HY 13100

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.

Installation, Operation and Maintenance of the Airflex® CH Multiple-Disc Clutch and Brake Assemblies

Caution:

Use Only Genuine Airflex Replacement Parts

The Airflex Division of Eaton Corporation recommends the use of genuine Airflex replacement parts. The use of non-genuine Airflex replacement parts could result in substandard product performance, and may void your Eaton warranty. For optimum performance, contact Airflex:

In the U.S.A. and Canada:: **(800) 233-5926**
Outside the U.S.A. and Canada: **(216) 281-2211**

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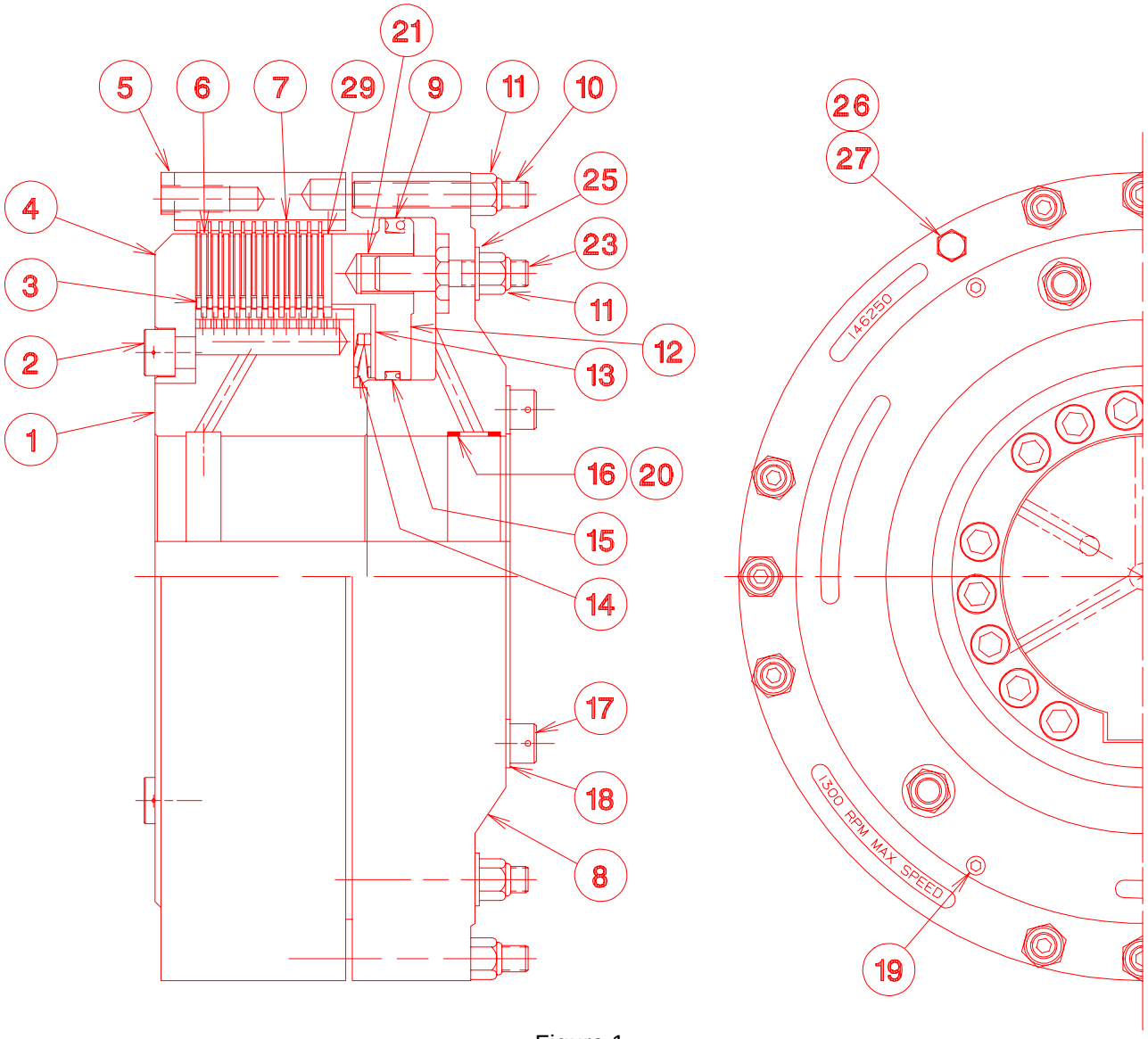


Figure 1

Item	Description
1	Hub
2	Socket Head Cap Screw
3	Separator Spring
4	End Plate
5	Drive Ring
6	Separator Disc
7	Friction Disc
8	Cylinder
9	Polypak Seal
10	Mechanical Lock-Up Screw
11	Locknut
12	Piston
13	Spring Retainer

Item	Description
14	Spring
15	Polypak Seal
16	Shaft Seal - Pressure
17	Socket Head Cap Screw
18	Clamp Plate
19	Pipe Plug
20	Shaft Seal - Balance
21	Bushing
23	Anti-Rotation Pin
25	Flat Washer
26	Hex Head Screw
27 *	Del-Loc Wiring Clip
29 *	Thick Separator Disc

* For Shipping Purposes ONLY.

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** and ⚠ **CAUTION** procedures by which hazards are to be avoided.

1.1 Description

1.1.1 The Airflex® CH is an air or hydraulic actuated, multiple-disc clutch or brake, featuring very high torque and energy capacities in a relatively small package. These units are ideally suited for applications such as marine main propulsion drives, mooring winches, overland conveyor drives, fan drives and other heavy-duty machinery.

1.2 How it Works

1.2.1 Referring to Figure 1, the CH is mounted to the driving shaft, and is connected to the driven shaft via an adapter attached to the drive ring (5). Air or hydraulic actuating pressure, along with cooling oil (if applicable), is supplied through a passage(s) in the driving shaft.

1.2.2 As pressure is applied to the cylinder (8), the piston (12) is forced axially toward the end plate (4), compressing the disc pack. The disc pack consists of externally splined friction discs (7) which mate with the drive ring (5), and internally splined separator discs (6) which mate with the hub (1). As the disc pack is compressed, the torque flow is from the hub mounted to the driving shaft, through the disc pack to the drive ring adapter-mounted to the driven shaft.

Note: The drive ring (5) could just as well be adapter-mounted to the driving shaft, in which case the torque flow described above would be reversed.

1.2.3 As the actuating pressure is relieved, the release springs (14) force the piston (12) away from the end plate (4), removing the compression on the disc pack. Separator springs (3) are provided to ensure total disengagement of the disc pack.

1.2.4 Should a failure of the actuating pressure system occur, positive drive screws (10) are provided for "come home" service.

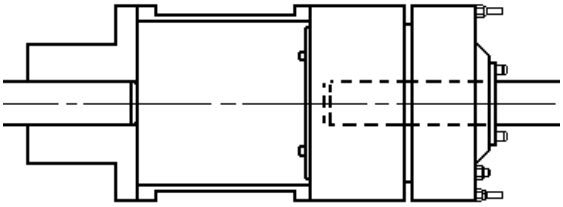


Figure 2

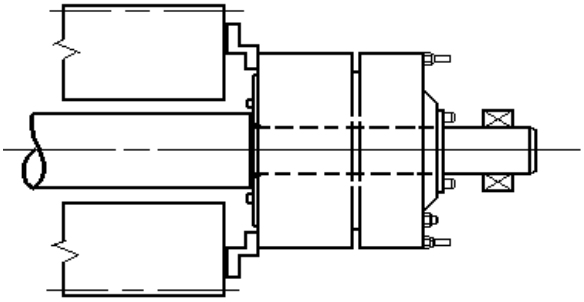


Figure 3

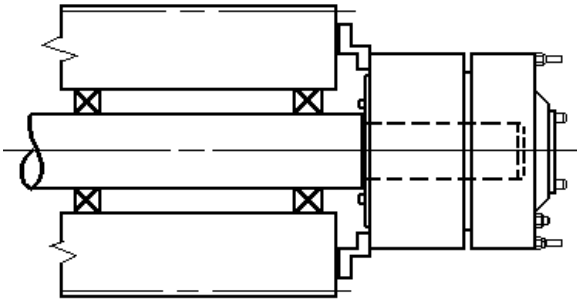


Figure 4

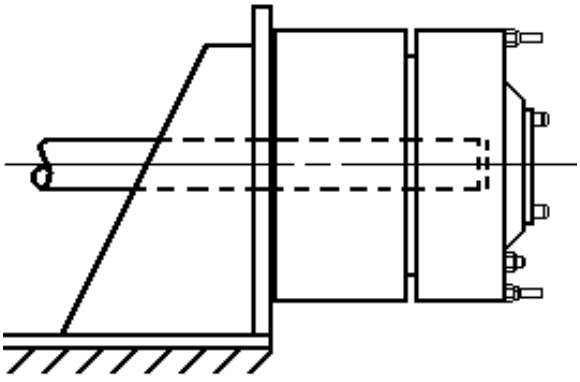


Figure 5

2.0 INSTALLATION

2.1 Mounting Arrangements

Consideration should be given to actuation and cooling methods and maintenance requirements when determining the appropriate mounting arrangement.

2.1.1 The gap mounting arrangement is illustrated in Figure 2. The CH is pressed onto the driven shaft, and is attached to the driving shaft via the spool. The spool allows installation and removal of the clutch without disturbing the shafts.

2.1.3 Figure 3 represents the quill mounting arrangement. The CH is pressed onto the quill shaft with a pinion adapter connected to the drive ring. Typically the quill will pass through the CH and be bearing supported at the end.

2.1.3 Bearing mounting ,as in Figure 4, is similar to quill mounting except the quill shaft is supported by bearings. This arrangement ensures accurate clutch alignment.

2.1.4 An example of brake mounting is illustrated in Figure 5. The CH is pressed onto the shaft which is to be stopped. The drive ring is attached to a stationary reaction member.

2.2 Shaft Preparation

2.2.1 To permit cylinder assembly onto the shaft without damaging the pressure seals, provide a smooth 20 degree x .062 in. (1,6mm) lead-in chamfer on the section of shaft that compresses the pressure seals.

2.2.2 Make sure the shaft is free of nicks and burrs, and the keys fit properly.

2.2.3 Ensure the actuating pressure and coolant oil supply ports, if applicable, are properly located, smoothly chamfered and deburred.

Caution:

Failure to sufficiently chamfer and smooth supply ports and shaft lead-in may result in damage to the pressure seals during installation of the cylinder assembly.

TABLE 1 Alignment Specifications, T.I.R.		
Size	**Angular**	**Parallel, in.(mm)**
CH1050	.0005 in./in. (0,0005mm/mm) diameter at indicator point	.010 (0,254)
CH1250		.010 (0,254)
CH 1440		.015 (0,381)
CH 1640		.015 (0,381)
CH 1940		.020 (0,508)
CH 2150		.020 (0,508)

2.3 Shaft Alignment

2.3.1 Prior to installing the CH element, the shafts must be aligned so that the CH components are held within the limits in Table 1.

2.3.2 The shafts must be located such that the gap between the drive ring (5) and cylinder (8), when the element is installed, is .190 +/-.030in. (4,83 +/- 0,76 mm). See Figure 6.

2.4 Installation Procedures

2.4.1 Preparation for Installation

2.4.1.1 The hub of the CH is bored and keyed for a resulting interference fit. Check the shaft and bore diameters to ensure that the assembled fit is within allowable specifications. See Table 2.

2.4.1.2 Remove the two shipping bolts (26) and safety wiring clips (27) and discard.

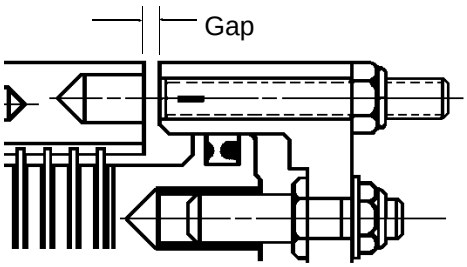


Figure 6

⚠ Warning:

Failure to remove shipping bolts prior to operation may result in exposure to personal injury or product/equipment damage.

⚠ Caution:

The drive ring is free to slide off of the disc pack during handling.

2.4.1.3 Remove the socket head cap screws (17) and clamp plate (18) attaching the piston/cylinder assembly to the hub (1). Carefully remove the piston/cylinder subassembly and the springs (14) from the hub.

2.4.1.4 Slide the drive ring (5) off of the disc pack.

2.4.1.5 Carefully remove the disc pack from the hub.

2.4.1.6 Check that the shaft is free of nicks and burrs per section 2.2, the actuating pressure and cooling oil (if applicable) holes are properly located, and the keys fit properly. Install the keys in the keyways.

⚠ Caution:

Failure to sufficiently chamfer and smooth supply ports and shaft lead-in may result in damage to the pressure seals during installation of the cylinder assembly.

2.4.1.7 Coat the shaft and keys with an anti-seize compound.

2.4.1.8 Make sure the shaft seals (16,20) are properly installed in the cylinder. See the Maintenance section of this manual for shaft seal installation instructions.

TABLE 2			
Size	**Typical Shaft Size Inches (MM)**	**Allowable Shaft To Hub Interference Fits, Inches. (MM)**	
	Maximum	**Maximum**	**Minimum**
CH1050	3.375 (85,73)	.0044 (0,112)	.0014 (0,036)
CH1250	4.500 (114,30)	.0049 (0,124)	.0014 (0,036)
CH1440	5.250 (133,35)	.0060 (0,152)	.0016 (0,041)
CH1640	6.250 (158,75)	.0060 (0,152)	.0019 (0,048)
CH1940	8.000 (203,20)	.0082 (0,208)	.0029 (0,074)
CH2150	9.000 (228,60)	.0092 (0,233)	.0032 (0,081)

2.4.2 Installation - Quill Mount Orientation

The following installation procedures should be followed for CH elements requiring that the hub be mounted prior to the cylinder, as in quill mounted applications (Figure 3). For elements requiring that the cylinder be mounted first, proceed to 2.4.3.

2.4.2.1 Heat the hub/end plate subassembly (1,2,4) uniformly to approximately 300°F (150°C). It is recommended the hub be immersed in heated oil for this purpose.

2.4.2.2 Noting the proper orientation, slide the heated hub subassembly into position on the shaft and allow to cool.

2.4.2.3 Remove any excess lubricant from the shaft.

2.4.2.4 Assemble the disc pack on the hub by placing a separator spring (3) on the hub, followed by a friction disc (7), followed by a separator disk (6) , and continuing in this sequence with the remaining disc pack components. DO NOT lubricate the splines on the hub.

Caution:

For dry applications, excess lubricant may contaminate the friction material, resulting in a significant reduction of clutch or brake torque.

2.4.2.5 Install the thick separator disc (29) on the hub to complete the disc pack.

2.4.2.6 Align the splines on the friction discs and carefully slide the drive ring (5) over the disc pack, noting the orientation of the mounting holes. DO NOT lubricate the splines on the drive ring.

2.4.2.7 Insert the springs (14) into their corresponding holes in the hub.

2.4.2.8 Nest the spring retainer (13) into the piston (12), as in Figure 1.

2.4.2.9 Lubricate the shaft and shaft seals (16,20) with oil.

2.4.2.10 Carefully slide the piston/cylinder assembly into position against the hub.

2.4.2.11 Attach the piston/cylinder assembly to the hub with socket head cap screws (17), making sure the clamp plate (18) is positioned between the screws and the cylinder. Torque the capscrews as specified in Table 3, and safety wire in pairs.

2.4.2.12 Assemble the drive ring (5) to the drive ring adapter with fasteners as specified in Table 3. Torque the screws to the value specified and safety wire in pairs.

TABLE 3
Fastener Assembly Torque (lubed), Ft.-lb, (Nm)

Model	End Plate Bolt (2)	Drive Screw Locknut (11)	Anti-Rotation Pin Locknut (11) *	Clamp Plate Bolt(17)	Drive Ring Adapter Screws	
					Description	Torque
CH1050	80 (108)	80 (108)	80 (108)	80 (108)	1/2-13 NC-2 Grade 8	69 (94)
CH1250	170 (230)	80 (108)	80 (108)	80 (108)	1/2-13 NC-2 Grade 8	69 (94)
CH1440	280 (380)	90 (122)	170 (230)	170 (230)	5/8-11NC-2 Grade 8	170 (230)
CH1640	280 (380)	90 (122)	170 (230)	170 (230)	5/8-11NC-2 Grade 8	170 (230)
CH1940	390 (528)	100 (135)	250 (339)	250 (339)	3/4-10NC-2 Grade 8	250 (339)
CH2150	460 (623)	100 (135)	250 (339)	250 (339)	3/4-10NC-2 Grade 8	250 (339)

Note: All fasteners lubricated with a light oil, unless otherwise noted.
* Threads should be dry. Apply Loctite® #262 to threads prior to assembly.

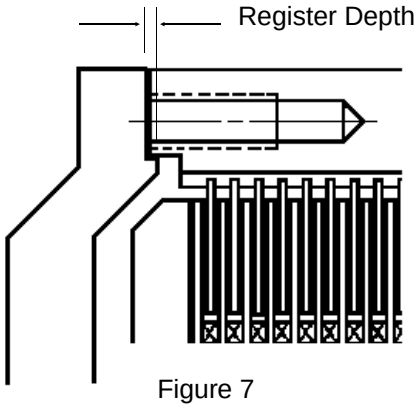


Figure 7

Warning:

Use only Grade 8 fasteners to attach the drive ring to the adapter. Use of commercial (Grade 2) fasteners may result in failure of the fasteners under load, and complete loss of clutch or brake torque.

Note: For proper oil-cooling, the register in the drive ring adapter must be no deeper than .12 in. (3,0 mm). See Figure 7.

2.4.2.13 Bleed the cylinder - if required - and adjust the controls. Refer to the OPERATION section.

2.4.3 Installation - Gap Mounted Arrangement

The following procedures are for CH elements requiring that the cylinder be mounted prior to the hub, as in gap mounted arrangements (Figure 2). For applications that require the hub be mounted prior to the cylinder, refer to section 2.4.2 of this manual.

2.4.3.1 Slide the clamp plate (18) onto the shaft.

2.4.3.2 Carefully slide the piston/cylinder assembly onto the shaft.

2.4.3.3 Nest the spring retainer (13) into the piston (12). See Figure 1.

2.4.3.4 Heat the hub uniformly to 300^{o}F (150^{o}C). It is recommended the hub be immersed in heated oil for this purpose.

2.4.3.5 Noting the proper orientation, slide the heated hub into position on the shaft and allow to cool.

2.4.3.6 Remove any excess lubricant from the shaft.

2.4.3.7 Attach the piston/cylinder assembly to the hub with socket head cap screws (17), making sure the clamp plate (18) is positioned between the screws and the cylinder. Torque the capscrews as specified in Table 3.

2.4.3.8 Safety wire the cap screw in pairs with .040 in. (1,02mm) stainless steel AISI 302 wire or equivalent. Twists should be uniform and neat in appearance, direction optional.

2.4.3.9 Insert the springs (14) into their corresponding holes in the hub.

2.4.3.10 Install the thick separator disc (29) on the hub. DO NOT lubricate the splines on the hub.

Caution:

For dry applications, excess lubricant may contaminate the friction material, resulting in a significant reduction of clutch or brake torque.

2.4.3.11 Complete the disc pack by placing a separator spring (3) on the hub, followed by a friction disc (7), followed by a separator disk (6), and continuing in this sequence with the remaining disc pack components. The final component of this sequence should be a friction disc.

2.4.3.12 Assemble the end plate (4) to the hub with the socket head cap screws (2), lightly oiled. Torque the screws to the value indicated in Table 3, and safety wire in pairs.

2.4.3.11 Align the splines on the friction discs and carefully slide the drive ring (5) over the disc pack, noting the orientation of the mounting holes. DO NOT lubricate the splines on the drive ring.

2.4.3.12 Assemble the drive ring (5) to the drive ring adapter with fasteners as specified in Table 3. Torque the screws to the values indicated and safety wire in pairs.

TABLE 4 Maximum Speeds (RPM)		
Size	**Actuation method**	
	Air	**Oil**
CH 1050	2200	1200
CH 1250	2000	1000
CH 1440	1800	800
CH 1640	1600	800
CH 1940	1300	500
CH 2150	1200	400

Warning:

Use only Grade 8 fasteners to attach the drive ring to the drive ring adapter. Use of commercial (Grade 2) fasteners may result in failure of the fasteners under load, and complete loss of clutch or brake torque.

Note: For proper oil-cooling, the register in the drive ring adapter must be no deeper than .12 in. (3 mm). See Figure 7.

2.4.3.13 Bleed the CH element - if required - and adjust the controls. Refer to the OPERATION section.

3.0 OPERATION

3.1 Torque and Speed Limits

TABLE 5 Minimum Air Supply Piping Sizes	
Size	**Pipe Size, NPT**
CH1050	3/8"
CH1250	
CH1440	
CH1640	
CH1940	1/2"
CH2150	

3.1.1 Developed torque is directly proportional to the applied pressure. If the developed torque seems inadequate, check for contamination of the friction discs, damage to the friction discs or separator discs, or in the case of oil cooled units, improper coolant temperature.

3.1.2 Maximum speeds are shown on Table 4. Inner and outer members (when disengaged) may operate in opposing directions, each at listed maximum RPM. If higher speeds are desired for hydraulically actuated elements, consult the factory.

Warning:

Operation at speeds exceeding the maximum allowable, as shown on Table 4, may result in exposure to personal injury or product/equipment damage.

Caution:

Attempts to disengage hydraulically actuated CH elements at speeds exceeding the maximum allowable, as shown on Table 4, may result in excessive heat and wear, or failure of the element to disengage properly.

3.2 Actuation Control System Requirements and Adjustment

The CH can be actuated with either air or hydraulic pressure. The maximum allowable working pressure is 200 psi (13.8 Bar) for oil-cooled applications and 120 psi (8.3 Bar) for air-cooled (dry) applications.

3.2.1 Pneumatic Actuation Systems

Since the air control arrangement will vary from one application to the next, a specific description cannot be presented here. Following are some general guidelines for installing air control components.

3.2.1.1 Use full size piping as recommended. See Table 5.

3.2.1.2 Keep the number of elbows to a minimum, to ensure consistent response times.

3.2.1.3 The CH element does not require lubricated air; however the solenoid valve may. Consult the valve manufacturer.

3.2.1.4 Use poppet-type solenoid valves. Spool valves are not recommended. Actuation valves should be located as close to the CH element as possible.

3.2.1.5 If a flow control is used, it must have free flow (indicated by arrow on the valve body) directed away from the CH element.

TABLE 6 Cylinder Volume, in.^{3}, (dm^3)		
Size	Friction Disc Condition	
	New	Worn
CH 1050	32 (0,52)	60 (0,98)
CH 1250	45 (0,74)	90 (1,48)
CH 1440	79 (1,29)	130 (2,13)
CH 1640	101 (1,66)	166 (2,72)
CH 1940	143 (2,34)	301 (4,93)
CH 2150	185 (3,03)	390 (6,39)

3.2.2 Hydraulic Actuation Systems

3.2.2.1 If the CH is to be hydraulically actuated, an accumulator or desurger must be incorporated in the pressure line to prevent pressure spikes. Since accumulator selection is dependent upon the entire system arrangement, sizing recommendations cannot be stated in this manual; however, for sizing calculations, the cylinder volume of the CH is required. See Table 6.

Caution:

An accumulator or desurger must be incorporated in the pressure line for hydraulic actuation. Excessive pressure spikes will result in damage to the piston and cylinder components.

3.2.2.2 For hydraulic actuated applications, the CH must be bled prior to being put into service. To bleed the cylinder, rotate the shaft so the pipe plug (19) is at the 12 o'clock position. Remove the pipe plug and apply approximately 10 psi (0,69 Bar) actuating pressure. Replace the pipe plug when there are no indications of air in the oil flowing from the bleed port.

3.3 Cooling Oil Requirements

3.3.1 Typically, acceptable cooling oils include type C-3 approved fluids, or SAE 10W to SAE 50 oils suitable for CC or SE service. Consult the factory for specific oil approval.

Caution:

EP oils severely affect torque capabilities and are not recommended unless provided for in the original application selection. Consult the factory when considering the use of EP oil.

TABLE 7 Coolant Oil Flow Rate		
Size	Gallons/min. (Liters/min.)	
	Minimum	Maximum
CH 1050	5 (19)	10 (38)
CH 1250	7 (26)	14 (53)
CH 1440	9 (34)	18 (68)
CH 1640	11(42)	22 (83)
CH 1940	16 (61)	32 (121)
CH 2150	23 (87)	46 (174)

3.3.2 For cooling oil flow requirements, refer to Table 7.

3.3.3 Pressure measured at the inlet, with the unit engaged (actuating pressure applied) should be between 5 and 20 psi (0,34 to 1,38 Bar), as required to maintain proper flow rate.

3.3.4 Oil temperature should not exceed 200^{o}F (93^{o}C). Minimum coolant oil temperature is dependent on coolant oil viscosity. Adjust temperature to maintain specified flow rate without exceeding the maximum coolant oil pressure.

3.3.5 Coolant oil should be filtered to 25 micron or smaller prior to entering the clutch.

3.4 Positive Drive Screws

3.4.1 Should a need arise where positive drive is required, drive screws (10) are provided which direct-couple the cylinder (8) to the drive ring (5). These screws are designed to transmit 100% of the rated clutch torque.

3.4.2 To engage the drive screws, align the drive screws with the mating holes in the drive ring. Loosen the locknuts (11) and screw the drive screws in until they lightly bottom in the mating holes. After the screws have bottomed, back them out one turn to prevent a thrust load from being applied to the cylinder. See Figure 8. Tighten the locknuts to the value indicated in Table 3.

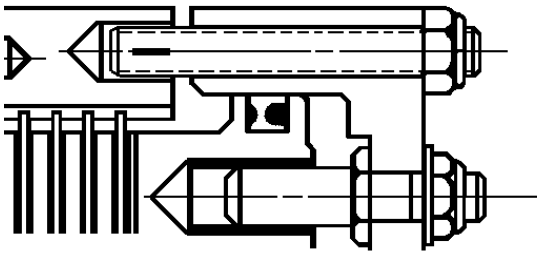


Figure 8

TABLE 8 Wear Limits for CH Components			
Item	**Description**	**Wear Limit**	**Remarks**
Hub (1)	Spline Wear	Maximum wear is .005 in. (.13 mm).	If worn, inspect separator discs for tooth wear.
End Plate (4)	Wear Surface	Maximum wear is .005 in. (.13 mm)	
Drive Ring (5)	Spline Wear	Maximum wear is .005 in. (.13 mm).	If worn, inspect friction discs for tooth wear.
Separator Discs (6,29)	Wear Surface	Maximum wear is .005 in. (.13 mm) on each side	Inspect for wear, flatness, and tooth damage.
Friction Disc (7)	Friction Material	See Section 4.3 for wear limits.	Entire disc pack (Items 3,6,7, & 29) should be replaced as a set.
Cylinder (8)	Seal Contact Areas	Visual	Replace when aluminum is visible.
Positive Drive Screws (10)	Damaged Threads	Replace after use.	Screws may be damaged during use.
Spring (14)	Spring Free Height	Minimum free height is shown on the table below.	Springs must be replaced in complete sets.
Piston Bushing (21)	Hole Elongation	Maximum inside diameter is shown on the table below.	Bushings cannot be replaced in piston. Replace piston sub-assembly.
Anti-rotation Pin (23)	Bushing Area	Minimum outside diameter is shown on the table below	Original pin diameter is shown below.

Size	**Spring Free Height (Item 14) IN. (MM)**		**Pin Outside Diameter (Item 23) IN, (MM)**		**Bushing Inside Diameter (Item 21) IN. (MM)**	
	Original	**Minimum**	**Original**	**Minimum**	**Original**	**Maximum**
CH1050	5.00 (127,0)	4.90 (124,4)	.602 (15,29)	.596 (15,14)	.626 (15,90)	.631 (16,03)
CH1250	5.50 (139,7)	5.39 (136,9)	.602 (15,29)	.596 (15,14)	.626 (15,90)	.631 (16,03)
CH1440	7.00 (177,8)	6.85 (174,0)	.729 (18,52)	.723 (18,36)	.750 (19,05)	.757 (19,23)
CH1640	7.00 (177,8)	6.85 (174,0)	.729 (18,52)	.723 (18,36)	.750 (19,05)	.757 (19,23)
CH1940	7.00 (177,8)	6.85 (174,0)	.977 (24,82)	.971 (24,66)	.997 (25,32)	1.004 (25,50)
CH2150	8.00 (203,2)	7.85 (199,1)	.977 (24,82)	.971 (24,66)	.997 (25,32)	1.004 (25,50)

TABLE 9				
Size	Friction Disc Thickness		Minimum Stack Height **	
	New *	Minimum	New *	Minimum
CH1050	.150" (3,81)	.126" (3,20)	2.79" (70,86)	2.51" (63,75)
CH1250			3.18" (80,77)	2.83" (71,88)
CH1440	.165" (4,91)	.130" (3,30)	3.63" (92,20)	3.28" (83,31)
CH1640				
CH1940				
CH2150	.198" (5,03)	.163" (4,14)	4.683" (118,95)	4.013" (101,93)

* Based on nominal values. Values listed may not reflect actual new thickness.
** Based on overall thickness of 12 friction discs and 11 separator discs.

Caution:

Positive drive screw engagement procedures must be followed to prevent damaging thrust loads from being applied to the cylinder.

Note: Positive drive screws should be replaced after use, as the threads are usually damaged during use.

4.0 MAINTENANCE

4.1 Wear Limits

4.1.1 Wear limits for the CH components are shown on Tables 8 and 9. If any wear limit has been reached or exceeded, that component *must* be replaced.

Caution:

Use only genuine Airflex replacement parts. The use of non-genuine Airflex® replacement parts could result in substandard product performance and may void your Eaton warranty.

4.1.2 If a component is found to be worn or damaged, check for wear or damage of adjoining components.

4.2 Periodic Inspection

4.2.1 The actuation control system should be periodically checked for correct settings and operation.

4.2.2 As the disc pack wears, engagement response time will increase, due to the gradual increase in cylinder volume. Adjustment of the actuation controls may be necessary to maintain response time.

4.2.3 Periodically check for leakage in the area of the cylinder seals (9, 15). For replacement, refer to section 4.5.

4.2.4 Inspect the cooling oil system, if applicable, for proper operation and settings.

4.2.5 Periodically check the coolant and actuation system filters for contamination. Replace per manufacturers recommendations.

4.3 Replacement of the Disc Pack

The disc pack includes the friction discs, separator discs, thick separator disc, and separator springs. Replacement of the disc pack is required when ANY of the following conditions exist:

1) Any one side of any friction disc has worn to the bottom of the grooves. in the friction material, or

2) The minimum stack height listed in Table 9 has been reached, or

3) The overall thickness of any one friction disc is worn to the minimum thickness indicated in Table 9.

Danger:

High spring forces exist within the CH assembly. Read the instructions carefully before attempting to disassemble the CH element.

Caution:

Use only genuine Airflex replacement parts. The use of non-genuine Airflex® replacement parts could result in substandard product performance and may void your Eaton warranty.

Note: Some assemblies use a non-standard quantity of friction discs, requiring a different assembly sequence than that stated in the following paragraphs. If in doubt of the proper assembly sequence or arrangement, contact the factory or your Airflex distributor.

4.3.1 Quill Mount Applications (ref. Figure 3)

The following procedures are to be followed for CH elements oriented with the cylinder (8) towards the end of the shaft. For elements mounted in the opposite orientation, refer to 4.3.2.

4.3.1.1 Using a crosswise pattern, one turn at a time, loosen the socket head screws (17) attaching the piston/cylinder assembly to the hub (1), until all of the spring force has been relieved. Remove the piston/cylinder assembly.

4.3.1.2 Remove the fasteners attaching the drive ring (5) to the drive ring adapter, and slide the drive ring off the disc pack.

4.3.1.3 Inspect the drive ring for wear. Replace if necessary.

4.3.1.4 Remove the friction discs (7), separator springs (3), separator discs (6), and thick separator disc (29) from the hub.

4.3.1.5 Check the condition of the hub (1) splines. If more than .005 in. (0,13mm) grooving/wear is evident, the hub must be replaced. If replacement is necessary, continue disassembly per section 4.4.

4.3.1.6 Inspect the end plate (4) for wear, as indicated in Table 8. If replacement is required, continue disassembly per section 4.4.

4.3.1.7 Inspect the shaft seals (16,20) for damage. Replace, if required per section 4.6.

4.3.1.8 Replace the disc pack components and reinstall the unit per section 2.4, as required.

4.3.2 Gap Mounted Applications (ref. Figure 2)

The following procedures are to be followed for CH elements oriented with the hub (1) towards the end of the shaft. For elements mounted in the opposite orientation, refer to section 4.3.1.

4.3.2.1 Remove the fasteners attaching the drive ring (5) to the drive ring adapter, and slide the drive ring off the disc pack.

4.3.2.2 Inspect the drive ring splines for wear. Replace the drive ring, if necessary.

4.3.2.3 Using a crosswise pattern, one turn at a time, loosen the socket head screws (2) attaching the end plate (4) to the hub, until all of the spring force has been relieved. Remove the end plate.

4.3.2.4 Remove the friction discs (7), separator springs (3), separator discs (6), and thick separator disc (29) from the hub.

4.3.2.5 Check the condition of the hub splines. If more than .005 in. (0,13mm) grooving/wear is evident, the hub must be replaced. If replacement is necessary, continue disassembly per section 4.4.

4.3.2.6 Replace the disc pack components and reinstall the unit per section 2.4, as required.

4.4 Hub Replacement

The hub and cylinder are manufactured in matched sets to ensure proper alignment of the keyways. Seperate replacement of the hub will require hand fitting of the keys.

Caution:

Improper fitting of the keys will result in damage to the hub or cylinder.

4.4.1 Remove the fasteners attaching the drive ring to the drive ring adapter.

4.4.2 Remove the CH element from the equipment and transport to a clean work area. Opposing end plate screws (2) or cylinder cap screws (17) can be removed to accommodate a puller.

Caution:

The drive ring is free to slide off of the disc pack during handling.

4.4.3 Lay the CH element on a flat work surface with the end plate (4) facing up.

4.4.4 Slide the drive ring (4) off of the disc pack. Inspect the drive ring splines for wear, as indicated in Table 8. Replace if necessary.

4.4.5 Using a crosswise pattern, one turn at a time, loosen the socket head screws (2) attaching the end plate (4) to the hub, until all of the spring force has been relieved. Remove the end plate.

4.4.6 Remove the friction discs (7), separator springs (3), separator discs (6), and thick separator disc (29) from the hub.

4.4.7 Remove the springs (14) from the hub, and turn the unit over so the cylinder faces up.

4.4.8 Remove the socket head cap screws (17) attaching the cylinder to the hub.

4.4.9 Remove the clamp plate (18), and lift the piston/cylinder subassembly off of the hub.

4.4.10 Some older CH1050 and CH1250 elements have a dowel pin in the cylinder, where the cylinder mates with the hub. This dowel pin should be removed prior to replacing the hub.

4.4.11 Remove the spring retainer (13) from the hub, and place it on the new hub, or replace, if required.

4.4.12 Attach the piston/cylinder subassembly to the new hub with socket head cap screws (17), making sure the clamp plate (18) is positioned between the screws and the cylinder.

4.4.13 Before tightening the socket head cap screws (17), fit the key(s) in the keyway(s) to properly align the hub to the cylinder. Torque the socket head cap screws as specified in Table 3. Hand fit the keys, if required.

Caution:

Improper fitting of the keys will result in damage to the hub or cylinder.

4.4.14 Reinstall the unit per section 2.4.

4.5 Replacement of the Piston/Cylinder Subassembly Components

Replacement of piston/cylinder subassembly components may require removal of the hub, depending on the mounting configuration. If hub removal is required, refer to section 4.4.

4.5.1 **Disassembly**

4.5.1.1 Remove the socket head cap screws (17) attaching the cylinder (8) to the hub (1).

4.5.1.2 Remove the cylinder from the hub, placing it on a clean, flat work surface.

4.5.1.3 Carefully remove the piston (12) from the cylinder.

Caution:

Do not use compressed air to remove the piston from the cylinder.

4.5.2 Inspection and Replacement of Components

4.5.2.1 Note the condition of the anti-rotation pin bushings (21) in the piston (12). If the bushings are worn excessively, the piston must be replaced.

4.5.2.2 Inspect the condition of the Polypak seals (9,15) for wear and damage. If replacement of the seals is necessary, remove the seals from the piston, and thoroughly clean the seal grooves in the piston.

4.5.2.3 Insert new seals, as required, into the piston grooves, noting the proper orientation of the seal lips, per Figure 1.

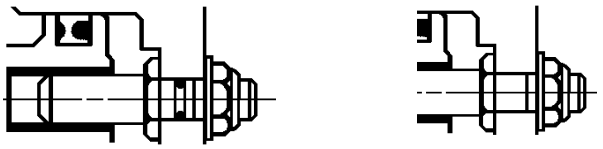
4.5.2.4 Carefully examine the seal surfaces in the cylinder. If the surfaces have worn as indicated in Table 8, the cylinder must be replaced.

Note: The hub and cylinder are manufactured as matched sets to ensure proper alignment of the keyways. Separate replacement of the cylinder will require hand fitting of the keys.

Caution:

Improper fitting of the keys will result in damage to the hub or cylinder.

4.5.2.5 Some older CH1050 and CH1250 elements have a dowel pin in the cylinder, where the cylinder mates with the hub. This dowel pin is no longer required, and will not be included in new or replacement cylinders.



Old Design Current Design

Figure 9

4.5.2.6 Units manufactured subsequent to April, 1988, have newer-design anti-rotation pins (23). The previous design used an o-ring as a seal between the pin and the cylinder. The current design is sealed with Loctite® #596. In addition to the seal change, the threads on the end of the pin have been modified. If the unit being serviced has the older-design pins, it is suggested the pins be replaced with the current design. When replacing, apply a small bead of Loctite® #596 under the hex on the pin, apply Loctite® #262 to the threads of the pin and tighten the locknut (11) as indicated in Table 3. Remove excess Loctite® after tightening the locknut. See Figure 9.

Note: Loctite® #262 must be shaken well prior to application.

Caution:

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

4.5.3 Reassembly

4.5.3.1 Lubricate the seal surfaces in the cylinder with a light coat of Parker O-Lube®.

4.5.3.2 Align the anti-rotation pins of the cylinder with the mating holes in the piston and carefully insert the piston into the cylinder, taking care not to damage the seal lips.

4.5.3.3 Reassemble the unit per section 2.4.

4.6 Shaft Seal Replacement

4.6.1 Check the condition of the shaft seals (16,20) for nicks or tears. If replacement is required, scrape the old seal(s) off and thoroughly clean the groove in the cylinder with acetone.

Caution:

Follow general precautions for working with acetone.

4.6.2 To bond the pressure shaft seal (16) in the cylinder bore, apply a thin coat of Loctite® "Blackmax" to the cylinder surface, and then apply a uniform mist of Loctite® "Tak Pak" accelerator to the black side of the seal. Assemble the seal to the cylinder within one minute of "Tak Pak" application, aligning the seal "thru hole" with the activation pressure port in the cylinder. Apply and maintain clamping pressure on the seal for a minimum of two minutes to fixture the seal in the cylinder.

Warning:

Loctite® "Blackmax" contains an eye irritant and will bond skin in seconds. Follow the safety precautions printed on the Loctite® product label.

Caution:

The blue side of the shaft seal is teflon coated. Proper adhesion will not be attained if used as the bonding surface, resulting in possible seal failure.

4.6.3 Trim the loose ends of the seal flush with the keyway.

4.6.4 Repeat the bonding process with the shaft seal balance (20). Trim the loose ends flush with the keyway.

5.0 ORDERING INFORMATION/ TECHNICAL ASSISTANCE

5.1 Equipment Reference

5.1.1 In any correspondence regarding Airflex equipment, refer to the part number and description on the cylinder of the assembly and call or write:

Eaton Corporation
Airflex Division
9919 Clinton Road
Cleveland, Ohio 44144.

Tel.: (800)-233-5926 In the U.S.A. and Canada
(216) 281-2211Outside the U.S.A. and Canada
Fax: (216) 281-3890

SPECIFIC PARTS LISTS HAVE NOT BEEN INCLUDED AS A PART OF THIS MANUAL DUE TO POSSIBLE INCOMPATIBILITY OF COMPONENTS OF PREVIOUS DESIGNS.

CONSULT THE AIRFLEX FACTORY OR AN AUTHORIZED AIRFLEX DISTRIBUTOR FOR PROPER PART NUMBERS WHEN ORDERING REPLACEMENT PARTS.

6.0 REVISIONS

Original Publication Date May 1988	
Revision Date	**Change**
May, 1998	Changed table 2 on page 4 to reflect correct maximum shaft sizes
	Add revision list, sec. 6.0 and updated table of contents

Airflex®

Form ML-318
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EATON PRODUCT WARRANTY

Subject to the conditions stated herein, Eaton Corporation warrants to the Purchaser that each new Airflex Product manufactured by Eaton will be free from failures caused by defects in material and workmanship, and will deliver its rated capacity, for a period of twelve (12) months from the date of shipment to Purchaser, provided such Product is properly installed, properly maintained, operated under normal conditions and with competent supervision. Warranty claims shall be made in writing and the part or parts shall, if requested by Airflex Division, be returned prepaid to the Airflex Division for inspection. Upon a determination that a defect exists, Eaton shall thereupon correct any defect, at its option either by repairing any defective part or parts or by making available at Eaton's plant a repaired or replacement part. This warranty does not extend to normal wear parts or components of the Product, such as friction material and friction surfaces.

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Eaton Corporation
Airflex Division
9919 Clinton Road
Cleveland, Ohio 44144

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