

ROTARY UNION[®]

DESIGN GUIDE



PRODUCT DISCLAIMER

The function of a rotating union is to separate the working media from the environment. Duff-Norton Rotary Union® brand of rotating unions are contacting seal type rotating unions and will allow leakage to some degree, as will all similarly designed and manufactured products. It is important to note the leakage of rotating unions will increase over time as the contacting seals wear. All persons specifying, installing and operating the rotating union must take note of this potential risk. The information in this catalog is supplied upon the condition the persons using Duff-Norton products will make their own determination whether this leakage may be dangerous, unsafe or cause damage of any nature whatsoever.

In no event may Duff-Norton be held responsible for unsafe operating practices of those employing Duff-Norton equipment. Users must be knowledgeable of the rotating union application and the product must never be operated outside the operating parameters given throughout this design guide. Duff-Norton Rotary Unions must not be used on media not specified in this design guide. If one is unsure about the safety of operating a rotating union in a particular application, it is strongly advised to contact Duff-Norton Engineering for assistance in determining suitability in the application.

NOTE

Duff-Norton has made every effort to ensure that the information contained in this publication is accurate and reliable. Determining the suitability of our products for specific applications is the user's responsibility.

WARNING

The equipment shown in this catalog is intended for industrial use only and should not be used to transfer media that is hazardous or toxic. Duff-Norton does not endorse the use of these products in a manner that is inconsistent with its intended use.

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What is a Rotary Union®?

A Rotary Union transfers media (water, steam, air, oil, Hydraulic fluid, etc) from a stationary source to rotating machinery, such as a drum or an indexing table.

How do I choose the best Rotary Union for my process?

Tell us about your process. We need to know:

- 1 Type of fluid or gas to be conveyed (Media).
- 2 Pressure (PSI).
- 3 Temperature (°F).
- 4 Speed (RPM).
- 5 Shaft connection (Thread size and type or flange size).
- 6 Flow rate of media (GPM).
- 7 Flow passage - mono flow or dual flow (if dual flow: stationary or rotating siphon pipe or tube).

Rotary Union Selection Guide

| Media | | | | | Pressure* (PSI) | Temperature* (°F) | Speed* (RPM) | Thread Size | Rotary Union Series | Catalog Page |
|-------|-------|---------|-----|-----------------|-----------------|-------------------|--------------|-----------------|---------------------|--------------|
| Water | Steam | Hot Oil | Air | Hydraulic Fluid | | | | | | |
| YES | | | YES | YES | 117 | 250 | 3,500 | 1/8" to 1/4" | 300 Series | 6 |
| YES | | YES | YES | | 150 | 375 | 500 | 2" to 4" Flange | 2000 Series | 28 |
| | YES | YES | | | 175 | 600 | 600 | 1/2" to 4" | 8000 Series | 32 |
| YES | YES | YES | | | 250 | 600 | 700 | 1/4" to 3" | 9000G Series | 38 |
| YES | YES | YES | | | 250 | 375 | 700 | 1/4" to 3" | 9000 Series | 22 |
| YES | | | YES | | 290 | 392 | Swivel | 2" to 12" | 1300 Series | 66 |
| YES | | | YES | YES | 435 | 320 | 5,000 | 1/4" to 1" | 805 Series | 10 |
| YES | | | YES | YES | 725 | 392 | 60 | 1/4" to 3" | 1100 Series | 56 |
| YES | YES | YES | YES | | 750 | 300 | 1,000 | 1/4" to 2" | 5000 Series | 18 |
| YES | | YES | YES | | 1,000 | 200 | 750 | 1/8" to 1" | 4000 Series | 14 |
| YES | | | YES | YES | 1,160 | 392 | 90 | 1/4" to 6" | 1102 Series | 60 |
| YES | | | YES | YES | 2,900 | 250 | 1,500 | 1/4" to 1" | 1600 Series | 46 |
| YES | | | YES | YES | 2,900 | 250 | 1,500 | 1/4" to 1" | 1650 Series | 48 |
| YES | | | YES | YES | 3,625 | 250 | 1,500 | 1/4" to 1" | 600 Series | 8 |
| YES | | | YES | YES | 5,075 | 248 | 80 | 1/4" to 3" | 1700 Series | 68 |
| YES | | | YES | YES | 5,075 | 392 | Swivel | 1/4" to 2" | 1200 Series | 64 |
| YES | | | YES | YES | 5,800 | 392 | 3,000 | 1/4" to 1/2" | 500 Series | 50 |
| YES | | | YES | YES | 5,880 | 248 | 3,000 | 1/8" to 1-1/4" | HPMC / HSMC | 42 |
| YES | | | YES | YES | 10,150 | 248 | 100 | 1/4" to 3" | 1900 Series | 70 |

*See performance charts for each Rotary Union for detailed performance data.

Rotating Joint Application Analysis Form



Duff-Norton engineers will be pleased to make recommendations for your specific requirements. Complete this form and mail or fax it to Duff-Norton Company. There is no obligation for this service.

Customer: _____

Address: _____

Phone Number: _____ **Fax Number:** _____

Contact: _____

1. Size Required: _____ **or Estimated Flow Required:** _____

2. Connection (check one): Threaded Shaft
 Quick Release
 Flange Mount

If Threaded Shaft, specify

Type: NPT UNF BSP ISO228 Metric

Direction: Left Hand Right Hand

If Flange Mount, then refer to Flange Mountings, page 63 of catalog.

3. Pressure: _____ psi or _____ bar **Temperature:** _____ F° or _____ C°

Does pressure or temperature fluctuate or change during operation? If so, please give maximum, minimum and describe. _____

4. Speed: _____ RPM or _____ Feet Per Minute & **Diameter of Roll:** _____

Does direction alternate? Yes No

5. Media to be Used: Water Steam Air Hot Oil Hydraulic Oil (specify type) _____
 Other (specify) _____

Is medium abrasive, corrosive, flammable, explosive or toxic? If so, please explain: _____

6. Check One: Single Flow Dual Flow Multiport

If Dual Flow, specify syphon size: _____

& Type: Stationary* Rotating

***If Stationary syphon, specify connection type:**

Threaded[†] Tube

†If Threaded, specify type: NPT ISO228

Other _____

If Multiport, specify number of ports: _____ **& Port Size** _____

7. Rod Supported Joints: Rod Spacing ("N" Spacing) _____ **Rod Diameter** _____

8. Balancer (Compensator): Yes No

9. How many are being used now? _____ **Potential Usage?** _____

10. Is Competitive Joint being used now? _____ **Manufacturer:** _____ **Model or Type:** _____

Any problems? Please describe: _____

11. Any other information regarding application and requirements of the rotating joint. Send Sketches or Drawings if available. _____

Please mail or fax completed sheet

If you have any questions or are in need of assistance please call our Application Engineers:

Phone: 1(800) 477-5002 • Fax: (704) 588-1994 • Email: duffnorton@cmworks.com

P.O. Box 7010 • Charlotte, NC 28241-7010 • FAX 704-588-1994

www.duffnorton.com



300 SERIES

SMALL ENVELOPE
GENERAL PURPOSE



Operating Parameters

| | |
|--|--|
| MEDIA Air, Water | PRESSURE* 117 PSI |
| TEMPERATURE* 250° F | SPEED* 3,500 RPM |
| THREADS <ul style="list-style-type: none"> ■ 1/8" to 1/4" NPT ■ Machine Thread ■ BSP & BSPP Available | MATERIAL Nickel Plated Steel |

* See Performance Charts For Details

Features & Benefits

High Speed Air & Water Applications

Ideal for high speed air and water applications with space constraints.

Small Profile

Small envelope dimensions make the 300 Series suitable for use in applications with space constraints.

Corrosion Resistant

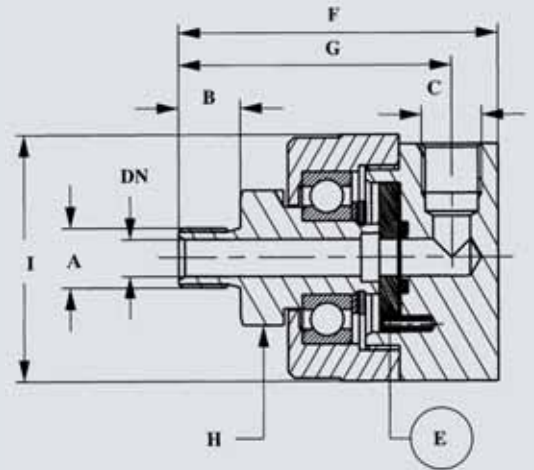
All steel parts are nickel plated steel for corrosion resistance.

| 300 SERIES ROTARY UNIONS | | | | | |
|--------------------------|------------------|-------------------|-------------|------------------|-------------|
| PART NUMBERS | Shaft Thread (A) | Right Hand Thread | | Left Hand Thread | |
| | | Part Number | Description | Part Number | Description |
| | 1/8 NPT | 770359C | R3S3747KNPT | 770358C | L3S3747KNPT |
| | 1/4 NPT | 770357C | R3S2086KNPT | 770356C | L3S2086KNPT |
| | 5/8-18 UNF | 770361C | R3S3862KUNF | 770360C | L3S3862KUNF |

* E (Seal) GR2086

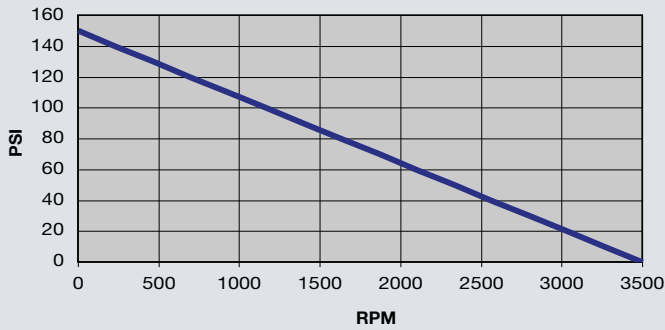
| 300 SERIES ROTARY UNIONS (in.) | | | | | | | | |
|--------------------------------|------------------|-----|---------------|------|---|-----|-----|-----|
| DIMENSIONS | Shaft Thread (A) | B | Inlet C (NPT) | DN | F | G | H | I |
| | 1/8 NPT | 0.4 | 1/8 (RH) | 0.15 | 2 | 1.7 | .75 | 1.5 |
| | 1/4 NPT | 0.5 | | 0.23 | | | | |
| | 5/8-18 UNF | 0.4 | | 0.23 | | | | |

* E (Seal) GR2086

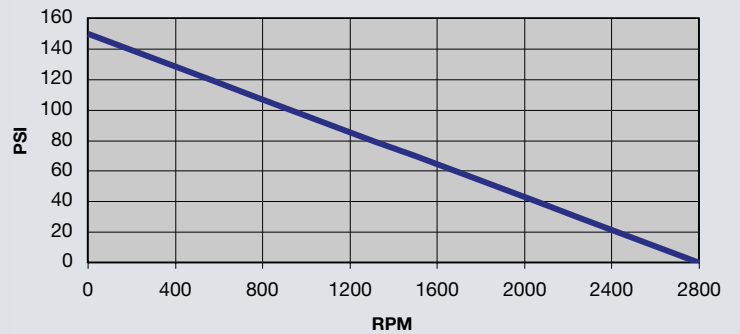


Performance Charts

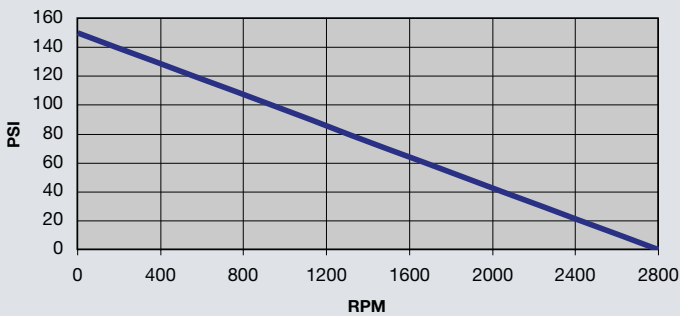
1/8"



1/4"



5/8"



■ Air & Water

600 SERIES

GENERAL PURPOSE



Operating Parameters

| | |
|--|--|
| MEDIA | PRESSURE* |
| Water, Air, Hydraulic Fluid | 3,625 PSI |
| TEMPERATURE* | SPEED* |
| 250° F | 1,500 RPM |
| THREADS | MATERIAL |
| <ul style="list-style-type: none"> ■ 1/4" to 1" NPT or MT ■ BSP & BSPP Available | Nickel Treated Carbon Steel Construction. Stainless Steel Models Also Available. |
| CONFIGURATION OPTIONS | |
| Mono Flow Configurations | <small>* See Performance Charts For Details</small> |

Features & Benefits

Two Configurations Offered

Either axial (straight through) nickel plated housing or radial (90 degree) inlet with aluminum housing for maximum flexibility.

Wide Range Of Sizes

Available in sizes from 1/4" to 1" NPT & MT.

High Speeds

Suitable for speeds up to 1,500 RPM.

Bi-Directional Rotation

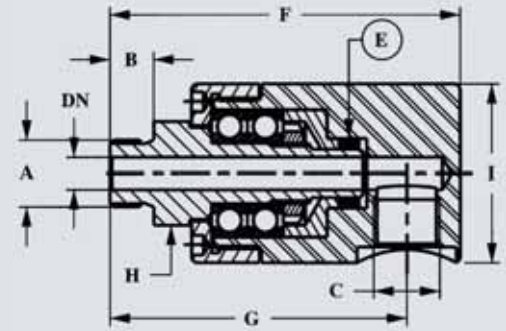
The 600 Series is equipped with a GR seal design that allows bi-directional rotation.

600 SERIES ROTARY UNIONS

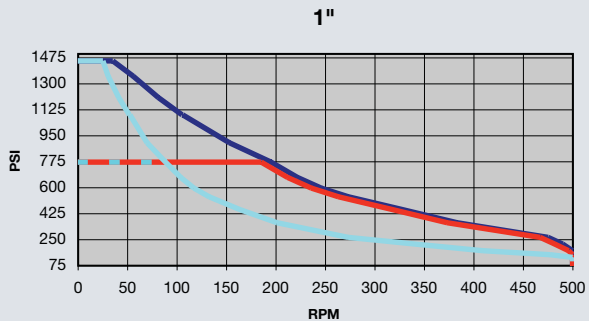
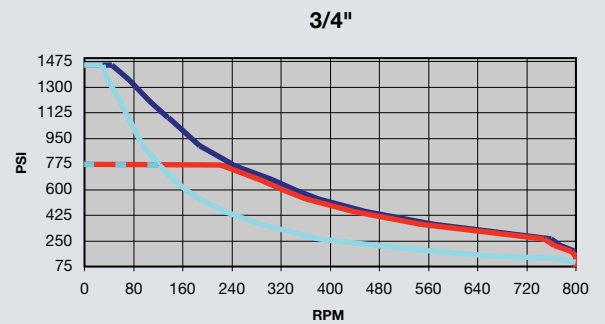
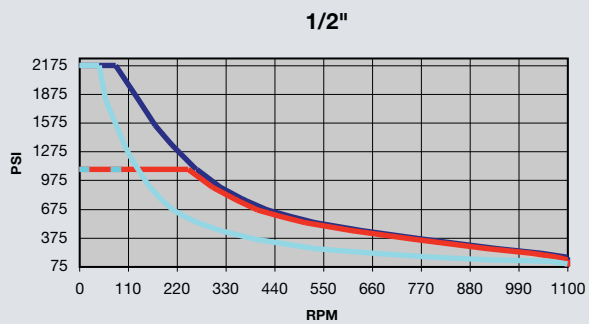
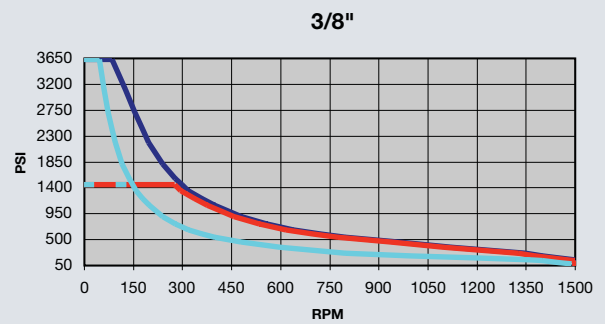
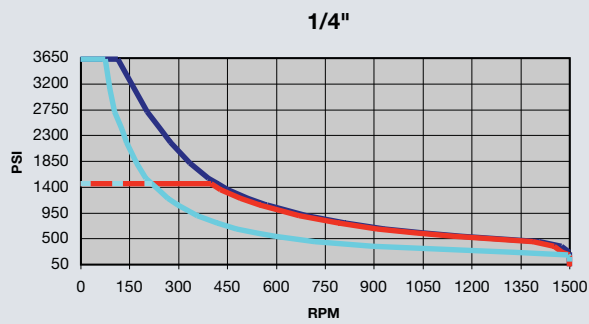
| PART NUMBERS | Nominal Pipe Size | Shaft Thread (A) | Axial Inlet | | | | Radial Inlet | | | |
|--------------|-------------------|------------------|-------------------|-------------|------------------|-------------|-------------------|-------------|------------------|-------------|
| | | | Right Hand Thread | | Left Hand Thread | | Right Hand Thread | | Left Hand Thread | |
| | | | Part Number | Description | Part Number | Description | Part Number | Description | Part Number | Description |
| 1/4 | 1/4 NPT | 770363C | R613JKANPT | 770362C | L613JKANPT | 770383C | R713JKRNPT | 770382C | L713JKRNPT | |
| | 5/8-18 UNF | 770365C | R613MKAUNF | 770364C | L613MKAUNF | 770385C | R713MKRUNF | 770384C | L713MKRUNF | |
| 3/8 | 3/8 NPT | 770367C | R617JKANPT | 770366C | L617JKANPT | 770387C | R717JKRNPT | 770386C | L717JKRNPT | |
| | 5/8-18 UNF | 770369C | R617MKAUNF | 770368C | L617MKAUNF | 770389C | R717MKRUNF | 770388C | L717MKRUNF | |
| 1/2 | 1/2 NPT | 770371C | R621JKANPT | 770370C | L621JKANPT | 770391C | R721JKRNPT | 770390C | L721JKRNPT | |
| | 3/4-16 UNF | 770373C | R621MKAUNF | 770372C | L621MKAUNF | 770393C | R721MKRUNF | 770392C | L721MKRUNF | |
| 3/4 | 3/4 NPT | 770375C | R627JKANPT | 770374C | L627JKANPT | 770395C | R727JKRNPT | 770394C | L727JKRNPT | |
| | 3/4-16 UNF | 770377C | R627MKAUNF | 770376C | L627MKAUNF | 770397C | R727MKRUNF | 770396C | L727MKRUNF | |
| 1 | 1 NPT | 770379C | R634JKANPT | 770378C | L634JKANPT | 770399C | R734JKRNPT | 770398C | L734JKRNPT | |
| | 1-1/2-12 UNF | 770381C | R634MKAUNF | 770380C | L634MKAUNF | 770401C | R734MKRUNF | 770400C | L734MKRUNF | |

| 600 SERIES AXIAL INLET (in.) | | | | | | | | | |
|------------------------------|-------------------|------------------|-----|----------------------|------|-----------------|--------------------|-----------|----------------------|
| DIMENSIONS | Nominal Pipe Size | Shaft Thread (A) | B | Inlet Thread C (NPT) | DN | Seal Design (E) | Overall Length (F) | Flats (H) | Outside Diameter (I) |
| | 1/4 | 1/4 NPT | .47 | 1/4 | .19 | GR8 | 2.79 | .74 | 1.49 |
| | | 5/8-18 UNF | | | | | | | |
| | 3/8 | 3/8 NPT | .43 | 3/8 | .31 | GR12 | 3.14 | 1.06 | 1.77 |
| | | 5/8-18 UNF | | | | | | | |
| | 1/2 | 1/2 NPT | .55 | 1/2 | .51 | GR18 | 4.05 | 1.25 | 2.36 |
| | | 3/4-16 UNF | | | | | | | |
| | 3/4 | 3/4 NPT | .70 | 3/4 | .70 | GR25 | 5.35 | 1.37 | 2.95 |
| | | 3/4-16 UNF | | | | | | | |
| 1 | 1 NPT | .74 | 1 | .86 | GR35 | 6.41 | 1.73 | 3.70 | |
| | 1-1/2-12 UNF | | | | | | | | |

| 600 SERIES RADIAL INLET (in.) | | | | | | | | | | |
|-------------------------------|-------------------|------------------|-----|----------------------|-----|-----------------|--------------------|-------------------|-----------|----------------------|
| DIMENSIONS | Nominal Pipe Size | Shaft Thread (A) | B | Inlet Thread C (NPT) | DN | Seal Design (E) | Overall Length (F) | Radial Design (G) | Flats (H) | Outside Diameter (I) |
| | 1/4 | 1/4 NPT | .47 | 1/4 | .19 | GR8 | 2.79 | 2.26 | .74 | 1.49 |
| | | 5/8-18 UNF | | | | | | | | |
| | 3/8 | 3/8 NPT | .43 | 3/8 | .31 | GR12 | 3.14 | 2.93 | 1.06 | 1.77 |
| | | 5/8-18 UNF | | | | | | | | |
| | 1/2 | 1/2 NPT | .55 | 1/2 | .51 | GR18 | 4.05 | 3.48 | 1.25 | 2.36 |
| | | 3/4-16 UNF | | | | | | | | |
| | 3/4 | 3/4 NPT | .70 | 3/4 | .70 | GR25 | 5.35 | 4.56 | 1.37 | 2.95 |
| | | 3/4-16 UNF | | | | | | | | |
| | 1 | 1 NPT | .74 | 1 | .86 | GR35 | 6.41 | 5.35 | 1.73 | 3.70 |
| 1-1/2-12 UNF | | | | | | | | | | |



Performance Charts



Performance charts are for oil, grease or similar lubricating media. For media such as water or air, reduce the maximum recommended speed as follows:

For water, multiply speed by 0.67
For air, multiply speed by 0.33

Maximum recommended speeds are found on the horizontal axis.

- Steel Axial Connection
- Steel Radial Connection
- Stainless Steel
- Stainless Steel Radial Connection

805 SERIES

GENERAL PURPOSE



Operating Parameters

MEDIA

Air, Hydraulic Fluid, Water,
Non-Toxic Gasses, Oil

TEMPERATURE*

320° F

THREADS

- 1/4" to 1" NPT
- MT & Metric
- BSP & BSPP Available

CONFIGURATION OPTIONS

Mono Flow and Dual Flow
Configurations Available

PRESSURE*

435 PSI

SPEED*

5,000 RPM

MATERIAL

Aluminum Housing With A
Stainless Steel Shaft. Also
Available In All Stainless Steel
Construction.

* See Performance Charts For Details

Features & Benefits

Flexible

Suitable for a wide range of applications.

Mono Flow Models

Offered in sizes 1/4" to 1".

Dual Flow Models

Offered in sizes 1/2" to 1".

Seal Options

Two seal options are offered:

■ Seal Option E1 (Standard)

The carbon graphite seal ring against ceramic face ring design can be used at pressures up to 435 psi.

■ Seal Option E2 (Consult Factory)

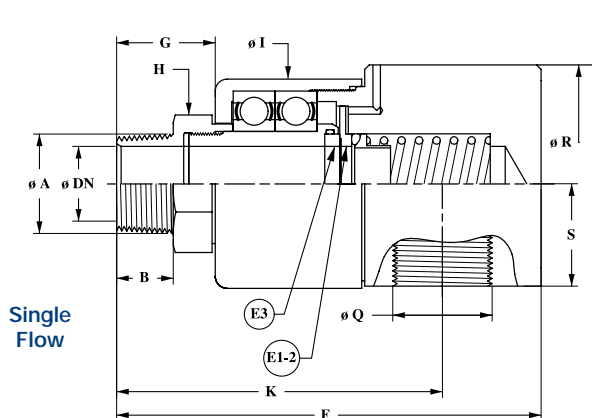
The stainless steel seal ring against ceramic face ring design can be used at pressures up to 725 psi.

805 SERIES ROTARY UNION • MONO FLOW

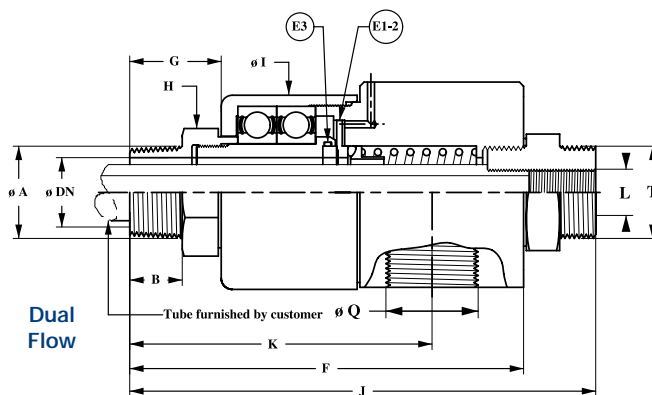
| PART NUMBERS | Nominal Pipe Size | Shaft Thread (A) | Right Hand | | Left Hand | |
|--------------|-------------------|------------------|----------------|----------------|----------------|-------------|
| | | | Part Number | Description | Part Number | Description |
| | | | | | | |
| PART NUMBERS | 1/4 | 1/4 NPT | 760150C | R813SR5NPT | 760155C | L813SR5NPT |
| | | 1/4 BSP | 760152C | R813SR5BSP | 760157C | L813SR5BSP |
| | | 1/4 BSPP | 760153C | R813SR5BSPP | 760158C | L813SR5BSPP |
| | | 5/8-18 UNF | 760151C | R813SR5UNF | 760156C | L813SR5UNF |
| | | M14xP1.5 | 760154C | R813SR5M | 760159C | L813SR5M |
| | 3/8 | 3/8 NPT | 760170C | R817SR5NPT | 760175C | L817SR5NPT |
| | | 3/8 BSP | 760172C | R817SR5BSP | 760177C | L817SR5BSP |
| | | 3/8 BSPP | 760173C | R817SR5BSPP | 760178C | L817SR5BSPP |
| | | 5/8-18 UNF | 760171C | R817SR5UNF | 760176C | L817SR5UNF |
| | | M16xP1.5 | 760174C | R817SR5M | 760179C | L817SR5M |
| | 1/2 | 1/2 NPT | 760190C | R821SR5NPT | 760195C | L821SR5NPT |
| | | 1/2 BSP | 760192C | R821SR5BSP | 760197C | L821SR5BSP |
| | | 1/2 BSPP | 760193C | R821SR5BSPP | 760198C | L821SR5BSPP |
| | | 3/4-16 UNF | 760191C | R821SR5UNF | 760196C | L821SR5UNF |
| | | M22xP1.5 | 760194C | R821SR5M | 760199C | L821SR5M |
| | 3/4 | 3/4 NPT | 760210C | R827SR5NPT | 760215C | L827SR5NPT |
| | | 3/4 BSP | 760212C | R827SR5BSP | 760217C | L827SR5BSP |
| | | 3/4 BSPP | 760213C | R827SR5BSPP | 760218C | L827SR5BSPP |
| | | 1-1/16-12 UNF | 760211C | R827SR5UNF | 760216C | L827SR5UNF |
| | | M25xP1.5 | 760214C | R827SR5M | 760219C | L827SR5M |
| 1 | 1 NPT | 760230C | R834SR5NPT | 760235C | L834SR5NPT | |
| | 1 BSP | 760232C | R834SR5BSP | 760237C | L834SR5BSP | |
| | 1 BSPP | 760233C | R834SR5BSPP | 760238C | L834SR5BSPP | |
| | 1-1/2-12 UNF | 760231C | R834SR5UNF | 760236C | L834SR5UNF | |
| | M35xP1.5 | 760234C | R834SR5M | 760239C | L834SR5M | |

805 SERIES ROTARY UNION • DUAL FLOW

| PART NUMBERS | Nominal Pipe Size | Shaft Thread (A) | Right Hand Thread | | Left Hand Thread | |
|--------------|-------------------|------------------|-------------------|-------------|------------------|-------------|
| | | | Part Number | Description | Part Number | Description |
| | | | | | | |
| PART NUMBERS | 1/2 | 1/2 NPT | 760250C | R921SR5NPT | 760255C | L921SR5NPT |
| | | 1/2 BSP | 760252C | R921SR5BSP | 760257C | L921SR5BSP |
| | | 1/2 BSPP | 760253C | R921SR5BSPP | 760258C | L921SR5BSPP |
| | | 3/4-16 UNF | 760251C | R921SR5UNF | 760256C | L921SR5UNF |
| | | M22xP1.5 | 760254C | R921SR5M | 760259C | L921SR5M |
| | 3/4 | 3/4 NPT | 760270C | R927SR5NPT | 760275C | L927SR5NPT |
| | | 3/4 BSP | 760272C | R927SR5BSP | 760277C | L927SR5BSP |
| | | 3/4 BSPP | 760273C | R927SR5BSPP | 760278C | L927SR5BSPP |
| | | 1-1/16-12 UNF | 760271C | R927SR5UNF | 760276C | L927SR5UNF |
| | | M25xP1.5 | 760274C | R927SR5M | 760279C | L927SR5M |
| | 1 | 1 NPT | 760290C | R934SR5NPT | 760295C | L934SR5NPT |
| | | 1 BSP | 760292C | R934SR5BSP | 760297C | L934SR5BSP |
| | | 1 BSPP | 760293C | R934SR5BSPP | 760298C | L934SR5BSPP |
| | | 1-1/2-12 UNF | 760291C | R934SR5UNF | 760296C | L934SR5UNF |
| | | M35xP1.5 | 760294C | R934SR5M | 760299C | L934SR5M |



Single Flow



Dual Flow

| 805 SERIES ROTARY UNION • MONO FLOW (in.) | | | | | | | | | | | |
|---|------------------|-------------------|-------------------------|------|------|------|------|------|------|------|------|
| Nominal Pipe Size | Shaft Thread (A) | Inlet Thread (Q)* | Shaft Thread Length (B) | DN | F | G | H | I | K | R | S |
| | | | | | | | | | | | |
| 1/4 | 1/4 NPT | NPT | .43 | .31 | 3.14 | .74 | .86 | 1.49 | 2.55 | 1.73 | .76 |
| | 1/4 BSP | BSP | | | | | | | | | |
| | 1/4 BSPP | BSPP | | | 3.42 | .82 | | | 2.71 | | |
| | 5/8-18 UNF | NPT | | | | | | | | | |
| M14xP1.5 | BSP | .43 | .39 | 1.02 | 1.65 | 2.91 | 1.81 | .78 | | | |
| 3/8 NPT | NPT | | | | | | | | 3.42 | .82 | 2.71 |
| 3/8 BSP | BSP | | | | | | | | | | |
| 3/8 BSPP | BSPP | | | | | | | | 3.42 | .82 | 2.71 |
| 5/8-18 UNF | NPT | 3.62 | 1.02 | 2.91 | | | | | | | |
| M16xP1.5 | BSP | | | | .55 | .55 | 1.25 | 2.16 | 3.38 | 2.36 | 1.02 |
| 1/2 NPT | NPT | 4.17 | .98 | 3.38 | | | | | | | |
| 1/2 BSP | BSP | | | | | | | | | | |
| 1/2 BSPP | BSPP | 4.17 | .98 | 3.38 | | | | | | | |
| 3/4-16 UNF | NPT | | | | 4.37 | 1.18 | 3.58 | | | | |
| M22xP1.5 | BSP | .62 | .78 | 1.37 | | | | 2.48 | 3.74 | 2.91 | 1.29 |
| 3/4 NPT | NPT | | | | 4.80 | 1.10 | 3.74 | | | | |
| 3/4 BSP | BSP | | | | | | | | | | |
| 3/4 BSPP | BSPP | | | | 4.80 | 1.10 | 3.74 | | | | |
| 1-1/16-12 UNF | NPT | 5.19 | 1.49 | 4.13 | | | | | | | |
| M25xP1.5 | BSP | | | | .74 | .98 | 1.61 | 2.75 | 4.25 | 3.14 | 1.33 |
| 1 NPT | NPT | 5.59 | 1.22 | 4.25 | | | | | | | |
| 1 BSP | BSP | | | | | | | | | | |
| 1 BSPP | BSPP | 5.59 | 1.22 | 4.25 | | | | | | | |
| 1-1/2-12 UNF | NPT | | | | 5.98 | 1.61 | 4.64 | | | | |
| M35xP1.5 | BSP | .70 | .98 | 1.61 | | | | 2.75 | 4.64 | 3.14 | 1.33 |

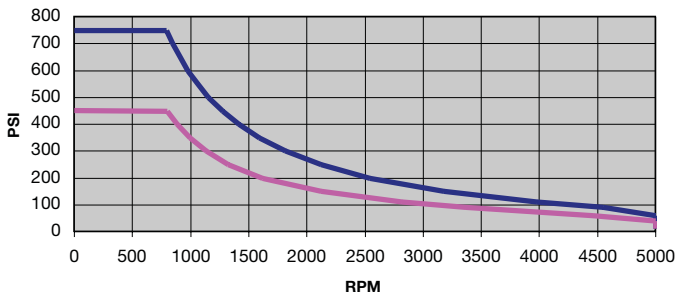
* All inlet threads are right hand threads

| 805 SERIES ROTARY UNION • DUAL FLOW (in.) | | | | | | | | | | | | | | | |
|---|------------------|-------------------|-------------------------|------|------|------|------|------|------|------|---------|------|------|---------|------------|
| Nominal Pipe Size | Shaft Thread (A) | Inlet Thread (Q)* | Shaft Thread Length (B) | DN | F | G | H | I | J | K | L (NPT) | R | S | T (NPT) | |
| | | | | | | | | | | | | | | | DIMENSIONS |
| 1/2 | 1/2 NPT | NPT | .55 | .55 | 4.17 | .98 | 1.25 | 2.16 | 5.23 | 3.38 | 1/8 | 2.36 | 1.02 | .50 | |
| | 1/2 BSP | BSP | | | | | | | | | | | | | 4.37 |
| | 1/2 BSPP | BSPP | | | 4.37 | 1.18 | | | 5.43 | 3.58 | | | | | |
| | 3/4-16 UNF | NPT | | | | | | | | | | | | | 4.80 |
| M22xP1.5 | BSP | .62 | .78 | 1.37 | 2.48 | 6.33 | 4.13 | 1/4 | 2.91 | 1.29 | .75 | | | | |
| 3/4 NPT | NPT | | | | | | | | | | | 4.80 | 1.10 | 5.94 | 3.74 |
| 3/4 BSP | BSP | | | | | | | | | | | | | | |
| 3/4 BSPP | BSPP | | | | | | | | | | | 4.80 | 1.10 | 5.94 | 3.74 |
| 1-1/16-12 UNF | NPT | 5.19 | 1.49 | 6.33 | 4.13 | | | | | | | | | | |
| M25xP1.5 | BSP | | | | | .74 | .98 | 1.61 | 2.75 | 6.85 | 4.25 | 3/8 | 3.14 | 1.33 | 1 |
| 1 NPT | NPT | 5.59 | 1.22 | 6.85 | 4.25 | | | | | | | | | | |
| 1 BSP | BSP | | | | | | | | | | | | | | |
| 1 BSPP | BSPP | 5.59 | 1.22 | 6.85 | 4.25 | | | | | | | | | | |
| 1-1/2-12 UNF | NPT | | | | | 5.98 | 1.61 | 7.24 | 4.64 | | | | | | |
| M35xP1.5 | BSP | .70 | .98 | 1.61 | 2.75 | | | | | 7.24 | 4.64 | | | | |

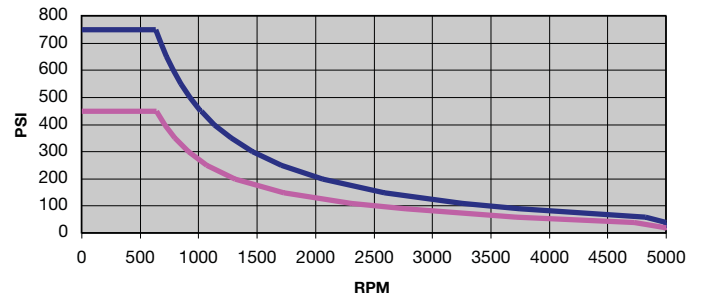
* All inlet threads are right hand threads

Performance Charts

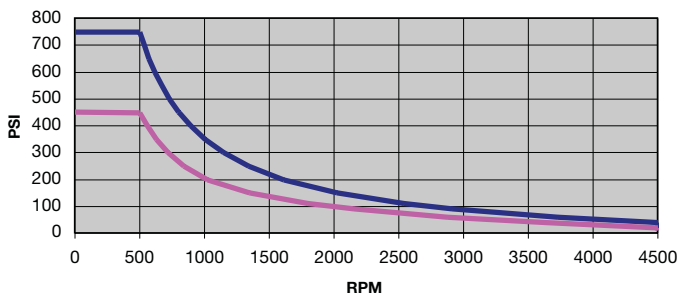
1/4"



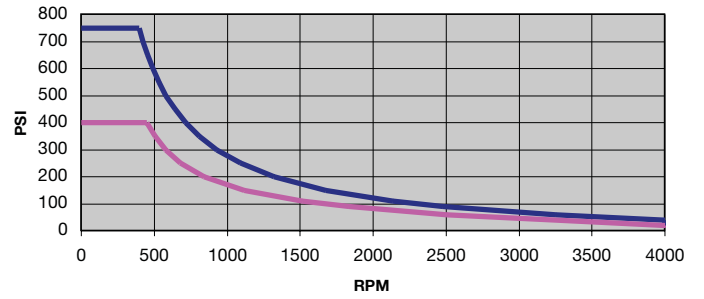
3/8"



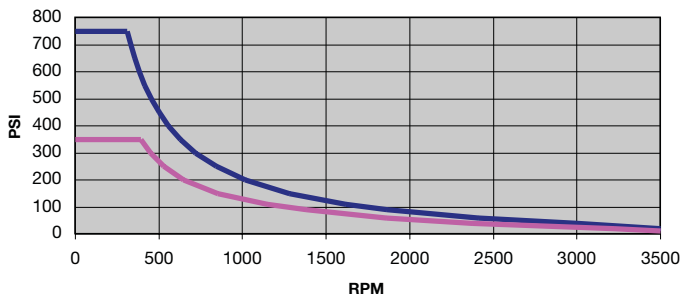
1/2"



3/4"



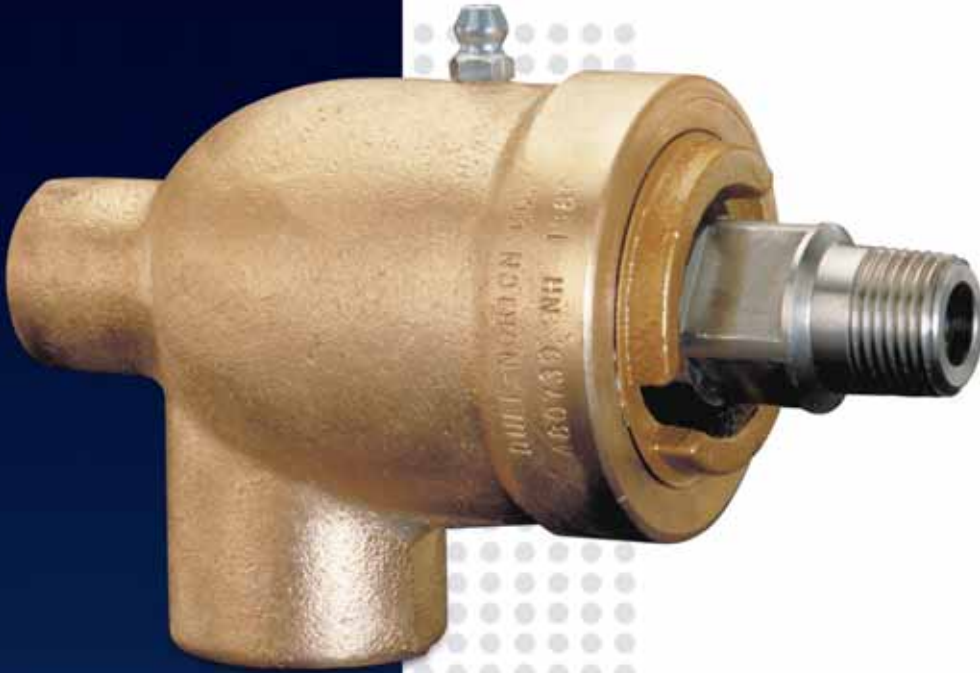
1"



Stainless Steel
 Standard Materials

4000 SERIES

LOW TORQUE
GENERAL PURPOSE



Operating Parameters

MEDIA

Water, Hot Oil, Air

PRESSURE*

1,000 PSI

TEMPERATURE*

200° F

SPEED*

750 RPM

THREADS

- 1/8" to 1" NPT & MT
- BSP & BSPP Available

MATERIAL

Stainless Steel Shaft and Bronze Housing

CONFIGURATION OPTIONS

Mono & Dual Flow Configurations
Available

* See Performance
Charts For Details

Features & Benefits

High Speed Applications

The low torque feature makes the 4000 Series ideal for high speed applications.

Designed For Radial And Thrust Loads

Two sets of ball bearings absorb radial and thrust loads.

Built For Long Life

Features a unique balanced seal for long life.

Wear Resistant

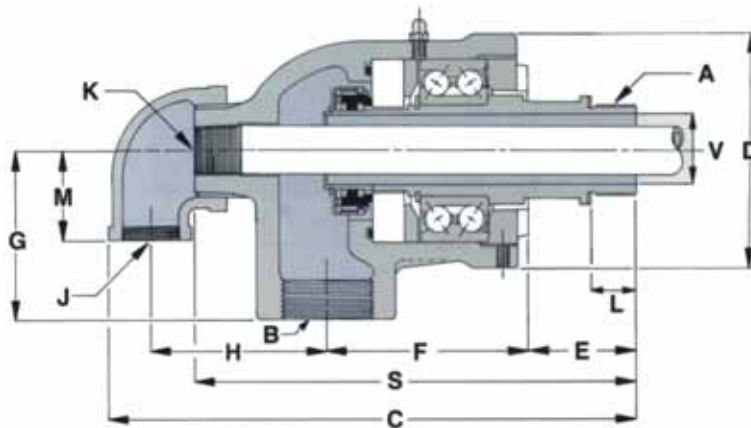
The primary seal design is carbon graphite against ceramic which offers maximum life and durability.

| 4000 SERIES ROTARY UNION (NPT) • MONO FLOW | | | | | | | | |
|--|-------------------|------------------|-------------------|-------------|------------------|------------------|-------------|------------------|
| PART NUMBERS | Nominal Pipe Size | Shaft Thread (A) | Right Hand Thread | | | Left Hand Thread | | |
| | | | Part Number | Description | Repair Cartridge | Part Number | Description | Repair Cartridge |
| | | 1/8 | 1/8 | 480735C | WR4050-0 | 481997C | 480734C | WL4050-0 |
| | 1/4 | 1/4 | 480737C | WR4000-0 | 481916C | 480736C | WL4000-0 | 481915C |
| | 3/8 | 3/8 | 480739C | WR4100-0 | 481896C | 480738C | WL4100-0 | 481895C |
| | 1/2 | 1/2 | 480741C | WR4200-0 | 481926C | 480740C | WL4200-0 | 481925C |
| | 3/4 | 3/4 | 480743C | WR4300-0 | 481934C | 480742C | WL4300-0 | 481933C |
| | 1 | 1 | 480745C | WR4400-0 | 481938C | 480744C | WL4400-0 | 481937C |

| 4000 SERIES ROTARY UNION (NPT) • DUAL FLOW | | | | | | | | |
|--|-------------------|------------------|-------------------|-------------|------------------|------------------|-------------|------------------|
| PART NUMBERS | Nominal Pipe Size | Shaft Thread (A) | Right Hand Thread | | | Left Hand Thread | | |
| | | | Part Number | Description | Repair Cartridge | Part Number | Description | Repair Cartridge |
| | | 1/2 | 1/2 | 470397C | WR4200S-0 | 481926C | 470396C | WL4200S-0 |
| | 3/4 | 3/4 | 470435C | WR4300S-0 | 481934C | 470434C | WL4300S-0 | 481933C |
| | 1 | 1 | 470452C | WR4400S-0 | 481938C | 470451C | WL4400S-0 | 481937C |

| 4000 SERIES ROTARY UNION (MACHINE THREADS) • MONO FLOW | | | | | | | | |
|--|-------------------|---------------|-------------------|-------------|------------------|------------------|-------------|------------------|
| PART NUMBERS | Nominal Pipe Size | Inlet B (NPT) | Right Hand Thread | | | Left Hand Thread | | |
| | | | Part Number | Description | Repair Cartridge | Part Number | Description | Repair Cartridge |
| | | 1/8 | 1/8 | 480747C | WR4051-0 | 481999C | 480746C | WL4051-0 |
| | 1/4 | 1/4 | 480749C | WR4024-0 | 481918C | 480748C | WL4024-0 | 481917C |
| | | 1/4 | 480751C | WR4075-0 | 481920C | 480750C | WL4075-0 | 481919C |
| | | 3/8 | 480753C | WR4080-0 | 481920C | 480752C | WL4080-0 | 481919C |
| | 3/8 | 3/8 | 480755C | WR4124-0 | 481714C | 480754C | WL4124-0 | 481713C |
| | 1/2 | 1/2 | 480757C | WR4260-0 | 481930C | 480756C | WL4260-0 | 481929C |
| | | 1/2 | 480759C | WR4224-0 | 481928C | 480758C | WL4224-0 | 481927C |
| | | 1/2 | 480761C | WR4275-0 | 481712C | 480760C | WL4275-0 | 481711C |
| | 3/4 | 3/4 | 480765C | WR4324-0 | 481936C | 480764C | WL4324-0 | 481935C |
| | 1 | 1 | 480767C | WR4424-0 | 481940C | 480766C | WL4424-0 | 481939C |

| 4000 SERIES ROTARY UNION (MACHINE THREADS) • DUAL FLOW | | | | | | | | |
|--|-------------------|---------------|-------------------|-------------|------------------|------------------|-------------|------------------|
| PART NUMBERS | Nominal Pipe Size | Inlet B (NPT) | Right Hand Thread | | | Left Hand Thread | | |
| | | | Part Number | Description | Repair Cartridge | Part Number | Description | Repair Cartridge |
| | | 1/2 | 1/2 | 470448C | WR4260S-0 | 481930C | 470447C | WL4260S-0 |
| 470444C | | | | WR4224S-0 | 481928C | 470443C | WL4224S-0 | 481927C |
| 470446C | | | | WR4275S-0 | 481712C | 470445C | WL4275S-0 | 481711C |
| | 3/4 | 3/4 | 470450C | WR4324S-0 | 481936C | 470449C | WL4324S-0 | 481935C |
| | 1 | 1 | 470454C | WR4424S-0 | 481940C | 470453C | WL4424S-0 | 481939C |



| 4000 SERIES ROTARY UNION (NPT) • MONO FLOW (in.) | | | | | | | | | |
|--|-------------------|------------------|---------------|----------------|------------------|---------|--------|-------|---------|
| DIMENSIONS | Nominal Pipe Size | Shaft Thread (A) | Inlet B (NPT) | Shaft I.D. (V) | Overall Length C | D | E | F | G |
| | 1/8 | 1/8 | 1/8 | 3/16 | 3-1/2 | 1-13/16 | 1 | 1-3/4 | 1-1/8 |
| | 1/4 | 1/4 | 1/4 | 1/4 | 3-5/8 | 1-13/16 | 1-1/8 | 1-3/4 | 1-1/8 |
| | 3/8 | 3/8 | 3/8 | 3/8 | 4-15/16 | 2-3/16 | 1-1/8 | 2-1/4 | 1-3/4 |
| | 1/2 | 1/2 | 1/2 | 1/2 | 5-1/8 | 2-3/16 | 1-5/16 | 2-1/4 | 1-3/4 |
| | 3/4 | 3/4 | 3/4 | 3/4 | 5-5/8 | 2-11/16 | 1-1/2 | 2-1/2 | 2 |
| | 1 | 1 | 1 | 1 | 6-5/8 | 3-1/16 | 1-3/4 | 3-1/4 | 1-13/16 |

| 4000 SERIES ROTARY UNION (NPT) • DUAL FLOW (in.) | | | | | | | | | | | | | |
|--|-------------------|------------------|---------------|----------------|------------------------|------------------|---------|--------|-------|--------|--------|-------|---------|
| DIMENSIONS | Nominal Pipe Size | Shaft Thread (A) | Inlet B (NPT) | Outlet J (NPT) | Siphon Thread K (NPSM) | Overall Length C | D | E | F | G | H | M | S |
| | 1/2 | 1/2 | 1/2 | 1/2 | 1/8 | 6-1/4 | 2-3/16 | 1-5/16 | 2-1/4 | 1-3/4 | 2-1/16 | 1-1/8 | 4-15/16 |
| | 3/4 | 3/4 | 3/4 | | 1/4 | 6-15/16 | 2-11/16 | 1-1/2 | 2-1/2 | 2 | 2-5/16 | 1-1/4 | 5-1/2 |
| | 1 | 1 | 1 | | 3/8 | 7-7/8 | 3-1/16 | 1-3/4 | 2-7/8 | 2-5/16 | 2-5/8 | 1-3/8 | 6-1/2 |

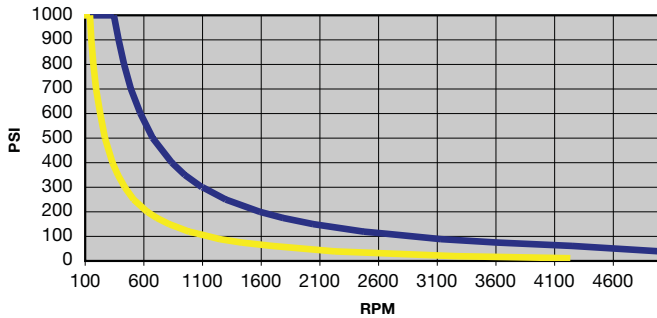
| 4000 SERIES ROTARY UNION (MACHINE THREADS) • MONO FLOW (in.) | | | | | | | | | | |
|--|-------------------|---------------|----------------|--------------------|-------------------|-------|---------|---------|---------|---------|
| DIMENSIONS | Nominal Pipe Size | Inlet B (NPT) | Shaft I.D. (V) | Machine Thread (A) | Thread Length (L) | C | D | E | F | G |
| | 1/8 | 1/8 | 3/16 | 7/16-20 | 7/16 | 3-3/8 | 1-13/16 | 7/8 | 1-3/4 | 1-1/8 |
| | 1/4 | 1/4 | 1/4 | 7/16-20 | 7/16 | 3-3/8 | 1-13/16 | 7/8 | 1-3/4 | 1-1/8 |
| | | 1/4 | 5/16 | 5/8-18 | 7/16 | 3-1/2 | 1-13/16 | 1 | 1-3/4 | 1-1/8 |
| | | 3/8 | 5/16 | 5/8-18 | 7/16 | 3-1/2 | 1 13/16 | 1 | 1-3/4 | 1-1/8 |
| | 3/8 | 3/8 | 3/8 | 5/8-18 | 7/16 | 4-3/4 | 2-3/16 | 15/16 | 2-1/4 | 1-3/4 |
| | | 1/2 | 1/2 | 3/4-16 | 5/8 | 4-7/8 | 2-3/16 | 1-3/16 | 2-1/4 | 1-3/4 |
| | | 1/2 | 1/2 | 7/8-14 | 5/8 | 5 | 2-3/16 | 1-3/16 | 2-1/4 | 1-3/4 |
| | 1/2 | 1/2 | 1/2 | 1-14 | 3/4 | 5 | 2-3/16 | 1-3/16 | 2-1/4 | 1-3/4 |
| | | 3/4 | 3/4 | 11/16 | 1-14 | 3/4 | 5-5/8 | 2-11/16 | 1-1/2 | 2-9/16 |
| 1 | | 1 | 7/8 | 1-1/4-12 | 3/4 | 6-1/2 | 3-1/16 | 1-11/16 | 2-15/16 | 2-15/16 |

4000 SERIES ROTARY UNION (MACHINE THREADS) • DUAL FLOW (in.)

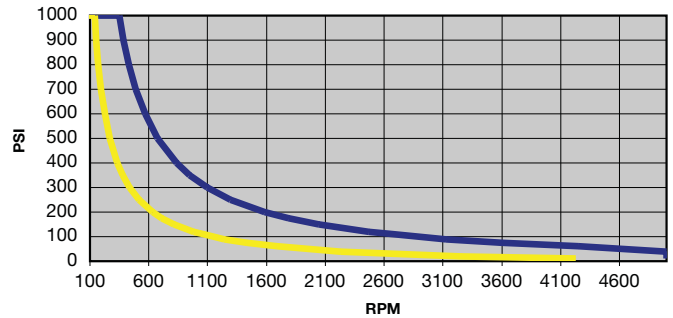
| DIMENSIONS | Nominal Pipe Size | Inlet B (NPT) | Outlet NPT (J) | Siphon Thread K (NPSM) | Shaft I.D. (V) | Machine Thread (A) | Thread Length (L) | C | D | E | F | G | H | M | S |
|------------|-------------------|---------------|----------------|------------------------|----------------|--------------------------|-------------------|----------------|---------|----------------------------|--------|--------|--------|--------|--------------------|
| | 1/2 | 1/2 | 1/2 | 1/8 | 1/2 | 3/4-16 7/8-14 1-14 | 5/8 3/4 | 6-1/8 6-1/4 | 2-3/16 | 1-3/16 1-3/16 1-5/16 | 2-1/4 | 1-3/4 | 2-1/16 | 1-1/8 | 4-13/16 4-15/16 |
| 3/4 | 3/4 | 1/2 | 1/4 | 11/16 | 1-14 | 3/4 | 6-15/16 | 2-11/16 | 1-1/2 | 2-1/2 | 2 | 2-5/16 | 1-1/4 | 5-1/2 | |
| 1 | 1 | 1/2 | 3/8 | 7/8 | 1-1/4-12 | 3/4 | 7-15/16 | 3-1/16 | 1-11/16 | 2-7/8 | 2-5/16 | 2-5/8 | 1-3/8 | 6-7/16 | |

Performance Charts

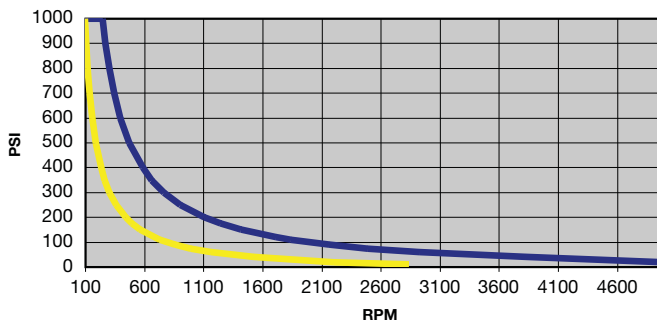
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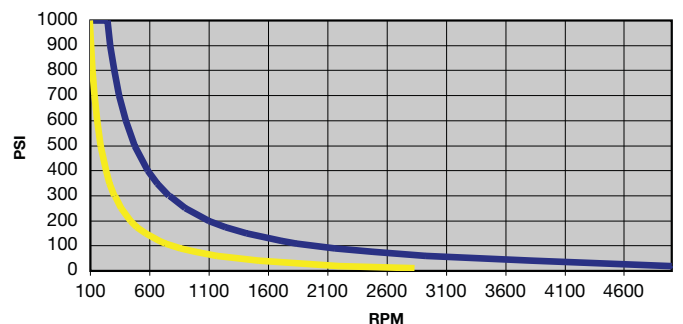
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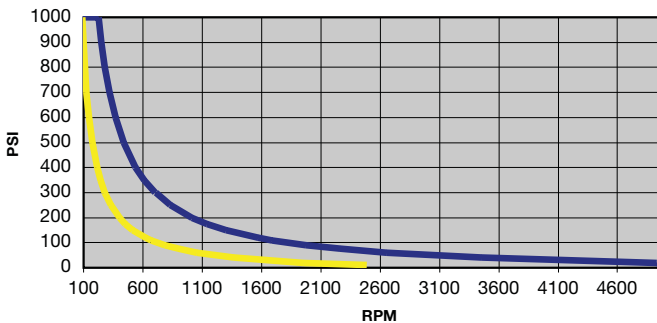
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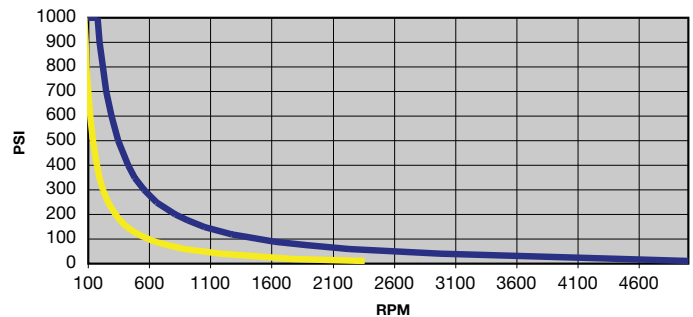
1/2"



3/4"



1"



Water Air

5000 SERIES

STAINLESS STEEL GENERAL PURPOSE



Operating Parameters

MEDIA

Water, Steam, Hot Oil, Air

PRESSURE*

750 PSI (Water), 120 PSI (Steam)
100 PSI (Hot Oil), 300 PSI (Air)

TEMPERATURE*

300° F (Water), 350° F (Steam), 395° F (Hot Oil)

SPEED*

1,000 RPM (NPT), 3,600 RPM (MT)

THREADS

- 1/4" to 2" NPT
- BSP, BSPP & Metric Threads Available

MATERIAL

300 Grade Stainless Steel

CONFIGURATION OPTIONS

Mono Flow and Dual Flow Configurations Available

* See Performance Charts For Details

Features & Benefits

Corrosion Resistant

300 Grade stainless steel construction for superior corrosion resistance.

Long Service Life

Two precision bearings keep the 5000 Series seal faces perfectly aligned to extend the life of the 5000 Series Rotary Union.

Dual Flow Option

With the addition of an elbow, the 5000 Series can become dual flow.

Balanced Mechanical Seal Design

The balanced mechanical seal design of the 5000 series allows for optimal operation with a wide variety of media.

Replaceable Cartridge

Integrated cartridge design makes repairs fast and easy reducing maintenance costs.

Multiple Seal Design Options

All sizes are available with three seal options for better wear resistance.

■ 5000 Series Standard

Carbon graphite against a ceramic coated steel seal design offers long life.

■ 5000 T Series (Consult Factory)

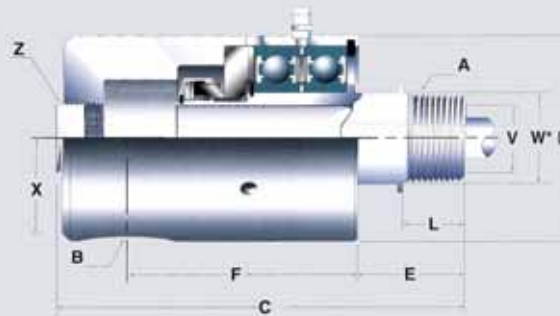
The carbon graphite seal ring against a tungsten carbide face ring design will offer longer wear life where dirty media is used.

■ 5000 ASM Series (Consult Factory)

The tungsten carbide face ring against a siliconized graphite seal ring design is used for abrasive applications.

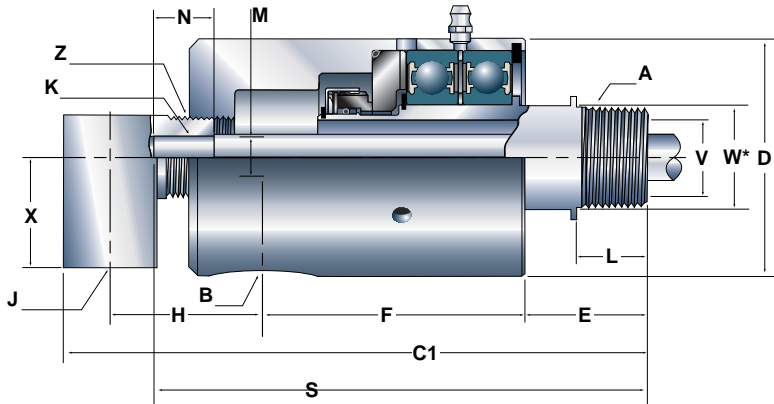
5000 SERIES ROTARY UNIONS • NPT, UNS, UN THREADS • MONO FLOW

| PART NUMBERS | Nominal Pipe Size | Shaft Thread (A) | 5000 Series Standard | | | | | |
|--------------|-------------------|------------------|----------------------|-------------|------------------|----------------|-------------|------------------|
| | | | Right Hand | | | Left Hand | | |
| | | | Part Number | Description | Repair Cartridge | Part Number | Description | Repair Cartridge |
| | 1/4 | 1/4 NPT | 750625C | R5000P | 451671C | 750624C | L5000P | 451670C |
| | 3/8 | 3/8 NPT | 750110C | R5100P | 451251C | 750109C | L5100P | 451250C |
| | | 5/8-18 UNF | 750142C | R5124P | 451253C | 750141C | L5124P | 451252C |
| | 1/2 | 1/2 NPT | 750112C | R5200P | 451258C | 750111C | L5200P | 451257C |
| | | 3/4-16 UNF | 750147C | R5224P | 451260C | 750146C | L5224P | 451259C |
| | | Quick Release | 750150C | Q5200P | 451263C | 750150C | Q5200P | 451263C |
| | 3/4 | 3/4 NPT | 750089C | R5300P | 451265C | 750088C | L5300P | 451264C |
| | | 1-14 UNS | 750152C | R5324P | 451267C | 750151C | L5324P | 451266C |
| | | Quick Release | 750155C | Q5300P | 451270C | 750155C | Q5300P | 451270C |
| | 1 | 1 NPT | 750114C | R5400P | 451272C | 750113C | L5400P | 451271C |
| | | 1-1/2-12 UNF | 750157C | R5424P | 451274C | 750156C | L5424P | 451273C |
| | | Quick Release | 750160C | Q5400P | 451277C | 750160C | Q5400P | 451277C |
| | 1-1/4 | 1-1/4 NPT | 750116C | R5500P | 451279C | 750115C | L5500P | 451278C |
| | | 1-3/4-12 UN | 750162C | R5524P | 451281C | 750161C | L5524P | 451280C |
| | | Quick Release | 750165C | Q5500P | 451284C | 750165C | Q5500P | 451284C |
| | 1-1/2 | 1-1/2 NPT | 750118C | R5600P | 451286C | 750117C | L5600P | 451285C |
| | | 2-12 UN | 750167C | R5624P | 451288C | 750166C | L5624P | 451287C |
| | | Quick Release | 750170C | Q5600P | 451291C | 750170C | Q5600P | 451291C |
| | 2 | 2 NPT | 750120C | R5700P | 451293C | 750119C | L5700P | 451292C |
| | | 2-1/2-12 UN | 750172C | R5724P | 451295C | 750171C | L5724P | 451294C |
| | | Quick Release | 750175C | Q5700P | 451298C | 750175C | Q5700P | 451298C |



5000 SERIES ROTARY UNIONS • NPT, UNS, UN THREADS • MONO FLOW (in.)

| DIMENSIONS | Nominal Pipe Size | Shaft Thread A (Right or Left) | B (NPT) | C | C1 | D | E | F | H | J (NPT) | L | V | W (Flats) | X | Z (NPT) |
|------------|-------------------|--------------------------------|---------|---------|--------|---------|---------|---------|-----|---------|-------|---------|-----------|-------|---------|
| | | | | | | | | | | | | | | | |
| 3/8 | 3/8 NPT | 3/8 | 4 | 5-1/4 | 1-9/16 | 1-1/4 | 2-9/32 | 1-3/8 | 3/8 | 5/8 | 3/8 | 5/8 | 1-1/16 | 3/8 | |
| | 5/8-18 UNF | | | | | | | | | | | | | | |
| 1/2 | 1/2 NPT | 1/2 | 4-3/4 | 5-15/16 | 2-1/16 | 1-9/32 | 2-23/32 | 1-7/16 | 3/8 | 3/4 | 1/2 | 7/8 | 1-1/16 | 3/8 | |
| | 3/4-16 UNF | | | | | | | | | | | | | | |
| | Quick Release | | | | | | | | | | | | | | |
| 3/4 | 3/4 NPT | 3/4 | 5-1/4 | 6-1/2 | 2-5/16 | 1-13/32 | 3 | 1-9/16 | 1/2 | 3/4 | 11/16 | 1-1/4 | 1-1/16 | 1/2 | |
| | 1-14 UNS | | | | | | | | | | | | | | |
| | Quick Release | | | | | | | | | | | | | | |
| 1 | 1 NPT | 1 | 6-3/16 | 7-1/2 | 3-1/8 | 1-5/8 | 3-7/16 | 1-13/16 | 1/2 | 15/16 | 1 | 1-3/8 | 1-15/32 | 3/4 | |
| | 1-1/2-12 UNF | | | | | | | | | | | | | | |
| | Quick Release | | | | | | | | | | | | | | |
| 1-1/4 | 1-1/4 NPT | 1-1/4 | 7-1/2 | 9-1/16 | 3-1/2 | 2-9/64 | 4-1/32 | 2-5/32 | 3/4 | 1-1/16 | 1-1/4 | 1-5/8 | 1-1/32 | 1 | |
| | 1-3/4-12 UN MT | | | | | | | | | | | | | | |
| | Quick Release | | | | | | | | | | | | | | |
| 1-1/2 | 1-1/2 NPT | 1-1/2 | 8-3/8 | 9-15/16 | 4 | 2-13/32 | 4-17/32 | 2-1/4 | 3/4 | 1-1/16 | 1-1/2 | 1-15/16 | 1-5/32 | 1-1/4 | |
| | 2-12 UN | | | | | | | | | | | | | | |
| | Quick Release | | | | | | | | | | | | | | |
| 2 | 2 NPT | 2 | 9-1/2 | 11 | 4-3/8 | 2-21/32 | 5-1/16 | 2-1/2 | 3/4 | 1-1/8 | 1-7/8 | 2-1/2 | 1-5/32 | 1-1/4 | |
| | 2-1/2-12 UN | | | | | | | | | | | | | | |
| | Quick Release | | | | | | | | | | | | | | |



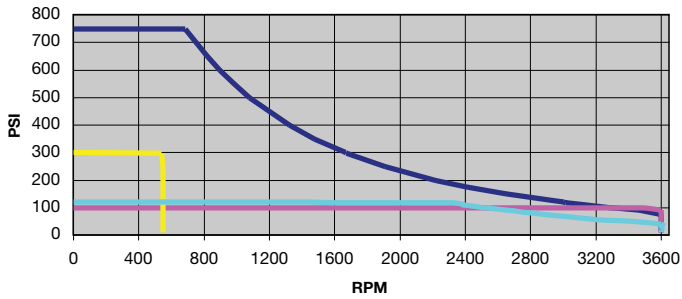
5000 SERIES ELBOWS FOR DUAL FLOW (in.)

| Nominal Pipe Size | Elbows for Stationary Siphon Systems | | | | Elbows for Rotating Siphon Systems | | | | |
|-------------------|--------------------------------------|------------------------|-------------|-------------|------------------------------------|------------|---------|------------|-------|
| | Part Number | Siphon K | Siphon Pipe | Siphon Tube | Part Number | Siphon (K) | S | M | N |
| | | Pipe Thread Tube OD | | | | | | | |
| 3/8 | 465409C | 1/4 | - | 4-1/4 | - | - | - | - | - |
| 1/2 | 465408C | 1/8 NPT | 4-15/16 | - | 451245C | 3/8 | 4-9/16 | .370-.371 | 1-1/4 |
| | 465410C | 3/8 | - | 4-15/16 | - | - | - | - | - |
| BSP | 465416C | 1/8-28 BSP | 125 mm | - | - | - | - | - | - |
| | 465401C | 1/8 NPT | 5-3/8 | - | - | - | - | - | - |
| 3/4 | 465402C | 1/4 NPT | 5-15/32 | - | - | - | - | - | - |
| | 465403C | 7/16 | - | 5-5/32 | - | - | - | - | - |
| | 465404C | 1/2 | - | 5-5/32 | 451243C | 1/2 | 5-5/32 | .495-.496 | 1-1/4 |
| BSP | 465417C | 1/8-28 BSP | 136 mm | - | - | - | - | - | - |
| | 465418C | 1/4-19 BSP | 139 mm | - | - | - | - | - | - |
| 1 | 465411C | 1/4 NPT | 6-5/16 | - | - | - | - | - | - |
| | 465412C | 3/8 NPT | 6-3/16 | - | 451246C | 5/8 | 6-1/8 | .619-.612 | 1-1/4 |
| | 465413C | 5/8 | - | 6-1/4 | - | - | - | - | - |
| BSP | 465419C | 3/8-19 BSP | 157 mm | - | - | - | - | - | - |
| | 465414C | 1/2 NPT | 7-13/32 | - | - | - | - | - | - |
| 1-1/4 | 465415C | 3/4 | - | 7-9/16 | 451247C | 3/4 | 7-7/16 | .743-.745 | 1-1/2 |
| | BSP | 465420C | 1/2-14 BSP | 188 mm | - | - | - | - | - |
| 1-1/2 | 465405C | 1/2 NPT | 8-9/32 | - | - | - | - | - | - |
| | 465406C | 3/4 NPT | 8-1/4 | - | 451244C | 1 | 8-9/16 | .998-1.000 | 1-3/4 |
| | 465407C | 1 | - | 8-1/2 | - | - | - | - | - |
| BSP | 465421C | 3/4-14 BSP | 210 mm | - | - | - | - | - | |
| 2 | 465405C | 1/2 NPT | 9-11/32 | - | - | - | - | - | - |
| | 465406C | 3/4 NPT | 9-9/32 | - | 451244C | 1 | 9-19/32 | .998-1.000 | 1-3/4 |
| | 465407C | 1 | - | 9-17/32 | - | - | - | - | - |
| BSP | 465421C | 3/4-14 BSP | 235 mm | - | - | - | - | - | |

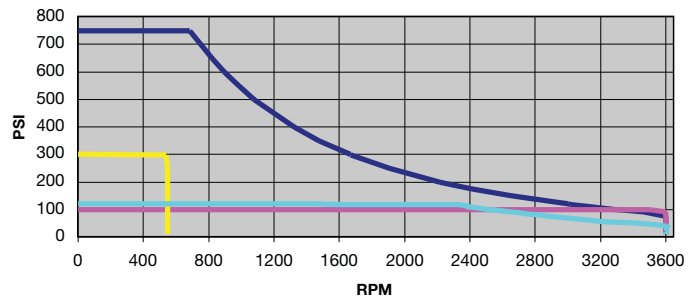
ELBOWS FOR DUAL FLOW

Performance Charts

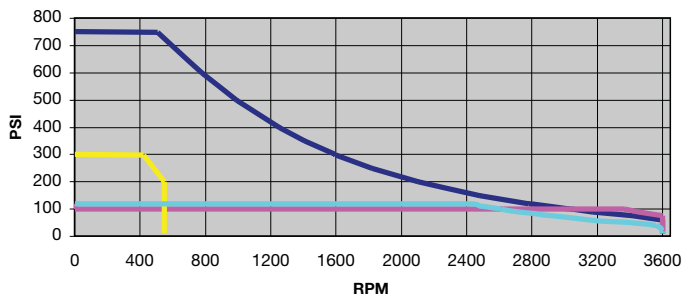
1/4"



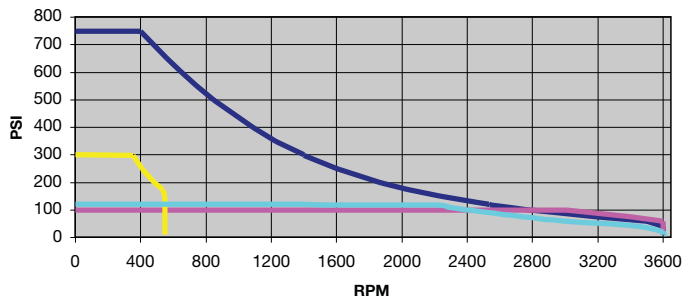
3/8"



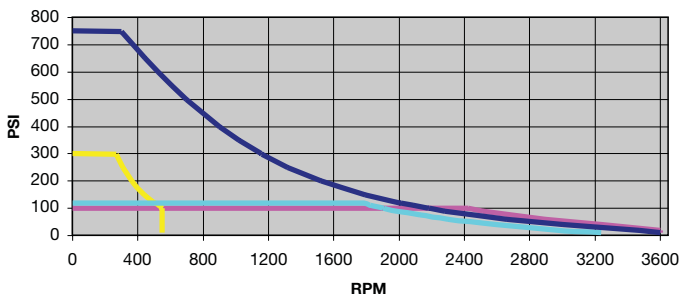
1/2"



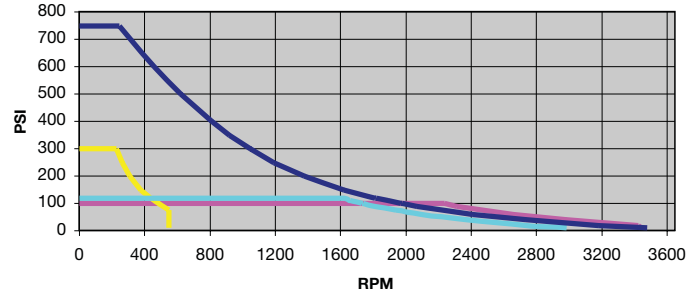
3/4"



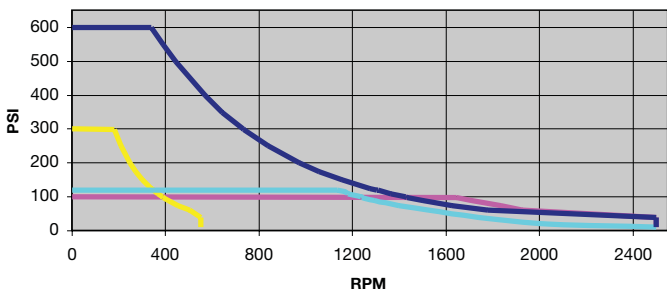
1"



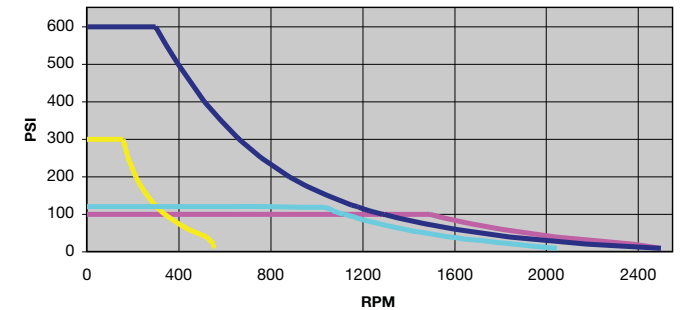
1 1/4"



1 1/2"



2"



Steam
 Water
 Hot Oil
 Air

9000 SERIES

GENERAL PURPOSE



Operating Parameters

MEDIA

Water, Steam, Hot Oil

PRESSURE*

250 PSI

TEMPERATURE*

375° F (Water), 375° F (Steam), 375° F (Hot Oil)

SPEED*

700 RPM

THREADS

- 1/4" to 3" NPT
- BSP & ISO228 Flanged Available

MATERIAL

Cast Iron Housing, Steel Shaft,
Stainless Steel Seal Face

CONFIGURATION OPTIONS

Mono Flow & Dual Flow Configurations
Available

* See Performance
Charts For Details

Features & Benefits

Advanced Sealing System

The Bellows Sealing System provides superior sealing performance throughout the wear life of the Rotary Union.

Superior Alignment

Dual bearings available in all sizes over 1 1/4" to provide superior alignment.

Resists Debris Build-Up

Debris in contaminated media will not be captured in the Bellows Sealing System, which reduces clogging.

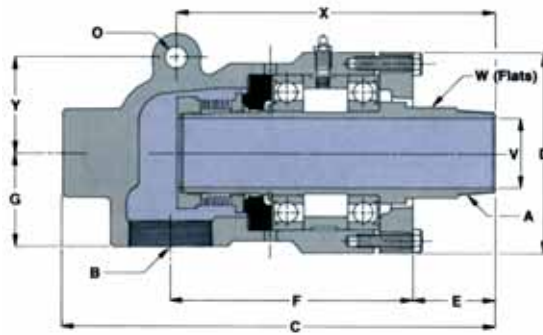
Flanged Mounted Units Available

Consult Factory.

| 9000 SERIES ROTARY UNIONS • MONO FLOW | | | | | | | | |
|---------------------------------------|-------------------|------------------|-------------------|-------------|------------------|------------------|-------------|------------------|
| PART NUMBERS | Nominal Pipe Size | Shaft Thread (A) | Right Hand Thread | | | Left Hand Thread | | |
| | | | Part Number | Description | Repair Cartridge | Part Number | Description | Repair Cartridge |
| PART NUMBERS | 1/4 | 1/4 NPT | 730432C | R030P | 441647C | 730431C | L030P | 441646C |
| | | 9/16-18 MT | 730434C | R024P | 441649C | 730433C | L024P | 441648C |
| | | 5/8-18 MT | 730436C | R024P | 441651C | 730435C | L024P | 441650C |
| | 3/8 | 3/8 NPT | 730444C | R100P | 441659C | 730443C | L100P | 441658C |
| | | 5/8-18 MT | 730446C | R124P | 441661C | 730445C | L124P | 441660C |
| | 1/2 | 1/2 NPT | 730396C | R200P | 441630C | 730395C | L200P | 441629C |
| | | 3/4-16 MT | 730402C | R224P | 441634C | 730401C | L224P | 441633C |
| | | 7/8-14 MT | 730410C | R224P | 441636C | 730409C | L224P | 441635C |
| | | 3/4-14 MT | 730639C | R224P | 441632C | 730638C | L224P | 441631C |
| | 3/4 | 7/8-16 MT | 730641C | R224P | 441709C | 730640C | L224P | 441708C |
| | | 3/4 NPT | 730332C | R300P | 441597C | 730331C | L300P | 441596C |
| | 1 | 1-14 MT | 730338C | R324P | 441599C | 730337C | L324P | 441598C |
| | | 1 NPT | 730303C | R400P | 441579C | 730302C | L400P | 441578C |
| | 1-1/4 | 1-1/4-12 MT | 730309C | R424P | 441581C | 730308C | L424P | 441580C |
| | | 1-1/4 NPT | 440320C | R9500P | 471460C | 440319C | L9500P | 471459C |
| | | 1-5/8-8 MT | 440326C | R9524P-3 | 471462C | 440325C | L9524P-3 | 471461C |
| | 1-1/2 | 1-5/8-12 MT | 440324C | R9524P-2 | 471464C | 440323C | L9524P-2 | 471463C |
| | | 1-1/2 NPT | 440144C | R9600P | 471364C | 440143C | L9600P | 471363C |
| | | 2-8 MT | 440148C | R9624P-3 | 471368C | 440147C | L9624P-3 | 471367C |
| | 2 | 2-12 MT | 440152C | R9624P-2 | 471374C | 440151C | L96240P-2 | 471373C |
| 2 NPT | | 440465C | R9700P | 471554C | 440464C | L9700P | 471553C | |
| 2-1/2 | 2-1/2 NPT | 440535C | R9800P | 471556C | 440534C | L9800P | 471555C | |
| 3 | 3 NPT | 440493C | R9900P | 471558C | 440492C | L9900P | 471557C | |
| | 3-1/2-8 MT | 440499C | R9924P-3 | 471644C | 440498C | L9924P-3 | 471643C | |

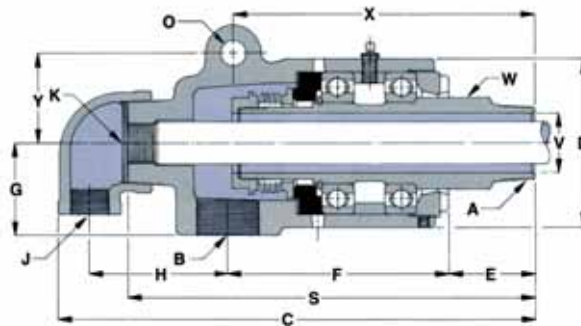
| 9000 SERIES ROTARY UNIONS • DUAL FLOW | | | | | | | | |
|---------------------------------------|-------------------|------------------|-------------------|-------------|------------------|------------------|-------------|------------------|
| PART NUMBERS | Nominal Pipe Size | Shaft Thread (A) | Right Hand Thread | | | Left Hand Thread | | |
| | | | Part Number | Description | Repair Cartridge | Part Number | Description | Repair Cartridge |
| PART NUMBERS | 1/2 | 1/2 NPT | 730398C | R200S | 441630C | 730397C | L200S | 441629C |
| | | 3/4-16 MT | 730404C | R224S | 441634C | 730403C | L224S | 441633C |
| | | 7/8-14 MT | 730412C | R224S | 441636C | 730411C | L224S | 441635C |
| | 3/4 | 3/4 NPT | 730334C | R300S | 441597C | 730333C | L300S | 441596C |
| | | 1-14 MT | 730340C | R324S | 441599C | 730339C | L324S | 441598C |
| | 1 | 1 NPT | 730305C | R400S | 441579C | 730304C | L400S | 441578C |
| | | 1-1/4-12 MT | 730311C | R424S | 441581C | 730310C | L424S | 441580C |
| | 1-1/4 | 1-1/4 NPT | 440322C | R9500S | 471460C | 440321C | L9500S | 471459C |
| | | 1-5/8-8 MT | 440330C | R9524S-3 | 471462C | 440329C | L9524S-3 | 471461C |
| | | 1-5/8-12 MT | 440328C | R9524S-2 | 471464C | 440327C | L9524S-2 | 471463C |
| | 1-1/2 | 1-1/2 NPT | 440146C | R9600S | 471364C | 440145C | L9600S | 471363C |
| | | 2-8 MT | 440150C | R9624S-3 | 471368C | 440149C | L9624S-3 | 471367C |
| | | 2-12 MT | 440154C | R9624S-2 | 471374C | 440153C | L96240S-2 | 471373C |
| | 2 | 2 NPT | 440467C | R9700S | 471554C | 440466C | L9700S | 471553C |
| | 2-1/2 | 2-1/2 NPT | 440575C | R9800S | 471556C | 440574C | L9800S | 471555C |
| | 3 | 3 NPT | 440495C | R9900S | 471558C | 440494C | L9900S | 471557C |

| 9000 SERIES ROTARY UNIONS • DUAL FLOW ROTATING SIPHON | | | | | | | | |
|---|-------------------|------------------|-------------------|-------------|------------------|------------------|-------------|------------------|
| PART NUMBERS | Nominal Pipe Size | Shaft Thread (A) | Right Hand Thread | | | Left Hand Thread | | |
| | | | Part Number | Description | Repair Cartridge | Part Number | Description | Repair Cartridge |
| PART NUMBERS | 1/2 | 1/2 NPT | 730400C | R225-4 | 441630C | 730399C | L225-4 | 441629C |
| | | 3/4-14 | 730406C | XR225-4 | 441632C | 730405C | XL225-4 | 441631C |
| | | 3/4-16 | 730408C | XR225-4 | 441634C | 730407C | XL225-4 | 441633C |
| | | 7/8-14 | 730414C | XR225-4 | 441636C | 730413C | XL225-4 | 441635C |
| | | 7/8-16 | 730644C | XR225-4 | 441709C | 730643C | XL225-4 | 441708C |
| | 3/4 | 3/4-14 | 730336C | R325-2 | 441597C | 730335C | L325-2 | 441596C |
| | | 1-14 | 730342C | XR325-2 | 441599C | 730341C | XL325-2 | 441598C |
| | 1 | 1 NPT | 730307C | R425-10 | 441579C | 730306C | L425-10 | 441578C |
| | | 1-1/2-12 | 730315C | XR425-10 | 441583C | 730314C | XL425-10 | 441582C |
| | | 1-1/4-12 | 730313C | XR425-10 | 441581C | 730312C | XL425-10 | 441580C |
| | 1-1/4 | 1-1/4 NPT | 440334 | R9525-20 | 471460 | 440333 | L9525-20 | 471459 |
| | | 1-5/8-12 MT | 440336 | XR9525-20 | 471464 | 440335 | XL9525-20 | 471463 |
| 1-1/2 | 1-1/2 NPT | 440251 | R9625-30 | 471364 | 440250 | L9625-30 | 471363 | |
| | 2-12 MT | 440438 | XR9625-30 | 471374 | 440437 | XL9625-30 | 471373 | |
| | 2-8 MT | 440449 | XR9625-30 | 471368 | 440448 | XL9625-30 | 471367 | |
| 2 | 2 NPT | 440475 | R9725-30 | 471554 | 440474 | L9725-30 | 471553 | |
| 2-1/2 | 2-1/2 NPT | 440585 | R9825-40 | 471556 | 440584 | L9825-40 | 471555 | |
| 3 | 3 NPT | 440587 | R9925-50 | 471558 | 440586 | L9925-50 | 471557 | |



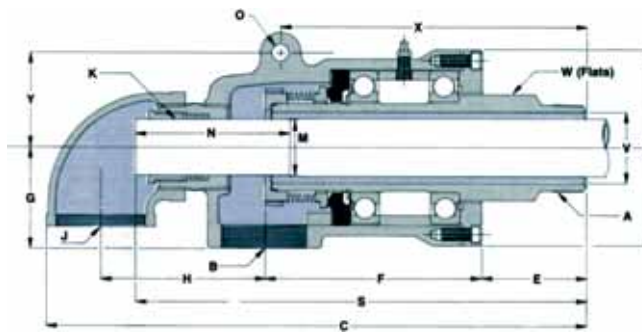
9000 SERIES ROTARY UNIONS • MONO FLOW (in.)

| DIMENSIONS | Nominal Pipe Size | Thread (A) | Inlet B (NPT) | C | D | E | F | G | V | W | O | Y | X | |
|------------|-------------------|-------------|---------------|--------|---------|---------|--------|--------|---------|---------|-------|---------|-------|---|
| | 1/4 | 1/4 NPT | 1/4 | 4-3/8 | 1-3/4 | 1-1/8 | 2-9/16 | 1-1/16 | 1/4 | 5/8 | - | - | - | - |
| | | 9/16-18 MT | | | | | | | | | | | | |
| | 3/8 | 3/8 NPT | 3/8 | 4-3/8 | 1-3/4 | 1-1/8 | 2-9/16 | 1-1/16 | 3/8 | 11/16 | - | - | - | - |
| | | 5/8-18 MT | | | | | | | | | | | | |
| | 1/2 | 1/2 NPT | 1/2 | 5 | 2-3/8 | 1-1/2 | 2-3/4 | 1-1/4 | 1/2 | 15/16 | - | - | - | - |
| | | 3/4-16 MT | | | | | | | | | | | | |
| | | 7/8-14 MT | | | | | | | | | | | | |
| | | 3/4-14 MT | | | | | | | | | | | | |
| | 3/4 | 3/4 NPT | 3/4 | 5-1/2 | 2-1/2 | 1-5/8 | 3 | 1-7/16 | 3/4 | 1-3/4 | - | - | - | - |
| | | 1-14 MT | | | | | | | | | | | | |
| | 1 | 1 NPT | 1 | 6-1/8 | 3 | 1-3/4 | 3-3/8 | 1-3/4 | 1 | 1-11/32 | - | - | - | - |
| | | 1-1/4-12 MT | | | | | | | | | | | | |
| 1-1/4 | 1-1/4 NPT | 1-1/4 | 9-1/16 | 3-3/4 | 2-1/16 | 4-13/16 | 2-3/16 | 1-1/4 | 1-11/16 | 5/8 | - | 2 | 6-7/8 | |
| | 1-5/8-8 MT | | 8-15/16 | | 1-15/16 | | | | | | | | 6-3/4 | |
| | 1-5/8-12 MT | | 9-11/16 | 2-3/16 | 7-3/4 | | | | | | | | | |
| 1-1/2 | 1-1/2 NPT | 1-1/2 | 10-1/4 | 4/8 | 2-3/4 | 5-1/4 | 2-3/16 | 1-1/2 | 1-15/16 | 5/8 | 2-1/4 | 7-15/16 | | |
| | 2-8 MT | | 2-3/4 | | 7-3/4 | | | | | | | | | |
| | 2-12 MT | | 11-3/4 | 5-7/8 | 2-7/16 | 6-7/8 | 2-5/8 | 2 | 2-9/16 | 5/8 | 2-3/4 | 8-9/16 | | |
| 2 | 2 NPT | 2 | 11-3/4 | 5-7/8 | 2-7/16 | 6-7/8 | 2-5/8 | 2 | 2-9/16 | 5/8 | 2-3/4 | 8-9/16 | | |
| 2-1/2 | 2-1/2 NPT | 2-1/2 | 13-7/8 | 6-1/2 | 3-1/2 | 7-3/16 | 3-3/8 | 2-1/2 | 3 | - | - | - | | |
| 3 | 3 NPT | 3 | 15-3/8 | 7-1/8 | 3-1/2 | 8-5/16 | 3-7/8 | 3 | 3-5/8 | - | - | - | | |
| | 3-1/2-8 MT | | 15-3/4 | | 3-7/8 | | | | | | | | - | |



9000 SERIES ROTARY UNIONS • DUAL FLOW • STATIONARY SIPHON (in.)

| DIMENSIONS | Nominal Pipe Size | Shaft Thread (A) | Inlet (B) | Outlet (J) | Siphon K (NPSM) | C | D | E | F | G | H | S | V | W | O | Y | X |
|------------|-------------------|------------------|-----------|------------|-----------------|----------|--------|--------|---------|--------|--------|--------|--------|---------|-------|--------|---------|
| | 1/2 | 1/2 NPT | 1/2 | 1/2 | 1/8 | 7-1/4 | 2-3/8 | 1-1/2 | 2-3/4 | 1-1/4 | 2-1/8 | 6 | 1/2 | 15/16 | - | - | - |
| | | 3/4-16 MT | | | | | | | | | | | | | | | |
| | | 7/8-14 MT | | | | | | | | | | | | | | | |
| | 3/4 | 3/4 NPT | 3/4 | 1/2 | 1/4 | 7-3/4 | 2-1/2 | 1-5/8 | 3 | 1-7/16 | 2-3/8 | 6-3/8 | 3/4 | 1-1/8 | - | - | - |
| | | 1-14 MT | | | | | | | | | | | | | | | |
| | 1 | 1 NPT | 1 | 1/2 | 3/8 | 8-1/2 | 3 | 1-3/4 | 3-3/8 | 1-3/4 | 2-5/8 | 7-1/8 | 1 | 1-3/8 | - | - | - |
| | | 1-1/4-12 MT | | | | | | | | | | | | | | | |
| | 1-1/4 | 1-1/4 NPT | 1-1/4 | 1/2 | 1/2" | 10-5/8 | 3-3/4 | 2-1/8 | 4-13/16 | 2 | - | 8-7/8 | 1-1/4 | 1-11/16 | 5/8 | 2 | 6-3/4 |
| | | 1-5/8-8 MT | | | | 10-7/8 | | 2 | | | | 8-3/4 | | | | | |
| | | 1-5/8-12 MT | | | | 11-3/8 | 2-3/16 | 7-3/4 | | | | | | | | | |
| | 1-1/2 | 1-1/2 NPT | 1-1/2 | 3/4 | 3/4" | 11-15/16 | 4-1/8 | 2-3/4 | 5-1/4 | 2-3/16 | - | 9-9/16 | 1-1/2 | 1-15/16 | 5/8 | 2-1/4 | 7-15/16 |
| | | 2-8 MT | | | | 2-3/4 | | 10-1/8 | | | | | | | | | |
| 2-12 MT | | 13-7/8 | | | | 5-7/8 | 2-7/16 | 6-1/2 | 2-5/8 | - | 11-1/2 | 2 | 2-9/16 | 5/8 | 2-3/4 | 8-9/16 | |
| 2 | 2 NPT | 2 | 1 | 3/4" | 13-7/8 | 5-7/8 | 2-7/16 | 6-1/2 | 2-5/8 | - | 11-1/2 | 2 | 2-9/16 | 5/8 | 2-3/4 | 8-9/16 | |
| 2-1/2 | 2-1/2 NPT | 2 | 1 | 1" | 16-7/8 | 6-1/2 | 3-1/2 | 7-1/4 | 3-3/8 | - | 14 | 2-1/2 | 3 | - | - | - | |
| 3 | 3 NPT | 2-1/2 | 1-1/4 | 1-1/4" | 18-3/4 | 7-1/8 | 3-1/2 | 8-5/16 | 3-7/8 | - | 15-5/8 | 3 | 3-5/8 | - | - | - | |



9000 SERIES ROTARY UNIONS • DUAL FLOW ROTATING SIPHON (in.)

| Nominal Pipe Size | Shaft Thread (A) | Inlet (B) | Outlet (J) | Siphon (K) | C | D | E | F | G | H | M | N | O | S | V | W | X | Y | |
|-------------------|------------------|-----------|------------|------------|----------|-------|--------|---------|--------|--------|----------------|-------|-----|----------|-------|---------|--------|-------|------------|
| | | | | | | | | | | | | | | | | | | | DIMENSIONS |
| 1/2" | 1/2 NPT | 1/2 | 1/2 | 1/4 Tube | 7-1/4 | 2-3/8 | 1-1/2 | 2-3/4 | 1-1/4 | 2-1/8 | 0.249 to 0.252 | 1-5/8 | - | 6-1/4 | 1/2 | 15/16 | - | - | |
| | 3/4-14 MT | | | | | | | | | | | | | | | | | | |
| | 3/4-16 MT | | | | | | | | | | | | | | | | | | |
| | 7/8-14 MT | | | | | | | | | | | | | | | | | | |
| 3/4" | 3/4 NPT | 3/4 | 1/2 | 1/4 Pipe | 7-3/4 | 2-1/2 | 1-5/8 | 3 | 1-7/16 | 2-3/4 | 0.522 to 0.528 | 1-3/4 | - | 6-13/16 | 3/4 | 1-1/8 | - | - | |
| | 1-14 MT | | | | | | | | | | | | | | | | | | |
| 1" | 1 NPT | 1 | 1/2 | 3/8 Pipe | 8-1/2 | 3 | 1-3/4 | 3-3/8 | 1-3/4 | 2-5/8 | 0.657 to 0.663 | 2 | - | 7-11/16 | 1 | 1-3/8 | - | - | |
| | 1-1/4-12 MT | | | | | | | | | | | | | | | | | | |
| 1-1/4 | 1-1/4 NPT | 1-1/4 | 1/2 | 1/2 Pipe | 10-5/8 | 3-3/4 | 2-1/8 | 4-13/16 | 2 | 3 | 0.803 to .808 | 3 | 5/8 | 9-7/16 | 1-1/4 | 1-11/16 | 6-7/8 | 2 | |
| | 1-5/8-12 MT | | | | 10-1/2 | | | | | | | | | 2 | | | 9-5/16 | | 6-3/4 |
| 1-1/2 | 1-1/2 NPT | 1-1/2 | 3/4 | 3/4 Pipe | 11-3/8 | 4-1/8 | 2-3/16 | 5-1/4 | 2-3/16 | 3-1/4 | 0.991 to 0.997 | 3-1/4 | 5/8 | 10-1/8 | 1-1/2 | 1-15/16 | 7-3/8 | 2-1/4 | |
| | 2-12 MT | | | | 11-15/16 | | | | | | | | | 2-3/4 | | | 10-3/4 | | 7-15/16 |
| | 2-8 MT | | | | | | | | | | | | | | | | | | |
| 2 | 2 NPT | 2 | 1 | 3/4 Pipe | 13-7/8 | 5-7/8 | 2-7/16 | 6-1/2 | 2-5/8 | 4-1/16 | 0.991 to 0.997 | 3-1/4 | 5/8 | 12-1/8 | 2 | 2-9/16 | 8-9/16 | 2-3/4 | |
| 2-1/2 | 2-1/2 NPT | 2 | 1-1/4 | 1 Pipe | 16-7/8 | 6-1/2 | 3-1/2 | 7-1/4 | 3-3/8 | 5 | 1.241 to 1.247 | 3-3/4 | - | 14-11/16 | 2-1/2 | 3 | - | - | |
| 3 | 3 NPT | 2-1/2 | 1-1/4 | 1-1/4 Pipe | 18-3/4 | 7-1/8 | 3-1/2 | 8-5/16 | 3-7/8 | 5-1/2 | 1.615 to 1.621 | 4-1/4 | - | 16-3/8 | 3 | 3-5/8 | - | - | |

* Flanged models available. Consult Factory.

**9000 Series
Repair Parts**



Shaft



Ball Bearing



Bearing Retainer



Seal Ring



Bellows Assembly



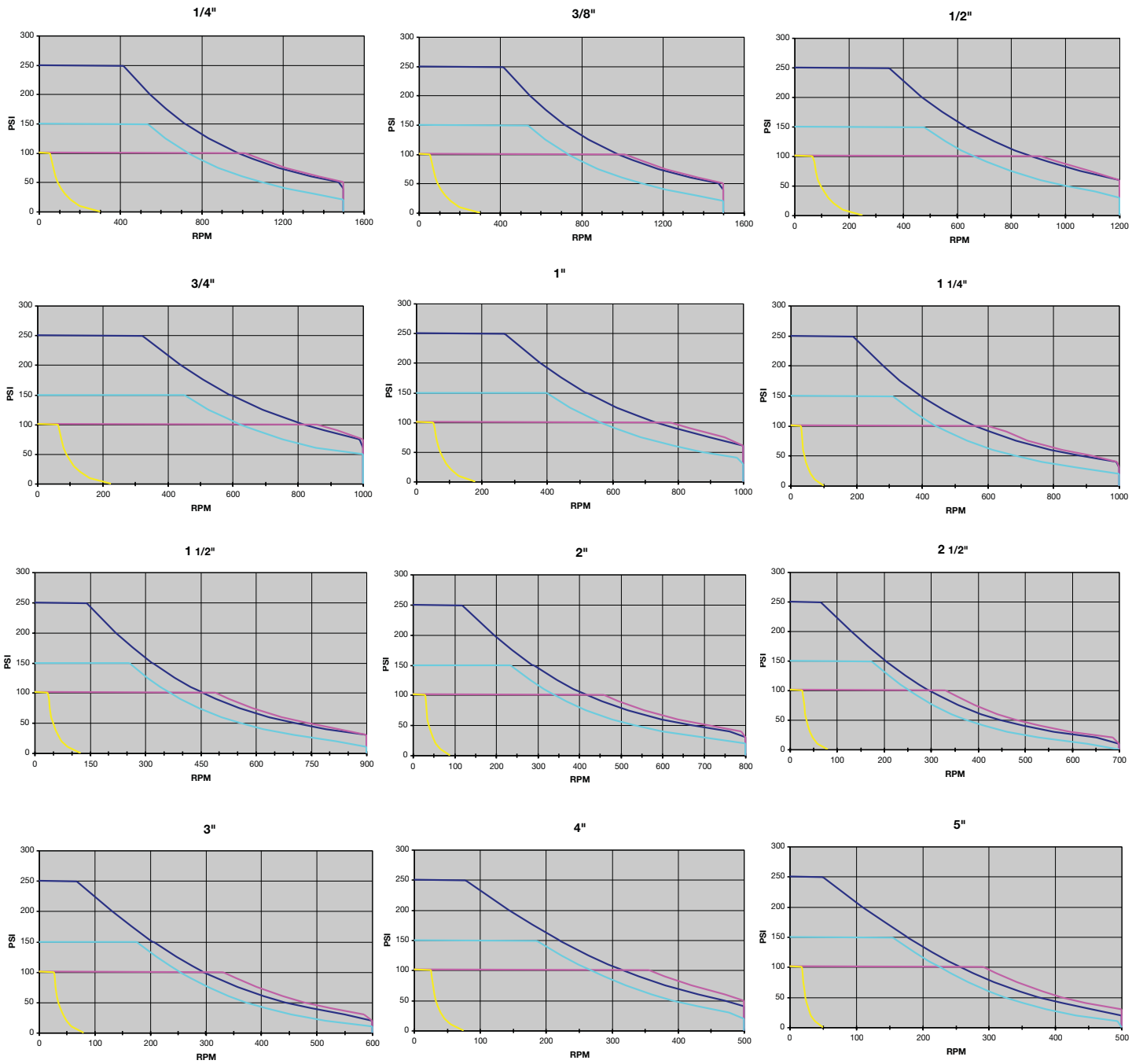
Bellows
Gasket

9000 SERIES ROTARY UNIONS • REPAIR PARTS

| Nominal Pipe Size | Thread Rotation | Shaft | | Ball Bearing | Bearing Retainer | Seal Ring | Bellows Gasket | Bellows Assembly | Housing Gasket |
|-------------------|-----------------|------------------|-------------|--------------|------------------|-----------|----------------|------------------|----------------|
| | | Shaft Thread (A) | Part Number | | | | | | |
| 1/4 | LH | 1/4 NPT | 463474C | 482020C | 847022C | 463472C | 482033C | 481010C | 482026C |
| | RH | | 463475C | | | | | | |
| | LH | 9/16-18 MT | 463476C | | | | | | |
| | RH | | 463477C | | | | | | |
| | LH | 5/8-18 MT | 463478C | | | | | | |
| 3/8 | RH | | 463479C | | | | | | |
| | LH | 3/8 NPT | 463484C | 482020C | 847022C | 463472C | 482033C | 481010C | 482026C |
| | RH | | 463485C | | | | | | |
| | LH | 5/8-18 MT | 463486C | | | | | | |
| | RH | | 463487C | | | | | | |
| 1/2 | LH | 1/2 NPT | 463428C | 482076C | 854744C | 463426C | 482090C | 481018C | 482083C |
| | RH | | 463429C | | | | | | |
| | LH | 3/4-16 MT | 463436C | | | | | | |
| | RH | | 463437C | | | | | | |
| | LH | 7/8-14 MT | 463430C | | | | | | |
| | RH | | 463431C | | | | | | |
| | LH | 3/4-14 MT | 463434C | | | | | | |
| | RH | | 463435C | | | | | | |
| 3/4 | LH | 7/8-16 MT | 463432C | | | | | | |
| | RH | | 463433C | | | | | | |
| | LH | 3/4 NPT | 463291C | 482134C | 844654C | 463287C | 482148C | 481035C | 482141C |
| | RH | | 463292C | | | | | | |
| | LH | 1-14 MT | 463293C | | | | | | |
| 1 | RH | | 463294C | | | | | | |
| | LH | 1 NPT | 463265C | 482188C | 844341C | 463264C | 482201C | 481048C | 482195C |
| | RH | | 463266C | | | | | | |
| | LH | 1-1/4-12 MT | 463277C | | | | | | |
| 1-1/4 | RH | | 463278C | | | | | | |
| | LH | 1-1/4 NPT | 485070C | 482241C | 854753C | 482246C | 482255C | 481062C | 482248C |
| | RH | | 485071C | | | | | | |
| | LH | 1-5/8-8 MT | 485086C | | | | | | |
| | RH | | 485087C | | | | | | |
| | LH | 1-5/8-12 MT | 485084C | | | | | | |
| 1-1/2 | RH | | 485085C | | | | | | |
| | LH | 1-1/2 NPT | 483951C | 482303C | 863095C | 482308C | 482316C | 481073C | 482310C |
| | RH | | 483952C | | | | | | |
| | LH | 2-8 MT | 483953C | | | | | | |
| | RH | | 483954C | | | | | | |
| 2 | LH | 2-12 MT | 483955C | | | | | | |
| | RH | | 483956C | | | | | | |
| | LH | 2 NPT | 485181C | 482362C | 854757C | 482786C | 482788C | 481247C | 482787C |
| 2-1/2 | RH | | 485182C | | | | | | |
| | LH | 2-1/2 NPT | 485256C | 482809C | 854762C | 482811C | 482813C | 481268C | 482812C |
| 3 | RH | | 485257C | | | | | | |
| | LH | 3 NPT | 485155C | 482839C | 854766C | 482841C | 482843C | 481289C | 482842C |
| | RH | | 485156C | | | | | | |
| | LH | 3-1/2-8 MT | 485199C | | | | | | |
| | RH | | 485200C | | | | | | |
| | LH | 3-1/2-12 MT | 485189C | | | | | | |
| | RH | | 485198C | | | | | | |

REPAIR PARTS

Performance Charts

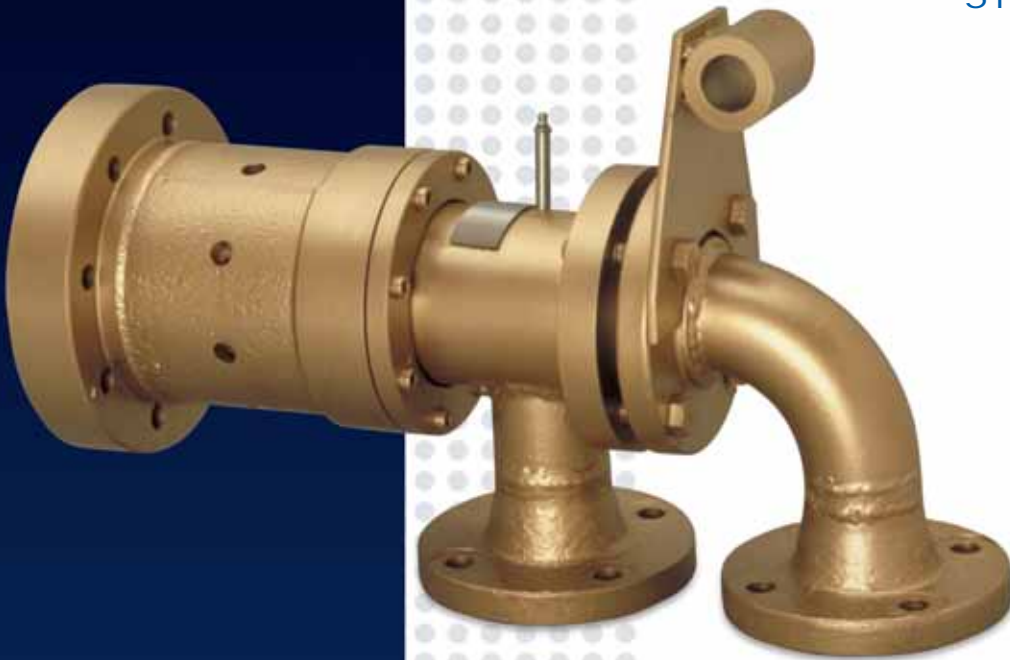


Steam
 Water
 Hot Oil
 Air

2000 SERIES

WATER, HOT OIL & AIR

SHOCK & VIBRATION
RESISTANT



Operating Parameters

MEDIA

Water, Hot Oil, Air

PRESSURE*

150 PSI (Water), 100 PSI (Air & Hot Oil)

TEMPERATURE*

375° F (Water), 550° F (Hot Oil)**

SPEED*

500 RPM

CONNECTIONS

2" to 4" ASA Flange

MATERIAL

Cast Iron Housing, Steel Shaft

CONFIGURATION OPTIONS

Mono Flow & Dual Flow Configurations Available

* See Performance Charts For Details

** Consult factory for applications exceeding 375° F

Features & Benefits

Heavy Duty Design

Designed with two ball bearings spaced to withstand radial and thrust loads.

No Leakage In Tough Applications

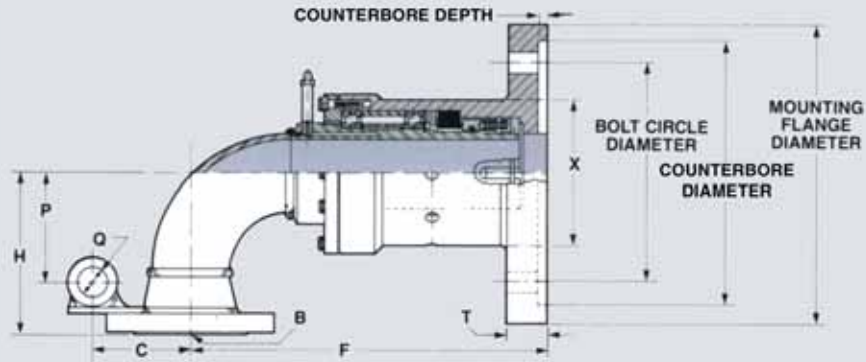
Compression springs in the 2000 Series provide even loading across the seal surfaces to maintain zero leakage even in low pressure applications.

Easy Maintenance

Designed with an integral flange that allows repairs without removing the housing from the machine.

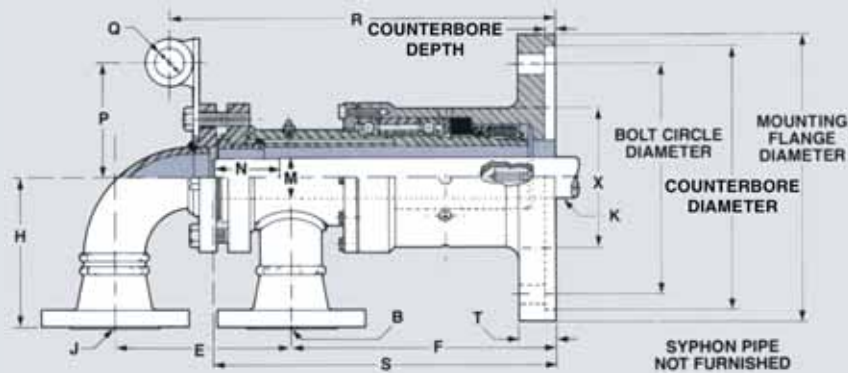
Easy Mounting

The flange attaches directly to the machine journal, providing inherently concentric mounting, minimizing overhang, and partially relieving bearing load to increase service life.



2000 SERIES ROTARY UNIONS • MONO FLOW (in.)

| Nominal Pipe Size | Part Number | Repair Cartridge | B (3) | F | T | Mounting Flange Diameter | Bolt Circle Diameter | Flange Type | Counterbore | | Bolt Hole Size | Number of Bolt Holes (4) | H | P | Diameter (X) | Diameter (Q) | C |
|-------------------|-------------|------------------|-------|--------|--------|--------------------------|----------------------|-------------|------------------|-------|----------------|--------------------------|-------|-------|--------------|--------------|---|
| | | | | | | | | | Diameter | Depth | | | | | | | |
| 2 | 730747C | 441781C | 2 | 12-3/4 | 1-7/16 | 10 | 7-1/8 | 2 | 9.002 to 9.004 | 3/16 | 11/16 | 4 | 5-1/2 | N/A | 5-1/4 | - | - |
| 3 | 730841C | 441845C | 3 | 16-1/8 | 1-3/4 | 9-1/2 | 7-9/16 | 2 | 10.824 to 10.820 | | 13/16 | 8 | 7-1/4 | N/A | 6-5/16 | - | - |
| 4 | 730842C | 441846C | 4 | 20-1/4 | 1-3/4 | 11-1/2 | 8-15/16 | 2 | 10.824 to 10.820 | | 6 | 9-1/8 | 6-3/4 | 7-3/4 | 1/8 | 5-3/4 | |



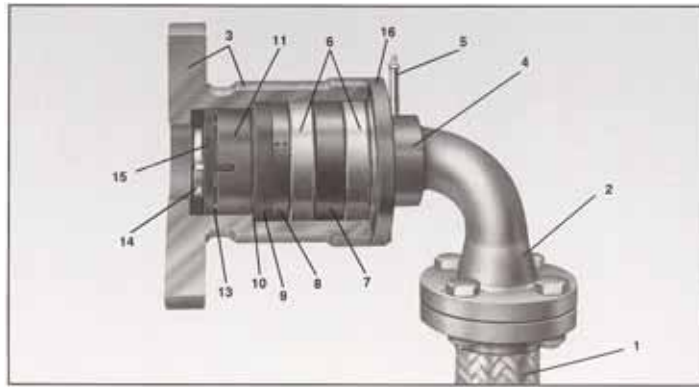
2000 SERIES ROTARY UNIONS • DUAL FLOW • WITH REVOLVING SYPHON (in.)

| Nominal Pipe Size | Part Number | Repair Cartridge | B(3) | F | T | Mounting Flange Diameter | Bolt Circle Diameter | Flange Type | Counterbore | | Bolt Hole Size | Number of Bolt Holes | H | P | Diameter (X) | Diameter (Q) | K(1) | M(2) | N | J(3) | S | E | R |
|-------------------|-------------|------------------|-------|--------|--------|--------------------------|----------------------|-------------|------------------|-------|----------------|----------------------|-------|-------|--------------|--------------|-------|----------------|-------|-------|--------|-------|--------|
| | | | | | | | | | Diameter | Depth | | | | | | | | | | | | | |
| 2 | 730843C | 441847C | 1-1/2 | 10 | 1-7/16 | 10 | 7-1/8 | 2 | 9.002 to 9.004 | 3/16 | 11/16 | 4 | 4-5/8 | - | - | - | 3/4 | .991 to .997 | 4-1/4 | 1-1/2 | 13-3/8 | 6-5/8 | N/A |
| 3 | 730737C | 441786C | 2-1/2 | 12-1/2 | 1-3/4 | 9-1/2 | 7-9/16 | | 9.002 to 9.004 | | 11/16 | 8 | 7-1/8 | 5-1/2 | 6-1/4 | 1-3/8 | 1-1/2 | 1.865 to 1.871 | | 2-1/2 | 16-1/4 | 8-3/8 | 18-1/4 |
| 4 | 730852C | 441860C | 2-1/2 | 15-3/8 | 1-3/4 | 11-1/2 | 8-15/16 | | 10.820 to 10.824 | | 13/16 | 6 | 7-1/8 | 6-1/8 | 7-3/4 | 1-3/8 | 2-1/2 | 2.801 to 2.807 | | 2-1/2 | 19-3/8 | 8-7/8 | 21 |

- (1) Standard syphon pipe diameter.
- (2) Machined dimension to allow revolving syphon pipe to run concentrically with journal diameter to within .005" T.I.R.
- (3) 150 lb. ASA Flange.
- (4) Equally spaced.
- (5) Not applicable to this size joint.

Notes:

- 1. For heat transfer oil applications, consult factory
- 2. Other flange dimensions available. See previous page.
- 3. For dimensions on 5" - 6", consult factory



The unique design of this 2000 series flanged type rotary joint permits them to be used to introduce heating or cooling agents into rolls or cylinders in various types of machinery. Models are available to handle water, oil and other fluids in applications requiring sealing pressure to 150 psi, speeds to 500 rpm, and temperatures to 550°F. when specified.

- 1 FLEXIBLE HOSE** eliminates complex piping, allows adjustment of rolls without repiping. Allows rotary joint to "float" so as to avoid unnecessary strain on sealing surfaces. A flexible hose either rubber or metal — must always be used with rotary joints.
- 2 FLANGED INLET** elbow of steel is a 150 lb. ASA flange type.
- 3 FLANGED ROTATING HOUSING** prevents leakage under pressure and protects the internal parts for a long service life. The flanged housing attaches directly to the machine journal, providing inherently concentric mounting, minimizes overhang. The housing may rotate in either direction without causing back out problems.
- 4 STATIONARY SHAFT** is constructed of steel. It serves as a conduit for the fluid transfer from the flanged inlet into the revolving flanged housing.
- 5 LUBRICATION FITTING** located on the stationary shaft allows lubrication of the ball bearings while the rotary joint is in operation.
- 6 TWO SINGLE ROW, WIDELY SPACED BALL BEARINGS** for radial and thrust loads.

- 7 GREASE RING ASSEMBLY** of steel, ground and spaced for ball bearing load sharing for increased life.
- 8 DRAIN RING** is made of steel. It allows minute start-up leakage from entering the ball bearings.
- 9 SEAL RING** forms the primary rotating seal with the face ring. The seal ring is constructed of carbon graphite to provide a low friction, wear resistant surface.
- 10 GASKET** provides an effective seal between the housing and the fluid chamber.
- 11 THE FACE RING** constructed of hardened and tempered stainless steel mates with the seal ring to form the primary seal.
- 12 O-RING ELASTOMER (not shown)** of ethylene propylene for hot water applications. For higher temperature applications, a perfluoroelastomer is used.
- 13 COMPRESSION SPRINGS** apply an initial pressure between the face ring and seal ring to provide sealing for low pressure applications.
- 14 DRIVE COLLAR** keys the face ring and the shaft together to prevent rotation.
- 15 RETAINER RINGS** secure the internal components to the shaft.
- 16 FLANGE SECURES** the internal components within the flanged housing. This allows quick rotary joint repair and less machine downtime.

| 2000 & 9000 SERIES • BOLT & FLANGE DIMENSIONS | | | | |
|---|---------------------|--------------------|-----------------------------|--------------------------|
| Shaft I.D. | Minimum Bolt Circle | | Maximum Flange Diameter (A) | Maximum Flange Thickness |
| | Bolt Circle (B) | Cap Screw Diameter | | |
| 2 | 7-1/8 | 5/8 | 10-7/8 | 1-7/16 |
| 3 | 7-9/16 | 5/8 | 13-1/2 | 1-3/4 |
| 4 | 8-15/16 | 3/4 | 14-7/8 | 2-1/16 |
| 5 | 11-9/16 | 1 | 16-1/4 | 2-3/4 |

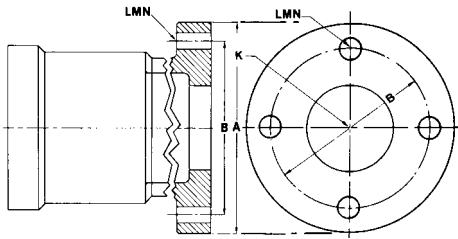
*All dimensions in inches

Order Checklist

Supply the following information when ordering

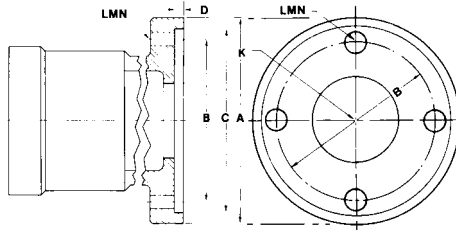
- 1. Desired bolt circle
- 2. Bolt hole size
- 3. Number of bolt holes and spacing
- 4. Desired flange thickness
- 5. Flange O.D.
- 6. Pilot diameter and type
- 7. Pilot (length or depth)

2000 Series Shock Resistant Flange Mountings



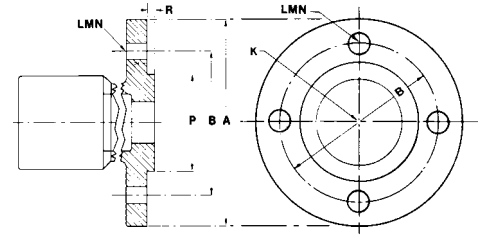
Flanged Housing Type 1

- A. Overall diameter
- B. Bolt circle diameter
- K. Rotary Union joint shaft thread size and direction
- L. Size of bolt holes
- M. Type and size of bolts
- N. Number of bolt holes required



Flanged Housing w/ Counterbore Type 2

- A. Overall diameter
- B. Bolt circle diameter
- C. O.D. of journal for sizing counterbore diameter
- D. Counterbore depth
- K. Rotary Union joint shaft thread size and direction
- L. Size of bolt holes
- M. Type and size of bolts
- N. Number of bolt holes required

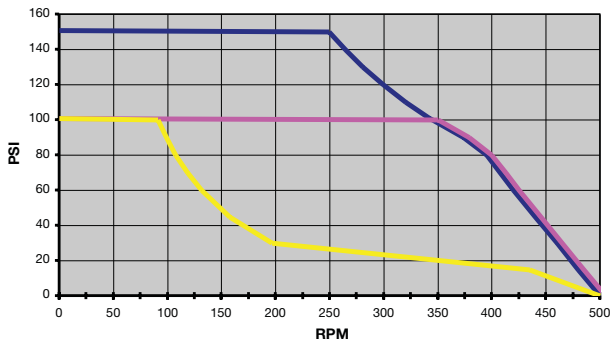


Flanged Housing w/ Pilot Type 3

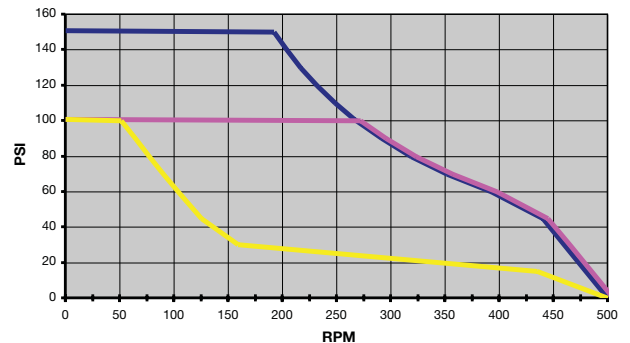
- A. Overall diameter
- B. Bolt circle diameter
- K. Rotary Union joint shaft thread size and direction
- L. Size of bolt holes
- M. Type and size of bolts
- N. Number of bolt holes required
- P. I.D. of journal for sizing pilot diameter
- R. Pilot length

Performance Charts

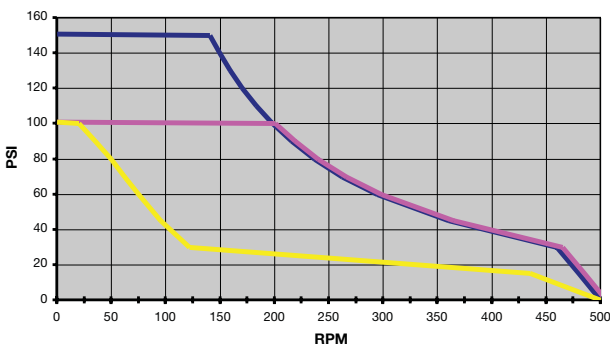
2"



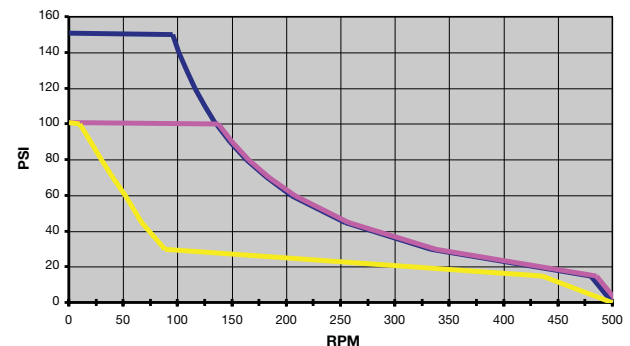
3"



4"



5"



Water Oil Air

8000 SERIES

STEAM & HOT OIL



Operating Parameters

MEDIA

Steam, Hot Oil

PRESSURE*

175 PSI (Steam), 100 PSI (Hot Oil)

TEMPERATURE*

450° F (Steam), 600° F (Hot Oil)

SPEED*

600 RPM

THREADS

- 1/2" to 4" NPT
- BSP or ISO228 Available
- Quick Release

MATERIAL

- Cast Iron Housing with Stainless Steel Sleeve
- Steel Shaft with Hardened Nickel Plating

CONFIGURATION OPTIONS

Mono Flow & Dual Flow Configurations Available

* See Performance Charts For Details

Features & Benefits

Ideal For Steam Applications

Designed for operation in a variety of steam applications.

Safety

An anti-torque lug prevents rotation of the housing while in operation.

No Lubrication Needed

The special carbon graphite bearing is lubricated by the process fluid and requires no additional lubrication.

Hot Oil Applications

8000HO offers the same design features as the standard 8000 Series but with a special high temperature seal ring for hot oil applications.

Stainless Steel Insert

The stainless steel housing insert in the 8000T Series makes this joint a favorite in the textile industry

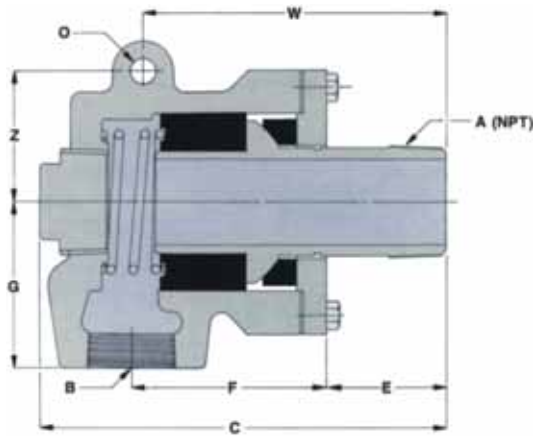
| 8000 SERIES ROTARY UNIONS • MONO FLOW | | | | | | | | | | | | | | |
|---------------------------------------|-----------------------|-----------|------------------|-------------|-------------------|-------------|-------------------|-------------|-------------------|-------------|-----------------|-------------|-------------------|-------------|
| PART NUMBERS | Nominal Pipe Size (A) | Inlet (B) | Left Hand Thread | | | | Right Hand Thread | | | | Quick Release | | | |
| | | | Standard Spring | Description | Heavy Duty Spring | Description | Standard Spring | Description | Heavy Duty Spring | Description | Standard Spring | Description | Heavy Duty Spring | Description |
| | 1/2 | 1/2 | 430483C | L8200P | 730215C | L8200P-HD | 430484C | R8200P | 730216C | R8200P-HD | 430533C | Q8200P | 730214C | Q8200P-HD |
| | 3/4 | 3/4 | 430485C | L8300P | 730223C | L8300P-HD | 430486C | R8300P | 730224C | R8300P-HD | 730534C | Q8300P | 730225C | Q8300P-HD |
| | 1 | 1 | 730856C | L8400-T | - | - | 730857C | R8400-T | - | - | 430535C | Q8400P | 730232C | Q8400P-HD |
| | 1-1/4 | 1-1/4 | 430489C | L8500P | 730244C | L8500P-HD | 430490C | R8500P | 730245C | R8500P-HD | 430536C | Q8500P | 730246C | Q8500P-HD |
| | 1-1/2 | 1-1/2 | 730496C | L8600P | 730506C | L8600P-HD | 730497C | R8600P | 730507C | R8600P-HD | 730498C | Q8600P | 730508C | Q8600P-HD |
| | 2 | 2 | 460617C | L8700P | 730269C | L8700P-HD | 460618C | R8700P | 730270C | R8700P-HD | 460616C | Q8700P | 730271C | Q8700P-HD |
| | 2-1/2 | 2 | 430495C | L8800P | 730278C | L8800P-HD | 430496C | R8800P | 730279C | R8800P-HD | 430539C | Q8800P | 730280C | Q8800P-HD |
| | 3 | 2-1/2 | 430497C | L8900P | 730290C | L8900P-HD | 430498C | R8900P | 730291C | R8900P-HD | 430540C | Q8900P | 730292C | Q8900P-HD |
| | 4 | 4 | 430501C | L81100P | 730322C | L81100P-HD | 430502C | R81100P | 730323C | R81100P-HD | 430542C | Q81100P | 730324C | Q81100P-HD |

| 8000 SERIES ROTARY UNIONS • DUAL FLOW | | | | | | | | | | | | | | |
|---------------------------------------|-----------------------|-----------|-------------------|-------------|-------------------|-------------|------------------|-------------|-------------------|-------------|-----------------|-------------|-------------------|-------------|
| PART NUMBERS | Nominal Pipe Size (A) | Inlet (B) | Right Hand Thread | | | | Left Hand Thread | | | | Quick Release | | | |
| | | | Standard Spring | Description | Heavy Duty Spring | Description | Standard Spring | Description | Heavy Duty Spring | Description | Standard Spring | Description | Heavy Duty Spring | Description |
| | 1/2 | 1/2 | 430504C | R8200S | 730219C | R8200S-HD | 430503C | L8200S | 730218C | L8200S-HD | 430543C | Q8200S | 730217C | Q8200S-HD |
| | 3/4 | 3/4 | 430506C | R8300S | 730227C | R8300S-HD | 430505C | L8300S | 730226C | L8300S-HD | 430544C | Q8300S | 730228C | Q8300S-HD |
| | 1 | 1 | 730859C | R8400S-T | - | - | 730858C | L8400S-T | - | - | 430545C | Q8400S | 730238C | Q8400S-HD |
| | | | 730861C | XR8400S-T | - | - | 730860C | XL8400S-T | - | - | 430546C | XQ8400S | 730235C | XQ8400S-HD |
| | 1-1/4 | 1-1/4 | 430512C | R8500S | 730248C | R8500S-HD | 430511C | L8500S | 730247C | L8500S-HD | 430547C | Q8500S | 730249C | Q8500S-HD |
| | 1-1/2 | 1-1/2 | 730500C | R8600S | 730523C | R8600S-HD | 730499C | L8600S | 730522C | L8600S-HD | 730501C | Q8600S | 730524C | Q8600S-HD |
| | 2 | 2 | 460648C | R8700S | 730273C | R8700S-HD | 460647C | L8700S | 730272C | L8700S-HD | 460595C | Q8700S | 730274C | Q8700S-HD |
| | | | 430520C | R8800S | 730285C | R8800S-HD | 430517C | L8800S | 730284C | L8800S-HD | 430550C | Q8800S | 730286C | Q8800S-HD |
| | 2-1/2 | 2 | 430521C | R8800S | 730282C | R8800S-HD | 430518C | L8800S | 730281C | L8800S-HD | 430551C | Q8800S | 730283C | Q8800S-HD |
| | | | 430522C | R8800S | 730288C | R8800S-HD | 430519C | L8800S | 730287C | L8800S-HD | 430552C | Q8800S | 730289C | Q8800S-HD |
| | 3 | 2-1/2 | 430526C | R8900S | 730296C | R8900S-HD | 430523C | L8900S | 730293C | L8900S-HD | 430553C | Q8900S | 730299C | Q8900S-HD |
| | | | 430527C | R8900S | 730297C | R8900S-HD | 430524C | L8900S | 730294C | L8900S-HD | 430554C | Q8900S | 730300C | Q8900S-HD |
| | | | 430528C | R8900S | 730298C | R8900S-HD | 430525C | L8900S | 730295C | L8900S-HD | 430555C | Q8900S | 730301C | Q8900S-HD |
| | 4 | 4 | 431532C | R81100S | 730326C | R81100S-HD | 430531C | L81100S | 730325C | L81100S-HD | 430557C | Q81100S | 730327C | Q81100S-HD |

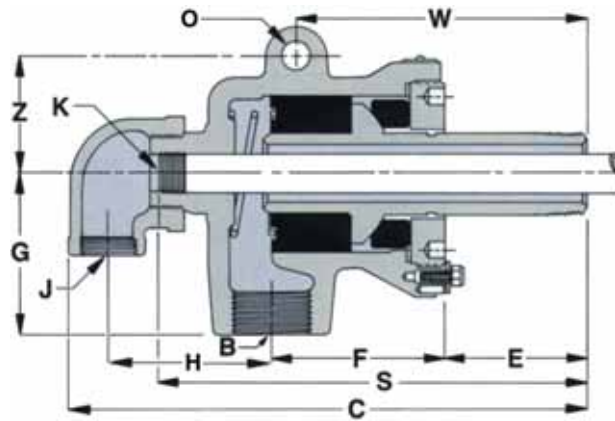
| 8000HO SERIES ROTARY UNIONS • MONO FLOW • HOT OIL | | | | | | | |
|---|-----------------------|-------------------|-------------|------------------|-------------|---------------|-------------|
| PART NUMBERS | Nominal Pipe Size (A) | Right Hand Thread | | Left Hand Thread | | Quick Release | |
| | | Part Number | Description | Part Number | Description | Part Number | Description |
| | 1/2 | 740226C | R8200P-HO | 740225C | L8200P-HO | 740227C | Q8200P-HO |
| | 3/4 | 740211C | R8300P-HO | 740210C | L8300P-HO | 740212C | Q8300P-HO |
| | 1 | 740242C | R8400P-HO | 740241C | L8400P-HO | 740243C | Q8400P-HO |
| | 1-1/4 | 740349C | R8500P-HO | 740348C | L8500P-HO | 740350C | Q8500P-HO |
| | 1-1/2 | 740279C | R8600P-HO | 740278C | L8600P-HO | 740280C | Q8600P-HO |
| | 2 | 740275C | R8700P-HO | 740274C | L8700P-HO | 740276C | Q8700P-HO |
| | 2-1/2 | 740425C | R8800P-HO | 750026C | L8800P-HO | 780995C | Q8800P-HO |
| | 3 | 740190C | R8900P-HO | 740189C | L8900P-HO | 740459C | Q8900P-HO |

| 8000HO SERIES ROTARY UNIONS • DUAL FLOW • HOT OIL | | | | | | | |
|---|-----------------------|-------------------|-------------|------------------|-------------|---------------|-------------|
| PART NUMBERS | Nominal Pipe Size (A) | Right Hand Thread | | Left Hand Thread | | Quick Release | |
| | | Part Number | Description | Part Number | Description | Part Number | Description |
| | 1/2 | 740222C | R8200S-HO | 740221C | L8200S-HO | - | Q8200S-HO |
| | 3/4 | 740324C | R8300S-HO | 740323C | L8300S-HO | 740325C | Q8300S-HO |
| | 1 | 740321C | R8400S-HO | 740320C | L8400S-HO | 740322C | Q8400S-HO |
| | 1-1/4 | 740388C | R8500S-HO | 740387C | L8500S-HO | 740389C | Q8500S-HO |
| | 1-1/2 | 740282C | R8600S-HO | 740281C | L8600S-HO | 740283C | Q8600S-HO |
| | 2 | 740272C | R8700S-HO | 740271C | L8700S-HO | 740273C | Q8700S-HO |
| | | 740314C | R8800S-HO | 740313C | L8800S-HO | 740315C | Q8800S-HO |
| | 2-1/2 | 740267C | R8800S-HO | 740266C | L8800S-HO | 740268C | Q8800S-HO |
| | | 740286C | R8900S-HO | 740285C | L8900S-HO | 740287C | Q8900S-HO |

Mono Flow



Dual Flow



| 8000 SERIES ROTARY UNIONS • STEAM & HOT OIL • MONO FLOW (in.) | | | | | | | | | |
|---|-----------------------|---------------|--------|--------|---------|--------------------|---------|---------|-------|
| DIMENSIONS | Nominal Pipe Size (A) | Inlet B (NPT) | F | E | G | Overall Length (C) | W | Z | O |
| | 1/2 | 1/2 | 2-1/2 | 2-1/8 | 2 | 6-1/4 | 4-7/16 | 1-5/8 | 15/32 |
| | | Quick Release | | | | | | | |
| | 3/4 | 3/4 | 2-1/2 | 2-3/16 | 2-3/8 | 6-3/8 | 4-11/16 | 1-13/16 | 15/32 |
| | | Quick Release | | | | | | | |
| | 1 | 1 | 2-3/4 | 2-5/16 | 2-5/8 | 7-1/8 | 4-7/8 | 1-7/8 | 15/32 |
| | | Quick Release | | | | | | | |
| | 1-1/4 | 1-1/4 | 3-3/16 | 2-1/2 | 3 | 8-1/8 | 5-5/8 | 2-1/8 | 5/8 |
| | | Quick Release | | | | | | | |
| | 1-1/2 | 1-1/2 | 3-3/4 | 2-1/2 | 3-1/2 | 8-13/16 | 6 | 2-7/8 | 5/8 |
| Quick Release | | | | | | | | | |
| 2 | 2 | 4 | 2-9/16 | 4 | 9-1/2 | 6-9/16 | 3-1/8 | 5/8 | |
| | Quick Release | | | | | | | | |
| 2-1/2 | 2 | 5-3/16 | 3-3/16 | 4-7/16 | 10-7/8 | 8 | 3-9/16 | 11/16 | |
| | Quick Release | | | | | | | | |
| 3 | 2-1/2 | 5-3/4 | 3-5/8 | 4-9/16 | 12-3/16 | 8-1/2 | 3-31/32 | 7/8 | |
| | Quick Release | | | | | | | | |
| 4 | 4 | 8-1/8 | 5-7/16 | 6-5/16 | 16-7/8 | 13-1/2 | 5-1/8 | 1-3/32 | |
| | Quick Release | | | | | | | | |

| 8000 SERIES ROTARY UNIONS • STEAM & HOT OIL • DUAL FLOW (in.) | | | | | | | | | | | | | |
|---|-----------------------|---------------|----------------|---------------------|----------|--------|--------|--------|---------|---------|---------|--------|--------|
| DIMENSIONS | Nominal Pipe Size (A) | Inlet B (NPT) | Outlet J (NPT) | Siphon Tap K (NPSM) | C | F | E | G | S | W | Z | O | H |
| | 1/2 | 1/2 | 1/2 | 1/8 | 7-1/2 | 2-1/2 | 2-1/8 | 2 | 6-1/16 | 4-7/16 | 1-5/8 | 15/32 | 2-1/4 |
| | 3/4 | 3/4 | 1/2 | 1/4 | 7-11/16 | 2-1/2 | 2-3/16 | 2-3/8 | 6-1/4 | 4-11/16 | 1-13/16 | 15/32 | 2-5/16 |
| | 1 | 1 | 1/2 | 3/8 | 8-3/4 | 2-3/4 | 2-5/16 | 2-5/8 | 6-15/16 | 4-7/8 | 1-7/8 | 15/32 | 2-5/8 |
| | | | 1/2 | 1/4 | | | | | | | | | |
| | 1-1/4 | 1-1/4 | 1/2 | 1/2 | 9-1/4 | 3-3/16 | 2-1/2 | 3 | 7-7/8 | 5-5/8 | 2-1/8 | 5/8 | 3-1/8 |
| | 1-1/2 | 1-1/2 | 3/4 | 3/4 | 10-3/8 | 3-3/4 | 2-1/2 | 3-1/2 | 8-5/8 | 6 | 2-7/8 | 5/8 | 3-9/16 |
| | 2 | 2 | 1 | 3/4 | 11-11/16 | 4 | 2-9/16 | 4 | 9-1/2 | 6-9/16 | 3-1/8 | 5/8 | 4 |
| | 2-1/2 | 2 | 1-1/4 | 3/4 | 14-1/8 | 5-3/16 | 3-3/16 | 4-7/16 | 11-1/4 | 8 | 3-9/16 | 11/16 | 5-1/16 |
| | | | | 1 | | | | | | | | | |
| 1-1/4 | | | | | | | | | | | | | |
| 3 | 2-1/2 | 1-1/4 | 1 | 17 | 5-3/4 | 3-5/8 | 4-9/16 | 12-1/2 | 8-1/2 | 3-31/32 | 7/8 | 5-9/16 | |
| | | 1-1/4 | 1-1/4 | | | | | | | | | | |
| | | 1-1/2 | 1-1/2 | | | | | | | | | | |
| 4 | 4 | 2-1/2 | 2 | 24-1/4 | 8-1/8 | 5-7/16 | 6-5/16 | 18-1/8 | 13-1/2 | 5-1/8 | 1-3/32 | 7-3/4 | |



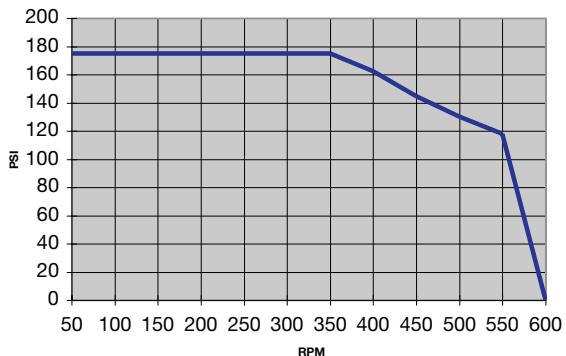
| 8000 SERIES ROTARY UNIONS • 1/2" to 1 1/4" REPAIR PARTS • STEAM ONLY | | | | | | | | | | |
|--|-----------------------------|-------------------|-------------------|-------------------------------------|-----------------------|----------------|---------------------|-------------------------|--------------------|---------------------------------------|
| REPAIR PARTS | Nominal Pipe Size | Mono Flow Housing | Dual Flow Housing | Rotating Siphon Housing Part Number | LH Shaft (NPT) | RH Shaft (NPT) | Quick Release Shaft | Graphite Bearing | 8000 Series Spring | 8000 Series Hot Oil Heavy Duty Spring |
| | 1/2 | 487240C | 487242C | Contact factory | 471050C | 471051C | 471818C | 484247C | 484246C | 487912C |
| | 3/4 | 487248C | 487252C | Contact factory | 481759C | 481760C | 471894C | 484005C | 484039C | 487909C |
| | 1 | 487153C | 487148C | 441147C | 441878C | 441879C | 471094C | 484007C | 484026C | 487872C |
| | 1-1/4 | 487214C | 487217C | Contact factory | 481753C | 481754C | 471095C | 484009C | 484033C | 487911C |
| | Rotating Siphon Models Only | | | | | | | | | |
| Nominal Pipe Size | Graphite Seal Ring | Housing Gasket | Housing Seal Nut | Lock Washer | Socket Head Cap Screw | Outlet Elbow | Siphon Packing Nut | Siphon Packing Ring Set | | |
| 1/2 | 484245C | 484361C | 487239C | 484037C | 854295C | 487234C | 482039C* | 482745C* | | |
| 3/4 | 484004C | 484038C | 487304C | 484037C | 854295C | 487235C | 482038C | 481473C | | |
| 1 | 484006C | 484025C | 487159C | 484023C | 854295C | 487160C | 482040C | 481475C | | |
| 1-1/4 | 484008C | 484032C | 487213C | 484031C | 854295C | 487212C | 482041C | 471476C | | |

| 8000 SERIES ROTARY UNIONS • 1 1/2" to 4" REPAIR PARTS • STEAM ONLY | | | | | | | | | | |
|--|--------------------|-------------------|-------------------|-------------------------------------|-----------------------------------|--|-----------------------------------|------------------------------------|--------------------|---------------------------------------|
| REPAIR PARTS | Nominal Pipe Size | Mono Flow Housing | Dual Flow Housing | Rotating Siphon Housing Part Number | LH Shaft (NPT) | RH Shaft (NPT) | Quick Release Shaft | Graphite Bearing | 8000 Series Spring | 8000 Series Hot Oil Heavy Duty Spring |
| | 1-1/2 | Contact Factory | Contact Factory | N/A | 481756C | 481757C | 471096C | 484011C | 484034C | 487910C |
| | 2 | Contact Factory | Contact Factory | | 471055C | 471056C | 471097C | 484301C | 484300C | 487903C |
| | 2-1/2 | Contact Factory | Contact Factory | | 471777C | 471776C | 471775C | 485416C | 485415C | 463306C |
| | 3 | Contact Factory | Contact Factory | | 471796C | 471795C | 471797C | 485467C | 485466C | 487305C |
| | 4 | Contact Factory | Contact Factory | | 471838C | 471837C | 471836C | 485594C | 485595C | 463025C |
| Nominal Pipe Size | Graphite Seal Ring | Housing Gasket | Housing Flange | Housing Cap Screw | Housing Plug for Mono Flow Models | Outlet Elbow for Dual Flow Models Only | Siphon Packing Nut for RSP Models | Siphon Packing Ring for RSP Models | | |
| 1-1/2 | 484010C | 463514C | 463513C | 855366C | N/A | 487171C | 482042C | 481477C | | |
| 2 | 484249C | 487927C | 487926C | 855236C | N/A | 487155C | 482042C | 481477C | | |
| 2-1/2 | 485420C | 485421C | 487208C | 485545C | Contact Factory | 487209C | N/A | N/A | | |
| 3 | 485470C | 485471C | 487236C | 485545C | Contact Factory | 487303C | N/A | N/A | | |
| 4 | 485596C | 485593C | 487238C | 485605C | Contact Factory | 487329C | N/A | N/A | | |

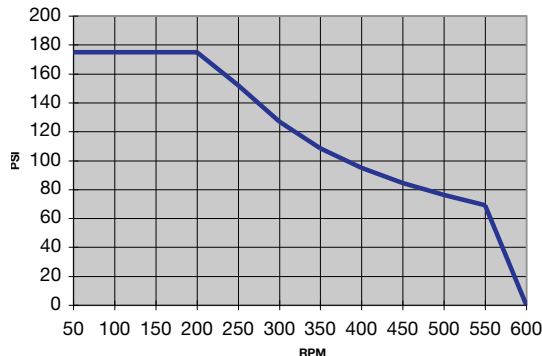
Performance Charts

8000 Series (with saturated steam)

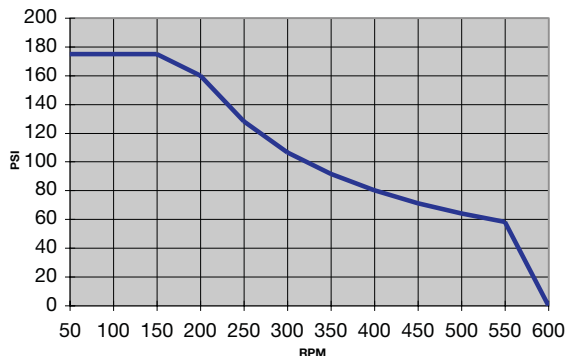
1/2"



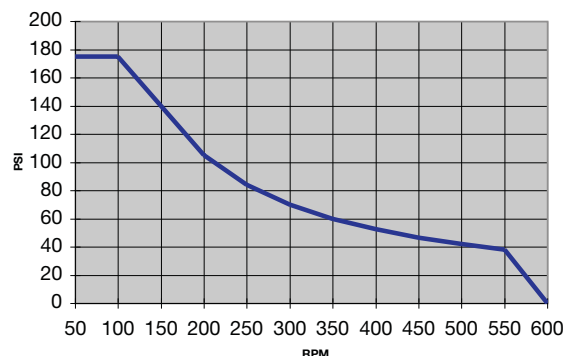
3/4" & 1"



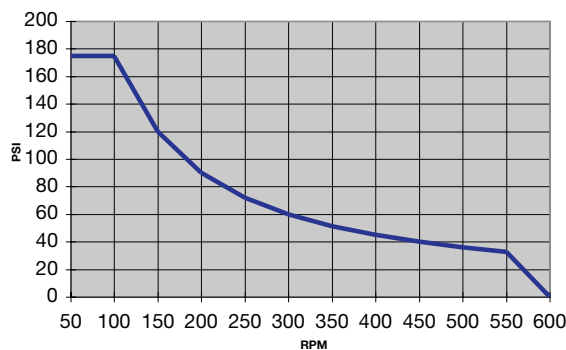
1 1/4"



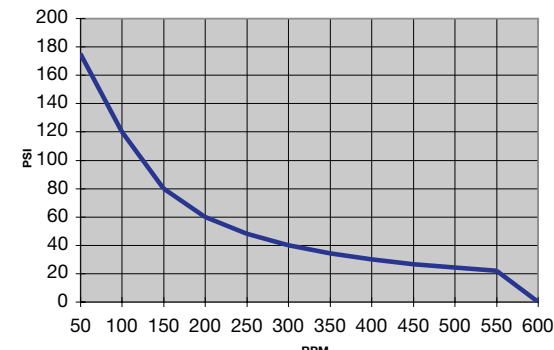
1 1/2"



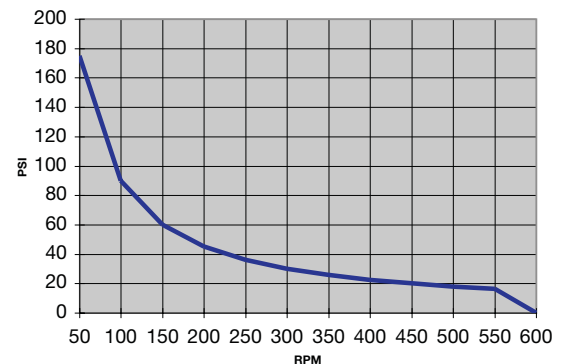
2"



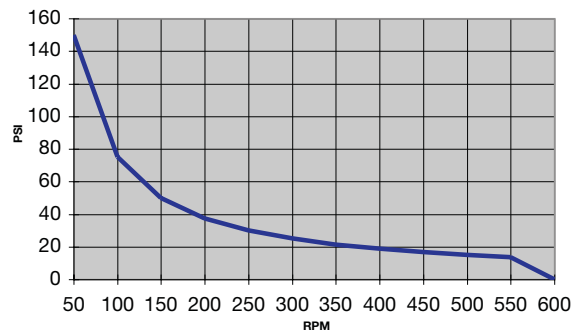
2 1/2"



3"

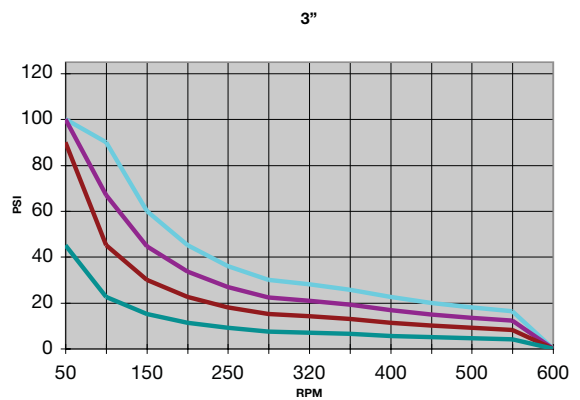
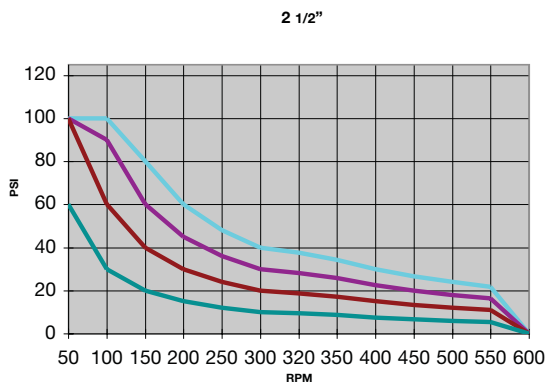
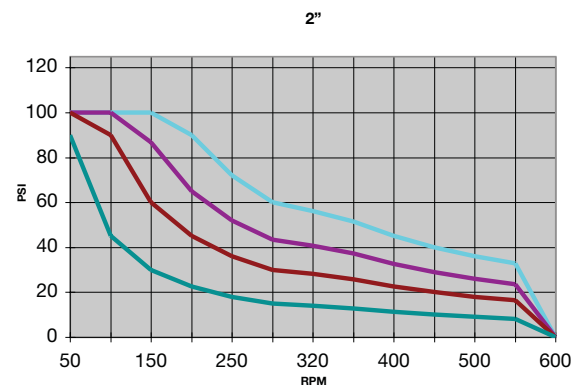
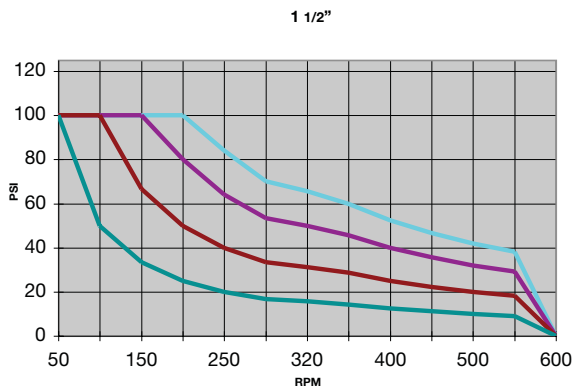
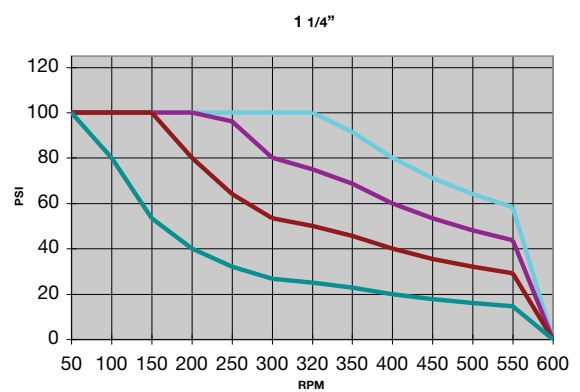
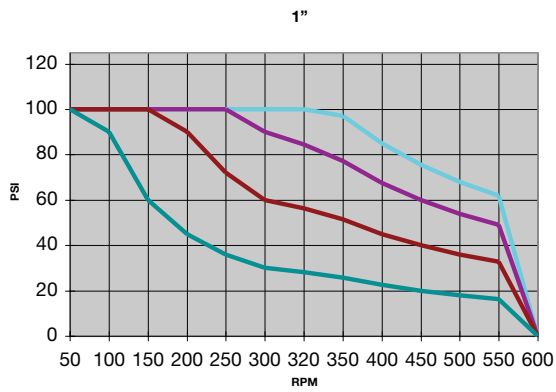
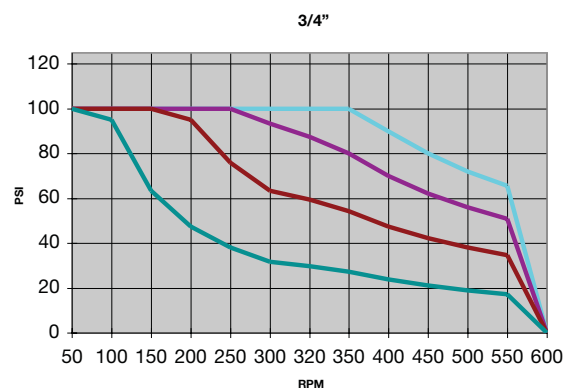
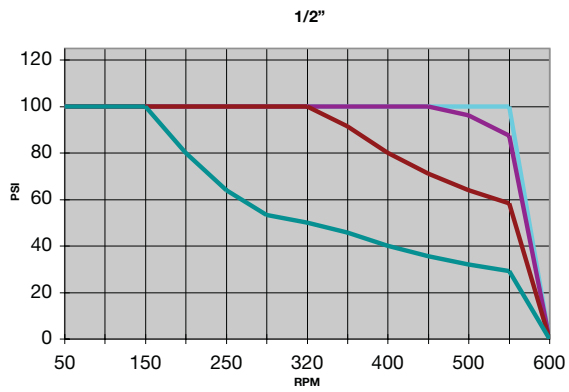


4"



Performance Charts

8000HO Series (Hot Oil)



■ 600°
 ■ 550°
 ■ 500°
 ■ 450°

9000G SERIES

WATER, STEAM & HOT OIL

HIGH TEMPERATURE



Operating Parameters

MEDIA

Steam, Hot Oil, Water

PRESSURE*

250 PSI (Water), 175 PSI (Steam),
100 PSI (Hot Oil)

TEMPERATURE*

600° F (Hot Oil), 378° F (Steam)

SPEED*

700 RPM

THREADS

- 1/4" to 3" NPT
- BSP Threads Available
- Flanged

MATERIAL

- Cast Iron Housing with Stainless Steel or Plated Sleeve
- Steel Shaft

CONFIGURATION OPTIONS

Mono Flow & Dual Flow Configurations Available

* See Performance Charts For Details

Features & Benefits

Superior Sealing Performance

Bellows Sealing System provides superior sealing performance throughout the wear life of the Rotary Union.

Designed For Dirty Media Applications

Debris in contaminated media will not be captured in the Bellows Sealing System, which reduces clogging.

Maintenance Free

The 9000G is maintenance free because there is no rolling element bearing, therefore no lubrication is required.

High Temperature Applications

Offers the same design as the standard 9000 Series, but utilizes carbon graphite bearings for high temperature applications.

Ideal For High Temperatures

The thrust collar allows for thermal expansion, making this an ideal union for high temperature, general purpose applications.

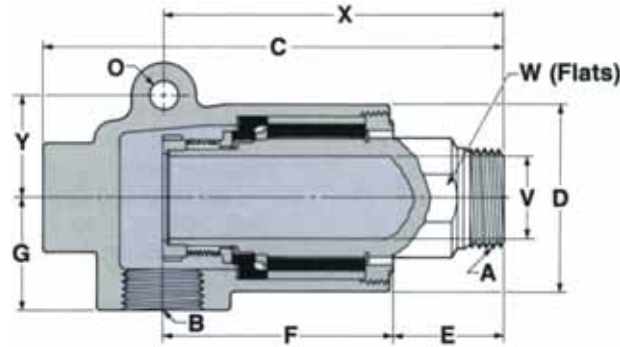
Flanged Mounted Units Available

Consult Factory.

| 9000G SERIES HIGH TEMPERATURE ROTARY UNIONS • MONO FLOW | | | | | | | | |
|---|-------------------|------------------|-------------------|-------------|------------------|------------------|-------------|------------------|
| PART NUMBERS | Nominal Pipe Size | Shaft Thread (A) | Right Hand Thread | | | Left Hand Thread | | |
| | | | Part Number | Description | Repair Cartridge | Part Number | Description | Repair Cartridge |
| | 1/4 | 1/4 | 480630C | R050P | 481323C | 480629C | L050P | 481322C |
| | 3/8 | 3/8 | 480632C | R150P | 481325C | 480631C | L150P | 481324C |
| | 1/2 | 1/2 | 480198C | R250P | 481204C | 480197C | L250P | 481203C |
| | 3/4 | 3/4 | 480247C | R350P | 481208C | 480246C | L350P | 481207C |
| | 1 | 1 | 430111C | R450P-8 | 471882C | 430110C | L450P-8 | 471881C |
| | 1-1/4 | 1-1/4 | 440581C | R9550P | 471665C | 440580C | L9550P | 471664C |
| | 1-1/2 | 1-1/2 | 440165C | R9650P | 471575C | 440164C | L9650P | 471576C |
| | 2 | 2 | 440469C | R9750P | 471716C | 440468C | L9750P | 471715C |
| 2-1/2 | 2-1/2 | 440577C | R9850P | 471718C | 440576C | L9850P | 471717C | |
| 3 | 3 | 440505C | R9950P | 471720C | 440504C | L9950P | 471719C | |

| 9000G SERIES HIGH TEMPERATURE ROTARY UNIONS • DUAL FLOW | | | | | | | | |
|---|-------------------|------------------|-------------------|-------------|------------------|------------------|-------------|------------------|
| PART NUMBERS | Nominal Pipe Size | Shaft Thread (A) | Right Hand Thread | | | Left Hand Thread | | |
| | | | Part Number | Description | Repair Cartridge | Part Number | Description | Repair Cartridge |
| | 1/2 | 1/2 | 480204C | R250S | 481204C | 480203C | L250S | 481203C |
| | 3/4 | 3/4 | 480253C | R350S | 481208C | 480252C | L350S | 481207C |
| | 1 | 1 | 430113C | R450S-8 | 471882C | 430112C | L450S-8 | 471881C |
| | 1-1/4 | 1-1/4 | 440583C | R9550S | 471665C | 440582C | L9550S | 471664C |
| | 1-1/2 | 1-1/2 | 440167C | R9650S | 471575C | 440166C | L9650S | 471576C |
| | 2 | 2 | 440471C | R9750S | 471716C | 440470C | L9750S | 471715C |
| | 2-1/2 | 2-1/2 | 440579C | R9850S | 471718C | 440578C | L9850S | 471717C |
| | 3 | 3 | 440507C | R9950S | 471720C | 440506C | L9950S | 471719C |

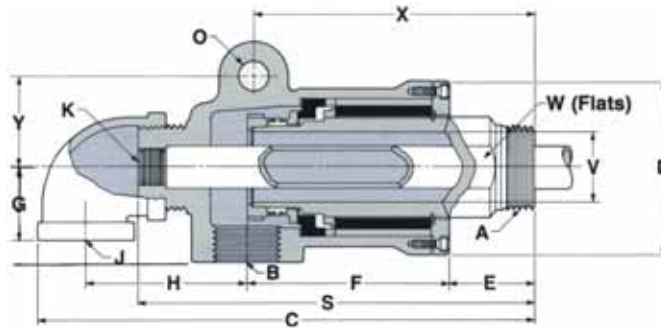
Mono Flow



9000G SERIES HIGH TEMPERATURE ROTARY UNIONS • MONO FLOW (in.)

| Nominal Pipe Size | Shaft Thread (A) | Right Hand Thread | | Left Hand Thread | | Inlet Thread (B) | C | D | E | F | G | O | V | W | X | Y | | |
|-------------------|------------------|-------------------|-------------|------------------|-------------|------------------|---------|-------|---------|-------|--------|---------|--------|-----|-------|---------|-------------|------------------|
| | | Part Number | Description | Repair Cartridge | Part Number | | | | | | | | | | | | Description | Repair Cartridge |
| 1/4 | 1/4 | 480630C | R050P | 481323C | 480629C | L050P | 481322C | 1/4 | 4-3/8 | 1-3/4 | 1-1/8 | 2-9/16 | 1-1/16 | — | 1/4 | 5/8 | — | — |
| 3/8 | 3/8 | 480632C | R150P | 481325C | 480631C | L150P | 481324C | 3/8 | 4-3/8 | 1-3/4 | 1-1/8 | 2-9/16 | 1-1/16 | — | 3/8 | 11/16 | — | — |
| 1/2 | 1/2 | 480198C | R250P | 481204C | 480197C | L250P | 481203C | 1/2 | 5 | 2-3/8 | 1-1/2 | 2-3/4 | 1-1/4 | — | 1/2 | 15/16 | — | — |
| 3/4 | 3/4 | 480247C | R350P | 481208C | 480246C | L350P | 481207C | 3/4 | 5-1/2 | 2-1/2 | 1-5/8 | 3 | 1-7/16 | — | 3/4 | 1-3/32 | — | — |
| 1 | 1 | 430111C | R450P-8 | 471882C | 430110C | L450P-8 | 471881C | 1 | 6-1/8 | 3 | 1-3/4 | 3-3/8 | 1-3/4 | — | 1 | 1-11/32 | — | — |
| 1-1/4 | 1-1/4 | 440581C | R9550P | 471665C | 440580C | L9550P | 471664C | 1-1/4 | 9-1/16 | 3-3/4 | 2-1/16 | 4-13/16 | 2-3/16 | 5/8 | 1-1/4 | 1-11/16 | 6-7/8 | 2 |
| 1-1/2 | 1-1/2 | 440165C | R9650P | 471575C | 440164C | L9650P | 471576C | 1-1/2 | 9-11/16 | 4-1/8 | 2-3/16 | 5-1/4 | 2-3/16 | 5/8 | 1-1/2 | 1-15/16 | 7-3/8 | 2-1/4 |
| 2 | 2 | 440469C | R9750P | 471716C | 440468C | L9750P | 471715C | 2 | 11-3/4 | 5-7/8 | 2-7/16 | 6-7/16 | 2-5/8 | 5/8 | 2 | 2-9/16 | 8-9/16 | 2-3/4 |
| 2-1/2 | 2-1/2 | 440577C | R9850P | 471718C | 440576C | L9850P | 471717C | 2-1/2 | 15-3/8 | 7-1/8 | 3-1/2 | 7-3/16 | 3-3/8 | — | 2-1/2 | 3 | — | — |
| 3 | 3 | 440505C | R9950P | 471720C | 440504C | L9950P | 471719C | 3 | 15-3/4 | 7-1/8 | 3-7/8 | 8-5/16 | 3-7/8 | — | 3 | 3-5/8 | — | — |

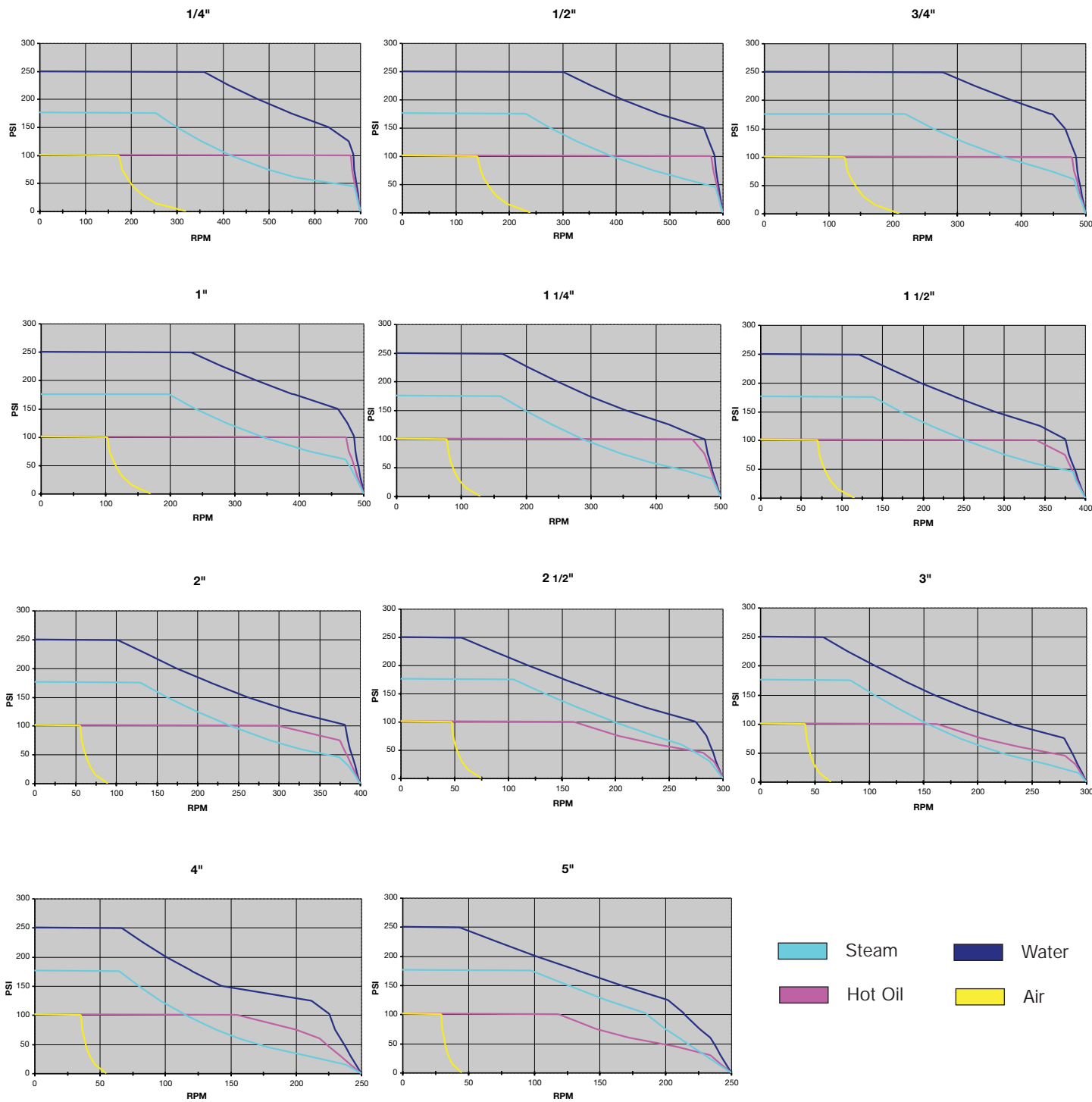
Dual Flow



9000G SERIES HIGH TEMPERATURE ROTARY UNIONS • DUAL FLOW (in.)

| Nominal Pipe Size | Shaft Thread (A) | Inlet (B) | Outlet (J) | Siphon K (NPSM) | C | D | E | F | G | H | O | S | V | W | X | Y |
|-------------------|------------------|-----------|------------|-----------------|--------|-------|--------|---------|--------|--------|-----|--------|-------|---------|--------|-------|
| | | | | | | | | | | | | | | | | |
| 3/4 | 3/4 | 3/4 | 1/2 | 1/4 | 7-3/4 | 2-1/2 | 1-5/8 | 3 | 1-7/16 | 2-3/8 | — | 6-3/8 | 3/4 | 1-3/32 | — | — |
| 1 | 1 | 1 | 1/2 | 3/8 | 8-1/2 | 3 | 1-3/4 | 3-3/8 | 1-3/4 | 2-5/8 | — | 7-1/8 | 1 | 1-11/32 | — | — |
| 1-1/4 | 1-1/4 | 1-1/4 | 1/2 | 1/2 | 10-5/8 | 3-3/4 | 2-1/8 | 4-13/16 | 2 | 3 | 5/8 | 8-7/8 | 1-1/4 | 1-11/16 | 6-7/8 | 2 |
| 1-1/2 | 1-1/2 | 1-1/2 | 3/4 | 3/4 | 11-3/8 | 4-1/8 | 2-3/16 | 5-1/4 | 2-3/16 | 3-1/4 | 5/8 | 9-9/16 | 1-1/2 | 1-15/16 | 7-3/8 | 2-1/4 |
| 2 | 2 | 2 | 1 | 3/4 | 13-7/8 | 5 | 2-7/16 | 6-1/2 | 2-5/8 | 4-1/16 | 5/8 | 11-1/2 | 2 | 2-9/16 | 8-9/16 | 2-3/4 |
| 2-1/2 | 2-1/2 | 2 | 1-1/4 | 1 | 16-7/8 | 6-1/2 | 3-1/2 | 7-1/4 | 3-3/8 | 5 | — | 14 | 2-1/2 | 3 | — | — |
| 3 | 3 | 2-1/2 | 1-1/4 | 1-1/4 | 18-3/4 | 7-1/8 | 3-1/2 | 8-5/16 | 3-7/8 | 5-1/2 | — | 15-5/8 | 3 | 3-5/8 | — | — |

Performance Charts



■ Steam ■ Water
■ Hot Oil ■ Air

HPMC • HSMC

SERIES

MULTI-PORT ROTARY UNIONS



Operating Parameters

MEDIA

Water, Air, Hydraulic Fluid

PRESSURE*

170 PSI (HSMC), 5,880 PSI (HPMC)

TEMPERATURE*

248° F (HSMC & HPMC)

SPEED*

3,000 RPM (HSMC), 180 RPM (HPMC)

THREADS

3/8" to 3/4" NPT or BSP

MATERIAL

Nickel Plated Steel

STANDARD NUMBER OF PORTS

2 to 8

* See Performance
Charts For Details

Features & Benefits

High Pressure Or High Speed Applications

Duff-Norton multi-port Rotary Unions are available in both high pressure (HPMC Series) and high speed (HSMC Series) configurations.

Pressures Up To 5,880 psi

HPMC Series Rotary Unions are designed for higher pressure, available with up to eight ports as standard and are suitable for use in low speed applications for pressures up to 5,880 psi.

Available Up To 4 Ports

HSMC Series Rotary Unions are available with up to four ports as standard.

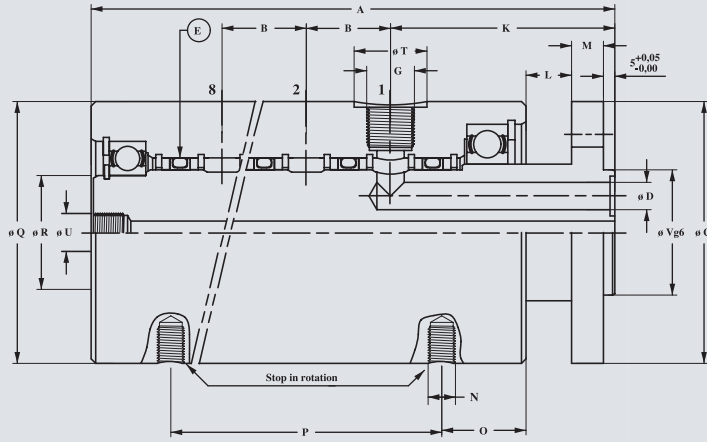
Speeds Up To 3,000 RPM

HSMC Series is perfect for low pressure applications, up to 175 psi with rotational speeds up to 3,000 rpm.

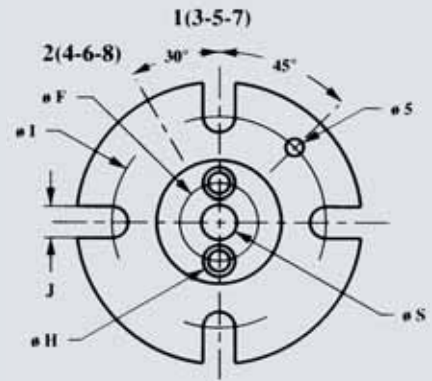
No Cross Contamination

Feel free to run dissimilar fluids through Duff-Norton Multi-Port Rotary Unions as each port is always individually sealed eliminating cross contamination between circuits.

HPMC Series



HPMC End

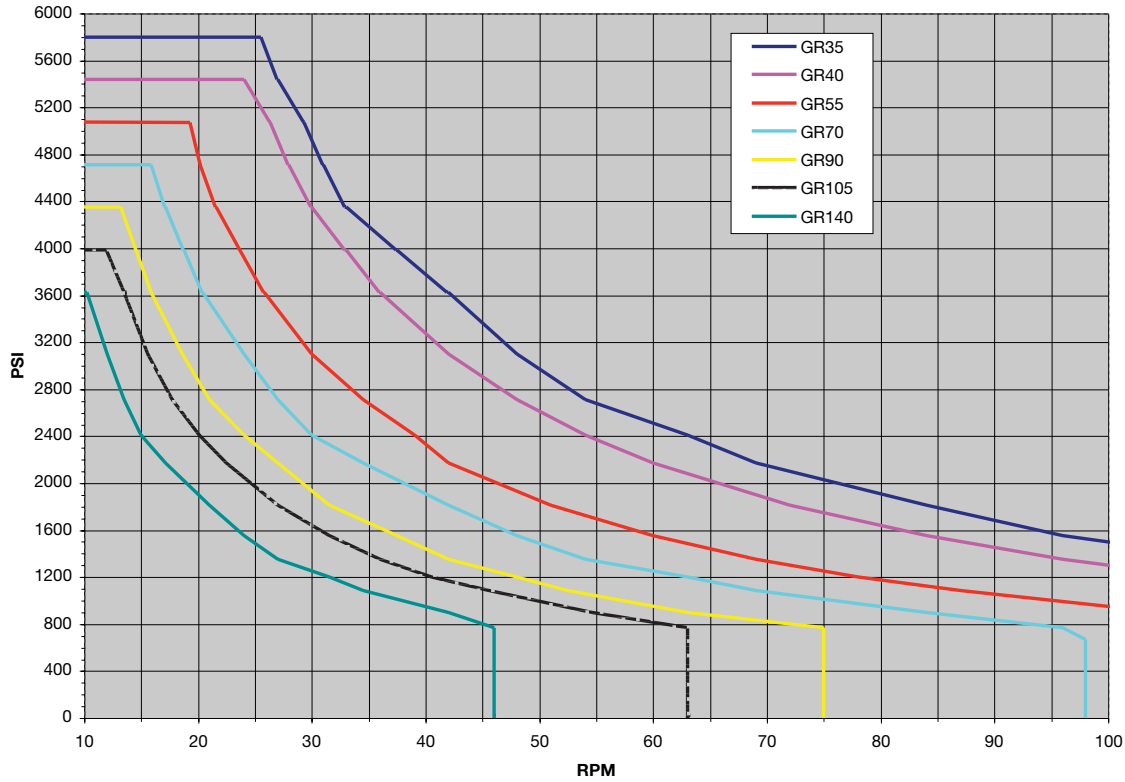


HPMC MULTI-PORT ROTARY UNIONS (in.)

| Number of Ports | Part Number | Description | A | B | C | D | E & Vg6 | F | G (NPT) | H | Ref. O-ring | I | J | K | L | M | N | O | P | Q | R | S | T | U |
|-----------------|-------------|--------------|-------|------|------|------|---------|------|---------|------|-------------|------|------|------|------|------|-----|------|-------|------|------|------|------|------|
| 2 | 750748C | RMC206R2KNPT | 5.89 | 1.04 | 3.15 | 0.24 | 1.38 | 0.87 | 1/8" | 0.35 | 06X01.5 | 2.36 | 0.35 | 3.05 | 0.59 | 0.39 | M8 | 1.26 | 2.26 | 3.15 | 1.18 | 0.39 | 0.71 | 3/8" |
| 3 | 750749C | RMC306R2KNPT | 6.93 | 1.04 | 3.15 | 0.24 | 1.38 | 0.87 | 1/8" | 0.35 | 06X01.5 | 2.36 | 0.35 | 3.05 | 0.59 | 0.39 | M8 | 1.26 | 3.31 | 3.15 | 1.18 | 0.39 | 0.71 | 3/8" |
| 4 | 750750C | RMC406R2KNPT | 7.97 | 1.04 | 3.15 | 0.24 | 1.38 | 0.87 | 1/8" | 0.35 | 06X01.5 | 2.36 | 0.35 | 3.05 | 0.59 | 0.39 | M8 | 1.26 | 4.35 | 3.15 | 1.18 | 0.39 | 0.71 | 3/8" |
| 5 | 750751C | RMC506R2KNPT | 9.02 | 1.04 | 3.15 | 0.24 | 1.38 | 0.87 | 1/8" | 0.35 | 06X01.5 | 2.36 | 0.35 | 3.05 | 0.59 | 0.39 | M8 | 1.26 | 5.39 | 3.15 | 1.18 | 0.39 | 0.71 | 3/8" |
| 6 | 750752C | RMC606R2KNPT | 10.06 | 1.04 | 3.15 | 0.24 | 1.38 | 0.87 | 1/8" | 0.35 | 06X01.5 | 2.36 | 0.35 | 3.05 | 0.59 | 0.39 | M8 | 1.26 | 6.44 | 3.15 | 1.18 | 0.39 | 0.71 | 3/8" |
| 7 | 750753C | RMC706R2KNPT | 12.32 | 1.14 | 3.94 | 0.24 | 1.57 | 1.06 | 1/8" | 0.35 | 06X01.5 | 2.83 | 0.43 | 3.50 | 0.79 | 0.47 | M8 | 1.26 | 8.43 | 3.54 | 1.38 | 0.47 | 0.71 | 1/2" |
| 8 | 750754C | RMC806R2KNPT | 13.46 | 1.14 | 3.94 | 0.24 | 1.57 | 1.06 | 1/8" | 0.35 | 06X01.5 | 2.83 | 0.43 | 3.50 | 0.79 | 0.47 | M8 | 1.26 | 9.57 | 3.54 | 1.38 | 0.47 | 0.71 | 1/2" |
| 2 | 750755C | RMC208R2KNPT | 6.77 | 1.22 | 3.94 | 0.31 | 1.57 | 0.94 | 1/4" | 0.47 | R6A | 2.83 | 0.43 | 3.54 | 0.79 | 0.47 | M10 | 1.26 | 2.87 | 3.54 | 1.38 | 0.31 | 0.87 | 1/4" |
| 3 | 750756C | RMC308R2KNPT | 7.99 | 1.22 | 3.94 | 0.31 | 1.57 | 0.94 | 1/4" | 0.47 | R6A | 2.83 | 0.43 | 3.54 | 0.79 | 0.47 | M10 | 1.26 | 4.09 | 3.54 | 1.38 | 0.31 | 0.87 | 1/4" |
| 4 | 750757C | RMC408R2KNPT | 9.21 | 1.22 | 3.94 | 0.31 | 1.57 | 0.94 | 1/4" | 0.47 | R6A | 2.83 | 0.43 | 3.54 | 0.79 | 0.47 | M10 | 1.26 | 5.31 | 3.54 | 1.38 | 0.31 | 0.87 | 1/4" |
| 5 | 750758C | RMC508R2KNPT | 10.43 | 1.22 | 3.94 | 0.31 | 1.57 | 1.02 | 1/4" | 0.47 | R6A | 2.83 | 0.43 | 3.54 | 0.79 | 0.47 | M10 | 1.26 | 6.54 | 3.54 | 1.38 | 0.39 | 0.87 | 3/8" |
| 6 | 750759C | RMC608R2KNPT | 12.48 | 1.30 | 4.53 | 0.31 | 2.17 | 1.48 | 1/4" | 0.47 | R6A | 3.39 | 0.43 | 3.80 | 0.79 | 0.55 | M10 | 1.46 | 8.11 | 4.53 | 1.97 | 0.47 | 0.87 | 1/2" |
| 7 | 750760C | RMC708R2KNPT | 13.78 | 1.30 | 4.53 | 0.31 | 2.17 | 1.48 | 1/4" | 0.47 | R6A | 3.39 | 0.43 | 3.80 | 0.79 | 0.55 | M10 | 1.46 | 9.41 | 4.53 | 1.97 | 0.47 | 0.87 | 1/2" |
| 8 | 750761C | RMC808R2KNPT | 15.08 | 1.30 | 4.53 | 0.31 | 2.17 | 1.48 | 1/4" | 0.47 | R6A | 3.39 | 0.43 | 3.80 | 0.79 | 0.55 | M10 | 1.46 | 10.71 | 4.53 | 1.97 | 0.47 | 0.87 | 1/2" |
| 2 | 750762C | RMC210R2KNPT | 6.93 | 1.30 | 3.94 | 0.39 | 1.57 | 0.94 | 3/8" | 0.49 | 010X01.3 | 2.83 | 0.43 | 3.58 | 0.79 | 0.47 | M10 | 1.26 | 3.03 | 3.54 | 1.38 | 0.31 | 0.98 | 1/4" |
| 3 | 750763C | RMC310R2KNPT | 8.23 | 1.30 | 3.94 | 0.39 | 1.57 | 0.94 | 3/8" | 0.49 | 010X01.3 | 2.83 | 0.43 | 3.58 | 0.79 | 0.47 | M10 | 1.26 | 4.33 | 3.54 | 1.38 | 0.31 | 0.98 | 1/4" |
| 4 | 750764C | RMC410R2KNPT | 9.53 | 1.30 | 3.94 | 0.39 | 1.57 | 0.94 | 3/8" | 0.49 | 010X01.3 | 2.83 | 0.43 | 3.58 | 0.79 | 0.47 | M10 | 1.26 | 5.63 | 3.54 | 1.38 | 0.31 | 0.98 | 1/4" |
| 5 | 750765C | RMC510R2KNPT | 11.57 | 1.38 | 4.53 | 0.39 | 2.17 | 1.34 | 3/8" | 0.49 | 010X01.3 | 3.39 | 0.43 | 3.84 | 0.79 | 0.55 | M10 | 1.46 | 7.20 | 4.53 | 1.97 | 0.47 | 0.98 | 1/2" |
| 6 | 750766C | RMC610R2KNPT | 12.95 | 1.38 | 4.53 | 0.39 | 2.17 | 1.34 | 3/8" | 0.49 | 010X01.3 | 3.39 | 0.43 | 3.84 | 0.79 | 0.55 | M10 | 1.46 | 8.58 | 4.53 | 1.97 | 0.47 | 0.98 | 1/2" |
| 7 | 750767C | RMC710R2KNPT | 14.33 | 1.38 | 4.53 | 0.39 | 2.17 | 1.34 | 3/8" | 0.49 | 010X01.3 | 3.39 | 0.43 | 3.84 | 0.79 | 0.55 | M10 | 1.46 | 9.96 | 4.53 | 1.97 | 0.47 | 0.98 | 1/2" |
| 8 | 750768C | RMC810R2KNPT | 16.26 | 1.38 | 5.51 | 0.39 | 2.76 | 1.85 | 3/8" | 0.49 | 010X01.3 | 4.25 | 0.51 | 4.27 | 0.98 | 0.59 | M12 | 1.57 | 11.42 | 5.31 | 2.56 | 0.71 | 0.98 | 3/4" |
| 2 | 750769C | RMC212R2KNPT | 7.60 | 1.46 | 4.53 | 0.47 | 2.17 | 1.26 | 1/2" | 0.69 | R10 | 3.39 | 0.43 | 3.88 | 0.79 | 0.55 | M12 | 1.46 | 3.23 | 4.53 | 1.97 | 0.39 | 1.26 | 3/8" |
| 3 | 750770C | RMC312R2KNPT | 9.06 | 1.46 | 4.53 | 0.47 | 2.17 | 1.26 | 1/2" | 0.69 | R10 | 3.39 | 0.43 | 3.88 | 0.79 | 0.55 | M12 | 1.46 | 4.69 | 4.53 | 1.97 | 0.39 | 1.26 | 3/8" |
| 4 | 750771C | RMC412R2KNPT | 10.51 | 1.46 | 4.53 | 0.47 | 2.17 | 1.26 | 1/2" | 0.69 | R10 | 3.39 | 0.43 | 3.88 | 0.79 | 0.55 | M12 | 1.46 | 6.14 | 4.53 | 1.97 | 0.39 | 1.26 | 3/8" |
| 5 | 750772C | RMC512R2KNPT | 12.52 | 1.46 | 5.51 | 0.47 | 2.76 | 1.65 | 1/2" | 0.69 | R10 | 4.25 | 0.51 | 4.31 | 0.98 | 0.59 | M12 | 1.57 | 7.72 | 5.31 | 2.56 | 0.47 | 1.26 | 3/4" |
| 6 | 750773C | RMC612R2KNPT | 15.20 | 1.54 | 6.69 | 0.47 | 3.54 | 2.13 | 1/2" | 0.69 | R10 | 5.20 | 0.67 | 4.80 | 1.18 | 0.63 | M12 | 1.77 | 9.72 | 6.30 | 3.35 | 0.71 | 1.26 | 3/4" |
| 7 | 750774C | RMC712R2KNPT | 16.73 | 1.54 | 6.69 | 0.47 | 3.54 | 2.13 | 1/2" | 0.69 | R10 | 5.20 | 0.67 | 4.80 | 1.18 | 0.63 | M12 | 1.77 | 11.26 | 6.30 | 3.35 | 0.71 | 1.26 | 3/4" |
| 8 | 750775C | RMC812R2KNPT | 18.27 | 1.54 | 6.69 | 0.47 | 3.54 | 2.13 | 1/2" | 0.69 | R10 | 5.20 | 0.67 | 4.80 | 1.18 | 0.63 | M12 | 1.77 | 12.80 | 6.30 | 3.35 | 0.71 | 1.26 | 3/4" |
| 2 | 750776C | RMC218R2KNPT | 8.66 | 1.69 | 5.51 | 0.71 | 2.76 | 1.50 | 3/4" | 0.94 | R14 | 4.25 | 0.51 | 4.43 | 0.98 | 0.59 | M12 | 1.57 | 3.86 | 5.31 | 2.56 | 0.39 | 1.46 | 3/8" |
| 3 | 750777C | RMC318R2KNPT | 10.35 | 1.69 | 5.51 | 0.71 | 2.76 | 1.50 | 3/4" | 0.94 | R14 | 4.25 | 0.51 | 4.43 | 0.98 | 0.59 | M12 | 1.57 | 5.55 | 5.31 | 2.56 | 0.39 | 1.46 | 3/8" |
| 4 | 750778C | RMC418R2KNPT | 12.05 | 1.69 | 5.51 | 0.71 | 2.76 | 1.50 | 3/4" | 0.94 | R14 | 4.25 | 0.51 | 4.43 | 0.98 | 0.59 | M12 | 1.57 | 7.24 | 5.31 | 2.56 | 0.39 | 1.46 | 3/8" |
| 5 | 750779C | RMC518R2KNPT | 14.84 | 1.77 | 6.69 | 0.71 | 3.54 | 2.20 | 3/4" | 0.94 | R14 | 5.20 | 0.67 | 4.92 | 1.18 | 0.63 | M12 | 1.77 | 9.37 | 6.30 | 3.35 | 0.71 | 1.46 | 3/4" |
| 2 | 750780C | RMC225R2KNPT | 10.08 | 2.05 | 6.69 | 0.98 | 3.54 | 1.97 | 1" | 1.26 | R19 | 5.20 | 0.67 | 5.06 | 1.18 | 0.63 | M14 | 1.77 | 4.61 | 6.30 | 3.35 | 0.47 | 1.69 | 1/2" |
| 3 | 750781C | RMC325R2KNPT | 12.13 | 2.05 | 6.69 | 0.98 | 3.54 | 1.97 | 1" | 1.26 | R19 | 5.20 | 0.67 | 5.06 | 1.18 | 0.63 | M14 | 1.77 | 6.65 | 6.30 | 3.35 | 0.47 | 1.69 | 1/2" |
| 4 | 750782C | RMC425R2KNPT | 14.17 | 2.05 | 6.69 | 0.98 | 3.54 | 1.97 | 1" | 1.26 | R19 | 5.20 | 0.67 | 5.06 | 1.18 | 0.63 | M14 | 1.77 | 8.70 | 6.30 | 3.35 | 0.47 | 1.69 | 1/2" |
| 5 | 750783C | RMC525R2KNPT | 17.32 | 2.17 | 7.48 | 0.98 | 4.13 | 2.72 | 1" | 1.26 | R19 | 5.91 | 0.67 | 5.41 | 1.18 | 0.63 | M14 | 2.05 | 11.38 | 7.48 | 3.94 | 0.71 | 1.69 | 3/4" |
| 2 | 750784C | RMC231R2KNPT | 11.30 | 2.40 | 7.48 | 1.22 | 4.13 | 2.24 | 1-1/4" | 1.44 | R22 | 5.91 | 0.67 | 5.53 | 1.18 | 0.63 | M14 | 2.05 | 5.35 | 7.48 | 3.94 | 0.47 | 2.17 | 1/2" |
| 3 | 750785C | RMC331R2KNPT | 13.70 | 2.40 | 7.48 | 1.22 | 4.13 | 2.24 | 1-1/4" | 1.44 | R22 | 5.91 | 0.67 | 5.53 | 1.18 | 0.63 | M14 | 2.05 | 7.76 | 7.48 | 3.94 | 0.47 | 2.17 | 1/2" |
| 4 | 750786C | RMC431R2KNPT | 16.10 | 2.40 | 7.48 | 1.22 | 4.13 | 2.24 | 1-1/4" | 1.44 | R22 | 5.91 | 0.67 | 5.53 | 1.18 | 0.63 | M14 | 2.05 | 10.16 | 7.48 | 3.94 | 0.47 | 2.17 | 1/2" |
| 5 | 750787C | RMC531R2KNPT | 20.87 | 2.64 | 9.06 | 1.22 | 5.51 | 3.43 | 1-1/4" | 1.44 | R22 | 7.24 | 0.67 | 6.28 | 1.18 | 0.79 | M16 | 2.44 | 13.90 | 9.06 | 5.12 | 0.71 | 2.17 | 3/4" |

Performance Charts

HPMC SERIES



| GR seals are used in these High Pressure Multi-Circuit Models | | | | | | |
|---|----------|----------|----------|----------|----------|----------|
| GR35 | GR40 | GR55 | GR70 | GR90 | GR105 | GR140 |
| MC206R2K | MC706R2K | MC608R2K | MC810R2K | MC612R2K | MC525R2K | MC531R2K |
| MC306R2K | MC806R2K | MC708R2K | MC512R2K | MC712R2K | MC231R2K | |
| MC406R2K | MC208R2K | MC808R2K | MC218R2K | MC812R2K | MC331R2K | |
| MC506R2K | MC308R2K | MC510R2K | MC318R2K | MC518R2K | MC431R2K | |
| MC606R2K | MC408R2K | MC610R2K | MC418R2K | MC618R2K | | |
| | MC508R2K | MC710R2K | | MC225R2K | | |
| | MC210R2K | MC212R2K | | MC325R2K | | |
| | MC310R2K | MC312R2K | | MC425R2K | | |
| | MC410R2K | MC412R2K | | | | |

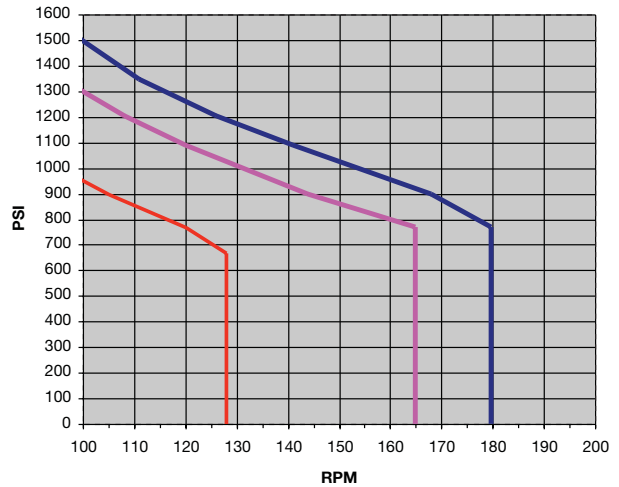
Performance charts are for oil, grease or similar lubricating media. For media such as water or air, reduce the maximum recommended speed as follows:

For Water: Multiply speed by 0.67

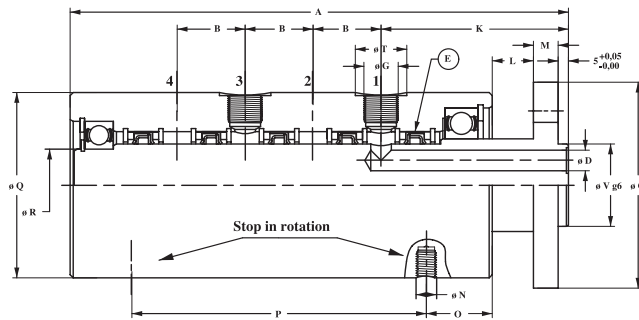
For Air: Multiply speed by 0.33

Where maximum recommended speeds are found on the horizontal axis.

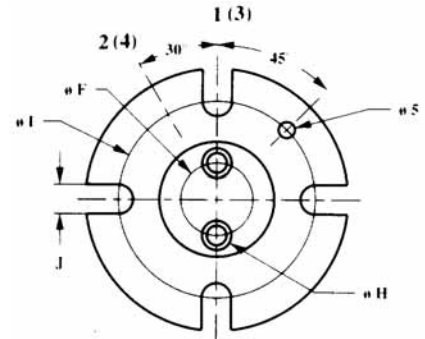
HPMC SERIES OVER 100 RPM



HSMC Series



HSMC End

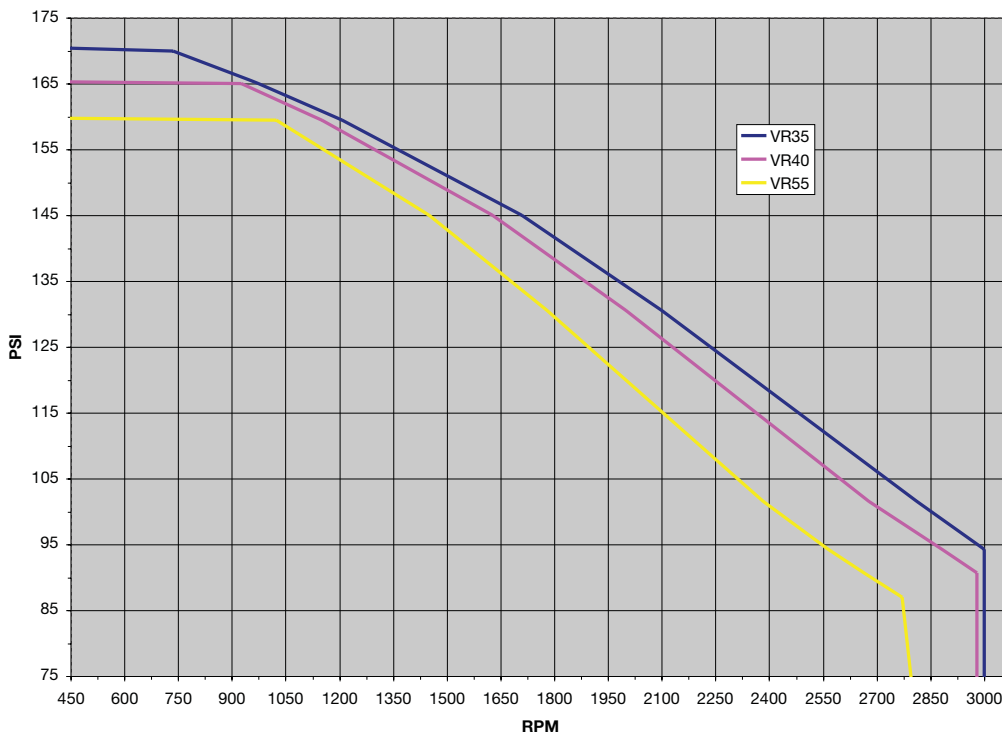


HSMC MULTI-PORT ROTARY UNIONS (in.)

| Number of Ports | Part Number | Description | A | B | C | D | V | F | G (NPT) | H | Ref. O-ring | I | J | K | L | M | N | O | P | Q | R | T |
|-----------------|-------------|---------------|------|------|------|------|------|------|---------|------|-------------|------|------|------|------|------|-----|------|------|------|------|------|
| 2 | 750889C | RMC206RVRKNPT | 5.89 | 1.04 | 3.15 | 0.24 | 1.38 | 0.87 | 1/8" | 0.35 | 06X01.5 | 2.36 | 0.35 | 3.05 | 0.59 | 0.39 | M8 | 1.26 | 2.26 | 3.15 | 1.18 | 0.71 |
| 3 | 750809C | RMC306RVRKNPT | 6.93 | 1.04 | 3.15 | 0.24 | 1.38 | 0.87 | 1/8" | 0.35 | 06X01.5 | 2.36 | 0.35 | 3.05 | 0.59 | 0.39 | M8 | 1.26 | 3.31 | 3.15 | 1.18 | 0.71 |
| 4 | 750810C | RMC406RVRKNPT | 7.97 | 1.04 | 3.15 | 0.24 | 1.38 | 0.87 | 1/8" | 0.35 | 06X01.5 | 2.36 | 0.35 | 3.05 | 0.59 | 0.39 | M8 | 1.26 | 4.35 | 3.15 | 1.18 | 0.71 |
| 2 | 750811C | RMC208RVRKNPT | 6.77 | 1.22 | 3.94 | 0.31 | 1.57 | 0.94 | 1/4" | 0.47 | R6A | 2.83 | 0.43 | 3.54 | 0.79 | 0.47 | M10 | 1.26 | 2.87 | 3.54 | 1.38 | 0.87 |
| 3 | 750812C | RMC308RVRKNPT | 7.99 | 1.22 | 3.94 | 0.31 | 1.57 | 0.94 | 1/4" | 0.47 | R6A | 2.83 | 0.43 | 3.54 | 0.79 | 0.47 | M10 | 1.26 | 4.09 | 3.54 | 1.38 | 0.87 |
| 4 | 750813C | RMC408RVRKNPT | 9.21 | 1.22 | 3.94 | 0.31 | 1.57 | 0.94 | 1/4" | 0.47 | R6A | 2.83 | 0.43 | 3.54 | 0.79 | 0.47 | M10 | 1.26 | 5.31 | 3.54 | 1.38 | 0.87 |
| 2 | 750814C | RMC210RVRKNPT | 6.93 | 1.30 | 3.94 | 0.39 | 1.57 | 0.94 | 3/8" | 0.49 | 010X01.3 | 2.83 | 0.43 | 3.58 | 0.79 | 0.47 | M10 | 1.26 | 3.03 | 3.54 | 1.38 | 0.98 |
| 3 | 750815C | RMC310RVRKNPT | 8.23 | 1.30 | 3.94 | 0.39 | 1.57 | 0.94 | 3/8" | 0.49 | 010X01.3 | 2.83 | 0.43 | 3.58 | 0.79 | 0.47 | M10 | 1.26 | 4.33 | 3.54 | 1.38 | 0.98 |
| 4 | 750816C | RMC410RVRKNPT | 9.53 | 1.30 | 3.94 | 0.39 | 1.57 | 0.94 | 3/8" | 0.49 | 010X01.3 | 2.83 | 0.43 | 3.58 | 0.79 | 0.47 | M10 | 1.26 | 5.63 | 3.54 | 1.38 | 0.98 |

Performance Charts

HSMC SERIES



| VR seals are used in these High Speed Multi-Circuit Models | | |
|--|-----------|-----------|
| GR35 | GR40 | GR55 |
| MC206R VR | MC208R VR | MC212R VR |
| MC306R VR | MC308R VR | MC312R VR |
| MC406R VR | MC408R VR | MC412R VR |
| | MC210R VR | |
| | MC310R VR | |
| | MC410R VR | |

Performance chart is for lubricated air, dry air, liquid and oils.

Maximum recommended speeds are found on the horizontal axis.

1600 SERIES

TWO PORT ROTARY UNION



Operating Parameters

MEDIA

Water, Air, Hydraulic Fluid

PRESSURE*

2,900 PSI

TEMPERATURE*

250° F

SPEED*

1,500 RPM

THREADS

- 1/4" to 1" NPT
- BSP & BSPP Available

MATERIAL

Nickel Plated Steel

Also available in all stainless steel with a hardened ceramic shaft for higher speed and longer life.

STANDARD NUMBER OF PORTS

Two Port Design

* See Performance Charts For Details

Features & Benefits

Two Port Design

Features two ports for use in a wide variety of applications.

Corrosion Resistant

Nickel plated steel for corrosion resistance. Also available in all stainless steel and with a hardened ceramic shaft for higher speeds and longer life.

Medium Speed & Medium Pressure Capable

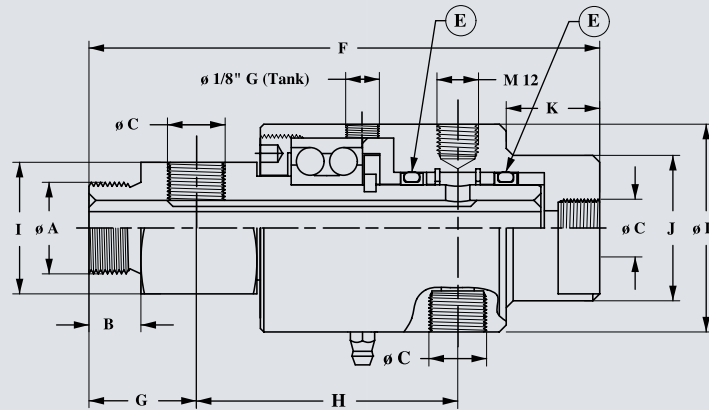
Offers the ability to use medium speed and pressure simultaneously.

No Cross Contamination

The 1600 Series can be used with two dissimilar fluids. All circuits are individually sealed eliminating cross contamination.

| 1600 SERIES TWO PORT ROTARY UNIONS | | | | | | | | | |
|------------------------------------|-------------------|---------------------|--------------|-------------------|--------------|------------------|---------------|-------------------|---------------|
| PART NUMBERS | Nominal Pipe Size | Nickel Plated Steel | | | | Hardened Shaft | | | |
| | | Left Hand Thread | | Right Hand Thread | | Left Hand Thread | | Right Hand Thread | |
| | | Part Number | Description | Part Number | Description | Part Number | Description | Part Number | Description |
| | 2 x 1/4 | 760607C | L16191/4KNPT | 760612C | R16191/4KNPT | 760617C | L16191/4KCNPT | 760622C | R16191/4KCNPT |
| | 2 x 3/8 | 760608C | L16833/8KNPT | 760613C | R16833/8KNPT | 760618C | L16833/8KCNPT | 760623C | R16833/8KCNPT |
| | 2 x 1/2 | 760609C | L16441/2KNPT | 760614C | R16441/2KNPT | 760619C | L16441/2KCNPT | 760624C | R16441/2KCNPT |
| | 2 x 3/4 | 760610C | L16443/4KNPT | 760615C | R16443/4KNPT | 760620C | L16443/4KCNPT | 760625C | R16443/4KCNPT |
| | 2 x 1 | 760611C | L17601KNPT | 760616C | R17601KNPT | 760621C | L17601KCNPT | 760626C | R17601KCNPT |

*2 seals per joint

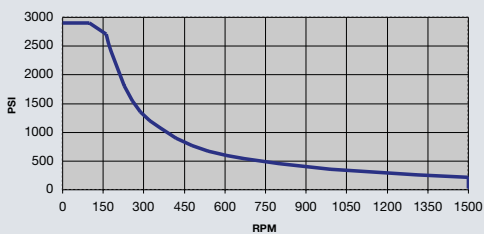


| 1600 SERIES TWO PORT ROTARY UNIONS (in.) | | | | | | | | | | | | | |
|--|-------------------|------------------|-----|----------------|------|------|------|------|------|------|------|-----------------------|-----|
| DIMENSIONS | Nominal Pipe Size | Shaft Thread (A) | B | Inlet Thread C | D | E* | F | G | H | I | J | Flats on (J) Diameter | K |
| | 2 x 1/4 | 1/2 | .50 | 1/4 | 1.96 | GR15 | 4.05 | .94 | 1.88 | 1.06 | 1.18 | .94 | .47 |
| | 2 x 3/8 | 3/4 | .59 | 3/8 | 2.36 | GR25 | 5.62 | 1.22 | 2.83 | 1.49 | 1.65 | 1.49 | .47 |
| | 2 x 1/2 | 1 | .78 | 1/2 | 3.14 | GR35 | 7.87 | 1.57 | 3.81 | 2.12 | 1.96 | 1.77 | .59 |
| | 2 x 3/4 | 1 | .78 | 3/4 | 3.14 | GR35 | 7.12 | 1.57 | 3.81 | 2.12 | 1.96 | 1.77 | .59 |
| 2 x 1 | 1-1/2 | .78 | 1 | 3.54 | GR50 | 9.72 | 2.04 | 5 | 3.54 | 2.36 | 1.96 | .70 | |

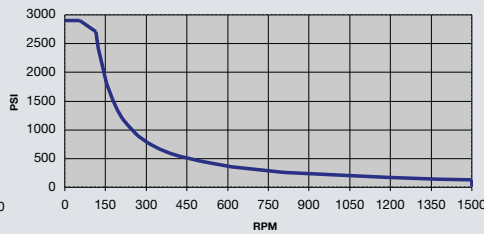
*2 seals per joint

Performance Charts

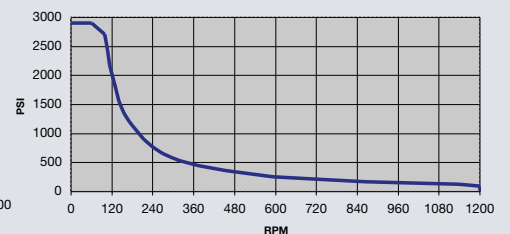
2 x 1/4"



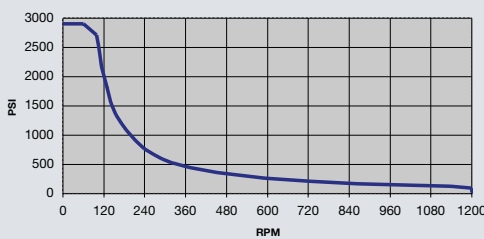
2 x 3/8"



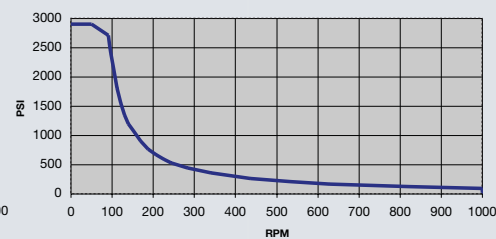
2 x 1/2"



2 x 3/4"



2 x 1"



Performance charts are for oil, grease or similar lubricating media. For media such as water or air, reduce the maximum recommended speed as follows:

For Water: Multiply speed by 0.67

For Air: Multiply speed by 0.33

Where maximum recommended speeds are found on the horizontal axis.

Standard Materials

1650 SERIES

TWO PORT ROTARY UNION



Operating Parameters

MEDIA

Water, Air, Hydraulic Fluid

PRESSURE*

2,900 PSI

TEMPERATURE*

250° F

SPEED*

1,500 RPM

THREADS

- 1/4" to 1" NPT
- BSP & BSPP Available

MATERIAL

Nickel Plated Steel

Also available in all stainless steel with a hardened ceramic shaft for higher speed and longer life.

STANDARD NUMBER OF PORTS

Two Port Design

* See Performance Charts For Details

Features & Benefits

Two Port Design

Features two circuits for use in a wide variety of applications.

Corrosion Resistant

Nickel plated steel for corrosion resistance. Also available in all stainless steel and with a hardened ceramic shaft for higher speeds and longer life.

Medium Speed & Medium Pressure Capable

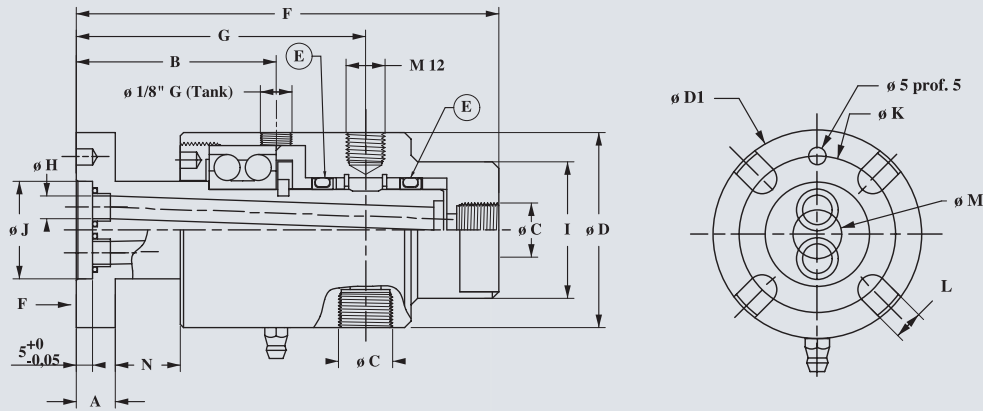
Offers the ability to use medium speed and pressure simultaneously.

No Cross Contamination

Can be used with two dissimilar fluids. All circuits are individually sealed to eliminate cross contamination.

| 1650 SERIES TWO PORT ROTARY UNIONS | | | | | | | | | |
|------------------------------------|-------------------|---------------------------|---------------|----------------|----------------|---------------------------|---------------|----------------|----------------|
| PART NUMBERS | Nominal Pipe Size | Nickel Plated Steel | | | | Stainless Steel | | | |
| | | Nickel Plated Steel Shaft | | Hardened Shaft | | Nickel Plated Steel Shaft | | Hardened Shaft | |
| | | Part Number | Description | Part Number | Description | Part Number | Description | Part Number | Description |
| | 1/4 | 760559C | F1619BKNPT | 760592C | F1619BKCNPPT | 760597C | F1619BINPT | 760602C | F1619BICNPT |
| | 3/8 | 760560C | F1683BKNPT | 760593C | F1683BKCNPPT | 760598C | F1683BINPT | 760603C | F1683BICNPT |
| | 1/2 | 760561C | F1644BK1/2NPT | 760594C | F1644BKC1/2NPT | 760599C | F1644BI1/2NPT | 760604C | F1644BIC1/2NPT |
| | 3/4 | 760562C | F1644BK3/4NPT | 760595C | F1644BKC3/4NPT | 760600C | F1644BI3/4NPT | 760605C | F1644BIC3/4NPT |
| | 1 | 760563C | F1760BKNPT | 760596C | F1760BKCNPPT | 760601C | F1760BINPT | 760606C | F1760BICNPT |

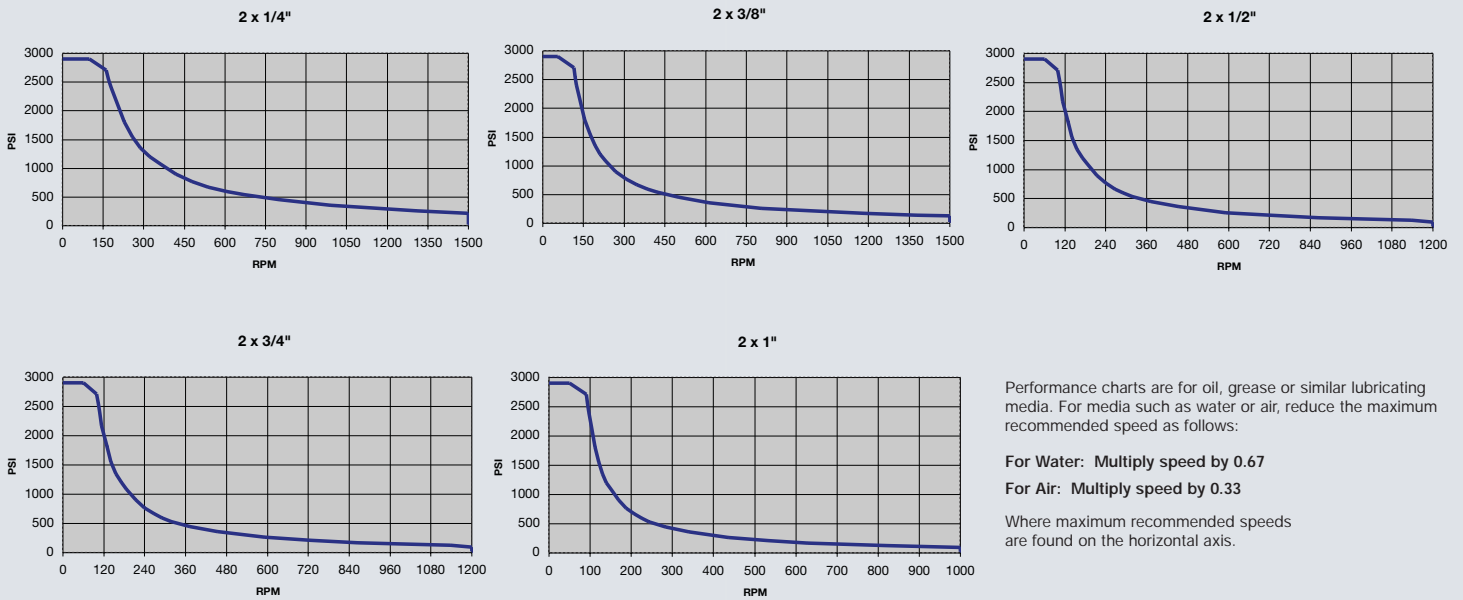
* 2 seals per joint



| 1650 SERIES TWO PORT ROTARY UNIONS (in.) | | | | | | | | | | | | | | | |
|--|-------------------|------|------|-------|------|------|------|------|------|------|-----------------------|------|------|------|-----|
| DIMENSIONS | Nominal Pipe Size | A | B | NPT C | D | E* | F | G | H | I | Flats on (I) Diameter | J | K | L | M |
| | 1/4 | .47 | 1.73 | 1/4 | 1.96 | GR15 | 3.85 | 2.55 | .11 | 1.18 | .94 | .78 | 1.37 | .33 | .39 |
| | 3/8 | .47 | 2.42 | 3/8 | 2.36 | GR25 | 5.11 | 3.5 | .27 | 1.65 | 1.49 | 1.18 | 1.77 | .33 | .55 |
| | 1/2 | .47 | 2.63 | 1/2 | 3.14 | GR35 | 6.49 | 3.85 | .47 | 1.96 | 1.77 | 1.77 | 2.55 | .33 | .82 |
| | 3/4 | .47 | 2.63 | 3/4 | 3.14 | GR35 | 5.70 | 3.85 | .47 | 1.96 | 1.77 | 1.77 | 2.55 | .33 | .82 |
| 1 | .59 | 3.79 | 1 | 3.54 | GR50 | 8.26 | 5.51 | .70 | 2.36 | 1.96 | 2.36 | 3.14 | .43 | 1.14 | |

* 2 seals per joint

Performance Charts



Performance charts are for oil, grease or similar lubricating media. For media such as water or air, reduce the maximum recommended speed as follows:

For Water: Multiply speed by 0.67

For Air: Multiply speed by 0.33

Where maximum recommended speeds are found on the horizontal axis.

Standard Materials

500 SERIES

AROUND THE SHAFT



Operating Parameters

| | |
|-----------------------------|--|
| MEDIA | PRESSURE* |
| Water, Air, Hydraulic Fluid | 5,800 PSI |
| TEMPERATURE* | SPEED* |
| 392° F | 3,000 RPM |
| THREADS | MATERIAL |
| 1/4" to 1/2" NPT or BSPP | Nickel Treated Carbon Steel Construction |

* See Performance Charts For Details

Features & Benefits

Shaft Mounted Design

Used in conjunction with the customer's shaft and retaining sleeve.

Two Configurations

High speed, low pressure applications, or high pressure, low speed applications.

High Pressure, Low Speed

High pressure, low speed models can be used at pressures to 5,800 psi and speeds less than 100 RPM.

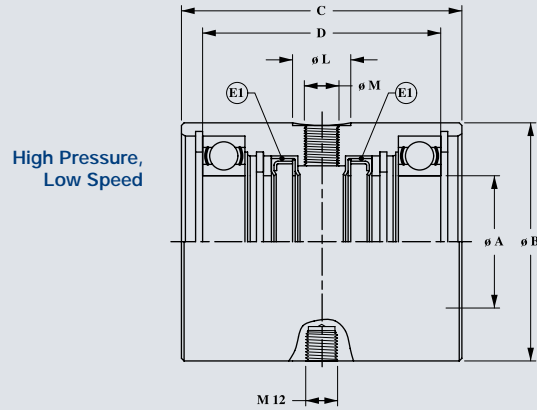
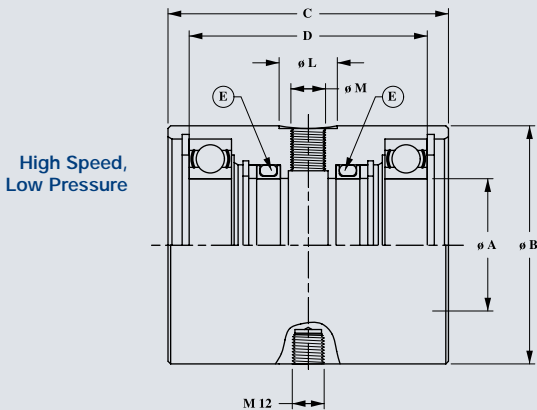
High Speed, Low Pressure

High speed, low pressure models can be used at speeds to 3,000 RPM, and pressures to 175 psi.

| 500 SERIES ROTARY UNIONS | | | | | | | | |
|--------------------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|--------------------------|-------------|
| Customer Shaft Size | Nickel Plated Steel | | | | Stainless Steel | | | |
| | High Pressure, Low Speed | | High Speed, Low Pressure | | High Pressure, Low Speed | | High Speed, Low Pressure | |
| | Part Number | Description | Part Number | Description | Part Number | Description | Part Number | Description |
| 20mm | 750905C | BAT20RK | 750935C | BAT20RKVR | 750920C | BAT20RI | 750950C | BAT20RIVR |
| 30mm | 750906C | BAT30RK | 750936C | BAT30RKVR | 750921C | BAT30RI | 750951C | BAT30RIVR |
| 40mm | 750907C | BAT40RK | 750937C | BAT40RKVR | 750922C | BAT40RI | 750952C | BAT40RIVR |
| 45mm | 750908C | BAT45RK | 750938C | BAT45RKVR | 750923C | BAT45RI | 750953C | BAT45RIVR |
| 50mm | 750909C | BAT50RK | 750939C | BAT50RKVR | 750924C | BAT50RI | 750954C | BAT50RIVR |
| 55mm | 750910C | BAT55RK | 750940C | BAT55RKVR | 750925C | BAT55RI | 750955C | BAT55RIVR |
| 60mm | 750911C | BAT60RK | 750941C | BAT60RKVR | 750926C | BAT60RI | 750956C | BAT60RIVR |
| 65mm | 750912C | BAT65RK | 750942C | BAT65RKVR | 750927C | BAT65RI | 750957C | BAT65RIVR |
| 70mm | 750913C | BAT70RK | 750943C | BAT70RKVR | 750928C | BAT70RI | 750958C | BAT70RIVR |
| 75mm | 750914C | BAT75RK | 750944C | BAT75RKVR | 750929C | BAT75RI | 750959C | BAT75RIVR |
| 80mm | 750915C | BAT80RK | 750945C | BAT80RKVR | 750930C | BAT80RI | 750960C | BAT80RIVR |
| 85mm | 750916C | BAT85RK | 750946C | BAT85RKVR | 750931C | BAT85RI | 750961C | BAT85RIVR |
| 90mm | 750917C | BAT90RK | 750947C | BAT90RKVR | 750932C | BAT90RI | 750962C | BAT90RIVR |
| 95mm | 750918C | BAT95RK | 750948C | BAT95RKVR | 750933C | BAT95RI | 750963C | BAT95RIVR |
| 100mm | 750919C | BAT100RK | 750949C | BAT100RKVR | 750934C | BAT100RI | 750964C | BAT100RIVR |

PART NUMBERS

*2 seals per joint



| 500 SERIES ROTARY UNION (in.) | | | | | | | | | |
|-------------------------------|------|------|------|------|-------|--------|------|-----|--|
| Customer Shaft Size | A | B | C | D | E* | E1* | L | M | |
| 20mm | 0.75 | 2.16 | 3.50 | 3.03 | GR20 | OAB20 | .86 | .25 | |
| 30mm | 1.18 | 2.55 | 3.58 | 3.03 | GR30 | OAB30 | .86 | .25 | |
| 40mm | 1.57 | 2.95 | 3.93 | 3.38 | GR40 | OAB40 | .86 | .25 | |
| 45mm | 1.77 | 3.34 | 4.09 | 3.54 | GR45 | OAB45 | .86 | .25 | |
| 50mm | 1.96 | 3.54 | 4.17 | 3.54 | GR50 | OAB50 | .86 | .25 | |
| 55mm | 2.16 | 3.93 | 4.68 | 4.05 | GR55 | OAB55 | 1.25 | .50 | |
| 60mm | 2.36 | 4.13 | 4.76 | 4.13 | GR60 | OAB60 | 1.25 | .50 | |
| 65mm | 2.55 | 4.33 | 4.84 | 4.21 | GR65 | OAB65 | 1.25 | .50 | |
| 70mm | 2.75 | 4.72 | 5.00 | 4.21 | GR70 | OAB70 | 1.25 | .50 | |
| 75mm | 2.95 | 4.92 | 5.27 | 4.48 | GR75 | OAB75 | 1.25 | .50 | |
| 80mm | 3.14 | 5.31 | 5.43 | 4.64 | GR80 | OAB80 | 1.25 | .50 | |
| 85mm | 3.34 | 5.51 | 5.51 | 4.72 | GR85 | OAB85 | 1.25 | .50 | |
| 90mm | 3.54 | 5.90 | 5.59 | 4.80 | GR90 | OAB90 | 1.25 | .50 | |
| 95mm | 3.74 | 6.10 | 5.78 | 5.00 | GR95 | OAB95 | 1.25 | .50 | |
| 100mm | 3.93 | 6.29 | 6.02 | 5.07 | GR100 | OAB100 | 1.25 | .50 | |

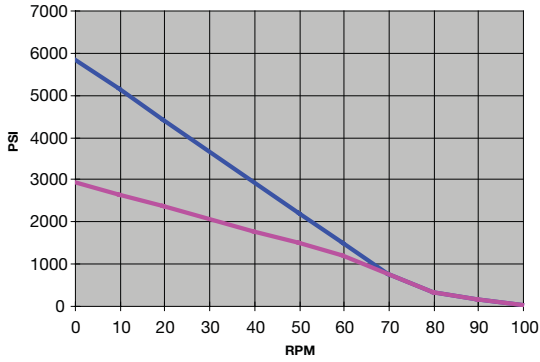
DIMENSIONS

*2 seals per joint

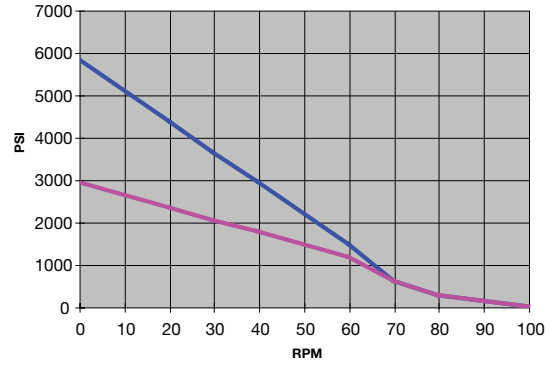
Performance Charts

500 Series - High Pressure

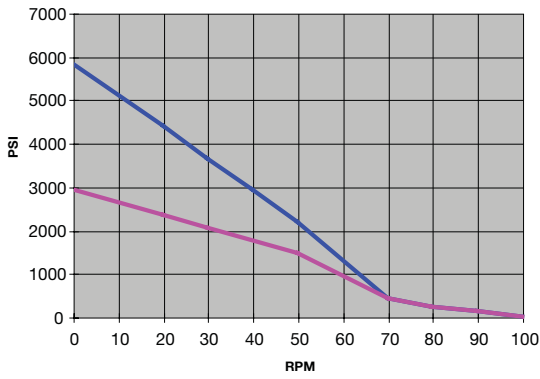
20mm



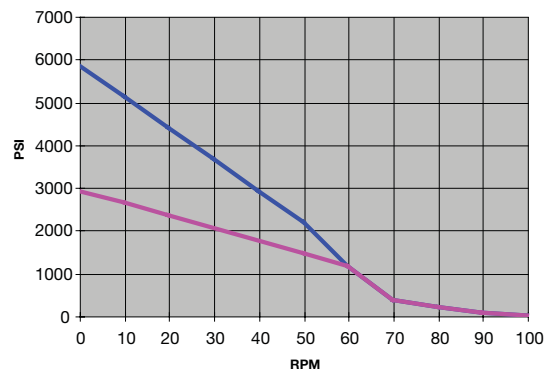
30mm



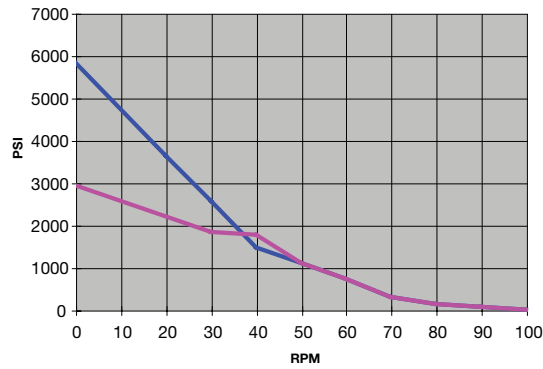
40mm



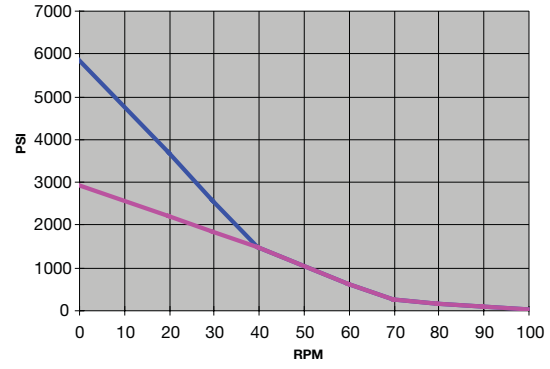
45mm



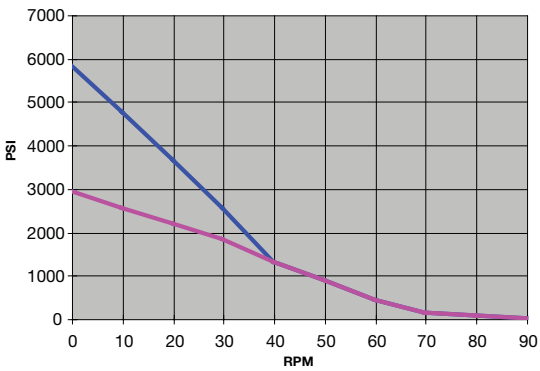
50mm



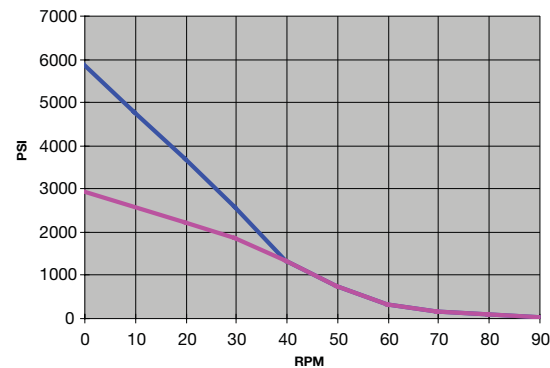
55mm



60mm



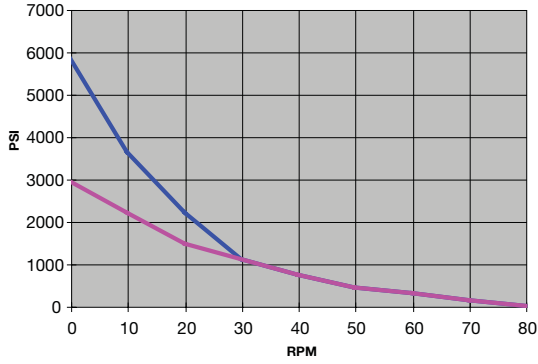
65mm



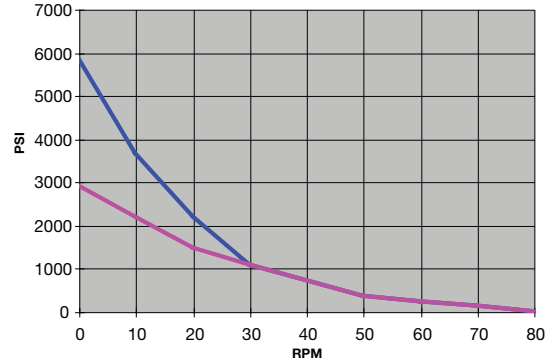
Performance Charts

500 Series - High Pressure

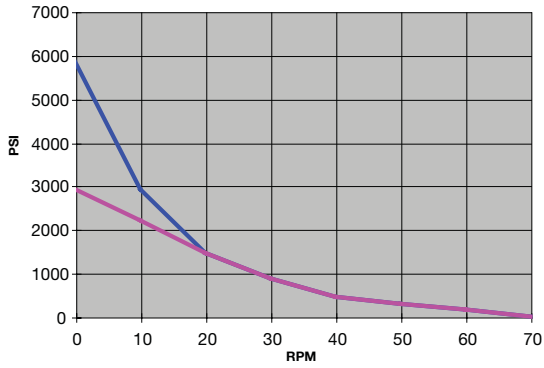
70mm



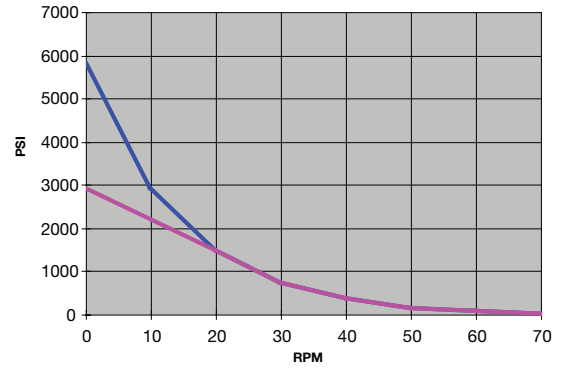
75mm



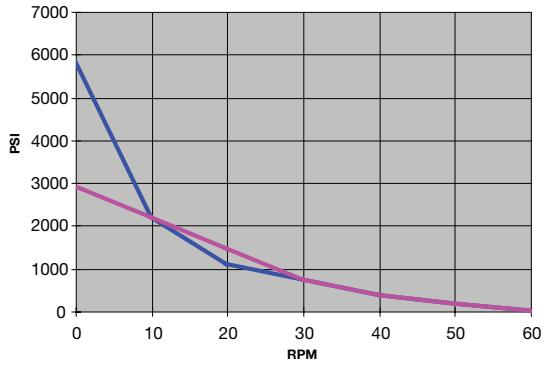
80mm



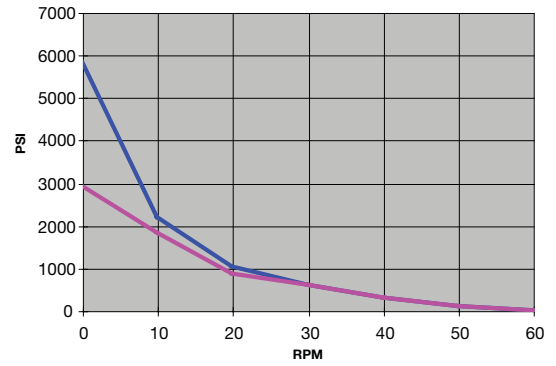
85mm



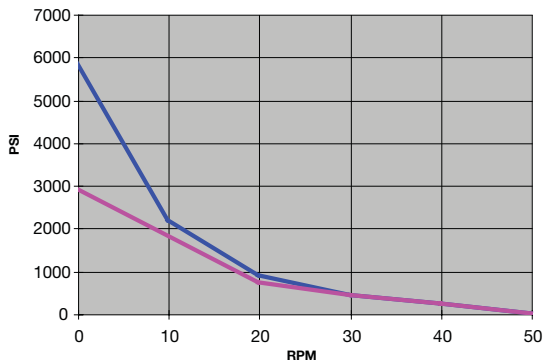
90mm



95mm



100mm

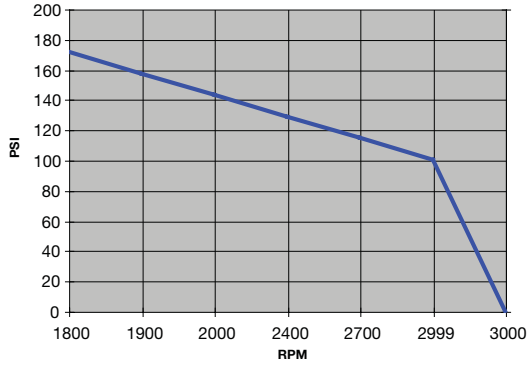


Standard Materials
 Stainless Steel

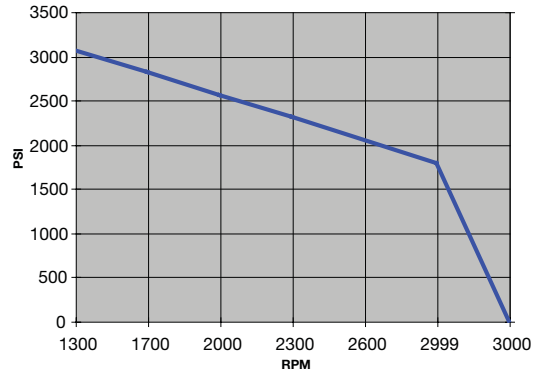
Performance Charts

500 Series - High Speed

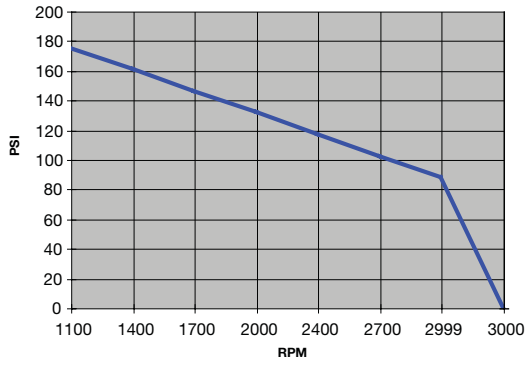
20mm



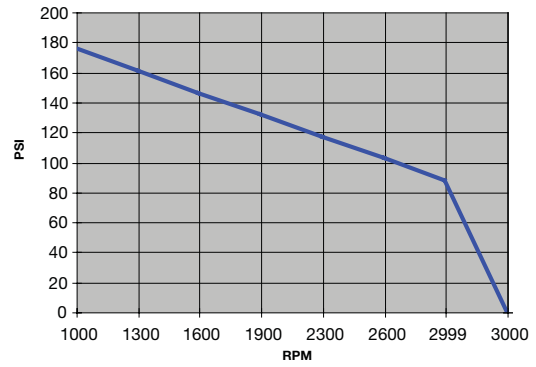
30mm



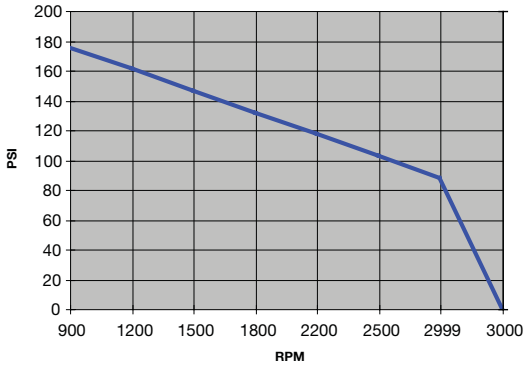
40mm



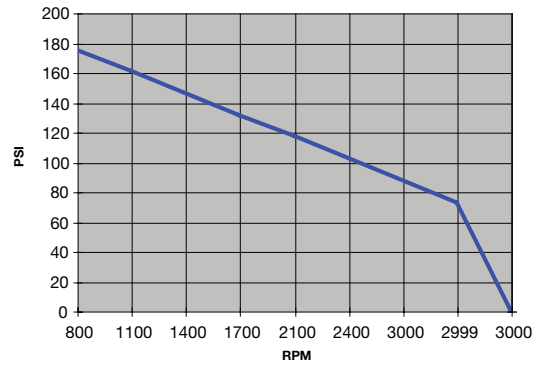
45mm



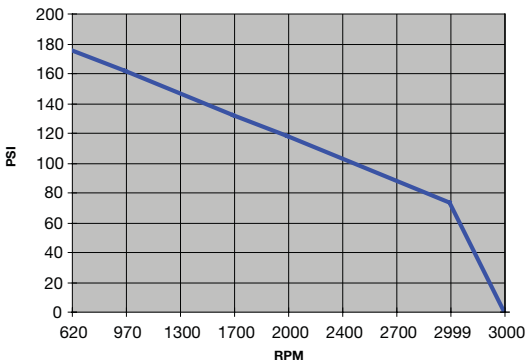
50mm



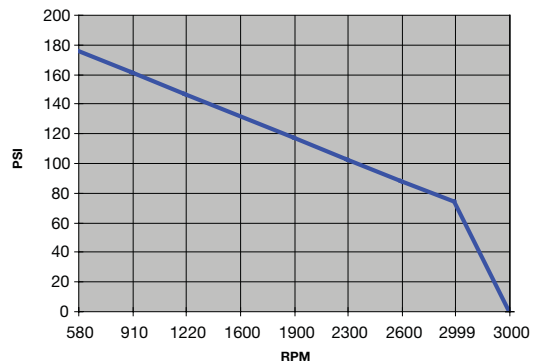
55mm



60mm



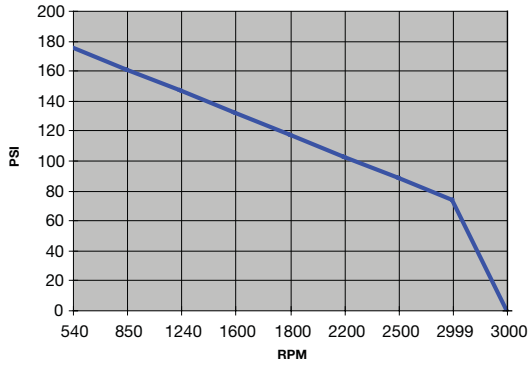
65mm



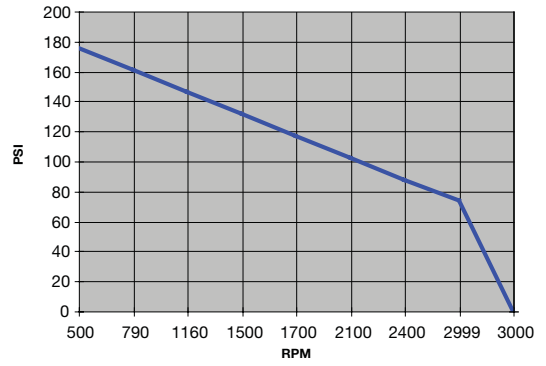
Performance Charts

500 Series - High Speed

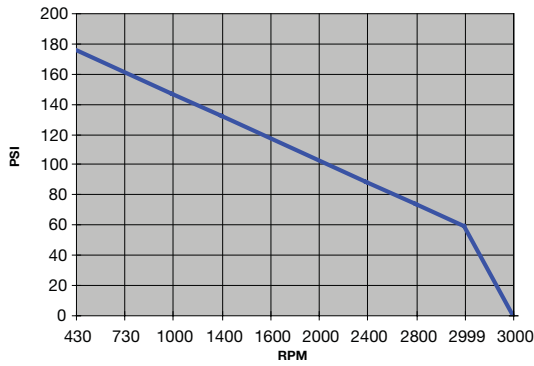
70mm



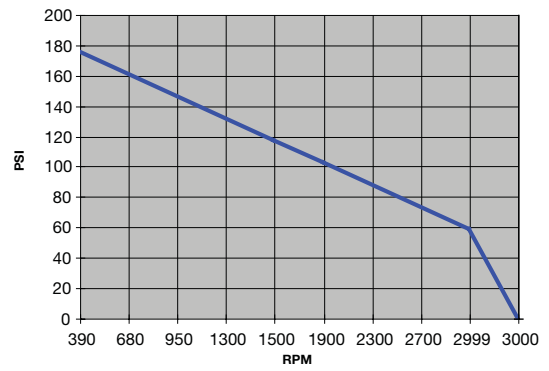
75mm



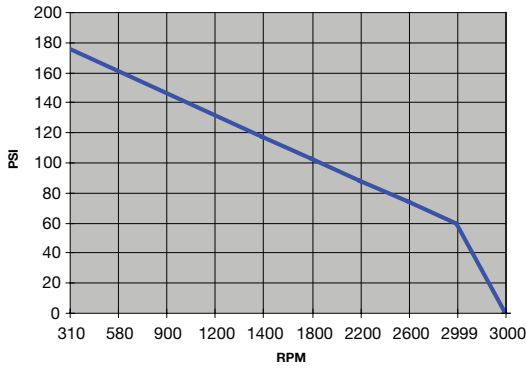
80mm



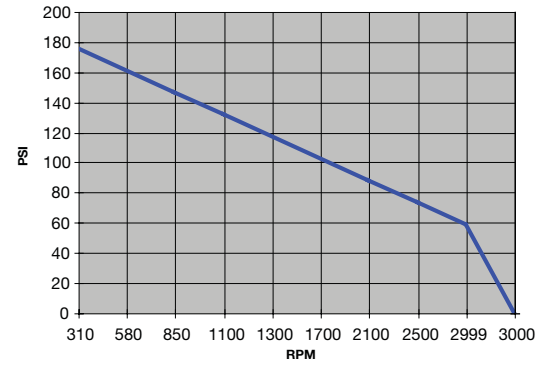
85mm



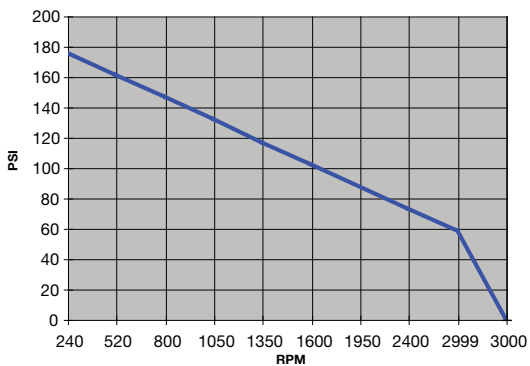
90mm



95mm



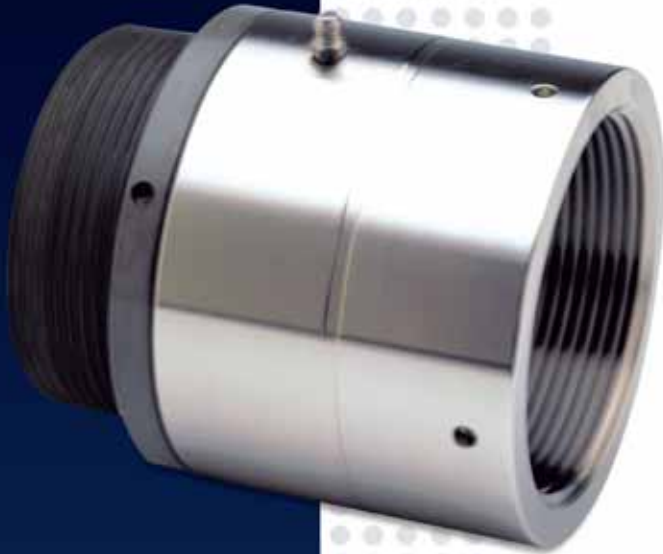
100mm



Standard Materials & Stainless Steel

1100 SERIES

SLOW ROTATION SWIVEL



Operating Parameters

MEDIA

Water, Air, Hydraulic Fluid

TEMPERATURE*

392° F

MATERIAL

Nickel Plated Steel

Also Available In All Stainless Steel

PRESSURE*

725 PSI

SPEED*

60 RPM

THREADS

■ 1/4" to 3" NPT

■ BSP Available

* See Performance Charts For Details

Features & Benefits

Bi-Directional Swivel

1100 Series swivels are for applications where complete rotation is not necessary.

Designed For Slow Rotation

Designed for swiveling or slow rotation applications.

Superior Sealing Performance

The 1100 series has the GR seal for superior sealing performance.

Multiple Configurations

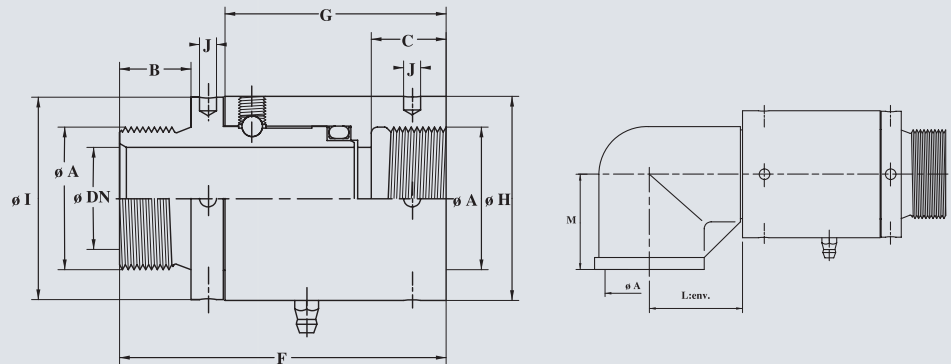
Available with axial (straight through) flow, or radial flow with the addition of a 90° stainless steel elbow.

Corrosion Resistant

Features nickel plated carbon steel construction. Stainless steel models are also available.

| 1100 SERIES SWIVELS | | | | | | | | | | |
|---------------------|-------------------|------------------|---------------------|-------------|-----------------|-------------|----------------------------|-------------|-----------------|-------------|
| PART NUMBERS | Nominal Pipe Size | Shaft Thread (A) | Axial Flow | | | | with Stainless Steel Elbow | | | |
| | | | Nickel Plated Steel | | Stainless Steel | | Nickel Plated Steel | | Stainless Steel | |
| | | | Part Number | Description | Part Number | Description | Part Number | Description | Part Number | Description |
| | 1/4 | 1/4 | 750839C | R1013KNPT | 760628C | R1013INPT | 760934 | R1013KENPT | 760944 | R1013IENPT |
| | 3/8 | 3/8 | 750840C | R1017KNPT | 750850C | R1017INPT | 760935 | R1017KENPT | 760945 | R1017IENPT |
| | 1/2 | 1/2 | 750841C | R1021KNPT | 750851C | R1021INPT | 760936 | R1021KENPT | 760946 | R1021IENPT |
| | 3/4 | 3/4 | 750842C | R1027KNPT | 750852C | R1027INPT | 760937 | R1027KENPT | 760947 | R1027IENPT |
| | 1 | 1 | 750843C | R1034KNPT | 750853C | R1034INPT | 760938 | R1034KENPT | 760948 | R1034IENPT |
| | 1-1/4 | 1-1/4 | 750844C | R1042KNPT | 750854C | R1042INPT | 760939 | R1042KENPT | 760949 | R1042IENPT |
| | 1-1/2 | 1-1/2 | 750845C | R1049KNPT | 750855C | R1049INPT | 760940 | R1049KENPT | 760950 | R1049IENPT |
| | 2 | 2 | 750846C | R1060KNPT | 750856C | R1060INPT | 760941 | R1060KENPT | 760951 | R1060IENPT |
| | 2-1/2 | 2-1/2 | 750847C | R1076KNPT | 750857C | R1076INPT | 760942 | R1076KENPT | 760952 | R1076IENPT |
| | 3 | 3 | 750848C | R1090KNPT | 750858C | R1090INPT | 760943 | R1090KENPT | 760953 | R1090IENPT |

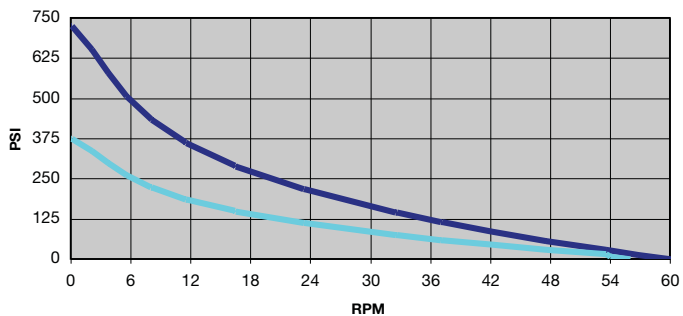
| MAXIMUM OPERATING PRESSURE (psi) | | |
|----------------------------------|---------------------|-----------------|
| Nominal Pipe Size | Nickel Plated Steel | Stainless Steel |
| 1/4 | 725 | 290 |
| 3/8 | 725 | 290 |
| 1/2 | 725 | 290 |
| 3/4 | 725 | 290 |
| 1 | 435 | 218 |
| 1-1/4 | 435 | 218 |
| 1-1/2 | 435 | 218 |
| 2 | 290 | 145 |
| 2-1/2 | 290 | 145 |
| 3 | 290 | 145 |



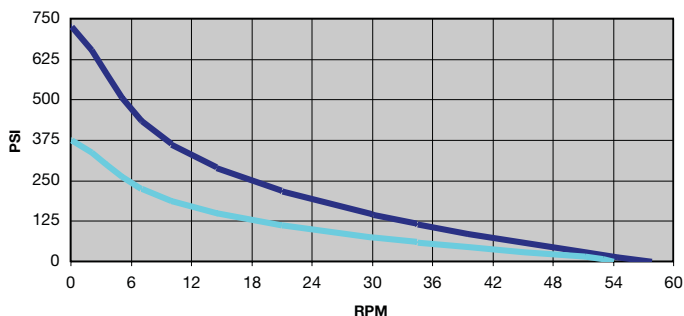
| 1100 SERIES SWIVEL (in.) | | | | | | | | | | | | |
|--------------------------|-------------------|------------------|------|------|------|--------------------|------|----------------------|------|------|------|------|
| DIMENSIONS | Nominal Pipe Size | Shaft Thread (A) | B | C | DN | Overall Length (F) | G | Overall Diameter (H) | I | J | L | M |
| | 1/4 | 1/4 | .39 | .43 | .27 | 1.87 | 1.22 | .98 | .74 | .19 | .78 | .78 |
| | 3/8 | 3/8 | .43 | .47 | .39 | 2.06 | 1.37 | 1.25 | 1.02 | .19 | 1.10 | .94 |
| | 1/2 | 1/2 | .55 | .59 | .43 | 2.30 | 1.49 | 1.25 | 1.02 | .19 | 1.18 | 1.10 |
| | 3/4 | 3/4 | .62 | .66 | .70 | 2.97 | 2 | 1.77 | 1.49 | .23 | 1.25 | 1.25 |
| | 1 | 1 | .74 | .78 | .98 | 3.42 | 2.36 | 2.04 | 2.04 | .23 | 1.53 | 1.49 |
| | 1-1/4 | 1-1/4 | .82 | .86 | 1.18 | 3.77 | 2.55 | 2.36 | 2.36 | .23 | 1.73 | 1.77 |
| | 1-1/2 | 1-1/2 | .82 | .86 | 1.49 | 3.85 | 2.63 | 2.55 | 2.55 | .23 | 2.00 | 1.96 |
| | 2 | 2 | .98 | 1.02 | 1.88 | 4.48 | 3.07 | 3.14 | 3.14 | .27 | 2.36 | 2.28 |
| | 2-1/2 | 2-1/2 | 1.10 | .90 | 2.36 | 4.46 | 2.95 | 3.74 | 3.74 | .27 | 2.95 | 2.75 |
| 3 | 3 | 1.18 | 1.02 | 2.95 | 4.78 | 3.18 | 4.17 | 4.17 | .27 | 3.42 | 3.07 | |

Performance Charts

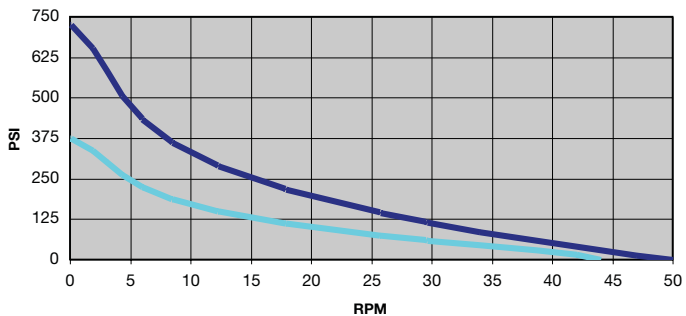
1/4"



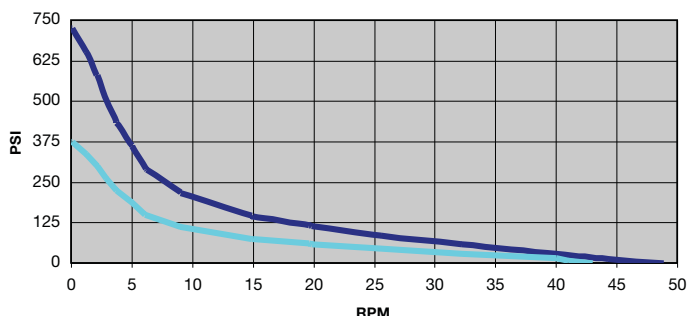
3/8"



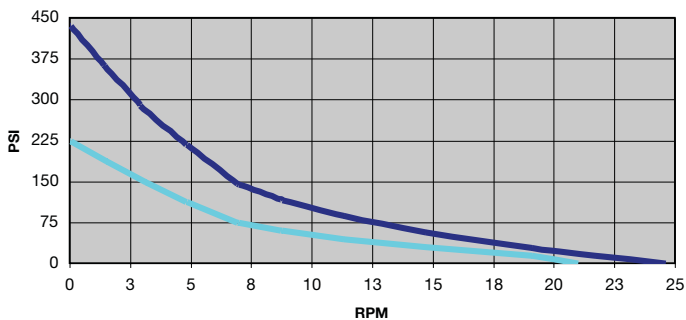
1/2"



3/4"



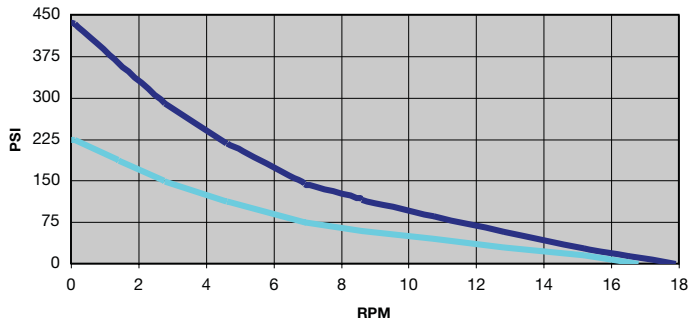
1"



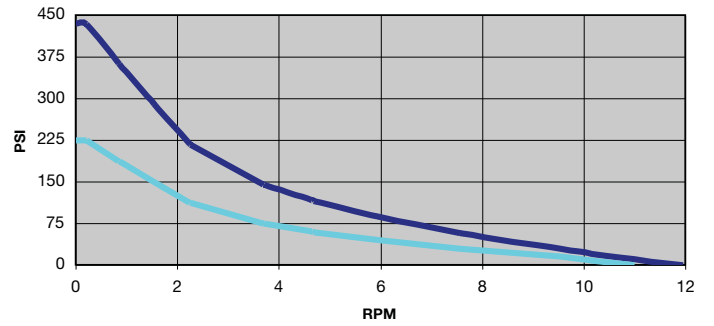
Standard Materials
Stainless Steel

Performance Charts

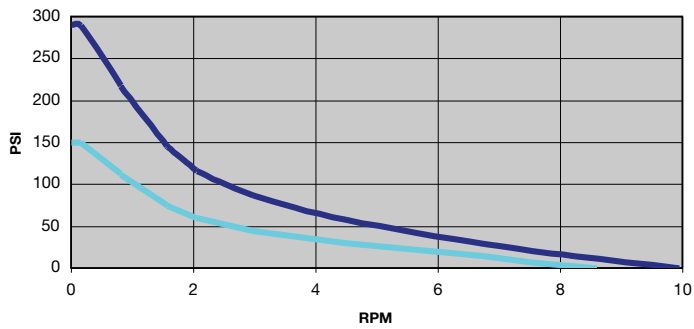
1 1/4"



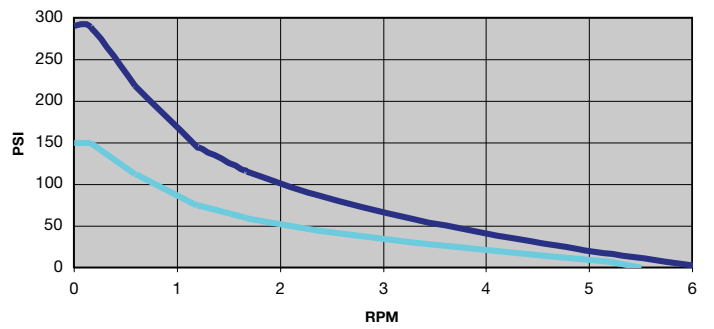
1 1/2"



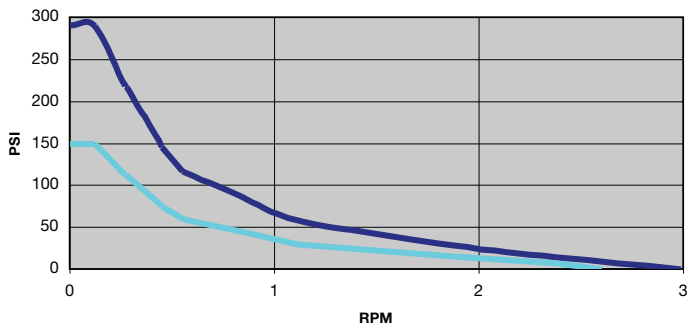
2"



2 1/2"



3"



Standard Materials

Stainless Steel

1102 SERIES

SLOW ROTATION SWIVEL



Operating Parameters

MEDIA

Water, Air, Hydraulic Fluid

PRESSURE*

1,160 PSI

TEMPERATURE*

392° F

SPEED*

90 RPM

THREADS

- 1/4" to 6" NPT
- BSP Available

MATERIAL

Nickel Plated Steel

Also Available In All Stainless Steel

** See Performance
Charts For Details*

Features & Benefits

Bi-Directional Swivel

1102 Series swivels are for applications where complete rotation is not necessary.

Slow Rotation Applications

Designed for swiveling or slow rotation applications.

High Pressure

The 1102 will operate at pressures up to 1160 psi.

Superior Sealing Performance

The 1102 series has the GR Seal for superior sealing performance.

Multiple Configurations

Available with axial (straight through) flow, or radial flow with the addition of a 90° stainless steel elbow.

Corrosion Resistant

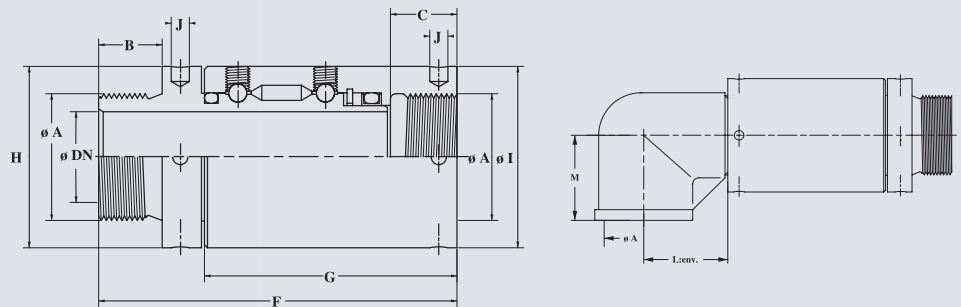
Features nickel plated carbon steel construction. Stainless steel models are also available.

Stability At Higher Speeds & Pressures

The 1102 Series offers two ball races which allow for increased pressure and speed.

| 1102 SERIES SWIVELS | | | | | | | | | | |
|---------------------|-------------------|------------------|---------------------|-------------|-----------------|-------------|----------------------------|-------------|-----------------|-------------|
| PART NUMBERS | Nominal Pipe Size | Shaft Thread (A) | Axial Flow | | | | with Stainless Steel Elbow | | | |
| | | | Nickel Plated Steel | | Stainless Steel | | Nickel Plated Steel | | Stainless Steel | |
| | | | Part Number | Description | Part Number | Description | Part Number | Description | Part Number | Description |
| | 1/4 | 1/4 | 750859C | R1013K2NPT | 750872C | R1013I2NPT | 760980C | R1013K2ENPT | 760993C | R1013I2ENPT |
| | 3/8 | 3/8 | 750860C | R1017K2NPT | 750873C | R1017I2NPT | 760981C | R1017K2ENPT | 760994C | R1017I2ENPT |
| | 1/2 | 1/2 | 750861C | R1021K2NPT | 750874C | R1021I2NPT | 760982C | R1021K2ENPT | 760995C | R1021I2ENPT |
| | 3/4 | 3/4 | 750862C | R1027K2NPT | 750875C | R1027I2NPT | 760983C | R1027K2ENPT | 760996C | R1027I2ENPT |
| | 1 | 1 | 750863C | R1034K2NPT | 750876C | R1034I2NPT | 760984C | R1034K2ENPT | 760997C | R1034I2ENPT |
| | 1-1/4 | 1-1/4 | 750864C | R1042K2NPT | 750877C | R1042I2NPT | 760985C | R1042K2ENPT | 760998C | R1042I2ENPT |
| | 1-1/2 | 1-1/2 | 750865C | R1049K2NPT | 750878C | R1049I2NPT | 760986C | R1049K2ENPT | 760999C | R1049I2ENPT |
| | 2 | 2 | 750866C | R1060K2NPT | 750879C | R1060I2NPT | 760987C | R1060K2ENPT | 770000C | R1060I2ENPT |
| | 2-1/2 | 2-1/2 | 750867C | R1076K2NPT | 750880C | R1076I2NPT | 760988C | R1076K2ENPT | 770001C | R1076I2ENPT |
| | 3 | 3 | 750868C | R1090K2NPT | 750881C | R1090I2NPT | 760989C | R1090K2ENPT | 770002C | R1090I2ENPT |
| | 4 | 4 | 750869C | R10114K2NPT | 750882C | R10114I2NPT | - | - | - | - |
| | 5 | 5 | 750870C | R10140K2NPT | 750883C | R10140I2NPT | - | - | - | - |
| | 6 | 6 | 750871C | R10165K2NPT | 750884C | R10165I2NPT | - | - | - | - |

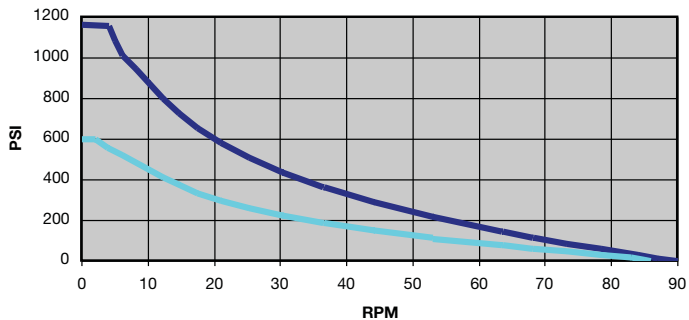
| MAXIMUM OPERATING PRESSURE (psi) | | |
|----------------------------------|---------------------|-----------------|
| Nominal Pipe Size | Nickel Plated Steel | Stainless Steel |
| 1/4 | 1160 | 435 |
| 3/8 | 1160 | 435 |
| 1/2 | 1160 | 435 |
| 3/4 | 870 | 360 |
| 1 | 870 | 360 |
| 1-1/4 | 580 | 290 |
| 1-1/2 | 580 | 290 |
| 2 | 435 | 215 |
| 2-1/2 | 435 | 215 |
| 3 | 435 | 215 |
| 4 | 290 | 145 |
| 5 | 290 | 145 |
| 6 | 215 | 115 |



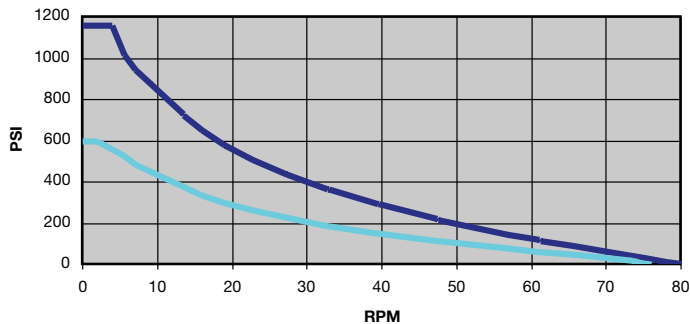
| 1102 SERIES SWIVEL (in.) | | | | | | | | | | | | |
|--------------------------|-------------------|------------------|------|------|------|------|------|--------------|------|-----|------|------|
| DIMENSIONS | Nominal Pipe Size | Shaft Thread (A) | B | C | DN | F | G | H | I | J | L | M |
| | 1/4 | 1/4 | .39 | .43 | .27 | 2.48 | 1.77 | .74 (flats) | .98 | .19 | .78 | .78 |
| | 3/8 | 3/8 | .43 | .47 | .39 | 2.83 | 2.00 | 1.02 (flats) | 1.25 | .19 | 1.10 | .94 |
| | 1/2 | 1/2 | .55 | .59 | .43 | 3.07 | 2.12 | 1.02 (flats) | 1.25 | .19 | 1.18 | 1.10 |
| | 3/4 | 3/4 | .62 | .66 | .70 | 3.77 | 2.65 | 1.49 (flats) | 1.77 | .23 | 1.25 | 1.25 |
| | 1 | 1 | .74 | .78 | .98 | 4.21 | 2.97 | 2.04 | 2.04 | .23 | 1.53 | 1.49 |
| | 1-1/4 | 1-1/4 | .82 | .86 | 1.18 | 4.64 | 3.28 | 2.36 | 2.36 | .23 | 1.73 | 1.77 |
| | 1-1/2 | 1-1/2 | .82 | .86 | 1.49 | 5.15 | 3.79 | 2.55 | 2.55 | .23 | 51 | 1.96 |
| | 2 | 2 | .98 | 1.02 | 1.88 | 5.90 | 4.38 | 3.14 | 3.14 | .27 | 2.36 | 2.28 |
| | 2-1/2 | 2-1/2 | 1.10 | 1.18 | 2.36 | 6.73 | 5.03 | 3.74 | 3.74 | .27 | 2.95 | 2.75 |
| | 3 | 3 | 1.18 | 1.25 | 2.95 | 7.28 | 5.51 | 4.17 | 4.17 | .27 | 3.42 | 3.07 |
| | 4 | 4 | 1.37 | 1.57 | 3.93 | 8.00 | 6.18 | 5.43 | 5.43 | .27 | - | - |
| 5 | 5 | 1.37 | 1.57 | 4.72 | 8.00 | 6.18 | 6.69 | 6.69 | .27 | - | - | |
| 6 | 6 | 1.37 | 1.57 | 5.90 | 8.00 | 6.18 | 7.87 | 7.87 | .27 | - | - | |

Performance Charts

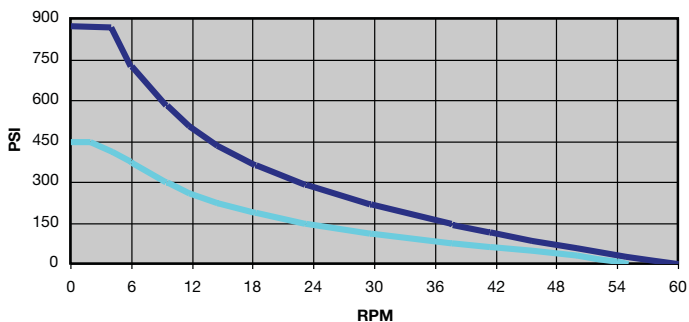
1/4" & 3/8"



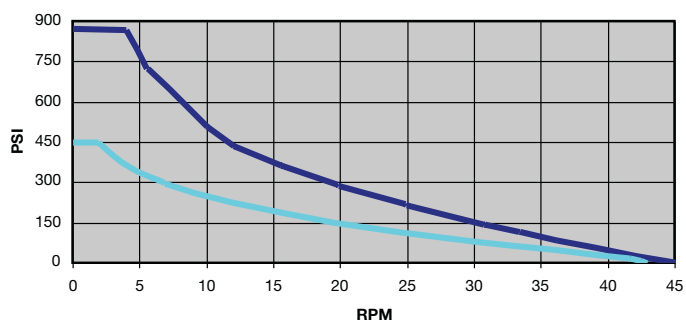
1/2"



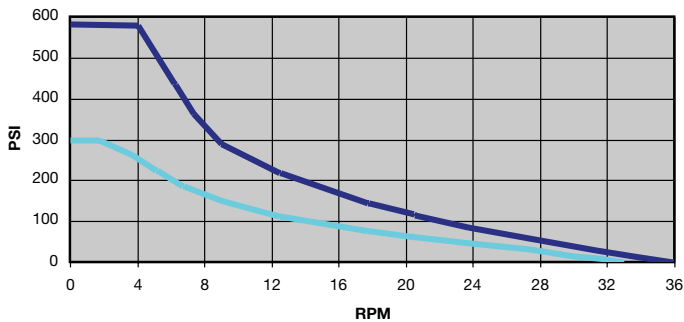
3/4"



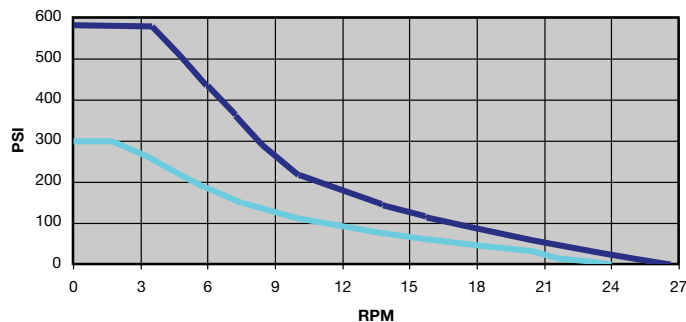
1"



1 1/4"



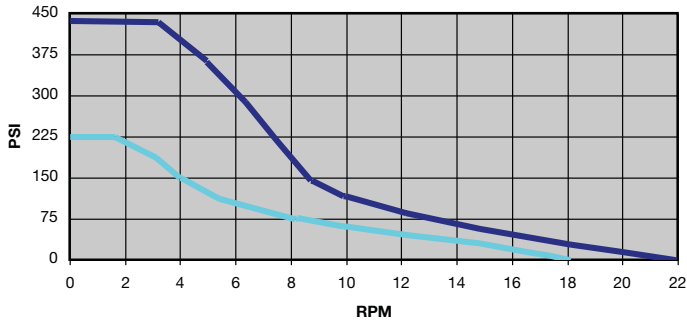
1 1/2"



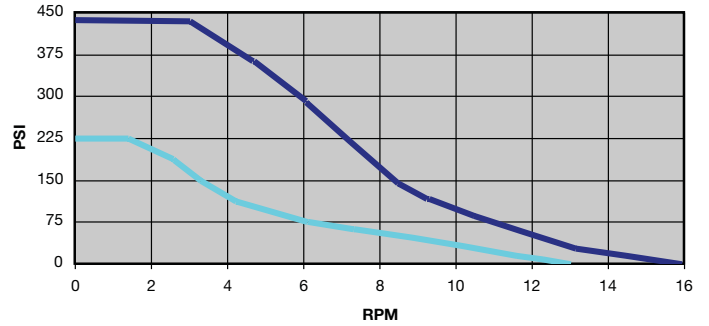
Standard Materials Stainless Steel

Performance Charts

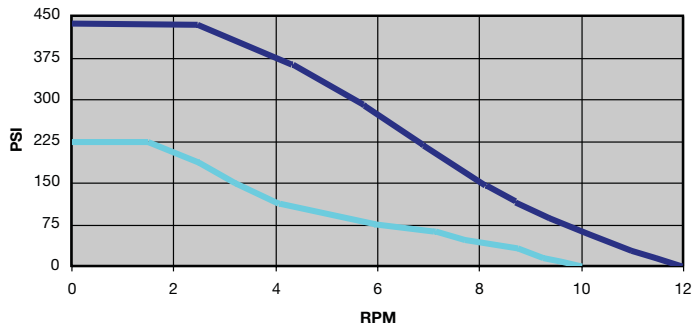
2"



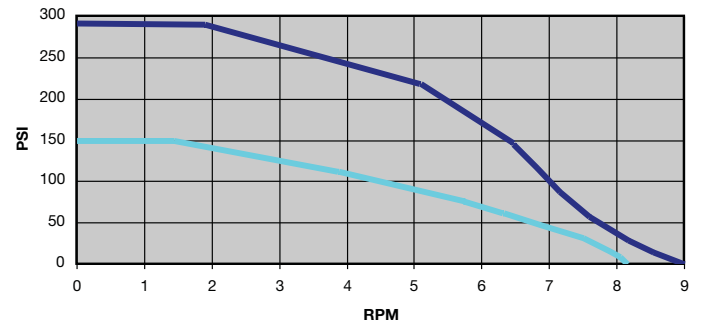
2 1/2"



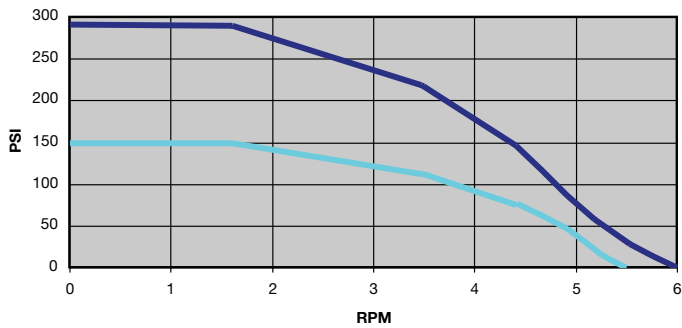
3"



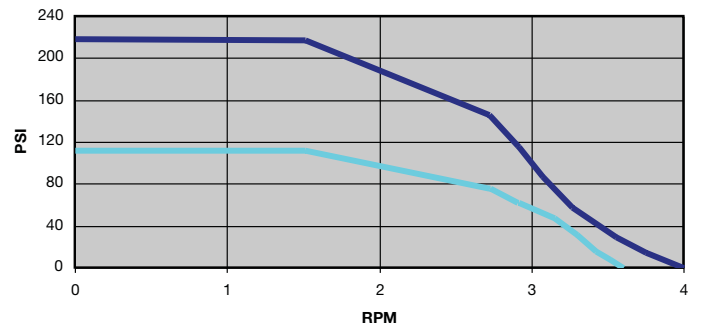
4"



5"



6"



Standard Materials Stainless Steel

1200 SERIES

SMALL ENVELOPE SWIVEL



Operating Parameters

MEDIA

Water, Air, Hydraulic Fluid

PRESSURE

5,075 PSI

TEMPERATURE

392° F

SPEED

Swivel

MATERIAL

Nickel Plated Steel

THREADS

- 1/4" to 2" NPT
- Other Threads Available

Features & Benefits

Small Profile

Perfect for small envelope dimensions.

Bi-Directional Swivel

Slow or swiveling rotation.

Hydraulic Applications

Suitable for hydraulic service.

No Lubrication

PTFE seals require no lubrication.

Easy Installation

Precision made wrench flats on center shaft for easy installation. Custom designs available.

Corrosion Resistant

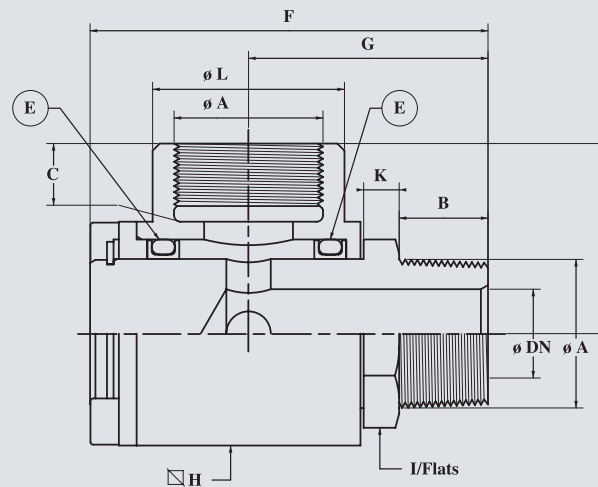
The 1200 Series is nickel plated as standard. Also available in stainless steel.

Thread Connections

NPT standard. SAE, JIC, DIN or ISO threads are available upon request.

| 1200 SERIES SWIVELS | | | | | | | | | |
|---------------------|-------------------|---------------------|--------------|------------------|--------------|-------------------|--------------|------------------|--------------|
| PART NUMBERS | Nominal Pipe Size | Nickel Plated Steel | | | | Stainless Steel | | | |
| | | Right Hand Thread | | Left Hand Thread | | Right Hand Thread | | Left Hand Thread | |
| | | Part Number | Description | Part Number | Description | Part Number | Description | Part Number | Description |
| | 1/4 | 750981C | R1213SR2KNPT | 760645C | L1213SR2KNPT | 750988C | R1213SR2INPT | 760653C | L1213SR2INPT |
| | 3/8 | 750982C | R1217SR2KNPT | 760646C | L1217SR2KNPT | 750989C | R1217SR2INPT | 760654C | L1217SR2INPT |
| | 1/2 | 750983C | R1221SR2KNPT | 760647C | L1221SR2KNPT | 750990C | R1221SR2INPT | 760655C | L1221SR2INPT |
| | 3/4 | 750984C | R1227SR2KNPT | 760648C | L1227SR2KNPT | 750991C | R1227SR2INPT | 760656C | L1227SR2INPT |
| | 1 | 750985C | R1234SR2KNPT | 760649C | L1234SR2KNPT | 750992C | R1234SR2INPT | 760657C | L1234SR2INPT |
| | 1-1/4 | 750986C | R1242SR2KNPT | 760650C | L1242SR2KNPT | 750993C | R1242SR2INPT | 760658C | L1242SR2INPT |
| | 1-1/2 | 750987C | R1249SR2KNPT | 760651C | L1249SR2KNPT | 750994C | R1249SR2INPT | 760659C | L1249SR2INPT |

| MAXIMUM OPERATING PRESSURE (psi) | | |
|----------------------------------|---------------------|-----------------|
| Nominal Pipe Size | Nickel Plated Steel | Stainless Steel |
| 1/4 | 5,075 | 2,530 |
| 3/8 | 5,075 | 2,530 |
| 1/2 | 4,350 | 2,175 |
| 3/4 | 4,350 | 2,175 |
| 1 | 3,625 | 1,810 |
| 1-1/4 | 3,625 | 1,810 |
| 1-1/2 | 2,900 | 1,450 |
| 2 | 2,900 | 1,450 |



| 1200 SERIES SWIVEL (in.) | | | | | | | | | | | | | |
|--------------------------|-------------------|------------------|------|------|------|---------|---------|------|------|-----------|------|------|------|
| DIMENSIONS | Nominal Pipe Size | Shaft Thread (A) | B | C | DN | E* | F | G | H | I (flats) | J | K | L |
| | | 1/4 | 1/4 | .55 | .47 | .27 | GR817SR | 2.24 | 1.33 | 1.10 | .82 | 1.02 | .23 |
| | 3/8 | 3/8 | .59 | .55 | .39 | GR821SR | 2.5 | 1.53 | 1.25 | .90 | 1.18 | .29 | 1.18 |
| | 1/2 | 1/2 | .70 | .59 | .51 | GR827SR | 3.07 | 1.81 | 1.57 | 1.18 | 1.37 | .31 | 1.49 |
| | 3/4 | 3/4 | .86 | .78 | .70 | GR834SR | 3.60 | 2.18 | 1.96 | 1.65 | 1.77 | .33 | 1.77 |
| | 1 | 1 | .98 | .86 | .94 | GR849SR | 4.40 | 2.63 | 2.48 | 1.81 | 2.10 | .39 | 2.15 |
| | 1-1/4 | 1-1/4 | 1.18 | 1.22 | 1.18 | GR849SR | 5.39 | 3.12 | 3.11 | 2.12 | 2.63 | .37 | 2.75 |
| | 1-1/2 | 1-1/2 | 1.18 | 1.18 | 1.49 | GR860SR | 6.25 | 3.62 | 3.77 | 2.75 | 3.03 | .47 | 3.74 |

* 2 Seals Per Joint

1300 SERIES

FLANGED SWIVEL



Operating Parameters

| | |
|---------------------|------------------------|
| MEDIA | PRESSURE* |
| Water, Air | 290 PSI |
| TEMPERATURE* | SPEED* |
| 392° F | Swivel |
| MATERIAL | CONNECTION TYPE |
| Nickel Plated Steel | 2" to 12" Flange |

* See Performance Charts For Details

Features & Benefits

Swivel Applications

Used in applications where slow rotation or swiveling motion is needed.

GR Seal Technology

Design features include a ball bearing for rotation, and a GR seal for superior sealing performance.

Flanged Swivel Design

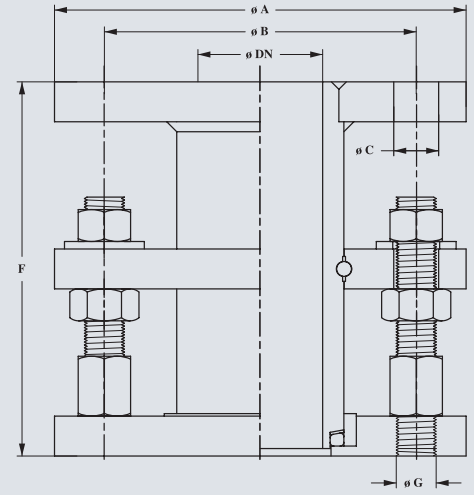
Allows for stability in high flow applications.

High Temperature Applications

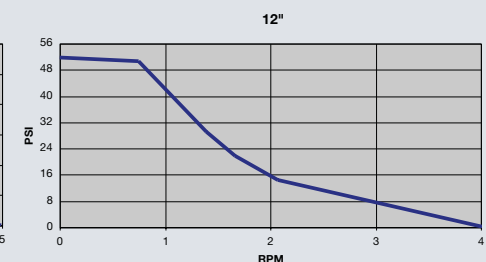
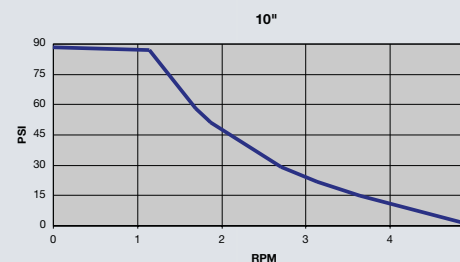
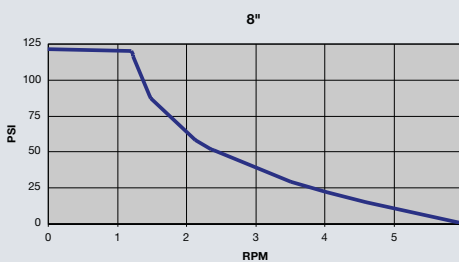
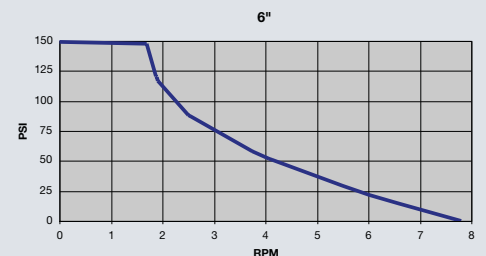
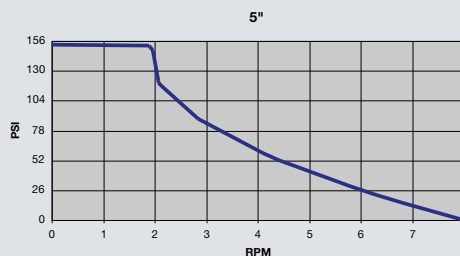
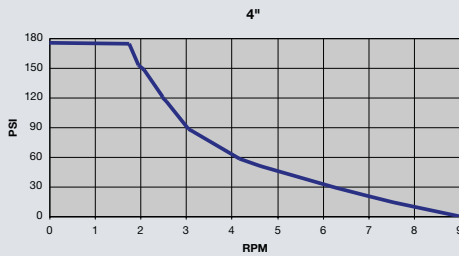
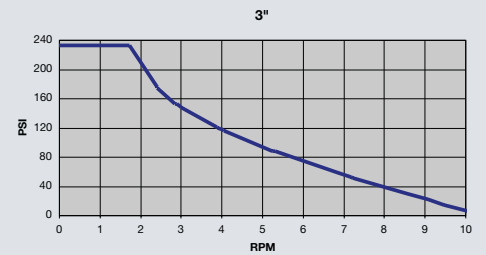
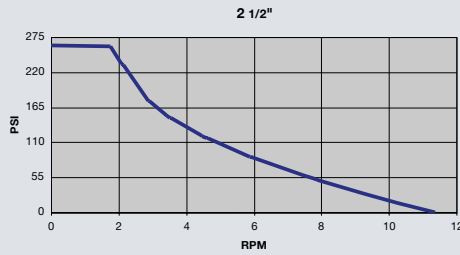
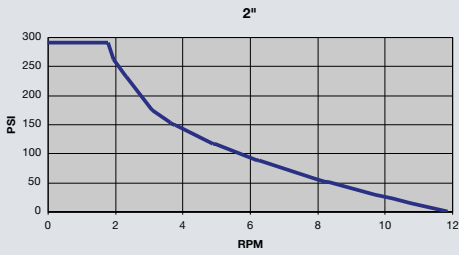
Can be used in applications with temperatures up to 392° F.

| 1300 SERIES FLANGED SWIVELS | | | | | |
|-----------------------------|-------------------|---------------------|-------------|-----------------|-------------|
| PART NUMBERS | Nominal Pipe Size | Nickel Plated Steel | | Stainless Steel | |
| | | Part Number | Description | Part Number | Description |
| | | 2 | 760572C | BR50K | 760582C |
| | 2-1/2 | 760573C | BR66K | 760583C | BR66I |
| | 3 | 760574C | BR80K | 760584C | BR80I |
| | 4 | 760575C | BR100K | 760585C | BR100I |
| | 5 | 760576C | BR125K | 760586C | BR125I |
| | 6 | 760577C | BR150K | 760587C | BR150I |
| | 8 | 760579C | BR200K | 760589C | BR200I |
| | 10 | 760580C | BR250K | 760590C | BR250I |
| | 12 | 760581C | BR300K | 760591C | BR300I |

| 1300 SERIES FLANGED SWIVEL (in.) | | | | | | | | |
|----------------------------------|-------------------|-----------------|----------------------|-------|--------|-------|--------------------|-----------------|
| DIMENSIONS | Nominal Pipe Size | Number of Holes | Overall Diameter (A) | B | Slot C | DN | Overall Length (F) | Thread (G) |
| | 2 | 4 | 6.49 | 4.92 | .70 | 2 | 5.90 | 4 x .70 |
| | 2-1/2 | 4 | 7.28 | 5.70 | .70 | 2-1/2 | 5.90 | 4 x .70 |
| | 3 | 8 | 7.87 | 6.29 | .70 | 3 | 5.90 | 4 x .70 4 x M16 |
| | 4 | 8 | 8.66 | 7.08 | .70 | 4 | 5.90 | 8 x .70 |
| | 5 | 8 | 9.84 | 8.26 | .70 | 5 | 5.90 | 8 x .70 |
| | 6 | 8 | 11.22 | 9.44 | .86 | 6 | 5.90 | 8 x .86 |
| | 8 | 8 | 13.38 | 11.60 | .86 | 8 | 7.87 | 8 x .86 |
| | 10 | 12 | 15.55 | 13.77 | .86 | 10 | 7.87 | 12 x .86 |
| 12 | 12 | 17.50 | 15.70 | .86 | 12 | 7.87 | 12 x .86 | |



Performance Charts



1700 SERIES

HIGH PRESSURE SWIVEL



Operating Parameters

| | |
|-----------------------------|--|
| MEDIA | PRESSURE* |
| Water, Air, Hydraulic Fluid | 5,075 PSI |
| TEMPERATURE* | SPEED* |
| 248° F | 80 RPM |
| MATERIAL | THREADS |
| Nickel Plated Steel | <ul style="list-style-type: none"> ■ 1/4" to 3" NPT ■ BSP & BSPP Available |

* See Performance Charts For Details

Features & Benefits

High Pressure Applications

High pressure swivel for use in hydraulic and pneumatic applications.

Corrosion Resistant

Standard models feature nickel treated carbon steel construction, but are also available in all stainless steel.

GR Seal Technology

Equipped with a GR seal, which is suitable for most fluids.

Thrust Bearings

A single acting thrust bearing permits slow rotation at high pressures.

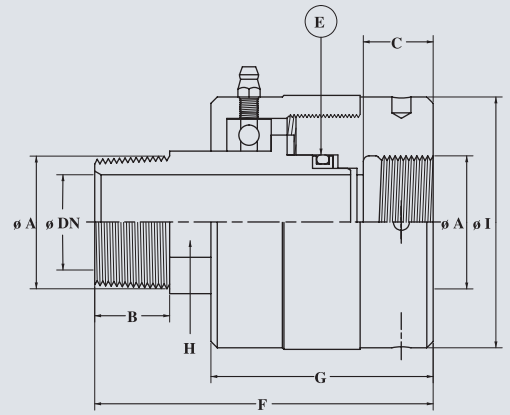
1700 SERIES HIGH PRESSURE SWIVEL

| PART NUMBERS | Nominal Pipe Size (DN) | Shaft Thread (A) | Part Number | Description |
|--------------|------------------------|------------------|----------------|-------------|
| | 1/4" | 1/4" | 750788C | R1813SRKNPT |
| 3/8" | 3/8" | 750789C | R1817SRKNPT | |
| 1/2" | 1/2" | 750790C | R1821SRKNPT | |
| 3/4" | 3/4" | 750791C | R1827SRKNPT | |
| 1" | 1" | 750792C | R1834SRKNPT | |
| 1-1/8" | 1-1/4" | 750793C | R1842SRKNPT | |
| 1-1/2" | 1-1/2" | 750794C | R1849SRKNPT | |
| 1-3/4" | 2" | 750795C | R1860SRKNPT | |
| 2-1/4" | 2-1/2" | 750796C | R1876SRKNPT | |
| 2-3/4" | 3" | 750797C | R1890SRKNPT | |

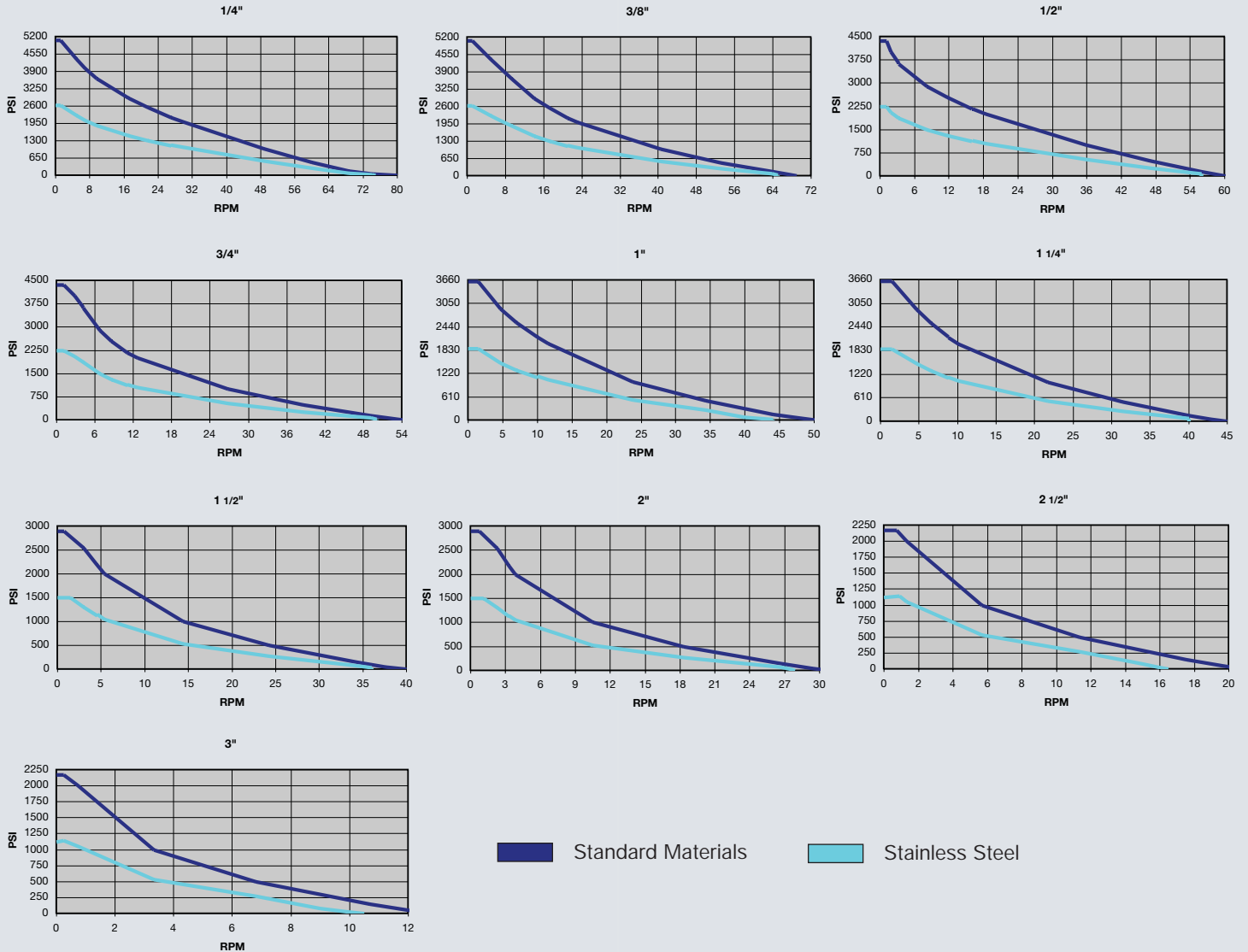
MAXIMUM OPERATING PRESSURE (psi)

| Nominal Pipe Size (DN) | Shaft Thread (A) | Maximum Pressure (PSI) |
|------------------------|------------------|------------------------|
| 1/4" | 1/4" | 5,075 |
| 3/8" | 3/8" | 5,075 |
| 1/2" | 1/2" | 4,350 |
| 3/4" | 3/4" | 4,350 |
| 1" | 1" | 3,625 |
| 1-1/8" | 1-1/4" | 3,625 |
| 1-1/2" | 1-1/2" | 2,900 |
| 1-3/4" | 2" | 2,900 |
| 2-1/4" | 2-1/2" | 2,175 |
| 2-3/4" | 3" | 2,175 |

| 1700 SERIES HIGH PRESSURE SWIVEL (in.) | | | | | | | | |
|--|------------------------|------------------|-------|-------|--------------------|---------|-----------|----------------------|
| DIMENSIONS | Nominal Pipe Size (DN) | Shaft Thread (A) | B | C | Overall Length (F) | G | Flats (H) | Overall Diameter (I) |
| | 1/4 | 1/4 | 1/2 | 7/16 | 2-5/8 | 1-3/4 | 1/2 | 1-1/4 |
| | 3/8 | 3/8 | 1/2 | 1/2 | 2-3/4 | 1-15/16 | 1/2 | 1-1/2 |
| | 1/2 | 1/2 | 5/8 | 9/16 | 3-1/8 | 2-3/16 | 3/4 | 2-1/16 |
| | 3/4 | 3/4 | 3/4 | 5/8 | 3-1/2 | 2-1/2 | 1 | 2-1/4 |
| | 1 | 1 | 7/8 | 3/4 | 3-3/4 | 2-9/16 | 1-1/4 | 2-1/2 |
| | 1-1/8 | 1-1/4 | 1 | 3/4 | 4-1/8 | 2-3/4 | 1-1/2 | 3 |
| | 1-1/2 | 1-1/2 | 1 | 3/4 | 4-9/16 | 3-1/8 | 1-3/4 | 3-3/8 |
| | 1-3/4 | 2 | 1-1/8 | 1 | 4-13/16 | 3-1/4 | 2-1/4 | 4 |
| | 2-1/4 | 2-1/2 | 1-1/8 | 1 | 5-1/2 | 3-3/4 | 2-3/4 | 5-1/8 |
| 2-3/4 | 3 | 1-1/4 | 1-1/8 | 7-1/8 | 4-13/16 | 3-3/8 | 6-1/8 | |



Performance Charts



1900 SERIES

HIGH PRESSURE SWIVEL



Operating Parameters

| | |
|-----------------------------|------------------|
| MEDIA | PRESSURE* |
| Water, Air, Hydraulic Fluid | 10,150 PSI |
| TEMPERATURE* | SPEED* |
| 248° F | 100 RPM |
| MATERIAL | THREADS |
| Nickel Plated Steel | 1/4" to 3" NPT |

* See Performance Charts For Details

Features & Benefits

Hydraulic Applications

High pressure swivel for use in hydraulic and pneumatic applications.

High Pressure

Designed for use in very high pressure applications up to 10,150 psi.

Corrosion Resistant

Standard models feature nickel plated carbon steel construction. Also available in all stainless steel.

GR Seal Technology

Equipped with a GR seal for superior sealing performance.

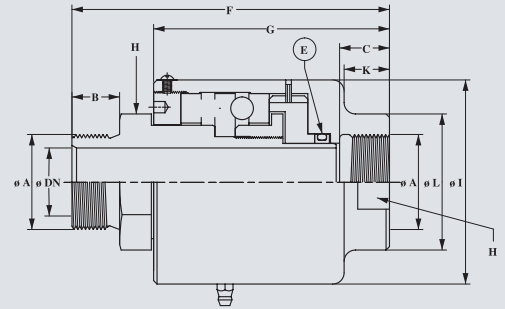
Stability At High Pressures

Equipped with a double acting thrust bearing and a bronze bushing. The bearing permits higher pressure, while the bushing increases the guide of the shaft to allow faster rotating speeds.

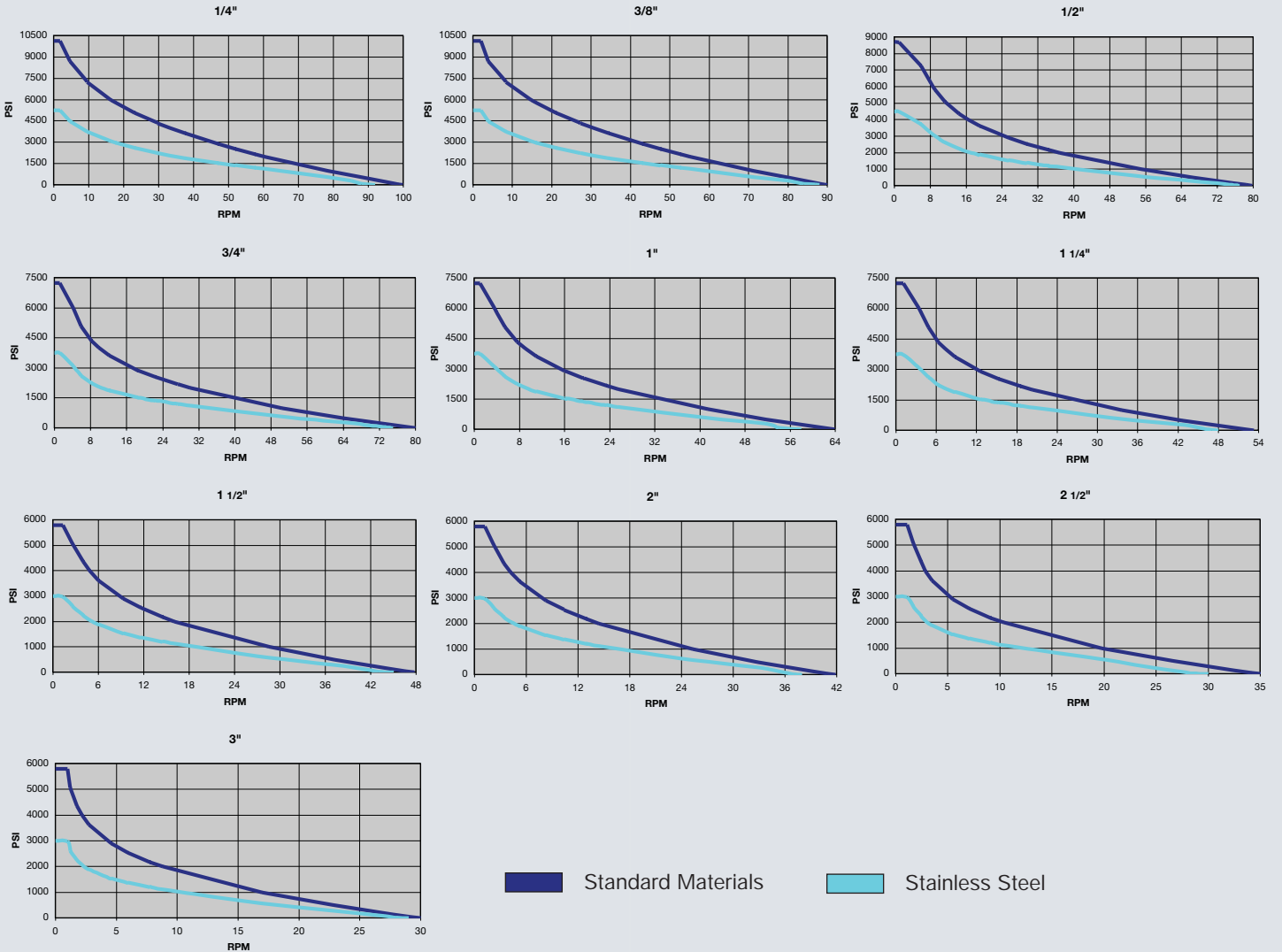
| 1900 SERIES SWIVEL | | | |
|--------------------|------------------|-------------|--------------|
| | Shaft Thread (A) | Part Number | Description |
| PART NUMBERS | 1/4 | 750798C | R1813SRDENPT |
| | 3/8 | 750799C | R1817SRDENPT |
| | 1/2 | 750800C | R1821SRDENPT |
| | 3/4 | 750801C | R1827SRDENPT |
| | 1 | 750802C | R1834SRDENPT |
| | 1-1/4 | 750803C | R1842SRDENPT |
| | 1-1/2 | 750804C | R1849SRDENPT |
| | 2 | 750806C | R1860SRDENPT |
| | 2-1/2 | 750807C | R1876SRDENPT |
| | 3 | 750805C | R1890SRDENPT |

| MAX. OPERATING PRESSURE (psi) | |
|-------------------------------|------------------------|
| Shaft Thread (A) | Maximum Pressure (PSI) |
| 1/4 | 10,150 |
| 3/8 | 10,150 |
| 1/2 | 8,700 |
| 3/4 | 7,250 |
| 1 | 7,250 |
| 1-1/4 | 7,250 |
| 1-1/2 | 5,800 |
| 2 | 5,800 |
| 2-1/2 | 5,800 |
| 3 | 5,800 |

| 1900 SERIES SWIVEL (in.) | | | | | | | | | | |
|--------------------------|------------------|--------|-------|--------|--------------------|---------|-----------|----------------------|-------|---------|
| DIMENSIONS | Shaft Thread (A) | B | C | DN | Overall Length (F) | G | Flats (H) | Overall Diameter (I) | K | L |
| | 1/4 | 3/8 | 7/16 | 1/4 | 3-5/8 | 2-15/16 | 13/16 | 1-15/16 | 5/8 | 15/16 |
| | 3/8 | 7/16 | 9/16 | 3/8 | 4 | 3-1/8 | 1-1/4 | 2-1/8 | 1/2 | 1-7/16 |
| | 1/2 | 9/16 | 5/8 | 1/2 | 4-1/8 | 3-1/8 | 1-1/4 | 2-1/8 | 5/8 | 1-3/8 |
| | 3/4 | 5/8 | 9/16 | 3/4 | 4-3/4 | 3-1/2 | 1-5/16 | 2-1/2 | 3/4 | 1-1/2 |
| | 1 | 3/4 | 3/4 | 13/16 | 5-1/4 | 4 | 2 | 3-5/16 | 3/4 | 2-1/8 |
| | 1-1/4 | 13/16 | 13/16 | 1-1/8 | 5-1/2 | 4-1/8 | 2-1/8 | 3-1/2 | 3/4 | 2-3/8 |
| | 1-1/2 | 13/16 | 13/16 | 1-7/16 | 6 | 4-5/8 | 2-3/8 | 4-1/16 | 1 | 2-5/8 |
| | 2 | 1 | 1 | 1-5/8 | 6-7/16 | 4-7/8 | 2-5/8 | 4-1/2 | 1 | 2-15/16 |
| | 2-1/2 | 1-1/16 | 1-1/8 | 2 | 7-1/2 | 5-3/4 | 4 | 6 | 1-1/8 | 4-1/4 |
| 3 | 1-1/8 | 1-1/4 | 2-1/2 | 8-1/4 | 6-7/16 | 4-3/4 | 6-13/16 | 1-1/8 | 5-1/8 | |



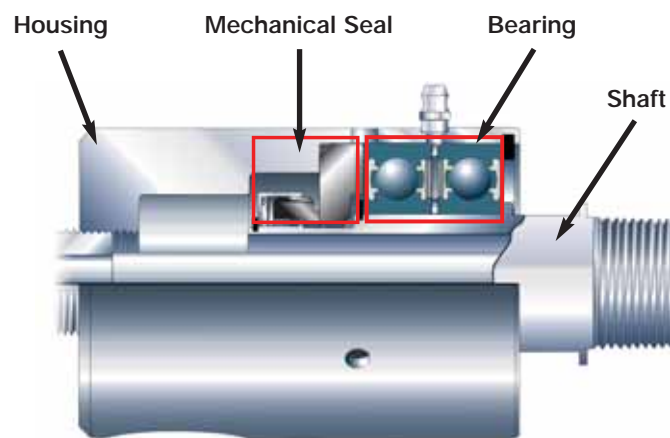
Performance Charts



Standard Materials Stainless Steel

Rotary Union Design

While rotating joints come in many shapes, sizes, and configurations, they always have the same four basic components: housing, a shaft, a bearing (or bearings) and a seal.



Mechanical Seal

The heart of the Rotary Union or rotary joint is the seal. The seal prevents the medium (water, oil, air, etc) from leaking outside the Rotary Union while the Rotary Union is in operation. Duff-Norton uses four basic types of mechanical seals in its Rotary Unions: **1)** pusher-type end face mechanical seal, **2)** non-pusher type end face mechanical seal, **3)** lip seals and **4)** o-ring seal. Rotary Unions may have more than one seal.

Bearing

The second most important part of the Rotary Union is the bearing. A Rotary Union may have only one bearing or multiple bearings. Roller bearings, such as ball bearings and tapered roller bearings, or non-roller bearings, like graphite bearings and bronze bushings, may be used in the Rotary Union. The bearings are always used to allow a part of the joint, either the shaft or the housing, to rotate.

Shaft

The shaft is the component that carries the medium through the Rotary Union into the drum or roll. In many cases, the shaft will turn with the drum or roll. In some cases, like in larger flanged rotary Unions, the shaft may be stationary while the housing rotates. The bearings and seal are typically assembled around the shaft.

Housing

The housing is the component that holds all of the other elements of the Rotary Union together. The housing has an inlet port, which is a threaded port to which the hose supplying the medium will be attached (*See the next page for recommended hose installation*). The Rotary Union may also have an outlet port, if the same joint is being used both to supply fluid to a roll and to remove fluid from the roll. In smaller Rotary Unions, the housing is stationary. In larger Rotary Unions, the housing maybe bolted to the drum or roll using a flange. In these cases, the housing rotates at the same speed as the drum.

Rotary Union Technical Data

| SINGLE FLOW - P | | |
|-----------------|--------------------------|------|
| Size | Free Flow Area (Sq. In.) | Cv |
| 1/4" | 0.050 | 2.06 |
| 3/8" | 0.111 | 2.95 |
| 1/2" | 0.196 | 5.25 |
| 3/4" | 0.442 | 11.8 |
| 1" | 0.785 | 21 |
| 1 1/4" | 1.227 | 33 |
| 1 1/2" | 1.767 | 47 |
| 2" | 3.14 | 84 |
| 2 1/2" | 4.43 | 113 |
| 3" | 6.49 | 173 |
| 4" | 12.57 | 335 |
| 5" | 19.60 | 523 |

$$GRM = C_v \sqrt{\Delta P}$$

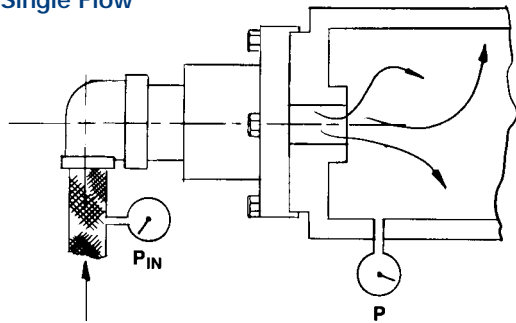
Where:

GPM = Flow rate in gallons per minute of water

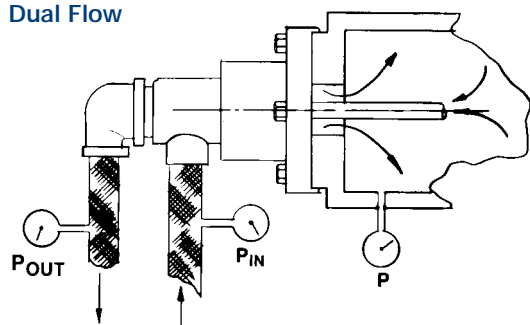
C_v = Flow factor in gallons of water flow per minute with a 1 psi pressure drop

ΔP = Pressure drop, psi

Single Flow



Dual Flow



| DUAL FLOW - S, CS, FS, RSP & FRSP | | | | | | |
|-----------------------------------|-------------|------------|-------|-------------|--------|---------------|
| Size (in.) | Siphon Size | Shaft Area | Cv In | Siphon Area | Cv Out | Cv In and Out |
| 1/4" * | 1/8 Tube | 0.065 | 1.6 | 0.004 | 0.11 | 0.1 |
| | 3/16 Tube | 0.049 | 1.2 | 0.012 | 0.35 | 0.34 |
| | 1/4 Tube | 0.028 | 0.7 | 0.025 | 0.73 | 0.5 |
| 3/8" * | 1/8 Tube | 0.099 | 2.5 | 0.004 | 0.11 | 0.11 |
| | 3/16 Tube | 0.083 | 2.1 | 0.012 | 0.35 | 0.34 |
| | 1/4 Tube | 0.062 | 1.6 | 0.025 | 0.73 | 0.67 |
| 1/2" | 1/4 Tube | 0.147 | 3.8 | 0.025 | 0.73 | 0.72 |
| | 1/8 Pipe | 0.068 | 1.7 | 0.057 | 1.6 | 1.16 |
| 3/4" | 1/8 Pipe | 0.312 | 8.1 | 0.057 | 1.6 | 1.57 |
| | 1/4 Pipe | 0.212 | 5.5 | 0.104 | 3 | 2.64 |
| | 3/8 Pipe | 0.083 | 2.1 | 0.191 | 5.6 | 1.97 |
| 1" | 1/8 Pipe | 0.656 | 17 | 0.057 | 1.6 | 1.59 |
| | 1/4 Pipe | 0.556 | 14 | 0.104 | 3 | 2.94 |
| | 3/8 Pipe | 0.427 | 11 | 0.191 | 5.6 | 5 |
| | 1/2 Pipe | 0.231 | 6 | 0.304 | 8.9 | 5 |
| 1 1/4" | 1/8 Pipe | 1.098 | 28 | 0.057 | 1.6 | 1.6 |
| | 1/4 Pipe | 0.998 | 26 | 0.104 | 3 | 2.97 |
| | 3/8 Pipe | 0.869 | 22 | 0.191 | 5.6 | 5.43 |
| | 1/2 Pipe | 0.673 | 17 | 0.304 | 8.9 | 7.88 |
| 1 1/2" | 3/4 Pipe | 0.361 | 9.4 | 0.533 | 15 | 8 |
| | 1/4 Pipe | 1.538 | 40 | 0.104 | 2 | 2 |
| | 3/8 Pipe | 1.409 | 36 | 0.191 | 5.6 | 5.53 |
| | 1/2 Pipe | 1.213 | 31 | 0.304 | 9 | 8.6 |
| | 3/4 Pipe | 0.901 | 23 | 0.533 | 15 | 12.5 |
| 2" | 1 Pipe | 0.409 | 10 | 0.864 | 23 | 9.2 |
| | 3/8 Pipe | 2.784 | 72 | 1.495 | 5.6 | 5.7 |
| | 1/2 Pipe | 2.588 | 67 | 0.304 | 9 | 8.95 |
| | 3/4 Pipe | 2.276 | 59 | 0.533 | 15 | 14.7 |
| | 1 Pipe | 1.784 | 46 | 0.864 | 23 | 20.8 |
| 2 1/2" | 1-1/4 Pipe | 0.978 | 25 | 1.495 | 44 | 21.8 |
| | 1/2 Pipe | 3.876 | 100 | 2.036 | 8.9 | 8.9 |
| | 3/4 Pipe | 3.564 | 92 | 3.355 | 15 | 14.8 |
| | 1 Pipe | 3.072 | 80 | 0.304 | 23 | 22.2 |
| 3" | 1-1/4 Pipe | 2.266 | 59 | 0.533 | 44 | 35.2 |
| | 1-1/2 Pipe | 1.595 | 41 | 0.864 | 60 | 33.9 |
| | 2 Pipe | 0.478 | 12 | 1.495 | 98 | 11.8 |
| 3" ** | 1/2 Pipe | 5.937 | 154 | 2.036 | 8.9 | 8.9 |
| | 3/4 Pipe | 5.625 | 146 | 3.355 | 15 | 14.9 |
| | 1 Pipe | 5.133 | 133 | 4.788 | 23 | 23 |
| | 1-1/4 Pipe | 4.327 | 112 | 1.495 | 44 | 40.7 |
| | 1-1/2 Pipe | 4.106 | 107 | 2.036 | 59 | 52 |
| | 2 Pipe | 2.061 | 53 | 3.355 | 98 | 46.7 |
| 3" *** | 2-1/2 Pipe | 0.576 | 15 | 4.788 | 140 | 14 |
| | 1-1/4 Pipe | 10.402 | 270 | 1.495 | 44 | 43.4 |
| 4" ** | 1-1/2 Pipe | 9.731 | 254 | 2.036 | 59 | 58 |
| | 2 Pipe | 8.136 | 212 | 3.355 | 98 | 89 |
| | 2-1/2 Pipe | 6.074 | 158 | 4.788 | 140 | 105 |
| | 3 Pipe | 2.945 | 76 | 7.393 | 216 | 71.7 |
| 5" ** | 1-1/4 Pipe | 17.471 | 450 | 1.495 | 44 | 43.7 |
| | 1-1/2 Pipe | 16.8 | 430 | 2.036 | 60 | 59.8 |
| | 2 Pipe | 15.205 | 390 | 3.355 | 98 | 95.1 |
| | 2-1/2 Pipe | 13.143 | 340 | 4.788 | 140 | 129 |
| 3 Pipe | 10.014 | 260 | 7.393 | 216 | 166 | |

Recommended Hose Installation

Flexible hose must be used to connect each Rotary Union® to its supply or drain piping. Use braided metal hose for all applications involving hot fluids, such as hot water, hot oil or steam. Use two-ply rubber hose for cooling water, refrigerants, air and vacuum service.

Allow for an offset between the Rotary Union joint and the rigid pipe as shown in Exhibit C. It is important to allow a slight curve in the hose to allow the hose to "float". This will prevent a side load from being placed on the Rotary Union. A side load will greatly reduce the life of the Rotary Union.

| Rotary Union Thread Size (in.) | Hose Size and Length (in.) | Dimensions (in.) | |
|--------------------------------|----------------------------|------------------|--------|
| | | A | B |
| 1/2" | 1/2 x 10 | 2 5/8 | 1 |
| 3/4" | 3/4 x 10 | 2 1/2 | 11 7/8 |
| 1" | 1 x 14 | 3 1/4 | 14 1/4 |
| 1 1/4" | 1 1/4 x 16 | 3 1/2 | 16 1/4 |
| 1 1/2" | 1 1/2 x 18 | 3 3/4 | 18 1/2 |
| 2" | 2 x 21 | 4 3/8 | 21 3/4 |
| 2 1/2" | 2 x 21 | 4 3/8 | 21 3/4 |
| | 2 1/2 x 24 | 4 1/4 | 24 3/4 |
| 3" | 2 1/2 x 24 | 4 1/4 | 24 3/4 |
| | 3 x 26 | 4 1/2 | 28 5/8 |
| 3 1/2" | 3 x 26 | 8 | 28 3/8 |
| 4" | 4 x 26 | 8 | 2 |

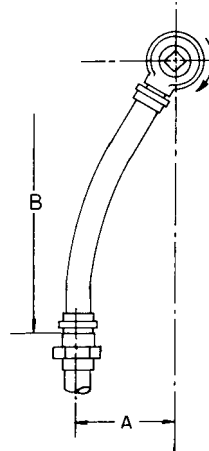


Exhibit C
Example of the correct way to install flexible hose on a Rotary Union.

CAUTION

A straight hose, when fully charged, becomes as rigid as solid pipe. This rigidity, plus the added weight of the fluid media and expansion due to temperature, can drastically shorten the service life of the Rotary Union.

Warranty

Subject to the conditions stated herein, Duff-Norton will repair or replace, without charge, any parts proven to Duff-Norton's satisfaction to be defective in materials or workmanship. Claims must be made within one year, except Series 9000, 8000, and 4000 Series.

Duff-Norton will not repair or replace any parts that become unusable and show clear evidence of improper maintenance, eccentric loading, overloading, excessive heat, chemical or abrasive wear, tampering or abuse. Equipment and accessories not manufactured by Duff-Norton are warranted only to the extent the manufacturer warrants them, and only if the claimed defect arose during normal use, application and service. Equipment that has been altered or modified by anyone without Duff-Norton's authorization is not warranted by Duff-Norton. Except as stated herein, Duff-Norton makes no other warranties, express or implied including warranties of merchantability and fitness for a particular purpose.

DUFF-NORTON TERMS OF SALE

All sales by Seller are made pursuant to the following terms. No other or additional terms or conditions are or will be accepted.

ACCEPTANCE OF ORDERS -

All orders, whether placed directly or through an agent, and all subsequent amendments thereto, are subject to a final approval and acceptance by Seller's main office.

LIMITATION OF WARRANTIES, REMEDIES AND DAMAGES -

THE WARRANTY STATED BELOW IS GIVEN IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE. NO PROMISE OR AFFIRMATION OF FACT MADE BY ANY AGENT OR REPRESENTATIVE OF SELLER SHALL CONSTITUTE A WARRANTY BY SELLER OR GIVE RISE TO ANY LIABILITY OR OBLIGATION.

Seller warrants that on the date of its delivery to carrier the goods are free from defects in workmanship and materials.

SELLER'S SOLE OBLIGATION IN THE EVENT OF BREACH OF WARRANTY OR CONTRACT OR FOR NEGLIGENCE OR OTHERWISE WITH RESPECT TO GOODS SOLD SHALL BE EXCLUSIVELY LIMITED TO REPAIR OR REPLACEMENT, F.O.B. SELLER'S POINT OF SHIPMENT, OF ANY PARTS WHICH SELLER DETERMINES TO HAVE BEEN DEFECTIVE or if Seller determines that such repair or replacement is not feasible, to a refund of the purchase price upon return of the goods to Seller.

Any action against Seller for breach of warranty, negligence or otherwise must be commenced within one year after such cause of action accrues.

NO CLAIM AGAINST SELLER FOR ANY DEFECT IN THE GOODS SHALL BE VALID OR ENFORCEABLE UNLESS BUYER'S WRITTEN NOTICE THEREOF IS RECEIVED BY SELLER WITHIN ONE YEAR FROM THE DATE OF SHIPMENT.

Seller shall not be liable for any damage, injury or loss arising out of the use of the goods if, prior to such damage, injury or loss, such goods are (1) damaged or misused following Seller's delivery to carrier; (2) not maintained, inspected, or used in compliance with applicable law and Seller's written instructions and recommendations; or (3) installed, repaired, altered or modified without compliance with such law, instructions or recommendations.

UNDER NO CIRCUMSTANCES SHALL SELLER BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES AS THOSE TERMS ARE DEFINED IN SECTION 2-715 OF THE UNIFORM COMMERCIAL CODE.

TERMS OF PAYMENT -

Unless otherwise stated herein, payment of each invoice is required within thirty (30) days after date of shipment. Any balance unpaid after the required payment date shall be subject to a service charge of 1% per month from such date.

PRICE ADJUSTMENTS -

Amendments made by the Buyer to orders already placed shall, without formal notice to the Buyer, be subject to extra charges. If the estimated shipping date for the goods is more than sixty (60) days after date of order, the price of the goods are subject to increase by Seller.

TAXES -

Any sales, use, excise, and other taxes applicable to this transaction and the goods and/or services furnished by Seller are not included in the price and shall be paid by Buyer when due. If Seller pays any such taxes, Buyer shall reimburse Seller upon demand.

INDEMNIFICATION AND SAFE OPERATION -

Buyer shall comply with and require its employees to comply with directions set forth in instructions and manuals furnished by Seller and shall use and require its employees to follow such instructions and manuals and to use reasonable care in the use and maintenance of the goods. Buyer shall not remove or permit anyone to remove any warning or instruction signs on the goods. In the event of personal injury or damage to property or business arising from the use of the goods, Buyer shall, within forty-eight (48) hours thereafter, give Seller written notice of such injury or damage. Buyer shall cooperate with Seller in investigating any such injury or damage and in the defense of any claims arising therefrom.

If Buyer fails to comply with this section or if any injury or damage is caused, in whole or in part, by Buyer's failure to comply with applicable federal or state safety requirements, Buyer shall indemnify and hold Seller harmless against any claims, loss or expense for injury or damage arising from the use of the goods.

GOVERNING LAW -

This agreement shall be governed by and construed under the laws of the State of New York.

DELIVERY AND DELAYS -

Unless otherwise specified herein, deliveries shall be F.O.B. Seller's point of shipment and risk of loss shall pass to Buyer upon Seller's delivery to carrier. All shipping dates are approximate and Seller shall not be liable for loss or damage because of delays occasioned by labor disputes, damage to facilities, or failure of suppliers or subcontractors to meet scheduled deliveries or any other cause beyond Seller's reasonable control or making its performance commercially impracticable.

Notwithstanding other provisions hereof, if shipment is delayed at Buyer's request, the goods shall be deemed to be stored at Buyer's risk and expense and Seller may thereupon bill Buyer for the full price and storage costs. Buyer shall pay such bill within 30 days after mailing thereof.

BUYER'S INSPECTION UPON RECEIPT OF SHIPMENT -

Buyer shall inspect the goods as soon as received. If any loss or damage is discovered, Buyer must notify both the carrier and Seller at once. Seller will cooperate with Buyer in filing claims with the carrier.

CHANGES AND CANCELLATION -

Seller reserves the right to change or cancel any order whenever circumstances require allocation of production or delivery or Seller deems change or cancellation to be necessary to comply with applicable laws, ordinances, regulations, directives or administrative actions. Seller reserves the right to make changes in materials or design which it determines appropriate for the goods.

SECURITY INTEREST AND REPOSSESSION -

Until full payment has been made therefor, Seller shall have a security interest in goods shipped to Buyer and the goods shall remain personal property. Upon request Buyer shall execute and deliver to Seller security agreements and financing statements further evidencing Seller's security interest. Buyer authorizes Seller to file a financing statement or statements relating to the goods, without Buyer's signature thereon, as Seller may deem appropriate and appoints Seller as Buyer's attorney-in-fact for the limited purpose of executing (without requiring Seller to do so) financing statements in Buyer's name and performing other acts which Seller deems appropriate to perfect and continue its security interest and to protect and preserve the goods.

In the event Buyer defaults in making any payment due Seller, Seller in addition to any other rights or remedies provided by law, shall have the right, with or without legal process, to enter the place where said goods are located and to repossess the goods in accordance with the Uniform Commercial Code.

ASSURANCES -

Shipment by Seller shall at all times be subject to the prior approval of its credit personnel and Seller may, at any time, decline to make shipment except upon receipt of prior payment or upon other terms and conditions or security satisfactory to such personnel.

PATENTS -

Except as to goods manufactured according to design supplied by Buyer, Seller will defend and hold Buyer free and harmless in a suit or proceeding brought against Buyer insofar as it is based on a claim that use of the goods by Buyer constitutes an infringement of any existing U.S. Patents, provided, however, that Buyer gives Seller prompt written notice of such suit or proceeding; permits Seller, through its counsel, to defend and/or settle the same; and gives Seller all necessary information, assistance and authority to enable Seller to do so. If Buyer's use of the goods is held to constitute infringement and further use is enjoined, Seller shall, at its option, either (i) procure for Buyer the right to continue using the goods; or (ii) replace the goods with non-infringing goods; or (iii) modify the goods to non-infringing goods. The foregoing states Seller's entire liability for patent infringement and shall not be construed to render Seller liable for damages based on product output.

MISCELLANEOUS -

This instrument constitutes the entire agreement between Seller and Buyer, superseding all previous understandings and writings regarding this transaction. Any amendment or modification of this Agreement shall be void unless in writing and signed by Seller.

No delay or omission by Seller in exercising any right or remedy hereunder shall be a waiver thereof or of any other right or remedy, and no single or partial exercise thereof shall preclude any other or further exercise thereof or the exercise of any other right or remedy. All rights and remedies of Seller are cumulative.

Sales made pursuant to this Agreement shall be governed by the Uniform Commercial Code as the same may from time to time be construed and in effect in the state wherein Seller has its main office.

ARBITRATION -

All disputes that may arise between the parties regarding the interpretation of the contract and the legal effect of the contract shall, to the exclusion of any court of law, be arbitrated and determined in accordance with the latest Commercial Arbitration Rules of the American Arbitration Association. The arbitration proceeding shall be held in the city in that state where the principal office of the Seller is located. The parties recognize and consent to the above mentioned arbitration association's jurisdiction over each and every one of them.

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