How To Use This Manual

This manual applies to standard Falk Types HF31, 31-1, 32 & 32-1. A Steelflex® Coupling Installation and Maintenance manual is also furnished (428-110 for 1140T10 and smaller, 428-112 for 1150T10 and larger.

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CAREFULLY FOLLOW THE INSTRUCTIONS IN THIS MANUAL FOR OPTIMUM PERFORMANCE AND TROUBLE FREE SERVICE.

Introduction

Type HF couplings are designed for horizontal operation. Connected equipment must be level. Refer to the Factory for coupling operation other than horizontal or for limited end float requirements (sleeve bearing motors).

Each fluid coupling is shipped from the Factory with an angle finder (P/N 1224653). Simply place the angle finder on the filler plug boss and rotate the coupling to the required fill angle as instructed in the "Fill Fluid Coupling" section of these instructions.

Maximize Performance and Life

The performance and life of couplings depend largely upon how you install and maintain them. Before installing couplings, make certain that foundations of equipment to be connected meet manufacturers' requirements. Check for soft foot. The use of stainless steel shims is recommended. Measuring misalignment and positioning equipment within alignment tolerances is simplified with an alignment computer. These calculations can also be done graphically or mathematically.

It is recommended that final alignment be checked using either an alignment computer or graphical analysis. Both methods allow the incorporation of "cold offsets", which will compensate for shaft position changes due to thermal growth.

WARNING: *Lockout starting switch of prime mover and remove all external loads from the drive before installing or servicing couplings or accessories.*

WARNING*: When opening the drain plug, filler plug, or metering orifice access plug of a warm or hot fluid coupling, place a rag over the plug and loosen the plug slowly to relieve any internal pressure.*

WARNING*: Consult applicable local and national safety codes for proper guarding of rotating members. Observe all safety rules when installing or servicing couplings. Coupling guard must not restrict free flow of air, but the portion of the guard in line with fusible plugs must be solid construction.*

CAUTION: *DO NOT PAINT fluid coupling. Painting will reduce fluid coupling thermal heat dissipation characteristics.*

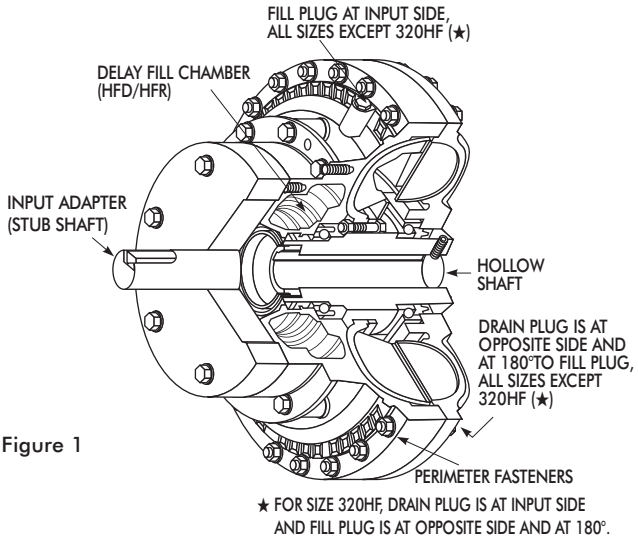

Figure 1

CAUTION: *DO NOT spray water on a hot fluid coupling, as this may result I cracking of aluminum components.*

Identification:

Shaft Coupling — Refer to shaft coupling service manual.

Fluid Coupling — Coupling size and M.O. Number (Mfg Order Number) are stamped on the perimeter of the coupling. Where Rexnord has been provided application data (HP, speed, start factor, driven equipment), the coupling will also include an orange label on the perimeter, indicating the approximate fill quantity in fluid ounces, and the correct fill angle from vertical. Refer to the Factory for replacement parts.

Keep Records for Future Reference

Future maintenance of your fluid coupling can be greatly simplified by keeping good records. It is strongly suggested you fill out the Fluid Coupling Data Record, Table 8, and store this record in your maintenance files.

Fluids

The following specifications and fluids listed in Table 1 apply to Rexnord fluid couplings. Refer to the Factory for use of fire resistant fluids. NOTE: Fluids listed are typical products ONLY and should not be construed as exclusive recommendations.

ISO Viscosity Grade, Petroleum Oils (R & O) 46
ISO Viscosity Grade, Synthetic Oils 32

Viscosity at 104°F(40°C) — 46 cSt (215 SSU)

Viscosity Index — Equal to or greater than 95.

Pour Point — Must be 5°F(3°C) lower than minimum ambient starting temperature.

Flash Point — 400°F(204°C) when using 140°C and/or 180°C fusible plugs.

Flash Point — 425°F (218°C) when using 200°C fusible plugs at both fill and drain holes.

Specific Gravity — 0.87

Antioxidant and Anti-foaming Additives

Annual Maintenance

An annual check of the coupling and fluid is recommended. For extreme or unusual operating conditions, or when the coupling is subjected to overheating, check the coupling and fluid more frequently. Overheated fluid which becomes dark in color and gives off a burnt odor must be changed. Fluid suppliers can test coupling fluid samples periodically and recommend economical change intervals based on the rate of degradation. Continuous operating temperature must not exceed 212°F(100°C).

TABLE 1 — Fluids & Operating Temperatures

Petroleum Oils (R & O) For Ambient Temperatures 20°F to 125°F (-6°C to 52°C)	
Manufacturer	**Fluid**
Amoco Oil Company	American Industrial Oil 46
BP Oil Company	Turbinol T-46
Chevron Products Company	Hydraulic Oil AW 46
Exxon Company, USA	Teresstic 46
Mobil Oil Corporation	Mobil Fluid 424
Petro-Canada Products	Harmony 46
Shell Oil Company	Turbo T 46
Texaco Lubricants Company	Rando Oil HD 46
76 Lubricants Company	76 Unax AW 46
Petroleum Oils (R & O) For Ambient Temperatures -20°F to 125°F (-28°C to 52°C)	
Manufacturer	**Fluid**
Amoco Oil Company	American Industrial Oil 46
Mobil Oil Corporation	Mobilfluid 424
Synthetic Oils and Synthetic Transmission Fluids For Ambient Temperatures -40°F to 125°F (-40°C to 52°C)	
Manufacturer	**Fluid**
Conoco Incorporated	Syncon R&O 32
Exxon Company, USA	Teresstic SHP 32
Mobil Oil Corporation	SHC 624
Texaco Lubricants Company	Pinnacle 32
Mobil Oil Corp.	Synthetic ATF
Chevron	Synthetic All Weather THF
Citgo	Transgard Fluid 250
Automatic Transmission Fluids (Dexron or Mercon Oils, etc.) For Ambient Temperatures GreaterThan -40°F to 125°F (-40°C to 52°C) NOTICE: Can only be used with two 140°C fusible plugs	
Mobil	Multi-purpose ATF
Texaco (Havoline)	Mercon/Dexron-III or ATF
Citgo	Transgard ATF,Type F

Lifting

Remove two perimeter fasteners (metric) approximately 90° apart. Insert threaded rod (Table 5, Page 5) with washers and nuts, then sling coupling as shown in Figure 2.

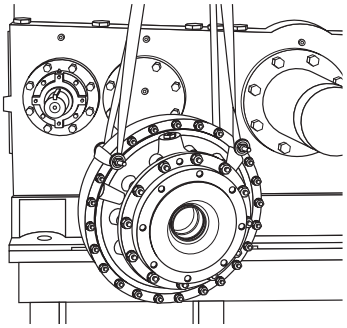

Figure 2

Installation of Steelflex Coupling

Unless otherwise specified, Sizes 1420HF and smaller are funished with Steelflex Size 1090T and smaller, and in these cases the Steelflex will be furnished for clearance fit with a setscrew over the keyway. Size 1480HF and larger are furnished with Steelflex Size 1100T and larger, and in these cases the Steelflex will be furnished for interference fit without setscrew.

INTERFERENCE FIT HUBS — Heat hubs to a maximum 275°F (135°C) using an oven, torch, induction heater or an oil bath.

When an oxy-acetylene or blow torch is used, use an excess acetylene mixture, as well as a rose bud tip. Mark hubs near the center of their length in several places on hub body with a temperature sensitive crayon, 275°F(135°C) melt temperature. Direct flame towards hub bore using constant motion to avoid overheating an area.

WARNING: *If an oil bath is used, the oil must have a flash point of 350°F(177°C) or higher. Do not rest hubs on the bottom of the container. Do not use an open flame in a combustible atmosphere or near combustible materials.*

CLEARANCE FIT HUBS — Clean all parts using a non-flammable solvent. Check hubs, shafts and keyways for burrs. Do not heat clearance fit hubs. Install keys, mount hubs with flange face flush with shaft ends or as otherwise specified, then tighten set screws.

1. Install Fluid Coupling

Only standard mechanics tools, torque wrenches, feeler gauges, straight edges and a bevel protractor with spirit level or angle finder (P/N 1224653) are required to install Falk fluid couplings.

A. Lock out starting switch of prime mover.

B. Check for nicks or burrs on driven shaft and in fluid coupling bore.

C. Check fit of key in keyways, then secure key in shaft keyway.

D. Coat driven shaft with an anti-seize compound or light oil.

E. Types HF31 & 31-1 — Make certain that key is secured in shaft keyway. Slide fluid coupling on driven shaft for maximum engagement and tighten setscrews. If setscrew above keyway does not contact the key, substitute a setscrew long enough to engage with shaft.

Types HF32 & 32-1: Installing fluid coupling on driven shaft.

1. HF32 & 32-1 couplings are normally furnished with a slight clearance to light interference fit between coupling hollow shaft bore and driven shaft. A threaded

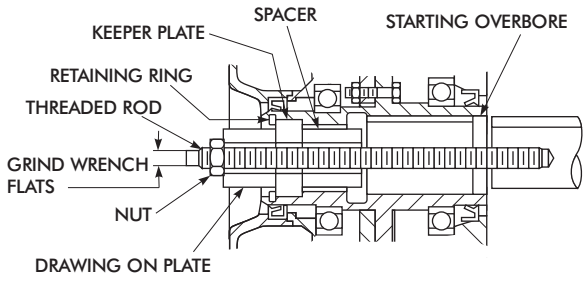

Figure 3

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rod and drawing on plate are required to draw the coupling onto driven shaft, see Figure 3. Refer to Table 2 for threaded rod and drawing on plate dimensions.
NOTICE: Drawing on plate not required for Type HFN.

TABLE 2 — Threaded Rod & Drawing On Plate – Dimensions Inches

Size	Threaded Rod ★		Drawing on Plate OD (Max) x ID x Thickness (Min) ✱
	Diameter	Length (Min) HFD/HFR	
185HF	.375-16UNC	8	1.500 x .438 x .750
235HF	.500-13UNC	10	1.750 x .562 x .750
270HF	.625-11UNC	11	1.750 x .688 x .750
320HF	.625-11UNC	13	2.250 x .688 x 1.500
370HF	.750-10UNC	15	2.375 x .875 x 2.000
1420HF	.875-9UNC	17	2.625 x 1.000 x 2.000
1480HF	.875-9UNC	19	3.125 x 1.000 x 3.000
1584HF	1.000-8UNC	21	3.500 x 1.125 x 3.000
1660HF	1.250-7UNC	24	4.250 x 1.438 x 3.000
1760HF	1.250-7UNC	27	5.250 x 1.438 x 4.000
1870HF	1.250-7UNC	30	5.750 x 1.438 x 5.000

★ SAE Grade 5 (ASTM A449) or equivalent.
✱ Drawing on plate not required for Type HFN.

CAUTION: DO NOT USE HEAT *on fluid coupling hollow shaft. The driven shaft may be cooled with dry ice to reduce its diameter and assist installation.*

2. Screw threaded rod (less the nut)into end of driven shaft.
3. Pass fluid coupling over threaded rod and onto driven shaft using the starting overbore area for alignment to driven shaft and keyway.
4. Assemble spacer, keeper plate and retaining ring (Refer to Table 5, Page 5 for retaining ring number) into hollow shaft of fluid coupling, Figure 3. Spacer must be properly seated against keeper plate.
5. Place drawing on plate and nut on threaded rod. Make certain drawing on plate is seated against keeper plate and not contacting retaining ring or end of fluid coupling housing.
6. Draw fluid coupling onto the driven shaft by tightening nut against drawing on plate. Hold threaded rod end while tightening nut to prevent shaft rotation. Draw coupling on until spacer makes contact with end of driven shaft.
7. Remove threaded rod and drawing on plate. Insert keeper plate fastener with lock washer through keeper plate and spacer, Figures 4 and 5. Carefully thread into tapped hole in driven shaft and tighten keeper plate fastener to torque specified in Table 5, Page 5, Column 7.

F. Reinstall perimeter fasteners and washers. Tighten to torque specified in Table 5, Page 5, Column 3.

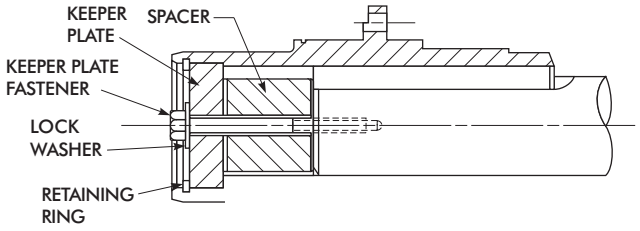

Figure 4 — TYPE HF32

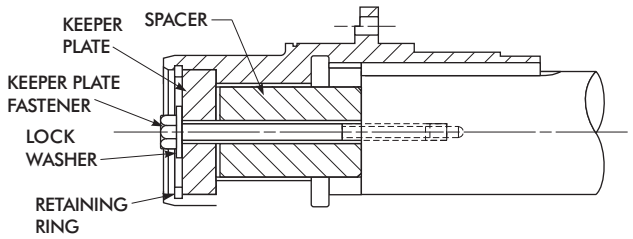

Figure 5 — TYPE HF32-1

2. Install Adapter and Shaft Coupling

A. Install input adapter (stub shaft) to fluid coupling with lock washers and fasteners provided and tighten to torque specified in Table 5, Page 5, Column 5. Adapter register must be properly engaged.

B. Assemble and lubricate Steelflex shaft coupling as instructed in furnished service manual. Recheck shaft coupling alignment after filling fluid couplings.

3. Fill Fluid Coupling

A. Rotate fluid coupling until fill plug is on top and remove the plug. (Both fill and drain plugs have metric threads.) Fill plug is on the input adapter (stub shaft) side of coupling, Figure 1, Page 1, except for Size 320HF where the fill plug location is on the opposite side.

CAUTION: *DO NOT fill coupling through drain hole.*

B. Fill with the required amount of fluid. Fill information is found on the orange label that is affixed to the coupling perimeter. Where no orange label is present, refer to fluid coupling Selection Guide 521-110 for fill data. Fluid must meet the specifications listed in Table 1.

Do not remove orange fluid fill label that is affixed to the coupling perimeter. In cases where no orange label is affixed, a blank label is furnished. Fill out the blank orange label once proper fill data has been determined, then affix that label to the coupling.

C. Before reinstalling fill plug, check fill angle as described in the following step.

4. Check Fill Angle

A. Refer to fluid fill label described in previous step for required fill angle, if applicable.

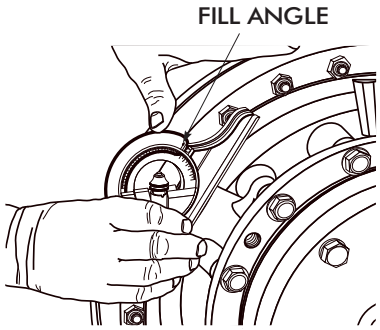

Figure 6

B. Use either a angle finder (P/N 1224653) or a bevel protractor with spirit level set for the required fill angle, and place it on flat boss of the filler hole as shown in Figure 6. Start at 0° (Figure 9).

C. Slowly rotate fluid coupling until the required fill angle is achieved, Figure 7. Fluid must appear at the lip of the fill hole. Add or drain fluid until level is correct. Figure 8 shows fill angle range, degrees from vertical (from 0°).

D. Reinstall fill plug with seal ring and tighten to required torque: Sizes 185-270, 22 lb-ft; Sizes 320-1660, 33 lb-ft; Sizes 1760 and 1870, 59 lb-ft. Do not overtighten.

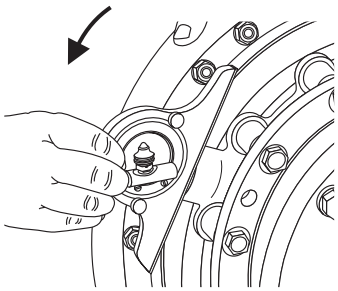

Figure 7

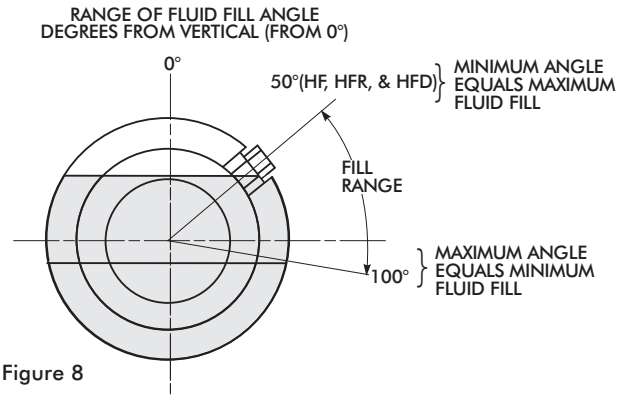

Figure 8

5. Orifice Plugs (Sizes 1420-1870, Types HFD & HFDD only)

The 1000 Series fluid couplings contain 3 orifice plugs (metric threaded) located near the perimeter of the casing. They are located behind three metric hex socket seal plugs (see Figure 9). The function of these orifice plugs is to meter the fluid exiting from the delay fill chamber into the working circuit of the fluid coupling. Orifice plugs are initially furnished as follows: 2.5mm hole (Sizes 1420-1660HFD), 3.5mm hole (Size 1760HFD), and 5.0mm hole (Size 1870HFD). These standard hole sizes result in acceptable starting times for most applications. Should your application require increased or reduced starting times,refer to Table 3 at right for other orifice hole sizes and their estimated affect on starting time. These estimates are based on the change in flow rate for the fluid to exit the delay fill chamber.

Sizes 1420HF-1870HF are furnished with a spare set of orifice plugs (undrilled).

CAUTION: *Increasing the starting time can result in overheating the fluid coupling and discharge of fluid via the fusible plugs.*

Refer to Table 4, Page 5 for orifice and seal plug sizes, required hex "Allen" wrench sizes, and tightening torques. DO NOT EXCEED SPECIFIED TIGHTENING TORQUES, as aluminum threads may strip. Apply anti-seize compound to the orifice plugs prior to their assembly. This will assist in the event of future removal. Typical compounds (or equal) are as follows:

Loctite™ Anti-Seize Thread Compound #767
Dow Corning 1000 High Temperature Anti-Seize Paste

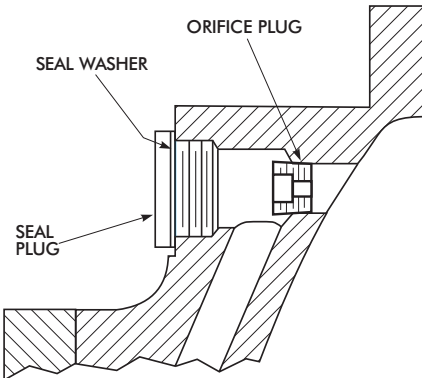

Figure 9

TABLE 3 — Fluid Coupling Starting Times

Orifice Hole Diameter	Estimated Starting Time - % of Original		
	1420HFD - 1660HFD	1760HFD	1870HFD
3/64" (0.0469)	440	860	. . .
1/16" (0.0625)	250	490	. . .
5/64" (0.0781)	160	310	. . .
3/32" (0.0937)	110	220	. . .
2.5 mm (0.0984)	100	200	. . .
7/64" (0.1094)	80	160	325
1/8" (0.1250)	60	120	250
3.5 mm (0.1380)	50	100	200
5/32" (0.1562)	40	80	160
3/16" (0.1875)	30	50	110
5.0mm (0.1968)	. . .	. . .	100
7/32" (.2187)	. . .	. . .	60

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TABLE 4 — Orifice Plug/Seal Plug/Seal Washer Sizes

Cplg Size	Orifice Plug DIN906			Seal Plug DIN908			Seal Washer DIN 7603 Type "A" Copper
	Thread Size	Hex Key Size	Tightening Torque (lb-ft)	Thread Size	Hex Key Size	Tightening Torque (lb-ft)	
1420	1/8R BSPT	5 mm	7	18 x 1.5 mm	10 mm	33	18 x 22 x 1.5 mm
1480	1/4R BSPT	6 mm	11	18 x 1.5 mm	10 mm	33	18 x 22 x 1.5 mm
1584	3/8R BSPT	8 mm	15	22 x 1.5 mm	12 mm	59	22 x 27 x 1.5 mm
1660	3/8R BSPT	8 mm	15	22 x 1.5 mm	12 mm	59	22 x 27 x 1.5 mm
1760	1/2R BSPT	10 mm	29	27 x 2.0 mm	17 mm	74	27 x 32 x 2.0 mm

6. Fusible Plugs

A. Fusible plugs in the fill and drain holes have solder cores that melt at the temperatures shown below:

Fill plug 392°F (200°C)
Drain plug 284°F (140°C)

One extra 284°F(140°C) plug is furnished with each coupling.

B. If solder in fusible plug melts due to overheating from stalling or overloading, refer to Table 7, Page 7, and correct the cause of overheating.

***CAUTION**: DO NOT replace fusible plugs with solid plugs. Use of solid plugs can result in coupling failure from overheating unless used in conjunction with a proximity sensor cutout switch. Refer to the Factory for switch specifications.*

C. Replace fusible plugs as instructed in Step 4D.

D. Refill coupling with clean fluid as instructed in Steps 3 & 4.

TABLE 5 — Fastener Sizes/Tightening Torques/Retaining Rings/Threaded Rod Sizes (for lifting)

COUPLING SIZE	Perimeter Fasteners Grade 8.8		Input Adapter Fasteners Grade 8.8		Keeper Plate Fastener SAE Grade 5		Retaining Ring No.♦	Threaded Rod for Lifting Diameter (in)
	Size x Length (mm)	Torque (lb-ft)	Size x Length mm (Grade)	Torque (lb-ft)	Size (Inch)	Torque (lb-ft)		
185HF	M6 x 55	6	.250-20UNC x 1.00(8) ‡	7.5	.375-16	12.0	RRN168	.188
235HF	M6 x 70	6	.250-20UNC x 1.00(8) ‡	7.5	.500-13	30.0	RRN200	.188
270HF	M8 x 65	15	M8 x 35	15.0	.625-11	60.0	RRN200	.250
320HF	M8 x 65	15	M12 x 40	59.0	.625-11	60.0	RRN256	.250
370HF	M10 x 80	33	M12 x 45	59.0	.750-10	110.0	RRN275	.375
1420HF	M10 x 80	33	M12 x 50	59.0	.875-9	120.0	RRN312	.375
1480HF	M10 x 80	33	M12 x 50	59.0	.875-9	120.0	RRN362	.375
1584HF	M14 x 100	88	M12 x 55	59.0	1.000-8	180.0	RRN412	.500
1660HF	M14 x 120	100	M14 x 65	88.0	1.250-7	250.0	RRN475	.500
1760HF	M16 x 160	140	M16 x 60	140.0	1.250-7	250.0	RRN575	.625
1870HF	M20 x 180	279	M20 x 75	245.0	1.250-7	250.0	RRN650	.750

♦ Ramsey Spir O Lox® RRN Series or equivalent.
‡ Dimensions shown are in inches.

7. Fluid Coupling Removal

A. **Types HF31 & 31-1**, Fluid coupling hollow bore has clearance fit, secured with setscrews.

1. Support fluid coupling with sling as shown in Figure 2.
2. Remove cover and grid of Steelflex coupling.
3. Remove input adapter.
4. Loosen setscrews in hollow shaft and slide fluid coupling off of the shaft.
5. If Step 2 does not work, refer to Steps B4 through B7 at right.

B. **Types HF32 & 32-1**, Fluid coupling hollow bore has modified transitional fit without setscrews. **NOTE:** Rexnord does not supply hand pump, cylinder, or threaded removal plate.

1. Support fluid coupling with sling as shown in Figure 2.
2. Remove cover and grid of Steelflex coupling.
3. Remove input adapter.
4. Remove keeper plate fastener, lock washer, retaining ring, and keeper plate.
5. Referring to Figure 10, insert threaded removal plate (made on site per specs in Table 6) and Spir O Lox® ring (Table 5) into hollow shaft bore.
6. The hydraulic cylinder should conform to specifications shown in Table 6. Coat threads of hydraulic removal cylinder with oil. Thread cylinder into removal plate until snug.
7. Connect Enerpac™ pump (or equal) to cylinder and pump until fluid coupling is free from shaft. If the cylinder rod is not long enough to completely remove coupling, it will be necessary to position a spacer block between the rod and the shaft end.

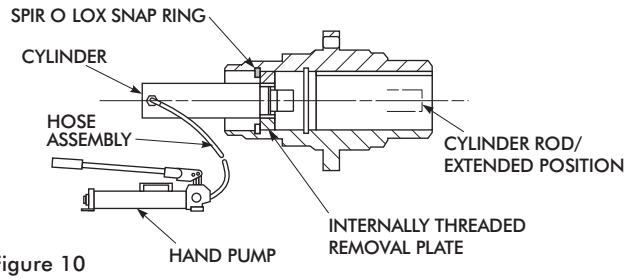

Figure 10

TABLE 6 — Specifications for Internally Threaded Removal Plate and Hydraulic Cylinder

SIZE	Dimensions for Steel Threaded Removal Plate — Inches			Hydraulic Cylinder Specifications	
	Outside Diameter	Thickness	Center Threaded Hole Diameter	Stroke	Tonnage
185HF **235HF**	1.678/1.683 1.990/1.995	.562/.572 .740/.760	Make to suit hydraulic cylinder being used	6″ 6″	10 10
270HF **320HF Mod A**	1.990/1.995 2.552/2.557	.740/.760 .740/.760		6″ 8″	10 10
320HF Mod B **370HF**	2.740/2.745 2.740/2.745	.740/.760 .740/.760		8″ 8″	10 10
1420HF **1480HF**	3.115/3.120 3.615/3.620	.990/1.010 1.110/1.135		8″ 12″	10 15
1584HF **1660HF**	4.115/4.120 4.740/4.745	1.110/1.135 1.110/1.135		12″ 12″	15 15
1760HF **2760HF**	5.740/5.745 5.740/5.745	1.240/1.260 1.240/1.260		12.25″ 12.25″	25 25
1870HF	6.490/6.495	1.240/1.260		12.25″	25

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TABLE 7— Startup and Trouble Shooting

Problem	Possible Cause	Solution
Driven shaft fails to reach specified speed.	Drive motor defective or incorrectly connected.	Check motor connection, speed, amperage draw and power draw.
	Driven machine jammed.	Check driven machine and remove jam.
	Power consumption exceeds coupling capacity at specified fill angle.	★
	Coupling over or under filled.	Re-check fill angle per Step 4.
	Coupling leaking.	Correct source of leakage and re-check fill angle per Step 4.
Fusible plugs melt.	Coupling under filled.	Re-check fill angle per Step 4.
	Coupling leaking.	Correct source of leakage and re-check fill angle per Step 4.
	Driven machine jammed.	Check driven machine and remove jam.
	Power consumption exceeds coupling capacity at specified fill angle.	★
Coupling vibration exceeds acceptable limits.	Incorrect shaft coupling alignment.	Re-align per instructions in shaft coupling service manual.
	Incorrect shaft coupling alignment due to thermal growth.	Check "HOT" alignment and adjust to compensate for thermal growth.
	Worn shaft coupling parts.	Correct cause of wear and replace worn parts.
	Loose foundation, shaft coupling or adapter fasteners.	Check and tighten fasteners accordingly.
	Damaged fluid coupling bearing.	Return fluid coupling to Falk for bearing replacement.

★ Increase fluid fill by decreasing fill angle in 5° increments to a minimum of 50°. If drive shaft still does not reach specified speed, refer to the Factory.

TABLE 8 — Fluid Coupling Data Record (Installer – Fill out data below. Keep in coupling maintenance file)

Equipment Identification . . . . . .

Motor/Brake Hp . . . . . @ . . . . . Input RPM . . . . . .

Fluid Coupling Size . . . . . .

Fill Angle . . . . . Degrees. Fill Volume . . . . . Fl. Oz.

Fluid Used (Mfg & Fluid Designation). . . . . .

Falk Master Order Number . . . . . Date Installed . . . . . .