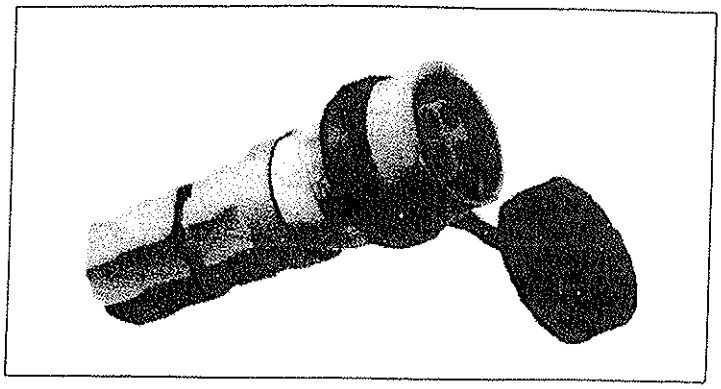
ARKTITE® Heavy Duty Cord Connector Made of KRYDON® Material NPR Series, Model M1 Style 2; 30, 60, & 100 Ampere

SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE

IF868

Installation & Maintenance Instruction



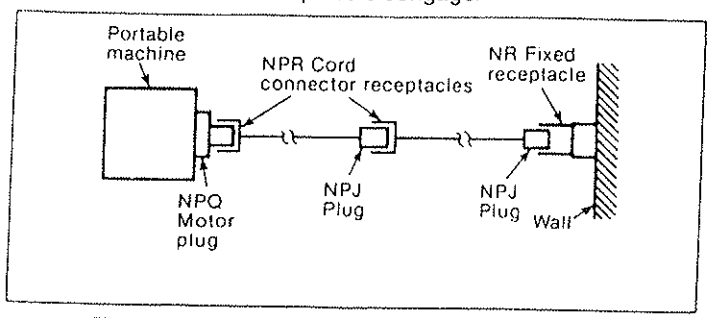
APPLICATION

NPR Series ARKTITE® heavy duty cord connectors are designed to provide connection and distribution of secondary electrical power (600 volts or less) between a power source and portable or stationary electrical equipment. NPR Series cord connectors are supplied in 3 and 4 pole designs. They are capable of carrying a maximum continuous current of 30, 60, or 100 amperes at a rated voltage of 600 volts AC from 50 through 400 Hertz, or 250 volts DC.

NPR Series cord connectors are designed for use in non-hazardous areas—indoors or outdoors. When properly maintained and installed, NPR cord connectors are designed to provide safe and reliable operation in wet, damp, dirty and corrosive industrial environments.

NPR Series cord connectors are used with Crouse-Hinds NPQ Series motor plugs and NPJ Series plugs. They may also be used with metal shelled APJ and APQ Series ARKTITE plugs and motor plugs with similar electrical ratings and configurations. Refer to Crouse-Hinds 4000 Series Catalogs for a complete listing of compatible ARKTITE heavy duty plug housings.

NPR Series plugs are Style 2, in which the extra (grounding) pole connection is made before line and load poles engage and is broken after line and load poles disengage.



Typical Installation (Non-hazardous location)

NPR Series cord connectors should be installed, inspected, maintained, and operated only by qualified and competent personnel.

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CORD CONNECTOR DISASSEMBLY

1. Unscrew gland nut from handle body.
2. Remove the cord compression basket and internal elastomeric cord seal.
3. Loosen the handle body set screw approximately 1/4 inch then unscrew handle body from connector housing.
4. Do not remove pressure termination type contacts from connector housing.

IMPORTANT

NPR Series cord connectors, identified by the addition of suffix T to the catalog number, are supplied with crimp/solder termination type contacts. Refer to Crimp/Solder Termination section of installation information before proceeding further.

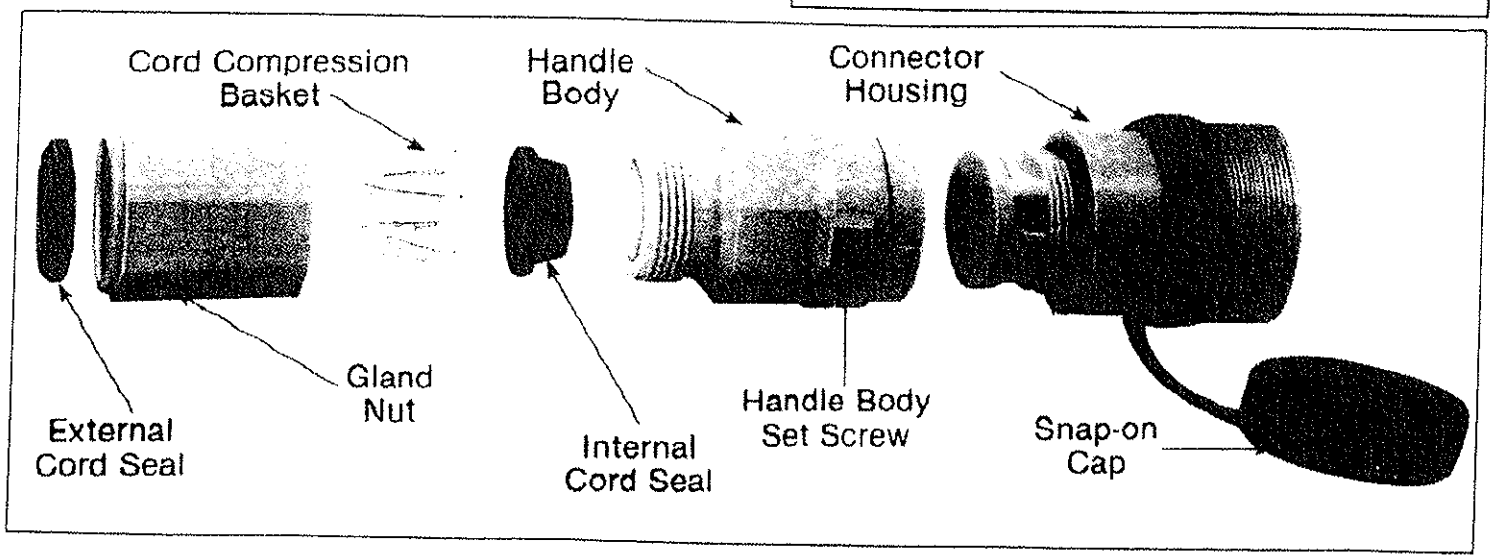


Figure 1. NPR Series ARKTITE Cord Connector

CORD CONNECTION

WARNING

Electrical power must be turned OFF before and during installation and maintenance.

1. Establish a wiring pattern.

WARNING

Before assembling an NPR Series cord connector, a wiring pattern must be established for your system. Locations having different voltages, frequencies or types of current (AC or DC) MUST NOT have interchangeable attachment plugs per section 210-7F of National Electrical Code. For each system the same colored wire must be put into the same numbered contact on all plugs, cord connectors, and receptacles in a system. This will assure correct system polarity and eliminate the possibility of equipment damage and/or personal injury due to misphasing or shorts.

ARKTITE plugs, cord connectors and receptacles are polarized so plug enters receptacle only one way. Contact recesses in insulating bodies are identified by number. This provides proper polarity of conductors through plug and receptacle or cord connector.

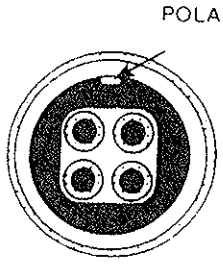


Figure 2. Standard Contact Pattern (4 pole) 30 and 60 amp

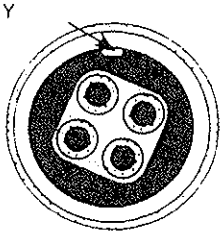


Figure 3. S4 Contact Pattern (4 pole) 30 and 60 amp

NOTE: NPR Series cord connectors identified by the addition of Suffix S4 to the catalog number are supplied with the contact pattern rotated 22-1/2 degrees for special polarity application.

NPR Series cord connectors with rotated contact patterns (Suffix S4) are compatible only with motor plugs and plugs built with the same special feature. Always compare catalog numbers located on unit nameplates if in doubt.

To ensure uniformity of the system, follow these instructions or use your own established standards. Electrical continuity testing is required to verify proper polarization.

CAUTION

Use only Type SO or equivalent portable cord with copper conductors only.

2. Make sure that the diameter of the cord is compatible with the NPR Series cord connector, elastomeric seals and cord compression basket. Refer to Table 1 for NPR Series catalog numbers and the corresponding cord diameters that they will accommodate.

Table 1

NPR Cord Connector		Cord Grip Range Diameter (in.)	Internal Cord Seal Part Number	External Cord Seal Part Number	Cord Compression Basket Part Number
Ampere Rating	Catalog Number				
30	NPR3363	.55-.70	0401817	0401828-1	0401808
	NPR3364	.70-.85	0401816	0401828-2	0401809
	NPR3463	.55-.70	0401817	0401828-1	0401808
	NPR3464	.70-.85	0401816	0401828-2	0401809
60	NPR6364	.75-.93	0402114	0401828-3	0401810
		.98-1.07	0402115	0401828-4	0401811
	NPR6365	1.07-1.21	0402116	0401828-4	0401812
		1.21-1.35	0402117	0401828-5	0402108
	NPR6464	.75-.93	0402114	0401828-3	0401810
		.93-1.07	0402115	0401828-4	0401811
	NPR6465	1.07-1.21	0402116	0401828-4	0401812
		1.21-1.35	0402117	0401828-5	0402108
100	NPR10366	*.93-1.07	0402124	0401828-6	0401811
		*1.07-1.21	0402125	0401828-7	0401812
	NPR10367	*1.21-1.35	0402126	0401828-7	0402119
		*1.35-1.50	0402127	0401828-8	0402119
	NPR10466	*.93-1.07	0402124	0401828-6	0401811
		*1.07-1.21	0402125	0401828-7	0401812
	NPR10467	*1.21-1.35	0402126	0401828-7	0402119
		*1.35-1.50	0402127	0401828-8	0402119

* Cord grip range of .93-1.35 requires use of 0402123 gland nut insert which is snapped into gland nut. Remove gland nut insert to accommodate 1.35-1.50 cord grip range.

3. Select the proper internal and external seals and cord compression basket that fit snugly over the cord jacket from selection supplied with each NPR Series cord connector.
4. Slide external cord seal, gland nut (seal end first), cord compression basket, inner seal and handle body over cord. See Figure 4.

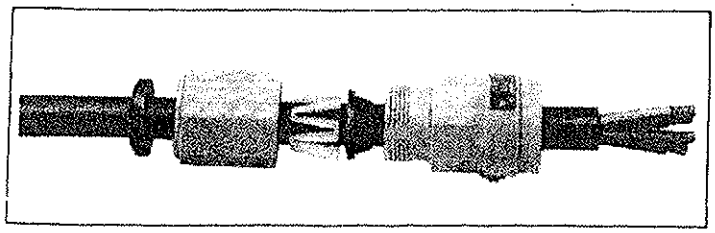
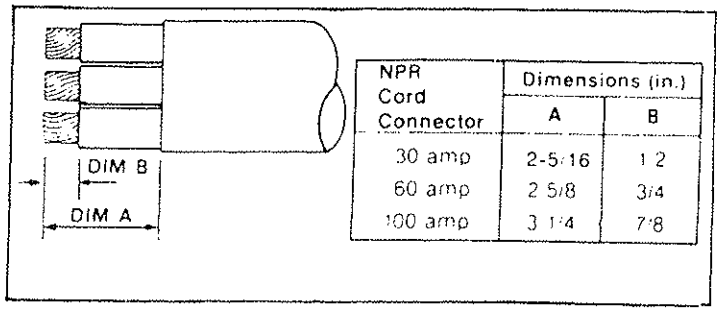


Figure 4. Gland Nut, Cord Compression Basket Detail

5. Strip outer cord jacket and then conductor insulation to the dimensions shown in Figure 5. A conductor strip gage is also located on the connector housing. These dimensions will allow the conductor to bottom in the contact wire well and the insulation to extend into the insulated housing.



NPR Cord Connector	Dimensions (in.)	
	A	B
30 amp	2-5/16	1/2
60 amp	2 5/8	3/4
100 amp	3 1/4	7/8

Figure 5. Cord Insulation

CAUTION

Do not cut into the individual conductor insulation when removing the outer cord jacket. Do not damage the conductor when removing its insulation.

6. Connect wires, identified by color in center column of Table 2, to contacts identified by number noted in columns to the right. White wire is connected to contact identified by #2. Connect other contacts in accordance with color of wires.

Conductors are identified by the color of insulation on each individual conductor. These colors agree with those given in Section 210-5 of N.E. Code for multi-wire branch circuits; an additional wire in the cord, uninsulated or identified green, is for grounding and complies with Sections 250-42 and 250-45 of N.E. Code. If conductors are not identified with exactly these colors, these colors may be assumed in making proper connections.

If the conductors are all alike except one, that one is to assumed to be white and the others to be in the same relative locations at the other end of same cord. Lacking positive color identification, test by checking electrical continuity.

Table 2

Cord Connector Style	Color of Wire in Cord	Numbers On Connector Housing
3 Pole	White*	Contact #2
	Black	Contact #1
	Green**	GR (Grounding Contact)
4 Pole	White*	Contact #2
	Black	Contact #3
	Red	Contact #1
	Green**	GR (Grounding Contact)

NOTE: All installations must be electrically tested to assure proper polarity of conductors between plugs, receptacles and connectors.
*White wire or terminal must not be used for grounding. The portable cord must contain an uninsulating wire, or one identified green, this wire is for grounding the portable device in accordance with Article 250 of the 1981 National Electrical Code.
**Use pressure type termination.

7. Loosen (but do not remove) pressure connector screws on contacts then insert conductors into wire wells according to your established wiring pattern. Conductors must bottom in contact wire well and insulation must extend below surface of insulated housing. Tighten contact pressure connector screws securely to 30 in. lbs. torque.

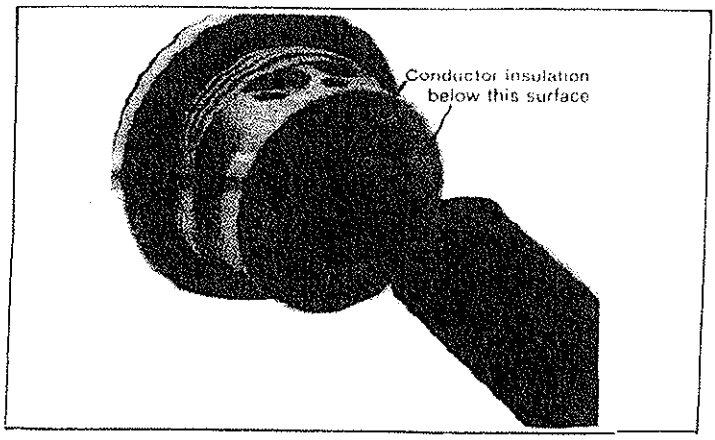


Figure 6. Conductor Installation

CORD CONNECTOR ASSEMBLY

1. Rethread handle body onto connector housing until body seats firmly against O-ring seal and alignment notches on handle body and connector housing are aligned. Tighten handle body set screw securely to 10 in. lbs. torque (see Figure 7).
2. Slide internal cord seal down cord until it seats into the handle body. Slide cord compression basket against internal seal.

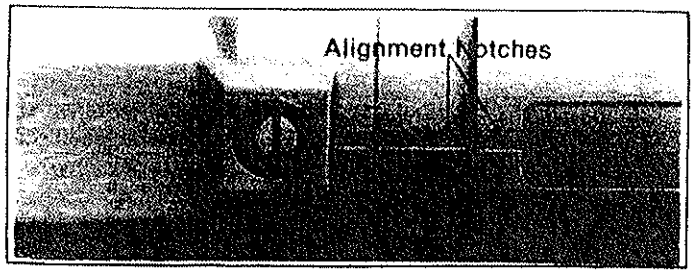


Figure 7.

3. Rethread gland nut onto handle body tight enough to firmly squeeze the cord compression basket against the cord. While tightening the gland nut, push in on the cord to relieve strain on the terminals. Tighten 30 amp gland nut to 12 ft. lbs. torque, 60 amp gland nut to 20 ft. lbs. torque and 100 amp gland nut to 25 ft. lbs. torque.

   NOTE: While tightening the gland nut you will feel a "ratcheting" action. This action is built into the gland nut/cord compression basket fit to resist turning once the cord connector is assembled.

4. Slide external cord seal down cord and insert into recessed groove in gland nut.

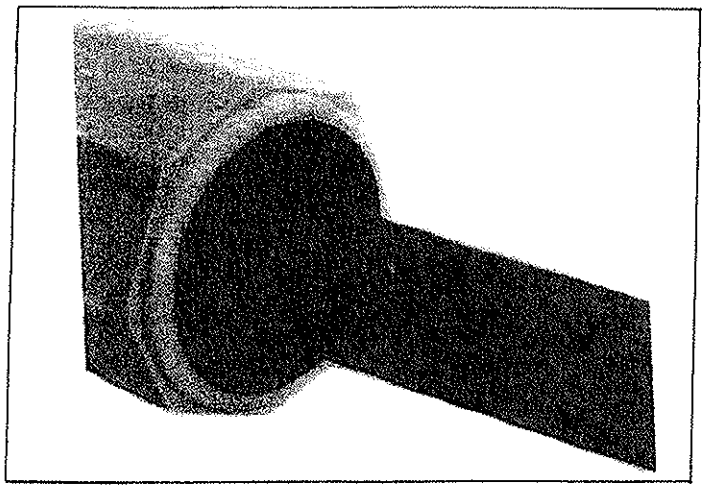


Figure 8. External Cord Seal

CRIMP/SOLDER TERMINATION

NPR Series cord connectors with crimp/solder termination are identified through the addition of "T" suffix to the catalog number.

1. Remove all contacts (except the grounding contact) from the connector housing in NPR cord connectors that require crimp or solder contact terminations. To remove the contacts, insert a flat blade screwdriver into the contact recess, depressing the contact retaining clip. While depressing the retaining clip, push on the contact from the opposite end removing the contact. See Figure 9. Remove the retaining clips from contacts and retain for reassembly.

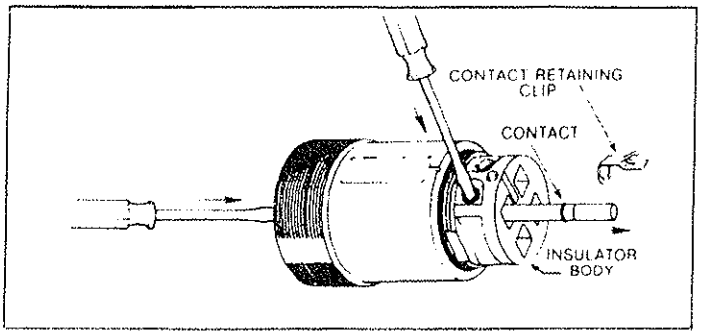


Figure 9. Contact Removal

2. Follow steps 1 through 6 of Cord Connection Instructions on page 2.
3. Connect the conductors into each contact wire well by either crimp or solder connection method, following the established system wiring pattern. Grounding conductors are not crimped or soldered but held securely with a pressure connector screw.

Crimp Connection:

Proper crimp termination may require the use of a wire well reducer to ensure a complete metal fill in the crimped joint. Table 3 lists the various wire well reducers and crimping dies to be used with each wire well contact and conductor size.

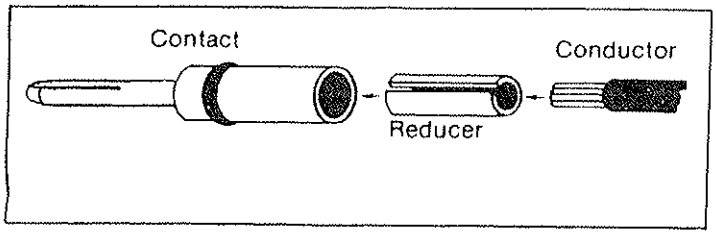


Figure 10. Wire Well Reducer

- Select the proper wire well reducer (supplied with NPR Series cord connectors ordered with a "T" suffix on the catalog number), and insert into the contact wire well. Insert the conductor and crimp the connection. The recommended Thomas and Betts hex crimp dies are listed in Table 3.

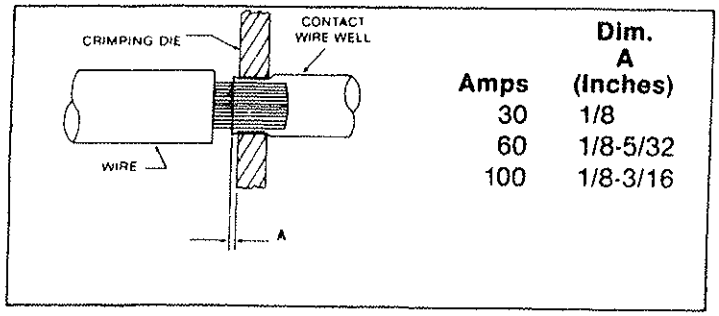


Figure 11. Crimp Connection

- Inspect the crimp connection. The contact should securely grip the conductor without any cracks or tears in the wire well.

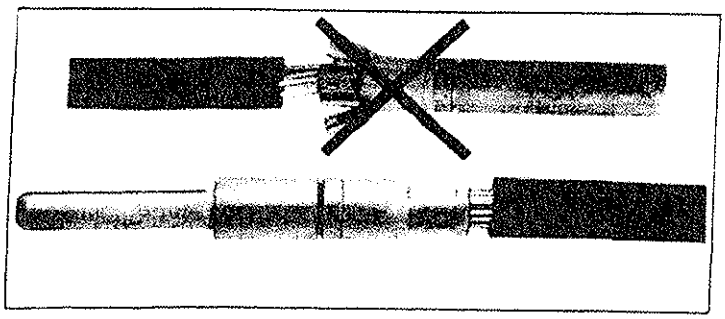


Figure 12. Crimp Connections

Table 3

NPR Cord Connector Rating (Amp)	Wire Size (AWG)	Nominal Wire Diameter (in.)	Reducer Required	Thomas and Betts Crimp Dies*	
				Code No.	Cat. No.
30	#10	.130	0400886	21	11732
	#8	.167	None Required	21	11732
60	#6	.210	0400887	29	11734
	#4	.266	None Required	29	11734
100	#2	.336	0400888	42	11737
	#1	.378	None Required	42	11737

*Use in Thomas and Betts Crimp Tools, Catalog #13642 (Head) #13604 (Pump)

Solder Connection:

CAUTION

Do not solder pressure connection type contacts. Solder only crimp type contacts.

Reliable solder connections require the use of proper soldering techniques.

- Remove O-ring gasket from the contact and wipe off the silicon lubricant.
- Remove insulation from conductor as shown in Figure 5 and wire brush contact wire well.
- Hold contact in insulated vise with wire well in upright position. Heat and pre-tin the wire well using a 60-40 rosin core solder. Do not fill well with solder.

  NOTE: A high heat source is required for good soldering. Use a high current resistance type. A torch may be used only if the surrounding conductor insulation is adequately protected.
- Insert conductor into wire well as far as possible while applying heat to the well. Add solder by melting on conductor until well fills and a smooth concave surface of solder forms between the conductor and well lip.
- Remove heat but continue to hold the conductor and contact rigid until solder solidifies. A good solder connection is indicated by a bright shiny solder surface.

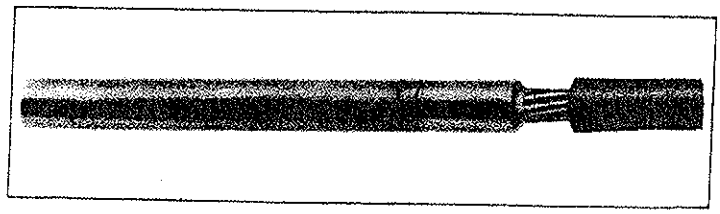


Figure 13. Solder Connection

- After contact has cooled completely, replace O-ring gasket and relubricate O-ring with silicon grease (e.g. Dow Corning #111 or General Electric Insulgrease® #640).

4. Following the system wiring pattern, reinstall the contact retaining clip onto each contact, then push each contact through the rear of the connector housing until the retaining clip snaps into position in the contact recess. Insert the green or grounding conductor into the grounding contact wire well at the same time and securely tighten the pressure connector screw to 30 in. lbs. torque. See Figure 14

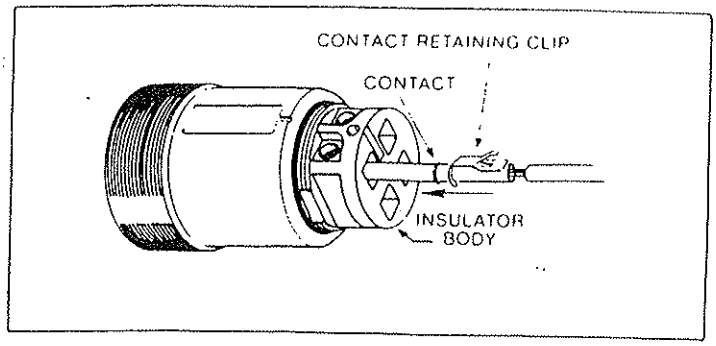


Figure 14.

5. Complete assembly of cord connector housing following Cord Connector Assembly instructions on page 3.

ELECTRICAL TESTING

Do not connect to power until the following electrical tests have been performed.

- Make continuity checks of wiring to verify correct phasing and grounding connections.
- Check insulation resistance to be sure system does not have any short circuits or unwanted grounds.

MAINTENANCE

Electrical and mechanical inspection of all components must be performed on a regular schedule determined by the environment and frequency of use. It is recommended that inspection be performed a minimum of once a year.

WARNING

If any parts of the plug, receptacle or connectors appear to be missing, broken, or shows signs of damage, DISCONTINUE USE IMMEDIATELY. Replace with the proper replacement part(s) before continuing service.

1. Inspect all contact wire terminals for tightness. Discoloration due to excessive heat is an indicator of a possible problem and should be thoroughly investigated and repaired as necessary.
2. Check grounding and bonding for correct installation and secure connection.
3. Check gaskets for deterioration and replace if necessary.
4. Clean exterior surfaces making sure nameplates remain legible.
5. Inspect gland nut tightness to ensure proper cord gripping.
6. Check tightness of all screws before using.
7. Inspect housings and replace those which are broken.

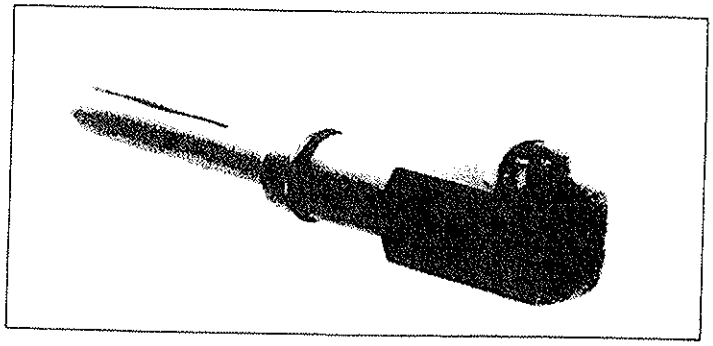


Figure 15. Split Pin Contact

8. Check contacts for signs of excessive arcing or burning and replace if necessary.

In addition to these required maintenance procedures, we recommend an Electrical Preventative Maintenance program as described in the National Fire Protection Association Bulletin NFPA No. 70B.

ELECTRICAL RATING

Maximum Voltages: 600 VAC @ 50-400 Hz, 250 VDC

Maximum Continuous Current: 30, 60, or 100 Amperes

COOPER INDUSTRIES

CROUSE-HINDS ELECTRICAL CONSTRUCTION MATERIALS

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