ABSTRACT

As part of my KSC summer internship, I was given the very cool task of writing a test preparation sheet (TPS). A TPS is a set of instructions for certain procedures or tasks, and serves as the documentation for the tasks. TPSs guide task leaders and technicians throughout the work procedures, safely, informing them of what steps will be hazardous, what precautions must be taken, and what to do in the case of an accident or emergency. I was placed in Boeing's Resupply & Return Division (R&R). R&R is responsible for sending up food and supplies to the International Space Station (ISS) with the use of three Italian Multi Purpose Logistics Modules – Leonardo, Donatello, and Raffaello. The supplies are loaded into Resupply Stowage Racks (RSRs) or Resupply Stowage Platforms (RSPs) (though, both are usually referred to as racks), depending on their size and shape. These racks are loaded into the modules with the help of a specialized crane known as the Rack Insertion Device (RID). The RID rests on four pneumatic air jacks, these allow for an operator to raise or lower the RID. The pneumatic air system supplies the air jacks with the necessary air pressure required to lift the RID.

This TPS covers the reassembly and testing of the pneumatic air system. "Section I" provides the task leader with general information, such as who created the TPS, the hazards of the procedures, what required parts and documents are needed, and what people will be necessary to complete the task. "Section II" covers the pre-operations briefing; this important section informs the task leader to set-up a controlled area, limiting access to only essential personnel, and perform an inspection of the work area and materials to be used. "Section Three", had it been required in this TPS, it would have covered operational support, such as communications. "Section IV" is the most

important part of this paper because it provides the task leader and technicians with the detailed instructions necessary to complete each task. Each step is so important, that every time a step is completed, like attaching a hose or securing a bolt, a technician must stamp/initial the step as being complete. "Section V" is the final section, it instructs the task leader how to perform the proper closeout procedures. This TPS required that the system, once installed, must be verified operational. Once verified, the TPS is signed by every person who had a role, and recorded as being complete.

WONUM: 150941

WAD Number: SS-GH5-00191-001-T1499
Date: 7/13/07
Revision: BASIC

SPACE STATION AND SHUTTLE PAYLOADS

RACK INSERTION DEVICE PNEUMATIC ASSEMBLY SETUP & TEST

TEST PREPARATION SHEET (TPS)

Hardware Affected: GSE

CONTRACT: CAPPS

CM REVIEW_____ RELEASE_____

THIS DOCUMENT DOES NOT CONTAIN HAZARDOUS OPERATIONS

National Aeronautics and
Space Administration

John F. Kennedy Space Center

WAD Number: SS-GH5-00191-001-T1499
Revision: BASIC
Date: 7/13/07

RACK INSERTION DEVICE PNEUMATIC ASSEMBLY SETUP & TEST

Type B - Non-Configuration Change

Prepared By:

NATHAN CONDE, NASA INTERN, Date

Approved By:

, CAPPS MECH SYS., Date

Reviewed By:

, CAPPS MECH SYS., Date

WAD Number: SS-GH5-00191-001-T1499
Revision: BASIC
Date: 7/13/07

DEVIATION LOG

_____Permanent _____Temporary _____Temp-Recycle

DEV. NUMBER	PAGE NO./SEQUENCE AFFECTED	STAMP AND DATE

TABLE OF CONTENTS

WAD Number: SS-GH5-00191-
001-T1499
Revision: BASIC
Date: 7/13/07

Objectives:

THE WORK OUTLINED IN THIS TPS IS IN SUPPORT OF PNEUMATIC AIRTUBE INSTALLATION FOR THE RACK INSERTION DEVICE'S PNEUMATIC ASSEMBLY.

Description:

PER ENGINEERING ORDER $$$$$$$$$$, REPLACEMENT PNEUMATIC TUBES AND VALVES WILL BE INSTALLED AND TESTED ON THE RACK INSERTION DEVICE'S PNEUMATIC ASSEMBLY. THIS TPS WILL PROVIDE INSTALLATION INSTRUCTIONS FOR EACH AIRHOSE ATTACHMENT AND VALVE ASSEMBLY.

SECTION I - INFORMATION

1.1 REFERENCED INSTRUCTIONS

1.1.1 REQUIRED DOCUMENTS

NUMBER	REV	TITLE

Comment [KB1]: In Section 1.1.1 list only those documents required at the work station in order to accomplish the task. (Include customer provided procedures).

1.1.2 REQUIRED DRAWINGS

NUMBER	REV	TITLE
82KØ4517	C	RACK INSERTION DEVICE PNEUMATIC ASSEMBLY

Comment [KB2]: In Section 1.1.2 list only those drawings required at the work station.

1.1.3 INFORMATION DOCUMENTS

NUMBER	REV	TITLE

Comment [KB3]: In Section 1.1.3 list any other information documents that might be used during the performance of the WAD.

1.1.4 INFORMATION DRAWINGS

NUMBER	REV	TITLE

Comment [KB4]: In Section 1.1.4 list any other information drawings that might be used during the performance of this WAD.

SECTION I - INFORMATION

1.2 COMPUTER SYSTEMS

N/A

1.3 SPECIAL TOOLS, EQUIPMENT AND MATERIALS

POC: NATHAN CONDE

WONUM: 150941 Parent WONUM:

WAD Number: SS-GH5-00191-001-T1499

Mission Number:

Required Date: Contract: CAPPS

Labor CCN: Material CCN:

1.3.1 KSC PROVIDED

PART NO.	NOMENCLATURE	QTY	SEQ./TASK

1.3.2 CUSTOMER PROVIDED

PART NO.	NOMENCLATURE	QTY	SEQ./TASK

Comment [KB5]: Section 1.3 will be used to list all tools, equipment, and materials supplied by Boeing, NASA, and/or the customer. (Items supplied by other base support contractors will be listed in Section 1.4). For WAD's which have multiple suppliers of tools, equipment, and materials, this section shall be divided into sub-sections to indicate which supplier is responsible for supply the equipment. Identify the sequence(s)/tasks the equipment is to be used in by listing the sequence/task number(s) under the SEQ/TASK column if the WAD will not be run in its entirety. The term "or equivalent" may be used at the SEQ/STEP level when the parameters of the equivalent item(s) are stated or when the equivalent items are listed in Section 1.3. In addition, the specifications or list of equivalent item(s) may be stated in a note prior to a sequence or step, or stated in the step.

SECTION I - INFORMATION

1.4 SUPPORT REQUIREMENTS

N/A

1.5 Personnel Certification Requirements

NONE REQUIRED

1.5.1 SKILL CERTIFICATIONS/LICENSE REQUIREMENTS

CERTIFICATION/LICENSE	SKILL	SEQ
N/A		

1.5.2 CONTROLLED AREA ACCESS

	BOEING	NASA
QUALITY	1	0
TECH	3	0
ENGR	1	1
SAFETY	0	0
Totals	5	1

TOTAL PERSONNEL = 6

1.5.3 PERSONNEL REQUIRED

	BOEING	NASA
QUALITY	1	0
TECH	3	0
ENGR	1	1
SAFETY	0	0
Totals	5	1

Comment [KB6]: Section 1.4 applies only to base support contractors other than Boeing and is for information purposes only. For testing, the Mission OR/OD is the driver for scheduling the support items needed. Delete unnecessary subsections. NOTE: Do not renumber subsections due to deletions.

Comment [KB7]: List special skill certifications and licensing, and standboard requirements. If there are "no special skills certification/licenses required", state so.

Comment [KB8]: For Hazardous operations or manloading requirements, a listing of personnel allowed in the controlled area is required in this section. If identical for all hazardous operations, list the type and quantity of personnel allowed in controlled area by each contractor and government agency. Then reference Section 1.5.2 when establishing a controlled area within the WAD.

SECTION I - INFORMATION

TOTAL PERSONNEL = 6

1.6 SAFETY REQUIREMENTS

1.6.1 SAFETY DOCUMENTATION (REFERENCE ONLY)

NUMBER	TITLE
KHB 1700.7	STS Payload Ground Safety Handbook
KHB 1710.2	KSC Safety Practices Handbook (KSC)
KHB 1860.1	KSC Ionizing Radiation Protection Program
KHB 1860.2	KSC Non-Ionizing Radiation Protection Program
BP 4090	Payload Services Emergency Preparedness Plan and Procedure
NASA STD 8719.9	Standard For Lifting Devices And Equipment
SP-SHEA-046	Mishap Reporting, Investigation, And Action
SLO-KSC-1997-XXX	Suspended Load Analysis/Approval Report
EPD S9903	Launch Control Center (LCC) (EPD)
EPD S9904	Orbiter Processing Facility (OPF 1/2/3) (EPD)
EPD S9908	Launch Pads (Pad A/B) (EPD)

Comment [KB9]: Use the latest issue (LI) of a document unless otherwise specified. List those documents relative to your WAD. (* - must be included in all WADs; ** - must be included in all WADs performed at facility indicated; *** - must be included in all TAPs)

1.6.2 HAZARDS

NONE

Comment [KB10]: List specific hazards to be encountered during the performance of the WAD.

1.7 SPECIAL INSTRUCTIONS

This WAD requires a [CAPPS] task leader.

Comment [KB11]: Fill in the blank with a task leader call sign. Example: PTC, SLES, HTL, NASA

1.7.1 GENERAL

This WAD does not require a constraints review prior to starting the WAD.

Comment [keb12]: List only those special instructions that are unique and specifically required for the performance of the WAD. In addition; list standard actions, items repetitive throughout the WAD, and normal housekeeping. Do not duplicate released SP's. List only those that are relative to your WAD and provide other paragraphs as necessary for unique situations.

SECTION I - INFORMATION

1.7.2 LIST OF ABBREVIATIONS

Comment [KB13]: Add Mission/Payload specifics.

Standard abbreviations are found at the following websites, do not put standard acronyms in 1.7.2.

NASA/KSC Acronyms: http://www.ksc.nasa.gov/facts/acronyms.html

Space Station Acronyms:
http://spaceflight.nasa.gov/station/reference/acronyms/index.html

1.8 APPLICABLE TECHNICAL REQUIREMENTS

Comment [KB14]: This section will be created by a document control representative before a scheduled review or release of the WAD per approved test requirements identified in the body of the WAD. Proper OMRS numbering is essential for its use in the development of the operations and maintenance plan (OMP). The OMRS number will be the last line item entered for any given step.

THIS TPS CONTAINS NO OMRSD REQUIREMENTS.

1.9 SECURITY REQUIREMENTS/INSTRUCTIONS

N/A

SECTION II - PRE-OPERATION SETUP INSTRUCTIONS

SEQ/STEP	CMD	RESP	DESCRIPTION	VERIF.
01-000			DOCUMENT VERIFICATION	
01-001			Verify your copy of SS-GH5-00191-001-T1499 is Rev BASIC Dated _____.	
01-002			CONDUCT A PRE-TASK BRIEFING.	
01-002			PERFORM A PRE-TASK ENGINEERING WALK-DOWN AND VERIFY THAT THERE ARE NO DISCREPANCIES PRIOR TO PERFORMING OPERATIONS	
01-003			SETUP A WORK AREA AND ESTABLISH A CONTROL AREA AS DIRECTED BY THE TASK LEADER. CLEAR AREA OF NON-ESSENTIAL PERSONNEL.	
01-004			GATHER PNEUMATIC HOSES AND ALL PARTS/EQUIPMENT NEEDED PER SECTION 1.3 AS DIRECTED BY TASK LEADER.	
01-005			PERFORM A VISUAL INSPECTION OF PNEUMATIC HOSES, JACKS, AND PARTS/EQUIPMENT; CHECKING FOR LOOSE, DAMAGED OR MISSING PARTS.	
01-007			PRE-OPS SETUP-1 COMPLETE.	

Comment [keb15]: This step can go anywhere in the procedure before the start of operations, it does not have to be a pre-operation setup.

SECTION III - OPERATION SUPPORT SETUP INSTRUCTIONS

SEQ/STEP	CMD	RESP	DESCRIPTION	VERIF.

NONE

SECTION IV - OPERATION INSTRUCTIONS

SEQ/STEP	CMD	RESP	DESCRIPTION	VERIF.
02-000			FACILITY COUPLING ASSEMBLY NOTE Reference: DWG. NO. 82K04517 DETAIL: HK (#) REPRESENTS ITEM NUMBER FOUND IN THE LIST MATERIALS	
02-001			WRAP ALL MALE ENDS WITH ANTI-SEIZING TAPE (255).	
02-002			ASSEMBLE MATERIALS, WITH THE EXCEPTION OF HOSES, AS DEPICTED IN DETAIL HK.	
03-000			DISTRIBUTING MANIFOLD ASSEMBLY	
03-001			WRAP ALL MALE ENDS WITH ANTI-SEIZING TAPE (255).	
03-002			CONNECT 1/2" BRASS TEES(266) TOGETHER WITH 1/2" BRASS HEX NIPPLE(267). (TWO PLACES)	
03-003			ATTACH 1/2" QUICK DISCONNECT COUPLING SOCKET HALF(264) WITH 1/2" BRASS TEES(266). (FOUR PLACES)	
04-000			FCA/DMA HOSE INSTALLATION	
04-001			WRAP MALE ENDS ON QUICK DISCONNECT COUPLING PLUG (265) WITH ANTI-SEIZING TAPE (255).	
04-002			CONNECT THE TWO 3/4" QUICK DISCONNECT COUPLING SOCKET FEMALE HALVES (260) TO QUICK DISCONNECT COUPLING PLUG (265).	

SECTION IV - OPERATION INSTRUCTIONS

SEQ/STEP	CMD	RESP	DESCRIPTION	VERIF.
04-003			ATTACH 3/4" HOSE (250) TO 3/4" QUICK DISCONNECT COUPLING SOCKET FEMALE HALF (260). (TWO PLACES)	
04-004			ATTACH A FREE 3/4" HOSE (250) END TO THE FCA.	
04-005			ATTACH SECOND FREE 3/4" HOSE (250) END TO THE DMA.	
05-000			DMA/RID HOSE INSTALLATION	
05-001			WRAP ALL MALE ENDS WITH ANTI-SEIZING TAPE (255).	
05-002			ATTACH 3/8" QUICK DISCONNECT COUPLING MALE PLUG (258) TO 3/8" QUICK DISCONNECT COUPLING FEMALE SOCKET (261). (TWO PLACES)	
05-003			ATTACH 3/8" RUBBER HOSE (249) BETWEEN THE SUPPORT JACK AND THE MALE QUICK DISCONNECTS AS DEPICTED IN ATTACHED DRAWING. (TWO PLACES)	
05-004			ATTACH 3/8" RUBBER HOSE (248) BETWEEN THE DMA AND THE FEMALE QUICK DISCONNECTS AS DEPICTED IN ATTACHED DRAWING. (TWO PLACES)	
05-005			ATTACH 3/8" RUBBER HOSE (249) BETWEEN THE SUPPORT JACK AND DMA. (TWO PLACES)	

SECTION V - POST OPERATION INSTRUCTIONS

SEQ/STEP	CMD	RESP	DESCRIPTION	VERIF.

06-000 SUPPORT JACK OPERATIONAL VERIFICATION

NOTE

THE FOLLOWING OPERATIONAL STEPS WERE TAKEN FROM THE REGENT JACK OPERATION AND MAINTENANCE MANUAL TO BE INCORPORATED INTO THIS TPS. A COPY OF THIS MANUAL IS INSERTED I APPENDIX A OF THIS TPS.

06-001 VISUALLY INSPECT ALL AIR HOSES FOR DAMAGE.

06-002 VERIFY ALL HOSE CONNECTIONS, REGULATORS, SWITCHES, AND SAFETY DEVICES ARE PROPERLY CONFIGURED.

06-003 TURN FACILITY AIR VALVE TO THE OPEN OR "ON" POSITION.

06-004 SCREW JACK LOCKNUT DOWN WITHIN 1" OF JACK BASE.

CAUTION

THE THREADED RAM OF THE JACK CONTAINS A LOCKNUT TO ALLOW THE MECHANICAL LOCKING OF THE RAM AT ANY POSITION DURING EXTENTION. FAILURE TO RELEASE THE LOCKNUT PRIOR TO OPERATION WILL DAMAGE THE JACK RAM AND LOCKNUT.

06-005 CLOSE RELEASE VALVE (APPENDIX A, FIG.1, ITEM 17).

06-006 PLACING 4-FOOT LEVELS ON THE RID FRAME, DEPRESS PALM
BUTTON ON AIR PUMP TO OPERATE PUMP UNTIL LOAD IS EXTENDED
TO PROPER HEIGHT AS DIRECTED BY TASK LEADER.

06-007 SCREW LOCKNUT UP AGAINST CYLINDER TO MECHANICALLY SECURE THE LOAD.

SECTION V - POST OPERATION INSTRUCTIONS

SEQ/STEP	CMD	RESP	DESCRIPTION	VERIF.
06-008			OPEN RELEASE VALVE TO RELEASE HYDRAULIC PRESSURE.	
06-009			THE LOAD IS NOW SECURE.	

APPENDIX A - 22 TON LEVELING JACK O&M MANUAL

APPENDIX A - 22 TON LEVELING JACK O&M MANUAL

SEQ/STEP	CMD	RESP	DESCRIPTION	VERIF.

REGENT

Model 9509-010
22 Ton Leveling Jack

OPERATION and MAINTENANCE MANUAL
with ILLUSTRATED PARTS LIST

11905 REGENTVIEW AVENUE
DOWNEY, CA 90241-5587 U.S.A.

TEL (562) 862-1174 FAX (562) 861-9624
www.regent4gse.com

APPENDIX A - 22 TON LEVELING JACK O&M MANUAL

SEQ/STEP	CMD	RESP	DESCRIPTION	VERIF.

APPENDIX A - 22 TON LEVELING JACK O&M MANUAL

SEQ/STEP	CMD	RESP	DESCRIPTION	VERIF.

REGENT MFG., INC.

MODEL 9509-010
22 TON LEVELING JACK
PAGE -2-

5.0 Extension Procedure:

5.1 Close release valve (Fig. 1, Item 17).

CAUTION: ALWAYS KEEP LOCKNUT WITHIN 1 INCH OF BOTTOM OF CYLINDER.

5.2 Depress palm button on air pump to operate pump until ram is extended to the proper length.

5.3 Screw locknut up against cylinder to mechanically secure the load.

5.4 Open release valve to release hydraulic pressure.

6.0 Retraction Procedure:

6.1 Close release valve.

6.2 Operate pump to lower ram enough to allow locknut to rotate freely.

6.3 While rotating locknut down the ram, open release valve to retract ram fully.

CAUTION: ALWAYS KEEP LOCKNUT WITHIN 1 INCH OF BOTTOM OF CYLINDER.

7.0 To Adjust Cylinder Relief Valve (Fig. 1, Item 19)

All Regent safety valves are adjustable and interchangeable. All valves are set at the factory and should not require any further adjustment. If adjustment is desired:

7.1 Position jack under a jack tester and partially extend the ram.

7.2 Loosen nut on relief valve.

7.3 Using an allen wrench, adjust pressure setting. Clockwise to increase pressure, counterclockwise to decrease pressure.

7.4 Tighten nut on relief valve.

CAUTION: ALL REGENT AIRCRAFT JACKS ARE DESIGNED FOR CERTAIN MAXIMUM LOADS USE CARE NOT TO SET VALVE MORE THAN 10% ABOVE RATED CAPACITY.

APPENDIX A - 22 TON LEVELING JACK O&M MANUAL

SEQ/STEP CMD RESP DESCRIPTION VERIF.

REGENT MFG., INC.

MODEL 9509-010
22 TON LEVELING JACK
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8.0 Oil Level

Proper oil level for most efficient operation is ½" below the filler hole when the ram is completely collapsed. The following hydraulic oils, compatible with Buna-N O-Rings, are recommended for use in Regent jacks:

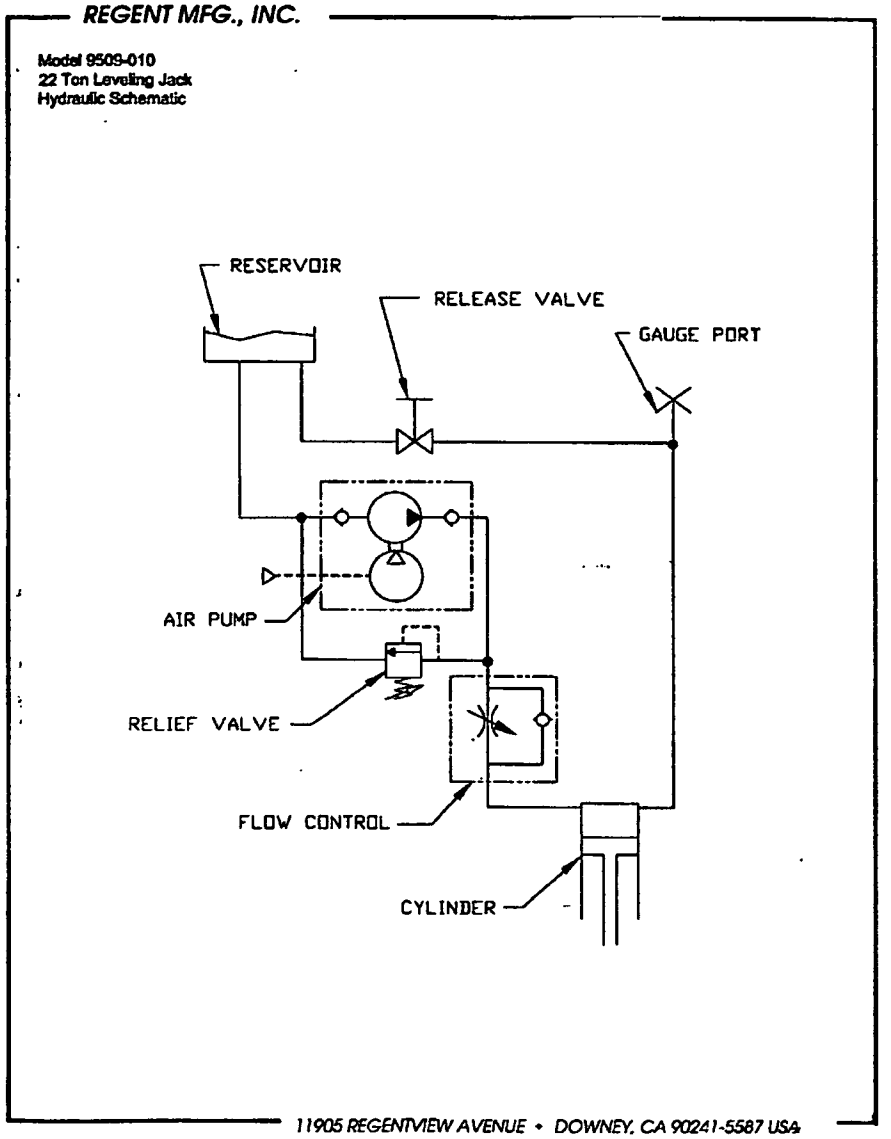
Tellus 15, (Shell Oil Company)
Calol Engine Oil (Union Oil Co.)
MIL-H-5606 (Shell Oil Co., Aero Shell No. 4)
MIL-H-6083a (Mobil Oil, MILVAC-6083)
Texaco Regal Oil AA (Texas Co.)
Opaline 10W Motor Oil (Sinclair Co.)
MIL-H-83282 (Shell Oil Co.)

9.0 Overhaul Kits Available

KC 9509	Seal Kit
KD 9509	Repair Kit

APPENDIX A - 22 TON LEVELING JACK O&M MANUAL

SEQ/STEP	CMD	RESP	DESCRIPTION	VERIF.

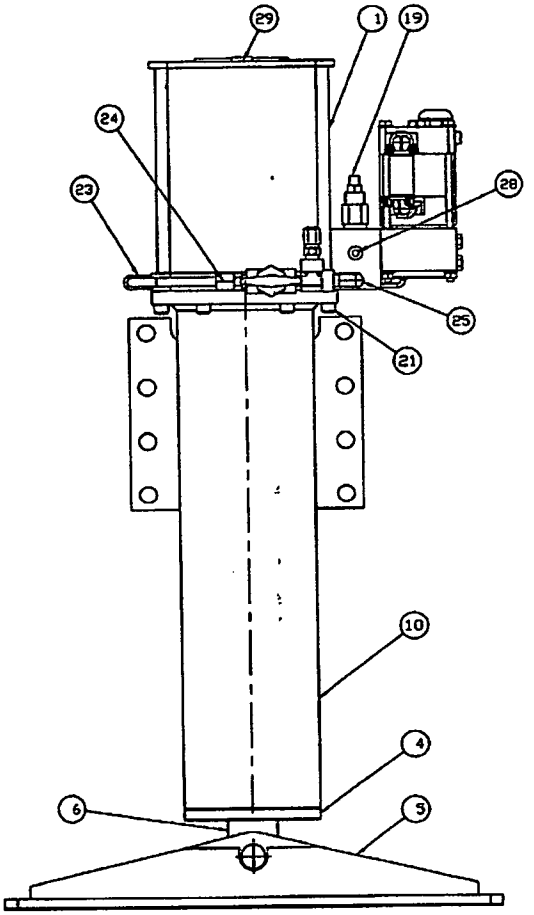


APPENDIX A - 22 TON LEVELING JACK O&M MANUAL

SEQ/STEP	CMD	RESP	DESCRIPTION	VERIF.

REGENT MFG., INC.

Model 9509-010
22 Ton Leveling Jack
Page 2 of 3
Figure 1



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APPENDIX A - 22 TON LEVELING JACK O&M MANUAL

SEQ/STEP CMD RESP DESCRIPTION VERIF.

REGENT MFG., INC.

Model 9509-010
22 Ton Leveling Jack
Page 1 of 3
Figure 1

FIG. & ITEM NO.	PART NUMBER	DESCRIPTION	UNITS PER ASSY
1-	9509-010	Leveling Jack	Ref.
-1	9509-1	Reservoir Weldment	1
-2	9509-2	Ram	1
-3	9509-3	Bushing	1
-4	9509-4	Locknut	1
-5	9509-D	Footpad Assy	1
-6	9509-6	Rod End Clevis	1
-7	9509-7	Rod End Plug	1
-8	9509-12	Spring	1
-9	9509-11	Pin	1
-10	9509-10	Cylinder Housing	1
-11	29554	Air Pump (Haskel)	1
-12	80103	Hush Kit (Haskel)	1
-13	MS28775-346	O-Ring	1
-14	MS28775-336	O-Ring	2
-15	MS28775-252	O-Ring	1
-16	916-45-4.072	Backup Ring	1
-17	5003	Needle Valve (Dragon)	1
-18	N400	Flow Control Valve (Parker Hannifin)	1
-19	RDDA-LCN	Relief Valve (Sun Hydraulics)	1
-20	.31-24 x 3.5 Lg	Hex Head Capscrew	2
-21	.5-20 x 1.12 Lg	Socket Head Capscrew	6
-22	5100-100ZD	Retaining Ring (Waldes Truarc)	2
-23	6CBTX-S	Elbow (Parker Hannifin)	3
-24	6FBTX-S	Connector (Parker Hannifin)	3
-25	¼ CR-S	Elbow (Parker Hannifin)	1
-26	¼ FF-S	Nipple (Parker Hannifin)	1
-27	¼ MMS-S	Tee (Parker Hannifin)	1
-28	¼ HHP-S	Pipe Plug (Parker Hannifin)	2
-29	916-36	Filler Plug	1
-30	.38-16 x .38 Lg	Setscrew	2
-31	9509-15	Top Plug	1
-32	915-150.18-4.935	Snap Ring	1
-33	¼ MRO-S	Tee (Parker Hannifin)	1
-34	6FTX-S	Connector (Parker Hannifin)	1
-35	6FNTX-S	Cap (Parker Hannifin)	1

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APPENDIX A - 22 TON LEVELING JACK O&M MANUAL

SEQ/STEP	CMD	RESP	DESCRIPTION	VERIF.

REGENT MFG., INC.

Model 9509-010
22 Ton Leveling Jack
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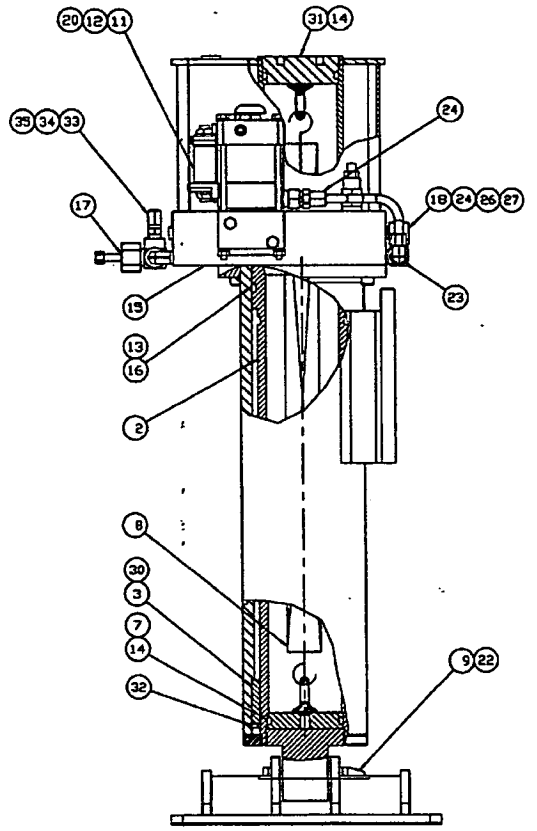
Figure 1



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APPENDIX A - 22 TON LEVELING JACK O&M MANUAL

SEQ/STEP	CMD	RESP	DESCRIPTION	VERIF.

REGENT MFG., INC.

APPENDIX

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APPENDIX Z - EMERGENCY INSTRUCTIONS

Comment [KB16]: The Appendix Z is approved for use when no specific shutdown or safing steps are required. Delete phone numbers for non-applicable facilities.

SEQ/STEP	CMD	RESP	DESCRIPTION	VERIF.
07-000			EMERGENCY INSTRUCTIONS Follow task leader instructions for Safing the operation and adhere to local emergency instructions as directed.	
07-001			Emergency Telephone Numbers (As Applicable) Fire 911 Medical 911 KSC Security 911 Boeing Security 7-6609 Boeing Operational Safety 7-5441/ 7-5442/ 7-5444/ 7-5445 Boeing Industrial Safety 7-2902/ 7-7806 Boeing Mishaps/Close Call 7-6609/2901 NASA Safety (Industrial Area) 7-6551 NASA Safety (LC-39 Area) OPF Bays 1&2 1-1014/1015 OPF Bay 3 1-7077/7078 Pad A 1-1050/0098 Pad B 1-6491/6504 Off Shifts 1-4120	

********** END-OF-WAD **********