

HD38999

High Density

A connector that has the
connections... Goes from 9 to 187 contacts!

High Density Interconnects

The HD38999 family of connectors has 30% more contact density than the highest density Mil Spec 38999 connectors of its size. This series of connectors was designed to utilize mil-specified 38999 components with the exception of the contacts and inserts arrangement. Utilizing existing mil-qualified 39029 size 23 contacts and 38999 insert materials, these connectors are essentially a drop-in replacement for the standard 38999 connector.

This connector design benefits users in a couple of different ways. For those users who need to increase the amount of contacts in their application, the HD38999 series allows them to do so without increasing the size of their connector. For users who are looking to decrease the overall size of their system, they can do so by using smaller shell sizes without decreasing the number of contacts.

Amphenol has qualified this series of connectors to the requirements of MIL-DTL-38999. Amphenol also manufactures this high density series in Filter, Hermetic and customized versions to fit our customer's needs. Please contact us if additional information is required.

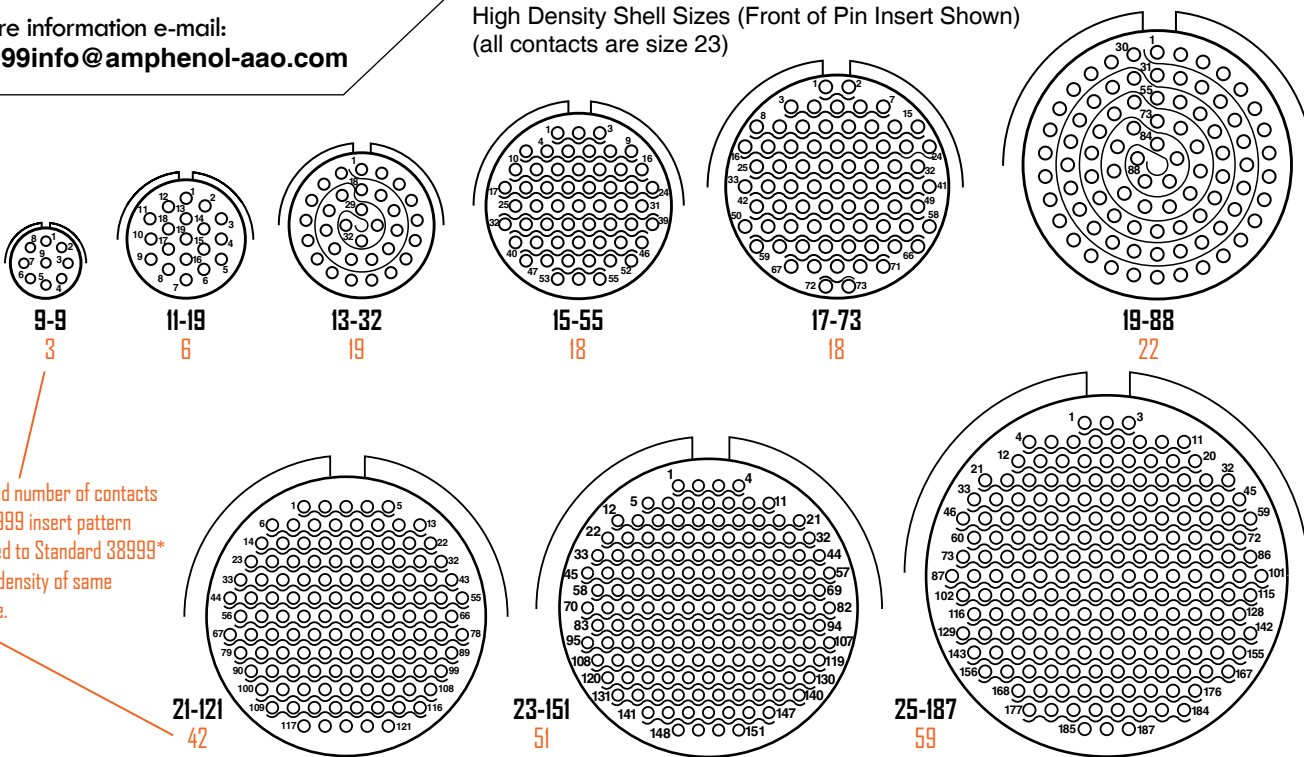


HD38999 Connectors available styles:

- Aluminum
- Composite
- Stainless Steel
- Sealed (IP67)
- Filtered

For more information e-mail:
hd38999info@amphenol-aao.com

High Density Shell Sizes (Front of Pin Insert Shown)
(all contacts are size 23)



* Standard inserts for 38999 series are shown in Amphenol's Combined Circular Catalog, 12-C ()

Amphenol
Aerospace

The Interconnection Leader

Call 800-678-0141 or visit us at www.amphenol-aerospace.com

Easy Steps to build a part number... HD38999

1.	2.	3.	4.	5.	6.	7.
Connector Type	Shell Styles	Service Class	Shell Size – Insert Arrangement	Contact Type	Alternate Positions	PCB Options
TV or PTV (Potted version)	06	RW	23-151	P	B	(P25)



Step 1. Select a Connector Type

		Designates
P (prefix for Potted)	TV	Tri-Start Series Connector
	TVP	Back panel mounted receptacle
	MTV	CLUTCH-LOK connector with "MS" stamping (Note: remove dashes in how to order part number when ordering CLUTCH-LOK)
	CTV	Composite MIL-DTL-38999 Series III connector
	CTVP	Panel mounted composite receptacle

Step 6. Select an Alternate Position

A, B, C, D, E or blank for normal.

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
11, 13, and 15	E	91	131	197	240
	N*	95	141	208	236
	A	113	156	182	292
	B	90	145	195	252
	C	53	156	220	255
17 and 19	D	119	146	176	298
	E	51	141	184	242
	N*	80	142	196	293
	A	135	170	200	310
	B	49	169	200	244
21, 23, and 25	C	66	140	200	257
	D	62	145	180	280
	E	79	153	197	272
	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

Step 2. Select a Shell Style

	Designates
00	Wall mount receptacle
01	Line receptacle
02	Box mount receptacle
06	Straight plug
07	Jam nut receptacle
26	Proprietary CLUTCH-LOK high vibration straight plug (service Classes RK & RS only)
97	Reduced flange jam nut receptacle (not available in composite)
96	Straight plug with integral backshell (not available in composite)

Step 3. Select a Service Class

	Designates
RF	Electroless nickel plated aluminum, optimum EMI shielding effectiveness -65dB @ 10GHz specification min., 48 hour salt spray, 175°C
RW	Corrosion resistant olive drab cadmium plate aluminum, 500 hour extended salt spray, EMI -50dB @ 10GHz specification min., 175°C
RL	Corrosion resistant stainless steel, electro-deposited nickel, 48 hours salt spray, 175°C, non-firewall
DT	Durmalon plated, alternative to cadmium. Corrosion resistant, 500 hour extended salt spray EMI -50dB @ 10GHz specification min. without CR ⁶
ZN	Zinc-Nickel alternative to cadmium. Corrosion resistant, 500 hour salt spray, conductive, -65°C to +175°C



Step 4. Select a Shell Size – Insert Arrangement

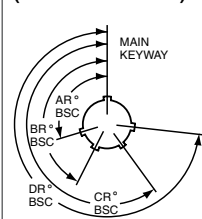
Shell Sizes are MIL-DTL-38999, Series III, with the newer High Density insert arrangements shown on page 1.

Shell Size	Insert Arrangement Number
9-	9
11-	19
13-	32
15-	55
17-	73
19-	88
21-	121
23-	151
25-	187

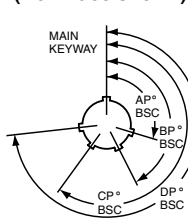
Step 5. Select a Contact Type

	Designates
P	Pin contacts
S	Socket contacts

RECEPTACLE (front face shown)



PLUG (front face shown)



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

Step 7. Select a PCB Contact Option

Pin Contacts	Pin Contacts with Alignment Disc*	Socket Contacts	Socket Contacts with Alignment Disc*	PCB tail stickout +/- .040 inch
P1	P1AD	S1	S1AD	.100" nominal
P15	P15AD	S15	S15AD	.150" nominal
P2	P2AD	S2	S2AD	.200" nominal
P25	P25AD	S25	S25AD	.250" nominal
P3	P3AD	S3	S3AD	.300" nominal
P35	P35AD	S35	S35AD	.350" nominal

* See page 8 for more information on alignment discs for HD38999 connectors.

Note: Standard tail diameter is 0.019 ±.001



Contacts & Tools

Contact Part Numbers:

Size 23 Sockets 10-597330-735 (M39029/17-172)
Size 23 Pins 10-597331-735 (M39029/18-177)
Sealing Plugs 10-405996-222 (MS27488-22-2)

Crimp Barrel Dia.:
(Inches) .034-.036

Crimp Barrel Depth:
(Inches) .151-.155

Tools:

Crimp Tool: DanielsM22520/2-01
Positioner: Daniels M22520/2-12 Pins
Insertion Tool: Daniels DAK225-22
Removal Tool: Daniels DRK225-22

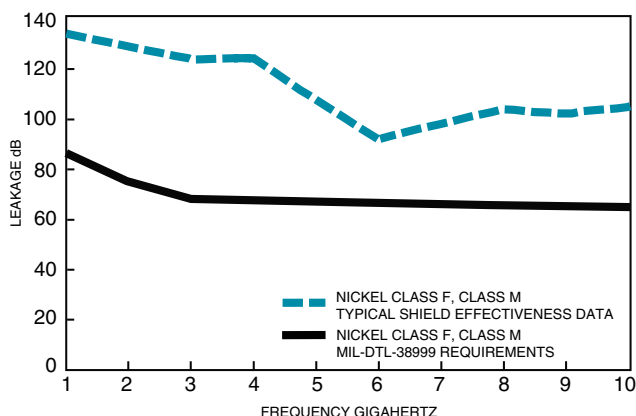
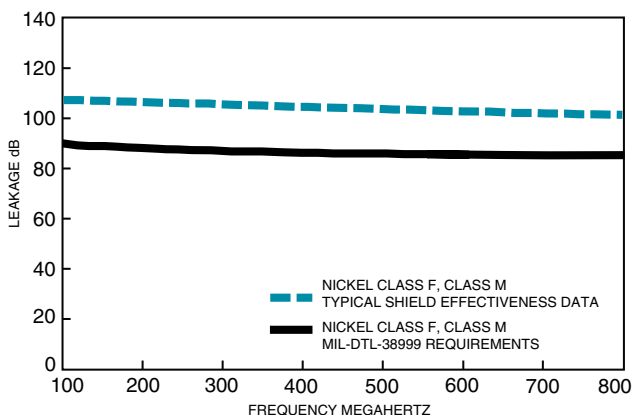
Note: Wire insulation diameter greater than 0.045 is too large for the extraction tool to work properly. Connector damage is possible.

Technical Data

HD38999 series was designed to meet and/or exceed the specifications of MIL-DTL-38999. The connector series has been tested to all the requirements of 38999 with the use of AS39029 size 23 contacts. Test reports are available upon request. The following is a summary of some of the performance requirements.

EMI Shielding Effectiveness:

Solid metal to metal coupling, EMI grounding fingers and conductive finishes have proven to be the ultimate in EMI/EMP shielding effectiveness. The following chart illustrated shielding effectiveness data which is typical in HD38999 connectors.



Electrical:

22 AWG: 5.0 AMPS
24 AWG: 3.0 AMPS
26 AWG: 2.0 AMPS
28 AWG: 1.5 AMPS

Insulation Resistance: 5000 megohms min. @500 VDC 25C

Dielectric Withstanding Voltage: 1000 VRMS@sea level

Mechanical:

Metallic Shells: Material: Aluminum alloy, Stainless Steel
Protection: Electroless Nickel, O.D. Cadmium, Durmalon (Nickel PTFE), Zinc Nickel

Composite Shells: Material: Thermoplastic
Protection: Electroless Nickel, O.D. Cadmium, Durmalon (Nickel PTFE), Zinc Nickel

Contacts: Material: Copper Alloy
Protection: Gold over Nickel

Insert Retention to Shell: 100 psi in axial load

Durability: 500 full mating and unmating cycles

Vibration: 60G sine per MIL-DTL-38999L Para 4.5.23.2.1
5G2 Random per EIA-364-28E, Test condition A
1G2 Random per EIA-364-28E, Test condition I

Shock: Per EIA-364-27B, 300g

Environmental:

Operating Temperature: -65°C to +175°C

Salt Spray:
Metallized: Electroless Nickel: 48 hours
Anodic Coating, O. D. Cadmium, Durmalon, Zinc Nickel: 500 hours

Salt Spray Composite: Electroless Nickel: 48 hours
O. D. Cadmium, Durmalon, Zinc Nickel: 500 hours

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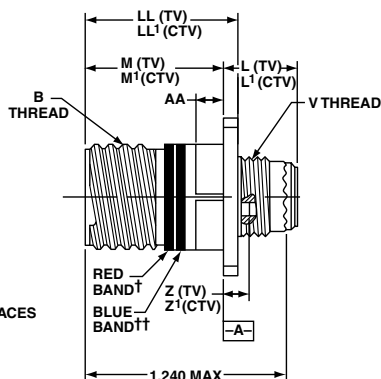
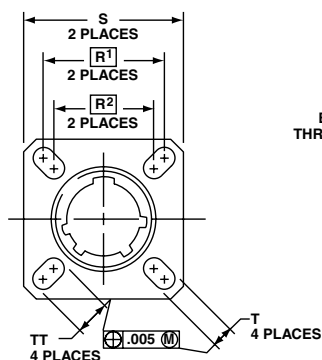
High Density

Shell Styles

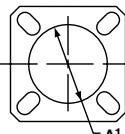
Wall Mounting Receptacle

TV00() - Crimp, Metal

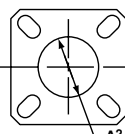
CTV00() - Crimp, Composite



PANEL HOLE DIMENSIONS



BACK PANEL MOUNTING



FRONT PANEL MOUNTING

See how to build a part number on pages 2 & 3

† Red band indicates fully mated

†† Blue band indicates rear release contact retention system.

Inches

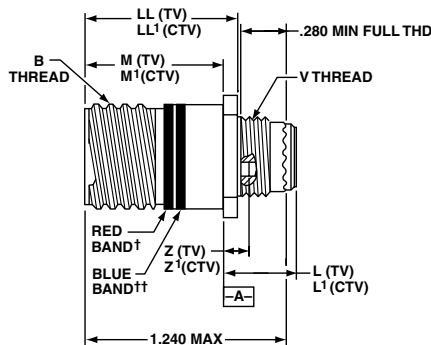
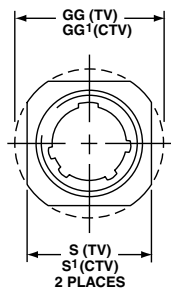
Shell Size	MS Shell Size Code	B Thread Class 2A 0.1P=0.3L-TS (Plated)	L Max. (TV)	L ¹ Max. (CTV)	M +.000 - .005 (TV)	M ¹ +.000 - .005 (CTV)	R ¹	R ²	S Max.	T ±.008	Z Max. (TV)	Z ¹ Max. (CTV)	A ¹ Back Panel Mount	A ² Front Panel Mount	AA Max. Panel Thickness	LL +.006 - .000 (TV)	LL ¹ ±.005 (CTV)	TT ±.008
9	A	.6250	.469	.514	.820	.773	.719	.594	.948	.128	.153	.198	.650	.510	.234	.905	.908	.216
11	B	.7500	.469	.514	.820	.773	.812	.719	1.043	.128	.153	.198	.800	.620	.234	.905	.908	.194
13	C	.8750	.469	.514	.820	.773	.906	.812	1.137	.128	.153	.198	.910	.740	.234	.905	.908	.194
15	D	1.0000	.469	.514	.820	.773	.969	.906	1.232	.128	.153	.198	1.040	.900	.234	.905	.908	.173
17	E	1.1875	.469	.514	.820	.773	1.062	.969	1.323	.128	.153	.198	1.210	1.010	.234	.905	.908	.194
19	F	1.2500	.469	.514	.820	.773	1.156	1.062	1.449	.128	.153	.198	1.280	1.130	.234	.905	.908	.194
21	G	1.3750	.500	.545	.790	.741	1.250	1.156	1.575	.128	.183	.228	1.410	1.250	.204	.905	.904	.194
23	H	1.5000	.500	.545	.790	.741	1.375	1.250	1.701	.154	.183	.228	1.530	1.360	.204	.905	.904	.242
25	J	1.6250	.500	.545	.790	.741	1.500	1.375	1.823	.154	.183	.228	1.660	1.470	.204	.905	.904	.242

All dimensions for reference only

Line Receptacle

TV01() - Crimp, Metal

CTV01() - Crimp, Composite



See how to build a part number on pages 2 & 3

† Red band indicates fully mated

†† Blue band indicates rear release contact retention system.

Inches

Shell Size	MS Shell Size Code	B Thread 0.1P-0.3L-TS-2A (Plated)	M +.000 - .005 (TV)	M ¹ +.000 - .005 (CTV)	L Max. (TV)	L ¹ Max. (CTV)	S ±.010 (TV)	S ¹ ±.010 (CTV)	Z Max (TV)	Z ¹ Max (CTV)	GG ±.010 (TV)	GG ¹ ±.010 (CTV)	LL +.006 - .000 (TV)	LL ¹ ±.005 (CTV)
9	A	.6250	.820	.773	.469	.514	.675	.635	.153	.198	.812	.699	.905	.908
11	B	.7500	.820	.773	.469	.514	.800	.765	.153	.198	.905	.875	.905	.908
13	C	.8750	.820	.773	.469	.514	.925	.885	.153	.198	1.093	1.007	.905	.908
15	D	1.0000	.820	.773	.469	.514	1.050	1.100	.153	.198	1.219	1.140	.905	.908
17	E	1.1875	.820	.773	.469	.514	1.238	1.197	.153	.198	1.375	1.229	.905	.908
19	F	1.2500	.820	.773	.469	.514	1.300	1.260	.153	.198	1.469	1.380	.905	.908
21	G	1.3750	.790	.741	.500	.545	1.425	1.385	.183	.228	1.625	1.493	.905	.904
23	H	1.5000	.790	.741	.500	.545	1.550	1.510	.183	.228	1.750	1.626	.905	.904
25	J	1.6250	.790	.741	.500	.545	1.675	1.635	.183	.228	1.875	1.777	.905	.904

All dimensions for reference only

H38999

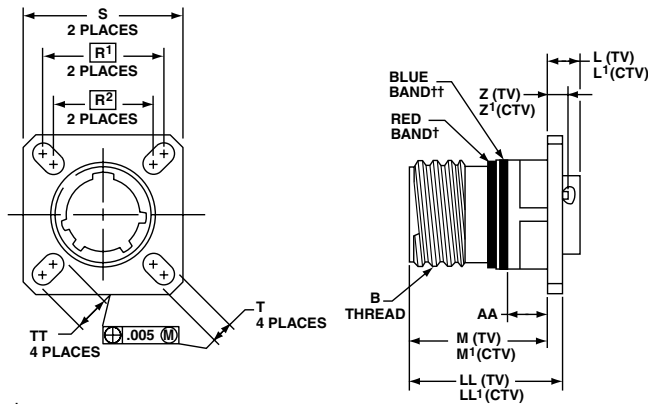
High Density

Shell Styles

Box Mount Receptacle

TV02() - Crimp, Metal

CTV02() - Crimp, Composite



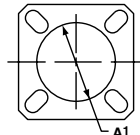
See how to build a part number on pages 2 & 3

† Red band indicates fully mated

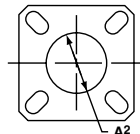
†† Blue band indicates rear release contact retention system.

Consult Amphenol Aerospace for availability for composite box mount receptacles.

PANEL HOLE DIMENSIONS



BACK PANEL MOUNTING



FRONT PANEL MOUNTING

Inches

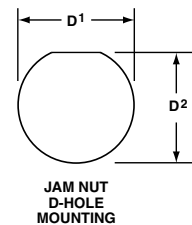
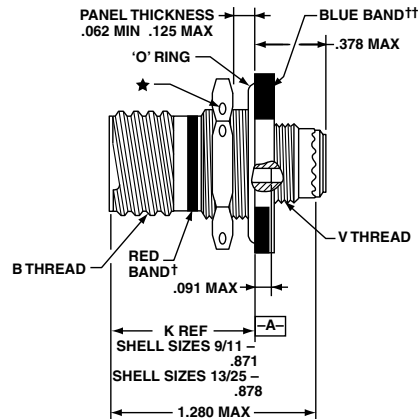
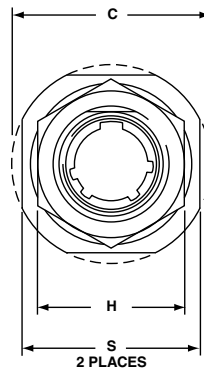
Shell Size	MS Shell Size Code	B Thread Class 2A 0.1P-0.3L-TS (Plated)	L Max. (TV)	L' Max. (CTV)	M +.000 - .005 (TV)	M' +.000 - .005 (CTV)	R ¹	R ²	S Max.	T ±.008	Z Max. (TV)	Z' Max. (CTV)	A ¹ Back Panel Mount	A ² Front Panel Mount	AA Max. Panel Thickness	LL +.006 - .000 (TV)	LL1 ±.005 (CTV)	TT ±.008
9	A	.6250	.205	.250	.820	.773	.719	.594	.948	.128	.153	.198	.650	.510	.234	.905	.908	.216
11	B	.7500	.205	.250	.820	.773	.812	.719	1.043	.128	.153	.198	.800	.620	.234	.905	.908	.194
13	C	.8750	.205	.250	.820	.773	.906	.812	1.137	.128	.153	.198	.910	.740	.234	.905	.908	.194
15	D	1.0000	.205	.250	.820	.773	.969	.906	1.232	.128	.153	.198	1.040	.900	.234	.905	.908	.173
17	E	1.1875	.205	.250	.820	.773	1.062	.969	1.323	.128	.153	.198	1.210	1.010	.234	.905	.908	.194
19	F	1.2500	.205	.250	.820	.773	1.156	1.062	1.449	.128	.153	.198	1.280	1.130	.234	.905	.908	.194
21	G	1.3750	.235	.280	.790	.741	1.250	1.156	1.575	.128	.183	.228	1.410	1.250	.204	.905	.904	.194
23	H	1.5000	.235	.280	.790	.741	1.375	1.250	1.701	.154	.183	.228	1.530	1.360	.204	.905	.904	.242
25	J	1.6250	.235	.280	.790	.741	1.500	1.375	1.823	.154	.183	.228	1.660	1.470	.204	.905	.904	.242

All dimensions for reference only

Jam Nut Receptacle

TV07() - Crimp, Metal

CTV07() - Crimp, Composite



See how to build a part number on pages 2 & 3

† Red band indicates fully mated

†† Blue band indicates rear release contact retention system.

★ .059 dia. min., 3 lockwire holes. Formed lockwire hole design (6 holes) is optional

Inches

Shell Size	MS Shell Size Code	B Thread Class 2A 0.1P-0.3L-TS (Plated)	C Max.	D ¹ +.010 - .000	D ² +.000 - .010	H Hex +.017 - .016	S ±.010	V Thread Metric
9	A	.6250	1.199	.700	.670	.875	1.062	M12X1-6g
11	B	.7500	1.386	.825	.770	1.000	1.250	M15X1-6g
13	C	.8750	1.511	1.010	.955	1.188	1.375	M18X1-6g
15	D	1.0000	1.636	1.135	1.085	1.312	1.500	M22X1-6g
17	E	1.1875	1.761	1.260	1.210	1.438	1.625	M25X1-6g
19	F	1.2500	1.949	1.385	1.335	1.562	1.812	M28X1-6g
21	G	1.3750	2.073	1.510	1.460	1.688	1.938	M31X1-6g
23	H	1.5000	2.199	1.635	1.585	1.812	2.062	M34X1-6g
25	J	1.6250	2.323	1.760	1.710	2.000	2.188	M37X1-6g

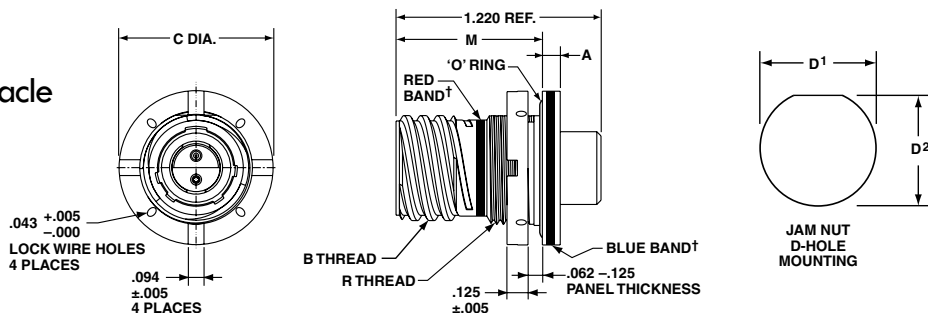
All dimensions for reference only



Shell Styles

Reduced Flange Jam Nut Receptacle

TV97() - Crimp, Metal



See how to build a part number on pages 2 & 3

† Red band indicates fully mated

†† Blue band indicates rear release contact retention system.

Inches

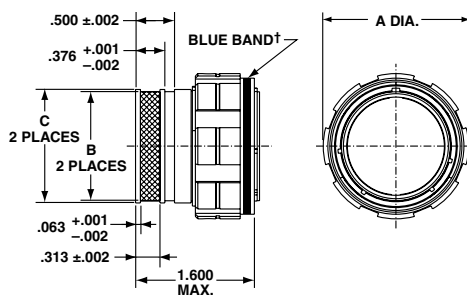
Shell Size	MS Shell Size Code	B Thread Class 2A 0.1P-0.3L-TS (Plated)	A +.010 -.005	C Dia. Max.	D ¹ +.010 -.000	D ² +.000 -.010	M	R Thread (Plated) 9-7543)
9	A	.6250	.104	1.199	.915	.670	.871	M12X1-6g
11	B	.7500	.104	1.386	1.042	.770	.871	M15X1-6g
13	C	.8750	.104	1.511	1.240	.955	.878	M18X1-6g
15	D	1.0000	.104	1.636	1.357	1.085	.878	M22X1-6g
17	E	1.1875	.104	1.761	1.630	1.210	.878	M25X1-6g
19	F	1.2500	.135	1.949	1.816	1.335	.878	M28X1-6g
21	G	1.3750	.135	2.073	1.942	1.460	.878	M31X1-6g
23	H	1.5000	.135	2.199	2.067	1.585	.878	M34X1-6g
25	J	1.6250	.135	2.323	2.190	1.710	.878	M37X1-6g

All dimensions for reference only

Straight Plug with Integral Backshell

TV96() (TV Type) - Crimp, Metal

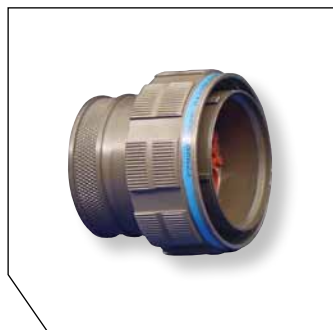
This MIL-DTL-38999 Series III style connector features an integral backshell design that eliminates the need for costly backshell accessories. The backshell feature is incorporated into the rear of the connector shell, allowing the user to attach the shield of their cable directly to the connector. This provides superior EMI shielding and ease for overmold applications. The straight plug with integral backshell is available in aluminum shells with OD Cad or Electroless Nickel plating.



See how to build a part number on pages 2 & 3

† Blue band indicates rear release contact retention system.

Inches



Shell Size	MS Shell Size Code	A Max.	B +.005 -.000	C +.003 -.002
9	A	.859	.416	.472
11	B	.969	.524	.580
13	C	1.141	.652	.708
15	D	1.266	.810	.866
17	E	1.391	.928	.984
19	F	1.500	1.046	1.102
21	G	1.625	1.164	1.220
23	H	1.750	1.282	1.338
25	J	1.875	1.400	1.456

All dimensions for reference only

H38999

High Density

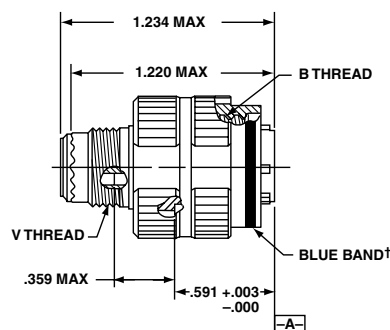
Shell Styles

Straight Plug

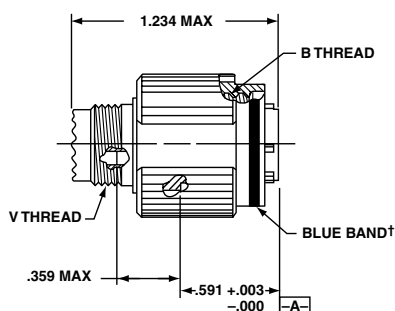
TV06() - Crimp, Metal

CTV06() - Crimp, Composite

METAL



COMPOSITE



CLUTCH-LOK™ Plug

TV26() - Crimp, Metal, Proprietary

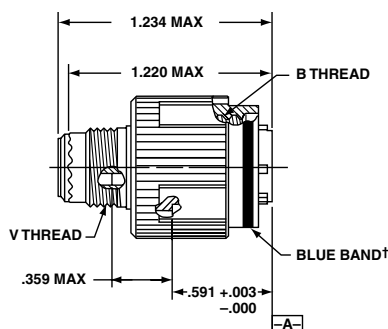
MTV26() - Crimp, Metal, with "MS" stamping

Designed for high vibration and harsh environments such as aircraft gas turbine engines, the CLUTCH-LOK is also an ideal choice for demanding applications such as aircraft, space and military ground vehicles. The unique clutch design of the Amphenol CLUTCH-LOK means that you don't have to compromise the need for quick, smooth mating of plugs and receptacles in order to get increased uncoupling torque.

The CLUTCH-LOK has proven to not only remain mated and pass all the Series III specification requirements, it also has proven to actually tighten itself under vibration. This is a powerful advantage over the traditionally high vibration application connectors. The CLUTCH-LOK is also a tremendous advantage in inaccessible, hard to reach areas where mating torque is difficult to apply and complete coupling is not verifiable by inspection.

CLUTCH-LOK features and benefits:

- High degree of differential torque
- Infinite free coupling and positive metal-to-metal bottoming with each mating
- No settling back to the next ratchet tooth
- Available with stainless steel shells and Class K firewall inserts
- All the advantages of MIL-DTL-38999 Series III including EMI/RFI shielding, electrolytic erosion resistance and contact protection with recessed pins
- Enhanced connector performance at affordable prices
- Completely interchangeable with all existing MIL-DTL-38999 Series III connectors
- Fully QPL'd



See how to build a part number on pages 2 & 3

† Blue band indicates rear release contact retention system

Inches

Shell Size	MS Shell Size Code	B Thread 0.1P-0.3L-TS-2B (Plated)	Q Dia. Max.
9	A	.6250	.858
11	B	.7500	.984
13	C	.8750	1.157
15	D	1.0000	1.280
17	E	1.1875	1.406
19	F	1.2500	1.516
21	G	1.3750	1.642
23	H	1.5000	1.768
25	J	1.6250	1.890

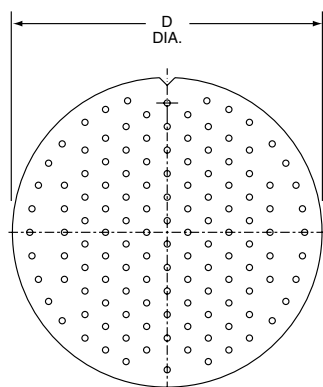
All dimensions for reference only



New Custom Designed HD38999 Connectors - Provide More Interconnect Solutions:

Alignment Disks

Alignment disks keep contacts aligned for easier insertion into circuit boards. These are typically ordered with the connector - see step 7 of How to Order on page 2.



Shell Size	D Dia. ±.010
9	.234
11	.350
13	.500
15	.725
17	.750
19	.850
21	.953
23	1.147
25	1.250

HD38999 Double Flange Receptacles for PC Board Applications

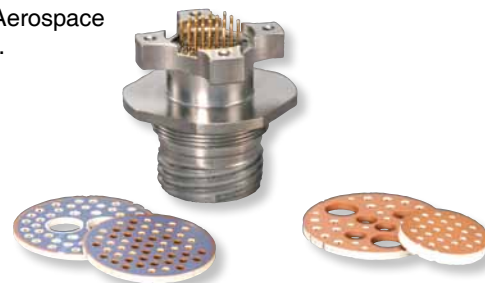
Amphenol also offers PC tail connectors in high density. A custom designed HD38999 with double flanges is available in box mount and jam nut panel mounting which allows the user to mount to PC boards. Shells are available in composite, aluminum and stainless steel.

Consult Amphenol Aerospace for ordering information.



Filtered HD38999 Connectors - for EMI/EMP Protection

High density patterns are available in filter 38999 connectors - consult Amphenol Aerospace for ordering.



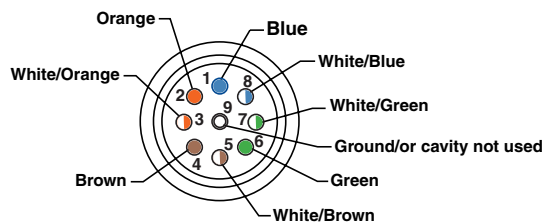
HD38999 for Gigabit Ethernet Applications

The HD38999 is available for high speed (Gigabit Ethernet) data transmission in the size 9-9 insert pattern.

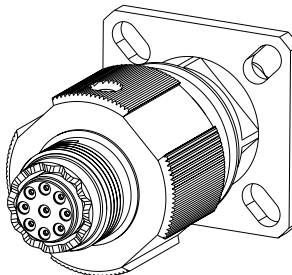
Data transmission performance of this connector insert:

- 10 Base T, 100 Base TX, and 1000 Base T networks using Cat 5e per TIA/EIA568B and Class D per ISO/IEC 11801.
(Test report available - consult Amphenol Aerospace for more information)

Signal-Ground Pin Configuration Wiring Recommendations



View Rear of Connector



HD38999 Connector with 9-9
Insert Pattern (Rear View)

Notice: Specifications are subject to change without notice. Contact your nearest Amphenol Corporation Sales Office for the latest specifications. All statements, information and data given herein are believed to be accurate and reliable but are presented without guarantee, warranty, or responsibility of any kind, expressed or implied. Statements or suggestions concerning possible use of our products are made without representation or warranty that any such use is free of patent infringement and are not recommendations to infringe any patent. The user should assume that all safety measures are indicated or that other measures may not be required. Specifications are typical and may not apply to all connectors.

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