

AMCB 16200

Installation, Operation and Maintenance of Airflex[®] Model AMCB AccuStop[™] Clutch\Brake Combination



Powering Business Worldwide

Warning

Forward this manual to the person responsible for Installation, Operation and Maintenance of the product described herein. Without access to this information, faulty Installation, Operation or Maintenance may result in personal injury or equipment damage.



Caution

Use Only Genuine Airflex[®] Replacement Parts.

The Airflex Division of Eaton Corporation recommends the use of genuine Airflex replacement parts. The use of non-genuine Airflex replacement parts could result in substandard product performance, and may void your Eaton warranty. For optimum performance, contact Airflex:

In the U.S.A. and Canada: **(800) 233-5926**

Outside the U.S.A. & Canada: **(216) 281-2211**

Internet: www.eaton.com/airflex

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204200

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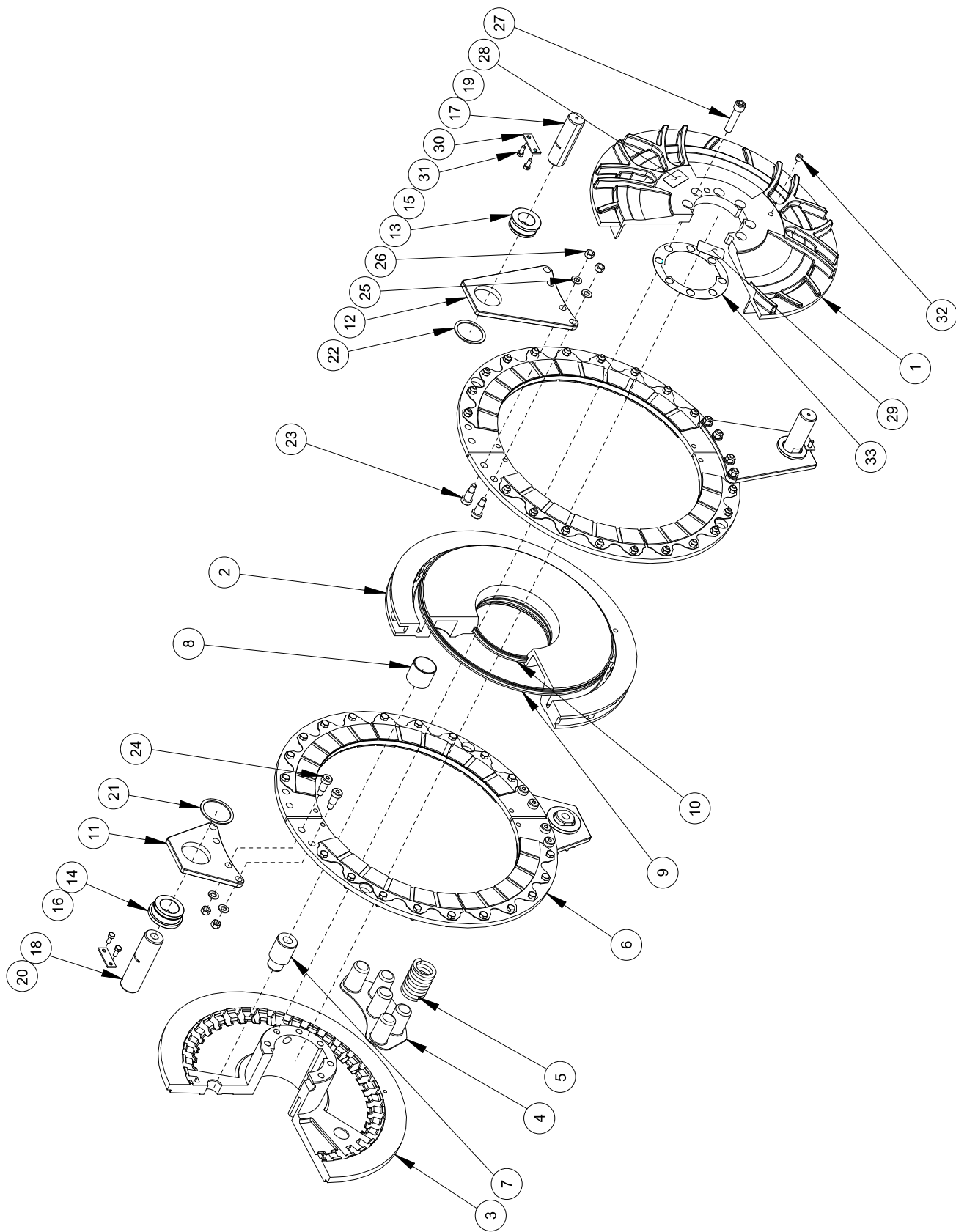



Figure 1 : Component Parts

TABLE 1
Item Descriptions

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Cylinder	18	Short Arm Reaction Pin (Round)
2	Piston	19	Long Arm Reaction Pin (Square)
3	Hub	20	Short Arm Reaction Pin (Square)
4	Spring Retainer	21	Retaining Ring
5	Compression Spring	22	Retaining Ring
6	Friction Disc Assembly	23	Shoulder Bolt
7	Torque Tube	24	Shoulder Bolt
8	Torque Tube Bushing	25	Flat Washer
9	Piston Seal (Outer)	26	Hexagon Nut
10	Piston Seal (Inner)	27	Socket Head Screw
11	Short Reaction Arm	28	Name Plate
12	Long Reaction Arm	29	Warning Plate
13	Long Arm Bushing (Round)	30	Retaining Plate
14	Short Arm Bushing (Round)	31	Hex Head Screw
15	Long Arm Bushing (Rectangular)	32	Pipe Plug
16	Short Arm Bushing (Rectangular)	33	Gasket
17	Long Arm Reaction Pin (Round)		

1.0 INTRODUCTION

Throughout this manual there are a number of **HAZARD WARNINGS** that must be read and adhered to in order to prevent possible personal injury and/or damage to equipment. Three signal words “**DANGER**”, “**WARNING**” and “**CAUTION**” are used to indicate the severity of a hazard, and are preceded by the safety alert symbol 

Danger

Denotes the most serious hazard, and is used when serious injury or death WILL result from misuse or failure to follow specific instructions.

Warning

Used when serious injury or death MAY result from misuse or failure to follow specific instructions.

Caution

Used when injury or product/equipment damage may result from misuse or failure to follow specific instructions.

It is the responsibility and duty of all personnel involved in the installation, operation and maintenance of the equipment on which this device is used to fully understand the:

Danger

Warning

Caution

procedures by which hazards can be avoided.

1.1 Description

- 1.1.1 The Airflex Model AMCB AccuStop™ is a pneumatically operated clutch-brake combination, which is designed and manufactured to provide dependable clutch-brake service in many different industrial applications. It is suitable for high speed and cyclic operation. The AMCB AccuStop™ requires no periodic lubrication or adjustment.

1.2 How it Works

Note : Refer to **Figure 1** for item numbers which are listed in parentheses (#) throughout this manual.

1.2.1 The AMCB AccuStop™ hub (3) is mounted to the machine input shaft, and the cylinder (1) is attached to the hub. These components are axially stationary. The clutch disc (6) is connected to reaction arms (11) that are supported by reaction pins (18) (20) mounted to the machine drive system such as a flywheel. The brake disc (6) is connected to reaction arms (12) that are supported by reaction pins (17) (19) that are mounted to a stationary member, such as the machine frame. Air pressure is routed through a supply line, through a rotary seal, and into the cylinder (1). As air pressure is introduced into the cylinder cavity, the piston (2) begins to move away from the cylinder, releasing the brake friction disc (6). When the pressure builds to overcome the force of the springs (5), the piston continues moving until it clamps the clutch friction disc assembly against the flange on the hub (3), engaging the clutch. As air pressure is exhausted from the cylinder cavity, the springs force the piston toward the cylinder, clamping the non-rotating brake disc between the piston and cylinder to stop the machine.

1.3 Technical Information

1.3.1 Maximum speeds and pressures are shown in Table 2. Please note that the actual maximum operating speed for each application might be less than the maximum allowable speed due to the energy (heat) capacity of the AMCB AccuStop™ assembly. Contact Airflex for operating limits specific to your application.

Warning

Operation at speeds and pressures that exceed the limits in Table 2 will cause damage to the AMCB AccuStop™.

2.0 INSTALLATION

2.1 Preparation

2.1.1 Prior to installation of the AMCB AccuStop™ assembly, the positioning of the clutch/brake on the machine should be planned and designed so that the hub and reaction pins are properly located, and the shaft that the assembly will mount onto has been properly sized. Air passages in the shaft should be properly located to align with the internal air passage in the hub. Contact Airflex for appropriate dimensional information required for installing the AMCB AccuStop™ assembly on your equipment.

Warning

Improper positioning of the AMCB AccuStop™ assembly and related mounting components may result in improper operation of the clutch or brake.

2.1.2 Measure the machine shaft and AMCB AccuStop™ hub bore to verify that they are the correct size for proper fit to one another.

Warning

If the AMCB AccuStop™ assembly fits too loosely onto the shaft, damage to the shafting, keys and keyways and the AMCB AccuStop™ hub will occur.

TABLE 2 Technical Data				
AMCB AccuStop™ Model	Maximum Speed* (RPM)	Maximum Air Pressure (Bar)	Brake Release Air Pressure (Bar) 15 Spring Configuration	AMCB AccuStop™ Weight (Kg)
45	900	7.0	2.5	190
*Note : Maximum speed for non-cyclic operation. Maximum speed for single stroke operation is dependent upon clutch and brake thermal requirements.				

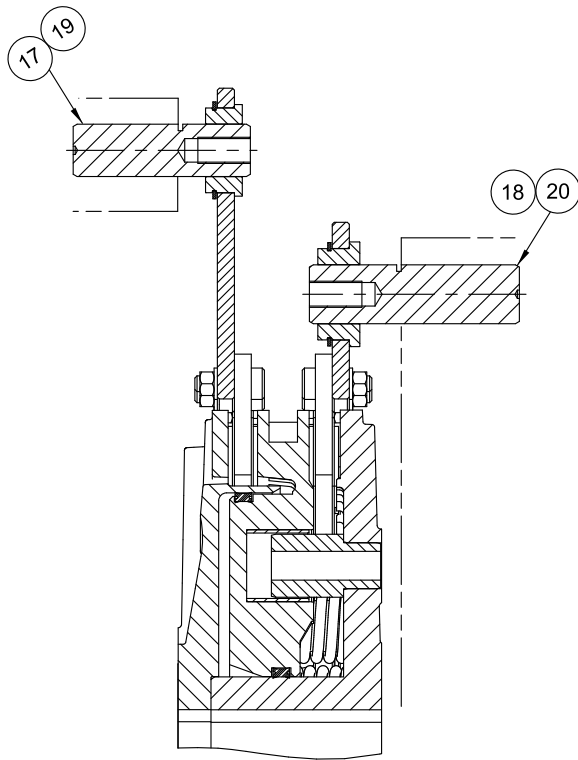


Figure 2 : Mounting Arrangement

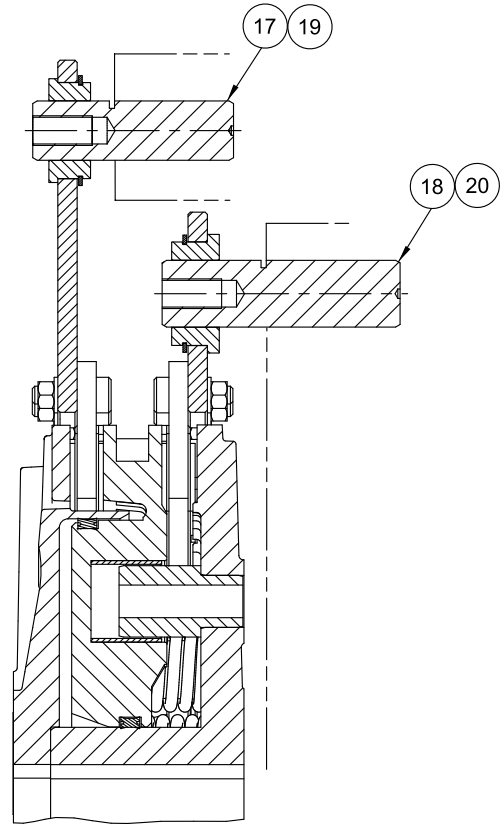


Figure 3 : Mounting Arrangement

2.1.3 Holes for the reaction pins (17, 18, 19 & 20) should be properly sized and located on the machine frame or flywheel, as appropriate. See Table 3 for proper hole sizes. All holes should be reamed smooth for good contact and fit of the pin. The edges of the holes should be slightly eased (radius at the edges) to reduce stress risers that could damage the reaction pin during operation.

2.1.4 Sealing plates that provide a method to contain the pressurized air between the machine shaft and AMCB AccuStop™ assembly should be fabricated by the customer. These are not supplied by Airflex. The bore of the plate will be custom sized according to the shaft size. The plates should also be secured to the hub or cylinder of the AMCB AccuStop™ to prevent them from rotating freely on the shaft. See Figure 4 that shows an example of this sealing method. For best results, the o-rings should be molded as a continuous ring, and not spliced or joined from cord stock.

TABLE 3 Reaction Pin Hole Size		
AMCB AccuStop™ Model	Short Arm Reaction Pin Bore Dimension (mm)	Long Arm Reaction Pin Bore Dimension (mm)
45	44.937 / 44.962	39.937 / 39.962

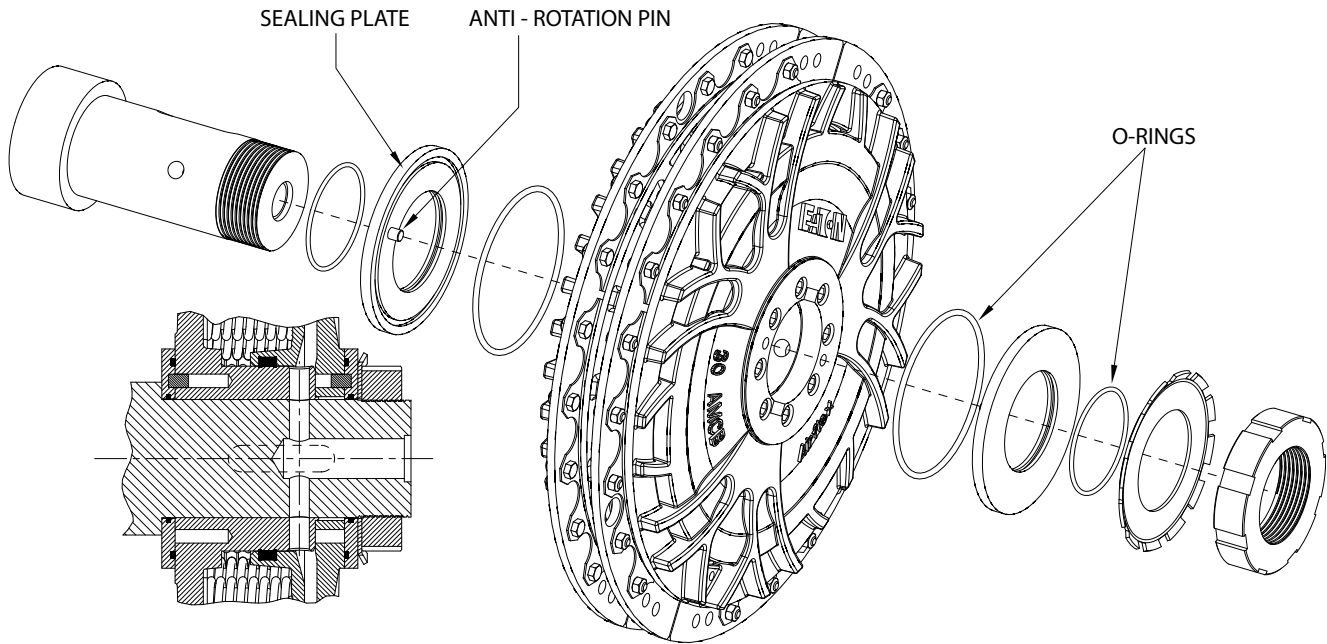


Figure 4 : Sealing Method

2.2 Installation AMCB AccuStop™ Assembly

Note : The following installation procedures are for typical arrangements as shown in **Figures 2 and 3**. The fit of the hub to the shaft should be a transition fit. Air passages are sealed by the use of customer supplied sealing plates and o-rings, as shown in **Figure 4**. Your specific arrangement might be different from what is being described, requiring a different sequence of assembly. Contact Airflex if you require assistance with installation procedures that will satisfy your specific arrangement.

2.2.1 Clutch and Brake Reaction Pins

Install the reaction pins (17, 18, 19 & 20) into the flywheel or machine frame per the following procedures. See **Figures 1, 2 and 3** for illustrations showing part locations and orientation.

2.2.1.1 Verify that the holes the reaction pins will be inserted into are properly sized and located. The reaction pins should be installed with an interference fit into the flywheel, machine frame or reaction bracket, as required for the particular arrangement. See Table 3 for recommended holes sizes. All holes should be reamed smooth for good contact and fit of the pin. The edges of the holes should be slightly eased (radius at the edges) to reduce stress risers that could damage the reaction pin during operation.

2.2.1.2 Freeze the reaction pins to shrink them temporarily, to help ease insertion of the reaction pins into the holes.

2.2.1.3 Noting the orientation of the slot in the side of the reaction pin and the location of the puller hole in the end of the reaction pin, insert the reaction pin into the fitted hole. The puller hole should be positioned outwards to allow for removal of the reaction pin during future maintenance. The slot on the side of the reaction pin should be positioned 180 degrees from the centerline of the machine shaft. Install the reaction pin to the proper depth, aligning the slot to allow for assembly of the retaining plate (30). See **Figures 2, 3 and 5**.

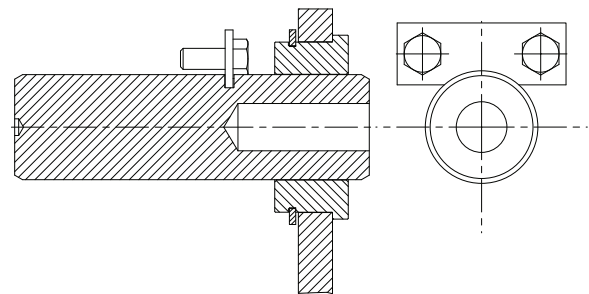


Figure 5 : Reaction Pin Orientation

Warning

Improper fits of the reaction pins could result in loosening or failure of the reaction pins, preventing the clutch or brake from functioning properly, potentially resulting in serious injury. Ensure that the reaction pins fit properly.

- 2.2.1.4 Assemble the retaining plate (30) to the flywheel with the appropriate hex head screws (31). Apply Loctite® #243 to the threads of the hex head screws, install and tighten to the appropriate value indicated in Table 4.
- 2.2.2 Check to be sure that there are no sharp edges on the edges of the keyway or air passages on the machine shaft that could damage the hub or o-rings during assembly onto the shaft. Correct as required.
- 2.2.3 Using an appropriate o-ring lubricant such as Parker O-Lube®, lubricate and install the o-rings into the grooves of the seal ring. Noting the orientation of the o-ring grooves, carefully slide the first sealing plate onto the shaft until it stops against the shoulder on the shaft. These plates and O-rings are customer supplied. See **Figure 4**.
- 2.2.4 Rotate the sealing plate to position the anti-rotation pin 90 degrees from the keyway location so that it will engage into the corresponding hole in the AMCB AccuStop™ hub (3) when assembled. See **Figure 4**.

 **Caution**

Failure to position the seal plate and anti-rotation pin properly will result in damage to components during assembly.

- 2.2.5 Install the key or keys (customer supplied) into the keyway(s) in the shaft. The keys should fit tightly in the shaft so that they do not fall from the keyway.
- 2.2.6 Apply a very light coating of anti-seize compound (Never-Seez® or equivalent) on the machine shaft and in the bore of the AMCB AccuStop™ hub (3).
- 2.2.7 Rig the AMCB AccuStop™ assembly into position, align the keyways in the hub (3) and shaft, and slide the AMCB AccuStop™ assembly onto the machine shaft until it is located properly onto the machine shaft. Be sure to position and align the holes in the reaction pin bushings (13, 14, 15, 16) in the arm plates with the reaction pins (17, 18, 19, 20) in the flywheel or machine frame so that they engage onto the reaction pins during installation.

Note the orientation of the hole in the round and square reaction pin bushing as shown in **Figure 1**. For brake reaction pin bushings, the round bushing should be assembled near the top or '12 o'clock' position and the square bushing should be located near the bottom, or '6 o'clock' position, corresponding with the shape and location of the reaction pins.

- 2.2.8 Using an appropriate o-ring lubricant such as Parker O-Lube®, lubricate and install the o-rings into the grooves of the remaining seal ring. These components are customer supplied. Assemble the seal ring onto the shaft and against the face of the cylinder (1). Rotate the seal plate to align the anti-rotation pin so that engages into the hole on the cylinder face. See **Figure 4**.
- 2.2.9 Using a shaft locking nut or other method as specified by the machine manufacturer, secure the AMCB AccuStop™ onto the shaft. The AMCB AccuStop™ and seal rings should be clamped adequately to compress the o-rings in the seal rings and prevent movement of the AMCB AccuStop™ hub on the shaft during machine operation.

 **Danger**

Failure to properly secure the AMCB AccuStop™ assembly onto the machine shaft could result in damage to the key, keyways, or hub and shaft interface that could prevent the AMCB AccuStop™ from properly stopping the machine.

**TABLE 4
Fastener Size and Torque - METRIC UNITS**

AMCB AccuStop™ Model	Location	Friction Shoe Assembly		Short Reaction Arm		Long Reaction Arm		Reaction Pin Retaining Plate	Cylinder Assembly
	Item #	N/A	N/A	24	26	23	26	31	27
	Description	Hex Head Screw (Class 8.8)	Nut with Nylon Insert (Class 8)	Socket Head Screw (Class 12.9)	Nut with Nylon Insert (Class 8)	Socket Head Screw (Class 12.9)	Nut with Nylon Insert (Class 8)	Hex Head Screw (Class 8.8)	Socket Head Screw (Class 12.9)
45	Size	M10 X 30	M10	M16 X 25	M12	M16 X 25	M12	M8	M16 X 70
	Torque	-	34 N-m	-	34 N-m	-	34 N-m	20 N-m	164 N-m

2.3 Air System Requirements

Note : Refer to Table 2 for air pressure limits.

2.3.1 Refer to **Figure 6** for a typical air system schematic.

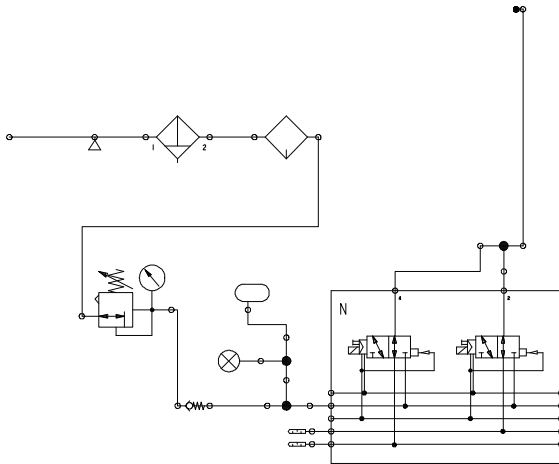


Figure 6 : Typical Air System Schematic

2.3.2 For air systems with restricted supply lines, a surge tank and check valve must be used to insure quick response to the clutch.

2.3.3 For air systems with a supply pressure that exceeds the 7 bar maximum pressure, a pressure relief valve may be placed between the rotor seal and dual solenoid valve to help prevent damage to the AMCB AccuStop™.

2.3.4 For faster brake response, the dual solenoid valve should be placed as close to the rotor seal as possible. A quick exhaust valve can also be used at the rotor seal to improve the exhaust time.

2.3.5 Limiting the use of elbows in the air piping will lower the air restriction, resulting in faster brake response.

2.3.6 A flexible hose is required between the dual valve supply line and the rotor seal to prevent bearings in the rotor seal from being overloaded and binding.

2.3.7 Clean, filtered air should be supplied to the AMCB AccuStop™ assembly. Avoid excessive air lubrication to prevent contamination of the friction discs and surrounding components.

2.3.8 Be sure to follow all appropriate safety regulations specific to the machinery or industry when designing and assembling the air system.

3.0 OPERATION

Warning

Be sure that the machine is properly secured or guarded to prevent personal injury prior to operating the AMCB AccuStop™ assembly.

Caution

Pinch points exist when operating the AMCB AccuStop™. Use care to prevent injury when working near the AMCB AccuStop™ assembly.

3.1 Initial Operation

Note : Initial start-up conditions will vary on different machines. During the initial wear-in period, low clutch or brake torque may be observed. Please be aware that Airflex friction material is formulated to minimize low start-up torques, however, due to initial irregular surfaces and uneven contact at the friction interface, operating or braking torque may be less than the product rating. As the clutch/brake is cycled during machine operation, the friction interface will wear down to full, even contact, and full torque rating will be achieved.

During the initial period of operation, excessive noise (squealing), dust, and wear rates may also be observed. This is due to the initial uneven surfaces of the friction material and mating iron components. As the unit is cycled, the high spots on these surfaces will wear down rapidly until full, even contact is achieved. As the unit wears in, the noise, dusting and wear rate will diminish to acceptable, designed levels.

Warning

Inadequate clutch or brake torque may exist until the friction interface is fully worn in. Verify proper operation of the clutch/brake prior to placing the machine into service to avoid personal injury.

- 3.1.1 After installation, apply air pressure (7 bar maximum) to the AMCB AccuStop™ and check for air leaks. If leaks are detected, investigate the cause and correct as required.
- 3.1.2 Apply air pressure and cycle the clutch/brake. Check to be sure that the clutch disc and brake disc move freely when not clamped between the piston (2) and hub (3) or piston and cylinder (1). The bushings in the reaction arms should not bind on the reaction pins. If they do bind, the reaction pins may not be properly located. Investigate and correct as required.

- 3.1.3 Start the flywheel and check for proper operation of the AMCB AccuStop™ and control system on the machine. Investigate and correct any operational problems.

3.2 Periodic Maintenance

- 3.2.1 Inspect friction material for signs of wear or contamination. Refer to section 3.3 for evaluating wear. Repair as required if limits have been reached.
- 3.2.2 Check for air leaks in the air system and at the clutch/brake.
- 3.2.3 Check rotor seal bearings for freedom of movement.
- 3.2.4 Insure that all guards are properly installed and do not interfere with operation of the AMCB AccuStop™ assembly or flywheel.
- 3.2.5 Check for loose fasteners (shoulder bolts, screws, hexagon nuts) or other component damage resulting from loose fasteners. Replace, repair and secure as required in the installation section of this manual.
- 3.2.6 Inspect arm bushings (13, 14, 15, 16) and reaction pins (17, 18, 19, 20) for looseness or wear. Refer to Table 8 for wear limits. Replace as required.

Warning

Exceeding wear limits can result in product failure and possible personal injury.

3.3 Friction Disc Wear Inspection

- 3.3.1 Check the friction lining thickness for wear. If the friction lining thickness on either side of the disc is less than the minimum allowable, all of the friction shoe assemblies on the disc must be replaced. See Table 9 for wear limits.
- 3.3.2 Refer to **Figure 7**. Exhaust all air pressure and measure the "X" dimension between the clutch disc and the flange on the hub. Refer to Table 5 for wear gap limits. If the maximum gap is achieved, refer to the maintenance section for repair instructions.

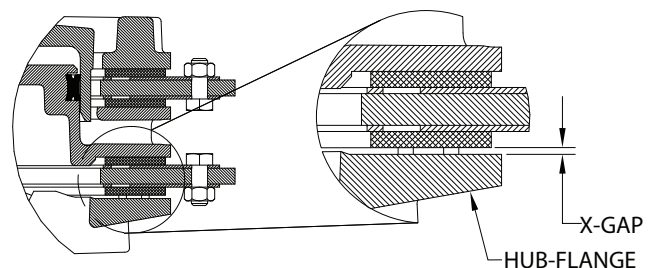


Figure 7 : "X" Gap Location

TABLE 5 Wear Gaps Values			
AMCB AccuStop™ Model	New Condition (mm)		Worn Condition (mm)
	Min	Max	Max
45	0.24	2.39	10.3

4.0 MAINTENANCE

Warning

Prior to performing any work on the AMCB AccuStop™, be sure that the machinery is and will remain in a safe condition. Follow appropriate lockout and blocking of machine components to prevent machine operation and injury to personnel.

4.1 Friction Shoe Replacement

- 4.1.1 Friction shoes can be replaced while the friction disc assemblies remain installed in the AMCB AccuStop™ assembly, provided that the machinery has been properly secured to avoid injury when performing repairs. Refer to **Figure 8** for item numbers (#) listed in this section. Refer to the part lists at the end of this manual for friction shoe replacement kit part numbers.

Caution

Pinch points exist when applying or exhausting air pressure from the AMCB AccuStop™ assembly. Keep hands away from small gaps where they can be injured if the clutch or brake will move when performing inspections or maintenance.

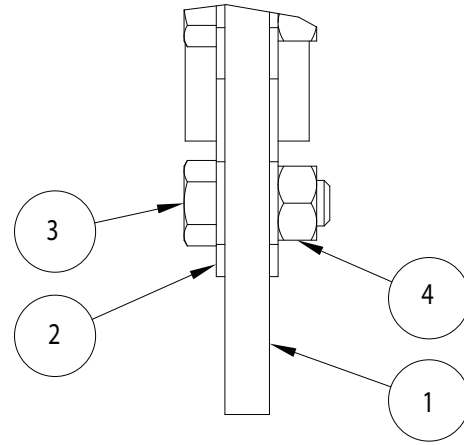


Figure 8 : Friction Shoe Assembly

- 4.1.2 The friction shoes (2) are assembled to the friction disc cores (1) as multiple pairs on each core. Each pair consists of one shoe on each side of the core. Remove the hexagon nuts (4) and hex head screws (3) that secure on pair of friction shoes. Discard the old friction shoes and hardware.
- 4.1.3 Clean the surface of the disc core (1) to remove any oil, grease, or contamination.
- 4.1.4 Position one new friction shoe (2) on the each side of the friction disc core (1) and assemble with new hex head screws (3) and hexagon nuts (4). Note the orientation of the heads of the hex head screws and hexagon nuts, as shown on **Figure 9**.

Caution

Be sure to use new hex head screws and nuts when replacing friction shoes. Do not re-use the old fasteners.

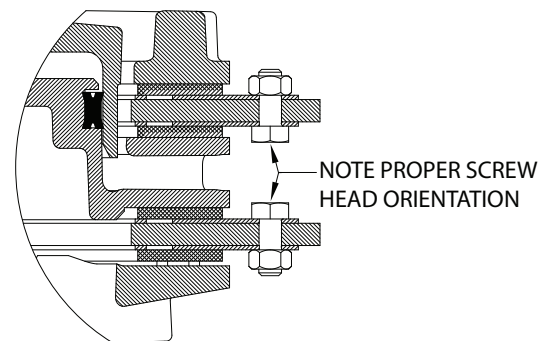


Figure 9 : Friction Shoe Screw Head Orientation

- 4.1.5 Tighten the screws in the sequence shown on **Figure 10** (A first, then B, and so on) to the torque specification listed on Table 4.
- 4.1.6 Repeat steps 4.1.2 through 4.1.5 for the remaining pairs of friction shoes until all shoes on the disc assembly have been replaced.
- 4.1.7 Refer to information in Section 3.1 for initial operation concerns during start-up after replacement of friction shoes.

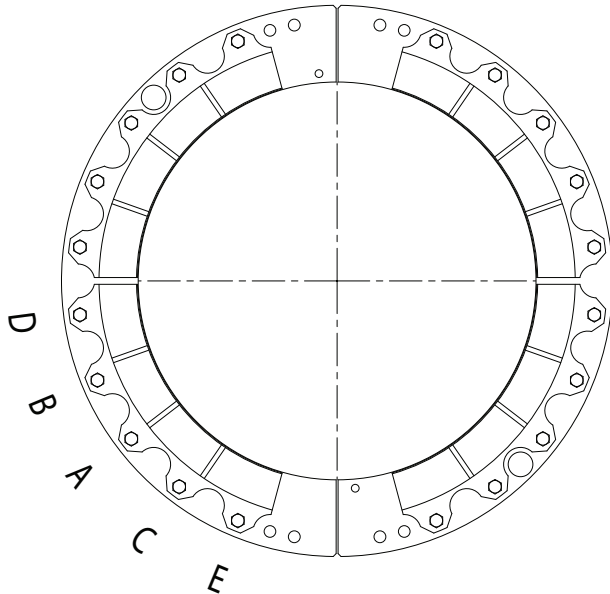


Figure 10 : Friction Shoe Screw Tightening Sequence

4.2 Reaction Arm Bushing Replacement

Warning

Prior to replacing arm bushings (13, 14, 15, 16), be sure that the machinery is properly supported and that no torque or load is or will be applied against the bushings. Severe injury can occur during replacement if the machinery is not properly supported.

- 4.2.1 Remove the retaining ring (21) or (22) that secures the bushing (13, 14, 15, or 16) into the reaction arm (11, 12).
- 4.2.2 While supporting the reaction arm, press the bushing out of the reaction arm.
- 4.2.3 Check the reaction pin (17, 18, 19, 20) for wear. See Table 8 for wear limits. Replace the reaction pin if worn to or beyond the wear limits.
- 4.2.4 Assemble the new bushing into the reaction arm and secure it into position with the retaining ring (21, 22). See **Figures 2 and 3** for proper bushing orientation.

4.3 Piston Seal Replacement

- 4.3.1 Replacement of the piston seals requires that the clutch / brake be removed from the machine shaft and complete disassembly of the AMCB AccuStop™ assembly. See Sections 4.4 and 4.5 for the appropriate procedures.

4.4 Removal of the AMCB AccuStop™ assembly

Warning

Prior to performing any work on the AMCB AccuStop™, be sure that the machinery is and will remain in a safe condition. Follow appropriate lockout and blocking of machine components to prevent machine operation and injury to personnel.

- 4.4.1 Remove the rotary air union and air supply lines.
- 4.4.2 Remove any interferences that would prevent the AMCB AccuStop™ from being removed from the shaft, including retaining plates, spacers or sealing rings.
- 4.4.3 Attempt to slide the AMCB AccuStop™ on the shaft to determine if a puller will be required. If the assembly begins to slide easily on the shaft, no puller is required. Proceed to section 4.4.5 for removal. If the removal from the shaft is difficult, a puller will be required. Proceed to section 4.4.4.
- 4.4.4 Remove 4 screws (13), 90 degrees apart, from the cylinder and install high strength studs for pulling the AMCB AccuStop™ assembly off of the shaft. Use a plate as a backing surface for a jack to push against. The jack will be positioned between this plate and the end of the machine shaft. The plate should have four holes to match the bolting pattern for the four studs. Refer to Table 6 for thread size, pitch and minimum engagement. Assemble the plate over the four studs, and assemble hardened washers and hex nuts onto the studs to position the plate against the jack.

**TABLE 6
Cylinder Screw Size**

AMCB AccuStop™ Model	Socket Head Screw (Class 12.9)
45	M16 X 2.0 X 70 mm lg

- 4.4.5 Using soft slings, rig the AMCB AccuStop™ assembly to support it during the removal process. See Table 2 for lifting weights.

Caution

Be sure to properly support the AMCB AccuStop™ assembly prior to removing it from the shaft.

- 4.4.6 Pull the AMCB AccuStop™ assembly off of the shaft and transport it to a clean work space.
- 4.4.7 Remove the key and the remaining sealing ring from the shaft.
- 4.4.8 Refer to sections 4.5 for disassembly and 4.6 for inspection procedures.

4.5 Disassembly of the AMCB AccuStop™

Note : Refer to Tables 8, 9 and 10 for wear limits. Components must be replaced if wear limits are reached.

Warning

Cylinder socket head screws (27) must be removed gradually to release the brake spring pressure. Failure to follow instructions could result in injury and/or damage to the AMCB AccuStop™ assembly.

- 4.5.1 Lay the AMCB AccuStop™ assembly on a clean, flat, level working surface, hub side down. Remove the socket head screws (27), turning each screw one turn at a time and following a crosswise pattern until ALL spring force is relieved. Watch to ensure that the cylinder and screws are not binding during the disassembly procedure.

Warning

High spring forces are contained in the AMCB AccuStop™ assembly until fully disassembled. Avoid cocking of the cylinder during the disassembly process. Uneven loosening of the socket head screws will cause the cylinder or screws to bind, creating a hazardous situation.

- 4.5.2 Lift the cylinder (1) off of the piston (2). Remove the brake disc and reaction arm assembly and set it aside, noting the orientation of the disc in the assembly in the event that it will be re-used.
- 4.5.3 Match mark the piston (2) and hub (3). Lift the piston off of the hub and set it aside.

- 4.5.4 Remove the clutch disc and reaction arm assembly and set it aside, noting the orientation of the disc in the assembly in the event that it will be re-used.
- 4.5.5 Remove the springs (5) and spring retainers (4) and set them aside. Note the spring quantities, orientation and location for reassembly in the same positions.

4.6 Inspection

Note : See Tables 8, 9 and 10 for wear limit values of the components described below.

- 4.6.1 Inspect the cylinder (1) for wear on the friction wear surface and at the seal contact area. Inspect the entire part for cracks. Replace the cylinder if cracks are found or if wear exceeds the allowable limits.
- 4.6.2 Remove the seals (9) and (10) from the piston (2) and discard.
- 4.6.3 Inspect the piston (2) for wear on the friction wear surfaces. Inspect the entire part for cracks. Replace the piston (2) and torque tube bushings (8) as an assembly if cracks are found or wear exceeds the allowable limits. See Item 2A in section 7.1 for the replacement part number of the piston sub-assembly.
- 4.6.4 Inspect the clutch and brake friction disc assemblies (6) for wear, contamination or damage. Refer to Table 9 for friction lining wear limits. If screw holes in the discs or reaction arms are worn or damaged, they must be replaced. If the mating wear surfaces (hub, piston or cylinder) are being replaced, it is recommended that the friction shoe assemblies be replaced also so that good contact is made between mating surfaces.
- 4.6.5 Inspect the bushings (13, 14, 15, 16) in the reaction arms for wear. Replace the bushings if worn.
- 4.6.6 Inspect the springs (5) for free height and wear. Refer to Table 10 for limits. Replace as required. Inspect the spring retainers (4) for wear or damage. Replace if worn or damaged.
- 4.6.7 Inspect the hub (1) seal surface and friction wear face for wear or damage. Also inspect the hub bore and keyway for damage. Replace the hub and torque tubes (7) if hub replacement is required.
- Note :** Replacement of the hub will require that it be machined so that the bore and keyway match the bore and keyway in the cylinder (1).
- 4.6.8 Inspect the torque tubes (7) for wear. Press them out of the hub and replace if required.
- 4.6.9 Inspect the Reaction Pins (17, 18, 19, 20) in the fly-wheel, machine frame or brake reaction bracket to check for looseness in the fit into the machine mounting holes and wear on the bushing contact area. If replacement is required, refer to Table 3 for the proper holes size for reaction pins.

4.7 Assembly

- 4.7.1 Place the hub (3) on a flat, level working surface with seal surface facing up and the flange side down.
- 4.7.2 If torque tubes (7) were removed, press the torque tubes into the mating holes in the hub until the torque tube shoulders contact hub surface, as shown in **Figure 2**.
- 4.7.3 Install the spring retainers (4) into the pockets in the hub and assemble the springs (5) onto the posts of the spring retainers in the same arrangement from which they were removed (equally spaced).
- 4.7.4 Position hub on the table with keyway at the 12:00 o'clock position and install two locating studs at 180°, as shown in **Figure 11**. See Table 7 for the proper size and length of the alignment studs to be used (customer provided).

TABLE 7 Alignment Stud Specifications			
AMCB AccuStop™ Model	Stud Thread	Stud Diameter (mm)	Length (mm)
45	M16 X 2.0	16	400

- 4.7.5 If the short reaction arms (11) were removed previously, re-attach the arms to the friction disc assembly (6) with shoulder bolts (24), flat washers (25) and hexagon nuts (26). Note the orientation of the fasteners. The heads of the shoulder bolts should be on the same side of the friction disc assembly as the heads of the hex head screws that secure the friction shoes to the friction disc core. See **Figure 1**. Tighten the hexagon nuts (26) to the proper torque value listed in Table 4.

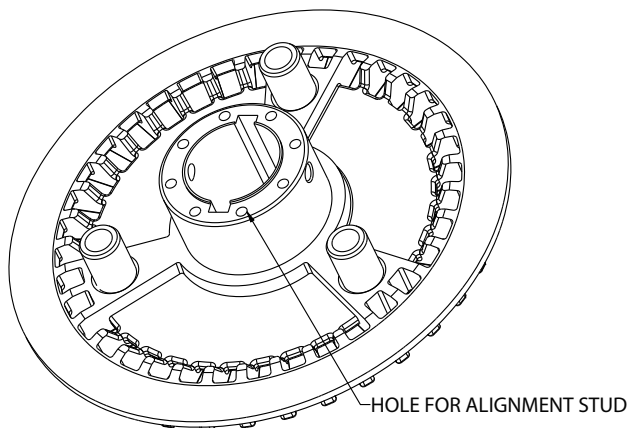


Figure 11 : Stud Alignment

⚠ Warning

Be sure to properly tighten the hex nuts and shoulder bolts to the appropriate values. Incorrect tightening can result in bolt failure and resultant brake failure that could cause severe injury.

- 4.7.6 If necessary, assemble the reaction pin bushings (14 and 16) into the appropriate holes of the short arm plates, securing them with the retaining rings (21). See **Figures 2 and 3** for the proper orientation of the flange of the bushing.
- 4.7.7 Noting the orientation of the reaction plate arms in **Figure 2**, lower the clutch disc over the alignment rods installed in 4.7.4 and rest the disc on the flange of the hub.
- 4.7.8 Ensure that the torque tube bushings (8) are installed in the piston (2) prior to assembly of the piston onto the hub. If replacing the piston, use piston sub-assembly (2A) listed in section 7.1.
- 4.7.9 Lubricate the inner seal groove in the piston (2) and also the inner seal (10) with Dow Corning 55® lubricant, and install the seal into the groove in the piston. Lubricate the area on the hub (3) that the seal will slide on.
- 4.7.10 Align the piston so that the torque tube bushings (8) in the piston are oriented with the torque tubes (7) in the hub (3). Lower the piston onto the hub until it rests onto the springs. Use care to prevent damage to the inner seal.
- 4.7.11 Lubricate the outer seal groove in the piston (2) and also the outer seal (9) with Dow Corning 55® lubricant, and install the seal into the groove in the piston (2). Lubricate the seal contact area in the cylinder (1).
- 4.7.12 If the long reaction arms (12) were removed previously, reattach the arms to the friction disc with shoulder bolts (23), flat washers (25) and hexagon nuts (26). The heads of the shoulder bolts should be on the same side of the friction disc assembly as the heads of the hex head screws that secure the friction shoes to the friction disc core. See **Figure 1**. Tighten the hexagon nuts (26) to the proper torque value listed in Table 4.
- 4.7.13 If necessary, assemble the reaction pin bushings (13 and 15) into the appropriate holes of the long arm plates, securing them with the retaining rings (22). The orientation of the flange of the bushing will depend on the specific brake arrangement. See **Figures 2 and 3**.

Warning

Be sure to properly tighten the hex nuts and shoulder bolts to the appropriate values. Incorrect tightening can result in bolt failure and resultant brake failure that could cause severe injury.

- 4.7.14 Install the brake friction disc assembly (6) and rest it against the wear surface on the piston (2). The heads of the hex head screws that secure the friction shoe assemblies to the disc core should be oriented so that they are closest to the piston. If re-using the brake disc assembly, be sure to orient the worn face against the same surface from which it was removed.
- 4.7.15 Place gasket onto piston using two alignment studs as guides. Position the cylinder (1) with the EATON Airflex AMCB AccuStop™ identification lettering facing up.
- 4.7.16 Place cylinder onto piston using two alignment studs as guides, line up keyway, lower it until it begins to engage onto the piston (2) and outer piston seal (9).
- 4.7.17 Install the socket head screws (27) into the counter-bored holes of the cylinder (1).
Note : The socket head screws may not engage into the tapped holes of the hub (3) at this time.
- 4.7.18 If the cylinder assembly screws have not engaged the tapped holes in the hub, use alternate hits with a rubber hammer and tap down on the cylinder (1) until the cylinder engages onto the piston seal (9). Use care to ensure that the piston seal properly engages into the cylinder without being damaged.
- 4.7.19 Tighten the socket head screws (27), ONE TURN AT A TIME IN A CROSSWISE PATTERN, until the cylinder is clamped against the end of the hub (3).

Caution

Insure that the cylinder is drawn down evenly to prevent damage to the seals and/or cylinder bore and resultant seal leakage.

- 4.7.20 ONE AT A TIME, remove one cylinder screw, apply a bead of Loctite® #262 to the first 10 threads at the end of the screw and install into one of the counterbored holes. Tighten the screws to the torque specification listed in Table 4. Repeat this procedure with the remaining screws, assembling them in an even, cross-wise pattern.

Caution

Loctite® #262 must be shaken prior to application.

Caution

Loctite® #262 may irritate sensitive skin. Refer to the product label for safety precautions.

- 4.7.21 Remove the two alignment rods from the AMCB AccuStop™ assembly.
- 4.7.22 Refer to Section 2.0 to install the assembly.

5.0 ORDERING INFORMATION / TECHNICAL ASSISTANCE

In any correspondence regarding Airflex Equipment, refer to the information on the product nameplate and call or write:

Eaton Corporation
Airflex Business Unit
9919 Clinton Road
Cleveland, Ohio 44144

Tel.: (216) 281-2211
Fax: (216) 281-3890
Internet: www.eaton.com/airflex

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6.0 TROUBLE SHOOTING

Problem	Probable Cause	Remedy
Loss of Clutch Torque	Low air pressure	Increase air pressure to recommended pressure. Add air tank to system if necessary.
	Worn friction disc	Replace friction shoes if required.
	Contaminated friction disc	Eliminate source of contamination and replace friction shoes.
	Air leakage	Check for leakage at seals, sealing plates, or other piping and repair as needed.
Loss of Brake Torque	Worn friction disc	Replace friction shoes if required.
	Contaminated friction disc	Eliminate source of contamination and replace friction shoes.
	Worn or damaged springs	Inspect springs and replace if worn or damaged.
Excessive Heat	Cycling rate is too high	Review application parameters and reduce speed.
	Operating speed is too high	Review application parameters and reduce speed.
	Excessive slipping	See sections for Loss of Clutch Torque and Loss of Brake torque.
	Lack of ventilation around assembly	Review application dimensional requirements. Correct as required.
	Binding of bushings on pins	Check pins and bushings for proper location, looseness, or damage. Correct as required.
Noise during clutch engagement	Lack of wear-in or glazing of friction shoes	Cycle press under lighter loads until friction interface is worn in.
	Excessive wear of arm bushings	Replace as required.
	Excessive wear of reaction pins	Inspect and replace if required.
	Loose reaction pins	Check for looseness and repair if fit is incorrect.
	Loose fasteners	Check for loose or broken fasteners and replace or repair as required.
	Worn torque tube bushings	Inspect and replace if required.
	Air leakage	Check for leakage at seals, sealing plates, or other piping and repair as needed.
	Worn gearing or linkages in machine	Inspect and repair as required.
Noise during brake engagement	Lack of wear-in or glazing of friction shoes	Cycle press under lighter loads until friction interface is worn in.
	Excessive wear of arm bushings	Replace as required.
	Excessive wear of reaction pins	Inspect and replace if required.
	Loose reaction pins	Check for looseness and repair if fit is incorrect.
	Loose fasteners	Check for loose or broken fasteners and replace or repair as required.
	Worn torque tube bushings	Inspect and replace if required.

**TABLE 8
AMCB AccuStop™ Wear Limits**

Item	Description	Wear Limit	Remarks
Cylinder (1)	Seal Wear Area	0.10 mm	Wear will be seen as a groove at the seal contact area in the inside diameter. Wear limit is the amount greater than the unworn cylinder diameter.
	Friction Surface	See Table below	Original thickness reference is the unworn area.
Piston (2)	Friction Surface	See Table below	Original thickness reference is the unworn area. Note minimum thickness value also.
Hub (3)	Seal Wear Area	0.10 mm	Wear will be seen as a groove at the seal contact area in the outside diameter. Wear limit is the amount less than the unworn hub diameter.
	Friction Surface	See Table below	Original thickness reference is the unworn area.
Torque Tube (7)	Bushing contact surface	0.50 mm	Wear will be in the form of a notch or step on the outside diameter of the torque tube. Wear limit value is the amount less than the unworn diameter.
Torque Tube Bushing (8)	Torque tube contact surface	0.50 mm	Wear will show as a groove in the inside diameter of the part. Wear limit is the amount greater than the adjacent unworn area.
Arm Bushing (13, 14, 15, 16)	Reaction pin contact area	1.0 mm	Wear is measured in the inside diameter of the part. Wear limit is the amount greater than the unworn diameter, or between flats.
Reaction Pin (17, 18, 19, 20)	Arm bushing contact area	1.0 mm	Wear is measured on the outside diameter of the part. Wear limit is the amount less than the unworn diameter or between flats.

Iron Component Wear Limits (Friction Contact Surfaces)

Item ()	AMCB AccuStop™ Model 45
Cylinder (1)	1.08 mm
Piston (2) (1 surface)	0.90 mm
Piston (2) (Minimum Thickness)	37.40 mm
Hub (3)	1.08 mm
Total Wear Allowable*	3.00 mm

* Total allowable accumulation of wear to all surfaces (Cylinder, Piston & Hub). After measuring each component for wear, the wear measurements should be totaled. The sum of the wear should not exceed this value. If necessary, replace some or all components to remain below this value.

**TABLE 9
Friction Material Wear Limits**

AMCB AccuStop™ Model	Friction Lining Thickness New (mm)	Friction Lining Thickness Worn (mm)
45	3.25	1.0

**TABLE 10
Spring Free Height**

AMCB AccuStop™ Model	New Condition (mm)	Worn Condition (mm)
45	127	119

7.0 PARTS LISTS

7.1 Assembly with Bore and Keyway

Item	Size		45 AMCB	
	Parts List (Bore & Key)		108141	
	Description	Notes	Part Number	Qty
1	Cylinder		515222	1
2	Piston	(3)	515224	1
2A	Piston Sub-assembly	(4)	515364	0
3	Hub	(1)	515228-####	1
4	Spring Retainer		417194	3
5	Compression Spring	(2)	417181-02	15
6	Friction Disc Assembly		417193	2
7	Torque Tube		308564-02	3
8	Torque Tube Bushing	(3)	308534-02	3
9	Piston Seal (Outer)		308531-07	1
10	Piston Seal (Inner)		308531-08	1
11	Short Reaction Arm	(5), (6)	417376-##	2
12	Long Reaction Arm	(5), (6)	417381-##	2
13	Long Arm Bushing (Round)	(5)	417184-02	1
14	Short Arm Bushing (Round)	(5)	417184-03	1
15	Long Arm Bushing (Rectangular)	(5)	417185-02	1
16	Short Arm Bushing (Rectangular)	(5)	417185-03	1
17	Long Arm Reaction Pin (Round)	(5)	417182-02	1
18	Short Arm Reaction Pin (Round)	(5)	417182-03	1
19	Long Arm Reaction Pin (Square)	(5)	417183-02	1
20	Short Arm Reaction Pin (Square)	(5)	417183-03	1
21	Retaining Ring		000190 X 0101	2
22	Retaining Ring		000190 X 0102	2
23	Shoulder Bolt		000436 X 0003	8
24	Shoulder Bolt		000436 X 0003	8
25	Flat Washer		000067 X 0060	16
26	Hexagon Nut		000414 X 0010	16
27	Socket Head Screw		000401 X 0038	8
28	Name Plate		307640-01	1
29	Warning Plate		203627-01	1
30	Retaining Plate		308543	4
31	Hex Head Screw		000391 X 0801	8
32	Pipe Plug		00077 X 0002	1
33	Gasket		417351	1

NOTE : (1) Specify bore and keyway dimensions.

(2) Maximum quantity installed. Quantity used will depend on specific application requirements.

(3) Not available as separate item. Use Sub-assembly 2A.

(4) Includes item 2 and item 8. For Customer replacement. Not shown in **Figure 1** .

(5) Quantity used will depend on specific mounting application requirements.

(6) Specify mounting dimensions.

7.2 Friction Shoe Kit

Item	Size	45 AMCB	
	Kit Part Number	14651 2KA	
	Description	Part Number	Qty
	Friction Shoe Assembly	308510	8
	Hex Head Screw	391 X 1002	20
	Hexagon Nut	414 X 0009	20

7.3 Element Seal Kit

Item	Size	45 AMCB	
	Kit Part Number	146512KB	
	Description	Part Number	Qty
9	Piston Seal (Outer)	308531-07	1
10	Piston Seal (Inner)	308531-08	1
	Gasket	417351	1
	Threadlocker (Loctite® 262)		1
	Seal Lubricant		1

8.0 REVISION

Original Publication Date : June, 2007		
Revision Date	Change	Page(s)
December 2008	Add AccuStop™ trade name of all AMCB entries	All
	Update Cover to current standards	Cover
	Delete data from all Tables except for size 45	Various
	Replace Figure 1 with updated graphic	1
	Add item 32 to Table 1	2
	Update info in Table 4 to current specifications	7
	Add paragraph 4.1.7	10
	Change screw class from 8.8 to 12.9 - Table 6	11
	Revised paragraph 4.6.3 and 4.6.8	12
	Revised paragraph 4.7.8 and 4.7.15	13
	Remove redundant paragraph 4.7.14 and renumber remaining paragraphs	13
	Delete section 4.8 Torque Tube Bushing Replacement	13
	Delete section 4.9 Replacement of Torque Tubes	14
	Delete Figure 12	14
	Update specifications in Table 9 and 10	15
	Add item 2A, notes 3 and 4, and revise part number for item 27	16
	Add item 32 to parts list	16
	Revise part numbers for items in section 7.2, size 45 AMCB	17
Add section 8.0 revisions	18	
Update warranty page to current standard	Last	
September 2009	Revised weight of size 45 AMCB - Table 2	3
	Revised data for size 45 - Table 5	9
	Revised data for size 45 - Tables 9 and 10	15
April 2010	Updated Figure 1 with Gasket and Name Plate	1
	Added item 33 and item 34 to Table 1	2
	Added items 33 and item 34 to 7.1	16
July 2010	Updated Figure 1 to include Part #29 Warning Plate	1
	Updated Table 1 - Parts #28 Name Plate and #29 Warning Plate	2
	Removed AMCB AccuStop™ Models 30, 35, 40 & 50 from Tables 2, 3, 4, 5, 6, 7, 8, 9 & 10	Various
	Updated Figures 2 and 3	4
	Updated Assembly Instructions 4.7.2, 4.7.4, 4.7.10, 4.7.14, 4.7.15 & 4.7.16	12
	Updated Figure 11 to show Hole for Alignment Stud	12
Removed AMCB AccuStop™ Models 30, 35, 40 & 50 from Parts Lists 7.1, 7.2 & 7.3	Various	
September 2010	Revise part numbers for items Part List(Bore & Key), 3, 11, 12 & 28 from Part List 7.1	16
	Add note (5) to items 11, 12, 13, 14, 15, 16, 17, 18, 19 to 20, and (6) to item 11 & 12 from Part List 7.1	16



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