



Service Data

SD-05-4623

Bendix® Versajust® GS™ Automatic Slack Adjuster with the Bendix® WearMax™ Clutch

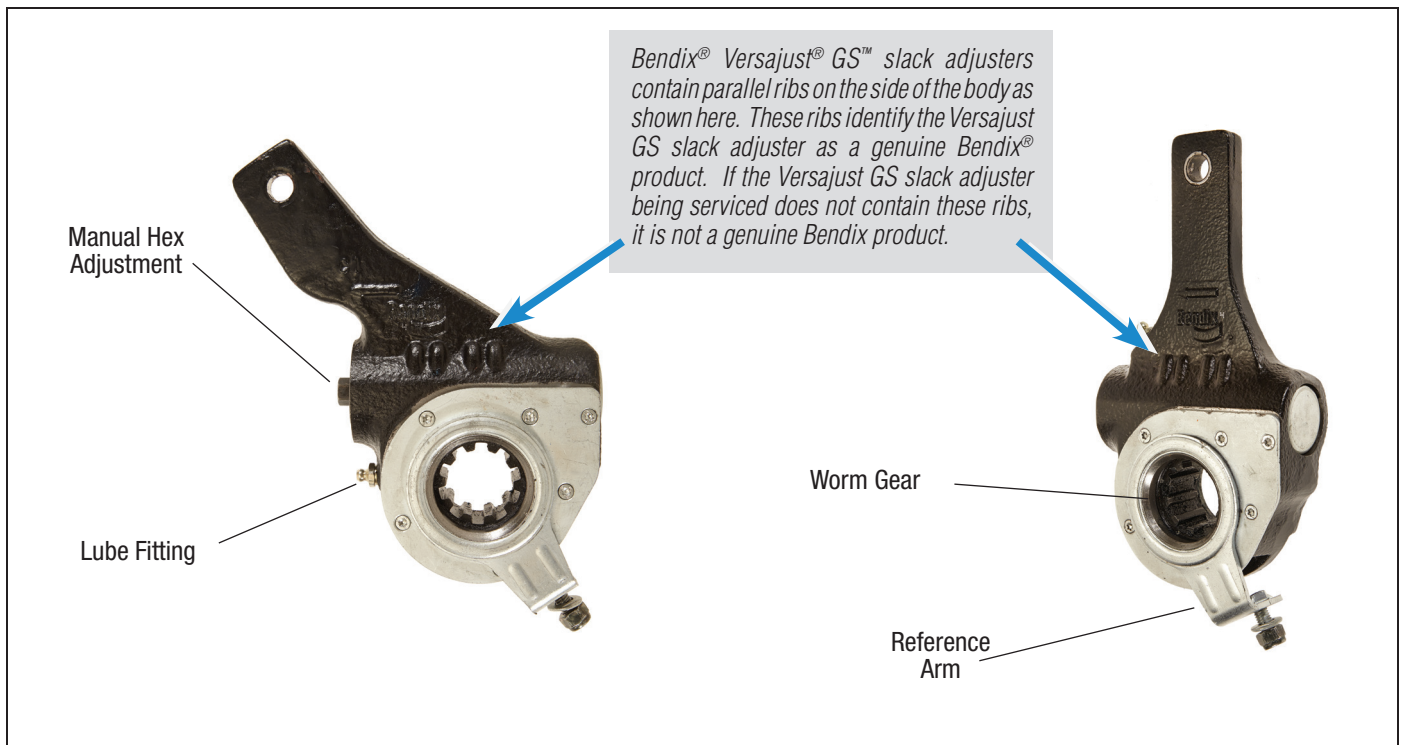


Figure 1 – Bendix® Versajust® GS™ Automatic Slack Adjuster

DESCRIPTION

The Bendix® Versajust® GS™ automatic slack adjuster with the Bendix® WearMax™ clutch is designed for use on cam-actuated drum brakes, the type of brake in use on most highway vehicles. Like a manual slack adjuster, the Versajust GS slack adjuster multiplies and transforms the linear force of the air actuator into a rotational force, or torque, which is used to apply the foundation brake. In addition, the Versajust GS slack adjuster automatically adjusts and maintains the clearance between the brake lining and drum to compensate for wear.

A variety of Versajust GS slack adjuster configurations are offered. These include multiple arm inclinations and offsets. The Versajust GS slack adjuster is offered in arm lengths of 5, 5½ and 6 inches, and worm gear splines to accommodate the standard 1¼" and 1½" SAE 10C-, 24-, and 28-tooth splines.

Either of two reference arm styles—design threaded fastener or slip-on bushing, in combination with an external manual adjuster hex—provides for convenient installation and maintenance of the Versajust GS slack adjuster.



See page 2 for the GENERAL SAFETY GUIDELINES and WARNINGS.



GENERAL SAFETY GUIDELINES

WARNING! PLEASE READ AND FOLLOW THESE INSTRUCTIONS

TO AVOID PERSONAL INJURY OR DEATH:

When working on or around a vehicle, the following guidelines should be observed **AT ALL TIMES**:

- ▲ Park the vehicle on a level surface, apply the parking brakes and always block the wheels. Always wear personal protection equipment.
- ▲ Stop the engine and remove the ignition key when working under or around the vehicle. When working in the engine compartment, the engine should be shut off and the ignition key should be removed. Where circumstances require that the engine be in operation, **EXTREME CAUTION** should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically-charged components.
- ▲ Do not attempt to install, remove, disassemble or assemble a component until you have read, and thoroughly understand, the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.
- ▲ If the work is being performed on the vehicle's air brake system, or any auxiliary pressurized air systems, make certain to drain the air pressure from all reservoirs before beginning ANY work on the vehicle. If the vehicle is equipped with a Bendix® AD-IS® air dryer system, a Bendix® DRM™ dryer reservoir module, or a Bendix® AD-9si® air dryer, be sure to drain the purge reservoir.
- ▲ Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.
- ▲ Never exceed manufacturer's recommended pressures.
- ▲ Never connect or disconnect a hose or line containing pressure; it may whip and/or cause hazardous airborne dust and dirt particles. Wear eye protection. Slowly open connections with care, and verify that no pressure is present. Never remove a component or plug unless you are certain all system pressure has been depleted.
- ▲ Use only genuine Bendix® brand replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, wiring, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.
- ▲ Components with stripped threads or damaged parts should be replaced rather than repaired. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle and component manufacturer.
- ▲ Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.
- ▲ For vehicles with Automatic Traction Control (ATC), the ATC function must be disabled (ATC indicator lamp should be ON) prior to performing any vehicle maintenance where one or more wheels on a drive axle are lifted off the ground and moving.
- ▲ The power **MUST** be temporarily disconnected from the radar sensor whenever any tests **USING A DYNAMOMETER** are conducted on a vehicle equipped with a Bendix® Wingman® system.
- ▲ You should consult the vehicle manufacturer's operating and service manuals, and any related literature, in conjunction with the Guidelines above.



WARNING

Failure to properly install and maintain the Automatic Slack Adjuster (ASA) can lead to a serious accident, property damage, personal injury, or death.

NEVER USE AN IMPACT WRENCH TO ADJUST OR BACK-OFF AN ASA.

MANUALLY ADJUST AN ASA ONLY during its initial installation or when it is necessary to replace brake shoes or a brake drum.

NEVER perform multiple or ongoing manual adjustments to ASA's as part of routine, periodic or preventive maintenance. The National Transportation Safety Board has determined that repeated, manual adjustments to ASAs is a **dangerous practice** that may damage the ASA or create a false sense of security by masking the true cause of an out-of-adjustment brake.

NEVER perform manual adjustments to an ASA to fix or repair a brake that is out-of-adjustment. The problem could be with the ASA itself or another part of the foundation brake that **cannot** be repaired or replaced by manually adjusting the ASA.

ALWAYS troubleshoot and diagnose an out-of-adjustment brake to determine the actual cause of the out-of-adjustment condition. *Refer to the Troubleshooting Chart, on page 12, for further information.*

FAILURE to properly identify and repair the actual cause of an out-of-adjustment brake can reduce braking effectiveness, increase stopping distance, and may lead to a serious accident, property damage, personal injury, or death.

OPERATION

GENERAL

The automatic adjustment provided by the Bendix® Versajust® GS™ slack adjuster results in consistent brake lining-to-drum clearance and brake actuator stroke. The key to its operation is the ability to disengage the adjustment process once the brake shoe makes proper contact with the drum—categorized as clearance sensing. This aspect of the adjuster mechanism's operation reduces the possibility of over-adjustment caused by lining compression, actuator bracket deflection, drum and foundation brake component distortion, or brake component wear.

The Bendix Versajust GS slack adjuster incorporates a patented Bendix® WearMax™ clutch-type adjuster mechanism that provides precise adjustments as lining and drum wear occurs. The adjustments made by the Versajust GS slack adjuster are independent of actuator stroke.

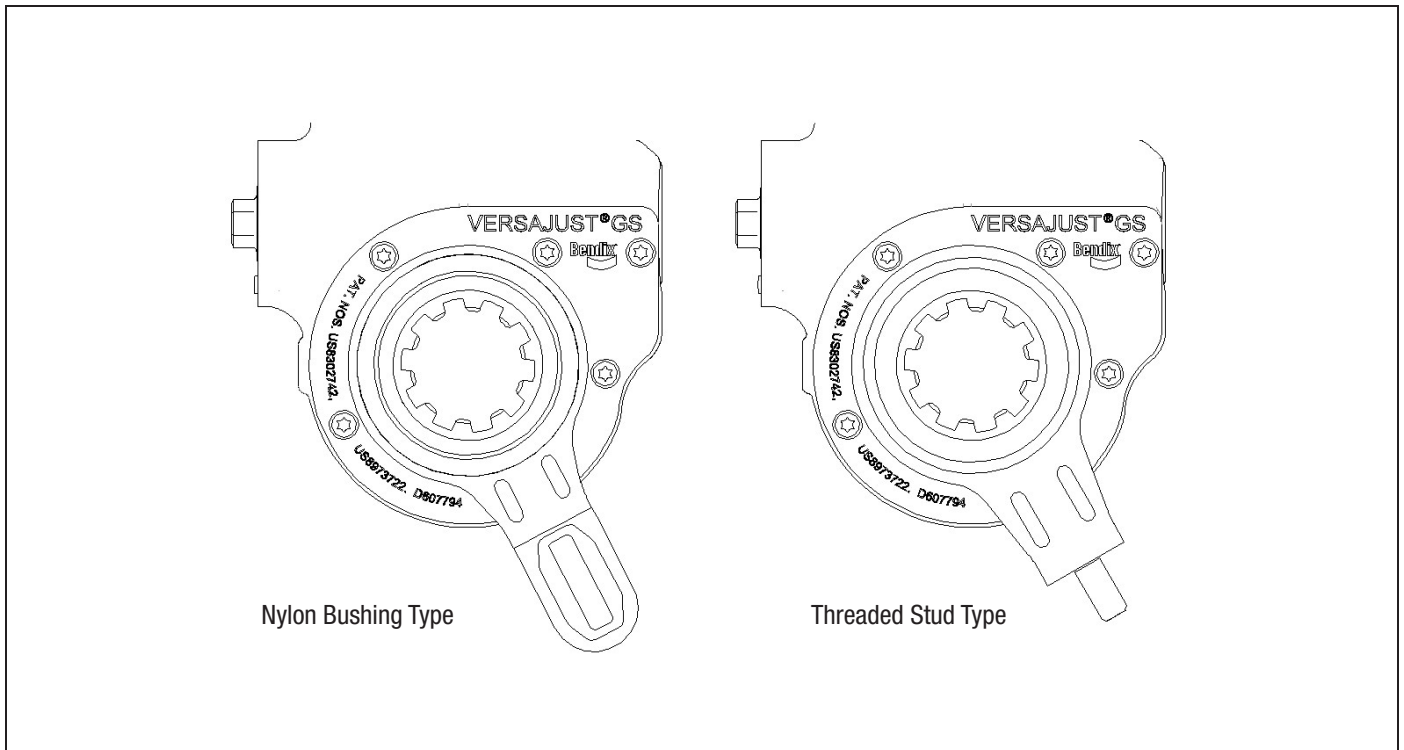


Figure 2 – Bendix® Versajust® GS™ Automatic Slack Adjuster Arm Types

BRAKE APPLICATION

When the vehicle brakes are applied, the linear travel of the brake actuator's pushrod causes the Bendix® Versajust® GS™ slack adjuster to rotate the foundation brake cam shaft. This, in turn, begins to expand the brake shoes into contact with the drum.

The Versajust GS slack adjuster has a reference arm that is anchored to the vehicle. This arm contains a gear wheel on the inner side and—when the slack adjuster rotates—the gear wheel turns, which turns the internal control train connected to the adjusting one-way clutch (OWC). The OWC is coupled to the worm-shaft through a conical toothed clutch. The worm-shaft turns the worm gear and thereby the camshaft.

As the slack rotates relative to the reference arm, it travels through its free stroke angle, turning the internal control train until the brake shoes contact the brake drum.

When there is no wear, the foundation brake shoes contact the drum and braking occurs. When there is excess travel due to wear, the adjustment control train continues to turn, creating an input to the OWC until the foundation brake shoes contact the drum. When the shoe contacts the drum, the force built-up on the worm-shaft causes the conical clutch to open, which then disconnects the OWC. Meanwhile, the slack adjuster continues to travel till the brake force is fully developed.

BRAKE RELEASE

When the brake application is released, the brake actuator pushrod returns the Versajust GS slack adjuster to the released position. During the release, the slack adjuster rotates back toward the actuator, causing the brake camshaft to again rotate—but in the opposite direction—and the brake shoes begin to move away from the drum. As the Versajust GS rotates back to the release position, the force on the worm-shaft drops and the conical clutch re-couples. If excessive wear input was received during brake application, the OWC mechanism will cause the worm shaft to rotate. This rotation results in worm gear rotation, which in turn, adjusts (or repositions) the brake camshaft to maintain proper shoe to drum clearance.

REFERENCE ARM TYPES

The Versajust GS slack adjuster may be equipped with one of two reference arm types—threaded stud or nylon bushing. Both arms are designed to permit easy installation or removal of the slack adjuster. (Refer to Figure 2)

The reference arm is held in a fixed angular position—attached to a fixed point on the vehicle. This provides a reference, or home, position for the internal adjustment mechanism and provides a grounding to generate the force required for automatic adjustment. The Versajust GS is a self-setting slack adjuster. This allows the reference arm to be rotated through a wide angular range during installation and does not require any specific angle for operation.

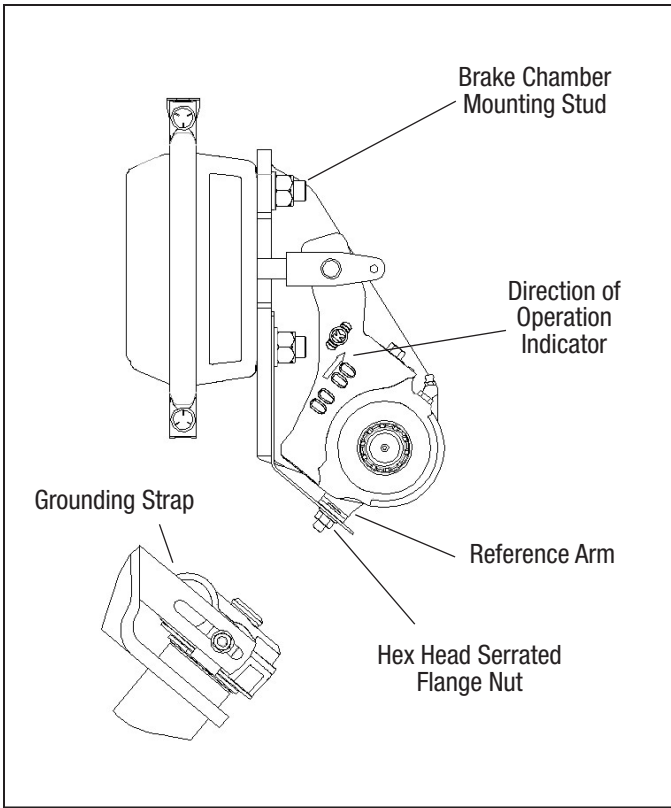


Figure 3 – Threaded Stud Reference Arm

THREADED STUD

The threaded stud reference arm utilizes a threaded fastener and grounding strap to provide the home position for the adjusting device. (Refer to Figure 3)

The grounding strap—made of stainless steel—is attached to the brake chamber mounting stud. The threaded stud of the reference arm is attached to this strap using a hex head serrated flange nut.

NYLON BUSHING

The nylon bushing reference arm utilizes a slotted nylon bushing and grounding stud to provide the home position for the adjusting device.

The grounding stud is a corrosion resistant coated metal stud that is inserted into the nylon bushing contained in the reference arm and held to a grounding bracket with a threaded connection. This connection prevents the reference arm from rotating, thus providing the reference—or home—position for the internal adjustment mechanism.

The grounding bracket is a corrosion resistant coated metal bracket that can be attached to the cam tube using a clamp—mainly used in steer axle applications (Refer to Figure 4), or bolted directly to the cam bushing bracket assembly—for trailer applications (Refer to Figure 5). Some manufacturers of trailer axles have integrated this bracket design directly into the cam bushing bracket.

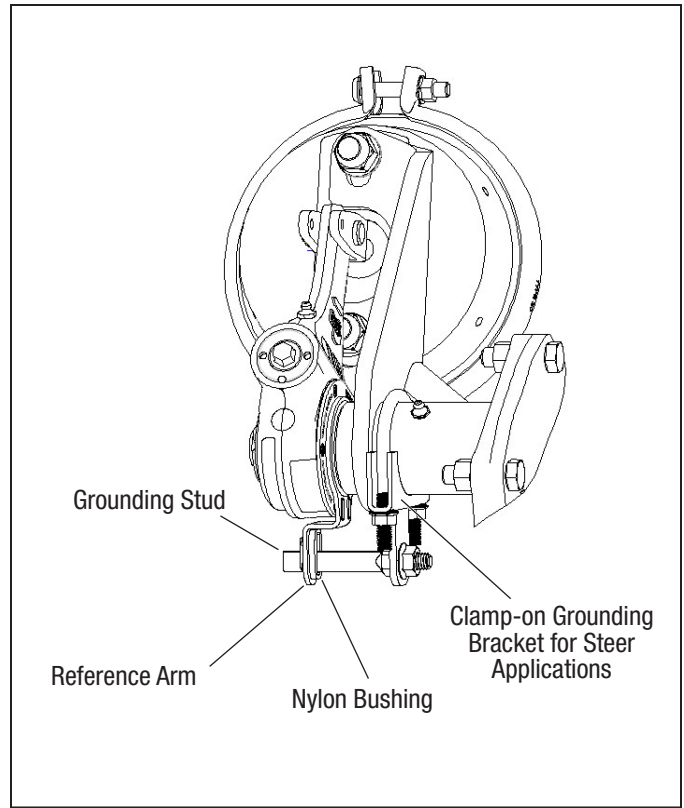


Figure 4 – Nylon Bushing Reference Arm (Steer Axle Application)

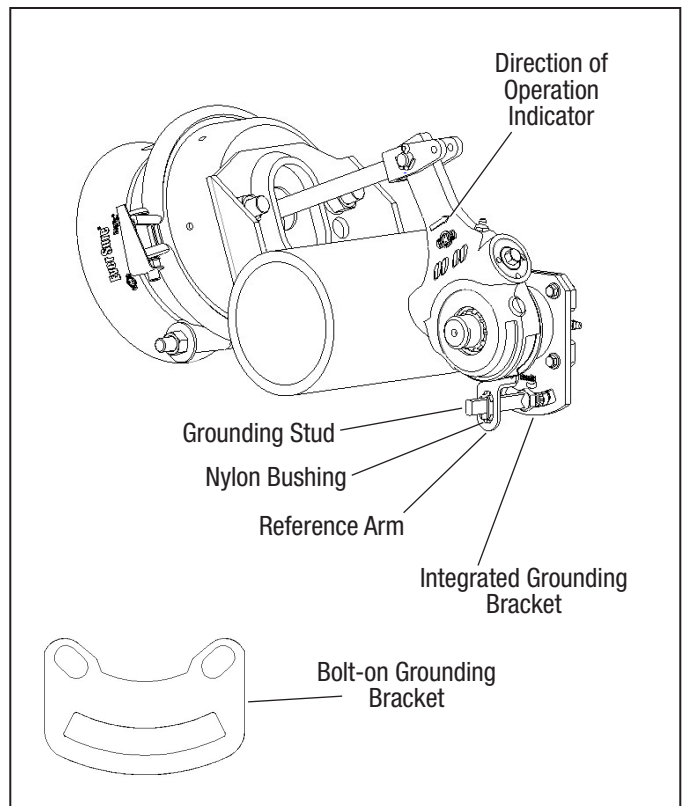


Figure 5 – Nylon Bushing Reference Arm (Trailer Application)

INSTALLATION PREPARATION

In order to install the Bendix® Versajust® GS™ automatic slack adjuster:

1. Ensure that the brake actuator pushrod is fully retracted.
The spring brake must be released by applying air to the actuator or by manually caging the spring.
2. Remove the manual or automatic slack adjuster currently installed.
3. Inspect the foundation brake, brake actuator, and related components. Make certain the camshaft bushings and seals are not excessively worn. Maximum camshaft bushings radial play is 0.035 inches. The combined camshaft and slack adjuster axial play should be checked. The permitted range of axial play is from 0.005 inches to a maximum of 0.025 inches. Servicing camshafts will reduce brake friction wear and increase the life of the entire system.
4. Lubricate the camshaft bushings. Check the brake actuator bracket for cracks and excessive corrosion. The brake actuator pushrod should not be loose or bent and the return spring should be firm. Replace any parts or components that are suspect.
5. Use a wire brush on the foundation brake camshaft to loosen contamination and wipe clean. Apply anti-seize compound to both the brake camshaft and the slack adjuster worm gear spline.
6. When using an air actuator with a threaded pushrod and clevis, ensure that there is sufficient thread to accommodate the clevis and locknut.



Verify that there is sufficient pushrod length available to properly actuate the brake after slack adjuster installation.

BENDIX® VERSAJUST® GS™ SLACK ADJUSTER INSTALLATION

Select the proper Versajust GS slack adjuster. See the *INSTALLATION PREPARATION* section of this document. Ensure the vehicle has been prepared according to the GENERAL SAFETY GUIDELINES on page 2.

For Versajust GS slack adjusters equipped with threaded stud reference arms:

1. Select the appropriate stainless steel grounding strap for the installation. Remove the nut and washer from the brake chamber mounting stud. Place the grounding strap on the brake chamber mounting stud. If the grounding strap has dual mounting holes, select the appropriate mounting hole based on the arm length of

the slack. Replace the washer and nut on the brake chamber mounting stud and hand tighten.

2. Install the slack adjuster on the brake camshaft so that the direction of operation indicator points away from the brake chamber (*Refer to Figure 3*). Use enough washer spacers to align the slack adjuster to the center of the pushrod. Add washers to the outside of the slack adjuster until the snap ring groove is just visible. Install the snap ring or E-clip. The total end play allowed for the slack assembly, as well as the cam, is 0.005 inches minimum to 0.025 inches maximum.
3. Ensure that the clevis is aligned with the slack adjuster, such that the clevis will not bind on the slack adjuster's body during regular operation. If necessary, the orientation of the clevis can be adjusted by simply rotating the pushrod relative to the actuator chamber. Use a bar or pipe inserted between the clevis jaws to provide leverage for rotation.
4. Using the adjuster hex, turn clockwise to rotate the Versajust GS slack adjuster into the clevis until the brake adjuster arm bushing hole aligns with the clevis hole. Note: Do NOT pull the pushrod to meet the brake adjuster.
5. Apply anti-seize compound or grease to the clevis pin; insert, and secure with a cotter pin. *Refer to Figure 6 for proper cotter pin installation.*
6. Rotate the reference arm towards the brake chamber and grounding strap. Insert the threaded stud of the reference arm into the slot of the grounding strap. Tighten the brake chamber mounting nut against the strap and brake chamber mounting bracket. Torque to manufacturers specification. Thread the serrated flange hex nut onto the reference arm stud and tighten. Ensure that the reference arm does not move and is anchored securely and that all fasteners are properly secured.

For Bendix Versajust GS slack adjusters equipped with nylon bushing reference arms:

1. Select the appropriate grounding bracket for the application.
2. Install the Versajust GS slack adjuster on the brake camshaft so that the direction of operation indicator points away from the brake chamber. Use enough washer spacers to align the slack adjuster to the center of the pushrod. Add washers to the outside of the slack adjuster until the snap ring groove is just visible. Install the snap ring or E-clip. The total end play allowed for the slack assembly, as well as the cam, is 0.005 inches minimum to 0.025 inches maximum.

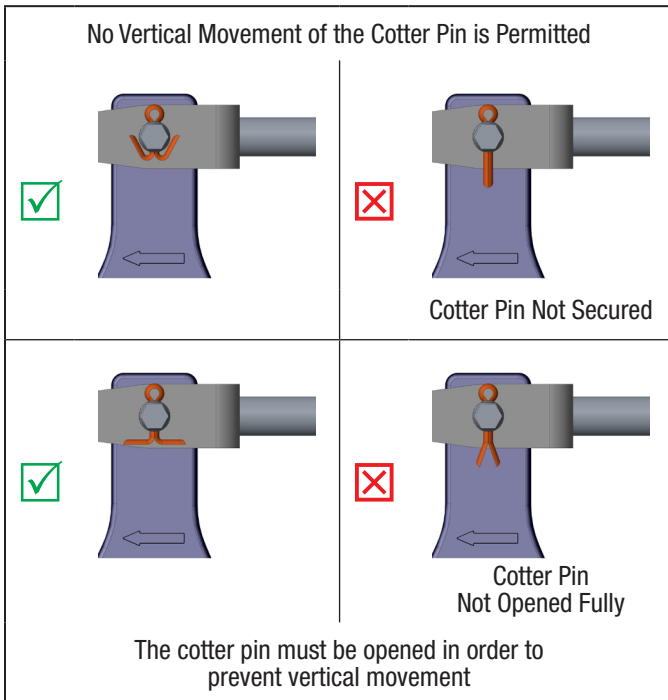


Figure 6 – Cotter Pin Installation Guide

3. Ensure that the clevis is aligned with the slack adjuster, such that the clevis will not bind on the slack adjuster's body during regular operation. If necessary, the orientation of the clevis can be adjusted by simply rotating the pushrod relative to the actuator chamber. Use a bar or pipe inserted between the clevis jaws to provide leverage for rotation.
4. Using the adjuster hex, turn clockwise to rotate the Bendix® Versajust® GS™ slack adjuster into the clevis until the brake adjuster arm bushing hole aligns with the clevis hole. Note: Do NOT pull the pushrod to meet the brake adjuster.
5. Apply anti-seize compound or grease to the clevis pin; insert, and secure with a cotter pin. Refer to Figure 6 for proper cotter pin installation.
6. Rotate the reference arm to align with the orientation of the grounding bracket. Insert the grounding stud into the nylon bushing slot of the reference arm. Secure the grounding bracket to the vehicle. Ensure that the reference arm does not move and is anchored securely and that all fasteners are properly secured.

COTTER PIN INSTALLATION

Secure the cotter pins, as shown in Figure 6, ensuring that the cotter pins are opened fully.

80–90 PSI Actuator Pressure	
Brake Actuator Size	Readjustable Stroke (Max.)
Type 6	1 ¹ / ₄ "
Type 9, 12	1 ³ / ₈ "
Type 12 Long Stroke	1 ³ / ₄ "
Type 16, 20, 24	1 ³ / ₄ "
Type 16, 20, 24 Long Stroke	2"
Type 20, 24 (with 3" Extended Long Stroke)	2 ¹ / ₂ "
Type 30	2"
Type 30 Long Stroke	2 ¹ / ₂ "
Type 36	2 ¹ / ₄ "

Table 1 – Readjustable Stroke

INSTALLATION BRAKE ADJUSTMENT

1. Rotate the manual adjustment hex clockwise until the linings are snug against the drum.
2. Turn the adjustment hex counterclockwise one half turn.
3. Pull the brake actuator pushrod to confirm that approximately ½ inch of free stroke exists.
4. Build up the system pressure until the gauge reads between 90 to 100 psi. Make a full brake application and check that the brake actuator pushrod stroke is below the readjustment limit set by the U.S. Department of Transportation (USDOT). (See Table 1)
5. If the stroke exceeds the readjustment limit, check the condition of the foundation brake. For Bendix double anchor pin S-Cam brakes, refer to the Brake Maintenance Inspection section of *Service Data sheet SD-22-3260*.
6. Manually uncage the spring brakes before returning the vehicle to service, following the manufacturer's instructions.
7. With the Versajust GS slack adjuster installed on the vehicle, ensure physical clearance requirements are met with the brake chamber fully released and at full stroke. Also, confirm the clearance with the vehicle suspension springs depressed to bumpers, as well as in the rebound state.
8. The Versajust GS automatic slack adjuster should be lubricated every 50,000 miles, 6 months—or at the time of routine vehicle chassis lubrication—whichever occurs first. The Versajust GS automatic slack adjuster should be lubricated through the lube fitting with a quality multipurpose chassis lubricant (N.L.G.I. Grade 2). After lubrication, the free stroke and power stroke must be checked to ensure the proper operation of all the components of the brake system.

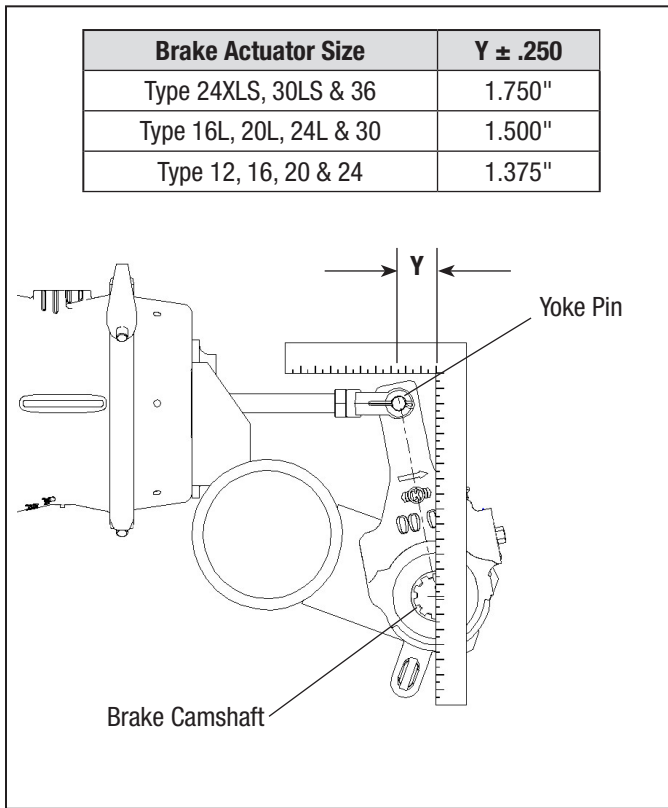


Figure 7 – Threaded Clevis

- When relining a brake, a resistance torque should be felt during the back off of the slack adjuster; this is normal. When backing off the adjustment, only back off enough to allow the removal of the drum.

ACTUATORS WITH THREADED CLEVIS

The illustration in Figure 7 depicts a properly installed Bendix® Versajust® GS™ slack adjuster when paired to an actuator with a threaded clevis and pushrod.

To ensure proper installation and operation, the distance between the center of the camshaft and the center of the yoke pin, (“Y”), as illustrated, should be as noted in the chart. The distance can be checked by placing a square (or an equivalent object) so that one edge is parallel to the actuator pushrod, while the other edge bisects the brake camshaft. This measurement should be taken with the actuator in the released position.

When measured with air supplied at 80-90 psi to the brake actuator and the brake properly adjusted, the angle between the brake actuator pushrod and the slack adjuster should be approximately 90° for maximum brake torque.

Note: The (“Y”) distance is also applicable as an installation check for Versajust GS slack adjuster installations on actuators with a welded clevis and can be verified using the same procedure as outlined above.

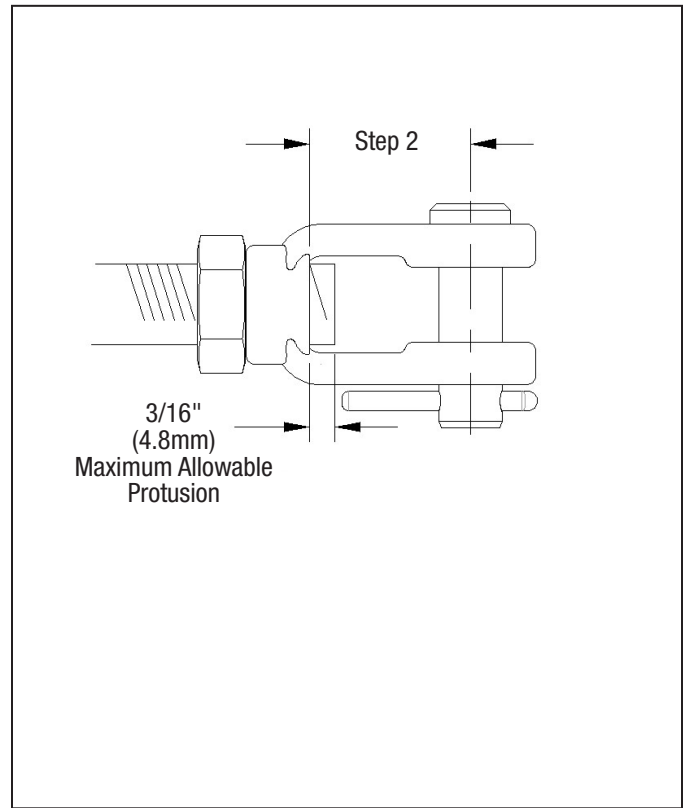


Figure 8 – Clevis Length Measurement

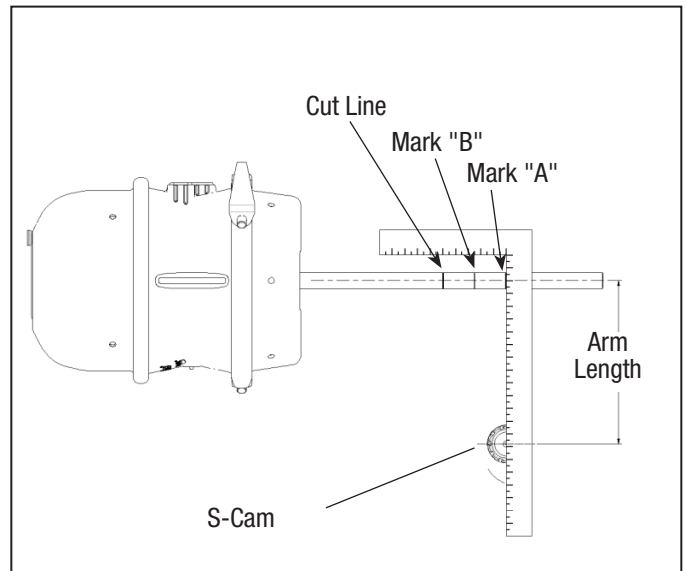


Figure 9 – Threaded Pushrod Measurement

Brake Chamber Pushrod Cutting Procedure

Follow this procedure when pairing a Bendix® Versajust® GS™ to a brake chamber with a threaded pushrod and clevis that requires cutting of the pushrod:

1. Determine the arm length of the slack adjuster by measuring from the center of the arm bushing to the center of the spline. This distance should be equal to the distance from the centerline of the brake actuator pushrod to the centerline of the S-Cam (See Figure 9).
2. Measure the distance from the center of the clevis pin hole to the bottom of the yoke. Record this distance as the length of the clevis (See Figure 8).
3. Using a square, mark the pushrod at a 90° angle to the S-Cam (Figure 9, Mark "A"). From "A" measure off the length of the clevis, recorded in Step 2, on the pushrod advancing toward the mounting surface of the brake actuator and mark the pushrod. (Figure 10, Mark "B").
4. To determine where the pushrod is to be cut, find the distance as specified in Table 2 Column IV: Set-Up Cut Length (which is the same as "Y" in Figure 7) Measure from Mark "B" toward the actuator mounting surface to find the cut line. Mark and cut the pushrod at this point.
5. Install the jam nut and clevis onto the pushrod. Tighten the jam nut as specified by the chamber manufacturer. (Usually 33 to 90 ft-lbs)
6. Install the actuator into the correct brake assembly bracket and fasten with the appropriate nuts to the actuator mounting studs. Torque the nuts as specified by the manufacture (100-140 ft-lbs is recommended).
7. Install the Bendix Versajust GS slack adjuster following the installation instructions as outlined in this document.

Note: When measured with air supplied at 80-90 psi to the brake actuator and the brake properly adjusted, the angle between the brake actuator pushrod and the slack adjuster should be approximately 90°.

PREVENTIVE MAINTENANCE

Important: Always review the Bendix Warranty Policy before performing any intrusive maintenance procedures. A warranty may be voided if intrusive maintenance is performed during the warranty period.

No two vehicles operate under identical conditions. As a result, maintenance intervals may vary. Experience is a valuable guide in determining the best maintenance interval for air brake components. (Also observe any more frequent brake adjustment inspections or maintenance intervals specified by the vehicle manufacturer.)

ACTUATOR STROKE VALUE			
STANDARD STROKE			
I	II	III	IV
Brake Actuator Size	Rated Stroke	Brake Adjustment Limit (CVSA 2014)	Set-Up Cut Length
36	3"	2 ¹ / ₄ "	1 ³ / ₄ "
30	2 ¹ / ₂ "	2"	1 ¹ / ₂ "
24	2 ¹ / ₄ "	1 ³ / ₄ "	1 ³ / ₈ "
20	2 ¹ / ₄ "	1 ³ / ₄ "	1 ³ / ₈ "
16	2 ¹ / ₄ "	1 ³ / ₄ "	1 ³ / ₈ "
12	1 ³ / ₄ "	1 ³ / ₈ "	1 ³ / ₈ "
LONG STROKE			
30LS	3"	2 ¹ / ₂ "	1 ³ / ₄ "
24L	2 ¹ / ₂ "	2 ¹ / ₂ "	1 ¹ / ₂ "
24XLS	3"	2 ¹ / ₂ "	1 ³ / ₄ "
20L	2 ¹ / ₂ "	2 ¹ / ₂ "	1 ¹ / ₂ "
16L	2 ¹ / ₂ "	2"	1 ¹ / ₂ "

Table 2 – Actuator Stroke Value

At a minimum the Versajust GS slack adjuster should be inspected every 3 months or 500 operating hours, whichever comes first, for proper operation. Should the Versajust GS slack adjuster not meet the elements of the operational tests noted in this document, further investigation and service of the slack adjuster may be required.

Every 50,000 miles, 3 months, or 500 operating hours – or at the time of routine vehicle chassis lubrication – whichever occurs first, the following steps should be followed:

1. Visually check for physical damage, such as broken air lines and broken or missing parts.
2. Lubricate the automatic slack adjuster through the lube fitting with a quality multipurpose chassis lubricant (N.L.G.I. Grade 2).
3. Perform the In Service Inspection described in this manual.

INSERVICE INSPECTION

1. Apply and release the vehicle brakes several times while observing the Versajust GS slack adjuster. The slack adjuster and brake actuator should move freely, without binding or interference, and should return to the full released position. Observe the looseness that exists between the yoke the yoke pin and their mating parts (yoke, body). Replace these parts if looseness appears excessive. Make certain the brake actuator pushrod jam nut is tight against the yoke adapter if equipped with a threaded yoke.

2. Inspect the Bendix® Versajust® GS™ slack adjuster for physical damage. Inspect for bent, broken, loose, or misaligned brake actuator pushrods and cracked or damaged brake actuator brackets. Repair or replace any components found to be damaged.
3. Measure the brake actuator pushrod stroke while making an 80-90 psi service brake application. Actuator pushrod strokes should not exceed the values shown in Table 2. The correct pressure for this test can be achieved as follows: Build the system pressure up to a 100 psi reading on the vehicle gauge. Shut the engine off. Fan the brakes to attain a 80-90 psi reading. Make and hold a full brake application while the strokes are checked.

IF THE BENDIX® VERSAJUST® GS™ SLACK ADJUSTER DOES NOT AUTOMATICALLY ADJUST THE BRAKE

If the actuator stroke exceeds those shown in the Brake Adjusting Limit (CVSA 2014)–column III–of TABLE 2-Actuator Stroke Value, inspection of the foundation brake and/or the automatic slack is necessary.

Maintenance of the foundation brake may be a factor in the excessive stroke condition. Inspecting the foundation brake – per the Brake Maintenance Inspection presented in this manual – should determine how much of the excessive stroke is caused by the condition of the foundation brake.

The Versajust GS slack adjuster can be tested using the instructions presented in this manual under Testing the Bendix Versajust GS Adjuster Mechanism.

The automatic slack adjuster is not designed to function as a manual adjuster once it is unable to maintain adjustment automatically. Manual adjustment should be done only as a temporary measure to correct brake adjustment in an emergency situation. The routine manual adjustment of an automatic slack adjuster that is still within adjustment limits may shorten its service life. Automatic slack adjusters should not be manually adjusted in an effort to correct excessive pushrod stroke.

This condition indicates that a problem exists with the automatic adjuster; with the installation of the adjuster; or with related foundation brake components, which manual adjustment will not fix. Replacement of the automatic slack adjuster or other foundation brake components may be necessary. Consult with the manufacturer's troubleshooting guidelines to find and fix the problem.



See page 2 for the GENERAL SAFETY GUIDELINES and WARNINGS.

TESTING THE BENDIX VERSAJUST GS ADJUSTER MECHANISM

The following test can be made to determine if the Versajust GS adjuster mechanism is functioning properly.

1. With the brakes released and the vehicle wheels blocked, de-adjust the brakes by rotating the manual adjustment hex counterclockwise approximately one-half to one full revolution.

Note: Considerable torque is required to rotate the manual adjustment hex counterclockwise and should be considered normal. The required torque may be as high as 25 ft-lbs.

2. Using a straight edge, scribe a line across the manual adjustment hex head and slack adjuster body with a paint marker of a color that is easily visible. A box wrench can also be placed on the hex in the horizontal position. (Refer to Figure 10).
3. Apply, and completely release, the service brakes several times while observing the manual adjustment hex and the scribed line or box wrench. The Versajust GS slack adjuster manual adjustment hex should rotate clockwise during the application and remain stationary during release. No counterclockwise rotation of the hex should be observed. The amount of clockwise rotation (adjustment) will decrease progressively as the brake nears proper adjustment. If the Versajust GS slack adjuster fails to perform as described, it will be necessary to repair or replace it.

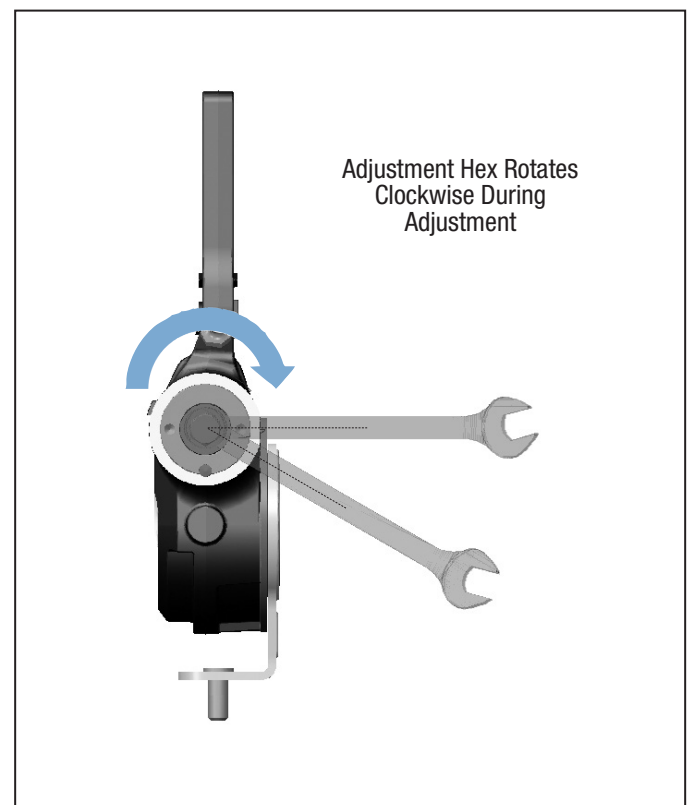


Figure 10 – Adjuster Testing

4. Manually readjust the Bendix® Versajust® GS™ slack adjuster being tested before returning the vehicle to service. See the *INSTALLATION BRAKE ADJUSTMENT* section.

Note: While it is possible to use the automatic adjustment feature of the Versajust GS slack adjuster to bring the brake back into adjustment, this process may require numerous applications and complete releases (the number of applications depends on how much the slack was deadadjusted).

BRAKE MAINTENANCE INSPECTION

Note: Make certain the vehicle has been prepared according to the instructions under the heading GENERAL SAFETY GUIDELINES in this manual.

The following test can be used to inspect the maintenance condition of the foundation brake and to determine how much of the chamber stroke is caused by the condition of the foundation brake:

1. Chock the wheels to keep the vehicle from moving.
2. Raise the axle so the wheel can be rotated.
3. Adjust the slack adjuster to produce light brake drag with wheel rotation.
4. Apply the brake to 80-90 psi and measure the stroke (See *Item 3 of INSERVICE INSPECTION for pressure tips*).
5. If the stroke significantly exceeds the values shown in Table 3, the brake may be out of the norm, and brake maintenance may be required.

BENDIX® VERSAJUST® GS™ SLACK ADJUSTER REMOVAL

Note: Make certain the vehicle has been prepared according to the instructions under the heading GENERAL SAFETY GUIDELINES in this manual.

1. Remove the cotter pin from the clevis pin.
2. Remove the clevis pin from the brake actuator pushrod clevis.
3. Rotate the manual adjustment hex counterclockwise until the Versajust GS slack adjuster is clear of the brake actuator pushrod.

Note: Considerably more torque is required to rotate the manual adjustment hex counterclockwise than is necessary to rotate it clockwise. The torque may be as high as 25 ft-lbs (a ratcheting sound may be present).

4. Remove the Versajust GS slack adjuster from the camshaft of the foundation brake by removing the retaining clip and any spacers or washers that may be present.

ACTUATOR STROKE			
AL Factor	15" x 4" Front Brake	16.5" x 7" Tractor, Truck or Bus Brake	16.5" x 7" Trailer Brake
12 x 5.0"	1/2"	N/A	N/A
12 x 5.5"	1/2"	N/A	N/A
16 x 5.0"	5/8"	1/2"	N/A
16 x 5.5"	3/4"	1/2"	N/A
16 x 6.0"	7/8"	5/8"	N/A
20 x 5.0"	5/8"	1/2"	3/8"
20 x 5.5"	3/4"	5/8"	1/2"
20 x 6.0"	7/8"	3/4"	5/8"
24 x 5.0"	N/A	5/8"	1/2"
24 x 5.5"	N/A	5/8"	5/8"
24 x 6.0"	N/A	3/4"	5/8"
30 x 5.0"	N/A	3/4"	5/8"
30 x 5.5"	N/A	7/8"	3/4"
30 x 6.0"	N/A	1"	7/8"

Table 3 – Actuator Stroke Table

DISASSEMBLY

GENERAL

A reasonable level of cleanliness should be observed when working on the Versajust GS slack adjuster. Clean the exterior before disassembly.

The following disassembly and assembly procedure is presented for reference purposes and presupposes that a rebuild or repair of the Versajust GS slack adjuster is being undertaken. Several replacement parts and maintenance kits are available which do not require full disassembly. The instructions provided with these parts and kits should be followed in lieu of the instructions presented here.

1. Clamp the slack adjuster ARM in a bench vise. Do not clamp across the portion of the body that contains the adjuster assembly or worm gear. Using a wire brush, thoroughly clean the exterior of the slack adjuster, paying particular attention to the area around the manual adjustment hex. Wipe all loose contaminants away before proceeding.
2. Press the clevis pin bushing out of the slack adjuster arm.
3. No further disassembly of the Versajust GS slack adjuster is permitted.

CLEANING AND INSPECTION

1. Inspect the worm gear camshaft splines for damage. If damaged, replace the Bendix® Versajust® GS™ slack adjuster.
2. Clean and inspect the clevis pin hole in the slack adjuster body. The hole should be visually round with no perceptible “egg shaping” or other wear. A new clevis pin can be used to make this inspection and check for fit. If this condition is noted, the affected part must be replaced.

REASSEMBLY

1. Press the clevis pin bushing into the slack adjuster arm.
2. Depending on environmental conditions, an application of anti-seize compound to the clevis pin may facilitate later removal. Bend each leg of the cotter pins to a minimum of 90°, creating a total angle of at least 180° between the legs.
3. Lubricate the automatic slack adjuster through the lube fitting with a quality multipurpose chassis lubricant (N.L.G.I. Grade 2).

RETROFITTING THE BENDIX® VERSAJUST® GS™ SLACK ADJUSTER

PREPARATION

The Versajust GS automatic slack adjuster can replace a manual slack adjuster or competitive automatic slack adjuster, provided some simple considerations are kept in mind:

1. Excessive duty cycles, high application pressures, improper slack and chamber pushrod alignment, and brake application compounding can result in reduced slack adjuster durability.
2. Determine that the AL factor of the vehicle to be retrofitted is 180 or less. To determine the AL factor, multiply the slack adjuster arm length (from center of the cam spline to the center of the clevis pin hole in use) times (x) the brake chamber size.

Example: For a Type 30 brake chamber connected to a 6 inch arm slack adjuster:

$$A = 30 \text{ square inches}$$

$$L = 6 \text{ inches}$$

$$\text{Therefore, } 30 \times 6 = 180 = \text{AL Factor}$$

3. Make sure the foundation brake components are in good condition. Excessive drum out-of-roundness will result in excessive lining wear. For Bendix double anchor pin S-Cam brakes, refer to the Brake Maintenance Inspection section of Service Data sheet SD-22-3260.
4. In order to select the proper slack adjuster, choose a Versajust GS automatic slack adjuster with the same offset, arm length, and spline size as the slack adjuster it is replacing.
5. When retrofitting the Versajust GS slack adjuster, make certain to follow the instructions along with any other literature packaged with service replacement Versajust GS slack adjusters.

The Bendix® Versajust® GS™ Automatic Slack Adjuster Troubleshooting Chart

SYMPTOMS	CAUSE	REMEDY
<p>1. Brake Actuator stroke is too long.</p> <p>WARNING: Automatic slack adjusters should not be manually adjusted in an effort to correct excessive pushrod stroke, because this condition indicates that a problem exists with the automatic adjuster, with the installation of the adjuster, or with related foundation brake components, which manual adjustment will not fix.</p>	A. Loose actuator pushrod jam nut.	A. Reposition components and torque to specification.
	B. Excessive clearance between components: yoke pin – body.	B. Replace worn parts.
	C. Damaged (worn) splines on slack or camshaft.	C. Replace damaged parts.
	D. Weak or broken brake actuator return springs. Weak or broken brake shoe return spring.	D. Replace weak or broken springs.
	E. Worn or broken foundation brake components, including camshaft bushings, brake chamber bracket, etc.	E. Repair or replace as required per the <i>Inservice Inspection</i> .
	F. Bendix® Versajust® GS™ adjuster mechanism not functioning.	F. Lubricate, test adjuster mechanism, conduct in service inspection, repair components as necessary, replace.
	G. Brake drum—worn, excessively machined, bell-mouthed, excessive thermal expansion.	G. Replace or repair as required.
	H. Damaged Versajust GS slack adjuster.	H. Replace component(s) or slack adjuster.
	I. The Versajust GS slack adjuster improperly installed.	I. Correct installation position.
<p>2. Brakes dragging – apparent over-adjustment of brakes.</p>	A. The Versajust GS slack adjuster improperly installed. Too close to actuator: brakes can't fully release.	A. Correct the Versajust GS slack adjuster installation.
	B. Loose actuator pushrod jam nut.	B. Reposition components and torque to specification.
	C. Spring brakes not fully retracting.	C. Check spring brake release air pressure and repair or replace air valves as necessary. Repair or replace spring brake.
	D. Broken foundation brake components, including camshaft bushings.	D. Repair or replace as required per the <i>Inservice Inspection</i> .
	E. Vehicle brake torque imbalance. (More work done by some brakes than others, thermal expansion of drums).	E. Check other brakes to ensure they are working. Check air pressure balance and threshold pressure (refer to Bendix publication BW1555). Check driver braking habits, e.g. use of trailer control valve. Use same friction material on all axles.
	F. Brake drum out-of-round, excessive thermal expansion.	F. Replace or repair as required.
	G. Air system malfunction, not exhausting completely.	G. Inspect and correct.
	H. New lining swells during break-in.	H. Back-off adjustment until brakes are free.