

# QUADRAX CONNECTOR SERIES

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



## SPECIFICATIONS

<b>Temperature Rating:</b>	-55°C to + 125°C
<b>Corrosion:</b>	MIL-STD-202 Method 101, Test Condition B
<b>Shock:</b>	MIL-STD-202 Method 213, Test Condition B
<b>Vibration:</b>	MIL-STD-202 Method 204, Test Condition B
<b>Thermal Shock:</b>	MIL-STD-202 Method 107, Test Condition B
<b>Durability:</b>	500 Mate/Unmate cycles/min.
<b>Dielectric Withstand Voltage:</b>	250 VDC
<b>Insulation Resistance:</b>	5.000 MegaOhms min
<b>Contact Current Rating:</b>	3.0 Amps D.C. max.
<b>Bandwidth:</b>	Up to 3 Gigahertz
<b>Data Rates:</b>	Exceeding 2 Gbits/sec
<b>Differential Pair Cable Impedance:</b>	100 Ohm $\pm$ 10 Ohm
<b>Signal to Shield Cable Impedance:</b>	50 Ohm $\pm$ 7 Ohm

## MATERIALS AND FINISHES

<b>MIL-DTL-38999</b>	Aluminum per ASTM-B211/221 6061-T6
<b>Shells:</b>	Electroless Nickel per SAE AMS C-26074
<b>Insulators:</b>	PTFE per ASTM-D1710 Ultem per ASTM-D5205
<b>Quadrax</b>	Brass per ASTM-B16, Alloy UNS C36000 or
<b>Contacts:</b>	BeCu per ASTM-B196, alloy UNS C17200, C17300 Gold plate per MIL-DTL-45204 Type II Class 1
<b>Notes:</b>	Quadrax contacts are common ground

### Recommended Backshells:

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

# MIL-DTL-38999 QUADRAX

- ▶ Matched impedance +/- 10 ohms for 100 ohm
- ▶ Standardized backshells
- ▶ Designed for ease of assembly quadrax construction
- ▶ Full crimp termination

Smiths Connectors 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.

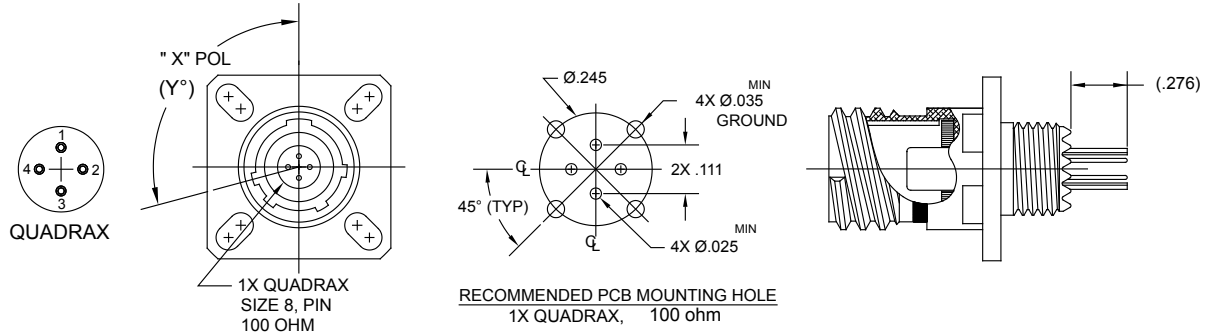
Smiths Connectors offer reverse gender Quadrax contacts to provide a more robust assembly for harsh environment applications. This alternative configuration places the stronger and larger diameter inner socket contacts within the more exposed Quadrax pin contact insulator. The more fragile inner pin 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 Connectors offer the most robust high speed Quadrax contacts available today.

### Testing Capabilities

Smiths Connectors 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.



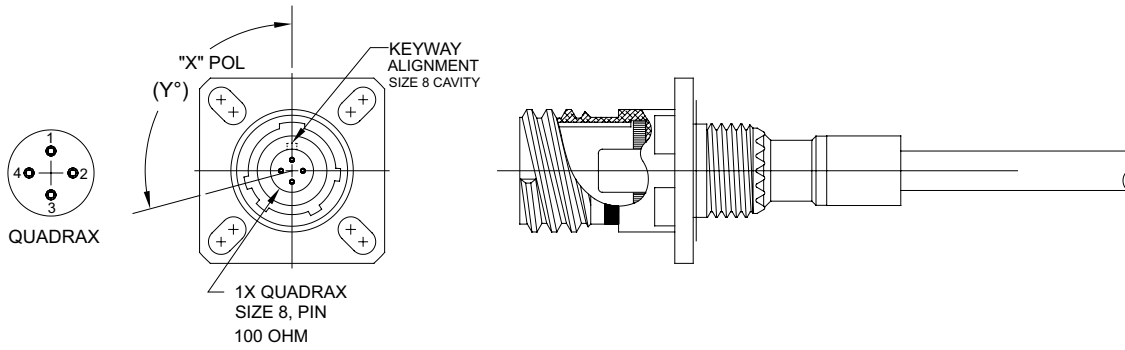
## ► MIL-DTL-38999/20 PC TAIL RECEPTACLE



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.

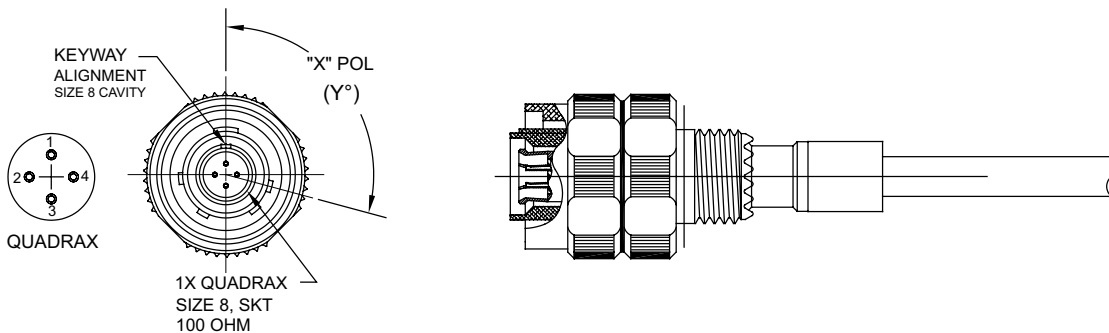
## ► MIL-DTL-38999/20 RECEPTACLE



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

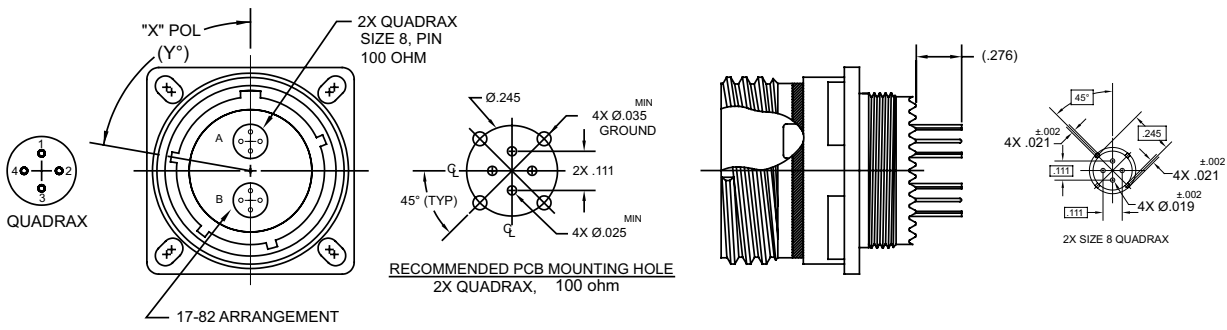
## ► MIL-DTL-38999/26 PLUG



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

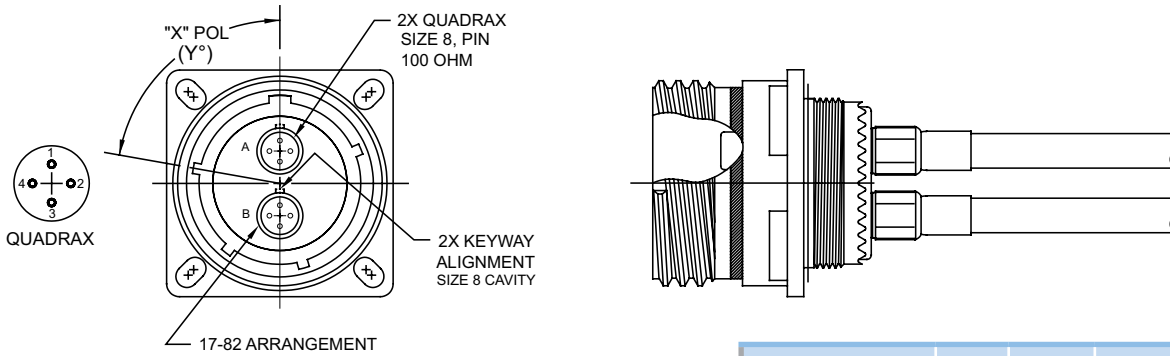
► MIL-DTL-38999/20 PC TAIL RECEPTACLE



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

PART NUMBER	"X"	"Y"
052617-3001-N	N	80°
052617-3001-A	A	135°
052617-3001-B	B	49°

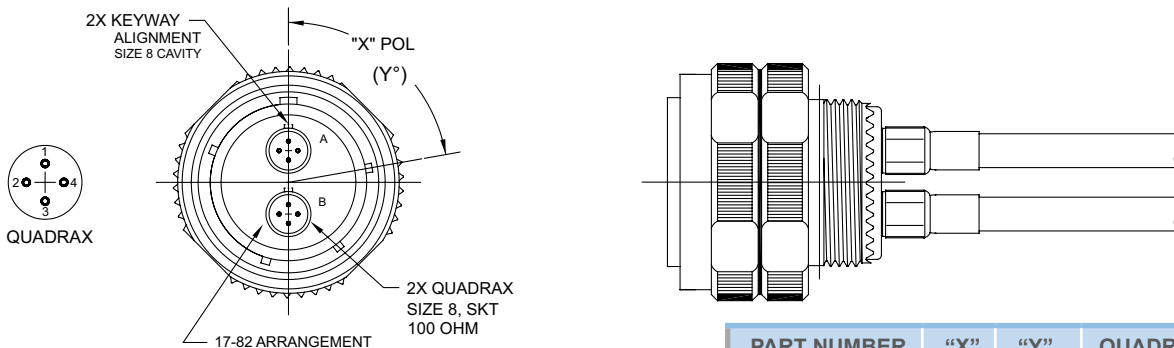
► MIL-DTL-38999/20 RECEPTACLE



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

PART NUMBER	"X"	"Y"	QUADRAX PART #
052631-3001-N	N	80°	019635-0008
052631-3001-A	A	135°	
052631-3001-B	B	49°	

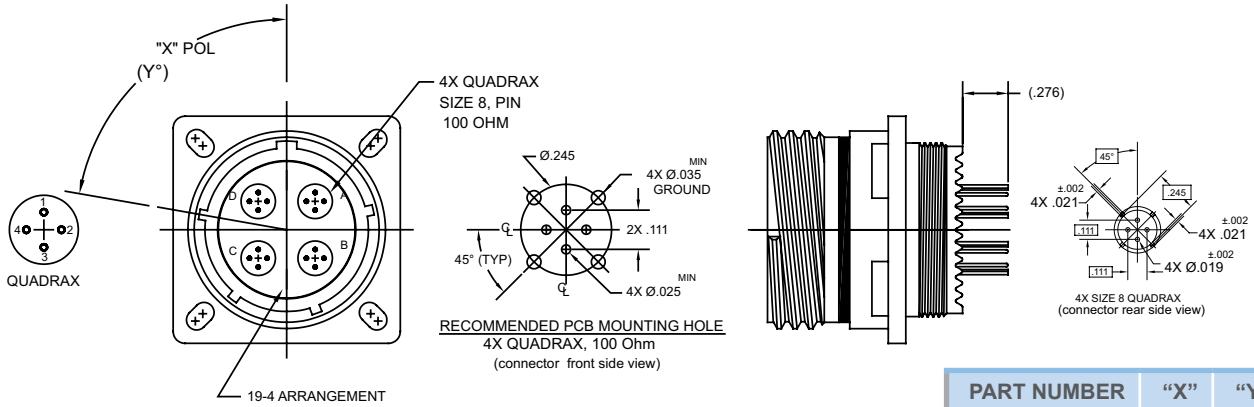
► MIL-DTL-38999/26 PLUG



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

PART NUMBER	"X"	"Y"	QUADRAX PART #
052632-2001-N	N	80°	019535-0008
052632-2001-A	A	135°	
052632-2001-B	B	49°	

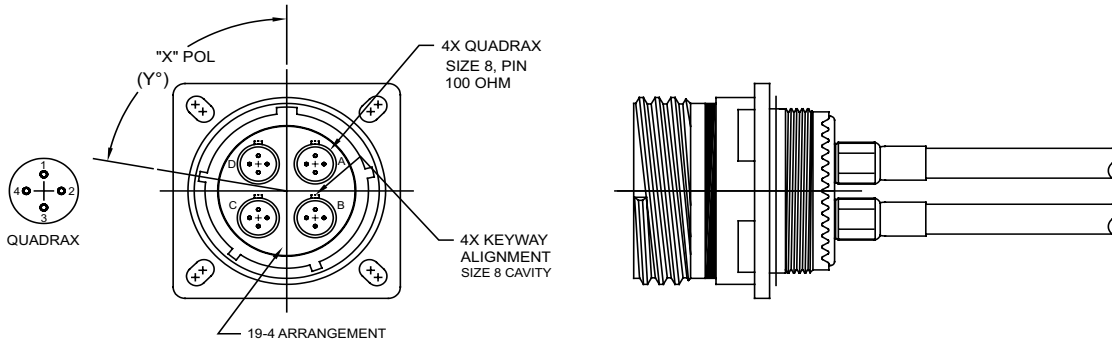
## ► MIL-DTL-38999/20 PC TAIL RECEPTACLE



Notes:

1. PC tail terminations are supplied complete with contacts.

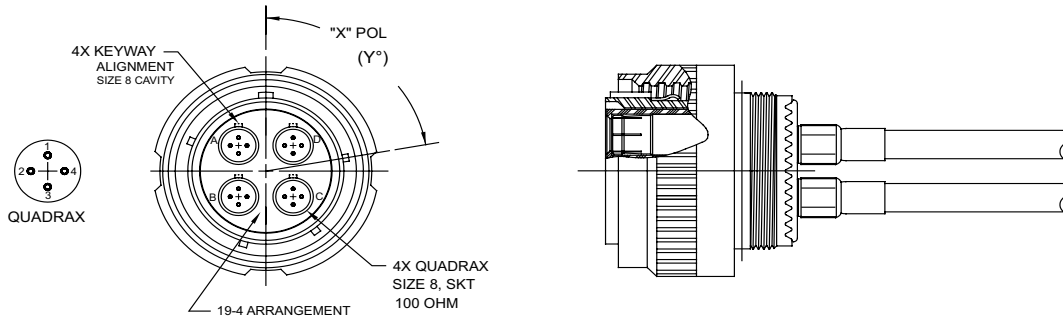
## ► MIL-DTL-38999/20 RECEPTACLE



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

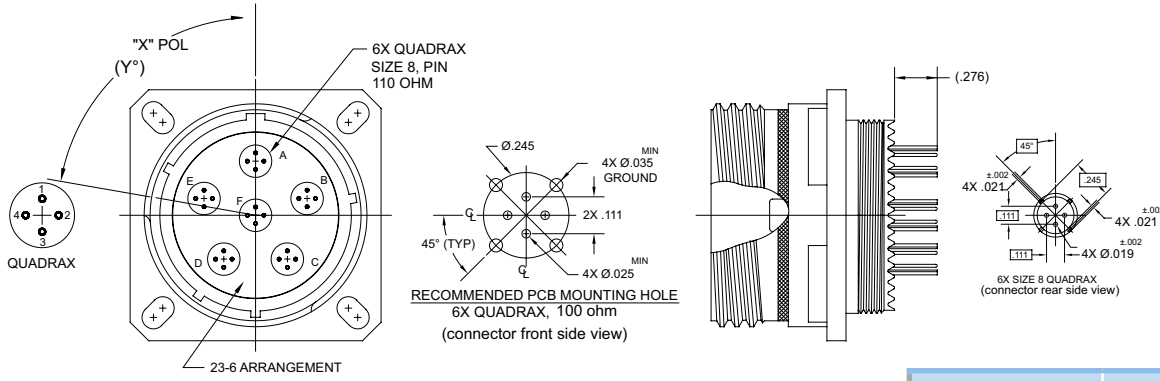
## ► MIL-DTL-38999/26 PLUG



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

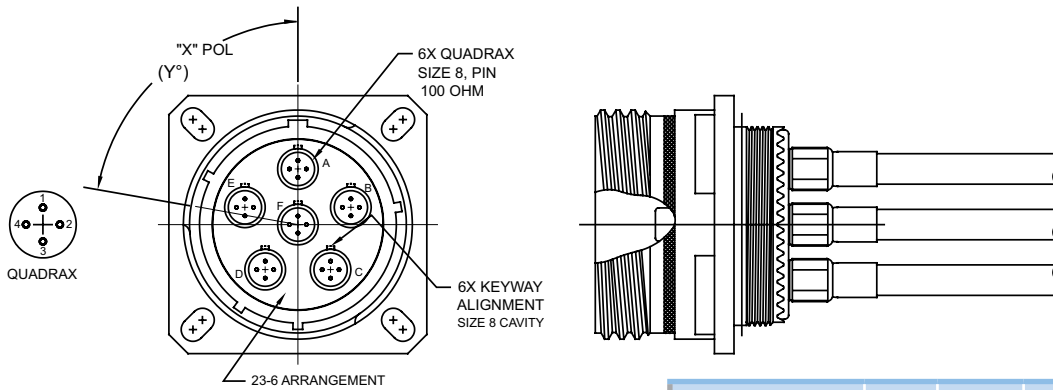
► MIL-DTL-38999/20 PC TAIL RECEPTACLE



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

PART NUMBER	"X"	"Y"
<a href="#">052617-3003-N</a>	N	80°
<a href="#">052617-3003-A</a>	A	135°
<a href="#">052617-3003-B</a>	B	49°

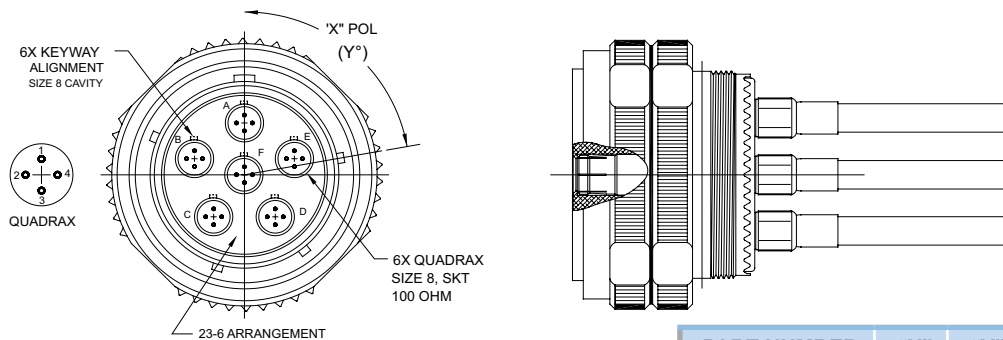
► MIL-DTL-38999/20 RECEPTACLE



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

PART NUMBER	"X"	"Y"	QUADRAx PART #
<a href="#">052631-3003-N</a>	N	80°	019635-0008
<a href="#">052631-3003-A</a>	A	135°	
<a href="#">052631-3003-B</a>	B	49°	

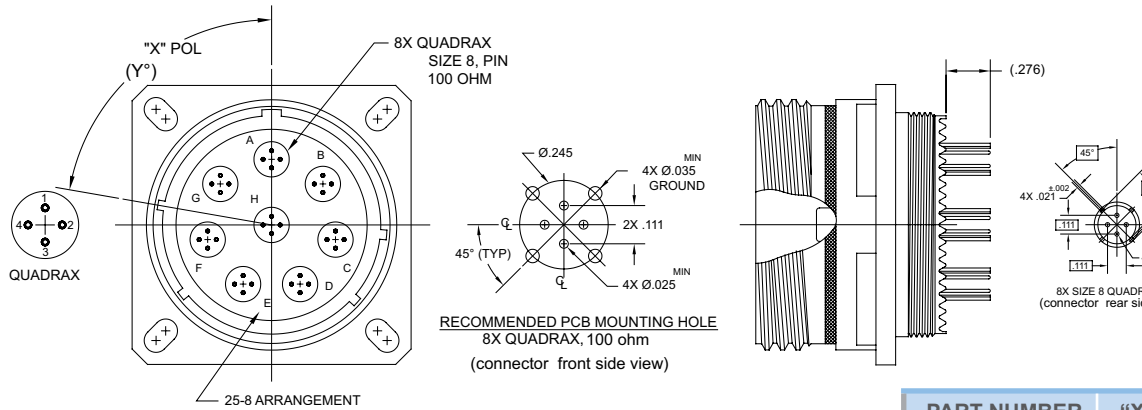
► MIL-DTL-38999/26 PLUG



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

PART NUMBER	"X"	"Y"	QUADRAx PART #
<a href="#">052632-2003-N</a>	N	80°	019535-0008
<a href="#">052632-2003-A</a>	A	135°	
<a href="#">052632-2003-B</a>	B	49°	

## ► MIL-DTL-38999/20 PC TAIL RECEPTACLE

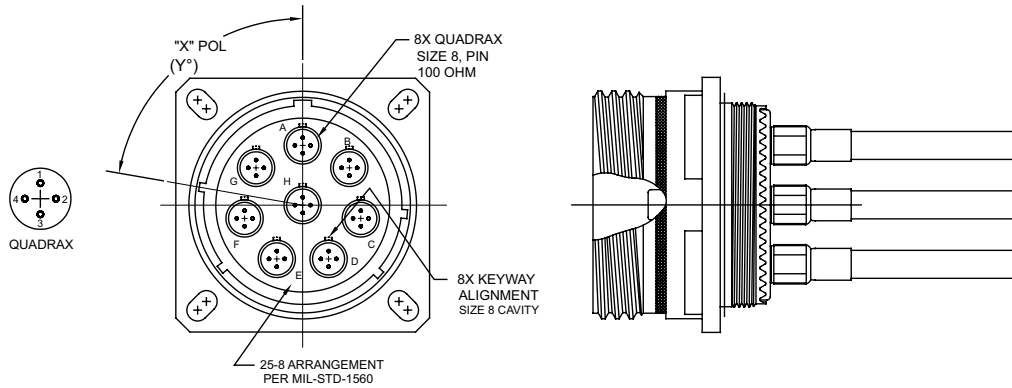


PART NUMBER	"X"	"Y"
<b>052617-3004-N</b>	N	80°
<b>052617-3004-A</b>	A	135°
<b>052617-3004-B</b>	B	49°

Notes:

1. PC tail terminations are supplied complete with contacts.

## ► MIL-DTL-38999/20 RECEPTACLE

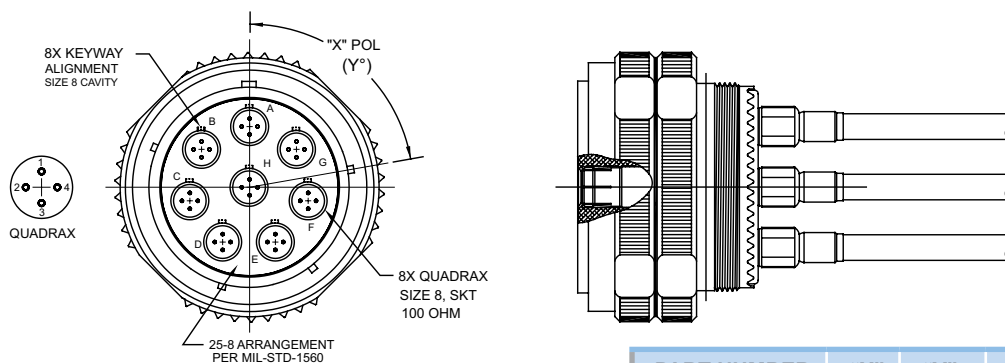


PART NUMBER	"X"	"Y"	QUADRAX PART #
<b>052631-3004-N</b>	N	80°	019635-0008
<b>052631-3004-A</b>	A	135°	
<b>052631-3004-B</b>	B	49°	

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

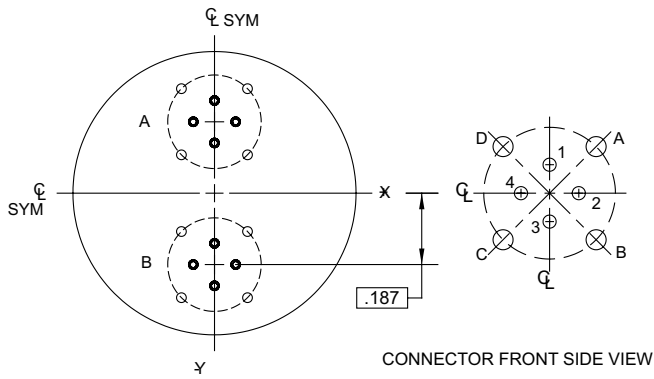


PART NUMBER	"X"	"Y"	QUADRAX PART #
<b>052632-2004-N</b>	N	80°	019535-0008
<b>052632-2004-A</b>	A	135°	
<b>052632-2004-B</b>	B	49°	

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

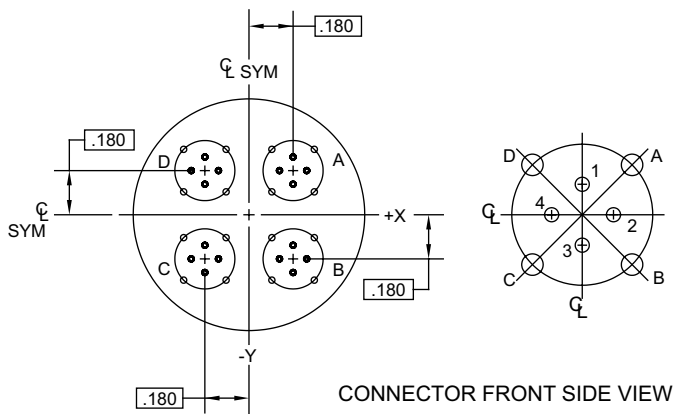
▶ ARRANGEMENT 17-82 PC TAIL



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

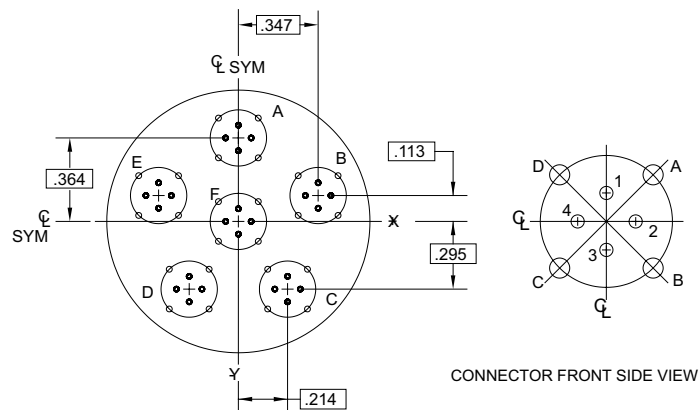


CONTACT LOCATION							
Contact Letter	X Axis	Y Axis	Contact Letter	X Axis	Y Axis		
A	1	+.1800	+.2355	B	1	+.1800	-.1245
	2	+.2355	+.1800		2	+.2355	-.1800
	3	+.1800	+.1245		3	+.1800	-.2355
	4	+.1245	+.1800		4	+.1245	-.1800
	A	+.2666	+.2666		A	+.2666	-.0934
	B	+.2666	+.0934		B	+.2666	-.2666
	C	+.0934	+.0934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



## ARRANGEMENT 23-6

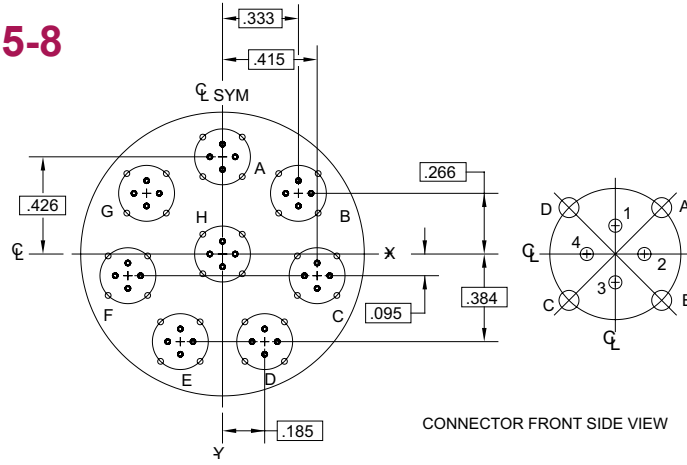


CONTACT LOCATION											
Contact Letter	X Axis	Y Axis	Contact Letter	X Axis	Y Axis	Contact Letter	X Axis	Y Axis	Contact Letter		
A	1	.0000	+ .4195	B	1	+ .3470	+ .1685	C	1	+ .2140	- .2395
	2	+ .0555	+ .3640		2	+ .4025	+ .1130		2	+ .2695	- .2950
	3	.0000	+ .3085		3	+ .3470	+ .0575		3	+ .2140	- .3505
	4	- .0555	+ .3640		4	+ .2915	+ .1139		4	+ .1585	- .2950
	A	+ .0866	+ .4506		A	+ .4336	+ .1996		A	+ .3006	- .2084
	B	+ .0866	+ .2774		B	+ .4336	+ .0264		B	+ .3006	- .3816
	C	- .0866	+ .2774		C	+ .2604	+ .0264		C	+ .1274	- .3816
	D	- .0866	+ .4506		D	+ .2604	+ .1996		D	+ .1274	- .2084
D	1	- .2140	- .2395	E	1	- .3470	+ .1685	F	1	.0000	+ .0555
	2	- .1585	- .2950		2	- .2915	+ .1130		2	+ .0555	+ .0000
	3	- .2140	- .3505		3	- .3470	+ .0575		3	.0000	- .0555
	4	- .2695	- .2950		4	- .4025	+ .1130		4	- .0555	- .0000
	A	- .1274	- .2084		A	- .2604	+ .1996		A	+ .0866	+ .0866
	B	- .1274	- .3816		B	- .2604	+ .0264		B	+ .0866	- .0866
	C	- .3006	- .3816		C	- .4336	+ .0264		C	- .0866	- .0866
	D	- .3006	- .2084		D	- .4336	+ .1996		D	- .0866	+ .0866

Notes:

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

▶ ARRANGEMENT 25-8

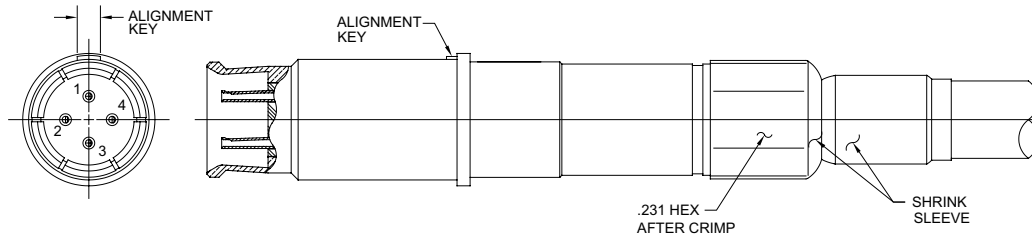


CONTACT LOCATION

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			
	2	- .2775		2	+ .0555			
	3	- .3330		3	.0000			
	4	- .3885		4	- .0555			
	A	- .2463		A	+ .0866			
	B	- .2463		B	+ .0866			
	C	- .4196		C	- .0866			
	D	- .4196		D	- .0866			

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

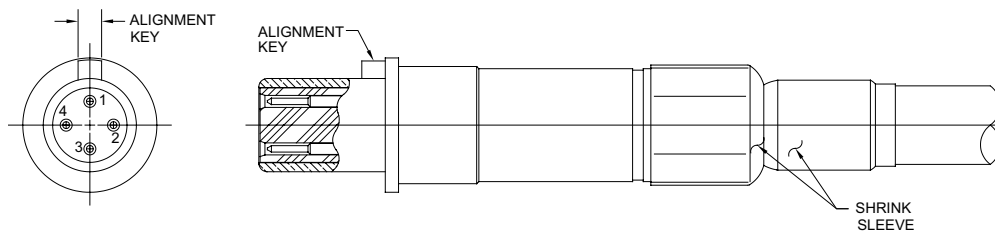
## ▶ SIZE 8 QUADRAX SOCKET



PART NUMBER	CABLE TYPE
019535-0008	540-1183-000

Consult factory for assembly instructions AI-1634

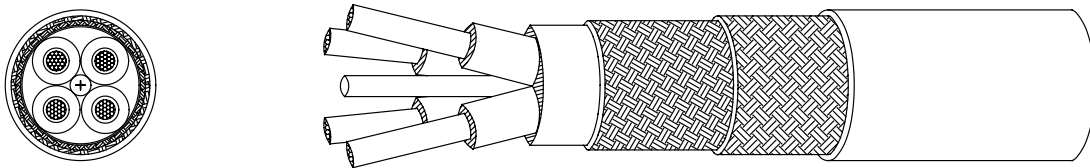
## ▶ SIZE 8 QUADRAX PIN



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:

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



# SMITHS CONNECTORS

## GLOBAL SUPPORT

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