



Powering Business Worldwide

Airflex DBA 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

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:

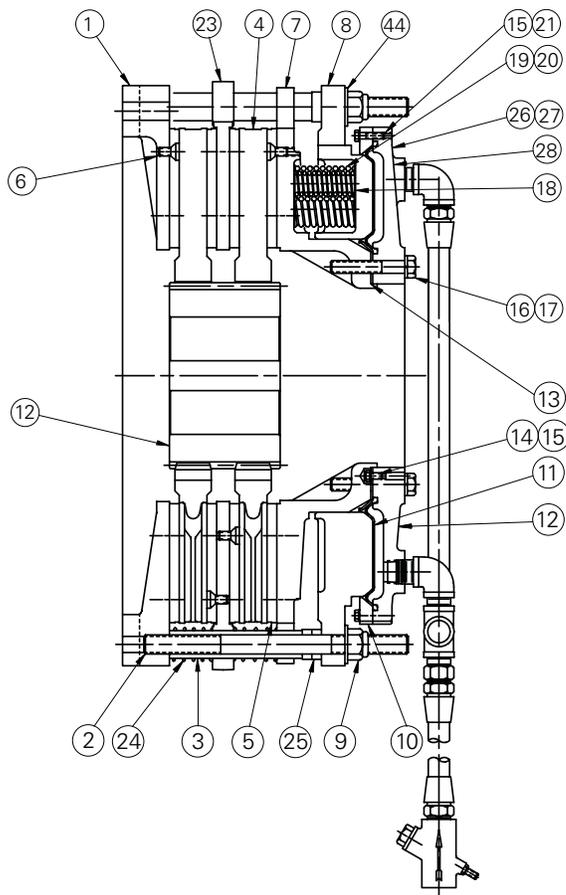
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Internet: www.eaton.com/airflex

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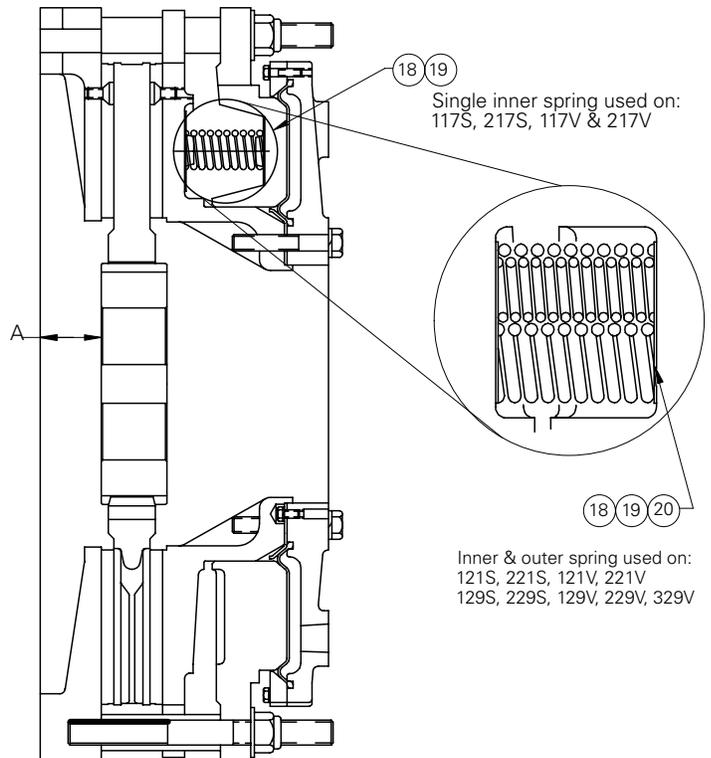
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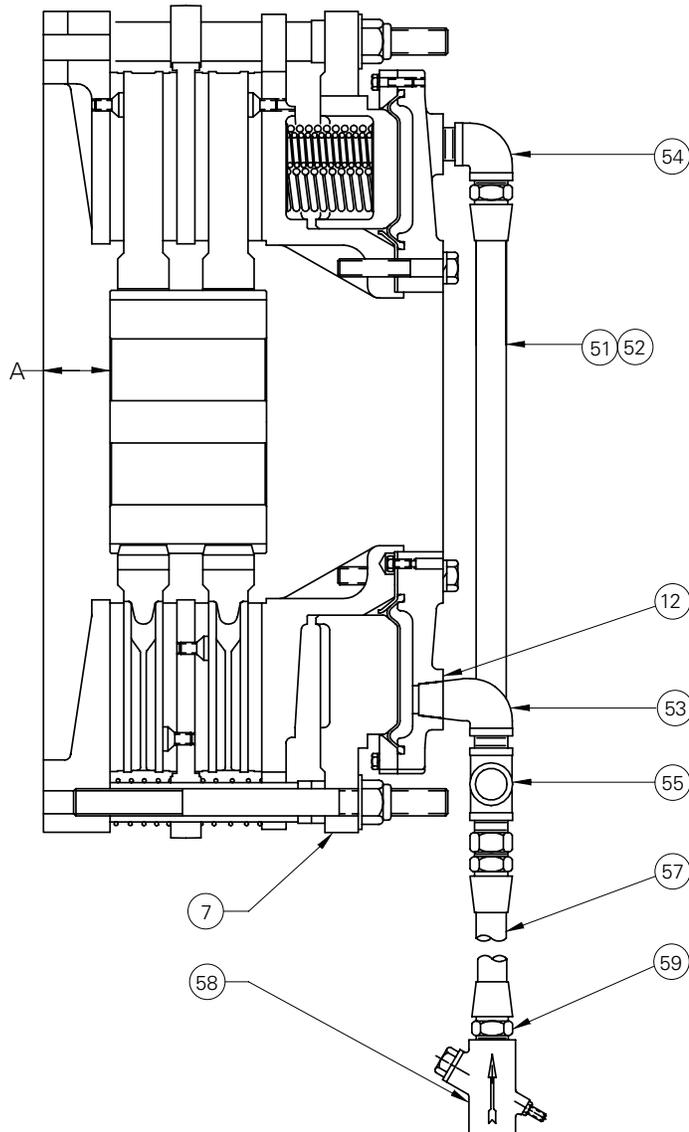
**Dual Disc
(Solid Disc)
Figure 1a**



**Single Disc
(Solid Disc)
Figure 1b**

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Air piping
Figure 1c

Table 1
Item description for fig. 1a (DBA Brake)

Item	Description	Item	Description
1	Mounting flange	16	Hex head screw
2	Stud	17	Lock washer
3	Clamp tube	18	Spring retainer plate
4	Disc	19	Inner spring
5	Friction disc	20	Outer spring
6	Flat head screw	21	Hex head screw
7	Pressure plate	22	Gear
8	Spring housing	23	Reaction plate
9	Locknut	24	Reaction spring
10	Outer clamp ring	25	Wear spacer
11	Diaphragm	26	Nameplate
12	End plate	27	Self tapping screw
13	Inner clamp ring	35	Warning decal
14	Hex head screw	44	Washer
15	Lock washer		

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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.

It is the responsibility and the 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**, and,  **Caution** procedures by which hazards are to be avoided.



Caution

This device uses 120 psig 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 DBA brakes were designed for heavy duty industrial applications where spring set (power off) braking is required.
- 1.1.2 All Airflex DBA brakes are supplied with long wearing, NON-ASBESTOS friction material.
- 1.1.3 Airflex DBB brakes are available in three basic sizes, namely, 17", 21", and 29" and can be supplied as single disc, dual disc or triple disc units. The model number identifies the number of discs and the disc diameter. For example, 221DBA indicates the brake uses two 21inch diameter discs. When size, such as 21DBA is referred to in this manual, it means that the information given applies to all DBA models using 21 inch diameter discs; i.e. 121DBA, 221DBA etc...

- 1.1.4 The disc type is indicated by an S for solid or a V for ventilated, in the brake model designation. Solid discs are used in applications requiring a heat sink and/or where engagement is infrequent. Ventilated discs are recommended for cyclic applications.
- 1.1.5 Minimal adjustment is required for lining wear. Single disc units require no wear adjustment, dual disc units require only one wear adjustment and three disc units require only two wear adjustments during the long life of the friction material.
- 1.1.6 The quantity of springs can be varied to customize the torque of the brake to suit a particular application. Consult the factory for brake torque of units with nonstandard spring configurations.
- 1.1.7 The large friction area of the DBA brake allows brakes to absorb and dissipate high energy loads associated with high cyclic and high inertia stops.

1.2 How it works

Note: Refer to Figure 1a, Figure 1b, Figure 1c, and Table 1 for Brake layout and parts list.

- 1.2.1 The brake is spring applied and air released. When the air pressure is exhausted, the spring force "clamps" the disc (4) between the Friction discs (5) on the Mounting flange (1) and the Pressure plate (7) and in the case of dual disc units, a Reaction plate (23). To disengage the brake, air pressure is applied through the end plate (12) into the diaphragm (11) cavity. As the air pressure increases, the end plate (12) moves away from the stationary Spring housing (8). The Pressure plate (7) is bolted to the end plate (12) and travels in the same direction with it, compressing springs (19), and (20) used in the larger units, and releasing the brake.

1.3 Condition of operation:



Danger

Maximum speed of the disc(s) (4) must not exceed the RPM listed in Table 4. Exposure to speeds in excess of this amount may cause the disc(s) to burst. Do not risk injury!

2.0 Installation



Danger

Prior to installation of the DBA Brake, make sure that the machinery will remain in a secured position. Failure to do so could result in serious personal injury or possibly death.

Airflex DBA brake assemblies

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Caution
Before performing any work, study this manual and the brake figures 1a, 1b, and 1c. Know what needs to be done. Do not risk injury - follow the instructions.

Caution
Before performing any work, study this manual and the brake figures 1a, 1b, and 1c. Know what needs to be done. Do not risk injury - follow the instructions.

Warning
A protective means must be used to prevent oil or grease from coming into contact with the disc(s) (4) or the Friction discs (5) during installation and operation. Oil or grease on the discs or the Friction discs will significantly reduce the torque capacity of the brake and decrease its ability to hold the machinery in a safe position. Do not risk injury!

Caution
If the brake is used in a very dirty or contaminated atmosphere, a protective means should be provided between the Outer clamp ring (10) and the Spring housing (8) to assure a long diaphragm (11) life.

Caution
Excessive air pressure can cause diaphragm (11) or end plate (12) failure. Do not apply air pressure greater than 120 psi (8.3 bar). Insufficient air pressure can cause the brake to partially release and generate heat. The minimum recommended operating DBA air pressure is indicated on the nameplate and is given in Table 2 below:

Table 2
Alignment requirements

DBA brake model	Concentricity (Parallel, TIR) of shaft and element inches (mm)		Perpendicularity (Angular, TIR) of Mounting flange to shaft* Inches (mm)	
117, 217	0.01	(0,25)	0.008	(0,20)
121, 221	0.01	(0,25)	0.01	(0,25)
129, 229, 329	0.01	(0,25)	0.014	(0,36)

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

Caution
Proper alignment is necessary to assure that the discs (4) will track properly between the Friction discs (5) and not cause excessive disc (4) and Friction disc (5) wear or binding. Refer to Figure 2.

2.1 Preparation

2.1.1 Figures 1a, 1b, & 1c show the relationship between the brake mounting surface and the end of the gear (dimension "A"). The gear is bored and keyed for a resulting Class FN2S interference fit for inch shafting and ISO System S7h6 for metric shafting.

2.1.2 Alignment
The DBA Brake must be concentric and at right angles to the shaft. See Table 2 for alignment requirements for each model brake.

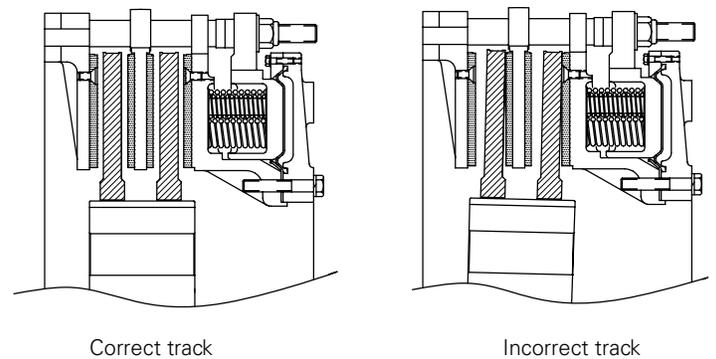


Figure 2

2.1.3 Apply a light coat of Castrol Molub-Alloy 936SF Heavy grease or equivalent to the driving gear teeth (22) and slide the brake assembly onto the gear. This also ensures proper movement of disc (4)

Note: Reference Eaton Airflex Part number 000153X1182 for the specified grease.

Caution
Gear (22) and disc (4) teeth must be kept free of dirt and debris to assure proper operation of the disc (4).

2.2 Mounting

The DBA Brake must be mounted to a clean, rigid surface with flat washers and screws. Refer to section Table 3 for grade, quantity, size and torque values.

2.2.1 The driving gear (22) must be positioned axially along the shaft so that the disc (4) will not run out of travel as the Friction discs (5) wear. Refer to dimension "A" in Figure 1a, 1b, 1c and to Table 4. It is important to pre-fit the key in both the gear (22) and the shaft keyways and check the bore, with respect to the shaft diameter, to assure proper fit at assembly.

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Table 3
Fastener description and assembly Torque - ft.-lb. (Nm)

Item	Description	Units	17DBA	21DBA	29DBA
(9)	Locknut	lb-ft (Nm)	500 (678)	500 (678)	500 (678)
(6 ²)	Flat head screw	lb-ft (Nm)	20 (27)	20 (27)	20 (27)
(14 ²)	Hex head screw	lb-ft (Nm)	10 (14)	10 (14)	20 (20)
(16 ²)	Hex head screw	lb-ft (Nm)	50 (68)	75 (102)	150 (204)
(21 ²)	Hex head screw	lb-ft (Nm)	20 (27)	20 (27)	20 (27)
	Mounting screw	lb-ft (Nm) SAE Metric	112 lube/148 dry (152) lube/(200) dry 3/4-10NC M18	163 lube/255 dry (221) lube/(345) dry 1-8NC M24	163 lube/255 dry (221) lube/(345) dry 1-8NC M24

*Note:

1. Threads on which Item #9 is mounted are lubricated.
2. Threads of items 6, 14, 16 & 21 are dry.
3. All Screws to be S.A. E. Grade 2 minimum. For plated bolts use lubed Torque.
4. If hardened washer is used with screws, use lubed Torque.

Table 4
'A' Dimension on figure 1 inches/(mm)

DBA Model		117	217	121	221	129	229	329
Solid disc	Inches (mm)	1.88 (48,0)	1.88 (48,0)	1.88 (48,0)	1.88 (48,0)	2.25 (57,0)	2.25 (57,0)	2.25 (57,0)
Ventilated disc	Inches (mm)	1.00 (25,0)	1.75 (44,0)	2.12 (54,0)	2.12 (54,0)	2.25 (57,0)	2.75 (70,0)	2.75 (70,0)

- 2.2.2 Grease driving gear teeth (22) at installation with a thin coat of Molub-Alloy OG Heavy grease or equivalent. This ensures proper movement of disc(4).



Caution

Gear (22) and disc (4) teeth must be kept free of dirt and debris to assure proper operation of the disc (4).

2.3 Air supply system:

- 2.3.1 It is recommended that pneumatic piping be used to supply control air to the brake. See Figure 3. To assure an adequate air supply, it is recommended that an air receiver tank and an adequate actuation valve be used along with the piping sizes identified in Table 5.

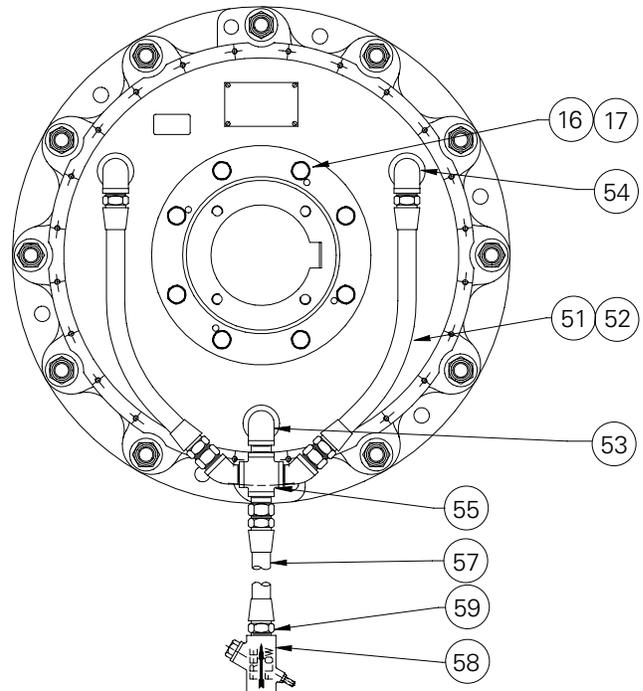


Figure 3

Airflex DBA brake assemblies

General information

Table 5
Air supply piping size

Pipe Size	17DBA		21DBA		29DBA	
	S	V	S	V	S	V
1/2-14 NPT	X					
3/4-14 NPT		X				
1-11 1/2 NPT			X	X	X	X

S = Solid disc models

V = Ventilated disc models

2.3.2 Pneumatic piping should be free of foreign material such as pipe thread sealer, metal chips, etc. Pipe ends must be reamed after cutting to prevent reduction of effective pipe diameter. Use minimum length of piping between the actuation air valve and brake. Excessive piping and other restrictions will slow down the response time of the brake.



Caution

Do not use rigid pipe to connect the end plate (12) to the air supply. Any restrictions in the movement of the end plate will cause the brake to malfunction.

2.3.3 DBA models with ventilated discs are shipped from the factory with flexible hose and a flow control valve. To install the flow control valve, refer to Manual CP 3084

3.0 Operation

3.1 Pressure 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 DBA components.

3.1.2 The minimum recommended DBA operating air pressure is indicated on the nameplate and is given in Table 6 below

3.1.3 Maximum disc speeds are shown on Table 7.



Warning

Operation at disc speeds exceeding the maximum allowable, as shown on Table 7, may result in exposure to personal injury or product/equipment damage.

Table 6
DBA Minimum operating air pressure

Air pressure	17DBA		21DBA		29DBA	
	S	V	S	V	S	V
60 psig (4.1 bar)		X		X		X
85 psig (5.9 bar)	X		X			
100 psig (6.9 bar)						X

S = Solid Disc Models

V = Ventilated Disc Models

Table 7

Brake size	Maximum disc speed solid disc rpm	Maximum Disc Speed Ventilated Disc rpm
17DBA	2300	1300
21DBA	1900	1000
29DBA	1500	900

3.2 Initial operation

3.2.1 The non-asbestos friction material used on DBA 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 (58) 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 1c shows the flow control valve. Airflex pneumatic component Part numbers for each size DBA brake can be found in Section 6.1.4 (Air Manifold)



Caution

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

3.2.3 If the DBA 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.

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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.
- 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



Danger

Prior to adjustment or disengagement of the DBA Brake, make sure that the machinery will remain in a secure position. Failure to do so could result in serious personal injury or possibly death.



Caution

Before performing any work, study this manual and the brake figures 1a,1b,1c. Know what needs to be done. Do not risk injury - follow the instructions.

4.1 Maintenance overview

This section provides the necessary information for the maintenance and repair of the single disc and the dual disc DBA Brakes. Pay attention to the brake model and type as dimensional data is different for several models. To be assured that the brake will function properly, all replacement parts should be purchased from Eaton Corporation, Airflex Division. Inspections should be performed when the brake torque decreases, and the brake is not engaging or disengaging properly or when normal machine maintenance or overhaul is performed. The frequency of required maintenance will vary depending upon the application and frequency of use of the brake.

4.2 Wear limits

- 4.2.1 Wear limits for the DBA components are shown on Table 8. If any wear limit has been reached or exceeded, that component must be repaired or replaced.

Airflex DBA brake assemblies

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Table 8
Wear limits for DBA components

Item	Item	Description	Size/Remarks	Remarks
#5	Friction disc	Friction Wear Surface for #2 Mounting flange #23 Reaction Plate; #7 Pressure plate	Fully Worn at Bottom of wear groove. See Figure #8. Friction Material must also be replaced if contaminated with oil or grease.	Mult-disc brakes have adjustment provision by removing wear spacers (25)
#4	Disc (Ventilated)	Friction Wear Surface Minimum Rotor Thickness	117DBA, 217DBA 121DBA, 221DBA 129DBA, 229DBA, 329DBA	1.44 (36.5) 1.44 (36.5) 1.56 (39.6)
#4	Disc (Solid)	Friction Wear Surface Minimum Rotor Thickness	117DBA, 217DBA 121DBA, 221DBA 129DBA, 229DBA, 329DBA	0.94 (23.8) 0.94 (23.8) 0.94 (23.8)
#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.
#11	Diaphragm	Inner clamp ring/Outer Clamp Ring Seal Area	Cracks or holes. 21DBA	Wear will be in the form of cracks or leaks.
#19	Inner spring	Original Spring Free Height	17DBA 21DBA 29DBA	4.5" (114) 5.1" (130) 5.6" (142)
#19	Inner spring	Minimum Spring Free Height	17DBA 21DBA 29DBA	4.28" (109) 4.84" (123) 5.32" (135)
#20	Outer spring	Original Spring Free Height	17DBA 21DBA 29DBA	n/a 5.1" (130) 5.6" (142)
#20	Outer spring	Minimum Spring Free Height	17DBA 21DBA 29DBA	n/a 4.84" (123) 5.32" (135)
#24	Reaction Spring	Original Spring Free Height	17DBA 21DBA 29DBA	3.01" (76) 3.01" (76) 2.57" (65)
#24	Reaction Spring	Minimum Spring Free Height	17DBA 21DBA 29DBA	2.78" (71) 2.78" (71) 2.37" (60)

4.3. Wear adjustment

4.3.1 Single disc DBA Brakes do not have a provision for adjustment. When the Friction disc is worn to the bottom of the wear step, the Friction discs must be replaced. The multi disc DBA Brakes do provide for adjustment should the running clearance become excessive as explained below.

To determine if the running clearance is excessive, release air (engage brake), and measure the distance "X" as shown in Figure 4. Compare this measurement to the value given in Table 9 for the proper brake model. "X" new is given in Table 9.

Note: The actual "X" dimension when new or rebuilt may vary slightly to "X" new dimension due to the stack up of tolerances.

Note: Be sure to note that the 'X' Gap measurement is taken from the bottom (machined surface) of the Pressure plate (7) to the bottom (machined surface) of the Spring housing (8).

If Wear spacers are present and if the "X" dimension is equal to or greater than the "X-Gap Adjust, Remove One Set of Wear spacers" value given in Table 9 then adjustment is done as given below.

If Wear spacers are not present and if the "X" dimension is equal to or greater than "X Gap, Replace Friction discs" value given or the Friction disc wear step is no longer visible, replace the the Friction discs.

Note: 'X Gap' value shown in Table 9 is the gap after wear adjustment. New or rebuilt brakes may vary slightly from this value due to tolerances.

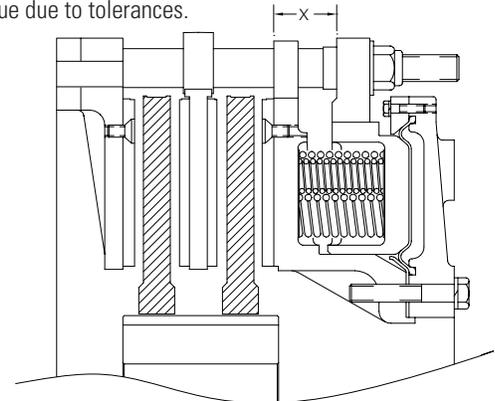


Figure 4

Airflex DBA brake assemblies

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Table 9
DBA Wear measurements X Gap - inches (mm)

DBA Size	Quantity of Discs		X-Gap* New Gap	(X-Gap)** Adjust Remove 1 set of spacers	(X-Gap)*** Replace Friction Discs
117DBA	1	Inches (mm)	1.62" (41,16)	n/a n/a	2.14" (54,37)
121DBA	1	Inches (mm)	1.62" (41,16)	n/a n/a	2.14" (54,37)
129DBA	1	Inches (mm)	2.37" (60,21)	n/a n/a	2.89" (73,42)
217DBA	2	Inches (mm)	1.75" (44,35)	2.24" (56,98)	2.27" (57,56)
221DBA	2	Inches (mm)	1.75" (44,35)	2.24" (56,98)	2.27" (57,56)
229DBA	2	Inches (mm)	2.50" (63,40)	2.99" (76,03)	3.02" (76,61)
329DBA	3	Inches (mm)	2.61" (66,37)	3.17" (80,58)	3.13" (79,58)

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

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

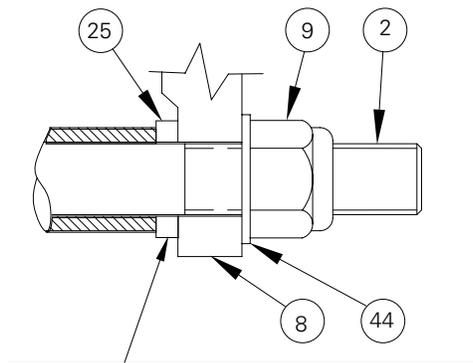
*** Replace Friction discs when wear step is no longer visible.

- 4.3.2 To adjust, remove locknuts (9) and washers (44) (Ref: Figure 5) in alternating sequence (Ref: Figure 6) in increments of 1/4 of the exposed stud thread length.



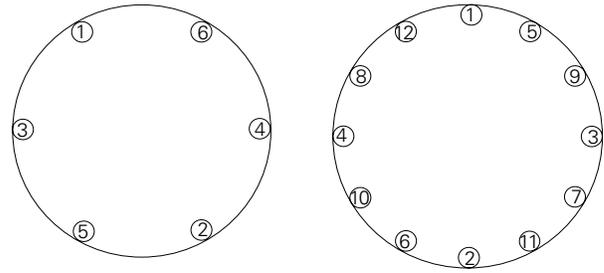
Caution

If a stud (2) comes loose from the Mounting flange (1), clean stud threads thoroughly. Apply Loctite 277, or equivalent. Stud must be threaded back into the Mounting flange hole until it bottoms.



Wear spacer location

Figure 5



DBA brake models
117, 217, 121, 221

DBA brake models
129, 229, 329

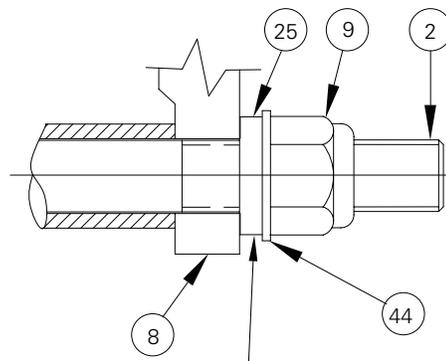
Figure 6

- 4.3.3 With locknuts (9) removed, the end plate (12), Spring housing (8), and the Pressure plate (7) can be removed as an assembly.
- 4.3.4 Remove one set of Wear spacers (25) from the studs.
- 4.3.5 Reassemble the end plate (12), Spring housing (8), and Pressure plate (7) as an assembly on the studs (2) with the Wear spacers (25) now located on the outside of the Spring housing as shown in Figure 9. Install washers (44) under the Wear spacers as shown.
- 4.3.6 Lubricate stud threads with 30 wt. oil or "Never Seez." Assemble locknuts (9) and washers (44) on the studs and torque locknuts to torque values specified in Table 3, for proper brake model, using the sequence shown in Figure 6



Caution

After adjustment, a minimum of 0.040" running clearance between each Friction disc (5) and each disc (4) must exist.



Wear spacer storage
Figure 7

Airflex DBA brake assemblies

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4.4 Replacement of Friction discs on single disc brakes:

4.4.1 This section covers the replacement of Friction discs (5) for DBA Brakes 117, 121 and 129. To determine if Friction discs need to be replaced, release air (engage brake) and check if the wear indicating step on the Friction discs is still visible, or if oil or grease has contaminated the surface (Reference Figure 8). If the step is visible and the surfaces are not oil or grease contaminated, no replacement is necessary. If the step is not visible, or if the surfaces are oil or grease contaminated, proceed to 4.4.2



Danger

Prior to disengagement of the brake, make sure that the machinery will remain in a secure position. Failure to do so could result in serious, personal injury or possibly death.

4.4.2 Remove locknuts (9) and washers (44) in an alternating sequence in increments of 1/4 of the exposed stud thread length (refer to Figure 8).

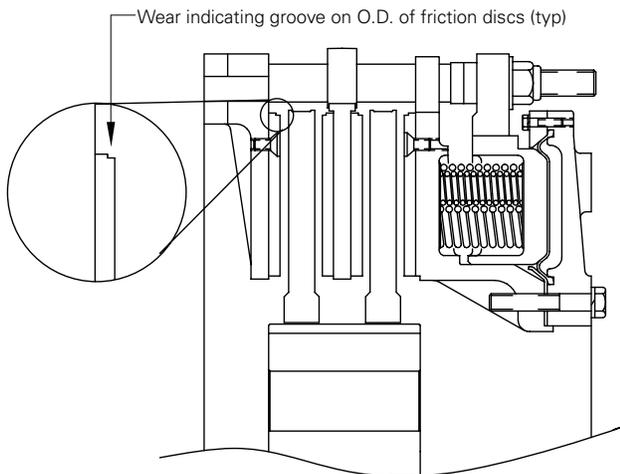


Figure 8



Caution

If a stud (2) comes loose from mounting flange (1), clean stud threads thoroughly. Apply Locktite 277 or equivalent. Stud must be threaded back in until it bottoms in Mounting flange (1).

4.4.3 Remove the end plate (12), Spring housing (8), and the Pressure plate (7) as an assembly.

4.4.4 Remove disc (4) from gear (22). Inspect disc (4) for wear. If either surface of the disc is worn more than 1/32", replace the disc. Removal of the disc from the gear will expose the Friction disc mounted on the Mounting flange (1).

4.4.5 Remove the old Friction discs (5) and replace with new Friction discs. Apply a coating of Locktite 242 (blue), or equivalent, to the threads of the Flat head screws (6). Install and torque the screws (6) to the value specified in Table 3 for the proper brake model.

Note: Refer to Section 7.1 for Friction disc Kit Part numbers and quantities.



Caution

Before installing the new screws, make sure that the holes are clean to ensure that the new screws will lock properly.

4.4.6 Reinstall the disc (4).

4.4.7 Reassemble the end plate (12), Spring housing (8), and the Pressure plate (7) as an assembly

4.4.8 Lubricate stud (2) threads with 30 wt. oil or "Never Seez".

4.4.9 Assemble the washers (44) and locknuts (9), torque the locknuts using the sequence shown in Figure 8 to the torque value specified in Table 3 for proper brake model.

4.5 Replacement of Friction discs on dual disc brakes:

4.5.1 This section covers the replacement of Friction discs (5) on DBA Brakes 217, 221, 229 and 329. To determine if Friction discs need to be replaced, release air (engage brake) and check if the wear indicating step on each Friction disc is still visible, or if oil or grease have contaminated the surfaces (Reference Figure 8). If the step is visible and the surfaces are not oil or grease contaminated, replacement is not necessary. If the step is not visible, or the surfaces are oil or grease contaminated, replace the Friction discs, proceed to 4.4.2.



Danger

Prior to replacement of Friction discs, make sure that the machinery will remain in a secure position. Failure to do so could result in serious personal injury or possibly death.

4.5.2 Remove locknuts (9) and washers (44) in an alternating sequence in increments of 1/4 of the exposed stud thread length. (Refer to Figure 8).

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- ⚠ Caution**
If a stud (2) comes loose from Mounting flange (1), clean stud threads thoroughly. Apply Loctite 277 or equivalent. Stud must be threaded in until it bottoms in Mounting flange (1).
- 4.5.3 Remove the end plate (12), Spring housing (8), and the Pressure plate (7) as an assembly.
- 4.5.4 Remove springs (24), Clamp tubes (3), discs (4), and Reaction plate (23). With these parts removed, all Friction discs (5) are accessible.
- 4.5.5 Inspect the discs (4) for wear. If either surface of the disc is worn more than 1/32", replace the disc.
- 4.5.6 Remove the old Friction discs (5) and replace them with new Friction discs. Apply a coating of Loctite 242 (blue), or equivalent, to the threads of screws (6). Install and torque the screws to the value specified in Table 8 for the proper brake model.
- ⚠ Caution**
Before installing the new screws, make sure that the holes are clean to ensure that the new screws will lock properly.
- 4.5.7 Reassemble springs (24), Clamp tubes (3), discs(4), and Reaction plate (23).
- ⚠ Caution**
Springs (24) are to be assembled on every other stud (2), The springs on either side of the re-action plate must be assembled on the same stud with the Clamp tubes. Improper assembly will result in cocking of the Reaction plate (23) and uneven brake release.
- 4.5.8 Reassemble the Wear spacers (25) and the end plate (12). Spring housing (8), and Pressure plate (7) as an assembly.
- ⚠ Caution**
While reassembling the end plate, Spring housing, and the Pressure plate assembly, take care to install the Wear spacers (25) in the proper position Refer to (Figure 5 & Figure 7)
- 4.5.9 Lubricate stud threads with 30 wt. oil or "Never-Seez". Assemble the washers (44) and locknuts (9). Torque the locknuts using the sequence shown in Figure 6 to the torque value specified in Table 3 for proper brake model.

4.6 Replacement of springs:

- ⚠ Danger**
Prior to disengagement or removal of the brake, make sure that the machinery will remain in a secure position. Failure to do so could result in serious injury or possibly death.
- 4.6.1 Remove locknuts (9) and washers (44) in alternating sequence in increments of 1/4 of exposed stud thread length (Refer to Figure 6).
- ⚠ Caution**
If a stud (2) comes loose from Mounting flange(1), clean stud threads thoroughly. Apply Loctite 277 or equivalent. Stud must be threaded in until it bottoms in Mounting flange (1).
- 4.6.2 Remove the end plate (12), Spring housing (8), and the Pressure plate (7) as an assembly and place it on a clean working surface with the end plate (12) facing up.
- 4.6.3 Remove Hex head screw (16) and Lock washers (17) in alternating sequence, two turns at a time (Refer to Figure 9). With these removed, the end plate (12), diaphragm (11), Outer clamp ring (10), Inner clamp ring (13), Hex head screws (14) and (21), and Lock washers (15) can be removed as an assembly.

Alternating sequence for endplate (12)
Screw / Washer (16)/(17) removal & installation

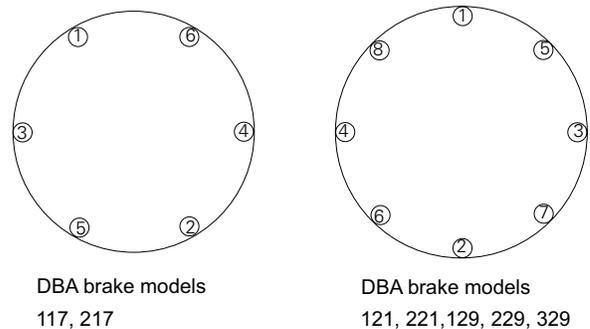


Figure 9

- ⚠ 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.
- 4.6.4 Remove Spring housing (8) exposing the springs (19) and (20) and Spring retainer plates (18).

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Note: DBA Brake models 117 and 217DBA use only spring (19). 121,221, 129, 229 and 329DBA use inner and Outer springs (19) and (20).

- 4.6.5 Remove Spring retainer plates (18) exposing the springs (19) and (20).
- 4.6.6 Replace springs (19) and (20). Refer to note in 4.5.4.
- 4.6.7 Install Spring retainer plates (18).

Note: No Spring retainer plates (18) should cross over the ribs in the Spring housing (8).



Caution

Clean the rubbing surfaces between the Spring housing (8) and the Pressure plate (7) and the spring

housing and the diaphragm (11) and coat with Amsoil long life, multi-purpose, molycompound synthetic grease. This helps prevent wear between these parts.

- 4.6.8 Install Spring housing (8). making sure the pockets line up with the pockets on the Pressure plate (7).
- 4.6.9 Reassemble end plate (12). diaphragm (11), Outer clamp ring (10), Inner clamp ring (13). Hex head screws (14) and (21) and Lock washers (15) as an assembly. Assemble Hex head screws (16) and Lock washers (17) and torque the screws using the sequence shown in Figure 9. Torque the screws (16) to the torque value specified in Table 8 for proper brake model.
- 4.6.10 Reassemble the end plate (12). Spring housing (8). and the Pressure plate (7) as an assembly.
- 4.6.11 Lubricate stud threads with 30 wt. oil or "Never-Seez". Assemble the locknuts (9) and washers (44) and torque the locknuts using the sequence shown in Figure 6 to the torque value specified in Table 3 for proper brake model.

4.7 Replacement of diaphragm for models 17DBA and 21DBA



Danger

Prior to disengagement or removal of the brake, 1, make sure the machinery will remain in a secure position. Failure to do so could lead to serious personal injury or possibly death.

- 4.7.1 Perform steps 4.6.1 through 4.6.3
- 4.7.2 Place the end plate (12) with. the diaphragm (11) facing up on a clean working surface. Remove Hex

head screw (21) and Lock washer (15). This will free Outer clamp ring (10) for removal.

- 4.7.3 Remove Hex head screw (14) and Lock washer (15). This will free Inner clamp ring (13) for removal.
- 4.7.4 Replace the diaphragm (11).
- 4.7.5 Reinstall Outer clamp ring (10) and torque Hex head screws (21) with Lock washer (15) to torque value specified in Table 8 for proper brake model.
- 4.7.6 Reinstall Inner clamp ring (13) and torque Hex head screws (14) with Lock washer (15) to torque value specified in Table 3 for proper brake model.



Caution

Clean the rubbing surfaces between the Spring housing (8) and the diaphragm (11) and coat with Amsoil long life, multi-purpose molycompound synthetic grease.

- 4.7.7 Carefully place newly assembled end plate (12) diaphragm (11), Outer clamp ring (10), and innt... clamp ring (13) assembly on brake. Assemble Hex head screws (16) and Lock washer (17) using the assembly sequence shown in Figure 9. Torque screws (16) to torque value specified in Table 3 for proper brake model.

4.8 Replacement of Diaphragm for Model 28DBA

Warning

Prior to replacement of parts supplied in this diaphragm replacement kit, carefully read the following instructions and make sure what is stated in each step is fully understood. Failure to follow these instructions may result in personal injury or equipment damage.

Note: The 29DBA diaphragm replacement kit contains a new diaphragm and a tube of Loctite® Superflex #596 sealant

4.8.1 Removal and disassembly

- 4.8.1.1 The end plate (12) and diaphragm (11) can be removed from the brake without removal or disassembly of the Spring housing (8) and Pressure plate (7), provided the locknuts (9) remain secured. The procedure is provided below in sections 4.8.1a through 4.8.1e. See Fig. 1 for item numbers.



Caution

If replacing the diaphragm while the brake is installed, do not loosen the locknuts (9). If Spring housing/Pressure plate disassembly is desired, refer to the maintenance section which describes proper

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disassembly procedures.

- a. While supporting the end plate, remove the Hex head screws (16) and lock washers (17).
- b. Remove the end plate/diaphragm assembly. Place it on a clean working surface with the diaphragm facing up.
- c. Remove the Hex head screws (21), lock washers (92) and Outer clamp ring segments (10).
- d. Remove the Hex head screws (14), lock washers (15) and Inner clamp ring (13).
- e. Remove the diaphragm (11) and clean the end plate and clamp rings, smoothing any nicks or burrs. Replace any damaged components.

4.8.2 Diaphragm installation and assembly

- 4.8.2.1 Using a solvent, thoroughly clean the grooves in the end plate which hold the diaphragm beads.

Note: Follow appropriate safety precautions when working with solvents.

- 4.8.2.2 Using a petroleum based solvent, clean any contamination or residue from both diaphragm beads. Allow the solvent to fully evaporate prior to continuing with the assembly.

Note: Apply solvent only to bead area of the diaphragm.

- 4.8.2.3 Apply a continuous layer of Loctite® Superflex #596 sealant (approximately .030" to .045" thick) to the bottom of the inner and outer bead grooves in the end plate. Spread the sealant evenly to form a layer in the groove bottom, contacting both sides of the groove.

- 4.8.2.4 Noting the proper orientation, install the diaphragm on the end plate, making sure the beaded edges are seated properly in the grooves. The side of diaphragm which should be facing up has the words "THIS SIDE UP" molded on the face.

Note: Loctite® Superflex will begin to skin over approximately ten minutes after being applied. The diaphragm MUST be installed in the end plate within ten minutes of applying the sealant.

- 4.8.2.5 Position the Outer clamp ring segments on the plate.

- 4.8.2.6 Apply Loctite #242 Threadlocker to the threads of the Hex head screws (21). Attach the clamp ring segments with the screws and washers (92), and tighten to 20 ft.-lb.

- 4.8.2.7 Attach the Inner clamp ring (13) with Hex head screws (14) and Lock washers (15). Tighten the screws to 20 ft.-lb, dry.

- 4.8.2.8 Clean the rubbing surfaces between the Spring housing (8) and the diaphragm (11) and coat with Amsoil® long life, multi-purpose moly-compound synthetic grease, or equivalent.

- 4.8.2.9 Position the end plate assembly on the Pressure plate. Align the match marks, making sure that the heads of the Hex head screws (14) will fit into the corresponding counter-bores in the Pressure plate.

- 4.8.2.10 Assemble the end plate to the Pressure plate with Hex head screws (16) and lock washers (17). Using a crosswise sequence, torque the screws to 150 ft.-lb, lubed.

4.9 Correct assembly of the 21DBA brake



Warning

For the Airflex model 21DBA spring applied brakes, it is possible to incorrectly install a part of this brake so that the brake will not achieve full torque holding capacity. Assemble per the following instructions.

Note: The Airflex21DBA spring applied brake models are:

Model number	Part number	Model	Part number
121DBA	146145A	221DBA	146151F
121DBA	146145P	221DBA	146151K
121DBA	146145M	221DBA	146151M
221DBA	146151A	221DBA	146151P

Note: Both the Airflex model and Part numbers appear on the nameplate attached to the end plate of the brake. The end plate is the plate to which the air supply is connected.

Note: The 21DBA has six main studs and large locknuts that are located near the O.D. of the end plate. The end plate has six clearance notches on the O.D. of the plate. When the plate is properly installed with the clearance notches opposite the studs, the notches provide the clearance to prevent the end plate from contacting the studs and locknuts. It is absolutely necessary for these notches to be positioned correctly or else the brake will not operate correctly.

- 4.9.1 It is imperative that a visual inspection be made of all 21DBA brakes to make sure that the end plate is correctly installed (this includes all brakes).

- 4.9.2 If the end plate is not positioned correctly, the end plate must be removed, rotated and reinstalled.



Danger

Prior to any adjustment, disconnect power to the machinery and air supply to the brake and make sure the machinery will remain in a safe position. Failure to do so could result in serious personal injury or possibly death.

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4.9.3 Remove the eight hex head cap screws and Lock washers located at the I.D. of the end plate and disconnect the air supply. Carefully rotate the end plate until the clearance notches line up with the studs. Due to the four internal screws which hold the diaphragm Inner clamp ring, the end plate will only fit in four positions. Therefore, rotate 90 deg at a time until the proper match of notches is achieved. Reinstall the eight hex head cap screws and Lock washers. Torque the screws in a crosswise manner to 50 lb-ft. Reconnect the power and air supply.

4.10 29DBA pressurization



Warning

All end plate fasteners must be installed.

4.10.1 It is extremely important that all fasteners used in the 29DBA brake assembly be properly assembled and tightened prior to pressurization and actuation of the brake, particularly those that secure the end plate (12) to the Pressure plate (7). All eight of the Hex head screws (17) should be installed with lock washers (16) and tightened to 150 lb-ft, lubed. The end plate should NOT be pressurized without proper assembly of ALL eight (8) of these fasteners. (Reference Figure 1a and Figure 3).



Warning

Failure to install and properly tighten all fasteners that secure the end plate to the Pressure plate prior to applying air pressure to actuate the brake may result in failure of the end plate and possible severe personal injury or death.

4.11 System static adjustment procedure:

Before the machinery is started up, a static actuation check of the brake is recommended as follows:



Danger

Prior to adjustment or disengagement of the brake, make sure that the machinery will remain in a secure position. Failure to do so could lead to serious injury or possibly death.

- 4.11.1 Bypass any interlocks or use manual overrides on actuation valves so static actuation may be made.
- 4.11.2 Check for proper installation of filter, regulator and air receiver tank.
- 4.11.3 Set minimum operating air pressure according to Table 2. The maximum operating pressure is 120 psi (8.3 bar).
- 4.11.4 Check for "all clear" in and around machinery.

- 4.11.5 Energize actuation valve(s).
- 4.11.6 Check for air leaks- correct if required.
- 4.11.7 Check all quick release valves for proper operation. Refer to QRV 9090.
- 4.11.8 De-energize actuation valves.
- 4.11.9 Repeat steps 3.7.5 and 3.7.8 several times.
- 4.11.10 Reset any interlocks which may have been bypassed in step 3.7.1.
- 4.11.11 Check pressure gauge for pressure loss and recovery.

Note: If loss is over 10 psi (0.7 bar) and recovery is slow, add air receiver tank, if one does not exist. Check restrictions in all air line components, including undersized piping. Refer to CP 3083 regarding "Overlap".

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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6.0 Parts

6.1 Basic assemblies

6.1.1 17DBA

Item	Description	117DBA S 146148CP		217DBA S 146152CP		117DBA V 146148CA		217DBA V 146152CX	
		Part number	Qty						
1	Mounting flange	510282	1	510282	1	510282	1	510282	1
2	Stud	307261-01	6	307261-03	6	307261-01	6	307261-04	6
3	Clamp tube	306542-03	6	306542-01	6	306542-04	6	306542-02	6
4	Disc	413295	1	413295	2	413490	1	413490	2
5	Friction disc	414686	2	414686	4	414686	2	414686	4
6	Flat head screw	000294x0405	18	000294x0405	36	000294x0405	18	000294x0405	36
7	Pressure plate	510284	1	510284	1	510284	1	510284	1
8	Spring housing	510286	1	510286	1	510286	1	510286	1
9	Locknut	000110x0073	6	000110x0073	6	000110x0073	6	000110x0073	6
10	Outer clamp ring	413647	1	413647	1	413647	1	413647	1
11	Deaphragm	413648-02	1	413648-02	1	413648-02	1	413648-02	1
12	End plate	510712	1	510712	1	510712	1	510712	1
13	Inner clamp ring	306944-02	1	306944-02	1	306944-02	1	306944-02	1
14	Hex head screw	000001x0205	3	000001x0205	3	000001x0205	3	000001x0205	3
15	Lock washer	000068x0007	21	000068x0007	21	000068x0007	21	000068x0007	21
16	Hex head screw	000001x0615	6	000001x0615	6	203840	6	203840	6
17	Lock washer	000068x0019	6	000068x0019	6	000068x0019	6	000068x0019	6
18	Spring retainer plate	306624	18	306624	18	306624	18	306624	18
19	Inner spring	306625	27	306625	27	306893	27	306893	27
20	Outer spring	n/a		n/a		n/a		n/a	
21	Hex head screw	000001x0208	18	000001x0208	18	000001x0208	18	000001x0208	18
22	Gear*	413113-##	1	413248-##	1	413113-##	1	413248-##	1
23	Reaction plate	n/a		510304	1	n/a		510304	1
24	Reaction spring	n/a		306546	6	n/a		306546	6
25	Wear spacer	n/a		306896	6	n/a		306896	6
26	Nameplate	307007-01	1	307007-02	1	306626-01	1	306626-02	1
27	Self tapping screw	000153x0644	4	000153x0644	4	000153x0644	4	000153x0644	4
35	Warning decal	203627	1	203627	1	203627	1	203627	1
44	Washer	000153x0641	6	000153x0641	6	000153x0641	6	000153x0641	6

*Note: The gear is not included with the assembly. Order separately. Numbers given are for straight bores. Tapered bore gears also available

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6.1.2 21DBA

Item	Description	121DBA S 146145CP		221DBA S 146151CP		121DBA V 146145CA		221DBA V 146151CA	
		Part number	Qty						
1	Mounting flange	509792	1	509792	1	509792	1	509792	1
2	Stud	307261-01	6	307261-03	6	307261-01	6	307261-04	6
3	Clamp tube	306542-03	6	306542-01	6	306542-04	6	306542-02	6
4	Disc	413053	1	413053	2	510549	1	510549	2
5	Friction disc	414685	2	414685	4	414685	2	414685	4
6	Flat head screw	000294x0405	36	000294x0405	72	000294x0405	36	000294x0405	72
7	Pressure plate	509794	1	509794	1	509794	1	509794	1
8	Spring housing	509796	1	509796	1	509796	1	509796	1
9	Locknut	000110x0073	6	000110x0073	6	000110x0073	6	000110x0073	6
10	Outer clamp ring	412601	1	412601	1	412601	1	412601	1
11	Deaphragm	408080-02	1	408080-02	1	408080-02	1	408080-02	1
12	End Plate	509798	1	509798	1	509798	1	509798	1
13	Inner clamp ring	412603-02	1	412603-02	1	412603-02	1	412603-02	1
14	Hex head screw	000001x0205	4	000001x0205	4	000001x0205	4	000001x0205	4
15	Lock washer	000068x0007	28	000068x0007	28	000068x0007	28	000068x0007	28
16	Hex head screw	203802	8	203802	8	203802	8	203802	8
17	Lock washer	000068x0019	8	000068x0019	8	000068x0019	8	000068x0019	8
18	Spring retainer plate	306920	24	306920	24	306920	24	306920	24
19	Inner spring	306922	24	306922	24	306928	24	306928	24
20	Outer spring	306921	24	306921	24	306927	24	306927	24
21	Hex head screw	000001x0209	24	000001x0209	24	000001x0209	24	000001x0209	24
22	Gear*	413534-##	1	413535-##	1	413534-##	1	413535-##	1
23	Reaction plate	n/a		510170	1	n/a		510170	1
24	Reaction spring	n/a		306546	6	n/a		306700	6
225	Wear spacer	n/a		306896	6	n/a		306896	6
26	Nameplate	306626-10	1	307007-10	1	306626-10	1	306626-10	1
27	Self tapping screw	000153x0644	4	000153x0644	4	000153x0644	4	000153x0644	4
35	Warning decal	203627	1	203627	1	203627	1	203627	1
44	Washer	000153x0641	6	000153x0641	6	000153x0641	6	000153x0641	6

*Note: The gear is not included with the assembly. Order separately. Numbers given are for straight bores. Tapered bore gears also available

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6.1.3 29DBA

Item	Description	121DBA S 146145CP		229DBA S 146151CP		121DBA V 146145CA		221DBA V 146151CA		329DBA 146210CA	
		Part number	Qty	Part number	Qty						
1	Mounting flange	414624	1	414624	1	414624	1	414624	1	414624	1
22	Stud	307261-02	12	307261-05	12	307261-02	12	307261-05	12	307261-06	12
3	Clamp tube	306542-05	12	306542-02	12	306542-06	12	306542-07	12	306542-11	12
4	Disc	413579	1	413579	2	510607	1	510607	2	510607	3
5	Friction disc	414665	2	414665	4	414665	2	414665	4	414665	6
6	Flat head screw	000294x0407	72	000294x0407	144	000294x0407	72	000294x0407	144	000294x0407	216
7	Pressure plate	510619	1	510619	1	510619	1	510619	1	510619	1
8	Spring housing	510616	1	510616	1	510616	1	510616	1	510616	1
9	Locknut	000110x0073	12	000110x0073	12	000110x0073	12	000110x0073	12	000110x0073	12
10	Outer clamp ring	414922	8	414922	8	414922	8	414922	8	414922	8
11	Diaphragm	404517-02	1	407517-02	1	407517-02	1	407517-02	1	407517-02	1
12	End Plate	413581	1	413581	1	413581	1	413581	1	413581	1
13	Inner clamp ring	407684-02	1	407684-02	1	407684-02	1	407684-02	1	407684-02	1
14	Hex head screw	000001x0205	4	000001x0205	4	000001x0205	4	000001x0205	4	000001x0205	4
15	Lock washer	000068x0007	4	000068x0007	4	000068x0007	4	000068x0007	4	000068x0007	4
16	Hex head screw	203806	8	203806	8	203806	8	203806	8	203806	8
17	Lock washer	000068x0025	8	000068x0025	8	000068x0025	8	000068x0025	8	000068x0025	8
18	Spring retainer plate	413583	24	413583	24	413583	24	413583	24	413583	24
19	Inner spring	307044	30	307044	30	304668-02	24	304668-02	24	304668-02	24
20	Outer spring	307045	30	307045	30	304668-01	24	304668-01	24	304668-01	24
21	Hex head screw	000001x0209	24	000001x0209	24	000001x0209	24	000001x0209	24	000001x0209	24
22	Gear*	413801-##	1	414126-##	1	413683-##	1	413585-##	1	415080-##	1
23	Reaction plate	n/a		413586	1	n/a		415331	1	415331	2
24	Reaction spring	n/a		306909	12	n/a		307077	12	307077	18
25	Wear spacer	n/a		306896	12	n/a		306896	12	307501	24
26	Nameplate	306626-10	1	306626-10	1	306626-10	1	306626-10	1	306626-10	1
27	Self tapping screw	000153x0644	4	000153x0644	4	000153x0644	4	000153x0644	4	000153x0644	4
35	Warning decal	203627	1	203627	1	203627	1	203627	1	203627	1
44	Washer	000153x0641	12	000153x0641	12	000153x0641	12	000153x0641	12	000153x0641	12

*Note: The gear is not included with the assembly. Order separately. Numbers given are for straight bores. Tapered bore gears also available

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6.1.4 DBA Air Manifold

Item	Description	117DBV V 146148CA		217DBA V 146152CA		121DBA V 146145CA		221DBA V 146151CA		129DBA V 146162CA		229DBA V 146163CA		329DBA V 146210CA	
		Part no.	Qty												
51	Air tube	--		--		413959	1	413959	1	511061	1	511061	1	511061	1
52	Air tube	511066	2	511066	2	413960	1	413960	1	511062	1	511062	1	511062	1
53	90 deg Street elbow	000079x0009	1	000079x0009	1	000079x0008	1								
54	90 deg Male Elbow	000153x0425	2	000153x0425	2	000153x0838	2								
55	Cross	000153x0427	1	000153x0427	1	000153x0428	1								
57	Hose assembly	000318x0004	1	000318x0004	1	000250x0020	1								
58	Flow Control Valve	000042x0215	1												
59	Bushing	000085x0005	1	000085x0005	1	--		--		--		--		--	

Note: Reference Figure 1c and Figure 3 for components and piping layout

7.0 DBA Rebuild Kits

7.1 Friction disc Kits

DBA Brake

Model	Kit No.	Description	Locknut Item (9)	Flat head screw Item (6)	Friction disc Item (5)	Loctite
117DBA	106885D	Part number Quantity	000110x0073 6	000294x0405 18	414686 2	n/a
217DBA	Contact Eaton Engineering for Part number	Part number Quantity	000110x0073 6	000294x0405 36	414686 4	n/a
121DBA	107074H	Part number Quantity	000110x0073 6	000294x0405 36	414685 2	000153x1016 1
221DBA	107074J	Part number Quantity	000110x0073 6	000294x0405 72	414685 4	000153x1016 2
2229DBA	106901J	Part number Quantity	000110x0073 12	000294x0405 144	414665 4	000153x1016 3
329DBA	Contact Eaton Airflex Engineering for part number	Part number Quantity	000110x0073 12	000294x0405 216	414665 6	000153x1016 4

Airflex DBA brake assemblies

General information

8.0 Revisions

Original publication date: November 2013

Revision date	Description
	Added Section 6 and Section 7 complete
August 2015	Added Section 5 ordering information and trademarks
	Revised Section 1 to 'Introduction' and added Introduction text rewrite of Section 1.0 thru 1.1.8
	Deleted size 14 brake from all references
	Created new Table 1 (Parts Description)
	Table 2 was Table 4; Table 3 was Table Tables 3 & 8; Table 4 was Tables 5 & 5a
	Table 5 was Table 6; Table 6 was Table 2; Table 7 was Table 1
	Created new Table 8; Table 9 was Table 7
	Figures 1a, 1b & 1c replaced Figures 1 thru 4.
	Figure 2 was Figure 5; Figure 3 is new; Figure 4 was 'B' dimension Figure 6
	Figure 5 was Figure 7; Figure 6 was Figure 8; Figure 7 was Figure 9
	Figure 8 was Figure 10; Figure 9 was Figure 11
	Created new Figures 10 and 11.
	Rewrite of Section 2.1 thru Section 2.3.3
	Section 3.0 was Maintenance
	Revised Maintenance section to Section 4.0 thru Section 4.10.1
	Section 4.9 is new
	Added Sections 4.10 & 4.11

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