

# Quadrax Connector Series

For Shell Styles MIL-DTL-38999/20 & 26



# MIL-DTL-38999 Quadrax

Smiths Interconnect offers a complete line of differential Quadrax connectors, contacts, and cable assemblies for high speed Ethernet, Firewire, and Fibre Channel applications. Differential pair quadrax connectors offer superior performance in high speed matched impedance data-on-demand applications. The signal to signal and signal to shield characteristic impedance is maintained throughout the connector pair.

## Quadrax Contacts

Quadrax contacts consist of four center contacts (Quad configuration applications exceeding 2 Gbit/sec) forming two differential pairs within a common ground. These contacts have a low impedance grounding shield and are ideal for Ethernet 100 Base-T (100 ohm), Firewire (IEEE 1394A and 1394B), USB, DVI and infiniband.

Smiths Interconnect offers reverse gender Quadrax contacts to provide a more robust assembly for harsh environment applications. This alternative configuration places the stronger and larger diameter inner socket contacts within the more exposed Quadrax pin contact insulator. The more fragile inner pin contacts are then placed within the Quadrax socket contact insulator minimizing the potential of alignment damage due to mishandling on both sides. With this arrangement, Smiths Interconnect offers the most robust high speed Quadrax contacts available today.

## Testing Capabilities

Smiths Interconnect Quadrax and Twinax interconnects are characterized for testing eye pattern, jitter, skew, and insertion loss on differential pair 100 ohm high speed Gigabit Ethernet applications with a wide variety of testing protocols. We utilize the Agilent E5071C 4 port network analyzer to measure the differential pair TDR impedance between Twinax connectors, cable assemblies, and quad cable Ethernet and Fibre Channel interconnect systems ensuring the most accurate acquired signal for high speed communications testing. The E5071C 4 port network analyzer is capable of highly accurate 100 ohm differential measurements up to 20 GHz and can measure Eye Diagrams up to 16 Gbps.



## Specifications

Temperature Rating	-55°C to + 125°C
Corrosion	MIL-STD-202 Method 101, Test Condition B
Shock	MIL-STD-202 Method 213, Test Condition B
Vibration	MIL-STD-202 Method 204, Test Condition B
Thermal Shock	MIL-STD-202 Method 107, Test Condition B
Durability	500 mate/unmate cycles/min
Dielectric Withstand Voltage	250 VDC
Insulation Resistance	5.000 MegaOhms min
Contact Current Rating	3.0 Amps D.C. max
Bandwidth	Up to 3 GHz
Data Rates	Exceeding 2 Gbps
Differential Pair Cable Impedance	100 Ohm ± 10 Ohm
Signal to Shield Cable Impedance	50 Ohm ± 7 Ohm

## Materials and Finishes

MIL-DTL-38999 Shells	Aluminum per ASTM-B211/221 6061-T6 Electroless Nickel per SAE AMS C-26074
Insulators	PTFE per ASTM-D1710 Ultem per ASTM-D5205
Quadrax Contacts	Brass per ASTM-B16, Alloy UNS C36000 or BeCu per ASTM-B196, Alloy UNS C17200, C17300
Notes	Quadrax contacts are common ground

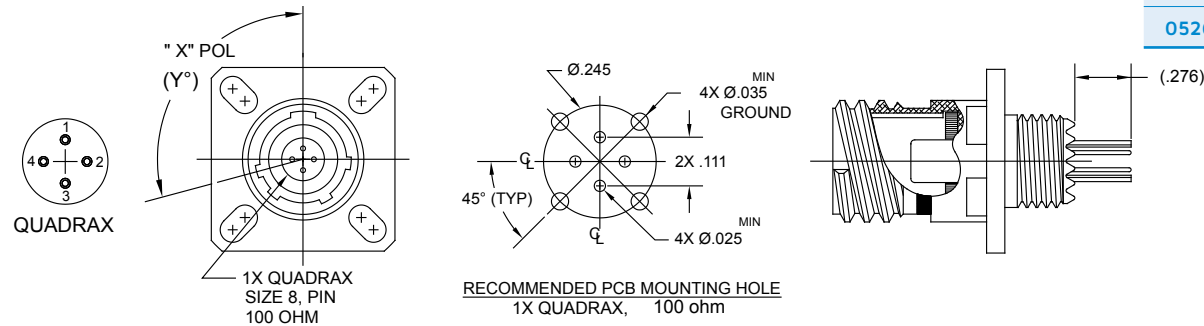
## Recommended Backshells

**M85049/21 (str) • M85049/88 (str) • M85049/89 (45° w/extender)**

Smiths Interconnect only recommends the use of backshells that avoid tight bending radii or high compressive forces being applied to cables that may upset the high frequency performance of the connector cable assembly.

# Arrangement 9-5

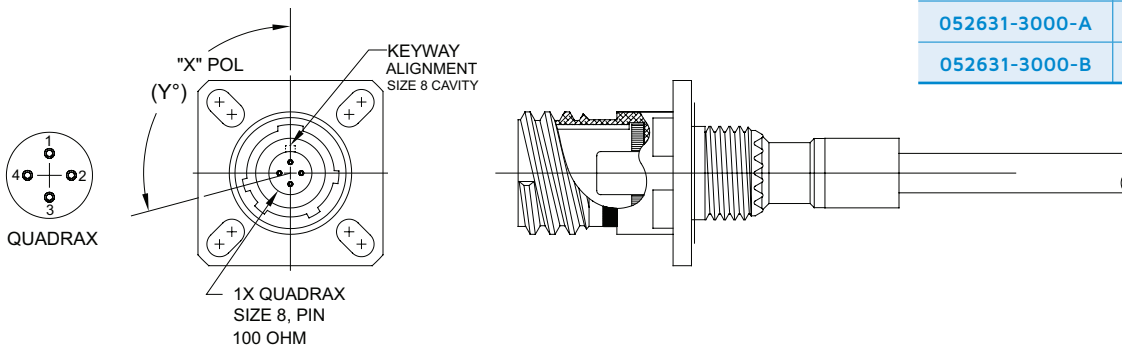
## MIL-DTL-38999/20 PC Tail Receptacle



Part Number	"X"	"Y"
052617-3000-N	N	105°
052617-3000-A	A	102°
052617-3000-B	B	80°

Notes: 1. PC tail terminations are supplied complete with contacts.

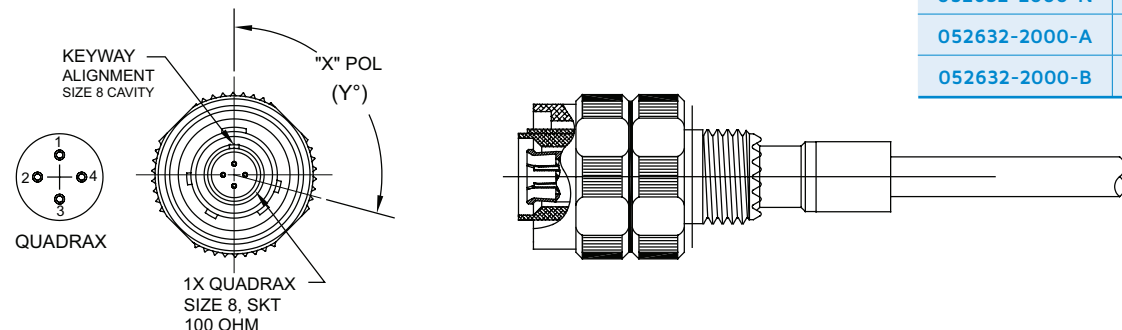
## MIL-DTL-38999/20 Receptacle



Part Number	"X"	"Y"	Quadrax Part #
052631-3000-N	N	105°	019635-0008
052631-3000-A	A	102°	
052631-3000-B	B	80°	

Notes: 1. Connectors with cable terminations are supplied without contacts. Contacts sold separately for connectors with cable termination 2. Removable Size 8 contacts use removal tool M81969/14-12

## MIL-DTL-38999/26 Plug

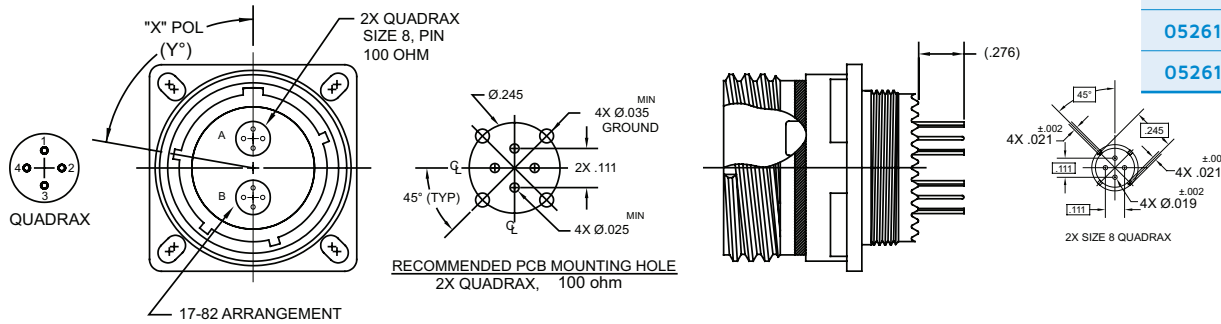


Part Number	"X"	"Y"	Quadrax Part #
052632-2000-N	N	105°	019535-0008
052632-2000-A	A	102°	
052632-2000-B	B	80°	

Notes: 1. Connectors with cable terminations are supplied without contacts. Contacts sold separately for connectors with cable termination 2. Removable Size 8 contacts use removal tool M81969/14-12

# Arrangement 17-82

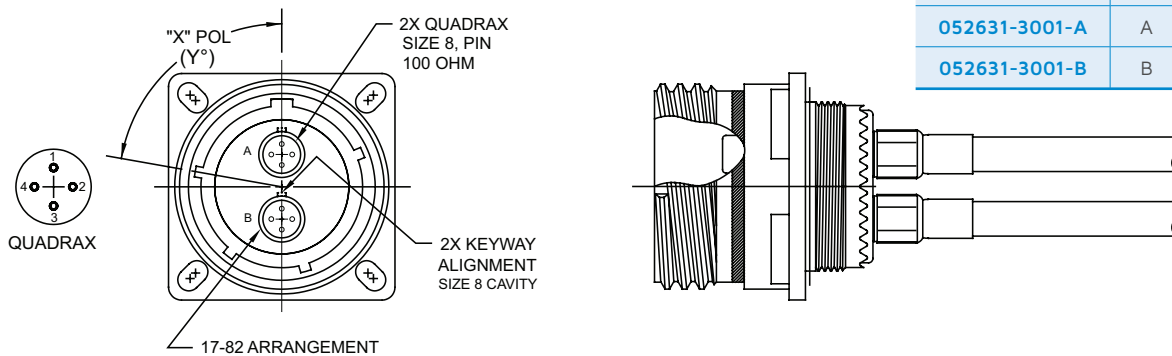
## MIL-DTL-38999/20 PC Tail Receptacle



Part Number	"X"	"Y"
052617-3001-N	N	80°
052617-3001-A	A	135°
052617-3001-B	B	49°

Notes: 1. PC tail terminations are supplied complete with contacts.

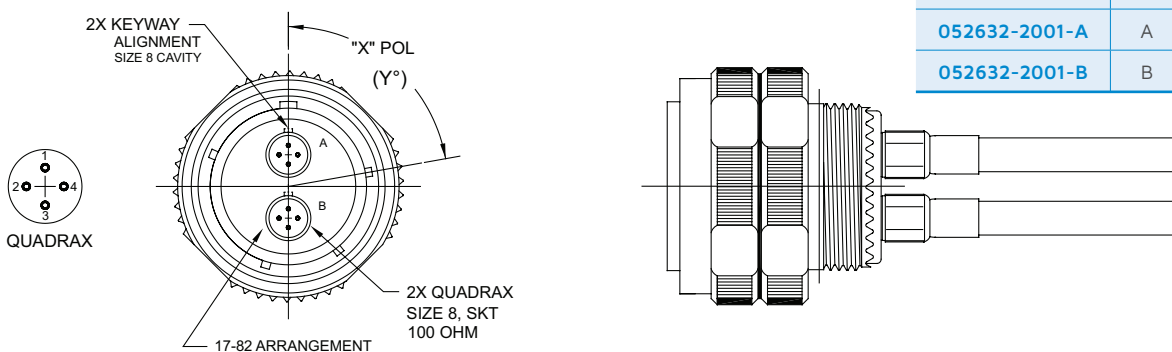
## MIL-DTL-38999/20 Receptacle



Part Number	"X"	"Y"	Quadrax Part #
052631-3001-N	N	80°	019635-0008
052631-3001-A	A	135°	
052631-3001-B	B	49°	

Notes: 1. Connectors with cable terminations are supplied without contacts. Contacts sold separately for connectors with cable termination 2. Removable Size 8 contacts use removal tool M81969/14-12

## MIL-DTL-38999/26 Plug

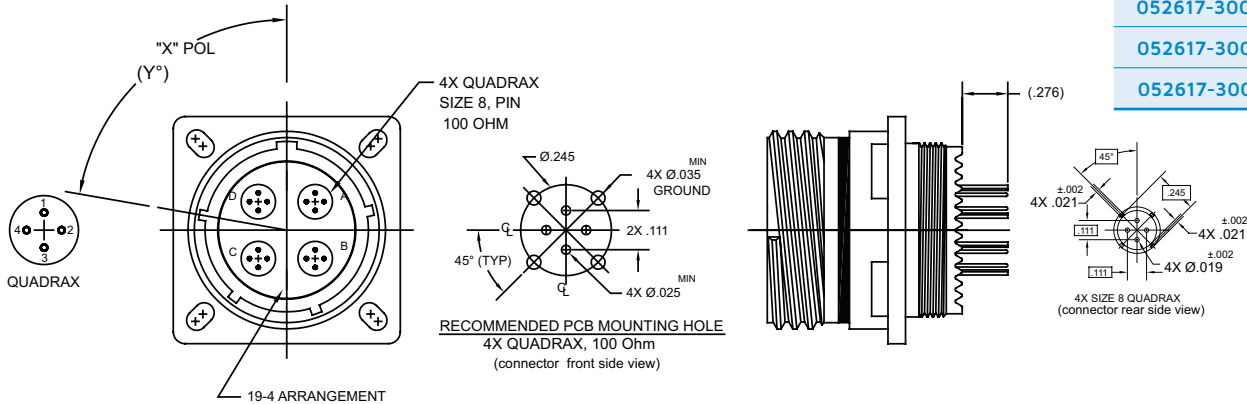


Part Number	"X"	"Y"	Quadrax Part #
052632-2001-N	N	80°	019535-0008
052632-2001-A	A	135°	
052632-2001-B	B	49°	

Notes: 1. Connectors with cable terminations are supplied without contacts. Contacts sold separately for connectors with cable termination 2. Removable Size 8 contacts use removal tool M81969/14-12

# Arrangement 19-4

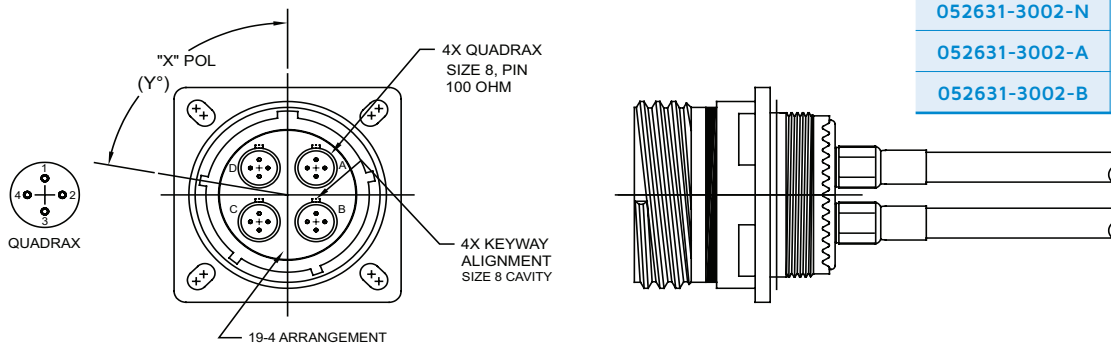
## MIL-DTL-38999/20 PC Tail Receptacle



Part Number	"X"	"Y"
052617-3002-N	N	80°
052617-3002-A	A	135°
052617-3002-B	B	49°

Notes: 1. PC tail terminations are supplied complete with contacts.

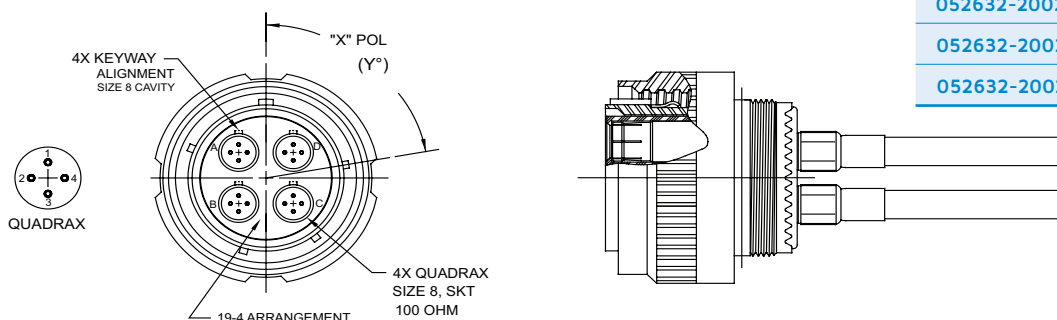
## MIL-DTL-38999/20 Receptacle



Part Number	"X"	"Y"	Quadrax Part #
052631-3002-N	N	80°	019635-0008
052631-3002-A	A	135°	
052631-3002-B	B	49°	

Notes: 1. Connectors with cable terminations are supplied without contacts. Contacts sold separately for connectors with cable termination 2. Removable Size 8 contacts use removal tool M81969/14-12

## MIL-DTL-38999/26 Plug

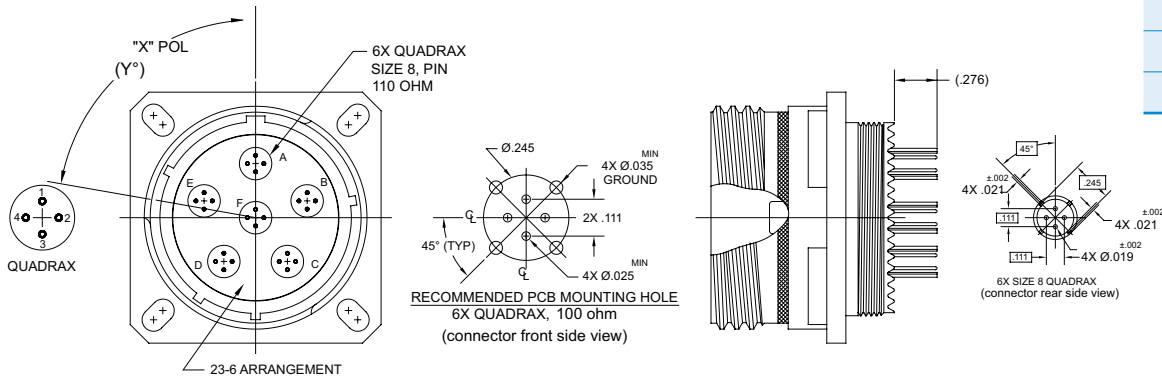


Part Number	"X"	"Y"	Quadrax Part #
052632-2002-N	N	80°	019535-0008
052632-2002-A	A	135°	
052632-2002-B	B	49°	

Notes: 1. Connectors with cable terminations are supplied without contacts. Contacts sold separately for connectors with cable termination 2. Removable Size 8 contacts use removal tool M81969/14-12

# Arrangement 23-6

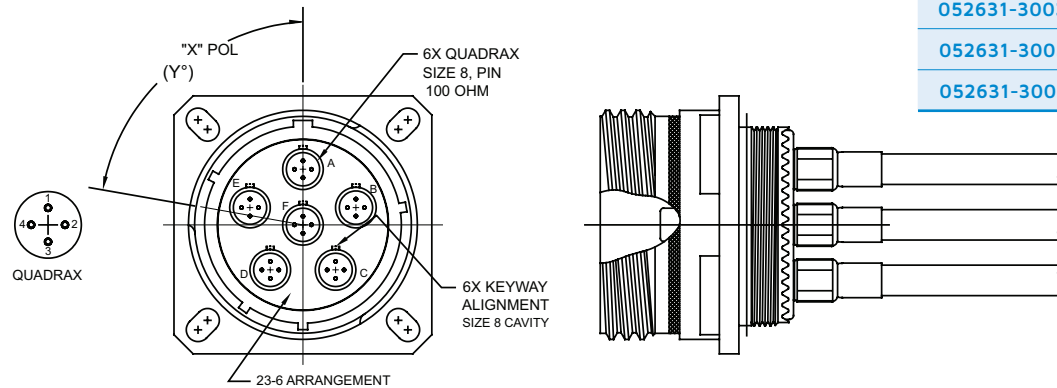
## MIL-DTL-38999/20 PC Tail Receptacle



Part Number	"X"	"Y"
052617-3003-N	N	80°
052617-3003-A	A	135°
052617-3003-B	B	49°

Notes: 1. PC tail terminations are supplied complete with contacts.

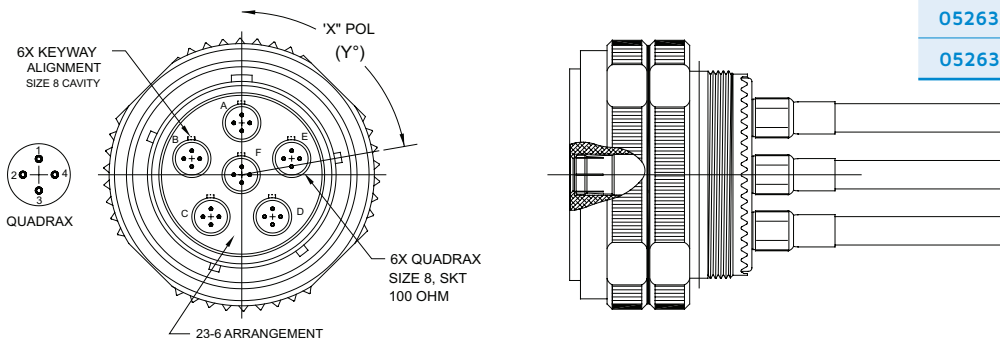
## MIL-DTL-38999/20 Receptacle



Part Number	"X"	"Y"	Quadrax Part #
052631-3003-N	N	80°	019635-0008
052631-3003-A	A	135°	
052631-3003-B	B	49°	

Notes: 1. Connectors with cable terminations are supplied without contacts. Contacts sold separately for connectors with cable termination 2. Removable Size 8 contacts use removal tool M81969/14-12

## MIL-DTL-38999/26 Plug



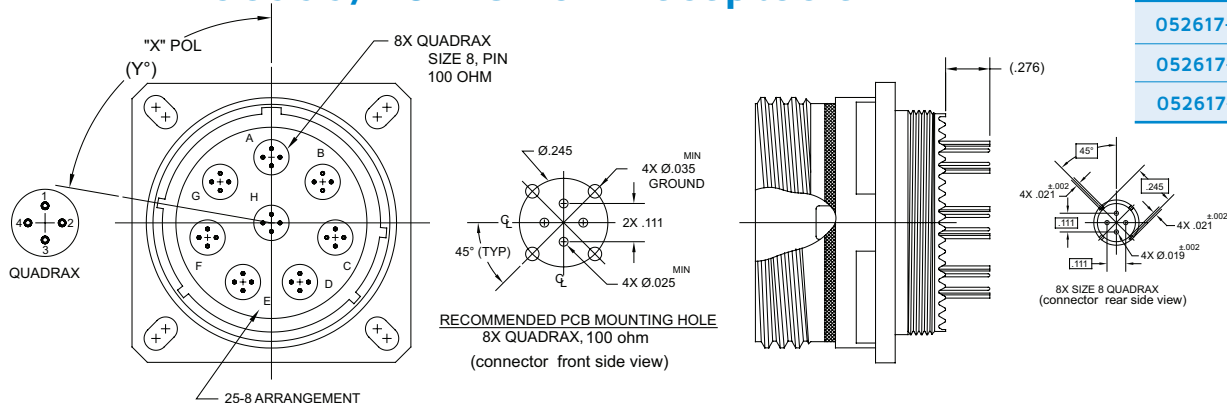
Part Number	"X"	"Y"	Quadrax Part #
052632-2003-N	N	80°	019535-0008
052632-2003-A	A	135°	
052632-2003-B	B	49°	

Notes: 1. Connectors with cable terminations are supplied without contacts. Contacts sold separately for connectors with cable termination 2. Removable Size 8 contacts use removal tool M81969/14-12



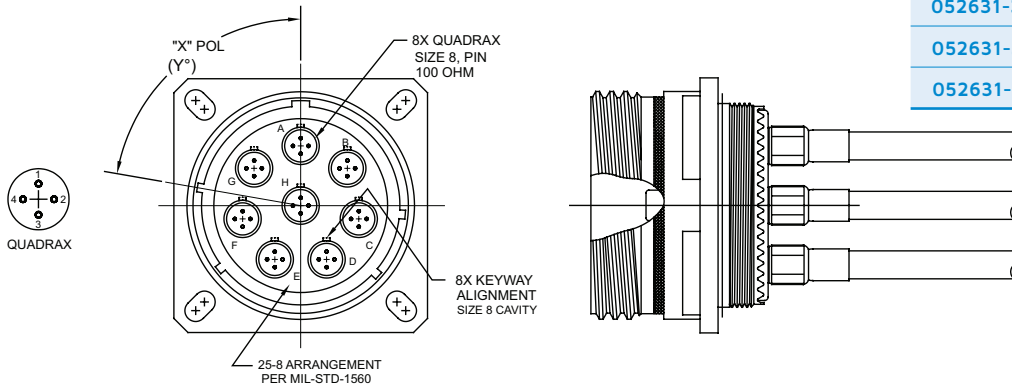
# Arrangement 25-8

## MIL-DTL-38999/20 PC Tail Receptacle



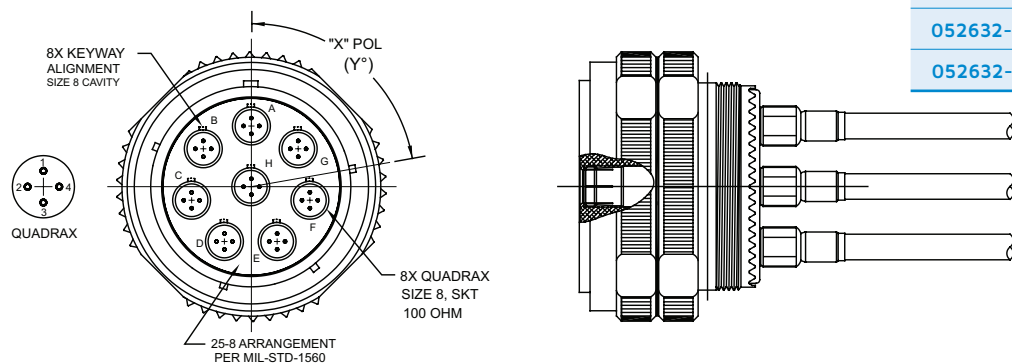
Notes: 1. PC tail terminations are supplied complete with contacts.

## MIL-DTL-38999/20 Receptacle



Notes: 1. Connectors with cable terminations are supplied without contacts. Contacts sold separately for connectors with cable termination 2. Removable Size 8 contacts use removal tool M81969/14-12

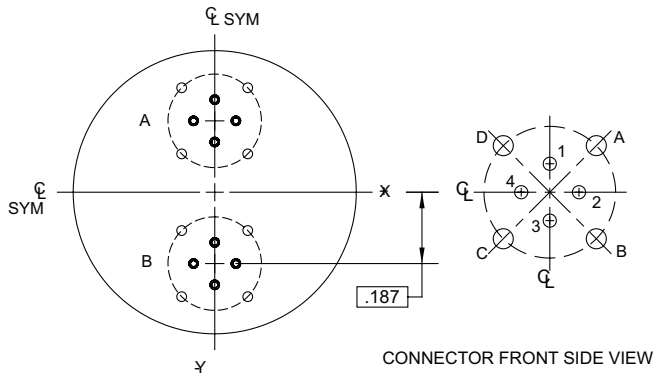
## MIL-DTL-38999/26 Plug



Notes: 1. Connectors with cable terminations are supplied without contacts. Contacts sold separately for connectors with cable termination 2. Removable Size 8 contacts use removal tool M81969/14-12

# Insert Arrangements

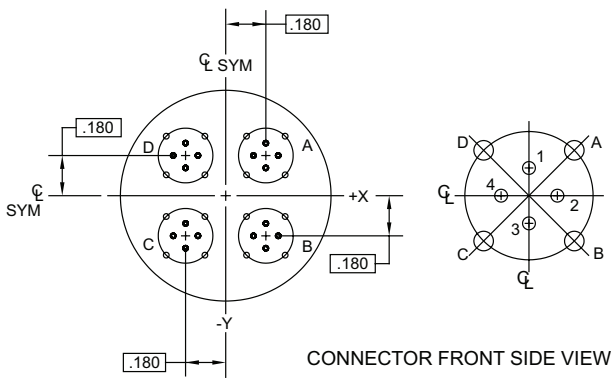
## Arrangement 17-82 PC Tail



Contact Location							
Contact Letter	X Axis	Y Axis	Contact Letter	X Axis	Y Axis		
A	1	.0000	+.2425	B	1	.0000	-.1315
	2	+.0555	+.1870		2	+.0555	-.1870
	3	.0000	+.1315		3	.0000	-.2425
	4	-.0555	+.1870		4	-.0555	-.1870
	A	+.0866	+.2736		A	+.0866	-.1004
	B	+.0866	+.1004		B	+.0866	-.2736
	C	-.0866	+.1004		C	-.0866	-.2736
	D	-.0866	+.2736		D	-.0866	-.1004

Notes: 1. X-Axis locations show 2 places 2. Y-Axis locations show 2 places

## Arrangement 19-4



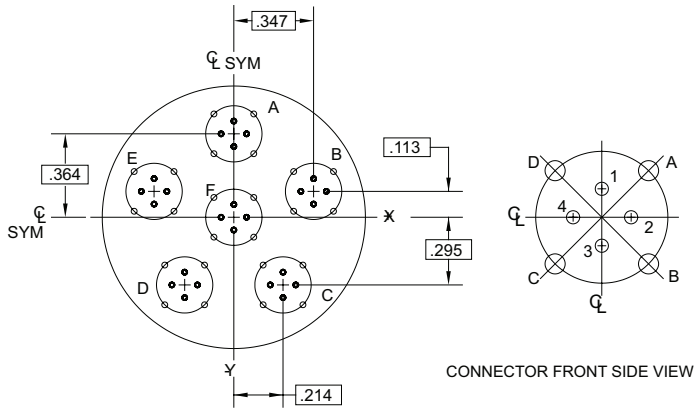
Contact Location							
Contact Letter	X Axis	Y Axis	Contact Letter	X Axis	Y Axis		
A	1	+.1800	+.2355	B	1	+.1800	-.1245
	2	+.2355	+.1800		2	+.2355	-.1800
	3	+.1800	+.1245		3	+.1800	-.2355
	4	+.1245	+.1800		4	+.1245	-.1800
	A	+.2666	+.2666		A	+.2666	-.0934
	B	+.2666	+.0934		B	+.2666	-.2666
	C	+.0934	+.0934		C	+.0934	-.2666
	D	+.0934	+.2666		D	+.0934	-.0934
C	1	-.1800	-.1245	D	1	-.1800	+.2355
	2	-.1245	-.1800		2	-.1245	+.1800
	3	-.1800	-.2355		3	-.1800	+.1245
	4	-.2355	-.1800		4	-.2355	+.1800
	A	-.0934	-.0934		A	-.0934	+.2666
	B	-.0934	-.2666		B	-.0934	+.0934
	C	-.2666	-.2666		C	-.2666	+.0934
	D	-.2666	-.0934		D	-.2666	+.2666

Notes: 1. X-Axis locations show 2 places 2. Y-Axis locations show 2 places



# Receptacle Inserts

## Arrangement 23-6

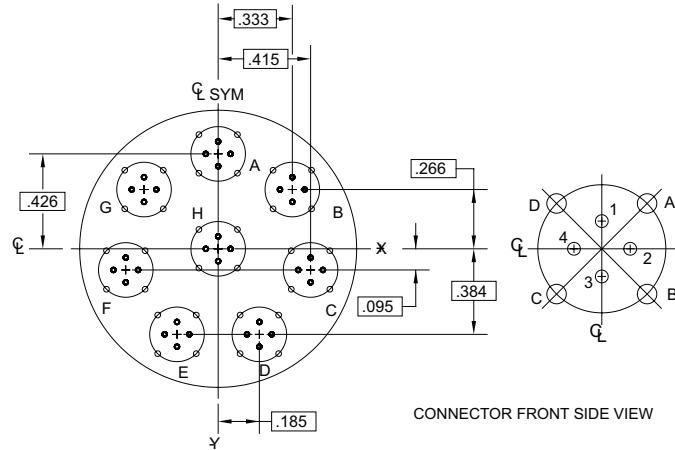


Contact Location											
Contact Letter	X Axis	Y Axis	Contact Letter	X Axis	Y Axis	Contact Letter	X Axis	Y Axis	Contact Letter	X Axis	Y Axis
A	1	.0000	B	1	+ .3470	C	1	+ .2140	D	1	+ .0555
	2	+ .0555		2	+ .4025		2	+ .2695		2	+ .0000
	3	.0000		3	+ .3470		3	+ .2140		3	.0000
	4	-.0555		4	+ .2915		4	+ .1585		4	-.0555
	A	+ .0866		A	+ .4336		A	+ .3006		A	+ .0866
	B	+ .0866		B	+ .4336		B	+ .3006		B	-.0866
	C	-.0866		C	+ .2604		C	+ .1274		C	-.0866
	D	-.0866		D	+ .2604		D	+ .1274		D	+ .0866
D	1	-.2140	E	1	-.3470	F	1	.0000	A	1	+ .0555
	2	-.1585		2	-.2915		2	+ .0555		2	+ .0000
	3	-.2140		3	-.3470		3	.0000		3	-.0555
	4	-.2695		4	-.4025		4	-.0555		4	-.0000
	A	-.1274		A	-.2604		A	+ .0866		A	+ .0866
	B	-.1274		B	-.2604		B	+ .0866		B	-.0866
	C	-.3006		C	-.4336		C	-.0866		C	-.0866
	D	-.3006		D	-.4336		D	-.0866		D	+ .0866

Notes: 1. X-Axis locations show 2 places 2. Y-Axis locations show 2 places

# Receptacle Inserts

## Arrangement 25-8



Contact Location

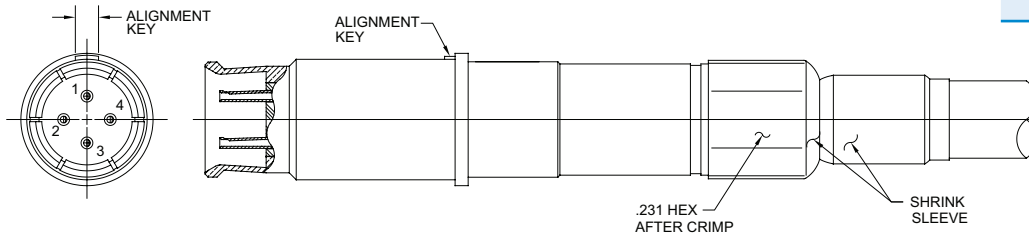
Contact Letter	X Axis	Y Axis	Contact Letter	X Axis	Y Axis	Contact Letter	X Axis	Y Axis
A	1	.0000	B	1	+ .3330	C	1	+ .4150
	2	+ .0555		2	+ .3885		2	+ .4705
	3	.0000		3	+ .3330		3	+ .4150
	4	- .0555		4	+ .2775		4	+ .3595
	A	+ .0866		A	+ .4196		A	+ .5016
	B	+ .0866		B	+ .4196		B	+ .5016
	C	- .0866		C	+ .2463		C	+ .3284
	D	- .0866		D	+ .2463		D	+ .3284
D	1	+ .1850	E	1	- .1850	F	1	- .4150
	2	+ .2405		2	- .1295		2	- .3595
	3	+ .1850		3	- .1850		3	- .4150
	4	+ .1295		4	- .2405		4	- .4705
	A	+ .2716		A	- .0983		A	- .3284
	B	+ .2716		B	- .0983		B	- .3284
	C	+ .0983		C	- .2716		C	- .5016
	D	+ .0983		D	- .2716		D	- .5016
G	1	- .3330	H	1	.0000		1	+ .0555
	2	- .2775		2	+ .0555		2	+ .0000
	3	- .3330		3	.0000		3	- .0555
	4	- .3885		4	- .0555		4	.0000
	A	- .2463		A	+ .0866		A	+ .0866
	B	- .2463		B	+ .0866		B	- .0866
	C	- .4196		C	- .0866		C	- .0866
	D	- .4196		D	- .0866		D	+ .0866

Notes: 1. X-Axis locations show 2 places 2. Y-Axis locations show 2 places

# Size 8 Quadrax Contacts

## Size 8 Quadrax Socket

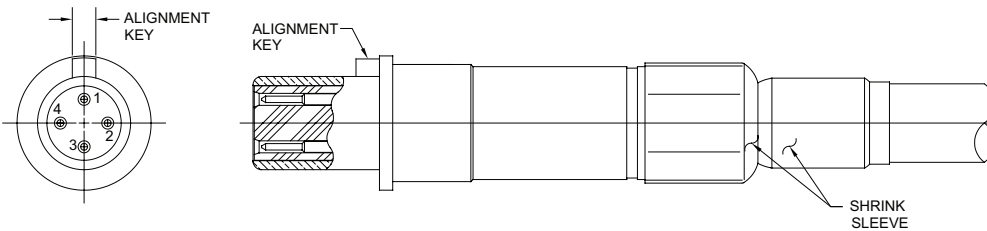
Part Number	Cable Type
019535-0008	540-1183-000



Consult factory for assembly instructions AI-1634

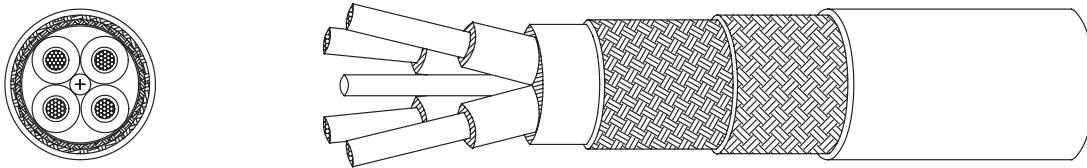
## Size 8 Quadrax Pin

Part Number	Cable Type
019635-0008	540-1183-000



Consult factory for assembly instructions AI-1634

## Differential Quadrax Cable



Quadrax contacts are designed to be used with cables of the following mechanical characteristics and characteristic impedance:

<b>Conductor</b>	Ø.0235 NOM. AWG 24, 19/36 AWG, silver-coated copper wire
<b>Dielectric</b>	Extruded expanded PTFE Ø.045 NOM spiral-wrapped & fused PTFE tape
<b>Filler</b>	Ø.032 NOM. FEP ROD
<b>Binder</b>	PTFE tape
<b>Shield 1</b>	Tin-coated copper flat braid
<b>Shield 2</b>	Tin-coated copper round braid
<b>Jacket</b>	Ø.160± 010 extruded FEP, color translucent yellow
<b>Impedance</b>	100 ± 10 Ohms (measured differentially)

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