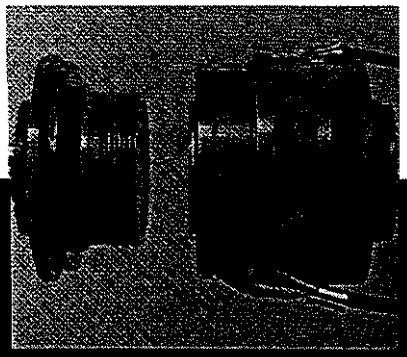
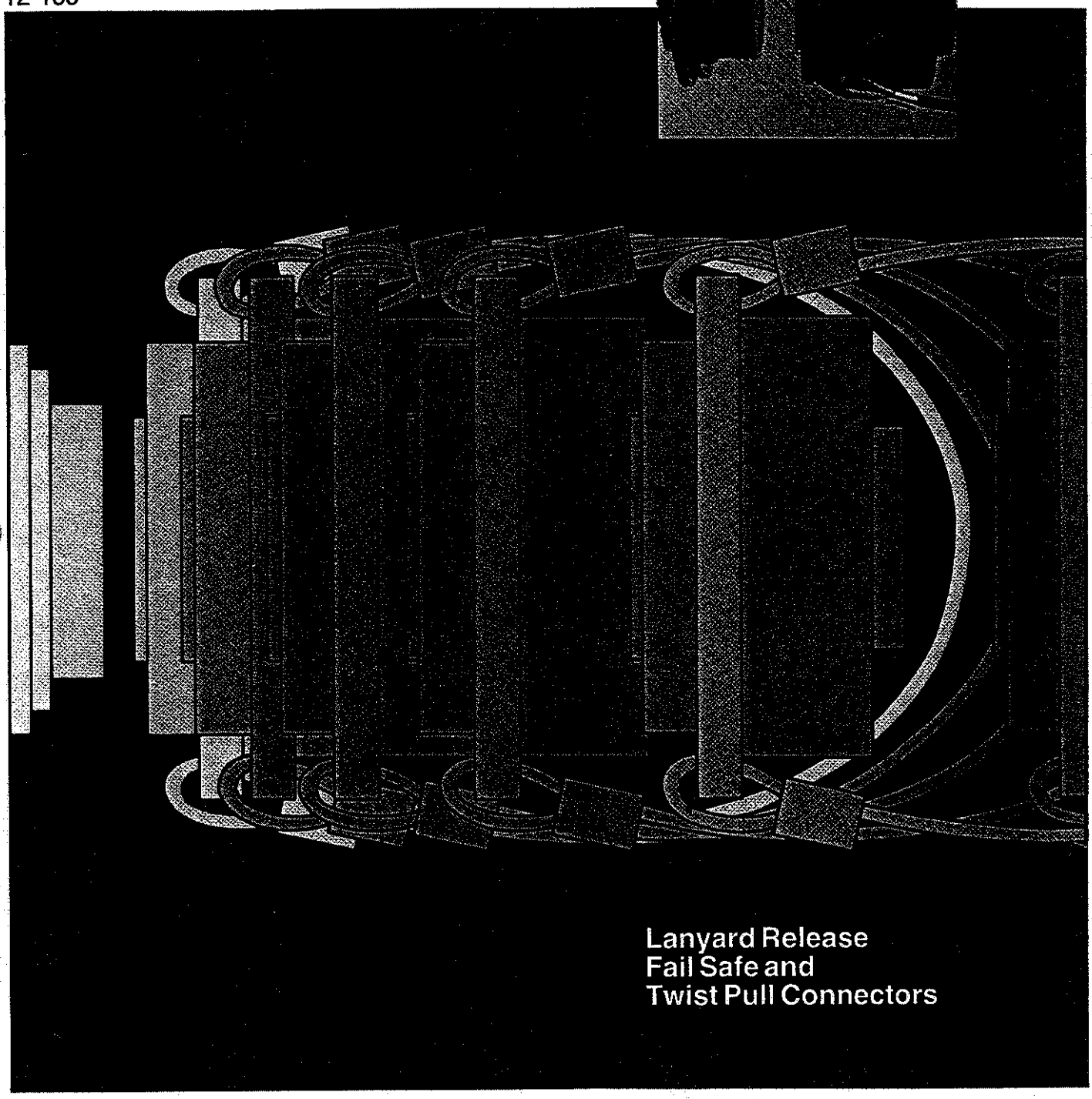
Bendix® Breakaway Connectors

12-160





Lanyard Release
Fail Safe and
Twist Pull Connectors

ALLIED Amphenol Products

CONTENTS

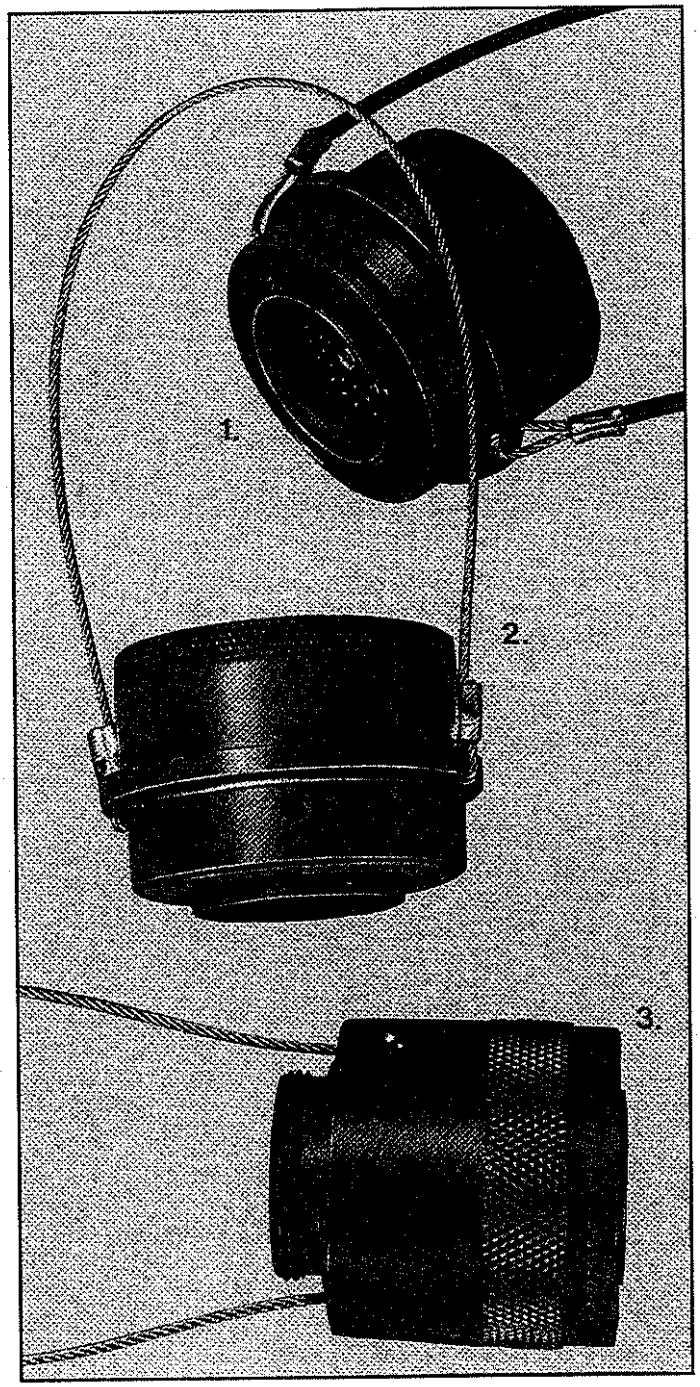
This catalog covers the complete line of Bendix® Breakaway Connectors. Designed for instant-disconnect, damage-free separations, Bendix® Breakaway connectors represent a superior level in connector sophistication with high reliability performance. MS approved and proprietary versions are included to give the user the largest selection of breakaway cylindrical connectors available in the market place.

The catalog is divided by connector series and is prefixed with an overview of the characteristics of each type to help the user in determining selections.

If more information is needed concerning the connectors covered in this publication, or if there are special application needs, please contact:

Allied, Amphenol Products
Bendix Connector Operations
40–60 Delaware Street
Sidney, NY 13838-1395
607-563-5324

Bendix® Breakaway Connectors



Bendix® Breakaway Connectors provide unequalled performance in environments requiring instant disengagement. Designed to provide quick disconnect of a connector plug and receptacle with an axial pull, the "Breakaway" is available in two styles; the Subminiature "Fail Safe" and the Miniature "Twist Pull". These breakaway connectors offer a wide range of electrical and mechanical features to meet the most demanding requirements.

- INSTANT-DECOUPLING, damage free separation
- COMPLETELY INTERMATEABLE, with standard receptacles
- 100% RELIABLE, even in severe environments
- INVENTORY SUPPORT COMMONALITY, versatility of standard insert arrangements, solder, crimp and other special purpose contacts.

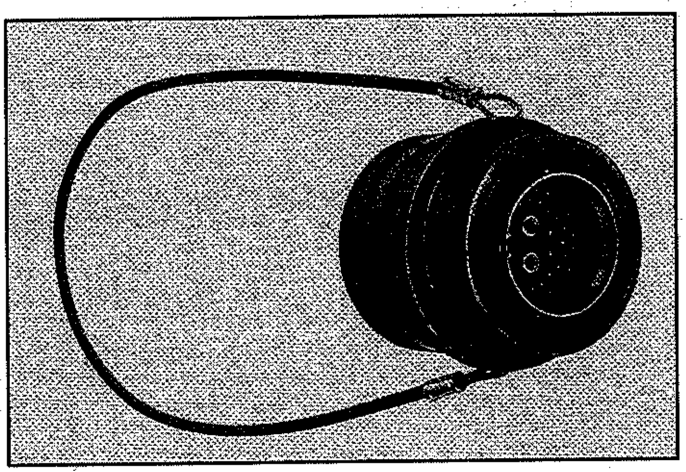
The Breakaway unmating action is initiated by applying a pull force to the lanyard causing the operating sleeve on the plug to move away from the mating receptacle. Coupling segments on the mating face diameter then expand and the receptacle is instantly released. The unmating sequence completed, spring compression returns the sleeve and segments to their original positions. Unmating of the plug may also be accomplished by normal rotation without affecting the breakaway capability.

Functional Comparisons

Connector	Prime Advantage	Coupling Mechanism	Design Features

1. **Tri-Start Fail Safe – Subminiature (MIL-C-38999 Type) Series**
2. **LJT Fail Safe – Subminiature (MIL-C-38999 Type) Series**
3. **Pygmy Twist Pull – Miniature (MIL-C-26482 Type) Series**

Breakaway Subminiature Tri-Start Fail Safe



- Instant Disconnect
- Disengagement From Any Stage Of Coupling
- Intermateable With Standard Receptacles
- Contact Protection
- EMI/EMP Shielding
- High Temperature Capability
- Moisture/Ice Resistant
- Quick Coupling (360 degrees)
- Swivel Lanyard
- Corrosion Resistant
- High Density Arrangements
- Meets MIL-STD-1760
- MIL-C-38999 Series III Qualified
- Fiber Optics Optional

The Tri-Start Fail Safe* is an extraordinary evolution in connector development. Numerous advantages in capability and performance are designed into this connector. While offering the Fail Safe disengagement action (Breakaway) that can be activated at any stage of coupling, it also gives the advantages of a MIL-C-38999 connector. The Tri-Start Fail Safe meets the connector requirement of MIL-STD-1760 for electrical interface between an aircraft and it's "stores".

By the use of a metal to metal positive coupling design the Tri-Start Fail Safe improves EMI/EMP shielding by eliminating any separation at the shell interface. This design also increases moisture resistance capability and guarantees a calculable electrical engagement. Grounding fingers and electroless nickel plating insure superior shielding with an EMI capability of 65 db minimum at 10 GHz.

Recessed pins minimize potential contact damage in this 100% "scoop-proof" connector. In a blind mating application the mating shell cannot "scoop" the pin and cause a shorting or bending of contacts.

In one complete turn of the Tri-Start Fail Safe plug the connector quickly mates and self locks. The anti-decoupling device design elminates the need for lockwiring.

A rigid dielectric insert with excellent electrical characteristics provides durable protection to the contacts. All socket contacts are probe proof and rear removable. Available in sizes 8 coax, 12, 16, 20 and 22D, contacts are plated with the standard 50 micro inches minimum gold. Special purpose contacts are also available along with a wide selection of standard MIL-C-38999 insert patterns.

The MIL-C-38999 Fail Safe is available in two finishes, electroless nickel or olive drab cadmium over aluminum. The olive drab over cadmium plating prevents severe corrosion. Resistance is tested by exposure to a 500 hour salt spray. Many other finishes are available on proprietary part numbers; consult Sidney, NY for variations.

MIL-STD-1760

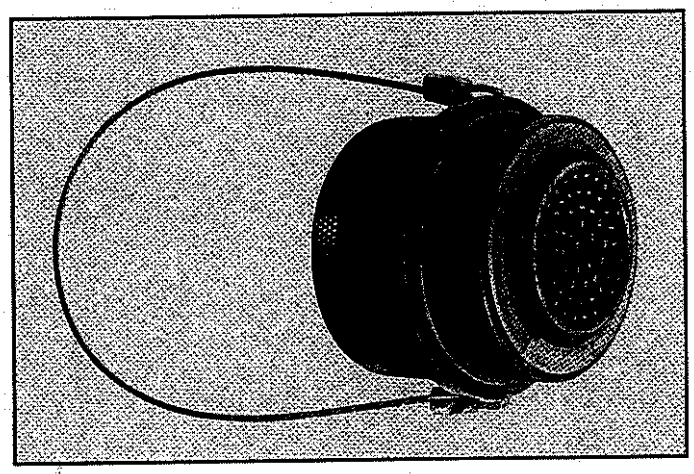
A special Tri-Start Fail Safe Breakaway MIL-C-38999/31 is qualified to MIL-STD-1760. This standard covers the electrical interface between an aircraft and it's "stores".

MIL-STD-1760 fully defines two basic electrical signal sets, the Primary Interface Signal Set and the Auxiliary Power Signal Set. The Primary Signal Set is intended to accomodate most applications and includes high bandwidth lines, redundant multiplex data buses, audio, power, fiber optics and various discretes. The Auxiliary Power Signal set is intended only for those applications requiring high current power.

MIL-STD-1760 standardizes on the intermateability/interface characteristics of the MIL-C-38999 Series III connector.

*Pat. 4,109,990, 4,279,458, other patents pending

Breakaway Subminiature LJT Fail Safe



- Instant Disconnect
- Disengagement From Any Coupling Condition
- Intermateable With Standard Receptacles
- Contact Protection
- Moisture Resistant
- 5 Key/Keyway Polarization
- Bayonet Coupling
- Swing Link Anti-Decouple
- Corrosion Resistant
- High Density Arrangements
- MIL-C-38999 Series I Modified

The LJT Fail Safe is the most widely used Breakaway connector. While offering the Fail Safe disengagement action (Breakaway) that can be activated at any stage of coupling, it also gives the advantages of a MIL-C-38999 Series I connector.

The deep shell "Scoop Proof" design insures that contacts cannot be bent or damaged by improper mating. The LJT offers maximum contact protection against bending and user aggressiveness.

Mismating is eliminated by the use of a five key/keyway guide design assuring proper alignment and the three point bayonet coupling system gives quick and positive coupling.

A rigid dielectric insert with excellent electrical characteristics provides durable protection to the contacts, and all socket contacts are probe proof. Available in sizes 8 coax, 12, 16, 20 and 22D contacts are plated in the standard 50 micro inches minimum gold. Shielded coaxial contacts are also available along with a wide selection of standard MIL-C-38999 insert patterns.

The MIL-C-38999 Series I LJT Fail Safe is available in two finishes, electroless nickel or olive drab cadmium over nickel. The olive drab cadmium plating prevents severe corrosion. Resistance is tested through exposure to a 500 hour salt spray. Many other finishes are available on proprietary part numbers; consult Sidney, NY for variations.

Subminiature Fail Safe
Tri-Start test data

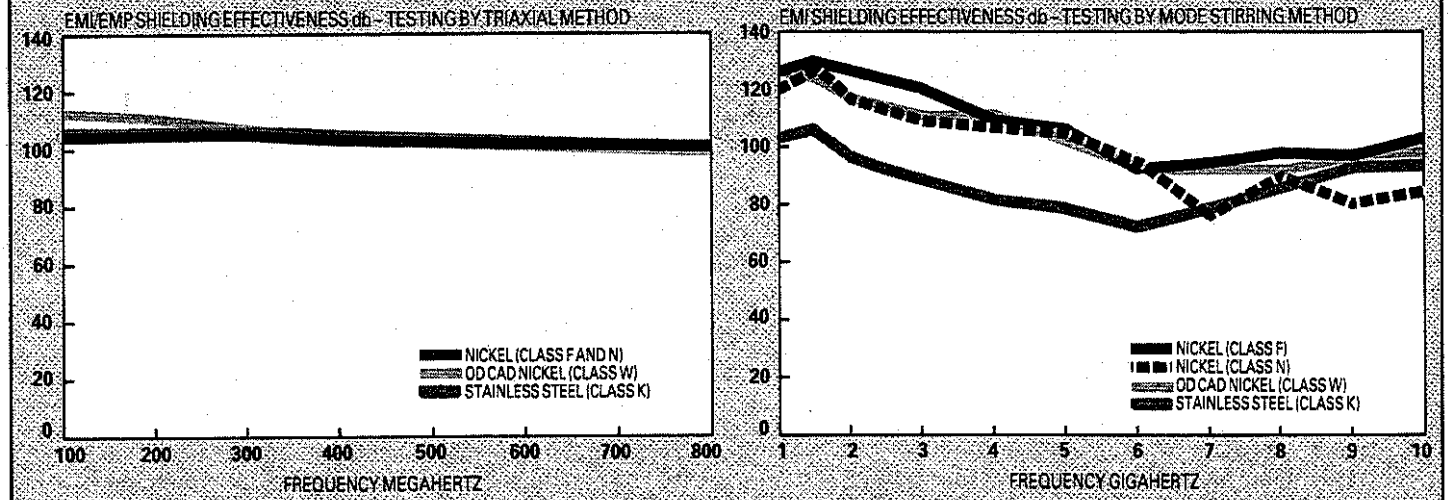
Bendix® Tri-Start Fail Safe connectors provide EMI/EMP shielding capability which exceeds MIL-C-38999 Series III requirements.

The TV Series III connector with solid metal to metal coupling, EMI grounding fingers and conductive finishes has proven to be the ultimate in EMI/EMP shielding effectiveness. The charts below illustrate shielding effectiveness data which is typical of Tri-Start connectors tested with various shell finishes over a wide frequency range.

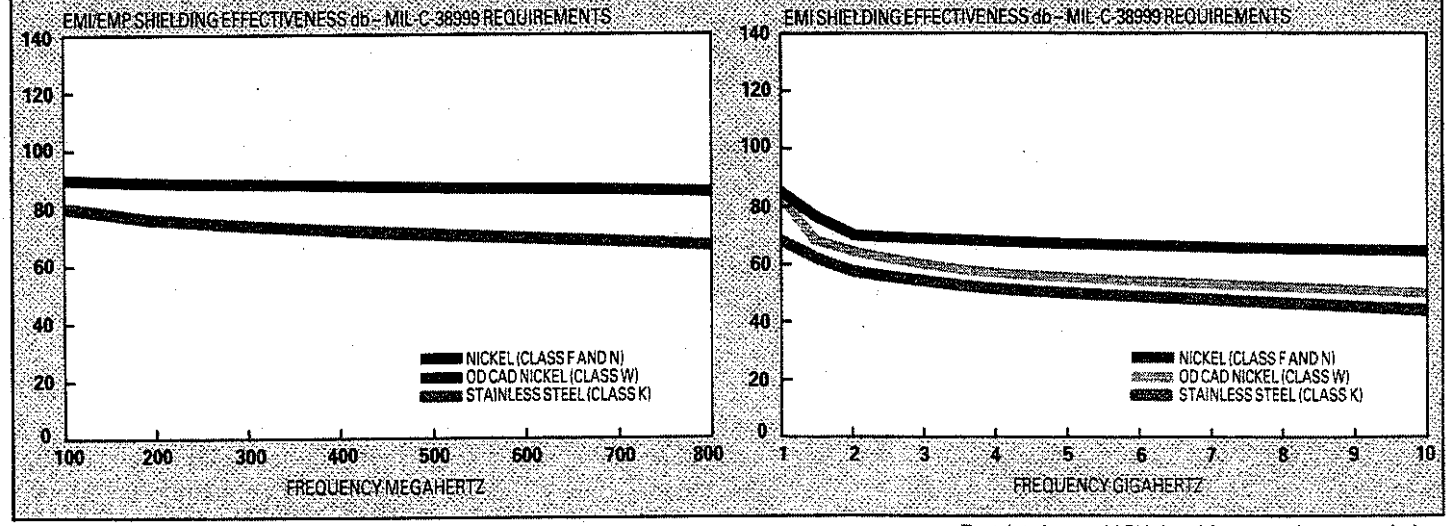
The vibration capability of the Tri-Start Series Fail Safe is shown in the chart on the left (pg 5). This illustrates the most severe vibration envelope of any qualified breakaway connector available today.

These capabilities along with a 200° temperature rating and superior moisture sealing protection provide the user with a connector that can withstand the most rigorous application.

Bendix® Test Data Tri-Start, Series III
Typical Shielding Effectiveness



Tri-Start, Series III Specifications
Shielding Effectiveness Min Limits



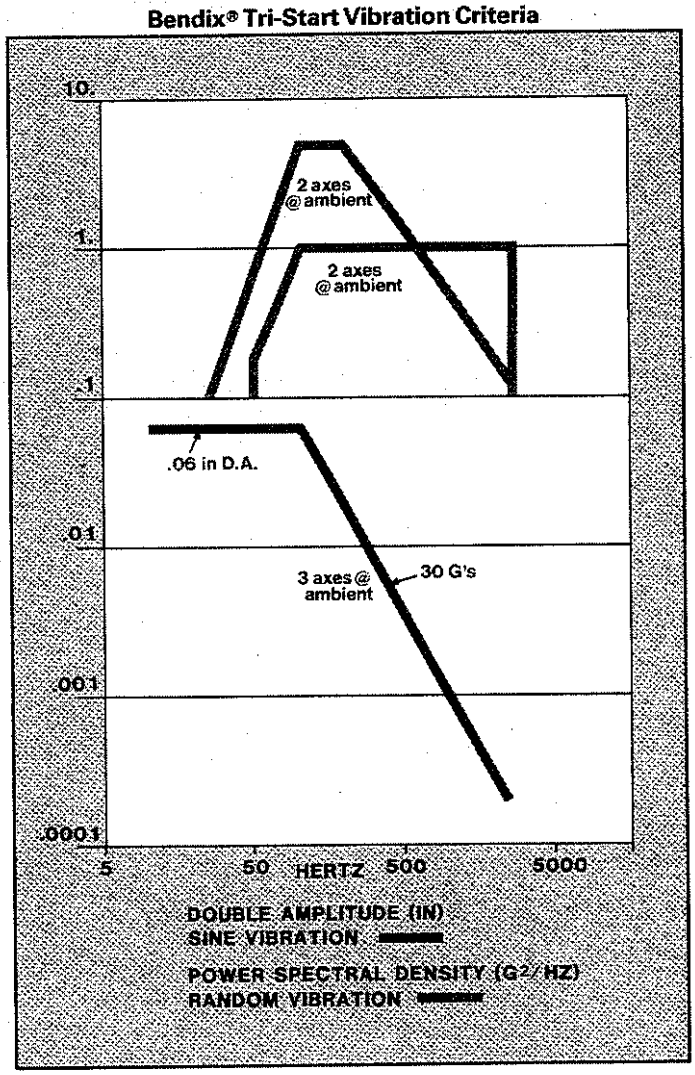
Test data beyond 2GHz is subject to equipment variation.

Subminiature Fail Safe

Tri-Start test data cont'd.

Tri-Start, LJT specifications

Bendix® Tri-Start Vibration Criteria



Separation Forces

Tri-Start			LJT		
Shell Size	Straight Pull (lbs max)	15 degree Pull (lbs max)	Shell Size	Straight Pull* (lbs max)	15 degree Pull* (lbs max)
11	45	55	11	15	20
13			13	20	25
15			15	25	30
17	90	100	17	30	35
19			19	35	45
21			21	45	55
23			23	55	65
25			25	65	75

*Increase by 50% for high density arrangements

Crimp Contact Rating

Contact Size	Test Current	Maximum Millivolt Drop*	Crimp Well Data	
			Well Diameter	Nominal Well Depth
22D	5	40	.0345 ± .0010	.141
20	7.5	35	.047 ± .001	.209
16	13	25	.067 ± .001	.209
12	23	25	.100 ± .002	.209

*Maximum Millivolt Drop Data is determined by measuring resistance of mated contacts from end to end.

Finish Data

Finish	Military Tri-Start	Military LJT	Proprietary Tri-Start and LJT
Electroless Nickel	F	F	91
Olive Drab Cadmium Plate, Nickel Base	W	B	88

Service Rating

Service Rating	Suggested Operating Voltage (Sea Level)		Test Voltage (Sea Level)	Test Voltage 50,000 ft.	Test Voltage 70,000 ft.	Test Voltage 110,000 ft.
	AC (RMS)	DC				
M	400	550	1300 VRMS	550 VRMS	350 VRMS	200 VRMS
I	600	850	1800 VRMS	600 VRMS	400 VRMS	200 VRMS
II	900	1250	2300 VRMS	800 VRMS	500 VRMS	200 VRMS

Please note that the establishment of electrical safety factors is left entirely in the designer's hands, since he is in the best position to know what peak voltage, switching surges, transients, etc., can be expected in a particular circuit.

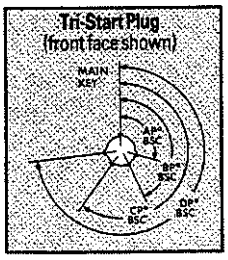
Subminiature FailSafe insert availability and identification, alternate positions

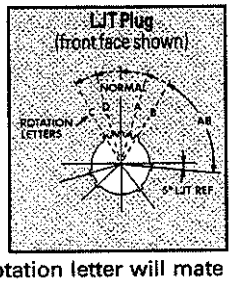
MIL-C-38999 Series III Tri-Start Key/Keyway Polarization

Shell Size	Key & Keyway arrangement identification letter	AP° BSC	BP° BSC	CP° BSC	DP° BSC
11, 13, and 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, and 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

MIL-C-38999 Series I LJT Key/Keyway Polarization

AB ANGLE OF ROTATION (Degrees)					
Shell Size	Normal	A	B	C	D
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 angle of rotation for a given connector is the same whether it contains pins or sockets. Inserts are not rotated in conjunction with the master key/keyway.

Insert Arrangement	Tri-Start	LJT	Service Rating	Total Contacts	Contact Size				
					22D	20	16	12	8 Coax*
11-4		X	I	4		4			
11-35	•	X	M	13	13				
11-98	•	X	I	6		6			
13-4		X	I	4			4		
13-8	•	X	I	8		8			
13-35	•	X	M	22	22				
13-98	•	X	I	10		10			
15-5	•	•	II	5			5		
15-19	•	•	I	19		19			
15-35	•	•	M	37	37				
15-97	•	•	I	12		8	4		
17-6	X	X	I	6				6	
17-8	X	X	II	8			8		
17-26	X	X	I	26		26			
17-35	X	X	M	55	55				
17-99	X	X	I	23		21	2		
19-11	X	X	II	11			11		
19-28	•	•	I	28		26	2		
19-32	X	X	I	32		32			
19-35	X	X	M	66	66				
21-11	•	•	I	11				11	
21-16	•	•	II	16			16		
21-35	•	•	M	79	79				
21-39	•	•	I	39		37	2		
21-41	•	•	I	41		41			
23-21	•	X	II	21			21		
23-35	•	X	M	100	100				
23-53	•	X	I	53		53			
25-4	X	X	I	56		48	8		
25-19	X	X	I	19				19	
25-24	X	X	I	24			12	12	
25-29	X	X	I	29			29		
25-35	X	X	M	128	128				
25-43	X	X	I	43		23	20		
25-46	X	X	I	46		40	4		2*
25-61	X	X	I	61		61			

X Completely tooled

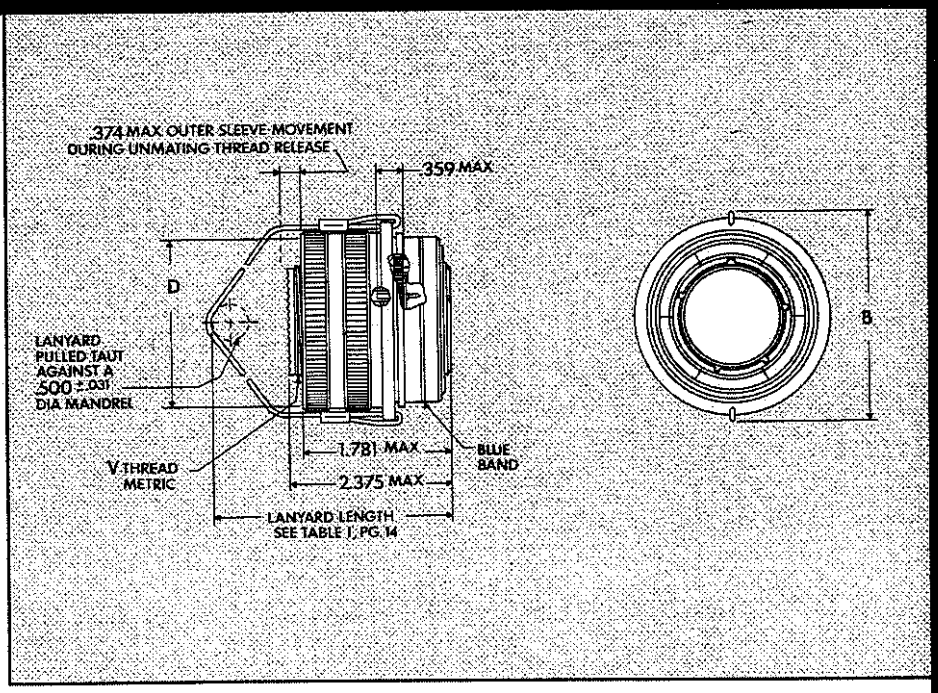
• Partial tooling is completed (check Sidney, NY for availability)

* For RG180/U and RG195/U cables only (check Sidney, NY for other cable applications)

For insert arrangements not shown consult Sidney, NY

Subminiature Tri-Start Fail Safe

Crimp rear release removable contacts



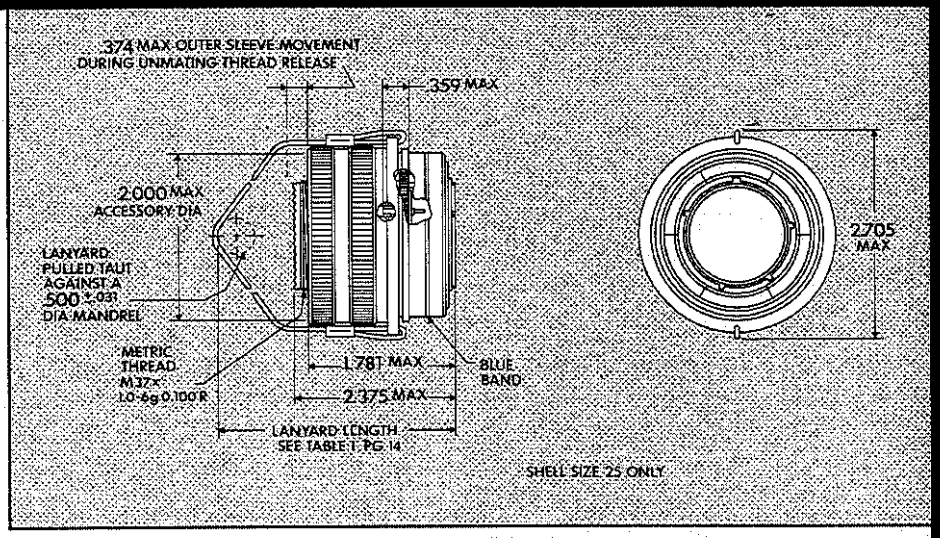
*To complete order number see how to order, pages 13–15.

Shell Size	MS Shell Size Code	B Max	D Max Accessory Dia	V Thread Metric
11	B	1.846	1.109	M15X1.0-6g 0.100R
13	C	1.972	1.250	M18X1.0-6g 0.100R
15	D	2.079	1.375	M22X1.0-6g 0.100R
17	E	2.205	1.500	M25X1.0-6g 0.100R
19	F	2.301	1.625	M28X1.0-6g 0.100R
21	G	2.472	1.750	M31X1.0-6g 0.100R
23	H	2.594	1.875	M34X1.0-6g 0.100R
25	J	2.705	2.000	M37X1.0-6g 0.100R

All dimensions for reference only

Subminiature Tri-Start Fail Safe for MIL-STD-1760

Crimp rear release removable contacts

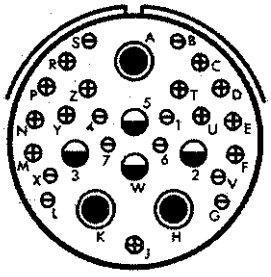


*To complete order number see how to order, pages 14–15.

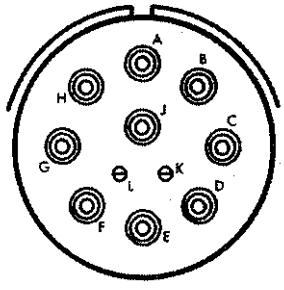
All dimensions for reference only

1760 Failsafe Features:

- **Incorporates all MIL-C-38999 Series III features**
- **Intermateable with D38999/20 and /24**
- **Available with pin contacts only for MIL-STD-1760 applications**
- **Insert arrangements totally compatible with MIL-STD-1553B Aircraft Multiplex Data Bus**
- **25–20 arrangement available only in "N" normal rotation**
- **25–11 arrangement available only in "A" rotation**
- **O.D. Cad corrosion resistant finish**
- **Accepts MIL-C-85049 Backshell Hardware**
- **Fiber Optics**



25-20
Primary Interface Signal Set



25-11
Auxiliary Power Signal Set

Front face of pin inserts illustrated

Contact Legend	8 (twinax)	10 (Power)	12 (coax)	16	20

Pin Contact Data for MIL-Std-1760

Insert Arrangement	Service Rating	Total Contacts	Contact Size			
			20	16*	12 (coax)	8 (twinax)
25-20	Inst.	30	10	13*	4	3

* 2 size 16 contacts dedicated to fiber optics. Contact home office for fiber optic contact information.

Insert Arrangement	Service Rating	Total Contacts	Contact Size	
			20	10 (power)
25-11	Inst.	11	2	9

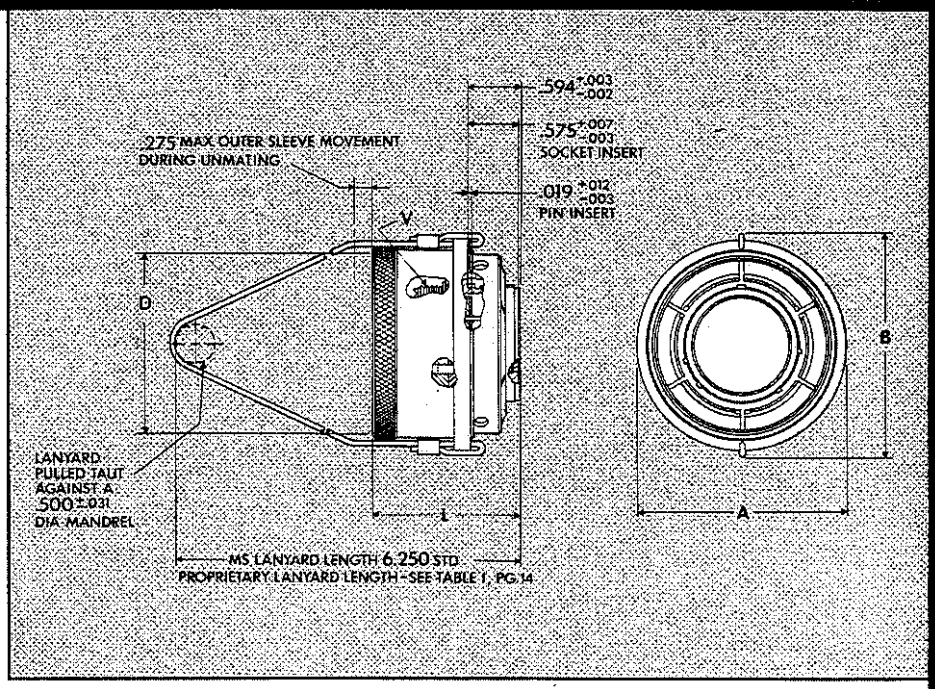
Contact Size	Proprietary No.	MS No.
8 (twinax)	21-33190-529	M39029/90-529
10 (power)	10-251415-105	M39029/58-528
12 (coax)	21-33122-546	M39029/28-211
16	†	†
20	†	†

†Standard Subminiature Connector contacts – see page 12 for part numbers.

For insertion and removal tools for sizes 8 twinax, 10 power and 12 coax contacts consult Sidney, NY. For size 16 and 20 contacts see page 12.

Subminiature LJT Fail Safe

Crimp rear release removable contacts

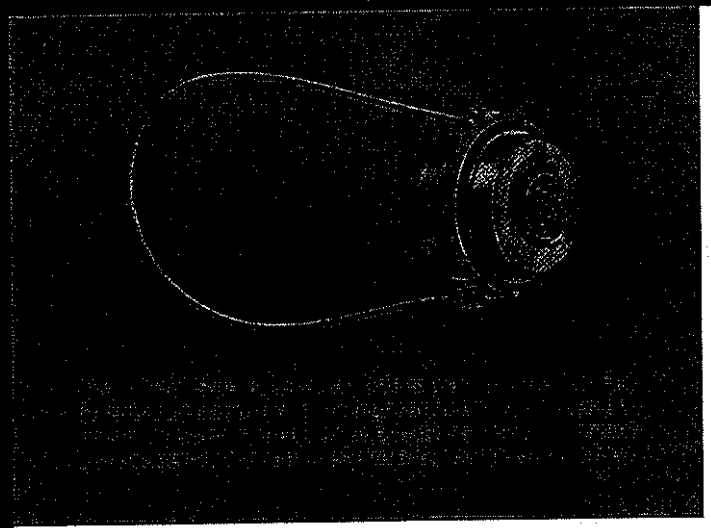


*To complete order number see how to order, pages 13–15.

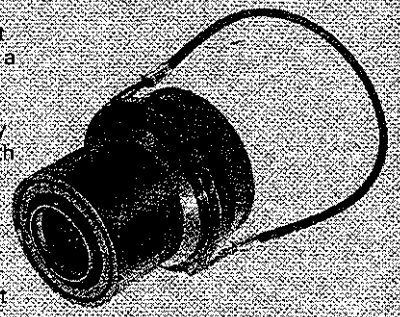
Shell Size	A Dia Max	B Max	D Max Accessory Dia	L Max	V Thread Class 2A UNEF (Plated)
11	1.393	1.797	.740	1.703	.5625-24
13	1.558	1.969	.926	1.703	.6875-24
15	1.669	2.078	1.051	1.703	.8125-20
17	1.797	2.203	1.176	1.703	.9375-20
19	1.926	2.323	1.300	1.703	1.0625-18
21	2.054	2.469	1.426	1.703	1.1875-18
23	2.183	2.594	1.551	1.703	1.3125-18
25	2.293	2.703	1.676	1.766	1.4375-18

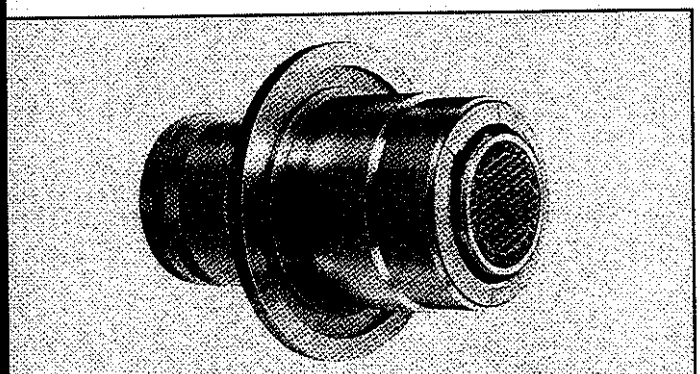
All dimensions for reference only

Subminiature Fail Safe
specials

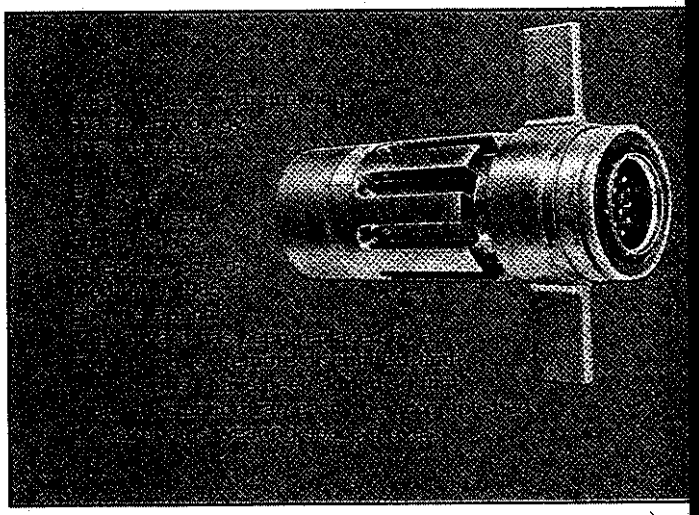


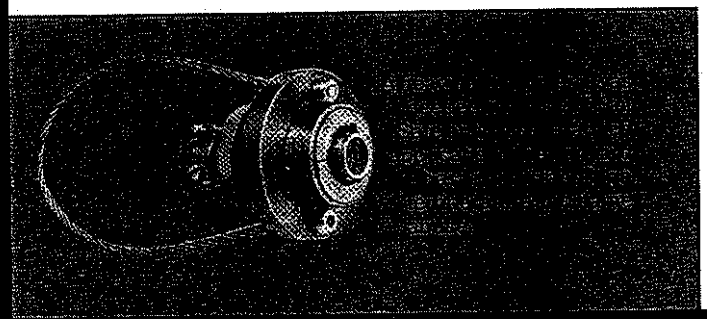
This special configuration of a Tri-Start Fail Safe is used on a missile launching system. The system needed a breakaway that would mate with a receptacle in a deep blind recess. The design of this coupling nut was able to meet this requirement without any performance degradation.



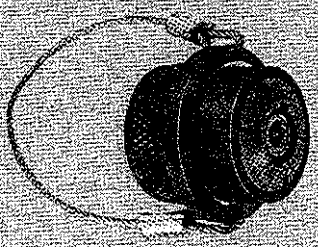


A large flange replaces the lanyard on this special LJT Fail Safe. This design is another example of the flexibility that Bendix® Breakaway connectors have in meeting the differing needs of any application.

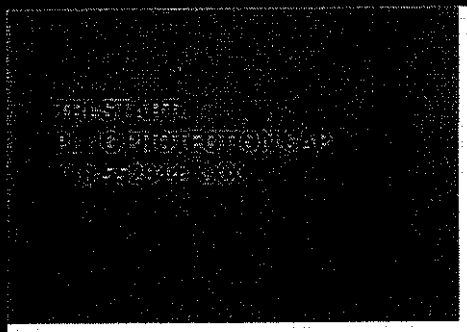


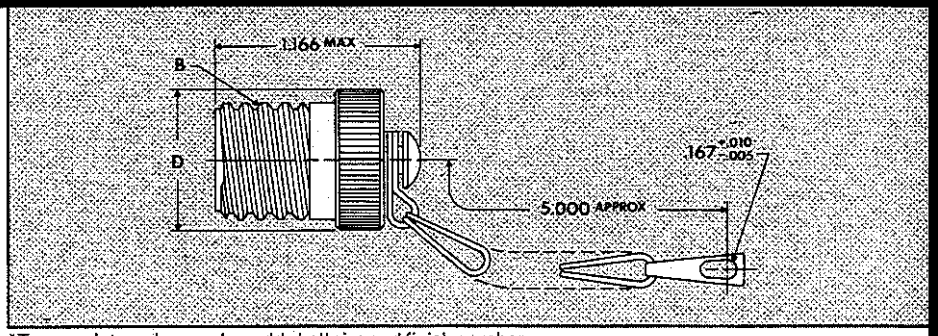


To meet the needs of coaxial cable connections the Square-Cut BNC and TNC are available in the Fail Safe Breakaway release system.



Subminiature Fail Safe
accessories – protection caps



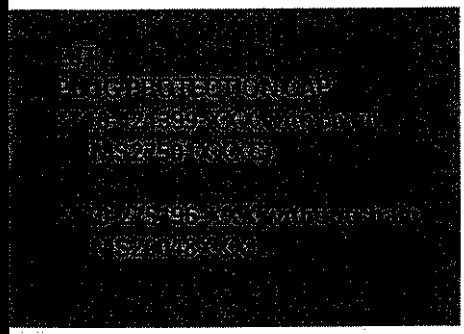


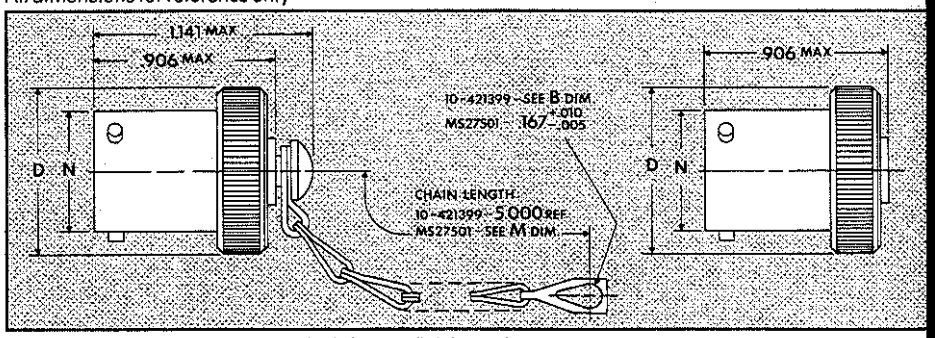
*To complete order number add shell size and finish number.
For example, shell size 11 with olive drab cadmium, nickel base; 10-552943-119.

Finish	10- No. Suffix
Olive drab cadmium, nickel base	-XX9
Electroless nickel	-XXG

Shell Size	MS Shell Size Code	B Thread Class 2A 0.1P-0.3L-TS	D Dia. Max.
11	B	.7500	1.000
13	C	.8750	1.171
15	D	1.0000	1.299
17	E	1.1875	1.436
19	F	1.2500	1.543
21	G	1.3750	1.670
23	H	1.5000	1.787
25	J	1.6250	1.914

All dimensions for reference only





**To complete order number add shell size and finish number.
For example, shell size 11 with olive drab cadmium, nickel base; 10-421399-119, MS27501B11C, 10-275196-119 or MS20048B11

Finish	10- No. Suffix	MS No. Suffix with Chain	MS No. Suffix Without Chain
Olive drab cadmium, nickel base	-XX9	BXXC	BXX
Electroless nickel	-XXG	FXXC	FXX

Shell Size	B Dia. Ref.	D Dia. Max.	M ±.250	N Dia. +.001 −.005
11	.180	.938	3.000	.700
13	.180	1.062	3.500	.850
15	.180	1.188	3.500	.975
17	.180	1.312	3.500	1.100
19	.209	1.438	3.500	1.207
21	.209	1.562	4.000	1.332
23	.209	1.688	4.000	1.457
25	.209	1.812	4.000	1.582

All dimensions for reference only

Subminiature Fail Safe contacts, application tools, sealing plugs

Pin Contacts

Contact Size	Proprietary No.	MS No.
8 (coax)	21-33102-21	M39029/60-367
12	10-251415-12(-)	M39029/58-365
16	10-251415-16(-)	M39029/58-364
20	10-251415-20(-)	M39029/58-363
22D	10-251415-72(-)	M39029/58-360

Socket Contacts

Contact Size	Proprietary No.	MS No.
8 (coax)	21-33101-21	M39029/59-366
12	10-407035-12(-)	M39029/56-353
16	10-407035-16(-)	M39029/56-352
20	10-407035-20(-) *10-497403-20(-)	M39029/56-351
22D	10-407035-72(-)	M39029/56-348

To complete proprietary contact part number add finish suffix. 5 designates standard finish for MIL-C-39029 contacts: 0.00005 min gold over nickel finish, rated at 200°C.

Example: 10-251415-725 defines TV or LJT 22D pin with 0.00005 min gold over nickel finish. For other finish variations consult Sidney, NY.

*Stamped and formed contact

Sealing Plugs

Contact Size	Proprietary No.	MS No.
8 (coax)	10-482099-8	—
12	10-405996-12	MS27488-12
16	10-405996-16	MS27488-16
20	10-405996-20	MS27488-20
22D	10-405996-24	MS27488-22

Application Tools

The following data includes information pertaining to the application tools which have been established for crimping, inserting and removing the size 8, 12, 16, 20 and 22D contacts incorporated in the TV, LJT-R (MIL-C-38999) series connectors as applicable.

All crimping tools included are the "full cycling" type and, when used as specified in the installation instructions (L-624 and L-1107) covering the TV, LJT-R and MS series connectors, will provide reliable crimped wire to contact terminations.

Crimping Tools

Crimping Tool	Turret Die or Positioner	Contact Size/Type
M22520/1-01	M22520/1-04	12 Pin and Socket
M22520/7-01 M22520/1-01	M22520/7-04 M22520/1-04	16 Pin and Socket
M22520/7-01 M22520/2-01 M22520/1-01	M22520/7-08 M22520/2-10 M22520/1-04	20 Pin and Socket
M22520/7-01 M22520/2-01	M22520/2-09 M22520/7-07	22D Pin

Crimping Tool	Turret Die or Positioner	Contact Size/Type
M22520/7-01	M22520/7-05	22D Socket
M22520/2-01	M22520/2-07	
M22520/2-01	M22520/2-31	8 Coaxial Inner Pin and Socket
M22520/5-01	M22520/1-05 Die Closure B	8 Coaxial Outer Pin and Socket
M22520/5-01	M22520/5-41 Die Closure B	
M22520/10-01	M22520/10-07 Die Closure B	

Where 2 or 3 Tools are listed for a contact size, only one tool and its die or positioner are required to crimp the contact.

The above crimping tools and positioners are available from the approved tool manufacturer.

Insertion Tools

Metal Tools				Plastic Tools		Use With Contact Size
Angle Type		Straight Type	Color Code	MS Part Number	Color Code	
MS Part Number	Proprietary Part Number	Proprietary Part Number				
M81969/8-09	11-8674-12	11-8794-12	Yellow	M81969/14-04*	Yellow	12
M81969/8-07	11-8674-16	11-8794-16	Blue	M81969/14-03*	Blue	16
M81969/8-05	11-8674-20	11-8794-20	Red	M81969/14-02*	Red	20
M81969/8-01	11-8674-24	11-8794-24	Black	M81969/14-01*	Green	22D
None Required						8 Coaxial

Removal Tools

Metal Tools For Unwired Contacts Proprietary Part Number	Metal Tools			Plastic Tools		Use With Contact Size
	Angle Type					
	MS Part Number	Proprietary Part Number	Color Code	MS Part Number	Color Code	
11-10050-5	M81969/8-10	11-8675-12	Yellow/White	M81969/14-04*	(Yellow)/White	12
11-10050-4	M81969/8-08	11-8675-16	Blue/White	M81969/14-03*	(Blue)/White	16
11-10050-3	M81969/8-06	11-8675-20	Red/White	M81969/14-02*	(Red)/White	20
11-10050-1	M81969/8-02	11-8675-24	Black/White	M81969/14-01*	(Green)/White	22D
None	None	11-9170	None	None	None	8 Coaxial

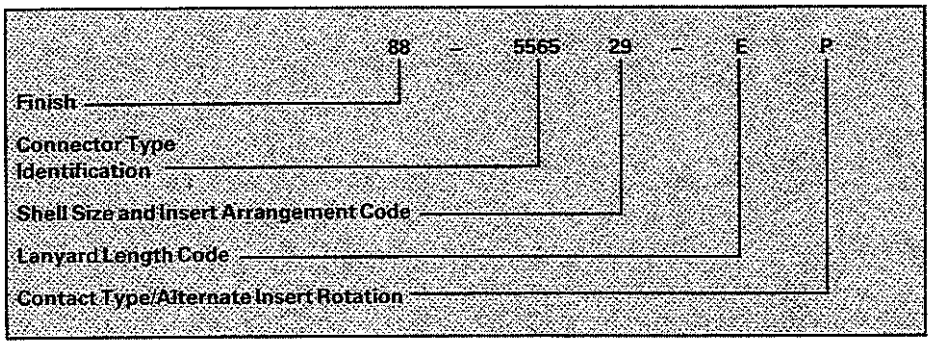
The M81969/8, 11-8674, 11-8675, and 11-8794 Metal Contact Insertion and Removal Tools will accommodate wires having the maximum outside diameter as follows: Contact size 12 — .155, 16 — .109, 20 — .077, 22D — .050. When wire diameters are in excess of those specified, the plastic tools must be used.

*Double ended insertion/removal tool

Subminiature Fail Safe
how to order

Proprietary Part Number

Bendix® Tri-Start and LJT Fail Safe Breakaway Connectors can be ordered by coded part number. Ordering procedure is illustrated by part number 88-556529-EP as shown below:



Finish

88 designates corrosion resistant olive drab cadmium plate over nickel, 500 hour extended salt spray, EMI –50db @ 10GHz specification min., 175°C

91 designates electroless nickel plated aluminum, optimum EMI shielding effectiveness – 65db @ 10GHz specification min., 48 hour salt spray, 200°C

These are standard finishes. Consult Sidney, NY for variations.

Connector Type Identification

88/91 – 5565 designates MIL-C-38999, Series III Tri-Start Lanyard Release Plug

88/91 – 5388 designates MIL-C-38999, Series I LJT Lanyard Release Plug

Shell Size and Insert Arrangement Code

Shell sizes are MIL-C-38999 from 11 thru 25, Tri-Start and LJT. The basic part number selected specifies the insert arrangement. See Table II on the following page. For further description of insert arrangements see insert identification chart on page 6.

Lanyard Length Code

See Table I, page 14 (for Tri-Start Proprietary use letters, for LJT Proprietary use numbers)

Contact Type/Alternate Insert Rotations

P designates pin, S designates socket for normal positioning of contacts. When an alternate position of the connector is required to prevent cross-mating a different letter (other than P or S) is used. See page 6 for description of alternate positions, Tri-Start or LJT, then convert to Bendix® proprietary coding by the following charts:

TRI-START

Pin Contacts		Socket Contacts	
MS Letter	Bendix® Letter	MS Letter	Bendix® Letter
PN	P (normal)	S	S (normal)
PA	G	SA	H
PB	I	SB	J
PC	K	SC	L
PD	M	SD	N
PE	R	SE	T

LJT

Pin Contacts		Socket Contacts	
MS Letter	Bendix® Letter	MS Letter	Bendix® Letter
P	P (normal)	S	S (normal)
PA	E	SA	F
PB	R	SB	T
PC	W	SC	X
PD	Y	SD	Z

Subminiature Fail Safe
how to order

Table I
For specifying lanyard length code.

Tri-Start				LJT		
Lanyard Length ±.236	MS Code	Proprietary Code	MIL-STD 1760 Code	Lanyard Length ±.250	MS	Proprietary Code
4.016	A	A		4.000		40
				4.250		41
4.528	B	B		4.500		42
				4.750		43
5.000	C	C		5.000		50
				5.250		51
5.512	D	D		5.500		52
				5.750		53
6.024	E	E	E	6.000		60
				6.250		61
6.535	F	F	F	6.500		62
				6.750		63
7.008	G	G	G	7.000		70
				7.250		71
7.520	H	H	H	7.500		72
				7.750		73
7.992	I	I		8.000		80
				8.250	No	81
8.503	J	J		8.500	Code	82
				8.750		83
9.016	K	K		9.000	Std.	90
				9.250	Length	91
9.528	L	L		9.500	6.250	92
				9.750		93
10.000	M	M				
10.512	N	N				
11.024	P	P				
11.535	R	R				
12.008	S	S				
12.520	T	T				
13.031	U	U				
14.016	V	V				
15.000	W	W				
16.024	X	X				
17.008	Y	Y				
18.031	Z	Z				

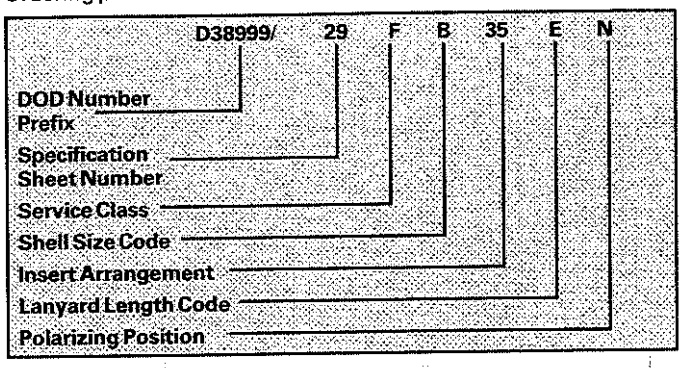
Table II
In ordering proprietary connectors the basic part number selected specifies the insert arrangement as shown below. For part numbers or insert arrangements not shown consult Sidney, NY.

Tri-Start		LJT	
Basic Part Number	MIL-C-38999 Insert Arrangement	Basic Part Number	MIL-C-38999 Insert Arrangement
88/91-556504	11-4	88/91-538804	11-4
06	11-35	06	11-35
07	11-98	07	11-98
10	13-4	10	13-4
11	13-8	11	13-8
13	13-98	13	13-98
14	13-35	14	13-35
18	15-5	18	15-5
19	15-19	19	15-19
20	15-35	20	15-35
		21	15-97
27	17-6		
28	17-8	27	17-6
29	17-26	28	17-8
30	17-35	29	17-26
31	17-99	30	17-35
37	19-11	37	19-11
38	19-28	38	19-28
39	19-32	39	19-32
40	19-35	40	19-35
47	21-11	47	21-11
48	21-16	48	21-16
49	21-35	49	21-35
50	21-41	50	21-41
51	21-39		
		57	23-21
57	23-21	58	23-35
58	23-35	59	23-53
59	23-53		
		66	25-19
66	25-19	67	25-29
67	25-29	68	25-35
68	25-35	69	25-43
69	25-43	70	25-61
70	25-61	71	25-46
71	25-4		
72	25-24		

Subminiature Fail Safe
how to order

Military Part Number
Tri-Start

Ordering procedure for P/N D38999/29FB35EN is shown below:



DOD Number Prefix

D38999/ designates MIL-C-38999, Series III Tri-Start Connector

Specification Sheet Number

29 designates Lanyard Release Plug with pin contacts

30 designates Lanyard Release Plug with socket contacts

Service Class

F designates electroless nickel plated aluminum, optimum EMI shielding effectiveness – 65dB @ 10GHz specification min., 48 hour salt spray, 200°C

W designates corrosion resistant olive drab cadmium plate aluminum, 500 hour extended salt spray, EMI –50dB @ 10 GHz specification min., 175°C

Shell Size Code

MIL-C-38999, Sizes 11 thru 25

A*	B	C	D	E	F	G	H	J	MIL Shell Size
9*	11	13	15	17	19	21	23	25	Bendix® Shell Size

*not available

Insert Arrangement

MIL-C-38999, see insert identification chart on page 6

For MIL-STD-1760 insert identification, see page 8

Lanyard Length Code

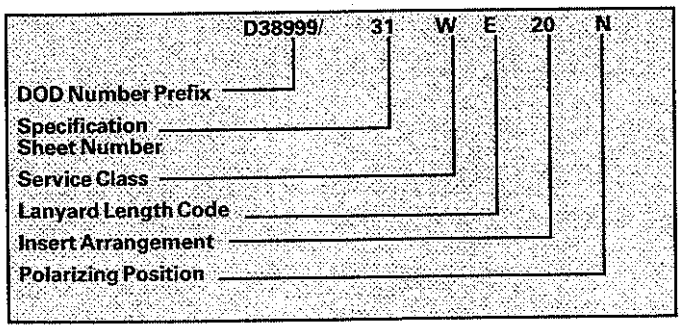
See Table I on page 14, Tri-Start MS Code

Polarizing Position

For alternate positions of connector (to prevent cross-mating) see Tri-Start key/keyway polarization description on page 6. (N indicates Normal)

Military Part Number
Tri-Start for MIL-STD-1760 applications

Ordering procedure for P/N D38999/31W E20N is shown below:



DOD Number Prefix

D38999/designates MIL-C-38999, Series III Tri-Start Connector

Specification Sheet Number

31 designates Lanyard Release Plug with MIL-STD-1760 pin contacts

Service Class

W designates corrosion resistant olive drab cadmium plated aluminum, 500 hour extended salt spray, EMI –50dB @ 10GHz specification min., 175°C

Lanyard Length Code

See Table I on page 14, Tri-Start MIL-STD-1760 Code

Insert Arrangement

See insert identification chart on page 8, Tri-Start MIL-STD-1760 (Arrangements 25–11 and 25–20 only)

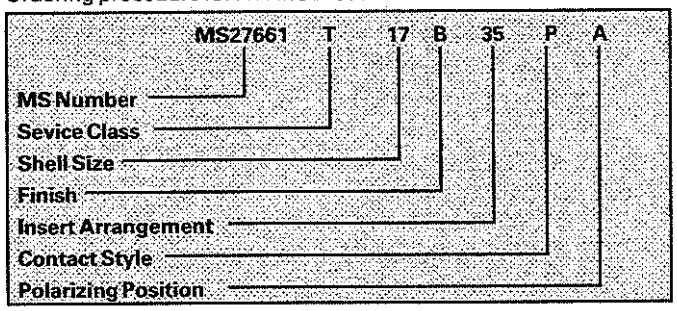
Polarizing Position

N 25–20 arrangement available only in "N" normal position

A 25–11 arrangement available only in "A" rotation

Military Part Number
LJT

Ordering procedure for P/N MS27661T17B35PA is shown below:



MS Number

MS Number designates MIL-C-38999, Series I LJT Lanyard Release Plug

Service Class

E for environmental crimp applications (Inactive for New Design)

T for environmental crimp applications with serrations on rear threads of shell

Shell Size

MIL-C-38999, sizes 11 thru 25

Finish

B designates corrosion resistant olive drab cadmium plated aluminum, 500 hour extended salt spray, EMI –50dB @ 10GHz specification min., 175°C

F designates electroless nickel plated aluminum, optimum EMI shielding effectiveness –65dB @10GHz specification min., 48 hour salt spray, 200°C

These are standard finishes. Consult Sidney, NY for variations.

Insert Arrangement

MIL-C-38999, see insert identification chart on page 6.

Contact Style

P designates Lanyard Release with pin contacts

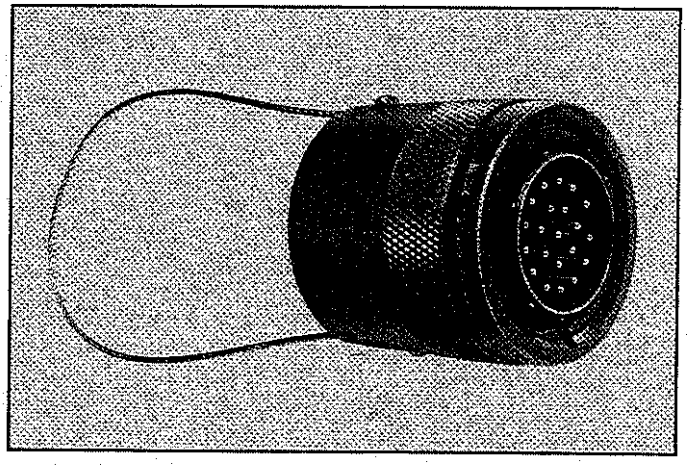
S designates Lanyard Release with socket contacts

Polarizing Position

For alternate positions of connector (to prevent cross-mating) see LJT key/keyway polarization description on page 6. (No letter is required for normal).

Bendix®Federal Vendor Identification/FSCM 77820

Breakaway Miniature Pygmy Twist Pull



The Pygmy Twist Pull Breakaway connector is designed to give instant disconnect of plug and receptacle with an axial pull on the lanyard when they are fully mated.

The Pygmy Twist Pull is offered in three styles; the PT solder contact, PT-SE crimp contact which incorporates a clip retention system and PT-CE crimp which incorporates a dielectric retention system. All contacts are copper and are plated with 50 micro inches minimum gold.

Mismating is eliminated by the use of a five key/keyway guide design assuring proper alignment and the three point bayonet coupling system gives quick and positive coupling.

Shell components are impact extruded or machined bar stock aluminum. The two standard finishes are olive drab cadmium plate or electrically non-conductive anodic coating. The anodic coating under an extended 500 hour salt spray test, provides extreme wear and corrosion resistance. Many other finishes are available; consult Sidney, NY for variations.

Miniature Twist Pull
specifications

Separation Forces
Pygmy CE, SE, PT Solder

Shell Size	Straight Pull (lb. max)
8	4
10	5
12	10
14	20
16	25
18	40
20	50
22	75
24	75

Crimp Contact Rating

Contact Size	Test Current	Maximum Millivolt Drop*	Crimp Well Data			
			Pygmy CE		Pygmy SE	
			Well Diameter	Nominal Well Depth	Well Diameter	Nominal Well Depth
20	7.5	55	$.045^{+.002}_{-.001}$	.284	.049 ± .001	.192
16	13	50	$.063^{+.004}_{-.001}$	.234	.067 ± .001	.250
12	23	50	—	—	.100 ± .002	.250

Finish Data

Finish	Suffix No.
Olive drab Cadmium plate	71
Anodic coated (nonconductive)	72

Solder Contact Rating

Contact Size	Test Current	Maximum Millivolt Drop*	Pygmy PT Solder Well Data	
			Well Diameter	Nominal Well Depth
20	7.5	55	$.046^{+.004}_{-.000}$	.125
16	13	50	$.078^{+.005}_{-.003}$	.188
12	23	50	$.116^{+.005}_{-.003}$	.188

* Maximum Millivolt Drop data is determined by measuring resistance of mated contacts in accordance with method 3004 of MIL-STD-1344.

Service Rating**

Service Rating	Suggested Operating Voltage (Sea Level)		Test Voltage (Sea Level)	Test Voltage 50,000 ft.	Test Voltage 70,000 ft.	Test Voltage 110,000 ft.
	AC (RMS)	DC				
I	500	700	1500	500	375	200
II	900	1250	2300	750	500	200
H.V.	—	—	5000	—	—	—

**Please note that the establishment of electrical safety factors is left entirely in the designer's hands, since he is in the best position to know what peak voltage, switching surges, transients, etc., can be expected in a particular circuit.

Miniature Pygmy Twist Pull
insert availability and identification, alternate positions

MIL-C-26482 Pygmy Insert Rotations

Shell Size	Pygmy Insert Arrangement	Degrees			
		W	X	Y	Z
8	8-2	58	122		
	8-3	60	210		
	8-4	45			
	8-33	90			
10	10-2	45	90	315	
	10-6	90			
	10-98	90	180	240	270
	10-99	90			
12	12-3			180	
	12-4	38			
	12-8	90	112	203	292
	12-10	60	155	270	295
	12-98	61	135	189	340
14	14-2	58	122		
	14-5	40	92	184	273
	14-8	48	162	189	312
	14-12	43	90		
	14-15	17	110	155	234
	14-16	35			
	14-18	15	90	180	270
	14-19	30	165	315	
	14-91		60		
16	16-6				
	16-8	54	152	180	331
	16-23	158	270		
	16-26	60		275	338
	16-99	66	156	223	340
18	18-5	55	97	263	315
	18-11	62	119	241	340
	18-28	49	158	207	329
	18-30	180	193	285	350
	18-32	85	138	222	265
	18-91	90	180	240	270

Insert Identification

Pygmy Insert Arrangement	CE	SE	PT Solder	Service Rating	Total Contacts	Contact Size		
						20	16	12
8-2	X		X	I	2	2		
8-3	X		X	I	3	3		
8-4	X		X	I	4	4		
8-33		X		I	3	3		
10-2			X	I	2		2	
10-6	X	X	X	I	6	6		
10-98	X		X	I	6	6		
10-99	X	X		I	7	7		
12-3	X	X	X	II	3		3	
12-4			X	I	4		4	
12-8	X	X	X	I	8	8		
12-10	X	X	X	I	10	10		
12-98			X	I	10	10		
14-2			X	II	2			2
14-5	X	X	X	II	5		5	
14-8			X	I	8	6		2
14-12	X	X	X	I	12	8	4	
14-15	X	X	X	I	15	14	1	
14-16			X	II	4		2	2
14-18	X	X	X	I	18	18		
14-19	X	X	X	I	19	19		
14-91		X	X	H.V.	3	3*		
16-6			X	I	6			6
16-8	X	X	X	II	8		8	
16-23	X	X	X	I	23	22	1	
16-26	X	X	X	I	26	26		
16-99		X	X	I	23	21	2	
18-5		X	X	II	5			5
18-11	X	X	X	II	11		11	
18-28		X	X	I	28	26	2	
18-30	X	X	X	I	30	29	1	
18-32	X	X	X	I	32	32		
18-91		X	X	H.V.	6	6*		

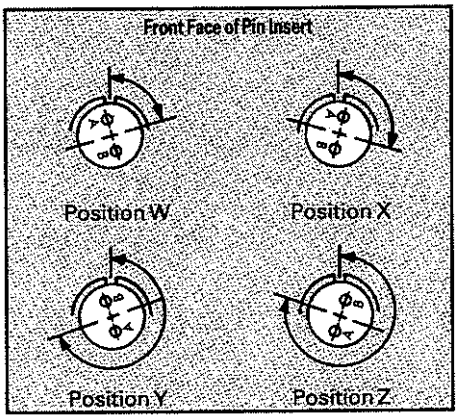
XCompletely tooled.
*5KV Voltage Rating
For insert arrangements not shown consult Sidney, NY.
For insert layouts see catalog 12-070, MIL-Std-1669 or consult Sidney, NY.

Miniature Pygmy Twist Pull

insert availability and identification, alternate positions (Cont'd)

MIL-C-26482 Pygmy Insert Rotations

Shell Size	Pygmy Insert Arrangement	Degrees W	X	Y	Z
20	20-8	71	155	218	286
	20-16	238	318	333	347
	20-24	70	145	215	290
	20-25	72	144	216	288
	20-27	72	144	216	288
	20-39	63	144	252	333
	20-41	45	126	225	
22	22-8	75	147	222	287
	22-21	16	135	175	349
	22-25	60	125	211	336
	22-32	72	145	215	288
	22-34	62	142	218	298
	22-36	72	144	216	288
	22-41	39	135	264	
	22-55	30	142	226	314
	22-96	19	41		
	22-97	19	93	265	341
	22-99	25	146	213	281
24	24-31	90	225	255	
	24-61	90	180	270	324



Alternate positioning of the connector insert prevents cross-plugging in applications requiring the use of more than one Pygmy connector of the same size and arrangement. The front face of the pin insert is rotated within the shell in a clockwise direction from the normal shell key. The socket insert would thus be rotated counter clockwise the same number of degrees in respect to the normal shell key.

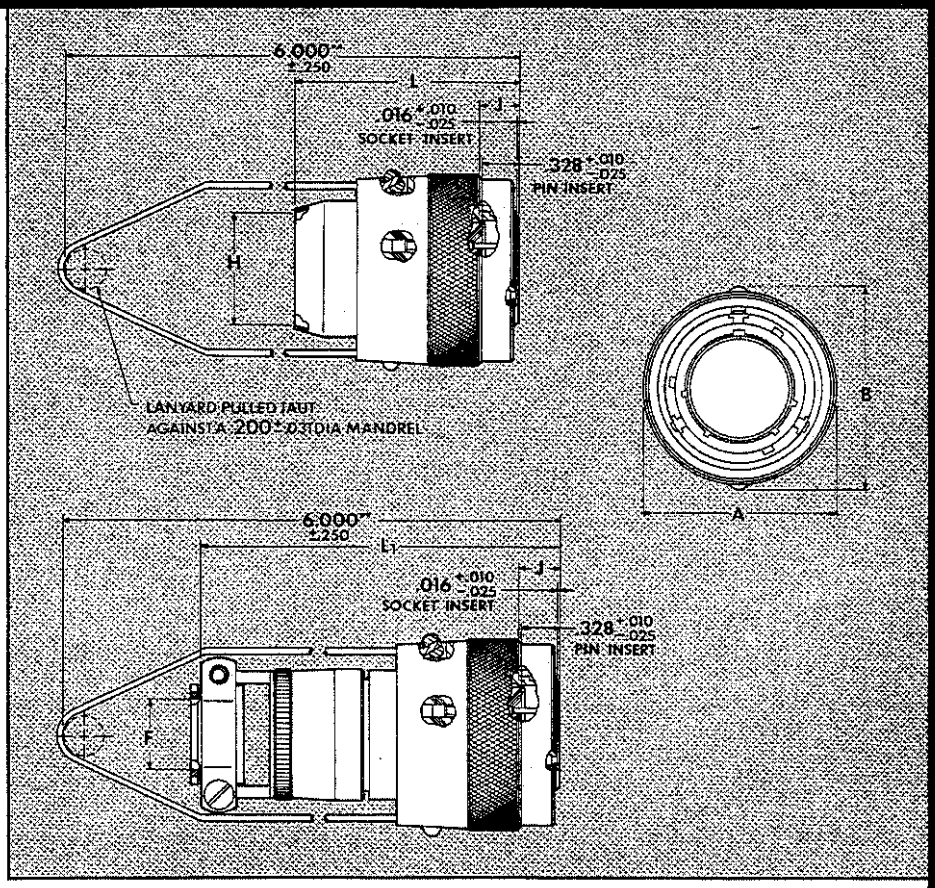
Insert Identification

Pygmy Insert Arrangement	CE	SE	PT Solder	Service Rating	Total Contacts	Contact Size 20	16	12
20-8			X	I	8		8	
20-16	X	X	X	II	16		16	
20-24	X		X	I	24	24		
20-25			X	I	25	25		
20-27	X		X	I	27	27		
20-39	X	X	X	I	39	37	2	
20-41	X	X	X	I	41	41		
22-8			X	II	8		8	
22-21	X	X	X	II	21		21	
22-25		X		I	25		25	
22-32	X	X	X	I	32	32		
22-34	X		X	I	34	34		
22-36	X		X	I	36	36		
22-41		X	X	I	41	27	14	
22-55	X	X	X	I	55	55		
22-96		X		II	7			7†
22-97			X	II	16		16	
22-99			X	II	11		11	
24-31	X			I	31		31	
24-61	X	X	X	I	61	61		

X Completely tooled.
* 5KV Voltage Rating
† Size 12 contact for # 10 wire
For insert arrangements not shown consult Sidney, NY.
For insert layouts see catalog 12-070, MIL-Std-1669 or consult Sidney, NY.

Miniature Pygmy Twist Pull

Crimp front release removable contacts (CE type)



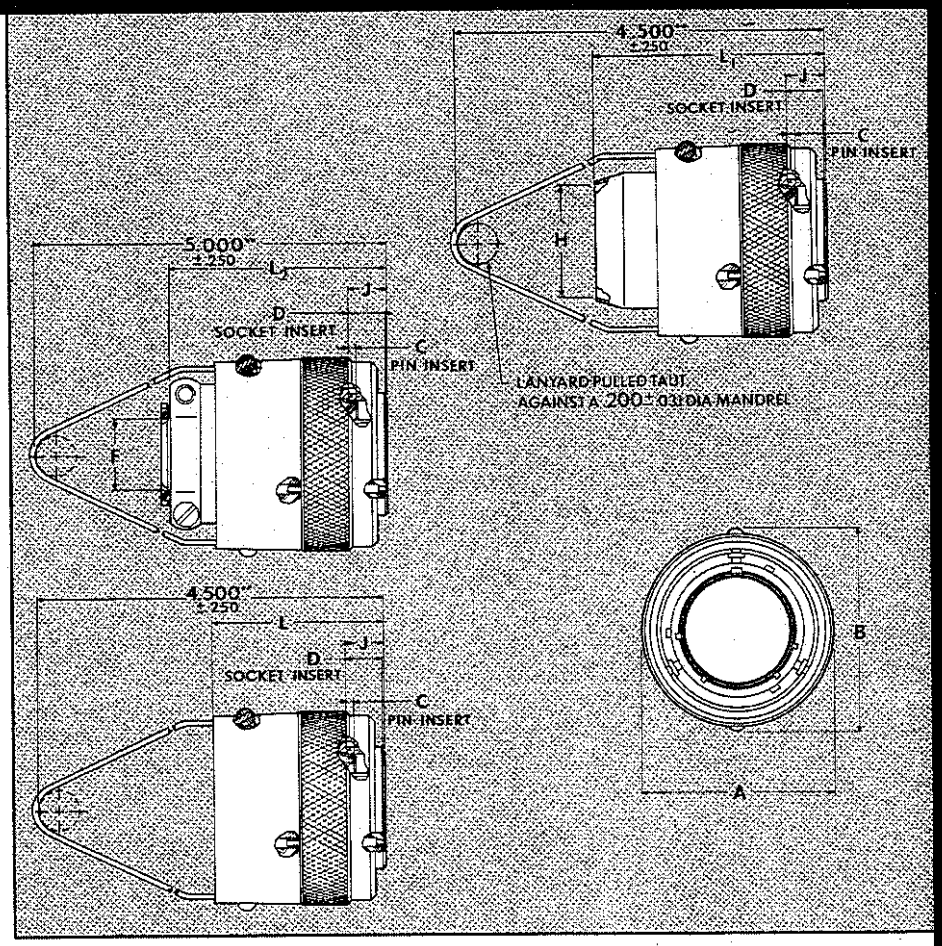
*To complete order number see how to order, page 25.
**Standard lanyard length shown. Consult Sidney, NY for variations and ordering procedure.

Part No.*	Part No.*	Shell Size	A Dia Max	B Max	F Dia ±.016	H ±.016	J ±.010	L Max	L_1 Max
71-251209	71-339508	8	.875	.984	.125	.327	.353	1.937	2.937
71-251210	71-339510	10	1.125	1.125	.188	.444	.353	1.890	2.937
71-251211	71-339512	12	1.281	1.406	.312	.558	.353	1.906	3.000
71-251212	71-339514	14	1.438	1.562	.375	.683	.353	1.953	3.000
71-251213	71-339516	16	1.562	1.688	.500	.808	.353	2.000	3.187
71-251214	71-339518	18	1.718	1.844	.625	.909	.353	2.031	3.375
71-251215	71-339520	20	1.875	2.000	.625	1.034	.415	2.234	3.375
71-251216	71-339522	22	2.031	2.188	.750	1.159	.415	2.328	3.375
71-251217	71-339524	24	2.156	2.312	.800	1.284	.415	2.359	3.625

All dimensions for reference only

Miniature Pygmy Twist Pull

Crimp front release removable contacts (SE type)



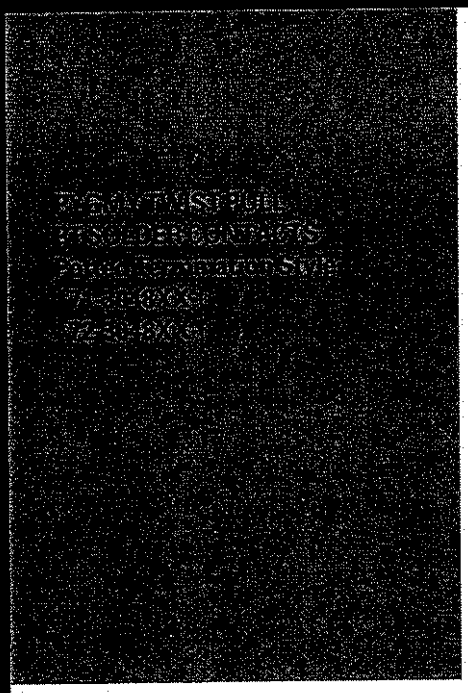
*To complete order number see how to order, page 25.
**Standard lanyard length shown. Consult Sidney, NY for variations and ordering procedure.

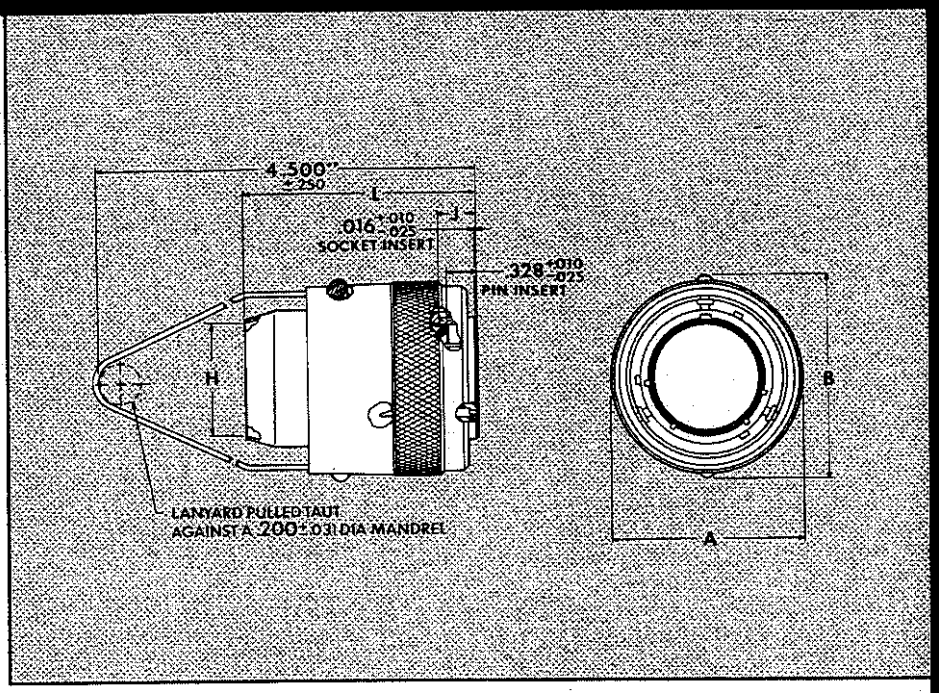
Part No.*	Part No.*	Part No.*	Shell Size	A Dia Max	B Max	C +.020 −.000	D +.020 −.000	F Dia ±.016	H Dia ±.016	J ±.010	L Max	L_1 Max	L_2 Max
71-419646	71-251181	71-345510	10	1.125	1.125	.030	.337	.188	.444	.353	1.875	2.140	2.156
71-419647	71-251182	71-345512	12	1.281	1.406	.030	.337	.312	.558	.353	1.875	2.156	2.406
71-419648	71-251183	71-345514	14	1.438	1.562	.030	.337	.375	.683	.353	1.906	2.203	2.406
71-419649	71-251184	71-345516	16	1.562	1.688	.030	.337	.500	.808	.353	1.969	2.250	2.531
71-419650	71-251185	71-345518	18	1.718	1.844	.030	.337	.625	.909	.353	2.000	2.281	2.531
71-419651	71-251186	71-345520	20	1.875	2.000	.092	.399	.625	1.034	.415	2.281	2.359	2.719
71-419652	71-251187	71-345522	22	2.031	2.188	.092	.399	.750	1.159	.415	2.344	2.453	2.844
71-419653	71-251188	71-345524	24	2.156	2.312	.092	.399	.800	1.284	.415	2.406	2.453	2.906

All dimensions for reference only

Miniature Pygmy Twist Pull

Solder contacts (PT type)



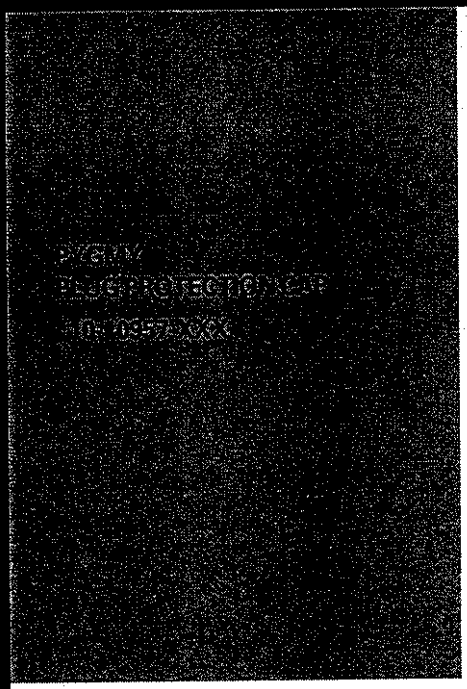


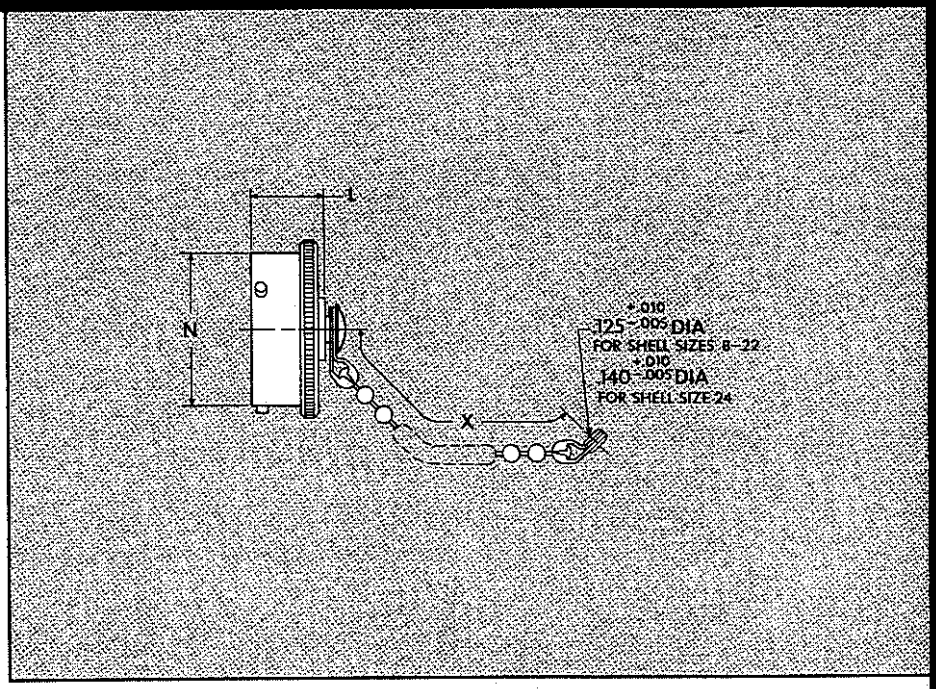
*To complete order number see how to order, page 25.
**Standard lanyard length shown. Consult Sidney, NY for variations and ordering procedure.

Part No.*	Shell Size	A Dia Max	B Max	H ±.016	J ±.010	L Max
71-304808	8	.875	.984	.327	.353	1.937
71-304810	10	1.125	1.125	.444	.353	1.890
71-304812	12	1.281	1.406	.558	.353	1.906
71-304814	14	1.438	1.562	.683	.353	1.953
71-304816	16	1.562	1.688	.808	.353	2.000
71-304818	18	1.718	1.844	.909	.353	2.031
71-304820	20	1.875	2.000	1.034	.415	2.234
71-304822	22	2.031	2.188	1.159	.415	2.328
71-304824	24	2.156	2.312	1.284	.415	2.359

All dimensions for reference only

Miniature Pygmy Twist Pull
accessories - protection caps





*To complete order number add shell size and finish number.
For example, shell size 10 with olive drab cadmium plate aluminum: 10-10957-103

Finish	10-No. Suffix
Olive drab cadmium plate	-XX3
Anodic Coated (Nonconductive)	-XX5

Shell Size	N Dia +.001 -.005	L +.025 -.015	X ±.250
8	.473	.532	3.000
10	.590	.532	3.000
12	.750	.532	3.500
14	.875	.532	3.500
16	1.000	.532	3.500
18	1.125	.532	3.500
20	1.250	.594	4.000
22	1.375	.594	4.000
24	1.500	.627	4.000

All dimensions for reference only

Miniature Twist Pull
contacts, application tools, sealing plugs

Contacts – Pygmy CE

Pin	
Contact Size	Proprietary No.
16	10-189004-16F
20	10-189000-20F
Socket	
Contact Size	Proprietary No.
16	10-189006-16F
20	10-189002-20F

Contacts – Pygmy SE

Pin		
Contact Size	Proprietary No.	MS No.
12	10-314980-12P	—
16	10-314980-16P	M39029/31-228
20	10-314980-20P	M39029/31-240
Socket		
Contact Size	Proprietary No.	MS No.
12	10-314980-12S	—
16	10-257982-16F	M39029/32-247
20	10-257982-20F	M39029/32-259

The above contact part numbers designate standard finish 0.00005 min. gold over copper. For other finish variations consult Sidney, NY.

Sealing Plugs – Pygmy CE

Contact Size	Proprietary No.
16	10-101033-12
20	10-101033-10

Sealing Plugs – Pygmy SE

Contact Size	Proprietary No.
12	10-101033-12
16	10-101033-11
20	10-101033-10

Sealing Plugs – Pygmy PT Solder

Contact Size	Proprietary No.
12	10-101033-13
16	10-101033-12
20	10-101033-11

Application Tools

The following data includes information pertaining to the application tools which have been established for crimping, inserting and removing the size 12, 16 and 20 contacts incorporated in the Pygmy CE and SE series connectors as applicable.

All crimping tools included are the "full cycling" type and, when used as specified in the installation instructions (L-658 for Pygmy CE series and MG-1074 for Pygmy SE series) will provide reliable crimped wire to contact terminations.

Crimping Tools – Pygmy CE

Crimping Tool/ Turret Die or Positioner	Contact Size/Type
M22520/1-01 requires special turret head not supplied by Allied	20, 16 Pin and Socket

Crimping Tools – Pygmy SE

Crimping Tool Part Number	Positioner Part Number	Use with Contact Size
M22520/1-01	M22520/1-02 (Yellow)	12
M22520/1-01 M22520/7-01	M22520/1-02 (Blue) M22520/7-03	16
M22520/1-01 M22520/7-01 M22520/2-01	M22520/1-02 (Red) M22520/7-02 M22520/2-02	20

Where 2 or 3 tools are listed for a contact size, only one tool and its positioner are required to crimp the contact.

The above crimping tools and positioners are available from the approved tool manufacturer.

Metal Insertion Tools – Pygmy CE

Part Number	Used with Contact Size
11-6782(Pliers)	20
11-6781(Pliers)	16

Metal Removal Tools – Pygmy CE

Part Number	Used with Contact Size
11-6900 (Kit)	20, 16

Metal Insertion Tools – Pygmy SE

MS Part Number	Proprietary Part Number	Use with Contact Size
M82969/17-05 (Channel)	11-7401-12 (Channel)	12
M81969/17-04 (Channel)	11-7401-16 (Channel) or 11-8107-16 (Pliers)	16
M81969/17-09 (Channel)	11-7401-20 (Channel) or 11-8107-20 (Pliers)	20

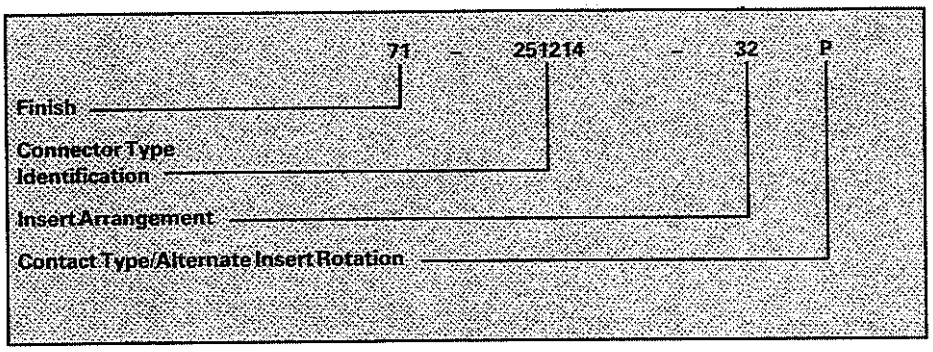
Metal Removal Tools – Pygmy SE

MS Part Number	Proprietary Part Number	Use with Contact Size
M81969/19-09	11-7880-12	12
M81969/19-08	11-7880-16	16
M81969/19-07	11-7880-20	20

Miniature Pygmy Twist Pull
how to order

Proprietary Part Number

Bendix® Pygmy Twist Pull Breakaway Connectors can be ordered by coded part number. Ordering procedure is illustrated by part number 71-251214-32P as shown below:



Finish

71 designates corrosion resistant olive drab cadmium plate

72 designates anodic coated (electrically nonconductive-anodic) finish providing extreme wear and corrosion resistance, 500 hour extended salt spray

These are standard finishes. Consult Sidney, NY for variations.

Connector Type Identification

See table on page 20 for CE type Lanyard Release Plug identification number:

2512XX series for potted termination style,

3395XX series for environmental strain relief style

See table on page 21 for SE type Lanyard Release Plug identification number:

4196XX series for potted termination style,

2511XX series for environmental strain relief style,

3455XX series for environmental style

See table on page 22 for PT solder type Lanyard Release Plug identification number:

3048XX series for potted termination style

Insert Arrangement

MIL-C-26482, see insert identification chart on pages 18 and 19.

The numbers illustrated in the insert arrangement column are hyphenated. The number preceding the hyphen is the shell size. The number following the hyphen is the insert arrangement and it is this number only that is used in the part number.

Contact Type/Alternate Insert Rotations

P designates pin, S designates socket for normal positioning of inserts. When an alternate position of the connector insert is required to prevent cross-mating a different letter (other than P or S) is used. See pages 18 and 19 for description of alternate positions, then convert to Bendix® proprietary coding by the following charts:

Pin Contacts		Socket Contacts	
MS Letter	Bendix® Letter	MS Letter	Bendix® Letter
PW	G	SW	H
PX	I	SX	J
PY	K	SY	L
PZ	M	SZ	N

Bendix® Federal Vendor Identification/FSCM 77820