

Rotary joints

Rotary joints

A vital part of a radar antenna system is the rotary joint, linking together the stationary part with the rotating part of the radar. The rotary joint must be capable of transmitting high microwave power with a minimum of losses while it is rotating, often at a high speed and in severe environments. Whatever the application is, SIVERS IMA probably have the rotary joint you need.

Our product range today, covers Single and Multichannel Joints, Waveguide with high power capacity, and Coaxial, from DC up to 40 GHz, Capacitive and Contacting. Integral Slip-ring options, Stackable and Around the Mast.

A few examples:

Application	Solution
SSR/IFF	3-ch coax
ATCR	2 waveguide + 4 coax
Airborne radar	2 waveguide
ESM	3-ch coax
Jammer	1 waveguide + 1 coax
Fire control	2 waveguide + 1 coax
Surveillance radar	1 waveguide + 2 coax



1. Six channel rotary joint SL 6768L/2
2. S-band U-type rotary joint PM 7364S
3. Around the mast coaxial rotary joint SL 6787
4. Two channel contacting rotary joint SL 6758
5. Double ridge rotary joint PM 7364DP
6. One channel WG rotary joint PM 7360P
7. Coaxial rotary joint DC-40 GHz PM 7889

General description

The part of a rotary joint which is containing the very joint must be electrically symmetrical. To achieve broad bandwidths, unwanted modes must be suppressed. Our solution for this, which applies for most rotary joints in this catalog, is to use a coaxial line carrying the symmetrical TEM-mode. A waveguide rotary joint is then achieved by means of coaxial to waveguide transitions. Some advantages with this solution are:

- high power handling capacity
- broad bandwidth
- different configurations are possible
- multi-channel joints can be realized

In a coaxial joint electrical continuity is maintained by the use of spring contacts or by $\lambda/4$ chokes.

Precious metal contacts extend the useful frequency range from the cutoff-frequency down to DC. Very compact designs are possible.

Quarter wave chokes require more space but have advantages such as long life, due to the absence of mechanical wear in the microwave circuit and simplicity.

All rotary joints in this catalog are ball-bearing supported. By a sort of preloading, the play of the ball-bearing is eliminated, which gives a very good centering and small gaps. Additionally, a proper lubrication reduces the torque.

Most joints are provided with seals to enable pressurization. Leakage test is performed at 0.2 MPa (2 ATO) overpressure. The leakage rate must not exceed 25 cc/min.

All SIVERS IMA rotary joints are fully tested before shipment and electrical performance is certified in writing.



Rotary joints

Rotary joint configurations

The following configurations are possible:

- U-style:** Two right-angle arms, one fixed to the housing. One free to rotate.
Advantages – About 50 percent higher peak power capacity than other configurations
Additional channels can easily be provided by using a hollow centre conductor.
- I-style:** Two in-line arms, one fixed to the housing. One free to rotate.
Advantages – Higher average power capacity than the U-style.
- F-style:** One in-line arm fixed to the housing, one right-angle arm free to rotate.
- L-style:** One right-angle arm fixed to the housing, one in line arm free to rotate.

Additional channels

- Dual-channel:** Two mechanically concentric, electrically isolated transmission lines designed to maintain electrical continuity for two signal paths under conditions of simultaneous mechanical rotation, with minimum cross-talk.
- Multi-channel:** Rotary joints with three or more concentric, electrically isolated transmission lines.

Definitions

- Life:** The life of a rotary joint depends on many factors, e.g. temperature, speed, gas pressure, mechanical loading conditions. For most rotary joints 50 million revolutions are guaranteed without maintenance.
- Speed:** The max rotational speeds are ranging from 5 rpm for pressurized L-band waveguide rotary joints to 2000 rpm for unpressurized coaxial rotary joints.
- WOW:** Rotational phase effects are negligible for all models. The variation of VSWR during rotation, the WOW, is defined as
$$\text{WOW} = \frac{\text{VSWR max}}{\text{VSWR min}}$$
- Starting torque:** Max starting torque (Nm) over the whole temperature range and at maximum specified pressure.
(1 Nm = 0.101972 kpm = 0.737562 ft · lbf)
- Pressurization:** Maximum permitted pressurization in atmosphere overpressure (ATO), or in megapascal difference (MPa diff).
- Temperature:** The rotary joints are designed for operating temperature range –40 to +85°C, and storage range of –70 to +125°C. Other temperature ranges require special seals and lubrication.
- Power:** The power capacity of the rotary joints is dependent on many factors, e.g. temperature, pressure, spurious and harmonic power, pulse length, repetition rate. Their relative influence is indicated on the chart on page 58.
Care must be taken not to use these data over too wide a range. For instance, the relationship between breakdown power of the waveguide and the pressure may change drastically if transition from volume breakdown to local breakdown occurs.
The figures of power capacity given in the tables are valid for +25°C, 0.1 MPa abs (1 ATA), 2 μs pulsewidth, 500 Hz repetition rate and matched load.
- Isolation:** Isolation between channels is normally 50 dB.

Slip-rings

The turntable of a radar antenna is not only used for microwave transmission but often also for various transmissions and control demands, e.g. antenna alignment. SIVERS IMA work close together with a leading European slip-ring manufacturer and thus can offer complete packages with built-in slip-rings.

The slip-ring package can be from a few rings built-in into the rotary joint to multi-slip-rings outside the joint. Common for all solutions are that the dimensions of the turntable may be reduced and that the electrical and microwave transmission of the turntable is integrated into one package. Another advantage is that when integrating the complete electrical/microwave-transmission into one package a reconstruction of the turntable is not always necessary when the whole system is to be refurbished.

The slip-rings can be conventional DC or AC rings for high currents or shielded high frequency rings for frequencies up to 300 MHz. Under development is also optical multi-channel slip-rings.

The slip-rings are mostly customer specified. On this page we show some examples of units delivered and we welcome your enquiries.



A three channel rotary joint with integrated 8-way slip-ring package.



This picture shows a small selection of our range of standard slipring assemblies. At the left side in front a 6-way module with a separate brush block is shown, to the right you see a 12-way slipring module and behind this a 3-way disc or pancake slip ring is shown.



An example of a 3 channel rotary joint with integrated slip-ring package – SL 6801X. The specification for the slip-ring unit shown is:

Number of channels	16 ways (isolated) 0.5 A, 26 V, 400 Hz or 0.5 A, 28 V, DC
Electrical noise:	Max 50 μ V/mA under following conditions: a) current 20 mA \pm 5 mA b) frequency band Dc to 1 Hz rotational speed max 150 rpm
Insulation resistance:	100 M Ω at 500 VDC
Operational life:	10.000 hours at 60 rpm

Waveguide rotary joints

Single-channel

The rotary joints described below are standard designs, but they are usually not stocks items. Our complete rotary program consists of several more, most of them customer specified, and we welcome your enquiries.

Waveguide size	Frequency range GHz	Model	Flanges ²⁾ mate	Power ¹⁾		VSWR	WOW
				peak kW	avg kW		
I-Style							
R 14 WR 650 WG 6	1.15– 1.45	PM 7360L	PDR 14	6000	30	1.15	1.02
R 32 WR 284 WG 10	2.7 – 3.4	PM 7360S	UAR 32	1000	7.5	1.20	1.02
R 58 WR 159 WG 13	5.9 – 6.4	PM 7360C	PDR 58	200	5	1.15	1.02
R 84 WR 112 WG 15	8.5 – 9.6	PM 7360H	UG-138/U	200	2	1.15	1.02
R 100 WR 90 WG 16	8.5 – 9.6	PM 7360X	UG-135/U	100	1	1.10	1.02
R100 WR 90 WG 16	8.2 –11.0	PM 7373X	UG-135/U	100	1	1.30	1.03
R 120 WR 75 WG 17	10.95–14.5	PM 7373M	UBR 120	30	0.5	1.50	1.03
R 140 WR 62 WG 18	12.4 –18.0	PM 7373P	UBR 140	15	0.2	1.60	1.05
R 140 WR 62 WG 18	15.5 –17.5	PM 7360P	UBR 140	30	0.5	1.15	1.03
L-Style							
R32 WR 284 WG 10	2.7–3.3	PM 7362S	UAR 32	1000	5	1.20	1.02
R 48 WR 187	5.4–5.9	PM 7362G	UAR 48	400	2	1.15	1.02
R58 WR 159 WG 13	5.4 – 5.9	SL 6791C	PDR 58/spec	90	2	1.15	1.05
R 84 WR 112 WG 15	8.5 – 9.6	PM 7362H	UG-138/U	200	1	1.15	1.02
WR 102	7.2 –10.8	PM 7362T	UG-1493/U	50	0.75	1.30	1.03
R 100 WR 90 WG 16	8.5 – 9.6	PM 7362X	UG-135/U	100	0.5	1.15	1.02
R 100 WR 90 WG 16	9.0 – 9.5	PM 7887X	UG-135/U	75	0.5	1.10	1.02
R 140 WR 62 WG 18	16.0 –17.0	PM 7362P	UBR 140	30	0.5	1.15	1.03
F-Style							
R 84 WR 112 WG 15	8.5 – 9.6	PM 7897H	UBR 135/U	200	1	1.15	1.02
WRD 750 D 24	7.5 –17.5	PM 7897DP	M 39000/3-072	20	0.35	1.50	1.05
U-Style							
R 14 WR 650 WG 16	1.25– 1.35	PM 7364L	UG-418A/U	3000	6	1.20	1.05
R 32 WR 284 WG 10	2.7 – 3.3	PM 7364S	UAR 32	1500	5	1.15	1.02
R 48 WR 187 WG 12	5.4 – 5.9	PM 7364G	UAR 48	700	3	1.15	1.02
R 84 WR 112 WG 15	8.5 – 9.6	PM 7364H	UG-138/U	250	1	1.10	1.02
WR 102	7.2 –10.8	PM 7364T	UG-1493/U	50	0.75	1.40	1.05
R 100 WR 90 WG 16	8.5 – 9.6	PM 7364X	UG-135/U	150	0.5	1.10	1.02
R 100 WR 90 WG 16	8.2 –12.4	PM 7371X	UG-135/U	75	0.5	1.30	1.03
R 140 WR 62 WG 18	14.0 –17.5	PM 7364P	UBR 140	60	0.3	1.15	1.04
WRD 475 D 24	4.75–10.8	PM 7364 DX	M 39000/3-36	30	0.7	1.50	1.05
WRD 750 D 24	7.5 –17.5	PM 7364 DP	M 39000/3-072	20	0.35	1.50	1.05

Finish: Chromate per MIL-C-5541A and dull black paint for aluminium
Silver and dull black paint for brass

Pressurization: 0.2 MPa diff (2 ATA)

Leakage: max 25 cc/min at 0.2 MPa diff (2 ATA)

Temperature range: –40°C to + 85°C operating
–70°C to +125°C storage

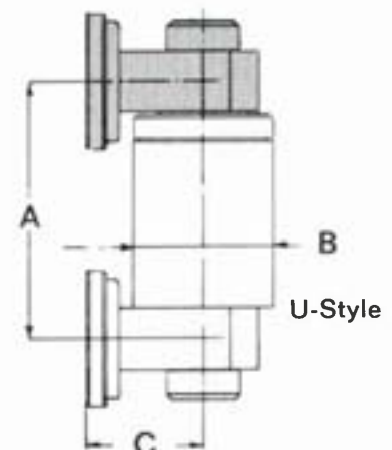
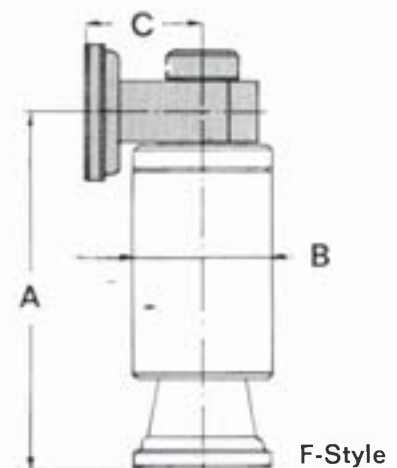
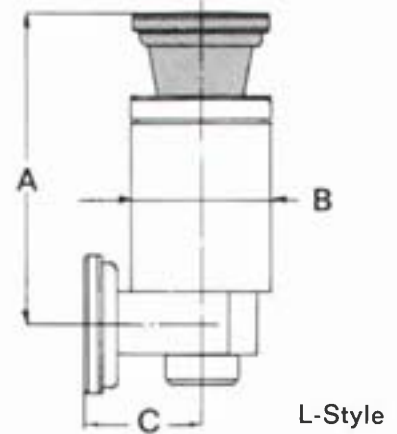
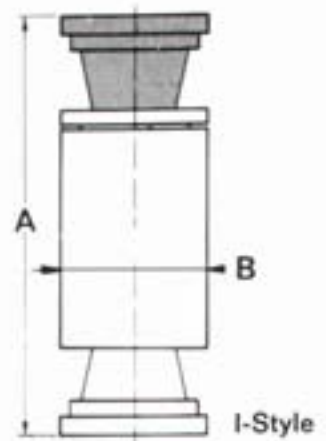
Life: 10–50 · 10⁶ revolutions guaranteed (depending on model)

Waveguide rotary joints

Insertion loss dB max	Starting torque Nm max	Material	Weight kg	Dimensions in mm		c
				A	B	
0.1	5	Al	40	1000	220	-
0.1	1	Al	8.0	462	144	-
0.15	0.3	Al	1.4	163	85	-
0.15	0.4	Al	0.6	140	48	-
0.2	0.4	Al	0.3	76.5	45	-
0.25	0.4	Al	0.3	76.5	45	-
0.3	0.3	Al	0.3	76.5	45	-
0.5	0.1	Brass	0.55	76.2	46	-
0.15	0.1	Brass	0.55	76.2	46	-
0.15	1	Al	7.0	326	105	110
0.1	1.5	Al	2.5	120	95	70
0.2	0.4	Al	0.8	106	55	90
0.15	0.4	Al	0.6	106	48	40
0.3	0.3	Al	0.6	118	47	70
0.15	0.4	Al	0.3	60.7	45	39
0.20	0.3	Brass	0.6	74.5	46	35
0.25	0.1	Al	0.2	56	38	30
0.15	0.4	Al	0.6	123	48	40
0.50	0.3	Al	0.25	65	40	50
0.3	3	Al	-	700	165	150
0.15	1	Al	6.7	192	105	110
0.1	0.4	Al	2	130	75	70
0.15	0.4	Al	0.6	89	48	40
0.5	0.3	Al	0.8	50	46	52
0.15	0.4	Al	0.3	44.5	45	39
0.2	0.4	Al	0.3	49	45	47
0.25	0.1	Al	0.2	41	38	30
0.5	0.4	Al	0.6	50	45	50
0.5	0.3	Al	0.25	45	40	50

¹⁾ The power capacity of rotary joints are given for +25°C
0.1 MPa (1 ATA) 2 μs pulsewidth, 500 Hz repetition rate and matched load.

²⁾ Flange face conforms to MIL-F-3922 or IEC 154 Type B.
For double-ridge waveguides MIL-F-39000.



Waveguide rotary joints

Dual-channel

The rotary joints described below are standard designs, but they are usually not stocks items. Our complete rotary program consists of several more, most of them customer specified, and we welcome your enquiries.

Channel no	Style	Waveguide/coax size	Frequency range GHz	Model	Flange/ ²⁾ conn mates	Power ¹⁾		VSWR max	WOW in VSWR
						peak kW	average kW		
1	I	R 14 WR 650 WG 6	1.15– 1.45	PM 7361L	PDR 14	6000	30	1.15	1.02
2		7/8 EIA	1.5 – 2.0		7/8 EIA	10	0.5	1.35	1.05
1	L	R 32 WR 284 WG 10	2.7 – 3.3	PM 7363S	UAR 32	1000	5.0	1.20	1.02
2		N-type coax	1.0 – 1.1		N	5	0.2	1.2	1.03
1	U	R 32 WR 284 WG 10	2.7 – 3.3	PM 7896S	UAR 32	1500	5.0	1.15	1.02
2		N-type coax	1.0 – 1.1		N	5	0.2	1.30	1.03
1	U	R 32 WR 284 WG 10	2.7 – 3.0	SL 6765S	5985-99-083-0058	300	5.9	1.15	1.02
2		N-type coax	1.1 – 1.3		N	7.5	8.25 W	1.2	1.02
1	U	R 32 WR 284 WG 10	2.7 – 3.1	SL 6785S	5985-99-083-1560	1500	5	1.15	1.03
2		N-type coax	2.7 – 3.1			–	10 W	1.3	1.05
1	U	R 48 WR 187 WG 12	5.4 – 5.9	PM 7896G	UAR 84	700	3	1.15	1.02
2		N-type coax	0.9 – 1.2		N	5	0.25	1.20	1.03
1	U	R 48 WR 187 WG 12	5.25– 5.8	SL 6753G	UAR 48	700	3	1.15	1.03
2		N-type coax	1.6 – 1.8		N	5	0.25	1.20	1.05
1	L	R 58 WR 159 WG 13	5.4 – 5.9	SL 6792C	PDR/mod	90	2	1.15	1.05
2		SMA/TNC coax	1.6 – 1.9		SMA/TNC	1.5	5 W	1.3	1.05
1	U	R 84 WR 112 WG 15	8.4 – 9.6	PM 7896H	UG-138/U	250	1.0	1.10	1.02
2		SMA coax	1.0 – 1.1		SMA	5	0.25	1.20	1.05
1	U	R 84 WR 112 WG 15	8.5 – 9.6	PM 7896H/01	UG-138/U	250	1.0	1.10	1.03
2		N-type coax	8.5 – 9.6		N	5	0.3	1.50	1.05
1	U	R 100 WR 90 WG 16	8.2 –12.4	PM 7371X/02	UG-135/U	75	0.5	1.30	1.03
2		SMA coax	8.2 –12.4		SMA	1.0	50 W	1.50	1.05
1	U	R 100 WR 90 WG 16	8.5 – 9.6	PM 7896X	UG-135/U	150	0.5	1.10	1.03
2		SMA coax	1.0 – 1.1		SMA	5	0.2	1.30	1.05
1	U	R 100 WR 90 WG 16	8.5 – 9.6	PM 7896X/01	UG-135/U	150	0.5	1.10	1.03
2		N-type coax	8.5 – 9.6		N	5	0.2	1.50	1.05
1	U	R 100 WR 90 WG 16	8.8 – 9.3	SL 6764X	UBR 100/M4	100	0.1	1.20	1.03
2		R 100 WR 90 WG 16	8.8 – 9.3		UBR 100/M4	100	0.1	1.20	1.03
1	U	R 140 WR 62 WG 18	14.0 –17.5	PM 7896P	UBR 100	60	0.3	1.15	1.04
2		SMA coax	1.0 – 1.1		SMA	5	0.2	1.20	1.05
1	U	R 140 WR 62 WG 18	12.0 –18.0	PM 7896P/01	UG-419/U	60	0.2	2.0/1.50	1.05
2		SMA coax	1.0 –12.0		SMA	0.5	0.2	1.5	1.06
1	U	R 140 WR 62 WG 18	16.0 –18.0	PM 7896P/04	M 3922/53-006	10	1	1.20	1.04
2		SMA coax	16.0 –18.0		SMA	1 W	–	1.60	1.05
1	U	WRD 475 D 24	4.75–10.8	PM 7896DX	M 39000/3-36	30	0.7	1.5	1.05
2		SMA coax	DC-11		SMA	5	50 W	1.5	1.05
1	U	WRD 750 D 24	7.5 –17.5	PM 7896DP	M 39000/3-072	20	0.35	1.50	1.05
2		SMA coax	DC-18.0		SMA	1	25 W	1.8	1.05

Finish: Chromate per MIL-C-5541A and dull black paint for aluminium
Silver and dull black paint for brass

Pressurization: 0.2 MPa diff (2 ATA)

Leakage: max 25 cc/min at 0.2 MPa diff (2 ATA)

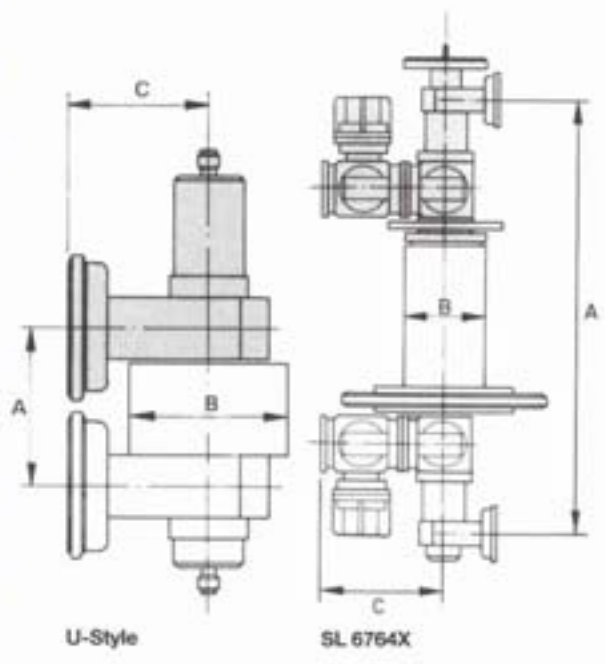
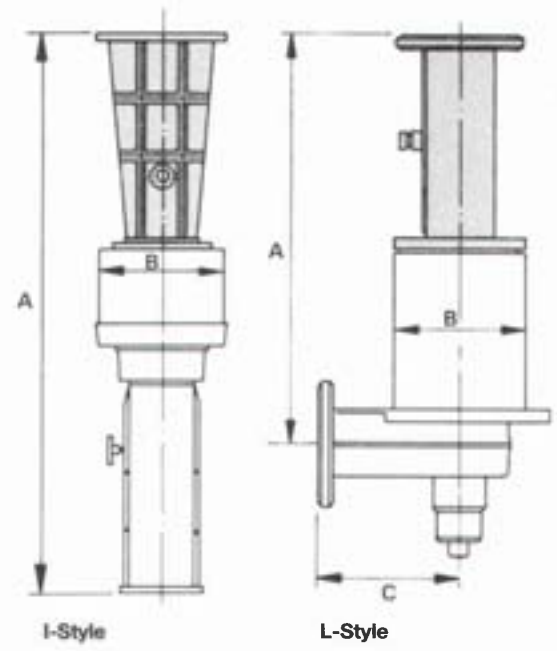
Temperature range: –40°C to + 85°C operating
–70°C to +125°C storage

Life: 10–50 · 10⁶ revolutions guaranteed (depending on model)

* VSWR 2.0 for 12.0–12.4 GHz
1.5 for 12.4–18 GHz

Waveguide rotary joints

Insertion loss dB max	Starting torque Nm	Material	Weight kg	Dimensions in mm		c
				A	B	
0.1 0.5	5	Al	41.0	1000	220	-
0.15 0.5	1	Al	7.3	326	105	110
0.15 0.5	1	Al	7.0	192	105	110
0.15 0.5	5	Al	5.0	141	109	109
0.2 0.5	1	Al	8.2	192	105	115
0.10 0.5	0.6	Al	2.2	130	75	70
0.15 0.5	0.3	Brass	8.5	120	75	147
0.2 0.3	1.5	Al	0.9	115	55	84
0.15 0.5	0.4	Al	0.65	89	48	40
0.15 0.5	0.4	Al	0.8	89	48	40
0.2 1.0	0.4	Al	0.4	49	45	47
0.15 0.6	0.4	Al	0.35	44	45	39
0.15 0.6	0.4	Al	0.35	44	45	39
0.35 0.35	0.5	Al	3.5	315	62	89
0.25 0.5	0.2	Al	0.25	41	38	30
0.7 0.7	0.2	Al	0.25	41	38	30
0.25 0.8	0.2	Al	0.25	41	38	30
0.5 1.0	0.4	Al	0.65	50	45	50
0.5 1.5	0.4	Al	0.35	45	40	50



¹⁾ The power capacity of rotary joints are given for +25°C 0.1 MPa (1 ATA) 2 μs pulsewidth, 500 Hz repetition rate and matched

²⁾ Flange face conforms to MIL-F-3922 or IEC 154 Type B. For double-ridge waveguides MIL-F-39000.

Waveguide rotary joints

Multi-channel

The rotary joints described below are standard designs, but they are usually not stocks items. Our complete rotary program consists of several more, most of them customer specified, and we welcome your enquiries.

Channel no.	Style	Model	Frequency range GHz	Power ¹⁾		VSWR max	WOW max (VSWR)	Insertion loss dB max	Starting torque Nm	Material	Weight kg	
				peak kW	avg kW							
1	I	PM 7899L	R 14 WR 650 WG 6	1.15– 1.45	6000	30	1.15	1.02	0.1	5	Al	41
2			7/8 EIA	1.5 – 2.0	10	0.5	1.35	1.05	0.5			
3			N-type	DC – 2	1	0.1	2.0	1.05	0.5			
1	U	SL 6768L/01	R 14 WR 650 WG 6	1.25– 1.35	3000	6	1.20	1.05	0.3	5	Al	63
2			R 14 WR 650 WG 6	1.25– 1.35	250	0.25	1.20	1.05	0.5			
3			N-type	1.0 – 1.15	6	6 W	1.30	1.10	1.2			
4			N-type	1.0 – 1.15	6	6 W	1.30	1.10	1.2			
5			N-type	1.25– 1.35	10	20 W	1.30	1.05	1.0			
1	U	SL 6768L/02	R 14 WR 650 WG 6	1.25– 1.35	6000	12	1.20	1.05	0.3	5	AL	65
2			R 14 WR 650 WG 6	1.25– 1.35	250	3	1.20	1.05	0.3			
3			N-type	1.0 – 1.15	10	20 W	1.30	1.10	1.0			
4			N-type	1.0 – 1.15	10	20 W	1.30	1.08	1.1			
5			N-type	1.0 – 1.15	10	20 W	1.30	1.08	1.1			
6			N-type	1.25– 1.35	10	20 W	1.30	1.05	1.0			
1	U	SL 6797L ²⁾	R 14 WR 650 WG 6	1.25– 1.35	5000	10	1.20	1.05	0.2	5	Al	65 appr
2			N-type	1.25– 1.35	RX	RX	1.20	1.05	0.7			
3			N-type	0.9 – 1.1	5	5 W	1.30	1.08	0.8			
4			N-type	0.9 – 1.1	5	5 W	1.30	1.08	0.8			
5			N-type	0.9 – 1.1	5	5 W	1.30	1.08	0.8			
1	U	SL 6728S	R 32 WR 284 WG 10	2.7 – 2.9	1000	5	1.20	1.03	0.2	2	Al	10.5
2			HN (UG 60B/U)	1.0 – 1.12	5	0.1	1.30	1.05	0.5			
3			HN (UG 60B/U)	1.0 – 1.12	5	0.1	1.30	1.05	0.5			
1	U	SL 6730S	R 32 WR 284 WG 10	3.03– 3.13	4000	5	1.20	1.03	0.3	5	Al	-
2			R 32 WR 284 WG 10	3.03– 3.13	1500	5	1.20	1.03	0.4			
3			HN-type	1.0 – 1.1	10	0.1	1.30	1.04	0.7			

Finish: Chromate per MIL-C-5541A and dull black paint for aluminium
Silver and dull black paint for brass

Pressurization: 0.2 MPa diff (2 ATA)

Leakage: max 25 cc/min at 0.2 MPa diff (2 ATA)

Temperature range: –40°C to + 85°C operating
–70°C to +125°C storage

Life: 10–50 · 10⁶ revolutions guaranteed (depending on model)

Multi-channel

Channel no.	Style	Frequency range GHz	Model	Power ¹⁾		VSWR max	WOW max (VSWR)	Insertion loss dB max	Starting torque Nm	Material	Weight kg	
				peak kW	avg kW							
1	U	R32 WR 284 WG 10	2.7 – 3.1	SL 6745S	1500	5	1.15	1.03	0.2	1	Al	8.2
2		N-type	2.7 – 3.1		10	10 W	1.30	1.05	0.5			
3		N-type	1.0 – 1.1		5	0.2	1.30	1.05	0.5			
1	U	R32 WR 284	3.1 – 3.5	SL 6745S/02	500	5	1.2	1.03	0.3	1	Al	9
2		N-type	1.0–1.1, 3.1 – 3.5		10/1	50 W	1.3	1.05	0.5			
3		N-type	3.1 – 3.5		10	10 W	1.3	1.05	0.5			
1	U	R32 WR 284 WG 10	2.7 – 3.1	SL 6800S	1500	1.8	1.20	1.05	0.2	5	Al	25 appr
2		N-type	1.0 – 3.1		1	12 W	1.50	1.05	1.0			
3		N-type	2.7 – 3.1		5	0.1	1.30	1.08	1.0			
4		N-type	1.0 – 1.1		5	12 W	1.25	1.08	0.75			
5		N-type	1.0 – 1.1		5	12 W	1.25	1.08	0.75			
6		N-type	1.0 – 1.1		5	12 W	1.25	1.08	0.75			
1	L	R48 WR 187 WG 12	5.4 – 5.9	SL 6767G	90	2	1.15	1.02	0.2	1.5	Al	4.5
2		SMA/TNC	1.0 – 1.1		0.5	10 W	1.3	1.08	0.5			
3		SMA/TNC	1.0 – 1.1		0.5	10 W	1.3	1.08	0.5			
1	U	R48 WR 187 WG 12	5.4 – 5.9	SL 6773G	25	0.25	1.3	1.05	0.3	0.5	Al	3.5
2		WG	10.0 – 10.25		25	0.2	1.5	1.06	0.5			
3		N-type	0.3 – 5.9		10	2 W	1.3	1.06	0.8			
1	U	R84 WR 112 WG 15	10.0 – 10.25	SL 6776H	200	2	1.2	1.05	0.35	0.5	Al	4
2		WG	8.5 – 9.5		250	0.2	1.2	1.05	0.3			
3		N-type	0.6 – 8.8		1	0.04	1.5	1.05	1.0			
1	U	R100 WR 90 WG 16	8.5 – 9.6	SL 6777X	150	0.5	1.2	1.03	0.3	1	Al	1.76
2		TNC	1.0 – 1.1		1.5	0.2	1.3	1.08	0.5			
3		TNC	1.0 – 1.1		1.5	0.2	1.3	1.08	0.5			
1	U	R100 WR 90 WG 16	8.5 – 9.6	SL 6760X/02	150	0.5	1.20	1.05	0.3	0.5	Al	5.6
2		Coax 4.1/9.5	1.0 – 1.1		5	0.2	1.30	1.05	0.5			
3		Coax 4.1/9.5	1.0 – 1.1		5	0.2	1.30	1.05	0.5			

¹⁾ The power capacity of rotary joints are given for +25°C
 0.1 MPa 2 μs pulsewidth, 500 Hz repetition rate and matched load.
²⁾ With integral slip-ring package.

Swivel joints

Swivel joints ($\pm 60^\circ$)

This is a joint for applications where full rotation is not required. The swivel joint is compact, with a low mechanical torque, and high peak power capacity.

Waveguide size	Frequency range GHz	Model	Flanges mate ²⁾	Power ¹⁾		VSWR max	Insertion loss dB max	Starting torque Nm max	Material	Weight kg	Dimensions in mm	
				peak MW	avg kW						A	B
R32 WR284 WG10	2.7 – 3.5	PM 7380S	UAR 32 mod	2	5	1.15	0.15	10	Al	7.2	155	163
R84 WR112 WG15	7.05–10.0	PM 7380H	UBR 84	0.2	0.5	1.15	0.3	0.7	Al	1.0	70	76
R100 WR90 WG16	8.2 –12.4	PM 7380X	UBR 100	0.15	1	1.15	0.35	0.4	Al	0.38	52	60
R140 WR62 WG18	12.4 –18.0	PM 7380P	UBR 140	0.06	0.5	1.15	0.35	0.3	Al	0.25	35	50
WRD475 D24	4.75–11.0	PM 7380DX	39000/3-038	0.02	0.75	1.35	0.75	0.7	Al	1.1	76	81
WRD750 D24	7.5 –18.0	PM 7380DP	39000/3-072	0.01	0.5	1.35	0.75	0.4	Al	0.35	50	55

Finish: Chromate per MIL-C-5541A and paint for aluminium

Temperature range: -40°C to $+85^\circ\text{C}$ operating
 -70°C to $+125^\circ\text{C}$ storage

Pressurization: 0.2 MPa diff (2 ATO)

Life: min $15 \cdot 10^6$ cycles guarantees

Leakage: max 25 cc/min at 0.2 MPa diff (2 ATO)

¹⁾ The power capacity of rotary joints is given for $+25^\circ\text{C}$, 1 ATA $2 \mu\text{s}$ pulse width, 500 Hz repetition rate and matched load.

²⁾ Flange face conforms to: for rectangular waveguide MIL-F-3922/53 or IEC154. Type B (plain flanges) for double ridge waveguide USA MIL-39000/3.

