



**CASA Modular Systems**

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Connectors  
for  
Commercial  
and  
Industrial  
Applications

MS STANDARD CIRCULARS  
DESIGNED TO MIL-C-5015  
PLUS MODIFICATIONS

- \* MULTI CONTACT SIGNAL AND POWER
- \* MSE MAINS POWER CONNECTORS
- \* CA BAYONET CONNECTORS
- \* HIGH VOLTAGE TYPES
- \* RFI MODS
- \* ACCESSORIES

DISTRIBUTORS IN ALL STATES

(MSE Sept/79)

# MS Standard Circular Connectors

DESIGNED  
TO  
MIL-C-5015

RUGGED \*\* VERSATILE \*\* WEATHERPROOF

**APPLICATIONS:** Wherever Electrical Connections are required,  
Aircraft, Military, Marine, Industrial, Power and  
Signal, Telecommunication and Commercial.  
Where environment is a problem.

- \* SHELL TYPES AND SIZES FOR EVERY APPLICATION
- \* CONTACT ARRANGEMENTS FROM 1 TO 48
- \* RATINGS UP TO 900V AC and 245 AMP
- \* INTERFACIAL INSULATOR SEALING PLUS INDIVIDUAL CONTACT BARRIERS FOR MOISTURE PROOF SEALING AND PROTECTION AGAINST CORONA AND FLASH-OVER
- \* POLYCHLOROPRENE INSULATORS RESISTANT TO MOST FUELS AND CHEMICALS
- \* "CRACK FREE" RESILIENT INSULATORS
- \* GROMMET SEALING OF TERMINATIONS COMPLETE ENVIRONMENT RESISTANT ASSEMBLY
- \* DIE CAST ALUMINIUM ALLOY SHELLS, NON REFLECTIVE FINISH OVER CADMIUM
- \* POSITIVE VIBRATION FREE COUPLING
- \* ROBUST CABLE CLAMPING
- \* CONTACTS PRECISION MACHINED FROM COPPER ALLOY-SILVER PLATED HIGH CONDUCTIVE FINISH
- \* CLOSED ENTRY SOCKET CONTACTS WITH POSITIVE SPRING CONTACT TO ELIMINATE "TIRED" CONDUCTIVITY
- \* SOLDER OR CRIMP CONTACT TERMINATIONS

## **MS-E:**

The basic connector — proven, reliable, versatile, environmental.

## **POTTING VERSIONS:**

For the difficult situations including space and environmental problems.

## **SOLDER AND CRIMP CONTACT TERMINATIONS:**

For crimp contact detail, see page 17. Fast accurate and reliable, termination crimping saves time and money in production applications.

## **HIGH VOLTAGE APPLICATIONS:**

For voltages up to 15,000V D.C.

## **R.F.I. SHIELDING:**

The latest addition to this comprehensive series. Offers high efficiency in guarding against spurious RFI/EMI.

## **MAINS POWER CONNECTORS:**

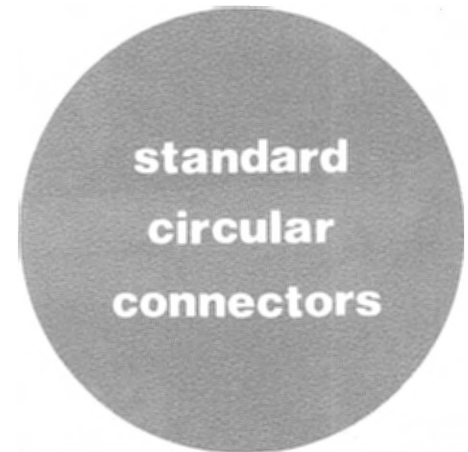
Environmental single and 3-phase connectors combining power and control circuits.

## **BAYONET LOCK:**

For fast coupling and even better water proofing.

## **PROTECTIVE DUST CAPS:**

Available for all types.



## **HEAD OFFICE AND FACTORY**

**STC CANNON COMPONENTS PTY. LTD.**

248 Wickham Rd., Moorabbin, Vic. 3189

Phone: 95 1566

Telex: AA30877

## **OTHER PRODUCTS**

The complete range of "CANNON" connectors cover the full range of applications:—

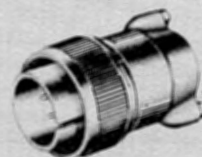
- \* MILITARY
- \* AEROSPACE
- \* COMMERCIAL
- \* INDUSTRIAL
- \* AUDIO
- \* MINIATURE AND MICRO-MINIATURE
- \* COMPUTER AND TELECOMMUNICATIONS
- \* P.C.B. APPLICATIONS
- \* FLAT CABLE CONNECTIONS
- \* BATTERY POWERED VEHICLES



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#### Environment Resistant MS-E, MS-F and MS-R Connectors

MS-E, MS-F and MS-R connectors have resilient insulators and wire sealing grommets for extreme environmental conditions and high altitude sealing. MS-E's and MS-F's have a mechanical cable clamp; the MS-R has a shorter, lighter weight endbell without cable clamp, and an O ring to supplement the interfacial seal. Shells are aluminium alloy. Contacts are silver plated copper alloy. Available in solder and crimp termination.



#### Potting ER Connectors

These light weight potting connectors provide resistance to salt water, fuels, etc., and will withstand the effects of high vibration. 3100 and 3106 connectors with plastic potting cups and resilient inserts meet the requirements of MS3103 and MS25183. Contacts are silver plated copper or brass. ER insulators are resilient; shells are aluminium alloy.



#### Accessories

Accessories to fit MS connectors include protective caps, cable clamps, telescoping bushings, dust caps.



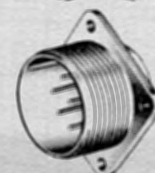
#### High Temperature Connectors

High temperature MIL-C-5015 type connectors are not covered in this catalogue. Write for the High Temp Catalogues describing the five series of connectors available for elevated temperatures from 257°F as high as 1300°F. In addition, some connectors are moisture and nuclear radiation-resistant.



#### High Performance Connectors.

The CV series of circular, environmental, high performance MIL-C-5015 type connectors per MIL-C-83723 are not covered in this catalogue. CV connectors are designed to operate in severe space and missile environments, and utilize crimp terminated contacts in the field-proven LITTLE CAESAR® rear release contact retention assembly. For more data write for the 83723 catalogue.



# General Information

## Shell Sizes and Contact Arrangements

Threaded coupling shell sizes are based on the diameter of the coupling threads in sixteenths of an inch; for example, size 22 shell has a coupling thread diameter of 22/16 inch, which equals 1-3/8". Note: bayonet coupling shell sizes are not directly related to coupling diameter. Due to nature of design, nut sizes are significantly larger. In the contact arrangement section, pages 5-9 the shell size and contact arrangement number are shown in combination, e.g. 10SL-4, 22-2, 24-10. The digits (10SL, 22 and 24) preceding the dash refer to the shell size. The digits (-4, -2, -10) following the dash are the contact arrangement numbers. ITT Cannon proprietary arrangements, which are not yet approved by MS, are separately identified, example, 24A24, 24 preceding the dash in 24A24 again refer to the shell size. A 24 is the contact arrangement number.

## Contacts

Generally the connectors described in this catalog are assembled with solder pot contacts. Crimp contacts, however, are available for connectors having resilient insulators.

Pin and socket contacts are machined from bar stock to assure precision operation. They are designed to resist severe vibration and repeated connection and disconnection. The average force to either engage or separate pin and socket contacts will not exceed the average values given in the latest revision of MIL-C-5015.

Force in lbs.	Contact Sizes				
	16	12	8	4	0
MAXIMUM	3.00	5.00	10.00	15.00	20.00
AVERAGE	2.10	3.50	7.00	10.50	14.00
MINIMUM	.25	.50	.75	1.00	2.00

The standard contact finish is silver plate. The closed-entry socket contact design, now an established MIL spec requirement, has been a standard for years at ITT Cannon Electric. The engaging spring on socket contacts assures positive electrical contact. All solder pots, except thermocouple are tinned.

## Thermocouple Contacts

Size 12 and 16 contacts, machined from matching thermocouple lead wire alloys, can be supplied in ITT Cannon connectors. These thermocouple contacts maintain continuity from thermal-sensor leads thru a bulkhead or other closures in temperature measuring applications.

These contacts for matching lead wires are detailed by the standards of the Instrument Society of America (I.S.A.):

I.S.A. Standards	Material
J and Y	Iron and constantan
K	Chromel and alumel
T	Copper and constantan

Since the thermocouple connector application determines the soldering methods and materials to be used, thermocouple contacts, identified by permanent markings, are normally supplied with untinned solder pots. Consult factory for part number information.

## Alternate Insert Positions

Alternate insert positions are available to prevent cross-plugging of adjacent assemblies. The diagram illustrating degrees of rotation shows the shell being rotated counter-clockwise in relation to the insert when viewed from the mating front of the pin insert. For ITT Cannon proprietary alternate insert positions see page 10.

## Wiring

For class E and R connectors, satisfactory moisture sealing will be obtained if AWG and MS wire sizes and insulation outside diameters are governed by this table.

Contact Size	Wire Size (MIL-W-5086)	Insulation OD	
		Limit inches	Solder Pot Size
16	16 thru 22	.064 min. to .130 max.	.073"
12	12 thru 14	.114 min. to .170 max.	.116"
8	8 thru 10	.164 min. to .255 max.	.209"
4	4 thru 6	.275 min. to .370 max.	.332"
0	0 thru 2	.415 min. to .550 max.	.468"

## Electrical Service Data

Maximum current ratings of contacts and maximum allowable voltage drop under test conditions when assembled as in service are shown below. Maximum total current to be carried per connector is the same as that allowable in wire bundles as specified in MIL-W-5088.

Contact Size	Max. Current Rating (amps)	Test Current (amps)	Potential Drop (millivolts)
16	22	20	21
12	41	35	20
8	73	60	12
4	135	110	10
0	245	200	10

As a guide only, the following formulae can be used to determine the maximum continuous current carrying capacity of the connector.

0- 5 contacts	no of contacts	x	max. current rating in free air	x	1.00
6-10	"	x	"	x	0.85
11-20	"	x	"	x	0.65
21-30	"	x	"	x	0.45
31-50	"	x	"	x	0.25

## High Potential Test Voltage

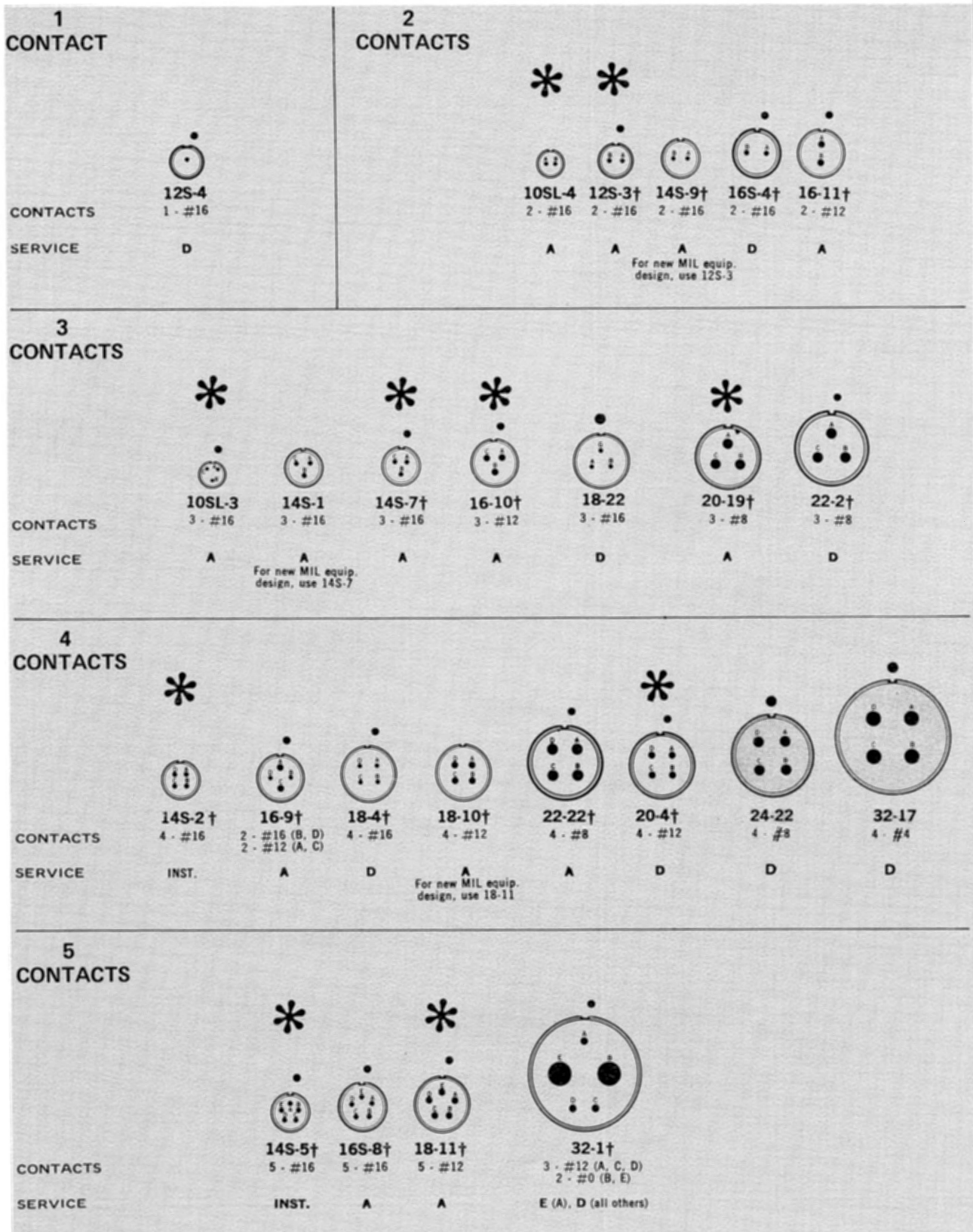
MS connectors show no evidence of breakdown when the test voltage given below is applied between the two closest contacts and between the shell and the contacts closest to the shell for a period of one minute.

MS Service Rating	Test Voltage (RMS) 60 cps	Suggested* Operating Voltages		Air Spacing nom. inches	Creepage Distance nom. inches
		DC	AC (rms)		
Inst.	1000	250	200	1/16	1/16
A	2000	700	500	1/16	1/8
D	2800	1250	900	1/8	3/16
E	3500	1750	1250	3/16	1/4
B	4500	2450	1750	1/4	5/16
C	7000	4200	3000	5/16	1

\*as indicated in previous MS Specification and to be used by the designer only as a guide.

# Contact Arrangements From Australian Manufacture

Drawings are pin front view and approximately half scale.



## Legend

- Inserts to MIL-C-5015 specifications
- † MS polarization
- †† ITT Cannon polarization

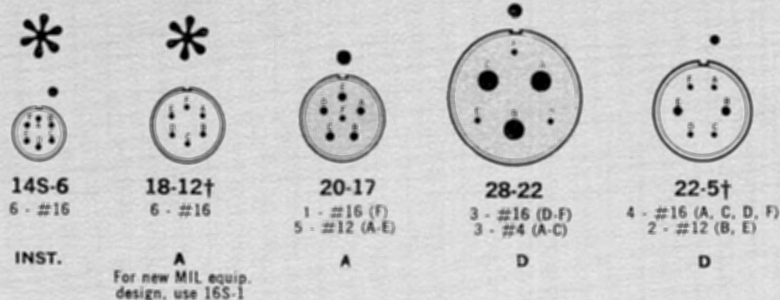
**SERVICE:** Refer page 4

**\* PREFERRED LAYOUTS NORMALLY EX-STOCK IN MS-3102E AND MS-3106E**

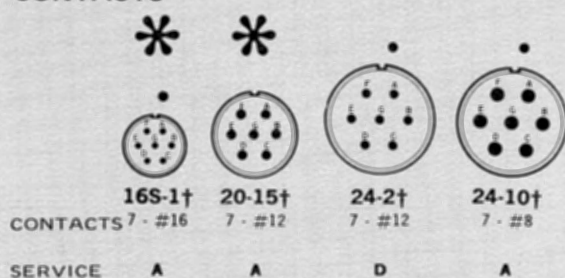


# Contact Arrangements From Australian Manufacture

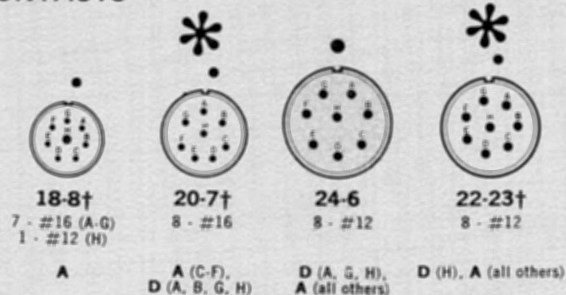
## 6 CONTACTS



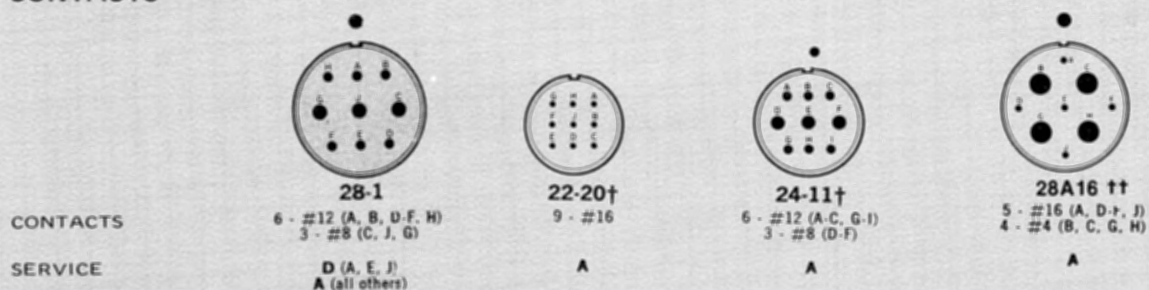
## 7 CONTACTS



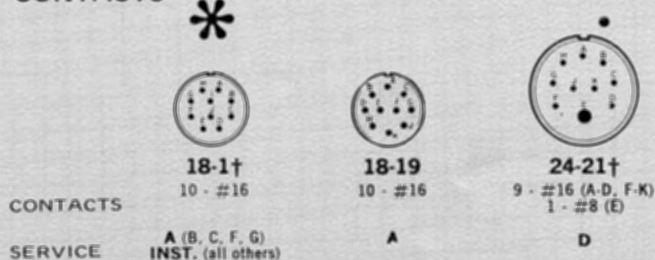
## 8 CONTACTS



## 9 CONTACTS



## 10 CONTACTS



## 11 CONTACTS



## 12 CONTACTS





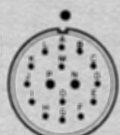
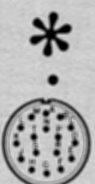

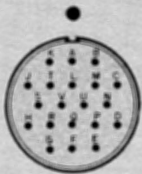
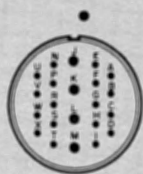


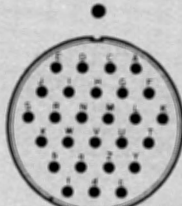
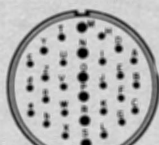
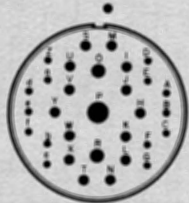


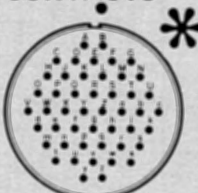
### Legend

- Inserts to MIL-C-5015 specifications
- † MS polarization
- †† ITT Cannon polarization

SERVICE: Refer page 4.

**\*PREFERRED LAYOUTS NORMALLY  
EX-STOCK IN MS-3102E AND MS-3106E**

# Contact Arrangements From Australian Manufacture

<div>14 CONTACTS</div> <div></div> <div>20-27† 14 - #16</div> <div>22-19† 14 - #16</div> <div>CONTACTS</div> <div>SERVICE</div> <div>A</div> <div>A</div>	<div>15 CONTACTS</div> <div></div> <div>28-17† 15 - #16</div> <div>A (A-L), B (R) D (M-P)</div>	<div>16 CONTACTS</div> <div></div> <div>24-7† 14 - #16 (A-M, O) 2 - #12 (P, N)</div> <div>A</div>	
<div>17 CONTACTS</div> <div></div> <div>20-29† 17 - #16</div> <div>CONTACTS</div> <div>SERVICE</div> <div>A</div>	<div>19 CONTACTS</div> <div></div> <div>22-14† 19 - #16</div> <div>A</div>	<div>20 CONTACTS</div> <div></div> <div>28-16 20 - #16</div> <div>A</div>	<div>22 CONTACTS</div> <div></div> <div>28-11† 18 - #16 (A-I, N-X) 4 - #12 (J-M)</div> <div>A</div>
<div>24 CONTACTS</div> <div></div> <div>24-28† 24 - #16</div> <div>CONTACTS</div> <div>SERVICE</div> <div>INST.</div> <div>A</div>	<div>26 CONTACTS</div> <div></div> <div>28-12† 26 - #16</div> <div>A</div>	<div>27 CONTACTS</div> <div></div> <div>36A46 †† 27 - #12</div> <div>A</div>	<div>30 CONTACTS</div> <div></div> <div>32-8† 24 - #16 (A-L, T-Z, a-e) 6 - #12 (M-S)</div> <div>A</div>
<div>31 CONTACTS</div> <div></div> <div>36-9† 14 - #16 (A-G, Z-f) 14 - #12 (H-N, S-Y) 2 - #8 (O, R), 1 - #4 (P)</div> <div>CONTACTS</div> <div>SERVICE</div> <div>A</div>	<div>35 CONTACTS</div> <div></div> <div>28-15† 35 - #16</div> <div>A For new MIL equip. design, use 28-21</div>	<div>37 CONTACTS</div> <div></div> <div>28-21† 37 - #16</div> <div>A</div>	<div>48 CONTACTS</div> <div></div> <div>36-10† 48 - #16</div> <div>A</div>

## Legend -

- Inserts to MIL-C-5015 specifications
- † MS polarization
- †† ITT Cannon polarization

**\* PREFERRED LAYOUTS NORMALLY  
EX-STOCK IN MS-3102E AND MS-3106E**

# Contact Arrangements From Australian Manufacture

Contact Arrangement	No. of Contacts	Wire Size	Amps	Service	Wt. Lbs. Polychl. Insert Assem.
---------------------	-----------------	-----------	------	---------	---------------------------------

## SHELL SIZE 10SL

10SL-3	3	#16	22	A	P.010 S.017
10SL-4	2	#16	22	A	P.009 S.014

## SHELL SIZE 12S

12S-3	2	#16	22	A	P.010 S.016
12S-4	1	#16	22	D	P.009 S.014

## SHELL SIZE 14S

14S-1	3	#16	22	A	P P
14S-2	4	#16	22	Inst.	P.019 S.028
14S-5	5	#16	22	Inst.	P.017 S.029
14S-6	6	#16	22	Inst.	P.031 S.015
14S-7	3	#16	22	A	P.015 S.024
14S-9	2	#16	22	A	P.013 S.022

## SHELL SIZE 16/16S

16S-1	7	#16	22	A	P.025 S.042
16S-4	2	#16	22	D	P.019 S.030
16S-8	5	#16	22	A	P.023 S.039
16-9	2	#12	41	A	P.013 S.044
	2	#16	22		
16-10	3	#12	41	A	P.031 S.047
16-11	2	#12	41	A	P.028 S.042

## SHELL SIZE 18

18-1	10	#16	22	A(A,C, F,G) Inst. (all others)	P.044 S.058
18-4	4	#16	22	D	P.037 S.053
18-8	1	#12	41	A	P.044 S.062
	7	#16	22		
18-9	2	#12	41	Inst.	P.045 S.062
	5	#16	22		
18-10	4	#12	41	A	P.046 S.067
18-11	5	#12	41	A	P.049 S.071
18-12	6	#16	22	A	P.039 S.054
18-19	10	#16	22	A	P.044 S.058
18-22	3	#16	22	D	P.035 S.051

## SHELL SIZE 20

20-4	4	#12	41	D	P.057 S.086
20-7	8	#16	22	A (C,D, E,F) D (A,B,H,G)	P.053 S.076
20-15	7	#12	41	A	P.068 S.100
20-17	5	#12	41	A	P.068 S.098
	1	#16	22		
20-19	3	#8	73	A	P.068 S.091
20-27	14	#16	22	A	P.062 S.082
20-29	17	#16	22	A	P.065 S.085

Contact Arrangement	No. of Contacts	Wire Size	Amps	Service	Wt. Lbs. Polychl. Insert Assem.
---------------------	-----------------	-----------	------	---------	---------------------------------

## SHELL SIZE 22

22-2	3	#8	73	D	P.077 S.104
22-5	2	#12	41	D	P.065 S.093
	4	#16	22		
22-14	19	#16	22	A	P.077 S.100
22-19	14	#16	22	A	P.070 S.095
22-20	9	#16	22	A	P.063 S.090
22-22	4	#8	73	A	P.085 S.112
22-23	8	#12	41	D(H)A (all others)	P.080 S.118

## SHELL SIZE 24

24-2	7	#12	41	D	P.089 S.133
24-6	8	#12	41	D(AGH) A (All others)	P.085 S.118
24-7	2	#12	41	A	P.090 S.125
	14	#16	22		
24-10	7	#8	73	A	P.125 S.157
24-11	3	#8	73	A	P.111 S.153
	6	#12	41		
24-20	2	#12	41	D	P.083 S.120
	9	#16	22		
24-21	1	#8		D	P.085 S.119
	9	#16			
24-22	4	#8	73	D	P S.132
24-28	24	#16	22	Inst.	P.096 S.126

## SHELL SIZE 28

28-1	3	#8	73	D(AJE) A (all others)	P.140 S.197
	6	#12	41		
28-9	6	#12	41	D	P.129 S.179
	6	#16	22		
28-11	4	#12	41	A	P.131 S.182
	18	#16	22		
28-12	26	#16	22	A	P.127 S.172
28-15	35	#16	22	A	P.139 S.181
28-16	20	#16	22	A	P.119 S.167
28-17	15	#16	22	A(A-L) D (M,N,P) B(R)	P.112 S.161
28-21	37	#16	22	A	P.142 S.183
28-22	3	#4	135	D	—
	3	#16	22		
28-A-16	4	#4	135	A	P —
	5	#16	22		S —

## SHELL SIZE 32

32-1	2	#0	245	E (A) D (all others)	P —
	3	#12	41		S —
32-8	6	#12	41	A	P.189 S.265
	24	# 6	22		
32-17	4	# 4	135	D	P.223 S.283

## SHELL SIZE 36

36-9	1	#4	135	A	P.275 S.378
	2	#8	73		
	14	#12	41		
	14	#16	22		
36-10	48	#16	22	A	P.214 S.321
36-A-46	27	#12		A	—



# Preferred - MSE Connectors & Accessories

## Connectors

RECEPTACLE (MALE) PART NUMBER	PLUG (FEMALE) PART NUMBER	CONTACTS
MS3102E-10SL-4P	MS3106E-10SL-4S	2 X #16
MS3102E-10SL-3P	MS3106E-10SL-3S	3 X #16
MS3102E-12S-3P	MS3106E-12S-3S	2 X #16
MS3102E-14S-2P	MS3106E-14S-2S	4 X #16
MS3102E-14S-5P	MS3106E-14S-5S	5 X #16
MS3102E-14S-6P	MS3106E-14S-6S	6 X #16
MS3102E-14S-7P	MS3106E-14S-7S	3 X #16
MS3102E-16S-1P	MS3106E-16S-1S	7 X #16
MS3102E-16-10P	MS3106E-16-10S	3 X #12
MS3102E-18-1P	MS3106E-18-1S	10 X #16
MS3102E-18-11P	MS3106E-18-11S	5 X #12
MS3102E-18-12P	MS3106E-18-12S	6 X #16
MS3102E-20-4P	MS3106E-20-4S	4 X #12
MS3102E-20-7P	MS3106E-20-7S	8 X #16
MS3102E-20-15P	MS3106E-20-15S	7 X #12
MS3102E-20-19P	MS3106E-20-19S	3 X # 8
MS3102E-20-27P	MS3106E-20-27S	14 X #16
MS3102E-20-29P	MS3106E-20-29S	17 X #16
MS3102E-22-14P	MS3106E-22-14S	19 X #16
MS3102E-22-23P	MS3106E-22-23S	8 X #12
MS3102E-24-28P	MS3106E-24-28S	24 X #16
MS3102E-28-12P	MS3106E-28-12S	26 X #16
MS3102E-28-15P	MS3106E-28-15S	35 X #16
MS3102E-28-21P	MS3106E-28-21S	37 X #16
MS3102E-36-10P	MS3106E-36-10S	48 X #16

RECEPTACLE (FEMALE) PART NUMBER	PLUG (MALE) PART NUMBER	CONTACTS
MS3102E-10SL-4S	MS3106E-10SL-4P	2 X #16
MS3102E-10SL-3S	MS3106E-10SL-3P	3 X #16
MS3102E-12S-3S	MS3106E-12S-3P	2 X #16
MS3102E-14S-2S	MS3106E-14S-2P	4 X #16
MS3102E-14S-5S	MS3106E-14S-5P	5 X #16
MS3102E-14S-6S	MS3106E-14S-6P	6 X #16
MS3102E-14S-7S	MS3106E-14S-7P	3 X #16
MS3102E-16S-1S	MS3106E-16S-1P	7 X #16
MS3102E-16-10S	MS3106E-16-10P	3 X #12
MS3102E-18-1S	MS3106E-18-1P	10 X #16
MS3102E-18-11S	MS3106E-18-11P	5 X #12
MS3102E-18-12S	MS3106E-18-12P	6 X #16
MS3102E-20-4S	MS3106E-20-4P	4 X #12
MS3102E-20-7S	MS3106E-20-7P	8 X #16
MS3102E-20-15S	MS3106E-20-15P	7 X #12
MS3102E-20-19S	MS3106E-20-19P	3 X # 8
MS3102E-20-27S	MS3106E-20-27P	14 X #16
MS3102E-20-29S	MS3106E-20-29P	17 X #16
MS3102E-22-14S	MS3106E-22-14P	19 X #16
MS3102E-22-23S	MS3106E-22-23P	8 X #12
MS3102E-24-28S	MS3106E-24-28P	24 X #16
MS3102E-28-12S	MS3106E-28-12P	26 X #16
MS3102E-28-15S	MS3106E-28-15P	35 X #16
MS3102E-28-21S	MS3106E-28-21P	37 X #16
MS3102E-36-10S	MS3106E-36-10P	48 X #16

FOR CONTACT ARRANGEMENTS  
REFER TO PAGES 5, 6, 7.

## Accessories

CABLE CLAMP WITH BUSHING	SUIT SHELL SIZE
MS3057-4A	10SL,12S
MS3057-6A	14S
MS3057-8A	16S,16
MS3057-10A	18
MS3057-12A	20,22
MS3057-16A	24,28
MS3057-24A	36

BUSHING	SUIT SHELL SIZE
MS3420-4	10SL,12S
MS3420-6	14
MS3420-8	16,16S
MS3420-10	18
MS3420-12	20,22
MS3420-16	24,28
MS3420-24	36

FOR ADDITIONAL DETAILS  
REFER PAGE 26.

# Designated Alternate Insert Positions

ITT Cannon Designated Alternate Insert Positions  
not MS approved

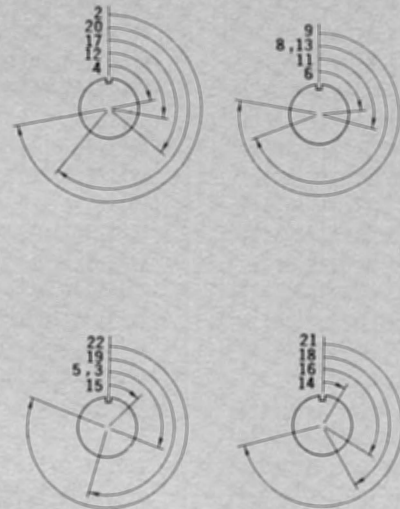
Shell Size	Contact Arrangement	Available Position									
28	A16	2	3	5	8	9	13				
36	A46	2	3	4	5	6	7	12	13	15	

## POSITIONS

POSITION	ANGLE (degrees)	POSITION	ANGLE (degrees)
Normal	0	15	45
2	260	16	120
3	110	17	130
4	80	18	150
5	use pos. 3	19	195
6	85	20	220
8	250	21	255
9	280	22	290
11	105	23	165
12	100	24	330
13	use pos. 8	25	235
14	30	26	125

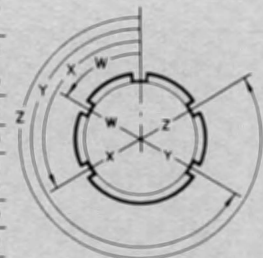
NOTE: For ITT Cannon contact arrangements not listed above, consult factory.

Note: Front view of pin insulator rotated as shown.



## MS Designated Alternate Insert Positions

Alternate Positions		Degrees						Degrees			
No. of Contacts	Contact Arrangement	W	X	Y	Z	No. of Contact	Contact Arrangement	W	X	Y	Z
2	10SL-4	—	—	—	—	8	18-8	70	—	—	290
	12S-3	70	145	215	290		20-7	80	110	250	280
	14S-9	70	145	215	290		22-23	35	—	250	—
	16S-4	35	110	250	325		24-6	80	110	250	280
	16-11	35	110	250	325	9	22-20	35	110	250	325
3	10SL-3	—	—	—	—		24-11	35	110	250	325
	14S-1	—	—	—	—		28-1	80	110	250	280
	14S-7	90	180	270	—	10	18-1	80	145	215	290
	16-10	90	180	270	—		18-19	—	—	—	—
	18-22	70	145	215	290		24-21	80	110	250	280
	20-19	90	180	270	—	11	24-20	80	110	250	280
	22-2	70	145	215	290		28-9	80	110	250	280
4	14S-2	—	120	240	—	14	20-27	35	110	250	325
	16-9	35	110	250	325		22-19	80	110	250	280
	18-4	35	110	250	325	15	28-17	80	110	250	280
	18-10	—	120	240	—		24-7	80	110	250	280
	20-4	45	110	250	—	17	20-29	80	—	—	280
	22-22	—	110	250	—		22-14	80	—	—	280
	24-22	45	110	250	—	20	28-16	80	110	250	280
5	32-17	45	110	250	—		28-11	80	110	250	280
	14S-5	—	110	—	—	24	24-28	80	110	250	280
	16S-8	—	170	265	—		28-12	90	180	270	—
	18-11	—	170	265	—	30	32-8	80	125	235	280
6	32-1	80	110	250	280		36-9	80	125	235	280
	14S-6	—	—	—	—	35	28-15	80	110	250	280
	18-12	80	—	—	280		28-21	80	110	250	280
	20-17	90	180	270	—	37	28-21	80	110	250	280
7	22-5	35	110	250	325		36-10	80	125	235	280
	28-22	70	145	215	290	48					
	16S-1*	80	—	—	280						
	18-9	80	110	250	280						
	20-15	80	—	—	280						



Note:  
Pin front view  
shell rotation

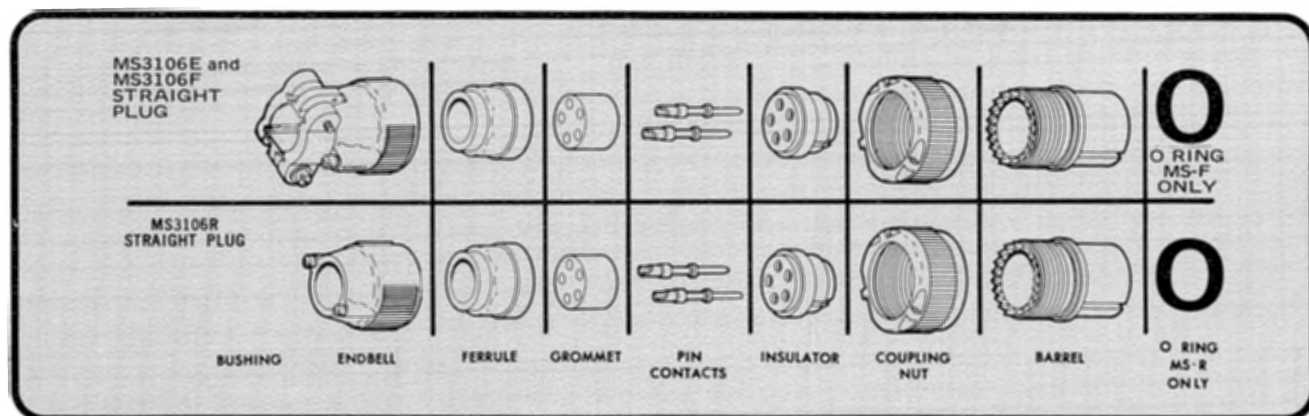
# MS-E/MS-R/CA xx F80 Crimp Environmental

In the latest revision of MIL-C-5015, a new class of environment resistant connectors was added. This new class F connector supplements the previous class E connector. The MS3100F is identical to the MS3100E and should be specified by the customer for new equipment design application. The class E will still be available upon request for existing programs, and upon ordering also bear the E nomenclature on the shell.

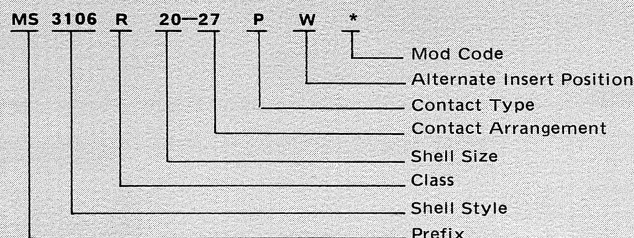
ITT Cannon MS-F and MS-R connectors are designed to operate in the extreme environmental conditions of high altitude flight. These connectors must be completely sealed to withstand moisture condensation, vibration, corona and flashover caused by high altitude environments.

MS-F and MS-R connectors have a resilient grommet with internal restrictions in the wire cavities which act as O rings around the wires. This allows the wires to slide thru the grommet with a minimum of friction, yet when the ferrule is seated and the endbell tightened it provides a perfect wire seal thru a wide variety of wire diameters. This seal at the rear, plus the interfacial seal at the front, effects a completely environment-resistant assembly when the plug is mated to an F or R receptacle. Sockets are of the closed-entry type. Contacts available in either crimp or solder termination.

Cable clamps have been integrally designed with the endbell on MS-E and MS-F connectors. Class R is without the cable clamp.



How to Order (see also pages 16, 18, 19)



## PREFIX

MS — Conforms to latest MIL-C-5015 revision

## SHELL STYLE

- 3100 — Wall mounting receptacle
- 3101 — Cable connecting plug
- 3102 — Box mounting receptacle
- 3106 — Straight plug
- 3108 — 90° angle plug

## CLASS

- E & F — Environmental with resilient insulators and integral cable clamp
- R — Environmental with resilient insulators and shortened light weight end-bell; also additional sealing with O ring seal under coupling nut in styles 3106 and 3108.

## SHELL SIZE

Coupling thread diameter in sixteenths of an inch.

## CONTACT ARRANGEMENT

See pages 5 thru 9.

## CONTACT TYPE

P for pin; S for socket

## ALTERNATE INSERT POSITION

See page 8

## \* MOD CODE

F80 (for crimp termination available only in 16# and 12# AWG)

## RFI — RFI Shielding

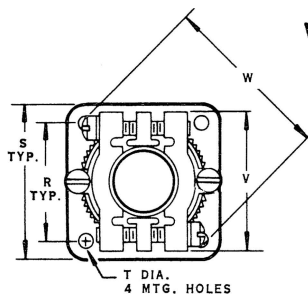
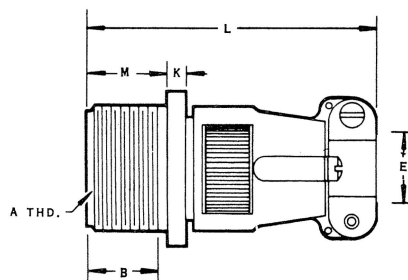
When modification code is used 'MS' prefix must be changed to 'CA' to indicate "not to MS specification".

## Standard Data

SHELL	MATERIAL	Aluminium alloy
	FINISH	Chromate drab olive over cadmium plating
INSULATOR	MATERIAL	Polychloroprene (resilient)
CONTACTS	MATERIAL	Brass or copper alloy
	FINISH	Silver plate
	TERMINATION	Tinned solder pot or crimp
TEMP. RATING		-55°C to +125°C

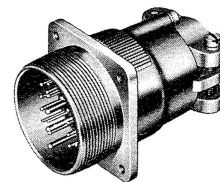


# MS-E/MS-R/CA xx F80 Crimp Environmental



**WALL MOUNTING RECEPTACLE**  
Integral Cable Clamp

**MS3100E**  
**MS3100F**



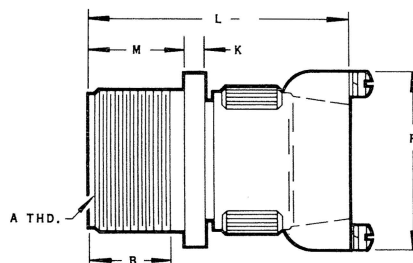
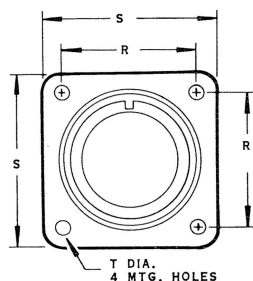
MS3100E is identical to MS3100F and is available upon request. For new equipment, customer should specify MS3100F.

Part Number by Shell Size Pin Insert*	A Thread	B Min.	E Max.	K Max.	L Max.	M +.031 -.000	R ±.005	S ±.031	V Max.	W Max.	T +.010 -.005
•MS3100F10SL.**P	5/8-24UNEF-2A	.375	.312	.109	2.045	.562	.718	1.000	.891	1.125	.120
MS3100F12S.**P	3/4-20UNEF-2A	.375	.312	.125	2.045	.562	.812	1.094	.891	1.125	.120
MS3100F14S.**P	7/8-20UNEF-2A	.375	.438	.125	2.125	.562	.906	1.188	1.077	1.344	.120
MS3100F16S.**P	1 -20UNEF-2A	.375	.562	.125	2.187	.562	.968	1.281	1.171	1.500	.120
MS3100F16.**P	1 -20UNEF-2A	.625	.562	.141	2.656	.750	.968	1.281	1.171	1.500	.120
MS3100F18.**P	1-1/8-18UNEF-2A	.625	.625	.180	2.656	.750	1.062	1.375	1.265	1.594	.120
MS3100F20.**P	1-1/4-18UNEF-2A	.625	.750	.180	2.656	.750	1.156	1.500	1.468	1.875	.120
MS3100F22.**P	1-3/8-18UNEF-2A	.625	.750	.180	2.953	.750	1.250	1.625	1.468	1.875	.120
MS3100F24.**P	1-1/2-18UNEF-2A	.625	.938	.203	2.953	.812	1.375	1.750	1.702	2.125	.147
MS3100F28.**P	1-3/4-18UNS -2A	.625	.938	.203	2.953	.812	1.562	2.000	1.702	2.125	.147
MS3100F32.**P	2 -18UNS -2A	.625	1.250	.203	2.953	.875	1.750	2.250	2.030	2.531	.173
MS3100F36.**P	2-1/4-16UN -2A	.625	1.375	.203	2.953	.875	1.938	2.500	2.270	2.875	.173

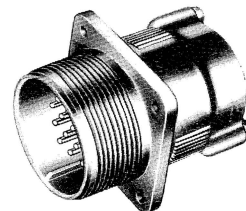
MS3100F wall mounting receptacles are used to carry wires thru walls or bulkheads, or to provide a means of disconnection at a bulkhead. MS3100F receptacles mate with 3106 and 3108 plugs.

\* For socket inserts, substitute S for P following the contact arrangement number.  
\*\* Add contact arrangement number. See pages 5-9.

• Socket inserts available but must be ordered with CA instead of MS prefix in part number. (Not to MS specification.)



**WALL MOUNTING RECEPTACLE** **MS3100R**



Part Number by Shell Size Pin Insert*	A Thread	B Min.	K Max.	L Max.	M +.031 -.000	P Max.	R ±.005	S ±.031 -.000	T +.010 -.005
•MS3100R10SL.**P	5/8-24UNEF-2A	.375	.120	1.531	.562	.946	.718	1.000	.120
MS3100R12S.**P	3/4-20UNEF-2A	.375	.136	1.542	.562	.946	.812	1.094	.120
MS3100R14S.**P	7/8-20UNEF-2A	.375	.136	1.531	.562	1.128	.906	1.188	.120
MS3100R16S.**P	1 -20UNEF-2A	.375	.136	1.531	.562	1.228	.968	1.281	.120
MS3100R16.**P	1 -20UNEF-2A	.625	.141	1.906	.750	1.228	.968	1.281	.120
MS3100R18.**P	1-1/8-18UNEF-2A	.625	.180	2.000	.750	1.431	1.062	1.375	.120
MS3100R20.**P	1-1/4-18UNEF-2A	.625	.180	2.016	.750	1.558	1.156	1.500	.120
MS3100R22.**P	1-3/8-18UNEF-2A	.625	.180	2.000	.750	1.558	1.250	1.625	.120
MS3100R24.**P	1-1/2-18UNEF-2A	.625	.203	2.000	.812	1.900	1.375	1.750	.147
MS3100R28.**P	1-3/4-18UNS -2A	.625	.203	2.000	.812	1.900	1.562	2.000	.147
MS3100R32.**P	2 -18UNS -2A	.625	.203	2.004	.875	2.132	1.750	2.250	.173
MS3100R36.**P	2-1/4-16UN -2A	.625	.203	2.003	.875	2.322	1.938	2.500	.173

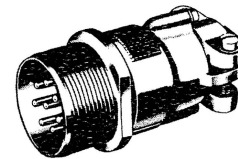
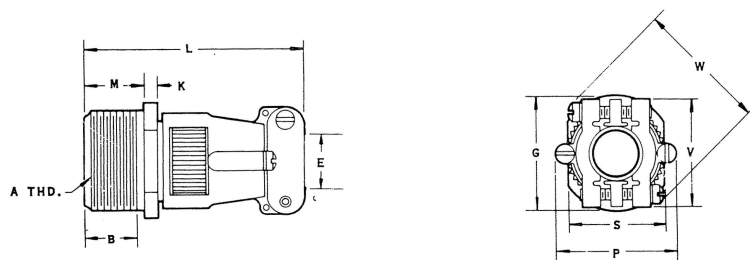
The MS3100R receptacle is identical in purpose to the MS3100F. The MS-3100R features a shorter lightweight endbell and mates with 3106 and 3108 plugs.

\* For socket inserts, substitute S for P following the contact arrangement number.  
\*\* Add contact arrangement number. See pages 5-9.

• Socket inserts available but must be ordered with CA instead of MS prefix in part number. (Not to MS specification.)

# MS-E/MS-R/CA xx F80 Crimp Environmental

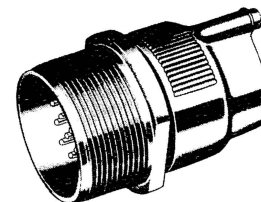
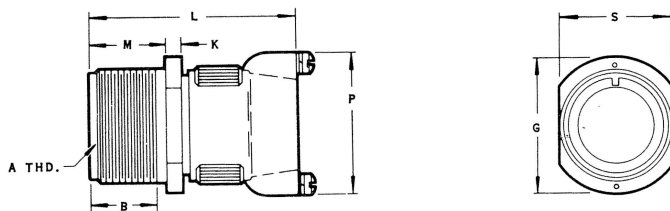
## CABLE CONNECTING PLUG MS3101E Integral Cable Clamp MS3101F



Shell Size	A Thread	B Min.	E Min.	E Max.	G Max.	K Max.	L Max.	M +.031 -.000	P Max.	S Max.	V Max.	W Max.
10SL	5/8-24NEF-2A		.140	.297	1.062	.125			.970	.640	.900	1.125
12S	3/4-20UNEF-2A		.140	.297	1.062	.140			.970	.765	.900	1.125
14S	7/8-20UNEF-2A		.195	.422	1.156	.140			1.150	.890	1.100	1.343
16S	1-20UNEF-2A	.375	.255	.547	1.281	.140	2.250	.562	1.250	1.015	1.200	1.484
18	1-20UNEF-2A		.255	.547	1.281	.146	2.625		1.250	1.015	1.200	1.484
18	1-1/8-18NEF-2A		.285	.610	1.344	.180	2.688		1.450	1.140	1.300	1.609
20	1-1/4-18NEF-2A		.350	.735	1.500	.180	2.750		1.570	1.265	1.500	1.890
22	1-3/8-18NEF-2A		.350	.735	1.625	.180	2.750	.750	1.570	1.390	1.500	1.890
24	1-1/2-18NEF-2A		.468	.922	1.750	.203	2.969	.812	1.880	1.515	1.740	2.170
28	1-3/4-18NS-2A		.468	.922	2.000	.203	3.031	.812	1.880	1.765	1.740	2.170
32	2-18NS-2A		.664	1.235	2.250	.203	3.031	.875	2.205	2.015	2.075	2.656
36	2-1/4-16UN-2A	.625	.694	1.360	2.500	.203	3.281	.875	2.400	2.270	2.300	2.922

MS3101E cable connecting plugs are used for cable extension requirements, where mounting provisions are unnecessary. MS3101E plugs mate with 3106, and 3108 plugs. NOTE: The D revision of MIL-C-5015 has changed the nomenclature of the 3101 from receptacle to plug.

## CABLE CONNECTING PLUG MS3101R



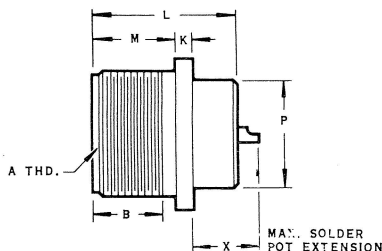
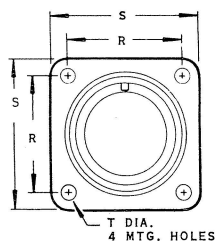
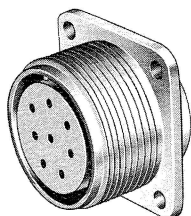
Shell Size	A Thread	B Min.	G Max.	K Max.	L Max.	M +.031 -.000	P Max.	S Max.
10SL	5/8-24NEF-2A	.375	1.062	.125			.970	.640
12S	3/4-20UNEF-2A	.375	1.062	.140			.970	.765
14S	7/8-20UNEF-2A	.375	1.156	.140			1.150	.890
16S	1-20UNEF-2A	.375	1.281	.140	1.838	.562	1.250	1.015
18	1-20UNEF-2A	.625	1.281	.146	2.181		1.250	1.015
18	1-1/8-18NEF-2A	.625	1.344	.180	2.281		1.450	1.140
20	1-1/4-18NEF-2A	.625	1.500	.180			1.570	1.265
22	1-3/8-18NEF-2A	.625	1.625	.180		.750	1.570	1.390
24	1-1/2-18NEF-2A	.625	1.750	.203		.812	1.880	1.515
28	1-3/4-18NS-2A	.625	2.000	.203	2.281	.812	1.880	1.765
32	2-18NS-2A	.625	2.250	.203	2.322	.875	2.205	2.015
36	2-1/4-16UN-2A	.625	2.500	.203	2.322	.875	2.400	2.270

MS3101R cable connecting plug is identical in purpose to the MS3101E. The MS3101R features a shorter lightweight endbell and mates with 3106 and 3108 plugs. NOTE: The D revision of the MIL-C-5015 specification has changed the nomenclature of the 3101 from receptacle to plug.

# MS-E/MS-R/CA xx F80 Crimp Environmental

## MS3102E

### BOX MOUNTING RECEPTACLE



X DIMENSION					
Max. Solder Pot Ext.—Pin or Socket					
SHELL SIZE	16	CONTACT SIZE	12	8	4
8S, 10S, 10SL	.534	—	—	—	—
12S, 14S, 16S	.518	—	—	—	—
12	.705	.705	—	—	—
14	.705	.705	.767	—	—
16	.705	.705	.767	.767	—
18	.674	.674	.736	.736	—
20, 22	.674	.674	.736	.736	.971
24, 28	.612	.612	.674	.674	.909
32, 36	.549	.549	.611	.611	.846

MS3102E and MS3102R box mounting receptacles are used in junction boxes or as an integral part of equipment. These connectors are identical in construction and will mate with 3106, 3107 and 3108 plugs. For new equipment customer should specify MS3102R.

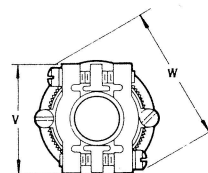
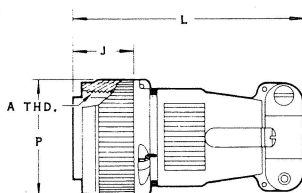
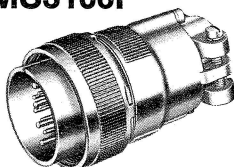
CLASS E Part Number by Shell Size Pin Insert*	CLASS R Part Number by Shell Size Pin Insert*	A Thread	B Min.	K Max.	L Max.	M +.031 -.000	P Max.	R ±.005	S +.031	T +.010 -.005
MS3102E10SL.**P	MS3102R10SL.**P	5/8-24UNEF-2A	.375	.119	.978	.562	.604	.719	1.000	.120
MS3102E12S.**P	MS3102R12S.**P	3/4-20UNEF-2A	.375	.135	.978	.562	.604	.812	1.000	.120
MS3102E14S.**P	MS3102R14S.**P	7/8-20UNEF-2A	.375	.135	.978	.562	.729	.906	1.188	.120
MS3102E16S.**P	MS3102R16S.**P	1 -20UNEF-2A	.375	.135	.978	.562	.854	.968	1.281	.120
MS3102E16.**P	MS3102R16.**P	1 -20UNEF-2A	.625	.135	1.34	.750	.854	.969	1.281	.120
MS3102E18.**P	MS3102R18.**P	1-1/8-18UNEF-2A	.625	.166	1.34	.750	.979	1.062	1.375	.120
MS3102E20.**P	MS3102R20.**P	1-1/4-18UNEF-2A	.625	.166	1.34	.750	1.135	1.156	1.500	.120
MS3102E22.**P	MS3102R22.**P	1-3/8-18UNEF-2A	.625	.166	1.34	.750	1.260	1.250	1.625	.120
MS3102E24.**P	MS3102R24.**P	1-1/2-18UNEF-2A	.625	.166	1.34	.812	1.385	1.375	1.750	.147
MS3102E28.**P	MS3102R28.**P	1-3/4-18UNS -2A	.625	.166	1.34	.812	1.604	1.562	2.000	.147
MS3102E32.**P	MS3102R32.**P	2 -18UNS -2A	.625	.166	1.34	.875	1.854	1.750	2.250	.173
MS3102E36.**P	MS3102R36.**P	2-1/4-16UN -2A	.625	.166	1.34	.875	2.041	1.938	2.500	.173

\* For socket inserts, substitute S for P following the contact arrangement number.  
\*\* Add contact arrangement number. See pages 5-9.

• Socket inserts available but must be ordered with CA instead of MS prefix in part number.

## MS3106E MS3106F

### STRAIGHT PLUG Integral Cable Clamp



MS3106E is identical to MS3106F except for "O" ring under the coupling nut, and is available upon request. For new equipment, customer should specify MS3106F.

MS3106F straight plugs mate with 3100 and 3102 receptacles and 3101 plugs.

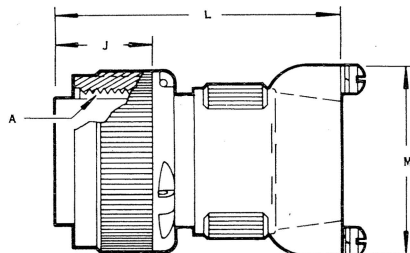
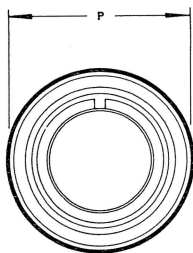
Part Number by Shell Size Pin Insert*	A Thread	E Max.	J Max.	L Max.	P Max.	V Max.	W Max.
MS3106F10SL.**S	5/8-24UNEF-2B	.312	.536	2.040	.969	.891	1.125
MS3106F12S.**P	3/4-20UNEF-2B	.312	.536	2.040	1.062	.891	1.125
MS3106F14S.**P	7/8-20UNEF-2B	.438	.536	2.125	1.156	1.077	1.344
MS3106F16S.**P	1 -20UNEF-2B	.562	.536	2.187	1.250	1.171	1.500
MS3106F16.**P	1 -20UNEF-2B	.562	.724	2.546	1.250	1.171	1.500
MS3106F18.**P	1-1/8-18UNEF-2B	.625	.724	2.656	1.344	1.265	1.594
MS3106F20.**P	1-1/4-18UNEF-2B	.750	.724	2.656	1.469	1.468	1.875
MS3106F22.**P	1-3/8-18UNEF-2B	.750	.724	2.656	1.594	1.468	1.875
MS3106F24.**P	1-1/2-18UNEF-2B	.938	.724	2.953	1.719	1.702	2.125
MS3106F28.**P	1-3/4-18UNS -2B	.938	.724	2.953	1.969	1.702	2.125
MS3106F32.**P	2 -18UNS -2B	1.250	.724	2.953	2.219	2.030	2.531
MS3106F36.**P	2-1/4-16UN -2B	1.375	.724	2.953	2.469	2.270	2.875

\* For socket inserts, substitute S for P following the contact arrangement number.  
\*\* Add contact arrangement number. See pages 5-9.

• Pin inserts available but must be ordered with CA instead of MS prefix in part number. (Not to MS specification.)

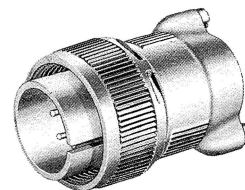


# MS-E/MS-R/CA xx F80 Crimp Environmental



**STRAIGHT PLUG**

**MS3106R**



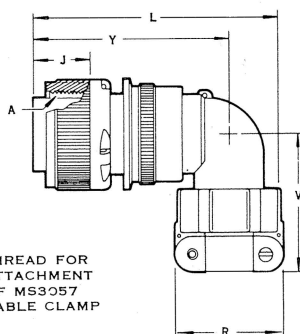
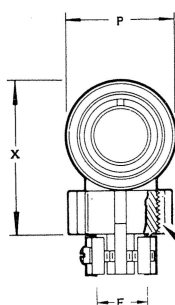
Part Number by Shell Size Pin Insert*	A Thread	J Max.	L Max.	M Max.	P Max.	Shell Wt. lbs.
•MS3106R10SL.**S	5/8-24UNEF-2B	.536	1.525	.946	.969	.0356
MS3106R12S.**P	3/4-20UNEF-2B	.536	1.547	.946	1.062	.0416
MS3106R14S.**P	7/8-20UNEF-2B	.536	1.523	1.128	1.156	.0532
MS3106R16S.**P	1 -20UNEF-2B	.536	1.515	1.228	1.250	.0629
MS3106R16.**P	1 -20UNEF-2B	.724	1.892	1.228	1.250	—
MS3106R18.**P	1-1/8-18UNEF-2B	.724	2.000	1.431	1.344	.0931
MS3106R20.**P	1-1/4-18UNEF-2B	.724	2.021	1.558	1.469	.0991
MS3106R22.**P	1-3/8-18UNEF-2B	.724	1.988	1.558	1.594	.1164
MS3106R24.**P	1-1/2-18UNEF-2B	.724	2.000	1.900	1.719	.1330
MS3106R28.**P	1-3/4-18UNS -2B	.724	2.000	1.900	1.969	.1530
MS3106R32.**P	2 -18UNS -2B	.724	2.010	2.132	1.219	.1923
MS3106R36.**P	2-1/4-16UN -2B	.724	2.010	2.322	2.469	.2307

\* For socket inserts, substitute S for P following the contact arrangement number.  
\*\* Add contact arrangement number. See pages 5-9.

• Pin inserts available but must be ordered with CA instead of MS prefix in part number. (Not to MS specification.)

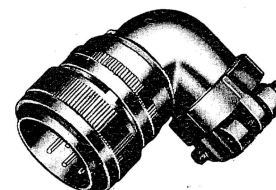
The MS3106R straight plug is identical in purpose to the MS3106F. The MS3106R has the shorter endbell.

This plug will mate with 3100 and 3102 receptacles and 3101 plugs.



**90° ANGLE PLUG**

**MS3108E  
MS3108R**



Note: Class R is without the cable clamp.

CLASS F Part Number by Shell Size Pin Insert*	CLASS R Part Number by Shell Size Pin Insert*	A Thread	E Max.	J Max.	L Max.	P Max.	R Max.	V Max.	X Max.	Y Max.	Shell Wt. lbs.
MS3108E10SL.**S	•MS3108R10SL.**S	5/8-24UNEF-2B	.312	.536	2.171	.969	.885	1.281	1.728	1.703	.0776
MS3108E12S.**P	MS3108R12S.**P	3/4-20UNEF-2B	.312	.536	2.171	1.062	.885	1.281	1.858	1.703	.0817
MS3108E14S.**P	MS3108R14S.**P	7/8-20UNEF-2B	.437	.536	2.328	1.156	1.072	1.406	1.494	1.765	.1156
MS3108E16S.**P	MS3108R16S.**P	1 -20UNEF-2B	.562	.536	2.406	1.250	1.166	1.531	2.223	1.796	.1371
MS3108E16.**P	MS3108R16.**P	1 -20UNEF-2B	.562	.724	2.765	1.250	1.166	1.531	2.223	2.156	.1577
MS3108E18.**P	MS3108R18.**P	1-1/8-18UNEF-2B	.625	.724	2.843	1.344	1.260	1.593	2.376	2.250	.1714
MS3108E20.**P	MS3108R20.**P	1-1/4-18UNEF-2B	.750	.724	3.078	1.469	1.463	1.656	2.567	2.312	.2213
MS3108E22.**P	MS3108R22.**P	1-3/8-18UNEF-2B	.750	.724	3.078	1.594	1.463	1.718	2.751	2.312	.2369
MS3108E24.**P	MS3108R24.**P	1-1/2-18UNEF-2B	.938	.724	3.406	1.719	1.697	1.890	2.957	2.531	.3223
MS3108E28.**P	MS3108R28.**P	1-3/4-18UNS -2B	.938	.724	3.406	1.969	1.697	1.968	3.286†	2.531	.3556
MS3108E32.**P	MS3108R32.**P	2 -18UNS -2B	1.250	.724	3.781	2.219	2.025	2.187	3.755	2.750	.4833
MS3108E36.**P	MS3108R36.**P	2-1/4-16UN -2B	1.375	.724	4.031	2.469	2.275	2.406	4.224†	2.875	.5874

\* For socket inserts, substitute S for P following the contact arrangement number.  
\*\* Add contact arrangement number. See pages 5-9.

• Pin inserts available but must be ordered with CA instead of MS prefix in part number. (Not to MS specification.)

MS3108R 90° angle plugs (with O ring seal less cable clamp) and the MS-3108E 90° angle plugs (less O ring seal with cable clamp) are used where there is limited space and where wires must be brought at abrupt angles.

This plug will mate with 3100 and 3102 receptacles and 3101 plugs.

# ER Potting Connectors

## General Information

Shell styles 00 and 06 with plastic cups and resilient insulators meet the requirements of MS3103, MS25183 and MS25183A. Also available is the 08 plug with resilient insulator and 90° angle nylon potting cup.

All potting plugs can be supplied with or without grounding means, as defined in the ordering nomenclature.

For potting connectors with resilient insulators, there is a 1/4" clearance for potting on all contact sizes.

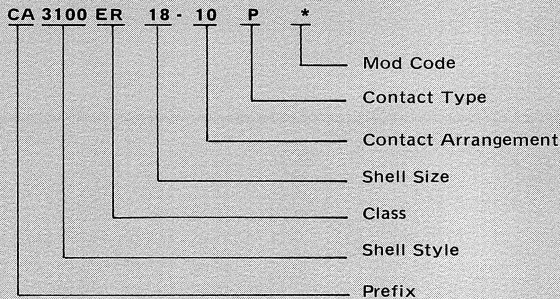
For contact arrangements with size 8, 4 and 0 contacts, consult factory for availability.

For electrical information refer page 4.

For contact arrangements and alternate insert positions refer pages 5 thru 9.

For material information refer page 10, 11.

## How to Order



\* F80 crimp termination (available only in 16# and 12# contacts).

### PREFIX

CA-ITT Cannon prefix indicating special application or variation of MS.

### SHELL STYLE

3100 — Wall mounting receptacle  
3103 — Straight plug (with grounding lug)  
3106 — Straight plug (less grounding lug)  
3108 — 90° angle plug

### CLASS

ER - Resilient insulator, nylon potting cup and thread attachment ring

### SHELL SIZE

Coupling thread diameter figures in sixteenths of an inch

### CONTACT ARRANGEMENT

See pages 5 thru 9.

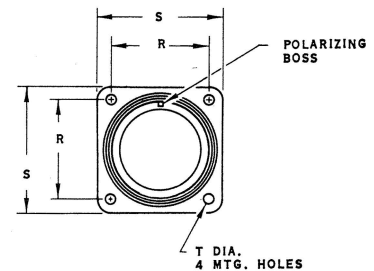
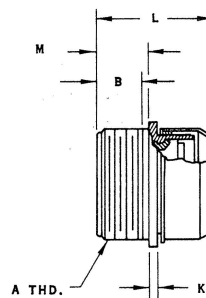
### CONTACT TYPE

P for pin; S for socket

## CA3100ER MS3103



## WALL MOUNTING RECEPTACLE Nylon Potting Cup Threaded Attachment Ring

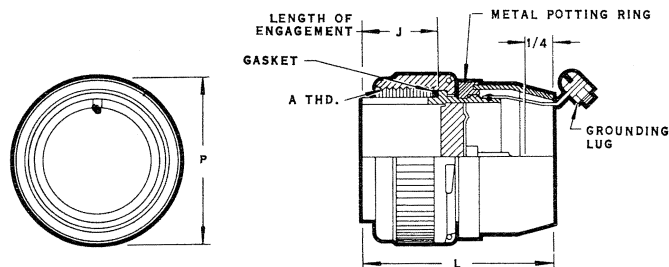


The CA3100ER receptacle (MS3103 type) is supplied with a resilient insulator and a nylon potting cup with a threaded attachment ring. This receptacle mates with 3106 and 3108 plugs.

Part Number by Shell Size Pin Insert*	A Thread	B Min.	K Max.	L Max.	M +.016 -.000	R ±.005	S Max.	T +.010 -.005
CA3100ER10SL.**P	5/8-24UNEF-2A	.375	.12	1.47	.562	.719	1.010	.120
CA3100ER12S.**P	3/4-20UNEF-2A	.375	.14	1.47	.562	.812	1.103	.120
CA3100ER14S.**P	7/8-20UNEF-2A	.375	.14	1.47	.562	.906	1.197	.120
CA3100ER16S.**P	1 -20UNEF-2A	.375	.14	1.47	.567	.969	1.291	.120
CA3100ER16.**P	1 -20UNEF-2A	.625	.14	1.91	.750	.969	1.291	.120
CA3100ER18.**P	1-1/8-18UNEF-2A	.625	.17	1.91	.750	1.062	1.385	.120
CA3100ER20.**P	1-1/4-18UNEF-2A	.625	.17	2.05	.750	1.156	1.510	.120
CA3100ER22.**P	1-3/8-18UNEF-2A	.625	.17	2.05	.750	1.250	1.635	.120
CA3100ER24.**P	1-1/2-18UNEF-2A	.625	.17	2.05	.812	1.375	1.762	.147
CA3100ER28.**P	1-3/4-18UNS -2A	.625	.17	2.05	.812	1.562	2.010	.147
CA3100ER32.**P	2 -18UNS -2A	.625	.17	2.05	.875	1.750	2.260	.173
CA3100ER36.**P	2-1/4-16UN -2A	.625	.17	2.05	.875	1.938	2.510	.173

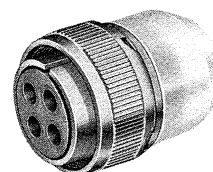
\* For socket inserts substitute S for P following the contact arrangement number.  
\*\* Add contact arrangement number. See pages 5-9.

# ER Potting Connectors



**STRAIGHT PLUG**  
Nylon Potting Cup  
Rubber Gasket

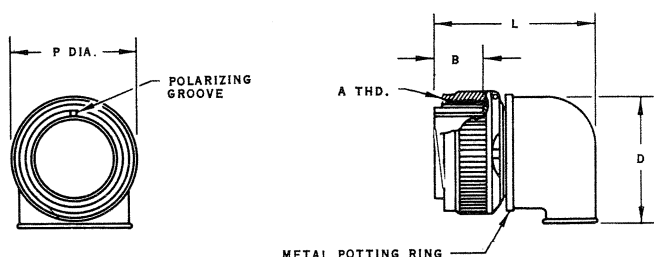
**CA06ER**  
**CA3106ER**  
MS25183 TYPES



Part Number by Shell Size Pin Insert*		A Thread	J Max.	L Max.	P Max.
With Grounding Lug	Less Grounding Lug				
CA06ER8S.**P	CA3106ER8S.**P	1/2-28UNEF-2B	.536	1.469	.844
CA06ER10S.**P	CA3106ER10S.**P	5/8-24UNEF-2B	.536	1.469	.969
CA06ER10SL.**P	CA3106ER10SL.**P	5/8-24UNEF-2B	.536	1.469	.969
CA06ER12S.**P	CA3106ER12S.**P	3/4-24UNEF-2B	.536	1.469	1.062
CA06ER14S.**P	CA3106ER14S.**P	7/8-20UNEF-2B	.536	1.469	1.156
CA06ER16S.**P	CA3106ER16S.**P	1 -20UNEF-2B	.536	1.469	1.250
CA06ER16.**P	CA3106ER16.**P	1 -20UNEF-2B	.724	1.906	1.250
CA06ER18.**P	CA3106ER18.**P	1-1/8-18UNEF-2B	.724	1.920†	1.344
CA06ER20.**P	CA3106ER20.**P	1-1/4-18UNEF-2B	.724	2.040	1.469
CA06ER22.**P	CA3106ER22.**P	1-3/8-18UNEF-2B	.724	2.040	1.594
CA06ER24.**P	CA3106ER24.**P	1-1/2-18UNEF-2B	.724	2.040	1.719
CA06ER28.**P	CA3106ER28.**P	1-3/4-18UNS -2B	.724	2.040	1.969
CA06ER32.**P	CA3106ER32.**P	2 -18UNS -2B	.724	2.040	1.219
CA06ER36.**P	CA3106ER36.**P	2-1/4-16UN -2B	.724	2.040	2.469

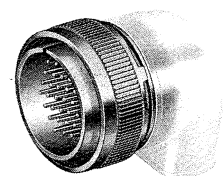
\* For socket inserts, substitute S for P following the contact arrangement number.  
\*\* Add contact arrangement number. See pages 5-9

The CA06ER (MS25183A type) and the CA3106ER (MS25183 type) plugs are supplied with resilient insulators, nylon potting cups with threaded attachment rings, and a rubber gasket under the coupling nut. In addition, the CA06ER is supplied with a grounding lug. Both plugs mate with 3100 and 3102 receptacles.



**90° ANGLE PLUG**  
Nylon Potting Cup  
Rubber Gasket

**CA3108ER**



Part Number by Shell Size Pin Insert*	A Thread	B Max.	D Max.	L Max.		P Max.
				For Arr. with #16 and #12 Contacts	For Arr. with #8 and #4 Contacts	
CA3108ER10SL.**P	5/8-24UNEF-2B	.536	1.030	1.410	—	.969
CA3108ER12S.**P	3/4-20UNEF-2B	.536	1.030	1.600	—	1.062
CA3108ER14S.**P	7/8-20UNEF-2B	.536	1.030	1.600	2.300	1.156
CA3108ER16S.**P	1 -20UNEF-2B	.536	1.280	1.600	2.550	1.250
CA3108ER16.**P	1 -20UNEF-2B	.724	1.280	1.910	2.850	1.250
CA3108ER18.**P	1-1/8-18UNEF-2B	.724	1.280	2.100	2.850	1.344
CA3108ER20.**P	1-1/4-18UNEF-2B	.724	1.530	2.100	2.850	1.469
CA3108ER22.**P	1-3/8-18UNEF-2B	.724	1.530	2.100	2.850	1.594
CA3108ER24.**P	1-1/2-18UNEF-2B	.724	1.780	2.281	2.985	1.719
CA3108ER28.**P	1-3/4-18UNS -2B	.724	2.030	2.485	2.985	1.969
CA3108ER32.**P	2 -18UNS -2B	.724	2.280	2.485	2.985	1.219
CA3108ER36.**P	2-1/4-16UN -2B	.724	2.580	2.485	2.985	2.469

\* For socket inserts, substitute S for P following the contact arrangement number.  
\*\* Add contact arrangement number. See pages 5-9.

The CA3108ER is supplied with resilient insulator, 90° nylon potting cup and threaded attachment ring with a rubber gasket under the coupling nut. This plug mates with 3100 and 3102 receptacles.



# F80 Crimp Contacts

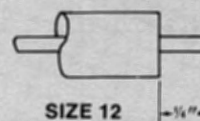
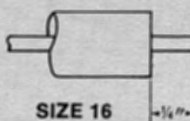
## NOTE: For Crimp Contacts

Standard MIL-C-5015 type connectors are supplied in Solder Contact Termination. Crimp type contacts are also available and are called up by part number suffix F80, e.g. CA 3106 R 20-27 P W F80 (see page 18 for part number make-up).

Contact sizes 16-G and 12-G are crimped with the hand tools below. MS-E type mains power connectors are not normally available in Crimp types.

## F80 Assembly Instructions

### Recommended Wire Stripping



### Crimping Contacts

1. Check the crimp tool to be sure that the proper crimp head locator is used.
2. Cycle the tool to be sure the indentors are open.
3. Place the contact, mating end first, into the tool.
4. Insert the stripped wire into the hollow end of the contact. Be sure the wire is inserted as far as it will go.
5. Close the tool completely to crimp. Unless the tool is closed completely, the tool will not release the contact.
6. Remove the crimped contact from the tool. Check the inspection hole to verify that the wire is fully inserted.

### Insertion of Contacts

1. Before inserting the contacts, remove the endbell, grommets, and ferrule from the receptacle. Remove the endbell, grommet, ferrule, and coupling nut from the plug. Slide the hardware over the wire bundle in the proper order for reassembly after all of the contacts are inserted.
2. To assist insertion of contacts, lubricate insert cavities with isopropyl alcohol. Alcohol will evaporate and will not leave a conductive film. **Caution: never use any lubricant other than isopropyl alcohol.** Hold the plug or receptacle body firmly and insert the wired contacts as far as possible by hand. Starting at one side of the insulator, work progressively from contact to contact across the layout. When inserting socket contacts, be sure to provide fixture space below the front face to permit length of guide pins for #16 and L12 contacts to clear insulator face. For guide pin numbers refer below.
3. Place the correct insertion tool on the contact so that the wire runs along the groove in the tool. (Tool tip will butt against the shoulder.)
4. Beginning with a cavity on the outer edge of the plug, apply a slow, even pressure perpendicular to the insulator face until the contact snaps into position. If contacts are not inserted all the way prior to removing insertion tool, do not try to reinsert the insertion tool. Instead, using the extraction tool, push the contact back to position it was in when the insertion tool was originally placed over the contact for pushin; otherwise the inside of contact cavity may be damaged by reinserting the insertion tool.
5. Inspect the front end of the insulator to assure that the contacts are inserted to the proper depth.

### Completion

After all the cavities have been filled, slide the hardware back into position on the barrel. Tighten the endbell until the ferrule and endbell are flush. Compression of the grommet in this manner results in maximum sealing characteristics of the plug.

### Extraction of Contacts

1. Select the appropriate tool. (Tool tips are reversible for either pin or socket.) Place the extraction tool over the pin or into the socket.
2. Apply a slow, even pressure to push the contact out of the rear of the insulator.

### Tools

ITT Cannon provides a complete line of crimp insertion and extraction tooling to be used with CA-F80 contacts as follows:

Contact Size	Hand Crimp Tool*	Locator
16	M-22520/1-01	TH-70
12	M-22520/1-01	TH-70

The M22520/1-01 is the MIL standard crimp tool for #12 thru #20 contacts and used to crimp #12 and 16 contacts for the CA-F80.

### Guide Pins

Guide pins are used to assist insertion of socket contact Sizes #16 and #12.

Contact	Guide Pin
#16	226-1017-000
#12	226-1018-000

Although obsoleted by MIL-T-22520, the MS3191-1 tool is commonly used in non-military commercial applications. The chart below specifies contact size and corresponding locator used with the MS-3191-1 tool.

Shell Styles	Contact Size	Locator
8S thru 16S	16 Pin	L-16-3191-7
	16 Socket	L-16-3191-46
12 thru 36	16 Pin	L-16-3191-10
	16 Socket	L-16-3191-52
	12 Pin	L-16-3191-16
	12 Socket	L-16-3191-20

Insertion and extraction tools used for these connectors are available for contact sizes 16 and 12.

Contact Size	Insertion Tools	Extraction Tools	Handle Color
16	CIT-16	CET-16-4	Blue
12	CIT-12	CET-12-2	Yellow

### Pin Contact Part Numbers

Contact Size	F80
16S	330-0345-016
16	330-0351-016
12	330-0351-012

### Socket Contact Part Numbers

Contact Size	F80
16S	031-0554-161
16	031-0560-161
12	031-0560-121

# High Voltage Cartridges and RFI Shielding

## High Voltage Cartridges for MS-E and MS-R



- Standard contact arrangements are adaptable to high voltage applications.
- Eliminates need for a separate high voltage connector.
- Assembly time is reduced.

High voltage conductors as well as power and/or control signal conductors can now be connected simultaneously in standard MS connectors. Previously, MS connectors involved in high voltage circuitry required individual design considerations and could only be ordered as a "special". The new high voltage cartridge allows conversion of a standard connector to one capable of handling up to 15,000 volts DC (Test Voltage — mated), operating voltage — sea level 5,000 V.D.C. or 3,500 V.A.C. These cartridges are molded of nylon and provide a high degree of arc-over protection between adjacent contacts or between a contact and the connector shell. Unmated, each cartridge provides a nylon isolating barrier capable of withstanding up to 10,000 volts DC (or peak).

The contact within the cartridge is a 7.5 amp, size 20, crimp snap-in type with dielectric rear release clip retention. This contact is removable with the plastic CIET 20 insertion/extraction tool provided the insulation is .084" or less. The contact may be crimped with the standard MS3191 tool and hand inserted into the nylon cartridge. The cartridge body is installed in the connector at the factory.

High voltage cartridges now available fit in the space normally occupied by a #4 or #8 size contact in an MS-E, MS-R or MS-F type connector.

## R.F.I. Shielding

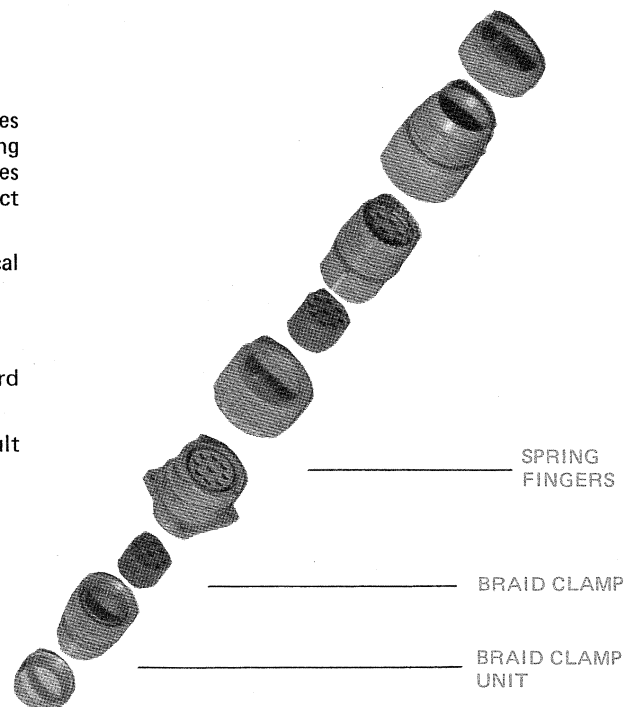
A further modification of the versatile MIL-C-5015 series provides continuity of R.F.I. screening through the mating connectors. A special end bell or rear end termination provides clamping of the braid, while spring fingers maintain contact between plug and receptacle.

Performance, physical characteristics, and materials are identical to the MS-E series shown on pages 10 thru 14.

## Ordering Information

To specify R.F.I. shielding add the suffix R.F.I. to the standard MS'E'/'R' front number as shown on page 18.

Note that the 'MS' prefix would be replaced by 'CA' as a result of the modification, e.g. CA3106E - 18-19 R.F.I.

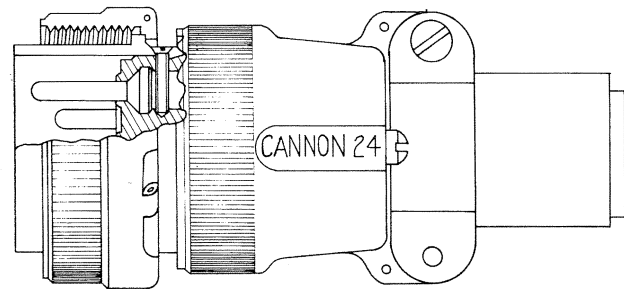


# CEA-R Mains Power Connectors

CEA-R Series for Single and Three Phase Power Applications:—

Features:—

- Compact rugged construction with moisture proof sealing for use in harsh industrial environments.
- Optional Bayonet or Threaded Coupling
- Leading Earth Pin Contact
- Cable Plug Earth Contact Grounded to Shell
- Combinations of Power and Signal Layouts
- Variety of current and voltage ratings for single phase and Star/Delta three phase applications
- Solder termination
- Temperature rating  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- Silver plated contacts



This series of Connectors has been developed to meet the safety requirements of the S.E.C.V. for "Prescribed Articles". Based on the proven MS-E series, with appropriate modifications, the following listings cover types already developed. The column, "Modified From", indicates the basic type. Dimensional details are shown on pages 11 thru 14. For other requirements, refer to Factory.

Description	No. Contacts	Modified From	Rating
CEA-R1099-P	3	3106E16-10P	250V-15A
CEA-R1099-S	3	3106E16-10S	250V-15A
CEA-R1100-P	3	3108R16-10P	250V-15A
CEA-R1100-S	3	3108R16-10S	250V-15A
CEA-R1109-P	3	3100R16-10P	250V-15A
CEA-R1109-S	3	3100R16-10S	250V-15A
CEA-R1246-P	3	3106E22-2P	250V-35A
CEA-R1246-S	3	3106E22-2S	250V-35A
CEA-R1247-P	3	3108E22-2P	250V-35A
CEA-R1247-S	3	3108E22-2S	250V-35A
CEA-R1248-P	3	3100R22-2P	250V-35A
CEA-R1248-S	3	3100R22-2S	250V-35A
CEA-R1123-P	4	3106E18-10P	500V-15A
CEA-R1123-S	4	3106E18-10S	500V-15A
CEA-R1125-P	4	3108E18-10P	500V-15A
CEA-R1125-S	4	3108E18-10S	500V-15A
CEA-R1127-P	4	3100R18-10P	500V-15A
CEA-R1127-S	4	3100R18-10S	500V-15A
CEA-R1025-P	4	3108E22-22P	500V-35A
CEA-R1025-S	4	3108E22-22S	500V-35A
CEA-R1030-P	4	3106E22-22P	500V-35A
CEA-R1030-S	4	3106E22-22S	500V-35A
CEA-R1031-P	4	3100R22-22P	500V-35A
CEA-R1031-S	4	3100R22-22S	500V-35A
CEA-R1124-P	5	3106E18-11P	500V-15A
CEA-R1124-S	5	3106E18-11S	500V-15A
CEA-R1126-P	5	3108E18-11P	500V-15A
CEA-R1126-S	5	3108E18-11S	500V-15A
CEA-R1128-P	5	3100R18-11P	500V-15A
CEA-R1128-S	5	3100R18-11S	500V-15A

Description	No. Contact	Modified From	Rating
CEA-R1155-P	7	3106E20-15P	240V-15A
CEA-R1172-S	7	3106E20-15S	240V-15A
CEA-R1156-P	7	3100R20-15P	240V-15A
CEA-R1156-S	7	3100R20-15S	240V-15A
CEA-R1249-P	7	3106E24-10P	500V-35A
CEA-R1249-S	7	3106E24-10S	500V-35A
CEA-R1250-P	7	3108E24-10P	500V-35A
CEA-R1250-S	7	3108E24-10S	500V-35A
CEA-R1251-P	7	3100R24-10P	500V-35A
CEA-R1251-S	7	3100R24-10S	500V-35A
CEA-R1283-P	9	3106E24-11P	240V-20A
CEA-R1284-S	9	3100E24-11S	240V-20A
CEA-R1036-P	10	3106E24-21P	500V-15A
CEA-R1036-S	10	3106E24-21S	500V-15A
CEA-R1038-P	10	3100R24-21P	500V-15A
CEA-R1038-S	10	3100R24-21S	500V-15A
CEA-R1313	22	3106E28-11S	250V-15A
CEA-R1314	22	3100R28-11P	250V-15A

## SPECIAL FOR M.M.B.W. SEWER PUMPS

CEA-R1185-P	6	3106F24-10PB	450V-40A
CEA-R1186-S	6	3101F24-10SB	450V-40A

(BAYONET COUPLING, GOLD PLATED CONTACTS)

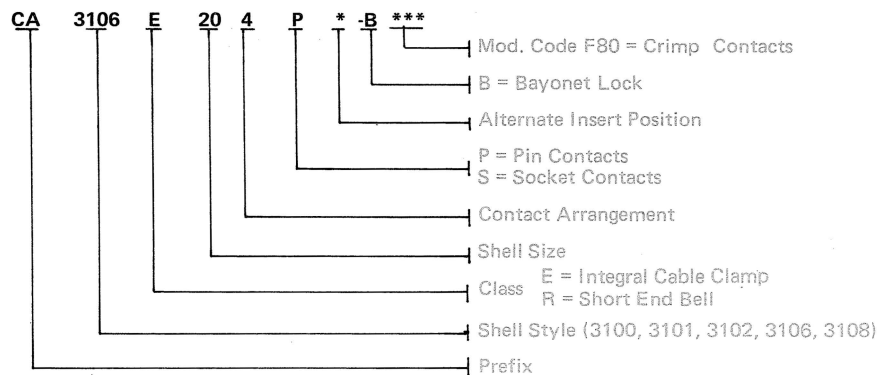
For bayonet coupling add suffix 'B' to description except where noted.



# CA Bayonet Lock

## How to Order

The photographs (below), illustrate the Bayonet Lock types available in each of the shell styles illustrated on Pages 22, 23, and 24.



## Six Advantages of Bayonet Lock

1. Fast coupling and uncoupling
2. Vibration resistant — loosening of the coupling nut under vibration or shock conditions prevented.
3. Unaffected by contaminants such as, dust, sand, etc.
4. Audible snap in lock provides for more safety in coupling.
5. Water-proof to 10m/30 ft.
6. Temperature range  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$

## Introduction

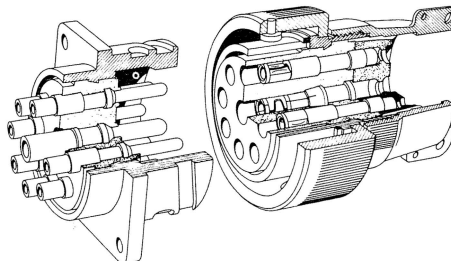
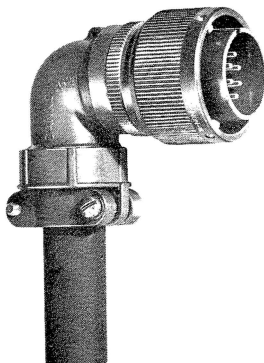
The CA Bayonet belong to the family of MS Connectors which were initially developed for aircraft, but which today are internationally used in the electrical equipment of land and sea-borne vehicles, in industrial facilities, telecommunication equipment, radar units, etc.

These connectors are interchangeable with all corresponding MS connectors to MIL-C-5015, as they have the same mounting dimensions and contact arrangements. It should be noted, however, that they are not mateable with the standard MS types due to bayonet lock feature.

## Design Features

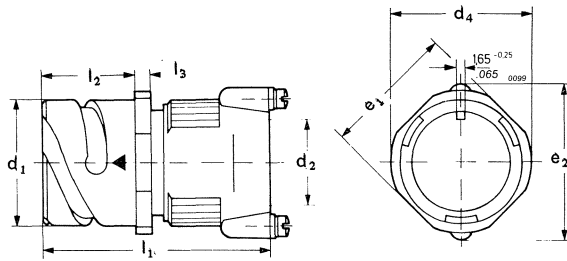
Bayonet lock connectors are rugged, shock and vibration resistant, and suitable for operating in water to a depth of 10 m/30 ft.

An "O" ring and interfacial seal ensure that mating connectors are leak proof and a grommet provides wire sealing. The alignment of three red arrows on the receptacle with three red dots on the plug indicate positive mating. All types shown, although not conforming to, exceed the requirements of German standards VG-95234 and VG-95235 and also MIL-C-5015. For types conforming to VG-95234 and VG-95235, consult factory.



For electrical performance data refer to page 4.  
For contact arrangements and alternate insert positions refer to pages 5 thru 9.  
For material information refer to page 10.

# CA Bayonet Lock



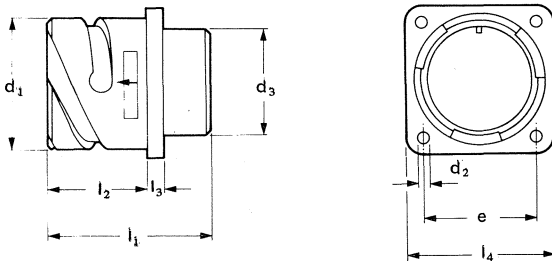
## CA3101R-B\*

Dimensions are mm

Size	d <sub>1</sub> -0.15	d <sub>2</sub> ±0.2	d <sub>4</sub> +0.3	e <sub>1</sub> +0.2	e <sub>2</sub> max.	l <sub>1</sub> max.	l <sub>2</sub> +0.4	l <sub>3</sub> ±0.2
10SL	18.2	9.6	24.9	20.6	25.5	46	18.2	2.8
12S	21.4	10.3	27.5	23.6	25.5	47	18.2	3.2
14S	24.6	12.4	29.5	25.4	30.0	46	18.2	3.2
16S	27.4	15.4	32.0	28.6	33.0	53	18.2	3.2
16	27.4	15.4	32.0	28.6	33.0	53	21.5	3.2
18	30.8	18.4	34.5	31.7	38.0	60	23.05	4.0
20	34.2	22.0	37.5	34.9	41.0	60	23.05	4.0
22	37.4	24.7	40.8	38.1	41.0	60	23.05	4.0
24	40.9	27.6	44.3	41.3	49.0	61	23.05	4.0
28	46.7	31.6	50.6	47.6	49.0	61	24.05	4.0
32	53.4	38.5	56.8	54.0	57.0	61	24.05	4.0
36	59.6	44.5	63.3	60.6	62.0	61	24.05	4.0

Dimensions are inches

Size	d <sub>1</sub> -0.005	d <sub>2</sub> ±0.007	d <sub>4</sub> +0.011	e <sub>1</sub> ±0.007	e <sub>2</sub> max.	l <sub>1</sub> max.	l <sub>2</sub> +0.015	l <sub>3</sub> ±0.007
10SL	.716	.377	.980	.811	1.003	1.811	.716	.110
12S	.842	.405	1.082	.929	1.003	1.850	.716	.125
14S	.968	.488	1.161	1.000	1.181	1.811	.716	.125
16S	1.078	.606	1.259	1.125	1.299	2.086	.716	.125
16	1.078	.606	1.259	1.125	1.299	2.086	.846	.125
18	1.212	.724	1.358	1.248	1.496	2.362	.907	.157
20	1.346	.866	1.476	1.374	1.614	2.362	.907	.157
22	1.472	.972	1.606	1.500	1.614	2.362	.907	.157
24	1.610	1.086	1.744	1.625	1.929	2.401	.907	.157
28	1.838	1.244	1.992	1.874	1.929	2.401	.946	.157
32	2.102	1.515	2.236	2.125	2.244	2.401	.946	.157
36	2.346	1.751	2.492	2.385	2.440	2.401	.946	.157



## CA3102E-B\*

Dimensions are mm

Size	d <sub>1</sub> -0.15	d <sub>2</sub> +0.2	d <sub>3</sub> +0.4	e +0.1	l <sub>1</sub> ±0.3	l <sub>2</sub> +0.4	l <sub>3</sub> ±0.2	l <sub>4</sub> ±0.3
10SL	18.2	3.2	15.1	18.2	24.7	14.2	2.8	25.4
12S	21.4	3.2	15.1	20.6	24.7	14.2	3.2	28.0
14S	24.6	3.2	18.3	23.0	24.7	14.2	3.2	30.0
16S	27.4	3.2	21.5	24.6	24.7	14.2	3.2	32.5
16	27.4	3.2	21.5	24.6	33.8	19.0	3.2	32.5
18	30.8	3.2	24.6	27.0	33.8	19.0	4.0	35.0
20	34.2	3.2	28.6	29.4	33.8	19.0	4.0	38.0
22	37.4	3.2	31.8	31.8	33.8	19.0	4.0	41.0
24	40.9	3.7	34.9	34.9	33.8	20.6	4.0	44.5
28	46.7	3.7	40.5	39.7	33.8	20.6	4.0	50.8
32	53.4	4.3	46.9	44.5	33.8	22.2	4.0	57.0
36	59.6	4.3	51.6	49.2	33.8	22.2	4.0	63.5

Dimensions are inches

Size	d <sub>1</sub> -0.005	d <sub>2</sub> +0.007	d <sub>3</sub> .015	e +0.003	l <sub>1</sub> ±0.011	l <sub>2</sub> +0.015	l <sub>3</sub> ±0.007	l <sub>4</sub> ±0.011
10SL	.716	.125	.594	.716	.972	.559	.110	1.000
12S	.842	.125	.594	.102	.972	.559	.125	1.102
14S	.968	.125	.720	.905	.972	.559	.125	1.181
16S	1.078	.125	.846	.968	.972	.559	.125	1.279
16	1.078	.125	.846	.968	1.330	.748	.125	1.279
18	1.212	.125	.968	1.062	1.330	.748	.157	1.377
20	1.346	.125	1.125	1.157	1.330	.748	.157	1.496
22	1.472	.125	1.251	1.251	1.330	.748	.157	1.614
24	1.610	.145	1.374	1.374	1.330	.811	.157	1.751
28	1.838	.145	1.594	1.562	1.330	.811	.157	2.000
32	2.102	.169	1.846	1.751	1.330	.874	.157	2.244
36	2.346	.169	2.031	1.937	1.330	.874	.157	2.500

## CA3106E-B\*

Dimensions are mm

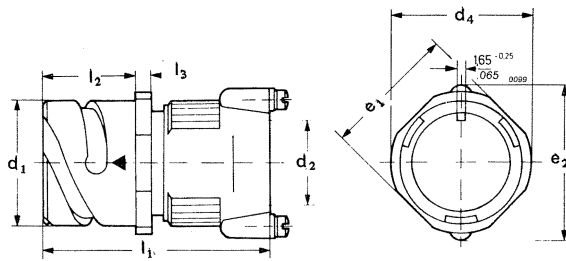
Size	d <sub>1</sub> ±0.4	d <sub>2</sub> *	l <sub>1</sub> max.	l <sub>2</sub> max.	l <sub>3</sub> max.	l <sub>4</sub> max.
10SL	22.4	6.5	115	55	25.5	22.7
12S	25.6	6.5	115	55	25.5	22.7
14S	28.8	9.0	112	57	30.0	27.5
16S	31.6	11.0	110	59	33.0	30.0
16	31.6	11.0	120	69	33.0	30.0
18	36.1	14.2	119	74	38.0	32.2
20	39.5	15.8	116	74	41.0	37.5
22	42.7	15.8	116	74	41.0	37.5
24	46.2	21.4	120	90	49.0	43.3
28	53.0	21.4	120	90	49.0	43.3
32	59.7	26.7	117	90	57.0	51.7
36	65.9	31.7	130	100	62.0	58.0

Dimensions are inches

Size	d <sub>1</sub> ±0.015	d <sub>2</sub> *	l <sub>1</sub> max.	l <sub>2</sub> max.	l <sub>3</sub> max.	l <sub>4</sub> max.
10SL	.881	.255	4.527	2.165	1.003	.893
12S	1.006	.255	4.527	2.165	1.003	.893
14S	1.133	.354	4.409	2.244	1.181	1.082
16S	1.244	.433	4.330	2.322	1.299	1.181
16	1.244	.433	4.724	2.716	1.299	1.267
18	1.421	.559	4.685	2.913	1.496	1.181
20	1.555	.622	4.566	2.913	1.614	1.476
22	1.681	.622	4.566	2.913	1.614	1.476
24	1.818	.842	4.724	3.543	1.929	1.704
28	2.086	.842	4.724	3.543	1.929	1.704
32	2.350	1.051	4.606	3.543	2.244	2.035
36	2.594	1.248	5.120	3.940	2.440	2.283

\* max. permissible outside diameter of cable

# CA Bayonet Lock



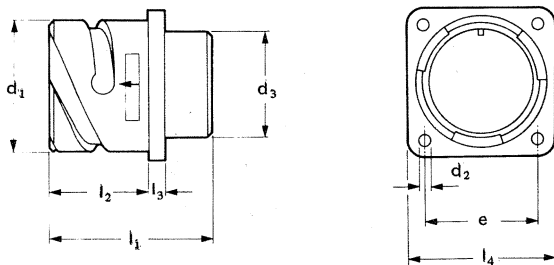
## CA3101R-B\*

Dimensions are mm

Size	d <sub>1</sub> -0.015	d <sub>2</sub> ±0.02	d <sub>4</sub> +0.3	e <sub>1</sub> ±0.2	e <sub>2</sub> max.	l <sub>1</sub> max.	l <sub>2</sub> +0.4	l <sub>3</sub> ±0.2
10SL	18.2	9.6	24.9	20.6	25.5	46	18.2	2.8
12S	21.4	10.3	27.5	23.6	25.5	47	18.2	3.2
14S	24.6	12.4	29.5	25.4	30.0	46	18.2	3.2
16S	27.4	15.4	32.0	28.6	33.0	53	18.2	3.2
16	27.4	15.4	32.0	28.6	33.0	53	21.5	3.2
18	30.8	18.4	34.5	31.7	38.0	60	23.05	4.0
20	34.2	22.0	37.5	34.9	41.0	60	23.05	4.0
22	37.4	24.7	40.8	38.1	41.0	60	23.05	4.0
24	40.9	27.6	44.3	41.3	49.0	61	23.05	4.0
28	46.7	31.6	50.6	47.6	49.0	61	24.05	4.0
32	53.4	38.5	56.8	54.0	57.0	61	24.05	4.0
36	59.6	44.5	63.3	60.6	62.0	61	24.05	4.0

Dimensions are inches

Size	d <sub>1</sub> -0.005	d <sub>2</sub> ±0.007	d <sub>4</sub> +0.011	e <sub>1</sub> ±0.007	e <sub>2</sub> max.	l <sub>1</sub> max.	l <sub>2</sub> +0.015	l <sub>3</sub> ±0.007
10SL	.716	.377	.980	.811	1.003	1.811	.716	.110
12S	.842	.405	1.082	.929	1.003	1.850	.716	.125
14S	.968	.488	1.161	1.000	1.181	1.811	.716	.125
16S	1.078	.606	1.259	1.125	1.299	2.086	.716	.125
16	1.078	.606	1.259	1.125	1.299	2.086	.846	.125
18	1.212	.724	1.358	1.248	1.496	2.362	.907	.157
20	1.346	.866	1.476	1.374	1.614	2.362	.907	.157
22	1.472	.972	1.606	1.500	1.614	2.362	.907	.157
24	1.610	1.086	1.744	1.625	1.929	2.401	.907	.157
28	1.838	1.244	1.992	1.874	1.929	2.401	.946	.157
32	2.102	1.515	2.236	2.125	2.244	2.401	.946	.157
36	2.346	1.751	2.492	2.385	2.440	2.401	.946	.157



## CA3102E-B\*

Dimensions are mm

Size	d <sub>1</sub> -0.15	d <sub>2</sub> +0.2	d <sub>3</sub> +0.4	e +0.1	l <sub>1</sub> ±0.3	l <sub>2</sub> +0.4	l <sub>3</sub> ±0.2	l <sub>4</sub> ±0.3
10SL	18.2	3.2	15.1	18.2	24.7	14.2	2.8	25.4
12S	21.4	3.2	15.1	20.6	24.7	14.2	3.2	28.0
14S	24.6	3.2	18.3	23.0	24.7	14.2	3.2	30.0
16S	27.4	3.2	21.5	24.6	24.7	14.2	3.2	32.5
16	27.4	3.2	21.5	24.6	33.8	19.0	3.2	32.5
18	30.8	3.2	24.6	27.0	33.8	19.0	4.0	35.0
20	34.2	3.2	28.6	29.4	33.8	19.0	4.0	38.0
22	37.4	3.2	31.8	31.8	33.8	19.0	4.0	41.0
24	40.9	3.7	34.9	34.9	33.8	20.6	4.0	44.5
28	46.7	3.7	40.5	39.7	33.8	20.6	4.0	50.8
32	53.4	4.3	46.9	44.5	33.8	22.2	4.0	57.0
36	59.6	4.3	51.6	49.2	33.8	22.2	4.0	63.5

Dimensions are inches

Size	d <sub>1</sub> -0.005	d <sub>2</sub> +0.007	d <sub>3</sub> .015	e +0.003	l <sub>1</sub> ±0.011	l <sub>2</sub> +0.015	l <sub>3</sub> ±0.007	l <sub>4</sub> ±0.011
10SL	.716	.125	.594	.716	.972	.559	.110	1.000
12S	.842	.125	.594	1.02	.972	.559	.125	1.102
14S	.968	.125	.720	.905	.972	.559	.125	1.181
16S	1.078	.125	.846	.968	.972	.559	.125	1.279
16	1.078	.125	.846	.968	1.330	.748	.125	1.279
18	1.212	.125	.968	1.062	1.330	.748	.157	1.377
20	1.346	.125	1.125	1.157	1.330	.748	.157	1.496
22	1.472	.125	1.251	1.251	1.330	.748	.157	1.614
24	1.610	.145	1.374	1.374	1.330	.811	.157	1.751
28	1.838	.145	1.594	1.562	1.330	.811	.157	2.000
32	2.102	.169	1.846	1.751	1.330	.874	.157	2.244
36	2.346	.169	2.031	1.937	1.330	.874	.157	2.500

## CA3106E-B\*

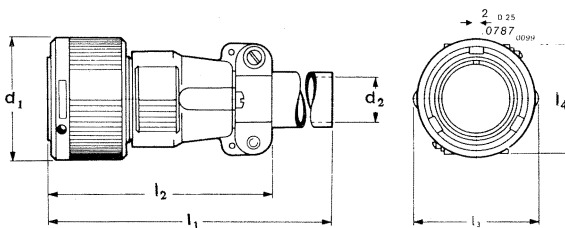
Dimensions are mm

Size	d <sub>1</sub> ±0.4	d <sub>2</sub> *	l <sub>1</sub> max.	l <sub>2</sub> max.	l <sub>3</sub> max.	l <sub>4</sub> max.
10SL	22.4	6.5	115	55	25.5	22.7
12S	25.6	6.5	115	55	25.5	22.7
14S	28.8	9.0	112	57	30.0	27.5
16S	31.6	11.0	110	59	33.0	30.0
16	31.6	11.0	120	69	33.0	30.0
18	36.1	14.2	119	74	38.0	32.2
20	39.5	15.8	116	74	41.0	37.5
22	42.7	15.8	116	74	41.0	37.5
24	46.2	21.4	120	90	49.0	43.3
28	53.0	21.4	120	90	49.0	43.3
32	59.7	26.7	117	90	57.0	51.7
36	65.9	31.7	130	100	62.0	58.0

Dimensions are inches

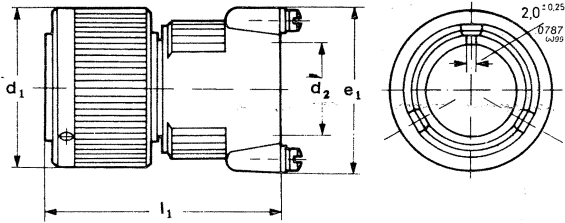
Size	d <sub>1</sub> ±0.015	d <sub>2</sub> *	l <sub>1</sub> max.	l <sub>2</sub> max.	l <sub>3</sub> max.	l <sub>4</sub> max.
10SL	.881	.255	4.527	2.165	1.003	.893
12S	1.006	.255	4.527	2.165	1.003	.893
14S	1.133	.354	4.409	2.244	1.181	1.082
16S	1.244	.433	4.330	2.322	1.290	1.181
16	1.244	.433	4.724	2.716	1.299	1.267
18	1.421	.559	4.685	2.913	1.496	1.181
20	1.555	.622	4.566	2.913	1.614	1.476
22	1.681	.622	4.566	2.913	1.614	1.476
24	1.818	.842	4.724	3.543	1.929	1.704
28	2.086	.842	4.724	3.543	1.929	1.704
32	2.350	1.051	4.606	3.543	2.244	2.035
36	2.594	1.248	5.120	3.940	2.440	2.283

\* max. permissible outside diameter of cable





# CA Bayonet Lock



## CA3106R-B-\*

Dimensions are mm

Size	$d_1$ $\pm 0.4$	$d_2$ $\pm 0.2$	$e_1$ max.	$l_1$ max.
10SL	22.4	9.6	25.5	45
12S	25.6	10.3	25.5	45
14S	28.8	12.4	30.0	45
16S	31.6	15.4	33.0	45
16	31.6	15.4	33.0	54
18	36.1	18.4	38.0	57
20	39.5	22.0	41.0	57
22	42.7	24.7	41.0	57
24	46.2	27.6	49.0	57
28	53.0	31.6	49.0	57
32	59.7	38.5	57.0	57
36	65.9	44.5	62.0	57

Dimensions are inches

Size	$d_1$ $\pm 0.015$	$d_2$ $\pm 0.007$	$e_1$ max.	$l_1$ max.
10SL	.881	.377	1.003	1.771
12S	1.007	.405	1.003	1.771
14S	1.133	.488	1.181	1.771
16S	1.244	.606	1.299	1.771
16	1.244	.606	1.299	2.125
18	1.421	.724	1.496	2.244
20	1.555	.868	1.614	2.244
22	1.681	.972	1.614	2.244
24	1.818	1.086	1.929	2.244
28	2.086	1.244	1.929	2.244
32	2.350	1.515	2.244	2.244
36	2.594	1.751	2.440	2.244

## CA3108F-B-\*

## CA3108R-B-\*

Dimensions are mm

Size	$d_1$ $\pm 0.4$	$d_2$ Thread	$d_3$ $\pm 0.3$	$l_1$ max.	$l_4$ $\pm 0.3$
10SL	22.4	5/8-24NEF-2A	9.6	45	21.5
12S	25.6	5/8-24NEF-2A	10.2	45	21.5
14S	28.8	3/4-20UNEF-2A	12.3	47	23.1
16S	31.6	7/8-20UNEF-2A	15.3	48	24.7
16	31.6	7/8-20UNEF-2A	15.3	57	24.7
18	36.1	1-10UNEF-2A	18.4	58	26.3
20	39.5	1 3/16-18NEF-2A	22.0	61	27.9
22	42.7	1 3/16-18NEF-2A	24.7	61	29.5
24	46.2	1 7/16-18NEF-2A	27.6	66	31.1
28	53.0	1 7/16-18NEF-2A	30.5	66	33.5
32	59.7	1 3/4-18NS-2A	37.5	72	39.0
36	65.9	2-18NS-2A	43.6	75	44.6

Dimensions are inches

Size	$d_1$ $\pm 0.015$	$d_2$ Thread	$d_3$ $\pm 0.011$	$l_1$ max.	$l_4$ $\pm 0.011$
10SL	.881	5/8-24NEF-2A	.733	1.771	.846
12S	1.007	5/8-24NEF-2A	.401	1.771	.846
14S	1.133	3/4-20UNEF-2A	.484	1.850	.909
16S	1.244	7/8-20UNEF-2A	.602	1.889	.972
16	1.244	7/8-20UNEF-2A	.602	2.244	.972
18	1.421	1-20UNEF-2A	.724	2.283	1.035
20	1.555	1 3/16-18NEF-2A	.866	2.401	1.098
22	1.681	1 3/16-18NEF-2A	.927	2.401	1.161
24	1.818	1 7/16-18NEF-2A	1.086	2.598	1.224
28	2.086	1 7/16-18NEF-2A	1.200	2.598	1.318
32	2.350	1 3/4-19NS-2A	1.476	2.834	1.535
36	2.594	2-18NS-2A	1.716	2.834	1.755

## CA3108E-B-\*

Dimensions are mm

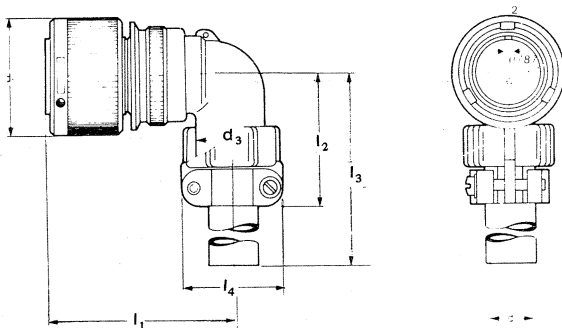
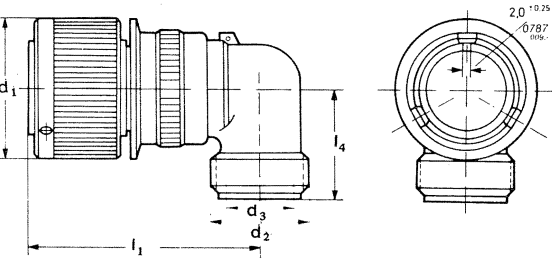
Size	$d_1$ $\pm 0.4$	$d_2$ max.	$d_3$ Thread	$l_1$ max.	$l_2$ max.	$l_3$ max.	$l_4$ max.
10SL	22.4	6.5	5/8-24NEF-2A	45	38	98	22.7
12S	25.6	6.5	5/8-24NEF-2A	45	38	98	22.7
14S	28.8	9.0	3/4-20UNEF-2A	47	41	96	27.5
16S	31.6	11.0	7/8-20UNEF-2A	48	43	94	30.0
16	31.6	11.0	7/8-20UNEF-2A	57	43	94	30.0
18	36.1	14.2	1-20UNEF-2A	58	45	92	32.2
20	39.5	15.8	1 3/16-18NEF-2A	61	50	94	37.5
22	42.7	15.8	1 3/16-18NEF-2A	61	51	95	43.3
24	46.2	21.4	1 7/16-18NEF-2A	66	54	94	43.3
28	53.0	21.4	1 7/16-18NEF-2A	66	56	96	51.7
32	59.7	26.7	1 3/4-18NS-2A	72	66	106	51.7
36	65.9	31.7	2-18NS-2A	75	69	103	58.0

\* max. permissible outside diameter of cable

Dimensions are inches

Size	$d_1$ $\pm 0.015$	$d_2$ max.	$d_3$ Thread	$l_1$ max.	$l_2$ max.	$l_3$ max.	$l_4$ max.
10SL	.881	.255	5/8-25NEF-2A	1.771	1.496	3.858	.893
12S	1.007	.255	5/8-25NEF-2A	1.771	1.496	3.858	.893
14S	1.133	.354	3/4-20UNEF-2A	1.850	1.614	3.779	1.082
16S	1.244	.433	7/8-20UNEF-2A	1.889	1.692	3.700	1.181
16	1.244	.433	7/8-20UNEF-2A	2.244	1.692	3.622	1.181
18	1.421	.559	1-20UNEF-2A	2.283	1.771	3.700	1.267
20	1.555	.622	1 3/16-18NEF-2A	2.401	1.968	3.740	1.476
22	1.681	.622	1 3/16-18NEF-2A	2.401	2.007	3.700	1.476
24	1.818	.842	1 7/16-18NEF-2A	2.598	2.125	3.770	1.704
28	2.086	.842	1 7/16-18NEF-2A	2.598	2.204	4.173	1.704
32	2.350	1.051	1 3/4-18NS-2A	2.834	2.598	4.173	2.035
36	2.595	1.248	2-18NS-2A	2.952	2.716	4.055	2.283

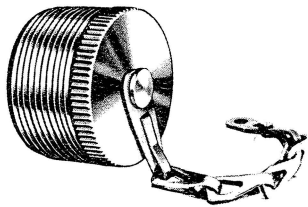
\* max. permissible outside diameter of cable



# Accessories

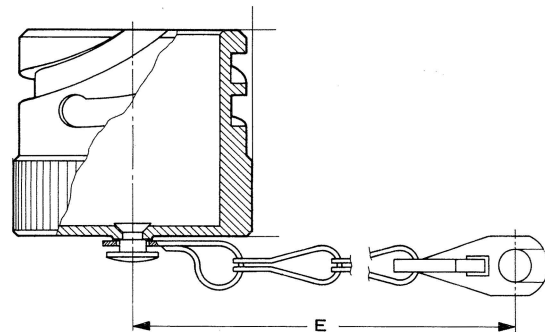
## PROTECTIVE METAL CAPS

For 06 and 08 Style Plugs



FINE THREAD

## BAYONET LOCK

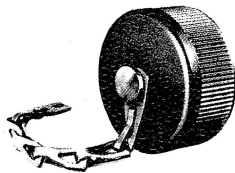


These externally threaded metal dust caps are used to protect the MS3106 and MS3108 plugs. Material is aluminium alloy. They are furnished with sash chain and are also available less chain.

FINE THREAD			BAYONET LOCK	
SHELL SIZE	SASH CHAIN	CHAIN LENGTH DIM 'E'	SASH CHAIN	CHAIN LENGTH DIM 'E'
10SL	MS25042-10C	4.25	CA121-004-1	3.937
12S	MS25042-12C	4.75	CA121-004-2	4.448
14S	MS25042-14C	4.75	CA121-004-3	4.448
16S	MS25042-16C	4.75	CA121-004-4	4.448
16	MS25042-16C	4.75	CA121-004-5	4.999
18	MS25042-18C	4.75	CA121-004-6	4.999
20	MS25042-20C	5.25	CA121-004-7	5.511
22	MS25042-22C	5.25	CA121-004-8	5.511
24	MS25042-24C	5.75	CA121-004-9	5.511
28	MS25042-28C	8.00	CA121-004-10	7.755
32	MS25042-32C	8.00	CA121-004-11	7.755
36	MS25042-36C	8.00	CA121-004-12	7.755

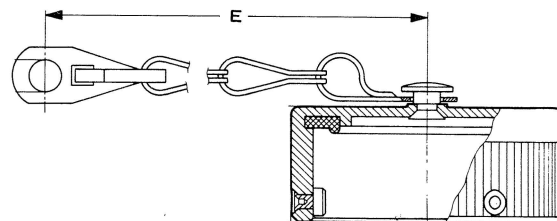
## PROTECTIVE METAL CAPS

For 00, 01 and 02 Style Receptacles



FINE THREAD

## BAYONET LOCK



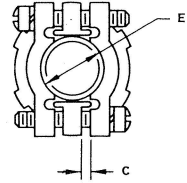
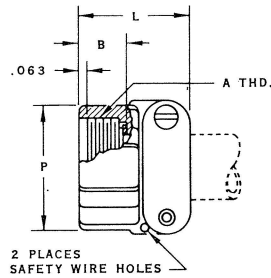
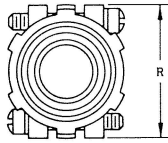
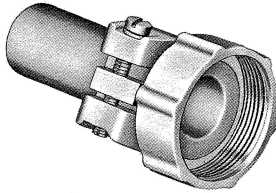
These internally threaded metal dust caps are used to protect MS3100, MS3101 and MS3102 receptacles. Material is aluminium alloy. They are furnished with sash chain and are also available less chain.

FINE THREAD			BAYONET LOCK	
SHELL SIZE	SASH CHAIN	CHAIN LENGTH DIM 'E'	SASH CHAIN	CHAIN LENGTH DIM 'E'
10SL	MS25043-10C	4.25	CA121-003-1	3.937
12S	MS25043-12C	4.75	CA121-003-2	3.937
14S	MS25043-14C	4.75	CA121-003-3	3.937
16S	MS25043-16C	4.75	CA121-003-4	3.937
16	MS25043-16C	4.75	CA121-003-5	4.448
18	MS25043-18C	4.75	CA121-003-6	4.448
20	MS25043-20C	5.25	CA121-003-7	4.999
22	MS25043-22C	5.25	CA121-003-8	4.999
24	MS25043-24C	5.75	CA121-003-9	4.999
28	MS25043-28C	8.00	CA121-003-10	6.653
32	MS25043-32C	8.00	CA121-003-11	6.653
36	MS25043-36C	8.00	CA121-003-12	6.653

# Accessories

## MS3057A

CABLE CLAMP  
with or without Bushing



The MS3057A cable clamp is made for plugs and receptacles that have an endbell with external conduit threads. The double clamping action provides a more balanced, positive hold on the wires and greatly reduces moisture transmission. Provision is made for safety wiring. This clamp is supplied without bushing; to order bushing, add "with bushing" after part number.

Part Number*	Fits Shell Size	Accommodates MS Bushings†	A Thread	B ±.016	C Max.	E Max.	L ±.031	P ±.031	R ±.031	Weight lbs. Appr.
MS3057-3A	8S, 10S	MS3420-3	1/2-28UNEF-2B	.406	.072	.260	.812	.688	.812	.026
● MS3057-4A	10SL, 12S, 12	MS3420-4	5/8-24UNEF-2B	.406	.088	.322	.812	.812	.875	.029
● MS3057-6A	14S, 14	MS3420-6	3/4-20UNEF-2B	.406	.088	.448	.875	.969	1.062	.041
● MS3057-8A	16S, 16	MS3420-8	7/8-20UNEF-2B	.406	.119	.572	.938	1.094	1.156	.052
● MS3057-10A	18	MS3420-10	1-20UNEF-2B	.406	.135	.635	.938	1.188	1.250	.060
● MS3057-12A	20, 22	MS3420-12	1-3/16-18UNEF-2B	.406	.166	.760	.938	1.375	1.469	.082
● MS3057-16A	24, 28	MS3420-16, -12	1-7/16-18UNEF-2B	.406	.198	.948	1.031	1.656	1.688	.124
MS3057-20A	32	MS3420-20, -16	1-3/4-18UNS -2B	.469	.260	1.260	1.094	2.031	2.031	.185
● MS3057-24A	36	MS3420-24, -20	2-18UNS -2B	.531	.307	1.385	1.156	2.219	2.281	.242

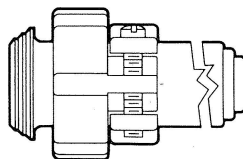
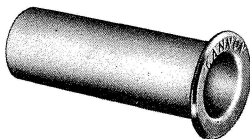
\* To order cable clamp with bushing, add "with bushing" after part number, i.e., MS3057-10A with bushing.

† MS bushings are polychloroprene.

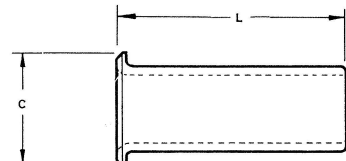
● PREFERRED

## MS3420

TELESCOPING BUSHING



TELESCOPING BUSHING WITH  
MS3057A CABLE CLAMP



Telescoping gland bushings (used with MS3057A cable clamp) keep dirt, oil and moisture out of endbell. Taping or wrapping wires is eliminated since bushing protects wires going thru clamp. Combinations of bushings may be used to decrease cable entry diameter to improve sealing. Material is polychloroprene (MS)

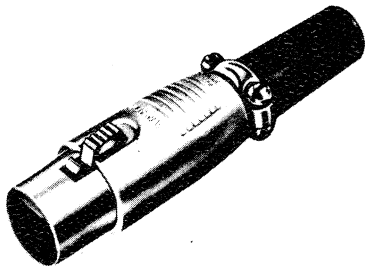
MS Part Number	ITT Cannon Part Number	Fits Shell Size	C ±.016	L ±.016	R ±.015
MS3420-3	CA18220-3	8S, 10S	.379	2.875	.130
● MS3420-4	CA18220-4	10SL, 12, 12S	.505	2.750	.220
● MS3420-6	CA18220-6	14, 14S	.619	2.625	.312
● MS3420-8	CA18220-8	16, 16S	.744	2.500	.437
● MS3420-10	CA18220-10	18	.869	2.375	.562
● MS3420-12	CA18220-12	20, 22	1.064	2.250	.625
● MS3420-16	CA18220-16	24, 28	1.314	2.125	.750
MS3420-20	CA18220-20	32	1.596	2.000	.937
● MS3420-24	CA18220-24	36	1.897	1.875	1.250

● PREFERRED



# Additional Mains Power Connectors

Other mains power types available include:-



**XLR-LNE**

A specially designed version of the XLR series for use in power applications up to 250V AC 5 AMP. Complies with the safety standards of BS4515. S.E.C.V. Approval Nos. 4166 and 6478 apply to cord connectors. 3 contacts.



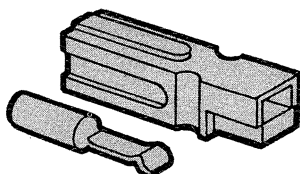
**EP-LNE**

A power version of the EP with similar features to that of the XLR-LNE series, but with a rating of 250V AC 7.5 AMPS. S.E.C.V. Approval No. 6730. 3 contacts.



**EP-LNEM**

A further development of the EP series for applications where separate technical and mains earths are required. 250V AC 7.5 AMP. S.E.C.V. Approval Nos. 74807, 74808, 74809. 4 contacts.



**1315  
ANDERSON  
POWERPOLE**

Single pole modular type for special applications, suitably installed within equipment. Rated 415V AC 10 AMP. Certificate of Suitability C.5.2015.

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