MIL-C-22992 Class "L" Connectors

Installation Instructions

MS 90555
MS 90556
MS 90557
MS 90558

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Bendix Electrical Components Division

Sidney, N.Y. 13838

SECTION I

DESCRIPTION

1-1. Bendix connectors designed in accordance with Specification MIL-C-22992 Class "L" are high current types for use in power and control circuits where waterproofing and exceptional resistance to vibration, shock, corrosion and abrasion are required. When properly installed, these connectors are explosion proof as defined in Specification MIL-E-5272A, Procedures 1 and 2. An "arc quenching" design traps any arc that may occur within the insert if the connector is disconnected while power is applied.

1-2. MIL-C-22992 Class "L" connectors utilize hard dielectric inserts with crimp contacts that are retained in the insert by a metallic retention bushing. Waterproofing is accomplished by use of a resilient rear grommet and an interfacial seal on the front face of the pin insert. Machined aluminum shells incorporate five key polarization. Varying location of the master keyway in normal or one of six alternate positions prevents hazardous mating of the connector with an incompatible power source. Rotation of the insert in the same manner prevents mismating of dissimilar frequencies.

1-3. Left hand threads are provided on the rear compression nut to prevent accidental loosening when the connector is being uncoupled. Contacts are silver plated and are available in sizes 6 through 4/0.

1-4. Four shell styles are available as follows: MS90555 - Power Source, wall mounting receptacle; MS90556 - Straight Plug; MS90557 - Cable Connecting Plug; MS90558 - Equipment, wall mounting receptacle with coupling nut. The MS90555 and MS90557 Connectors incorporate socket contacts only, while the MS90556 and MS90558 Connectors are available with pin contacts only.

SECTION II

INSTALLATION

2-1. CONNECTOR PREPARATION.

2-2. Visually inspect the connector and accessory for damaged contacts or other parts.

2-3. Inserts, contacts and inside surfaces of shell must be kept free of contamination by oil, grease and dirt throughout the installation procedure. Clean these areas using a soft, lint free cloth dampened with Neosol* or proprietary denatured ethyl alcohol (Federal Specification O-E-760, Grade IV).

NOTE

Shell threads are lubricated. If lubrication is removed by cleaning procedure, apply a thin film of Uni-Temp Grease EP** to the threads before assembly.

*Available from Shell Chemical Co., 50 W. 50th St., N.Y., N.Y. 10020.
**Available from Texaco, Inc., 135 E. 42nd St., N.Y., N.Y. 10017.

2-4. CABLE PREPARATION.

2-5. Determine lay of cable so that individual contacts may be aligned with insert holes as closely as possible. Provide sufficient cable slack to facilitate connector installation. Cable should be cut clean and square.

2-6. Strip cable sheath or outer jacket a distance ("D", Figure 2-1) indicated in Table 2-1 when installing MS90556 or MS90557 Plug Assemblies. With a sharp cutting tool, cut around jacket and pull it off. If jacket is not easily removed, make an additional cut lengthwise and peel off. Avoid cutting or nicking individual conductor insulation.

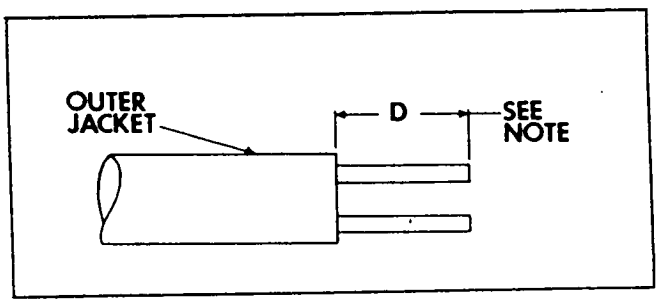

Figure 2-1. Stripping Distance

Connector Size	D Inches Approx.
28	3.000
32	3.000
44	4.250
48	4.750
52	5.000

Table 2-1. Stripping Dimensions

NOTE

Certain insert arrangements require that two or more ground wires be terminated into one contact. Dimension D must therefore be increased a sufficient amount to permit routing these wires around the larger conductors.

2-7. Install accessory components over cable in the order shown in the applicable exploded view (Section III). Compress the ends of the MS-90561 Cable Grip toward each other expanding its diameter to facilitate installation. Non-grounding connector assemblies include an additional skid-washer (not illustrated) over the grommet.

2-8. Strip insulation of individual conductors 3/4 inch from end. Hot wire stripping methods are recommended. If other methods are employed, use extreme care to avoid cutting or nicking wire strands. If necessary, reform separated conductors by lightly twisting the strands together.

2-9. CRIMPING CONTACTS.

2-10. Insert stripped end of conductor into contact wire well, applying slight pressure until it is positively bottomed. Wire strands must be visible in the inspection hole provided in the wire well.

NOTE

When installing two or more ground wires into one contact, it is important that all ground wires be completely seated into the contact wirewell prior to crimping. If this is not done one of the ground wires may pull out resulting in an extremely low crimp tensile strength on the remaining wires which could result in loss of grounding.

2-11. Select proper crimping die for contact and wire size to be crimped from Table 2-2.

2-12. With conductor in place, insert contact into tool. Close crimping die fully to form a uniform crimp. Repeat procedure for other contacts.

NOTE

Extreme care must be taken to make sure the power conductors are in the same plane as the ground conductors after crimping of the ground conductors into the contact. This will locate all contact retention shoulders in the same transverse plane and will ease the assembly of the contacts into the spacer assembly. If one conductor is shorter than the others, severe damage to the retention bushings could result.

2-13. Verify that contacts are properly crimped and ends of conductors are visible in inspection holes of wire wells.

2-14. SOLDERING CONTACTS.

2-15. Whenever crimping tools are not available, contacts may be affixed to conductors using the alternate solder method of installation described below.

2-16. Apply a good grade of rosin-alcohol solder flux to the stripped conductor ends by dipping ends in flux halfway to insulation. Shake off excess flux. Avoid using excess flux as both flux and solder will tend to flow up conductor during tinning.

2-17. Immediately after fluxing, pretin each conductor halfway to insulation using a solder pot and a good grade of 60/40 tin-lead solder. Dip into pot long enough for conductors to heat through and tin all wire strands. Avoid overheating which may

Contact Part Number	MS Part Number	Size	Type	Crimping Tool*	Locator*	Die*	Removal Tool
10-497100-43 10-497101-43 10-497102-43	MS90559-1 MS90560-1 MS90559-2	4/0 4/0 4/0N	P S P	Pico Model 400 B	4297-1	414DA-4/0N-1	MS90562-1 11-9951-43
10-497100-3 10-497101-3 10-497102-3	MS90559-5 MS90560-3 MS90559-6	1/0 1/0 1/0N	P S P	Pico Model 400 B	4297-3	414DA-1/0N	MS90562-3 11-9951-3
10-497100-4 10-497101-4 10-497102-4 10-497222-4 10-497223-4	MS90559-8 MS90560-5 MS90559-9 MS90559-13 MS90560-9	4 4 4N 4G 4G	P S P P S	Pico Model 400 B	4297-5	414DA-4N	MS90562-5 11-9951-4
10-497100-6 10-497101-6 10-497102-6 10-497222-6 10-497223-6	MS90559-11 MS90560-7 MS90559-12 MS90559-14 MS90560-8	6 6 6N 6G 6G	P S P P S	Pico Model 400 B	4297-6	414DA-6N	MS90562-6 11-9951-6

*Available from Pico Crimping Tools Co., 9832 Jersey Ave., Santa Fe Springs, Ca. 90670.

NOTE: Use contact wire well adapter, MS3348-4-6L (Bendix Part Number 10-74696-17), when crimping size 6 wire into size 4 contacts.

Table 2-2. Contact Crimping and Removal Tools

cause melting, burning or scorching of insulation. Shake off excess solder when conductors are removed.

2-18. Either probe type resistance soldering equipment or a 500 watt soldering iron may be used for soldering conductors to contacts. When using an iron, reshape tip as needed to conform to contact solder well shape. Leave tip as large as possible to obtain greatest heat transfer in shortest time. Keep tip clean, free of pits, and well tinned.

2-19. Support contact to be soldered in wooden block having a hole slightly larger than contact diameter. Apply rosin-alcohol flux to pre-tinned conductor end or to solder well. Heat contact with resistance probe or soldering iron. Push conductor into solder well, maintaining heat long enough to ensure solder to conductor becomes completely liquid. Avoid melting, burning, or scorching conductor insulation. Add solder if needed. While holding wire steady and in line with contact, remove heat source and allow solder to become completely solid. Remove excess flux with alcohol.

NOTE
Extreme caution should be used to prevent excess solder from running out of the inspection hole and down on the contact shoulder and retention area.

2-20. CONTACT INSTALLATION.

2-21. Align insert (2, figures 3-1 thru 3-4) with shell (1) so that large tab on insert mates with large slot in shell. Push insert into shell until it bottoms.

2-22. Apply a thin coating of Dow Corning Corporation DC-4 lubricant around the individual grommet sealing holes to aid in the insertion of the contacts. Align the contacts with the appropriate holes in spacer or grommet assembly (4). Grasp the cable or conductors and push contacts into the rear of the spacer or grommet assembly until it locks into the contact retaining bushing. Check to make sure all contacts are locked in place by pushing on the front of each contact.

2-23. Align contacts with proper insert holes. Small key of insert must be aligned with keyway in wafer. Slide contacts into insert holes until spacer or grommet assembly butts

against insert. A thin film of Dow Corning Corporation DC-4 applied to the periphery of each contact hole will ease assembly and provide maximum sealing efficiency.

2-24. If lubricant on "O" ring of back adapter has been wiped dry, apply a very thin film of Dow Corning Corporation DC-4. Avoid applying any excess. Slide back-adapter (used on MS90556 and MS90557) (5, figures 3-2 and 3-3) or retaining nut (used on MS90555 and MS-90558) (5, figures 3-1 and 3-4) forward on cable and fasten into place on shell. The back-adapter is secured using three screws and lockwashers (11 and 10, figures 3-2 and 3-3). The retaining nut is threaded onto the connector shell using a left hand thread.

2-25. Lubricate outer surface of gland (7, figures 3-2 and 3-3) and threads of gland nut (9) with a thin film of Uni-Temp Grease EP. Keep lubricant from cable and inside surfaces of parts as it will reduce effective grip of gland on cable. Slide gland washer (6) and gland into connector housing, making sure they are seated properly. Slide the MS90561 Cable Grip into place against gland and install gland nut. Compress ends of grip toward each other to increase its diameter, permitting it to slide along cable. When in position, pre-load grip by stretching it back along cable so that tightening of nut will cause grip to bite into cable jacket.

NOTE

Grip banding clamps (figure 2-2) Bendix part number 10-183249-XX, are available in a variety of sizes to keep the loop end of the MS90561 Cable Grip from working itself slack, causing loss of strain relief. Refer to Table 2-3 for the range of sizes available.

2-26. Tighten the retaining nut or gland nut until a metal to metal seating with the adapter or shell occurs. When tightening the gland nut on maximum diameter cable, a metal to metal seating may not occur on the initial tightening. A second tightening is therefore necessary after the cable has been allowed to "cold flow" (approximately 12 hours).

2-27. CONTACT REMOVAL.

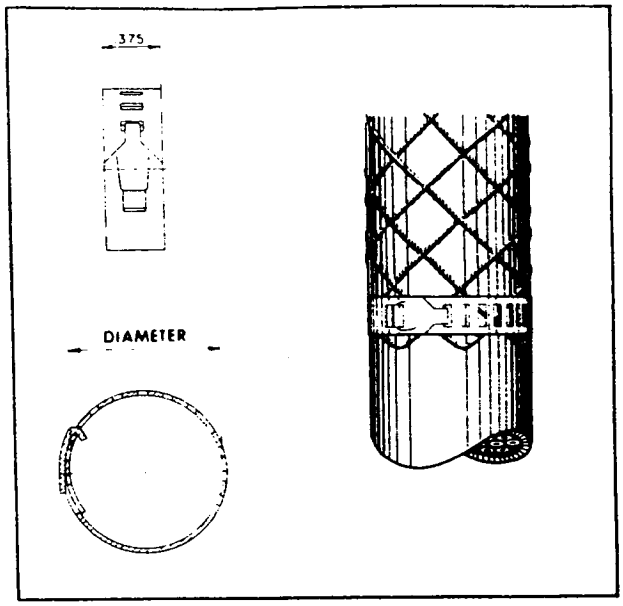

Figure 2-2. Grip Banding Clamp

Part Number	Diameter Max.	Min.
10-183249-10	1.125	.750
-11	1.312	.938
-12	1.500	1.125
-13	1.688	1.312
-14	1.875	1.500
-15	2.062	1.688
-16	2.250	1.875
-17	2.438	2.062
-18	2.625	2.250
-19	2.812	2.438
-20	3.000	2.625

Table 2-3. Diameters of Grip Banding Clamps

2-28. Should it become necessary to replace contacts, proceed as follows:

a. Loosen all rear accessories and slide back along cable.

b. Remove spacer or grommet assembly with contacts from connector shell.

c. Using the appropriate contact removal tool from Table 2-2 for the contact being replaced, slide tool over front of contact until it firmly bottoms in spacer or grommet assembly hole. A slight drag may be noticed as tool opens contact retaining bushing, releasing the contact. All contacts must be released from the contact retention bushings before removal of the contacts is attempted.

d. Grasp conductor and remove contact from spacer or grommet assembly by pulling straight to rear. Remove tool from spacer or grommet assembly.

SECTION III

PARTS REFERENCE

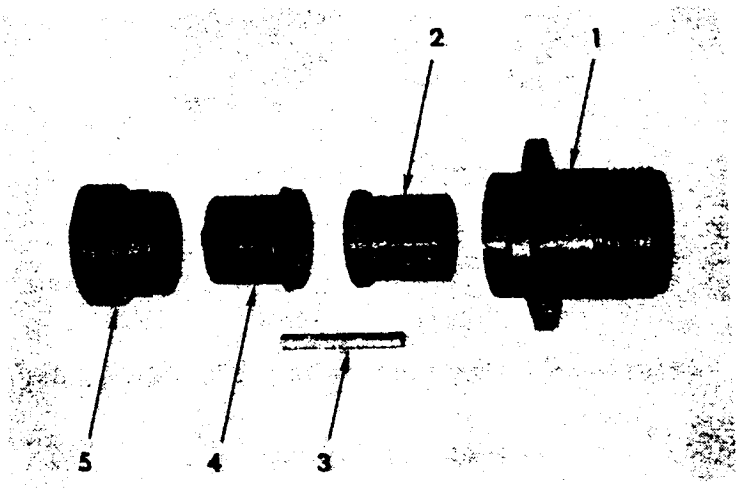

Figure 3-1. Connector MS90555, Exploded View

Legend for Figure 3-1.

1. Shell
2. Insert Assembly, Socket
3. Contact, Socket
4. Grommet Assembly, Socket
5. Nut, Retaining
6. Protective Cap Assembly (Not Shown)
7. Flange Gasket (Not Shown)

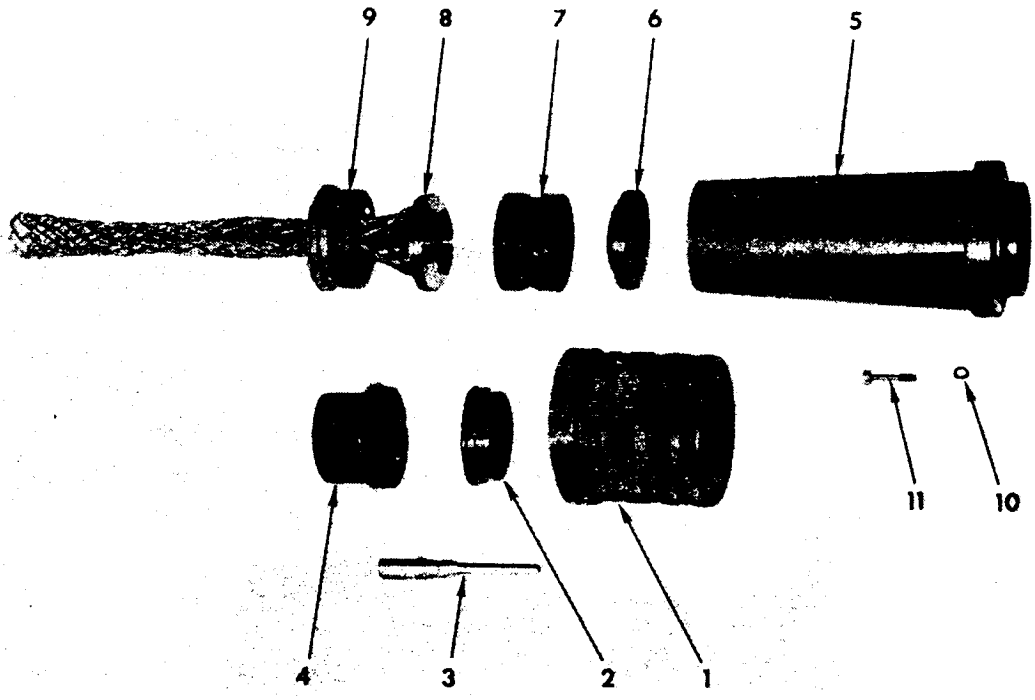

Figure 3-2. Connector MS90556, Exploded View

Legend for Figure 3-2.

1. Shell and Coupling Nut Assembly
2. Insert Assembly, Pin
3. Contact Pin
4. Spacer Assembly, Pin
5. Back Adapter
6. Gland Washer
7. Gland
8. Cable Grip
9. Gland Nut
10. Lockwasher (3 each)
11. Screw (3 each)
12. Protective Cap Assembly (Not Shown)

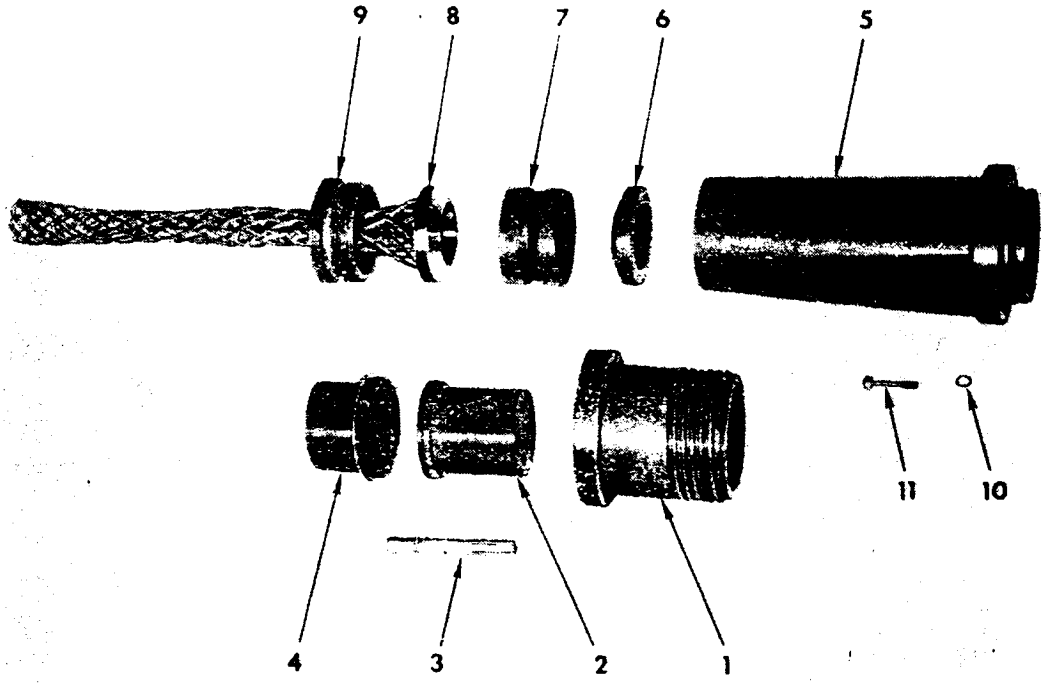

Figure 3-3. Connector MS90557, Exploded View

Legend for Figure 3-3.

1. Shell
2. Insert Assembly, Socket
3. Contact, Socket
4. Spacer Assembly, Socket
5. Back Adapter
6. Gland Washer
7. Gland
8. Cable Grip
9. Gland Nut
10. Lockwasher (3 each)
11. Screw (3 each
12. Protective Cap Assembly (Not Shown)

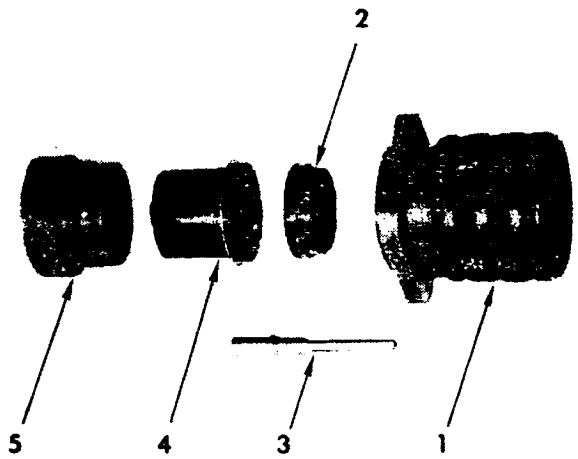

Figure 3-4. Connector MS90558, Exploded View

Legend for Figure 3-4.

1. Shell and Coupling Nut Assembly
2. Insert Assembly, Pin
3. Contact, Pin
4. Grommet Assembly, Pin
5. Nut, Retaining
6. Protective Cap Assembly (Not Shown)
7. Flange Gasket (Not Shown)