

VEAM

CIR Series Assembly Guide



ITT

ENGINEERED FOR LIFE

ITT Corporation

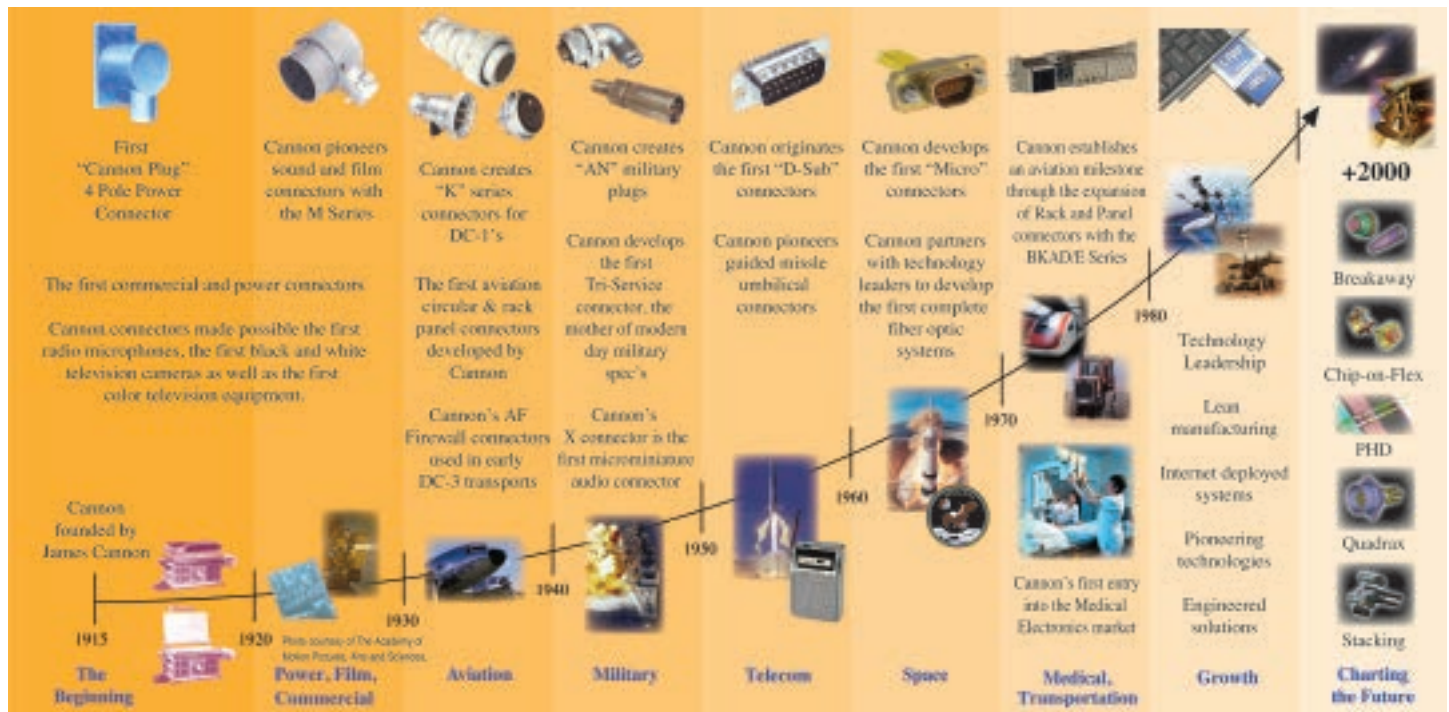
A Historical Achievement of Technology Leadership

Defining and Championing Innovation

Showcasing a portfolio of creativity, ITT's "Engineered For Life" execution embraces products which have become ubiquitous in a broad collection of markets including: Military/Aerospace, Civil Aircraft, Industrial Instrumentation, Medical, Oil & Gas, Energy, Transportation, Telecom/Handset, Computer, Consumer, and Automotive.

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- Commercial and military communications systems, linking the voices of the world.
- Computerized tools, reshaping the information highway.
- Aircraft, rapid transit, and automobiles, mobilizing our expanding society.
- Oil and natural gas production, powering the world's economies.
- Agricultural equipment, attacking the roots of world hunger.



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Interconnect Solutions is a division of the multi-national ITT Corporation, a \$11.6 billion dollar global enterprise representing the brands Cannon, VEAM, and BIW. Our connector portfolio remains the most extensive in the industry offering the most reliable and cost effective range of interconnect solutions. These innovations have enabled ITT to provide products and technologies to such markets as:

- Automotive
- Computer/Consumer
- Industrial/Instrumentation
- Military/Aerospace
- Oil Fields
- Telecom/Handset
- Transportation

When you specify a Interconnect Solutions connector, you can rely on a product designed, developed, and manufactured to the highest quality and reliability standards. This tradition of excellence is based on ITT's corporate culture of operating its businesses under the principles of Six Sigma. At ITT, Six Sigma is not just a quality philosophy but a complete corporate culture that drives the entire business. Our Value Based Management and Value Based Product Development systems are two cornerstones that allow for the development of both leadership and product engineering principles, ensuring the correct industry leading products are developed to the accepted market driven lead times. These principles have allowed ITT to become the market leader in all of our business portfolios.

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ITT operates manufacturing facilities in the United States, Germany, Italy, Mexico, China, Japan and the UK, all of which have particular product area strengths allowing ITT to offer a truly global footprint to our customers. Our facilities are world class and accommodate full vertical integration utilizing the latest manufacturing technologies including: automated and robotic machining centers, Super Market manufacturing cells, Kanban pull systems, and automated electrical, mechanical, and optical test and inspection equipment. The combination of our manufacturing strength and our

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As the industry leader in harsh environment interconnect applications, ITT's world class engineering teams will work directly with our customers to design and develop cost effective solutions for their applications. In many cases we may modify one of our standard designs to ensure a highly reliable solution where timing is critical. Yet, in those cases where a complete custom interconnect solution is required, ITT will work with our customer's Engineers to design an interconnect solution which will be cost effective yet highly reliable. As professional consultants, our Engineering teams will provide a thorough systems and mechanical analysis of any proposed solution. These analyses provide our customers with sophisticated electrical signal and mechanical characterizations to determine the best solution for their application.

RoHS Compliance Information

ITT has implemented a strict parts control plan for all ITT electronics plants worldwide that allows the Cannon, VEAM, and BIW connector product portfolios to meet the requirements of European Union Directive 2002/95/EC better know as the Reduction of Hazardous Substances initiative. As appropriate, specific Cannon, VEAM, and BIW products may be ordered with an R prefix number which insures our customers will receive RoHS compliant parts for their commercial electronics applications and equipment. Since most RoHS hazardous substances center around specific metal plating and lead solder coatings, ITT's products for RoHS compliance are available in the following plating finishes: electroless nickel, stainless steel, Anodize over aluminum and Gold plating. It should be noted that gold plating would be recommended as the replacement for tin-lead solder when ordering board mount connectors.



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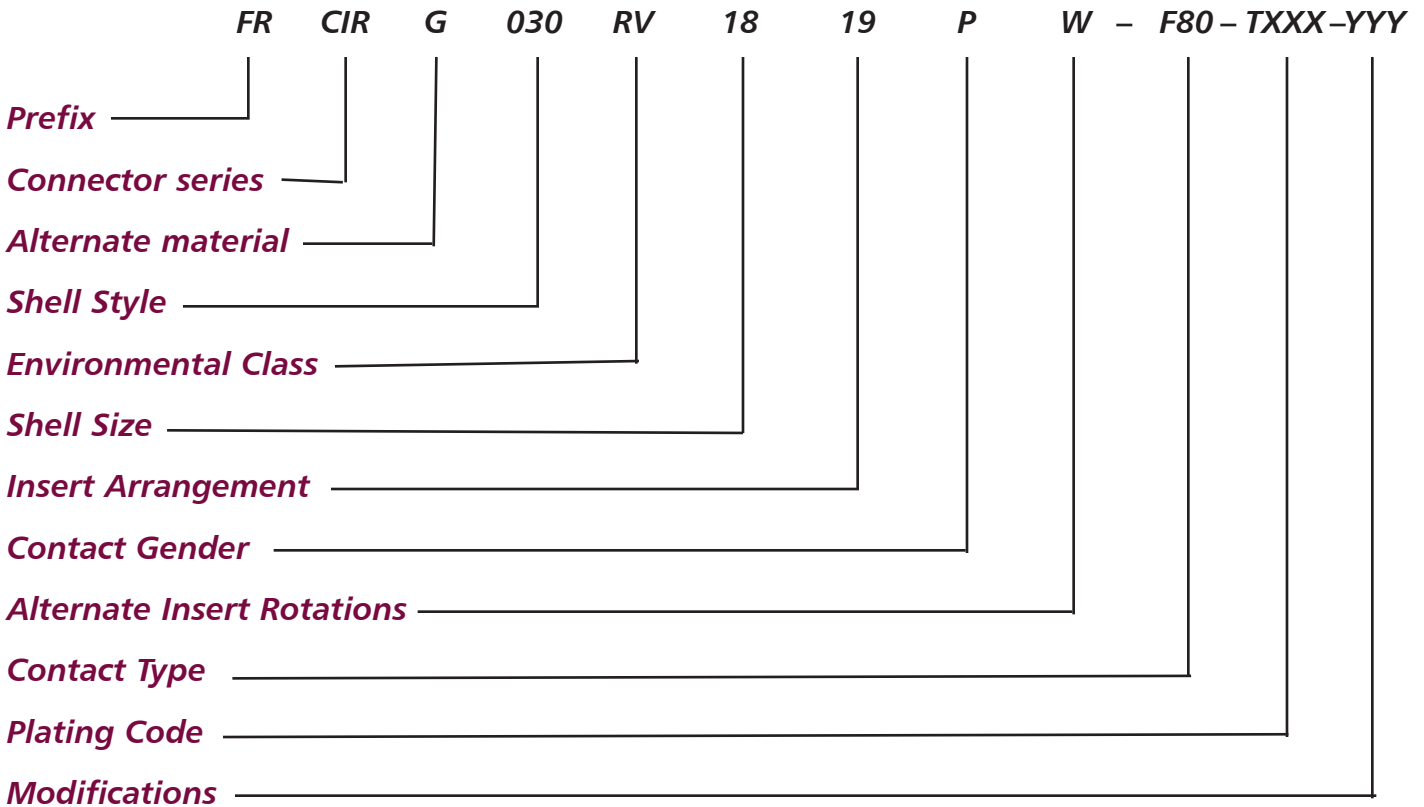


Table I

Insert Arrangement Service Rating

Service Rating	Operating Voltage DC (at sea level)	Operating Voltage AC (at sea level)
I	250 V	200 V
A	700 V	500 V
D	1250 V	900 V
E	1750 V	1250 V
B	2450 V	1750 V
C	4200 V	3000 V

Table II

Contact Rating

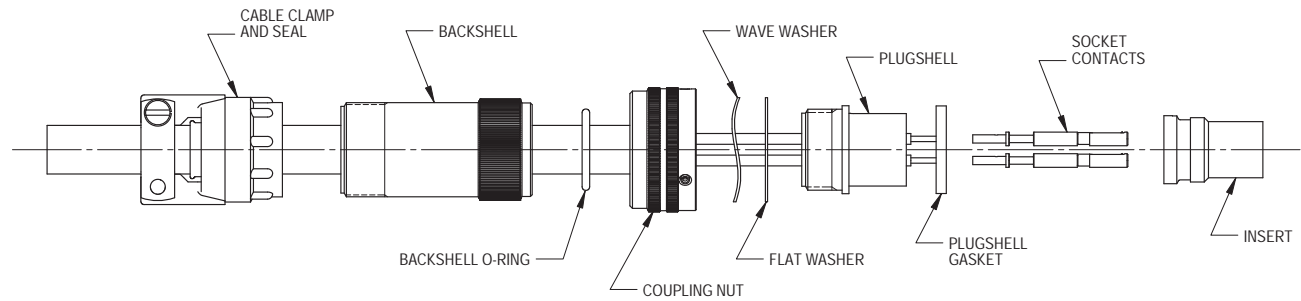
Contact Size	Maximum Current	Rated And Test Current *	Potential Drop Millivolts Maximum *
20	7.5 A	7.5 A	83 mV
18	10 A	7.5 A	83 mV
16-16S	22 A	13 A	74 mV
12	41 A	23 A	63 mV
8	73 A	46 A	65 mV
4	135 A	80 A	58 mV
0	245 A	150 A	53 mV
4/0	350 A	225 A	53 mV

Table III

Dielectric Strength (Standard at Seal Level Conditions)

Service Rating	Minimum Flashover AC RMS	Test Voltage AC RMS (Hi Pot)
I	1400 V	1000 V
A	2800 V	2000 V
D	3600 V	2800 V
E	4500 V	3500 V
B	5700 V	4500 V
C	8500 V	7000 V



**Figure 1****Exploded View of a typical "Plug" connector**

All mating connectors can be classified as either plugs or receptacles. A mating set, consisting of a plug and a receptacle, can be male and female or female and male. A general rule of thumb is to specify socket contacts in the connector identified as the current source. A typical plug connector is illustrated in Figure 1.

The Basic CIR Plug Connector**Plug Connector Description**

The basic VEAM plug design has a variety of accessories available including backshells, cable clamps, and wire sealing grommets with associated compression rings, and gland seals for jacketed cables and bushings. Proper selection of accessory hardware can protect your connections in harsh environments and avoid costly down time for repairs. Please consult the VEAM Technical Service Department for assistance in proper selection.

The basic CIR plug connector consists of the following parts:

- A. Plugshell- Holds the insulator (insert) and retains contacts.
- B. Insert - Bonded plugshell insulator to hold contacts firmly. Not removable.
- C. Contacts - Crimped or soldered to the wire depending on type. (Crimp contacts are supplied loose. Solder contacts are factory installed except for sizes 8, 4, and 0). Crimp contacts are designated by F80 in the part number.
- D. Plugshell Gasket - Square cross section gasket used to seal the plugshell-receptacle interface when the connectors are mated.
- E. Wave Washer - Ensures positive locking and dynamic seal compression when the connectors are coupled.
- F. Flat Washer - Presents a smooth bearing surface for the wave washer.
- G. Coupling Nut - Provides cam action to pull and lock mating plugs and receptacles. Also exerts a cam force for separating the connectors when uncoupling.
- H. Backshell - An accessory which screws onto the rear of the plug or receptacle shell. Contains the wire terminations and provides an interface for other accessories - cable clamps, conduit terminations, etc. Note: Adequate backshell length is important to ensure sufficient working room.
- I. Backshell O-Ring - Maintains a waterproof seal on the thread interface.
- J. Cable Clamp - An accessory which screws onto a backshell to provide cable jacket seal and/or strain relief for individual wire bundles.
- K. Grommet - Compressible elastomeric seal for individual wire terminations.
- L. Compression Ring - A nylon or metal cone which compresses a grommet to seal on the individual conductors when the backshell is in position.

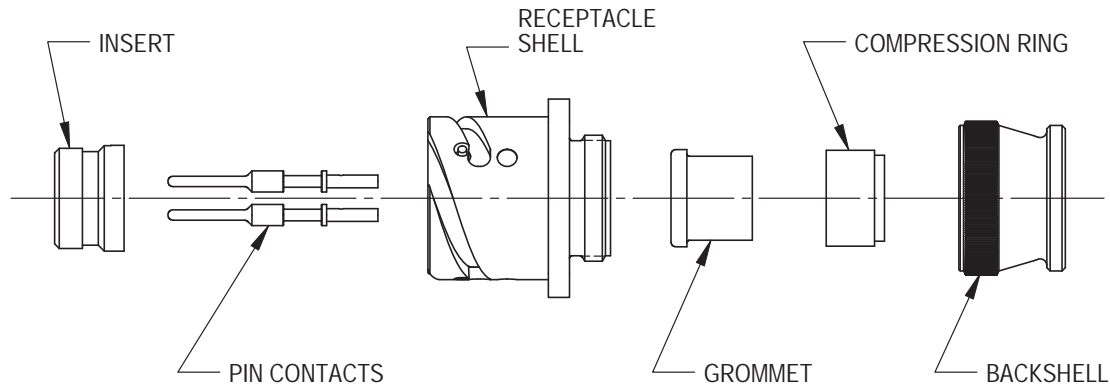


Figure 2

Exploded View of a typical "Receptacle" connector

The Basic CIR Receptacle Connector

Receptacle Parts Description

The basic parts of the receptacle connector are:

A. Receptacle Shell- Usually the fixed half of a mated connector pair. Coupling ramps provide cam action for mating or demating. A stainless steel lock ring at the top of the coupling ramp guarantees long service life and positive locking.

B. Insert - Contact insulator which is bonded within the receptacle to hold the contacts firmly. The insert is not removable.

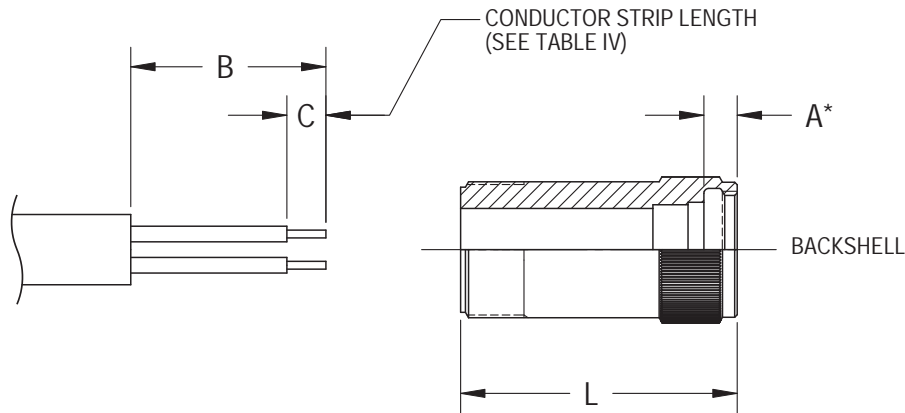
C. Contacts - Crimped or soldered to the wire depending on type. (Crimp contacts are supplied loose. Solder contacts are factory installed except for sizes 8, 4, and 0).

D. Grommet - Resilient rubber wire sealing device prevents moisture entry into contact wire interface area.

E. Compression Ring - A nylon or metal cone which compresses a grommet to seal on the individual conductors when the backshell is in position.

F. Backshell - An accessory which screws onto the rear of the receptacle shell or plugshell. Contains the wire terminations. Holds grommet and compression ring and/or other accessories in place. A wide variety of backshells are available for various applications.

All plug connector accessory hardware can be used with any receptacle connector.



* - Dim. A is from the front of the backshell to the bases of the O-Ring groove

Figure 3

Jacketed Cable Termination

Procedure

Recommendation: As cables differ from manufacturer to manufacturer and even lot to lot from the same manufacturer we recommend you make up one assembly first to familiarize yourself with cable lay and wire cross overs.

A. When terminating a jacketed cable in application that require sealing the backshell onto the jacket, to guarantee effective sealing, the jacket strip length must be precisely determined. This ensures proper location of the gland seal in the cable clamp mechanism. Strip length for the jacket must also be maximized to permit adequate “working room.” This permits the assembler to crimp contacts onto wires and insert them into connectors.

B. To calculate strip length for the jacket (Dimension B): Subtract Dimension A from Dimension L.

C. Use care in removing the jacket and any cable filler material. Cuts or nicks in the wire insulation can generate problems.

D. Strip individual wires according to Table IV below:

Table IV

Contact Size	Crimp Contact P/N		Conductor Strip Length Dimension C	
	Pin	Socket	(mm)	inch
20	46730-20	46731	(4.8)	.18
18	46740P	46740S	(4.8)	.18
16S	27911	27961	(6.4)	.25
16	27913	27963	(6.4)	.25
12	27914-26	27964-26	(8.5)	.33
8	27915	27935	(12.7)	.50
4	27916	27936	(12.7)	.50
0	27917	27937	(14.0)	.55
4/0	47107-165	47114-165	(23.0)	.90
	Solder Contact P/N			
	Pin	Socket		
16S	27901	27951	(6.4)	.25
16	27903	27953	(6.4)	.25
12	27904	27954	(9.5)	.37
8	27905	27925M	(12.7)	.50
4	27906	27926	(15.9)	.62
0	27907	27927	(16.0)	.63



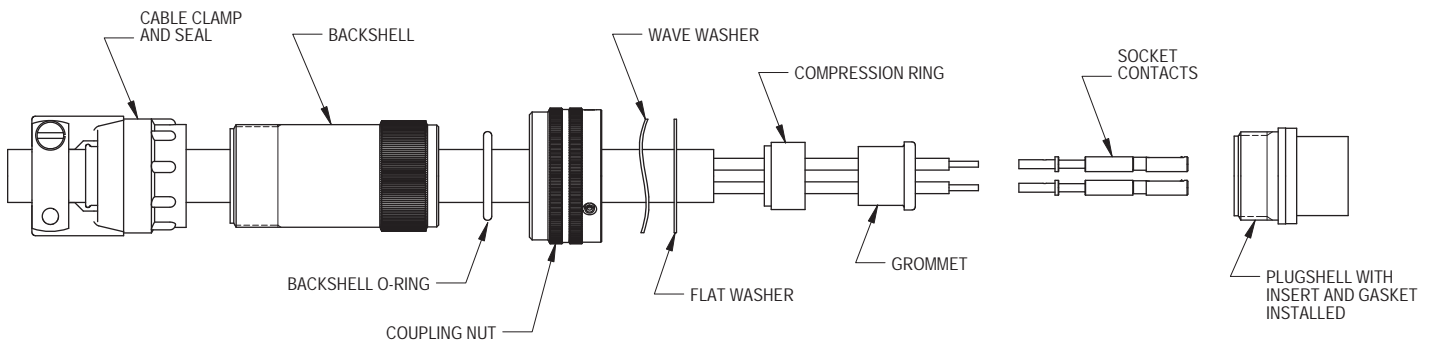


Figure 4

Jacketed Cable Connector Assembly Sequence

Procedure (continued)

E. Assemble the connector components onto the cable in the order shown in Figure 4.

F. Double check the cable clamp sealing range to be certain it is sized properly for your cable. Page 28, Dimension B.

G. Crimp contacts onto wires following the step-by-step instructions on pages 17-23.

H. Using the proper insertion tool (see page 32-33)*, with a straight motion, push the contacts from rear of the insert into the proper cavity until seated. See table V, on page 11 for seating dimensions.

* When installing size 12 or smaller female contacts, guide pins should be used to ease entry and prevent shaving the insert retention shoulders. See Page 12 for installation. Use isopropyl alcohol **only** as a lubricant. The extraction tool can be used to reposition the contacts if they are inserted too deeply.

I. Place flat washer and wave washer into the coupling nut and then slide forward over the plugshell.

Note: Wave washer split must bear against the flat washer.

J. Couple the plug onto a mating receptacle shell or dummy receptacle (clamp the receptacle horizontally in a vise).

K. Slide the wire sealing grommet** forward over the contact wire junctions. Make certain any alcohol has evaporated.

L. Slide the compression ring** forward over the rear of the grommet.

M. Check to make certain that the backshell O-ring** is installed into its internal groove.

** if supplied

N. Slide the backshell forward and screw it onto the rear of the plugshell. Proper torque values are shown in Table VI, page 12.

O. Slide the cable clamp (if provided) forward and screw onto the rear of the backshell using the same torque values. Use isopropyl alcohol **only** as a lubricant. Page 28 shows the clamp size and cable sealing range with and without a bushing.

P. Perform a continuity check to insure all wires in the cable are properly terminated. Label as required.

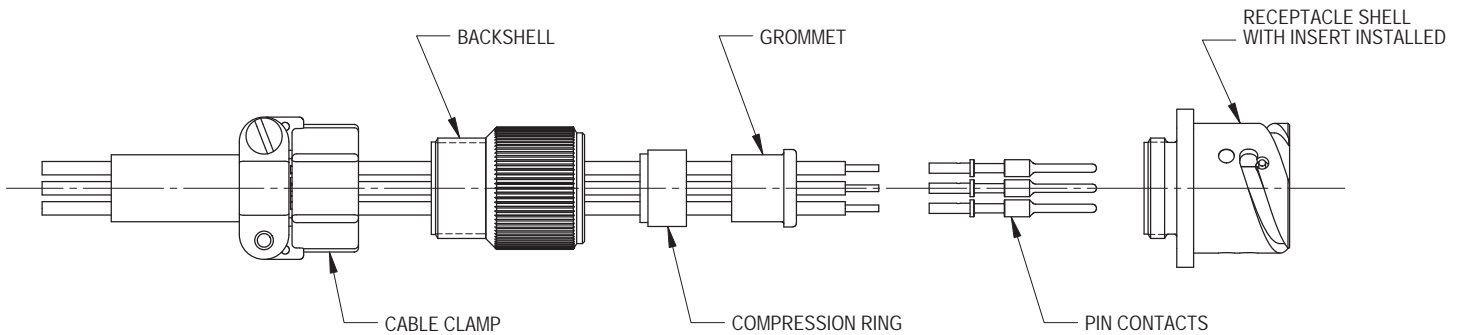


Figure 5

Individual Wire Termination Procedure (Shown on receptacle connector)

- A. Strip ends of the wires according to Table IV, page 9.
- B. Slide connector components onto the cable in the order shown in Figure 5. Double check the cable clamp sealing range to be sure it is sized properly for your wire bundle (listed on page 27). **Important: Install wires through the grommet in the same orientation as they will be installed into the insert.**
- C. Crimp contacts onto wires following the step-by-step instructions on pages 17-23.
- D. Grasp the receptacle flange gently in a vise to hold it firmly. Cushion the vise jaws to protect the connector finish.
- E. Using the proper insertion tool (pages 32-33), push the contacts into the proper cavity with a straight push until seated. Use isopropyl alcohol **only** as a lubricant. The proper seating dimension is per Table V. Use the extraction tool to reposition the contacts if inserted too deeply.

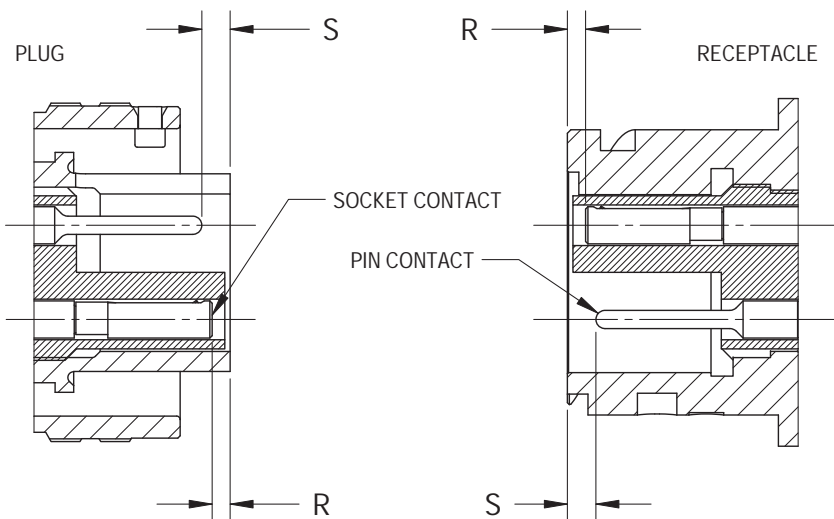
Consult our customer service department for seating dimensions of special insert arrangements: 16A-10, 18-1, 22-27, 24A-6, 24-2GM, 32A-69, 32-101, 32A-1, 36A-72, 40A-5.

Table V

SEATING DIMENSIONS		
SIZE	Pin Contact	Socket Contact
	S dim (+ .032")	R dim (+ .032")
20	.433	.059
18	.307	.118
16S	.095	.095
16	.280	.095
12	.095	.095
8*	.236	.200
8	.095	.095
4	.095	.095
0	.095	.095
4/0	.098	.098

Dimensions are in inches.
 * (Coax)
 Note: All contacts do not need to be the exact same height when seated but must fall within the seating dimensions and tolerances stated in Table V as measured from the top of the shell to the top of the contact (see Figure 6).

Figure 6



Important: When installing size 12 or smaller female contacts, guide pins should be used to ease entry and prevent shaving of the shoulders in the insert (See figure 7). Use isopropyl alcohol **only** as a lubricant.

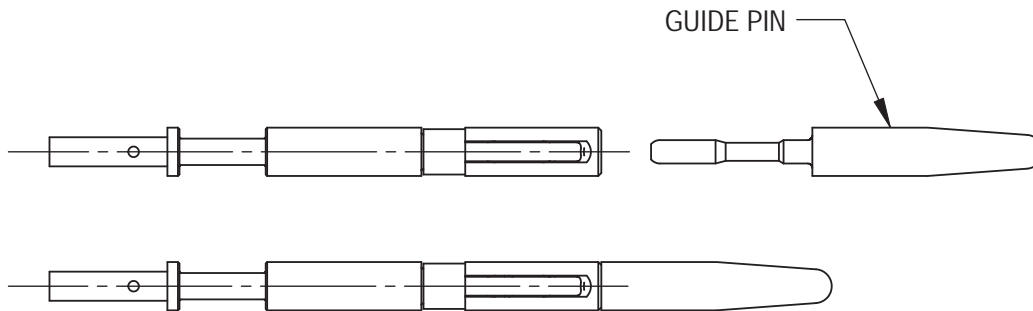


Figure 7

- F. Slide the wire sealing grommet** forward over the contact wire junctions.
- G. Slide the compression ring** forward over the rear of the grommet.
- H. Be sure that the backshell O-ring** is installed into its internal groove.
- I. Slide the backshell forward and screw onto the rear of the plugshell using a torque wrench or a strap wrench (see page 34). Proper torque values are shown in Table VI.
- J. Slide the cable clamp** forward and screw onto the rear of the backshell using the same torque values.
- K. Perform a continuity check to insure all wires in the cable are properly terminated. Label as required.

** if supplied

Table VI

<i>Recommended Torque Forces Connector Backshells/Clamps</i>			
<i>Size</i>	<i>In. lb Min/Max</i>	<i>Size</i>	<i>In. lb Min/Max</i>
10SL	26/31	22	87/104
14S	44/49	24	96/130
16	57/66	28	121/165
16S	57/66	32	130/182
18	61/69	36	165/235
20	69/87	40	182/347

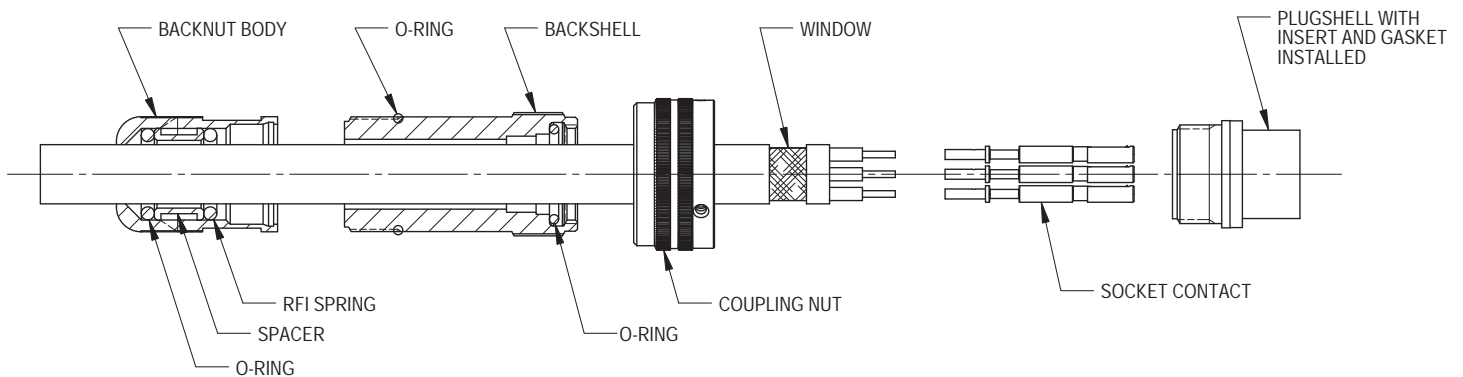
Styles WK1, SB

Termination of shielded cables is sometimes necessary to provide RFI or EMI assembly protection. The CIR Series has numerous methods for attaching shield braid to the connector backshell. Two of the most popular types are described below. For other types, consult our customer service department.

Style WK1 Termination

The Style WK1 termination method utilizes a stainless steel garter spring that concentrically closes to mechanically grip and electrically terminate the overall shield to the connector backshell. The assembly also incorporates an O-Ring. It closes down on the cable jacket providing a high pressure environmental seal.

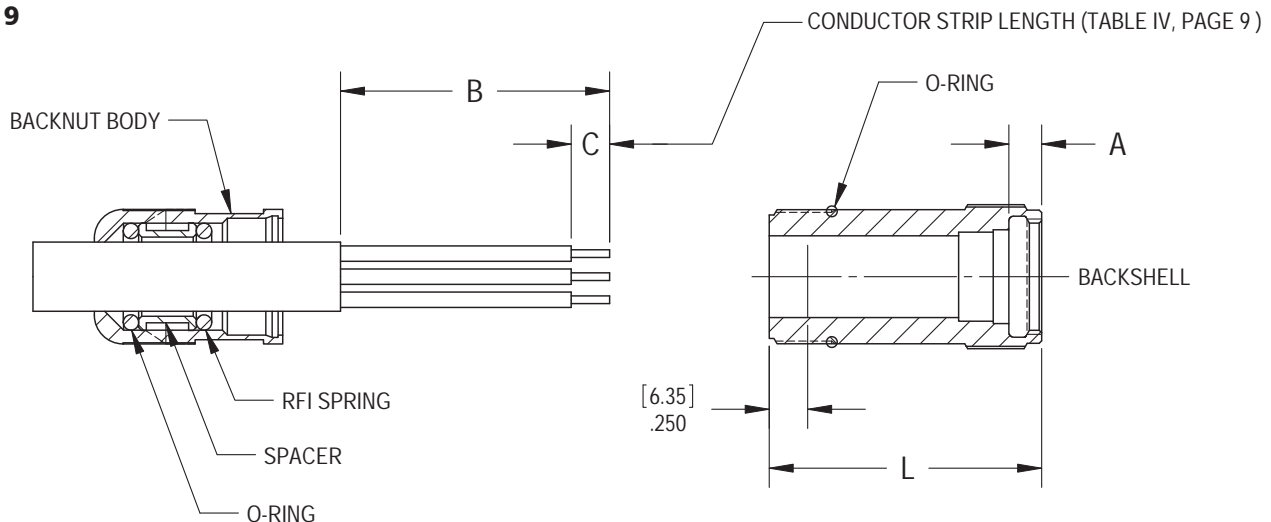
Figure 8



1. Strip the jacket and shield away from the individual conductors to a length corresponding to Dimension B - see Figure 10 and Table IV, page 9. Use caution. Do not nick the wire insulation.

To determine jacket strip length "B," subtract dimension "A" and .250 from "L." Dimension "A" is from the front of the backshell to the base of the O-Ring groove.

Figure 9



2. Open a "window" in the cable jacket .300 wide and .200 inches back from the stripped end as shown in Figure 10.

3. Strip the individual wires according to Dimension C, Table IV, page 9.

Figure 10

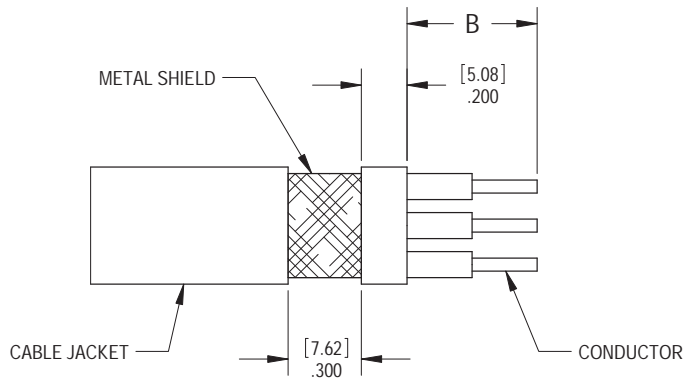


Table VI A
Backnut Assembly Torque Values

P/N Suffix Designation	Cable Range min	Cable Range max	Inch Pounds Min.	Newton Meter
-01	.062	.125	15	1.73
-02	.125	.250	20	2.30
-03	.250	.375	30	3.45
-04	.375	.500	35	4.03
-05	.500	.625	40	4.60
-06	.625	.750	45	5.18
-07	.750	.875	50	5.75
-08	.875	1.000	55	6.33
-09	1.000	1.125	60	6.90
-10	1.125	1.250	65	7.48
-11	1.250	1.375	70	8.05
-12	1.375	1.500	75	8.62
-13	1.500	1.625	75	8.62
-14	1.625	1.750	75	8.62
-15	1.750	1.875	75	8.62
-16	1.875	2.000	75	8.62

4. Disassemble the connector and slide the components back over the cable as shown in Figure 11.

5. Crimp contacts onto the wires. Follow step-by-step instructions on pages 17 to 23.

6. Using the proper insertion tool (pages 32-33),* push contacts from rear of the insert into the proper cavity using a straight push until seated. For proper seating dimension See Table V page 11. Use isopropyl alcohol **only** as a lubricant.

* **Important: if installing size 12 or smaller female contacts, guide pins should be used to ease entry and prevent shaving of the insert retention shoulders. (See Figure 7, Page 12).**

7. Place flat washer and wave washer into the coupling nut and then slide forward over the plugshell.

Note: Wave washer split must bear against the flat washer.

8. Couple plug onto a mating receptacle shell or dummy receptacle. Clamp the receptacle horizontally in a vise.

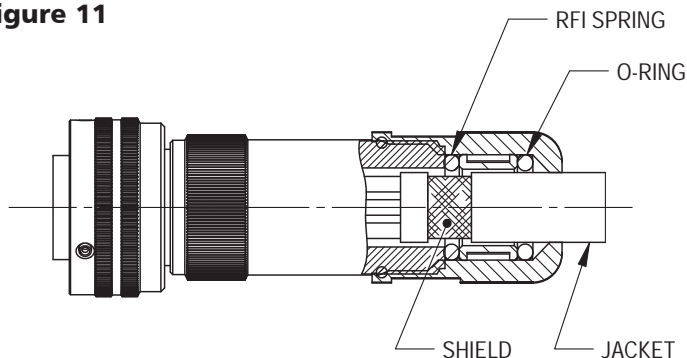
9. Insure that backshell O-Ring (if supplied) is installed into its internal groove.

10. Slide the backshell forward and screw it onto the rear of the plugshell. Proper torque values are shown in Table VI, page 12. The shield window will be in the area of the base of the 45 degree angle chamfer at the rear of the backshell, as shown in Figure 11.

11. Slide the backnut assembly forward. Screw it onto the backshell using the torque values listed in table VI A.

12. Perform a continuity check to ensure all wires on the cable are terminated properly and that the shield is electrically connected to the backshell. Assembled view is shown in Figure 11.

Figure 11



Style SB Termination

This style SB termination method uses a backshell with a screw-on backnut to capture the braid thereby mechanically and electrically terminating it to the backshell. Because there is no sealing provision for jacketed cable with this design, for environment protection, a knurl on the backnut and a rib on the backshell provide retention for a heat shrink.

Figure 12a

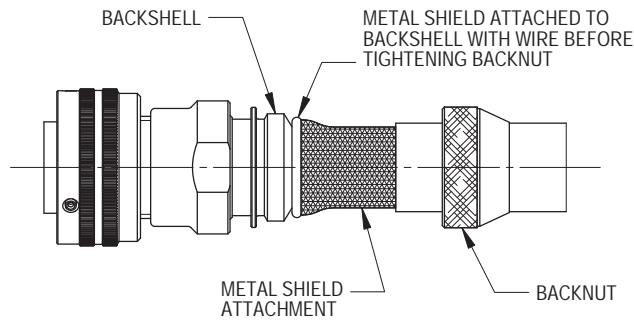
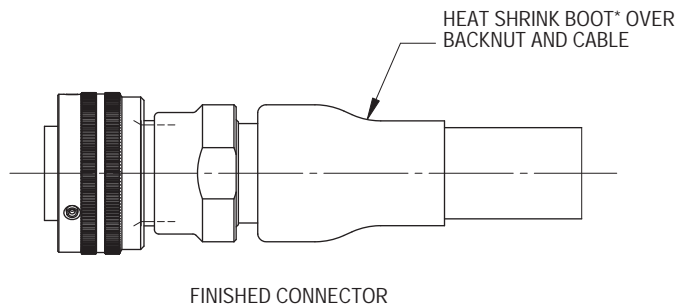


Figure 12b



* - Consult VEAM Customer Service for Heat Shrink Boots.

1. Strip back outer jacket and remove any filler material. Nicks are not permissible on the conductor insulation. Use Table VII to determine the proper strip length.

Figure 13

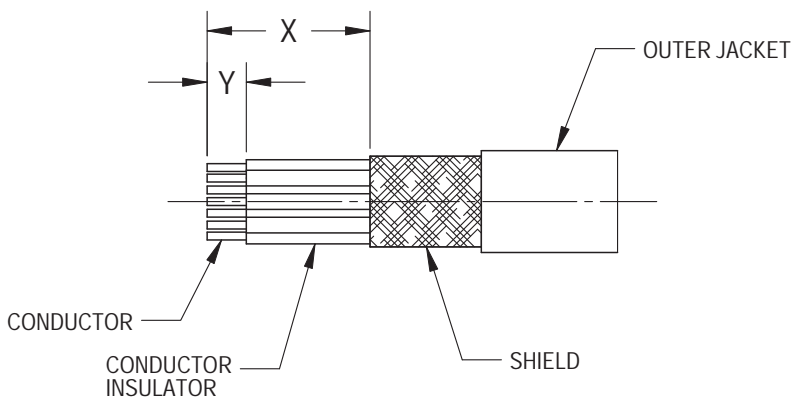


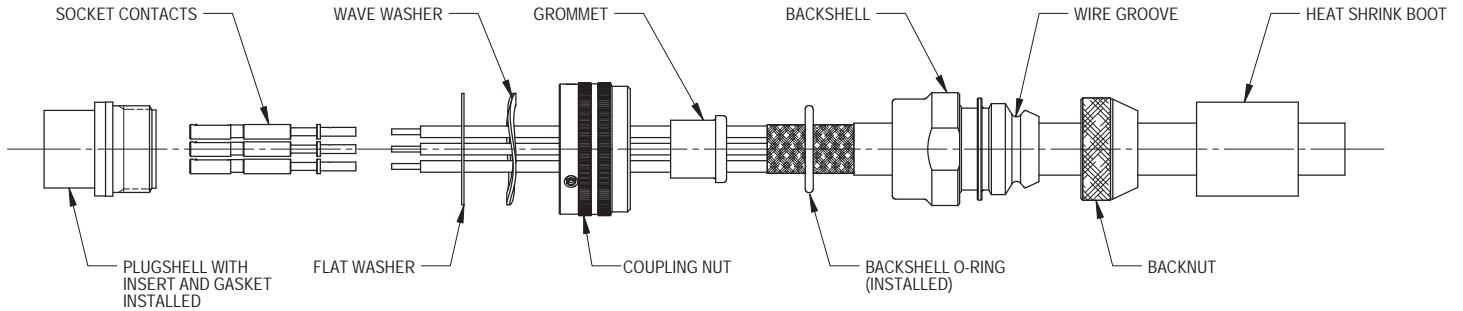
Table VII

Size	X	Y
10SL	53	23
14S	53	23
16	53	24.5
16S	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

Dimensions are in mm.

2. Slide connector components back over the cable as shown in Figure 14.

Figure 14



3. Strip the individual wires according to Table IV page 9.

4. Crimp the contacts onto the wires following the step-by-step instructions on pages 17-23.

5. Using the proper insertion tool (refer to pages 32-33),* push contacts into the proper cavity with a straight push until seated. Check proper seating dimension per Table V, page 11. Use isopropyl alcohol **only** as a lubricant.

*** Important: if installing size 12 or smaller female contacts, guide pins should be used to ease entry and prevent shaving of the insert (See Figure 7, Page 12). Use the extraction tool to reposition the contact if inserted too deeply.**

6. Place flat washer and wave washer into the coupling nut and then slide forward over the plugshell.
Note: Wave washer split must bear against the flat washer.

7. Couple plug onto a mating receptacle shell or dummy receptacle. Clamp the receptacle horizontally in a vise.

8. Push the grommet forward over cable and bring to bear against back of insert in plugshell.
Important: A separate compression ring is not required with the SB style backshell. Compression ring geometry is duplicated within the backshell body.

9. Slide the backshell forward. Tighten it onto the rear of the plugshell using an adjustable wrench.

10. Pull the metal shield up over the wire groove in rear of backshell. Bring to bear against back of threads. Do not cover threads with the metal shield. See Figure 12A, page 15.

11. Wrap a precut length of steel wire completely around portion of metal shield that is positioned over wire groove in the backshell. Using pliers, twist ends of wire together until the shield is securely held inside the groove. Trim off any excess wire or shield braid.

12. Slide the backnut forward over the cable. Tighten securely to the backshell, using a strap wrench.

13. Slide a heat shrink boot up over the rear of the connector until it covers the backnut and metal cable shield. Cover completely.

14. Shrink the boot with a heat gun. After the shrink boot cools, check to make sure the backnut and metal shield are sealed. See Figure 12B, page 15.

15. Perform a continuity check on wiring and verify proper assembly per the schematic.

Table VIII

Contact Size	Wire Size AWG	VEAM Contact Number	AF8 or M22520/1-01 Hand Tools			Model 400 BHD Pneumatic		Model 500 D Pneumatic	
			Turret	Setting	Color	Die Part No.	Locator Part No.	Die Part No.	Locator Part No.
20P	20	46730-20P	616266	20/4	Red	.....	.....	.....	.....
20S	20	46731	616266	20/4	Green	.....	.....	.....	.....
18P	18	46740P	TH485	20/4	Yellow	.....	.....	.....	.....
18S	18	46740S	TH485	20/4	Red	.....	.....	.....	.....
18P	20-22	46740-15P	TH485	20/4	Yellow	.....	.....	.....	.....
18S	20-22	46740-15S	TH485	20/4	Red	.....	.....	.....	.....
18P	16	46740-22P	TH485	16/6	Yellow	.....	.....	.....	.....
18S	16	46740-22S	TH485	16/6	Red	.....	.....	.....	.....
16S P	16	27911	616266	16/6	Red	414DA-16N	4314-2	.....	.....
16S S	16	27961	616266	16/6	Red	414DA-16N	4314-1	.....	.....
16S P	20-24	27911-13	616266	20/4	Red	.....	.....	.....	.....
16S S	20-24	27961-13	616266	20/4	Red	.....	.....	.....	.....
16S P	20	27911-15	616266	18/5	Red	414DA-16N	4314-2	.....	.....
16S S	20	27961-15	616266	18/5	Red	414DA-16N	4314-1	.....	.....
16S P	14-16	27911-20	616266	16/6	Red	414DA-12N or 16N	4314-2	.....	.....
16S S	14-16	27961-20	616266	16/6	Red	414DA-12N or 16N	4314-1	.....	.....
16S P	12-14	27911-26	616266	12/8	Red	414DA-12N	4314-1	.....	.....
16S S	12-14	27961-26	616266	12/8	Green	414DA-12N	4314-2	.....	.....
16 P	16	27913	616266	16/6	Blue	414DA-16N	4332	.....	.....
16 S	16	27963	616266	16/6	Green	414DA-16N	4332	.....	.....
16 P	24-26	27913-08	616266	20/4	Blue	.....	.....	.....	.....
16 S	24-26	27963-08	616266	20/4	Green	.....	.....	.....	.....
16 P	20-22	27913-12	616266	20/4	Blue	.....	.....	.....	.....
16 S	20-22	27963-12	616266	20/4	Green	.....	.....	.....	.....
16 P	20-24	27913-13	616266	20/4	Blue	.....	.....	.....	.....
16 S	20-24	27963-13	616266	20/4	Green	.....	.....	.....	.....
16 P	18-20	27913-15	616266	20/5	Blue	414DA-16N	4332	.....	.....
16 S	18-20	27963-15	616266	20/5	Green	414DA-16N	4333	.....	.....
16 P	14-16	27913-20	616266	16/6	Blue	414DA-12N or 16N	4332	.....	.....
16 S	14-16	27963-20	616266	14/7	Green	414DA-12N or 16N	4333	.....	.....
16 P	12-14	27913-26	616266	12/8	Blue	414DA-12N	4332	.....	.....
16 S	12-14	27963-26	616266	12/8	Green	414DA-12N	4333	.....	.....
12 P	8	27914-8	.....	.....	.....	414DA-8HEX or 8N	4330M	.....	.....
12 S	8	27964-8	.....	.....	.....	414DA-8HEX or 8N	4331M	.....	.....
12 P	20-22	27914-12	616266	20/4	Green	.....	.....	.....	.....
12 S	20-22	27964-12	616266	20/4	Green	.....	.....	.....	.....
12 P	14-18	27914-20	616266	12/8	Green	414DA-10N	4330	.....	.....
12 S	14-18	27964-20	616266	12/8	Green	414DA-10N	4331	.....	.....
12 P	2.5mm ²	27914-22	616266	12/8	Green	414DA-10N	4330	.....	.....
12 S	2.5mm ²	27964-22	616266	12/8	Green	414DA-10N	4331	.....	.....
12 P	12	27914-26	616266	12/8	Green	414DA-12N or 10N	4330	.....	.....
12 S	12	27964-26	616266	12/8	Green	414DA-12N or 10N	4331	.....	.....
12 P	4mm ²	27914-30	.....	.....	.....	414DA-10N	4330	.....	.....
12 S	4mm ²	27964-30	.....	.....	.....	414DA-10N	4331	.....	.....
12 P	10	27914-38	.....	.....	.....	414DA-10N	4330	.....	.....
12 S	10	27964-38	.....	.....	.....	414DA-10N	4331	.....	.....

Table VIII

Contact Size	Wire Size AWG	VEAM Contact Number	AFB Hand Tool	Model 400 BHD Pneumatic		Pneumatic Model 500 D	
			Turret	Die Part Number	Locator Part Number	Die Part Number	Locator Part Number
8P	4 mm sq	27915-30	---	414DA-10N	4329	---	---
8S	4 mm sq	27935-30	---	414DA-10N	4329	---	---
8P	10	27915-38	---	414DA-10N	4329	---	---
8S	10	27935-38	---	414DA-10N	4329	---	---
8P	6	27915-58	---	414DA-8 HEX	4329	514DA-8 HEX	5497
8S	6	27935-58	---	414DA-8 HEX	4329	514DA-8 HEX	5497
8P	8	27915	---	414DA-8 HEX OR 8N	4329	514DA-8 HEX	5404
8S	8	27935	---	414DA-8 HEX OR 8N	4329	514DA-8 HEX	5404
8P	12-14	27915-26-62	---	414DA-8N	4329	514DA-8 HEX	5404
8S	12-14	27935-26-62	---	414DA-8N	4329	514DA-8 HEX	5404
8P	12-14	27915-26	---	414DA-10N	4329	---	---
8S	12-14	27935-26	---	414DA-10N	4329	---	---
4P	4 AWG 6 AWG	27916	---	414DA-4 HEX 414DA-8N or 8 HEX	4043	514DA-4 HEX 514DA-8N or HEX	5497
4S	4 AWG 6 AWG	27936	---	414DA-4 HEX 414DA-8N or 8 HEX	4043	514DA-4 HEX 514DA-8N or HEX	5497
4P	2.5 mm sq.	27916-22	---	414DA-12N	4043	---	---
4S	2.5 mm sq.	27936-22	---	414DA-12N	4043	---	---
4P	16 mm sq	27916-62	---	414DA-4 HEX	4043	514DA-4 HEX	5497
4S	16 mm sq	27936-62	---	414DA-A HEX	4043	514DA-4 HEX	5497
0P	0	27917V	---	---	---	---	---
0S	0	27937V	---	---	---	514DA-0 HEX	5441
0P	8	27917-45	---	---	---	514DA-0/8 HEX	5442
0S	8	27937-45	---	---	---	514DA-0/8 HEX	5441
0P	10 mm sq	27917-50	---	---	---	514DA-0/8 HEX	5442
0S	10 mm sq	27937-50	---	---	---	514DA-0/8 HEX	5441
0P	16 mm sq	27917-62	---	---	---	514DA-4 HEX	5442
0S	16 mm sq	27937-62	---	---	---	514DA-4 HEX	5441
0P	25 mm sq	27917-78	---	---	---	514DA-4 HEX	5442
0S	25 mm sq	27937-78	---	---	---	514DA-4 HEX	8002
0P	35 mm sq	27917-90	---	---	---	514DA-0 HEX	5442
0S	35 mm sq	27937-90	---	---	---	514DA-4 HEX	5442
0P	50 mm sq	27917-107	---	---	---	514DA-4 HEX	5442
0S	50 mm sq	27937-107	---	---	---	514DA-0 HEX	5441
0P	4	46646-0	---	---	---	514DA-4 HEX	5441-F
0S	4	4764-0	---	---	---	514DA-4 HEX	5441-F
4/0 P	2	47107-90	---	---	---	514DA-0 HEX	5498-1
4/0 S	2	47114-90	---	---	---	514DA-0 HEX	5498-2
4/0 P	0 (1/0)	47107-115	---	---	---	514DA-0 HEX	5498-1
4/0 S	0 (1/0)	47114-115	---	---	---	514DA-0 HEX	5498-2
4/0 P	2/0	47107-135	---	---	---	514DA-2/0 HEX	5498-1
4/0 S	2/0	47114-135	---	---	---	514DA-2/0 HEX	5498-1
4/0 P	70 mm sq	47107-144	---	---	---	514DA-4/0 HEX	5487
4/0 S	70 mm sq	47114-144	---	---	---	514DA-4/0 HEX	5487
4/0 P	95 mm sq	47107-165	---	---	---	514DA-4/0 HEX	5487
4/0 S	95 mm sq	47114-165	---	---	---	514DA-4/0 HEX	5487
4/0 P	4/0	47107-165	---	---	---	514DA-4/0 HEX	5487
4/0 S	4/0	47114-165	---	---	---	514DA-4/0 HEX	5487

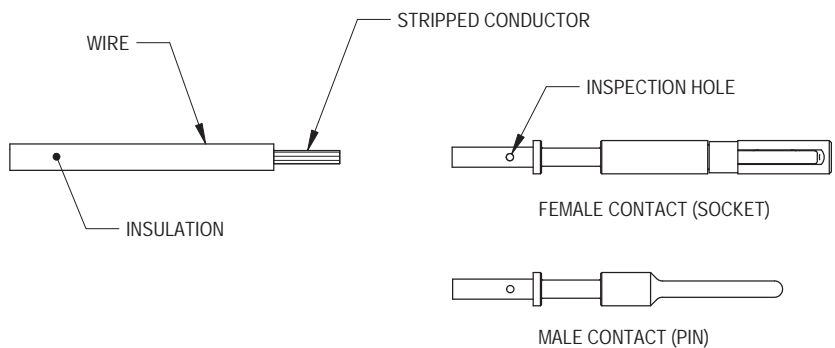
* TH378 & TH379 maybe combined into one turret under P/N 616266

1. Select the proper crimp tool and contact locator for the contact used from Table VIII. Contacts Size 8 and larger require a pneumatic crimper (See Page 22).
2. Install the proper turret or contact positioner onto the crimp tool frame. Per Table VIII.
3. Check crimp tool calibration with a Go No-Go gauge (refer to page 21 for AF8 calibration). Go No-Go inspection gauges are available- consult factory.
4. Set the tool for the contact being crimped as per Table VIII, page 17.
5. Insert stripped wire into the contact wire bucket.
6. Check inspection hole to see if the wire strands are evident. If you cannot see them, conductor strip length is too short. See Figure 15

Table IX

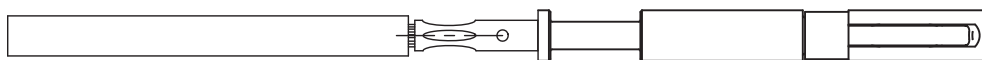
Crimp Retention Forces Per MIL-C-39029B		
Wire Sizes	Silver or Tin-Plated Copper Wire	Nickel Plated Copper Wire
	Pounds Minimum	Pounds Minimum
20	20	19
16	50	37
14	70	60
12	110	100
10	150	135
8	220	200
6	300	270
4	400	360
0	700	630
4/0	875	785

Figure 15



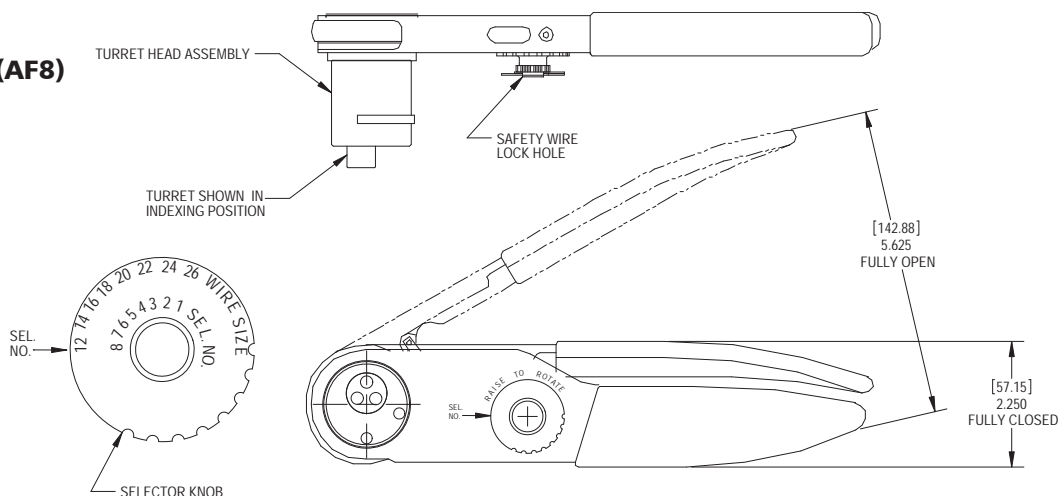
7. Insert the contact with the wire installed into the contact locating hole in the crimp tool positioner until it “bottoms” in the locating hole.
8. Activate crimp tool through one complete cycle.
Important: Tool ratchet action will not allow the contact to be removed in mid cycle.
9. Examine the crimp joint for proper crimp location (see Figure 16). Loose wire strands or cracks in the contact crimp area must not be allowed. Proper crimp retention forces are detailed in Table IX.

Figure 16



Crimping Tools - Set up and Calibration

Figure 17 Crimp Tool (AF8)



Crimp Tool Set Up - AF8 or M22520/1-01

1. Select proper turret from Table VIII, Page 17 and install it onto the AF8 crimp tool frame with the hex wrench supplied with the tool (9/64 hex).

Changing Turret Head

All turrets are attached by means of two socket head screws.

Press the trigger which releases the Turret to the indexing position.

With screws lined up with the tapped holes, place the selected Turret Head Assembly onto the retainer ring.

After the Turret Head Assembly is seated against the ring, tighten the socket head screws with a 9/64 inch Allen Wrench. Turret should index easily without binding.

To remove, loosen socket head screws until the threads are disengaged from the retainer ring and remove with a straight lifting motion.

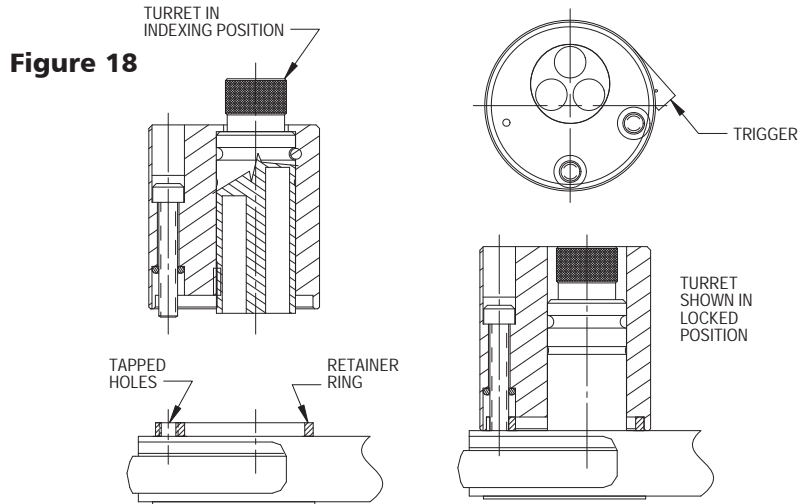


Figure 18

Using Indentor Closure Selector

Refer to data plate on Turret Head Assembly and Table VIII, page 17 for wire and contact size (Figure 19a).

Remove the spring clip lock from selector knob.

The tool must be in the open position when using selector.

Raise selector knob and rotate to desired selector setting (Refer to Table VIII, page 17). Replace the spring clip. The tools is ready for use. Repeat the instruction procedure when changing contact and/or wire sizes.

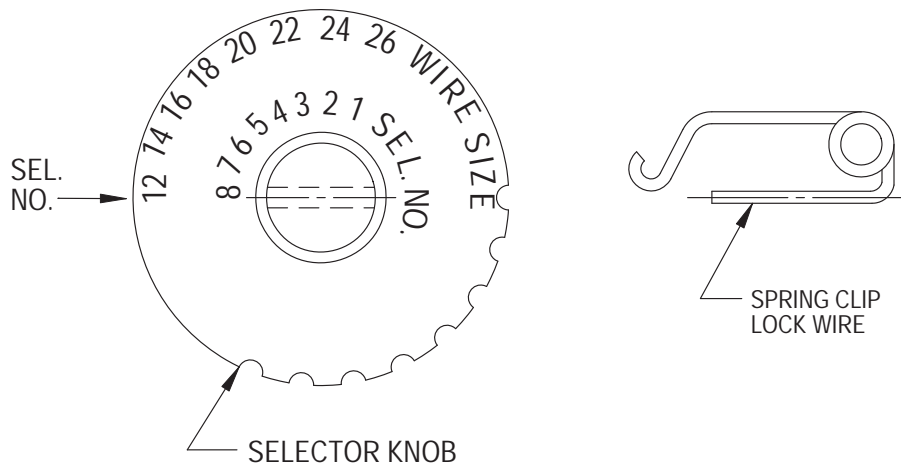
Figure 19a

Typical Data Plate

CONTACT	COLOR CODE	26	24	22	20	18	16	14	12	WIRE SIZE
-20	RED	1	2	3	4					SEL. No.
-16	BLUE				4	5	6			
-12	GREEN							7	8	

2. Adjust the indentor closure selector per Figure 19b.

Figure 19b



3. Index the turret head assembly for the proper contact per Figure 20.

Indexing Turret Head

Assemblies:

Press trigger to release the Turret to the indexing position.

Select the setting desired according to color coded data plate on Turret Head Assembly (Figure 19a) and Turret setting chart, page 17.

Index the Turret until the color coded positioner is lined up with the index mark on the Turret Head Assembly. The trigger will position the Turret.

Press the positioner until it snaps into locked position.

Figure 20

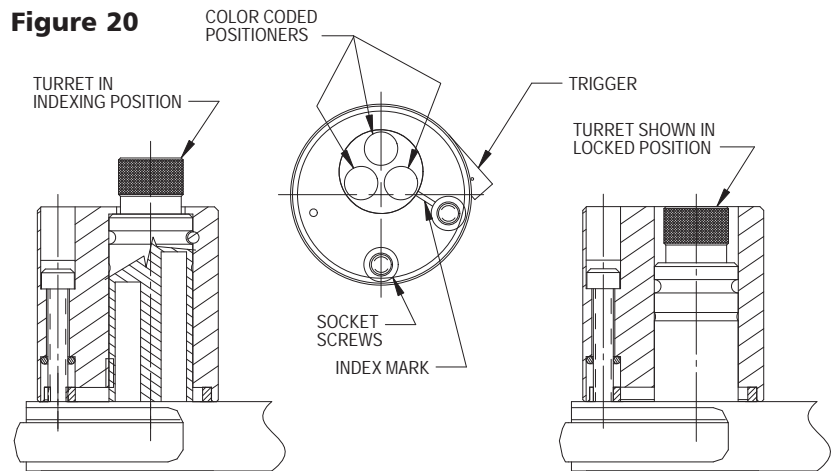
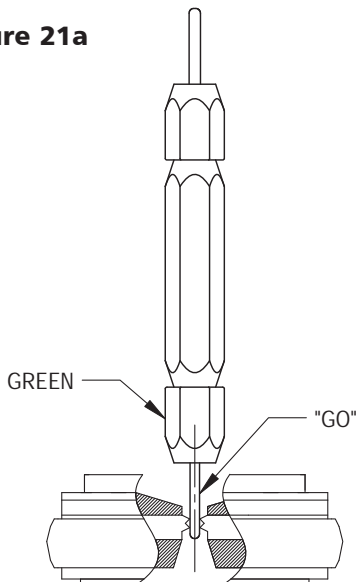


Figure 21a



You are now ready to check calibration and crimp wire into the contact.

Crimping Tools and Calibration - AF8

1. Set the selector knob to position No. 4 (whether the turret is installed or not is immaterial).
2. Move the handles to the fully closed position.
3. Insert the "Go" gauge (G125) as shown in Figure 21a. The gauge must pass freely between the indenter tips. Remove the gauge.
4. Insert the "No-Go" gauge shown in Figure 21b. The gauge must not enter between the indenter tips.

Caution: Do not crimp the gauge.

Figure 21b

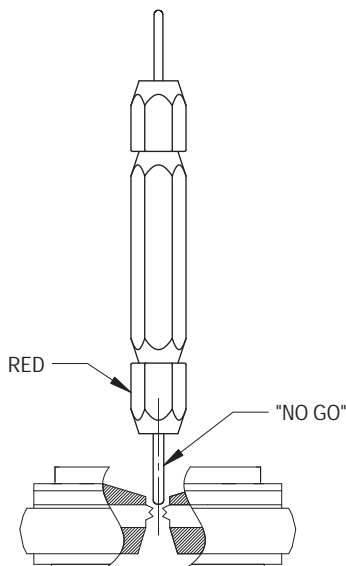
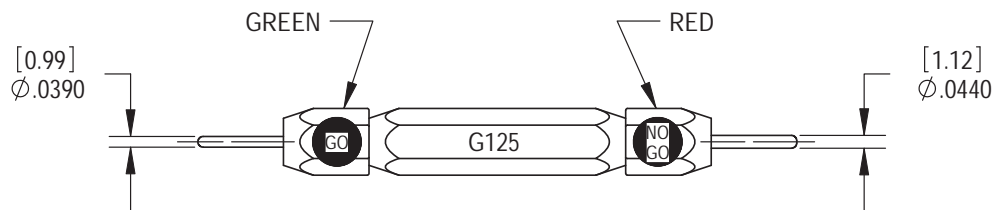


Figure 21c



Pneumatic Crimp Tool Set Up - Model 400BHD and Model 500

Model 400 BHD and 500 crimp tools are precision, pneumatic, full cycling tools. They are capable of producing four-indent crimps on pin and socket type contacts size 12 through 300 MCM, hex crimps on pin and socket type contacts size 0, 4, and 8, and two-indent crimps on terminals, splices or pigtailed, insulated or non-insulated through wire sizes 26-300 MCM. Flexibility is achieved by simply changing heads and locators in accord with factory directions. Either tool is usable as a portable hand tool, a bench-mounted hand controlled tool, or as a foot controlled unit. They are designed and tested to operate on a supply of clean dry air or inert gas within a pressure range of 90 to 125 PSI (maximum) depending on the size of contacts or terminals to be installed. **Installation must include a good regulator with filter installed within 25 feet of the tool.**

The air inlet port is tapped to accommodate 1/4 NPT fittings. You may use direct pipe thread fittings or quick disconnect. To avoid leakage or damage to the threads, always use a non-setting pipe thread compound or soft grease when installing connections. Connection should be tight enough to prevent leakage.

Be sure that proper location and die assembly head are installed before turning on air supply.

Installation of Location and Die Assembly Head

1. The Locator must be seated in counterbore flush with retainer face. The Locator number should be visible. The Die Assembly must locate on the index pin and sit flat on the retainer face. The nut must be securely screwed down on the barrel (use spacer if provided).

Refer to Crimping Tool Selector on page 17.

2. Turn air on. Adjust to approximately 100 PSI. Operate the trigger without a contact and wire in place. Observe the action of the indentors to be sure they operate freely.

Gaging: Four-Indent and Hex Crimp Die Assemblies

All pin/socket crimp die assemblies are clearly marked at the factory with the "Closed Diameter" of the indentors, and may be gaged with check pins, .005 under marked diameter for "Go" and .002 over marked diameter for "No-Go."

After observing the free action of indentors, hold the trigger or foot control in the "On" position and check with the proper size gage or pin. The "Go" gage shall enter freely. The "No-Go" gage should not enter.

Caution: Do not crimp against gage! To do so will injure the tool and void your warranty.

Gaging: Terminal Die Assemblies

All terminal crimp die assemblies are clearly marked at the factory with the "Gaging diameter" of the indentors and may be gaged with check pin, .005 under marked diameter for "Go" and .002 over marked diameter for "No-Go."

After observing the free action of indentors, hold the trigger or foot control in the "On" position and check with the proper size gage or pin. The "Go" gage shall enter freely. The "No-Go" gage shall not enter.

Caution: Do not crimp against gage! To do so will injure the tool and void your warranty.

3. Insert the contact or terminal and wire assembly and proceed to crimp. Test a few crimped samples every day to be sure all quality requirements are within the limits of the applicable MIL specification.

Cycling Mechanisms

To check proper operation of the cycling mechanism, reduce the line pressure to the minimum necessary to operate the tool without a contact and wire assembly in position (usually about 20 to 25 PSI).

Insert contact and wire assembly into position.

Activate the trigger or foot control. The indentors should lock on the contact and wire assembly and shall not release until the air supply is either increased to the normal operating range, (tool completes cycle); or, is completely disconnected from the air supply.

This check should be made once per week; or, after every 10,000 crimps, whichever occurs first. Tests should be under the direction of responsible personnel from Quality Control or Plant Supervisor.

To use as a foot controlled unit:

- a. First, disconnect from the air supply.
- b. Remove the 1/4 NPT socket head plug from the center of the rear casting. Re-install it in the rear of handle, using a non-setting pipe compound or soft grease.
- c. In the center of the rear casting, install 1/4 NPT brass coupler bushing, or a quick disconnect fitting.
- d. Connect the hose from the foot control pedal to the tool. Connect the air supply to the inlet port of the foot control.
- e. You can now proceed as instructed in #1.

All parts of the Model 400 BHD and 500 are precision made from the finest materials, designed to give long satisfactory service. All are warranted to be free from manufacturing or material defects for one (1) year.

To be sure that you obtain peak performance, we recommend that your tool be returned to the factory at least once per year for the regular overhaul and test. Service can be completed normally within five (5) days at a moderate cost. If the preceding instructions are carefully followed and the tool is not abused, you can count on many years of reliable, trouble-free performance.

Caution: Do not attempt to disassemble power unit, trigger handle, or foot control unit, at any time. To do so will void your warranty.

Soldering Electrical Contacts

As soldering is a known art and an acquired skill, we will not attempt a tutorial on the proper procedure in this manual. Explicit instructions are available from the VEAM Customer Service Department upon request.

It is necessary, however, to point out the following Do’s and Don’ts:

Do:	Don’t:
Use rosin core flux Use a solder iron sized for the job Allow the solder to flow properly Clean the soldered joints Inspect each soldered joint	Use acid core flux Use a too hot iron or torch Cool the soldered joint rapidly Create “solder bridges” Burn the insulators with prolonged heat

Solder and solder aids (tools, flux, instructions, etc.) are available from:
 Kester Inc.
 800 West Thorndale Ave.
 Itasca, IL 60143
 1-800-253-7837
 www.kester.com



TENSILE STRENGTH AND MILLIVOLT DROP MEASUREMENTS MEET THE REQUIREMENTS OF MIL- C-39029, MIL-C-22520, MIL-T-7928 AS APPLICABLE.

***Pneumatic Power Crimping Tool
Model 400B HD***

This lightweight (16 lbs.) crimping tool will crimp pin and socket contacts as well as solderless terminals. Non-adjustable dies are available to accommodate wires ranging from 16AWG through 4AWG. The four-indent crimp jaws guarantee a perfect gas tight crimp every time, maximizing wire-contact pull-out forces. Locators are available for every CIR series contact.

The Model 400B HD Power Crimp Tool is excellent for high production runs of small gauge contacts.

Operating Air pressure: 100-120 PS Size: 4" O.D. x 12^{3/4}" Long
Bench mounting version is standard. Foot pedal # 104 available.
For large contacts and terminals use our Model 500D Tool.

This tool is available from Pico Corporation
Phone: (805) 388-5510
Fax: (805) 482-4038



***Pneumatic Power Crimping Tool
Model 500D***

This power crimping tool will handle pin and socket contacts plus lug terminals (insulated or non-insulated) in all sizes ranging from 8AWG to 250 MCM. Bench mounting version is standard. Foot pedal #105 available.

Consult our factory for foot pedal accessories.

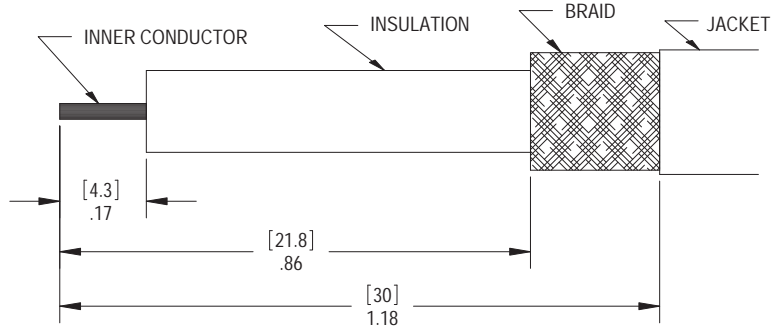
Shipping weight: 45 lbs. approximate.

Operating Air pressure: 100-120 PSI.

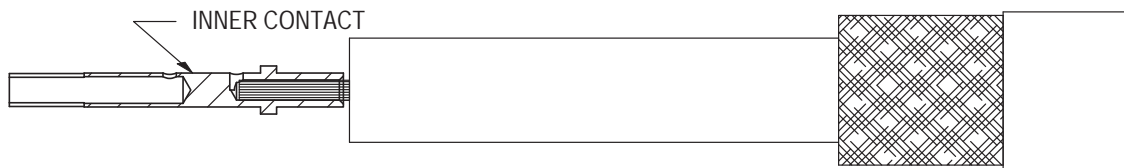
This tool is available from Pico Corporation
Phone: (805) 388-5510
Fax: (805) 482-4038

Assembly Procedure for F80 Style Coaxial Contacts (Size 8)

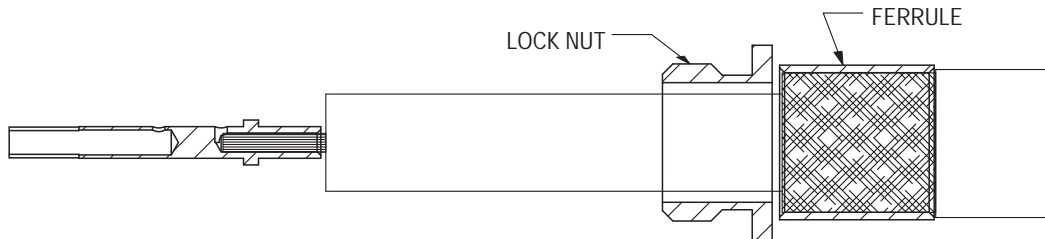
1. Cut the end of the cable squarely, do not crush.
2. Strip the outer jacket, trim the braid and strip the inner conductor insulation as shown below. Use care not to nick braid or inner conductor.



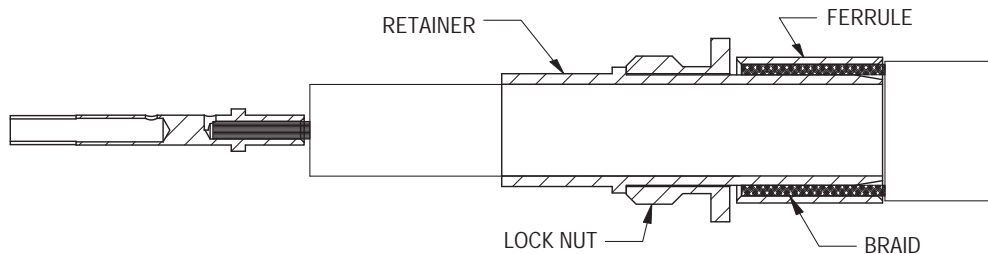
3. Assemble components in following order:
 - a. Solder the inner contact to the inner conductor.



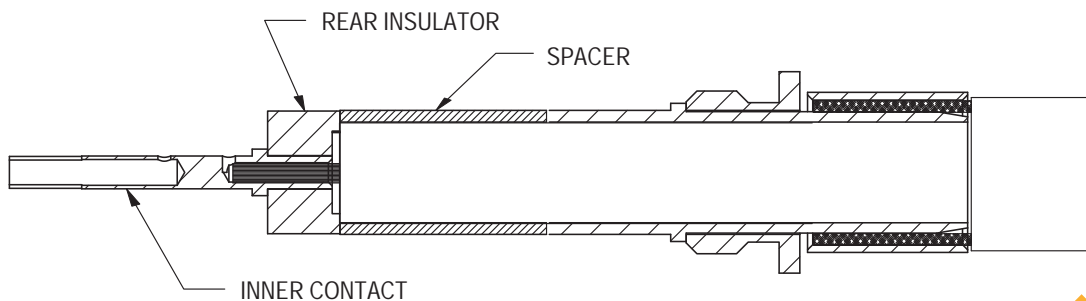
- b. Slide crimp ferrule over the braid and the locknut over the insulation.



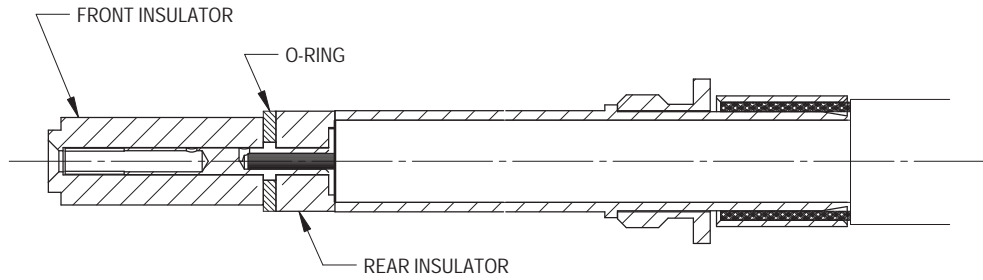
- c. Install the retainer (tapered end first) over the insulation so that the retainer slides under the locknut and under the braid until it butts against the jacket. The braid will be sandwiched between the retainer and the crimp ferrule.



- d. Slide the metal spacer over the inner insulation against the retainer.
 - e. Assemble the rear teflon insulator over the inner contact (the insulator is split) against the spacer, with the flat surface facing front.



f. Assemble the O-ring over the inner contact up to the rear insulator. Slide the front teflon insulator over the inner contact with the flat surface facing the O-ring.



g. Position the crimp ferrule against the locknut and crimp the braid and retainer together using the crimp tool per Table X. Slide the assembled components into the outer contact body, which has been previously installed into the insert at the factory and tighten the lock nut,

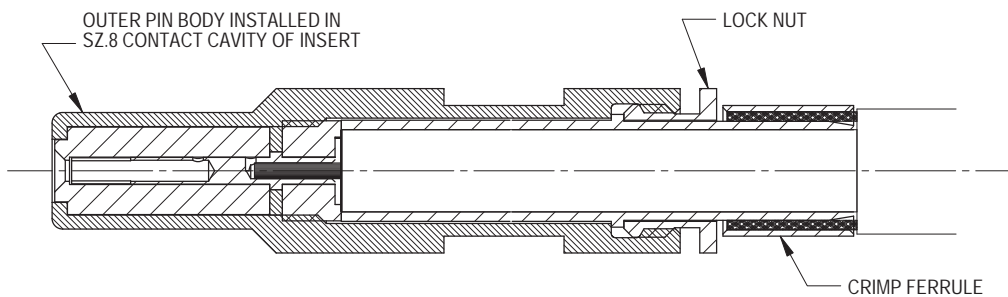


Table X

CRIMP TOOLS FOR COAXIAL CONTACTS				
Contact Part Number				
Pin	Socket	Cable	Crimp Tool	Crimp Die
C8-058P	C8-058S	RG 58	M22520/5-01	M22520/5-05
C8-062P	C8-062S	RG 59 & RG 62	M22520/5-01	M22520/5-05
C8-142P	C8-142S	RG 142	M22520/5-01	M22520/5-05
C8-174P	C8-174S	RG 174 & RG 188	M22520/5-01	M22520/5-06
C8-179P	C8-179S	RG 179	M22520/5-01	M22520/5-06
C8-180P	C8-180S	RG 180	M22520/5-01	M22520/5-05
C8-400P	C8-400S	RG 400	M22520/5-01	M22520/5-05

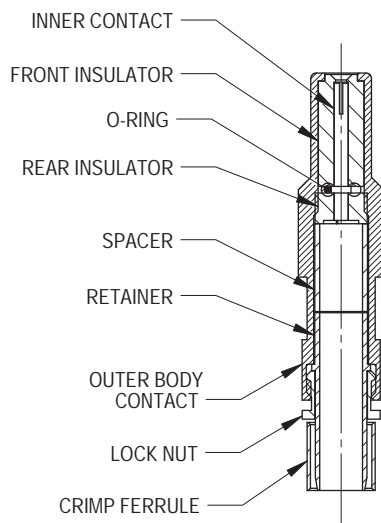


Figure 25 - PIN CONTACT

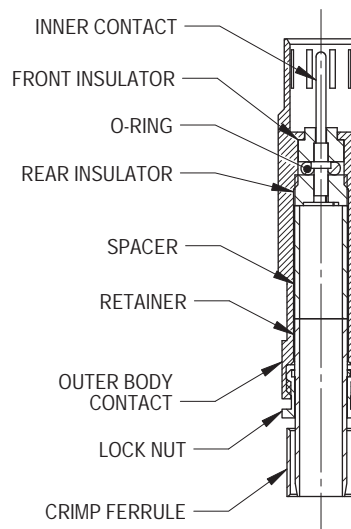
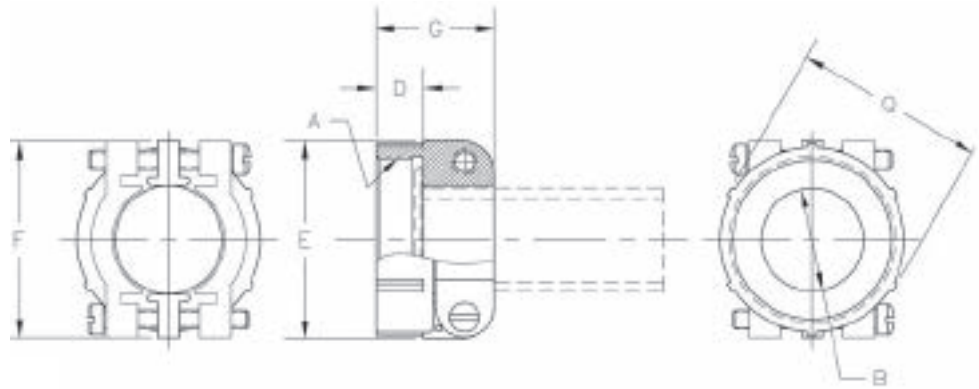


Figure 26 - SOCKET CONTACT

Cable Clamp
MS 3057-XXA

Concentric cable clamps. They insure strain relief and central location of the cable. Can be used with bushing MS 3420.



"A" Style Clamp With Bushing

MS 3057-XXA



Shell Size	Clamp Part Number	A thread class 2B (inches)	B dia. mm / inch	D mm / inch	G mm / inch	E-F-Q mm / inch	Used With Bushing Part Number
10SL	MS3057-4A	.625-24UNEF	8.0 .32	10.5 .41	20.6 .81	22.0 .87	MS3420-4
14S	MS3057-6A	.750-20UNEF	11.0 .43	10.5 .41	22.2 .87	27.0 1.06	MS3420-6
16S & 16	MS3057-8A	.875-20UNEF	14.2 .56	10.5 .41	24.0 .95	28.0 1.10	MS3420-8
18	MS3057-10A	1.000-20UNEF	15.8 .62	10.5 .41	28.5 1.12	33.0 1.30	MS3420-10
20 & 22	MS3057-12A	1.187-18UNEF	19.0 .75	10.5 .41	24.0 .95	35.0 1.38	MS3420-12
24 & 28	MS3057-16A	1.437-18UNEF	23.8 .94	10.5 .41	26.0 1.02	43.0 1.69	MS3420-16
32	MS3057-20A	1.750-18UNS	31.7 1.25	12.5 .49	28.0 1.10	51.0 2.01	MS3420-20
36	MS3057-24A	2.000-18UNS	35.0 1.38	14.0 .55	29.4 1.16	58.0 2.28	MS3420-24
40	MS3057-28A	2.250-16UN	41.2 1.62	14.0 .55	42.8 1.68	65.0 2.56	MS3420-28

Bushing

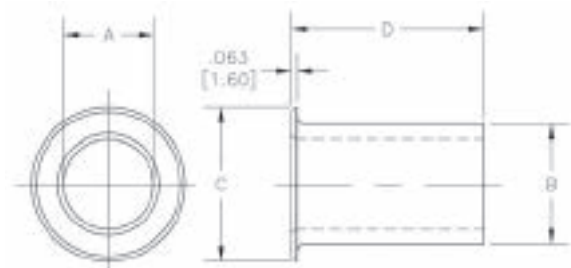


MS 3420 - XX
Bushing

Bushing of synthetic rubber to be used with cable clamps MS 3057 A for protection of the cable or wires. These bushings can be telescoped for smaller cable diameters.

MS 3420-XX

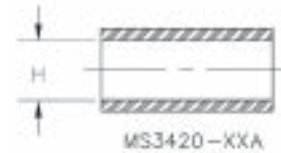
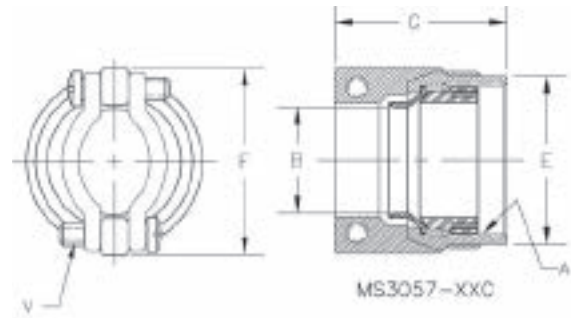
Bushing Part Number	Used With Cable Clamp	A dia. mm / inch	B mm / inch	C dia. mm / inch	D mm / inch
MS3420-4	MS3057-4A	5.58 .220	7.7 .30	12.8 .50	69.8 2.75
MS3420-6	MS3057-6A	7.92 .312	10.8 .43	15.7 .62	66.8 2.63
MS3420-8	MS3057-8A	11.09 .437	14.0 .55	18.8 .74	63.5 2.50
MS3420-10	MS3057-10A	14.27 .562	15.6 .61	22.6 .89	60.3 2.37
MS3420-12	MS3057-12A	15.87 .625	18.8 .74	27.5 1.08	57.1 2.25
MS3420-16	MS3057-16A	19.05 .750	23.5 .93	33.3 1.31	53.9 2.12
MS3420-20	MS3057-20A	23.79 .937	31.5 1.24	40.5 1.59	50.8 2.00
MS3420-24	MS3057-24A	31.75 1.250	34.7 1.37	46.9 1.85	47.6 1.87
MS3420-28	MS3057-28A	34.92 1.374	41.0 1.61	52.9 2.08	44.4 1.75



Waterproof clamp for jacketed cables. Provides mechanical strain relief plus concentric clamping over a wide range of cable sizes.

A Neoprene gland seal ensures a waterproof seal on the cable jacket.

Note: Other materials available.



Shell Size	Clamp Part Number	A thread class 2B (inches)	B (Approx.) open closed mm / inch mm / inch		E +/- 0.4 .016 mm inch		F +/- 0.2 .008 mm inch		G + 0.5 .020 mm inch		V thread class 2A (inches)	Bushing Part Number	H open mm inch
10SL	MS3057-4C	.625-24UNEF	7.93 .312	2.38 .094	19.0 .748	22.6 .890	32.3 1.272	6-32UNC	MS3420-4A	5.56 .219			
14S	MS3057-6C	.750-20UNEF	11.12 .441	5.8 .228	25.8 1.016	25.8 1.016	32.3 1.272	6-32UNC	MS3420-6A	7.93 .312			
									MS3420-4A	5.56 .219			
16S&16	MS3057-8C	.875-20UNEF	13.48 .531	8.0 .315	25.4 1.000	28.1 1.106	32.3 1.106	6-32UNC	MS3420-8A	11.10 .437			
									MS3420-6A	7.93 .312			
18	MS3057-10C	1.000-20UNEF	15.87 .625	9.6 .378	28.5 1.122	31 1.220	35.3 1.390	6-32UNC	MS3420-10A	11.10 .437			
									MS3420-6A	7.93 .312			
20&22	MS3057-12C	1.187-18UNEF	19.00 .748	11.3 .445	33.3 1.311	37.3 1.468	35.7 1.405	8-32UNC	MS3420-12A	13.74 .541			
									MS3420-8A	11.10 .437			
24&28	MS3057-16C	1.437-18UNEF	23.80 .937	15.5 .610	39.6 1.559	42.0 1.653	38.5 1.516	8-32UNC	MS3420-16A	19.00 .748			
									MS3420-12A	13.74 .541			
									MS3420-8A	11.10 .437			
32	MS3057-20C	1.750-18UNS	31.75 1.250	23.4 .921	47.6 1.874	54.0 2.126	44.8 1.764	250-20UNC	MS3420-20A	23.80 .937			
									MS3420-16A	19.00 .748			
									MS3420-12A	13.74 .541			
36	MS3057-24C	2.000-18UNS	35.00 1.378	23.4 .921	53.9 2.122	57.1 2.248	51.6 2.031	250-20UNC	MS3420-24A	28.5 1.122			
									MS3420-20A	23.80 .937			
									MS3420-16A	19.00 .748			
40	MS3057-28C	2.250-16UN	41.25 1.624	29.9 1.177	60.3 2.374	63.5 2.500	51.6 2.031	250-20UNC	MS3420-28A	31.75 1.25			
									MS3420-20A	23.80 .937			
									MS3420-16A	19.00 .748			
44	MS3057-32C	2.500-16UN	47.40 1.866	36.1 1.421	66.6 2.622	71.4 2.811	55.6 2.189	250-20UNC	MS3420-32A	41.27 1.625			
									MS3420-28A	31.75 1.250			

"C" Style Clamp With Gland



Cable Clamp MS-3057-XXC

For "C" Style Clamp Bushing



Bushing MS3420-XXA

Crimp Reduction Sleeves

Used to reduce the size of the contact crimp bucket to accept smaller gauge wires.



VEAM Part Number	From Wire Size	To Wire Size
45378	16 AWG	20 AWG
45370	16 AWG	22 AWG
47227-16-24	16 AWG	24 AWG
47227-16-0.12	16 AWG	26 AWG
45372	12 AWG	16 AWG
LV242999-142	12 AWG	18 AWG
LV242999-152	12 AWG	20 AWG
LV242999-172	10 AWG	16 AWG
LV242999-12	8 AWG	10 AWG
46661	8 AWG	12 AWG
LV242999-122	8 AWG	14 AWG
LV242999-132	8 AWG	16 AWG
45374	8 AWG	6 mm ²
46263	8 AWG	4 mm ²
47227-8-2.5	8 AWG	2.5 mm ²
47227	8 AWG	1.5 mm ²
LV242999-32	8SP	12 AWG
46269	4 AWG	6 AWG
46660	4 AWG	8 AWG
LV242999-192	4 AWG	10 AWG
46650	4 AWG	12 AWG
46665	4 AWG	16 mm ²
46666	4 AWG	10 mm ²
46667	4 AWG	6 mm ²
47227-2-4	2 AWG	4 AWG

VEAM Part Number	From Wire Size	To Wire Size
45373	0 AWG	2 AWG
LV242999-82	0 AWG	4 AWG
LV242999-92	0 AWG	6 AWG
LV242999-102	0 AWG	8 AWG
46664	0 AWG	16 mm ²
47227-53-20	0 AWG	20 mm ²
45375	0 AWG	25 mm ²
45376	0 AWG	35 mm ²
47227-7025	2/0 AWG	25 mm ²
47227-6-1.5	6 mm ²	1.5 mm ²
47227-6-2.5	6 mm ²	2.5 mm ²
45379	10 mm ²	12 AWG
47227-16-2.5	16 mm ²	2.5 mm ²
47227-16-4	16 mm ²	4 mm ²
47227-16-6	16 mm ²	6 mm ²
47227-16-10	16 mm ²	10 mm ²
47227-25-6	25 mm ²	6 mm ²
47227-25-10	25 mm ²	10 mm ²
47227-25-16	25 mm ²	16 mm ²
47227-50-25	50 mm ²	25 mm ²
47227-95-70	95 mm ²	70 mm ²
47227-150-70	150 mm ²	70 mm ²
47227-150-95	150 mm ²	95 mm ²
46266	50 mm ²	16 mm ²
46264	50 mm ²	35 mm ²

NOTE: Add suffix T9 for silver plating, T12 for gold plating. For other options, consult Customer Service Department.

Contact Hole Plugs

Used to fill a grommet or insert cavity in lieu of a contact to maintain the environmental seal.



Grommet Hole Sealing Range		
Hole Size	Sealing Range	
	mm	inch
18-20	2.0–2.5	.08 -.10
16	2.2–2.8	.09 -.11
12	3.1–3.5	.12 -.14
8	5.9–6.5	.23 -.26
4	7.1–7.7	.28 -.30
0	12.1–12.8	.48 -.50

Contact Size AWG	DIN	Hole Plugs For Grommet	Color	Hole Plugs For Insert	Color
20	10	10-101033-11	Red	46808-20	Red
16S, 16	15, 15S	10-101033-12	Blue	46808-16	Blue
16S, 16 High Density Inserts		10-101033-11	Red	LMB-G-3	Blue
12	25	10-101033-13	Yellow	10-101033-13	Yellow
8	60, 100	10-101033-14	White	10-305045	White
4	160	10-101033-15	Green	10-305045-4	White
0	500	10-305045-0	Black	10-101033-16	Black
0 (Ground)				10-305045-01	White

Note: Hole plugs are installed from the rear and sit flush with the rear of the insert.

Protective Plastic Caps



Protective vinyl caps are available upon request to guard against entry of moisture, dirt and other foreign matter to the contact area during shipment.

Shell Size	For Receptacles CIR 00, 01, 020, 030, 070, TB	For Plugs CIR 06, 08	For Plugs CIR 06GG, 08GG	For Plugs CIR 065	For Plugs CIR 064
	Part Number	Part Number	Part Number	Part Number	Part Number
10SL	#26	#35	#45	#35	#35
14S	#38	#42	#51	#51	#45
16S	#41	#45	#55	#51	#48
16	#42	#45	#55	#51	#48
18	#45	#51	#57	#53	#53
20	#51	#55	#57	#56	#56
22	#53	#56	#65	#57	#57
24	#56	#57	#65	#58	#58
28	#58	#65	#71	#66	#66
32	#66	#71	#76	#76	#75
36	#71	#76	#81	#78	#78
40	#76	#81	#82	#81	#81

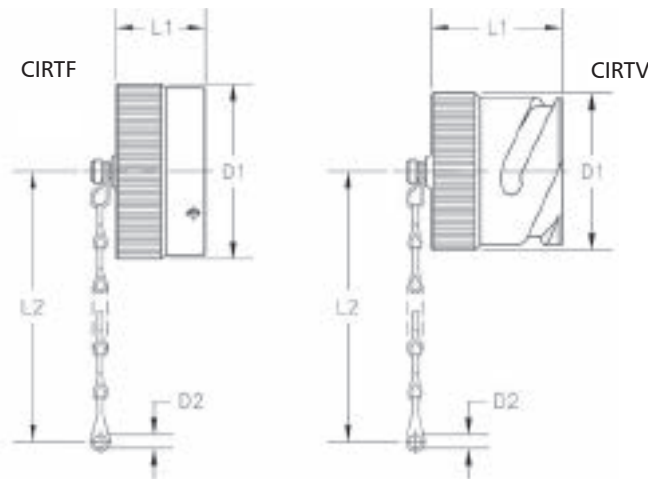
CIRTF



CIRTV



Protective metal caps which seal the front of plugs or receptacles. Include a chain for retention of the cap at the required location. Other methods of attachment are available.



TF Caps (for receptacles CIR00, 01, 020, 030, 05, 070, TB)

VEAM Part Number	D1 Maximum mm / inch	D2 mm+0.5 inch+0.020 mm-0.25 inch -0.010	L1 Maximum	L2 Approximate mm / inch
CIR10SLTF	23.5 .93	4.4 .173	16.5 .65	127.0 5.00
CIR14STF	30.5 1.20	4.4 .173	16.5 .65	127.0 5.00
CIR16STF	33.0 1.30	4.4 .173	16.5 .65	127.0 5.00
CIR16TF	33.0 1.30	4.4 .173	21.0 .83	127.0 5.00
CIR18TF	37.5 1.48	4.4 .173	21.0 .83	127.0 5.00
CIR20TF	41.0 1.61	4.4 .173	21.0 .83	127.0 5.00
CIR22TF	44.0 1.73	4.4 .173	21.0 .83	127.0 5.00
CIR24TF	47.5 1.87	4.4 .173	21.0 .83	127.0 5.00
CIR28TF	54.5 2.15	5.6 .220	21.0 .83	190.0 7.48
CIR32TF	61.0 2.40	5.6 .220	21.0 .83	190.0 7.48
CIR36TF	67.5 2.66	5.6 .220	21.0 .83	175.0 6.89
CIR40TF	73.0 2.87	5.6 .220	21.0 .83	190.0 7.48

TV Caps (for plugs CIR06, 08)

VEAM Part Number	D1 Maximum mm / inch	D2 mm+0.5 inch+0.020 mm-0.25 inch -0.010	L1 Maximum mm / inch	L2 Approximate mm / inch
CIR10SLTV	21.0 .83	4.4 .173	24.0 .94	127.0 5.0
CIR14STV	27.5 1.08	4.4 .173	24.0 .94	127.0 5.0
CIR16STV	30.0 1.18	4.4 .173	24.0 .94	127.0 5.0
CIR16TV	30.0 1.18	4.4 .173	32.0 1.26	127.0 5.0
CIR18TV	33.5 1.32	4.4 .173	32.0 1.26	127.0 5.0
CIR20TV	37.0 1.45	4.8 .189	32.0 1.26	140.0 5.5
CIR22TV	40.0 1.57	4.8 .189	32.0 1.26	140.0 5.5
CIR24TV	43.5 1.71	4.8 .189	32.0 1.26	140.0 5.5
CIR28TV	49.5 1.95	4.8 .189	32.0 1.26	190.0 7.5
CIR32TV	56.0 2.20	5.6 .220	32.0 1.26	190.0 7.5
CIR36TV	62.5 2.46	5.6 .220	32.0 1.26	190.0 7.5
CIR40TV	67.7 2.66	5.6 .220	32.0 1.26	190.0 7.5

Contact Size	Wire Size (AWG)	VEAM Contact Number	Insertion Tool	Removal Tool Kit	Removal Tool Kit		Guide Pins
					Replacement Parts	Handles	
20P	20	46730-20P	T98143	11-7576-101	0148B	46592M-VPT	---
20S	20	46731	T98143	11-7576-101	0148B	46592M-101S	27977-20T50
18P	18	46740P	T98143	11-7576-37	0148B	46592M-37PT50	---
18S	18	46740S	T98143	11-7576-37	0148B	46592M-37ST50	27977-20T50
18P	20-22	46740-15P	T98143	11-7576-37	0148B	46592M-37PT50	---
18S	20-22	46740-15S	T98143	11-7576-37	0148B	46592M-37ST50	27977-20T50
18P	16	46740-22P	11-7345	11-7576-37	0148B	46592M-37PT50	---
18S	16	46740-22S	11-7345	11-7576-37	0148B	46592M-37ST50	27977-20T50
16S P	16	27911	11-7345	A43240	---	---	---
16S S	16	27961	11-7345	A43240	---	---	27977-16T50
16S P	20-24	27911-13	11-7345	A43240	---	---	---
16S S	20-24	27961-13	11-7345	A43240	---	---	27977-16T50
16S P	20	27911-15	T98143	A43240	---	---	---
16S S	20	27961-15	T98143	A43240	---	---	27977-16T50
16S P	14-16	27911-20	11-7345	A43240	---	---	---
16S S	14-16	27961-20	11-7345	A43240	---	---	27977-16T50
16S P	12-14	27911-26	46736	A43240	---	---	---
16S S	12-14	27961-26	46736	A43240	---	---	27977-16T50
16P	16	27913	11-7345	A43240	---	---	---
16S	16	27963	11-7345	A43240	---	---	27977-16T50
16P	24-26	27913-08	11-7345	A43240	---	---	---
16S	24-26	27963-08	11-7345	A43240	---	---	27977-16T50
16P	20-22	27913-12	T98143	A43240	---	---	---
16S	20-22	27963-12	T98143	A43240	---	---	27977-16T50
16P	20-22	27913-13	T98143	A43240	---	---	---
16S	20-22	27963-13	T98143	A43240	---	---	27977-16T50
16P	18-20	27913-15	11-7345	A43240	---	---	---
16S	18-20	27963-15	11-7345	A43240	---	---	27977-16T50
16P	14-16	27913-20	11-7345	A43240	---	---	---
16S	14-16	27963-20	11-7345	A43240	---	---	27977-16T50
16P	12-14	27913-26	46736	A43240	---	---	---
16S	12-14	27963-26	46736	A43240	---	---	27977-16T50
12P	8	27914-8	46736-6	A43240	---	---	---
12S	8	27964-8	46376-6	A43240	---	---	27977-12T50
12P	20-24	2914-12	46736	A43240	---	---	---
12S	20-24	27964-12	46736	A43240	---	---	27977-12T50
12P	14-18	27914-20	46736	A43240	---	---	---
12S	14-18	27964-20	46736	A43240	---	---	27977-12T50
12P	2.5 mm	27914-22	46736	A43240	---	---	---
12S	2.5 mm	27964-22	46736	A43240	---	---	27977-12T50
12P	12	27914-26	46736	A43240	---	---	---
12S	12	27964-26	46736	A43240	---	---	27977-12T50
12P	4 mm sq	27914-30	46736	A43240	---	---	---
12S	4 mm sq	27964-30	46736	A43240	---	---	27977-12T50
12P	10	27914-38	46736-6	A43240	---	---	---
12S	10	27964-38	46736-6	A43240	---	---	27977-12T50
8P	8	27915	A46151-8T50	A43240-8	0148B	2-8252	Not Required
8S	8	27935	A46151-8T50	A43240-8	0148B	2-8251	Not Required
8P	12-14	27915-26-62	A46151-8T50	A43240-8	0148B	2-8252	Not Required
8S	12-14	27935-26-62	A46151-8T50	A43240-8	0148B	2-8251	Not Required
8P	12-14	27915-26	A46151-8T50	A43240-8	0148B	2-8252	Not Required
8S	12-14	27935-26	A46151-8T50	A43240-8	0148B	2-8251	Not Required
8P	4 mm sq	27915-30	A46151-8T50	A43240-8	0148B	2-8252	Not Required
8S	4 mm sq	27935-30	A46151-8T50	A43240-8	0148B	2-8251	Not Required

*Assembly manual available upon request



Insertion Tools



Guide Pins



A43240 Removal Kit



Contact Size	Wire Size (AWG)	VEAM Contact Number	Insertion Tool	Removal Tool Kit	Removal Tool Kit Replacement Parts Handle		Guide Pins
8P	10	27915-38	A46151-8T50	A43240-8	0148B-8	2-8252	Not Required
8S	10	27935-38	A46151-8T50	A43240-8	0148B-8	2-8251	Not Required
8P	6	27915-58	A46151-8T50	A43240-8	0148B-8	2-8252	Not Required
8S	6	27935-58	A46151-8T50	A43240-8	0148B-8	2-8251	Not Required
4P	4-6	27916	A46151-4T50*	46150-4	46150	11-7370-4	Not Required
4S	4-6	27936	A46151-4T50*	46150-4	46150	11-7674-2	Not Required
4P	2.5mm sq.	27916-22	A46151-4T50*	46150-4	46150	11-7370-4	Not Required
4S	2.5mm sq.	27936-22	A46151-4T50*	46150-4	46150	11-7674-2	Not Required
4P	16mm sq.	27916-62	A46151-4T50*	46150-4	46150	11-7370-4	Not Required
4S	16mm sq.	27936-62	A46151-4T50*	46150-4	46150	11-7674-2	Not Required
0P	0	27917V	A46151-0T50*	46150-0	46150	11-7370-5	Not Required
0S	0	27937V	A46151-0T50*	46150-0	46150	11-7674-3	Not Required
0P	8	27917-45	A46151-0T50*	46150-0	46150	11-7370-5	Not Required
0S	8	27937-45	A46151-0T50*	46150-0	46150	11-7674-3	Not Required
0P	10mm sq.	27917-50	A46151-0T50*	46150-0	46150	11-7370-5	Not Required
0S	10mm sq.	27937-50	A46151-0T50*	46150-0	46150	11-7674-3	Not Required
0P	16mm sq.	27917-62	A46151-0T50*	46150-0	46150	11-7370-5	Not Required
0S	16mm sq.	27937-62	A46151-0T50*	46150-0	46150	11-7674-3	Not Required
0P	25mm sq.	27917-78	A46151-0T50*	46150-0	46150	11-7370-5	Not Required
0S	25mm sq.	27937-78	A46151-0T50*	46150-0	46150	11-7674-3	Not Required
0P	35mm sq.	27917-90	A46151-0T50*	46150-0	46150	11-7370-5	Not Required
0S	35mm sq.	27937-90	A46151-0T50*	46150-0	46150	11-7674-3	Not Required
0P	50mm sq.	27917-107	A46151-0T50*	46150-0	46150	11-7370-5	Not Required
0S	50mm sq.	27937-107	A46151-0T50*	46150-0	46150	11-7674-3	Not Required
0P	4	46646-0	A46151-0T50*	46150-0	46150	11-7370-5	Not Required
0S	4	47647-0	A46151-0T50*	46150-0	46150	11-7674-3	Not Required
4/0 P	2	47107-90	Not Required	Not Required	Not Required	Not Required	Not Required
4/0 S	2	47114-90	Not Required	Not Required	Not Required	Not Required	Not Required
4/0 P	0 (1/0)	47107-115	Not Required	Not Required	Not Required	Not Required	Not Required
4/0 S	0 (1/0)	47114-115	Not Required	Not Required	Not Required	Not Required	Not Required
4/0 P	2/0	47107-135	Not Required	Not Required	Not Required	Not Required	Not Required
4/0 S	2/0	47114-135	Not Required	Not Required	Not Required	Not Required	Not Required
4/0 P	70mm sq.	47107-144	Not Required	Not Required	Not Required	Not Required	Not Required
4/0 S	70mm sq.	47114-144	Not Required	Not Required	Not Required	Not Required	Not Required
4/0 P	95mm sq.	47107-155	Not Required	Not Required	Not Required	Not Required	Not Required
4/0 S	95mm sq.	47114-155	Not Required	Not Required	Not Required	Not Required	Not Required
4/0 P	4/0	47107-165	Not Required	Not Required	Not Required	Not Required	Not Required
4/0 S	4/0	47114-165	Not Required	Not Required	Not Required	Not Required	Not Required

*For solder contacts use TIP P/N SD46151-4T50 and SD46151-0T50.

Assembly manual available upon request.

TOOL KITS FOR CONNECTOR ASSEMBLY

Deluxe Model Assembly Kit

The VEAM Model DMC 292 M is housed in a case with die cut poly-foam compartments to nest each tool. A complete set of connector assembly instructions is provided on a CD and stored within the tool case for easy access.

DMC 292 M

Part Number

1. AF8
2. 616266
3. G125
4. M2700-420
5. 11-7345
6. 46736
7. A43240
8. 45-123
9. 45-092
10. TG70
11. 140
12. 27977-16T50
13. 27977-12T50
14. H183BKF7240LNO

Tool Kit Contents

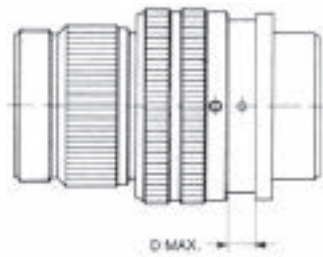
Description

- Crimp Tool Frame
- Turret
- Inspection Gauge
- Wrench
- Insertion Tool
- Insertion Tool
- Removal Tool Kit
- Wire Cutter
- Wire Stripper
- Mini Strap Wrench
- Assembly Manual CD
- Guide Pin Size 16
- Guide Pin Size 12
- Carrying Case



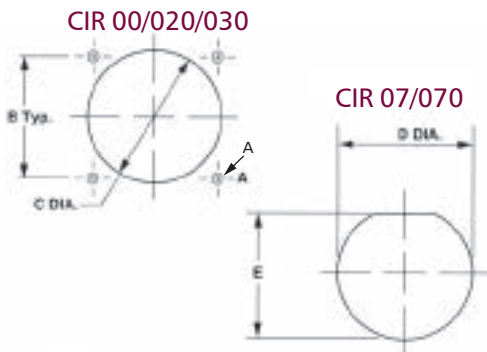
Rear Mounting Data-Maximum Panel Thickness

Size	Dimension D							
	CIR 00/020		CIR 030		GG/ D Max. Mated with CIR 030		CIR TB	
	inches	mm	inches	mm	inches	mm	inches	mm
10SL	.15	3.7	.28	7.2	.16	4.0	.39	10.0
14S	.15	3.7	.28	7.2	.14	3.5	.38	9.6
16S	.15	3.7	.28	7.2	N/A	N/A	.38	9.6
16	.15	3.7	.29	7.5	.14	3.5	.54	13.8
18	.15	3.7	.29	7.5	.12	3.0	.51	13.0
20	.15	3.7	.29	7.5	.12	3.0	.51	13.0
22	.15	3.7	.29	7.5	.12	3.0	.51	13.0
24	.21	5.4	.29	7.5	.06	1.5	.45	11.4
28	.21	5.4	.32	8.2	.10	2.5	.49	12.4
32	.24	6.1	.29	7.5	.04	1.0	.35	9.0
36	.24	6.1	.29	7.5	.04	1.0	.35	9.0
40	.24	6.0	.29	7.5	.039	1.0	.35	9.0



Tightening torque for CIR07-070 receptacles

Size	N/m min.	In/lb min.
10SL	15.6	138
14S	18.6	164.6
16S	19.6	173.5
16	19.6	173.5
18	23.5	208
20	25.5	225.7
22	29.4	260.2
24	35.3	312.4
28	39.2	347
32	42.2	373.5
36	44.1	390.3
40	49	433.7



Panel Cut-out Dimensions

Shell Size	A Through Mtg. Hole Diameter		A Threaded Mtg. Hole Diameter		B +/- .004		C Diameter Front Mount		C Diameter Rear Mount		D Diameter		E Dim.	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
10SL	3.2	.126	4.5	.177	18.2	.717	17.45	11/16	19.05	3/4	22.23	7/8	21.10	.83
14S	3.2	.126	4.5	.177	23.0	.906	20.62	13/16	25.40	1	28.58	1 1/8	27.43	1.08
16S	3.2	.126	4.5	.177	24.6	.969	23.80	15/16	28.58	1 1/8	31.75	1 1/4	30.73	1.21
16	3.2	.126	4.5	.177	24.6	.969	23.80	15/16	28.58	1 1/8	31.75	1 1/4	30.73	1.21
18	3.2	.126	4.5	.177	27.0	1.063	26.97	1 1/16	31.75	1 1/4	34.92	1 3/8	33.53	1.32
20	3.2	.126	4.5	.177	29.4	1.157	30.15	1 3/16	34.92	1 3/8	38.10	1 1/2	36.83	1.45
22	3.7	.146	4.5	.177	31.8	1.252	33.32	1 5/16	38.10	1 1/2	41.27	1 5/8	39.90	1.57
24	3.7	.146	5.5	.217	34.9	1.374	36.50	1 7/16	41.27	1 5/8	44.45	1 3/4	43.30	1.70
28	3.7	.146	5.5	.217	39.7	1.563	42.85	1 11/16	47.63	1 7/8	50.80	2	49.53	1.95
32	4.3	.169	5.5	.217	44.5	1.752	49.20	1 15/16	53.98	2 1/8	57.15	2 1/4	55.88	2.20
36	4.3	.169	5.5	.217	49.2	1.937	53.98	2 1/8	60.33	2 3/8	63.50	2 1/2	62.23	2.45
40	4.3	.169	5.5	.217	55.5	2.185	60.38	2 3/8	66.68	2 5/8	69.85	2 3/4	68.58	2.70

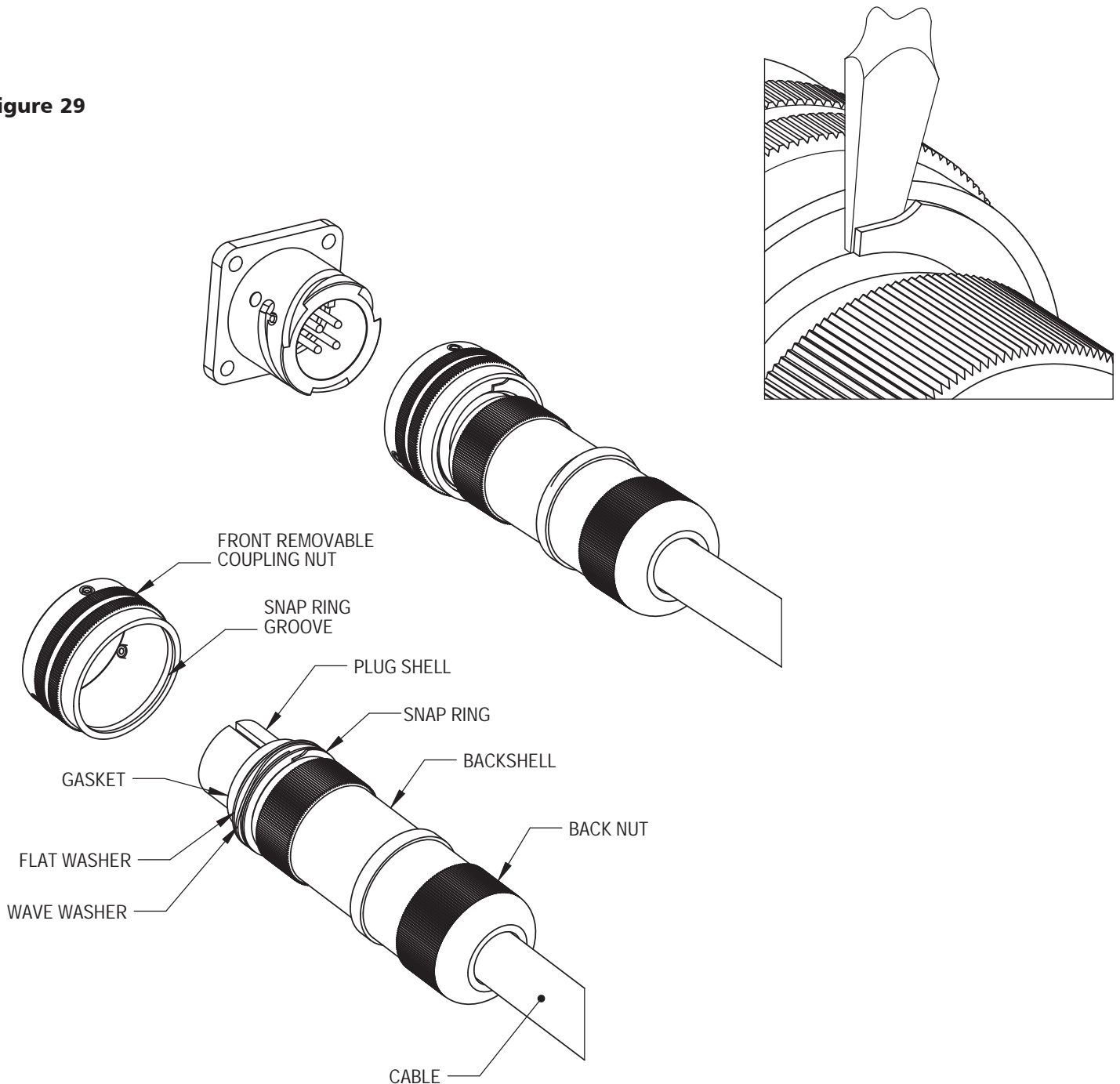
VEAM has developed a front replaceable coupling ring for field repair of damaged cable assemblies, in the even CIR coupling rings are accidentally distorted.

This allows you to repair a damaged cable assembly without removing backshell hardware, electrical contacts, or cable from the connector. no special tools are required. This method is very quick and easy. It will cut equipment down time to minutes instead of hours or days.

Procedure:

1. Cut away the distorted coupling ring (be careful not to damage the wave washer, flat washer, or plug shell).
2. Install the front replaceable coupling ring as illustrated below.

Figure 29



Product Safety and Warranty

1. MATERIAL CONTENT AND PHYSICAL FORM

Electrical connectors do not usually contain hazardous materials. They contain conducting and non-conducting materials and can be divided into two groups.

a) Printed circuit types and low cost audio types which employ all plastic insulators and casings.

b) Rugged, Fire Barrier and High Reliability types with metal casings and either natural rubber, synthetic rubber, plastic or glass insulating materials. Contact materials vary with type of connector and also application and are usually manufactured from either: Copper, copper alloys, nickel, alumel, chromel or steel. In special applications, other alloys may be specified.

2. FIRE CHARACTERISTICS AND ELECTRIC SHOCK HAZARD

There is no fire hazard when the connector is correctly wired and used within the specified parameters. Incorrect wiring or assembly of the connector or careless use of metal tools or conductive fluids, or transit damage to any of the component parts may cause electric shock or burns. Live circuits must not be broken by separating mated connectors as this may cause arcing, ionization and burning. Heat dissipation is greater at maximum resistance in a circuit. Hot spots may occur when resistance is raised locally by damage, e.g. cracked or deformed contacts, broken strands of wire. Local overheating may also result from the use of the incorrect application tools or from poor quality soldering or slack screw terminals. Overheating may occur if the ratings in the product Data Sheet/Catalog are exceeded and can cause breakdown of insulation and hence electric shock. If heating is allowed to continue it intensifies by further increasing the local resistance through loss of temper of spring contacts, formation of oxide film on contacts and wires and leakage currents through carbonization of insulation and tracking paths. Fire can then result in the presence of combustible materials and this may release noxious fumes. Overheating may not be visually apparent. Burns may result from touching overheated components.

3. HANDLING

Care must be taken to avoid damage to any component parts of electrical connectors during installation and use. Although there are normally no sharp edges, care must be taken when handling certain components to avoid injury to fingers. Electrical connectors may be damaged in transit to the customers, and damage may result in creation of hazards. Products should therefore be examined prior to installation/use and rejected if found to be damaged.

4. DISPOSAL

Incineration of certain materials may release noxious or even toxic fumes.

5. APPLICATION

Connectors with exposed contacts should not be selected for use on the current supply side of an electrical circuit, because an electric shock could result from touching exposed contacts on an unmated connector. Voltages in excess of 30 V ac or 42.5 V dc are potentially hazardous and care should be taken to ensure that such voltages cannot be transmitted in any way to exposed metal parts of the connector body. The connector and wiring should be checked, before making live, to have no damage to metal parts or insulators, no solder blobs, loose strands, conducting lubricants, swarf, or any other undesired conducting particles. Circuit resistance and continuity check should be made to make certain that there are no high resistance joints or spurious conducting paths. Always use the correct application tools as specified in the Data Sheet/Catalog. Do not permit untrained personnel to wire, assemble or tamper with connectors. For operation voltage please see appropriate national regulations.

IMPORTANT GENERAL INFORMATION

(i) Air and creepage paths/Operating voltage. The admissible operating voltages depend on the individual applications and the valid national and other applicable safety regulations.

For this reason the air and creepage path data are only reference values. Observe reduction of air and creepage paths due to PC board and/or harnessing.

(ii) Temperature

All information given are temperature limits. The operation temperature depends on the individual application.

(iii) Other important information

Cannon continuously endeavors to improve their products. Therefore, Cannon products may deviate from the description, technical data and shape as shown in this catalog and data sheets.

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Cannon invented D-sub connectors in 1952. Our family of D-Subs now includes combinations of signal, power and RF, as well as severe service sealed connectors. Cannon D-Subs are available with an extensive line of backshells and accessories and are one of the most economical shielded connector solutions available. ITT D-Sub connectors are qualified to the MIL-DTL-24308 specification.

www.ittcannon.com/dsubs



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www.ittcannon.com/micro



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www.ittcannon.com/rackandpanel



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ITT Interconnect Solutions has been providing interconnect products to the Microwave and RF industry since 1963 (formerly The Sealectro Corporation). The RF 50 & 75 Ohm product lines cover UHF band through Ku band requirements. These connectors and cable assemblies are available with a thread type, snap type, bayonet type or slide on coupling method. The frequencies range from DC to 18+ GHz.

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The ITT ICS interconnect range includes sealed circular and rectangular connectors in metal or plastic shells. These configurations include board to cable or cable to cable/ bulkhead applications. Both signal and power contacts can be combined in various layouts. All product lines within the Transportation segment offer very low contact resistance providing maximum signal integrity.

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