TO 37A12-25-1

TECHNICAL MANUAL

OPERATION AND
MAINTENANCE INSTRUCTIONS
WITH
ILLUSTRATED PARTS BREAKDOWN

TANK, TRAILER MOUNTED
RECOVERABLE AVIATION TURBINE FUEL:
200, 400, AND 600 GALLON

PART NUMBER SV200S-WR07
PART NUMBER SV416S-WR07
PART NUMBER SV616S-WR07

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FOREWORD

1. GENERAL.

2. PURPOSE AND SCOPE.

This manual provides operation and maintenance instructions for the Tank, Trailer Mounted, Recoverable Aviation Turbine Fuel: 200, 400, and 600 Gallon.

3. ARRANGEMENT.

This manual consists of seven chapters. Chapter 1 contains introductory material for the manual and general description information. Chapter 2 contains a list of special tools and test equipment. Chapter 3 provides instructions and references for preparation for use, reshipment, air transportability, and storage. Chapter 4 provides operating instructions. Chapter 5 provides maintenance instructions with schematics. Chapter 6 is not applicable. Chapter 7 contains Illustrated Parts Breakdowns and Maintenance Parts Lists.

4. RELATED PUBLICATIONS.

List of Related Publications

Number	Title
AFI 23-502	Recoverable and Unusable Liquid Petroleum Products
TO 42B-1-23	Management of Recoverable and Waste Liquid Petroleum Products
TO 00-25-172	Ground Servicing of Aircraft and Static Grounding/Bonding
TO 1-1-3	Inspection and Repair of Aircraft Integral Tanks and Fuel Cells

5. ABBREVIATIONS AND SYMBOLS.

FOD	Foreign Object Damage/Debris
ID	Inner Diameter
inch Hg	Inches of Mercury (vacuum pressure)
NPT	National Pipe Thread
OD	Outer Diameter
PSIG	Pounds Per Square Inch - Gauge
SCFM	Standard Cubic Feet per Minute

6. RECORD OF APPLICABLE TIME COMPLIANCE TECHNICAL ORDERS.

The record of applicable time compliance technical orders is a list of all TCTOs which affect the technical content (text or illustrations) of this publication. The Change/ Revision/Supplement Date column lists the date of the issue during which the changes generated by each TCTO were (or will be) incorporated in this publication. Only currently effective TCTOs are listed. A TCTO is deleted from the list when any of the following occurs:

a. The equipment configuration to which the TCTO is applicable is no longer covered in the publication.

b. The TCTO is rescinded.

c. The TCTO is superseded or replaced.

When there are no applicable TCTOs, the record of applicable time compliance technical orders will show the word “None”.

List of Time Compliance Technical Orders

TCTO Number	TCTO Title	TCTO Date
None		

SAFETY SUMMARY

1. GENERAL SAFETY INSTRUCTIONS.

This manual describes physical and chemical processes which may cause injury or death to personnel, or damage to equipment if not properly followed. This safety summary includes general safety precautions and instructions that must be understood and applied during operation and maintenance to ensure personnel safety and protection of equipment. Prior to performing any task, the WARNINGs, CAUTIONs and NOTEs included in that task shall be reviewed and understood.

2. WARNINGS, CAUTIONS AND NOTES.

WARNINGs and CAUTIONs are used in this manual to highlight operating or maintenance procedures, practices, conditions or statements which are considered essential to protection of personnel (WARNING) or equipment (CAUTION). WARNINGs and CAUTIONs immediately precede the step or procedure to which they apply. WARNINGs and CAUTIONs consist of four parts: heading (WARNING or CAUTION), a statement of the hazard, minimum precautions, and possible result if disregarded. NOTEs are used in this manual to highlight operating or maintenance procedures, practices, conditions or statements which are not essential to protection of personnel or equipment. NOTEs may precede or follow the step or procedure, depending upon the information to be highlighted. The headings used and their definitions are as follows:

WARNING

Highlights an essential operating or maintenance procedure, practice, condition, statement, etc, which if not strictly observed, could result in injury to, or death of, personnel or long term health hazards.

CAUTION

Highlights an essential operating or maintenance procedure, practice, condition, statement, etc, which if not strictly observed, could result in damage to, or destruction of, equipment or loss of mission effectiveness.

NOTE

Highlights an essential operating or maintenance procedure, condition, or statement.

3. PROTECTIVE CLOTHING.

When fuels are being handled, approved equipment such as gloves, eye protection, face shields, etc. shall be used. Local standard operating procedures and AFOSH (Air Force Occupation Safety and Health) standards, will always take precedence over this publication.

4. STATIC BONDING AND GROUNDING.

Improper static bonding and grounding can lead to a fire. Refer to TO 00-25-172, Ground Servicing of Aircraft and Static Grounding/Bonding, for specific Air Force procedures.

5. FIRE HAZARD.

This equipment is designed to safely handle fuel. However, fuel is inherently dangerous and no amount of engineering can assure that a fire will not occur. Always assume a fire can occur. Read and understand this publication.

6. RECOVERABLE PRODUCTS.

Recoverable products resulting from ground handling and servicing of aircraft will be handled in accordance with federal, state, and local pollution control laws. Refer to AFI 23-502, Recoverable and Unusable Liquid Petroleum Products, and TO 42B-1-23, Management of Recoverable and Waste Liquid Petroleum Products. Fuel or oil spills will be reported to the base fire department and the civil engineering pollution control response team as required by local directives.

7. CONFINED SPACE.

Personnel that work within an aircraft space(s) that: by design has limited openings for entry and exit; has unfavorable natural ventilation, not intended primarily for human occupancy, or contains other recognized safety

hazards shall comply with the requirements of AFOSH Std 127-25, “Confined Spaces”. An AF Form 1024, “Confined Spaces Entry Permit” will be processed with the local Safety, Health, and Fire Prevention offices prior to entering the space. The equipment described in this manual is considered to be a confined space.

8. LOCKOUT / TAGOUT.

Personnel shall be aware of the hazards associated with unguarded machinery parts, capacitors, gaseous and wet pipe systems, spring loaded devices, etc. Lockout/tagout the energy source prior to performing maintenance, adjustment, or other procedures that would bypass safety guards, barriers, or otherwise expose personnel to hazardous energy sources. Any equipment, machine, or process that could unexpectedly energize, start-up, or release energy will be equipped with a means to lockout/ tagout the energy source(s).

9. AREA OF USE.

This equipment has been designed to operate outdoors. Flammable and/or combustible vapors in ignitable quantities could be produced under certain circumstances. Indoor operation requires a vent adaptor that allows typical ventilation equipment to be used to ventilate the equipment’s exhaust air. Additionally, local protocols must be consulted to determine if fuel draining equipment can be used in the location being considered.

10. EQUIPMENT SECURITY.

This equipment has lockable features to prevent unauthorized use. The manway assembly, telescoping funnel assembly and ball valves accept a standard padlock. The storage boxes are keyed.

CHAPTER 1

INTRODUCTION AND GENERAL INFORMATION

1.1 INTRODUCTION.

The instructions in this manual cover the operation and maintenance of the Tank, Trailer Mounted, Recoverable Aviation Turbine Fuel: 200, 400, and 600 Gallon, part numbers SV200S-WR07, SV416S-WR07, and SV616S-WR07 respectively, manufactured by Spokane Industries, Inc. of Spokane Valley, Washington.

1.2 PURPOSE.

Tank, Trailer Mounted, Recoverable Aviation Turbine Fuel: 200, 400, and 600 Gallon; herein referred to as the SealVac™, provides a convenient, safe, and efficient means to recover and store aviation fuels. SealVac™ is a trademark of Spokane Industries, Inc. The SealVac™ Vacuum Fuel Drain System is protected by the following U.S. Patents: US 5,117,876, US 6,860,300 B1, US 6,896,013 B2, and 7,171,990 B2.

1.3 DESCRIPTION.

Refer to Figure 1-1 for location and identification of major components and Tables 1.1 through 1.3 for leading particulars of each size. The SealVac consists of a full vacuum inner tank assembly and an outer tank, (known as double wall construction.) Defueling is accomplished by several specialized aircraft interface drain tools, a fifty (50-foot) depuddling hose, and a sixteen foot (16-foot) telescoping funnel assembly (400 & 600 gallon sizes only.)

WARNING

Read the manual in its entirety before operating, shipping, or performing maintenance procedures. Flammable and combustible vapors can cause fire and/or explosion and lead to serious injury or death.

CAUTION

Read the manual in its entirety before operating, shipping, or performing maintenance procedures. Flammable and combustible vapors can cause fire and/or explosion and lead to serious equipment and aircraft damage.

1.4 THEORY OF OPERATION.

The SealVac is comprised of six primary functional areas. The theory of operation for each area is described in the following paragraphs.

1.4.1 Full Vacuum Tank Assembly. The Full Vacuum Tank Assembly collects and stores the fluid that is being handled. The tank weldment has an integrated sediment chamber to collect foreign object damage/debris (FOD). The tank is baffled laterally for transport stability and structural soundness. The tank weldment has an outer wrap that serves as secondary containment in the event of a primary tank leak. See Figure 1-1, 1.

1.4.2 Vacuum System Assembly. The Vacuum System Assembly uses compressed air to create vacuum inside the tank weldment, provides vacuum to the Drain Tools, and controls the tank operation. See Figure 1-1, 3.

1.4.3 Vacuum Governor. The Vacuum Governor maintains a maximum vacuum level of 8 inches Hg inside the tank weldment. This vacuum limit protects the airframe fuel cell from damage.

Table 1-1. Leading Particulars for Part Number SV200S-WR07

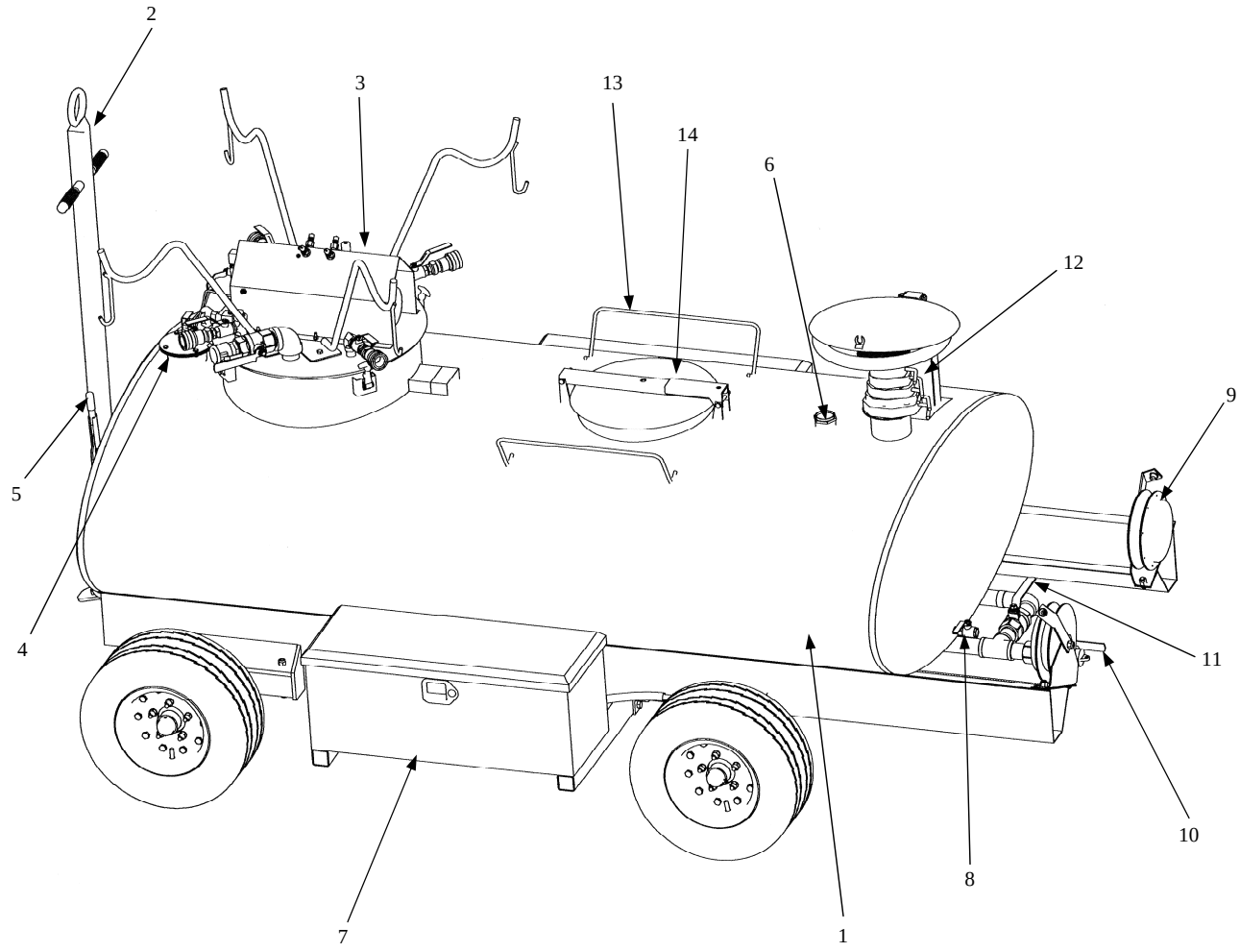
Tank Volume:	
Nominal Capacity	200-gallons
Max Capacity	220-gallons
Equipment Dimensions:	
Length (Tow bar down)	153-inches
(Tow bar up)	93-inches
Width (Tire to tire)	59-inches
(Box to box)	59-inches
Height (Tow bar down)	60-inches
(Tow bar up)	72-inches
Weight (Empty)	1,400-pounds
(Full, at nominal capacity with fuel)	2,920-pounds
Telescoping Funnel Height (Fully collapsed)	N/A
(Fully extended)	N/A
Ground Clearance (At tow bar)	6-inches
(At axle)	8-inches
Environmental Conditions:	
Operating Temperature Range	-25°F to 110°F
Storage Temperature Range	-40°F to 150°F
Supply Air Requirements:	
Supply Air Pressure (Maximum)	100-PSIG
(Minimum)	45-PSIG
Supply Air Flow Rate (Maximum)	Not established
(Minimum)	68-SCFM
Operational Characteristics:	
Tank Vacuum Pressure	8-inches Hg
Tank Vacuum Flow	89-SCFM
Drain Tool (Adherence Vacuum pressure)	17-inches Hg
(Adherence Vacuum flow)	2.1-SCFM
(Length)	35-feet
(Diameter, inner)	3/4-inch
Depuddling Hose (Length)	50-feet
(Diameter, inner)	1-inch
Towing Characteristics:	
Speed, Forward Direction	15-MPH
Speed, Backward Direction	(hand push/pull only)
Turning Radius (Curb to curb)	336-inches
Tire Size and Pressure:	
Tire Size	20.5 x 8.0-10
Tire Pressure (Cold)	90-PSIG
Other Characteristics:	
Double Wall Construction	Yes
Number of Defueling Ports	Four (4) Drain Tool Ports / One (1) Depuddle/Utility Port

Table 1-2. Leading Particulars for Part Number SV416S-WR07

Tank Volume:	
Nominal Capacity	400-gallons
Max Capacity	440-gallons
Equipment Dimensions:	
Length (Tow bar down)	187-inches
(Tow bar up)	128-inches
Width (Tire to tire)	76-inches
(Box to box)	76-inches
Height (Tow bar down)	42-inches
(Tow bar up)	72-inches
Weight (Empty)	1,650-pounds
(Full, at nominal capacity with fuel)	4,690-pounds
Telescoping Funnel Height (Fully collapsed)	42-inches
(Fully extended)	234-inches
Ground Clearance (At tow bar)	6-inches
(At axle)	8-inches
Environmental Conditions:	
Operating Temperature Range	-25°F to 110°F
Storage Temperature Range	-40°F to 150°F
Supply Air Requirements:	
Supply Air Pressure (Maximum)	100-PSIG
(Minimum)	45-PSIG
Supply Air Flow Rate (Maximum)	Not established
(Minimum)	68-SCFM
Operational Characteristics:	
Tank Vacuum Pressure	8-inches Hg
Tank Vacuum Flow	89-SCFM
Drain Tool (Adherence Vacuum pressure)	17-inches Hg
(Adherence Vacuum flow)	2.1-SCFM
(Length)	35-feet
(Diameter, inner)	3/4-inch
Depuddling Hose (Length)	50-feet
(Diameter, inner)	1-inch
Towing Characteristics:	
Speed, Forward Direction	15-MPH
Speed, Backward Direction	(hand push/pull only)
Turning Radius (Curb to curb)	372-inches
Tire Size and Pressure:	
Tire Size	20.5 x 8.0-10
Tire Pressure (Cold)	90-PSIG
Other Characteristics:	
Double Wall Construction	Yes
Number of Defueling Ports	Four (4) Drain Tool Ports / One (1) Depuddle/Utility Port

Table 1-3. Leading Particulars for Part Number SV616S-WR07

Tank Volume:	
Nominal Capacity	600-gallons
Max Capacity	660-gallons
Equipment Dimensions:	
Length (Tow bar down)	187-inches
(Tow bar up)	128-inches
Width (Tire to tire)	76-inches
(Box to box)	89-inches
Height (Tow bar down)	62-inches
(Tow bar up)	72-inches
Weight (Empty)	2,135-pounds
(Full, at nominal capacity with fuel)	6,695-pounds
Telescoping Funnel Height (Fully collapsed)	62-inches
(Fully extended)	254-inches
Ground Clearance (At tow bar)	6-inches
(At axle)	8-inches
Environmental Conditions:	
Operating Temperature Range	-25°F to 110°F
Storage Temperature Range	-40°F to 150°F
Supply Air Requirements:	
Supply Air Pressure (Maximum)	100-PSIG
(Minimum)	45-PSIG
Supply Air Flow Rate (Maximum)	Not established
(Minimum)	68-SCFM
Operational Characteristics:	
Tank Vacuum Pressure	8-inches Hg
Tank Vacuum Flow	89-SCFM
Drain Tool (Adherence Vacuum pressure)	17-inches Hg
(Adherence Vacuum flow)	2.1-SCFM
(Length)	35-feet
(Diameter, inner)	3/4-inch
Depuddling Hose (Length)	50-feet
(Diameter, inner)	1-inch
Towing Characteristics:	
Speed, Forward Direction	15-MPH
Speed, Backward Direction	(hand push/pull only)
Turning Radius (Curb to curb)	372-inches
Tire Size and Pressure:	
Tire Size	20.5 x 8.0-10
Tire Pressure (Cold)	90-PSIG
Other Characteristics:	
Double Wall Construction	Yes
Number of Defueling Ports	Four (4) Drain Tool Ports / One (1) Depuddle/Utility Port



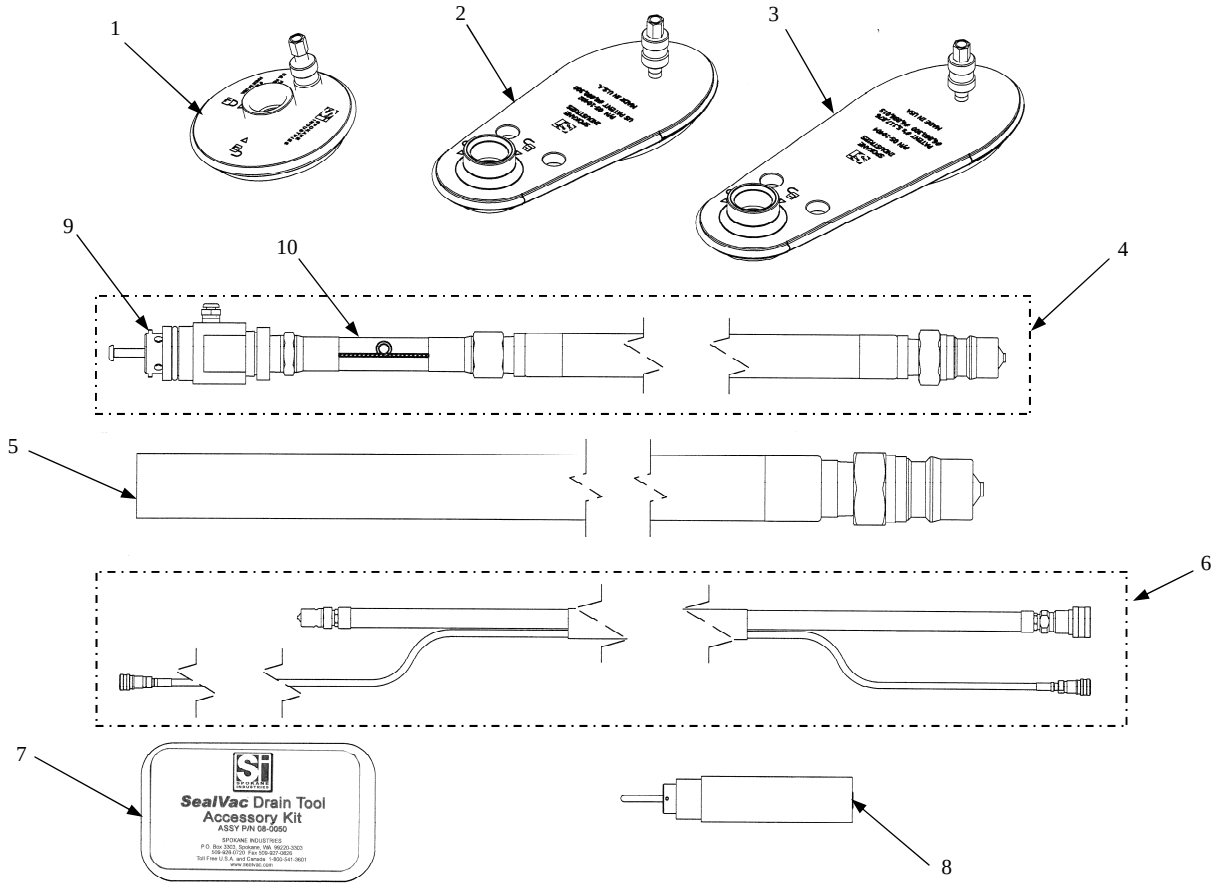
1. FULL VACUUM TANK ASSEMBLY
2. TOW BAR
3. VACUUM SYSTEM ASSEMBLY
4. AUTO SHUT-OFF ASSEMBLY
5. PARKING BRAKE
6. LIQUID LEVEL GAUGE
7. STORAGE BOX (1 OF 2)
8. SAMPLE PORT VALVE
9. GROUNDING REEL (1 OF 2)
10. TANK DRAIN VALVE
11. FUNNEL ISOLATION VALVE (400/600 ONLY)
12. TELESCOPING FUNNEL ASSEMBLY (400/600 ONLY)
13. HOSE CRADLE
14. MANWAY ASSEMBLY

Figure 1-1. Equipment Component Identification

1.4.4 Auto Shut-off Assembly. The Auto Shut-off Assembly prevents the tank from being over-filled by shutting off the tank vacuum on a "tank full" condition. The "tank full" condition is equal to the nominal tank size. A 10-percent vapor/liquid expansion space is provided to ensure spill-free operation. See Figure 1-1,4.

1.4.5 Drain Tools. The Drain Tools allow for leak-free draining of bottom sumps. The Drain Tools use vacuum to adhere to the surface surrounding the sump. A fuel probe locks into the Drain Tool while simultaneously opening the sump's poppet drain valve. Tank vacuum pressure is then applied to the fuel cell to accomplish draining. See Figure 1-2, 1 through 3.

1.4.6 Drain Tool Vacuum Group. The Drain Tool Vacuum Group provides constant vacuum to the Drain Tools. These vacuum generators produce approximately 18 inches Hg. The Drain Tool Vacuum Group is separate from the Tank Vacuum Group to provide a higher vacuum condition that is not dependant on tank fluid level and not interrupted by the Auto Shut-off feature.



1. ROUND DRAIN TOOL
2. OVAL DRAIN TOOL
3. ELONGATED DRAIN TOOL
4. FUEL PROBE PIGTAIL
5. DEPUDDLING/UTILITY HOSE
6. DUPLEX HOSE ASSEMBLY
7. DRAIN TOOL KIT
8. ALIGNMENT TOOL
9. FUEL PROBE
10. FUEL FLOW VIEWING WINDOW

Figure 1-2. Drain Tools and Accessories

CHAPTER 2

SPECIAL TOOLS AND TEST EQUIPMENT

2.1 GENERAL.

The SealVac is easy to use and easy to maintain. No special tools or equipment are needed to service this equipment except some specific pressure, vacuum, and flow equipment.

2.2 PRESSURE TEST EQUIPMENT.

The following test equipment should be used with the trouble shooting tables contained in Chapter 5 and the Supply Air Requirements contained in Tables 1-1 through 1-3.

2.2.1 Supply Air Pressure. Supply air pressure readings can often be found at the source of the supply air. If not, an air pressure gauge will be needed to service the supply air system on the unit. These gauges are readily available in many sizes and configurations. An air pressure gauge capable of reading 0 to 125 PSI is required to trouble shoot the equipment.

2.2.2 Supply Air Flow. Supply air flow rate readings should be obtained at the air connection point of the equipment. An air flow gauge capable of reading 0 to 100 SCFM is required to troubleshoot the equipment.

2.2.3 Vacuum Pressure. Vacuum pressure readings should be obtained at the point of interest. A vacuum pressure gauge capable of reading 0 to 30 inch Hg is required to trouble shoot the equipment.

2.2.4 Vacuum Flow. Vacuum flow rate readings should be obtained at the point of interest. A vacuum flow gauge capable of reading 0 to 100 SCFM is required to troubleshoot the equipment.

2.3 ELECTRICAL TEST EQUIPMENT.

A digital multi-meter is needed to test electrical continuity of various static bonding/grounding components used in the SealVac. A meter capable of reading milliohms is required to troubleshoot the equipment.

CHAPTER 3

PREPARATION FOR USE AND SHIPMENT

3.1 PREPARATION FOR USE.

The following set of instructions should be followed prior to using the unit for the first time or preparing the SealVac for shipment.

3.2 FIRST TIME USE.

3.2.1 Un-packaging. Un-package the SealVac by:

a. Remove outer wrapping material.
b. Remove equipment from pallet if palletized.
c. Open manway cover.
d. Remove Duplex Hose assemblies and Depuddling Hose from interior of tank.
e. Remove Drain Tools and Fuel Probe Pigtail assembly from side storage boxes and unwrap.
f. Remove air transport bolts and nuts from Vacuum System Assembly and store in storage box.

3.2.2 Taking Inventory. After all the components are removed from the packaging, conduct an inventory to ensure all loose items are present. See Table 3-1 for components listing.

3.2.3 Storage of Components. Each component has a storage location in or on the tank weldment.

a. Coil Duplex Hose assemblies and hang on hose hangers.
b. Coil Depuddling Hose and place in Hose Cradle.
c. Place Drain Tools and Fuel Probe Pigtail assemblies in storage boxes.

3.3 SHIPMENT.

The SealVac has been designed to be transported by truck or cargo aircraft.

3.3.1 Preparation for Shipment. Begin the shipping preprocess by following these steps:

a. Drain the tank of all liquid products by opening the drain valve.

WARNING

Flammable and combustible vapors must be removed from the tank before shipping to prevent a fire and/or explosion. Serious injury or death could occur.

b. Evacuate all flammable and/or combustible vapors from the tank using an approved ventilation method.
c. Coil Duplex Hose assemblies and the Depuddling Hose assembly. Place inside the tank through the manway.
d. Place all other loose items inside the side storage boxes.
e. Ensure that Manway Assembly, Funnel Cover, and Vacuum System Assembly are securely latched.

3.3.2 Truck Shipment. To load the SealVac on a truck, a forklift with fork extensions will be required.

a. Ensure the steps in Paragraph 3.3.1 have been completed.
b. Set the parking brake.
c. Approach the unit from the front only.

CAUTION

Fork extensions must be in contact with axle tubes only. Damage to equipment will occur if the equipment is lifted from any other location.

d. Ensure fork extensions are contacting both the front and rear axle tubes.
e. Place on truck.
f. Secure to truck bed using attachment points on tank weldment.

3.3.3 Air Shipment. The SealVac has been designed to be air transported. Specific aircraft loading procedures take precedence over the steps described here.

a. Ensure the steps in Paragraph 3.3.1 have been completed.

b. Follow specific aircraft loading requirements.

CAUTION

Do not back equipment by any means other than hand pushing/pulling. Damage to the equipment will occur if self propelled tow methods are employed.

c. Load equipment by towing forward only by self propelled tow methods or by hand pushing/pulling.

d. After placement in aircraft, lock tow bar in upright position.

e. Ensure Parking Brake is set.

f. Ensure Funnel Cover is latched.

g. Ensure Vacuum System Assembly is latched and bolted using the 3/8-16 by 4-inch long bolts and nuts provided.

h. Ensure the Manway Assembly is latched.

i. Ensure storage boxes are latched.

Table 3-1. Loose Component Listing

Component	Quantity
50-foot long Depuddling/Utility Hose Assembly, part number 06-101674	1
Duplex Hose Assembly, 3/4-inch by 35-foot, part number 08-0030	1
Fuel Probe Pigtail Assembly, part number 08-0151	1
Round Drain Tool Assembly, part number 08-0200	1
Oval Drain Tool Assembly, part number 08-0300	1
Elongated Drain Tool Assembly, part number 08-0310	1
Alignment Tool, part number 08-12020	1
Drain Tool Kit, part number 08-0050	1

CHAPTER 4
OPERATION INSTRUCTIONS

4.1 INTRODUCTION.

The instructions contained in this chapter provide step by step procedures for operating the SealVac. All three configurations are described in this chapter. All operational steps are identical except for the 200 gallon size which does not have a Telescoping Funnel Assembly.

4.2 GENERAL PRECAUTIONS.

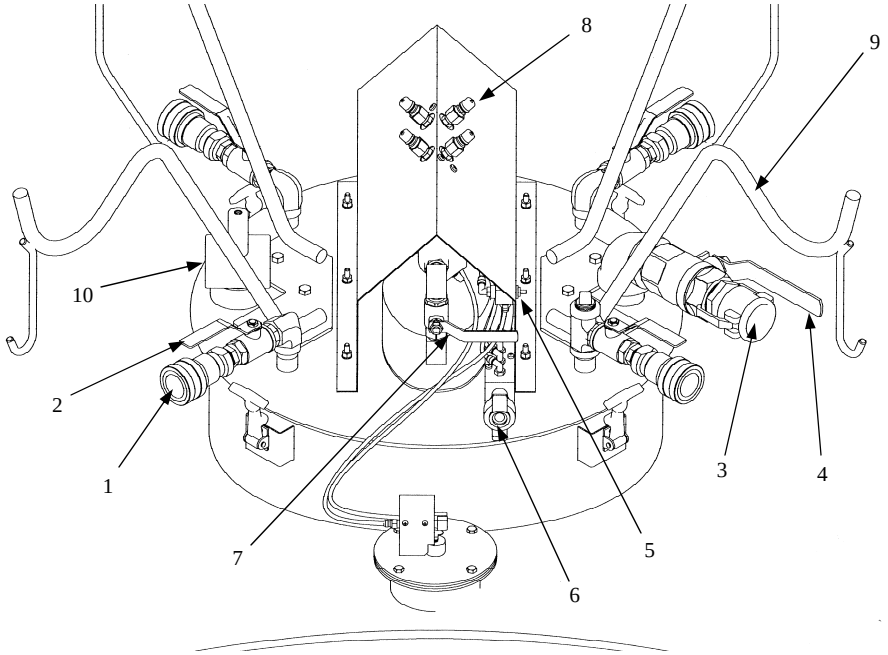
Observe all WARNING, CAUTION, and NOTE headings throughout these instructions. Fuel is inherently flammable and/or combustible under many conditions. Fully understanding the safety and operational characteristics of the SealVac is crucial for successful and safe fuel handling operations.

4.3 CONTROLS AND INDICATORS.

Refer to Table 4-1 and Figure 4-1 for descriptions and locations of all the controls and indicators.

4.4 OPERATION.

The SealVac is designed to perform three major modes of operation: Vacuum Draining, Depuddling, and Gravity Draining. Paragraph 4.5 describes supporting operations that are used in conjunction with these major modes of operation. Paragraph 4.6 describes the theory of operation and operational steps for the Vacuum Draining mode. Paragraph 4.7 describes the operational steps of the Depuddling mode. Paragraph 4.8 describes the operation steps of the Gravity Draining mode. Finally, Paragraph 4.9 describes supplemental operations.



1. FUEL EXTRACTION PORT, (1 OF 4)
2. FUEL EXTRACTION VALVE, (1 OF 4)
3. DEPUDDLING/UTILITY HOSE PORT
4. DEPUDDLING/UTILITY HOSE VALVE
5. AUTO SHUT-OFF BYPASS VALVE
6. SUPPLY AIR CONNECTOR
7. TANK VACUUM VALVE
8. DRAIN TOOL VACUUM PORT (1 OF 4)
9. DUPLEX HOSE HANGER (1 OF 4)
10. VACUUM GOVERNOR

Figure 4-1. Component Identification - Vacuum System Assembly

Table 4-1. Controls and Indicators

Description	Function
Parking Brake Handle	Used to set the parking brake during operation and storage.
Liquid Level Gauge	Indicates level of the fluid inside the tank. Located on the top centerline of the tank.
Fuel Extraction Valve; 4 each	Control valves for the vacuum draining mode using the Drain Tools. Located on top of the Vacuum System Assembly.
Depuddling/Utility Hose Valve	Control valve for the depuddling mode. Located on top of the sediment chamber lid.
Auto Shut-off Bypass Valve	Allows the user to bypass the air signal from the Auto Shutoff Assembly that controls whether or not vacuum is applied to the tank. Located top front of tank weldment.
Tank Drain Valve	Used to empty tank when at capacity. Located bottom rear of tank.
Funnel Isolation Valve	Isolates vacuum tank from funnel assembly. Valve must be open to use funnel and closed to use vacuum tank.
Sample Port Valve	Used to take samples from the tank. Located bottom rear of tank.
Tank Vacuum Valve	Control valve for operating tank vacuum.

4.5 SUPPORTING OPERATIONS.

Each major mode of operation uses one or more of these supporting operations. Instructions for each supporting operation is described below.

4.5.1 Parking Brake. The parking brake is applied by using the parking brake handle located at the front of the tank assembly. See Figure 4-2.

a. Ensure the SealVac is at rest.
b. To set parking brake, move handle so that it points upward.
c. Chock equipment if required by local operating procedures.
d. To release parking brake, move handle so that it points to the side.

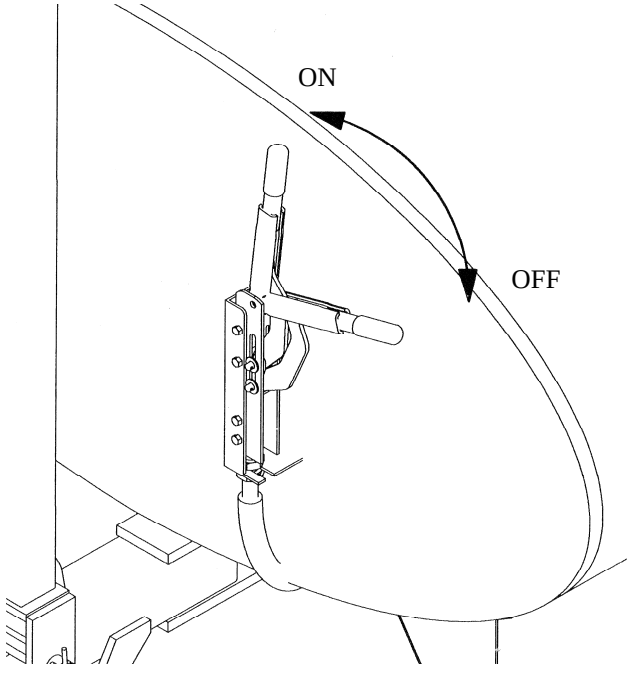


Figure 4-2. Parking Brake Handle

4.5.2 Static Bonding/Grounding. The static bonding/grounding reels are located at the rear of the tank assembly. Follow local protocol for static bonding/grounding procedures if different than described here.

a. Ensure parking brake is set. See Paragraph 4.5.1 for instructions.

WARNING

Static bonding/grounding reels are spring loaded. Ensure that the cable stops before letting loose. Injury can occur if cable is allowed to retracted uncontrolled.

b. Locate reel with clamp end and pull cable outward until desired length has been taken out.

c. Allow cable to retract until it stops.

d. Attach to ramp at an approved bonding/ground location.

e. Locate reel with plug end and pull cable outward until desired length has been taken out.

f. Allow cable to retract unit it stops.

g. Attach to airframe at an approved bonding/grounding location.

h. To detach, reverse these steps.

4.5.3 Liquid Level Gauge. The liquid level gauge is located on top of the tank assembly, rear of the manway assembly. See Chapter 1, Figure 1-1, 6. The liquid level gauge should be checked prior to, and during any major mode of operation.

4.5.4 Supply Air Connection. The supply air connector is located at the front of the tank, near the vacuum system assembly. See Figure 4-3. The air supply should be within the parameters specified in Chapter 1, Tables 1-1 through 1-3.

a. Ensure parking brake is set. See Paragraph 4.5.1 for instructions.

b. Ensure tank vacuum valve (arrow B) is “off”.

c. Attach air supply hose to connector (arrow A) by pushing connectors together and turning counterclockwise a quarter turn.

d. Secure connection by inserting locking pin into connector safety holes.

e. Disconnect air supply by reversing steps.

NOTE

If supply air is flowing, air will flow to the drain tool vacuum group even when tank vacuum valve is closed. This is normal.

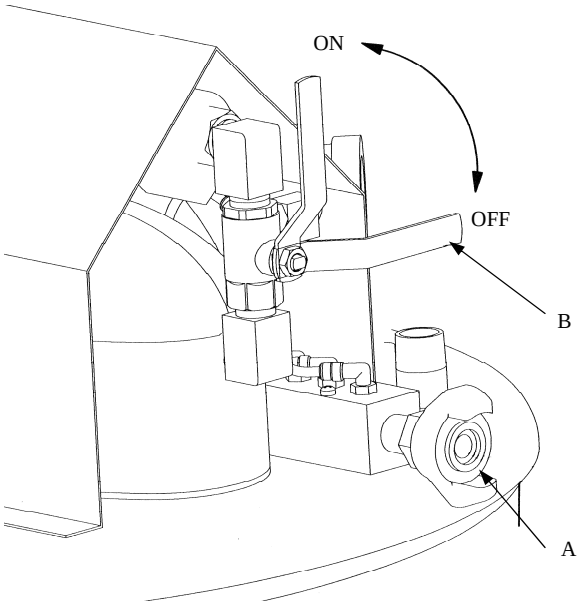


Figure 4-3. Supply Air Connector and Tank Vacuum Valve

4.5.5 Tank Vacuum Operation. The tank Vacuum Valve is used to turn the Tank Vacuum Group on and off. See Figure 4-3.

a. Ensure parking brake is set. See Paragraph 4.5.1 for instructions.

b. Ensure supply air connection is made. See Paragraph 4.5.4.

c. Turn valve handle to “on” position.

d. Turn off by reversing steps.

4.5.6 Auto Shut-off Bypass Valve Operation. The Auto Shut-off Bypass Valve; see Figure 4-1, 5, is intended to be used when tank vacuum is needed to clear fuel from hoses after the tank has reached capacity. The valve bypasses the Auto Shut-off feature and should be used with extreme caution. These operational step requires two people.

a. Close all Fuel Extraction Valves (2).

WARNING

The Auto Shut-off Bypass Valve allows vacuum operation to resume after the Auto Shut-off feature stops vacuum operation on tank-full conditions. Overfull conditions and spills are possible if care is not exercised. Injury and/or exposure to fuel can occur.

b. Perform steps (c), (d), and (e) simultaneously.
c. Operator number 1: detach Fuel Probe Pigtail assembly from Drain Tool. Hold Fuel Probe Pigtail assembly in the air to ensure fuel does not drain out.
d. Operator number 2: open Fuel Extraction Valve corresponding to Fuel Probe Pigtail assembly that operator number 1 is holding.
e. Operator number 2: hold Auto Shut-off Bypass Valve (5) open (by depressing button) until fuel has been extracted from Fuel Probe Pigtail assembly that operator number 1 is holding.
f. Repeat (b) through (e) for remaining Fuel Probe Pigtail assemblies that are still being used.

NOTE

This procedure can be used with Depuddling Mode also on tank-full conditions. Substitute valve and hose names in instruction to accomplish.

4.6 VACUUM DRAINING MODE.

Vacuum Draining refers to draining from under-wing airframe sumps using the Drain Tool, Fuel Probe Pigtail assembly, and the Duplex Hose assembly.

4.6.1 Description of Major Components. A description of the Vacuum Draining components are giving below to assist the user with understanding how the SealVac performs Vacuum Draining operations.

4.6.1.1 The Drain Tool Assemblies. The Drain Tools are used to interface with the aircraft. The Drain Tools have two parts. The first part is the Vacuum Area that is used to adhere the tool to the aircraft. The second part is the Fuel Hub. The Fuel Hub centers and locks the Fuel Probe that opens the sump poppet drain valve. See Chapter 1, Figure 1-2, 1 through 3.

4.6.1.2 The Fuel Probe Pigtail Assembly. The Fuel Probe Pigtail assembly is used to open the aircraft's sump poppet drain valve. The probe has an adjustable pin that depresses the poppet valve while locking into the Fuel Hub, and simultaneously creates a seal between the Fuel Probe and the Drain Tool. See Chapter 1, Figure 1-2, 4.

4.6.1.3 The Fuel Flow Viewing Window. The Fuel Flow Viewing Window allows the operator to observe whether of not fuel is flowing out of the sump drain. See Figure 1-2, 10.

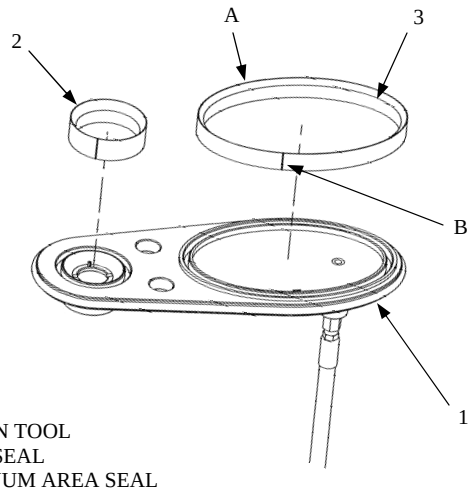
4.6.1.4 The Duplex Hose Assembly. The Duplex Hose assembly consists of two individual hoses bundled together. The 3/4-inch drain hose provides vacuum to the Fuel Probe Pigtail assembly and drains fuel. The 1/4-inch vacuum hose provides vacuum to the Drain Tool vacuum area. See Chapter 1, Figure 1-2, 6.

4.6.2 Vacuum Draining Setup Steps. Before the vacuum draining operation can begin, the drain tools and the fuel probes need to be configured for the airframe to be drained. Once a setup is established for an airframe, the setup procedure does not have to be repeated. Refer to Table 4-2 for initial setup parameters.

4.6.2.1 Drain Tool Setup. The Drain Tools use two functional seals. The Hub Seal, see Figure 4-4, 2 creates a seal around the Fuel Probe. The Vacuum Area Seal (3), creates the vacuum area that allows the Drain Tool to adhere to the airframe. The Oval and Elongated Drain Tools use either the Flat Vacuum Area Seal or the Contoured Vacuum Area Seal, depending on the surface profile. Table 4-2 suggests which seal should be used for a specific airframe.

4.6.2.1.1 Selection of the Vacuum Seal. When working with a relatively flat surface, the Flat Vacuum Area Seal is used. When working with a curved surface, the Contoured Vacuum Area Seal is used. Round Drain Tools use the Short Hub Seals, while the Oval and Elongated Drain Tools use the Tall Hub Seals.

4.6.2.1.2 Changing the Vacuum and Hub Seals. To change either the Vacuum Seal or the Hub Seal, follow the steps described below. See Figure 4-4 for supporting diagrams.



1. DRAIN TOOL
2. HUB SEAL
3. VACUUM AREA SEAL

Figure 4-4. Changing Drain Tool Seals

a. Wipe drain tool (1) and seal surfaces free of any fuel and oil.

b. Grasp seal (2) or (3) and pull directly outward. If seal will not come loose, use a small screwdriver to carefully pry out the seal.

c. Remove any foreign material from seal groove.

d. Orient seal so that the knife edge (reference arrow A) is pointing away from the drain tool and the tallest side is along the outer edge.

e. Lubricate seal with petroleum jelly.

f. For Vacuum Area Seals, align seal seam (reference arrow B) along center of long side of oval groove. The Hub Seals do not have a seam alignment requirement.

g. Press firmly while working the seal into the groove. Start at the seam and work in around the perimeter of the seal.

h. After seals are installed, connect the vacuum supply line of the Duplex Hose assembly and verify that the seal installation is correct by adhering drain tool to side of tank.

4.6.2.2 Fuel Probe Pigtail Assembly. The Fuel Probe Pigtail assembly uses a number of different types and lengths of Fuel Probe Pins. Due to the variety of fuel drain sump designs, it will be necessary to adjust the length and type of the Probe Pin. Proper pin length is critical for efficient vacuum draining operations. Too short of a pin will not fully open the poppet drain. Too long of a pin will fully open the drain, but will not allow the Fuel Probe to lock into the Drain Tool.

4.6.2.2.1 Types of Probe Pins. There are two types of Fuel Probe Pins. The first type is a button head machine screw. The button head pins are typically used on larger poppet drain valves. The second type is an Allen head set screw . The set screw type pins are typically used on smaller poppet drain valves.

CAUTION

Do not over tighten the Probe Pins. Damage to the Fuel Probe will occur if Fuel Probe Pins are over tightened.

4.6.2.2.2 Determining Fuel Probe Pin Length. Use the following steps to determine proper Fuel Probe Pin length. See Figure 4-5 for supporting diagrams.

a. Determine which pin type (1) or (2) is most appropriate for the poppet drain valve being opened.

b. Select the shortest Fuel Probe Pin from the pin kit.

c. Thread pin (1) or (2) into Fuel Probe end (3) and tighten.

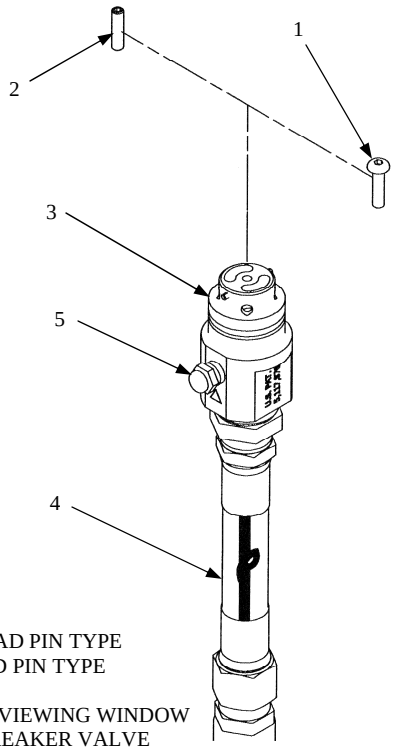
d. Perform steps in Paragraph 4.6.3 for Vacuum Draining, stopping at step (m).

WARNING

Poppet drain valves can get stuck open for a number of reasons. An open poppet drain valve will allow uncontrolled fuel flow. Exposure to fuel can occur.

e. Verify that Fuel Probe locks into Drain Tool. If no, go back to step (b) of these instructions and select a shorter pin. If yes, continue to step (f) of these instructions.

f. Turn on Tank Vacuum Valve.



1. BUTTON HEAD PIN TYPE
2. ALLEN HEAD PIN TYPE
3. FUEL PROBE
4. FUEL FLOW VIEWING WINDOW
5. VACUUM BREAKER VALVE

Figure 4-5. Fuel Probe and Pins

g. Observe Fuel Flow Viewing Window (4). If no, or small flow is present, turn off tank vacuum and go back to step (b) of these instructions, selecting a longer pin length. If good fuel flow is present, the correct pin length has been selected.

4.6.3 Vacuum Draining Procedure. The Vacuum Draining procedure can only be performed after the initial set up instructions in Paragraph 4.6.2 have been finished. Aircraft specific draining procedure take precedence over the steps described here. See Figure 4-6 for abridged pictorial description of these steps.

CAUTION

Ensure that aircraft fuel cell is properly vented before applying vacuum. Negative pressure can cause severe damage to aircraft fuel cell.

a. Ensure the setup procedure outlined in Paragraph 4.6.2 have been completed for the airframe being drained.

b. Position the SealVac within the reach distance of the 35-foot Duplex Hose assembly.

c. Set parking brake. See Paragraph 4.5.1 for instructions.

d. Attach static bonding/grounding cables. See Paragraph 4.5.2 for instructions.

e. Check Liquid Level Gauge for tank capacity. See Paragraph 4.5.3 for instructions.

f. Attach air supply hose to the Vacuum System Assembly. See Paragraph 4.5.4 for instructions.

g. Uncoil the Duplex Hose assembly and select a Drain Tool to be used.

h. Make Duplex Hose connections to Fuel Extraction Port and the Drain Tool Vacuum Port at the Vacuum System Assembly.

i. Connect Duplex Hose to Fuel Probe Pigtail assembly and Drain Tool assembly. Ensure vacuum slide valve at Drain Tool is closed.

j. Stretch Duplex Hose to point of use. If elevated, secure Duplex Hose to stand with safety lanyard.

k. Insert Alignment tool into Drain Tool.

l. Align Drain Tool and Alignment tool to aircraft sump poppet drain valve.

m. While aligned, push up on slide valve (open valve) and adhere Drain Tool to surface.

n. Return to the SealVac and turn on the Tank Vacuum Valve.

o. Return to Drain Tool and insert the Fuel Probe Pigtail assembly into the Fuel Hub. Lock probe by turning a quarter turn until probe stops.

p. Stop draining if hub seal leaks fuel.

q. Observe fuel flow in Fuel Flow Viewing Window; see Figure 4-5, 4.

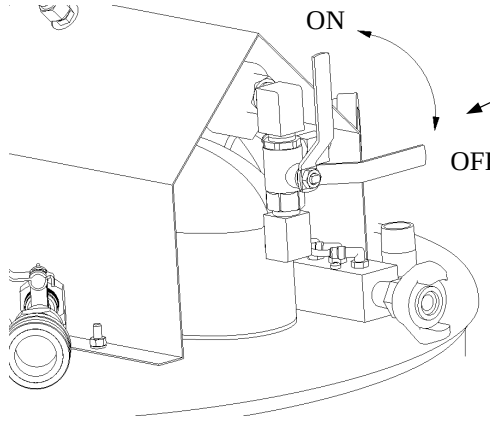
r. To stop draining, push and hold Vacuum Breaker Valve; see Figure 4-5, 5, on probe, un-lock probe and pull out of drain tool.

s. Allow vacuum to clear fuel in Duplex Hose.

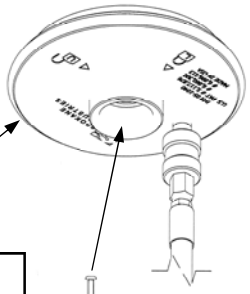
t. Turn off Tank Vacuum Valve.

u. Remove Drain Tool by pulling down on slide valve (close valve) and remove tool.

v. Coil Duplex Hose and store Drain Tools.



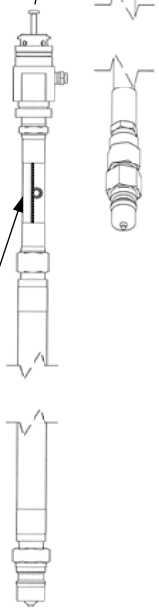
STEP 3:
- TURN ON TANK VACUUM (n)



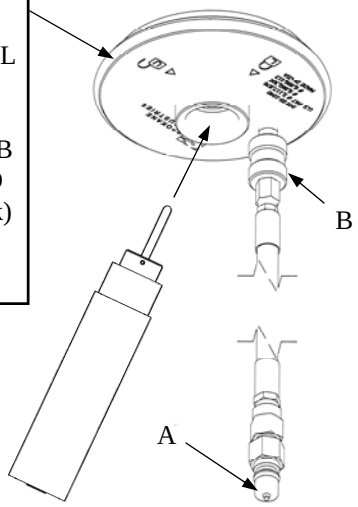
STEP 4:
- INSERT FUEL PROBE PIG-TAIL INTO DRAIN TOOL FUEL HUB. (o)

NOTE

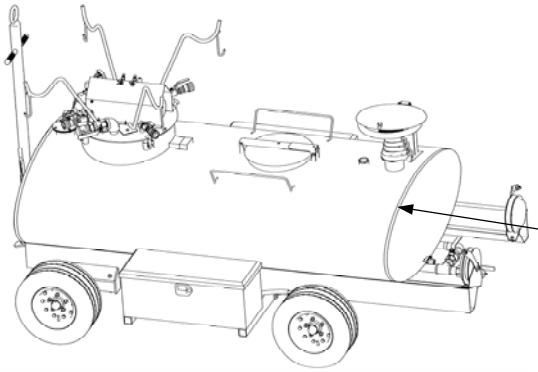
FUEL WILL START FLOWING IMMEDIATELY



STEP 2:
- CONNECT VACUUM LINE OF DUPLEX HOSE TO DRAIN TOOL (ARROW A) (i)
- INSERT ALIGNMENT TOOL INTO FUEL HUB OF DRAIN TOOL AND ALIGN WITH SUMP (k)
- OPEN SLIDE VALVE (ARROW B) (m)



STEP 5:
- OBSERVE FUEL FLOW (q)
- REVERSE STEPS TO FINISH OPERATION



STEP 1:
- POSITION WITHIN 35-FEET (b)
- SET PARKING BRAKE (c)
- ATTACH STATIC GROUNDING REELS (d)
- CHECK LIQUID LEVEL GAUGE (e)
- ATTACH AIR SUPPLY (f)
- UNCOIL HOSES AND ATTACH TO UNIT (g)(h)

Figure 4-6. Vacuum Draining Steps

Table 4-2. Drain Tool Setup And Usage for Select Airframes

Airframe	Wing - Outer	Wing - Middle	Wing - Outer	Fuselage	Conformal Tank	Wing Drop Tank	Fuselage Drop Tank
A-10	NA	NA	NA	NA	NA	NA	NA
B-1B	Os	Os	Os	Es, Os, Oc (optional tank)	Es (fuselage center)	NA	NA
B-2	NA	NA	NA	NA	NA	NA	NA
B-52	Os	Os	Os	Os	NA	NA	NA
C-5	Os	Os	Os	Os	NA	NA	NA
C-17	Os	Os	Os	Os (extended range)	NA	NA	NA
CV-22	Es, Os	Es, Os	Es, Os	Es, Os	NA	NA	NA
C-130	Os	Os	Os	Os	NA	Oc	NA
F-15	Oc	Oc	Oc	NA	Es	Oc	Oc
F-16	NA	NA	NA	Rs, Os	NA	Oc	Oc
F-22	NA	NA	NA	NA	NA	Oc	NA
KC-135	Os	Os	Os	Os, R	NA	NA	NA
T-38	NA	NA	NA	Es	NA	NA	NA

E - Elongated Drain Tool
O - Oval Drain Tool
R - Round Drain Tool
s - flat seal (E and O Drain Tools)
c - contoured seal (E and O Drain Tools
NA - Not Applicable

4.7 Depuddling Mode. Depuddling operations are performed by using the 1-inch by 50-foot Depuddling Hose assembly. Aircraft specific depuddling procedures take precedence over the steps described here.

a. Position the SealVac within the reach distance of the 50-foot Depuddling Hose assembly.

b. Set parking brake. See Paragraph 4.5.1 for instructions.

c. Attach static bonding/grounding cables. See Paragraph 4.5.2 for instructions.

d. Check Liquid Level Gauge for tank capacity. See Paragraph 4.5.3 for instructions.

e. Attach air supply hose to the Vacuum System Assembly. See Paragraph 4.5.4 for instructions.

f. Remove Depuddling Hose from Hose Cradle and uncoil.

g. Turn on tank vacuum by opening the Tank Vacuum Valve. See Paragraph 4.5.5 for instructions.

h. Open Depuddling Port Valve (See Figure 4-1,3).

i. Perform depuddling operation.

j. Stop operation by reversing steps.

4.8 Gravity Draining Mode. The Telescoping Funnel is designed for Gravity Draining operations. The following instructions describe how to use the Telescoping Funnel.

WARNING

Ensure that the tank has enough capacity to receive the amount of fuel being drained. The Auto Shut-off feature of the SealVac is not available for gravity draining operations. Overfill and spill conditions can occur resulting in exposure to fuel.

Use Figure 4-7 for the following steps.

a. Position SealVac so that the Telescoping Funnel is under the drain point.

b. Set parking brake. See Paragraph 4.5.1 for instructions.

c. Attach static bonding/grounding cables to approved location. See Paragraph 4.5.2 for instructions.

d. Open cover (1) to expose funnel.

e. Inspect funnel and screen (2) for obstructions.

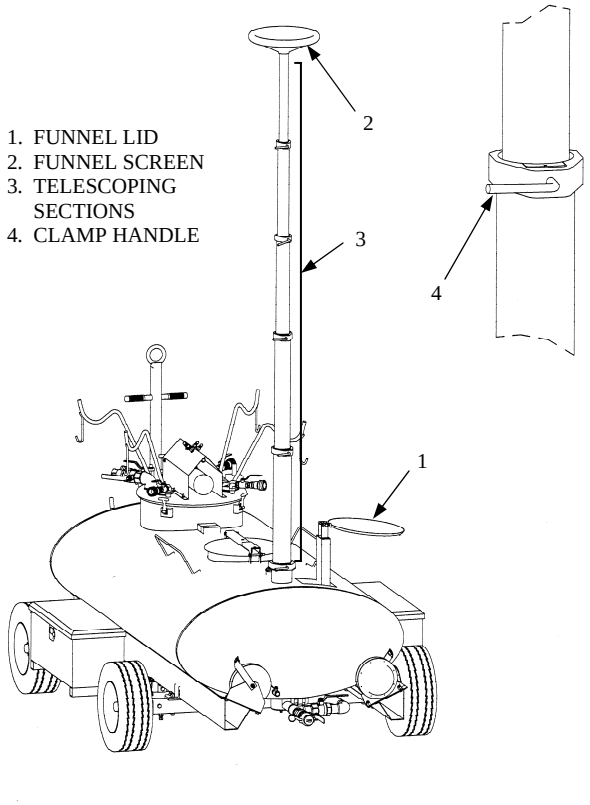


Figure 4-7. Telescoping Funnel Operation

WARNING

Operation of the Telescoping Funnel Assembly inherently involves pinch points. Use gloves and ensure clamps are secured before letting go of the sections being raised or lowered. Injury from falling funnel sections could occur.

f. Raise upper most section (3) of funnel assembly.

g. Secure clamp by handle (4) when either the section is fully extended, or when the desired funnel height has been achieved.

h. Raise next section (3) of funnel assembly.

i. Secure clamp (4) when either the section is fully extended, or when the desired funnel height is achieved.

j. Repeat steps f. through g. until the desired funnel height is achieved.

k. Open Funnel Isolation Valve, (see Figure 4-8, 1). The valve handle will be pointed in-line with the plumbing in the open position.

CAUTION

The Funnel Isolation Valve must be opened before starting the Gravity Draining operation. Failure is open valve will result in an overfill and spill condition, resulting in exposure to fuel.

l. Begin gravity draining operations.

m. Continually check tank capacity. Stop when full.

n. Lower assembly by reversing steps.

4.9 SUPPLEMENTAL OPERATIONS.

Supplemental operations are not specific to either a major mode of operation or a supporting operation. Supplemental operation instructions are described in the following paragraphs.

4.9.1 Towing the SealVac. The SealVac can be towed by means of self propelled tow apparatus or by pushing/pulling by hand.

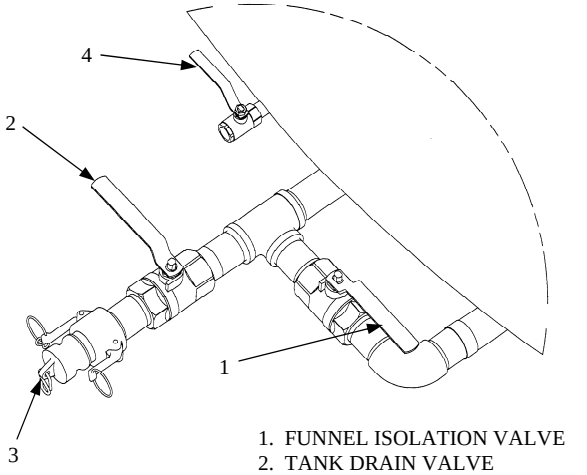


Figure 4-8. Funnel Isolation Valve, Open Position

a. Ensure that all hoses, static bonding/grounding cables, and tools are properly stored and all valves are closed.

b. (See Figure 4-9). Release Tow Bar from the up-right position by applying foot pressure to Toe Latch (reference arrow A) and swing Tow Bar downward (reference arrow B).

c. Attach to tow apparatus if not being pushed/pulled by hand.

d. Release parking brake (reference arrow C). See Paragraph 4.5.1 for instructions.

e. While towing, observe towing speed and turning radius restrictions in Tables 1-1 through 1-3.

CAUTION

Do not back equipment by any means other than hand pushing/pulling. Damage to the equipment will occur if self propelled tow methods are employed.

f. If towing with a self propelled apparatus, do not back unit.

4.9.2 Parking the SealVac. The SealVac can be used to store recoverable aviation fuels. Follow local protocol for storing recoverable aviation fuels if different than described here.

a. Place SealVac in approved area.

b. Set parking brake. See Paragraph 4.5.1 for instructions.

c. Attach static bonding/grounding reels. See Paragraph 4.5.2 for instructions.

d. Ensure that the Tank Drain Valve and the Sample Port Valve is closed.

e. Ensure Manway Assembly is closed and latched.

4.9.3 Draining the SealVac. The tank drain is located at the rear of the tank assembly. (See Figure 4-8).

a. Ensure the parking brake is set. See Paragraph 4.5.1 for instructions.

b. Attach static bonding/grounding reels. See Paragraph 4.5.2 for instruction.

c. Ensure Tank Drain Valve (2) is closed.

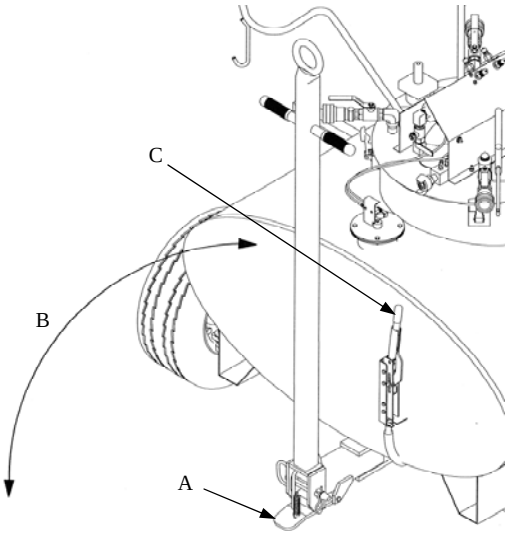


Figure 4-9. Releasing The Tow Bar

d. Remove cam lock plug (3).

e. Attach drain hose if applicable.

f. Ensure drain hose is attached at opposite end to approved source.

g. Open Tank Drain Valve (2).

h. Open Funnel Isolation Valve (3).

i. Complete drain operation.

j. Reverse steps upon completion of drain operation.

4.9.4 Checking the Sediment Chamber. The Sediment Chamber collects foreign objects/debris (FOD) from the fuel being extracted by Vacuum Draining and Depuddling modes. To check for FOD, follow these steps. Use Figure 4-10 while performing these steps.

a. Ensure parking brake is set. See Paragraph 4.5.1 for instructions.

b. Disconnect air supply. See Paragraph 4.5.4 for instructions.

c. Disconnect Auto Shut-off pneumatic lines (reference arrow A) and the bond strap (reference arrow B).

d. Unlatch rubber straps, (reference arrow C), four places.

WARNING

The Vacuum System Assembly weighs approximately 90-pounds. The use of two people is recommended to remove the assembly. Injury could result from a one person lift.

e. Lift vacuum system assembly/sediment chamber lid assembly vertically and place to the side. Two people should perform this step.

f. Remove FOD from chamber.

g. Reassemble in reverse order.

4.9.5 Taking Fuel Samples. The Sample Port valve located at the rear of the tank can be used to take fuel samples.

a. Ensure parking brake is set. See Paragraph 4.5.1 for instructions.

b. Place approved sample container under Sample Port Valve.

c. Open valve.

d. Finish operation by reversing steps.

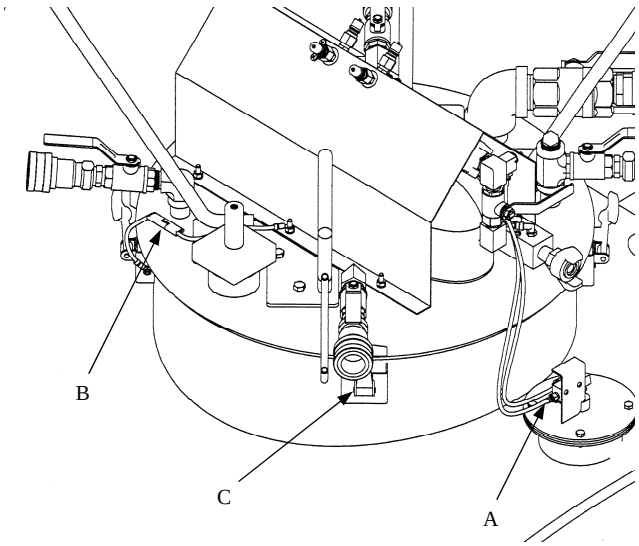


Figure 4-10. Accessing The Sediment Chamber

CHAPTER 5

MAINTENANCE INSTRUCTIONS

5.1 OPERATIONAL CHECKOUT.

Operational checkout is performed during the course of normal operation. While the SealVac is operating normally, it may be assumed that no repair is required. However, the preventive maintenance procedures may be preformed at regular intervals or in accordance with standard shop procedures; which ever is more suitable.

5.2 INSPECTION AND PREVENTIVE MAINTENANCE.

5.2.1 Inspection. Prior to each day's use, determine that the equipment is in serviceable condition by performing a daily inspection. A daily inspection check sheet is illustrated in Table 5-10.

5.2.2 Preventive Maintenance. Paragraph 5.5 contains preventive maintenance items and intervals.

5.3 REPAIR AND REPLACE INSTRUCTIONS.

WARNING

The parking brakes must be set while performing maintenance procedures. Approved jack stands and wheel chocks must also be used. Serious injury or death may occur from rolling, or falling equipment.

The following procedures are for the disassembly, repair, replacement, and reassembly of the various component groups of the equipment. Perform only those steps necessary to effect the desired repairs.

5.3.1 General Tank Equipment. This procedure covers all components attached to the tank by means of threaded pipe connections. No specific maintenance instructions for disassembly or reassembly are needed for components attached to the tank by pipe threads. The following maintenance steps describe how to properly apply pipe joint sealing compounds. Pipe joint sealing compounds should be approved for fuel service.

WARNING

Ensure that the tank is free of fuel and flammable and/or combustible vapors before performing any maintenance operation involving the tank. Serious injury or death could occur.

a. Remove component(s) that need to be repaired or replaced.
b. Remove old pipe sealing compound from component (s) by wire brush or approved solvent. If solvent is used, allow component(s) to dry before proceeding.
c. Inspect threads for damage. Replace component(s) that have damage.
d. Apply an even coat of pipe joint sealing compound across and all the around the first four threads. The coat thickness should fill the thread "valleys", and no more.
e. Hand start the threaded component(s) and tighten until hand-tight. Do not cross thread components.
f. Tighten component(s) until a leak-free connection is achieved.

5.3.2 Vacuum System Assembly. The Vacuum System Assembly consists of three main groups that are accessed by removing the Vacuum System Assembly cover. The Drain Tool Vacuum Group is detailed in Paragraph 5.3.2.1. The Control Valving Group is detailed in Paragraph 5.3.2.2. The Tank Vacuum Group is detailed in Paragraph 5.3.2.3. The following maintenance steps allow access to all three groups.

a. Remove all hose assemblies from connection points and hangers.
b. Disconnect Auto Shut-off Assembly control lines (Figure 5-1, reference arrow A)
c. Disconnect static bond wire (Figure 5-1, reference arrow B).
d. Unlatch rubber hold downs (Figure 5-1, reference arrow C).

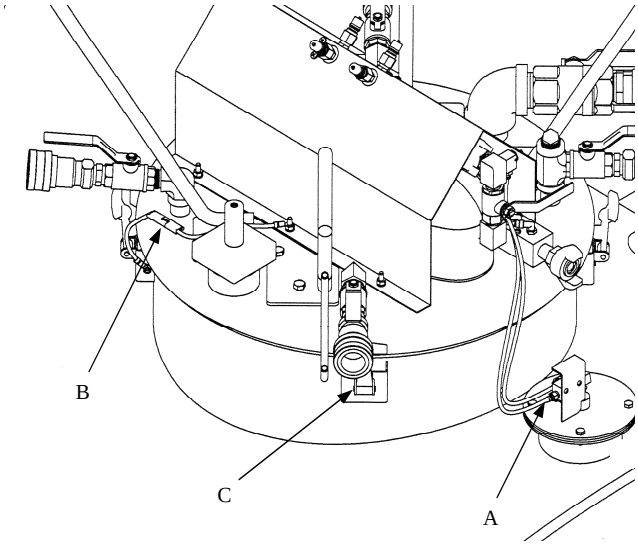


Figure 5-1. Vacuum System Removal

WARNING

The Vacuum System Assembly weighs approximately 90-pounds. The use of two people is recommended to remove the assembly. Injury could result from a one person lift.

e. Lift Vacuum System Assembly vertically and place on work bench. This should be done by two people.

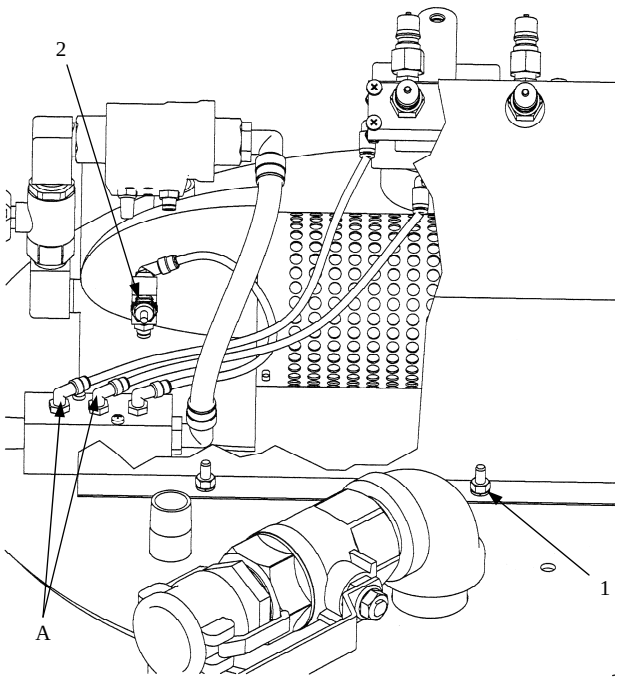
g. Detach pneumatic tube from Drain Tool Vacuum Group at connection points on manifold (Figure 5-2, reference arrow A).

h. Remove nuts (1), six places; and bypass valve nut (2) to remove cover and Drain Tool Vacuum Group. Ensure that Auto Shut-off Bypass Valve is free from cover before removing. (See Figure 5-2).

i. Reassemble in reverse order. Ensure Sediment Chamber Gasket is installed and is in good condition.

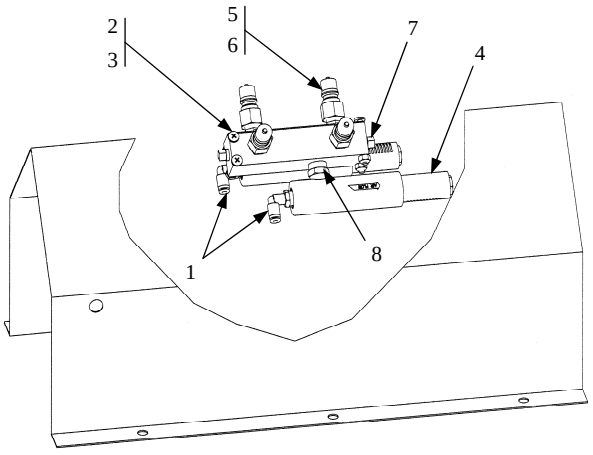
5.3.2.1 Drain Tool Vacuum Group. The Drain Tool Vacuum Group is contained inside of the Vacuum System Assembly cover. Follow the maintenance step in Paragraph 5.3.2 before beginning the next maintenance steps. See Figure 5-3 for the following steps.

a. Remove quick disconnect fittings (5) and close nipples (6).



1. NUTS, 6 PLACES
2. NUT, BYPASS VALVE

Figure 5-2. Vacuum System Assembly Cover Removal



1. TUBE CONNECTOR
2. BOLT
3. NYLON INSERT NUT
4. VACUUM GENERATOR
5. Q. D. FITTING
6. CLOSE NIPPLE
7. HEX PLUG
8. CLOSE NIPPLE

Figure 5-3. Drain Tool Vacuum Group

b. Remove bolts (2) and nuts (3). Separate manifold from cover.

c. Remove vacuum generators (4).

d. Remove close nipples (8) and hex plugs (7).

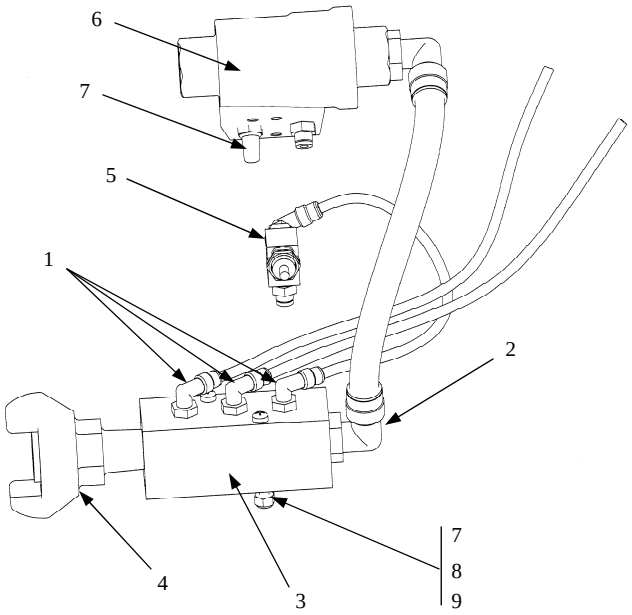
e. Remove tube fittings (1) from vacuum generators (4).

f. Repair/replace components.

g. Reassembly in reverse order.

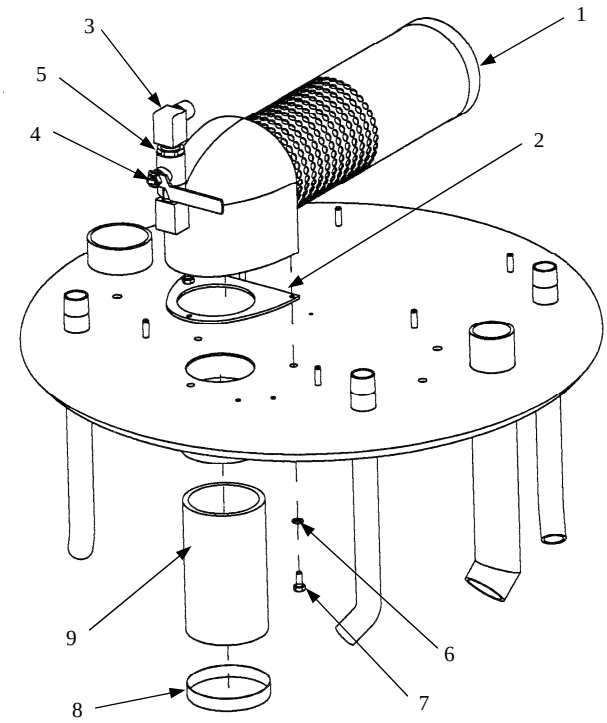
5.3.2.2 Control Valving Group. The Control Valving Group is located under the Vacuum System Assembly cover. Follow the maintenance steps in Paragraph 5.3.2 before beginning the next maintenance steps. See Figure 5-4 for the following steps.

a. Remove pneumatic lines coming from the Auto Shut-off Assembly (not shown) from the Control Valve (6) and Auto Shut-off Bypass Valve (5) by releasing tube connectors. This will free the Auto Shut-off Bypass Valve from the group.



1. TUBE CONNECTOR
2. TUBE CONNECTOR
3. MANIFOLD
4. AIR CONNECTOR
5. BYPASS VALVE
6. CONTROL VALVE
7. NYLON INSERT NUT
8. WASHER
9. BOLTS

Figure 5-4. Control Valving Group



1. VACUUM GENERATOR
2. GASKET
3. STREET ELBOW
4. BALL VALVE
5. CLOSE NIPPLE
6. LOCK WASHER
7. BOLT
8. HOSE CLAMP
9. HOSE

Figure 5-5. Tank Vacuum Group

b. Remove remaining pneumatic tubes from tube connectors (1) and (2), at the manifold (3), and Control Valve (6).

c. Remove manifold (3) from Sediment Chamber Lid by removing nuts (7), washers (8), and bolts (9).

d. Replace/repair components.

e. Reassemble in reverse order.

5.3.2.3 Tank Vacuum Group. The Tank Vacuum Group is mounted to the Sediment Chamber Lid. Follow the maintenance steps in Paragraph 5.3.2 before beginning the next maintenance steps. (See Figure 5-5).

a. Detach pneumatic lines to Control Valve as describes in Paragraph 5.3.2.2.

b. Remove bolts (7) and lock washers (6).

c. Lift vacuum generator vertically to remove. Note presence of gasket (2).

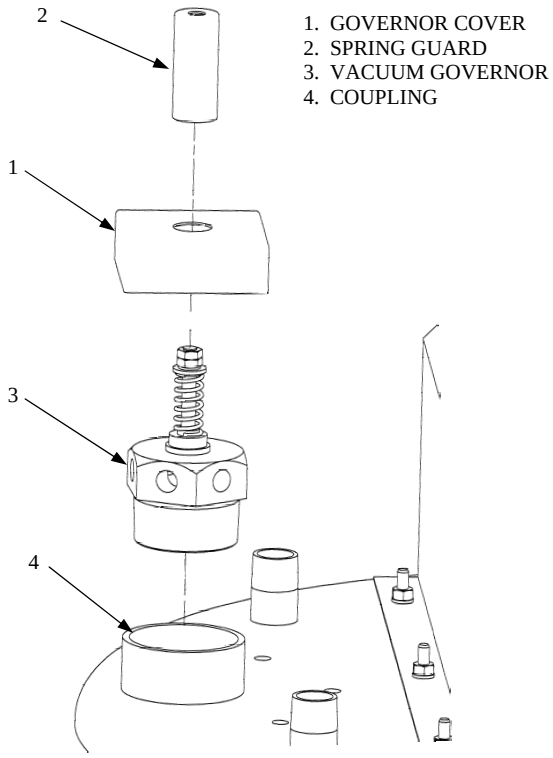


Figure 5-6. Vacuum Governor

d. Disassembly Tank Vacuum Valve (4), street elbows (3), and nipples (5), as needed.

e. Reassemble in reverse order. Refer to Paragraph 5.3.1 for pipe joint sealing compound instructions.

5.3.3 Vacuum Governor. Use Figure 5-6 for the following maintenance steps. The Vacuum Governor is located on the right side of the Vacuum System Assembly.

a. Remove vacuum governor cover (1), by unscrewing component (2) from the assembly.

b. Remove vacuum governor (3) from Sediment Chamber Lid fitting (4).

c. Replace components

d. Reassemble in reverse order. Refer to Paragraph 5.3.1 for pipe joint sealing compound instructions.

5.3.4 All Other Vacuum System Assembly Components. The remaining components of the Vacuum System Assembly (e.g. Fuel Extraction Ports and Duplex Hose Hangars) do not merit maintenance steps for disassemble and reassembly. When performing maintenance steps on pipe thread connection, follow the steps described in Paragraph 5.3.1

5.3.5 Auto Shut-off Assembly. The auto shut-off assembly is located in the front of the tank weldment. Use Figure 5-7 for the following maintenance steps.

a. Remove pneumatic tubes from the Vacuum System Assembly by releasing the quick disconnect fittings (See Figure 5-1, reference arrow A).

b. Remove bolts (11) and nuts (9); four places. Lift Auto Shut-off Assembly vertically to remove from tank, note presence of gasket (10).

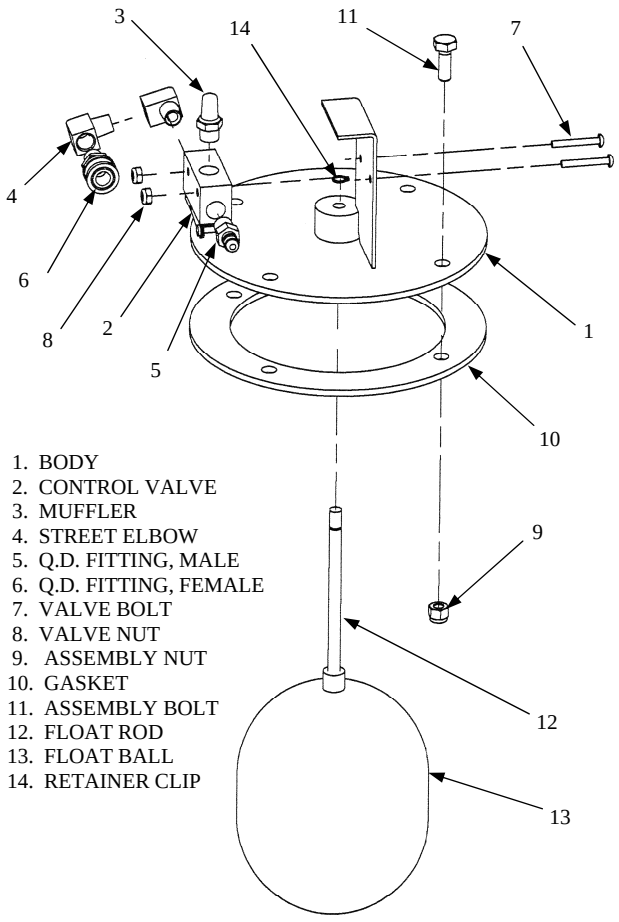


Figure 5-7. Auto Shut-off Assembly

c. Remove bolts (7) and nuts (8) to detach control valve (2) from body (1).

d. Remove fittings (5), (6), and (4) and pneumatic muffler (3) as needed.

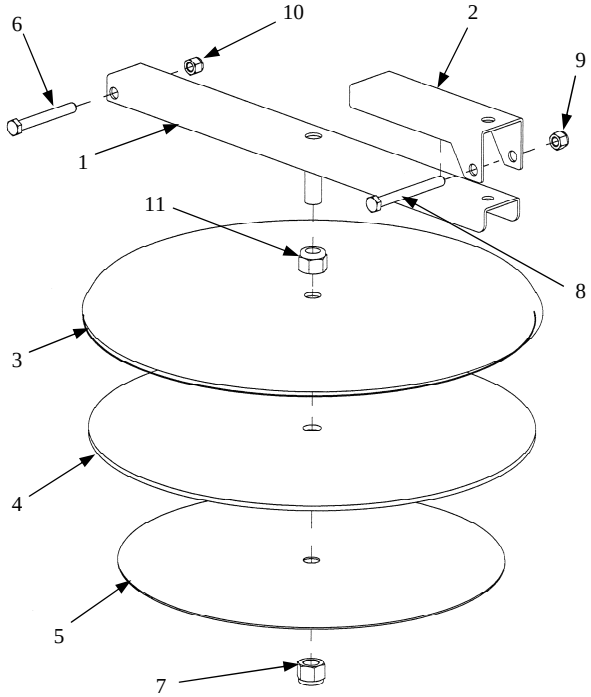
e. Remove retainer clip (14) to remove float rod (12) from body (1).

f. Un-thread float rod (12) from float (13). Use caution not to damage float by puncturing it during maintenance activities.

g. Repair/replace components.

h. Reassemble in reverse order.

5.3.6 Manway Assembly. The manway assembly is located on the top of the tank. The manway assembly has one adjustment point, see Paragraph 5.3.6.2 for adjustment steps. Use Figure 5-8 for the following maintenance steps.



1. CROSS ARM
2. FLIP LOCK
3. LID
4. GASKET
5. GASKET RETAINER
6. CROSS ARM BOLT
7. CROSS ARM NUT
8. FLIP LOCK BOLT
9. FLIP LOCK NUT
10. NUT
11. ADJUSTMENT NUT

Figure 5-8. Manway Assembly

5.3.6.1 Disassembly/Reassembly Steps.

a. Open handle (2).

b. Open Manway Assembly.

c. Remove nut (7).

d. Remove gasket retainer (5), gasket (4), and lid (3).

e. Remove bolt (6) and nut (10) to remove cross-arm (1).

f. Repair/replace components

g. Reassemble in reverse order, leaving nut (7) only partially threaded onto cross arm (1).

h. Adjust manway as indicated in Paragraph 5.3.6.2, starting at step (b).

5.3.6.2 Adjustment. Perform the following procedures to adjust the manway assembly.

a. Open handle (2).

b. Open Manway Assembly.

c. Rotate nut (11) to adjust lid position. Turn clockwise to move lid closer to the tank. Turn counter clockwise to move the lid away from the tank.

d. Tighten nut (7) until snug.

5.3.7 Telescoping Funnel Assembly. The Telescoping Funnel Assembly is located at the top, rear of the tank. The assembly consists of (starting at the top), a cover assembly (See Paragraph 5.3.7.1), a gasket (Paragraph 5.3.7.2), a funnel screen (See Paragraph 5.3.7.3), a funnel section and four telescoping sections (See Paragraph 5.3.7.4), and a base clamp (See Paragraph 5.3.7.5).

5.3.7.1 Funnel Cover Assembly. (See Figure 5-9). The funnel cover (1) is removed by removing nut (6) and bolt (5).

5.3.7.2 Funnel Gasket. (See Figure 5-9). The funnel gasket (3) is replaced by opening funnel cover (1). Remove damaged gasket and install new one.

5.3.7.3 Funnel Screen. The funnel screen (2), prevents FOD from entering the tank. The screen is replaced by opening the funnel cover and removing nut (7). Replace screen and reinstall nut. (See Figure 5-9).

5.3.7.4 Funnel and Telescoping Sections. The funnel section (4) and telescoping sections are removed independently; starting at the uppermost sub-assembly, until the section needing repair/replacement is reached.

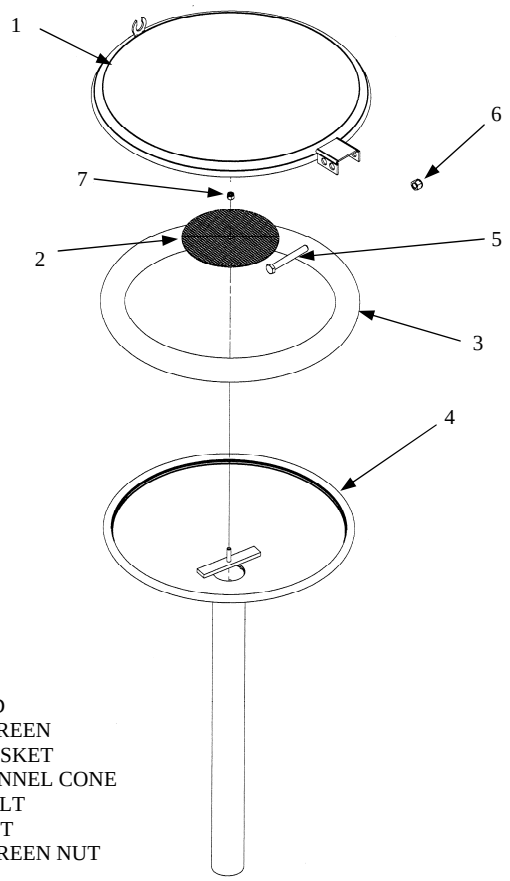


Figure 5-9. Funnel Section Assembly

a. Rotate each subassembly, starting with the upper most section, 180-degrees so that the clamp handle points toward the front of the tank (toward the tow bar.)

b. Lift each section vertically until almost free from clamp below.

c. When bottom edge of tube reaches clamp, lift firmly and rotate assembly slightly clockwise and counter-clockwise to guide alignment detent past alignment notch in clamp. (See Figure 5-10, reference arrow A).

d. Remove set screw (1), then remove clamp handle (2) to release clamp wedge (3). (See Figure 5-10).

e. Repair/replace damaged components.

f. Reassembly in reverse order.

5.3.7.5 Base Clamp. The base clamp (4), is attached directly to the tank. (See Figure 5-10).

a. Rotate entire funnel assembly (all telescoping section and funnel section) 180 degrees until clamp handles are facing the front of the tank (toward the tow bar).

b. Lift entire funnel assembly by the largest telescoping section. When bottom edge of bottom telescoping section tube reaches the base clamp (4), lift firmly and rotate assembly slightly clockwise and counter-clockwise to guide alignment detent past alignment notch in base clamp (See reference arrow A).

c. Remove bolts (5) and lock washers (6).

d. Repair / replace components.

e. Reassembly in reverse order.

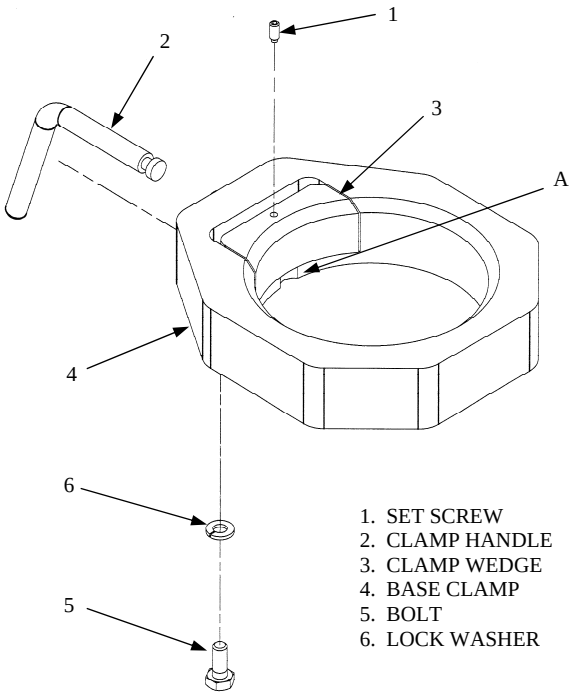


Figure 5-10. General Clamp Diagram

5.3.8 Front Undercarriage Assembly. The Front Undercarriage assembly consists of a wheel assembly (See Paragraph 5.3.8.1), a hub assembly (See Paragraph 5.3.8.2), a spindle assembly (See Paragraph 5.3.8.3), a tow latch assembly (See Paragraph 5.3.8.4), a steering arm assembly (See Paragraph 5.3.8.5), and an adjustable tie rod assembly (See Paragraph 5.3.8.6). The Wheel Assembly is discussed in Paragraph 5.3.10.

5.3.8.1 Front Wheel Assembly Removal. To remove the wheel assembly, the equipment must have the front end raised and placed on approved jack stands.

WARNING

Use suitable lifting and support equipment when performing these steps. Serious injury or death could occur from rolling or falling equipment.

a. Raise equipment with suitable maintenance jack (See Figure 5-11, reference arrow A for jack placement) high enough to remove wheel assembly.

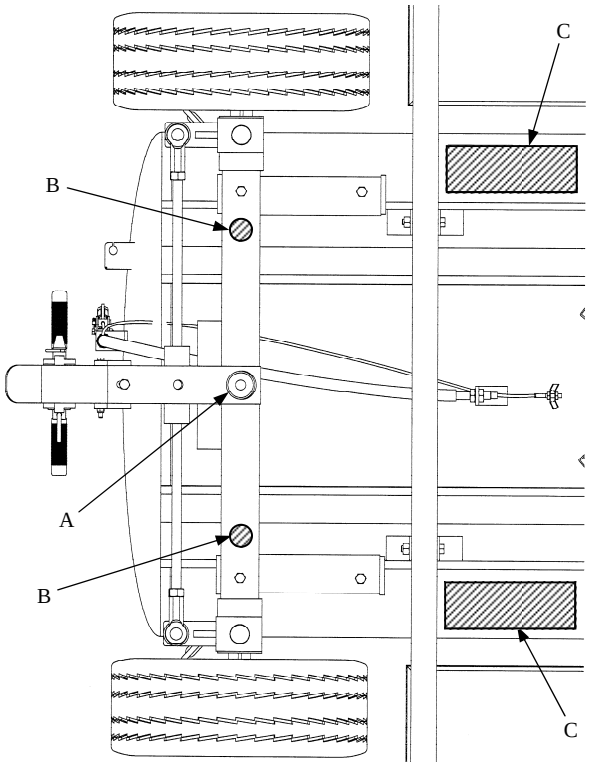


Figure 5-11. Generic Undercarriage Lift Points

b. Place approved jack stands under front axle (see Figure 5-11, reference arrow B for stand placement).

c. Remove lug nuts of wheel assembly needing maintenance, and remove.

5.3.8.2 Front Hub Assembly. To remove the front hub assembly, follow the maintenance steps in Paragraph 5.3.8.1 before beginning the next steps. (See Figure 5-12).

a. Remove dust cap (1) by lightly tapping with a rubber hammer.

b. Remove cotter pin (2), castle nut (3), and washer (4).

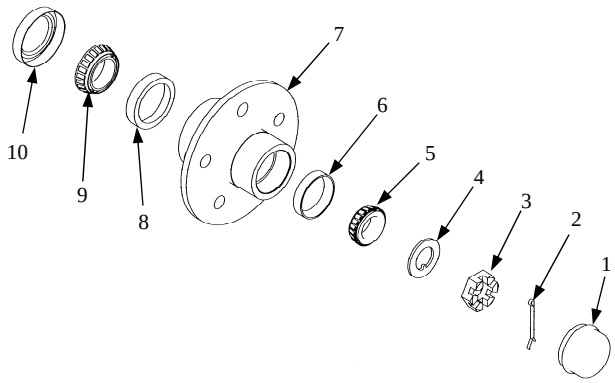
c. Grasp front hub (7) and pull outward firmly. Ensure that bearing (5) doesn't fall from hub and strike the ground.

d. Remove bearing (5), seal (10), and bearing (9) from the front hub (7).

e. Using a suitable H-frame press, remove bearing races (6) and (8).

f. Replace components and grease bearings before reassembly.

g. Reassemble in reverse order. Castle nut (3) should be tightened until the hub assembly rotates barely past free.



1. HUB
2. OUTER RACE
3. OUTER BEARING
4. WASHER
5. CASTLE NUT
6. COTTER PIN
7. DUST CAP
8. INNER RACE
9. INNER BEARING
10. SEAL

Figure 5-12. Front Hub Assembly

5.3.8.3 Spindle Assembly. To remove the spindle assembly, follow the maintenance steps in Paragraph 5.3.8.2 before beginning the next steps. (See Figure 5-14).

a. Remove nut (17) and washer (16).
b. Remove nut (21) and washer (20).
c. Remove king pin (14) from yoke by using a rubber hammer.
d. Grasp spindle assembly (18) and rotate toward front of tank until free of yoke.
e. Remove spindle assembly from tie rod (15).
f. Remove bushings (19) with bronze punch and hammer.
g. Repair/replace components.
h. Reassembly in reverse order. Nut (21) should not be tighten past snug.

5.3.8.4 Tow Latch Assembly. The tow latch assembly is used to secure the tow bar in the upright position. (See Figure 5-14).

a. Remove tow bar (1) by placing the tow bar in upright, latched position. Remove hair pin (2). While holding onto tow bar, place foot on toe latch assembly (See reference arrow A) and depress.
b. Pull hitch pin (3) from steering arm assembly and place tow bar to the side.

NOTE

Removing hitch pin from steering arm assembly will free tow bar. Prevent tow bar from falling by holding it firmly until free. Set aside.

c. See Figure 5-14 for the remaining steps. Remove bolt (7) and nut (10).
d. Rotate toe latch plate (9) downward to free from assembly.
e. Detach spring (8) from toe latch plate (9) and spring anchor (24).

5.3.8.5 Steering Arm Assembly. To remove the steering arm assembly, follow the maintenance steps in Paragraph 5.3.8.4 before beginning the next steps. (See Figure 5-14).

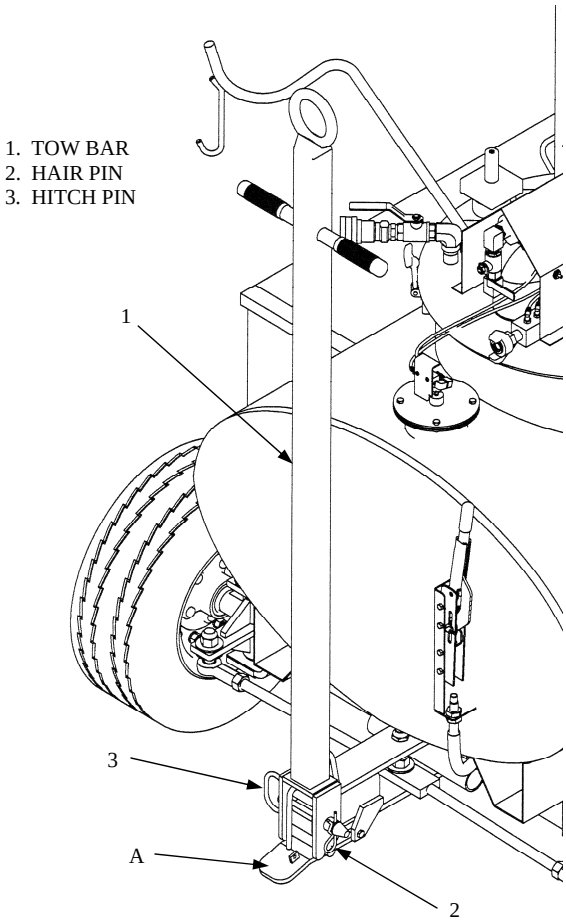
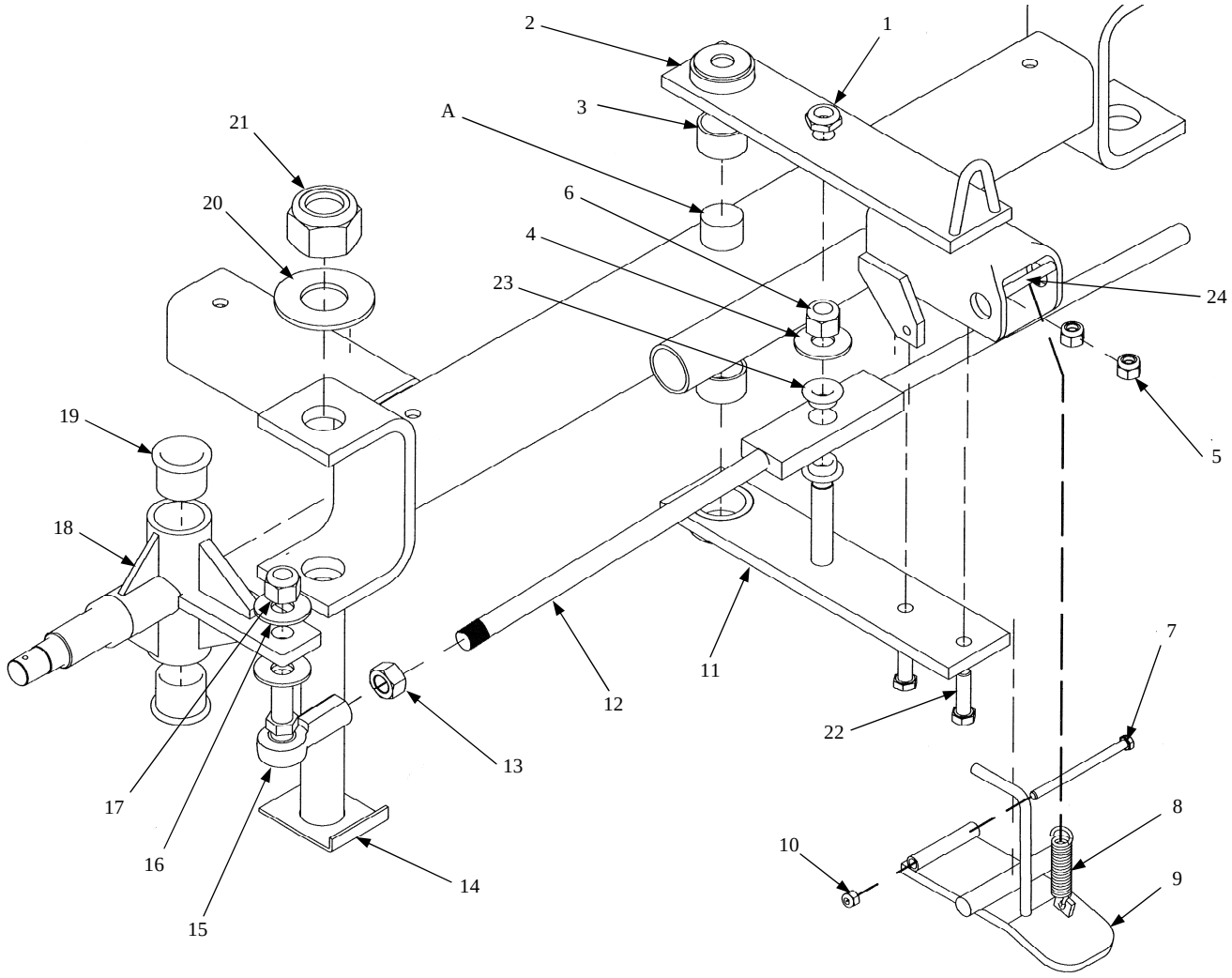


Figure 5-13. Tow Bar Removal

a. Remove thin lock nut (1).
b. Remove nuts (17) and flat washers (16).
c. Remove bolts (22) and nuts (5). Allow lower steering arm subassembly (11), bushing (3), and tie rod assembly (12) to drop down; place to the side.
d. Lift upper steering arm subassembly vertically to clear pivot pin (reference arrow A), then pull outward to clear tank and front axle tube.
e. Remove tie rod assembly (12) by removing nut (6) and flat washer (4). Note presence of bushings (23).
f. Repair / replace components.
g. Reassemble in reverse order.



1. THIN LOCK NUT
2. UPPER STEERING ARM
3. PIVOT BUSHING
4. FLAT WASHER
5. NYLON INSERT NUT
6. NYLON INSERT NUT
7. BOLT
8. SPRING
9. TOE LATCH
10. NYLON INSERT NUT
11. LOWER STEERING ARM
12. TIE ROD ASSY
13. JAM NUT
14. KING PIN
15. TIE ROD END
16. FLAT WASHER
17. NYLON INSERT NUT
18. SPINDLE ASSEMBLY
19. KING PIN BUSHING
20. FLAT WASHER
21. KING PIN NUT
22. BOLT
23. TIE ROD BUSHING
24. SPRING ANCHOR

Figure 5-14. Front Undercarriage Exploded Assembly

5.3.8.6 Tie Rod Assembly. The tie rod assembly is removed by the following steps. (See Figure 5-14).

a. Start by following the steps in Paragraph 5.3.8.5. Note presence and location of bushings (23) when removing tie rod assembly from steering arm assembly.

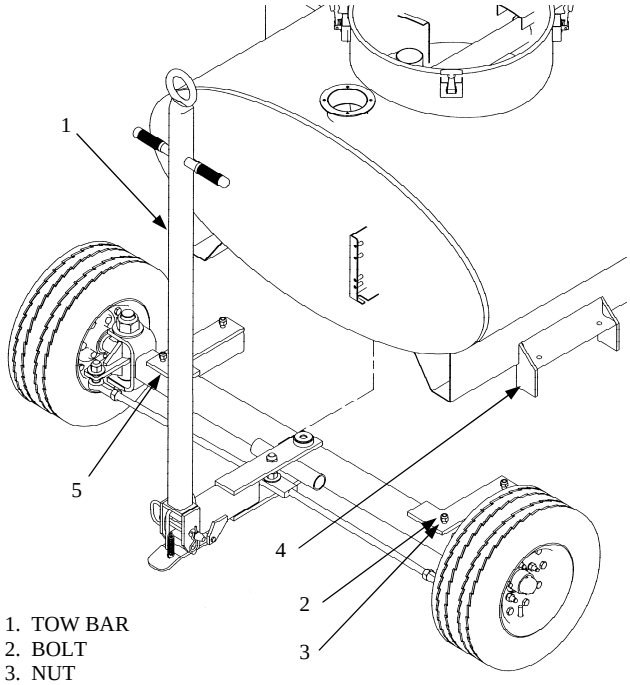
b. Disassembly tie rod assembly by unthreaded components. Before disassembly, mark tie rod length with masking tape.

c. Repair/replace components.

d. Reassemble in reverse order. Note that tie rod ends angle downward toward tie rod ends when reassembling.

e. Adjust tire toe in /toe out as needed.

5.3.8.7 Front Undercarriage Assembly Removal. To remove the entire Front Undercarriage assembly, the equipment must have the front end raised. See Figure 5-15 for these steps.



1. TOW BAR
2. BOLT
3. NUT
4. TANK MOUNT
5. MOUNTING PAD

Figure 5-15. Removal of Front Undercarriage

WARNING

The Front Undercarriage will become unstable when the wheels make contact with the ground. Serious injury could result from unexpected movement if proper attention is not being observed.

a. Raise equipment with suitable maintenance jack (see Figure 5-11, reference arrow A for jack placement) to allow for 4-inches of space between the wheels and the ground.

b. Place cribbing under tank skids (see Figure 5-11, reference points C) to safely support the equipment.

c. Lower onto cribbing. Leave jack in place.

d. Place tow bar (1) in the up position.

e. Raise jack to apply slight pressure on assembly.

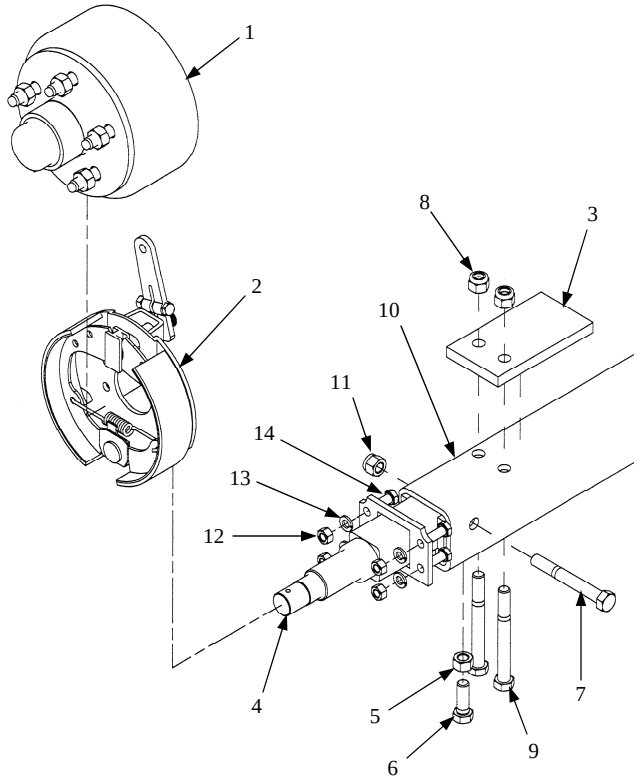
f. Remove bolts (2) and nuts (3).

g. Carefully lower jack and assembly until wheels are on the ground and front axle tube clears tank mounts (4).

h. Pull Front Undercarriage forward. Note location of rubber mounting pads (5).

i. Reassembly in reverse order.

5.3.9 Rear Undercarriage Assembly. See Figure 5-16 for the following maintenance steps. The rear undercarriage assembly consists of: a wheel assembly, a hub and brake drum assembly (1), a mechanical parking brake assembly (2), a rear spindle (4), and the axle (10).



1. REAR HUB/DRUM ASSY
2. MECHANICAL BRAKE
3. RUBBER PAD
4. SPINDLE
5. JAM NUT
6. PINCH BOLT
7. BOLT
8. NYLON INSERT NUT
9. MOUNT BOLT
10. REAR AXLE
11. NYLON INSERT NUT
12. BRAKE NUT
13. BRAKE WASHER
14. BRAKE BOLT

Figure 5-16. Rear Undercarriage

5.3.9.1 Rear Wheel Assembly Removal. To remove the wheel assembly, the equipment must have the back end raised and placed on approved jack stands.

WARNING

Use suitable lifting and support equipment when performing these steps. Serious injury or death could occur from rolling or falling equipment.

NOTE

Figure 5-11 is generic for both the Front Undercarriage and Rear Undercarriage. Points A and B are similar on both axles.

a. Raise equipment with suitable maintenance jack (See Figure 5-11, reference arrow A for jack placement) high enough to remove wheel assembly.

b. Place approved jack stands under rear axle (See Figure 5-11, reference arrow B for stand placement).

c. Remove lug nuts of wheel assembly needing maintenance, and remove.

5.3.9.2 Rear Hub/Brake Drum Assembly. To remove the rear hub and brake drum assembly, follow the maintenance steps in Paragraph 5.3.9.1 before beginning the next steps. (See Figure 5-17).

a. Remove dust cap (1) by lightly tapping with a rubber hammer.

b. Remove cotter pin (2), castle nut (3), and washer (4).

c. Grasp front hub (7) and drum (8). Pull outward firmly. Ensure that bearing (5) doesn't fall from hub and strike the ground.

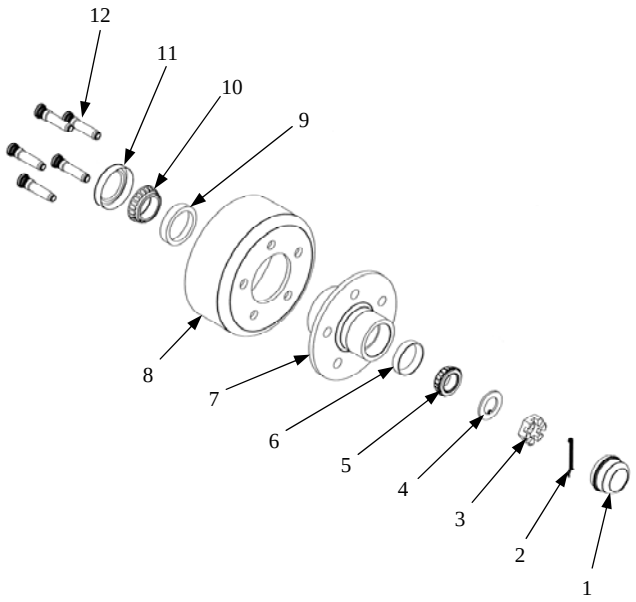
d. Remove bearing (5), seal (11), and bearing (10) from the rear hub (7).

e. Using a suitable H-frame press, remove bearing races (6) and (9).

f. Remove drum (8) by pressing out wheel studs (12) in suitable H-frame press.

g. Replace components and grease bearings before reassembly.

h. Reassemble in reverse order. Castle nut (3) should be tightened until the hub assembly rotates barely past free.



1. DUST CAP
2. COTTER PIN
3. CASTLE NUT
4. SPINDLE WASHER
5. OUTER BEARING
6. OUTER RACE
7. HUB
8. BRAKE DRUM
9. INNER RACE
10. INNER BEARING
11. SEAL
12. WHEEL STUDS

Figure 5-17. Rear Hub and Brake Drum

5.3.9.3 Parking Brake Assembly. The parking brake assembly consists of a brake handle and cable assembly (See Paragraph 5.3.9.3.1), and a mechanical brake assembly (See Paragraph 5.3.9.3.2). The parking brake assembly is adjusted by following the instructions in Paragraph 5.3.9.3.3.

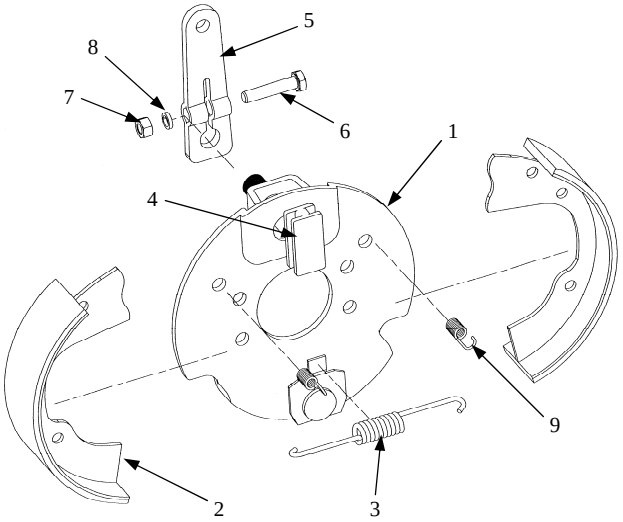
5.3.9.3.1 Brake Handle and Cable Assembly. The brake handle and cable assembly only need to be disassembled to the point that the repair is needed. These instructions start at the wheel assembly and progress toward the brake handle. (See Figure 5-19).

a. Remove cotter pin (13) and clevis pin (14) to release clevis (12).

b. Unthread clevis (12) from cable (11).

c. Remove nut (15) and remove cable housing (10) from bracket.

d. Remove nut at opposite end of cable and disassemble cable linkage parts (6), (7), (8), and (9).



1. BACKING PLATE
2. BRAKE SHOE
3. SPRING
4. CAM BOLT
5. CAM ARM
6. BOLT
7. NUT
8. LOCK WASHER
9. HOLD DOWN SPRINT

Figure 5-18. Mechanical Parking Brake

e. Repeat steps a. through d. for opposite side.

f. Remove nut (4) to release cable equalizer (5).

g. Repeat step c. for cable housing leading to brake handle.

h. Remove nut at opposite end of cable and release cable by disassembling cable linkage from brake handle (1).

i. Remove bolts (2) and nuts (3) to free brake handle (1).

j. Reassembly in reverse order.

5.3.9.3.2 Mechanical Brake Assembly. The mechanical brake assembly is disassembled by following the steps described here. The assembly can be disassembled while attached to the rear spindle or removed from the unit. (See Figure 5-18).

a. Remove Rear Wheel Assembly as described in paragraph 5.3.9.1.

b. Remove Rear Hub and Brake Drum Assembly as described in Paragraph 5.3.9.2

c. Remove brake cable end from arm (5) as described in Paragraph 5.3.9.3.1, step (a).

d. Remove nuts (12), washers (13), and bolts (14) shown in Figure 5-16.

e. Remove mechanical brake assembly and place on flat surface.

NOTE

Steps (d) and (e) are needed only if Mechanical Brake Assembly is to be removed from the axle.

f. Remove spring (3).

g. Release brake shoes (2) by removing springs (9) from the backing plate (1).

h. Remove nut (7), lock washer (8), and bolt (6) to release arm (5).

i. Remove brake cam (4) by pulling directly outward.

j. Reassembly in reverse order.

5.3.9.3.3 Parking Brake Adjustment. The parking brake can be adjusted at three different locations. An in-field adjustment can be made at the brake handle by turning the handle cap clockwise to tighten brakes and counter-clockwise to loosen the brakes (See reference arrow D.) This adjustment must be made with the brake handle in the off position. Maintenance level adjustments can be made at reference arrow E and reference arrow F (each side).

5.3.9.4 Rear Spindle. To remove the rear spindle, follow the maintenance steps described in this paragraph. (See Figure 5-16).

a. Remove Rear Wheel Assembly as described in Paragraph 5.3.9.1 for the side needing repair.

b. Remove Rear Hub and Brake Drum as described in Paragraph 5.3.9.2 for the side needing repair.

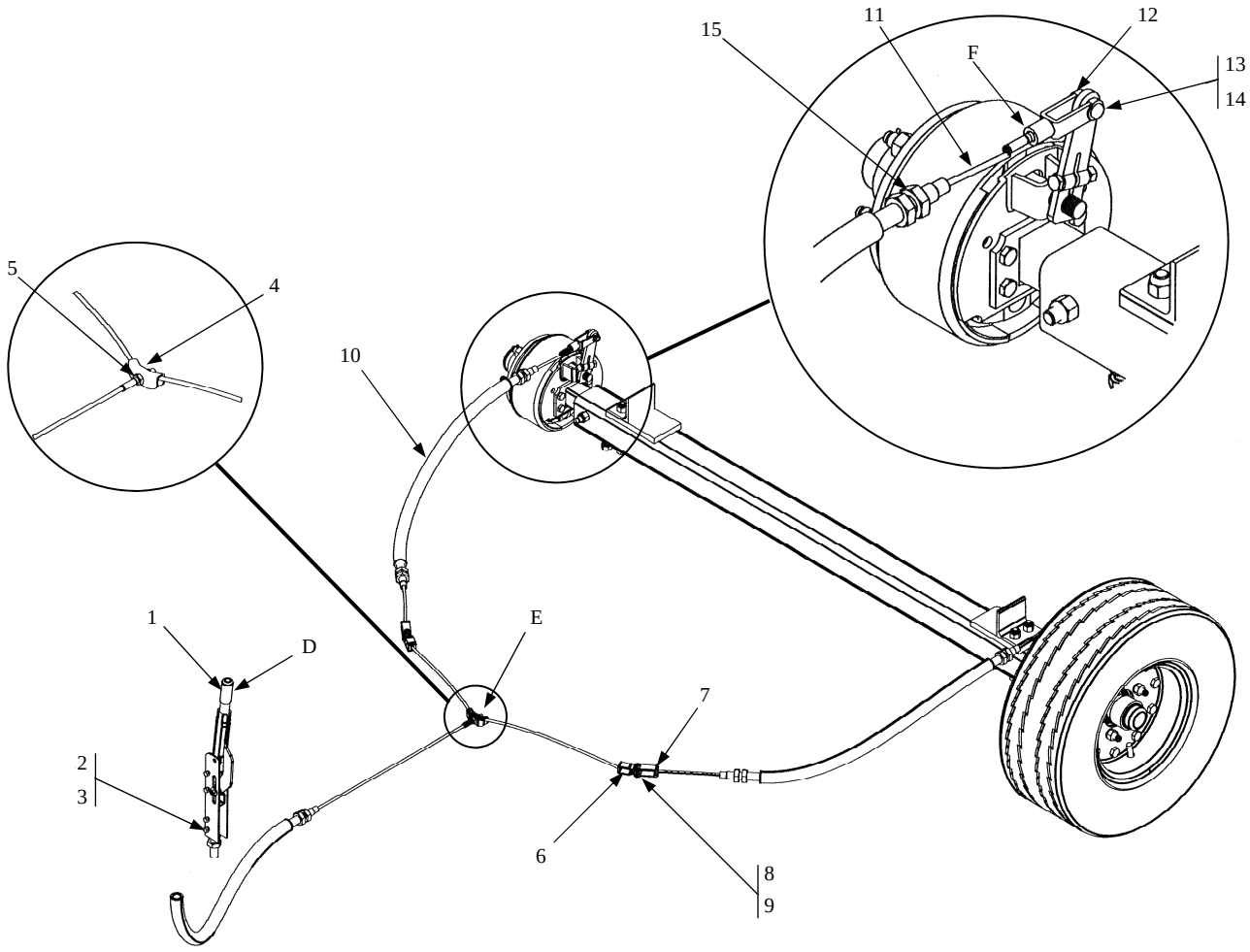
c. Remove Mechanical Brake Assembly as described in Paragraph 5.3.9.3 for the side needing repair.

d. Loosen jam nut (5) and remove bolt (6).

e. Remove nut (11) and bolt (7).

f. Pull rear spindle (4) directly outward to free from axle tube (10).

g. Reinstall in reverse order.



1. BRAKE HANDLE
2. BOLT
3. NUT
4. EQUALIZER NUT
5. EQUALIZER
6. LINKAGE
7. LINKAGE PIN
8. COTTER PIN
9. CABLE HOUSING (TYP)
10. BRAKE CABLE
11. CLEVIS
12. COTTER PIN
13. CLEVIS PIN
14. CABLE HOUSING NUT

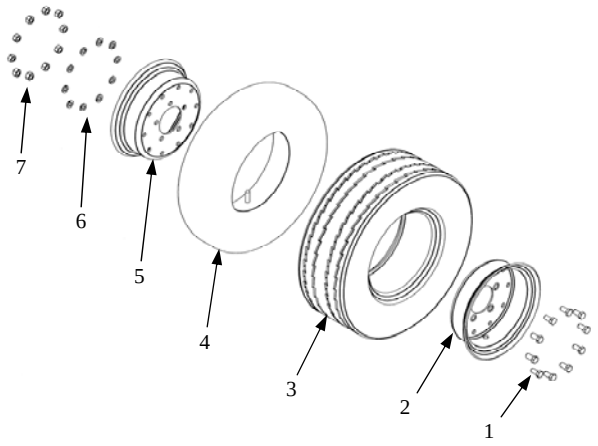
Figure 5-19. Brake Handle And Cable Assembly

5.3.9.5 Rear Undercarriage Assembly Removal. To remove the entire Rear Undercarriage assembly, the equipment must have the back end raised. See Figure 5-16 for these instructions.

WARNING

Use suitable lifting and support equipment when performing these steps. Serious injury or death could occur from rolling or falling equipment.

a. Raise equipment with suitable maintenance jack (See Figure 5-11, reference arrow A for jack placement) and allow for 2-inches of space between the wheels and the ground.
b. Place cribbing under tank skids (See Figure 5-11, reference points C) to safely support the equipment.
c. Lower onto cribbing. Leave jack in place.
d. Disconnect parking brake cables at mechanical brake assembly as described in Paragraph 5.3.9.1, step (a).
e. Raise jack to apply slight pressure on assembly.
f. Remove mounting nuts and bolts from both sides of axle assembly.
g. Carefully lower jack and assembly until wheels are on the ground and front axle tube clears tank mounts.



1. BOLTS
2. SPLIT RIM FOR STEM
3. TIRE
4. INNER TUBE
5. SPLIT RIM
6. LOCK WASHER
7. NUTS

Figure 5-20. Wheel Assembly

5.3.10 Wheel Assembly. The Wheel assembly is a two-piece, split rim design. Use Figure 5-20 for the following maintenance steps.

a. Remove wheel assembly as described in Paragraph 5.3.9.1 for the side needing repair.
b. Release air pressure from the inner tube by depressing stem valve or by removing the stem valve.
c. Remove nuts (7), lock washers (6), and bolts (1).
d. Separate split-rims (2) and (5) from tire (3).
e. Remove inner tube (4) from tire (3). Reassembly in reverse order. Ensure that inner tube stem is positioned through access hole in split-rim.
f. Torque nuts (6) to 150-foot-pounds before applying air pressure to wheel.

5.4 TROUBLESHOOTING.

The trouble shooting paragraphs and tables outline probable causes to typical problems. Operational steps, such as "open valve," are not included in solutions. Verify that the operational steps outlined in Chapter 4 are being followed correctly before trouble shooting suspected problems. Tables 5-1 through 5-8 contain the trouble shooting guides.

5.5 PREVENTIVE MAINTENANCE.

The SealVac has been designed to require very little preventive maintenance. Materials such as stainless steel, 6061 aluminum, and oil-impregnated bronze bushings have been used in the design to minimize maintenance and repair requirements. Preventive Maintenance information can be found in Table 5-9.

Table 5-1. Troubleshooting - General Tank

Problem	Probable Cause	Corrective Action
Threaded connection leaking or weeping	Loose fitting, bad seal, damaged fitting.	Fix condition. See Paragraph 5.3.1.
Valve leaking, weeping, or inoperable	Internal damage to valve's ball, stem, or seat.	Replace valve. See Paragraph 5.3.1.

Table 5-2. Troubleshooting - Tank Vacuum

Problem	Probable Cause	Corrective Action
No vacuum	A) Supply air not within required specifications.	A) Check supply air pressure and flow rate. See Table 1-1 through Table 1-3 and Chapter 2.
	B) Tank is full - Auto Shut-off has shut down tank vacuum.	B) Empty tank. See Paragraph 4.9.3.
Low vacuum	A) Supply air not within required specifications.	A) Check supply air pressure and flow rate. See Table 1-1 through Table 1-3 and Chapter 2.
	B) Depuddling/Utility Valve open or Funnel Isolation Valve open.	B) Close valves if not being used in operation.
	C) Air leakage from tank.	C) Check Sediment Chamber Gasket, Manway Assembly, see Paragraph 5.3.6, and all other threaded connections, see Paragraph 5.3.1.

Table 5-3. Troubleshooting - Drain Tools

Problem	Probable Cause	Corrective Action
Drain Tool won't adhere or has weak adherence	A) Supply air not within required specifications.	A) Check supply air pressure and flow rate. See Tables 1-1 through 1-3 and Chapter 2.
	B) Vacuum Area Seal damaged or installed in-correctly.	B) Inspect seal and correct. See Paragraph 4.6.2.1.2.
	C) Drain Tool vacuum generator muffler restricted.	C) Inspect and correct. See Paragraph 5.3.2.1.
	D) Drain Tool seal is positioned over rivet head, weep hole, seam, or some other obstacle preventing a vacuum seal from being created.	D) Remove Drain Tool and reposition until obstacle doesn't interfere with seal.
	E) Drain Tool seals aren't lubricated.	E) Lubricate seals with petroleum jelly. Reattach.

Table 5-3. Troubleshooting - Drain Tools Continued

Problem	Probable Cause	Corrective Action
No or low flow Through Fuel Probe	A) Fuel Probe Pin missing, or too short to fully open sump poppet valve. B) Fuel Probe, fuel line, or quick disconnect clogged with FOD.	A) Check Fuel Probe Pin. See Paragraph 4.6.2.2.2. B) Inspect items for FOD. Remove FOD.

Table 5-4. Troubleshooting - Auto Shut-off Assembly

Problem	Probable Cause	Corrective Action
Auto Shut-off doesn't shut off tank vacuum on full-tank conditions, or doesn't' allow tank vacuum to function on tank-empty conditions	A) Control lines not attached properly. B) Float rod assembly sticking. C) Float is sunk.	A) Ensure control lines are connected. See Paragraph 4.9.4, step c. and Figure 4-10. B) Disassemble as needed. Clean float rod. See Paragraph 5.3.5. C) Replace float. See Paragraph 5.3.5.

Table 5-5. Troubleshooting - Manway Assembly

Problem	Probable Cause	Corrective Action
Manway Assembly won't seal	A) Manway Assembly is out of adjustment. B) Seal is damaged.	A) Adjust Manway Assembly. See Paragraph 5.3.6.2. B) Replace Manway Seal. See Paragraph 5.3.6.1.

Table 5-6. Troubleshooting - Telescoping Funnel Assembly

Problem	Probable Cause	Corrective Action
Funnel sections won't lock in place.	A) Clamps are not being tightened B) Clamp wedge or threads are damaged	A) Tighten Clamp Handles more. B) Inspect and replace as needed. See Paragraph 5.3.7.4 and 5.3.7.5.

Table 5-7. Troubleshooting - Front Undercarriage

Problem	Probable Cause	Corrective Action
Tow bar won't lock in the up-right position	Tow latch spring damaged or missing.	Inspect and replace as needed. See Paragraph 5.3.8.4.
Wheels won't steer properly	A) Steering Arm Assembly is damaged.	A) Inspect and repair as needed. See Paragraph 5.3.8.5.
	B) Tie Rod Assembly is damaged or misadjusted.	B) Inspect, repair, and adjust as needed. See Paragraph 5.3.8.6.
Wheels wobble or drag while rolling	Wheel bearings damaged or loose.	Inspect and repair as needed See Paragraph 5.3.8.3.

Table 5-8. Troubleshooting - Rear Undercarriage/Brakes

Problem	Probable Cause	Corrective Action
Wheels wobble or drag while rolling	Wheel bearings damaged or loose.	Inspect and repair as needed. See Paragraph 5.3.9.2.
Brakes do not properly secure unit while engaged	A) Brakes are out of adjustment.	A) Adjust brakes. See Paragraph 5.3.9.3.3.
	B) Parking Brake Assembly is damaged or missing.	B) Inspect and repair as needed. See Paragraph 5.3.9.3.

Table 5-9. Preventive Maintenance

Item	Interval	Action
Brakes	Quarterly	Check Brakes for proper adjustment. Adjust as needed. See Paragraph 5.3.9.3.3 for maintenance instructions.
Tank Weldment	Yearly	Inspect inner tank welds for cracks. Check baffles for cracks. Check outer tank welds for cracks. Remove plug from outer tank test fitting and inspect for evidence of fuel.
Wheel Bearings	Yearly	Disassemble and pack wheel bearings with grease. Inspect for damage and replace components as needs. See Paragraphs 5.3.8.2 and 5.3.9.2 for maintenance instructions.

Table 5-10. Pre-operation Inspection Check Sheet

Item	What to Inspect
Sediment Chamber Screen	Clean Sediment Chamber Screen by removing collected FOD. See Paragraph 4.9.5 for Sediment Chamber Lid removal instructions.
Sediment Chamber Seal	Thoroughly inspect Sediment Chamber Seal for tears, cracks, and compression damage. Replace if needed.
Manway Seal	Inspect Manway Seal for tears, cracks, and compression damage. Replace if needed. See Paragraph 5.3.6 for maintenance instructions.
Static Bonding and Grounding	Check Static Bonding/Grounding Reels and bond straps between the tank weldment and the Sediment Chamber Lid for electrical resistance. Maximum allowable resistance should be 10-Ohms.
Wheels/Tires	Inspect for tire damage and proper tire pressure. Ensure that no lug nuts are missing or loose.
Brakes	Inspect for proper function and adjustment.
Tow Bar	Inspect for damage such as cracks in welds and missing attachment pin and retaining clip.
Tank	Inspect for leaks and obvious damage. Ensure Manway Assembly closes and latches properly. Check undercarriage mounting hardware for loose and/or missing components.
Hoses	Inspect for damage such as cracks and rub spots. Ensure fittings ends are operational.
Ground Reels	Inspect for function. Ensure cable ends are securely fastened to cable.
Valves	Inspect for function.
Drain Tools	Inspect for damage to Drain Tool body and seals.
Funnel	Inspect for function.

CHAPTER 6
DIAGRAMS

Not Applicable

CHAPTER 7
ILLUSTRATED PARTS BREAKDOWN
SECTION I FOREWORD

7.1 INTRODUCTION.

This Illustrated Parts Breakdown (IPB) is designed to assist supply and maintenance personnel in requisitioning, storing, issuing, an identifying parts, and to illustrate assembly and disassembly relationships. It is not intended to be used as an authority for procedures of disassembly or reassembly. Maintenance or repair should be performed by authorized personnel using the applicable maintenance instructions contained in Chapter 5 of this publication. Illustrations at the end of this section show how to use the IPB.

7.2 MODELS COVERED.

7.2.1 Equipment Covered. This IPB lists and describes items necessary for support of TANK, TRAILER MOUNTED RECOVERABLE AVIATION TURBINE FUEL: 200, 400, AND 600 GALLON; part numbers SV200S-WR07, SV416S-WR07, and SV616S-WR07 respectively; manufactured by Spokane Industries Inc. of Spokane Valley, Washington State, USA.

7.2.2 Accessories Covered. This IPB also lists and describes the accessories necessary for support of TANK, TRAILER MOUNTED RECOVERABLE AVIATION TURBINE FUEL: 200, 400, AND 600 GALLON; namely the Drain Tools manufactured by Spokane Industries Inc. of Spokane Valley, Washington State, USA.

7.3 MAINTENANCE PARTS LIST (MPL).

The MPL is divided into figures by main equipment groups and/or assemblies. Each group or assembly is keyed to a related illustration by figure and index number. They are then broken down into assemblies, modules and detailed parts. The relation of each part to its next higher assembly and/or group is shown either by indentation or by figure cross-reference notes. The MPL is divided into seven columns as described below.

7.3.1 Figure and Index Number Column. This column provides the figure and index numbers used to key a part or assembly listed in the MPL to its location in an illustration. The figure number precedes the first index number in each listing and the first index number on each page of a multipage listing. Index numbers are listed in sequence.

7.3.2 Part Number Column. Part numbers may be specification control numbers, vendor part numbers or commercial part numbers. Part numbers, including dash numbers, are assigned to each listed part in accordance with current industry engineering practices. Parts which are indexed in the MPL, but not shown on the illustration, have a dash (-) preceding the index number.

7.3.3 Commercial and Government Entity (CAGE) Code Column. Explanations of CAGE codes are contained in CAGE Cataloging Handbook H4/H8 and amendments thereto.

7.3.4 Description Column. The description column contains indenture, nomenclature and cross-reference information. The identifying noun is given first. Sizes, dimensions, materials, and tolerances are then indicated. If applicable, the appropriate numbers for types, models, specifications, specification control drawings, and source control drawings follow the nomenclature. When the drawing number for a part is different than the part number (excluding dash differences), the drawing number follows the description. References to other illustrations for information on detail parts or information on next higher assemblies (NHA) are given. Attaching parts are identified by the abbreviation (AP) following the description. Parts listed in the MPL are indented to indicate item relationship or NHA. Nomenclature of each assembly is followed in the list (except for attaching parts) by nomenclature of its component indented one column to the right. This indentation indicates relationship of component to assembly. To determine NHA of a part or assembly, note column in which the first word of nomenclature appears. First item directly above, which appears one column to the left (except for attaching parts), is the NHA.

Description

1234567

END ITEM, COMPONENT, MAJOR ASSEMBLY
. DETAIL PARTS FOR END ITEM
. COMPONENT, MAJOR ASSEMBLY
. ASSEMBLY
. Attaching parts for assembly (AP)
. . Detail parts for assembly
. . Subassemblies
. . Attaching parts for subassemblies (AP)
. . . Detail parts for subassemblies
. . . Attaching parts for sub-subassemblies (AP)
. . . . Detail parts for sub-subassemblies

7.3.5 Units Per Assembly Column. Quantities shown in this column represent units required for each detail part in an assembly, each assembly in the NHA, and each attaching part to attach one unit or one assembly. The abbreviation AR (as required) is used when quantity required must be determined when parts are installed. The abbreviation REF (reference) indicates that items has been previously listed under it NHA. The SEE FIGURE notation in description of item indicates figure and index numbers at which units per assembly can be determined.

7.3.6 Usable On Code Column. These codes indicate parts usage. Absence of a code indicates that the part is usable on all its NHAs. When required, Usable on Codes are defined in the MPL. MIL-PRF-38807C contains additional information about Usable on Codes.

7.3.7 Source, Maintenance and Recoverability (SMR) Code Column. For complete information about Joint Military Services Uniform SMR codes, refer to TO 00-25-195.

7.3.8 Symbols Used in the MPL. A dash (-) before an index number denotes a part which is not illustrated. A number sign (#) flush right of a part number indicates that detail parts are listed in a separate manual. An asterisk (*) flush right of the part number means the marking is to be requisitioned in accordance with AFI 37-162. The letter "F" before the figure number means "follows" and is used when an assembly or part has not been assigned an index number, and the figure and index number of the preceding part has been used.

7.3.9 Multi-sheet Illustrations. If used, the sheet number follows the index number and is separated by a slash (/). If an indexed item is on more than one sheet of an illustration, the first and last sheet numbers on which the item appears are given.

7.4 NUMERICAL INDEX (NI).

If applicable, an NI is provided which contains an alphanumerical listing of all drawings and parts listed in the MPL (including model and type numbers for components not assigned part numbers).

7.4.1 Part Number Column. Part numbers begin at the extreme left and continue from left to right, one position at a time. For the first character of the part number, the letters A through N and P through Z take precedence over the numerals, 0 through 9 (alphabetic Os are considered numeric zeros). For the second and succeeding characters of a part number, precedence is as follows: (1) diagonal, (2) period, (3) dash, (4) letters A through N and P through Z, and (5) numerals 0 through 9. Refer to MIL-PRF-38807C for detailed information about part numbers and their usage in the MPL.

7.4.2 Figure and Index Number Column. This column contains the figure and index number for all parts listed.

7.5 REFERENCE DESIGNATION INDEX (RDI).

If used, the RDI follows the NI and contains a listing of the reference designations that are assigned to the parts list of this IPB. Reference designations appear on electrical and electronic diagrams and are used to correlate graphic symbols show thereon with parts lists, descriptions, and instructions concerning the diagrams.

7.6 USABLE ON CODES.

When two or more assemblies are listed in the same parts list, a code letter (A, B, etc.) is assigned to each main assembly. All subcomponents, peculiar to a particular assembly, are identified by the same code letter as the main assembly. If parts are common to all assemblies covered, the Usable on Code column is left blank. Usable on Codes are further explained in MIL-PRF-38807C.

7.7 SOURCE, MAINTENANCE, AND RECOVERABILITY (SMR) CODES AND UNIQUE SOURCE CODES.

Information about Joint Military Services Uniform SMR codes and unique source codes can be found in TO 00-25-195.

7.8 COMMERCIAL AND GOVERNMENT ENTITY (CAGE).

Information about CAGE codes can be found in the H4/H8 Cataloging Handbook and its amendments.

7.9 PARTS STANDARDIZATION.

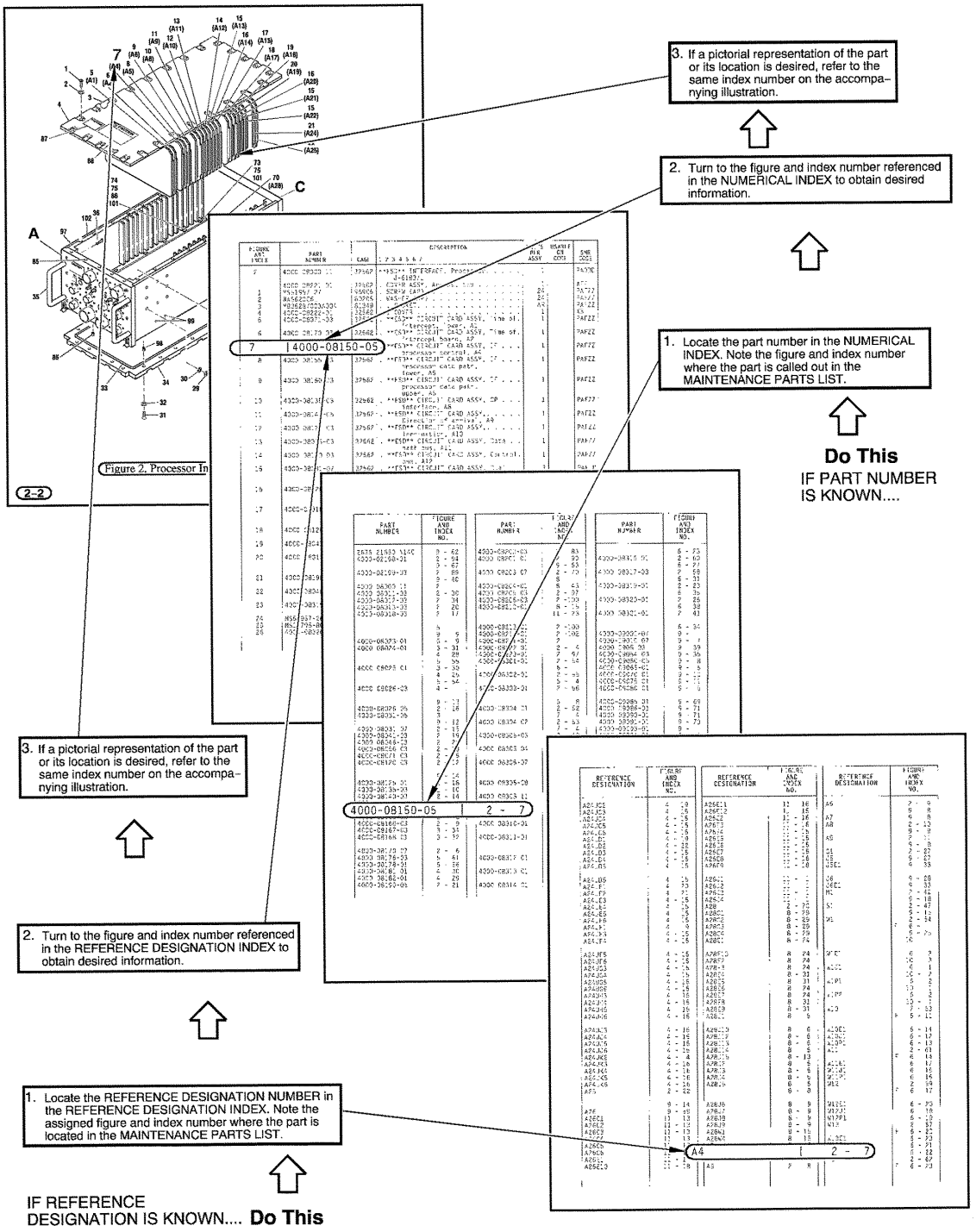
Authority for use of a part number different than the part number listed in the IPB is established by the Department of Defense (DoD) Interchangeability and Substitution (I&S) Program. Refer to the DO43B Master Item Identification Base for Air Force I&S information. The maintenance technician has final responsibility and authority for determining acceptability of substitute parts. Authority for use of a part number different than the part number listed in this IPB shall be approved in writing by the cognizant engineering agency responsible for configuration control.

7.10 LIST OF MANUFACTURER'S CODES (CAGE).

Following is a list of CAGE codes with name and addresses that corresponds to each code. The codes are in accordance with Cataloging Handbook H4/H8. Codes are listed in numerical order, followed by an alphabetical listing of manufacturers for which no code has bee assigned. Government standard codes are not listed.

CODE	NAME AND ADDRESS
1P384	Gardner Industries, Inc. 1115 N. Utica Tulsa, OK 74110-4632
60038	Timken Roller Bearing Company 1835 Dueber Avenue SW Canton, OH 44706-2728
61349	Ametek DBA U.S. Gauge 900 East Clymer Avenue Sellerville, PA 18960-2625
66144	Spokane Industries, Inc. P.O. Box 3303 Spokane, WA 99220
72661	Dixon Valve & Coupling Company 800 High Street Chestertown, MD 21620-1196
80201	SKF USA Inc. 900 North State Street Elgin, IL 60123-2147
ORG94	Knott Brake Company 144 West Drive Lodi, OH 44254-1062

HOW TO USE THE ILLUSTRATED PARTS BREAKDOWN IF PART NUMBER IS KNOWN



HOW TO USE THE ILLUSTRATED PARTS BREAKDOWN
IF PART NUMBER IS NOT KNOWN

IF PART NUMBER IS NOT KNOWN.... **Do This**

1. Determine in which unit the part is located. Turn to the TABLE OF CONTENTS. From this list, select the illustration most likely to contain the desired part.

2. Refer to page number of the illustration selected from TABLE OF CONTENTS. Locate the desired part on the illustration. Note index number.

3. Refer to corresponding MAINTENANCE PARTS LIST. Locate the index number selected from the illustration for part number, nomenclature, etc.

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6	Wiring Harness Assembly, W1 thru W3, W10 thru W14, W16 thru W18 and Cable Assembly W19, W20	2-22
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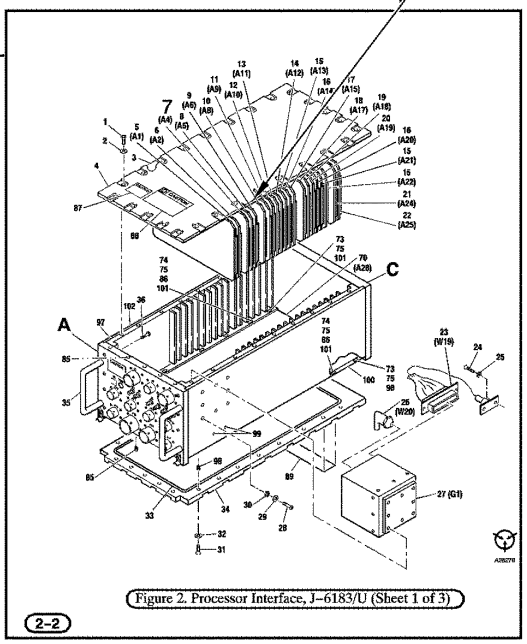

Figure 2. Processor Interface, J-6183/U (Sheet 1 of 3)

FIGURE AND INDEX	PART NUMBER	CAGE	1 2 3 4 5 6 7 DESCRIPTION	UNITS PER ASSY	USABLE ON CODE	SMR CODE
2-	4000-08000-11	32562	**ESD** INTERFACE, Processor, J 6183/U	1		PAC3D
	4000-08721-03	32562	. COVER ASSY, Access, Top	1		AFF
1	MS51957-27	96906	. SCREW (AP)	24		PAFZZ
2	NAS620C04	80205	. WASHER (AP)	24		PAFZZ
3	M83528/003A004	81349	. GASKET	AR		PAFZZ
4	4000-08727-01	32562	. COVER	1		3H
5	4000-08071-03	32562	. **ESD** CIRCUIT CARD ASSY, Time of Interconn, Lower, A1	1		PAFZZ
6	4000-08170-07	32562	. **ESD** CIRCUIT CARD ASSY, Time of	1		PAFZZ
7	4000-08150-05	32562	. **ESD** CIRCUIT CARD ASSY, IF			
8	4000-08165-03	32562	. **ESD** CIRCUIT CARD ASSY, IF processor data path, lower, A5	1		PAFZZ
9	4000-08160-03	32562	. **ESD** CIRCUIT CARD ASSY, IF processor data path, upper, A6	1		PAFZZ
10	4000-08135-03	32562	. **ESD** CIRCUIT CARD ASSY, CP interface, A8	1		PAFZZ
11	4000-08145-05	32562	. **ESD** CIRCUIT CARD ASSY, Direction of arrival, A9	1		PAFZZ
12	4000-08120-03	32562	. **ESD** CIRCUIT CARD ASSY, Termination, A10	1		PAFZZ
13	4000-08066-03	32562	. **ESD** CIRCUIT CARD ASSY, Data path bus, A1	1		PAFZZ
14	4000-08140-03	32562	. **ESD** CIRCUIT CARD ASSY, Control bus, A12	1		PAFZZ
15	4000-08031-07	32562	. **ESD** CIRCUIT CARD ASSY, Dual redundant bus 1553, A3, A21, A22 (see fig. 3 for bkdn)	3		PAFZD
16	4000-08026-05	32562	. **ESD** CIRCUIT CARD ASSY, One megabyte ram, A14, A20 (see fig. 4 for bkdn)	2		PAFZD
17	4000-08018-03	32562	. **ESD** CIRCUIT CARD ASSY, Dual bus processor 286, A15 (see fig. 5 for bkdn)	1		PAFLD
18	4000-08175-01	32562	. **ESD** CIRCUIT CARD ASSY, Interface unit bus 1, A17	1		PAFZZ
19	4000-08041-03	32562	. **ESD** CIRCUIT CARD ASSY, Small computer system interface, A18	1		PAFZZ
20	4000-08013-03	32562	. **ESD** CIRCUIT CARD ASSY, Electrical erasable static ram, A19	1		PAFLL
21	4000-08190-05	32562	. **ESD** CIRCUIT CARD ASSY, Battery regulator, A2C	1		PAFZZ
22	4000-08046-03	32562	. **ESD** CIRCUIT CARD ASSY, Diagnostic processor, A25	1		PAFZZ
23	4000-08319-01	32562	. CABLE ASSY, Rubidium oscillator, W19 (see fig. 6 for bkdn)	1		AFF
24	MS51957-26	96906	. SCREW (AP)	2		PAFZZ
25	MS15795-803	96906	. WASHER (AP)	2		PAFZZ
26	4000-08320-01	32562	. CABLE ASSY, RF, W20 (see fig. 6 for bkdn)	1		AFF

SECTION II MAINTENANCE PARTS LIST

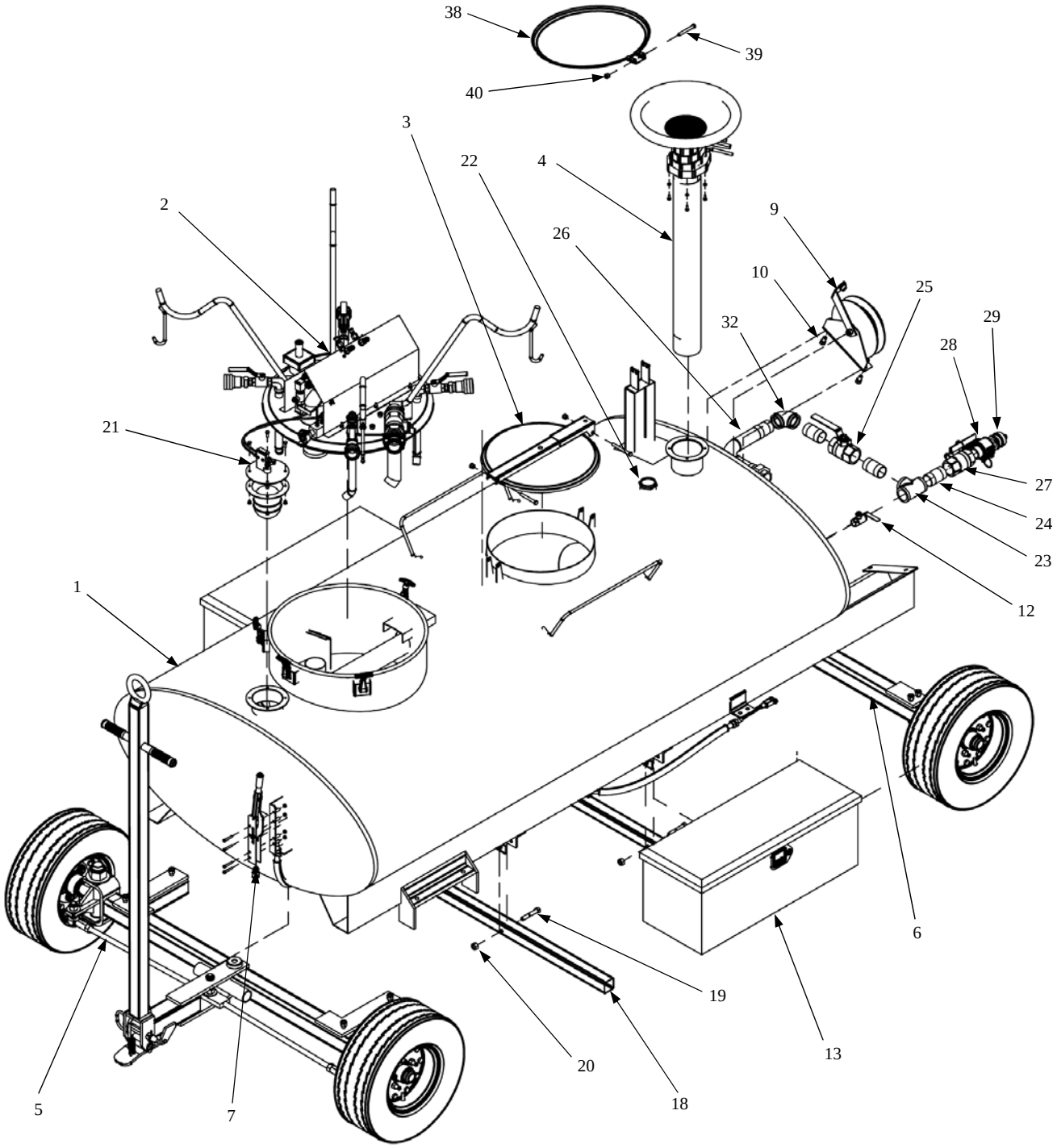

Figure 7-1. Overall Assembly

FIGURE & INDEX / SHEET NO.	PART NUMBER	CAGE	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE	SMR CODE
7-1			OVERALL ASSEMBLY			
	SV200S-	66144	200 GALLON SEALVAC,			
	WR07	66144	NSN: 2330-01-558-5333	1	A	PAFOOO
	SV416S-	66144	400 GALLON SEALVAC,			
	WR07	66144	NSN: 2330-01-558-5335	1	B	PAFOOO
	SV616S-	66144	600 GALLON SEALVAC,			
	WR07	66144	NSN: 2330-01-558-5334	1	C	PAFOOO
- 1	07-9000	66144	. TANK WELDMENT, SV200S	1	A	XB
1	07-9001	66144	. TANK WELDMENT, SV416S	1	B	XB
- 1	07-9002	66144	. TANK WELDMENT, SV616S	1	C	XB
2	08-1000U	66144	. VACUUM SYSTEM ASSY (SEE FIG. 7-3)	1		XB
3	08-10251	66144	. MANWAY ASSEMBLY, (SEE FIG. 7-7)	1		XB
4	08-1034U	66144	. 16-FOOT TELESCOPING FUNNEL ASSEMBLY (SEE FIG. 7-8)	1	B, C	PAOZZN
5		66144	. FRONT UNDERCARRIAGE ASSY (SEE FIG. 7-9)	1		XB
6		66144	. REAR UNDERCARRIAGE ASSY (SEE FIG. 7-10)	1		XB
- 7	08-2501	66144	. PARKING BRAKE ASSEMBLY (200)	1	A	XB
7	08-2502	66144	. PARKING BRAKE ASSEMBLY (400/600)	1	B, C	XB
- 8	04-10361	61349	. STATIC GROUND REEL WITH CLAMP	1		PBOZZN
9	04-10361R	61349	. STATIC GROUND REEL WITH PLUG	1		XB
10	02-3020	66144	. . Bolt, 1/2-13 by 3/4-inch long (AP)	4		XB
- 11	02-3092	66144	. . Nut, nylon insert, 1/2-13 (AP)	4		XB
12	04-1032	66144	. VALVE, BALL, 1/2-INCH	1		XB
13	04-00301	66144	. STORAGE BOX, ALUMINUM	2		XB
- 14	04-8000	66144	. . FOAM, Shadow Board for Drain Tools	1		XB
- 15	04-8001	66144	. . FOAM, Shadow Board for Tools	1		XB
- 16	02-3151	66144	. . BOLT, 1/4-20 by 2-1/2-Inch Long (AP)	8		XB
- 17	02-3088	66144	. . NUT, Nylon Insert, 1/4-20 (AP)	8		XB
- 18	01-8947	66144	. MOUNT BAR, STORAGE BOX, SIZE 200	2	A	XB
18	01-8948	66144	. MOUNT BAR, STORAGE BOX, SIZE 400	2	B	XB
- 18	01-8949	66144	. MOUNT BAR, STORAGE BOX, SIZE 600	2	C	XB
19	02-3019	66144	. . BOLT, 1/2-13 by 3-Inch Long (AP)	4		XB
20	02-3087	66144	. . NUT, Nylon Insert, 1/2-13 (AP)	4		XB
21		66144	. AUTO SHUT-OFF ASSEMBLY (SEE FIG. 7-6)	1		XB
- 22	04-01540	66144	. LEVEL GAUGE, 200 GALLON SIZES	1	A	XB
22	04-8006	66144	. LEVEL GAUGE, 400 GALLON SIZES	1	B	XB
- 22	04-8007	66144	. LEVEL GAUGE, 600 GALLON SIZES	1	C	XB
23	03-10074	66144	. TEE, THREADED, 1-1/2-INCH NPT	1	B, C	XB
24	03-02921S	66144	. NIPPLE, THREADED, 1-1/2-INCH NPT	4	B, C	XB
25	04-10321	66144	. VALVE, BALL, 1-1/2 NPT (FUNNEL ISOLATION)	1	B, C	XB
26	06-10164	66144	. FLEXIBLE HOSE ASSEMBLY, 1-1/2-INCH	1	B, C	XB
27	04-10321	66144	. VALVE, BALL, 1-1/2 NPT (DRAIN)	1		XB
28	04-1033	66144	. CAMLOCK, TYPE “B” 1-1/2-INCH	1		XB
29	04-10331	66144	. CAMLOCK, TYPE “DP” 1-1/2-INCH	1		XB
- 30	01-8963	66144	. . CHAIN, Sash By 6-Inch Lg. (AP)	1		XB
- 31	04-10351	66144	. . HOOK, Chain, “S”, #10, ZP (AP)	1		XB
32	03-10014	66144	. ELBOW, 1-1/2-INCH NPT	1	B. C	XB
- 33	04-1039	66144	. STRAINER, SEALVAC COMMON	1		XB
- 34	02-3088	66144	. . NUT, Nylon Insert, 1/4-20 (AP)	1		XB
- 35	04-10366	66144	. RECEPTACLE, GROUNDING	2		XB
- 36	03-0320S	66144	. PLUG, PIPE, 1/4-INCH NPT (FUNNEL)	1	B, C	XB
- 37	03-0106S	66144	. PLUG, PIPE, 1/2-INCH NPT (WRAP)	1		XB
38	08-10261	66144	. FUNNEL COVER	1	B, C	XB
39	02-3042	66144	. . BOLT, 3/8-16 By 3-Inch Long (AP)	1	B, C	XB
40	02-3089	66144	. . NUT, Nylon Insert, 3/8-16 (AP)	1	B, C	XB
- 41	04-8026	66144	. FOAM, TOOL BOX BOTTOM	2		XB
			USABLE ON CODES: A - Part number SV200S-WR07 B - Part number SV416S-WR07 C - Part number SV616S-WR07			

- Not Illustrated

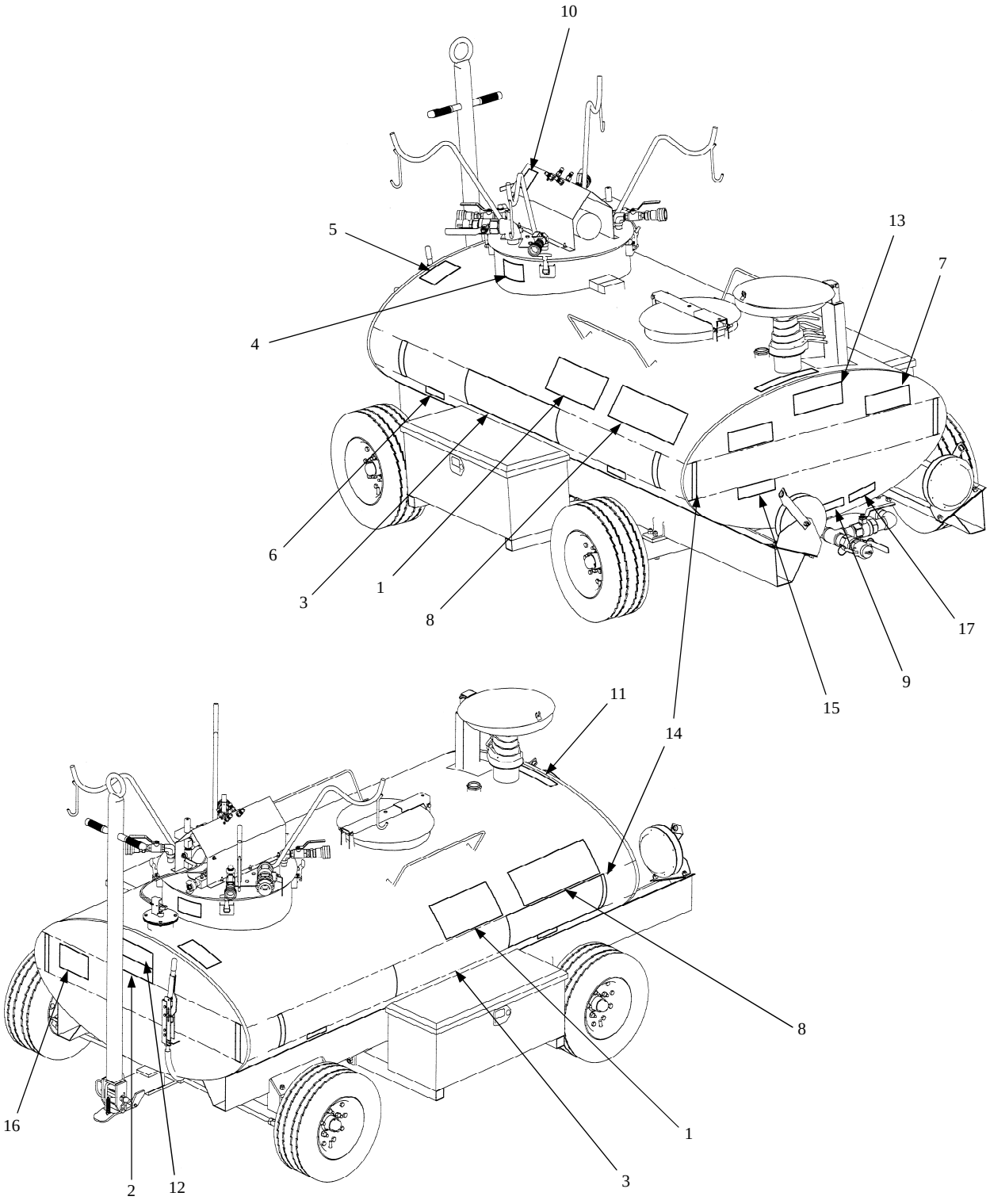

Figure 7-2. Equipment Markings and Accessories

FIGURE & INDEX / SHEET NO.	PART NUMBER	CAGE	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE	SMR CODE
7-2			EQUIPMENT MARKINGS AND ACCESSORIES			
	SV200S-WR07	66144	200 GALLON SEALVAC, NSN: 2330-01-558-5333			
	SV416S-WR07	66144	400 GALLON SEALVAC, NSN: 2330-01-558-5335			
	SV616S-WR07	66144	600 GALLON SEALVAC, NSN: 2330-01-558-5334			
1	06-1006	66144	. DECAL, “DANGER, NO SMOKING“	2		XB
2	06-1008	66144	. DECAL, “MAXIMUM, TOWING SPEED”	1		XB
3	06-7018	66144	. DECAL, “RECLAIMED JP-8”	2		XB
4	06-1002	66144	. DECAL, “CAUTION, MAXIMUM ALLOWABLE“	1		XB
5	06-1003	66144	. DECAL, “CAUTION, BRAKE MUST”	1		XB
6	06-7016	66144	. DECAL, “TIRE PRESSURE - 90 PSI”	4		XB
7	06-1004	66144	. DECAL, “WARNING, GROUNDS MUST”	2		XB
8	06-10028	66144	. DECAL, “SEALVAC TM”	2		XB
9	06-10114	66144	. DECAL, “TANK DRAIN VALVE”	1		XB
10	06-10027	66144	. DECAL, “CAUTION, THIS VACUUM”	1		XB
11	06-7001	66144	. DECAL, “FUNNEL VALVE MUST”	1	B, C	XB
12	06-1007	66144	. DECAL, “NOTICE, READ INSTRUCTIONS”	1		XB
13	06-7002	66144	. DECAL, “WARNING, FUNNEL PINCH”	1	B, C	XB
14	06-7012	66144	. DECAL, REFLECTIVE TAPE, WHITE	8		XB
15	06-7017	66144	. DECAL, “SAMPLE PORT VALVE”	1		XB
16		66144	. DECAL, UNIQUE IDENTIFICATION TAG	1		XB
17	06-10116	66144	. DECAL, “FUNNEL DRAIN VALVE”	1		XB
- 18	06-7020	66144	. DECAL, SI LOGO, SMALL	2		XB
- 19	06-7021	66144	. DECAL, SI LOGO, LARGE	1		XB
- 20	06-7015	66144	. DECAL KIT (CONTAINS ALL DECALS ABOVE EXCEPT UID TAG)	0		XB
- 21	08-0200	66144	. DRAIN TOOL, ROUND (SEE FIG. 7-14)	1		XB
- 22	08-0300	66144	. DRAIN TOOL, OVAL (SEE FIG. 7-14)	1		XB
- 23	08-0310	66144	. DRAIN TOOL, ELONGATED (SEE FIG. 7-14)	1		XB
- 24	06-101674	66144	. DEPUDDLING HOSE	1		XB
- 25	08-0030	66144	. DUPLEX HOSE ASSEMBLY	1		XB
- 26	08-0151	66144	. FUEL PROBE PIGTAIL	1		XB
- 27	08-12020	66144	. ALIGNMENT TOOL	1		XB
- 28	08-0050	66144	. DRAIN TOOL KIT	1		XB
- 29	02-3110	66144	. . SET SCREW, #10-32 by 3/8-Inch Lg	2		XB
- 30	02-3105	66144	. . SET SCREW, #10-32 by 1/2-Inch Lg	2		XB
- 31	02-3111	66144	. . SET SCREW, #10-32 by 5/8-Inch Lg	2		XB
- 32	02-3109	66144	. . SET SCREW, #10-32 by 3/4-Inch Lg	2		XB
- 33	02-3112	66144	. . SET SCREW, #10-32 by 7/8-Inch Lg	2		XB
- 34	02-3108	66144	. . SET SCREW, #10-32 by 1-Inch Lg	2		XB
- 35	02-3107	66144	. . SET SCREW, #10-32 by 1-1/8-Inch Lg	2		XB
- 36	02-3106	66144	. . SET SCREW, #10-32 by 1-1/4-Inch Lg	2		XB
- 37	02-3011	66144	. . BUTTON HEAD SCREW, #10-32 by 3/8-Inch Lg	2		XB
- 38	02-3013	66144	. . BUTTON HEAD SCREW, #10-32 by 1/2-Inch Lg	2		XB
- 39	02-3010	66144	. . BUTTON HEAD SCREW, #10-32 by 5/8-Inch Lg	2		XB
- 40	02-3012	66144	. . BUTTON HEAD SCREW, #10-32 by 3/4-Inch Lg	2		XB
- 41	02-3009	66144	. . BUTTON HEAD SCREW, #10-32 by 7/8-Inch Lg	2		XB
- 42	02-3008	66144	. . BUTTON HEAD SCREW, #10-32 by 1-Inch Lg	2		XB
- 43	02-3014	66144	. . BUTTON HEAD SCREW, #10-32 by 1-1/4-Inch Lg	2		XB
- 44	04-0054	66144	. . ALAN Wrench, 1/8-inch	1		XB
- 45	04-0056	66144	. . ALAN Wrench, 3/32-Inch	1		XB
- 46	04-0058	66144	. . PETROLEUM Jelly, 6-Oz	1		XB
			USABLE ON CODES: A - Part number SV200S-WR07 B - Part number SV416S-WR07 C - Part number SV616S-WR07			

- Not Illustrated

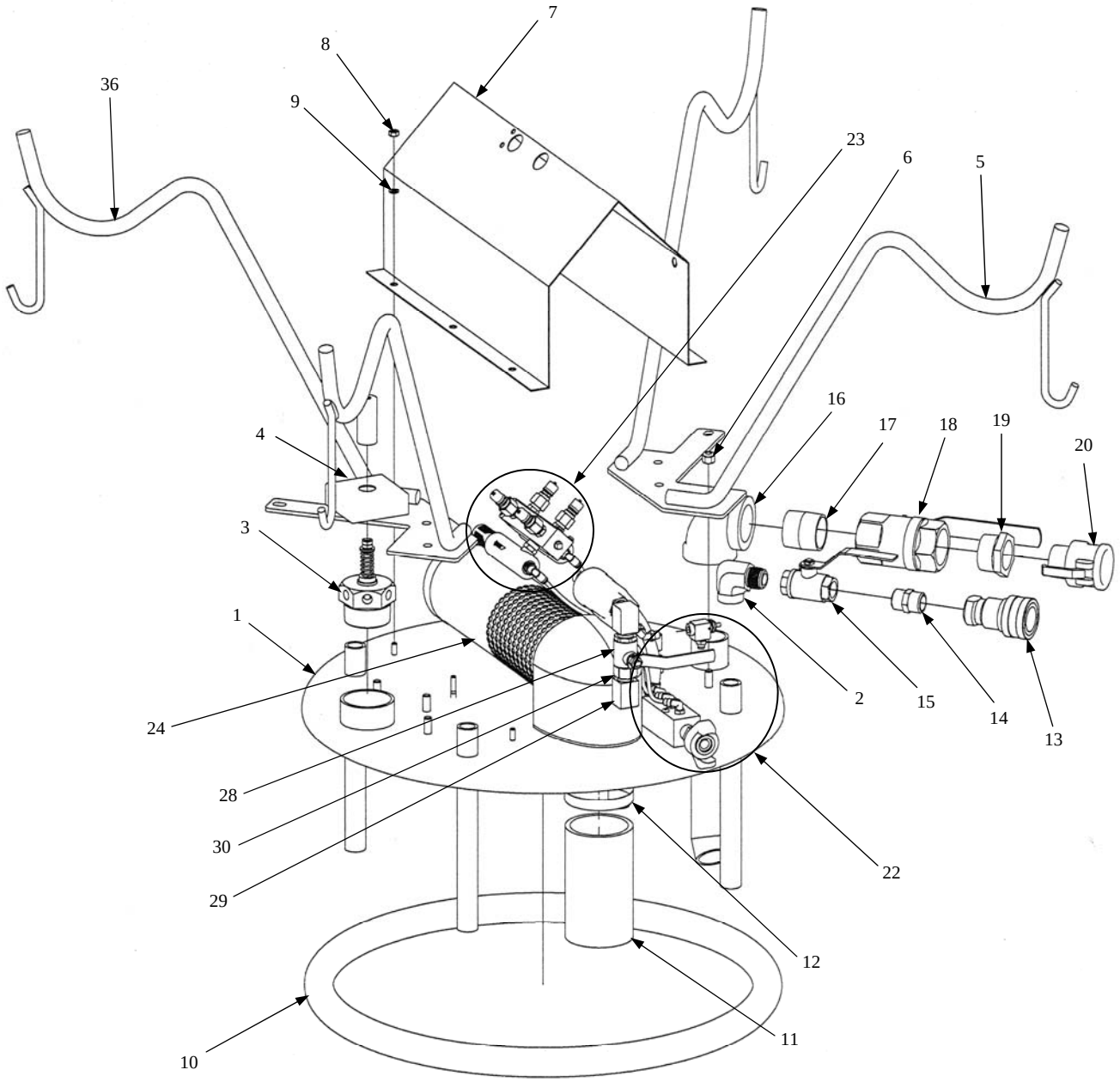

Figure 7-3. Vacuum System Assembly

FIGURE & INDEX / SHEET NO.	PART NUMBER	CAGE	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE	SMR CODE
7-3	08-1000U	66144	VACUUM SYSTEM ASSEMBLY	1		XB
1	08-1002	66144	. WELDMENT, SEDIMENT CHAMBER LID	1		XB
2	03-0065S	66144	. ELBOW, STREET, 3/4-INCH NPT	4		XB
3	04-10098	66144	. VACUUM GOVERNOR	1		XB
4	07-10339	66144	. VACUUM GOVERNOR COVER	1		XB
5	07-1076LH	66144	. DUPLEX HOSE HANGAR, LEFT	1		XB
6	02-3089	66144	. . NUT, Nylon Insert, 3/8-16 (AP)	3		XB
7	07-1034SV2	66144	. VACUUM SYSTEM COVER, SV	1		XB
8	02-3088	66144	. . NUT, 1/4-20 (AP)	7		XB
9	02-3138	66144	. . WASHER, Lock, 1/4-Inch (AP)	6		XB
10	06-1022V	66144	. GASKET, SEDIMENT CHAMBER LID	1		PBOZZN
11	06-101791	66144	. HOSE, VACUUM SYSTEM, SV	1		XB
12	03-10181	66144	. . CLAMP, Hose, 3-Inch	1		XB
13	03-111392	66144	. QUICK DISCONNECT, 3/4-INCH FEMALE	4		XB
14	03-111390	66144	. NIPPLE, CLOSE HEX, 3/4-INCH NPT	4		XB
15	04-10320	66144	. VALVE, BALL, 3/4-INCH	4		XB
16	03-1001	66144	. ELBOW, 1-1/2-INCH NPT, ALUM	1		XB
17	03-02922S	66144	. NIPPLE, CLOSE, 1-1/2-INCH NPT, ALUM	1		XB
18	04-10321	66144	. VALVE, BALL, 1-1/2-INCH	1		XB
19	03-1002	66144	. BUSHING, 1-1/2 BY 1-1/4-INCH NPT, ALUM	1		XB
20	04-103371	66144	. CAMLOCK, TYPE “B”, 1-INCH	1		XB
- 21	04-10368	66144	. BOND STRAP, SV	1		XB
22	08-2503	66144	. CONTROL VALVING GROUP (SEE FIG. 7-4)	1		XB
23	08-2504	66144	. DRAIN TOOL VACUUM GROUP (SEE FIG. 7-5)	1		XB
24	04-1003	66144	. TANK VACUUM GENERATOR	1		XB
- 25	04-1010	66144	. . GASKET, Tank Vacuum Generator	1		XB
- 26	02-3150	66144	. . BOLT, 1/4-28 by 5/8-Inch Lg. (AP)	3		XB
- 27	02-3138	66144	. . WASHER, Lock, 1/4-Inch (AP)	3		XB
28	04-1032N	66144	. VALVE, BALL, 1/2-INCH	1		XB
29	03-1006	66144	. ELBOW, STREET, 1/2-INCH NPT, BRASS	2		XB
30	03-4001	66144	. NIPPLE, CLOSE HEX, 1/2-INCH NPT, BRASS	2		XB
- 31	06-5050	66144	. PLUG, 3/4-INCH QD, RUBBER	4		XB
- 32	06-5015	66144	. CAP, 1/4-INCH QD, RUBBER	4		XB
- 33	04-10338	66144	. CAMLOCK, TYPE “DB”, 1-INCH	1		XB
- 34	04-10351	66144	. . HOOK, “S”, #10, ZP (AP)	1		XB
- 35	01-8963	66144	. . CHAIN, Sash, 6-Inch Lg. (AP)	1		XB
36	07-1076RH	66144	. DUPLEX HOSE HANGAR, RIGHT	1		XB
- 37	02-3089	66144	. . NUT, Nylon Insert, 3/8-16 (AP)	3		XB

- Not Illustrated

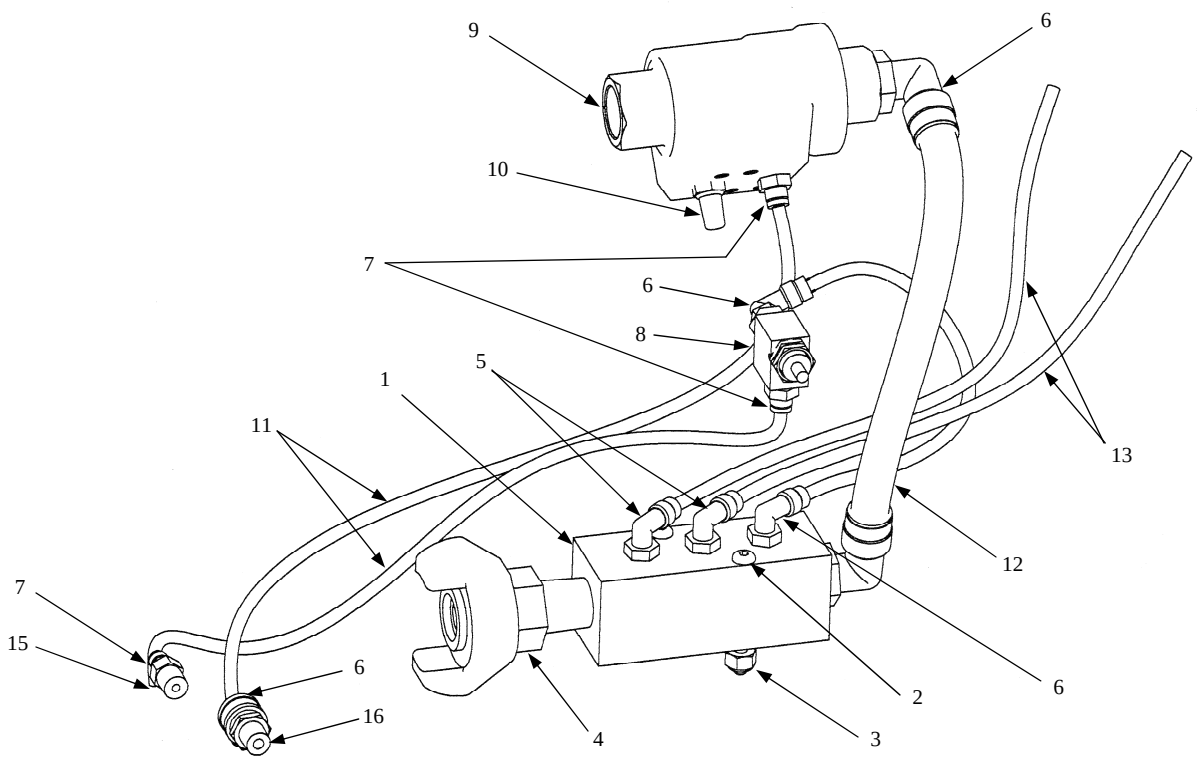

Figure 7-4. Control Valving Group

FIGURE & INDEX / SHEET NO.	PART NUMBER	CAGE	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE	SMR CODE
7-4	08-2503	66144	CONTROL VALVING GROUP	1		XB
1	04-8002	66144	. MANIFOLD, UDA, 3-PORT, MAIN	1		XB
2	02-3149	66144	. . MACHINE SCREW, #10-32 by 1-5/8-Inch (AP)	2		XB
3	02-3085	66144	. . NUT, Nylon Insert, #10-32 (AP)	2		XB
4	AM-2	72661	. FITTING, Supply Air Connection	1		PBOZZN
5	04-8010	66144	. PUSH-TO-CONNECT, 1/4-INCH TUBE BY 1/4-INCH NPT, 90-DEGREE SW	2		XB
6	04-8011	66144	. PUSH-TO-CONNECT, 5/32-INCH TUBE BY 1/8-INCH NPT, 90-DEGREE, SW	3		XB
7	04-8012	66144	. PUSH-TO-CONNECT, 5/32-INCH TUBE BY 1/8-INCH NPT, STRAIGHT SW	3		XB
8	04-10327	66144	. AUTO SHUT-OFF BYPASS VALVE	1		XB
9	04-8008	66144	. CONTROL VALVE, SV	1		XB
10	03-1076	66144	. MUFFLER, PNEUMATIC, 1/8-INCH NPT	1		XB
11	06-2561	66144	. TUBING, 5/32-INCH OD, DOT RATED	BULK		XB
12	06-2562	66144	. TUBING, 1/2-INCH OD, DOT RATED	BULK		XB
13	06-0101	66144	. TUBING, 1/4-INCH OD, DOT RATED	BULK		XB
- 14	02-9994	66144	. HAIR PIN, SUPPLY AIR CONNECTION	1		XB
15	03-1071	66144	. QUICK DISCONNECT, MALE, 1/8-INCH BY 1/8-INCH NPT	1		XB
16	03-1074	66144	. QUICK DISCONNECT, FEMALE, 1/8-INCH BY 1/8-INCH NPT	1		XB

- Not Illustrated

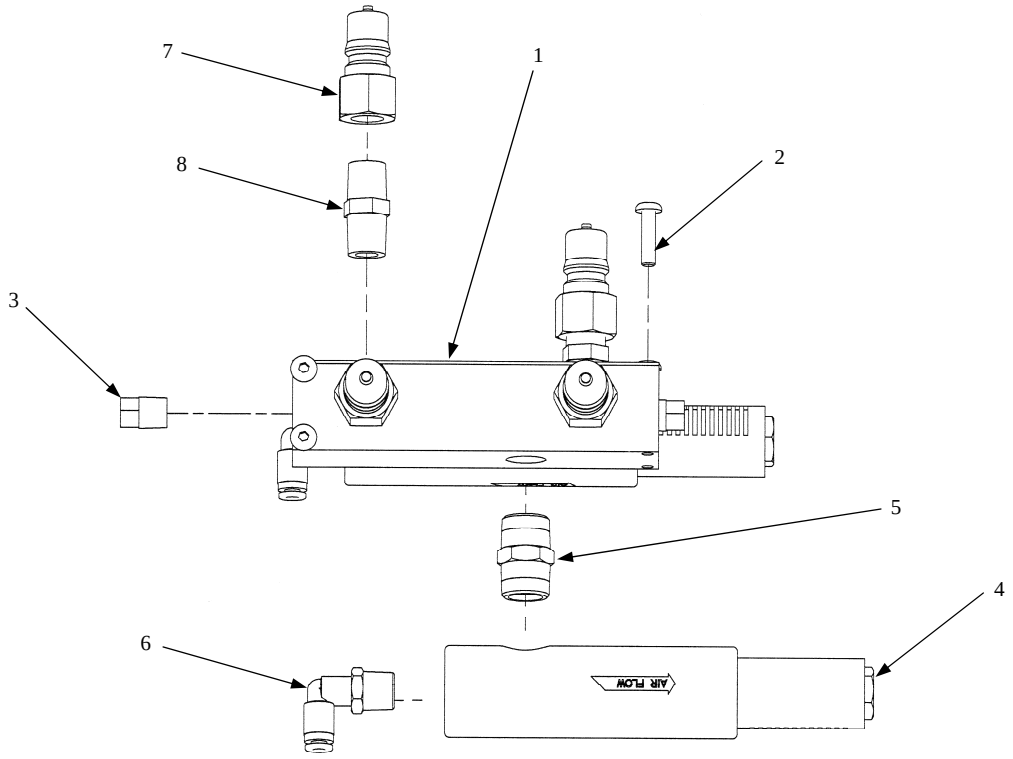

Figure 7-5. Drain Tool Vacuum Group

FIGURE & INDEX / SHEET NO.	PART NUMBER	CAGE	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE	SMR CODE
7-5	08-2504	66144	DRAIN TOOL VACUUM GROUP	1		XB
1	05-2012	66144	. MANIFOLD, UDA, 4-PORT, DRAIN TOOL	1		XB
2	02-3012	66144	. . MACHINE SCREW, #10-32 by 3/4-Inch (AP)	4		XB
3	03-1022	66144	. PLUG, HEX PIPE, 1/4-INCH NPT	2		XB
4	04-8005	66144	. VACUUM GENERATOR, DRAIN TOOL	2		XB
5	03-4003	66144	. . NIPPLE, CLOSE HEX, 3/8-INCH NPT (AP)	2		XB
6	04-8010	66144	. PUSH-TO-CONNECT, 1/4-INCH TUBE BY 1/4-INCH NPT, 90-DEGREE, SW	2		XB
7	03-111397	66144	. QUICK DISCONNECT, 1/4-INCH MALE	4		XB
8	03-10691	66144	. . NIPPLE, CLOSE HEX, 1/4-INCH NPT (AP)	4		XB

- Not Illustrated

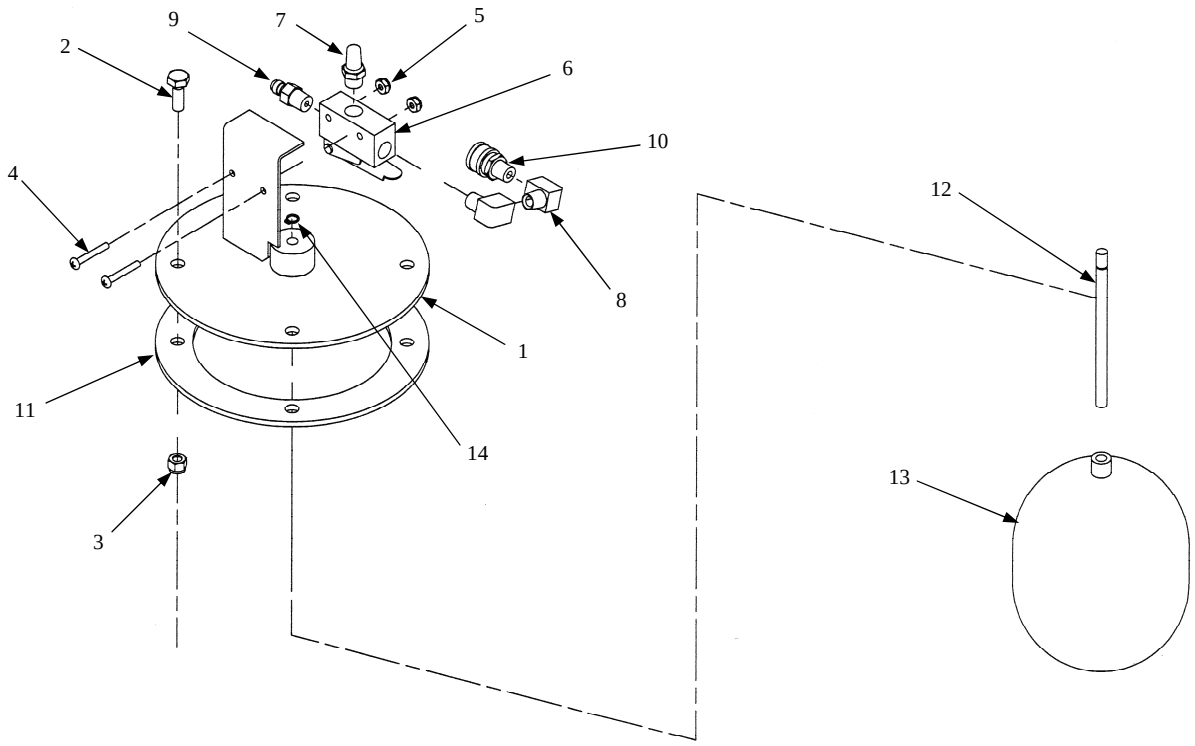

Figure 7-6. Auto Shut-off Assembly

FIGURE & INDEX / SHEET NO.	PART NUMBER	CAGE	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE	SMR CODE
7-6			AUTO SHUT-OFF ASSEMBLY			
	08-1803	66144	ASSEMBLY, AUTO SHUT-OFF, 200 GALLON	1	A	XB
	08-1804	66144	ASSEMBLY, AUTO SHUT-OFF, 400 GALLON	1	B	XB
	08-1805	66144	ASSEMBLY, AUTO SHUT-OFF, 600 GALLON	1	C	XB
1	07-1804	66144	. BODY, FLOAT ROD MOUNT	1		XB
2	02-3034	66144	. BOLT, 1/4-20 BY 3/4-INCH LG (AP)	4		XB
3	02-3088	66144	. NUT, NYLON INSERT, 1/4-20 (AP)	4		XB
4	02-3147	66144	. MACHINE SCREW, #6-32 BY 1-INCH LG (AP)	2		XB
5	02-3148	66144	. NUT, NYLON INSERT, #6-32 (AP)	2		XB
6	04-10326	66144	. . VALVE, Pneumatic Limit Switch	1		XB
7	03-1076	66144	. . MUFFLER, Pneumatic, 1/8-Inch NPT	1		XB
8	03-1070	66144	. . ELBOW, Street, 1/8-Inch NPT	2		XB
9	03-1072	66144	. . QUICK Disconnect, Male, 1/8 by 1/8-Inch NPT	1		XB
10	03-1073	66144	. . QUICK Disconnect, Female,1/8 by 1/8-Inch NPT	1		XB
11	04-10011	66144	. . GASKET, Auto Shut-off	1		XB
-12	05-3002	66144	. . FLOAT Rod, 200 Gallon	1	A	XB
12	05-3003	66144	. . FLOAT Rod, 400 Gallon	1	B	XB
-12	05-3004	66144	. . FLOAT Rod, 600 Gallon	1	C	XB
13	06-1019	66144	. . FLOAT, Plastic Ball	1		XB
14	02-3099	66144	. . . Retaining Clip, 1/4-Inch External (AP)	1		XB
			USABLE ON CODES: A - Part number SV200S-WR07 B - Part number SV416S-WR07 C - Part number SV616S-WR07			

- Not Illustrated

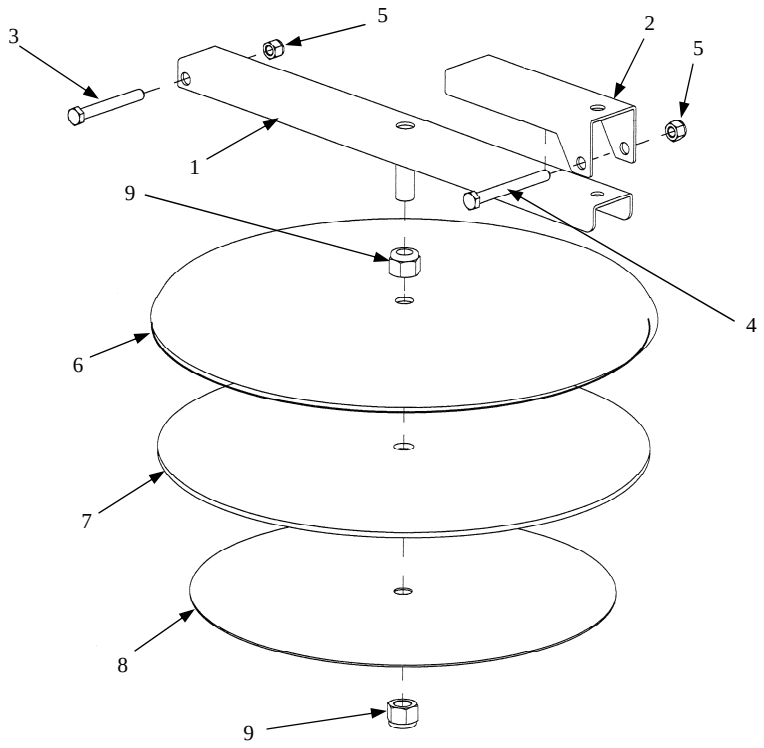

Figure 7-7. Manway Assembly

FIGURE & INDEX / SHEET NO.	PART NUMBER	CAGE	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE	SMR CODE
7-7	08-10251	66144	MANWAY ASSEMBLY	1		XB
1	07-1039S	66144	. WELDMENT, CROSS ARM	1		XB
2	01-8222S	66144	. FLIP LOCK	1		XB
3	02-3042	66144	. BOLT, 3/8-16 BY 3-INCH LG (AP)	1		XB
4	02-3044	66144	. BOLT, 3/8-16 BY 3-1/2-INCH LG (AP)	1		XB
5	02-3089	66144	. NUT, NYLON INSERT, 3/8-16 (AP)	2		XB
6	01-86001	66144	. LID, 16-INCH MANWAY	1		XB
7	06-25025	66144	. GASKET, 16-INCH MANWAY, SV	1		PBOZZN
8	01-8710	66144	. RETAINER, GASKET, SV	1		XB
9	02-3091	66144	. NUT, NYLON INSERT, 5/8-18 (AP)	2		XB

- Not Illustrated

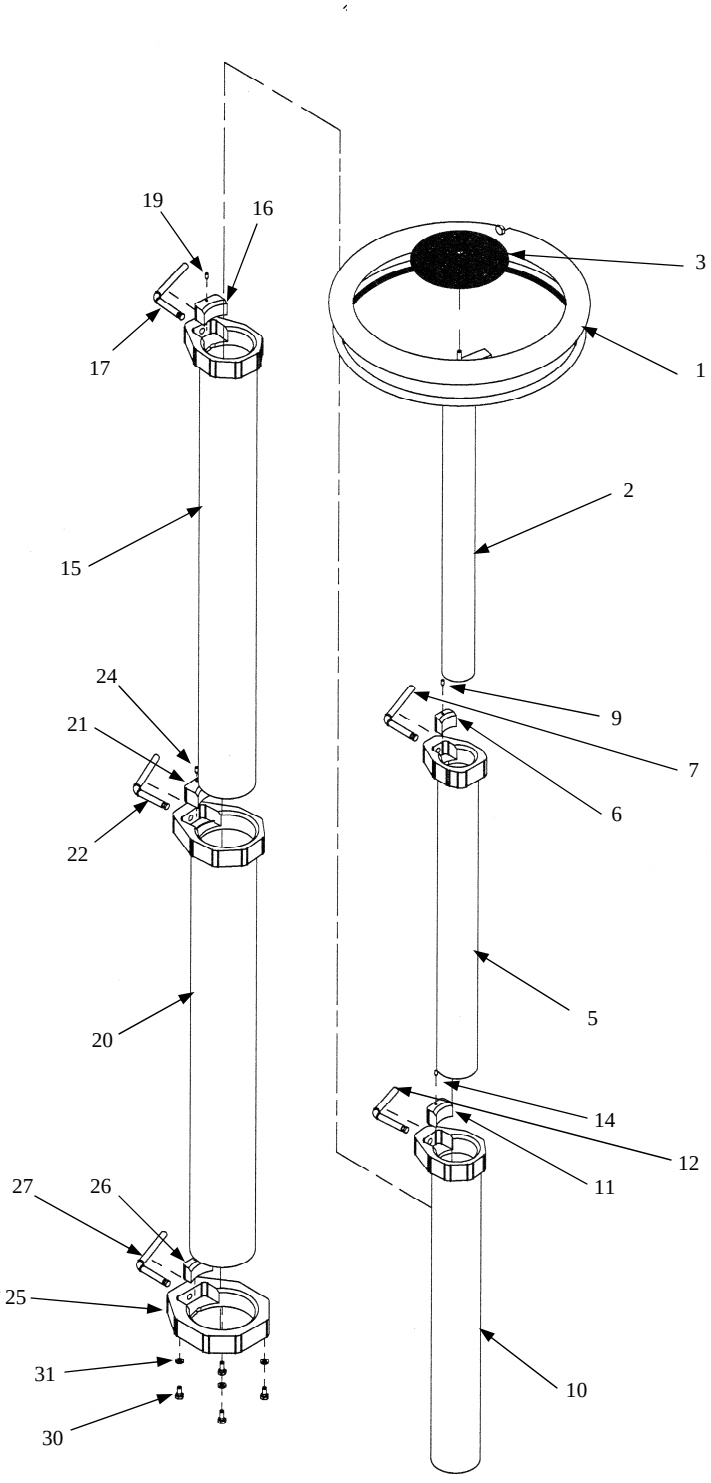

Figure 7-8. Telescoping Funnel Assembly

FIGURE & INDEX / SHEET NO.	PART NUMBER	CAGE	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE	SMR CODE
7-8	08-1034U	66144	TELESCOPING FUNNEL ASSEMBLY	1	B, C	PAOZZN
1	06-1022T	66144	. GASKET, TELESCOPING FUNNEL	1	B, C	PAOZZN
2	07-10541	66144	. ASSEMBLY, FUNNEL SECTION	1	B, C	XB
3	04-1039	66144	. . STRAINER, Telescoping Funnel	1	B, C	PAOZZN
- 4	02-3088	66144	. . NUT, Nylon Insert, 1/4-20 (AP)	1	B, C	XB
5	08-1017U	66144	. 2-1/2-INCH TELESCOPING SECTION	1	B, C	PAOZZN
6	05-10011	66144	. . WEDGE, for 2-Inch Clamp Assy	1	B, C	XB
7	05-10181	66144	. . CLAMP Handle	1	B, C	XB
- 8	04-0094	66144	. . HELI-COIL, 3/8-16 by 1/2-Inch Long	1	B, C	XB
9	02-3113	66144	. . SET SCREW, #8-32 by 11/32-Inch Long (AP)	1	B, C	XB
10	08-1027U	66144	. 3-INCH TELESCOPING SECTION	1	B, C	XB
11	05-10021	66144	. . WEDGE, for 2-1/2-Inch Clamp Assy	1	B, C	XB
12	05-10181	66144	. . CLAMP Handle	1	B, C	XB
- 13	04-0094	66144	. . HELI-COIL, 3/8-16 by 1/2-Inch Long	1	B, C	XB
14	02-3113	66144	. . SET SCREW, #8-32 by 11/32-Inch Long (AP)	1	B, C	XB
15	08-1028U	66144	. 3-1/2-INCH TELESCOPING SECTION	1	B, C	PAOZZN
16	05-10031	66144	. . WEDGE, for 3-Inch Clamp Assy	1	B, C	XB
17	05-10181	66144	. . CLAMP handle	1	B, C	XB
- 18	04-0094	66144	. . HELI-COIL, 3/8-16 by 1/2-Inch Long	1	B, C	XB
19	02-3113	66144	. . SET SCREW, #8-32 by 11/32-Inch Long (AP)	1	B, C	XB
20	07-1014U	66144	. 4-INCH TELESCOPING SECTION	1	B, C	PAOZZN
21	05-10041	66144	. . WEDGE, for 3-1/2-Inch Clamp Assy	1	B, C	XB
22	05-10181	66144	. . CLAMP Handle	1	B, C	XB
- 23	04-0094	66144	. . HELI-COIL, 3/8-16 by 1/2-Inch Long	1	B, C	XB
24	02-3113	66144	. . SET SCREW, #8-32 by 11/32-Inch Long (AP)	1	B, C	XB
25	05-10302	66144	. 4-INCH BASE CLAMP	1	B, C	XB
26	05-10051	66144	. . WEDGE, 4-Inch Clamp	1	B, C	XB
27	05-10181	66144	. . CLAMP Handle	1	B, C	XB
- 28	04-0094	66144	. . HELI-COIL, 3/8-16 by 1/2-Inch Long	1	B, C	XB
- 29	02-3113	66144	. . SET SCREW, #8-32 by 11/32-Inch Long (AP)	1	B, C	XB
30	02-3030	66144	. . BOLT, 1/4-20 by 5/8-inch Long (AP)	4	B, C	XB
31	02-3139	66144	. . WASHER, Lock, 1/4-Inch (AP)	4	B, C	XB
			USABLE ON CODES: A - Part number SV200S-WR07 B - Part number SV416S-WR07 C - Part number SV616S-WR07			

- Not Illustrated

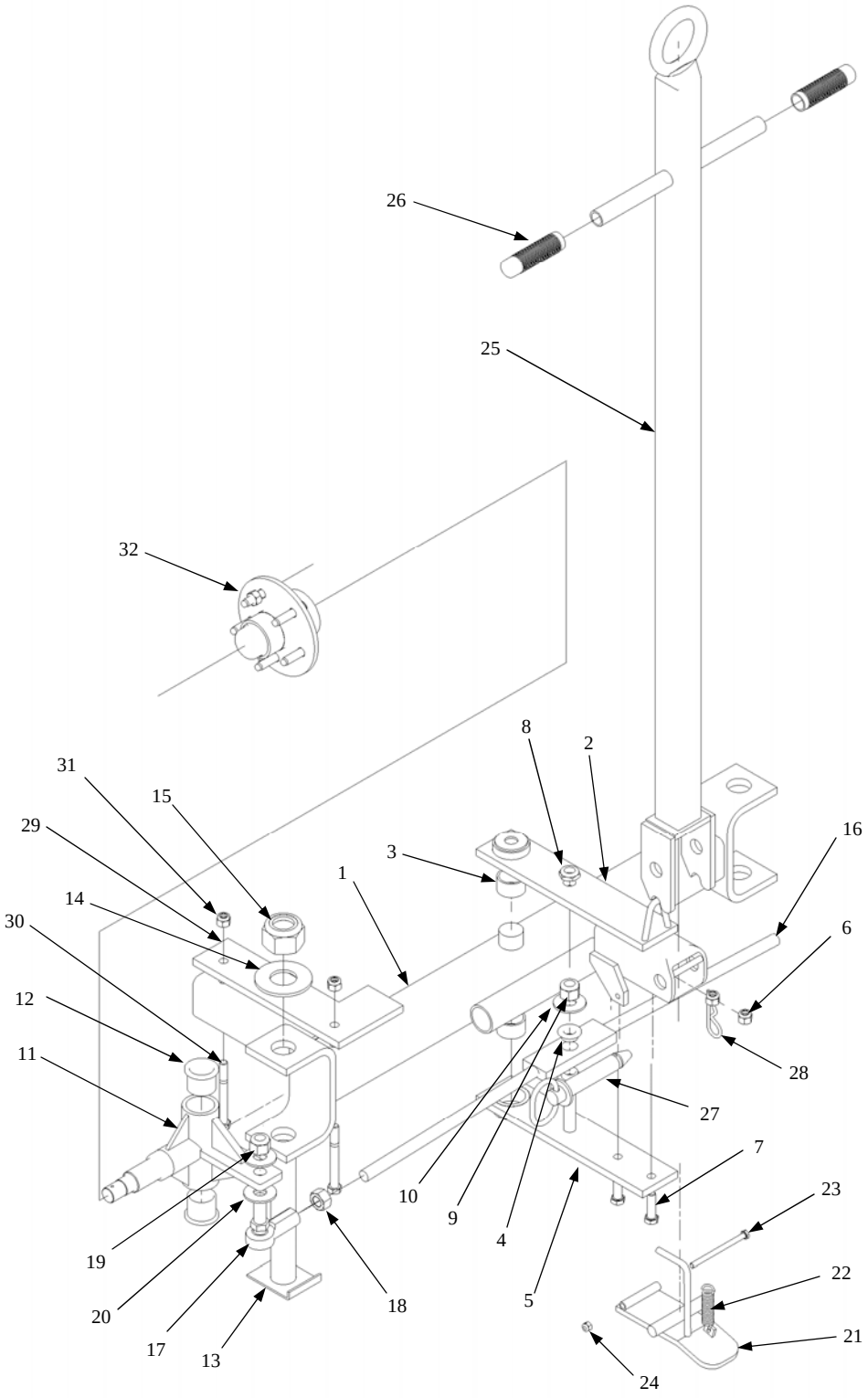

Figure 7-9. Front Undercarriage Assembly

FIGURE & INDEX / SHEET NO.	PART NUMBER	CAGE	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE	SMR CODE
7-9		66144	FRONT UNDERCARRIAGE ASSEMBLY			
	08-1029R1	66144	FRONT UNDERCARRIAGE, 200 GALLON	1	A	XB
	08-1018	66144	FRONT UNDERCARRIAGE, 400/600 GALLON	1	B, C	XB
- 1	07-1053	66144	. WELDMENT, FRONT AXLE, 200 GALLON	1	A	XB
1	07-11071	66144	. WELDMENT, FRONT AXLE, 400/600 GALLON	1	B, C	XB
- 2	07-1052	66144	. STEERING ARM, UPPER, 200 GALLON	1	A	XB
2	07-1104	66144	. STEERING ARM, UPPER, 400/600 GALLON	1	B, C	XB
3	03-1014	66144	. . BUSHING, Steering Arm	2		XB
4	03-1015	66144	. . BUSHING, Tie Rod	2		XB
5	07-5002	66144	. STEERING ARM, LOWER PLATE	1		XB
6	02-3087	66144	. . NUT, Nylon Insert, 1/2-13 (AP)	2		XB
7	02-3022	66144	. . BOLT, 1/2-13 by 1-3/4 Lg. (AP)	2		XB
8	02-3081	66144	. . JAM NUT, Nylon Insert, 3/4-16 (AP)	1		XB
9	02-3095	66144	. . NUT, Nylon Insert, 3/4-16 (AP)	1		XB
10	02-3131	66144	. . WASHER FLAT, 3/4-Inch (AP)	1		XB
11	07-1009	66144	. HOUSING, KING PIN	2		XB
12	03-1013	66144	. . BUSHING, King Pin	4		XB
13	07-10105	66144	. . KING Pin	2		XB
14	02-3127	66144	. . . Washer, Flat, 1-1/2-Inch (AP)	2		XB
15	02-3093	66144	. . . Nut, Nylon Insert, 1-1/2-12 (AP)	2		XB
- 16	07-10371	66144	. TIE ROD ASSEMBLY, 200 GALLON	1	A	XB
16	07-1005	66144	. TIE ROD ASSEMBLY, 400/600 GALLON	1	B, C	XB
17	03-1016	66144	. . ROD END, Ball Joint	2		XB
18	02-3081	66144	. . JAM NUT, Nylon Insert, 3/4-16	2		XB
19	02-3095	66144	. . . Nut, Nylon Insert, 3/4-16 (AP)	2		XB
20	02-3131	66144	. . . Washer, Flat, 3/4-Inch (AP)	4		XB
21	07-1020	66144	. TOE LATCH	1		XB
22	04-1054	1P384	. SPRING, TOE LATCH	1		PAOZZN
23	02-3055	66144	. . BOLT, 5/16-18 by 4-1/2 Lg. (AP)	1		XB
24	02-3090	66144	. . NUT, Nylon Insert, 5/16-18 (AP)	1		XB
25	07-1103	66144	. TOW BAR	1		PBOZZN
26	04-1055	66144	. . HAND GRIP	2		XB
27	02-3063	66144	. . . Hitch Pin (AP)	1		XB
28	02-3016	66144	. . . Pin, Cotter (AP)	1		XB
29	06-1023	66144	. PAD, MOUNTING	2		PAOZZN
30	02-3025	66144	. . BOLT, 1/2-13 by 4-1/2 Lg (AP)	4		XB
31	02-3087	66144	. . NUT, Nylon Insert, 1/2-13 (AP)	4		XB
32	08-1011	66144	. FRONT HUB ASSEMBLY (See Fig. 7-12)	2		XB
- 33	07-10201	66144	. WHEEL ASSEMBLY (See Figure 7-11)	2		XB

USABLE ON CODES:
A - Part number SV200S-WR07
B - Part number SV416S-WR07
C - Part number SV616S-WR07

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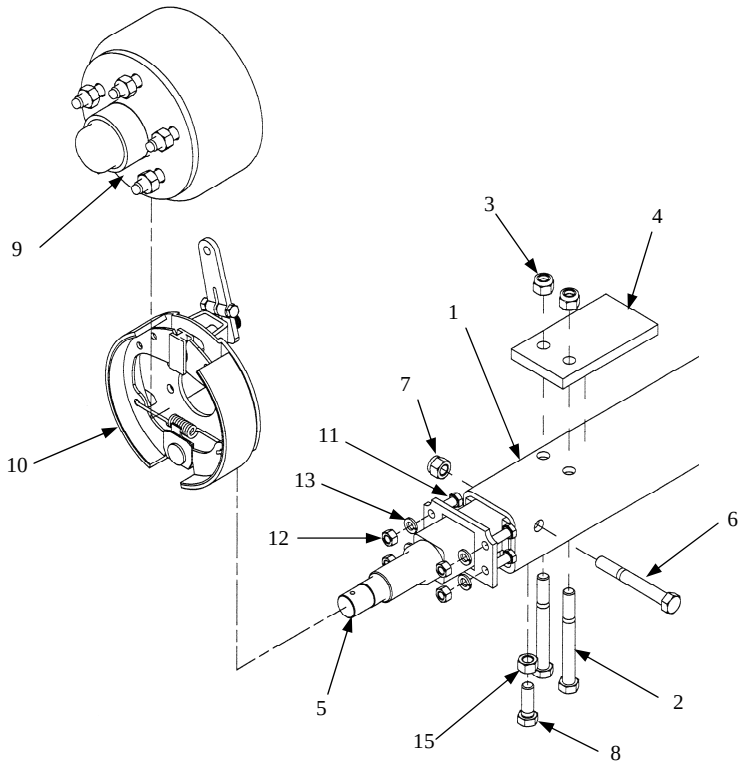

Figure 7-10. Rear Undercarriage Assembly

FIGURE & INDEX / SHEET NO.	PART NUMBER	CAGE	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE	SMR CODE
7-10		66144	REAR UNDERCARRIAGE ASSEMBLY			
	08-10101	66144	ASSEMBLY, REAR UNDERCARRIAGE, 200 GALLON	1	A	XB
	08-10301	66144	ASSEMBLY, REAR UNDERCARRIAGE, 400/600 GALLON	1	B, C	XB
-1	05-1054	66144	. REAR AXLE TUBE, 200 GALLON	1	A	XB
1	05-1023	66144	. REAR AXLE TUBE, 400/600 GALLON	1	B, C	XB
2	02-3025	66144	. BOLT, 1/2-13 by 4/1/2-INCH (AP)	4		XB
3	02-3087	66144	. NUT, NYLON INSERT, 1/2-13 (AP)	4		XB
4	06-1012	66144	. MOUNT PAD, REAR	2		PAOZZN
5	07-1010	66144	. . WELDMENT, Rear Spindle	2		XB
6	02-3024	66144	. . BOLT, 1/2-13 by 4-Inch Lg (AP)	2		XB
7	02-3087	66144	. . NUT, Nylon Insert, 1/2-13 (AP)	2		XB
8	02-3026	66144	. . BOLT, 1/2-13 by 1-1/2-Inch Lg (AP)	2		XB
9	08-10111	66144	. REAR HUB AND DRUM ASSY (SEE FIG. 7-13)	2		XB
10	825155	ORG94	. BRAKE ASSEMBLY	2		XB
11	02-3050	66144	. . BOLT, 3/8-16 by 1-Inch Long (AP)	8		XB
12	02-3072	66144	. . NUT, 3/8-16 (AP)	8		XB
13	02-3143	66144	. . LOCK WASHER, 3/8 (AP)	8		XB
- 14	07-10201	66144	. WHEEL ASSEMBLY (SEE FIG. 7-11)	2		XB
15	02-3068	66144	. NUT, 1/2-13, PLATED	2		XB
			USABLE ON CODES: A - Part number SV200S-WR07 B - Part number SV416S-WR07 C - Part number SV616S-WR07			

- Not Illustrated

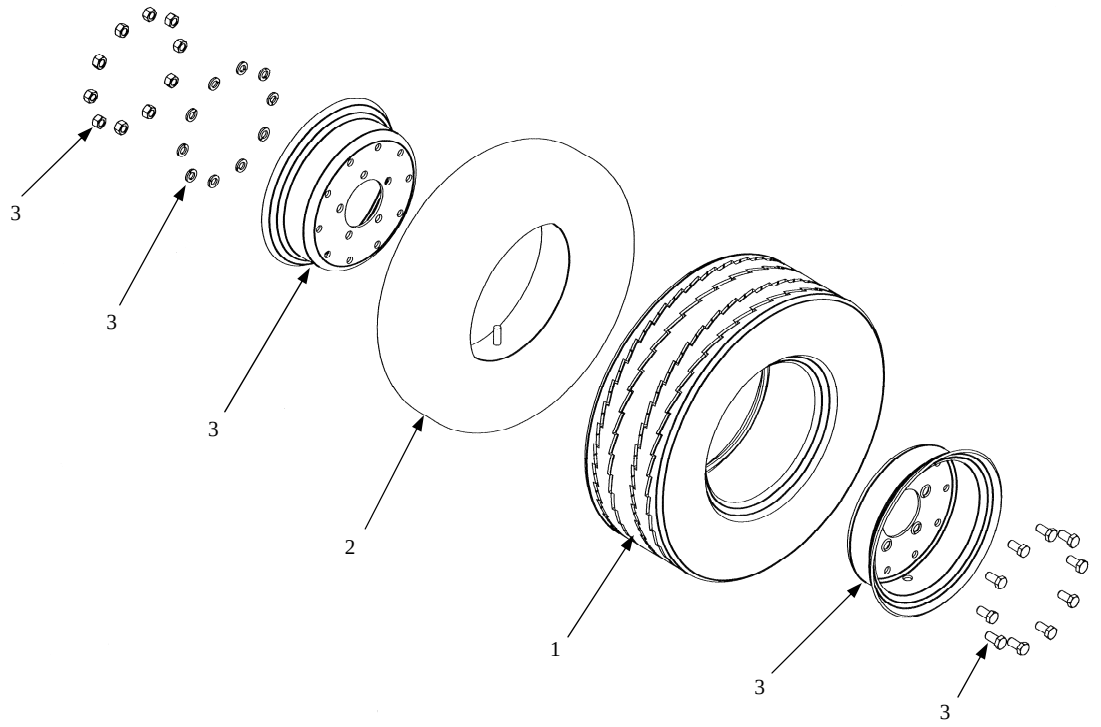

Figure 7-11. Wheel Assembly

FIGURE & INDEX / SHEET NO.	PART NUMBER	CAGE	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE	SMR CODE
7-11	07-10201	66144	WHEEL ASSEMBLY	4		XB
1	04-10221	66144	. TIRE, 20.5 x 8.0-10, E-RANGE	1		PAOOOP
2	04-1045	66144	. TUBE, INNER	1		PBOZZN
3	04-1020	66144	. SPLIT RIM WHEEL ASSEMBLY	1		XB

- Not Illustrated

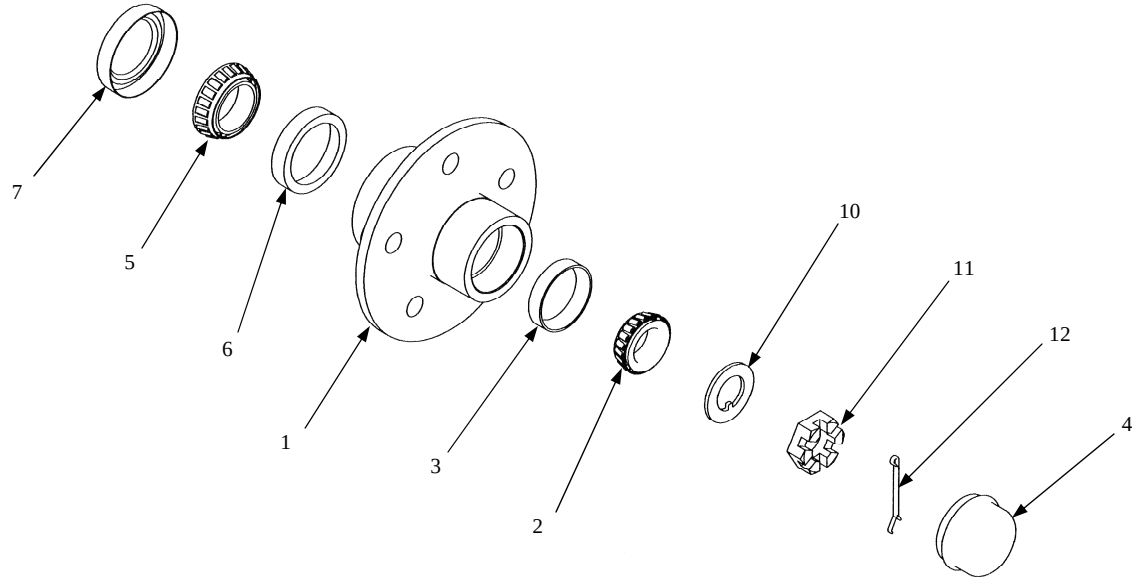

Figure 7-12. Front Hub Assembly

FIGURE & INDEX / SHEET NO.	PART NUMBER	CAGE	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE	SMR CODE
7-12	08-1011	66144	FRONT HUB ASSEMBLY	2		XB
1	04-1017	66144	. HUB, FRONT AXLE	1		PBOZZN
2	L44649	60038	. . BEARING, Outer	1		PAOZZN
3	04-1016	66144	. . RACE, Outer Bearing	1		XB
4	04-1019	66144	. . CAP, Dust	1		XB
5	L68149	60038	. . BEARING, Inner	1		PAOZZN
6	L6811	60038	. . RACE, Inner Bearing	1		PAOZZN
7	CR17146	80201	. . SEAL, Bearing	1		PAOZZN
- 8	02-1017	66144	. . STUD, Wheel	5		XB
- 9	02-3065	66144	. . . NUT, Lug (AP)	5		XB
10	02-12055	66144	. . . WASHER, Spindle (AP)	1		XB
11	02-1205	66144	. . . NUT, Castle (AP)	1		XB
12	02-3018	66144	. . . PIN, Cotter (AP)	1		XB

- Not Illustrated

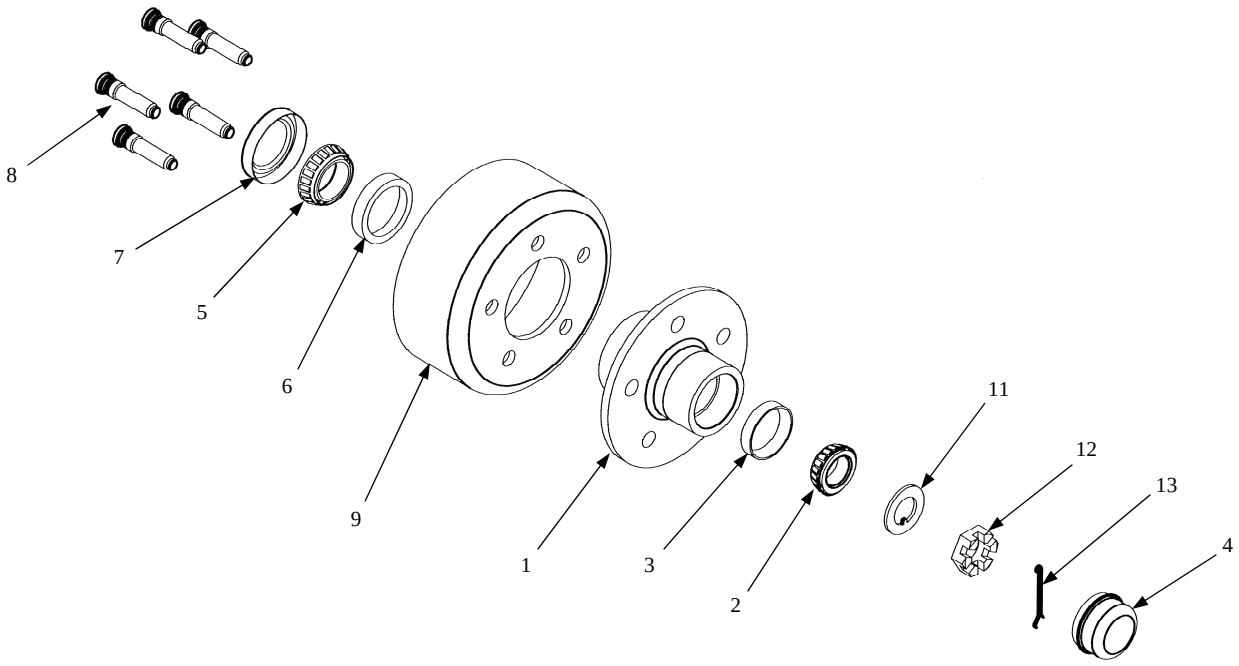

Figure 7-13. Rear Hub Assembly

FIGURE & INDEX / SHEET NO.	PART NUMBER	CAGE	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE	SMR CODE
7-13	08-10111	66144	REAR HUB ASSEMBLY	2		XB
1	05-1020	66144	. HUB, REAR AXLE	1		PBOZZN
2	L44649	60038	. . BEARING, Outer	1		PAOZZN
3	04-1016	66144	. . RACE, Outer Bearing	1		XB
4	04-1019	66144	. . CAP, Dust	1		XB
5	L68149	60038	. . BEARING, Inner	1		PAOZZN
6	L6811	60038	. . RACE, Inner Bearing	1		PAOZZN
7	CR17146	80201	. . SEAL, Bearing	1		PAOZZN
8	02-1017	66144	. . STUD, Wheel	5		XB
9	05-1021	66144	. . DRUM, Brake	1		XB
- 10	02-3065	66144	. . . NUT, Lug (AP)	5		XB
11	02-12055	66144	. . . WASHER, Spindle (AP)	1		XB
12	02-1205	66144	. . . NUT, Castle (AP)	1		XB
13	02-3018	66144	. . . PIN, Cotter (AP)	1		XB

- Not Illustrated

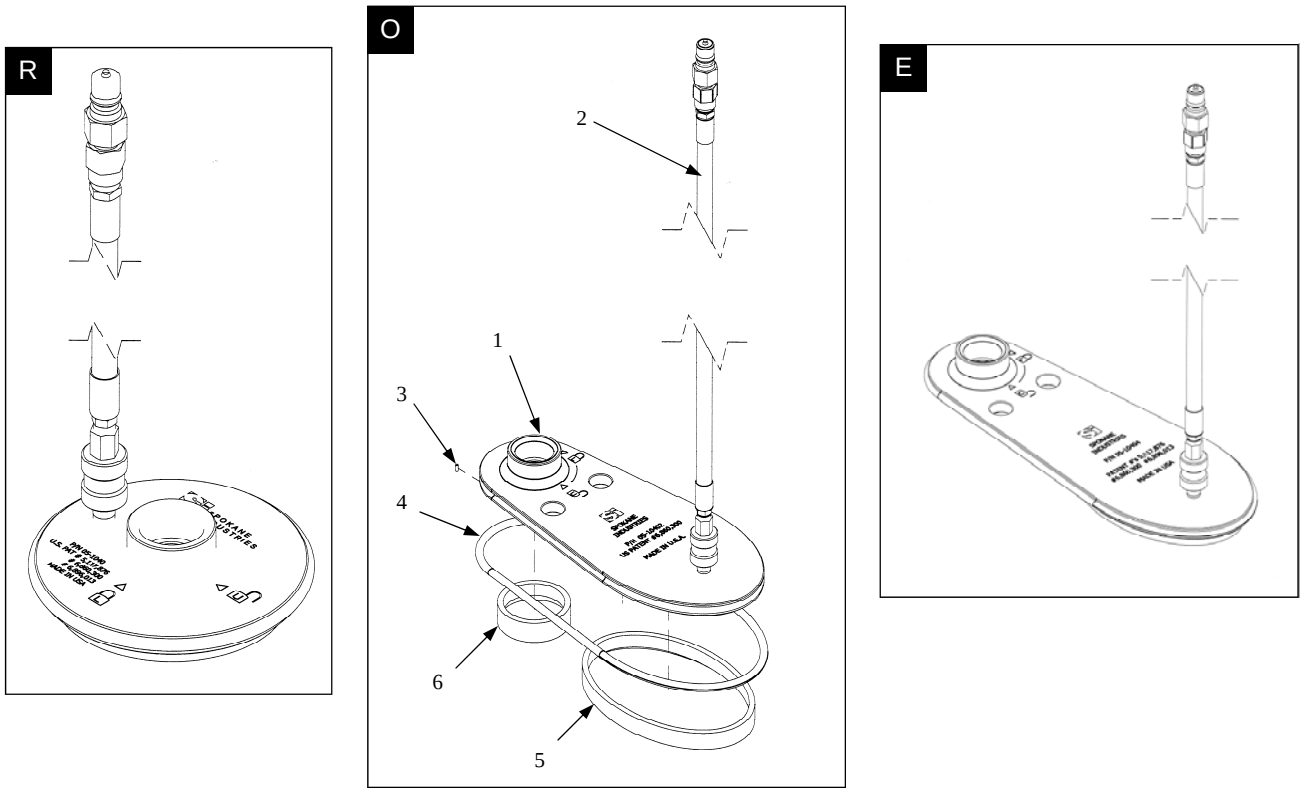

Figure 7-14. Drain Tool Assemblies

FIGURE & INDEX / SHEET NO.	PART NUMBER	CAGE	DESCRIPTION 1 2 3 4 5 6 7	UNITS PER ASSY	USABLE ON CODE	SMR CODE
7-14			DRAIN TOOL ASSEMBLIES			
	08-0200	66144	DRAIN TOOL ASSEMBLY, ROUND	1		XB
	08-0300	66144	DRAIN TOOL ASSEMBLY, OVAL	1		XB
	08-0310	66144	DRAIN TOOL ASSEMBLY, ELONGATED	1		XB
- 1	05-1040	66144	. DRAIN TOOL BODY, MACHINED, ROUND	1	R	XB
1	05-10402	66144	. DRAIN TOOL BODY, MACHINED, OVAL	1	O	XB
- 1	05-10404	66144	. DRAIN TOOL BODY, MACHINED, ELONGATED	1	E	XB
2	08-1505	66144	. . HOSE Assembly, Drain Tool Vacuum	1		XB
3	02-3102	66144	. . ROLL Pin, 3/32 by 1/4-Inch Lg	1		XB
- 4	06-00688	66144	. . O-RING, Bumper for Round	1	R	XB
4	06-00685	66144	. . O-RING, Bumper for Oval	1	O	XB
- 4	06-00686	66144	. . O-RING, Bumper for Elongated	1	E	XB
- 5	06-0075	66144	. . SEAL, Vacuum Area, Round	1	R	XB
5	06-0077	66144	. . SEAL, Vacuum Area, Flat	Note 1	O, E	XB
- 5	06-00774	66144	. . SEAL, Vacuum Area, Contoured	Note 1	O, E	XB
- 6	06-0074	66144	. . SEAL, Fuel Hub, Short	1	R	XB
6	06-0073	66144	. . SEAL, Fuel Hub, Tall	1	O, E	XB
			USABLE ON CODES: E - Drain Tool, Elongated O - Drain Tool, Oval R - Drain Tool, Round			
			NOTE: 1) Qty 1 of either part number required per drain tool.			

- Not Illustrated

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