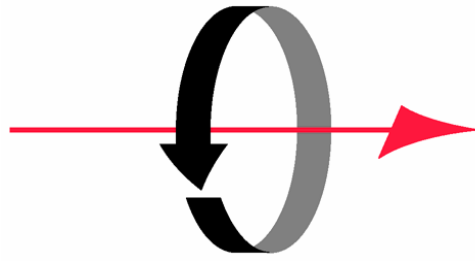


# HPS SERIES

## Steam Joints

**DEUBLIN<sup>®</sup> COMPANY**

2050 Norman Drive, West  
Waukegan, IL USA 60085-6747  
Phone: 847/689-8600  
Fax: 847/689-8690



## **TABLE OF CONTENTS**

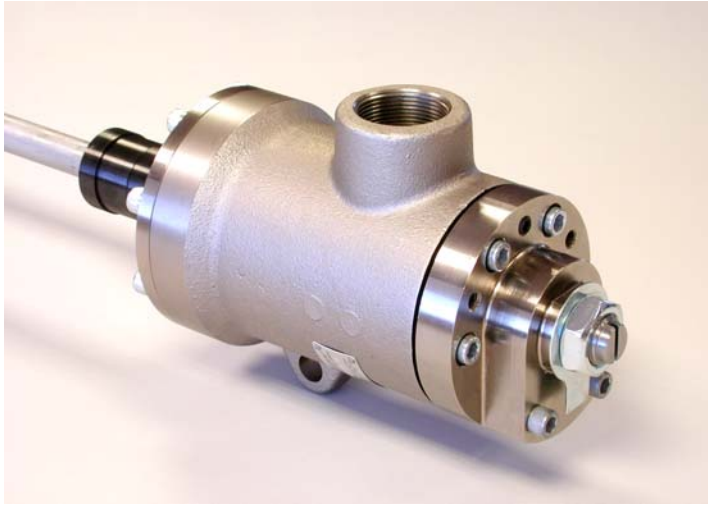
- 1. HPS Series Steam Joint Product Data Sheet**
- 2. HPS Series Steam Joint Drawing**
- 3. Installation Instructions**
- 4. Repair Instructions**
- 5. Mounting Kit Drawings**





**HPS SERIES  
STEAM JOINTS  
DOUBLE BEARING**

Series: HPS  
Sheet: PDS-HPS-1001  
Revised: August 7, 2003



**Operating Data:**

**Max Speed:** 400 rpm

(for higher speeds consult Deublin Engineering)

**Pressure:** 250 psi (17.2 BAR)

**Media:** Steam

**Size:** 1½"

**Other Sizes:** 1¼" (1½" bushed down)  
2" (1½" bushed up)

The HPS joint is a self-supported design. Two bearings support the housing allowing the rotor to rotate easily within the joint body. In the seal assembly, the Convex Antimony Impregnated Carbon Graphite Seal Ring mates against a concave metallic surface.

Many joints use a concave seal ring. Pressure loads radiate outward against this seal to put the ring in tension, allowing it to break apart. By contrast, the HPS features a Convex Seal Ring. Forces against the seal put the ring into compression, making it four times more resistant to failure than Concave Rings. Furthermore, the seal configuration significantly improves seal life.

The HPS Series Joints are available both in monoflow and duoflow configurations.

**Applications:**

- Corrugating Machines
  1. Applicator Rolls
  2. Doctor Rolls
  3. Center Shaft
  4. Preheat Rolls
  5. Pressure Rolls
  6. Upper and Lower Corrugating Rolls

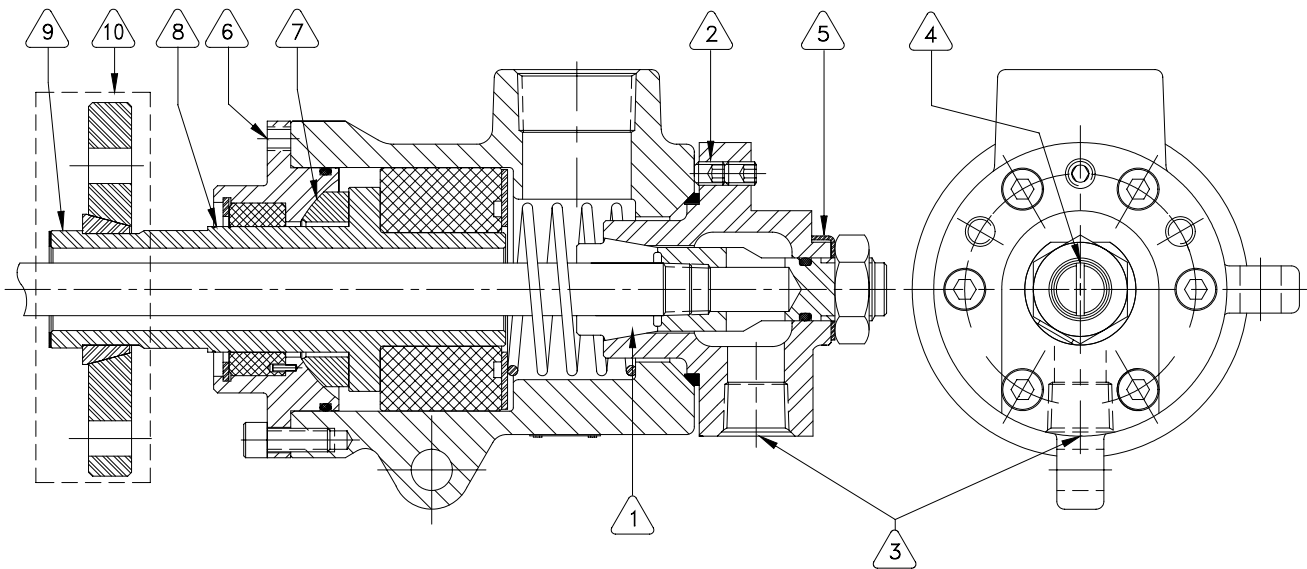
**Materials of Construction:**

- Housing: Nickel Plated Ductile Iron
- Grade 8 Socket Head Cap Screws
- Spring: Stainless Steel
- Seal Ring: Antimony Impregnated Carbon Graphite
- Outboard Bearing: Antimony Impregnated Carbon Graphite
- Siphon Pipe: ½" Schedule 80 Required
- Nickel Plated Front and Rear End Caps



**HPS SERIES  
STEAM JOINTS  
DOUBLE BEARING**

Series: HPS  
Sheet: PDS-HPS-1001  
Revised: August 7, 2003



**HPS Series  
1 1/2" Union**

Note: Numbers correspond to Features & Benefits on page 3



**HPS SERIES  
STEAM JOINTS  
DOUBLE BEARING**

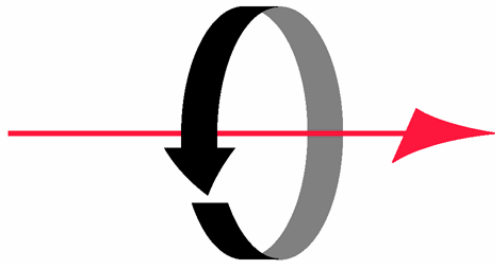
Series: HPS  
Sheet: PDS-HPS-1001  
Revised: August 7, 2003

**Features:**

1. Siphon Bushing
2. External Mechanism to adjust siphon pipe
3. Adjustable Siphon End Cap
4. Alignment Slot
5. Flat Tab Washer
6. Jacking Screw Holes in front end cap
7. Convex Seal Ring
8. Seal Wear Indicator
9. Heavy Duty Rotor Design (66% thicker rotor wall thickness than competition or 3/32" thicker)
10. Fitting dimensions conform to current industry standards
11. One Model for All Applications
12. Field Repair Kit

**Benefits:**

- Provides rigid and secure attachment of siphon pipe eliminating stresses causing siphon breakage.
- Allows easy external adjustment of siphon clearance with set screw, thus preventing the welded seam from catching the siphon pipe.
- Provides optimum condensate removal
- Helps eliminate blistering
- Ability to orient outlet in any desired direction
- Allows for quick visual check of siphon drop leg position and continuous monitoring
- Bent flat tab washer keeps siphon drop leg in set position
- Easy to remove front end cap
- Keeps carbon in compression (4 times stronger than concave rings in tension)
- Better suited to handle mechanical and thermal shock
- Allows for planned maintenance
- Eliminates Rotor breakage
- Increases worker safety
- Allows easy field retrofit
- Allows usage of existing adaptive hardware (split wedges, flange, rotor pilot)
- 1-1/2" replaces 1-1/4", 1-1/2" and 2" size unions
- Lowers inventory holding costs
- Allows economical and easy field repair



# Installation Instructions



**DEUBLIN<sup>®</sup>**

**HPS SERIES**

**Steam Joints**

Model C15D-004-02-3A (UNC)

**DEUBLIN<sup>®</sup> COMPANY**

2050 Norman Drive, West  
Waukegan, IL USA 60085-6747  
Phone: 847/689-8600  
Fax: 847/689-8690



## HPS SERIES Installation Instructions

Series: HPS

Model: C15D-004-02-3A UNC

Date: March 12, 2004

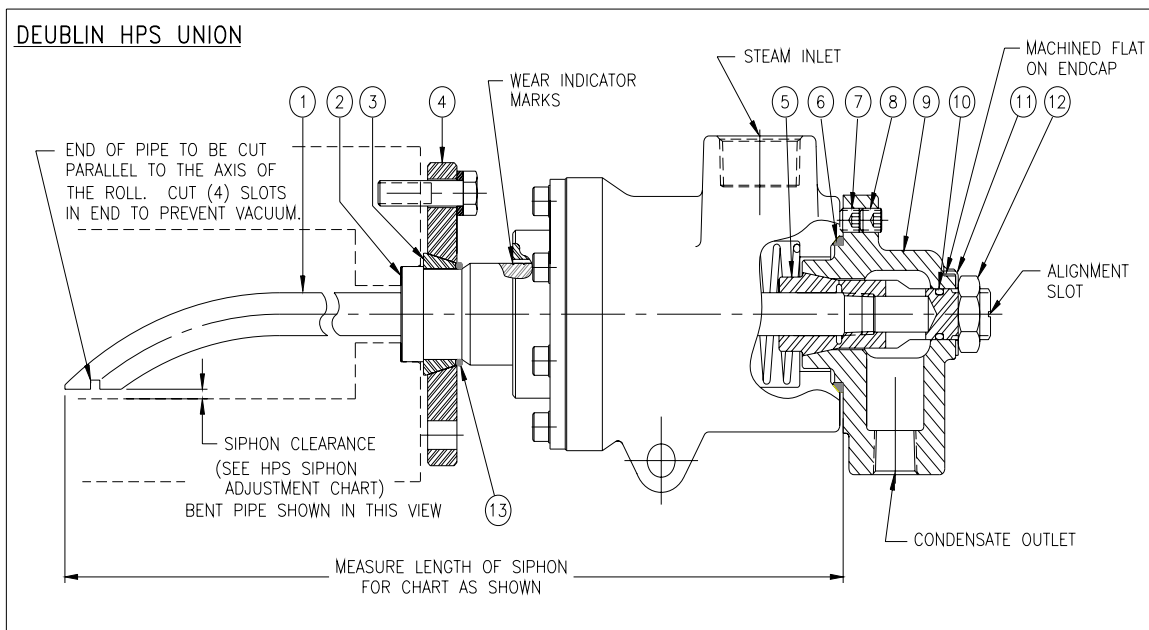
The following instructions are designed to insure proper installation and operation of the **HPS Series Rotating Union, 1-1/2 inch, Double-Bearing with External Siphon Adjustment**.

### Required Tools

- Allen wrench (5/16 inch)
- Allen wrench (3/16 inch) for adjustment set screw
- Open end wrench (7/8 inch)
- Torque wrench
- Adjustable wrench to fit 1-1/2" nut

### Additional items that may be required for installation

- 1/2 inch Schedule 80 siphon pipe
- Mounting adaptation kit (to go from 1-1/2 inch mounting to 2 inch or 1-1/2 inch mounting to 1-1/4 inch mounting)



- |                         |                                 |
|-------------------------|---------------------------------|
| 1. Siphon Pipe          | 8. Adjustment Locking Set Screw |
| 2. Rotor Gasket         | 9. End Cap                      |
| 3. Split Wedges         | 10. O-ring (for Siphon Bushing) |
| 4. Rotor Flange         | 11. Tab Washer                  |
| 5. Siphon Bushing       | 12. Jam Nut                     |
| 6. Copper Gasket        | 13. Hairpin Clip                |
| 7. Adjustment Set Screw |                                 |



## HPS SERIES Installation Instructions

Series: HPS

Model: C15D-004-02-3A UNC

Date: March 12, 2004

**Note:** *It is advisable to use some type of anti-seize compound on all bolts and screws in this installation.*

### Preparation

1. Clean all threads and bores to remove any grease and metal chips which may be left from machining.
2. When installing a bent pipe it should be threaded to 1/2" NPT and bent to the desired shape.

### HPS Installation

1. With the union on the bench, slide the siphon pipe (Item 1) into the union from the journal end. See Figure 1.
2. With the siphon pipe extending from the union, thread the siphon bushing (Item 5) onto the siphon pipe. Tighten the bushing hand-tight and align the alignment slot with the downward leg of the siphon. See Figure 2.
3. Place the o-ring (Item 10), on the siphon bushing, in the groove as shown. See Figure 2.
4. Coat the tapered portion of the bushing with anti-seize compound. Lubricate the o-ring with silicone base grease.
5. Ensure that the copper gasket (Item 6) is installed on the end cap (Item 9), and slide the siphon bushing and siphon pipe into the end cap, aligning the siphon opening with the condensate outlet in the end cap and being careful not to damage the o-ring. See Figure 2.
6. Place the tab washer (Item 11) and jam nut (Item 12) on the end of the bushing and hand-tighten only at this time. See Figure 3.
7. Start the bolts in the end cap leaving them loose at this time.
8. Remove existing steam joint and journal flange, if necessary. Clean the end of the journal or journal flange, removing any residual gasket material.
9. Install new journal flange and gasket, **(if necessary)**.





## HPS SERIES Installation Instructions

Series: HPS

Model: C15D-004-02-3A UNC

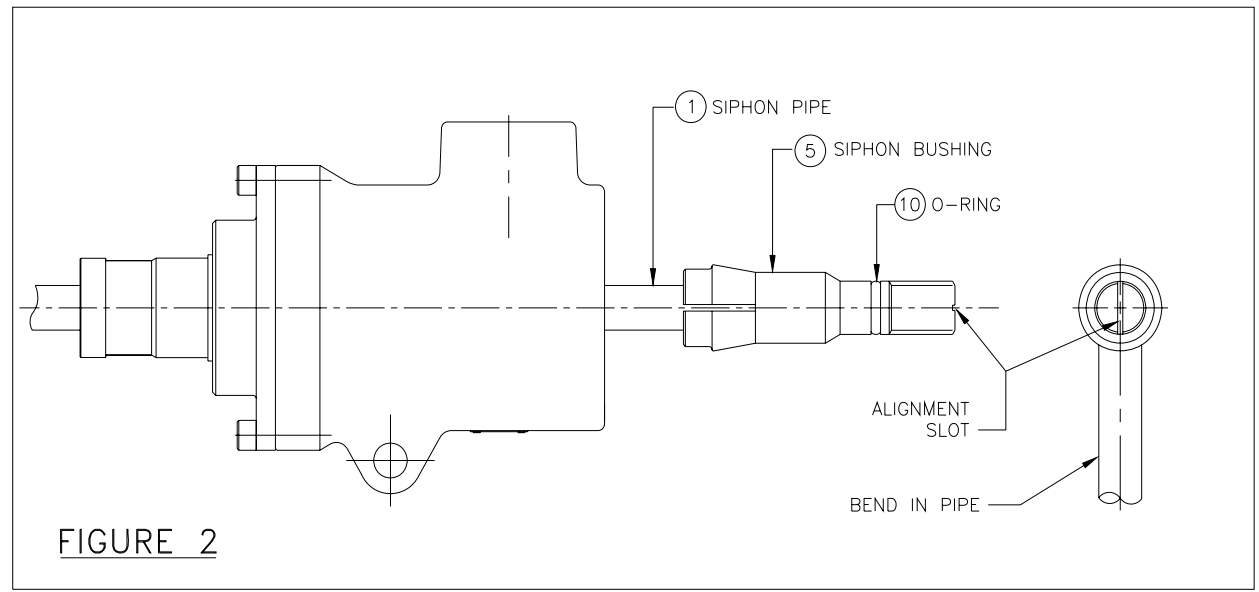
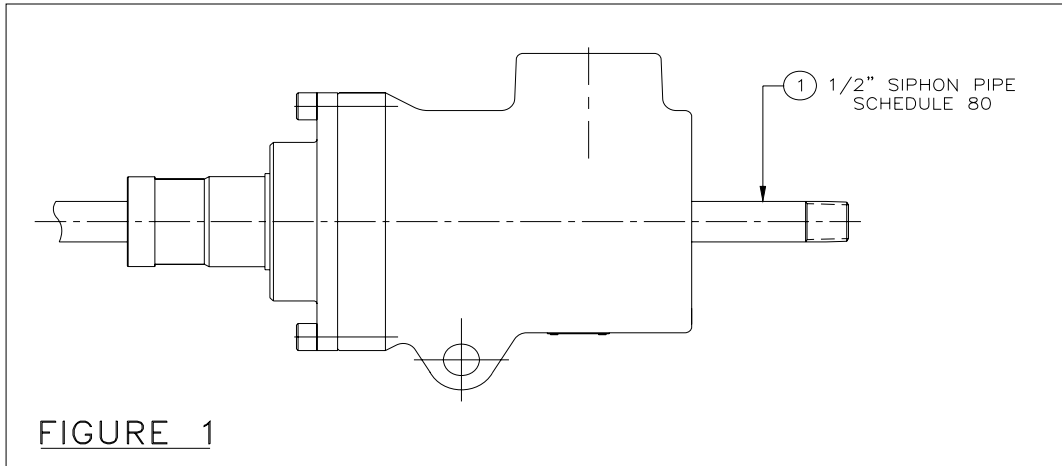
Date: March 12, 2004

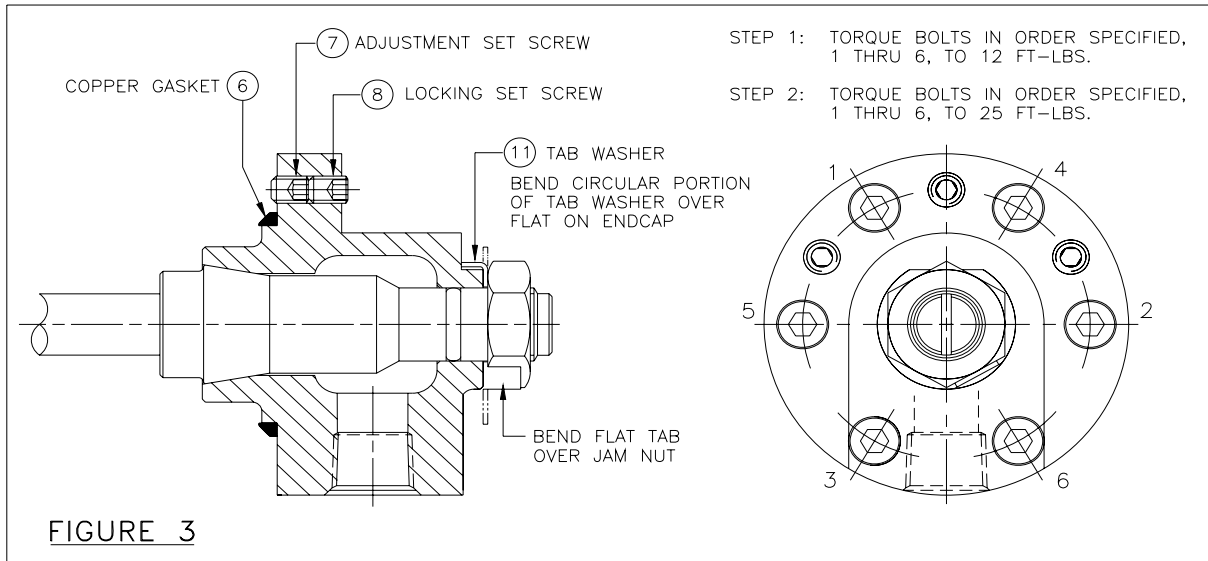
10. Ensure that the siphon is installed in the union and end cap as previously noted.
11. Attach flexible hoses to the inlet and outlet ports of the union. The design of the flexible hoses must not restrain the natural movement of the union or place additional loads on the union. See the Hose Installation Guide (page 6).
12. Temporarily remove hairpin clip (Item 13). Place the rotor flange (Item 4) over the rotor. Position the split wedges (Item 3) in the rotor grooves. Slide the rotor flange forward, over the split wedges, securing the rings in place. Replace hairpin clip behind flange as shown to hold flange and split wedges during assembly.
13. Place the rotor gasket (Item 2) in the recess of the journal flange.
14. Approach the union to the journal and carefully slide the rotor into the journal flange pilot.
15. Secure the rotor flange to the journal flange with the four hex head bolts and lock washers using a uniform locking pattern. A uniform gap between the flanges is critical and must be consistent to 0.020" to ensure the joint is properly aligned.
16. Remove the locking set screw (Item 8) at the top of the end cap and back out the adjusting set screw (Item 7) until it is flush with the end cap flange face.
17. Align siphon pipe by turning the alignment slot on the siphon bushing (Item 5) so it is vertical. Hold the siphon bushing in this position with a screwdriver and tighten the jam nut (Item 12) to 60 ft.-lbs. Ensure that the tab on the washer (Item 11) is not aligned with the machined flat on the end cap (Item 9). See Figure 3.
18. Bend the tab portion of the washer against one of the nut flats and bend the circular portion into the machined flat on the end cap.
19. Back out all end cap bolts and then with two fingers gently tighten the two bolts 90° from the set screw.
20. Tighten adjustment set screw (Item 7) until it just touches the union housing. Tighten the adjustment set screw the additional amount required to obtain the desired siphon clearance per Figure 4.
21. Tighten all remaining bolts 1 through 6 following the sequence shown in Figure 3. Torque initially to 12 ft.-lbs., then re-torque all bolts to 25 ft.-lbs.
22. Replace the locking set screw (Item 8).
23. Attach torque restraining rods that will allow 3/16" axial and 1/4" radial movement.
24. After 2-3 hours of operation, verify that all connections remain secure.



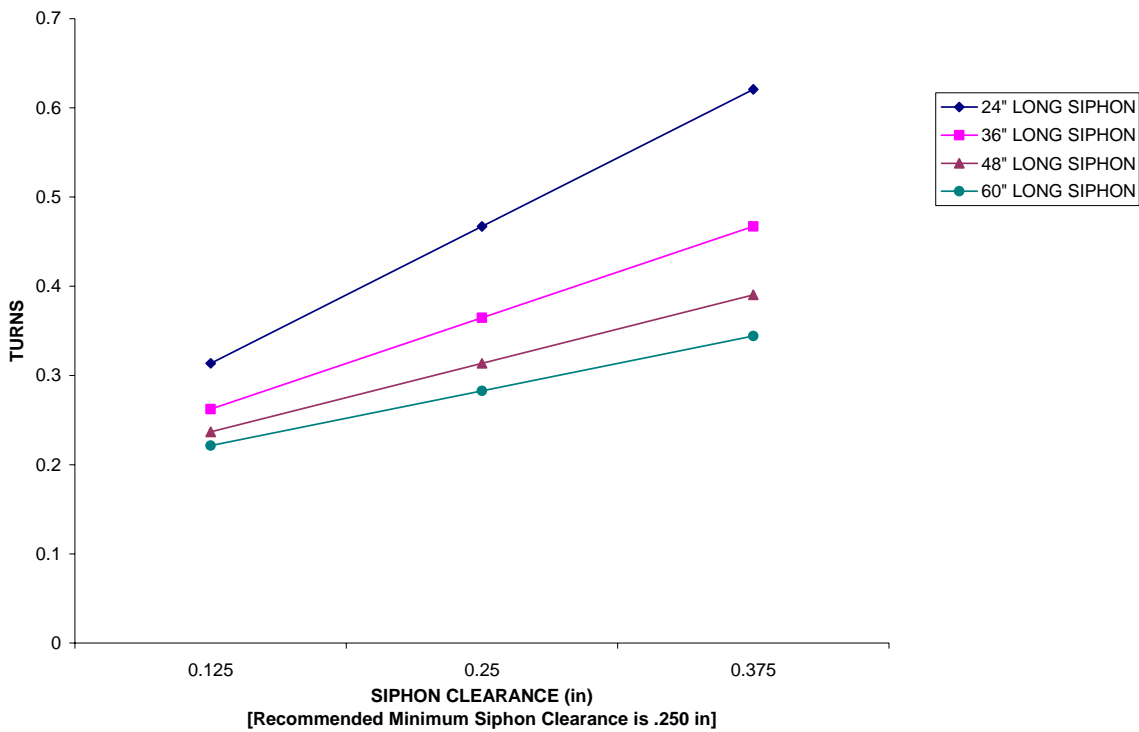
# HPS SERIES Installation Instructions

Series: HPS  
Model: C15D-004-02-3A UNC  
Date: March 12, 2004





### URNS OF UNC ADJUSTMENT SCREW vs. SIPHON CLEARANCE



Flexible hose must be used to connect the HPS Series Rotating Union to its steam supply and condensate return piping. Use of rigid piping will drastically reduce the life of the rotating union due to its inflexibility. The union should not be burdened with the weight of the pipe and fittings. The hose should be connected directly to the union and suitable support should be provided for the fittings and supply pipe beyond the hose. Use braided metal hose for inlet and outlet connections. Make certain that the pressure rating of the hose is above the operating pressure of the system.

**FIGURE A**

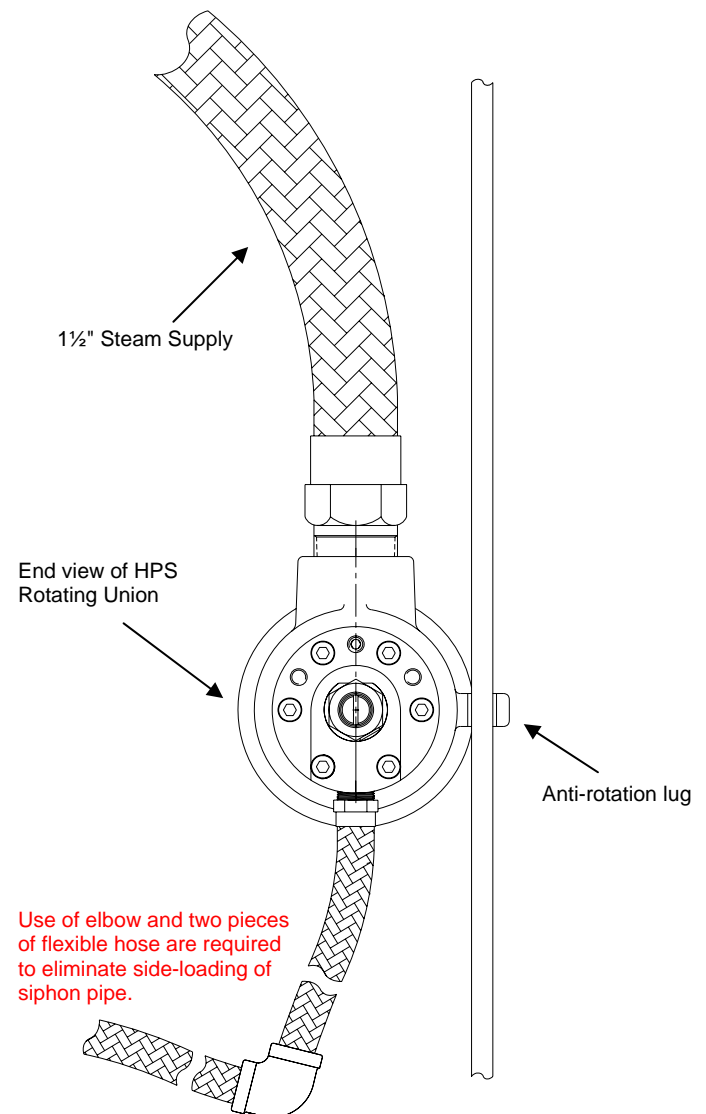
Minimum Recommended Hose Lengths for Steam Inlet & Condensate Outlet		
Hose Diameter		Length
1/2"	x	10"
3/4"	x	14"
1"	x	16"
1-1/4"	x	18"
1-1/2"	x	20"
2"	x	24"

**NOTE: WARRANTY WILL BE VOID IF TWO-PIECE HOSE ASSEMBLY IS NOT UTILIZED IN CONDENSATE RETURN LINE.**

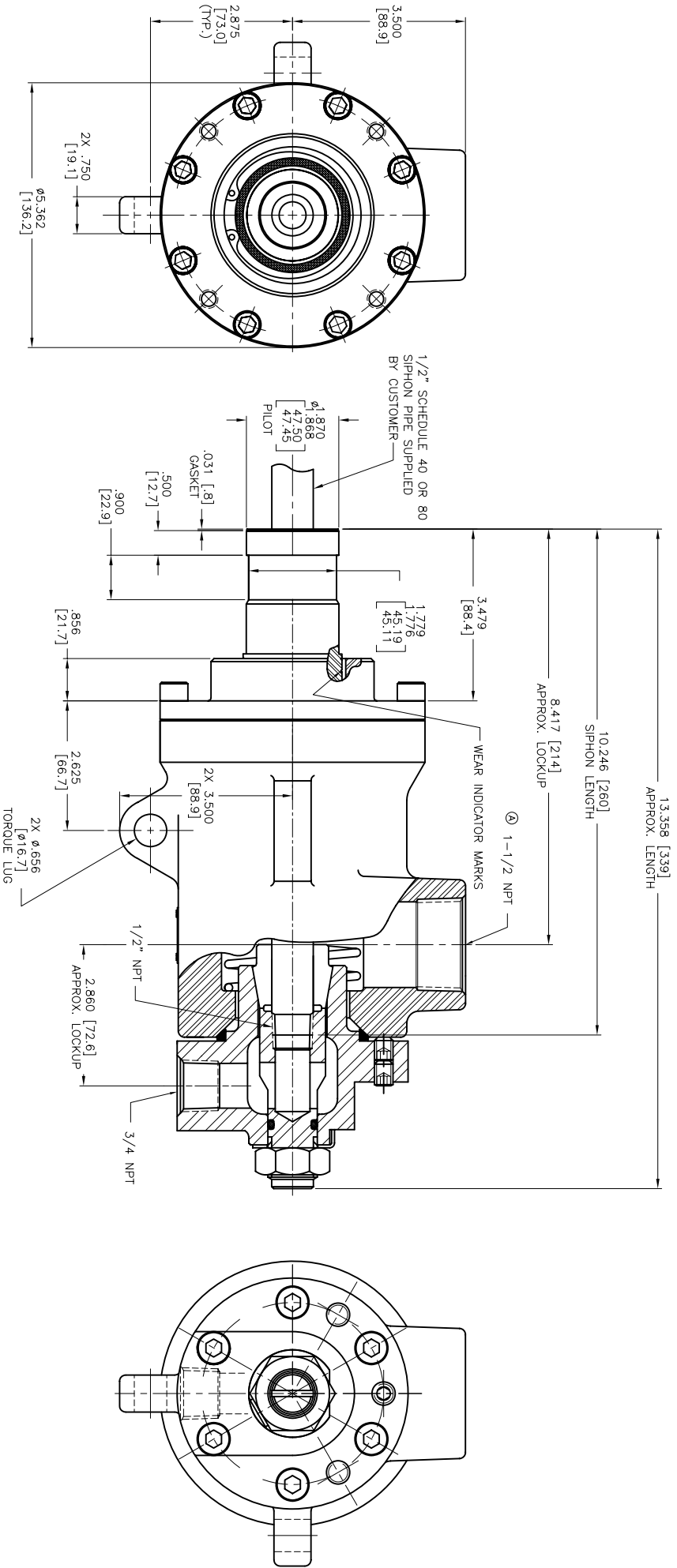
**FIGURE B**

Steam inlet and condensate outlet connections.

Use 45° or 90° elbow and pipe union for connection to supply and return headers. Ensure that the hose is not installed taut.



NOTES:  
 1 - WHEN ORDERING FROM DEUBLIN USE PART NUMBER: C1SD-004-02-3A.



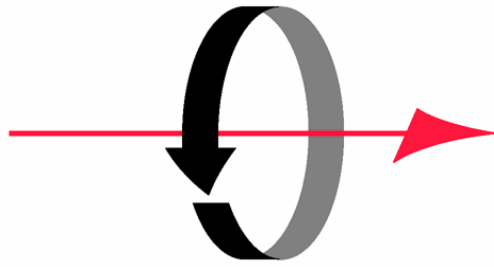
**DEUBLIN UNION**  
**HPS SERIES**  
 HIGH PRESSURE STEAM SERIES

**OPERATING DATA:**  
 STEAM SERVICE  
 250 PSI (17bar) MAX. STEAM PRESSURE  
 400 RPM (400/min) MAX. SPEED \*  
 400°F (204°C) MAX. STEAM TEMPERATURE  
 \*FOR HIGHER SPEEDS CONSULT DEUBLIN ENGINEERING

REV	DESCRIPTION	DATE	BY	CHKD	APP'D
1	ISSUED FOR QUOTE	07/23/03	LE	LE	LE
2	ISSUED FOR ORDER	07/23/03	LE	LE	LE
3	ISSUED FOR ORDER	07/23/03	LE	LE	LE
4	ISSUED FOR ORDER	07/23/03	LE	LE	LE
5	ISSUED FOR ORDER	07/23/03	LE	LE	LE
6	ISSUED FOR ORDER	07/23/03	LE	LE	LE
7	ISSUED FOR ORDER	07/23/03	LE	LE	LE
8	ISSUED FOR ORDER	07/23/03	LE	LE	LE
9	ISSUED FOR ORDER	07/23/03	LE	LE	LE
10	ISSUED FOR ORDER	07/23/03	LE	LE	LE

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**DEUBLIN COMPANY**  
 WASHINGTON, ILLINOIS, U.S.A.  
**INTERFACE CONTROL**  
 DRAWING FOR DEUBLIN  
 UNION C1SD-004-02-3A  
 C1SD-004-02-3A-1C

C1SD-004-02-3A-1C

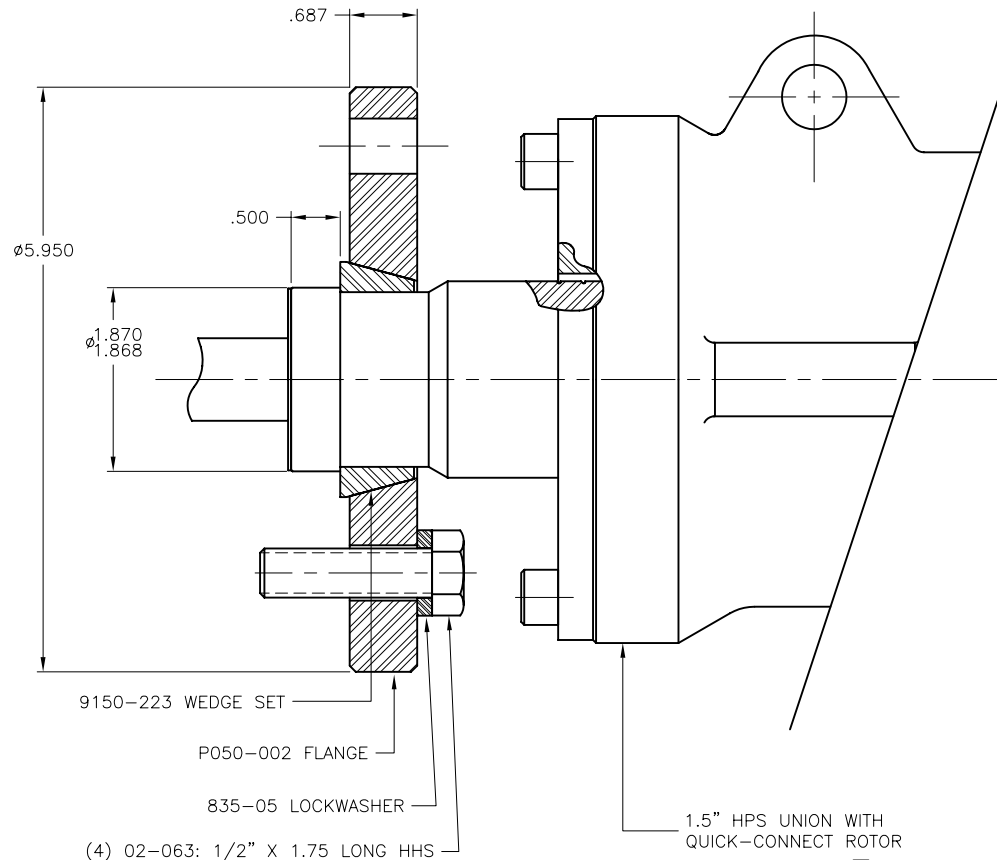
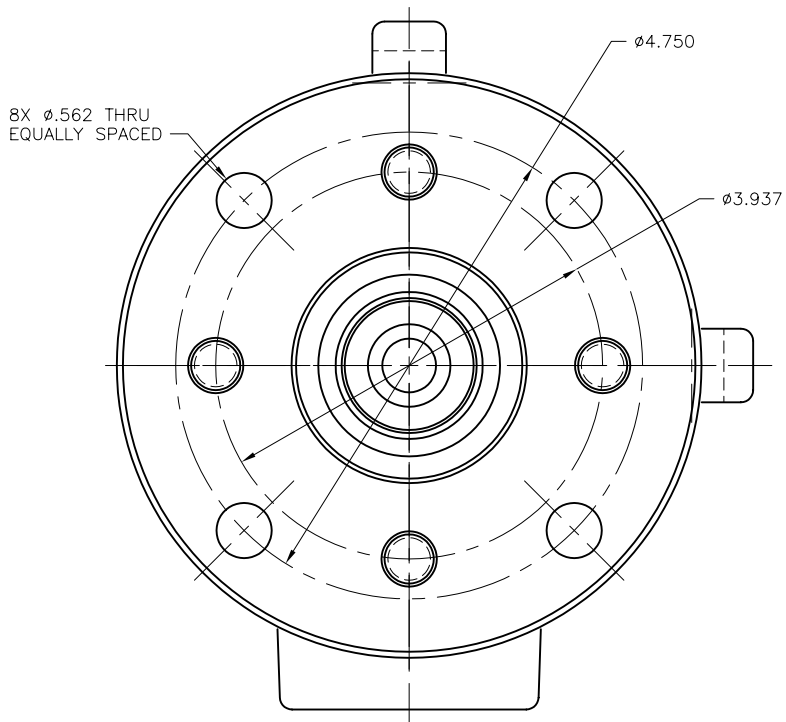


# HPS SERIES

## Mounting Kit Drawings

**DEUBLIN<sup>®</sup> COMPANY**

2050 Norman Drive, West  
Waukegan, IL USA 60085-6747  
Phone: 847/689-8600  
Fax: 847/689-8690



- OBSOLETE MODELS
- C15B-001-01-3F
  - C15D-001-02-3F
  - C15D-002-02-3A
  - C15D-003-02-3A
  - C15R-001-03-3F
  - C15R-002-03-3A
  - C15R-003-03-3F
  - C15R-004-03-3A
- C15D-004-02-3A

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TITLE: **MOUNTING KIT**  
**1.5" HPS Q-CONN TO**  
**1.5" Q-CONN HOLE**

FINAL ASSY: C15X-XXX UNION C.A.D. DRAWING  
NO. **P009-001**

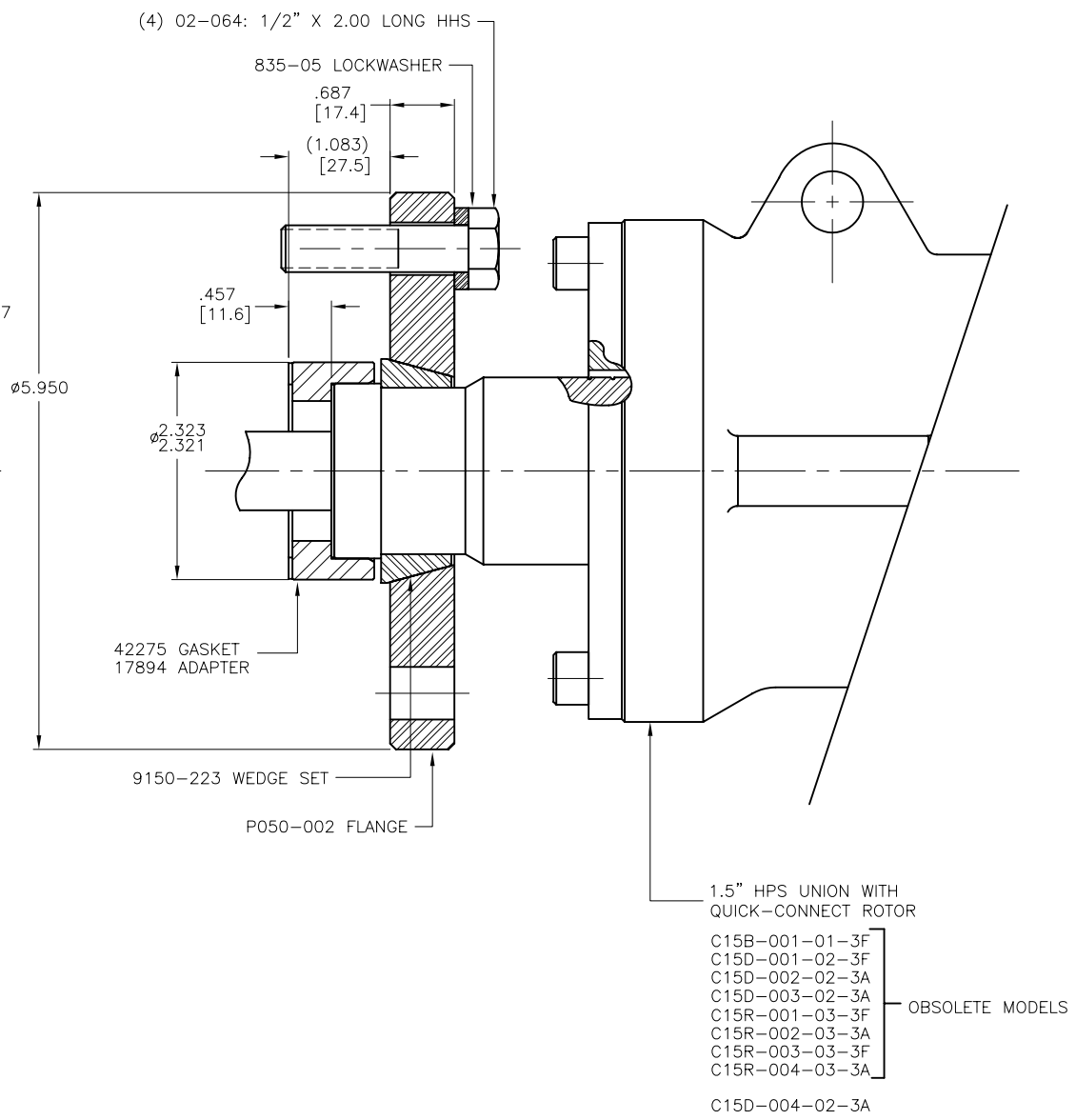
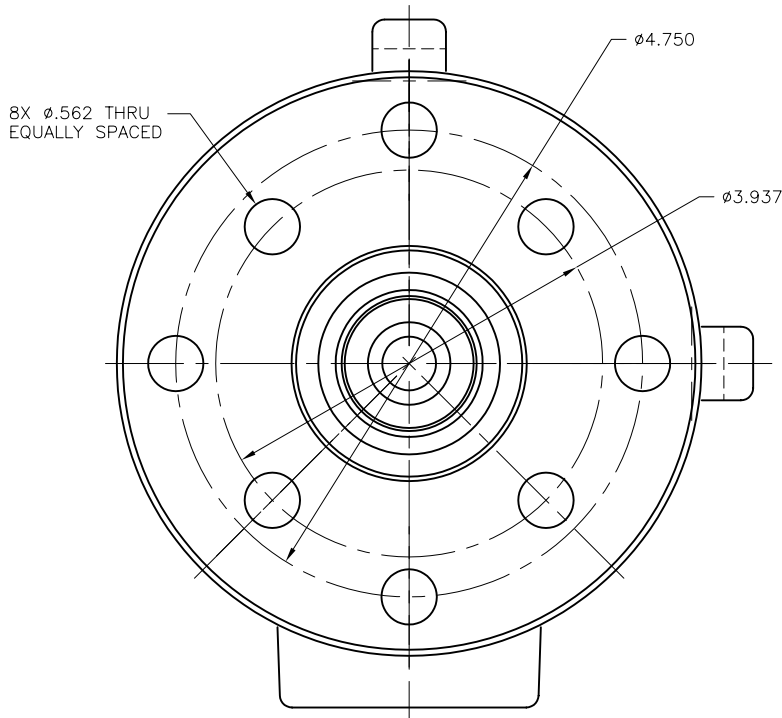
MATERIALS				SCALE	FULL	DWG SIZE	C
				DRN	LG	01/10/01	
				ENGR			
				APPR			

UNLESS OTHERWISE SPECIFIED:

1. UNTOLERANCED DIMENSIONS  $\pm$ .010
2. MACHINED DIAS CONCENTRIC WITHIN .005 T.I.R.
3. COUNTERSINK TAPPED HOLES TO FIRST THREAD
4. REMOVE BURRS AND SHARP CORNERS .010 MAX
5. ANGLE TOLERANCE  $\pm$  1/2°
6. ALL DIMENSIONS ARE FINISHED
7. DIP PARTS IN CORROSION PREVENTATIVE OIL

REV	DESCRIPTION	DATE	BY	CHKD
B	02-063 WAS 02-062 IN ERROR (STILL 1-3/4")	5/6/82	02/04	LG
A	UPDATED MODEL #'S, 3/8" SHCS WAS 5/16" HEX	07/03	LG	

LET	REVISION	ECO	DATE	SIGN



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TITLE: **MOUNTING KIT**  
**1.5" HPS Q-CONN TO 2" Q-CONN HOLE**

FINAL ASSY: C15X-XXX UNION C.A.D. DRAWING  
NO. **P009-002**

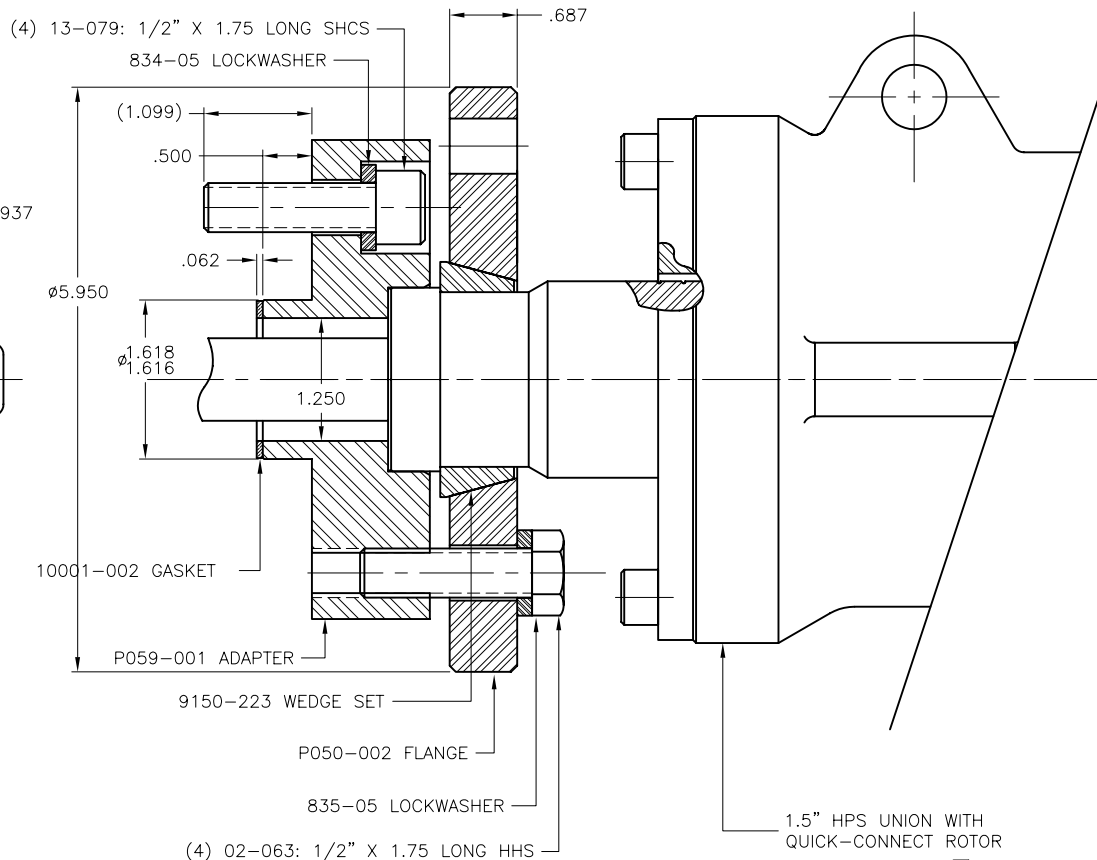
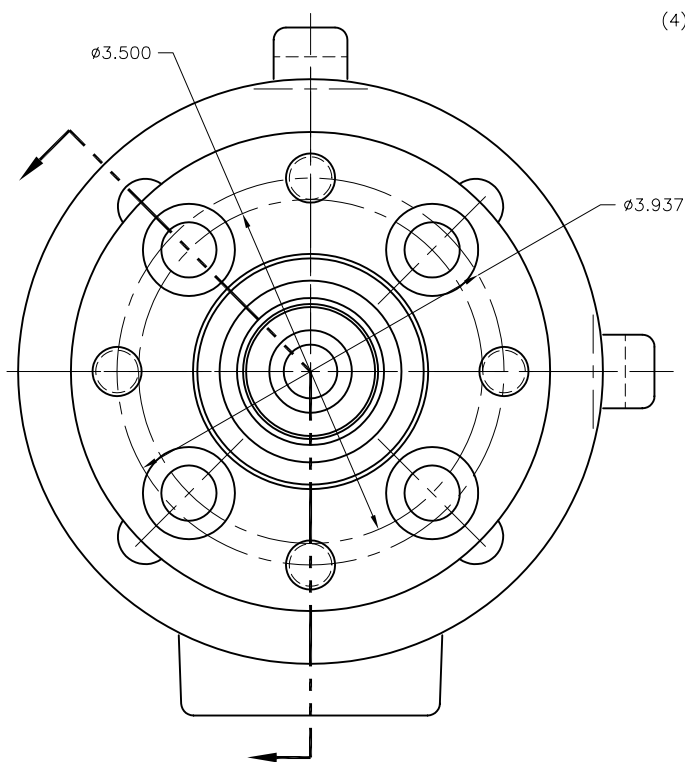
MATERIALS		SCALE	FULL	DWG SIZE	C
DRN	LG	01/10/01			
ENGR					
APPR					

UNLESS OTHERWISE SPECIFIED:

1. UNTOLERANCED DIMENSIONS ±.010
2. MACHINED DIAS CONCENTRIC WITHIN .005 T.I.R.
3. COUNTERSINK TAPPED HOLES TO FIRST THREAD
4. REMOVE BURRS AND SHARP CORNERS .010 MAX
5. ANGLE TOLERANCE ± 1/2°
6. ALL DIMENSIONS ARE FINISHED
7. DIP PARTS IN CORROSION PREVENTATIVE OIL

LET.	REVISION	ECO	DATE	SIGN
A	UPDATED MODEL P/S, 3/8" SHCS WAS 5/16" HEX		07/03	LG





1.5" HPS UNION WITH QUICK-CONNECT ROTOR

- C15B-001-01-3F
  - C15D-001-02-3F
  - C15D-002-02-3A
  - C15D-003-02-3A
  - C15R-001-03-3F
  - C15R-002-03-3A
  - C15R-003-03-3F
  - C15R-004-03-3A
- OBSOLETE MODELS
- C15D-004-02-3A

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TITLE: **MOUNTING KIT**  
**1.5" HPS Q-CONN TO 1.25" Q-CONN HOLE**

FINAL ASSY: C15X-XXX UNION C.A.D. DRAWING  
 NO. **P009-003**

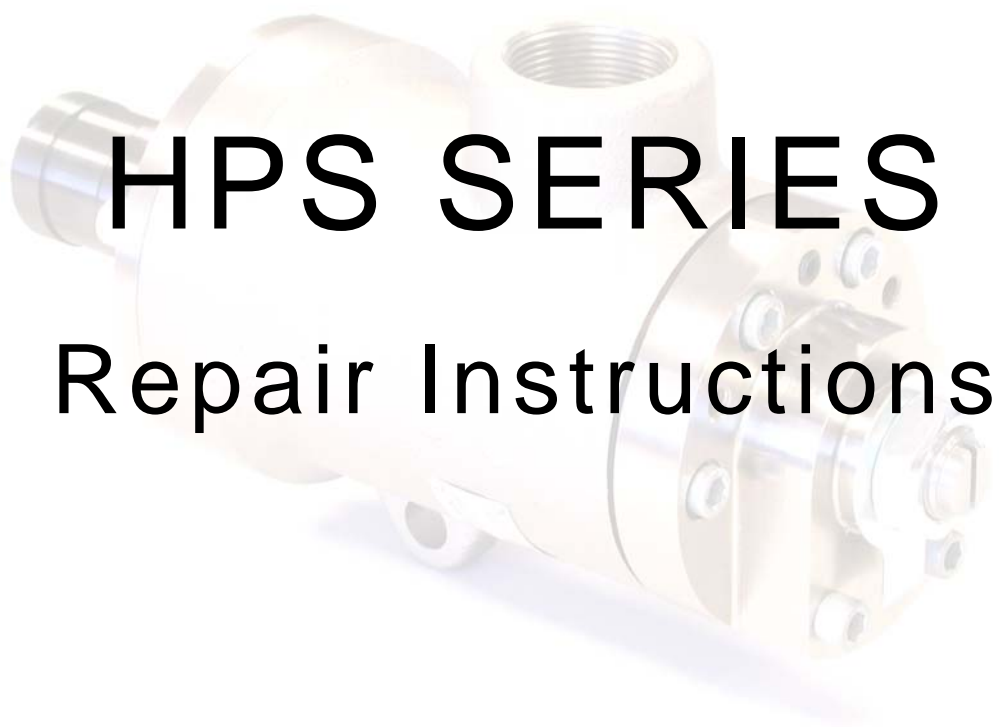
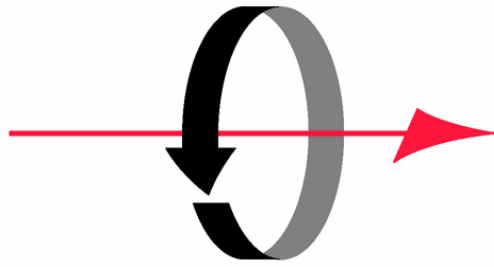
MATERIALS				SCALE	FULL	DWG SIZE	C
				DRN	LG	01/10/01	
				ENGR			
				APPR			

UNLESS OTHERWISE SPECIFIED:

1. UNTOLERANCED DIMENSIONS ±.010
2. MACHINED DIAS CONCENTRIC WITHIN .005 T.I.R.
3. COUNTERSINK TAPPED HOLES TO FIRST THREAD
4. REMOVE BURRS AND SHARP CORNERS .010 MAX
5. ANGLE TOLERANCE ± 1/2°
6. ALL DIMENSIONS ARE FINISHED
7. DIP PARTS IN CORROSION PREVENTATIVE OIL

REV	DESCRIPTION	DATE	BY	CHKD
B	02-063 WAS 02-062 (STILL 1-3/4" LG)	5/6/82	02/04	LG
A	REVISED TO UPDATE MODEL NUMBERS	07/03	LG	

LET	REVISION	ECO	DATE	SIGN



# HPS SERIES

## Repair Instructions

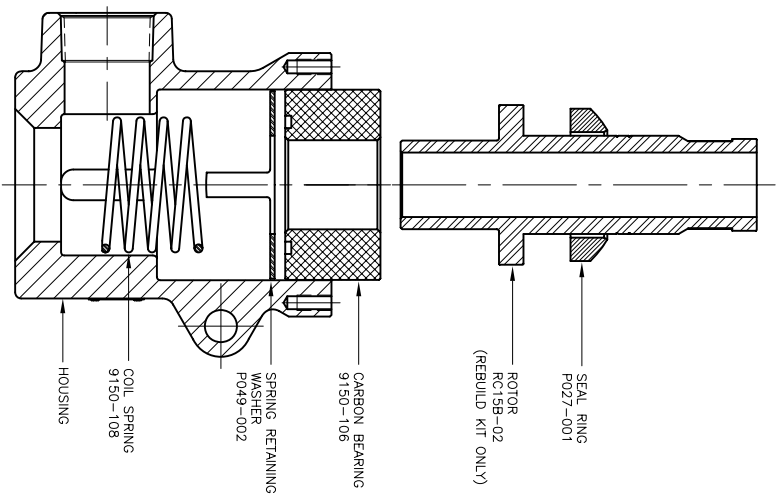
**DEUBLIN<sup>®</sup> COMPANY**

2050 Norman Drive, West  
Waukegan, IL USA 60085-6747  
Phone: 847/689-8600  
Fax: 847/689-8690

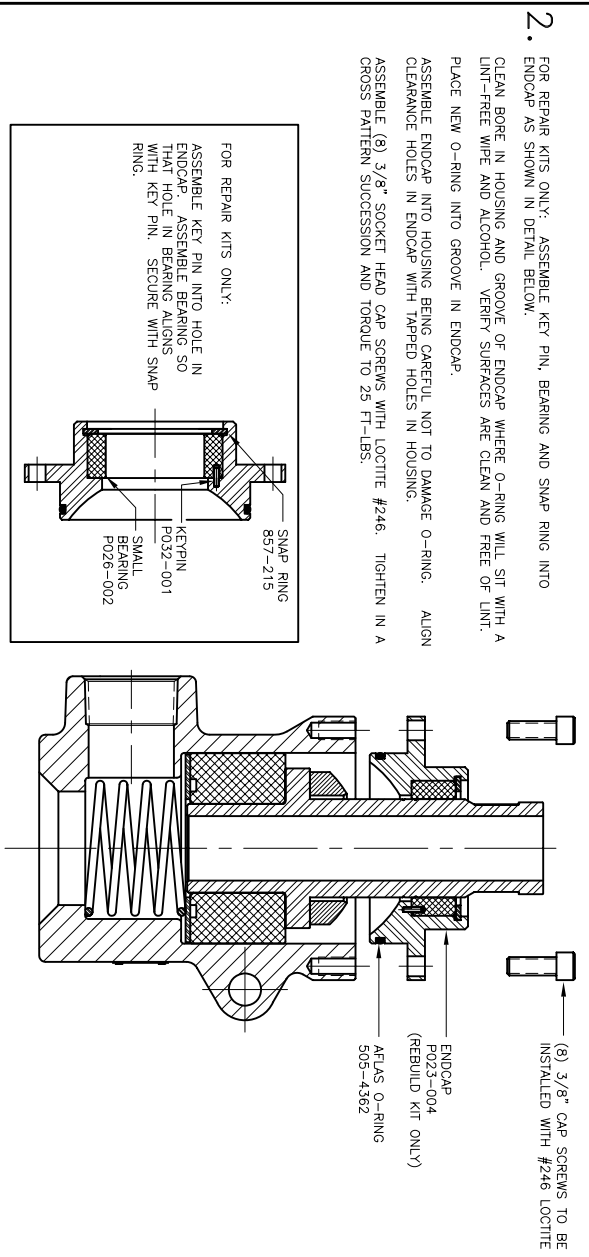
# ASSEMBLY

DA-075 (SHT 2 OF 2)

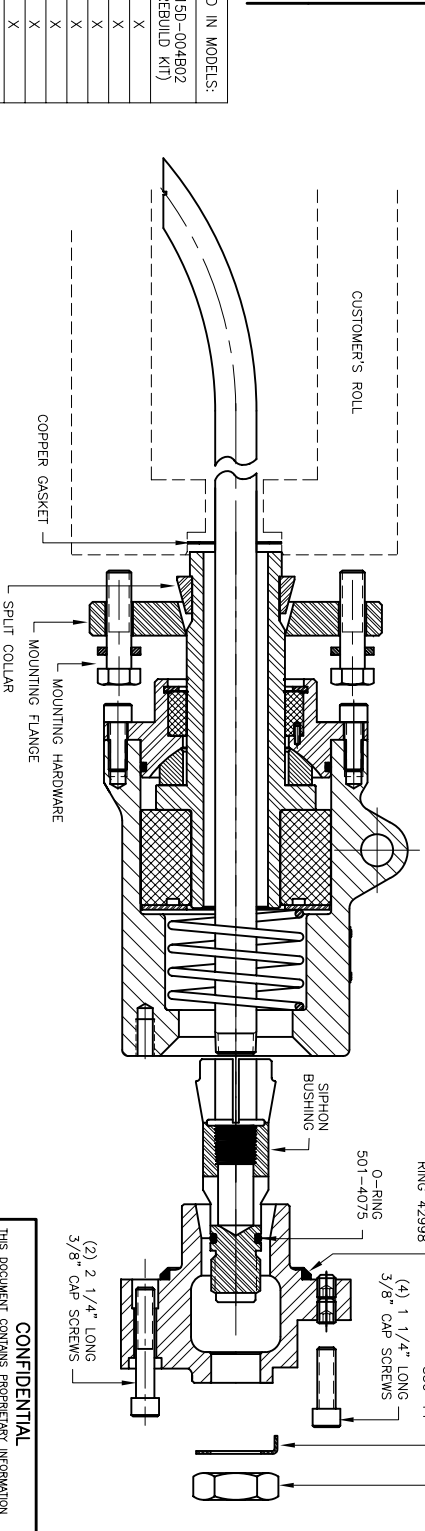
1. ASSEMBLE COIL SPRING INTO BORE. ALIGN TABS ON SPRING RETAINING WASHER WITH HOUSING AND PLACE ON TOP SPRING. PRESS DOWN A FEW INCHES. SPRING WASHER CAN SLIDE FREELY WITH THE COMPRESSION OF THE SPRING.  
ASSEMBLE BEARING WITH GROOVE SIDE DOWN INTO BORE. SLIDE ROTOR INTO BEARING.  
ASSEMBLE SEAL WITH CONVEX SIDE UP AS SHOWN.



2. FOR REPAIR KITS ONLY: ASSEMBLE KEY PIN, BEARING AND SNAP RING INTO ENDCAP AS SHOWN IN DETAIL BELOW.  
CLEAN BORE IN HOUSING AND GROOVE OF ENDCAP WHERE O-RING WILL SIT WITH A LINT-FREE WIFE AND ALCOHOL. VERIFY SURFACES ARE CLEAN AND FREE OF LINT.  
PLACE NEW O-RING INTO GROOVE IN ENDCAP.  
ASSEMBLE ENDCAP INTO HOUSING BEING CAREFUL NOT TO DAMAGE O-RING. ALIGN CLEARANCE HOLES IN ENDCAP WITH TAPPED HOLES IN HOUSING.  
ASSEMBLE (8) 3/8" SOCKET HEAD CAP SCREWS WITH LOCKITE #246. TIGHTEN IN A CROSS PATTERN SUCCESSION AND TORQUE TO 25 FT.-LBS.



3. AFTER ENDCAP IS ASSEMBLED, PLACE COPPER GASKET IN JOURNAL, PILOT, AND ASSEMBLE SIPHON PIPE INTO ROLL. MOUNT JOINT TO ROLL WITH SPLIT COLLAR AND FLANGE. CHECK GAP BETWEEN FLANGE AND ROLL TO VERIFY THAT IT IS CONSISTENT ALL THE WAY AROUND (GASKET MUST BE COMPRESSED EVENLY). ASSEMBLE REMAINING ITEMS AT REAR OF JOINT.  
**NOTE: REFER TO APPROPRIATE "HPS SERIES INSTALLATION INSTRUCTIONS" FOR ASSEMBLY DETAILS.**



QTY	ITEM	DESCRIPTION	PARTS CONTAINED IN MODELS:	
			C15D-004C (REPAIR KIT)	C15D-004B02 (REBUILD KIT)
1	P034-020	COPPER GASKET	X	X
1	RC15B-02	ROTOR, DUAL BEARING	X	X
1	P032-001	KEY PIN	X	X
1	857-215	SNAP RING	X	X
1	P026-002	CARBON BEARING	X	X
1	P023-004	ENDCAP	X	X
1	505-4362	O-RING (FOR ENDCAP)	X	X
1	P027-001	SEAL	X	X
1	9150-108	CARBON BEARING	X	X
1	P049-002	SPRING RETAINING WASHER	X	X
1	9150-108	COIL SPRING	X	X
1	42998	COPPER SEAL RING	X	X
1	501-4075	O-RING (SIPHON BUSHING)	X	X
1	830-14	TAB WASHER	X	X

REV	DESCRIPTION	DATE	BY	CHKD
1	ISSUED	08/03	LC	
2	ADD NOTE TO CHECK CAP BETWEEN FLANGE & ROLL			
3	REVISION			

EQUIPMENT REF: \_\_\_\_\_

ASSY/TEST FIXTURES REQUIRED: \_\_\_\_\_

UNLESS OTHERWISE TOLERANCES ARE IN MILLIMETERS.

SCALE: 1:2

DATE: 07/30/03

BY: LG

CHKD: LG

NO. \_\_\_\_\_

TITLE: REPAIR INSTRUCTIONS FOR DEUBLIN HPS UNION C15D-004-02-3A

DA-075 (SHT 2 OF 2)

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DEUBLIN COMPANY  
 WAUKESHA, ILLINOIS, U.S.A.

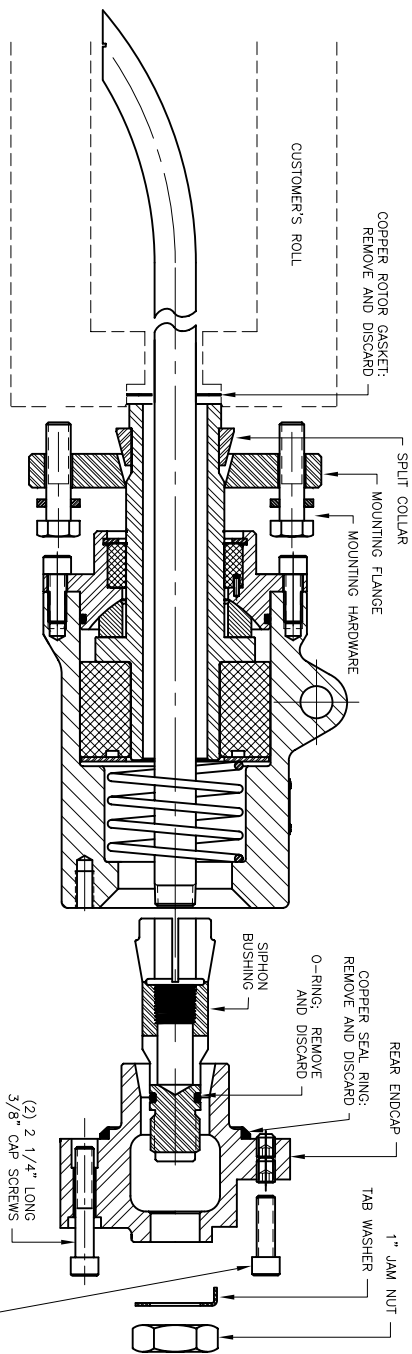
# DISASSEMBLY

**1. REMOVING JOINT FROM ROLL:**

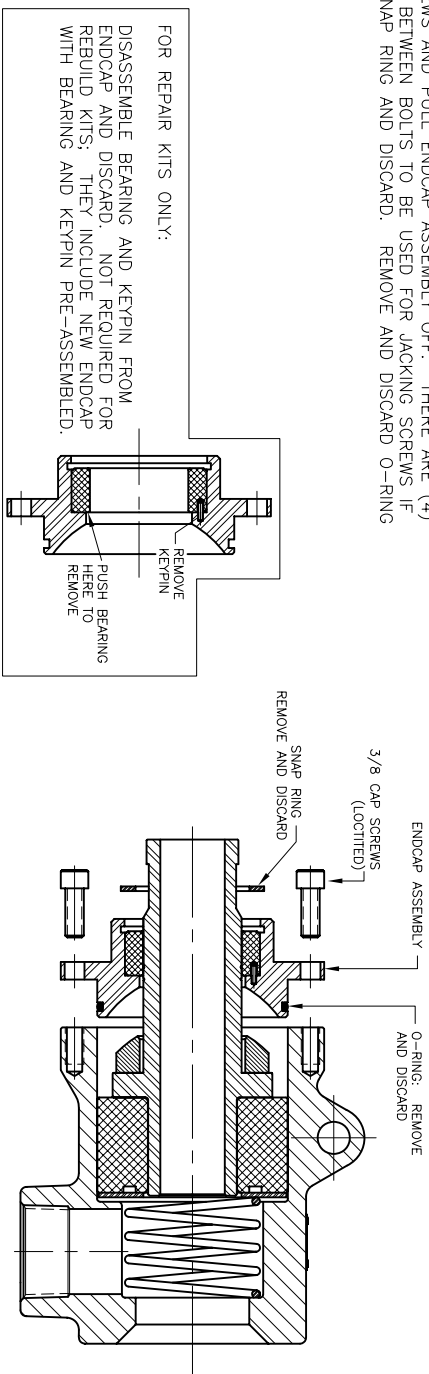
- REMOVE 1" JAM NUT AND TAB WASHER. REMOVE (6) 3/8" CAP SCREWS AND REMOVE REAR ENDCAP. DISCARD COPPER SEAL RING. UN-THREAD SIPHON BUSHING FROM PIPE USING SCREWDRIVER SLOT IN END. REMOVE AND DISCARD O-RING.

REMOVE MOUNTING FLANGE HARDWARE. BACK OFF MOUNTING FLANGE AND REMOVE SPLIT COLLAR.

SLIDE JOINT AND GASKET OFF SIPHON PIPE; DISCARD COPPER ROTOR GASKET.



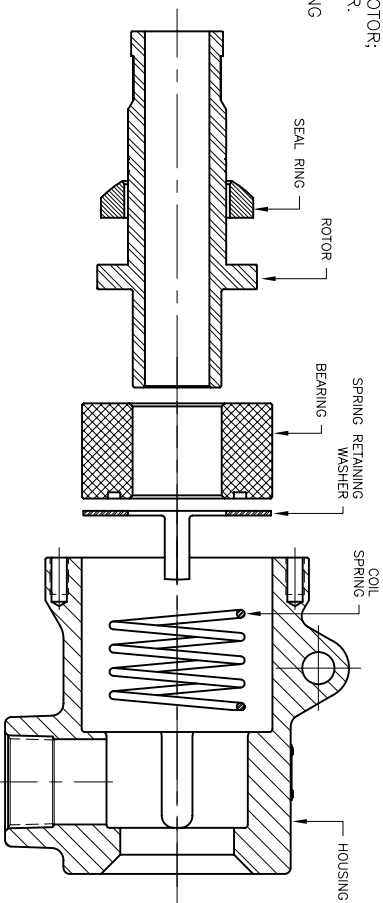
**2. REMOVE 3/8" CAP SCREWS AND PULL ENDCAP ASSEMBLY OFF. THERE ARE (4) 3/8" TAPPED HOLES IN BETWEEN BOLTS TO BE USED FOR JACKING SCREWS IF NECESSARY. REMOVE SNAP RING AND DISCARD. REMOVE AND DISCARD O-RING FROM END CAP.**



FOR REPAIR KITS ONLY:  
DISASSEMBLE BEARING AND KEYPIN FROM ENDCAP AND DISCARD. NOT REQUIRED FOR REBUILD KITS. THEY INCLUDE NEW ENDCAP WITH BEARING AND KEYPIN PRE-ASSEMBLED.

**3. REMOVE SEAL RING AND DISCARD. REMOVE ROTOR; DISCARD FOR REBUILD BUT RETAIN FOR REPAIR.**

REMOVE AND DISCARD CARBON BEARING, SPRING RETAINING WASHER, AND COIL SPRING.



REV	DATE	BY	CHKD	DESCRIPTION
1	07/30/03	LG	MD	ADDED INFO FOR JOINTS WITH 3/8 BOLTS
2	07/30/03	LG	MD	ADDED INFO FOR JOINTS WITH 3/8 BOLTS
3	07/30/03	LG	MD	ADDED INFO FOR JOINTS WITH 3/8 BOLTS
4	07/30/03	LG	MD	ADDED INFO FOR JOINTS WITH 3/8 BOLTS
5	07/30/03	LG	MD	ADDED INFO FOR JOINTS WITH 3/8 BOLTS
6	07/30/03	LG	MD	ADDED INFO FOR JOINTS WITH 3/8 BOLTS
7	07/30/03	LG	MD	ADDED INFO FOR JOINTS WITH 3/8 BOLTS
8	07/30/03	LG	MD	ADDED INFO FOR JOINTS WITH 3/8 BOLTS
9	07/30/03	LG	MD	ADDED INFO FOR JOINTS WITH 3/8 BOLTS
10	07/30/03	LG	MD	ADDED INFO FOR JOINTS WITH 3/8 BOLTS

EQUIPMENT REF:		SCALE: 1:2	DATE: 07/30/03
ASSY/TEST FIXTURES REQUIRED:		SCALE: LG	DATE: 07/30/03
UNLESS OTHERWISE TOLERANCES ARE IN MILLIMETERS.		SCALE: LG	DATE: 07/30/03
UNLESS OTHERWISE TOLERANCES ARE IN MILLIMETERS.		SCALE: LG	DATE: 07/30/03

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WAUKEGAN, ILLINOIS, U.S.A.

**REPAIR INSTRUCTIONS FOR DEUBLIN HPS JOINT C15D-004-02-3A**

NO. **DA-075 (SHT 1 OF 2)**