SPOKANE INDUSTRIES

SealVac™ FUEL Drain System
TECHNICAL MANUAL
PARTS, OPERATION AND MAINTENANCE

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SPOKANE INDUSTRIES

SealVac™ FUEL Drain System
Models SVU100, SVU125, SVU150 & SVU200
TECHNICAL MANUAL

PARTS, OPERATION AND MAINTENANCE

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Universal drain assembly (Fuel Drain System) Back of Manual

1.0 INTRODUCTION

1.1 To obtain optimum benefit from your *SealVac*™ unit, it is recommended that all personnel operating it read and understand this manual prior to operation.

1.2 Upon receipt of the *SealVac*™ unit, a visual inspection should be made to determine that it is complete and has not sustained any damage during transportation.

2.0 SAFETY

2.1 Potential Fire Or Explosion

2.1.1 Due to the nature of fuel, care should be exercised to eliminate all sparks and open flame in the area of the unit.

2.1.2 A 50 foot radius area around the unit for no smoking, sparks, or open flames is usually a good practice.It is strongly recommended all local or other regulations be consulted for further restrictions.

CAUTION: The *SealVac*™ unit should never be used inside of an enclosed area. Proper ventilation is required at all times.

2.2 Telescoping Drain

2.2.1 Care should be exercised in using the telescope to prevent injury fingers between clamps by dropping sections.

2.3 Grounding

2.3.1 To eliminate static sparks, the unit is equipped with grounding reels which should be connected prior to draining or filling operations.

2.4 Towing

2.4.1 Make sure the tow bar is securely attached to the towing vehicle.

2.4.2 Before moving the bowser unit, check to assure the parking brake is released.

2.4.3 Maximum allowable towing speed is 15 MPH.

2.5 Parking

2.5.1 Parking brake must be applied when filling and draining or when left unattended.

2.6 Air Supply

2.6.1 Caution: Check the air pressure of supply lines to the vacuum generator to assure it is not in excess of 100 PSI.

2.7 Inspections

2.7.1 Inspection of tires, undercarriage, tow bar, vent, valves, hoses, sight gauge, reflectors, safety labels, etc., should be inspected on a periodic basis. It is recommended these inspections be performed weekly.

2.7.2 Internal inspection will be necessary to insure structural integrity and cleanliness. It is recommended that interval inspections be performed at least every (6) six months.

2.8 Vacuum Manway

2.8.1 Insure the manway cover is provided with a "lock out" devised to prevent accidental closing of the manway while doing internal inspections and to prevent unwanted elements from being introduced to the fuel supply.

2.9 Hoses

2.9.1 Inspect hoses daily prior to usage. The hoses should be extended, as it normally would be for operating. Check for evidence of blistering, carcass saturation or separation, cuts, nicks or abrasions that expose reinforcement materials. Look for slippage, misalignments or leaks at the couplings; if coupling slippage or leaks are found the cause of the problem shall be determined. All defective hoses should be removed for service.

2.10 Vacuum Governor

2.10.1 The *SealVac*™ unit is provided with a pre-adjusted vacuum governor. See maintenance for adjusting.

Caution! When entering confined spaces such as the interior of the *SealVac*™ unit, care should be taken to provide proper breathing equipment and a separate person dedicated solely to a safety watch of the person inside. It is strongly recommended that all local or other regulations be consulted.

3.0 OPERATION

3.1 Intended Use

3.1.1 The unit is intended for use in draining and collection of fuel from aircraft and the transportation to a disposal site.Any other use is prohibited and may void any and all warranties.

3.2 Parking Brake

3.2.1 The unit is equipped with a mechanically operated parking brake. The brake should be applied prior to disengaging tow bar. The brake should be applied when filling, or draining tank, or whenever left unattended.

3.3 Tow Bar and Undercarriage

3.3.1 The unit is equipped with steerable front wheels controlled by the tow bar.

3.3.2 Care should be taken not to jackknife the unit when backing up.

3.3.3 Tire inflation should be checked and maintained as described in the maintenance section.

3.3.4 Before towing, check to see the brake is disengaged, grounding reels and hoses are disconnected, valves are closed, tow bar is securely attached to the towing vehicle, telescoping drain is collapsed and its lid is closed and secured, that the manway and vacuum covers are closed, secured and latched.

3.3.5 The unit is equipped with a tow bar latch to hold it in the upright position.

3.4 Telescoping Drain Assembly

3.4.1 The unit is equipped with a telescoping drain assembly. That is capable of being adjusted up to 16'0" high.

3.4.2 To Raise:

(1) Loosen top clamp if necessary.
(2) Grasp top section with one hand and lift until the top clamp raises approximately 6 inches.
(3) Tighten clamp securely with the other hand.
(4) Reposition lifting hand by grasping tube below tightened clamp and lift until next clamp is raised approximately 6 inches.
(5) Repeat steps 1-4 until desired height is obtained or assembly is fully extended.

3.4.3 To Lower:

(1) Tightly grasp bottom extended tube with one hand and loosen the securing clamp.
(2) Slowly lower tube, hand over hand, until the following clamp is resting on the loosed clamp.
(3) Repeat steps 1 and 2 until all sections are lowered.

3.4.4 Funnel is equipped with a nitrile rubber seal around the top edge to allow placement against the underside of a wing.

3.4.5 When not in use, telescope should be collapsed and the cover closed to eliminate contamination.

3.5 Vacuum Assembly

3.5.1 This assembly is equipped with an air powered vacuum generator.

3.5.2 It is intended for vacuum draining or depuddling fuel and condensation.

Caution! If other objects such as rock or metallic pieces are vacuumed into the vacuum chamber, they may create a hazard due to sparks.

3.5.3 Vacuum is started by attaching a recommended air supply of 60CFM at 100 PSI and turning on the air supply valve.

3.5.4 The vacuum chamber is equipped with a screened drain opening. This opens directly into the main tank.

3.5.5 The vacuum generator is equipped with an autovac shutoff mechanism preventing overflowing. When the level of product is full, the valve shuts off and eliminates the vacuum. The vacuum chamber will then automatically drain.

3.5.6 The vacuum assembly is supplied with 50 feet of vacuum hose and a ball valve on the vacuum suction outlet.

3.5.7 The vacuum assembly is equipped with (4) four each 1/2" NPT opening for use with pencil drains. To use, the pipe caps must be removed and self-closing quick disconnects attached that match local standards. To operate, close vacuum suction valve, turn air supply on and connect drain lines.

3.6 Grounding Reels

3.6.1 The unit is supplied with grounding reels.

3.6.2 Before filling, draining, or vacuuming, the grounding reels must be attached to the aircraft or object being serviced and an appropriate ground.

3.7 Drain Valves

3.7.1 The unit is equipped with a 1-1/2" NPT ball valve with a camlock connector.

3.8 Sample Port

3.8.1 The unit is equipped with a 1/2" NPT valve for use as a sample port.

3.9 Telescoping Drain Strainer

3.9.1 The unit is equipped with a sump with removable bottom to allow cleaning of the drain strainer.

3.10 Vacuum Manway

3.10.1 The *SealVac*™ unit is equipped with a quick opening manway assembly for internal inspections.

3.10.2 The manway is equipped with a flip locking cross arm assembly to ensure sealing and securing the cover in place.

3.11 Vacuum Governor

3.11.1 The vacuum governor has been preset at the factory and needs no further adjustments. See maintenance should adjustments or replacement be needed.

4.0 MAINTENANCE

4.1 Parking Brake

4.1.1 The unit is equipped with a parking brake assembly consisting of a 7" diameter brake drum with 2-1/4" wide brake shoes.

4.1.2 The shoes are activated via a mechanical linkage, eccentric and lever.

4.1.3 Adjustment may be necessary as the shoes wear.

(1) Tightening is accomplished by removing the bolt through one yoke and screwing yoke in to shorten connecting rod.

(2) Do not over tighten or brakes may drag when released.

4.1.4 Replacement of shoes.

(1) Remove wheel.
(2) Remove nut retaining hub and drum assembly.
(3) Disconnect actuating rod.
(4) Remove shoe retainers.
(5) Install new shoes.
(6) Replace shoe retainers.
(7) Adjust actuator rod length.
(8) Replace wheel.

4.2 Under Carriage and Tow Bar

4.2.1 The unit is equipped with steerable front wheels, fixed rear wheels, and a tow bar.

4.2.2 Maintenance should consist of the following:
(1) King pin bushing, turning bushings and tie rod ends are self lubricating and need no additional maintenance.
(2) Pack wheel bearing at intervals not to exceed three (3) months.
(3) Check tire pressure weekly. Pressure should be maintained at 60 PSI.

4.2.3 Tow bar pivot pin and hook ring should be inspected monthly for excessive wear or cracks.

4.3 Telescoping Drain Assembly

4.3.1 The telescoping Drain Assembly consists of stainless steel housing permanently attached to the tank and multible tube sections.

4.3.2 The stainless tube and four largest aluminum tubes are equipped with a clamp assembly.

4.3.3 Each aluminum tube is crimped on the lower end which acts as a stop to prevent the tube from sliding through the clamp.

4.3.4 Disassembling of the telescope assembly is accomplished by rotating the four sections 180 degrees from normal position and gently lifting each section so that the crimped edge on the tube is aliened with the slot on the clamp.

4.4 Vacuum Assembly

4.4.1 The vacuum assembly consists of a vacuum chamber with an air powered vacuum generator mounted on a removable cover. The cover is held in place by three (3) latches.

4.4.2 The vacuum chamber is equipped with an autovac shut off mechanism. Lable each air hose and locations prior to disconnecting for maintainance. The assembly is pre-adjusted at the factory and should not need further adjustment.

4.4.3 The vacuum cover is equipped with an overflow valve which should require no maintenance.

4.4.4 The vacuum generator is attached to the chamber cover. It is equipped with an exhaust silencer which should be cleaned at six (6) month intervals or more often depending on the amount of use and conditions.

4.4.5 The vacuum hose should be inspected monthly for cracks. Any sudden loss of vacuum suction power may indicate a crack in the vacuum hose.

4.4.6 The cover gasket should be inspected monthly for deterioration. This gasket should be pliable and free from weather checking.

4.5 Grounding Reels

4.5.1 Grounding reel cables should be pulled out, cleaned and inspected monthly.

4.5.2 Cable clamps and ends should be inspected for loose connections monthly.

4.6 Sight Gauge

4.6.1 The sight gauge should be inspected monthly for loose connections and weathering of clear tubing.

4.7 Vacuum Manway

4.7.1 Inspect the manway gasket weekly for cuts, cracks and galling. Replace as needed.

4.8 Vent Overflow Preventor

4.8.1 The vent overflow preventor is located inside the tank directly under the vent.

4.8.2 It consists of a caged float with an elastomer seal.

4.9 Vacuum Governor

4.9.1 The vacuum governor has been preset at the factory and should need no further adjustments.

4.9.2 Should adjustments be required:

(1) A ½" nipple on the lid of the vacuum pot is provided for the attachment of a vacuum gauge.

(2) The air supply must be started from 0 pressure and slowly open while simultaneously adjusting the vacuum governor until you reach the desired operating range.

CAUTION: (1) The governor **must not** be adjusted outside of the designed operating range and to do so may damage the tank. Improper adjustments will nullify the factory warranty.

4.10 TROUBLE SHOOTING

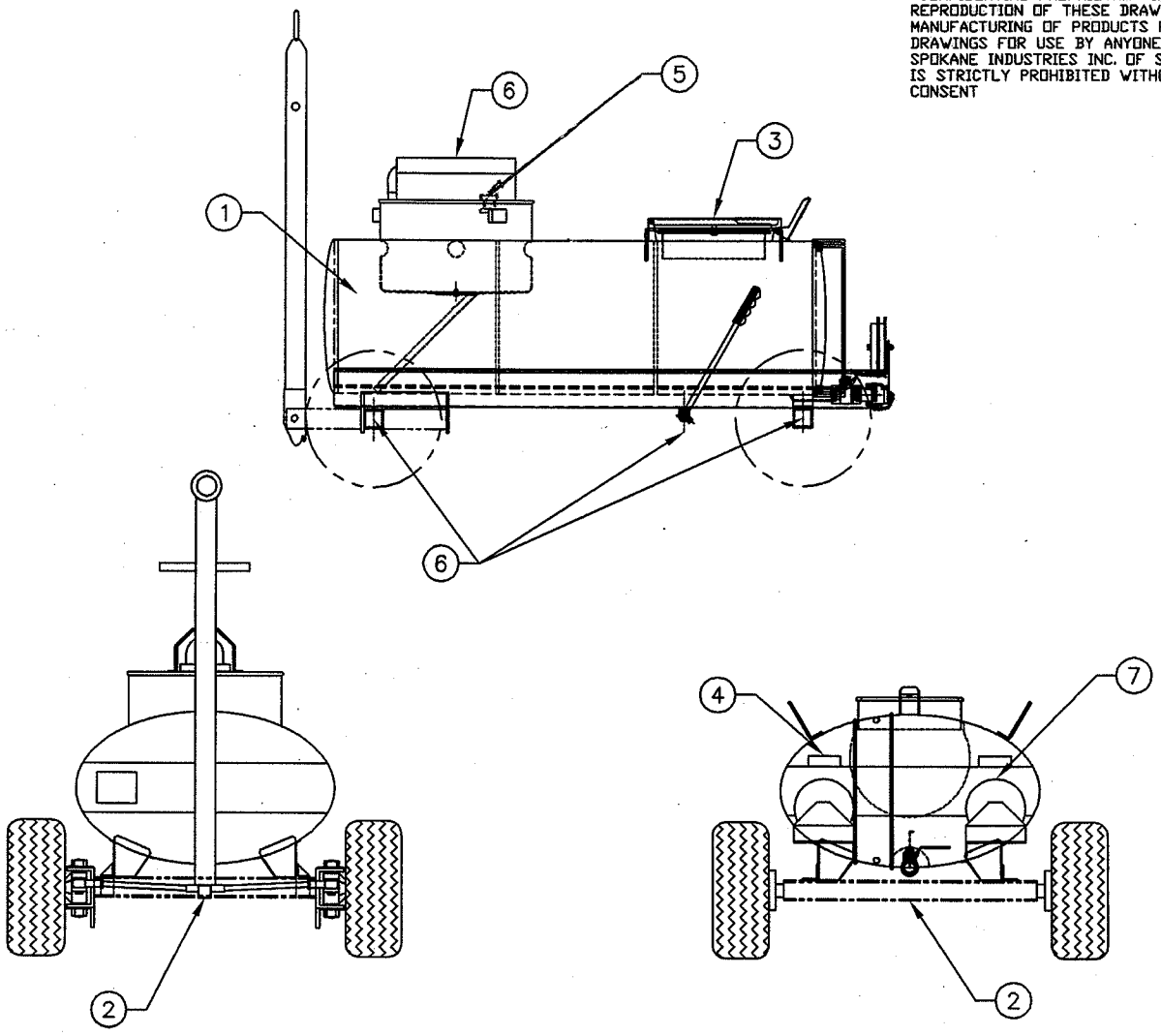
SYMPTOM	PROBABLE CAUSE	PROBABLE CORRECTIONS
The unit does not track or steer correctly or steers Loosely	Bent King Pin housing see see section 5.2.1 Item#7	Replace King Pin Housing
	Defective Tie Rod End see section 5.2.1 Item#12	Replace Tie Rod End
	Loose or worn out Bushings see section 5.2.1 Items#11,16 or 18	Replace as needed
Toe Bar does not stay in The upright position	Broken or stretched spring see section 5.2.1 Item #26	Replace as needed
Parking Brake does not work	Needs adjustment	Adjust as per instructions in sections 4.1.0
	Needs repairing	Replace as needed see section 5.2.3
Vacuum System does not Have much suction	Defective lower drain stop gasket see section 5.6 Item#2	Replace as needed
	Not enough air pressure to operate generator, see section 3.5.3 and 4.4	Increase air pressure and volume
	Plugged outlet Filter see section 5.6	Replace or clean as required
Telescoping Drain wont stay up	Loose clamp handles	Tighten handles a little tighter
Telescoping Drain is over flowing	Tank is full	Empty main tank
	Clogged screen or strainer, see section 4.7 and or 5.5	Remove and clean as required

5.0 REPLACEMENT PARTS

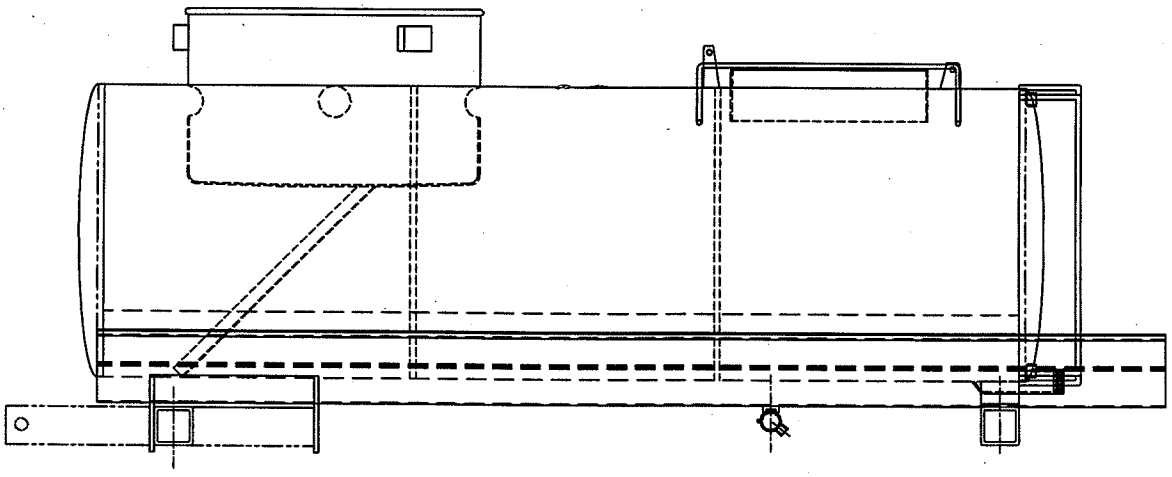
This section provides information for identification of parts for ordering. To order, it is important to have the Model Number, Subassembly Number, Part Number and Description. Parts may be ordered by calling or writing to:

Spokane Industries, Inc.
Fuel Bowser Division
P.O. Box 3303
Spokane, WA 99220-3303
Telephone: (509)928-0720
Tele Fax:(509)927-0826

You are welcome to visit us at SpokaneIndustries.com



Item No.	Description	Section
1	Main Tank	5.1
2	Axle, Front	5.2.1
2	Axle, Rear	5.2.2
2	Brake, Parking	5.2.3
2	Wheel Assembly, Front	5.2.4
2	Wheel Assembly, Rear	5.2.5
3	Vacuum Manway	5.3
4	Decal Package	5.4
5	Vacuum Governor	5.5
6	Vacuum Assembly	5.6
7	Miscellaneous Fixtures	5.7

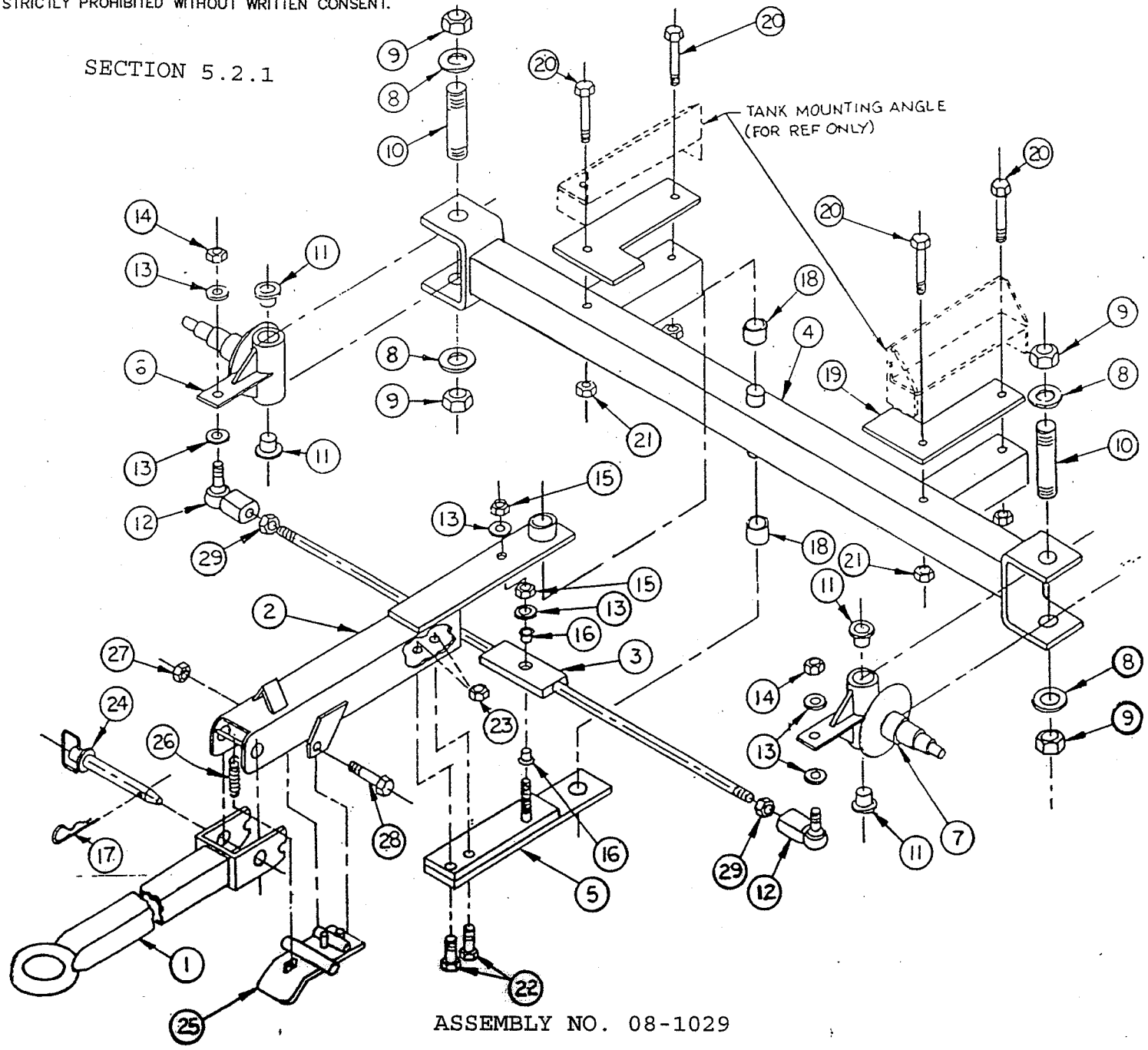


ASSEMBLY NO. SMP-19235

MAJOR ASSEMBLY - TANK WELDMENT

Item	Sub Assy.	Part No.	Qnt.	Description	Wt.#
1		SMP-19235	1	Stainless Steel Tank Weldment	398

SECTION 5.2.1



ASSEMBLY NO. 08-1029

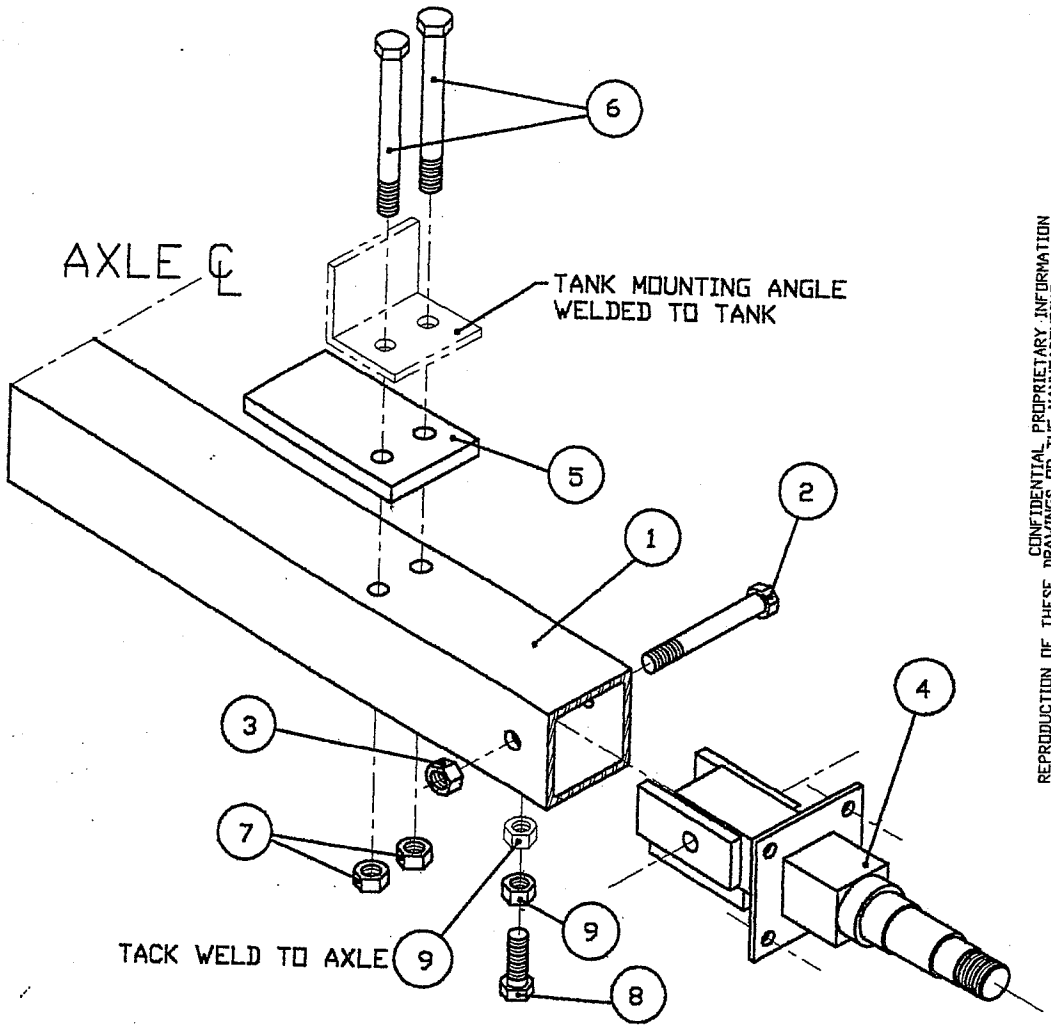
MAJOR ASSEMBLY - AXLE ASSEMBLY

Sub Assy.	Item	Part No.	Quantity	Description	Wt.#
08-1029				Axle, Assembly, Front	
	1	07-1103	1	Tow Bar	23
	2	07-1052	1	Arm, Turning	16
	3	07-10371	1	Tie Rod	7.3
	4	07-1053	1	Axle, Front	53

ASSEMBLY NO 08-1029

MAJOR ASSEMBLY - AXLE ASSEMBLY (CONTINUED)

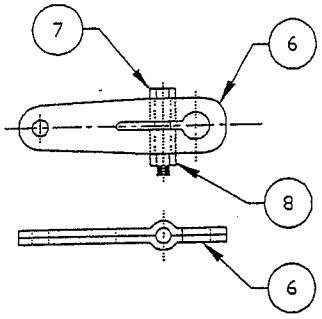
Sub Assy.	Item	Part No.	Quantity	Description	Wt.#
	5	07-1046	1	Steering Arm, Lower Plate	6.1
	6	07-1009	1	Sleeve, King Pin, Right	24
	7	07-1009	1	Sleeve, King Pin, Left	24
	8	02-11131	4	Washer, King Pin	1
	9	02-12131	4	Nut, King Pin	2
	10	05-1010	2	King Pin	11
	11	03-1013	4	Bushing, King Pin Sleeve	1
	12	03-1016	2	Ends, Tie Rod	5
	13	02-11072	5	Washers, Tie Rod	
	14	02-12071	2	Nuts, Tie Rod Ends	1
	15	02-12071	1	Nut, Tie Rod Pivot	.5
	16	03-1015	2	Bushing, Tie Rod Pivot	.8
	17	02-1300	2	Cotter Pin	.2
	18	03-1014	2	Bushing, Axle Pivot	1
	19	06-1023	2	Mounting Pad, Tank	4
	20	02-1503	4	Bolts, Tank Mounting	1.3
	21	02-12041	4	Nuts, Tank Mounting	.5
	22	02-1502	2	Bolts, Turning Arm Clamp	.32
	23	02-12041	2	Nuts, Turning Arm Clamp	.2
	24	02-1304	1	Hitch Pin	2
	25	07-1020	1	Toe Latch	3.1
	26	04-1054	1	Spring, Toe Latch	.5
	27	02-12012	1	Nut, Toe Latch	.1
	28	02-1501	1	Bolt, Toe Latch	.2
	29	02-12141	2	Hex Nut, Tie Rod	.2



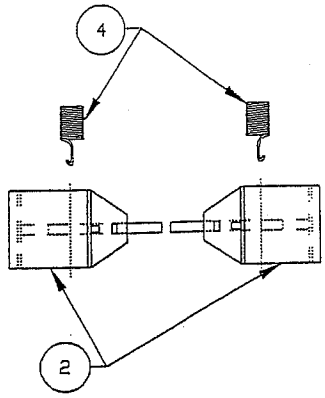
ASSEMBLY NO. 08-1030ZR

MAJOR ASSEMBLY - AXLE ASSEMBLY (CONTINUED)

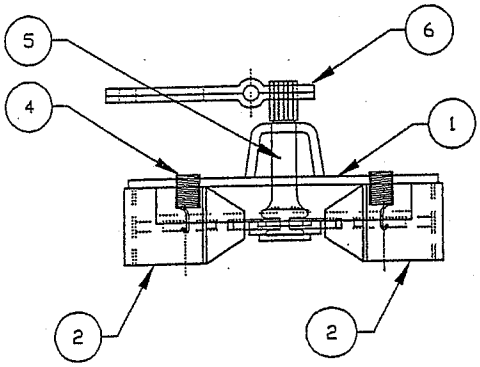
08-1030ZR				Axle Assembly, Rear	
	1	05-1054	1	Axle, Rear Weldment	40
	2	02-1505	2	Bolts, Mounting Spindle	.6
	3	02-12041	2	Nuts, Mounting Spindle	.5
	4	07-1010R	2	Spindle, Rear	17
	5	06-1012	2	Mounting Pad, Tank	1
	6	02-1503	4	Bolt, Tank Mounting	1.3
	7	02-12041	4	Nuts, Tank Mounting	.5
	8	02-10041	2	Bolt, Spindle Stablizer	.5
	9	02-1203	4	Nuts, Spindle Stablizer	.5



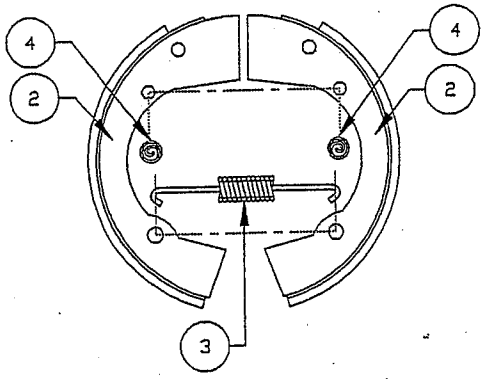
CAM LEVER OPERATOR DETAIL



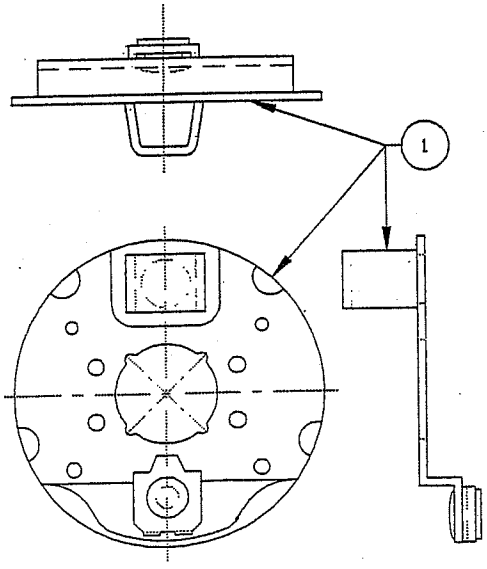
BRAKE SHOE / HOLD DOWN SPRING DETAIL



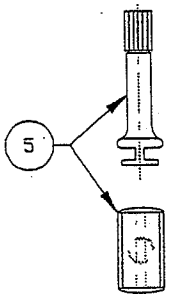
BRAKE/CAM/LEVER/BACKING PLATE ASSY



BRAKE SHOE / SPRING ORIENTATION
RETURN SPRING



BACKING PLATE DETAIL



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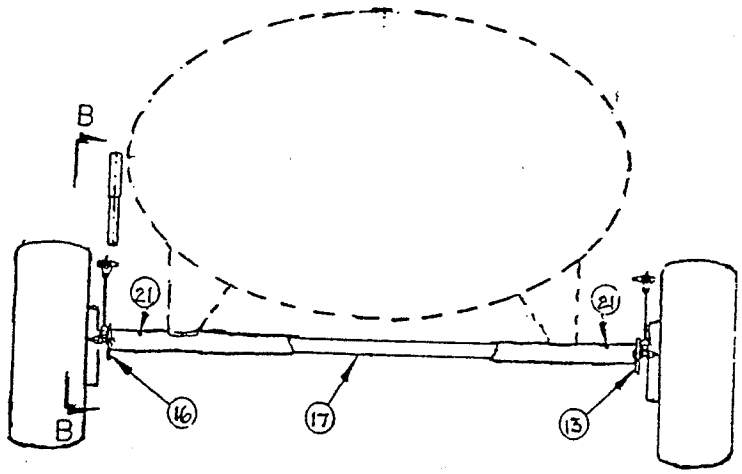
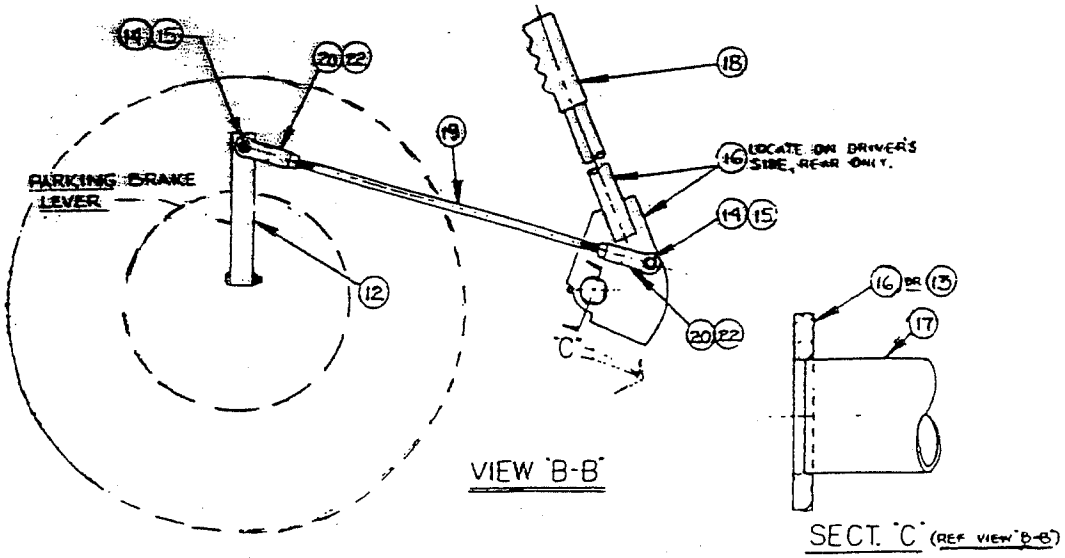


REAR VIEW
NTS

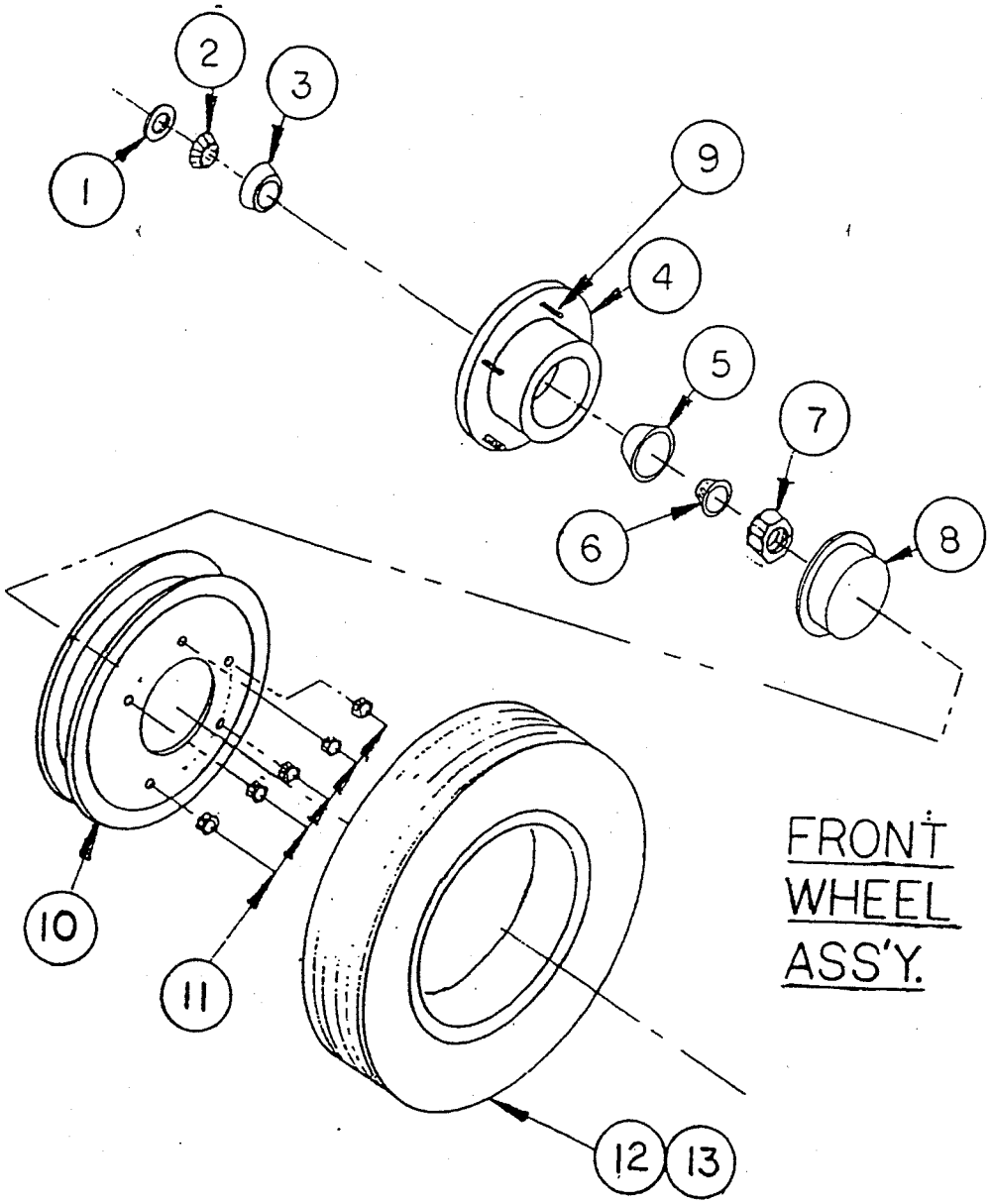


VIEW 'B-B'

SECT. 'C' (REF VIEW 'B-B')

ASSEMBLY No. 10-100030R
MAJOR ASSEMBLY – BRAKE, PARKING

Sub Assy.	Item	Part No.	Quantity	Description	Wt. #
08-1007R		04-1063		Brake Assembly (2 Req.)	4.4
	1	04-1064R	1	Backing Plate Assembly	1.4
	2	04-1065R	2	Brake Shoe Assembly	1.6
	3	04-10265R	1	Return Spring	.04
	4	04-1026R	2	Hold Down Spring	.06
	5	04-1028R	1	Cam	.5
	6	04-1030R	1	Cam Lever	.7
	7	02-10017R	1	Cam Bolt	.07
	8	02-12012	1	Cam Nut	.03
	9				
	10				
	11				
	12				
08-1008				Brake Linkage Assembly	14.8
	13	05-1025	1	Cam, Brake Linkage	1.4
	14	02-10012	1	Bolt	.4
	15	02-12021	1	Nut	.1
	16	07-1033	1	Brake Handle, Fab'd Sub Assy	5.4
	17	01-8104	1	Brake Handle, Connector	4
	18	04-1055	1	Grip, Vinyl	1
	19	05-1026	1	Rod, Brake Linkage	1
	20	04-2516	4	Yoke Ends	.5
	21	03-1020	2	Grease Fitting	.5
	22	02-100231	4	Jam Nut	.5

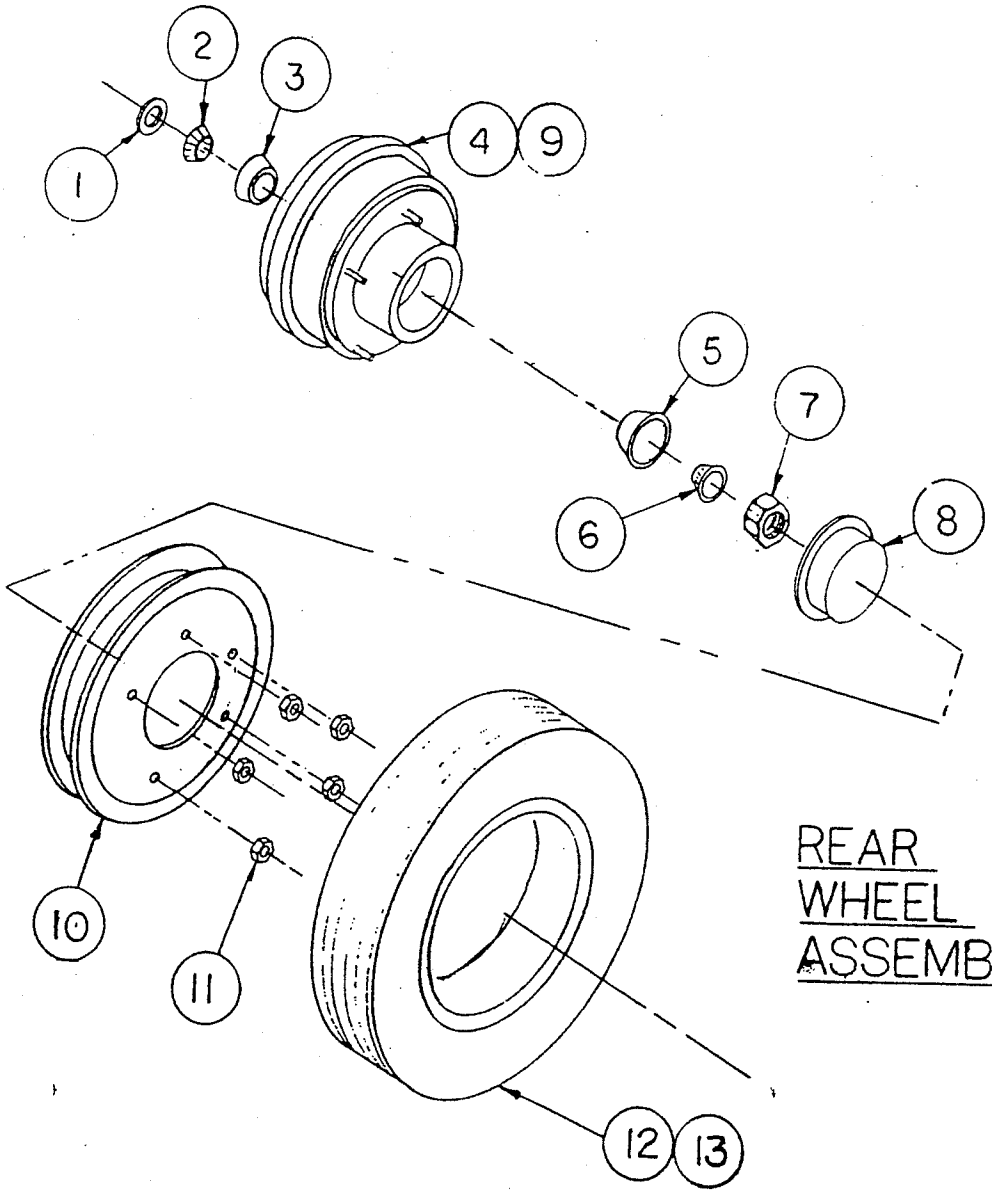


FRONT WHEEL ASS'Y.

ASSEMBLY NO. 10-100042

MAJOR ASSEMBLY - WHEEL ASSEMBLY, FRONT

Sub Assy.	Item	Part No.	Quantity	Description	Wt.#
08-1011		04-1050		Bearing & Hub Assembly (2 Reqd)	
	1	04-1012	1	Seal, Bearing	1
	2	04-1013	1	Bearing, Inner	3
	3	04-1015	1	Cup, Inner	2
	4	04-1017	1	Hub, Wheel	7
	5	04-1016	1	Cup, Outer	4
	6	04-1014	1	Bearing, Outer	3
	7	02-1205	1	Spindle Nut	1
	8	04-1019	1	Dust Cap	1
	9	02-1017	5	Studs, Hub	1
08-10061		04-10201		Tire/Wheel/Tube Assembly (2 Reqd)	
	10	04-1020	1	Wheel, Split Rim, 10"	9.5
	11	04-1021	5	Lug Nuts, Wheel	1
	12	04-10221	1	Tire, 10"	4
	13	04-1045	1	Tube Assembly	11

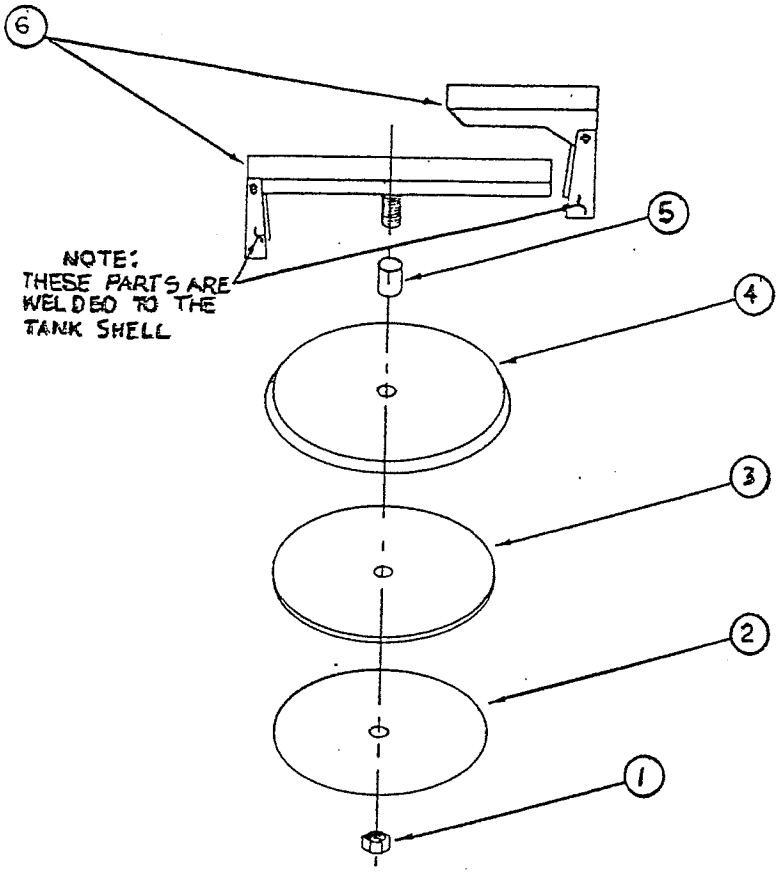


REAR WHEEL ASSEMBLY

ASSEMBLY NO. 10-100052R

MAJOR ASSEMBLY - WHEEL ASSEMBLY, REAR

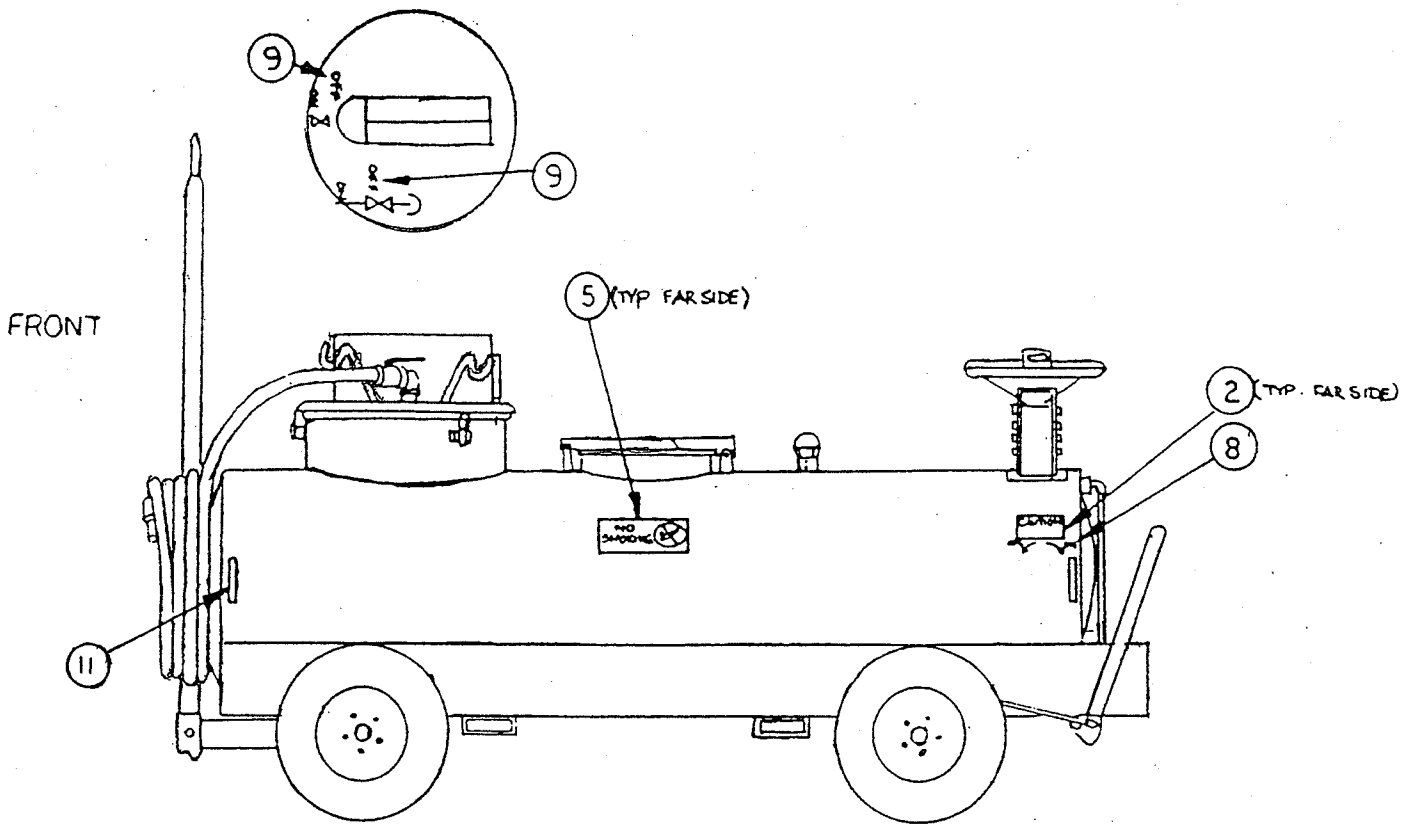
Sub Assy.	Item	Part No.	Quantity	Description	Wt.#
08-10111R		04-1062R		Bearing & Hub Assembly (2 Reqd)	
	1	04-1012	1	Seal, Bearing	1
	2	04-1013	1	Bearing, Inner	3
	3	04-1015	1	Cup, Inner	2
	4	05-1008R	1	Hub/Brake Drum Sub-Assy	16
	5	04-1016	1	Cup, Outer	4
	6	04-1014	1	Bearing, Outer	3
	7	02-1205	1	Nut, Spindle	1
	8	04-1019	1	Dust Cap	1
08-10061		04-1020		Tire/Wheel/Tube Assembly (2 Reqd)	
	10	04-10201	1	Wheel, Split Rim	9.5
	11	04-1021	5	Lug Nuts, Wheel	1
	12	04-10221	1	Tire, 10"	4
	13	04-1045	1	Tube Assembly	11

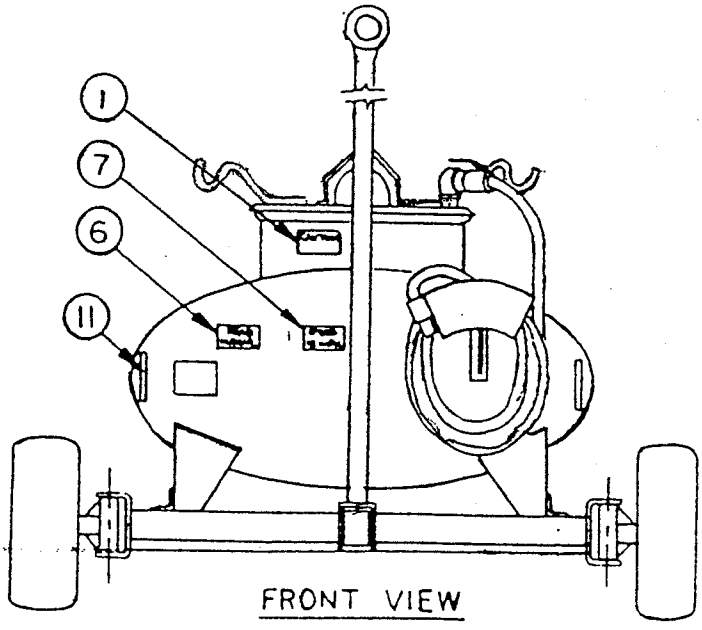


ASSEMBLY NO. 10-100060SP

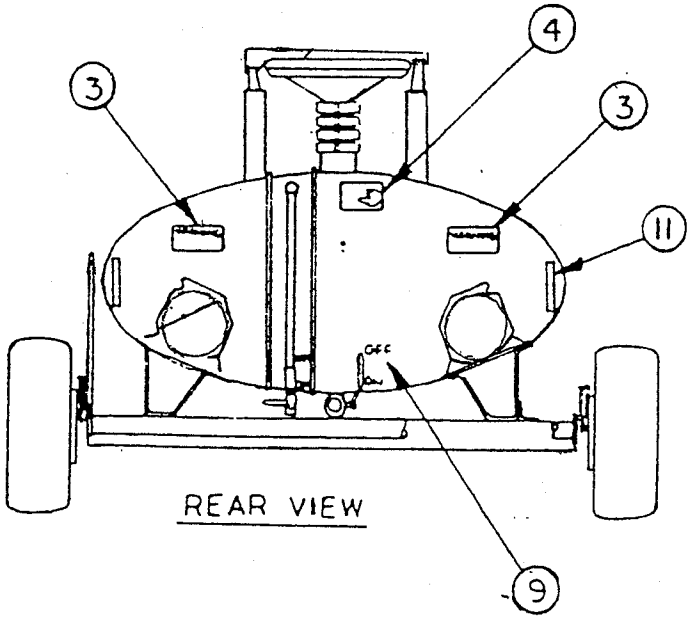
MAJOR ASSEMBLY - MANWAY ASSEMBLY

Sub Assy.	Item	Part No.	Quantity	Description	Wt.#
08-1025SP				Manway Cover Assembly	
	1	07-2102	1	16" Cross Arm Sub-Assy	2.5
	2	01-8222S	1	7" Cross Arm	4
	3	01-93455S	1	Spacer	.5
	4	01-86001SP	1	Cover, 10 GA	5
	5	06-25025	1	Gasket	1
	6	07-2303	1	Gasket Retainer	2
	7	02-1206	1	Nut	.5
	8	02-10013	1	Bolt	1
	9	02-10014	1	Bolt	1
	10	02-1202	2	Nut	.5





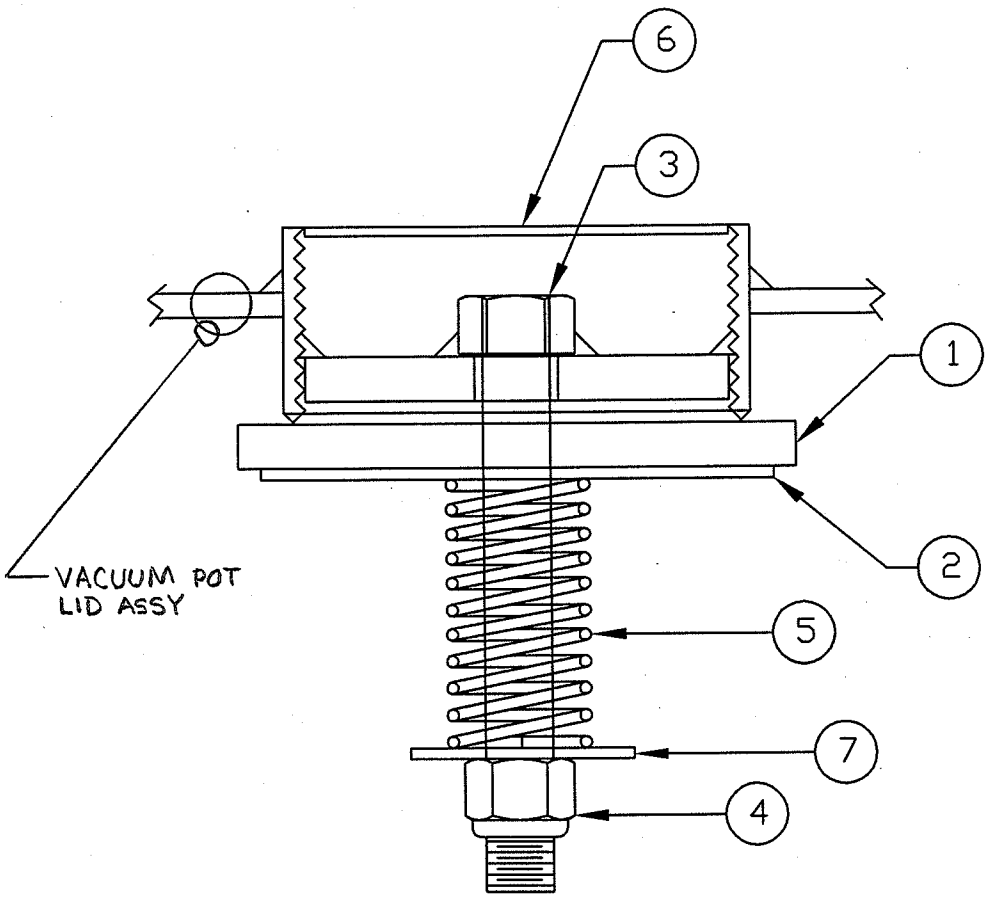
FRONT VIEW



REAR VIEW

ASSEMBLY NO 10-100070
MAJOR ASSEMBLY - DECAL PACKAGE

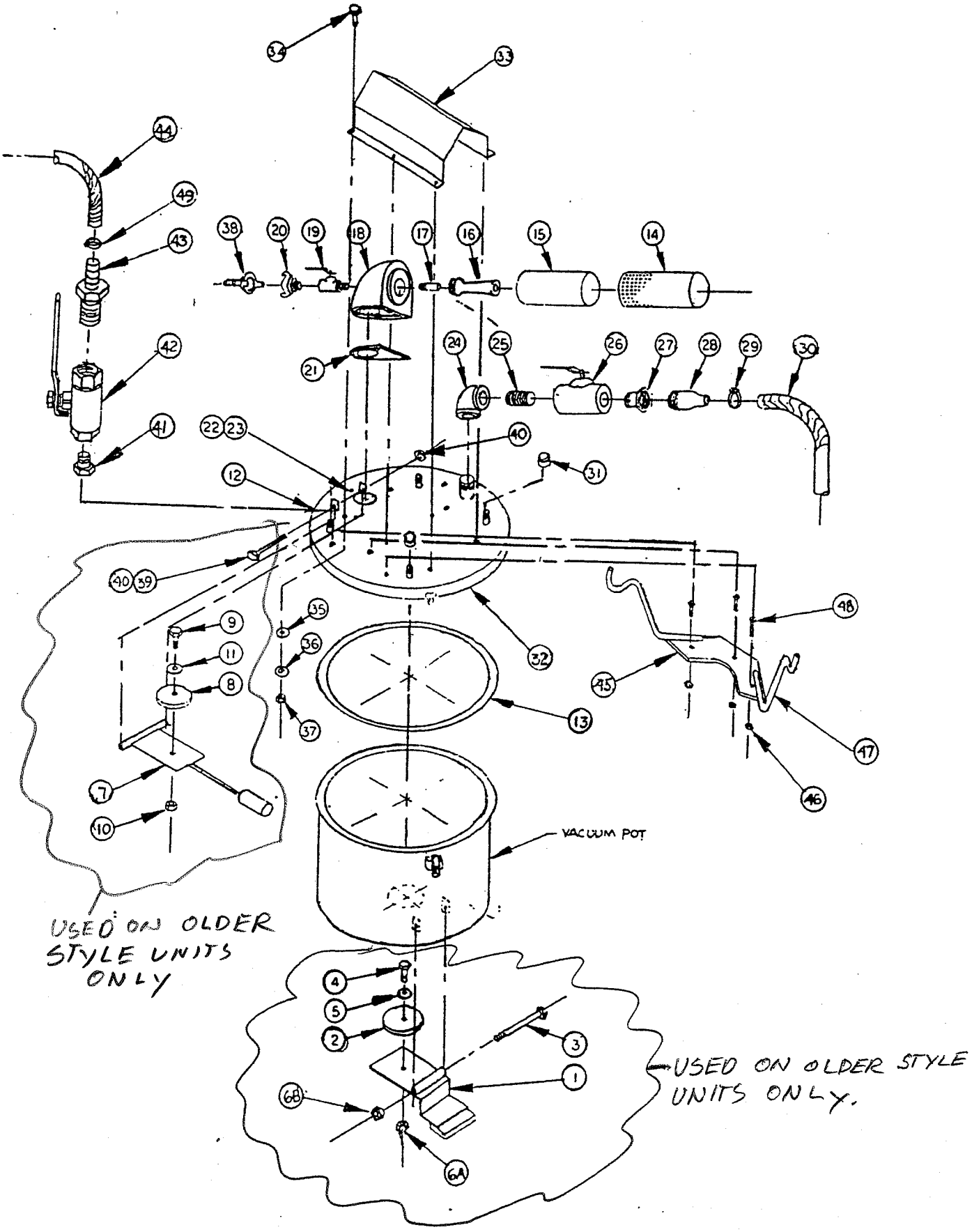
Sub Assy.	Item	Part No.	Quantity	Description	Wt.#
10-100070				Decal Assembly	.1
	1	06-1002	1	Caution, Vacuum System	.1
	2	06-1003	1	Caution, Parking Brake	.1
	3	06-1004	2	Warning, Grounding Reels	.1
	4	06-1005	1	Warning, Telescoping Drain	.1
	5	06-1006	2	Danger, No Smoking	.2
	6	06-1007	1	Notice, Read Manual	.1
	7	06-1008	1	Maximum Towing Speed 15MPH	.1
	8	06-1010	1	Off/On, Parking Brake	.1
	9	06-1011	8	Off/On, Drain Valve	.8
	11		8	Reflector Tape	.8



ASSEMBLY NO. 08-10015

MAJOR ASSEMBLY – VACUUM GOVENOR

Item	Sub Assy. 08-10015	Part No.	Qnt.	Description	Wt.#
				Vacuum Govenor Assembly	
1		08-10015-1	1	Gasket	0.3
2		08-10015-2	1	Washer, Flat	0.1
3		08-10015-3	1	Bolt	0.2
4		08-10015-4	1	Nut	0.1
5		08-10015-5	1	Sprint, Century J-38	0.1
6		08-10015-6	1	Screen 16 Mesh	0.1
7		08-10015-7	1	Washer, Flat 91090A121	0.1

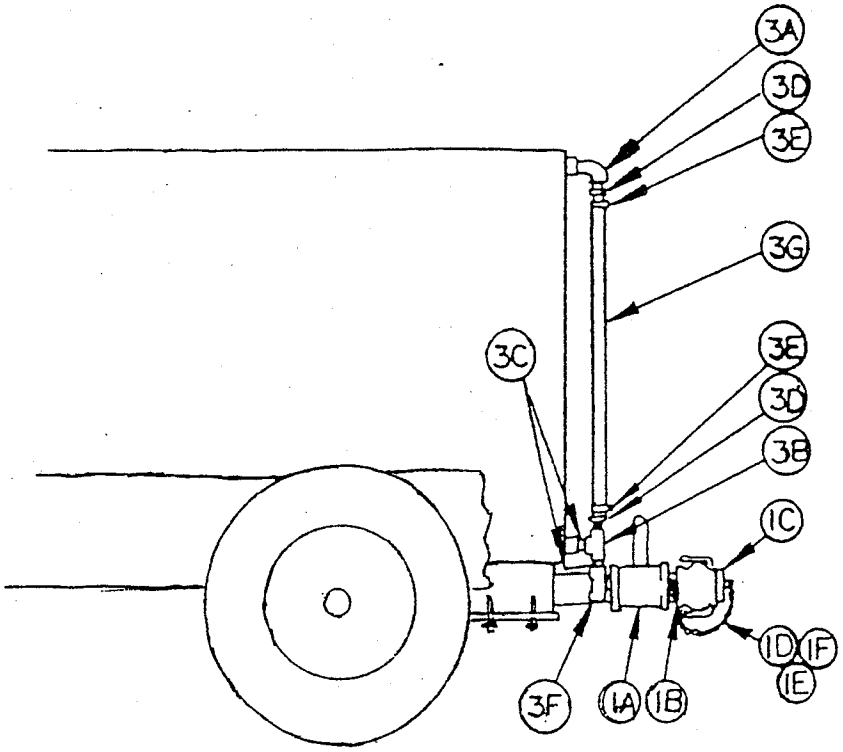


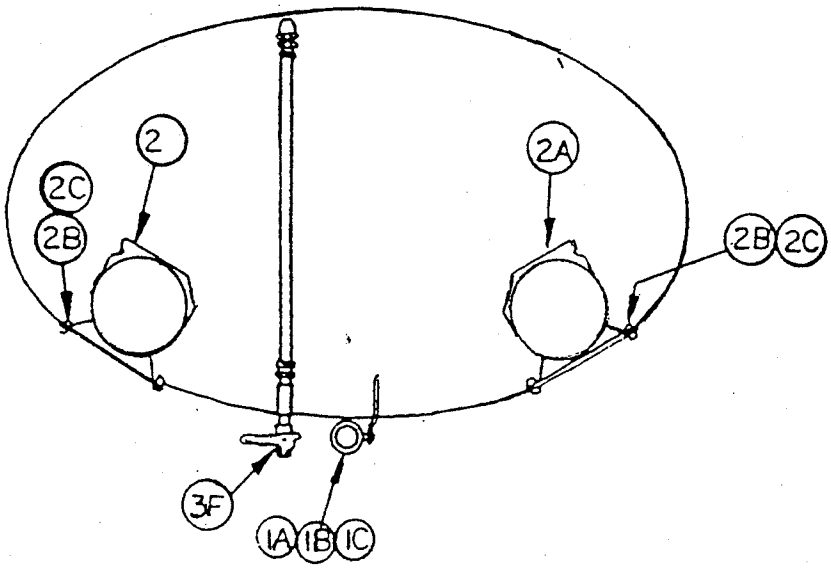
ASSEMBLY NO. 08-0001U
VACUUM SYSTEM ASSEMBLY

Sub Assy.	Item	Part No.	Quantity	Description	Wt.#
08-1000				Drain Stop Assembly	
	1	07-1000	1	Drain Stop Arm	3.5
	2	04-1000	1	Gasket	1.5
	3	02-10016	1	Bolt	.1
	4	02-10002	1	Bolt	.1
	5	02-1100	1	Flatwasher	.1
	6A	02-1201	1	Nut	.1
	6B	02-1200	1	Nut	.1
08-1001				Overflow Stop Assembly	
	7	07-1109	1	Float Sub. Assembly	4
	8	04-1001	1	Gasket	.1
	9	02-10003	1	Bolt	.1
	10	02-1200	1	Nut	.1
	11	02-1100	1	Flatwasher	.1
08-10022				Cover Assembly	
	12	07-1002	1	Lid	5
	13	06-1022	1	Gasket	2.7
08-1003				Nortech Vacuum Head Assy.	
	14	04-1004	1	Exhaust Housing	9.5
	15	04-1005	1	Exhaust Silencer	4.7
	16	04-1006	1	Venturi	2.2
	17	04-1007	1	Air Jet	2.7
	18	04-1008	1	Venturi Box	2.7
	19	04-1032	1	Valve	5.8
	20	04-1056	1	Coupler	1.7
	21	04-1010	1	Gasket	.1
	22	02-10010	3	Bolt	.1

ASSEMBLY NO. 08-0001U (CONTINUED)
VACUUM SYSTEM ASSEMBLY

	23	02-11001	3	Washer	.1
08-1004				Accessories	
	24	03-1001	1	Elbow	2
	25	03-02922S	1	Nipple	.5
	26	04-10321	1	Valve	3
	27	03-1002	1	Hex Bushing	.2
	28	03-1003	1	Nipple	.1
	29	03-10101	1	Hose Clamp	.1
	30	06-10161	1	Hose	15
	31	03-1021	4	Pipe Cap (Optional)	1
	32	07-1019	1	Lid	24
	33	07-1034	1	Cover, Vacuum Generator	8
	34	02-10010	6	Bolt	.1
	35	06-1021	6	Washer	.1
	36	02-1100	6	Washer	.1
	37	02-1200	6	Nuts	.1
	38	04-1057	1	Coupler	.5
	39	02-10016	1	Bolt	.5
	40	02-1201	1	Nut	.1
	41	03-10155	4	Bushing (Optional)	.5
	42	04-10320	4	Ball Valve (Optional)	4
	43	03-10091	4	Hose Barb (Optional)	2
	44	06-10185	4	Tubing (Optional)	4
	45	01-9026S	2	Hanger Plate (Optional)	3
	46	02-12014	6	Hex Nuts (Optional)	.5
	47	01-9172S	4	Tubing Hangers (Optional)	2.5
	48	02-100115	6	Bolt (Optional)	1
	49	03-101005	4	Hose Clamp (Optional)	.5





REAR VIEW

ASSEMBLY NO. 10-100110

MAJOR ASSEMBLY - MISC. FIXTURES

Sub Assy.	Item	Part No.	Quantity	Description	Wt.#
08-1012				Drain Assembly	
	1A	04-10321	1	Ball Valve	6
	1B	04-1033	1	Camlock Adaptor	1.5
	1C	04-10331	1	Camlock Plug	.5
	1D	04-1034	1	Safety Chain	.2
	1E	04-1035/	1	S-Hook, Safety Link	.1
	1F	04-1035	1	S-Hook, Safety Link	.1
08-1013				Grounding Reel Assembly	
	2	04-10361	1	Grounding Reel	12
	2A	04-1036	1	Grounding Reel	12
	2B	02-10040	4	Bolts	.3
	2C	02-12041	4	Nuts	.1
08-1014	3			Sight Gauge Assembly	
	3A	03-0017S	2	Elbow	.5
	3B	03-1007	1	Tee	.5
	3C	03-1008	2	Nipple	.5
	3D	03-11130	2	Hose Barb	1
	3E	03-1010	2	Hose Clamp	.1
	3F	04-1032	1	Ball Valve	2.7
	3G	06-2527	1	Tubing	.1

AutoVac Shut Off

Introduction

The AutoVac Shut-Off (AVSO) is designed to prevent overfilling the tank during the vacuum process. The AVSO is equipped with a float *Item 20* set to regulate the maximum tank volume at 92% allowing for fuel expansion. The AVSO operates on compressed air, the same air that operates the primary vacuum generator. Once the 92% tank liquid level point is reached the air powered cylinder *Item 25* actuates and turns off the air supply to the primary vacuum generator. The AVSO is also equipped with a bypass valve *Item 18* that allows you to override the air cylinder so that you can finish draining the hoses prior to emptying the tank. The AVSO is equipped with a twist coupler *Item 19* for fast air connection.

Operation

Start-Up

1) To start the AVSO first hook up an adequate air supply (60CFM @ 90PSI) to the twist coupler *Item 19*
2) Turn on the air control valve *Item 3* by pushing the handle *Item 27* inward so the air cylinder *Item 25* rod is not visible and compressed.
3) You should here the primary vacuum generator turn on.

Shut-Down

1) Pull the handle *Item 27* toward you so the air cylinder *Item 25* rod is visible.
2) The primary vacuum generator will turn off.

AVSO Override

1) When the tank level reaches approximately ¾ full it should be emptied.
2) In the event that the AVSO energizes the air cylinder *Item 25* and the air control valve *Item 3* shuts off, you can override the system so that you can finish draining the suction hoses.
3) Locate the bypass valve *Item 18*
4) Push in and hold the bypass valve push button.
5) Turn on the air control valve *Item 3* by pushing the handle *Item 27* inward so the air cylinder *Item 25* rod is not visible and compressed.
6) The vacuum generator will remain on until you let go of the bypass valve button *Item 18* at which time the ASO will energize the air cylinder *Item 25* and shut off the air control valve *Item 3.*
7) When the suction lines are clear of liquid release the bypass valve push button
8) The primary vacuum generator will turn off.

Maintenance

Prior to each use

The AVSO requires little maintenance. It is strongly suggested that you test the AVSO operation prior to each use.

1) Simply turn on the AVSO as shown in the operations start-up section.
2) Once the primary vacuum generator has turned on simply pull up on the cylinder control valve *Item 2* lever located on the top cover of the level sensor assembly *Item*
3) If the AVSO is operating correctly the air cylinder *Item 25* should energize and turn off the primary vacuum generator.
4) If you hear any air leaks once the vacuum generator shuts off, locate and fix as required.

Check the 1/8" air lines *Items 34 & 35* for leaks or cuts, replace as required.

Every Six months

1) Check the float *Item 20* to ensure that it has no cracks or leaks.
2) Remove the 4 bolts that hold down the top cover of the level sensor assembly *Item 1*
3) Carefully lift up on the assembly and viewing the float *Item 20*
4) Check to ensure that the float level rod moves the *operating rod Item 24* up and down with little effort.
5) Replace any parts as required.
6) Reinstall using a new gasket if required.

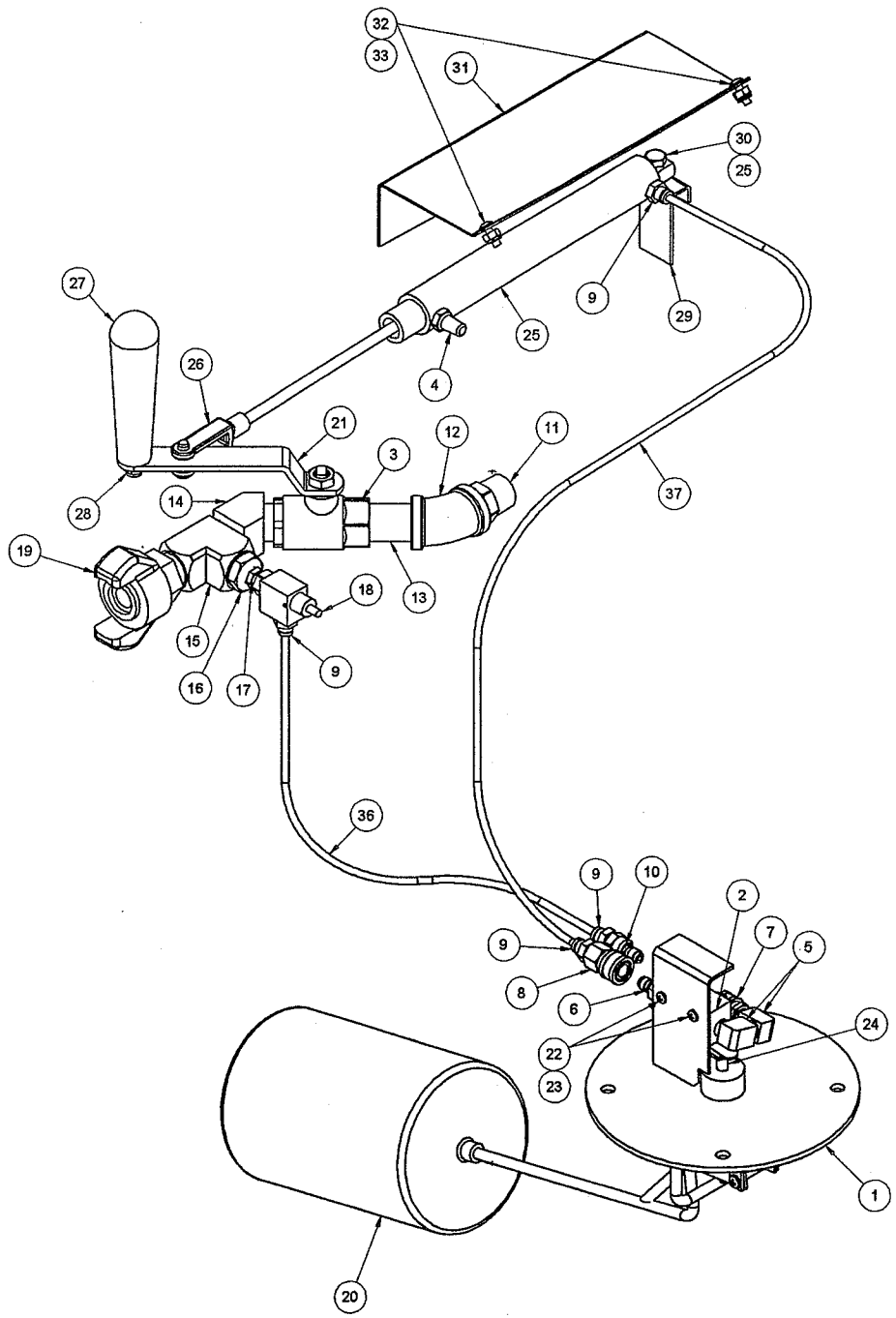
(Special Note) You must remove the 2 small quick couplers *Items 8 & 10* prior to removing the vacuum lid and reinstall the 2 small quick couplers *Items 8 & 10* when the vacuum lid has been reinstalled.

Trouble Shooting

Problem: Air cylinder does not energize

1) Perform AVSO test as listed in the maintenance section.
2) If the air cylinder *Item 25* does not move, check to ensure that the 1/8" air lines *Items 34 & 35* are connected as shown.
3) Check the float *Item 20* as listed in the maintenance section.
4) Check the cylinder control valve *Item 2* by removing quick couplers *Items 10 & 7*
5) Perform the AVSO test again and listen for air coming out of the disconnected quick coupler.
6) If you hear air then the air cylinder *Item 25* needs replacing.
7) If no air escapes then the cylinder control valve *Item 2* requires replacing.

08-1802 AUTO SHUT-OFF



ITEM	QTY	P.N.	DESCRIPTION	MATERIAL	WT
37	1	06-0100	TUBING, 1/8" x 31" LG.	Nylon	.0
36	1	06-0100	TUBING, 1/8" x 14" LG.	Nylon	.0
33	2	02-1211	NUT, NYLON INSERT, #8-32	Stainless Steel	.0
32	2	02-1498	MACHINE SCREW, PAN HEAD PHILLIPS #8-32 x 1/2" LG.	Stainless Steel	.0
31	1	01-8360	COVER, CYLINDER	Stainless Steel	.6
30	1	02-1497	BOLT, HEX HEAD, 1/4-20 UNC x 3/4" LG.	Stainless Steel	.0
29	1	01-8093	CLIP, BASKET	Stainless Steel	.1
28	2	02-1200	NUT, NYLON INSERT, 1/4-20 UNC	Stainless Steel	.0
27	1	04-10551	HANDLE	Phenolic	.1
26	1	04-25161	YOKE, 1/4-28 UNF	Steel, Mild	.1
24	1	05-0501	OPERATING ROD	Bronze	.0
23	2	02-1212	NUT, NYLON INSERT, #6-32	Stainless Steel	.0
22	2	02-1496	MACHINE SCREW, PAN HEAD PHILLIPS #6-32 x 1" LG.	Stainless Steel	.0
21	1	01-8359	HANDLE, VALVE	Stainless Steel	.1
20	1	06-1013	FLOAT	Plastic	.4
19	1	04-1056	CHUCK, AIR	Aluminum	.3
18	1	04-10327	VALVE, BYPASS	Brass	.2
17	1	03-1077	NIPPLE, HEX, 1/8" NPT	Brass	.0
16	1	03-10151	BUSHING, HEX, 1/2" MNPT x 1/8" FNPT	Brass	.1
15	1	03-10057	TEE, STREET, 1/2" NPT	Brass	.3
14	1	03-10062	ELBOW, STREET, 45 DEGREE, 1/2" NPT	Brass	.2
13	1	03-10082	NIPPLE, 1/2" NPT x 2" LG.	Brass	.2
12	1	03-10061	ELBOW, 45 DEGREE, 1/2" NPT	Brass	.2
11	1	03-10083	NIPPLE, HEX, 1/2" NPT x 1 1/2" LG.	Brass	.1
10	1	03-1071	PLUG, STRAIGHT THROUGH, 1/8" x 1/8" FNPT	Brass	.0
9	4	03-1075	ADAPTER, HOSE, 1/8" MNPT x 1/8" HOSE	Brass	.0
8	1	03-1074	COUPLER, STRAIGHT THROUGH, 1/8" x 1/8" FNPT	Brass	.1
7	1	03-1073	COUPLER, STRAIGHT THROUGH, 1/8" x 1/8" MNPT	Brass	.1
6	1	03-1072	PLUG, STRAIGHT THROUGH, 1/8" x 1/8" MNPT	Brass	.0
5	2	03-1070	ELBOW, STREET, 1/8" NPT	Brass	.0
4	2	03-1076	MUFFLER, 1/8" NPT	Brass	.0
25	1	04-7001	CYLINDER, AIR		2.0
3	1	04-1032	VALVE, BALL, 1/2"		.5
2	1	04-10326	VALVE, CYLINDER CONTROL		.2
1	1	08-1801	LEVEL SENSOR ASSEMBLY		1.8

Parts List

SPOKANE INDUSTRIES

SealVac™ FUEL Drain System

ONE YEAR LIMITED WARRANTY

Seller warrants its " SealVac™ " to be free from defects in material and workmanship under the normal use and service for which the unit is intended if, but only if the unit has been properly operated, maintained and stored in accordance with printed directions contained in the product manual. Our obligation under this warranty shall be limited to the repair or exchange of equipment and parts which may prove defective within one year of the date the unit is put into service but shall in no event extend beyond a date two years from the date the unit is shipped from our plant. All transportation charges on parts returned to us for replacement under this warranty must be returned pre-paid.

This warranty does not extend to damages caused by environmental factors varying from normal design conditions, whether natural or man-made, or to units subjected to misuse, negligence or accident. This warranty likewise does not extend to the unit or any parts thereof which have been repaired or altered improperly or in any way so as to effect adversely its stability or reliability. This warranty does not cover parts or labor required to repair or replace parts whose usefulness is exhausted due to normal operation of this unit.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE NOT SET FORTH IN A WRITING SIGNED BY AN AUTHORIZED REPRESENTATIVE OR SELLER. SELLER SHALL IN NO EVENT BE LIABLE FOR ANY CONSEQUENTIAL LOSS OR DAMAGE RESULTING FROM THE USE OR LOSS OF USE OF THIS UNIT.

SealVac™

FUEL DRAIN SYSTEM

PARTS, OPERATION and MAINTENACE MANUAL

U.S. Patent No. 5,117,876 - Other Patents Pending

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Section 1: Introduction Fuel Drain System

Vacuum Generator and the Fuel Drain System

The use of a primary vacuum generator for the delivery of fuel into the ***SealVac***™ fuel drain unit was based upon many optimal benefits. The vacuum generator is economical to operate, compact in size, low in cost, with minimal maintenance and built to quality construction with no moving parts and yet is capable of delivering as much as 17.0"Hg at 120CFM.

To obtain optimum benefit from your ***SealVac***™ vacuum system it is recommended that all personnel operating it read and understand this section prior to operating. Upon receipt of the ***SealVac***™ fuel drain unit, a visual inspection should be made to determine that it is complete and has not sustained any damage during transportation.

When compressed air is forced through the double conical nozzle within the vacuum generator, velocity increases and the pressure decreases. The vacuum generators operate on this principle, which creates vacuum without a single moving part making it safe for moving flammable liquids. If the aircraft is equipped with a "POP-IT", also known as a "PENCIL" type low point drain then the ***SealVac***™ fuel drain unit is equipped with the proper tooling to be able to hook up and function properly. The vacuum cover assembly is provided with (4) four ½" quick connect ports for attaching the shielded duplex 35' static dissipating hose assemblies. There are (2) two small secondary vacuum generators provided that supply vacuum through the (4) four ¼" vacuum generator cover quick connect ports. These ports connect to the shielded duplex 35' static dissipating hose assemblies, and provide the vacuum required to attach the ***SealVac***™ standard or dual-disk suction plates to the aircraft. The ***SealVac***™ fuel drain system standard drain tool assembly (single suction plate model) see page ... fig ... Can be used on any low point drain valve that is in an open area and can be easily centered over the low point drain without obstructions.

The ***SealVac***™ fuel drain system dual-disk drain tool assembly (double suction plate model) (see page ... fig ...) can be used in most applications. It is best used on the C-17 aircraft or any place where you may have an obstruction to work around, or where the bottom drain valve is too close to an obstruction so that the standard cup will not center around the bottom drain valve. The U.S.A. dual cup delta wing model comes with a probe that inserts into the center of a hub at the apex of the delta wing. The probe has an actuator pin that threads into the center of the probe (see page 4 – fig 1.) this probe pin adjusted at the proper length will open the bottom drain valve when the probe is fully inserted. The standard pin will be ¼" above the top of the sealing gasket that is in the probe hub. This standard pin is strictly a guide. You may find that a pin longer will give you better depression into the bottom drain valve, supplied is a variety of different length pins with two different style heads.

The large round-headed pin fits well with the C-5 bottom drain without having to remove the center plastic portion.

Section 2: Safety

The ***SealVac***™ vacuum generator is an air-powered generator. An air supply of 60 CFM @ 80 to 90 PSI is recommended to operate this system. Smaller capacity air supply will result in decreased performance.

Check the air pressure of supply lines to the vacuum generator to assure it is never in excess of 90 PSI.

Parking brake must be applied when operating the ***SealVac***™ vacuum system.

The ***SealVac***™ vacuum system should never be used inside of an enclosed area. Proper ventilation is required at all times.

Due to the nature of fuel, care should be exercised to eliminate all sparks and open flames in the area of the ***SealVac***™ fuel drain unit.

To eliminate static sparks, prior to operating the ***SealVac***™ vacuum system connect the grounding cables to the proper ground and to the Aircraft to be defueled.

A 50-foot radius area around the ***SealVac***™ fuel drain unit, for no smoking, sparks or open flames is usually a good practice. It is strongly recommended all local or other regulations be consulted for further restrictions.

If other objects such as rock or metallic pieces are vacuumed into the vacuum chamber they may create a hazard due to sparks.

Prior to any defueling to the aircraft you must insure proper venting to the aircraft fuel tanks or fuel cells or damage to the aircraft will occur.

The ***SealVac***™ fuel drain unit should only be used when applying your local operating instruction and procedures, and safety precautions and operation procedures.

Section 3: Operation

3.0 Model Selection

3.0.0 The ***SealVac***™ Drain tool assembly single suction plate model see page ... fig ... Can be used on any bottom drain valve that is in an open area and can be easily centered over the bottom drain valve without obstructions.

3.0.1 The ***SealVac***™ Drain tool assemblies Dual-Disk suction plate model (see page ... fig ...) can be used in most applications. It is best used on the C-17 aircraft or any place where the bottom drain valve is too close to an obstruction and the single suction plate will not center around the bottom drain valve.

3.0.2 ***SealVac***™ Dual-Disk Drain tool assembly comes with a fuel probe that inserts into the center of the hub at the apex of the delta wing. The fuel probe has an actuator pin that threads into the center of the fuel probe (see page ... fig ...) this actuator pin adjusted at the proper length will open the bottom drain valve when the fuel probe is fully inserted. The standard actuator pin length is ¼" above the top of the sealing gasket that is in the fuel probe hub. This standard actuator pin is strictly a guide. You may find that an actuator pin longer will give you better depression into the bottom drain valve. Supplied is a variety of different length actuator pins with two different style heads. The large round-headed pin fits well with the C-5 bottom drain without having to remove the center plastic portion.

3.0.3 The single suction plate model incorporates the same procedures as the dual-disk model.

3.0.4 The fuel probe for both models inserts into the suction plate or dual-disk style hub the same way. See page ... fig ... you will see two small stainless steel roll pins that protrude out of the side of the fuel probes. These pins are 180 degrees apart and will line up with two groves located on the inside bore of the dual-disk hub or the in the center of the suction plate. The roll pins when lined up with the groves in the hubs inner bore will allow the fuel probe to be inserted fully into the hub. With the probe fully inserted you should be able to twist the probe 90 degrees until the roll pins in the fuel probe hit a pressed stop pin located on the recessed portion of the center hub. With the fuel probe in place and twisted until it hits the stop, the fuel probe is locked into place (see page ... fig ....).

3.0.5 The ***SealVac***™ Drain tool assemblies come with a wide array of actuator probe pins with lengths in 1/8" progressions. Note: if you select a pin length that is to long the fuel probe will not insert fully into the hub.

3.0.6 The ***SealVac***™ Drain tool assembly comes with (2) shielded duplex, 35' long ½" static dissipating hose assemblies that will quick couple to one of the multy ports on top of the ***SealVac***™ vacuum cover. This cover mounts on top of the sediment chamber mounted in the ***SealVac***™ vacuum tank (this was once called the vacuum chamber). Each 35' section of hose has a ¼" clear vacuum line included, both are encapsulated in a vinyl shrink-wrapped tube cover. This section of hose called the shielded duplex, 35' long ½" static dissipating hose assembly also has a portable hose hanger with a hook located 36"in from the fuel probe end of the hose. This hook is designed to be attached to the railing around the working platform and support the top end of the hose. The 36"long pigtail section with the fuel probe is the same for both models. The other ½"hose end attaches to the multy port quick disconnect located on the ***SealVac***™ vacuum cover.

3.0.7 Note: If for any reason the vacuum generator cover is removed from the sediment chamber/vacuum chamber be sure to reconnect the ground when reinstalling, and before use.

3.0.8 Where the main air supply is attached to the air inlet fitting you will note a (4) way fitting (cross) directing airflow to each side just past the main air supply twist connector. Attached to each fitting is a ball valve and a clear air line that attaches to the small vacuum generators mounted on the inside of the weather protective hood. Each small generator has a hard plumbed manifold (one on each side of the hood with (2) ports that have a ¼" brass male quick disconnect. See page ... fig ... This portion of the vacuum system is used to supply vacuum to the suction area of each suction plate that attaches to the aircraft surface. On the vacuum cover there are (4) ½" ports two on each side, each has a ball shut off valve and a female quick disconnect. The shielded duplex, 35' long ½" static dissipating hose assemblies talked about before have a ¼"and ½" quick disconnect on both ends. The hose end with the ¼" female quick disconnect and the ½" male quick disconnect will attach to the ***SealVac***™ vacuum cover and the ¼" male quick disconnect port located on both sides of the ***SealVac***™ vacuum generator weather protector hood. see page ... fig ... This attachment procedure is the same for all for ports. Where the main air supply attaches, you will see a ½" ball valve directly inline with the four way fitting that branches off to the small Vacuum generators see page ... fig ... This ½"ball valve when opened Will allow air to flow through the main vacuum generator and pull a vacuum on the entire tank. The (2) ¼" ball valves to both sides operate the (2) small vacuum generators that supply vacuum to the suction plates.

3.1 Standard Drain Tool Assembly

Safety Note: Review Safety Section prior to operating or maintaining

3.1.0 Setting up the ***SealVac***™ fuel drain system with the shielded duplex 35' static dissipating hose assemblies to the aircraft low point drains.

3.1.1 08-0050 on the drawing includes a set of probe tips with the same diameters but have different lengths. The service technician will need to determine which probe tip works best for the type of low point drain provided on the aircraft. Thread the selected probe tip into the probe 08-0100-1. (NOTE: If you choose a tip length too short no or little fuel flow occurs. If you choose a tip length too long, proper sealing between (Item #B1) and the aircraft will not be achieved and the suction plate could leak or fall to the ground and be damaged.

3.1.2 A good clean sealing surface is required around the low point drain for the suction plate, (Item #B1), to vacuum seal. If the aircraft has seams or uneven surfaces an artificial mating surface may need to be considered.

3.1.3 There is a check valve provided, (Item #A5), on the ¼ inch clear tube line of the shielded duplex 35' static dissipating hose. Insure this check valve is installed, and that the direction of flow goes from (Item #B1) toward (Item #A10). This line is required for providing a vacuum area between the inner and the outer gasket seals (Items # B2 & B3) provided with the suction plate.

3.1.4 Connect the female quick coupler 08-0025-9 on each of the ¼ inch clear lines of the shielded duplex 35' static dissipating hose to the male quick coupler. Ports 08-14005-15 located on the vacuum generator cover.

3.1.5 Connect the opposite end of the ¼ inch clear line of the shielded duplex 35' static dissipating hose to the (Item #A10) male quick coupler on the suction plate.

3.1.6 Connect the male quick coupler 08-0025-1 on each black ½ inch line of the shielded duplex 35' static dissipating hose, to the female quick couplers (Item # F4) located on the vacuum cover assembly.

3.1.7 Connect the male quick coupler 08-0100-8 on each black ½ inch x 3' long pig tail line to the female quick coupler 08-0025-2 on the black ½ inch line of the shielded duplex 35' static dissipating hose

3.1.8 Install the vacuum probe 08-0100-1 into the suction plate center (Item # B1) by inserting probe and turning 90 degrees to lock into place.

3.1.9 Cover the inner and outer gasket seals (Items #B2 & B3) with a light coat of petroleum jelly.

3.1.10 Close the 1/8-inch slider valve (Item #A3) located on the suction plate where the ¼ inch clear lines attach to the suction plate by sliding the knurled valve ring away from the aircraft.

3.1.11 Connect 1/2 inch minimum air supply line to the ***SealVac™*** vacuum generator inlet twist coupler making sure that both vacuum generator ball valves are in the off position. (Note: the air supply recommended is 40 to 60 CFM at 80 to 90PSI) (Note: make sure that all aircraft fuel tank or fuel cell vents are open prior to any defueling or damage to the aircraft will occur.)

3.1.12 Turn on the small vacuum generator 08-14005-1 by opening the ¼ inch ball valve 08-14005-6 located on both sides of the centered primary vacuum generator on the top of the vacuum cover.

3.1.13 Align the vacuum probe 08-0100-1 with the proper tip 08-0050 installed to the aircraft "POP-IT" (pencil) low point drain on the wing and the fuselage low point drains.

3.1.14 Open the 1/8 inch slide valve (Item #A3) on the selected cup (Item #B1) to attach to aircraft by moving the knurled ring toward the suction plate and attaching the cup/probe over the low point drain making sure probe tip is centered on the low point drain.

3.1.15 Observe the clear ¼ inch line (Item #A4) for fuel leaking past inner seal (Item #B3). If any fuel is present in the ¼" inch line (Item #A4) remove suction plate assembly (Item #B1) by reversing the previous directions. Re-seal or replace the seals (Items #B2 & B3) as required.

3.1.16 Turn on the ***SealVac™*** primary vacuum generator by opening the attached ½ inch ball valve centered on the top of the vacuum cover.

3.1.17 Slowly open up the 1/2 inch quick coupler ball valves (Item #F2) located on the vacuum lid for only the black ½ inch lines to be used, watching for leaks and seepage past the seals. Repair as required to stop any leaks.

3.1.18 Reinstall sumping cup if required.

3.1.19 Commence with defueling operation only when all observations prove a proper seal tight operation.

3.1.20 Once the operation has started the fuel is delivered from the aircraft to the vacuum.

3.1.21 The vacuum generator is equipped with a float actuated automatic overflow shutoff. When the vacuum chamber or the tank is full the float valve shuts off and eliminates the vacuum.

3.2 Dual disk drain tool assembly

3.2.0 Select the fuel containment Bowser for operation and place under aircraft in accordance with standard procedures.

3.2.1 Attach grounding reel cables to required points per your standard regulations.

3.2.2 Attach air supply line to the vacuum generator fitting. See 08-14005.

3.2.3 Remove a 35' long dual hose assembly from the vacuum cover hanger and place in position on stand or working platform.

3.2.4 Using the portable hose hanger attachment on hose attach to work platform railing.

3.2.5 Select single suction cup model or dual cup delta wing model to be used and the probe.

3.2.6 At this time you are ready to proceed by turning on the main air supply and the valves that allow air to flow to the (2) small vacuum generators on each side of the main vacuum generator cover.

3.2.7 The 35' hose that is on the work platform and also runs down to the ½" quick disconnect and ball valve on top of the vacuum cover can now activated by turning on the ball valve. This will put the ½"black static dissipating hose under vacuum to and allow fuel to be drawn in to the tank when the attachment is made to the aircraft.

3.2.8 With the vacuum cup assembly that you choose to use and the corresponding probe in hand proceed to the top of the work platform. At this time attach the small clear vacuum line running from the suction cup. To corresponding female disconnect sticking out of the dual hose assembly.

3.2.9 Before attaching the 3' long probe hose to the dual hose assembly check to be sure that you have vacuum to the suction cup port. This port is located between the rubber-sealing ring on the suction cup. Opening the brass slide valve 08-0020-10 can do this. This valve is attached directly to suction cup on one end and then quick coupled to the clear hose that is coming out of the dual hose assembly. To actuate the slide valve push the outer sleeve on the slide valve towards the cup. With slide valve activated place your finger over the hole on the suction port side of the suction cup and you should feel the suction. If you do not feel suction move the slide ring on the slide valve the other direction and check for vacuum on the cup suction side again. If you do not have any suction make sure all of the valves are open, all of the quick disconnects are securely coupled and that the secondary vacuum generators are turned on.

3.2.10 Lightly coat the cup seals with petroleum jelly, using fingers to evenly apply. Note: on single cup models coat both inner and outer seals. On dual cup delta wing models coat the two-cup seals only.

3.2.11 With suction to the cup off, place the hub portion that the probe inserts into and center it over the bottom drain fitting by visually aligning hub center with bottom drain center. (Note: Hub must be aligned properly with bottom drain of the probe will not engage to the proper depth.) Activate the secondary vacuum by sliding the slide valve toward the cups. Press the cup firmly up against the surface that you are trying to attach to and the vacuum should hold it in place. Note: Always check the edge of the rubber sealing rings to make sure that they are smooth and have not been damaged in any way. If the sealing Rings have any nicks or deformed in any way and will affect the way it seals. This could make the suction cup pull away from the surface that it is attached to prematurely. If sealing rings are damaged replace before using the system.

3.2.12 Now couple the probe section of hose (this section is apox 36"long) to the 35' long hose using the quick disconnects. With the probe section now attached you to the 35' hose you should feel suction around the holes in the end of the probe. These holes are around the pin that depresses the center of the sump/bottom drain valve. On the side of the probe you will see a small valve with a button head. This valve is a vacuum bleeder and should be pressed in when inserting the probe into the center hub or removing the probe.

3.2.13 Lightly coat the probe "O-Ring" seal with petroleum jelly, using fingers to evenly apply.

3.2.14 With the probe in hand and vacuum flowing through the probe suction holes, depress the vacuum bleeder valve and insert the probe outlined in 08-0100. With the probe inserted and locked into position you should see fuel flowing through the clear section of ½" hose attached on the probe end. Note: If the probe is fully inserted and there is no flow of fuel the probe needs to be removed and a longer pin inserted. Remember to depress the vacuum bleeder valve when removing the probe, if you don't it will create a vacuum lock and make removing the probe more difficult. With the probe removed replace the center pin with a pin ¼" longer and reinsert with the same procedure as before. With the probe inserted you should see a flow of fuel through the clear section. Once you see fuel you can now release the vacuum bleeder valve. This will allow you to be able to pull a full column of fuel.

3.2.15 The fuel cell that you are working on is close to being empty. Note: If you need to stop the flow of fuel, begin removing the probe by depressing the vacuum bleeder valve and turn the probe until the pins on the side of the probe are aligned as described. As you start to pull the probe down watch the flow of fuel through the clear hose. Keep pulling the probe down until the flow stops. Remember to keep the bleeder valve depressed. Once you see that there is no more fuel running through the clear hose you can pull the probe out of the suction cup hub. Note: if the flow of fuel continues at a very slow pace this may indicate that there may be some f o d trapped between the sealing surfaces of the bottom drain valve. This can be overcome by pushing the probe in and out a number of times allowing fuel to flush the obstruction from the valve.

3.2.16 Before shutting the vacuum system off make sure that the fuel suction line is clear. This is done by looking at the clear hose on the end of the line where it is attached to the vacuum cover. Once you see no more fuel passing through the line you can then turn the vacuum system off. In order to evacuate all of the fuel from the hose the line must be open on the far end. This can be done by leaving the probe end attached until the line is clear.

Section 4: Maintenance

4.1.0 The vacuum generator is supplied with a filtered exhaust silencer. Remove and wash this with soap and water. Thoroughly dry and reinstall as needed.

4.1.1 All vacuum hoses should be inspected regularly for cracking. Any sudden loss of vacuum suction power may indicate a crack in the hose lines, replace if any cracks, deformation or any leakage is visible.

4.1.2 Check both inner and outer sumping cup seals prior to each usage, Replace if any cracks or deformation is visible.

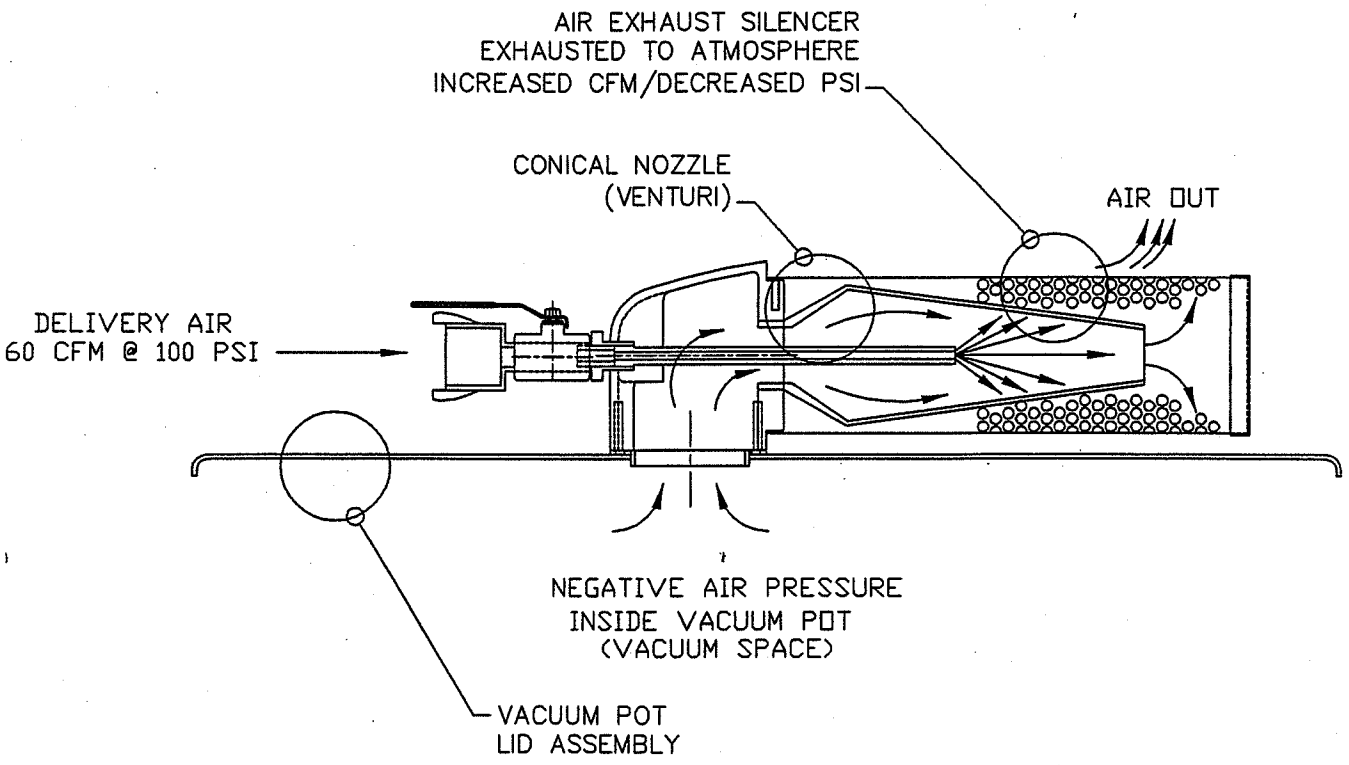
4.1.3 Check the "O-Ring" Seal on the probe prior to each usage replace if any cracks or deformation is visible.

4.1.4 Check probe tips to ensure that they are not bent or damaged, replace as required.

4.1.5 Check all components regularly

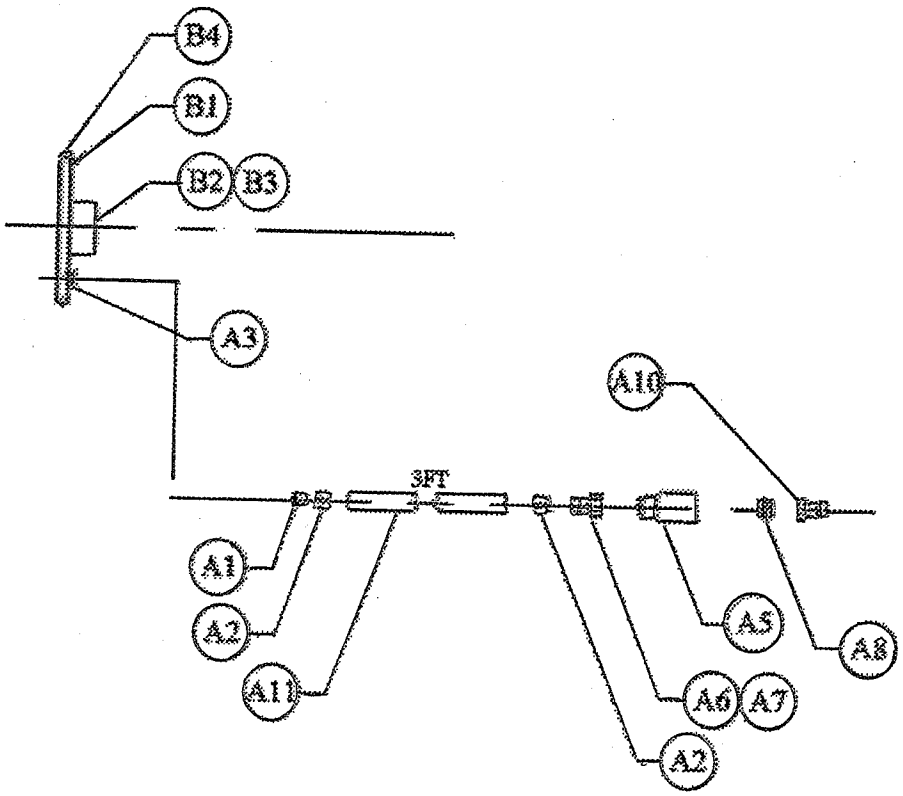
Section 5: Parts

5.0 Vacuum



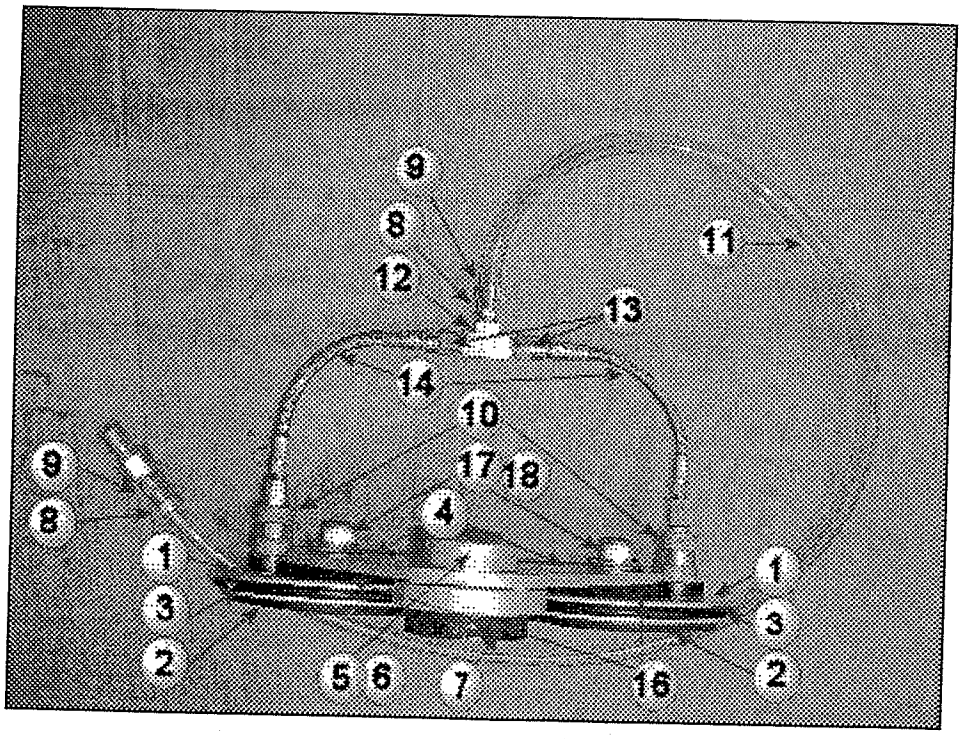
5.1 Part 08-0200 Standard Suction Plate Assembly (1 Required)

Item	Part Number	Qty	Description
B1	005-1040	1	Sumping Cup, Machined Alum.
B2	06-0075	1	Seal, 4.75" OD, Viton (40 Dur), 3/16 x ½ (R/S 06-0072)
B3	06-0074	1	Seal, 2" ID, Viton (40 Dur), 3/16 x ½ (R/S 06-0072)
B4	06-00688	1	O-Ring Bumper, Buna-Nitrile #460-B
A1	03-111334	1	Hose Barb, Brass, 1/8 NPT x ¼ " Barb #29-42
A2	03-10105	2	Clamp, Oitker ½ #11/13
A3	04-10325	1	Slider Valve, 1/8" Brass, #250
A11	06-2526	1	Tubing, 1/7 x ½ OD PVC x 3'-0" #510
A5	04-10099	1	Check Valve, Brass, Linde #639110
A6	03-111336	1	Hose Barb Adapter, Brass, Linde #17
A7	03-111337	1	Nut Brass, Linde #7
A8	03-111338	1	Bushing, Brass
A10	03-111397	1	Quick Disconnect, ¼" Male #BH2-61



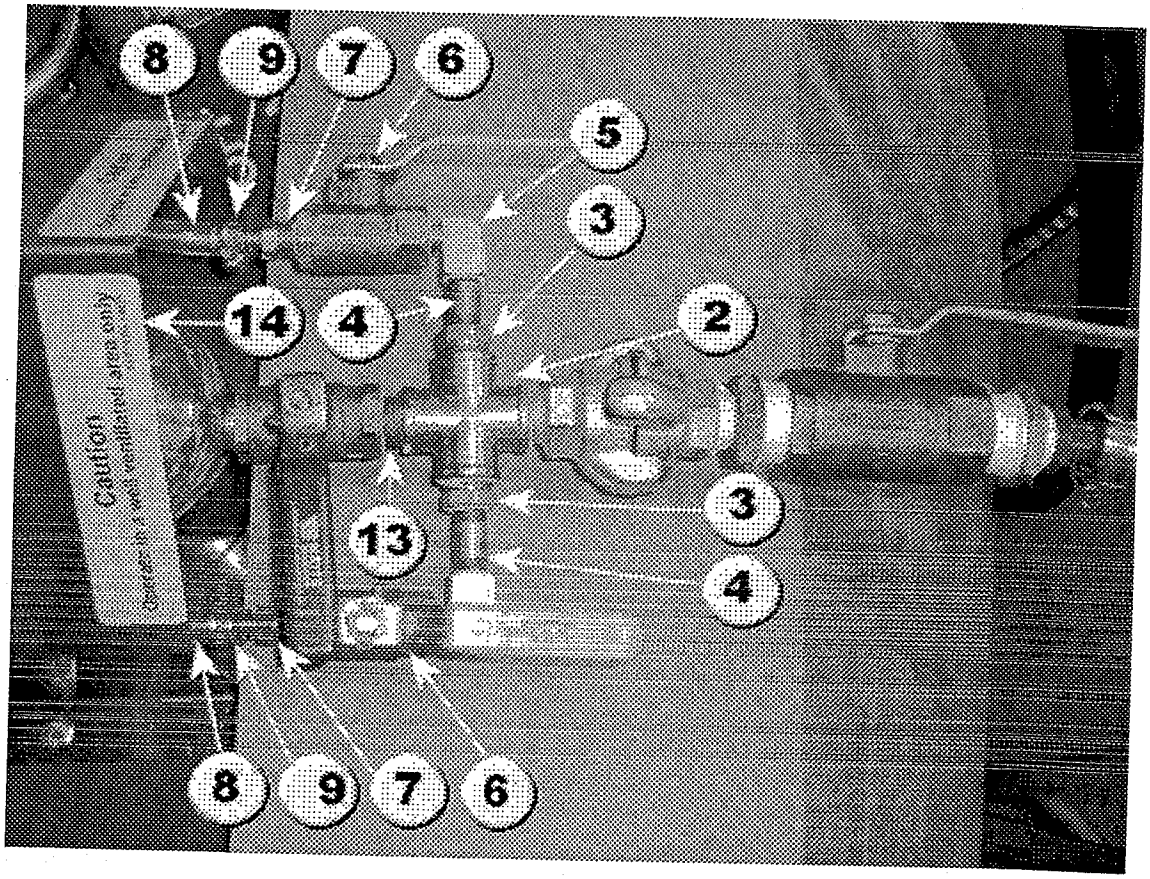
5.2 Part 08-0020 Duel Drain Assembly

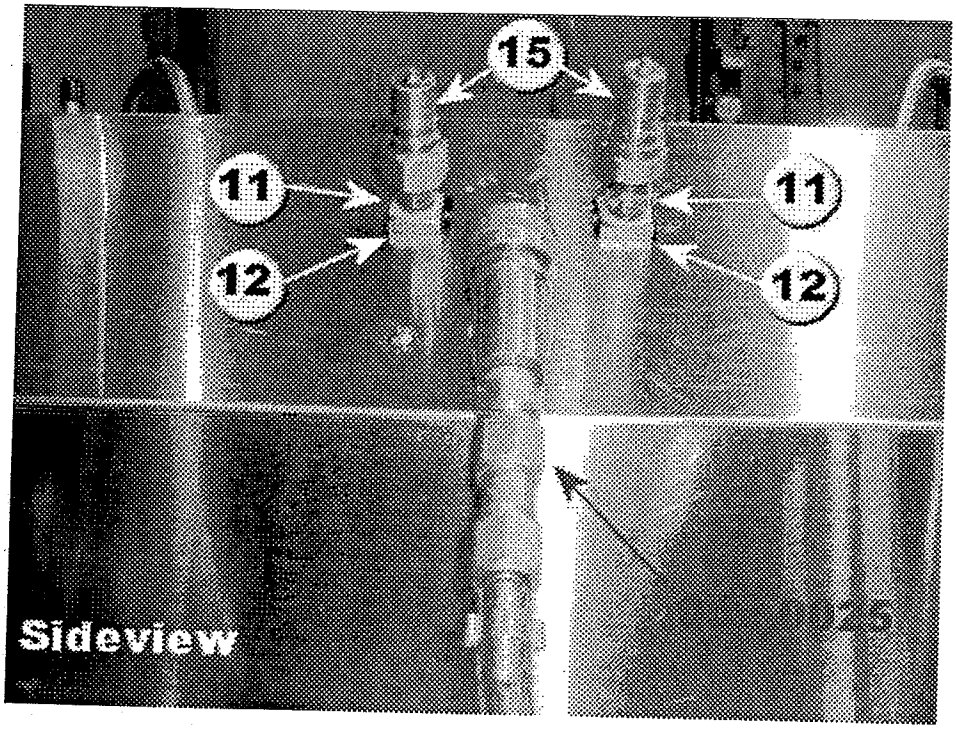
Item	Part Number	Qty	Description
1	05-1039	2	Suction Plate, Machined Aluminum.
2	06-0075	2	Seal, 4.75" OD, Viton (40 Dur), 3/16 x 1/2 (R/S 06-0072)
3	06-00688	2	O-Ring Bumper, Buna-Nitrile #430-B
4	07-0850	1	Delta Wing Plate
5	05-10401	1	Hub, Delta Wing, Machined
6	02-1490	4	Flat Head Machine Screws #10-32 x 1/2" SS
7	06-0073	1	Hub Seals, 3/16" Soft Buna-Nitrile 3/4" W x 2" ID
8	03-111334	2	Hose Barb, Brass 1/8 NPT x 1/4" Barb #29-42
9	03-10105	2	Clamp, Oitker 1/2 #11/13
10	04-10325	2	Slider Valve, 1/8" Brass, #250
11	06-2526	1	Tubing, 1/4 x 1/2 OD PVC x 3'-0" #510
12	03-11131	1	Tee. 1/4" X 11" Lg.
13	04-10099R	2	Check valves
14	06-10168	2	Braided SS hose, 1/8" x1 11" Lg.
15	03-111397	1	Quick Disconnect, 1/4" Male #BH2-61
16	06-0076	2	Cup cushions, 1/82" sponge Buna-Nitrile, cut special
17	02-1475	2	Allen Head Bolt, SS, 1/2" x 3/4" Lg.
18	02-11025	2	Washer, Flat, SS, 1/2"



5.3 Part 08-14005 UDA Vacuum Pump Assembly

Item	Part Number	Qty	Description
1	04-100035	2	Vacuum Pump, 1/8" Intake/1/4" Outlet, #41605K14
2	03-1059	1	Cross, 1/2 Brass #3950-8
3	03-11135	4	Bushing, 1/2" x 1/4" Brass #3220-8-4
4	03-10692	2	Nipple, 1/4" x 1.5" 1g Brass #3327-4
5	03-11136	2	Street El, 1/4" x 90 #3400-4
6	04-2506	2	Valve, Ball, 1/4" Brass #70-101-01
7	03-11133	2	Hose Barb, Brass 1/4 NPT x 1/84" Barb #29-44
8	06-2565	2	Tubing, 1/4 x 1/2 OD PVC x 12" #510
9	03-10105	4	Clamp, Oitker 1/2 #11/13
10	03-111334	2	Hose Barb. Brass 1/8 NPT x 1/4" Barb #29-42
11	03-10690	2	Close Nipple, Brass, 1/4 #3325-4
12	03-11136	2	Street El, 1/4" x 90 #3400-4
13	03-10081	2	Close Nipple Br, 1/2" #3326-8
14	07-1034W	1	Dog House cover
15	03-111397	2	Quick Disconnect, 1/4" Male #BH2-61

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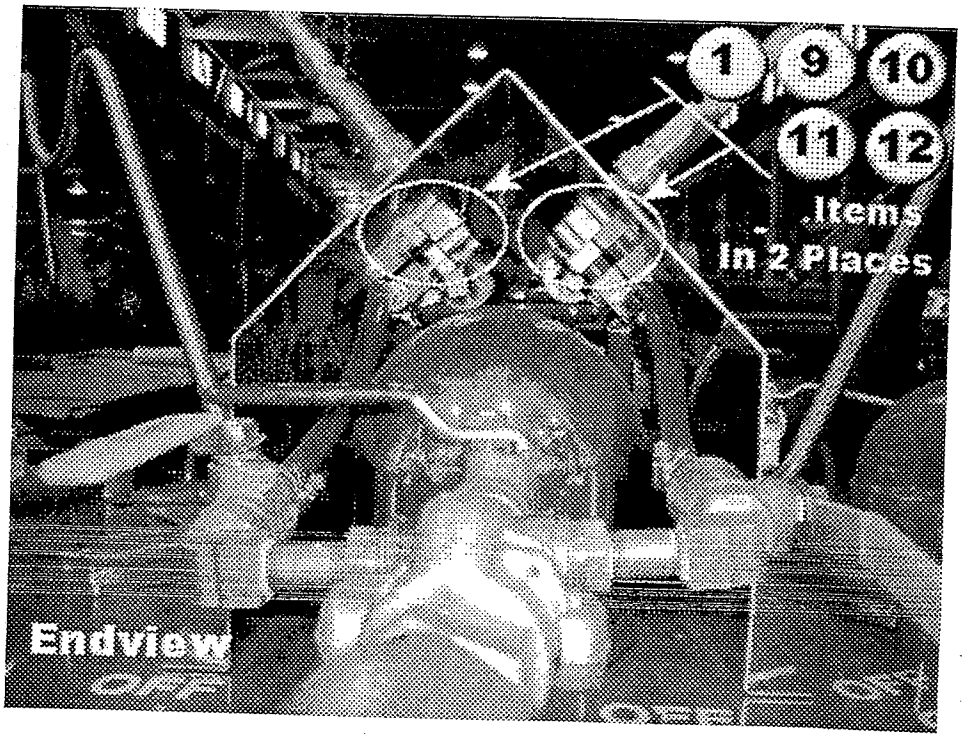
Sideview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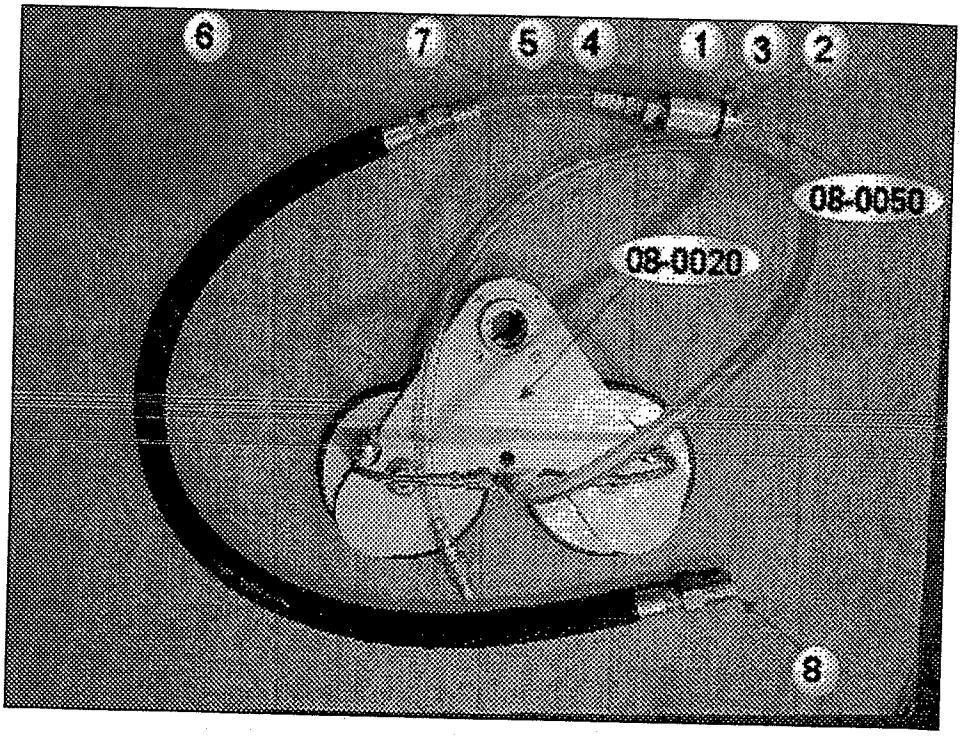
Items
In 2 Places
Endview

5.4 Part 08-0100 Fuel Probe Assembly (2 Required)

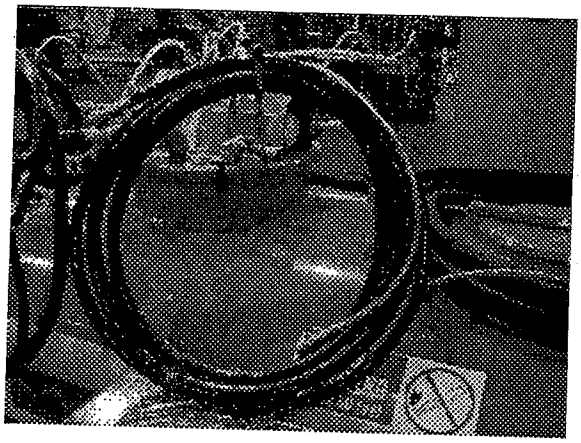
Item	Part Number	Qty	Description
1	05-1037R	1	Fuel Probe, Machined Alum.
2	02-1350	2	Poll Pin, .3/32" OD x 1/4"LG. #92373A139 18-8 SS
3	06-00684	1	O-Ring Part No. 2-214
4	04-10328	1	Bleeder Valve, 1/8" NPT Amflo #711
	08-1050	1	Hose, Probe Pigrail Consisting:
5	03-10155	1	Bushing, Brass, 3/4 TO 1/2" #3220 x 12 x 8
6	06-10166	1	Aircraft Defueling Hose, 1/2" x 3'LG w/1/2" M-NPT ends
7	04-0750	1	Clear sight windows, 1/2" urethane x 7" OA Long
8	03-111395	1	Quick Disconnect 1/2 Male #BH4-61
	08-0020	1	

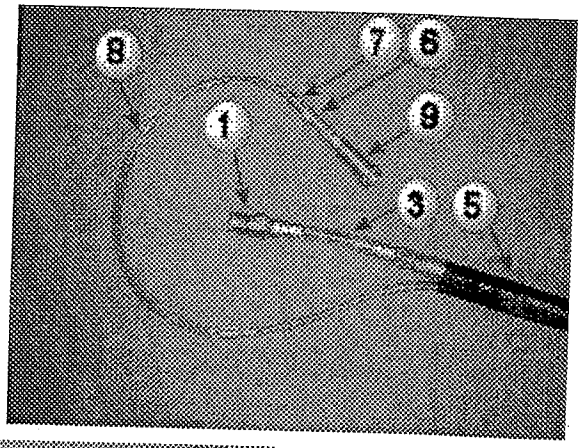


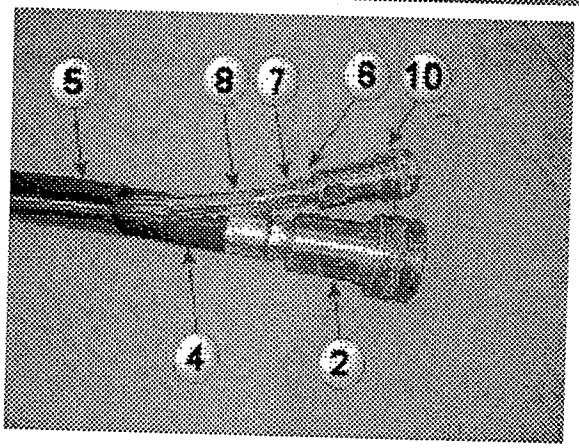
5.5 Part 08-0025 Shielded Dual Hose Assembly, 35'-0"LG

(2 Required)

Item	Part Number	Qty	Description
1	03-111395	1	Quick Disconnect 1/2 Male #BH4-61
2	03-111394	1	Quick Disconnect 1/2 Female #BH4-60
3	04-0750	1	Clear Sight windows, 1/2" urethane x 7" OA Long
4	06-10166	1	Aircraft Defueling hose, 1/2" x 35'LG w/1/2" M-NPT ends
5	06-10165	1	2" black heat shrink tubing x 35'LG MC#7132K561
6	03-111334	2	Hose Barb, Bass 1/8 NPT x 1/4"Barb #29-42
7	03-10105	4	Clamp, Oitker 1/2 #11/13
8	06-2526	1	Tubing, 1/4 x 1/2 OD PVC x 35'-0" #510
9	03-111398	1	Quick Disconnect, 1/4" Female #BH2-60
10	03-111397	1	Quick Disconnect, 1/4" Male #BH2-61

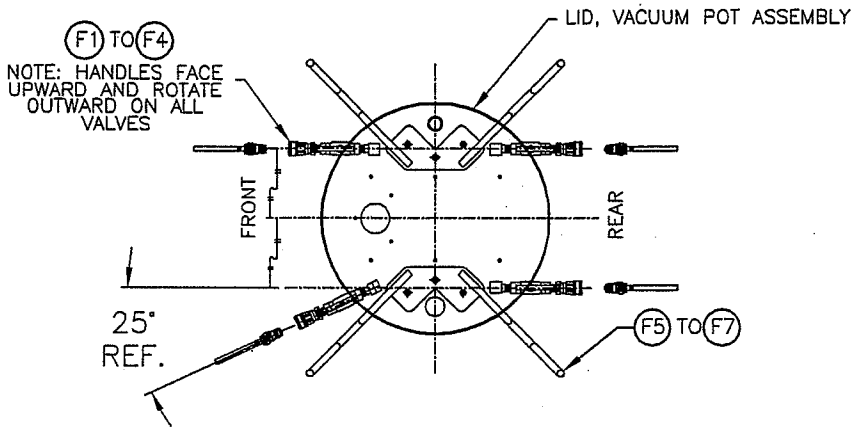




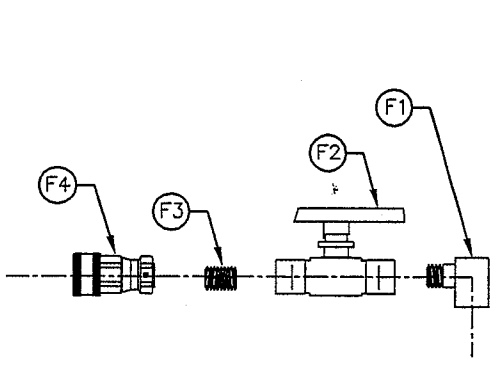


5.6 Part 08-14004 Vacuum Cover Adapter Parts (4-Ports)

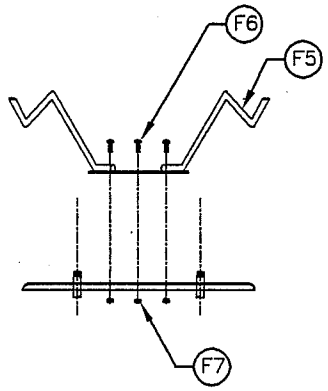
Item	Part Number	Qty	Description
F1	03-1006	4	Elbow, Brass Street, 1/2" x 90 #3400-8
F2	04-2507	4	Valve, Brass, 1/2 Apollo Ball #70-103-01
F3	03-10081	4	Close Nipple, Brass, 1/2 #3326-8
F4	03-111394	4	Quick Disconnect, 1/2 Female, #BH4-60
F5	07-1075	2	New Style Hose support brackets, Consisting of:
F6	02-100115	6	Bolts, 3/8" NC 1" LG.T-304SS
F7	02-1202	6	Nuts. 3/8" NC NYLOC, T-304SS



TOP ASSEMBLY VIEW



VALVE ASSEMBLY



HOSE HANGER SUPPORT BRACKET

Section 6: Warranty

VACUUM GENERATOR AND UNIVERSAL SUMPING CUP ASSEMBLY

ONE YEAR LIMITED WARRANTY

Seller warrants its "Vacuum Generator and Universal Sumping Cup Assembly" to be free from defects in material and workmanship under the normal use and service for which the unit is intended if, but only if the unit has been properly operated, maintained and stored in accordance with printed directions contained in the product manual. Our obligation under this warranty shall be limited to the repair or exchange of equipment and parts which may prove defective within one year of the date the unit is put into service but shall in no event extend beyond a date two years from the date the unit is shipped from our plant. All transportation charges on parts returned to us for replacement under this warranty must be returned pre-paid.

This warranty does not extend to damages caused by environmental factors varying from normal design conditions, whether natural or man-made, or to units subjected to misuse, negligence or accident. This warranty likewise does not extend to the unit or any parts thereof, which have been repaired or altered improperly or in any way so as to effect adversely its stability or reliability. This warranty does not cover parts or labor required to repair or replace parts whose usefulness is exhausted due to normal operation of this unit.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE NOT SET FORTH IN A WRITING SIGNED BY AN AUTHORIZED REPRESENTATIVE OR SELLER. SELLER SHALL IN NO EVENT BE LIABLE FOR ANY CONSEQUENTIAL LOSS OR DAMAGE RESULTING FROM THE USE OR LOSS OF USE OF THIS UNIT.