



**MERITOR®**

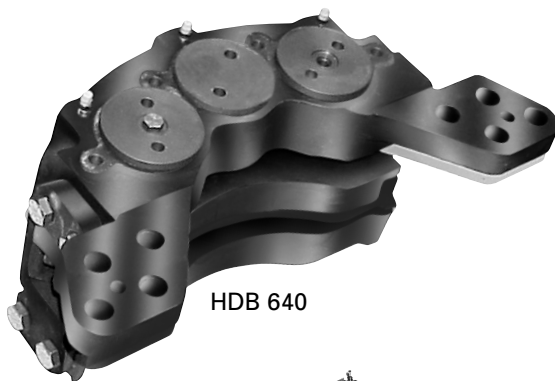
an **ArvinMeritor** brand

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\$2.50

# Dry Disc Brake Calipers

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## Maintenance Manual 4Y



HDB 640



SCL 46



SCL 35






SCL 53

## Before You Begin

This manual provides installation and maintenance procedures for Meritor's HDB 640, SCL 35, 46 and 53 Series dry disc brake calipers. Before you begin procedures:

1. Read and understand all instructions and procedures before you begin to service components.
2. Read and observe all Caution and Warning safety alerts that precede instructions or procedures you will perform. These alerts help to avoid damage to components, serious personal injury, or both.
3. Follow your company's maintenance and service, installation, and diagnostics guidelines.
4. Use special tools when required to help avoid serious personal injury and damage to components.

## Safety Alerts, Torque Symbol and Notes

 <b>WARNING</b>	A Warning alerts you to an instruction or procedure that you must follow exactly to avoid serious personal injury and damage to components.
 <b>CAUTION</b>	A Caution alerts you to an instruction or procedure that you must follow exactly to avoid damage to components and possible serious personal injury can also occur.
	The torque symbol alerts you to tighten fasteners to a specified torque value.
<b>NOTE:</b>	A Note provides information or suggestions that help you correctly service a component.

## Access Information on ArvinMeritor's Web Site


Additional maintenance and service information for ArvinMeritor's commercial vehicle systems component lineup is also available on ArvinMeritor's web site at [www.arvinmeritor.com](http://www.arvinmeritor.com).

To access information, click on Products & Services/Tech Library Icon/HVS Publications. The screen will display an index of publications by type.

## Additional Information

For complete maintenance and service procedures for all disc brake calipers, call ArvinMeritor's Customer Service Center at 800-535-5560 to order the following publications.

- *Hydraulic Dry Disc Brake Parts* (Parts Book PB-9201)
- *Off-Highway Dry Disc Brakes* (Publication SP-8611)
- *Technical Electronic Library* on CD. Features product and service information on most ArvinMeritor, ZF Meritor and Meritor WABCO components. \$20. Order TP-9853.

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# Asbestos and Non-Asbestos Fibers



## ASBESTOS FIBER WARNING

*The following procedures for servicing brakes are recommended to reduce exposure to asbestos fiber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from Meritor.*

### Hazard Summary

Because some brake linings contain asbestos, workers who service brakes must understand the potential hazards of asbestos and precautions for reducing risks. Exposure to airborne asbestos dust can cause serious and possibly fatal diseases, including asbestosis (a chronic lung disease) and cancer, principally lung cancer and mesothelioma (a cancer of the lining of the chest or abdominal cavities). Some studies show that the risk of lung cancer among persons who smoke and who are exposed to asbestos is much greater than the risk for non-smokers. Symptoms of these diseases may not become apparent for 15, 20 or more years after the first exposure to asbestos.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to asbestos dust follow. Consult your employer for more details.

### Recommended Work Practices

1. **Separate Work Areas.** Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons. OSHA has set a maximum allowable level of exposure for asbestos of 0.1 f/cc as an 8-hour time-weighted average and 1.0 f/cc averaged over a 30-minute period. Scientists disagree, however, to what extent adherence to the maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling asbestos dust. OSHA requires that the following sign be posted at the entrance to areas where exposures exceed either of the maximum allowable levels:

**DANGER: ASBESTOS  
CANCER AND LUNG DISEASE HAZARD  
AUTHORIZED PERSONNEL ONLY  
RESPIRATORS AND PROTECTIVE CLOTHING  
ARE REQUIRED IN THIS AREA**

2. **Respiratory Protection.** Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA for use with asbestos at all times when servicing brakes, beginning with the removal of the wheels.
3. **Procedures for Servicing Brakes.**
  - a. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
  - b. As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
  - c. If an enclosed vacuum system or brake washing equipment is not available, employers may adopt their own written procedures for servicing brakes, provided that the exposure levels associated with the employer's procedures do not exceed the levels associated with the enclosed vacuum system or brake washing equipment. Consult OSHA regulations for more details.
  - d. Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
  - e. **NEVER** use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. **NEVER** use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.
4. **Cleaning Work Areas.** Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. **NEVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.
5. **Worker Clean-Up.** After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.
6. **Waste Disposal.** Dispose of discarded linings, used rags, cloths and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

### Regulatory Guidance

References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.



## NON-ASBESTOS FIBERS WARNING

*The following procedures for servicing brakes are recommended to reduce exposure to non-asbestos fiber dust, a potential cancer and lung disease hazard. Material Safety Data Sheets are available from Meritor.*

### Hazard Summary

Most recently manufactured brake linings do not contain asbestos fibers. These brake linings may contain one or more of a variety of ingredients, including glass fibers, mineral wool, aramid fibers, ceramic fibers and silica that can present health risks if inhaled. Scientists disagree on the extent of the risks from exposure to these substances. Nonetheless, exposure to silica dust can cause silicosis, a non-cancerous lung disease. Silicosis gradually reduces lung capacity and efficiency and can result in serious breathing difficulty. Some scientists believe other types of non-asbestos fibers, when inhaled, can cause similar diseases of the lung. In addition, silica dust and ceramic fiber dust are known to the State of California to cause lung cancer. U.S. and international agencies have also determined that dust from mineral wool, ceramic fibers and silica are potential causes of cancer.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to non-asbestos dust follow. Consult your employer for more details.

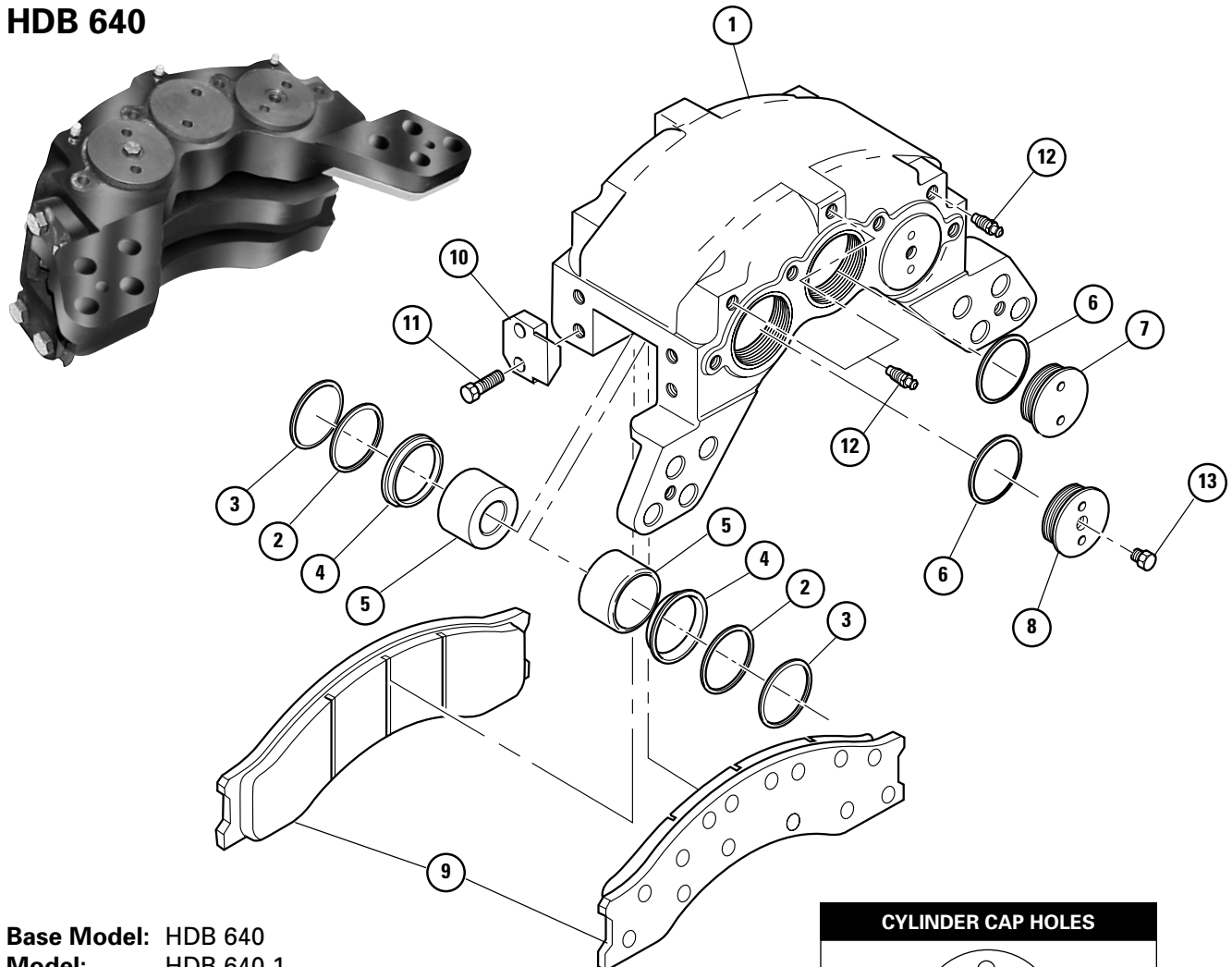
### Recommended Work Practices

1. **Separate Work Areas.** Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons.
  2. **Respiratory Protection.** OSHA has set a maximum allowable level of exposure for silica of 0.1 mg/m<sup>3</sup> as an 8-hour time-weighted average. Some manufacturers of non-asbestos brake linings recommend that exposures to other ingredients found in non-asbestos brake linings be kept below 1.0 f/cc as an 8-hour time-weighted average. Scientists disagree, however, to what extent adherence to these maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling non-asbestos dust.
- Therefore, wear respiratory protection at all times during brake servicing, beginning with the removal of the wheels. Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA, if the exposures levels may exceed OSHA or manufacturer's recommended maximum levels. Even when exposures are expected to be within the maximum allowable levels, wearing such a respirator at all times during brake servicing will help minimize exposure.
3. **Procedures for Servicing Brakes.**
    - a. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
    - b. As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
    - c. If an enclosed vacuum system or brake washing equipment is not available, carefully clean the brake parts in the open air. Wet the parts with a solution applied with a pump-spray bottle that creates a fine mist. Use a solution containing water, and, if available, a biodegradable, non-phosphate, water-based detergent. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
    - d. Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
    - e. **NEVER** use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. **NEVER** use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.
  4. **Cleaning Work Areas.** Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. **NEVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA, to minimize exposure. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.
  5. **Worker Clean-Up.** After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.
  6. **Waste Disposal.** Dispose of discarded linings, used rags, cloths and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

### Regulatory Guidance

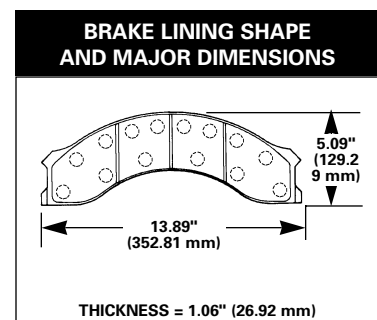
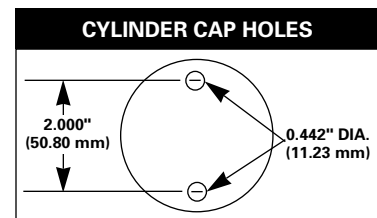
References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.

## HDB 640



**Base Model:** HDB 640  
**Model:** HDB 640 1

Item	Description	Quantity	Sequence Number*
1	Housing	1	00100
2	Back-up Ring	6	00110
3	O-Ring	6	00120
4	Dust Seal	6	00130
5	Piston	6	00140
6	O-Ring	3	00150
7	Cylinder Cap	1	00160
8	Cylinder Cap	2	00170
9	Lining Assembly	2	00180
10	End Plate	4	00190
11	End Plate Bolt	8	00200
12	Bleeder Screw	3	00210
13	Plug	1	00230

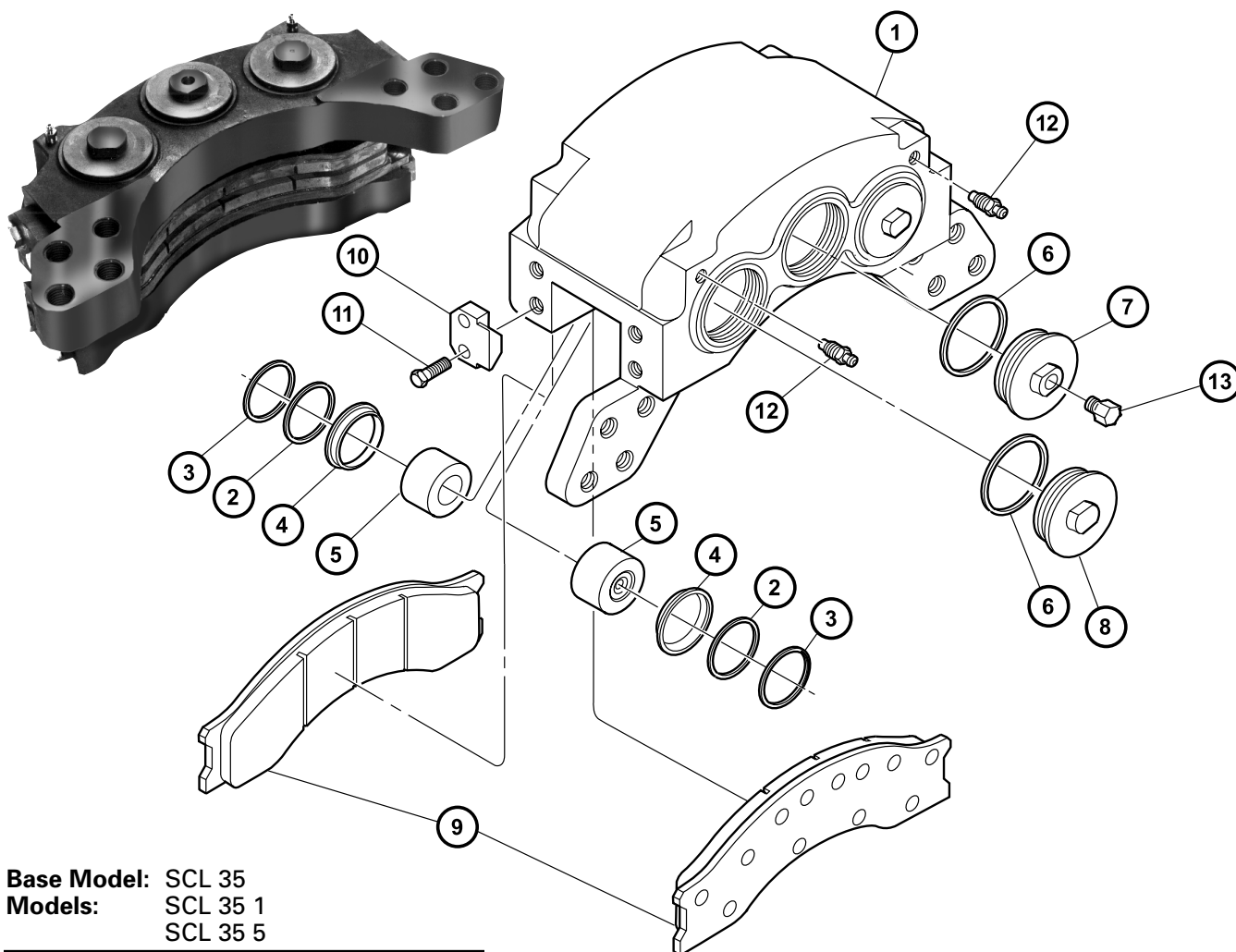


\*Sequence numbers as they appear in the Bill of Material available from the equipment manufacturer.

# Exploded Views

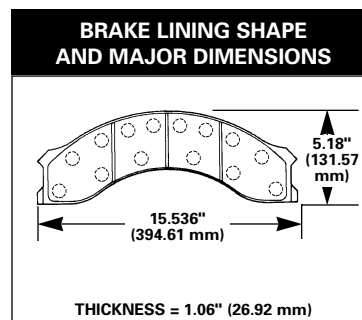


## SCL 35 Series



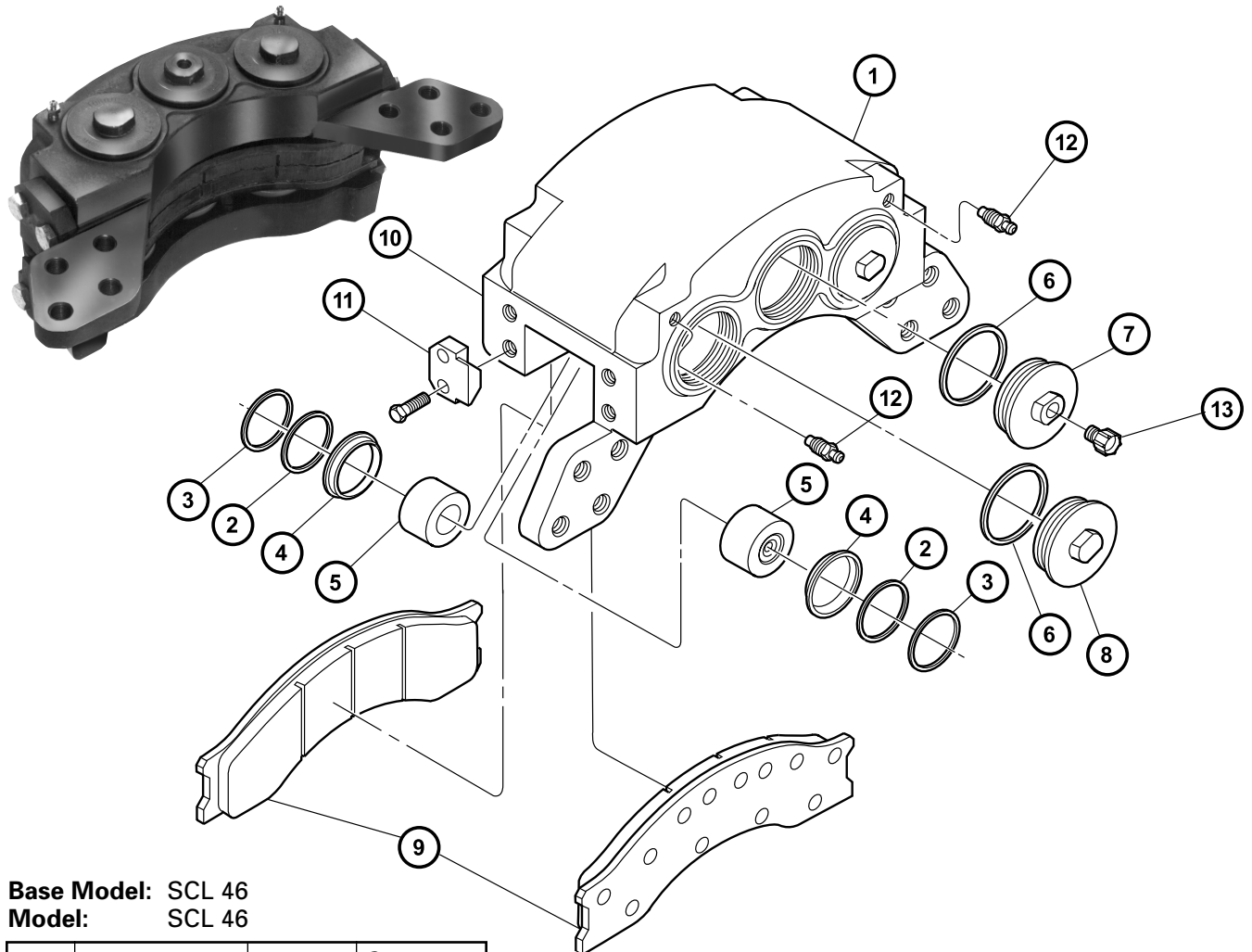
**Base Model:** SCL 35  
**Models:** SCL 35 1  
 SCL 35 5

Item	Description	Quantity	Sequence Number*
1	Housing	1	00100
2	Back-up Ring	6	00110
3	O-Ring	6	00120
4	Dust Seal	6	00130
5	Piston	6	00140
6	O-Ring	3	00150
7	Cylinder Cap	1	00160
8	Cylinder Cap	2	00170
9	Lining Assembly	2	00180
10	End Plate	4	00190
11	End Plate Bolt	8	00200
12	Bleeder Screw	2	00210
13	Plug	1	00220



\*Sequence numbers as they appear in the Bill of Material available from the equipment manufacturer.

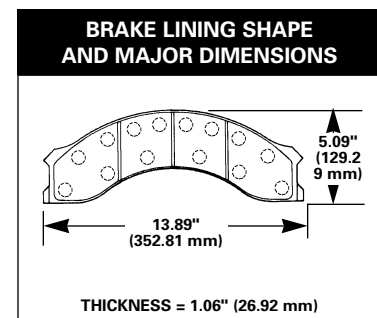
## SCL 46 Series



**Base Model:** SCL 46  
**Model:** SCL 46

Item	Description	Quantity	Sequence Number*
1	Housing	1	00100
2	Back-up Ring	6	00110
3	O-Ring	6	00120
4	Dust Seal	6	00130
5	Piston	6	00140
6	O-Ring	3	00150
7	Cylinder Cap	1	00160
8	Cylinder Cap	2	00170
9	Lining Assembly	2	00180
10	End Plate	4	00190
11	End Plate Bolt	8	00200
12	Bleeder Screw	2	00210
13	Plug	1	00220

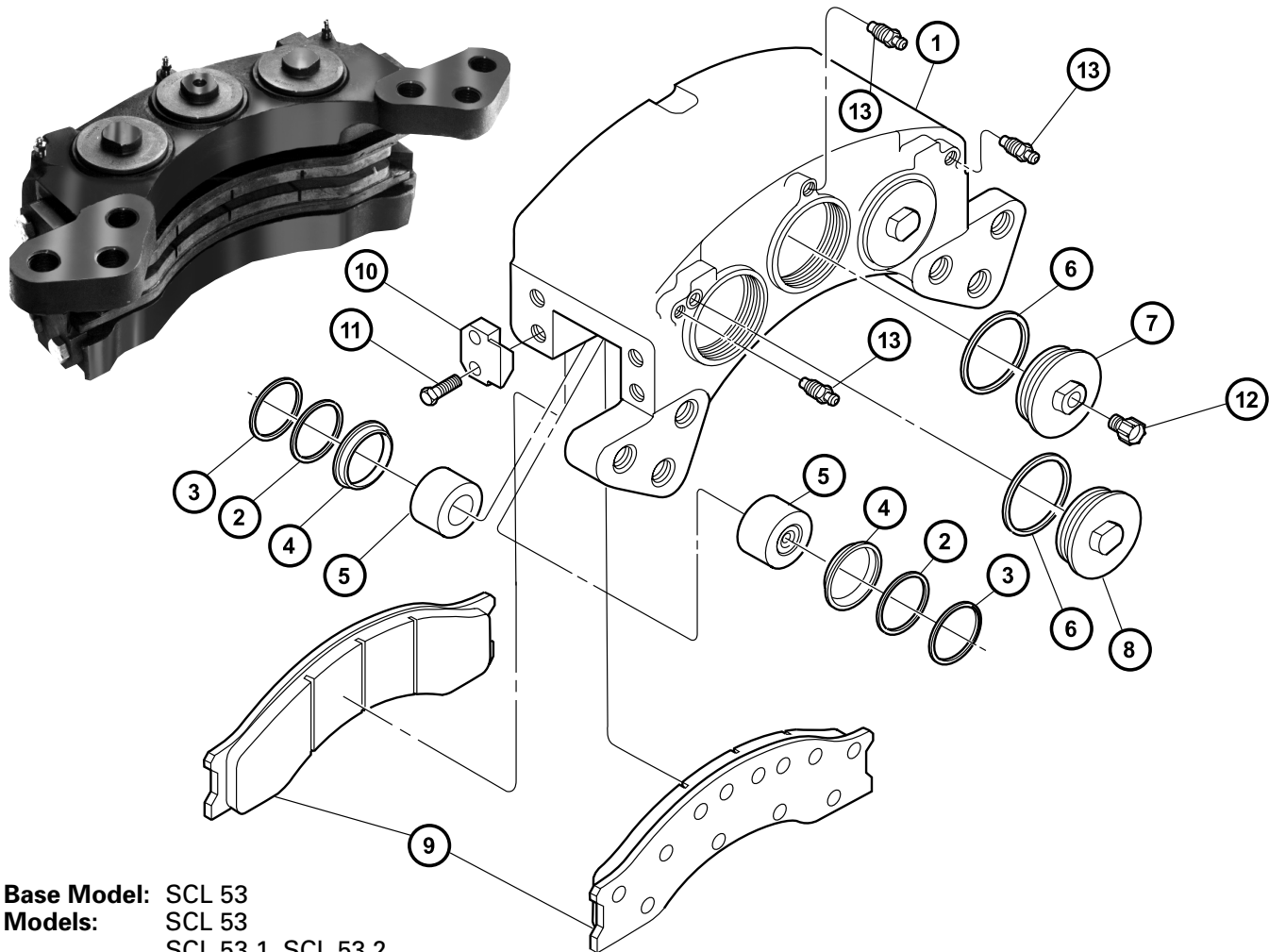
\*Sequence numbers as they appear in the Bill of Material available from the equipment manufacturer.



# Exploded Views



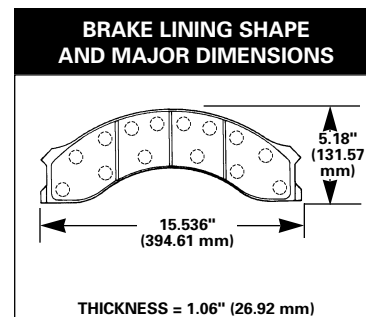
## SCL 53 Series



Base Model: SCL 53  
Models: SCL 53  
SCL 53 1, SCL 53 2

Item	Description	Quantity	Sequence Number*
1	Housing	1	00100
2	Back-up Ring	6	00110
3	O-Ring	6	00120
4	Dust Seal	6	00130
5	Piston	6	00140
6	O-Ring	3	00150
7	Cylinder Cap	1	00160
8	Cylinder Cap	2	00170
9	Lining Assembly	2	00180
10	End Plate	4	00190
11	End Plate Bolt	8	00200
12	Plug	1	00210
13	Bleeder Screw	3	00220

\*Sequence numbers as they appear in the Bill of Material available from the equipment manufacturer.





### Description

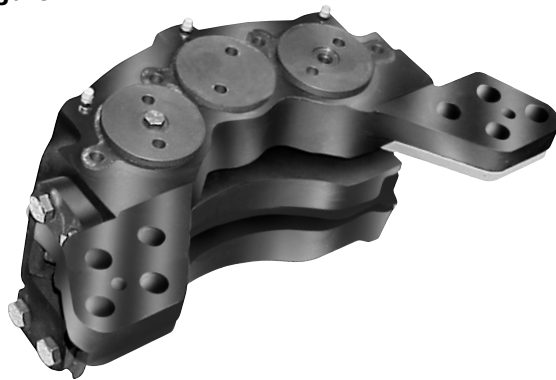
The HDB 640, SCL 35, 46 and 53 Series dry disc brake calipers are intended only for service use on hydraulic brake systems. All calipers mount to a fixed position on fixed position discs. **Figures 1.1, 1.2, 1.3 and 1.4.**

One or two calipers can be used on a disc. Install the SCL 35 and SCL 46 calipers at the 3 or 9 o'clock positions. Install the HDB 640 and SCL 53 calipers at the 3, 9, or 12 o'clock positions.

The calipers are designed to be used on the following size discs:

Model	Disc Size/Inches (millimeters)
HDB 640	18.50" (470 mm) in a 25" rim (635 mm)
SCL 35	22.50" (571 mm) in a 29" rim (737 mm)
SCL 46	18.75" (476 mm) in a 25" rim (635 mm)
SCL 53	26" (660 mm) in a 33" rim (838 mm) 28" (711 mm) in a 35" rim (889 mm)

**Figure 1.1**



**HDB 640**

**Figure 1.2**



**SCL 35**

**Figure 1.3**



**SCL 46**

**Figure 1.4**



**SCL 53**

# Section 1

## Introduction



### Hydraulic Fluid

#### **WARNING**

*Use only the type of hydraulic fluid specified by the equipment manufacturer. Do not use or mix different types of hydraulic fluid. Using incorrect hydraulic fluid will damage the rubber parts of the caliper. Loss of braking control, serious personal injury and damage to components can result.*

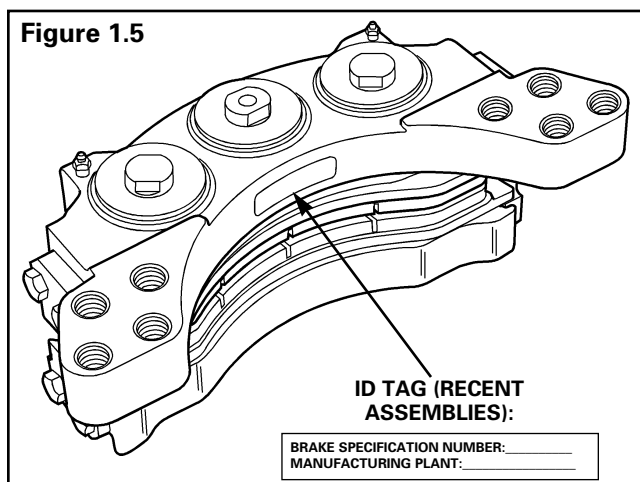
*Do not reuse hydraulic fluid. Used fluid can be contaminated and can cause incorrect operation. Serious personal injury and damage to components can result.*

The HDB 640, SCL 35, 46, and 53 brake systems use one of two types of hydraulic fluid:

Petroleum Base Hydraulic Fluid (Mineral Oil)	Non-Petroleum Base Hydraulic Fluid (Automotive Brake Fluid)
Example: Meets MIL-H-5606 specifications	Example: Glycol DOT 3, meets SAE J-1703 specifications

### Identification

An assembly number located on the side of the caliper that is opposite from the mounting plate identifies older assemblies. An identification tag located on the inside radius of the caliper identifies more recent assemblies. **Figure 1.5.**



### **WARNING**

*To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.*

## Removal

### **WARNING**

*Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury can result.*

1. Park the vehicle on a level surface.
2. Place blocks under the wheels not being serviced to keep the vehicle from moving.
3. If necessary, raise the vehicle so that the wheels to be serviced are off the ground. Support the vehicle with safety stands.
4. Remove the wheel.

## Brake Linings

1. Remove the bolts that fasten the end plates to one side of the caliper housing. Remove the end plates. Replace worn or damaged end plates.
  2. Loosen the bleeder screws in the caliper housings to release hydraulic pressure.
  3. Use a piece of wood to pry the linings away from the disc and push the pistons completely into the housing. Tighten the bleeder screws.
  4. Remove the linings from the housing. Inspect the linings. Refer to "Linings and End Plates" in Section 3.
- **If you are only changing the linings:** Refer to "Linings" in Section 5.

## Caliper Housing

### **WARNING**

*Housings are very heavy. Support the housing during removal and installation. Serious personal injury or damage to caliper can occur if a caliper housing falls.*

**NOTE:** To lighten caliper weight, remove the brake linings from the caliper before you remove the caliper from the vehicle.

1. Disconnect the brake line from the inlet fitting. Put a plug in the brake line and the inlet fitting to prevent contamination of the system.
  2. Remove the linings as described earlier in this section.
  3. Remove the fasteners that hold the caliper housing onto the mounting bracket. Remove the caliper housing from the mounting bracket.
- **If shims are used between the housing and mounting bracket:** Mark the shim positions.

## Disassembly

### Caliper

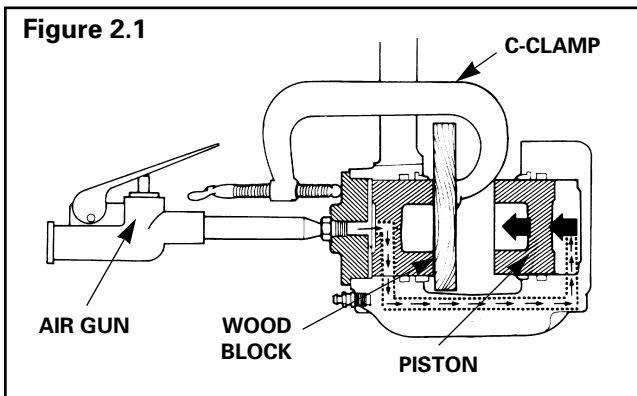
1. Remove the inlet fitting and the O-ring from the cylinder cap. Drain the hydraulic fluid from the caliper. Discard the fluid.
2. Clean the outside of the housing with isopropyl alcohol. Dry the housing with a clean cloth.
3. If installed, remove the bolts that hold the end plates on the housing. Remove the end plates and linings.

## Section 2 Removal and Disassembly



4. Remove the pistons from the side of the housing opposite the mounting plate according to the following procedure:
  - A. Use a C-clamp to hold a 0.50 inch (12.7 mm) block of wood against three pistons on the mounting side of the housing. Make sure the C-clamp is not in the area in front of the piston bore. **Figure 2.1.**

**Figure 2.1**

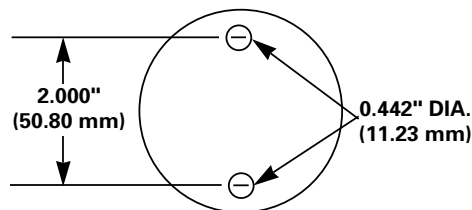


**WARNING**  
Do not put your hand in front of the pistons when you force the pistons out of the housing. Serious personal injury can occur.

- B. Apply compressed air to the inlet fitting to force the pistons out of the housing. If one piston comes out before the other piston, put a piece of wood in front of the piston that comes out first.
  - C. Apply compressed air to force the other piston out of the housing.
  - D. Remove the wood block and the C-clamp from the housing.
  - E. Remove the pistons from the bores that are opposite from the mounting plate.
5. Remove the two bleeder screws from the housing.
6. Use the following procedures to remove the cylinder caps from the housing. **Figure 2.2.**

**Figure 2.2**

**HDB 640 Cylinder Cap Holes**



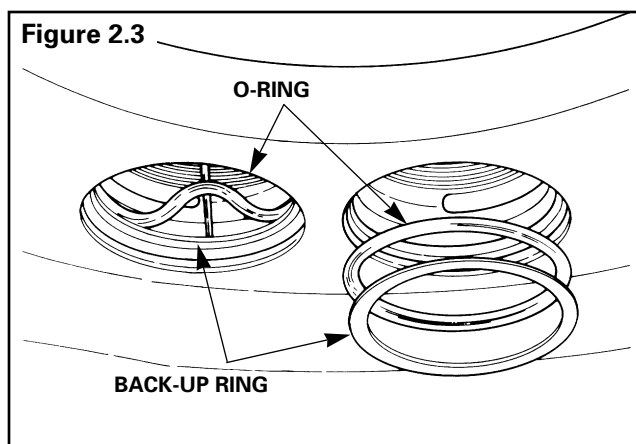
7. Remove the pistons from the mounting plate side of the housing. Push on the cap ends of the pistons to force them out of the disc side of the housing.

8. Remove the dust seals from the housing.

**NOTE:** Use a soft tool to prevent scratching the housing and grooves.

9. Use a soft tool to remove the O-rings and backup rings. Discard the parts. **Figure 2.3.**

**Figure 2.3**



10. Inspect the ring grooves in the housing for scratches and rust. Use a fine emery cloth to remove small scratches and rust.

- **If scratches are deep, or there is a large amount of rust:** Replace the housing. Refer to "Caliper" in Section 3.

11. Inspect the pistons and bores for scratches and rust. Use a fine emery cloth to remove small scratches and rust.
- **If scratches are deep, there is a large amount of rust, or the pistons and bores are damaged:** Replace the components. Refer to "Caliper" in Section 3.

## Section 3 Inspection



### **WARNING**

*To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.*

## Inspect Parts

### Linings and End Plates



### **CAUTION**

*Always replace both linings with specified parts. If you only replace one lining, damage to the disc can occur. If you use non-Meritor parts, incorrect brake operation can occur. Damage to components can result.*

1. Remove the linings. Inspect the linings for wear and damage. Replace damaged linings.
2. Replace the linings if you find the following conditions:
  - The thickness is 0.125-inch (3.2 mm) from the backplate.
  - Each lining has a different thickness.
  - The linings are contaminated with oil or grease.
  - The linings have large or deep cracks. Small, tight cracks (heat checks) on the lining's surface, which are caused by high temperatures, are normal.
3. Inspect the end plate and end plate bolts for wear. Replace worn or damaged end plates and bolts.

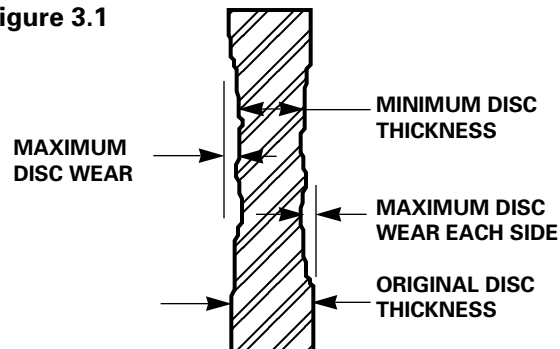
### Dust Seals

Check that the dust seals are soft and flexible. Replace worn or damaged seals.

## Disc

If the disc is worn beyond the specifications in **Figure 3.1**, replace the disc. Also refer to the vehicle manufacturer's specifications that may be different from those below.

**Figure 3.1**



**Typical Section Through Disc Showing Recommended Maximum Wear Limits**

Model	Original Disc Thickness	Maximum Disc Wear Each Side	Minimum Disc Thickness
HDB 640	1.574 inch (40 mm)	0.06 inch (1.5 mm)	1.450 inch (36.83 mm)
SCL 35, 46 and 53	0.625 inch (15.875 mm)	0.06 inch (1.5 mm)	0.50 inch (12.7 mm)

## Caliper

1. Inspect the pistons, housing bores and O-ring grooves. Use a fine emery cloth to remove scratches or corrosion. Replace worn or damaged components. Replace components that are heavily corroded or have large scratches.
2. Check the pistons for correct operation. Replace the piston and housing if a piston is not straight in the bore.
3. If fluid leaks at a piston, disassemble the caliper. Inspect the piston, bore, O-rings and the back-up rings. Service as necessary.
4. Measure the outer diameter of the piston. Replace the piston if the outer diameter is less than 2.995 inches (76.07 mm).
5. Measure the outer diameter of the housing bore. Replace the housing if the diameter exceeds 3.003 inches (76.28 mm).

6. Inspect inlet fitting and O-ring for damage.  
Replace O-ring if necessary.
7. Inspect the linings as described earlier in this section.
8. Inspect caliper ports and end plate bolt holes for thread damage. Refer to the table below.
  - A. Use the appropriate taps lubricated with light oil to inspect tapped holes for thread damage and to clean minor thread damage.
  - B. Replace components with thread damage that you cannot repair. Use a thread tap to repair minor damage.

Area to Inspect	Tap Size to Use
Bleeder ports	0.4375-20 UNF
End plate bolt holes	0.6250-11 UNC
Inlet port	0.5000-20 UNF

9. Discard all back-up rings, O-rings and dust boots. Install new ones when you assemble the caliper.

## Section 4

# Prepare Parts for Assembly



### **WARNING**

*To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.*

## Clean, Dry and Protect Parts

### **WARNING**

*Solvent cleaners can be flammable, poisonous and cause burns. Examples of solvent cleaners are carbon tetrachloride, emulsion-type cleaners and petroleum-based cleaners. To avoid serious personal injury when you use solvent cleaners, you must carefully follow the manufacturer's product instructions and these procedures:*

- *Wear safe eye protection.*
- *Wear clothing that protects your skin.*
- *Work in a well-ventilated area.*
- *Do not use gasoline, or solvents that contain gasoline. Gasoline can explode.*
- *You must use hot solution tanks or alkaline solutions correctly. Follow the manufacturer's instructions carefully.*

## Cleaning Parts

### **CAUTION**

*Do not use hot solution tanks or water and alkaline solutions to clean ground or polished parts. Damage to parts will result.*

1. Use a cleaning solvent or kerosene or diesel fuel to clean ground or polished metal parts or surfaces. Examples of ground or polished parts are the piston and the piston bore in the caliper.
2. Use a cleaning solvent or a weak alkaline solution in a hot solution tank to clean rough metal parts. If you use a hot solution tank, follow the instructions below.
  - A. Leave the parts in the tank until they are completely cleaned and heated.
  - B. Remove the parts from the tank.
  - C. Wash the parts with water until you remove the alkaline solution.

3. Use a wire brush to clean fastener and fitting threads.

4. Remove mud and dirt on the linings. Replace all linings contaminated with oil or grease.

## Dry Parts Immediately After Cleaning

1. Use soft, clean paper or cloth rags, or compressed air to completely dry parts immediately after you clean them.
2. Carefully inspect all parts for wear or damage before you assemble them.
3. Repair or replace worn or damaged parts.

## Apply Corrosion Protection

1. Apply a thin layer of grease to cleaned, dried parts. Be careful that you do not apply the grease to the linings or rotor.
2. If you will store the parts, apply a special material, which prevents corrosion and rust, to all surfaces. Store parts inside special paper or other material that prevents rust and corrosion.



### **WARNING**

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

## Assembly

### Caliper

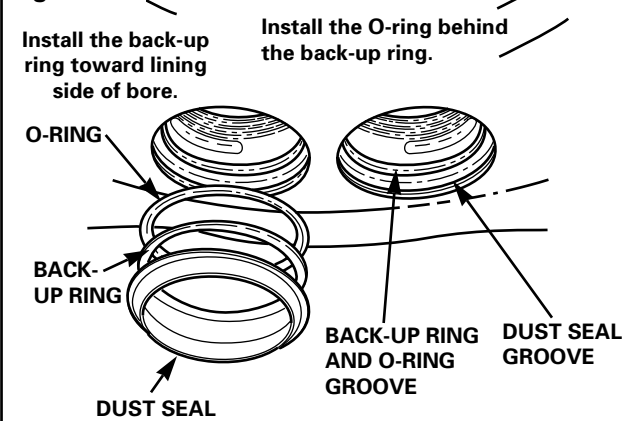
### **CAUTION**

Only use specified components when you assemble the caliper. If you install the incorrect components, the caliper will not operate correctly. If you use non-Meritor parts, incorrect brake operation can occur. Damage to components can result.

**NOTE:** You must lubricate the O-rings, back-up rings, pistons and bores before you can install the pistons.

1. Lubricate all pistons, bores, O-rings and back-up rings with silicone grease such as Dow Corning DC-4 or equivalent. If silicone grease is not available, use the same type of fluid that is used in the brake system.
2. Install a new O-ring and a back-up ring into the groove in the middle of the bore.
  - A. Install the back-up ring toward the lining side of the bore. **Figure 5.1.**
  - B. Install the O-ring behind the back-up ring. **Figure 5.1.**

**Figure 5.1**



3. Install a new dust seal into the top groove of the bore. Do not use silicone grease on the dust seal. **Figure 5.1.**


**NOTE:** Take care when you install the O-ring, so that the cylinder cap threads don't cut the O-ring.

4. Install a new O-ring into the cylinder cap groove between the threads and flange.

**NOTE:** Apply extra grease to the O-ring before you install a cylinder cap to help prevent the O-ring from catching on cylinder cap threads.

5. Apply extra grease to the O-ring. Install the cylinder cap into the caliper housing. Tighten the cylinder cap to the following specifications.

Model	Torque (Minimum)
HDB 640	500 lb-ft (680 N•m)
SCL 35, SCL 46, SCL 53	75 lb-ft (100 N•m)

6. Install the pistons into the housing, with the hole in the piston toward the lining. Push the pistons into the housing from the lining side of the housing. Check that the pistons are straight in the bores.
7. Push each piston into the bore until the top of each piston is even with the top of the dust seal.
8. Install the bleeder screws into the housing and tighten them to 100-180 lb-in (11.3-20.3 N•m). 
9. Install the O-ring and the inlet fitting into the cylinder cap.

## Installation

### Caliper


1. Place blocks under the wheels of the vehicle to keep the vehicle from moving.
2. If shims are used, put the shims in the position marked during removal.
3. Place the caliper housing on the mounting bracket. Install the fasteners that hold the caliper onto the bracket. Tighten the fasteners to the torque specified by the equipment manufacturer.

## Section 5 Assembly and Installation



### **WARNING**

*Take care when you use Loctite® to avoid serious personal injury. Follow the manufacturer's instructions to prevent irritation to the eyes and skin.*

4. Install the brake linings into the caliper housing, with the metal backing plate against the pistons and not toward disc. Apply Loctite® 271 or equivalent to the threads of the bolts that fasten the end plates to the housing.
5. Install the end plates onto the housing. Install the bolts and tighten them to 165-210 lb-ft (224-285 N•m). 
6. Check that the housing is installed correctly on the mounting bracket. The disc must be within  $\pm 0.06$  inches ( $\pm 1.5$  mm) of being centered between the lining end plates.

**NOTE:** Shims must be steel, and ground flat and parallel.

- **If it is necessary to install a shim:** Install the shim either between the housing and mounting bracket, or between the hub and disc, to increase outboard clearance and decrease inboard clearance.

A shim must cover the entire hub or housing mounting surface, and the linings must move freely in the housing and between the end plates.

7. Remove the plugs from the brake line and the inlet fitting. Connect the brake line to the inlet fitting.
8. Remove the air from the brake system. Refer to "Remove Air from the System."
9. Apply and release the brakes three times to ensure the caliper operates correctly. Check for fluid leaks. Check that the linings move freely in the caliper.

## Linings


### **CAUTION**

*Replace the linings on both brakes of a single axle at the same time. Use Meritor parts. The use of non-Meritor parts can damage the discs and affect brake operation.*

1. Place blocks under the wheels of the vehicle to keep the vehicle from moving.
2. Install the linings in the caliper housing with the metal backing plate against the pistons and not toward disc.

### **WARNING**

*Take care when you use Loctite® to avoid serious personal injury. Follow the manufacturer's instructions to prevent irritation to the eyes and skin.*

3. Apply Loctite® 271 or equivalent to the threads of the bolts and fasten the end plates to the housing.
4. Install the end plates onto the housing. Install the bolts and tighten them to 165-210 lb-ft (224-285 N•m). Ensure that the linings move freely in the housing. 
5. Remove the air from the brake system. Refer to "Remove Air From the System," below.
6. Apply and release the brakes three times to ensure the caliper operates correctly. Check for fluid leaks. Ensure that the linings move freely in the housing.

## Remove Air from the System ("Bleed" the Brakes)

### **WARNING**

*You must bleed the brakes to remove all air from the system, when you loosen any brake system hydraulic connection. Air can prevent hydraulic pressure from applying the brakes properly and can increase stopping distance. Serious personal injury and damage to components can result.*


*Use only the type of hydraulic fluid specified by the equipment manufacturer. Do not use or mix different types of hydraulic fluid. Using incorrect hydraulic fluid will damage the rubber parts of the caliper. Loss of braking control, serious personal injury and damage to components can result.*

*Do not reuse hydraulic fluid. Used fluid can be contaminated and can cause incorrect operation. Serious personal injury and damage to components can result.*


1. Check that the master cylinder is filled to the correct level with hydraulic fluid specified by the component manufacturer. Keep the master cylinder filled when you bleed the brakes, so air does not enter the system through the master cylinder.
2. When you have finished bleeding the brakes, check that the master cylinder is filled to the correct level.
3. Put a clear tube on the bleeder screw. Submerge the opposite end of the tube into a clear container of the specified hydraulic fluid.
  - HDB 640 and SCL 53 dry disc brakes are designed to bleed correctly when mounted at the three, nine and twelve o'clock positions.
  - SCL 35 and SCL 46 dry disc brakes are designed to bleed correctly when mounted in the three and nine o'clock positions.
4. Always start at the point in the system that is farthest from the master cylinder and work back toward the master cylinder.

5. **When you complete a bleeder screw:** Go to the next closest bleeder screw on the same caliper.
6. **When you complete a caliper:** Go to the next closest caliper on the same wheel.
7. **When you complete a wheel:** Go to the farthest bleeder screw on the next closest wheel.
8. Follow the instructions below to bleed the brakes.

### Full Hydraulic Systems

1. Slowly apply low hydraulic pressure to the caliper. Loosen the bleeder screw.
2. Continue to apply pressure until there are no air bubbles in the hydraulic fluid.
3. Tighten the bleeder screw to 100-180 lb-in (11.3-20.3 N•m). Release the pressure to the caliper. 
4. Check for fluid leaks.

### Air Hydraulic or Mechanical Actuator Systems

1. Apply the brake pedal. Loosen the bleeder screw.
2. Tighten the bleeder screw 100-180 lb-in (11.3-20.3 N•m) before you release the brake pedal so that air does not enter the system. 
3. Repeat until there are no air bubbles in the hydraulic fluid when you apply the brake pedal and loosen the bleeder screw.
4. Check for fluid leaks.

## Section 6 Troubleshooting



### Brake Does Not Apply

Condition	Possible Causes	Correction
<b>There is no pressure to the brake.</b>	<ol style="list-style-type: none"> <li>1. Empty fluid reservoir</li> <li>2. Damaged hydraulic system</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill the reservoir to the correct level with specified fluid.</li> <li>2. Repair the hydraulic system.</li> </ol>
<b>Piston does not move.</b>	<ol style="list-style-type: none"> <li>1. No pressure to brake</li> <li>2. Piston not straight in the bore</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill the reservoir to the correct level with specified fluid.</li> <li>2. If piston diameter is less than 2.995 inches (76.073 mm): Replace piston.  If caliper bore diameter is greater the 3.003 inches (76.276 mm): Replace the caliper housing.  If tapered lining wear exists: Replace the linings. Remove dirt and other material between the lining and piston.</li> </ol>
<b>Brake leaks.</b>	<ol style="list-style-type: none"> <li>1. Loose bleeder screw</li> <li>2. Loose inlet fitting</li> <li>3. Damaged inlet fitting</li> <li>4. Worn or damaged piston, housing bore, O-rings and/or back-up rings</li> <li>5. Loose cylinder cap</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten the bleeder screw to 100-180 lb-in. (11.3-20.3 N•m). If the leak continues, replace the bleeder screw.</li> <li>2. Tighten the inlet fitting. If the leak continues, replace the O-ring.</li> <li>3. Replace the inlet fitting.</li> <li>4. Inspect the piston and housing bore for wear and damage. Service as necessary. Replace O-rings and backup rings.</li> <li>5. Replace the O-ring. For HDB 640, tighten the cylinder cap to 500 lb-ft (680 N•m) minimum.  For SCL 35, 46 and 53, tighten the cylinder cap to 75 lb-ft (100 N•m) minimum.</li> </ol>
<b>Linings are damaged.</b>	<ol style="list-style-type: none"> <li>1. Lining thickness less than 0.125 inch (3.2 mm)</li> <li>2. Lining wear not even</li> <li>3. Cracked or broken linings</li> <li>4. Oil or grease on linings</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace the linings.</li> <li>2. Inspect the piston. Service the piston as necessary. If caliper bore diameter is more than 3.003 inches (76.276 mm): Replace caliper.  Inspect the housing for clogged fluid passages. Service as necessary. If end plates are worn, replace them.</li> <li>3. Replace the linings.</li> <li>4. Replace the linings.</li> </ol>

### Brake Does Not Release

Condition	Possible Causes	Correction
<b>Vehicle does not move.</b>	<ol style="list-style-type: none"> <li>1. Parking brake applied</li> <li>2. Damaged hydraulic system</li> </ol>	<ol style="list-style-type: none"> <li>1. Release the parking brake.</li> <li>2. Repair the hydraulic system.</li> </ol>
<b>Brakes drag.</b>	<ol style="list-style-type: none"> <li>1. More than 3 psi (.2 bar) pressure applied when brakes are released</li> <li>2. Vehicle or equipment not operated correctly</li> <li>3. Piston not straight in the bore</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair the hydraulic system so that pressure is less than 3 psi (.2 bar) when the brakes are released. Bleed the brakes.</li> <li>2. Advise the operator on correct vehicle or equipment operation.</li> <li>3. If piston diameter is less than 2.995 inches (76.073 mm): Replace piston.  If caliper bore diameter is more than 3.003 inches (76.276 mm): Replace the caliper housing.  If tapered lining wear exists: Replace linings. Remove dirt and other material from the lining and piston.</li> </ol>

### Torque Chart

Component	Torque
End plate bolts	165-210 lb-ft (224-285 N•m)
Caliper mounting bracket fasteners	Vehicle manufacturer's specification
Bleeder screws	100-180 lb-in (11.3-20.3 N•m)
Cylinder cap <b>HDB 640</b> <b>SCL 35, 46 and 53</b>	500 lb-ft (680 N•m) minimum 75 lb-ft (100 N•m) minimum

### Wear Dimensions\*

Component	When to Replace
Disc	Wear exceeds maximum of 0.06 in (1.5 mm) per side
Housing	Bore diameter exceeds 3.003 in (76.276 mm)
Linings	Thickness is less than 0.125 in (3.2 mm) from back plate
Piston	Diameter worn to less than 2.995 in (76.073 mm)

### Hydraulic Fluid\*

Component	Example
Petroleum Base Hydraulic Fluid (Mineral Oil)	Meets MIL-H-5606 specifications
Non-Petroleum Base Hydraulic Fluid (Automotive Brake Fluid)	Glycol DOT 3, meets SAE J-1703 specifications

\*See fluid and specification recommendations of equipment manufacturer.











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ArvinMeritor, Inc.  
**Commercial Vehicle Systems**  
2135 West Maple Road  
Troy, MI 48064 U.S.A.  
248-435-1085  
800-535-5560 (North America only)  
[www.arvinmeritor.com](http://www.arvinmeritor.com)

Meritor do Brasil Ltda.  
Av. João Batista, 824  
06097-900 Osasco-SP  
BRAZIL  
(55-11) 7084-6510  
Fax: (55-11) 7084-6600

Meritor Commercial Vehicle Systems Saint-Etienne S.A.  
4, Rue Jean Servanton  
Boite Postale 656  
42042 Saint Etienne Cedex 1  
FRANCE  
(33) 477.92.88.00 Fax: (33) 477.92.88.93

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