9/2016

EMI/EMP Filter Protection Connectors

FOR MILITARY, AEROSPACE AND HARSH ENVIRONMENTS





Filter

Amphenol
Aerospace

EMI/EMP Filter Protection

G



TABLE OF CONTENTS FOR SECTION G

Filter Product Overview 2
EMI Capabilities 3, 4
Filter Connector Options/Specials 5, 6
Filter Selection Data 7
Effect of Temperature on EMI Filter, Attenuation Curves 8
Impedance Matching Formula 9
Quality Assurance Testing 10
Insert Arrangements Chart and Illustrations 11-22

Filter Connector Shell Styles:

How to Order-Standard 23, 24
How to Order-Special/EMI Check Sheet 25
Filter MIL-DTL-38999, Series III - FTV Aluminum / FCTV Composite 26
Filter MIL-DTL-38999, Series III - FCTV Composite Shell Styles 27-30
Filter MIL-DTL-38999, Series III - FTV Aluminum Shell Styles 31-36
Filter MIL-DTL-38999, Series II - FJT, FJTP Aluminum 37-43
Filter MIL-DTL-38999, Series I - FLJT Aluminum 44-53
Filter SJT Series (MIL-DTL-38999 type) - FSJT Aluminum 54-57
Filter MIL-DTL-38999 Series IV - FBL Aluminum 58-60
Filter MIL-DTL-26482 - FPT Aluminum 61-67
Filter “AN” Series, MIL-DTL-5015 - FAN Aluminum 68, 69

Filter Adapters 70
Transient Protection MOV (Metal Oxide Varistor) Connectors 71, 72
Transient Protection Diode Connectors 73, 74
Transient Protection ESA (Energy Shunting Assembly) Connectors 75
EMI/Transient Protection Specials 76

EMI/EMP Filter Protection Connectors

For Protection of Sensitive Circuits

Overview

Amphenol® EMI/EMP Protection Connectors offer the versatility of standard connectors with EMI/EMP protection for sensitive circuits. Internal housing of the EMI/EMP devices eliminates costly and bulky exterior discrete protection devices.

Virtually all major MIL-Spec circulars can be incorporated with filter devices:

- MIL-DTL-38999
- MIL-DTL-26482
- MIL-DTL-83723
- MIL-DTL-5015
- MIL-DTL-27599
- MIL-DTL-26500



Mil-Spec



FTV
Subminiature Tri-Start, MIL-DTL-38999 Series III, Metal or Composite shells with Filter Protection.
Page 26



FLJT
Subminiature LJT, MIL-DTL-38999 Series I with Filter Protection.
Page 44



Filter AN Connector
MIL-DTL-5015 Type Connectors with Filter Protection.
Page 68



FJT
Subminiature JT, MIL-DTL-38999 Series II with Filter Protection.
Page 37



FBL
Intermateable with MIL-DTL-38999 Series IV Plugs. Maintaines the standard of MIL-DTL-38999 Series IV Receptacles
Page 58



FPT
Miniature MIL-DTL-26482 Series I with Filter Protection.
Page 61



High Density HD38999
- Provide 30% more contacts
- Work with existing mil-specified 38999 shells
- Utilize mil-qualified 39029 size 23 contact
- Available in Mil-Spec or filter length shells

Available in Filter, Hermetic & Epoxy Seal



2M
- Ideal where space is limited
- High density interconnect
- Light weight
- Intermateable & inter-mountable with Glenair's "Might Mouse"

Available in Filter, Hermetic & Epoxy Seal

For more information visit www.amphenol-aerospace.com. The Micro-Miniature Catalog 12-M1 is online or contact an Amphenol Salesperson for more information.

Rectangular

Rectangular Connectors available by Amphenol:

- MIL-DTL-24308 D-Sub
- MIL-DTL-83513 Micro D
- ARINC 404/600
- DOD-83527 Rack and Panel
- MIL-DTL-83733 Rack and Panel

Rectangular filter interconnects are manufactured and supplied by Amphenol Canada (www.amphenolcanada.com).

Advantages

ADVANTAGES OF FILTER CONNECTORS:

- Reduction in overall weight and space with the elimination of external filter circuits
- Reduction of solder junctions
- Increase in reliability due to fewer connections
- Fragile filter elements protected by connector shell from handling and environmental damage
- Pre-testing from factory and ready for installation

Options

AMPHENOL OFFERS FILTER CONNECTORS, WHICH CAN INCLUDE:

- EMP protection using diodes
- EMP protection utilizing metal oxide varistors (MOV's)
- Filtered plug connectors
- Glass fused hermetic seal
- ESD protection
- Combinations of filtering devices within one connector package

Filtering Solutions

PLANARS, MOV'S, AND DIODE CONTACTS

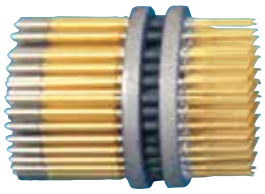
Amphenol provides a wide range of filtering solutions. You can select your options for your particular interference threats - VHF, UHF, MF1, HF or other filter ranges, then couple with a connector package of your choice. Or give Amphenol your custom shell design requirements for assistance in designing your unique filter solution.

EMI Filter connectors are intended for use in temperatures from –55°C to +125°C. Attenuation will change with feed-through current and temperature.

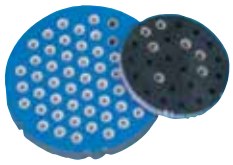
To assure reliability, connectors may be subjected to an attenuation performance test verifying proper assembly and grounding of the filters. Attenuation data on filter performance is stated in reference to a 50 ohm impedance system in order to allow filter performance to be more easily translated into real world impedances. Those interested in determining the expected filter performance in an impedance system other than 50 ohms may refer to page 285 of this catalog or may contact Amphenol Aerospace for further assistance.

IT IS SUGGESTED THAT THE USER(S) ANALYZE THEIR SYSTEM REQUIREMENTS FOR EMI PROTECTION IN THE FOLLOWING AREAS:

- Working voltage (DC or AC and Frequency)
- Peak voltage
- Desired attenuation at a given frequency level
- Any special capacitance limitations



Planar Capacitor Array Diode Contacts



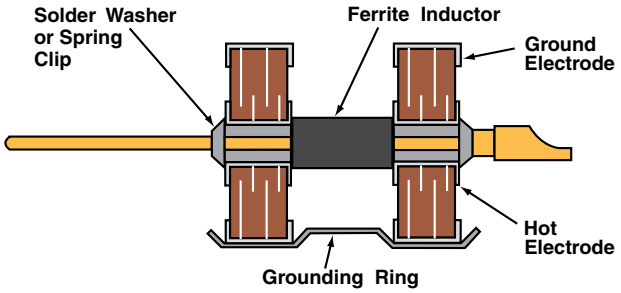
Assembly Capacitor and MOV Planars

For Maximum Design Flexibility, Continued

Planar Capacitor Technology

The Amphenol® EMI filter connector utilizes planar capacitor technology to provide the user with the most reliable and cost effective performance across the frequency range. (See MOV and Diode pages 71-73).

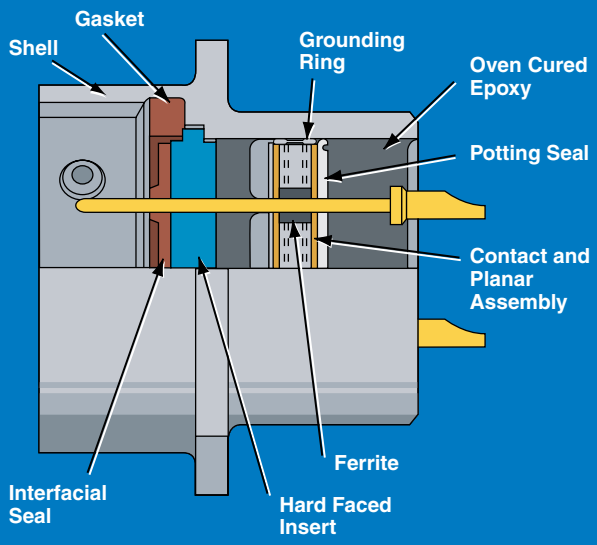
Pi Type Planar Array Assembly



Several array configurations are available, see page 274 for illustrations. An encapsulant of oven-cured epoxy in the rear provides:

- Mechanical and thermal insulation of the ceramic elements – mechanical loading can be accomplished without capacitor damage.
- Pins can be bent 90° and straightened with no damage to the filter.
- Hermeticity (4.6 x 10^{-3} cc/sec) – prevents water from entering through the rear of the connector in high humidity environments.
- Amphenol recommends using metal protection caps during cleaning operations.

PLANAR ASSEMBLY



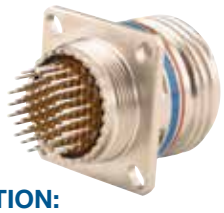
Contacts

CONTACT OPTIONS:

- Coaxial, concentric twinax, triax and quadrax contacts can be included in arrangements of filtered contacts for signal or power circuits (Please refer to the High Speed Contacts Section for High Frequency Contacts for Multi-Pin Connectors).
- Filter contacts with differing cut-off frequencies can be mixed in any given insert arrangement. (ratio 100:1 typical)
- Ground, insulated or filter contacts can be combined within the same connector to meet unique or changing frequency protection requirements.
- Thermocouple contacts
- Diodes or MOV for EMP



Wire Terminations



METHODS OF WIRE TERMINATION:

- Solder cup - wire termination
- PCB termination (Pre-tinning is available)
- Solderless wrap
- Amphenol® UTS (Universal Termination System) allows crimp termination. It uses crimp insertable socket contacts on conductor wires. Sockets mate with filter pins within the connector body. (Socket type M39029/57). (For further contact information, see section, 38999 Series I & II).
- Weld terminal for thermocouple contacts
- Compliant Pin (press fit) for epoxy

* More in-depth information on attenuation is available in: L-1146, General Design Guideline for EMI Filters and/or TVS (Transient Voltage Suppression) Connectors.

Also for further information ask for:

L-1145, How to Specify Filter Connectors.

ADAPTERS:

Features and Benefits:

- Effective and economical method of introducing EMI filtering and/or transient protection to an installed system
- Intermateable with all popular MIL-SPEC connectors
- Can also be configured to provide transient protection utilizing diodes and MOVs
- Space qualified components available
- Quick and efficient installation
- Readily available in MIL-DTL-38999 Series I, II, and III as well as MIL-DTL-26482 types

For more information see page 70



FILTER PLUG:

Features and Benefits:

- Utilized when access to receptacle is denied
- Utilizes same components as standard EMI/EMP receptacles
- Can be assembled to electrical harness
- Alternative to connector adapter when length restrictions exist

Consult Amphenol Aerospace for availability.



Transient Protection

DIODE:

Features and Benefits:

- Versatility with transient protection for sensitive circuits
- Low capacitance diode for high speed signals
- Can be used in combination with Filters and MOV's
- Transients up to 200 Volts either Bipolar or Uni-polar
- MIL-S-19500 Compatible
- Available for Surface Mount, or "Leaded" type devices
- Nanosecond response time

For more information see pages 73



MOV:

Features and Benefits:

- Filter connector size package
- Protection for 14, 31, 38 DC voltage circuits
- No additional circuits required
- Low impedance
- Elimination of costly external suppression assemblies
- Nanosecond response time

For more information see pages 71, 72



ESA - ENERGY SHUNTING ASSEMBLY:

Features and Benefits:

- Compact unit providing lightning and EMP Protection
- Eliminates per line circuit protection devices
- Single surge arrestor providing space saving
- Simplified assembly can be integrated with an EMI filter connector

For more information see page 75



ESD

ESD:

Features and Benefits:

- Utilizes The Faraday Cage Principle to shunt ESD events through conductive enclosures
- Maintains same physical envelopes as standard counterparts
- Eliminates need for discrete components
- Infinite pulse life

For more information see page 75



High Speed

HIGH SPEED:

Filter connector can incorporate high frequency coax, twinax, triax quadrax and differential twinax contact:

Features and Benefits:

- Eliminate discontinuities or impedance variations
- High speed data transfer
- Fits various RG and special cables



Specials

Sealed Connectors

HERMETIC & HIGH SPEED HERMETIC:



Features and Benefits:

- Leak rate of 1X10-7 cc of He/sec or less
- Utilizes fused glass insert in a steel shell
- Approximately 1/2 inch longer than standard series
- Filter and Transient protection integration available.
- Hermetically sealed High Speed Contacts available

For more information www.amphenol-aerospace.com

AQUACON:



Features and Benefits:

- Underwater Use
- Hermetically Sealed-Moisture/Oil Resistant 1500 PSI capability
- Leak rate of 1X10-7 cc of He/sec or less
- Utilizes fused glass insert in a steel shell

For more information see the Aquacon catalog online at www.amphenol-aerospace.com

EPOXY SEALED CONNECTORS:



Features and Benefits:

- Light weight alternative to glass sealed hermetic connector
- Leak rate of 1x10-5 cc of He/sec leak rate maintained after temperature cycling, 5 cycles -55 to +125°C
- Available in standard and custom configurations.
- Available in virtually all major MIL-SPEC circular connectors

SEALED RECEPTACLES WITH CRIMP CONTACT:



Features and Benefits:

- Leak rate of 1x10-5 cc of He/sec leak rate maintained after temperature cycling, 5 cycles -55 to +125°C
- Allows quick and reliable termination using standard M39029/57 socket contacts.
- Intermateable & inter-mountable with standard 38999 Series III plugs.

For more information www.amphenol-aerospace.com

Printed Circuit Board Mount

PRESS FIT CONNECTORS:



Features and Benefits:

- Solderless mounting on printed circuit boards
- High speed
- Low cost
- Elimination of soldering thermal stress
- No cold soldered joints
- No short circuits
- No cleaning of excess flux
- Optional contact for piercing conformal board coating is available.

For more information www.amphenol-aerospace.com

PRINTED CIRCUIT BOARD MOUNT:



Features and Benefits:

- Allows mounting directly to a PC board, Flex circuit, and header connector
- Available in Composite and Aluminum shells
- Improved reliability by elimination of external spacers and washers
- Stand-off shells available in different configurations

For more information see page 29, 30, 35, 36, 49, 52

HEADER FOR FLEX PRINTED OR PC BOARD:



Features and Benefits:

- Circular and rectangular
- Provides easy separation of the connector from the PC board or flex
- Cost savings in the manufacturing process
- Assemblies can be vapor phase or wave soldered to flex/printed circuit board
- Eliminates possible damage to your expensive filter ,TVS protected connectors, or Printed Circuit Boards

For more information www.amphenol-aerospace.com

Weight Saving

COMPOSITE:



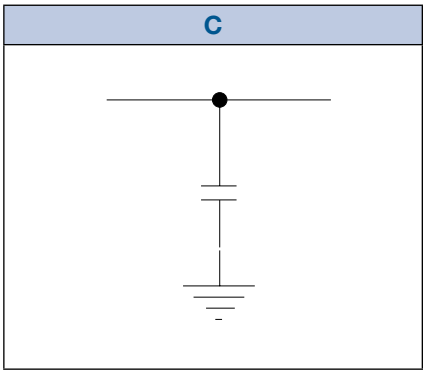
Features and Benefits:

- Meets MIL-DTL-38999, Series III dimensional lengths
- Offers same high performance as its metal counterpart
- Lightweight: 17%-70% weight savings over metal
- Corrosion Resistant
- Offers better environmental performance than its metal counterpart
- Durable- 1500 coupling minimum

See FCTV Composites on pages 27-30

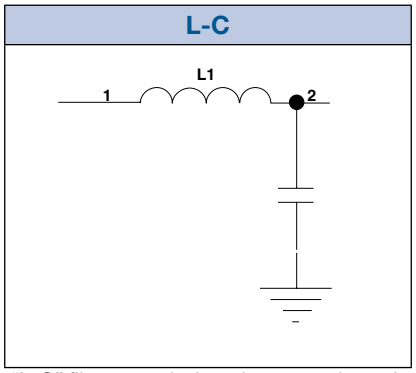
Amphenol® EMI Connectors are produced with several types of filters. They are all low band pass filters with the following configurations:

C



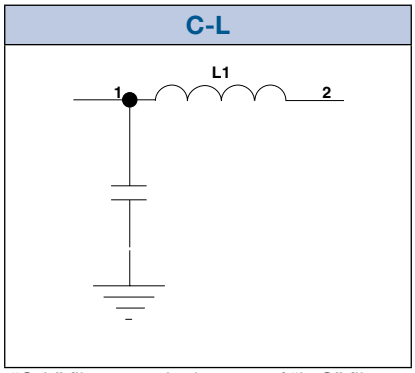
"C" filters involve a single capacitor. This simple, cost efficient design excels at low frequency performance which often exceeds the performance of multiple-component configurations.

L-C



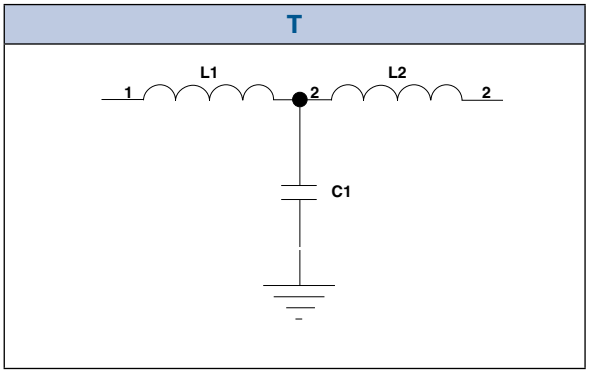
"L-C" filters excel when the source impedance is less than the load impedance, often outperforming "PI" filters at frequencies lower than 10MHz

C-L



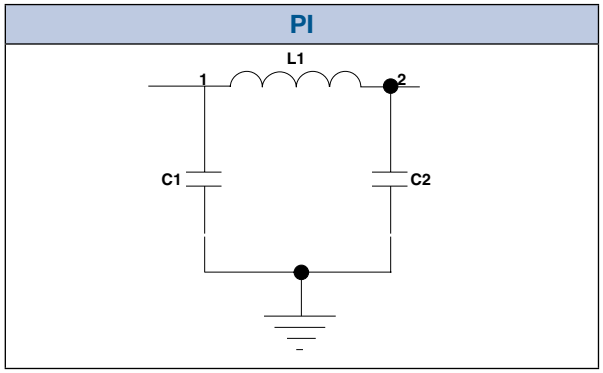
"C-L" filters are the inverse of "L-C" filters, performing best when the source impedance is greater than the load impedance

T



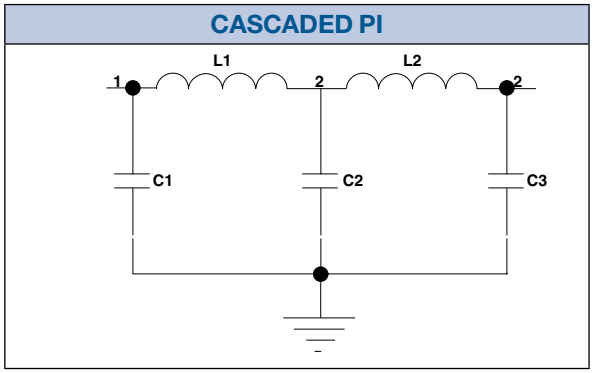
"T" filters combine the advantages of both the "L-C" and "C-L" filter types in one package, with superior high frequency performance.

PI



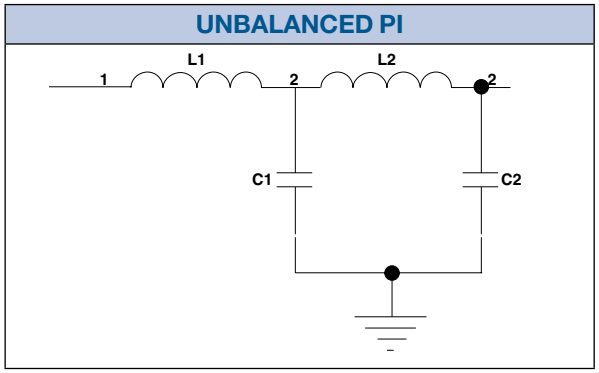
Typical of MF1, VHF and UHF designations, "PI" filters are the workhorse of the filter industry. Combining performance with cost efficiency, this three-component filter has a steep insertion loss curve, and excels at frequencies above 10MHz. "PI" filters work well with a combination of different source and load impedances

CASCADED PI



Typical of the HF1 designation, "Cascaded PI" filters contain three shunt capacitors and two series inductors, resulting in a very steep insertion loss curve, outperforming all other filter configurations at frequencies above 10MHz.

UNBALANCED PI



"Unbalanced PI" filters have all the advantages of "PI" filters, with superior performance when the source impedance is less than the load impedance.

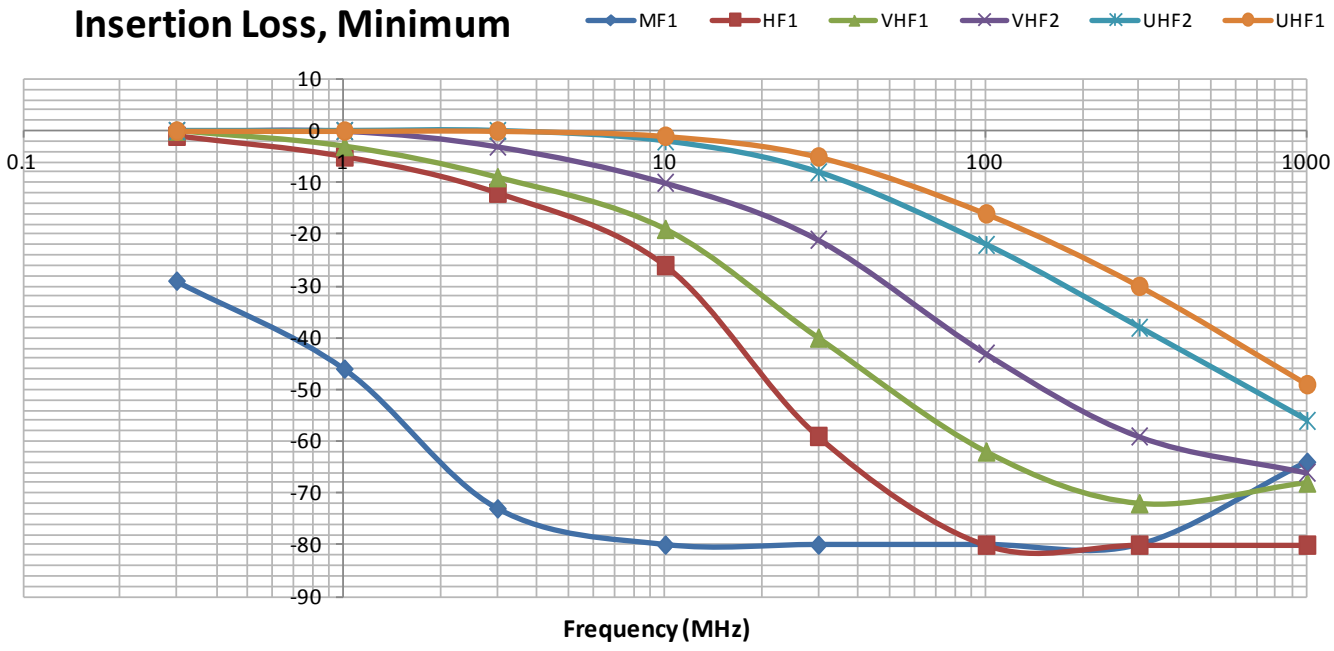
Consult Amphenol Aerospace for attenuation performance values

Filter Characteristics

Attenuation Curve

AAO Filter Designation	MF1 *	HF1	VHF1	VHF2	UHF2	UHF1
Filter Type	PI	Casc PI	PI	PI	PI	PI
MIL-STD-2120 Designation			Band G	Band E	Band C	Band B
Min Cap (pFd)	800,000	9,800	6,000	1,900	500	300
Typical Cap (pFd)	1,000,000	16,900	9,000	2,950	800	375
Max Cap (pFd)	1,600,000	24,000	12,000	4,000	1,100	450
Working Voltage, Max (VDC)	50	200	200	200	200	200
Dielectric Withstanding Voltage (VDC) ****	100	500	500	500	500	500
Insulation Resistance, Min (G-ohms)	0.25	10	10	10	10	10
Cut-off Frequency, Min (3db, MHz)	0.004	0.26	0.52	1.6	5.6	13.6
Insertion Loss 0.3 MHz **	29	1	0	0	0	0
Insertion Loss 1 MHz **	46	5	3	0	0	0
Insertion Loss 3 MHz **	73	12	9	3	0	0
Insertion Loss 10 MHz **	80	26	19	10	2	1
Insertion Loss 30 MHz **	80	59	40	21	8	5
Insertion Loss 100 MHz **	80	80	62	43	22	16
Insertion Loss 300 MHz **	80	80	72	59	38	30
Insertion Loss 1 GHz **	64	80	68	66	56	49

General Specifications ***	
Air leakage max	4.6 x 10^-3 cc/sec
Operating Temp Range	-55 to +125 deg C
Max RF Current (amps)	3
Feed-Thru Current, max, sz 22 and 23 cont	5
Feed-Thru Current, max, sz 20 cont	7.5
Feed-Thru Current, max, sz 16 cont	13



Notes:

* MF1 designation is not available in size 22 and 23 contacts.

** All insertion loss values are minimum, in units of -db. Insertion loss performance will vary due to voltage, current and temperature. Consult Amphenol Aerospace for more information.

*** Common for all filter types.

**** Higher DWV ratings are available on request. Consult Amphenol Aerospace.

Impedance Matching Formula
(Your System to a 50 Ohm System)

Amphenol Aerospace

The following formula and example are offered in order to determine the expected filter performance in an impedance system other than 50 ohms.

With the attenuation expressed in 50 ohms and the transfer impedance curve shown in Figure 1 below, a designer can relate the expressed attenuation to the input and output impedance of their circuit.

Example:

(1) Noise is 40dB above specification level at 100 MHz

(2) Output and input impedance are 10 and 100 ohms respectively

(3) Amphenol® VHF 7000 pf filter has a 65 dB minimum attenuation at 100 MHz and +25°C

Formula (Taken from Figure 1):

1.4×10^{-2} ohm = transfer impedance for 65 dB in a 50 ohm system

$$\text{Atten (dB)} = 20 \log_{10} \left[1 + \frac{Z_S Z_L}{Z_{12}(Z_S + Z_L)} \right]$$

Z_S = source impedance (output)

Z_L = load impedance (input)

Z_{12} = transfer impedance

Atten = filter performance in a system other than 50 ohms

$$\text{Atten (dB)} = 20 \log_{10} \left[1 + \frac{10(100)}{1.4 \times 10^{-2} (10 + 100)} \right]$$

Attenuation = 56.3dB

In this case, the 7000 pf VHF filter will give 56.3 dB which is 16.3dB below the desired reduction in noise (40dB) as stated in the above problem.

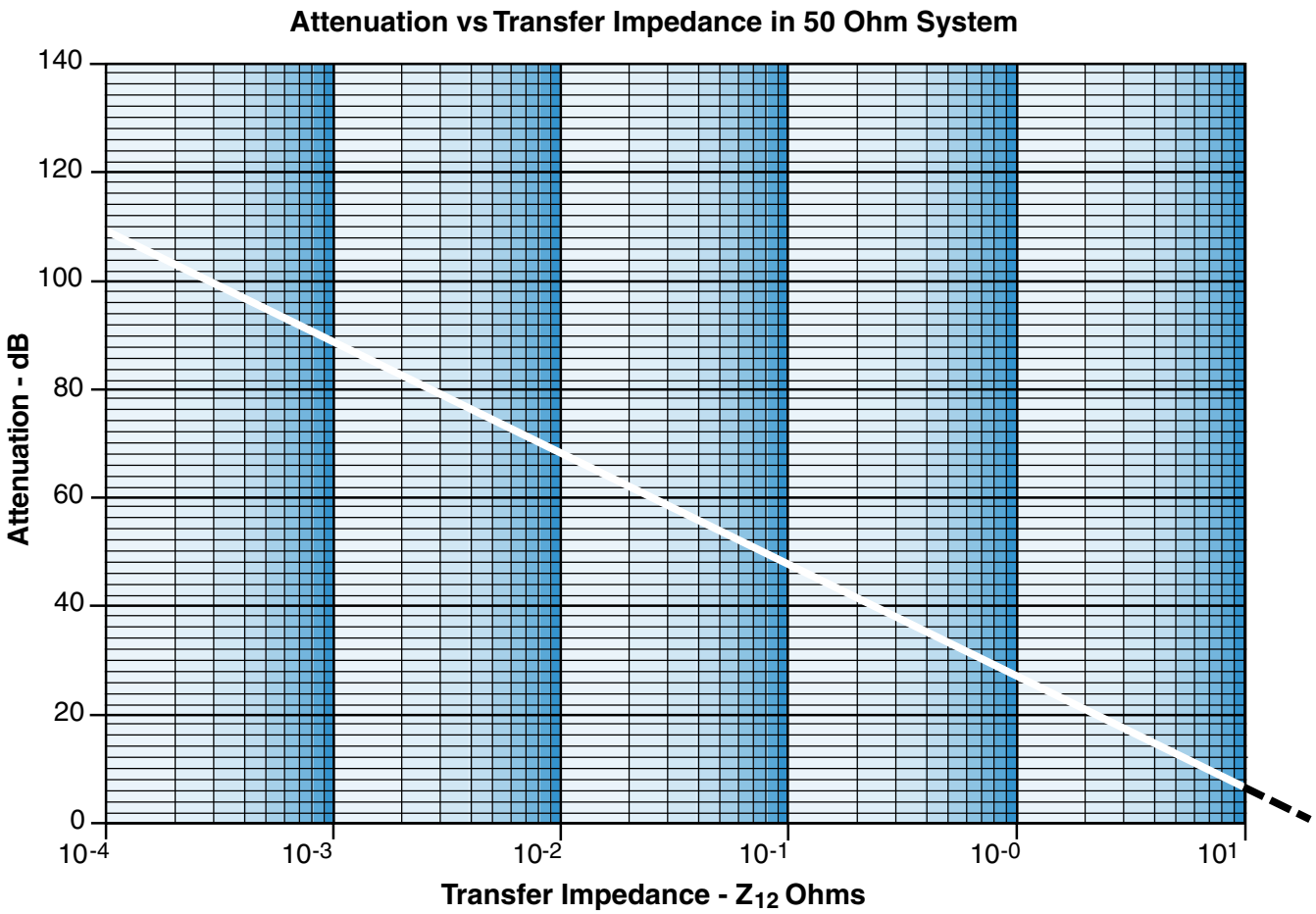


Figure 1

Testing

ACCEPTANCE TESTING

All filter connectors undergo extensive acceptance testing to assure product quality. An outline of standard acceptance testing performed is as follows:

MECHANICAL INSPECTION

- Dimensional inspection of shells, keys, keyways and mounting surfaces by either in-process inspection of components or inspection of final assemblies.
- Visual inspection of contacts, inserts and seals, gaskets and surface finish of shells and hardware.

ELECTRICAL TESTS

- Insulation resistance of filter contacts is checked 100% **at the working voltage and to the test limit** listed for each filter in the filter selection data table.
- Dielectric withstanding voltage is tested on 100% of filter contacts at the voltage listed in the filter selection data table.
- Capacitance is tested 100% at 1KHz.

SPECIAL TESTS/PROCESSES

In addition to the standard acceptance testing and processes, the following additional production testing and processing can be provided upon request:

- Automated attenuation testing (through 100 MHz)
- Attenuation testing available through 1G upon special request. Contact Amphenol Aerospace in Sidney for additional details.
- Leakage inspection
- Thermal cycling/shock
- Burn-in
- De-gassing

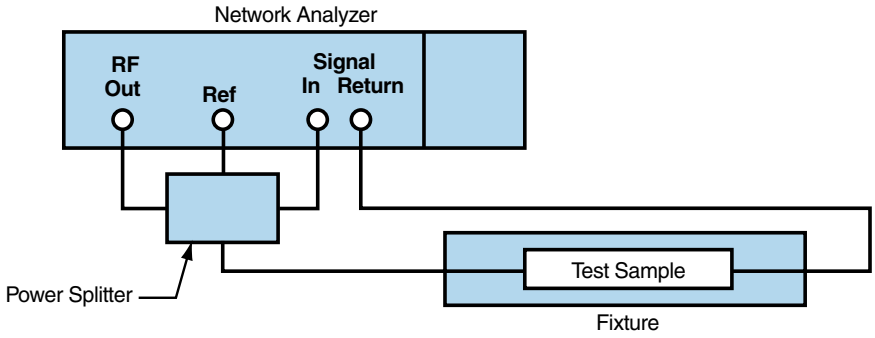
Consult Amphenol Aerospace for further information.

QUALIFICATIONS

Amphenol® filter connectors have been qualified and are on periodic requalification to specification BSF-1 (available from your Amphenol representative). This is patterned after MIL-DTL-38999, modified to include mechanical and environmental testing and electrical parameters important to filter connector performance.

These acceptance tests, along with exhaustive in-process inspection and testing, give Amphenol® filter connectors their reputation for reliability.

ATTENUATION TEST CIRCUIT





There are multiple test stations located on the Amphenol production floor that support all in-process, final electric and qualification testing as necessary.

MIL-DTL-38999, Series I LJT, II JT, III TV, HD

Insert Availability and Identification Chart

Amphenol Aerospace

Series	Series	Series	Military	MIL-DTL-27599		Hermetics					Contact Size										
JT II	LJT I	TV III	III	JT/LJT Solder	Crimp	Class H	Class Y	TV*	Service Rating	Total Contacts	23 HD	22D	22M	22	20	16	12	12 (Coax)	10 (Power)	8 (Coax)	8†† (Twinax)
		7-D2							M	2		2									
		7-D3							M	3		3									
		7-D4							M	4		4									
8-2■				P					M	2					2						
8-3■				X	NA	P	P		M	3					3						
	9-3■			X																	
		9-5★■							Grounded	1											1
8-6				X	X	P	P		M	6			6								
	9-6			X	X	P	P														
	9-7■			X					M	7			7								
		9-9■	A23						N	9	9										
	9-22■			X					I	2					2						
8-35					X	P	P		M	6		6									
	9-35	9-35	A35		X	P	P	P													
8-44					X	P	P		M	4				4							
	9-44				X																
		9-94■			◆				M	2					2						
8-97■				X					M	4			2		2						
8-98				S	X	P	P		I	3					3						
	9-98	9-98	A98	X	X	P	P	P													
	11-2★	11-2★	B2		X	P**			I	2						2					
10-4					3				I	4					4						
	11-4	11-4		X	2																
10-5				X	X	P	P		I	5					5						
	11-5	11-5	B5	X	X			P													
	11-6■			S					I	6					6						
10-13				X	X	P/S	P/S		M	13			13								
	11-13			X	X	P/S	P/S														
		11-19■	B23						N	19	19										
10-35					X	P/S	P/S		M	13		13									
	11-35	11-35	B35		X	P/S	P/S	P													
		11-54■			X ◆				II	4		4									
10-98				X	X	P/S	P/S		I	6					6						
	11-98	11-98	B98	X	X	P/S	P/S	P													
10-99					X	P	P		I	7					7						
	11-99	11-99	B99		X X			P													
12-3				X	X ◆	P	P		II	3						3					
	13-3■				P																
12-4				X	X	P	P		I	4						4					
	13-4★	13-4★	C4	X	X	P	P	P													
12-8				X	X	P	P		I	8					8						
	13-8	13-8	C8	X	X	P	P	P													
		13-13■							I, Fiber Optic	4						2**	2				
12-22					X	P/S	P/S		M	22			22								
	13-22			X	X	P/S	P/S														
		13-26■			2				M	8		6					2				
		13-32■	C23						N	32	32										
12-35					X	P/S	P/S		M	22		22									
	13-35	13-35	C35		X	P/S	P/S	P													
		13-63■			◆				I	4						2	2				
12-98				X	X	P/S	P/S		I	10					10						
	13-98	13-98	C98	X	X	P/S	P/S	P													
14-4■					2				I	4							4				
	15-4■	15-4■			2 ◆																
14-5				X	X	P	P		II	5						5					
	15-5★	15-5★	D5	X	X	P	P	P													

X Completely tooled.

\+ Majority of tooling is completed (contact Amphenol Aerospace for availability).

◆ Not tooled for 02-R.

P Available with Pin contacts only

S Available with Socket contacts only

P/S Available with Pin contacts or Socket contacts

★ Ground plane proprietary option available. Arrg. 9-5 is exclusively ground plane type.

■ Not Mil-Qualified.

✧ 21-75 is Mil-Qualified with twinax contacts only. Note: MS connector 21-75 is supplied with size 8 twinax. Commercial connector 21-75 is supplied with size 8 coax.

HD designates High Density 38999 Series III insert patterns which use size 23 contacts only. Not rated over 175°C.

* Hermetic inserts - solder termination standard. (Contact Amphenol Aerospace for optional PCB or eyelet termination).

** Two size 16 contacts dedicated to fiber optics. See the Fiber Optic section for more information.

*** For use in MIL-STD-1760 applications.

† For RG 180/U and RG 195/U cables only.

†† Size 8 Coax and Twinax are interchangeable.

(2) Not Tooled for RP or 02RE

(3) Pin inserts only, not tooled for RP or 02RE (Consult Amphenol Aerospace for avail.)

(5) MS Connector 21-79 has provision for two size 8 coax contacts. Coax contacts are not supplied unless specified by customer.

MIL-DTL-38999, Series I LJT, II JT, III TV, HD

Insert Availability and Identification Chart

Series	Series	Series	Military	MIL-DTL-27599		Hermetics					Contact Size										
JT II	LJT I	TV III	III	JT/LJT Solder	Crimp	Class H	Class Y	TV*	Service Rating	Total Contacts	23 HD	22D	22M	22	20	16	12	12 (Coax)	10 (Power)	8 (Coax)	8†† (Twinax)
14-15				X	X	P	P		I	15					14	1					
	15-15	15-15	D15	X	X	P/S	P/S	P	I	15					14	1					
14-18				X	X	P/S	P/S		I	18					18						
	15-18	15-18	D18	X	X	P/S	P/S	P													
14-19■				X	X				I	19					19						
	15-19	15-19	D19		X	P	P	P													
14-35					X	P	P		M	37		37									
	15-35	15-35	D35		X	P/S	P/S	P													
14-37				X	X	P	P		M	37			37								
	15-37			X	X	P	P														
		15-55■	D23						N	55	55										
14-68■					2	P	P		1	8						8					
	15-68■			X	3																
14-97■					X	P	P		I	12					8	4					
	15-97	15-97	D97	X	X	P	P	P													
	17-2	17-2	E2		X ◆				M	39		38									1
16-6					X	P	P		I	6							6				
	17-6	17-6	E6		X	P	P	P													
16-8				X	X	P	P		II	8						8					
	17-8★	17-8★	E8	X	X	P/S	P/S	P													
16-13■					2				I	13						13					
	17-13■				2																
	17-22■	17-22★■			◆				Coax	4								2		2	
	17-25■				2				M	24		22								2	
16-26				X	X	P/S	P/S		I	26					26						
	17-26	17-26	E26	X	X	P/S	P/S	P													
16-35					X	P	P		M	55		55									
	17-35	17-35	E35	X	X	P	P	P													
16-42					X				M	42				42							
	17-42■				P																
		17-52■			X ◆				M	2											2
16-55				X	X	P/S	P/S		M	55			55								
	17-55			X	X	P/S	P/S														
		17-60■			X				I/Coax	10		8								2	
		17-73■	E73						N	73	73										
16-99				X	X	P	P		I	23					21	2					
	17-99	17-99	E99	X	X	P	P														
		19-AD■			X ◆				Inst.	17					16						1
18-11				X	X	P	P		II	11						11					
	19-11★	19-11★	F11	X	X	P	P	P													
	19-18	19-18	F18		2 2				M	18		14									4
18-28				X	X				I	28					26	2					
	19-28■	19-28	F28	X	P X																
18-30				X	X				I	30					29	1					
	19-30■			X	P																
		19-31■			X				M	15		12					1			2	
18-32				X	X	P/S	P/S		I	32					32						
	19-32	19-32	F32	X	X	P/S	P/S	P													
18-35					X	P	P		M	66		66									
	19-35	19-35	F35		X	P	P	P													
18-53				X	X				M	53				53							
	19-53■				P																
18-66				X	X	P	P		M	66			66								
	19-66				X	P	P														
	19-67■			X	3	S	S		M	67			67								
18-68■					2				I	18						18					
	19-68■	19-68			3 S																
18-96■					2				I	9							9				
		19-88■	F23						N	88	88										
20-1					X	P	P		M	79			79								
	21-1				X	P/S	P/S															

MIL-DTL-38999, Series I LJT, II JT, III TV, HD

Insert Availability and Identification Chart

Series	Series	Series	Military	MIL-DTL-27599		Hermetics					Contact Size										
JT II	LJT I	TV III	III	JT/LJT Solder	Crimp	H	Y	TV*	Service Rating	Total Contacts	23 HD	22D	22M	22	20	16	12	12 (Coax)	10 (Power)	8 (Coax)	8†† (Twinax)
20-2					X				M	65				65							
	21-2■				X																
20-11■					3				I	11							11				
	21-11★	21-11★	G11		X																
20-16				X	X	P/S	P/S		II	16						16					
	21-16★	21-16★	G16	X	X	P	P	P													
	21-25■								I	25					25						
	21-27■			X					I	27					27						
		21-29■			X				I	27					19	4	4				
20-35					X	P	P		M	79		79									
	21-35	21-35	G35		X	P/S	P/S	P													
20-39				X	X	P	P		I	39					37	2					
	21-39	21-39	G39	X	X	P	P	P													
20-41				X	X	P	P		I	41					41						
	21-41	21-41	G41	X	X	P/S	P/S	P													
	21-75★	21-75★✧	G75		2 X				N M	4										4	(4)
	21-79■	21-79■			2 X				II	19		17								2	(5)
		21-121■	G23						N	121	121										
22-1					X	P/S	P/S		M	100			100								
	23-1				X	P	P														
22-2				X	X	P	P		M	85				85							
	23-2			X	X	P	P														
	23-6★■	23-6★■			P				M	6											6
22-14■					2 ◆				I	14							14				
	23-14■	23-14■			2 ◆																
22-21				X	X	P	P		II	21						21					
	23-21★	23-21★	H21	X	X	P	P	P													
22-32				X	X	P	P		I	32					32						
	23-32■			X	P																
	23-34■			X					I	34					34						
22-35					X	P/S	P/S		M	100		100									
	23-35	23-35	H35		X	P	P	P													
22-53■					P				I	53					53						
	23-53	23-53	H53	X	X	P/S	P/S	P													
		23-54 ■			X				M	53		40				9	4				
22-55				X	X	P	P		I	55					55						
	23-55	23-55	H55		X			P													
	23-97■			X					II	16						16					
	23-99■			X					II	11						11					
		23-151 ■	H23						N	151	151										
24-1					X	P	P		M	128			128								
	25-1				X	P	P														
24-2					X				M	100				100							
	25-2				X																
24-4					X	P	P		I	56					48	8					
	25-4	25-4	J4		X			P													
	25-7■	25-7	J7		X				M Twinax	99		97								2	
		25-8★	J8		◆				Twinax	8											8
		25-11***	J11		2 ◆				N	11					2				9		
		25-17■			◆				M	42		36									6
24-19■					X	P	P		I	19							19				
	25-19★	25-19★	J19		X			P													
	25-20■	25-20***	J20		2 ◆				N	30					10	13		4			3

X Completely tooled.

\+ Majority of tooling is completed (contact Amphenol Aerospace for availability).

◆ Not tooled for 02-R.

P Available with Pin contacts only

S Available with Socket contacts only

P/S Available with Pin contacts or Socket contacts

★ Ground plane proprietary option available. Arrg. 9-5, 26-62 is exclusively ground plane type.

■ Not Mil-Qualified.

✧ 21-75 is Mil-Qualified with twinax contacts only.

* Hermetic inserts - solder termination standard. (Contact Amphenol Aerospace for optional PCB or eyelet termination).

HD designates High Density 38999 Series III insert patterns which use size 23 contacts only. Not rated over 175°C.

** Two size 16 contacts dedicated to fiber optics. See the Fiber Optic Section for more information.

*** For use in MIL-STD-1760 applications.

† For RG 180/U and RG 195/U cables only.

†† Size 8 Coax and Twinax are interchangeable.

(2) Not Tooled for RP or 02RE

(3) Pin inserts only, not tooled for RP or 02RE (Consult Amphenol for avail.)

(4) MS connector 21-75 is supplied with size 8 twinax. Commercial connector 21-75 is supplied with size 8 coax.

(5) MS Connector 21-79 has provision for two size 8 coax contacts. Coax contacts are not supplied unless specified by customer.

MIL-DTL-38999, Series I LJT, II JT, III TV, HD

Insert Availability and Identification Chart

Series JT II	Series LJT I	Series TV III	Military III	MIL-DTL-27599 JT/LJT Solder	Crimp	Hermetics H	Hermetics Y	Hermetics TV*	Service Rating	Total Contacts	Contact Size 23 HD	22D	22M	22	20	16	12	12 (Coax)	10 (Power)	8 (Coax)	8†† (Twinax	8 Quadrax
24-24					X	P	P		I	24						12	12					
	25-24★	25-24★	J24		X	P	P		I	24						12	12					
		25-26■★			✦				I	25					16		5			4		
24-29					X				I	29						29						
	25-29★	25-29★	J29	X	X																	
24-35					X	P	P		New	128		128										
	25-35	25-35	J35		X	P	P	P	M													
24-37					X				I	37						37						
	25-37★	25-37★	J37		X																	
24-43■					3				I	43					23	20						
	25-43	25-43	J43	X	2 ◆																	
	25-46	25-46	J46		2 ◆				I	46					40	4				2		
24-61				X	X	P	P		I	61					61							
	25-61	25-61	J61	X	X	P	P	P														
		25-62■★			X ◆				I	12						8						4
		25-90			◆				I	46					40	4					2	
		25-187■	J23						N	187	187											
		25-F4■			X				M/I	66		49				13	4					

HD designates High Density 38999 Series III insert patterns which use size 23 contacts only. Not rated over 175°C

X Completely tooled.

◆ Not tooled for 02-R.

P Pin inserts only (contact Amphenol Aerospace for socket availability).

★ Ground plane proprietary option available. Arrg. 9-5, 25-62 is exclusively ground plane type.

■ Not Mil-Qualified.

TV Series III

SELECT SHELL SIZE - SPECIAL INSERT ARRANGEMENT

(Not Mil-Spec Qualified)

Shell Size-Insert Arrg.	Crimp	Hermetics*	Service Rating	Total Contacts	Comments	Contact Size 22D	20	16	12
9-2	X		I	2	Formerly Pyle		2		
15-4	X		II	4	Formerly Pyle			4	
15-25	X		M	25	Formerly Pyle	22		3	
15-AT	X		I	13		10			3
17-20	X		M	20	Formerly Pyle		16	4	
21-12	X		I	12	Formerly Pyle		3		9
21-21	X		M/Inst.	41	Improved sealing	32			9
21-99	X		M	16	Formerly Pyle	5			11
25-92	X		M	101	Formerly Pyle	92		9	
25-97	X		M	42	Formerly Pyle	26		3	13

Select Non-Standard Shell Size

- SPECIAL INSERT ARRANGEMENT

Shell Size-Insert Arrg.	Crimp	Hermetics*	Service Rating	Total Contacts	Contact Size 22D	20	8	4	0
25-16	X		M	8		6		2	
25L-3	X		II	3			1	2	
25L-7	X		II	7			7		
33-3	X		II	3				1	2
33-5	X		II	5				5	
33-6	X		II	6			2	4	
37-5	X		II	4					4

(Insert arrangements requiring non-standard shells or larger contacts)

X Completely tooled.

\+ Majority of tooling is completed (contact Amphenol Aerospace for availability).

◆ Not tooled for 02-R.

P Pin inserts only (contact Amphenol Aerospace for socket availability).

★ Ground plane proprietary option available. Arrangement 9-5, 25-62 is exclusively ground plane type.

■ Not Mil-Qualified.

* Hermetic inserts - solder termination standard. (Contact Amphenol Aerospace for optional PCB or eyelet termination).

** Two size 16 contacts dedicated to fiber optics. See the Fiber Optic section for more information.

*** For use in MIL-STD-1760 applications .

† For RG 180/U and RG 195/U cables only.

†† Size 8 Coax and Twinax are interchangeable.

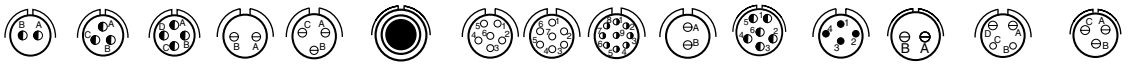
Note: 25L-3 and 25L-7 require longer shells.

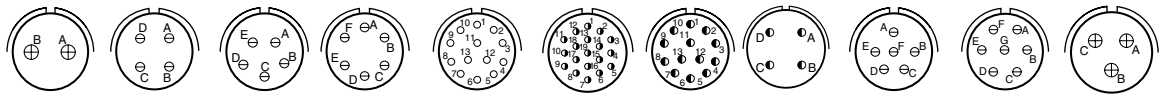
MIL-DTL-38999, Series I LJT, II JT, III TV, HD

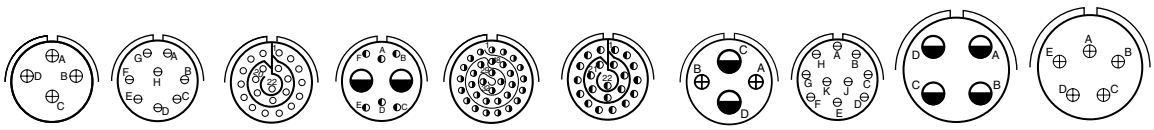
Insert Arrangements

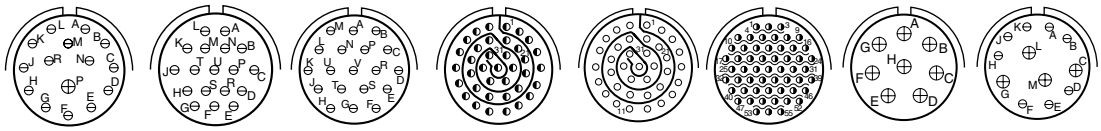
Amphenol Aerospace

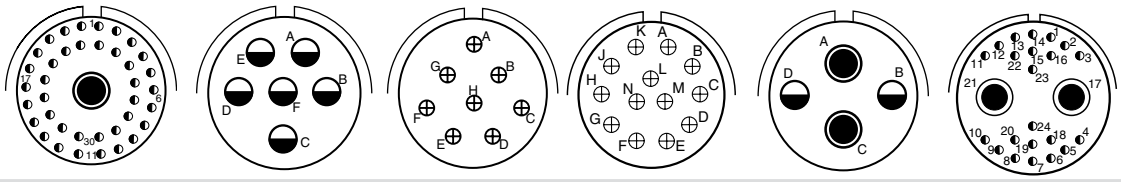
Front face of pin inserts illustrated

Shell Size & Insert Arrg. for:																
Series II JT				8-2	8-3		8-6				8-35	8-44		8-97		8-98
Series I LJT					9-3		9-6	9-7		9-22	9-35	9-44				9-98
Series III TV	7-D2	7-D3	7-D4			9-5			9-9 HD		9-35		9-94			9-98
Service Rating	M	M	M	M	M	Grounded	M	M	N	I	M	M	M	M		I
Number of Contacts	2	3	4	2	3	1	6	7	9	2	6	4	2	2	2	3
Contact Size	22D	22D	22D	20	20	8 Twinax	22M	22M	23	20	22D	22	20	22M	20	20

Shell Size & Insert Arrg. for:												
Series II JT		10-4	10-5		10-13		10-35		10-98	10-99	12-3	
Series I LJT	11-2	11-4	11-5	11-6	11-13		11-35		11-98	11-99	13-3	
Series III TV	11-2	11-4	11-5			11-19 HD	11-35	11-54	11-98	11-99		
Service Rating	I	I	I	I	M	N	M	II	I	I	II	
Number of Contacts	2	4	5	6	13	19	13	4	6	7	3	
Contact Size	16	20	20	20	22M	23	22D	22D	20	20	16	

Shell Size & Insert Arrg. for:											
Series II JT	12-4	12-8	12-22			12-35		12-98	14-4	14-5	
Series I LJT	13-4	13-8	13-22			13-35		13-98	15-4	15-5	
Series III TV	13-4	13-8		13-26	13-32 HD	13-35	13-63	13-98	15-4	15-5	
Service Rating	I	I	M	M	N	M	I	I	I	II	
Number of Contacts	4	8	22	6 2	32	22	2 2	10	4	5	
Contact Size	16	20	22M	22D 12	23	22D	16 12	20	12	16	

Shell Size & Insert Arrg. for:										
Series II JT	14-15		14-18	14-19	14-35	14-37		14-68	14-97	
Series I LJT	15-15		15-18	15-19	15-35	15-37		15-68	15-97	
Series III TV	15-15		15-18	15-19	15-35		15-55 HD		15-97	
Service Rating	I		I	I	M	M	N	I	I	
Number of Contacts	14	1	18	19	37	37	55	8	8	4
Contact Size	20	16	20	20	22D	22M	23	16	20	16

Shell Size & Insert Arrg. for:										
Series II JT			16-6	16-8	16-13					
Series I LJT	17-2		17-6	17-8	17-13	17-22		17-25		
Series III TV	17-2		17-6	17-8		17-22				
Service Rating	M		I	II	I	Coax		M		
Number of Contacts	38	1	6	8	13	2	2	22	2	
Contact Size	22D	8 Twinax	12	16	16	12 Coax	8 Coax	22D	8 Coax	

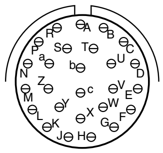
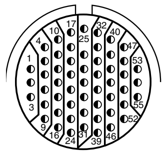
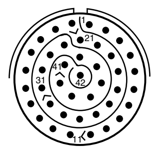
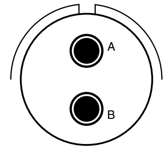
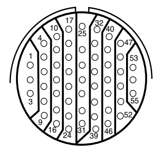
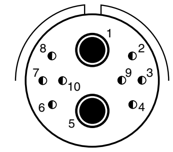
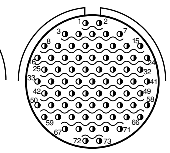
HD: High Density HD38999 (use size 23 contacts only)

CONTACT LEGEND	8	10	12	16	20	22	22M	22D	23

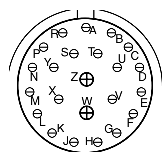
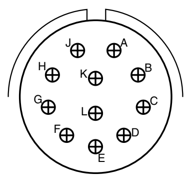
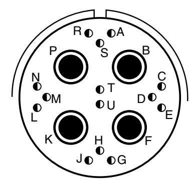
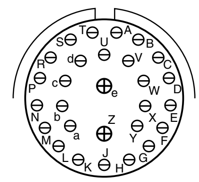
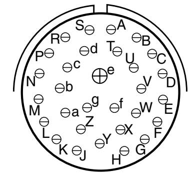
MIL-DTL-38999, Series I LJT, II JT, III TV, HD

Insert Arrangements

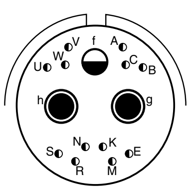
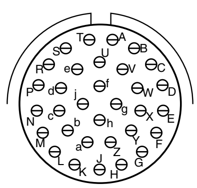
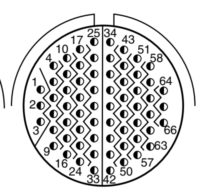
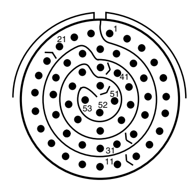
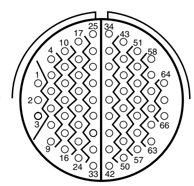
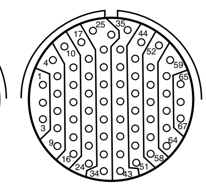
Front face of pin inserts illustrated

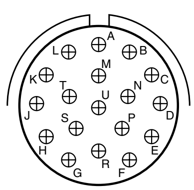
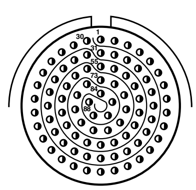
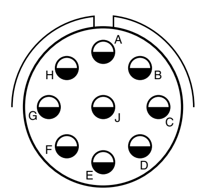
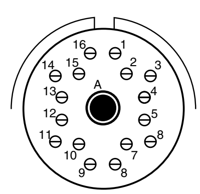
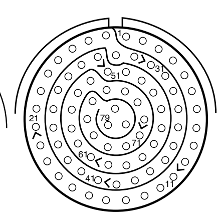
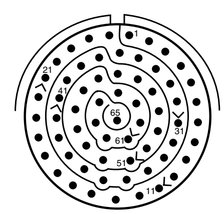
Shell Size & Insert Arrg. for:								
Series II JT	16-26	16-35	16-42		16-55			
Series I LJT	17-26	17-35	17-42		17-55			
Series III TV	17-26	17-35		17-52		17-60		17-73 HD
Service Rating	I	M	M	M	M	I/Coax		N
Number of Contacts	26	55	42	2	55	8	2	73
Contact Size	20	22D	22	8 Twinax	22M	22D	8 Coax	23

Shell Size & Insert Arrg. for:									
Series II JT	16-99		18-11			18-28		18-30	
Series I LJT	17-99		19-11	19-18		19-28		19-30	
Series III TV	17-99		19-11	19-18		19-28			
Service Rating	I		II	M		M		I	
Number of Contacts	21	2	11	14	4	26	2	29	1
Contact Size	20	16	16	22D	8 Twinax	20	16	20	16

Shell Size & Insert Arrg. for:								
Series II JT				18-32	18-35	18-53	18-66	
Series I LJT				19-32	19-35	19-53	19-66	19-67
Series III TV		19-31		19-32	19-35			
Service Rating		M		1	M	M	M	M
Number of Contacts	2	1	12	32	66	53	66	67
Contact Size	8 Coax	12	22D	20	22D	22	22M	22M

Shell Size & Insert Arrg. for:							
Series II JT	18-68		18-96			20-1	20-2
Series I LJT	19-68					21-1	21-2
Series III TV		19-88 HD		19-AD			
Service Rating	I	N	I	Inst.		M	II
Number of Contacts	18	88	9	16	1	79	65
Contact Size	16	23	12	20	8 Twinax	22M	22



CONTACT LEGEND 8 10 12 16 20 22 22M 22D 23

HD: High Density HD38999
(use size 23 contacts only)

Filter

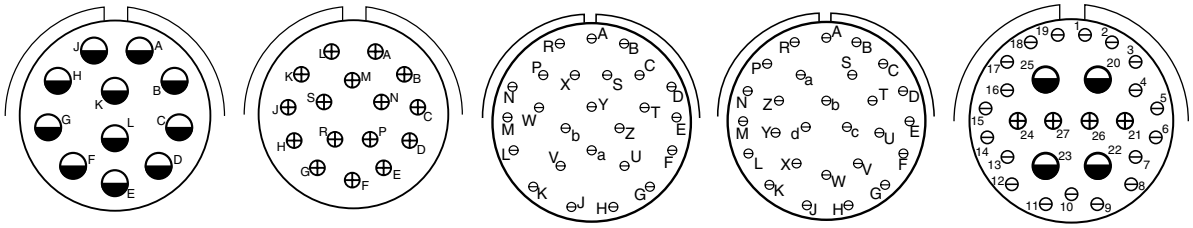
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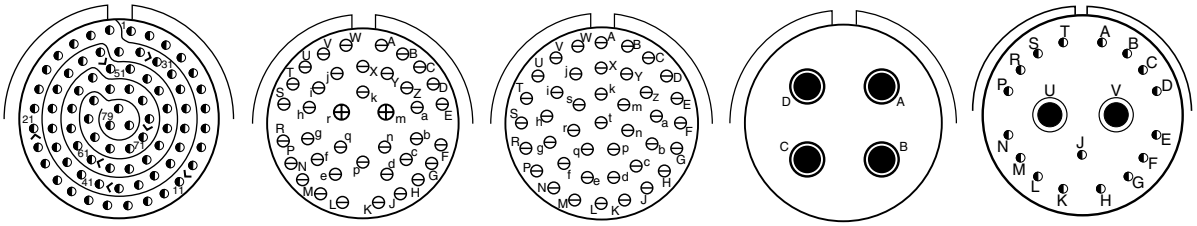
Amphenol Aerospace

Insert Arrangements

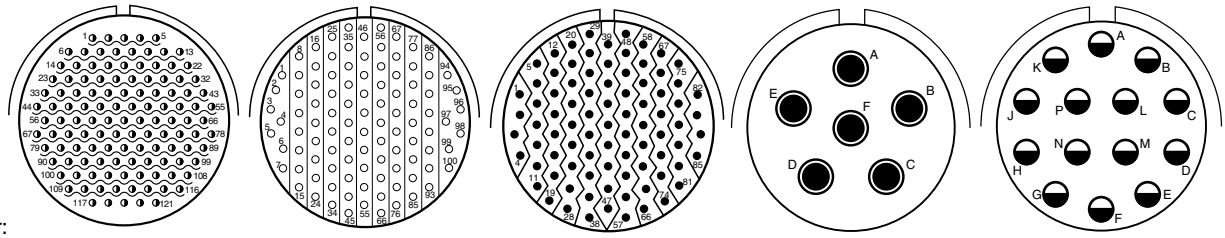
Front face of pin inserts illustrated



Shell Size & Insert Arrg. for:							
Series II JT	20-11	20-16					
Series I LJT	21-11	21-16	21-25	21-27			
Series III TV	21-11	21-16				21-29	
Service Rating	I	II	I	I		I	
Number of Contacts	11	16	25	27	19	4	4
Contact Size	12	16	20	20	20	16	12



Shell Size & Insert Arrg. for:					
Series II JT	20-35	20-39	20-41		
Series I LJT	21-35	21-39	21-41	21-75	21-79
Series III TV	21-35	21-39	21-41	21-75	21-79
Service Rating	M	1	I	N	II
Number of Contacts	79	37 2	41	4	17 (See Note)
Contact Size	22D	20 16	20	(See Note)	22D



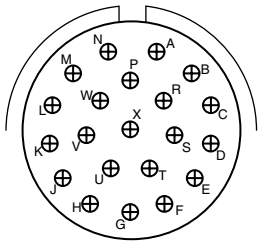
Shell Size & Insert Arrg. for:					
Series II JT		22-1	22-2		22-14
Series I LJT		23-1	23-2	23-6	23-14
Series III TV	21-121 HD			23-6	
Service Rating	N	M	M	M	I
Number of Contacts	121	100	85	6	14
Contact Size	23	22M	22	8 Twinax	12

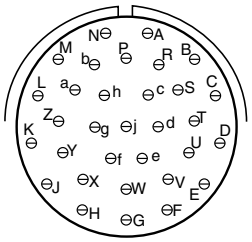
HD: High Density HD38999 (use size 23 contacts only)
Note: MS connector 21-75 is supplied with four size 8 twinax contacts.
Commercial connector 21-75 is supplied with four size 8 coax contacts.
MS connector 21-79 has provision for two size 8 coax contacts.
Coax contacts are not supplied unless specified by customers.

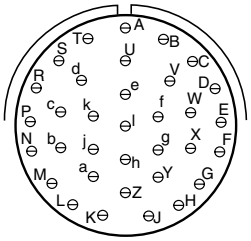
CONTACT LEGEND	8	10	12	16	20	22	22M	22D	23

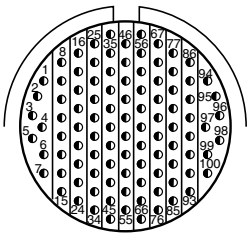
Insert Arrangements

Front face of pin inserts illustrated

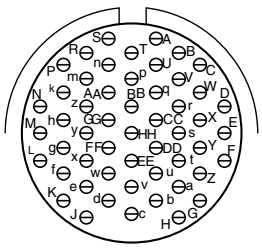


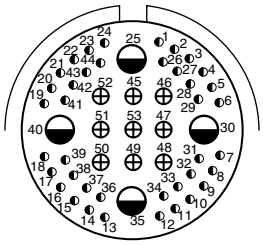


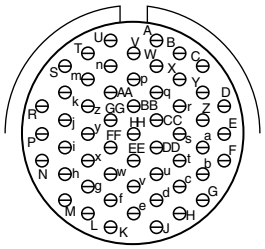


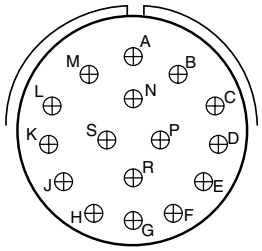


Shell Size & Insert Arrg. for:				
Series II JT	22-21	22-32		22-35
Series I LJT	23-21	23-32	23-34	23-35
Series III TV	23-21			23-35
Service Rating	II	I	I	M
Number of Contacts	21	32	34	100
Contact Size	16	20	20	22D

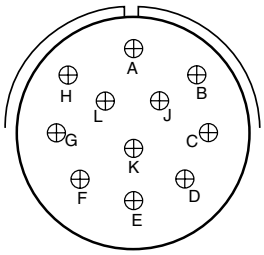


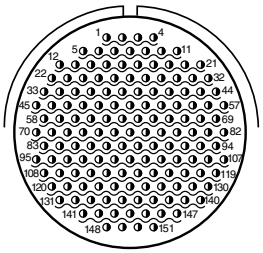


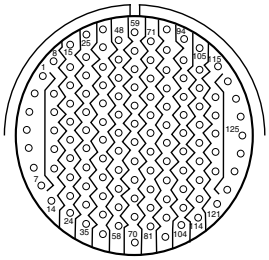


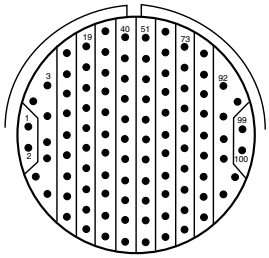


Shell Size & Insert Arrg. for:				
Series II JT	22-53		22-55	
Series I LJT	23-53		23-55	23-97
Series III TV	23-53	23-54	23-55	
Service Rating	I	M	I	II
Number of Contacts	53	40 9 4	55	16
Contact Size	20	22D 16 12	20	16









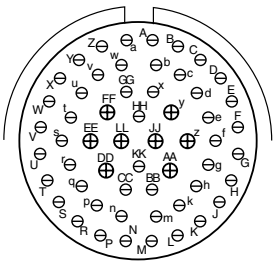
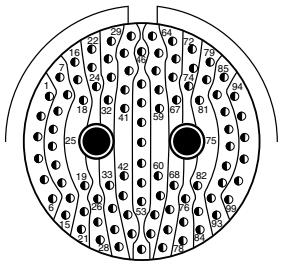
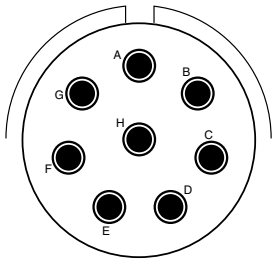
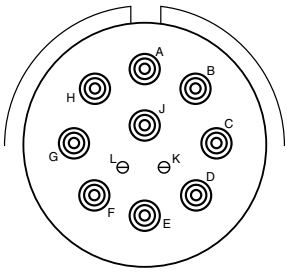
Shell Size & Insert Arrg. for:				
Series II JT			24-1	24-2
Series I LJT	23-99		25-1	25-2
Series III TV		23-151 HD		
Service Rating	II	N	M	M
Number of Contacts	11	151	128	100
Contact Size	16	23	22M	22

CONTACT LEGEND	8	10	12	16	20	22	22M	22D	23

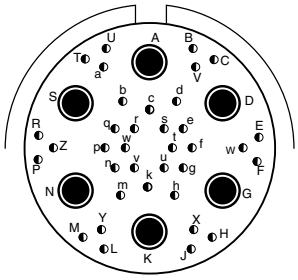
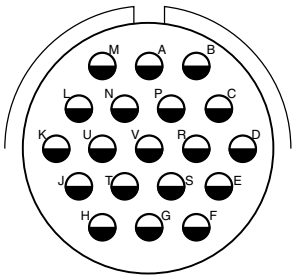
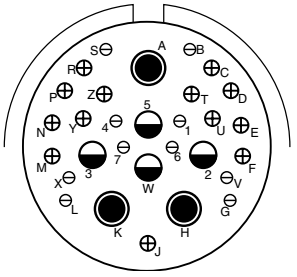
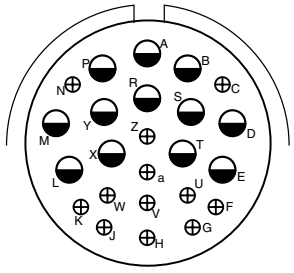
HD: High Density HD38999 (use size 23 contacts only)

Insert Arrangements

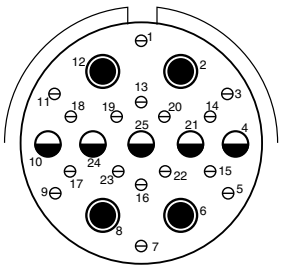
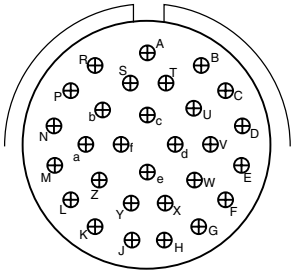
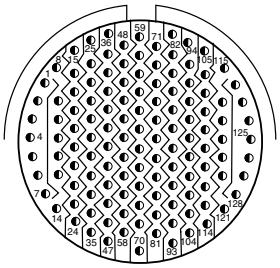
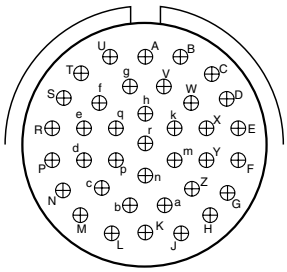
Front face of pin inserts illustrated

Shell Size & Insert Arrg. for:								
Series II JT	24-4							
Series I LJT	25-4		25-7				25-11	
Series III TV	25-4		25-7		25-8		25-11***	
Service Rating	I		M		Twinax		N	
Number of Contacts	48	8	97	2	8		2	9
Contact Size	20	16	22D	8 Twinax	8 Twinax		20	10

Shell Size & Insert Arrg. for:										
Series II JT			24-19					24-24		
Series I LJT			25-19		25-20			25-24		
Series III TV	25-17		25-19		25-20***			25-24		
Service Rating	M		I		N			I		
Number of Contacts	36	6	19		10	13	3	4	12	12
Contact Size	22D	8 Twinax	12		20	16	8 Twinax	12 Coax (With Matched Impedance)	16	12

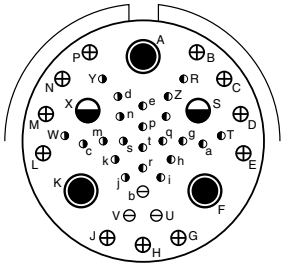
Shell Size & Insert Arrg. for:								
Series II JT			24-29		24-35		24-37	
Series I LJT			25-29		25-35		25-37	
Series III TV	25-26		25-29		25-35		25-37	
Service Rating	I		I		M		I	
Number of Contacts	16	5 4	29		128		37	
Contact Size	20	12 8 Coax	16		22D		16	

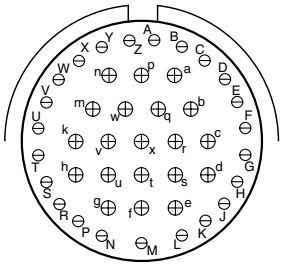
*** For use in MIL-STD-1760 applications.

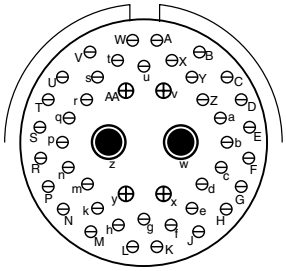
MIL-DTL-38999, Series I LJT, II JT, III TV, HD

Insert Arrangements

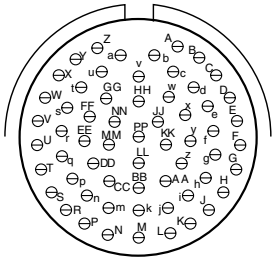
Front face of pin inserts illustrated

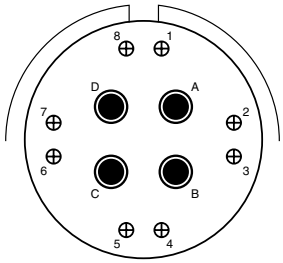


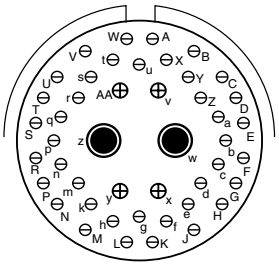




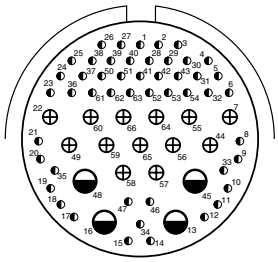
Shell Size & Insert Arrg. for:												
Series II JT							**25-43**					
Series I LJT							**25-43**			**25-46**		
Series III TV			**25-41**				**25-43**			**25-46**		
Service Rating			**N/Inst.**				**I**			**I**		
Number of Contacts	**22**	**3**	**11**	**2**	**3**		**23**	**20**		**40**	**4**	**2**
Contact Size	**22D**	**20**	**16**	**12 Coax**	**8 Twinax**		**20**	**16**		**20**	**16**	**8 Coax †**

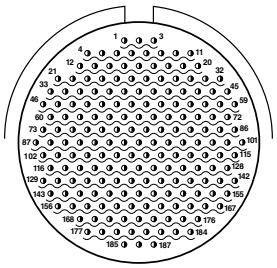






Shell Size & Insert Arrg. for:												
Series II JT			**24-61**									
Series I LJT			**25-61**									
Series III TV			**25-61**				**25-62**			**25-90**		
Service Rating			**I**				**I**			**I**		
Number of Contacts			**61**				**8**	**4**		**40**	**4**	**2**
Contact Size			**20**				**16**	**8**		**20**	**16**	**8 Twinax**
							Ground Plane Only					





Shell Size & Insert Arrg. for:											
Series II JT											
Series I LJT											
Series III TV			**25-F4**							**25-187 HD**	
Service Rating			**Size 22D=M, Balance =I**							**N**	
Number of Contacts	**49**		**13**		**4**					**187**	
Contact Size	**22D**		**16**		**12**					**23**	

CONTACT LEGEND	8	10	12	16	20	22	22M	22D	23

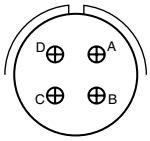
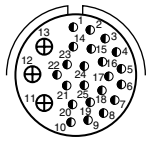
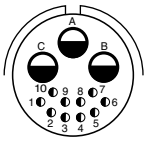
† Coax contacts for RG180/U or RG195/U cable.

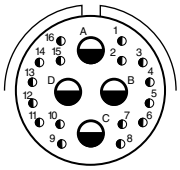
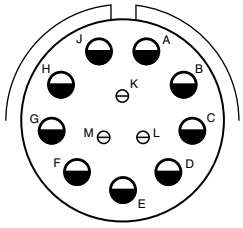
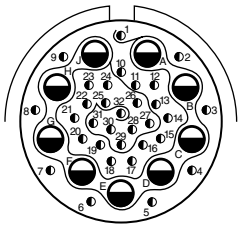
HD: High Density HD38999 (use size 23 contacts only)

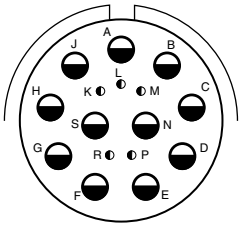
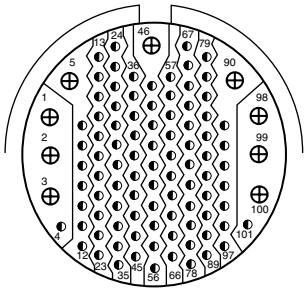
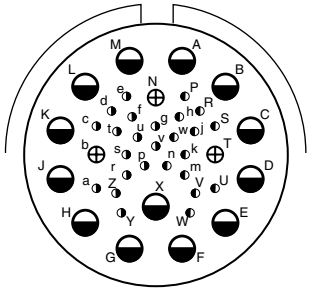
Special Insert Arrangements

Amphenol Aerospace

Front face of pin inserts illustrated

Shell Size & Insert Arrg. for:				
Series III TV	**9-2**	**15-4***	**15-25**	**15-AT**
Service Rating	**I**	**II**	**M**	**M**
Number of Contacts	**2**	**4**	**22 3**	**16 4**
Contact Size	**20**	**16**	**22D 16**	**22D 12**

Shell Size & Insert Arrg. for:			
Series III TV	**17-20**	**21-12**	**21-21**
Service Rating	**M**	**I**	**M/Inst.**
Number of Contacts	**16 4**	**3 9**	**32 9**
Contact Size	**22D 12**	**20 12**	**22D 12**

Shell Size & Insert Arrg. for:			
Series III TV	**21-99**	**25-92**	**25-97**
Service Rating	**M**	**M**	**M**
Number of Contacts	**5 11**	**92 9**	**26 3 13**
Contact Size	**22D 12**	**22D 16**	**22D 16 12**

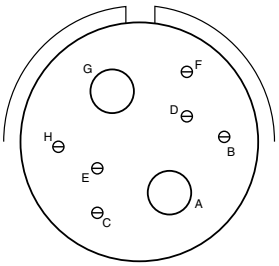
NOTE: Some specials shown here were formerly known as Pyle arrangements.
Consult Amphenol for how to order information for connectors with these inserts.
For further information on special arrangements consult Amphenol Aerospace, Sidney NY.
* Pyle 15-4 does not mate with Amphenol Tri-Start 15-4 insert.

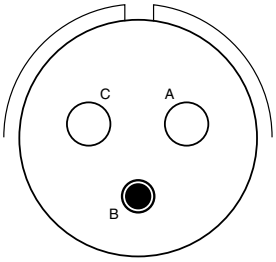
MIL-DTL-38999, Series III TV

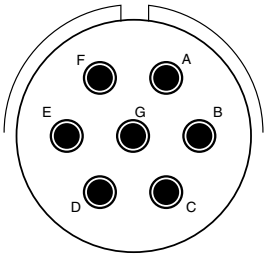
Special Insert Arrangements

Non-Standard Shells or Large Contacts

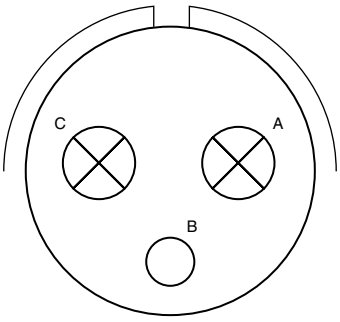
Front face of pin inserts illustrated

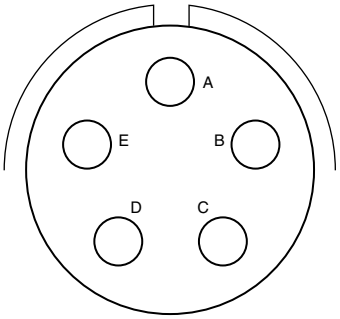


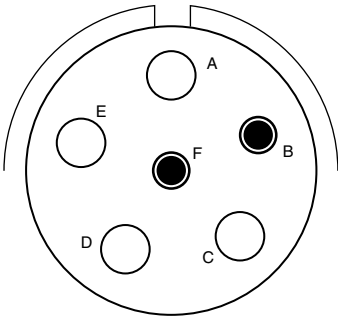




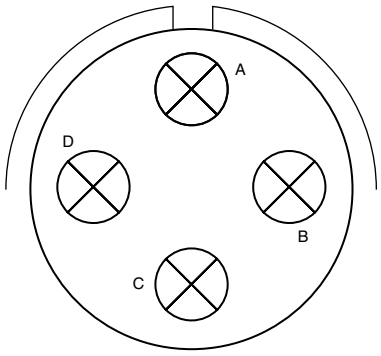
Shell Size & Insert Arrg. for:						
Series III TV	**25-16**		**25L-3**		**25L-7**	
Service Rating	**M**		**II**		**II**	
Number of Contacts	**6**	**2**	**1**	**2**	**7**	
Contact Size	**20**	**4**	**8**	**4**	**8**	







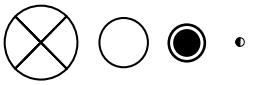
Shell Size & Insert Arrg. for:						
Series III TV	**33-3**		**33-5**		**33-6**	
Service Rating	**II**		**II**		**II**	
Number of Contacts	**1**	**2**	**5**		**2**	**4**
Contact Size	**4**	**0**	**4**		**8**	**4**



Shell Size & Insert Arrg. for:	
Series III TV	**37-5**
Service Rating	**II**
Number of Contacts	**4**
Contact Size	**0**

NOTE: Some specials shown here were formerly known as Pyle arrangements. Consult Amphenol for how to order information for connectors with these inserts.
Consult Amphenol Aerospace for longer shell drawings.

CONTACT LEGEND



How to Order - Standard

Filter Connectors

Amphenol Aerospace

1. Filter Connector Designator	2. Connector and Filter Type	3. Shell Finish	4. Shell Styles	5. Shell Size – Insert Arrg.	6. Type of Contact and Keyway Position	7. Printed Circuit Board Tail Length
21	24	9	2	16-**26**	P	1

1. CONNECTOR TYPE

21	Filter Connector
36	MOV Connector
47	Diode Connector

3. SHELL FINISH

0	Chromate
1	Bright cadmium
2	Stainless steel (electrolytic nickel plated)
4	Electroless nickel, MS (F)
5	Gold plate over nickel
7	Cadmium plate over nickel, MS(A)
8	Bright nickel
9	Cadmium plate, nickel base, OD, MS(B), (500 hr. salt spray test)
D	Durmalon™ Nickel-PTFE (cadmium alternative) - 38999 Class T refer to page 5
Z	Black Zinc

4. SHELL STYLE

0	Wall mount receptacle
2	Box mount receptacle
3	Jam nut receptacle with rear thread (PT only)
4	Minimum penetration jam nut receptacle
7	Jam nut receptacle

5. SHELL SIZE AND INSERT ARRANGEMENT

8 through 24	Shell sizes available for FJT, Series II
9 through 25	Shell sizes available for FLJT, Series I, TV, Series III and the FBL Series IV

Shell Size & Insert Arrangements are together in one chart. First number represents Shell Size, second number is the Insert Arrangement. See pages 11-22

2. CONNECTOR/FILTER TYPE

20	FPT with VHF-1 filter
22	FPTE with VHF-1 filter
24	FJT with VHF-1 filter
25	FJT with ±8 volt diode/VHF-1 filter combination
26	FAN with VHF-1 filter
29	FLJT with VHF-1 filter
31	FPT with MF-1 filter
32	FJT with MF-1 filter
33	FPT with HF-1 filter (long shell)
34	FJTP with VHF-1 filter
36	FLJT with HF-1 filter (long shell)
37	FJT with HF-1 filter (long shell-min. penetration also available)
38	FJTP with HF-1 filter (long shell)
39	FJTP with MF-1 filter
40	FLJT with MF-1 filter
41	FJT (UTS-crimp) with VHF-1 filter
46	FPT (UTS-crimp) with VHF-1 filter
47	FLJTPQ with VHF-1 filter
48	FLJTPQ (UTS-crimp) with VHF-1 filter
50	FTV (UTS-crimp) with VHF-1 filter
51	FTV (UTS-crimp) with HF-1 filter (long shell)
52	FTV with VHF-1 filter
53	FTV with HF-1 filter (long shell)
56	FJTP (UTS-crimp) with VHF-1 filter
57	FLJT with VHF-1 filter (printed circuit board mount, mod. flange)
58	FJTPQ (UTS-crimp) with VHF-1 filter
61	FBL with VHF-1 filter
63	FSJT with VHF-1 filter
64	FBL (UTS-crimp) with VHF-1 filter
65	FSJT (UTS-crimp) with VHF-1 filter
73	M83723 bayonet coupling with VHF-1 filter
76	FCTV with VHF-1 filter with composite shell
77	FTV with VHF-1 filter and standard series III shells
78	FCTV PCB mount with standard flange and VHF-1 filter
79	Same as 77 with no filter - Epoxy sealed
80	FTV PCB mount with standard flange, standard nut and VHF-1 filter
81	Same as 80 with no Filter - Epoxy sealed
82	FTV with ±8 volt diode/VHF-1 filter combination
83	FSJT with ±8 volt diode/VHF-1 filter combination
84	FTV (UTS-crimp) with ±8 volt diode only
85	Same as 76 with no filter - Epoxy sealed
87	FLJT (UTS-crimp) with ±8 volt diode/VHF-1 filter combination
96	FPT (UTS-crimp) with VHF-1 filter for 2000 Volts

Federal Vendor Identification/FSCM 77820

How to Order - Standard

Filter Connectors

6. TYPE OF CONTACT	
P	Pins in a normal rotation
S	Socket in a normal rotation

ALTERNATE ROTATION SUFFIX LETTERS

FJT, FLJT or FSJT			FTV FCTV			FPT			FBL Series IV			FAN		
Alternate Position	Suffix Letter		Alternate Position	Suffix Letter		Alternate Position	Suffix Letter		Alternate Position	Suffix Letter		Alternate Position	Suffix Letter	
	Pins	Sockets		Pins	Sockets		Pins	Sockets		Pins	Sockets		Pins	Sockets
Normal	P	S	Normal	P	S	Normal	P	S	Normal	P	S	Normal	P	S
A	E	F	A	G	H	W	G	H	A	E	F	W	G	H
B	R	T	B	I	J	X	I	J	B	G	H	X	I	J
C	W	X	C	K	L	Y	K	L	C	J	L	Y	K	L
D	Y	Z	D	M	N	Z	M	N	D	R	T	Z	M	N
			E	R	T				K	W	X	12	C	D
												13	A	B

Rotations

7. (OPTIONAL) THIS WILL CHANGE CONNECTOR TO PCB TERMINATION FROM DEFAULT SOLDER CUP

Code	± .030	Pre-Tinned?
1	0.120	NO
2		YES
3	0.185	NO
4		YES
5	0.270	NO
6		YES

Note:

-2XX Suffix

Any combination of filters, non-filters, grounds, and non-standard contact terminations will require -2XX suffix. Please consult Amphenol Aerospace for assistance in setting up these part numbers.

- Standard voltage for diode is ±8 volts. Any deviation requires a –2XX suffix.
- Standard voltage for a MOV is 47 volts. Any deviation requires a –2XX suffix.
- Standard diode/filter combination is ±8 volt/VHF-1 filter. Any deviation requires a –2XX suffix.
- Standard MOV/filter combination is 47 volt/VHF-1 filter. Any deviation requires a –2XX suffix.

Unable to find what you are looking for under our "How to Order" page 23?. Fill out our EMI Check Sheet on page 25 and send it to Filterapps@amphenol-aao.com or call us directly at 800-678-0141

How to Order - Special

Amphenol Aerospace

Filter Connectors (EMI Check Sheet)

Unable to find what you are looking for under our "How to Order" page? Fill out our EMI Check Sheet and send it to Filterapps@amphenol-aao.com or call us directly at 800-678-0141

Date_____

Ref. Filter P/N _____ **Ref. Mil-Spec**_____

Filter Requirements:

Filter Type (Pi, C, LC, T, LL, other)_____

Capacitance (locations) _____

Capacitance (locations) _____

Capacitance (locations) _____

Ground Contacts (locations) _____

Insulated feed-thru (locations) _____

Frequency (MHz)	Insertion Loss (dB)
1	
3	
10	
30	
100	

Electrical Requirements:

Working Voltage (VDC or VAC and frequency) _____

Dielectric Withstand Voltage (VDC) _____

Modified Shell: (Flange moved, clinch nuts, helicoils, stand-offs, etc.) _____

_____

_____

Special Requirements: (AC voltage, spike voltage, attenuation testing, thermal cycling, burn-in, capacitor lot traceability, water immersion, etc.) _____

_____

_____

Contact Termination:

UTS (Crimp) _____

Solder Cup _____

Compliant Pin _____

Wire Wrap Flat dim. _____

Stickout dim. _____

PCB tail:

Diameter dim. _____

Stickout dim. _____

Pre-tin? _____

What is terminated to connector (ie. flex, rigid flex, PCB, etc.)? _____

_____

_____

Special Cleaning _____

(if so, recommend a protective cap with an environmental gasket)

Special Stamping: _____

Customer: _____

Program: _____

Forecast: _____

Requested by: _____

Comments: _____

_____

_____ Email to Filtersapps@amphenol-aao.com

FTV Aluminum & FCTV Composite

38999, Series III Features, Alternate Rotations

The Amphenol® FTV Series III, demonstrates unsurpassed technical leadership. With added filter features, the high performance general duty threaded connector is designed to withstand the pressures of severe environment applications. The FCTV Series is the Composite Series III with filtering for EMI/EMP protection. It offers the same high performance as its metal counterpart, the FTV, but with a lightweight, corrosion resistance shell.



FTV

Composite FCTV Connector for PCB board mounting. Amphenol is currently the only supplier of one-piece composite PCB stand-off shells.

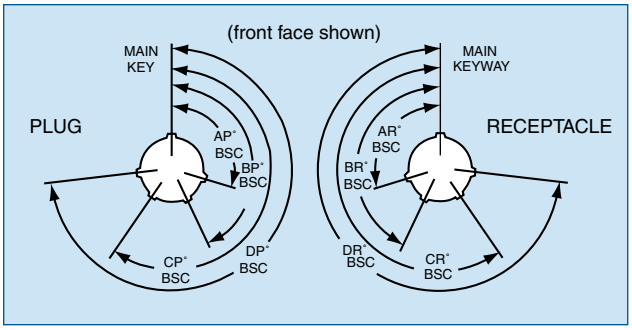
FTV & FCTV COMPOSITE INTERMATEABLE WITH MIL-DTL-38999 SERIES III CONNECTORS

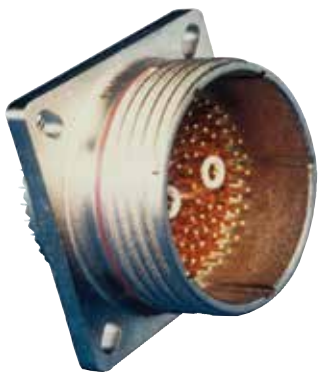
- Quick Mating - completely mates in a 360° turn of the coupling nut
- Lockwiring Eliminated - incorporates anti-decoupling device
- Contact Protection - 100% “scoop-proof”
- Improved Moisture Resistance - prevents electrolytic erosion of contacts
- Lightweight Composite Shell - 17% – 70% weight savings over metal
- Corrosion Resistant - available in standard MIL-DTL-38999 olive drab cadmium (175°C) and electroless nickel plating (200°C), both withstanding 2000 hours of salt spray exposure. The base material is able to withstand an indefinite exposure to salt spray.
- Durability - 1500 couplings minimum (in reference to connector couplings, not contacts)

FTV & FCTV Key/Keyway Positions

Shell Size	Key & Keyway arrangement identification letter	AR° or AP° BSC	BR° or BP° BSC	CR° or CP° BSC	DR° or DP° BSC
9	N	105	140	215	265
	A	102	132	248	320
	B	80	118	230	312
	C	35	140	205	275
	D	64	155	234	304
	E	91	131	197	240
11, 13, 15	N	95	141	208	236
	A	113	156	182	292
	B	90	145	195	252
	C	53	156	220	255
	D	119	146	176	298
	E	51	141	184	242
17 and 19	N	80	142	196	293
	A	135	170	200	310
	B	49	169	200	244
	C	66	140	200	257
	D	62	145	180	280
	E	79	153	197	272
21, 23, 25	N	80	142	196	293
	A	135	170	200	310
	B	49	169	200	244
	C	66	140	200	257
	D	62	145	180	280
	E	79	153	197	272

All angles are BSC
The insert arrangement does not rotate with main key/keyway.





FCTV

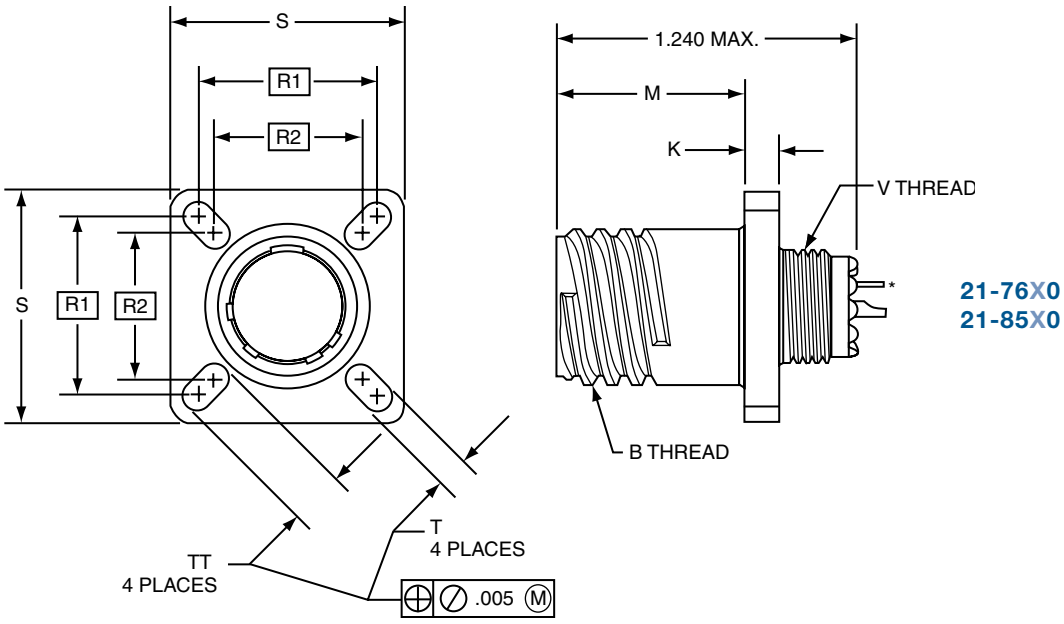
Wall Mounting Receptacle

Amphenol Aerospace

PART NUMBER BUILDER Page G23-25

Commercial

COMPOSITE
21-76X0
21-85X0



21-76X0
21-85X0

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.

Shell Size	B Thread Class 2A 0.1P-0.3L-TS (Plated)	M +.000 –.005	K ±.0025	R[1] TP	R[2] TP	S +.011 –.010	T +.008 –.006	TT +.008 –.006	V Thread Metric (Plated)
9	.6250	.773	.1378	.719	.594	.938	.128	.216	M12X1-6g0.100R
11	.7500	.773	.1378	.812	.719	1.031	.128	.194	M15X1-6g0.100R
13	.8750	.773	.1378	.906	.812	1.125	.128	.194	M18X1-6g0.100R
15	1.0000	.773	.1378	.969	.906	1.219	.128	.173	M22X1-6g0.100R
17	1.1875	.773	.1378	1.062	.969	1.312	.128	.194	M25X1-6g0.100R
19	1.2500	.773	.1378	1.156	1.062	1.438	.128	.194	M28X1-6g0.100R
21	1.3750	.741	.1654	1.250	1.156	1.562	.128	.194	M31X1-6g0.100R
23	1.5000	.741	.1654	1.375	1.250	1.688	.154	.242	M34X1-6g0.100R
25	1.6250	.741	.1654	1.500	1.375	1.812	.154	.242	M37X1-6g0.100R

All dimensions for reference only.

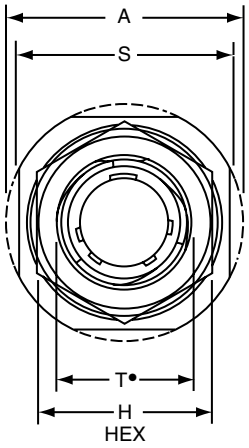
FCTV – MIL-DTL-38999, Series III Composite

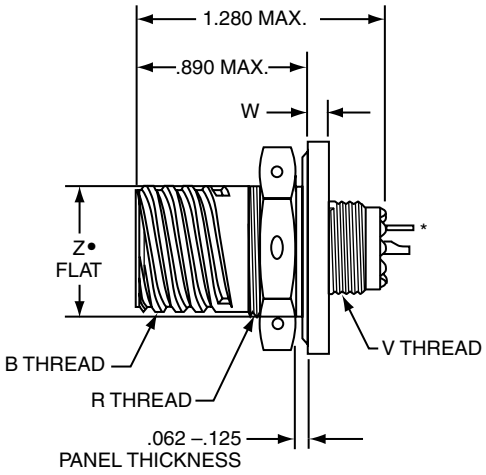
Jam Nut Receptacle

PART NUMBER BUILDER Page G23-25

Commercial

COMPOSITE
21-76X7
21-85X7





21-76X7
21-85X7

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.

D shaped mounting hole dimensions

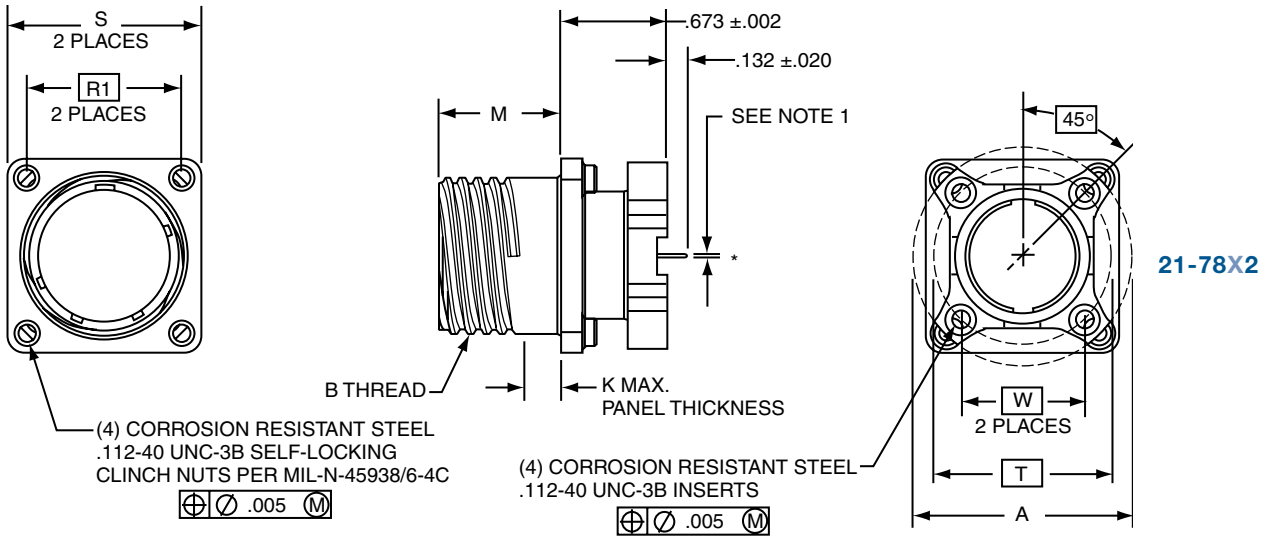
Shell Size	A Dia. ±.010	B Thread Class 2A 0.1P-0.3L-TS (Plated)	H Hex +.017 –.016	R Thread Metric (Plated)	S ±.015	T• +.010 –.000	V Thread Metric (Plated)	W +.035 –.004	Z• Flat +.000 –.010
9	1.188	.6250	.875	M17X1-6g0.100R	1.062	.697	M12X1-6g0.100R	.086	.669
11	1.375	.7500	1.000	M20X1-6g0.100R	1.250	.822	M15X1-6g0.100R	.086	.769
13	1.500	.8750	1.188	M25X1-6g0.100R	1.375	1.007	M18X1-6g0.100R	.086	.955
15	1.625	1.0000	1.312	M28X1-6g0.100R	1.500	1.134	M22X1-6g0.100R	.086	1.084
17	1.750	1.1875	1.438	M32X1-6g0.100R	1.625	1.259	M25X1-6g0.100R	.086	1.208
19	1.937	1.2500	1.562	M35X1-6g0.100R	1.812	1.384	M28X1-6g0.100R	.118	1.333
21	2.062	1.3750	1.688	M38X1-6g0.100R	1.938	1.507	M31X1-6g0.100R	.118	1.459
23	2.188	1.5000	1.812	M41X1-6g0.100R	2.062	1.634	M34X1-6g0.100R	.118	1.575
25	2.312	1.6250	2.000	M44X1-6g0.100R	2.188	1.759	M37X1-6g0.100R	.118	1.709

All dimensions for reference only.

PART NUMBER BUILDER Page G23-25

Commercial

COMPOSITE
21-78X2



***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Please consult Amphenol Aerospace for additional lengths.

Shell Size	A Dia. ±.005	B Thread Class 2A 0.1P-0.3L-TS (Plated)	M +.003 −.003	K Max. Panel Thickness	R1 TP	S +.011 −.010	PCB Mounting Dimensions	
							T Dia. TP	W TP
9	1.016	.6250	.770	.234	.719	.938	.752	.532
11	1.148	.7500	.770	.234	.812	1.031	.850	.601
13	1.250	.8750	.770	.234	.906	1.125	.994	.703
15	1.375	1.0000	.770	.234	.969	1.219	1.119	.791
17	1.500	1.1875	.770	.234	1.062	1.312	1.237	.875
19	1.625	1.2500	.770	.234	1.156	1.438	1.379	.975
21	1.750	1.3750	.738	.204	1.250	1.562	1.489	1.053
23	1.875	1.5000	.738	.204	1.375	1.688	1.619	1.145
25	2.000	1.6250	.738	.204	1.500	1.812	1.744	1.233

All dimensions for reference only.

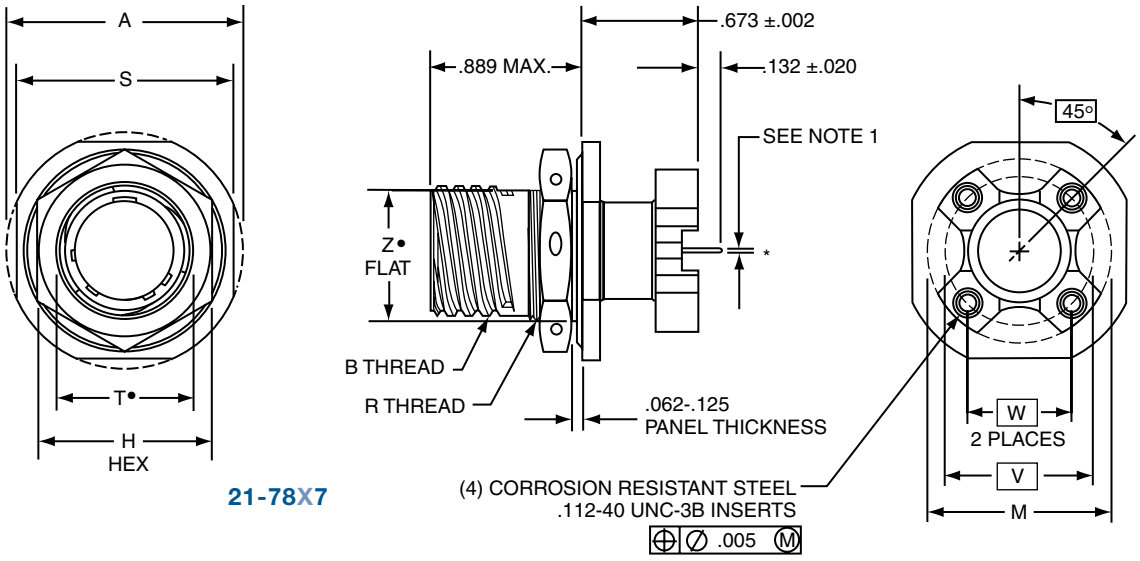
FCTV – MIL-DTL-38999, Series III Composite

Jam Nut Receptacle (Printed Circuit Board Mount)

PART NUMBER BUILDER Page G23-25

Commercial

COMPOSITE
21-78X7



21-78X7

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Please consult Amphenol Aerospace for additional lengths.
"D" shaped mounting hole dimensions

Shell Size	A Dia. ±.005	B Thread Class 2A 0.1P-0.3L-TS (Plated)	H Hex +.017 –.016	M Dia. ±.005	R Thread Metric (Plated)	S +.011 –.010	T• Dia. +.010 –.000	PCB Mounting Dimensions		Z• Flat +.000 –.010
								W TP	V Dia. TP	
9	1.188	.6250	.875	1.016	M17X1-6g0.100R	1.062	.697	.532	.752	.669
11	1.375	.7500	1.000	1.148	M20X1-6g0.100R	1.250	.822	.601	.850	.769
13	1.500	.8750	1.188	1.250	M25X1-6g0.100R	1.375	1.007	.703	.994	.955
15	1.625	1.0000	1.312	1.375	M28X1-6g0.100R	1.500	1.134	.791	1.119	1.084
17	1.750	1.1875	1.438	1.500	M32X1-6g0.100R	1.625	1.259	.875	1.237	1.208
19	1.937	1.2500	1.562	1.625	M35X1-6g0.100R	1.812	1.384	.975	1.379	1.333
21	2.062	1.3750	1.688	1.750	M38X1-6g0.100R	1.937	1.507	1.053	1.489	1.459
23	2.188	1.5000	1.812	1.875	M41X1-6g0.100R	2.062	1.634	1.145	1.619	1.575
25	2.312	1.6250	2.000	2.000	M44X1-6g0.100R	2.188	1.759	1.233	1.744	1.709

All dimensions for reference only.

Amphenol Aerospace

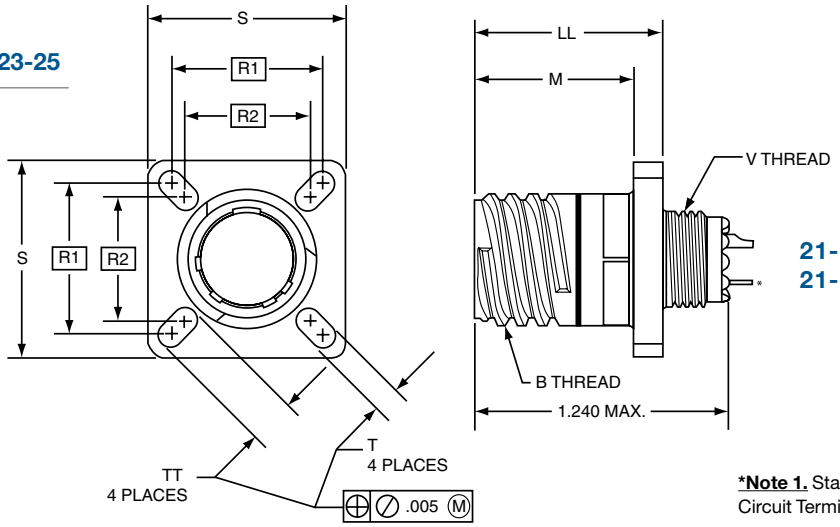
Wall Mounting Receptacle - Aluminum

PART NUMBER BUILDER Page G23-25

Commercial

ALUMINUM
21-77X0
21-79X0

EXTENDED LENGTH BELOW
21-52X0



21-77X0
21-79X0

Shell Size	B Thread Class 2A 0.1P-0.3L-TS (Plated)	M +.000 –.005	LL +.006 –.000	R¹ TP	R² TP	S Max	T +.008 –.006	V Thread Metric (Plated)	TT +.008 –.006
9	.6250	.820	.905	.719	.594	.948	.128	M12X1-6g0.100R	.216
11	.7500	.820	.905	.812	.719	1.043	.128	M15X1-6g0.100R	.194
13	.8750	.820	.905	.906	.812	1.137	.128	M18X1-6g0.100R	.194
15	1.0000	.820	.905	.969	.906	1.232	.128	M22X1-6g0.100R	.173
17	1.1875	.820	.905	1.062	.969	1.323	.128	M25X1-6g0.100R	.194
19	1.2500	.820	.905	1.156	1.062	1.449	.128	M28X1-6g0.100R	.194
21	1.3750	.790	.905	1.250	1.156	1.575	.128	M31X1-6g0.100R	.194
23	1.5000	.790	.905	1.375	1.250	1.701	.154	M34X1-6g0.100R	.242
25	1.6250	.790	.905	1.500	1.375	1.823	.154	M37X1-6g0.100R	.242

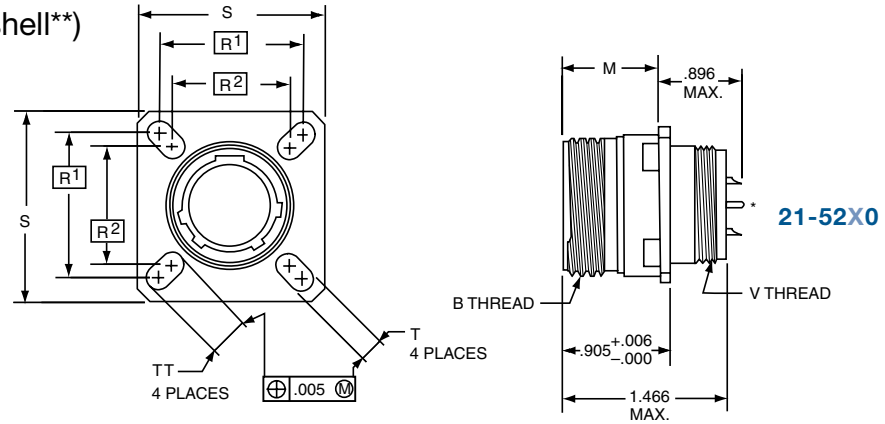
All dimensions for reference only.

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.

(Extended length shell**)



21-52X0

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.
**Extended length accommodate higher voltage and/or higher capacitance applications.
Plug movement required to clear FTV receptacles: .625 min.

Shell Size	B Thread Class 2A 0.1P-0.3L-TS (Plated)	M +.000 –.005	R¹ TP	R² TP	S ±.010	T +.008 –.006	V Thread Metric (Plated)	TT +.008 –.006
9	.6250	.820	.719	.594	.938	.128	M12X1-6g0.100R	.216
11	.7500	.820	.812	.719	1.031	.128	M15X1-6g0.100R	.194
13	.8750	.820	.906	.812	1.125	.128	M18X1-6g0.100R	.194
15	1.0000	.820	.969	.906	1.219	.128	M22X1-6g0.100R	.173
17	1.1875	.820	1.062	.969	1.312	.128	M25X1-6g0.100R	.194
19	1.2500	.820	1.156	1.062	1.438	.128	M28X1-6g0.100R	.194
21	1.3750	.790	1.250	1.156	1.562	.128	M31X1-6g0.100R	.194
23	1.5000	.790	1.375	1.250	1.688	.154	M34X1-6g0.100R	.242
25	1.6250	.790	1.500	1.375	1.812	.154	M37X1-6g0.100R	.242

FTV – MIL-DTL-38999, Series III

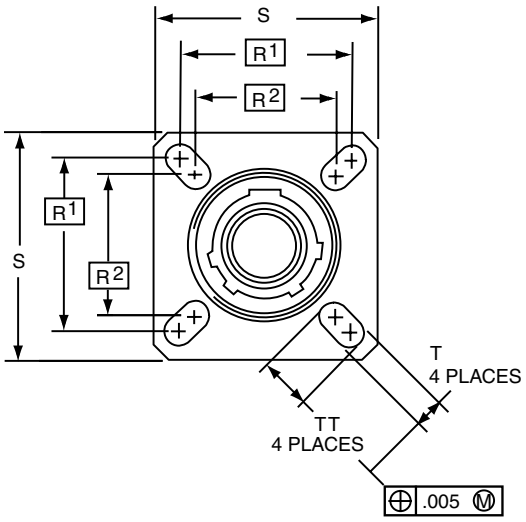
Wall Mounting Receptacle - Aluminum (UTS Crimp)

PART NUMBER BUILDER Page G23-25

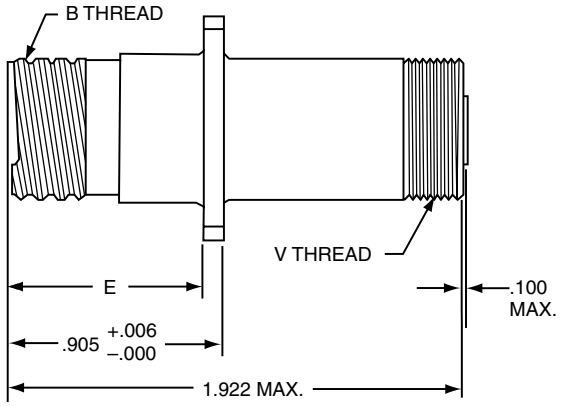
Commercial

ALUMINUM
21-50X0

UTS (Crimp) Contact SAE AS39029/57



21-50X0
UTS (Crimp) Contact
SAE AS39029/57



Shell Size	B Thread Class 2A 0.1P-0.3L-TS (Plated)	E +.000 −.005	R¹ TP	R² TP	S ±.010	T +.008 −.006	V Thread Metric (Plated)	TT +.008 −.006
9	.6250	.820	.719	.594	.938	.128	M15X1-6g0.100R	.216
11	.7500	.820	.812	.719	1.031	.128	M18X1-6g0.100R	.194
13	.8750	.820	.906	.812	1.125	.128	M22X1-6g0.100R	.194
15	1.0000	.820	.969	.906	1.219	.128	M25X1-6g0.100R	.173
17	1.1875	.820	1.062	.969	1.312	.128	M28X1-6g0.100R	.194
19	1.2500	.820	1.156	1.062	1.438	.128	M31X1-6g0.100R	.194
21	1.3750	.790	1.250	1.156	1.562	.128	M34X1-6g0.100R	.194
23	1.5000	.790	1.375	1.250	1.688	.154	M37X1-6g0.100R	.242
25	1.6250	.790	1.500	1.375	1.812	.154	M41X1-6g0.100R	.242

All dimensions for reference only.

FTV – MIL-DTL-38999, Series III

Jam Nut Receptacle (Mil-Spec Length) - Aluminum

Amphenol Aerospace

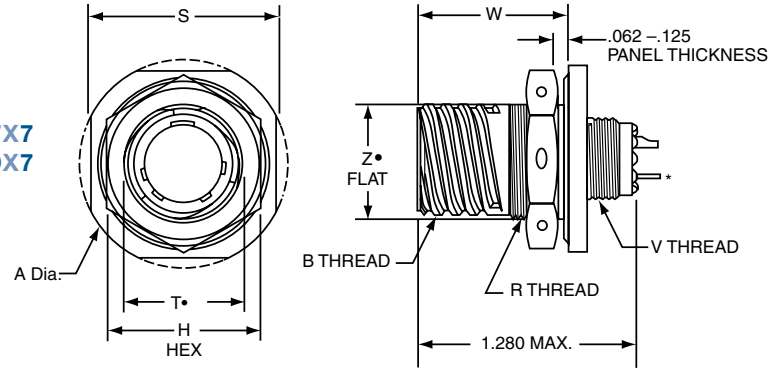
PART NUMBER BUILDER Page G23-25

Commercial

ALUMINUM
MIL-SPEC LENGTH
21-77X7
21-79X7

EXTENDED LENGTH BELOW
21-52X7

21-77X7
21-79X7



"D" shaped mounting hole dimensions

Shell Size	A Dia• Max	B Thread Class 2A 0.1P-0.3L-TS (Plated)	H Hex +.017 –.016	R Thread Metric (Plated)	S ±.010	T• Dia +.010 –.000	V Thread Metric (Plated)	W +.011 –.010	Z• Flat +.000 –.010
9	1.199	.6250	.875	M17X1-6g0.100R	1.062	.697	M12X1-6g0.100R	.871	.669
11	1.386	.7500	1.000	M20X1-6g0.100R	1.250	.822	M15X1-6g0.100R	.871	.769
13	1.511	.8750	1.188	M25X1-6g0.100R	1.375	1.007	M18X1-6g0.100R	.878	.955
15	1.636	1.0000	1.312	M28X1-6g0.100R	1.500	1.134	M22X1-6g0.100R	.878	1.084
17	1.761	1.1875	1.438	M32X1-6g0.100R	1.625	1.259	M25X1-6g0.100R	.878	1.208
19	1.949	1.2500	1.562	M35X1-6g0.100R	1.812	1.384	M28X1-6g0.100R	.878	1.333
21	2.073	1.3750	1.688	M38X1-6g0.100R	1.938	1.507	M31X1-6g0.100R	.878	1.459
23	2.199	1.5000	1.812	M41X1-6g0.100R	2.062	1.634	M34X1-6g0.100R	.878	1.575
25	2.323	1.6250	2.000	M44X1-6g0.100R	2.188	1.759	M37X1-6g0.100R	.878	1.709

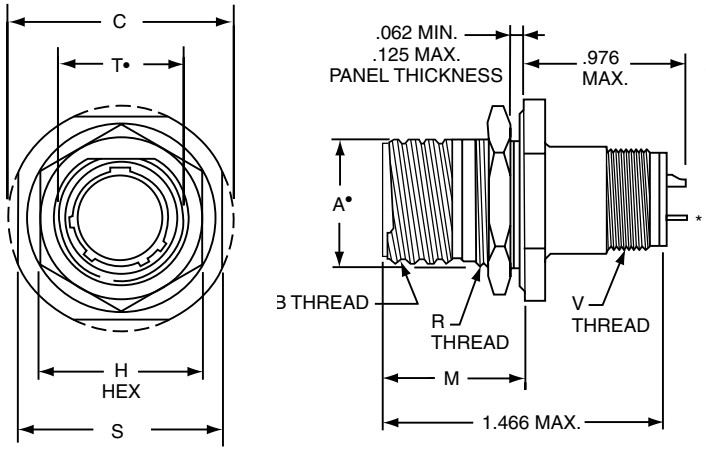
***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup. Please consult Amphenol Aerospace for additional lengths.

(Extended length shell**)

21-52X7



"D" shaped mounting hole dimensions

Shell Size	A• +.000 –.010	B Thread Class 2A 0.1P-0.3L-TS (Plated)	C Max	H Hex +.017 –.016	M +.011 –.010	R Thread (Plated)	S +.011 –.010	T• +.010 –.000	V Thread Metric (Plated)
9	.669	.6250	1.199	.875	.871	M17X1-6g0.100R	1.062	.697	M12X1-6g0.100R
11	.769	.7500	1.386	1.000	.871	M20X1-6g0.100R	1.250	.822	M15X1-6g0.100R
13	.955	.8750	1.511	1.188	.878	M25X1-6g0.100R	1.375	1.007	M18X1-6g0.100R
15	1.084	1.0000	1.636	1.312	.878	M28X1-6g0.100R	1.500	1.134	M22X1-6g0.100R
17	1.208	1.1875	1.761	1.438	.878	M32X1-6g0.100R	1.625	1.259	M25X1-6g0.100R
19	1.333	1.2500	1.949	1.562	.878	M35X1-6g0.100R	1.812	1.384	M28X1-6g0.100R
21	1.459	1.3750	2.073	1.688	.878	M38X1-6g0.100R	1.938	1.507	M31X1-6g0.100R
23	1.575	1.5000	2.199	1.812	.878	M41X1-6g0.100R	2.062	1.634	M34X1-6g0.100R
25	1.709	1.6250	2.323	2.000	.878	M44X1-6g0.100R	2.188	1.759	M37X1-6g0.100R

**Extended length to accommodate higher voltage and/or higher capacitance applications.
Plug movement required to clear FTV receptacles: .625 min.

All dimensions for reference only.

FTV – MIL-DTL-38999, Series III

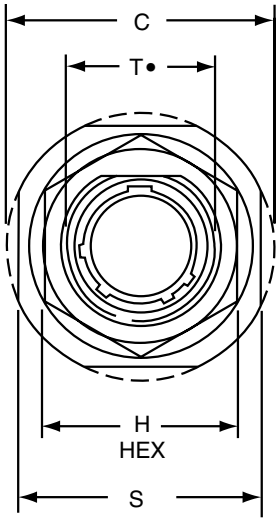
Jam Nut Receptacle - Aluminum (UTS Crimp)

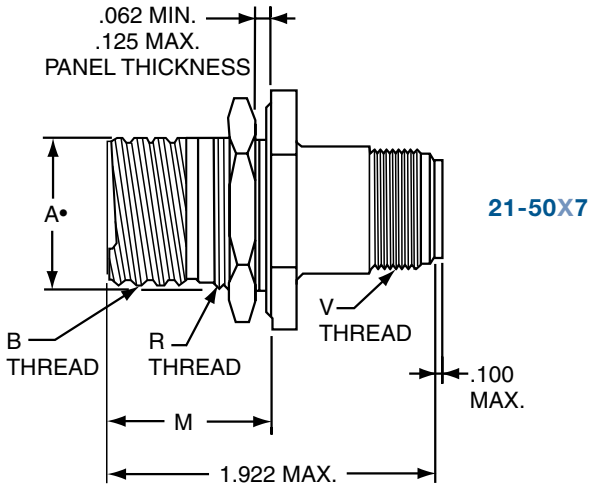
PART NUMBER BUILDER Page G23-25

Commercial

ALUMINUM
21-50X7

UTS (Crimp) Contact SAE AS39029/57





"D" shaped mounting hole dimensions
Plug movement required to clear FTV receptacles: .625 min.

Shell Size	A• +.000 –.010	B Thread Class 2A 0.1P-0.3L-TS (Plated)	C Max	H Hex +.017 –.016	M ±.005	R Thread (Plated)	S +.011 –.010	T• +.010 –.000	V Thread Metric (Plated)
9	.669	.6250	1.199	.875	.871	M17X1-6g0.100R	1.062	.697	M15X1-6g0.100R
11	.769	.7500	1.386	1.000	.871	M20X1-6g0.100R	1.250	.822	M18X1-6g0.100R
13	.955	.8750	1.511	1.188	.878	M25X1-6g0.100R	1.375	1.007	M22X1-6g0.100R
15	1.084	1.0000	1.636	1.312	.878	M28X1-6g0.100R	1.500	1.134	M25X1-6g0.100R
17	1.208	1.1875	1.761	1.438	.878	M32X1-6g0.100R	1.625	1.259	M28X1-6g0.100R
19	1.333	1.2500	1.949	1.562	.878	M35X1-6g0.100R	1.812	1.384	M31X1-6g0.100R
21	1.459	1.3750	2.073	1.688	.878	M38X1-6g0.100R	1.938	1.507	M34X1-6g0.100R
23	1.575	1.5000	2.199	1.812	.878	M41X1-6g0.100R	2.062	1.634	M37X1-6g0.100R
25	1.709	1.6250	2.323	2.000	.878	M44X1-6g0.100R	2.188	1.759	M41X1-6g0.100R

All dimensions for reference only.

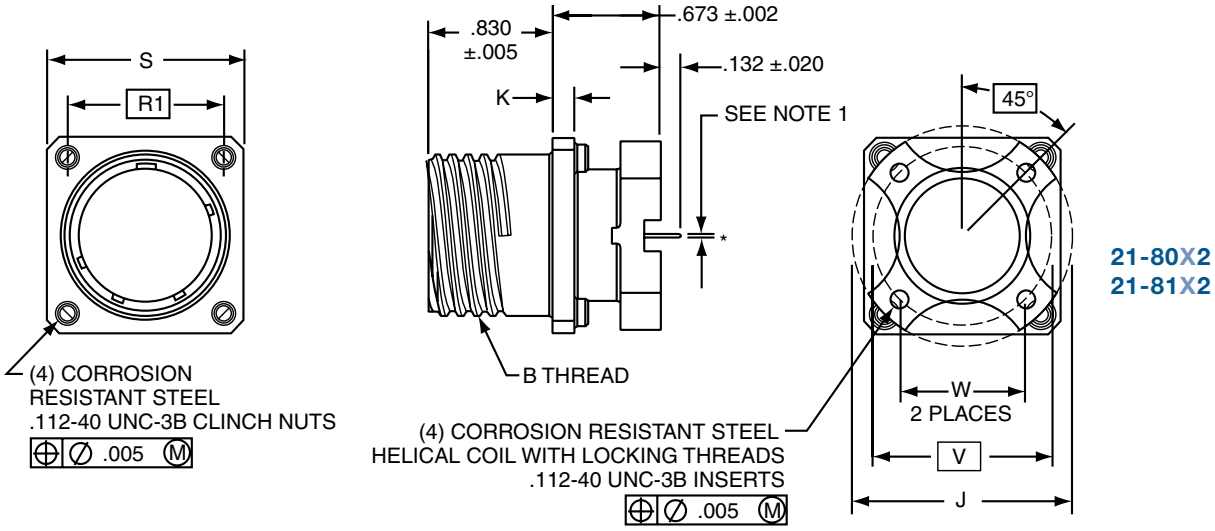
Box Mount Receptacle - Aluminum (Printed Circuit Board Mount)

Amphenol Aerospace

PART NUMBER BUILDER Page G23-25

Commercial

ALUMINUM
21-80X2
21-81X2



21-80X2
21-81X2

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Please consult Amphenol Aerospace for additional lengths

Shell Size	B Thread Class 2A 0.1P-0.3L-TS (Plated)	J Dia. ±.005	K ±.005	R[1] TP	S ±.010	PCB Mounting Dimensions	
						W TP	V Dia. TP
9	.6250	1.016	.085	.719	.938	.532	.752
11	.7500	1.062	.085	.812	1.031	.601	.850
13	.8750	1.250	.085	.906	1.125	.703	.994
15	1.0000	1.375	.085	.969	1.219	.791	1.119
17	1.1875	1.500	.085	1.062	1.312	.875	1.237
19	1.2500	1.625	.085	1.156	1.438	.975	1.379
21	1.3750	1.750	.115	1.250	1.562	1.053	1.489
23	1.5000	1.875	.115	1.375	1.688	1.145	1.619
25	1.6250	2.000	.115	1.500	1.812	1.233	1.744

All dimensions for reference only.

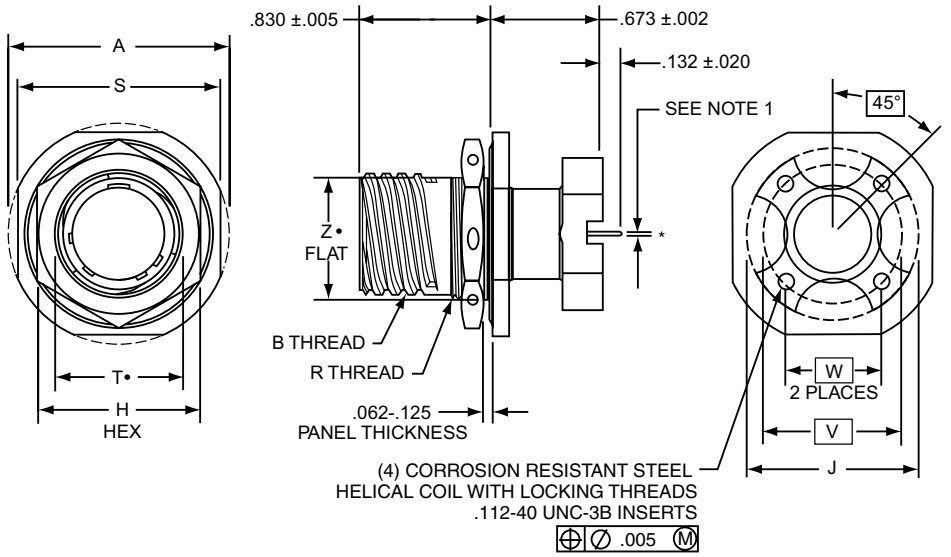
FTV – MIL-DTL-38999, Series III

Jam Nut Receptacle - Aluminum (Printed Circuit Board Mount)

PART NUMBER BUILDER Page G23-25

Commercial

ALUMINUM
21-80X7
21-81X7



21-80X7
21-81X7

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Please consult Amphenol Aerospace for additional lengths

"D" shaped mounting hole dimensions

Shell Size	A Dia. ±.010	B Thread Class 2A 0.1P-0.3L-TS (Plated)	H Hex +.017 –.016	J Dia. ±.005	R Thread Metric (Plated)	S ±.015	T• Dia. +.010 –.000	PCB Mounting Dimensions W TP	PCB Mounting Dimensions V Dia. TP	Z• Flat +.000 –.010
9	1.188	.6250	.875	1.016	M17X1-6g0.100R	1.062	.697	.532	.752	.669
11	1.375	.7500	1.000	1.062	M20X1-6g0.100R	1.250	.822	.601	.850	.769
13	1.500	.8750	1.188	1.250	M25X1-6g0.100R	1.375	1.007	.703	.994	.955
15	1.625	1.0000	1.312	1.375	M28X1-6g0.100R	1.500	1.134	.791	1.119	1.084
17	1.750	1.1875	1.438	1.500	M32X1-6g0.100R	1.625	1.259	.875	1.237	1.208
19	1.937	1.2500	1.562	1.625	M35X1-6g0.100R	1.812	1.384	.975	1.379	1.333
21	2.062	1.3750	1.688	1.750	M38X1-6g0.100R	1.937	1.507	1.053	1.489	1.459
23	2.188	1.5000	1.812	1.875	M41X1-6g0.100R	2.062	1.634	1.145	1.619	1.575
25	2.312	1.6250	2.000	2.000	M44X1-6g0.100R	2.188	1.759	1.233	1.744	1.709

All dimensions for reference only.

Features, Alternate Rotations

Amphenol Aerospace

The Amphenol® FJT Series space and weight saving design, coupled with a filter, gives high reliability.

- Intermateable with MIL-DTL-38999/27599 Series II connectors (see Catalog 38999, Series II JT section)
- Quick positive coupling – 3 point bayonet locking
- Error-proof alternate positioning of shell keyways
- Higher reliability and greater durability with permanently encapsulated contacts
- Environmental resistant
- Aluminum shells with several finish options



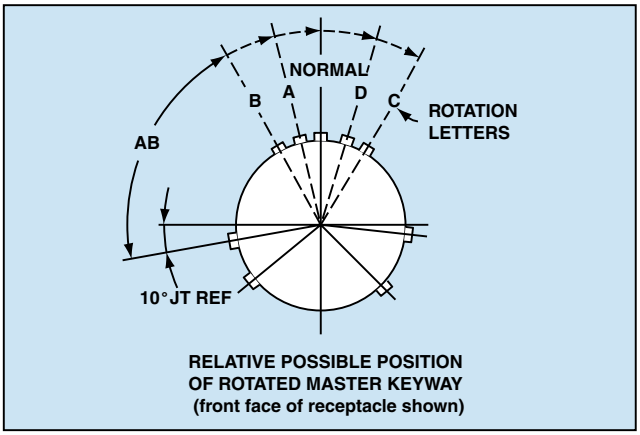
FJT

FJT MASTER KEY/KEYWAY ROTATION

Shell Size	AB Angle of Rotation (Degrees)				
	Normal	A	B	C	D
8	100	82	–	–	118
10	100	86	72	128	114
12	100	80	68	132	120
14	100	79	66	134	121
16	100	82	70	130	118
18	100	82	70	130	118
20	100	82	70	130	118
22	100	85	74	126	115
24	100	85	74	126	115

A plug with a given rotation letter will mate with a receptacle with the same rotation letter. The AB angle for a given connector is the same whether it contains pins or sockets. Inserts are not rotated in conjunction with the master key/keyway.

AB angles shown are viewed from the front face of the connector. A receptacle is shown at right. The angles for the plug are exactly the same, except the direction of rotation is opposite of that shown for the receptacle.



RELATIVE POSSIBLE POSITION OF ROTATED MASTER KEYWAY (front face of receptacle shown)

Rotations

FJT – MIL-DTL-38999, Series II

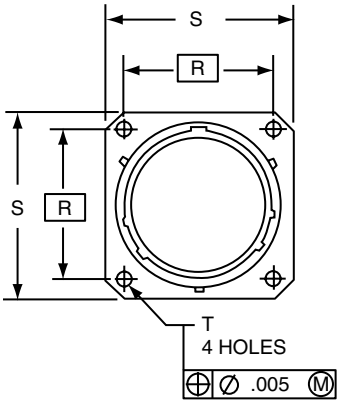
Wall Mounting Receptacle - Aluminum

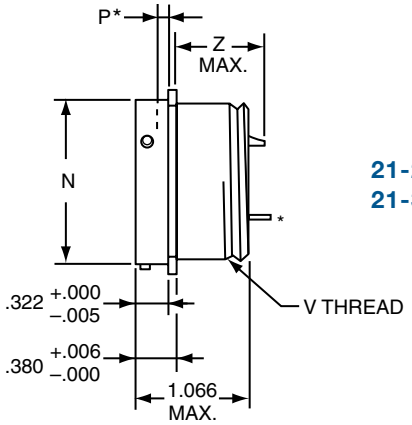
PART NUMBER BUILDER Page G23-25

MILITARY
MS27334

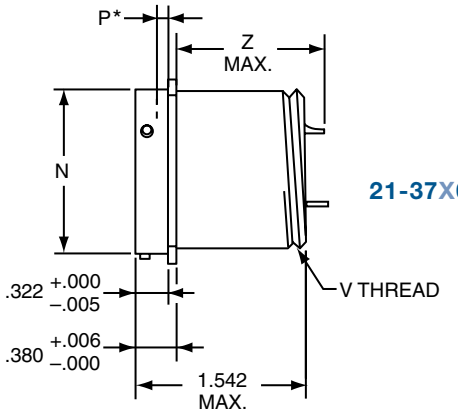
Commercial

ALUMINUM
21-24X0
21-32X0
21-37X0





21-24X0 (MS27334)
21-32X0 (MS27334)



21-37X0 (MS27334)

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup
Please consult Amphenol Aerospace for additional lengths
Plug movement required to clear FJT receptacles: .281 min.
* Acceptable panel thickness for back panel mounting a standard receptacle.

Shell Size	N Dia +.001 –.005	P* Max.	R (TP)	S +.011 –.010	T Dia. ±.005	V Thread UNEF-2A (Plated)	SHORT SHELL VHF/UHF/MF Filters			LONG SHELL HF Filters	
							Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.	Size 22 Contact Z Max.	Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.
8	.473	.022	.594	.812	.120	.4375-28	.937	.952	.902	1.300	1.496
10	.590	.027	.719	.938	.120	.5625-24	.937	.952	.902	1.300	1.496
12	.750	.027	.812	1.031	.120	.6875-24	.937	.952	.902	1.300	1.496
14	.875	.027	.906	1.125	.120	.8125-20	.937	.952	.902	1.300	1.496
16	1.000	.027	.969	1.219	.120	.9375-20	.937	.952	.902	1.300	1.496
18	1.125	.027	1.062	1.312	.120	1.0625-18	.937	.952	.902	1.300	1.496
20	1.250	.054	1.156	1.438	.120	1.1875-18	.937	.952	.902	1.300	1.496
22	1.375	.054	1.250	1.562	.120	1.3125-18	.937	.952	.902	1.300	1.496
24	1.500	.054	1.375	1.688	.147	1.4375-18	.937	.952	.902	1.300	1.496

All dimensions for reference only.

FJTP – MIL-DTL-38999, Series II

Wall Mounting Receptacle - Aluminum (Back Panel Mounting)

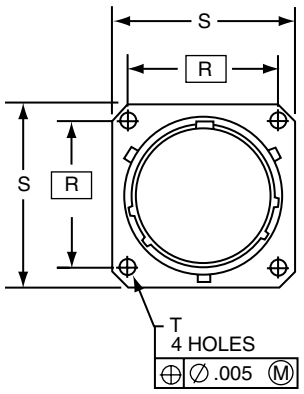
Amphenol Aerospace

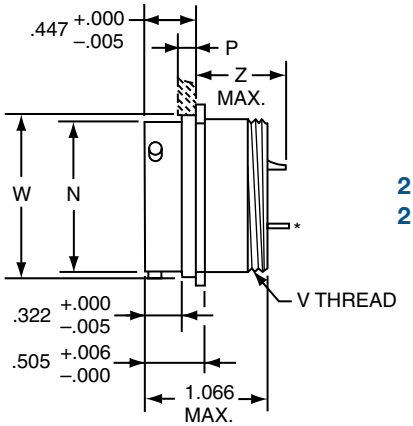
PART NUMBER BUILDER Page G23-25

MILITARY
MS27497

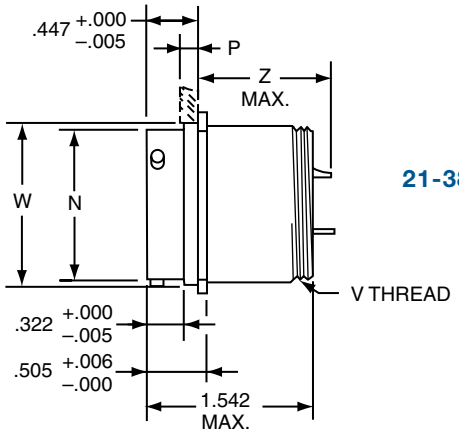
Commercial

ALUMINUM
21-34X0
21-38X0
21-39X0





21-34X0 (MS27497)
21-39X0 (MS27497)



21-38X0 (MS27497)

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup
Please consult Amphenol Aerospace for additional lengths.
Plug movement required to clear FJT receptacles: .281 min.

Shell Size	N Dia +.001 –.005	P Max. Panel Thickness	R (TP)	S +.011 –.010	T Dia. ±.005	V Thread UNEF-2A (Plated)	W Dia. +.001 –.005	SHORT SHELL VHF/UHF/MF Filters		LONG SHELL HF Filters	
								Size 16 or 16 & 20 Contacts Z Max.	Size 20 or 22 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.	Size 20 Contact Z Max.
8	.473	.147	.594	.812	.120	.4375-28	.516	.900	.875	1.385	1.285
10	.590	.152	.719	.938	.120	.5625-24	.633	.900	.875	1.385	1.285
12	.750	.152	.812	1.031	.120	.6875-24	.802	.900	.875	1.385	1.285
14	.875	.152	.906	1.125	.120	.8125-20	.927	.900	.875	1.385	1.285
16	1.000	.152	.969	1.219	.120	.9375-20	1.052	.900	.875	1.385	1.285
18	1.125	.152	1.062	1.312	.120	1.0625-18	1.177	.900	.875	1.385	1.285
20	1.250	.179	1.156	1.438	.120	1.1875-18	1.302	.900	.875	1.385	1.285
22	1.375	.179	1.250	1.562	.120	1.3125-18	1.427	.900	.875	1.385	1.285
24	1.500	.179	1.375	1.688	.147	1.4375-18	1.552	.900	.875	1.385	1.285

All dimensions for reference only.

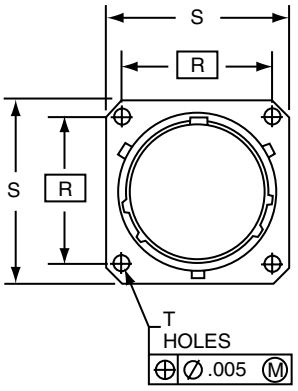
FJT – MIL-DTL-38999, Series II

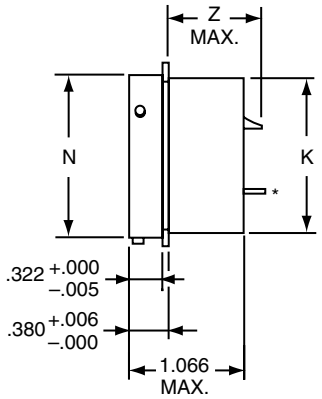
Box Mounting Receptacle - Aluminum

PART NUMBER BUILDER Page G23-25

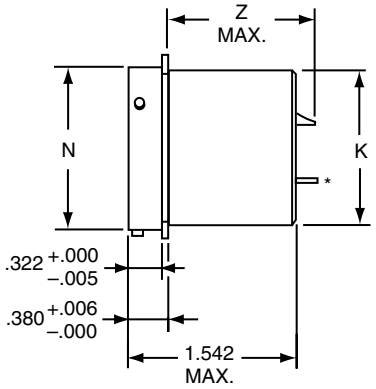
Commercial

ALUMINUM
21-24X2
21-32X2
21-37X2





21-24X2
21-32X2
SIMULAR TO MS27335



21-37X2
SIMULAR TO MS27335

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.
Plug movement required to clear FJT receptacles: .281 min.

Shell Size	K Dia. +.000 –.007	N Dia +.001 –.005	R (TP)	S +.011 –.010	T Dia. ±.005	SHORT SHELL VHF/UHF/MF Filters			LONG SHELL HF Filters	
						Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.	Size 22 Contact Z Max.	Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.
8	.438	.473	.594	.812	.120	.937	.952	.902	1.300	1.496
10	.562	.590	.719	.938	.120	.937	.952	.902	1.300	1.496
12	.688	.750	.812	1.031	.120	.937	.952	.902	1.300	1.496
14	.812	.875	.906	1.125	.120	.937	.952	.902	1.300	1.496
16	.938	1.000	.969	1.219	.120	.937	.952	.902	1.300	1.496
18	1.062	1.125	1.062	1.312	.120	.937	.952	.902	1.300	1.496
20	1.188	1.250	1.156	1.438	.120	.937	.952	.902	1.300	1.496
22	1.312	1.375	1.250	1.562	.120	.937	.952	.902	1.300	1.496
24	1.438	1.500	1.375	1.688	.147	.937	.952	.902	1.300	1.496

All dimensions for reference only.

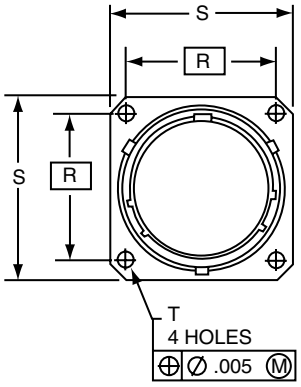
Box Mounting Receptacle - Aluminum (Back Panel Mounting)

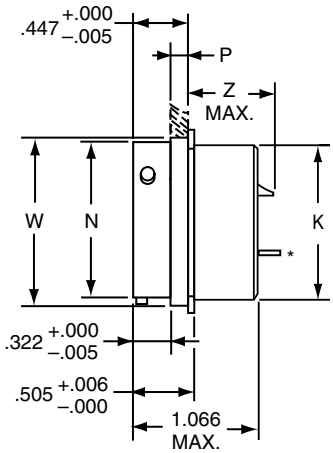
Amphenol Aerospace

PART NUMBER BUILDER Page G23-25

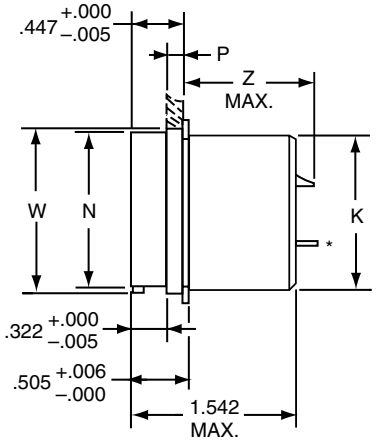
Commercial

ALUMINUM
21-34X2
21-39X2
21-38X2





21-34X2
21-39X2
SIMULAR TO MS27508



21-38X2
SIMULAR TO MS27508

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.
Plug movement required to clear FJT receptacles: .281 min.

Shell Size	K Dia. +.000 –.007	N Dia +.001 –.005	P Max. Panel Thickness	R (TP)	S +.011 –.010	T Dia. ±.005	W Dia. +.001 –.005	SHORT SHELL VHF/UHF/MF Filters		LONG SHELL HF Filters	
								Size 16 or 16 & 20 Contacts Z Max.	Size 20 or 22 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.	Size 20 Contact Z Max.
8	.438	.473	.147	.594	.812	.120	.516	.900	.875	1.385	1.285
10	.562	.590	.152	.719	.938	.120	.633	.900	.875	1.385	1.285
12	.688	.750	.152	.812	1.031	.120	.802	.900	.875	1.385	1.285
14	.812	.875	.152	.906	1.125	.120	.927	.900	.875	1.385	1.285
16	.938	1.000	.152	.969	1.219	.120	1.052	.900	.875	1.385	1.285
18	1.062	1.125	.152	1.062	1.312	.120	1.177	.900	.875	1.385	1.285
20	1.188	1.250	.179	1.156	1.438	.120	1.302	.900	.875	1.385	1.285
22	1.312	1.375	.179	1.250	1.562	.120	1.427	.900	.875	1.385	1.285
24	1.438	1.500	.179	1.375	1.688	.147	1.552	.900	.875	1.385	1.285

All dimensions for reference only.

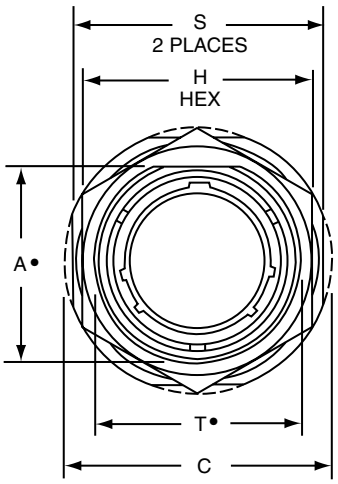
FJT – MIL-DTL-38999, Series II

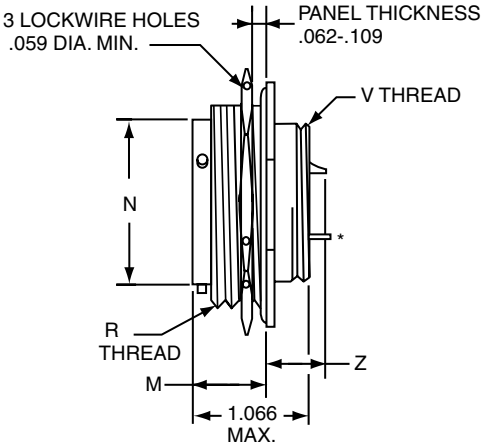
Jam Nut Receptacle - Aluminum

PART NUMBER BUILDER Page G23-25

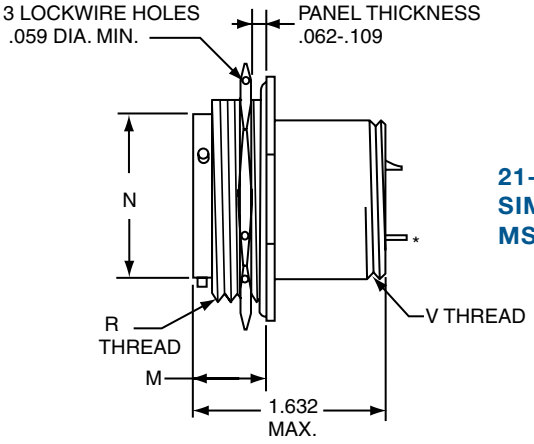
Commercial

ALUMINUM
21-24X7
21-32X7
21-37X7





21-24X7
21-32X7
SIMULAR TO
MS27337



21-37X7
SIMULAR TO
MS27337

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.
"D" shaped mounting hole dimensions. Plug movement required to clear FJT receptacles: .281 min.

Shell Size	A• Flat +.000 –.010	C Dia. +.011 –.010	H Hex +.017 –.016	M ±.005	N Dia +.001 –.005	R Thread (Plated) Class -2A	S ±.010	T• Dia. +.010 –.000	V Thread UNEF-2A (Plated)	SHORT SHELL VHF/UHF/MF Filters: Size 16 or 16 & 20 Contacts Z Max.	SHORT SHELL VHF/UHF/MF Filters: Size 20 Contact Z Max.	SHORT SHELL VHF/UHF/MF Filters: Size 22 Contact Z Max.	LONG SHELL HF Filters: Size 16 or 16 & 20 Contacts Z Max.	LONG SHELL HF Filters: Size 20 Contact Z Max.
8	.830	1.375	1.062	.438	.473	.8750-20UNEF	1.250	.884	.4375-28	.900	.884	.849	1.443	1.276
10	.955	1.500	1.188	.438	.590	1.0000-20UNEF	1.375	1.007	.5625-24	.900	.884	.849	1.443	1.276
12	1.084	1.625	1.312	.438	.750	1.1250-18UNEF	1.500	1.134	.6875-24	.900	.884	.849	1.443	1.276
14	1.208	1.750	1.438	.438	.875	1.2500-18UNEF	1.625	1.259	.8125-20	.900	.884	.849	1.443	1.276
16	1.333	1.938	1.562	.438	1.000	1.3750-18UNEF	1.781	1.384	.9375-20	.900	.884	.849	1.443	1.276
18	1.459	2.016	1.688	.438	1.125	1.5000-18UNEF	1.890	1.507	1.0625-18	.900	.884	.849	1.443	1.276
20	1.576	2.141	1.812	.464	1.250	1.6250-18UNEF	2.016	1.634	1.1875-18	.874	.858	.823	1.443	1.276
22	1.701	2.265	2.000	.464	1.375	1.7500-18UNS	2.140	1.759	1.3125-18	.874	.858	.823	1.417	1.250
24	1.826	2.390	2.125	.464	1.500	1.8750-16UN	2.265	1.884	1.4375-18	.874	.858	.823	1.417	1.250

All dimensions for reference only.

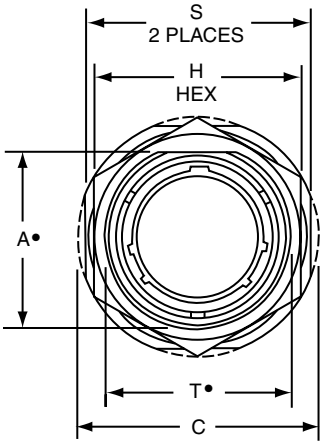
Jam Nut Receptacle - Aluminum (Minimum Penetration)

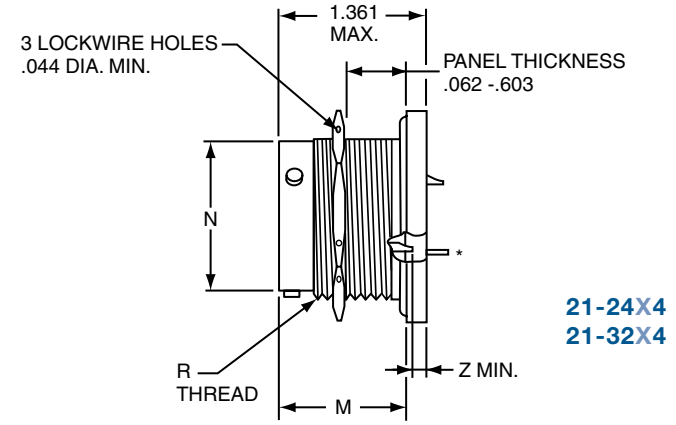
Amphenol Aerospace

PART NUMBER BUILDER Page G23-25

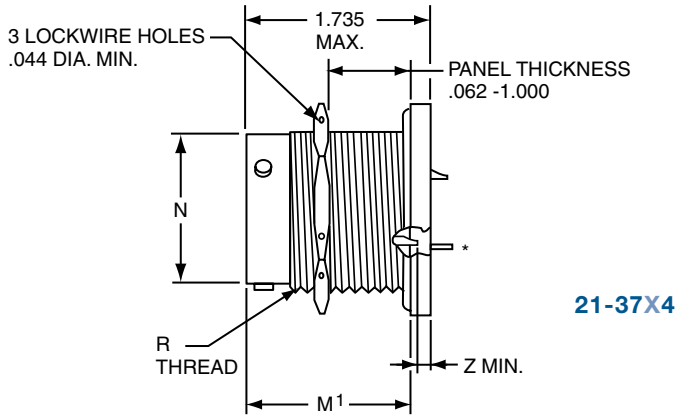
Commercial

ALUMINUM
21-24X4
21-32X4
21-37X7





21-24X4
21-32X4



21-37X4

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths "D" shaped mounting hole.
dimensions Plug movement required to clear FJT receptacles: .281 min.

Shell Size	A• Flat +.000 –.010	C Dia. +.011 –.010	H Hex +.017 –.016	M ±.005	M[1] ±.005	N Dia +.001 –.005	R Thread UNEF-2A (Plated)	S +.011 –.010	T• Dia. +.010 –.000	SHORT SHELL VHF/UHF/MF Filters: Size 16 or 16 & 20 Contacts Z Max.	SHORT SHELL VHF/UHF/MF Filters: Size 20 Contact Z Max.	SHORT SHELL VHF/UHF/MF Filters: Size 22 Contact Z Max.	LONG SHELL HF Filters: Size 16 or 16 & 20 Contacts Z Max.	LONG SHELL HF Filters: Size 20 Contact Z Max.
8	.542	1.062	.750	1.220	1.594	.473	.5625-24	.938	.572	.000	.022	.057	.000	.000
10	.669	1.188	.875	1.220	1.594	.590	.6875-24	1.062	.697	.000	.022	.057	.000	.000
12	.830	1.375	1.062	1.220	1.594	.750	.8750-20	1.250	.844	.000	.022	.057	.000	.000
14	.955	1.500	1.188	1.220	1.594	.875	1.0000-20	1.375	1.007	.000	.022	.057	.000	.000
16	1.084	1.625	1.312	1.220	1.594	1.000	1.1250-18	1.500	1.134	.000	.022	.057	.000	.000
18	1.208	1.750	1.438	1.220	1.594	1.125	1.2500-18	1.625	1.259	.000	.022	.057	.000	.000
20	1.333	1.938	1.562	1.188	1.563	1.250	1.3750-18	1.812	1.384	.000	.022	.057	.000	.000
22	1.459	2.062	1.688	1.188	1.563	1.375	1.5000-18	1.938	1.507	.000	.022	.057	.000	.000
24	1.575	2.188	1.812	1.188	1.563	1.500	1.6250-18	2.062	1.634	.000	.022	.057	.000	.000

All dimensions for reference only.

FLJT – MIL-DTL-38999, Series I

Features, Alternate Rotations

The Amphenol® FLJT Series offers all the design features of the FJT plus a 100% “scoop-proof” contact protection design.

- Intermountable with MIL-DTL-38999/27599 Series I connectors (see Catalog 38999, Series I LJT section)
- Contact Protection - shell design prevents contact damage
- Quick Positive Coupling – 3 point bayonet locking
- Higher reliability and greater durability with permanently encapsulated contacts
- Environmental Resistant
- Aluminum shells with several finish options
- Error-proof alternate positioning of shell keyways
- Corrosion Resistant - 500 hour salt spray olive drab cadmium over nickel plating, class T (aluminum), electroless nickel plating, class F (aluminum) or stainless steel shells

FLJT



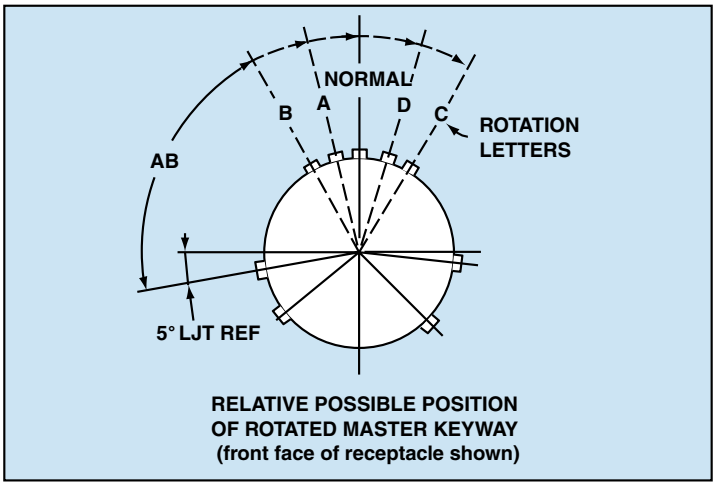
FLJT MASTER KEY/KEYWAY ROTATION

Shell Size	AB Angle of Rotation (Degrees)				
	Normal	A	B	C	D
9	95	77	–	–	113
11	95	81	67	123	109
13	95	75	63	127	115
15	95	74	61	129	116
17	95	77	65	125	113
19	95	77	65	125	113
21	95	77	65	125	113
23	95	80	69	121	110
25	95	80	69	121	110

A plug with a given rotation letter will mate with a receptacle with the same rotation letter. The AB angle for a given connector is the same whether it contains pins or sockets. Inserts are not rotated in conjunction with the master key/keyway.

AB angles shown are viewed from the front face of the connector. A receptacle is shown at right. The angles for the plug are exactly the same, except the direction of rotation is opposite of that shown for the receptacle.

Rotations



RELATIVE POSSIBLE POSITION
OF ROTATED MASTER KEYWAY
(front face of receptacle shown)

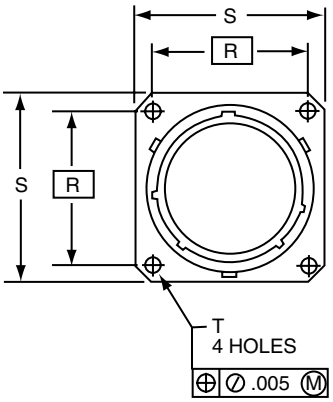
Wall Mounting Receptacle - Aluminum

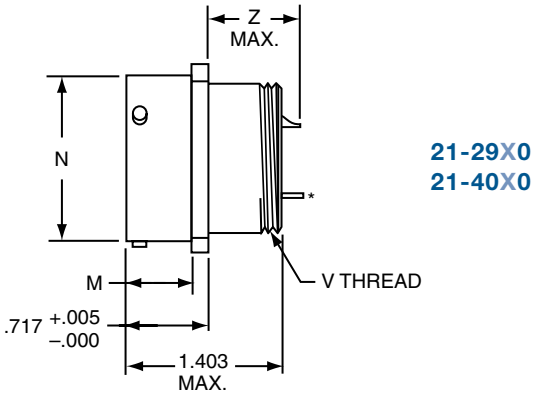
Amphenol Aerospace

PART NUMBER BUILDER Page G23-25

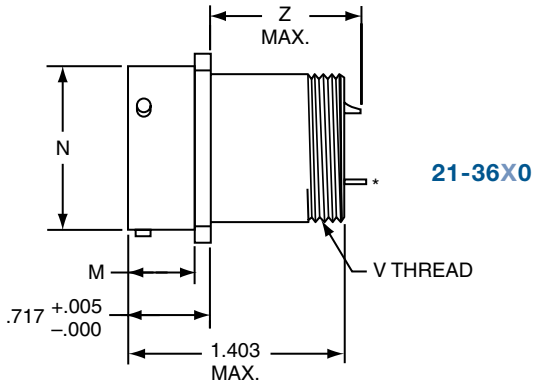
Commercial

ALUMINUM
21-29X0
21-40X0
21-36X0





21-29X0
21-40X0



21-36X0

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.
Plug movement required to clear FLJT receptacles: .625 min.

Shell Size	M +.000 –.006	N Dia. +.001 –.005	R (TP)	S +.011 –.010	T Dia. ±.005	V Thread UNEF-2A (Plated)	SHORT SHELL VHF/UHF/MF Filters			LONG SHELL HF Filters	
							Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.	Size 22 Contact Z Max.	Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.
9	.632	.572	.719	.938	.128	.4375-28	.865	.950	.820	1.324	1.394
11	.632	.700	.812	1.031	.128	.5625-24	.865	.950	.820	1.324	1.394
13	.632	.850	.906	1.125	.128	.6875-24	.865	.950	.820	1.324	1.394
15	.632	.975	.969	1.219	.128	.8125-20	.865	.950	.820	1.324	1.394
17	.632	1.100	1.062	1.312	.128	.9375-20	.865	.950	.820	1.324	1.394
19	.632	1.207	1.156	1.438	.128	1.0625-18	.865	.950	.820	1.324	1.394
21	.602	1.332	1.250	1.562	.128	1.1875-18	.865	.950	.820	1.324	1.394
23	.602	1.457	1.375	1.688	.147	1.3125-18	.865	.950	.820	1.324	1.394
25	.602	1.582	1.500	1.812	.147	1.4375-18	.865	.950	.820	1.324	1.394

All dimensions for reference only.

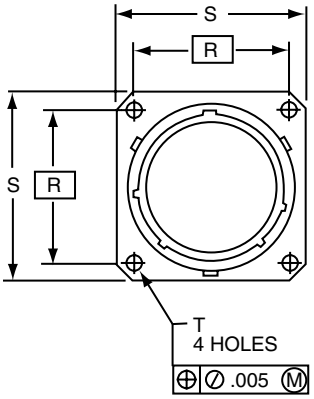
FLJTPQ – MIL-DTL-38999, Series I

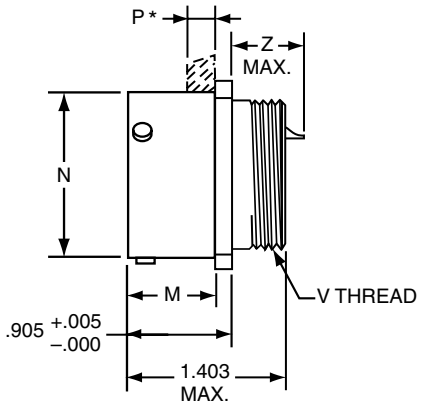
Wall Mounting Receptacle - Aluminum (Back Panel Mounting, UTS Crimp)

PART NUMBER BUILDER Page G23-25

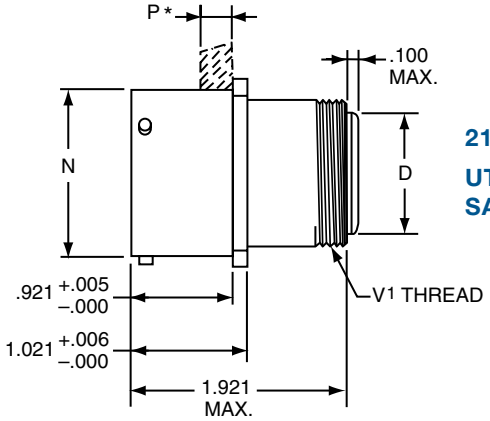
Commercial

ALUMINUM
21-47X0
21-48X0





21-47X0



21-48X0

UTS (Crimp) Contact
SAE AS39029/57

Plug movement required to clear FLJT receptacles: .625 min.
* Acceptable panel thickness for back panel mounting a standard receptacle.

Shell Size	D Dia. ±.005	M +.000 –.006	N Dia. +.001 –.005	P Max. Panel Thickness	R (TP)	S +.011 –.010	T Dia. ±.005	V Thread UNEF-2A (Plated)	V1 Thread UNEF-2A (Plated)	SHORT SHELL VHF/UHF Filters		
										Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.	Size 22 Contact Z Max.
9	.299	.820	.572	.234	.719	.938	.128	.4375-28	.5625-24	.672	.763	.632
11	.427	.820	.700	.234	.812	1.031	.128	.5625-24	.6875-24	.672	.763	.632
13	.541	.820	.850	.234	.906	1.125	.128	.6875-24	.8125-20	.672	.763	.632
15	.666	.820	.975	.234	.969	1.219	.128	.8125-20	.9375-20	.672	.763	.632
17	.791	.820	1.100	.234	1.062	1.312	.128	.9375-20	1.0625-18	.672	.763	.632
19	.897	.820	1.207	.234	1.156	1.438	.128	1.0625-18	1.1875-18	.672	.763	.632
21	1.022	.790	1.332	.204	1.250	1.562	.128	1.1875-18	1.3125-18	.672	.763	.632
23	1.147	.790	1.457	.204	1.375	1.688	.147	1.3125-18	1.4375-18	.672	.763	.632
25	1.272	.790	1.582	.193	1.500	1.812	.147	1.4375-18	1.5625-18	.672	.763	.632

All dimensions for reference only.

FLJT – MIL-DTL-38999, Series I

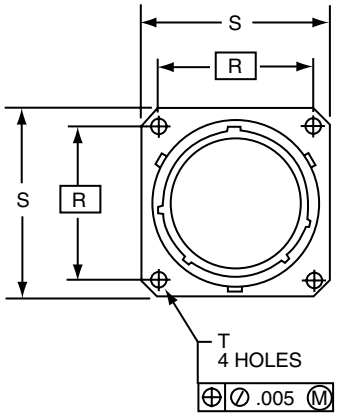
Box Mounting Receptacle - Aluminum

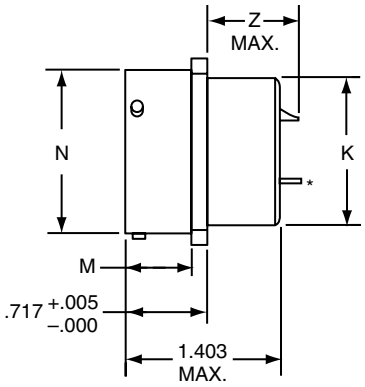
Amphenol Aerospace

PART NUMBER BUILDER Page G23-25

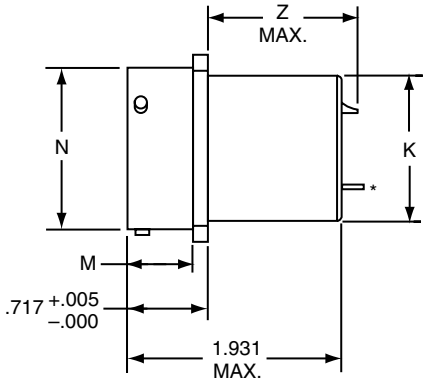
Commercial

ALUMINUM
21-29X2
21-40X2
21-36X2





21-29X2
21-40X2



21-36X2

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.

Plug movement required to clear FLJT receptacles: .625 min.

Shell Size	K Dia. +.001 −.006	M +.000 −.006	N Dia. +.001 −.005	R (TP)	S +.011 −.010	T Dia. ±.005	SHORT SHELL VHF/UHF/MF Filters			LONG SHELL HF Filters	
							Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.	Size 22 Contact Z Max.	Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.
9	.436	.632	.572	.719	.938	.128	.865	.950	.820	1.324	1.394
11	.560	.632	.700	.812	1.031	.128	.865	.950	.820	1.324	1.394
13	.686	.632	.850	.906	1.125	.128	.865	.950	.820	1.324	1.394
15	.810	.632	.975	.969	1.219	.128	.865	.950	.820	1.324	1.394
17	.936	.632	1.100	1.062	1.312	.128	.865	.950	.820	1.324	1.394
19	1.060	.632	1.207	1.156	1.438	.128	.865	.950	.820	1.324	1.394
21	1.186	.602	1.332	1.250	1.562	.128	.865	.950	.820	1.324	1.394
23	1.310	.602	1.457	1.375	1.688	.147	.865	.950	.820	1.324	1.394
25	1.436	.602	1.582	1.500	1.812	.147	.865	.950	.820	1.324	1.394

All dimensions for reference only.

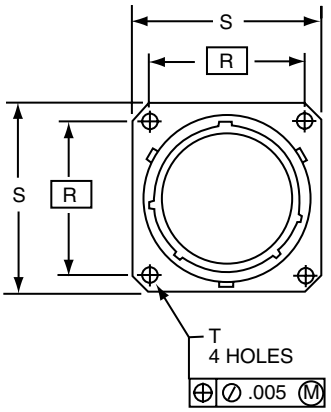
FLJTP – MIL-DTL-38999, Series I

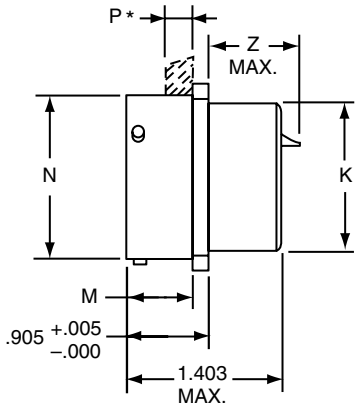
Box Mount Receptacle - Aluminum (Back Panel Mounting, UTS Crimp)

PART NUMBER BUILDER Page G23-25

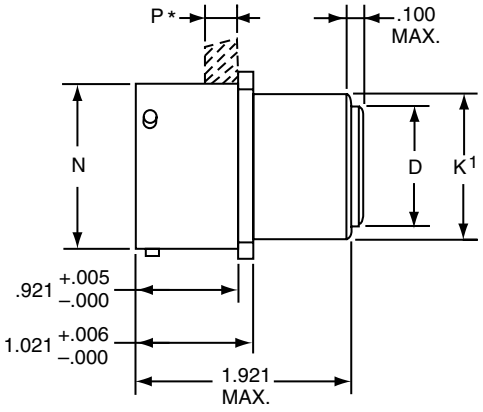
Commercial

ALUMINUM
21-47X2
21-48X2





21-47X2



21-48X2
UTS (Crimp)
Contact
SAE AS39029

Plug movement required to clear FLJT receptacles: .625 min.

* Acceptable panel thickness for back panel mounting a standard receptacle.

Shell Size	D Dia. ±.005	K Dia. +.000 –.006	K[1] Dia. +.000 –.007	M +.000 –.006	N Dia. +.001 –.005	P Max. Panel Thickness	R (TP)	S +.011 –.010	T Dia. ±.005	SHORT SHELL VHF/UHF Filters		
										Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.	Size 22 Contact Z Max.
9	.299	.437	.561	.820	.572	.234	.719	.938	.128	.672	.763	.632
11	.427	.562	.687	.820	.700	.234	.812	1.031	.128	.672	.763	.632
13	.541	.688	.811	.820	.850	.234	.906	1.125	.128	.672	.763	.632
15	.666	.812	.937	.820	.975	.234	.969	1.219	.128	.672	.763	.632
17	.791	.938	1.061	.820	1.100	.234	1.062	1.312	.128	.672	.763	.632
19	.897	1.062	1.187	.820	1.207	.234	1.156	1.438	.128	.672	.763	.632
21	1.022	1.188	1.312	.790	1.332	.204	1.250	1.562	.128	.672	.763	.632
23	1.147	1.312	1.437	.790	1.457	.204	1.375	1.688	.147	.672	.763	.632
25	1.272	1.438	1.562	.790	1.582	.193	1.500	1.812	.147	.672	.763	.632

All dimensions for reference only.

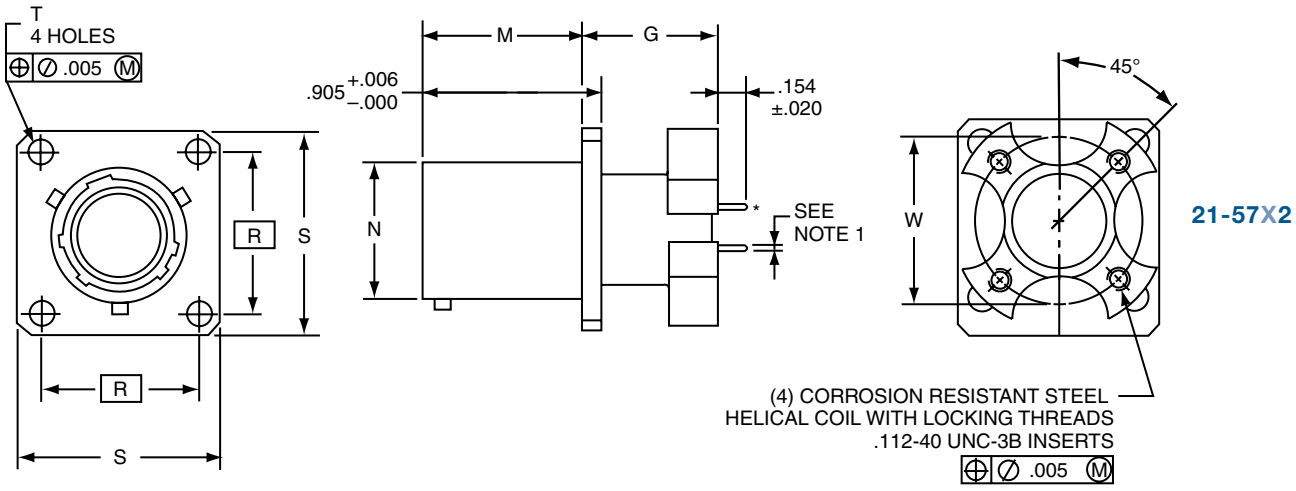
Box Mounting Receptacle - Aluminum (Printed Circuit Board Mount)

Amphenol Aerospace

PART NUMBER BUILDER Page G23-25

Commercial

ALUMINUM
21-57X2



***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Please consult Amphenol Aerospace for additional lengths.

Plug movement required to clear FLJT receptacles: .625 min.

Shell Size	G +.006 −.005	M +.000 −.005	N Dia. +.001 −.005	R (TP)	S +.011 −.010	T Dia. +.004 −.003	W
11	.689	.820	.700	.812	1.031	.128	.850
13	.689	.820	.850	.906	1.125	.128	.994
15	.689	.820	.975	.969	1.219	.128	1.119
17	.689	.820	1.100	1.062	1.312	.128	1.237
19	.689	.820	1.207	1.156	1.438	.128	1.379
21	.689	.790	1.332	1.250	1.562	.128	1.489
23	.719	.790	1.457	1.375	1.688	.147	1.619
25	.719	.790	1.582	1.500	1.812	.147	1.744

All dimensions for reference only.

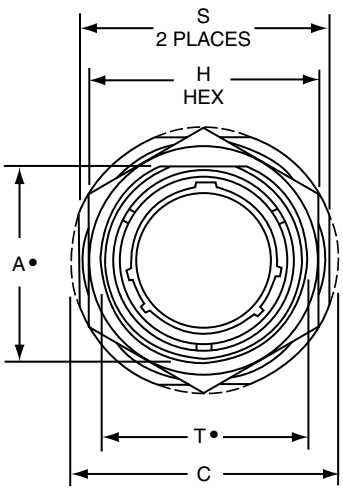
FLJT – MIL-DTL-38999, Series I

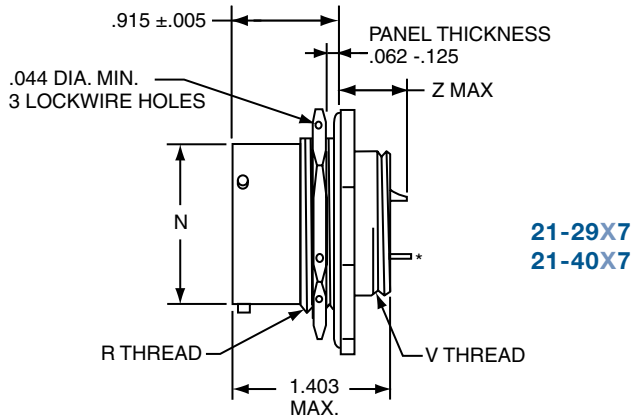
Jam Nut Receptacle - Aluminum

PART NUMBER BUILDER Page G23-25

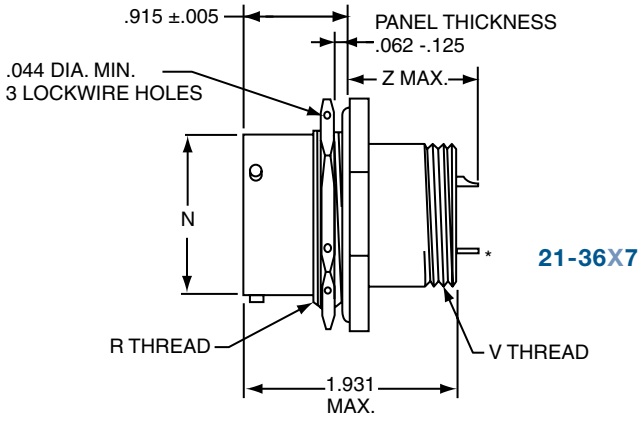
Commercial

ALUMINUM
21-29X7
21-40X7
21-36X7





21-29X7
21-40X7



21-36X7

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.
"D" shaped mounting hole dimensions. Plug movement required to clear FLJT receptacles: .625 min.

Shell Size	A• Flat +.000 –.010	C Dia. +.011 –.010	H Hex +.017 –.016	N Dia +.001 –.005	R Thread (Plated) Class -2A	S +.016 –.015	T• Dia. +.010 –.000	V Thread UNEF-2A (Plated)	SHORT SHELL VHF/UHF/MF Filters: Size 20 Contact Z Max.	SHORT SHELL VHF/UHF/MF Filters: Size 16 or 16 & 20 Contacts Z Max.	SHORT SHELL VHF/UHF/MF Filters: Size 22 Contact Z Max.	LONG SHELL HF Filters: Size 20 Contact Z Max.	LONG SHELL HF Filters: Size 16 or 16 & 20 Contacts Z Max.
9	.669	1.188	.875	.572	.6875-24UNEF	1.062	.697	.4375-28	.667	.756	.616	1.228	1.201
11	.769	1.375	1.000	.700	.8125-20UNEF	1.250	.822	.5625-24	.667	.756	.616	1.228	1.201
13	.955	1.500	1.188	.850	1.0000-20UNEF	1.375	1.007	.6875-24	.667	.756	.616	1.228	1.201
15	1.084	1.625	1.312	.975	1.1250-18UNEF	1.500	1.134	.8125-20	.667	.756	.616	1.228	1.201
17	1.208	1.750	1.438	1.100	1.2500-18UNEF	1.625	1.259	.9375-20	.667	.756	.616	1.228	1.201
19	1.333	1.938	1.562	1.207	1.3750-18UNEF	1.812	1.384	1.0625-18	.667	.756	.616	1.228	1.201
21	1.459	2.062	1.688	1.332	1.5000-18UNEF	1.938	1.507	1.1875-18	.667	.756	.616	1.228	1.201
23	1.580	2.188	1.812	1.457	1.6250-18UNEF	2.062	1.634	1.3125-18	.667	.756	.616	1.228	1.201
25	1.709	2.312	2.000	1.582	1.7500-18UNS	2.188	1.759	1.4375-18	.667	.756	.616	1.228	1.201

All dimensions for reference only.

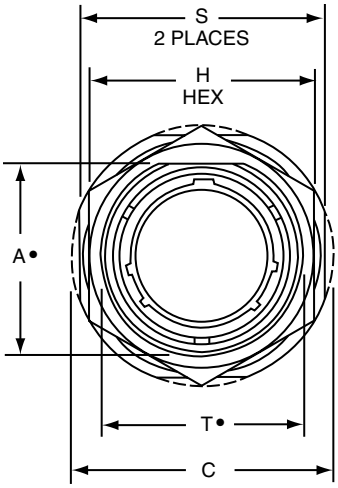
Jam Nut Receptacle - Aluminum (UTS Crimp)

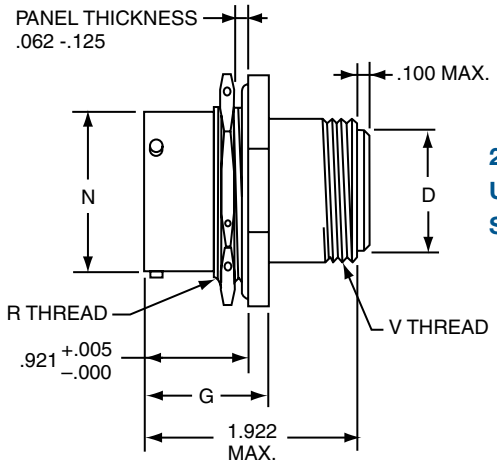
Amphenol Aerospace

PART NUMBER BUILDER Page G23-25

Commercial

ALUMINUM
21-48X7





21-48X7
UTS (Crimp) Contact
SAE AS39029/57

"D" shaped mounting hole dimensions
Plug movement required to clear FLJT receptacles: .625 min.

Shell Size	A• Flat +.000 −.010	C Dia. +.011 −.010	D Dia. ±.005	G +.006 −.005	H Hex +.017 −.016	N Dia +.001 −.005	R Thread (Plated) Class -2A	S +.016 −.015	T• Dia. +.010 −.000	V Thread UNEF-2A (Plated)
9	.669	1.188	.299	1.030	.875	.572	.6875-24UNEF	1.062	.697	.5625-24
11	.769	1.375	.427	1.030	1.000	.700	.8125-20UNEF	1.250	.822	.6875-24
13	.955	1.500	.541	1.030	1.188	.850	1.0000-20UNEF	1.375	1.007	.8125-20
15	1.084	1.625	.666	1.030	1.312	.975	1.1250-18UNEF	1.500	1.134	.9375-20
17	1.208	1.750	.791	1.030	1.438	1.100	1.2500-18UNEF	1.625	1.259	1.0625-18
19	1.333	1.938	.897	1.061	1.562	1.207	1.3750-18UNEF	1.812	1.384	1.1875-18
21	1.459	2.062	1.022	1.061	1.688	1.332	1.5000-18UNEF	1.938	1.507	1.3125-18
23	1.580	2.188	1.147	1.061	1.812	1.457	1.6250-18UNEF	2.062	1.634	1.4375-18
25	1.709	2.312	1.272	1.061	2.000	1.582	1.7500-18UNS	2.188	1.759	1.5625-18

All dimensions for reference only.

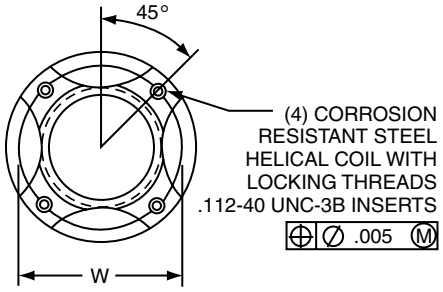
FLJT – MIL-DTL-38999, Series I

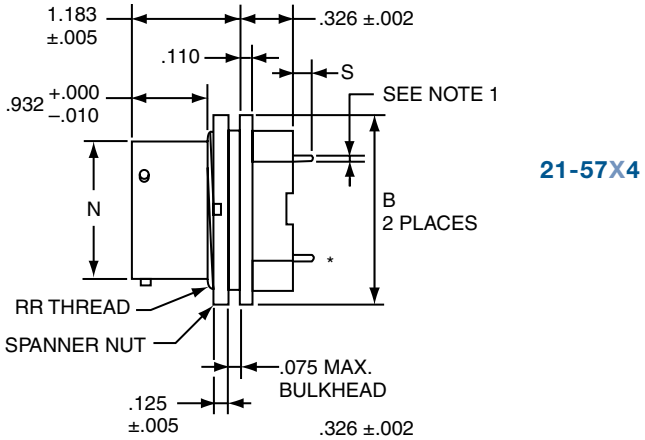
Jam Mounting Receptacle - Aluminum (Printed Circuit Board Mount)

PART NUMBER BUILDER Page G23-25

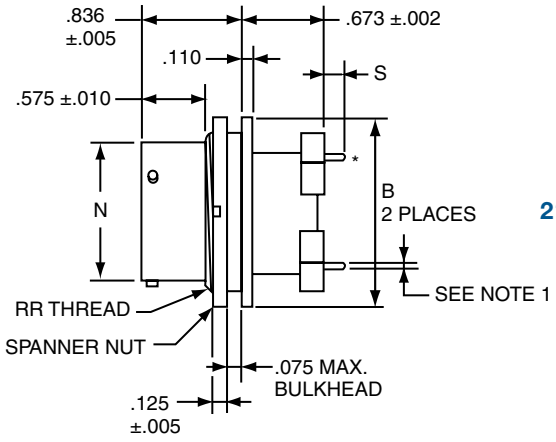
Commercial

ALUMINUM
21-57X4
21-57X7





21-57X4



21-57X7

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Please consult Amphenol Aerospace for additional lengths.
Plug movement required to clear FLJT receptacles: .625 min.

Shell Size	B Dia. ±.005	N Dia. +.001 −.005	S ±.020	W	RR Thread UNEF-2A
11	1.062	.700	.132	.850	.8125-20
13	1.250	.850	.132	.994	1.0000-20
15	1.375	.975	.132	1.119	1.1250-20
17	1.500	1.100	.132	1.237	1.2500-18
19	1.625	1.207	.132	1.379	1.3750-18
21	1.750	1.332	.132	1.489	1.5000-18
23	1.875	1.457	.132	1.619	1.6250-18
25	2.000	1.582	.132	1.744	1.7500-18

All dimensions for reference only.

FLJT – MIL-DTL-38999, Series I

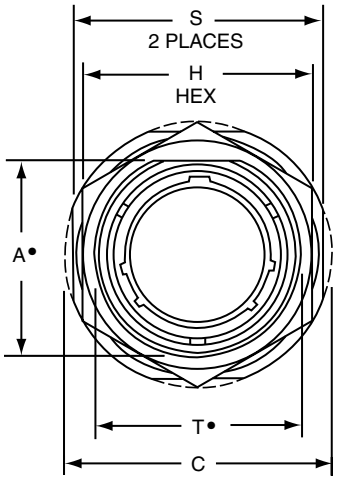
Amphenol Aerospace

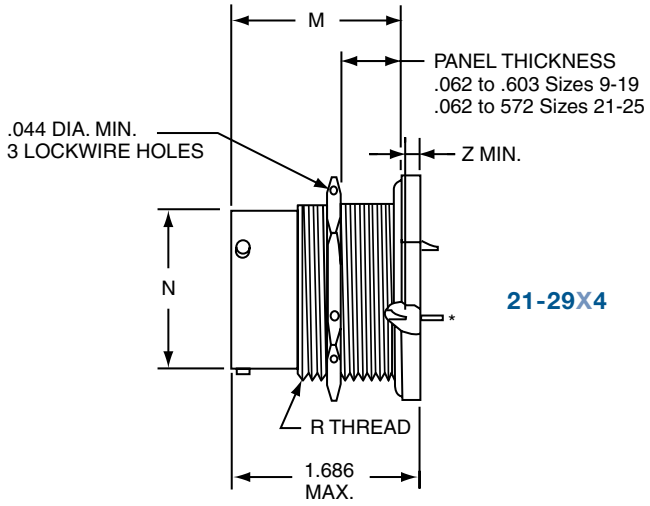
Jam Nut Receptacle - Aluminum (Minimum Penetration)

PART NUMBER BUILDER Page G23-25

Commercial

ALUMINUM
21-29X4





21-29X4

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.
"D" shaped mounting hole dimensions.
Plug movement required to clear FLJT receptacles: .625 min.

Shell Size	A• Flat +.000 –.010	C Dia. +.011 –.010	H Hex +.017 –.016	M ±.005	N Dia +.001 –.005	R Thread (Plated) Class -2A	S +.016 –.015	T• Dia. +.010 –.000	SHORT SHELL VHF/UHF Filters			
									Size 16 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.	Size 20 Contact Z Max.	Size 22 Contact Z Max.
9	.669	1.188	.875	1.557	.572	.6875-24UNEF	1.062	.697	.000	.000	.000	.000
11	.769	1.375	1.000	1.557	.700	.8125-20UNEF	1.250	.822	.000	.000	.000	.000
13	.955	1.500	1.188	1.557	.850	1.0000-20UNEF	1.375	1.007	.000	.000	.000	.000
15	1.084	1.625	1.312	1.557	.975	1.1250-18UNEF	1.500	1.134	.000	.000	.000	.000
17	1.208	1.750	1.438	1.557	1.100	1.2500-18UNEF	1.625	1.259	.000	.000	.000	.000
19	1.333	1.938	1.562	1.557	1.207	1.3750-18UNEF	1.812	1.384	.000	.000	.000	.000
21	1.459	2.062	1.688	1.525	1.332	1.5000-18UNEF	1.938	1.507	.000	.000	.000	.000
23	1.580	2.188	1.812	1.525	1.457	1.6250-18UNEF	2.062	1.634	.000	.000	.000	.000
25	1.709	2.312	2.000	1.525	1.582	1.7500-18UNS	2.188	1.759	.000	.000	.000	.000

All dimensions for reference only.

FSJT – MIL-DTL-38999 Type

Circular Filter Connectors - Features, Alternate Rotations

The Amphenol® FSJT Series combines the unique design features of the scoop-proof FLJT Series with the standard mounting dimensions of JT types.

- 100% scoop-proof design
- Standard mounting dimensions
- Compliance with European Specifications PAN6433-2, LN29729, VG96912
- Uses proven filter technology with available components from other series
- EMP protection versions available



FSJT

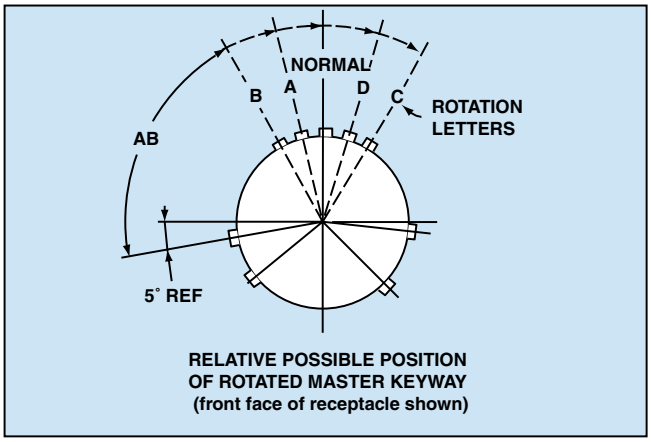
FSJT Master Key/Keyway Rotation

Shell Size	AB Angle of Rotation (Degrees)				
	Normal	A	B	C	D
8	95	–	–	–	–
10	95	81	67	123	109
12	95	75	63	127	115
14	95	74	61	129	116
16	95	77	65	125	113
18	95	77	65	125	113
20	95	77	65	125	113
22	95	80	69	121	110
24	95	80	69	121	110

A plug with a given rotation letter will mate with a receptacle with the same rotation letter. The AB angle for a given connector is the same whether it contains pins or sockets. Inserts are not rotated in conjunction with the master key/keyway.

AB angles shown are viewed from the front face of the connector. A receptacle is shown at right. The angles for the plug are exactly the same, except the direction of rotation is opposite of that shown for the receptacle.

Rotations



FSJT – MIL-DTL-38999 Type

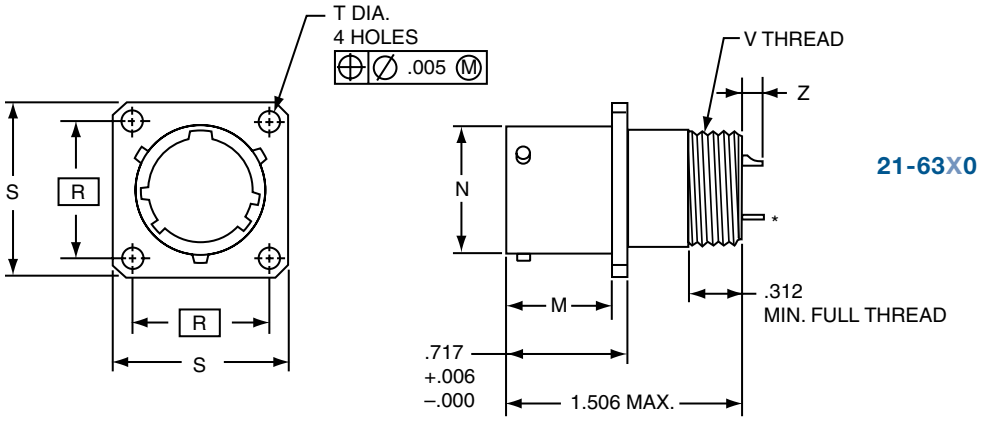
Wall Mounting Receptacle - Aluminum

Amphenol Aerospace

PART NUMBER BUILDER Page G23-25

Commercial

ALUMINUM
21-63X0



***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.
Plug movement required to clear FSJT receptacles: .625 min.

Shell Size	M +.000 –.005	N Dia. +.001 –.005	R (TP)	S +.021 –.020	T Dia. +.004 –.003	V Thread UNEF-2A	Z Max. Size 20 Contact	Z Max. Size 16 or 16 & 20 Contacts	Z Max. Size 22 Contact
10	.632	.590	.719	.938	.120	.5625-24	.165	.265	.134
12	.632	.750	.812	1.031	.120	.6875-24	.165	.265	.134
14	.632	.875	.906	1.125	.120	.8125-20	.165	.265	.134
16	.632	1.000	.969	1.219	.120	.9375-20	.165	.265	.134
18	.632	1.125	1.062	1.312	.120	1.0625-18	.165	.265	.134
20	.602	1.250	1.156	1.438	.120	1.1875-18	.165	.265	.134
22	.602	1.375	1.250	1.562	.120	1.3125-18	.165	.265	.134
24	.602	1.500	1.375	1.688	.147	1.4375-18	.165	.265	.134

All dimensions for reference only.

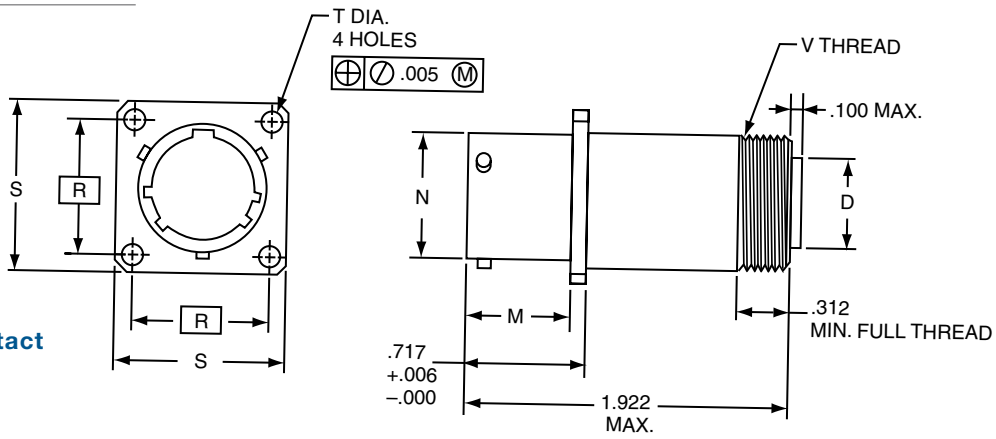
FSJT – MIL-DTL-38999 Type

Wall Mounting Receptacle (UTS crimp)- Aluminum

PART NUMBER BUILDER Page G23-25

Commercial

ALUMINUM
21-65X0
21-63X2 BELOW



21-65X0

UTS (Crimp) Contact
SAE AS39029/57

Plug movement required to clear FSJT receptacles: .625 min.

Shell Size	D Dia. ±.005	M +.000 –.005	N Dia. +.001 –.005	R (TP)	S +.021 –.020	T Dia. +.004 –.003	V Thread UNEF-2A
10	.427	.632	.590	.719	.938	.120	.6875-24
12	.541	.632	.750	.812	1.031	.120	.8125-20
14	.666	.632	.875	.906	1.125	.120	.9375-20
16	.791	.632	1.000	.969	1.219	.120	1.0625-18
18	.897	.632	1.125	1.062	1.312	.120	1.1875-18
20	1.022	.602	1.250	1.156	1.438	.120	1.3125-18
22	1.147	.602	1.375	1.250	1.562	.120	1.4375-18
24	1.272	.602	1.500	1.375	1.688	.147	1.5625-18

***Note 1.** Standard Printed Circuit Termination diameter

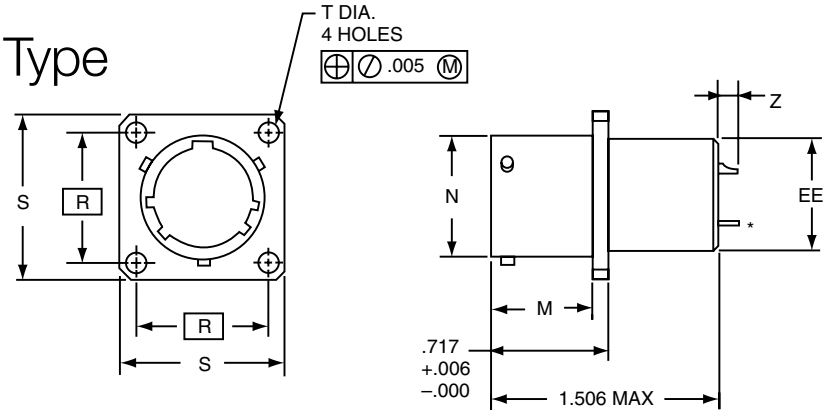
Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup Please consult. Amphenol Aerospace for additional lengths.

FSJT - MIL-DTL-38999 Type

Box Mounting Receptacle - Aluminum

21-63X2



Plug movement required to clear FSJT receptacles: .625 min.

Shell Size	M +.000 –.005	N Dia. +.001 –.005	R (TP)	S +.021 –.020	T Dia. +.004 –.003	EE +.001 –.005	Z Max. Size 16 Contact	Z Max. Size 20 Contact	Z Max. Size 16 or 16 & 20 Contacts	Z Max. Size 22 Contact
10	.632	.590	.719	.938	.120	.562	.265	.165	.265	.134
12	.632	.750	.812	1.031	.120	.687	.265	.165	.265	.134
14	.632	.875	.906	1.125	.120	.812	.265	.165	.265	.134
16	.632	1.000	.969	1.219	.120	.937	.265	.165	.265	.134
18	.632	1.125	1.062	1.312	.120	1.062	.265	.165	.265	.134
20	.602	1.250	1.156	1.438	.120	1.187	.265	.165	.265	.134
22	.602	1.375	1.250	1.562	.120	1.312	.265	.165	.265	.134
24	.602	1.500	1.375	1.688	.147	1.437	.265	.165	.265	.134

All dimensions for reference only.

FSJT – MIL-DTL-38999

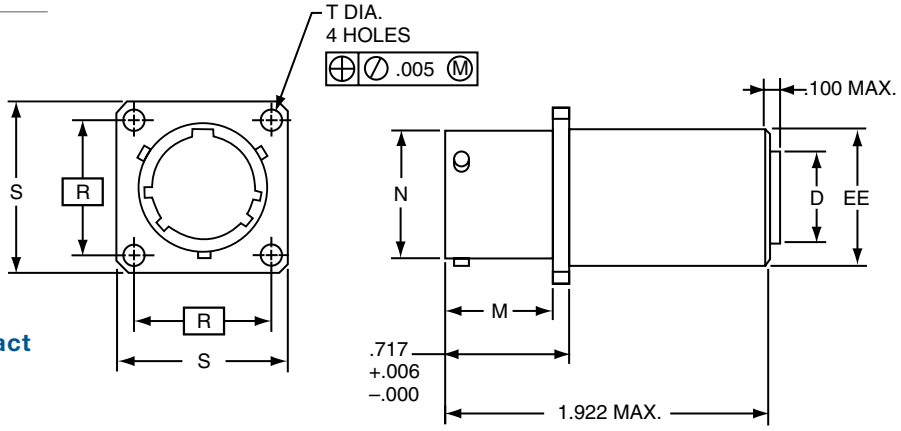
Box Mounting Receptacle (UTS crimp) - Aluminum

Amphenol Aerospace

PART NUMBER BUILDER Page G23-25

Commercial

ALUMINUM
21-65X2
21-63X7 BELOW



21-65X2

UTS (Crimp) Contact
SAE AS39029/57

Plug movement required to clear FSJT receptacles: .625 min.

Shell Size	D Dia. ±.005	M +.000 –.005	N Dia. +.001 –.005	R (TP)	S +.021 –.020	T Dia. +.004 –.003	EE Dia. +.001 –.005
10	.427	.632	.590	.719	.938	.120	.687
12	.541	.632	.750	.812	1.031	.120	.811
14	.666	.632	.875	.906	1.125	.120	.937
16	.791	.632	1.000	.969	1.219	.120	1.061
18	.897	.632	1.125	1.062	1.312	.120	1.187
20	1.022	.602	1.250	1.156	1.438	.120	1.312
22	1.147	.602	1.375	1.250	1.562	.120	1.437
24	1.272	.602	1.500	1.375	1.688	.147	1.562

***Note 1.** Standard Printed Circuit Termination diameter

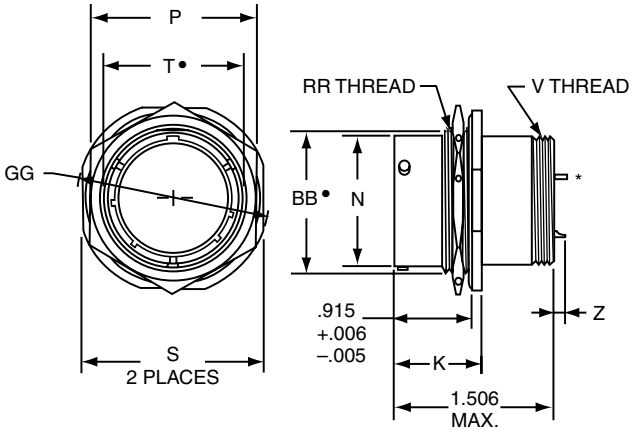
Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

"D" shaped mounting hole dimensions
Plug movement required to clear FSJT receptacles: .625 min.

FSJT MIL-DTL-38999

Jam Nut Receptacle - Aluminum

21-63X7



Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.

Shell Size	K +.006 –.005	N Dia. +.001 –.005	P Hex	S ±.016	T• +.010 –.000	V Thread UNEF Class 2A	Z ±.020	BB• +.000 –.010	GG Max.	RR Thread UNEF Class 2A	SS +.001 –.016
10	1.024	.590	.875	1.062	.697	.5625-24	.150	.669	1.203	.6875-24	.680
12	1.024	.750	1.062	1.250	.884	.6875-24	.150	.830	1.391	.8750-20	.859
14	1.024	.875	1.188	1.375	1.007	.8125-20	.150	.955	1.515	1.0000-20	.984
16	1.024	1.000	1.312	1.500	1.134	.9375-20	.150	1.084	1.641	1.1250-18	1.108
18	1.055	1.125	1.438	1.625	1.259	1.0625-18	.150	1.208	1.766	1.2500-18	1.233
20	1.055	1.250	1.562	1.812	1.384	1.1875-18	.150	1.333	1.953	1.3750-18	1.358
22	1.055	1.375	1.688	1.938	1.507	1.3125-18	.150	1.459	2.078	1.5000-18	1.483

FBL MIL-DTL-38999, Series IV

Circular Filter Connectors

Features, Alernate Rotations

Components designed to meet the severe mechanical and environmental requirements of MIL-DTL-38999 Series III are now available to Series IV users. Modifications of the connector are available with EMP protection, incorporating MOV's, diodes or a combination of both.

- Intermateable with MIL-DTL-38999 Series IV plugs
- Maintains all the features of standard MIL-DTL-38999 Series IV receptacles
- Scoop-proof pins provide contact protection
- Uses insert patterns from MIL-DTL-38999 Series III



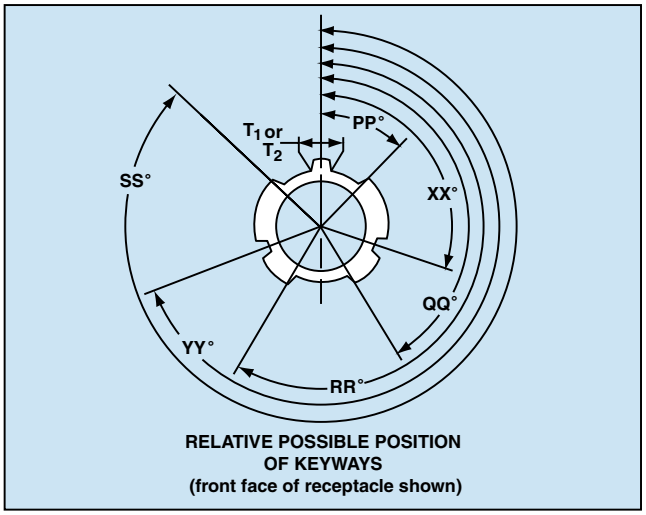
FBL

FBL MASTER KEY/KEYWAY ROTATION

Shell Size	Receptacle Key Position				Main Key Receptacle/Basic	
	PP°	QQ°	RR°	SS°	Socket Contact T_1	Pin Contact T_2
11	44°28'	151°6'	208°54'	315°32'	.075	.109
13	44°25'	150°31'	209°29'	315°35'	.076	.112
15	44°33'	150°24'	209°36'	315°27'	.096	.132
17	44°36'	150°22'	209°38'	315°24'	.096	.134
19	44°33'	150°27'	209°33'	315°27'	.117	.154
21	44°34'	150°23'	209°37'	315°26'	.118	.155
23	44°34'	150°20'	209°40'	315°26'	.138	.176
25	44°42'	150°22'	209°48'	315°18'	.139	.177

POLARITY DIMENSIONS

Key and Keyway Arrangement	XX°	YY°
N	110°	250°
A	100°	260°
B	90°	270°
C	80°	280°
D	70°	290°
K	120°	255°



RELATIVE POSSIBLE POSITION OF KEYWAYS
(front face of receptacle shown)

Rotations

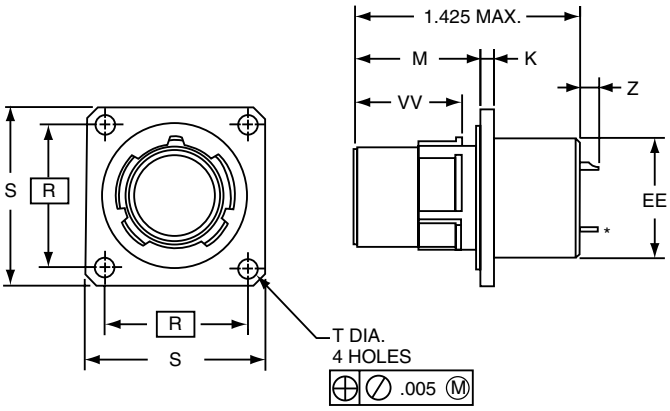
Box and Wall Mounting Receptacle

Amphenol Aerospace

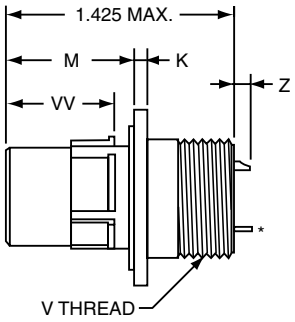
PART NUMBER BUILDER Page G23-25

Commercial

21-61X2
21-61X0



BOX MOUNT
21-61X2XX-XXX



WALL MOUNT
21-61X0XX-XXX

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.

Shell Size	K ±.010	M ±.020	R (TP)	S +.021 −.020	T Dia. +.004 −.003	V Thread (Plated) −.006	EE Dia. +.001 −.005	VV ±.003	Z Max. Size 16 Contact	Z Max. Size 20 Contact	Z Max. Size 16 or 16 & 20 Contacts	Z Max. Size 22 Contact
11	.092	.791	.812	1.029	.128	M15X1-6g0.100R	.589	.672	.265	.165	.265	.134
13	.092	.791	.906	1.124	.128	M18X1-6g0.100R	.707	.672	.265	.165	.265	.134
15	.092	.791	.969	1.218	.128	M22X1-6g0.100R	.865	.672	.265	.165	.265	.134
17	.092	.791	1.062	1.313	.128	M25X1-6g0.100R	.983	.672	.265	.165	.265	.134
19	.092	.791	1.156	1.439	.128	M28X1-6g0.100R	1.101	.662	.265	.165	.265	.134
21	.124	.791	1.250	1.561	.128	M31X1-6g0.100R	1.219	.662	.265	.165	.265	.134
23	.124	.791	1.375	1.687	.147	M34X1-6g0.100R	1.337	.662	.265	.165	.265	.134
25	.124	.791	1.500	1.813	.147	M37X1-6g0.100R	1.455	.662	.265	.165	.265	.134

All dimensions for reference only.

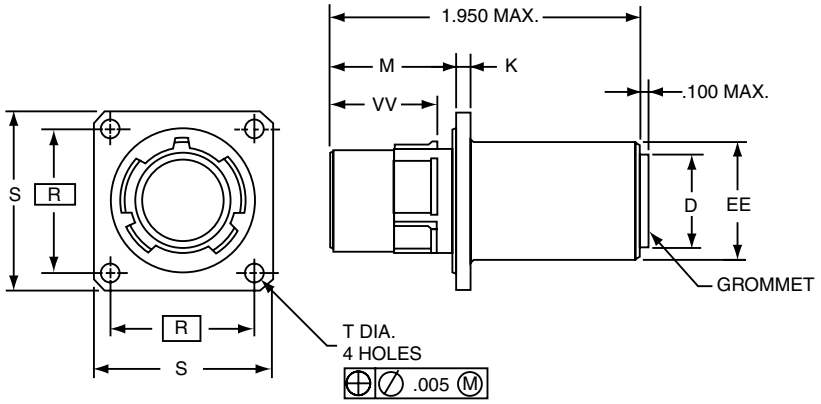
FBL – MIL-DTL-38999 Series IV

Box and Wall Mounting Receptacle (UTS Crimp)

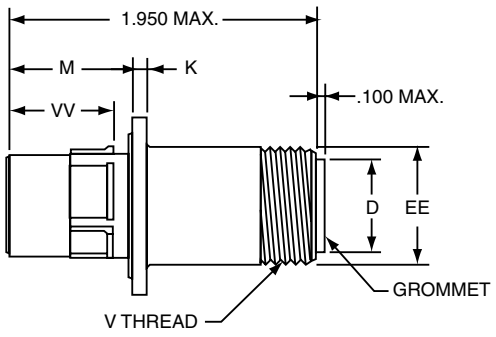
PART NUMBER BUILDER Page G23-25

Commercial

21-64X2
21-64X0



BOX MOUNT
21-64X2XX-XXX
UTS (Crimp) Contact
MIL-C-39029/57



WALL MOUNT
21-64X0XX-XXX
UTS (Crimp) Contact
MIL-C-39029/57

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.

Shell Size	D Dia. ±.005	K ±.010	M ±.020	R (TP)	S +.021 –.020	T Dia. +.004 –.003	V Thread (Plated) –.006	EE Dia. +.001 –.005	VV ±.003
11	.427	.092	.791	.812	1.029	.128	M18X1-6g0.100R	.687	.672
13	.541	.092	.791	.906	1.124	.128	M22X1-6g0.100R	.811	.672
15	.666	.092	.791	.969	1.218	.128	M25X1-6g0.100R	.937	.672
17	.791	.092	,791	1.062	1.313	.128	M28X1-6g0.100R	1.061	.672
19	.897	.092	.791	1.156	1.439	.128	M31X1-6g0.100R	1.187	.662
21	1.022	.124	.791	1.250	1.561	.128	M34X1-6g0.100R	1.312	.662
23	1.147	.124	.791	1.375	1.687	.147	M37X1-6g0.100R	1.437	.662
25	1.272	.124	.791	1.500	1.813	.147	M41X1-6g0.100R	1.562	.662

FPT – MIL-DTL-26482 Series

Circular Filter Connectors Features, Alternate Rotations

Amphenol Aerospace

The Amphenol® FPT Series combines the unique design features of the miniature PT Series with an EMI filter.

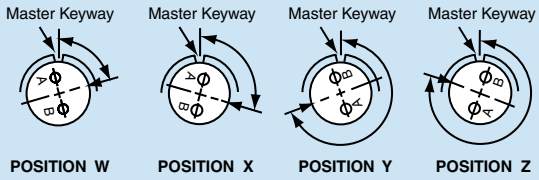
- Intermateable with MIL-DTL-26482 Series connectors; see Matrix 26482, Series 2 at www.amphenol-aerospace.com or Catalog MIL-DTL-26482, Series 1.
- Quick positive coupling with visual confirmation of mating
- Higher reliability and greater durability with permanently encapsulated contacts
- Aluminum shells with several finish options



FPT

FPT Alternate Positions

Insert Arrangements	Degrees			
	W	X	Y	Z
10-5	45	151	180	270
10-6	90	–	–	–
10-98	90	180	240	270
12-3	–	–	180	–
12-8	90	112	203	292
12-10	60	155	270	295
12-98	61	135	189	340
14-12	434	90	–	–
14-18	15	90	180	270
14-19	30	165	315	–
16-8	54	152	180	331
16-26	60	–	275	338
18-32	85	138	222	265
20-41	45	126	225	–
22-41	39	–	–	–
22-55	30	142	226	314
24-61	90	180	270	324



Views looking into front face of pin insert or rear of socket insert.

Rotations

Filter

EMI/EMP

G

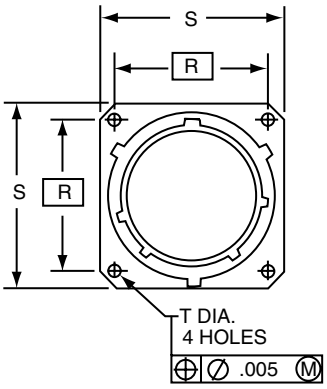
FPT - MIL-DTL-26482

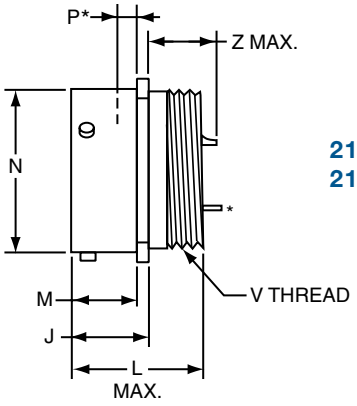
Wall Mounting Receptacle

PART NUMBER BUILDER Page G23-25

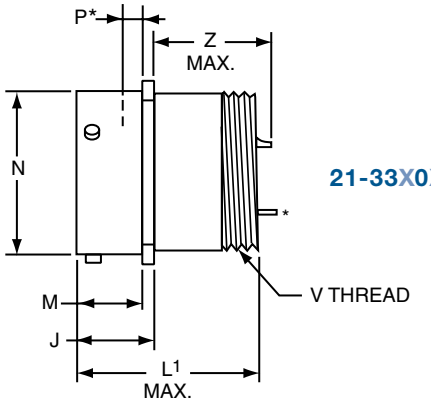
Commercial

ALUMINUM
21-20X0
21-31X0
21-33X0





21-20X0XX-XXX
21-31X0XX-XXX



21-33X0XX-XXX

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.

Plug movement required to clear FPT receptacles: .438 min. * Acceptable panel thickness for back panel mounting a standard receptacle.

Shell Size	J +.021 −.010	M +.010 −.000	N Dia +.001 −.005	P* Max.	R (TP)	S +.011 −.010	T Dia. ±.005	V Thread UNEF-2A (Plated)	SHORT SHELL VHF/UHF/MF Filters			LONG SHELL HF Filters		
									L Max.	Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.	L[1] Max.	Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.
8	.493	.431	.473	.087	.594	.812	.120	.4375-28	1.103	.850	.904	1.588	1.258	1.328
10	.493	.431	.590	.087	.719	.938	.120	.5625-24	1.103	.850	.904	1.588	1.258	1.328
12	.493	.431	.750	.087	.812	1.031	.120	.6875-24	1.103	.850	.904	1.588	1.258	1.328
14	.493	.431	.875	.087	.906	1.125	.120	.8125-20	1.103	.850	.904	1.588	1.258	1.328
16	.493	.431	1.000	.087	.969	1.219	.120	.9375-20	1.103	.850	.904	1.588	1.258	1.328
18	.493	.431	1.125	.087	1.062	1.312	.120	1.0625-18	1.103	.850	.904	1.588	1.258	1.328
20	.650	.556	1.250	.212	1.156	1.438	.120	1.1875-18	1.166	.755	.809	1.651	1.163	1.233
22	.650	.556	1.375	.212	1.250	1.562	.120	1.3125-18	1.166	.755	.809	1.651	1.163	1.233
24	.683	.589	1.500	.212	1.375	1.688	.147	1.4375-18	1.166	.722	.776	1.651	1.130	1.200

All dimensions for reference only.

FPT - MIL-DTL-26482

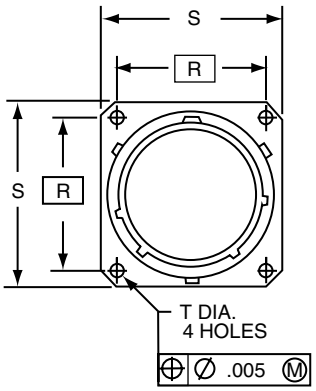
Box Mounting Receptacle

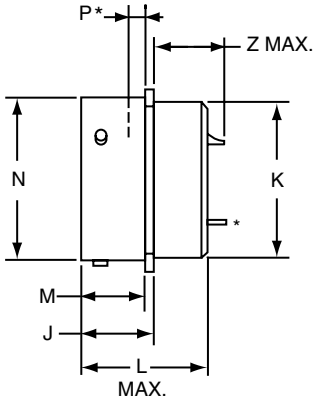
Amphenol Aerospace

PART NUMBER BUILDER Page G23-25

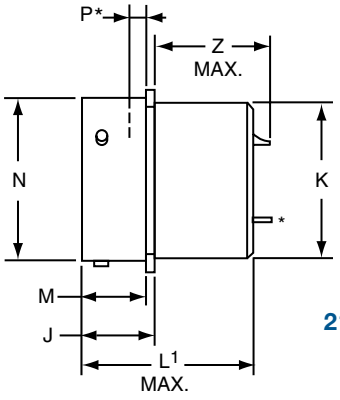
Commercial

ALUMINUM
21-20X2
21-31X2
21-33X2





21-20X2XX-XXX
21-31X2XX-XXX



21-33X2XX-XXX

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.

Plug movement required to clear FPT receptacles: .438 min. Acceptable panel thickness for back panel mounting a standard receptacle.

Shell Size	J +.021 −.010	K Dia. +.011 −.000	M +.010 −.000	N Dia +.001 −.005	P* Max.	R (TP)	S +.011 −.010	T Dia. ±.005	SHORT SHELL VHF/UHF/MF Filters			LONG SHELL HF Filters		
									L Max.	Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.	L[1] Max.	Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.
8	.493	.438	.431	.473	.087	.594	.812	.120	1.103	.850	.904	1.588	1.258	1.328
10	.493	.562	.431	.590	.087	.719	.938	.120	1.103	.850	.904	1.588	1.258	1.328
12	.493	.688	.431	.750	.087	.812	1.031	.120	1.103	.850	.904	1.588	1.258	1.328
14	.493	.812	.431	.875	.087	.906	1.125	.120	1.103	.850	.904	1.588	1.258	1.328
16	.493	.938	.431	1.000	.087	.969	1.219	.120	1.103	.850	.904	1.588	1.258	1.328
18	.493	1.062	.431	1.125	.087	1.062	1.312	.120	1.103	.850	.904	1.588	1.258	1.328
20	.650	1.188	.556	1.250	.212	1.156	1.438	.120	1.166	.755	.809	1.651	1.163	1.233

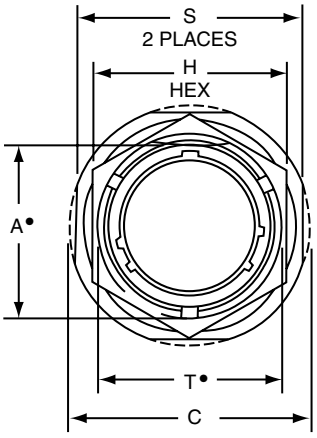
All dimensions for reference only.

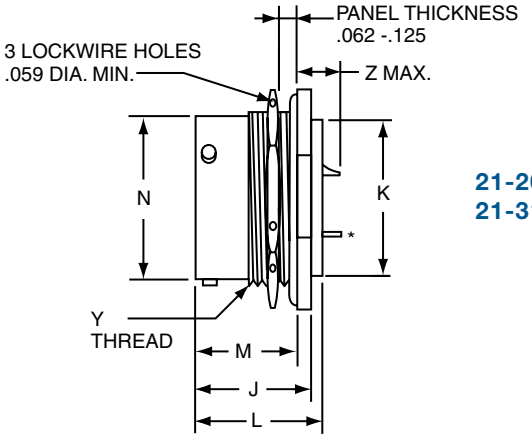
Jam Nut Receptacle

PART NUMBER BUILDER Page G23-25

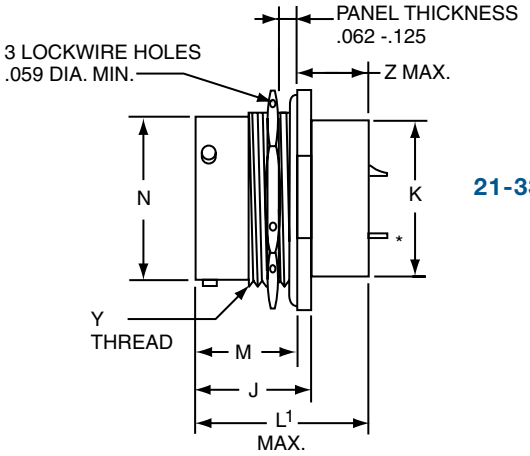
Commercial

ALUMINUM
21-20X7
21-31X7
21-33X7





21-20X7XX-XXX
21-31X7XX-XXX



21-33X7XX-XXX

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.
"D" shaped mounting hole dimensions. Plug movement required to clear FPT receptacles: .438 min.

Shell Size	A• Flat +.000 −.010	C Dia. +.011 −.010	H Hex +.017 −.016	J +.006 −.005	K Dia. +.011 −.000	M ±.005	N Dia +.001 −.005	S ±.010	T• Dia. +.010 −.000	Y Thread UNEF-2A (Plated)	SHORT SHELL VHF/UHF/MF Filters L Max.	Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.	LONG SHELL HF Filters L[1] Max.	Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.
8	.542	1.062	.750	.821	.438	.696	.473	.938	.572	.5625-24	1.103	.642	.698	1.588	1.050	1.120
10	.669	1.188	.875	.821	.562	.696	.590	1.062	.697	.6875-24	1.103	.642	.698	1.588	1.050	1.120
12	.830	1.375	1.062	.821	.688	.696	.750	1.250	.884	.8750-20	1.103	.642	.698	1.588	1.050	1.120
14	.955	1.500	1.188	.821	.812	.696	.875	1.375	1.009	1.0000-20	1.103	.642	.698	1.588	1.050	1.120
16	1.084	1.625	1.312	.821	.938	.696	1.000	1.500	1.134	1.1250-18	1.103	.642	.698	1.588	1.050	1.120
18	1.208	1.750	1.438	.821	1.062	.696	1.125	1.625	1.259	1.2500-18	1.103	.642	.698	1.588	1.050	1.120
20	1.333	1.938	1.562	1.040	1.188	.884	1.250	1.812	1.384	1.3750-18	1.166	.516	.570	1.651	.924	.994
22	1.459	2.062	1.688	1.040	1.312	.884	1.375	1.938	1.509	1.5000-18	1.166	.516	.570	1.651	.924	.994
24	1.575	2.188	1.812	1.073	1.438	.917	1.500	2.062	1.634	1.6250-18	1.166	.483	.537	1.651	.891	.961

All dimensions for reference only.

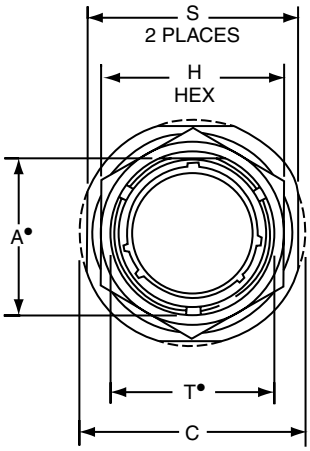
Jam Nut Receptacle (Minimum Penetration)

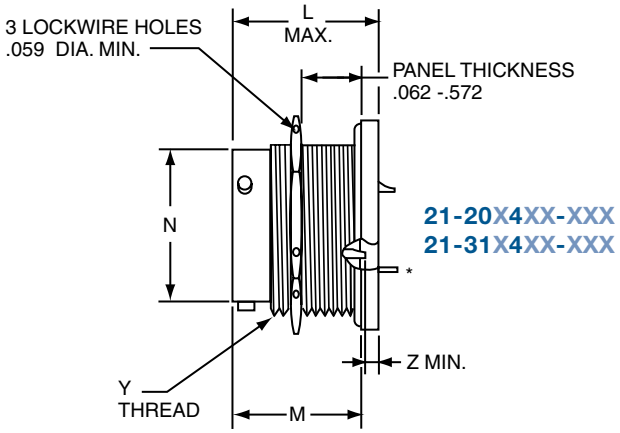
Amphenol Aerospace

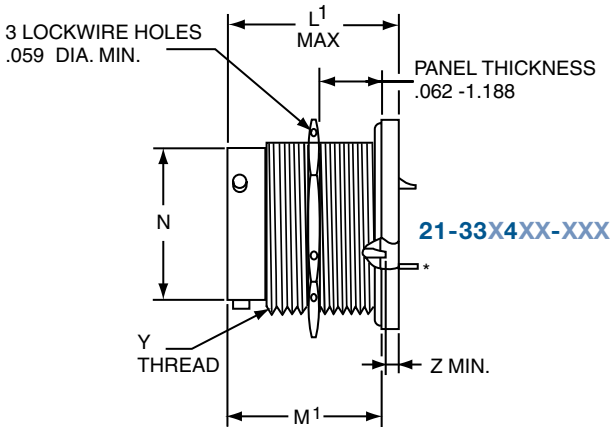
PART NUMBER BUILDER Page G23-25

Commercial

ALUMINUM
21-20X4
21-31X4
21-33X4







***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.
"D" shaped mounting hole dimensions. Plug movement required to clear FPT receptacles: .438 min.

Shell Size	A• Flat +.000 −.010	C Dia. +.011 −.010	H Hex +.017 −.016	M +.016 −.015	M¹ +.016 −.015	N Dia +.001 −.005	S +.011 −.010	T• Dia. +.010 −.000	Y Thread UNEF-2A (Plated)	SHORT SHELL VHF/UHF/MF Filters			LONG SHELL HF Filters		
										L Max.	Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.	L¹ Max.	Size 20 Contact Z Max.	Size 16 or 16 & 20 Contacts Z Max.
8	.542	1.062	.750	1.235	1.690	.473	.938	.572	.5625-24	1.366	.022	.029	1.821	.070	.000
10	.669	1.188	.875	1.235	1.690	.590	1.062	.697	.6875-24	1.366	.022	.029	1.821	.070	.000
12	.830	1.375	1.062	1.235	1.690	.750	1.250	.884	.8750-20	1.366	.022	.029	1.821	.070	.000
14	.955	1.500	1.188	1.235	1.690	.875	1.375	1.009	1.0000-20	1.366	.022	.029	1.821	.070	.000
16	1.084	1.625	1.312	1.235	1.690	1.000	1.500	1.134	1.1250-18	1.366	.022	.029	1.821	.070	.000
18	1.208	1.750	1.438	1.235	1.690	1.125	1.625	1.259	1.2500-18	1.366	.022	.029	1.821	.070	.000
20	1.333	1.938	1.562	1.266	1.721	1.250	1.812	1.384	1.3750-18	1.428	.062	.029	1.883	.070	.000
22	1.459	2.062	1.688	1.266	1.721	1.375	1.938	1.509	1.5000-18	1.428	.062	.029	1.883	.070	.000
24	1.575	2.188	1.812	1.266	1.721	1.500	2.062	1.634	1.6250-18	1.428	.062	.029	1.883	.070	.000

All dimensions for reference only.

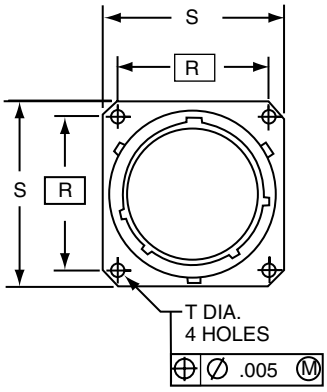
FPTE

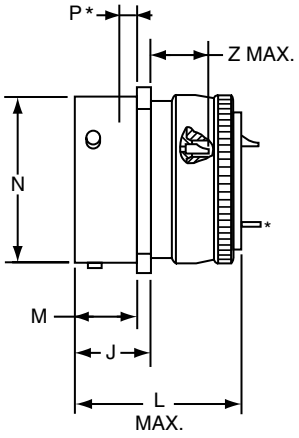
Wall Mounting Receptacle

PART NUMBER BUILDER Page G23-25

Commercial

ALUMINUM
21-22X0





21-22X0XX-XXX

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup
Please consult Amphenol Aerospace for additional lengths

Plug movement required to clear FPT receptacles: .438 min.
* Acceptable panel thickness for back panel mounting a standard receptacle.

Shell Size	J +.021 −.010	M +.010 −.000	N Dia +.001 −.005	P* Max.	R (TP)	S +.011 −.010	T Dia. ±.005	SHORT SHELL VHF/UHF/MF Filters	
								L Max.	Size 20 Contact Z Max.
8	.493	.431	.473	.087	.594	.812	.120	1.409	.774
10	.493	.431	.590	.087	.719	.938	.120	1.409	.774
12	.493	.431	.750	.087	.812	1.031	.120	1.409	.774
14	.493	.431	.875	.087	.906	1.125	.120	1.409	.774
16	.493	.431	1.000	.087	.969	1.219	.120	1.409	.774
18	.493	.431	1.125	.087	1.062	1.312	.120	1.409	.774
20	.650	.556	1.250	.212	1.156	1.438	.120	1.553	.679
22	.650	.556	1.375	.212	1.250	1.562	.120	1.553	.679
24	.683	.589	1.500	.212	1.375	1.688	.147	1.553	.646

All dimensions for reference only.

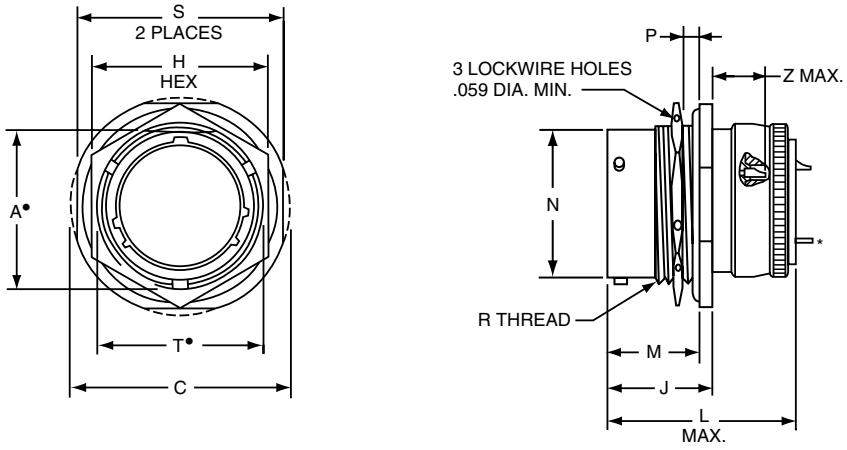
Jam Nut Receptacle

Amphenol Aerospace

PART NUMBER BUILDER Page G23-25

Commercial

ALUMINUM
21-22X7



21-22X7XX-XXX

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup
Please consult Amphenol Aerospace for additional lengths

All dimensions for reference only.
"D" shaped mounting hole dimensions. Plug movement required to clear FPT receptacles: .438 min.

Shell Size	A• Flat +.000 −.010	C Dia. +.011 −.010	H Hex +.017 −.016	J +.006 −.005	M ±.005	N Dia. +.001 −.005	P Panel Thickness Max.	P Panel Thickness Min.	R Thread UNEF-2A (Plated)	S ±.010	T• Dia. +.010 −.000	SHORT SHELL VHF/UHF Filters L Max.	SHORT SHELL VHF/UHF Filters Size 20 Contact Z Max.
8	.542	1.062	.750	.821	.696	.473	.125	.062	.5625-24	.938	.572	1.546	.566
10	.669	1.188	.875	.821	.696	.590	.125	.062	.6875-24	1.062	.697	1.546	.566
12	.830	1.375	1.062	.821	.696	.750	.125	.062	.8750-20	1.250	.884	1.546	.566
14	.955	1.500	1.188	.821	.696	.875	.125	.062	1.0000-20	1.375	1.009	1.546	.566
16	1.084	1.625	1.312	.821	.696	1.000	.125	.062	1.1250-18	1.500	1.134	1.546	.566
18	1.208	1.750	1.438	.821	.696	1.125	.125	.062	1.2500-18	1.625	1.259	1.546	.566
20	1.333	1.938	1.562	1.040	.884	1.250	.250	.062	1.3750-18	1.812	1.384	1.672	.440
22	1.459	2.062	1.688	1.040	.884	1.375	.250	.062	1.5000-18	1.938	1.509	1.672	.440
24	1.575	2.188	1.812	1.073	.917	1.500	.250	.062	1.6250-18	2.062	1.634	1.672	.407

Amphenol FAN Series

Filtered "AN" - Features, Alternate Rotations

The "AN" Filter Connector is designed in configurations intermateable and intermountable with MIL-DTL-5015* connectors and provides electromagnetic interference protection for critical circuits.

- Same dimensions as the non-filtered standard MIL-Spec connectors with the exception of back shell length. (See Catalog MIL-DTL-5015).
- Uses non-removable solder cup terminated contacts.
- Shells are impact extruded or machined bar stock aluminum and are available in several conductive platings.
- Applications include power transmission, medical communications, and ground support equipment.

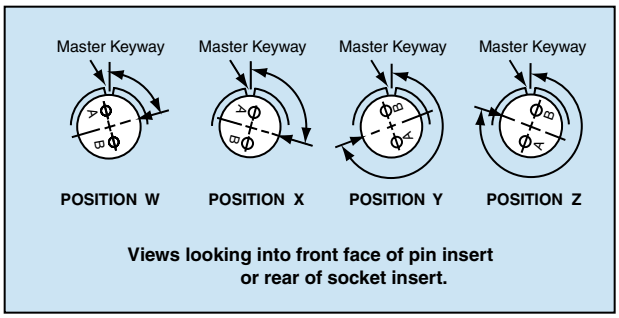


FAN

The following insert arrangements within the 5015 family have the same alternate insert rotations for W, X, Y and Z, which are:

Degrees			
W	X	Y	Z
80	110	250	280

16-7	20-22	22-29	24-17	28-16	32-13
18-5	22-6	22-33	24-20	28-17	32-22
18-9	22-12	22-34	24-21	28-19	32-AF
18-13	22-14	24-1	24-28	28-20	36-1
18-14	22-15	24-3	28-1	28-21	36-7
20-7	22-16	24-4	28-4	32-1	36-8
20-8	22-17	24-5	28-8	32-3	36-13
20-9	22-18	24-6	28-9	32-4	40-AR
20-12	22-19	24-7	28-10	32-6	40-AS
20-14	22-21	24-12	28-11	32-9	40-AT
20-16	22-24	24-14	28-14	32-10	40-AU
20-20	22-25	24-16	28-15	32-12	



Rotations

The following are additional 5015 insert arrangements with alternate rotations.

Insert Arrangement	Degrees			
	W	X	Y	Z
10SL-4	63	–	–	–
12S-3	70	145	215	290
14S-2	–	120	240	–
14S-5	–	110	–	–
14S-7	90	180	270	–
14S-9	70	145	215	290
16-9	35	110	250	325
16-10	90	180	270	–
16-11	35	110	250	325
16-13	35	110	250	325
16S-1	80	–	–	280
16S-4	35	110	250	325
16S-5	70	145	215	290
16S-6	90	180	270	–
16S-8	–	170	265	–
18-1	70	145	215	290
18-3	35	110	250	325
18-4	35	110	250	325
18-8	70	–	–	290
18-10	–	120	240	–
18-11	–	170	265	–
18-12	80	–	–	280
18-15	–	120	240	–
18-20	90	180	270	–
18-22	70	145	215	290
18-29	90	180	270	–
20-3	70	145	215	290
20-4	45	110	250	–
20-5	35	110	250	325
20-6	70	145	215	290

* MIL-DTL-5015 supersedes MIL-C-5015.

Insert Arrangement	Degrees			
	W	X	Y	Z
20-15	80	–	–	280
20-17	90	180	270	–
20-18	35	110	250	325
20-19	90	180	270	–
20-21	35	110	250	325
20-23	35	110	250	325
20-24	35	110	250	325
20-27	35	110	250	325
20-29	80	–	–	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
22-8	35	110	250	325
22-9	70	145	215	290
22-10	35	110	250	325
22-11	35	110	250	325
22-13	35	110	250	325
22-20	35	110	250	325
22-22	–	110	250	–
22-23	35	–	250	–
22-27	80	–	250	280
22-28	80	–	–	280
22-63	20	–	–	–
24-2	80	–	–	280
24-9	35	110	250	325
24-10	80	–	–	280
24-11	35	110	250	325
24-22	45	110	250	–
24-27	80	–	–	280
28-2	35	110	250	325
28-3	70	145	215	290
28-5	35	110	250	325
28-6	70	145	215	290

Insert Arrangement	Degrees			
	W	X	Y	Z
28-7	35	110	250	325
28-12	90	180	270	–
28-18	70	145	215	290
28-22	70	145	215	290
28-AY	45	110	250	–
32-2	70	145	215	290
32-5	35	110	250	325
32-7	80	125	235	280
32-8	80	125	235	280
32-15	35	110	250	280
32-17	45	110	250	–
32-25	60	120	–	–
32-48	80	–	–	–
32-64	80	100	110	250
32-68	30	–	–	–
32-82	30	–	–	–
36-3	70	145	215	290
36-4	70	145	215	290
36-5	–	120	240	–
36-6	35	110	250	325
36-9	80	125	235	280
36-10	80	125	235	280
36-14	90	180	270	–
36-15	60	125	245	305
36-AF	65	–	–	–
40-1	65	130	235	300
40-5	33	–	–	270
40-9	65	125	225	310
40-10	65	125	225	310
40-35	70	130	230	290
40-AD	45	–	–	–
40-AG	37	74	285	322
40-AP	35	110	250	325
40-AV	90	180	270	–

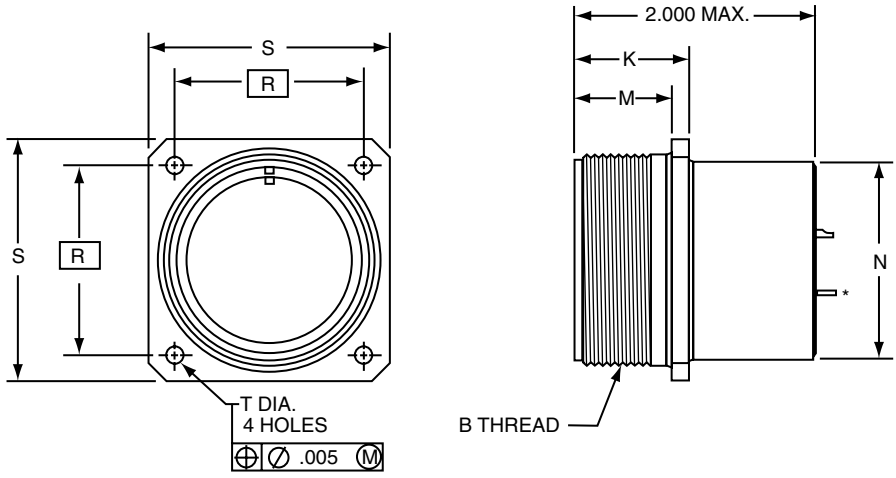
Box Mounting Receptacle

Amphenol Aerospace

PART NUMBER BUILDER Page G23-25

Commercial

ALUMINUM
21-26X2



21-26X2XX-XXX

***Note 1.** Standard Printed Circuit Termination diameter

Contact size (AWG)	±.002
22	0.020
20	0.030
16	0.040
12	0.081

Standard contact termination is Solder Cup.
Please consult Amphenol Aerospace for additional lengths.

Shell Size	B Thread Class 2A (Plated)	M +.010 −.000	K +.020 −.010	N Dia. +.010 −.000	R TP	S ±.031	T Dia. +.004 −.002
8S	.5000-28 UNEF	.562	.672	.375	.594	.875	.120
10S	.6250-24 UNEF	.562	.672	.500	.719	1.000	.120
10SL	.6250-24 UNEF	.562	.672	.625	.719	1.000	.120
12S	.7500-20 UNEF	.562	.672	.625	.812	1.094	.120
12	.7500-20 UNEF	.750	.860	.625	.812	1.094	.120
14S	.8750-20 UNEF	.562	.672	.750	.906	1.188	.120
14	.8750-20 UNEF	.750	.860	.750	.906	1.188	.120
16S	1.0000-20 UNEF	.562	.672	.875	.969	1.281	.120
16	1.0000-20 UNEF	.750	.860	.875	.969	1.281	.120
18	1.1250-18 UNEF	.750	.891	1.000	1.062	1.375	.120
20	1.2500-18 NEF	.750	.891	1.125	1.156	1.500	.120
22	1.3750-18 NEF	.750	.891	1.250	1.250	1.625	.120
24	1.5000-18 NEF	.812	.953	1.375	1.375	1.750	.147
28	1.7500-18 NS	.812	.953	1.625	1.562	2.000	.147
32	2.0000-18 NS	.875	1.031	1.875	1.750	2.250	.173
36	2.2500-16 UN	.875	1.031	2.062	1.983	2.500	.173

Amphenol Filter Adapters

Circuit Protection for Existing Applications

Filter adapters present an effective and economical method of introducing EMI/EMP protection to an installed system. The adapter series of filter connectors from Amphenol are available to intermate with all the popular MIL-Specs.

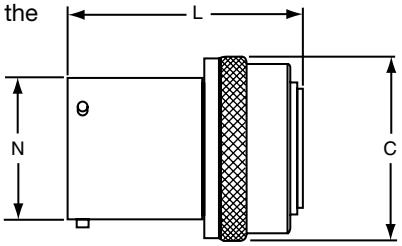


FEATURES OF THE AMPHENOL ADAPTER INCLUDE:

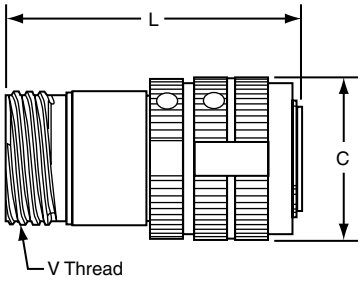
- Planar technology from the industry's leader in circulars
- Filter products
- MOV or diode capability for transient protection
- Wide range of tooled patterns
- Space qualified components

Installation of the adapter is quick and efficient, requiring no tools, fixtures or extended downtime. Simply un-mate the existing cable harness from the receptacle; attach the coupling nut to the receptacle on the unit; then mate the cable harness to the receptacle side of the adapter. Several design alternatives are available that will help ensure that the adapter remains permanently attached to either the cable harness or the unit receptacle.

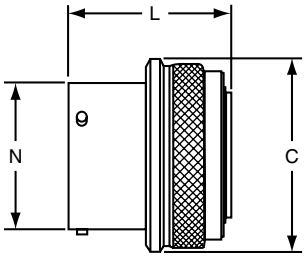
FPT Adapter
21-900075-XXX



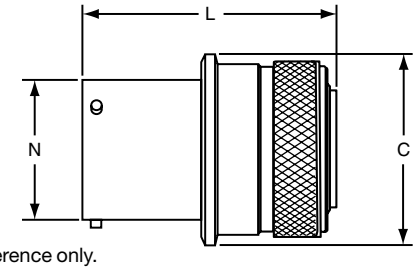
FTV Adapter
21-900529-XXX



FJT Adapter
21-900393-XXX



FLJT Adapter
21-900423-XXX



All dimensions for reference only.
Consult Amphenol Aerospace for ordering information.

ADAPTERS

FPT Shell Size	C Dia. Ref.	N Dia. +.001 –.005	L Max.
8	.729	.473	1.626
10	.851	.590	1.626
12	1.035	.750	1.626
14	1.158	.875	1.626
16	1.280	1.000	1.626
18	1.403	1.125	1.626
20	1.525	1.250	1.688
22	1.648	1.375	1.688
24	1.770	1.500	1.688

FTV Shell Size	C Dia. Ref.	V Thread 0.1P-0.3L-TS Class 2A	L Max.
9	.845	.6250	2.257
11	.950	.7500	2.257
13	1.121	.8750	2.257
15	1.249	1.0000	2.257
17	1.386	1.1875	2.257
19	1.493	1.2500	2.257
21	1.620	1.3750	2.257
23	1.737	1.5000	2.257
25	1.864	1.6250	2.257

FJT Shell Size	C Dia. +.011 –.010	N Dia. +.001 –.005	L Max.
8	.847	.473	1.397
10	.969	.590	1.397
12	1.143	.750	1.397
14	1.255	.875	1.397
16	1.388	1.000	1.397
18	1.510	1.125	1.397
20	1.633	1.250	1.397
22	1.756	1.375	1.397
24	1.878	1.500	1.397

FLJT Shell Size	C Dia. Ref.	N Dia. +.001 –.005	L Max.
9	.827	.572	2.038
11	1.949	.700	2.038
13	1.121	.850	2.038
15	1.243	.975	2.038
17	1.378	1.100	2.038
19	1.488	1.207	2.038
21	1.611	1.332	2.038
23	1.733	1.457	2.038
25	1.856	1.582	2.038

MOV– Metal Oxide Varistor Connectors

Amphenol Aerospace



MOV

FEATURES & BENEFITS:

- Filter connector size package
- Protection for 14, 31, 38 DC voltage circuits
- Radiation hardened
- No additional circuits required
- Low impedance
- Increased reliability
- Nanosecond response time
- Elimination of costly external suppression assemblies

The Amphenol ® MOV Connector offers the versatility of a standard connector, with transient protection for sensitive circuits. Transients in electrical circuits caused by a sudden release of stored energy can originate within or outside of the circuit and may be repeatable or random.

Regardless of frequency or origin, transient caused failures generated by load switching, lightning, electrostatic discharge (ESD) and electromagnetic pulse (EMP) can destroy unprotected IC components.

Compatible with present filter connector assembly procedures, MOVs can be combined with existing filters. Internal housing of the MOV offers weight and space savings over other protection methods available today, and eliminates costly and bulky exterior suppression mechanisms in appropriate situations. MOVs are presently available in contact sizes 22, 20 and 16.

Transient protection can be provided in receptacle, plug or adapter configuration. These connectors are intermateable and intermountable with the following MIL-Specs:

- MIL-DTL-38999
- MIL-DTL-83723
- MIL-DTL-5015
- MIL-DTL-26482
- MIL-DTL-26500
- MIL-DTL-27599

MOV Connectors

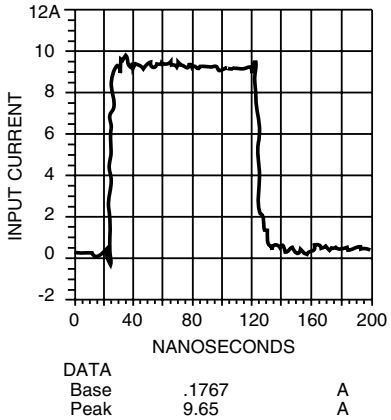
Performance Characteristics

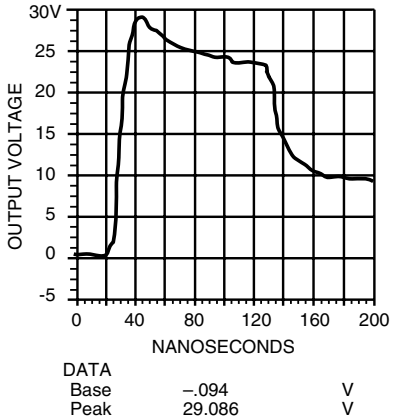
M.O.V. PERFORMANCE CHARACTERISTICS

Designation	Contact Size	Maximum Rating (125°C) Continuous DC Voltage V_m Volts	Maximum Rating (125°C) Continuous RMS Voltage V_m Volts	Maximum Rating (125°C) Transient Energy (10/1000µS) W_{tm} Joules	Maximum Rating (125°C) Transient Peak Current (8/20µS) I_{tm} Amperes	Specifications (25°C) Varistor Voltage at 1mA (DC) Min. Volts	Varistor Voltage at 1mA (DC) Nominal Volts	Varistor Voltage at 1mA (DC) Max. Volts	Maximum Clamping Voltage V_c at Test Current I_p (8/20µS) V_c Volts	Maximum Clamping Voltage V_c at Test Current I_p (8/20µS) I_p Amps	Capacitance at 1 MHz Picofarads Min.	Capacitance at 1 MHz Picofarads Max.	Maximum Leakage Current at V_t (dc) I_L Max. 25°C µA	Maximum Leakage Current at V_t (dc) I_L Max. 125°C µA
F8	22	**8**	5.6	1.2	250	12	**14**	17	28	10	1000	2500	5	50
	20			1.3	300					10				
	16			1.5	350					20				
F14	22	**14**	10	1.2	250	18.5	**22**	25	40	10	800	2000	5	50
	20			1.5	300					10				
	16			1.5	350					20				
F25	22	**25**	17	1.3	250	29	**33**	38	66	10	600	1600	5	50
	20			1.7	300					10				
	16			1.7	350					20				
F31	22	**31**	22	1.5	250	35	**39**	45	80	5	400	1400	5	50
	20			2	300					10				
	16			2	350					10	600	1600		
F38	22	**38**	27	1.5	250	42	**47**	58	90	5	200	1000	5	50
	20			2	300					10				
	16			2.5	350					10	400	1200		
F45	22	**45**	32	1.5	250	53	**59**	68	100	5	200	850	5	50
	20			2.5	300					10				
	16			3	350					10	300	1000		

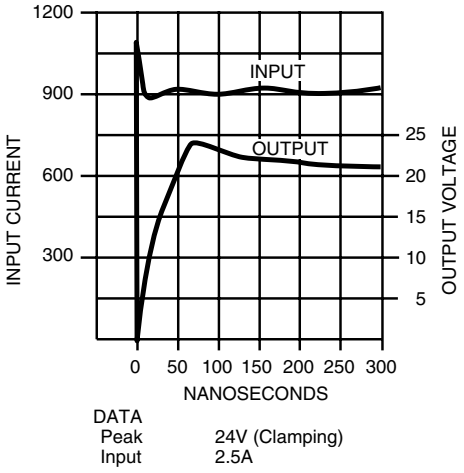
NOTE: Continuous voltage ratings are based on 1000 hour reliability assurance tests at 125°C rated ambient temperature per MIL-STD-202 method 108. Contact Amphenol Sidney for options not listed in chart.

The following charts show the typical MOV response to an input pulse open circuit of 1000V and 10A peak square wave with a 5 nanosecond rise time in a 50 Ohm system.





The following chart shows response time and output voltage of a typical MOV with 1000V, 5 nanosecond, 2.5A input pulse mounted in an LJT 13–35P connector. Test was performed without load.



Transient Protection

Diode Connectors

Amphenol Aerospace

FEATURES & BENEFITS:

- Clamping voltage as low as 11.9 volts
- Low capacitance – suitable for high frequency applications
- Unipolar or bipolar – using existing proven diode technology
- Protection for 5.8 to 60 VDC circuits
- No additional circuits required
- Low impedance – high frequency response
- Increased reliability
- Nanosecond response time
- Elimination of costly external suppression assemblies
- Screening to applicable requirements of MIL-S-19500TX/TXV available
- Keeps transients outside of the box
- Minimizes fast transient voltage overshoot



The Amphenol® Diode Connector offers the versatility of a standard connector, with transient protection for sensitive circuits, such as TTL Lines.

Transients in electrical circuits caused by a sudden release of stored energy can originate within or outside of the circuit and may be repeatable or random.

Regardless of frequency or origin, transient caused failures generated by load switching, lightning, electrostatic discharge (ESD) and electromagnetic pulse (EMP) can destroy unprotected IC components.

Compatible with present filter connector assembly procedures, diodes can stand alone or can be combined in series with filters. Internal housing of the diode offers weight and space savings over other protection methods available today, and eliminates costly and bulky exterior suppression mechanisms in appropriate situations. Diodes are presently available in contact sizes 22 and 20.

Transient protection can be provided in receptacle, plug or adapter configurations. These connectors are intermateable and intermountable with the following MIL-Specs:

- MIL-DTL-5015
- MIL-DTL-26482
- MIL-DTL-26500
- MIL-DTL-27599
- MIL-DTL-38999
- MIL-DTL-83723

Amphenol can provide COTS solutions utilizing leaded & surface mounted devices. For more information contact Amphenol Aerospace at 800-678-0141.



Transient Protection

ESA – Energy Shunting Assembly

The Amphenol ® Energy Shunting Assembly (ESA) is a simple, compact unit which provides lightning and electromagnetic pulse (EMP) protection of systems in which many signal lines enter sensitive electronic equipment. The efficient packaging of the ESA circumvents the concept of one protective device per line. It provides a surge arrestor which has the advantage of space saving and simplified assembly when compared to current protective devices which range from diodes to large spark gaps.

The current ESA design consists of two 53-pin contact, Mil-Standard, hermetic connectors assembled back to back, and encompassing a ground plate. A sealed chamber is formed within this thru-bulkhead unit, housing 53 in-line spark gaps. Introducing a controlled atmosphere enhances fast rise breakdown.

The ESA can be integrated with an EMI filter connector which can improve its performance. These two assemblies provide a method to help protect against lightning, EMP, EMI and TEMPEST effects.



ESA
ENERGY SHUNTING ASSEMBLY

PERFORMANCE CHARACTERISTICS		
1. DC breakdown voltage		230 Volts
2. Maximum rated surge discharge current (8 x 20 microsecond pulse)		5,000 Amperes per pin
3. Insulation resistance		10^{10} ohms minimum
4. Capacitance between each electrode and the ground plane		Less than 2 pf
5. Rate-of-rise breakdown voltage	Maximum Breakdown Voltage (Volts)	Rate of Rise (Volts/microsecond)
	600 800 1,500 2,000	10 1,000 10,000 1000,000
6. Surge breakdown unbalance (at 100 Volts/microseconds)		180 Volts
7. Surge life (500 Ampere – 10 x 1,000 microsecond)		400 Surges
8. Hold-over voltage		100 Volts
9. Arcing voltage		40 Volts
10. Glow to arc transition point		1 Ampere
11. Temperature range		–40°F to 150°F (233°K to 339°K)

(ESD) Protected Connectors

Protection from Electrostatic Discharge

Amphenol Aerospace

Amphenol has developed cylindrical and rectangular connectors which protect sensitive components from Electrostatic Discharge (ESD) without diodes, varistors, gas tubes, or "experimental" semi-conductive materials.
These connectors utilize the Faraday Cage principle to shunt electrostatic discharge events to the conductive enclosure on which the connector is mounted, thus never allowing the high voltage, high current discharge event to reside on any contacts.
The ESD protected connectors have the same physical envelope as their standard counterparts, and do not require special mounting or terminating techniques. All of the contacts remain fully functional, and electrical characteristics such as capacitance are not effected.

PRODUCT FEATURES:

- Connector envelope identical to unprotected design for most applications
- Exceeds protection requirements of IEC 801-2 and MIL-STD-1686:
- Ensures that all components within a conductive enclosure will be subjected to a maximum of 10V during electrostatic discharges between –26 KV and +26 KV
- Voltage observed on contacts during ESD events – <10V (at 1 megohm)
- Current observed on contacts during ESD events – <100 milliamperes (at 2 ohms)
- Response time – instantaneous (voltage and current are maximum values)
- Maximum ESD voltage – tested to ±26KV
- No capacitive loading
- Eliminates the need for discrete components (such as diodes) and maximizes printed circuit board real estate for equipment housed in conductive enclosures which require ESD protection as free-standing units
- Operating voltage of connectors not affected for most designs
- Pulse life – infinite

WHAT IS ELECTROSTATIC DISCHARGE (ESD)?

Electrostatic Discharge (ESD) is the rapid transfer of a static electric charge from one body to another. A static electric charge consists of either a surplus or depletion of electrons on a body, which gives that body a potential or voltage relative to ground (or another body). The discharge is extremely fast (less than 1 nanosecond risetime) and the current flow may exceed 100 amps!

Static electricity is normally the result of two materials transferring charges when rubbed or separated, such as shoes scuffing across a dry carpet, or sheets of untreated plastic being separated. This phenomena is commonly referred to as the triboelectric effect.
The voltage developed due to the triboelectric effect depends on the materials involved, the quantity and type of contact, and relative humidity. In a dry environment a person can accumulate a charge of up to 25 KV! In a moist environment a person's potential is reduced due to the effect of moisture on the insulating properties of materials.

WHAT IS A FARADAY CAGE?

A **Faraday Cage** is a conductive enclosure. It may be solid in form such as a sheet–metal enclosure, or it may be full of apertures, such as a wire cloth box. When a charge is placed on a Faraday Cage, the electrons which make up the charge, having like polarity, try to position themselves as far as possible from each other. This places the electrons on the outer surface of the enclosure, leaving the inner surface uncharged. The charge on the outer surface does not induce a charge on any neutral object inside of the Faraday Cage, and therefore does not try to transfer itself onto the internal object. Neutral objects (such as IC's) inside of a faraday cage are thereby
protected from ESD activity external to the Faraday Cage.



ESD TESTING ON MIL-DTL-38999, SERIES III FILTER CYLINDRICAL CONNECTOR (ACTUAL PHOTO)

The voltage and current observed on neutral objects within a Faraday Cage during ESD events are due to the secondary effects of ESD. These include Electromagnetic Interference (EMI), magnetic and electrical field coupling. The Faraday Cage of the Amphenol ESD Protected Connectors has been designed to minimize these effects.

THE AMPHENOL® ESD PROTECTED CONNECTORS

The Amphenol ESD Protected Connectors have a Faraday Cage at the mating interface. The Faraday Cage has been specifically designed to intercept electrostatic discharges from the contacts in the unmated state, while maintaining each contact's isolation when the connector is mated. When the ESD Protected Connectors have been mounted to a conductive enclosure, a Faraday Cage is created which will protect components located within the enclosure from electrostatic discharges. This eliminates the need for discrete components such as diodes and gas discharge tubes, and saves printed circuit board real estate. Amphenol ESD Protected Connectors have also been applied to Line Replaceable Modules (LRM).*