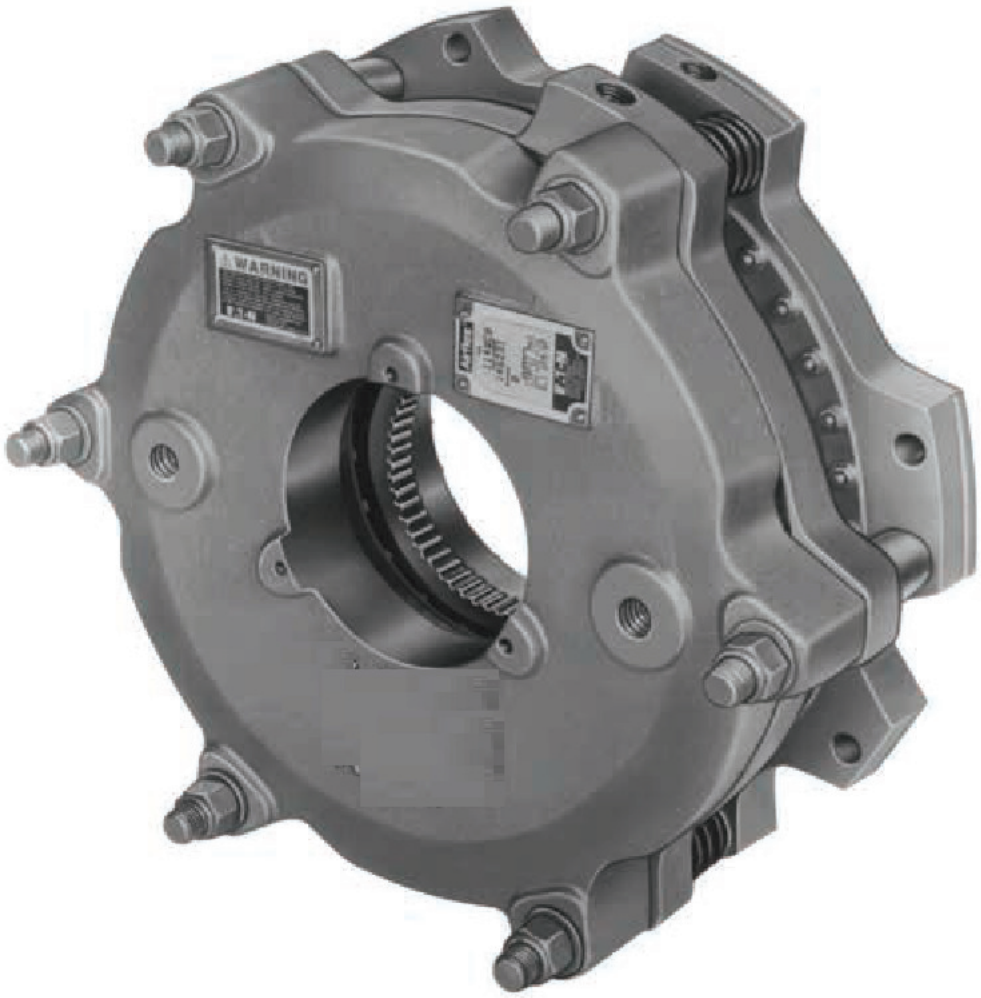
WCB11070

WCB2 Tensioner/Brake Installation, Operation and Maintenance Manual

Airflex® Product Line

204182



Danfoss

AN435379741991en-000101

WCB2 Tensioner/Brake

General Information

⚠ Warning

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

⚠ Caution

Use Only Genuine Airflex® Replacement Parts
Danfoss's Airflex division recommends the use of genuine Airflex replacement parts. The use of non-genuine Airflex replacement parts could result in substandard product performance, and may void your Danfoss warranty. For optimum performance, contact Airflex:

Table of Contents

Section	Description	Page No.
	CUTAWAY DRAWINGS	5 & 6
1.0	INTRODUCTION	7
1.1	Description	7
1.2	How It Works	7
2.0	INSTALLATION	8
2.1	Preparation and Arrangements	8
2.2	Mounting	9
2.3	Air System	10
2.4	Coolant System	10
3.0	OPERATION	14
3.1	Conditions of Operation	14
3.2	Pressure and Speed Limits	14
3.3	Periodic Maintenance	14
4.0	MAINTENANCE	16
4.1	Wear Limits	16
4.2	Wear Adjustment	16
4.3	Disassembly Procedures	19
4.4	Friction Material Replacment (8WCB2 and 14WCB2)	19
4.5	Friction Material Replacment (18WCB2, thru 48WCB2)	20
4.6	Wear Plate Replacement	21
4.7	Cylinder Seal Replacement	23
4.8	Bushing Replacement	25
4.9	Assembly Procedures	25
4.10	Corrosion Protection	26
5.0	ORDERING INFORMATION/TECHNICAL ASSISTANCE	27
5.1	Equipment Reference	27
6.0	PARTS	28
6.1	Parts (Standard)	28
6.2	Parts (Corrosion Resistant)	31
7.0	KITS	38
7.1	Friction Disc Kits (Standard)	38
7.2	Friction Disc Kits (Corrosion Resistant)	39
7.3	Cylinder Seal Kits	39
7.4	Wear Plate Kits for Mounting Flange and Pressure Plate	40
7.5	Wear Plate Kits for Reaction Plate	40
8.0	REVISION PAGE	41

Index of Tables

Table No.	TableTitle	Page No.
1	Item Description	5
2	Alignment Requirements	8
3	"A" dimension on Figure 1 & 2 inches (mm)	8
4	Fastener Description and Assembly Torque - ft.-lb. (Nm)	9
5	Air Inlet Size	10
6	Coolant Pressure, psi (bar)	11
7	Coolant Supply Data	11
8	Maximum Outlet Coolant Temperature	13
9	Maximum Friction Disc Assembly Speeds	14
10	Wear Measurements X, Y & Z Gaps – Inches (mm)	18
11	Wear Plate Fastener Torque: ft.lb. (Nm)	22
12	Inlet and Outlet Water Port Sizes	23
13	Wear Limits for WCB2 Components inches (mm)	27

WCB2 Tensioner/Brake

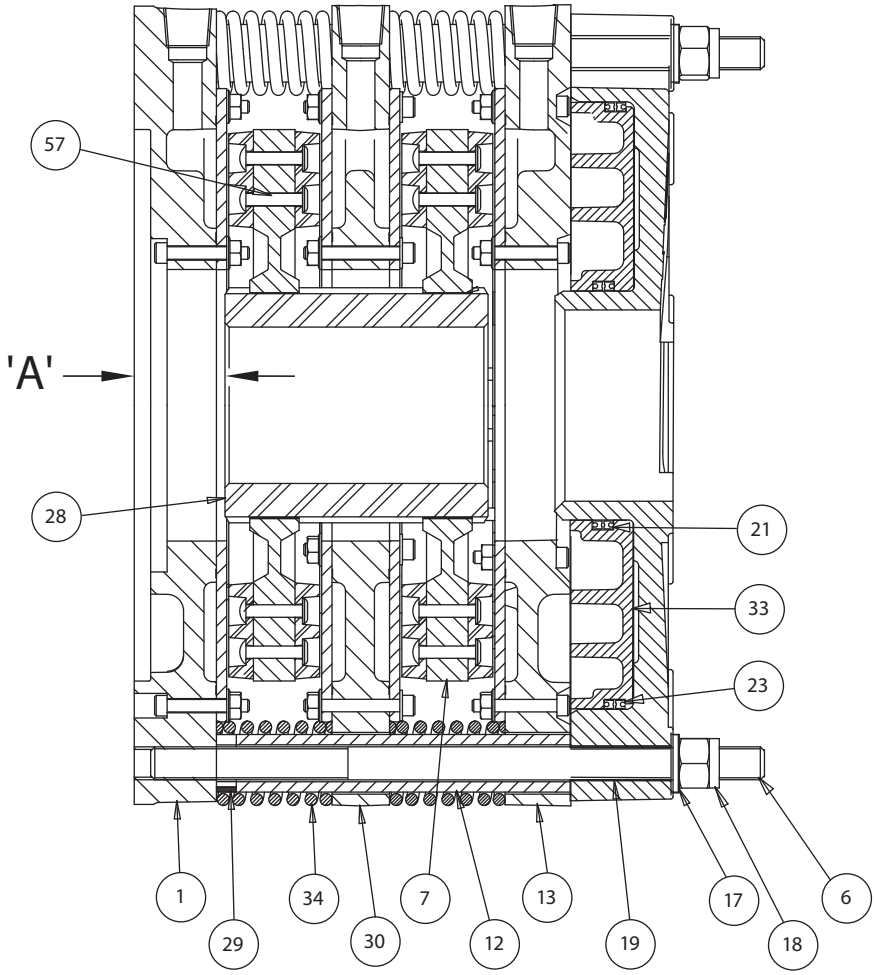


Figure 1

Table 1
Item Description

Item	Description
1	Mounting Flange S/A
6	Stud
7	Friction Disc S/A
12	Clamp Tube
13	Pressure Plate S/A
17	Flat Washer

Item	Description
18	Self Locking Nut
19	Cylinder
21	Seal (Inner)
23	Seal (Outer)
28	Gear (Not Included in P/L)
29	Wear Spacer

Item	Description
30	Reaction Plate S/A
33	Piston
34	Release Spring
105	Pipe Plug

WCB2 Tensioner/Brake

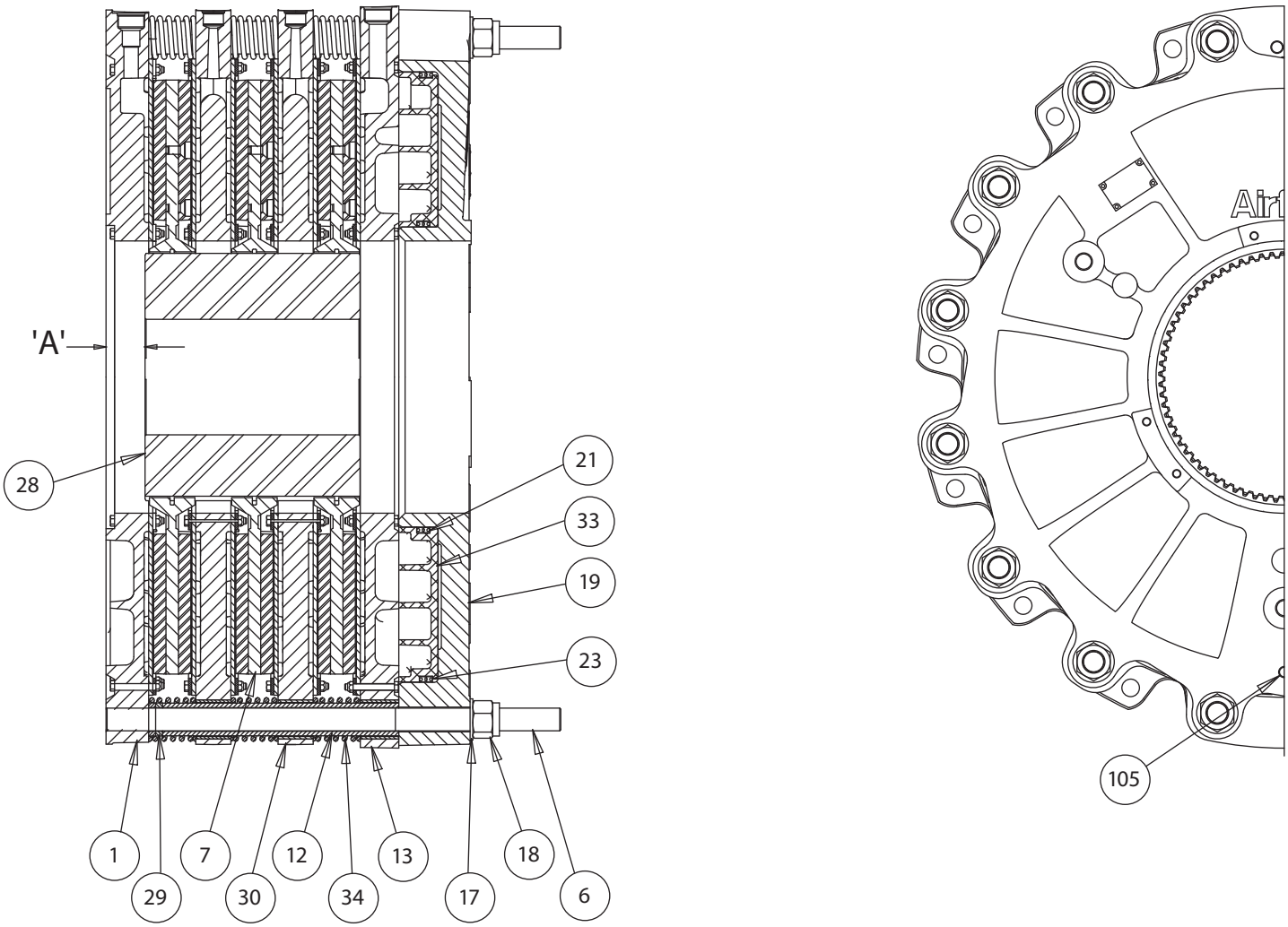


Figure 2

1.0 INTRODUCTION

Throughout this manual there are a number of HAZARD Warnings that must be read and adhered to in order to prevent possible personal injury and/or damage to equipment. Three signal words “Danger”, "Warning", and "Caution" are used to indicate the severity of a hazard, and are preceded by the safety alert symbol ⚠

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

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

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

It is the responsibility and duty of all personnel involved in the installation, operation and maintenance of the equipment on which this device is used to fully understand the:
⚠ Danger ⚠ Warning ⚠ Caution
procedures by which hazards can be avoided.

1.1 Description

1.1.1 The Airflex® WCB2 water-cooled tensioner/brake assembly is designed for constant tension applications. It is exceptionally well suited for high inertia stopping and rapid heat dissipation. The design of the WCB2 tensioner/brake assembly permits mid-shaft or end-shaft mounting. The rugged construction ensures long, trouble free service.

1.1.2 WCB2 tensioner/brake assemblies are available in various sizes and quantities of friction disc assemblies. The model number identifies the number of discs and the nominal friction disc assemblies diameter. For example, 324WCB2 indicates three 24" diameter discs.

1.1.3 When size, such as 36WCB2, is referred to in this manual, it means that the information given applies to all models using the 36" diameter watercooled disc assembly; i.e., 236WCB2, 336WCB2, etc.

1.1.4 WCB2 tensioner/brake assemblies can be used with either closed loop or open loop water systems.

1.1.5 This manual includes metric equivalents usually shown in brackets (#) following the U.S. measurement system value. Be sure to use the correct value.

1.2 How It Works

1.2.1 Referring to Figure 1, the gear (28) is mounted on the shaft which is to be stopped and the WCB2 tensioner/brake assembly is attached to the machine frame or a reaction bracket.

Air pressure is applied through the ports in the cylinder (19) causing the piston (33) and pressure plate assembly (13) to move towards the mounting flange, compressing the release springs. As the applied pressure increases, the friction disc(s) are clamped between the pressure plate and mounting flange, stopping or controlling the shaft the discs are mounted on. Modulation of air pressure then controls applied torque of the WCB2 tensioner/brake assembly. Multiple disc assemblies utilize reaction plates (30) between friction disc assemblies. The release springs (34) assist in disengagement and retraction of the piston, pressure plate, and reaction plates, if applicable. High heat dissipation is accomplished by passing water through a special cavity behind the copper alloy wear plates.

Torque flows through the WCB2 tensioner/brake assembly from the shaft to be controlled, through the friction disc assemblies, through the pressure plate and reaction plates, through the clamp tubes and studs, to the mounting flange, which is attached to a rigid surface.

2.0 INSTALLATION

⚠ Warning
Only qualified maintenance personnel should install, adjust or repair these units. Faulty workmanship will result in unreasonable exposure to hazardous conditions or personal injury.

⚠ Caution
Read these instructions thoroughly and review until you fully understand the installation sequence before proceeding with the work described in this section. Failure to follow these instructions will result in unreasonable exposure to hazardous conditions or personal injury.

⚠ Caution
Do not paint the clamp tubes (12), wear spacers (29), or the release springs (34), as this may hinder the engagement or disengagement of the WCB2 tensioner/brake assembly.

Note: Some three and four disc units may require support on the cylinder end of the WCB2 tensioner/brake assembly in certain high torque applications. Contact the factory for specific application information.

2.1 Preparation and Arrangements

2.1.1 Refer to the appropriate catalog information (available upon request) for appropriate envelope dimensions, mounting register diameters, mounting bolt circles and positions, and stud support bracket recommendations for each specific WCB2 tensioner/brake assembly.

2.1.2 The WCB2 tensioner/brake assembly's reaction member (such as the machine frame) should have a machined register to allow for mounting and alignment control of the WCB2 tensioner/brake assembly. The mounting surface should be designed to provide full support of the face of the mounting flange (1), preventing deflection during operation.

2.1.3 For proper operation and service life, the WCB2 tensioner/brake assembly's reaction member must be aligned to the shaft within the limits shown in Table 2.

⚠ Caution
Proper alignment is necessary to ensure that the friction disc assemblies track properly. Improper alignment will result in excessive wear to the friction material and mating surfaces, plus the gear and splined bore of the friction disc assemblies. See Figure 3.

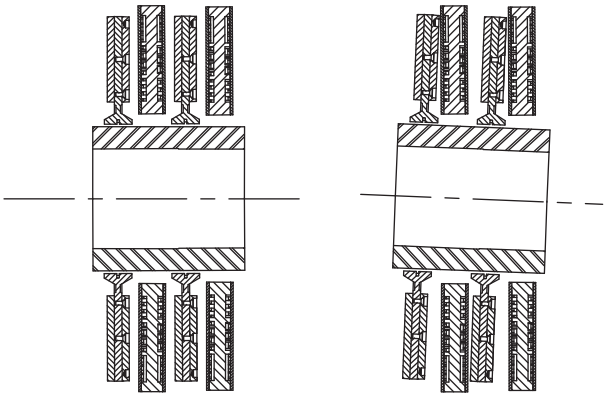


Figure 3

Table 2
Alignment Requirements

Size	(Parallel,TIR) of Shaft and tensioner/brake assembly Inches (mm)	Concentricity Perpendicularly (Angular,TIR) of Mounting Flange to Shaft* Inches (mm)
8WCB2	0.005 (0,13)	0.005 (0,13)
14WCB2	0.010 (0,25)	0.007 (0,18)
18WCB2	0.010 (0,25)	0.010 (0,25)
24WCB2	0.010 (0,25)	0.012 (0,30)
36WCB2	0.010 (0,25)	0.019 (0,48)
48WCB2	0.010 (0,25)	0.025 (0,64)

*Perpendicularity measured near the outside diameter of the mounting flange.

Table 3
"A" dimension on Figure 1 & 2 inches (mm)

Size	1xxWCB2	2xxWCB2	2xxWCB2	4xxWCB2
8WCB2	1.00 (25,4)	1.38 (35,0)	0.19 (4,8)	N/A
14WCB2	1.06 (26,9)	1.69 (42,9)	1.06 (26,9)	N/A
18WCB2	1.25 (31,8)	1.25 (31,8)	1.25 (31,8)	1.25 (31,8)
24WCB2	1.38 (35,1)	1.38 (35,1)	1.38 (35,1)	1.38 (35,1)
36WCB2	2.36 (59,9)	2.36 (59,9)	2.36 (59,9)	2.36 (59,9)
48WCB2	1.96 (50,0)	1.75 (44,0)	1.75 (44,0)	1.75 (44,0)

2.1.4 Refer to Table 3 for the setup dimension between the WCB2 tensioner/brake assembly's mounting surface and the end of the gear (dimension "A" on Figure 1). Gears should be positioned to ensure that when the WCB2 tensioner/brake assembly is mounted the disc splines will not overhang the end of the gear when components are in both new and worn conditions. The gear is typically bored and keyed for a resulting Class FN2S interference fit for inch shafting and ISO System S7h6 for metric shafting. Contact Airflex Application Engineering for specific recommendations.

2.2 Mounting

2.2.1 The WCB2 must be mounted to a clean, rigid surface with hardened flat washers and screws of the grade, quantity, and size as listed in Table 4. Mounting to a properly aligned, rigid surface that fully supports the face of the mounting flange minimizes any deflection during operation and helps to ensure that the friction disc assemblies will track properly on the copper wear plates.

Note: To facilitate the mounting process, the friction disc assemblies should be aligned to the gear and centered in the WCB2 tensioner/brake assembly. With the WCB2 tensioner/brake assembly positioned with the mounting flange facing down, lower the gear (28) slowly and carefully into the splined bore of the friction disc assemblies (7). Adjust the friction disc assemblies so that they are centered in the WCB2 tensioner/brake assembly and fit in the gear. Apply and maintain an air pressure of 25 psig (1.7 bar) to the cylinder. This will engage and hold the friction disc assemblies in position during installation. Remove the gear.

⚠ Danger
Use only the proper number and grade fasteners shown in Table 4. Use of commercial grade (Grade 2) fasteners where Grade 8 fasteners are specified may result in failure of the fasteners and a sudden and drastic reduction in brake torque.

⚠ Caution
Water inlets and outlets must be located as close as possible to the 6 o'clock and 12 o'clock positions, respectively. This will help to prevent air pockets in the water cavities, which would allow the WCB2 tensioner/brake assembly to overheat.

2.2.2 Ensure that the shaft is free of nicks or burrs and the key fits properly in the shaft and gear.

2.2.3 Apply a light coat of anti-seizing compound to the shaft and key. Tap the key into the shaft keyway.

2.2.4 Heat the gear uniformly to 250 °F (121 °C) to expand the bore and ease assembly. Press the gear onto the shaft, making sure that the dimension between the gear and the WCB2 tensioner/brake assembly mounting surface ("A") is maintained. See Figure 1 and Table 3. Allow the gear to cool.

2.2.5 Apply a thin coat of MOLUB-ALLOY 936 SF HEAVY or equivalent grease to the splines of the gear.

⚠ Caution
Excessive lubricant may contaminate friction material, resulting in erratic response or loss of torque.

⚠ Caution
The use of anti-seize or bearing greases on the gear splines may result in premature gear and disc spline wear.

2.2.6 Pre-fill the grease channel in the friction disc splines (if applicable) with MOLUB-ALLOY 936 SF HEAVY or equivalent grease, as shown on Figure 4.

2.2.7 Rig the WCB2 tensioner/brake assembly into position and slide it over the gear.Avoid placing lifting straps or cables directly on the release springs (34).

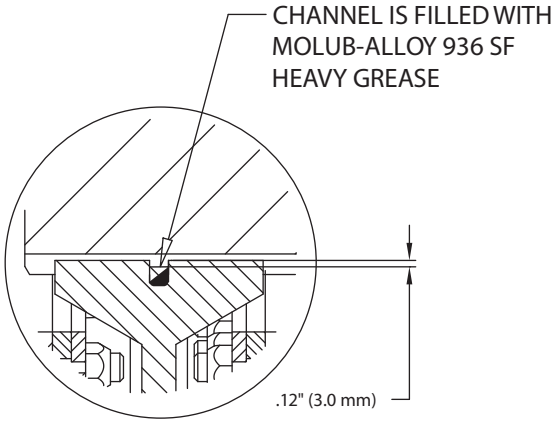


Figure 4

Table 4
Fastener Description and AssemblyTorque - ft.-lb. (Nm)

Item	Description	**Specification**	8WCB2	14WCB2	18WCB2	24WCB2	36WCB2	48WCB2
4	Wear Plate	Size	#10-24NC	1/4-NC2	5/16-18 NC Gr. 8	5/16-18NC Gr. 8	3/8-16NC2Gr. 8	3/8-16NC2Gr. 8
	Screw	Quantity	42	60	80	90	108	120
5	Locknut	Torque, Dry	5 (7)	12 (16)	21 (28)	21 (28)	40 (54)	40 (54)
18	Locknut	Size	1/2-13NC-3	3/4-10NC-3	3/4-10 NC-3Gr. 8	1 1/8-7 NC Gr. 8	1 3/8-6 NC Gr. 8	1 3/8-6 NC Gr. 8
		Quantity	6	6	12	12	16	16
		Torque, Lubed	60 (81)	150 (203)	150 (203)	500 (677)	750 (1016)	750 (1016)
	Mounting	Size	1/2-13 NC-2Gr. 8	5/8-11NC-2Gr. 8	5/8-11NC-2Gr. 8	5/8-11NC-2Gr. 8	1-8NC Gr. 8	1 3/8-6NC Gr. 5
	Screw	Quantity	4	6	10	10	14	14
		Torque, Lubed	70 (95)	150 (203)	150 (203)	150 (203)	660 (895)	1100 (1490)

2.2.8 Attach the mounting flange (1) to the mounting surface using the appropriate fasteners. If applied pressure was used to help position the friction disc assemblies during mounting, exhaust the air pressure prior to tightening the fasteners. Tighten the fasteners to the specified torque value. See Table 4.

⚠ Caution
Maximum allowable air pressure in the cylinder (19) is 150 psig (10.2 bar).

2.2.9 WCB2 tensioner/brake assembly should be covered to protect the unit from dirt, rain, overspray, and other sources of external contamination. In extreme environments the use of a sealed enclosure with internal strip heater is recommended to prevent moisture from collecting on the unit.

2.3 Air System

⚠ Warning
Maximum allowable air pressure is 150 psig (10.2 bar). Application of pressure exceeding maximum allowable may result in damage to the WCB2 tensioner/brake assembly.

2.3.1 Maximum allowable pressure is 150 psig (10.2 bar).

2.3.2 Use only clean, filtered air (a 50 micron filter or better is recommended) which is free of excess moisture.

2.3.3 Air inlet sizes are shown in Table 5. Air inlets are located on the face of the cylinder (19). For cylinders with three ports, the lowest port should be located at or near the 6 o'clock position to facilitate purging of moisture that may accumulate in the air system or cylinder.

Table 5
Air Inlet Size

Size	Thread Size
8WCB2	3/8"-18 NPT
14WCB2	1/2"-14 NPT
18WCB2	1/2"-14 NPT
24WCB2	1/2"-14 NPT
36WCB2	3/4"-14 NPT
48WCB2	1"-11.5 NPT

2.3.4 All pipes should be free of metal chips, cutting compound and any other foreign matter. Pipe ends should be reamed after cutting to eliminate possible restrictions. For optimum air system response, a minimum number of bends and elbows should be used.

2.3.5 The WCB2 tensioner/brake assembly does not require lubricated air; however associated control valves may. Consult the valve manufacturer for appropriate recommendations.

2.4 Coolant System

⚠ Caution
Make sure that the water inlets and outlets are positioned as close as possible to the 6 o'clock and 12 o'clock positions, respectively. This will help to minimize the formation of air pockets in the water cavity during operation, which could contribute to overheating of the WCB2 tensioner/brake assembly.

2.4.1 Maximum allowable coolant pressure within the water cavity is water cavity is 40 psig (2.7 bar) for 36WCB2 and 48WCB2 tensioner/brake assemblies and water cavity is 45 psig (3.1 bar) for all other WCB2 tensioner/brake assemblies. See Table 6 for coolant pressure limitations as measured at the inlets and outlets of water jackets. Note that inlet pressures exceeding the maximum allowable static pressures are only permissible under dynamic flow conditions, provided that the average pressure between the inlet and outlet does not exceed the maximum allowable pressure stated above. The use of an accumulator or pressure relief valve may be desirable to reduce the effect of pressure spikes in the coolant system during operation.

⚠ Caution
High outlet pressures or surges exceeding maximum allowable may result in damage to the WCB2 tensioner/brake assembly.

⚠ Caution
Maximum allowable water pressure is dependent upon WCB2 tensioner/brake assembly's size and specific application requirements.

⚠ Caution
Inlet pressures exceeding the maximum allowable average pressure are only permissible when the outlet pressures are at or below the limits listed in Table 6.

2.4.2 The coolant supply and discharge hose, pipe and fitting sizes, along with minimum flow rates for the WCB2 tensioner/brake assembly's rated horsepower, are listed in Table 7.

Table 6
Coolant Pressure, psi (bar)

Size	Maximum Static Pressure	Maximum Inlet Pressure*	Maximum Average Pressure [1]*
8WCB2	45 (3,1)	65 (4,5)	45 (3,1)
14WCB2	45 (3,1)	65 (4,5)	45 (3,1)
18WCB2	45 (3,1)	65 (4,5)	45 (3,1)
24WCB2	45 (3,1)	65 (4,5)	45 (3,1)
36WCB2	40 (2,7)	60 (4,1)	40 (2,7)
48WCB2	40 (2,7)	60 (4,1)	40 (2,7)

1 Maximum Average Pressure = (Inlet + Outlet)/2
*Under Dynamic Flow Conditions
Note: Minimum outlet pressure under dynamic flow conditions equals zero.
Note: Above ratings for tensioning/winding type applications. For high cyclic applications, consult the factory.

Table 7
Coolant Supply Data

Model	Thermal Rating HP (kW) [1]	Water Inlet and Outlet Pipe Size (Minimum piping I.D.)	Min Flow Rate GPM (dm^3/min) 100% Water [2]	Min Flow Rate GPM (dm^3/min) 70% Water, 30% Ethylene Glycol by vol. [3]	Min Flow Rate GPM (dm^3/min) 60% Water, 40% Ethylene Glycol by vol. [4]	Min Flow Rate GPM (dm^3/min) 50% Water, 50% Ethylene Glycol by vol. [5]
108	30 (22.4)	3/8″-18 NPT (3/8″)	3 (11.4)	3.5 (13.4)	3.9 (14.7)	4.5 (17.0)
208	60 (44.7)	3/8″-18 NPT (3/8″)	6 (22.7)	7 (26.8)	7.8 (29.4)	9 (33.9)
308	90 (67.1)	3/8″-18 NPT (3/8″)	9 (34.2)	10.5 (40.2)	11.7 (44.1)	13.5 (50.9)
114	60 (44.7)	1/2″-14 NPT (1/2″)	6 (22.7)	7 (26.8)	7.8 (29.4)	9 (33.9)
214	120 (89.4)	1/2″-14 NPT (1/2″)	12 (45.4)	14 (53.6)	15.6 (58.8)	13 (67.9)
314	180 (134.4)	1/2″-14 NPT (1/2″)	18 (68.4)	21 (80.4)	23.4 (88.2)	27 (101.8)
118	120 (89.4)	1/2″-14 NPT (1/2″)	12 (45.4)	14 (53.6)	15.6 (58.8)	18 (67.9)
218	240 (179)	1/2″-14 NPT (1/2″)	24 (91)	28 (106)	31 (117)	36 (136)
318	360 (268)	1/2″-14 NPT (1/2″)	36 (136)	42 (162)	47 (177)	54 (204)
418	480 (358)	1/2″-14 NPT (1/2″)	48 (182)	56 (212)	62 (234)	72 (272)
124	270 (201)	3/4″-14 NPT (3/4″)	27 (102)	32 (121)	35 (132)	40 (151)
224	540 (402)	3/4″-14 NPT (3/4″)	54 (204)	64 (242)	70 (265)	80 (303)
324	810 (603)	3/4″-14 NPT (3/4″)	81 (305)	96 (361)	105 (395)	120 (451)
424	1080 (805)	3/4″-14 NPT (3/4″)	108 (406)	128 (481)	140 (526)	160 (602)
136	650 (485)	1 1/4″-11.5 NPT (1″)	65 (246)	76 (288)	84 (318)	98 (371)
236	1300 (969)	1 1/4″-11.5 NPT (1″)	130 (489)	152 (572)	168 (632)	196 (737)
336	1950 (1454)	1 1/4″-11.5 NPT (1″)	195 (738)	228 (863)	253 (958)	294 (1113)
436	2600 (1937)	1 1/4″-11.5 NPT (1″)	260 (978)	304 (1143)	336 (1263)	392 (1474)
148	1300 (969)	1 1/4″-11.5 NPT (1-1/4″)	130 (489)	152 (572)	168 (632)	196 (737)
248	2600 (1937)	1 1/4″-11.5 NPT (1-1/4″)	260 (978)	304 (1143)	336 (1263)	392 (1474)
348	3900 (2906)	1 1/4″-11.5 NPT (1-1/4″)	390 (1467)	456 (1715)	504 (1895)	588 (2211)
448	5200 (3874)	1 1/4″-11.5 NPT (1-1/4″)	520 (1956)	608 (2286)	672 (2526)	784 (2948)

1 - Thermal rating based on a 70°F (21°C) water inlet temperature and a 50°F (28°C) temperature rise between inlet and outlet.
2 - 10HP/GPM, (1.97kw/(dm^3/min))
3 - 8.55HP/GPM, (1.68kw/(dm^3/min))
4 - 7.74HP/GPM, (1.53kw/(dm^3/min))
5 - 6.63HP/GPM, (1.31kw/(dm^3/min))
Note : Minimum Flow Rates listed above are to achieve thermal rating. Lower flow rates are acceptable provided that they satisfy peak thermal requirement

2.4.3 In order to reduce the possibility of splitting NPT ports during the assembly process while maintaining proper sealing, it is recommended that the four step process listed below be followed when installing NPT fittings into NPT ports in sections 2.4.3.1 thru 2.4.3.4.

2.4.3.1 Inspect port and fitting to ensure that both are free of excessive burrs, nicks, or any foreign material.

2.4.3.2 Apply sealant/lubricant to the male pipe threads. Leave the first two pipe threads uncovered. Use of an anaerobic liquid pipe sealant with thread locking abilities like Loctite ® #565 or similar is encouraged. Any liquid, paste, or pre-applied pipe sealant designed for tapered fittings is preferred over PTFE (Teflon) tape. If PTFE tape is used, it should be wrapped 1.5 to 2 turns in the clockwise direction when viewed from the pipe thread end.

⚠ Caution
More than two turns of PTFE tape may cause distortion or cracking of the port.

2.4.3.3 Screw the fitting into the port to finger tight position.

2.4.3.4 Wrench tighten the fitting within the appropriate T.F.F.T. (Turns From Finger Tight). The T.F.F.T for the 8WCB2 thru 24WCB2 are 1.5 to 3 turns. The T.F.F.T for the 36WCB2 and 48WCB2 are 1 to 2.5 turns. Consider shaped tubed fitting (i.e. elbows and tees) orientation that is needed for proper alignment to the hoses prior to tightening to ensure that the number of turns does not exceed the maximum T.F.F.T.

Note: If the maximum TFFT is exceeded, the casting will be at a much higher risk of cracking.

⚠ Caution
Use of "long" handled tools or handle extensions is highly discouraged and unnecessary. Standard length wrenches or ratchets have proven sufficient to install NPT fittings according to the steps provided above. Maximum inlet pressure is only 65 psig (4.5 bar) for the 8WCB2 thru 24WCB2 tensioner/brake assemblies and 60 psig (4.1 bar) for the 36WCB2 and 48WCB2 tensioner/brake assembly. Because of the low operating pressure, excessive tightening of fittings is not required for sealing.

⚠ Caution
Do not loosen fittings to obtain proper alignment. If necessary, remove the fitting, clean the threaded areas as necessary and follow assembly steps above to ensure proper seal and alignment.

Note: Torque values are not listed as using tightening torques for NPT style of connections is not a recommended process for field installation. Thread taper and quality, port and fitting materials, plating thickness and types, varying thread sealants, orientation, and other factors cause high variability to required torque for an effective joint seal.

Note: Refer to the fitting or sealant/lubricant manufacturer for any additional product specific installation instructions or general guidance.

2.4.4 Coolant supply connections to the WCB2 tensioner/brake assembly should provide a parallel flow through each section of the WCB2 tensioner/brake assembly. Series flow is not recommended, as it can lead to overheating of the WCB2 tensioner/brake assembly.

2.4.5 Inlet and outlet coolant manifolds must be provided. Manifolds should be constructed to allow for even flow through all ports. On 18WCB2 thru 48WCB2 tensioner/brake assemblies, two hoses can be routed to the reaction plates (30) to assist with balancing the flow to each wear plate.

Note: Reaction plates (30) in 18WCB2 thru 48WCB2 tensioner/brake assemblies typically have two inlet and two outlet ports to assist with obtaining balanced flow to each cooling chamber. In the event that a multiple disc WCB2 tensioner/brake assembly includes an older style reaction plate with only one inlet and one outlet port, water flow should be restricted from the outlet of the pressure plate (13) and mounting flange (1) to allow for equally proportional heat dissipation at each cooling cavity. See Figure 5.

2.4.6 Use flexible connecting hose to each WCB2 tensioner/brake assembly's coolant section to allow axial travel of the pressure plate, reaction plate, and end plate during WCB2 tensioner/brake assembly operation without restricting the movement of components. When determining hose lengths, consideration should be given to movement and location of the pressure plate and reaction plate as friction material wears. Hose lengths running between the manifolds and the inlet or outlet ports should be equal in length, if possible. Reductions in the recommended line diameter should be avoided to prevent excessive line pressures.

2.4.7 Avoid the use of sharp bends and elbows that will restrict water flow. Loops and bends in the lines may create air pockets, which substantially reduce the flow of coolant and can contribute to overheating.

2.4.8 Coolant and coolant supply lines should be free of foreign material (a 500 micron water filter is recommended). In the event that contaminated water is used as a coolant (not generally recommended), use of a multi-stage filter/strainer may be desirable to avoid the need for frequent cleaning of fine mesh filters.

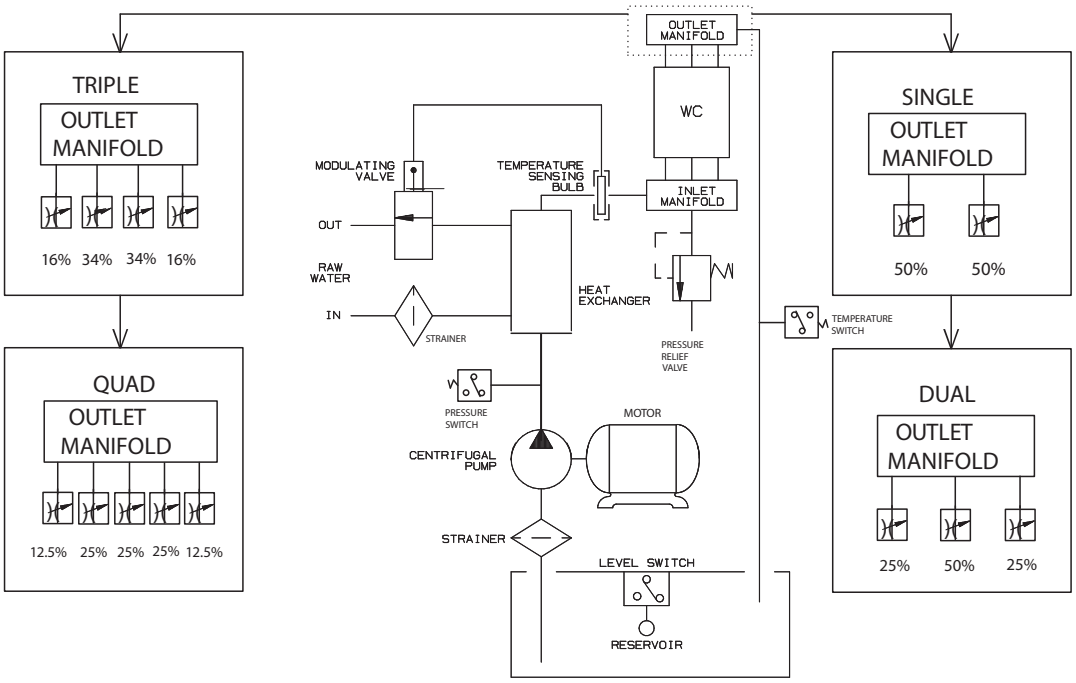


Figure 5

2.4.9 Figure 5 illustrates a typical closed loop liquid to liquid coolant system. The heat exchanger and temperature control would be replaced with a radiator, fan and motor in a liquid to air system.

2.4.10 The coolant supply temperature at the inlet should not exceed the values given in Table 8. However, in no event should there be more than a 50 °F (28 °C) temperature rise between inlet and outlet. See Table 8 for maximum allowable outlet coolant temperature with various water/ethylene glycol mixtures and other cooling media.

Table 8
Maximum Outlet CoolantTemperature

Water/ Ethylene Glycol Mixture % by volume	Maximum Allowable Coolant Inlet Temperature °F (°C)*	Maximum Allowable Coolant Outlet Temperature °F (°C)	Maximum Allowable Coolant Temperature Rise°F (°C)
100/0	100 (38)	150 (66)	50 (28)
70/30	115 (46)	165 (74)	50 (28)
60/40	115 (46)	165 (74)	50 (28)
50/50	120 (49)	170 (77)	50 (28)

* Provided that temperature rise is no greater than 50 °F (28 °C)

2.4.11 Open Loop Systems

For efficient operation of the WCB2 tensioner/brake assembly, an adequate supply of filtered fresh water is required. (See Section 2.4.1 - 2.4.2). Excessive water hardness promotes the formation of scale deposits, which, in time, will affect the service life of the WCB2 tensioner/brake assembly. Water of high acidity or high in corrosive salts may cause corrosion between the dissimilar metals used in the water cavities. Water treatment should be considered if the properties of the water exceed the following:

Equivalent calcium carbonate content hardness: Maximum 100 p.p.m.pH value: 7.0 to 9.0.

⚠ Caution
Open loop systems should be thoroughly flushed with clean fresh water after operation to reduce the corrosive effects of contaminants on internal components.

2.4.12 Closed Loop Systems

For efficient operation of the WCB2 tensioner/brake assembly in a closed loop system, ethylene glycol coolant conforming to SAE Standard J1034 should be used. For preparation of the proper concentration of a water/ethylene glycol mixture, use make-up water which is low in corrosive ions such as chlorides and sulfates:

Recommended pH value of the water/ethylene glycol mixture: 7.5 to 10.5.

3.0 OPERATION

3.1 Conditions of Operation

The following Hazard Warnings are to be followed for proper WCB2 tensioner/brake assembly's functioning:

⚠ Warning
Friction material must be worn-in to achieve product torque rating. For new installations or after repair, a minimum wear-in period for the friction material of four hours at 50% of the rated horsepower is recommended to achieve rated torque. Verify proper operation before putting the product into service.

⚠ Warning
Protective means must be used to prevent oil, grease, dirt or coolant from coming into contact with the surfaces of the friction discs (8), or the wear plates (3). Oil or grease on these parts will significantly reduce the torque capacity of the unit. Dirt or coolant will produce erratic torque. Do not risk personal injury or damage to the equipment

⚠ Warning
Maximum free wheeling speed must not exceed the speeds listed in Table 9. Exposure to speeds in excess of these values may cause the friction discs (8) to burst and result in extensive damage to the WCB2 tensioner/brake assembly and/or cause personal injury.

⚠ Caution
For proper cooling of the WCB2 tensioner/brake assembly, it is required that the coolant inlet be located as close as possible to the 6 o'clock position and the outlet be located near the 12 o'clock position. This will help to assure that all coolant cavities are water filled to help avoid overheating.

⚠ Caution
For operation in subfreezing temperatures, ethylene glycol antifreeze must be added to the water. The antifreeze content of the mixture is critical and should not exceed 50% by volume. Excessive amounts of antifreeze will reduce cooling capacity and can cause coolant leakage due to overheating. Refer to Table 8.

⚠ Caution
Maximum ambient temperature is 110 °F (43 °C). Minimum ambient temperature for closed loop systems using ethylene glycol antifreeze is 0 °F (-18°C). For open loop systems using water as a coolant, the minimum ambient temperature is 45°F (7 °C).

3.2 Pressure and Speed Limits

3.2.1 Maximum applied air pressure is 150 psig (10.2 bar).

3.2.2 Maximum coolant pressure allowable within the water cavities is 40 psig (2,7 bar) for 36WCB2 and 48WCB2 tensioner/brake assemblies and 45 psig (3,1 bar) for the 8WCB2 thru 24WCB2 tensioner/brake assemblies. The use of an accumulator or pressure relief valve may be desirable to reduce the effect of pressure spikes in the coolant system during operation.

⚠ Warning
Maximum allowable water pressure is dependent upon WCB2 tensioner/brake assembly's size. Water piping elevations, restrictions in outlet piping or pressure surges may cause pressures that exceed the maximum allowable, resulting in damage to the WCB2 tensioner/brake assembly.

3.2.3 Maximum slip speeds and free wheeling friction disc assembly speeds are shown in Table 9.

⚠ Caution
Excessive slip speeds will result in rapid friction material wear. For good life of wear components, the operating values in Table 9 should not be exceeded.

Table 9
Maximum Friction Disc Assembly Speeds

Size	Maximum Slip Speed RPM	Maximum Free Wheeling Speed RPM
8WCB2	2150	3400
14WCB2	1260	2100
18WCB2	955	1600
24WCB2	715	1200
36WCB2	475	700

3.3 Periodic Maintenance

3.3.1 As the friction material wears, adjustment of the WCB2 tensioner/brake assembly may be required to keep pistons within the proper stroke range. See Section 4.0 for wear measurement, adjustment procedures and component wear limits

3.3.2 Periodically check for external air leakage in the area of the piston seals (21) (23). For replacement, refer to procedures in Section 4.7, Maintenance.

3.3.3 Moisture that may accumulate in the cylinder can be purged. With air pressure exhausted from the cylinder, remove the pipe plug (105) at the 6 o'clock position on the cylinder, and apply low air pressure to assist in expelling any excess moisture. After draining the cylinder, reinstall the pipe plug, applying a pipe thread sealant on the threads prior to installation.

⚠ Caution
Applied air pressure greater than 10 psig (.69 bar) should not be used when draining the cylinder. Use adequate shielding to avoid contact with direct spray from moisture being purged from the cylinder.

3.3.4 Periodically observe the rotating friction disc assemblies while the WCB2 tensioner/brake assembly is fully released. Dragging friction disc assemblies may be caused by wear or contamination of the gear or friction disc splines, lack of spline lubrication, friction disc imbalance, warped friction disc, or misalignment. Correct as required.

3.3.5 Pneumatic and electrical control interlocks should be periodically checked for proper settings and operation.

3.3.6 If leakage or blockage of any watercooled chamber is suspected, a static or dynamic test may be performed as follows:

3.3.6.1 Static Pressure Test

(a) Release the WCB2 tensioner/brake assembly by exhausting the air pressure from the WCB2 tensioner/brake assembly and secure the air supply during this test.

⚠ Warning
Ensure that the machinery will remain in a safe position prior to releasing the WCB2 tensioner/brake assembly.

(b) Bleed all air from within the coolant cavity. Air bleeding must be accomplished by running coolant through the cavity with the WCB2 tensioner/brake assembly secured in its proper operating position.

Note: Avoid contaminating the friction material with coolant or water.

⚠ Warning
Contamination of the friction material could result in erratic or loss of torque.

(c) After the air has been removed, install a pipe plug(s) in the outlet(s) and apply maximum allowable coolant pressure measured at the inlet to the water cavity. Maximum allowable is 40 psig (2.7 bar) for 36WCB2 and 48WCB2 tensioner/brake assemblies, and 45 psig (3.0 bar) for 8WCB2 thru 24WCB2 tensioner/brake assemblies. Maintain this pressure for 30 minutes. Check for leakage at O.D. and I.D. sealing areas.

3.3.6.2 Dynamic Flow Test

(a) Dynamic flow testing of the WCB2 tensioner/brake assembly should be conducted at the required flow rate for the rated HP dissipation and coolant quality, as given in Table 7. Inlet and outlet pressures for the appropriate WCB2 tensioner/brake assembly's size as listed in Table 6 should not be exceeded.

(b) There should be no restrictions on the outlet side of the WCB2 tensioner/brake assembly to cause any back pressure to the unit. Coolant inlet and outlet sizes are listed in Table 6. Full size hoses and piping should be used. Check for low flow and/or leakage at the O.D. and I.D. seal areas.

4.0 MAINTENANCE

⚠ Warning
Before performing any maintenance work on the WCB2 tensioner/brake assembly, make sure that the machinery will remain in a safe position. Failure to do so could result in serious injury or possibly death.

⚠ Warning
Only qualified maintenance personnel should install, adjust or repair the WCB2 tensioner/brake assembly. Faulty workmanship will result in unreasonable exposure to hazardous conditions or personal injury.

⚠ Caution
Read these instructions thoroughly and review until you fully understand the parts replacement steps before proceeding with the work described in this section. Failure to follow these instructions can result in unreasonable exposure to hazardous conditions or personal injury.

4.1 Wear Limits

⚠ Warning
Periodically examine the WCB2 tensioner/brake assembly for wear of friction material and wear plates. Failure to perform this examination periodically may result in excessive wear to components, improper operation or a significant reduction in torque, and may result in personal injury and/or damage to the machinery.

4.1.1 Wear limits for the WCB2 tensioner/brake assembly's components are shown in Table 13. If any wear limit has been reached or exceeded, that component must be repaired or replaced.

4.2 Wear Adjustment

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

4.2.1 Determining Wear

The friction material must be replaced when worn to the bottom of the groove of the friction material as shown on Figure 6 (or O.D. "step" for 48WCB2 tensioner/brake assemblies) or any "Y" or "Z" dimension exceeds the limits shown on Table 10. On multi-disc units, a wear adjustment is required when the "X" dimension has been reached and the friction discs or "Y" or "Z" dimension(s) are NOT worn to their limits.

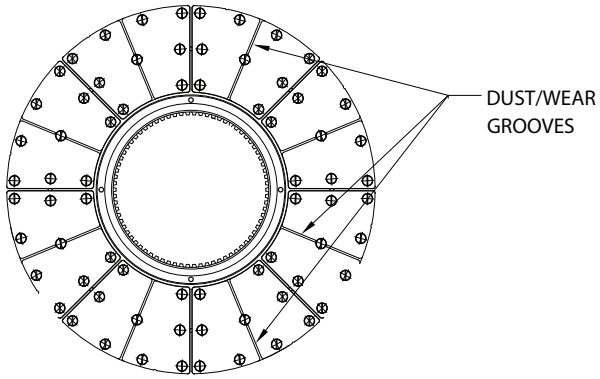


Figure 6

4.2.1.1 Single Disc Units

Apply approximately 25 psig (1.7 bar) air pressure to the cylinder to engage the WCB2 tensioner/brake assembly. Measure the "X" gap between the cylinder (19) and the pressure plate (13) or the gap "Y" between the pressure plate (13) and the mounting flange (2) as shown in Figure 7. If either gap exceeds the limits shown in Table 10, the friction discs and/or wear plates must be inspected to ensure that the wear limits listed in Table 13 have not been exceeded.

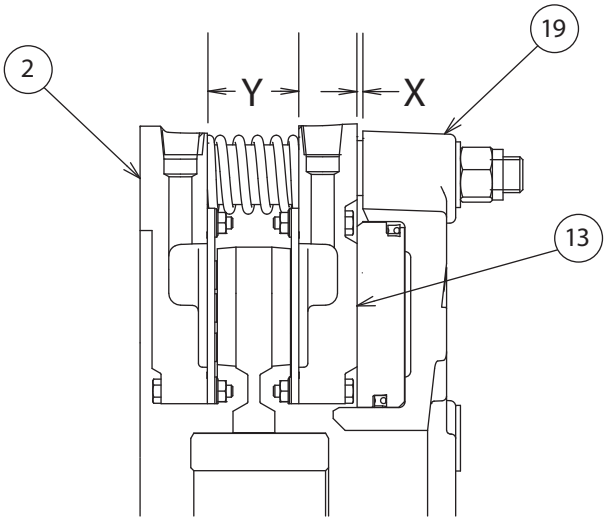


Figure 7

4.2.1.2 Multi - Disc Units

Apply approximately 25 psig (1.7 bar) air pressure to the cylinder to engage the WCB2 tensioner/brake assembly. Measure the gap "X" between the cylinder (19) and the pressure plate (13) to determine if adjustment may be required.

Measure the "Y" gap between the pressure plate (13) and the reaction plate (31), the "Y" gap between the reaction plate (31) and the mounting flange (2), and the "Z" gap between the reaction plates (31) as shown in Figures 8, 9 and 10.

If the "X worn" dimension has been reached or exceeded and the "Y" or "Z" dimensions have not reached the limits shown in Table 10 AND none of the friction discs are worn to the bottom of the wear groove / step, wear adjustment is required. It is also recommended that wear plates be inspected to ensure that the wear limits listed in Table 13 have not been exceeded.

⚠ Warning
If wear adjustment is not made, the piston may extend out of the cylinder beyond an acceptable operating range, resulting in loss of torque and/or seal damage.

If the "Y" or "Z" dimensions have been reached or any of the friction discs are worn to the bottom of the wear groove (or step), the WCB2 tensioner/brake assembly should be taken out of service and rebuilt with new components as required.

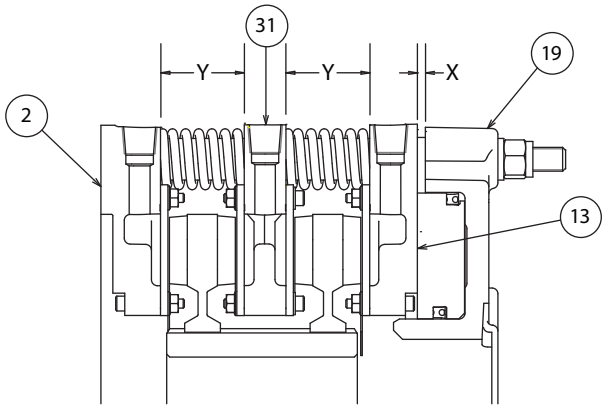


Figure 8

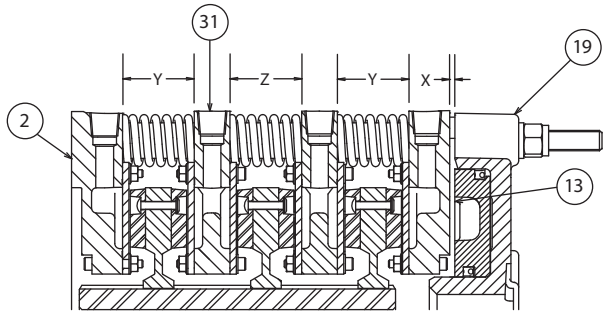


Figure 9

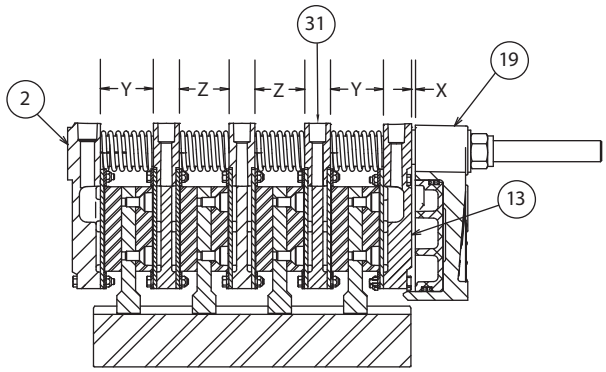


Figure 10

4.2.2 Adjustment Procedure

Wear adjustment can be conducted without full disassembly of the WCB2 tensioner/brake assembly. The wear adjustment spacers are slotted to allow for easy removal with a chisel.

⚠ Warning
Before performing any maintenance work on the WCB2 tensioner/brake assembly, make sure that the machinery will remain in a safe position. Failure to do so could result is serious injury or possibly death.

Note: It may be necessary to disconnect air and water supply lines to prevent damage to the hoses and binding of componen during the adjustment procedure.

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

⚠ Warning
Removal of spacers in quantities other than complete sets (layers) will result in severe damage to WCB2 tensioner/brake assembly's components during reassembly, and could cause the WCB2 tensioner/ brake assembly to not function properly.

4.2.2.2 If so equipped, remove the support bracket from the cylinder (19) end of the unit.

4.2.2.3 Loosen the locknuts (18) evenly (ONE TURN AT A TIME) and in an alternating (cross wise) pattern to prevent binding of the cylinder on the studs. Continue to loosen the locknuts until the force of the release springs is relieved, allowing for access to the wear spacers. It may be necessary to push the pressure plate and reaction plate(s) away from the mounting flange so that the release springs can be moved to gain access to the wear spacers.

Table 10
Wear Measurements X,Y & Z Gaps – Inches (mm)

Model	X - New*	X - Max (Adjustment)	Y - New	Y - Min	Z - New	Z - Min
108	0.06 (1,5)	0.44 (11,2)	1.69 (42,9)	1.31 (33,3)		
208	0.12 (3,0)	0.50 (12,7)	1.69 (42,9)	1.31 (33,3)		
308	0.18 (4,6)	0.56 (14,2)	1.69 (42,9)	1.31 (33,3)	1.69 (42,9)	1.31 (33,3)
114	0.07 (1,8)	0.45 (11,4)	1.84 (46,7)	1.46 (37,1)		
214	0.14 (3,6)	0.52 (13,2)	1.84 (46,7)	1.46 (37,1)		
314	0.21 (5,3)	0.59 (15,0)	1.84 (46,7)	1.46 (37,1)	1.84 (46,7)	1.46 (37,1)
118	0.08 (2,0)	0.58 (14,7)	1.95 (49,5)	1.45 (36,8)		
218	0.16 (4,1)	0.66 (16,8)	1.95 (49,5)	1.45 (36,8)		
318	0.24 (6,1)	0.74 (18,8)	1.95 (49,5)	1.45 (36,8)	2.04 (51,8)	1.75 (44,5)
418	0.32 (8,1)	0.82 (20,8)	1.95 (49,5)	1.45 (36,8)	2.04 (51,8)	1.75 (44,5)
124	0.09 (2,3)	0.59 (15,0)	2.92 (74,2)	2.42 (61,5)		
224	0.18 (4,6)	0.68 (17,3)	2.92 (74,2)	2.25 (57,2)		
324	0.27 (6,9)	0.77 (19,6)	2.92 (74,2)	2.25 (57,2)	2.58 (65,5)	2.08 (52,8)
424	0.36 (9,1)	0.86 (21,8)	2.92 (74,2)	2.25 (57,2)	2.58 (65,5)	2.08 (52,8)
136	0.12 (3,0)	0.54 (13,7)	2.75 (69,9)	2.31 (58,7)		
236	0.24 (6,1)	0.66 (16,8)	2.75 (69,9)	2.31 (58,7)		
336	0.36 (9,1)	0.78 (19,8)	2.75 (69,9)	2.31 (58,7)	2.75 (69,9)	2.31 (58,7)
436	0.48 (12,2)	0.90 (22,9)	2.75 (69,9)	2.31 (58,7)	2.75 (69,9)	2.31 (58,7)
148	0.15 (3,8)	0.57 (14,5)	3.37 (85,6)	2.95 (74,9)		
248	0.30 (7,6)	0.72 (18,3)	3.37 (85,6)	2.95 (74,9)		
348	0.45 (11,4)	0.87 (22,1)	3.37 (85,6)	2.95 (74,9)	3.37 (85,6)	2.95 (74,9)
448	0.60 (15,2)	1.02 (25,9)	3.37 (85,6)	2.95 (74,9)	3.37 (85,6)	2.95 (74,9)

* Value shown is gap after wear adjustment. New or rebuilt WCB2 tensioner/brake assemblies may vary slightly from this value due to tolerances.

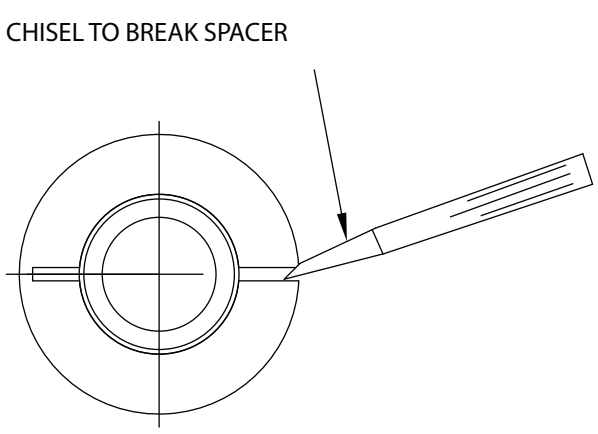


Figure 11

4.2.2.4 Wear spacers are slotted to allow for in-place removal. Using a narrow chisel wedged into the slot in the spacer, as shown in Figure 11, pry the wear spacer until it fractures and is clear to be removed from the stud. Repeat for the remaining spacers in the set that is to be removed (one spacer from each stud location).

⚠ Warning
Be sure to collect all wear spacers when removed. Spacers lodging in between WCB2 tensioner/brake assembly's components could prevent the WCB2 tensioner/brake assembly from properly engaging or releasing.

4.2.2.5 While supporting the weight of the cylinder/piston assembly, tighten the locknuts (18) ONE TURN AT A TIME and in a crosswise pattern, until the cylinder is seated firmly against the clamp tubes. Torque the locknuts to the appropriate value. See Table 4.

⚠ Caution
The locknuts (18) must be tightened gradually and evenly to prevent damage to the WCB2 tensioner/brake assembly's components.

4.2.2.6 Reinstall the support bracket if required.

4.2.2.7 Restore any piping or covers removed prior to operating the WCB2 tensioner/brake assembly.

4.3 Disassembly Procedures

⚠ Warning
Ensure that the machinery is and will remain in a safe position prior to loosening fasteners or removing the WCB2 tensioner/brake assembly.

4.3.1 Disconnect the air supply lines and water lines from the WCB2 tensioner/brake assembly.

4.3.2 Remove the fasteners that secure the WCB2 tensioner/brake assembly (and support bracket, if applicable) to the mounting structure.

4.3.3 Using soft slings, rig the WCB2 tensioner/brake assembly and slide the WCB2 tensioner/brake assembly off of the gear. Avoid placing slings or straps directly on the release springs (34).

4.3.4 Transport the WCB2 tensioner/brake assembly to a clean working area and position the unit on a flat surface with the mounting flange (1) facing down.

4.3.5 If the gear (28) requires replacement, remove it from the shaft with a portable jack, using the threaded holes in the end of the gear for puller holes. Heating may be required to ease removal. Replace the gear and install per Section 2.2.

4.3.6 Match-mark the mounting flange (1), reaction plates (30), pressure plate (13) and cylinder (19) to one another prior to disassembly to adequately show the proper orientation of components and various ports to one another.

4.3.7 Loosen the locknuts (18) ONE TURN AT A TIME and in sequence until the release spring force is relieved.

4.3.8 Lift the cylinder and piston off of the studs as an assembly. Set the assembly aside on a clean, level area, making sure to avoid damaging the face of the piston.

4.3.9 Continue removing the remaining components if required.

4.3.10 Inspect all components using the wear limits in Table 13 as a reference.

4.3.11 For friction disc replacement refer to Section 4.4 or 4.5.

4.3.12 For wear plate replacement refer to Section 4.6.

4.3.13 For seal replacement refer to Section 4.7

4.3.14 Assemble the WCB2 tensioner/brake assembly per Section 4.9.

4.4 Friction Material Replacment (8WCB2 and 14WCB2)

Note: When replacing friction material, it is recommended that the mating wear surface be replaced or machined flat to ensure good contact between the mating surfaces. See Table 13 for wear limits.

4.4.1 Friction disc cores may be relined with new friction material per the following instructions. Refer to Section 7.1 or 7.2 for the appropriate friction disc replacement kit part number.

⚠ Warning
Use only genuine, Airflex friction material. Use of friction material not of Airflex origin may result in unpredictable WCB2 tensioner/brake assembly performance and/or excessive wear of the WCB2 tensioner/brake assembly components.

4.4.2 Drill out the old rivets and discard the old friction discs.

4.4.3 Clean and deburr the friction disc cores. If rivet holes in the core are elongated or damaged, the disc core should be repaired or replaced.

4.4.4 Position the friction discs on both sides of the disc core and align the rivet holes, using several rivets as a guide.

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

4.4.5 Insert a rivet through any hole and set using a washer on the clinched end of the rivet. Figure 12 illustrates machine setting and Figure 13 illustrates setting the rivet manually. When setting manually, use an arbor press and keep the setting tool square to avoid splitting the rivet.

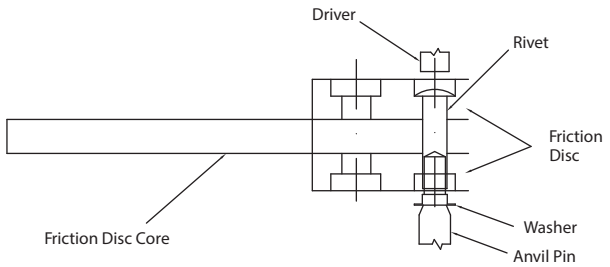


Figure 12

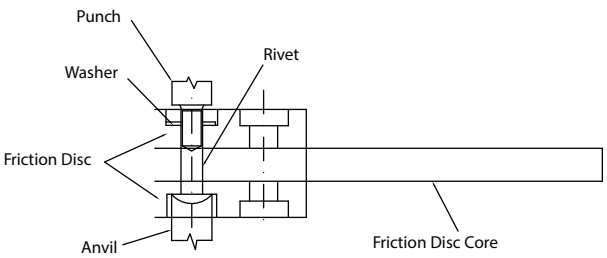


Figure 13

⚠ Caution
The clinched end of the rivet must have a washer in place prior to clinching. Failure to use the washer or use of excessive force when clinching the rivet will fracture the friction material.

4.4.6 The remaining rivets may be installed in any reasonable sequence following a crosswise pattern.

⚠ Caution
After replacement of friction material, a minimum wear-in period of four hours at 50% of the rated horsepower is recommended for the friction material to achieve rated torque.

4.5 Friction Material Replacement (18WCB2 thru 48WCB2)

Note: When replacing friction material, it is recommended that the mating wear surface be replaced or machined flat to ensure good contact between the mating surfaces. See Table 13 for wear limits.

4.5.1 Refer to Section 6.0 for the appropriate friction disc (or block) replacement part numbers

⚠ Caution
Use only genuine Airflex friction material. Use of friction material not of Airflex origin may result in unpredictable performance.

4.5.2 Disassemble the WCB2 tensioner/brake assembly per Section 4.3.

4.5.3 Remove the old screws and discard the old friction material.

Note: Use of a pinpoint torch to heat the screws and soften the Loctite® will ease removal of the screws.

4.5.4 Clean all burrs, corrosion etc. from the friction disc core or mounting surface.

4.5.5 Position the friction material to align the screw holes. Install several screws loosely at several of the outer most screw hole locations to properly align the friction discs or blocks.

For friction discs (18WCB2 and 24WCB2 tensioner/brake assemblies), install the remain-ing screws in an even, crosswise pattern per the procedure in the next paragraph. When installing screws in friction material (36WCB2 and 48WCB2 tensioner/brake assemblies), install and tighten the screws from the centermost position in the block, then progress towards the outer edges of the block.

Following the above pattern, install one screw at a time by applying Loctite® #262 to the screw threads (use Loctite® #242 for 18WCB2 tensioner/brake assemblies) and tightening the screw to the proper torque value. Tighten screws to 15 ft.-lb. (20.3 Nm) (75 in-lb. (8.5 Nm) for 18WCB2 tensioner/brake assemblies). Install and torque each remaining screw immediately after application of Loctite®, then proceed to the next screw. Be sure to remove, apply Loctite® and properly tighten the initial screws used for alignment of the friction disc or block.

Note the relevant safety precautions in the following column when assembling screws.

⚠ Warning
Loctite® may cure prior to properly tightening the screw if not tightened to the proper torque value immediately after installation.

⚠ Caution
Use only Airflex-supplied screws.

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

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

4.5.6 WCB2 tensioner/brake friction disc assemblies(7) for the 36WCB2 and 48WCB2 tensioner/brake assemblies require that the friction material be machined flat after assembly, to allow for even contact and minimize wear-in. Attach the friction blocks (8) to one side of the disc core (9) and machine to 0.748" (19 mm) +/- 0.010" (0,25 mm). Install the friction blocks to the opposite side of the disc core and machine those friction blocks to make a thickness of 2.25" (57,15 mm) for the entire friction disc assembly. The flatness specification is 0.010" (0,25 mm) and the parallelism specification is 0.010" (0,25 mm) for the entire friction disc assembly. The perpendicularity specification is 0.010" (0,25 mm) from the disc blocks to the spline of the disc core.

⚠ Warning
Use appropriate safety equipment and dust collection systems when machining friction material.

4.5.7 After replacement of friction material, reassemble the WCB2 tensioner/brake assembly per Section 4.9. During start-up, observe wear-in and operation precautions per Section 3.0, Operation.

⚠ Caution
After replacement of friction material, a minimum wear-in period of four hours at 50% of the rated horsepower is recommended for the friction couple to achieve rated torque.

4.6 Wear Plate Replacement

Note : When replacing wear surfaces, it is recommended that the mating friction material be replaced or machined flat to ensure good contact between the mating surfaces. See Table 13 for wear limits.

4.6.1 Disassemble the WCB2 tensioner/brake assembly per Section 4.3.

4.6.2 Remove the screws and locknuts holding the wear plates and remove the wear plates. If the wear plates cannot be easily lifted off, gently tap the O.D. to break the gasket seal.

Caution

Do not attempt to break the gasket seal by prying between the wear plate and housing. Damage to the sealing surfaces may occur.

4.6.3 Inspect the water passages and, if necessary, use a wire brush to clean them. If re-painting is necessary, sand blast the water passages and paint the surfaces with PLASITE ® Epoxy #9052 Polymine coating. Dry film thickness should be 8 to 12 mils (0,2 to 0,3 mm). Be careful not to allow the paint to get into the seal grooves or onto the face of the support nubs.

⚠ Caution
Follow manufacturer's instructions and proper safety precautions for application of epoxy coatings.

⚠ Caution
If nubs in the water cavity are severely corroded, wear plates may not be properly supported. Replace the pressure plate, reaction plate or mounting flange, if necessary.

4.6.4 Assembly with Loctite Superflex® #596 Sealant

4.6.4.1 Clean and completely dry the sealing surfaces at the I.D. and O.D. on the pressure plate (14), reaction plate(s) (31) and mounting flange. These surfaces should be free of nicks and scratches to prevent leaks. Minor nicks and scratches may be filled with Loctite Superflex® #596 Sealant during assembly.

4.6.4.2 Apply a uniform bead of Loctite Superflex® #596 Sealant in the grooves of the pressure plate, reaction plate(s) and/or mounting flange. Recommended bead diameter is 0.060" - 0.090" (1,5 mm - 2,3 mm) for the 8WCB2 thru 36WCB2 tensioner/brake assemblies. For the 48WCB2 tensioner/brake assemblies, refer to procedure 4.6.4.3 for proper sealant application procedure. For the 8WCB2 thru 36WCB2 tensioner/brake assemblies, skip to Section 4.6.5 after application of sealant.

⚠ Caution
Loctite Superflex® #596 Silicon Sealant will begin to set up and skin over in approximately 10 minutes. The wear plate must be fastened to the mating component within 10 minutes of applying the sealant.

4.6.4.3 The 48WCB2 incorporates a dual groove for both the Loctite Superflex® #596 Sealant and an O-ring. An initial bead of sealant 0.030"-0.060" (0,7 mm - 1,5 mm) in size must be applied to the bottom of the deep groove in order to hold the O-ring in place. See Figure 14.

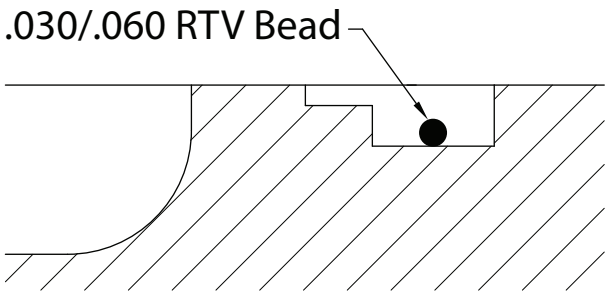


Figure 14

4.6.4.4 Install the O-rings (I.D. and O.D.) on top of the sealant, working them into position so that they lay flat in the bottom of the groove. See Figure 15. A second bead of sealant .060"-.090" (1,5 mm - 2,3 mm) in size should then be applied in the shallow groove. See Figure 16.

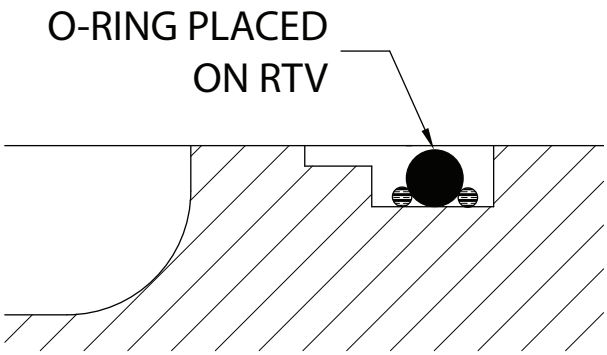


Figure 15

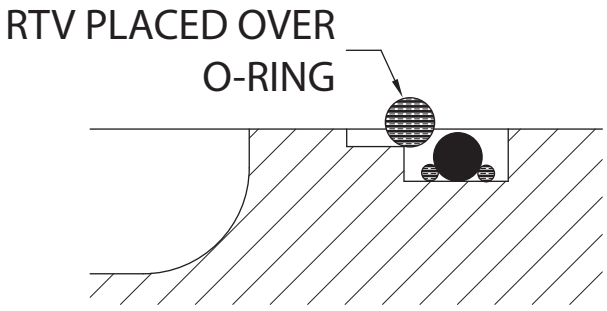


Figure 16

4.6.5 Inspect the new wear plates (3) and remove any scratches or raised edges with very fine sandpaper or steel wool. Position the smoothest side of the wear plate on the sealing surface, being careful to align the holes with those in the IRON.

4.6.6 Position the support rings (50) & (51) over the holes in the wear plates (3) and install the new hex head screws (4) and locknuts (5) provided, securing them finger tight.

Note: The support rings (50) &(51) are only used for the 18WCB2 thru 48WCB2 tensioner/brake assemblies.

⚠ Caution
To prevent excessive warping of the wear plate and to endure a good seal, the following torque tightening procedure must be followed.

4.6.7 For each wear plate being replaced, the torque tightening instructions are as follows:

Note: The torque of the screws & nuts (4) (5) that attach the wear plate (3) to the mounting flange (1), reaction plate (30) & pressure plate (13) is a four step process.

(a) For the first 16 screws, bring the initial torque of each screw up to 33% of the torque value shown in Table 15 using the tightening sequence shown in Figure 17. Install and torque the remaining screws in any reasonable crosswise pattern to 33% of the torque value shown in Table 11.

(b) Repeat the sequence of torque tightening on the first 16 screws as shown in Figure 17 and bring each screw up to 66% of the torque value shown in Table 11. Torque the remaining screws in any reasonable crosswise pattern to 66% of the torque value shown in Table 11.

(c) Repeat the sequence of torque tightening on the first 16 screws as shown in Figure 17 and bring each screw up to 100% of the torque value shown in Table 11. Torque the remaining screws in any reasonable crosswise pattern to 100% of the torque value shown in Table 11.

(d) Finish torque tightening by selecting a starting position (usually at the 12 o'clock position) and check the 100% torque of each screw going in a sequential clockwise or counterclockwise rotation. Mark or highlight screw head or nut & shank after final torque check as a visual indication that the screw/nut has been tightened to specification shown in Table 11.

⚠ Caution
Allow the Loctite Superflex® #596 Sealant 24 hours to completely cure before performing the following leak test procedure.

Table 11
Wear Plate FastenerTorque: ft.lb. (Nm)

Size	Size	Torque
8WCB2	#10-24NC	5 (7)
14WCB2	1/4-20NC2	12 (16)
18WCB2	5/16-18NC	21 (28)
24WCB2	5/16-18NC	21 (28)
36WCB2	3/8-16NC2	40 (54)
48WCB2	3/8-16NC2	40 (54)

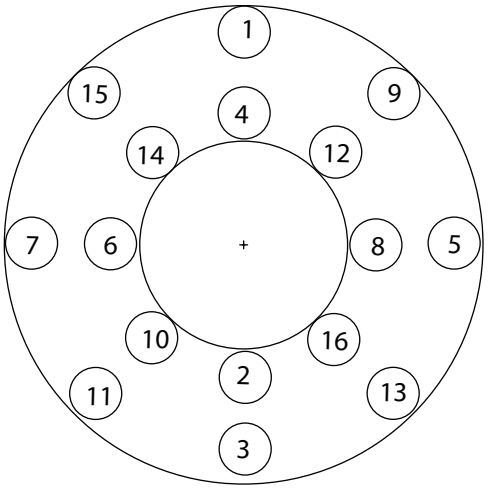


Figure 17

4.6.8 After completion of the assembly, each water cavity should be checked for leaks.

4.6.9 Using lifting straps, suspend each assembly with the water outlet port at the 12 o'clock position. Connect a water supply line to the inlet port (at 6 o'clock position). In reaction plates, plug the remaining inlet port. See Table 12 for water port sizes.

Table 12
Inlet and Outlet Water Port Sizes

Size	Size
8WCB2	3/8-18NPT
14WCB2	1/2-14NPT
18WCB2	1/2-14NPT
24WCB2	3/4-14NPT
36WCB2	1-1/4-11.5NPT
48WCB2	1-1/4-11.5NPT

4.6.10 Slowly fill with water to purge all air from water cavities.

4.6.11 Install pipe plug(s) in the outlet port(s) and apply appropriate water pressure 40 psig (2.7 bar) for 36WCB2 and 48WCB2 tensioner/brake assemblies and 45 psig (3.1 bar) for 8WCB2 thru 24WCB2 tensioner/brake assemblies measured at the inlet. Maintain this pressure for a minimum of 30 minutes.

4.6.12 Check for leakage at O.D. and I.D. seal areas. NO leakage is allowed.

4.6.13 If the assembly leaks, check the torque on each screw and re-test. If leaks still occur, the wear plate(s) or sealant groove may be damaged. Repeat procedure from 4.6.1.

4.6.14 Follow steps in Section 4.9 to reassemble the WCB2 tensioner/brake assembly.

4.6.15 Machining of the wear surfaces is required for 36WCB2 and 48WCB2 tensioner/brake assemblies after replacement of the wear plates or the adjoining friction material. See Figure 18 for machining specifications. Clean all wear surfaces after machining to remove any residual contaminates.

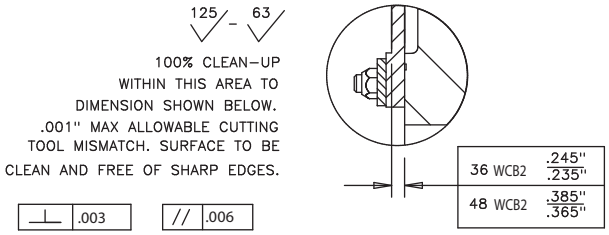


Figure 18

⚠ Warning
Failure to machine wear plates flat could result in poor contact between the friction material and subsequent reduction or erratic torque of the WCB2 tensioner/brake assembly.

⚠ Caution
After replacement or machining of wear plates, a minimum wear-in period of four hours at 50% of the rated horsepower is recommended for the friction couple to achieve rated torque.

4.7 Cylinder Seal Replacement

Note: Item numbers (#) are shown on Figures 1 and 2.

4.7.1 Disconnect the air connections.

4.7.2 While supporting the cylinder, loosen the locknuts (18) ONE TURN AT TIME and in an alternating (crosswise) pattern until the spring force is completely relieved. Remove the locknuts and washers (17). Deep well sockets are required for removal of the locknuts.

4.7.3 Using lifting equipment, carefully remove the cylinder (19) and piston (33) as an assembly. Set aside in a clean area.

4.7.4 Place the cylinder and piston assembly with the piston facing down on blocks approximately 6" (150 mm) high. The blocks must only contact the cylinder (19) so that the piston (33) will be free to move out of the cylinder bore.

4.7.5 If a regulated air line is available, the piston can be partially ejected from the cylinder by applying no more than 15 psig (1.0 bar) to the cylinder.

⚠ Caution
Application of a higher pressure may cause damage to the components.

4.7.6 To complete the removal of the piston from the cylinder, open all air inlets. Alternately insert a 0.50" (12 mm) diameter by 6" (150 mm) long wood dowel into each air inlet and gently tap the piston with a mallet so that it moves evenly out of the cylinder. Be careful not to damage the sealing surfaces of the piston or cylinder by cocking the piston in the cylinder.

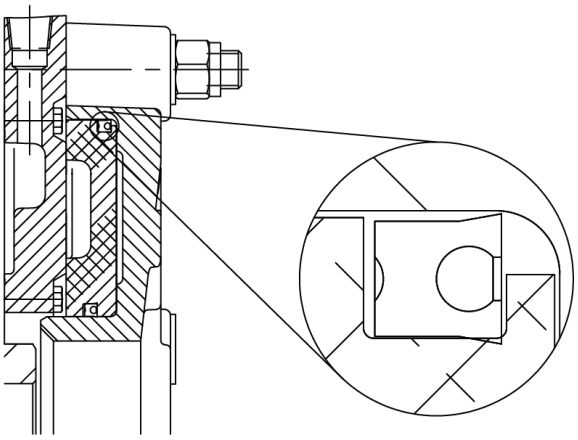
4.7.7 Remove the old seals and discard.

4.7.8 Inspect the cylinder sealing surface condition for nicks or scratches or any other defect which may prevent the seals from being effective. See Table 13 for wear limits of the sealing surface. Replace the cylinder, if necessary.

4.7.9 Thoroughly clean the seal grooves in the piston (33) and apply a thin, even coat of Molykote ® 55 O- ring lubricant to the piston seal grooves and chamfer on the piston, the sealing surfaces in the cylinder (19), and the seals (21)(23).

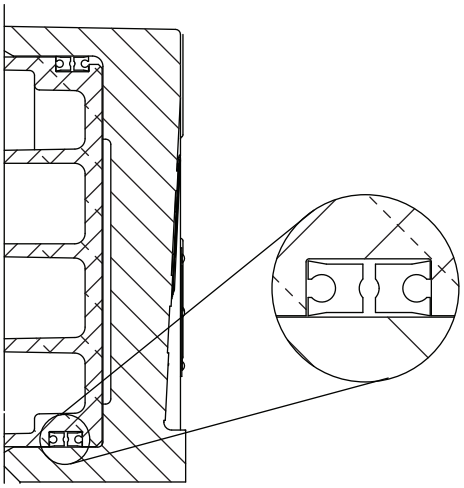
4.7.10 Install the new seals in the grooves in the piston, noting the orientation of the seal lips. See Figure 19 & 20.

Note: Some assemblies might have used a one piece bi-directional lip seal. That type of seal has been superseded by the use of TWO seals that fit back-to-back as shown in Figure 20.



8 & 14WCB2

Figure 19



18, 24, 36 & 48 WCB2

Figure 20

4.7.11 Position the cylinder on a flat, level surface so that the pressure cavity faces upward.

4.7.12 Carefully place the piston onto the cylinder with the chamfered edge of the piston facing downward, taking special care to avoid damaging the seal lips.

4.7.13 Gradually apply an evenly distributed force to press the piston into the cylinder being sure not to cock the piston which may damage the sealing surfaces. The use of 'C-clamps' may assist with the assembly process.

4.7.14 Using a lifting strap, slide the cylinder/piston assembly onto the studs.

4.7.15 Lubricate the threads on the end of the studs with 30 wt. oil or anti-seizing compound and install the washers (17) and locknuts (18).

4.7.16 While supporting the weight of the cylinder/piston assembly, tighten the locknuts, ONE TURN AT A TIME and in an alternating (crosswise) pattern until the cylinder is seated firmly against the clamp tubes. Torque the locknuts to the appropriate value. See Table 4.

⚠ Caution
The locknuts (18) must be tightened gradually to prevent damage to the WCB2 tensioner/brake assembly's components.

4.7.17 Connect an air supply line to one of the ports in the cylinder, plugging the remaining port(s).

4.7.18 Perform an air test by applying 80 psig (5.5 bar) to engage the WCB2 tensioner/brake assembly. Shut off the air supply. If the air pressure does not drop below 70 psig (4.8 bar) after 10 minutes, the seals have been properly installed. If excessive leaking is found, disassemble the piston / cylinder and inspect the seals or sealing surfaces for damage. Repair or replace components as required.

4.8 Bushing Replacement

Note: Some pressure plate and reaction plates have bushings installed in the reaction holes. (Typically corrosion resistant units, and older 36WCB2 tensioner/brake assemblies). See Figure 21. If applicable, replacement of the bushings can be performed per the following procedures.

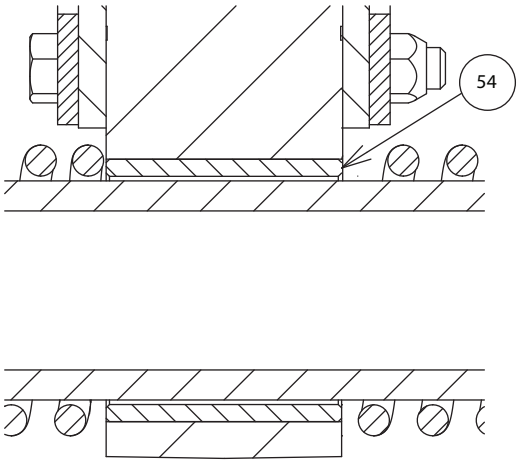


Figure 21

4.8.1 Disassemble the WCB2 tensioner/brake assembly per Section 4.3.

4.8.2 Refer to the wear limits in Table 13 to determine if the bushings (54) require replacement.

4.8.3 Heat up the area around each bushing to soften the Loctite® and press out the old bushings.

4.8.4 Clean the bores in the mating component, removing any residual Loctite®.

4.8.5 Apply Loctite® #RC601, 635 or 680 to the bushing O.D. and mating hole in the reaction plate using a swab. Apply enough liquid to entirely fill the space between the parts. Install the bushings by twisting the bushing while pushing it down, until it is flush with the casting surface. Inspect to see that a ring of liquid adhesive is visible at the parting line. Reapply Loctite if required. Allow the Loctite to cure for 15 minutes before moving the sub assembly.

4.8.6 Assemble the WCB2 tensioner/brake assembly per Section 4.9, as required.

4.9 Assembly Procedures

Note: Friction disc assemblies and water jackets (mounting flange, end plate, and reaction plate- if applicable) should be assembled per the appropriate maintenance procedures prior to final assembly of the WCB2 tensioner/brake assembly.

4.9.1 Position the mounting flange (1) on a flat, level surface, mounting face down.

4.9.2 Install the studs (6) into the mounting flange. The stud end with the shorter length of threads is to be assembled into the mounting flange. Clean the stud end to be assembled by applying Loctite Locquic® Primer Grade "T" to the threads. After the threads have dried, apply Loctite® #271 on the threads to be assembled and insert the stud completely into the threaded hole in the mounting flange so that the installed end is flush or slightly recessed inside the face of mounting flange. See Figure 1. Using a machinist square as a reference, hold the stud in position so that it remains perpendicular to the machined surface of the mounting flange until the Loctite® has cured. Repeat for the remaining studs.

⚠ Caution
Loctite Locquic® Primer Grade "T" contains harmful vapors. Refer to the product label and follow proper safety precautions.

⚠ Caution
The end of the stud must not extend past the mounting surface of the mounting flange.

4.9.3 Install the appropriate number of wear spacers (29) and clamp tubes (12) over the studs.

4.9.4 Place a friction disc assembly onto the mounting flange. Center the friction disc assembly.

4.9.5 For 8WCB2 thru 18WCB2 tensioner/brake assemblies place a release spring (34) over every other clamp tube. For 24WCB2 thru 48WCB2 tensioner/brake assemblies install a release spring over every clamp tube. For single disc WCB2 tensioner/brake assemblies, proceed to Section 4.9.9.

4.9.6 Noting the location of the water inlets in the mounting flange, lift the reaction plate (30) into position, align the water inlets with those in the mounting flange, and slide the reaction plate over the studs and clamp tubes.

4.9.7 For 8WCB2 thru 18WCB2 tensioner/brake assemblies place a release spring (34) over every other clamp tube. For 24WCB2 thru 48WCB2 tensioner/brake assemblies install a release spring over every clamp tube.

4.9.8 Place friction disc assembly onto the reaction plate. Repeat the sequence of steps 4.9.5 through 4.9.8 until all friction disc assemblies, reaction plates and release springs are friction disc assemblies.

4.9.9 Noting the location of the water inlets in the mounting flange, lift the pressure plate (13) into position and align the water inlets with those in the mounting flange. Slide the pressure plate over the studs and clamp tubes.

4.9.10 Thoroughly clean the seal grooves in the piston (33) and apply a thin, even coat of Molykote ® 55 O-ring lubricant to the piston seal grooves and chamfer on the piston, the sealing surfaces in the cylinder (19), and the seals (21) (23).

4.9.11 Install the new seals in the grooves in the piston, noting the orientation of the seal lips. See Figure 19 or 20.

4.9.12 Position the cylinder on a flat level surface so that the pressure cavity faces upward.

4.9.13 Carefully place the piston onto the cylinder with the chamfered edge of the piston facing downward, taking special care to avoid damaging the seal lips.

4.9.14 Gradually apply an evenly distributed force to press the piston into the cylinder being sure not to cock the piston which may damage the sealing surfaces or seals. The use of 'C-clamps' may assist with the assembly process.

4.9.15 Lift the cylinder/piston assembly into position and slide it over the studs, noting the orientation of the ports on the cylinder face.

4.9.16 Lubricate the threads on the end of the studs with 30 wt. oil or anti-seizing compound and assemble the washers (17) and locknuts (18).

4.9.17 Tighten the locknuts, ONE TURN AT A TIME and in an alternating (crosswise) pattern until the cylinder is seated firmly against the clamp tubes. Torque the locknuts to the appropriate value. See Table 4.

⚠ Caution
The locknuts (18) must be tightened gradually to prevent damage to the WCB2 tensioner/brake assembly components.

4.9.18 Re-install the WCB2 tensioner/brake assembly per Section 2.0

4.10 Corrosion Protection

⚠ Caution
All previously painted areas must be touched up after maintenance or installation to provide corrosion protection.

4.10.1 Clean any contamination, scale, or loose paint from disturbed surfaces.

4.10.2 Touch up any disturbed area with an organic zinc primer.

4.10.3 Paint areas with two coats of a high solid two part, marine grade epoxy paint as per manufacturer's instructions.

5.0 ORDERING INFORMATION/TECHNICAL ASSISTANCE

5.1 Equipment Reference

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

Danfoss
Power Solutions (US) Company
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515 239 6000

Loctite®, Locquic®, and Loctite Superflex® are registered trademarks of Henkel Corporation.

Molykote® is a registered trademark of Dow Corning Corporation.

Polypak® is a registered trademark of Parker Hannifin Corporation.

MOLUB-ALLOY® is a trademark of Castrol Industrial Lubricants

Table 13
Wear Limits for WCB2 Components inches (mm)

Item	Component	Description	Wear Limit/Remarks		Original Sizes/Remarks	
3	Wear Plate	Friction Wear Signature	Model Size: 8, 14, and 18 WCB2 24 WCB2 36 WCB2 48 WCB2	Maximum Wear: 0.030 (0,76) 0.045 (1,14) 0.050 (1,27) 0.060 (1,52)	Wear will be in form of even wear or circular grooves in the copper surface.	
8	Friction Disc	Friction Material	Fully worn at the bottom of the dust groove or wear notch, or step on O.D. for 48WCB2. See Figure 6. Friction Material must also be replaced if contaminated with oil or grease.		WCB2 tensioner/brake assemblies have adjustment provision. See Section 4.2	
9 28	Friction Disc Core & Gear	Gear Backlash	Maximum total backlash is 0.060 (1.5).		If step is worn in gear, gear must be replaced.	
12	Clamp Tube	Reaction Area	Maximum wear is 0.015 (0.38).		Wear will be in the form of notch or step on the side of tube.	
14 13 54	Pressure Plate Reaction Plate Bushings	Reaction Holes	Wear will be in the form of elongation of the holes. Maximum wear is 0.031 (0.80).		Original Reaction Hole and Bushing Sizes: Model Size: 8 WCB2 14 and 18 WCB2 24 WCB2 36 WCB2 48 WCB2	 Bore Size: 0.938 (23,83) 1.312 (33,33) 1.668 (42,88) 2.065 (52,45) 2.375 (60,33)
19	Cylinder	Seal Area	Maximum wear is 0.005 (0.13).		Wear will be in form of grooves where the seals contact the cylinder wall.	
34	Spring	Spring Free Height	Springs must be replaced in complete sets. Model Size: 8 WCB2 14 and 18 WCB2 24 and 36 WCB2 48 WCB2	 Minimum Free Height: 2.07 (52,58) 3.06 (77,72) 3.88 (98,55) 4.85 (123,19)	 Model Size: 8 WCB2 14 and 18 WCB2 24 and 36 WCB2 48 WCB2	 Original Free Height: 2.14 (54,36) 3.16 (80,26) 4.00 (101,6) 5.00 (127,6)

6.0 PARTS

6.1.1 8WCB2 Parts (Standard)

Item	Description	108 WCB2 146455A Part Number	Qty	208 WCB2 146456A Part Number	Qty	308 WCB2 146457A Part Number	Qty
1	Mounting Flange Sub Assembly*	512508-01	1	512508-01	1	512508-01	1
6	Stud	000245X0055	6	000245X0056	6	000245X0099	6
7	Friction Disc Sub Assembly*	512512	1	512512	2	512512	3
12	Clamp Tube	307694-01	6	307694-02	6	307694-05	6
13	Pressure Plate Sub Assembly*	512508-03	1	512508-03	1	512508-03	1
17	Flat Washer	000067X0041	6	000067X0041	6	000067X0041	6
18	Locknut	000110X0024	6	000110X0024	6	000110X0024	6
19	Cylinder	512483	1	512483	1	512483	1
21	Lip Seal	000402X0001	1	000402X0001	1	000402X0001	1
23	Lip Seal	000402X0002	1	000402X0002	1	000402X0002	1
28	Gear (not included with assembly)	415313-####	1	415314-####	1	416457-####	1
29	Wear Spacer	N/A	N/A	308393	6	308393	12
30	Reaction plate Sub Assembly*	N/A	N/A	512508-02	1	512508-02	2
33	Piston	512500	1	512500	1	512500	1
34	Release Spring	307696	3	307696	6	307696	9

* Individual parts breakdown for standard WCB2 sub-assemblies are in section 6.2

6.1.2 14WCB2 Parts (Standard)

Item	Description	114 WCB2 146458A Part Number	Qty	214 WCB2 146459A Part Number	Qty	314 WCB2 146460A Part Number	Qty
1	Mounting Flange Sub Assembly*	513300-01	1	513300-01	1	513300-01	1
6	Stud	000245X0058	6	000245X0054	6	000245X0083	6
7	Friction Disc Sub Assembly*	415208	1	415208	2	415208	3
12	Clamp Tube	306956-07	6	306956-26	6	306956-27	6
13	Pressure Plate Sub Assembly*	513300-03	1	513300-03	1	513300-03	1
17	Flat Washer	000067X0040	6	000067X0040	6	000067X0040	6
18	Locknut	000110X0030	6	000110X0030	6	000110X0030	6
19	Cylinder	512296	1	512296	1	512296	1
21	Lip Seal	000402X0003	1	000402X0003	1	000402X0003	1
23	Lip Seal	000402X0004	1	000402X0004	1	000402X0004	1
28	Gear (not included with assembly)	415454-####	1	415302-####	1	416303-####	1
29	Wear Spacer	N/A	N/A	308388-01	6	308388-01	12
30	Reaction plate Sub Assembly*	N/A	N/A	513300-02	1	513300-02	2
33	Piston	512302	1	512302	1	512302	1
34	Release Spring	307629	3	307629	6	307629	9

* Individual parts breakdown for standard WCB2 sub-assemblies are in section 6.2

6.1.3 18WCB2 (Standard)

Item	Description	118 WCB2 146461A Part Number	Qty	218 WCB2 146462A Part Number	Qty	318 WCB2 146463A Part Number	Qty	418 WCB2 146464A Part Number	Qty
1	Mounting Flange Sub Assembly*	513232-01	1	513232-01	1	513232-01	1	513232-01	1
6	Stud	000245X0057	12	000245X0063	12	000245X0085	12	000245X0086	12
7	Friction Disc Sub Assembly*	513882	1	513882	2	513882	3	513882	4
12	Clamp Tube	306956 -11	12	306956-12	12	306956-34	12	306956-22	12
13	Pressure Plate Sub Assembly*	513232-03	1	513232-03	1	513232-03	1	513232-03	1
17	Flat Washer	000153X0727	12	000153X0727	12	000153X0727	12	000153X0727	12
18	Locknut	000110X0030	12	000110X0030	12	000110X0030	12	000110X0030	12
19	Cylinder	512693	1	512693	1	512693	1	512693	1
21	Lip Seal	000402X0021	2	000402X0021	2	000402X0021	2	000402X0021	2
23	Lip Seal	000402X0022	2	000402X0022	2	000402X0022	2	000402X0022	2
28	Gear (not included with assembly)	302813-####	1	302907-####	1	413208-####	1	414111-####	1
29	Wear Spacer	N/A	N/A	308388-02	12	308388-02	24	308388-02	36
30	Reaction plate Sub Assembly*	N/A	N/A	513232-02	1	513232-02	2	513232-02	3
33	Piston	512761	1	512761	1	512761	1	512761	1
34	Release Spring	307629	6	307629	12	307629	18	307629	24

* Individual parts breakdown for standard WCB2 sub-assemblies are in section 6.2

6.1.4 24WCB2 (Standard)

Item	Description	124 WCB2 146465A Part Number	Qty	224 WCB2 146466A Part Number	Qty	324 WCB2 146467A Part Number	Qty	424 WCB2 146468A Part Number	Qty
1	Mounting Flange Sub Assembly*	513348-01	1	513348-01	1	513348-01	1	513348-01	1
6	Stud	000245X0069	12	000245X0071	12	000245X0081	12	000245X0082	12
7	Friction Disc Sub Assembly*	513964-01	1	513964-01	2	513964-01	3	513964-01	4
12	Clamp Tube	306542-05	12	306542-20	12	306542-23	12	306542-24	12
13	Pressure Plate Sub Assembly*	513348-03	1	513348-03	1	513348-03	1	513348-03	1
17	Flat Washer	000153X0641	12	000153X0641	12	000153X0641	12	000153X0641	12
18	Locknut	000110X0073	12	000110X0073	12	000110X0073	12	000110X0073	12
19	Cylinder	513264	1	513264	1	513264	1	513264	1
21	Lip Seal	000402X0023	2	000402X0023	2	000402X0023	2	000402X0023	2
23	Lip Seal	000402X0024	2	000402X0024	2	000402X0024	2	000402X0024	2
28	Gear (not included with assembly)	411672-####	1	410970-####	1	412433-####	1	413195-####	1
29	Wear Spacer	N/A	N/A	308396	12	308396	24	308396	36
30	Reaction Plate Sub Assembly*	N/A	N/A	513348-02	1	513348-02	2	513348-02	3
33	Piston	513317	1	513317	1	513317	1	513317	1
34	Release Spring	416751-02	12	416751-02	24	416751-02	36	416751-02	48
105	Pipe Plug	000077X0021	1	000077X0021	1	000077X0021	1	000077X0021	1

* Individual parts breakdown for standard WCB2 sub-assemblies are in section 6.2

6.1.5 36WCB2 (Standard)

Item	Description	136 WCB2 146469A Part Number	Qty	236 WCB2 146470A Part Number	Qty	336 WCB2 146471A Part Number	Qty	436 WCB2 146472A Part Number	Qty
1	Mounting Flange Sub Assembly*	513985-01	1	513985-01	1	513985-01	1	513985-01	1
6	Stud	307111-04	16	307111-10	16	307111-05	16	307111-07	16
7	Friction Disc Sub Assembly*	513990	1	513990	2	513990	3	513990	4
12	Clamp Tube	308204-07	16	308204-02	16	308204-04	16	308204-05	16
13	Pressure Plate Sub Assembly*	513985-03	1	513985-03	1	513985-03	1	513985-03	1
17	Flat Washer	000067X0042	16	000067X0042	16	000067X0042	16	000067X0042	16
18	Locknut	000110X0075	16	000110X0075	16	000110X0075	16	000110X0075	16
19	Cylinder	513988	1	513988	1	513988	1	513988	1
21	Lip Seal	000402X0005	2	000402X0005	2	000402X0005	2	000402X0005	2
23	Lip Seal	000402X0006	2	000402X0006	2	000402X0006	2	000402X0006	2
28	Gear (not included with assembly)	416538-####	1	416536-####	1	416535-####	1	416537-####	1
29	Wear Spacer	N/A	N/A	308397	16	308397	32	308397	48
30	Reaction plate Sub Assembly*	N/A	N/A	513985-02	1	513985-02	2	513985-02	3
33	Piston	512858	1	512858	1	512858	1	512858	1
34	Release Spring	416751-01	16	416751-01	32	416751-01	48	416751-01	64
105	Pipe Plug	000077X0021	1	000077X0021	1	000077X0021	1	000077X0021	1

* Individual parts breakdown for standard WCB2 sub-assemblies are in section 6.2

6.1.6 48WCB2 (Standard)

Item	Description	148 WCB2 146473A Part Number	Qty	248 WCB2 146474A Part Number	Qty	348 WCB2 146475A Part Number	Qty	448 WCB2 146476A Part Number	Qty
1	Mounting Flange Sub Assembly*	514329-05	1	514329-05	1	514329-05	1	514329-05	1
6	Stud	307111-23	16	307111-22	16	307111-21	16	307111-20	16
7	Friction Disc Sub Assembly*	514325	1	514325	2	514325	3	514325	4
12	Clamp Tube	308440-08	16	308440-07	16	308440-06	16	308440-05	16
13	Pressure Plate Sub Assembly*	514329-01	1	514329-01	1	514329-01	1	514329-01	1
17	Flat Washer	000067X0042	16	000067X0042	16	000067X0042	16	000067X0042	16
18	Locknut	000110X0075	16	000110X0075	16	000110X0075	16	000110X0075	16
19	Cylinder	514516	1	514516	1	514516	1	514516	1
21	Lip Seal	000402X0042	2	000402X0042	2	000402X0042	2	000402X0042	2
23	Lip Seal	000402X0044	2	000402X0044	2	000402X0044	2	000402X0044	2
28	Gear (not included with assembly)	416794-####	1	416795-####	1	416688-####	1	416797-####	1
29	Wear Spacer	N/A	N/A	308398	16	308398	32	308398	48
30	Reaction plate Sub Assembly*	N/A	N/A	514329-02	1	514329-02	2	514329-02	3
33	Piston	514745	1	514745	1	514745	1	514745	1
34	Release Spring	416751-04	16	416751-04	32	416751-04	48	416751-04	64
105	Pipe Plug	000077X0021	1	000077X0021	1	000077X0021	1	000077X0021	1

* Individual parts breakdown for standard WCB2 sub-assemblies are in section 6.2

6.2 Sub-Assemblies (Standard)

6.2.1 Parts Breakdown of WCB2 Mounting Flange Sub-assemblies (Item 1). Reference: Figures 22 & 23.

Model		8 WCB2		14 WCB2		18 WCB2		24 WCB2		36 WCB2		48 WCB2	
Sub-Assembly Part No.		512508-01		513300-01		513232-01		513348-01		513985-01		514329-05	
Item	Description	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty
2	Mounting Flange	512496	1	512375	1	513207	1	513337	1	513986	1	514749	1
4	Wear Plate Screw	000030X540742		000153X101760		000153X072680		000153X068590		000153X0842	108	000153X122412	0
5	Locknut	000153X104942		000153X106160		000153X064280		000153X064290		000153X0844	108	000153X084412	0
3	Wear Plate	512507	1	415212	1	412953	1	508459	1	416527	1	416690	1
50	Inner Support Ring	N/A	N/A	N/A	N/A	413105	4	413107	3	414032-01	6	416618	5
51	Outer Support Ring	N/A	N/A	N/A	N/A	413106	4	413108	5	414033-01	9	416673	10
I	Inner O-ring	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	000073X04101	
O	Outer O-ring	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	000073X04111	

6.2.2 Parts Breakdown of WCB2 Pressure Plate Sub-assemblies (Item 13). Reference: Figures 22 & 23.

Model		8 WCB2		14 WCB2		18 WCB2		24 WCB2		36 WCB2		48 WCB2	
Sub-Assembly Part No.		512508-03		513300-03		513232-03		513348-03		513985-03		514329-01	
Item	Description	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty
14	Pressure Plate	512502	1	512377	1	513214	1	513345	1	512860	1	514513	1
4	Wear Plate Screw	000030X540742		000153X101760		000153X072680		000153X068590		000153X0842	108	000153X122312	0
5	Locknut	000153X104942		000153X106160		000153X064280		000153X064290		000153X0844	108	000153X088412	0
3	Wear Plate	512507	1	415212	1	412953	1	508459	1	416527	1	416690	1
50	Inner Support Ring	N/A	N/A	N/A	N/A	413105	4	413107	3	414032-01	6	416618	5
51	Outer Support Ring	N/A	N/A	N/A	N/A	413106	4	413108	5	414033-01	9	416673	10
I	Inner O-ring	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	000073X04101	
O	Outer O-ring	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	000073X04111	

6.2.3 Parts Breakdown of WCB2 Reaction Plate Sub-assemblies (Item 30). Reference: Figures 22 & 23.

Model		8 WCB2		14 WCB2		18 WCB2		24 WCB2		36 WCB2		48 WCB2	
Sub-Assembly Part No.		512508-02		513300-02		513232-02		513348-02		513985-02		514329-02	
Item	Description	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty
31	Reaction Plate	512504	1	512380	1	513217	1	513343	1	513989	1	514514	1
4	Wear Plate Screw	000030X540842		000153X101860		000153X068580		000153X068590		000153X0843	108	000153X122412	0
5	Locknut	000153X104942		000153X106160		000153X064280		000153X064290		000153X0844	108	000153X088412	0
3	Wear Plate	512507	2	415212	2	412953	2	508459	2	416527	2	416690	2
50	Inner Support Ring	N/A	N/A	N/A	N/A	413105	8	413107	6	414032-01	12	416618	10
51	Outer Support Ring	N/A	N/A	N/A	N/A	413106	8	413108	10	414033-01	18	416673	20
49	Washer	000067X003642		000067X004360		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
I	Inner O-ring	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	000073X04101	
O	Outer O-ring	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	000073X04111	

6.2.4 Parts Breakdown of WCB2 Friction Disc Sub-assemblies (Item 7). Reference: Figures 22 & 23.

Model Sub-Assembly Part No.		8 WCB2 512512		14 WCB2 415208		18 WCB2 513882		24 WCB2 513964-01		36 WCB2 513990		48 WCB2 514325	
Item	Description	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty
8	Friction Disc	512509	2	415227	2	513657	2	508725	2	513658	16	514286	16
9	Friction Disc Core	512510	1	415207	1	513666	1	510745	1	513667	1	514287	1
57	Screw	N/A	N/A	N/A	N/A	000153X1147	48	000294X0407	36	000294X0407	144	000294X0407	224
10	Rivet	000130X0086	20	000130X0085	30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	Washer	000153X1065	20	000153X1064	30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

6.3.1 8WCB2 Parts (Corrosion Resistant)

Item	Description	108 WCB2 146455AJ Part Number	Qty	208 WCB2 146456AJ Part Number	Qty	308 WCB2 146457AJ Part Number	Qty
1	Mounting Flange Sub Assembly*						
6	Stud						
7	Friction Disc Sub Assembly*						
12	ClampTube						
13	Pressure Plate Sub Assembly*						
17	FlatWasher						
18	Locknut						
19	Cylinder						
21	LipSeal						
23	LipSeal						
28	Gear (not included with assembly)						
29	WearSpacer						
30	Reaction plate Sub Assembly*						
33	Piston						
34	ReleaseSpring						

* Individual parts breakdown for standard WCB2 sub-assemblies are in section 6.4
Contact the factory for part information if not shown.

6.3.2 14WCB2 Parts (Corrosion Resistant)

Item	Description	114 WCB2 146458AJ Part Number	Qty	214 WCB2 146459AJ Part Number	Qty	314 WCB2 146460AJ Part Number	Qty
1	Mounting Flange Sub Assembly*						
6	Stud						
7	Friction Disc Sub Assembly*						
12	ClampTube						
13	Pressure Plate Sub Assembly*						
17	FlatWasher						
18	Locknut						
19	Cylinder						
21	LipSeal						
23	LipSeal						
28	Gear (not included with assembly)						
29	WearSpacer						
30	Reaction plate Sub Assembly*						
33	Piston						
34	ReleaseSpring						

* Individual parts breakdown for standard WCB2 sub-assemblies are in section 6.4
Contact the factory for part information if not shown.

6.3.3 18WCB2 Parts (Corrosion Resistant)

Item	Description	118 WCB2 146461AJ Part Number	Qty	218 WCB2 146462AJ Part Number	Qty	318 WCB2 146463AJ Part Number	Qty	418 WCB2 146464AJ Part Number	Qty
1	Mounting Flange Sub Assembly*			514143-01	1				
6	Stud			308139-05	12				
7	Friction Disc Sub Assembly*			514172	2				
12	Clamp Tube			308207-05	12				
13	Pressure Plate Sub Assembly*			514143-03	1				
17	Flat Washer			000153X0727	12				
18	Locknut			000110X0070	12				
19	Cylinder			514017	1				
21	Lip Seal			000402X0021	2				
23	Lip Seal			000402x0022	2				
28	Gear (not included with assembly)			308208-####	1				
29	Wear Spacer			308445	12				
30	Reaction plate Sub Assembly*			514143-02	1				
33	Piston			514389	1				
34	Release Spring			308138	12				
N/A	Grease			000153X1182	2				

* Individual parts breakdown for standard WCB2 sub-assemblies are in section 6.4
Contact the factory for part information if not shown.

6.3.4 24WCB2 Parts (Corrosion Resistant)

Item	Description	124 WCB2 146465AJ Part Number	Qty	224 WCB2 146466AJ Part Number	Qty	324 WCB2 146467AJ Part Number	Qty	424 WCB2 146468AJ Part Number	Qty
1	Mounting Flange Sub Assembly*							514130-01	1
6	Stud							308160-08	12
7	Friction Disc Sub Assembly*							514131	4
12	Clamp Tube							308206-08	12
13	Pressure Plate Sub Assembly*							514130-03	1
17	Flat Washer							000153X0854	12
18	Locknut							000110X0076	12
19	Cylinder							514039	1
21	Lip Seal							000402X0023	2
23	Lip Seal							000402X0024	2
28	Gear (not included with assembly)							414343-####	1
29	Wear Spacer							308407	36
30	Reaction Plate Sub Assembly*							514130-02	3
33	Piston							513924	1
34	Release Spring							416751-02	48
105	Pipe Plug							000077X0021	1
N/A	Grease							000153X1182	1

* Individual parts breakdown for standard WCB2 sub-assemblies are in section 6.4
Contact the factory for part information if not shown.

6.3.5 36WCB2 Parts (Corrosion Resistant)

Item	Description	136 WCB2 146469AJ Part Number	Qty	236 WCB2 146470AJ Part Number	Qty	336 WCB2 146471AJ Part Number	Qty	436 WCB2 146472AJ Part Number	Qty
1	Mounting Flange Sub Assembly*			513284-01	1	513284-01	1	513284-01	1
6	Stud			307111-10	16	307111-05	16	307111-07	16
7	Friction Disc Sub Assembly*			514129	2	514129	3	514129	4
12	Clamp Tube			308204-02	16	308204-04	16	308204-05	16
13	Pressure Plate Sub Assembly*			513284-03	1	513284-03	1	513284-03	1
17	Flat Washer			000067X0042	16	000153X0850	16	000153X0850	16
18	Locknut			000110X0075	16	000110X0075	16	000110X0075	16
19	Cylinder			512809	1	512809	1	512809	1
21	Lip Seal			000402X0005	2	000402X0005	2	000402X0005	2
23	Lip Seal			000402X0006	2	000402X0006	2	000402X0006	2
28	Gear (not included with assembly)			416435-####	1	416435-####	1	416495-####	1
29	Wear Spacer			308400	16	308400	32	308400	48
30	Reaction plate Sub Assembly*			513284-02	1	513284-02	2	513284-02	3
33	Piston			513872	1	513872	1	513872	1
34	Release Spring			416751-01	32	416751-01	48	416751-01	64
105	Pipe Plug			000077X0021	1	000077X0021	1	000077X0021	1
N/A	Grease			000153X1182	2	000153X1182	3	000153X1182	4

* Individual parts breakdown for standard WCB2 sub-assemblies are in section 6.4
Contact the factory for part information if not shown.

6.3.6 48WCB2 Parts (Corrosion Resistant)

Item	Description	148 WCB2 146473AJ Part Number	Qty	248 WCB2 146474AJ Part Number	Qty	348 WCB2 146475AJ Part Number	Qty	448 WCB2 146476AJ Part Number	Qty
1	Mounting Flange Sub Assembly*					515200-05	1		
6	Stud					307111-21	16		
7	Friction Disc Sub Assembly*					515202	3		
12	Clamp Tube					308440-06	16		
13	Pressure Plate Sub Assembly*					515200-01	1		
17	Flat Washer					000067X0042	16		
18	Locknut					000110X0075	16		
19	Cylinder					515205	1		
21	Lip Seal					000402X0042	2		
23	Lip Seal					000402X0044	2		
28	Gear (not included with assembly)					417170-####	1		
29	Wear Spacer					308501	32		
30	Reaction plate Sub Assembly*					515200-02	2		
33	Piston					515206	1		
34	Release Spring					416751-04	48		
105	Pipe Plug					000077X0021	1		
N/A	Grease					000153X1182	0		

* Individual parts breakdown for standard WCB2 sub-assemblies are in section 6.4
Contact the factory for part information if not shown.

6.4 Sub-Assemblies (Corrosion Resistant)

6.4.1 Parts Breakdown of WCB2 Mounting Flange Sub-assemblies (Item 1). Reference: Figures 22 & 23.

Model		8 WCB2		14 WCB2		18 WCB2		24 WCB2		36 WCB2		48 WCB2	
Sub-Assembly Part No.						514143-01		514130-01		513284-01		515200-05	
Item	Description	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty
2	Mounting Flange					513207	1	513337	1	513986	1	514749	1
4	Wear Plate Screw					000153X0726	80	000153X0685	90	000153X0842	108	000153X1224	120
5	Locknut					000153X0856	80	000153X0856	90	000153X0844	108	000153X0884	120
3	Wear Plate					412953	1	508459	1	416527	1	416690	1
50	Inner Support Ring					413105	4	413107	3	414032-01	6	416618	5
51	Outer Support Ring					413106	4	413108	5	414033-01	9	416673	10
I	Inner O-ring					N/A	N/A	N/A	N/A	N/A	N/A	000073X0410	1
O	Outer O-ring					N/A	N/A	N/A	N/A	N/A	N/A	000073X0411	1

6.4.2 Parts Breakdown of WCB2 Pressure Plate Sub-assemblies (Item 13). Reference: Figures 22 & 23.

Model		8 WCB2		14 WCB2		18 WCB2		24 WCB2		36 WCB2		48 WCB2	
Sub-Assembly Part No.						514143-03		514130-03		513284-03		515200-01	
Item	Description	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty
14	Pressure Plate					514014	1	514044	1	513869	1	515203	1
4	Wear Plate Screw					000153X0726	80	000153X0685	90	000153X0842	108	000153X1223	120
5	Locknut					000153X0856	80	000153X0856	90	000153X0844	108	000153X0884	120
3	Wear Plate					412953	1	508459	1	416527	1	416690	1
50	Inner Support Ring					413105	4	413107	3	414032-01	6	416618	5
51	Outer Support Ring					413106	4	413108	5	414033-01	9	416673	10
I	Inner O-ring					N/A	N/A	N/A	N/A	N/A	N/A	000073X0410	1
O	Outer O-ring					N/A	N/A	N/A	N/A	N/A	N/A	000073X0411	1
54	Bushing					204114-02	12	203866-01	12	203863-04	16	308382-01	16

6.4.3 Parts Breakdown of WCB2 Reaction Plate Sub-assemblies (Item 30). Reference: Figures 22 & 23.

Model		8 WCB2		14 WCB2		18 WCB2		24 WCB2		36 WCB2		48 WCB2	
Sub-Assembly Part No.						514143-02		514130-02		513284-02		515200-02	
Item	Description	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty
31	Reaction Plate					514013	1	514040	1	512813	1	515204	1
4	Wear Plate Screw					000153X0685	80	000153X0685	90	000153X0843	108	000153X1224	120
5	Locknut					000153X0856	80	000153X0856	90	000153X0844	108	000153X0884	120
3	Wear Plate					412953	2	508459	2	416527	2	416690	2
50	Inner Support Ring					413105	8	413107	6	414032-01	12	416618	10
51	Outer Support Ring					413106	8	413108	10	414033-01	18	416673	20
I	Inner O-ring					N/A	N/A	N/A	N/A	N/A	N/A	000073X0410	2
O	Outer O-ring					N/A	N/A	N/A	N/A	N/A	N/A	000073X0411	2
54	Bushing					204114-04	12	203866-04	12	203863-03	16	308382-02	16

6.4.4 Parts Breakdown of WCB2 Friction Disc Sub-assemblies (Item 7). Reference: Figures 22 & 23.

Model		8 WCB2		14 WCB2		18 WCB2		24 WCB2		36 WCB2		48 WCB2	
Sub-Assembly Part No.						514172		514131		514129		515202	
Item	Description	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty	Part No.	Qty
8	Friction Disc					513657	2	508725	2	513658	16	514286	16
9	Friction Disc Core					514145	1	514140	1	514139	1	515201	1
57	Screw					000422X0008	48	000421X0407	36	000421X0407	144	000421X0407	224
10	Rivet					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	Washer					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

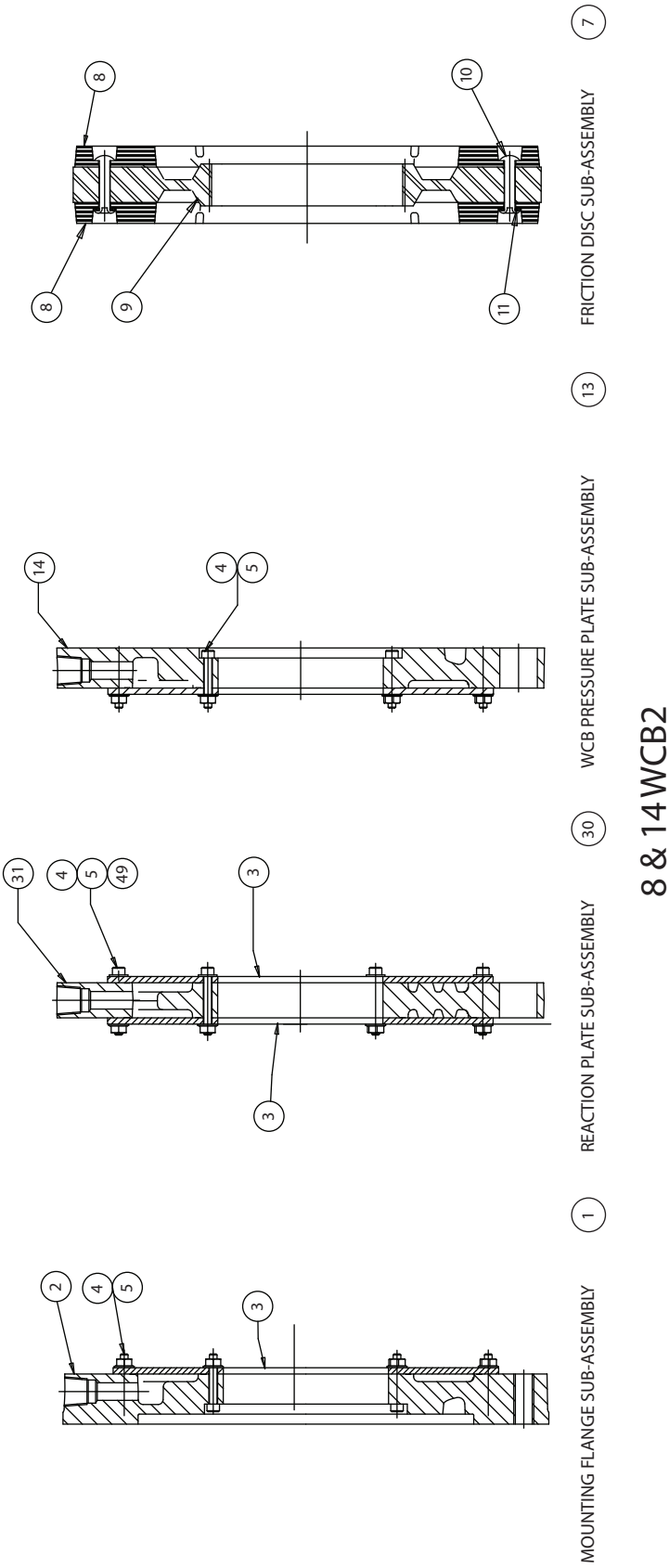

8 & 14 WCB2
7
FRICTION DISC SUB-ASSEMBLY
8
10
8
9
11
13
WCB PRESSURE PLATE SUB-ASSEMBLY
14
4
5
30
REACTION PLATE SUB-ASSEMBLY
31
4
5
49
3
3
1
MOUNTING FLANGE SUB-ASSEMBLY
2
4
5
3

Figure 22

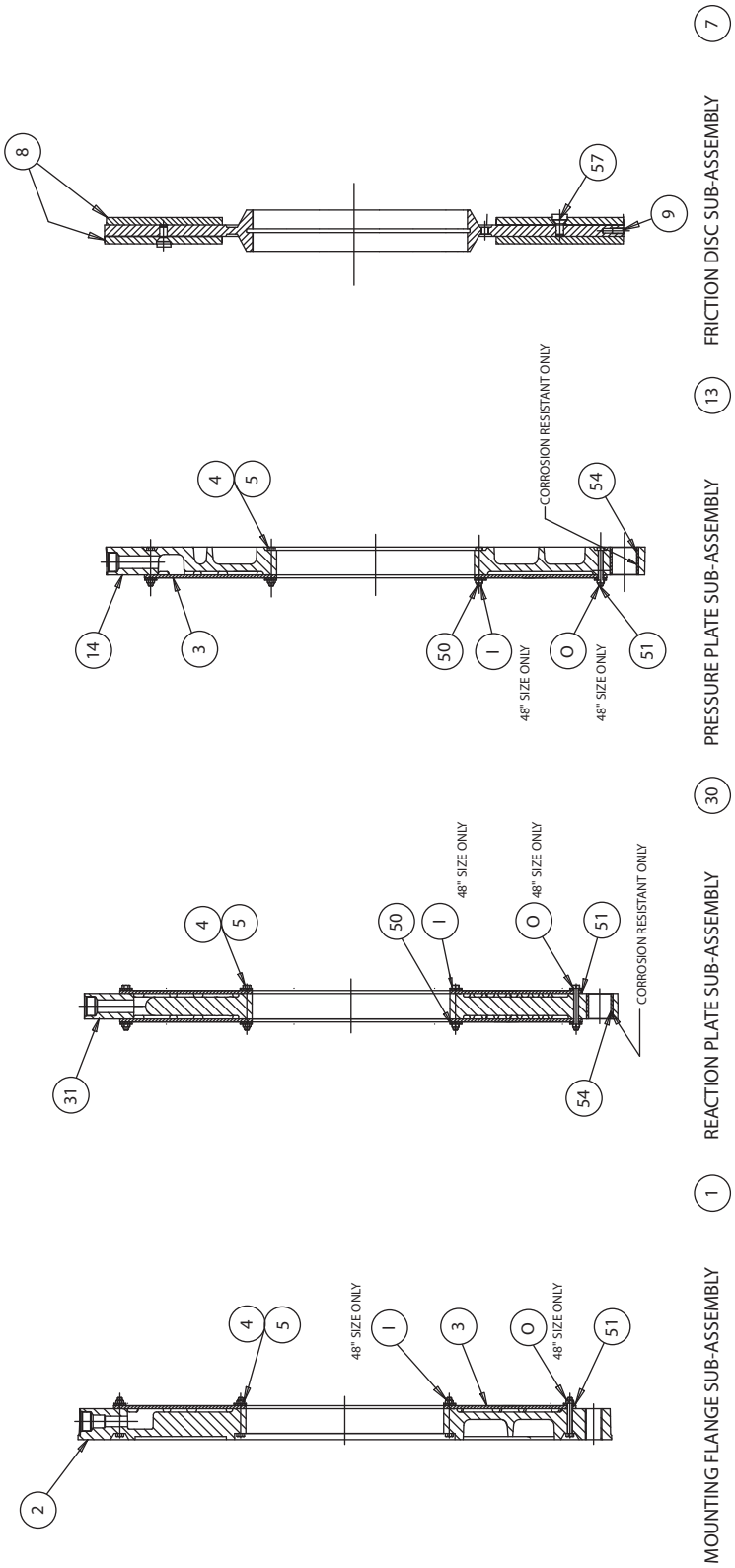

18, 24, 36 & 48 WCB2
MOUNTING FLANGE SUB-ASSEMBLY
REACTION PLATE SUB-ASSEMBLY
PRESSURE PLATE SUB-ASSEMBLY
FRICTION DISC SUB-ASSEMBLY
48" SIZE ONLY
CORROSION RESISTANT ONLY

Figure 23

7.0 KITS

Note : Item Numbers (#) for Kits Are Shown on Figures 22 & 23

7.1 Friction Disc Kit (Standard)

Model	Kit P/N	Description	Rivet (10)	Flat Washer (11)	Friction Disc (8)	Wear Spacer (29)	Flat Head Screw (57)	Loctite® #242 Sealant	Loctite® #262 Sealant	Instruction Sheet
108WCB2	107671B	Part No. Quantity	000130X0086 25	000153X1065 25	512509 2	N/A N/A	N/A N/A	N/A N/A	N/A N/A	204064 1
208WCB2	107671BA	Part No. Quantity	000130X0086 50	000153X1065 50	512509 4	308393 6	N/A N/A	N/A N/A	N/A N/A	204064 1
308WCB2	107671BB	Part No. Quantity	000130X0086 75	000153X1065 75	512509 6	308393 12	N/A N/A	N/A N/A	N/A N/A	204064 1
114WCB2	107672B	Part No. Quantity	000130X0085 35	000153X1064 35	415227 2	N/A N/A	N/A N/A	N/A N/A	N/A N/A	204064 1
214WCB2	107672BA	Part No. Quantity	000130X0085 70	000153X1064 70	415227 4	308388-01 6	N/A N/A	N/A N/A	N/A N/A	204064 1
314WCB2	107672BB	Part No. Quantity	000130X0085 105	000153X1064 105	415227 6	308388-01 12	N/A N/A	N/A N/A	N/A N/A	204064 1
118WCB2	107820B	Part No. Quantity	N/A N/A	N/A N/A	513657 2	N/A N/A	000153X1147 48	000153X0923 1	N/A N/A	204097 1
218WCB2	107820BA	Part No. Quantity	N/A N/A	N/A N/A	513657 4	308388-02 12	000153X1147 96	000153X0923 1	N/A N/A	204097 1
318WCB2	107820BB	Part No. Quantity	N/A N/A	N/A N/A	513657 6	308388-02 24	000153X1147 144	000153X0923 2	N/A N/A	204097 1
418WCB2	107820BC	Part No. Quantity	N/A N/A	N/A N/A	513657 8	308388-02 36	000153X1147 192	000153X0923 2	N/A N/A	204097 1
124WCB2	107821B	Part No. Quantity	N/A N/A	N/A N/A	508725 2	N/A N/A	000294X0407 36	N/A N/A	000153X1016 1	204097 1
224WCB2	107821BA	Part No. Quantity	N/A N/A	N/A N/A	508725 4	308396 12	000294X0407 72	N/A N/A	000153X1016 2	204097 1
324WCB2	107821BB	Part No. Quantity	N/A N/A	N/A N/A	508725 6	308396 24	000294X0407 108	N/A N/A	000153X1016 3	204097 1
424WCB2	107821BC	Part No. Quantity	N/A N/A	N/A N/A	508725 8	308396 36	000294 X 0407 144	N/A N/A	000153X1016 4	204097 1
136WCB2	107822B	Part No. Quantity	N/A N/A	N/A N/A	513658 16	N/A N/A	000294X0407 144	N/A N/A	000153X1168 1	204097 1
236WCB2	107822BA	Part No. Quantity	N/A N/A	N/A N/A	513658 32	308397 16	000294X0407 288	N/A N/A	000153X1168 2	204097 1
336WCB2	107822BB	Part No. Quantity	N/A N/A	N/A N/A	513658 48	308397 32	000294X0407 432	N/A N/A	000153X1168 3	204097 1
436WCB2	107822BC	Part No. Quantity	N/A N/A	N/A N/A	513658 64	308397 48	000294X0407 576	N/A N/A	000153X1168 4	204097 1
148WCB2	108058B	Part No. Quantity	N/A N/A	N/A N/A	514286 16	N/A N/A	000294X0407 224	N/A N/A	000153X1168 2	204097 1
248WCB2	108058BA	Part No. Quantity	N/A N/A	N/A N/A	514286 32	308398 16	000294X0407 448	N/A N/A	000153X1168 3	204097 1
348WCB2	108058BB	Part No. Quantity	N/A N/A	N/A N/A	514286 48	308398 32	000294X0407 672	N/A N/A	000153X1168 5	204097 1
448WCB2	108058BC	Part No. Quantity	N/A N/A	N/A N/A	514286 64	308398 48	000294X0407 896	N/A N/A	000153X1168 6	204097 1

7.2 Friction Disc Kit (Corrosion Resistant)

Model	Kit P/N	Description	Friction Disc (8)	Wear Spacer (29)	Flat Head Screw (57)	Loctite® #262 Sealant	936SF MOLUB-ALLOY	Instruction Sheet
124WCB2	107821C	Part No. Quantity	508725 2	N/A N/A	000421X0407 36	000153X1016 1	000153X1182 1	204130 1
224WCB2	107821CA	Part No. Quantity	508725 4	308424 12	000421X0407 72	000153X1016 2	000153X1182 1	204130 1
324WCB2	107821CB	Part No. Quantity	508725 6	308424 24	000421X0407 108	000153X1016 3	000153X1182 1	204130 1
424WCB2	107821CC	Part No. Quantity	508725 8	308424 36	000421X0407 144	000153X1016 4	000153X1182 1	204130 1
136WCB2	107822C	Part No. Quantity	513658 16	N/A N/A	000421X0407 144	000153X1168 1	000153X1182 1	204130 1
236WCB2	107822CA	Part No. Quantity	513658 32	308425 16	000421X0407 288	000153X1168 2	000153X1182 1	204130 1
336WCB2	107822CB	Part No. Quantity	513658 48	308425 32	000421X0407 432	000153X1168 3	000153X1182 1	204130 1
436WCB2	107822CC	Part No. Quantity	513658 64	308425 48	000421X0407 576	000153X1168 4	000153X1182 4	204130 1
148WCB2	108058C	Part No. Quantity						
248WCB2	108058CA	Part No. Quantity						
348WCB2	108058CB	Part No. Quantity						
448WCB2	108058CC	Part No. Quantity						

7.3 Cylinder Seal Kits

Model	Kit P/N	Description	Lip Seal (Inner) (21)	Lip Seal (Outer) (23)	Seal Lubricant	Instruction Sheet
8WCB2	107671C	Part No. Quantity	000402X0001 1	000402X0002 1	000153X1239 1	204067 1
14WCB2	107672C	Part No. Quantity	000402X0003 1	000402X0004 1	000153X1239 1	204067 1
18WCB2	107726C	Part No. Quantity	000402X0021 2	000402X0022 2	000153X1239 1	204067 1
24WCB2	107727C	Part No. Quantity	000402X0023 2	000402X0024 2	000153X1239 1	204067 1
36WCB2	107662C	Part No. Quantity	000402X0005 2	000402X0006 2	000153X1239 1	204067 1
48WCB2	108055C	Part No. Quantity	000402X0042 2	000402X0044 2	000153X1239 1	204067 1

7.4 Wear Plate Kit for Mounting Flange and Pressure Plate

Model	Kit P/N	Description	Screw (4)	Lock Nut (5)	Wear Plate (3)	Inner Support Ring (50)	Outer Support Ring (51)	Loctite #596	Instruction Sheet
8WCB2	107671A	Part No. Quantity	000030X540784	000153X084484	512507 2	N/A	N/A	000153X1071 1	204063 1
14WCB2	107672A	Part No. Quantity	000153X1017120	000153X1061120	415212 2	N/A	N/A	000153X1071 1	204063 1
18WCB2	107726A	Part No. Quantity	000153X0642160	000153X0726160	412953 2	413105 8	413106 8	000153X1071 1	204063 1
24WCB2	107727A	Part No. Quantity	000153X0642180	000153X0685180	508459 2	413107 6	413108 10	000153X1071 1	204063 1
36WCB2	107662A	Part No. Quantity	000153X0842216	000153X0844216	416527 2	414032-01 12	414033-01 18	000153X1071 2	204063 1

Model	Kit P/N	Description	Screw Pressure Plate (4)	Screw Mounting Flange (4)	Lock Nut (5)	Wear Plate (3)	Inner Support Ring (50)	Outer Support Ring (51)	Inner O-Ring (I)	Outer O-Ring (O)	Loctite #596	Instruction Sheet
48WCB2	108055A	Part No. Quantity	000153X1223120	000153X1224120	000153X0844240	416690 2	416618 10	416673 20	000073X0410 2	000073X0411 2	000153X1071 3	204063 1

7.5 Wear Plate Kit for Reaction Plate

Model	Kit P/N	Description	Screw (4)	Lock Nut (5)	Washer (49)	Wear Plate (3)	Inner Support Ring (50)	Outer Support Ring (51)	Loctite #596	Instruction Sheet
8WCB2	107671E	Part No. Quantity	000030X540842	000153X104942	000067X003642	512507 2	N/A	N/A	000153X1071 2	204063 1
14WCB2	107672E	Part No. Quantity	000153X101860	000153X106160	000067X000160	415212 2	N/A	N/A	000153X1071 2	204063 1
18WCB2	107726E	Part No. Quantity	000153X064280	000153X068580	N/A	412953 2	413105 8	413106 8	000153X1071 2	204063 1
24WCB2	107727E	Part No. Quantity	000153X064290	000153X068590	N/A	508459 2	413107 6	413108 10	000153X1071 2	204063 1
36WCB2	107662E	Part No. Quantity	000153X0843108	000153X0844108	N/A	416527 2	414032-01 12	414033-01 18	000153X1071 2	204063 1

Model	Kit P/N	Description	Screw (4)	Lock Nut (5)	Wear Plate (3)	Inner Support Ring (50)	Outer Support Ring (51)	Inner O-Ring (I)	Outer O-Ring (O)	Loctite #596	Instruction Sheet
48WCB2	108055A	Part No. Quantity	000153X1224120	000153X0844120	416690 2	416618 10	416673 20	000073X0410 2	000073X0411 2	000153X1071 3	204063 1

8.0 REVISIONS

Original Publication Date: April 2002

Revision Date	Change	Page
October 2014	Added Section 8 (REVISION PAGE) to the table of contents	3
	Corrected Table 2 size 8WCB2 with the correct English units dimensional information.	8
	Added Section 2.4.3	12
	Added metric units to Table 10	18
	Added section 4.6.5	21, 22
	Renumbered parts lists in Sections 6.1 to 6.4	29, 30, 31, 33, 34, 35, 36
	Added Item 7, 28, 29,	29, 30, 31, 33, 34, 35
	Added corrected description for Item 7	29, 30, 31, 33, 34, 35
	Updated parts lists with the correct part numbers and descriptions in Section 6.1.2.1 and 6.1.2.2	32
	Updated parts lists with the correct part numbers and descriptions in Section 6.1.2.3 and 6.1.2.4	32, 33
	Updated parts lists with the correct part numbers and descriptions and quantities in Section 6.2	33, 34, 35
	Added parts lists for styles 18 and 24 in Section 6.2.2.1 and 6.2.2.2	36
	Added parts lists for styles 18 and 48 in Section 6.2.2.3 and 6.2.2.4	36
	Corrected part numbers and quantities for styles 24 and 36 in Section 6.2.2.3 and 6.2.2.4	36
	Updated Figure 21 (48WCB2)	38
	Corrected parts lists in Section 7.4 and 7.5	41
	Added Section 8 (REVISION PAGE)	42
	Deleted warranty page.	
	Added current back cover page. Last	
	IOM WCB11070 format, text, tables and figures revised for entire manual	
December 2016	Added part number on cover page	1
	Deleted notes related to PTFE in section 4.6	21
	Deleted figure 14, 15 & 16 from wear plate replacement section 4.6	22
	Corrected cylinder seal replacement image for 8 & 14WCB2 in section 4.7	25
	Corrected 24WCB2 mounting flange sub assembly part number in section 6.2.1	32
	Corrected wear plate screw part number in section 6.2.3	32
	Corrected screw part numbers in friction disc sub assembly section 6.2.4	33
	Corrected friction disk subassembly quantity in section 6.3.3	34
	Corrected 436WCB2 wear spaces part number in section 6.3.5	35
	Corrected reaction plate part number for 24WCB2 in section 6.4.3	36
	Corrected O ring quantity for 48WCB2 in section 6.4.3	36
	Corrected screw part number for 36WCB2 & 48WCB2 in section 6.4.4	36
	Corrected instruction sheet part number in section 7.1	39
	Corrected 224, 324, 424WCB2 wear spacer part number in section 7.2	40
	Deleted PTFE Gasket part number columns & added Loctite #596 colimn in section 7.4	41
	Corrected 48WCB2 kit part number in section 7.4	41
	Deleted PTFE Gasket part number columns & added Loctite #596 column in section 7.5	41
	Corrected 48WCB2 kit part number in section 7.5	41

ENGINEERING
TOMORROW

Products we offer:

- Cartridge valves
- DCV directional control valves
- Electric converters
- Electric machines
- Electric motors
- Gear motors
- Gear pumps
- Hydraulic integrated circuits (HICs)
- Hydrostatic motors
- Hydrostatic pumps
- Orbital motors
- PLUS+1® controllers
- PLUS+1® displays
- PLUS+1® joysticks and pedals
- PLUS+1® operator interfaces
- PLUS+1® sensors
- PLUS+1® software
- PLUS+1® software services, support and training
- Position controls and sensors
- PVG proportional valves
- Steering components and systems
- Telematics

Hydro-Gear
www.hydro-gear.com

Daikin-Sauer-Danfoss
www.daikin-sauer-danfoss.com

Danfoss Power Solutions is a global manufacturer and supplier of high-quality hydraulic and electric components. We specialize in providing state-of-the-art technology and solutions that excel in the harsh operating conditions of the mobile off-highway market as well as the marine sector. Building on our extensive applications expertise, we work closely with you to ensure exceptional performance for a broad range of applications. We help you and other customers around the world speed up system development, reduce costs and bring vehicles and vessels to market faster.

Danfoss Power Solutions – your strongest partner in mobile hydraulics and mobile electrification.

Go to www.danfoss.com for further product information.

We offer you expert worldwide support for ensuring the best possible solutions for outstanding performance. And with an extensive network of Global Service Partners, we also provide you with comprehensive global service for all of our components.

Local address:

Danfoss
Power Solutions (US) Company
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515 239 6000

Danfoss
Power Solutions GmbH & Co. OHG
Krokamp 35
D-24539 Neumünster, Germany
Phone: +49 4321 871 0

Danfoss
Power Solutions ApS
Nordborgvej 81
DK-6430 Nordborg, Denmark
Phone: +45 7488 2222

Danfoss
Power Solutions Trading (Shanghai) Co., Ltd.
Building #22, No. 1000 Jin Hai Rd
Jin Qiao, Pudong New District
Shanghai, China 201206
Phone: +86 21 2080 6201

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without subsequent changes being necessary in specifications already agreed.
All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.

© Danfoss | September 2022