



502-XB1-001-02

SERVICE MANUAL

AND

REPAIR PARTS

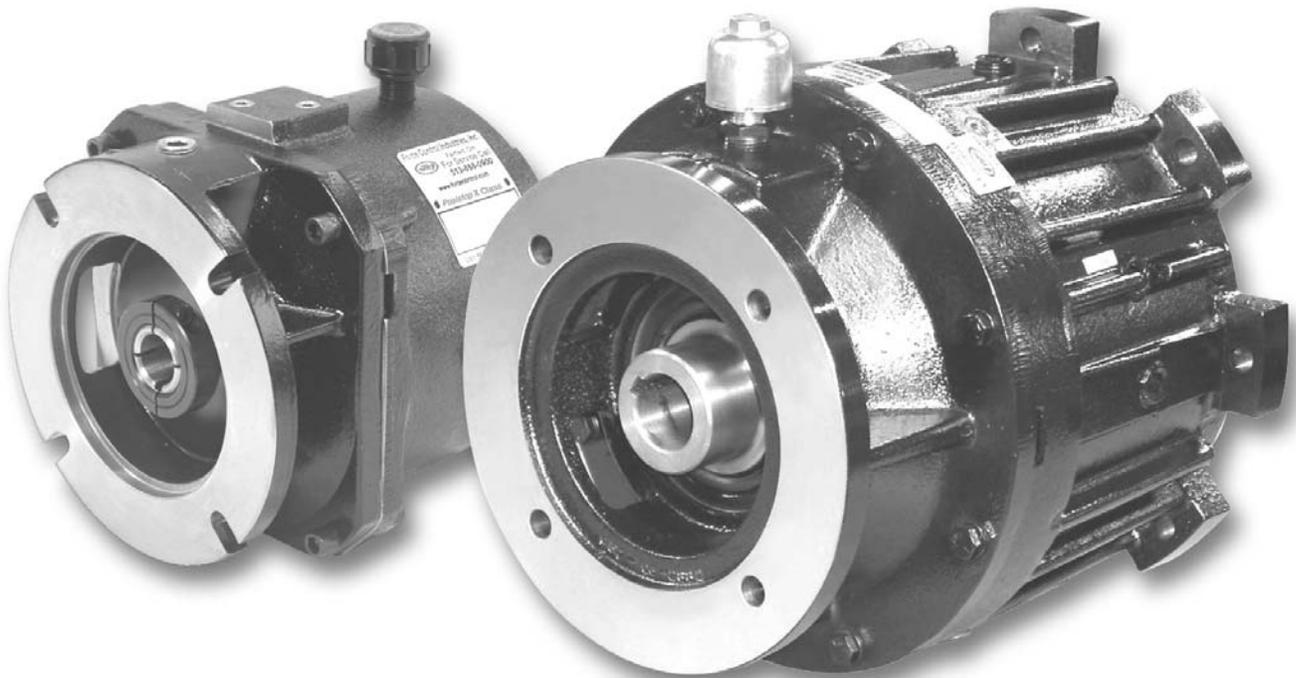
FOR

Sizes XB1, XB2, XB3, XB4, XB5 & XB6

Posistop® X Class

COUPLER BRAKES &

MOTOR BRAKES



FORCE CONTROL INDUSTRIES, INC.

WARNING - Read this manual before any installation, maintenance or operation.

MANUFACTURERS OF MECHANICAL AND ELECTRICAL POWER TRANSMISSION EQUIPMENT

Limited Warranty

SPECIAL 24 MONTH WARRANTY

Upon written approval of the application by Force Control Industries, Inc. the Standard Warranty period will be extended to 24 months from date of shipment.

Force Control Industries, Inc. ("Force Control") warrants its products to be free from defects in material and workmanship under normal and proper use for a period of one year from the date of shipment. Any products purchased from Force Control that upon inspection at Force Control's factory prove to be defective as a result of normal use during the one year period will be repaired or replaced (at Force Controls' option) without any charge for parts or labor. This limited warranty shall be void in regard to (1) any product or part thereof which has been altered or repaired by a buyer without Force Control's previous written consent or (2) any product or part thereof that has been subjected to unusual electrical, physical or mechanical stress, or upon which the original identification marks have been removed or altered. Transportation charges for shipping any product or part thereof that the buyer claims is covered by this limited warranty shall be paid by the buyer. If Force Control determines that any product or part thereof should be repaired or replaced under the terms of this limited warranty it will pay for shipping the repaired or replaced product or part thereof back to the buyer. EXCEPT FOR THE EXPRESS WARRANTY SET OUT ABOVE, FORCE CONTROL DOES NOT GRANT ANY WARRANTIES EITHER EXPRESSED OR IMPLIED, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR USE. The warranty obligation set forth above is in lieu of all obligations or liabilities of Force Control for any damages. Force Control specifically shall not be liable for any costs incurred by the buyer in disconnecting or re-installing any product or part thereof repaired or replace under the limited warranty set out above. FORCE CONTROL EXPRESSLY EXCLUDES ALL LIABILITY FOR ANY INDIRECT OR CONSEQUENTIAL DAMAGES THE BUYER MAY SUSTAIN IN CONNECTION WITH THE DELIVERY, USE, OR PERFORMANCE OF FORCE CONTROL PRODUCTS. Under no circumstances shall any liability for which Force Control is held responsible exceed the selling price to the buyer of the Force Control products that are proven to be defective. This limited warranty may be modified only in writing signed by a duly authorized officer of the company. This limited warranty applies exclusively to Force Control products; warranties for motors and gear reducers and other component parts may be provided by their respective manufactures. Any legal action for breach of any Force Control warranty must be commenced within one year of the date on which the breach is or should have been discovered.

A Return Goods Authorization (RGA) number must be obtained from the factory and clearly marked on the outside of the package before any equipment will be accepted for warranty work. Force Control will pay the shipping costs of returning the owner parts that are covered by warranty.

Force Control believes that the information in this document is accurate. The document has been carefully reviewed for technical accuracy. In the event that technical or typographical errors exist, Force Control reserves the right to make changes to subsequent editions of this document without prior notice to holders of this edition. The reader should consult Force Control if errors are suspected. In no event shall Force Control be liable for any damages arising out of or related to this document or the information contained in it.

Posistop X Class Coupler and Motor Brake

TABLE OF CONTENTS

Section 1

DESCRIPTION and OPERATION

1-1 The Oil Shear Principle	1
1-2 Description and Operation	1

Section 2

SPECIFICATIONS

2-1 Operating Specifications	2
2-2 Coupler Brake Dimensions	3
2-3 Motor Brake Dimensions	3
2-4 Coupler Brake with Mounting Feet and Male Input Shaft Dimensions	4
2-5 Vertical Mounting Dimensions	4

Section 3

INSTALLATION

3-1 Receiving the <i>Posistop</i> Brake	5
3-2 Mounting the <i>Posistop</i> Brake with Split Clamp Quill to the Drive Motor	5
3-3 Mounting the Coupler Brake with Male Input Shaft and Mounting Feet	5
3-4 Mounting Motor & Coupler Brake to a Gear Reducer	6
3-5 Vertical Vs. Horizontal Installation	6
3-6 Pneumatic Hookup	7
3-7 Final Installation Checks	8

Section 4

LUBRICATION

4-1 Checking the Fluid Level	9
4-2 Changing the Oil	9
4-3 Type of Oil	9

Section 5

OPERATIONAL CHECKS

5-1 Operational Checks	10
------------------------------	----

Section 6

TROUBLESHOOTING

6-1 Troubleshooting Chart	11
6-2 Checking Brake and Clutch Stacks for Wear	12
6-3 Measuring Piston Stroke (XB5 and XB6 Only)	13

Section 7

DISASSEMBLY

7-1 General Disassembly Procedure	14
7-2 Removing the Coupler Brake and Motor from the Gear Reducer	14
7-3 Removing the Brake from the Motor	14
7-4 Disassembly Procedure	15

Section 8

CLEANING and INSPECTION

8-1 Cleaning and Inspection	17
8-2 Repair and Replacement	17

Section 9

REASSEMBLY

9-1 General Reassembly Instructions	18
9-2 Installing Oil Seals	18
9-3 Installing Bearing (#26)	19
9-4 Installing Shaft Assembly (#2) Into End Housing (#9)	19
9-5 Installing the Brake Stack	20
9-6 Piston Installation	20
9-7 Installing Bearing (#35)	20
9-8 Attaching Input Housing (#8)	21
9-9 Final Reassembly	21
9-10 Remounting the Brake to the Drive Motor and Gearbox	21

Section 10

ORDERING REPAIR PARTS

10-1 General Information	22
10-2 Drive Motors	22
10-3 Factory Rebuild Service	22
10-4 Ordering Replacement Parts	22
10-5 Name Plate and Model Number	23

Exploded View Drawings

Parts List for Figure 10.1	24
Figure 10.1 - <i>Posistop</i> X Class Coupler and Motor Brake	25
Parts List for Figure 10.2	26
Figure 10.2 - Brake Stack Configurations (XB1, XB2, XB3 & XB4)	27
Parts List for Figure 10.3	28
Figure 10.3 - Brake Stack Configurations (XB5 & XB6)	29
Parts List for Figure 10.4	30
Figure 10.4 - Manifold Mounted Valve Kit, Male Input Adapter Kit & Foot Mounting Kit	31

Section 11

SPECIAL ASSEMBLY TOOLS

Oil Seal Assembly Tool (#601-X1-002) XB1 and XB2 <i>Posistop</i> Brake	32
Output Bearing Assembly Tool (#601-X1-006B) Size XB1 <i>Posistop</i> Coupler Brake ...	32
(#601-X1-006A) Size XB2 <i>Posistop</i> Coupler Brake ...	32
Oil Seal Assembly Tool (#601-X3-003) XB3 <i>Posistop</i> Coupler and Motor Brake	32
Oil Seal Assembly Tool (#601-X3-001) XB4 <i>Posistop</i> Coupler and Motor Brake	32
Oil Seal Assembly Tool (#601-X5-001) XB5 & XB6 <i>Posistop</i> Coupler and Motor Brake	33
Input Bearing Assembly Tool (#601-X5-003) XB5 & XB6 <i>Posistop</i> Coupler and Motor Brake	33
Output Bearing Assembly Tool (#601-X5-002-____) XB5 & XB6 <i>Posistop</i> Coupler and Motor Brake	33

Section 1 - DESCRIPTION & OPERATION

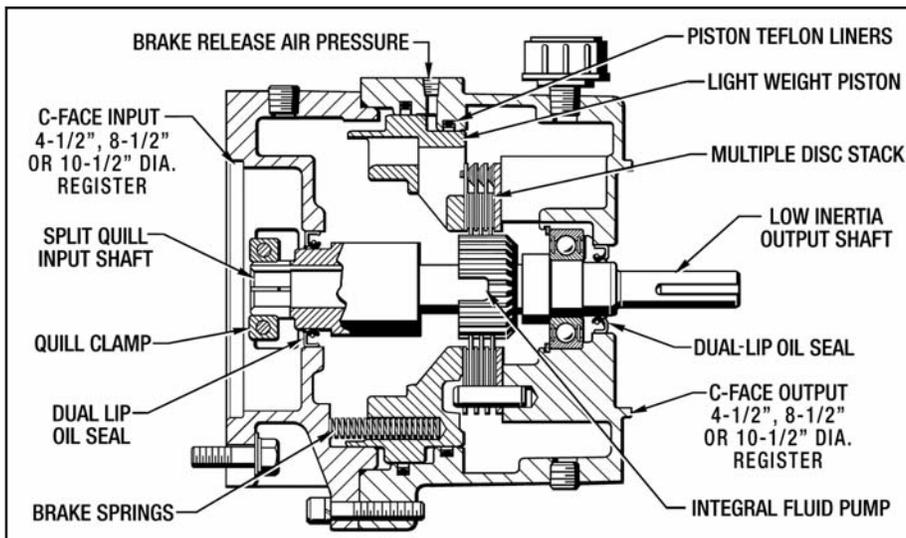
1-1 THE OIL SHEAR PRINCIPLE

Conventional motor brakes and coupler brakes depend on the friction between solid surfaces operating in air to transmit torque. Friction does the job, but produces a great amount of heat and wear. The *Posistop X Class Brake* units are **Oil Shear Brakes**, with the friction surfaces operating in a bath of oil, the oil molecules tend to cling to each other and to the friction surfaces. As moving and stationary elements are brought together, a thin, but positive film of oil is maintained between them, controlled by the clamping pressure and carefully designed grooves in the elements. Torque is transmitted from one element to the other through the viscous shear of the oil film. So long as there is relative motion between the elements, they are protected by the oil, thus greatly reducing wear. The oil bath also effectively transmits heat away from the friction elements.

1-2 DESCRIPTION & OPERATION

In the *Posistop X Class Brakes*, the friction surfaces in the Brake Stack consist of alternate carbon steel plates and advanced friction material on steel discs. The oil control grooves are molded into the friction material disc surfaces. The discs have internal teeth which mate with a spline on the output shaft for brake applications. The steel plates are pinned to the end housing. The splined sections of the shaft assembly contains a centrifugal pumping system to maintain a positive flow of fluid between the discs and plates.

The *Posistop X Class Brakes* are spring-set/air release units. There are two basic types. **1. Coupler Brake** (See Figure 1.1) and **2. Motor Brake** (See Figure 1.2). There are six sizes of each type. XB1, XB2, XB3, XB4, XB5 and XB6.



Coupler Brake - Double C-Face (4.500", 8.500" or 10.500" Dia. Registers) with clamped split quill input and male output shaft.

Typical Application - Sandwiched in between a drive motor and a gear reducer.



Coupler Brake

Figure 1.1 - Coupler Brake

Motor Brake - C-Face only on input end (4.500", 8.500" or 10.500" Dia. Register) with clamped split quill input.

Typical Application - Mounted on the back of a drive motor as an Assembled Brake Motor (ABM)



Motor Brake

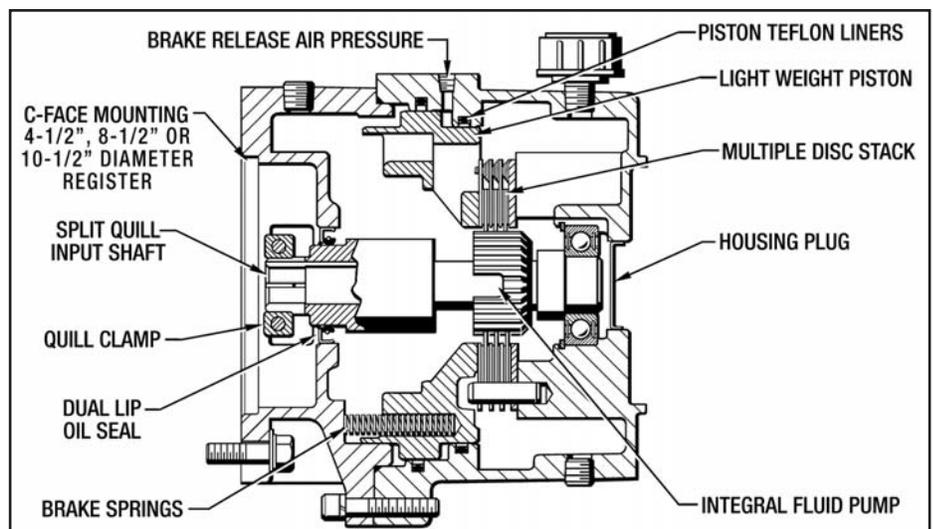


Figure 1.2 - Motor Brake

Section 2 - SPECIFICATIONS

2-1 OPERATING SPECIFICATIONS

STATIC TORQUE (Lb. Ft.)

XB1	Spring Qty. (Light)			³ (2) Drive Plates
	3	6	9	
	(2) Friction Discs	4	8	
	10	20	30	
	Pr. to Release (PSI)			

XB2	Spring Qty. (Medium)			(3) Drive Plates
	3	6	9	
	(3) Friction Discs	6	12	
	15	30	46	
	Pr. to Release (PSI)			

XB3 STATIC TORQUE (Lb. Ft.)

No. of Friction Discs	No. of Springs (Heavy)				No. of Drive Plates
	3	7	15	23	
	4	10	20	30	
	5	12	25	38	
	6	17	34	50	
	Pressure to Release (PSI)				

XB4 STATIC TORQUE (Lb. Ft.)

No. of Friction Discs	No. of Springs (Heavy)				No. of Drive Plates
	3	12	24	37	
	4	17	35	54	
	5	25	50	76	
	6	17	34	50	
	Pressure to Release (PSI)				

XB5 & XB6 STATIC TORQUE (Lb. Ft.)

No. of Friction Discs	No. of Springs				No. of Drive Plates
	4	50	100	150	
	5	65	130	185	
	6	80	160	240*	
	7	100	200	300*	
	16	32	48		
	Pressure to Release (PSI)				

XB1 & XB2 TECHNICAL SPECIFICATIONS

	No. Of Friction Discs	Thermal Rating (HP Sec/Min)	Max. KE per Engagement (Ft. Lbs.)	Piston Volume (Cu. In.)	Inertia WK ² (Lb. Ft. ²)	Max. Speed (RPM)	Weight (Lbs.)	Oil Capacity (Ounces)
XB1	2	21	7,530	.9	0.0130	1800	31	28
XB2	3	39	11,295					

XB3 TECHNICAL SPECIFICATIONS

	No. Of Friction Discs	Thermal Rating (HP Sec/Min)	Max. KE per Engagement (Ft. Lbs.)	Piston Volume (Cu. In.)	Inertia WK ² (Lb. Ft. ²)	Max. Speed (RPM)	Weight (Lbs.)	Oil Capacity (Ounces)
	3	42	11,295	.9	.0174	1800	45	30
	4		15,060		.0181			
	5		18,825		.0189			

XB4 TECHNICAL SPECIFICATIONS

	No. Of Friction Discs	Thermal Rating (HP Sec/Min)	Max. KE per Engagement (Ft. Lbs.)	Piston Volume (Cu. In.)	Inertia WK ² (Lb. Ft. ²)	Max. Speed (RPM)	Weight (Lbs.)	Oil Capacity (Ounces)
	3	CF	11,347	2.66	.0473	1800	75	60
	4		20,730		.0499			
	5		25,912		.0526			

CF = Consult Factory

XB5 & XB6 TECHNICAL SPECIFICATIONS

	No. Of Friction Discs	Thermal Rating (HP Sec/Min)	Max. KE per Engagement (Ft. Lbs.)	Piston Volume (Cu. In.)	Inertia WK ² (Lb. Ft. ²)	Max. Speed (RPM)	Weight (Lbs.)	Oil Capacity (Ounces)
	4	80	29,103	3.92	0.2011	1800	140	110
	5		36,378					
	6		43,654		0.2215			
	7		50,930					

* These Torques only available with 1-5/8" & 1-7/8" Dia. Shafts.

³ These stack configurations are with (2) Thrust Plates (#6).

2-2 COUPLER BRAKE DIMENSIONS

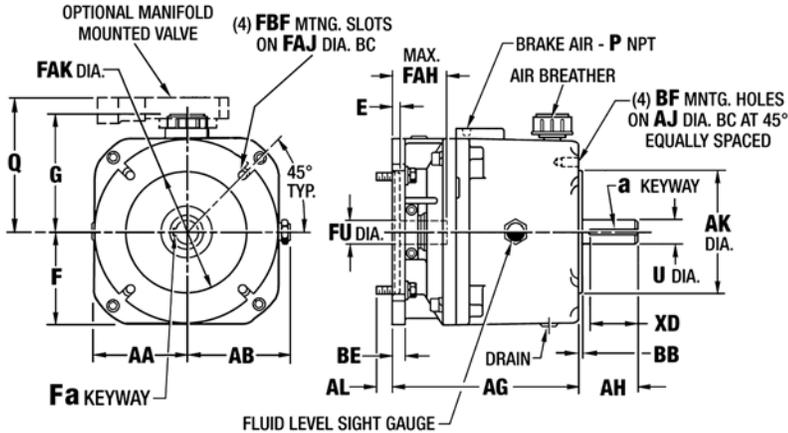


Figure 2.1 - Coupler Brake Dimensions

Dimensions are subject to change without notice. Certified Installation Drawings are available upon request.

Brake Size	Coupler Brake Overall Dimensions (Inches)						
	AA	AB	AG	F	G	P	Q
XB1	3.51	3.77	7.00	3.44	4.50	1/8 NPT	4.94
XB2							
XB3	4.44	4.44	8.48	4.44	5.08	1/8 NPT	4.94
XB4	4.50	5.00	11.75	4.50	5.67	1/4 NPT	6.00
XB5	5.50	5.50	11.45	5.50	6.64	1/4 NPT	-----
XB6							

Brake Size	Coupler Brake Input Dimensions (Inches)								
	AL	BE	E	FAH	FAJ	FAK	FU	FBF	Fa
XB1	.63	.50	.28	2.38	5.88	4.502	5/8	13/32 Slot	3/16 x 3/32
XB2						4.500	7/8		
XB3	.57	.73	.19	2.94	7.25	8.502	1-1/8	17/32 Slot	1/8 x 1/4
XB4	.75	.83		3.13		8.500	1-3/8		5/16 x 5/32
XB5	.71	.69	-----	3.88	7.25	-----	1-1/8 1-3/8 1-5/8	9/16 Holes	1/4 x 1/8 5/16 x 5/32 3/8 x 3/16
XB6			-----	4.88	9.00	-----	1-5/8 1-7/8	9/16 Holes	3/8 x 3/16 1/2 x 1/4

Brake Size	Coupler Brake Output Dimensions (Inches)							
	a	AH	AJ	AK	BB	BF	U	XD
XB1	3/16 x 3/32	2.06	5.875	4.500	.16	3/8-16	5/8	1.50
XB2		2.12		4.498			7/8	
XB3	1/4 x 1/8	2.63	7.250	8.500	.25	1/2-13	1-1/8	2.00
XB4	5/16 x 5/32	3.13		8.498			1-3/8	2.66
XB5	1/4 x 1/8 5/16 x 5/32 3/8 x 3/16	2.75 3.12 3.75	7.250	8.500 8.498	.25	1/2-13	1-1/8 1-3/8 1-5/8	2.65 3.00 3.63
XB6	3/8 x 3/16 1/2 x 1/4	4.62 4.37		9.000			10.500 10.498	1-5/8 1-7/8

2-3 MOTOR BRAKE DIMENSIONS

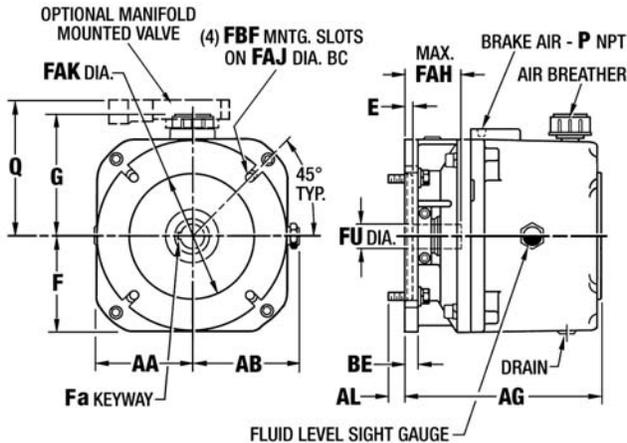


Figure 2.2 - Motor Brake Dimensions

Dimensions are subject to change without notice. Certified Installation Drawings are available upon request.

Brake Size	Motor Brake Dimensions (Inches)															
	AA	AB	AG	AL	BE	E	F	G	FAH	FAK	FU	Fa	FBF	FAJ	P	Q
XB1	3.51	3.77	7.00	.63	.50	.28	3.44	4.50	2.38	4.502	5/8	3/16 x 3/32	13/32 Slot	5.875	1/8 NPT	4.94
XB2										4.500	7/8					
XB3	4.44	4.44	8.48	.57	.73	.19	4.44	5.08	2.94	8.502 8.500	7/8 1-1/8	3/16 x 3/32	17/32 Slot	7.250	1/8 NPT	4.94
XB4	4.50	5.00	11.75	.75	.83	.19	4.50	5.67	3.13		1-1/8 1-3/8	1/4 x 1/8			1/4 NPT	6.00
XB5	5.50	5.50	11.70	.71	.69	---	5.50	6.64	3.88	-----	1-1/8 1-3/8 1-5/8	1/4 x 1/8 5/16 x 5/32 3/8 x 3/16	9/16 Holes	7.250	1/4 NPT	-----
XB6											4.88	-----				

2-4 DIMENSIONS (COUPLER BRAKE WITH MOUNTING FEET AND MALE INPUT SHAFT) (XB1, XB2, XB3 & XB4 Only)

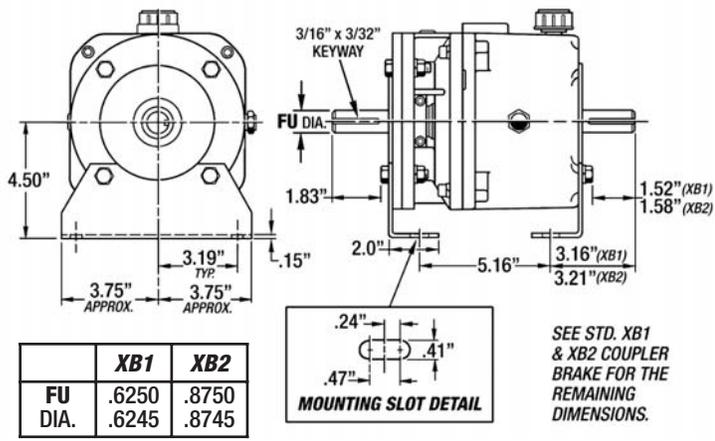


Figure 2.3 - XB1 and XB2 Coupler Brake Dimensions (With Mounting Feet & Male Input Shaft)

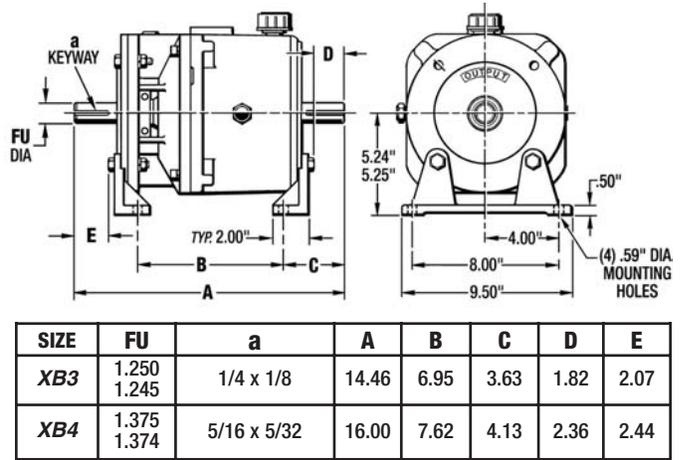


Figure 2.4 - XB3 and XB4 Coupler Brake Dimensions (With Mounting Feet & Male Input Shaft)

NOTES:

1. All other dimensions are the same as shown in Figures 2.1 & 2.2.
2. Contact Force Control for XB5 and XB6 Coupler Brake with Mounting Feet and Male Input Shaft Dimensions.

Dimensions are subject to change without notice. Certified Installation Drawings are available upon request.

Overhung Load Capacity @ Midpoint of Male Input Shaft

XB1.....75 Lbs.	XB3.....215 Lbs.	XB5.....425 Lbs.
XB2.....75 Lbs.	XB4.....230 Lbs.	XB6.....400 Lbs.

2-5 VERTICAL MOUNTING DIMENSIONS

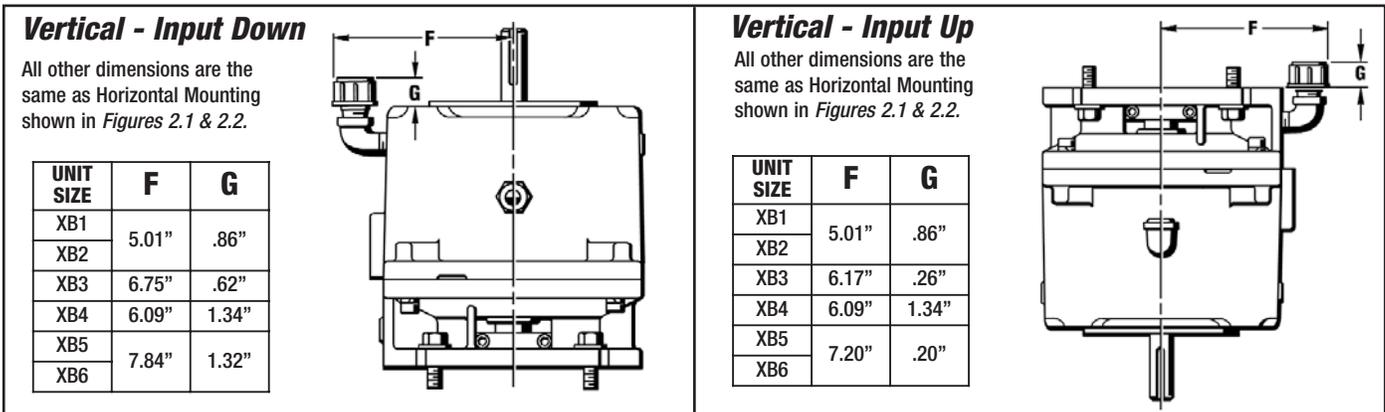


Figure 2.5 - Vertical Mounting Dimensions

Section 3 - INSTALLATION

3-1 RECEIVING THE *Posistop* BRAKE

Check the *Posistop* Brake for shortages or damages immediately after arrival. Prompt reporting to the Carrier's Agent, with notations made on the Freight Bill, will expedite any adjustment made by the Carrier.

When unloading or handling the *Posistop* Brake, keep it upright. All *Posistop* brakes are filled with oil for horizontal mounting, ready to run, when shipped. **Vertical mounted units will require additional fluid.** Refer to **Section 4.** Before placing the *Posistop* Brake in service or storage, check the fluid level to make sure none has spilled out in transit. Add fluid if necessary. Refer to **Section 4.**

Remove the red plastic pipe plug from the top of the End Housing and install the Air Breather (#45).

Note - There are some pipe fittings supplied for Vertical Mounting. This is used for the Air Breather as shown in *Figure 4.1.*

If the *Posistop* Brake is not to be installed or operated soon after arrival, store it in a clean dry place having a slow and moderate change in ambient temperature.

3-2 MOUNTING THE BRAKE WITH SPLIT CLAMP QUILL TO THE DRIVE MOTOR (See *Figure 3.1*)

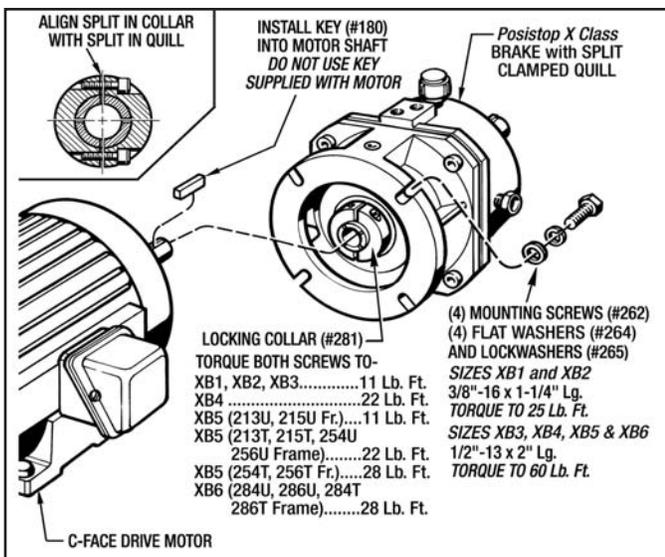


Figure 3.1 - Posistop X Class Brake Installation

1. First make sure that the pilot diameter and mating surfaces of the C-Face Flange is clean and free of all nicks, burrs or anything that would not allow the *Posistop* Brake to seat properly.
2. Remove the drive motor key if applicable. Install the Key (#180) into the motor shaft keyway.

NOTE - The Key (#180) may need to be fitted to the motor shaft. A tight fit for the key is essential to prevent shaft damage to the drive motor and the *Posistop* brake.

IMPORTANT - Make sure the motor shaft is thoroughly cleaned, but do not use any oil or lubricant on the shaft. Torque transfer depends on friction between the motor shaft and the split quill input shaft.

3. Place the Locking Collar (#281) on the Input Shaft (#2) up against the shoulder. Only tighten the Locking collar Screws enough so it is snug on the shaft. **Do not tighten enough to compress the shaft.**
4. Slip the *Posistop* Brake onto the motor shaft with the Key (#180) aligned with the keyway in the Input Shaft (#2) as shown in *Figure 3.1.* Push the Brake Unit until it seats firmly onto the motor pilot diameter.
5. Attach the *Posistop* Brake with the (4) Hex Hd. Mounting Screws (#262) and (4) Lock Washers (#265). **Only finger tighten them at this time. Make sure the brake is snug up against the drive motor.**

NOTE - There also will be (4) Flat Washers (#264) for Sizes XB1, XB2, XB3 and XB4.

6. Torque the (2) Screws in the Locking Collar (#281) in an even manner to the correct torque as shown in *Figure 3.1.*
7. Attach the correct pneumatic control valve and install the necessary pneumatic plumbing as described in **Section 3-6 Pneumatic Hook-Up.** Adjust the air pressure to the correct Minimum Actuating Pressure. (See **Section 2**)
8. Actuate the brake and turn the motor shaft by hand to make sure that the bearings turn freely. Adjust if necessary.
9. Evenly torque the (4) Mounting Screws (#262) in an opposite manner to the specified torque as shown in *Figure 3.1.*

3-3 MOUNTING THE COUPLER BRAKE WITH MALE INPUT SHAFT & MOUNTING FEET (See *Figure 10.4*) (XB1, XB2, XB3 and XB4 Only)

1. Insert the Male Input Shaft into the split quill. Attach the adapter plate and mounting feet to the unit as shown in *Figure 10.4.* Torque the (4) mounting bolts and nuts to 25 Lb. Ft. for Sizes XB1 & XB2 and 60 Lb. Ft. for Sizes XB3 & XB4. Torque the (2) Screws in the Locking Collar as described in **Step 6 above.**

- The Brake should be mounted on a firm, level base or foundation, common with both the driving and driven components. Use SAE Grade 5 Hex Hd. Cap Screws to bolt the drive securely into place. Before tightening down the bolts, check alignment with both the driving and driven machinery, then recheck after tightening.
- If the input end or the output end of the Shaft (#2) is to be directly coupled, use only a flexible coupling (with horsepower service factor 3 to 1) to take care of maximum torque requirements. Make sure that the shafts to be coupled are concentric within 0.005 in. TIR. Check for horizontal, vertical and angular misalignment. Use shims as necessary to correct.

CAUTION:

Do not force couplings or bushings on shaft.

- If the Brake is to be connected through a belt, chain or gear drive, locate as close as possible to the housing to minimize overhung loads. Make sure that the sheaves, sprockets or gears are in line and that the shafts are parallel. See Section 2 for Maximum Overhang Loads.

3-4 MOUNTING MOTOR AND COUPLER BRAKE TO A GEAR REDUCER

(See Figure 3.2)

It is recommended that you use a Coupling, rather than a hollow shaft to connect the Coupler Brake Output Shaft to a Gear Reducer or any Driven Machinery.

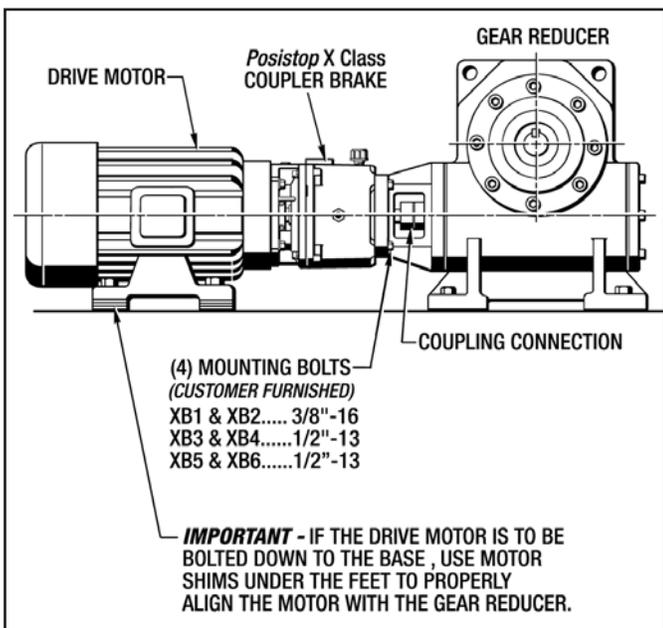


Figure 3.2 - Drive Motor & Gear Reducer Alignment

- Attach the Drive Motor and Coupler Brake Assembly to the Gear Reducer or Driven Machinery with (4)

Mounting Bolts and Lockwashers (Customer Furnished).

NOTE - The Mounting Bolts are to be 3/8"-16 for Sizes XB1 and XB2. **Torque to 25 Ft. Lbs.**

The Mounting Bolts are to be 1/2"-13 for Sizes XB3, XB4, XB5 & XB6. **Torque to 60 Ft. Lbs.**

- Connect the Coupling as per Manufacturer's Specifications.
- If the Drive Motor is to be bolted down to the base, use motor shims under the feet to correctly align the motor with the gear reducer as shown in Figure 3.2. **This is very important so the Coupler Brake will not be pulled down or pushed up during operation.**

3-5 VERTICAL Vs. HORIZONTAL INSTALLATION

The Installation for a Vertical Mounted Brake is the same as described in the previous sections for a Horizontal Mounted Brake except for the placement of the sight gauge, breather and related fittings, which are shown in Section 4.

The following Figure 3.3 shows the Mounting Angles that determines a Vertical Up, Horizontal or Vertical Down Installation for the XB1, XB2, XB3 and XB4. See Figure 3.4 on the next page for the XB5 and XB6 Vertical Installation.

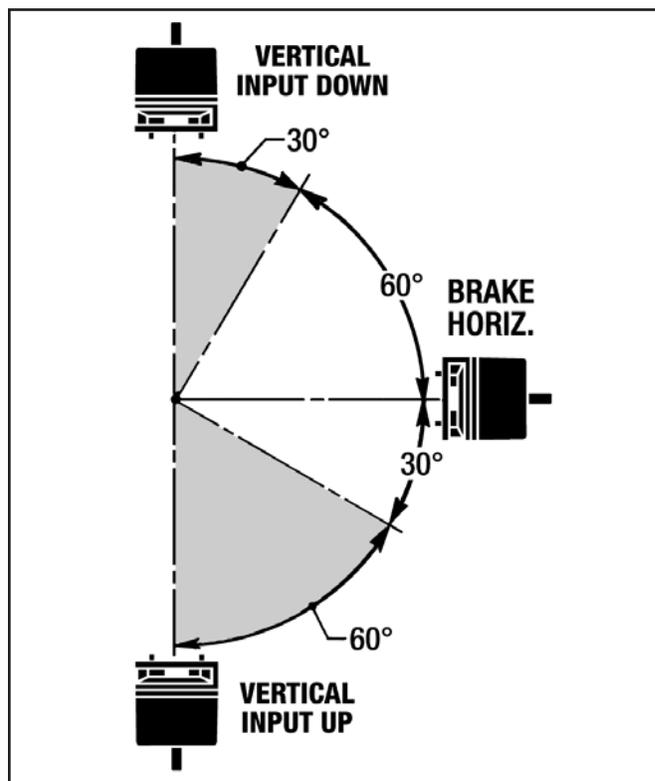


Figure 3.3 - Vertical Vs. Horizontal Mounting (XB1, XB2, XB3 and XB4 Sized Brakes)

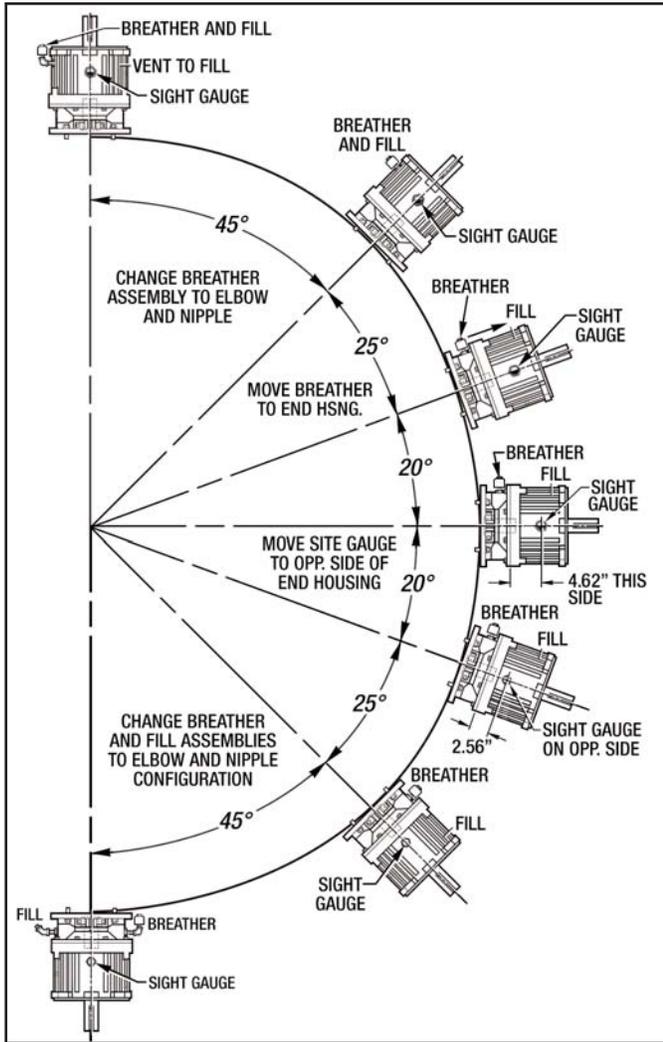


Figure 3.4 - Vertical vs. Horizontal Installation for XB5 and XB6 Posistop Coupler or Motor Brake

3-6 PNEUMATIC HOOKUP

Figure 3-5 illustrates a typical compressed air system for the XB1, XB2, XB3 and XB4 Posistop X Class Brake Unit. See Figure 3.7 on the next page for XB5 and XB6 Posistop X Class Brake Unit.

Note the following when planning and installing the air system:

1. Use direct acting solenoid air valves or pilot operated valves to give the response speed required. Locate the valves as close as possible to the air inlets on the Posistop Brake.
2. The optional accumulator should be used for quick response, particularly if the air line loss and the nature of the air supply is such that recovery is slow. Size the accumulator to be at least 10 times the air required per engagement.
3. A small amount of oil in the air supply may prolong the life of the pneumatic control valve, but too much oil will fill the Posistop Brake piston chamber with oil and make the actuation sluggish.

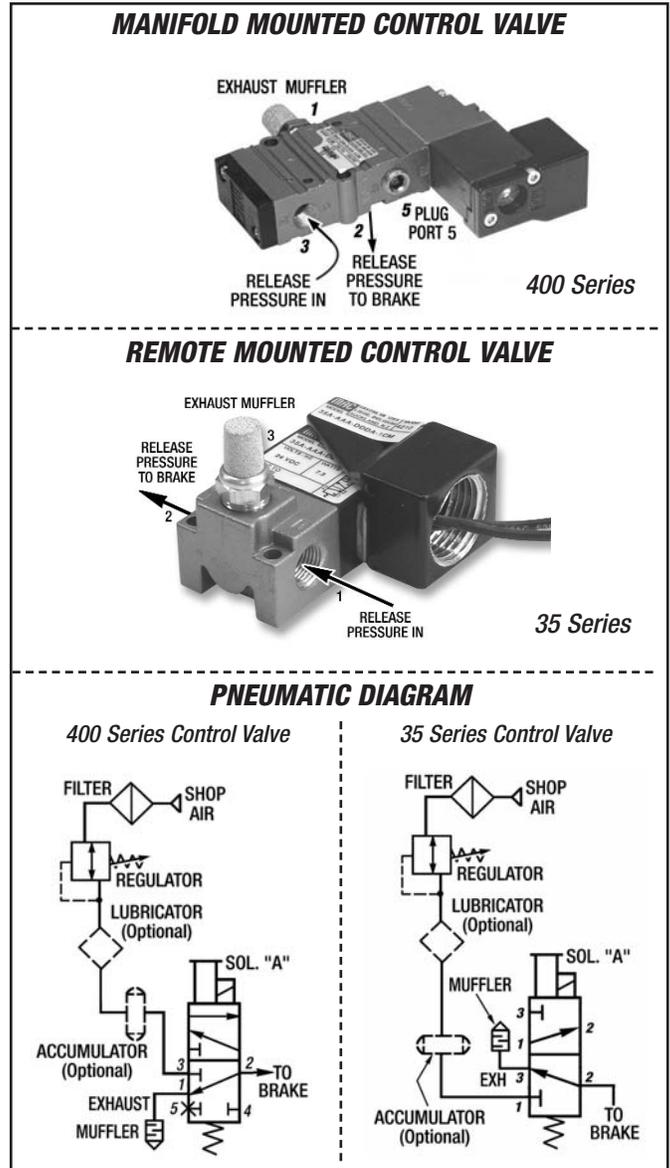


Figure 3.5 - Control Valves and Schematics (XB1, XB2, XB3 and XB4)

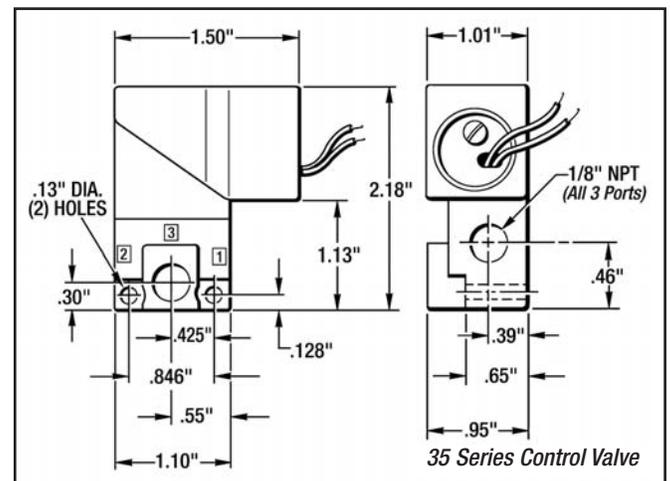
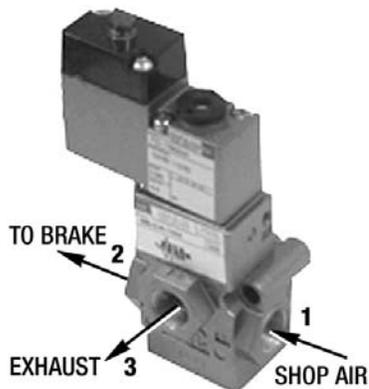


Figure 3.6 - Valve Dimensions For Remote Mounting (XB1, XB2, XB3 and XB4)

REMOTE MOUNTED CONTROL VALVE



55B Series Control Valve

PNEUMATIC DIAGRAM

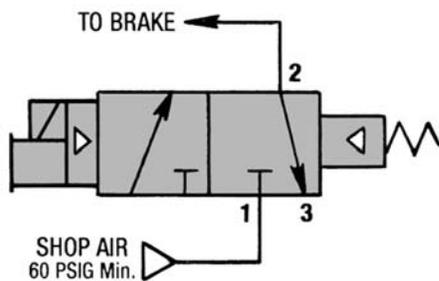


Figure 3.7 - 1PI-Br-3/8 Control Valve and Schematic (XB5 and XB6 Only)

No oil in the air supply is better than too much oil in the air supply.

4. The air pressure regulator should be sized and set to provide the required torque. (**See Torque Specifications Chart for Max. Air Pressure.**)
5. 80 PSI is the maximum pressure for Spring Set Logic on all sizes. Use only the air pressure necessary. This will give additional life to the Brake Unit.

NOTE: Use 3/16" I.D. tubing or hoses for Remote Installation for Sizes XB1, XB2 and XB3 *Posistop*. Use 1/4" I.D. tubing or hoses for Remote Installation for Size XB4, XB5 and XB6 *Posistop*.

3-7 FINAL INSTALLATION CHECKS

1. After the machinery has been in operation for a few hours, make sure that all mounting bolts are tight and recheck the alignment of all components.
2. After machinery has been in operation for 40 hours check the mounting bolts and tighten if necessary.

Section 4 - LUBRICATION

4-1 CHECKING THE FLUID LEVEL

When the *Posistop* Brake is installed and weekly thereafter, or until experience dictates otherwise, check the fluid level. Always check the fluid level with the brake at room temperature and while it is not running.

The *Posistop* Brake has a fluid sight gauge located on the side of the *Posistop* Brake except if your brake is mounted vertically with the input up (See Figure 4.1 below). The fluid level is to show at the center of the gauge with the motor turned off.

4-2 CHANGING THE FLUID

(See Figure 4.1 for XB1 thru XB4 and Figure 4.2 for XB5 and XB6 Sized Brakes)

IMPORTANT : Open the disconnects to the drive motors before attempting to change the fluid.

After the first 30 days of operation completely drain the fluid from the drive using the drain plug provided. If the fluid sight glass is dirty it should be removed and cleaned. Also the Magnetic Drain Plug (#73) should be cleaned and any metal shavings removed.

After the first fluid change check the fluid level and color of the fluid at least once per month. Maintain the fluid level to the center of the sight glass by adding additional fluid as needed. The fluid should be changed after every 12 months of operation or sooner if the fluid color darkens. High energy applications, high cycle rates and extremely dirty environments will darken the color of the fluid.

CAUTION: Do not overfill the Drive Unit. Excess fluid will cause the unit to overheat.

A. Horizontal Brakes

1. Remove the Magnetic Drain Plug (#73) and drain out all of the fluid. Replace the drain plug.
2. Remove the Pipe Plug (#92) and fill the brake with fresh fluid to the center of the Sight Gauge (#46).

B. Vertical - Input Down Brakes

1. Remove the Magnetic Drain Plug (#73) and drain out all of the fluid. Replace the drain plug.
2. Remove the Breather (#45) and fill the brake with fresh fluid to the center of the Sight Gauge (#46).

C. Vertical - Input Up Brakes

1. Remove the Magnetic Drain Plug (#73) and drain out all of the fluid. Replace the drain plug.
2. Remove the Breather (#45) and the Pipe Plug (#92) out of the (2) Street Elbows (#117). Fill the brake through the top elbow with fresh fluid until the fluid starts to run out of the top of the lower elbow. Replace the plug and breather into the brake and clean-up your mess.

4-3 TYPE OF FLUID

Use only Mobil Automatic Transmission Fluid ATF-210 (Type "F") or Mobil Multi-purpose Automatic Transmission Fluid for all drives. **Always use the type of fluid specified on the Name Plate.**

For Washdown and/or Food Processing Applications use **Mobil Synthetic ATF Fluid.**

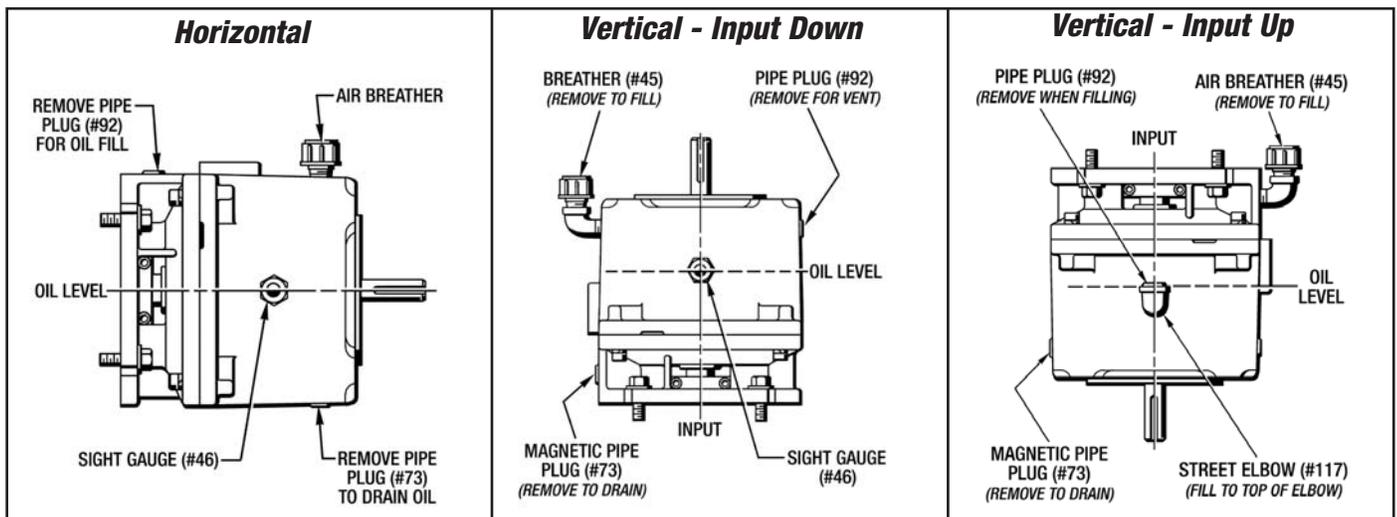


Figure 4.1 - Lubrication - (XB1, XB2, XB3 & XB4 Motor and Coupler Brakes)

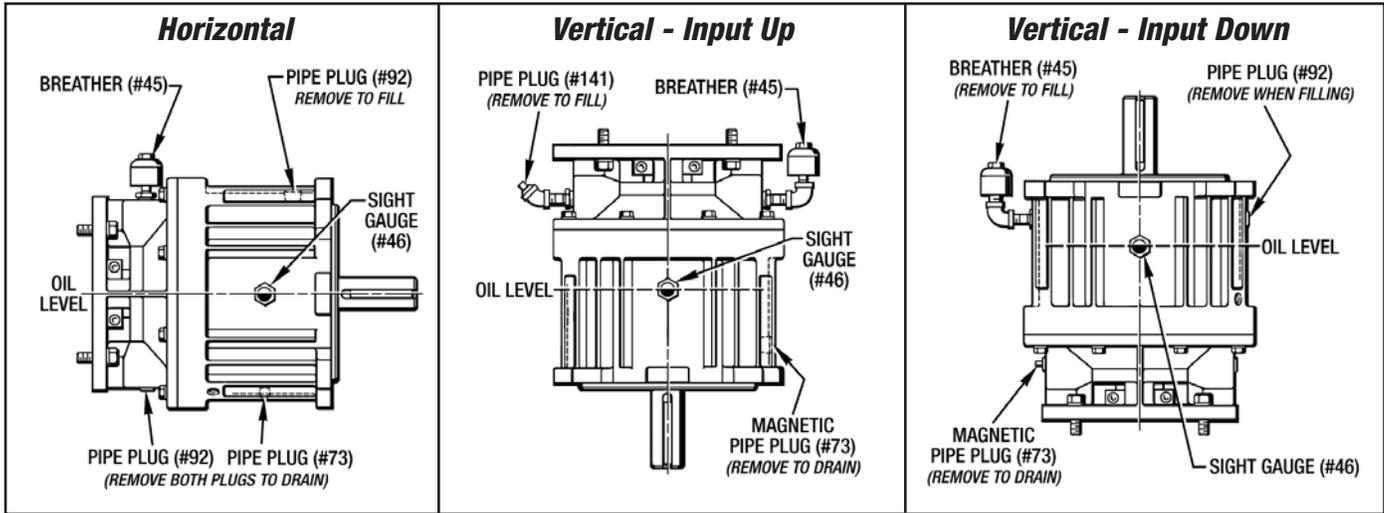


Figure 4.2 - Lubrication (XB5 and XB6 Motor & Coupler Brake)

Section 5 - OPERATIONAL CHECKS

WARNING

Make these Operational Checks only when the brake unit is not in operation. Open the motor disconnect and lock it out to avoid any personal injury.

5-1 OPERATIONAL CHECKS

Provisions for manual operation is to be made if the brake has been removed for service and repair. Set up a temporary manually controlled air supply with a quick acting shut-off valve and a pressure gauge. (See Figure 5.1)

1. Apply air pressure to the brake and quickly shut the air off. Observe the pressure gauge to see if there is a significant pressure drop.

If there is a pressure drop of 5 PSI or more within 30 seconds, then the brake is not operating properly.

This would indicate that the piston seals and O-Rings are worn or damaged and would need replaced.

2. Exhaust the air pressure and attempt to manually turn the Shaft (#2) extension. The shaft should be locked in position. If the shaft can be turned then the piston did not return to the normal braked position.

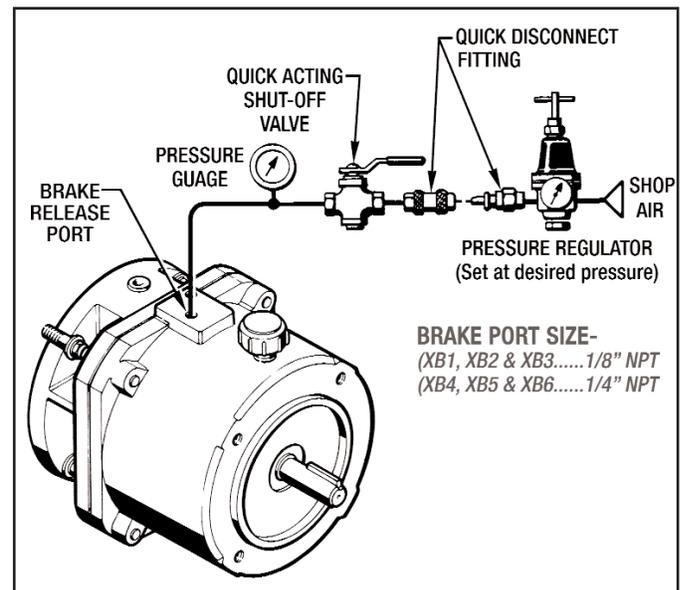


Figure 5.1 - Pneumatic Testing Set-Up

Section 6 - TROUBLESHOOTING

6-1 TROUBLE SHOOTING CHART

TROUBLE	POSSIBLE CAUSE	REMEDY
A. Brake fails to engage properly.	Pistons stacking or binding.	Disassemble to the extent necessary and inspect for damaged parts.
	Worn friction discs.	Replace brake stack.
	Weak or broken springs.	Replace as needed.
	Air pressure not exhausting or slow in exhausting.	Check control valve or muffler and clean or replace as necessary.
B. Brake engages too quickly.	Low oil level.	Check oil level and correct.
C. Noise and vibration.	Improper or loose mounting on motor and/or gear reducer.	Check mounting bolts and alignment. If partial disassembly is required refer to Section 3 - Installation
D. Brake fails to disengage properly.	Low air pressure.	Increase air pressure. (See Section 2)
	Piston sticking or binding.	Disassemble to the extent necessary and inspect for damaged parts.
	Control valve not functioning properly.	Check valve operation and replace if necessary.
E. Brake overheats. (Over 225° F.)	Brake not engaging or disengaging properly causing excessive slippage.	Refer to troubles A and D.
	Improper oil level.	Check oil level and correct.
F. Oil Leakage.	Oil Seal lip damaged.	Check for leakage around shaft and replace oil seal if necessary.
	Bad alignment.	Check and correct alignment.
	External bolts not tight.	Tighten all external bolts.
	Housing O-Ring seal damaged.	Disassemble to the extent necessary to check THE O-Ring and replace if necessary.
G. Oil leakage at breather.	Oil level too high.	Drain excess oil.
H. Brake does not repeat.	Air pressure changed.	Check and adjust air pressure.
	*Oil temperature changed.	Check temperature.
	Inconsistent stopping signal.	Check control circuit.

* - **NOTE:** For installations requiring precise starting and stopping, operating temperatures are very important. Operating temperatures between 116° F. and 165° F. are recommended.

6-2 CHECKING BRAKE STACK for WEAR

To assure correct piston travel and stack engagement, the following steps must be taken when replacing the Brake Stack. **Worn Stack Condition** can also be determined with this procedure.

Measure the stacks as shown in *Figure 6.1*. **Always measure each stack separately.**

Place the correct number of Drive Plates (#13) and Friction Discs (#12) in an arbor press and clamp firmly.

NOTE - Do not include the Stack Pressure Plates (#6) when you measure the stack height.

Measure the **Stack Height** and compare it with the tabulated value given in the **Stack Height Table**.

The **Worn Stack Condition** given in the **Stack Height Table** can be used to determine whether or not your old stacks are worn enough to be replaced.

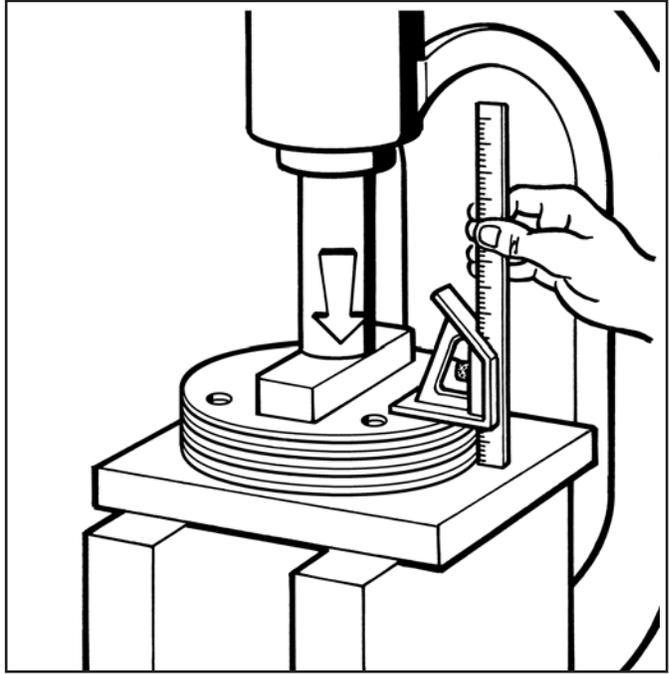


Figure 6.1 - Measuring Stack Height

STACK HEIGHT TABLE (Inches)

BRAKE SIZE	No. OF DISKS	NEW STACK HEIGHT				WORN STACK CONDITION	
		MINIMUM		MAXIMUM		DECIMAL	NEAREST FRACTION
		DECIMAL	NEAREST FRACTION	DECIMAL	NEAREST FRACTION		
XB1	2	.212	7/32	.228	15/64	.190	3/16
XB2	3	.379	3/8	.407	13/32	.313	5/16
XB3	3	.546	35/64	.584	19/32	.482	31/64
	4	.728	47/64	.792	51/64	.660	21/32
	5	.730	47/64	.794	51/64	.660	21/32
XB4	3	.642	41/64	.696	45/64	.537	17/32
	4	.799	51/64	.865	55/64	.924	59/64
	5	.842	27/32	.908	29/32	.924	59/64
XB5 & XB6	4	1.409	1-13/32	1.495	1-1/2	1.356	1-23/64
	5	1.435	1-7/16	1.520	1-33/64	1.357	1-23/64
	6	1.461	1-15/32	1.545	1-35/64	1.359	1-23/64
	7	1.487	1-31/64	1.570	1-37/64	1.361	1-23/64

6-3 MEASURING PISTON STROKE

(XB5 and XB6 Only)

1. First drain all the fluid from the brake. Save or discard as condition warrants.
2. Remove the Sight Gauge (#46).
3. Apply 60 PSI air pressure to disengage the brake stack.
4. Apply machinist fast drying layout die or (use a black magic marker) to the sloping surface of the Gap Tool as shown in *Figure 6.2* below.

NOTE - This Gap Tool can be ordered from Force Control with the Part Number 601-X5-007.

5. Firmly insert the Gap Tool through the sight gauge hole in between the Piston and the Brake Stack so that all slack is removed from the Brake Stack as shown in *Figure 6.3*.

NOTE - The straight side of the Gap Tool will be towards the Brake Stack.

6. The sharp corner of the Piston (#3) will scrape the bluing off the Gap Tool. Slightly push the Gap Tool from side to side when it is firmly inserted. (This will remove the bluing in a straight line rather than an arc.)
7. Measure distance "X" with a micrometer as shown in *Figure 6.4*.

If it measures .312" or more, then the brake stack is worn and needs replaced.

8. Replace any pipe plugs removed and the Sight Gauge (#46). Refill the unit with fresh fluid as directed in the **Lubrication Section 4**.

If the Brake Stack needs replaced, refer to **Section 7** for the Disassembly Procedure.

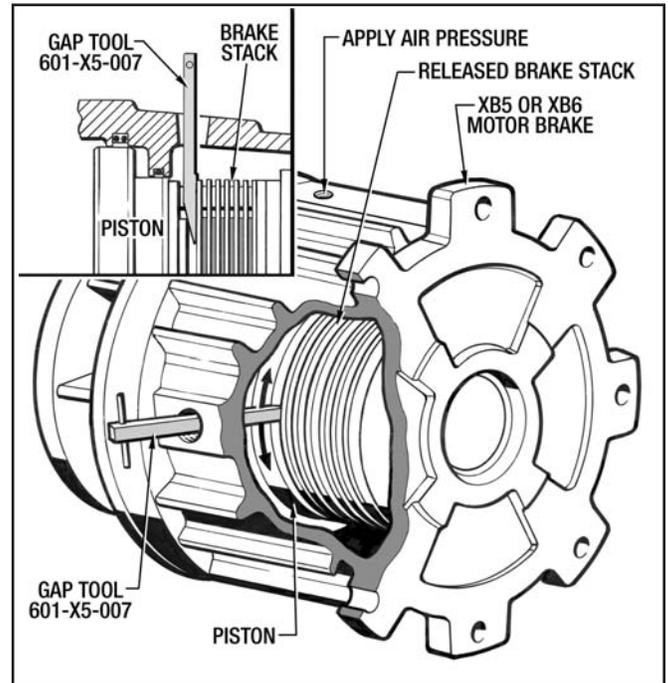


Figure 6.3 - Inserting Gap Tool

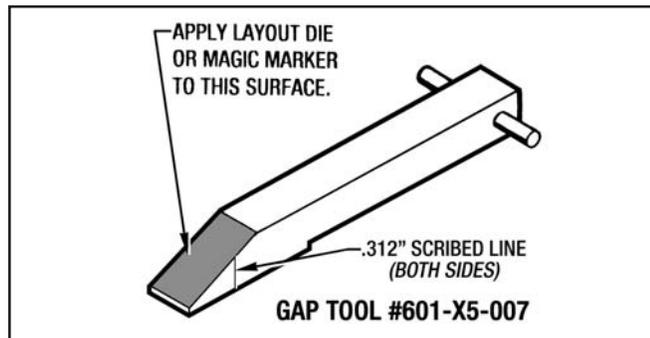


Figure 6.2 - Gap Tool #601-X5-007

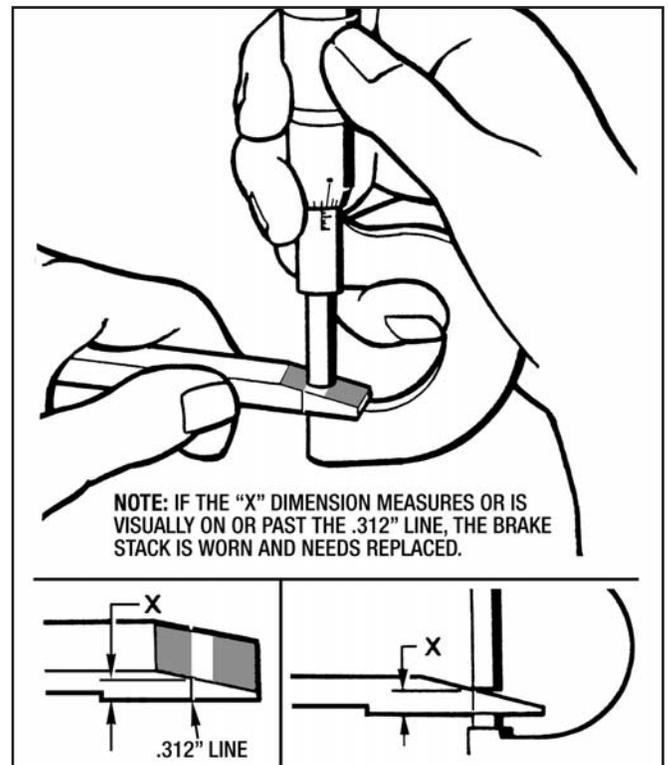


Figure 6.4 - Measuring Piston Stroke

Section 7 - DISASSEMBLY

7-1 GENERAL DISASSEMBLY PROCEDURE

WARNING

Before attempting to disassemble or remove the *Posistop X Class Motor Brake or Coupler Brake* open the motor disconnect, shut-off the air supply and electrical service to the brake control valve. Lock them out to prevent any personal injury.

Unless the brake is to be completely overhauled, it should be disassembled only to the extent necessary to gain access to the worn or damaged parts.

See the following illustrations in Section 10 for a visual reference to all parts described in this section:

1. Figure 10.1 - *Posistop X Class Brake Unit*.
2. Figure 10.2 - *Brake Stack Configurations for XB1, XB2, XB3 & XB4 Size Brakes*.
2. Figure 10.3 - *Brake Stack Configurations for XB5 & XB6 Size Brakes*.
3. Figure 10.4 - *Manifold Mounted Kit, Male Input Adapter Kit and Foot Mounting Kit for XB1, XB2, XB3 & XB4 Size Brakes*.

7-2 REMOVING THE COUPLER BRAKE AND DRIVE MOTOR FROM THE GEAR REDUCER (See Figure 7.1)

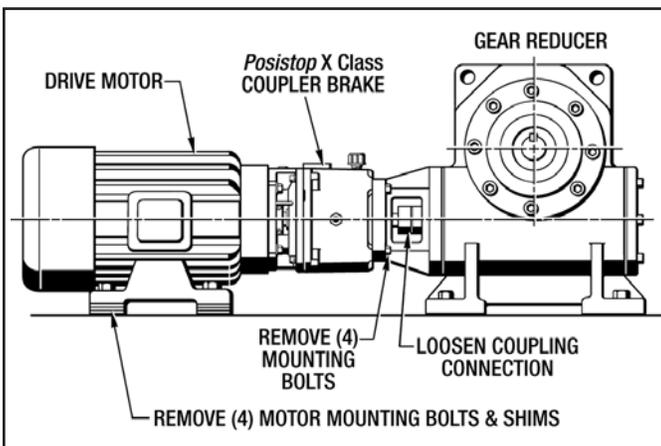


Figure 7.1 - Removing Coupler Brake From Gear Reducer

(Coupler Brake Only)

1. Disconnect any air lines and electrical connections to the Pneumatic Control Valve.
2. Loosen Coupling Connection as per Manufacturer's Specifications.
3. Remove the (4) Mounting Bolts in the Gear Reducer

C-Face Flange.

4. If the Drive Motor is foot mounted, then remove the (4) motor mounting bolts and any shims that might be under the motor feet.
5. With an appropriate sling and overhead hoist pull the Drive Motor and Coupler Brake away from the Gear Reducer and take it to a work bench for further disassembly.

7-3 REMOVING THE BRAKE FROM THE MOTOR

(See Figure 7.2 & 7.3)

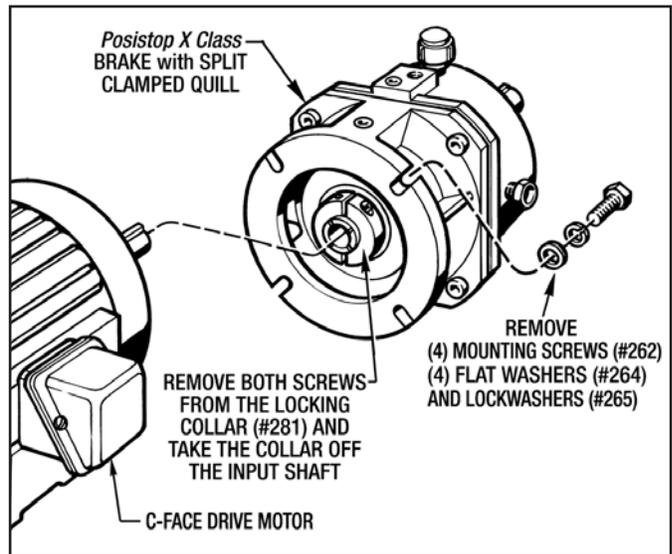


Figure 7.2 - Removing XB1, XB2, XB3 & XB4 Coupler or Motor Brake From The Drive Motor

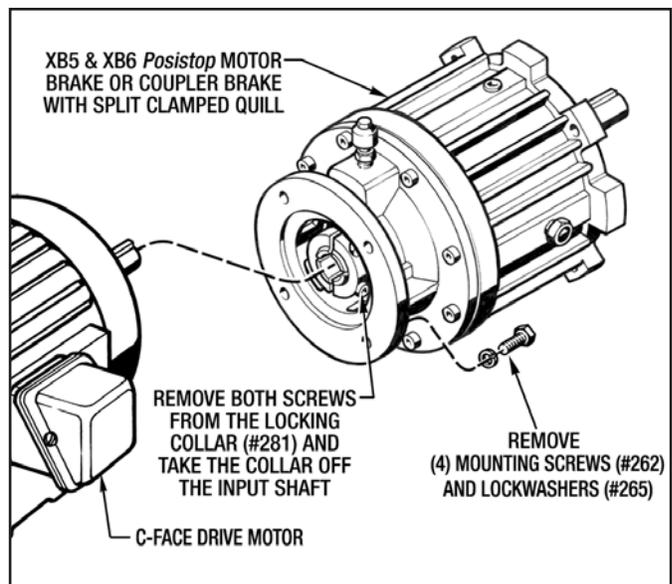


Figure 7.3 - Removing XB5 & XB6 Coupler or Motor Brake From The Drive Motor

(Coupler Brake or Motor Brake)

1. Loosen the (2) Screws in the Locking collar (#281).
2. Remove the (4) Mounting Screws (#262), (4) Lockwashers (#265) and (4) Flat Washers (#264).

NOTE - The (4) Flat Washers (#264) are only on the smaller units with mounting slots.

3. Pull the Brake away from the drive motor face and shaft.
4. Take the Locking Collar (#281) off the split quill and remove the Key (#180).
5. Drain all the fluid from the brake as described in **Section 4**.
6. Remove the Breather (#45) and Sight Gauge (#46) from the brake so they can be cleaned and don't get damaged.

7-4 DISASSEMBLY PROCEDURE

(See Figures 10.1 and 10.2)

1. Place the Brake on the workbench with the input end facing upwards.

(XB1, XB2, XB3 and XB4 Size Brakes)

2. Remove the (4) Screws (#64) and (4) Lockwashers (#127) from the Input Housing (#8).

CAUTION - Remove these (4) Screws in an even manner because this Input Housing (#8) is under spring pressure.

(XB5 and XB6 Size Brakes)

2. Remove the (8) Screws (#64) and (8) Lockwashers (#127) from the Input Housing (#8).

CAUTION - Remove these (8) Screws in an even manner because this Input Housing (#8) is under spring pressure.

(All Size Brakes)

3. Lift the Input Housing (#8) straight up and off the End Housing (#9).

CAUTION - Be very careful not to damage the Oil Seal (#32) Lip.

4. Remove and discard the O-Ring (#104).
5. Remove the Brake Springs (#36) from the spring pockets in the Piston (#3).

(XB5 and XB6 Size Brakes)

The Bearing (#35) has to be removed from the Shaft Assembly (#2) before the Piston Sub-Assembly and Brake Stack can be removed.

6. Pull the Bearing (#35) off the Shaft Assembly (#2) with a standard 3-Jaw Bearing Puller and flat plate as shown in *Figure 7.4*.

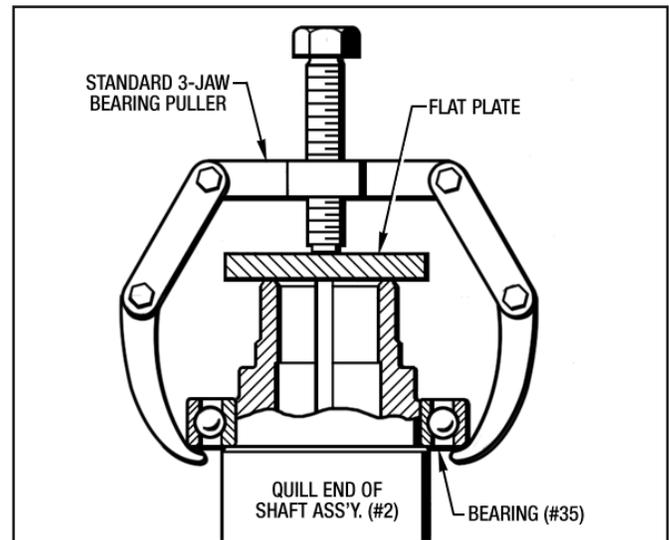


Figure 7.4 - Removing Bearing (#35)

(All Size Brakes)

7. Lift the Piston (#3) out of the End Housing (#9).

NOTE - One way to ease the removal of this Piston (#3) is to apply a *little air pressure* to the brake port. If you just attempt to pull the piston out without using air pressure, make sure the **brake port is open** and not blocked. If it is blocked, then a vacuum will be formed inside the piston chamber, not allowing you to remove the piston.

8. If the Piston Seals are to be replaced, then remove the Piston Liner (#43), O-Ring (#40), Piston Liner

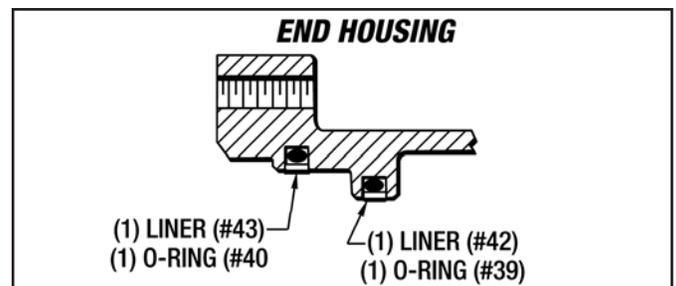


Figure 7.5 - Piston Liners and O-Rings

(#42) and O-Ring (#39) from the grooves in the End Housing (#9). (See *Figure 7.5*)

9. Remove the Brake Stack from the Shaft (#2) spline and the (4) Pins (#121).

NOTE - It will be easier to remove each Drive Plate (#13) and each Friction Disc (#12) one at a time. There will be (4) Separator Springs (#229) in between each set of Drive Plates (#13). Set the Separator Springs (#229) aside for Reassembly. A hooked tool or a pair of magnetic probes may ease the stack removal.

10. Check the Brake Stack Height for wear as indicated in **Section 6-2** and shown in *Figure 6.1*.

If you are not replacing the Brake Stack, then keep the plates and discs in the same order as they were removed for reassembly. If you are replacing the Brake Stack, then discard the old stack.

11. Remove the Pressure Plate (#6) off the (4) Pins (#121).

(Motor Brake Only)

12. Remove the Retaining Ring (#44) out of the end Housing (#9) **(Not on XB5 or XB6)**. Pull the Shaft (#1) and Bearing (#26) out of the End Housing (#9).
13. If the Bearing (#26) needs replaced, use a bearing puller to pull it off the shaft. (See *Figure 7.6*)
14. If the Oil Seal (#31) needs replaced, use an arbor press to push it out of the Input Housing (#8).

(Coupler Brake Only)

12. If the Key (#180) is still in the output end of the Shaft (#2), remove it at this time and place some masking tape over the keyway. Coat the tape and shaft with a little white grease.
13. Take the Retaining Ring (#44) out of the End Housing (#9) **(Not on XB5 or XB6)**. Pull the Shaft Assembly (#2) and Bearing (#26) up and out of the End Housing (#9).

CAUTION - Be very careful not to damage the lip of the Oil Seal (#31).

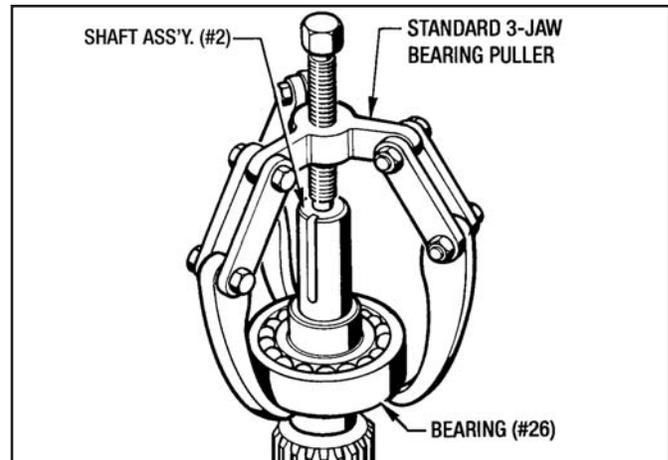


Figure 7.6 - Removing Bearing (#26)

14. If the Bearing (#26) needs replaced, use a standard 3-jaw bearing puller to remove it from the Shaft Assembly (#2) as shown in *Figure 7.6*.

(All Size Brakes)

15. If the Oil Seals (#31) and (#32) need replaced, use an arbor press to push them out of the Input Housing (#8) and End Housing (#9).

Section 8 - CLEANING AND INSPECTION

8-1 CLEANING AND INSPECTION

Clean metal parts in a suitable solvent and dry in a stream of low pressure compressed air. The Brake Drive Plates (#13) can be cleaned in a solvent, but **DO NOT** clean the Brake Friction Discs (#12) in solvent. Use only a clean, dry and lint-free rag to clean these Friction Discs. (Solvent will damage the resilient paper-based friction material used on the Friction Discs). Keep the Drive Plates and Friction Discs in the same order as they were removed. After cleaning, inspect parts for cracks, distortion, scoring, nicks, burrs or other damage would affect serviceability.

Pay particular attention to the following:

1. Check the disc wear surfaces for scoring, galling or evidence of uneven wear.
2. Check the brake plates for scoring or galling. Make sure they are flat. If a perceptible ridge is worn in any of the drive plates, replace all of the drive plates and friction discs as a complete set. Check to see if Dowel Holes have elongated.
3. Carefully check the piston and bore surfaces for nicks, scratches, scoring or other damage which would affect operation or cause leakage.
4. Pay particular attention to the shafts in the area of rotary seals. Check for nicks, scratches which would cause leakage. Replace any damaged parts. Check spline teeth for grooving. 0.003" maximum depth.
5. It is not necessary to remove the ball bearings to check their operation. Slowly rotate the free race of each bearing by hand checking to see if it turns freely without rough or flat spots.

8-2 REPAIR AND REPLACEMENT

A fine stone or crocus cloth may be used to remove minor surface defects from parts so long as the operating or sealing action of the part is not affected. The use of coarser abrasives or other machining methods should not be attempted. Otherwise, damaged parts should be replaced.

Replacement is recommended also for the following, as applicable:

1. Replace all O-Rings and Oil Seals removed during the course of disassembly.
2. Replace Brake Discs and Drive Plates in complete sets only.

Section 9 - REASSEMBLY

9-1 GENERAL REASSEMBLY INSTRUCTIONS

1. Refer to **Section 10 - Ordering Repair Parts** for a visual reference to all parts described in this Reassembly Section. (See *Figures 10.1, 10.2, 10.3 and 10.4*)
2. Basically the Reassembly Procedure is just the reverse order of the Disassembly Procedure.
3. Lubricate O-rings, Liners and the lips of Oil Seals with a little "White Grease" (Mobil Lithium #SHC-PM) immediately prior to installation and reassembly of any mating parts.
4. One method of installing Ball Bearings on to their prospective shafts is to heat up the bearings to a **maximum of 212° F.** and drop them onto the shaft. Always make sure that the bearings are seated properly when using this method.

CAUTION- Always wear suitable protective gloves when handling heated parts.

5. The other method of installing press fitted parts is to use an Arbor Press. Special Assembly Tools are required with this method. **Section 11 - Special Assembly Tools** shows machining drawings for each Assembly Tool, if you prefer to make your own tools.

Each Assembly Tool has its own Part Number and can be ordered from the Force Control factory. The Special Assembly Tool Part Numbers are as follows:

1. **OIL SEALS (#32) & (#31)**
 - Sizes XB1 & XB2#601-X1-002
 - Size XB3#601-X3-003
 - Size XB4#601-X3-001
 - Size XB5 and XB6#601-X5-001
2. **OUTPUT BEARING (#26)**
 - Size XB1#601-X1-006B
 - Size XB2#601-X1-006A
 - Size XB3#601-X3-009B
 - Size XB4Consult Factory
 - Sizes XB5 & XB6#601-X5-002
3. **INPUT BEARING (#35)**
 - Sizes XB5 and XB6 Only#601-X5-003

9-2 INSTALLING OIL SEALS

(See *Figures 9.1, 9.2 and 10.1*)

A. Oil Seal (#31) Into End Housing (Coupler Brake Only)

1. Apply **Permatex "Form-A-Gasket" 3D** to the OD of the Oil Seal (#31).

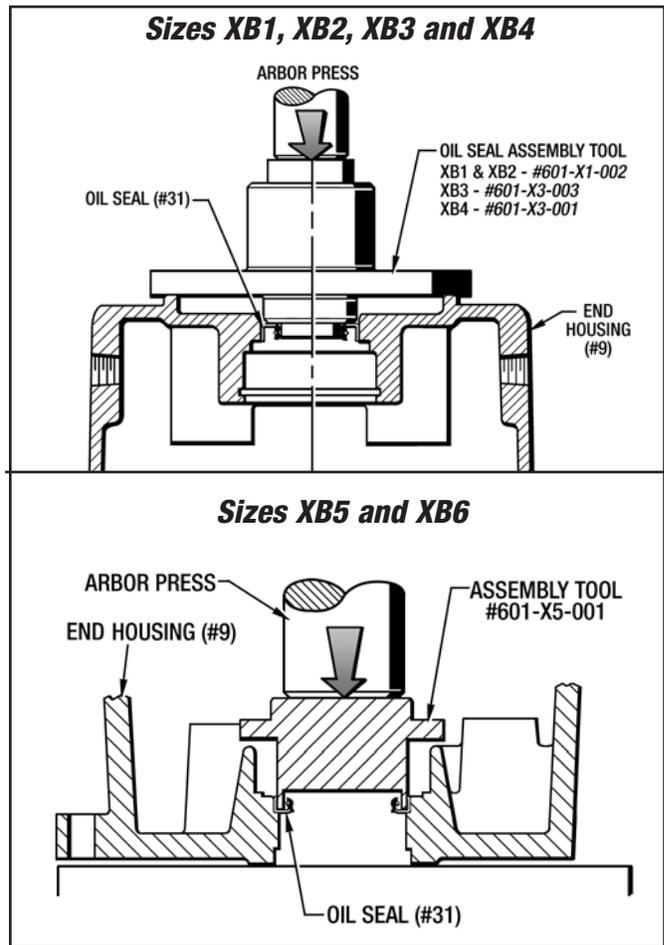


Figure 9.1 - Installing Oil Seal (#31) in a Coupler Brake

2. Install the Oil Seal (#31) into the End Housing (#9) with an Arbor Press and the appropriate Assembly Tool as shown in *Figure 9.1*. **Make sure the Oil Seal (#31) is completely seated in the bore.**

IMPORTANT - This Oil Seal (#31) must be installed squarely to prevent any oil leaks.

3. Clean off any excess Permatex.

B. Oil Seal (#32) Into Input Housing

1. Apply **Permatex "Form-A-Gasket" 3D** to the OD of the Oil Seal (#32).
2. Install the Oil Seal (#32) into the Input Housing (#8) with an Arbor Press and the appropriate Assembly Tool as shown in *Figure 9.2*.

IMPORTANT - This Oil Seal (#32) must be installed squarely to prevent any oil leaks.

3. Clean off any excess Permatex.

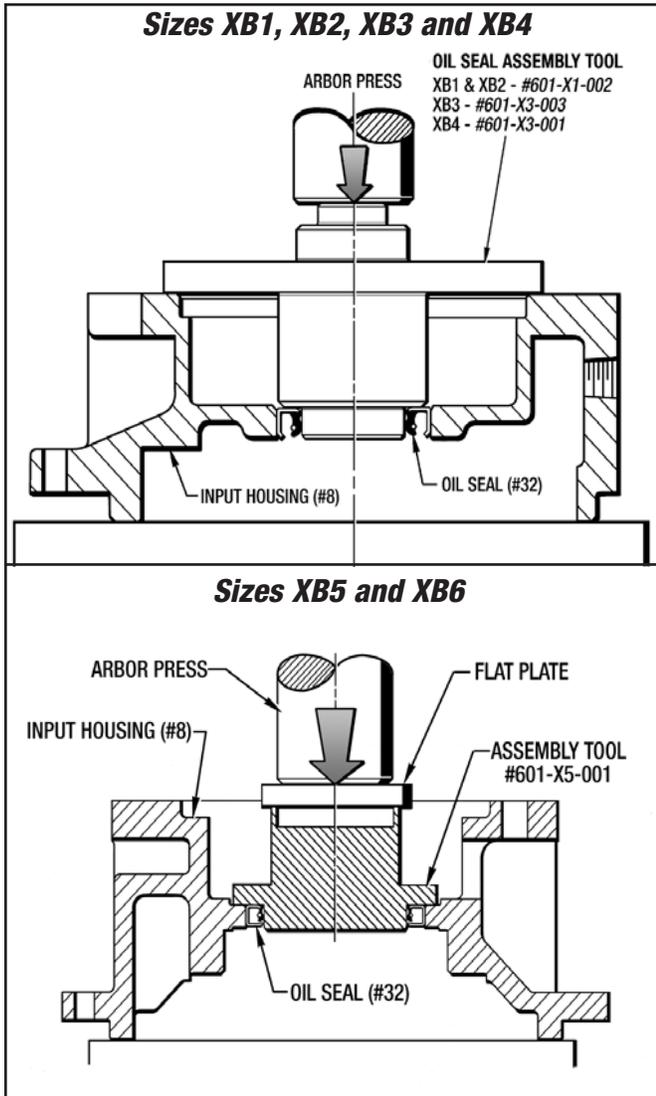


Figure 9.2 - Installing Oil Seal (#32) in the Input Housing

9-3 INSTALLING BEARING (#26)

(See Figure 10.1)

A. Coupler Brake Only

1. Install the Bearing (#26) on to the Shaft Assembly (#2) with an Arbor Press and the appropriate Assembly Tool as shown in Figure 9.3. **Make sure the Bearing is completely seated on the shaft shoulder.**

B. Motor Brake Only

1. Install the Bearing (#26) on to the Shaft Assembly (#2) with an Arbor Press and the appropriate Sleeve as shown in Figure 9.4. **Make sure the Bearing is completely seated on the shaft shoulder.**

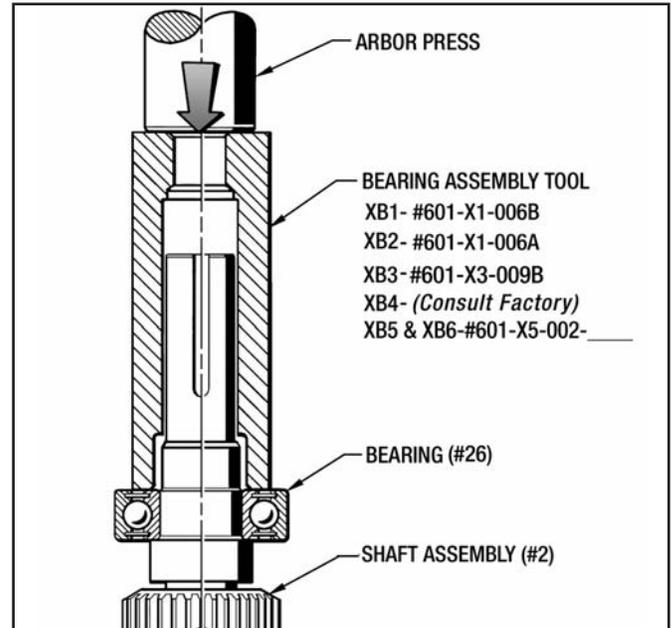


Figure 9.3 - Installing Bearing (#26) in a Coupler Brake

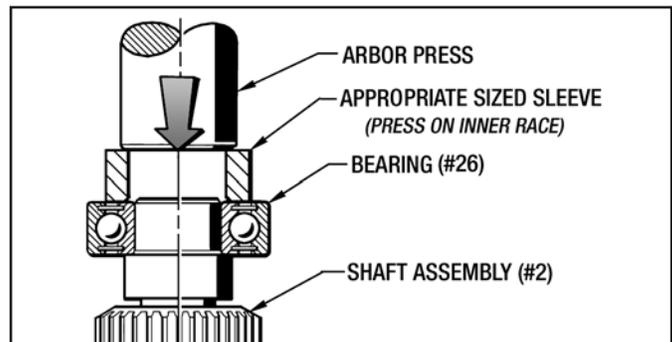


Figure 9.4 - Installing Bearing (#26) in a Motor Brake

9-4 INSTALLING SHAFT ASSEMBLY (#2) INTO END HOUSING (#9)

(See Figure 10.1)

1. Lubricate the lip of the Oil Seal (#31) with a little White Grease and set the End Housing (#9) face down on the table. Cover up the keyway in the Shaft Assembly (#2) with electrical tape.

NOTE - You will need approximately 3" to 4" clearance under the End Housing (#9) to insert the Shaft Assembly (#2).

2. Carefully insert the Shaft Assembly (#2) into the End Housing (#9) until the Bearing (#26) is completely seated in the bearing bore.

CAUTION - Be very careful not to damage the Oil Seal (#31) lip when inserting this Shaft Assembly (#2).

3. Install the Retaining Ring (#44) into the End Housing (#9). **This Step only applies to Sizes XB1 to XB4.**

9-5 INSTALLING THE BRAKE STACK

(See Figure 10.2)

The Brake Stack can be placed on the Shaft Assembly (#2) spline and the Brake Dowel Pins (#121). It will consist of Pressure Plates (#6), Drive Plates (#13), Friction Discs (#12) and Separator Springs (#229) over the dowel pins between the drive plates.

See Figure 10.2 and 10.3 for the correct **Stack Configuration** for each specific unit size.

9-6 PISTON INSTALLATION

(See Figure 10.1)

1. Apply a little White Grease to both O-Rings (#40) & (#39) and both Liners (#43) & (#42). Install them into the End Housing (#9) piston seal grooves as shown in Figure 9.5.

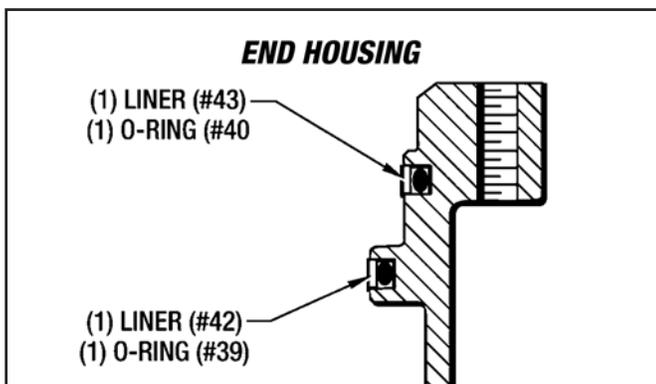


Figure 9.5 - Installing Piston Seals in End Housing (#9)

2. Carefully place the Piston Sub-Assembly into the End Housing (#9). Make sure the hole in the bottom surface of the Piston (#3) is aligned with the top Pin (#121) as shown in Figure 9.6.

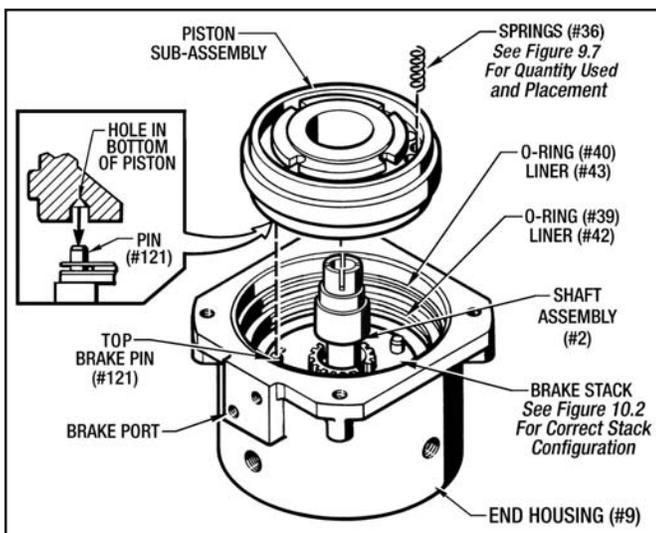


Figure 9.6 - Installing Piston Sub-Assembly

Make sure the Brake Port is open to atmosphere and not plugged as shown in Figure 9.6.

3. Place the correct number of Springs (#36) into the spring pockets of the Piston (#3). (See Figure 9.7)

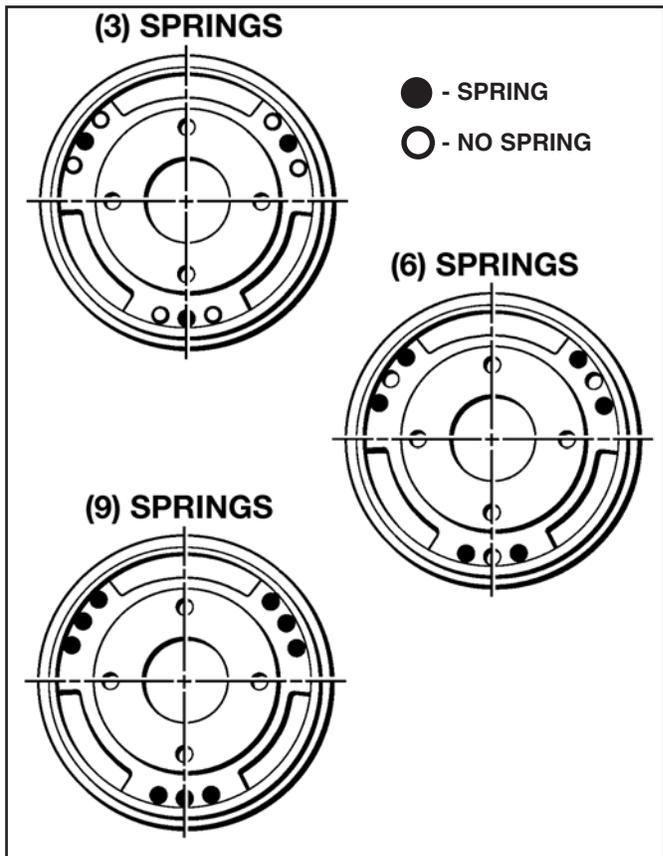


Figure 9.7 - Brake Spring Placement

9-7 INSTALLING BEARING (#35) (XB5 and XB6 Only)

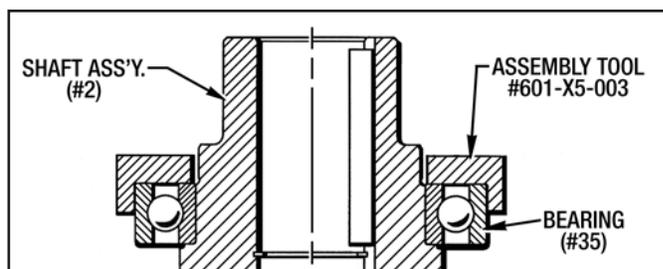


Figure 9.8 - Installing Bearing (#35)

1. The easiest method to install the Bearing (#35) on to the Shaft Assembly (#2) is to heat it up to 225°F. and drop it on to the shaft. The Assembly Tool can be used to properly seat the Bearing (#35) against the shoulder. (See Figure 9.8)

CAUTION - Always wear suitable work gloves when handling heated parts.

The other method would be to use an Arbor Press to install the nBearing (#35) as shown in *Figure 9.9*.

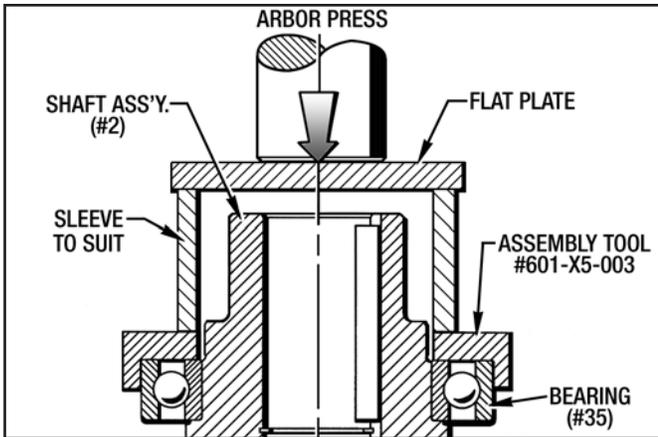


Figure 9.9 - Installing Bearing (#35)

9-8 ATTACHING INPUT HOUSING (#8)

(See *Figure 10.1*)

1. Lubricate the lip of the Oil Seal (#32) with a little white grease.
2. Apply a little white grease to a new O-Ring (#104) and place it on the mounting register of the Input Housing (#8).
3. Carefully slide the Input Housing (#8) straight down over the Shaft (#2).

CAUTION - Be very careful not to damage the lip of the Oil Seal (#32).

4. Attach the Input Housing (#8) with (4) Screws (#64) and (4) Lockwashers (#127).

IMPORTANT - These (4) Screws (#64) will have to be tightened down in an even manner to compress the Springs (#36) correctly.

5. Torque the (4) Screws (#64) to the following torques:
 Sizes XB1, XB2 and XB3 **14 Ft. Lbs.**
 Size XB4, XB5 and XB6 **25 Ft. Lbs.**
6. Before going any further, do a complete **Operational Check** as described in **Section 5**.
7. Place the Locking Collar (#281) on the shaft and only hand tighten the (2) screws.

9-9 FINAL REASSEMBLY

(See *Figure 10.1*)

1. Replace any Pipe Plugs, Fittings, Air Breather and Sight Gauge removed for Disassembly.
2. Fill with Mobil ATF 210 Type F Automatic Transmission Fluid as specified in **Section 4 - Lubrication. Always use the type of fluid specified on the Name Plate.**

9-10 MOUNTING THE BRAKE TO THE DRIVE MOTOR AND GEARBOX (See *Figure 10.1*)

1. Mount the Brake back on the Drive Motor and Gearbox, if applicable, with the same procedure as described in **Section 3 - Mounting The Posistop Brake.**
2. Connect the Pneumatic System as specified in **Section 3-3 - Pneumatic Hook-Up.**

Section 10 - ORDERING REPAIR PARTS

10-1 GENERAL INFORMATION

This section illustrates, lists and describes all available repair parts for the Force Control *Posistop X Class* Brake Units. Parts are identified on the exploded views with Part Reference Numbers. These Numbers correspond to the Part Reference Number given in the Parts List. The Part Name and Quantity is also given in the Parts List. This Part Reference Number, Part Name and Quantity should be used when ordering parts.

The Exploded View Drawings are as follows:

Figure 10.1 - Posistop X Class Brake.

*Figure 10.2 - XB1, XB2, XB3 & XB4
Stack Configurations*

Figure 10.3- XB5 & XB6 Stack Configurations

*Figure 10.4 - Options - Manifold Mounted Valve Kit,
Male Input Adapter Kit and Foot
Mounting Kit (XB1, XB2, XB3 & XB4)*

10-2 DRIVE MOTORS

The motors used with these Brake Units are standard and may be repaired or replaced by any qualified motor rebuild facility or supplier.

10-3 FACTORY REBUILD SERVICE

Factory Rebuild Service is offered by Force Control Industries at the factory. Before returning a unit for this service, however, be sure to first contact the Force Control Industries Service Sales Department for authorization and shipping instructions. Force Control Industries cannot be responsible for units returned to the factory without prior notice and authorization.

Care must be given to the packing of return drives. Always protect mounting surfaces by attaching to a skid.

Shipment-damaged drives always delay repairs. It is usually impossible to recover damage costs from the carrier. When possible describe the problem experienced on your shipping papers.

RETURN TO :

Force Control Industries, Inc.
3660 Dixie Highway
Fairfield, Ohio 45014

Telephone: 513-868-0900

Fax No.: 513-868-2105

E-Mail: info@forcecontrol.com

10-4 ORDERING REPLACEMENT PARTS

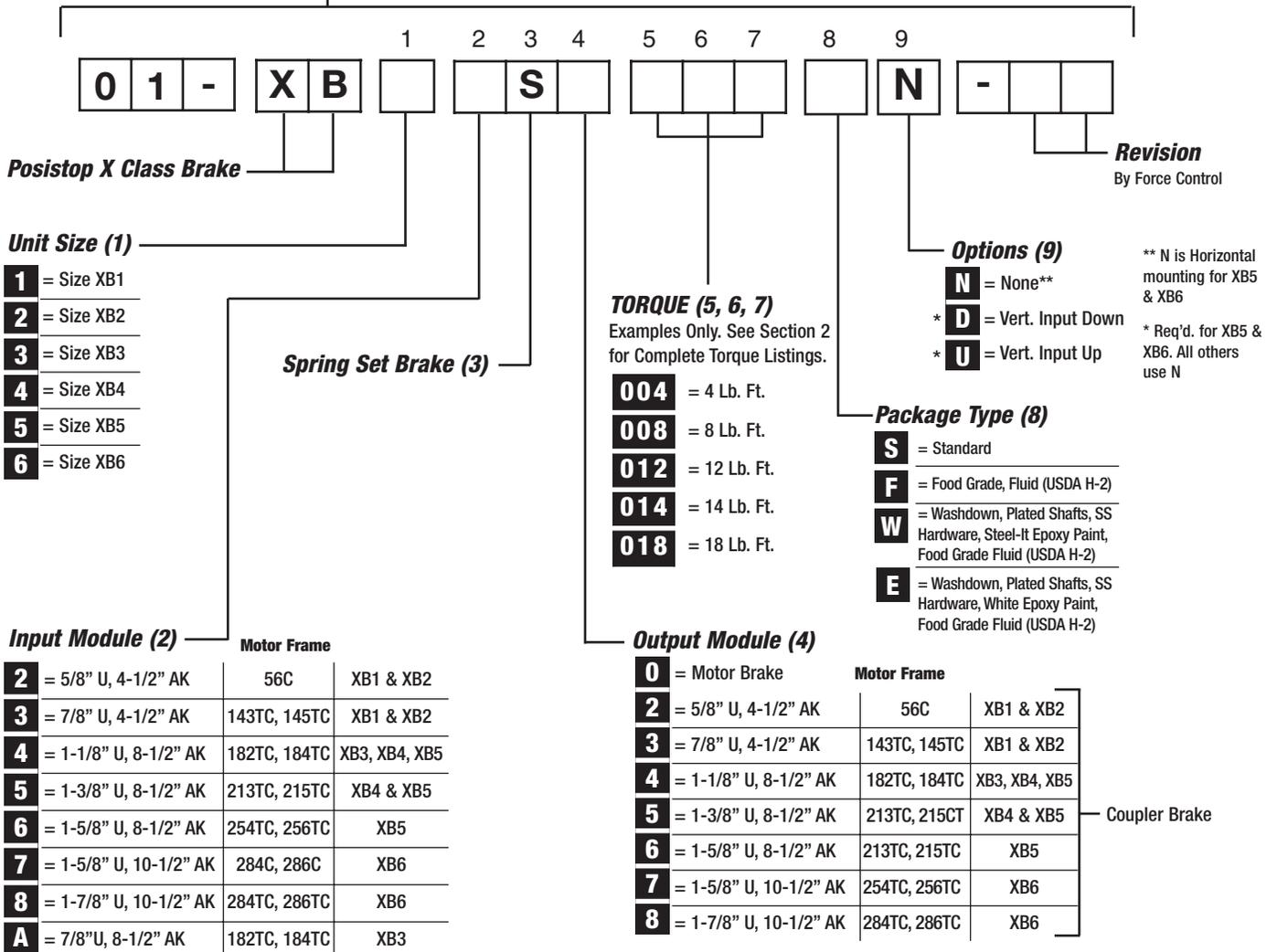
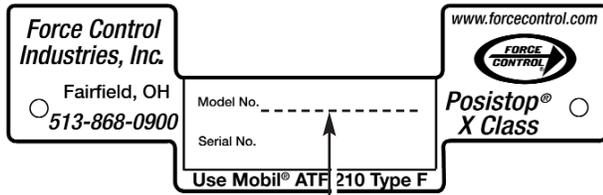
When ordering replacement parts, please specify all of the following information:

1. **Brake Model Number** (on the name plate)
2. **Brake Serial Number** (on the name plate)
3. **Part Reference Number** (from the parts list or exploded view drawing.)
4. **Part Name** (from the parts list)
5. **Quantity** (from the parts list)
6. **Complete Shipping Information**

Failure to include information for items 1 thru 6 will only delay your parts order. Unless another method is specified for item 6, parts less than 150 pounds will be shipped United Parcel Service, parts over 150 pounds will be shipped Motor Freight. Air freight and other transportation services are available but only if specified on your order.

10-5 NAME PLATE & MODEL NUMBER

The Name Plate shown below is located on the Input Housing.



Posistop X Class COUPLER & MOTOR BRAKE

(Figure 10.1)

REF. No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
2	Shaft Assembly.....	1	99	Freeze Plug (Motor Brake Only).....	1
3	Piston.....	1	*104	O-Ring	1
8	Input Housing	1	121	Dowel Pin	
9	End Housing	1		(XB1, XB2, XB3 & XB4) 3/8" x 1-1/4"	4
*26	Bearing	1		(XB5 & XB6) 1/2" x 3-1/2"	4
*31	Oil Seal (Coupler Brake Only).....	1	127	Lockwasher	
*32	Oil Seal	1		(XB1 & XB2) 5/16".....	4
*35	Bearing (XB5 & XB6).....	1		(XB3, XB4, XB5 & XB6) 3/8".....	4
*36	Brake Spring		138	Pipe Nipple (XB5 & XB6 Only).....	2
	XB1, XB2 & XB3	6	139	Pipe Elbow, 90° (XB5 & XB6 Only)	1
	XB4, XB5 & XB6	9	140	Pipe Elbow, 45° (XB5 & XB6 Only)	1
*39	O-Ring	1	141	Pipe Plug, Sq. Hd. (XB5 & XB6 Only)	1
*40	O-Ring	1	180	Key	
*42	Piston Liner, Small Diameter	1		(Coupler Brake).....	2
*43	Piston Liner, Large Diameter	1		(Motor Brake)	1
*44	Retaining Ring (XB1, XB2, XB3 & XB4).....	1	262	Hex Hd. Mounting Screw	
*45	Air Breather	1		(XB1 & XB2) 3/8"-16 x 1-1/4" Lg.	4
*46	Sight Gauge.....	1		(XB3 & XB4) 1/2"-13 x 2" Lg.	4
64	Soc. Hd. Cap Screw			(XB5 & XB6) 1/2"-13 x 3-1/2" Lg.	4
	(XB1 & XB2) 5/16"-18 x 1-1/2" Lg.	4	264	Flat Washer	
	(XB3, XB4, XB5 & XB6)			(XB1 and XB2) 3/8".....	4
	3/8"-16 x 1-1/2" Lg.....	4		(XB3 and XB4) 1/2"	4
73	Pipe Plug, Magnetic 3/8" NPT	1	265	Lockwasher	
74	Pipe Plug			(XB1 and XB2) 3/8".....	4
	(XB1, XB2 & XB3) 1/8" NPT.....	1		(XB3, XB4, XB5 & XB6) 1/2".....	4
	(XB4, XB5 & XB6) 1/4" NPT.....	1	*281	Clamping Collar	1
90	Reducer (XB4, XB5 & XB6 Only).....	1			
92	Pipe Plug				
	(XB1, XB2 & XB3) 3/8" NPT.....	2			
	(XB4) 1/2" NPT	2			
	(XB5 & XB6) 1/2" NPT	3			

* - Indicates parts in the Overhaul Kit.

Posistop X Class COUPLER BRAKE & MOTOR BRAKE

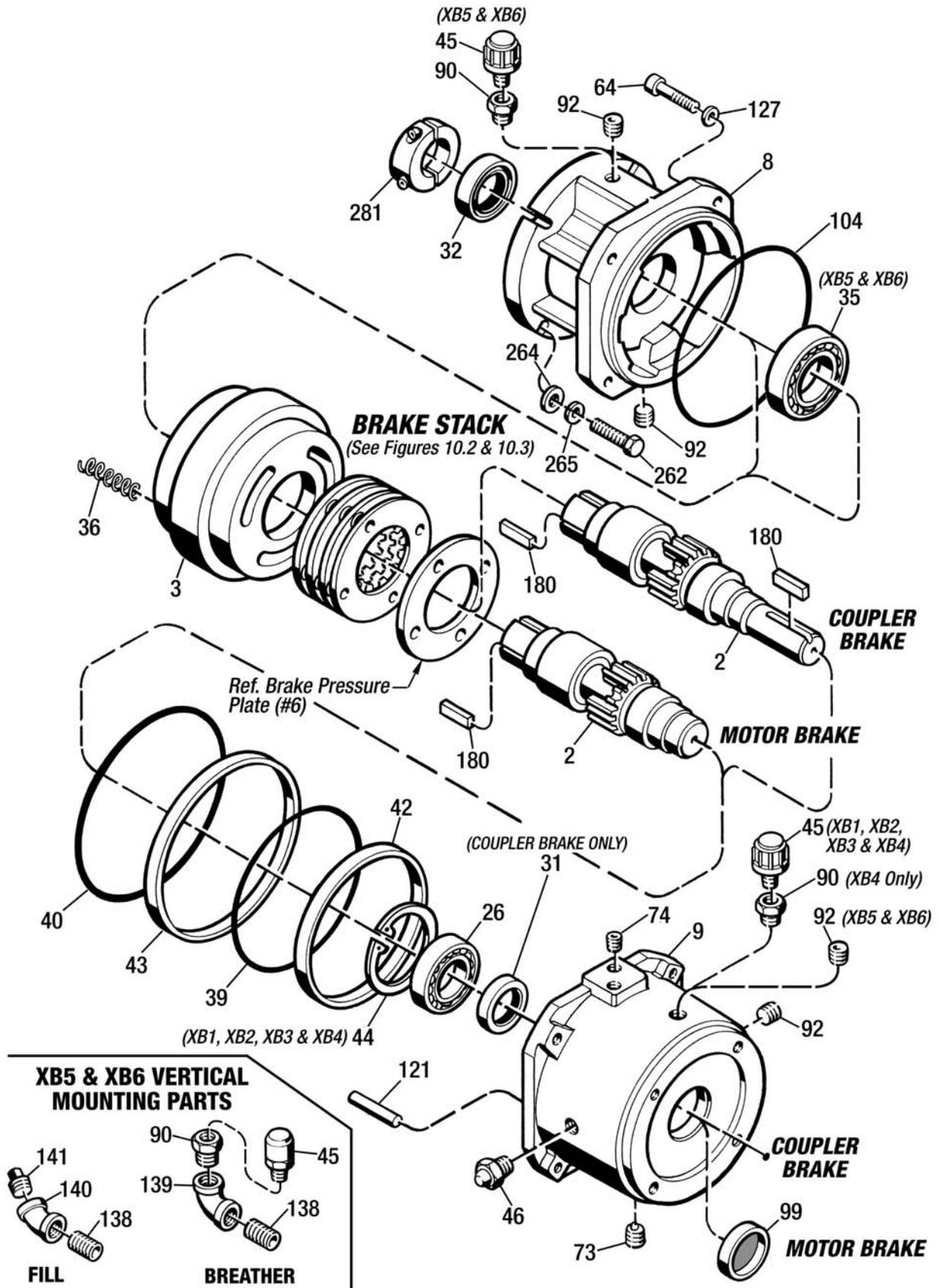


Figure 10.1 - Posistop X Class Coupler and Motor Brake

BRAKE STACK CONFIGURATIONS

(Figure 10.2)

Size XB1 Posistop

A	REF. No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
	6	Stack Pressure Plate	2	*13	Drive Plate	2
	*12	Friction Disc	2	*229	Separator Spring	8

* - Indicates parts in Minor Overhaul Kit.

Size XB2 Posistop

B	REF. No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
	6	Stack Pressure Plate	1	*13	Drive Plate	3
	*12	Friction Disc	3	*229	Separator Spring	12

* - Indicates parts in Minor Overhaul Kit.

Size XB3 & XB4 Posistop (3 Discs)

C	REF. No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
	6	Stack Pressure Plate	2	*13	Drive Plate	6
	*12	Friction Disc	3	*229	Separator Spring	12

* - Indicates parts in Minor Overhaul Kit.

Size XB3 & XB4 Posistop (4 Discs)

D	REF. No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
	6	Stack Pressure Plate	1	*13	Drive Plate	8
	*12	Friction Disc	4	*229	Separator Spring	16

* - Indicates parts in Minor Overhaul Kit.

Size XB3 & XB4 Posistop (5 Discs)

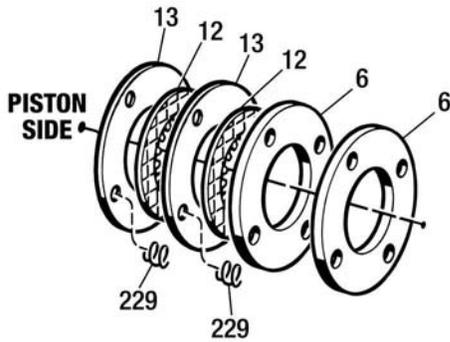
E	REF. No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
	6	Stack Pressure Plate	1	*13	Drive Plate	6
	*12	Friction Disc	5	*229	Separator Spring	20

* - Indicates parts in Minor Overhaul Kit.

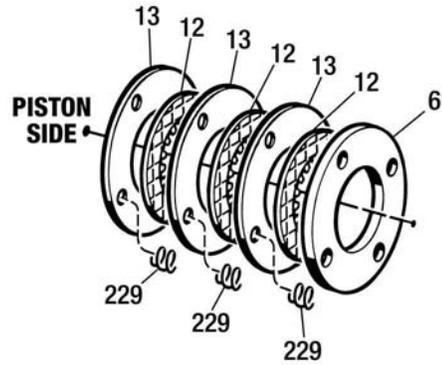
BRAKE STACK CONFIGURATIONS

(XB1, XB2, XB3 and XB4 Size Brakes)

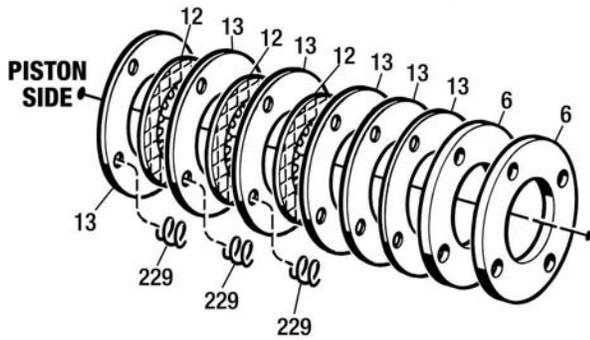
A XB1 Brake Stack



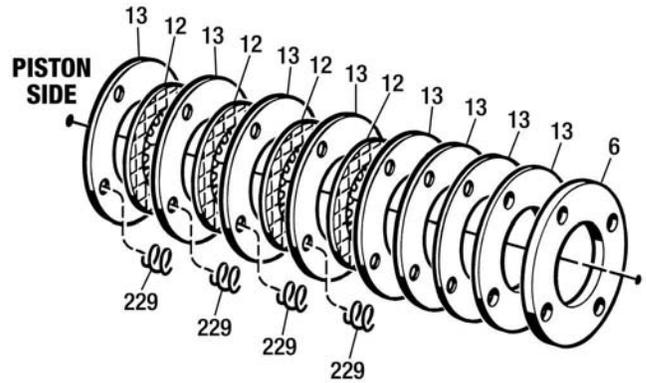
B XB2 Brake Stack



C XB3 & XB4 (3-Disc) Brake Stack



D XB3 & XB4 (4-Disc) Brake Stack



E XB3 & XB4 (5-Disc) Brake Stack

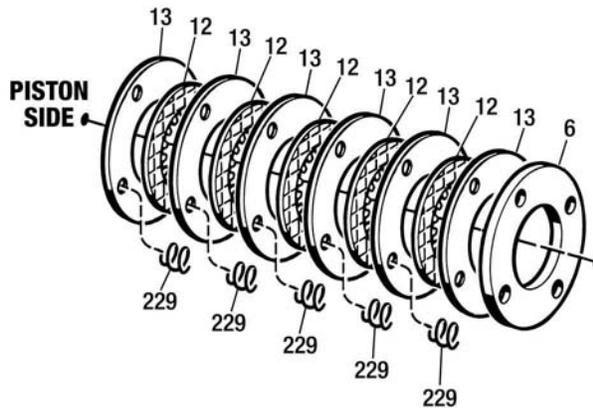


Figure 10.2 - XB1, XB2, XB3 and XB4 Brake Stack Configurations

BRAKE STACK CONFIGURATIONS

(Figure 10.3)

Size XB5 and XB6 Posistop (4-Discs)

F	REF. No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
	6	Stack Pressure Plate	2	*13	Drive Plate	6
	*12	Friction Disc	4	³ *229	Separator Spring	16

* - Indicates parts in Minor Overhaul Kit.

³ - Vertical Installation Only

Size XB5 & XB6 Posistop (5-Discs)

G	REF. No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
	6	Stack Pressure Plate	1	*13	Drive Plate	10
	*12	Friction Disc	5	³ *229	Separator Spring	20

* - Indicates parts in Minor Overhaul Kit.

³ - Vertical Installation Only

Size XB5 & XB6 Posistop (6-Discs)

H	REF. No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
	6	Stack Pressure Plate	1	*13	Drive Plate	9
	*12	Friction Disc	6	³ *229	Separator Spring	24

* - Indicates parts in Minor Overhaul Kit.

³ - Vertical Installation Only

Size XB5 & XB6 Posistop (7-Discs)

J	REF. No.	PART NAME	QTY.	REF. No.	PART NAME	QTY.
	6	Stack Pressure Plate	1	*13	Drive Plate	8
	*12	Friction Disc	7	³ *229	Separator Spring	28

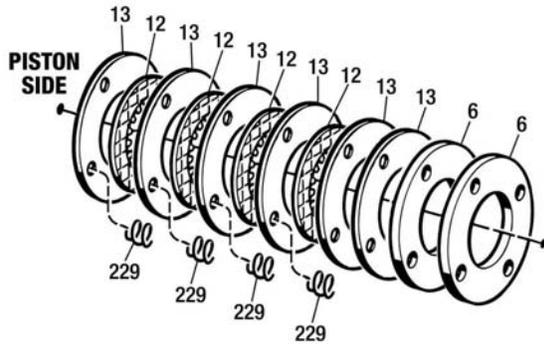
* - Indicates parts in Minor Overhaul Kit.

³ - Vertical Installation Only

BRAKE STACK CONFIGURATIONS

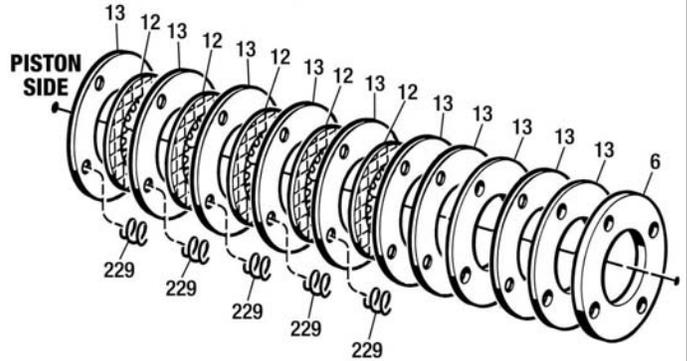
(XB5 and XB6 Size Brakes)

F XB5 & XB6 (4-Disc) Brake Stack



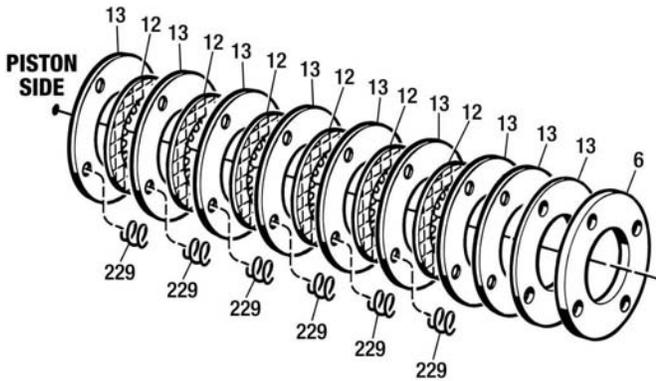
Separator Springs (#229) Only Used For Vertical Installation.

G XB5 & XB6 (5-Disc) Brake Stack



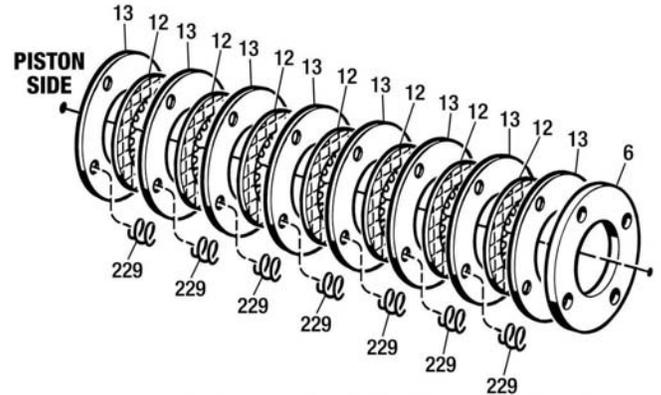
Separator Springs (#229) Only Used For Vertical Installation.

H XB5 & XB6 (6-Disc) Brake Stack



Separator Springs (#229) Only Used For Vertical Installation.

J XB5 & XB6 (7-Disc) Brake Stack



Separator Springs (#229) Only Used For Vertical Installation.

Figure 10.3 - XB5 and XB6 Brake Stack Configurations

Parts List - Figure 10.4
Manifold Mounted Valve Kit
(XB1, XB2, XB3 & XB4 Posistop)

REF. No.	PART NAME	QTY.
701	Manifold	1
727	Soc. Hd. Screw, #10-32 x 1-3/8" Lg.....	2
737	Lockwasher, #10.....	2
807	Gasket	1

To order a complete Manifold Mounted Valve Kit use the following Part Number - 09-56-907-00

Parts List - Figure 10.4
Foot Mounting Kit
XB1 and XB2 Posistop

REF. No.	PART NAME	QTY.
1	Foot Bracket	2
2	Hex Hd. Screw, 3/8"-16 x 3/4" Lg.	2
3	Lockwasher, 3/8"	4
4	Hex Hd. Screw, 3/8"-16 x 1-1/2" Lg.....	2
5	Hex Nut, 3/8"-16	2
6	Flat Washer, 3/8"	2

Parts List - Figure 10.4
Foot Mounting Kit
XB3 and XB4 Posistop

REF. No.	PART NAME	QTY.
1	Foot Bracket	2
2	Hex Hd. Screw, 1/2"-13 x 1-1/4" Lg.....	2
3	Lockwasher, 1/2"	4
4	Hex Hd. Screw, 1/2"-13 x 2-1/4" Lg.....	2
5	Hex Nut, 1/2"-13	2
6	Flat Washer, 1/2"	2

To order a complete Foot Mounting Kit use the following Part Number - 02-X1-FT-KIT

Add a "W" after KIT for Washdown Duty.
 Example: #02-X1-FT-KITW

Add a "E" after KIT for Washdown Duty with housings painted with white epoxy paint.
 Example: #02-X1-FT-KITE (String & Winder not included.)

NOTE - This Foot Mounting Kit cannot be used on these *Posidyne* units without the Male Input Adapter Kit.

Parts List - Figure 10.4
Male Input Adapter Kit
(XB1, XB2, XB3 & XB4 Posistop)

REF. No.	PART NAME	QTY.
1	Input Adapter	1
2	Male Input Shaft	1
3	Hex Hd. Screw (XB1 & XB2) 3/8"-16 x 1-1/2" Lg.	4
	(XB3 & XB4) 1/2"-13 x 2-1/4" Lg.	4
4	Hex Nut (XB1 & XB2) 3/8"-16	4
	(XB3 & XB4) 1/2"-13	4
5	Lockwasher (XB1 & XB2) 3/8"	4
	(XB3 & XB4) 1/2"	4
6	Bearing	1
7	Key (XB1 & XB2) 3/16" Sq. x 3/4" Lg.	1
	(XB3) 1/4" Sq. x 1-1/2" Lg.	1
	(XB4) 5/16" Sq. x 1-1/2" Lg.	1
8	Flat Washer (XB1 & XB2) 3/8"	4
	(XB3 & XB4) 1/2"	4

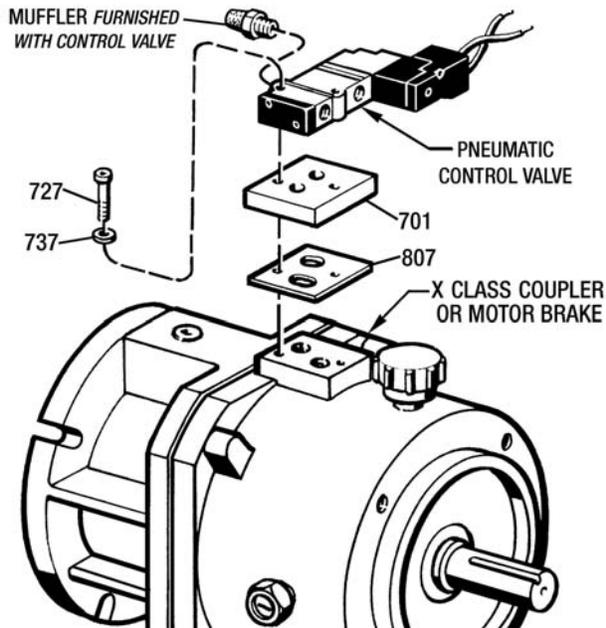
To order a complete Male Input Adapter Kit use the following Part Numbers:

XB1 Posistop #02-X1-1A-KIT
 XB2 Posistop #02-X2-1A-KIT
 XB3 Posistop #02-X3-1A-KIT
 XB4 Posistop #02-X4-1A-KIT

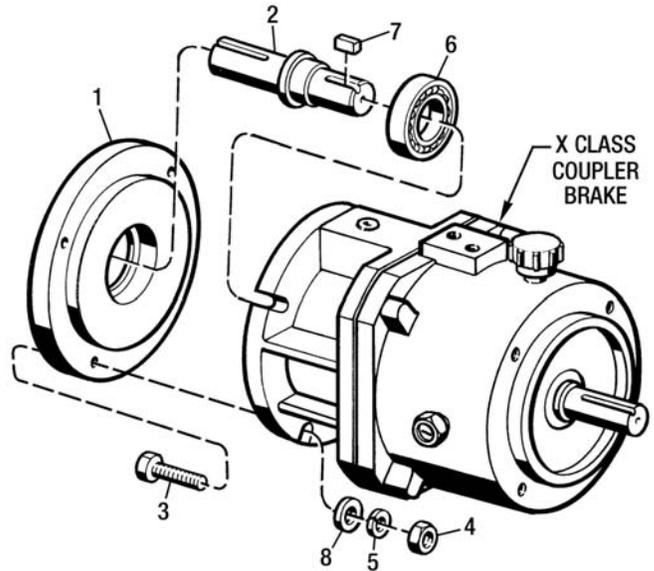
Add a "W" after KIT for Washdown Duty.
 Example: #02-X1-1A-KITW

Add a "E" after KIT for Washdown Duty with housings painted with white epoxy paint.
 Example: #02-X1-FT-KITE (String & Winder not included.)

**MANIFOLD MOUNTED VALVE KIT
(XB1, XB2, XB3 & XB4 Posistop)**

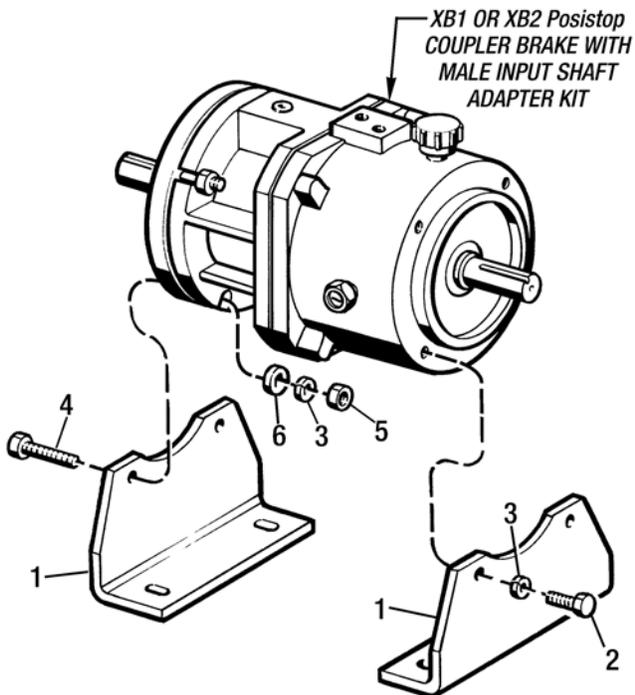


**MALE INPUT ADAPTER KIT
(XB1, XB2, XB3 & XB4 Posistop)**



FOOT MOUNTING KIT

(XB1 and XB2 Posistop)



(XB3 and XB4 Posistop)

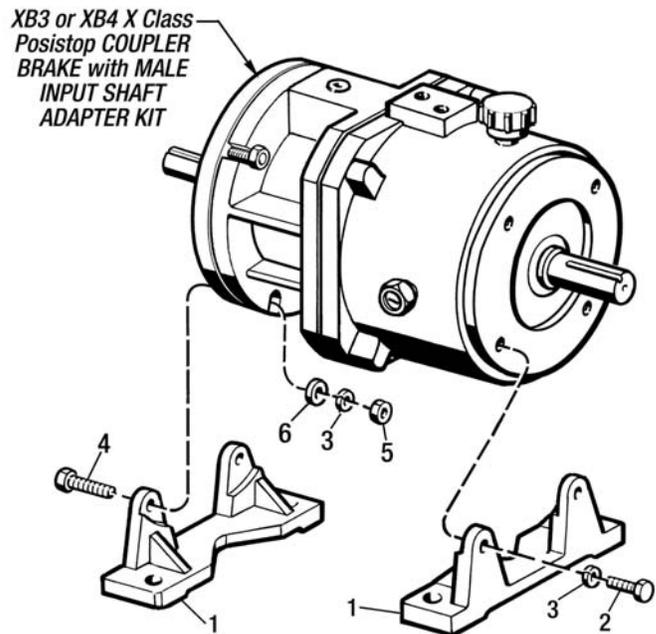
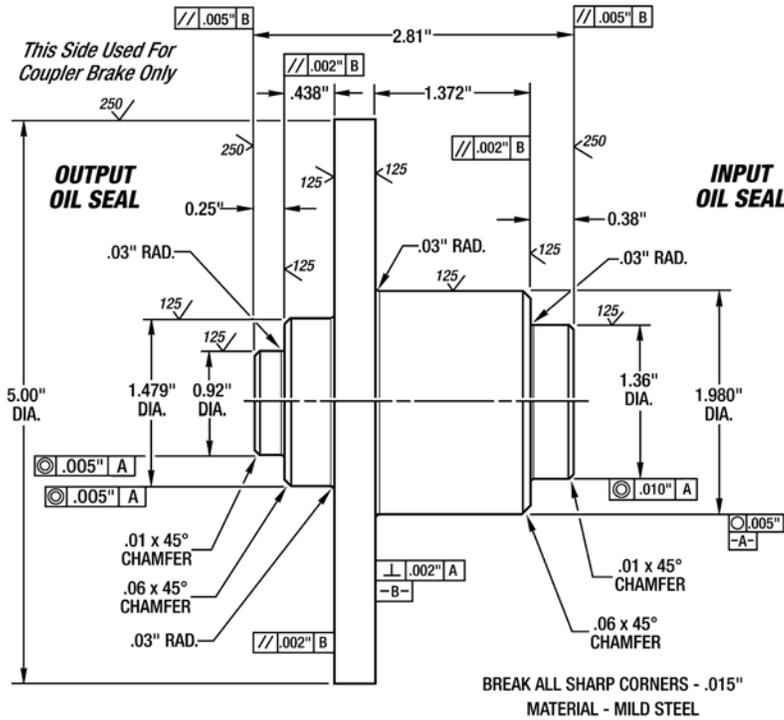


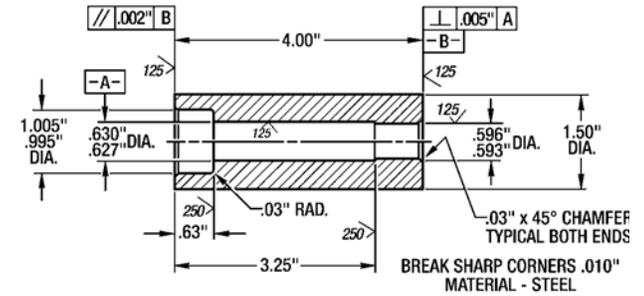
Figure 10.4 - Options - Manifold Mounted Valve Kit, Male Input Adapter Kit & Foot Mounting Kit

Consult factory for a Manifold Mounted Valve, Male Input Adapter Kit or a Foot Mounting Kit for Sizes XB5 & XB6 Posistop Brakes.

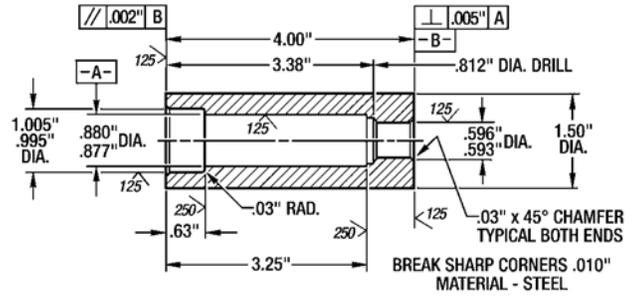
Section 11 - SPECIAL ASSEMBLY TOOLS



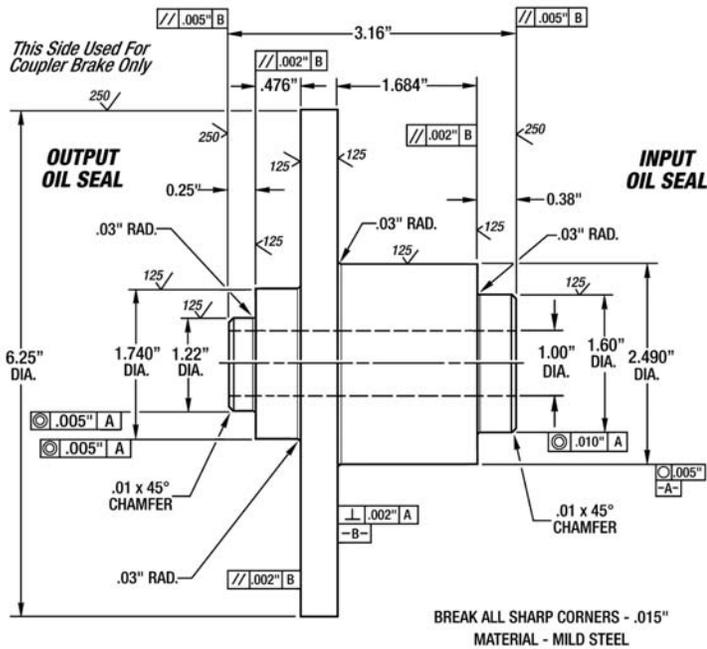
OIL SEAL ASSEMBLY TOOL (Part Number 601-X1-002)
(XB1 and XB2 Posistop Coupler & Motor Brake)



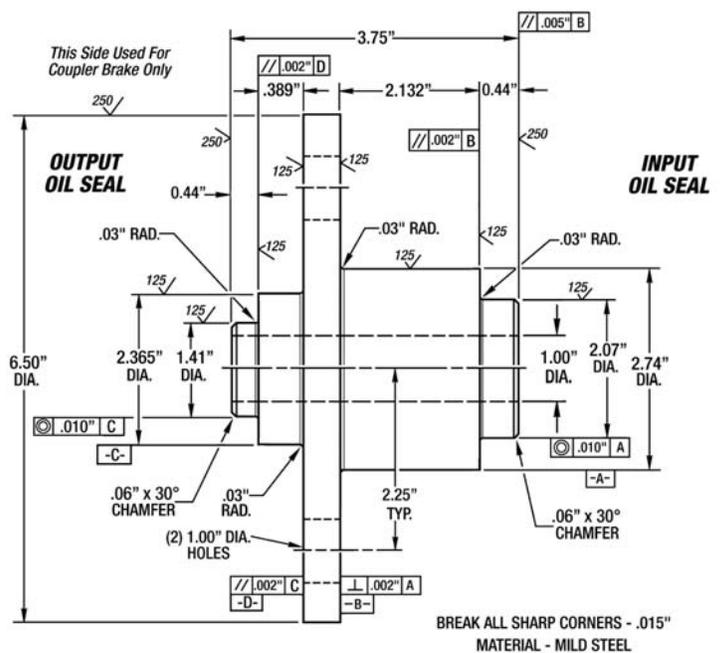
XB2 Posistop Coupler Brake (Part No. 601-X1-006B)



XB3 Posistop Coupler Brake (Part No. 601-X1-006A)
OUTPUT BEARING ASSEMBLY TOOL

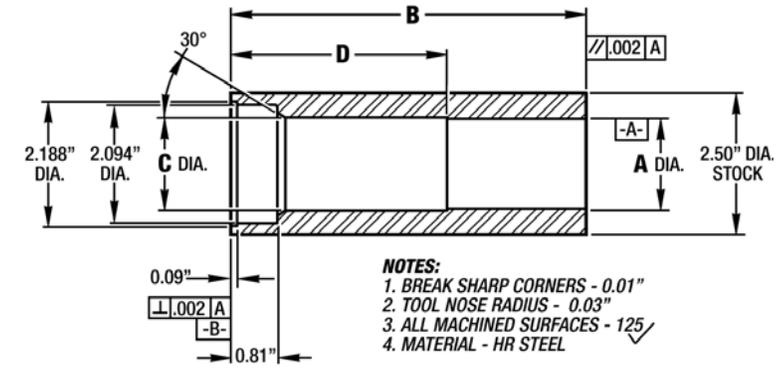
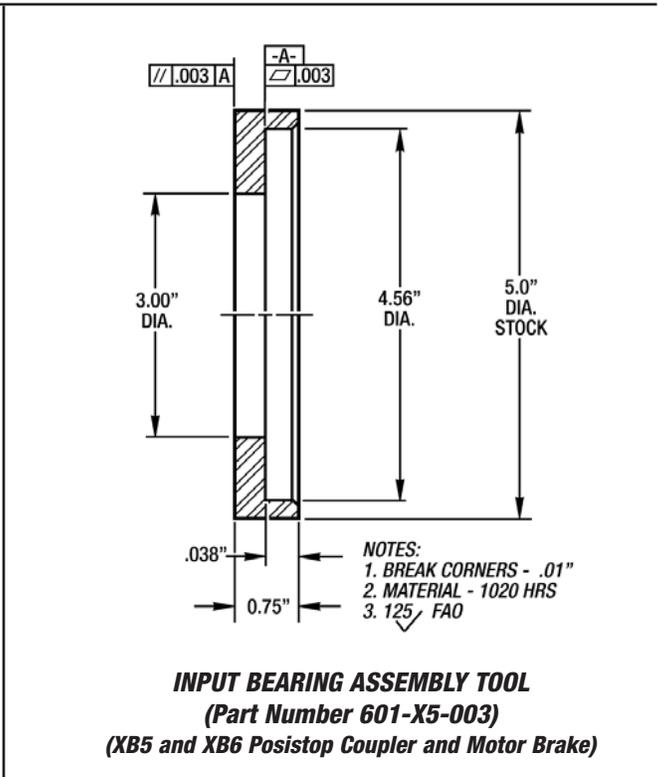
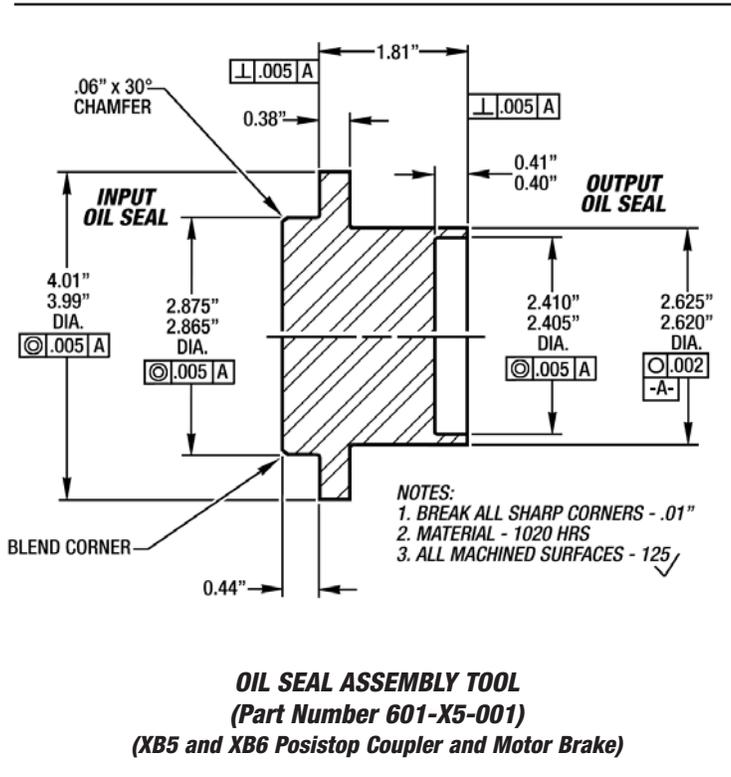


OIL SEAL ASSEMBLY TOOL (Part Number 601-X3-003)
(XB3 Posistop Coupler and Motor Brake)



OIL SEAL ASSEMBLY TOOL (Part Number 601-X3-001)
(XB4 Posistop Coupler and Motor Brake)

Contact Force Control for Assembly Tools for Posistop Brake sizes not shown.



A Dia.	B	C Dia.	D	Part Number
1.130 / 1.127	4.25	N/A	N/A	601-X5-002-1.125
1.385 / 1.382	4.75	N/A	N/A	601-X5-002-1.375 *
1.630 / 1.627	6.25	1.663 / 1.658	3.80	601-X5-002-1.625 **
1.880 / 1.877	6.00	N/A	N/A	601-X5-002-1.875

* Also for 35 mm shaft. ** Also for 42 mm shaft.

Manual Revision History

X Class Motor Brakes and Coupler Brakes

REVISION NUMBER	REVISION DATE (Month/Year)	REVISION/ACTION DESCRIPTION	REVISION INITIATED BY: (Name)	REVISION MADE BY: (Name)
502-XB1-001-00	1/2004	Created new Manual	T. VonDerHaar	Brooks
502-XB1-001-01	10/2005	Added Measuring Piston Stroke for XB5 and XB6 Added "A" input Module for XB3	Bachmann	Brooks
502-XB1-001-02	9/2009	Changed sight gauge location from 4.25" to 4.62" in figure 3.4	T. Zierenberg	T. VonDerHaar

FORCE CONTROL INDUSTRIES, INC.

Worldwide Leader in Oil Shear Technology.

*Providing today's industries with
Oil Shear Clutch/Brake Drives
and Servo Drive Systems
that delivers:
Flexibility • Efficiency
Endurance • Performance
Dependability*

“Built to Last - Guaranteed to Perform”



FORCE CONTROL INDUSTRIES, INC.

MAIN OFFICE

3660 Dixie Highway
Fairfield, Ohio 45014

Tel: (513) 868-0900
Fax: (513) 868-2105

E-Mail: info@forcecontrol.com
Web Site: www.forcecontrol.com