



LOW INERTIA

**SPRING-APPLIED
AIR or HYDRAULIC RELEASE
BRAKES**

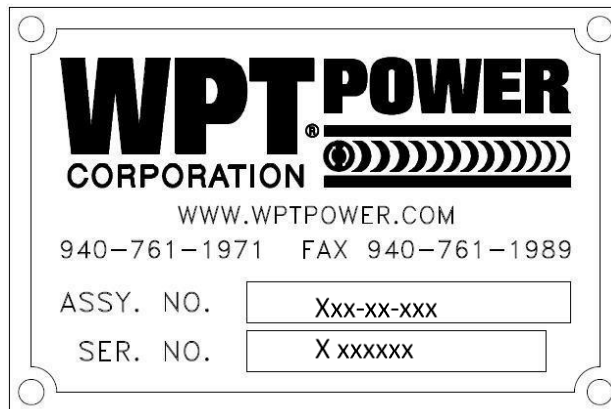
**INSTALLATION AND
MAINTENANCE
INSTRUCTIONS**

FOR 8” THRU 60”

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I. PRODUCT DESCRIPTION

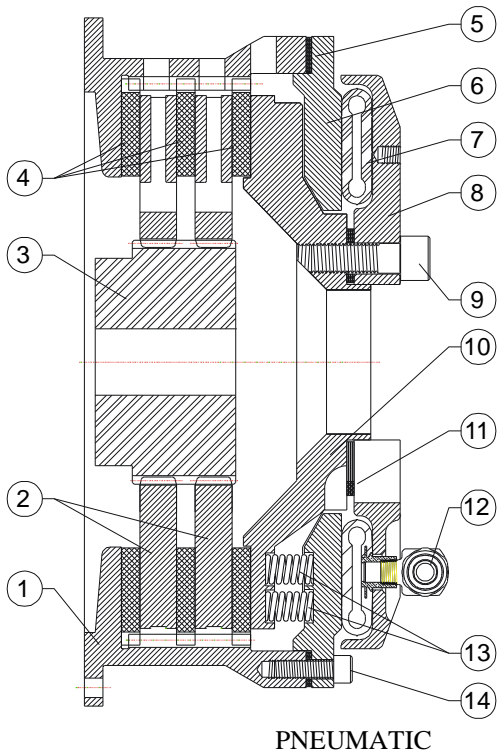
1. The WPT Low Inertia Spring-Applied brake is designed for applications such as: Stamping Presses, Steel Shears, Drawworks, Winches, Parking Brakes, and Emergency Stop applications. The Hub and Centerplates are designed such that the inertia required to start and stop the brake itself is significantly reduced from similar products, which increases machine efficiency. These brakes can be supplied Spring-Applied Air-Released or in Spring-Applied Hydraulic-Released variants.
2. When fluid pressure is removed from the brake, the engagement springs apply axial force to the brake discs, which resists torque on the input/output shaft.
3. In Pneumatic applications, the brakes can be fitted with WPT's own Quick Release Valves, which aid in rapid response of applying brake torque.
4. When ordering replacement parts, use the part numbers from the Bill of Material and drawing supplied with the Brake. The most current documents may be obtained by contacting WPT or an authorized distributor. When ordering parts, provide the assembly number and serial number for the unit found on the brass tag affixed to the front of the Brake. See the example shown in the figure immediately below.



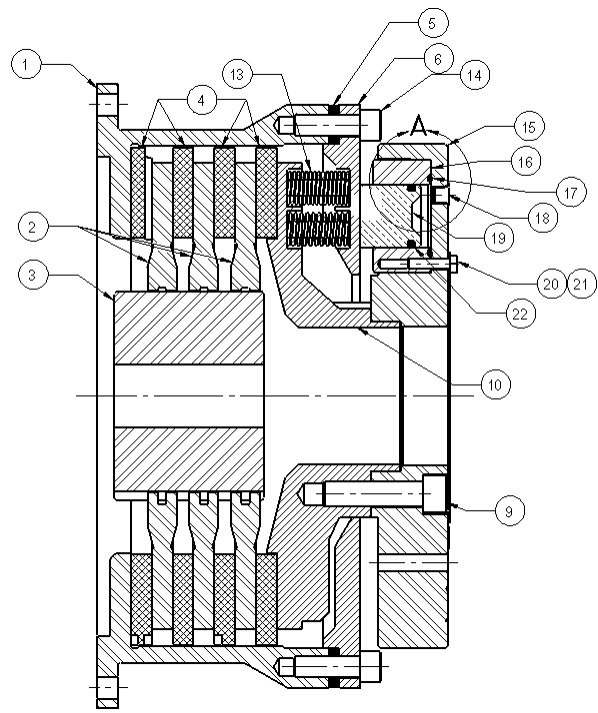
5. See the Recommended Spare Parts section of this manual for a list of parts that are recommended by WPT, to have on hand at all times.

II. Introduction

FIGURE 1



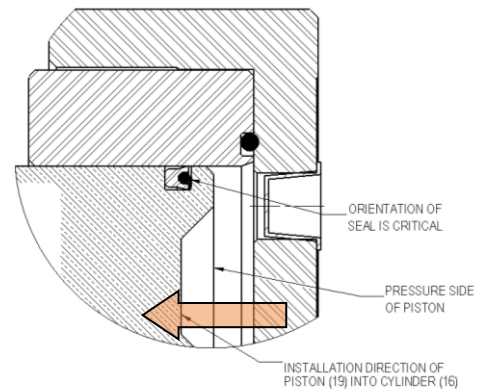
PNEUMATIC



HYDRAULIC

ITEM #	PNEUMATIC	HYDRAULIC
1	RING	RING
2	CENTER PLATE	CENTER PLATE
3	HUB	HUB
4	FRICITION DISC	FRICITION DISC
5	SHIM (OUTER)	SHIM (OUTER)
6	AIRTUBE SPRING PLATE	SPRING PLATE
7	AIRTUBE	N/A
8	AIRTUBE HOLDING PLATE	N/A
9	CAPSCREW (INNER)	CAPSCREW (INNER)
10	SPRING RELEASE PLATE	SPRING RELEASE PLATE
11	SHIM (INNER)	N/A
12	QUICK RELEASE VALVE	N/A
13	ENGAGEMENT SPRING	ENGAGEMENT SPRING
14	CAPSCREW (OUTER)	CAPSCREW (OUTER)
15	N/A	CYLINDER HOLDING PLATE
16	N/A	CYLINDER
17	N/A	O-RING
18	N/A	PLUG
19	N/A	PISTON
20	N/A	HHCS
21	N/A	WASHER
22	N/A	PISTON POLYPAK SEAL

TABLE 1



DETAIL A

DETAIL "A" FIGURE 1

INSTALLATION & MAINTENANCE INSTRUCTIONS

III. CAUTION, WARNING, DANGER



Caution

Proper alignment is necessary to ensure that the friction discs track properly. Improper alignment will result in poor function and reduced service life.



Caution

Even though the units are properly set before shipment from the factory, they should be checked for proper clearance before being put into operation. See Section 5.2 for detailed instructions on checking the clearance.



Danger

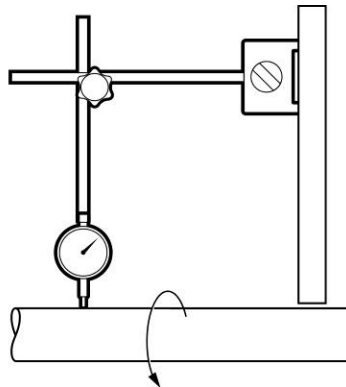
Use only the proper quantity and grade of fasteners shown in the drawings. Failure to do so may result in fastener failure and/or a reduction in Brake torque.

IV. PREPARATION AND ALIGNMENT

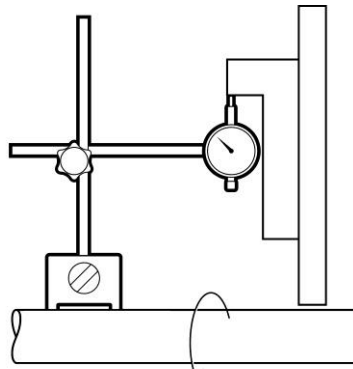
1. The machine surface (or attached mounting bracket) should have a machined pilot to allow for the mounting and alignment control of the Brake. The design should provide full support of the face of the mounting flange in order to prevent any deflection during operation. Refer to the appropriate drawing for the detailed mounting pilot diameters, mounting bolt circles and positions, and other recommendations for each Brake.
2. For proper operation and service life, the Clutch/Brakes should be mounted to a solid part of the machine which has a mounting pilot for the Ring (1). Use a dial indicator to verify that the total indicated reading of alignment is within the specifications provided in the following table. Correct as necessary to ensure compliance per the table immediately below.

ALIGNMENT SPECIFICATIONS			
PRODUCT SIZE	MAXIMUM CONCENTRICITY OF THE SHAFT	MAXIMUM CONCENTRICITY OF THE MOUNTING BRACKET	MAXIMUM PERPENDICULARITY OF THE MOUNTING BRACKET
inch	in [nn]	in [nn]	in [nn]
6	0.003 [0.08]	0.003 [0.08]	0.003 [0.08]
8	0.004 [0.10]	0.004 [0.10]	0.004 [0.10]
11	0.006 [0.15]	0.006 [0.15]	0.006 [0.15]
14, 14H	0.007 [0.18]	0.007 [0.18]	0.007 [0.18]
16	0.008 [0.20]	0.008 [0.20]	0.008 [0.20]
18, 18H	0.009 [0.23]	0.009 [0.23]	0.009 [0.23]
21	0.011 [0.28]	0.011 [0.28]	0.011 [0.28]
24, 24H	0.012 [0.30]	0.012 [0.30]	0.012 [0.30]
27	0.014 [0.36]	0.014 [0.36]	0.014 [0.36]
30, 30H	0.015 [0.38]	0.015 [0.38]	0.015 [0.38]
36	0.018 [0.46]	0.018 [0.46]	0.018 [0.46]
42	0.021 [0.53]	0.021 [0.53]	0.021 [0.53]
48	0.024 [0.61]	0.024 [0.61]	0.024 [0.61]
60	0.030 [0.76]	0.030 [0.76]	0.030 [0.76]

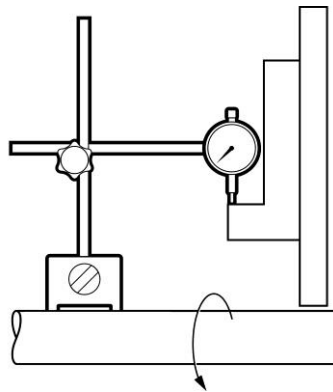
3. **Concentricity of the Shaft:** With the dial indicator mounted to the brakes mounting face, place the indicator tip on the shaft, approximately where the center of the hub (3) will be located, then rotate the shaft. The Total Indicated Reading should be within value shown in Table 7. See figure immediately below.



4. **Concentricity of Mounting Bracket:** With the dial indicator mounted to the shaft, place the indicator tip on the pilot diameter and rotate the shaft. The Total Indicated Reading should be within value shown in Table 7. See figures immediately below.

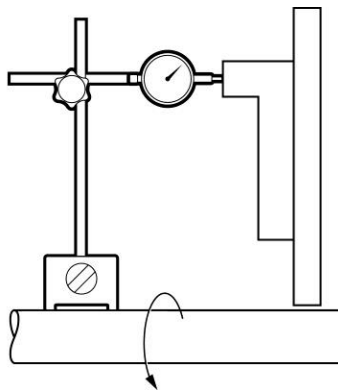


or



5. **Perpendicularity of Mounting Bracket:** With the dial indicator mounted to the shaft, place the indicator tip on the clutch/brake mounting face of the mounting bracket/surface and rotate the shaft. The T.I.R. (Total Indicated Reading) should be within value shown in Table 7. See figure immediately below.

NOTE: Adjustment of the mounting surface(s) may be necessary.



V. INSTALLATION

1. Always consult the assembly drawing specific to the assembly you will be working on, prior to performing any work. Contact WPT for an assembly drawing and Bill of Materials prior to beginning any work.
2. Slide hub (3) into correct position on shaft.
3. It is preferable that the hub (3) of the brake be axially restrained. This may be achieved by using a stepped shaft and an end plate, a taper key or a set screw fitted in a tapped hole in the hub (3).
4. If brake is to be mounted as an assembled unit, slide the unit over the hub (3) ensuring that the teeth on the center plate (2) are properly engaged in the teeth of the hub (3). This step is easily achieved by applying air to the brake so that the center plate (2) moves freely.
5. Insert mounting bolts in ring (1) and tighten. (See Pages 13 & 14 for torque values.) Connect air/hydraulic supply to brake.
6. Although brakes are correctly set before leaving our factory, the clearance should be checked before being put into operation. (See limits on page 12.)
7. Clearance can be checked by the following: (see FIGURE 3, page 12)
 - Pneumatic: Applying and releasing air to the brake and measuring clearance difference.
 - Hydraulic: Applying and releasing fluid to the brake and measuring clearance difference.
8. If clearance is incorrect, the removal or addition of shims (5) is required.
9. To modify shim thickness, unscrew all capscrews (14) by 2-3 turns only, then completely remove half of the capscrews so that half of the shim segments (5) may be removed. Add or remove shims, and replace capscrews. Repeat the procedure for the other half of shims (5). Tighten capscrews. (See Pages 13 & 14 for torque values.)
10. If the clutch/brake is to be mounted disassembled follow Part I, steps 1, 2, and Part IV.
11. Slide ring (1) over hub (3), insert mounting bolts through ring (1) into mating surface and tighten bolts. (See Pages 13 & 14 for torque values.)
12. Follow steps in Part IV.

VI. LUBRICATION

1. CLUTCH/BRAKE: No lubrication is required.

VII. AIR SUPPLY CONTROLS (For pneumatic actuator only)

1. Use flexible hose between control valve and brake.
2. When fast engagement/disengagement is required, use ample diameter pipe and valves and always use bends rather than elbows to ensure good airflow. Keep length of pipe as short as possible to gain filling time.

VIII. REPLACEMENT OF FRICTION DISCS (4)

1. Friction discs (4) should be replaced when the maximum clearance (see page 12) has been reached and all shims have been removed.
2. Disconnect air supply to clutch/brake. Remove capscrews (14). Do not remove the inner ring of capscrews (9)

3. Remove as a sub-assembly: airtube holding plate (8), airtube (7), airtube spring plate (6), engaging springs (13), and spring release plate (10).
4. Slide out friction discs (4) and center plates (2).
5. When friction discs (4) are replaced, also replace all engagement springs (13). If springs are fitted between the friction discs, ensure that the springs are correctly located in their counterbores.
6. Re-assemble in reverse order, using new discs. Check clearances and tighten capscrews. (See Pages 9 & 10 for torque values.)

IX. REPLACEMENT OF AIRTUBE

1. To replace airtube (7), disconnect air supply to brake. Disconnect flexible air hose on brake and remove quick release valves (12) / elbows from airtube connections.
2. If release springs (13) are fitted between the friction discs (4), wedge or clamp friction discs so that springs stay in place.
3. Remove capscrews (9). Do not remove the outer ring of capscrews (14). Remove airtube holding plate (8) and airtube (7). Discard old airtube and replace with new airtube. Re-assemble in reverse order. Torque capscrews (9). (See Pages 13 & 14 for torque values.) With airtube deflated, check the distance between the airtube holding plate (8) and the airtube spring plate (6) and make sure this distance matches the dimension shown on the assembly drawing for the particular brake. If this distance needs to be adjusted, this can be done by adding or removing shims (11). Make sure that all engagement springs (13) are resting in their respective counterbores. Check operating clearance by following steps 6-8 in Section V of this manual.

X. REPLACEMENT OF HYDRAULIC ACTUATOR SEALS

1. To replace hydraulic actuator seals, disconnect hydraulic lines to unit.
2. Connect lifting equipment to the cylinder holding plate (15).
3. Remove the socket head cap screw (9) from cylinder holding plate (15).
4. Remove the parts (15) thru (22) as an assembly and rest it on a flat, non-marring, surface.
5. Remove bolt and washer (20) and (21) from one cylinder (16). Remove the cylinder (16) and piston (19) from the cylinder holding plate (15) by simply sliding them out of the bottom.
6. Remove the piston (19) from the cylinder (16). Replace the piston seal (22), wetting it and the piston's (19) outer diameter with hydraulic oil. When installing the seal (22) on the piston (19), see "Detail A" in "Figure 1" of this manual.
7. Install the piston (19) with replaced piston seal (22) into the cylinder as indicated in "Detail A" found in "Figure 1" in this manual. Installing the long end of the piston (19) into the grooved end of the cylinder (16) is easily done by hand.
8. Install the O-ring (17) into the cylinder (16) groove after wetting with hydraulic oil.
9. Insert the assembly comprising of the piston (19), cylinder (16), seal (22) and O-ring (17) into the cylinder holding plate (15), aligning the mounting holes, then install the bolts (20) with Loctite 242, or equal, and washers (21).
10. Tighten the bolts (20) in accordance with Table 3 shown in this manual.
11. Reconnect supply hoses.

12. Cycle ON/OFF with the full rated pressure approximately 25x to remove most of the air from the system.
13. Apply rated pressure and hold with a closed valve for one hour to inspect for leaks.

NOTE: The thermal expansion coefficient for oil is significantly different than that of the contacting parts. So, it is expected to see a significant pressure change over, approximately, the first 15 minutes. As the temperature of the oil and contacting parts stabilizes, the temperature should stabilize. If pressure decays steadily after the oil and contacting parts have a stabilized temperature, inspect the sealed system for leaks.

14. After the pressure test is completed, the brake can be returned to normal operation.

XI. ADJUSTING AIRTUBE HOLDING PLATE FOR PROPER AIRTUBE CLEARANCE (Airtube models only)

1. Check clearance under the airtube with no pressure on the actuator.

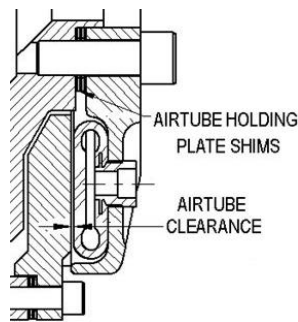


Figure 2

- Add or remove airtube holding plate shims as required to bring clearance into tolerance. (1/16-3/32" [1.6-4.8 mm])

XII. OPERATING CLEARANCE ADJUSTMENT (Airtube & Hydraulic)

1. Apply pressure and release to engage and dis-engage actuator for measurements.
2. Add or remove outer shims to achieve proper operating clearance per drawing provided with unit.

***Measure distance between actuator & spring plate while disengaged and then again while engaged. Difference equals operating clearance. (See Table 2 & Figure 3)

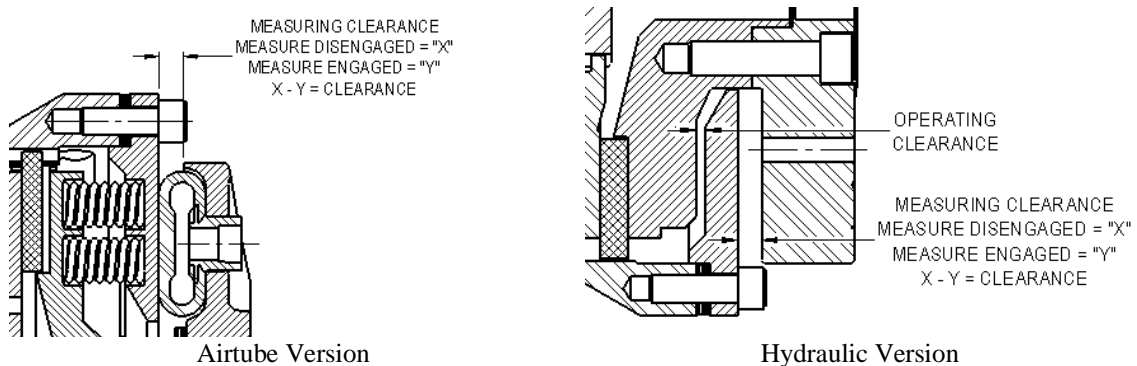


Figure 3

XIII. CHECK/ SET RELEASE PRESSURE

1. Set up dial indicator base on airtube holding plate and plunger on spring plate with enough travel for clearance. Zero dial indicator.
2. Ensure all air inlets are securely plugged except for one.
3. Apply 120 lbf/in² to actuator. Dial indicator should read within brake operating clearance per drawing specification.
4. Zero dial indicator then release air pressure.
5. Increase air pressure until 10 lbf/in² below drawing release pressure.
6. Slowly increase pressure until dial indicator reads between .006" - .012" [.15-.30] from zero.
7. Adjust quantity of release springs to obtain release pressure per drawing
8. Zero dial indicator and release pressure. Dial indicator should show clearance at full release pressure

RECOMMENDED SPARES

Recommended spares should be held by customer to greatly reduce costly "down time", with the exception of the airtubes, which have a limited shelf life. The airtubes may deteriorate faster on the shelf than in service. These are normally stock items at the factory or local distributor and can be shipped from stock.

Due to the many variations obtainable in a basic type and size of brake, spare parts lists are issued against specific serial numbers. Anytime you require information about your unit or place an order for parts from the factory or your distributor, please furnish the serial number of the unit which is located on the face of the airtube holding plate. For general guidance, the normal recommended spares are listed below.

FRICITION DISCS (4)

Discs should be replaced when the maximum clearance, as stated in TABLE 2, page 8, has been reached after all shims have been removed. Discs should be kept clean, dry, free from oil or grease and stored flat to prevent warping.

ENGAGEMENT SPRINGS (13)

It is strongly recommended that engagement springs are renewed every time the friction discs are replaced.

AIRTUBE (7) (if applicable)

Failures may occasionally occur if the airtube becomes excessively hot, over-expanded or saturated by lubrication oil. Over-expansion is usually due to excessively worn friction linings. Follow storage guidelines when storing spare airtubes.

ACTUATOR SEALS (22) (if applicable)

It is recommended to replace the piston seal when friction discs are replaced.

O-Ring (17) (if applicable)

It is recommended that O-Rings are renewed every time the friction discs are replaced.

QUICK RELEASE VALVES (12) (if applicable)

If the quick release valves are fitted, they should be dismantled and cleaned about every 6 months.

TO DISMANTLE: Hold valve body with spanner and disconnect air hose. Unscrew valve from airtube. Place body of valve in a vise and remove end cap. **DO NOT** attempt to remove the end cap while valve is fitted to airtube as valve may break at thread neck. Keep complete replacement unit in stock.

General Storage Guidelines

Upon receipt of parts or assemblies, they should be inspected for corrosion or other related damage. If any problem is detected, contact WPT's warranty department.

It is the owner's primary responsibility to store and protect the WPT product.

Products should be stored in a manner that it is protected from the environment and outside sources, which may include but are not limited to the following:

- **Environmental storage requirements should be maintained as follows:**
 - No exposure to rain water
 - Temperatures 32F° (0C°) to 110F° (43C°)
 - Below 50% average humidity
 - Average sunlight

- **Hazards that require addition protection:**
 - Dust and debris
 - Oil, water, salt water, acids, or other chemicals
 - Any other foreign items which may damage the product
 - Other measures include covering the product to prevent ingress of foreign matter

- **Additional Protection Measures for Long-Term Storage**
(For storage exceeding 1 month):
 - Coating the studs, hub, springs, and exposed metal with Cosmoline RP-342 "HEAVY" Military-Grade Rust Preventive Aerosol Spray, or equal
 - Coating of painted surfaces is not required or recommended
 - Visually inspect the product for degradation once every three-months

- **Rubber Storage Environment (spare parts):**
 - Temperatures 50F° (10C°) to 85F° (29C°)
 - Below 50% average humidity
 - Limited exposure to light and UV
 - Clean, dust-free environment

TABLE 2: OPERATING CLEARANCES FOR SPRING SET BRAKES

PNEUMATIC ACTUATORS

CLUTCH SIZE: INCHES	MINIMUM – MAXIMUM CLEARANCES					
	1 DISC UNITS		2 DISC UNITS		3 DISC UNITS	
	DIM: IN	DIM: mm	DIM: IN	DIM: mm	DIM: IN	DIM: mm
6	1/16 - 3/32	1.59 - 2.38	1/16 - 3/32	1.59 - 2.38	3/32 - 1/8	2.38 - 3.18
8,11,14,14H,16	1/16 - 1/8	1.59 - 3.18	3/32 - 5/32	2.38 - 3.97	1/8 - 5/32	3.18 - 3.97
18,18H,21	1/16 - 1/8	1.59 - 3.18	3/32 - 5/32	2.38 - 3.97	1/8 - 3/16	3.18 - 4.76
24,24H,27	3/32 - 5/32	2.38 - 3.97	1/8 - 3/16	3.18 - 4.76	5/32 - 7/32	3.97 - 5.56
30,30H,36	3/32 - 5/32	2.38 - 3.97	1/8 - 3/16	3.18 - 4.76	3/16 - 1/4	4.76 - 6.35
42,48	1/8 - 3/16	3.18 - 4.76	5/32 - 7/32	3.97 - 5.56	3/16 - 1/4	4.76 - 6.35
60	1/8 - 1/4	3.18 - 6.35	3/16 - 5/16	4.76 - 7.94	1/4 - 3/8	6.35 - 9.53

HYDRAULIC ACTUATORS

CLUTCH SIZE: INCHES	MINIMUM – MAXIMUM CLEARANCES					
	1 DISC UNITS		2 DISC UNITS		3 DISC UNITS	
	DIM: IN	DIM: mm	DIM: IN	DIM: mm	DIM: IN	DIM: mm
6	SEE ASSEMBLY DRAWING SPECIFIC TO YOUR BRAKE					
8,11,14,14H						
18,18H,21						
24,24H,27						
30,30H,36						
42,48						
60						

TABLE 3: TORQUE VALUES FOR BOLTS (continued on next page)

TORQUE VALUES FOR SOCKET HEAD AND HEX HEAD CAPSCREWS						
SOCKET HEAD CAP SCREWS						
BOLT SIZE INCHES	As Received			Lubricated**		
	lbf-ft	lbf-in	N-m	lbf-ft	lbf-in	N-m
1/4	13	150	17	10	120	13
5/16	23	305	34	18	244	27
3/8	45	545	62	36	436	49
7/16	70	840	95	56	672	76
1/2	108	1300	147	86	1040	117
9/16	155	1860	210	124	1488	168
5/8	211	2530	286	168	2024	228
3/4	367	4400	497	293	3520	397
7/8	583	7000	791	466	5600	632
1	867	10400	1175	693	8320	940
1 1/8	1242	14900	1684	993	11920	1347
1 1/4	1750	21000	2374	1400	16800	1899
1 3/8	2317	27800	3142	1853	22240	2513
1 1/2	3042	36500	4125	2433	29200	3300
1 3/4	4950	59400	6714	3960	47520	5371
2	7492	89900	10161	5993	71920	8128
HEX HEAD CAP SCREWS - Grade 8						
BOLT SIZE INCHES	As Received			Lubricated**		
	lbf-ft	lbf-in	N-m	lbf-ft	lbf-in	N-m
1/4	8	100	11	6	80	9
5/16	17	200	23	13	160	18
3/8	30	360	41	24	288	32
7/16	48	570	64	38	456	51
1/2	83	990	112	66	792	89
9/16	107	1285	145	85	1028	116
5/8	143	1714	194	114	1371	155
3/4	256	3070	347	204	2456	277
7/8	417	5000	565	333	4000	452
1	625	7500	848	500	6000	678
HEX HEAD CAP SCREWS - Grade 5						
BOLT SIZE INCHES	As Received			Lubricated**		
	lbf-ft	lbf-in	N-m	lbf-ft	lbf-in	N-m
1/4	6	71	8	5	56	6
5/16	12	142	16	9	113	12
3/8	22	260	29	17	208	23
7/16	34	410	46	27	328	36
1/2	53	636	72	42	508	57
9/16	74	890	101	59	712	80
5/8	104	1250	141	83	1000	112
3/4	183	2200	249	146	1760	199
7/8	298	3570	403	238	2856	322
1	440	5280	597	352	4224	477
1 1/8	553	6640	750	442	5312	600
1 1/4	775	9300	1051	620	7440	840
1 3/8	1012	12140	1372	809	9712	1097
1 1/2	1350	16200	1831	1080	12960	1464

** NOTE: For Loctite use lubricated values

Torque Values for Stainless Steel and Brass HHCS and SHCS						
Standard / Inch				Metric		
Bolt Size	316 / 304 Stainless		Brass	Bolt Size	316 / 304 Stainless	
	Dry	Lubricated			Dry	Lubricated
	lbf-in (Nm)	lbf-in (Nm)	lbf-in (Nm)		lbf-in (Nm)	lbf-in (Nm)
6-32	10.1 (1.14)	8.60 (0.972)	7.9 (0.893)	3	8.9 (1.0)	8. (.9)
6-40	12.7 (1.43)	10.8 (1.22)	9.9 (1.12)	4	23. (2.6)	20.7 (2.3)
8-32	20.7 (2.34)	17.6 (1.99)	16.2 (1.83)	5	45.1 (5.1)	40.6 (4.6)
8-36	23.0 (2.60)	19.6 (2.21)	18.0 (2.03)	6	77.0 (8.7)	69.3 (7.8)
10-24	23.8 (2.69)	20.2 (2.28)	18.6 (2.10)	8	188 (21.2)	169 (19.1)
10-32	33.1 (3.74)	28.1 (3.17)	25.9 (2.93)	10	372 (42)	335 (38)
1/4-20	78.8 (8.90)	67.0 (7.57)	61.5 (6.95)		lbf-ft (Nm)	lbf-ft (Nm)
1/4-28	99.0 (11.2)	84.0 (9.49)	77.0 (8.70)	12	54.0 (73.2)	48.0 (65.1)
5/16-18	138 (15.6)	117 (13.2)	107 (12.1)	14	87.0 (118)	78.0 (106)
5/16-24	147 (16.6)	125 (14.1)	116 (13.1)	16	133 (180)	119 (161)
3/8-16	247 (27.9)	210 (23.7)	192 (21.7)	18	190 (258)	171 (232)
3/8-24	271 (30.6)	230 (26.0)	212 (24.0)	20	273 (370)	246 (334)
7/16-14	393 (44.4)	334 (37.7)	317 (35.8)	22	358 (485)	322 (437)
7/16-20	418 (47.2)	355 (40.1)	327 (36.9)	24	445 (603)	400 (542)
	lbf-ft (Nm)	lbf-ft (Nm)	lbf-ft (Nm)			
1/2-13	45.0 (61.0)	38.0 (51.5)	35.2 (47.7)			
1/2-20	47.0 (63.7)	40.0 (54.2)	37. (50.2)			
9/16-12	59.0 (80.0)	50.0 (67.8)	47. (63.7)			
9/16-18	65.0 (88.1)	55.0 (74.6)	51. (69.1)			
5/8-11	96.0 (130)	82.0 (111)	76. (103)			
5/8-18	108 (146)	92.0 (125)	85. (115)			
3/4-10	131 (178)	111 (150)	104 (141)			
3/4-16	129 (175)	110 (149)	102 (138)			
7/8-9	202 (274)	172 (233)	159 (216)			
7/8-14	201 (273)	171 (232)	158 (214)			
1 - 8	299 (405)	254 (344)	235 (319)			
1 - 14	270 (366)	230 (312)	212 (287)			
1-1/8 - 7	432 (586)	367 (498)	337 (457)			
1-1/8 - 12	408 (553)	347 (470)	318 (431)			
1-1/4 - 7	546 (740)	464 (629)	428 (580)			
1-1/4 - 12	504 (683)	428 (580)	394 (534)			
1-1/2 - 6	930 (1260)	791 (1070)	727 (986)			
1-1/2 - 12	732 (992)	622 (843)	575 (780)			

NOTES:

1. 304 stainless steel is also known as 18-8 stainless steel (US) and A2 stainless steel (outside US)
2. 316 stainless steel is also known as A4 stainless steel.
3. For Loctite use lubricate values.