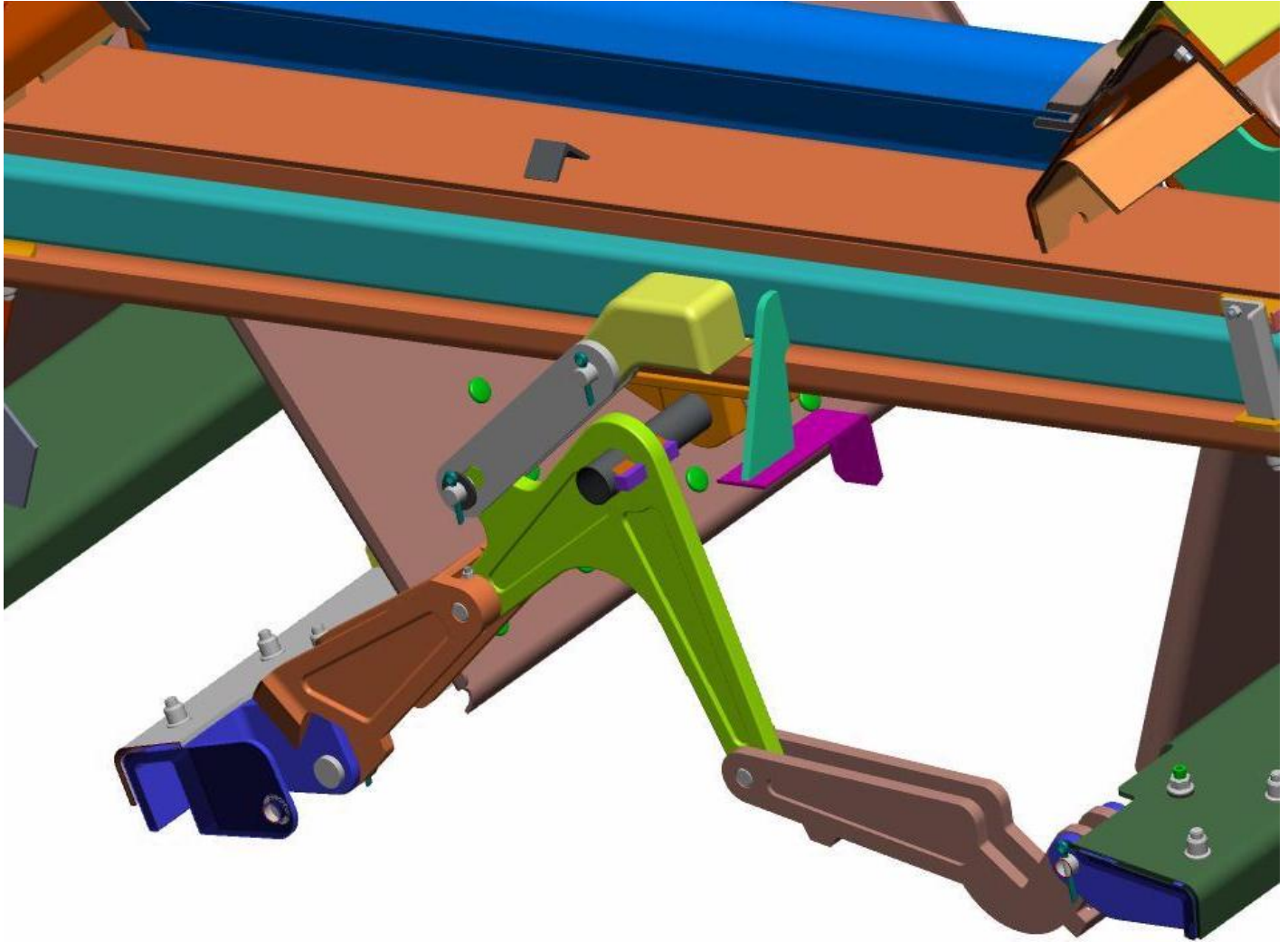


MegaFlo™ Door Operations Manual

AutoFlood II & III, 4th Issue - 2019



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FREIGHTCAR AMERICA

AutoFlood II™

AutoFlood III™



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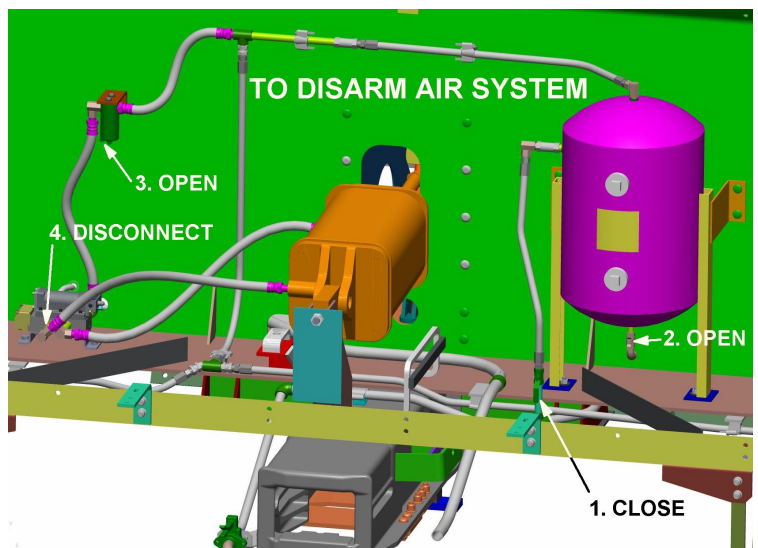
This manual is loaned subject to the express understanding and agreement that the drawings and information therein contained are, and shall remain the property of FreightCar America, Inc. and will not be otherwise utilized or disposed of, directly or indirectly, and will not be used in whole or in part to assist in making or to furnish any information for the making of drawings, prints, or other reproductions hereof, or for the design or making of any item, part, object, apparatus or parts thereof, except upon written permission of FreightCar America, Inc. is first obtained. The acceptance of this manual will be construed as an acceptance of the foregoing agreement.

Section 2: Theory of Operation

- 2.1 Loaded car moves over trestle or pit.
- 2.2 Extended third rail pickup shoe on car body engages a third rail or portable power supply.
- 2.3 A 24-27 Volt (9.5-watt min. per spool valve) signal is sent through the power supply to the pickup shoe.
- 2.4 The signal goes from the pickup shoe to the spool valve (electrically actuated control valve).
- 2.5 As the valve is actuated, it sends air to the air drive cylinder.
- 2.6 As the cylinder extends, it actuates the main lever.
- 2.7 As the main lever rotates about the center point, the bottom of the lever pushes the operating beam in a linear direction.
- 2.8 As the operating beam moves, it pushes the door mechanism tri-lever over center, which unlocks and opens the mechanism and doors. This is done sequentially, in a predetermined order.
- 2.9 Some systems are designed to operate manually only. Their operating process is described as follows (Automatic systems may also be operated manually):
 - 2.9.1 Make sure the train has come to a complete stop.
 - 2.9.2 Locate the control valve or Mini I Valves / manual control input (manual doors).
 - 2.9.3 Instruct anyone near the car to **STAND CLEAR**.
 - 2.9.4 **Caution** - The operator must stand clear of door operating cylinder when manually opening or closing doors. Protective eyewear and hearing protection are required.
 - 2.9.5 Depress the button or move the manual lever to the "OPEN" position.
 - 2.9.6 When car has completely unloaded, depress the button on the opposite end of the control valve, Mini I Valves or rotate the manual lever, and doors will close.
- 2.10 As you can see, the door operating system has two subsystems on cars equipped with manual operation doors (no electrical) and three subsystems on cars equipped with fully automatic doors; these are the pneumatic system, the electric control system and the door operating mechanism.
- 2.11 Air is introduced to the system through the auxiliary trainline. From there it passes through the filter and into the "pressure" port of the control valve sub-base. The piston-actuated slide valve provides two-position operation of the air drive cylinder. The valve has a ported sub-base, which is piped to the air drive cylinder. Changes in airflow through the valve occur when the control valve piston (or spool) is moved from one end of the valve to the other. A slide valve attached at the center of the piston moves along the surface of the sub-base and connects airflow to the cylinder and exhaust ports of the sub-base. The piston stops at full travel against the cap at each end of the body. The caps have ports through which shifting pressure from the solenoid operators is delivered to the piston.
- 2.12 The electrical signal is received through the pick-up shoes, which are mounted on diagonally opposite sides of the hopper car. The signal is carried through a diode switch circuit, which is located in the control valve. When a positive (+) 24 Volt D.C. signal is received through the shoe with the running rails negative (-) the control valve is energized causing the valve slide to shift and in turn allows air to flow to the door-opening side of the cylinder. When a negative (-) 24-volt signal is received through the shoe with the running rail positive (+) the control valve is energized causing the valve to shift and in turn allows air to flow to the door-closing side of the cylinder.
- 2.13 The door operating mechanism is powered by a double acting air cylinder, which unlocks and opens the doors when its rod is extended. It closes and locks the doors when the rod is retracted. This is accomplished by the mechanical linkage system, which operates as described in steps 2.6, 2.7, 2.8 above.

Section 3: Safety Precautions

- 3.1 All maintenance, repair, or adjustments must be made on shop or repair track where car will not be moved. Protective eye and ear wear should be used when doors are operated.
- 3.2 Carefully follow the instructions which are located on stencils at the sides of the car, which include:
 - 3.2.1 Caution stencils
 - 3.2.2 Thawing heat limitations
 - 3.2.3 Door lock indicators
 - 3.2.4 Car plate size
- 3.3 **ALWAYS - STAND CLEAR AND ASSURE OTHERS ARE CLEAR WHILE DOORS ARE BEING OPERATED.**
- 3.4 Do not operate the doors manually unless the car has completely stopped moving.
- 3.5 When operating the doors manually, the operator must keep well away from the air cylinder and main operating lever. The operator must also have an assistant on each side of the car to ensure that everyone stands clear of the car doors.
- 3.6 If the car does not operate electrically or manually, **DO NOT** attempt to force the mechanism in any way.
- 3.7 Do not make any repairs, alterations, replacements or adjustments to any part of the door system without first fully releasing the air pressure in the system. To release air pressure, first close auxiliary train line valves to cut off air source and then slowly open reservoir drain valve. CAUTION: The in-line check valve will not allow all air in the system to exhaust through the auxiliary trainline and/or door reservoir. This residual air pressure can be released by draining the door filter if equipped with an auxiliary drain valve and slowly disconnecting the air hose fittings that connect the door cylinder and spool valve.
- 3.8 Always use caution when first applying air to the cars. The control valve can be actuated with as little as 10-15 psi of residual air pressure. If the control valve is inadvertently actuated to open by pressing the manual button or if the car has run through a charged 3rd rail system and there is a minimum amount of residual air pressure, the doors will open as soon as air is applied.
- 3.9 To completely disable a car and render the air system inoperative assure that the doors are locked (see 3.10) then perform the following steps:
 - 3.9.1 Close the ¾" cut-out ball valve that is located between the branch tee and door reservoir.
 - 3.9.2 Open the door reservoir drain valve (note: if a rush of air is not noted when the valve is opened, it may be necessary to clean out the passage from the reservoir to the opening. Use caution when clearing the passage, when debris is dislodged it will shoot from the opening.)

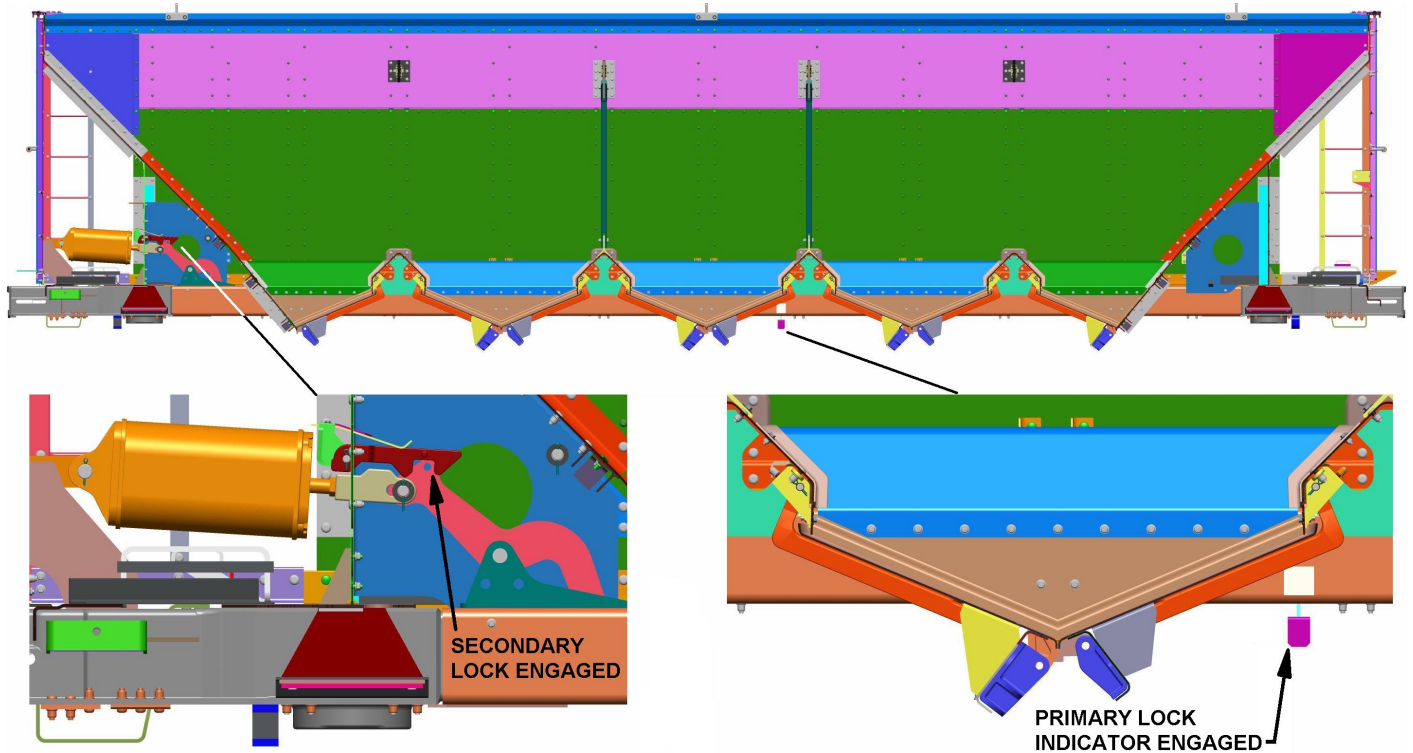


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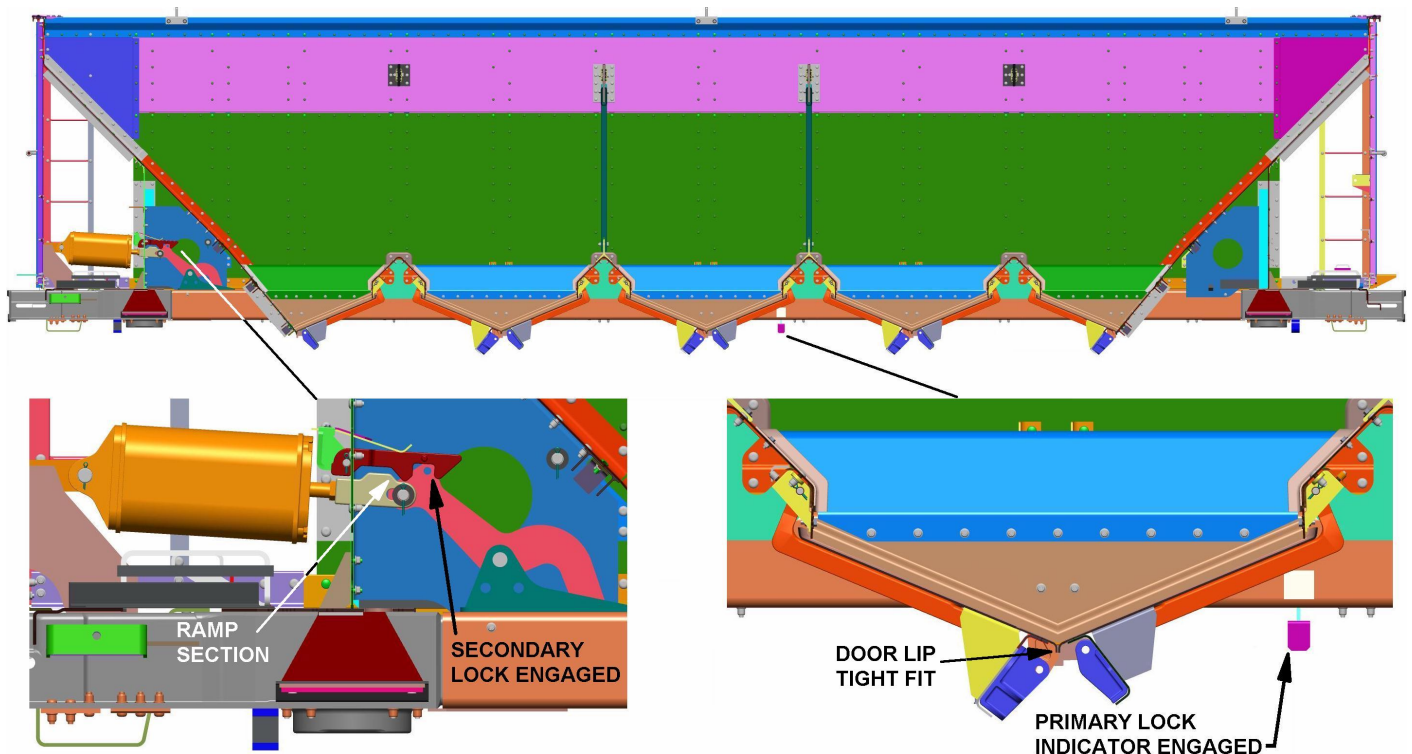
- 3.9.3 Open the filter auxiliary drain if equipped.
- 3.9.4 Disconnect the rear (outboard) air hose from the spool valve connection. Cover both open ends with tape after being disconnected to prevent foreign material from entering. Also, secure the loose end of the door cylinder hose to prevent it from being damaged.
- 3.10 Do not load or ship car unless the primary door mechanism is locked over center and the secondary lock hook is in the locked position. The over center indicator under the center sill will align with the indicator stripes when the mechanism is locked.



- 3.11 **When welding on any part of the car, the pick-up shoe must not be struck with the welding arc, as the high current will destroy the diodes in the control valve. It is recommended that both pick up shoes be disconnected and the wire ends insulated before welding on the car.**

Section 4: Inspection of Doors at Loading & Unloading Facilities

- 4.1 PURPOSE: The purpose of this section is to provide loaders and unloaders of the MegaFlo™ door system the proper visual inspection procedures before and after door operation. The procedures below will ensure the MegaFlo™ door system is in the proper condition to operate successfully and the doors are locked over center. Before proceeding with any inspection or tests become familiar with the **SAFETY PRECAUTIONS** section of this manual.
- 4.2 Visual inspection of MegaFlo™ door system. Three conditions must be met to ensure the MegaFlo™ door system is properly locked-over-center. IF ANY OF THESE CONDITIONS ARE NOT MET, YOU MUST NOT PROCEED TO LOAD THE CAR. If all three conditions are not met, consult the other sections of this manual.
- 4.2.1 Visually check the primary lock indicator to assure that it is in the proper position. The white stripe on the indicator should be within the white stripe on the center sill. If indicator stripe is not within center sill stripe, the next step is critical. If indicator stripe is within center sill stripe, the next step is recommended as a fail-safe check.



- 4.2.2 Secondary lock must be properly engaged. Visually check the secondary lock relationship to the cylinder rod clevis and latch pin on the vertical lever. Note: assure that the latch is not engaged on the cylinder rod clevis at ramp section.
- 4.2.3 Doors should contact each other a minimum of one point across width of door. A 1/8-inch "GO/NO-GO" gauge gap at areas not touching each other is acceptable.

4.3 Compressed air supply connection.

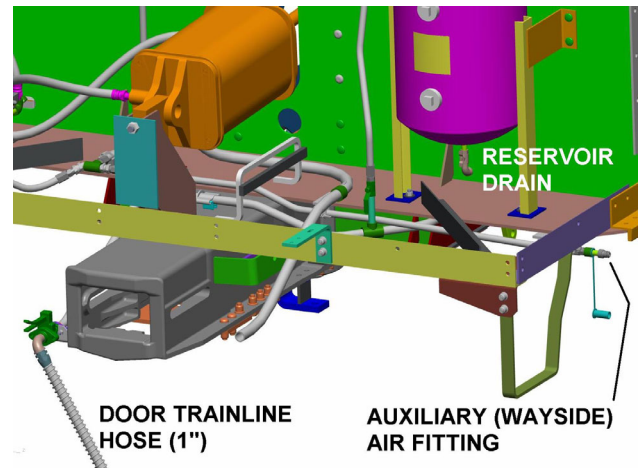
4.3.1 The air supply can be connected to the door system at three typical locations:

4.3.1.1 The door system trainline hose (Figure 4).

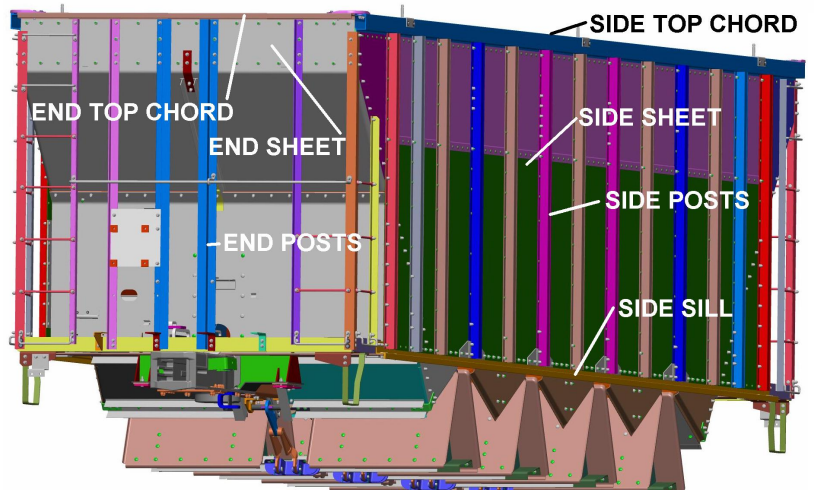
4.3.1.2 The auxiliary (wayside) hose fitting (Figure 5).

4.3.1.3 The bottom of the door cylinder air reservoir (Figure 6).

4.3.2 The compressed air supply should be a minimum of 90 psi and of sufficient volume (CFM) to supply the number of cars connected and simultaneously operated. Supply air pressure should not exceed 130 psi.



4.4 FreightCar America, Inc. also recommends the inspection of various car body components to ensure the railcars are in the proper condition for loading and unloading. In general, the car body should appear as illustrated below. Visually inspect the following areas before loading or unloading:



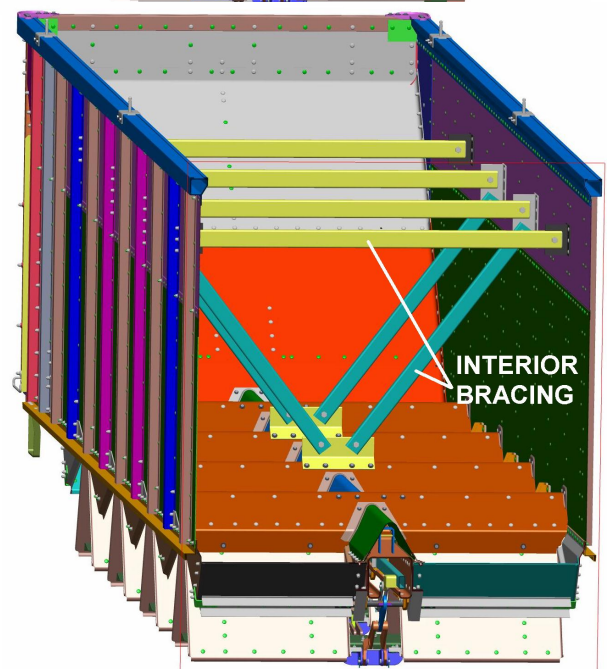
4.4.1 Interior bracing should be intact and properly secured. If there are loose or missing braces, do not proceed.

4.4.2 The side top chord should be

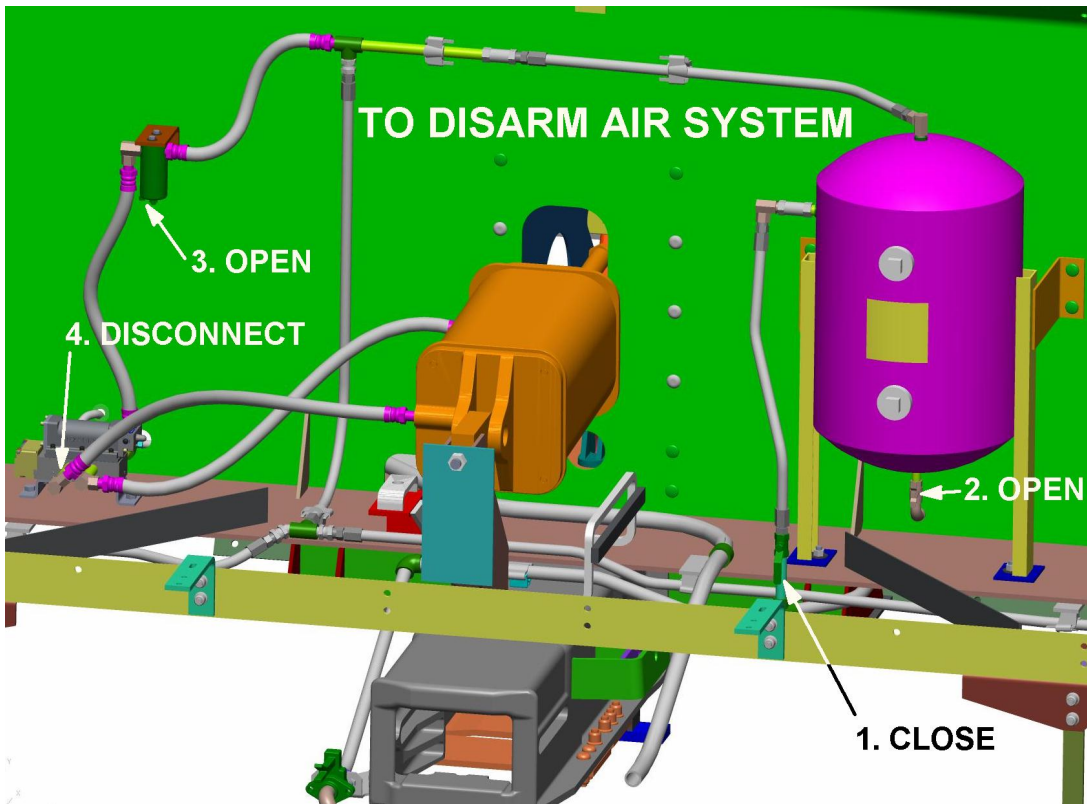
straight and properly fastened. If there is any damage, distortion, or missing fasteners do not proceed.

4.4.3 All structural components on the sides and ends should be intact and properly secured. If there are loose or missing components, do not proceed. Inspect side sheets, end/side top chords, end sheets, end posts, side sill, and end sill.

4.5 Always use caution when first applying air to the cars. The control valve can be actuated with as little as 10-15 psi of residual air pressure. If the control valve is inadvertently actuated to open by pressing the manual button or running the car through a charged 3rd rail system and there is a minimum amount of residual air pressure, the doors will open as soon as air is applied. To avoid this, keep the control valve box secure and develop and follow proper operating procedures at your plant.



- 4.6 After assuring that steps 4.2.1, 4.2.2 and 4.2.3 have been completed. Use the following process to disable the door operating system on a single car in a train:
- 4.6.1 Move the $\frac{3}{4}$ " door cut-out valve handle to the closed position (handle perpendicular to the pipe indicates closed). The door cut-out valve is located on the "A" end of the car.
 - 4.6.2 Open the door reservoir drain valve (handle parallel to pipe indicates open). If no air discharges when the valve is opened, assure that there is no obstruction in the reservoir drain piping. After a few minutes the air flow should stop. The reservoir drain valve must remain open for the system to be disabled. (Note: if a rush of air is not noted when the valve is opened, it may be necessary to clean out the passage from the reservoir to the opening. Use caution when clearing the passage, when debris is dislodged it will shoot from the opening.)
 - 4.6.3 Open the filter auxiliary drain if equipped.
 - 4.6.4 Disconnect the rear (outboard) air hose from the spool valve connection. Cover both open ends with tape after being disconnected to prevent foreign material from entering. Also, secure the loose end of the door cylinder hose to prevent it from being damaged.

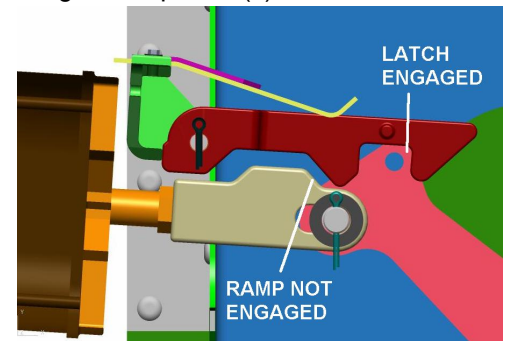


Section 5: Inspection and Maintenance of Doors

- 5.1 **PURPOSE:** To establish the criteria for the proper inspection and maintenance of the MegaFlo™ door system. Before proceeding with any inspection or tests, become familiar with the **SAFETY PRECAUTIONS** section of this manual.
- 5.2 The following list should be considered the minimum number of tools and equipment necessary to test the MegaFlo™ door system.
- 5.2.1 Compressed air supply, min. of 90 psi.
 - 5.2.2 Pressure regulator with a minimum range of 20-90 psi, a supply pressure gauge, and a calibrated gauge on the regulated side.
 - 5.2.3 24v DC power supply with clearly marked positive and negative probes with a minimum output of 5 amps.
 - 5.2.4 Calibrated pressure gauge with a minimum range of 20-90 psi in 1 pound increments. It is recommended that adapters be made to accept an AAR brake cylinder pressure gauge tap.
 - 5.2.5 Miscellaneous pipe fittings & adapters and hand tools to make the necessary connections.

Pre-Test:

- 5.3 Before applying air to the door system, drain the air from the car by opening the valve at the bottom of the door reservoir and both end cocks if so equipped.
- 5.3.1 With the doors closed, visually inspect all door pins, cotter keys, fasteners, links, levers, cylinder, and operating beam for condition. Repair or replace worn, missing or damaged component(s).
 - 5.3.2 Visually check the secondary lock relationship to the cylinder rod clevis and latch pin on the vertical lever. Note: assure that the latch is not engaged on the cylinder rod clevis at ramp portion.
 - 5.3.3 Disassemble filter and clean or replace filter element and reassemble if not done within the previous year.
 - 5.3.4 Visually inspect the door pan lips. Bent or distorted door pans will adversely affect the door cylinder operating pressure. In extreme conditions, this will prevent the doors from locking over center.
 - 5.3.5 Replace door gladhand gaskets.



Leakage Test

- 5.4 Close the reservoir drain valve. Connect supply air to the door gladhand on the “A” end of the car. Open air supply and assure that air flows through to the opposite end of the car, and then apply a dummy coupling to the “B” end.
- 5.4.1 The air supply can be connected to the door system at two (2) alternate locations as shown in Section 4.3:
 - 5.4.1.1 The auxiliary (wayside) hose fitting.
 - 5.4.1.2 The bottom of the door cylinder air reservoir.
 - 5.4.2 Connect a pressure tap to the exhaust pipe of the spool valve.
 - 5.4.3 Open and close the doors several times using the manual override buttons on the control valve. If the doors do not operate, consult the trouble shooting section.
 - 5.4.4 Close the ¾” door cutout valve and charge system to 90 psi. Soap test all (1”) door line connections. A 1” bubble in 1 minute is cause for attention.
 - 5.4.5 Open the ¾” door line cutout valve. Briefly open the ½” reservoir drain valve to assure it is functional and free of debris.

Note: several of the following tests require the doors to be both open and closed requiring the test to be repeated.

- 5.4.6 Soap test all hose & pipe connections from the branch pipe tee—reservoir—filter—spool valve—cylinder. A 1” bubble in 1 minute is cause for attention.

- 5.4.6.1 Particular attention is required at the check valve, ball valves, quick exhaust valve (at cylinder) and the cylinder hoses
- 5.4.6.2 All hoses must be flexed by hand to assure the connections are tight and leak free after soapy water is applied. Note: excessive leaks will not bubble but can be heard.
- 5.4.7 The following connections must be soap test checked with the doors open and/or closed.
 - 5.4.7.1 The push rod end cylinder hose & fittings with doors closed and the pressure head end cylinder hose & fittings with the doors opened.
 - 5.4.7.2 Both spool valve acorn nut with the doors both open and closed. Note: air normally flows through the acorn nut until the system equalizes. Continuous flow through the acorn nut indicates spool valve attention is required.
 - 5.4.7.3 Close off the spool valve exhaust pipe and monitor the pressure after door system pressures have equalized. A rise of more than 5 psi in 1 minute indicates attention is required in the spool valve and/or door cylinder. Further test the cylinder independently to determine which device requires attention.
- 5.4.8 Leave the doors open and drain the air from the door system as you did in paragraph 5.3.
- 5.4.9 Re-inspect as outlined in 5.3.1 – 5.3.4. Note: this step is necessary as many of the items may not be completely visible with the doors closed.

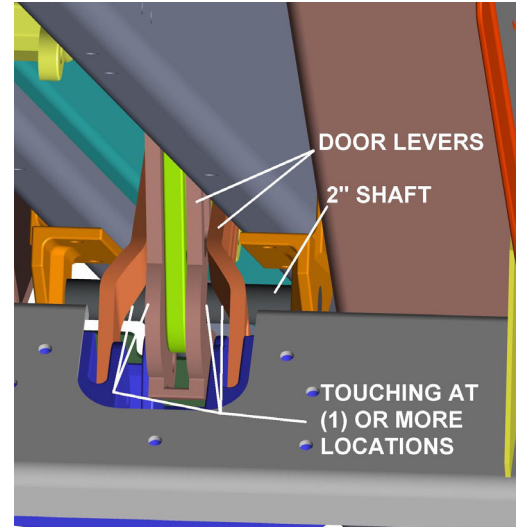
Air pressure test (Note: begin with doors open).

- 5.5 Remain connected to an air source that continuously supplies 90 psi throughout the air tests. Charge the system to 90 psi.
 - 5.5.1 NOTE: As with all air pressure gage readings, allow sufficient time for door system to equalize in pressure to assure accurate reading. Abrupt increases and decreases of input air pressure will give false readings.
 - 5.5.2 The device supplying air to the door system must be regulated at the car so that it can be adjusted from 20-90 psi and regulated (output) air pressure is monitored by a calibrated gage that reads in 1 psi increments. Additionally, when troubleshooting, pressure on the door side of the device must be monitored through this same range by means of a gage located as close as possible to the door cylinder. As a general note, the doors should begin to open with the car empty between 18-25 psi. This is not a requirement.
 - 5.5.3 Start a slow application of air pressure at 20 psi to the door system and when input pressure gage reaches 20 psi, depress the “close” manual override button on the control valve.
 - 5.5.4 Gradually increase the air pressure until the doors lock over center as indicated by a snapping sound and alignment of the primary door lock indicator. Note air pressure. The air pressure gage will jump dramatically at the final lock over center, so it is important that the regulator be increased at a rate of no more than 1 psi every 15-30 seconds and your final reading is taken after the air pressure has equalized. It is recommended to watch the cylinder push rod. Only increase pressure if the rod has stopped retracting and then only increase 1 psi in the time interval stated (or slower).
 - 5.5.5 Ideal closing pressure should be between 35-55 psi. If doors close within this range, **go to step 5.7**. If doors close outside of this range, then continue.

Retest when closing pressure is outside of ideal pressure range (35-55 psi)

- 5.6 Procedure to assure proper primary lock engagement.
 - 5.6.1 With the system charged to 90 psi.
 - 5.6.2 Push the manual override buttons on the control valve. - First open - then close.
 - 5.6.3 Completely drain the air from the system, including the reservoir.
 - 5.6.4 Visually recheck all the door pans to see that they are touching at some point along the leading edge.
 - 5.6.5 Visually recheck the secondary lock relationship to the cylinder rod clevis and latch pin on the vertical lever.

- 5.6.6 Visually check the primary lock indicator to assure that it is in the proper position. The white stripe on the indicator should be within the white stripe on the center sill. If indicator stripe is not within center sill stripe the next step is critical. If indicator stripe is within center sill stripe, the next step is recommended as a fail-safe check.
- 5.6.7 Check to see that at least 1 of the 2 door operating levers is touching the 2" diameter door shaft as specified in. As a final check, you may manually grasp the operating beam to tri-lever links (2 per pocket) and move them to see that they are loose. Note: some may be a little snug. This is a secondary reference to assure that the mechanism is in over lock and relieved.
- 5.6.8 Check for air restrictions, particularly at check valves, ball valves, filters, and spool valves. This can be achieved by placing a calibrated gage on each side of the suspected device. Operate the doors through several cycles and note that the air pressure recovers (equalizes) at about the same rate. When the down stream pressure gage is slower to recover than the upstream gage, a restriction is likely.
- 5.6.9 Second Air Pressure Test**
- 5.6.10 If all the conditions of 5.6 through 5.6.8 are met, repeat steps 5.5.1 & 5.5.2.
- 5.6.11 Doors will be considered in correct operating condition if they lock over center at 80 psi or less.
- 5.6.12 If doors lock at over 80 psi or fail to lock, the Procedure for INITIAL Setup of Doors will need to be performed.



Electrical

- 5.7 Electrical Test
- 5.7.1 With the system charged to 90 psi.
- 5.7.2 Close the doors using the manual override buttons on the control valve if they are not already closed.
- 5.7.3 On one side of the car, apply a positive (+) 24 Volt D.C. signal to the third rail shoe and the negative (-) to the rails, trucks, or car body. The control valve should be energized causing the doors to open.
- 5.7.4 On the same side of the car, apply a negative (-) 24 Volt D.C. signal to the third rail shoe and the positive (+) to the rails, trucks, or car body. The control valve should be energized causing the doors to close.
- 5.7.5 Repeat steps 5.7.3 & 5.7.4 for the opposite side of the car.
- 5.7.6 Consult the trouble shooting section if the doors do not operate electrically.
- 5.8 Disconnect the air supply from the car and drain the door system.

TEST COMPLETE

5.9 Maintenance Notes:

- 5.9.1 While monitoring system air pressure at the inlet to the car is acceptable in most cases, it is recommended to insert the test pressure gage as close to the door cylinder as possible when trouble shooting a problem car.
- 5.9.2 (3) 9v (transistor radio type) batteries connected in series makes an excellent small portable power supply to use in door testing or operation. Note that cars equipped with multiple spool valves will require an increased amperage supply.
- 5.9.3 Inspect the operating beam wear protectors for worn/broken or missing condition. Also, inspect the area between the operating beam and center sill for debris that may be fouling the operating beam's operation when addressing a problem car. The upper wear protector should be 0.375" thicker than the lower.
- 5.9.4 Check Valves - Our standard check valve, part number 10305-087, is the preferred replacement. The Teflon seal and brass construction are less susceptible to sticking when exposed to wet, dirty air. Check valves are directional and are marked with either a flow arrow or the inlet (trainline side) marked "IN".

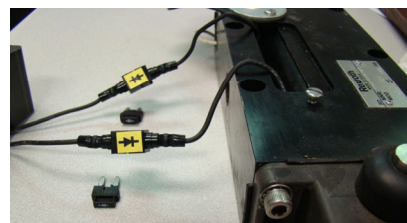
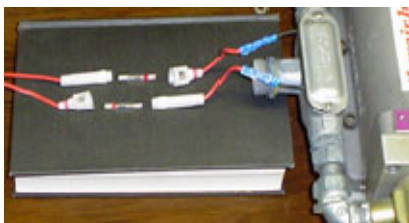
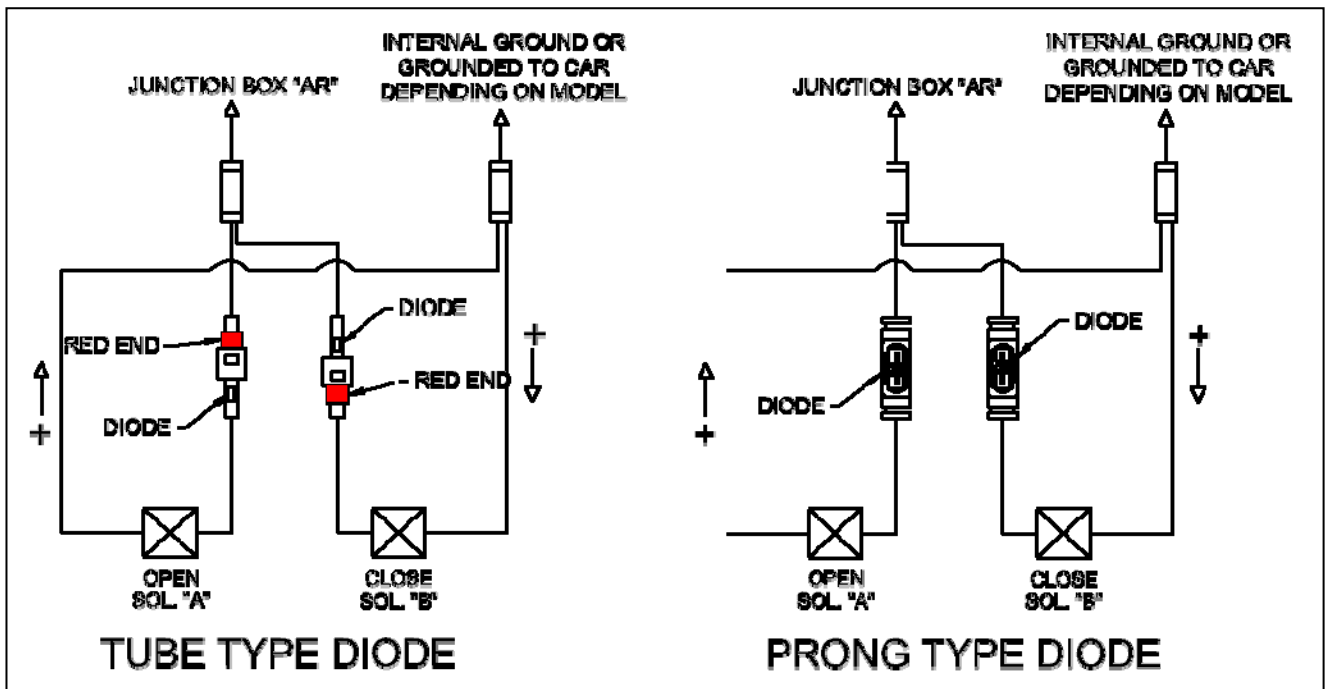
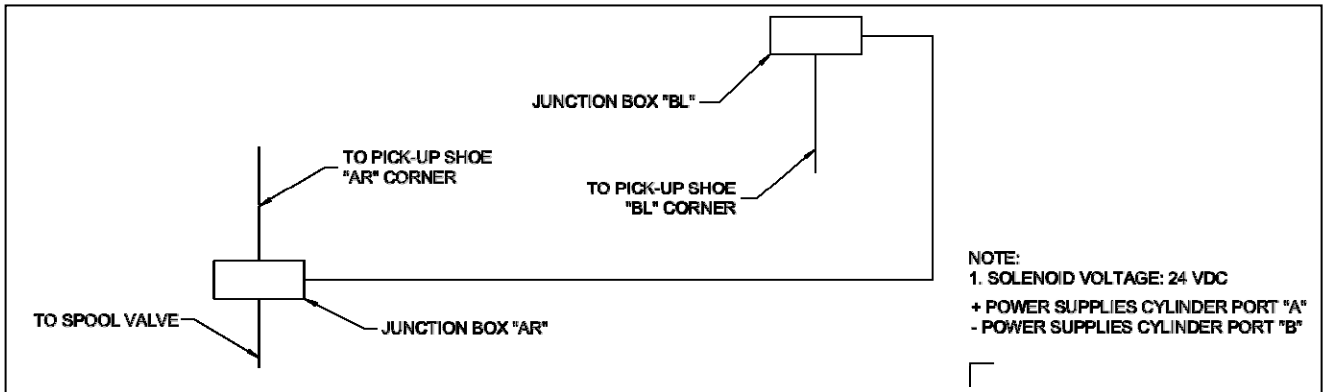
5.9.5 Check Valves – it has also been found that by installing the check valve horizontally, there is less accumulated dirt and debris build up in the valve.

5.9.6 Diode Alignment –

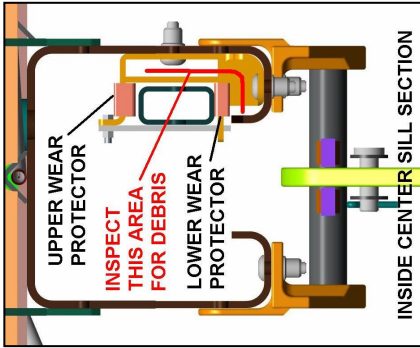
5.9.6.1 Tube Type - The red end of the diode must be placed in the red end of the diode holder for the correct polarity of the system. If the red end points AWAY from the valve's solenoid, it is the opening (+) lead; if it points TOWARDS the solenoid, it is the closing (-) lead.

5.9.6.2 Prong Type = The directional symbol on the holder and diode must match for correct polarity. If the arrow points TOWARDS the valve's solenoid, it is the opening (+) lead; if it points AWAY, this is the closing (-) lead.

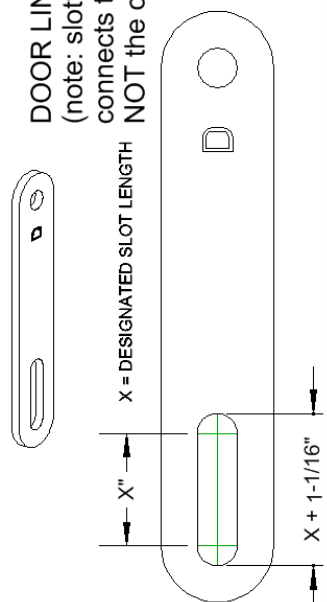
5.9.7 Typical electrical schematic:



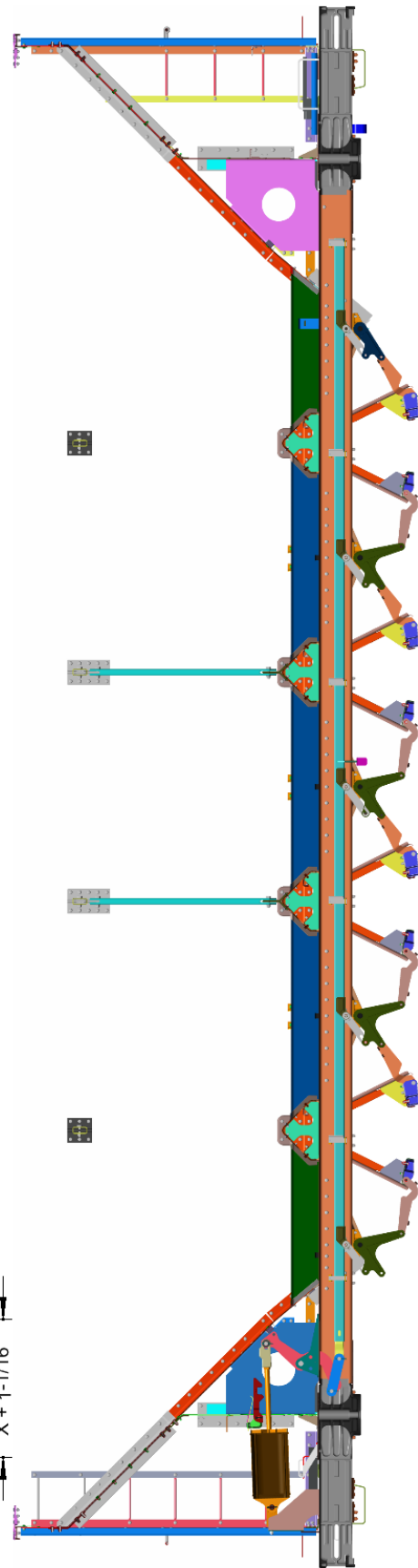
5.9.8 Door Link Sequence



DOOR LINK IDENTIFICATION
 (note: slotted end ALWAYS connects to the tri-lever and NOT the operating beam)



DOOR LINK SEQUENCE



POCKET # (from door cyl.)	#1	#2	#3	#4	#5
AUTOFLOOD II	4-1/2" 10305-039	3/4" 10305-007	2-1/4" 10305-009	3-1/2" 10305-038	3" 10305-010
AUTOFLOOD III	4-1/2" 10305-039	3" 10305-010	1-1/2" 10305-008	0-1/4" 10305-379	3" 10305-010

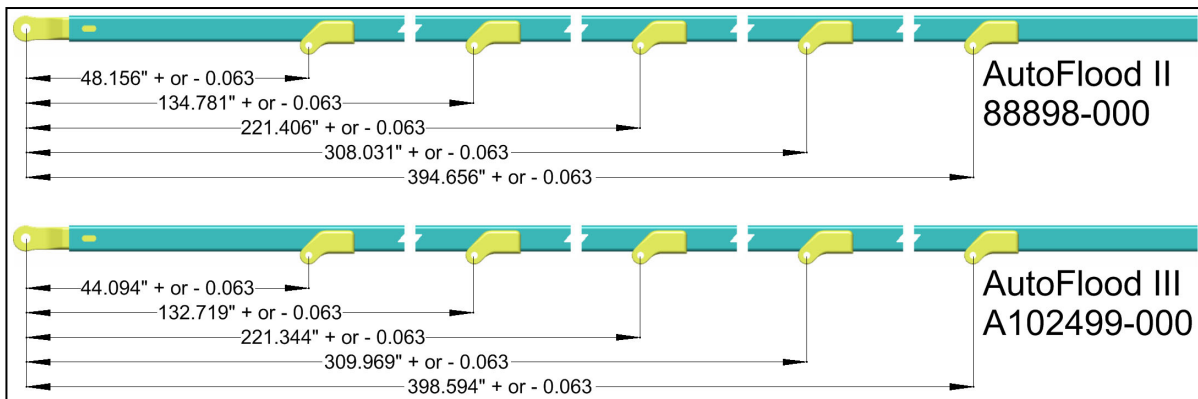
Section 6: Repair Procedure for *INITIAL* Setup of Doors

While periodic readjustment of the door system is not necessary, FreightCar America recognizes the possibility that reconstruction of the door system may be necessary due to damage, such as that caused by derailment. Therefore, FreightCar America has included this section for your use.

6.1 **PURPOSE:** To establish a procedure for the proper set up and adjustment of the MegaFlo™ door system.

6.2 **PROCEDURE:**

6.2.1 Verify operating beam assembly dimensions.

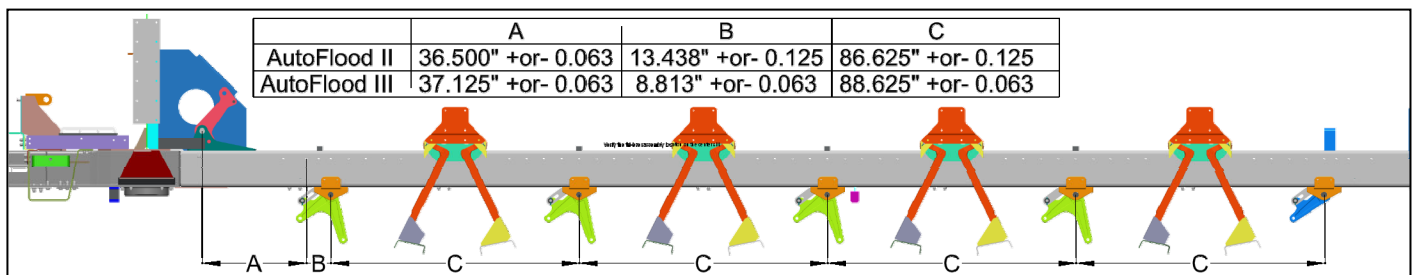


6.2.2 Verify the tri-lever assembly location on the center sill (B&C).

6.2.3 Verify that the vertical lever fulcrum casting is correctly located (A).

6.2.3.1 If the above (6.2.1 thru 6.2.3) meet specifications, then proceed to step 6.3.

6.2.3.2 If the above (6.2.1 thru 6.2.3) are out of specification, make necessary correction(s) before proceeding to step 6.3.



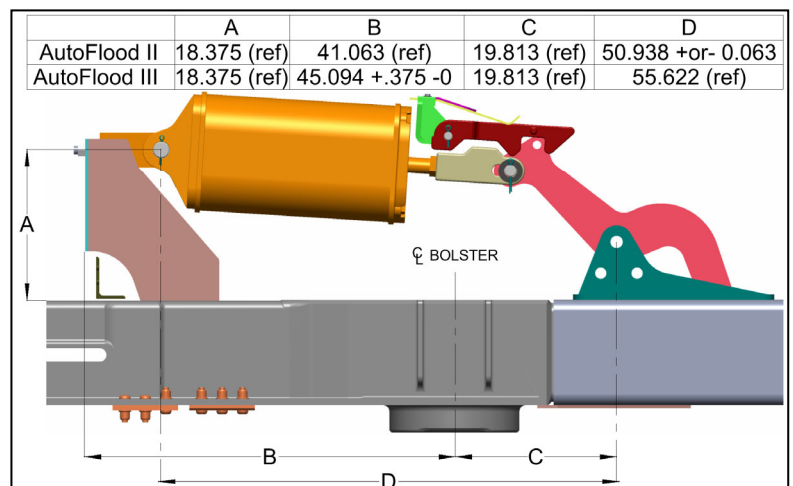
6.3 Connect and verify the main operating link and door links are in proper sequence. Starting from door cylinder end of the operating beam (See Section 5.9.8).

6.4 Door spreader assemblies should be loosely attached to the door hinges.

6.5 Connect operating levers from tri-lever assembly to door spreader fulcrum casting.

6.6 Verify that the door cylinder fulcrum is located properly. Then apply cylinder to fulcrum and vertical door lever.

6.6.1 All levers and fulcrums should be pinned at this point.



MegaFlo™ Door System Operations Manual

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- 6.7 Apply door pans to door spreader assembly.
 - 6.7.1 For initial set-up of door adjustment, locate door pan to door spreader assembly snug and centered in slotted holes of hinge and gussets. DO NOT ream or apply fasteners to middle holes of door pans at this time.
- 6.8 Close and adjust doors (NOTE: Individual door adjustments may have an effect on other areas within the door system. For example: 1) the link slope and 2) gap between lever and center sill). The majority of door adjustment should be achieved through the “up” or “down” movement of the door pan/door spreader assemblies in the slotted holes of hinge.
 - 6.8.1 See drawing A105773-000 for final door inspection criteria.
- 6.9 Complete a final inspection and perform a final air test as outlined in **Section 5.**

Final Door Inspection Criteria for Standard Autoflood III design

- The Door Operating Lever at each end must contact the 2.000" dia. Trilever shaft. SEE: FIGURE 2.
- The Door Operating Levers at the three center pockets must have one of the two levers CONTACT the 2.000" dia. Trilever shaft with the other lever being less than 0.250" NO-GO gauge of SEE: FIGURE 2.
- The Door mechanism lever links are to be within the range of 0.188" positive to 0.25" negative max. slope. Positive slope is defined as the trilever connection being above the lever link fulcrum connection. Negative slope is defined as the trilever connection being below the lever link fulcrum connection. The dimension used for inspection purposes shall be taken from center line to center line of the connection pins. SEE: FIGURE 2.
- A minimum 0.031" GO-gauge clearance gap must be maintained between the top of the Trilever and the inside surface of the center sill. SEE: FIGURE 2.
- Door cylinder rear lug setting. Lug adjustment nut should be tightened to aid in removing excess play. Link the Door operating links. Typically, rear lug may be adjusted until at least one set of operating links are in contact with the cylinder. It is recommended to use at least 30 PSI on the rod end of cylinder during this adjustment. SEE: FIGURE 3.
- The pin in the Trilever to Link must be within 0.000" to 0.500" away from the closing end of the link slot. SEE: FIGURE 2.
- Each pair of door lips MUST CONTACT each other at one point and have less than a 0.125" NO-GO gauge gap at any given point. SEE: FIGURE 1.
- Inside and Outside end hopper sheets to door pan gaps shall meet a 0.125" GO-gauge SEE: FIGURE 1.
- Secondary Lock Latch adjustment. The secondary lock springs theoretically have a 0.125" ± 0.125" spring tension preset. Visual inspection of contact between the Secondary Lock Latch and Spring must be witnessed. Latch to Operating Lever Pin setting. Within 3C psi, min. on the rod end of the door cylinder. minimum 3 psi between 0.063" NO-GO gauge clearance on the lever pin. The 3C psi is defined as the contact point of the pin being within the vertical flat area of the latch. SEE: FIGURE 1.
- Recommend the lower edge elevation of door lips to be within 0.250" of each other. SEE: FIGURE 1.
- Final open/close air pressure acceptance criteria. Open: 18 psi min. to 25 psi max. Close: 55 psi max.

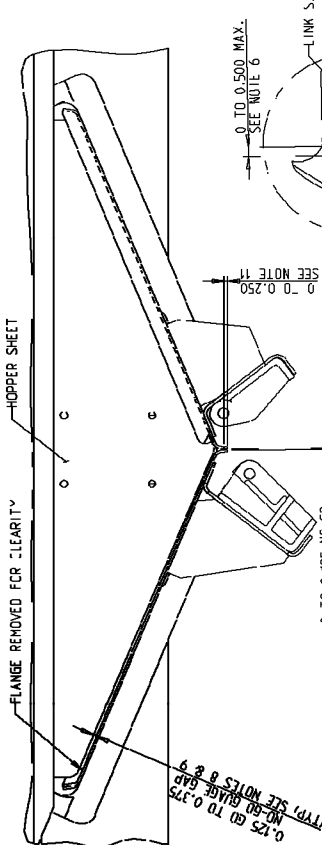


FIGURE 1

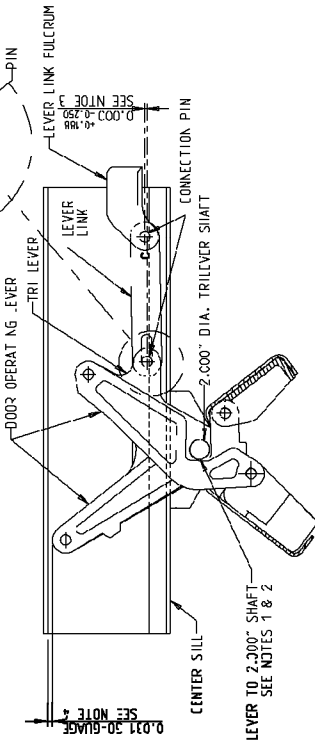


FIGURE 2

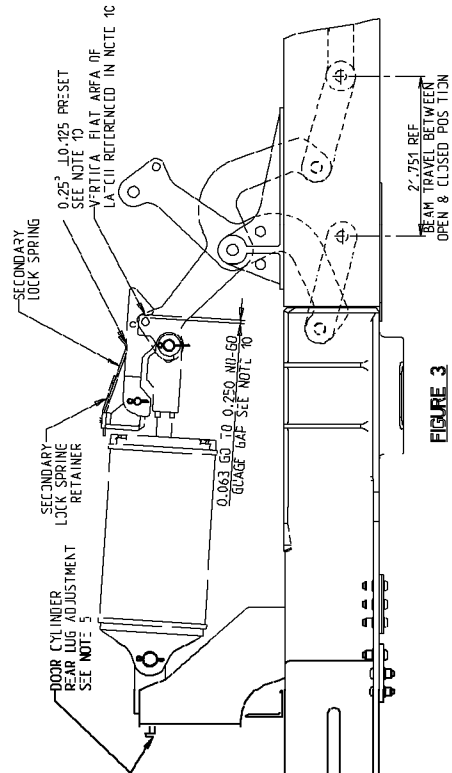


FIGURE 3

Level	Date	Approved	Description
A	06-20-00	JAJ	ADDED "NOTE" TERMINOLOGY TO STEP NO. 9
REVISIONS			

Standard Tolerances (Unless Noted)	
Drill diameters	± 0.003
Hole diameters	± 0.03
Diagonals	0.125 Max. Variation
Angles	± 1°
Flatness	0.125 Max. Variation
Yield By: RBF	Date: 09-27-07 Ref DWG: NA
Approved: JAJ	Do Not Scale Drawing

ARRANGEMENT, AUTOFLOOD DOOR CRITERIA	
Sheet	5 of 8
Drawing / Part Number	A105773-000
Rev.	A

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Section 7: Trouble Shooting

- 7.1 If the doors will not operate when the shoe contacts the 3rd rail, make the following checks in the sequence listed. Do not perform any work on the car until the safety precautions included in this manual have been read and fully understood.
- 7.2 If the doors will not operate:
- 7.2.1 Clean rust and moisture from the shoe and the 3rd rail.
 - 7.2.2 Check the integrity of electrical connections between:
 - 7.2.2.1 the wire and the shoe
 - 7.2.2.2 the ground wire and the car body
 - 7.2.2.3 the car body and the rail (through trucks)
 - 7.2.3 Operate the spool valve manually. (See operating instructions and safety precautions). If the doors operate manually, proceed to step 7.4.
- 7.3 If the doors will not operate electrically or manually:
- 7.3.1 Check the hopper doors and mechanism for damage that could restrict operation.
 - 7.3.2 Make sure angle cocks are open and adequate air pressure is being supplied to the system, min. 90 psi. Inspect for and repair any leaks found in the system. Also, check for air restrictions that may occur in the pipes, filter and/or valves.
 - 7.3.3 Inspect the secondary lock at the air cylinder for damage or a jammed condition. Be sure to stand away from the air cylinder and lock when attempting to operate the doors.
 - 7.3.4 Disconnect external air supply to the car and release the air pressure in the system. Carefully remove the hoses from the front and rear port of the cylinder. Connect shop air through a valve directly to the rear port of the cylinder. Supply pressure must be at least 90 psi and no greater than 130 psi. If shop air, applied directly to the cylinder will operate the doors: inspect the control valve and piping, make repairs as necessary. If shop air, applied directly to the cylinder, will not operate the door properly, either the cylinder is inoperative or the linkage is jammed.
- 7.4 If the doors operate manually but not electrically:
- 7.4.1 Check the polarity of the operating source voltage. Positive to 3rd rail shoe and negative to car body ground should open the doors. (See operating instructions).
 - 7.4.2 Open the control valve box and check continuity of the wire entering the box from each of the 3rd rail shoes.
 - 7.4.3 Check diode package for continuity.
- 7.5 If doors operate, but mechanism will not lock over center:
- 7.5.1 Check air pressure to cylinder (See section 5)
 - 7.5.2 Check for door pan or lever interference (bent, dirty, etc.)