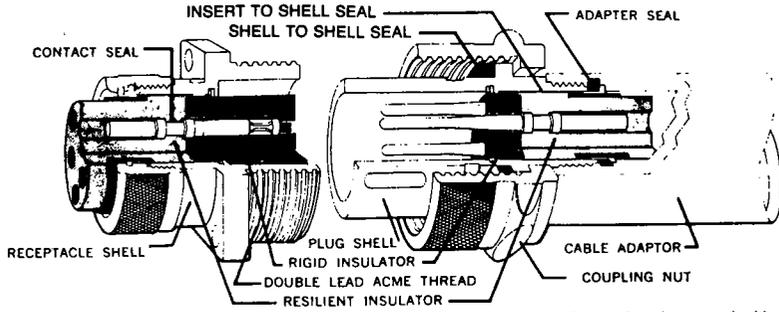


# PYLE-STAR-LINE<sup>®</sup> Neptune Series ASSEMBLY INSTRUCTIONS

## MOD II INSERTABLE/REMOVABLE CRIMP CONTACT INSERTS



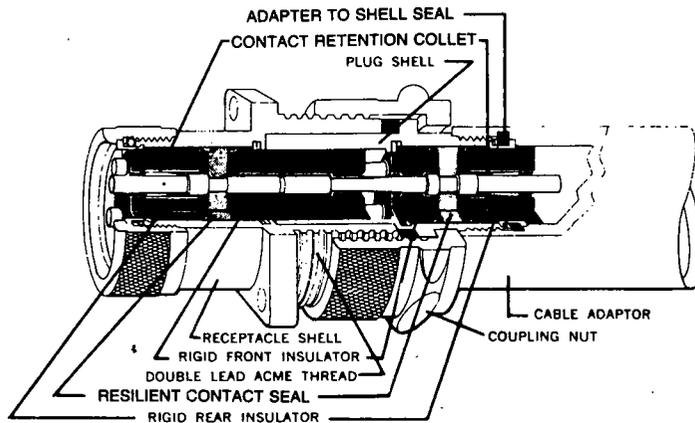
Individual contacts are crimped to their respective conductors outside of the connector where ample working space is available. The crimping operation can be by hand or power operated tools.

Terminated contacts are individually inserted into the insulation with a hand tool.

Contacts may be inserted and removed without degrading contact retention or environmental capability. The front rigid portion of the insert functions to stabilize and insure positive alignment of the contacts.

Contact cavities are clearly numbered on the front and rear insert face to facilitate identification during assembling, inspecting, and maintenance.

## MOD III INSERTABLE/REMOVABLE CRIMP COLLET RETAINED CONTACT INSERTS



Three element contact inserts are factory installed and locked into position with a non-removable retaining ring. This "sandwich" assembled insert, for rear-insertable and released contacts consists of a resilient seal interposed between two rigid plastic insulators.

The main advantage of collet retention are lower insertion forces, eliminating need for insertion tools, and higher reten-

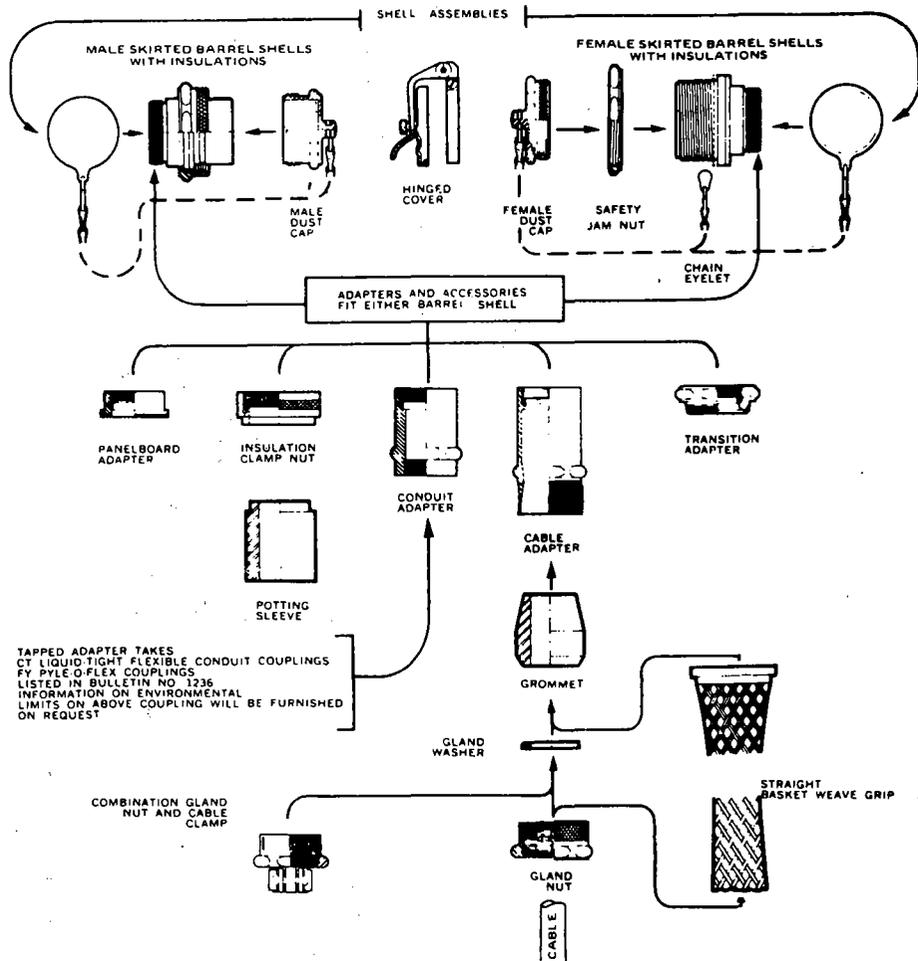
tion forces. Collet locking lines permit the contacts to be released and removed from the rear of the insert for quick and easy circuit changes.

Contact cavities are clearly numbered on the front and rear insert face to facilitate identification during assembling, inspecting and maintenance.

## NEPTUNE SERIES FAMILIARIZATION & ASSEMBLY INFORMATION

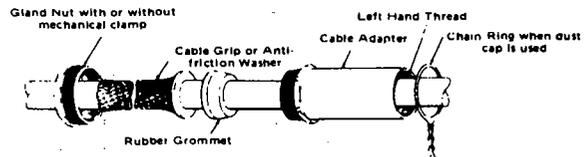
1. Read assembly instructions before starting to assemble connectors, for two important reasons; 1) To identify the various component parts, and 2) to check for missing parts.
2. Cut cable jacket or sheathing squarely to correct length, using strippers that have been approved for the operation. In preparing individual wires in cables for assembly, make allowances in length for reaching the outermost contact cavities in the connector insert. This, means that conductors should be cut longer as they extend out from the center of the cable to assure sufficient length for cross-overs.
3. Follow specifications covering maximum cable stripping lengths for effective cable grommet sealing. All wires should be cut squarely so that they will fit into contact wire wells correctly.
4. Before starting to terminate wires, it is essential that cable wires be laid out in accordance with the wiring diagram. Proper layout will reduce the need for twisting and cross-over of conductors. If the wiring layout is not correct, termination will be difficult or even impossible and chances for making errors will be increased. Cable having a spiral wire lay must be matched carefully to correct contacts in both the male and female inserts.
5. Some cables have a soft filter or braid on the conductors which, compresses when external pressure is applied. As a result, the cable diameter will reduce to a point where the grommet sealing range is exceeded. To avoid leakage at the seal under these conditions, it is suggested that, where construction of the cable permits, a metal ferrule be slipped under the cable jacket at the sealing area. This ferrule will serve as a supporting member and enable the grommet to seal properly.
6. Use correct size sealing grommets to assure resistance to moisture and other contaminants. Make certain that cable jacket is smooth where grommet is to seal. Remove any grooves or ridges if present by sanding.
7. Use only proper crimp tools that have been set with precision gages.
8. Make certain that all contacts are the correct size before attempting to assemble them into insert cavities. This point is particularly important when both power and control types of contacts are used in the same connector.
9. Be sure that grounding contacts are correctly located.
10. Seat contacts properly so they will not be damaged or become disengaged during connector mating operations.
11. Use proper size insertion tools and be sure that they are aligned axially when pushing contacts into their fully seated position.
12. When inserts have more cavities than conductors, plug unused cavities with either plain contacts or special seal plugs designed for the purpose. Some connectors require both a contact and seal plug in unused cavities to meet military specifications and to assure complete internal environmental sealing.
13. After contacts are inserted in their respective cavities and inspected, the cable adaptor or insert clamp nut should be tightened with a strap wrench. This assembly operation should be done by placing the components in a vise with smooth-faced jaws or holding fixture.
14. If contacts have to be removed from an insert because of an assembly error or change in circuitry, be sure to loosen the insert clamp nut first before extracting the contact and reinserting it. This step is important because removing contacts when the resilient insulator component is under pressure will result in damage.
15. When handling cables, use adequate support to prevent damage to the internal wires. Gland nuts and grommets are intended for sealing purposes and should not be used as a cable grip.
16. If one of the connector poles is a grounding wire, make sure that it is grounded properly before the connector is actually engaged.
17. When connectors having the same configuration are to be mounted close together, alternate keying arrangements should be used to prevent mismatching or cross-mating and possible damage to the electrical system or human injury.
18. Always inspect all aspects of connector assembly operations before putting connectors into actual operation.
19. Crimping and terminating of conductors to contacts must be done carefully. Make certain that wire strands are fully bottomed in contact wells by checking through inspection hole provided.
20. Be careful not to damage wire grommets or contact retaining collets when inserting or extracting contacts.
21. Never try to straighten bent contacts. Straightening cannot be done properly and the plating on contacts will very likely be marred. This will result in a high resistance connection and will expose the base metal to possible corrosion.
22. Do not attempt to remove inserts that are bonded or locked in place in their shells.
23. Be certain that all connector components are assembled; each part performs a vital function.
24. Each assembler of connectors should be his own inspector. Assembly workmanship is a significant factor in determining the quality of multiple contact connectors. Quality cannot be "inspected" into connectors; it must be "built-in" during each and every assembly operation.

## STEP 1 - IDENTIFICATION OF PRINCIPAL PARTS - SEQUENCE OF ASSEMBLY



## STEP 2 - INITIAL ASSEMBLY

Slide the gland nut, cable grips or anti-friction washer, grommet and cable adapter over the cable in the order named. Be sure the right size grommet has been selected to obtain a good grommet seal. If a dust cover with ring and chain is used, ring must be placed on cable barrel before terminating. See Fig. below.



## STEP 3 - CABLE JACKET & WIRE STRIPPING

### PREPARING CABLE FOR TERMINATING

Use suitable tools and strippers to remove cable sheath and conductor insulation. Be sure cable is cut square.

Refer to Tables below for conductor cutting and stripping dimensions.

Remove any ridges or grooves by scarfing the edges to provide a smooth surface on the cable to insure good grommet sealing.

### CABLE AND CONDUCTOR CUTTING AND STRIPPING DIMENSIONS

Dimension "A" is the cable jacket length recommended for maintaining effective grommet cable sealing.

Dimension "B" is slightly longer than the depth of the contact terminal well.

#### DIMENSION "A"

INDIVIDUAL CONDUCTOR CUTTING LENGTHS/Varies with Shell Size, and Contact Size and must be measured after conductors are straightened and formed parallel. Additional length required if conductors must be crossed over.



#### DIMENSION "B"

INDIVIDUAL CONDUCTOR STRIPPING LENGTHS/Varies with Contact Size.



Dimension "B" Table

CONTACT SIZE	CRIMP CONTACTS
18	29/64
16	37/64
12	39/64
10	43/64
8	53/64
4	29/32
1/0	1-13/64

DIMENSION "A" TABLE

### MOD II

### MOD III

SHELL SIZE	CONTACT SIZE	MINIMUM FOR CRIMP CONTACTS			MINIMUM FOR CRIMP CONTACTS		
		ADAPTER TYPE			ADAPTER TYPE		
		2000	2400	2900	2000	2400	2900
12	18	1-37/64	3-53/64	5-5/64	*	3-9/16	4-13/16
	16	1-45/64	3-61/64	5-13/64	*	3-9/16	4-13/16
	12	1-43/64	3-59/64	5-11/64	*	3-9/16	4-13/16
	10	1-39/64	3-55/64	5-7/64	*	3-5/8	4-7/8
	8	1-5/8	3-7/8	5-1/8	*	3-5/8	4-7/8
	4	1-45/64	3-61/64	5-13/64	*	3-3/4	5
16	18	1-53/64	4-5/64	5-21/64	*	3-13/16	5-1/16
	16	1-61/64	4-13/64	5-29/64	*	3-13/16	5-1/16
	12	1-59/64	4-11/64	5-27/64	*	3-13/16	5-1/16
	10	1-55/64	4-7/64	5-23/64	*	3-7/8	5-1/8
	8	1-7/8	4-1/8	5-3/8	*	3-7/8	5-1/8
	4	1-61/64	4-13/64	5-29/64	*	4	5-1/4
20	18	2-21/64	4-37/64	5-53/64	*	4-5/16	5-9/16
	16	2-29/64	4-45/64	5-61/64	*	4-5/16	5-9/16
	12	2-27/64	4-43/64	5-59/64	*	4-5/16	5-9/16
	10	2-23/64	4-39/64	5-55/64	*	4-3/8	5-5/8
	8	2-3/8	4-5/8	5-7/8	*	4-3/8	5-5/8
	4	2-23/64	4-45/64	5-61/64	*	4-1/2	5-3/4
24 & C24	18	2-59/64	5-5/64	6-21/64	2-9/16	4-13/16	6-1/16
	16	2-61/64	5-13/64	6-23/64	2-9/16	4-13/16	6-1/16
	12	2-59/64	5-11/64	6-21/64	2-9/16	4-13/16	6-1/16
	10	2-55/64	5-7/64	6-23/64	2-5/8	4-7/8	6-1/8
	8	2-7/8	5-1/8	6-3/8	2-5/8	4-7/8	6-1/8
	4	2-61/64	5-13/64	6-29/64	2-5/8	5	6-1/4
28 & C28	18	3-21/64	5-21/64	6-37/64	3-1/16	5-1/16	6-5/16
	16	3-29/64	5-29/64	6-45/64	3-1/16	5-1/16	6-5/16
	12	3-27/64	5-27/64	6-43/64	3-1/16	5-1/16	6-5/16
	10	3-23/64	5-23/64	6-39/64	3-1/8	5-1/8	6-3/8
	8	3-3/8	5-3/8	6-5/8	3-1/8	5-1/8	6-3/8
	4	3-29/64	5-29/64	6-45/64	3-1/4	5-1/4	6-1/2
28 & C28	18	3-21/64	5-21/64	6-37/64	*	4-7/8	6-1/8
	16	3-29/64	5-29/64	6-45/64	*	4-7/8	6-1/8
	12	3-27/64	5-27/64	6-43/64	*	4-7/8	6-1/8
	10	3-23/64	5-23/64	6-39/64	*	4-1/2	5-3/4
	8	3-3/8	5-3/8	6-5/8	*	4-1/2	5-3/4
	4	3-29/64	5-29/64	6-45/64	*	4-1/2	5-3/4

\*Use longer adapter

## STEP 4 - TERMINATING CONDUCTORS

All connectors are shipped with the insulations factory assembled in the barrel shell and in the specified key position with exception of MOD II with contacts of size 8 and larger, which are shipped unassembled.

All the contacts are packaged separately.

DO NOT ATTEMPT TO REMOVE insulations from shells.

**CRIMPING CONTACTS.** Contacts are crimped to the wires outside of the connector with the proper tool (see page 7). Check through the inspection hole in contact to make certain wires are fully bottomed in well before crimping.

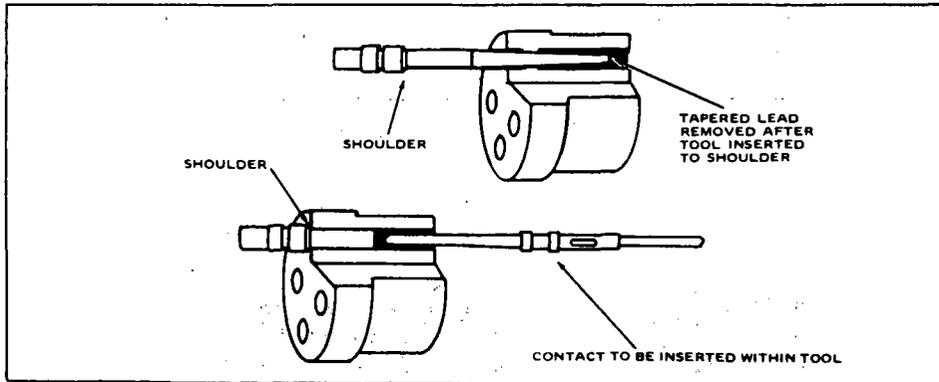
**PRECAUTIONS:** Exercise cleanliness throughout termination procedure to avoid contamination of insert insulation. Any contamination will reduce the dielectric properties of the insulation.

**RECOMMENDED CLEANING PROCEDURE:** Air clean away all residual materials. DO NOT USE ANY SOLVENTS. Clean with CRC CHEMICALS Div. C. J. WEBB Inc. of Dresher Pa. "LECTRA-CLEAN" No. 2017 cleaner, available in spray cans.

### MOD II CONTACT INSERTION

Before inserting Contacts into insert shell assembly loosen clamp nut as loose as possible to release pressure on the resilient insulator. Contacts should be inserted into contact cavities with a contact insertion tool (see page 8). Male contacts should be inserted into red resilient insulation and fully seated; female contacts should be inserted into the green resilient insulation and fully seated. Contacts are inserted from the back side. If a contact is inserted into a wrong cavity, loosen insulation clamp nut, if present, to relieve pressure on insulator, then push contact out with removal tool (see page 8).

### MOD II CONTACT SIZES 8, 4 & 1/0 INSERTIONS



Expander tool is inserted at front of resilient insert, and pushed in completely to shoulder. After tool is inserted to shoulder the tapered lead is removed. The contact is then inserted from the back of the resilient and into the remaining tool which is subsequently withdrawn, leaving contact in place. With contacts in place, the insulation should be inserted into the shells and fully seated, taking care to align the insulation keyway with the shell keys.

### MOD III CONTACT INSERTION

Before inserting contacts into shell assembly containing an insulation clamp nut, make sure the clamp nut is as loose as possible to release pressure on resilient insulator. A slight application of silicone oil over the outer contact surface will facilitate contact assembly. If a contact is inserted into a wrong cavity, loosen insulation clamp nut, if present, to relieve pressure on the insulator, then pull contact out with removal tool (see page 8).

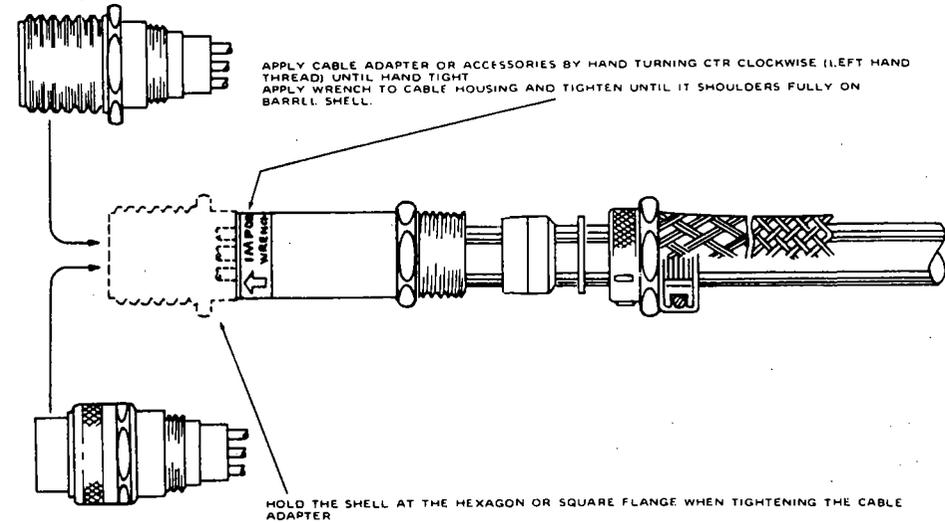
The silicone oil film applied to the resilient contact seal laminant (green color) sometimes after the prolonged storage dries out and causes a difficulty to insert the contacts.

Apply slightly the silicone oil over the outer surface or the resilient laminant, avoid the silicone oil application on the contact mating areas, as the silicone oil is insulator.

Dipping the contact into the alcohol prior to the contact insertion also facilitates to assemble.

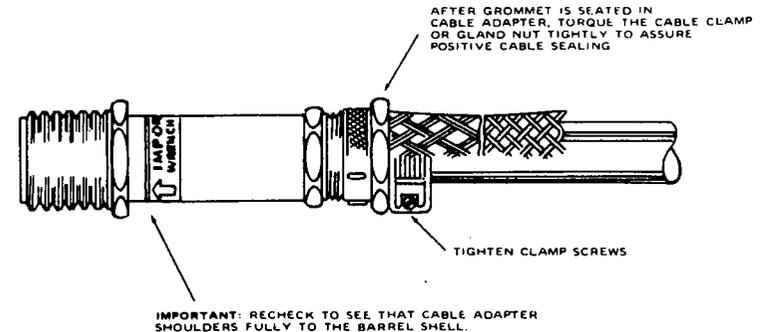
**IMPORTANT: MOD II OR III IF ALL CONTACTS IN AN INSERT CONFIGURATION ARE NOT BEING USED, PLUG UP ANY OPEN CAVITIES TO ASSURE ENVIRONMENTAL SEALING.**

## STEP 5 - CABLE ADAPTER & PLUG SHELL ASSEMBLY



Shells with male skirt but without flange should be held with dust cover or female shell as a holding fixture. The shell keys are designed to withstand the assembly torque. If dust cover with ring and chain is used, ring must be placed on barrel before applying contacts to the insulation.

## STEP 6 - FINAL ASSEMBLY



**IMPORTANT: RECHECK TO SEE THAT CABLE ADAPTER SHOULDERS FULLY TO THE BARREL SHELL.**

## CRIMPING TOOLS

### TP-201351-AG—HAND CRIMP TOOL

This tool is complete with carrying case, checking gage, and complete instructions for crimping #10 through #18 contacts of MOD II or MOD III design.



### TP-201352—HAND/FOOT PNEUMATIC CRIMP TOOL:

This tool is complete with foot control, checking gage, wrench, and complete instructions for crimping #10 through #18 contacts of MOD II or MOD III design.

### TP-201411 Crimping Tool and Accessories for Contacts #18 through #10

Contact Size	Range of Conductor Size (Avg)	Tool & Locators	Tool Only	Contact Locator	
				Pin	Socket
18	18-20-22	TP-201411-AG	TP-201411-TO	TP-201411-16-18	TP-201411-16-18
16	16-18-20			TP-201411-16-18	TP-201411-16-18
12	12-14-16			TP-201411-12P	TP-201411-10-12
10	10-12-14			TP-201411-10-12	TP-201411-10-12

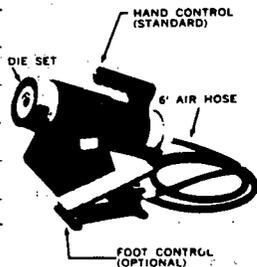
TP-201411-AG



### TP-201328 Crimping Tool only, and Accessories for Contacts #12 through #4/0

Contact Size	Wire Size	Die Number	Check Gage	Color	(Locator)	
					MOD II	MOD III
12 W Length 12 C Length	12-14	TP-201328-12D	TP-201328-12G	Yellow	TP-201328-12 TP-201328-12C	TP-201328-12L
10 W Length 10 C Length	10-12	TP-201328-10D	TP-201328-10G	Black	TP-201328-10 TP-201328-10C	TP-201328-10L
8 W Length 8 C Length	8-10	TP-201328-8D	TP-201328-8G	Red	TP-201328-8 TP-201328-8C	TP-201328-8L
4 W Length 4 C Length	4-6	TP-201328-4D	TP-201328-4G	Brown	TP-201328-4 TP-201328-4C	TP-201328-4L
1/0	1/0-1 2	TP-201328-00 TP-201328-20	TP-201328-0G TP-201328-2G	Blue	TP-201328-OC TP-201328-2G	TP-201328-OL
4/0	4/0-3/0	TP-201328-41D	TP-201328-41G	Green	TP-201328-41	TP-201328-41L

Foot control unit with 6 foot air hose—Cat. No. TP-201328-F



## MOD II CONTACT INSERTION AND REMOVAL TOOLS FOR BOTH MOD II AND III

Insertion tools shown (for Mod II) are used for completing the barrel and insert assembly after the conductors have been terminated with contacts. Because pin and socket contacts have identical terminal ends the same tool is used for either. The probe of the insertion tools is offset for convenience of inserting contacts in their respective insulation cavities without interference from other conductors in the wire bundle. For Mod II contact sizes 8, 4 and 1/0 (see selection below).

size contacts. Only one taper lead tool is required for any number of expanders. One expander is required for each cavity into which contacts are to be inserted.

Removal tools as shown are used for extracting contacts from the barrel and insert assembly after they have been seated.

Expander tools, barrel and tapered leads, are pushed thru front face of rubber backcap to facilitate insertion of larger

insertion and removal tools are color coded for quick identification by contact size.

INSERTION TOOLS REQUIRED FOR MOD II				Handle Color
Size	Catalog No.	Replacement Tips		
18	TP-201047-1	USE SAME	TP-201047 PA	GREEN
16	TP-201048-1	TOOL FOR	TP-201048 PA	BLUE
12	TP-201049-1	PIN OR	TP-201049 PA	YELLOW
10	TP-201046-1	SOCKET	TP-201046 PA	BLACK



Size	Expander Barrel	Tapered Lead	T-Bar Handle
8	TP-201007-A	TP-201007-B	
4	TP-201033-A	TP-201033-B	
0	TP-201000-EBL	TP-201000-TL	TP-201000-TH
0	TP-201000-EBS		



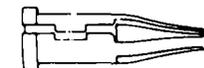
- ▶ A separate expander barrel is required for each cavity of the contact insert.
- ▶ An even number of long and short barrels should be used: Example—if the insert contains four cavities, use two long (EBL) and two short (EBS). Insert the short ones first and remove them last.
- ▶ The T-Bar handle should be used in the insertion and extraction of the expander barrel for the 1/0 cavities—only one is required.

REMOVAL TOOLS FOR MOD II				Handle Color
Size	Pin	Socket		
18	TP-201011-2	TP-201011-3		GREEN
16	TP-201010-2	TP-201010-3		BLUE
12	TP-201009-2	TP-201009-3		YELLOW
10	TP-201008-2	TP-201008-3		BLACK



### MOD III PIN AND SOCKET CONTACT EXTRACTION TOOL

Contact Size	Tool Number 500 and 600 Series
18	TP-201315-18
16	TP-201315-16
12	TP-201315-12
10	TP-201315-10
8	TP-201315-08
4	TP-201315-04
1/0	TP-201260-00



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