DBB8100 DBB Brake Assemblies Installation, Operation and Maintenance Manual

Airflex® Product Line

Powering Business Worldwide

DBB Brake Assemblies

General Information

⚠ 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
Eaton's Airflex division 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. and Canada: (216) 281-2211
Internet: www.eaton.com/airflex

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DBB Brake Assemblies

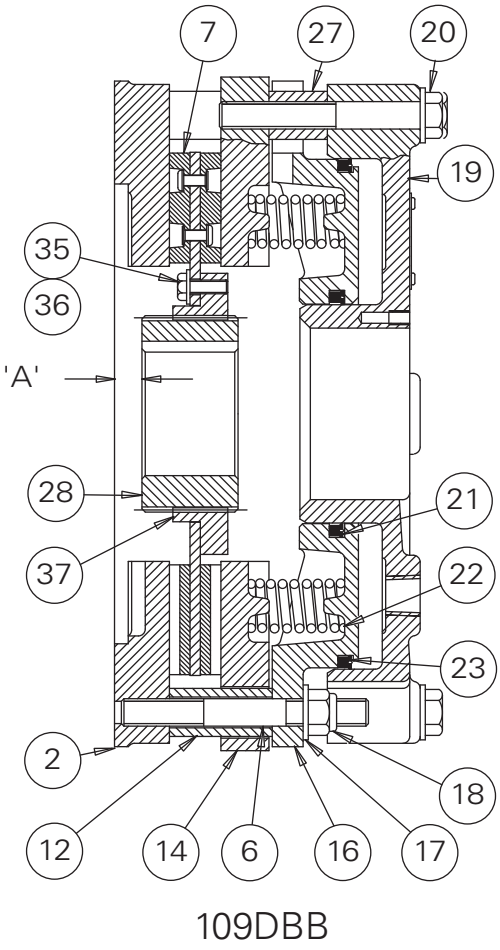


Figure 1A

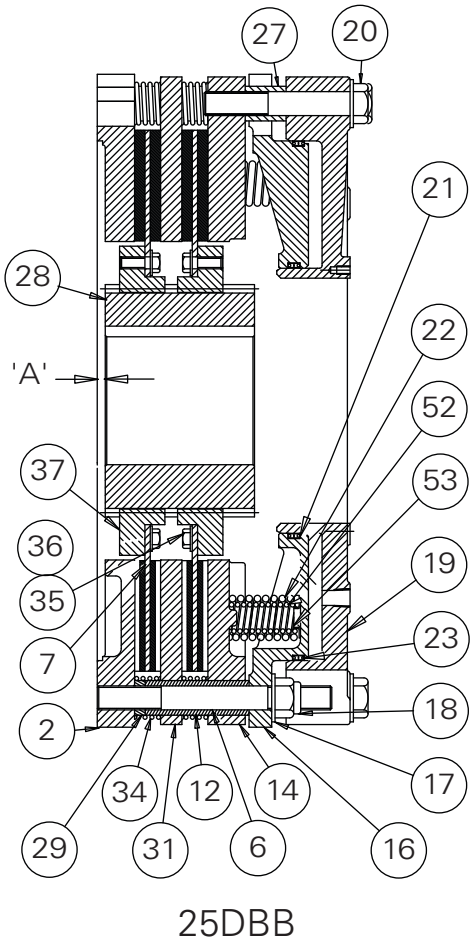


Figure 1B

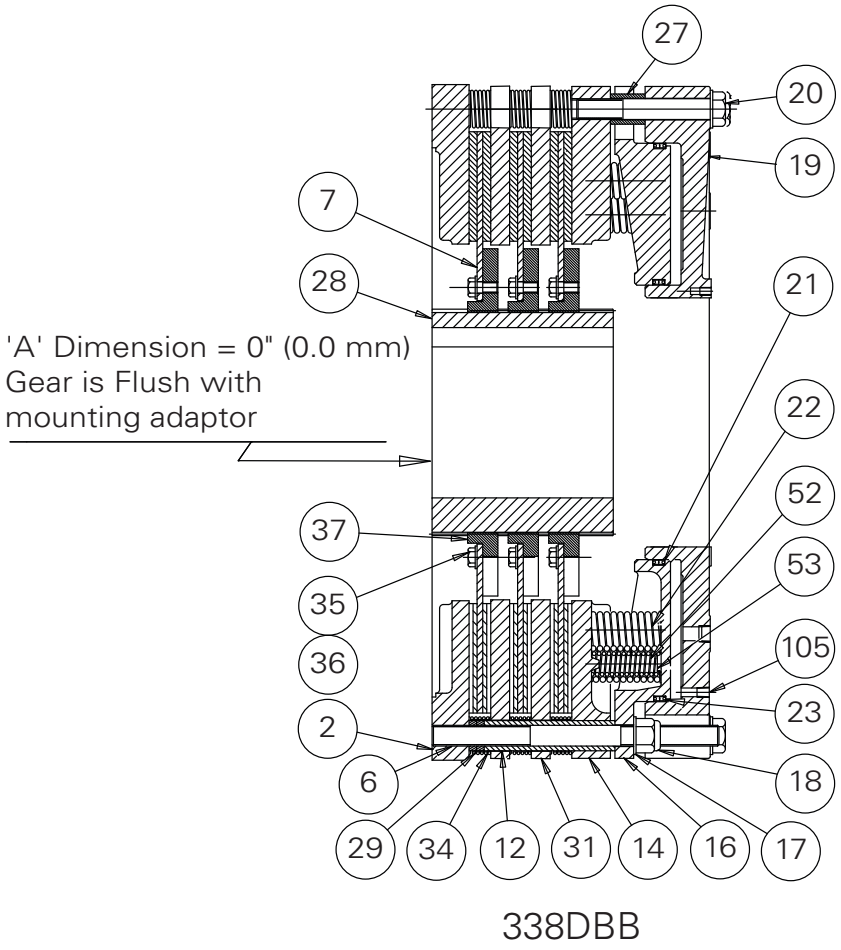


Figure 1C

Table 1
Item Description for Figure 1

Item	Description
2	Mounting Flange
6	Stud
7	Friction Disc Assembly
11	Washer
12	Clamp Tube
14	Pressure Plate
16	Spring Housing
17	Flat Washer
18	Self Locking Nut
19	Cylinder
20	Hex Head Screw
21	Inner Seal
22	Spring (Outer)

Item	Description
23	Seal (Outer)
27	Spacer Tube
28	Gear (not included with assembly)
29	Clamp Tube Wear Spacer
31	Reaction Plate
34	Release Spring
35	Flat Washer
36	Hex Head Screw
37*	Ring Gear
38*	Pipe Nipple
39*	Elbow
40*	Pipe Nipple
41*	Reducing Tee

Item	Description
42*	Hose Assembly
43*	Pipe Nipple
44*	Flow Control Valve
45*	45 deg Street Elbow
46*	Pipe Cross
47*	Pipe Reducer
48*	Hose Assembly
52	Spring (Inner)
53	Spring Retainer
56**	Hex Head Screw
105	Brass Pipe Plug

* Items 37 thru 48 are found on Figures 5a, 5b, 5c, 5d & 5e for the mounting flange.
** Item 55 exists only on the 115DBB and is provided preassembled.

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 the equipment. Three signal words "DANGER", "WARNING", and "CAUTION" are used to indicate the severity of the hazard, and are preceded by the safety alert symbol ⚠.

⚠ **Danger**
Denotes the most serious injury 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.

This device uses 120 psig (8.3 bar) compressed air, compressed springs, bonding chemicals and lubricants. All safety precautions (Local, State & Federal) shall be adhered. The device, chemicals and lubricants shall be used per the manufacturer's instructions.

1.1 Description

1.1.1 The Airflex Model DBB brakes were designed for heavy duty industrial applications where spring set (power off) braking is required.

1.1.2 All Airflex DBB brakes are supplied with longwearing, NON-ASBESTOS friction material.

1.1.3 Airflex DBB brakes are available in four basic sizes and can be supplied as single, dual, triple or quadruple disc units. The model number identifies the number of discs and the disc diameter. For example, 225DBB indicates the brake uses two 25 inch diameter discs. When size, such as 25DBB is referred to in this manual, it means that the information given applies to all DBB models using 25 inch diameter discs; i.e. 125DBB, 225DBB etc.

1.2 How it Works

1.2.1 Referring to Figure 1, the gear (28) is mounted on the shaft which is to be stopped and the brake assembly is attached to the machine frame or a reaction bracket. As air pressure is applied through the ports in the cylinder (19), the cylinder and pressure plate (14), which are attached to each other with screws (20), flat washers (17) and spacer tubes (27), move away from the mounting flange (2), which is connected to the machine frame or reaction bracket. The pressure plate compresses the springs (22) against the stationary spring housing (16) and the clamp force is removed from the friction disc assembly (7) which rides on the gear. The shaft is then free to rotate. As air pressure is exhausted, the springs force the pressure plate toward the mounting flange, clamping the friction disc assembly between the two members. On dual disc models, an additional friction disc assembly and a reaction plate (31) are clamped between the pressure plate and mounting flange.

2.0 INSTALLATION

2.1 Preparation

2.1.1 Table 2 shows the relationship between the DBB mounting surface and the end of the gear (dimension 'A' on Figure 1). The gear is bored and keyed for a resulting Class FN2S interference fit for inch shafting and ISO System S7h6 for metric shafting.

⚠ **Caution**
Failure to install the gear to the recommended 'A' dimension can: (A) Cause erratic tracking when the discs wear and move closer to the machine. (B) create a potentially dangerous situation with multiple discs of the lead disc falling off when the power head is removed.

Table 2
'A' Dimension on Figure 1, inches (mm)

Size	1XXDBB	2XXDBB	3XXDBB	4XXDBB
9DBB	0.50 (13)	0.25 (6)	0.00	
15DBB	0.38 (10)	0.37 (9)	see Note 1	
20DBB	1.00 (25)	0.38 (10)	0.38 (10)	0.38 (10)
25DBB	0.75 (19)	0.38 (10)	0.38 (10)	0.38 (10)
38DBB	1.25 (32)	0.00	0.00	0.00

Note: 1. Consult Eaton Airflex Engineering for this Dimension

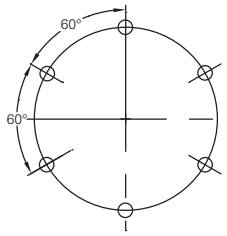
2.1.2 Figures 2A, 2B, 2C, 2D & 2E and Table 3 show the mounting dimensions for the brake to the machine frame or reaction bracket. Note that a male or female register may be used.

Note: Mounting hole sizes fin the 325DBB and the 425DBB are larger than the mounting holes in the 125DBB & 225DBB. The 325DBB & 425DBB mounting hole diameter is .781" (19.8mm) on the same 28.750" (730.3mm) BC.

Table 3
Brake Mounting Register Diameters* inches (mm)

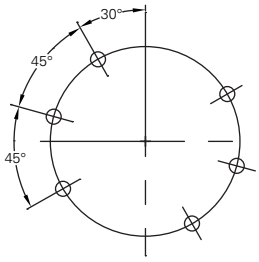
Size	Female Register	Male Register
9DBB	08.375 (212,7)	12.124 (308)
15DBB	14.375 (365,1)	18.370 (466,7)
20DBB	18.250 (463,6)	n/a
25DBB	24.375 (619,1)	n/a
38DBB	36.375 (923,9)	n/a

*O.D. Tolerance: +.003" (0,08 mm) / -0.00
Registers to be .125" - .250" (3,2 mm - 6,35 mm) deep



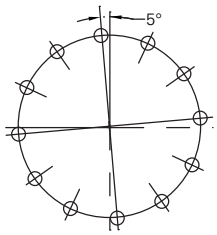
9DBB
(6) 0.531" (13,5mm) Ø MOUNTING HOLES EQUALLY SPACED AS SHOWN ON 11.125" (282,5) BOLT CIRCLE

Figure 2A



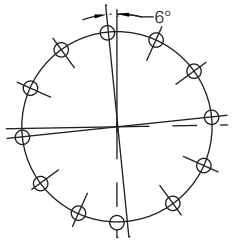
15DBB
(6) 0.656" (16,7mm)Ø MOUNTING HOLES BASED ON 8 EQUALLY SPACED AS SHOWN ON 17.50" (444,5) BOLT CIRCLE

Figure 2B



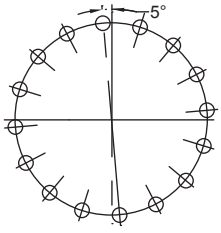
20DBB
(12) 0.656" (16,7mm)Ø MOUNTING HOLES EQUALLY SPACED AS SHOWN ON 22.00" (558,8) BOLT CIRCLE

Figure 2C



25DBB
(12) 0.656" (16,7mm)Ø MOUNTING HOLES EQUALLY SPACED AS SHOWN ON 28.750" (730,3) BOLT CIRCLE.
SIZE 325DBB & 425DBB HAVE (12) 0.781" (19,8) MOUNTING HOLES EQUALLY SPACED.

Figure 2D



38DBB
(6) 1.062" (27.0mm)Ø MOUNTING HOLES EQUALLY SPACED, SPACED AS SHOWN ON 42.00" (1066,8) BOLT CIRCLE

Figure 2E

2.1.3 Alignment

2.1.3.1 For proper operation and service life, the brake reaction member must be aligned to the shaft within the limits shown on Table 4.

Table 4
Alignment Requirements

Size	Concentricity (Parallel, TIR) of Shaft and Element Inches (mm)	Perpendicularly (Angular, TIR) of Mounting Flange to shaft* Inches (mm)
9DBB	0.005 (0,13)	0.005 (0,13)
15DBB	0.010 (0,25)	0.007 (0,18)
20DBB	0.010 (0,25)	0.010 (0,25)
25DBB	0.010 (0,25)	0.012 (0,30)
38DBB	0.010 (0,25)	0.019 (0,48)

*Perpendicularity measured near the O.D. of the mounting flange.

⚠ **Caution**
Proper alignment is necessary to assure the friction discs track properly. Improper alignment will result in excessive wear to the friction material and its mating surfaces, gear and ring gear (37). See Figure 3.

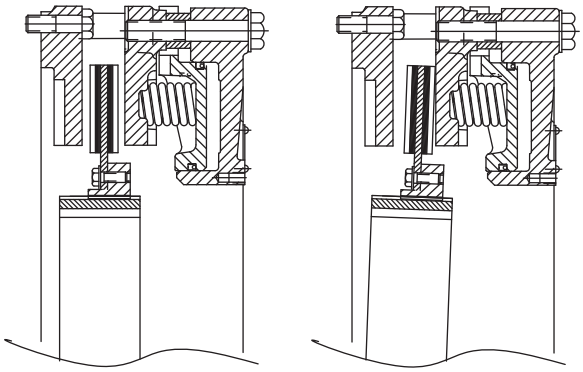


Figure 3

2.2 Mounting

⚠ **Warning**
Support brackets for external stud support may be required for specific brake models. See Table 5 for models requiring support brackets. Consult Eaton Airflex Engineering for design parameters.

Note: Failure to properly support studs as noted in Table 5 may result in drastic loss of torque, brake damage and brake failure.

Table 5
DBB Sizes Requiring Rigid Support Bracket*

No. of Discs	9DBB	15DBB	20DBB	25DBB	38DBB
3	x	x	x		
4			x	x	x

*Customer must provide a RIGID support on the cylinder end of the DBB.

2.2.1 Ensure the shaft is free of nicks or burrs and the key fits properly in the shaft and gear. Tap the key into the shaft keyway.

2.2.2 Apply a light coat of anti-seizing compound to the shaft.

2.2.3 Press the gear onto the shaft, making sure the dimension between the gear and the brake mounting surface ('A') is maintained. See Figure 1 and Table 2. Heating the gear uniformly to approximately 200ºF (93ºC) will expand the bore and ease assembly.

Note: On multiple disc brakes, before installing the gear onto the shaft, slide it into the brake assembly to align the splines on the friction disc assemblies. Air pressure must be applied to the brake to release the friction disc assemblies for alignment. Once the gear passes through both friction disc assemblies, exhaust the air to clamp them into position and remove the gear.

⚠ **Warning**
Maximum allowable air pressure is 120 psig (8,2 bar). Application of pressure exceeding maximum allowable may result in damage to the brake.

2.2.4 To install the gear, heat uniformly to approximately 250°F (121°C), prior to pressing the gear onto the shaft. Making sure the dimension between the gear and brake mounting surface ('A') is held per the dimension shown in Table 2.

⚠ **Caution**
Do not allow the gear temperature to exceed 350°F (176°C). Overheating the gear will adversely affect the hardness and wear life.

2.2.5 Apply a light coat of Castrol Molub-Alloy 936SF Heavy grease or equivalent to the gear teeth and slide the brake assembly onto the gear. See Figure 4.

Note: Reference Eaton Airflex part number 000153x1182 for the specified grease.

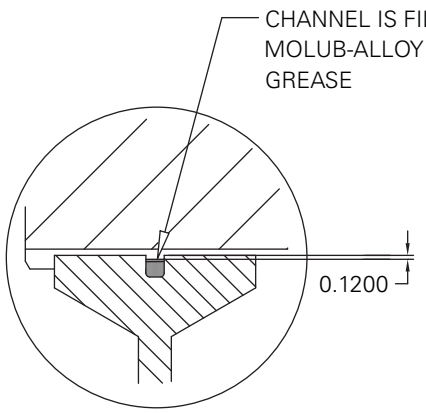


Figure 4

2.2.6 While supporting the brake, connect an air supply and apply enough pressure to release the brake. Attach the mounting flange (2) to the brake mounting surface using the appropriate fasteners. Torque the fasteners to the specified value. See Table 6.

Note: Mounting holes in the 325DBB and 425DBB brakes are larger than the 125DBB and 225DBB sizes. Be sure to use the correct size fasteners.

⚠ **Danger**
Use only the proper number and grade fasteners shown in Table 6. Use of commercial grade (Grade 2) fasteners where Grade 8 fasteners are specified may result in failure of the fasteners and a sudden and drastic reduction in brake torque.

Note: On the 115DBB and the 215DBB brakes, two fasteners are pre-assembled in the mounting flange (see item 56).

2.3 Air Supply System

2.3.1 Maximum allowable pressure is 120 psig (8,2 Bar)

⚠ **Warning**
Maximum allowable air pressure in cylinder (19) is 120 psig (8,2 Bar). Application of pressure exceeding maximum allowable pressure may result in damage to the brake components.

⚠ **Caution**
Minimum releasing pressure for low pressure brakes is 60 psig (4,1 Bar). Operation at pressures below minimum will result in brake drag and excessive heat and wear.

2.3.2 Use only clean, filtered air (a 40 micron filter or better is recommended) which is free of excess moisture. Long air line runs or dips in the line that allow moisture to collect should have drip legs with blow-down capability. Excess moisture due to temperature changes can be removed by using an in line ambient dryer.

2.3.3 The air inlet size is shown in Table 7. Air inlets are located on the face of the cylinder (19). Note the quantity and NPT size of the air inlet from Table 7. Note that the size 25DBB and size 38DBB have an additional threaded hole in the cylinder that is used to purge moisture from the cylinder. See Figure 1C and reference the drain plug (105). When mounting a 25DBB or a 38DBB, the drain plug shall be located near the 6 o'clock position to facilitate purging of moisture that may accumulate in the air system or cylinder.

Note: Purging of moisture from the air lines and cylinder should be performed daily until a frequency is determined for purging the cylinder. The frequency of purging the air line is dependent upon the amount of moisture in the air line and the ambient temperature. A petcock or other appropriate drain valve may be installed on this port to facilitate purging. Once per day (or at appropriate interval) each morning before operation and after extended periods of shutdown or down time.

2.3.4 Use full size piping consistent with the control valve size. All pipes should be free of metal chips, cutting compound and any other foreign matter. Pipe ends should be reamed after cutting to eliminate possible restrictions or air-line contamination. For optimum air system response, a minimum number of bends and elbows should be used. Good engineering practices should be followed, such as, blow-down of all air piping after installation and before connecting and operating valves and the brake. Refer to section 2.3.1 for general orientation of each size brake and general guidelines for the piping layout.

2.3.5 The DBB brake does not require lubricated air; however associated control valves may. Consult the valve manufacturer for appropriate recommendations.

⚠ **Caution**
The use of lubricated air in the air supply system (if required) will require the addition of a 'point of use' lubricator. Lubricated air is not required for the DBB brake but once lubrication is used, lubrication will always be required in the air system. If the lubricator is allowed to run dry then pneumatic valves and cylinders will dry out and stick thus creating erratic operation and down-time. Good engineering design practices shall be followed when using lubrication thus avoiding the overuse of lubrication, long airline runs and elevation changes.

Table 6
Fastener Description & Assembly Torque ft-lb (Nm) Lubed

Item	Description	Specification	9DBB	15DBB	20DBB	25DBB	38DBB
18	Locknut	Size Torque (lubed)	1/2-13NC-3 60 (81)	3/4-10NC-3 150 (203)	3/4-10NC-3 150 (203)	1-1/8-7NC-3 500 (677)	1-3/8-6NC-3 750 (1015)
20	Hex Head Screw	Size Torque (lubed)	1/2-13NC-2 Gr.8 60 (81)	3/4-10NC-2 Gr.8 150 (203)	3/4-10NC-2 Gr.8 150 (203)	1-1/8-7NC-2 Gr.8 500 (677)	1-3/8-6NC-2 Gr.8 750 (1015)
36	Hex Head Screw	Size Torque (lubed)	3/8-16NC-2 Gr.8 12 (16)	3/8-16NC-2 Gr.8 40 (54)	1/2-13NC-2 Gr.8 40 (54)	3/4-10NC-2 Gr.8 70 (95)	 200 (271)
Mounting Screw	Hex Head Screw	Size Torque (lubed)	1/2-13NC-2 Gr.8 70 (95)	5/8-11NC-2 Gr.8* 138 (187)	5/8-11NC-2 Gr.8 138 (187)	5/8-11NC-2 Gr.8 138 (187)	1-8NC-2 Gr.8 500 (677)

*Includes the two preassembled bolts, item 56 on the 15DBB

2.3.6 Since the air control arrangement will vary from one application to the next, a specific description cannot be presented here. Following are some general guidelines for installing the air control components. Refer to Figure 5A, Figure 5B, Figure 5C, Figure 5D and Figure 5E for general layout of the air piping arrangement. Refer to Table 1 for description of item part numbers of air system components and Section 6 for part numbers and quantities.

2.3.6.1 Use full size piping as shown in Table 7.

Table 7
Air Supply Piping Sizes

DBB Size	Pipe Size NPT	No. of Ports
9DBB	3/8"-18	2
15DBB	1/2"-14	2
20DBB	1/2"-14	3
25DBB	1/2"-14	3
25DBB w/Drain Hole	3/8"-18	1
38DBB	3/4"-14	3
38DBB w/Drain Hole	3/8"-18	1

2.3.6.2 Keep the number of elbows to a minimum to ensure consistent brake response.

2.3.6.3 Spool type solenoid valves are not recommended. Use only poppet type valves if possible, and locate the solenoid valve as close as possible to the brake. The sizing of the solenoid valve will be sufficient to meet the flow requirements of the piping and brake.

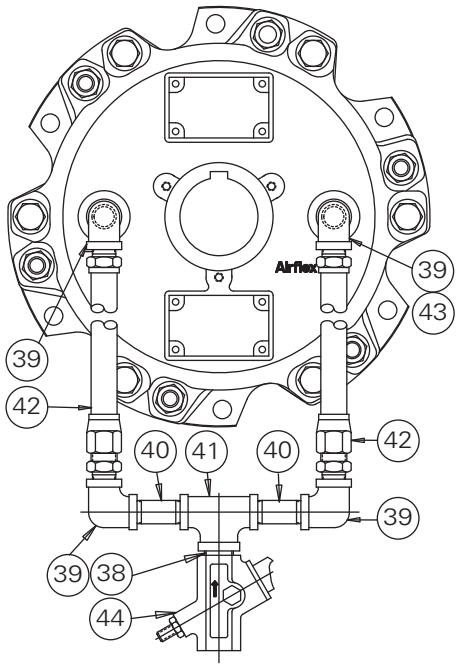
⚠ **Warning**
If the DBB brake is being used on a mechanical power press, special valving may be required.

2.3.6.4 If the DBB brake is being used on a cyclic application, an air receiver tank should be installed in the air supply line and isolated (check valve) from other air consuming equipment.

2.3.6.5 The final connection to the brake inlet ports must be made with flexible hose.

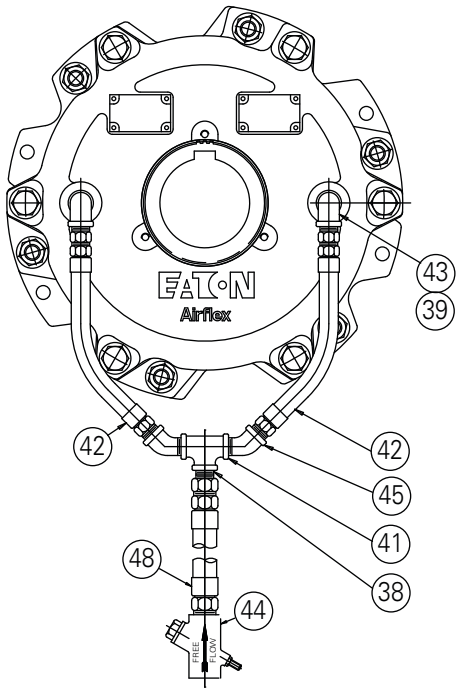
2.3.6.6 The DBB brake does not require lubricated air however the solenoid valve may. Consult the valve manufacturer.

2.3.6.7 A pressure switch should be located in the air supply line to the brake and interlocked with the equipment electrical controls.



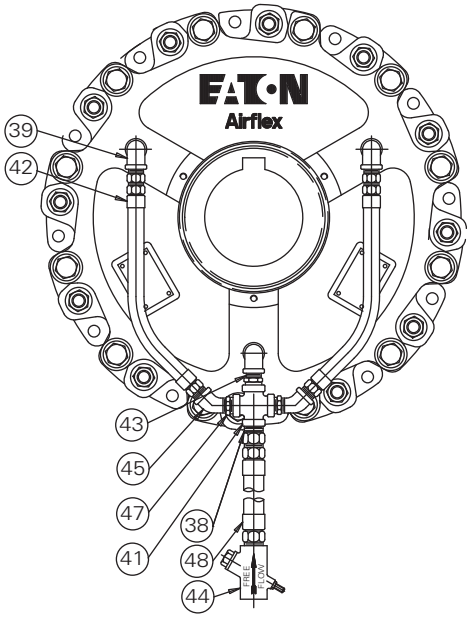
9DBB

Figure 5A



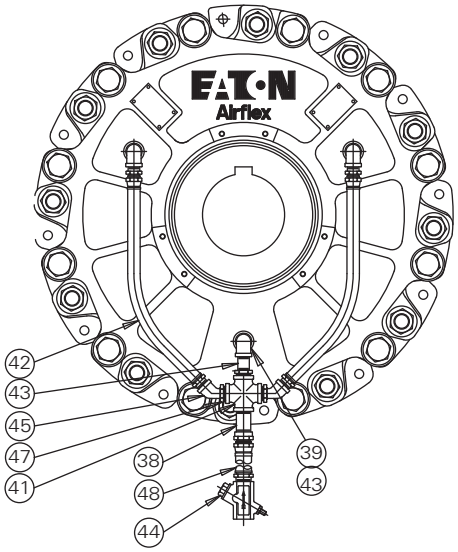
15DBB

Figure 5B



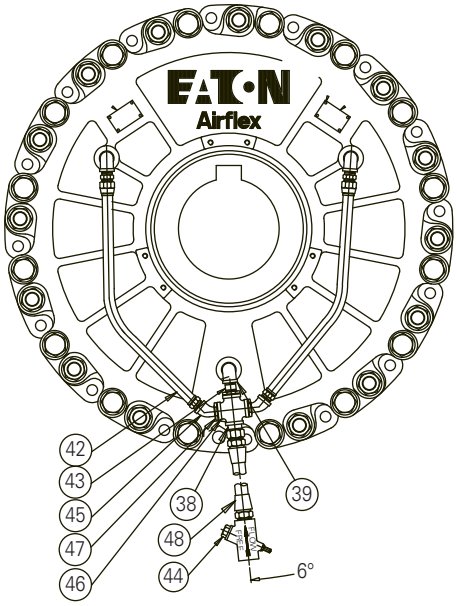
20DBB

Figure 5C



25DBB

Figure 5D



38DBB

Figure 5E

3.0 OPERATION

3.1 Pressure, Temperature and Speed Limits

3.1.1 Maximum applied pressure is 120 psig (8.2 bar). Minimum releasing pressure for low pressure brakes is 60 psig (4.1 bar).

⚠ **Warning**
Maximum applied pressure is 120 psig (8.2 bar). Operation at pressures exceeding maximum may result in damage to the DBB components.

3.1.2 Maximum disc speeds are shown on Table 8.

⚠ **Warning**
Operation at disc speeds exceeding the maximum allowable, as shown on Table 8, may result in exposure to personal injury or product/equipment damage.

3.1.3 Operating Temperature

Proper brake sizing will handle the torque and the energy. The maximum safe operating temperature is 250°F (121°C).

⚠ **Warning**
If temperature exceeds 250°F (121°C). operation shall be suspended and Eaton Airflex Applications Engineering must be consulted to determine corrective action.

Table 8
Maximum Disc Speed

Size	Maximum Disc Speed (rpm)
9DBB	3000
15DBB	2400
20DBB	1800
25DBB	1400
38DBB	950

3.2 Initial Operation

3.2.1 The non-asbestos friction material used on DBB brakes may not develop rated torque as a short wear in period is required.

3.2.2 If the brake engagement appears harsh, a flow control valve (44) may be installed in the brake air supply line. When using a flow control valve, install so free flow is to the brake and restricted flow is away from the brake. Figure 5 shows the flow control valves and Airflex item numbers for each size DBB brake can be found in the Parts List.

⚠ **Caution**
Excessive restriction of the brake exhaust air will result in long stopping times and inconsistent stopping position.

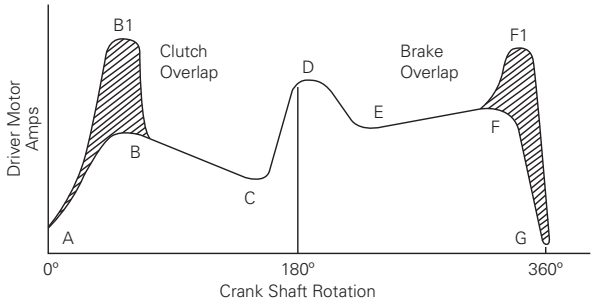
3.2.3 If the DBB brake is used in combination with a clutch, clutch/brake overlap may occur which will result in excessive heat generation and motor overload. Overlap may be detected by monitoring the drive motor current at the beginning and end of each machine cycle. A current surge at the beginning of the cycle usually indicates clutch overlap which can be corrected by restricting the air flow to the clutch or increasing the air pressure to the brake.
A current surge at the end of the machine cycle usually indicates brake overlap which can be corrected by installing and adjusting a flow control valve in the brake air supply line, as indicated in 3.2.2. Figure 6 illustrates clutch and brake overlap.

3.3 Periodic Inspection

3.3.1 As the friction material wears, the brake torque will be reduced somewhat and adjustment of the stopping position controls (flow control or limit switch) will be necessary. See the MAINTENANCE section for the friction material wear limit and replacement procedure.

Typical Motor Ampere Curve

Solid Line – Normal Current Fluctuations During Complete Cycle
Dotted Line – Abnormal Current Surges Indicating Overlap



A-B	Normal Motor Amp Surge – During Acceleration
A-B1	Abnormal Surge Indicates Clutch Overlap
B-C	Ram on Down stroke - Motor Amps Drop
C-D	Ampere Surge as Dies Make Contact
E-F	Ram Moving up Back Stroke
F-G	Clutch Release, Brake Set – Normal Drop to No Load Amps
F-F1-G	Ampere Surge Indicates Brake Overlap

Figure 6

3.3.2 Periodically check for air leakage in the area of the piston seals (21) & (23). For replacement, refer to the MAINTENANCE section.

3.3.3 Periodically observe the friction disc assembly(s) with the brake released. Dragging friction discs may be caused by wear or contamination at the gear/ring gear contact areas.

3.3.4 Pneumatic and electrical control interlocks should be periodically checked for correct settings and operation.

4.0 MAINTENANCE

⚠ **Warning**
Prior to performing any maintenance on the DBB brake, make sure the equipment is in, and will remain in, a safe condition.

4.1 Wear Limits

4.1.1 Wear limits for the DBB components are shown on Table 10. If any wear limit has been reached or exceeded, that component must be repaired or replaced.

4.2 Wear Adjustment

4.2.1 Refer to Figure 7 for illustration of the friction material wear groove for all sizes of DBB brake. Refer to Figure 8 for the 'X' Gap location. On single and multiple disc units, the friction material must be replaced when worn to the bottom of the groove on the friction material. Multiple disc brakes, however, are manufactured with wear spacers that allow for wear adjustment when the 'Gap Required for Adjustment' has been reached per the values in Table 9. Multiple disc brakes have a quantity of wear spacers equal to the number of discs minus 1. For example: a 438DBB brake has 4 discs and 3 wear spacers. The number of wear spacers will dictate the number of adjustments before the brake requires complete disassembly for friction disc replacement. Spacers are removed to correct for wear. One complete set of spacers is removed for each wear adjustment. Reference Section 4.2.3.

⚠ **Caution**
Remove, retain or support discs as needed so that they do not fall off the gear during maintenance.

⚠ **Warning**
If a wear adjustment is not made, the brake torque may deteriorate to the point where the equipment will not stop properly.

Note: Multiple disc DBB units are manufactured with solid wear spacers (29), requiring brakes to be fully disassembled in order to make wear adjustments. In 2013, Eaton has provided the split wear spacer. As a result, a new DBB may have the split wear spacer installed or Eaton may send the split wear spacer in kits for rebuild. When performing a wear adjustment first verify the design of the wear spacer per the following instructions.

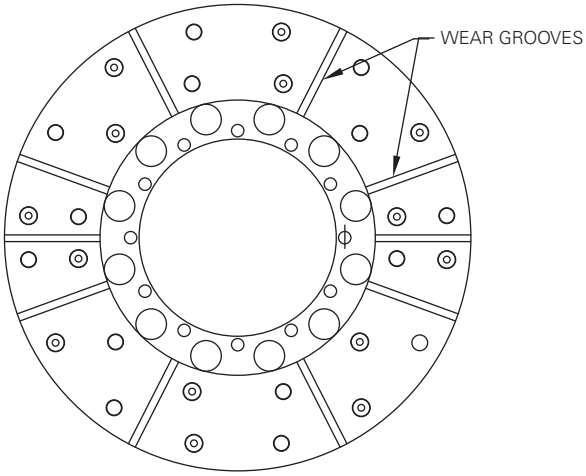


Figure 7

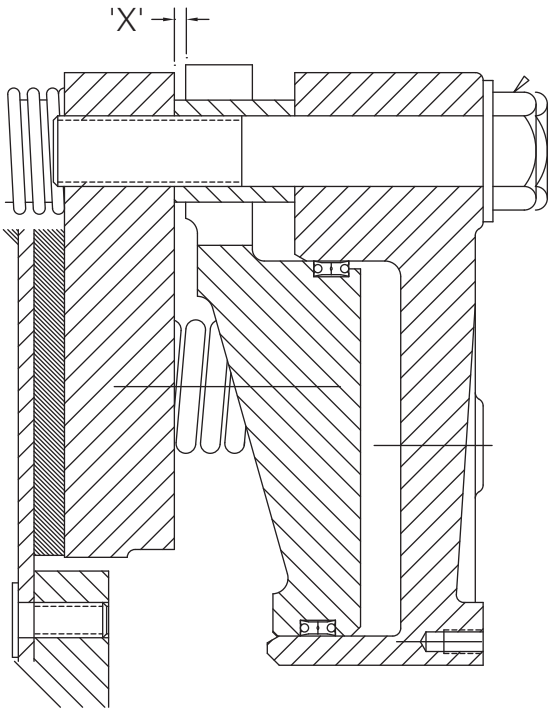


Figure 8

Table 9
DBB Wear Measurements X Gap - inches (mm)

Size	X-New*	X - Max (Adjustment)**
209	0.120 (3,050)	0.423 (10,730)
309	0.180 (4,570)	0.483 (12,270)
215	0.160 (4,060)	0.463 (11,750)
315	n/a	n/a
220	0.140 (3,560)	0.640 (16,260)
320	0.210 (5,330)	0.710 (18,030)
420	0.280 (7,110)	0.780 (19,810)
225	0.180 (4,570)	0.680 (21,840)
325	0.270 (6,860)	0.770 (19,560)
425	0.360 (9,140)	0.860 (21,840)
238	0.310 (7,870)	0.810 (20,570)
338	0.300 (7,620)	0.720 (18,290)
438	0.400 (10,160)	0.820 (20,830)

*Values shown is gap after wear adjustment. New or rebuilt brakes may vary slightly from this value due to manufacturing tolerances.

**Perform wear adjustment when X-Gap reaches or exceeds this value.

4.2.2 Wear Adjustment with Solid Wear Spacers

Note: Wear adjust is performed only on multi disc brakes (two or more discs) and is outlined below.

4.2.2.1 Disconnect the air supply lines from the brake. Wipe down the brake and match mark all components from the mounting flange (2) to the cylinder (19) prior to disassembly. Match marking all components will ensure that the components are reinstalled in the orientation and location from which they were removed.

4.2.2.2 While supporting the cylinder (19), loosen the locknuts (18) ONE TURN AT A TIME and in an alternating (crosswise) pattern to prevent binding of the cylinder on the studs. Continue to loosen the locknuts until the force of the release springs (34) is relieved, allowing for access to the wear spacers (29). It may be necessary to push the reaction plate(s) (31) away from the mounting flange so that the release springs can be moved to gain access to the wear spacers.

Table 10
Wear Limits for DBB Components

Item	Component	Description	Wear Limit	Remarks
7	Friction Disc Assembly	Friction Material	Fully worn at bottom of wear groove. See Figure #7. Friction material must also be replaced if contaminated with oil or grease.	Mulit-disc brakes have adjustment provision by removing wear spacers (29)
2	Mounting Flange	Friction Wear Surface	Maximum wear is .031" (,80mm)	Wear will be in form of circular grooves on iron surface
13 30	Pressure plate & Reaction plate	Friction Wear Surface	Maximum wear is .031" (,80mm)	Wear will be in form of circular grooves on iron surface. Reaction plate wear is each side.
13 30	Pressure plate & Reaction plate	Reaction Holes	Maximum wear is .031" (,80mm)	Wear will be in the form of elongation of the holes. Original hole diameters are shown below.
13 30	Pressure plate & Reaction plate	Original reaction hole diameter in. (mm)		9DBB .938" (234mm) 15DBB 1.312" (33mm) 20DBB 1.343" (34mm) 25DBB 1.688" (43mm) 25DBB 2.063" (54mm)
12	Clamp Tube	Reaction Area	Maximum wear is .015" (,38mm)	Wear will be in the form of a notch or step on the side of the tube.
19	Cylinder	Seal Area	Maximum wear is .005" (,13mm)	Wear will be in the form of grooves where the seals contact
22	Spring (Outer)	Spring Free Height	**Minimum free height** 9DBB 2.40" (61mm) 15DBB 2.84" (72mm) 20DBB 4.25" (108mm) 25DBB 4.90" (124mm) 38DBB 6.53" (166mm)	**Original free height** 9DBB 2.50" (64mm) 15DBB 3.00" (76mm) 20DBB 4.50" (114mm) 25DBB 5.18" (132mm) 38DBB 6.80" (173mm)
34	Release Spring	Spring Free Height	**Minimum free height** 9DBB 1.23" (31mm) 15DBB 1.40" (36mm) 20DBB 1.52" (39mm) 25DBB 1.70" (43mm) 38DBB 2.60" (66mm)	**Original free height** 9DBB 1.39" (35mm) 15DBB 1.60" (40mm) 20DBB 1.66" (42mm) 25DBB 1.85" (47mm) 38DBB 2.85" (72mm)
52	Spring (Inner)	Spring Free Height	**Minimum free height** 9DBB n/a 15DBB n/a 20DBB n/a 25DBB 4.95" (126mm) 38DBB 6.50" (165mm)	**Original free height** 9DBB n/a 15DBB n/a 20DBB n/a 25DBB 5.23" (133mm) 38DBB 6.78" (172mm)

4.2.2.3 Remove the locknuts (18) and washers (17) and slide the cylinder (19), spring housing (16) and pressure plate (14) off of the studs (6) as an assembly. See TABLE 11 for weight of subassembly.

Note: If a stud (6) should happen to come loose, remove it completely and clean the threads on the stud and the threads in the mounting flange. Apply Loctite® Loc- Quic® Primer Grade "T" to the stud threads. After the threads have dried, assemble to the mounting flange using Loctite #262. The end of the stud must not extend past the mounting surface on the mounting flange.

⚠ **Caution**
Loctite#262 must be shaken prior to application.

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

Table 11
Power Head Weights

Size	9DBB	15DBB	20DBB	25DBB	38DBB
Approximate Total Weight	67 (30)	169 (77)	269 (122)	474 (215)	1527 (693)

4.2.2.4 Remove the outer disc (58), the reaction plate (31) and the release springs (34) and set aside.

Note: For 3 disc brakes remove one additional disc, reaction plate and set of springs during disassembly.

Note: For 4 disc brakes remove two additional disc, reaction plate and set of springs during disassembly.

4.2.2.5 Slide the clamp tubes (12) and one set (layer) of wear spacers (29) off of the studs. Reinstall the clamp tubes only. For all sizes of DBB brakes clamp tubes (12) are placed over every stud (6).

4.2.2.6 Place the release springs (34) onto the clamp tubes (12) and slide the reaction plate (31) onto the clamp tubes. Reference Table 12 for number of release springs required and assembly pattern.

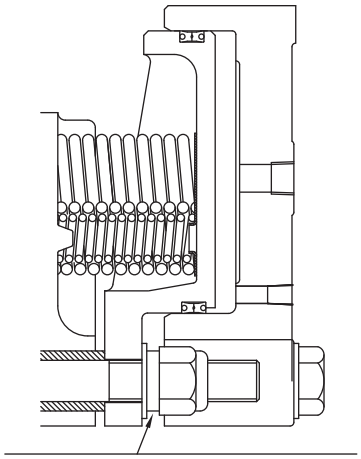
4.2.2.7 Slide the second disc onto the gear.

4.2.2.8 Place the release springs (34) onto the clamp tube (12) and slide the pressure plate/cylinder assembly onto the clamp tubes.

4.2.2.9 Lubricate the threads on the ends of the studs with 30 wt. oil or anti-seizing compound and install the locknuts (18), washers (17) and the wear spacers (29) removed in 4.2.2.5. The wear spacers are "stored" under the locknuts for use after replacing friction discs (8). See Figure 9.

4.2.2.10 While supporting the weight of the cylinder/ spring housing/pressure plate assembly, tighten the locknuts (18), ONE TURN AT A TIME and in a crosswise pattern, until the spring housing is seated against the clamp tubes. Torque the locknuts to the appropriate value. See Table 6.

⚠ **Caution**
The locknuts (18) must be tightened gradually, one turn at a time, to prevent damage to the brake components.



WEAR SPACER STORAGE

Figure 9

4.2.3 Wear Adjustment with Split Wear Spacers

Note: To determine the type of wear spacers (29) installed in the brake, refer to section 4.2.3.4 that directs to loosen the locknuts (18) until the force of the release springs is relieved. Once the assembly is loose, the wear spacers can be rotated to confirm that they are the 'Split Spacers'. The split wear spacers are identified by the presence of a slot running across the thickness of the spacer. See Figure 10. If the wear spacers do not have the slot then they are solid wear spacers and the DBBS must be disassembled per 4.2.2.1 in order to make adjustments.

⚠ **Caution**
Be sure to follow 4.2.3.4 instructions complete to prevent damage to the brake components.

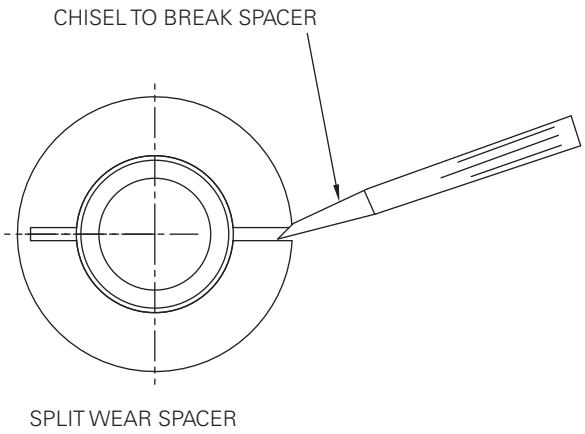


Figure 10

4.2.3.1 Disconnect the air supply lines from the brake. Wipe down the brake and match mark all components from the mounting flange (2) to the cylinder (19) prior to disassembly. Match marking all components will ensure that the components are reinstalled in the orientation and location from which they were removed.

4.2.3.2 Wear adjustment can be conducted without full disassembly of the Multi-disc DBB brake. The wear adjustment spacers are slotted to allow for easy removal with a chisel. See Figure 10.

4.2.3.3 Wear spacers shall be removed in complete sets only (one from each stud location). Mark the spacers to be removed to avoid confusion during removal.

⚠ **Warning**
Removal of spacers in quantities other than complete sets (layers) will result in severe damage to DBB components during reassembly and could cause the brake to not function properly.

4.2.3.4 Loosen the locknuts (18) one at a time and in an alternating (crosswise) pattern to prevent binding of the cylinder on the studs. Continue to loosen the locknuts until the force of the release springs is relieved, allowing for access to the wear spacers. It may be necessary to push the reaction plate(s) away from the mounting flange so that the release springs can be moved to gain access to the wear spacers.

⚠ **Caution**
The locknuts (18) must be loosened gradually, one turn at a time, to prevent damage to the brake components.

⚠ **Caution**
Remove discs as needed so that they do not fall off the gear during maintenance.

4.2.3.5 Using a narrow chisel wedged into the slot in the wear spacer, pry the wear spacer until it fractures and is clear to be removed from the stud. Repeat for the remaining spacers in the set that is to be removed (one spacer from each stud position). See Fig 10 (Removing Split Wear Spacers with Chisel)

⚠ **Warning**
Be sure to collect all wear spacers when removed. Spacers lodging in between brake components could prevent the brake from properly engaging or releasing.

4.2.3.6 While supporting the weight of the cylinder/piston assembly, tighten the locknuts (18) ONE TURN AT A TIME and in a crosswise pattern until the cylinder is seated firmly against the clamp tubes. Torque the locknuts to the appropriate value. See Table 5.

⚠ **Caution**
The locknuts (18) must be loosened gradually, one turn at a time, to prevent damage to the brake components.

4.2.3.7 Restore any piping or covers removed prior to operating the brake.

4.3 Friction Material Replacement

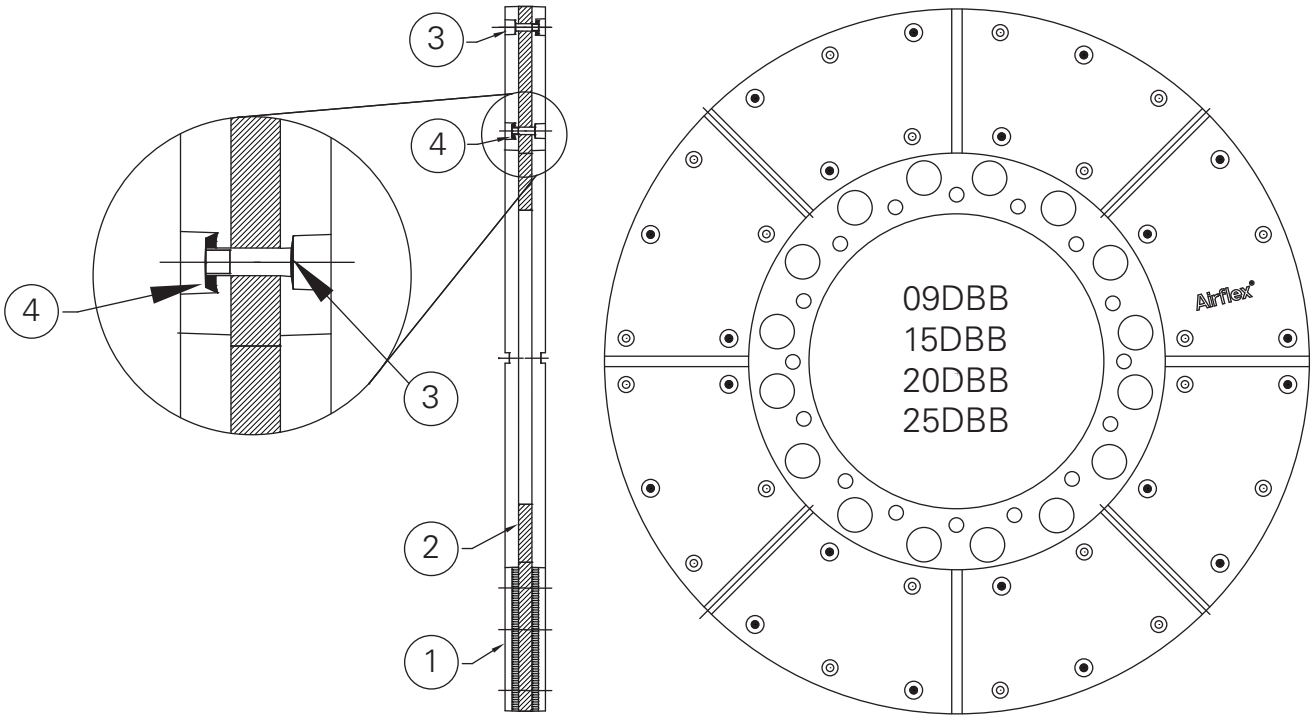
Note: Replacing the friction disc subassembly (7) applies to all DBB sizes. Replacing the friction material as outlined in Section 4.3 applies only to 09DBB, 15DBB, 20DBB & 25DBB. Bonded friction disc sub assembly should be replaced in its entirety. Friction material for this size is not available separately for replacement onto steel core.

Note: Friction material is bonded to the friction disc core (9) on all 38DBB brakes. See Figure 10 (Bonded Friction Disc Subassembly).

4.3.1 Disconnect the air supply lines and remove the cylinder/spring housing/pressure plate assembly per 4.2.1.2.

4.3.2 Slide the friction disc assembly off of gear and transport to a clean area. On multi disc brakes, the reaction plate, release springs and remaining friction disc assembly must also be removed.

4.3.3 Remove the screws (36) and washers (35) attaching the friction disc subassembly (7) to the ring gear (37) and remove the friction disc subassembly. Reference Figure 11 (Riveted Friction Disc Subassembly).



RIVETED FRICTION DISC ASSEMBLY

Figure 11

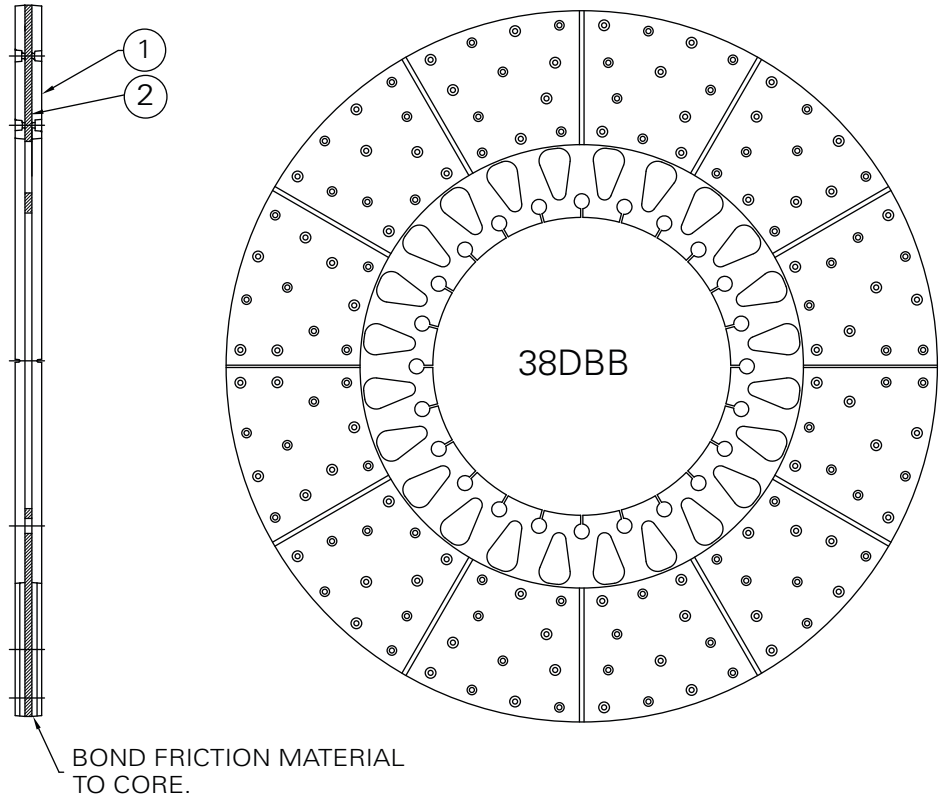


Figure 12

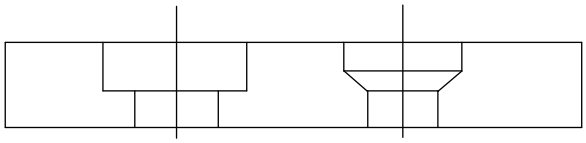
4.3.4 Thoroughly clean the threaded holes in the ring gear and the threads on the screws (36).

4.3.5 Attach a new friction disc subassembly to the ring gear using Loctite #262 on the screw threads. Torque the screws to the value shown on Table 6.

⚠ **Warning**
Use only the proper size and grade screws to attach the friction disc subassembly to the ring gear. Use of commercial (Grade 2) scews where Grade 8 screws are specified may result in failure of the screws and a sudden loss of brake torque.

4.3.6 Friction disc cores (9) for sizes 9DBB thru 25DBB may be relined with new friction material per the following instructions. Refer to Section 7 (Repair Kits) for the appropriate friction disc replacement kit part number.

⚠ **Caution**
Use on genuine, Airflex friction material. Use of material not of Airflex origin may result in unpredictable brake performance and/or excessive wear of the brake components.



COUNTERBORED HOLES FOR RIVETED FRICTION DISC

Figure 13

4.3.6.1 Drill out the old rivets using the appropriate size drill as shown below. Remove and discard the old friction discs.

4.3.6.2 Refer to Figure 13 and carefully examine the counterbored holes in the new friction disc. One set of counterbored holes is tapered and designed to accept the rivet head, while the other set of counterbored holes is flat-bottomed and designed to accept the clinched end of the rivet.

4.6.6.3 Position the friction discs on both sides of the disc core and align the rivet holes. Remember, a tapered counterbored hole on one friction disc will mate with a flat-bottomed counterbored hole on the opposite friction disc.

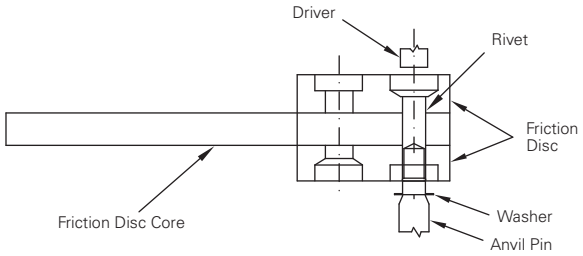
⚠ **Caution**
Failure to orient the Friction Disc Subassembly (7) in the proper direction will cause interferences and damage to the brake.

Note: Refer to section 4.6.2 for instructions on the orientation of the single and multiple Friction Disc Sub Assemblies.

⚠ **Caution**
Manual setting of the rivets using a punch very frequently results in splitting of the clinched end of the rivet. When this occurs, the rivet will ultimately fail in service due to fatigue. It is therefore recommended that rivets be set using automatic rivet setting machine.

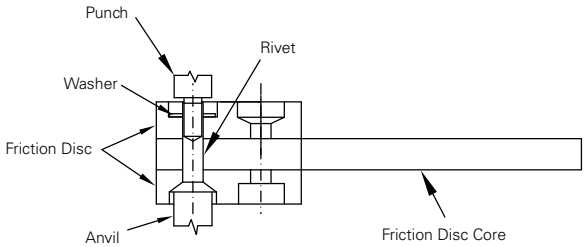
4.3.6.4 Insert a rivet through any hole and set using a washer (11) on the clinched end of the rivet. Be sure to note the type of counterbored hole to determine the position of the rivet head. See Figures 14 and 15. Figure 14 shows machine-setting and Figure 15 shows setting the rivet manually. When setting manually, use an arbor press and keep the setting tool square to avoid splitting the rivet. Rivet setting tool part numbers are shown in Section 7.0.

⚠ **Caution**
The clinched end of the rivet must have a washer (11) in place prior to clinching. Failure to use the washer will allow the rivet to fracture the friction lining. Also, use of excessive force to clinch the rivet will fracture the friction lining.



MACHINE RIVIT INSTALLATION

Figure 14



MANUAL RIVIT INSTALLATION

Figure 15

4.3.6.5 The remaining rivets may be installed in any reasonable sequence following 4.3.6.4.

4.3.6.6 When replacing the friction material measure the wear surfaces of the reaction plate (31), pressure plate (14) and mounting flange (2). Refer to Table 10 for wear limits of the above component and determine if the components require replacement. If the reaction plate, pressure plate and mounting flange is reused then it is recommended to machine the wear surfaces. A light skim cut to remove surface imperfections and true the surface is desired.

⚠ **Warning**
Failure to machine wear plates flat could result in poor contact between the friction couple and subsequent reduction or erratic torque of the tensioner.

⚠ **Warning**
Failure to replace a worn reaction plate (31), pressure plate (14) and mounting flange (2) could result in tensioner failure, equipment damage and possible injury to personnel.

4.3.6.7 If new reaction plate (31), pressure plate (14) and mounting flange (2) is used then machining is not required. Inspect the plates and remove any dirt or oils that may have been deposited during handling and prior to installation.

4.4 Cylinder Seal Replacement

4.4.1 Disconnect the air supply lines and remove the screws (20), washers (17) and spacer tubes (27) attaching the cylinder (19) to the pressure plate (14).

4.4.2 Carefully slide the cylinder off of the spring housing (16).

⚠ **Caution**
Do not use compressed air to remove the cylinder from the spring housing.

4.4.3 Remove the cylinder seals (21,23) from the spring housing and thoroughly clean the seal grooves in the spring housing.

4.4.4 Insert new seals into the grooves, noting the orientation of the seals per Figure 16.

4.4.5 Carefully examine the seal surfaces in the cylinder. If the surfaces have worn to point as indicated on Table 10, the cylinder must be replaced.

4.4.6 Lubricate the seal surfaces in the cylinder with Molycote® 55 O-ring lubricant and carefully slide the cylinder onto the spring housing. Take special care to avoid damaging the seal lips.

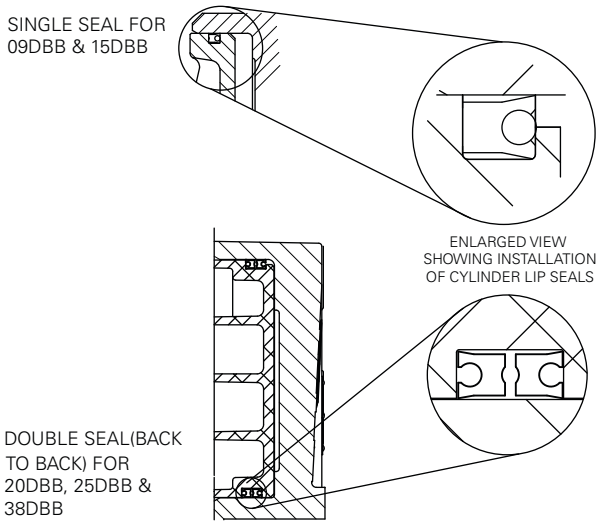


Figure 16

4.4.7 Attach the cylinder to the pressure plate with the screws, washers and spacer tubes removed in 4.4.1. Use Loctite Loc-Quic Primer Grade "T" to clean and prepare the screw threads and install with Loctite #262. Using a crosswise pattern, torque the screws to the value shown on Table 6.

4.5 Spring Replacement

4.5.1 (DBB 9 & 15)

4.5.1.1 Disconnect the air supply lines and loosen the locknuts (18), ONE TURN AT A TIME and in a crosswise pattern, until the spring force has been relieved.

⚠ **Caution**
The locknuts (18) must be loosened gradually to prevent damage to the brake components.

4.5.1.2 Remove the locknuts (18) and washers (17) and carefully remove the cylinder/spring housing/pressure plate assembly. Transport to a clean work area.

4.5.1.3 Loosen the screws (20) gradually until the remaining spring force is relieved. Remove the screws and washers (17).

4.5.1.4 Carefully lift the cylinder and spring housing off of the pressure plate, exposing the springs (22).

⚠ **Caution**
Before removing the old springs, make note of the number used and the position that they are in so that the new springs may be installed similarly for proper brake functioning. Refer to Table 12 for quantity of release springs (34) per brake assembly and the spring pattern.

Table 12
Number of Release Springs Required & Assembly Pattern

Size	Item	Description	Quantity	Assembly Pattern
209	34	Release Spring	12	Release Springs over every clamp tube.
309	34	Release Spring	18	Release Springs over every clamp tube.
215	34	Release Spring	6	Release Springs over every other clamp tube.
315	34	Release Spring	9	Release Springs over every other clamp tube.
220	34	Release Spring	12	Release Springs over every other clamp tube.
320	34	Release Spring	18	Release Springs over every other clamp tube.
420	34	Release Spring	24	Release Springs over every other clamp tube.
225	34	Release Spring	12	Release Springs over every other clamp tube.
325	34	Release Spring	18	Release Springs over every other clamp tube.
425	34	Release Spring	24	Release Springs over every other clamp tube.
238	34	Release Spring	16	Release Springs over every other clamp tube.
338	34	Release Spring	24	Release Springs over every other clamp tube.
438	34	Release Spring	32	Release Springs over every other clamp tube.

4.5.1.5 Remove the springs and check the free height. If the free height of any spring is less than the value shown on Table 10, the entire complement of springs must be replaced.

4.5.1.6 Re-install the springs into the pockets in the pressure plate in reverse order.

4.5.1.7 Place a spacer tube (27) in position over each tapped hole in the pressure plate and carefully lower the spring housing/cylinder assembly onto the springs, making sure the springs engage the bosses in the spring housing.

4.5.1.8 Clean and prepare the threads on the screws (20) with Loctite Loc-Quic Primer Grade "T" and install with Loctite #262, making sure the washers (17) are in place. Using a crosswise pattern, tighten the screws one turn at a time until the spacer tubes are clamped between the cylinder and pressure plate. Torque the screws to the value shown on Table 6.

4.5.1.9 While supporting the weight of the cylinder/spring housing/pressure plate assembly, tighten the locknuts, ONE TURN AT A TIME and in a crosswise pattern, until the spring housing is seated against the clamp tubes. Torque the locknuts to the appropriate value. See Table 6.

⚠ **Caution**
The locknuts (18) must be tightened gradually to prevent damage to the brake components.

4.5.2 (DBB 20, 25 & 38)

4.5.2.1 Disconnect the air supply lines and loosen the locknuts (18), ONE TURN AT A TIME and in a crosswise pattern, until the spring force has been relieved.

4.5.2.2 Match mark the pressure plate and spring housing to one another.

⚠ **Caution**
The locknuts (18) must be loosened gradually to prevent damage to the brake components.

4.5.2.3 Remove the locknuts (18) and washers (17) and carefully remove the cylinder/spring housing/pressure plate assembly. Transport to a clean work area.

4.5.2.4 Loosen the screws (20) gradually until the remaining spring force is relieved. Remove the screws and washers (17).

4.5.2.5 Carefully lift the cylinder and spring housing off of the pressure plate, exposing the springs (22).

⚠ **Caution**
Before removing the old springs, make note of the number used and the position that they are in so that the new springs may be installed similarly for proper brake functioning. Refer to Table 12 for quantity of release springs (34) per brake assembly and the spring pattern.

4.5.2.6 Noting their orientation, remove the spring retainer plates (53), exposing the springs.

4.5.2.7 Remove the springs and check the free height. If the free height of any spring is less than the value shown on Table 10, the entire complement of springs must be replaced.

4.5.2.8 Re-install the springs into the pockets in the pressure plate in reverse order.

⚠ **Caution**
No spring retainer plate (53) should cross over the ribs in the spring housing (16).

4.5.2.9 Arrange the spring retainer plates onto the springs in the reverse order removed.

4.5.2.10 Place a spacer tube (27) in position over each tapped hole in the pressure plate, align the match marks and carefully lower the spring housing/cylinder assembly onto the springs, making sure the springs engage the bosses in the spring housing.

4.5.2.11 Clean and prepare the threads on the screws (20) with Loctite Loc-Quic Primer Grade "T" and install with Loctite #262, making sure the washers (17) are in place. Using a crosswise pattern, tighten the screws, one turn at a time until the spacer tubes are clamped between the cylinder and pressure plate. Torque the screws to the value shown on Table 6.

4.5.2.12 While supporting the weight of the cylinder/spring housing/pressure plate assembly, tighten the locknuts, ONE TURN AT A TIME, and in a crosswise pattern, until the spring housing is seated against the clamp tubes. Torque the locknuts to the appropriate value. See Table 6.

⚠ **Caution**
The locknuts (18) must be tightened gradually to prevent damage to the brake components.

4.6 Disassembly

4.6.1 Disassembly instructions can be found in Section 4.5 (reference Sections 4.5.1 thru 4.5.1.4)

4.7 Assembly

4.7.1 Assembly instructions can be found in Section 4.5 (reference Sections 4.5.2.8 thru 4.5.2.12)

4.7.2 When building the brake and installing the Friction Disc Subassembly, be sure to orient the Friction Disc Subassembly in the proper direction. Refer to Figure 1A for a single assembly and note the hex head screw (36) facing the mounting flange (2). Refer to Figure 1B for a dual assembly and note the hex head facing the same direction towards the mounting flange. A quad disc brake assembly is similar to the triple disc assembly.

5.0 ORDERING INFORMATION/TECHNICAL ASSISTANCE

5.1 Equipment Reference

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

Eaton
Hydraulics Group USA
Airflex Products
9919 Clinton Road
Cleveland, Ohio 44144
Tel.: (216) 281-2211
Fax: (216) 281-3890
www.eaton.com/hydraulics

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Castrol Molub-Alloy 936SF Heavy is a registered trademark of Castrol Limited.

Molykote is a registered trademark of Dow Corning Corp.

6.0 PARTS

6.1 Basic Assemblies

6.1.1 9DBB

Item	Description	109DBB 146333E Part Number	109DBB 146333E Qty	209DBB 146334E Part Number	209DBB 146334E Qty	309DBB 146380E Part Number	309DBB 146380E Qty
2	Mounting Flange	512554	1	512554	1	512554	1
6	Stud	000245x0046	6	000245x0055	6	000245x0102	6
7	Friction Disc Assembly	512567	1	512567	2	512567	3
12	Clamp Tube	307694-03	6	307694-04	6	307694-06	6
14	Pressure Plate	512537	1	512537	1	512537	1
16	Spring Housing	512491	1	512491	1	512491	1
17	Flat Washer	000067x0041	12	000067x0041	12	000067x0041	12
18	Self Locking Nut	000110x0024	6	000110x0024	6	000110x0024	6
19	Cylinder	512483	1	512483	1	512483	1
20	Hex Head Screw	000197x0418	6	000197x0418	6	000197x0418	6
21	Seal (Inner)	000402x0001	1	000402x0002	1	000402x0003	1
22	Spring (Outer)	308225	12	308225	12	308225	12
23	Seal (Outer)	000402x0002	1	000402x0002	1	000402x0002	1
27	Spacer Tube	307710-01	6	307710-01	6	307710-01	6
28	Gear (not included with assembly)	415314-XXXX	1	415314-XXXX	1	416481-XXXX	1
29	Clamp Tube Wear Spacer	-	-	307710-02	6	307710-02	12
31	Reaction Plate	-	-	512541	1	512541	2
34	Release Spring	-	-	307709	12	307709	18
35	Flat Washer	000067x0001	12	000067x0001	24	000067x0001	24
36	Hex Head Screw	000197x0005	12	000197x0005	24	000197x0005	24
37	Ring Gear	415309	1	415309	2	415309	3
38	Pipe Nipple	000070x0064	1	000070x0064	1	000070x0064	1
39	Elbow	000078x0002	4	000078x0002	4	000078x0002	4
40	Pipe Nipple	000070x0021	2	000070x0021	2	000070x0021	2
41	Reducing Tee	000161x0010	1	000161x0010	1	000161x0010	1
42	Hose Assembly	000318x0030	2	000318x0030	2	000318x0030	2
43	Pipe Nipple	000070x0020	2	000070x0020	2	000070x0020	2
44	Flow Control Valve	000042x0223	1	000042x0223	1	000042x0223	1
45	45^0 Street Elbow	-	-	-	-	-	-
46	Pipe Cross	-	-	-	-	-	-
47	Pipe Reducer	-	-	-	-	-	-
48	Hose Assembly	-	-	-	-	-	-
52	Spring (Inner)	-	-	-	-	-	-
53	Spring Retainer	-	-	-	-	-	-
56	Hex Head Screw	-	-	-	-	-	-
105	Brass Pipe Plug	-	-	-	-	-	-

6.1.2 15DBB

Item	Description	115DBB 146222E Part Number	Qty	215DBB 146337E Part Number	Qty	315DBB 146929E Part Number	Qty
2	Mounting Flange	512462	1	512462	1	512462	1
6	Stud	000245x0059	6	000245x0059	6	000245x0059	6
7	Friction Disc Assembly	512293	1	512293	2	512293	3
12	Clamp Tube	306956-05	6	306956-05	6	306956-05	6
14	Pressure Plate	512449	1	512449	1	512449	1
16	Spring Housing	512295	1	512295	1	512295	1
17	Flat Washer	000067x0040	12	000067x0040	12	000067x0040	12
18	Self Locking Nut	000110x0030	6	000110x0030	6	000110x0030	6
19	Cylinder	512296	1	512296	1	512296	1
20	Hex Head Screw	000197x0719	6	000197x0719	6	000197x0719	6
21	Seal (Inner)	000402x0003	1	000402x0003	1	000402x0003	1
22	Spring (Outer)	308224	12	308224	12	308224	12
23	Seal (Outer)	000402x0004	1	000402x0004	1	000402x0004	1
27	Spacer Tube	307636-01	6	307636-01	6	307636-01	6
28	Gear (not included with assembly)	415454-XXXX	1	415454-XXXX	1	415454-XXXX	1
29	Clamp Tube Wear Spacer	-	-	308155-01	6	308155-01	12
31	Reaction Plate	-	-	512340	1	512340	2
34	Release Spring	-	-	307641	6	307641	9
35	Flat Washer	000067x0003	12	000067x0003	24	000067x0003	24
36	Hex Head Screw	000197x0207	12	000197x0207	24	000197x0207	24
37	Ring Gear	415118	1	415118	2	415118	3
38	Pipe Nipple	000070x0147	1	000070x0147	1	000070x0147	1
39	Elbow	000078x0001	2	000078x0001	2	000078x0001	2
40	Pipe Nipple	-	-	-	-	-	-
41	Reducing Tee	000161x0008	1	000161x0008	1	000161x0008	1
42	Hose Assembly	000318x0029	2	000318x0029	2	000318x0029	2
43	Pipe Nipple	000070x0166	2	000070x0166	2	000070x0166	2
44	Flow Control Valve	000042x0224	1	000042x0224	1	000042x0224	1
45	45^0 Street Elbow	000081x0001	2	000081x0001	2	000081x0001	2
46	Pipe Cross	-	-	-	-	-	-
47	Pipe Reducer	-	-	-	-	-	-
48	Hose Assembly	000318x0004	1	000318x0004	1	000318x0004	1
52	Spring (Inner)	-	-	-	-	-	-
53	Spring Retainer	-	-	-	-	-	-
56	Hex Head Screw	000197x0611	2	000197x0611	-	000197x0611	-
105	Brass Pipe Plug	-	-	-	-	-	-

6.1.3 20DBB

Item	Description	120DBB 146299E Part Number	220DBB 146300E Qty	Part Number	320DBB 146378E Qty	Part Number	420DBB 146379E Qty	Part Number	Qty
2	Mounting Flange	512752	1	512752	1	512752	1512752	1	
6	Stud	000245x0061	12	000245x0064	12	000245x0063	12	000245x0103	12
7	Friction Disc Assembly	512768	1	512768	2	512768	3512768	4	
12	Clamp Tube	306956-09	12	306956-10	12	306956-19	12	306956-30	12
14	Pressure Plate	512637	1	512637	1	512637	1	512637	1
16	Spring Housing	512639	1	512639	1	512639	1	512639	1
17	Flat Washer	000153x0727	24	000153x0727	24	000153x0727	24	000153x0727	24
18	Self Locking Nut	000110x0030	12	000110x0030	12	000110x0030	12	000110x0030	12
19	Cylinder	512693	1	512693	1	512693	1	512693	1
20	Hex Head Screw	000197x0723	12	000197x0723	12	000197x0723	12	000197x0723	12
21	Seal (Inner)	000402x0021	2	000402x0021	2	000402x0021	2	000402x0021	2
22	Spring (Outer)	307947	12	307947	12	307947	12	307947	12
23	Seal (Outer)	000402x0022	2	000402x0022	2	000402x0022	2	000402x0022	2
27	Spacer Tube	308155-06	12	308155-06	12	308155-06	12	308155-06	12
28	Gear (not included with assembly)	415900-XXXX	1	416059-XXXX	1	416304-XXXX	1	416471-XXXX	1
29	Clamp Tube Wear Spacer	-	-	308155-02	12	308155-02	24	308155-02	36
31	Reaction Plate	-	-	512763	1	512763	2	512763	3
34	Release Spring	-	-	307996	12	307996	18	307996	24
35	Flat Washer	000067x0003	16	000067x0003	32	000067x0003	32	000067x0003	32
36	Hex Head Screw	000197x0207	16	000197x0207	32	000197x0207	32	000197x0207	32
37	Ring Gear	513193	1	513193	2	513193	3	513193	4
38	Pipe Nipple	000070x0147	1	000070x0147	1	000070x0147	1	000070x0147	1
39	Elbow	000078x0001	3	000078x0001	3	000078x0001	3	000078x0001	3
40	Pipe Nipple	-	-	-	-	-	-	-	-
41	Reducing Tee	-	-	-	-	-	-	-	-
42	Hose Assembly	000318x0032	2	000318x0032	2	000318x0032	2	000318x0032	2
43	Pipe Nipple	000070x0206	4	000070x0247	4	000070x0247	4	000070x0247	4
44	Flow Control Valve	000042x0224	1	000042x0224	1	000042x0224	1	000042x0224	1
45	45^0 Street Elbow	000008x0001	2	000008x0001	2	000008x0001	2	000008x0001	2
46	Pipe Cross	000185x0001	1	000185x0001	1	000185x0001	1	000185x0001	1
47	Pipe Reducer	000085x0004	3	000085x0004	3	000085x0004	3	000085x0004	3
48	Hose Assembly	000318x0004	1	000318x0004	1	000318x0004	1	000318x0004	1
52	Spring (Inner)	-	-	-	-	-	-	-	-
53	Spring Retainer	415823	6	415823	6	415823	6	415823	6
56	Hex Head Screw	-	-	-	-	-	-	-	-
105	Brass Pipe Plug	-	-	-	-	-	-	-	-

6.1.4 25DBB

Item	Description	125DBB 146315E Part Number	225DBB 146327E Qty	Part Number	325DBB 146370E Qty	Part Number	425DBB 146381E Qty	Part Number	Qty
2	Mounting Flange	513276	1	513276	1	514199	1	514199	1
6	Stud	000245x0067	12	000245x0078	12	000245x0100	12	000245x0101	12
7	Friction Disc Assembly	513293	1	513293	2	513293	3	513293	4
12	Clamp Tube	306542-15	12	306542-16	12	306542-27	12	306542-35	12
14	Pressure Plate	513271	1	513271	1	513271	1	513271	1
16	Spring Housing	513268	1	513268	1	513268	1	513268	1
17	Flat Washer	000153x0641	24	000153x0641	24	000153x0641	24	000153x0641	24
18	Self Locking Nut	000110x0073	12	000110x0073	12	000110x0073	12	000110x0073	12
19	Cylinder	513264	1	513264	1	513264	1	513264	1
20	Hex Head Screw	000197x1035	12	000197x1035	12	000197x1035	12	000197x1035	12
21	Seal (Inner)	000402x0023	2	000402x0023	2	000402x0023	2	000402x0023	2
22	Spring (Outer)	307970	16	307970	16	307970	16	307970	16
23	Seal (Outer)	000402x0024	2	000402x0024	2	000402x0024	2	000402x0024	2
27	Spacer Tube	308170-02	12	308170-02	12	308170-02	12	308170-02	12
28	Gear (not included with assembly)	416073-XXXX	1	416074-XXXX	1	416233-XXXX	1	416477-XXXX	1
29	Clamp Tube Wear Spacer	-	-	308170-01	12	308170-01	24	308170-01	36
31	Reaction Plate	-	-	513319	1	513319	2	513319	3
34	Release Spring	-	-	308037	12	308037	18	308037	24
35	Flat Washer	000067x0005	18	000067x0005	36	000067x0005	54	000067x0005	72
36	Hex Head Screw	000197x0409	18	000197x0409	36	000197x0408	54	000197x0408	72
37	Ring Gear	513278	1	513278	2	513797	3	513797	4
38	Pipe Nipple	000070x0147	1	000070x0147	1	000070x0147	1	000070x0147	1
39	Elbow	000078x0001	3	000078x0001	3	000078x0001	3	000078x0001	3
40	Pipe Nipple	-	-	-	-	000070x0166	1	000070x0166	1
41	Reducing Tee	-	-	-	-	-	-	-	-
42	Hose Assembly	000318x0038	2	000318x0038	2	000318x0038	2	000318x0038	2
43	Pipe Nipple	000070x0247	4	000070x0247	4	000070x0247	3	000070x0247	3
44	Flow Control Valve	000042x0224	1	000042x0224	1	000042x0224	1	000042x0224	1
45	45^0 Street Elbow	000081x0001	2	000081x0001	2	000081x0001	2	000081x0001	2
46	Pipe Cross	000185x0001	1	000185x0001	1	000185x0001	1	000185x0001	1
47	Pipe Reducer	000085x0004	3	000085x0004	3	000085x0004	3	000085x0004	3
48	Hose Assembly	000318x0004	1	000318x0004	1	000318x0004	1	000318x0004	1
52	Spring (Inner)	307969	16	307969	16	307969	16	307969	16
53	Spring Retainer	307971	8	307971	8	307971	8	307971	8
56	Hex Head Screw	-	-	-	-	-	-	-	-
105	Brass Pipe Plug	-	-	-	-	-	-	-	-

6.1.5 38DBB

Item	Description	138DBB 146295E Part Number	238DBB 146296E Qty	Part Number	338DBB 146386E Qty	Part Number	438DBB 146387E Qty	Part Number	Qty
2	Mounting Flange	513137	1	513137	1	513137	1	513137	1
6	Stud	000245x0072	16	000245x0074	16	000245x0107	16	000245x0104	16
7	Friction Disc Subassembly (Bonded)	514024	1	514024	2	514024	3	514024	4
12	Clamp Tube	307941-01	16	307941-02	16	307941-12	12	307941-13	12
14	Pressure Plate	513071	1	513071	1	513071	1	513071	1
16	Spring Housing	513764	1	513764	1	513764	1	513764	1
17	Flat Washer	000067x0042	32	000067x0042	32	000067x0042	24	000067x0042	24
18	Self Locking Nut	000110x0075	16	000110x0075	16	000110x0075	12	000110x0075	12
19	Cylinder	513988	1	513988	1	513988	1	513988	1
20	Hex Head Screw	000197x1338	16	000197x1338	16	000197x1338	12	000197x1338	12
21	Seal (Inner)	000402x0005	2	000402x0005	2	000402x0005	2	000402x0005	2
22	Spring (Outer)	308035	32	308035	32	308035	32	308035	32
23	Seal (Outer)	000402x0006	2	000402x0006	2	000402x0006	2	000402x0006	2
27	Spacer Tube	308150-01	16	308150-01	16	308150-01	12	308150-01	12
28	Gear (not included with assembly)	416068-XXXX	1	416069-XXXX	1	416241-XXXX	1	416469-XXXX	1
29	Clamp Tube Wear Spacer	-	-	308150-02	16	308150-05	32	308150-05	48
31	Reaction Plate	-	-	513139	1	513139	2	513139	3
34	Release Spring	-	-	307940	16	307940	24	307940	32
35	Flat Washer	000067x0009	24	000067x0009	48	000067x0009	54	000067x0009	72
36	Hex Head Screw	000197x0709	24	000197x0709	48	000197x0709	54	000197x0709	72
37	Ring Gear	513154	1	513154	2	513811	3	513811	4
38	Pipe Nipple	000070x0244	1	000070x0244	1	000070x0244	1	000070x0244	1
39	Elbow	000078x0009	3	000078x0009	3	000078x0009	3	000078x0009	3
40	Pipe Nipple	-	-	-	-	-	-	-	-
41	Reducing Tee	-	-	-	-	-	-	-	-
42	Hose Assembly	000318x0033	2	000318x0033	2	000318x0033	2	000318x0033	2
43	Pipe Nipple	000070x0138	4	000070x0138	4	000070x0138	3	000070x0138	3
44	Flow Control Valve	000042x0215	1	000042x0215	1	000042x0215	1	000042x0215	1
45	45^0 Street Elbow	000081x0005	2	000081x0005	2	000081x0005	2	000081x0005	2
46	Pipe Cross	000185x0004	1	000185x0004	1	000185x0004	1	000185x0004	1
47	Pipe Reducer	000085x0005	3	000085x0005	3	000085x0005	3	000085x0005	3
48	Hose Assembly	000318x0023	1	000318x0023	1	000318x0023	1	000318x0023	1
52	Spring (Inner)	308034	32	308034	32	308034	16	308034	16
53	Spring Retainer	415635	16	415635	16	415635	8	415635	8
56	Hex Head Screw	-	-	-	-	-	-	-	-
105	Brass Pipe Plug	000077x0021	1	000077x0021	1	000077x0021	1	000077x0021	1

6.2 Subassembly

6.2.1 DBB Friction Disc Sub Assembly (3-61 Friction Material) Standard

Item*	Description	9DBB	15DBB	20DBB	25DBB	38DBB
-	Friction Disc Sub-Assembly*	512567	512293	512768	513293	514024
1	Friction Disc**	512565	512305	512766	513291	Bonded
2	Core**	512566	512303	512767	513292	Bonded
3	Rivet**	000130x0093	000130x0094	000130x0094	000130x0094	Bonded
4	Plain Washer**	000067x0036	000067x0043	000067x0039	000067x0039	Bonded

*Reference Figure 11 for Item numbers.
**Reference Section 7.2.1 for quantities of components.

7.0 DBB REBUILD KITS

7.1 DBB Cylinder Seal Kits

Model	Kit P/N	Lubricant Part No.	(Qty)	Lip Seal (Inner) (21) Part No.	(Qty)	Lip Seal (Outer) (23) Part No.	(Qty)	Instruction Sheet Part No.	(Qty)
9DBB	107671C	000153x1239	1	000402x0001	1	000402x0002	1	204067	1
15DBB	107672C	000153x1239	1	000402x0003	1	000402x0004	1	204067	1
20DBB	107726C	000153x1239	1	000402x0021	2	000402x0022	2	204067	1
25DBB	107727C	000153x1239	1	000402x0023	2	000402x0024	2	204067	1
38DBB	107662C	000153x1239	1	000402x0005	2	000402x0006	2	204067	1

7.2 DBB Friction Disc Kits

7.2.1 DBB Friction Disc Kits (Friction Material 3-61)

Model	Kit P/N	Plain Washer (4) Part No.	(Qty)	Rivet (3) Part No.	(Qty)	Friction Disc (1) Part No.	(Qty)	Instructions Part No.	(Qty)
9DBB	107742D	000067x0036	20	000130x0093	20	512565	2	000153x1095	1
15DBB	107743D	000067x0043	28	000130x0094	28	512305	2	000153x1095	1
20DBB	107744D	000067x0039	40	000130x0094	40	512766	2	000153x1095	1
25DBB	107745D	000067x0039	64	000130x0073	64	513291	2	000153x1095	1
38DBB		See Note 1						000153x1095	1

Notes: 1. Friction Material is Bonded to the the Disc Core. Customer must order bonded assembly. Reference Part No. 514024
2. a. Single disc brakes require one kit
b. Two disc brakes require two kits
c. Three disc brakes require three kits
d. Four disc brakes require four kits

8.0 REVISIONS

Original Publication Date: November 2013

Revision Date	Description
November xx, 2013	1. Changed parts description to Table 1
	2. Table changes: Table 2 was Table1; Table 3 was Table 2; Table 4 was Table 3
	3. Table changes: Table 6 was Table 4; Table 7 was Table 5; Table 8 was Table 6
	4. Table changes: Table 9 was Table 7; Table 10 was Table 8
	5. Added Table 5, Brake sizes requiring support bracket
	6. Added Table 11, Power Head Weights
	7. Added Table 12 after section 4.5.1.4 & Caution
	8. Combined reaction hole diameter and spring height informtion in new Table 10
	9. Deleted old Table 9 and put information into Section 7.
	10. Figure 1 was revised to three figures (1A, 1B & 1C)
	11. Figure 2 was revised to (2A, 2B, 2C, 2D 7 2E) and added angular information.
	12. Figure 3 was redrawn
	13. Figures 4A thru 4E was the piping layout in old figure 1.
	14. Figure changes: Figure 5 was Figure 4; Figure 6 was Figure 5; Figure 7 was Figure 6.
	15. Figure 8 was Figure 7; Figure 11 was Figure 8; Figure 12 was Figure 9
	16. Created a new Figure 9 after Section 4.3
	17. Created a new Figure 10 after Section 4.3.3
	18. Figure 13 was Figure 10; Figure 14 was Figure 11
	19. Revised Section 6.0 parts list. Added sections 6.1, 6.1.1, 6.1.2, 6.1.3, 6.1.4, 6.1.5
	20. Added item 29 for 15DBB
	21. Item 22 for 38DBB was 30835
	22. Removed the description 'Polypak' from Items 21 & 23 for all DBB Brakes
	23. Added 3 disc & 4 disc Brake models to all Tables
	24. Added Sections 7.0, 7.1, 7.2, 7.2.1, 7.2.2
	25. Added the 'Revision' page
	26. Added an additional Caution in section 1.0 (compressed air & regulations)
	27. Added 'Note' on mounting hole size after Section 2.1.2
	28. Added Warning and Note after Section 2.2
	29. Revised Section 2.4 and added Caution
	30. Revised Lubrication Specification in Section 2.5. Was Molylube.
	31. Added Section 2.2.6 and Note
	32. Rewrite of Section 2.3 'Air Supply System'
	33. Rewrite of Section 4.2.1 'Wear Adjustment' and added Caution after this section
	34. Replaced Sections 4.2.1.1 thru 4.2.1.10 with 4.2.2 thru 4.2.2.10 and added Note preceding Section 4.2.2
	35. Added 'Notes' after Section 4.3
	36. Added 'Note' and 'Caution' after Section 4.6.6.3
	37. Added 'Note' after Section 4.3.6.

User Notes

Eaton
Hydraulics Group USA
Airflex Division
9919 Clinton Road
Cleveland, OH 44144-1077
Tel: 216-281-2211
Fax: 216-281-3890

Eaton
Hydraulics Group Asia Pacific
281 Fa Sai Road
Waigaoqiao Free Trade Zone
Shanghai 200131
China
Tel:(+8621) 5048-48

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