

WHEEL BEARINGS

OIL LUBRICATED WHEEL ENDS*:

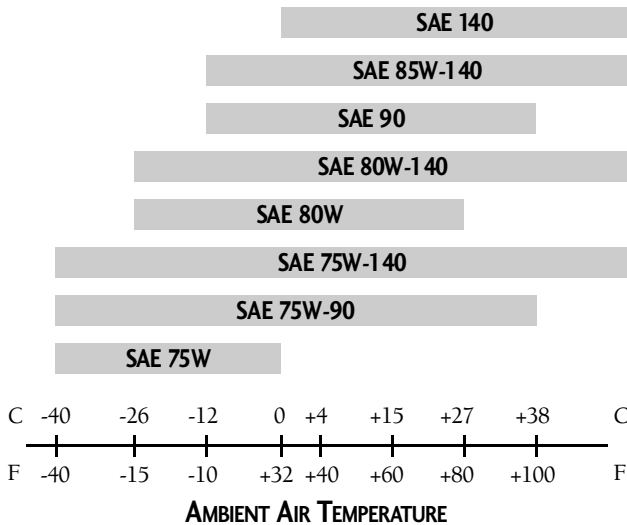
*Note: For unitized wheel ends, please refer to the Spicer RM™ Service Manual

Oil should be changed at least every 100,000 miles or once a year, and whenever the seals or brakes are replaced. Oil level should be inspected every 1,000 miles. Always allow a few minutes, after adding oil or after vehicle operation, for the oil to settle when establishing the required oil level.

SUGGESTED OIL PROPERTIES

Petroleum based or synthetic oils that meet or exceed military specification MIL-L-2105D and API (American Petroleum Institute) service classification GL-1 through GL-5 are the minimum requirements for use in Spicer Trailer Axles.

The table below indicates which SAE viscosities are recommended for various temperature ranges the vehicle will encounter.



WARNING Do not mix motor oil with EP gear oil, due to possible compatibility problems.

GREASE LUBRICATED WHEEL ENDS:

Grease should be replaced if contaminated or if the hub is removed from the spindle. For normal service, grease should be replaced annually or at 100,000 mile intervals. For severe or off-highway service, grease should be replaced semi-annually or at 30,000 mile intervals. Bearings should be packed by machine or by hand methods to ensure grease is forced into the cavities between the rollers, cone and cage of the bearings. The wheel and hub cap should be filled with grease when reassembling.

SUGGESTED GREASE PROPERTIES

The table below indicates the NLGI[†] Grade of grease recommended under normal loading and operating speeds of 100-1000 rpm. For heavy loads and low speeds, the advice of a lubrication engineer should be obtained.

GREASE GUIDE

| SOAP BASED GREASE TYPE | NLGI GREASE GRADE | NOTE |
|----------------------------------|-------------------|---------------------|
| Calcium Complex | #1 | Use in extreme cold |
| Lithium Complex | #2 | Normally Preferred |
| SEMI FLUID SYNTHETIC GREASE TYPE | NLGI GREASE GRADE | NOTE |
| Mobilith 007 or equivalent | #00 | Normally Preferred |

[†] National Lubricating Grease Institute

WARNING Do not mix lithium, calcium, sodium or barium complex greases due to possible compatibility problems. When changing from one type of grease to another, it is necessary to ensure that all the old grease has been removed.

WARNING Failure to correctly lubricate bearings - and to maintain proper lubrication - could cause bearing and axle spindle damage, which could result in the wheel locking up or coming off during vehicle operation.

WHEEL BEARING ADJUSTMENT PROCEDURE

DOUBLE NUT ARRANGEMENT

1. Prior to installing any wheel-end fasteners, make sure the spindle area is free of dirt and debris. As well, make sure all nuts and washers are free of dirt. Clean mating surfaces are important for proper wheel end assembly.
2. After properly installing the bearing cones and wheel end seal onto the spindle, and sliding the wheel end onto the spindle, tighten the inner spindle nut with a torque wrench to 150-200 ft. lbs. to set the bearings and wheel end. **Caution: Do not use an air impact wrench to tighten this nut!**
3. Loosen this inner nut to allow the brake drum to rotate freely. Backing off one (1) full turn is recommended.
4. Retighten the inner spindle nut to 50 ft. lbs. by hand using a torque wrench to position the bearings for final adjustment. **Caution: Do not use an air impact wrench to tighten this nut!**
5. Back the inner spindle nut off 1/4 turn.
6. Install the retaining fastener or fasteners onto the spindle according to the fastener used. If washers are used, be sure they are facing in the right direction and are clean. Make sure any washers with dowels fit properly into the mating holes.
7. Install the outer spindle nut. Using a torque wrench, tighten this nut to 300-400 ft.-lbs. Resulting end play should be .001" to .005".

Note: If end play is not .001" to .005", disassemble and repeat this procedure.



WARNING FAILURE TO TORQUE THE OUTER LOCK NUT PROPERLY COULD CAUSE THE WHEEL TO COME OFF DURING VEHICLE OPERATION, WHICH COULD RESULT INPROPERTY DAMAGE, SERIOUS INJURY OR DEATH.



WARNING IF AN EXTERNAL TANG OR SETSCREW TYPE LOCK WASHER IS USED, IT IS IMPORTANT TO REMEMBER TO BEND THE TABS OVER THE OUTER LOCK NUT, OR TO INSTALL THE SET SCREWS IN THE LOCK WASHER, AFTER THE OUTER NUT HAS BEEN TORQUED. FAILURE TO FOLLOW THIS PROCEDURE COULD RESULT IN PROPERTY DAMAGE, SERIOUS INJURY OR DEATH.

Periodic inspection and regular replacement of lubricant is important to obtaining maximum bearing life. Always inspect bearing for damage prior to installation. When installing wheel bearings it is important to ensure both the inside of the wheel hub and bearings are clean. Spicer recommends that seals be replaced when wheels are removed. Extreme care should be taken when reinstalling wheels to prevent damage to the seals.


SPECIFICATIONS

| AXLE MODEL | LOCATION | SPICER BEARING CUP NUMBER | SPICER BEARING CONE NUMBER | INDUSTRY STD. CUP NUMBER | INDUSTRY STD. CUP NUMBER | WIDTH | OUTSIDE DIAMETER | INSIDE BORE |
|------------|-------------|---------------------------|----------------------------|--------------------------|--------------------------|--------|------------------|-------------|
| D22 | Inner | M10HA102 | M10HB100 | HM218210 | HM218248 | 1.575" | 5.787" | 3.542" |
| D22 | Outer | M10HA103 | M10HB101 | HM212011 | HM212049 | 1.500" | 4.813" | 2.625" |
| P22 | Inner/Outer | M10HA116 | M10HB119 | HM518410 | HM518445 | 1.563" | 6.000" | 3.501" |

RECOMMENDED BRAKE ADJUSTMENT PROCEDURE

 **CAUTION** FAILURE TO PROPERLY ADJUST BRAKES COULD CAUSE REDUCED BRAKING PERFORMANCE.

A. Grease cam bracket and spider fittings prior to brake shoe installation.

 **WARNING** CARE MUST BE EXERCISED TO PREVENT GREASE FROM COMING IN CONTACT WITH BRAKE LININGS WHICH COULD CAUSE A REDUCTION IN BRAKING PERFORMANCE. REDUCED BRAKING PERFORMANCE COULD CAUSE AN ACCIDENT RESULTING IN SERIOUS INJURY OR DEATH.


B. Adjust the slack adjuster until the brake lining comes into contact with the brake drum.

1. For green brakes* there should be a slight amount of wheel drag at initial adjustment to compensate for any lining irregularities (high spots, etc.).

**A "green brake" is an unground, unburnished brake. There is a break-in period where the lining will seat into a normal contact pattern with the drum.*

2. For burnished or broken-in brakes, back off the slack adjuster to achieve .010" clearance between drum and shoe.

C. Apply brakes using normal truck operating pressure. (Average line pressure should be 90 psi.)


 **WARNING** USE OF AIR PRESSURE IN EXCESS OF 130 PSI COULD RESULT IN FAILURE OF THE AIR CHAMBER OR SPRING BRAKE CHAMBER, WHICH COULD RESULT IN SERIOUS INJURY OR DEATH.

1. Check the amount of push rod travel. Maximum should not exceed 2.5" for Type 30 Long Stroke chambers, 2" for Type 30 chambers and 1 3/4" for Type 24 chambers.

a. Optimum pushrod travel on a green brake* should be under 2".

b. Optimum pushrod travel on a burnished or broken-in brake should be under 1 3/4".

2. Check the angle between the slack adjuster and push rod. With the brakes applied, the angle should be 90 degrees +/- 5 degrees.

 **CAUTION** WHEN AUTOMATIC BRAKE ADJUSTERS ARE USED, IT IS NECESSARY TO FOLLOW THE INSTALLATION AND ADJUSTMENT PROCEDURE RECOMMENDED BY THE AUTOMATIC BRAKE ADJUSTER MANUFACTURER. FAILURE TO FOLLOW THE RECOMMENDED PROCEDURE COULD RESULT IN IMPROPER OPERATION OF THE AUTOMATIC SLACK ADJUSTER, RESULTING IN REDUCED BRAKE PERFORMANCE OR PREMATURE LINING WEAR.


3. For burnished brakes, apply pressure to brakes and check for lining to drum contact. Using a .010" feeler gauge, the lining to drum contact should range from 60 to 100% during brake application.

4. Check to ensure the lining is inside the drum during application. More than .060" protruding out of the drum is not recommended.

D. Rapidly release air pressure from the brakes and confirm that all brakes quickly release to the normal relaxed position.

WARNING

- BRAKELININGS CONTAIN NON-ASBESTOS FIBERS
- BREATHING BRAKE DUST MAY BE HAZARDOUS TO YOUR HEALTH AND MAY CAUSE SERIOUS RESPIRATORY OR OTHER BODILY HARM.
- AVOID CREATING DUST.
- DON'T REMOVE BRAKE DRUM WITHOUT PROPER PROTECTIVE EQUIPMENT.
- DO NOT WORK ON LININGS WITHOUT PROPER PROTECTIVE EQUIPMENT.
- DO NOT REPLACE LININGS WITHOUT PROPER PROTECTIVE EQUIPMENT.
- DON'T ATTEMPT TO SAND, GRIND, CHISEL, FILE, HAMMER OR ALTER BRAKE LININGS IN ANY MANNER WITHOUT PROPER PROTECTIVE EQUIPMENT.
- FOLLOW O.S.H.A. STANDARDS FOR PROPER PROTECTIVE DEVICES TO BE USED WHEN WORKING WITH BRAKE MATERIALS.

 **WARNING** IT IS CRITICAL THAT ANY BRAKE DRUM REACHING MAXIMUM WEAR DIAMETER, AS CAST ON DRUM, BY TURNING, GRINDING, AND/OR WEARING BE CONSIDERED UNSAFE AND IMMEDIATELY REPLACED. IN ORDER TO AVOID SERIOUS INJURY OR DEATH, ANY BRAKE DRUM EXCEEDING THIS DIMENSION IS CONSIDERED A SAFETY HAZARD. IF IN DOUBT, CONTACT THE BRAKE DRUM MANUFACTURER.

BRAKE DISASSEMBLY/ASSEMBLY

BRAKE DISASSEMBLY:

1. Release brakes and back off slack adjuster.
2. Remove slack adjuster lock ring and slack adjuster.
3. Remove brake drum.
4. Remove anchor pins and brake shoes.

⚠ CAUTION EXCESSIVE POUNDING ON ANCHOR PINS OR CAM ROLLER PINS TO REMOVE OR INSTALL THEM CAN DAMAGE THE PINS AND CAUSE MISALIGNMENT OF THE BRAKE SPIDERS AND BRAKE SHOES. THE USE OF A SOFT HAMMER OR BRASS DRIFT IS RECOMMENDED TO REMOVE OR INSTALL THE ANCHOR PINS IF NECESSARY.

5. Remove brake return springs.
6. Remove camshaft lock ring, spacer washer, and cam shaft.
7. Remove cam roller and shaft (in the case of the cast shoe, remove roller shaft set screw and roller assembly) and anchor pin bushing from shoes.
8. Remove anchor pin bushings, camshaft bushing and seals from spider.

BRAKE ASSEMBLY

1. Install new anchor pin bushings, camshaft bushing and camshaft seals into the spider.

⚠ WARNING WHEN INSTALLING CAMSHAFT SEALS, THE SEAL ON THE SLACK ADJUSTER SIDE SHOULD BE INSTALLED WITH SEAL FACING INTO SPIDER. THIS ALLOWS GREASE TO PURGE OUTSIDE THE BRAKE ASSEMBLY WHEN GREASING THE CAMSHAFT BUSHING. FAILURE TO FOLLOW THIS PROCEDURE COULD CAUSE GREASE TO COME INTO CONTACT WITH BRAKE LININGS, CAUSING BRAKE FAILURE.

2. Install cam roller assemblies onto the brake shoes.
3. Install the camshaft into the spider. Install spacer washer and lock ring on cam before sliding the cam through the camshaft support bracket. Install the slack adjuster and the lock ring.

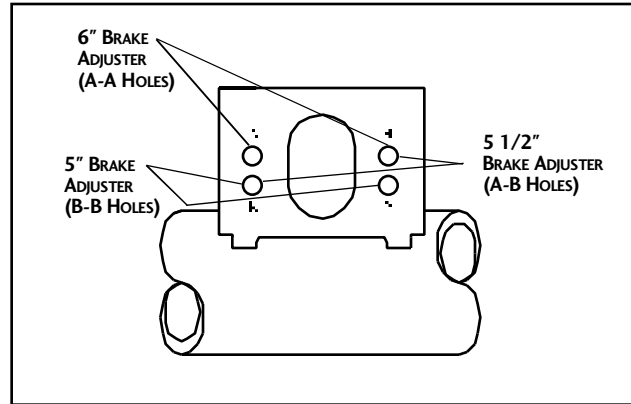


FIG. 4

⚠ WARNING WHEN REASSEMBLING BRAKES, SPICER TRAILER PRODUCTS RECOMMENDS THAT THE BRAKE RETURN SPRINGS BE REPLACED WITH NEW SPRINGS TO ASSURE PROPER OPERATION OF THE BRAKE.

4. Install the brake return springs on the brake shoes.
5. Position brake shoes on the spider and insert the anchor pins.
6. If air brake chambers are replaced, the correct mounting holes must be used to correspond to brake adjuster length (See Fig.4).
7. Connect slack adjuster to brake chamber push rod.
8. Adjust brakes as outlined in brake adjustment procedures.

⚠ NOTE TO ENSURE BRAKES MEET F.M.V.S.S. 121 PERFORMANCE REQUIREMENTS, SPICER TRAILER PRODUCTS RECOMMENDS THAT ONLY ORIGINAL EQUIPMENT BRAKE COMPONENTS BE USED.

Any questions or comments on the above procedure should be directed to the Spicer Trailer Engineering Department.

WELDING ABS WHEEL SPEED SENSOR BLOCKS

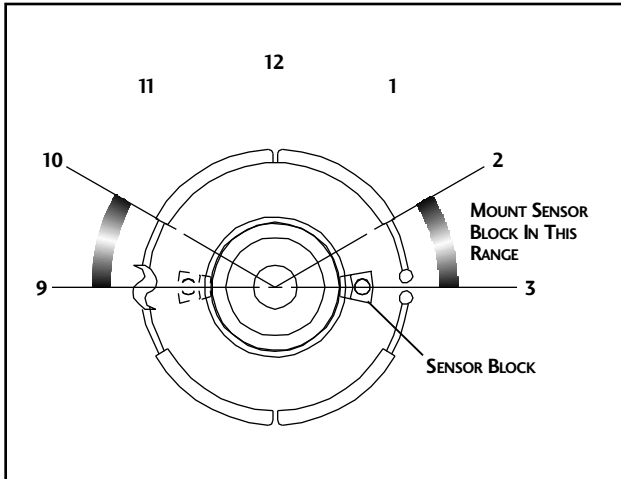


FIG. 5

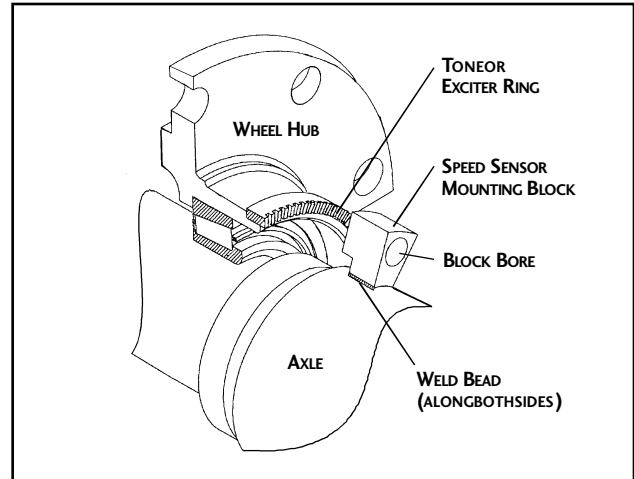


FIG. 6

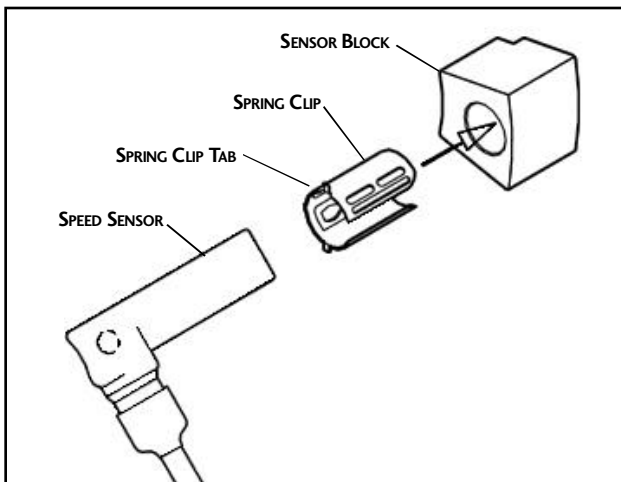


FIG. 7

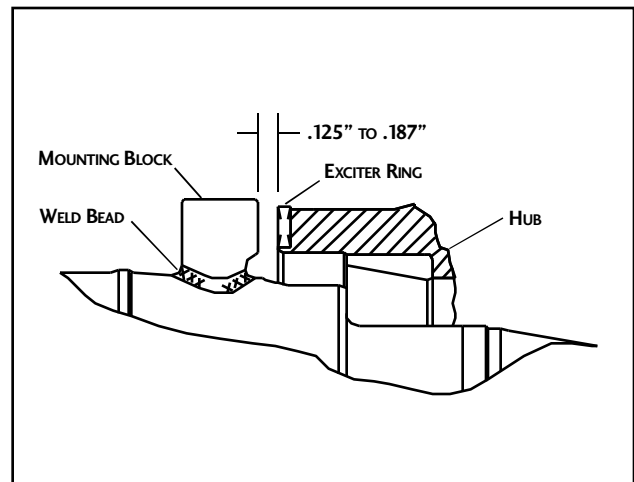


FIG. 8

Correct installation of the speed sensor blocks is extremely important for proper operation of the AntiLock system. Use electric welding equipment only to install the blocks.

1. Properly support the trailer axle using jack stands. Be sure to provide proper clearance to be able to weld the sensor block on the axle near the tone (exciter) ring.
2. With the hub in place, locate the sensor mounting block at the 9 or 3 o'clock position on the axle spindle to lessen the effect from axle flexure due to loading. See Figure 5. Manually hold the sensor block in place and scribe its location on the axle spindle. See Fig. 6 & 8.

Important: the distance of the sensor block from the face of the tone ring "teeth" must be between .125" to .187". See Fig. 8.

3. Remove the hub and bearing assembly and brake assembly from the axle spindle. Clean all oil or grease from the axle spindle.
4. Install the sensor block on the fixture tool and attach the fixture tool to the axle spindle.
5. Adjust the position of the fixture tool as necessary to align the sensor block to the scribed position in Step 2 and tighten in place.
6. Weld the sensor block to the spindle axle. Weld along both sides of the block. See Fig. 6.
7. Remove the fixture tool and let the sensor block cool. After cool down, install the sensor spring clip and sensor as illustrated in Fig. 7.

TORQUE SPECIFICATIONS

FASTENER SPECIFICATIONS

| PART NAME | SIZE & THREAD | TORQUE |
|----------------------------|--|--|
| Spindle Outer Nut | 2 5/8 - 16 UN | 250-400 ft.-lbs. |
| Cam Brackets | 5/16 - 18 Self-tapping | 175-225 in.-lbs. |
| Air Chamber Mounting Bolts | 5/8 - 11 UNC | 100-115 ft.-lbs. |
| Dust Shield Mounting | Self-tapping | 180-200 in.-lbs. |
| Brake Lining To Table | Brass Screw 3/8 - 24 UNF | 100-150 in.-lbs. |
| Hub Cap to Hub | 1/14 - 20 UNC 5/16 - 18 UNC | 96-144 in.-lbs. 144-216 in.-lbs. |
| Wheel Stud Backnut | 3/4 - 16 UNF 7/8 - 14 UNF 1 - 14 UNF | 175-200 ft.-lbs. 180-250 ft.-lbs. 200-300 ft.-lbs. |
| Haldex ABA Control Arm Nut | 7/16 - 14 UN | 40-50 ft.-lbs. |

SUGGESTED PREVENTATIVE MAINTENANCE

EVERY 1,000 MILES:

- Check oil level in wheel hub and inspect wheel for leaks.

15,000 MILES OR MINIMUM OF TWICE A YEAR:

- Check brake adjustment.
- Repack wheel bearings (grease application).

25,000 TO 30,000 MILES

- Check lining wear and estimate replacement time. Replace with new shoes or reline when thickness of lining is 1/4" at thinnest point, or 1/16" above rivet or bolt head. Replace any cracked, broken or oil-soaked linings immediately.
- Inspect camshaft, camshaft spider bushing, and camshaft support bracket bushing for any signs of wear.
- Lubricate camshaft bushings.
- Inspect brake drums for heat checks, grooves, hot spots, glazing, cracks, and out of round.

100,000 MILES, ONCE A YEAR, OR AT BRAKE RELINE:

- Replace wheel bearing lubricating oil (if applicable).
- Check brake air chambers and slack adjusters.
- Inspect brake rollers, roller shafts, anchor pins and bushings and replace if necessary.
- Lubricate brake adjusters.
- Check shoes for bent shoe ribs, cracks in shoe table welds or ribs, and elongated rivet holes. Replace shoes if any of these conditions exist.