



## FIX-N-FAX

Equipment Standard

Number 52a

Mandatory Compliance

Revised: May, 2011

### Brake Adjustment Procedures

#### CRITICAL ITEM:

Brake adjustment is one of the most critical items for inspection. It will be impossible for the brake lining to make maximum contact with the brake drum if the minimum push rod travel is not obtained. The efficiency of braking pressure decreases appreciably as maximum stroke is approached. Too much stroke could result in the push rod bottoming out in the brake pot chamber as the drum expands under intensive heat.

#### **Brake Adjustment Check:**

Park the vehicle on level ground, place the transmission in neutral, and chock the wheels to prevent the vehicle from moving. Release the parking brake and mark the push rod in the unapplied position with chalk or a scribe at the point where it exits the brake pot chamber. Apply the brakes and measure the travel of the push rod from the base of the brake pot chamber to the mark made on each pushrod.

Note: **Caution** should be taken to avoid injury from pressurized air when brake valves are actuated or released.

Make note of each measurement and refer to the "*Slack Adjuster Data Chart*" (shown on page 2) for the allowable tolerances. In the "Axle" column there will be an "F" to designate front axle chamber type and an "R" to designate the rear axle chamber type.

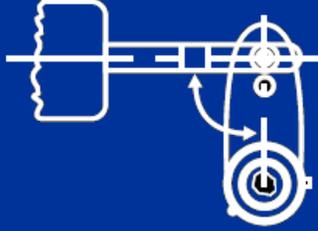
The slack adjuster to push rod angle should not be less than 80 degrees nor more than 105 degrees when the brakes are fully applied.

Brake adjustment shall **NOT** meet nor exceed the maximum stroke indicated on the "*Slack Adjustment Data Chart*". If one wheel meets or exceeds the maximum stroke, the vehicle shall be considered **OUT OF SERVICE** until the brakes have been adjusted.

## Slack Adjustment Data Chart

(Dimensions In Inches)

Brake Adjustment shall not meet or exceed these specifications relating to  
"maximum Stroke at Which Brakes Must Be Readjusted."

Axle	Chamber Type	* Outside Diameter	** Maximum Stroke at which Brakes must be Readjusted	Maximum Stroke With Brakes Adjusted	
	12	5 11/16	1 3/8	Should be as short as possible without brakes dragging.	 <p>An angle of less than 80° or more than 105° when the brakes are fully applied is condition of improper maintenance and a violation of 26453 VC.</p>
	16	6 3/8	1 3/4		
	20	6 25/32	1 3/4		
	20L	6 25/32	2 ***		
	24	7 7/32	1 3/4		
	30	8 3/32	2		
	30L	8 3/32	2 1/2 ***		
	36	9	2 1/4		

\* Dimensions listed do not include bolt clamp projections.

\*\* Dimensions are to be measured with an application pressure of 80 - 90 psi.

\*\*\* Long Stroke Design.

## Slack Adjustment Data Chart

**Note:** The "Slack Adjustment Data Chart" is installed near the driver's door on all vehicles delivered from the Davis Equipment Facility. This chart also includes data for long stroke chambers.

If a vehicle does not have a "Slack Adjuster Data Chart", contact the Unit Fleet Manager.

### Manual Slack Adjusters:

Use either a box end or socket wrench on the worm shaft adjustment nut. Push in on the locking sleeve to its disengaged position. Be sure the locking ring is held in while turning the worm shaft nut when making an adjustment. There is more than one way to adjust "S" cam brakes but the most accurate way is to jack up each wheel and turn the slack adjuster worm shaft nut until the brake locks, then back off until very light drag between the brake shoe and drum occurs. After completing adjustment, make sure the locking ring releases and engages the worm

shaft adjusting nut.

***Push rod travel should be adjusted as short as possible with very light drag between the brake shoe and the brake drum.*** Push rod travel should be checked daily to determine whether adjustment is necessary. (More frequent adjustment may be required for a vehicle descending steep grades on a regular basis).

### Automatic "S" Cam Brake Slack Adjuster:

Automatic slack adjusters are designed to keep the travel of the air brake chamber push rod to a minimum and to maintain clearance between the brake shoe and brake drum. It should maintain push rod travel well within the maximum stroke tolerances for which the brakes must be readjusted, (reference "Slack Adjustment Data Chart").

When an automatic slack adjuster is found to be "out of adjustment", utilize the following procedure:

1. Park the vehicle on level ground, place transmission in neutral, and chock the wheels
2. Assure that the air system is fully charged (100-120 psi).
3. Release the parking brake
4. Apply foot brake firmly (full application) 6-10 times.
5. Recharge the air system to 100-120 psi.
6. Recheck brake adjustment.

If one wheel measurement remains in excess of the maximum stroke, after this procedure is completed, the vehicle shall be considered **OUT OF SERVICE**. Contact the Unit Fleet Manager immediately.

### **Long Stroke Brake Chambers:**

**A long stroke brake chamber can be identified by the raised square air inlets, embossed etching on the side of the chamber, and/or a trapezoidal shaped I.D. tag indicating "long stroke" along with the maximum stroke allowed.**

Most new vehicles now come equipped with long-stroke brake chambers. This allows for more stroke than older models. You will find either a clamp type 20 or a clamp type 16 long stroke chamber on the steering axle and a clamp type 24 or clamp type 30 long stroke chamber on all other axles.

The key advantage with the extra stroke length in long-stroke brake chambers is to allow for longer intervals between necessary brake adjustment (reducing citations). More importantly, the longer brake stroke is more efficient allowing for 17% more stopping ability on a "Hot Stop!!"

**Never install long stroke and standard stroke brake chamber on the same vehicle. This can cause poor brake balance and timing.**

**When servicing long stroke brake actuators it is imperative that strict attention is paid to the components. Long stroke chambers have push rod stroke capabilities in excess of the standard 2.25" to 2.5" design. Long stroke components are unique, and include the following: (They are identified as "Long Stroke"- "LS"-or "3"stroke")**

***All 2003 Navistar & Newer Model 7400 Fire Engines and ECTs and All 2003 Freightliner Model FL70 Have Long Stroke Brake Chambers With Square Ports.***



Short Stroke w/  
Round Ports



Long Stroke w/  
Square Ports

According to MGM, single chamber-long stroke service chambers also have square ports indicated in picture taken from their catalog.



### **Wedge Type Brakes:**

Some of the department's vehicles may be equipped with wedge type brakes with a modified automatic adjuster. To check the adjustment of these brakes the use of a feeler gauge is required. If the drum to shoe clearance is more than .060 inch the vehicle should be considered **OUT OF SERVICE**. Contact the Unit Fleet Manager immediately. Manual adjustment is necessary and the adjuster may need to be inspected for proper operation. This adjustment and/or repair should only be done by a trained technician.

**CAUTION !! BRAKE SYSTEMS WHICH INCLUDE AUTOMATIC ADJUSTMENT FEATURES STILL REQUIRE DAILY INSPECTION.**

### **IMPORTANT FACTS ABOUT AIR BRAKES AND ADJUSTMENT:**

- Regardless of whether preventive maintenance is assigned to a maintenance crew or to the driver, one person alone is responsible to ensure the braking system is in safe operating condition before the vehicle moves; that person is **THE DRIVER**.
- California law states **DAILY BRAKE INSPECTIONS** are required to be performed **BY THE VEHICLE DRIVER**, including brakes with automatic adjustment features.
- The greater the slack adjuster travel (stroke), the longer the brake lag time.
- The further the diaphragm and push rod must travel to apply the brakes, the greater will be the volume of air used for complete application.

- If the main reservoir gauge drops more than 8-12 psi during application, brake adjustment may be needed.
- If the diaphragms have bottomed in the chambers, regardless of the amount of air pressure applied to the chambers, **THE BRAKES WILL NOT HOLD! THIS WILL ALSO EFFECT THE HOLDING CAPABILITIES OF THE PARKING BRAKE.**
- Slack adjuster travel should be checked with air pressure readings between 90 and 100 psi.
- The more often the driver checks “the Slack Adjusters”, the less the possibility of brake failure. Very few vehicles lose their brakes because of loss of air, **IT IS USUALLY LOSS OF ADJUSTMENT.**
- When automatic slack adjusters are found to be out of adjustment after hard application is used to bring them into compliance, it will be necessary to contact a trained technician.
- Vehicles delivered after 1994 will be equipped with automatic adjusters.
- Most new vehicles are now being equipped with long-stroke brake chambers.
- A long stroke brake chamber can be identified by the raised square air inlets, embossed etching on the side of the chamber and/or a trapezoidal shaped I.D. tag indicating long stroke along with maximum stroke allowed.
- The “Slack Adjustment Data Chart” is installed on all vehicles delivered from the Davis Equipment Facility with “S” Cam brake chambers. This chart includes both standard and long stroke brake chambers. You will find this chart on or near the driver’s door.
- Brake adjustment shall **NOT** meet nor exceed the maximum stroke indicated on the “*Slack Adjustment Data Chart*”. If even one wheel meets or exceeds the maximum stroke, the vehicle shall be considered OUT OF SERVICE until the brakes have been adjusted.
- If a vehicle does not have a “*Slack Adjustment Data Chart*”, contact the Unit Fleet Manager.

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