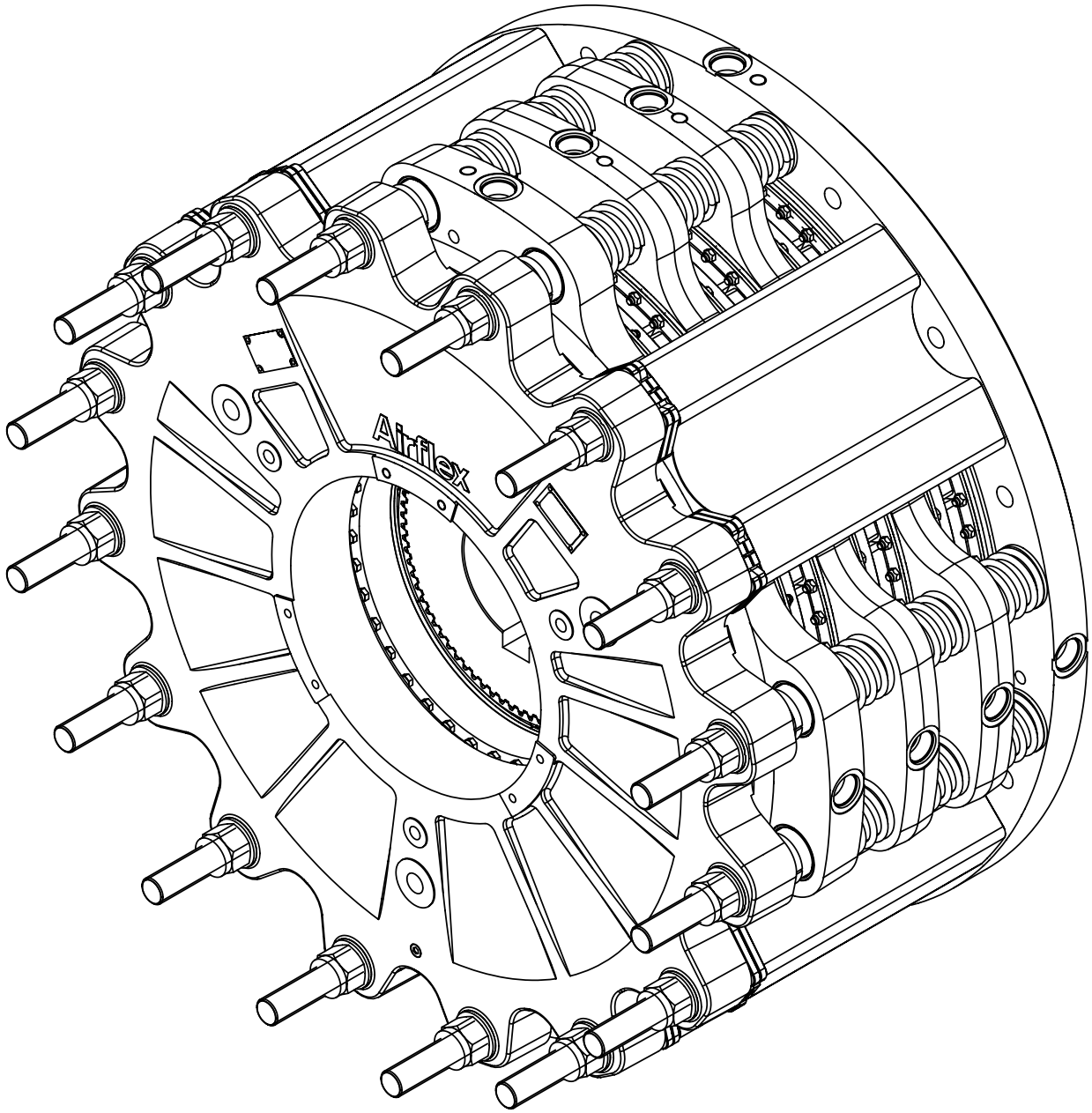
WCB 11080 WCBD3 Water Cooled Tensioner - Installation, Operation and Maintenance Manual

Airflex ® Product Line



AN447678527359en-000102

WCBD3 Tensioners

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, Opera - tion or Maintenance may result in personal injury or equip - ment damage.

⚠ Caution

Use Only Genuine Airflex ® Replacement Parts.
The Airflex Division of Danfoss Power Solutions 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:

In the U.S.A. and Canada: (800) 233-5890 Outside

the U.S.A. and Canada: (216) 281-2211

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WCBD3 Tensioners

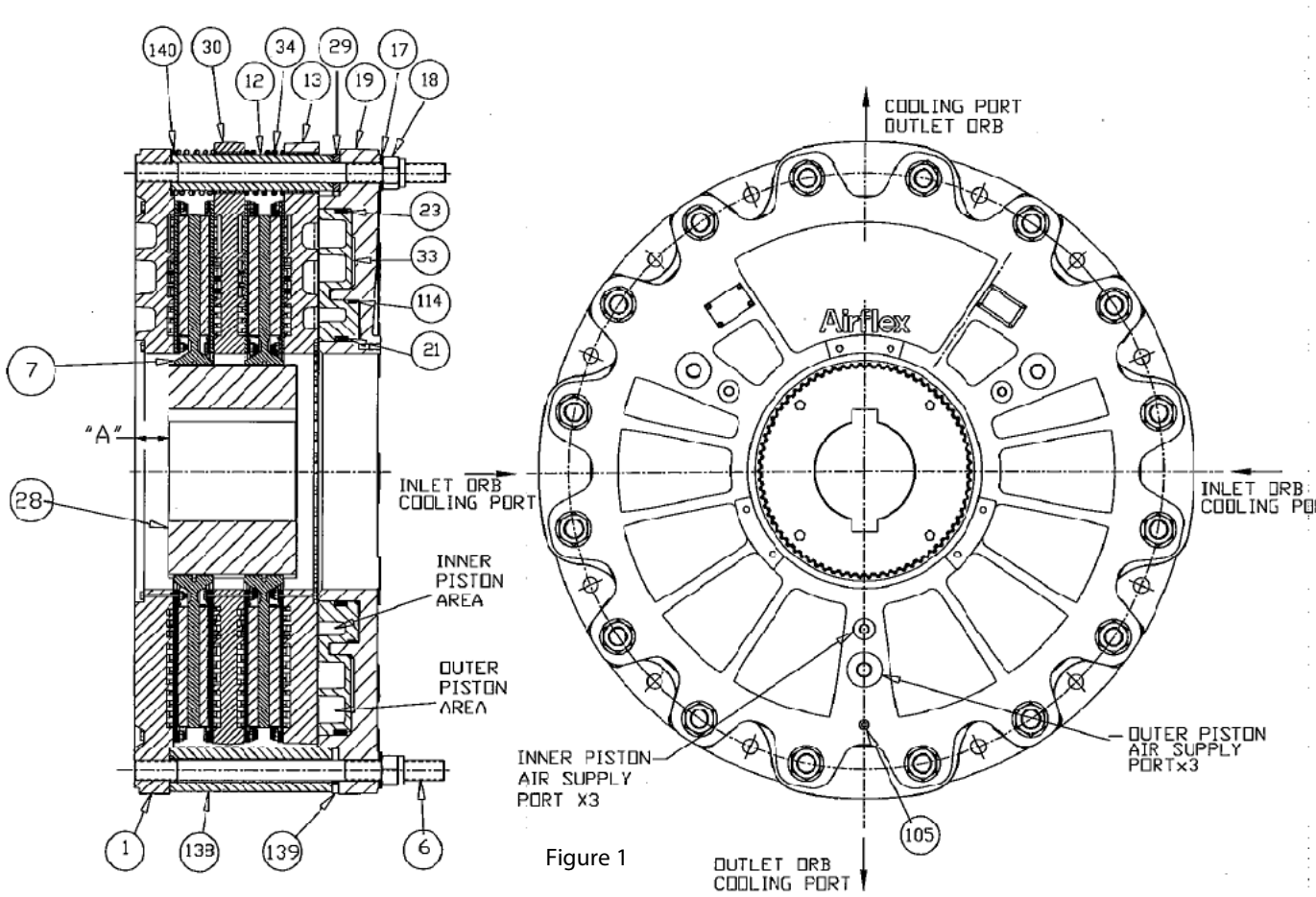


Figure 1

Table 1
Item Description

Item	Description
1	Mounting Flange
6	Stud
7	Friction Disc Assembly
12	Clamp Tube
13	Pressure Plate
17	Flat Washer
18	Self Locking Nut
19	Cylinder
21	Seal (inner)
23	Seal (outer)
28	Gear
29	Clamp Tube Wear Spacer
30	Reaction Plate
33	Dual Piston
34	Release Spring
105	Pipe Plug
114	Seal (Intermediate)
138	Support Beam
139	Support Beam Wear Spacer
140	Spring Spacer

WCBD3 Tensioners

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, the Warning and the Caution procedures by which hazards are to be avoided.

1.1 Description

1.1.1 The Airflex Model WCBD3 water cooled tensioner is designed for constant tension applications and is designed with a dual piston and cylinder that is also referred to as the “power head assembly”. It is exceptionally well suited for high inertia stopping, rapid heat dissipation. Corrosion resistant materials and coatings are used in all assemblies to provide durable corrosion protection. The design of the WCBD3 tensioner permits mid-shaft or end-shaft mounting and can handle high horsepower for higher RPM. The addition of the support beam design adds strength and rigidity to the assembly and eliminates the need for outboard support. The WCBD3 wear spacer design and location allow for easy wear adjustment of models with multiple friction disc assemblies. The rugged construction ensures long, trouble free service.

1.1.2 The 36WCBD3 tensioner is available in one basic size and can be supplied as single, dual, triple or quadruple disc assemblies. The model number identifies the number of discs and the nominal disc diameter. For example, 336WCBD3 indicates three 36” diameter discs.

1.1.3 When size, such as 36WCBD3, is referred to in this manual, it means that the information given applies to all models using the 36” diameter water-cooled disc assembly; i.e., 236WCBD3, 336WCBD3, etc.

1.1.4 Tensioners can be cooled with either closed loop or open loop cooling systems . Tensioners can be cooled with closed loop systems that utilize a water/ ethylene glycol mix, up to a 50/50 ratio.

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.

1.1.6 All Airflex WCBD3 tensioners are supplied with long wearing, non-asbestos friction material.

1.2 How It Works

1.2.1 Referring to Figure 1 and Table 1, the gear (28) is mounted on the shaft which is to be stopped and the tensioner assembly is attached to the machine frame. The Airflex WCBD3 has a dual chambered piston/cylinder power head assembly. In the WCBD3 tensioner, air pressure is applied to either the inner, outer, or both sets of the ports in the dual cylinder (19), causing the dual piston (33) and pressure plate assembly (13) to move towards the mounting flange(1), compressing the release springs (34). As the applied pressure to either or both pressure chambers increases, the friction disc assembly (7) is clamped between the pressure plate and mounting flange, stopping or controlling the shaft that the discs are mounted upon. Modulation of the air pressure then controls applied torque of the tensioner. The inner cylinder/piston pressure chambers are chamber area of the power head is referred to as the inner piston and the outer piston small cylinder/piston and the outer cylinder/piston chamber area is referred to as the large cylinder/ piston. Multiple disc tensioners utilize reaction plates (30) between the friction disc assemblies. The release springs (34) assist the disengagement and retraction of the piston (33) pressure plate (13) and reaction plates (30). High heat dissipation is accomplished by passing coolant through a cavity behind the copper alloy wear plates (3).

Torque transfers through the tensioner from the shaft to be controlled; through the friction disc assembly (7), through the pressure plate (13) and reaction plates (30), through the clamp tubes (12) and studs (6) and to the mounting flange (1) (which is attached to a rigid surface).

⚠ Caution
The tensioner is never to be operated without the coolant supply attached and coolant running through the unit

1.3 WCBD3 Dual Piston Design Advantages

The WCBD3 dual piston/cylinder power head offers precise tensioning control by dividing the piston/cylinder into small inner and large outer section sections. See Figure 1. This provides the ability to improve fine modulation of clamping pressure on the tensioner discs and improved control over our standard single chamber design. For very light tensioning loads, the outer piston can be used solely, with no pressure applied to the inner piston. For the largest tensioning loads, both pistons can be used together. If it is desirable to operate the tensioner at maximum tensioning load and not utilize the precise tensioning feature, the tensioner can be ordered without the intermediate piston seal (114).

2.0 INSTALLATION

⚠ Danger
Prior to installation of the WCBD3 tensioner, make sure that the machinery will remain in a secured position. Failure to do so could result in serious personal injury or possibly death.

⚠ Warning
Only qualified maintenance personnel should in stall, 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 follow these instructions will result in unreasonable exposure to hazardous conditions or personal injury.

⚠ Caution
Do not paint the clamp tubes (12), the release springs (34), as this may hinder the engagement or disengagement of the tensioner.

2.1 Preparation and Alignment

Note: For proper operation and service life, the WCBD3 tensioner/brake must be oriented concentric and at right angles to the shaft within the limits shown in Table 2.

Table 2
Alignment Requirements

Size	Concentricity (Parallel,TIR) of Shaft and Element (Inches (mm))	Perpendicularly (Angular,TIR) of Mounting Flange to Shaft* (Inches (mm))
36WCBD3	0.010 (0,25)	0.019 (0,48)

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

⚠ Caution
Proper alignment is necessary to assure that the friction disc assemblies (7) will 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 block and gear (28). See Figure 2.

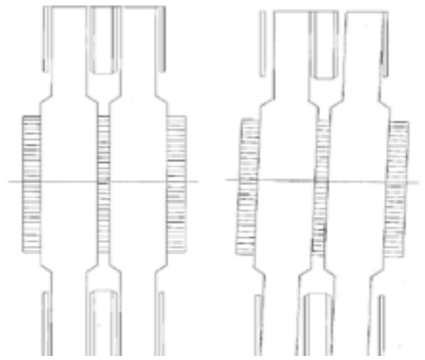


Figure 2

2.1.2 To aid in obtaining accurate readings, a rigid bracket should be fabricated for mounting a dial indicator when checking alignment.

2.1.3 Bearing or machinery manufacturers may require different alignment tolerances. Use the tightest of those recommended.

2.1.4 Refer to the appropriate catalog information (available upon request) for appropriate envelope dimensions, mounting register diameters, mounting bolt circles and positions for each tensioner.

2.1.5 The tensioner reaction member (such as the machine frame) should have a machined register to allow for mounting and alignment control of the tensioner. The mounting surface should be designed to provide full support of the face of the mounting flange (1), preventing deflection during operation. Refer to appropriate catalog dimensional info or contact your Airflex representative for appropriate mounting configuration details.

2.1.6 Refer to Table 3 for the setup dimension between the tensioner mounting surface and the end of the gear (28) (dimension “A” on Figure 1). Gears should be positioned to ensure that - when the tensioner 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 classFN2S interference fit for inch shafting and ISO System S7h6 for metric shafting. Contact Airflex Application Engineering for specific recommendations.

Table 3
"A" Dimension on Figure #1 inches (mm)

Size	Single	Dual	Triple	Quad
36WCBD3	2.36 (59,9)	2.36 (59,9)	2.36 (59,9)	2.36 (59,9)

2.2 Mounting

2.2.1 The WCBD3 must be mounted to a clean, rigid surface with hardened, customer supplied, 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 (1) minimizes any deflection during operation and helps to ensure that the friction discs disc assemblies will track properly on the copper wear plates. Within the mounting flange (1), reaction plate (30) and pressure plate (13) assemblies.

Note: To facilitate the mounting process, the friction disc assemblies should be aligned to the gear and centered in the tensioner. With the tensioner positioned with the mounting flange (1) facing down, lower the gear (28) slowly and carefully into the splined bore of the friction disc assemblies (7). Adjust the discs so that they are centered in the tensioner and fit in the gear. Apply and maintain an air pressure of 25 psi (1.7 Bar) to the cylinder. This will engage and hold the friction discs 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 tensioner torque.

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

2.2.3 Apply a light coat of anti-seizing compound or 30 weight oil to the shaft. Tap the key into the shaft keyway.

2.2.4 Heat the gear (28) uniformly to 250°F (121°C) to expand the bore and ease assembly. Press the gear onto the shaft, making sure the dimension between the gear and tensioner mounting surface ("A") is held at 2.36" (59.9 mm) See Figure 1 and Table 3. Allow the gear to cool to ambient temperature after it has been properly positioned on the shaft.

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

Do not allow the gear temperature to exceed 350º (176º). Overheating the gear will adversely affect the hardness and wear life.

2.2.5 Pre-fill the grease channel in the friction disc splines (if applicable) with MOLUB-ALLOY 936SF Heavy grease or equivalent as shown in Figure 3. Try to maintain the grease level at 1/8" (3 mm) below the top of the friction disc splines as shown in Figure 3. For reference, the recommended grease is Danfoss Part Number 000153X1182.

⚠ Caution
Excessive lubricant in the grease channel and on the gear teeth may contaminate friction disc 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.

Note: Orient the tensioner to position the drain plug (105) at the 6 o'clock position. This will guarantee the coolant outlets are at the 12 o'clock and 6 o'clock position (provided that the tensioner is been assembled correctly).

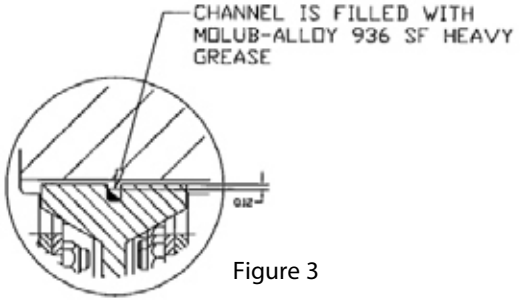


Figure 3

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

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

Item No. & Description	Specification	36WCBD3
000153x0843 Screw (xx)	Size	3/8-16 NC2
000153x0844 Lock Nut (xx)	Quantity	*
	Torque (Dry)	40 (54)
18 Self Locking Nut	Size	1-3/8 - 6NC-2 Gr. 8
	Torque (Lubed)	750 (1015)
Mounting Screw (Customer Supplied)	Size	1-8NC-2 Gr. 8
	Quantity	12
	Torque (Lubed)	660 (895)

* Reference subassembly drawing 515635.
Quan 108 screw & locknut for mounting flange sub assembly
Quan 108 screw & locknut for pressure plate sub assembly
Quan 108 screw & locknut for each reaction plate sub assembly

2.2.7 WCBD3 tensioners should be covered to protect the WCBD3 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.

⚠ Warning
Contamination from rain, overspray, coolant, dirt, oils and grease must be avoided. Failing to provide adequate protection against contamination may result in loss of performance and/or damage to the tensioner.

2.3 Air System

2.3.1 Maximum allowable pressure is 150 psig (10.3 Bar).

⚠ Warning
Maximum allowable air pressure in cylinder (19) is 150 psig (10.3 Bar). Application of pressure exceeding maximum allowable pressure may result in damage to the tensioner.

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

2.3.3 The air inlet size is shown in Table 5. Air inlets are located on the face of the cylinder (19). Each size of 36WCBD3 tensioner has three (3) air inlet ports for the inner (smaller) piston and three (3) air inlet ports for the outer (larger) piston. Additionally, each size 36WCBD3 has one drain hole that is to be used to purge moisture from the cylinder. See Figure 1 and reference the drain plug (105). The outboard port next to the drain plug shall be located at the 6 o'clock position to facilitate purging of moisture that may accumulate in the air system or cylinder.

Table 5
Air Inlet Size

Port	Thread Size
Air inlet (inboard)	3/8"-18 NPT
Air inlet (outboard)	3/4"-14 NPT
Drain Plug	3/8"-18 NPT

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

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

2.3.5 The WCBD3 tensioner does not require lubricated air; however associated control valves may. Consult the valve manufacturer for appropriate recommendations.

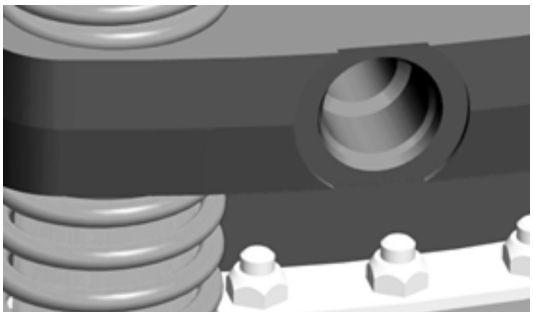
⚠ Caution
The use of lubricated air in the air supply system (if required) will require the addition of a 'point of use' lubricator. Lubricated air is not required for the WCBD3 Danfoss Tensioner but once lubrication is used, lubrication will always be required in the air system. If the lubricator is allowed to run dry then pneumatic valves and cylinders will dry out and stick thus creating erratic operation and down-time. Good engineering design practices shall be followed when using lubrication thus avoiding the overuse of lubrication, long airline runs and elevation changes.

2.4 Coolant System

2.4.1 The 36WCBD3 is designed with four (4) coolant ports on in each pressure plate (13), mounting flange (1) and reaction plate (30). Each plate has two opposing inlet ports and two opposing outlet ports. In order to mount the 36WCBD3 with the coolant

inlet and outlet ports in the proper orientation, first locate the three pair of air supply ports on the cylinder. One of the pairs of air supply ports has a third port which is a drain port (See Figure 1, drain plug 105) outboard the inlet. This third port is a drain for purging water from the piston and the system air-line Reference Figure 1, plug (105) for the drain port. Position the 36WCBD3 so that the drain port is located at the 6 o'clock position. Thus, the water coolant outlets will be located at the 12 o'clock & 6 o'clock positions while the water coolant inlets will be located at the 3 o'clock & 9 o'clock positions.

2.4.2 The coolant porting is designed for SAE O-ring Boss (ORB) fittings. The ORB fittings conform to the J514 & J1926/3 specification for torque values. The O-ring Boss ports are used for the hydraulic cooling media. Follow the fitting manufacturer's recommendation for the proper method of installation and tightening. The WCBD3 water cooled brake is designed with SAE O-ring Boss (ORB) ports for the coolant inlets and outlets. These ports utilize a straight thread and an O-ring for sealing versus the NPT tapered thread used previously. ORB ports provide superior sealing properties and reduce the risk of damage to the brake during fitting installation. An ORB port can be identified by the machined spot face and a chamfer (for sealing of the O-ring). See Figure 4. Follow the fitting manufacturer's recommendation for the proper method of installation and tightening. The 36WCBD3 uses the SAE-20 for the ORB port size.



ORB PORT
Figure 4

2.4.3 Each inlet and outlet coolant port in each mounting flange (1), reaction plate (30) and pressure plate (13) is designed with a 'fixed' orifice. The fixed orifice is designed to proportion the flow to what is required by each component. Thus, a reaction plate that requires a total of 100 GPM has the ports designed to pass 50 GPM per port. Alternately, a pressure plate that requires 50 GPM has the ports designed to pass 25 GPM per port. (The pressure plate and the mounting flange are designed for 50% of the flow of the reaction plate). It is recommended, however, that the flow rate from each section be verified with some type of flow metering device. It is recommended, however, that the flow rate from each section be verified with some type of flowmetering device.

2.4.4 After measuring the flow from each coolant section pressure plate (13), reaction plate (30) and mounting flange (1) outlet port, an adjustment may be required. Thus, it is recommended that each drain side (or return side) outlet port should be equipped with an adjustable flow controls on each outlet hose . The flow for each size tensioner should be balanced as shown Table 9.

2.4.5 Maximum allowable coolant pressure within the water cavity is 40 psig for size 36WCBD3 units.
See Table 7 for coolant pressure limitations as measured at the inlets and outlets of water jackets. Note that inlet 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 the maximum allowable, in Table 7, may result in damage to the tensioner.

⚠ 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 7.

2.4.6 The coolant supply and discharge hose, pipe and fitting sizes, along with minimum flow rates for the tensioner rated horsepower, are listed in Table 6.

Table 6
Coolant Supply Data

No of Discs	Disc Size inches	Thermal Rating	Water Inlet and outlet Pipe Size (Minimum piping I.D.)	Min Flow Rate GPM (dm^3/min) 100% Water	Min Flow Rate GPM (dm^3/min) 50% Water, 50% Ethylene Glycol by Vol
1	36	1000 (746)	SAE-20 J1926 ORB	100 (378)	149 (564)
2	36	2000 (1491)	SAE-20 J1926 ORB	200 (756)	298 (1128)
3	36	3000 (2237)	SAE-20 J1926 ORB	300 (1134)	447 (1692)
4	36	4000 (2983)	SAE-20 J1926 ORB	400 (1512)	596 (2256)

Table 7
Coolant Pressure, psi (bar)

Size	Maximum Static	Maximum Inlet*
36WCBD3	40 (2,7)	40 (2,7)

* Under Dynamic flow Conditions

Note: Above ratings for tensioning/winding type applications. For high cyclic application, consult the factory.

2.4.7 Coolant supply connections to the tensioner should provide a parallel flow through each coolant section of the tensioner. Series flow is not recommended as it can lead to overheating of the tensioner.

2.4.8 Inlet and outlet coolant manifolds must be provided. Manifolds should be constructed to allow for even flow through all ports. Individual hoses should be routed from the manifolds to each port in the pressure plate (13), reaction plates (30) and mounting flange (1).

⚠ Caution
Do not plug any ports or plumb the cooling passages in series. Parallel arrangement of hoses similar to that shown in Figure 5 are required for proper coolant flow.

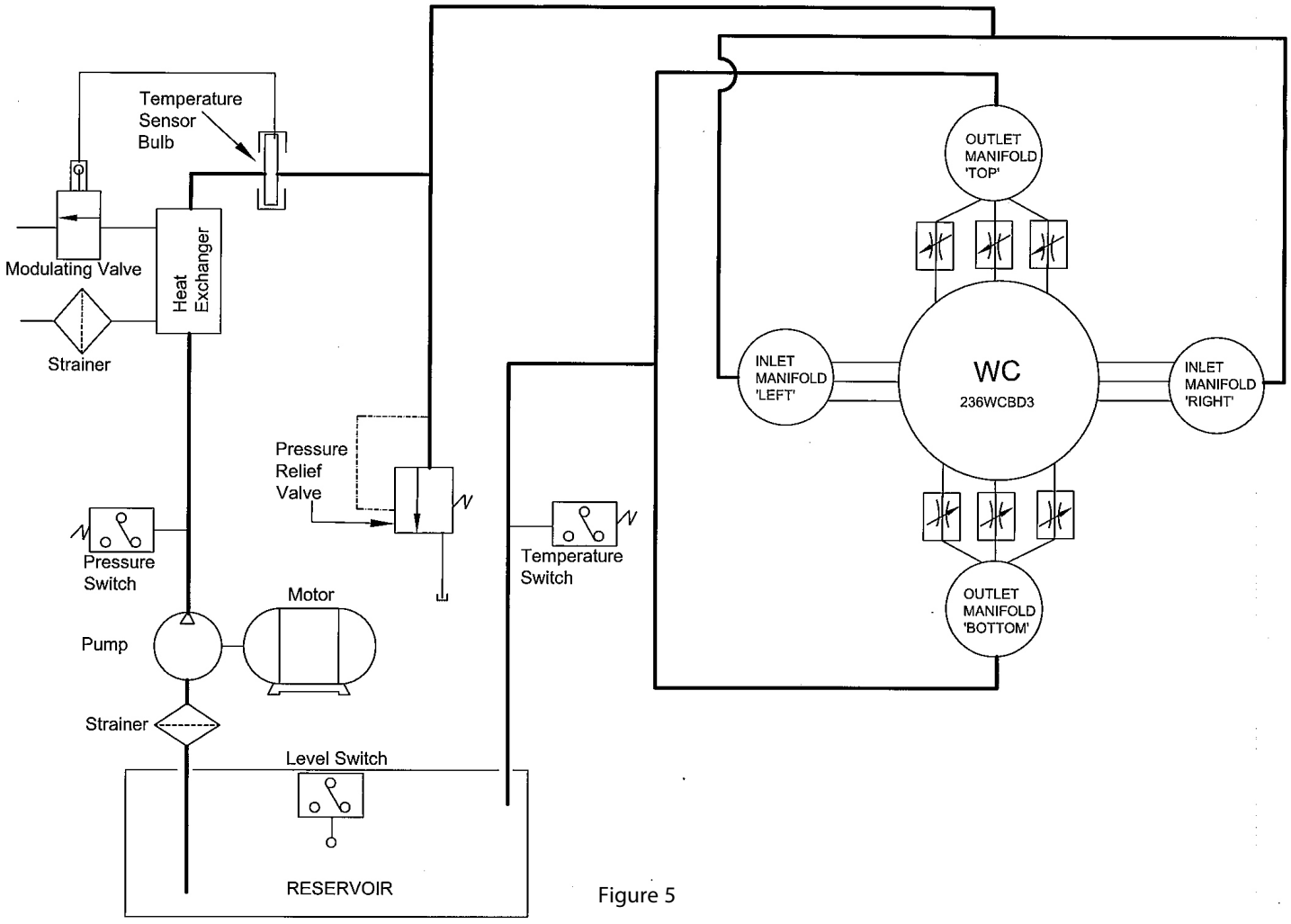


Figure 5

2.4.9 Inlet and outlet coolant manifolds and hoses must be sized to handle the maximum flow for each size tensioner per Table 6.

2.4.10 The number of flexible hoses required for both the inlet and outlet ports of each size tensioner is given listed in Table 8.

Table 8
Quantity of Cooling Water Hoses Required

Tensioner Size	136	236	336	436
No. of Inlet Hoses*	4	6	8	10
No. of Outlet Hoses*	4	6	8	10

* Hose ID shall be equal to or greater than supply & drain orifice ID.

2.4.11 Using flexible connecting hose to each tensioner coolant section will allow axial travel of the pressure plate (13), and reaction plate (30) and mounting flange (1) during tensioner operation without restricting the movement of the 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.

⚠ Caution
Short or excessively rigid hoses may restrict proper movement of the pressure plate (13) and reaction plates (30).

2.4.12 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.

2.4.13 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.

2.4.14 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.

Note: The schematic (Figure 5) illustrates a dual disc tensioner (236WCBD3). Three coolant 'supply' lines feed the ports at the 3 o'clock and 9 o'clock position. Three coolant 'return' lines 'drain' or 'recirculate' coolant from the ports at the 12 o'clock and 6 o'clock position. Reference to Table 8 for the quantity of hoses required for all sizes of 36WCBD3. Reference Refer to Table 16 9 for the percentage flow required at the outlet for all sizes of 36WCBD3. Figure 5 illustrates the supply lines & hoses and the return lines & hoses are equal in length and flow controls are located on the return lines to balance flow.

2.4.15 The maximum coolant supply temperature at the inlet should be 100° F (38° C) or lower. The coolant outlet temperature should not exceed the values given in Table 10. However, in no event should there be more than a 50° F (28° C) temperature rise between inlet and outlet. See Table 10 for maximum allowable outlet coolant temperature with various water/ethylene glycol mixtures and other cooling media.

⚠ Caution
Temperature rise between inlet and outlet temperatures in excess of recommendation may result in damage to the tensioner.

Table 9
Percentage of Flow Required for each Coolant Section Outlet

Tensioner Size	136	236	336	436
Mounting Flange 12 o'clock	25%	12.50%	8%	6.25%
Mounting Flange 6 o'clock	25%	12.50%	8%	6.25%
Reaction Plate 12 o'clock		25%	17%	12.50%
Reaction Plate 6 o'clock		25%	17%	12.50%
Reaction Plate 12 o'clock			17%	12.50%
Reaction Plate 6 o'clock			17%	12.50%
Reaction Plate 12 o'clock				12.50%
Reaction Plate 6 o'clock				12.50%
Pressure Plate 12 o'clock	25%	12.50%	8%	6.25%
Pressure Plate 6 o'clock	25%	12.50%	8%	6.25%

Note: Each Coolant Section has two Outlets. The Outlets are located at the 12 o'clock and 6 o'clock position. Flow controls (if required) should be installed in each outlet and adjusted to provide the percentage flow shown above.

Table 10
Maximum Outlet CoolantTemperature

Size	Water Ethylene Glycol Mixture % by Volume	Maximum Inlet Coolant Temperature °F (°C)	Maximum Outlet Coolant Temperature °F (°C)	Maximum Ambient Temperature °F (°C)	Minimum Ambient Temperature °F (°C)
36WCBD3	100/0	100 (38)	150 (66)	110 (43)	0 (-18)
36WCBD3	50/50	100 (38)	170 (77)	110 (43)	0 (-18)

2.4.16 Open Loop Systems

2.4.16.1 For efficient operation of the WCBD3, an adequate supply of filtered fresh water is required. Excessive water hardness promotes the formation of scale

deposits, which in time, will affect the service life of the WCBD3 unit. Water of high acidity or high in corrosive salts may cause electrolytic 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 ppm.
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.

2.4.17 Closed Loop Systems

2.4.17.1 For efficient operation of the WCBD3 in a closed loop system, ethylene glycol coolant conforming to SAE Standard J1034 -1996 Revision 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 is 7.5 to 10.5

3.0 OPERATION

3.1 Conditions of Operation

The following Hazard Warnings shall be followed for proper WCBD3 functioning.

⚠ Warning
Friction lining must be worn-in to achieve product torque rating. For new installations or after repair, a minimum wear-in period for the fiction couple of four hours at 50% of the rated horse power 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 of damage to the equipment.

⚠ Warning
Maximum free-wheeling speed must not exceed the speeds listed in Table 11. Exposure to speeds in excess of these values may cause the friction discs (8) to burst and result in extensive damage to the tensioner and/or cause personal injury.

⚠ Caution
For proper cooling of the WCBD3 tensioner, it is required that the coolant inlet and outlet manifolds be located as close as possible to the tensioner. It is recommended that the inlet hoses are of the same length and all outlet hoses are of the same length.

⚠ 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 cooling leakage due to overheating. Refer to Table 10 for the percentage of water/ethylene glycol mix and the corresponding maximum outlet coolant temperature.

⚠ 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)

⚠ Caution
The tensioner is never to be operated without the coolant supply attached and coolant running through the unit.

Table 11

Maximum Disc Speeds

Size	Maximum Slip Speeds (RPM)	Maximum Free Wheeling Speeds (RPM)
36WCBD3	475	700

3.2 Friction Lining Wear-In

3.2.1 A minimum wear-in period for the friction couple of four hours at 50% of the rated horse-power is recommended to achieve rated torque. Verify proper operation before putting the product into operation.

3.3 Pressure and Speed Limits

3.3.1 Maximum applied air pressure is 150 psig (10.2 Bar).

3.3.2 Maximum coolant pressure allowable within the

water cavities is 40 psig (2.75 Bar) for 36WCBD3 units. 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
Water piping elevations, restrictions in outlet piping or pressure surges may cause pressures that exceed the maximum allowable, resulting in damage to the tensioner.

3.3.3 Maximum slip speeds and free-wheeling disc speeds are shown in Table 11.

⚠ Caution
Excessive slip speeds will result in rapid friction material wear. For good life of wear components, the operating values in Table 11 should not be exceeded.

3.4 Periodic Maintenance

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

3.4.2 Periodically check for external air leakage in the area of the piston seals (21) (23). For replacement, refer to procedures in Section 4.0, Maintenance.

3.4.3 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 should not be used when draining the cylinder. Use adequate shielding to avoid contact with direct spray from moisture being purged from the cylinder.

3.4.4 Periodically observe the rotating discs while the tensioner is fully released. Dragging discs may be caused by wear or contamination of the gear or disc splines, lack of spline lubrication, disc imbalance, warped discs, or misalignment. Correct as required.

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

3.4.6 If leakage or blockage of any water-cooled chambers suspected, a static or dynamic test may be performed as follows:

3.4.6.1 Static Pressure Test

(a) Release the tensioner by exhausting the air pressure from the cylinder (19).

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

(b) Bleed all air from within the mounting flange (1), reaction plate (30) and pressure plate (13) coolant cavities cavity. Air bleeding must be accomplished by running coolant through the each cavity with the tensioner secured in its proper operating position.

⚠ Caution
Bleeding air from each coolant cavity will require isolation of the drain ports. When static test is complete, all isolation shall be removed to maintain full flow through the system.

⚠ Warning
Removing any hoses for isolation of the supply or drain ports will require a compatible fitting for the ORB porting. Failure to do so will damage the porting and cause leakage, a loss of flow and possible damage to the tensioner.

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 bled from each coolant cavity, isolate the drain ports and apply maximum allowable coolant pressure measured at the inlet to the water cavity. Maximum allowable is 40 PSIG (2.7 bar) for size 36WCBD3. Maintain this pressure for 30 minutes. Check for leakage at O.D. and I.D. wear plate seal areas.

3.4.6.2 Dynamic Flow Test

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

(b) There should be no restrictions on the outlet side of the tensioner to cause any back pressure to the unit.

Table 12
Wear Limits for WCBD3 Components

Item	Description	Wear Limit	Remarks
#3 Wear Plate	Friction Wear Signature	Maximum Wear for 36WCBD3 is: 0.050" (1,27mm)	Wear will be in form of even wear of circular grooves in the copper surface.
#8 Friction Disc	Friction Material	Fully Worn at Bottom of wear groove. See Figure #5 Friction Material must also be replaced if contaminated with oil or grease.	Brake has adjustment provision See Section 4.2
#7 Friction Disc Assembly (disc Core) #28 Gear	Gear Backlash	Maximum total backlash is 0.060" (1,5mm)	If step is worn in gear, gear must be replaced.
#12 Clamp Tube	Reaction Area	Maximum wear is 0.015" (0,38mm)	Wear will be in the form of notch or step on the side of tube
#13 Pressure plate assembly #30 Reaction plate assembly	Reaction Holes	Maximum ID is 2.877" (73,07mm)	Wear will be in the form of elongation of the original reaction hole diameter or enlarged hole.
#54 Pressure plate & Reaction plate Bushing	Reaction Hole Bushing ID	Maximum wear is 0.031" (0,80mm)	Wear will be in the form of elongation of the bushing ID.
#19 Cylinder	Seal Area	Maximum wear is 0.005" (0,13mm)	Wear will be in the form of grooves where the seals contact the cylinder wall
#34 Spring	Spring Free Height	Maximum free height is 4.130" (104,90mm)	Original free height is 4.250" (107,95mm) Springs must be replaced in complete sets

Coolant inlet and outlet sizes are listed in Table 15. Full size hoses and piping should be used. Check for low flow and/or leakage at the O.D. and I.D. wear plate seal areas.

⚠ Danger
Before performing any maintenance work on the WCBD3 tensioner, 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 WCBD3 units. Faulty workmanship will could 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 could result in unreasonable exposure to hazardous conditions or personal injury.

4.0 MAINTENANCE

4.1 Wear Limits

⚠ Warning
Periodically examine the tensioner for wear of friction linings and wear plates (3). 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 WCBD3 components are shown in Table 12. 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 tensioner torque may deteriorate to the point where the equipment will not stop properly.

4.2.1 Determining Wear

On single disc units, the friction material must be replaced when worn to the bottom of the groove of the friction lining (as shown on Figure 6 or any "X" or "Y" dimension (see Figure 7) exceeds the limits shown on Table 13). 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) (see Figure 8, Figure 9 & Figure 10) are NOT worn to their limits.

4.2.1.1 Single Disc Units Single Disc Unit Wear Adjustment

Apply approximately 25 PSIG (1.7 bar) air pressure to the cylinder to engage the tensioner. 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 (1) as shown in Figure 7. If either gap exceeds the limits shown in Table 13, the friction discs and/or wear plates must be inspected to ensure that the wear limits listed in Table 12 have not been exceeded.

Note: The clamp tube (12) rests on the mounting flange (1) and fits in the ID of the spring spacer (140). and the spacer is the same diameter as the clamp tube. When measuring between the pressure plate (13) and the mounting flange (1) it is important to measure to the surface of the mounting flange and not the top of the washer spring spacer.

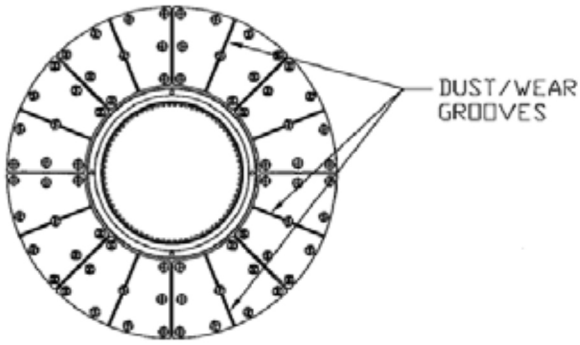


Figure 6

Table 13
36WCBD3 Wear Measurements X,Y & Z Gaps - inches (mm)

Number of Discs	X-New*	X-Max (Adjustment)	Z-New	Z-Min	Z-New	Z-Min	Z-New	Z-Min	Z-New	Z-Min	Y-New	Y-Min
1	1.64 (41.7)	2.06 (52.3)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2.87 (72.9)	2.45 (62.2)
2	1.78 (45.2)	2.20 (55.9)	2.67 (67.8)	2.25 (57.2)	2.67 (67.8)	2.25 (57.2)	n/a	n/a	n/a	n/a	2.87 (72.9)	2.45 (62.2)
3	1.92 (48.8)	2.34 (59.4)	2.67 (67.8)	2.25 (57.2)	2.67 (67.8)	2.25 (57.2)	2.67 (67.8)	2.25 (57.2)	n/a	n/a	2.87 (72.9)	2.45 (62.2)
4	2.06 (52.3)	2.48 (63.0)	2.67 (67.8)	2.25 (57.2)	2.67 (67.8)	2.25 (57.2)	2.67 (67.8)	2.25 (57.2)	2.67 (67.8)	2.25 (57.2)	2.87 (72.9)	2.45 (62.2)

*Value shown is the GAP after wear adjustment.
New or rebuilt brakes may vary slightly from 'NEW' values shown due to tolerances.

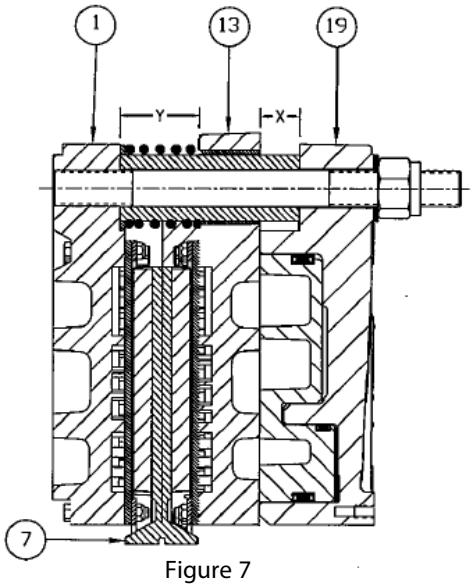


Figure 7

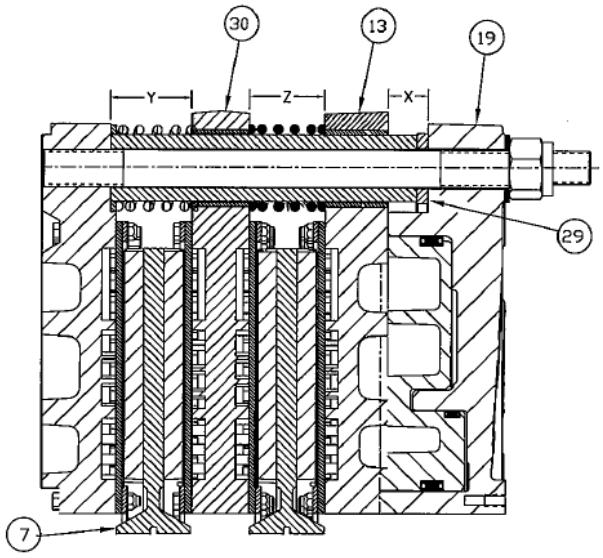


Figure 8

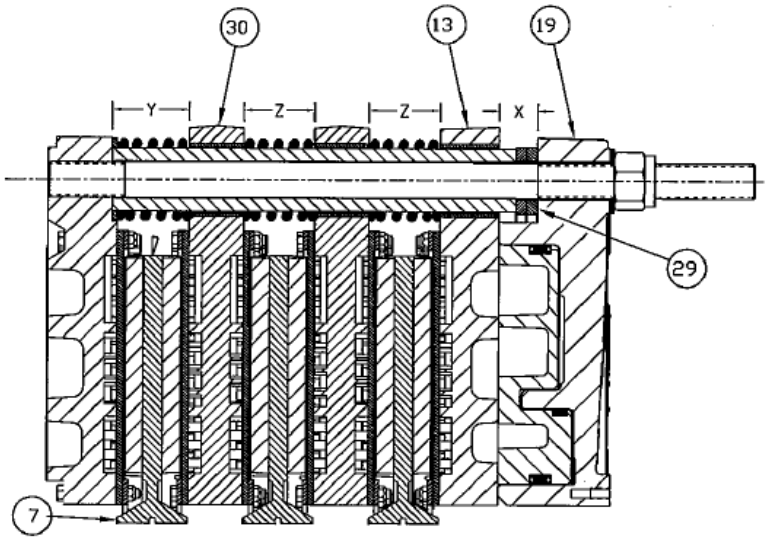


Figure 9

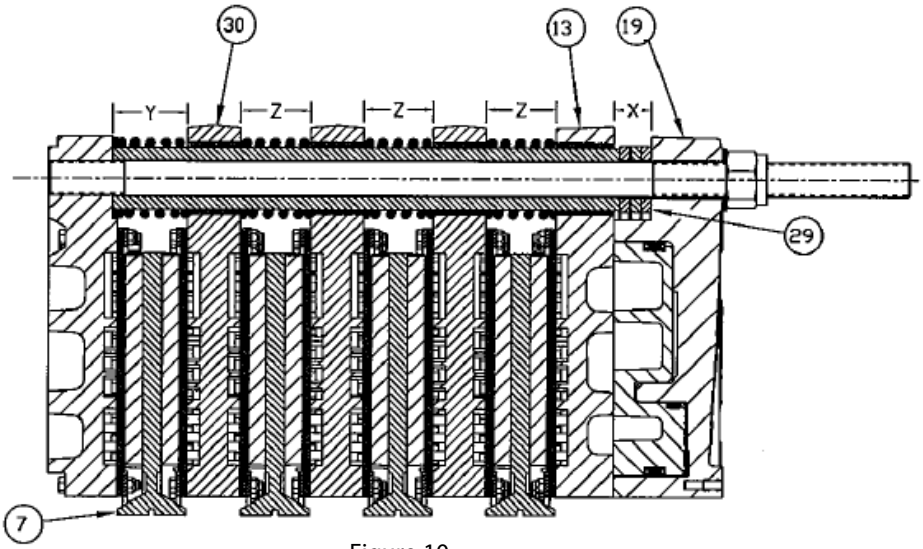


Figure 10

4.2.1.2 Multi-disc Units Unit Wear Adjustment

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

Measure the "Z" gap between the pressure plate (13) and the reaction plate (30), the "Y" gap between the reaction plate (30) and the mounting flange (1), and the "Z" gap between the reaction plates (30) as shown in Figure 8, Figure 9 and Figure 10.

Note: The clamp tube (12) rests on the mounting flange (1) and fits in the ID of the spring spacer (140). and the spacer is the same diameter as the clamp tube. When measuring between the reactionplate (30) and the mounting flange (1) it is important to measure to the surface of the mounting flange and not the top of the washer spring spacer.

If the "X worn" dimension has been reached or exceeded and the "Y" or "Z" dimensions have not reached the limits shown in Table 13 AND none of the friction discs are worn to the bottom of the wear groove, wear adjustment is required. It is also recommended that wear plates (3) be inspected to ensure that the wear limits listed in Table 12 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 (21, 23 and/or 114) 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, the tensioner should be taken out of service and rebuilt with new components as required.

4.2.2 Adjustment Procedure

Wear adjustment can be conducted without full disassembly of the WCBD3 tensioner. Wear adjustment is accomplished by the removal of support beam shims (139) and wear spacers (29). The wear adjustment spacers are slotted to allow for easy removal with a chisel. The support beam shims are slotted to allow bending and removal of the shim with the aid of a pair of pliers. Refer to section 4.2.2.4.

Warning
⚠ Before performing any maintenance work on the WCBD3 unit, make sure that the machinery will remain in a safe position. Failure to do so could result is serious injury or possibly death.

Note: Disconnect air and water supply lines to prevent damage to the hoses and binding of components during the adjustment procedure.

4.2.2.1 Wear spacers (29) and support beam shims (139) should must be removed in complete sets only (one wear spacer from each stud location and one shim from each support beam stud). Mark the spacers and shims to be removed to avoid confusion during removal.

Warning
⚠ Removal of wear spacers (29) and support beam shims (139) in quantities other than complete sets (layers) will result in severe damage to CBD3 components during re-assembly, and could cause the tensioner to not function properly.

4.2.2.2 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 (34) is relieved, allowing for access to the wear spacers (29) and support beam shims (139). See Figure 12.

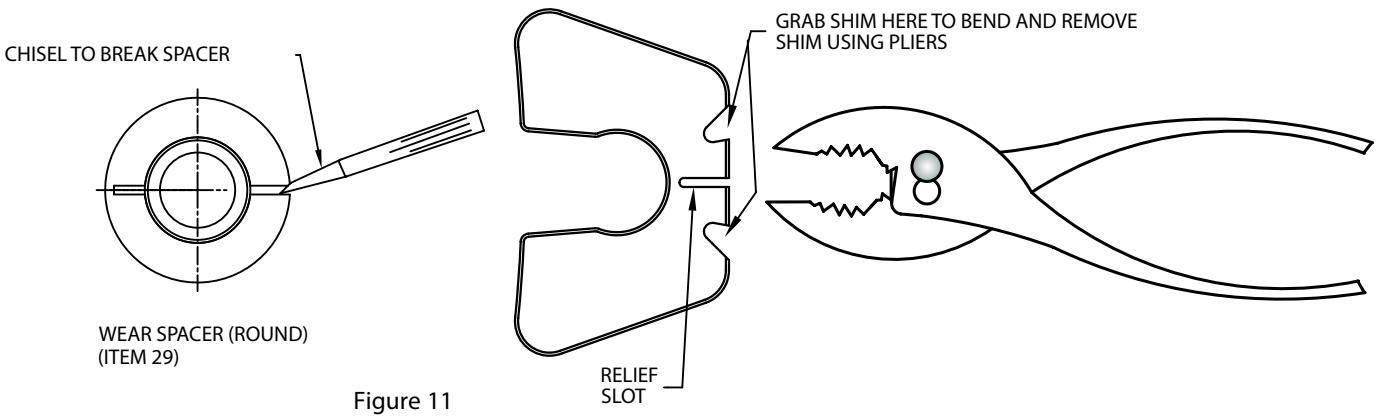


Figure 11

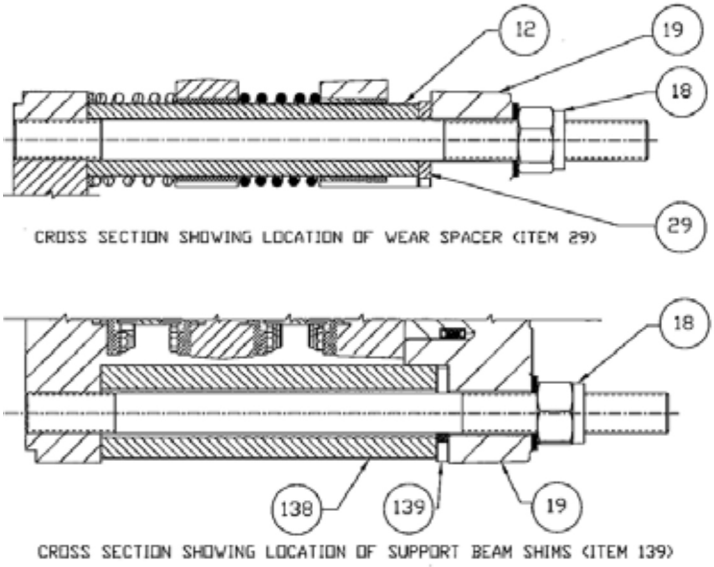


Figure 12

Note: Refer to Figure 12. The wear spacers (29) are located between the cylinder (19) and the clamp tube (12). The support beam shims (139) are located between the cylinder (19) and the support beam (138).

4.2.2.3 Wear spacers (29) are slotted to allow for in-place removal. Using a narrow chisel wedged into the slot in the wear spacer, as shown in Figure 11, pry the wear spacer until it fractures and is clear to be removed from the stud. Support beam shims (139) are designed with a relief slot to allow for bending and removal by using a pair of pliers to bend the beam shim and remove it from around the stud (6) (See Figure 11). Pry one shim from its position around a stud (6) and between the cylinder (19) and support beam (138). Repeat for the remaining spacers and shims in the set that is to be removed (one spacer from each stud location and one shim from each support beam stud location).

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

4.2.2.4 Prior to tightening the locknuts, verify that the support beams and support beam shims are located properly over the step on the cylinder to prevent damaging them during the tightening process. While supporting the weight of the cylinder/ piston assembly , tighten the locknuts (18) ONE TURN AT A TIME and in a crosswise pattern, alternating, until the cylinder is seated firmly against the clamp tubes. Torque the locknuts to the appropriate value. See Table 4.

⚠ Warning
Damage to the cylinder or support beam shims and support beams could occur if not positioned properly, possibly causing the tensioner to malfunction.

⚠ Caution
The locknuts (18) must be tightened gradually and evenly to prevent damage to the tensioner components.

4.2.2.5 Reinstall any piping or covers removed prior to operating the tensioner.

4.3 Disassembly Procedures

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

4.3.1 Disconnect the air supply lines and water coolant lines from the tensioner.

4.3.2 Using soft slings, and rig the tensioner and slide the WCBD3 off of the gear. Avoid placing slings or straps directly on the release springs (34).

4.3.3 Transport the tensioner to a clean working area and position the unit on a flat surface with the mounting flange (1) facing down.

4.3.4 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.

4.3.5 Match-mark the mounting flange (1), reaction plates (30), pressure plate (13), cylinder (19) and support beams (138) to one another prior to disassembly to adequately show the proper orientation of components and various ports to one another.

4.3.6 Loosen the locknuts (18) ONE TURN AT A TIME and in sequence until the release spring (34) force is relieved.

4.3.7 Lift the cylinder and piston assembly 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.

4.3.8 Continue removing the remaining components if required.

4.3.9 Inspect all components using the wear limits in Table 13 12 as a reference.

4.3.10 For friction lining replacement refer to Section 4.4.

4.3.11 For wear plate replacement, refer to Section 4.5.

4.3.12 Refer to Section 4.6 to replace cylinder seals.

4.3.13 Assemble the tensioner per Section 4.8.

⚠ 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.

4.4 Friction Material Replacement (Size 36WCBD3)

Note: When replacing friction material, it is recommended that the mating wear surface be replaced to ensure good contact between the mating surfaces. See Table 12 for wear limits. A light touch up of the wear surfaces may be performed to remove high spots or burrs if desired but is typically not necessary.

4.4.1 Refer to Section 7.0 for the appropriate friction disc kit replacement part numbers.

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

4.4.2 Disassemble the tensioner per Section 4.3.

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

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

4.4.4 Clean all burrs, corrosion etc. from the friction disc core or mounting surface. Chase all tapped holes with a tap to clean threads and remove any residual Loctite.

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

4.4.6 When installing screws in friction blocks, install and tighten the screws from the center most position in the block, then progress towards the outer edges of the block.

4.4.7 Following the above pattern, install one screw at a time by applying Loctite ® #262 to the screw threads and tightening the screw to the proper torque value. Tighten screws to 15 ft-lb (20 Nm). Install and torque each remaining screw immediately after the application of Loctite ®, then proceed to the next screw.

Note: Be sure to remove, apply Loctite® and properly tighten the initial screws used for alignment of the friction disc or block.

⚠ 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.

4.4.8 After replacement of friction material, reassemble the tensioner per Section 4.8. During start-up, observe wear-in and operation precautions per Section 3, 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.

4.5 Wear Plate Replacement

Note: When replacing wear surfaces plates (3), it is recommended that the mating friction material be replaced to ensure good contact between the mating surfaces. See Table 12 for wear limits.

4.5.1 Disassemble the tensioner per Section 4.3.

4.5.2 Remove the screws and locknuts holding the wear plates (3) and remove the wear plates. If the wear plates cannot be easily lifted off, gently tap the O.D. to break the gasket seal.

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

4.5.3 Internal Corrosion Protection

Note: Water-cooled tensioners used in both the open and closed loop operating modes are required to be painted with Flame Control TemperKote®1000 PRIMER and top coated with TemperKote 1000 TOPCOAT.

4.5.3.1 Lifting off the wear plates (3) in section 4.5.2 will expose the water passages. Inspect the water passages and, if necessary, use a wire brush to clean them. For best results, surfaces should be free from oil, grease, dirt, mill scale, rust, corrosion products, oxides, and foreign matter. The water passages should be sand blasted prior to painting. Remove all remaining abrasive from surface by air blasting. Coat the freshly blasted surface as soon as possible. Do not allow surface to become wet. Do not wash freshly blasted surface with solvents.

4.5.3.2 Sand blast the surfaces to be painted.

Note: Read the manufacturer's instructions thoroughly for proper handling, preparation, application and spray of paint system.

4.5.3.3 Primer: One coat of Flame control TemperKote 1000 Primer at approximately 5.0-7.5 mils wet film thickness to yield a dry film thickness of 2.0-3.0 mils dry.

4.5.3.4 Topcoat: Apply coat of Flame Control TemperKote 1000 paint (Topcoat). to achieve the total topcoat thickness of 6.0-8.0 mils dry . Measure the coating thickness on the machined surfaces at 4 places. The Total dry coating thickness should not be less than 5 mils.

Note: Follow the manufacturer's recommendation for applying layers (film thickness) of paint and allow for sufficient drying time.

Caution

⚠ Care must be taken to deal with painting in the 'water cavity area' to ensure that there is full coverage of paint with uniform thickness on the water cavity surface. Refer to Figure 14-A to mask the inner & outer lands that will receive the gasket tape for sealing.

Note: If nubs in the water cavity are severely corroded, wear plates (3) may not be properly supported. Replace the pressure plate (13), reaction plate (30) or mounting flange (1), if necessary. Note: Measure the coating thickness on the machined surfaces at 4 places. The Total dry coating thickness should not be less than 5 mils.

4.5.4 Assembly with Gasket Tape

Note: The Pressure Plate (13), Reaction Plate (30) and Mounting Flange (1) will be referred to as IRON in the following paragraphs. Refer to Figure 1 for item number references shown in the parenthesis (#).

4.5.4.1 Preparation and Cleaning of the Iron

Ensure that the IRON surface is smooth and free of scale, burrs and corrosion. Thoroughly clean both the inner and outer lands which will receive the gasket. Use a solvent based cleaner such as acetone, mineral spirits or a general-purpose waxs/oil/grease remover turning the wipe until it is free of new dark debris. Finish the cleaning process bye blowing off lint on the sealing surface. If a paint touch-up is required, reference Figure 14-A to mask the inner & outer lands that will receive the gasket tape for sealing.

Caution

⚠ Follow manufacturer's instructions and proper safety precautions for the use of solvent based cleaners (acetone, mineral spirits, or general-purpose was wax/oil/grease remover).

4.5.4.2 Preparation and Cleaning of Copper Wear Plate

Ensure that the wear plate surface is smooth and free of burrs and corrosion. Thoroughly clean both the outer and inner areas which will be in contact with the gasket tape. Use a solvent based cleaner such as acetone, numeral spirits or a general purpose was wax/oil/grease remover. Finish the cleaning process by blowing off any lint from lint and the sealing surface.

Caution

⚠ Follow the manufacturer's instructions and proper safety precautions for the use of solvent based cleaners (acetone, mineral spirits or general-purpose) for oil/grease.

4.5.4.3 Preparation of the Gasket Tape Ends

Start with the leading end of the gasket tape and skive the end at 45 degrees per Figure 15. This initial step is required to insure a smooth transition of the tape when the tape is overlapped per section 4.5.4.4 (b) below. Also skive the trailing end of the tape at 45 degrees after it is overlapped per section 4.5.4.4 (b) below.

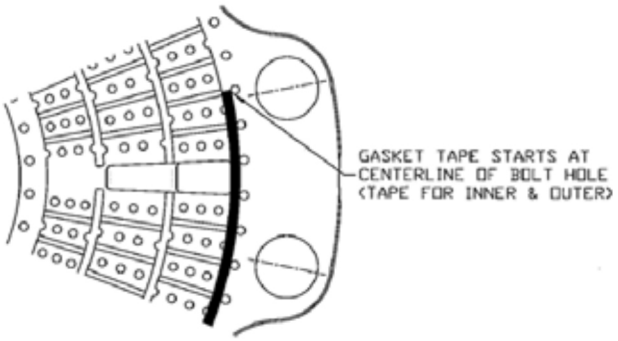


Figure 13

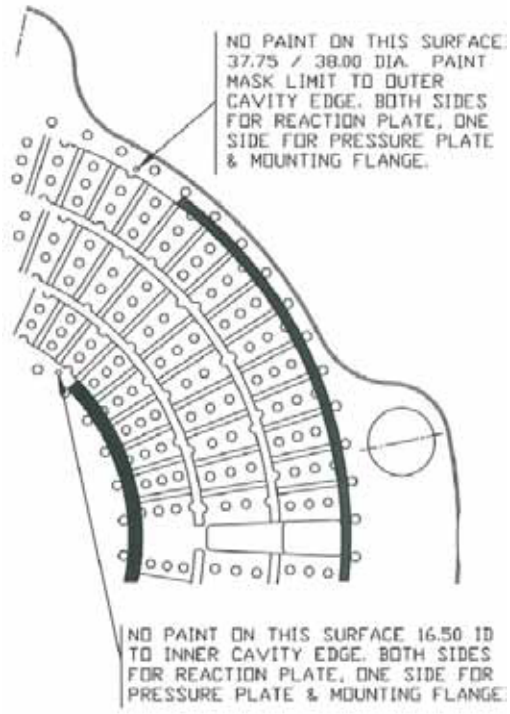


Figure 14-A

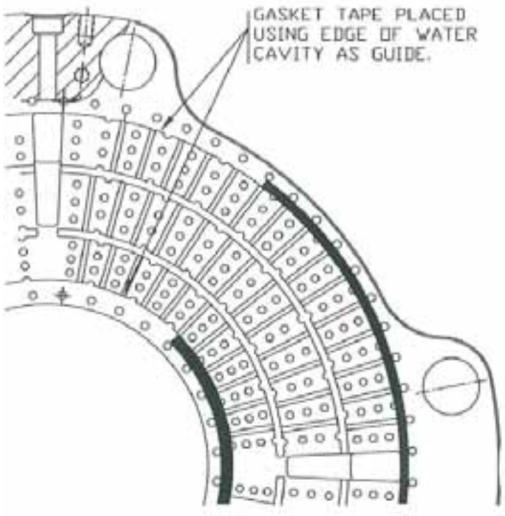


Figure 14-B

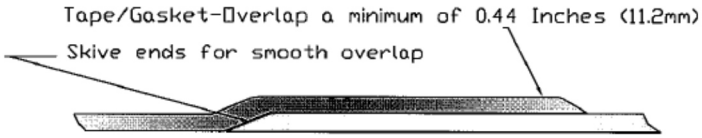


Figure 15

4.5.4.4 Applying the Gasket Tape to the IRON

(a) Start with the sealing area nearest to the inner diameter on the IRON. Remove the adhesive backing on the gasket tape a little at a time to prevent the adhesive from picking up dirt during installation. Start by positioning one end of the tape at the center- line of a bolt hole as shown in Figure 13, using the edge of the water cavity as a guide, as shown in Figure 14-B. Proceed to apply the tape on the sealing surface following a smooth circular path, being sure to press the tape in place.

(b) After the gasket tape has been placed around the entire inner circumference of the IRON, overlap the starting end of the end of the tape by a minimum of 0.44" (11.2 mm). See Figure 15. Be sure to smooth the tape at the overlap transition in order to get a good seal. No air gaps or bubbles should be present.

(c) Repeat steps 'a' and 'b' for the outer sealing area nearest to the outer diameter of the IRON, again using the edge of the water cavity as a guide.

⚠ Caution
Before the gasket tape is covered with the wear plate, the sealing surface should be protected to prevent contamination from dust, dirt or oils. No additional cleaning or liquid should be applied to the surface of the IRON or gasket tape.

4.5.5 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.

4.5.6 Position the clamp rings over the holes in the wear plates (3) and install the new hex head screws (4) and locknuts (5) provided, securing them finger tight.

⚠ Caution
To prevent excessive warping of the wear plate (3) and to endure ensure a good seal, the following hardware tightening procedure must be followed.

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

Follow the tightening sequence shown in Figure 15 for the first 16 screws. 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) Step One: For the first 16 screws, bring the initial torque of each screw up to 33% of the torque value shown in Table 14 using the tightening sequence shown in Figure 16. Install and torque the remaining screws in any reasonable crosswise pattern to 33% of the torque value shown in Table 14.

(b) Step Two: Repeat the sequence of torque tightening on the first 16 screws as shown in Figure 16 and bring each screw up to 66% of the torque value shown in Table 14. Torque the remaining screws in any reasonable crosswise pattern to 66% of the torque value shown in Table 14.

(c) Step Three: Repeat the sequence of torque tightening on the first 16 screws as shown in Figure 16 and bring each screw up to 100% of the torque value shown in Table 14. Torque the remaining screws in any reasonable crosswise pattern to 100% of the torque value shown in Table 14.

(d) Step Four: 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 14.

Table 14
Wear Plate Fastener*Torque: ft.lb. (Nm)

Model	Size	Torque
36WCBD3	3/8-16NC2	40 (54)

* Alloy Steel Grade 8

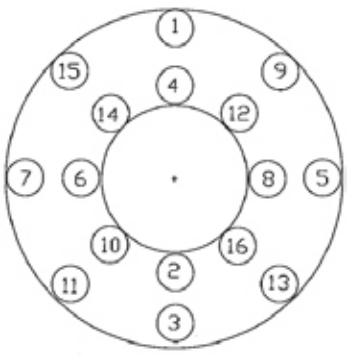


Figure 16

4.5.8 After completion of the assembly, each water cavity should be checked for leaks per static test in 3.4.6.1.

4.5.8.1 Using lifting straps, suspend each assembly with the cooling water outlet port at the 12 o'clock and 6 o'clock position. Connect a water supply line to the cooling water inlet outlet port at the 6 o'clock position. Next plug the cooling water inlet ports and leave the cooling water outlet port at the 12 o'clock position open to purge air from the coolant cavity. See Table 15 for cooling water port sizes.

Table 15
Inlet & Outlet Coolant Port Sizes

Model	Size O-ring Boss (ORB)
36WCBD3	SAE-20 J1926

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

4.5.8.3 Install an ORB pipe plug(s) in the outlet 12 o'clock port(s) and apply appropriate water pressure (40 psig (2.76 Bar) for the 36WCBD3. Pressure is measured at the inlet . Maintain this pressure for a minimum of 30 minutes.

4.5.8.4 Check for leakage at the O.D. and I.D. seal areas. No leakage is allowed.

4.5.8.5 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 4.5.2

4.5.8.6 Follow steps in section 4.8 to reassemble the tensioner.

⚠ Caution
After replacement of wear plates (3), 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 Dual Cylinder Seal Replacement

4.6.1 Disconnect the air connections and match mark the cylinder to a stud or other component to ensure proper orientation during reassembly.

4.6.2 While supporting the cylinder (19), loosen the locknuts (18) ONE TURN AT A 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.

4.6.3 Using lifting equipment, carefully remove the cylinder (19) and piston (33) as an assembly. Set aside in a clean area. See Table 16 for cylinder weights.

Table 16
Tensioner Weight lbs (kg)

Tensioner Size	136	236	336	436
Total weight	3000 (1361)	3750 (1701)	5100 (2313)	6700 (3039)
Cylinder/Piston assembly weight	760 (345)	760 (345)	760 (345)	760 (345)

4.6.4 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.

4.6.5 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 any of the pressure ports on the cylinder.

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

4.6.6 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 or small brass drift 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.

4.6.7 Note how the lips of the Outer seal (23), the Intermediate seal (114) and Inner seal (21) are oriented back-to-back. Refer to Figure 1 and Figure 17. Remove the cylinder seals (21, 23 and 114) and discard.

Note: Some WCBD3 tensioner assemblies do not include the intermediate seals (114). Refer to the appropriate parts list to ensure proper seal configuration and assembly.

4.6.8. Inspect the cylinder sealing surface condition for nicks or scratches, corrosion, or any other defect which may prevent the seals from being effective. The maximum amount of radial wear on the seal surfaces is 0.005". The wear on the sealing surfaces will be in the form of grooves where the seals contact the cylinder wall. Replace the cylinder, if necessary.

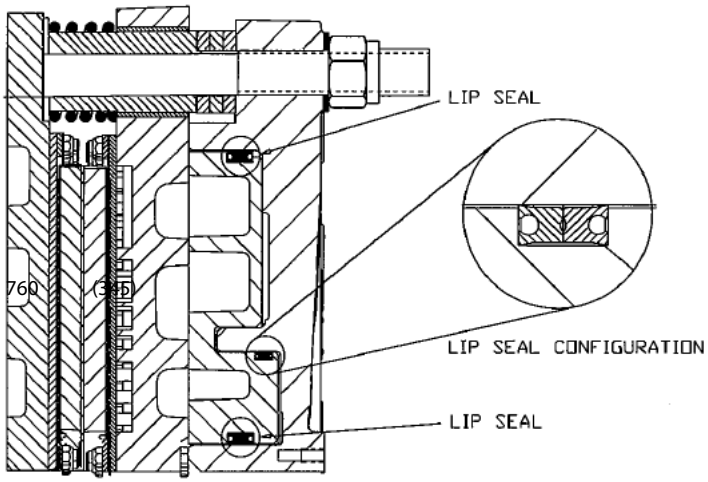


Figure 17

4.6.9 Thoroughly clean the seal grooves in the piston (33) and apply a thin coat of Molycote ® 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) and (114).

4.6.10 Install the new seals in the grooves in the piston, noting the original orientation of the seal lips. See Figures 1 & 17.

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

4.6.12 Carefully place the piston (13) onto the cylinder (19) with the chamfered edge of the piston facing downward, taking special care to avoid damaging the seal lips.

4.6.13 Gradually apply an evenly distributed force to press the piston (13) into the cylinder (19) being sure not to cock the piston, which may damage the sealing surfaces. The use of 'C-Clamps' may assist with the assembly process.

4.6.14 Using a lifting strap, slide the cylinder/piston assembly onto the studs (6). Orient the drain port plug (105) to be in-line with the coolant ports or align match marks if match marking was previously performed.

4.6.15 Lubricate the threads on the end of the studs (6) with 30 wt. oil or anti-seizing compound and install the washers (17) and locknuts (18).

Note: Failure to position the wear spacers (29), support beam shims (139) and support beams (138) properly on the shoulder of the cylinder (19) before the locknuts (18)are tightened may cause damage to those components.

4.6.16 While supporting the weight of the cylinder/piston assembly, tighten the locknuts (18,) -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 tensioner components.

4.6.17 Test for proper seal installation as follows

4.6.17.1 There are two sets of ports on the cylinder; the outermost positioned ports connect to the outer pressure chamber. The innermost ports connect to the inner pressure chamber. Remove all pipe plugs or fittings from the inner ports.

4.6.17.2 Install a pressure gauge in one of the outer cylinder ports. Apply 80 PSIG air through a second outer cylinder port (after plugging the other outer NPT port) to engage the brake.

4.6.17.3 After the air pressure has stabilized, shut off the air supply. Monitor the pressure gauge for a drop in pressure for a period of ten minutes. If the air pressure does not drop below 60 PSIG (4.1 Bar) within 10 minutes, the seals have been properly installed. If leakage is excessive, try to note the location of the leakage. If the intermediate seal is leaking, air will pass into the small (inner) chamber.

4.6.17.4 Exhaust all air pressure from the brake. Remove the plugs and gauges from the outer-most ports and install them in the inner ports, leaving all of the outermost ports open.

4.6.17.5 Apply 80 PSIG (5.5 Bar) air pressure through one of the inner ports in the cylinder (after plugging the other inner port) to engage the brake.

4.6.17.6 After the pressure has stabilized, shut off the air supply. Monitor the pressure gauge for a drop in pressure for a period of ten minutes. If the air pressure does not drop below 60 PSIG (4.1 Bar) within 10 minutes, the seals have been properly installed. If leakage is excessive, try to note the location of the leakage. If the intermediate seal is leaking, air will pass into the large (outer) chamber.

4.6.17.7 If excessive leakage is found in testing of the large or small pressure chamber, disassemble the brake and check the suspect seals and sealing surfaces for damage or other causes of leakage. Repair or replace components as required.

4.7 Bushing Replacement

Note: Pressure plate (13) and reaction plates (30) have bushings (54) installed in the reaction holes (Figure 18). The Pressure plate and Reaction plate bushings are different lengths. Be sure to install the correct length bushing in the proper component. Refer to the Reaction plate and Pressure plate sub-assemblies in the parts list for the selection of the proper replacement bushing. Replacement of the bushings can be performed per the following procedures.

4.7.1 Disassemble the tensioner per Section 4.3.

4.7.2 Refer to the wear limits in Table 17 to determine if the bushings (54), in Figure 18, require replacement.

Table 17
Reaction Hole & Bushing size 'New'

Pressure Plate*	Reaction Hole Diameter Reaction Hole Bushing I.D.	2.876" (73,05mm) 2.565" (65,15mm)
Reaction Plate*	Reaction Hole Diameter Reaction Hole Bushing I.D.	2.876" (73,050mm) 2.565" (65,15mm)

* Refer to Figure 18

4.7.3 Heat up the area around each bushing (54) to soften the Loctite ® and press out the old bushings.

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

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

4.7.4.1 If the reaction hole is oblong or measures from the wear specification (Table 17) then consult the factory. Inspect he ID of the reaction hole before installation of the new bushing (54).

4.7.5 Apply Loctite ® #RC601, 635 or 680 to the bushing O.D. and mating hole in the reaction plate (30) and pressure plate (13) using a swab. Apply enough liquid to entirely fill the space between the parts. Install the bushings (54) 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.

⚠ Caution
The bushing (54) shall be held in place so it is centered in the reaction hole. Do not allow the bushing to protrude beyond the surface of the reaction plate (30) or pressure plate (13) during

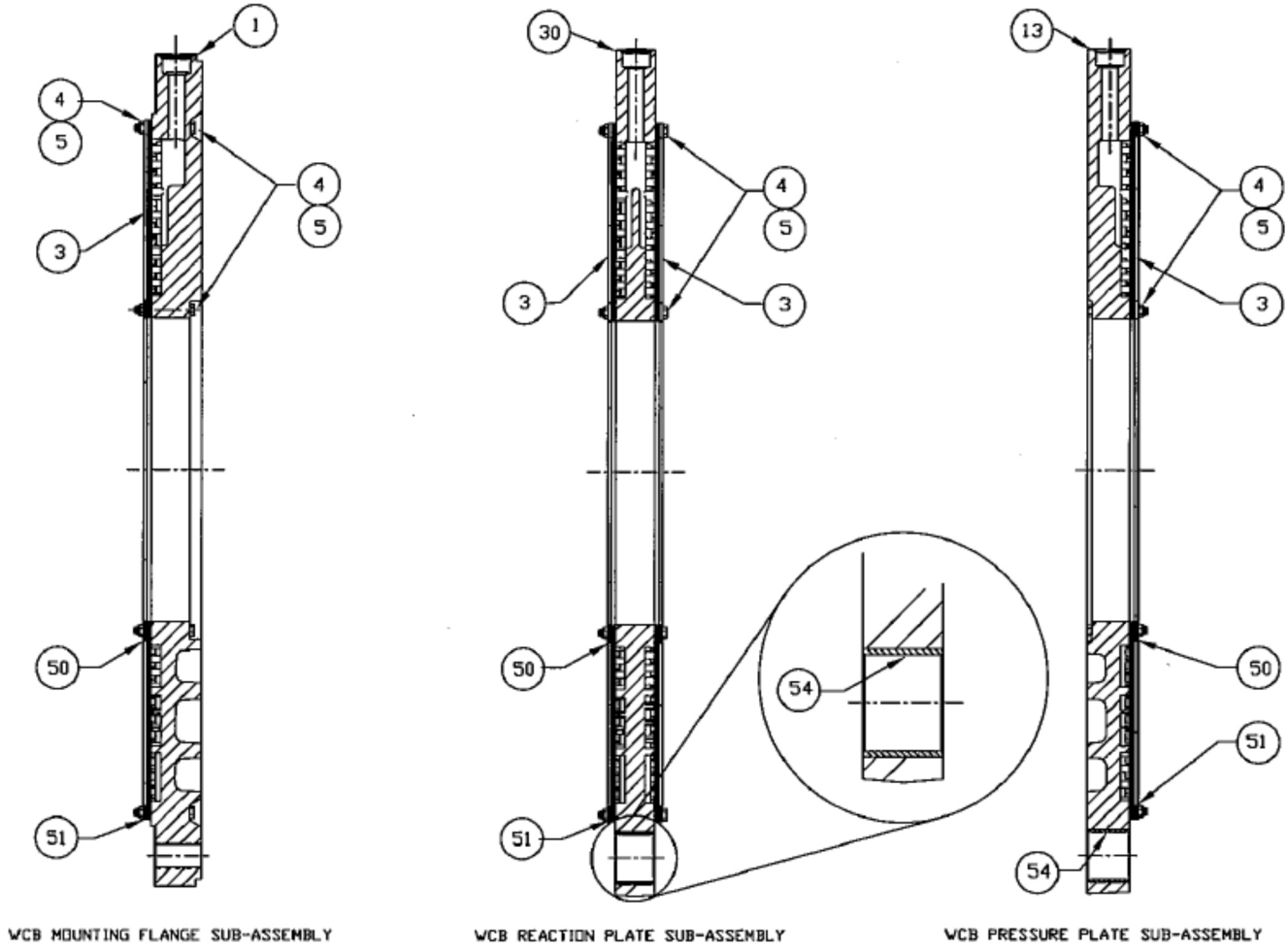


Figure 18

installation. Allow the Loctite to cure for 15 minutes before moving the sub-assembly.

4.7.6 Assemble the tensioner per section 4.8 as required.

4.8 Assembly Procedures

Note: Friction discs and water jackets (mounting flange, pressure plate, and reaction plate) should be assembled per the appropriate maintenance procedures prior to final assembly of the tensioner.

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

4.8.2 Install the studs (6) into the mounting flange (1). 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 machinists 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 (6) must not extend past the mounting surface of the mounting flange (1).

4.8.3 Noting the location of the water inlets/ outlets in the mounting flange (1), install the appropriate number of clamp tubes (12) over the studs (6) that are located on either side of each water inlet/outlet. Eight clamp tubes are required. See Figure 19.

4.8.4 Place a support beam (138) over each pair of studs that are located at 45 degrees to each water inlet/ outlet. Four support beams are required.

4.8.5 Place a friction disc assembly (7) onto the mounting flange (1). Center the friction disc.

4.8.6 First, install a spring spacer (140) over every clamp tube the install a release spring (34) over every clamp tube (12) and be sure the spring is resting on the spring spacer. For single disc WCBD3 tensioners, proceed to Section 4.8.10.

4.8.7 Noting the location of the water inlets/outlets in the mounting flange (1), lift the reaction plate (30) into position, align the water inlets/outlets with those in the mounting flange, and slide the reaction plate over the studs (6) and clamp tubes (12).

4.8.8 Install a release spring (34) over every clamp tube (12). Refer to Parts list in Section 6 for quantity of springs per tensioner model.

4.8.9 Place friction disc assembly onto the reaction plate (30).

4.8.10 Repeat the sequence of steps 4.8.7 through 4.8.9 until all friction discs (3), reaction plates (30) and release springs (34) are assembled.

4.8.11 Noting the location of the water inlets/outlets in the mounting flange (1), lift the pressure plate (13) into position and align the water inlets/outlets with those in the mounting flange. Slide the pressure plate over the studs and clamp tubes.

4.8.12 Install Wear Spacers and Wear Shims.

4.8.12.1 For single disc tensioners no wear spacers (29) or support beam shims (139) are required. Go to section 4.8.13

4.8.12.2 For multi disc tensioners, install the appropriate number of wear spacers (29) on each clamp tube and an equal number of wear support beam shims (139) over the studs at each support beam (138). Refer to Section 6.1 for quantities of wear spacers and wear shims required for each tensioner size.

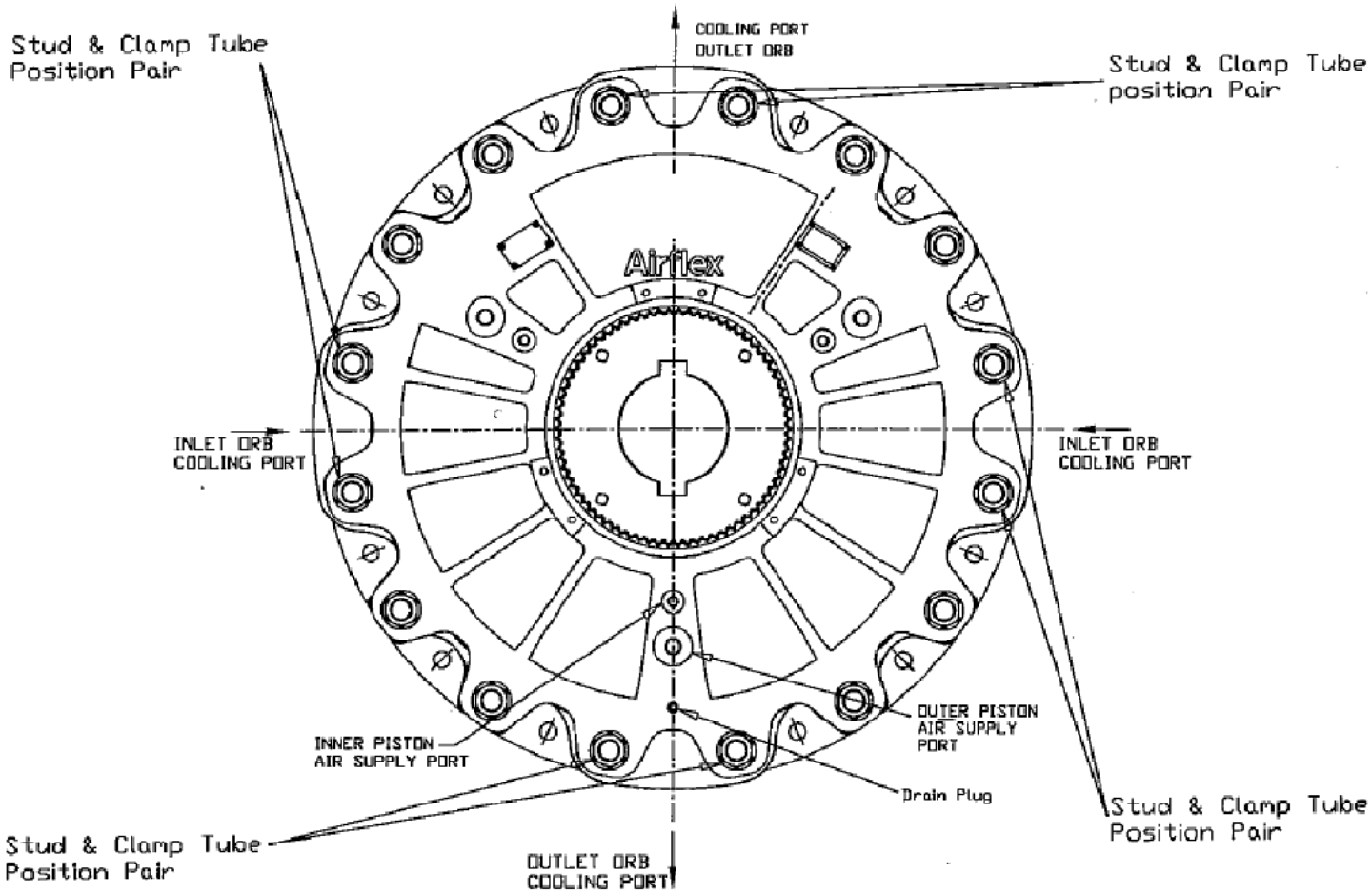


Figure 19

4.8.13 Thoroughly clean the seal grooves in the piston (33) and apply a thin, even coat of Molycote ® 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) and (114).

4.8.14 Install the new seals in the grooves in the piston, noting the orientation of the seal lips. (See Figure 17).

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

4.8.16 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.

4.8.17 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.

4.8.18 Lift the cylinder/piston assembly into position and slide it over the studs, noting the orientation of the ports on the cylinder face. Orient the drain port plug (105) to be in-line with the coolant ports or align match marks if this match marking was previously performed.

4.8.19 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).

4.8.20 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).

Note: Make sure that wear spacers, support beam shims and support beams are in proper positions on the shoulder of the cylinder as the locknuts are tightened, perhaps after this paragraph. If not, they may be damaged.

Caution

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

4.8.21 Re-install the tensioner per Section 2.0.

4.9 External Corrosion Protection

4.9.1 Touch up needs to be done for the locations where the paint is damaged. Touch up can be done for two main reasons.

4.9.1.1 Touch up done for repair purpose (to repair the scratches during transport and/or handling) should be done at component level with PRIMER followed by TOPCOAT with spray gun.

4.9.1.2 Clean any contamination, scale, or loose paint from disturbed surfaces and touch up the assembly. Repair .

Touch up done after the assembly (to cover the damages done any damage that may have occurred during assembly) by brush and with TOPCOAT ONLY.

4.9.2 Application of Primer & Topcoat

Caution

⚠ Do not paint the clamp tubes (12), the release springs (34), wear plate (3) and active friction block surfaces as this may hinder the engagement or disengagement of the tensioner.

Note: The customer should refer to and follow the paint manufacturer's recommendations for paint application and safety precautions.

4.9.2.1 One coat of Flame control TemperKote 1000 Primer at approximately 5.0-7.5 mils wet film thickness to yield a dry film thickness of 2.0-3.0 mils dry.

4.9.2.2 Apply coat of Flame Control TemerKote 1000 paint (topcoat) to achieve the total topcoat thickness of 6.0-8.0 mils dry.

5.0 ORDERING INFORMATION / TECHNICAL ASSISTANCE

5.1 Equipment Reference

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

Loctite and Loc-Quic are registered trademarks of Henkel Corporation.

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

Molykote is a registered trademark of Dow Corning Corp.

TemperKote is a registered trademark of Flame Control Coatings, LLC.

6.0 PARTS

6.1 Basic Assemblies

Item	Description	136WCBD3 146572AE Part Number	Qty	236WCBD3 146573AE Part Number	Qty	336WCBD3 146574AE Part Number	Qty	436WCBD3 146575AE Part Number	Qty
1	Mounting Flange S/A	515635-01	1	515635-01	1	515635-01	1	515635-01	1
6	Stud	307111-28	16	307111-27	16	307111-26	16	307111-15	16
7	Friction Disc Assembly	515435	1	515435	2	515435	3	515435	4
12	Clamp Tube	308608-11	8	308608-10	8	308608-09	8	308608-06	8
13	Pressure Plate S/A	515635-03	1	515635-03	1	515635-03	1	515635-03	1
17	Flat Washer	000067x0042	16	000067x0042	16	000067x0042	16	000067x0042	16
18	Self Locking Nut	000110x0075	16	000110x0075	16	000110x0075	16	000110x0075	16
19	Cylinder	515639	1	515639	1	515639	1	515639	1
21	PolyPak Seal	000402x0005	2	000402x0005	2	000402x0005	2	000402x0005	2
23	PolyPak Seal	000402x0006	2	000402x0006	2	000402x0006	2	000402x0006	2
24	Warning Decal	203627	1	203627	1	203627	1	203627	1
25	Name Plate	307640	1	307640	1	307640	1	307640	1
26	Drive Screw	000153x0644	8	000153x0644	8	000153x0644	8	000153x0644	8
28	Gear (not included with assembly	417019-####	1	417023-####	1	416435-####	1	416495-####	1
29	Clamp Tube Wear Spacer)	n/a	0	308609	8	308609	16	308609	24
30	Reaction Plate S/A	n/a	0	515635-02	1	515635-02	2	515635-02	3
32	Decal Plate	307753	2	307753	2	307753	2	307753	2
33	Dual Piston	515657	1	515657	1	515657	1	515657	1
34	Release Spring	416751-15	8	416751-15	16	416751-15	24	416751-15	32
105	Brass Pipe Plug	000077x0021	1	000077x0021	1	000077x0021	1	000077x0021	1
114	PolyPak Seal	000402x0040	2	000402x0040	2	000402x0040	2	000402x0040	2
138	Support Beam	417434-04	4	417434-03	4	417434-02	4	417434-01	4
139	SHIMS Support Beam	n/a	0	308610	8	308610	16	308610	24

6.1.1 Sub-Assemblies

6.1.1.1 Parts Breakdown of WCBD3 Reaction Plate Sub Assembly (Figure 18)

36 WCBD3 Reaction Plate Sub Assembly (515635-02)

Description	Part Number	Quantity
Reaction Plate	515630	1
Bushing	204240-01	8
Wear Plate	417437	2
Screw (4)	000153x0843	108
Locknut (5)	000153x0844	108
Inner Support Ring	414032-01	12
Outer Support Ring	417435	8
Outer Support Ring	417459	8

6.1.1.2 Parts Breakdown of WCBD3 Pressure Plate Sub Assembly (Figure 18)

36 WCBD3 Pressure Plate Sub Assembly (515635-03)

Description	Part Number	Quantity
Pressure Plate	515632	1
Bushing	204240-02	8
Wear Plate	417437	1
Screw (4)	000153x0842	108
Locknut (5)	000153x0844	108
Inner Support Ring	414032-01	6
Outer Support Ring	417435	4
Outer Support Ring	417459	4

6.1.1.3 Parts Breakdown of WCBD3 Mounting Flange Sub Assembly (Figure 18)

36 WCBD3 Mounting Flange Sub Assembly (515635-01)

Description	Part Number	Quantity
Mounting Flange	515628	1
Wear Plate	417437	1
Screw (4)	000153x0842	108
Locknut (5)	000153x0844	108
Inner Support Ring	414032-01	6
Outer Support Ring	417435	4
Outer Support Ring	417459	4

6.1.1.4 Parts Breakdown of WCBD3 Friction Disc Assembly (Figure 18)

36 WCBD3 Friction Disc Sub Assembly (Lo-Co)

Description	Part Number	Quantity
Friction Disc Assembly	515435	1
Frictin Block	515387	16
Friction Disc Core	514139	1
Flat Head Screw (Brass)	000421x0467	144

7.0 WCBD3 REBUILD KITS

7.1 WCBD3 Cylinder Seal Kits

Parts included in Kit		Lip Seal (Inner) (21)		Lip Seal (Intermediate) (114)		Lip Seal (Outer) (23)	
Model	Kit P/N	Part No.	(Qty)	Part No.	(Qty)	Part No.	(Qty)
36WCBD3	107662CD	000402X0005	(2)	000402X0040	(2)	000402X0006	(2)

Note: All kits include one 5.3 oz tube of Dow Corning 55® lubricant (000153x1239)

7.2 WCBD3 Friction Disc Kits (LO-CO)

Model	Kit P/N	Loctite Sealant 262 Part No.	(Qty)	Flat Head Screw (3) Part No.	(Qty)	Friction Disc (1) Part No.	(Qty)	Shim (Support Beam) (139) Part No.	(Qty)	Wear Spacer (29) Part No.	(Qty)	Grease Part No.	(Qty)
136	108165B	153x1168	(1)	000421x0407	(144)	515387	(16)	N/A		N/A		000153x1182	(1)
236	108165BA	153x1168	(2)	000421x0407	(288)	515387	(32)	308610	(8)	308609	(8)	000153x1182	(1)
336	108165BB	153x1168	(3)	000421x0407	(432)	515387	(48)	308610	(16)	308609	(16)	000153x1182	(1)
436	108165BC	153x1168	(4)	000421x0407	(576)	515387	(64)	308610	(24)	308609	(24)	000153x1182	(4)

Note: Ref: 515435 - S/A

7.3 Wear Plate Kits for Mounting Flange and Pressure Plate

Parts Included in Kit		Screw (4)		Locknut (5)		Inner Support Wear Plate		Outer Support Ring (50)		Ring (51)		PTFE Gasket O.D.		PTFE Gasket I.D.	
Model	Kit P/N	Part No.	(Qty)	Part No.	(Qty)	Part No.	(Qty)	Part No.	(Qty)	Part No.	(Qty)	Part No.	(Qty)	Part No.	(Qty)
36 WCBD3	108163A	000153x0842	(216)	000153x0844	(216)	417437	(2)	414032-01	(12)	417435 417459	(8) (8)	308581-01	(2)	308581-02	(2)

7.4 Wear Plate Kits for Reaction Plate

Parts Included in Kit		Screw (4)		Locknut (5)		Wear Plate		Inner Support Ring (50)		Outer Support Ring (51)		PTFE Gasket O.D.		PTFE Gasket I.D.	
Model	Kit P/N	Part No.	(Qty)	Part No.	(Qty)	Part No.	(Qty)	Part No.	(Qty)	Part No.	(Qty)	Part No.	(Qty)	Part No.	(Qty)
36 WCBD3	108164A	000153x0843	(108)	000153x0844	(108)	417437	(2)	414032-01	12	417435 417459	(8) (8)	308581-01	(2)	308581-02	(2)

8.0 REVISIONS

Original Publication Date: October 2013

Revision Date	Change

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