

The Baier Rail Single Bolt Manway

IMO-030620

Installation, Maintenance, and Operation Manual



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1. General

a. Introduction

Extensive design, engineering, and testing have gone into the Baier Rail Single Bolt Manway (BTSB), to address the persisting problem of non-accidental releases (NARs) common to the manways in use today.

Please read this manual prior to using the product, and follow the proper operation, inspection, and maintenance.

b. Safety First



- i. All BTSB Manway installations must be performed by an Association of American Railroads (AAR) certified tank car facility and trained personnel. The following instructions should only be used as a supplemental guide and in no way supersede the operating, safety, welding, or quality assurance procedures of the tank car facility.
- ii. Although the manway cover includes a lift-assist spring, maintenance personnel should use extreme caution when interacting with the BTSB manway cover assembly while it is in the open position to avoid injury from accidental closure.

c. Warranty

- i. Go to <https://baierrail.com/documents/#documents-warranty>

2. Product Description

a. Models

MODELS	DESCRIPTION	DIM "A"
<i>COVER ASSEMBLIES</i>		
BTSB	Cover Assy, carbon steel construction with stainless steel o-ring sealing surfaces	N/A
BTSB-SS	Cover Assy, stainless steel on all surfaces in contact with commodity (internally)	N/A
<i>NOZZLES</i>		
BNTZ-R-5	Nozzle, Retrofit, stainless steel on all surfaces in contact with commodity (internally)	5.5
BNTZ-SS-9.625	Nozzle, New Construction, DOT-111, stainless steel on all surfaces in contact with commodity (internally)	9.625
BNTZ-SS-12.5	New Construction, DOT-117, stainless steel on all surfaces in contact with commodity (internally)	12.5

b. Envelope Dimensions and Part Identification

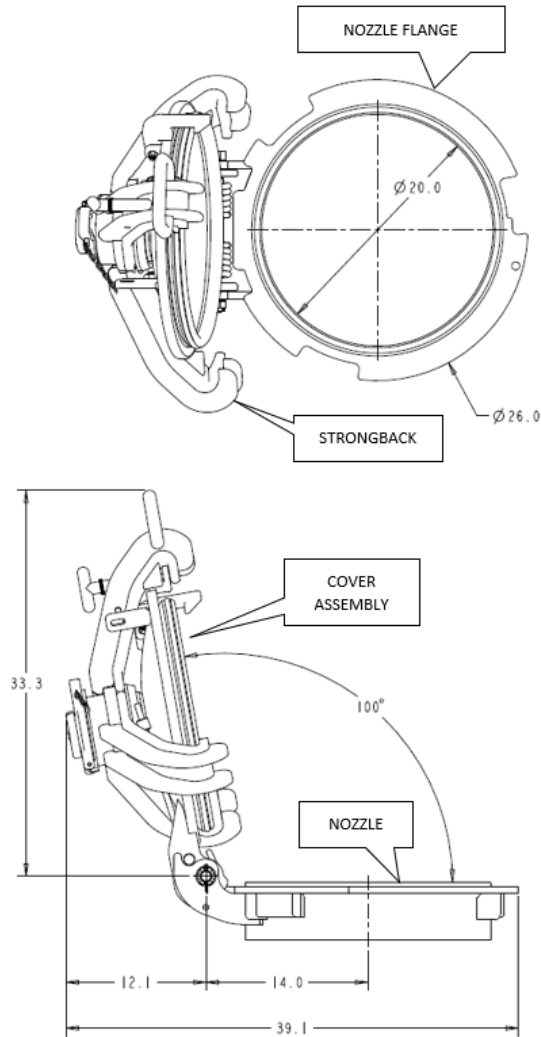


Figure 1A - Envelope Dimensions – Shown in Open-Lock-Position

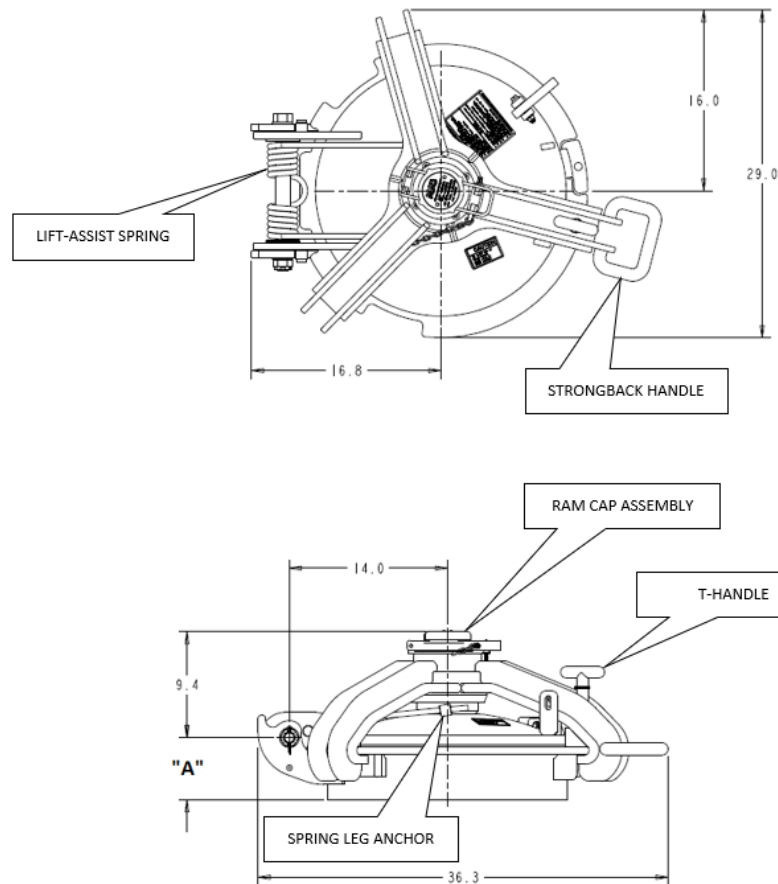


Figure 1B - Envelope Dimensions – Shown in Closed-Lock-Position

- c. Shipping
 - i. Nozzles and cover assemblies are shipped separately. This allows the cover assemblies to be safely stored while the nozzles are being welded to the tank car.

3. Inspection of Sealing Elements (Inspect before adding to tank car)

- a. Nozzle Sealing Surface
 - i. The nozzle sealing surface must be free from damage, debris or defects. If the sealing surface needs to be repaired or cleaned follow the instructions in section 5.b.ii.2.a.
- b. Cover Sealing Surface
 - i. The cover sealing surface must be free from damage, debris or defects. If the sealing surface needs to be repaired or cleaned follow the instructions in section 5.b.ii.2.a.
- c. Cover O-ring
 - i. Inspect the cover o-ring for defects such as cuts, tears, debris, or raised areas. If any defects are found, the o-ring must be replaced before using the BTRB manway.

4. Installing the Cover Assembly

a. Cover Assembly Position



- i. The cover assembly should be installed in the open position, when there is no tension on the Lift-assist spring.
- ii. Using a means to lift and support the weight of the cover assembly, align the hinge holes of the cover with the hinge holes of the nozzle.
- iii. Insert the two legs of the lift-assist spring into the corresponding anchors on the top of the cover, then insert the hinge bolt, sleeve, washers, and spring spacers, through the hinge brackets of the nozzle, cover, and spring coil.
- iv. Using two female 1 ½" socket or crescent wrenches, install the castle nut on to the hinge bolt and thread it until the bolt passes the cotter pin hole location.
- v. Using pliers, insert the cotter pin into the hole on the hinge bolt, and bend the cotter pin end back to prevent disengagement.



- vi. Install the o-ring.
- vii. Close the cover. **IMPORTANT:** Keep hands and other body parts away from the nozzle opening at all times to avoid risk of injury.

b. Closing the Cover Assembly

- i. Note that the strongback is locked in relation to the cover by means of a spring-loaded T-handle locking pin. This is called the **open-lock-position**. With one hand pushing the cover assembly down on the Strongback' main handle, pull the T-handle up, and turn the strongback clockwise. Release the T-handle and continue to turn until the spring-loaded pin of the T-handle releases and fully engages the corresponding hole in the nozzle flange. This is called the **closed-lock-position**. If the strongback does not freely move from one position to another it is due to contact between the surfaces of the strongback arms and the nozzle flange. To eliminate this contact, turn the ram so that the nozzle flange is equally positioned between the strongback "claws" and "wedges" (See figure 2).

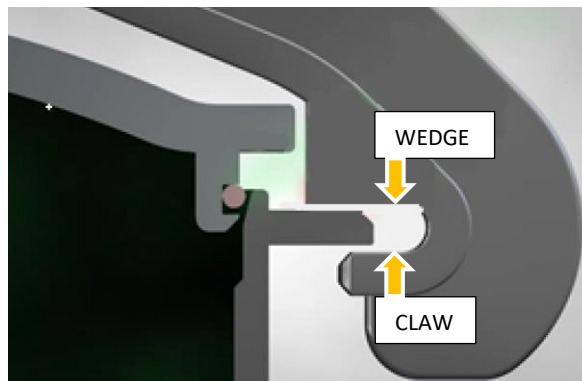


Figure 2 - Strongback in Neutral Position

Note: The "claws" bear up against the bottom side of the nozzle flange when closing the cover assembly. The "wedges" bear up against the upper side of the nozzle flange when opening the cover assembly. Practice moving the

strongback from one position to the other a few times before moving to the next step.

- ii. With the strongback in the **closed-lock-position** turn the ram clockwise, approximately 5 ½ turns, using a 3/4" male square socket until the cover is fully seated, which is when the ram will no longer turn. Hand or impact wrenches may be used to turn the ram. It is important to note that after the cover is fully seated no additional torque should be applied, as this is not required to achieve a proper seal and may make it difficult to open the cover assembly.



Once the Cover is fully seated, back-turn the ram ¼ turn; this will ensure the Cover is not difficult to open. For more detailed instructions see instructional videos at <https://baierrail.com/videos/>.

c. Ram Cap Assembly

- i. The ram cap assembly has a dual function. First, it acts as a cover for the ram to help keep dirt, water, and debris from entering the threaded area and interfering with the ram function. Second, by way of a square boss on the underside of the ram cap cover, it helps restrict the ram from back-driving movement beyond ¼ turn, effectively keeping the cover and strongback in a locked and sealed position.
- ii. The cover assembly must be in the down, locked and sealed position for the ram cap assembly to properly close and for its locking pin to pass freely through the features that lock it into place. If the locking pin cannot pass through freely, it is an indication that the cover assembly is not down, locked, and sealed. See following illustrations for details.

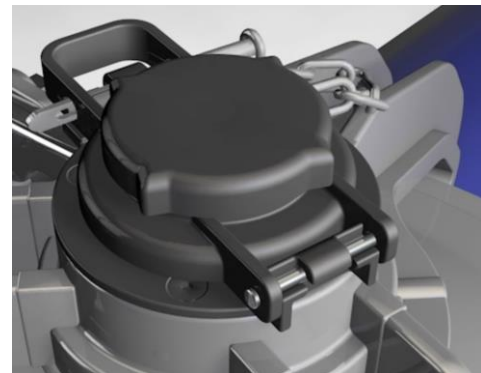


Figure 3 - Cap Assembly and Locking Pin

Opening the Cover Assembly

- iii. Remove the lock-pin and open the ram cap assembly.
- iv. Using a hand tool or impact wrench with a 3/4" male square socket, turn the ram counter-clockwise (approximately 5 ½ turns) until it stops to release any residual pressure present in the tank car. Then turn the ram clockwise ½ turn to allow the strongback to swing freely to the **open-lock-position**.
- v. Lift the T-handle and rotate strongback counter-clockwise. Release the T-handle and continue to turn until the spring-loaded pin of the T-handle releases and fully engages the corresponding hole in the nozzle flange. The strongback is now in the **open-lock-position**. If the strongback does not freely move from one position to another it is due to contact between the surfaces of the strongback arms and the nozzle flange. To eliminate this contact, turn the ram so that the nozzle flange is equally positioned between the strongback "claws" and "wedges" (See figure 2). Note: The "claws" bear up against the bottom side of the nozzle flange when closing the cover assembly. The "wedges" bear up against the upper side of the nozzle flange when opening the cover assembly.
- vi. Lift the cover assembly up by the strongback handle until the safety latch engages.
- vii. Release safety latch.
- viii. Continue lifting the cover assembly until fully opened and resting in the vertical position.

5. Maintenance and Part Replacement

a. Greasing the Single-Bolt Ram

- i. The ram is pre-greased the factory; however, it can be re-greased as needed by pushing grease through a Zerk fitting at the bottom of the ram square socket.
 1. Fill grease through the Zerk fitting until grease begins to exit through the vent location at the front of the cap assembly directly under the locking pin channel, as indicated in the following illustration.
 2. Continue to purge until exiting grease is free of discoloration due to wear or contaminates.

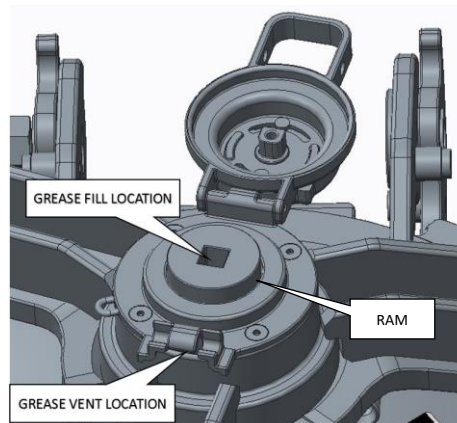


Figure 4 - Grease Fill and Vent Locations

3. To maintain warranty and maximize product life, use a performance synthetic grease of Lithium/Lithium complex type thickener, with a drop point temperature range of 356-482°F (180-250°C) and service temperature range of -40-302°F (-40-150°C). Example: Shell Gadus S2 V100 2.

b. Replacing the Cover O-ring

i. Removal



1. The seal is an encapsulated o-ring, consisting of a silicone core encased by a Teflon jacket. When removing the o-ring, be careful not to damage or puncture the jacket. DO NOT use a screwdriver or knife to remove o-ring. Use a dull, flat tool, such as a tire lever iron, as shown below (not included). If the o-ring or its Teflon jacket becomes damaged by a tool, or excessively worn, it must be replaced.



ii. Installation



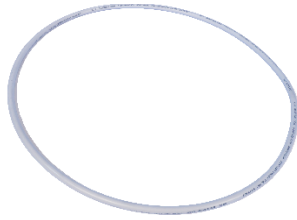
1. **Use only Baier Rail encapsulated o-rings. Using unauthorized o-rings will void the warranty and may produce unintended results, including non-accidental release of commodities (NARs).** No tools are required for installation. Insert a section of the o-ring into the cover assembly o-ring retaining groove. Run the o-ring around and push into the groove until it snaps into place.



2. Seal surface damage
 - a. The nozzle and cover surfaces that come in contact with the o-ring must be clean and visually inspected for defects. These surfaces should be smooth, although very minor machining marks, gouges, nicks, and other defects should not prevent sealing. Seal surface defects suspected of impairing sealing, must be repaired by welding and / or machining. Corroded surfaces and debris must be cleaned to expose a clean, smooth profile.

c. Replacement Parts

REPLACEMENT PARTS LIST (Includes mounting hardware where applicable)	
DESCRIPTION	PART NO.
O-RING, COVER	08867-705A
CAP ASSEMBLY	08867-102A
LIFT ASSIST SPRING ASSEMBLY	08867-191A
SAFETY LATCH	08867-192A
T-HANDLE	08867-190A



O-Ring, Cover 08867-705A



Cap Assembly 08867-102A



Lift-Assist Spring Assembly 08867-191A



Safety Latch 08867-192A



T-Handle 08867-190A

- d. For replacement of cap Assembly, lift-assist spring assembly, safety latch and T-Handle see these and other helpful videos at <https://baierrail.com/videos/>.