

Glenair®



Contact Termination & Connector/Backshell

Assembly Instructions

*for Comital Series IT (MIL-C-5015),
Series ITB and ITS (VG95234) Connectors*

United States ■ United Kingdom ■ Germany ■ France ■ Nordic ■ Italy ■ Spain

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Cover Photo: Gus Vanderput



1) INTRODUCTION

The goal of this manual is to show Glenair Commital connector users the correct wiring and assembling processes involved with the different components that comprise the connector.

Following these instructions will help the less skilled wiring operator to avoid making mistakes that could affect the assembly's reliability.

The following connector families can be supplied with both crimp and solder contacts:

IT (MIL-C-5015)
ITB and ITS (VG 95234)

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TABLE A

CONTACT SIZE	A		B DIA		C DIA		D DIA		CONDUCTOR SIZE		MANUAL CRIMP TOOL	TURRET	PNEUMATIC CRIMP TOOL	PNEUMATIC CRIMP TOOL	LOCATOR	HYDRAULIC CRIMP TOOL	CRIMPING DIE	INSERTION TOOL	EXTRACTION TOOL	
	CONTACT SIZE	A	B	C	D	AWG	mm ²	mm ²	mm ²											
10-375-20	20	24.30	1.00	1.30	1.93	0.5	24+20	M.105001	M.105026	M.105003										M.118251
10-40579	18	26.60	1.40	1.30	1.93	0.15+0.6	26+20	M.105001	M.105025	M.105003										M.118249
10-40553	16S	26.60	1.58	1.70	2.60	1+1.5	18+16	M.105007	M.105009	M.105003										M.118250
10-40553-12	16S	26.60	1.58	1.20	2.60	0.6	20	M.105007	M.105009	M.105003										M.118250
10-40553-13	16S	26.60	1.58	1.30	1.93	0.15+0.6	26+20	M.105007	M.105009	M.105003										M.118250
10-40553-15	16S	26.60	1.58	1.50	2.60	1	18	M.105007	M.105009	M.105003										M.118250
10-40553-20	16S	26.60	1.58	2.00	2.90	2	14	M.105007	M.105009	M.105003										M.118250
10-40553-26	16S	26.60	1.58	2.50	3.80	3	12	M.105007	M.105009	M.105003										M.118250
10-40557	16	31.75	1.58	1.70	2.60	1+1.5	18+16	M.105007	M.105009	M.105003										M.118250
10-40557-08	16	31.75	1.58	0.85	1.55	0.15+0.2	26+24	M.105007	M.105009	M.105003										M.118250
10-40557-12	16	31.75	1.58	1.20	2.60	0.6	20	M.105007	M.105009	M.105003										M.118250
10-40557-13	16	31.75	1.58	1.30	1.93	0.15+0.6	26+20	M.105007	M.105009	M.105003										M.118250
10-40557-15	16	31.75	1.58	1.50	2.60	1	18	M.105007	M.105009	M.105003										M.118250
10-40557-20	16	31.75	1.58	2.00	2.90	2	14	M.105007	M.105009	M.105003										M.118250
10-40557-26	16	31.75	1.58	2.50	3.80	3	12	M.105007	M.105009	M.105003										M.118250
10-40557-32	16	31.75	1.58	0.45	1.95	32+28		M.105007	M.105009	M.105003										M.118250
10-40561	12	37.65	2.38	2.40	3.90	3	12	M.105007	M.105009	M.105003										M.118250
10-40561-12	12	37.65	2.38	1.20	2.60	0.6	20	M.105007	M.105009	M.105003										M.118250
10-40561-15	12	37.65	2.38	1.50	3.40	1	18	M.105007	M.105009	M.105003										M.118250
10-40561-20	12	37.65	2.38	2.00	3.90	1+2	18+14	M.105007	M.105009	M.105003										M.118250
10-40561-22	12	37.65	2.38	2.10	3.90	2.5		M.105007	M.105009	M.105003										M.118250
10-40561-30M	12	37.65	2.38	3.00	4.80	4		M.105007	M.105009	M.105003										M.118250
10-40561-38	12	37.65	2.38	3.60	4.80	6		M.105007	M.105009	M.105003										M.118250
10-40792	8	40.70	3.60	4.50	6.90	9	8	M.105007	M.105009	M.105003										M.118260
10-40792-15	8	40.70	3.60	1.50	3.40	1	18	M.105007												M.118260
10-40792-18	8	40.70	3.60	1.80	3.80	1+2	18+14	M.105000	M.105012											M.118260
10-40792-30	8	40.70	3.60	3.00	4.80	4		M.105000	M.105012											M.118260
10-40792-38	8	40.70	3.60	3.60	6.80	6														M.118260
10-40792-50	8	40.70	3.60	5.00	6.80	10														M.118260
10-40792-58	8	40.70	3.60	5.80	7.80	13.2	6													M.118260
10-113474-4P	4	42.00	5.70	7.10	9.53	22	4													M.118270
10-113474-4P-22	4	42.00	5.70	2.20	3.80	2.5		M.105007												M.118270
10-113474-4P-25	4	42.00	5.70	7.80	9.50	25														M.118270
10-113474-4P-26	4	42.00	5.70	2.50	3.80	3		M.105007												M.118270
10-113474-4P-30	4	42.00	5.70	3.00	4.80	4														M.118270
10-113474-4P-35	4	42.00	5.70	9.00	14.35	35														M.118270
10-113474-4P-50	4	42.00	5.70	6.00	7.00	10														M.118270
10-113474-4P-62	4	42.00	5.70	6.20	9.53	16														M.118270
10-113474-1P	0	45.00	9.05	11.50	14.30	53	0													M.118280
10-113474-1P-107	0	45.00	9.05	10.70	14.35	50														M.118280
10-113474-1P-25	0	45.00	9.05	7.80	9.50	25														M.118280
10-113474-1P-35	0	45.00	9.05	9.00	14.35	35														M.118280
10-113474-1P-45	0	45.00	9.05	4.55	6.80	9	8													M.118280
10-113474-1P-50	0	45.00	9.05	5.00	7.00	10														M.118280
10-113474-1P-62	0	45.00	9.05	6.20	9.50	16														M.118280
10-113474-0P	40	63.00	12.69	16.5	20	107	40													M.118280

All contacts are available with the following platings: G10 (Flash Cu + 3+6µ Au), G117 (2µ Ni + 0.4+0.6µ Au)

TABLE B

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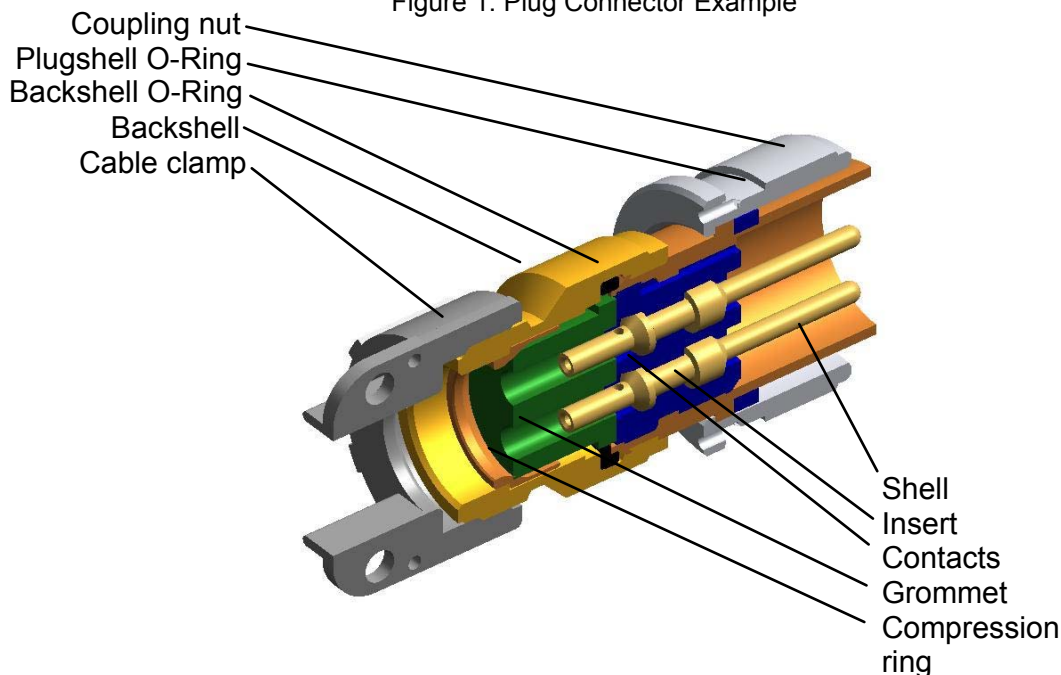
CONTACT TYPE	A	B DIA	C DIA	D DIA	CONDUCTOR SIZE		MANUAL CRIMP TOOL	TURRET	PNEUMATIC CRIMP TOOL	PNEUMATIC CRIMP TOOL	CRIMPING DIE	LOCATOR	HYDRAULIC CRIMP TOOL	CRIMPING DIE	INSERTION TOOL	EXTRACTION TOOL	GUIDE PIN
					mm ²	AWG											
	LC	36.5	1.08	1.3	1.93	0.5	24-20	M.105001	M.105003						M.117346	M.116251	M.125007
	C.E.	34.4	1.46	1.3	1.93	0.15+0.6	26-20	M.105001	M.105003						M.117346	M.116249	M.125000
	L	26.6	1.65	1.7	2.60	1+1.5	18-16	M.105007	M.105009						M.117345	M.116250	M.125001
	R	26.6	1.65	1.7	2.60	1+1.5	18-16	M.105007	M.105009						M.117345	M.116250	M.125001
	C.E.	26.6	1.65	1.2	2.60	0.6	20	M.105007	M.105009						M.117345	M.116250	M.125001
	L	26.6	1.65	1.3	1.93	0.15+0.6	26-20	M.105007	M.105009						M.117346	M.116250	M.125001
	L	26.6	1.65	1.5	2.60	1	18	M.105007	M.105009						M.117345	M.116250	M.125001
	L	26.6	1.65	2.0	2.60	2	14	M.105007	M.105009						M.117345	M.116250	M.125001
	L	26.6	1.65	2.5	3.80	3	12	M.105007	M.105009						M.117346	M.116250	M.125001
	L	36.5	1.65	1.7	2.60	1+1.5	18-16	M.105007	M.105009						M.117345	M.116250	M.125001
	R	36.5	1.65	1.7	2.60	1+1.5	18-16	M.105007	M.105009						M.117345	M.116250	M.125001
	C.E.	36.2	1.65	1.7	2.60	1+1.5	18-16	M.105007	M.105009						M.117345	M.116250	M.125001
	L	36.5	1.65	1.85	1.93	0.15+0.2	26-24	M.105007	M.105009						M.117346	M.116250	M.125001
	L	36.5	1.65	1.2	2.60	0.6	20	M.105007	M.105009						M.117346	M.116250	M.125001
	L	36.5	1.65	1.35	1.93	0.15+0.6	26-20	M.105007	M.105009						M.117346	M.116250	M.125001
	L	36.5	1.65	1.45	2.60	1	18	M.105007	M.105009						M.117345	M.116250	M.125001
	L	36.5	1.65	2.0	2.60	2	14	M.105007	M.105009						M.117345	M.116250	M.125001
	C.E.	36.2	1.65	2.2	3.80	2.5	12	M.105007	M.105009						M.117082	M.116250	M.125001
	L	36.5	1.65	2.5	3.80	3	12	M.105007	M.105009						M.117082	M.116250	M.125001
	L	36.5	1.65	0.45	1.95		32-28	M.105007	M.105009						M.117345	M.116250	M.125001
	C.E.	37.5	2.48	2.5	3.9	3	12	M.105007	M.105009					M.112004		M.125002	
	L	37.6	2.48	2.5	3.9	3	12	M.105007	M.105009							M.125002	
	L	37.6	2.48	2.6	0.6	2	10	M.105007	M.105009						M.117345	M.116250	M.125002
	L	37.6	2.48	1.45	3.4	1	18	M.105007	M.105009						M.117082	M.116250	M.125002
	L	37.6	2.48	2.1	3.9	1-2	18-14	M.105007	M.105009						M.117082	M.116250	M.125002
	L	37.6	2.48	2.1	3.9	2.5	18	M.105007	M.105009						M.117082	M.116250	M.125002
	L	37.6	2.48	2.9	4.2	4	4	M.105007	M.105009						M.117082	M.116250	M.125002
	L	37.6	2.48	3.3	4.2	4	4	M.105007	M.105009						M.117082	M.116250	M.125002
	L	37.6	2.48	3.6	4.8	6	4	M.105007	M.105009						M.117082	M.116250	M.125002
	T	42.0	3.70	4.5	6.9	9	8								M.117344	M.116260	M.125003
	C.E.	40.5	3.70	4.5	6.75	9	8								M.117344	M.116260	M.125003
	C.E.	40.5	3.70	1.45	3.4	1	18	M.105007							M.117344	M.116260	M.125003
	C.E.	40.5	3.70	1.8	3.8	1-2	18-14								M.117082	M.116260	M.125003
	L	40.5	3.70	2.5	3.8	3	12	M.105007							M.117082	M.116260	M.125003
	C.E.	40.5	3.70	3.0	4.8	6	6								M.117082	M.116260	M.125003
	C.E.	40.5	3.70	3.6	6.8	6	6								M.117082	M.116260	M.125003
	C.E.	40.5	3.70	5.0	6.9	10									M.117344	M.116260	M.125003
	C.E.	40.5	3.70	5.5	7.8	13.2	6								M.117344	M.116260	M.125003
	T	42.0	3.70	3.0	5.0		4								M.117082	M.116260	M.125003
	T	42.0	3.70	3.0	5.0		4								M.117347	M.116270	M.125003
	C.E.	41.0	5.80	7.1	9.53	22	4								M.117082	M.116270	M.125003
	C.E.	41.0	5.80	2.2	3.8	2.5	4								M.117082	M.116270	M.125003
	C.E.	41.0	5.80	2.5	3.8	3	4	M.105007							M.117082	M.116270	M.125003
	C.E.	41.0	5.80	3.0	4.8	4	4								M.117082	M.116270	M.125003
	C.E.	41.0	5.80	5.0	7.0	10	10								M.117344	M.116270	M.125003
	C.E.	41.0	5.80	6.2	9.5	16	16								M.117344	M.116270	M.125003
	C.E.	41.0	5.80	9.0	14.35	35	35								M.117348	M.116270	M.125003
	C.E.	48.0	5.80	8.0	9.53	25	25								M.117348	M.116270	M.125003
	T	42.0	5.80	8.0	9.53	25	25								M.117348	M.116270	M.125003
	C.E.	44.6	9.17	11.5	14.3	63	0								M.117348	M.116280	M.125003
	C.E.	44.6	9.17	11.5	14.35										M.117348	M.116280	M.125003
	C.E.	44.6	9.17	10.7	14.35	50									M.117348	M.116280	M.125003
	C.E.	44.6	9.17	7.8	9.5	25	25								M.117348	M.116280	M.125003
	C.E.	44.6	9.17	9.0	14.35	35	35								M.117344	M.116280	M.125003
	C.E.	44.6	9.17	4.95	6.8	9	8								M.117344	M.116280	M.125003
	C.E.	44.6	9.17	5.0	7.0	10	10								M.117344	M.116280	M.125003
	C.E.	45.3	9.17	6.2	9.5	20	10								M.117347	M.116280	M.125003
	C.E.	65.9	12.7	16.5	20.0	167	40								M.117347	M.116280	M.125003

All contacts are available with the following partings: C1(Flash Cu + 3-6µ Ag), G117 (2µ Ni + 0.4+0.6µ Au), G121 (1µ Cu + 2µ Ni + 1.3+1.7µ Au)

NOTE: Contacts marked with * are also available as Hyperboloid versions. Add "HC" to the Part Number (Example: 10-40552-12HC)

2) CONNECTOR DESCRIPTION IT SERIES

Figure 1: Plug Connector Example

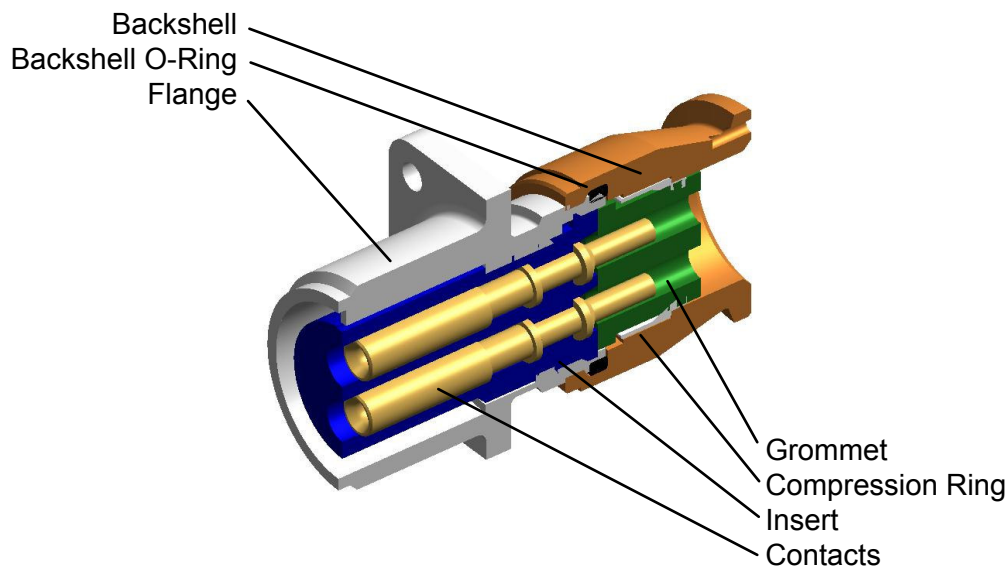


- Plugshell O-ring:** The Plugshell O-Ring is designed to help to maintain water tightness after coupling. It is supplied installed on the shell (where required).
- Shell:** A metallic container for the insulating insert.
- Insert:** The insert is made of an insulating material and is used to divide contacts and insulate them from each other while holding them in place. It is supplied installed in the shell.
- Contacts :** Available in crimp or solder versions, contacts transmit signals from the cable to another connector or to electrical equipment, fixtures, instruments and controls. Solder contacts are installed in the insert, crimp connectors are supplied separately.
- Grommet :** When the backshell is tightened, the grommet is designed to provide an environmental seal to protect conductors from corrosion.

- Compression Ring:** When the backshell is tightened into place, the compression ring compresses the grommet that seals the cables inside.
- Coupling Nut:** When tightened, the coupling nut joins together the plug and receptacle to help assure a secure and reliable connection.
- Backshell O-Ring:** Designed to help prevent exposure of the connector shell and backshell to water or other liquids with a watertight seal.
- Backshell:** Constructed of metal alloy, the backshell is an accessory designed to protect the terminated wires while providing strain relief by accommodating cable clamps or other accessories. Sufficient backshell length is necessary to ensure ample working room.
- Cable clamp:** The cable clamp compresses multiple or single cables to hold them in place securely, and to help seal the connector and backshell against water and other liquids.



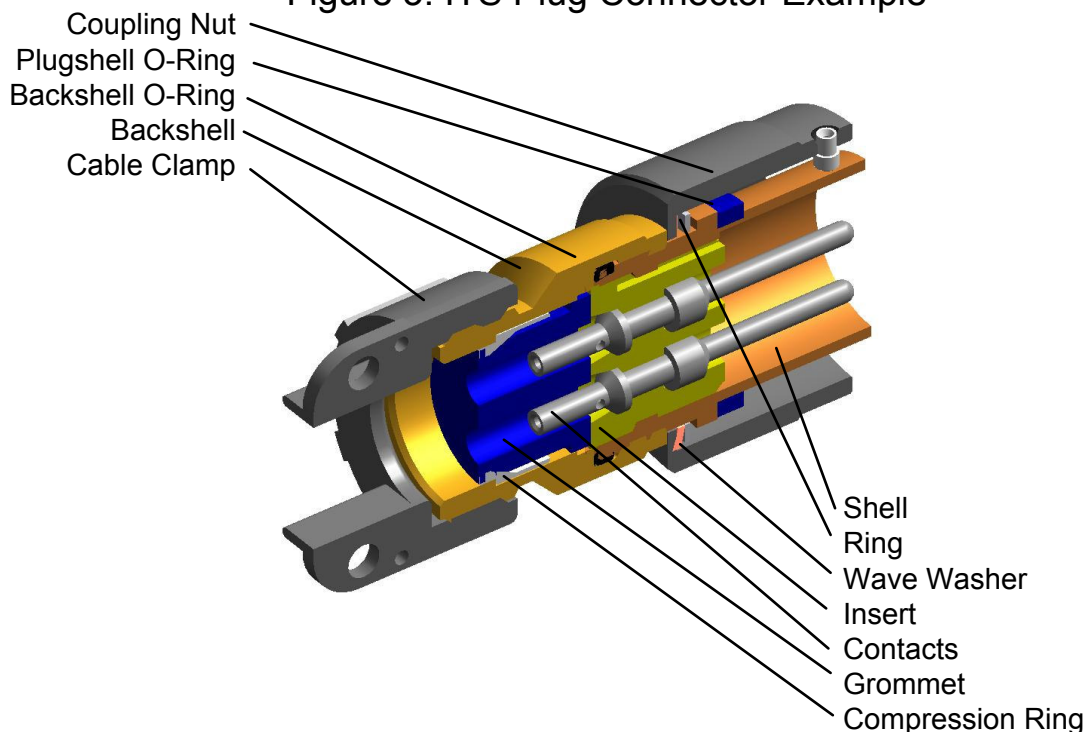
Figure 2: Receptacle Connector Example



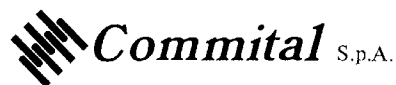
- Flange:** The flange contains the insulating insert, holding it in place.
- Insert:** Supplied mounted in the shell, the insert is constructed of an insulating material. It secures the contacts in place while insulating them from electrical interference from each other.
- Contacts** Contacts transmit signals from the cable to contacts in another connector, or to electrical equipment, instruments, fixtures or controls. Contacts are available in a solder version (supplied mounted in the insert), or in a crimp version (supplied separately).
- Grommet:** When the backshell is tightened, the grommet is designed to provide an environmental seal to protect conductors from corrosion.
- Compression ring:** When the backshell is tightened into place, the compression ring compresses the grommet that seals the cables inside.
- Backshell:** Constructed of metal alloy, the backshell is an accessory designed to protect the terminated wires while providing strain relief by accommodating cable clamps or other accessories.

ITB and ITS SERIES

Figure 3: ITS Plug Connector Example

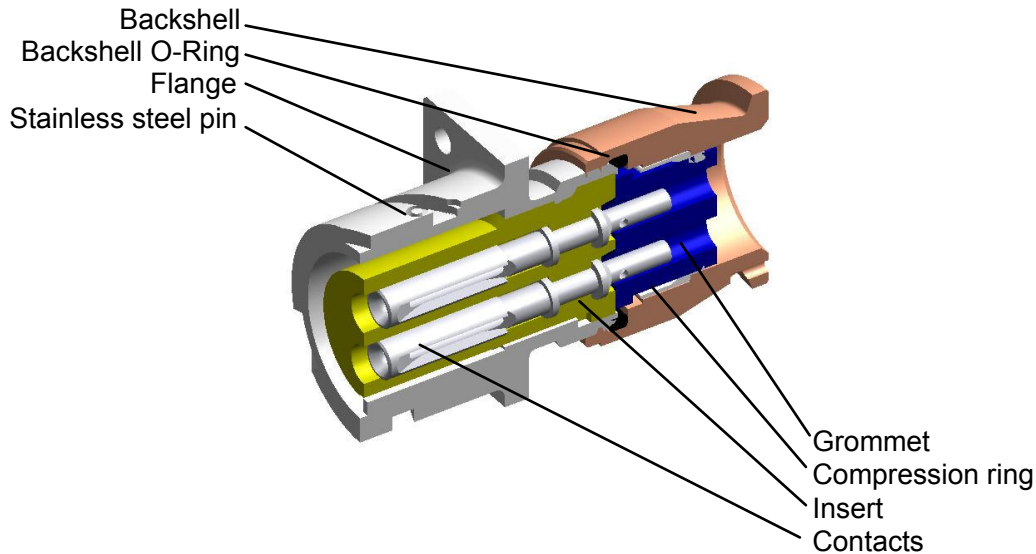


- Plugshell O-Ring:** Designed to help assure a watertight fit when the coupling is completed. Supplied mounted on the shell.
- Shell:** Made of metal alloy, the shell contains the insulating insert.
- Insert:** Made of insulating material, the insert holds the contacts in place while it insulates each contact from possible electrical interference from the other contacts.
- Contacts:** Signals are passed from the cable by the contacts to another connector or to electrical equipment, fixtures, instruments or controls. Solder versions are mounted in the insert. Crimp versions are supplied separately.
- Grommet:** The grommet is designed to help provide a watertight seal, protecting the conductors from corrosion, after the backshell is tightened properly.



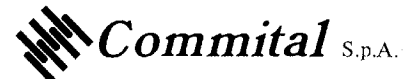
- Compression Ring: The compression ring squeezes the grommet to achieve a tight seal on the cable when the backshell is tightened.
- Ring: The ring serves as the support base for the wave washer.
- Wave washer: Compressing the front O-Ring to achieve a tight seal, the wave washer helps prevent casual plug and receptacle disconnection.
- Coupling Nut: Three stainless steel pins are designed to assure the coupling nut will reliably join the plug and receptacle.
- Backshell O-Ring: The backshell O-Ring is designed to create a watertight seal between the connector shell and the backshell.
- Backshell: A metal alloy container employed to protect the terminated cable and connector that will also accommodate cable clamps to provide cable strain relief.
- Cable clamp: The cable clamp compresses multiple or single cables to hold them in place securely and to provide a seal and strain relief.

Figure 4: Receptacle Connector Example



- Flange:** The flange contains the insulating insert, holding it in place.
- Insert:** Supplied mounted in the shell, the insert is constructed of an insulating material. It secures the contacts in place while insulating them from electrical interference from each other.
- Contacts:** Contacts transmit signals from the cable to contacts in another connector, or to electrical equipment, instruments, fixtures or controls. Contacts are available in a solder version (supplied mounted in the insert), or in a crimp version (supplied separately).
- Grommet:** When the backshell is tightened, the grommet is designed to provide a watertight seal to protect conductors from corrosion.
- Compression ring:** Designed to hold the cables in place, the compression ring maintains a tight grip when the backshell is tightened.
- Backshell:** Constructed of metal alloy, the backshell is a container designed to protect the terminated cable and connector while providing strain relief by accommodating cable clamps.

In the ITB version the stainless steel pin is omitted.



3) TERMINATION INSTRUCTIONS CABLES TO CONTACTS

ATTENTION: When it is necessary to use the grommet to achieve water tightness, size the external diameter of the conductor pursuant to Table 1:

TABLE 1: GROMMET HOLE SEALING RANGE

Connector Type	Contacts size	Ø external cable	
		min	Max
IT ITB ITS	16	1.62	3.30
	12	2.89	4.32
	8	4.16	6.47
	4	6.90	9.40
	0	10.54	13.97
Water tightness required according to VG 95234	AWG 16	2.2	2.8
	AWG 12	3.1	3.5
	AWG 8	5.9	6.5
	AWG 4	-	-
	AWG 0	12.1	12.8

SOLDERING

Strip the conductor according to Table 2, then proceed with the instructions on the following page.

Stripped Conductor

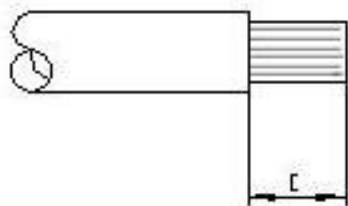
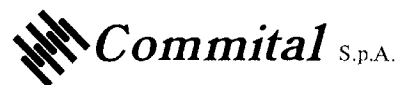


TABLE 2:
CONDUCTOR STRIP LENGTHS

Contact Size	C (mm)	
	Crimp	Solder
18	4,8	4.0
16S	6,4	6.4
16	6,4	6.4
12	8,5	9.5
8	12,7	12.1
4	12,7	15.9
0	14.0	15.9
4/0	23.2	23.6



- 1) Immerse the stripped end of the conductor to half the dimension C (Table 2) in a solution of deoxidizer compound, and then in a chemical mixture that contains an alloy of 60% tin and 40% lead maintained in a constant fusion temperature.
- 2) Immobilize the connector so that the soldering buckets are turned upward and towards the operator. Fix the connector to its mating connector or fixture and clamp it securely.
- 3) Insert the pre-tinned conductor into the contact cavity and heat it until the solder melts, then add a tin-lead alloy with a deoxidizer core as a filler.
- 4) Remove the heat source away from the contact. Continue to immobilize the conductor until the soldering has cooled and solidified.
- 5) Be careful to not overheat the contacts which could compromise the electrical characteristics of the connector.
- 6) Adjust the power of the welding system according to the table below:

Contact Size	Welding Power
18 - 16	30 W
12	60 W
8 - 4 - 0	300 W

- 7) When all soldering is completed, carefully clean the parts around the contact to remove excess tin and deoxidizer.
- 8) Large dimension contacts (Size 0 and 4) can be removed from the insert before soldering to the cable as outlined above in paragraphs 1 through 4.

(Instructions continued on following page)



- 9) Place the contact into the insert after having immobilized the connector pursuant to the instructions outlined in paragraphs 1 through 4 and to tables 5 and 6 on page 18.
- 10) If you plan to use heat shrink tubing to insulate the contacts, you must wait to do so until after the contacts have been correctly installed in the insert.
- 11) When working with large connectors (Sizes 36 - 40 - 110) that require contacts sized 4, 0, and 4/0, special care must be made to control correct alignment. In applications where space is severely limited, the choice of a highly flexible cable can help assure an adequate bend radius that will not stress the contact. Cables must be fixed inside such applications. Large connectors can be supplied with rigid or non-rigid grommets that help to achieve proper alignment.



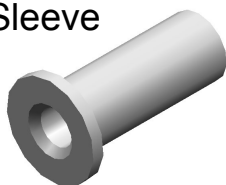
CRIMPING

- 1) Check Table A (page 2) and B (page 3) to assure that the contacts are the correct ones for your conductors. If the conductors are too small for your contacts, a range of reduction sleeves is available to reduce the crimping diameter of the contact (see Table 3 below). For other requirements, please contact the factory.

Table 3

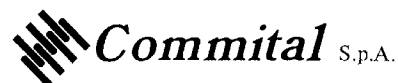
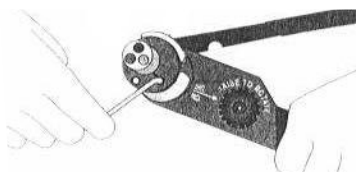
Reduction Sleeve	Dimension	
	Contact	Conductor
3001008004	AWG 20	AWG 26
3001008006	AWG 16	AWG 22
3001008060	AWG 4	10 mm ²
3001008061	AWG 4	6 mm ²
3001008062	AWG 4	16 mm ²
3001008063	190 mm ²	AWG 4/0
3001008064	AWG 4	15 mm ²
3001008065	AWG 8	AWG 12
3001008066	AWG 0	AWG 6
3001008067	AWG 0	AWG 2
3001008068	AWG 8	AWG 10
3001008069	AWG 8	AWG 18
3001008070	AWG 8	AWG 16
3001008071	AWG 4	2,5 mm ²
3001008075	70 mm ²	25 mm ²
3001008080	AWG 0	16 mm ²
3001008081	AWG 0	35 mm ²
3001008082	AWG 0	25 mm ²
3001008083	AWG 0	10 mm ²
3001008084	AWG 0	50 mm ²
3001008086	AWG 2/0	70 mm ²
3009008000	AWG 2/0	50 mm ²

Crimp
Reduction
Sleeve



- 2) The information provided by Tables A (page 2) and B (page 3) will help you to select the proper crimping/turret/insertion tooling.
- 3) Install the turret in the crimping tool (instructions continue on following page).

Figure 5: Turret closing

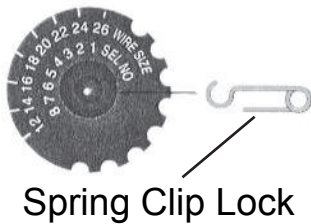


- 4) Adjust contact and conductor crimping depth using the crimping tool selector and turret pursuant to the Turret Table (below):

Figure 7: Turret Table

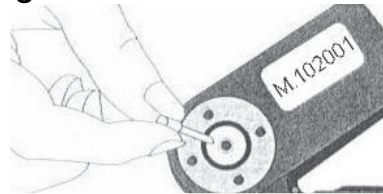
Commital P.N.	Color	6	4	12 3	2.5	14 1.9	1.5	16 1.2	18 1	.75	20 .60	.50	AWG mm ²
				8	7	6							
10-40561	RED										6		
-15									7	7	6	6	
10-40560								8	7	6			
-22					6	5							
-30			8										
-38													
10-40556							7	6	5	4	4	3	
10-234-10S									4				
10-234-15S							7	6	5				
10-234-25P				8	7								
10-234-25S													
10-40557	BLUE						7	6	5	4	4	3	
10-234-15P							7	6	5				
10-234-15SS							7	6	5				
10-40553	GREEN						7	6	5				
10-40552													
10-234-15SP							7	6	5				

Figure 6:
Selector Knob



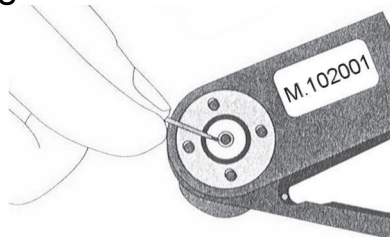
- 5) Insert the contact into the open tool in the same position as the turret and close the tool just enough to hold the contact without crushing it.

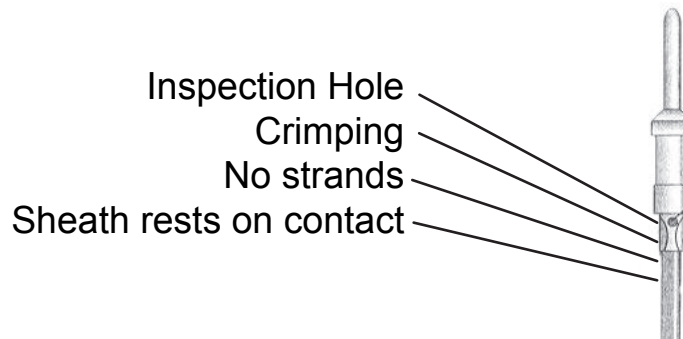
Figure 8: Contact Insertion



- 6) Insert the stripped conductor to dimension C (Table 2, Page 10) into the contact, being careful to assure that all individual wire strands are within the contact. Ensure wire is visible through the inspection hole. If not, the conductor strip length is too short. Activate crimp tool through a full cycle. Contact will not release unless the tool has closed completely.

Figure 9: Conductor Insertion





- 7) Remove the crimped contact from the tool and inspect it for the following:
- All wire strands are inside the contact.
 - Conductor is visible from the inspection hole.
 - Sheaths rest on the contacts.
 - No breaks are present near the deforming side.
 - Mechanical tightness of the contact on the conductor is to Table 4 (below):

TABLE 4: CRIMP RETENTION FORCES

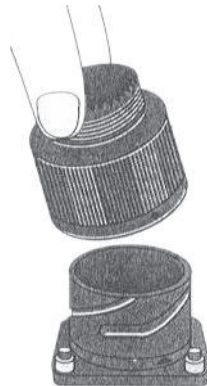
Cable AWG	Section mm ²	Min. conductor tightness	
		Ag+Sn	Ni
4/0	107	397 Kg	356 Kg
0	53	317 Kg	285 Kg
4	22	181 Kg	163 Kg
8	9	100 Kg	90 Kg
12	3	50 Kg	45 Kg
16	1.2	23 Kg	16 Kg

CRIMPED CONTACT INSERTION

Disassemble the connector and slide the rear accessories over the wire bundle in proper sequence (For reassembly, see Figures 15 & 15). Use the insertion tool to place the crimped contacts into the insert pursuant to Tables A (page 2) & B (page 3).

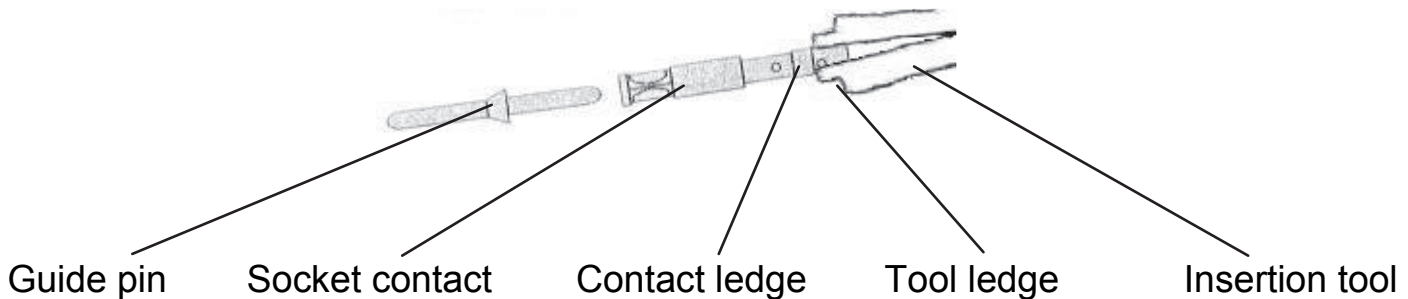
- 1) Attach the connector to its mate in a fixed position to facilitate the insertion process.

Figure 10: Attach Connector to Its Mate



- 2) Place the contact in the insertion tool, resting the crimping tool on the crimping edge for a stronger hold. To insert the female contact, it is necessary to use the guide pin (See Table B, page 3) to facilitate the insertion and to avoid shaving the shoulders of the insert. At the end of the operation, the guide pin is removed from the connector.

Figure 11/a: Contact Insertion

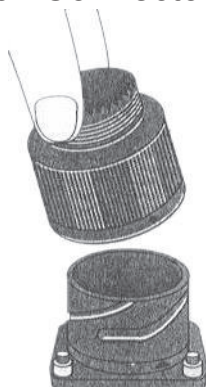


CRIMPED CONTACT INSERTION

Disassemble the connector and slide the rear accessories over the wire bundle in proper sequence (For reassembly, see Figures 17 & 18). Use the insertion tool to place the crimped contacts into the insert pursuant to Tables A (page 2) & B (page 3).

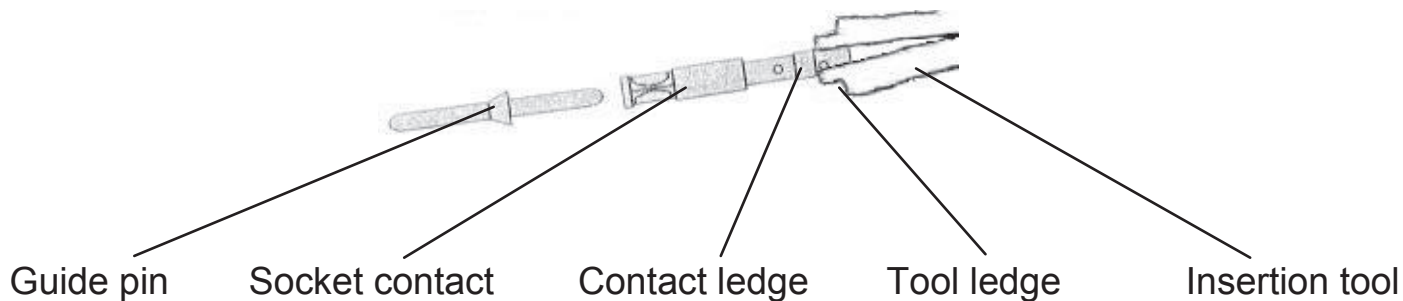
- 1) Attach the connector to its mate in a fixed position to facilitate the insertion process.

Figure 10: Attach Connector to Its Mate



- 2) Place the contact in the insertion tool, resting the crimping tool on the crimping edge for a stronger hold. To insert the female contact, it is necessary to use the guide pin (See Table B, page 3) to facilitate the insertion and to avoid shaving the shoulders of the insert. At the end of the operation, the guide pin is removed from the connector.

Figure 11/a: Contact Insertion



NOTE: it is recommended that the operation be facilitated using small quantities of isopropyl alcohol. It is necessary to dry the connector immediately so that insulating resistance is not reduced. All contacts, including unused contacts (or suitable sealing plugs), should be inserted into the connector.

- 3) Insert the contact from the back side of the connector employing a slow but constant force until the contact snaps into position in the proper cavity. Start at the center of the pattern and work toward outside edges.

Figure 11/b: Contact Insertion

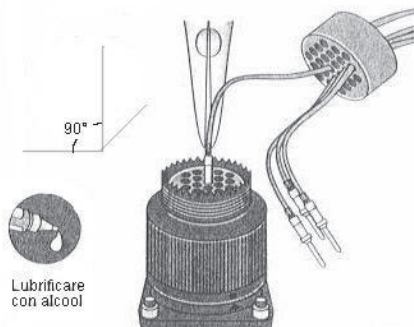
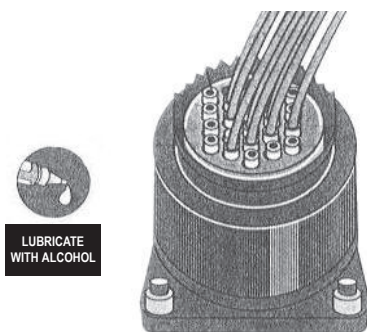
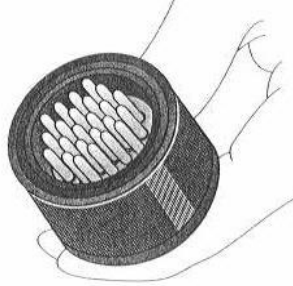


Figure 11/C: Contact Insertion



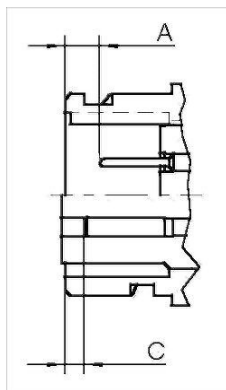
When all contacts have been inserted, check positioning from the front side of the connector to verify correct alignment.

Figure 11: Final Result



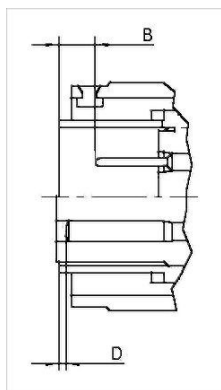
Use Tables 5 and 6 (below) to verify the correct positioning of the contacts.

TABLE 5: SEATING DIMENSIONS FOR RECEPTACLES

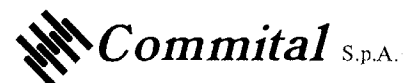


Size	A ±1 Male Contacts							C ±1 Female Contacts						
	Contact Size							Contact Size						
	16S	16	12	8	4	0	4/0	16S	16	12	8	4	0	4/0
10SL	3.5							2.8						
14S	3.0							2.8						
16S	3.0							2.8						
16		7.3	2.5	2.5	2.5				2.5	2.5	2.5	2.5		
18		7.3	2.5	2.5					2.5	2.5	2.5	2.5		
20		7.3	2.5	2.5		2.9			2.5	2.5	2.5	2.5		
22		7.3	2.5	2.5		2.5			2.5	2.5	2.5	2.5	2.7	
24		7.0	2.2	2.5	2.5				2.5	2.5	2.5	2.5		
28		7.0	2.2	2.5	2.5	2.5			2.8	2.8	2.8	2.8		
32		7.0	2.2	2.5	2.5	2.5			2.2	2.2	2.2	2.2	2.3	
36		7.0	2.2	2.5	2.5	2.5	2.5		2.2	2.2	2.2	2.2	2.3	2,3
40		7.0	2.2	2.5	2.5	2.5			2.2	2.2	2.2	2.2	2.3	
110			5,6			6,3	6,3			7,4			7,6	7,6

TABLE 6: SEATING DIMENSIONS FOR PLUGS



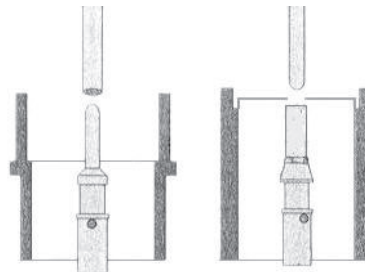
Size	B ±1 Male Contacts							D ±1 Female Contacts						
	Contact Size							Contact Size						
	16S	16	12	8	4	0	4/0	16S	16	12	8	4	0	4/0
10SL	2.6							2.6						
14S	2.8							2.8						
16S	2.9							2.8						
16		7.3	2.5	2.5	2.5				2.5	2.5	2.5	2.5		
18		7.3	2.5	2.5					2.5	2.5	2.5			
20		7.3	2.5	2.5		2.9			2.5	2.5	2.5		2.7	
22		7.3	2.5	2.7		2.5			2.5	2.5	2.5		2.7	
24		7.1	2.4	2.4	2.4				2.5	2.5	2.5	2.5		
28		7.1	2.4	2.4	2.4	2.4			2.5	2.5	2.5	2.5	2.3	
32		7.1	2.4	2.4	2.4	2.4			2.4	2.4	2.4	2.4	2.3	
36		7.1	2.4	2.4	2.4	2.4			2.4	2.4	2.4	2.4	2.3	
40		7.1	2.4	2.4	2.4	2.4			2.4	2.4	2.4	2.4	2.3	
110			5,6			6,3	6,3			7,0			7,0	6,0



If some contacts have been inserted too deeply, a slight pull in the opposite direction might help place them into the proper position.

- 4) To extract the contact from the insert use the extraction tools pursuant to Tables A (page 2) and B (page 3). Exercise a slow but constant force on the contact from the front side of the insert until the contact comes out the rear of the connector.

Figure 13: Contact Extraction



4) CONNECTOR TERMINATION INSTRUCTIONS SINGLE WIRES

Figure 14: Plug Example

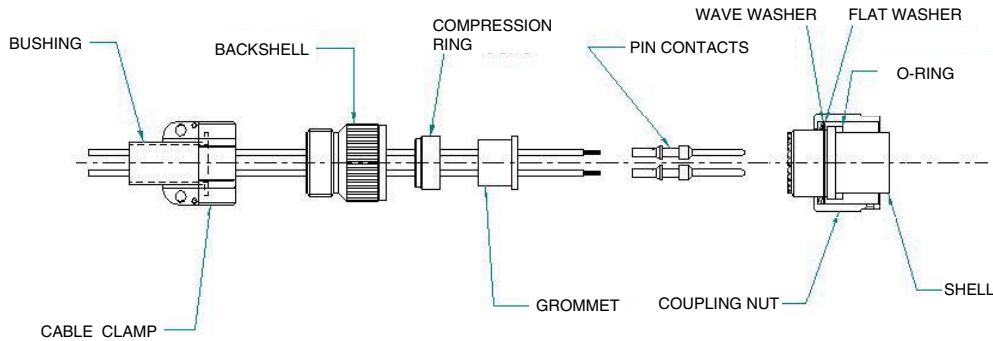
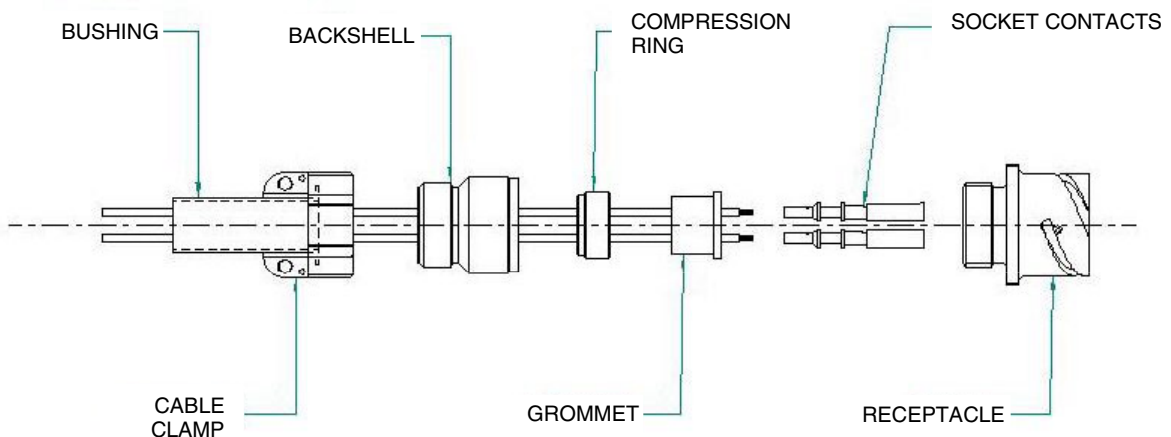


Figure 15: Receptacle Example



- 1) Assemble components as shown in figures 14 and 15 above.
- 2) Insert conductors in the grommet (when required), being careful to align the letters or numbers imprinted on the back side with the corresponding letters or numbers imprinted on the insert.
- 3) Cut conductors pursuant to Table 2 (page 10) using the correct tool. Be careful to not cut any of the individual wire strands.
- 4) Begin crimping contacts (see pages 13-15) or soldering contacts (see pages 10-12).

- 5) To insert crimped contacts, follow the instructions on pages 16-19.
- 6) Carefully clean the insulating components after using lubricant to facilitate contact insertion.
- 7) Assemble the components as follows:
 - 7.1) PLUG
In the following sequence, attach the following components to the shell: flat washer, wave washer and the coupling nut. Take care to assure that the wave washer and flat washer are properly fitted, and then attach the connector to its secured and fixed mate to facilitate assembly.
 - 7.2) RECEPTACLE
Lock the flange, taking care to not damage it.
- 8) Assemble the insert, grommet and compression ring in sequence.
- 9) Check to see that the backshell O-Ring is lubricated when required, and in the correct position.
- 10) Screw the backshell onto the connector using cushioned pliers (P/N: M.120002) or a strap wrench (P/N: M.120001) to avoid damaging the external plating. For correct torque, consult Table 7 below:

Table 7 : Torque forces
Connector Torque (N/m)

Size	Min.	Max.
10SL	1.5	2.5
14S	4.4	5.4
16S	6.4	7.4
16	6.4	7.4
18	6.9	7.8
20	7.8	9.8
22	9.8	11.8
24	10.8	14.7
28	13.7	18.6
32	14.7	20.6
36	18.6	26.5
40	20.6	39.2



- 11) If the cable is sleeved, pull it close to the backshell, then screw the cable clamp to the backshell pursuant to Table 7 on page 21.
- 12) Tighten the saddle clamp screws to help assure a sufficiently tight mechanical grip on the cable.

MULTIPLE RUBBER-COATED CABLES

Figure 16: Plug Example

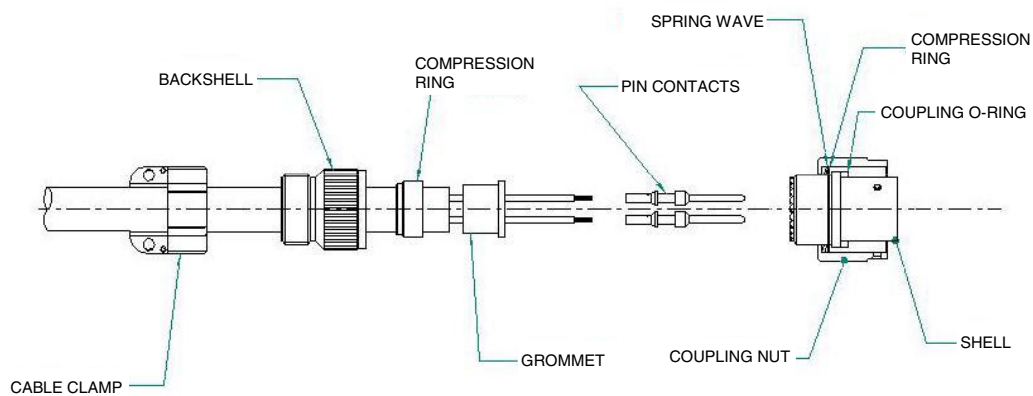
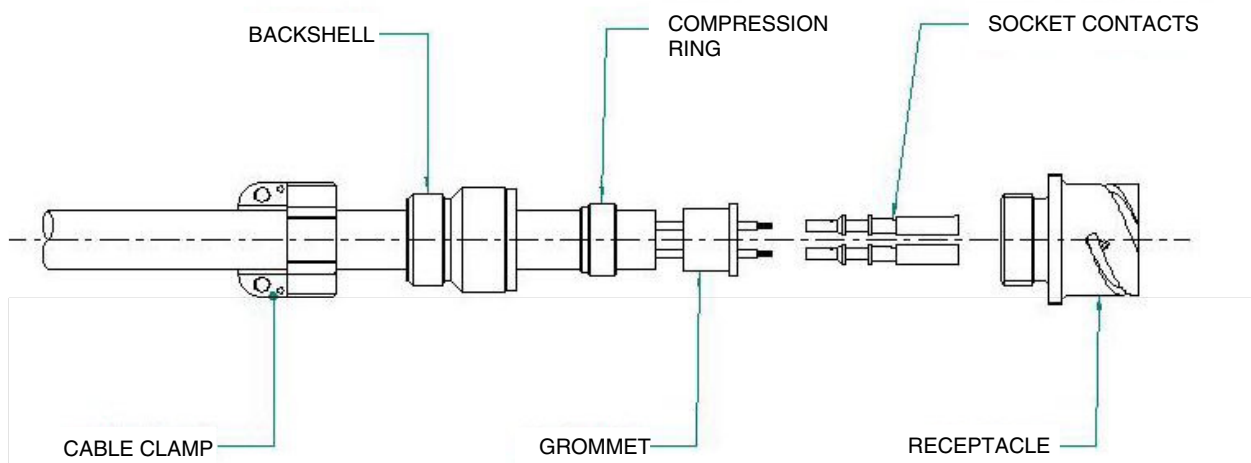
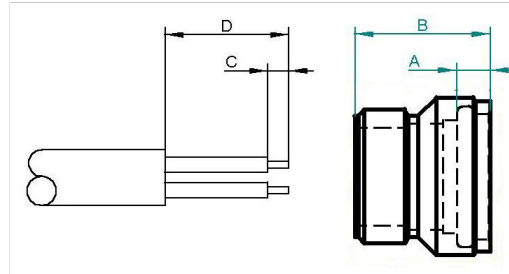


Figure 17: Receptacle Example



- 1) Strip the cable as shown in figure 18.

Figure 18: Cable Stripping



$$D = B - A$$

- 2) Assemble the components as shown in figures 16 and 17 on page 22.
- 3) Insert conductors in grommet when required. Take care to properly align letters or numbers imprinted on the backside with those imprinted on the front of the insert.
- 4) Cut the cable jacketing (Figure 18) and insulator pursuant to Table 2 (page 10) using the correct tool and be careful to not cut any individual wire strands. Strip length for jacket must be maximized to allow sufficient “working room.” Use care in removing jacket and any cable filler
- 5) Begin crimping the contacts (see pages 13-15), or soldering the contacts (see pages 10-12).
- 6) Follow the instructions on pages 16-19 for inserting crimped contacts.
- 7) If you use lubricant to facilitate contact insertion, carefully clean the insulating parts (use only isopropyl alcohol as a lubricant).
- 8) Assemble the components in the following manner:
 - 8.1) PLUG
In sequence, place the the flat washer, wave washer and coupling nut onto the connector and attach the connector to its fixed and secure mate to fixture to facilitate the assembly.
 - 8.2) RECEPTACLE
Lock the flange taking care to not damage it.

- 9) In sequence assemble the grommet and compression ring behind the insert.
- 10) Make sure the backshell O-Ring is in the correct position.
- 11) Screw the backshell onto the connector using cushioned pliers (P/N: M.120002) or a strap wrench (P/N: M.120001) to avoid damaging the external plating. For correct torque, consult Table 7 on page 21.
- 12) If using a jacketed cable, pull the jacket close to the backshell then tighten the cable clamp onto the backshell, using cushioned pliers (P/N: M.120002) or a strap wrench (P/N: M.120001) to avoid damaging the external plating. For correct torque, consult Table 7 on page 21.
- 13) Tighten the saddle clamp screws (if required) to help assure a sufficient mechanical grip on the cable.

CABLES WITH BRAIDED SHIELDING

Termination of braided shielding of cables is required when EMI/RFI protection is necessary. Employ the following procedure for terminating such cables:

TYPE RG CONNECTORS
Figure 19: Plug Example

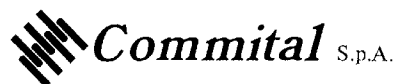
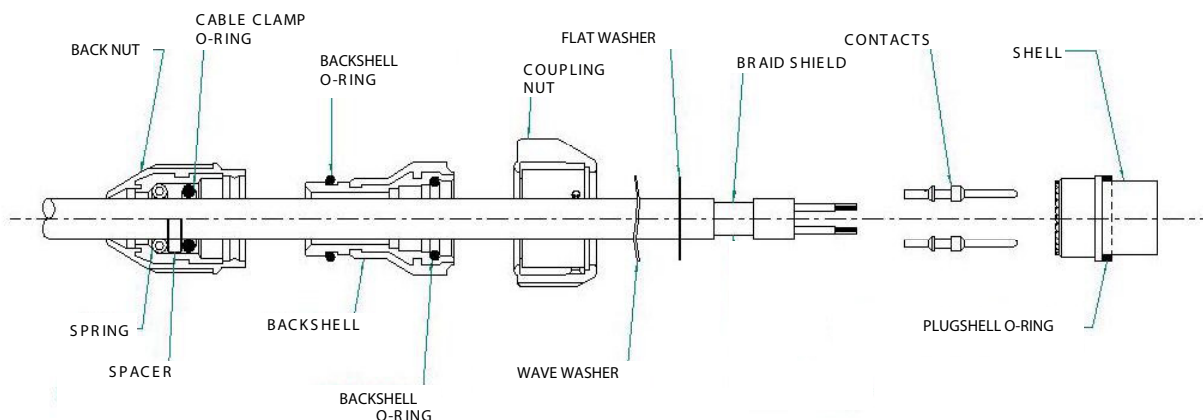
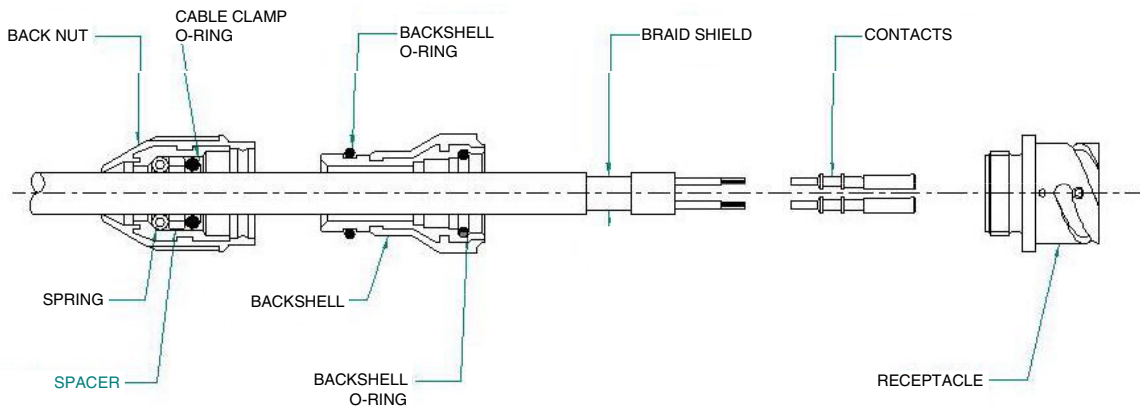
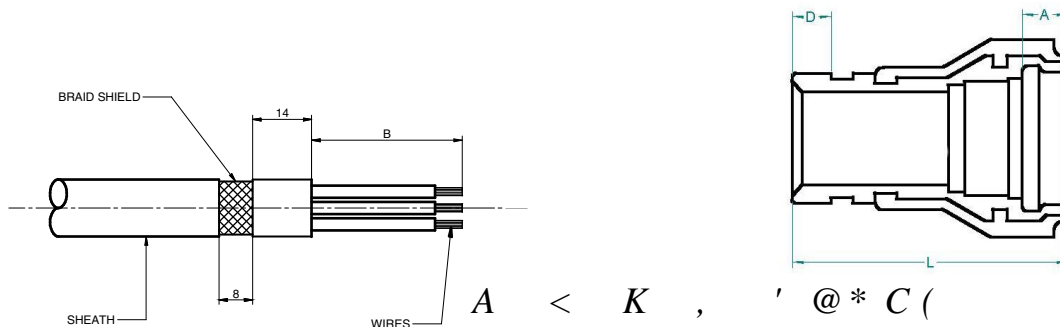


Figure 20: Receptacle Example

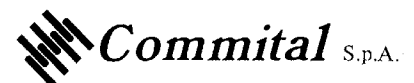


1) Cut back the cable jacketing as shown in figure 21.

Figure 21: Stripping the cable jacketing



- 2) Cut and strip off the cable jacketing pursuant to the dimensions shown in figure 21 to expose the braided shielding. Be careful to not cut any of the wire strands comprising the braided shielding.
- 3) Assemble the components as shown in figures 19 and 20.
- 4) Begin crimping (pages 13-15) or soldering (pages 10-12) the contacts.
- 5) For insertion of crimped contacts, follow the instructions on pages 16-19.
- 6) If you use lubricant to facilitate contact insertion, be sure to clean all insulating parts carefully (Use only isopropyl alcohol as a lubricant).



7) Assemble the components in the following manner:

7.1) PLUG

The ring, wave washer and the coupling nut should be assembled in sequence onto the connector shell, and the connector should be fastened to its fixed and secure mate or fixture to facilitate assembly.

7.2) RECEPTACLE

Lock the flange taking care to not damage it.

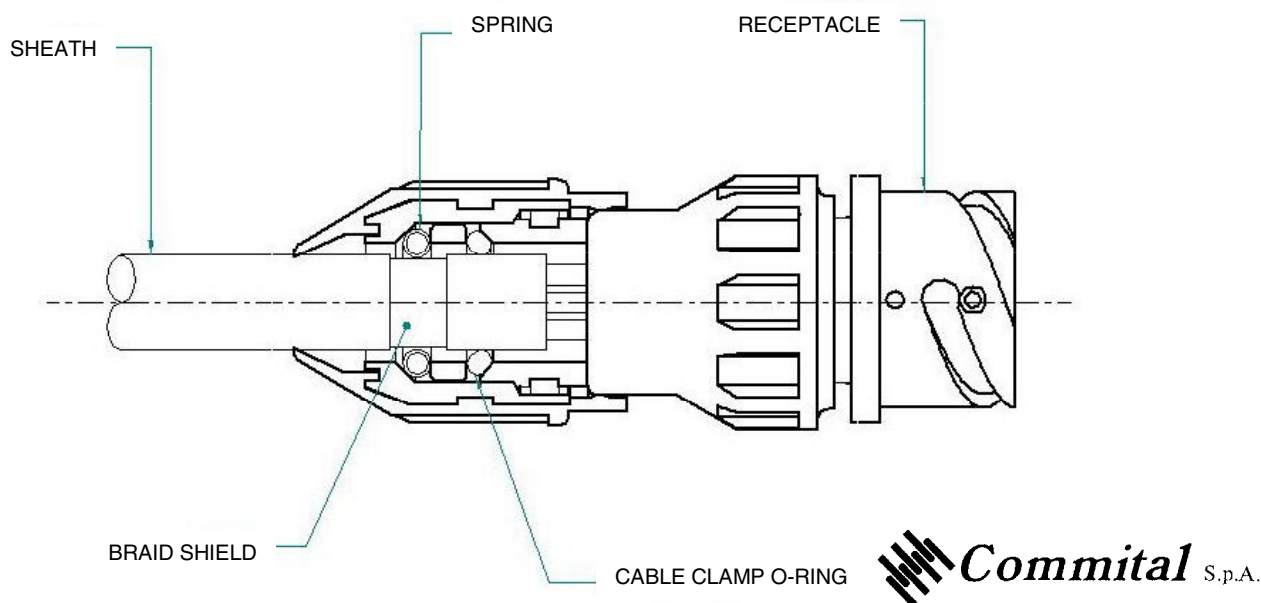
8) In sequence, assemble the insert, grommet and compression ring on the back of the connector.

9) Make sure the backshell O-ring is in the correct position.

10) Screw the backshell onto the connector using cushioned pliers (P/N: M.120002) or a strap wrench (P/N: M.120001) to avoid damaging the external plating. For correct torque, consult Table 7 on page 21.

11) Assemble the cable clamp with washer and spacer and tighten according to the torque values shown on Table 7, page 21.

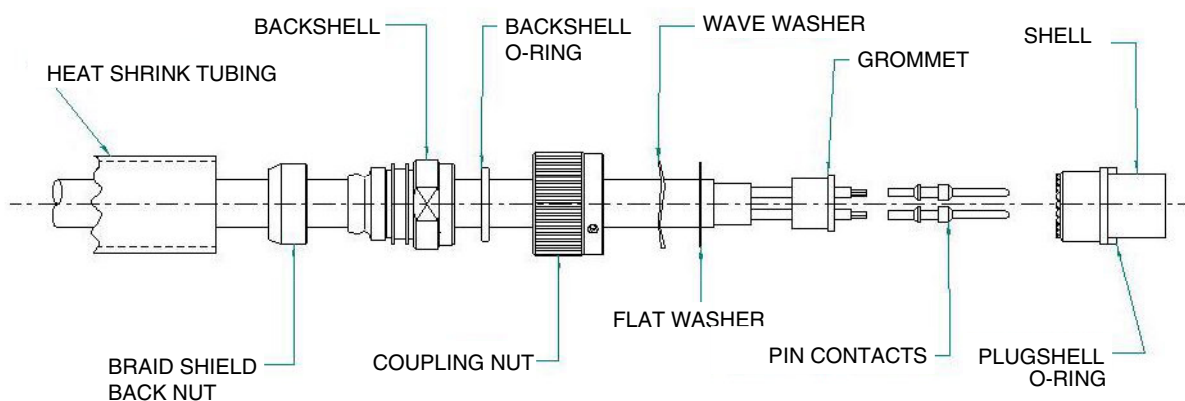
Figure 22: RG Type Wired Connector



MULTIPLE RUBBER-COATED CABLES WITH BRAIDED SHIELDING AND SHRINK BOOT

When EMI/RFI protection is necessary, the use of cables sheathed in braided shielding is required. Use the following procedure to terminate SP connectors to such cables. The difference between the SP and RG types is in the way the braided shielding is terminated.

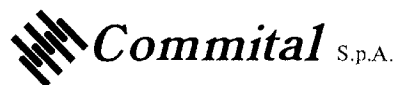
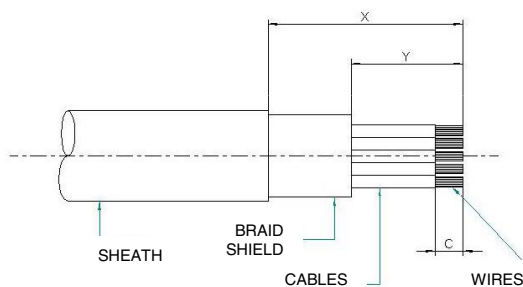
SP TYPE CONNECTOR
Figure 23: Plug Example



- 1) Strip off the cable jacketing pursuant to the dimensions shown on Table 8, being careful to not cut any of the wire strands comprising the braided shielding.

Table 8

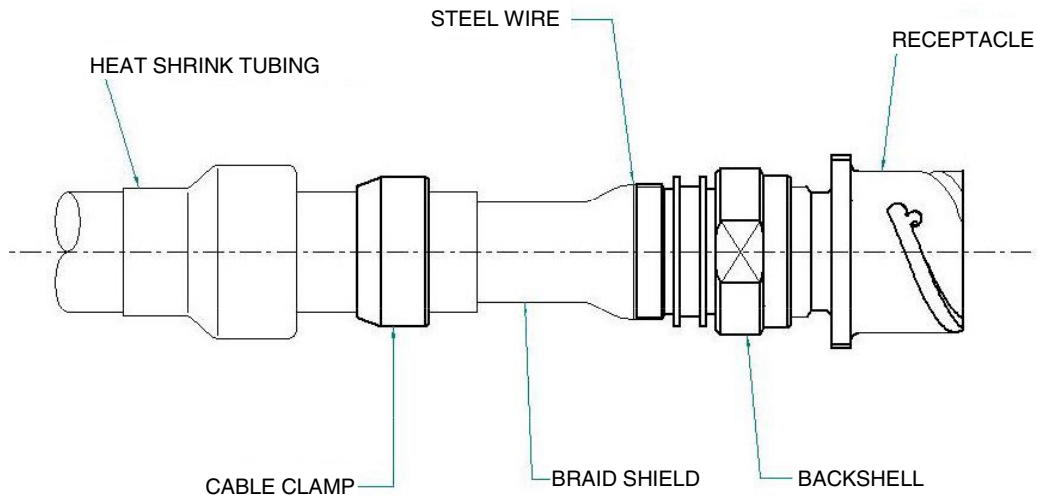
Connector size	X	Y
10SL	53	23.0
14S	53	23.0
16S	53	24.5
16	68	28.5
18	68	28.5
20	75	28.5
22	75	28.5
24	75	28.5
28	75	28.5
32	75	28.5
36	75	28.5
40	75	28.5



- 2) Assemble connector components as shown in figure 23, page 27.
- 3) Insert conductors in grommet, aligning the imprinted letters or numbers of the cavities on the backside of the insert with those imprinted on the front.
- 4) Strip the cables pursuant to the dimensions shown on Table 2, page 10, using the correct tool. Take care to not cut any wire strands comprising the braided shielding.
- 5) Begin crimping (pages 13-15) or soldering (pages 10-12) contacts.
- 6) Follow instructions on pages 16-19 for inserting crimped contacts.
- 7) If you use lubricant to facilitate contact insertion, carefully clean all insulating parts (Use only isopropyl alcohol as a lubricant).
- 8) Assemble components in the following manner:
 - 8.1) PLUG
In sequence, assemble the flat washer, wave washer and coupling nut onto the connector. Fasten the connector onto its fixed and secure mate or fixture to facilitate assembly.
 - 8.2) RECEPTACLE
Lock the flange taking care to not damage it.
- 9) Assemble the grommet and the compression ring on the back of the connector in sequence.
- 10) Make sure the backshell O-Ring is lubricated (when required) and in the correct position.
- 11) Screw the backshell onto the connector using cushioned pliers (P/N: M.120002) or a strap wrench (P/N: M.120001) to avoid damaging the external plating. For correct torque, consult Table 7 on page 21.
- 12) Pull the braid up over and around the conical part of the backshell, and fix it in place with a stainless steel wire that fits in the seat provided between the conical part and the thread.

When this operation is complete, be sure that the steel retaining wire and the braided shielding do not interfere with the thread (see figure 24).

Figure 24: Receptacle Example



- 13) Screw the backshell onto the connector using cushioned pliers (P/N: M.120002) or a strap wrench (P/N: M.120001) to avoid damaging the external plating. For correct torque, consult Table 7 on page 21.
- 14) Place the shrink boot tubing onto the backshell to position it on the joint seat. Using the proper heating tool, heat the leading side of the shrink boot to adhere it onto the backshell, then heat the rest of the shrink boot until it shrinks and adheres to the cable. When this operation is complete, maintain the cable in the correct position until the shrink boot has cooled.

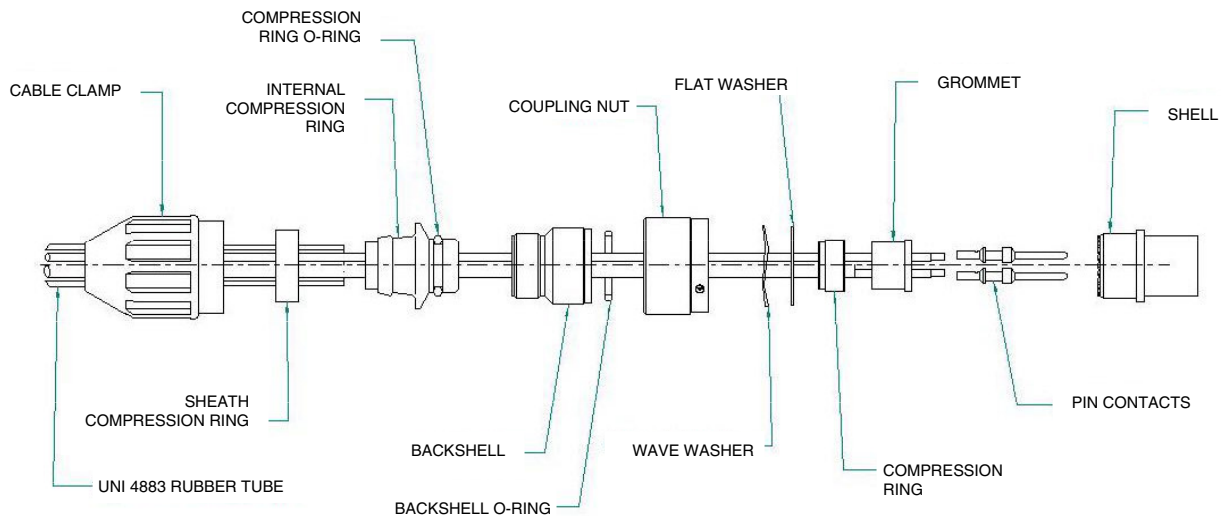
MULTIPLE RUBBER-COATED CABLES WITH SHRINK BOOTS

The first 11 assembly steps to follow in this application are detailed for Rubber-Coated Cables on pages 22-24. Shrink Boot procedures are detailed in paragraph #14 above (page 29).

MULTIPLE OR SINGLE RUBBER-COATED CABLES WITH UNI 4883 PROTECTIVE JACKETING

Linen-faced UNI 4883 protective jacketing is employed when a higher level of protection of single or multiple cables is required. Figure 25 shows a generic configuration of a terminated BF connector.

Figure 25: BF Connector



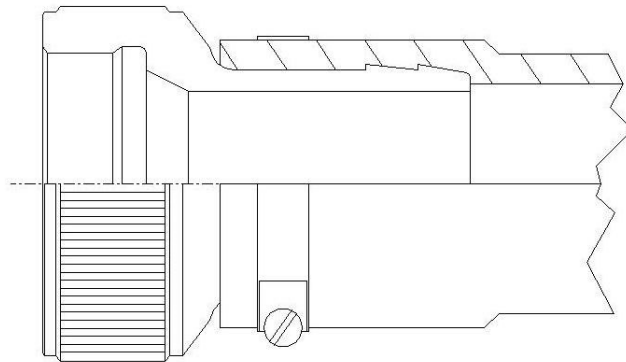
- 1) Strip off the protective cable jacketing to the proper length to permit easy assembly, termination and to allow for the jacketing to be pulled over the conical part of the internal compression ring (step 5 below).
- 2) Assemble all components in sequence as shown in figure 25.
- 3) For wiring termination and backshell assembly, see figure 17 and the instructions on page 22 for multiple rubber-coated cables, or Table 2 on page 10 for single rubber-coated cables.
- 4) Make sure that the O-Ring is properly seated on the compression ring and insert the compression ring into the backshell until it stops.
- 5) Pull the protective cable jacketing up and over the conical part of the internal compression ring until it stops.

- 6) Slide the sheath compression ring up and over the protective cable jacketing and the conical part of the internal compression ring.
- 7) Screw the backshell onto the connector using cushioned pliers (P/N: M.120002) or a strap wrench (P/N: M.120001) to avoid damaging the external plating. For correct torque, consult Table 7 on page 21.

TYPE BR CONNETOR ADAPTER

The BR connector features a cable clamp designed to properly secure UNI 4883 protective cable jacketing. It differs from the BF connector in that securing the jacketing is made easier with a metal clip (see figure 26).

Figure 26: BR Adapter with protective jacketing and metal clip



5) ACCESSORIES

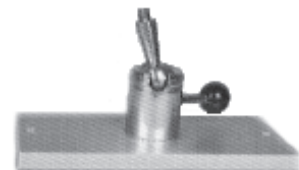
M.120002: 0-60 mm Cushioned Wrench



M.120001: 60-120 mm Strap Wrench



M.105005: Support Base for
Pneumatic Crimping Tool (M.105003)



M.105004: Pedal



M.105006: Gauge



6) CRIMP CONTACTS CROSS REFERENCE

MALE PIN CONTACT		
P/N VEAM	P/N COMMITAL	SIZE
46740 P	10-40579	18
27911	10-40553	16S
27911-12	10-40553-12	16S
27911-13	10-40553-13	16S
27911-15	10-40553-15	16S
27911-20	10-40553-20	16S
27911-26	10-40553-26	16S
27913	10-40557	16
27913-08	10-40557-08	16
27913-12	10-40557-12	16
27913-13	10-40557-13	16
27913-15	10-40557-15	16
27913-20	10-40557-20	16
27913-26	10-40557-26	16
27913-32	10-40557-32	16
27914-12	10-40561-12	12
27914-15	10-40561-15	12
27914-18	10-40561-20	12
27914-22	10-40561-22	12
27914-26	10-40561	12
27914-30	10-40561-30	12
27914-30M	10-40561-30M	12
27914-38	10-4561-38	12
27915	10-40792	8
27915-15	10-40792-15	8
27915-18	10-40792-18	8
27915-30	10-40792-30	8
27915-50	10-40792-50	8
27915-58	10-40792-58	8
27916	10-113474-4P	4
27916-22	10-113474-4P-22	4
27916-26	10-113474-4P-26	4
27916-30	10-113474-4P-30	4
27916-50	10-113474-4P-50	4
27916-62	10-113474-4P-62	4
27916-78	10-113474-4P-25	4
27916-90	10-113474-4P-35	4
27917	10-113474-1P	0
27917-45	10-113474-1P-45	0
27917-50	10-113474-1P-50	0
27917-78	10-113474-1P-25	0
27917-90	10-113474-1P-35	0
27917-107	10-113474-1P-107	0
	10-40579 RES	18

FEMALE SOCKET CONTACT		
P/N VEAM	P/N COMMITAL	SIZE
46740 S	10-40588	18
27961	10-40552	16S
	10-40552	16S
27961-12	10-40552-12	16S
27961-13	10-40552-13	16S
27961-15	10-40552-15	16S
27961-20	10-40552-20	16S
27961-26	10-40552-26	16S
27963	10-40556	16
	10-40556 RES	16
	10-40556 TU	16
	10-40556-22 TU	16
27963-08	10-40556-08	16
27963-12	10-40556-12	16
27963-13	10-40556-13	16
27963-15	10-40556-15	16
27963-20	10-40556-20	16
27963-26	10-40556-26	16
27963-32	10-40556-32	16
27964-26	10-40560	12
	10-40560 TU	12
27964-12	10-40560-12	12
27964-15	10-40560-15	12
27964-18	10-40560-20	12
27964-22	10-40560-22	12
27964-30	10-40560-30	12
27964-30M	10-40560-30M	12
27964-38	10-40560-38	12
	10-40793	8
27935	10-40793-1	8
27935-15	10-40793-1-15	8
27935-18	10-40793-1-18	8
27935-30	10-40793-1-30	8
27935-50	10-40793-1-50	8
27935-58	10-40793-1-58	8
	10-40793-50	8
	10-40793-M4	8
	10-113-474-4S	4
27936	10-113474-4S-1	4
27936-22	10-113474-4S-1-22	4
27936-26	10-113474-4S-1-26	4
27936-30	10-113474-4S-1-30	4
27936-50	10-113474-4S-1-50	4
27936-62	10-113474-4S-1-62	4
27936-78	10-113474-4S-1-25	4
27936-90	10-113474-4S-1-90	4
	10-113474-4S-25M	4
27937	10-113474-1S	0
27937-45	10-113474-1S-45	0
27937-50	10-113474-1S-50	0
27937-78	10-113474-1S-25	0
27937-90	10-113474-1S-35	0
27937-107	10-113474-1S-107	0

