



5026-SA DISK BRAKE SPRING / AIR VERSION

Owner's Operation, Installation & Maintenance Manual

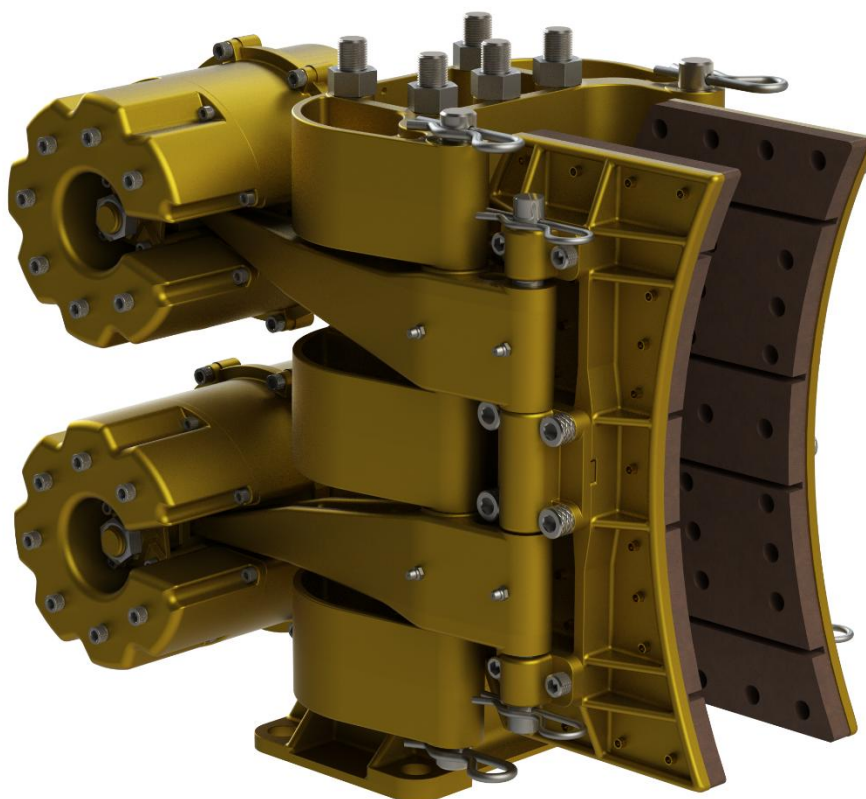


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1 INTRODUCTION

1.1 CONTACT INFORMATION

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1.2 SAFETY INFORMATION


1.2.1 Safety Instructions


Notice to Installer:


Disregarding the following safety measures can result in an accident causing severe injury to personnel and damage to material assets:


- Only use the product as directed in this manual.
- Never put the product into service if there is evidence of visible damage.
- Never put the product into service before fully completing installation and commissioning.
- Do not carry out any modifications to the product.
- Only use authentic Kobelt spare parts.
- Observe all local regulations, directives and laws during the installation of this product.
- All installation, commissioning and maintenance work must only be conducted by qualified personnel. (For the purpose of this manual, qualified personnel are persons who are familiar with the assembly, installation, commissioning, and operation of the product and who have the qualifications necessary for their occupation.)
- Observe all specifications in this manual. If these guidelines are not followed and damage occurs, the warranty will be voided.


1.2.2 Hazards


Throughout this publication, Warnings and Cautions accompanied by the International Hazard Symbol  is used to alert the user to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly.

 DANGER	Equipment Starts Automatically: Brake systems frequently are controlled remotely and may activate suddenly causing bodily harm. Ensure all power sources are locked out prior to performing work.
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 DANGER	Brake Actuators Contain Compressed Springs: The brake actuators contain springs that are under compression even when the brakes are not pressurized. The springs will release suddenly if disassembled incorrectly posing a risk of serious injury or death. Do not attempt to disassemble the actuators without clear work instructions and training.
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 WARNING	Pinch Points: Brakes contain numerous pinch points which can cause serious injury. Ensure all power sources are locked out prior to performing work.
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 WARNING	High Pressure Fluids: Kobel lever brakes use high pressure hydraulics. Ensure all pressure is exhausted and the pressure source locked out prior to performing work.
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 WARNING	Hot Surfaces: Disc brakes are capable of making the surfaces of the brake disc dangerously hot when burnishing or during braking events. Ensure the disc is adequately guarded to prevent inadvertent contact with the disc.
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SAFETY INSTRUCTIONS	Airborne Dust: Brake linings contain fibers that may become airborne during cutting or sanding operations. Over exposure to these dusts should be considered hazardous. Use NIOSH approved respirators when working with brake linings. Request a MSDS for further information.
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1.3 PRODUCT DESCRIPTION

1.3.1 Overview

The diagram below shows a typical Kobelt caliper brake with all the major components identified. All of the Kobelt caliper brakes can be fitted with either air applied, hydraulic applied, spring applied with air released or spring applied with hydraulic released actuators depending on the required service.

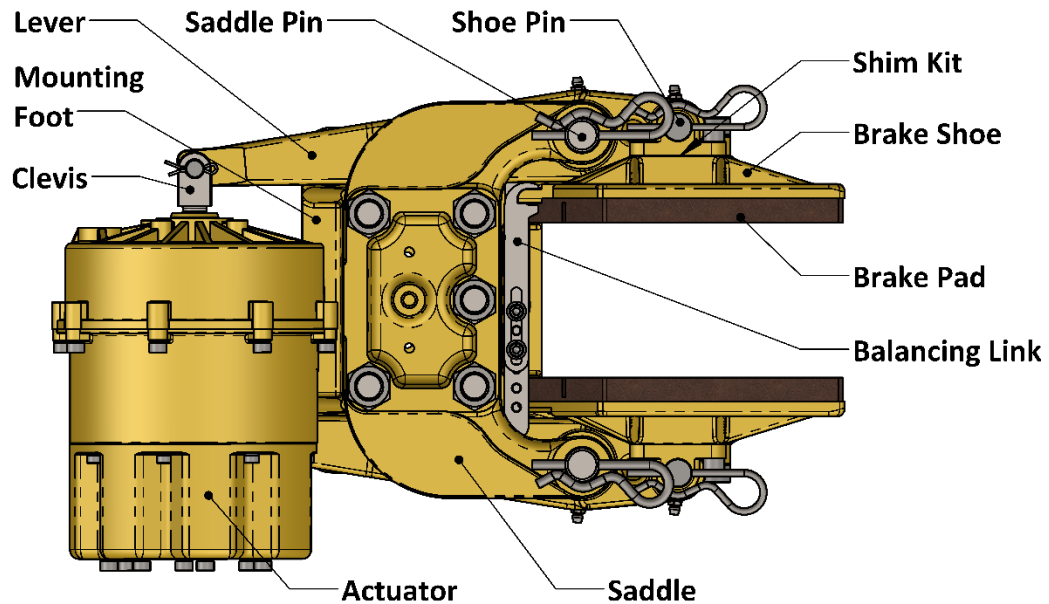


Figure 1: Caliper Brake Nomenclature

1.4 TECHNICAL DATA

Table 1: 5026-SA Technical Data

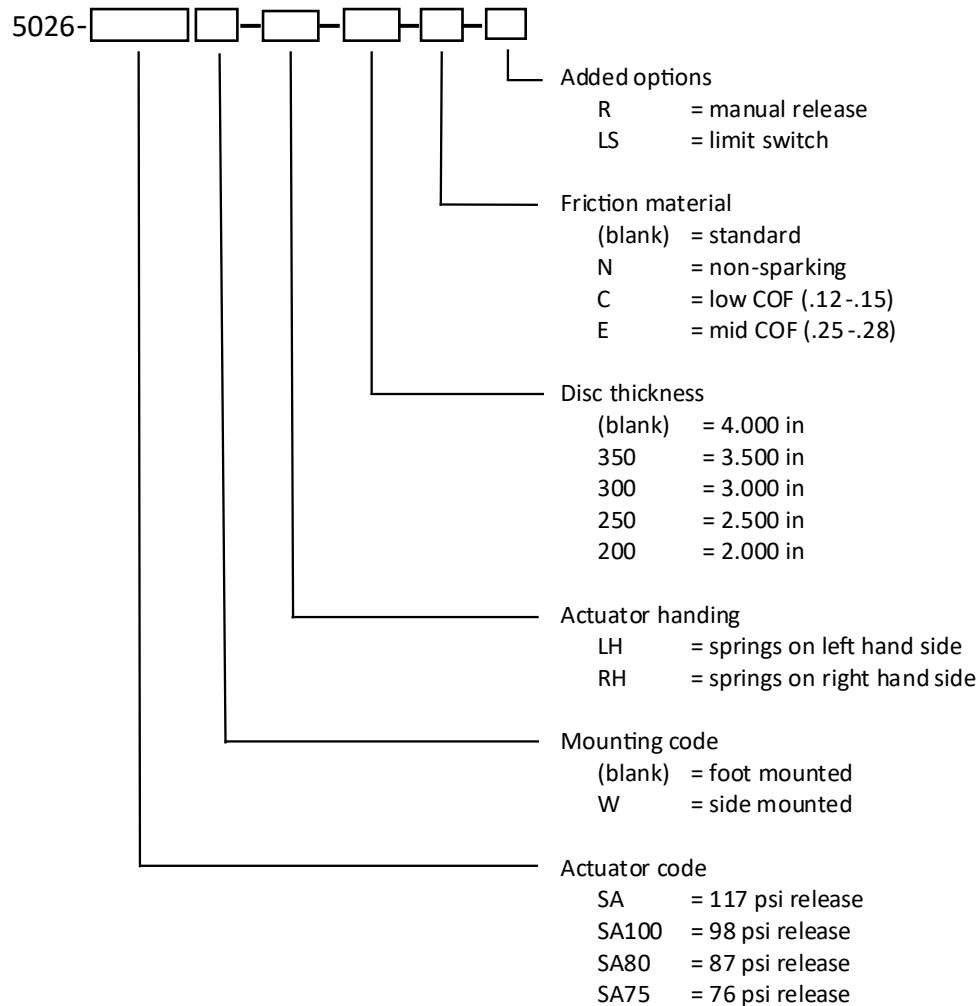
MODEL	NORMAL FORCE	PRESSURES	
		RELEASE	HOLD-OFF
5026-SA	17,400 lbs [77.4 kN]	117 psi [8.0 bar]	105 psi [7.3 bar]
5026-SA100	15,820 lbs [70.4 kN]	98 psi [6.8 bar]	92 psi [6.4 bar]
5026-SA80	14,230 lbs [63.3 kN]	87 psi [6.0 bar]	81 psi [5.6 bar]
5026-SA75	12,010 lbs [53.5 kN]	76 psi [5.2 bar]	66 psi [4.6 bar]
5026-SA70	11,200 lbs [49.9 kN]	68 psi [4.7 bar]	59 psi [4.1 bar]

Maximum Pressure:	150 psi	[10.3 bar]
Port Size:	3/8 NPT	
Actuator Volume:	92.4 in ³	[1514 cc]
Temperature Range:	-40°F ...+131°F	[-40°C ...+55°C]
Disc Thickness:	4 in	[102 mm]
Max Running Clearance:	.08in	[2 mm]
Minimum Disc Diameter:	30 in	[762 mm]
Maximum Disc Diameter:	61 in ¹	[1549 mm]
Total Pad Area:	175 in ²	[1128 cm ²]
Weight:	259 lbs	[118 kg]

1) Requires a minimum 7.28 in [185 mm] wide face

Technical data and specifications are also available from our datasheet posted on www.kobelt.com or the technical drawings in Appendix A.

1.5 MODEL CODE KEY



2 INSTALLATION

2.1 PREPARATION

The foundation plate to support the brake caliper must be designed to withstand the maximum braking forces generated by the brake caliper. The foundation must also be flat to ISO tolerance grade IT8 and square to the brake disc. See Appendix A for key installation dimensions. The brake pedestal must be designed to allow the mounting bolts to be inserted from underneath.

The rotating element should have bearings sufficient to carry the weight of the disc and also resist the additional stress when the disc brake is applied.

The spigot that centers the brake disc must not be designed in such a way that it impedes the thermal expansion of the disc.


Actuator ports are plugged to prevent contamination of the seals. Remove the plugs prior to connection to the piping.

Brake discs are shipped with a light rust inhibitor applied to the surfaces. Remove the rust inhibitor using solvent and a cloth prior to installation.

Any guarding around the brakes must provide enough room to allow full extension of the brake actuators plus full pad wear adjustment.

2.1.1 Rigging – 5026-SA

The 5026-SA model brake has a lifting provision at the top of brake as shown in Figure 1. Customers may attach a lifting device such as an eye bolt(not included) into the 3/8 UNC hole and use it as a lifting point to lift and position the brake during installation. Ensure lifting devices are rated for the weight of the 5026-SA assembly.

 WARNING	<p>Only use the lifting provision for lifting the weight of the 5026 brake.</p> <p><i>Additional hardware such as a brake mounting pedestal should be lifted separately, and should not be lifted through the brake lifting provision.</i></p>
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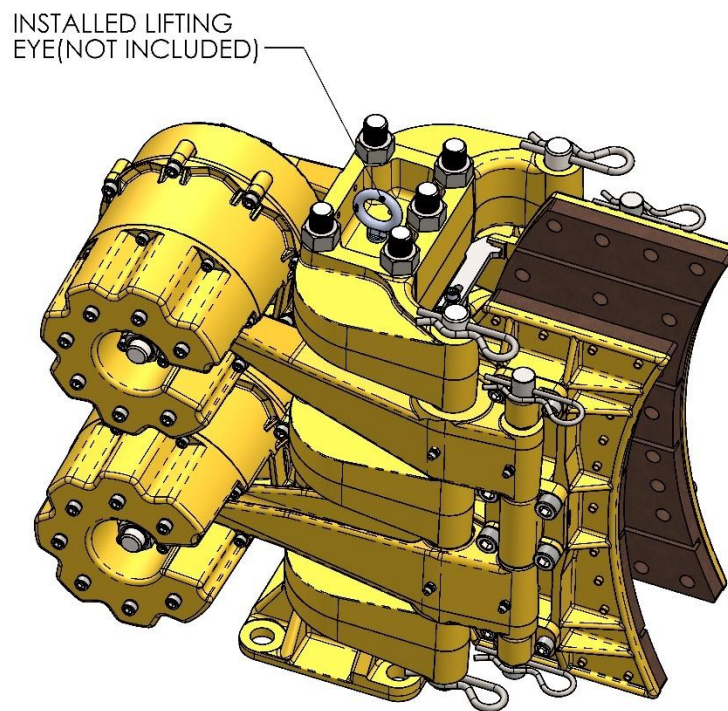
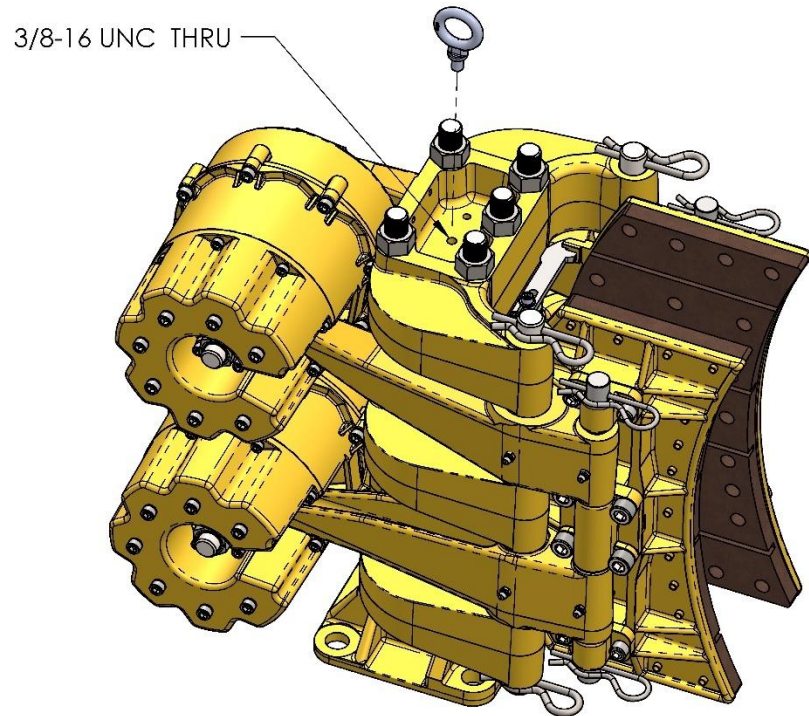


Figure 1: 5026-SA rigging


2.1.2 Rigging – 5026-SAW


The 5026-SAW can be lifted by installing a lifting nut(not included) onto the end of the central $\frac{3}{4}$ UNC tie rod as shown in Figure 2. Ensure the lifting devices are rated for the weight of the brake and lifting geometry.

When the 5026-SAW is rigged as shown in Figure 2, the safe working load (SWL) of the tie rod threads are given in Table 2. **Safe working loads are specified for straight vertical lifts only.**

Table 2: 5026-SAW tie rod safe working load

Tie rod thread	Minimum exposed thread length	Safe working load
3/4-10 UNC	0.35in [8.9mm]	1500 lbs [675 kg]

 WARNING	Only use the lifting provision for lifting the weight of the 5026 brake.
	<i>Additional hardware such as a brake mounting pedestal should be lifted separately, and should not be lifted through the brake lifting provision.</i>

 WARNING	Lifting device SWL must not be exceeded
	<i>Hardware used to lift the 5026-SAW brake such as the lifting nut needs to have a rated capacity sufficient to lift the 5026-SAW. Consult lifting hardware manufacturers for their rated lifting loads.</i>

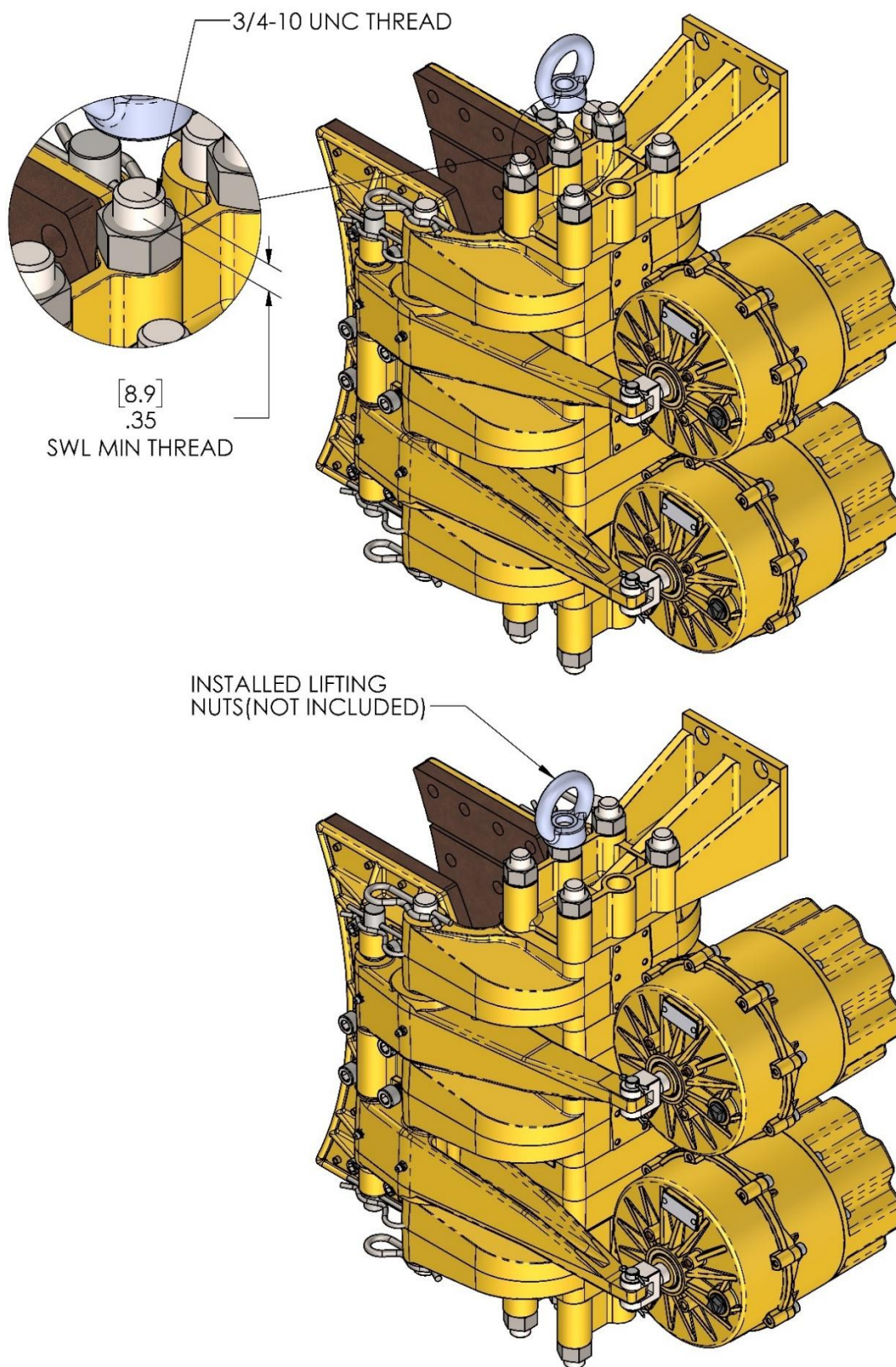


Figure 2: 5026-SAW rigging

2.2 BRAKE DISCS

The brake disc must be installed onto the rotating element before installing the caliper. Brake discs must meet the following requirements:

Table 3: Brake Disc Requirements

MODEL	5000-SERIES
AXIAL RUN OUT	IT9 (TIR) ¹
RADIAL RUN OUT	IT11 (TIR) ¹
FLATNESS	.004 in [.10 mm]
PILOT FIT	H9/f8
SURFACE FINISH	63 micro inches [1.6 micrometers] RMS
SURFACE HARDNESS	Light Duty ² HB135 minimum
	Heavy Duty ³ HB235 minimum

To achieve the runout tolerance the mounting face on the rotating element must be machined flat. Excessive run-out of the disc could cause premature wear of the linings, caliper pins, lever journals as well as the actuators.

The disc mounting bolts used must be of a suitable size and grade to safely resist the brake torque plus the stresses induced from thermal expansion of the disc. For high temperature disc applications, the holes for the mounting bolts must be machined oversized to allow the disc to expand during operation. Ensure that adequate washers are used to bridge the gap between the bolt and bolt hole.

Table 4: Mounting Bolt Radial Clearance





MOUNTING BOLT RADIAL CLEARANCE				
Disc Bolt Circle In [mm]	Maximum Disc Temperature, °F [°C]			
	400 [204]	500 [260]	600 [316]	700 [371]
10 [254]	0.011 [0.3]	0.014 [0.4]	0.017 [0.4]	0.021 [0.5]
15 [381]	0.016 [0.4]	0.021 [0.5]	0.026 [0.7]	0.031 [0.8]
20 [508]	0.022 [0.6]	0.028 [0.7]	0.035 [0.9]	0.041 [1.0]
25 [635]	0.027 [0.7]	0.035 [0.9]	0.043 [1.1]	0.051 [1.3]
30 [762]	0.032 [0.8]	0.042 [1.1]	0.052 [1.3]	0.062 [1.5]
35 [889]	0.038 [1.0]	0.049 [1.2]	0.061 [1.5]	0.072 [1.8]
40 [1016]	0.043 [1.1]	0.056 [1.4]	0.069 [1.8]	0.082 [2.1]
45 [1143]	0.049 [1.2]	0.063 [1.5]	0.078 [2.0]	0.092 [2.3]

¹ International tolerance class. Allowable run out is proportional disc O.D.

² Parking brakes and emergency brakes with stopping times of 10 seconds or less are considered light duty.

³ Ventilated discs are exempted from this requirement

To reduce the size of the mounting bolt clearance hole it is recommended to offset the bolt circle on the brake disc inwards the required amount for radial clearance. The end result is the brake disc will have a slightly smaller bolt circle than the hub and the required radial clearance will be on the side where it is needed.

 WARNING	Do not use fitted bolts for installing brake discs. The bolt holes must be over sized to permit uninhibited expansion.
 WARNING	Do not secure a brake disc to a rotating element by welding.
 WARNING	Do not paint the cooling fins of a ventilated disc. The cooling efficiency will be compromised, and overheating may result.
 WARNING	<p>Keep Discs free from contaminants:</p> <p>Failure to keep the brake discs free some contaminants such as dirt and oil can result in the brake not generating the rated brake force. Discs and brake pads that have been contaminated must be cleaned thoroughly. A burnishing procedure should follow cleaning before returning the brake to service.</p>

If the disc was damaged during installation with nicks or welding marks, remove the defects before putting into service.

For cases where a disc guard or some protective cover is required for a ventilated disc ensure that the guard does not compromise the performance. An improperly designed cover or shield may cause air recirculation through the disc or radiant heat reflection, which could result in the disc overheating. The cooling air pumped through the disc must be exhausted away from the outer diameter of the disc to allow fresh, cool air to enter the inner vent opening of the disc.

2.3 CALIPER BRAKES

2.3.1 Mechanical

Perform the following steps to properly install a caliper brake:

1. Ensure that the brake has been manually opened (see section 3.1).
2. Lower the brake onto the brake pedestal and center over the mounting holes.
3. Using feeler gauges to ensure that the brake air gap is equal on both sides of the disc.

NOTICE	Ensure the caliper is centered. The balancing link will be subjected to excessive stresses that will damage it.
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4. Position the brake so that the outer radius of the brake shoe is in full contact with the Disc. Do not move the brake too close as enough radial distance must be provided to

- allow for disc expansion without causing interference between the outer circumference of the disc and the inner caliper frame.
5. Manually apply the brake onto the disc. The brake shoes will naturally align with the disc.
 6. Probe under the brake base with feeler gauges to determine the shimming requirement.
 7. Manually release the brake again and lift the brake up approximately two inches.
 8. Insert the shims determined from step 6. Use ANSI shims that straddle the mounting bolts.
 9. Lower the brake back down, insert the mounting bolts from underneath the pedestal using appropriate flat washers. The nut must be on top of the brake foot. The mounting bolts must be of the type and installed as noted below to ensure a vibration resistant and secure joint:
 - a. Bolt size: $\frac{3}{4}$ -10 UNC
 - b. Bolt grade: SAE J429, grade 5
 - c. Thread locker: Loctite® 243
 - d. Tightening torque: 200 ft-lbf [271 Nm]

2.3.2 Piping

The piping to the brakes must be adequately sized to ensure rapid response times in all weather conditions. The piping must be selected to safely withstand the pressures required to operate the brakes. Secure the piping against vibration with pipe clamps per the schedule in the table below.

Table 5: Pipe Clamp Table

PIPE CLAMP TABLE				
PIPE SCHEDULE	3/8"-1/2" tube [DN6]	1/4" – 1/2" pipe 1/2"-3/4" tube [DN8-DN15]	3/4" pipe 1"-1.25" tube [DN20]	1" pipe 1.50" tube [DN25]
CLAMP SPACING	3 ft [914 mm]	4 ft [1219 mm]	5 ft [1524 mm]	6.5 ft [1981 mm]

All piping must be cleaned prior to connection to the actuators. Welded carbon steel piping must be pickled to remove the scale produced by welding.


The connections to the brake actuators must be made by hoses of suitable rating to accommodate the movement of the brake levers.

The brake actuators are equipped with different sizes of pressure ports. Consult the technical drawing of the relevant model code for the specific port data. Install the port fitting using thread sealant and tighten to 2 - 3 turns from finger tight. Use brass pipe fittings for making the connection as steel fittings are too heavy and may split the port.

⚠ WARNING	Do not over tighten the fitting in the actuator port as damage to the actuator may occur.
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For spring applied / air released caliper brakes it is recommended to install a quick exhaust valve at each actuator.

For operation in sub-zero temperatures down to a minimum of 0°F [-20°C] the air must be dried to a dew point of -50°F [-44°F]

 DANGER	Failure to adequately dry the compressed air supply may result in the brake valve freezing and rendering the brakes inoperable in sub-zero weather conditions.
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2.3.3 Isolation Valves

It is recommended to install a local isolation valve on the actuator pneumatic supply lines. This will aid maintenance personnel in locking out the brake caliper during maintenance activities. The valve must be capable of withstanding the maximum actuator pressure as given in section 1.4. The valve must be sized to meet or exceed the actuator port size given in section 1.4.

Consult your local governing body in your jurisdiction on the exact requirements for pneumatic isolation valves that lock out pneumatic energy sources during maintenance activities.

2.3.4 Instrumentation

Kobelt caliper disc brakes may be equipped with sensors and switches, such as the

- **6230-MSKIT** brake release indicating switch kit or,
- **6230-WSKIT** brake wear indicating switch kit

The connection to the switch must be made by cable or flexible conduit and a ½ NPT cable or conduit gland. To access the switch terminals, remove the two captive screws holding on the back cover. Connect the wires to the common (C) and normally open (NO) terminal screws using ring or spade terminals.

Follow the governing electrical code for wiring practices. Use only hardware approved for the zone that the brake is installed in.

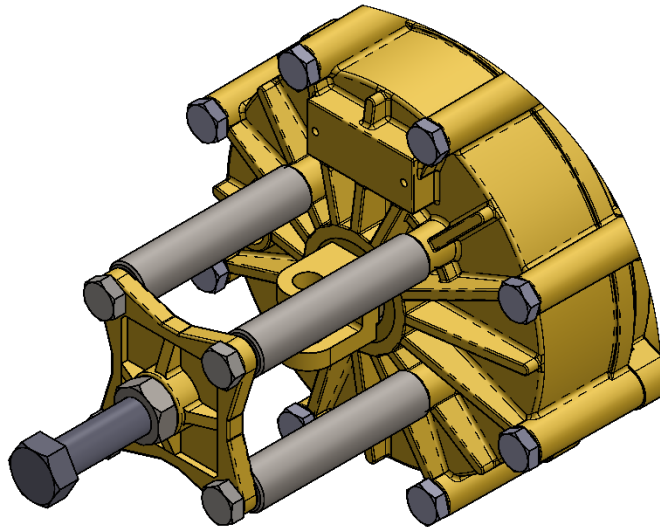
3 COMMISSIONING

3.1 CAGING



The Kobelt 5026-SA spring applied / air released caliper brake can be equipped with a manual release kit, part number **6230-RLKIT**. The release kit permits manual release of the brake in the event that fluid pressure is lost or not available. To manually release the brakes;

1. Ensure that the fluid supply line is open to tank or atmosphere to permit the piston to displace the fluid from the actuator.
2. Screw in the manual release bolt clockwise to open the brake shoes. If the brake is equipped with two actuators the release screws must be advanced in equal increments of one turn at a time.



The manual release screw must be fully retracted prior to putting the brakes into service. Failure to do so may result in a complete loss of brake torque.

Brakes without the manual release screw option will have to be opened using an external pressure source.

3.2 FLUSHING

Kobelt spring applied, air released disc brakes may be used in low pressure hydraulic applications. Before subjecting the brake system to full hydraulic pressure, the brake lines must be flushed to an ISO 4406 cleanliness rating of 19/17/14.

3.3 AIR GAP

Prior to putting the brakes into service ensure that the airgap between the brake pads and disc when the brakes are released is set to .01" [.25 mm] per shoe. Adjust if necessary, per [section 5.3.2](#).

3.4 FUNCTION TEST

Before burnishing the brakes perform a quick inspection and function test of the brakes:

- (1) Ensure that all mounting bolts are properly installed.
- (2) Ensure proper running clearance (air gap) with the disc.
- (3) Ensure unobstructed movement of the brake levers for full actuator extension.
- (4) Ensure the brake disc surface is clean. Remove all contamination from the disc with cleaning solvent.
- (5) Check the source of fluid supplied that it complies with the specified pressure range and that it is properly interlocked with other machinery such as clutches, electric motors, etc.
- (6) Check that all bolts are tight and cotter pins are in place.
- (7) Cycle the brakes and ensure that the brakes are operational

3.5 BURNISHING


Burnishing is required to achieve rated brake torque. The process of burnishing removes minor contaminants from the rubbing surfaces and improves the degree of contact between the brake pad and disc.

Before burnishing, the brake disc must be checked to ensure it is free from contamination and oil. Use a solvent and cloth to remove any oil residue. Slight surface rust will be removed during the burnishing process, but heavy rust should be removed prior to burnishing.

If present, safety interlocks of the drive mechanism should be temporarily defeated to allow the disc to be driven with the brake partially applied.

The temperature of the disc surface must be monitored during the burnishing process and kept between 250°F (120°C) and 500°F (260°C). If the upper temperature is reached, pause the burnishing process until the disc is cooled to the lower limit.

Extreme care must be taken not to overheat the disc during the process. On water cooled discs it may be necessary to limit the flow of cooling water to achieve the necessary disc temperature for effective burnishing.


 WARNING	Disc temperature must not exceed 700°F (371°C) or permanent degradation of the lining may occur.
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Burnishing is best achieved by applying the maximum torque and minimum speed that the drive can tolerate. Depending on the configuration of the brake system it may be necessary to reduce the burnishing torque by;

- a) Partially releasing the brake with fluid pressure to a level that the drive can tolerate, or
- b) In systems with more than one brake, isolate all but one brake and burnish one brake at a time.

Three important points to consider when burnishing are;

- i. The temperature of the disc must be closely monitored. Excessive heat will damage the friction linings.
- ii. The duration of burnishing varies with each application.
- iii. Burnishing is not complete until the brake is producing rated torque. This will be indicated by the motor current while burnishing.

 WARNING	Failure to properly burnish will not allow the brake to produce adequate torque for the intended duty.
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3.6 TORQUE TEST

Before putting equipment into service, confirm that full rated braking torque has been achieved through load testing or a torque test against the drive motors. If full brake torque has not been achieved, continue burnishing.

4 OPERATION

4.1 FUNCTIONAL REQUIREMENTS

4.1.1 Pressure Supply

The release pressure for spring applied air release actuators are a maximum of 125 psi. Ensure that the system pressure is adequate to fully release the brakes.

It is necessary to size air compressors and storage tanks to provide sufficient air for the intended duty of the brakes. Actuators and control valves equipped with “U” cups and “O” rings require lubrication in order to provide long service life. Unlubricated seals will have excessive friction and wear. The oil that is required for the lubricator should be a hydraulic type with a viscosity grade of 10 to 32 centistokes. Heavy oils do not work well for lubricators.

The main supply line to the control and brake system should be equipped with a filter, regulator and lubricator. The filter’s function is to remove moisture and dirt in the system and the regulator will provide a constant air pressure to the control system. If the brake system is operating in sub-zero temperatures, it is recommended to have an air dryer in the system to remove all moisture. Alternatively, a lubricator can be filled with methyl hydrate (wood alcohol) to prevent freezing of the air system.

For hydraulic applications the pressure supply system must supply a hydraulic oil appropriate for the service conditions. Consult the table below for approved oils.

Ambient Temperature Range	Approved Oil	Approved Brands
0...+40 °C [+32...+104 °F]	ISO VG 32, VI 60	Rando HD32, Mobil DTE, Tellus S2 V 32
-20....+20 °C [-4...+68 °F]	ISO VG 22, VI 150	Rando HDZ22, Mobil DTE10
+40....+80 °C [+104...+176 °F]	ISO VG 68, VI 60	Rando HD68, Mobil DTE, Tellus S2 V 68
-40 ...-20 °C [-40...-4 °F]	ISO VG 26, VI 300	Univis HVI 26, Tellus S4 VX, Hydrex MV Arctic

In all cases hydraulic circuits must have a relief valve that is set to limit the system pressure to the rated maximum pressure of the actuator. In applications where the brakes cycle infrequently with significant changes in ambient temperature it may be necessary to provide a thermal relief to protect the actuators from over pressurization due to thermal expansion.

4.1.2 Control

Emergency brakes must be controlled by a system adhering to a “fail safe” methodology. Relays, contacts and valves must be “normally open”. The use of detented, manual or spool valves is strongly discouraged as these devices can either be inadvertently closed or fail closed.

4.2 SERVICE LIMITS

4.2.1 Disc Temperature

The Kobelt brake lining achieves maximum friction at 300°F. Over 300°F the brake begins to fade or experience diminishing friction. The maximum operating temperature of the brake linings is 700 °F [371° C]. Temperatures in excess of this limit will permanently damage the linings and require replacement.

4.2.2 Ambient Temperature

In sub-zero temperatures, ventilated discs must be warmed up gently to avoid causing excessive thermal stresses in the disc. Failure to do so could cause the disc to crack. Once the temperature of the disc is out of freezing condition it can be used as normally intended.

Operating temperature of standard brake actuators is -40°C [-40°F] to 55°C [131°F]

4.2.3 Pressure

Do not allow the supply pressure to exceed the values given in the [Technical Data](#) section. If the available supply pressure exceeds the maximum allowable working pressure, then some form of a pressure regulator is required. Also, the pressure supply system must be equipped with a safety relief valve to ensure the given maximum allowable working pressure.



4.2.4 Disc speed

The potential imbalance in the ventilated disc could be detrimental to rotating equipment at high speeds. For running speeds greater than the values listed in the table below the discs must be balanced. Under no circumstances must the running speed exceed the value given in the right-hand column.

Table 6: Maximum Disc Speeds

Part Number	Nominal OD		Max. Speed	
	inch	mm	rpm	
4" x 7" Series			Standard	Balanced
4-07-30	30	762	870	1800
4-07-35	35	889	720	1500
4-07-40	40	1016	610	1300
4-07-48	48	1219	480	1100
4-07-54	54	1372	430	1000

5 MAINTENANCE

 WARNING	Brake Actuators Contain Release without Warning: Brake actuators contain springs and can apply at any time should the applied pneumatic pressure be released or reduced. When working around the brake through the various maintenance procedures it is recommended to have clear work procedures for maintenance tasks. Pneumatic pressure should be locked out through the use of an isolation valve to prevent remote activation.
 WARNING	Maintenance routines and inspection schedules must be followed: Failure to follow the specified maintenance routines can result in failure of brake caliper components. Inspections must be done at scheduled intervals to assess the condition of the brake caliper and its components.

5.1 PREVENTATIVE MAINTENANCE

Maintenance Schedule

Maintenance Item	Daily	Monthly	Annually	5 years
Torque Test	✓			
Inspect for leaks	✓			
Measure air gap		✓		
Determine pad life		✓		
Lubricate pivot pins			✓	
Inspect brake disc			✓	
Inspect Brake pins				✓
Service Actuators				✓

5.2 INSPECTION

5.2.1 Pad Wear

The running clearance (air gap) between lining and disc must be maintained within the specified limits. Failure to do so will result in the brake not capable of producing rated torque. When the running clearance has reached .08" [2 mm] the brake must be adjusted back to .01" [.25 mm] per shoe. Refer to [section 5.3.2](#).

The maximum allowable pad life has been reached when the brake pad has worn down to 3/16" [4.8 mm] thick. The lining must be replaced before the shoe lining bolts or rivets start making contact with the brake disc.

5.2.2 Seals

The actuator seals should be inspected on a periodic basis. Soapy water applied to the actuator rod would indicate any seal leakage.

5.2.3 Actuator Test

Occasionally it may be necessary to test the actuator springs as a means of trouble shooting. The easiest method is to measure the hold-off and release pressure of the actuator. The release pressure is defined as the minimum pressure required to fully retract the actuator whereas hold-off pressure is defined as the pressure at which the actuator begins to extend. Both of these pressures give an indication of the condition of the actuator.

To conduct this test a dial indicator or depth micrometer is required as well as a pressure source with a calibrated gauge. The pressure source must have a means of accurately controlling the pressure. Follow these steps to perform the test:

1. Connect the pressure source to the actuator and fully retract the actuator. Be careful not to exceed the MAWP of the actuator.
2. Install the dial indicator to sense the rod stroke and set the dial to zero.
3. Begin reducing the pressure in small increments (5% of rated system pressure) and observe the displacement on the dial indicator.
4. When the dial indicator has moved at least .01" [.25 mm] note the pressure. This is the hold-off pressure. The measured value must be within +/- 5% of the specified value.
5. Continue dropping the pressure to allow the actuator to extend 0.1" [2.5 mm].
6. Begin increasing the pressure in small increments and observe the displacement on the dial indicator.
7. The minimum pressure required to return the actuator rod back to within .01" [.25 mm] is the release pressure. Note this pressure. The measured release pressure must be within +/-5% of the specified value.

5.2.4 Pin Wear

The pivot pins must be removed for inspection once every five years. If there is any evidence of heavy scoring more than .01" [.25 mm] deep or if any area of the pin has been worn down by more than .01" [.25 mm] then replace the pins.

5.2.5 Brake Disc

The brake disc must be inspected periodically to monitor the condition of the braking surface. When the condition of the braking surface has deteriorated to the point that the quality requirements in section 2.2 are no longer met the disc must be removed and resurfaced or replaced. Follow the minimum thickness allowances in the table below as a guideline for when a disc must be replaced.

Table 7: Brake Disc Minimum Thickness Allowances

Brake Disc Minimum Thickness		
Disc Series	Original Thickness in [mm]	Minimum Thickness in [mm]
4-07-XX	4.00 [101.6]	3.88 [98.6]

NOTICE

When re-machining the disc surface, equal amounts must be taken off of each face.

5.3 SERVICE

WARNING

Brake Actuators can Apply without Warning:

Brake actuators contain springs and can apply at any time should the applied pneumatic pressure be released or reduced. When working around the brake through the various service procedures it is recommended to have clear work procedures for maintenance tasks. Pneumatic pressure should be locked out through the use of an isolation valve to prevent remote activation.

5.3.1 Lubrication

Disc brake calipers equipped with spring applied, air released actuators must have a lubricator in the control air system using light hydraulic oil as a lubricant. This is to prevent premature seal wear and reduce seal friction.

All Kobelt calipers, during assembly, are pre-greased on the shoe pin and saddle pin with a Lithium based NLGI 2 grease. These pins must be re-greased no less than once annually.

5.3.2 Stroke Adjustment

On spring applied calipers, the running clearance between the shoe and disc must be maintained within specifications.

DANGER

Failure to maintain the running clearance within the specified limits will not allow the brake to produce adequate torque for the intended duty.

WARNING

Brake Actuators can apply without warning:

Brake actuators contain springs and can apply at any time should the applied pneumatic pressure be released or reduced. When adjusting the stroke, pneumatic pressure should be locked out through the use of an isolation valve to prevent remote activation.

Air Gap Adjustment Procedure:

1. Apply 120 psi of pressure to open the brake & loosen the clevis jam nut on both actuators.
2. Remove the 2 screws on each clevis bracket
3. Push the actuator away to separate the actuator assembly from the clevis bracket
4. Rotate each clevis bracket to desired position (1 full turn = 0.025in [0.7mm] of shoe movement)
5. Reinstall clevis brackets into position, tighten screws

Step 1:

Loosen jam nut

Step 2:

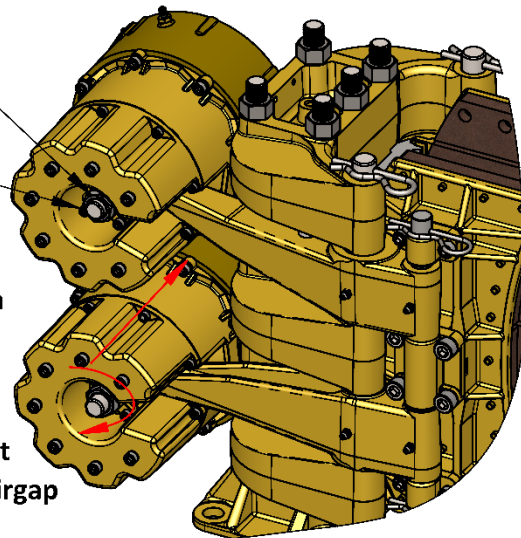
Remove 2 bolts

Step 3:

Swing actuator from clevis bracket

Step 4:

Rotate clevis bracket clockwise to close airgap



WARNING

Ensure that the valve isolating the brakes is locked out and the pressure securely retained in the brake actuator prior to performing work.

Note:

1. When the spring side clevis has been adjusted to its maximum position, further adjustments may be made to the rod side clevis.
2. When the brake linings are replaced, it will be necessary to reset the clevises by turning inward to allow for the extra thickness of a new lining.

5.3.3 Release Limit Switch

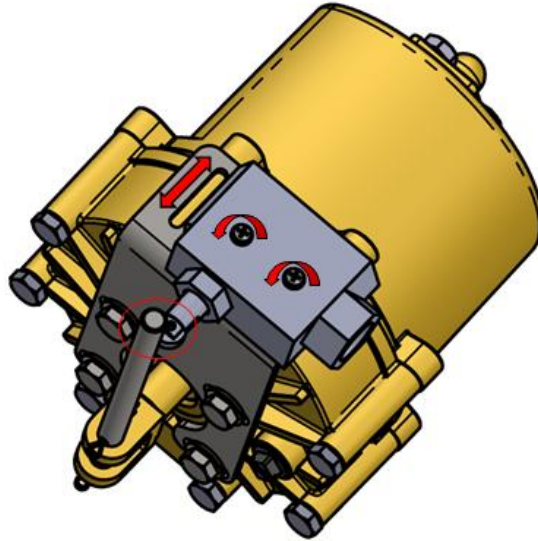
If the brake is equipped with a 6230-MSKIT release indicating limit switch, the switch position must be adjusted after any wear adjustments.

Step 1: Begin by loosening the two mounting screws with a Philips driver and a 5/16" wrench.

Step 2: With the switch loose pressurize the brake to retract the actuator.

Step 3: Slide the switch forward or back until the switch plunger contacts the pin and trips the switch.

Step 4: Retighten the two mounting screws.



5.3.4 Wear Indicating Limit Switch

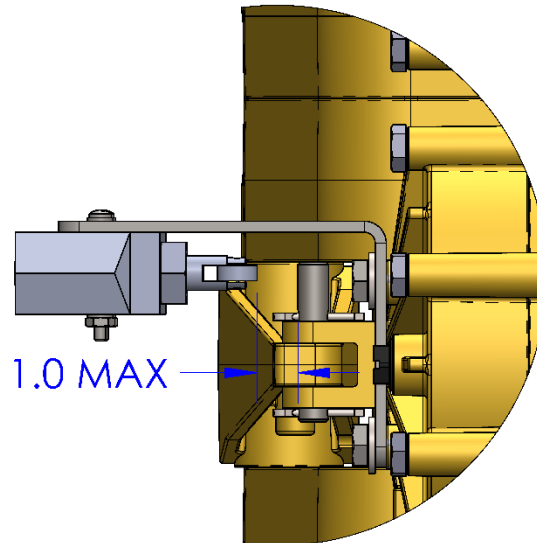
If the brake is equipped with a 6230-WSKIT wear indicating limit switch, the switch position must be adjusted after any wear adjustments.

Step 1: Begin by loosening the two mounting screws with a Philips driver and a 5/16" wrench.

Step 2: With the switch loose pressurize the brake to retract the actuator.

Step 3: Slide the switch back to leave a 1/2" [13mm] maximum gap between the switch plunger and the pin.

Step 4: Retighten the two mounting screws.



5.3.5 Spring Actuators


If maintenance is required on the spring applied actuator, it must first be removed from the brake assembly. To remove the actuator, pressure must be applied to the actuator to release the brake. After removal, the actuator must be retained in a press strong enough to retain the spring tension. The bolts holding both housings can now be removed, and the pressure of the press can be slowly released thus allowing the housings to separate. Clean the actuator, replace seals, inspect springs and change parts if necessary. Lubricate all moving parts, re-assemble and re-install actuator in reverse order.



Brake Actuators Contain Compressed Springs:

The brake actuators contain springs that are under compression even when the brakes are not pressurized. The springs will release suddenly if disassembled incorrectly posing a risk of serious injury or death. Do not attempt to disassemble the actuators without clear work instructions and training.

5.3.6 Shoe Removal/Installation

 WARNING	Brake Actuators Contain Release without Warning: Brake actuators contain springs and can apply at any time should the applied pneumatic pressure be released or reduced. When replacing the shoes, pneumatic pressure should be locked out through the use of an isolation valve to prevent remote activation.
--	--

To replacing the brake lining or the entire shoe assembly, it is required to remove the shoes from the brake caliper. Refer to Table 8 - Table 10 for the list of tools, spare parts and technical specification relevant to replacing the shoes.

Table 8: Tools required for brake shoe removal/installation

Tool/Consumable	Application
5/16in Hex key wrench	Outer pivot bolt installation
Torque wrench, 200 in.lbs capacity	
3/8in Hex key wrench	Inner pivot bolt installation
Torque wrench, 37 ft.lbs capacity	
Loctite 243	Fastener retention
NLGI Grade 2 Lithium Grease	Shoe pin lubrication

Table 9: Brake shoe replacement required spare parts

Part number	Description	Qty	Recommended/ Required
5026-LS**	Shoe assembly, 5/8in	2	Required
1039-0352	Hitch pin, 3/16 X 3-1/4; 18-8	4	Recommended
1002-1220	Screw, SKT HD, 3/8-16 UNC x 1-1/4; A564 TYPE 630	8	Recommended
1002-1420	Screw, SKT HD, 1/2-13 UNC x 1-1/4, 18-8 SS	8	Recommended

**Refer to section 5.4 or [Appendix B](#) for required shoe assembly part number.

Table 10: Technical specifications, brake shoe replacement

Specification	Value
Outer pivot block bolt torque	200 in-lbs [22.6 Nm]
Inner pivot block torque	37 ft-lbs [50.2 Nm]
Pivot block bore diameter	0.755-0.757 in [19.18-19.22 mm]
Lever shoe pin bore diameter	0.755-0.760 in [19.18-19.30 mm].

Follow the instructions and figures below for replacing the brake shoes on a 5026 caliper. Before starting on shoe replacement, ensure the brake is in the released position and has been locked out from its energy source.

Refer to Figure 3 for the next four steps.

1. Support the shoe being replaced.
2. Remove the hitch pins on the shoe pin. It is only required to remove one hitch pin.
3. Pull the shoe pin from the caliper to release the shoe from the caliper.
4. Pull the shoe out of the caliper.

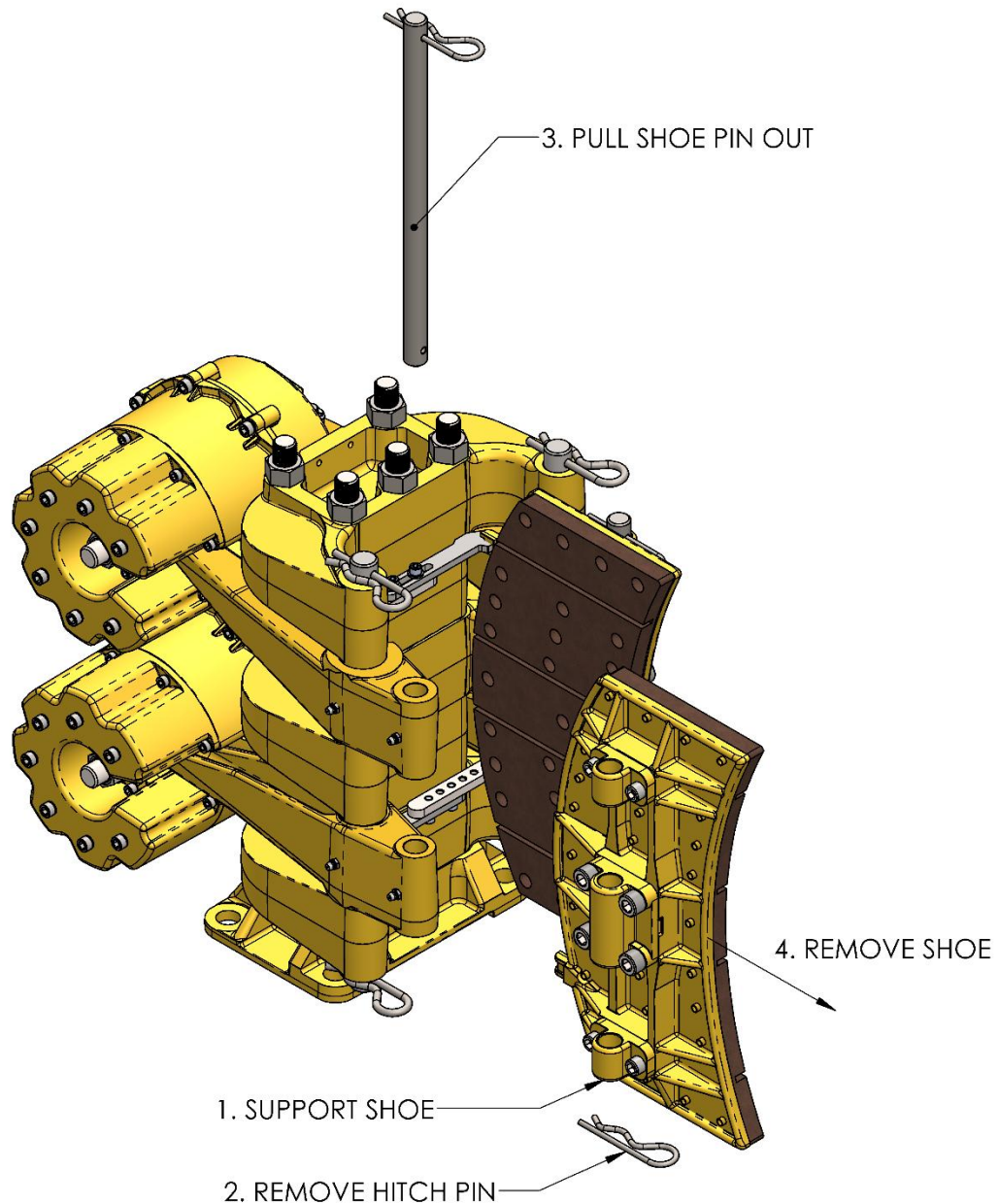


Figure 3: Shoe removal from caliper

5. Refer to Figure 6 for the next 3 steps.
6. Mark the placement and orientation of the pivot blocks. It is recommended to replace the pivot blocks in the same position on the new shoe.
7. Remove the pivot block mount screws.
8. Remove the pivot blocks

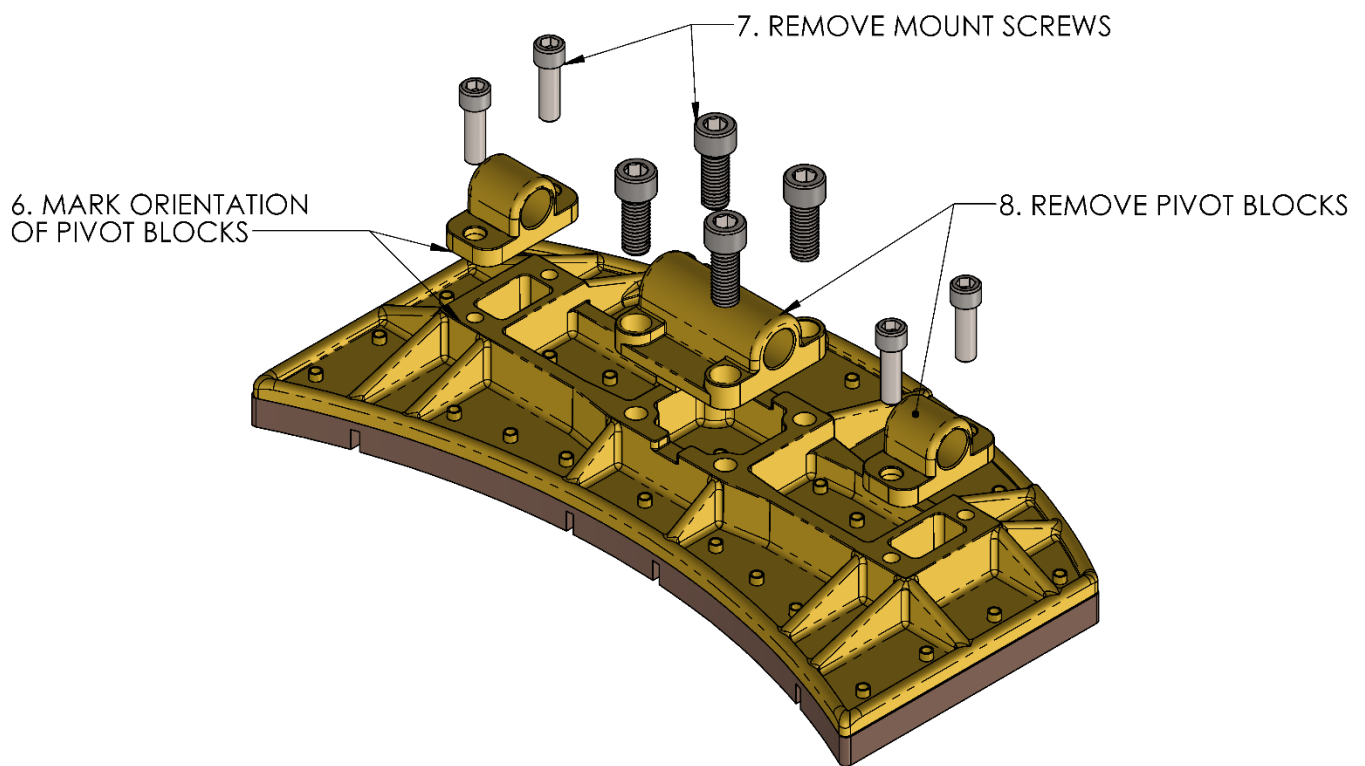


Figure 4: Disassembling old shoe

9. Repeat steps 1-8 to remove the other shoe from the caliper.
10. Inspect the pivot block bores for signs of wear and damage. The pivot block bore must not exceed the specified diameter given in Table 10. If needed, replacement pivot blocks can be ordered from the factory.
11. Inspect the lever shoe pin bushing bores for signs of wear and damage as shown in Figure 5. The lever shoe pin bore must not exceed the specified diameter given in Table 10. If needed, replacement levers can be ordered from the factory.

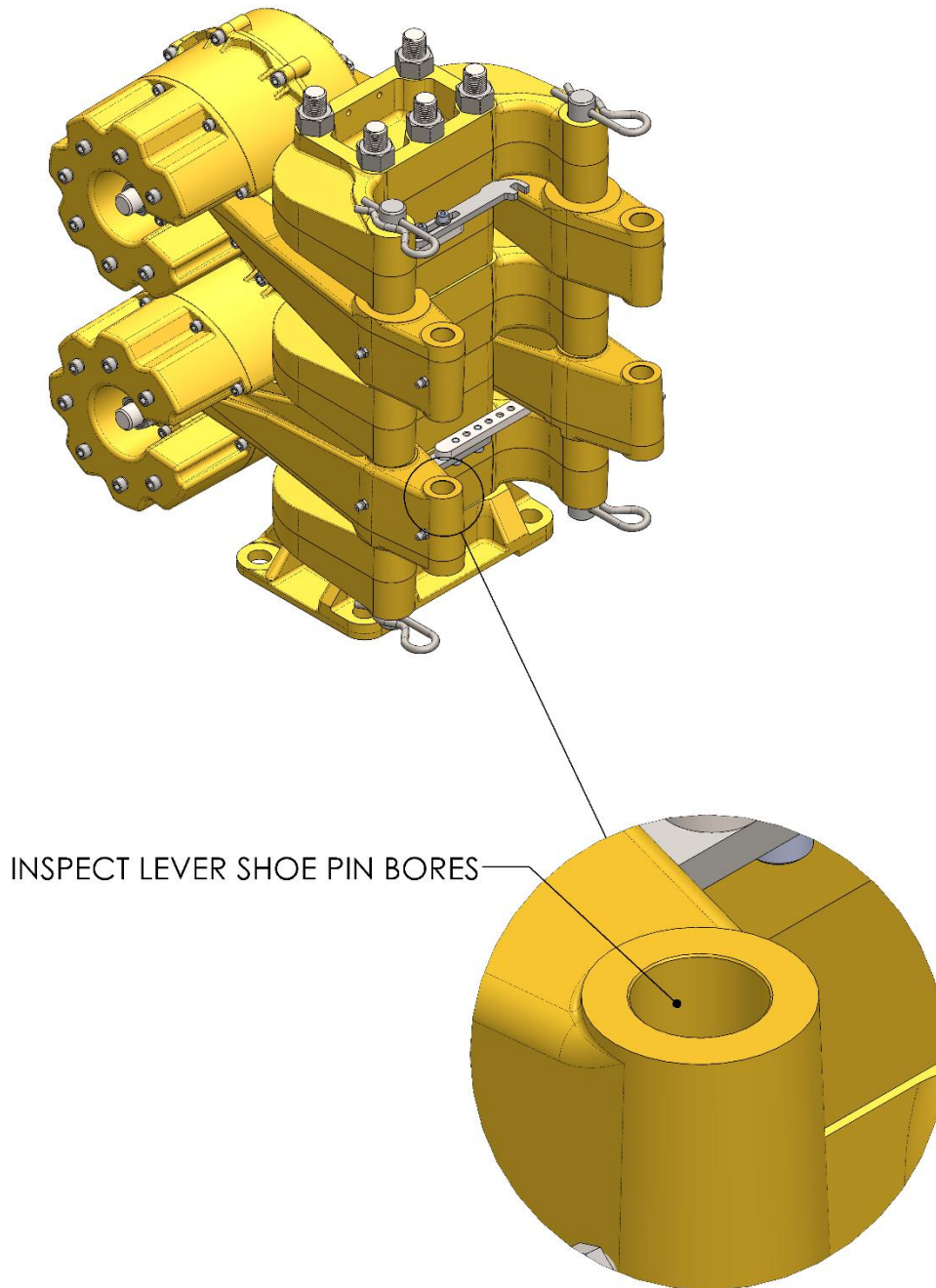


Figure 5: Inspecting lever shoe pin bore

12. Inspect the shoe pin for signs of wear and damage, refer to section 5.2.4. Pins with excessive wear or scoring must be replaced.

-
13. Clean the bottoms of the pivot blocks and the mating surface on the shoes. Any burrs or raised edges must be stoned or filed flat.
 14. Replace the pivot blocks onto the new shoe maintaining the same placement and orientation as on the old shoes.
 15. Apply Loctite 243 to the threads of the pivot block bolts.
 16. Install the pivot block bolts observing the placement of the different sized inner and outer pivot block bolts as shown in Figure 6. **FINGER TIGHTEN** the pivot blocks in this step.

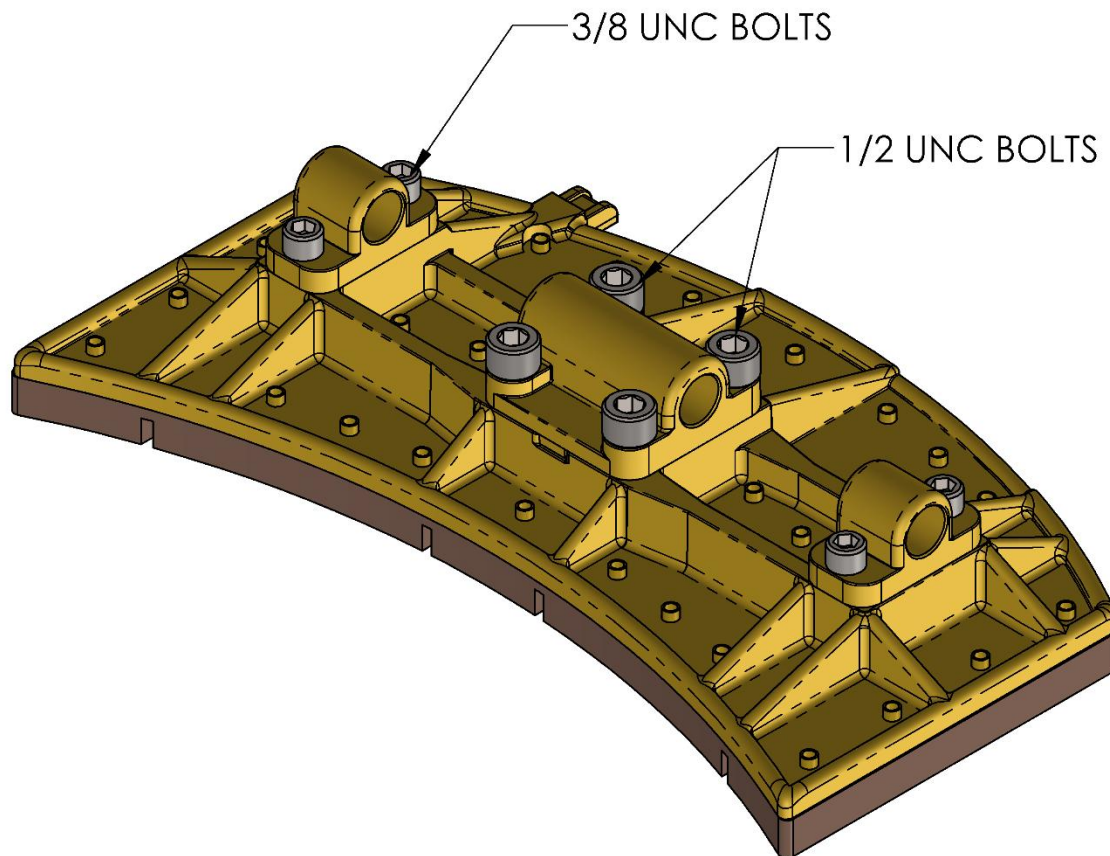


Figure 6: Pivot block mounting bolt placement

17. Refer to section 5.3.2 and adjust the stroke of the brake actuators back to its original position (Clevises screwed fully in). The brake actuators will be properly positioned once both new shoes have been replaced.
18. Apply a light coat of grease to the pivot block bores and lever shoe pin bore. Refer to the specified grease in Table 8.

-
19. Place the shoe assembly back into the caliper lining the bore of the pivot blocks with the bores of the lever shoe pin bore. Ensure the balancing link is placed back onto the shoe as shown in Figure 7.

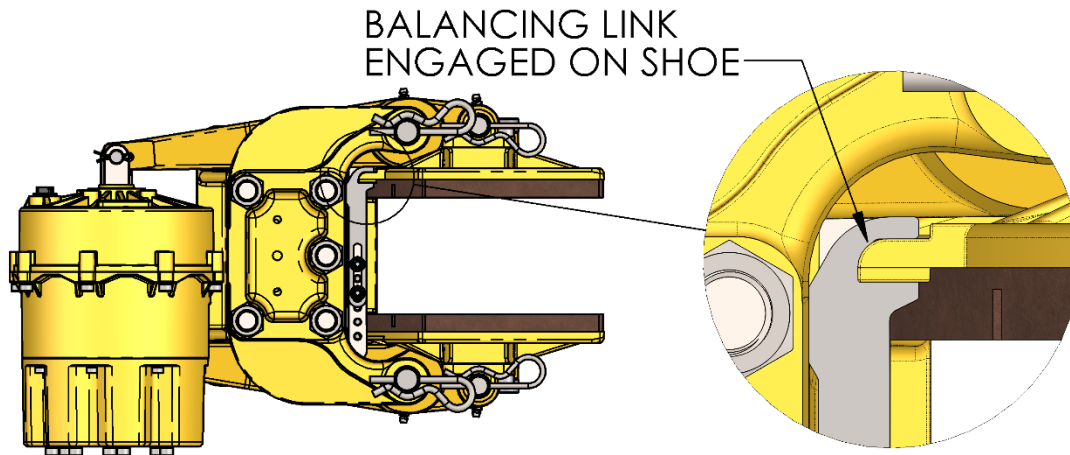


Figure 7: Balancing link engaged on shoe

20. Apply a light coat of grease to the shoe pin. Refer to the specified grease in Table 8.
21. Reinstall the shoe pin into the shoe assembly. If severe resistance is found, stop and assess if the shoe pin bores are all lined up. Check that pivot block bolts are still loose enough to allow the pivot blocks to self-align themselves.
22. Replace the hitch pin(s) onto the shoe pin.
23. Torque the pivot block bolts in a multistep, alternating sequence to the torque specifications given Table 10. **NOTE:** The outer and inner pivot block bolts have two different torque values.
- If significant time has passed between application of thread locker and torquing the bolts, the thread locker should be re-applied.*
24. Check that the shoe can still be rotated freely about the shoe pin and a binding condition does not exist.
25. Replace both shoes before continuing to the next step.
26. Re-adjust the actuator stroke per section 5.3.2.
27. Remove the lockout condition on the brake so it may be operated.
28. Follow the directions in section 5.3.7 to adjust the balancing links for the new shoes.
29. Recheck function of the brake and burnish the new brake shoes per sections 3.4 - 3.6

5.3.7 Brake Linings

The linings must be replaced before the rivets make contact with the disc. Follow the steps in section 5.3.6 to remove the shoes from the caliper. Remove worn linings from the shoe by drilling out the rivets with a 1/4" drill. Install new linings with the proper rivets

	<h4>LINING REPLACEMENT</h4> <ol style="list-style-type: none">1. Remove bottom cotter pins from pins 'E'.2. Remove pins 'E' by pulling upwards.3. Remove shoes by sliding radially forward to clear the ends of the levers. <p>When re-installing the shoes into the caliper assembly, be sure to re-engage the balancing links "A".</p> <p>If there is insufficient room radially to remove the shoe, then screws 'C' must be removed.</p>
	<h4>BALANCING LINK ADJUSTMENT</h4> <p>To adjust;</p> <ol style="list-style-type: none">1. Loosen screws 'B',2. Apply brakes onto the disc,3. Ensure link 'A' has no tension on it. Adjust if necessary.4. Tighten screws 'B'

Follow the instructions in section 5.3.6 for re-installing the shoes.

5.4 RECOMMENDED SPARES

The spare parts kept on hand will depend on the severity of the service. As a minimum Kobelt recommends keeping the following parts for each brake in service:

1. One Lined set of brake shoes
2. One set of brake pads with rivets
3. One actuator
4. Two seal kits

Refer to the parts list drawings in [Appendix B](#) for a complete list of parts.

The table below itemizes which kit/spare part numbers change with the various brake configuration options. Please reference this table to ensure you receive the correct parts.

Table 11: Configuration Kit Numbers

Configuration Kit Numbers		
Actuator Code	Actuator No.	Description
-SA	6230	117 psi release
-SA100	6230-100	98 psi release
-SA80	6230-80	87 psi release
-SA75	6230-75	76 psi release
Disc Code	Shim Kit	Disc Thickness
-350	5026-3500	3.500 in
-300	5026-3000	3.000 in
-250	5026-2500	2.500 in
-200	5026-2000	2.000 in
Friction Code	Lined Shoe	Friction Material
-N	5026-LSN5	non-sparking
-C	5026-LSC5	low COF (.12-.15)
-E	5026-LSE5	mid COF (.25-.28)

6 REVISION HISTORY

Table 7: Revision History

Document Revision	Release Date	CO	Author	Revision Summary
C	2026-01-22	01336	GG	<ul style="list-style-type: none">• Section 2.2: Added warning about keeping discs free of contaminants• Added section 2.3.3 Isolation• Added section 5.3.6 for replacing shoes.• Added warnings throughout section 5 for working with Spring Applied actuators and using isolation valves during maintenance.
B	2025-10-09	01325	GG	<ul style="list-style-type: none">• Added section 2.1.1 & 2.1.2: Rigging. Corrected references to 5020 brake
A	2025-03-28	-	HE	<ul style="list-style-type: none">• Initial release

7 WARRANTY

Kobelt Manufacturing Co. Ltd. ("Kobelt") warrants the Products and Parts manufactured by Kobelt to be free from defects in workmanship or material and that said products are designed mechanically and functionally to perform to specifications.

This warranty is effective providing:

- The equipment is used within the intended operating conditions and in accordance with Kobelt recommendations
- The equipment is installed according to equipment diagrams, specifications and recommendations which Kobelt has provided

This warranty becomes invalid if the factory supplied serial number has been removed or altered on the product. This warranty does not cover cosmetic damage or damage caused by an act of God, accident, misuse, abuse, negligence or modification of any part of the product. This warranty does not cover damage due to improper operation or maintenance, connection to inappropriate equipment or attempted repair by anyone other than an authorized Kobelt representative.

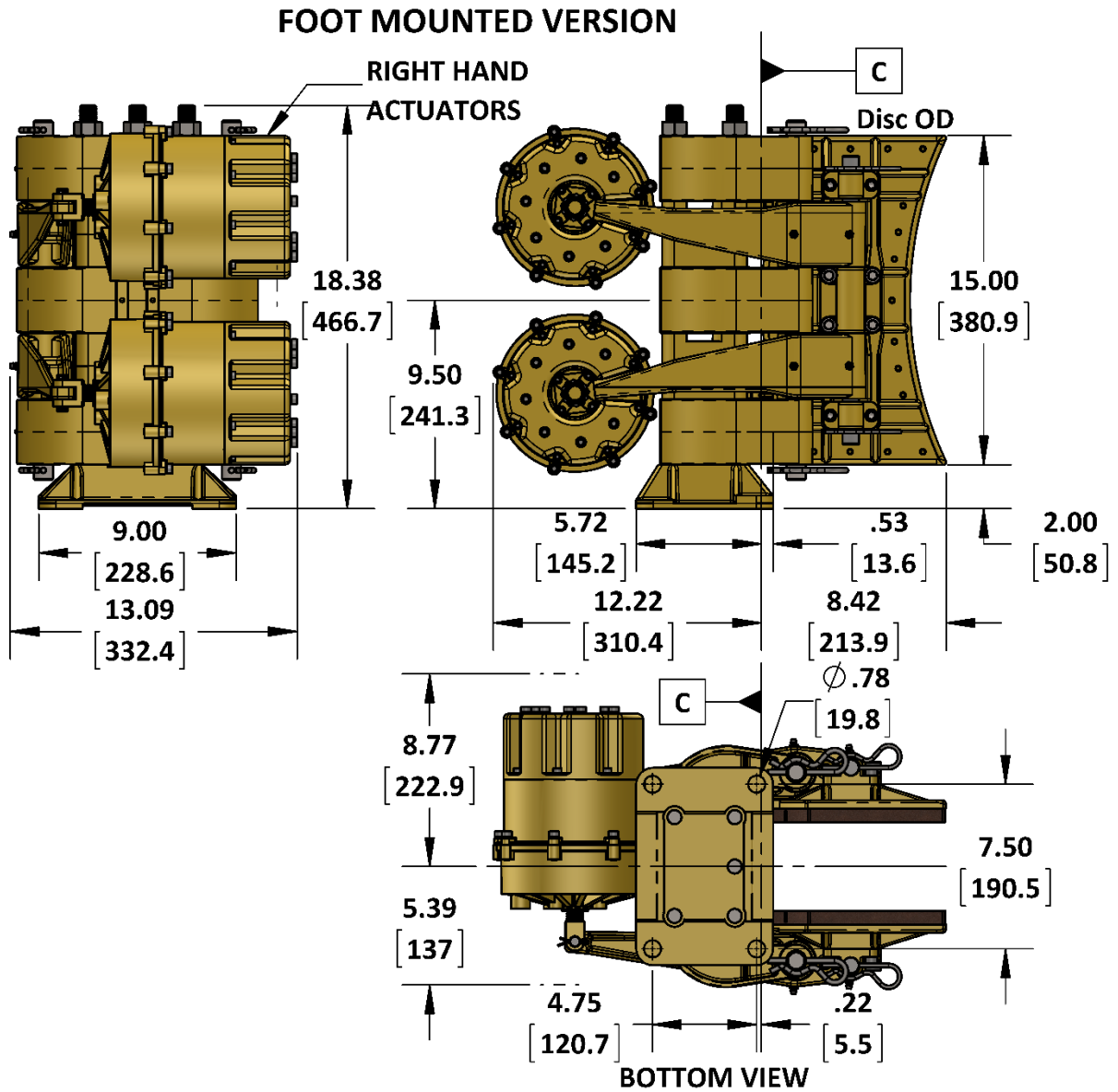
Upon identification of a potential issue or defect with a Kobelt Product or Part, the Warranty Applicant ("Applicant") must immediately contact Kobelt and describe the issue in writing, by letter, fax, email or other electronic conveyance. Kobelt will then assess the cause of the defect, and determine warranty applicability and appropriate remediation.

If any part is found to be defective, Kobelt will replace said part FOB the Kobelt factory provided that any such defective part is returned by the Buyer with freight and applicable forwarding charges prepaid by the Buyer. Kobelt's sole obligation to the Applicant will be to repair or replace the defective part with same or similar product, to a maximum value of the list price of the product or part. The Kobelt warranty does not cover labour charges, travel or any other associated expenses.

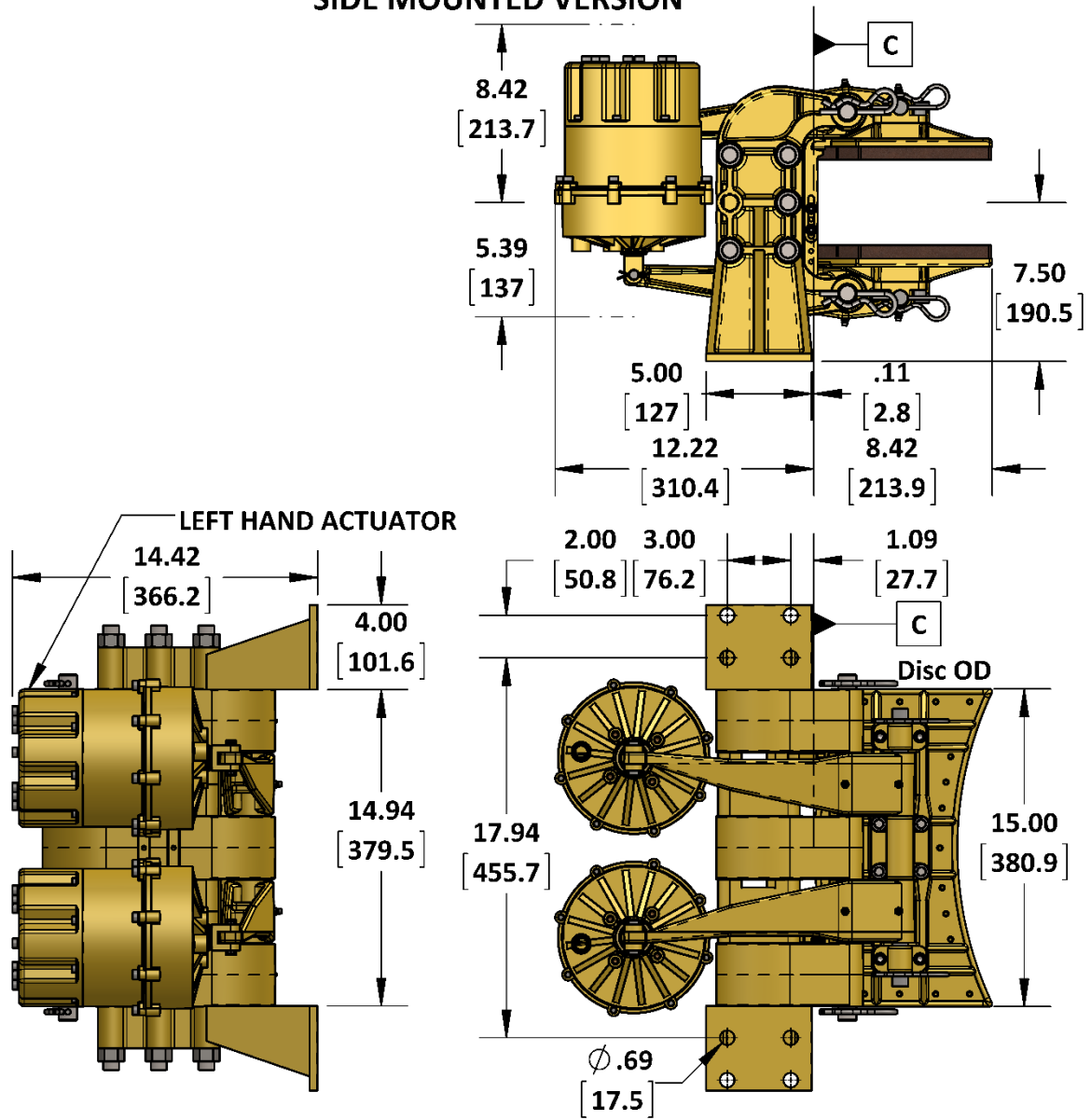
All Products and Parts manufactured by Kobelt, with the exception of brake discs and pads, are subject to a warranty against manufacturer's defects in materials or workmanship for a period of two (2) years from the date of purchase. Brake discs are subject to a one (1) year warranty period, and brake pads and linings are not covered by warranty.

Kobelt will be responsible for all Products or Parts sold by Kobelt but manufactured by 3rd party manufacturing companies. However, these products and parts are subject to applicable 3rd party warranties, and may not be the same as the Kobelt warranty.

8 APPENDIX A: TECHNICAL DRAWINGS

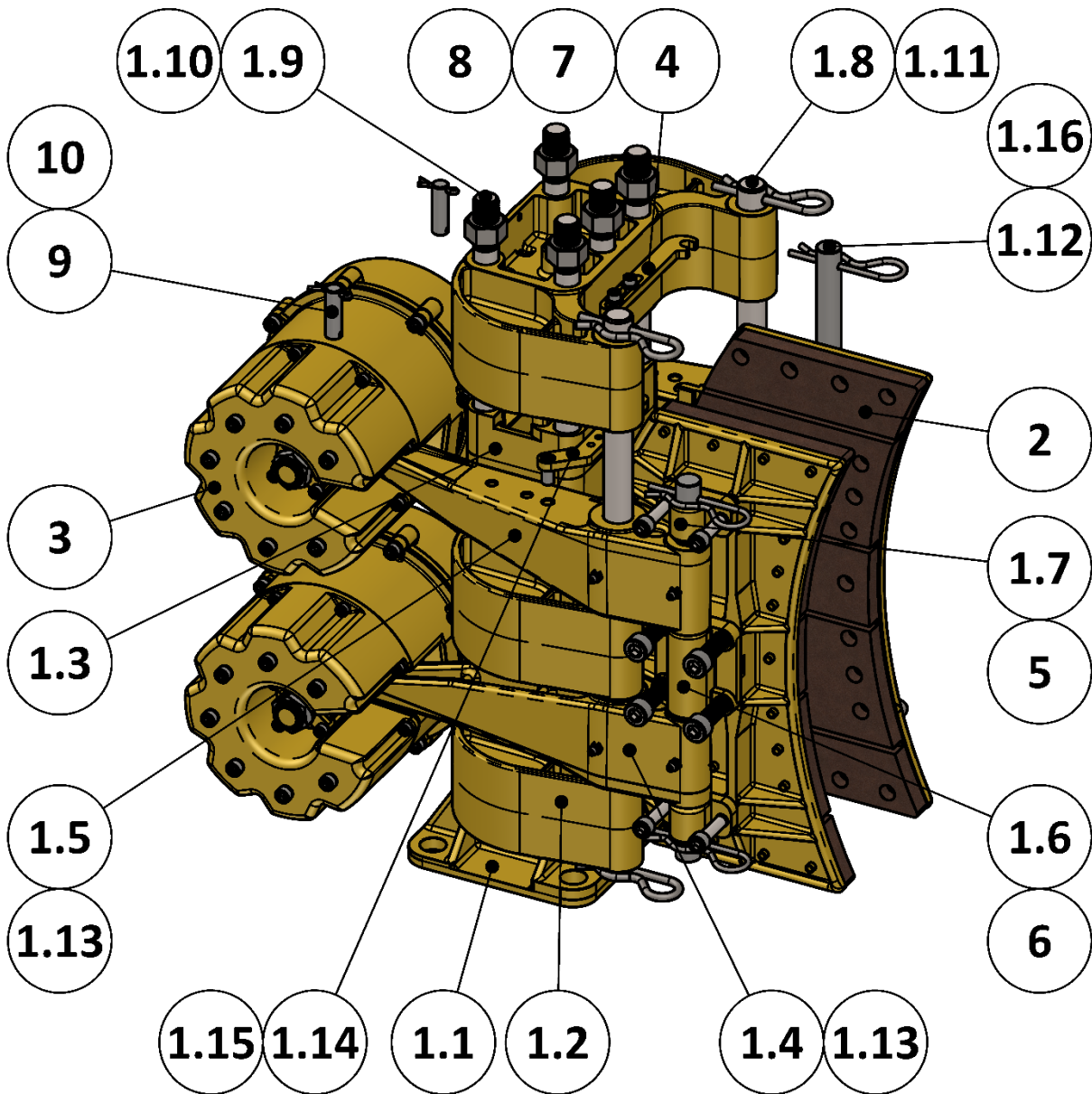


SIDE MOUNTED VERSION



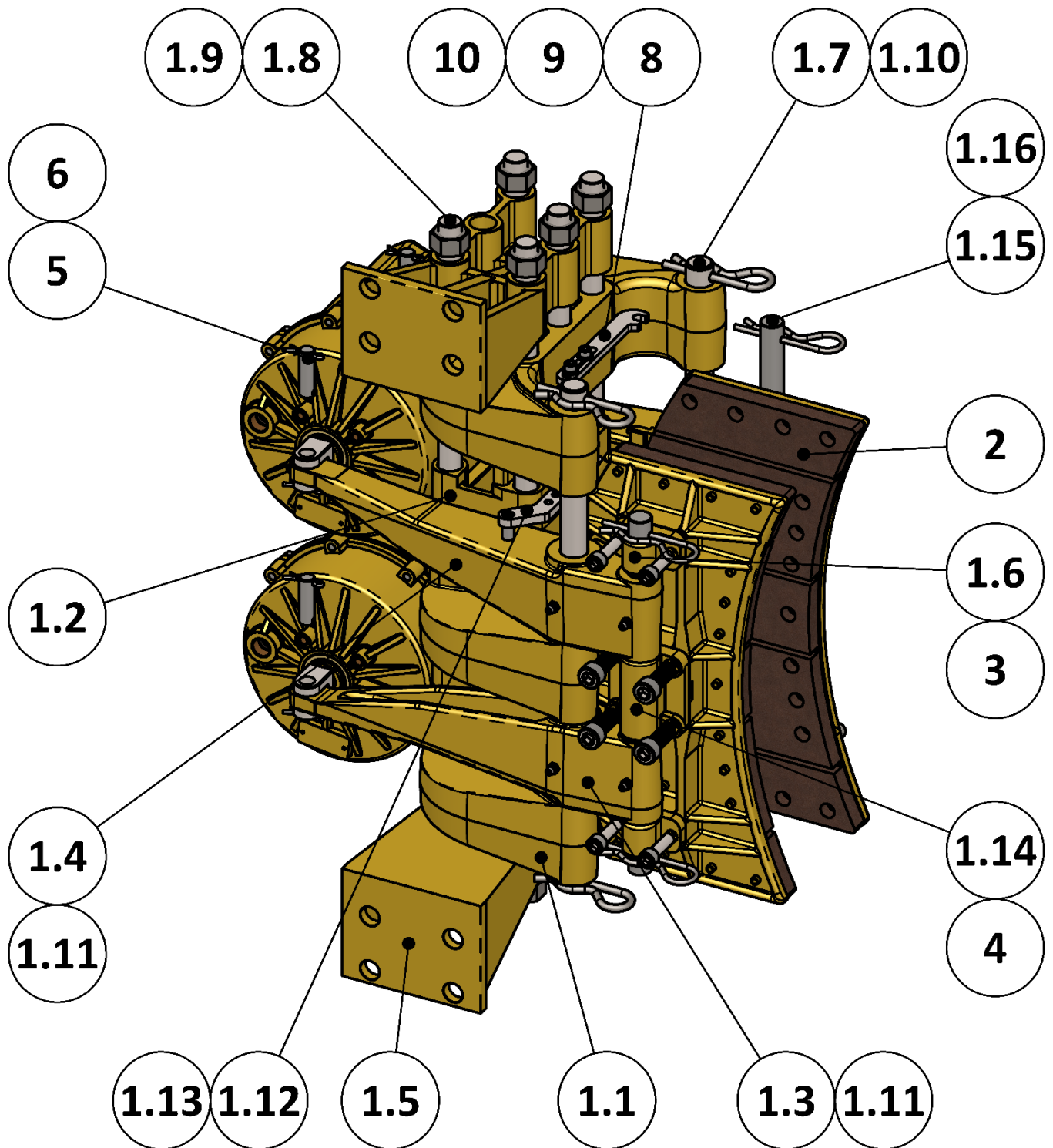
9 APPENDIX B: PARTS LIST DRAWINGS

5026-SA



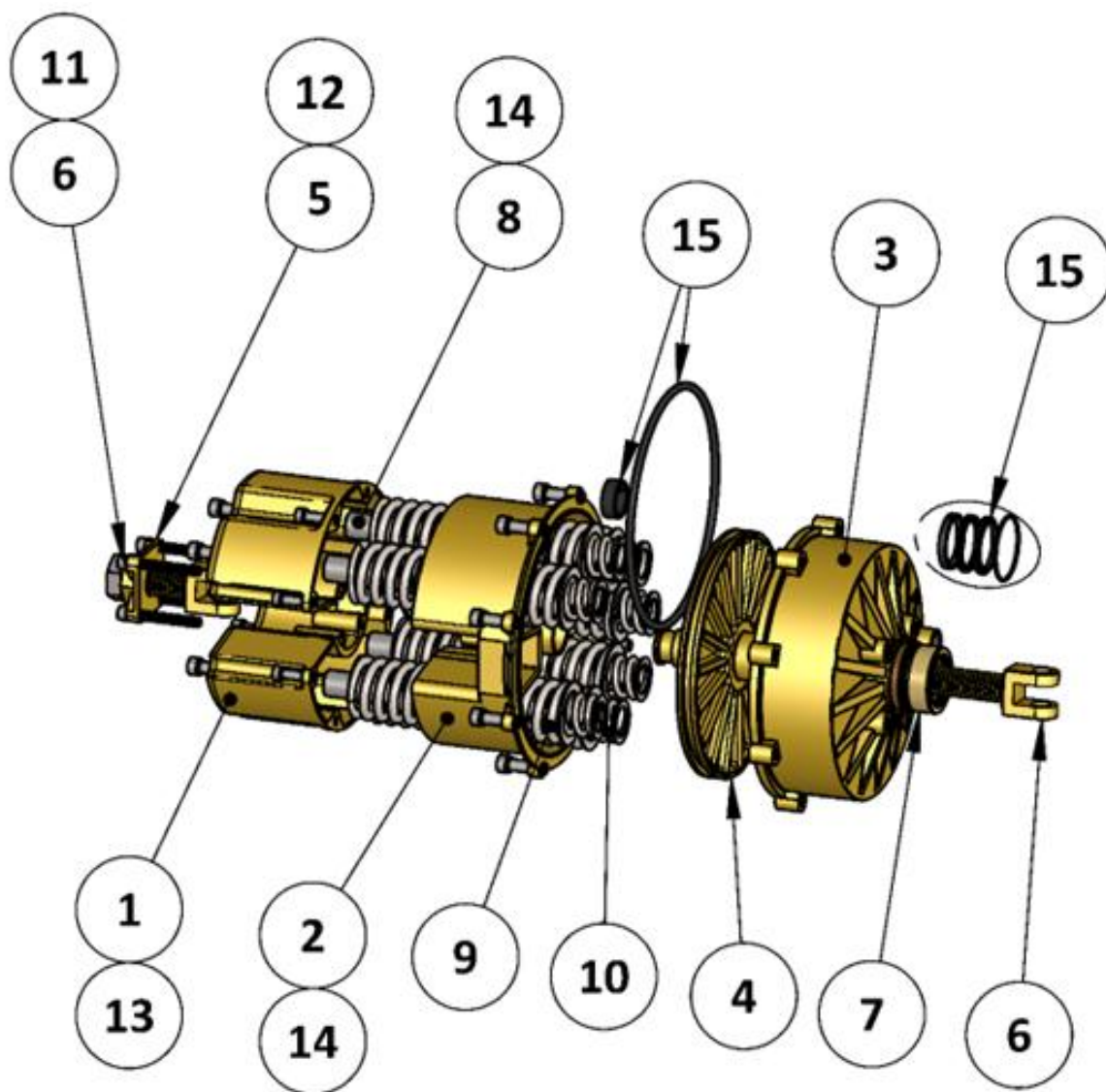
ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	5026-SUB	SUB-ASSEMBLY, 5026 CALIPER
1.1	1	5026-0001	FOOT, 5026 CALIPER
1.2	3	5026-0002	SADDLE, 5026 CALIPER
1.3	2	5026-0003	SPACER, 5026 CALIPER
1.4	2	5027-0004-R	LEVER, RIGHT, 5027
1.5	2	5027-0004-L	LEVER ARM, LEFT, 5026 CALIPER
1.6	2	5026-0013	PIVOT BLOCK, CENTER, 5026 CALIPER
1.7	4	5026-0014	PIVOT BLOCK, OUTER, 5026 CALIPER
1.8	2	5026-0028	PIVOT PIN, 5026/28 CALIPERS
1.9	5	5027-0023	TIE ROD, 5026 & 5027 CALIPER
1.1	5	1022-0117	NUT, HEX, 3/4-10 UNC, Gr 18-8
1.11	4	1039-0470	PIN, HAIRPIN COTTER, 1/4 X 4-1/4, STEEL
1.12	2	5026-0027	SHOE PIN, 5026 CALIPER
1.13	8	1501-0301	GREASE NIPPLE, 1/4-28
1.14	2	5025-0011	BALANCING LINK, PIVOT END
1.15	2	5024-0026	LINK PIN, 5024 - 5026 CALIPERS
1.16	4	1039-0352	HITCH PIN, 5/16 X4, STEEL
2	2	5026-LS	SHOE ASSEMBLY, 5/8" K5, 5026 CALIPER
3	2	6230	ACTUATOR, SPRING APP / AIR REL, 120 PSI
4	2	5025-0012	BALANCING LINK, FORK END, 5025 CALIPER
5	8	1002-1220	SCREW, SKT HD, 3/8-16 UNC X 1-1/4, SS
6	8	1002-1420	SCREW, SKT HD, 1/2-13 UNC X 1-1/4, SS
7	4	1002-1010	SCREW, SKT HD, 1/4 UNC X 5/8 LG, 18-8 SS
8	4	1023-0216	FLAT WASHER, 1/4, TYPE B, NARROW
9	4	6230-0010	CLEVIS PIN, 1/2" DIA
10	8	1026-0516	COTTER PIN, 1/8" X 1", SS

5026-SAW



ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	5026-SUB-W	SUB-ASSEMBLY, SIDE MOUNT
1.1	3	5026-0002	SADDLE, 5026 CALIPER
1.2	2	5026-0003	SPACER, 5026 CALIPER
1.3	2	5027-0004-R	LEVER, RIGHT, 5027
1.4	2	5027-0004-L	LEVER ARM, LEFT, 5026 CALIPER
1.5	2	5026-0060	BRACKET, SIDEWALL MOUNT, 5025/5026
1.6	4	5026-0014	PIVOT BLOCK, OUTER, 5026 CALIPER
1.7	2	5026-0028	PIVOT PIN, 5026/28 CALIPERS
1.8	5	5026-0124	TIE ROD, SIDE MOUNT CALIPER
1.9	10	1022-0117	NUT, HEX, 3/4-10 UNC, Gr 18-8
1.1	4	1039-0470	PIN, HAIRPIN COTTER, 1/4 X 4-1/4, STEEL
1.11	8	1501-0301	GREASE NIPPLE, 1/4-28
1.12	2	5025-0011	BALANCING LINK, PIVOT END
1.13	2	5024-0026	LINK PIN, 5024 - 5026 CALIPERS
1.14	2	5026-0013	PIVOT BLOCK, CENTER, 5026 CALIPER
1.15	2	5026-0027	SHOE PIN, 5026 CALIPER
1.16	4	1039-0352	HITCH PIN, 5/16 X4, STEEL
2	2	5026-LS	SHOE ASSEMBLY, 5/8" K5, 5026 CALIPER
3	8	1002-1220	SCREW, SKT HD, 3/8-16 UNC X 1-1/4, SS
4	8	1002-1420	SCREW, SKT HD, 1/2-13 UNC X 1-1/4, SS
5	4	6230-0010	CLEVIS PIN, 1/2" DIA
6	8	1026-0516	COTTER PIN, 1/8" X 1", SS
7	2	6230	ACTUATOR, SPRING APP / AIR REL, 120 PSI
8	2	5025-0012	BALANCING LINK, FORK END, 5025 CALIPER
9	4	1002-1010	SCREW, SKT HD, 1/4 UNC X 5/8 LG, 18-8 SS
10	4	1023-0216	FLAT WASHER, 1/4, TYPE B, NARROW

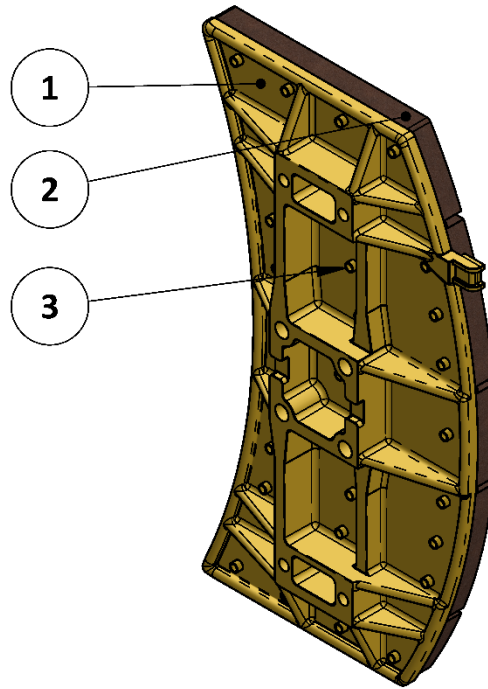
6230 Actuator



ITEM	QTY.	PART NUMBER	DESCRIPTION
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1	1	6230-0001	SPRING HOUSING, COVER
2	1	6230-0101	SPRING HOUSING, CENTRE
3	1	6230-0002	ACTUATOR HEAD, 6233 ACTUATOR
4	1	6230-0003	PISTON, AIR, 6230 ACTUATOR
5	1	6230-0004	CLEVIS BRACKET, 6230 & 6232 ACTUATOR
6	2	6230-0005	CLEVIS, 3/4 UNC X 0.50 DIA
7	1	6230-PHB	SEAL CARRIER, 6230 ACTUATOR
8	7	6230-0012	SPRING GUIDE - 3/4"
9	7	1201-0158	SPRING, COMPRESSION, 1.68 OD X .250 WIRE X 9.5L
10	7	1201-0159	SPRING, COMPRESSION, 1.15 OD X .177 WIRE X 9.5L
11	1	1022-0217	NUT, JAM, 3/4-10 UNC, SS
12	4	1002-1032	SCREW, SCKT HD, 1/4-20 UNC X 2, SS
13	8	1002-1012	SCREW, SCKT HD, 1/4-20 UNC X 3/4, SS
14	15	1002-1116	SCREW, SCKT HD, 5/16-18 UNC X 1, SS
15	1	6230-RK-W	SEAL KIT, 6230 ACTUATOR

5026-LS



ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5026-0005	SHOE, 5026 CALIPER
2	1	5026-0007-K	LINING, 5/8" K5, 5026 CALIPER
3	29	1033-1007	RIVET, 1/4 X 7/16 (10-7), BRASS



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