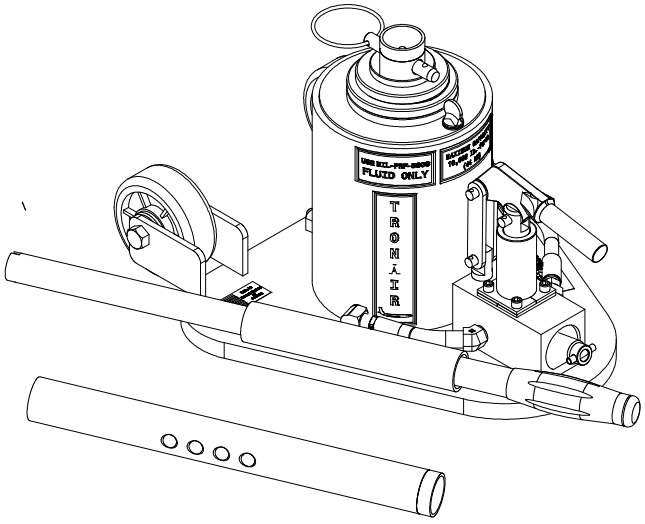
Operation & Service Manual



Model: 02-0511-0132
5 Ton Two Stage Jack

12/2011 – Rev. 11

Includes Illustrated Parts Lists

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REVISION	DATE	TEXT AFFECTED
09	11/2004	pg 2 5.0 added warning and illustrations
10	09/2005	pg 2 Modified 5.1 Jack Instructions
11	12/2011	Major revision

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APPENDIX I HC-1752 2,500 psi Hand Pump Parts List
APPENDIX II MSDS Hydraulic Fluid (MIL-PRF-5606)

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 DESCRIPTION

The Tronair Model 02-0511-0132 two stage hydraulic jack incorporates the following quality features:

- Steel Construction.
- Two-stage telescoping rams.
- Mechanical ram lock nuts that prevent lowering of jack under load.
- Quick action mechanical extension.
- Single speed, manually operated pump with pressure relief.
- Uses standard MIL-PRF-5606 hydraulic fluid.
- Mechanical extensions provided to allow jack to be utilized on other aircraft as shown in specifications.

2.0 USAGE

The purpose of this jack is to lift aircraft for maintenance. It has a maximum capacity of five (5) tons (4.4 kN).

3.0 SPECIFICATIONS

- Vertical capacity: 10,000 lbs. (44.5 kN)
- Minimum closed heights:
  - with R-1013-01 mechanical extension 11.4 in (29 cm)
  - with R-1012-01 mechanical extension 17.5 in (44.6 cm)
- Mechanical extension: 3.0 in (7.6 cm)
- Hydraulic extension: 12.22 in (31 cm)
- Maximum heights obtainable:
  - with R-1013-01 mechanical extension 26.6 in (67.6 cm)
  - with R-1012-01 mechanical extension 32.7 in (83.1 cm)
- Overall: 14 ½ x 15 in (36.8 x 38.1 cm)
- Floor area (triangular): 156 in^2 (1006 cm^2)
- Weight: 100 lbs (45.4 kg)

4.0 ASSEMBLY INSTRUCTIONS

4.1 GENERAL INFORMATION

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. The **3/8** -24 bolts should be tightened to 35 ft-lbs.

All replacement parts must be the same as or equal to the original parts supplied.

4.2 PRE-USE CHECKS

- Refer to the Jack Parts Lists and Illustrations to identify and ensure that all parts are present.
- Generally check over unit to assure the tightness of all fittings.
- With rams completely collapsed, check hydraulic fluid level; fluid level should be 5/8 to ½ inches from the outside top of reservoir. Replenish with MIL-PRF-5606 fluid as required.

5.0 OPERATING INSTRUCTIONS

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

CAUTION!

- **NEVER put hands between aircraft and jack pad, as after aircraft has been lowered, struts may have hung up.**
- **Never align jack under aircraft by pounding on jack legs. Dented legs may lead to jack collapse.**
- **Always lower ram locking nut(s) after jack is under load. Be sure ram nut(s) is seated fully after jacking.**
- **Always raise and lower jacks simultaneously so that aircraft remains level.**
- **Always use a tail or nose stand, as applicable, for additional stability.**

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.

To Raise Aircraft:

1. Place jack on a hard level surface.
2. Hydraulic rams must be completely retracted before operating the jack.
3. Raise mechanical extension as close to aircraft jack pad as possible.

NOTE: Jacks equipped with two mechanical extensions. The difference between the extensions is a length of 6.1 in. Select the extension that best suits the jacking position.

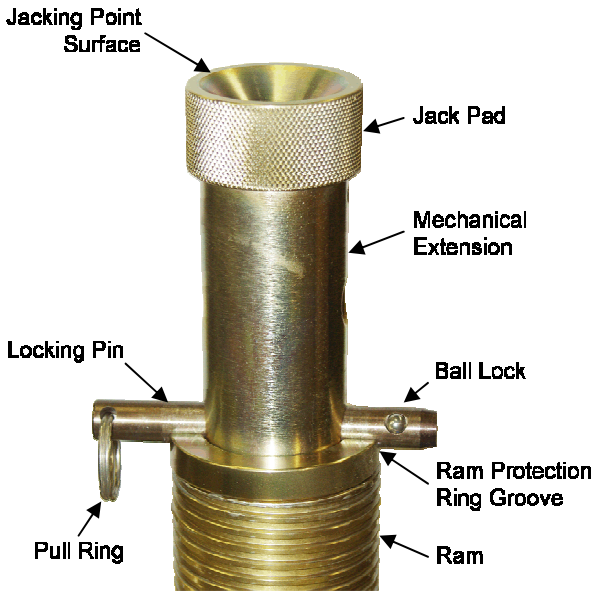
WARNING!

The locking pin MUST be placed in the ram protection ring groove and fully through the mechanical extension.

The locking pin pull ring and ball lock MUST be placed outside the ram protection ring.

- **Visually inspect the jack prior to every use.**
- **Do not place extra locking pins in any other hole on the mechanical extension.**
- **Insure mating surfaces to jack point are free of debris and damage.**
- **Under no conditions should the locking pin pull ring be inside the ram protection ring groove.**
- **Under no conditions should the locking pin's ball lock be inside the ram protection ring groove.**
- **Never use the jack if the ram protection ring is not installed.**
- **Never use the locking pin without a locking pin pull ring.**
- **Never use a locking pin that has been damaged.**
- **Never use a ram protection ring that has been damaged or deformed.**
- **Replace ram protection ring if it does not have a radius groove for the locking pin.**
- **Load test jacks annually.**
- **Only order replacement parts from Tronair.**

Failure to comply could result in premature failure below certified weight and could cause serious injury including death.



CORRECT PIN PLACEMENT

5.0 Operating instructions continued on following page

5.0 OPERATING INSTRUCTIONS *(continued)*

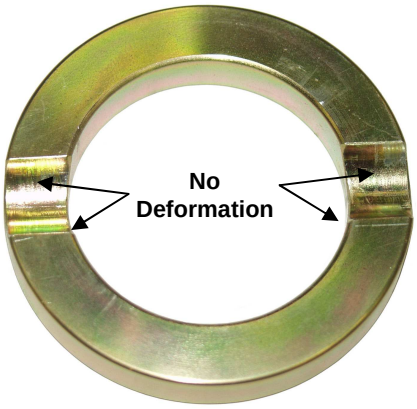
INCORRECT PIN PLACEMENTS

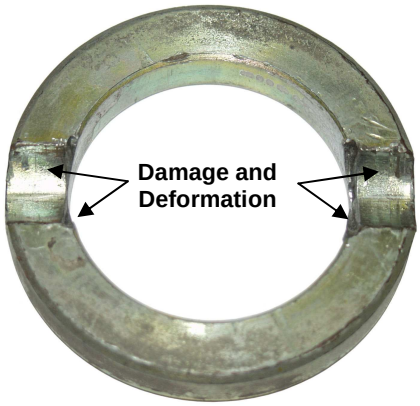
Pull Ring In
Ram Protection Ring

Locking Pin Not In
Ram Protection Ring and
top Locking Pin in Mechanical Extension
(use only one pin)

Ball Lock In
Ram Protection Ring

INCORRECT PIN PLACEMENTS





RESULTS OF INCORRECT LOCKING PIN PLACEMENTS

4. Close pump release valve and operate pump.

NOTE: Turning the pump release valve counter-clockwise lowers the jack. Turning the pump release valve clockwise stops the jacks descent, and allows it to be raised.

5. Hydraulic rams must extend in order form largest to smallest diameter.
6. Lower ram locknut(s) as aircraft is raised. Keep locknuts within 1 inch from bottom of extending ram.
7. Largest diameter hydraulic ram must fully extend before the next stage ram begins to rise.
8. Do not continue to operate hand pump after all rams have fully extended.

WARNING!

The ram locknuts are user operated safety devices. Failure to utilize these locknuts may result in personal injury or death and/or damage to aircraft or equipment.

5.0 OPERATING INSTRUCTIONS *(continued)*

To Lower Aircraft:

1. Lower all jacks simultaneously.
2. If ram locknut(s) is tight, raise jack slightly to release nut(s) ¼ inch from tripod.
3. Ensure proper staging as aircraft is being lowered: loosen ram locknut beginning with smallest ram (1" max) until stage is completely lowered. Repeat for next largest stage.
4. Loosen pump release valve slightly to slowly lower aircraft.

Note: When using jack during washing operations, completely cover top of jack near ram seal.

CAUTION!

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

Always wear safety glasses.

6.0 MAINTENANCE

6.1 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 O-rings 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 both O-rings and backup rings once removed. Cut and damaged rings normally result in fluid leakage.
- At this time flush old hydraulic fluid and dirt from over-all system and replenish with new, clean hydraulic fluid.

6.2 SERVICING JACK

To Disassemble Jack:

1. Raise first stage ram high enough to allow removal of the threaded tube stop.
2. Raise both first and second stage rams **together** to the point where this assembly can be lifted from the jack cylinder.

NOTE: If the second stage ram is allowed to precede the first stage ram, it will fill with oil causing an oil spill when the assembly is removed from the cylinder.

To Re-assemble Jack:

1. Re-assemble in reverse order of above.

NOTE: Lubricate cylinder, ram(s) and o-ring(s) for assembly:
Lubricate inner cylinder wall(s) with MIL-PRF-5606 hydraulic fluid
Apply suitable o-ring lubricant grease to installed o-ring(s) and to o-ring lead-in chamfer at opening of cylinder

NOTE: To minimize air entrapment under the rams. Actuate cylinder with had pump several inches and release. This will circulate oil and bleed out air.

2. Spray I.D. of cylinder and O.D. of rams with DoALL RPM, LPS or equivalent water repellent that will not harm the Buna "N" O-rings to protect surfaces from rusting when not in use.
3. Ensure locknut retaining ring is present on second stage ram to prevent nut removal after seal kit installation.

6.3 REMOVING AND SERVICING PUMP

NOTE: If pump is found faulty, call the factory for replacement or replace seals as follows:

1. Review Illustrated Parts List for Hand Pump (Appendix I)
2. Clamp suction (push on) hose and remove hose from pump.
3. Uncouple output hose from pump.
4. Remove two (2) pump mounting bolts. Remove pump.
5. Remove clevis pin assembly (Item 13).
6. Remove four (4) socket head cap screws.
7. Remove flanges.
8. Remove tube assembly (Item 8).
9. Replace O-rings and back-up ring. (See Appendix I for kits available).
10. Re-assemble in reverse order.

6.4 JACK FUNCTION LOAD TEST

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 5% to 10%.

7.0 TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	ACTION
Fluid leakage at pump piston or pump body	Damaged backup ring, o-ring, piston or pump body	Remove piston and pump body. Inspect for damage. Replace defective part(s). Replace removed o-ring and backup ring
External fluid leakage at rams	Damaged o-ring, backup ring or inner cylinder wall.	Remove rams as a unit from cylinder. Inspect parts. Replace o-ring and defective part(s)
Jack fails to lift rated load	Release valve not closed properly	Fully tighten release valve
	Low fluid level	Fill to correct fluid level
	Pressure relief valve improperly adjusted	Adjust or replace release valve
	Leakage at inlet or outlet check ball	Inspect valve body for wear or replace valve body and check balls
	Vent screw closed	Open vent screw
Rams will not support load after manual or pneumatic pump up	Leaking ram o-ring seals	Check for external leakage, if present replace defective seal and back up ring
	Leaking pressure check valve	Inspect valve body for wear or replace valve body and check balls
	Leaking pressure relief valve	Remove release valve, inspect ball and ball seat in pump block. Replace effective part(s)
Rams raise and fall with each manual pump stroke	Release valve open	Fully tighten release valve
	Inlet check valve not seated or sticking	Pump rapidly to dislodge or replace valve body
	Pressure check valve not seated or sticking	Pump rapidly to dislodge or replace valve body
Jack fails to lower	Ram locknut not loosened	Raise jack ¼ inch and release locknut
	Vent screw closed	Open vent screw
	O-Ring (pinched or rolled)	Replace o-ring and back-up ring, clean up cylinder wall of debris

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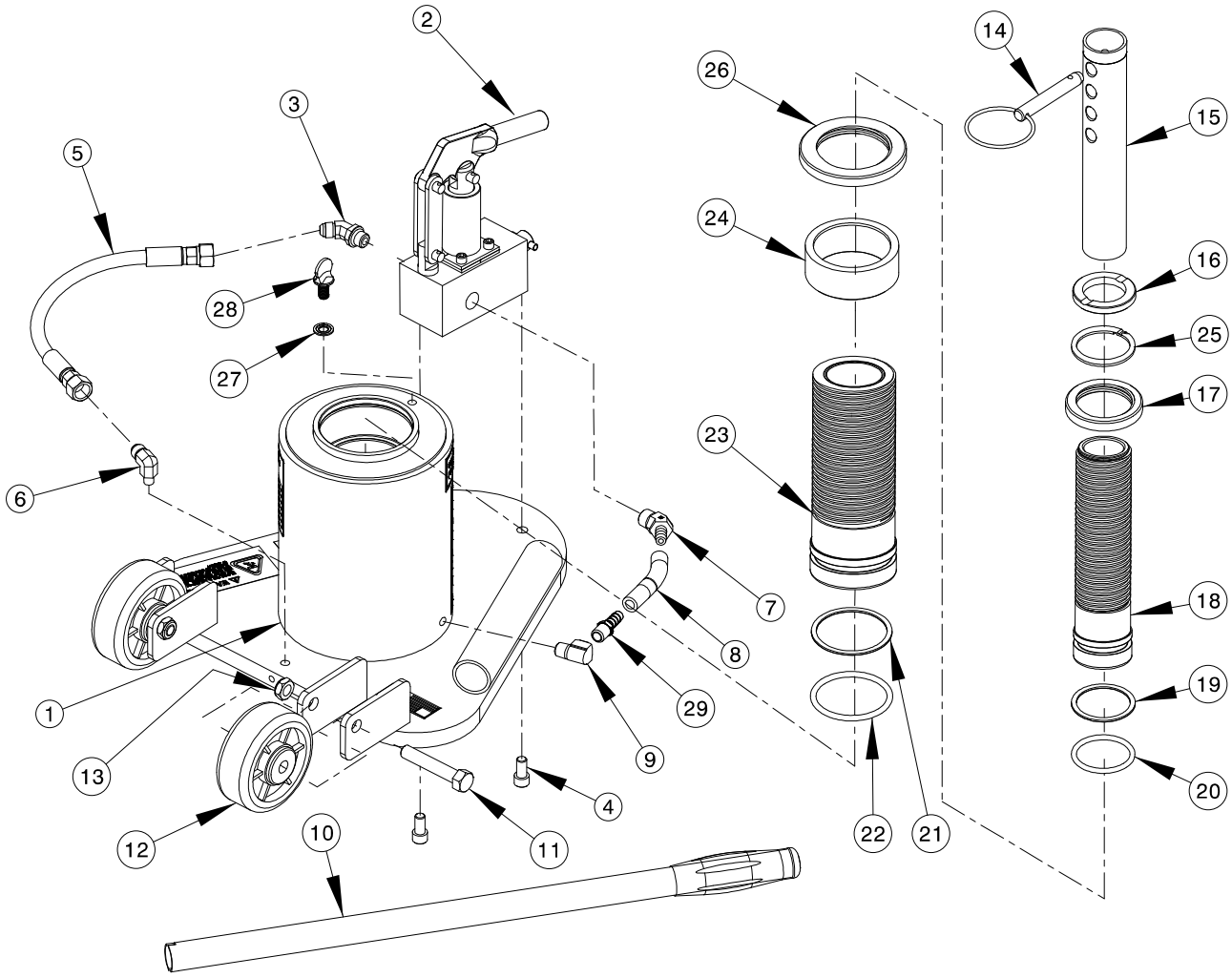
Parts List

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



ITEM	PART NUMBER	DESCRIPTION	QTY
1	Z-7710-01	Assembly Reservoir Tube	1
3	N-2042-05-S-B	Elbow, 45º Male	1
4	G-1151-107206	Socket Head Cap Screw, 3/8 - 16 x ¾ " long	2
5	TF-1043-03*12.5	Hose Assembly, 12.5 long	1
6	N-2005-09-S	Elbow, Male 1/8 – 27 NPT	1
7	N-2409-04	Elbow, 45° Male 3/8 NPT x 3/8 Hose	1
8	TF-1047-04*03.5	Hose, Push On, ¼ x 3 ½" long	1
9	N-2200-03-B	Elbow, 90º ¼ NPT x ¼ NPT	1
10	H-1009-01	Pump Handle	1
11	G-1100-109526	Bolt, Grade 5, ½-20 x 2 ¾" long Hex Head	2
12	U-1002	Wheel	2
13	G-1203-1095	Jamnut, ½-20 Elastic	2
14	G-1307-0825	Pin ½ x 2 ½ " long	1
15	R-1013-01	Extension, Center	1
	R-1012-01	Extension, Center (adds 6.1 inches)	1
16	TR-1026	Ram Protection Ring	1
17	TR-2223	Second Stage Locknut	1
18	Z-7683-04	Second Stage Ram	1
23	Z-7681-04	First Stage Ram Assembly	1
24	TR-2222	Stop Tube	1
25	G-1397-206	Ring, External Retaining	1
26	TR-2230	First Stage Locknut	1

Parts List

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

ITEM	PART NUMBER	DESCRIPTION	QTY
27	G-1281-06	Washer	1
28	G-1177	Thumbscrew Vent	1
29	N-2412-10	Connector, Straight ¼ NPT to 3/8 Hose	1
	K-4588	**Kit, Ram Seal Replacement;** *consists of:*	
19	HC-2020-329	Backup Ring	1
20	HC-2000-329	O-ring	1
21	HC-2020-338	Backup Ring	1
22	HC-2000-338	O-ring	1
	K-1987	**Kit, Hand Pump Replacement**; *consists of:*	
2		See Appendix I	1
	K-1165	**Kit, Wheel Replacement**; *consists of:*	
12		Wheel	1

NOTES: 1. Those items designated as kits contain all hardware necessary for installation.
2. Unless otherwise listed, all replacement bolts should be grade '5' or better.

TRONAIR

APPENDIX I

HC-1752
2,500 psi
Hand Pump Parts List

Model: HC-1752
2,500 psi Hand Pump

***

Illustrated Parts List

08/2001 – Rev. OR

1740 Eber Rd
Holland, OH 43528-9794
USA

Tronair, Inc.
www.tronair.com
Email: sales@tronair.com

Phone: (419) 866-6301
800-426-6301
Fax: (419) 867-0634

HC-1752
2,500 PSI Hand Pump

Parts List

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

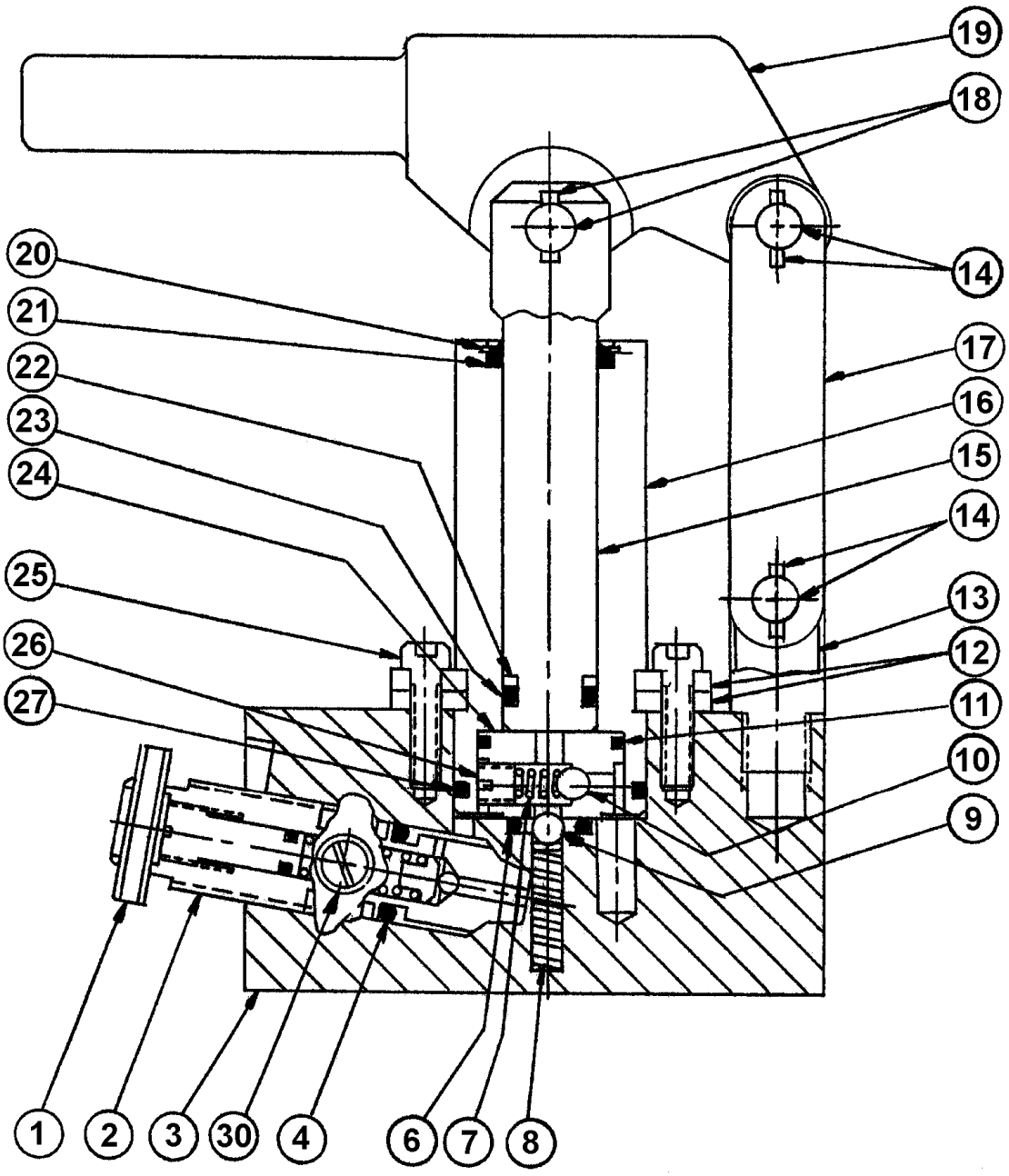
Reference Parts List Illustration on following page.

ITEM	PART NUMBER	DESCRIPTION	QTY
3	5M1-000-001	Body, Pump	1
12	506-000	Half, Flange	4
25	518-000	Screw, Socket Head Cap	4
Not Shown	H-1009-01	Handle	1
	K-1001	**Kit, Seal Replacement**; *consists of:*	
4		O-ring, Release Screw	1
6		O-ring, Outlet Check	1
11		O-ring, Valve Body	1
21		Wiper, Rod	1
22		Ring, Backup	1
23		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
	K-1068	**Kit, Linkage Replacement**; *consists of:*	
13		Pivot	1
14		Assembly, Linkage Pin	2
17		Strap	2
18		Assembly, Clevis Pin	1
19		Bracket, Pump Handle	1
	K-1069	**Kit, Internal Parts Replacement;** *consists of:*	
♦ Not Shown		Ball, Release	1
7		Spring, Inlet Check	1
8		Spring, Outlet Check	1
9		Ball, Outlet Check	1
10		Ball, Inlet Check	1
	K-1778	**Kit, Piston/Cylinder Replacement;** *consists of:*	
15		Piston	1
16		Tube	1
20		Retainer, Wiper	1
24		Assembly, Valve Body (Includes Items 7, 10, 24, 26)	1
	K-1906	**Kit, Piston/Seal Replacement;** *consists of:*	
15		Piston	1
22		Ring, Backup	1
23		O-ring, Piston	1
	K-2783	**Kit, Release Screw Replacement;** *consists of:*	
2		Screw, Release	1
30		Retainer, Screw	1

♦ **Although this item is listed in its particular kit, it is not used on HC-1752 pump. These items may be discarded.**

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

Parts List Illustration



WARNING!

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

TRONAIR

APPENDIX II

MSDS
Hydraulic Fluid
(MIL-PRF-5606)

ExxonMobil

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

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

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300
ExxonMobil Transportation No.	281-834-3296
MSDS Requests	713-613-3661
Product Technical Information	800-662-4525, 800-947-9147
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	10 - 30%
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	30 - 60%
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	64742-55-8	10 - 30%

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

SECTION 3 HAZARDS IDENTIFICATION

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

POTENTIAL PHYSICAL / CHEMICAL EFFECTS

Combustible. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited.

POTENTIAL HEALTH EFFECTS

If swallowed, may be aspirated and cause lung damage. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May be irritating to the eyes, nose, throat, and lungs. High-pressure injection under skin may cause serious damage.

Target Organs: Skin |

NFPA Hazard ID:	Health:	0	Flammability:	2	Reactivity:	0
HMIS Hazard ID:	Health:	0*	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 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. 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 (CO2) 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: Smoke, Fume, Sulfur oxides, Aldehydes, Incomplete combustion products, Oxides of carbon, Phosphorus oxides

FLAMMABILITY PROPERTIES
Flash Point [Method]: >82C (180F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 7.0
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 regulations. U.S. regulations require reporting releases of this material to the environment which exceed the 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 Section 3 for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

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.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid contact with skin. Avoid prolonged breathing of mists and heated vapor. Use proper bonding and/or grounding procedures. Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is a static accumulator.

STORAGE

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. Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

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

Source	Form	Limit / Standard			Note	Source
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)		TWA	2000 mg/m3	500 ppm	N/A	OSHA Z1
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	STEL	10 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	TWA	5 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	Mist.	STEL	10 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	Mist.	TWA	5 mg/m3		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/m³ - ACGIH TLV, 10 mg/m³ - ACGIH STEL, 5 mg/m³ - OSHA PEL.

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

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. 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. Work conditions can greatly effect glove durability; 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
See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION
Physical State: Liquid
Color: Red
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION
Relative Density (at 15 C): 0.88
Flash Point [Method]: >82C (180F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 7.0
Autoignition Temperature: >225°C (437°F)
Boiling Point / Range: 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 mm2/sec) at 40 C | 5.1 cSt (5.1 mm2/sec) at 100C
Oxidizing Properties: See Sections 3, 15, 16.

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

SECTION 10 STABILITY AND REACTIVITY

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.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m3	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data.	Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.

CHRONIC/OTHER EFFECTS

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.

Additional information is available by request.

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

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

Material -- Expected to be harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

Base oil 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:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- 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.

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, corrositivity 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 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) : Not Regulated for Land Transport

LAND (TDG) : Not Regulated for Land Transport

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

ExxonMobil

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

AIR (IATA) : Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: AICS, IECSC, DSL, EINECS, ENCS, KECI, PICCS, TSCA

EPCRA: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: Fire. 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.

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	17, 18, 19
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	1, 4, 13, 17, 18
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	64742-55-8	1, 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

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Revision Changes:
Section 05: Fire Fighting Measures - Unusual Fire Hazards was modified.
Section 10: Conditions to Avoid was modified.
Section 07: Handling and Storage - Handling was modified.
Section 07: Handling and Storage - Storage Phrases was modified.
Section 03: HMIS Flammability was modified.
Section 03: NFPA Flammability was modified.
Section 06: Accidental Release - Spill Management - Land was modified.
Section 09: Flash Point C(F) was modified.
Section 08: Exposure Control was modified.
Section 15: SARA (311/312) REPORTABLE HAZARD CATEGORIES was modified.
Section 16: Land Spill was modified.
Section 14: DOT Technical Name - All was added.
Section 03: Physical/Chemical Hazard was added.
Section 14: Proper Shipping Name - Header was added.
Section 14: Proper Shipping Name was added.
Section 14: Hazard Class & Division - Header was added.
Section 14: Hazard Class was added.
Section 14: UN Number - Header was added.
Section 14: UN Number was added.
Section 14: Packing Group - Header was added.
Section 14: Packing Group was added.
Section 14: Label(s) - Header was added.
Section 14: Label(s) was added.
Section 14: ERG Number - Header was added.
Section 14: ERG Number was added.
Section 14: Transport Document Name - Header was added.
Section 14: Transport Document Name was added.
Section 14: DOT Technical Name - Open parenthesis was added.
Section 14: DOT Technical Name - Close parenthesis was added.
Section 03: Physical/Chemical Hazard was added.
Section 03: Physical/Chemical Hazards - Header was added.
Section 14: DOT Footnote was added.
Section 16: Physical Hazards was added.
Section 16: Physical Hazards - Header was added.
Section 16: Precautions was added.
Section 16: Precautions - Header was added.
Section 10: Conditions to Avoid was deleted.
Section 14: LAND (DOT) - Default was deleted.

PRECAUTIONARY LABEL TEXT:
Contains: DISTILLATES (PETROLEUM), HYDROTREATED LIGHT
CAUTION!

HEALTH HAZARDS
Repeated exposure may cause skin dryness or cracking. If swallowed, may be aspirated and cause lung damage.
Target Organs: Skin |

PHYSICAL HAZARDS
Combustible.

PRECAUTIONS
Use proper bonding and/or grounding procedures.

FIRST AID
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.

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

Oral: Seek immediate medical attention. Do not induce vomiting. If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

Skin: Wash contact areas with soap and water. 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.

FIRE FIGHTING MEDIA
Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

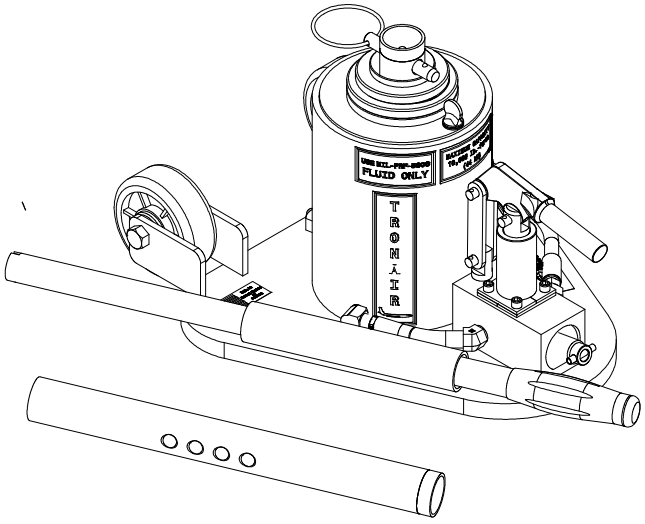
SPILL/LEAK
Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. 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.
Use
Not intended or suitable for use in or around a household or dwelling.

Internal Use Only
MHC: 2A,0,0,0,0,1 PPEC: C

DGN: 2005454XUS (552975)

Operation & Service Manual



Model: 02-0511-0132
5 Ton Two Stage Jack

12/2011 – Rev. 11

Includes Illustrated Parts Lists

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REVISION	DATE	TEXT AFFECTED
09	11/2004	pg 2 5.0 added warning and illustrations
10	09/2005	pg 2 Modified 5.1 Jack Instructions
11	12/2011	Major revision

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2.0 USAGE 1
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6.4 JACK FUNCTION LOAD TEST 4
7.0 TROUBLE SHOOTING 5

APPENDIX I HC-1752 2,500 psi Hand Pump Parts List
APPENDIX II MSDS Hydraulic Fluid (MIL-PRF-5606)

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 DESCRIPTION

The Tronair Model 02-0511-0132 two stage hydraulic jack incorporates the following quality features:

- Steel Construction.
- Two-stage telescoping rams.
- Mechanical ram lock nuts that prevent lowering of jack under load.
- Quick action mechanical extension.
- Single speed, manually operated pump with pressure relief.
- Uses standard MIL-PRF-5606 hydraulic fluid.
- Mechanical extensions provided to allow jack to be utilized on other aircraft as shown in specifications.

2.0 USAGE

The purpose of this jack is to lift aircraft for maintenance. It has a maximum capacity of five (5) tons (4.4 kN).

3.0 SPECIFICATIONS

- Vertical capacity: 10,000 lbs. (44.5 kN)
- Minimum closed heights:
  - with R-1013-01 mechanical extension 11.4 in (29 cm)
  - with R-1012-01 mechanical extension 17.5 in (44.6 cm)
- Mechanical extension: 3.0 in (7.6 cm)
- Hydraulic extension: 12.22 in (31 cm)
- Maximum heights obtainable:
  - with R-1013-01 mechanical extension 26.6 in (67.6 cm)
  - with R-1012-01 mechanical extension 32.7 in (83.1 cm)
- Overall: 14 ½ x 15 in (36.8 x 38.1 cm)
- Floor area (triangular): 156 in^2 (1006 cm^2)
- Weight: 100 lbs (45.4 kg)

4.0 ASSEMBLY INSTRUCTIONS

4.1 GENERAL INFORMATION

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. The **3/8** -24 bolts should be tightened to 35 ft-lbs.

All replacement parts must be the same as or equal to the original parts supplied.

4.2 PRE-USE CHECKS

- Refer to the Jack Parts Lists and Illustrations to identify and ensure that all parts are present.
- Generally check over unit to assure the tightness of all fittings.
- With rams completely collapsed, check hydraulic fluid level; fluid level should be 5/8 to ½ inches from the outside top of reservoir. Replenish with MIL-PRF-5606 fluid as required.

5.0 OPERATING INSTRUCTIONS

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

CAUTION!

- **NEVER put hands between aircraft and jack pad, as after aircraft has been lowered, struts may have hung up.**
- **Never align jack under aircraft by pounding on jack legs. Dented legs may lead to jack collapse.**
- **Always lower ram locking nut(s) after jack is under load. Be sure ram nut(s) is seated fully after jacking.**
- **Always raise and lower jacks simultaneously so that aircraft remains level.**
- **Always use a tail or nose stand, as applicable, for additional stability.**

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.

To Raise Aircraft:

1. Place jack on a hard level surface.
2. Hydraulic rams must be completely retracted before operating the jack.
3. Raise mechanical extension as close to aircraft jack pad as possible.

NOTE: Jacks equipped with two mechanical extensions. The difference between the extensions is a length of 6.1 in. Select the extension that best suits the jacking position.

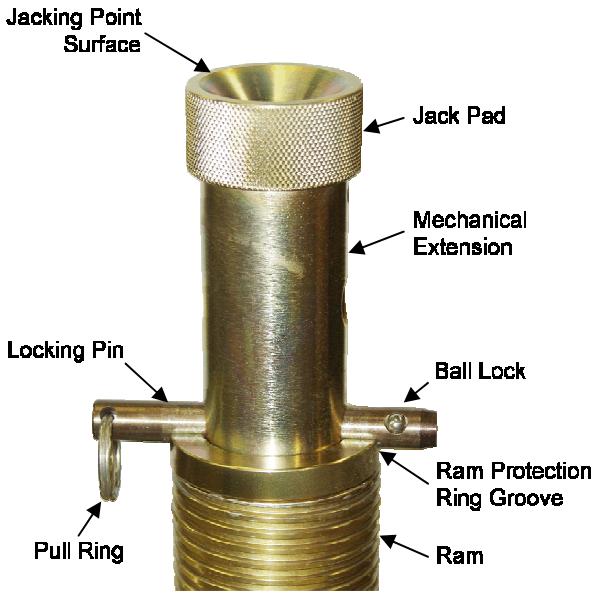
WARNING!

The locking pin MUST be placed in the ram protection ring groove and fully through the mechanical extension.

The locking pin pull ring and ball lock MUST be placed outside the ram protection ring.

- **Visually inspect the jack prior to every use.**
- **Do not place extra locking pins in any other hole on the mechanical extension.**
- **Insure mating surfaces to jack point are free of debris and damage.**
- **Under no conditions should the locking pin pull ring be inside the ram protection ring groove.**
- **Under no conditions should the locking pin's ball lock be inside the ram protection ring groove.**
- **Never use the jack if the ram protection ring is not installed.**
- **Never use the locking pin without a locking pin pull ring.**
- **Never use a locking pin that has been damaged.**
- **Never use a ram protection ring that has been damaged or deformed.**
- **Replace ram protection ring if it does not have a radius groove for the locking pin.**
- **Load test jacks annually.**
- **Only order replacement parts from Tronair.**

Failure to comply could result in premature failure below certified weight and could cause serious injury including death.



CORRECT PIN PLACEMENT

5.0 Operating instructions continued on following page

5.0 OPERATING INSTRUCTIONS *(continued)*

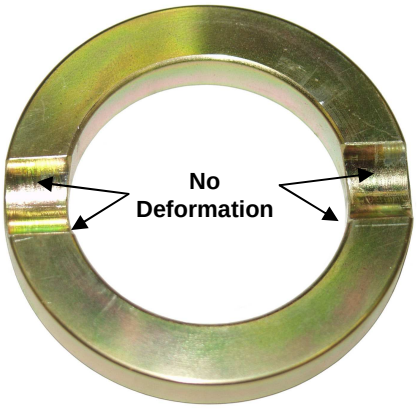
INCORRECT PIN PLACEMENTS

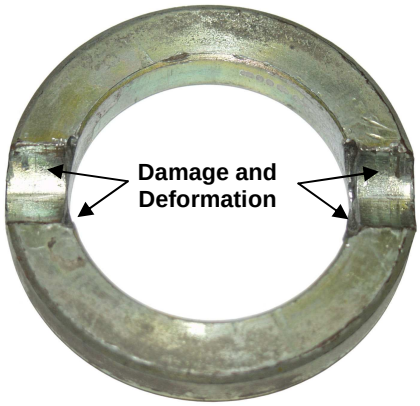
Pull Ring In
Ram Protection Ring

Locking Pin Not In
Ram Protection Ring and
top Locking Pin in Mechanical Extension
(use only one pin)

Ball Lock In
Ram Protection Ring

INCORRECT PIN PLACEMENTS





RESULTS OF INCORRECT LOCKING PIN PLACEMENTS

4. Close pump release valve and operate pump.

NOTE: Turning the pump release valve counter-clockwise lowers the jack. Turning the pump release valve clockwise stops the jacks descent, and allows it to be raised.

5. Hydraulic rams must extend in order form largest to smallest diameter.
6. Lower ram locknut(s) as aircraft is raised. Keep locknuts within 1 inch from bottom of extending ram.
7. Largest diameter hydraulic ram must fully extend before the next stage ram begins to rise.
8. Do not continue to operate hand pump after all rams have fully extended.

WARNING!

The ram locknuts are user operated safety devices. Failure to utilize these locknuts may result in personal injury or death and/or damage to aircraft or equipment.

5.0 OPERATING INSTRUCTIONS *(continued)*

To Lower Aircraft:

1. Lower all jacks simultaneously.
2. If ram locknut(s) is tight, raise jack slightly to release nut(s) ¼ inch from tripod.
3. Ensure proper staging as aircraft is being lowered: loosen ram locknut beginning with smallest ram (1" max) until stage is completely lowered. Repeat for next largest stage.
4. Loosen pump release valve slightly to slowly lower aircraft.

Note: When using jack during washing operations, completely cover top of jack near ram seal.

CAUTION!

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

Always wear safety glasses.

6.0 MAINTENANCE

6.1 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 O-rings 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 both O-rings and backup rings once removed. Cut and damaged rings normally result in fluid leakage.
- At this time flush old hydraulic fluid and dirt from over-all system and replenish with new, clean hydraulic fluid.

6.2 SERVICING JACK

To Disassemble Jack:

1. Raise first stage ram high enough to allow removal of the threaded tube stop.
2. Raise both first and second stage rams **together** to the point where this assembly can be lifted from the jack cylinder.

NOTE: If the second stage ram is allowed to precede the first stage ram, it will fill with oil causing an oil spill when the assembly is removed from the cylinder.

To Re-assemble Jack:

1. Re-assemble in reverse order of above.

NOTE: Lubricate cylinder, ram(s) and o-ring(s) for assembly:
Lubricate inner cylinder wall(s) with MIL-PRF-5606 hydraulic fluid
Apply suitable o-ring lubricant grease to installed o-ring(s) and to o-ring lead-in chamfer at opening of cylinder

NOTE: To minimize air entrapment under the rams. Actuate cylinder with had pump several inches and release. This will circulate oil and bleed out air.

2. Spray I.D. of cylinder and O.D. of rams with DoALL RPM, LPS or equivalent water repellent that will not harm the Buna "N" O-rings to protect surfaces from rusting when not in use.
3. Ensure locknut retaining ring is present on second stage ram to prevent nut removal after seal kit installation.

6.3 REMOVING AND SERVICING PUMP

NOTE: If pump is found faulty, call the factory for replacement or replace seals as follows:

1. Review Illustrated Parts List for Hand Pump (Appendix I)
2. Clamp suction (push on) hose and remove hose from pump.
3. Uncouple output hose from pump.
4. Remove two (2) pump mounting bolts. Remove pump.
5. Remove clevis pin assembly (Item 13).
6. Remove four (4) socket head cap screws.
7. Remove flanges.
8. Remove tube assembly (Item 8).
9. Replace O-rings and back-up ring. (See Appendix I for kits available).
10. Re-assemble in reverse order.

6.4 JACK FUNCTION LOAD TEST

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 5% to 10%.

7.0 TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	ACTION
Fluid leakage at pump piston or pump body	Damaged backup ring, o-ring, piston or pump body	Remove piston and pump body. Inspect for damage. Replace defective part(s). Replace removed o-ring and backup ring
External fluid leakage at rams	Damaged o-ring, backup ring or inner cylinder wall.	Remove rams as a unit from cylinder. Inspect parts. Replace o-ring and defective part(s)
Jack fails to lift rated load	Release valve not closed properly	Fully tighten release valve
	Low fluid level	Fill to correct fluid level
	Pressure relief valve improperly adjusted	Adjust or replace release valve
	Leakage at inlet or outlet check ball	Inspect valve body for wear or replace valve body and check balls
	Vent screw closed	Open vent screw
Rams will not support load after manual or pneumatic pump up	Leaking ram o-ring seals	Check for external leakage, if present replace defective seal and back up ring
	Leaking pressure check valve	Inspect valve body for wear or replace valve body and check balls
	Leaking pressure relief valve	Remove release valve, inspect ball and ball seat in pump block. Replace effective part(s)
Rams raise and fall with each manual pump stroke	Release valve open	Fully tighten release valve
	Inlet check valve not seated or sticking	Pump rapidly to dislodge or replace valve body
	Pressure check valve not seated or sticking	Pump rapidly to dislodge or replace valve body
Jack fails to lower	Ram locknut not loosened	Raise jack ¼ inch and release locknut
	Vent screw closed	Open vent screw
	O-Ring (pinched or rolled)	Replace o-ring and back-up ring, clean up cylinder wall of debris

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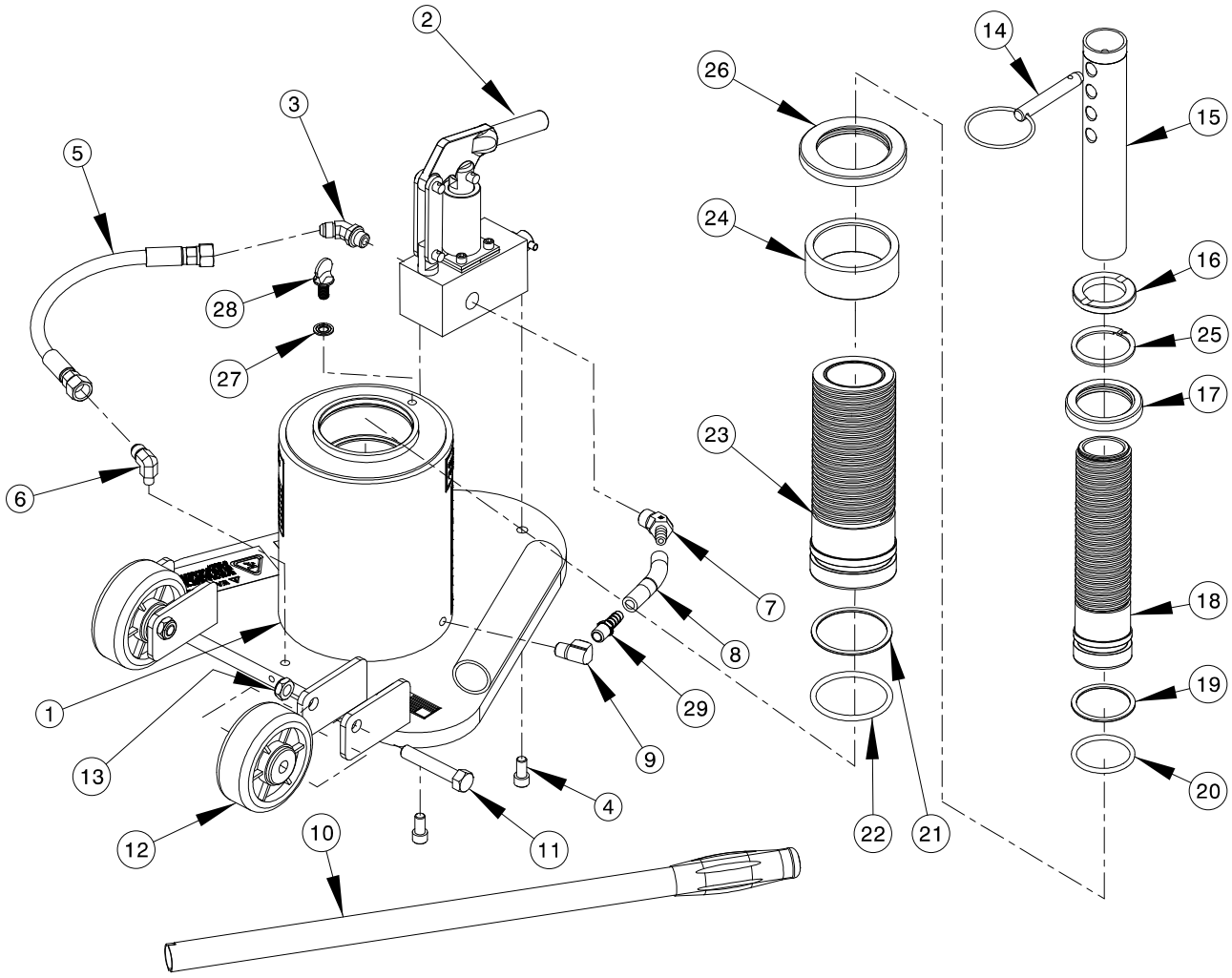
Parts List

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



ITEM	PART NUMBER	DESCRIPTION	QTY
1	Z-7710-01	Assembly Reservoir Tube	1
3	N-2042-05-S-B	Elbow, 45º Male	1
4	G-1151-107206	Socket Head Cap Screw, 3/8 - 16 x ¾ " long	2
5	TF-1043-03*12.5	Hose Assembly, 12.5 long	1
6	N-2005-09-S	Elbow, Male 1/8 – 27 NPT	1
7	N-2409-04	Elbow, 45° Male 3/8 NPT x 3/8 Hose	1
8	TF-1047-04*03.5	Hose, Push On, ¼ x 3 ½" long	1
9	N-2200-03-B	Elbow, 90º ¼ NPT x ¼ NPT	1
10	H-1009-01	Pump Handle	1
11	G-1100-109526	Bolt, Grade 5, ½-20 x 2 ¾" long Hex Head	2
12	U-1002	Wheel	2
13	G-1203-1095	Jamnut, ½-20 Elastic	2
14	G-1307-0825	Pin ½ x 2 ½ " long	1
15	R-1013-01	Extension, Center	1
	R-1012-01	Extension, Center (adds 6.1 inches)	1
16	TR-1026	Ram Protection Ring	1
17	TR-2223	Second Stage Locknut	1
18	Z-7683-04	Second Stage Ram	1
23	Z-7681-04	First Stage Ram Assembly	1
24	TR-2222	Stop Tube	1
25	G-1397-206	Ring, External Retaining	1
26	TR-2230	First Stage Locknut	1

Parts List

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

ITEM	PART NUMBER	DESCRIPTION	QTY
27	G-1281-06	Washer	1
28	G-1177	Thumbscrew Vent	1
29	N-2412-10	Connector, Straight ¼ NPT to 3/8 Hose	1
	K-4588	**Kit, Ram Seal Replacement;** *consists of:*	
19	HC-2020-329	Backup Ring	1
20	HC-2000-329	O-ring	1
21	HC-2020-338	Backup Ring	1
22	HC-2000-338	O-ring	1
	K-1987	**Kit, Hand Pump Replacement**; *consists of:*	
2		See Appendix I	1
	K-1165	**Kit, Wheel Replacement**; *consists of:*	
12		Wheel	1

NOTES: 1. Those items designated as kits contain all hardware necessary for installation.
2. Unless otherwise listed, all replacement bolts should be grade '5' or better.

TRONAIR

APPENDIX I

HC-1752
2,500 psi
Hand Pump Parts List

Model: HC-1752
2,500 psi Hand Pump

***

Illustrated Parts List

08/2001 – Rev. OR

1740 Eber Rd
Holland, OH 43528-9794
USA

Tronair, Inc.
www.tronair.com
Email: sales@tronair.com

Phone: (419) 866-6301
800-426-6301
Fax: (419) 867-0634

HC-1752
2,500 PSI Hand Pump

Parts List

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

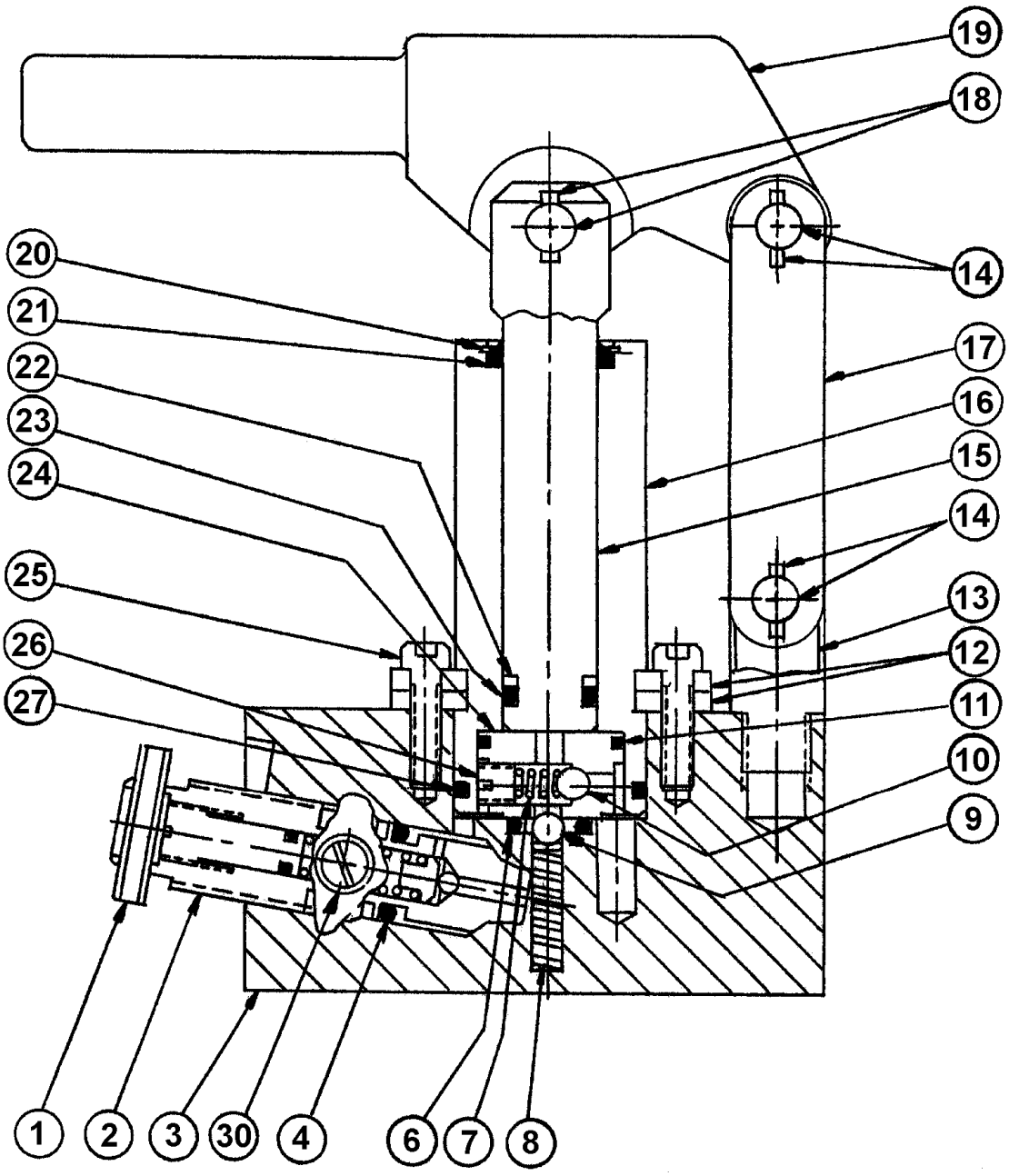
Reference Parts List Illustration on following page.

ITEM	PART NUMBER	DESCRIPTION	QTY
3	5M1-000-001	Body, Pump	1
12	506-000	Half, Flange	4
25	518-000	Screw, Socket Head Cap	4
Not Shown	H-1009-01	Handle	1
	K-1001	**Kit, Seal Replacement**; *consists of:*	
4		O-ring, Release Screw	1
6		O-ring, Outlet Check	1
11		O-ring, Valve Body	1
21		Wiper, Rod	1
22		Ring, Backup	1
23		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
	K-1068	**Kit, Linkage Replacement**; *consists of:*	
13		Pivot	1
14		Assembly, Linkage Pin	2
17		Strap	2
18		Assembly, Clevis Pin	1
19		Bracket, Pump Handle	1
	K-1069	**Kit, Internal Parts Replacement;** *consists of:*	
♦ Not Shown		Ball, Release	1
7		Spring, Inlet Check	1
8		Spring, Outlet Check	1
9		Ball, Outlet Check	1
10		Ball, Inlet Check	1
	K-1778	**Kit, Piston/Cylinder Replacement;** *consists of:*	
15		Piston	1
16		Tube	1
20		Retainer, Wiper	1
24		Assembly, Valve Body (Includes Items 7, 10, 24, 26)	1
	K-1906	**Kit, Piston/Seal Replacement;** *consists of:*	
15		Piston	1
22		Ring, Backup	1
23		O-ring, Piston	1
	K-2783	**Kit, Release Screw Replacement;** *consists of:*	
2		Screw, Release	1
30		Retainer, Screw	1

♦ **Although this item is listed in its particular kit, it is not used on HC-1752 pump. These items may be discarded.**

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

Parts List Illustration



WARNING!

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

TRONAIR

APPENDIX II

MSDS
Hydraulic Fluid
(MIL-PRF-5606)

ExxonMobil

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

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

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300
ExxonMobil Transportation No.	281-834-3296
MSDS Requests	713-613-3661
Product Technical Information	800-662-4525, 800-947-9147
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	10 - 30%
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	30 - 60%
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	64742-55-8	10 - 30%

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

SECTION 3 HAZARDS IDENTIFICATION

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

POTENTIAL PHYSICAL / CHEMICAL EFFECTS

Combustible. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited.

POTENTIAL HEALTH EFFECTS

If swallowed, may be aspirated and cause lung damage. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May be irritating to the eyes, nose, throat, and lungs. High-pressure injection under skin may cause serious damage.

Target Organs: Skin |

NFPA Hazard ID:	Health:	0	Flammability:	2	Reactivity:	0
HMIS Hazard ID:	Health:	0*	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 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. 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 (CO2) 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: Smoke, Fume, Sulfur oxides, Aldehydes, Incomplete combustion products, Oxides of carbon, Phosphorus oxides

FLAMMABILITY PROPERTIES
Flash Point [Method]: >82C (180F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 7.0
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 regulations. U.S. regulations require reporting releases of this material to the environment which exceed the 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 Section 3 for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

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.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid contact with skin. Avoid prolonged breathing of mists and heated vapor. Use proper bonding and/or grounding procedures. Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is a static accumulator.

STORAGE

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. Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

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

Source	Form	Limit / Standard			Note	Source
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)		TWA	2000 mg/m3	500 ppm	N/A	OSHA Z1
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	STEL	10 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	TWA	5 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	Mist.	STEL	10 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	Mist.	TWA	5 mg/m3		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/m³ - ACGIH TLV, 10 mg/m³ - ACGIH STEL, 5 mg/m³ - OSHA PEL.

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

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. 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. Work conditions can greatly effect glove durability; 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
See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION
Physical State: Liquid
Color: Red
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION
Relative Density (at 15 C): 0.88
Flash Point [Method]: >82C (180F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 7.0
Autoignition Temperature: >225°C (437°F)
Boiling Point / Range: 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 mm2/sec) at 40 C | 5.1 cSt (5.1 mm2/sec) at 100C
Oxidizing Properties: See Sections 3, 15, 16.

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

SECTION 10 STABILITY AND REACTIVITY

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.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m3	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data.	Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.

CHRONIC/OTHER EFFECTS

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.

Additional information is available by request.

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

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

Material -- Expected to be harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

Base oil 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:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- 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.

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, corrositivity 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 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) : Not Regulated for Land Transport

LAND (TDG) : Not Regulated for Land Transport

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

ExxonMobil

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

AIR (IATA) : Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: AICS, IECSC, DSL, EINECS, ENCS, KECI, PICCS, TSCA

EPCRA: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: Fire. 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.

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	17, 18, 19
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	1, 4, 13, 17, 18
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	64742-55-8	1, 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

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Revision Changes:
Section 05: Fire Fighting Measures - Unusual Fire Hazards was modified.
Section 10: Conditions to Avoid was modified.
Section 07: Handling and Storage - Handling was modified.
Section 07: Handling and Storage - Storage Phrases was modified.
Section 03: HMIS Flammability was modified.
Section 03: NFPA Flammability was modified.
Section 06: Accidental Release - Spill Management - Land was modified.
Section 09: Flash Point C(F) was modified.
Section 08: Exposure Control was modified.
Section 15: SARA (311/312) REPORTABLE HAZARD CATEGORIES was modified.
Section 16: Land Spill was modified.
Section 14: DOT Technical Name - All was added.
Section 03: Physical/Chemical Hazard was added.
Section 14: Proper Shipping Name - Header was added.
Section 14: Proper Shipping Name was added.
Section 14: Hazard Class & Division - Header was added.
Section 14: Hazard Class was added.
Section 14: UN Number - Header was added.
Section 14: UN Number was added.
Section 14: Packing Group - Header was added.
Section 14: Packing Group was added.
Section 14: Label(s) - Header was added.
Section 14: Label(s) was added.
Section 14: ERG Number - Header was added.
Section 14: ERG Number was added.
Section 14: Transport Document Name - Header was added.
Section 14: Transport Document Name was added.
Section 14: DOT Technical Name - Open parenthesis was added.
Section 14: DOT Technical Name - Close parenthesis was added.
Section 03: Physical/Chemical Hazard was added.
Section 03: Physical/Chemical Hazards - Header was added.
Section 14: DOT Footnote was added.
Section 16: Physical Hazards was added.
Section 16: Physical Hazards - Header was added.
Section 16: Precautions was added.
Section 16: Precautions - Header was added.
Section 10: Conditions to Avoid was deleted.
Section 14: LAND (DOT) - Default was deleted.

PRECAUTIONARY LABEL TEXT:
Contains: DISTILLATES (PETROLEUM), HYDROTREATED LIGHT
CAUTION!

HEALTH HAZARDS
Repeated exposure may cause skin dryness or cracking. If swallowed, may be aspirated and cause lung damage.
Target Organs: Skin |

PHYSICAL HAZARDS
Combustible.

PRECAUTIONS
Use proper bonding and/or grounding procedures.

FIRST AID
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.

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

Oral: Seek immediate medical attention. Do not induce vomiting. If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

Skin: Wash contact areas with soap and water. 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.

FIRE FIGHTING MEDIA
Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

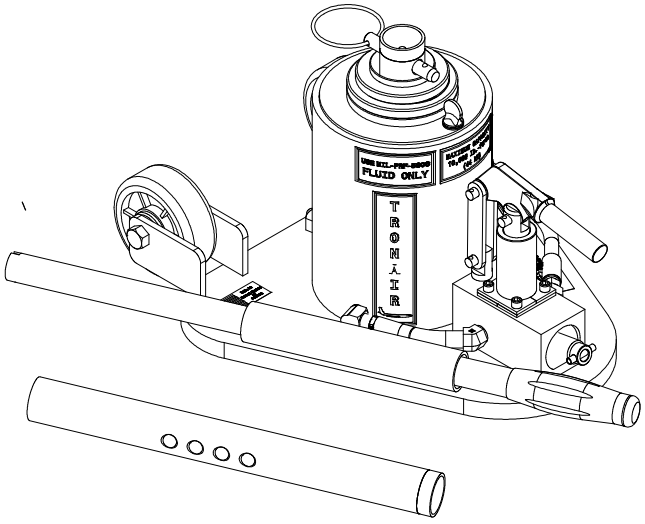
SPILL/LEAK
Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. 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.
Use
Not intended or suitable for use in or around a household or dwelling.

Internal Use Only
MHC: 2A,0,0,0,0,1 PPEC: C

DGN: 2005454XUS (552975)

Operation & Service Manual



Model: 02-0511-0132
5 Ton Two Stage Jack

12/2011 – Rev. 11

Includes Illustrated Parts Lists

1740 Eber Rd
Holland, OH 43528-9794
USA

Tronair, Inc.
www.tronair.com
Email: sales@tronair.com

Phone: (419) 866-6301
800-426-6301
Fax: (419) 867-0634

REVISION	DATE	TEXT AFFECTED
09	11/2004	pg 2 5.0 added warning and illustrations
10	09/2005	pg 2 Modified 5.1 Jack Instructions
11	12/2011	Major revision

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6.4 JACK FUNCTION LOAD TEST 4
7.0 TROUBLE SHOOTING 5

APPENDIX I HC-1752 2,500 psi Hand Pump Parts List
APPENDIX II MSDS Hydraulic Fluid (MIL-PRF-5606)

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 DESCRIPTION

The Tronair Model 02-0511-0132 two stage hydraulic jack incorporates the following quality features:

- Steel Construction.
- Two-stage telescoping rams.
- Mechanical ram lock nuts that prevent lowering of jack under load.
- Quick action mechanical extension.
- Single speed, manually operated pump with pressure relief.
- Uses standard MIL-PRF-5606 hydraulic fluid.
- Mechanical extensions provided to allow jack to be utilized on other aircraft as shown in specifications.

2.0 USAGE

The purpose of this jack is to lift aircraft for maintenance. It has a maximum capacity of five (5) tons (4.4 kN).

3.0 SPECIFICATIONS

- Vertical capacity: 10,000 lbs. (44.5 kN)
- Minimum closed heights:
  - with R-1013-01 mechanical extension 11.4 in (29 cm)
  - with R-1012-01 mechanical extension 17.5 in (44.6 cm)
- Mechanical extension: 3.0 in (7.6 cm)
- Hydraulic extension: 12.22 in (31 cm)
- Maximum heights obtainable:
  - with R-1013-01 mechanical extension 26.6 in (67.6 cm)
  - with R-1012-01 mechanical extension 32.7 in (83.1 cm)
- Overall: 14 ½ x 15 in (36.8 x 38.1 cm)
- Floor area (triangular): 156 in^2 (1006 cm^2)
- Weight: 100 lbs (45.4 kg)

4.0 ASSEMBLY INSTRUCTIONS

4.1 GENERAL INFORMATION

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. The **3/8** -24 bolts should be tightened to 35 ft-lbs.

All replacement parts must be the same as or equal to the original parts supplied.

4.2 PRE-USE CHECKS

- Refer to the Jack Parts Lists and Illustrations to identify and ensure that all parts are present.
- Generally check over unit to assure the tightness of all fittings.
- With rams completely collapsed, check hydraulic fluid level; fluid level should be 5/8 to ½ inches from the outside top of reservoir. Replenish with MIL-PRF-5606 fluid as required.

5.0 OPERATING INSTRUCTIONS

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

CAUTION!

- **NEVER put hands between aircraft and jack pad, as after aircraft has been lowered, struts may have hung up.**
- **Never align jack under aircraft by pounding on jack legs. Dented legs may lead to jack collapse.**
- **Always lower ram locking nut(s) after jack is under load. Be sure ram nut(s) is seated fully after jacking.**
- **Always raise and lower jacks simultaneously so that aircraft remains level.**
- **Always use a tail or nose stand, as applicable, for additional stability.**

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.

To Raise Aircraft:

1. Place jack on a hard level surface.
2. Hydraulic rams must be completely retracted before operating the jack.
3. Raise mechanical extension as close to aircraft jack pad as possible.

NOTE: Jacks equipped with two mechanical extensions. The difference between the extensions is a length of 6.1 in. Select the extension that best suits the jacking position.

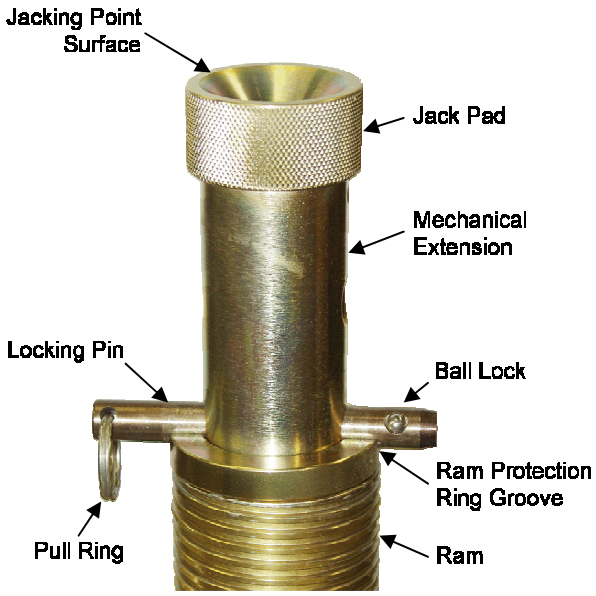
WARNING!

The locking pin MUST be placed in the ram protection ring groove and fully through the mechanical extension.

The locking pin pull ring and ball lock MUST be placed outside the ram protection ring.

- **Visually inspect the jack prior to every use.**
- **Do not place extra locking pins in any other hole on the mechanical extension.**
- **Insure mating surfaces to jack point are free of debris and damage.**
- **Under no conditions should the locking pin pull ring be inside the ram protection ring groove.**
- **Under no conditions should the locking pin's ball lock be inside the ram protection ring groove.**
- **Never use the jack if the ram protection ring is not installed.**
- **Never use the locking pin without a locking pin pull ring.**
- **Never use a locking pin that has been damaged.**
- **Never use a ram protection ring that has been damaged or deformed.**
- **Replace ram protection ring if it does not have a radius groove for the locking pin.**
- **Load test jacks annually.**
- **Only order replacement parts from Tronair.**

Failure to comply could result in premature failure below certified weight and could cause serious injury including death.



CORRECT PIN PLACEMENT

5.0 Operating instructions continued on following page

5.0 OPERATING INSTRUCTIONS *(continued)*

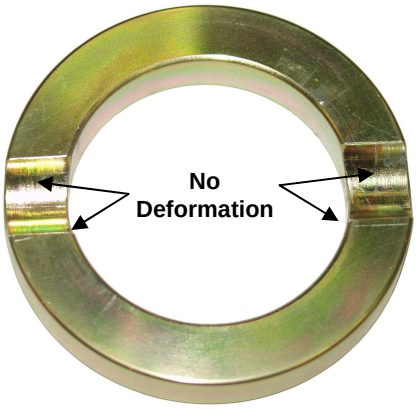
INCORRECT PIN PLACEMENTS

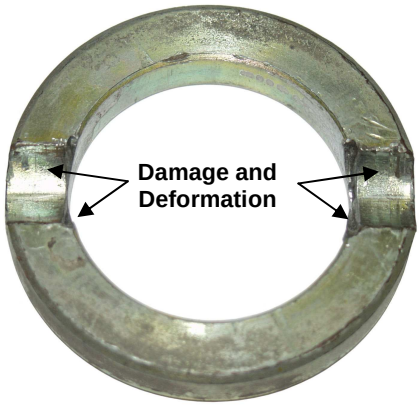
Pull Ring In
Ram Protection Ring

Locking Pin Not In
Ram Protection Ring and
top Locking Pin in Mechanical Extension
(use only one pin)

Ball Lock In
Ram Protection Ring

INCORRECT PIN PLACEMENTS





RESULTS OF INCORRECT LOCKING PIN PLACEMENTS

4. Close pump release valve and operate pump.

NOTE: Turning the pump release valve counter-clockwise lowers the jack. Turning the pump release valve clockwise stops the jacks descent, and allows it to be raised.

5. Hydraulic rams must extend in order form largest to smallest diameter.
6. Lower ram locknut(s) as aircraft is raised. Keep locknuts within 1 inch from bottom of extending ram.
7. Largest diameter hydraulic ram must fully extend before the next stage ram begins to rise.
8. Do not continue to operate hand pump after all rams have fully extended.

WARNING!

The ram locknuts are user operated safety devices. Failure to utilize these locknuts may result in personal injury or death and/or damage to aircraft or equipment.

5.0 OPERATING INSTRUCTIONS *(continued)*

To Lower Aircraft:

1. Lower all jacks simultaneously.
2. If ram locknut(s) is tight, raise jack slightly to release nut(s) ¼ inch from tripod.
3. Ensure proper staging as aircraft is being lowered: loosen ram locknut beginning with smallest ram (1" max) until stage is completely lowered. Repeat for next largest stage.
4. Loosen pump release valve slightly to slowly lower aircraft.

Note: When using jack during washing operations, completely cover top of jack near ram seal.

CAUTION!

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

Always wear safety glasses.

6.0 MAINTENANCE

6.1 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 O-rings 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 both O-rings and backup rings once removed. Cut and damaged rings normally result in fluid leakage.
- At this time flush old hydraulic fluid and dirt from over-all system and replenish with new, clean hydraulic fluid.

6.2 SERVICING JACK

To Disassemble Jack:

1. Raise first stage ram high enough to allow removal of the threaded tube stop.
2. Raise both first and second stage rams **together** to the point where this assembly can be lifted from the jack cylinder.

NOTE: If the second stage ram is allowed to precede the first stage ram, it will fill with oil causing an oil spill when the assembly is removed from the cylinder.

To Re-assemble Jack:

1. Re-assemble in reverse order of above.

NOTE: Lubricate cylinder, ram(s) and o-ring(s) for assembly:
Lubricate inner cylinder wall(s) with MIL-PRF-5606 hydraulic fluid
Apply suitable o-ring lubricant grease to installed o-ring(s) and to o-ring lead-in chamfer at opening of cylinder

NOTE: To minimize air entrapment under the rams. Actuate cylinder with had pump several inches and release. This will circulate oil and bleed out air.

2. Spray I.D. of cylinder and O.D. of rams with DoALL RPM, LPS or equivalent water repellent that will not harm the Buna "N" O-rings to protect surfaces from rusting when not in use.
3. Ensure locknut retaining ring is present on second stage ram to prevent nut removal after seal kit installation.

6.3 REMOVING AND SERVICING PUMP

NOTE: If pump is found faulty, call the factory for replacement or replace seals as follows:

1. Review Illustrated Parts List for Hand Pump (Appendix I)
2. Clamp suction (push on) hose and remove hose from pump.
3. Uncouple output hose from pump.
4. Remove two (2) pump mounting bolts. Remove pump.
5. Remove clevis pin assembly (Item 13).
6. Remove four (4) socket head cap screws.
7. Remove flanges.
8. Remove tube assembly (Item 8).
9. Replace O-rings and back-up ring. (See Appendix I for kits available).
10. Re-assemble in reverse order.

6.4 JACK FUNCTION LOAD TEST

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 5% to 10%.

7.0 TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	ACTION
Fluid leakage at pump piston or pump body	Damaged backup ring, o-ring, piston or pump body	Remove piston and pump body. Inspect for damage. Replace defective part(s). Replace removed o-ring and backup ring
External fluid leakage at rams	Damaged o-ring, backup ring or inner cylinder wall.	Remove rams as a unit from cylinder. Inspect parts. Replace o-ring and defective part(s)
Jack fails to lift rated load	Release valve not closed properly	Fully tighten release valve
	Low fluid level	Fill to correct fluid level
	Pressure relief valve improperly adjusted	Adjust or replace release valve
	Leakage at inlet or outlet check ball	Inspect valve body for wear or replace valve body and check balls
	Vent screw closed	Open vent screw
Rams will not support load after manual or pneumatic pump up	Leaking ram o-ring seals	Check for external leakage, if present replace defective seal and back up ring
	Leaking pressure check valve	Inspect valve body for wear or replace valve body and check balls
	Leaking pressure relief valve	Remove release valve, inspect ball and ball seat in pump block. Replace effective part(s)
Rams raise and fall with each manual pump stroke	Release valve open	Fully tighten release valve
	Inlet check valve not seated or sticking	Pump rapidly to dislodge or replace valve body
	Pressure check valve not seated or sticking	Pump rapidly to dislodge or replace valve body
Jack fails to lower	Ram locknut not loosened	Raise jack ¼ inch and release locknut
	Vent screw closed	Open vent screw
	O-Ring (pinched or rolled)	Replace o-ring and back-up ring, clean up cylinder wall of debris

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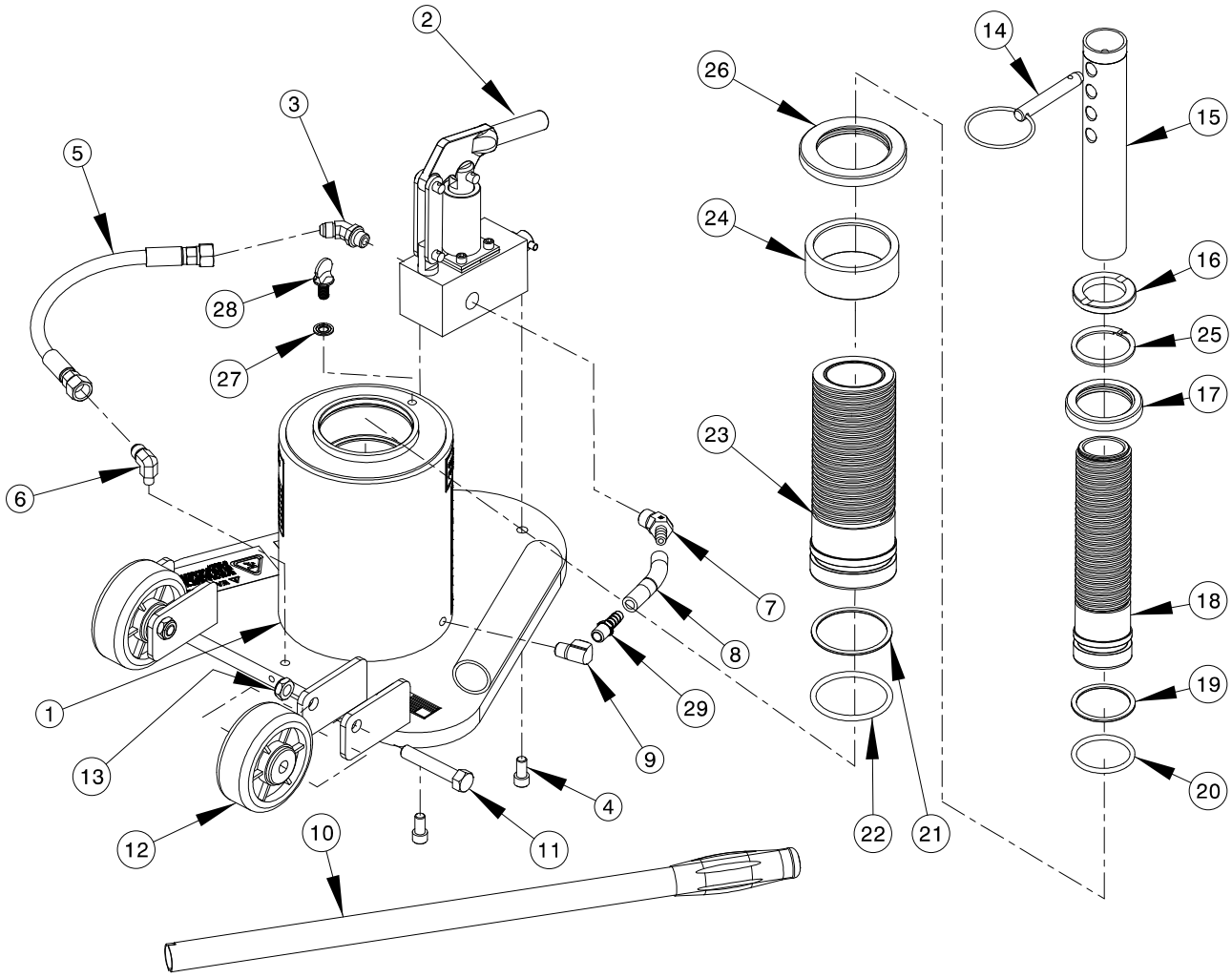
Parts List

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



ITEM	PART NUMBER	DESCRIPTION	QTY
1	Z-7710-01	Assembly Reservoir Tube	1
3	N-2042-05-S-B	Elbow, 45º Male	1
4	G-1151-107206	Socket Head Cap Screw, 3/8 - 16 x ¾ " long	2
5	TF-1043-03*12.5	Hose Assembly, 12.5 long	1
6	N-2005-09-S	Elbow, Male 1/8 – 27 NPT	1
7	N-2409-04	Elbow, 45° Male 3/8 NPT x 3/8 Hose	1
8	TF-1047-04*03.5	Hose, Push On, ¼ x 3 ½" long	1
9	N-2200-03-B	Elbow, 90º ¼ NPT x ¼ NPT	1
10	H-1009-01	Pump Handle	1
11	G-1100-109526	Bolt, Grade 5, ½-20 x 2 ¾" long Hex Head	2
12	U-1002	Wheel	2
13	G-1203-1095	Jamnut, ½-20 Elastic	2
14	G-1307-0825	Pin ½ x 2 ½ " long	1
15	R-1013-01	Extension, Center	1
	R-1012-01	Extension, Center (adds 6.1 inches)	1
16	TR-1026	Ram Protection Ring	1
17	TR-2223	Second Stage Locknut	1
18	Z-7683-04	Second Stage Ram	1
23	Z-7681-04	First Stage Ram Assembly	1
24	TR-2222	Stop Tube	1
25	G-1397-206	Ring, External Retaining	1
26	TR-2230	First Stage Locknut	1

Parts List

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

ITEM	PART NUMBER	DESCRIPTION	QTY
27	G-1281-06	Washer	1
28	G-1177	Thumbscrew Vent	1
29	N-2412-10	Connector, Straight ¼ NPT to 3/8 Hose	1
	K-4588	**Kit, Ram Seal Replacement;** *consists of:*	
19	HC-2020-329	Backup Ring	1
20	HC-2000-329	O-ring	1
21	HC-2020-338	Backup Ring	1
22	HC-2000-338	O-ring	1
	K-1987	**Kit, Hand Pump Replacement**; *consists of:*	
2		See Appendix I	1
	K-1165	**Kit, Wheel Replacement**; *consists of:*	
12		Wheel	1

NOTES: 1. Those items designated as kits contain all hardware necessary for installation.
2. Unless otherwise listed, all replacement bolts should be grade '5' or better.

TRONAIR

APPENDIX I

HC-1752
2,500 psi
Hand Pump Parts List

Model: HC-1752
2,500 psi Hand Pump

***

Illustrated Parts List

08/2001 – Rev. OR

1740 Eber Rd
Holland, OH 43528-9794
USA

Tronair, Inc.
www.tronair.com
Email: sales@tronair.com

Phone: (419) 866-6301
800-426-6301
Fax: (419) 867-0634

HC-1752
2,500 PSI Hand Pump

Parts List

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

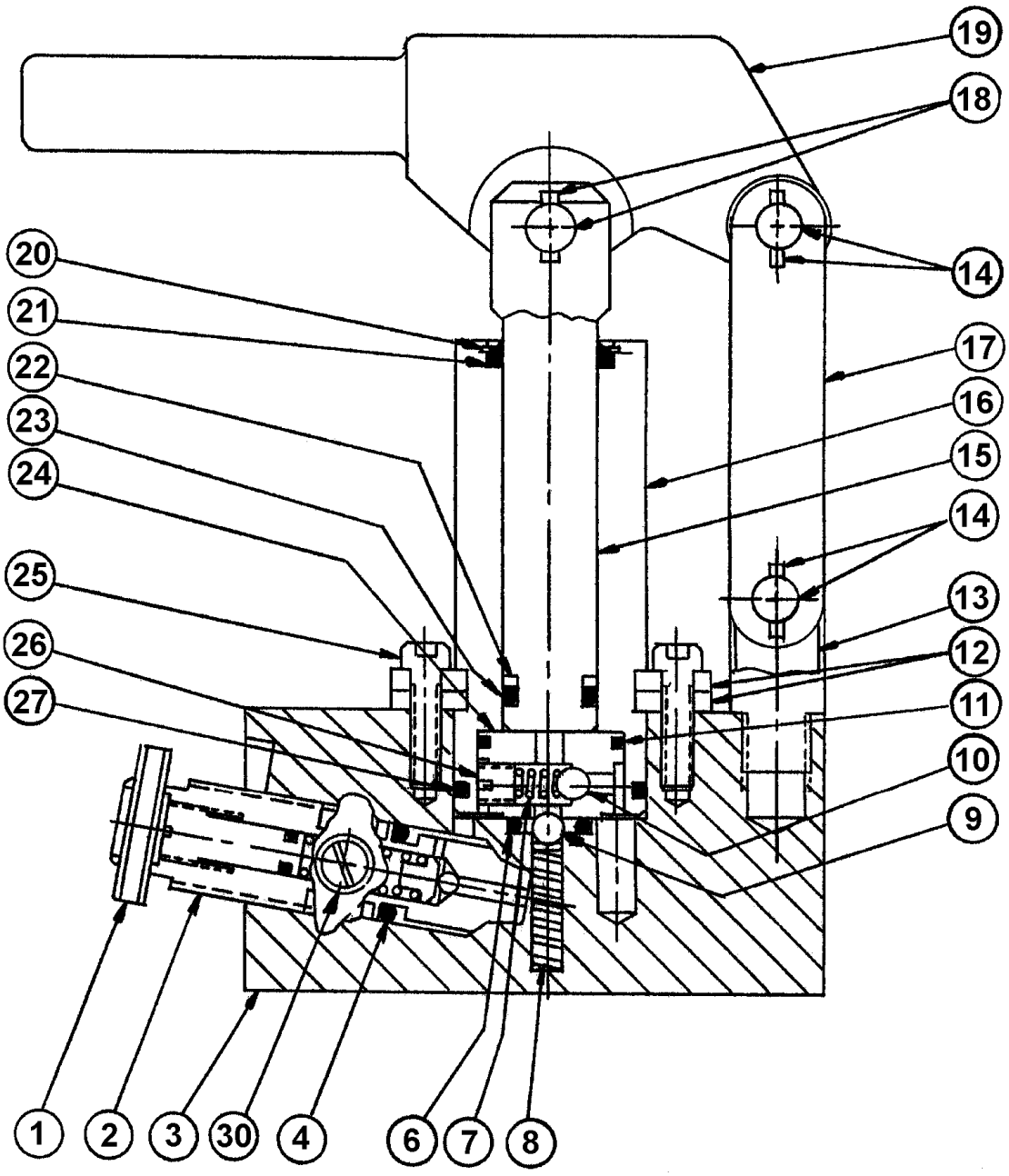
Reference Parts List Illustration on following page.

ITEM	PART NUMBER	DESCRIPTION	QTY
3	5M1-000-001	Body, Pump	1
12	506-000	Half, Flange	4
25	518-000	Screw, Socket Head Cap	4
Not Shown	H-1009-01	Handle	1
	K-1001	**Kit, Seal Replacement**; *consists of:*	
4		O-ring, Release Screw	1
6		O-ring, Outlet Check	1
11		O-ring, Valve Body	1
21		Wiper, Rod	1
22		Ring, Backup	1
23		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
	K-1068	**Kit, Linkage Replacement**; *consists of:*	
13		Pivot	1
14		Assembly, Linkage Pin	2
17		Strap	2
18		Assembly, Clevis Pin	1
19		Bracket, Pump Handle	1
	K-1069	**Kit, Internal Parts Replacement;** *consists of:*	
♦ Not Shown		Ball, Release	1
7		Spring, Inlet Check	1
8		Spring, Outlet Check	1
9		Ball, Outlet Check	1
10		Ball, Inlet Check	1
	K-1778	**Kit, Piston/Cylinder Replacement;** *consists of:*	
15		Piston	1
16		Tube	1
20		Retainer, Wiper	1
24		Assembly, Valve Body (Includes Items 7, 10, 24, 26)	1
	K-1906	**Kit, Piston/Seal Replacement;** *consists of:*	
15		Piston	1
22		Ring, Backup	1
23		O-ring, Piston	1
	K-2783	**Kit, Release Screw Replacement;** *consists of:*	
2		Screw, Release	1
30		Retainer, Screw	1

♦ **Although this item is listed in its particular kit, it is not used on HC-1752 pump. These items may be discarded.**

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

Parts List Illustration



WARNING!

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

TRONAIR

APPENDIX II

MSDS
Hydraulic Fluid
(MIL-PRF-5606)

ExxonMobil

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

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

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300
ExxonMobil Transportation No.	281-834-3296
MSDS Requests	713-613-3661
Product Technical Information	800-662-4525, 800-947-9147
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	10 - 30%
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	30 - 60%
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	64742-55-8	10 - 30%

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

SECTION 3 HAZARDS IDENTIFICATION

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

POTENTIAL PHYSICAL / CHEMICAL EFFECTS

Combustible. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited.

POTENTIAL HEALTH EFFECTS

If swallowed, may be aspirated and cause lung damage. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May be irritating to the eyes, nose, throat, and lungs. High-pressure injection under skin may cause serious damage.

Target Organs: Skin |

NFPA Hazard ID:	Health:	0	Flammability:	2	Reactivity:	0
HMIS Hazard ID:	Health:	0*	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 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. 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 (CO2) 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: Smoke, Fume, Sulfur oxides, Aldehydes, Incomplete combustion products, Oxides of carbon, Phosphorus oxides

FLAMMABILITY PROPERTIES
Flash Point [Method]: >82C (180F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 7.0
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 regulations. U.S. regulations require reporting releases of this material to the environment which exceed the 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 Section 3 for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

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.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid contact with skin. Avoid prolonged breathing of mists and heated vapor. Use proper bonding and/or grounding procedures. Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is a static accumulator.

STORAGE

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. Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

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

Source	Form	Limit / Standard			Note	Source
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)		TWA	2000 mg/m3	500 ppm	N/A	OSHA Z1
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	STEL	10 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	TWA	5 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	Mist.	STEL	10 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	Mist.	TWA	5 mg/m3		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/m³ - ACGIH TLV, 10 mg/m³ - ACGIH STEL, 5 mg/m³ - OSHA PEL.

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

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. 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. Work conditions can greatly effect glove durability; 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
See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION
Physical State: Liquid
Color: Red
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION
Relative Density (at 15 C): 0.88
Flash Point [Method]: >82C (180F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 7.0
Autoignition Temperature: >225°C (437°F)
Boiling Point / Range: 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 mm2/sec) at 40 C | 5.1 cSt (5.1 mm2/sec) at 100C
Oxidizing Properties: See Sections 3, 15, 16.

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

SECTION 10 STABILITY AND REACTIVITY

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.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m3	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data.	Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.

CHRONIC/OTHER EFFECTS

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.

Additional information is available by request.

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

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

Material -- Expected to be harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

Base oil 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:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- 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.

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, corrositivity 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 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) : Not Regulated for Land Transport

LAND (TDG) : Not Regulated for Land Transport

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

ExxonMobil

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

AIR (IATA) : Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: AICS, IECSC, DSL, EINECS, ENCS, KECI, PICCS, TSCA

EPCRA: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: Fire. 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.

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	17, 18, 19
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	1, 4, 13, 17, 18
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	64742-55-8	1, 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

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Revision Changes:
Section 05: Fire Fighting Measures - Unusual Fire Hazards was modified.
Section 10: Conditions to Avoid was modified.
Section 07: Handling and Storage - Handling was modified.
Section 07: Handling and Storage - Storage Phrases was modified.
Section 03: HMIS Flammability was modified.
Section 03: NFPA Flammability was modified.
Section 06: Accidental Release - Spill Management - Land was modified.
Section 09: Flash Point C(F) was modified.
Section 08: Exposure Control was modified.
Section 15: SARA (311/312) REPORTABLE HAZARD CATEGORIES was modified.
Section 16: Land Spill was modified.
Section 14: DOT Technical Name - All was added.
Section 03: Physical/Chemical Hazard was added.
Section 14: Proper Shipping Name - Header was added.
Section 14: Proper Shipping Name was added.
Section 14: Hazard Class & Division - Header was added.
Section 14: Hazard Class was added.
Section 14: UN Number - Header was added.
Section 14: UN Number was added.
Section 14: Packing Group - Header was added.
Section 14: Packing Group was added.
Section 14: Label(s) - Header was added.
Section 14: Label(s) was added.
Section 14: ERG Number - Header was added.
Section 14: ERG Number was added.
Section 14: Transport Document Name - Header was added.
Section 14: Transport Document Name was added.
Section 14: DOT Technical Name - Open parenthesis was added.
Section 14: DOT Technical Name - Close parenthesis was added.
Section 03: Physical/Chemical Hazard was added.
Section 03: Physical/Chemical Hazards - Header was added.
Section 14: DOT Footnote was added.
Section 16: Physical Hazards was added.
Section 16: Physical Hazards - Header was added.
Section 16: Precautions was added.
Section 16: Precautions - Header was added.
Section 10: Conditions to Avoid was deleted.
Section 14: LAND (DOT) - Default was deleted.

PRECAUTIONARY LABEL TEXT:
Contains: DISTILLATES (PETROLEUM), HYDROTREATED LIGHT
CAUTION!

HEALTH HAZARDS
Repeated exposure may cause skin dryness or cracking. If swallowed, may be aspirated and cause lung damage.
Target Organs: Skin |

PHYSICAL HAZARDS
Combustible.

PRECAUTIONS
Use proper bonding and/or grounding procedures.

FIRST AID
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.

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

Oral: Seek immediate medical attention. Do not induce vomiting. If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

Skin: Wash contact areas with soap and water. 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.

FIRE FIGHTING MEDIA
Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

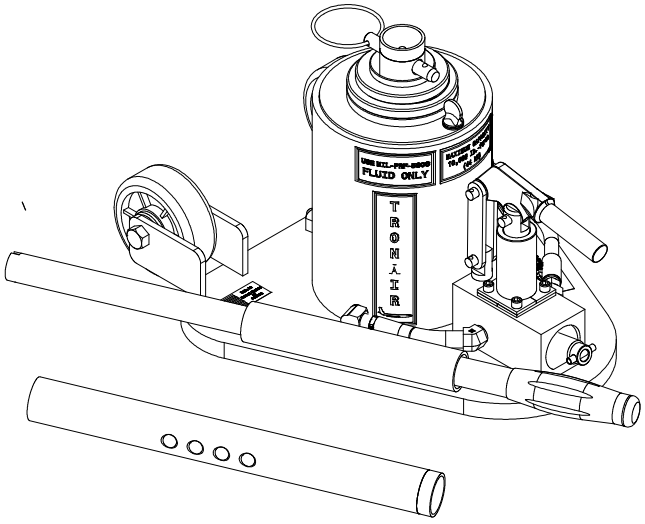
SPILL/LEAK
Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. 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.
Use
Not intended or suitable for use in or around a household or dwelling.

Internal Use Only
MHC: 2A,0,0,0,0,1 PPEC: C

DGN: 2005454XUS (552975)

Operation & Service Manual



Model: 02-0511-0132
5 Ton Two Stage Jack

12/2011 – Rev. 11

Includes Illustrated Parts Lists

1740 Eber Rd
Holland, OH 43528-9794
USA

Tronair, Inc.
www.tronair.com
Email: sales@tronair.com

Phone: (419) 866-6301
800-426-6301
Fax: (419) 867-0634

REVISION	DATE	TEXT AFFECTED
09	11/2004	pg 2 5.0 added warning and illustrations
10	09/2005	pg 2 Modified 5.1 Jack Instructions
11	12/2011	Major revision

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6.4 JACK FUNCTION LOAD TEST 4
7.0 TROUBLE SHOOTING 5

APPENDIX I HC-1752 2,500 psi Hand Pump Parts List
APPENDIX II MSDS Hydraulic Fluid (MIL-PRF-5606)

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 DESCRIPTION

The Tronair Model 02-0511-0132 two stage hydraulic jack incorporates the following quality features:

- Steel Construction.
- Two-stage telescoping rams.
- Mechanical ram lock nuts that prevent lowering of jack under load.
- Quick action mechanical extension.
- Single speed, manually operated pump with pressure relief.
- Uses standard MIL-PRF-5606 hydraulic fluid.
- Mechanical extensions provided to allow jack to be utilized on other aircraft as shown in specifications.

2.0 USAGE

The purpose of this jack is to lift aircraft for maintenance. It has a maximum capacity of five (5) tons (4.4 kN).

3.0 SPECIFICATIONS

- Vertical capacity: 10,000 lbs. (44.5 kN)
- Minimum closed heights:
  - with R-1013-01 mechanical extension 11.4 in (29 cm)
  - with R-1012-01 mechanical extension 17.5 in (44.6 cm)
- Mechanical extension: 3.0 in (7.6 cm)
- Hydraulic extension: 12.22 in (31 cm)
- Maximum heights obtainable:
  - with R-1013-01 mechanical extension 26.6 in (67.6 cm)
  - with R-1012-01 mechanical extension 32.7 in (83.1 cm)
- Overall: 14 ½ x 15 in (36.8 x 38.1 cm)
- Floor area (triangular): 156 in^2 (1006 cm^2)
- Weight: 100 lbs (45.4 kg)

4.0 ASSEMBLY INSTRUCTIONS

4.1 GENERAL INFORMATION

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. The **3/8** -24 bolts should be tightened to 35 ft-lbs.

All replacement parts must be the same as or equal to the original parts supplied.

4.2 PRE-USE CHECKS

- Refer to the Jack Parts Lists and Illustrations to identify and ensure that all parts are present.
- Generally check over unit to assure the tightness of all fittings.
- With rams completely collapsed, check hydraulic fluid level; fluid level should be 5/8 to ½ inches from the outside top of reservoir. Replenish with MIL-PRF-5606 fluid as required.

5.0 OPERATING INSTRUCTIONS

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

CAUTION!

- **NEVER put hands between aircraft and jack pad, as after aircraft has been lowered, struts may have hung up.**
- **Never align jack under aircraft by pounding on jack legs. Dented legs may lead to jack collapse.**
- **Always lower ram locking nut(s) after jack is under load. Be sure ram nut(s) is seated fully after jacking.**
- **Always raise and lower jacks simultaneously so that aircraft remains level.**
- **Always use a tail or nose stand, as applicable, for additional stability.**

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.

To Raise Aircraft:

1. Place jack on a hard level surface.
2. Hydraulic rams must be completely retracted before operating the jack.
3. Raise mechanical extension as close to aircraft jack pad as possible.

NOTE: Jacks equipped with two mechanical extensions. The difference between the extensions is a length of 6.1 in. Select the extension that best suits the jacking position.

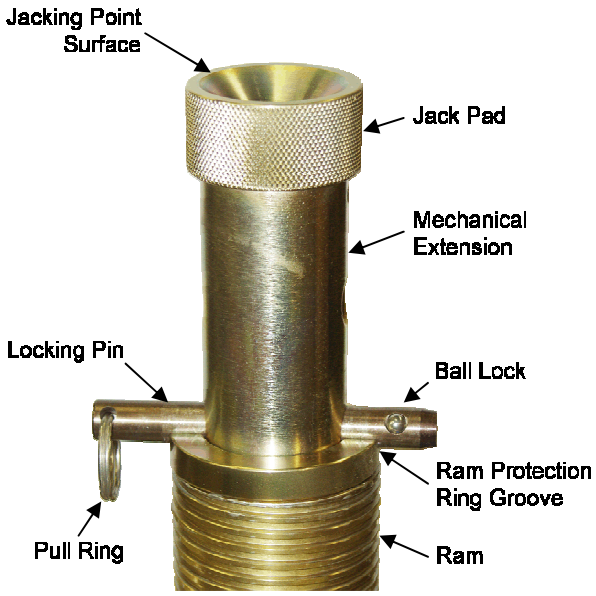
WARNING!

The locking pin MUST be placed in the ram protection ring groove and fully through the mechanical extension.

The locking pin pull ring and ball lock MUST be placed outside the ram protection ring.

- **Visually inspect the jack prior to every use.**
- **Do not place extra locking pins in any other hole on the mechanical extension.**
- **Insure mating surfaces to jack point are free of debris and damage.**
- **Under no conditions should the locking pin pull ring be inside the ram protection ring groove.**
- **Under no conditions should the locking pin's ball lock be inside the ram protection ring groove.**
- **Never use the jack if the ram protection ring is not installed.**
- **Never use the locking pin without a locking pin pull ring.**
- **Never use a locking pin that has been damaged.**
- **Never use a ram protection ring that has been damaged or deformed.**
- **Replace ram protection ring if it does not have a radius groove for the locking pin.**
- **Load test jacks annually.**
- **Only order replacement parts from Tronair.**

Failure to comply could result in premature failure below certified weight and could cause serious injury including death.



CORRECT PIN PLACEMENT

5.0 Operating instructions continued on following page

5.0 OPERATING INSTRUCTIONS *(continued)*

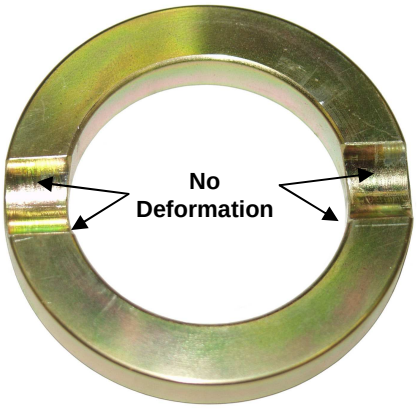
INCORRECT PIN PLACEMENTS

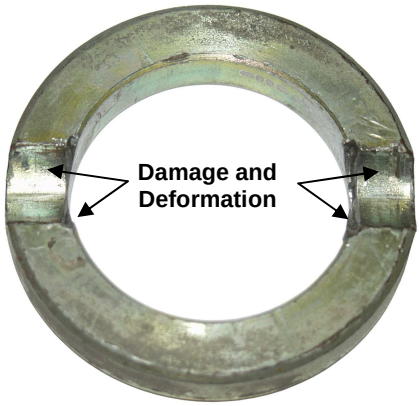
Pull Ring In
Ram Protection Ring

Locking Pin Not In
Ram Protection Ring and
top Locking Pin in Mechanical Extension
(use only one pin)

Ball Lock In
Ram Protection Ring

INCORRECT PIN PLACEMENTS





RESULTS OF INCORRECT LOCKING PIN PLACEMENTS

4. Close pump release valve and operate pump.

NOTE: Turning the pump release valve counter-clockwise lowers the jack. Turning the pump release valve clockwise stops the jacks descent, and allows it to be raised.

5. Hydraulic rams must extend in order form largest to smallest diameter.
6. Lower ram locknut(s) as aircraft is raised. Keep locknuts within 1 inch from bottom of extending ram.
7. Largest diameter hydraulic ram must fully extend before the next stage ram begins to rise.
8. Do not continue to operate hand pump after all rams have fully extended.

WARNING!

The ram locknuts are user operated safety devices. Failure to utilize these locknuts may result in personal injury or death and/or damage to aircraft or equipment.

5.0 OPERATING INSTRUCTIONS *(continued)*

To Lower Aircraft:

1. Lower all jacks simultaneously.
2. If ram locknut(s) is tight, raise jack slightly to release nut(s) ¼ inch from tripod.
3. Ensure proper staging as aircraft is being lowered: loosen ram locknut beginning with smallest ram (1" max) until stage is completely lowered. Repeat for next largest stage.
4. Loosen pump release valve slightly to slowly lower aircraft.

Note: When using jack during washing operations, completely cover top of jack near ram seal.

CAUTION!

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

Always wear safety glasses.

6.0 MAINTENANCE

6.1 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 O-rings 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 both O-rings and backup rings once removed. Cut and damaged rings normally result in fluid leakage.
- At this time flush old hydraulic fluid and dirt from over-all system and replenish with new, clean hydraulic fluid.

6.2 SERVICING JACK

To Disassemble Jack:

1. Raise first stage ram high enough to allow removal of the threaded tube stop.
2. Raise both first and second stage rams **together** to the point where this assembly can be lifted from the jack cylinder.

NOTE: If the second stage ram is allowed to precede the first stage ram, it will fill with oil causing an oil spill when the assembly is removed from the cylinder.

To Re-assemble Jack:

1. Re-assemble in reverse order of above.

NOTE: Lubricate cylinder, ram(s) and o-ring(s) for assembly:
Lubricate inner cylinder wall(s) with MIL-PRF-5606 hydraulic fluid
Apply suitable o-ring lubricant grease to installed o-ring(s) and to o-ring lead-in chamfer at opening of cylinder

NOTE: To minimize air entrapment under the rams. Actuate cylinder with had pump several inches and release. This will circulate oil and bleed out air.

2. Spray I.D. of cylinder and O.D. of rams with DoALL RPM, LPS or equivalent water repellent that will not harm the Buna "N" O-rings to protect surfaces from rusting when not in use.
3. Ensure locknut retaining ring is present on second stage ram to prevent nut removal after seal kit installation.

6.3 REMOVING AND SERVICING PUMP

NOTE: If pump is found faulty, call the factory for replacement or replace seals as follows:

1. Review Illustrated Parts List for Hand Pump (Appendix I)
2. Clamp suction (push on) hose and remove hose from pump.
3. Uncouple output hose from pump.
4. Remove two (2) pump mounting bolts. Remove pump.
5. Remove clevis pin assembly (Item 13).
6. Remove four (4) socket head cap screws.
7. Remove flanges.
8. Remove tube assembly (Item 8).
9. Replace O-rings and back-up ring. (See Appendix I for kits available).
10. Re-assemble in reverse order.

6.4 JACK FUNCTION LOAD TEST

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 5% to 10%.

7.0 TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	ACTION
Fluid leakage at pump piston or pump body	Damaged backup ring, o-ring, piston or pump body	Remove piston and pump body. Inspect for damage. Replace defective part(s). Replace removed o-ring and backup ring
External fluid leakage at rams	Damaged o-ring, backup ring or inner cylinder wall.	Remove rams as a unit from cylinder. Inspect parts. Replace o-ring and defective part(s)
Jack fails to lift rated load	Release valve not closed properly	Fully tighten release valve
	Low fluid level	Fill to correct fluid level
	Pressure relief valve improperly adjusted	Adjust or replace release valve
	Leakage at inlet or outlet check ball	Inspect valve body for wear or replace valve body and check balls
	Vent screw closed	Open vent screw
Rams will not support load after manual or pneumatic pump up	Leaking ram o-ring seals	Check for external leakage, if present replace defective seal and back up ring
	Leaking pressure check valve	Inspect valve body for wear or replace valve body and check balls
	Leaking pressure relief valve	Remove release valve, inspect ball and ball seat in pump block. Replace effective part(s)
Rams raise and fall with each manual pump stroke	Release valve open	Fully tighten release valve
	Inlet check valve not seated or sticking	Pump rapidly to dislodge or replace valve body
	Pressure check valve not seated or sticking	Pump rapidly to dislodge or replace valve body
Jack fails to lower	Ram locknut not loosened	Raise jack ¼ inch and release locknut
	Vent screw closed	Open vent screw
	O-Ring (pinched or rolled)	Replace o-ring and back-up ring, clean up cylinder wall of debris

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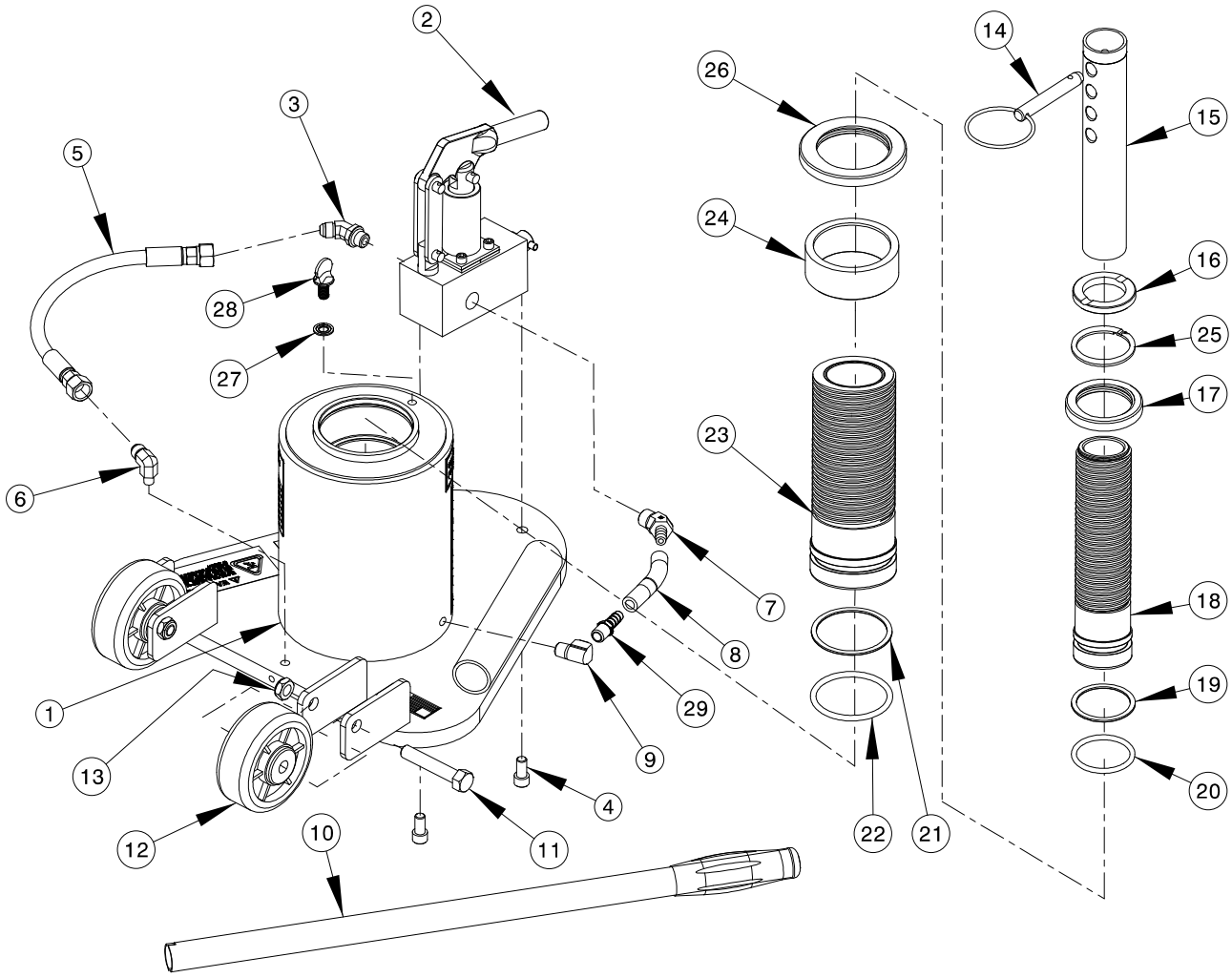
Parts List

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



ITEM	PART NUMBER	DESCRIPTION	QTY
1	Z-7710-01	Assembly Reservoir Tube	1
3	N-2042-05-S-B	Elbow, 45º Male	1
4	G-1151-107206	Socket Head Cap Screw, 3/8 - 16 x ¾ " long	2
5	TF-1043-03*12.5	Hose Assembly, 12.5 long	1
6	N-2005-09-S	Elbow, Male 1/8 – 27 NPT	1
7	N-2409-04	Elbow, 45° Male 3/8 NPT x 3/8 Hose	1
8	TF-1047-04*03.5	Hose, Push On, ¼ x 3 ½" long	1
9	N-2200-03-B	Elbow, 90º ¼ NPT x ¼ NPT	1
10	H-1009-01	Pump Handle	1
11	G-1100-109526	Bolt, Grade 5, ½-20 x 2 ¾" long Hex Head	2
12	U-1002	Wheel	2
13	G-1203-1095	Jamnut, ½-20 Elastic	2
14	G-1307-0825	Pin ½ x 2 ½ " long	1
15	R-1013-01	Extension, Center	1
	R-1012-01	Extension, Center (adds 6.1 inches)	1
16	TR-1026	Ram Protection Ring	1
17	TR-2223	Second Stage Locknut	1
18	Z-7683-04	Second Stage Ram	1
23	Z-7681-04	First Stage Ram Assembly	1
24	TR-2222	Stop Tube	1
25	G-1397-206	Ring, External Retaining	1
26	TR-2230	First Stage Locknut	1

Parts List

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

ITEM	PART NUMBER	DESCRIPTION	QTY
27	G-1281-06	Washer	1
28	G-1177	Thumbscrew Vent	1
29	N-2412-10	Connector, Straight ¼ NPT to 3/8 Hose	1
	K-4588	**Kit, Ram Seal Replacement;** *consists of:*	
19	HC-2020-329	Backup Ring	1
20	HC-2000-329	O-ring	1
21	HC-2020-338	Backup Ring	1
22	HC-2000-338	O-ring	1
	K-1987	**Kit, Hand Pump Replacement**; *consists of:*	
2		See Appendix I	1
	K-1165	**Kit, Wheel Replacement**; *consists of:*	
12		Wheel	1

NOTES: 1. Those items designated as kits contain all hardware necessary for installation.
2. Unless otherwise listed, all replacement bolts should be grade '5' or better.

TRONAIR

APPENDIX I

HC-1752
2,500 psi
Hand Pump Parts List

Model: HC-1752
2,500 psi Hand Pump

***

Illustrated Parts List

08/2001 – Rev. OR

1740 Eber Rd
Holland, OH 43528-9794
USA

Tronair, Inc.
www.tronair.com
Email: sales@tronair.com

Phone: (419) 866-6301
800-426-6301
Fax: (419) 867-0634

HC-1752
2,500 PSI Hand Pump

Parts List

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

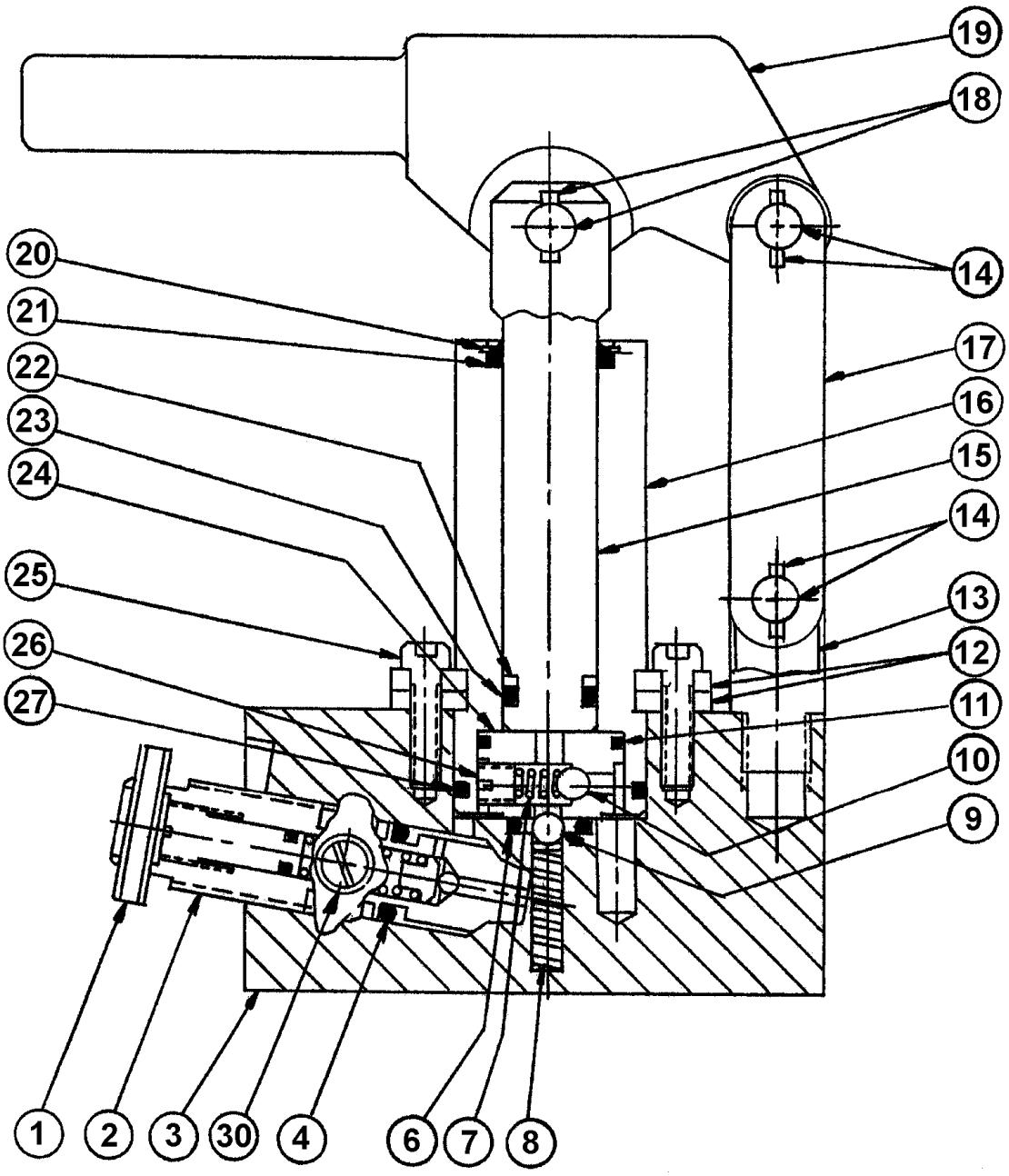
Reference Parts List Illustration on following page.

ITEM	PART NUMBER	DESCRIPTION	QTY
3	5M1-000-001	Body, Pump	1
12	506-000	Half, Flange	4
25	518-000	Screw, Socket Head Cap	4
Not Shown	H-1009-01	Handle	1
	K-1001	**Kit, Seal Replacement**; *consists of:*	
4		O-ring, Release Screw	1
6		O-ring, Outlet Check	1
11		O-ring, Valve Body	1
21		Wiper, Rod	1
22		Ring, Backup	1
23		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
	K-1068	**Kit, Linkage Replacement**; *consists of:*	
13		Pivot	1
14		Assembly, Linkage Pin	2
17		Strap	2
18		Assembly, Clevis Pin	1
19		Bracket, Pump Handle	1
	K-1069	**Kit, Internal Parts Replacement;** *consists of:*	
♦ Not Shown		Ball, Release	1
7		Spring, Inlet Check	1
8		Spring, Outlet Check	1
9		Ball, Outlet Check	1
10		Ball, Inlet Check	1
	K-1778	**Kit, Piston/Cylinder Replacement;** *consists of:*	
15		Piston	1
16		Tube	1
20		Retainer, Wiper	1
24		Assembly, Valve Body (Includes Items 7, 10, 24, 26)	1
	K-1906	**Kit, Piston/Seal Replacement;** *consists of:*	
15		Piston	1
22		Ring, Backup	1
23		O-ring, Piston	1
	K-2783	**Kit, Release Screw Replacement;** *consists of:*	
2		Screw, Release	1
30		Retainer, Screw	1

♦ **Although this item is listed in its particular kit, it is not used on HC-1752 pump. These items may be discarded.**

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

Parts List Illustration



WARNING!

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

TRONAIR

APPENDIX II

MSDS
Hydraulic Fluid
(MIL-PRF-5606)

ExxonMobil

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

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

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300
ExxonMobil Transportation No.	281-834-3296
MSDS Requests	713-613-3661
Product Technical Information	800-662-4525, 800-947-9147
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	10 - 30%
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	30 - 60%
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	64742-55-8	10 - 30%

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

SECTION 3 HAZARDS IDENTIFICATION

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

POTENTIAL PHYSICAL / CHEMICAL EFFECTS

Combustible. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited.

POTENTIAL HEALTH EFFECTS

If swallowed, may be aspirated and cause lung damage. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May be irritating to the eyes, nose, throat, and lungs. High-pressure injection under skin may cause serious damage.

Target Organs: Skin |

NFPA Hazard ID:	Health:	0	Flammability:	2	Reactivity:	0
HMIS Hazard ID:	Health:	0*	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 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. 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 (CO2) 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: Smoke, Fume, Sulfur oxides, Aldehydes, Incomplete combustion products, Oxides of carbon, Phosphorus oxides

FLAMMABILITY PROPERTIES
Flash Point [Method]: >82C (180F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 7.0
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 regulations. U.S. regulations require reporting releases of this material to the environment which exceed the 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 Section 3 for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

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.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid contact with skin. Avoid prolonged breathing of mists and heated vapor. Use proper bonding and/or grounding procedures. Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is a static accumulator.

STORAGE

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. Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

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

Source	Form	Limit / Standard			Note	Source
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)		TWA	2000 mg/m3	500 ppm	N/A	OSHA Z1
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	STEL	10 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	TWA	5 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	Mist.	STEL	10 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	Mist.	TWA	5 mg/m3		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/m³ - ACGIH TLV, 10 mg/m³ - ACGIH STEL, 5 mg/m³ - OSHA PEL.

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

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. 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. Work conditions can greatly effect glove durability; 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
See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION
Physical State: Liquid
Color: Red
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION
Relative Density (at 15 C): 0.88
Flash Point [Method]: >82C (180F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 7.0
Autoignition Temperature: >225°C (437°F)
Boiling Point / Range: 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 mm2/sec) at 40 C | 5.1 cSt (5.1 mm2/sec) at 100C
Oxidizing Properties: See Sections 3, 15, 16.

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

SECTION 10 STABILITY AND REACTIVITY

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.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m3	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data.	Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.

CHRONIC/OTHER EFFECTS

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.

Additional information is available by request.

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

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

Material -- Expected to be harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

Base oil 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:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- 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.

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, corrositivity 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 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) : Not Regulated for Land Transport

LAND (TDG) : Not Regulated for Land Transport

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

ExxonMobil

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

AIR (IATA) : Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: AICS, IECSC, DSL, EINECS, ENCS, KECI, PICCS, TSCA

EPCRA: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: Fire. 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.

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	17, 18, 19
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	1, 4, 13, 17, 18
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	64742-55-8	1, 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

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Revision Changes:
Section 05: Fire Fighting Measures - Unusual Fire Hazards was modified.
Section 10: Conditions to Avoid was modified.
Section 07: Handling and Storage - Handling was modified.
Section 07: Handling and Storage - Storage Phrases was modified.
Section 03: HMIS Flammability was modified.
Section 03: NFPA Flammability was modified.
Section 06: Accidental Release - Spill Management - Land was modified.
Section 09: Flash Point C(F) was modified.
Section 08: Exposure Control was modified.
Section 15: SARA (311/312) REPORTABLE HAZARD CATEGORIES was modified.
Section 16: Land Spill was modified.
Section 14: DOT Technical Name - All was added.
Section 03: Physical/Chemical Hazard was added.
Section 14: Proper Shipping Name - Header was added.
Section 14: Proper Shipping Name was added.
Section 14: Hazard Class & Division - Header was added.
Section 14: Hazard Class was added.
Section 14: UN Number - Header was added.
Section 14: UN Number was added.
Section 14: Packing Group - Header was added.
Section 14: Packing Group was added.
Section 14: Label(s) - Header was added.
Section 14: Label(s) was added.
Section 14: ERG Number - Header was added.
Section 14: ERG Number was added.
Section 14: Transport Document Name - Header was added.
Section 14: Transport Document Name was added.
Section 14: DOT Technical Name - Open parenthesis was added.
Section 14: DOT Technical Name - Close parenthesis was added.
Section 03: Physical/Chemical Hazard was added.
Section 03: Physical/Chemical Hazards - Header was added.
Section 14: DOT Footnote was added.
Section 16: Physical Hazards was added.
Section 16: Physical Hazards - Header was added.
Section 16: Precautions was added.
Section 16: Precautions - Header was added.
Section 10: Conditions to Avoid was deleted.
Section 14: LAND (DOT) - Default was deleted.

PRECAUTIONARY LABEL TEXT:
Contains: DISTILLATES (PETROLEUM), HYDROTREATED LIGHT
CAUTION!

HEALTH HAZARDS
Repeated exposure may cause skin dryness or cracking. If swallowed, may be aspirated and cause lung damage.
Target Organs: Skin |

PHYSICAL HAZARDS
Combustible.

PRECAUTIONS
Use proper bonding and/or grounding procedures.

FIRST AID
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.

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

Oral: Seek immediate medical attention. Do not induce vomiting. If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

Skin: Wash contact areas with soap and water. 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.

FIRE FIGHTING MEDIA
Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

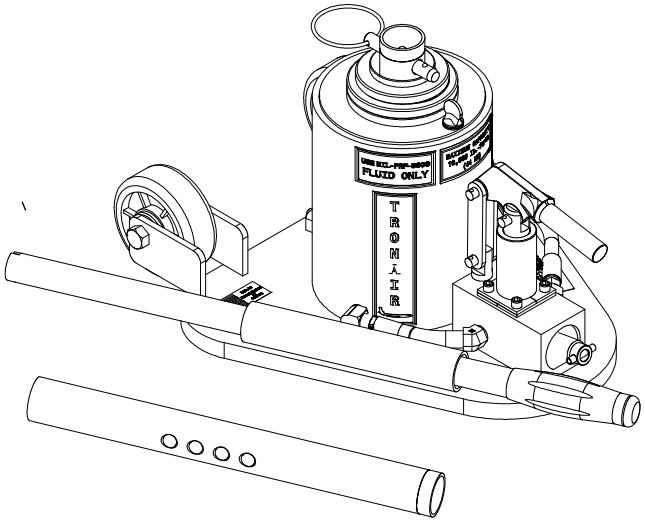
SPILL/LEAK
Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. 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.
Use
Not intended or suitable for use in or around a household or dwelling.

Internal Use Only
MHC: 2A,0,0,0,0,1 PPEC: C

DGN: 2005454XUS (552975)

Operation & Service Manual



Model: 02-0511-0132
5 Ton Two Stage Jack

12/2011 – Rev. 11

Includes Illustrated Parts Lists

1740 Eber Rd
Holland, OH 43528-9794
USA

Tronair, Inc.
www.tronair.com
Email: sales@tronair.com

Phone: (419) 866-6301
800-426-6301
Fax: (419) 867-0634

REVISION	DATE	TEXT AFFECTED
09	11/2004	pg 2 5.0 added warning and illustrations
10	09/2005	pg 2 Modified 5.1 Jack Instructions
11	12/2011	Major revision

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6.2 SERVICING JACK 4
6.3 REMOVING AND SERVICING PUMP 4
6.4 JACK FUNCTION LOAD TEST 4
7.0 TROUBLE SHOOTING 5

APPENDIX I HC-1752 2,500 psi Hand Pump Parts List
APPENDIX II MSDS Hydraulic Fluid (MIL-PRF-5606)

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 DESCRIPTION

The Tronair Model 02-0511-0132 two stage hydraulic jack incorporates the following quality features:

- Steel Construction.
- Two-stage telescoping rams.
- Mechanical ram lock nuts that prevent lowering of jack under load.
- Quick action mechanical extension.
- Single speed, manually operated pump with pressure relief.
- Uses standard MIL-PRF-5606 hydraulic fluid.
- Mechanical extensions provided to allow jack to be utilized on other aircraft as shown in specifications.

2.0 USAGE

The purpose of this jack is to lift aircraft for maintenance. It has a maximum capacity of five (5) tons (4.4 kN).

3.0 SPECIFICATIONS

- Vertical capacity: 10,000 lbs. (44.5 kN)
- Minimum closed heights:
  - with R-1013-01 mechanical extension 11.4 in (29 cm)
  - with R-1012-01 mechanical extension 17.5 in (44.6 cm)
- Mechanical extension: 3.0 in (7.6 cm)
- Hydraulic extension: 12.22 in (31 cm)
- Maximum heights obtainable:
  - with R-1013-01 mechanical extension 26.6 in (67.6 cm)
  - with R-1012-01 mechanical extension 32.7 in (83.1 cm)
- Overall: 14 ½ x 15 in (36.8 x 38.1 cm)
- Floor area (triangular): 156 in^2 (1006 cm^2)
- Weight: 100 lbs (45.4 kg)

4.0 ASSEMBLY INSTRUCTIONS

4.1 GENERAL INFORMATION

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. The **3/8** -24 bolts should be tightened to 35 ft-lbs.

All replacement parts must be the same as or equal to the original parts supplied.

4.2 PRE-USE CHECKS

- Refer to the Jack Parts Lists and Illustrations to identify and ensure that all parts are present.
- Generally check over unit to assure the tightness of all fittings.
- With rams completely collapsed, check hydraulic fluid level; fluid level should be 5/8 to ½ inches from the outside top of reservoir. Replenish with MIL-PRF-5606 fluid as required.

5.0 OPERATING INSTRUCTIONS

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

CAUTION!

- **NEVER put hands between aircraft and jack pad, as after aircraft has been lowered, struts may have hung up.**
- **Never align jack under aircraft by pounding on jack legs. Dented legs may lead to jack collapse.**
- **Always lower ram locking nut(s) after jack is under load. Be sure ram nut(s) is seated fully after jacking.**
- **Always raise and lower jacks simultaneously so that aircraft remains level.**
- **Always use a tail or nose stand, as applicable, for additional stability.**

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.

To Raise Aircraft:

1. Place jack on a hard level surface.
2. Hydraulic rams must be completely retracted before operating the jack.
3. Raise mechanical extension as close to aircraft jack pad as possible.

NOTE: Jacks equipped with two mechanical extensions. The difference between the extensions is a length of 6.1 in. Select the extension that best suits the jacking position.

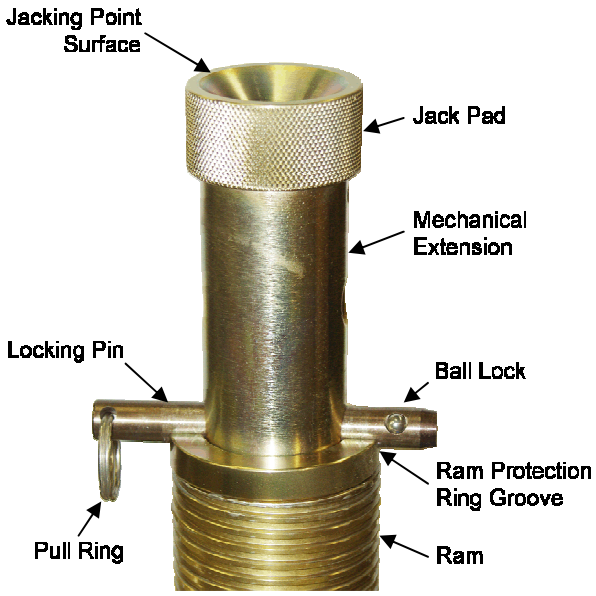
WARNING!

The locking pin MUST be placed in the ram protection ring groove and fully through the mechanical extension.

The locking pin pull ring and ball lock MUST be placed outside the ram protection ring.

- **Visually inspect the jack prior to every use.**
- **Do not place extra locking pins in any other hole on the mechanical extension.**
- **Insure mating surfaces to jack point are free of debris and damage.**
- **Under no conditions should the locking pin pull ring be inside the ram protection ring groove.**
- **Under no conditions should the locking pin's ball lock be inside the ram protection ring groove.**
- **Never use the jack if the ram protection ring is not installed.**
- **Never use the locking pin without a locking pin pull ring.**
- **Never use a locking pin that has been damaged.**
- **Never use a ram protection ring that has been damaged or deformed.**
- **Replace ram protection ring if it does not have a radius groove for the locking pin.**
- **Load test jacks annually.**
- **Only order replacement parts from Tronair.**

Failure to comply could result in premature failure below certified weight and could cause serious injury including death.



CORRECT PIN PLACEMENT

5.0 Operating instructions continued on following page

5.0 OPERATING INSTRUCTIONS *(continued)*

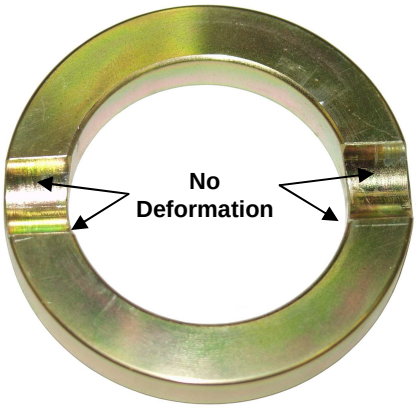
INCORRECT PIN PLACEMENTS

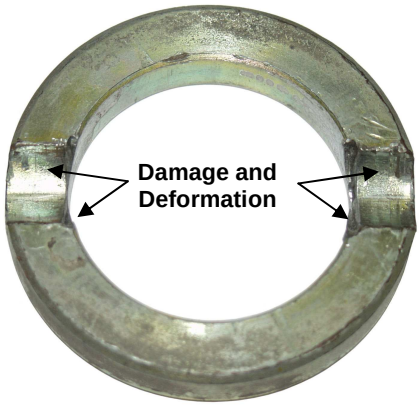
Pull Ring In
Ram Protection Ring

Locking Pin Not In
Ram Protection Ring and
top Locking Pin in Mechanical Extension
(use only one pin)

Ball Lock In
Ram Protection Ring

INCORRECT PIN PLACEMENTS





RESULTS OF INCORRECT LOCKING PIN PLACEMENTS

4. Close pump release valve and operate pump.

NOTE: Turning the pump release valve counter-clockwise lowers the jack. Turning the pump release valve clockwise stops the jacks descent, and allows it to be raised.

5. Hydraulic rams must extend in order form largest to smallest diameter.
6. Lower ram locknut(s) as aircraft is raised. Keep locknuts within 1 inch from bottom of extending ram.
7. Largest diameter hydraulic ram must fully extend before the next stage ram begins to rise.
8. Do not continue to operate hand pump after all rams have fully extended.

WARNING!

The ram locknuts are user operated safety devices. Failure to utilize these locknuts may result in personal injury or death and/or damage to aircraft or equipment.

5.0 OPERATING INSTRUCTIONS *(continued)*

To Lower Aircraft:

1. Lower all jacks simultaneously.
2. If ram locknut(s) is tight, raise jack slightly to release nut(s) ¼ inch from tripod.
3. Ensure proper staging as aircraft is being lowered: loosen ram locknut beginning with smallest ram (1" max) until stage is completely lowered. Repeat for next largest stage.
4. Loosen pump release valve slightly to slowly lower aircraft.

Note: When using jack during washing operations, completely cover top of jack near ram seal.

CAUTION!

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

Always wear safety glasses.

6.0 MAINTENANCE

6.1 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 O-rings 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 both O-rings and backup rings once removed. Cut and damaged rings normally result in fluid leakage.
- At this time flush old hydraulic fluid and dirt from over-all system and replenish with new, clean hydraulic fluid.

6.2 SERVICING JACK

To Disassemble Jack:

1. Raise first stage ram high enough to allow removal of the threaded tube stop.
2. Raise both first and second stage rams **together** to the point where this assembly can be lifted from the jack cylinder.

NOTE: If the second stage ram is allowed to precede the first stage ram, it will fill with oil causing an oil spill when the assembly is removed from the cylinder.

To Re-assemble Jack:

1. Re-assemble in reverse order of above.

NOTE: Lubricate cylinder, ram(s) and o-ring(s) for assembly:
Lubricate inner cylinder wall(s) with MIL-PRF-5606 hydraulic fluid
Apply suitable o-ring lubricant grease to installed o-ring(s) and to o-ring lead-in chamfer at opening of cylinder

NOTE: To minimize air entrapment under the rams. Actuate cylinder with had pump several inches and release. This will circulate oil and bleed out air.

2. Spray I.D. of cylinder and O.D. of rams with DoALL RPM, LPS or equivalent water repellent that will not harm the Buna "N" O-rings to protect surfaces from rusting when not in use.
3. Ensure locknut retaining ring is present on second stage ram to prevent nut removal after seal kit installation.

6.3 REMOVING AND SERVICING PUMP

NOTE: If pump is found faulty, call the factory for replacement or replace seals as follows:

1. Review Illustrated Parts List for Hand Pump (Appendix I)
2. Clamp suction (push on) hose and remove hose from pump.
3. Uncouple output hose from pump.
4. Remove two (2) pump mounting bolts. Remove pump.
5. Remove clevis pin assembly (Item 13).
6. Remove four (4) socket head cap screws.
7. Remove flanges.
8. Remove tube assembly (Item 8).
9. Replace O-rings and back-up ring. (See Appendix I for kits available).
10. Re-assemble in reverse order.

6.4 JACK FUNCTION LOAD TEST

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 5% to 10%.

7.0 TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	ACTION
Fluid leakage at pump piston or pump body	Damaged backup ring, o-ring, piston or pump body	Remove piston and pump body. Inspect for damage. Replace defective part(s). Replace removed o-ring and backup ring
External fluid leakage at rams	Damaged o-ring, backup ring or inner cylinder wall.	Remove rams as a unit from cylinder. Inspect parts. Replace o-ring and defective part(s)
Jack fails to lift rated load	Release valve not closed properly	Fully tighten release valve
	Low fluid level	Fill to correct fluid level
	Pressure relief valve improperly adjusted	Adjust or replace release valve
	Leakage at inlet or outlet check ball	Inspect valve body for wear or replace valve body and check balls
	Vent screw closed	Open vent screw
Rams will not support load after manual or pneumatic pump up	Leaking ram o-ring seals	Check for external leakage, if present replace defective seal and back up ring
	Leaking pressure check valve	Inspect valve body for wear or replace valve body and check balls
	Leaking pressure relief valve	Remove release valve, inspect ball and ball seat in pump block. Replace effective part(s)
Rams raise and fall with each manual pump stroke	Release valve open	Fully tighten release valve
	Inlet check valve not seated or sticking	Pump rapidly to dislodge or replace valve body
	Pressure check valve not seated or sticking	Pump rapidly to dislodge or replace valve body
Jack fails to lower	Ram locknut not loosened	Raise jack ¼ inch and release locknut
	Vent screw closed	Open vent screw
	O-Ring (pinched or rolled)	Replace o-ring and back-up ring, clean up cylinder wall of debris

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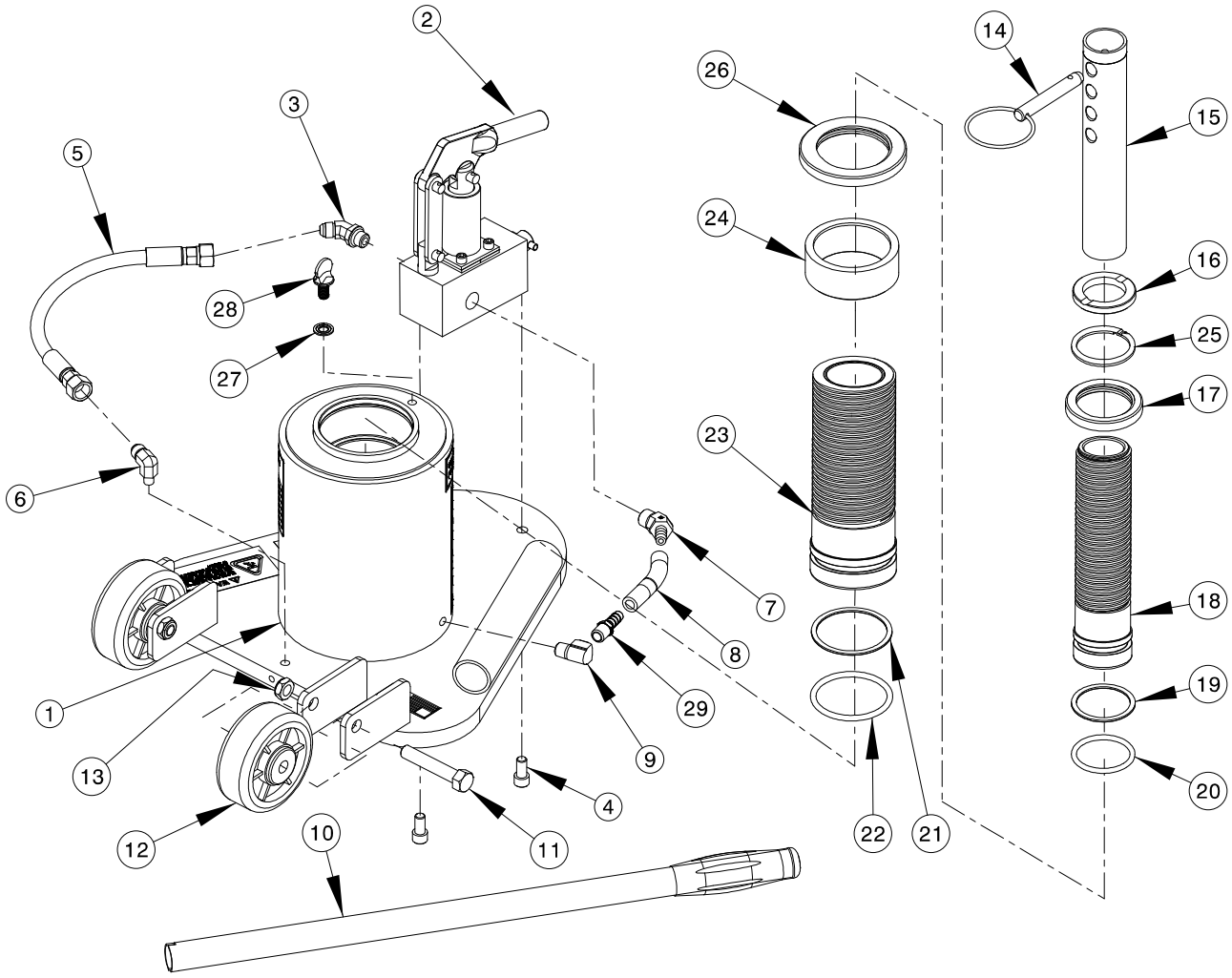
Parts List

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



ITEM	PART NUMBER	DESCRIPTION	QTY
1	Z-7710-01	Assembly Reservoir Tube	1
3	N-2042-05-S-B	Elbow, 45º Male	1
4	G-1151-107206	Socket Head Cap Screw, 3/8 - 16 x ¾ " long	2
5	TF-1043-03*12.5	Hose Assembly, 12.5 long	1
6	N-2005-09-S	Elbow, Male 1/8 – 27 NPT	1
7	N-2409-04	Elbow, 45° Male 3/8 NPT x 3/8 Hose	1
8	TF-1047-04*03.5	Hose, Push On, ¼ x 3 ½" long	1
9	N-2200-03-B	Elbow, 90º ¼ NPT x ¼ NPT	1
10	H-1009-01	Pump Handle	1
11	G-1100-109526	Bolt, Grade 5, ½-20 x 2 ¾" long Hex Head	2
12	U-1002	Wheel	2
13	G-1203-1095	Jamnut, ½-20 Elastic	2
14	G-1307-0825	Pin ½ x 2 ½ " long	1
15	R-1013-01	Extension, Center	1
	R-1012-01	Extension, Center (adds 6.1 inches)	1
16	TR-1026	Ram Protection Ring	1
17	TR-2223	Second Stage Locknut	1
18	Z-7683-04	Second Stage Ram	1
23	Z-7681-04	First Stage Ram Assembly	1
24	TR-2222	Stop Tube	1
25	G-1397-206	Ring, External Retaining	1
26	TR-2230	First Stage Locknut	1

Parts List

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

ITEM	PART NUMBER	DESCRIPTION	QTY
27	G-1281-06	Washer	1
28	G-1177	Thumbscrew Vent	1
29	N-2412-10	Connector, Straight ¼ NPT to 3/8 Hose	1
	K-4588	**Kit, Ram Seal Replacement;** *consists of:*	
19	HC-2020-329	Backup Ring	1
20	HC-2000-329	O-ring	1
21	HC-2020-338	Backup Ring	1
22	HC-2000-338	O-ring	1
	K-1987	**Kit, Hand Pump Replacement**; *consists of:*	
2		See Appendix I	1
	K-1165	**Kit, Wheel Replacement**; *consists of:*	
12		Wheel	1

NOTES: 1. Those items designated as kits contain all hardware necessary for installation.
2. Unless otherwise listed, all replacement bolts should be grade '5' or better.

TRONAIR

APPENDIX I

HC-1752
2,500 psi
Hand Pump Parts List

Model: HC-1752
2,500 psi Hand Pump

***

Illustrated Parts List

08/2001 – Rev. OR

1740 Eber Rd
Holland, OH 43528-9794
USA

Tronair, Inc.
www.tronair.com
Email: sales@tronair.com

Phone: (419) 866-6301
800-426-6301
Fax: (419) 867-0634

HC-1752
2,500 PSI Hand Pump

Parts List

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

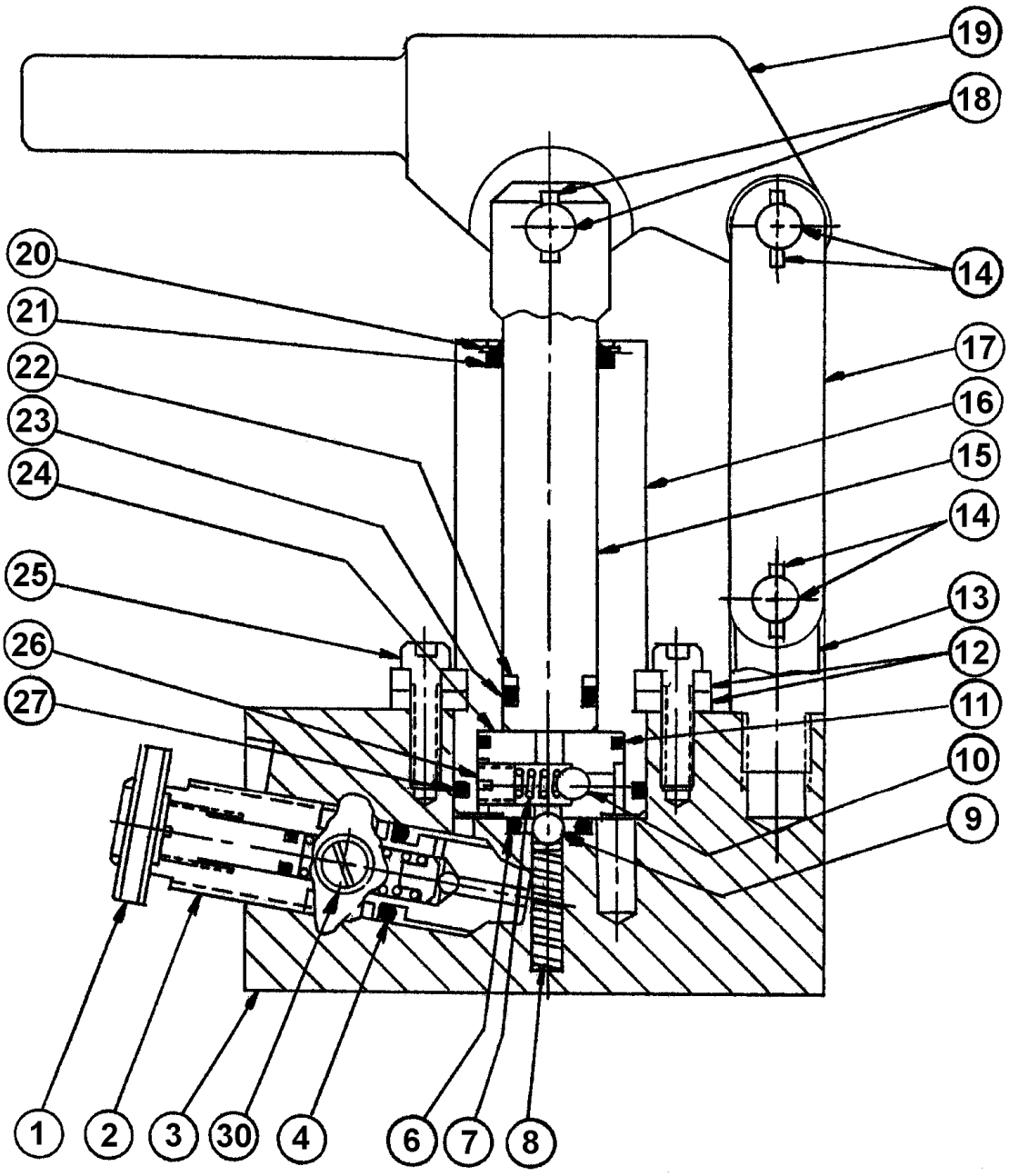
Reference Parts List Illustration on following page.

ITEM	PART NUMBER	DESCRIPTION	QTY
3	5M1-000-001	Body, Pump	1
12	506-000	Half, Flange	4
25	518-000	Screw, Socket Head Cap	4
Not Shown	H-1009-01	Handle	1
	K-1001	**Kit, Seal Replacement**; *consists of:*	
4		O-ring, Release Screw	1
6		O-ring, Outlet Check	1
11		O-ring, Valve Body	1
21		Wiper, Rod	1
22		Ring, Backup	1
23		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
	K-1068	**Kit, Linkage Replacement**; *consists of:*	
13		Pivot	1
14		Assembly, Linkage Pin	2
17		Strap	2
18		Assembly, Clevis Pin	1
19		Bracket, Pump Handle	1
	K-1069	**Kit, Internal Parts Replacement;** *consists of:*	
♦ Not Shown		Ball, Release	1
7		Spring, Inlet Check	1
8		Spring, Outlet Check	1
9		Ball, Outlet Check	1
10		Ball, Inlet Check	1
	K-1778	**Kit, Piston/Cylinder Replacement;** *consists of:*	
15		Piston	1
16		Tube	1
20		Retainer, Wiper	1
24		Assembly, Valve Body (Includes Items 7, 10, 24, 26)	1
	K-1906	**Kit, Piston/Seal Replacement;** *consists of:*	
15		Piston	1
22		Ring, Backup	1
23		O-ring, Piston	1
	K-2783	**Kit, Release Screw Replacement;** *consists of:*	
2		Screw, Release	1
30		Retainer, Screw	1

♦ **Although this item is listed in its particular kit, it is not used on HC-1752 pump. These items may be discarded.**

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

Parts List Illustration



WARNING!

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

TRONAIR

APPENDIX II

MSDS
Hydraulic Fluid
(MIL-PRF-5606)

ExxonMobil

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

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

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300
ExxonMobil Transportation No.	281-834-3296
MSDS Requests	713-613-3661
Product Technical Information	800-662-4525, 800-947-9147
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	10 - 30%
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	30 - 60%
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	64742-55-8	10 - 30%

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

SECTION 3 HAZARDS IDENTIFICATION

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

POTENTIAL PHYSICAL / CHEMICAL EFFECTS

Combustible. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited.

POTENTIAL HEALTH EFFECTS

If swallowed, may be aspirated and cause lung damage. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May be irritating to the eyes, nose, throat, and lungs. High-pressure injection under skin may cause serious damage.

Target Organs: Skin |

NFPA Hazard ID:	Health:	0	Flammability:	2	Reactivity:	0
HMIS Hazard ID:	Health:	0*	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 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. 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 (CO2) 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: Smoke, Fume, Sulfur oxides, Aldehydes, Incomplete combustion products, Oxides of carbon, Phosphorus oxides

FLAMMABILITY PROPERTIES
Flash Point [Method]: >82C (180F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 7.0
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 regulations. U.S. regulations require reporting releases of this material to the environment which exceed the 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 Section 3 for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

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.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid contact with skin. Avoid prolonged breathing of mists and heated vapor. Use proper bonding and/or grounding procedures. Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is a static accumulator.

STORAGE

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. Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

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

Source	Form	Limit / Standard			Note	Source
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)		TWA	2000 mg/m3	500 ppm	N/A	OSHA Z1
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	STEL	10 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	TWA	5 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	Mist.	STEL	10 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	Mist.	TWA	5 mg/m3		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/m³ - ACGIH TLV, 10 mg/m³ - ACGIH STEL, 5 mg/m³ - OSHA PEL.

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

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. 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. Work conditions can greatly effect glove durability; 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
See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION
Physical State: Liquid
Color: Red
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION
Relative Density (at 15 C): 0.88
Flash Point [Method]: >82C (180F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 7.0
Autoignition Temperature: >225°C (437°F)
Boiling Point / Range: 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 mm2/sec) at 40 C | 5.1 cSt (5.1 mm2/sec) at 100C
Oxidizing Properties: See Sections 3, 15, 16.

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

SECTION 10 STABILITY AND REACTIVITY

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.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m3	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data.	Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.

CHRONIC/OTHER EFFECTS

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.

Additional information is available by request.

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

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

Material -- Expected to be harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

Base oil 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:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- 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.

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, corrositivity 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 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) : Not Regulated for Land Transport

LAND (TDG) : Not Regulated for Land Transport

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

ExxonMobil

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

AIR (IATA) : Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: AICS, IECSC, DSL, EINECS, ENCS, KECI, PICCS, TSCA

EPCRA: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: Fire. 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.

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	17, 18, 19
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	1, 4, 13, 17, 18
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	64742-55-8	1, 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

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Revision Changes:
Section 05: Fire Fighting Measures - Unusual Fire Hazards was modified.
Section 10: Conditions to Avoid was modified.
Section 07: Handling and Storage - Handling was modified.
Section 07: Handling and Storage - Storage Phrases was modified.
Section 03: HMIS Flammability was modified.
Section 03: NFPA Flammability was modified.
Section 06: Accidental Release - Spill Management - Land was modified.
Section 09: Flash Point C(F) was modified.
Section 08: Exposure Control was modified.
Section 15: SARA (311/312) REPORTABLE HAZARD CATEGORIES was modified.
Section 16: Land Spill was modified.
Section 14: DOT Technical Name - All was added.
Section 03: Physical/Chemical Hazard was added.
Section 14: Proper Shipping Name - Header was added.
Section 14: Proper Shipping Name was added.
Section 14: Hazard Class & Division - Header was added.
Section 14: Hazard Class was added.
Section 14: UN Number - Header was added.
Section 14: UN Number was added.
Section 14: Packing Group - Header was added.
Section 14: Packing Group was added.
Section 14: Label(s) - Header was added.
Section 14: Label(s) was added.
Section 14: ERG Number - Header was added.
Section 14: ERG Number was added.
Section 14: Transport Document Name - Header was added.
Section 14: Transport Document Name was added.
Section 14: DOT Technical Name - Open parenthesis was added.
Section 14: DOT Technical Name - Close parenthesis was added.
Section 03: Physical/Chemical Hazard was added.
Section 03: Physical/Chemical Hazards - Header was added.
Section 14: DOT Footnote was added.
Section 16: Physical Hazards was added.
Section 16: Physical Hazards - Header was added.
Section 16: Precautions was added.
Section 16: Precautions - Header was added.
Section 10: Conditions to Avoid was deleted.
Section 14: LAND (DOT) - Default was deleted.

PRECAUTIONARY LABEL TEXT:
Contains: DISTILLATES (PETROLEUM), HYDROTREATED LIGHT
CAUTION!

HEALTH HAZARDS
Repeated exposure may cause skin dryness or cracking. If swallowed, may be aspirated and cause lung damage.
Target Organs: Skin |

PHYSICAL HAZARDS
Combustible.

PRECAUTIONS
Use proper bonding and/or grounding procedures.

FIRST AID
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.

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

Oral: Seek immediate medical attention. Do not induce vomiting. If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

Skin: Wash contact areas with soap and water. 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.

FIRE FIGHTING MEDIA
Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

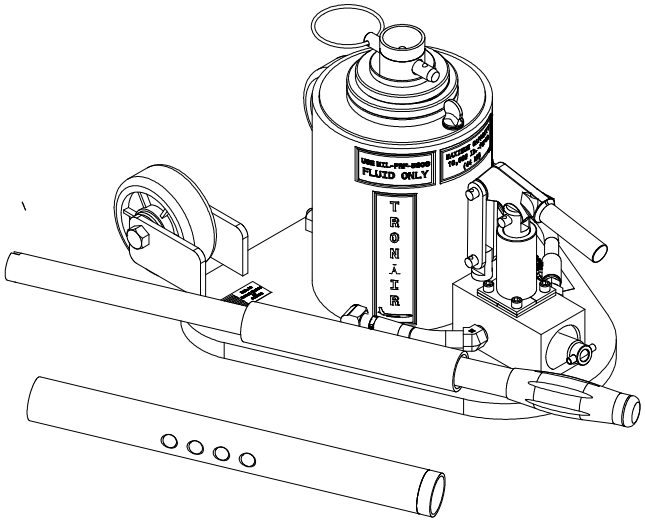
SPILL/LEAK
Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. 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.
Use
Not intended or suitable for use in or around a household or dwelling.

Internal Use Only
MHC: 2A,0,0,0,0,1 PPEC: C

DGN: 2005454XUS (552975)

Operation & Service Manual



Model: 02-0511-0132
5 Ton Two Stage Jack

12/2011 – Rev. 11

Includes Illustrated Parts Lists

1740 Eber Rd
Holland, OH 43528-9794
USA

Tronair, Inc.
www.tronair.com
Email: sales@tronair.com

Phone: (419) 866-6301
800-426-6301
Fax: (419) 867-0634

REVISION	DATE	TEXT AFFECTED
09	11/2004	pg 2 5.0 added warning and illustrations
10	09/2005	pg 2 Modified 5.1 Jack Instructions
11	12/2011	Major revision

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7.0 TROUBLE SHOOTING 5

APPENDIX I HC-1752 2,500 psi Hand Pump Parts List
APPENDIX II MSDS Hydraulic Fluid (MIL-PRF-5606)

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 DESCRIPTION

The Tronair Model 02-0511-0132 two stage hydraulic jack incorporates the following quality features:

- Steel Construction.
- Two-stage telescoping rams.
- Mechanical ram lock nuts that prevent lowering of jack under load.
- Quick action mechanical extension.
- Single speed, manually operated pump with pressure relief.
- Uses standard MIL-PRF-5606 hydraulic fluid.
- Mechanical extensions provided to allow jack to be utilized on other aircraft as shown in specifications.

2.0 USAGE

The purpose of this jack is to lift aircraft for maintenance. It has a maximum capacity of five (5) tons (4.4 kN).

3.0 SPECIFICATIONS

- Vertical capacity: 10,000 lbs. (44.5 kN)
- Minimum closed heights:
  - with R-1013-01 mechanical extension 11.4 in (29 cm)
  - with R-1012-01 mechanical extension 17.5 in (44.6 cm)
- Mechanical extension: 3.0 in (7.6 cm)
- Hydraulic extension: 12.22 in (31 cm)
- Maximum heights obtainable:
  - with R-1013-01 mechanical extension 26.6 in (67.6 cm)
  - with R-1012-01 mechanical extension 32.7 in (83.1 cm)
- Overall: 14 ½ x 15 in (36.8 x 38.1 cm)
- Floor area (triangular): 156 in^2 (1006 cm^2)
- Weight: 100 lbs (45.4 kg)

4.0 ASSEMBLY INSTRUCTIONS

4.1 GENERAL INFORMATION

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. The **3/8** -24 bolts should be tightened to 35 ft-lbs.

All replacement parts must be the same as or equal to the original parts supplied.

4.2 PRE-USE CHECKS

- Refer to the Jack Parts Lists and Illustrations to identify and ensure that all parts are present.
- Generally check over unit to assure the tightness of all fittings.
- With rams completely collapsed, check hydraulic fluid level; fluid level should be 5/8 to ½ inches from the outside top of reservoir. Replenish with MIL-PRF-5606 fluid as required.

5.0 OPERATING INSTRUCTIONS

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

CAUTION!

- **NEVER put hands between aircraft and jack pad, as after aircraft has been lowered, struts may have hung up.**
- **Never align jack under aircraft by pounding on jack legs. Dented legs may lead to jack collapse.**
- **Always lower ram locking nut(s) after jack is under load. Be sure ram nut(s) is seated fully after jacking.**
- **Always raise and lower jacks simultaneously so that aircraft remains level.**
- **Always use a tail or nose stand, as applicable, for additional stability.**

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.

To Raise Aircraft:

1. Place jack on a hard level surface.
2. Hydraulic rams must be completely retracted before operating the jack.
3. Raise mechanical extension as close to aircraft jack pad as possible.

NOTE: Jacks equipped with two mechanical extensions. The difference between the extensions is a length of 6.1 in. Select the extension that best suits the jacking position.

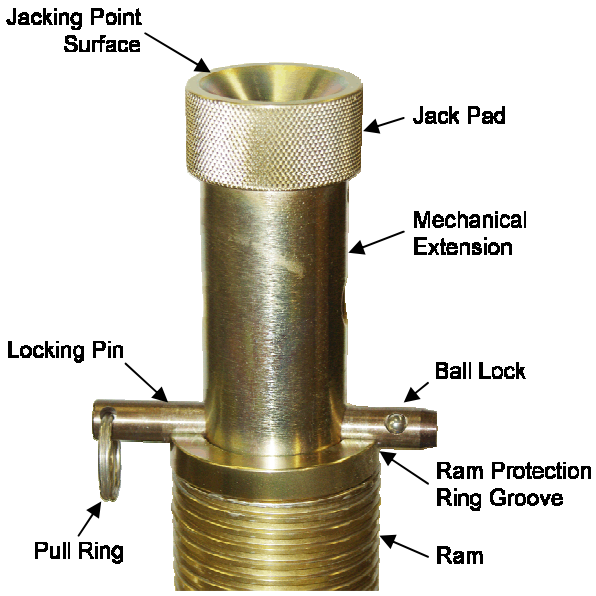
WARNING!

The locking pin MUST be placed in the ram protection ring groove and fully through the mechanical extension.

The locking pin pull ring and ball lock MUST be placed outside the ram protection ring.

- **Visually inspect the jack prior to every use.**
- **Do not place extra locking pins in any other hole on the mechanical extension.**
- **Insure mating surfaces to jack point are free of debris and damage.**
- **Under no conditions should the locking pin pull ring be inside the ram protection ring groove.**
- **Under no conditions should the locking pin's ball lock be inside the ram protection ring groove.**
- **Never use the jack if the ram protection ring is not installed.**
- **Never use the locking pin without a locking pin pull ring.**
- **Never use a locking pin that has been damaged.**
- **Never use a ram protection ring that has been damaged or deformed.**
- **Replace ram protection ring if it does not have a radius groove for the locking pin.**
- **Load test jacks annually.**
- **Only order replacement parts from Tronair.**

Failure to comply could result in premature failure below certified weight and could cause serious injury including death.



CORRECT PIN PLACEMENT

5.0 Operating instructions continued on following page

5.0 OPERATING INSTRUCTIONS *(continued)*

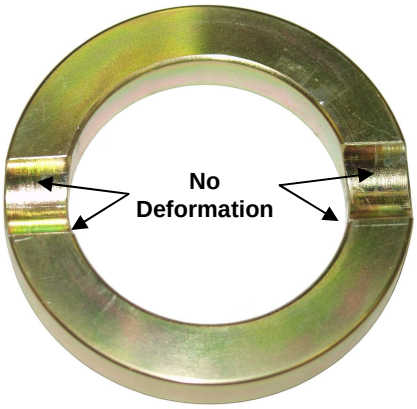
INCORRECT PIN PLACEMENTS

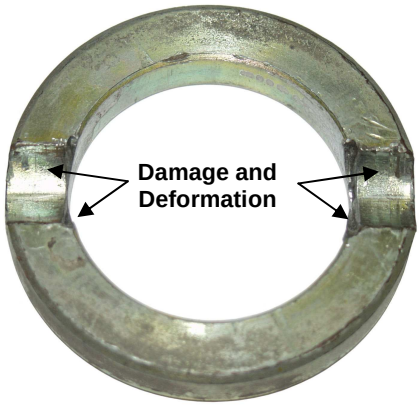
Pull Ring In
Ram Protection Ring

Locking Pin Not In
Ram Protection Ring and
top Locking Pin in Mechanical Extension
(use only one pin)

Ball Lock In
Ram Protection Ring

INCORRECT PIN PLACEMENTS





RESULTS OF INCORRECT LOCKING PIN PLACEMENTS

4. Close pump release valve and operate pump.

NOTE: Turning the pump release valve counter-clockwise lowers the jack. Turning the pump release valve clockwise stops the jacks descent, and allows it to be raised.

5. Hydraulic rams must extend in order form largest to smallest diameter.
6. Lower ram locknut(s) as aircraft is raised. Keep locknuts within 1 inch from bottom of extending ram.
7. Largest diameter hydraulic ram must fully extend before the next stage ram begins to rise.
8. Do not continue to operate hand pump after all rams have fully extended.

WARNING!

The ram locknuts are user operated safety devices. Failure to utilize these locknuts may result in personal injury or death and/or damage to aircraft or equipment.

5.0 OPERATING INSTRUCTIONS *(continued)*

To Lower Aircraft:

1. Lower all jacks simultaneously.
2. If ram locknut(s) is tight, raise jack slightly to release nut(s) ¼ inch from tripod.
3. Ensure proper staging as aircraft is being lowered: loosen ram locknut beginning with smallest ram (1" max) until stage is completely lowered. Repeat for next largest stage.
4. Loosen pump release valve slightly to slowly lower aircraft.

Note: When using jack during washing operations, completely cover top of jack near ram seal.

CAUTION!

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

Always wear safety glasses.

6.0 MAINTENANCE

6.1 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 O-rings 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 both O-rings and backup rings once removed. Cut and damaged rings normally result in fluid leakage.
- At this time flush old hydraulic fluid and dirt from over-all system and replenish with new, clean hydraulic fluid.

6.2 SERVICING JACK

To Disassemble Jack:

1. Raise first stage ram high enough to allow removal of the threaded tube stop.
2. Raise both first and second stage rams **together** to the point where this assembly can be lifted from the jack cylinder.

NOTE: If the second stage ram is allowed to precede the first stage ram, it will fill with oil causing an oil spill when the assembly is removed from the cylinder.

To Re-assemble Jack:

1. Re-assemble in reverse order of above.

NOTE: Lubricate cylinder, ram(s) and o-ring(s) for assembly:
Lubricate inner cylinder wall(s) with MIL-PRF-5606 hydraulic fluid
Apply suitable o-ring lubricant grease to installed o-ring(s) and to o-ring lead-in chamfer at opening of cylinder

NOTE: To minimize air entrapment under the rams. Actuate cylinder with had pump several inches and release. This will circulate oil and bleed out air.

2. Spray I.D. of cylinder and O.D. of rams with DoALL RPM, LPS or equivalent water repellent that will not harm the Buna "N" O-rings to protect surfaces from rusting when not in use.
3. Ensure locknut retaining ring is present on second stage ram to prevent nut removal after seal kit installation.

6.3 REMOVING AND SERVICING PUMP

NOTE: If pump is found faulty, call the factory for replacement or replace seals as follows:

1. Review Illustrated Parts List for Hand Pump (Appendix I)
2. Clamp suction (push on) hose and remove hose from pump.
3. Uncouple output hose from pump.
4. Remove two (2) pump mounting bolts. Remove pump.
5. Remove clevis pin assembly (Item 13).
6. Remove four (4) socket head cap screws.
7. Remove flanges.
8. Remove tube assembly (Item 8).
9. Replace O-rings and back-up ring. (See Appendix I for kits available).
10. Re-assemble in reverse order.

6.4 JACK FUNCTION LOAD TEST

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 5% to 10%.

7.0 TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	ACTION
Fluid leakage at pump piston or pump body	Damaged backup ring, o-ring, piston or pump body	Remove piston and pump body. Inspect for damage. Replace defective part(s). Replace removed o-ring and backup ring
External fluid leakage at rams	Damaged o-ring, backup ring or inner cylinder wall.	Remove rams as a unit from cylinder. Inspect parts. Replace o-ring and defective part(s)
Jack fails to lift rated load	Release valve not closed properly	Fully tighten release valve
	Low fluid level	Fill to correct fluid level
	Pressure relief valve improperly adjusted	Adjust or replace release valve
	Leakage at inlet or outlet check ball	Inspect valve body for wear or replace valve body and check balls
	Vent screw closed	Open vent screw
Rams will not support load after manual or pneumatic pump up	Leaking ram o-ring seals	Check for external leakage, if present replace defective seal and back up ring
	Leaking pressure check valve	Inspect valve body for wear or replace valve body and check balls
	Leaking pressure relief valve	Remove release valve, inspect ball and ball seat in pump block. Replace effective part(s)
Rams raise and fall with each manual pump stroke	Release valve open	Fully tighten release valve
	Inlet check valve not seated or sticking	Pump rapidly to dislodge or replace valve body
	Pressure check valve not seated or sticking	Pump rapidly to dislodge or replace valve body
Jack fails to lower	Ram locknut not loosened	Raise jack ¼ inch and release locknut
	Vent screw closed	Open vent screw
	O-Ring (pinched or rolled)	Replace o-ring and back-up ring, clean up cylinder wall of debris

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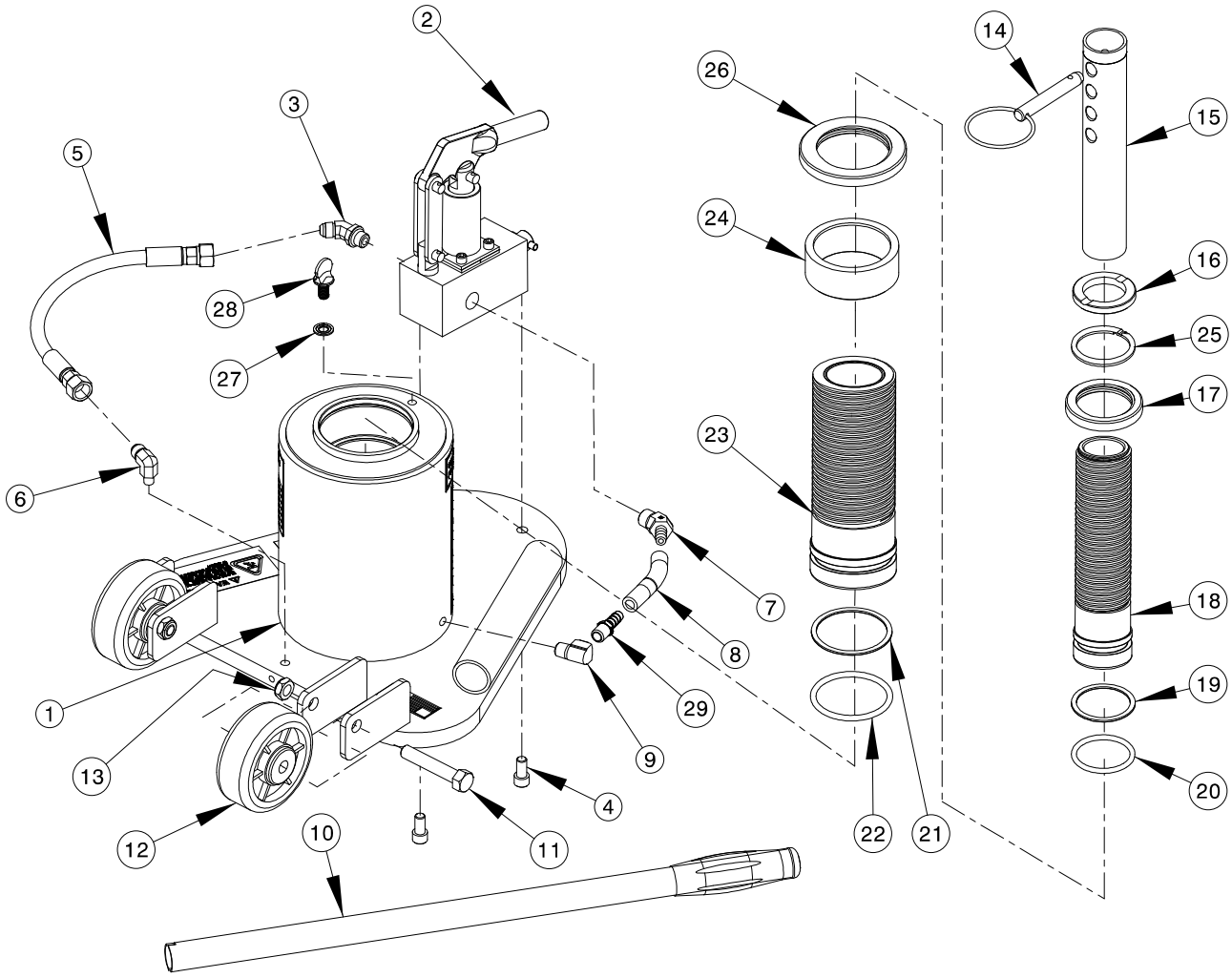
Parts List

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



ITEM	PART NUMBER	DESCRIPTION	QTY
1	Z-7710-01	Assembly Reservoir Tube	1
3	N-2042-05-S-B	Elbow, 45º Male	1
4	G-1151-107206	Socket Head Cap Screw, 3/8 - 16 x ¾ " long	2
5	TF-1043-03*12.5	Hose Assembly, 12.5 long	1
6	N-2005-09-S	Elbow, Male 1/8 – 27 NPT	1
7	N-2409-04	Elbow, 45° Male 3/8 NPT x 3/8 Hose	1
8	TF-1047-04*03.5	Hose, Push On, ¼ x 3 ½" long	1
9	N-2200-03-B	Elbow, 90º ¼ NPT x ¼ NPT	1
10	H-1009-01	Pump Handle	1
11	G-1100-109526	Bolt, Grade 5, ½-20 x 2 ¾" long Hex Head	2
12	U-1002	Wheel	2
13	G-1203-1095	Jamnut, ½-20 Elastic	2
14	G-1307-0825	Pin ½ x 2 ½ " long	1
15	R-1013-01	Extension, Center	1
	R-1012-01	Extension, Center (adds 6.1 inches)	1
16	TR-1026	Ram Protection Ring	1
17	TR-2223	Second Stage Locknut	1
18	Z-7683-04	Second Stage Ram	1
23	Z-7681-04	First Stage Ram Assembly	1
24	TR-2222	Stop Tube	1
25	G-1397-206	Ring, External Retaining	1
26	TR-2230	First Stage Locknut	1

Parts List

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

ITEM	PART NUMBER	DESCRIPTION	QTY
27	G-1281-06	Washer	1
28	G-1177	Thumbscrew Vent	1
29	N-2412-10	Connector, Straight ¼ NPT to 3/8 Hose	1
	K-4588	**Kit, Ram Seal Replacement;** *consists of:*	
19	HC-2020-329	Backup Ring	1
20	HC-2000-329	O-ring	1
21	HC-2020-338	Backup Ring	1
22	HC-2000-338	O-ring	1
	K-1987	**Kit, Hand Pump Replacement**; *consists of:*	
2		See Appendix I	1
	K-1165	**Kit, Wheel Replacement**; *consists of:*	
12		Wheel	1

NOTES: 1. Those items designated as kits contain all hardware necessary for installation.
2. Unless otherwise listed, all replacement bolts should be grade '5' or better.

TRONAIR

APPENDIX I

HC-1752
2,500 psi
Hand Pump Parts List

Model: HC-1752
2,500 psi Hand Pump

***

Illustrated Parts List

08/2001 – Rev. OR

1740 Eber Rd
Holland, OH 43528-9794
USA

Tronair, Inc.
www.tronair.com
Email: sales@tronair.com

Phone: (419) 866-6301
800-426-6301
Fax: (419) 867-0634

HC-1752
2,500 PSI Hand Pump

Parts List

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

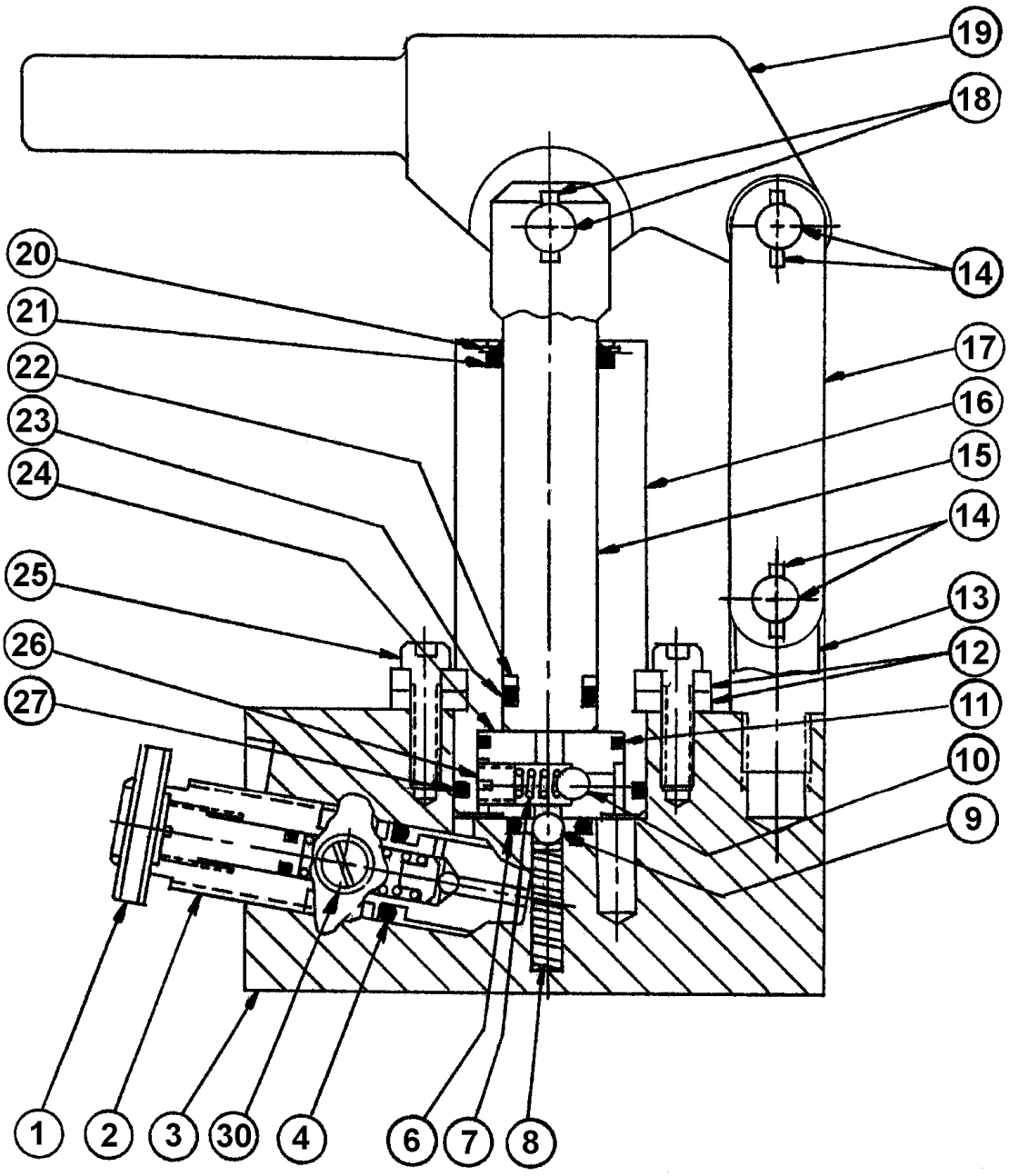
Reference Parts List Illustration on following page.

ITEM	PART NUMBER	DESCRIPTION	QTY
3	5M1-000-001	Body, Pump	1
12	506-000	Half, Flange	4
25	518-000	Screw, Socket Head Cap	4
Not Shown	H-1009-01	Handle	1
	K-1001	**Kit, Seal Replacement**; *consists of:*	
4		O-ring, Release Screw	1
6		O-ring, Outlet Check	1
11		O-ring, Valve Body	1
21		Wiper, Rod	1
22		Ring, Backup	1
23		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
	K-1068	**Kit, Linkage Replacement**; *consists of:*	
13		Pivot	1
14		Assembly, Linkage Pin	2
17		Strap	2
18		Assembly, Clevis Pin	1
19		Bracket, Pump Handle	1
	K-1069	**Kit, Internal Parts Replacement;** *consists of:*	
♦ Not Shown		Ball, Release	1
7		Spring, Inlet Check	1
8		Spring, Outlet Check	1
9		Ball, Outlet Check	1
10		Ball, Inlet Check	1
	K-1778	**Kit, Piston/Cylinder Replacement;** *consists of:*	
15		Piston	1
16		Tube	1
20		Retainer, Wiper	1
24		Assembly, Valve Body (Includes Items 7, 10, 24, 26)	1
	K-1906	**Kit, Piston/Seal Replacement;** *consists of:*	
15		Piston	1
22		Ring, Backup	1
23		O-ring, Piston	1
	K-2783	**Kit, Release Screw Replacement;** *consists of:*	
2		Screw, Release	1
30		Retainer, Screw	1

♦ **Although this item is listed in its particular kit, it is not used on HC-1752 pump. These items may be discarded.**

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

Parts List Illustration



WARNING!

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

TRONAIR

APPENDIX II

MSDS
Hydraulic Fluid
(MIL-PRF-5606)

ExxonMobil

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

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

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300
ExxonMobil Transportation No.	281-834-3296
MSDS Requests	713-613-3661
Product Technical Information	800-662-4525, 800-947-9147
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	10 - 30%
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	30 - 60%
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	64742-55-8	10 - 30%

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

SECTION 3 HAZARDS IDENTIFICATION

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

POTENTIAL PHYSICAL / CHEMICAL EFFECTS

Combustible. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited.

POTENTIAL HEALTH EFFECTS

If swallowed, may be aspirated and cause lung damage. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May be irritating to the eyes, nose, throat, and lungs. High-pressure injection under skin may cause serious damage.

Target Organs: Skin |

NFPA Hazard ID:	Health:	0	Flammability:	2	Reactivity:	0
HMIS Hazard ID:	Health:	0*	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 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. 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 (CO2) 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: Smoke, Fume, Sulfur oxides, Aldehydes, Incomplete combustion products, Oxides of carbon, Phosphorus oxides

FLAMMABILITY PROPERTIES
Flash Point [Method]: >82C (180F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 7.0
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 regulations. U.S. regulations require reporting releases of this material to the environment which exceed the 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 Section 3 for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

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.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid contact with skin. Avoid prolonged breathing of mists and heated vapor. Use proper bonding and/or grounding procedures. Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is a static accumulator.

STORAGE

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. Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

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

Source	Form	Limit / Standard			Note	Source
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)		TWA	2000 mg/m3	500 ppm	N/A	OSHA Z1
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	STEL	10 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	TWA	5 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	Mist.	STEL	10 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	Mist.	TWA	5 mg/m3		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/m³ - ACGIH TLV, 10 mg/m³ - ACGIH STEL, 5 mg/m³ - OSHA PEL.

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

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. 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. Work conditions can greatly effect glove durability; 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
See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION
Physical State: Liquid
Color: Red
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION
Relative Density (at 15 C): 0.88
Flash Point [Method]: >82C (180F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 7.0
Autoignition Temperature: >225°C (437°F)
Boiling Point / Range: 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 mm2/sec) at 40 C | 5.1 cSt (5.1 mm2/sec) at 100C
Oxidizing Properties: See Sections 3, 15, 16.

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

SECTION 10 STABILITY AND REACTIVITY

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.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m3	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data.	Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.

CHRONIC/OTHER EFFECTS

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.

Additional information is available by request.

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

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

Material -- Expected to be harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

Base oil 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:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- 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.

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, corrositivity 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 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) : Not Regulated for Land Transport

LAND (TDG) : Not Regulated for Land Transport

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

ExxonMobil

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

AIR (IATA) : Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: AICS, IECSC, DSL, EINECS, ENCS, KECI, PICCS, TSCA

EPCRA: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: Fire. 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.

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	17, 18, 19
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	1, 4, 13, 17, 18
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	64742-55-8	1, 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

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Revision Changes:
Section 05: Fire Fighting Measures - Unusual Fire Hazards was modified.
Section 10: Conditions to Avoid was modified.
Section 07: Handling and Storage - Handling was modified.
Section 07: Handling and Storage - Storage Phrases was modified.
Section 03: HMIS Flammability was modified.
Section 03: NFPA Flammability was modified.
Section 06: Accidental Release - Spill Management - Land was modified.
Section 09: Flash Point C(F) was modified.
Section 08: Exposure Control was modified.
Section 15: SARA (311/312) REPORTABLE HAZARD CATEGORIES was modified.
Section 16: Land Spill was modified.
Section 14: DOT Technical Name - All was added.
Section 03: Physical/Chemical Hazard was added.
Section 14: Proper Shipping Name - Header was added.
Section 14: Proper Shipping Name was added.
Section 14: Hazard Class & Division - Header was added.
Section 14: Hazard Class was added.
Section 14: UN Number - Header was added.
Section 14: UN Number was added.
Section 14: Packing Group - Header was added.
Section 14: Packing Group was added.
Section 14: Label(s) - Header was added.
Section 14: Label(s) was added.
Section 14: ERG Number - Header was added.
Section 14: ERG Number was added.
Section 14: Transport Document Name - Header was added.
Section 14: Transport Document Name was added.
Section 14: DOT Technical Name - Open parenthesis was added.
Section 14: DOT Technical Name - Close parenthesis was added.
Section 03: Physical/Chemical Hazard was added.
Section 03: Physical/Chemical Hazards - Header was added.
Section 14: DOT Footnote was added.
Section 16: Physical Hazards was added.
Section 16: Physical Hazards - Header was added.
Section 16: Precautions was added.
Section 16: Precautions - Header was added.
Section 10: Conditions to Avoid was deleted.
Section 14: LAND (DOT) - Default was deleted.

PRECAUTIONARY LABEL TEXT:
Contains: DISTILLATES (PETROLEUM), HYDROTREATED LIGHT
CAUTION!

HEALTH HAZARDS
Repeated exposure may cause skin dryness or cracking. If swallowed, may be aspirated and cause lung damage.
Target Organs: Skin |

PHYSICAL HAZARDS
Combustible.

PRECAUTIONS
Use proper bonding and/or grounding procedures.

FIRST AID
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.

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

Oral: Seek immediate medical attention. Do not induce vomiting. If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

Skin: Wash contact areas with soap and water. 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.

FIRE FIGHTING MEDIA
Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

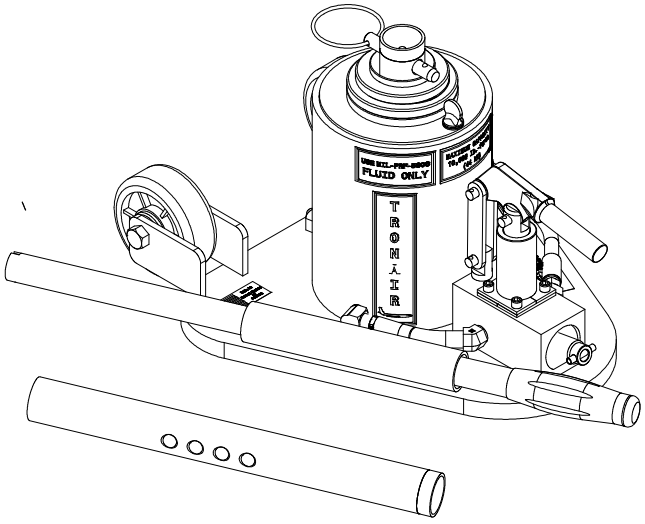
SPILL/LEAK
Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. 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.
Use
Not intended or suitable for use in or around a household or dwelling.

Internal Use Only
MHC: 2A,0,0,0,0,1 PPEC: C

DGN: 2005454XUS (552975)

Operation & Service Manual



Model: 02-0511-0132
5 Ton Two Stage Jack

12/2011 – Rev. 11

Includes Illustrated Parts Lists

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Holland, OH 43528-9794
USA

Tronair, Inc.
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REVISION	DATE	TEXT AFFECTED
09	11/2004	pg 2 5.0 added warning and illustrations
10	09/2005	pg 2 Modified 5.1 Jack Instructions
11	12/2011	Major revision

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7.0 TROUBLE SHOOTING 5

APPENDIX I HC-1752 2,500 psi Hand Pump Parts List
APPENDIX II MSDS Hydraulic Fluid (MIL-PRF-5606)

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 DESCRIPTION

The Tronair Model 02-0511-0132 two stage hydraulic jack incorporates the following quality features:

- Steel Construction.
- Two-stage telescoping rams.
- Mechanical ram lock nuts that prevent lowering of jack under load.
- Quick action mechanical extension.
- Single speed, manually operated pump with pressure relief.
- Uses standard MIL-PRF-5606 hydraulic fluid.
- Mechanical extensions provided to allow jack to be utilized on other aircraft as shown in specifications.

2.0 USAGE

The purpose of this jack is to lift aircraft for maintenance. It has a maximum capacity of five (5) tons (4.4 kN).

3.0 SPECIFICATIONS

- Vertical capacity: 10,000 lbs. (44.5 kN)
- Minimum closed heights:
  - with R-1013-01 mechanical extension 11.4 in (29 cm)
  - with R-1012-01 mechanical extension 17.5 in (44.6 cm)
- Mechanical extension: 3.0 in (7.6 cm)
- Hydraulic extension: 12.22 in (31 cm)
- Maximum heights obtainable:
  - with R-1013-01 mechanical extension 26.6 in (67.6 cm)
  - with R-1012-01 mechanical extension 32.7 in (83.1 cm)
- Overall: 14 ½ x 15 in (36.8 x 38.1 cm)
- Floor area (triangular): 156 in^2 (1006 cm^2)
- Weight: 100 lbs (45.4 kg)

4.0 ASSEMBLY INSTRUCTIONS

4.1 GENERAL INFORMATION

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. The **3/8** -24 bolts should be tightened to 35 ft-lbs.

All replacement parts must be the same as or equal to the original parts supplied.

4.2 PRE-USE CHECKS

- Refer to the Jack Parts Lists and Illustrations to identify and ensure that all parts are present.
- Generally check over unit to assure the tightness of all fittings.
- With rams completely collapsed, check hydraulic fluid level; fluid level should be 5/8 to ½ inches from the outside top of reservoir. Replenish with MIL-PRF-5606 fluid as required.

5.0 OPERATING INSTRUCTIONS

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

CAUTION!

- **NEVER put hands between aircraft and jack pad, as after aircraft has been lowered, struts may have hung up.**
- **Never align jack under aircraft by pounding on jack legs. Dented legs may lead to jack collapse.**
- **Always lower ram locking nut(s) after jack is under load. Be sure ram nut(s) is seated fully after jacking.**
- **Always raise and lower jacks simultaneously so that aircraft remains level.**
- **Always use a tail or nose stand, as applicable, for additional stability.**

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.

To Raise Aircraft:

1. Place jack on a hard level surface.
2. Hydraulic rams must be completely retracted before operating the jack.
3. Raise mechanical extension as close to aircraft jack pad as possible.

NOTE: Jacks equipped with two mechanical extensions. The difference between the extensions is a length of 6.1 in. Select the extension that best suits the jacking position.

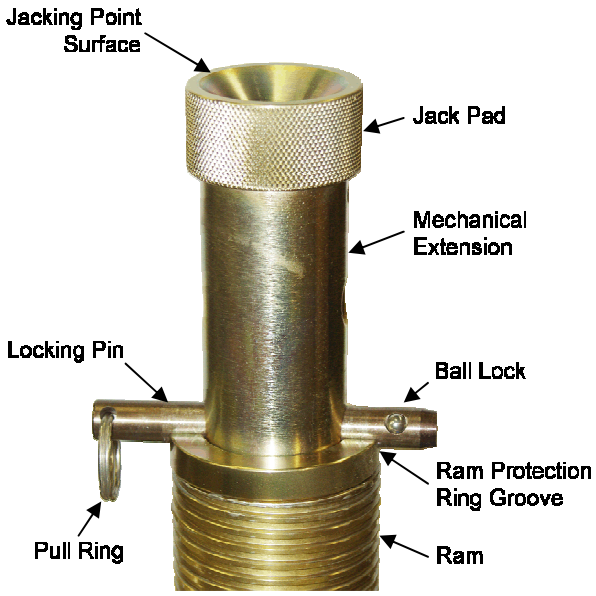
WARNING!

The locking pin MUST be placed in the ram protection ring groove and fully through the mechanical extension.

The locking pin pull ring and ball lock MUST be placed outside the ram protection ring.

- **Visually inspect the jack prior to every use.**
- **Do not place extra locking pins in any other hole on the mechanical extension.**
- **Insure mating surfaces to jack point are free of debris and damage.**
- **Under no conditions should the locking pin pull ring be inside the ram protection ring groove.**
- **Under no conditions should the locking pin's ball lock be inside the ram protection ring groove.**
- **Never use the jack if the ram protection ring is not installed.**
- **Never use the locking pin without a locking pin pull ring.**
- **Never use a locking pin that has been damaged.**
- **Never use a ram protection ring that has been damaged or deformed.**
- **Replace ram protection ring if it does not have a radius groove for the locking pin.**
- **Load test jacks annually.**
- **Only order replacement parts from Tronair.**

Failure to comply could result in premature failure below certified weight and could cause serious injury including death.



CORRECT PIN PLACEMENT

5.0 Operating instructions continued on following page

5.0 OPERATING INSTRUCTIONS *(continued)*

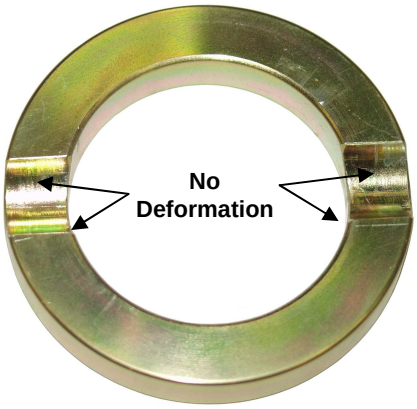
INCORRECT PIN PLACEMENTS

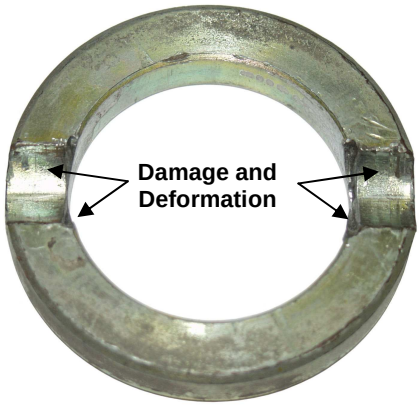
Pull Ring In
Ram Protection Ring

Locking Pin Not In
Ram Protection Ring and
top Locking Pin in Mechanical Extension
(use only one pin)

Ball Lock In
Ram Protection Ring

INCORRECT PIN PLACEMENTS





RESULTS OF INCORRECT LOCKING PIN PLACEMENTS

4. Close pump release valve and operate pump.

NOTE: Turning the pump release valve counter-clockwise lowers the jack. Turning the pump release valve clockwise stops the jacks descent, and allows it to be raised.

5. Hydraulic rams must extend in order form largest to smallest diameter.
6. Lower ram locknut(s) as aircraft is raised. Keep locknuts within 1 inch from bottom of extending ram.
7. Largest diameter hydraulic ram must fully extend before the next stage ram begins to rise.
8. Do not continue to operate hand pump after all rams have fully extended.

WARNING!

The ram locknuts are user operated safety devices. Failure to utilize these locknuts may result in personal injury or death and/or damage to aircraft or equipment.

5.0 OPERATING INSTRUCTIONS *(continued)*

To Lower Aircraft:

1. Lower all jacks simultaneously.
2. If ram locknut(s) is tight, raise jack slightly to release nut(s) ¼ inch from tripod.
3. Ensure proper staging as aircraft is being lowered: loosen ram locknut beginning with smallest ram (1" max) until stage is completely lowered. Repeat for next largest stage.
4. Loosen pump release valve slightly to slowly lower aircraft.

Note: When using jack during washing operations, completely cover top of jack near ram seal.

CAUTION!

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

Always wear safety glasses.

6.0 MAINTENANCE

6.1 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 O-rings 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 both O-rings and backup rings once removed. Cut and damaged rings normally result in fluid leakage.
- At this time flush old hydraulic fluid and dirt from over-all system and replenish with new, clean hydraulic fluid.

6.2 SERVICING JACK

To Disassemble Jack:

1. Raise first stage ram high enough to allow removal of the threaded tube stop.
2. Raise both first and second stage rams **together** to the point where this assembly can be lifted from the jack cylinder.

NOTE: If the second stage ram is allowed to precede the first stage ram, it will fill with oil causing an oil spill when the assembly is removed from the cylinder.

To Re-assemble Jack:

1. Re-assemble in reverse order of above.

NOTE: Lubricate cylinder, ram(s) and o-ring(s) for assembly:
Lubricate inner cylinder wall(s) with MIL-PRF-5606 hydraulic fluid
Apply suitable o-ring lubricant grease to installed o-ring(s) and to o-ring lead-in chamfer at opening of cylinder

NOTE: To minimize air entrapment under the rams. Actuate cylinder with had pump several inches and release. This will circulate oil and bleed out air.

2. Spray I.D. of cylinder and O.D. of rams with DoALL RPM, LPS or equivalent water repellent that will not harm the Buna "N" O-rings to protect surfaces from rusting when not in use.
3. Ensure locknut retaining ring is present on second stage ram to prevent nut removal after seal kit installation.

6.3 REMOVING AND SERVICING PUMP

NOTE: If pump is found faulty, call the factory for replacement or replace seals as follows:

1. Review Illustrated Parts List for Hand Pump (Appendix I)
2. Clamp suction (push on) hose and remove hose from pump.
3. Uncouple output hose from pump.
4. Remove two (2) pump mounting bolts. Remove pump.
5. Remove clevis pin assembly (Item 13).
6. Remove four (4) socket head cap screws.
7. Remove flanges.
8. Remove tube assembly (Item 8).
9. Replace O-rings and back-up ring. (See Appendix I for kits available).
10. Re-assemble in reverse order.

6.4 JACK FUNCTION LOAD TEST

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 5% to 10%.

7.0 TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	ACTION
Fluid leakage at pump piston or pump body	Damaged backup ring, o-ring, piston or pump body	Remove piston and pump body. Inspect for damage. Replace defective part(s). Replace removed o-ring and backup ring
External fluid leakage at rams	Damaged o-ring, backup ring or inner cylinder wall.	Remove rams as a unit from cylinder. Inspect parts. Replace o-ring and defective part(s)
Jack fails to lift rated load	Release valve not closed properly	Fully tighten release valve
	Low fluid level	Fill to correct fluid level
	Pressure relief valve improperly adjusted	Adjust or replace release valve
	Leakage at inlet or outlet check ball	Inspect valve body for wear or replace valve body and check balls
	Vent screw closed	Open vent screw
Rams will not support load after manual or pneumatic pump up	Leaking ram o-ring seals	Check for external leakage, if present replace defective seal and back up ring
	Leaking pressure check valve	Inspect valve body for wear or replace valve body and check balls
	Leaking pressure relief valve	Remove release valve, inspect ball and ball seat in pump block. Replace effective part(s)
Rams raise and fall with each manual pump stroke	Release valve open	Fully tighten release valve
	Inlet check valve not seated or sticking	Pump rapidly to dislodge or replace valve body
	Pressure check valve not seated or sticking	Pump rapidly to dislodge or replace valve body
Jack fails to lower	Ram locknut not loosened	Raise jack ¼ inch and release locknut
	Vent screw closed	Open vent screw
	O-Ring (pinched or rolled)	Replace o-ring and back-up ring, clean up cylinder wall of debris

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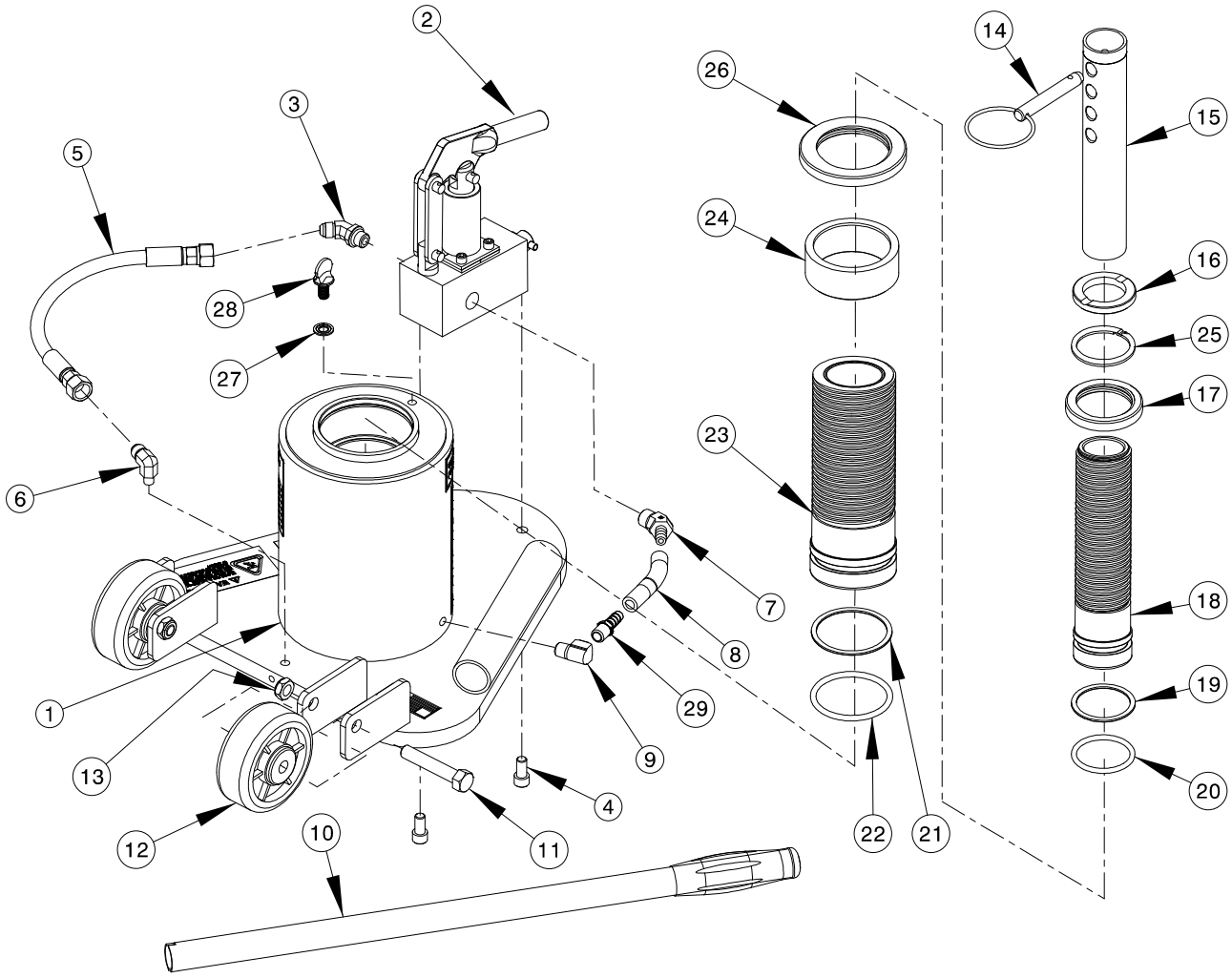
Parts List

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



ITEM	PART NUMBER	DESCRIPTION	QTY
1	Z-7710-01	Assembly Reservoir Tube	1
3	N-2042-05-S-B	Elbow, 45º Male	1
4	G-1151-107206	Socket Head Cap Screw, 3/8 - 16 x ¾ " long	2
5	TF-1043-03*12.5	Hose Assembly, 12.5 long	1
6	N-2005-09-S	Elbow, Male 1/8 – 27 NPT	1
7	N-2409-04	Elbow, 45° Male 3/8 NPT x 3/8 Hose	1
8	TF-1047-04*03.5	Hose, Push On, ¼ x 3 ½" long	1
9	N-2200-03-B	Elbow, 90º ¼ NPT x ¼ NPT	1
10	H-1009-01	Pump Handle	1
11	G-1100-109526	Bolt, Grade 5, ½-20 x 2 ¾" long Hex Head	2
12	U-1002	Wheel	2
13	G-1203-1095	Jamnut, ½-20 Elastic	2
14	G-1307-0825	Pin ½ x 2 ½ " long	1
15	R-1013-01	Extension, Center	1
	R-1012-01	Extension, Center (adds 6.1 inches)	1
16	TR-1026	Ram Protection Ring	1
17	TR-2223	Second Stage Locknut	1
18	Z-7683-04	Second Stage Ram	1
23	Z-7681-04	First Stage Ram Assembly	1
24	TR-2222	Stop Tube	1
25	G-1397-206	Ring, External Retaining	1
26	TR-2230	First Stage Locknut	1

Parts List

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

ITEM	PART NUMBER	DESCRIPTION	QTY
27	G-1281-06	Washer	1
28	G-1177	Thumbscrew Vent	1
29	N-2412-10	Connector, Straight ¼ NPT to 3/8 Hose	1
	K-4588	**Kit, Ram Seal Replacement;** *consists of:*	
19	HC-2020-329	Backup Ring	1
20	HC-2000-329	O-ring	1
21	HC-2020-338	Backup Ring	1
22	HC-2000-338	O-ring	1
	K-1987	**Kit, Hand Pump Replacement**; *consists of:*	
2		See Appendix I	1
	K-1165	**Kit, Wheel Replacement**; *consists of:*	
12		Wheel	1

NOTES: 1. Those items designated as kits contain all hardware necessary for installation.
2. Unless otherwise listed, all replacement bolts should be grade '5' or better.

TRONAIR

APPENDIX I

HC-1752
2,500 psi
Hand Pump Parts List

Model: HC-1752
2,500 psi Hand Pump

***

Illustrated Parts List

08/2001 – Rev. OR

1740 Eber Rd
Holland, OH 43528-9794
USA

Tronair, Inc.
www.tronair.com
Email: sales@tronair.com

Phone: (419) 866-6301
800-426-6301
Fax: (419) 867-0634

HC-1752
2,500 PSI Hand Pump

Parts List

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

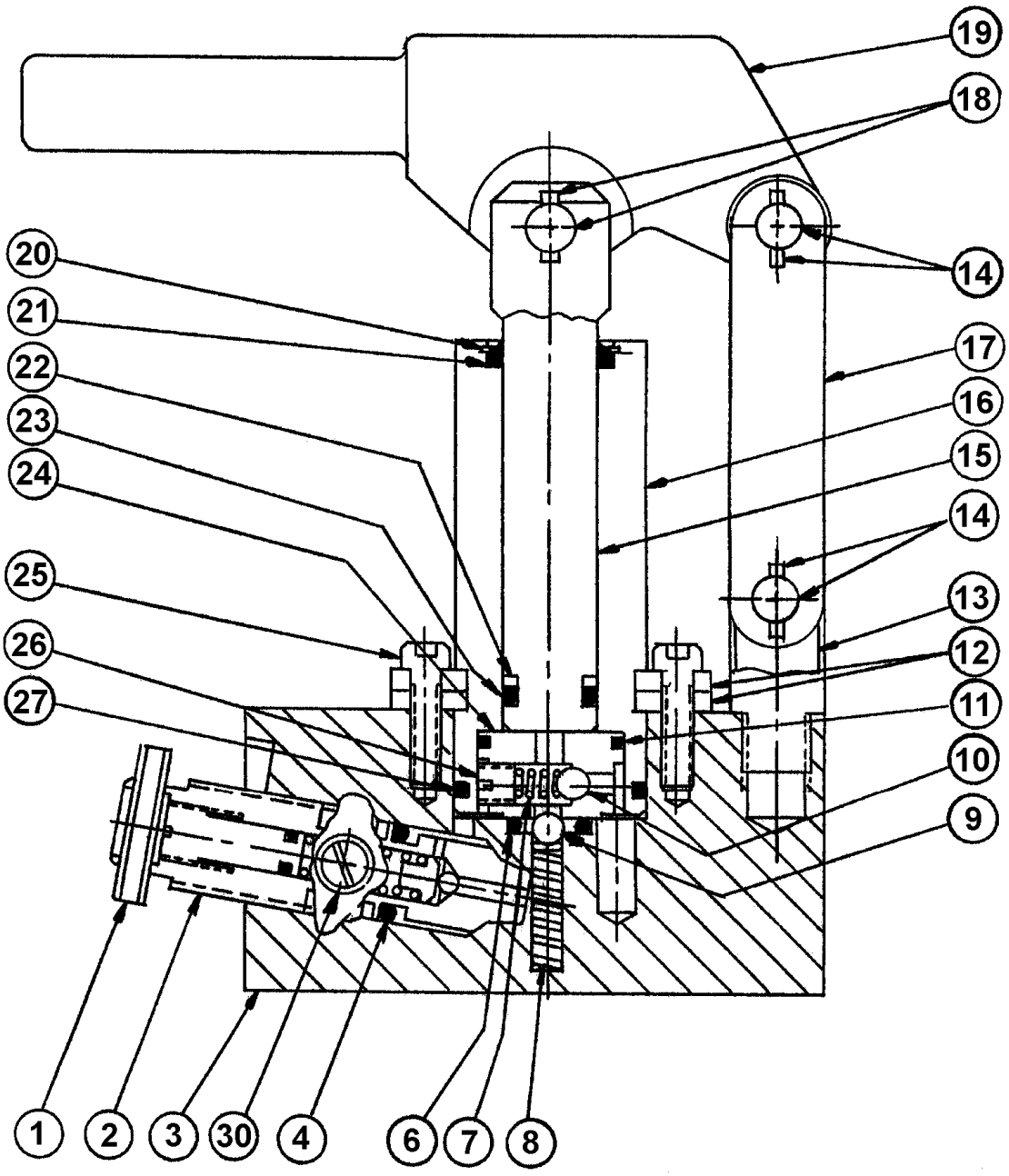
Reference Parts List Illustration on following page.

ITEM	PART NUMBER	DESCRIPTION	QTY
3	5M1-000-001	Body, Pump	1
12	506-000	Half, Flange	4
25	518-000	Screw, Socket Head Cap	4
Not Shown	H-1009-01	Handle	1
	K-1001	**Kit, Seal Replacement**; *consists of:*	
4		O-ring, Release Screw	1
6		O-ring, Outlet Check	1
11		O-ring, Valve Body	1
21		Wiper, Rod	1
22		Ring, Backup	1
23		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
	K-1068	**Kit, Linkage Replacement**; *consists of:*	
13		Pivot	1
14		Assembly, Linkage Pin	2
17		Strap	2
18		Assembly, Clevis Pin	1
19		Bracket, Pump Handle	1
	K-1069	**Kit, Internal Parts Replacement;** *consists of:*	
♦ Not Shown		Ball, Release	1
7		Spring, Inlet Check	1
8		Spring, Outlet Check	1
9		Ball, Outlet Check	1
10		Ball, Inlet Check	1
	K-1778	**Kit, Piston/Cylinder Replacement;** *consists of:*	
15		Piston	1
16		Tube	1
20		Retainer, Wiper	1
24		Assembly, Valve Body (Includes Items 7, 10, 24, 26)	1
	K-1906	**Kit, Piston/Seal Replacement;** *consists of:*	
15		Piston	1
22		Ring, Backup	1
23		O-ring, Piston	1
	K-2783	**Kit, Release Screw Replacement;** *consists of:*	
2		Screw, Release	1
30		Retainer, Screw	1

♦ **Although this item is listed in its particular kit, it is not used on HC-1752 pump. These items may be discarded.**

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

Parts List Illustration



WARNING!

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

TRONAIR

APPENDIX II

MSDS
Hydraulic Fluid
(MIL-PRF-5606)

ExxonMobil

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

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

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300
ExxonMobil Transportation No.	281-834-3296
MSDS Requests	713-613-3661
Product Technical Information	800-662-4525, 800-947-9147
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	10 - 30%
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	30 - 60%
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	64742-55-8	10 - 30%

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

SECTION 3 HAZARDS IDENTIFICATION

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

POTENTIAL PHYSICAL / CHEMICAL EFFECTS

Combustible. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited.

POTENTIAL HEALTH EFFECTS

If swallowed, may be aspirated and cause lung damage. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May be irritating to the eyes, nose, throat, and lungs. High-pressure injection under skin may cause serious damage.

Target Organs: Skin |

NFPA Hazard ID:	Health:	0	Flammability:	2	Reactivity:	0
HMIS Hazard ID:	Health:	0*	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 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. 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 (CO2) 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: Smoke, Fume, Sulfur oxides, Aldehydes, Incomplete combustion products, Oxides of carbon, Phosphorus oxides

FLAMMABILITY PROPERTIES
Flash Point [Method]: >82C (180F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 7.0
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 regulations. U.S. regulations require reporting releases of this material to the environment which exceed the 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 Section 3 for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

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.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid contact with skin. Avoid prolonged breathing of mists and heated vapor. Use proper bonding and/or grounding procedures. Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is a static accumulator.

STORAGE

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. Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

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

Source	Form	Limit / Standard			Note	Source
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)		TWA	2000 mg/m3	500 ppm	N/A	OSHA Z1
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	STEL	10 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	TWA	5 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	Mist.	STEL	10 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	Mist.	TWA	5 mg/m3		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/m³ - ACGIH TLV, 10 mg/m³ - ACGIH STEL, 5 mg/m³ - OSHA PEL.

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

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. 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. Work conditions can greatly effect glove durability; 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
See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION
Physical State: Liquid
Color: Red
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION
Relative Density (at 15 C): 0.88
Flash Point [Method]: >82C (180F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 7.0
Autoignition Temperature: >225°C (437°F)
Boiling Point / Range: 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 mm2/sec) at 40 C | 5.1 cSt (5.1 mm2/sec) at 100C
Oxidizing Properties: See Sections 3, 15, 16.

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

SECTION 10 STABILITY AND REACTIVITY

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.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m3	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data.	Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.

CHRONIC/OTHER EFFECTS

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.

Additional information is available by request.

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

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

Material -- Expected to be harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

Base oil 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:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- 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.

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, corrositivity 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 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) : Not Regulated for Land Transport

LAND (TDG) : Not Regulated for Land Transport

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

ExxonMobil

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

AIR (IATA) : Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: AICS, IECSC, DSL, EINECS, ENCS, KECI, PICCS, TSCA

EPCRA: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: Fire. 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.

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	17, 18, 19
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	1, 4, 13, 17, 18
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	64742-55-8	1, 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

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Revision Changes:
Section 05: Fire Fighting Measures - Unusual Fire Hazards was modified.
Section 10: Conditions to Avoid was modified.
Section 07: Handling and Storage - Handling was modified.
Section 07: Handling and Storage - Storage Phrases was modified.
Section 03: HMIS Flammability was modified.
Section 03: NFPA Flammability was modified.
Section 06: Accidental Release - Spill Management - Land was modified.
Section 09: Flash Point C(F) was modified.
Section 08: Exposure Control was modified.
Section 15: SARA (311/312) REPORTABLE HAZARD CATEGORIES was modified.
Section 16: Land Spill was modified.
Section 14: DOT Technical Name - All was added.
Section 03: Physical/Chemical Hazard was added.
Section 14: Proper Shipping Name - Header was added.
Section 14: Proper Shipping Name was added.
Section 14: Hazard Class & Division - Header was added.
Section 14: Hazard Class was added.
Section 14: UN Number - Header was added.
Section 14: UN Number was added.
Section 14: Packing Group - Header was added.
Section 14: Packing Group was added.
Section 14: Label(s) - Header was added.
Section 14: Label(s) was added.
Section 14: ERG Number - Header was added.
Section 14: ERG Number was added.
Section 14: Transport Document Name - Header was added.
Section 14: Transport Document Name was added.
Section 14: DOT Technical Name - Open parenthesis was added.
Section 14: DOT Technical Name - Close parenthesis was added.
Section 03: Physical/Chemical Hazard was added.
Section 03: Physical/Chemical Hazards - Header was added.
Section 14: DOT Footnote was added.
Section 16: Physical Hazards was added.
Section 16: Physical Hazards - Header was added.
Section 16: Precautions was added.
Section 16: Precautions - Header was added.
Section 10: Conditions to Avoid was deleted.
Section 14: LAND (DOT) - Default was deleted.

PRECAUTIONARY LABEL TEXT:
Contains: DISTILLATES (PETROLEUM), HYDROTREATED LIGHT
CAUTION!

HEALTH HAZARDS
Repeated exposure may cause skin dryness or cracking. If swallowed, may be aspirated and cause lung damage.
Target Organs: Skin |

PHYSICAL HAZARDS
Combustible.

PRECAUTIONS
Use proper bonding and/or grounding procedures.

FIRST AID
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.

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

Oral: Seek immediate medical attention. Do not induce vomiting. If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

Skin: Wash contact areas with soap and water. 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.

FIRE FIGHTING MEDIA
Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

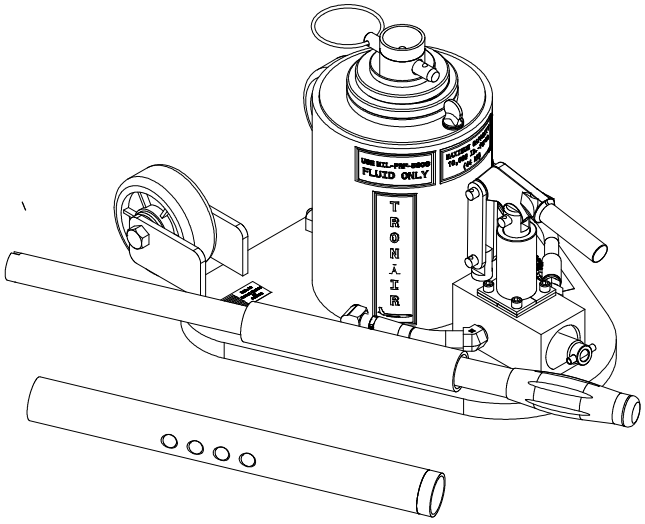
SPILL/LEAK
Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. 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.
Use
Not intended or suitable for use in or around a household or dwelling.

Internal Use Only
MHC: 2A,0,0,0,0,1 PPEC: C

DGN: 2005454XUS (552975)

Operation & Service Manual



Model: 02-0511-0132
5 Ton Two Stage Jack

12/2011 – Rev. 11

Includes Illustrated Parts Lists

1740 Eber Rd
Holland, OH 43528-9794
USA

Tronair, Inc.
www.tronair.com
Email: sales@tronair.com

Phone: (419) 866-6301
800-426-6301
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REVISION	DATE	TEXT AFFECTED
09	11/2004	pg 2 5.0 added warning and illustrations
10	09/2005	pg 2 Modified 5.1 Jack Instructions
11	12/2011	Major revision

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APPENDIX I HC-1752 2,500 psi Hand Pump Parts List
APPENDIX II MSDS Hydraulic Fluid (MIL-PRF-5606)

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 DESCRIPTION

The Tronair Model 02-0511-0132 two stage hydraulic jack incorporates the following quality features:

- Steel Construction.
- Two-stage telescoping rams.
- Mechanical ram lock nuts that prevent lowering of jack under load.
- Quick action mechanical extension.
- Single speed, manually operated pump with pressure relief.
- Uses standard MIL-PRF-5606 hydraulic fluid.
- Mechanical extensions provided to allow jack to be utilized on other aircraft as shown in specifications.

2.0 USAGE

The purpose of this jack is to lift aircraft for maintenance. It has a maximum capacity of five (5) tons (4.4 kN).

3.0 SPECIFICATIONS

- Vertical capacity: 10,000 lbs. (44.5 kN)
- Minimum closed heights:
  - with R-1013-01 mechanical extension 11.4 in (29 cm)
  - with R-1012-01 mechanical extension 17.5 in (44.6 cm)
- Mechanical extension: 3.0 in (7.6 cm)
- Hydraulic extension: 12.22 in (31 cm)
- Maximum heights obtainable:
  - with R-1013-01 mechanical extension 26.6 in (67.6 cm)
  - with R-1012-01 mechanical extension 32.7 in (83.1 cm)
- Overall: 14 ½ x 15 in (36.8 x 38.1 cm)
- Floor area (triangular): 156 in^2 (1006 cm^2)
- Weight: 100 lbs (45.4 kg)

4.0 ASSEMBLY INSTRUCTIONS

4.1 GENERAL INFORMATION

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. The **3/8** -24 bolts should be tightened to 35 ft-lbs.

All replacement parts must be the same as or equal to the original parts supplied.

4.2 PRE-USE CHECKS

- Refer to the Jack Parts Lists and Illustrations to identify and ensure that all parts are present.
- Generally check over unit to assure the tightness of all fittings.
- With rams completely collapsed, check hydraulic fluid level; fluid level should be 5/8 to ½ inches from the outside top of reservoir. Replenish with MIL-PRF-5606 fluid as required.

5.0 OPERATING INSTRUCTIONS

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

CAUTION!

- **NEVER put hands between aircraft and jack pad, as after aircraft has been lowered, struts may have hung up.**
- **Never align jack under aircraft by pounding on jack legs. Dented legs may lead to jack collapse.**
- **Always lower ram locking nut(s) after jack is under load. Be sure ram nut(s) is seated fully after jacking.**
- **Always raise and lower jacks simultaneously so that aircraft remains level.**
- **Always use a tail or nose stand, as applicable, for additional stability.**

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.

To Raise Aircraft:

1. Place jack on a hard level surface.
2. Hydraulic rams must be completely retracted before operating the jack.
3. Raise mechanical extension as close to aircraft jack pad as possible.

NOTE: Jacks equipped with two mechanical extensions. The difference between the extensions is a length of 6.1 in. Select the extension that best suits the jacking position.

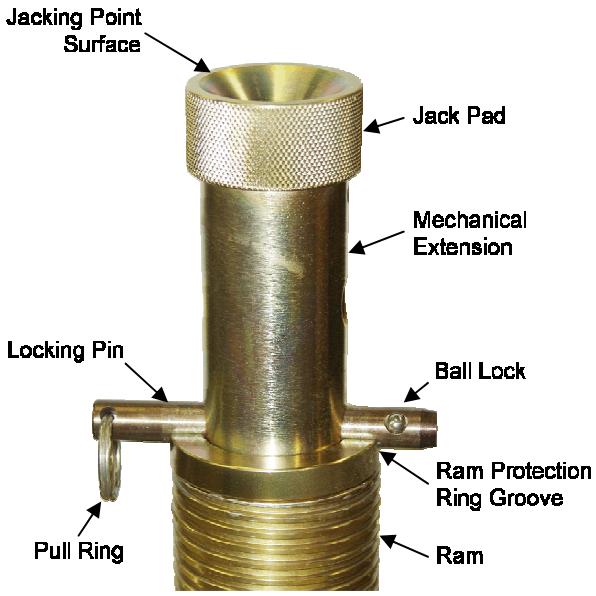
WARNING!

The locking pin MUST be placed in the ram protection ring groove and fully through the mechanical extension.

The locking pin pull ring and ball lock MUST be placed outside the ram protection ring.

- **Visually inspect the jack prior to every use.**
- **Do not place extra locking pins in any other hole on the mechanical extension.**
- **Insure mating surfaces to jack point are free of debris and damage.**
- **Under no conditions should the locking pin pull ring be inside the ram protection ring groove.**
- **Under no conditions should the locking pin's ball lock be inside the ram protection ring groove.**
- **Never use the jack if the ram protection ring is not installed.**
- **Never use the locking pin without a locking pin pull ring.**
- **Never use a locking pin that has been damaged.**
- **Never use a ram protection ring that has been damaged or deformed.**
- **Replace ram protection ring if it does not have a radius groove for the locking pin.**
- **Load test jacks annually.**
- **Only order replacement parts from Tronair.**

Failure to comply could result in premature failure below certified weight and could cause serious injury including death.



CORRECT PIN PLACEMENT

5.0 Operating instructions continued on following page

5.0 OPERATING INSTRUCTIONS *(continued)*

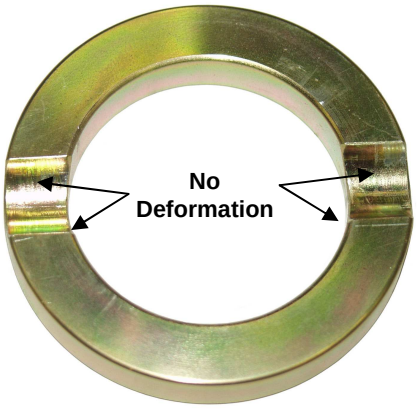
INCORRECT PIN PLACEMENTS

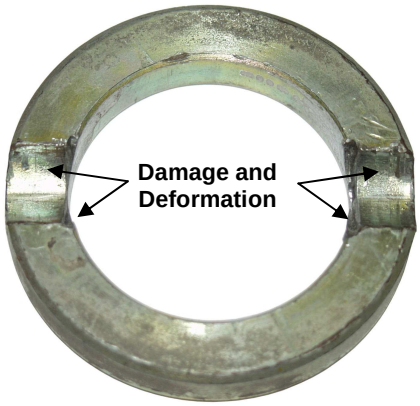
Pull Ring In
Ram Protection Ring

Locking Pin Not In
Ram Protection Ring and
top Locking Pin in Mechanical Extension
(use only one pin)

Ball Lock In
Ram Protection Ring

INCORRECT PIN PLACEMENTS





RESULTS OF INCORRECT LOCKING PIN PLACEMENTS

4. Close pump release valve and operate pump.

NOTE: Turning the pump release valve counter-clockwise lowers the jack. Turning the pump release valve clockwise stops the jacks descent, and allows it to be raised.

5. Hydraulic rams must extend in order form largest to smallest diameter.
6. Lower ram locknut(s) as aircraft is raised. Keep locknuts within 1 inch from bottom of extending ram.
7. Largest diameter hydraulic ram must fully extend before the next stage ram begins to rise.
8. Do not continue to operate hand pump after all rams have fully extended.

WARNING!

The ram locknuts are user operated safety devices. Failure to utilize these locknuts may result in personal injury or death and/or damage to aircraft or equipment.

5.0 OPERATING INSTRUCTIONS *(continued)*

To Lower Aircraft:

1. Lower all jacks simultaneously.
2. If ram locknut(s) is tight, raise jack slightly to release nut(s) ¼ inch from tripod.
3. Ensure proper staging as aircraft is being lowered: loosen ram locknut beginning with smallest ram (1" max) until stage is completely lowered. Repeat for next largest stage.
4. Loosen pump release valve slightly to slowly lower aircraft.

Note: When using jack during washing operations, completely cover top of jack near ram seal.

CAUTION!

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

Always wear safety glasses.

6.0 MAINTENANCE

6.1 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 O-rings 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 both O-rings and backup rings once removed. Cut and damaged rings normally result in fluid leakage.
- At this time flush old hydraulic fluid and dirt from over-all system and replenish with new, clean hydraulic fluid.

6.2 SERVICING JACK

To Disassemble Jack:

1. Raise first stage ram high enough to allow removal of the threaded tube stop.
2. Raise both first and second stage rams **together** to the point where this assembly can be lifted from the jack cylinder.

NOTE: If the second stage ram is allowed to precede the first stage ram, it will fill with oil causing an oil spill when the assembly is removed from the cylinder.

To Re-assemble Jack:

1. Re-assemble in reverse order of above.

NOTE: Lubricate cylinder, ram(s) and o-ring(s) for assembly:
Lubricate inner cylinder wall(s) with MIL-PRF-5606 hydraulic fluid
Apply suitable o-ring lubricant grease to installed o-ring(s) and to o-ring lead-in chamfer at opening of cylinder

NOTE: To minimize air entrapment under the rams. Actuate cylinder with had pump several inches and release. This will circulate oil and bleed out air.

2. Spray I.D. of cylinder and O.D. of rams with DoALL RPM, LPS or equivalent water repellent that will not harm the Buna "N" O-rings to protect surfaces from rusting when not in use.
3. Ensure locknut retaining ring is present on second stage ram to prevent nut removal after seal kit installation.

6.3 REMOVING AND SERVICING PUMP

NOTE: If pump is found faulty, call the factory for replacement or replace seals as follows:

1. Review Illustrated Parts List for Hand Pump (Appendix I)
2. Clamp suction (push on) hose and remove hose from pump.
3. Uncouple output hose from pump.
4. Remove two (2) pump mounting bolts. Remove pump.
5. Remove clevis pin assembly (Item 13).
6. Remove four (4) socket head cap screws.
7. Remove flanges.
8. Remove tube assembly (Item 8).
9. Replace O-rings and back-up ring. (See Appendix I for kits available).
10. Re-assemble in reverse order.

6.4 JACK FUNCTION LOAD TEST

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 5% to 10%.

7.0 TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	ACTION
Fluid leakage at pump piston or pump body	Damaged backup ring, o-ring, piston or pump body	Remove piston and pump body. Inspect for damage. Replace defective part(s). Replace removed o-ring and backup ring
External fluid leakage at rams	Damaged o-ring, backup ring or inner cylinder wall.	Remove rams as a unit from cylinder. Inspect parts. Replace o-ring and defective part(s)
Jack fails to lift rated load	Release valve not closed properly	Fully tighten release valve
	Low fluid level	Fill to correct fluid level
	Pressure relief valve improperly adjusted	Adjust or replace release valve
	Leakage at inlet or outlet check ball	Inspect valve body for wear or replace valve body and check balls
	Vent screw closed	Open vent screw
Rams will not support load after manual or pneumatic pump up	Leaking ram o-ring seals	Check for external leakage, if present replace defective seal and back up ring
	Leaking pressure check valve	Inspect valve body for wear or replace valve body and check balls
	Leaking pressure relief valve	Remove release valve, inspect ball and ball seat in pump block. Replace effective part(s)
Rams raise and fall with each manual pump stroke	Release valve open	Fully tighten release valve
	Inlet check valve not seated or sticking	Pump rapidly to dislodge or replace valve body
	Pressure check valve not seated or sticking	Pump rapidly to dislodge or replace valve body
Jack fails to lower	Ram locknut not loosened	Raise jack ¼ inch and release locknut
	Vent screw closed	Open vent screw
	O-Ring (pinched or rolled)	Replace o-ring and back-up ring, clean up cylinder wall of debris

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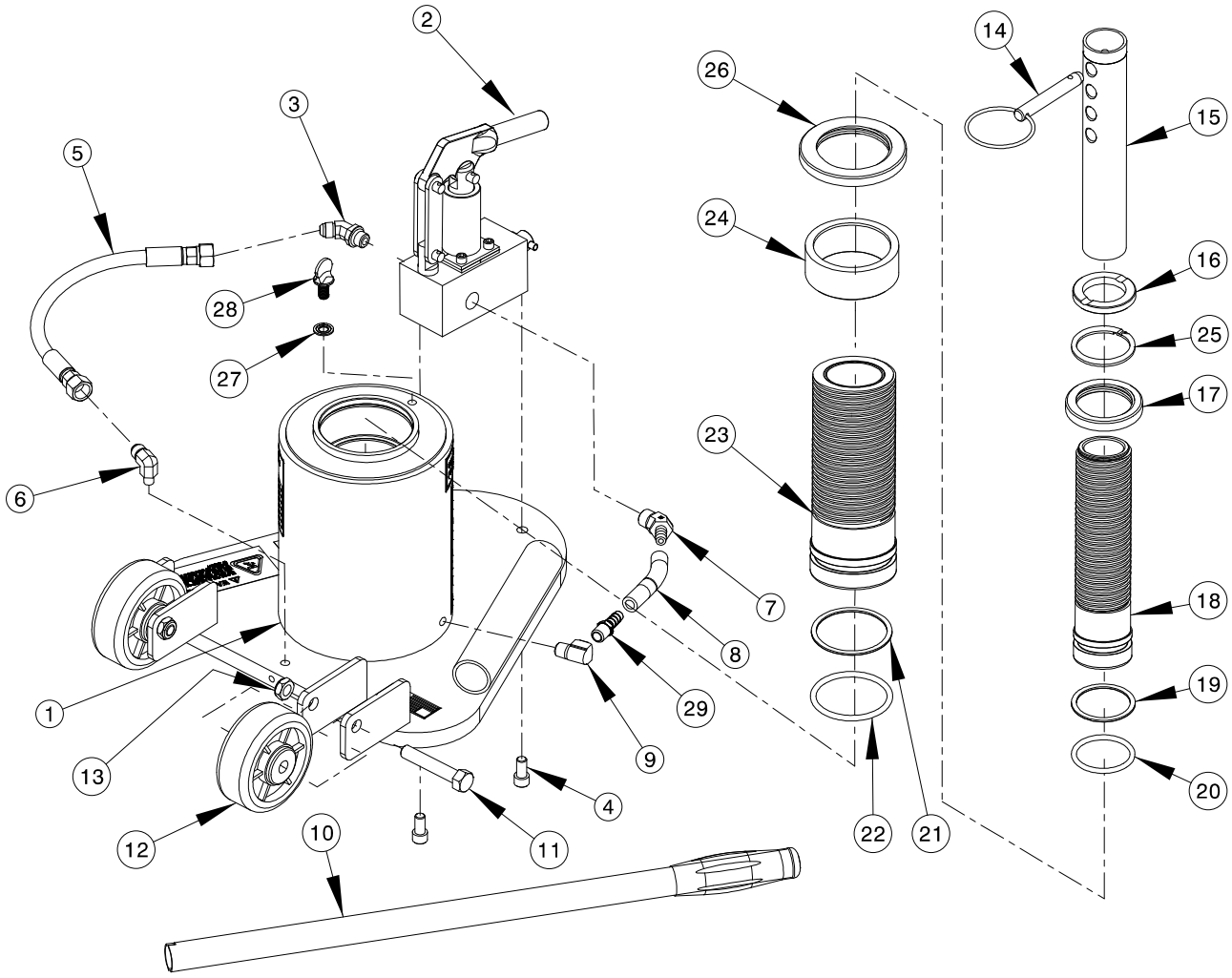
Parts List

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



ITEM	PART NUMBER	DESCRIPTION	QTY
1	Z-7710-01	Assembly Reservoir Tube	1
3	N-2042-05-S-B	Elbow, 45º Male	1
4	G-1151-107206	Socket Head Cap Screw, 3/8 - 16 x ¾ " long	2
5	TF-1043-03*12.5	Hose Assembly, 12.5 long	1
6	N-2005-09-S	Elbow, Male 1/8 – 27 NPT	1
7	N-2409-04	Elbow, 45° Male 3/8 NPT x 3/8 Hose	1
8	TF-1047-04*03.5	Hose, Push On, ¼ x 3 ½" long	1
9	N-2200-03-B	Elbow, 90º ¼ NPT x ¼ NPT	1
10	H-1009-01	Pump Handle	1
11	G-1100-109526	Bolt, Grade 5, ½-20 x 2 ¾" long Hex Head	2
12	U-1002	Wheel	2
13	G-1203-1095	Jamnut, ½-20 Elastic	2
14	G-1307-0825	Pin ½ x 2 ½ " long	1
15	R-1013-01	Extension, Center	1
	R-1012-01	Extension, Center (adds 6.1 inches)	1
16	TR-1026	Ram Protection Ring	1
17	TR-2223	Second Stage Locknut	1
18	Z-7683-04	Second Stage Ram	1
23	Z-7681-04	First Stage Ram Assembly	1
24	TR-2222	Stop Tube	1
25	G-1397-206	Ring, External Retaining	1
26	TR-2230	First Stage Locknut	1

Parts List

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

ITEM	PART NUMBER	DESCRIPTION	QTY
27	G-1281-06	Washer	1
28	G-1177	Thumbscrew Vent	1
29	N-2412-10	Connector, Straight ¼ NPT to 3/8 Hose	1
	K-4588	**Kit, Ram Seal Replacement;** *consists of:*	
19	HC-2020-329	Backup Ring	1
20	HC-2000-329	O-ring	1
21	HC-2020-338	Backup Ring	1
22	HC-2000-338	O-ring	1
	K-1987	**Kit, Hand Pump Replacement**; *consists of:*	
2		See Appendix I	1
	K-1165	**Kit, Wheel Replacement**; *consists of:*	
12		Wheel	1

NOTES: 1. Those items designated as kits contain all hardware necessary for installation.
2. Unless otherwise listed, all replacement bolts should be grade '5' or better.

TRONAIR

APPENDIX I

HC-1752
2,500 psi
Hand Pump Parts List

Model: HC-1752
2,500 psi Hand Pump

***

Illustrated Parts List

08/2001 – Rev. OR

1740 Eber Rd
Holland, OH 43528-9794
USA

Tronair, Inc.
www.tronair.com
Email: sales@tronair.com

Phone: (419) 866-6301
800-426-6301
Fax: (419) 867-0634

HC-1752
2,500 PSI Hand Pump

Parts List

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

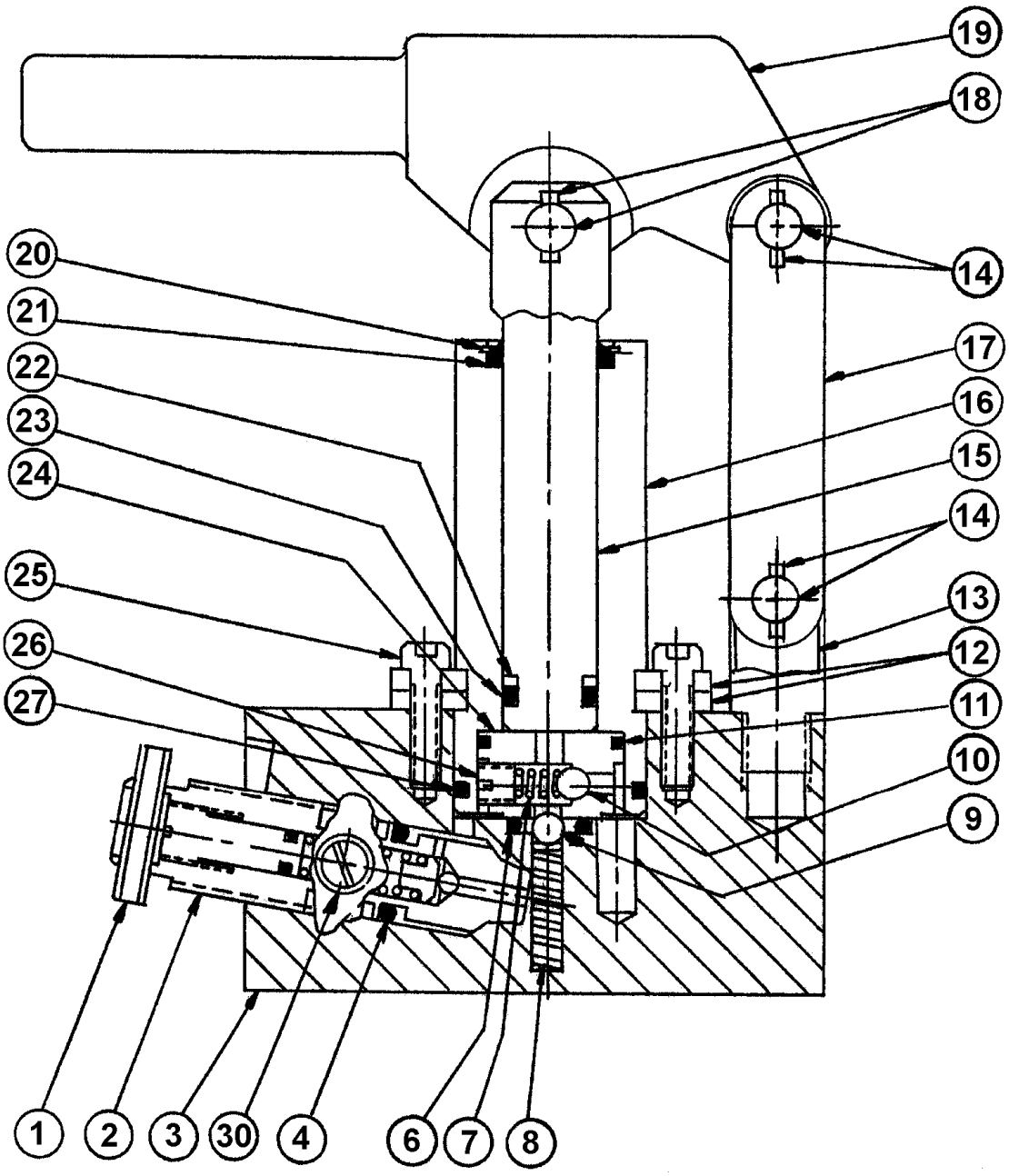
Reference Parts List Illustration on following page.

ITEM	PART NUMBER	DESCRIPTION	QTY
3	5M1-000-001	Body, Pump	1
12	506-000	Half, Flange	4
25	518-000	Screw, Socket Head Cap	4
Not Shown	H-1009-01	Handle	1
	K-1001	**Kit, Seal Replacement**; *consists of:*	
4		O-ring, Release Screw	1
6		O-ring, Outlet Check	1
11		O-ring, Valve Body	1
21		Wiper, Rod	1
22		Ring, Backup	1
23		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
	K-1068	**Kit, Linkage Replacement**; *consists of:*	
13		Pivot	1
14		Assembly, Linkage Pin	2
17		Strap	2
18		Assembly, Clevis Pin	1
19		Bracket, Pump Handle	1
	K-1069	**Kit, Internal Parts Replacement;** *consists of:*	
♦ Not Shown		Ball, Release	1
7		Spring, Inlet Check	1
8		Spring, Outlet Check	1
9		Ball, Outlet Check	1
10		Ball, Inlet Check	1
	K-1778	**Kit, Piston/Cylinder Replacement;** *consists of:*	
15		Piston	1
16		Tube	1
20		Retainer, Wiper	1
24		Assembly, Valve Body (Includes Items 7, 10, 24, 26)	1
	K-1906	**Kit, Piston/Seal Replacement;** *consists of:*	
15		Piston	1
22		Ring, Backup	1
23		O-ring, Piston	1
	K-2783	**Kit, Release Screw Replacement;** *consists of:*	
2		Screw, Release	1
30		Retainer, Screw	1

♦ **Although this item is listed in its particular kit, it is not used on HC-1752 pump. These items may be discarded.**

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

Parts List Illustration



WARNING!

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

TRONAIR

APPENDIX II

MSDS
Hydraulic Fluid
(MIL-PRF-5606)

ExxonMobil

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

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

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300
ExxonMobil Transportation No.	281-834-3296
MSDS Requests	713-613-3661
Product Technical Information	800-662-4525, 800-947-9147
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	10 - 30%
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	30 - 60%
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	64742-55-8	10 - 30%

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

SECTION 3 HAZARDS IDENTIFICATION

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

POTENTIAL PHYSICAL / CHEMICAL EFFECTS

Combustible. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited.

POTENTIAL HEALTH EFFECTS

If swallowed, may be aspirated and cause lung damage. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May be irritating to the eyes, nose, throat, and lungs. High-pressure injection under skin may cause serious damage.

Target Organs: Skin |

NFPA Hazard ID:	Health:	0	Flammability:	2	Reactivity:	0
HMIS Hazard ID:	Health:	0*	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 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. 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 (CO2) 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: Smoke, Fume, Sulfur oxides, Aldehydes, Incomplete combustion products, Oxides of carbon, Phosphorus oxides

FLAMMABILITY PROPERTIES
Flash Point [Method]: >82C (180F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 7.0
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 regulations. U.S. regulations require reporting releases of this material to the environment which exceed the 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 Section 3 for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

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.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid contact with skin. Avoid prolonged breathing of mists and heated vapor. Use proper bonding and/or grounding procedures. Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is a static accumulator.

STORAGE

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. Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

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

Source	Form	Limit / Standard			Note	Source
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)		TWA	2000 mg/m3	500 ppm	N/A	OSHA Z1
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	STEL	10 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	Mist.	TWA	5 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	Mist.	STEL	10 mg/m3		N/A	ACGIH
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	Mist.	TWA	5 mg/m3		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/m³ - ACGIH TLV, 10 mg/m³ - ACGIH STEL, 5 mg/m³ - OSHA PEL.

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

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. 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. Work conditions can greatly effect glove durability; 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
See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION
Physical State: Liquid
Color: Red
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION
Relative Density (at 15 C): 0.88
Flash Point [Method]: >82C (180F) [ASTM D-93]
Flammable Limits (Approximate volume % in air): LEL: 0.7 UEL: 7.0
Autoignition Temperature: >225°C (437°F)
Boiling Point / Range: 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 mm2/sec) at 40 C | 5.1 cSt (5.1 mm2/sec) at 100C
Oxidizing Properties: See Sections 3, 15, 16.

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

SECTION 10 STABILITY AND REACTIVITY

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.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m3	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data.	Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.

CHRONIC/OTHER EFFECTS

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.

Additional information is available by request.

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

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

Material -- Expected to be harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

Base oil 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:

Base oil component -- Expected to be inherently biodegradable

BIOACCUMULATION POTENTIAL

Base oil component -- 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.

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, corrositivity 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 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) : Not Regulated for Land Transport

LAND (TDG) : Not Regulated for Land Transport

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

ExxonMobil

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

AIR (IATA) : Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: AICS, IECSC, DSL, EINECS, ENCS, KECI, PICCS, TSCA

EPCRA: This material contains no extremely hazardous substances.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: Fire. 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.

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT	64742-47-8	17, 18, 19
HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM)	64742-53-6	1, 4, 13, 17, 18
HYDROTREATED LIGHT PARAFFINIC DISTILLATES, PETROLEUM	64742-55-8	1, 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

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Revision Changes:
Section 05: Fire Fighting Measures - Unusual Fire Hazards was modified.
Section 10: Conditions to Avoid was modified.
Section 07: Handling and Storage - Handling was modified.
Section 07: Handling and Storage - Storage Phrases was modified.
Section 03: HMIS Flammability was modified.
Section 03: NFPA Flammability was modified.
Section 06: Accidental Release - Spill Management - Land was modified.
Section 09: Flash Point C(F) was modified.
Section 08: Exposure Control was modified.
Section 15: SARA (311/312) REPORTABLE HAZARD CATEGORIES was modified.
Section 16: Land Spill was modified.
Section 14: DOT Technical Name - All was added.
Section 03: Physical/Chemical Hazard was added.
Section 14: Proper Shipping Name - Header was added.
Section 14: Proper Shipping Name was added.
Section 14: Hazard Class & Division - Header was added.
Section 14: Hazard Class was added.
Section 14: UN Number - Header was added.
Section 14: UN Number was added.
Section 14: Packing Group - Header was added.
Section 14: Packing Group was added.
Section 14: Label(s) - Header was added.
Section 14: Label(s) was added.
Section 14: ERG Number - Header was added.
Section 14: ERG Number was added.
Section 14: Transport Document Name - Header was added.
Section 14: Transport Document Name was added.
Section 14: DOT Technical Name - Open parenthesis was added.
Section 14: DOT Technical Name - Close parenthesis was added.
Section 03: Physical/Chemical Hazard was added.
Section 03: Physical/Chemical Hazards - Header was added.
Section 14: DOT Footnote was added.
Section 16: Physical Hazards was added.
Section 16: Physical Hazards - Header was added.
Section 16: Precautions was added.
Section 16: Precautions - Header was added.
Section 10: Conditions to Avoid was deleted.
Section 14: LAND (DOT) - Default was deleted.

PRECAUTIONARY LABEL TEXT:
Contains: DISTILLATES (PETROLEUM), HYDROTREATED LIGHT
CAUTION!

HEALTH HAZARDS
Repeated exposure may cause skin dryness or cracking. If swallowed, may be aspirated and cause lung damage.
Target Organs: Skin |

PHYSICAL HAZARDS
Combustible.

PRECAUTIONS
Use proper bonding and/or grounding procedures.

FIRST AID
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.

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

Oral: Seek immediate medical attention. Do not induce vomiting. If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

Skin: Wash contact areas with soap and water. 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.

FIRE FIGHTING MEDIA
Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

SPILL/LEAK
Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. 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.
Use
Not intended or suitable for use in or around a household or dwelling.

Internal Use Only
MHC: 2A,0,0,0,0,1 PPEC: C

DGN: 2005454XUS (552975)
