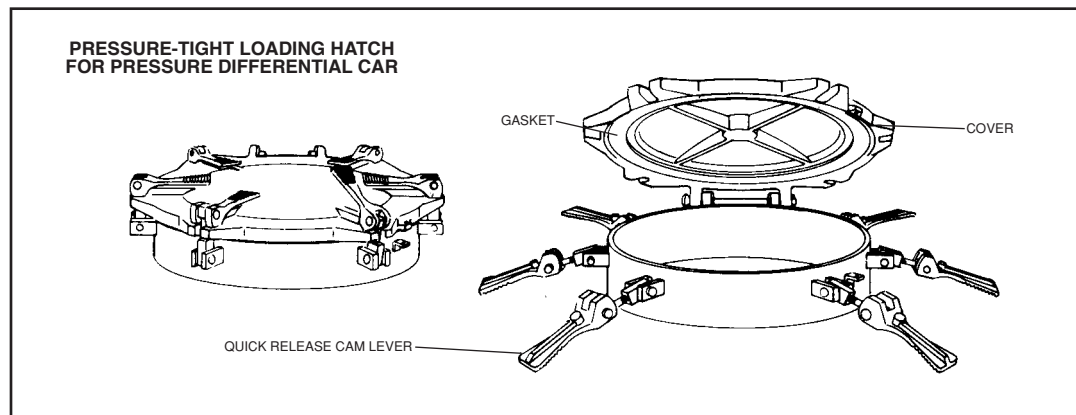


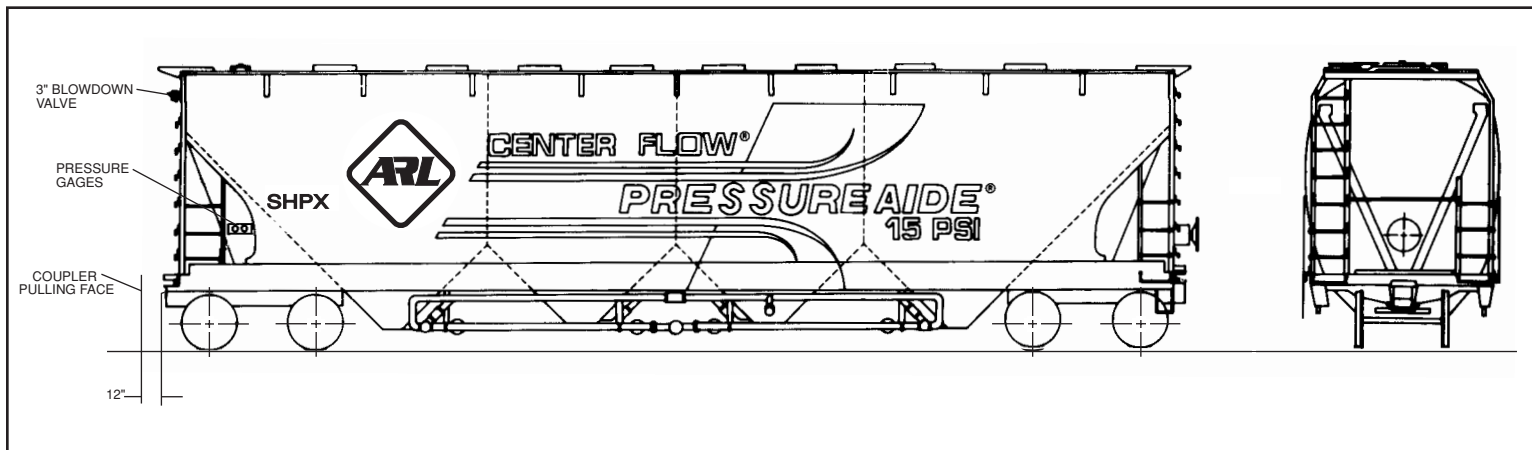
# SPECIFICATION SHEET



BASIC SPECIFICATIONS	5000	5001	5003	5007
Length Over Strikers	56'-11"	56'-11"	62'-5 1/4"	62'-5 1/4"
Truck Centers	46'-3"	46'-3"	51'-9 1/4"	51'-9 1/4"
Overall Height	15'-6"	15'-4 13/16"	15'-5 9/16"	15'-5 9/16"
Overall Width	10'-7 3/16"	10'-6"	10'-3"	10'-3"
Height Rail to Bottom of Discharge Outlets (Light Car)	12 13/16"	12 13/16"	13"	13"
Number of Hoppers	4	4	4	4
Number of Outlets per Hopper	1	1	1	1
Number of Roof Hatches	8	8	8	8
Size of Roof Hatches	20" Dia.	20" Dia.	20" Dia.	20" Dia.
Slope End Floor Sheet	50°-45°	50°-43°	50°-43°	43°-45°
Slope Interior Floor Sheet	50°	50°-45°	50°-45°	43°-45°
Slope Side Slope Sheet	45°	45°	45°	51°
Cubic Capacity	5000 cu. ft.	5000 cu. ft.	5300 cu. ft.	5750 cu. ft.
Estimated Nominal Lightweight	72,000 lbs	66,900 lbs.	70,300 lbs.	70,100 lbs
Horizontal Curve Negotiability - Uncoupled	150 ft.	150 ft.	180 ft.	180 ft.

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**Figure 1. Center Flow® Pressureaide® Car**

The ARL Pressureaide® pressure differential Center Flow® covered hopper car is designed to handle dry bulk commodities. With operating pressures up to 14.5 psig, fast, efficient unloading for long distances can be achieved. Unloading rates up to 100,000 lbs/hour may be obtained depending upon the commodity and unloading system.

The Pressureaide® car has many of the famous Center Flow® car design features: centerline loading, unloading, complete sanitation and ease of operation. Designed to operate with standard positive displacement blowers, this car may be used with equipment compatible with pressure sleds. As safety is a prime consideration for American Railcar Leasing LLC, the Pressureaide® car is equipped with two pressure relief valves, a rupture disc and a vacuum relief valve.

The Pressureaide® car is unmatched by any railcar in its class when it comes to sanitation, maintenance and unloading performance.

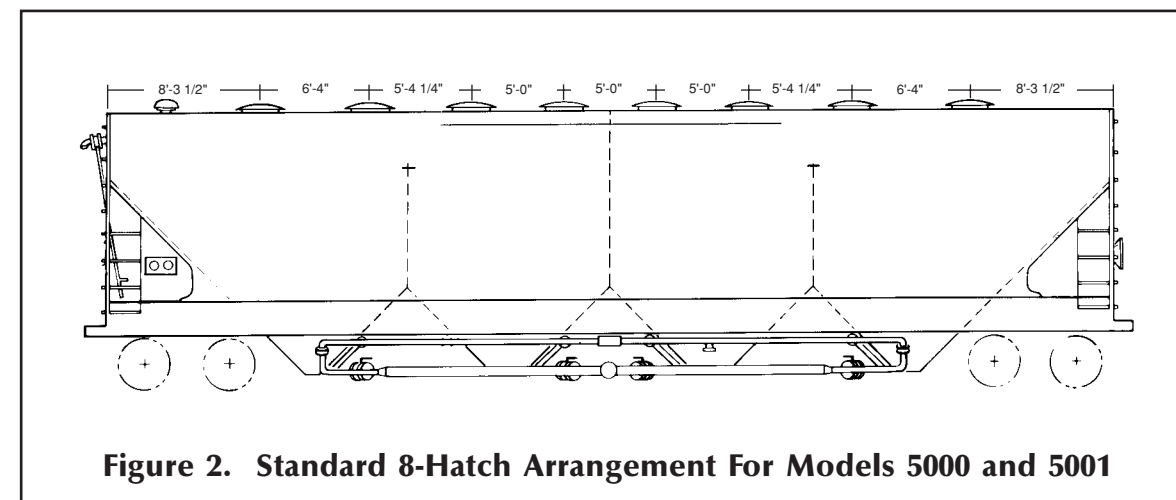
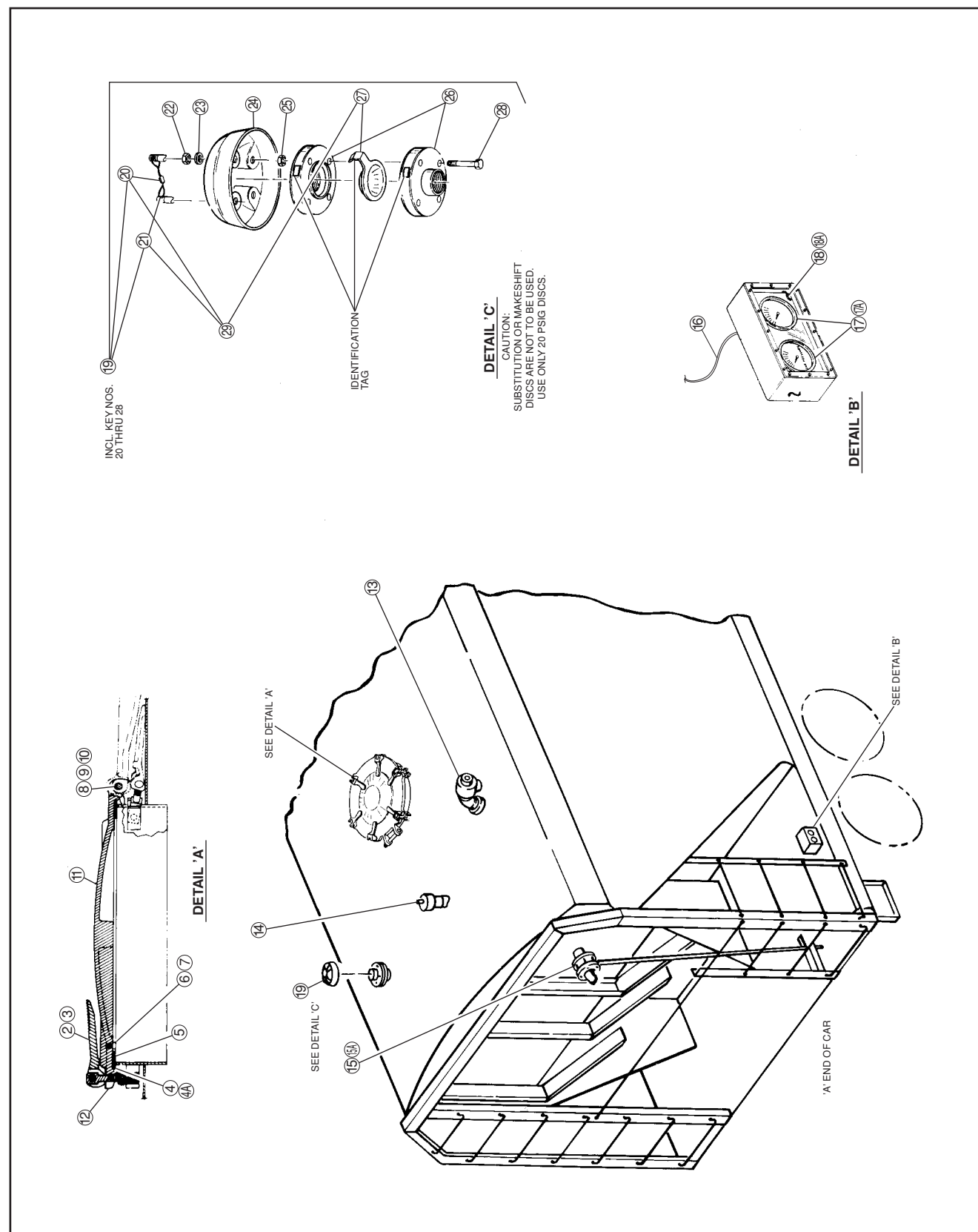
**Parts List**

KEY	NUMBER PER UNIT	DESCRIPTION	CATALOG NUMBER	DRAWING NUMBER
2	8	Cam Lever Assy. at Safety Catch	5W107206	5-W-1072-06
3	40	Cam Lever Assy.	5W107205	5-W-1072-05
4	8	Gasket For Hatch Cover For Retainer Type	90011238	---
4A	8	Gasket For Hatch Cover Without Retainer	90038668	3-K-7329
5	8	Gasket Retainer	50093367	---
6	48	Cap Screw	90018658	---
7	48	Shakeproof Washer	90004405	---
8	8	Hinge Pin	50092946	2-K-8961
9	16	Washer	90004404	---
10	8	Cotter Pin	90007113	---
11	8	Cover (Includes Gasket)	50091016	4-U-4326
12	8	Safety Catch	50092947	3-K-8981-00
13	1	2" Pressure Relief Valve Without Elbow	57333505 or 57334111	2-J-3995 or 2-V-5363
14	1	Vacuum Relief Valve	57333907	3-J-2077-01
15	1	Blowdown Valve Assy.	57333754*	---
15 A	1	Blowdown Valve Assy.	57334107**	3-V-8073
16	2	Tubing - Meter Box 25' Section	91002188	---
17	2	Pressure Gauge	50093321*	1-J-2685
17A	2	Pressure Gauge	50091480**	1-V-5465
18	1	Gauge Cover	50093290*	11-82043
18A	1	Gauge Cover	2V610400**	2-V-6104
19	1	Rupture Disc Assy. Includes Key Nos. 20 Through 28	50093602	3-J-5612
20	1	Lead Wire Seal	---	---
21	1	Wire	---	---
22	4	Stop Nut	---	---
23	4	Washer S. S.	---	---
24	1	Rupture Disc Valve Cover	---	---
25	4	Hex Nut	---	---
26	1	Rupture Disc Holder	---	---
27	1	Rupture Disc	---	---
28	4	Bolt With Seal Hole	---	---
29	1	Rupture Disc Replacement Kit Includes Key Nos. 20, 21 and 27	50093596	2-J-5615

NOTE: For replacement of rupture disc only, (Reference Page 11 - Figure 14 of this manual for service and repair procedure) order Rupture Disc Replacement Kit per Key No. 29.

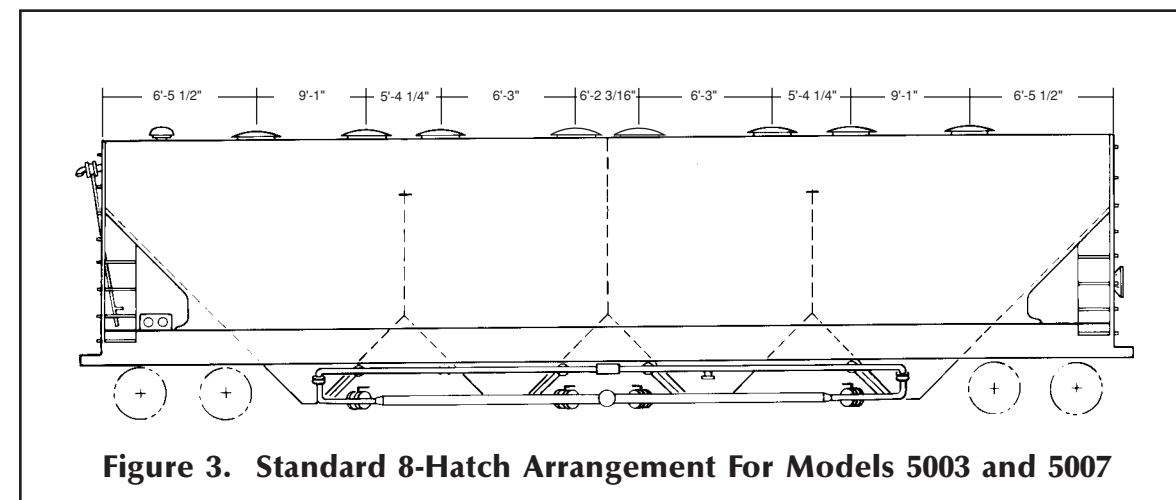
\* For Cars Built Before January 2000

\*\* For Cars Built In January of 2000 And Later



**Figure 2. Standard 8-Hatch Arrangement For Models 5000 and 5001**

Figure 2 shows the standard roof hatch and bulkhead arrangement for the models 5000 and 5001 Pressureaide® cars. Each compartment has two hatches located on the car's longitudinal centerline. Intermediate bulkheads are designed to permit simultaneous loading of adjacent compartments from one hatch.



**Figure 3. Standard 8-Hatch Arrangement For Models 5003 and 5007**

Figure 3 shows the standard roof hatch and bulkhead arrangement for the models 5003 and 5007 Pressureaide® cars. Each compartment has two hatches located on the car's longitudinal centerline. Intermediate bulkheads are designed to permit simultaneous loading of adjacent compartments from one hatch.

# PRE-TRIP CAR INSPECTION

The Pressureaide® car is a special piece of equipment, as such, it requires regular preventative maintenance. Part of this program includes a thorough pre-trip inspection prior to loading.

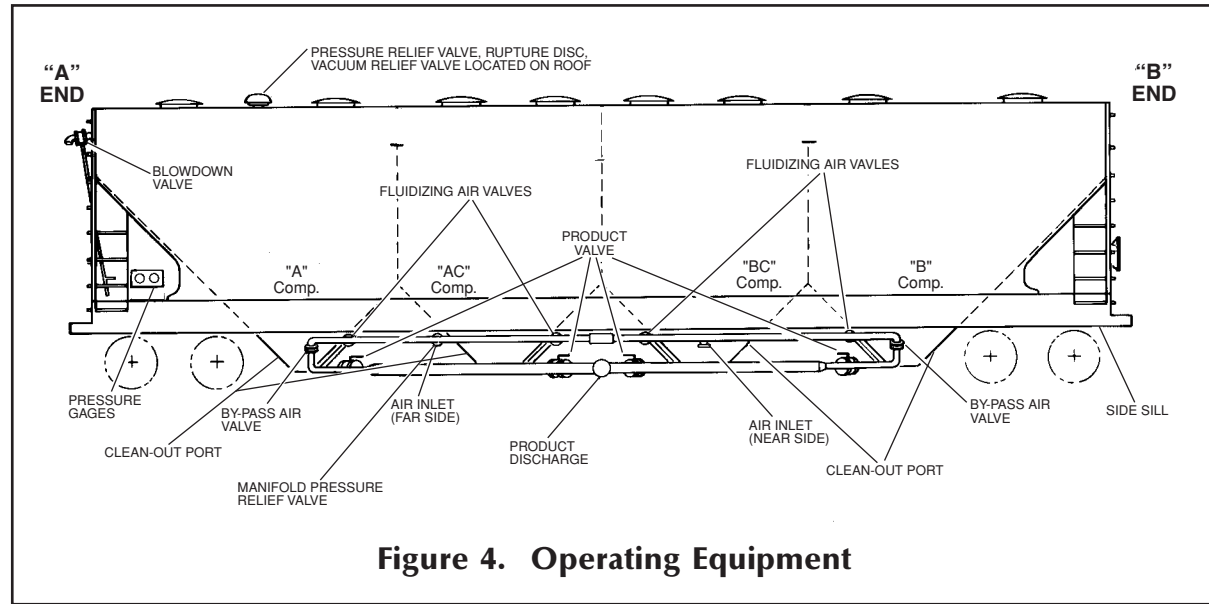


Figure 4. Operating Equipment

## PRE-TRIP CHECKLIST BEFORE LOADING

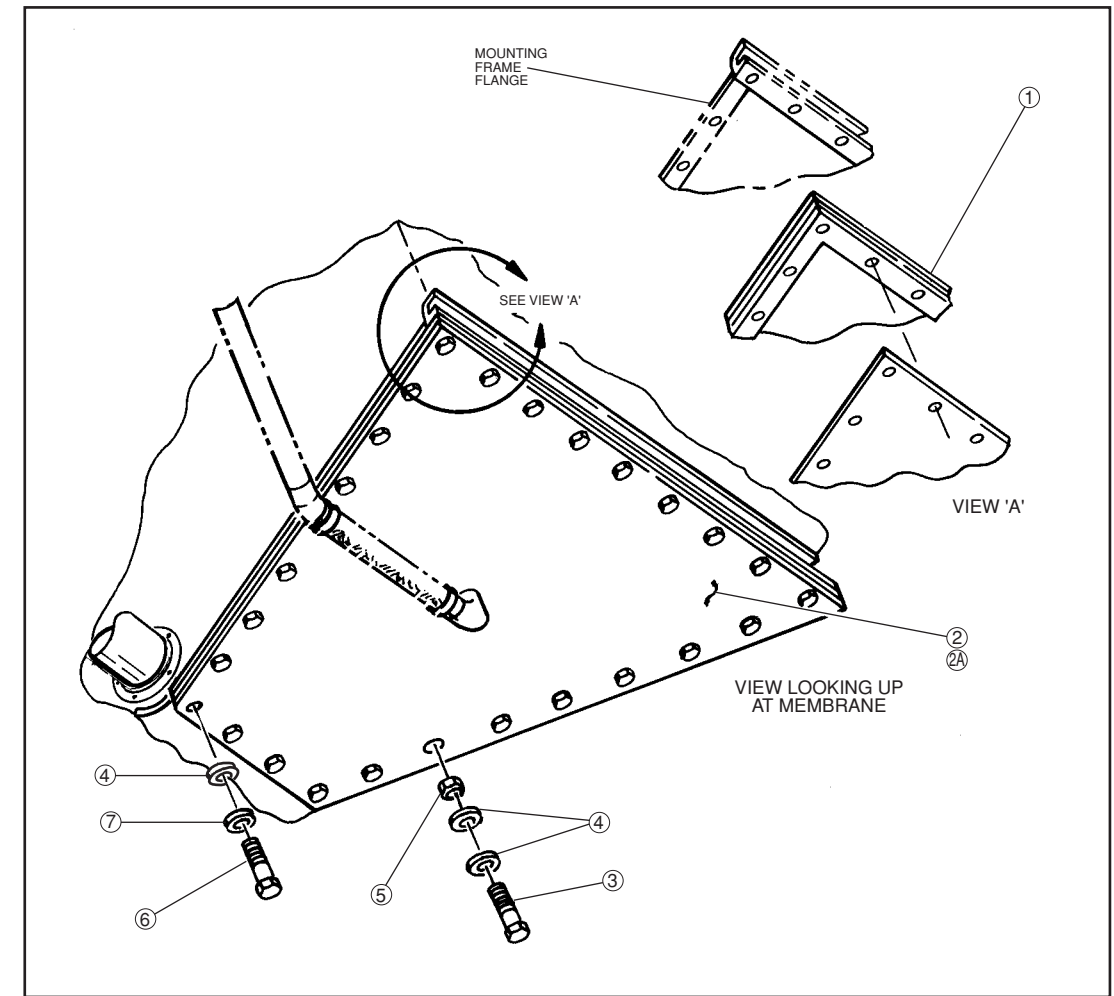
1. If the car is to be cleaned, follow the procedures on page 15.
2. Ensure there is no water in the air manifold and that the product manifold and membranes are clean and dry.
3. Inspect all hatch covers, locking mechanisms and safety catches for proper operation. Ensure gaskets are clean and in good condition.
4. Inspect and operate all control valves (product, by-pass air, fluidizing air and blowdown) to ensure they are in proper working condition.
5. Inspect all dust caps. Ensure gaskets are in place and in good condition. Attachment chains and cam levers must be intact.
6. Inspect pressure gauges and protective covers. Be sure the gauges read zero with car depressurized and the cover is not broken.
7. Inspect all rubber hoses to ensure the hose clamps are properly installed and tightened and that the hoses are intact.

8. If the cleanout port has a flanged cover, ensure its gasket is properly installed and all fasteners properly tightened. If the cleanout port has a dust cap arrangement, ensure the cap is properly installed, its gasket is in good condition and a proper locking seal is applied to the operating levers.

9. Ensure all valves are closed prior to loading product into the car. If venting is required, it may be provided for by opening the blowdown valve or a hatch. Proper filters may be required to minimize dusting.

## AFTER LOADING

1. Check all caps for secure installation.
2. Ensure blowdown valve is closed.
3. Ensure cover over pressure gauges is closed.
4. All hatches must be closed and all hold-downs properly engaged in the closed position.



Parts List For Models 5000, 5001 and 5003

KEY	NUMBER PER UNIT	DESCRIPTION	CATALOG NUMBER	DRAWING NUMBER
1	8	Gasket & Membrane Assy.	50092502	4-K-7333
2	4	Membrane Support Assy. With Elbow As Shown	4U068701	4-U-0687-01
2A	4	Membrane Support Assy. With Elbow Rotated 180°	4U068700	4-U-0687-00
3	248	H.H. Bolt	90034612	---
4	528	Washer	90004419	---
5	248	Stop Nut	90002400	---
6	32	H.H. Bolt W/Nylon Patch	90034526	2-J-2721
7	32	Lock Washer - Hi-Collar	90004418	---

Parts List For Model 5007

KEY	NUMBER PER UNIT	DESCRIPTION	CATALOG NUMBER	DRAWING NUMBER
1	8	Gasket & Membrane Assy.	50091430	4-V-4636-00
2	4	Membrane Support Assy. With Elbow As Shown	4V463400	4-V-4634
2A	4	Membrane Support Assy. With Elbow Rotated 180°	4V463401	4-V-4634-01
3	280	H.H. Bolt	90035259	---
4	624	Washer	90004475	---
5	280	Stop Nut	90002170	---
6	64	H.H. Bolt With Nylon Patch	90035258	2-V-5335-00
7	64	Lock Washer	90004259	---

# AIR REQUIREMENTS

## MANIFOLD ASSEMBLY FOR CARS EQUIPPED WITH 5" PRODUCT LINE AND 4" AIR INLET LINE

KEY	NUMBER PER CAR	DESCRIPTION	CATALOG NUMBER	DRAWING NUMBER
1	6	5" Alum. KamLok Cap	50093980	---
2	6	Gasket - 5" KamLok Cap	90038105	---
3	2	Hose 4 1/2" I.D. x 8 1/2"	50093438	2-J-3768-00
4	8	Hose Clamp - 5 1/8"	50093460	2-V-6794-01
5	2	4" Alum. KamLok Cap	50093981	---
6	2	Gasket - 4" KamLok Cap	90038100	---
7	12	Gasket - 5" Manifold	90038085	2-J-4059
8	4	Four-Way Valve	6J599700	6-J-5997
9	4	Valve Repair Kit	3V469500	3-V-4695
10	1	5" Cross - Alum.	5J979700	5-J-9797
11	4	Hose 5 9/16" I.D. x 8 1/2"	50093465	1-J-3336-01
12	8	Hose Clamp - 6 1/8"	50093464	2-V-6794-02
13	8	Hose 2 3/8" I.D. x 15 5/16"	50093454	1-J-3981
14	16	Hose Clamp - 3"	50093458	2-V-6794
15	1	Pressure Relief Valve	57333501 or 2V908800	2-J-3946 or 2-V-9088
16	4	5" Butterfly Valve	57334109	3-V-8073-02
17	2	Flexible Hose 4 1/2" x 11 1/2"	50093439	2-J-3768-01
18	2	4" Butterfly Valve	57334108	3-V-8073-01
19	2	5" Check Valve (applies to model 5000)	50093501	3-J-3939-02
20	2	Gasket (1 required for use w/item 19)	2W688100	2-W-6881
21	2	Check Valve (models 5001, 5003, 5007)	4V438100	4-V-4381
22	4	Gasket (2 required for use w/item 21)	90038909	2-U-7457
23	8	Gasket	90038148	1-J-5874
24	4	Gasket	90038147	1-J-5875

The Pressureaide® car has been designed to operate with air supplies from 200 CFM to 1000 CFM (CFM=Cubic Feet Per Minute).

The air requirement for a particular system depends on the diameter and configuration of the conveying line and the characteristics of the material being conveyed. **To determine the air requirements for a specific unloading system, furnish your ARL representative with the details of the system.** As a general guide for air requirements in low-pressure pneumatic systems, refer to the following chart:

PRODUCT LINE SIZE	AIR VOLUME
4-inch (pipe)	. . . . .440 CFM
5-inch (pipe)	. . . . .680 CFM
6-inch (pipe)	. . . . .1000 CFM

**CAUTION:**  
**UNDER NO CIRCUMSTANCES SHOULD MORE THAN 1000 CFM BE USED TO PRESSURIZE THE CAR NOR SHOULD CAR PRESSURE EXCEED 14.5 PSIG.**

Best results are obtained by using a positive displacement blower which will develop air flow (CFM) at a minimum of 14.5 psig. However, there are many other types of blowers and air compressors that produce adequate air flow to operate the Pressureaide® car.

Large industrial plant systems, which produce an adequate air flow, may be used to operate the Pressureaide® car provided they are equipped with a pressure regulator that limits the pressure to 20 psig, an adequate water trap and a good filter.

**NOTE:**  
**WHEN USING ANY AIR SOURCE, THE AIR MUST BE CLEAN, FREE FROM OIL AND WATER AND ITS TEMPERATURE MUST NOT EXCEED 250°F. FAILURE TO DO SO MAY RESULT IN DAMAGE TO THE CAR'S MEMBRANES.**

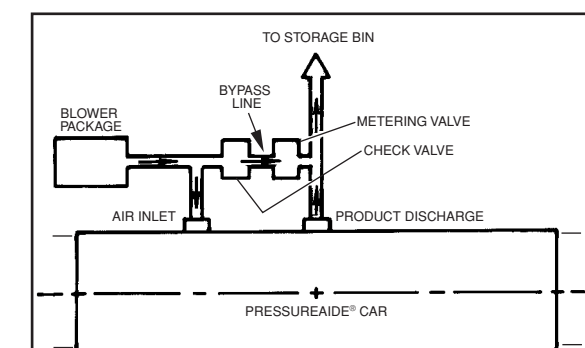
The Pressureaide® car has two membranes in the bottom of each compartment. Air directed through the membranes fluidizes the lading and pressurizes the car. The fluidization breaks down the internal strength of the lading and the pressurization provides the energy to convey the lading.

To ensure the system works properly, the air inlet side of the membranes must remain clean. This requires that precautions be taken at the unloading site:

- 1.) Air inlet hose must be free of product and/or other foreign material.
- 2.) Air supply should be clean and dry.

In situations where by-pass air lines are used (see Figure 5) a check valve and metering valve arrangement should be part of the system. The purpose of the metering valve is to permit proper adjustment of air flow into and by the car, while the check valve is to ensure against a backflow of lading into the blower package and the car's air inlet line in the event the air supply is interrupted during the unloading process.

Unloading systems utilizing automation are special cases. If the unloading system uses automated controls, contact an ARL representative. Potentially undesirable situations may be avoided after a brief review of the railcar and its relationship with the system.



**Figure 5. Product Discharge With By-Pass**



## OPERATING CONTROLS

1. **Pressure Relief Valves** (Refer to figures 4 and 6) - The car is equipped with a pressure relief valve on the "A" end of the car body that is set to open at  $14.5 \pm 0.5$  psig. The car is also equipped with a pressure relief valve on the air inlet manifold (see figure 6) which is set to open at  $16 \pm 0.5$  psig.

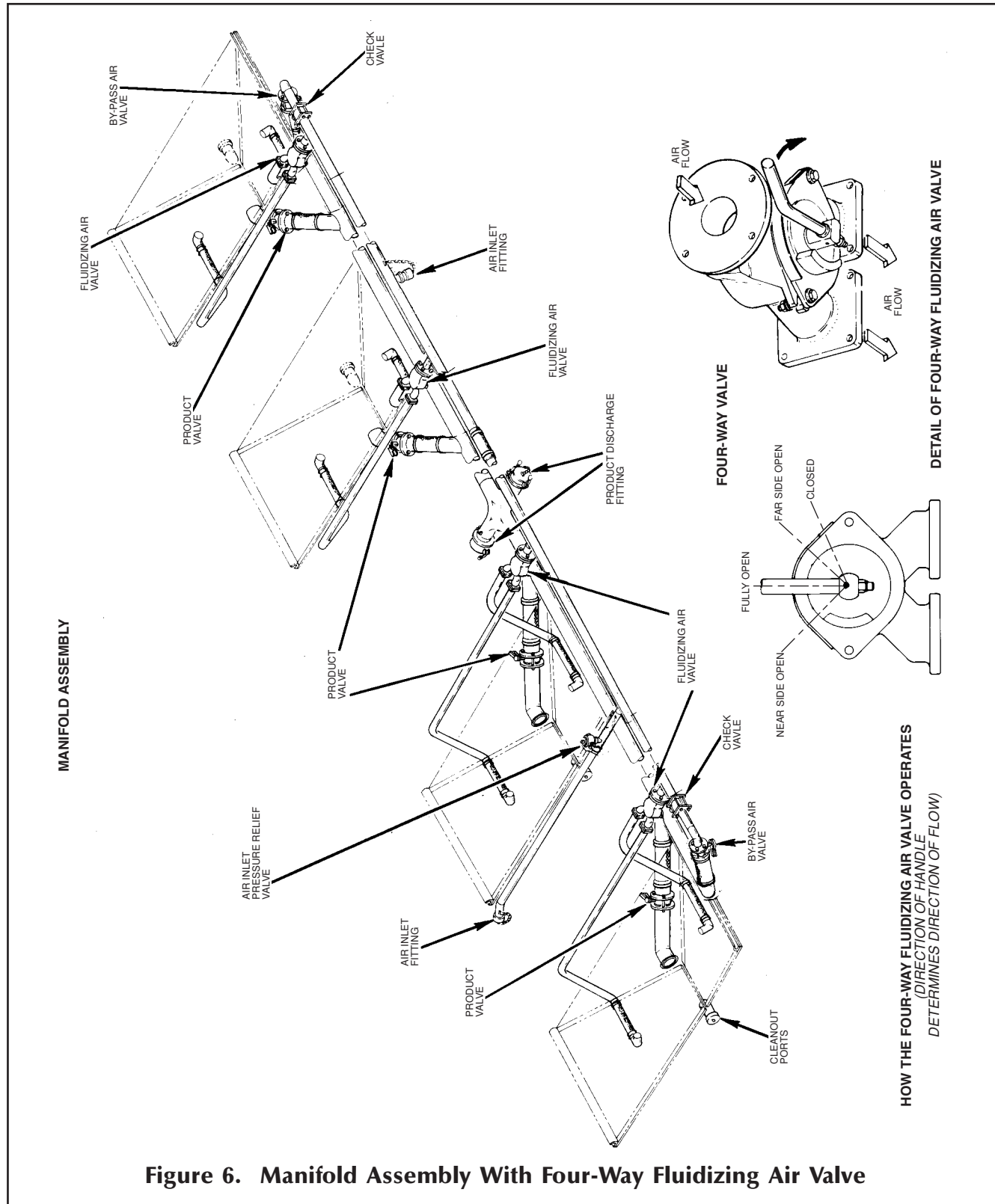
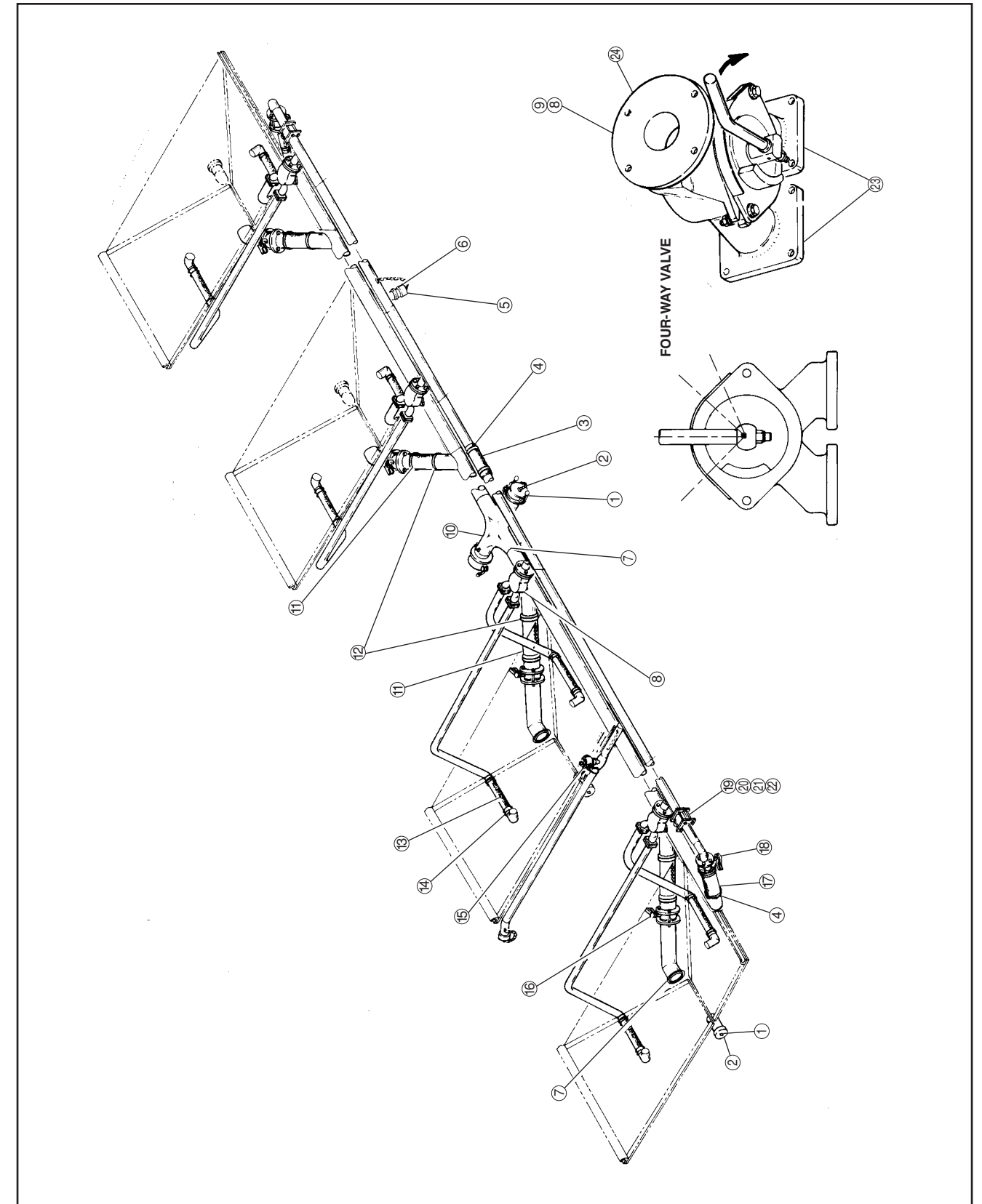


Figure 6. Manifold Assembly With Four-Way Fluidizing Air Valve

## SPARE PARTS



**CONDITION: NO LADING FLOW OR REDUCED FLOW (Cont.)**

CHECK FOR	ACTION REQUIRED
Plugged line. (continued)	<p>Open product valve on the most empty hopper. Restart blower.</p> <p>Close product valve and allow the pressure in the manifold line to build to the maximum capacity of the blower or to a maximum of 14.5 psig.</p> <p>Rapidly open and close product valve until reverse flow starts. Leave valve open until flow stops. Close product valve and repeat.</p> <p>When line pressure drops to a low pressure (less than 2 psig for most systems) with the product valve closed, the line is clear.</p> <p>When the plugged line has been cleared, close product valve and open both by-pass valves to clear manifold.</p> <p>Open fluidizing valve.</p> <p>Close blowdown valve to re-pressurize car and proceed with unloading.</p> <p><i>If the preceding procedures do not unplug the line, it will be necessary to disassemble the unloading line.</i></p> <p>Open one fluidizing valve.</p> <p>Open blowdown valve, depressurize car.</p> <p>Open product valve on most empty compartment.</p> <p>Close both by-pass air valves.</p> <p>Shut off blower.</p> <p>Manually disassemble and clean out product line between the car and the storage bin.</p> <p>CAUTION - Be sure product line is depressurized before attempting to disassemble.</p>
Insufficient air flow or inadequate blower.	<p>Check for proper size blower. Refer to guidelines on Page 5.</p> <p>Check blower for proper operation. Consult blower manufacturer, if required.</p> <p>Contact ARL representative.</p>
Rat holing (material hanging on side walls and outlet membrane covered).	<p>The membrane may be plugged. Unload compartment using manual assist if required.</p> <p>Contact an ARL representative.</p>

2. **Rupture Disc** - A rupture disc is applied to the car body as a back-up safety device. The disc is designed to rupture at 20 psig at 72°F and is located on the roof of the car.

3. **Lading Controls** - The product discharge portion of the manifold is equipped with a product valve at each hopper. The air inlet portion of the manifold is equipped with a valve arrangement at each hopper to permit selective fluidization of the hoppers and prevent the car from losing pressure if the blower inadvertently shuts down or if it's necessary to disconnect the air inlet or product discharge hoses while the car is pressurized.

**NOTE: BEFORE REMOVING ANY DUST CAP, OPEN THE BLOWDOWN VALVE, ANY FLUIDIZING VALVE AND ANY PRODUCT VALVE. IF GAUGE READINGS ARE NOT ZERO, CHECK FOR FAULTY GAUGES.**

4. **By-pass Air Controls** - A butterfly check valve arrangement is installed in the air supply portion of the manifold at each end of the car. This permits air to be metered into the product discharge line. The check valves are installed to prevent the back flow of lading if there is an interruption in the air supply.

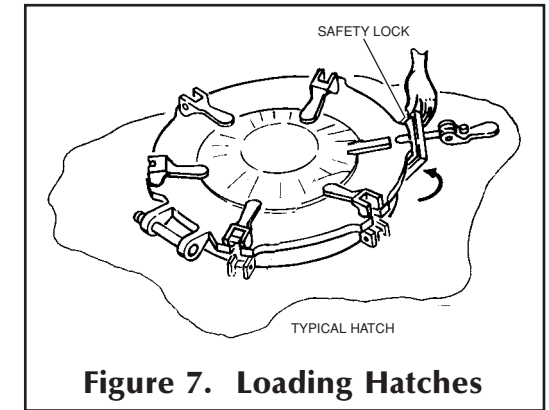
5. **Blowdown Valve** - A manually operated blowdown valve is applied to the "A" end bulk-head to depressurize the car. This valve is equipped with a handle extension to permit operation from ground level.

GENERAL UNLOADING INSTRUCTIONS

**NOTE: BEFORE REMOVING ANY DUST CAP, OPEN THE BLOWDOWN VALVE, ANY FLUIDIZING VALVE AND ANY PRODUCT VALVE. IF GAUGE READINGS ARE NOT ZERO, CHECK FOR FAULTY GAUGES.**

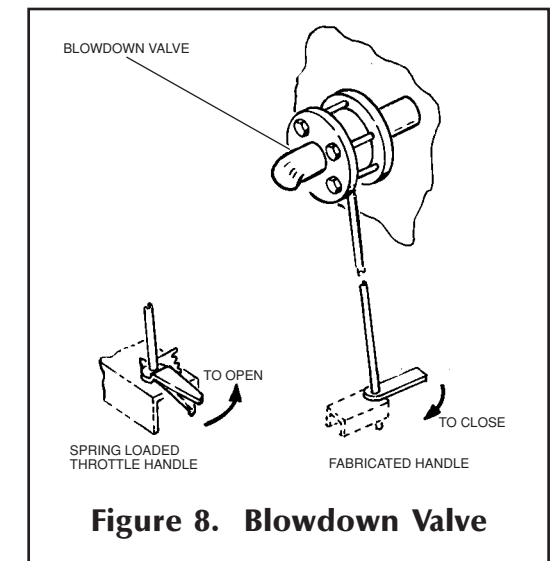
Prior to hook-up for unloading, inspect car thoroughly to ensure:

1. All hatches are secure (See Figure 7).



**Figure 7. Loading Hatches**

2. Blowdown valve is in closed position (See Figure 8).



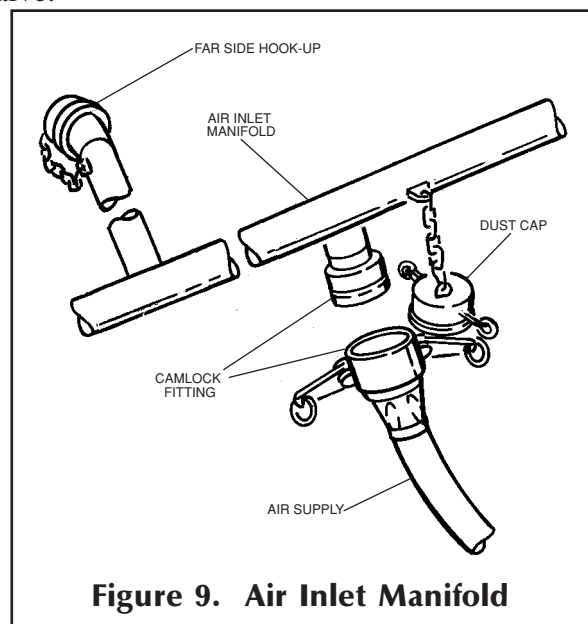
**Figure 8. Blowdown Valve**

- 3. All product valves are closed.
- 4. All fluidizing air valves and by-pass air valves are closed.
- 5. Pressure gauges are intact and petcocks are closed. If petcocks are open, gauges will not give accurate readings.

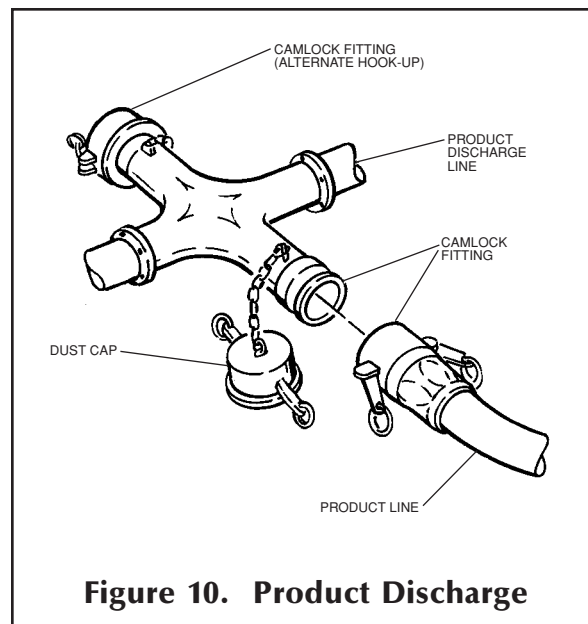
# OPERATING INSTRUCTIONS

## HOOK-UP

Prior to removing any dust caps, open the blowdown valve, any fluidizing valve and any product valve.



**Figure 9. Air Inlet Manifold**



**Figure 10. Product Discharge**

1. Remove dust cap and connect air supply line to air inlet fitting. Air supply can be connected to either side of the car (See Figure 9).

**NOTE:**  
**CARE MUST BE EXERCISED TO ENSURE AIR SUPPLY LINE IS CLEAN AND FREE OF CONTAMINATION.**

2. Remove dust cap from product discharge line on car and connect product line (See Figure 10).
3. Ensure all valves on the car are closed after hook-up is completed.
4. Attach grounding straps to both the car body and the product discharge line.

## PRESSURIZATION

1. Open fluidizing air valve to full open position on the first compartment to be unloaded.
2. Start the blower and pressurize the car. Monitor the pressure with the car's pressure gauges (one gauge reads car body pressure, the other gauge reads air inlet pressure).

**CAUTION:**  
**IF DUST EMITS FROM THE CAR, IMMEDIATELY STOP UNLOADING. DEPRESSURIZE THE CAR, MAKE A THOROUGH INSPECTION AND CORRECT THE PROBLEM. IF ANY CRACKS ARE FOUND IN THE CAR'S STRUCTURE, CONTACT AN ARL REPRESENTATIVE. IF THE CAR'S BODY PRESSURE EXCEEDS 15.0 PSIG AND THE PRESSURE RELIEF VALVE DOES NOT OPEN, SHUT OFF THE AIR SUPPLY, BLEED PRESSURE FROM CAR AND DETERMINE REASON FOR PRESSURE RELIEF VALVE MALFUNCTION. IF A MALFUNCTION OCCURS WHILE UNLOADING, REFER TO "TROUBLESHOOTING" SECTION ON PAGE 16.**

3. When the car reaches the optimum operating pressure, it is ready to unload. The maximum car body operating pressure is 14.5 psig. Optimum pressures will vary depending upon the unload site's pneumatic unloading system.

## CONDITION: CAR WILL NOT PRESSURIZE OR WILL NOT REACH OPERATING PRESSURE, (Cont.)

CHECK FOR	ACTION REQUIRED
Leakage from car body.	Contact an ARL representative.
Jammed check valve in air inlet portion of the manifold.	Check valve is located in the air inlet portion of the manifold. Loosen bolts, inspect and reposition.

## CONDITION: NO LADING FLOW OR REDUCED FLOW.

CHECK FOR	ACTION REQUIRED
Jammed check valve or fluidizing air valve in air lines.	With blower running, rapidly open and close valve. Check to be sure fluidizing air valve is properly installed. See Figure 6. Remove valve and inspect for obstruction. Flapper must be free. If stuck, replace valve.
Excessive back pressure in receiving vessel.	Check receiving vessel for proper air vent. Clean air filters if applicable.
Plugged line.	Immediately close all product valves and all fluidizing air valves. Open both by-pass air valves to the full open position and restart blower, if shut off. If line can not be blown clear, (indicated by a line pressure drop) close by-pass air valves and shut off blower. <b>CAUTION:</b> If the blower must be shut down before line is clear, ensure the product valve on the most empty compartment is open. The following reverse flow procedure may also be followed to clear a plugged line: <ol style="list-style-type: none"> <li>1. Open blowdown valve to depressurize car. (Leave valve open).</li> <li>2. Close all product valves.</li> <li>3. Close all fluidizing air valves.</li> <li>4. Open by-pass air valves to the full open position.</li> </ol>

**CONDITION: CAR WILL NOT PRESSURIZE OR WILL NOT REACH OPERATING PRESSURE.**

CHECK FOR	ACTION REQUIRED
Proper operation of gauges.	Petcock on gauge line must be closed. Check for clogged air line to gauge and clean if necessary. Check pressure gauge calibration (consult gauge manufacturer for instructions on calibrating gauges).
Dust cap installed.	Check air inlet, cleanout port and product line dust caps to ensure they are installed with gaskets intact.
Adequate air supply.	See Page 5 for air requirements.
Obstruction or air leaks in air supply line.	Remove obstruction and repair leaks.
Blown rupture disc.	See Page 11 for rupture disc service procedures.
Leaking blowdown valve.	Close valve. If leakage persists, clean seat.
Leaking or prematurely opening pressure relief valve.	Refer to service and repair procedures for pressure relief valve Page 12.
Leaking vacuum relief valve.	With the car under pressure, depress vacuum relief valve and release. Repeat 2-3 times. If this doesn't work, depressurize the car and clean the valve seat.
Leaking hatch covers.	Check to be sure all hatches are closed and cam levers are secure. Clean hatch cover gaskets and gasket seats. Replace hatch gaskets and broken cam levers if necessary. See Page 13 for hatch adjustments.
Open blowdown, by-pass or product valves, closed fluidizing valve.	Close blowdown, by-pass and product valves. Open fluidizing valve.

**UNLOADING**

- Open one by-pass valve to its full open position. Use the by-pass valve on the "A" end of the car for the "A" or "AC" compartment and the by-pass valve on the "B" end of the car for the "B" or "BC" compartment (See Figures 4 & 6).
- Open the product valve on the compartment being fluidized.
- In general, optimum unloading rates are obtained when the air inlet (manifold) pressure gauge reading is 1 to 3 psig higher than the car body pressure gauge reading. Meter the product flow to suit the unloading system's capacity and to avoid plugging the conveying line by adjusting the product valve and by-pass valve to obtain the best product-to-air mixture. Long conveying distances generally require more by-pass air than short conveying distances. Check gauges to ensure proper pressures are being maintained.
- If one side of the hopper is empty and the other side has material, use the four-way fluidizing valve to direct air to the side that has material in it.
- A rapid drop in car body pressure normally indicates the compartment is empty. Close the by-pass and product valves while continuing to supply air. Open and close the product valve at about twenty second intervals four or five times for final cleanout. Use by-pass air valve as needed.
- Open the fluidizing valve to the full open position on the next compartment to be unloaded. Close all other valves on the car.
- Allow car body pressure to build to operating pressure.
- Repeat steps 1 through 7 for each compartment.
- After the last compartment is unloaded, open both by-pass valves and close all other valves. Allow the blower to run a sufficient amount of

time to clean out the manifold and unloading site conveying lines.

**10. SHUT DOWN THE BLOWER.**

- Open the blowdown valve on the "A" end of the car until all pressure is reduced to zero psig and air has stopped flowing out of the blowdown valve. Disconnect flexible air and product hoses and secure all dust caps.

**UNLOADING ASSISTS**

- Vibration** - The unloading system for the Pressureaide® car will provide satisfactory cleanout with most commodities. If unusual conditions exist which require vibration for cleanout, contact your ARL representative.
- Fluidization** - The Pressureaide® car is equipped with fluidizing membranes in each compartment. The air used for pressurizing the car is adequate for fluidizing the lading and will provide complete cleanout when the recommended unloading procedures are followed.



Ensure there is no pressure on any portion of the car before attempting to perform any maintenance. Open the blowdown valve, any fluidizing valve and any product valve before removing any dust caps.

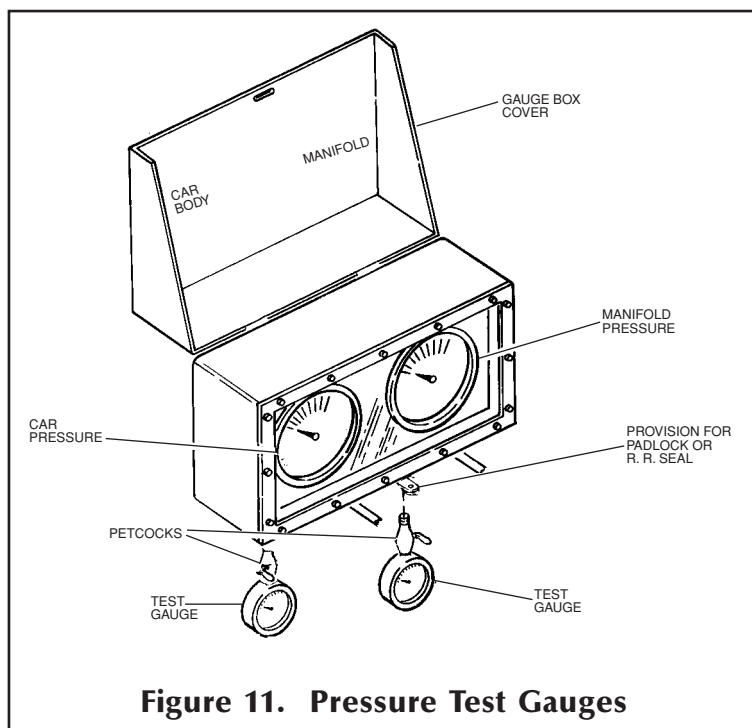


Figure 11. Pressure Test Gauges

#### PRESSURE GAUGES

(Refer to Figures 11 and 12)

Calibration of the pressure gauges should be checked annually. To do this, install test gauges to the fittings where the petcocks are located. Hook up the blower's air supply line to the car's air inlet. All valves, except one fluidizing valve, should be closed. With the fluidizing valve in the full open position, pressurize the car to 10 psig. If the car body or manifold gauge deviates from the test gauge by more than one psig, return the gauge to American Railcar Leasing LLC.

If the pressure indicating needle does not move after the blower has been started, stop the blower and relieve the pressure in the car by opening the blowdown valve. Disconnect the fittings at the back of the gauges, the blowdown valve and the air manifold. Attach a compressed air line to the gauge line and blow the line clean. Reassemble and check gauges.

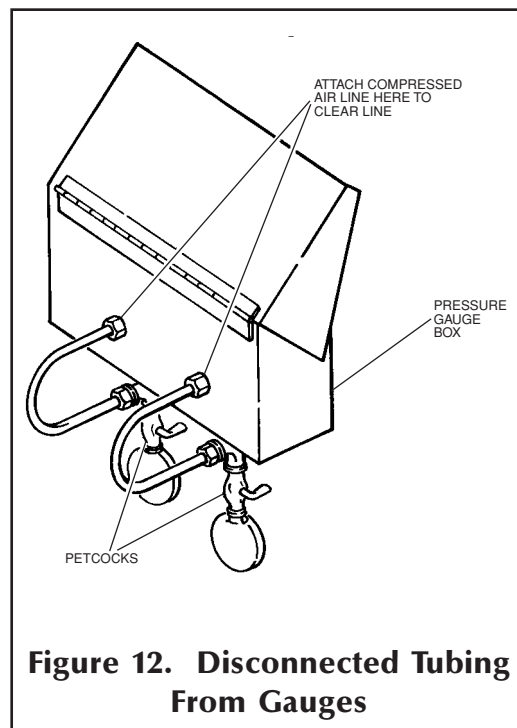


Figure 12. Disconnected Tubing From Gauges



#### GENERAL CLEANING

1. Steam or grit blasting is not recommended as either may cause damage to the lining or permeable membrane. The most common methods of cleaning hopper cars are dry cleaning by scraping residue off with plastic or wood scrapers and washing with water.
2. When entering the car, a ladder should be used which is equipped with rubber or suitably padded feet to protect the permeable membrane. The ladder should not be allowed to rest on the membranes, nor should workmen walk on them. Of course, a ladder of adequate length should be used as well as following procedures compatible with good safety practices. Scaffold brackets to assist in dry cleaning the car's interior can be provided if desired.

**NOTE:**  
RESIDUE FROM CLEANING WILL END UP IN PRODUCT DISCHARGE MANIFOLD. THIS RESIDUE CAN BE REMOVED THROUGH THE CLEANOUT PORT PROVIDED IN THE DISCHARGE OUTLET CASTING OR BY PRESSURIZING THE CAR AND OPENING EACH PRODUCT VALVE INDIVIDUALLY.

**CAUTION:**  
IF THE CLEAN-OUT PORT HAS A FLANGED COVER, REPLACE CLEAN-OUT PORT FLANGE AND GASKET AFTER CLEANING. (TORQUE BOLTS TO 35 FT. LBS.)

#### WASH PROCEDURE

1. Connect a positive displacement blower with a minimum capacity of 450 CFM to the air inlet connection.
2. Close both by-pass air valves and all four fluidizing air valves. Open all four product valves, remove dust covers from each side of the product discharge line and hook up hoses to direct air away from work station. Open hatches on top of car.
3. Starting at one end of car, set the fluidizing air valve to the full open position in the compartment being washed.
4. Start blower.
5. Wash compartment by using a rotojet inserted into

the hatch opening or by a hand-held hose. AIR MUST CONTINUE TO BE BLOWN THROUGH MEMBRANE BEFORE, DURING AND AFTER WASHING.

**NOTE:**  
CARE MUST BE TAKEN NOT TO DIRECT A HIGH PRESSURE STREAM OF WATER AT THE INLET PIPE OF THE RUPTURE DISC ASSEMBLY LOCATED ON CAR'S ROOF. THIS COULD CAUSE DAMAGE TO THE DISC.

6. When compartment has been washed, allow air to be blown through the membrane for an additional 10 minutes, then open the fluidizing air valve on the next compartment to be washed. Close the fluidizing air valve on the cleaned compartment.
  7. Wash the remaining compartments following preceding instructions.
  8. When all compartments have been washed, open all four fluidizing air valves and allow air to blow through the membranes until interior of car is dry.
  9. Shut off blower, close and secure hatches and close all four product valves. Start blower and pressurize car to at least 10 psig.
- Starting at one end of the car, open the product valve for approximately two minutes to blow water and residue from the product line. Close the product valve, pressurize the car and repeat for the remaining compartments.

**CAUTION:**  
ENSURE HOSES ARE HOOKED UP TO BOTH PRODUCT DISCHARGE CONNECTIONS TO DIRECT HIGH PRESSURE AIR AND RESIDUE AWAY FROM WORK STATION.

10. With blower still operating, open both air by-pass valves and then all four product line valves. Blow for two minutes then shut off blower. Allow the car to depressurize. Remove the product line and clean out the port cover. Inspect the discharge piping and the discharge casting; wipe out any remaining residue.
11. Ensure pressure gauges read zero, disconnect air supply line and replace all dust caps. Close by-pass valves and product line valves.

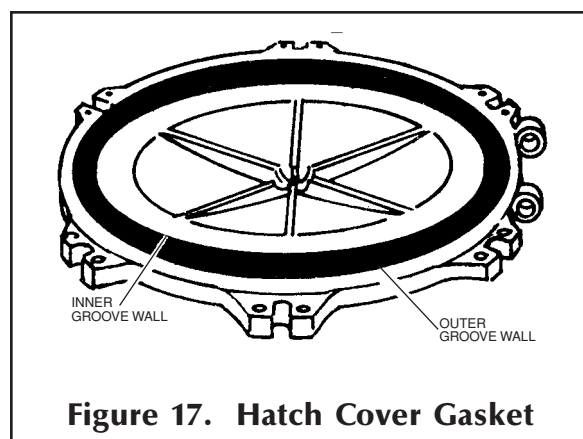


Figure 17. Hatch Cover Gasket

For Hatch Covers not using a retaining ring (See Figure 17):

1. Remove the worn gasket. This may be facilitated by inserting a flat head screwdriver or knife blade along side of the straight outer groove wall and prying upward. When enough gasket is exposed to grab onto, pull remaining gasket from its groove. Do not pry from or damage the dovetailed inner groove wall.
2. Clean the gasket groove with a good solvent, such as methyl-ethyl ketone, to remove any adhesive build-up. Wipe all surfaces of the new gasket with a clean, solvent-moistened rag to remove any dust or mold release agent that may be present. Allow solvent to dry. Coat the bottom of the groove with a uniform, thin layer of adhesive such as 3M's Scotch-grip #1300 Rubber Adhesive. Allow a couple of minutes for adhesive to become tacky. Install new gasket, forcing it into the groove beginning at the inner groove wall at four points approximately 90° apart. Continue forcing the gasket in the groove using hand and thumb pressure until gasket is uniformly seated in its groove. A small steel wheel roller may help facilitate the last step.
3. After the gasket is in place, be sure there is no excess adhesive exposed. Remove any excess with a clean, solvent-moistened rag. At this point the hatch cover should be reinstalled and/or cammed shut to ensure sufficient pressure for complete adhesive contact. Adjust per "Hatch Cover Installation and Adjustment" instructions.

### DUST CAPS

Dust caps should be inspected prior to each loading.

1. Open the blowdown valve, any fluidizing valve and product valve before removing any dust cap.
2. Inspect for missing caps, broken or missing cam levers, gaskets and chains. Replace items as required.

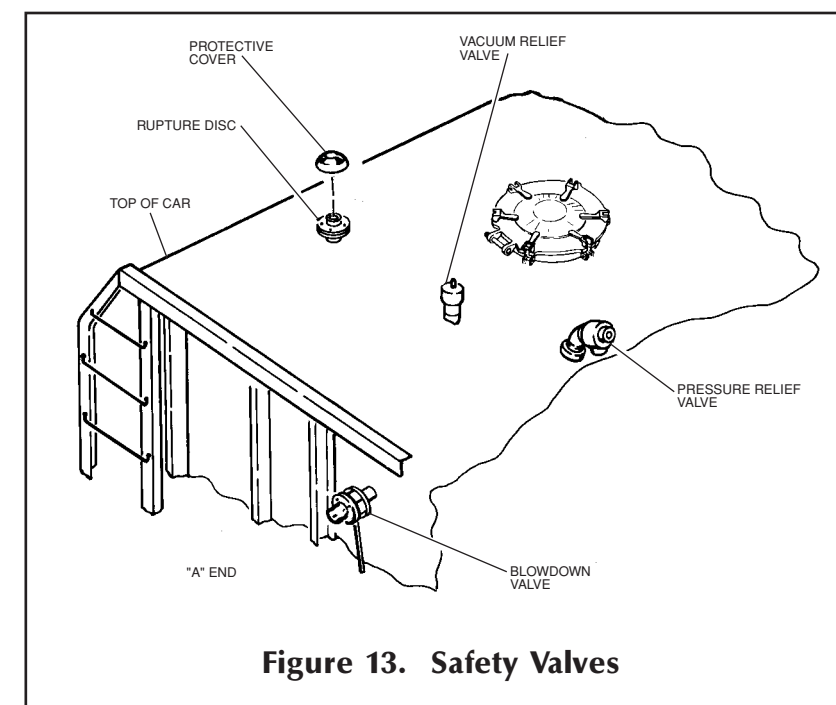


Figure 13. Safety Valves

### RUPTURE DISC

(Reference Figure 13)

Inspect the rupture disc annually. If the seal is broken, remove the protective cover and check the disc. Disc should be intact and in good condition. If condition is in doubt, pressurize the car to 10 psig and inspect for leakage. If a leak is detected, depressurize the car and replace the disc.

**CAUTION:**  
SUBSTITUTE OR MAKESHIFT DISCS ARE NOT TO BE USED. SEE THE PARTS LIST FOR SPECIFIED DISC.

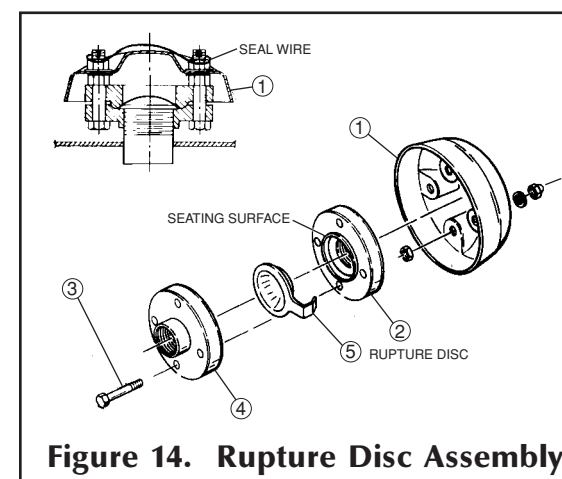


Figure 14. Rupture Disc Assembly

### DISASSEMBLY AND ASSEMBLY OF RUPTURE DISCS

(Reference Figure 14)

1. Remove protective cover (Item 1) by breaking sealing wire and removing four nuts.
2. Inspect the rupture disc (Item 5) to determine if it has ruptured or if there are any imperfections (tears, holes, etc.).
3. If disc must be replaced, remove flange (Item 2) by removing four bolts and nuts (Item 3).
4. Foreign matter or rough surfaces may damage the rupture disc or cause leakage. Clean seating surfaces of both inlet and outlet flanges (Items 2 & 4) before installing the rupture disc. Polish with a fine emery cloth.
5. When installing the rupture disc, handle carefully. Examine seating and prebulged surfaces. **DO NOT INSTALL A DAMAGED DISC!** Damage to seating area may cause leakage. Damage to prebulged surface of disc may affect disc rating. A vacuum support is permanently attached to concave side of disc. If missing or damaged, replace the disc with a new one.

**NOTE:**  
DISCS ARE PACKAGED IN PROTECTIVE CONTAINERS. DO NOT INSTALL SHIPPING PROTECTOR.

6. Place rupture disc (Item 5) on inlet fitting (Item 4) with crown up. SYSTEM PRESSURE MUST BE AGAINST CONCAVE SIDE OF DISC.

7. Carefully place outlet flange (Item 2) in position. Install bolts and nuts and torque evenly to 34 to 38 ft. lbs. Make sure flanges are not cocked. DO NOT OVERTORQUE! Angular seating surfaces help seal disc with minimum bolt loading. Excessive tightening may damage the rupture disc.

8. Install protective cover and torque second set of nuts to 20 to 25 ft. lbs.

9. Install wire through holes in bolts and seal.

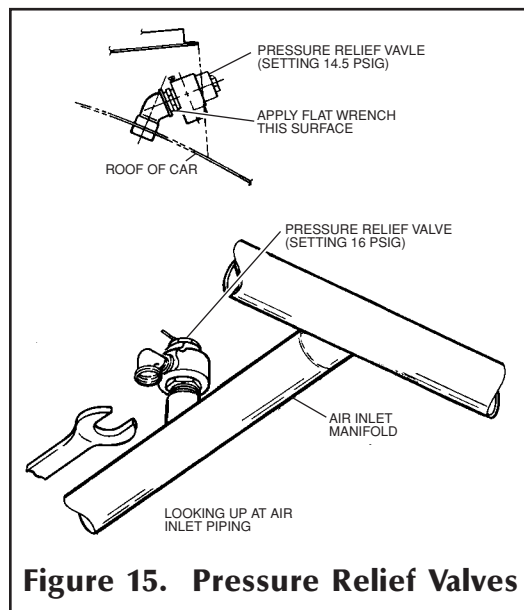


Figure 15. Pressure Relief Valves

**PRESSURE RELIEF VALVE**

(Reference Figure 15)

Pressure relief valves should have a regular program of visual inspection. Build up of dirt and/or foreign material around and in the valve as well as broken parts will adversely affect the valve's operating characteristics.

The valves should be checked annually to ensure they are opening at the specified pressures. This may be done with the valves installed on the car or they may be removed and

bench tested.

1. To remove valve, unscrew by placing a flat jawed wrench on flats provided. Do not use the valve outlet or cap as a lever.

2. To reinstall the valve, apply a moderate amount of pipe compound to male threads only, leaving the first thread clean. Compound applied to female threads or used to excess can find its way into the valve causing leakage.

**NOTE:  
DO NOT OVERTIGHTEN.**

3. The opening pressure for the relief valve mounted on the roof of the car is 14.5 psig. The opening pressure for the valve on the air inlet line is 16 psig. If the opening pressures vary by more than ±0.5 psig, return the valve to American Railcar Leasing LLC.

4. Do not paint, oil or otherwise cover any interior or working parts of the pressure relief valves. These valves do not require any lubrication or protective coating to work properly.

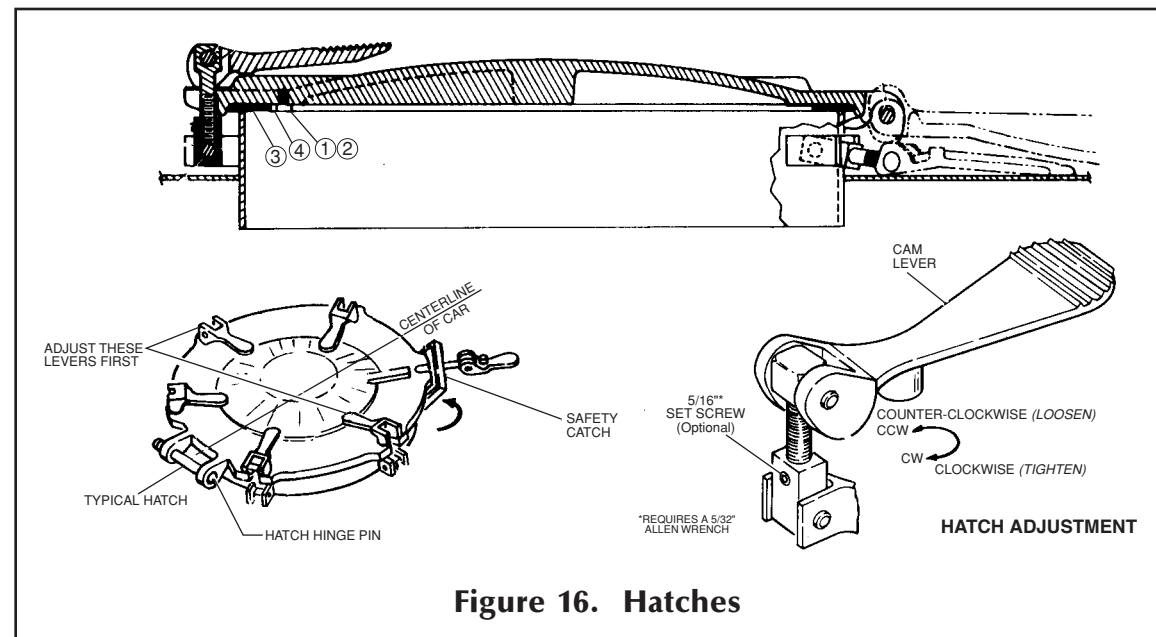


Figure 16. Hatches

**HATCHES**

(Reference figure 16)

Hatch covers, holddown assemblies, safety catches and gaskets should be inspected prior to each loading. Broken or missing parts should be replaced and all cam levers properly adjusted.

**HATCH COVER INSTALLATION AND ADJUSTMENT**

Use this procedure to adjust existing hatch covers and for installing new hatch covers.

1. With all cam levers disengaged, center hatch cover on hatch ring. Ensure the hatch hinge pin is installed. This will center the cover along the centerline of the car, then it can be moved to the right or left to center it across the car.

2. Loosen set screw in the cam lever assemblies and adjust and engage the two cam levers located 90° from the hinge (some cam lever assemblies are not equipped with set screws). Both levers must be adjusted at the same time. (Rotate entire cam lever assembly clockwise to tighten and counter-clockwise to loosen). Levers should be adjusted so that each requires about 40 lbs. of force to lock down.

3. Adjust remaining cam levers (levers across from each other should be adjusted simultaneously). All levers should require approximately 40 lbs. of force to engage.

4. Recheck all cam lever forces (some of the levers might require additional adjustment due to the gasket compression).

5. Retighten all set screws.

**HATCH GASKET REPLACEMENT**

There are two gasket designs in service. Ensure you identify the proper arrangement before ordering gaskets for a hatch cover.

For Hatch Covers using a retaining ring see Figure 16):

1. Remove cap screws and shakeproof washers (Items 1 and 2).
2. Remove gasket retainer (Item 4) and old gasket (Item 3).
3. Thoroughly clean gasket retainer and seal on hatch cover and hatch ring.
4. Install new gasket and reassemble.
5. Adjust per Hatch Cover Installation and Adjustment instructions.