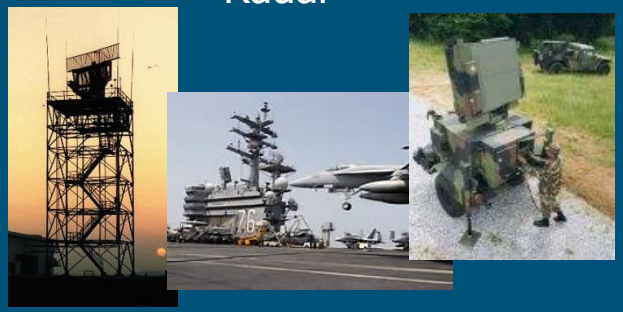
DIAMOND ANTENNA EUROPE

DIAMOND

Radar



Satcom & Datalink

Commercial

OVERVIEW AND CAPABILITY BRIEF

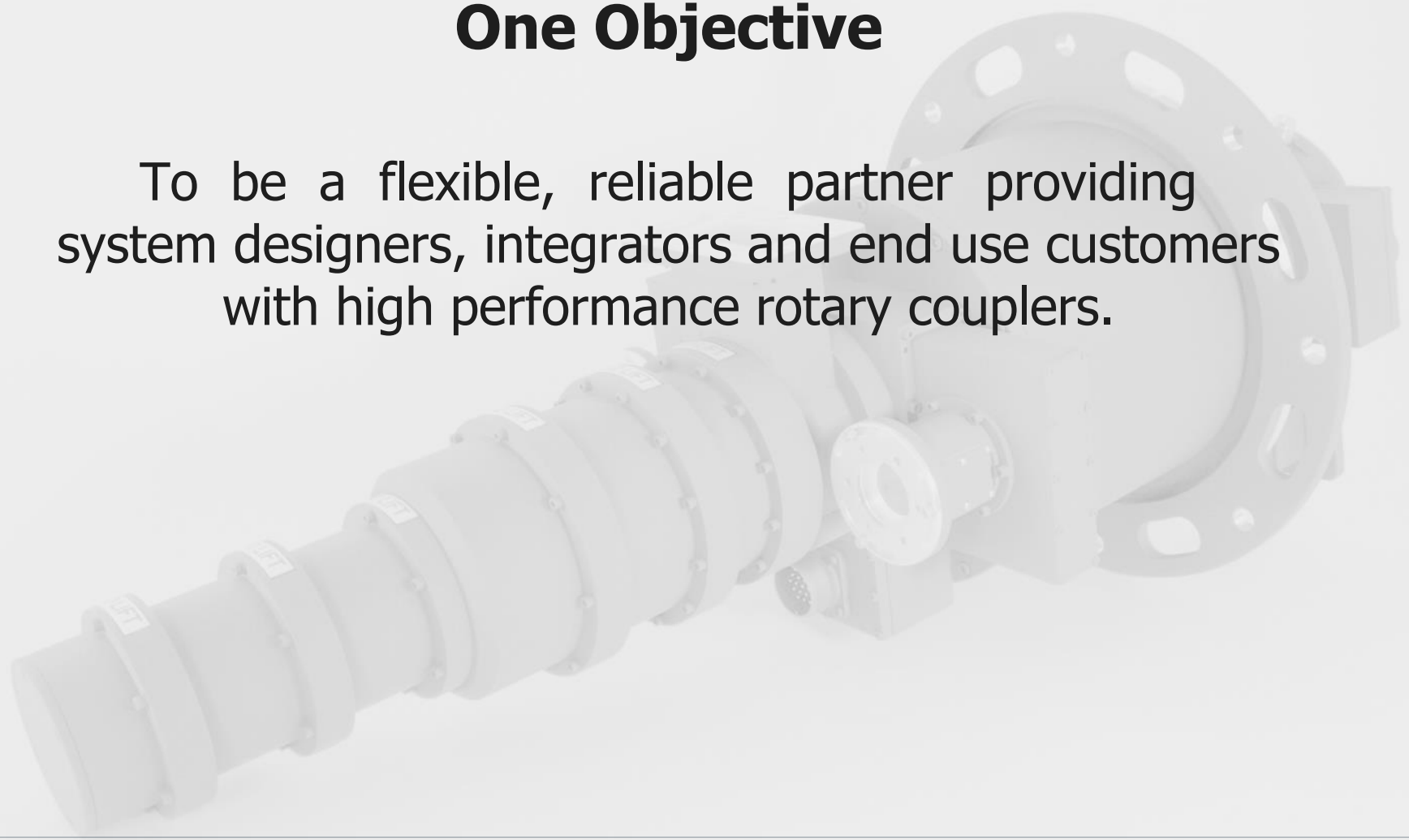
Approved for Global Viewing
June 2018

Diamond Antenna Europe

- Joint Venture between Diamond Antenna and Microwave Corporation and AML Microtechnique Lorraine S.A. to manufacture rotary joints in Fèves, France.
- DAE BVBA is established within the European Union.
- The venture was created to provide for the design, manufacture, customer service and sales support of rotary couplers to designated European markets.

One Objective

To be a flexible, reliable partner providing system designers, integrators and end use customers with high performance rotary couplers.



Company Overview

- Headquartered in Littleton, MA
  28 miles west of Boston
- 20,000 sq. ft. (1,860 sq. m.) manufacturing facility
  - With immediate expansion capabilities
- AS 9100 certified
- In business since 1956
- Employee owned
  - 65 Employees
  - Focused design and manufacturing to precision rotating products

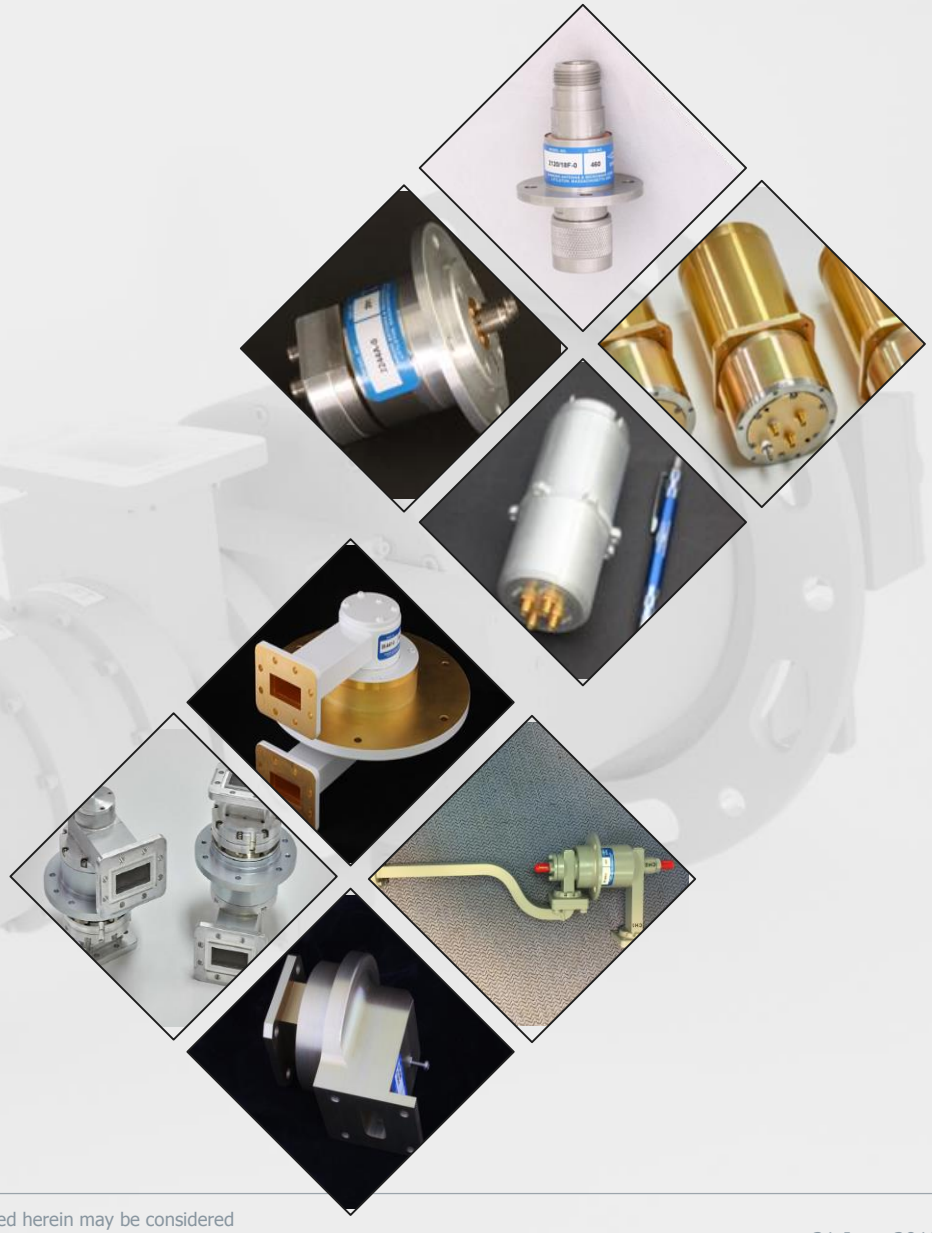
Rotary Joints

Coaxial Rotary Joints

- Available in an array of configurations, connections and frequencies
- Lower Power, Broadband Devices
- Operating up to 50GHz

Waveguide Rotary Joints

- Available in an U, L and I style configurations.
- Operating up to full waveguide bandwidth
- High Power



Diamond Markets

Air Traffic Control Radar

Military Ground Radar

Weather Radar

Military Shipboard Radar

Military Airborne Radar

Diamond Markets

Space
Communications

Commercial
Communications

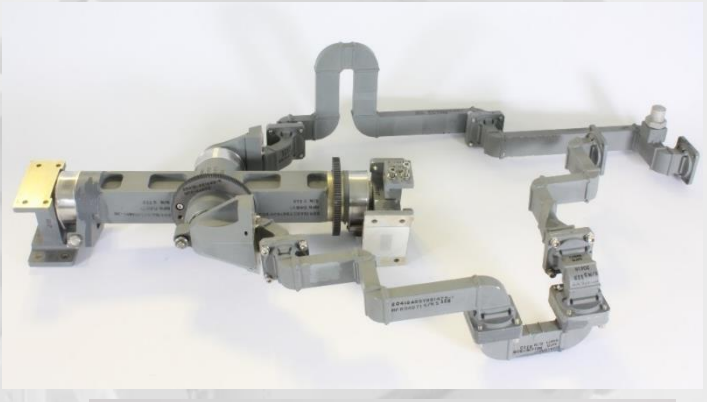
Military
Communications

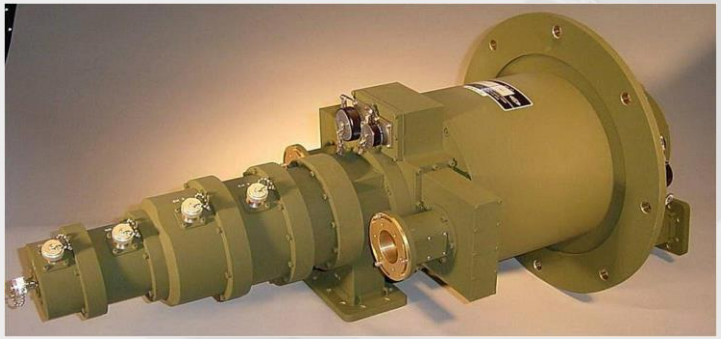
Primary & Secondary Air Traffic Control

- Up to 9 RF Channels
  - S-Band / L-Band / 740 MHz
- 20+ channel Slip Ring/Roll Ring
- Encoders or Inductosyns

Military Radar

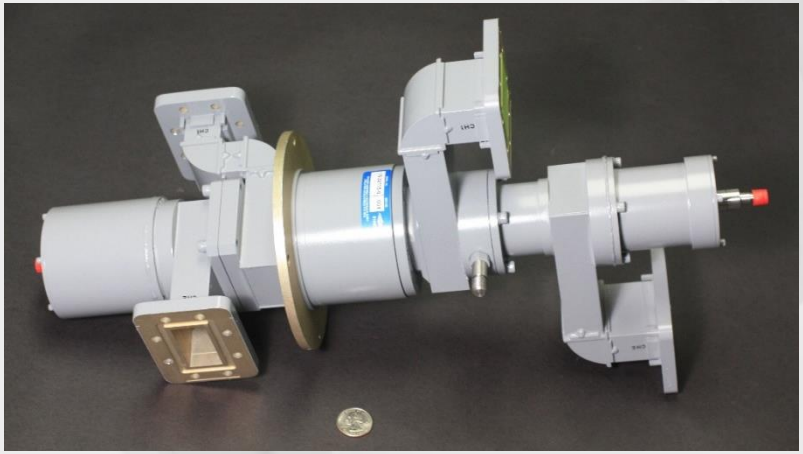
- Single Channel to Six Channel Rotary Joints
  - Integrated Slip Rings or Roll Rings
  - Encoders/Encoder Mounting Provisions
  - Fiber-optic channel(s)
- Airborne, Marine or Ground
- Severe Environments
- High Power

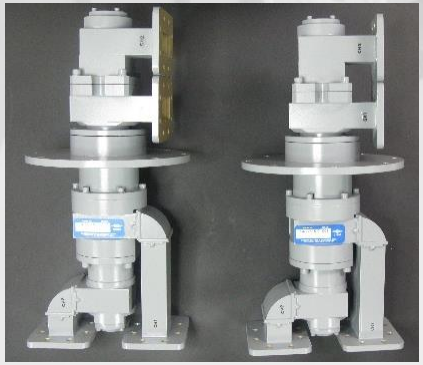




Weather Radar

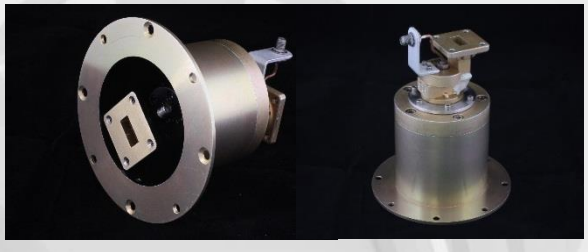
- S, C and X-Band RF Rotary Joints
- Waveguide and WG/Coax Styles
- Integrated Fiber Optic RJ and Slip Rings
- Typically One High Power Channel

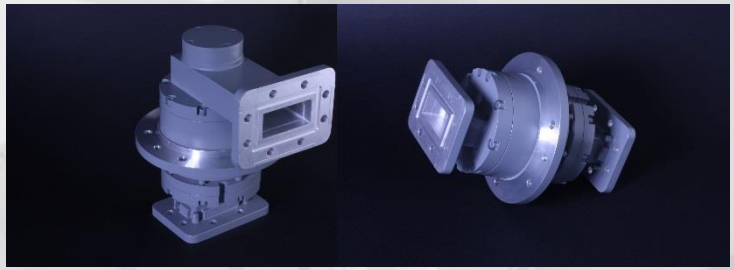




Military Communications & Surveillance

- Single Channel to Twelve Channel Rotary Joints
  - Include slip rings
  - Fiber Optic Rotary Joints
  - Operating up to 50GHz (waveguide and coax)
- Airborne, Marine or Ground
- Severe Environments
- High Power

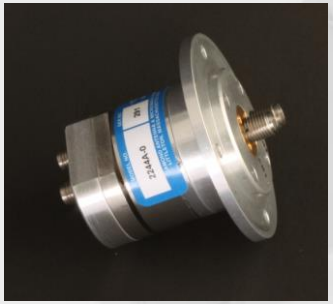




Airborne and Ground Satcom

Commercial

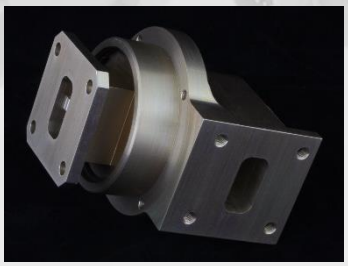
- Single to Three Channel Rotary Joints
  - Including slip rings, air channel



Marine Satcom

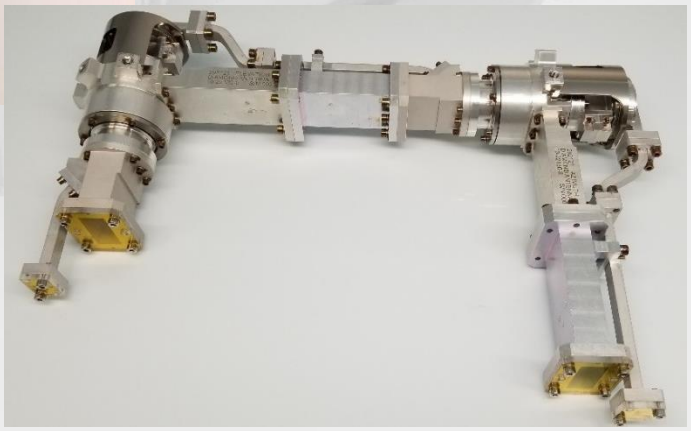
Commercial

- Single and Dual Channel Rotary Joints



Space Communications

- Single Channel to Four Channel Rotary Joints
  - Significant temperature extremes
    - e.g. - -100°C to +300°C
  - Severe non-operating shock and vibration
  - Special materials, handling and processing
    - e.g. – gold plated titanium waveguide and bodies
- High Reliability
- Analysis
  - Structural
  - Thermal
  - Bearing
  - Multipaction
  - FMECA
  - Reliability

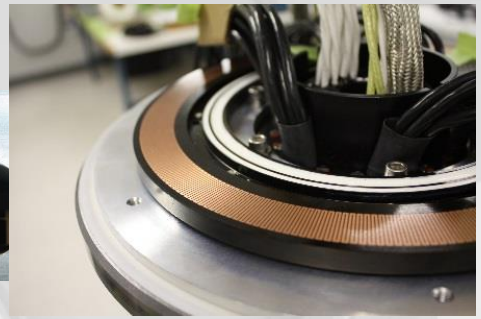


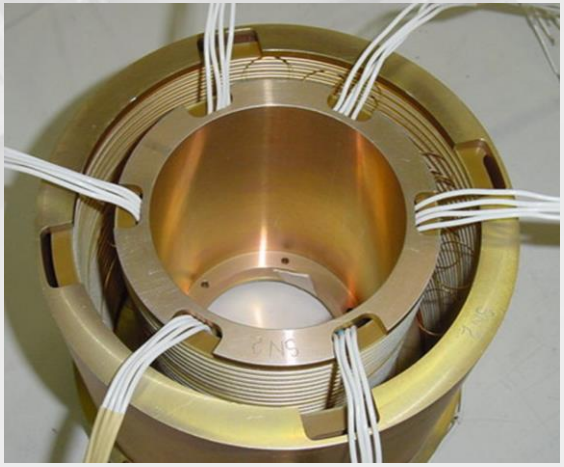
High Power Rotary Joints

- Thermal Management
  - Convection
  - Forced air
  - Water Cooling
  - Heat Pipes
- L-Band: 200 KW average, 2.5 MW peak
- Ku-Band: 9 KW average
- X-band: 1 MW peak, 35 KW avg
- S-Band: 3.5MW peak, 48 KW avg

Rotary Joint Designs with Ancillary Components

- Single Channel to Nine Channel
- Low complexity, high volume … to … complex, one-of-a-kind
- Stand-alone or with ancillary products
  - Roll Rings®
  - Slip Rings
  - Gears
  - Encoders or encoder provisions
  - Inductosyns
  - Fiber Optic Rotary Joints
  - Fluid Rotary Joints

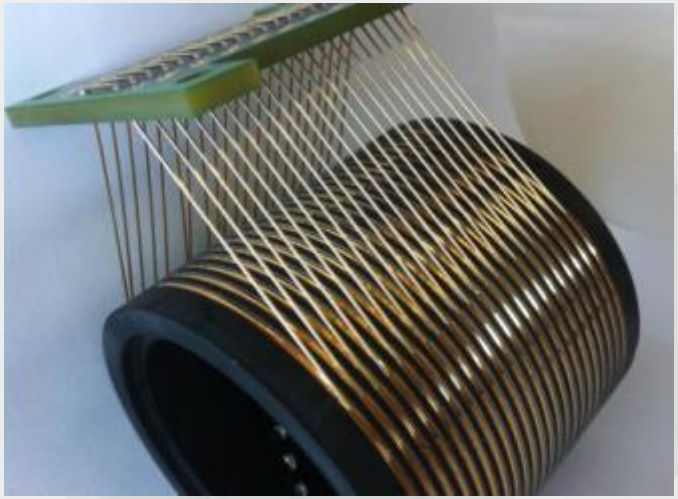




Ancillary Products - Slip Ring and Roll-Ring®

Diamond teams closely with slip ring suppliers to support existing product refurbishment and new design needs by integrating our RF rotary joints with slip rings for AC and DC power as well as data requirements. Gold wire is the preferred slip ring choice for traditional slip ring assemblies.

For customers looking to improve system performance, Diamond integrates a longer life, lower maintenance Roll-Ring®.



Traditional Slip Ring – Ring and Brush Assembly

Roll-Ring® Assembly

- Long Life
- Maintenance Free
- Shock Tolerant
- Low Torque
- Low Resistance
- Low Noise

Repair/Refurbish Center

- Business unit established to solely focus on repair & refurbishment
  - Staffed with senior manager and technicians
  - Equipment, processes and procedures optimized
  - The personnel involved in the repair efforts with specific partner company's comply to the drug/alcohol standard required for a 14 CFR 145 Repair Station.
- Restore products to like-new condition
- Standard 1-year product warranty included
- Routinely overhaul products not originally manufactured by Diamond
  - e.g.: Cobham (Kevlin/Sivers), MDL, Premier, Prime Contractors, …
  - Reverse Engineering
  - Customer & Supplier Partnerships

Repair/Refurbish Center

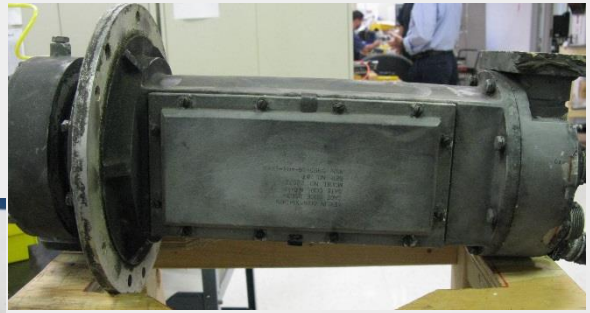
- Typical overhauls include:
  - Electrical & Mechanical performance evaluations
  - Development of Evaluation Report for distribution to Customer
  - Teardown, cleaning and inspection of every component
    - Replacement, re-use or rework disposition for every component, with critical focus on bearings and seals
  - Rebuild and test to ensure operational compliance
  - Refinish and product marking
- Coordinate activities with customer
  - Establish standard scope of work for family of products
  - Establish bonded stores to reduce per unit cost and lead time

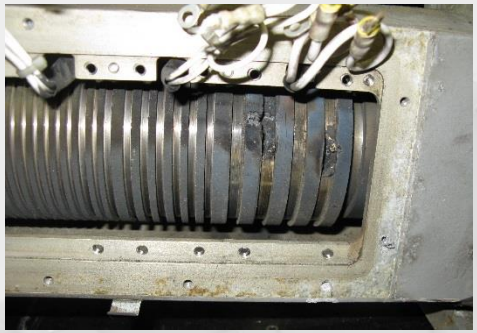
Recent Facility Enhancement

- Upgrade of the Diamond Repair Center to support increased demand
  - Increased Ceiling Height to 16 feet
  - Dual two-ton monorail overhead crane
  - High illumination LED lighting

Rotary Coupler used on shipboard radar

Before



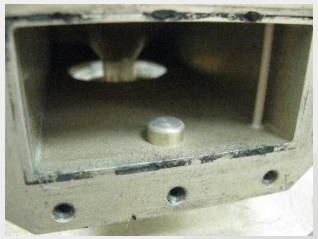


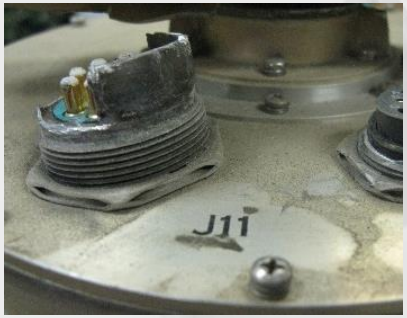
After

Rotary Coupler used on land-based radar

Before





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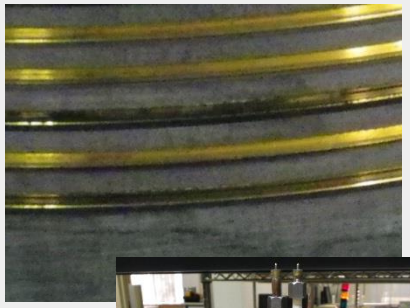
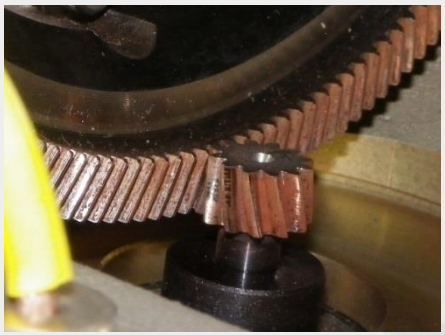
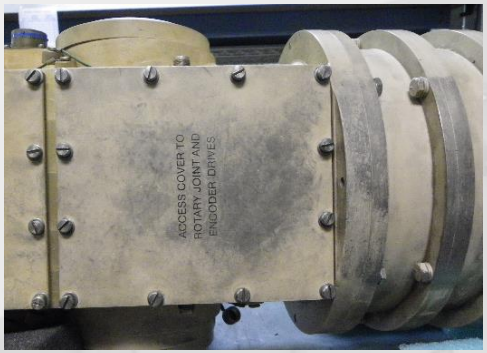
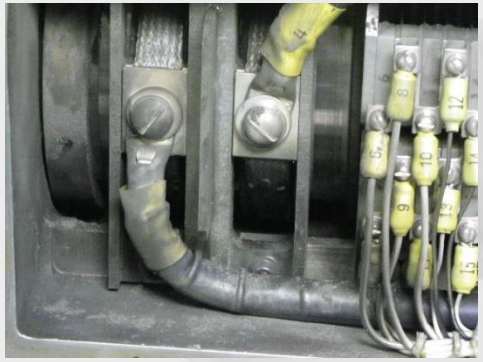
Before









After

Upgrade

- Increase capability of fielded systems
- Provide economical alternative to customer
- Diamond or non-Diamond designs
- Standard 1-year warranty included

Customer Problem:

1) Existing product (non-Diamond) required extensive maintenance resulting in significant radar downtime
2) Existing product not Mode-S capable

Diamond Solution:

1) Remove existing platter-style slip ring and install a Roll-Ring®
2) Remove existing coaxial channels and install new Mode-S capable coaxial channels
3) Install an additional coaxial channel
4) General repair & refurbishment

Additional Services

Trade Studies

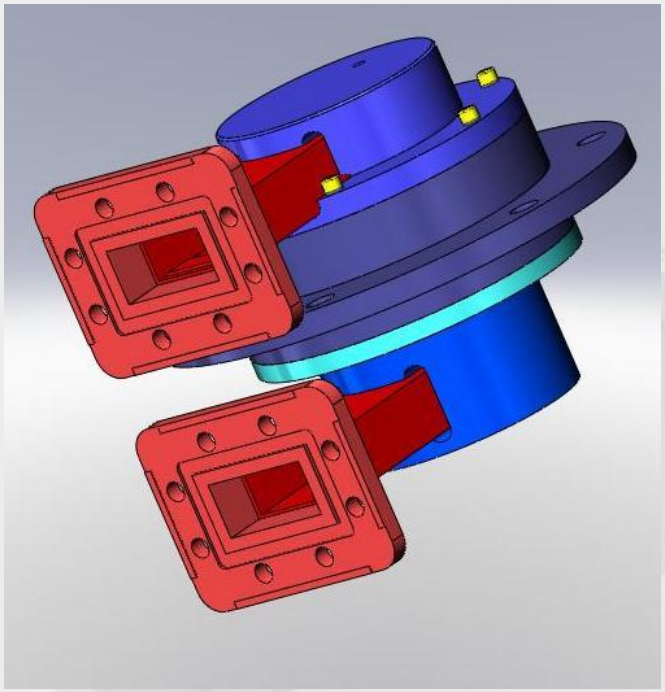
- Determine the feasibility and concepts for advanced, passive microwave designs.

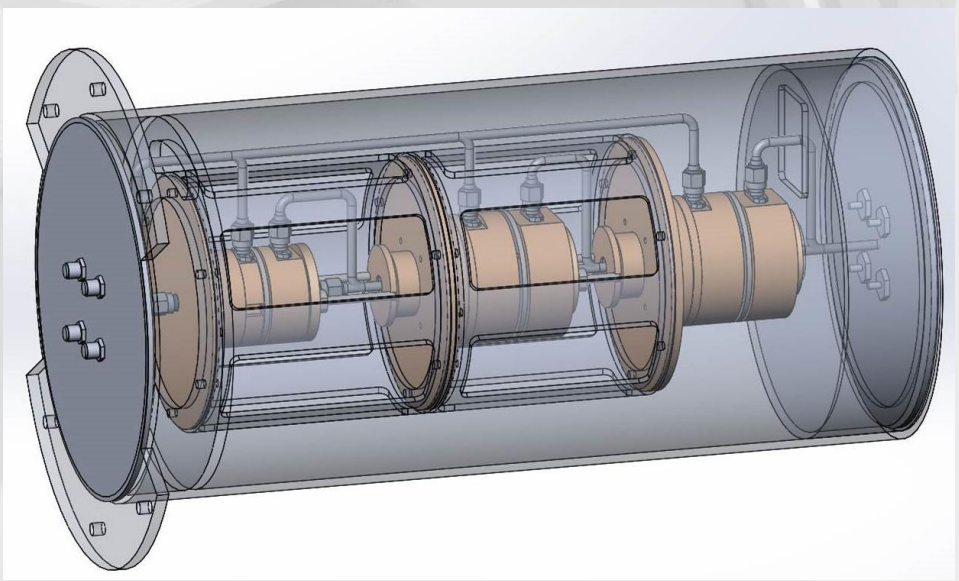
Field Service

- Support customer during troubleshooting, maintenance or installation

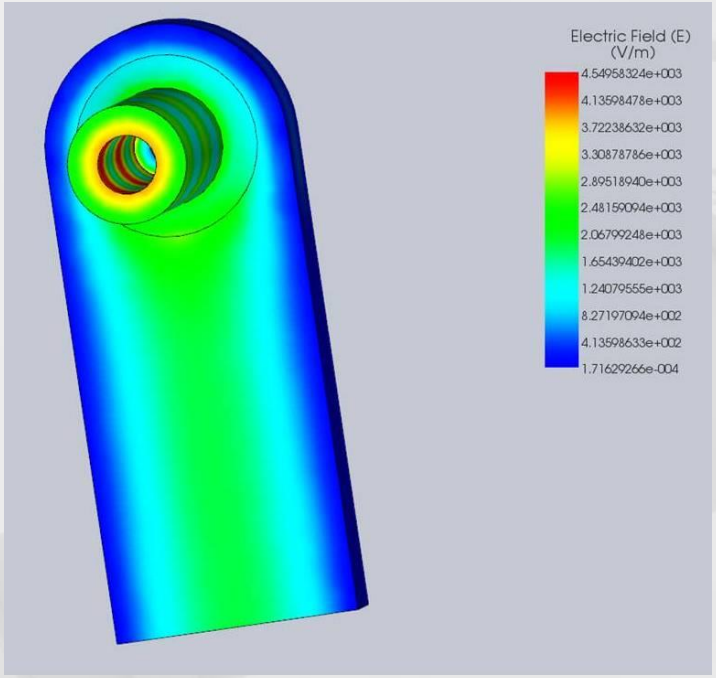
Engineering

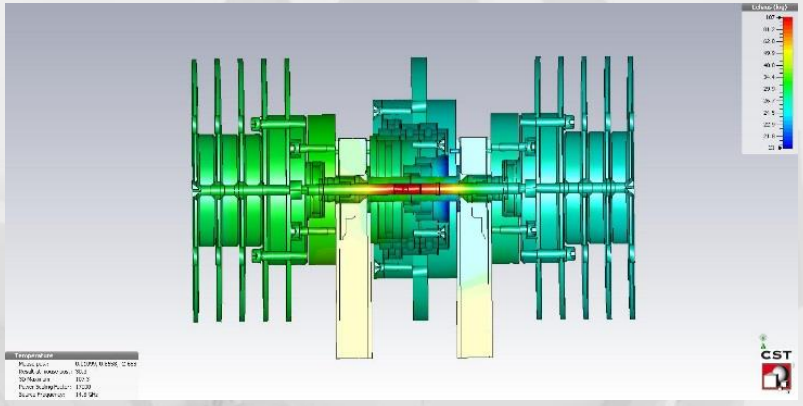
Our Engineering staff employs the latest CAD/modeling tools including SolidWorks, SolidWorks Simulation, Orbis, Ansys, HF Works and CST.

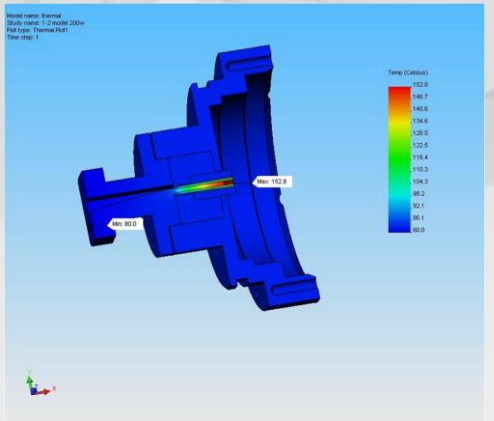




Thermal and Vector Analyses are performed during product development using CST, Solidworks Simulation and HF Works.

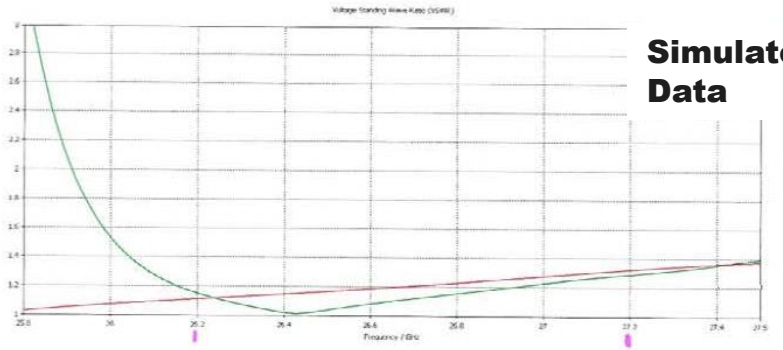




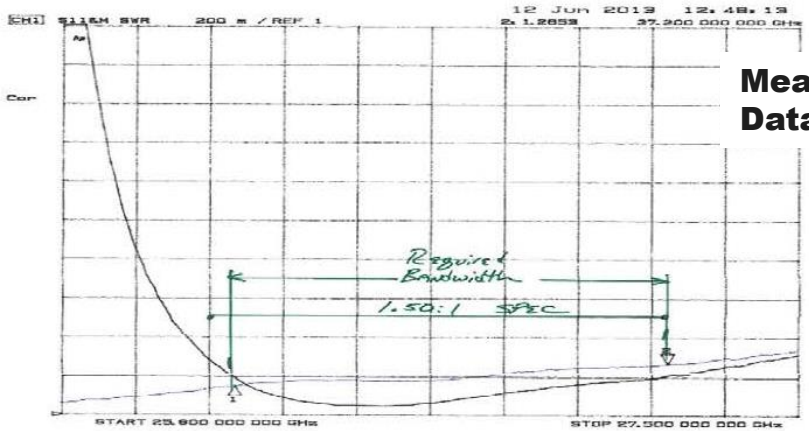


RF analyses is performed during product development

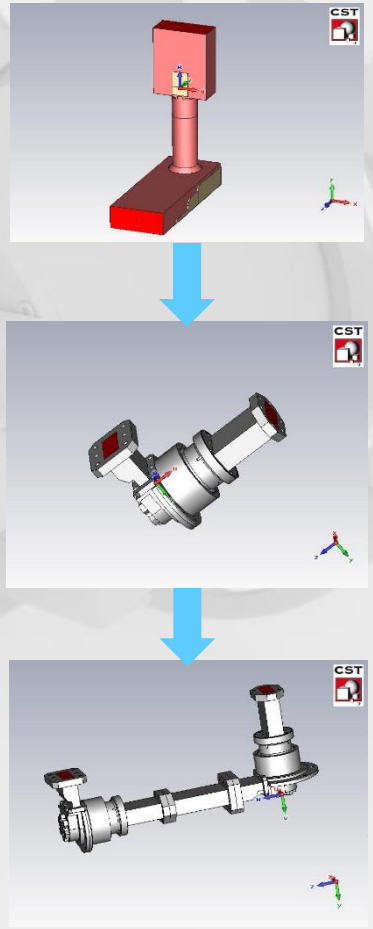
- Eliminating the need for breadboard prototypes
- Expediting development stage



Simulated Data



Measured Data

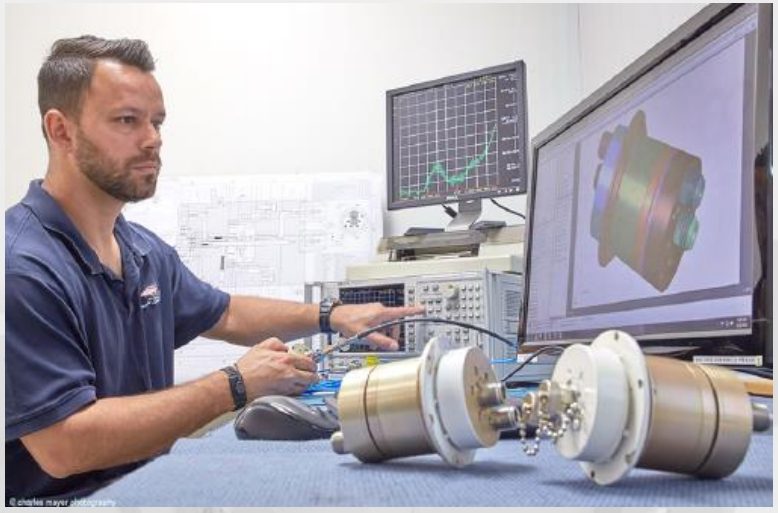


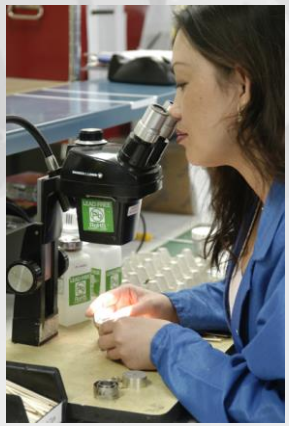
Manufacturing

- CNC, Prototrak and Conventional Lathes & Millers.
- Optimized to support secondary machining operations.
- Manufacturing equipment is integrated with engineering modeling tools to facilitate quick-turn prototyping.
- Developed strategic supplier base to support needs.

Assembly & Test

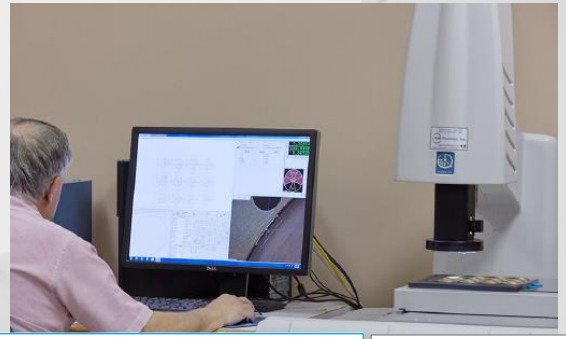
- Assembly and Electrical testing are conducted on-site
- Fifteen Network Analyzers
  - Test capability to 50GHz
- Additional equipment on site to measure:
    - Encoder count & jitter
    - Slip Ring/Roll Ring channel continuity, noise and insulation resistance
    - Audible noise
- Cross-trained team of assembly & test personnel
- Product routers integrated with ERP system

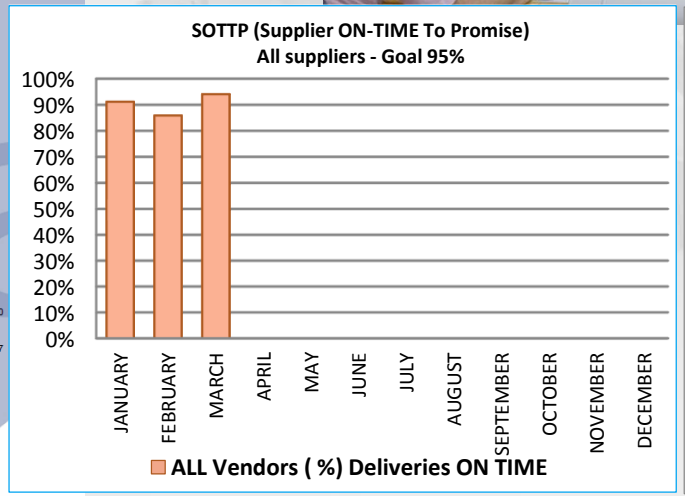


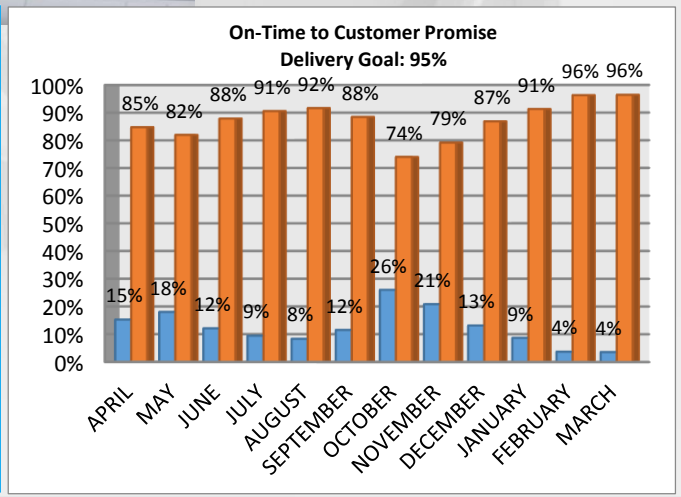


Quality Management System

- High precision dimensional inspection performed by vision system and coordinate measuring machine
- QMS quarterly review meetings
- Implementation of performance metrics
- AS9100 certification







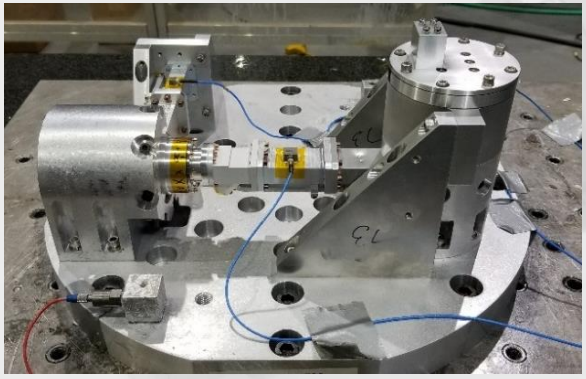
Qualification & Environmental Testing

Temperature testing, either as part of Qualification or Acceptance, performed on site.

-73°C to +200°C at 5.8°C/min ramp rate

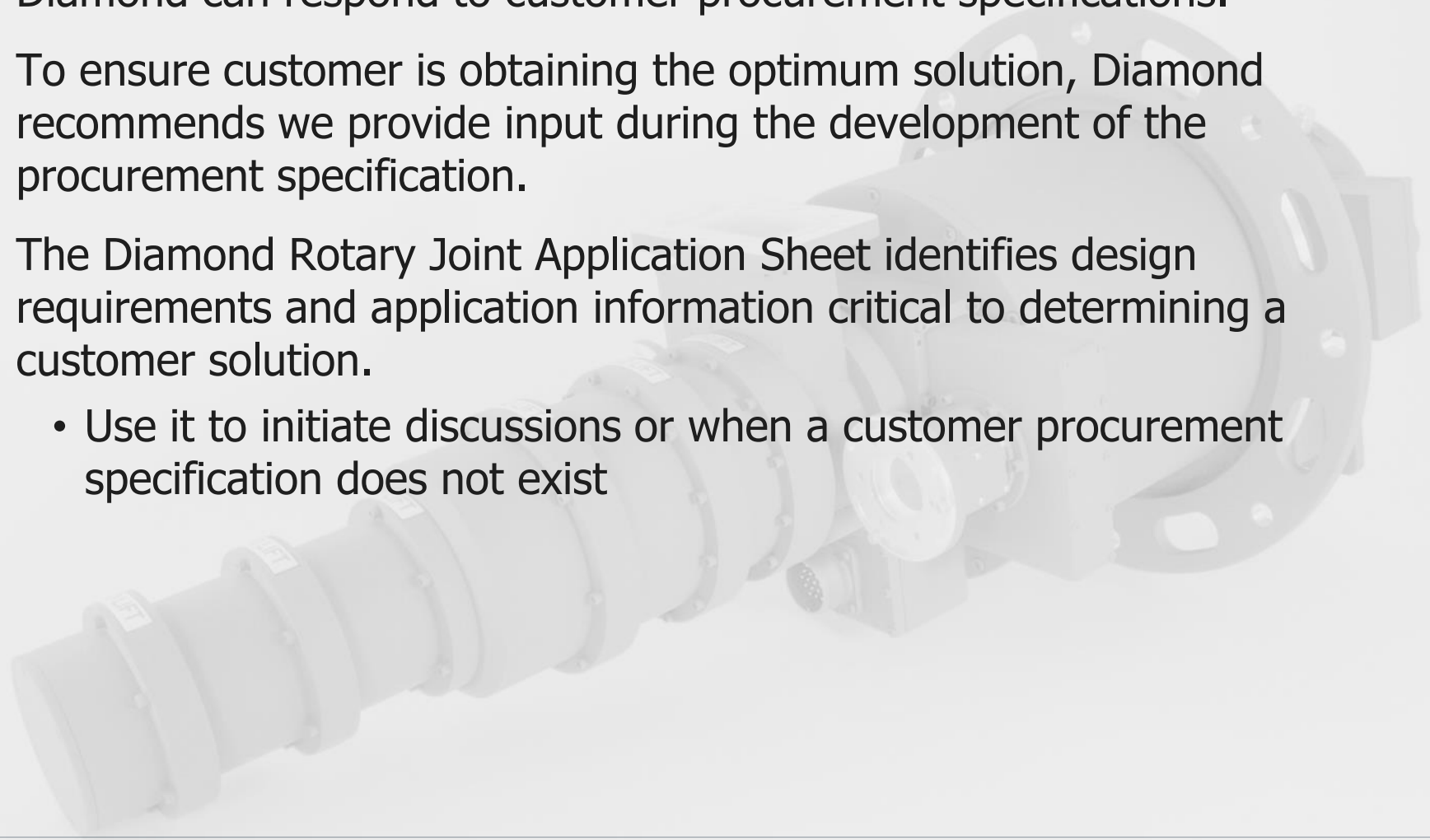
Qualification testing coordinated with local, regional and global test facilities.

Temperature	Thermal Shock	Humidity
Rain	Icing	Sand & Dust
Altitude	Salt Fog	Explosive Atmosphere
Vibration	Shock	Handling
EMI/EMC	High Power	Thermal Vacuum



Customer Engagement

- Diamond can respond to customer procurement specifications.
- To ensure customer is obtaining the optimum solution, Diamond recommends we provide input during the development of the procurement specification.
- The Diamond Rotary Joint Application Sheet identifies design requirements and application information critical to determining a customer solution.
  - Use it to initiate discussions or when a customer procurement specification does not exist



Application Sheet

Rotary Joint Application Sheet

Customer Data:

Name of the Company: _____

Address _____

Postal Code/City: _____

Country: _____

Contact Person(s)

Name: _____ Phone: _____ Email: _____

Project Name

_____

Quantity / Future Potential

_____

Application:

Military ☐	Shipborne ☐	Surveillance ☐	Communications ☐
Civilian ☐	Ground ☐	Weather ☐	Radar ☐
	Satellite (flight) ☐	ATC ☐	Satcom ☐
		Space ☐	Other ☐

Environmental Requirements and Documentation

Shock ☐	Altitude _____	Acceptance Test Procedure ☐
Salt ☐	Fungus ☐	Preliminary Design Review ☐
Vibration ☐	Sand / Dust ☐	Qualification Test Procedure ☐
Humidity ☐	Temperature _____	Critical Design Review ☐
Other Info _____		Manual Required ☐

1

Electrical Requirements	Channel 1	Channel 2	Channel 3	Channel 4
Frequency (GHz)				
VSWR Max				
VSWR-WOW 360° max				
Insertion Loss (dB Max)				
Insertion Loss-WOW (dB Max)				
Peak Power				
Average Power				
Phase Requirements (DEG)				
Tracking				
WOW				
Matching				

Slip Ring Requirements

Number of Rings		Noise	
Voltage		Current	

Fiber Optic Joint

Number of Channels		Wavelength	
Single or Multimode		Other	

Fluid Joint / Air Joint

Number of Paths		Pressure	
Flow Rate		Pressure Drop	

Encoder/APG Requirements

Resolution		Accuracy	
Type		Other	

Mechanical Requirements

Pressurization (PSIG)		Style (I, L, U)	
Leakage (cc/min)		Finish	
Rotational Speed (RPM)		Size L x W x H	
Weight		Waveguide Flanges	
Torque			
Life		Connector Type	
Material		Paint	

2

Summary

- Over 60 years of experience in the design, analysis and manufacture of precision rotating components used on radar and communication platforms.

- Over 2,000 unique rotary joint designs to leverage for future applications.

Simple single channel	to	Complex multi-channel
<1 inch long, weighing oz.	to	8 feet tall, weighing 700 lbs.
one-time lab use	to	24/7 operation in extreme environment

- A customer focused, flexible, recognized leader in the design and manufacture of RF Rotary Joints.

Vision, Mission & Values

VISION

Contribute to our customer's ability to produce the most effective communication and surveillance systems while becoming the *world's leading supplier* of RF rotary couplers.

MISSION

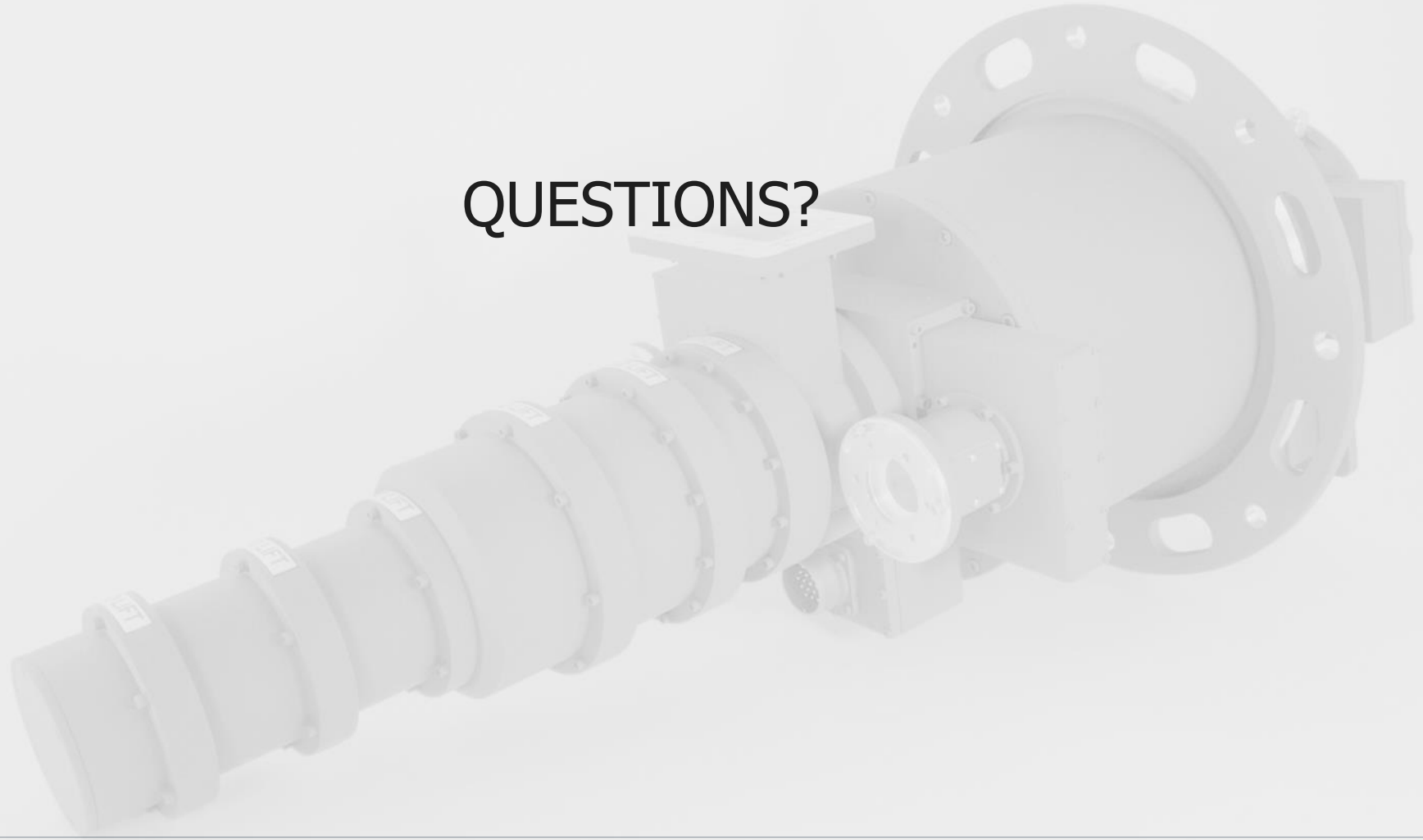
Ensure *growth* and greatest *value* to our employee *shareholders* as a world-class design and manufacturing *partner* focused on providing the customer with precision rotating products.

We ensure total customer *satisfaction* by offering high *quality*, innovative *solutions* with on-time delivery and exemplary *support*.

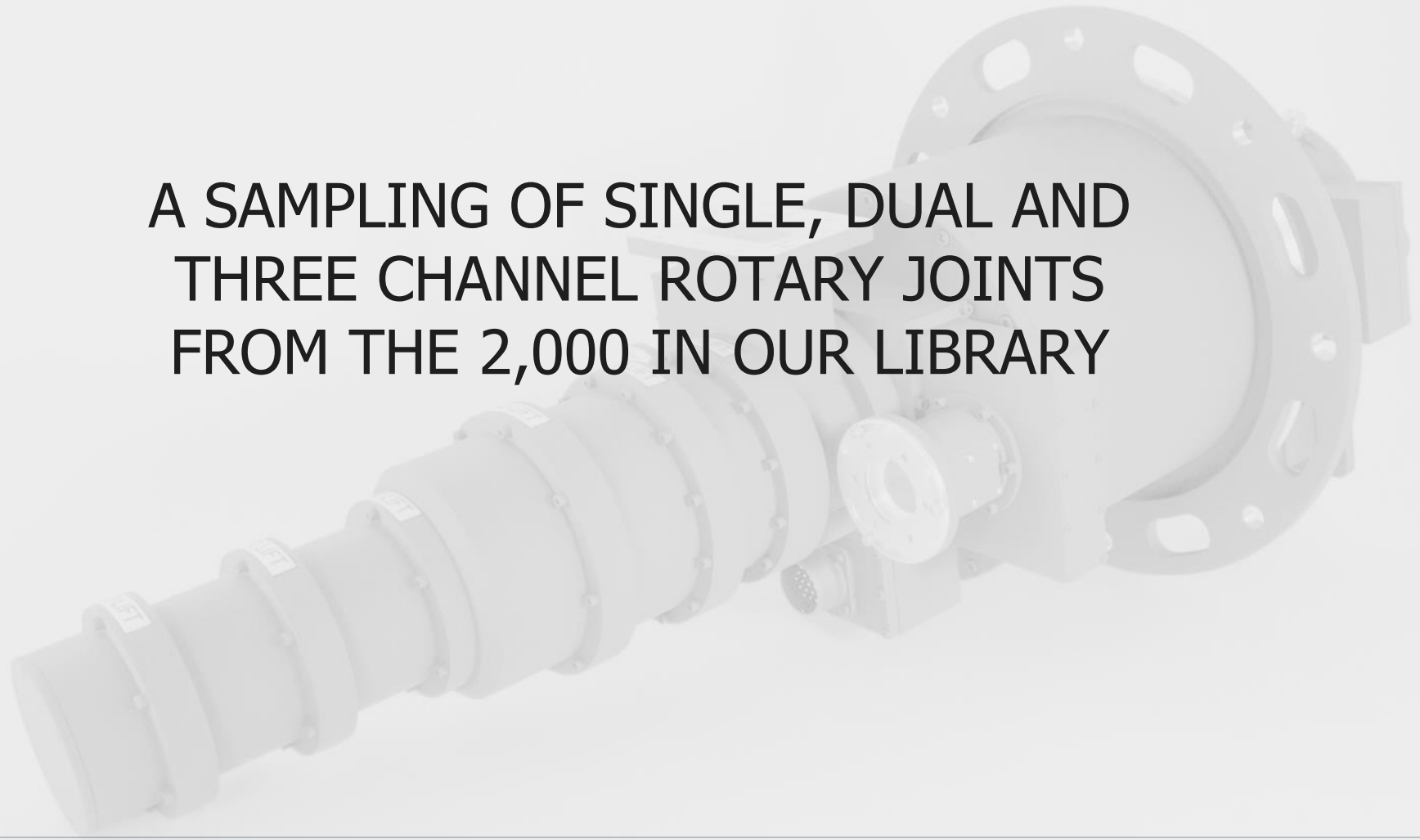
VALUES

Our employee owners will demonstrate our values of good *Stewardship, Leadership & Teamwork, Trust & Accountability,* and *Innovation* to drive excellence for our customers, vendors, employees, and the environment.

QUESTIONS?

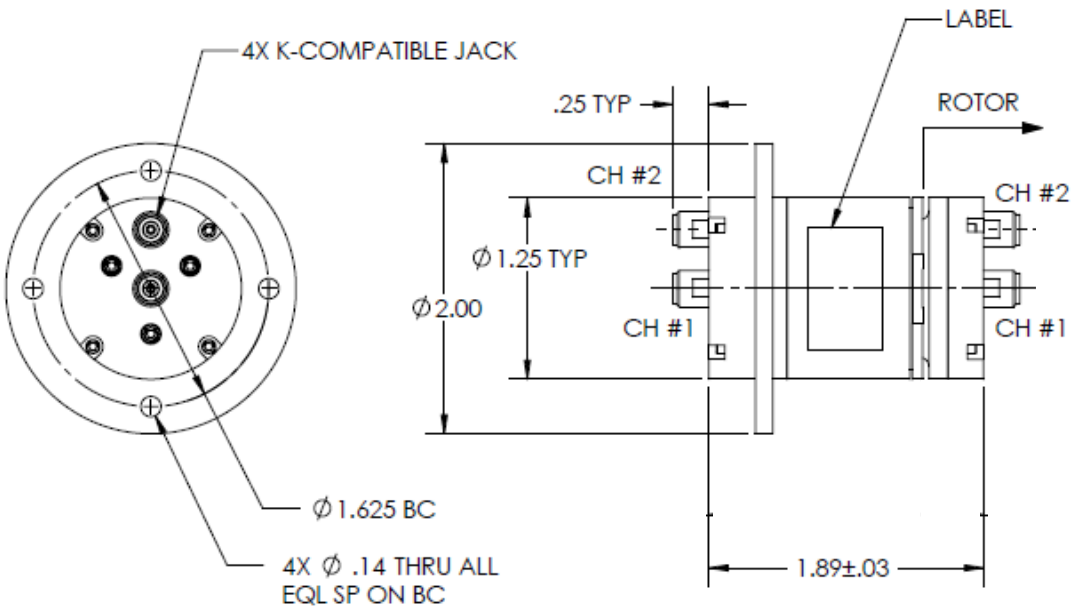


A SAMPLING OF SINGLE, DUAL AND THREE CHANNEL ROTARY JOINTS FROM THE 2,000 IN OUR LIBRARY



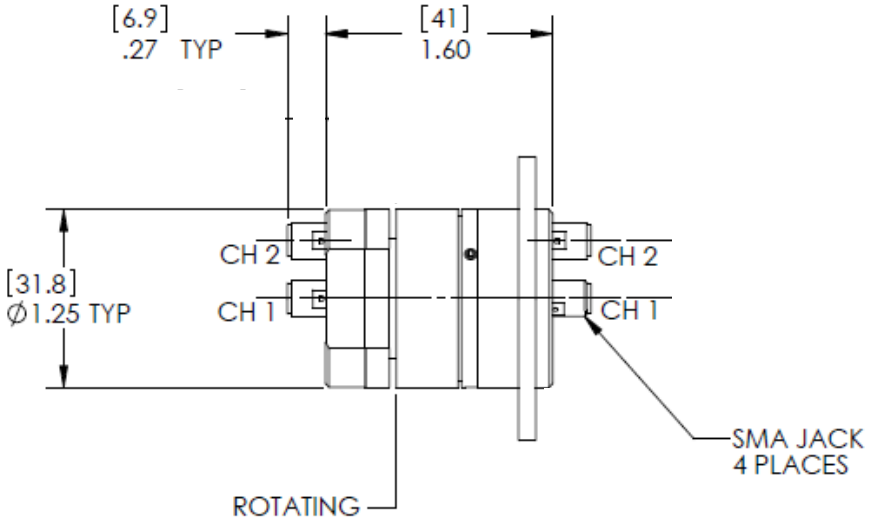
2240-0 Dual Channel Broadband RJ

SPECIFICATIONS		
	CHAN 1	CHAN 2
FREQUENCY (GHz):	DC - 18	DC - 18
VSWR (MAX):	1.35:1 (DC-8.0)	2.0:1 (DC-4.0)
	1.75:1 (8.0-18)	3.0:1 (4.0-8.0)
		3.5:1 (8.0-12)
		4.5:1 (12-18)
VSWR WOW (MAX):	0.05	.1 (DC-4.0)
		.35 (4.0-8.0)
		.8 (8.0-12)
		2.0 (12-18)
INSERTION LOSS (MAX):	.4 dB (DC-8.0)	.75 dB (DC-4.0)
	1.0 dB (8.0-18)	1.5 dB (4.0-8.0)
		2.5 dB (8.0-12)
		3.0 dB (12-18)
INSERTION LOSS WOW (MAX):	.05 dB	0.1 dB (DC-4.0)
		.3 dB (4.0-8.0)
		.75 dB (8.0-12)
		1.5 dB (12-18)
POWER (PK):	2 KW	2 KW
POWER, AVG (MIN @ 1 GHz):	50 W	50 W



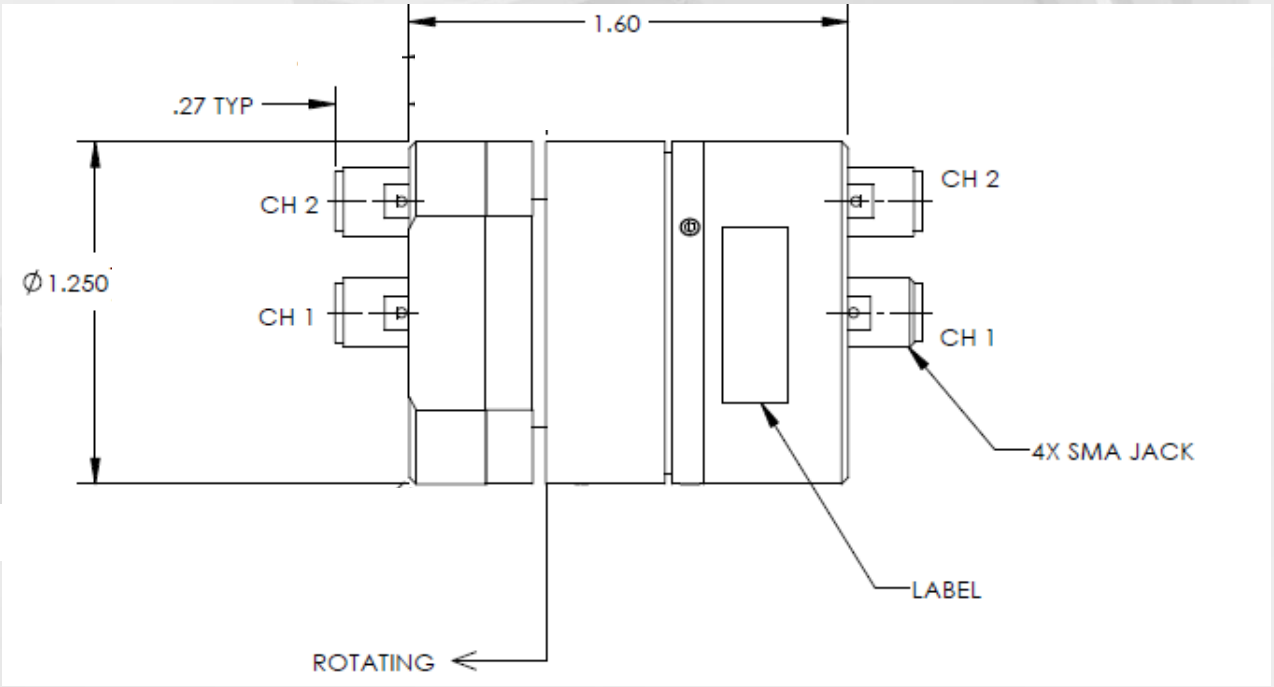
2244A-0 Dual Channel Broadband RJ

DESIGN SPECIFICATIONS				
ELECTRICAL				
	CHANNEL #1		CHANNEL #2	
FREQUENCY (GHz):	DC-18		DC-2.0	2.0-4.0
VSWR (MAX):	1.80:1		1.35:1	2.0:1
VSWR WOW (MAX):	0.05		0.1	0.2
INSERTION LOSS (dB max):	1.5		0.4	1.0
WOW (dB MAX):	0.05		0.1	0.2
POWER, PEAK (KW MAX):	5		5	
POWER, AVERAGE (W MAX):	200 @ 1 GHz		200 @ 1 GHz	
ISOLATION (MIN):	<——————50 dB——————>			



23-2244A-0 Dual Channel Rotary Joint

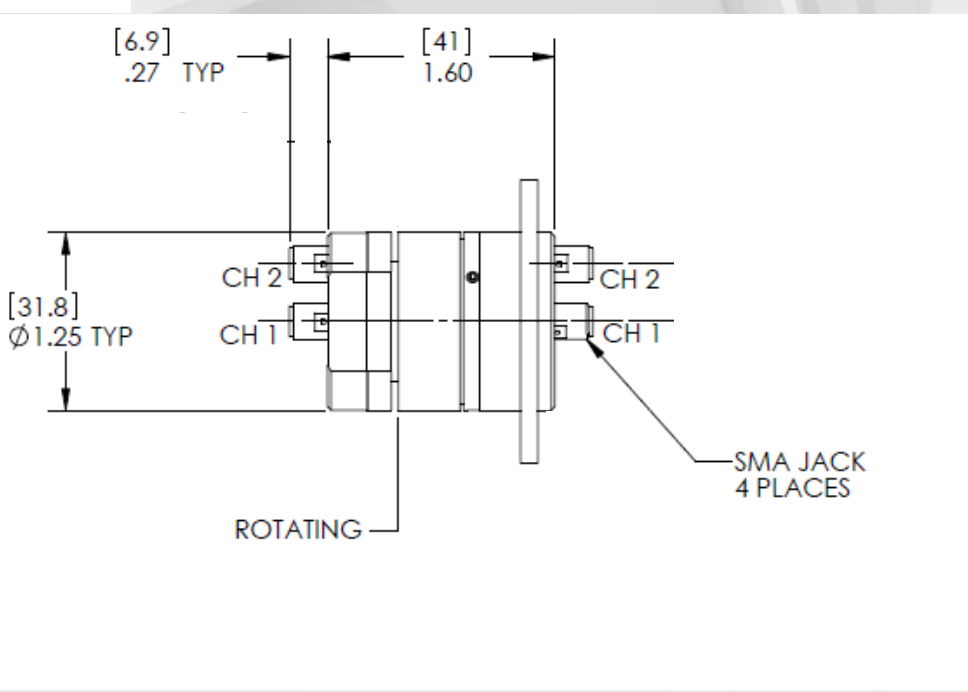
DESIGN SPECIFICATIONS		
ELECTRICAL		
	CHANNEL #1	CHANNEL #2
FREQUENCY (GHz):	DC-4.5	DC-4.5
VSWR (MAX):	1.50:1	2.00:1
VSWR WOW (MAX):	0.05	0.25
INSERTION LOSS (MAX):	0.50dB	1.0 dB
WOW (MAX):	0.05dB	0.25dB
POWER, AVERAGE (MIN):	5W	5W
ISOLATION (MIN):	<----------40 dB---------->	



84-2244A-0 Dual Channel Rotary Joint

DESIGN SPECIFICATIONS

ELECTRICAL	CHANNEL 1			CHANNEL 2	
USED FOR	UP-LINK, TRANSMISSION PATH			DOWN-LINK RECEIVE PATH	
INTERFACE	SMA			SMA	
DC PASS	YES			YES (LOWER THAN 1AX20V = 20W)	
FREQUENCY RANGE	10 MHz	950-2120 MHz	13.75-14.50 GHz	10 MHZ	950-2120 MHz
AVERAGE POWER	0.1W	0.1W	80W (NOTE 1)	0.1W	0.1W
PEAK POWER	N/A	N/A	5KW (NOTE 2)	N/A	N/A
INSERTION LOSS, MAX	0.1dB	0.25dB	0.4dB	0.1dB	0.4dB
INSERTION LOSS WOW, MAX	0.05dB	0.05dB	0.05dB	0.05dB	0.10dB
VSWR, MAX	1.2:1	1.3:1	1.5:1	1.5:1	1.5:1
VSWR WOW	0.05	0.05	0.05	0.05	0.1
ISOLATION, MIN	----------50dB----------				

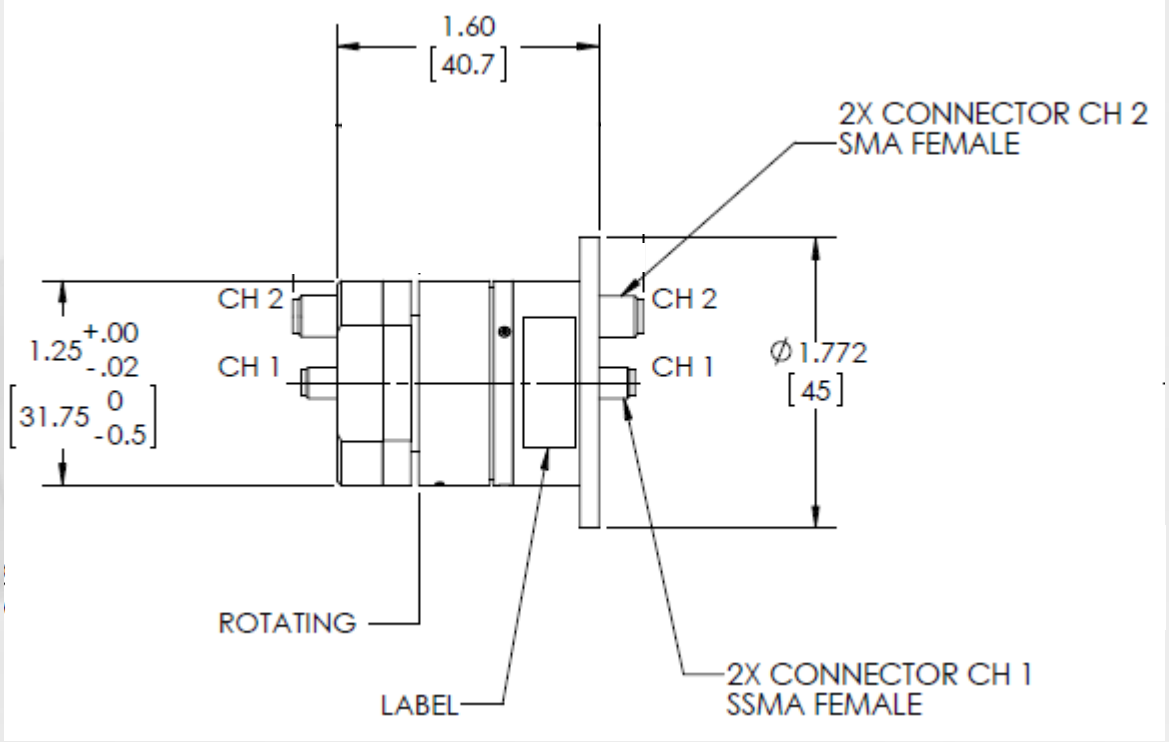


89-2244A-0

DESIGN SPECIFICATIONS

ELECTRICAL

	CHANNEL 1		CHANNEL 2
FREQUENCY (GHz):	13.75-14.5 (Ku-BAND)	29-31 (Ka-BAND)	DC - 2.15
VSWR (MAX):	1.4:1	1.4:1	1.4:1
INSERTION LOSS (dB max):	1.0	1.0	1.0
POWER, AVERAGE (MAX):	40 W	30 W	2 W
ISOLATION (MIN):	<———	50 dB MIN	———>



101-2244A-0 Dual Channel Rotary Joint with Slip Ring

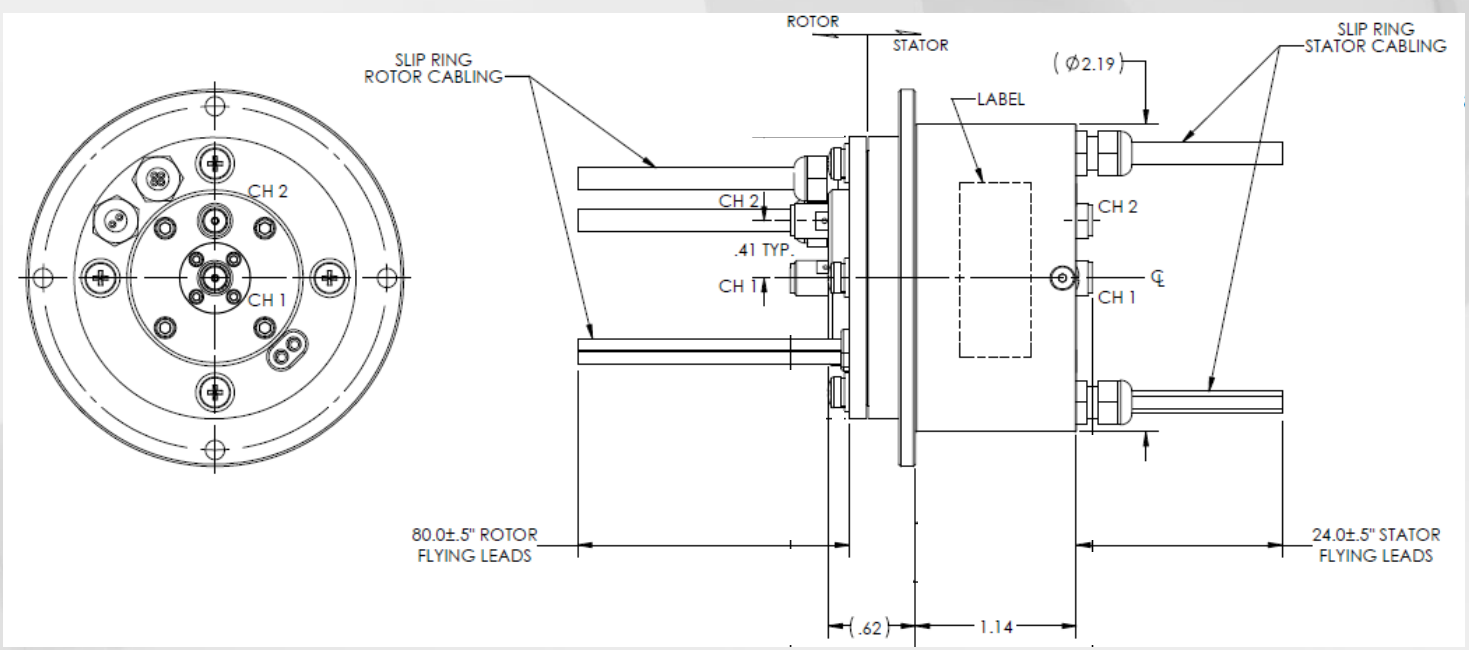
DESIGN SPECIFICATIONS

ELECTRICAL

	CHANNEL 1	CHANNEL 2
FREQUENCY (MHz):	DC-2000	DC-2000
VSWR (MAX):	1.3:1	1.3:1
VSWR WOW (MAX):	0.05	0.1
INSERTION LOSS (dB max):	0.3	0.3
WOW (dB MAX):	0.05	0.1
POWER, PEAK (W MAX):	5	5
POWER, AVERAGE (W MAX):	2	2
ISOLATION (MIN):	<----------65 dB---------->	

SLIP RING SPECS.

	NO. OF CHANNELS :	8
2 CHANNEL @	VOLTAGE :	28 VDC
	AMPERAGE :	15A
6 CHANNELS @ (ALL SHIELDS TO CHASSIS GND)	LOW POWER COMMUNICATION	



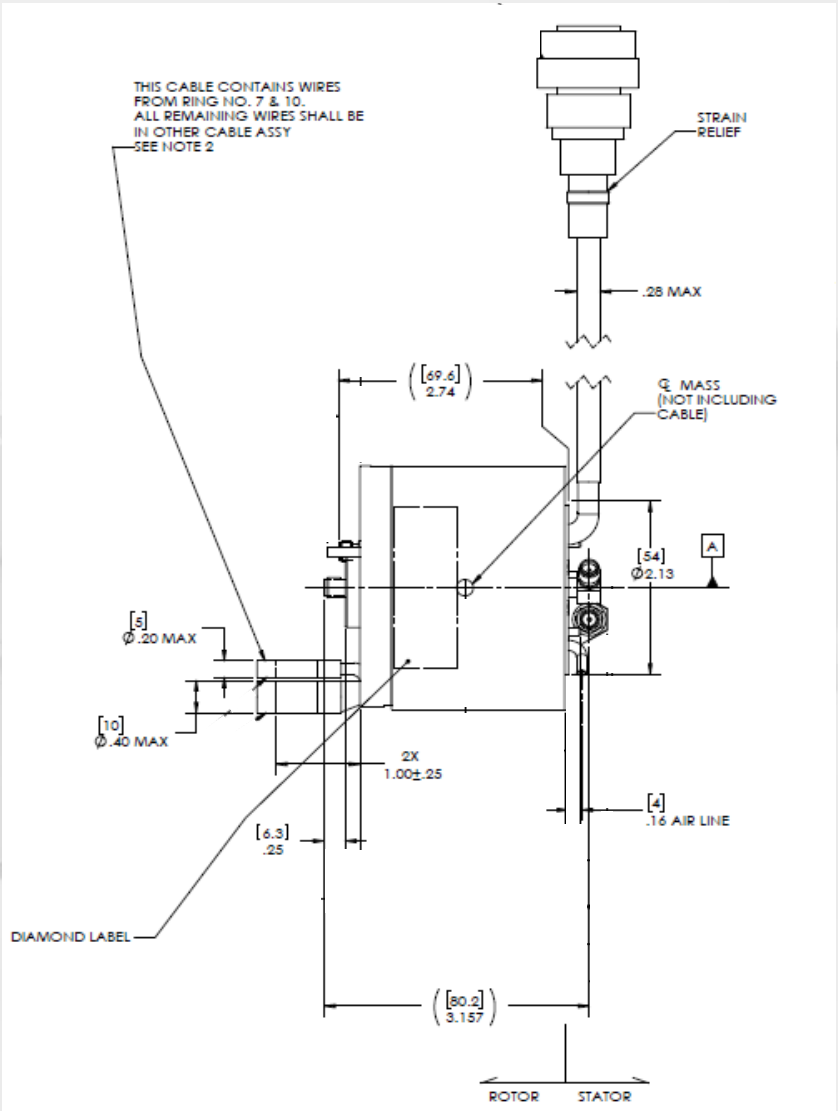
56-2244A-0 Dual Channel Rotary Joint with Slip Ring

SPECIFICATIONS - ROTARY JOINT:

RF	CHANNEL 1 & 2
FREQUENCY (GHz):	12.2-12.7
POWER:	1.0 W
VSWR (MAX.):	1.5:1
INSERTION LOSS (dB) (MAX.):	0.9O
INSERTION LOSS WOW:	0.1 dB Pk-Pk
INSERTION PHASE WOW	2° Pk-Pk
ISOLATION:	40 dB MIN
INTERMODULATION	40 dB MIN

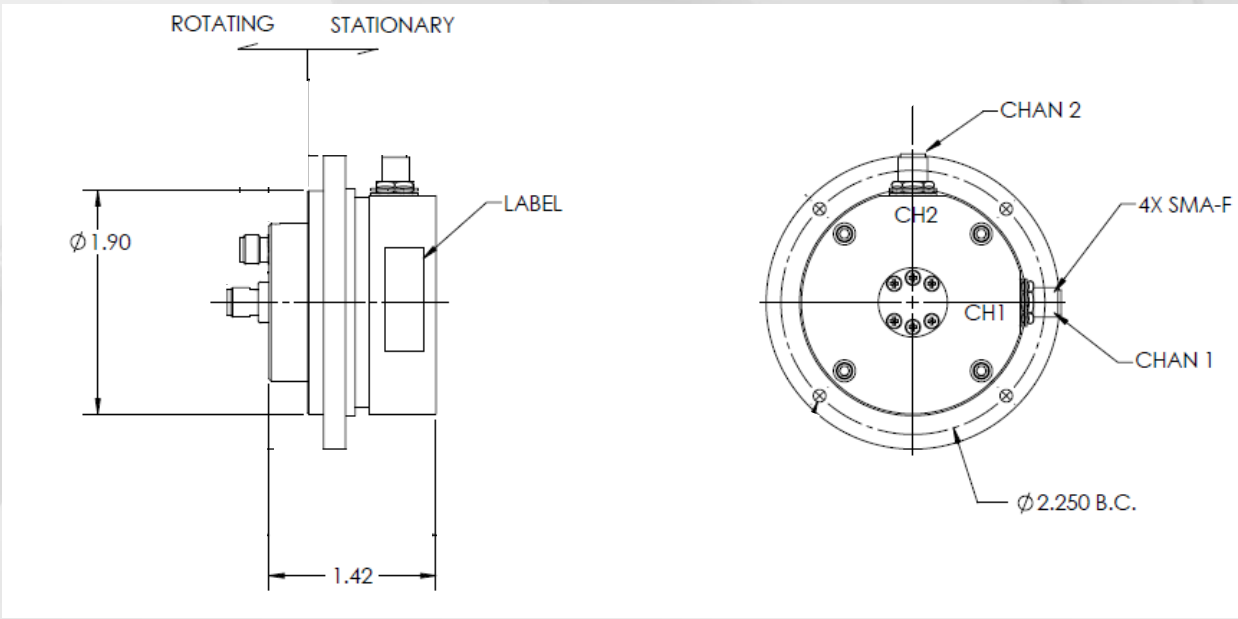
SLIP RING CIRCUIT REQUIREMENTS

RING NUMBER	DESCRIPTION	RATED VOLTAGE	CONTINUOUS CURRENT
1	RS-422 DATA (TX-L)	100V	50 mA
2	RS-422 DATA (TX-H)	100V	50 mA
3	RS-422 DATA (RX-H)	100V	50 mA
4	RS-422 DATA (RX-L)	100V	50 mA
5	POWER, PRIMARY	100V	3 AMP
6	POWER, PRIMARY	100V	3 AMP
7	POWER, PRIMARY	100V	3 AMP
8	RETURN, PRIMARY POWER	100V	3 AMP
9	RETURN, PRIMARY POWER	100V	3 AMP
10	RETURN, PRIMARY POWER	100V	3 AMP
11	SPARE	100V	3 AMP
12	CHASSIS GROUND	100V	3 AMP



84-2255-0 Dual Channel Rotary Joint

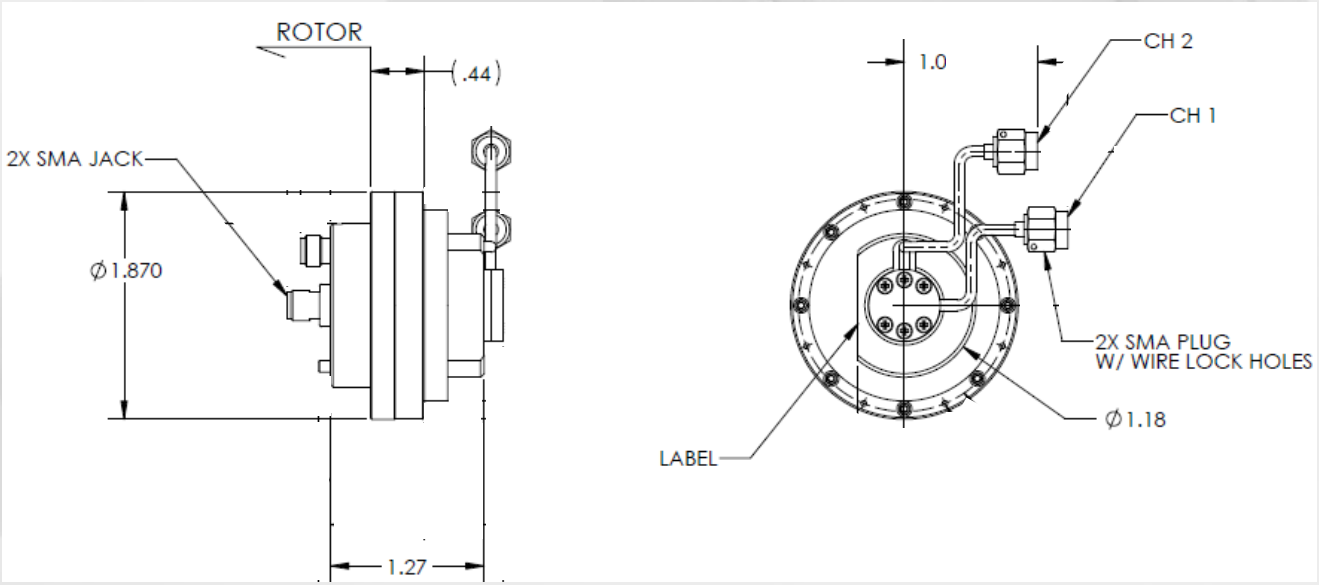
SPECIFICATIONS		
	CH. 1	CH. 2
FREQUENCY (GHz)	13.75-14.5	10.75-12.75
VSWR	1.40:1	1.35:1
INS LOSS (dB)	0.50	0.50
POWER	25 W	10 W
ISOLATION (dB)	50	



96-2255-0 Dual Channel Rotary Joint

SPECIFICATIONS

	CH 1		CH 2
FREQUENCY (GHz)	10.7-12.75	13.75-14.5	10.7-12.75
MIN VSWR	1.60:1	1.25:1	1.60:1
MAX INS LOSS	0.75 dB	0.35 dB	0.75 dB
MIN POWER	10 mW	45 W	10 mW
ISOLATION (dB min)	---------- 50 ----------		



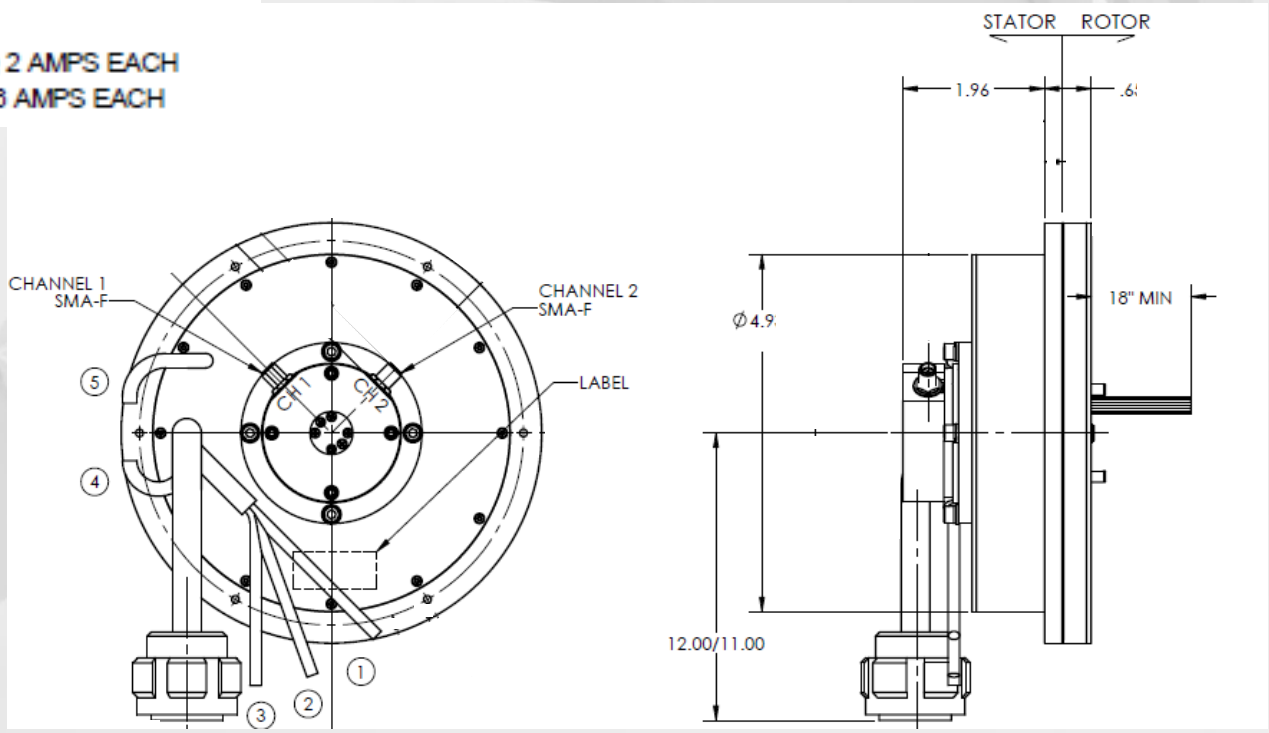
109-2255-0 Dual Channel Rotary Joint with Slip Ring

DESIGN SPECIFICATIONS

ELECTRICAL	CH 1	CH 2
FREQUENCY (GHz) :	10.95-12.75	13.75-14.5
VSWR :	1.4:1	1.4:1
INS LOSS (dB) :	0.75	0.75
POWER :	10 W	30 W
ISOLATION (dB) :	<---------- 50 ---------->	

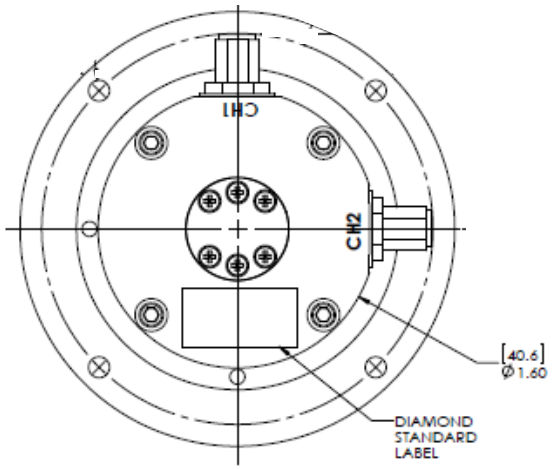
24 CHANNEL SLIP RING

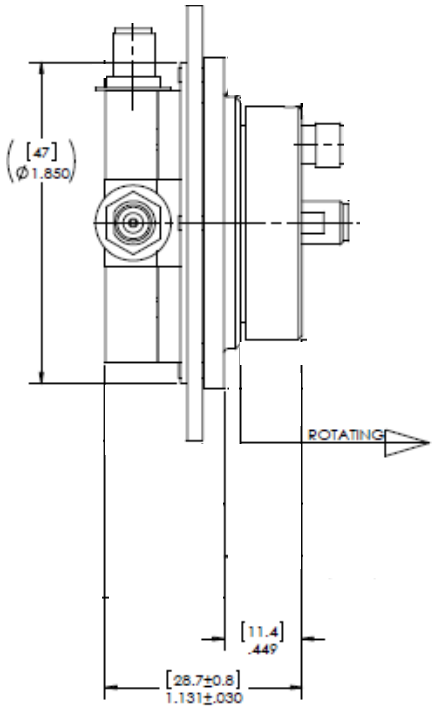
SIGNAL : 22 CHANNELS @ 2 AMPS EACH
POWER : 2 CHANNELS @ 6 AMPS EACH



111-2255-0 Dual Channel Rotary Joint

	CH 1	CH 2 (CENTER)
FREQUENCY (GHz):	19.2 - 21.2	29.0 - 31.0
VSWR, MAX:	1.50:1	1.50:1
VSWR WOW, MAX:	.20	.10
INSERTION LOSS, dB MAX:	.80	.80
INSERTION LOSS WOW, dB:	.20	.10
INSERTION PHASE WOW:	8°	4°
AVERAGE POWER, W:	1	10
ISOLATION:	--------- 50 dB --------	



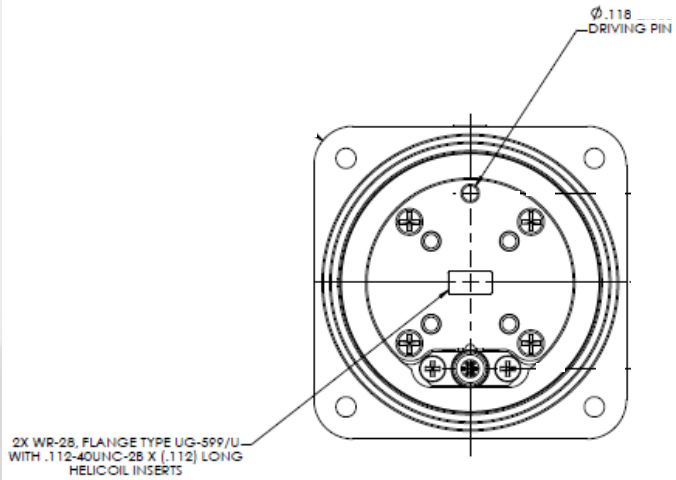


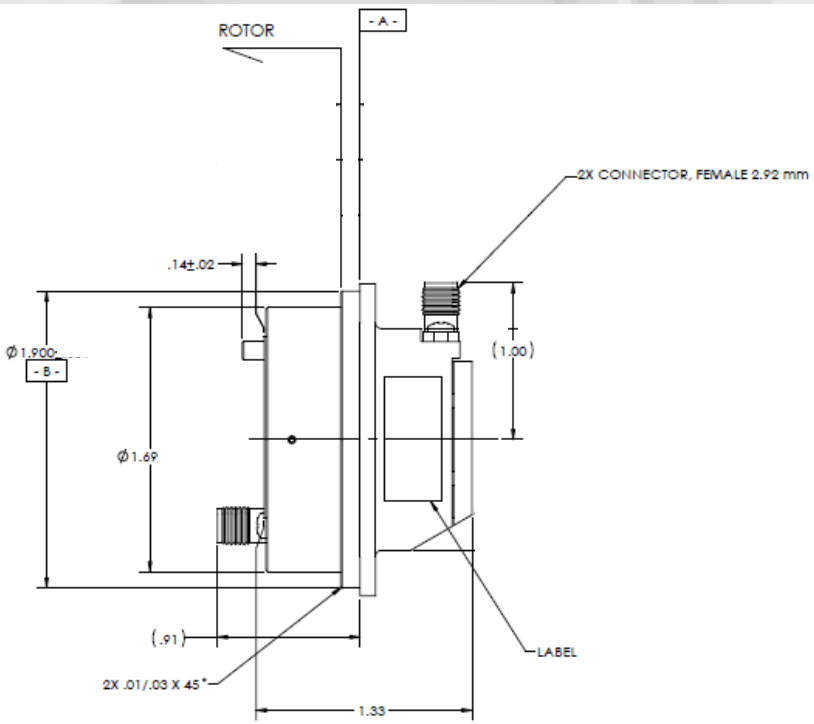
20-22124-0 Dual Channel Rotary Joint

DESIGN SPECIFICATIONS

ELECTRICAL

	CH 1 TX	CH 2 RX
	WR-28	2.92mm
FREQUENCY (GHz):	29-31	19.2 - 21.2
VSWR (MAX):	1.2:1	1.25:1
INSERTION LOSS (dB, MAX):	0.35	0.7
INSERTION LOSS WOW (dB, MAX):	0.1	0.2
PHASE WOW (deg):	2.0	2.0
PEAK POWER @ 45,000 FT (MAX):	100 W	5 W
PEAK POWER @ 55,000 FT (MAX):	50 W	5 W
AVERAGE POWER @ 45,000 FT (MAX):	100 W	5 W
AVERAGE POWER @ 55,000 FT (MAX):	50 W	5 W
ISOLATION (dB, MIN):	<---------- 65 --------->	

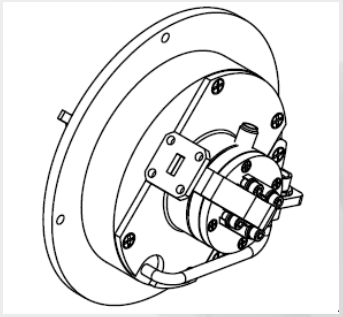


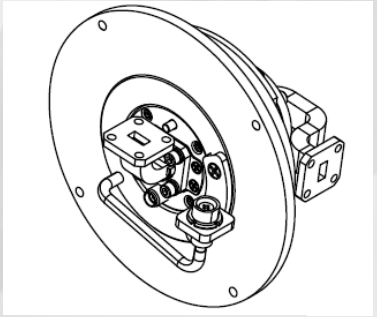


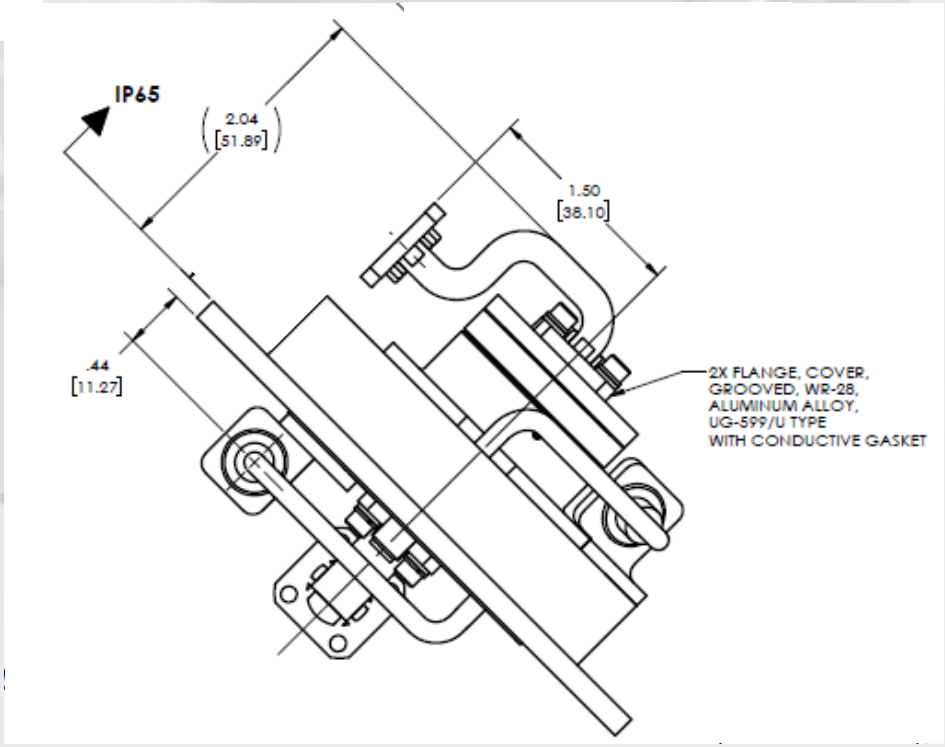
23-22124-0 Dual Channel Rotary Joint with Slip Ring

ELECTRICAL

	CH 1 TX	CH 2 RX
	WR-28	SMA
FREQUENCY:	28.5-30.5 GHz	900 Hz - 2.5 GHz
VSWR (MAX):	1.5:1	1.8:1
INSERTION LOSS (dB, MAX):	0.4	0.4
INSERTION LOSS WOW (dB, MAX):	0.1	0.2
AVERAGE POWER (MAX):	50 W	1 W
ISOLATION (dB, MIN):	<---------- -60 --------->	



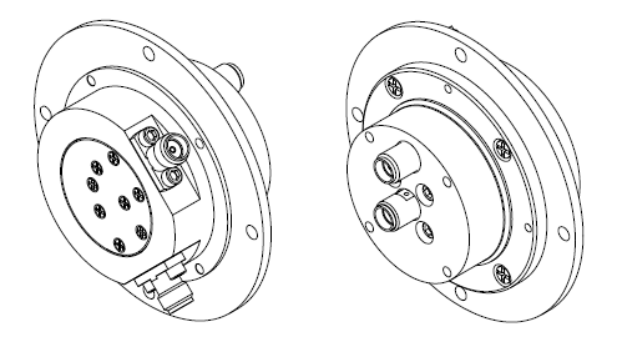


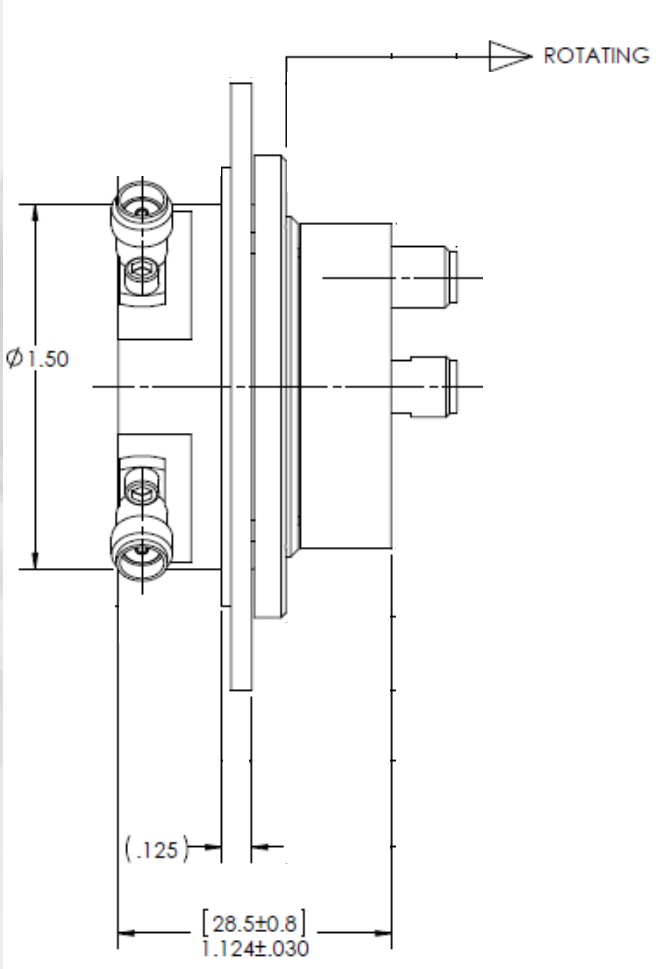


12-2241-0 & 13-2241-0
Dual Channel Rotary Joints

ELECTRICAL	CH1 (CENTER)	CH2
FREQUENCY:	DC - 12.75 GHz	DC - 5 GHz
VSWR, REF:	1.3:1	1.3:1
VSWR WOW, MAX:	0.05	0.5
INSERTION LOSS, dB MAX:	.6 dB	.5 dB
INSERTION LOSS WOW, dB MAX:	0.05 dB	0.2 dB
PEAK POWER:	1 KW	1 KW
AVERAGE POWER:	100W @ DC - 2 GHZ	10 W

CHANNEL DESIGNATION	CH1	CH2 (CENTER)
FREQUENCY:	DC - 13 GHz	DC - 13 CHz
VSWR, MAX:	2.0:1	2.0:1
VSWR WOW, MAX:	0.5	0.1
INSERTION LOSS, dB MAX:	0.8 dB	0.8 dB
INSERTION LOSS WOW, dB MAX:	0.3 dB	0.1 dB
AVERAGE POWER, MAX:	30W	30W
PEAK POWER, MAX:	1KW	1KW
ISOLATION dB, MIN:	------- 50 -------	

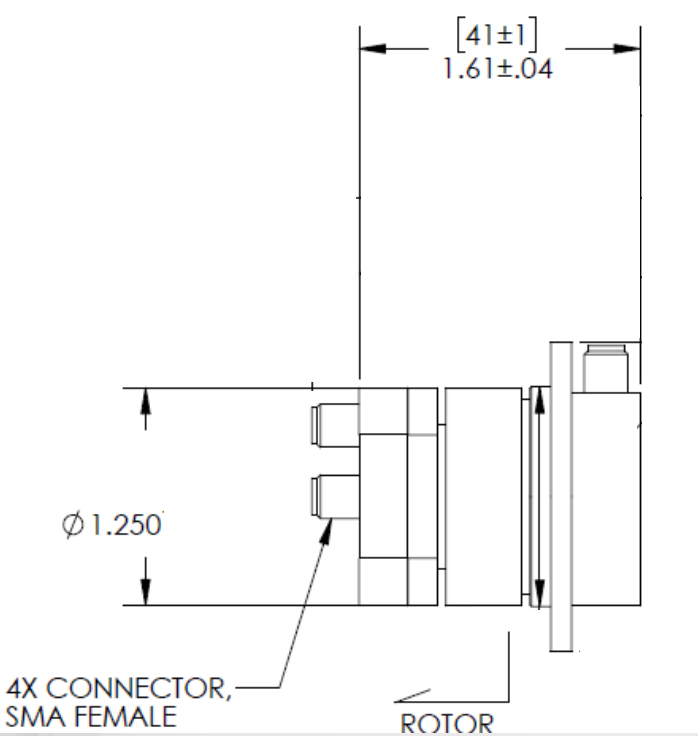


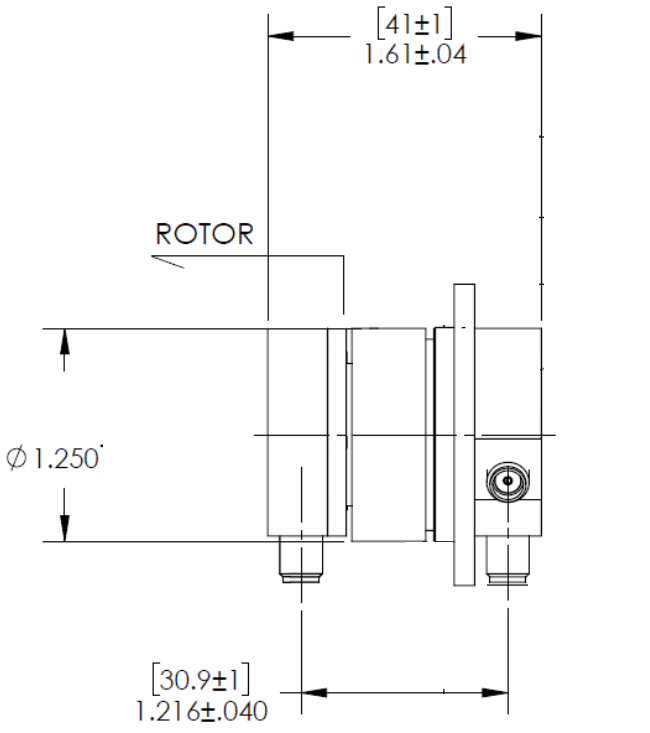


14-2241-0 and 15-2241-0 Dual Channel Rotary Joints

ELECTRICAL

	CHANNEL 1	CHANNEL 2
FREQUENCY, GHz:	DC-4.5	DC-4.5
VSWR, MAX:	1.5:1	1.5:1
VSWR WOW, MAX:	0.1	0.5
INSERTION LOSS, dB MAX:	0.3	0.3
INSERTION LOSS WOW, dB MAX:	0.15	0.15
POWER, PEAK, kW MAX:	1	1
POWER, AVERAGE, W MAX:	100 @ DC-2 GHz 60 @ 2-4.5 GHz	10

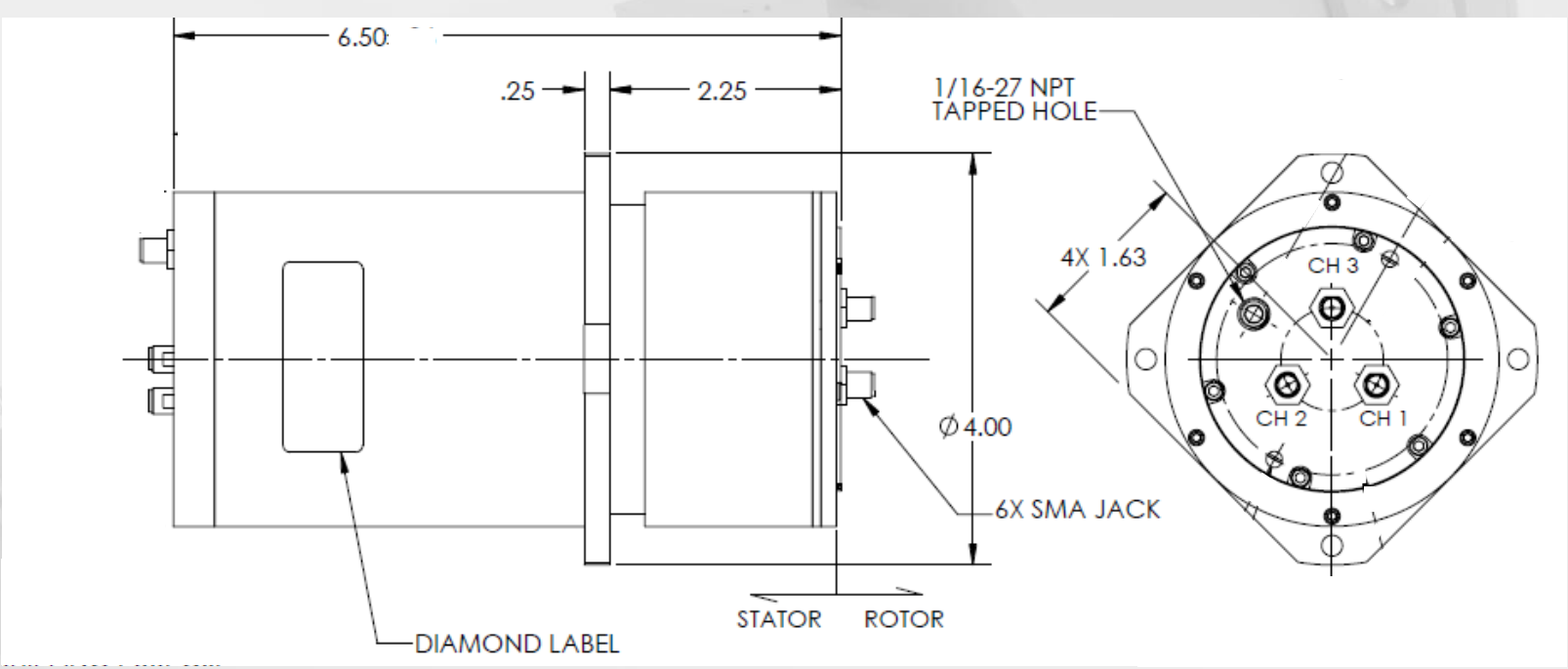




27-2349-0 Three Channel Rotary Joint

DESIGN SPECIFICATIONS

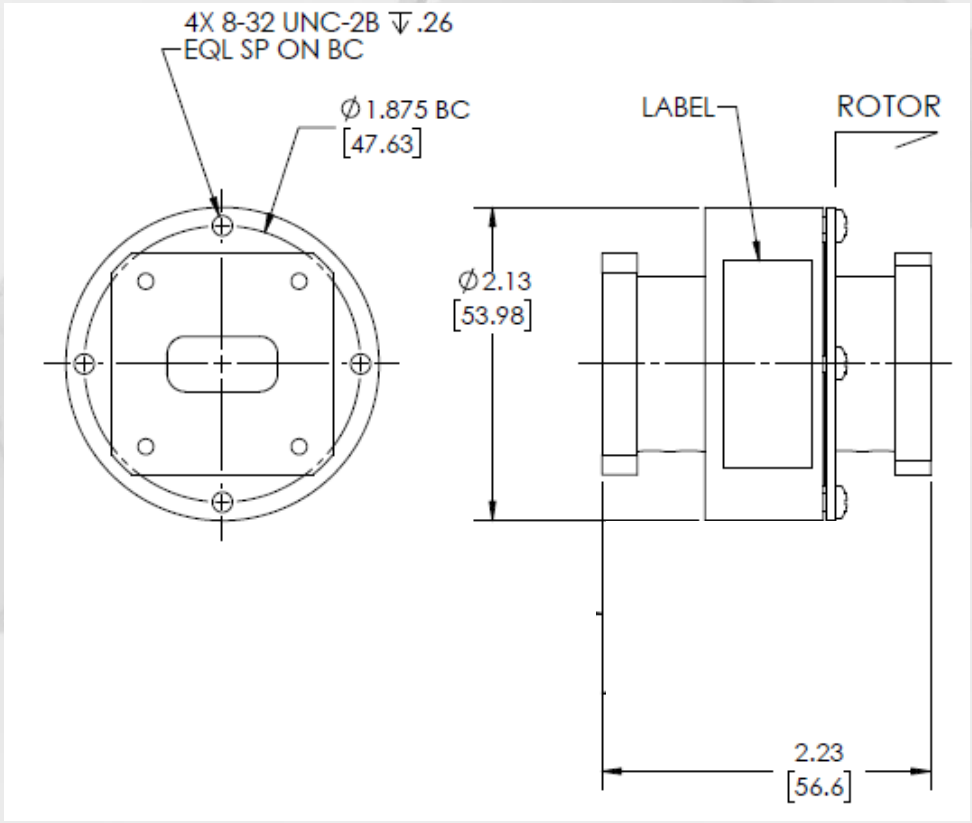
ELECTRICAL	CHAN 1	CHAN 2	CHAN 3
FREQUENCY (GHz):	1.0-6.0	1.0-6.0	0.2-2.5
VSWR (MAX):	1.2:1	3.0:1	1.8:1
VSWR WOW (MAX):	0.05	0.3	0.4
INSERTION LOSS (MAX):	0.5 dB	2.0 dB	0.8 dB
INSERTION LOSS WOW (MAX):	0.05 dB	0.3 dB	0.15 dB
POWER, AVG:	1 W	1 W	50 W
ISOLATION	--------50 dB--------		



64-845-0 Single Channel Rotary Joint

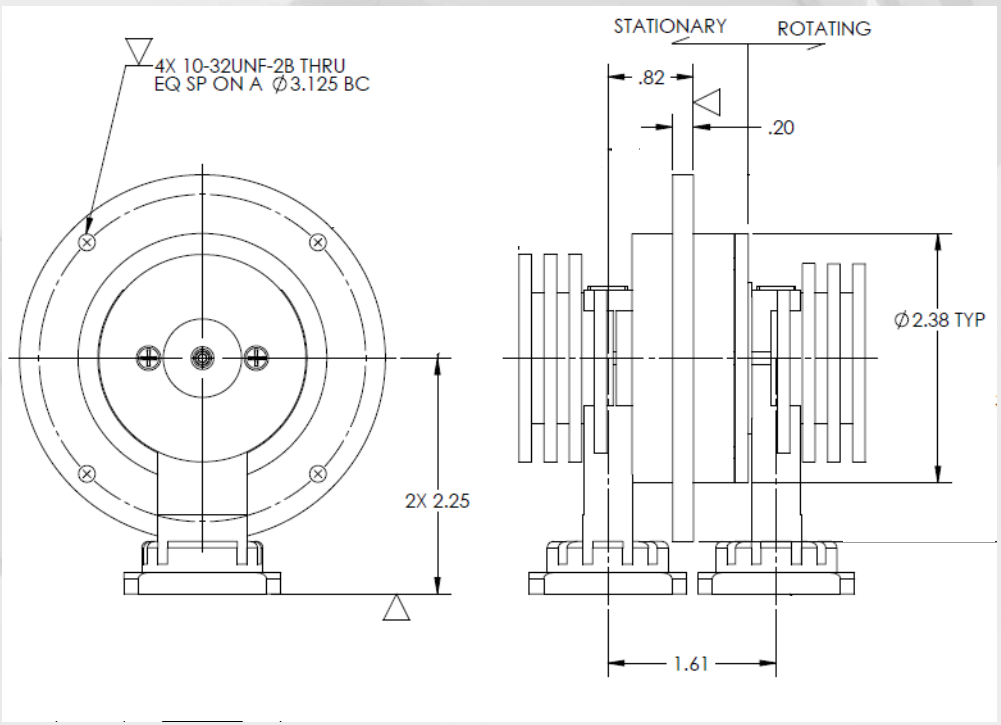
SPECIFICATIONS

FREQUENCY (GHz):	10.7 - 14.5
VSWR (MAX):	1.2:1
VSWR WOW (MAX):	0.05
INSERTION LOSS (MAX):	0.2 dB
INSERTION LOSS WOW (MAX):	0.05
PEAK POWER (MAX):	5 KW



52-846-0 Single Channel Rotary Joint

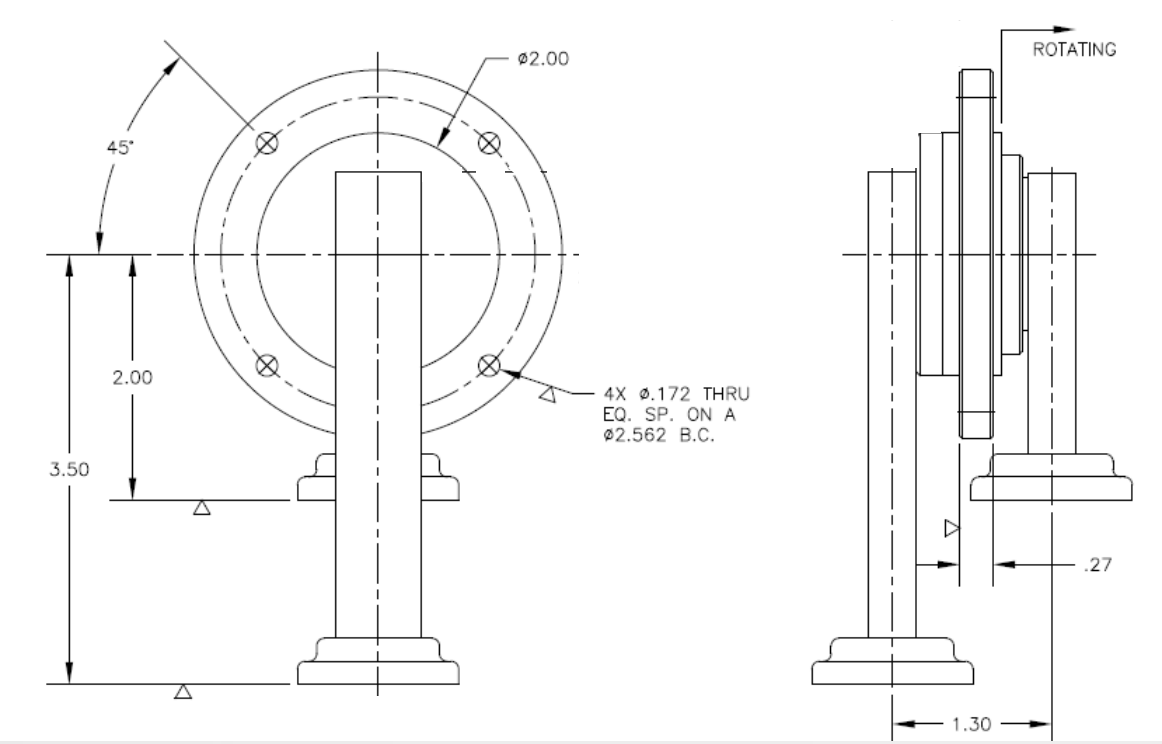
ELECTRICAL	
FREQUENCY (GHz):	12.75 - 14.0
VSWR (max):	1.35:1
VSWR WOW (max):	0.20dB/360°
INSERTION LOSS (max):	0.15dB
WOW (max):	0.30dB/360°
POWER, CW (max):	4.5KW



33-946-0 Single Channel Rotary Joint

SPECIFICATIONS

FREQUENCY:	17.3–18.4
VSWR:	1.20:1
VSWR WOW:	.1
INSERTION LOSS (dB):	.20 MAX.
LOSS WOW (dB):	.05
POWER (AVG.):	1 KW CW



20-2354-0 Dual Channel Rotary Joint

ELECTRICAL	CHAN 1	CHAN 2
FREQUENCY (GHz) :	9.3 - 9.6	9.3 - 9.6
VSWR (MAX) :	1.2:1	1.3:1
VSWR WOW (MAX) :	.1	.1
INSERTION LOSS (MAX) :	.22 dB	.35 dB
INSERTION LOSS WOW (MAX) :	.1 dB	.1 dB
* POWER, PEAK :	250 KW	125 KW
* POWER, AVG :	500 W	125 W
ISOLATION:	<-------- 50 dB -------->