

MISSION-CRITICAL
INTERCONNECT
SOLUTIONS



CLASS 1E · 10CFR50 APPENDIX B

Nuclear-Grade Connectors and Accessories

SuperNG · ITS-NG · IPT SE-NG · Mighty Mouse NG

OCTOBER 2019



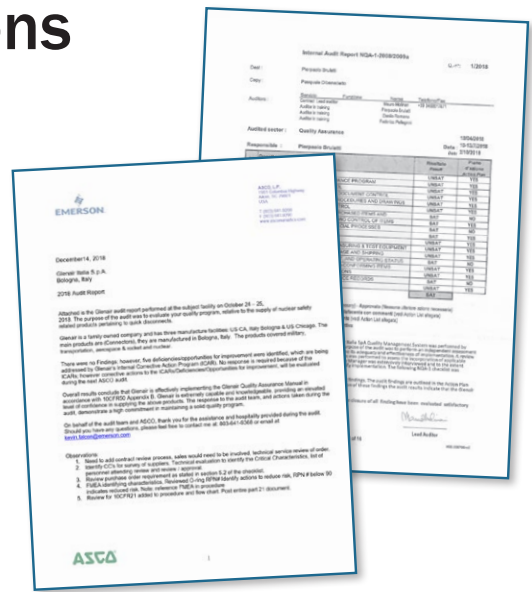
NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS

SuperNG, Mighty Mouse NG, ITS-NG, and IPT SE-NG

Designed for Containment Area (Class 1E) Nuclear Power Plant Applications

Glenair offers four connector series engineered in accordance with nuclear industry standards for containment area class 1E. Series SuperNG and Mighty Mouse NG are suitable for use in new plants with the most stringent zone 1E qualification standards. Series ITS-NG and IPT SE-NG are suitable for use in older plants undergoing retrofit or refurbishment.

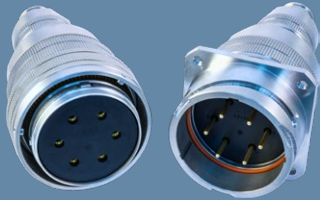
- The entire family of Glenair NG interconnect solutions is manufactured in an NQA-1 (10CFR50 Appendix B) qualified manufacturing quality and traceability system
- Full audit report and auditor statement of compliance available
- ASME NQA-1 : Quality Assurance Program Requirements for Nuclear Facility Applications in place. Quality controls include “down-to-the-molecular-level” analysis for all raw materials ensuring Glenair’s total control over all aspects of fabrication employed in our NG series connectors.



NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS
Designed For New Construction and Existing Plant
Containment Area (Class 1E) Applications



NG Connector Selection Guide



SuperNG

Double Peripheral Seal Quick-Connect Series for Stringent Class 1E Containment Area Applications



Mighty Mouse NG

Ultraminiature High-Pressure Quick-Connect for New Plant Class 1E Containment Area Applications



ITS-NG

Series ITS (5015 Type) Reverse-Bayonet Quick-Connect for Existing Plant Class 1E Refurbishment and Retrofit Applications



IPT SE-NG

Series IPT SE (26482 Type) Bayonet-Lock Quick-Connect Connectors for Existing Plant Class 1E Refurbishment and Retrofit Applications



Qualification and Test Capabilities

In-House Independent Test Laboratory



Series SuperNG

CLASS 1E

SuperNG

Double peripheral seal reverse-bayonet connectors designed to meet the latest, most stringent global Zone 1E qualification standards including those requiring long-term submersion

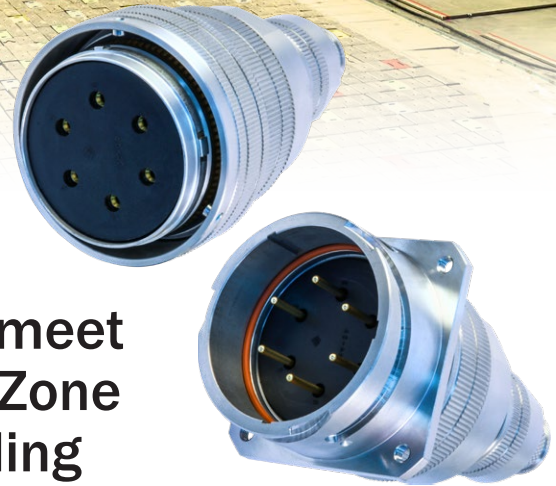
Glenair SuperNG connectors have been designed to withstand the most stringent LOCA qualification criteria, including those requiring long-term submersion, 60-year thermal cycle simulation, and long-term radiation exposure. SuperNG utilizes machined stainless steel shells and polymeric insert materials for maximum resistance to cumulative radiation, thermal, seismic, and pressure for class 1E harsh nuclear environments. Double peripheral seals ensure life-of-system environmental performance.

Built with proven reverse-bayonet technology for rapid mating and demating during maintenance cycles, and support for the broad range of military 5015 insert arrangements, the connectors can be configured in small shell sizes with as few as two signal contacts, all the way up to large size shell sizes accommodating over sixty 20-amp power contacts. Need a single 500 amp power contact layout for a three-phase motor application? The Series SuperNG supports that too.

Wire-to-connector termination is facilitated with precision-machined crimp or solder-cup contacts with ample wiring space in the connector housing for back-potting or environmental shrink boot accommodation.



Signature double O-ring peripheral seal



- Machined / passivated stainless steel shells
- Available EMC grounding fingers for improved shell-to-shell resistance
- Stainless steel backshells suitable for band termination and backpotting
- NPT threaded plugs and receptacles
- Radiation-hardened inserts, gaskets, seals, O-rings
- Standard signal, power or thermocouple contacts
- Polarization keys and keyways

NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS

Double Peripheral Seal Interconnect for Stringent Containment Area (Class 1E) Applications

SuperNG performance and applications



KEY PERFORMANCE ATTRIBUTES: Glenair SuperNG Connectors

Glenair SuperNG connectors are optimized for containment area (Class 1E) applications in modern nuclear power plants with stringent LOCA test and performance requirements including radiation resistance, high-temperature tolerance, sealed, high-pressure tolerance, fluid/chemical resistance, and corrosion resistance. Radiation-hardened inserts, gaskets, seals, and O-rings ensure 60-year life-of-system performance and are manufactured in accordance with a 10CFR50 Appendix B quality system.

Test	Zone 1 Requirements
Vibration aging	90 minutes of vibration each orthogonal axis, no discontinuity of 1 ms or greater, sinusoidal motion 0.75 g from 5 Hz to 100 Hz to 5 Hz
Thermal cycling	13 cycles between 30°C [86°F] and 121°C [250°F]
Mechanical cycle aging	500 mating/un-mating cycles
Environmental Requirements (Temperature and Pressure)	Normal Operating Conditions: Normal Temperature: (10 - 48.9°C) [50 -120°F] Normal Pressure: -0.001 +0.007 Mpa [-0.2 +1.0 psig]
	Group 1 Abnormal Operating Conditions, 18 4-h events: Abnormal Temperature: (10 - 65.6°C) [50 -150°F] Abnormal Pressure: Atmospheric
	Group 2 Abnormal Events Operating Conditions, 1-5 30-day events: Abnormal Temperature : (10 - 121°C) [50 - 250°F] Abnormal Pressure: ≤ 0.124 Mpa [≤18 psig]
Normal Service Radiation	60-Year Equivalent Gamma Total Integrated Dose= 4,12 E+07 rads [412 kGy]
Total Accumulated Dose (TAD)	250 MRads (2.5 X 10 ⁸)
Seismic test	In accordance with IEEE 344 and IEEE 382, max peak value 6.5g
Thermal Aging	Qualified Life 60 years
Containment pressure test	4.7 bar [68 psig] for 24 hours
DBA (LOCA) Test	DBA Operating Conditions in 1-year-long event: Maximum Accident Temperature (for aprox. 3 s): 216.7°C [422°F] Maximum Accident Pressure (for aprox. 3 s): 406.8 kPa [59 psig] Post Accident Gamma Total Integrated Dose for 1 year = 3.7 E+07 rads [370 kGy] Post Accident Beta Total Integrated Dose for 1 year = 2.6 E+08 rads [2600 kGy] Chemical Spray 30 hours Post DBA 30 days in chemical spray fluid
Post DBA test	1-year long immersion as per IEEE 383:09-2015, water at 85.2°C [185.38°F] pressure 0.11 Mpa [16.62 psig]



GLENAIR SuperNG ZONE 1 INTERCONNECT APPLICATION SUPPORT

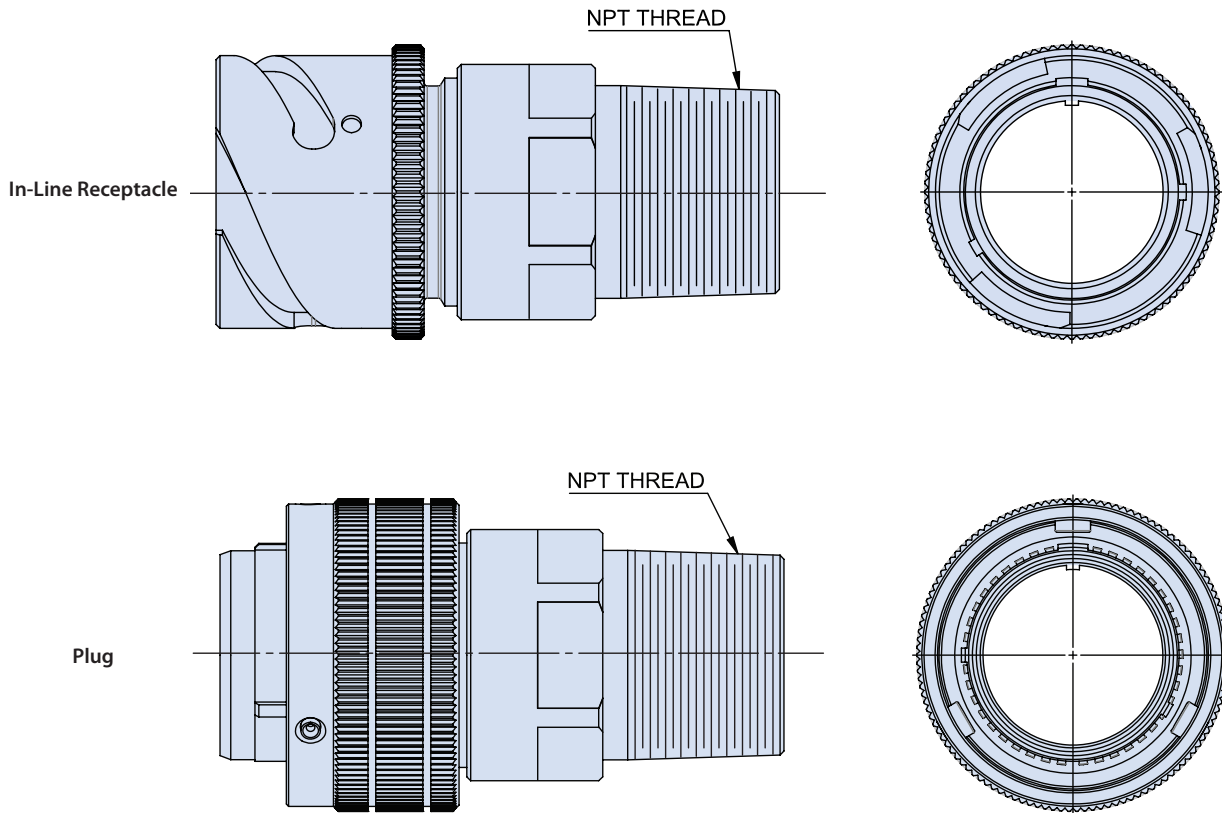
SuperNG is optimized for equipment applications in containment area Class 1E including:

- Valve controls/monitoring
- Control rod drive mechanisms
- Rod position indicators
- Pressure transmitters
- Solenoids
- Hydrogen detectors
- Fuel handing equipment
- Radiation tolerant cameras
- Limit switches
- Radiation detectors
- In-core detectors
- Data acquisition equipment
- Post accident monitoring systems
- Process control monitoring



NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS
**Double Peripheral Seal Interconnect for Stringent
Containment Area (Class 1E) Applications**
SuperNG connectors with NPT adapter

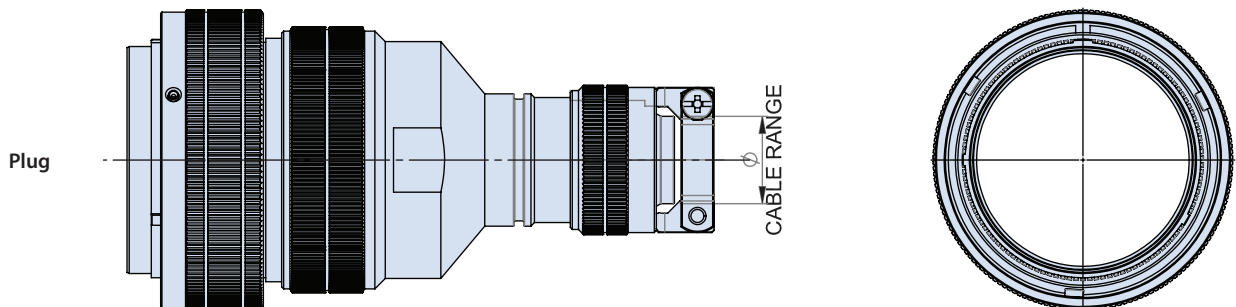
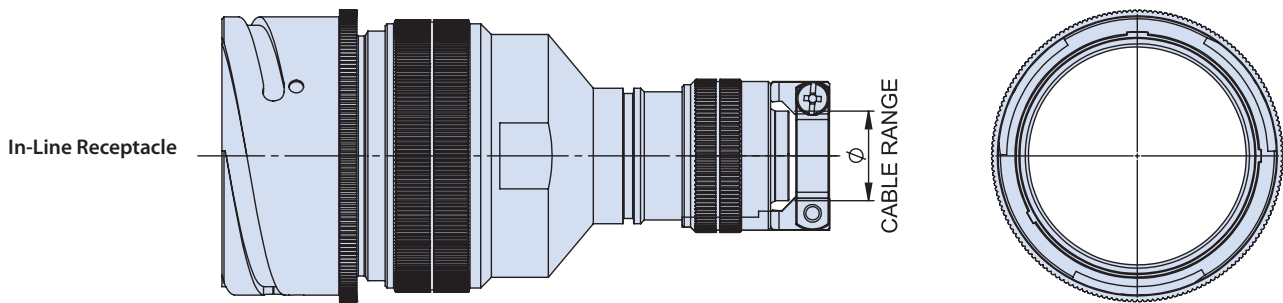
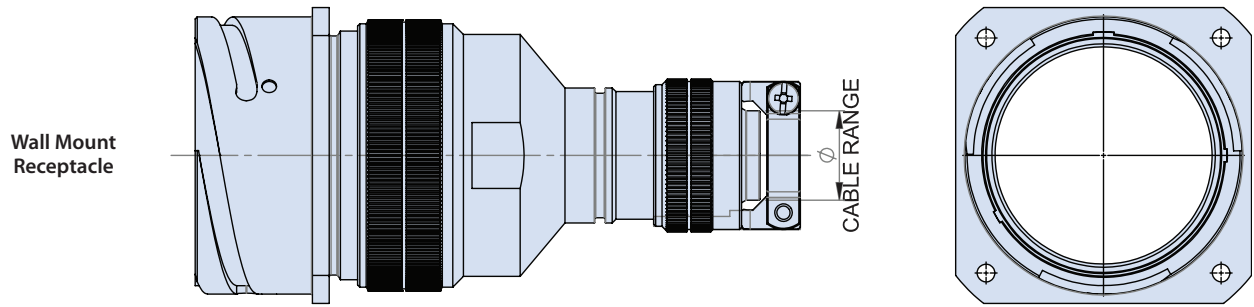
SuperNG RECEPTACLE AND PLUG WITH NPT ADAPTER



NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS
**Double Peripheral Seal Interconnect for Stringent
 Containment Area (Class 1E) Applications**
 SuperNG connectors with environmental cable clamp



SuperNG RECEPTACLES AND PLUG WITH 'CLASS C' ENVIRONMENTAL CABLE CLAMP (N5)





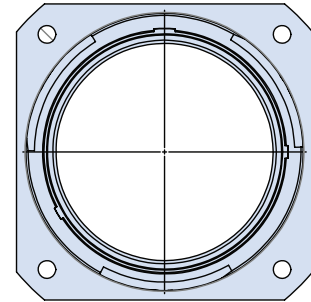
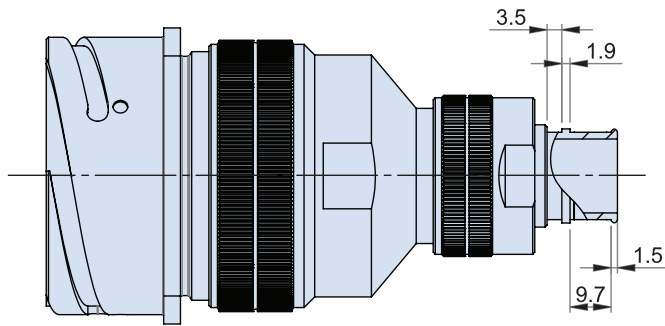
NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS

Double Peripheral Seal Interconnect for Stringent Containment Area (Class 1E) Applications

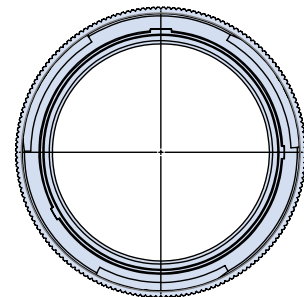
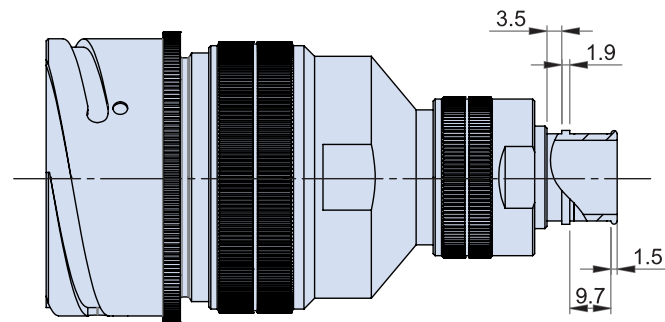
SuperNG connectors with shield termination backshells

SuperNG RECEPTACLE AND PLUG WITH SHIELD TERMINATION BACKSHELL

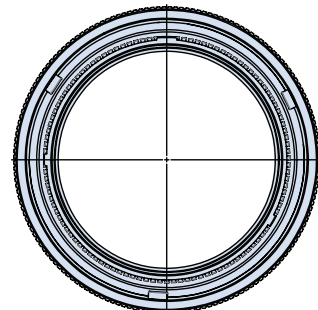
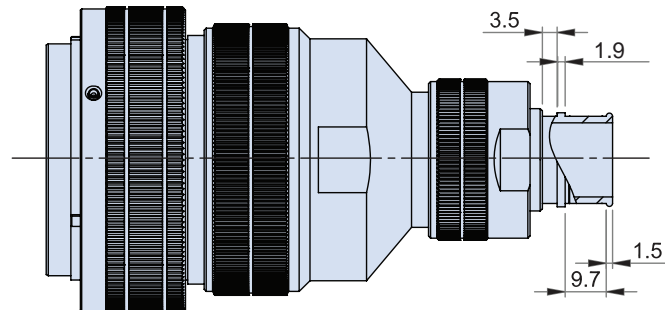
Wall Mount Receptacle



In-Line Receptacle



Plug

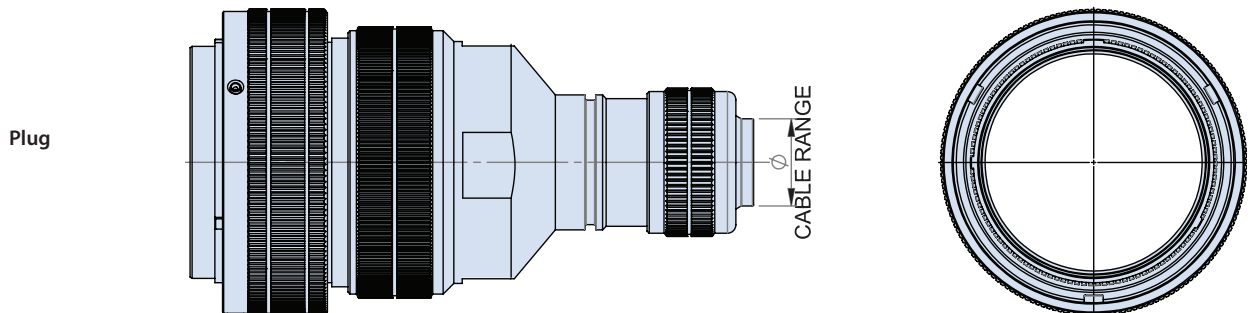
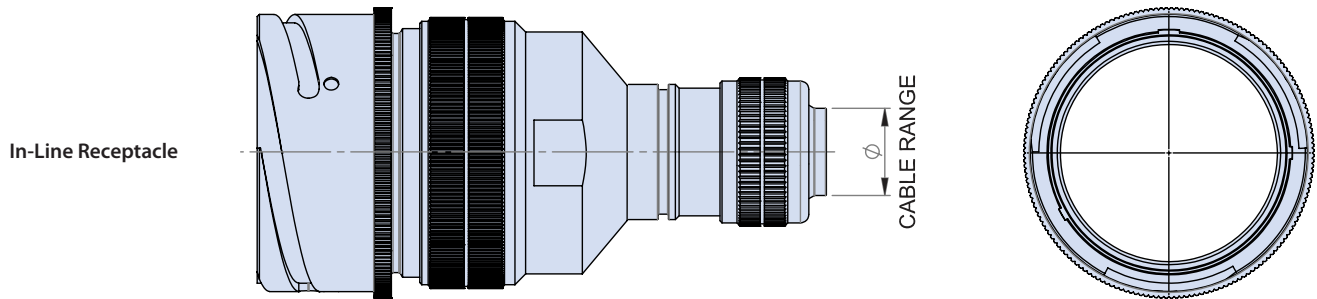
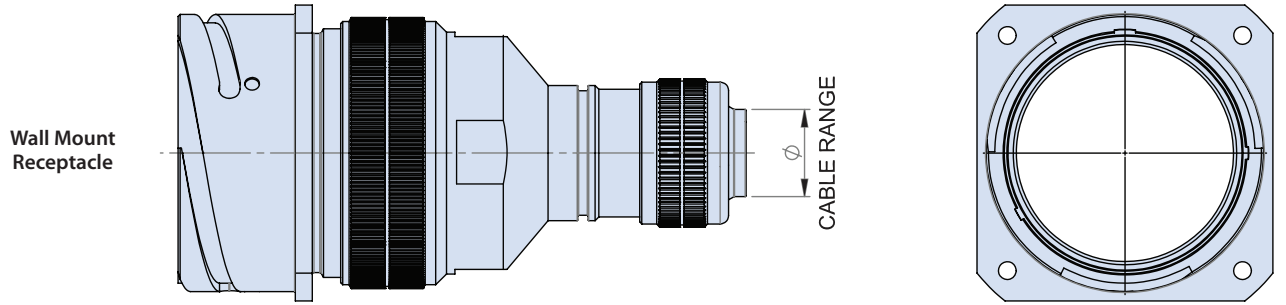


Double Peripheral Seal Interconnect for Stringent Containment Area (Class 1E) Applications



SuperNG connectors with environmental backshell or cable gland

SuperNG RECEPTACLE AND PLUG WITH ADAPTER AND PHM CABLE GLAND FOR JACKETED CABLES



NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS

Double Peripheral Seal Interconnect for Stringent Containment Area (Class 1E) Applications

SuperNG contact arrangements



Arrangement	Rating	Contact Number	Contact Size							
			4/0	0	4	8	12	16	18	20
28-9	D	12					6	6		
28-10	A	7			2	2	3	3		
28-11	A	22					4	18		
28-12	A	26						26		
28-13 (28-12x100*)	A	26						26		
28-15	A	35						35		
28-16	A	20						20		
28-17	A	15						15		
28-18	I	12						12		
28-19	A	10					4	6		
28-20	A	14					10	4		
28-21	A	37						37		
28-22	D	6			3			3		
28-51	D	12					12			
28-59	A	17					7	10		
28-70	A	7				7				
28-72*	I	72								72
28-79	A	16				7		9		
28-84	A	9				9				
28-124	A	16				4		12		
28-A29	A	29				2		27		
28-A31*	A	31				6				25
28-A35	A	35						35		
28-A63	I	28					9	19		
28-B1	B	1		1						
28-B2	E	2				2				
32-1	D	5		2			3			
32-2	E	5			3			2		
32-3	D	9		1	2		2	4		
32-5	D	2		2						
32-6	A	23			2	3	2	16		
32-7	I	35					7	28		
32-8	A	30					6	24		
32-9	D	14			2			12		
32-013	D	13					13			
32-13	D	23					5	18		
32-15	D	8		2			6			
32-17	D	4			4					
32-22	A	54						54		
32-31	A	31						31		
32-59	A	42				2		40		
32-68	A	16			4			12		
32-689	A	9			3			6		
32-A5GM	A	5			5					
32-76	A	19					19			
32-79	D	5			4	1				
32-88	A	54						54		
32-A1	A	1		1						
32-A3	E	3			3					
32-A8	A	8				8				
32-A25	A	25					25			
32-A27	A	27					10	17		
32-A28	A	28					28			
32-A30	A	30					10	20		
32-A40	A	40						40		
32-A48	I	48						48		
32-A55	A	55						55		
32-B22	A	22			2			20		
36-01	C	1		1						
36-3	D	6			3			3		
36-4	A	3			3					
36-5	A	4			4					
36-6	A	6			2	4				

Arrangement	Rating	Contact Number	Contact Size							
			4/0	0	4	8	12	16	18	20
36-7	A	47						7	40	
36-8	A	47						1	46	
36-9	A	31				1	2	14	14	
36-10	A	48							48	
36-14	D	16					5	5	6	
36-15	A	35							35	
36-18 (36-9x100*)	A	31				1	2	14	14	
36-22	D	22						22		
36-35	A	36					4		32	
36-54=36-B39	A	39					8		31	
36-66	A	56						4	52	
36-74	A	44					1		43	
36-77	D	7				7				
36-A7	A	7			3	2		2		
36-A10	A	10				2	8			
36-A35	A	8			4				4	
36-A51	D	6			3	2			1	
36-A72	I	72						4	16	52
36-A99*	A	65							15	50
36-B61	E	6				2		4		
36-B78	D	14					12		2	
36-B90	D	1								n.1 Special Contact
36-D78	D	14					10		4	
40-1	D	30						6	24	
40-9	A	47					1	22	24	
40-10	A	29				4	9		16	
40-26	A	26					7	19		
40-31	D	31							31	
40-35	D	35							35	
40-47	A	47					1	22	24	
40-53	A	60							60	
40-56	A	85							85	
40-62	A	60							60	
40-63	A	61							61	
40-67	A	11				10			1	
40-100	A	100								100
40-150	I	150								150
40-951	A	51						25	26	
40-A3	A	5			3			2		
40-A4	A	6			4			2		
40-A5	A	5			3	1		1		
40-A5GM	A	5			5					
40-A6	B	6						6		
40-A8	E	8				4			4	
40-A9	A	9			3		6			
40-A10	D	8				4			4	
40-A14	A	14				8		6		
40-A20	D	20					2	18		
40-A24	D	24					8	16		
40-A38	A	38						38		
40-A51	A	31					15		16	
40-A55	A	5			5					
40-A56	A	85							85	
40-A62	A	62					2		60	
40-A65	A	65							65	
40-A70	A	70							70	
40-B4	E	4			4					
40-B19	A	19					19			
40-B25	A	29			4				25	
40-B37	A	37						37		
40-D4	C	4					4			
40-G4	E	4					4			

* Only Crimp Contact Version



NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS

Double Peripheral Seal Interconnect for Stringent Containment Area (Class 1E) Applications

SuperNG insert rotation alternate positions

Arrangement	$\alpha \pm 2^\circ$			
	W	X	Y	Z
10SL-3				
10SL-4				
14S-1	90	180	270	
14S-2		120	240	
14S-5		110		
14S-6	90			
14S-7	90	180	270	
14S-9	70	145	215	290
14S-07				
16S-1	80			280
16S-4	35	110	250	325
16S-5	70	145	215	290
16S-8		170	265	
16-2				
16-7	80	110	250	280
16-9	35	110	250	325
16-10	90	180	270	
16-11	35	110	250	325
16-12				
16A-10	35	112	235	315
18-1	70	145	215	290
18-3	35	110	250	325
18-4	35	110	250	325
18-5	80	110	250	280
18-6				
18-06	180			
18-7				
18-8	70			290
18-9	80	110	250	280
18-10		120	240	
18-10S MT				
18-11		170	265	
18-12	80			280
18-13	80	110	250	280
18-16				
18-19		120	240	
18-20	90	180	270	
18-22	70	145	215	290
18-29	90	180	270	
18-30				
20-2				
20-3	70	145	215	290

Arrangement	$\alpha \pm 2^\circ$			
	W	X	Y	Z
20-4	45	110	250	
20-6	70	145	215	290
20-7	80	110	250	280
20-8	80	110	250	280
20-9	80	110	250	280
20-11				
20-14	80	110	250	280
20-15	80			280
20-16	80	110	250	280
20-17	90	180	270	
20-18	35	110	250	325
20-19	90	180	270	
20-21	35	110	250	325
20-22	80	110	250	280
20-23	35	110	250	325
20-24	35	110	250	325
20-A24	55	125	200	340
20-25				
20-27	35	110	250	325
20-29	80			280
20-30				
20-33				280
20-A8				
20-A9		110	250	
20-A48		80	280	
20-B8	80	110	250	280
22-1	35	110	250	325
22-2	70	145	215	290
22-4	35	110	250	325
22-5	35	110	250	325
22-7				
22-9	70	145	215	290
22-10	35	110	250	325
22-11	35	110	250	325
22-12	80	110	250	280
22-14	80	110	250	280
22-15	80	110	250	280
22-17	80	110	250	280
22-18	80	110	250	280
22-19	80	110	250	280
22-20	35	110	250	325
22-21	80	110	250	280

Arrangement	$\alpha \pm 2^\circ$			
	W	X	Y	Z
22-22		110	250	
22-23	35		250	
22-27	80		250	280
22-28	80			280
22-34	80	110	250	280
22-82	80	110	250	280
22A-10		120	240	
22-A37	80	112	250	280
22-22S MT				
24-2	80			280
24-3	80	110	250	280
24-4	80	110	250	280
24-5	80	110	250	280
24-06	40			320
24-6	80	110	250	280
24-07	80			280
24-7	80	110	250	280
24-9	35	110	250	325
24-10	80			280
24-11	35	110	250	325
24-12	80	110	250	280
24-013				
24-19				
24-20	80	110	250	280
24-22	45	110	250	
24-27	80			280
24-28	80	110	250	280
24-67	80			335
24-A1				
24-A8				
24-A11	35	110	250	325
24-A12				
24-A25	80	110	250	280
24-A28	65	146	235	
24-A55	80	110	250	280
24-G5	70	110	240	270
28-1	80	110	250	280
28-2	35	110	250	325
28-3	70	145	215	290
28-6	70	145	215	290
28-09	110	250	260	280
28-9	80	110	250	280

NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS

Double Peripheral Seal Interconnect for Stringent Containment Area (Class 1E) Applications

SuperNG insert rotation alternate positions

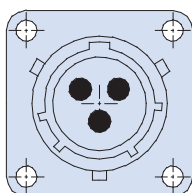


Arrangement	$\alpha \pm 2^\circ$			
	W	X	Y	Z
28-10	80	110	250	280
28-11	80	110	250	280
28-12	90	180	270	
28-13				
28-15	80	110	250	280
28-16	80	110	250	280
28-17	80	110	250	280
28-18	70	145	215	290
28-19	80	110	250	280
28-20	80	110	250	280
28-21	80	110	250	280
28-22	70	145	215	290
28-51	80	135	190	
28-59	35	110	250	325
28-70	80			280
28-72	72	144	216	288
28-79	70	133	227	290
28-84	45	157	90	135
28-124	80	110	250	280
28A-29	80	110	250	280
28A-31	35		260	310
28A-35	80	110	250	280
28A-63		100	260	
28-B1				
28-B2				
32-1	80	110	250	280
32-2	70	145	215	290
32-3	80	110	250	280
32-5	35	110	250	325
32-6	80	110	250	280
32-7	80	125	235	280
32-8	80	125	235	280
32-9	80	110	250	280
32-013	65	130	230	295
32-13	80	110	250	280
32-15	35	110	250	280
32-17	45	110	250	
32-22	80	110	250	280
32-31	80	125	215	280
32-59	36	108	252	324
32-68	65	135	225	275
32-689				

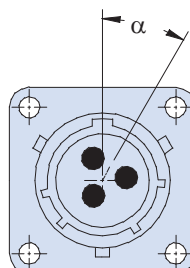
Arrangement	$\alpha \pm 2^\circ$			
	W	X	Y	Z
32-A5 GM				
32-76	80	110	250	280
32-79				
32-88	80	110	250	280
32-A1				
32-A3	22	44	76	98
32A-8	35	122		315
32A-25	60	120		
32-A27	30	115	285	335
32-A28				
32-A30				
32A-40	35	130		
32A-48	80	125	235	
32-A55	80	110	250	280
32-B22	35	110	250	325
36-01				
36-3	70	145	215	290
36-4	70	145	215	290
36-5		120	240	
36-6	35	110	250	325
36-7	80	110	250	280
36-8	80	110	250	280
36-9	80	125	235	280
36-10	80	125	235	280
36-14	90	180	270	
36-15	60	125	245	305
36-18				
36-22	80	110	250	280
36-35				
36-54 = 36-B39	67			
36-66	110	250	260	280
36-74				
36-77	45	90		
36-A7				
36-A10	45	110	250	315
36-A35				
36-A51	45	135	225	315
36A-72		110		
36-A99	30	135		
36B-61				
36B-78	35	106	254	325
36B-90				

Arrangement	$\alpha \pm 2^\circ$			
	W	X	Y	Z
36D-78	35	106	254	325
40-1	65	130	235	300
40-9	65	125	225	310
40-10	65	125	225	310
40-26	80	110	250	280
40-31	80	110	250	280
40-35	70	130	230	290
40-47	65	125	225	310
40-53	80	110	250	280
40-56	72	144	216	288
40-62	30	130	220	290
40-63	80			280
40-67	70	110	230	280
40-100	30	105	230	315
40-150				
40-951	90	105		
40-A3	70	145	215	290
40-A4	50	120	240	325
40-A5	33			270
40-A6	35	110	250	280
40-A5GM	33			270
40-A8	35	110	250	325
40-A9				
40-A10	65			
40-A14	80	135	195	
40-A20	80	110	250	280
40-A24				
40-A38	37			
40-A51				
40-A55				
40-A56	72	144	216	288
40-A62	80	130	230	280
40-A65	70	145	215	285
40-A70	80	110	250	280
40-B4	45	110	215	300
40-B19	35	105	255	325
40-B25				
40-B37				
40-D4				
40-G4				

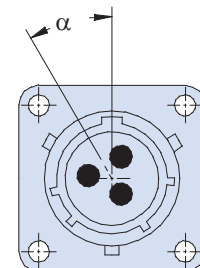
Insert Rotation (front view)



Normal Position



Alternate Position with Pin Contacts



Alternate Position with Socket Contacts



Mighty Mouse NG



CLASS 1E

Ultraminiature Mighty Mouse NG

High-pressure small form-factor connectors designed to meet the latest, most stringent global Zone 1E qualification standards including those requiring long-term submersion

High density, small form-factor Mighty Mouse NG connectors are designed for use in new nuclear power plant containment zone (class 1E) equipment. Series 802 Mighty Mouse NG connectors are built to meet the most severe nuclear industry test requirements, including long-term submersion, radiation, and 60-year thermal cycle simulation. The series is available in ten sizes from 1 to 130 contacts.

These ultraminiature connectors (fully half the size and weight compared to standard nuclear-grade connectors) feature high-density inserts, 316 stainless steel shells and a piston O-ring for high-pressure, 3500 psi sealing. Gold-plated crimp contacts accept #12 – #30 AWG wire. Connectors are backfilled with epoxy potting compound to achieve an open face pressure rating 1000 PSI.



- 3500 psi pressure rated
- Ultraminiature #23 contacts
- Size #20, #20HD, #16, #12, #8 signal, power, fiber optic and shielded contacts
- Discrete connectors and turnkey cable assemblies

Custom high-pressure glass sealed and bulkhead feed-thru versions available, consult factory.

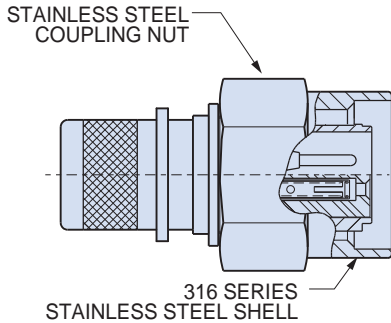
NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS

Ultraminiature High-Pressure Interconnect for Stringent Containment Area (Class 1E) Applications

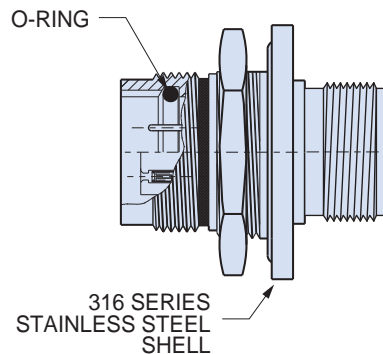
Mighty Mouse NG specifications



GLENAIR MIGHTY MOUSE NG DELIVERS HIGH-PRESSURE SEALING AND RUGGED DESIGN IN A MINIATURE PACKAGE



Mighty Mouse NG Plug



Mighty Mouse NG Receptacle

Stainless Steel

Available in ten sizes from 1 to 130 contacts, Series 802 connectors feature 316 stainless steel shells.

3500 psi

These connectors withstand up to 3500 PSI hydrostatic pressure in a mated condition. Potted versions withstand 1000 PSI open face pressure.

MIGHTY MOUSE NG SPECIFICATIONS AND PLUG KEY POSITIONS

Plug Key Positions		
Key Position	Key Rotation	
	A°	B°
Normal (A)	150°	210°
B	75°	210°
C	95°	230°
D	140°	275°
E	75°	275°
F	9°	210°

Performance Specifications	
Current Rating	#23-5 A, #20-7.5 A, #16-13 A, #12-23 A
Dielectric Withstanding Voltage	#23-750 VAC, #20HD-1000VAC, #16 and #12-1800 VAC
Insulation Resistance	5000 megohms minimum
Operating Temperature	-65° C. to +175° C.
Hydrostatic Pressure	3500 PSI mated, 1000 PSI open face (hermetic)
Shock	300 g.
Vibration	37 g.
Durability	2000 mating cycles

Material and Finish	
Shells, Jam Nuts, Coupling Nuts	316 stainless steel
Contacts	Copper alloy, 50 µInch gold plated. Socket hood: stainless steel, passivated. Hermetic pin contacts: Nickel-Iron alloy per ASTM-F-30, 50 µInch gold plated.
Contact Retention Clip	Beryllium copper alloy

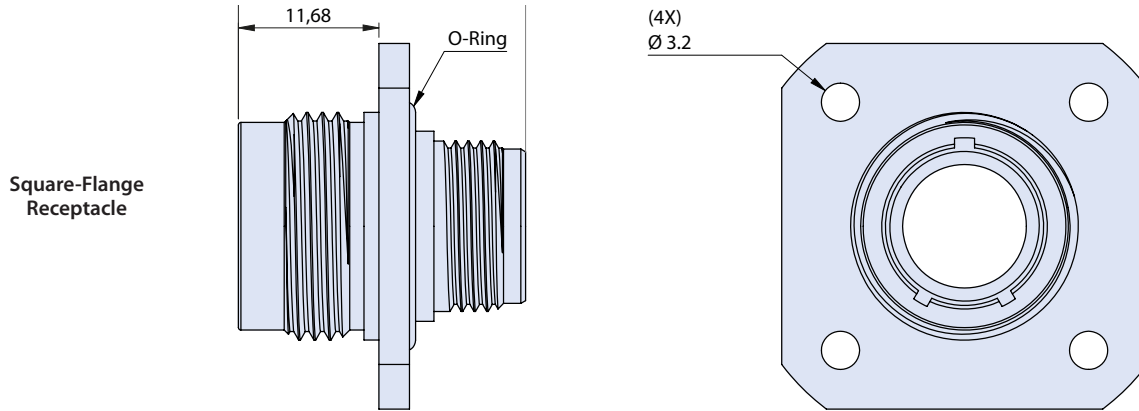


NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS

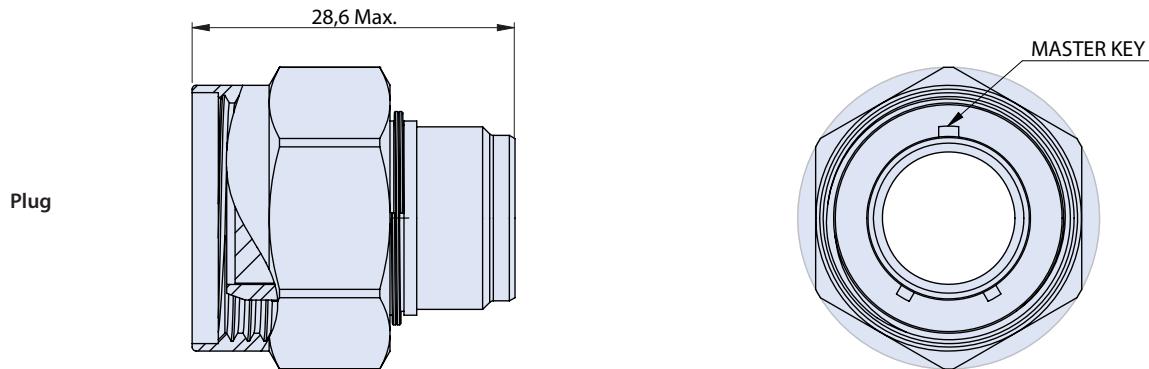
Ultraminiature High-Pressure Interconnect for Stringent Containment Area (Class 1E) Applications

Mighty Mouse NG connector configurations

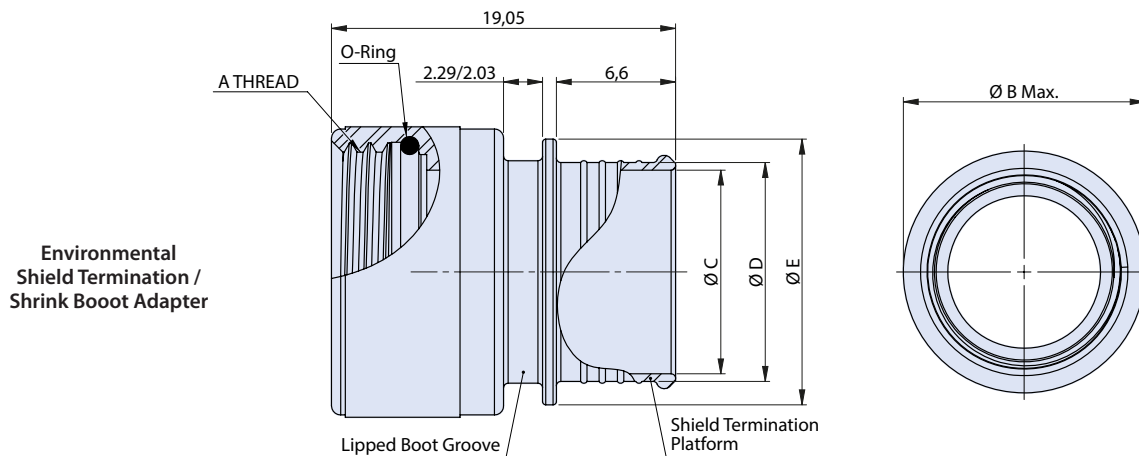
SQUARE FLANGE RECEPTACLE WITH ACCESSORY THREAD



PLUG WITH ACCESSORY THREAD



ENVIRONMENTAL EMI/RFI SHIELD TERMINATION AND SHRINK BOOT ADAPTER



NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS
**Ultraminiature High-Pressure Interconnect for
Stringent Containment Area (Class 1E) Applications**
Mighty Mouse NG cable harness configurations



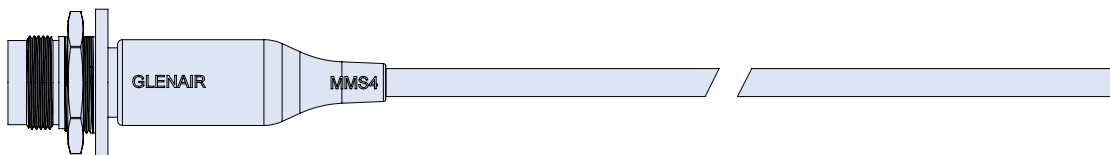
CABLE HARNESS WITH MIGHTY MOUSE NG PLUG



CABLE HARNESS WITH MIGHTY MOUSE NG PLUG AND CASTLE GRIP BACKSHELL



CABLE HARNESS WITH MIGHTY MOUSE NG JAM NUT RECEPTACLE





NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS

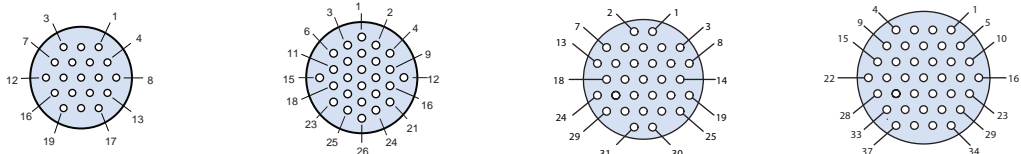
Ultraminiature High-Pressure Interconnect for Stringent Containment Area (Class 1E) Applications

Mighty Mouse NG contact arrangements

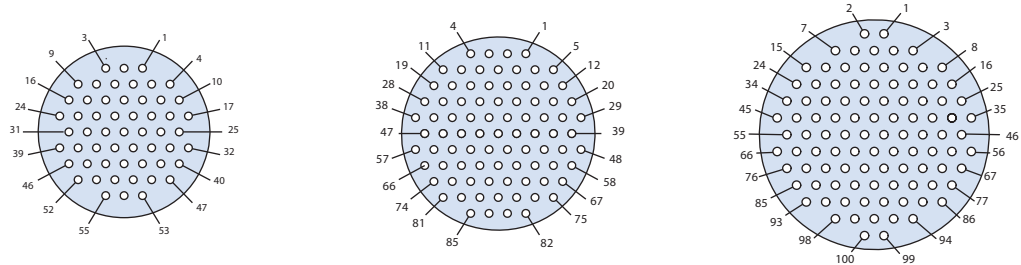
SIZE #23 SIGNAL CONTACTS, TESTED AT 750 VAC



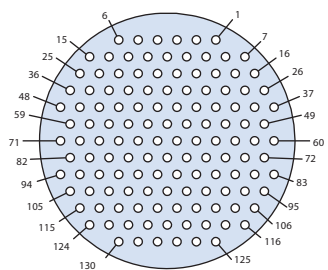
Insert Arrangement	5-3	6-4	6-6	6-7	7-10	8-13
No. of Contacts	3	4	6	7	10	13



Insert Arrangement	9-19	10-26	11-31	12-37
No. of Contacts	19	26	31	37



Insert Arrangement	14-55	15-85	19-100
No. of Contacts	55	85	100



Insert Arrangement	21-130
No. of Contacts	130

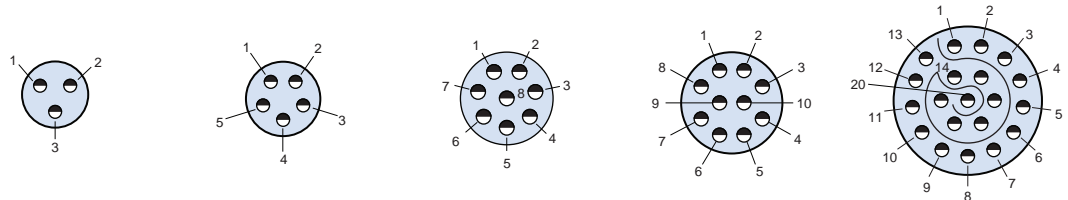
NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS

Ultraminiature High-Pressure Interconnect for Stringent Containment Area (Class 1E) Applications

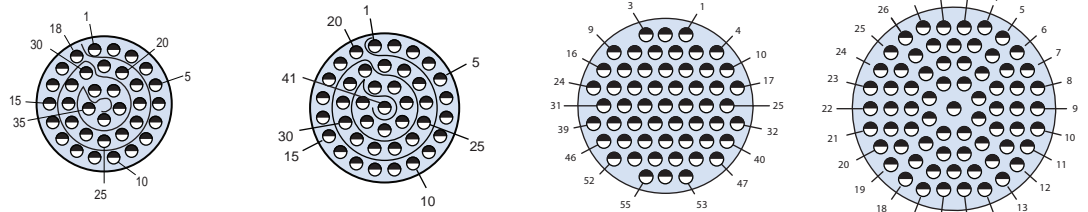
Mighty Mouse NG contact arrangements



SIZE #20HD POWER CONTACTS, TESTED AT 1000 VAC

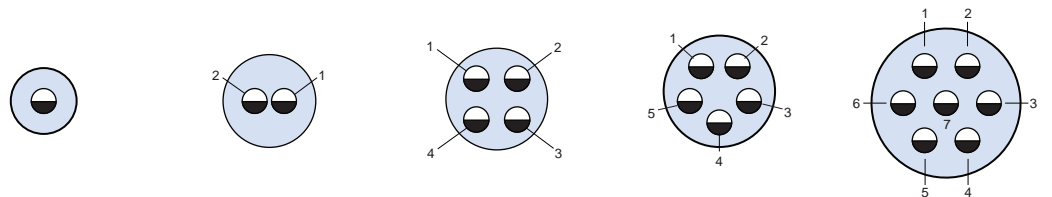


Insert Arrangement	6-23	7-25	8-28	9-210	12-220
No. of Contacts	3	5	8	10	20

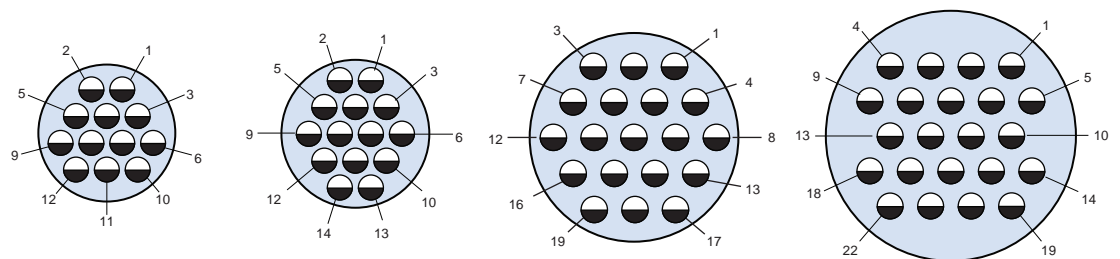


Insert Arrangement	14-235	15-241	19-255	21-269
No. of Contacts	35	41	55	69

SIZE #16 POWER CONTACTS, TESTED AT 1800 VAC



Insert Arrangement	6-1	8-2	9-4	10-5	12-7
No. of Contacts	1	2	4	5	7

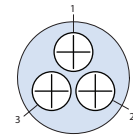
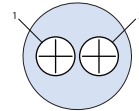
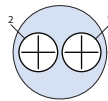


Insert Arrangement	14-12	15-14	19-19	21-22
No. of Contacts	12	14	19	22

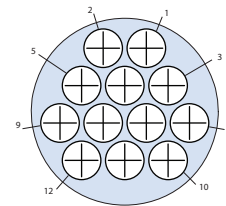
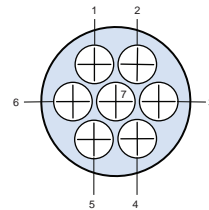
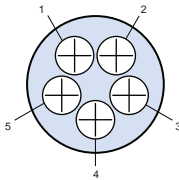
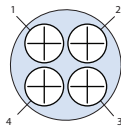


NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS
Ultraminiature High-Pressure Interconnect for
Stringent Containment Area (Class 1E) Applications
Mighty Mouse NG contact arrangements

SIZE #12 POWER CONTACTS, TESTED AT 1800 VAC

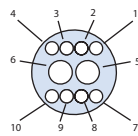
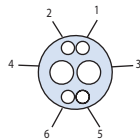


Insert Arrangement	7-1	10-2	12-2	12-3
No. of Contacts	1	2	2	3



Insert Arrangement	14-4	14-5	15-7	21-12
No. of Contacts	4	5	7	12

SIZE #20 POWER AND SIZE #23 SIGNAL, COMBO CONTACT ARRANGEMENTS



Insert Arrangement	8-200		9-201	
Contact Size	#20	#23	#20	#23
No. of Contacts	2	4	2	8
VAC Test Voltage	750		750	

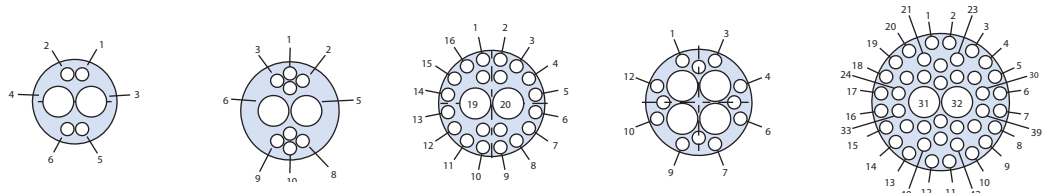
NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS

Ultraminiature High-Pressure Interconnect for Stringent Containment Area (Class 1E) Applications

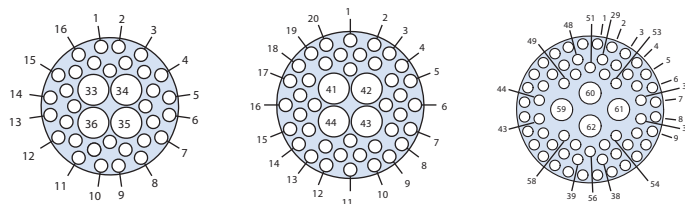
Mighty Mouse NG contact arrangements



SIZE #16 POWER AND SIZE #23 SIGNAL, COMBO CONTACT ARRANGEMENTS

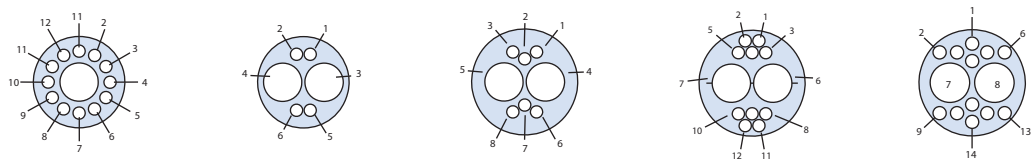


Insert Arrangement	9-200		10-202		12-202		12-203		14-204	
Contact Size	#16	#23	#16	#23	#16	#23	#16	#23	#16	#23
No. of Contacts	2	4	2	8	2	20	4	12	2	40
VAC Test Voltage	750		750		1300		1300		1300	

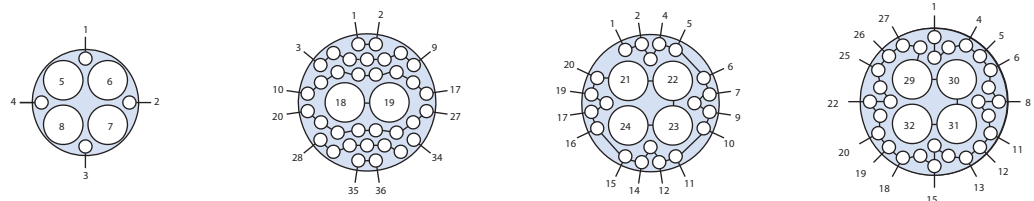


Insert Arrangement	14-205		15-203		15-206	
Contact Size	#16	#23	#16	#23	#16	#23
No. of Contacts	4	32	4	40	4	58
VAC Test Voltage	1300		1300		1300	

SIZE #12 POWER AND SIZE #23 SIGNAL, COMBO CONTACT ARRANGEMENTS



Insert Arrangement	10-200		10-201		12-200		12-201		12-204	
Contact Size	#12	#23	#12	#23	#12	#23	#12	#23	#12	#23
No. of Contacts	1	12	2	4	2	6	2	10	2	12
VAC Test Voltage	750		750		750		750		1300	



Insert Arrangement	12-205		14-206		14-207		15-204	
Contact Size	#12	#23	#12	#23	#12	#23	#12	#23
No. of Contacts	4	4	2	34	4	20	4	28
VAC Test Voltage	1300		1300		1300		1300	



Series ITS-NG



CLASS 1E

Series ITS-NG Reverse-Bayonet Coupling

Nuclear industry standard power and signal connectors for existing plant refurbishment

Glenair ITS-NG series connectors meet previous-generation nuclear industry LOCA test requirements and are suitable for equipment retrofit and refurbishment applications for power plants with legacy containment zone 1E requirements. These industry-standard reverse bayonet lock connectors offer fast and reliable mating and demating. The Nuclear-Grade ITS series connector is Glenair's qualified equivalent for MIL-DTL-5015 (VG95135)

Discrete connectors or turnkey cable assemblies



reverse-bayonet connectors. The popular series offers hundreds of crimp-contact power and signal insert arrangements with gold-plated copper contacts. Polymeric insert materials deliver maximum radiation and temperature tolerance, as well as long-term durability. Stainless steel, environmentally-resistant materials are fabricated in accordance with NQA-1 (10CFR50 Appendix B). All material selections meet cumulative radiation, thermal, seismic, and pressure-induced stress factors for legacy class 1E harsh nuclear environments.

- Fast connect / disconnect reverse-bayonet coupling
- High corrosion-resistant stainless steel shells and bodies
- Chemical and moisture-resistant inserts and O-rings
- Performance tested for advanced temperature, radiation, and seismic stress factors
- Ideally suited for power generation monitoring, valve control devices, sensors, and other electronic equipment in Class 1E harsh nuclear / safety-related applications

NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS

Reverse-Bayonet (5015 type) Interconnect for Legacy Containment Area (Class 1E) Applications

Series ITS-NG applications and specifications



GLENAIR SERIES ITS-NG APPLICATION NOTES

- Glenair Series ITS-NG connectors are based on the MIL-DTL-5015 standard, but feature an improved reverse-bayonet coupling technology in place of the threaded interface used in MIL-DTL-5015.
- The ITS-NG family of connectors features improved O-ring sealing and other design enhancements for applicability in containment area (Class 1E) / safety-related applications, particularly in existing or older nuclear facilities with legacy LOCA test requirements. For new interconnect applications in modern-day power plants, Glenair recommends the SuperNG or Mighty Mouse NG series connectors currently undergoing qualification to the latest LOCA test and long-term durability requirements.
- ITS-NG is an industry-standard connector design, intermateable and intermountable with all other 5015-based reverse-bayonet connector series. The ITS-NG is considered particularly appropriate for retrofit and refurbishment applications as the 3-point bayonet coupling mechanism reduces mating time—an important consideration in time-sensitive plant refurbishment work. Positive locking of the three stainless steel pins provides reliable resistance to vibration and shock, and prevents connector de-coupling in severe vibration applications.
- Both plug and receptacle connector configurations are available with dynamic peripheral seals for environmental sealing. Equipped with appropriate backshells and accessories, the connectors are submersible for up to 1 year at 85°C to 1m depth.
- Glenair Series ITS-NG connectors share the same insert arrangements, shell dimensions, supported contacts, and electrical performance ratings as MIL-DTL-5015 and VG 95234 and are fully interchangeable with VG standard connectors.
- Glenair ITS-NG connectors are particularly well-suited for use in applications where electromagnetic compatibility is a requirement. A complete range of EMI shield termination accessories is available for both overall as well as individual wire shields.

CONTACT SPECIFICATIONS

Copper alloy with gold plating (standard)

Contact Size	Rated Current at 20 C	Rated Current at 80 C	Max. Contact resist.	Wire size
20	7.5 A	7.5 A	12.0 mΩ	20-26 AWG
18	10A	7.5 A	12.0 mΩ	18-26 AWG
16	22 A	13 A	6.0 mΩ	16-22 AWG
12	41 A	23 A	3.0 mΩ	12-14 AWG
8	73 A	46 A	1.0 mΩ	8-10 AWG
4	135 A	80 A	0.5 mΩ	4-6 AWG
0	245 A	150 A	0.3 mΩ	0-2 AWG
4/0	350 A	225 A	0.2 mΩ	4/0 AWG

SERVICE RATING

(Minimum Insulating resistance: $\geq 5 \times 10^3 \text{ M}\Omega$)

Class	Operating voltage Vdc	Operating voltage Vac RMS	Test voltage Vac RMS
INST.	250 V	200 V	1000 V
A	700 V	500 V	2000 V
D	1250 V	900 V	2800 V
E	1750 V	1250 V	3500 V
B	2450 V	1750 V	4500 V
C	4200 V	3000 V	7000 V

Materials and Finishes	
Shells, Coupling Nuts	316 Stainless Steel, Passivated
Contacts	Copper alloy, Gold Plated
Hoods (Socket contacts)	Copper Alloy, Nickel Plated
Pencil Clip (Socket contacts)	Stainless Steel
Wave Spring	Stainless Steel
Grounding Finger	Beryllium Copper



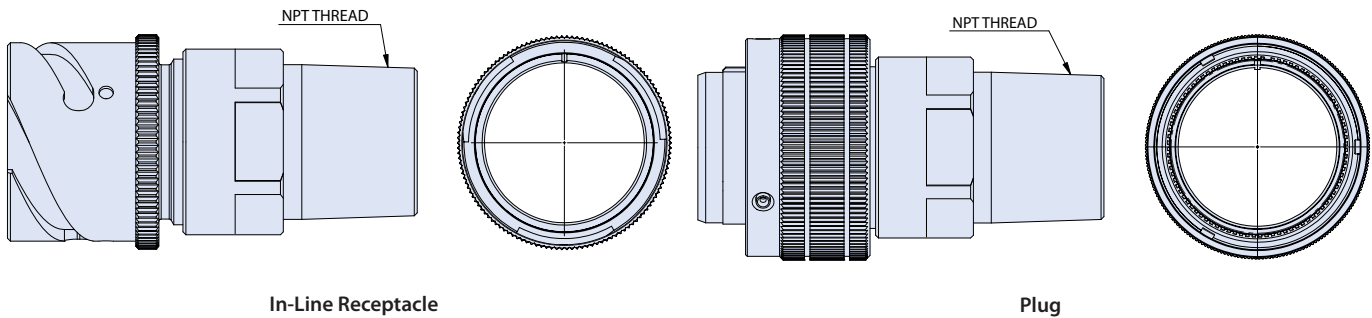


NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS

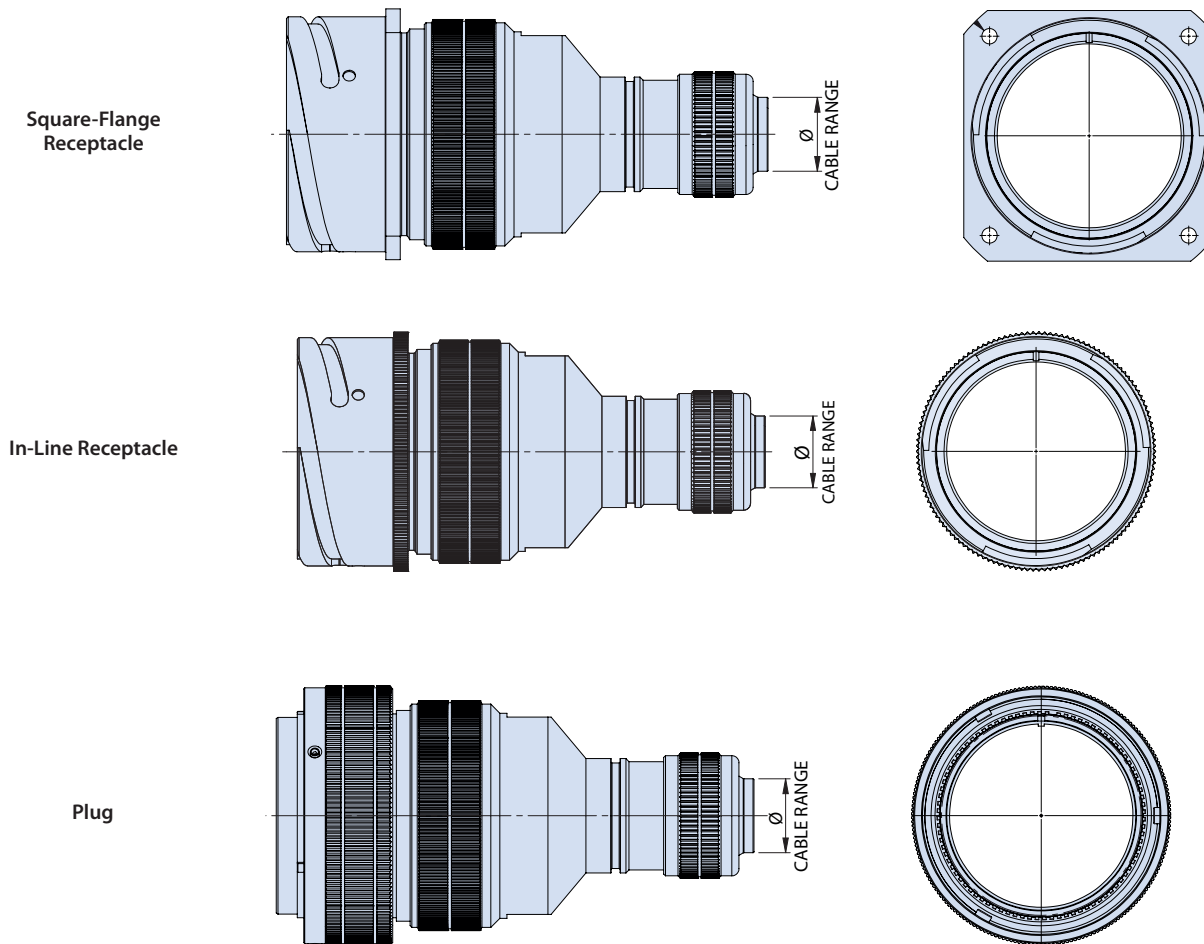
Reverse-Bayonet (5015 type) Interconnect for Legacy Containment Area (Class 1E) Applications

Series ITS-NG connectors with NPT adapters or cable gland

ITS-NG RECEPTACLE AND PLUG WITH NPT ADAPTER



ITS-NG RECEPTACLES AND PLUG WITH ENVIRONMENTAL CABLE GLAND



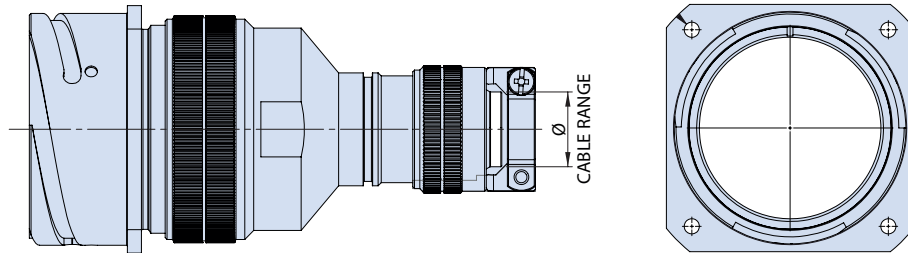
NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS
**Reverse-Bayonet (5015 type) Interconnect for
 Legacy Containment Area (Class 1E) Applications**



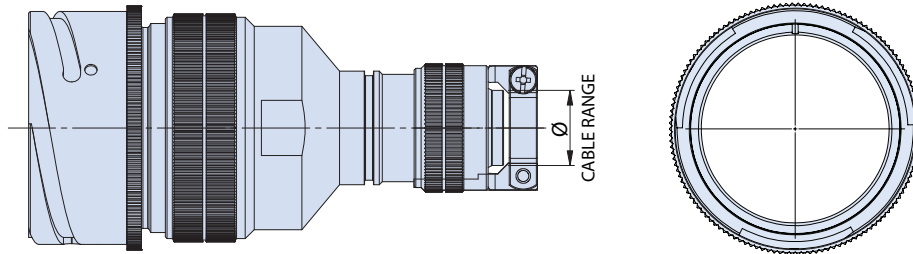
Series ITS-NG connectors with environmental cable clamp or backshell

ITS-NG RECEPTACLES AND PLUG WITH ENVIRONMENTAL CABLE CLAMP

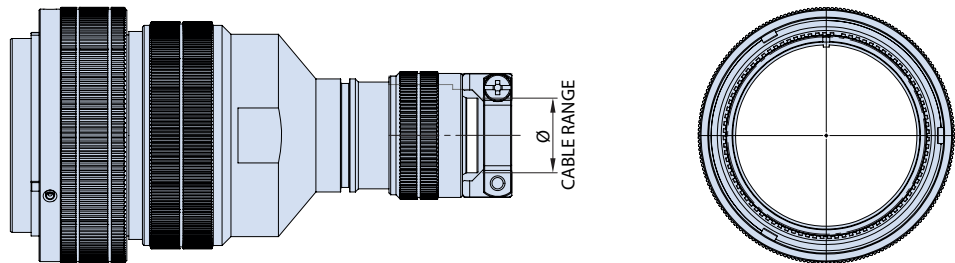
Square-Flange Receptacle



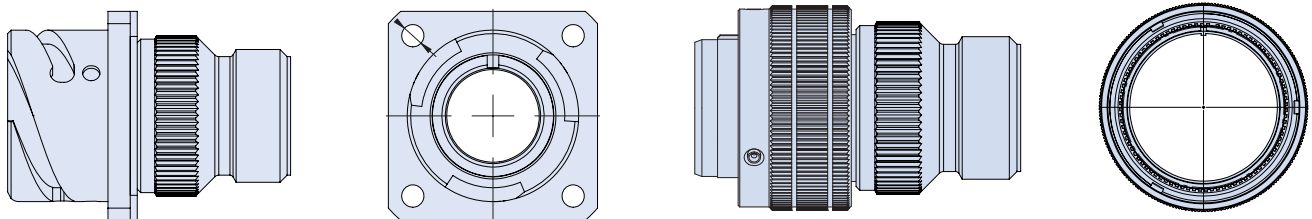
In-Line Receptacle



Plug



ITS-NG SQUARE-FLANGE RECEPTACLE AND PLUG WITH ENVIRONMENTAL BACKSHELL



Square-Flange Receptacle

Plug



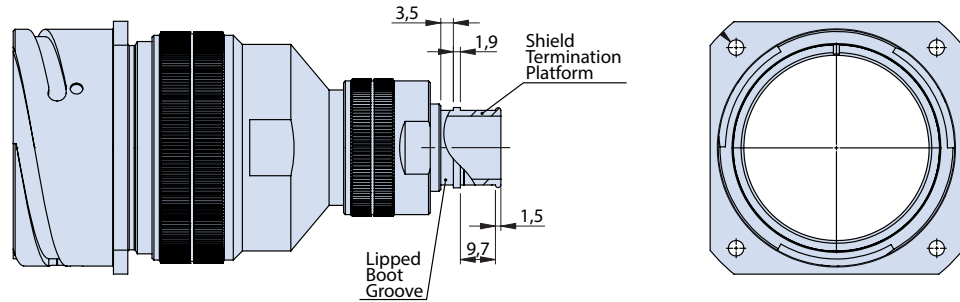
NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS

Reverse-Bayonet (5015 type) Interconnect for Legacy Containment Area (Class 1E) Applications

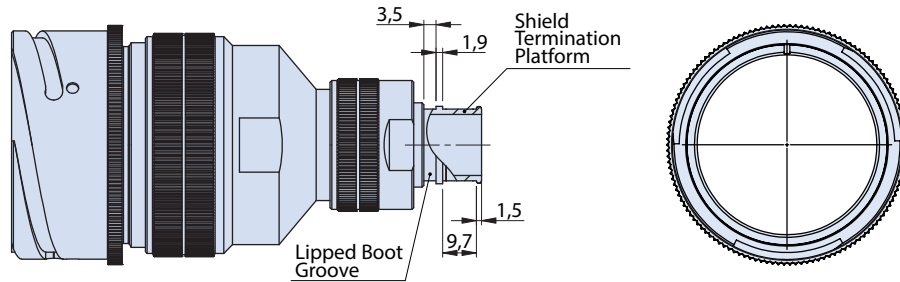
Series ITS-NG connectors with shield termination backshell

ITS-NG RECEPTACLES AND PLUG WITH SHIELD TERMINATION BACKSHELL

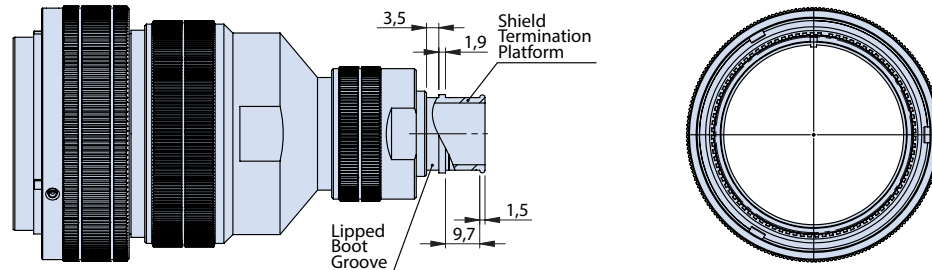
Square-Flange Receptacle



In-Line Receptacle



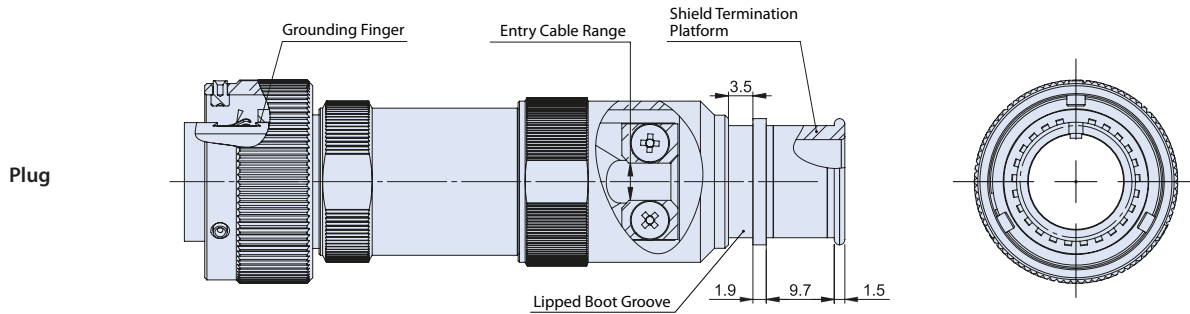
Plug



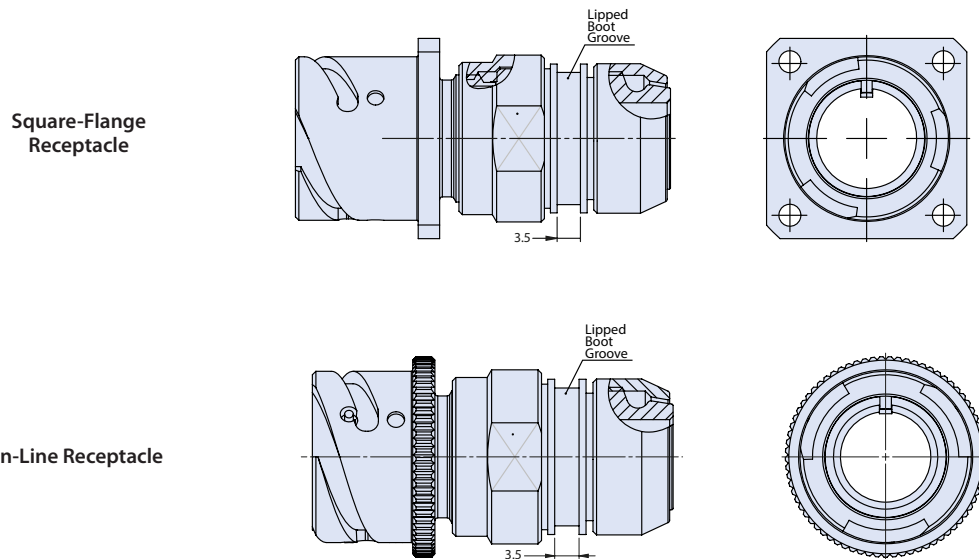
NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS
Reverse-Bayonet (5015 type) Interconnect for
Legacy Containment Area (Class 1E) Applications
Series ITS-NG connectors with special backshell configurations



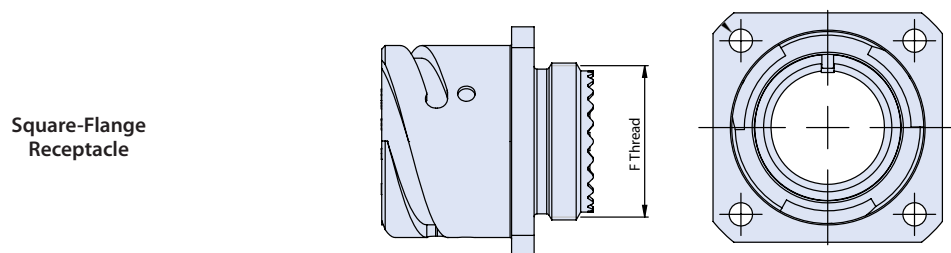
PLUG WITH INTERNAL STRAIN RELIEF AND SHIELD TERMINATION



IN-LINE AND PANEL MOUNT RECEPTACLE WITH EMI/RFI SHIELDING ENVIRONMENTAL BACKSHELL



SQUARE-FLANGE RECEPTACLE WITH ACCESSORY THREAD





NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS
Reverse-Bayonet (5015 type) Interconnect for
Legacy Containment Area (Class 1E) Applications
Series ITS-NG insert rotation alternate positions

Arrangement	$\alpha \pm 2^\circ$			
	W	X	Y	Z
10SL-3				
10SL-4				
14S-1	90	180	270	
14S-2		120	240	
14S-5		110		
14S-6	90			
14S-7	90	180	270	
14S-9	70	145	215	290
14S-07				
16S-1	80			280
16S-4	35	110	250	325
16S-5	70	145	215	290
16S-8		170	265	
16-2				
16-7	80	110	250	280
16-9	35	110	250	325
16-10	90	180	270	
16-11	35	110	250	325
16-12				
16A-10	35	112	235	315
18-1	70	145	215	290
18-3	35	110	250	325
18-4	35	110	250	325
18-5	80	110	250	280
18-6				
18-06	180			
18-7				
18-8	70			290
18-9	80	110	250	280
18-10		120	240	
18-10S MT				
18-11		170	265	
18-12	80			280
18-13	80	110	250	280
18-16				
18-19		120	240	
18-20	90	180	270	
18-22	70	145	215	290
18-29	90	180	270	
18-30				
20-2				
20-3	70	145	215	290

Arrangement	$\alpha \pm 2^\circ$			
	W	X	Y	Z
20-4	45	110	250	
20-6	70	145	215	290
20-7	80	110	250	280
20-8	80	110	250	280
20-9	80	110	250	280
20-11				
20-14	80	110	250	280
20-15	80			280
20-16	80	110	250	280
20-17	90	180	270	
20-18	35	110	250	325
20-19	90	180	270	
20-21	35	110	250	325
20-22	80	110	250	280
20-23	35	110	250	325
20-24	35	110	250	325
20-A24	55	125	200	340
20-25				
20-27	35	110	250	325
20-29	80			280
20-30				
20-33				280
20-A8				
20-A9		110	250	
20-A48		80	280	
20-B8	80	110	250	280
22-1	35	110	250	325
22-2	70	145	215	290
22-4	35	110	250	325
22-5	35	110	250	325
22-7				
22-9	70	145	215	290
22-10	35	110	250	325
22-11	35	110	250	325
22-12	80	110	250	280
22-14	80	110	250	280
22-15	80	110	250	280
22-17	80	110	250	280
22-18	80	110	250	280
22-19	80	110	250	280
22-20	35	110	250	325
22-21	80	110	250	280

Arrangement	$\alpha \pm 2^\circ$			
	W	X	Y	Z
22-22		110	250	
22-23	35		250	
22-27	80		250	280
22-28	80			280
22-34	80	110	250	280
22-82	80	110	250	280
22A-10		120	240	
22-A37	80	112	250	280
22-22S MT				
24-2	80			280
24-3	80	110	250	280
24-4	80	110	250	280
24-5	80	110	250	280
24-06	40			320
24-6	80	110	250	280
24-07	80			280
24-7	80	110	250	280
24-9	35	110	250	325
24-10	80			280
24-11	35	110	250	325
24-12	80	110	250	280
24-013				
24-19				
24-20	80	110	250	280
24-22	45	110	250	
24-27	80			280
24-28	80	110	250	280
24-67	80			335
24-A1				
24-A8				
24-A11	35	110	250	325
24-A12				
24-A25	80	110	250	280
24-A28	65	146	235	
24-A55	80	110	250	280
24-G5	70	110	240	270
28-1	80	110	250	280
28-2	35	110	250	325
28-3	70	145	215	290
28-6	70	145	215	290
28-09	110	250	260	280
28-9	80	110	250	280

NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS

Reverse-Bayonet (5015 type) Interconnect for Legacy Containment Area (Class 1E) Applications

Series ITS-NG insert rotation alternate positions

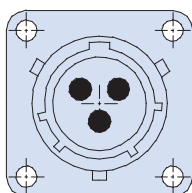


Arrangement	$\alpha \pm 2^\circ$			
	W	X	Y	Z
28-10	80	110	250	280
28-11	80	110	250	280
28-12	90	180	270	
28-13				
28-15	80	110	250	280
28-16	80	110	250	280
28-17	80	110	250	280
28-18	70	145	215	290
28-19	80	110	250	280
28-20	80	110	250	280
28-21	80	110	250	280
28-22	70	145	215	290
28-51	80	135	190	
28-59	35	110	250	325
28-70	80			280
28-72	72	144	216	288
28-79	70	133	227	290
28-84	45	157	90	135
28-124	80	110	250	280
28A-29	80	110	250	280
28A-31	35		260	310
28A-35	80	110	250	280
28A-63		100	260	
28-B1				
28-B2				
32-1	80	110	250	280
32-2	70	145	215	290
32-3	80	110	250	280
32-5	35	110	250	325
32-6	80	110	250	280
32-7	80	125	235	280
32-8	80	125	235	280
32-9	80	110	250	280
32-013	65	130	230	295
32-13	80	110	250	280
32-15	35	110	250	280
32-17	45	110	250	
32-22	80	110	250	280
32-31	80	125	215	280
32-59	36	108	252	324
32-68	65	135	225	275
32-689				

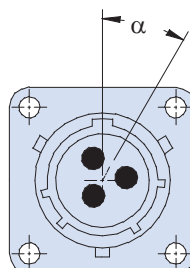
Arrangement	$\alpha \pm 2^\circ$			
	W	X	Y	Z
32-A5 GM				
32-76	80	110	250	280
32-79				
32-88	80	110	250	280
32-A1				
32-A3	22	44	76	98
32A-8	35	122		315
32A-25	60	120		
32-A27	30	115	285	335
32-A28				
32-A30				
32A-40	35	130		
32A-48	80	125	235	
32-A55	80	110	250	280
32-B22	35	110	250	325
36-01				
36-3	70	145	215	290
36-4	70	145	215	290
36-5		120	240	
36-6	35	110	250	325
36-7	80	110	250	280
36-8	80	110	250	280
36-9	80	125	235	280
36-10	80	125	235	280
36-14	90	180	270	
36-15	60	125	245	305
36-18				
36-22	80	110	250	280
36-35				
36-54 = 36-B39	67			
36-66	110	250	260	280
36-74				
36-77	45	90		
36-A7				
36-A10	45	110	250	315
36-A35				
36-A51	45	135	225	315
36A-72		110		
36-A99	30	135		
36B-61				
36B-78	35	106	254	325
36B-90				

Arrangement	$\alpha \pm 2^\circ$			
	W	X	Y	Z
36D-78	35	106	254	325
40-1	65	130	235	300
40-9	65	125	225	310
40-10	65	125	225	310
40-26	80	110	250	280
40-31	80	110	250	280
40-35	70	130	230	290
40-47	65	125	225	310
40-53	80	110	250	280
40-56	72	144	216	288
40-62	30	130	220	290
40-63	80			280
40-67	70	110	230	280
40-100	30	105	230	315
40-150				
40-951	90	105		
40-A3	70	145	215	290
40-A4	50	120	240	325
40-A5	33			270
40-A6	35	110	250	280
40-A5GM	33			270
40-A8	35	110	250	325
40-A9				
40-A10	65			
40-A14	80	135	195	
40-A20	80	110	250	280
40-A24				
40-A38	37			
40-A51				
40-A55				
40-A56	72	144	216	288
40-A62	80	130	230	280
40-A65	70	145	215	285
40-A70	80	110	250	280
40-B4	45	110	215	300
40-B19	35	105	255	325
40-B25				
40-B37				
40-D4				
40-G4				

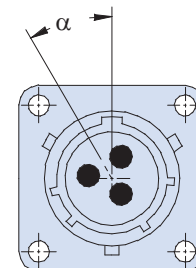
Insert Rotation (front view)



Normal Position



Alternate Position with Pin Contacts



Alternate Position with Socket Contacts



Series IPT SE-NG

CLASS 1E

Series IPT SE-NG Bayonet-Lock Connectors

For Westinghouse, CANDU and GE Nuclear MIL-DTL-26482-based installations



Glenair Nuclear-Grade IPT SE Bayonet-Lock Signal Connectors are ideally suited for general and Class 1E harsh environment nuclear applications where reliable mating and quick connection and disconnection of safety zone connectors is required.

The nuclear-grade concept of the VG95328 bayonet mechanism provides fast and easy coupling, especially when the connector is situated in an awkward or hard to reach location.

Supplied crimp contacts are gold-plated copper alloy. Inserts are made from high-insulation synthetic rubber, high-temperature and radiation resistant from -40°C to +125°C.

Intermateability

Nuclear-Grade Series IPT SE connectors are interchangeable and intermateable with the wide range of industry-standard bayonet connectors designed around MIL-DTL-26482 Series I and/or qualified to VG 95328.

Glenair can also accommodate custom changes and modifications to meet compatibility requirements with previously installed legacy connectors.

MAIN TECHNICAL CHARACTERISTICS

- High-performance crimp version with integral contact retention clips
- Two contact sizes: #20 and #16
- 21 signal contact insert arrangements, 3 to 61 contacts
- Rear-insertion/front release snap-in contacts
- Intermateable with other MIL-DTL-26482 Series I connectors
- Environmentally sealed system
- Audible and visual coupling indicators
- Keyed polarization

NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS Bayonet-Lock (26482 type) Interconnect for Legacy Containment Area (Class 1E) Applications



Series IPT SE-NG

Service Rating			
Class	Operating Voltage AC	Operating Voltage DC	Test Voltage AC
I	600	700	1500
II	1000	1250	2300

Maximum Voltage Drop		
Contact Size	Test Current	Voltage Drop
20	7.5 A	25 mV
16	13.0 A	21 mV

Materials & Finishes	
Shells, Coupling Nuts	316 Stainless Steel, Passivated
Contacts	Copper alloy, Gold Plated
Contact Retainer	Semicrystalline High-temperature engineering thermoplastic
Wave Spring	Stainless Steel
Grounding Finger	Beryllium Copper, Gold Plated

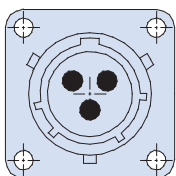
INSERT ARRANGEMENT

Arrangement	Service Rating	Dim. contact size	
		20	16
8 - 2	I	2	
8 - 3A	I	3	
8 - 4	I	4	
8-33	I	3	
10 - 6	I	6	
10 - 7	I	7	
12 - 3	II		3
12 - 10	I	10	
14 - 5	II		5
14 - 12	I	8	4
14 - 15	I	14	1
14 - 19	I	19	
16 - 8	II		8
16 - 23	I	22	1
16 - 26	I	26	
18 - 11	II		11
18 - 32	I	32	
20 - 16	II		16
20 - 39	I	37	2
20 - 41	I	41	
22 - 21	II		21
22 - 55	I	55	
24 - 61	I	61	

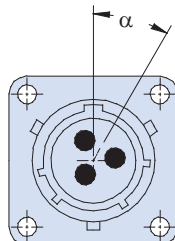
INSERT ROTATION ALTERNATE POSITIONS

Arrangement	Degrees			
	W	X	Y	Z
8 - 2	58	122		
8 - 3A	60			
8 - 4	45			
8-33	90			
10 - 6	90			
10 - 7	90			
12 - 3			180	
12 - 10	60	155	270	295
14 - 5	40	92	184	273
14 - 12	43	90		
14 - 15	17	110	155	234
14 - 19	30	165	315	
16 - 8	54	152	180	331
16 - 23	158			
16 - 26	60		275	338
18 - 11	62	119	241	340
18 - 32	85	138	222	265
20 - 16	238	318	333	347
20 - 39	63	144	252	333
20 - 41	45	126	225	
22 - 21	16	135	175	349
22 - 55	30	142	226	314
24 - 61	90	180	270	324

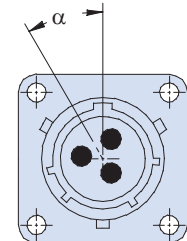
Insert Rotation (front view)



Normal Position



Alternate Position with Pin Contacts

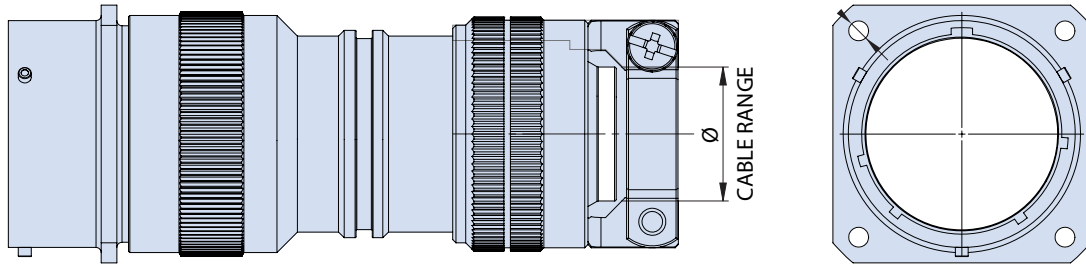


Alternate Position with Socket Contacts

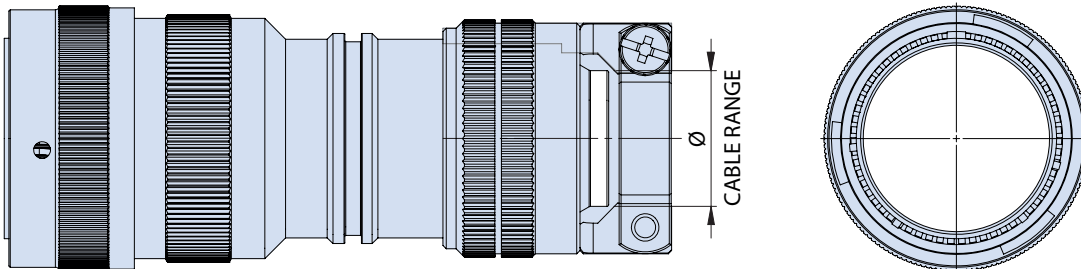


NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS
Bayonet-Lock (26482 type) Interconnect for
Legacy Containment Area (Class 1E) Applications
Series IPT SE-NG connector configurations

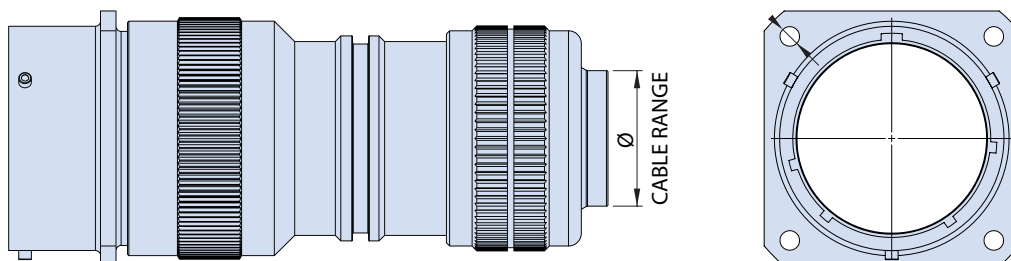
SQUARE-FLANGE RECEPTACLE WITH ENVIRONMENTAL CABLE CLAMP



PLUG WITH ENVIRONMENTAL CABLE CLAMP



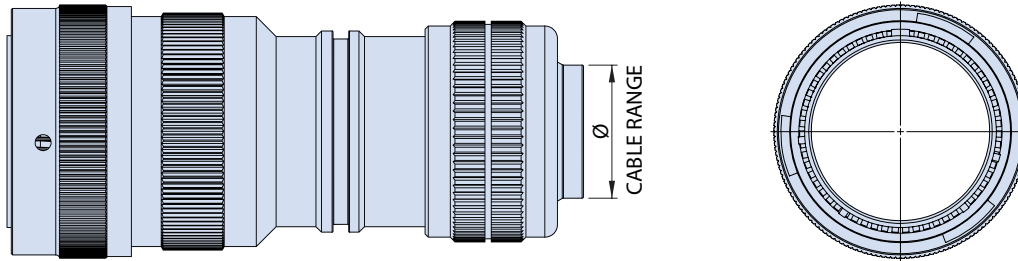
SQUARE-FLANGE RECEPTACLE WITH ENVIRONMENTAL CABLE GLAND



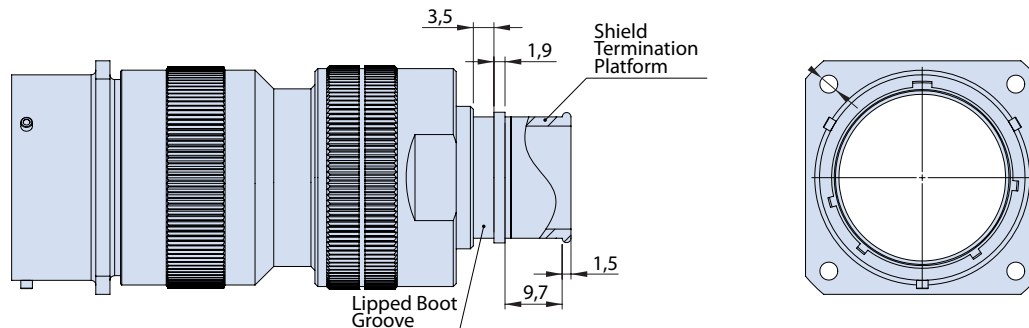
NUCLEAR-GRADE QUICK-DISCONNECT CONNECTORS
**Bayonet-Lock (26482 type) Interconnect for
 Legacy Containment Area (Class 1E) Applications**
 Series IPT SE-NG connector configurations



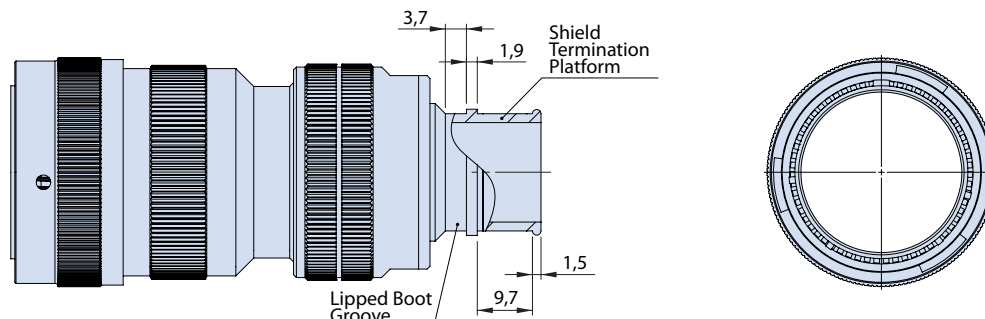
PLUG WITH ENVIRONMENTAL CABLE GLAND



PANEL-MOUNT SQUARE-FLANGE RECEPTACLE WITH ENV SHIELD TERMINATION BACKSHELL



PLUG WITH ENVIRONMENTAL SHIELD TERMINATION BACKSHELL



Environmental Zone 1 Qualification

ENVIRONMENTAL ZONE 1 QUALIFICATION

Glenair recently reached an important milestone with the qualification of a cable assembly program for a major global nuclear client. Included in these assemblies were our Mighty Mouse NG plug/receptacle connectors, EPDM O-Rings, and Glenair's proprietary epoxy resin.

Testing followed "CEI 60780:1998 Nuclear Power Plants – Electrical Equipment Of The Safety System – Qualification".

Dry heat thermal aging totaling 1 month at 120 °C as per EN 60068-2-2:2007, 24h dampheat at 95% RH as per 60068-2-78:2013,

Irradiation 67 kGy of 60Co as per EN 60544-2:2012,

Seismic testing as per CEI 60980:1989 and CEI 60068-2-57:2013,

Watertightness for 24h under 2 bar as per EN 60068-2-18:2001.

Testing required a 52-year lifespan condition, final electrical testing confirmed that the assemblies would perform their job flawlessly over the required period.

132 °C for 770h, representing a 60 year-long lifespan, and watertightness testing at 8 bar for 24h, as per IEEE 572:2006 /MIL-DTL-5015H / VG95328-1:12/96.

Upcoming product qualification will have our connectors undergo the following:

60-Year Equivalent conditions inside Zone 1 harsh environment.

Thermal cycling between 30 °C and 121 °C

Mechanical aging, thermal aging at 120 °C

Normal Service and DBA radiation aging totaling 4,12 E+07 rads of Gamma Dose

Vibration Aging and Seismic Testing as per IEEE 344, IEEE 323 and IEEE 382

Containment Pressure Test at 4,7 bar for 24 h

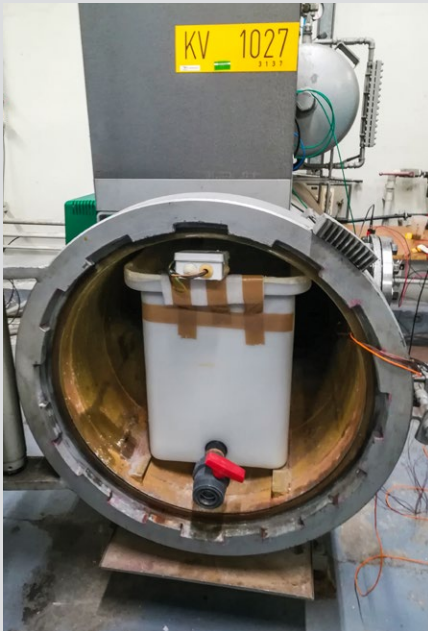
Design Basis Accident (DBA) and Post DBA Test -with such extremes as max. Temp 216,7 °C

Max, 30h-long chemical spray

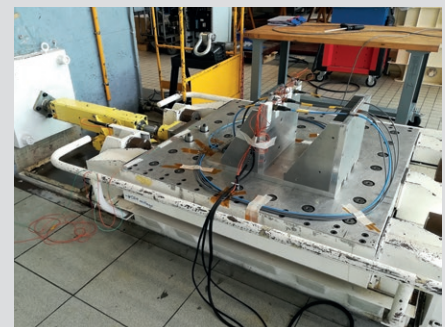
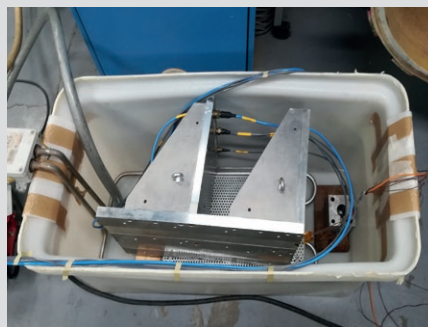
1-year long immersion in water.



AP1000 Environmental Zone 1 Qualification



Test	Zone 1 Requirements
Vibration aging	90 minutes of vibration each orthogonal axis, no discontinuity of 1 ms or greater, sinusoidal motion 0,75 g from 5 Hz to 100 Hz to 5 Hz
Thermal cycling	13 cycles between 30 °C [86 °F] and 121 °C [250 °F]
Mechanical cycle aging	500 mating/un-mating cycles
Environmental Requirements (Temperature and Pressure)	Normal Operating Conditions: Normal Temperature: (10 - 48,9 °C) [50 -120 °F] Normal Pressure: -0.001 +0.007 Mpa [-0.2 +1.0 psig]
	Group 1 Abnormal Operating Conditions, 18 4-h events: Abnormal Temperature: (10 - 65,6 °C) [50 -150 °F] Abnormal Pressure: Atmospheric
	Group 2 Abnormal Events Operating Conditions, 1-5 30-day events: Abnormal Temperature : (10 - 121 °C) [50 - 250 °F] Abnormal Pressure: ≤ 0.124 Mpa [≤18 psig]
Normal Service Radiation	60-Year Equivalent Gamma Total Integrated Dose= 4,12 E+07 rads [412 kGy]
Total Accumulated Dose (TAD)	250 MRads (2,5 X 10 ⁶)
Seismic test	In accordance with IEEE 344 and IEEE 382, max peak value 6,5g
Thermal Aging	Qualified Life 60 years
Containment pressure test	4,7 bar [68 psig] for 24 hours
DBA (LOCA) Test	DBA Operating Conditions in 1-year-long event: Maximum Accident Temperature (for aprox. 3 s): 216,7 °C [422°F] Maximum Accident Pressure (for aprox. 3 s): 406,8 kPa [59 psig] Post Accident Gamma Total Integrated Dose for 1 year = 3,7 E+07 rads [370 kGy] Post Accident Beta Total Integrated Dose for 1 year = 2,6 E+08 rads [2600 kGy] Chemical Spray 30 hours Post DBA 30 days in chemical spray fluid
Post DBA test	1-year long immersion as per IEEE 383:09-2015, water at 85,2 °C [185,38 °F] pressure 0,11 Mpa [16,62 psig]





ISO/IEC 17025

Environmental Test Laboratory

Fast and Reliable IEC Qualified Assessment Laboratory for Electronic Components (IECQ)

Environmental testing, consisting of the complete range of mechanical, electrical and environmental stress factors that affect electronic equipment, cabling, and systems is now available from Glenair's IEC/IECQ certified testing laboratories. Test engineers and technicians follow qualified processes, and report generation protocols to deliver timely and professional environmental testing services. As an interconnect component manufacturer and wire and cable assembly supplier, Glenair is well-versed in all aspects of qualification testing including corrosion resistance, solvent resistance, electromagnetic compatibility, dielectric withstanding voltage, current rating and so on. Our test laboratories are equipped with current-generation equipment, and are maintained in accordance with industry best practices and certification agency requirements. Perhaps most importantly, Glenair environmental test services are offered with accelerated lead

times—from initial quoting to final test report delivery. Please contact the factory for more information

- Mechanical / dynamic testing for fiber optic systems, electrical components, wiring harnesses
- Broad spectrum of electrical testing (resistance, current rating, EMC shielding and more)
- Heat, cold, and thermal shock testing
- Corrosion and solvent resistance testing
- Fast turnaround on quotes and testing services
- Decades of experience



Environmental Test Laboratory



IEC QUALITY ASSESSMENT SYSTEM FOR ELECTRONIC COMPONENTS (IECQ)

IEC QUALITY ASSESSMENT SYSTEM (IECQ)
covering Electronic Components,
Assemblies, Related Materials and Processes
For rules and details of the IECQ visit www.iecq.org

IECQ Certificate of Approval
Independent Testing Laboratory

IECQ Certificate No.: IECQ-L BSI 13.0001	Issue No.: 2	Status: Current
Supersedes: IECQ-L BSI 13.0001 Issue 1	Issue Date: 2016/11/07	Org Issue: 2013/11/07
CB Reference No.: T598257 IECQ	Expiration: 2019/11/06	

Glenair Italia S.p.A.
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Quarto Inferiore, Granarolo dell' Emilia
Bologna, 40057
Italy

The organization, facilities and procedures have been assessed and found to comply with the applicable requirements for Independent Testing Laboratory organization approval, in support of the IECQ system, which is in accordance with the Basic Rules IECQ 01 and Rules of Procedure IECQ 03-6 "Independent Testing Laboratory Assessment Program Requirements" of the IEC Quality Assessment System for Electronic Components (IECQ) and applicable requirements of ISO/IEC 17025: 2005 for the testing of electronic components under the IECQ.

Scope:

- Attached Schedule: T598257 IECQ Scope Issue 2.pdf -

Approved by Certification Body (CB): BSI
Kitemark Court, Davy Avenue
Knowlhill, Milton Keynes MK5 8PP
United Kingdom
Authorized person:
Paul Turner

The validity of the certificate is maintained through ongoing surveillance audits by the IECQ CB issuing the certificate.
This Certificate of Conformity may be suspended or withdrawn in accordance with the Rules of Procedure of the IECQ System and its Schemes.
The certificate and any schedule(s) may only be reproduced in full.
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The Status and authority of the certificate may be verified by visiting www.iecq.org

IECQ-L Rev. 09

IEC QUALITY ASSESSMENT SYSTEM (IECQ)
covering Electronic Components,
Assemblies, Related Materials and Processes
For rules and details of the IECQ visit www.iecq.org

Schedule of Scope to Certificate of Approval
Independent Testing Laboratory

IECQ Certificate No.: IECQ-L BSI 13.0001	CB Certificate No.: T598257 IECQ
--	----------------------------------

Schedule Number: IECQ-L BSI 13.0001-S Rev No.: 2 Revision Date: 2016/11/07 Page 1 of 1

CONDITIONING TESTS		
ENVIRONMENTAL		
Cold	Test A	BS EN 60068 / IEC 60068
Dry Heat	Test B	60068-2-2
Damp Heat – Steady State	Test Cab	60068-2-78
Damp Heat – Cyclic	Test Db	60068-2-30
Change of Temperature	Test N	60068-2-14
Salt Mist	Test Ka	60068-2-11
MECHANICAL		
Vibration, sinusoidal	Test Fc	60068-2-6
Vibration, random	Test Fh	60068-2-64
Shock	Test Ea	60068-2-27
CONNECTORS FOR ELECTRONIC EQUIPMENT		
Contact Resistance	Test 2a	BS EN 60512 / EN 60512
	Test 2b	BS EN 60512-2-2
Housing (Shell) Electrical Continuity	Test 2f	BS EN 60512-2-6
Insulation Resistance	Test 3a	BS EN 60512-3-1
Voltage Proof	Test 4a	BS EN 60512-4-1
Temperature Rise	Test 5a	BS EN 60512-5-1
Current-temperature derating	Test 5b	BS EN 60512-5-2
Shielding Effectiveness		BS EN / IEC 62153-4-7
MEASUREMENT CAPABILITIES (Parameters)		
DC Voltage, DC Current, AC Voltage, AC Current, DC Resistance, Temperature, Humidity.		
ELECTRICAL PRODUCT TESTS		
Resistors, Printed Circuits, Switches, Relays, Connectors, Transformers, Electrical Harnesses		

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IECQ-L Schedule of Scope Rev. 03



MISSION-CRITICAL INTERCONNECT SOLUTIONS

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