ELS™ Rotary Joints

For steam and thermal oil service

KADANT
AN ACCENT ON INNOVATION

Self-aligning rotary joint with dual carbon bearing support.

Engineered reliability and performance.

Table of Contents

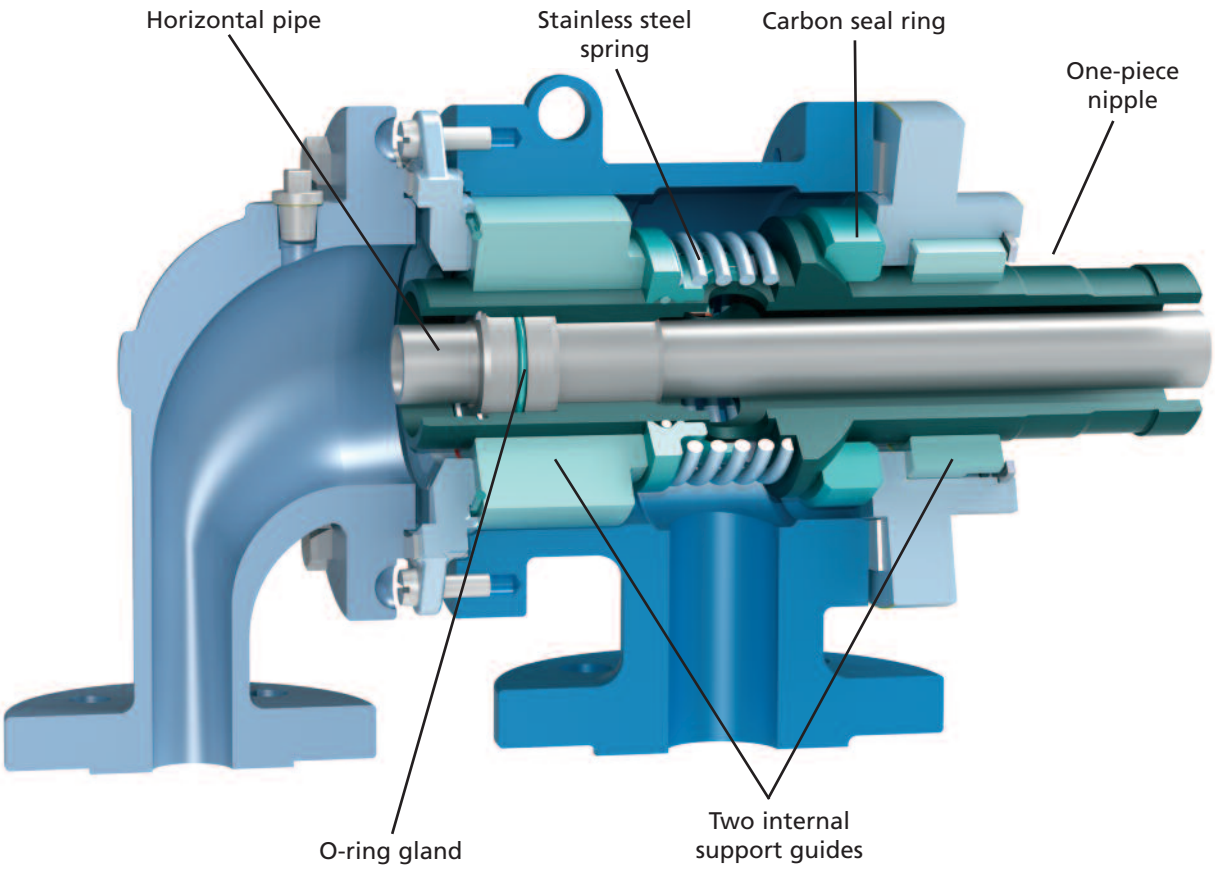
Quick Select Chart

Type	Media			Pressure (Max.) Thermal Oil/Steam	Temperature Thermal Oil/Steam	Speed (RPM)
	Water	Thermal Oil	Steam	BAR	(Max.) °C	
2" to 3½"	●	●	●	10/20	343/288	200
4"	●	●	●	10/50	343/288	200
5"	●	●	●	10/40	343/288	200
6½" to 14"	●	●	●	10/20	343/288	15

● Recommended
● Acceptable
● Not Recommended

Do not operate unions at maximum values of pressure, temperature, and speed.

Overview ELS



The ELS™ rotary joint is designed for use with steam and thermal oil service. The double-guide design provides internal support for the rotary joint and maintains alignment even when the roll or cylinder is not concentric. The ELS rotary joint is available in sizes ranging from 2" to 14" and is rated up to 343°C, 50 bar, and 200 RPM.

The ELS rotary joint is manufactured according to Pressure Equipment Directive - PED 97/23/EC.

Features

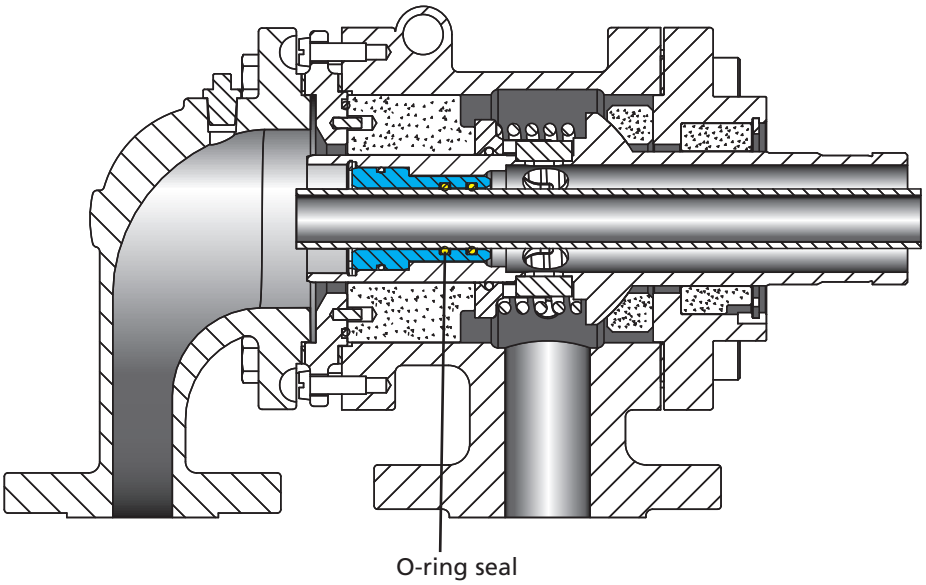
- Designed for steam and thermal oil
- Two internal support guides
- Standard o-ring or preformed packing
- Stationary or rotating horizontal pipe
- Flexibility in mounting

Benefits

- Application flexibility, simplified inventory
- Increased reliability and performance
- Reduced handling time, easy to maintain
- Extended operating life
- No special installation tools required

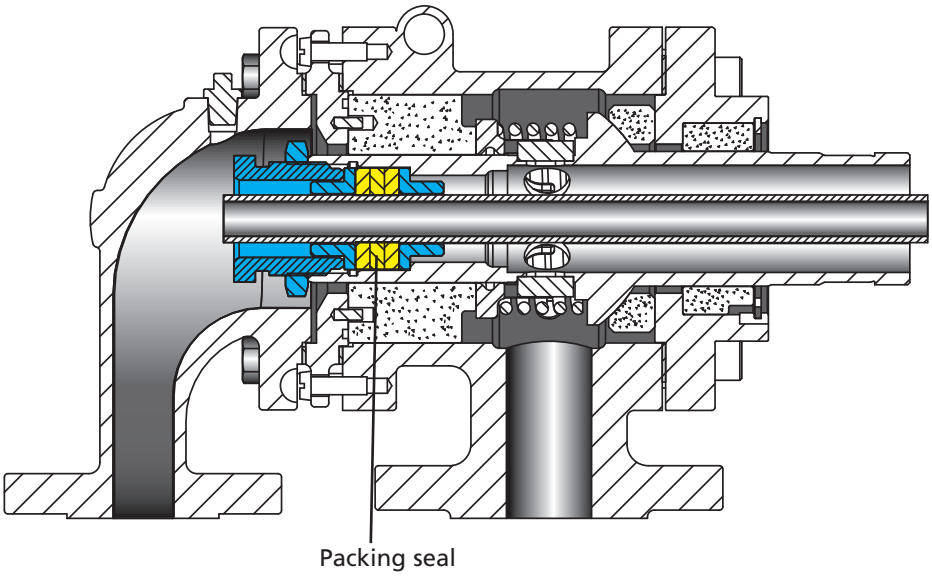
Syphon Seal Options

O-ring gland seal option for steam up to 3˝



Packing gland seal option for steam 3½˝ to 14˝

Packing gland seal option for thermal oil up to 14˝



ELSN 2" to 3"

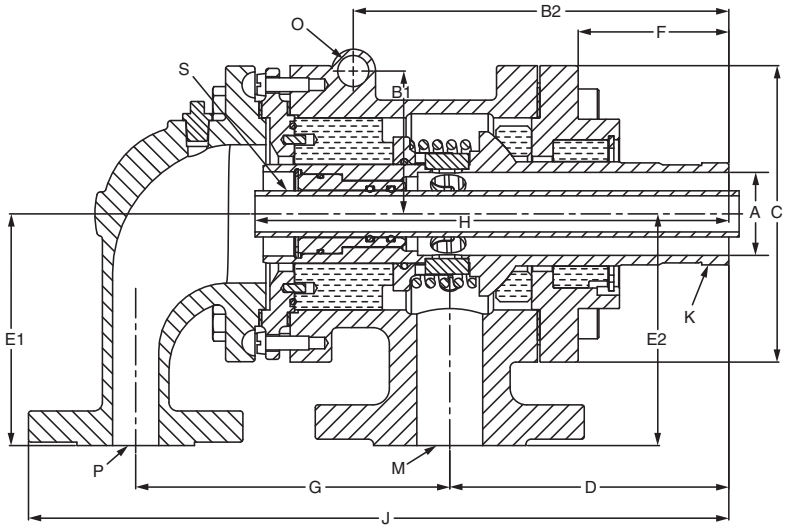
Dual flow

Standard ELSN Ratings

Media:	Steam	Oil
Pressure:	20 bar*	10 bar
Temperature:	288°C	288°C**
Speed:	200 RPM	200 RPM

* For pressure above 20 bar, please consult Kadant Johnson.

** For higher temperatures up to 343°C, please consult Kadant Johnson.

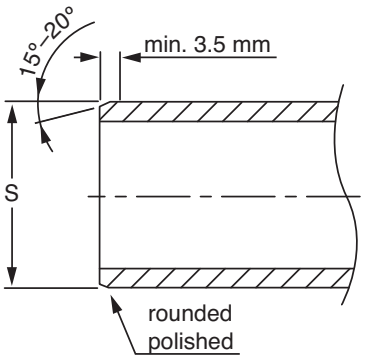


Media: Steam/Thermal Oil*

Model	Size (K)*	Steam Part ID	Oil Part ID	M*	P*	S**	A	B1	B2	C	D	E1	E2	F	G	H	J	O
2550	2"	997.129/0001	997.130	DN40PN40	DN25PN40	3/4"	48	83	217	171	161	134	134	87	182	274	405	18
		997.129/0002	997.130			1"												
2600	2 1/2"	997.126/0002	997.127	DN50PN40	DN32PN40	1"	59	92	256	184	189	138	138	107	205	330	464	22
		997.126/0001	997.127/0001			1 1/4"												
2700	3"	997.121/008	997.219	DN65PN40	DN40PN40	1"	73	103	285	200	209	152	147	120	232	365	518	27
		997.121/006	997.219/003			1 1/4"												

** For additional connection sizes, please consult Kadant Johnson.* *Dimensions are in mm, are for reference only and subject to change.*

*** For steam rotary joints, the syphon pipe must be rounded according to the figure below.*



ELSN 3½" to 5"

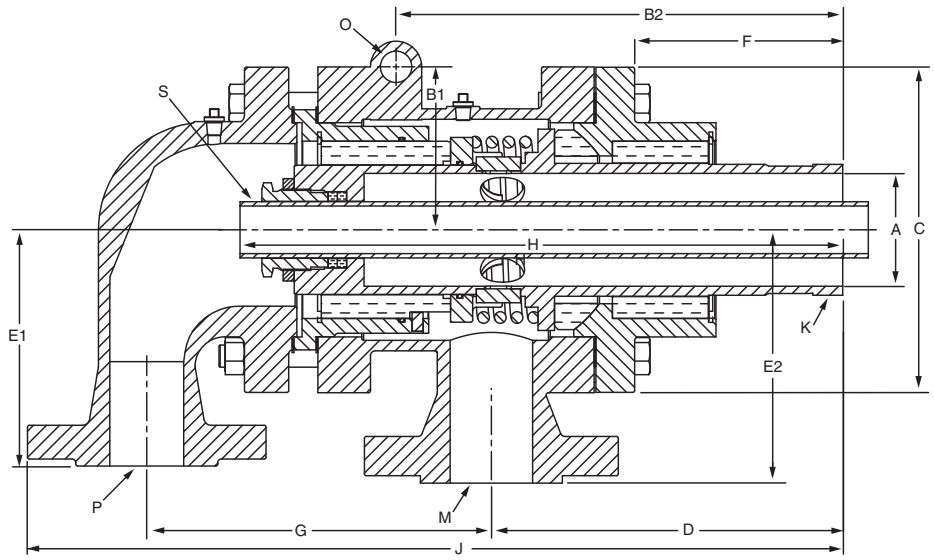
Dual flow

Standard ELSN Ratings

Media:	Steam	Oil
Pressure:	20/40/50 bar*	10 bar
Temperature:	288°C	288°C**
Speed:	75 RPM	75 RPM

* Standard up to 20 bar (3½"), 50 bar (4") and 40 bar (5"). For different pressures, please consult Kadant Johnson.

** Standard up to 288°C. For higher temperatures up to 343°C, please consult Kadant Johnson.



Media: Steam/Thermal Oil*

Model	Size (K)*	Steam Part ID	Oil Part ID	M*	P*	S*	A	B1	B2	C	D	E1	E2	F	G	H	J	O
2750	3½"	997.123/0001	997.124	DN80PN40	DN40PN40	1¼"	84	119	373	235	263	165	165	160	277	477	618	27
		997.123/0002	997.124		DN50PN40													
2800	4"	997.011/0005	997.221	DN80PN40	DN65PN40	2" – 2½"	95	140	384	280	302	203	218	179	293	518	698	27
2950	5"	997.012/0003	997.222/0001	DN100PN40	DN80PN40	3"	120	165	508	349	400	254	264	232	354	663	859	34

** For additional connection sizes, please consult Kadant Johnson.*

Dimensions are in mm, are for reference only and subject to change.

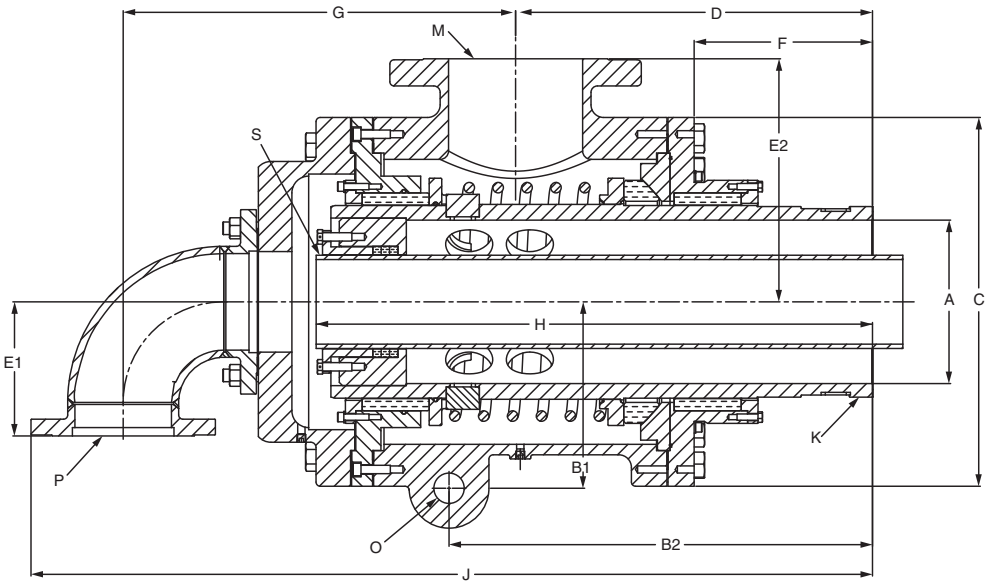
ELSN 6½" to 14"

Dual flow

Standard ELSN Ratings

Media:	Steam*
Pressure:	20 bar
Temperature:	288°C
Speed:	15 RPM

* For other media, please consult Kadant Johnson.



Media: Steam

Model	Size (K)*	Steam Part ID	M*	P*	S*	A	B1	B2	C	D	E1	E2	F	G	H	J	O
1050	6½"	997.051	DN200PN40	DN100PN40	4"	165	202	333	381	395	164	267	207	479	631	1.000	33
1150	8½"	997.052	DN200PN40	DN150PN40	5"	222	260	540	486	457	304	337	220	605	690	1.164	62
1200	10"	997.027	DN200PN40	DN150PN40	5"	248	282	642	560	542	304	368	268	710	860	1.401	78
1400	12"	N/A	DN250PN40	DN200PN40	7"	292	307	728	605	608	343	389	341	664	923	1.448	67
1600	14"	N/A	DN300PN40	DN250PN40	7"	343	356	882	699	712	356	470	366	762	1.067	1.702	89

** For additional connection sizes, please consult Kadant Johnson.*

Dimensions are in mm, are for reference only and subject to change.

N/A = Not Available

ELST

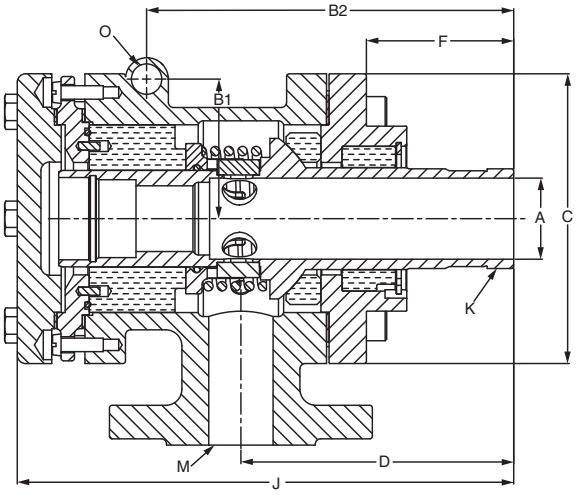
Single flow

Standard ELST Ratings

Media:	Steam	Oil
Pressure:	20 bar*	10 bar
Temperature:	288°C	288°C**
Speed:	200 RPM	200 RPM

* For pressure above 20 bar, please consult Kadant Johnson.

** For higher temperatures up to 343°C, please consult Kadant Johnson.



Media: Steam/Thermal Oil*

Model	Size (K)*	Steam Part ID	Oil Part ID**	M*	A	B1	B2	C	D	E	F	J	O
2550	2"	997.132	CF	DN40PN40	48	83	217	171	159	134	85	292	18
2600	2 1/2"	N/A	CF	DN50PN40	59	92	256	184	190	138	107	347	22
2700	3"	N/A	CF	DN65PN40	73	103	285	200	209	147	120	376	27
2750	3 1/2"	997.137	CF	DN80PN40	84	119	373	235	263	165	160	473	27
2800	4"	997.138	CF	DN80PN40	95	140	384	280	302	218	179	514	27
2950	5"	997.139	CF	DN100PN40	120	165	508	349	400	264	232	638	34
1050	6 1/2"	N/A	CF	8"	165	202	333	381	395	267	208	626	33

** For additional connection sizes, please consult Kadant Johnson.*

*** For oil part ID numbers, please consult Kadant Johnson.*

Dimensions are in mm, are for reference only and subject to change.

CF = Consult Factory

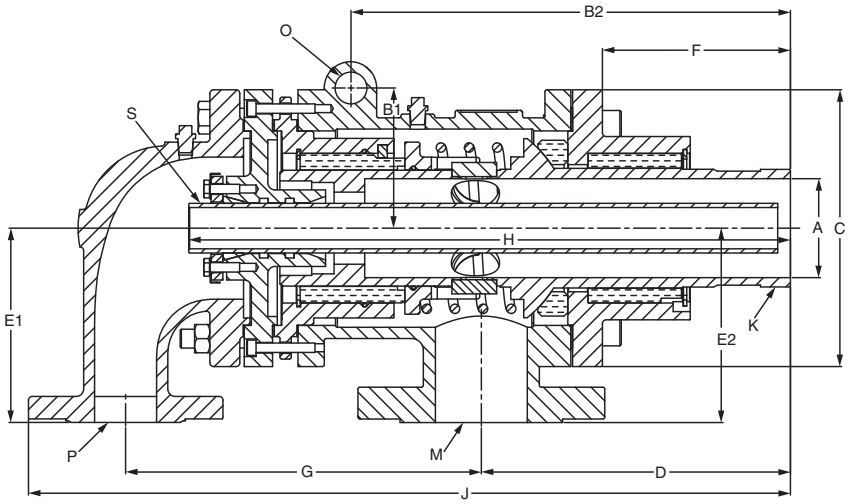
N/A = Not Available

ELSJ 2" to 3½"

Dual flow

Standard ELSJ Ratings

Media:	Steam
Pressure:	20 bar
Temperature:	288°C
Speed:	200 RPM



Media: Steam/Thermal Oil*

Model	Size (K)*	Steam Part ID	M*	P*	S*	A	B1	B2	C	D	E1	E2	F	G	H	J	O
2550	2"	997.133/0001	DN40PN40	DN25PN40	3/4"	48	83	217	171	161	134	134	87	203	319	426	18
		997.133/0002			1"												
2600	2 1/2"	997.134/0001	DN50PN40	DN32PN40	1"	59	92	256	184	189	138	138	107	225	372	485	22
		997.134/0002			1 1/4"												
2700	3"	997.135/0001	DN65PN40	DN40PN40	1"	73	103	285	200	209	152	147	120	247	404	533	27
		997.135/0002			1 1/4"												
2750	3 1/2"	997.136/0001	DN80PN40	DN40PN40	1 1/4"	84	165	373	235	263	165	165	160	301	510	647	27
		997.136/0002		DN50PN40													

** For additional connection sizes, please consult Kadant Johnson.*

Dimensions are in mm, are for reference only and subject to change.

ELSJ 4" to 5"

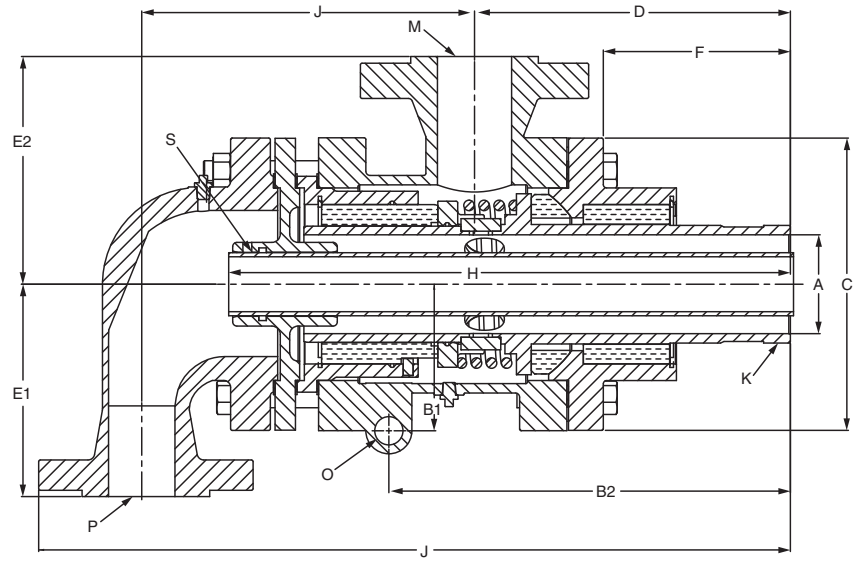
Dual flow

Standard ELSJ Ratings

Media:	Steam	Oil
Pressure:	40/50 bar*	10 bar
Temperature:	288°C	288°C**
Speed:	75 RPM	75 RPM

* Standard up to 50 bar (4") and 40 bar (5"). For different pressures, please consult Kadant Johnson.

** For higher temperatures up to 343°C, please consult Kadant Johnson.



Media: Steam/Thermal Oil*

Model	Size (K)*	Steam Part ID	Oil Part ID	M*	P*	S*	A	B1	B2	C	D	E1	E2	F	G	H	J	O
2800	4"	997.019	997.228	DN80PN40	DN65PN40	2" – 2 1/2	95	140	384	280	302	203	218	179	293	518	698	27
2950	5"	997.024	997.229	DN100PN40	DN80PN40	3"	120	165	508	349	400	254	264	232	354	663	859	34

** For additional connection sizes, please consult Kadant Johnson.*

Dimensions are in mm, are for reference only and subject to change.

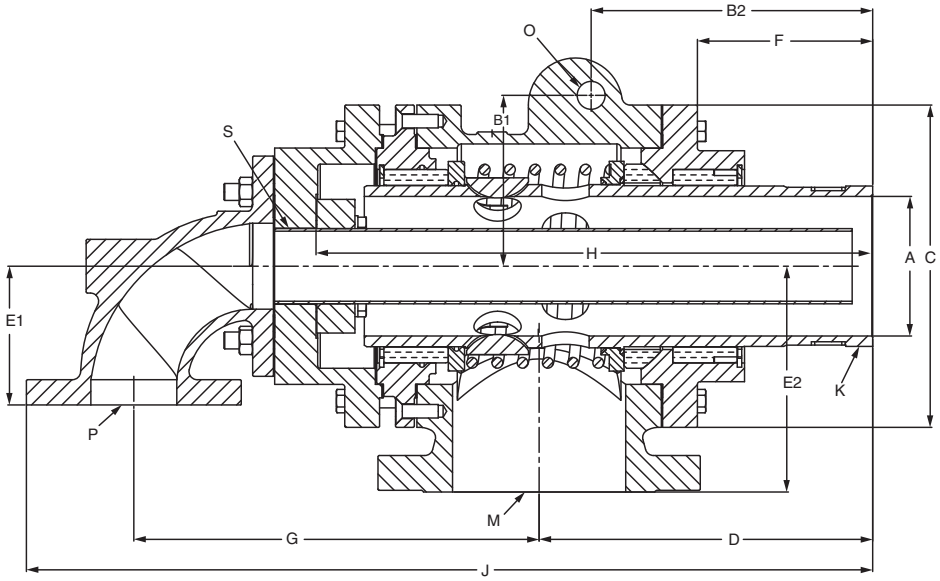
ELSJ 6½" to 14"

Dual flow

Standard ELSJ Ratings

Media:	Steam*
Pressure:	20 bar
Temperature:	288°C
Speed:	15 RPM

* For other media, please consult Kadant Johnson.



Media: Steam*

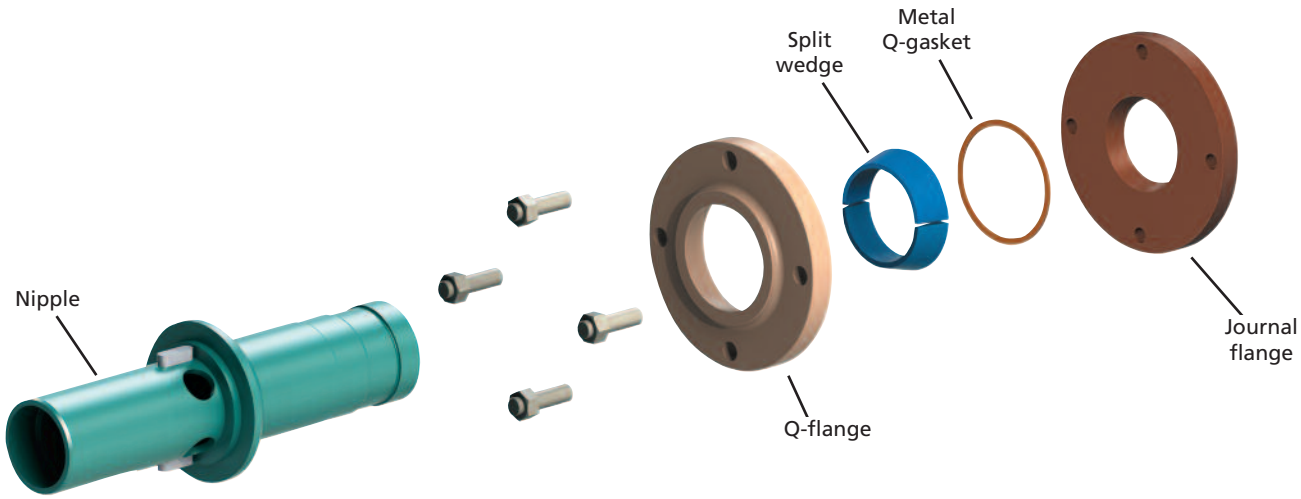
Model	Size (K)*	Steam Part ID	M*	P*	S*	A	B1	B2	C	D	E1	E2	F	G	H	J	O
1050	6½"	997.050	DN200PN40	DN100PN40	4"	165	202	333	381	395	164	267	207	479	631	1.000	33
1150	8½"	997.053	DN200PN40	DN150PN40	5"	222	260	540	486	457	304	337	220	605	690	1.164	62
1200	10"	997.028	DN200PN40	DN150PN40	5"	248	282	642	560	542	304	368	268	710	860	1.401	78
1400	12"	N/A	DN250PN40	DN200PN40	7"	292	307	728	605	608	343	389	341	664	923	1.448	67
1600	14"	N/A	DN300PN40	DN250PN40	7"	343	356	882	699	712	356	470	366	762	1.067	1.702	89

** For additional connection sizes, please consult Kadant Johnson.*

Dimensions are in mm, are for reference only and subject to change.

N/A = Not Available

Quick Release Flange



Nipple and journal flange not included in set.

Model	Rotary Joint Size	Flange (n)	Flange Set Steam	Flange Set Oil	Flange	Split Wedge	Gasket Copper Steam	Gasket Aluminium Oil
2550	2"	4 holes	050.306	050.406	050.006	550.006	080.056	080.105
2600	2½"	4 holes	050.307	050.407	050.007	550.007	080.057	080.106
2700	3"	4 holes	050.317	050.417	050.011	550.008	080.058	080.107
		5 holes	050.308	050.408	050.008	550.008	080.058	080.107
		6 holes	050.318	050.418	050.012	550.008	080.058	080.107
2750	3½"	6 holes	050.309	050.409	050.009	550.009	080.059	080.108
		8 holes	050.310	050.410	050.010	550.009	080.059	080.108
2800	4"	6 holes	050.311	050.411	050.011	550.010	080.060	080.109
		8 holes	050.312	050.412	050.012	550.010	080.060	080.109
2950	5"	8 holes	050.313	050.413	050.013	550.013	080.061	080.110
1050	6½"	12 holes	050.340	050.440	050.040	550.040	080.063	080.112
1150	8"	8 holes	050.320	–	050.015	550.014	080.064	–
		12 holes	050.316	–	050.016	550.014	080.064	–
1200	10"	CF	CF	CF	CF	CF	CF	CF
1400	12"							
1600	14"							

CF = Consult Factory.

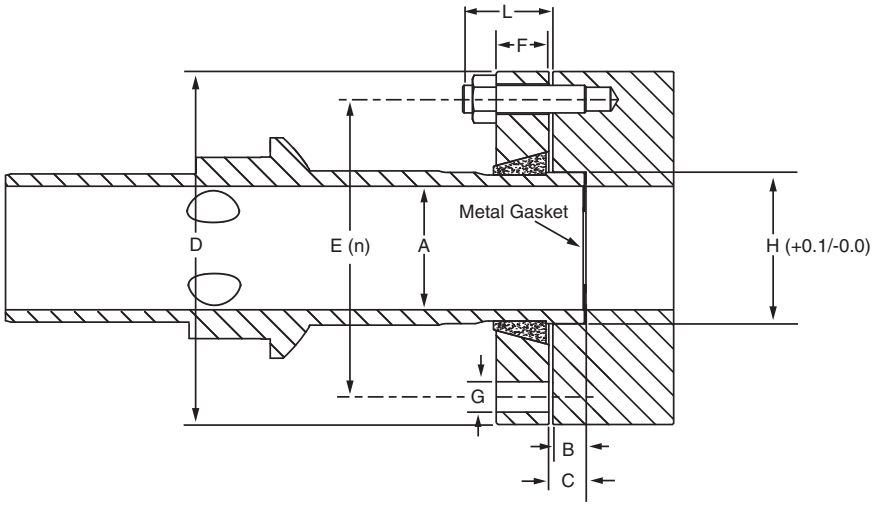
Quick Release Flanges are used for increased ease of installation and reduced maintenance cost. The Quick Release Flange can be used for steam, water, oil, and all other media which passes through the rotary joint.

Features

- Split wedge construction for ease of installation
- Q-Flange can be used for LH and RH rotation
- Gaskets for different media
- Mounting with multiple bolts
- Sizes available from 2" up to 14"

Benefits

- Reduced installation and maintenance times
- Reduced inventory levels
- Application for all media
- Easy installation with hand tools



Model	Rotary Joint Size	A	B	C	D	E	F	G	H	L	n	Torque (Nm) Copper Gasket	Torque (Nm) Aluminium Gasket	Kg
2550	2"	48	13	15,9	165	120,6	20	14,25	59,1	M12x40	4	29	25	2,6
2600	2½"	59	16	19	165	120,6	20	14,25	72,1	M12x40	4	34	28	2,5
2700	3"	73	19	22,2	203	171,5	31	17,5	87,3	M16x55	4	72	62	5,9
											5	66	57	
											6	61	54	
2750	3½"	85	20	25,4	216	177,8	32	17,5	100	M16x55	6	66	57	6,4
								14,25		M12x55	8	31	26	
2800	4"	97	20	25,4	229	190,5	35	17,5	112,7	M16x60	6	71	61	7,6
											8	63	56	
2950	5"	122	25	32	292	235	39	22	139,2	M20x70	8	117	104	13,8
1050	6½"	171,5	25	33	380	305	44,5	22	190,2	M20x100	12	117	105	30
1150	8"	184	25	32	380	305	44,5	22	203	M20x75	8	142	121	28
											12	121	107	
1200	10"	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF	CF
1400	12"													
1600	CF													

CF = Consult Factory.

Dimensions are in mm, are for reference only and subject to change.

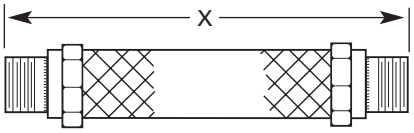
Recommendations

Installation
Before the installation of the ELS joint, please carefully read the Installation sheet that can be found on our website (http://www.kadant.com/en/product-literature).

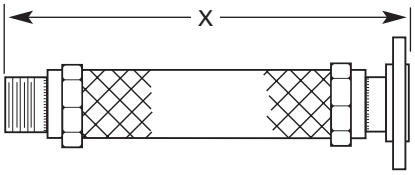
Flexible hose
To ensure free movement of the rotary joint and elimination of side loading, the proper installation, type, and length of flexible hose should be used.

Recommended hose length, bend, and offset (mm)

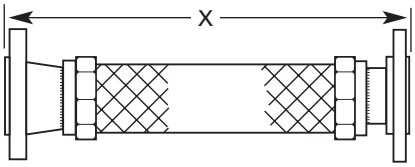
Pipe Size	Minimum Length (X)	Minimum Bend Radius	Maximum Offset
1"	375	225	38
1¼"	450	250	50
1½"	450	300	50
2"	525	375	50
2½"	550	355	60
3"	600	425	60
4"	700	550	75
5"	750	700	60
6½"	850	850	60



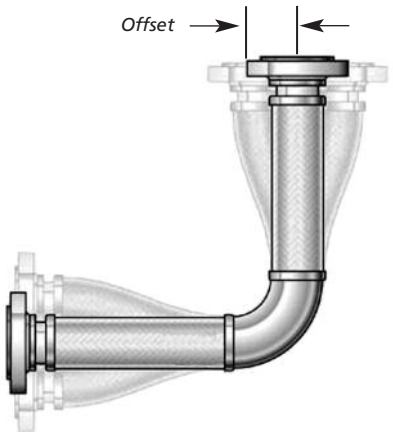
Threaded both ends



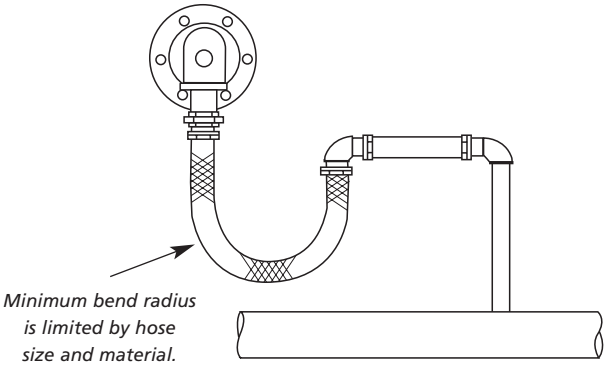
Threaded one end, lap flange other end



Fixed flange one end, lap flange other end

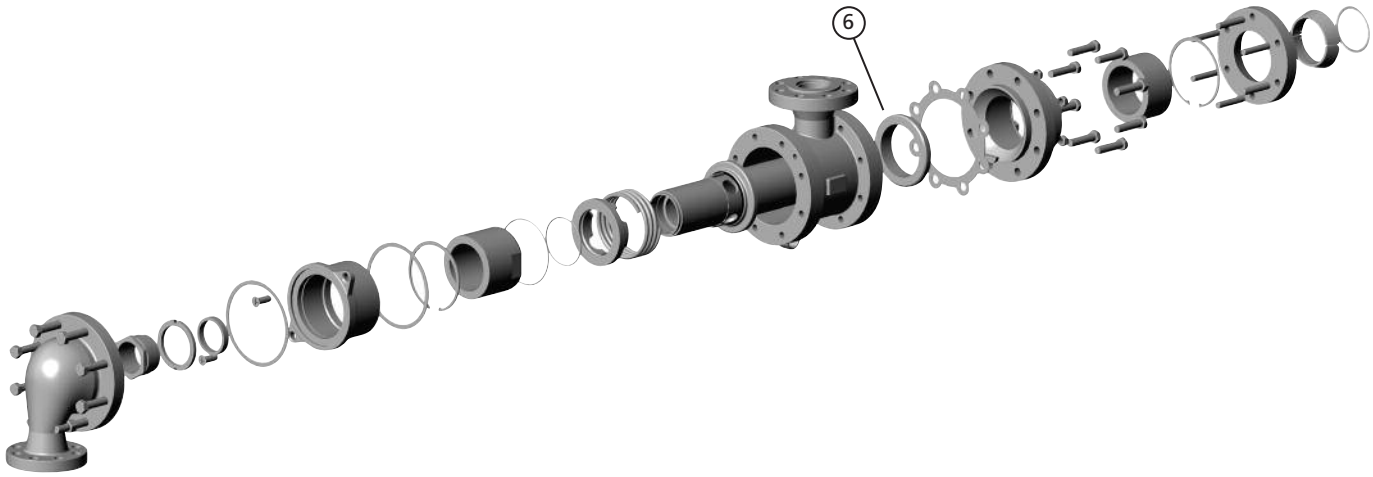


Compound hose (recommended)


Minimum bend radius is limited by hose size and material.

Filtration
It is important to follow the filtration requirements recommended by the machinery manufacturer. ELS rotary joints do not require additional filtration other than what is recommended for the fluid circulation system (typically 40–60 micron).

Guarantee
ELS rotary joints are tested and warranted against manufacturing defects for 12 months. Kadant Johnson's global sales and service network stands behind its products and provides support to more than 150 countries worldwide.



Procedure for determining seal ring wear

Check the rotary joint regularly to determine seal ring (6) wear. As shown in Figure 1, the shoulder of the nipple will be exposed as seal ring wear occurs. Should the seal ring (6) wear away completely, the metal nipple can wear into the wear plate and eventually through it. This will result in a significant leak and create a hazardous condition. Lack of attention may require replacement of the entire rotary joint instead of just the seal ring.

Step 1.
Locate the shoulder that has been machined into the rotary joint nipple. See Figure 1.

Step 2.
As the rotary joint moves, the shoulder on the rotary joint's nipple is exposed.

Step 3.
Refer to Table 1 and determine the maximum seal ring wear for your rotary joint size.

Step 4.
When the exposed shoulder on the nipple is equal to the dimension in Step 3, the rotary joint should be rebuilt.

Anti-rotation
The anti-rotation rod performs two functions: (1) To prevent the rotary joint from turning off the center of rotation due to torque. (2) To minimize stress on the flexible hoses due to rotary joint rotation.

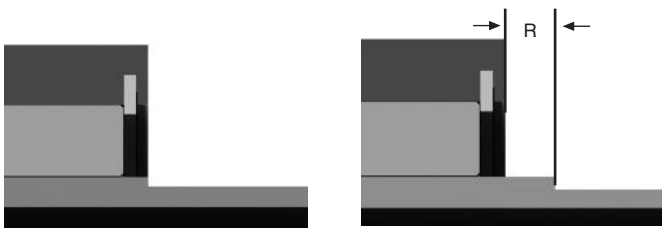
A properly sized anti-rotation rod needs to be placed into the lug hole of the rotary joint (see Table 2). For rotary joints that operate above 13 bar, a solid rod, rather than a pipe, should be used. Please refer to the rotary joint drawing for anti-rotation rod size requirements or contact Kadant Johnson.

TABLE 1
MAXIMUM SEAL RING WEAR (R)

Rotary Joint Size	Seal Wear	
3/4″	1/4″	6 mm
1″	1/3″	9 mm
1 1/4″	3/8″	10 mm
1 1/2″	5/16″	8 mm
2″	1/3″	9 mm
2 1/2″	3/8″	10 mm
3″	7/16″	11 mm
3 1/2″	7/16″	11 mm
4″	9/16″	14 mm
5″	9/16″	14 mm
6 1/2″	7/16″	11 mm
7 1/2″	11/16″	18 mm
8″	13/16″	21 mm

TABLE 2
RECOMMENDED SIZES FOR ANTI-ROTATION RODS

Rotary Joint Size	Rotary Joint Number	Use Schedule 80 Pipe Size	
2″	2550	1/4″	6 mm
2 1/2″	2600	3/8″	10 mm
3″	2700	1/2″	12 mm
3 1/2″	2750	3/4″	18 mm
4″	2800	1″	25 mm
5″	2950	1″	25 mm



New installation

When nipple shoulder is exposed by "R", seal should be replaced. See Table 1.

Figure 1. Seal ring wear indicator shoulder

Engineering Data

Kadant Johnson seal rings are made of proprietary materials that meet or exceed six critical qualification criteria. Based on results from the Seal Laboratory at the Kadant Johnson Research Centre, only a select group of seal rings are qualified for use in Kadant Johnson rotary joints.

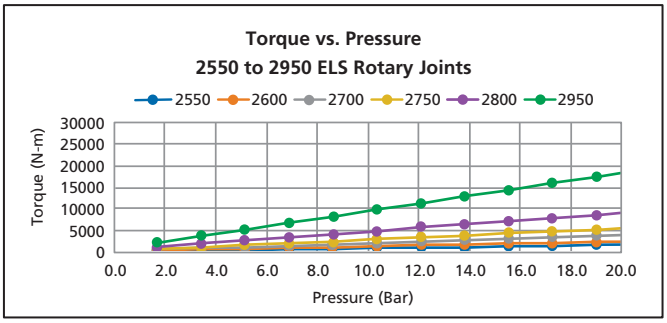
Kadant Johnson can provide seal materials for specific food, pharmaceutical, or chemical industries regulated by the FDA. Those materials comply with the high Kadant Johnson standards. Seal life may vary from the standard seal materials based on the specific application.

For steam service, Kadant Johnson uses Silver Streak seal rings. Silver Streak seals can last up to three times longer than resin seals and are usually applied to high-pressure or high-speed applications.

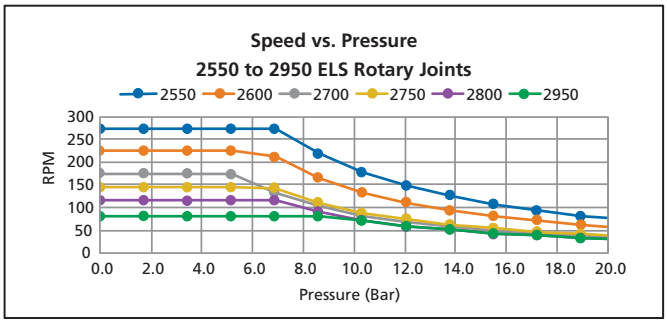
Thermal oil
The ELS rotary joints are available in a special configuration for thermal oil applications. Using a Silver Streak seal ring with distinctive seal geometry and seal loading, the ELS rotary joints can operate on oil service up to 343°C (available on request).

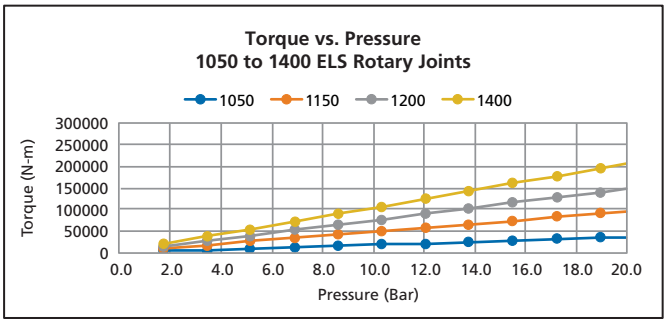
PV Curves

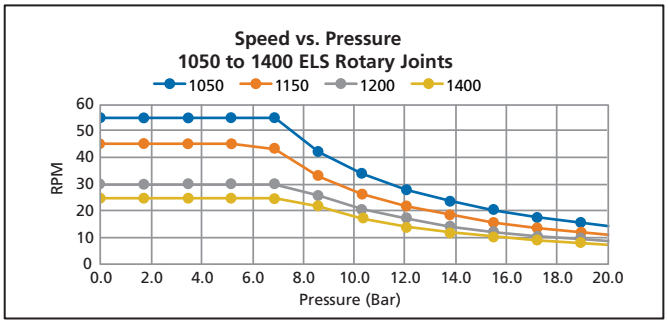
Torque vs. Pressure



Speed vs. Pressure







Other Rotary Joints

SX® rotary joint for steam and thermal oil (¾" to 3")
The SX rotary joint is designed for steam and thermal oil applications. Its two internal carbon-graphite bearings permit self-alignment and long operating life – even on cylinders that are not concentric. The convex seal ring and optimized seal diameter provide extended seal life and reduced maintenance for the SX rotary joint. The SX rotary joint line is available in sizes from ¾" to 3" and can be used in single or dual flow applications. The rotary joint is rated up to 343°C, 20 bar, and 550 RPM.

SNX™ rotary joint for steam and thermal oil (2" to 4")
The dual-flow SNX rotary joint is designed for rotating syphon applications and features two carbon guides with maximum separation for increased operating life and syphon support. The SNX rotary joint also offers greater reliability with its positive differential seal between the rotating nipple and spring shoulder. The SNX is a robust rotary joint that performs well in steam and thermal oil applications. The SNX rotary joint line is available in sizes from 2" to 4" and can be used in dual flow applications. The rotary joint is rated up to 288°C, 20 bar, and 450 RPM.

RX® rotary union for water, thermal oil, and air (⅜" to 6")
The RX rotary union features a balanced seal and carbon-to-tungsten carbide seal package that makes the RX rotary union more robust and able to run longer than other ball bearing designs. The RX rotary union is supported by two widely-spaced anti-friction bearings, capable of intermittent dry running, and has the balanced seal-loading springs located outside the flow area to minimise potential for fouling. The RX rotary union is rated up to 260°C, 13 bar, and 3.500 RPM.

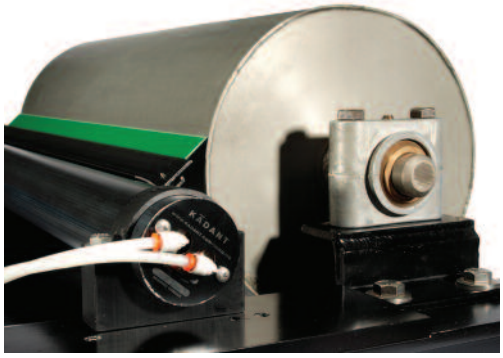
Special ELS™ 4-way rotary joint
This multi-passages joint has been developed on special demand for a specific industry. Similar versions can be applied for various industries. Rotary joints can be designed in such a way to integrate perfectly with the requirements of customised machines. For specific requirements, please contact Kadant Johnson.

Complementary Products

Sight flow indicators
Sight flow indicators are engineered to provide visual observation of liquid and non-hazardous gas flows. These pipeline indicators are available with ductile iron bodies in sizes ⅜" to 4" with threaded or flanged connections. All glass windows are made of borosilicate glass. Sight flow indicators can be furnished with special transparent-type Mica liners to provide additional protection against glass erosion.

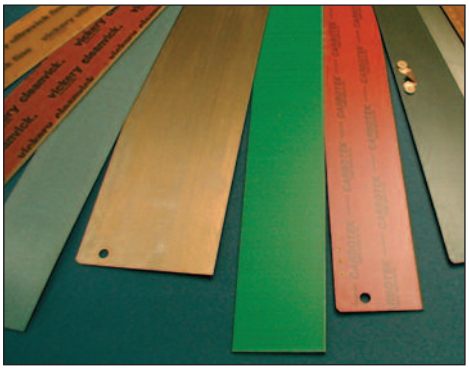
Pivot Body™ syphon elbow
The Pivot Body syphon elbow allows a syphon pipe to be inserted into a roll through the journal and then pivot into place. Unlike conventional syphon elbows, the Pivot Body syphon elbow does not rely on a hinge pin to hold vertical and horizontal pipes together. Its patented pinless design provides improved performance and increased reliability compared to conventional syphon elbows. U.S. Patent No. 7,618,068.

Nozzles
A wide variety of nozzles are available for various industrial applications. These include both fan and needle jet nozzles constructed in stainless steel, brass, and other corrosion resistant materials with standard and custom fitting connections. Each nozzle is individually tested for pattern integrity.

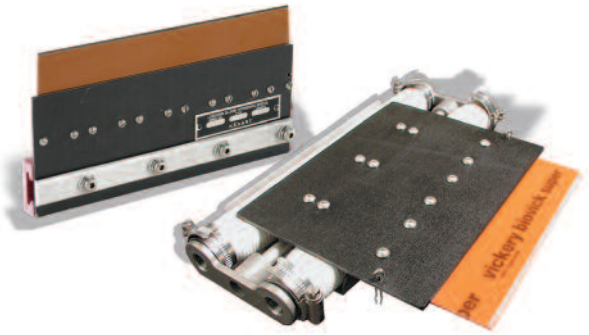


Roll cleaning systems
Kadant roll cleaning systems provide a compact and unique technology that offers improved cleaning results for increased uptime and reduced maintenance costs in a variety of industrial roll and belt cleaning applications including drum flaking, fibre processing, filtration, and metal processing. Roll cleaning systems provide precise blade load adjustment and quick blade change.

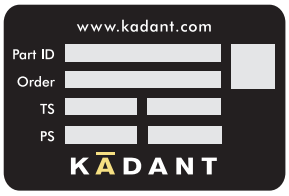
Roll cleaning blades
Roll cleaning blades are used in a variety of industries and applications including fibre processing, converting, corrugating, printing, roofing, steel, and food processing. Kadant offers more than 60 blade materials including UHMW poly, fiberglass, carbon, and metal. Blade thickness, bevel, and other features are customer-engineered for the specific application requirements.



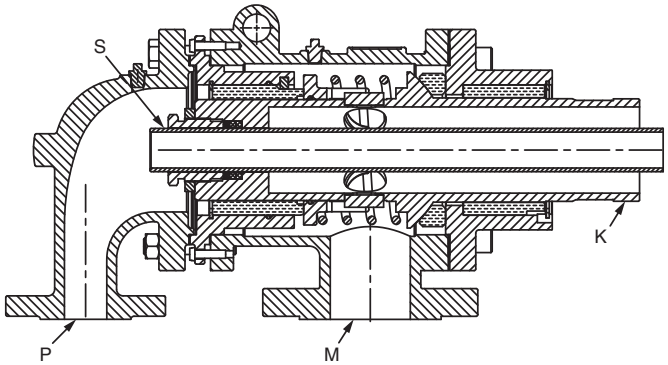
Roll cleaning blade holders and accessories
Roll cleaning blade holders feature quick and easy blade changing, precise adjustability, and flexible models that offer self-adjustability and uniform loading. Roll cleaning blade holders are available in steel, stainless steel, and lightweight composite materials.



Ordering information
If you have an existing Kadant Johnson rotary joint with a product label affixed to the housing, the Part ID written on the label is all that is required to order a replacement rotary joint. For new applications or if no Part ID is available, the following data are requested:



1. Number of passages (single flow or dual flow)
2. Nipple connection (threaded or Q-flange) (K)
3. Nipple thread (right- or left hand and type (K)
4. Supply pipe (none, fixed, or rotating) (S)
5. Fluid inlet connection (M)
6. Fluid outlet connection (P)
7. Media (steam, thermal oil or water)
8. Fluid pressure
9. Fluid temperature
10. Rotational speed (RPM)



Local Assistance On A Worldwide Basis

Many suppliers have made a commitment to the international marketplace. But few have taken that commitment as far as Kadant Johnson. To assure product availability wherever it's needed, Kadant Johnson rotary joints, syphons, and related equipment are manufactured in North America, Europe, South America, and Asia.

Because knowledgeable advice and prompt service are as important as the products, Kadant Johnson has factory-authorised representatives in nearly 150 countries. So no matter where you are, Kadant Johnson products, service, and assistance are nearby.

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ELS Rotary Joints-3002 (BR EN) 02/2016
Replaces: ELS Rotary Joints-3001 (BR EN)