.  
 Composition: Component Table information was modified.  
 Section 08: Exposure Limits Table information was modified.  
 Section 16: Revision Information - Implementation of GHS requirements phrase. information was deleted.

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Internal Use Only

MHC: 2A, 0, 0, 0, 1, 1

PPEC: C

DGN: 2005454XUS (552975)

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## **APPENDIX IV**

### **Maintenance Schedule**



## Multi-Stage Tripod Jacks

Tronair recommends performing preventative maintenance on all jacks, which should include a 90-day routine inspection and a 12-month load test.

Model Number \_\_\_\_\_ Serial Number \_\_\_\_\_

Maintenance Performed By \_\_\_\_\_ Date \_\_\_\_\_

### 90-Day Maintenance:

- Check hydraulic system for leaks including the following:
  - Hydraulic lines; hoses and fittings
  - Hand pump; cylinder, fittings and seals
  - Reservoir; welds and fittings
  - Air operated pump (optional equipment); fittings, air side and oil side seals
- Check jack structure for corrosion, bending, cracking and excessive wear including the following:
  - Ball lock pins
  - Mechanical extension
  - Welded joints; tripod legs, cylinder and foot pads
  - Ram retaining rings
  - Ram lock nuts; gouge marks and cracks in threads
  - Jack pads
- Check fluid level with rams fully retracted. See manual or reservoir tag for proper level height
- Extend rams and visually inspect for corrosion, foreign matter, excessive wear and leaks around ram seals. Remove any foreign matter
- Check air operated pump if equipped (reference air operated pump service manual).
- Check paint condition, touch-up areas that are exposed
- Actuate the hand pump and raise the ram to full extension at least once with a minimum weight of 50 lbs applied.  
**Do not** pressurize hydraulic system once fully extended  
**Do not** allow jack to miss-stage when raising the rams to full extension
- Extend rams and visually inspect for corrosion, foreign matter, excessive wear and leaks around ram seals. Remove any foreign matter
- Apply DoAll, RPM, LPS or equivalent water repellant that is Buna N compatible to the rams
- Open release valve and verify that rams fully retract
- Lubricate casters (if applicable)

### Annual (12-Month) Maintenance:

- Check hydraulic fluid for contamination (dirt/water) drain and flush if required
- Perform 90-day maintenance checklist
- Capacity test (105% - 110% of jack's rated capacity)

**NOTE:** The jack may be returned to Tronair for load testing, or sent to a local hydraulic repair shop. Please contact Tronair to obtain a "Return Material Authorization Number" (RMA #) before sending any product to Tronair.

the Tronair group of companies:

[www.tronair.com](http://www.tronair.com) | [www.columbusjack.com](http://www.columbusjack.com) | [www.daeind.com](http://www.daeind.com) | [www.datcomedia.com](http://www.datcomedia.com) | [www.eagletugs.com](http://www.eagletugs.com) | [www.malabar.com](http://www.malabar.com)