

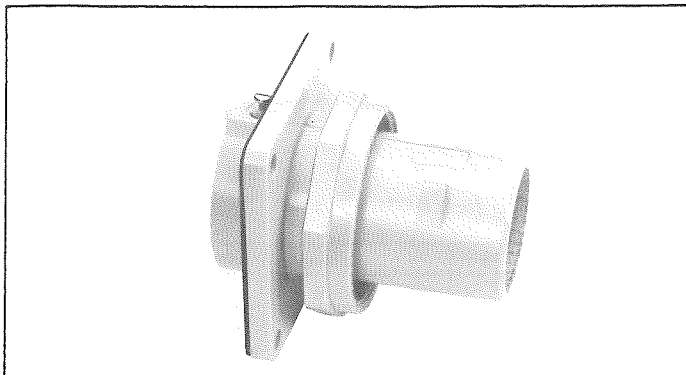


# ARKTITE® Heavy Duty Motor Plug Made of Krydon® Material NPQ Series, Model M1, Style 2; 30, 60 & 100 Ampere

SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE

IF867

## Installation & Maintenance Information



### APPLICATION

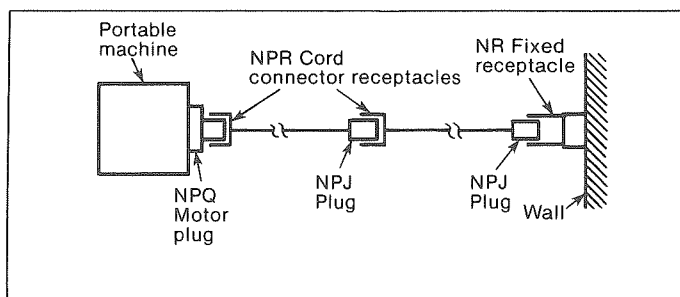
NPQ Series ARKTITE® heavy duty motor plugs are designed to provide connection and distribution of secondary electrical power (600 volts or less) between a power source and portable electrical equipment. NPQ Series motor plugs are supplied in 3 and 4 pole designs. They are capable of carrying a maximum 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.

NPQ Series motor plugs are designed for use in non-hazardous areas — indoors or outdoors. When properly maintained and installed, NPQ motor plugs are designed to provide safe and reliable

operation in wet, damp, dirty and corrosive industrial environments.

NPQ Series motor 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.

NPQ Series motor plugs are used with Crouse-Hinds NPR Series cord connectors and ARE and AJ back box assemblies. They may also be used with metal shelled APR Series ARKTITE cord connectors with similar electrical ratings and configurations.



Typical Installation (Non-hazardous location)

Refer to Crouse-Hinds Product Catalog for a complete listing of compatible ARKTITE heavy duty motor plug housings and cord connectors.

### INSTALLATION

NPQ Series motor plugs should be installed, inspected, maintained, and operated only by qualified and competent personnel.

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### MOTOR PLUG DISASSEMBLY

1. Loosen the flange adapter set screw approximately 1/4 inch, then unscrew flange adapter from motor plug housing.

2. **DO NOT REMOVE** pressure termination type contacts from Motor Plug housing.

### IMPORTANT

NPQ Series Motor Plugs identified by the addition of suffix T to the catalog number are supplied with crimp or solder termination type contacts. Refer to Crimp/Solder Termination section of Instructions for installation information before proceeding further.

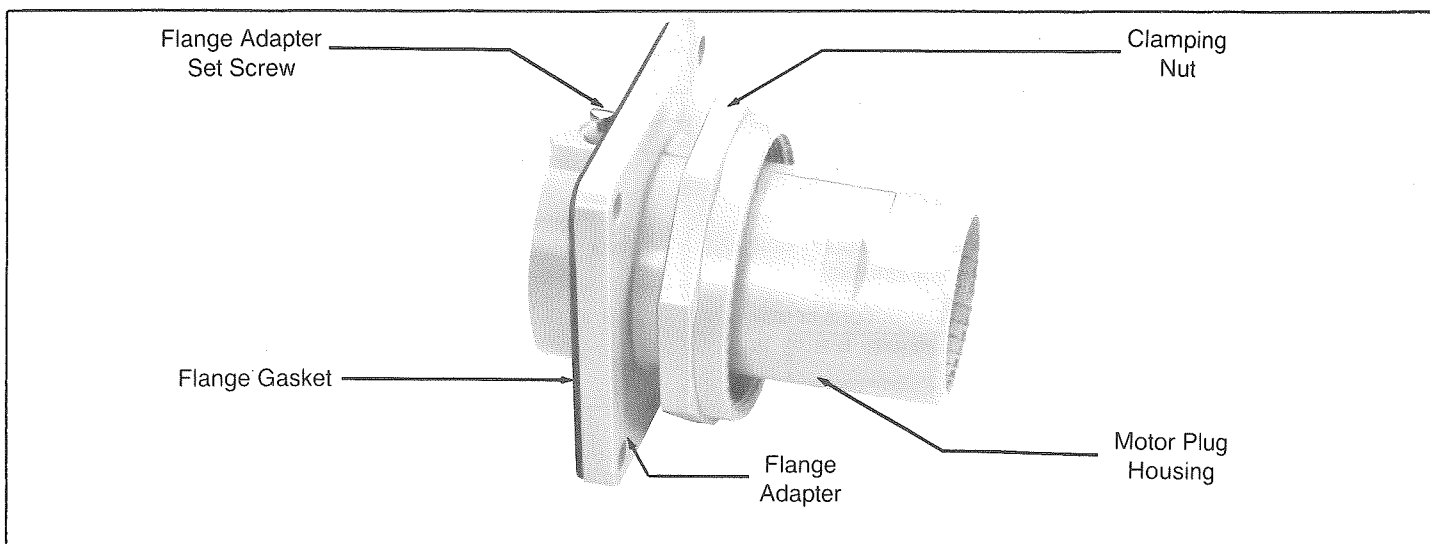


Figure 1. NPQ Series ARKTITE Motor Plug

## WIRING CONNECTION

### Acceptable Wire Sizes For Use With Pressure Contacts

Ampere Rating	Diameter of Recess	Wire Sizes	
		Building	Extra Flex
30	0.281	#10 - #6	#10 - #8
60	0.312	#6 - #4	#8 - #4
100	0.390	#4 - #1	#4 - #2

### WARNING

Electrical power must be turned **off** before and during installation and maintenance.

1. Establish a wiring pattern.

### WARNING

Before assembling an NPQ Series motor plug, 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 the National Electrical Code and/or per rule 26-700 (4) of the Canadian Electrical Code\*. For each system the same colored wire must be put into the same numbered contact on all plugs and cord connectors in that system. This will assure correct system polarity and eliminate the possibility of equipment damage and/or personal injury due to misphasing or shorts.

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

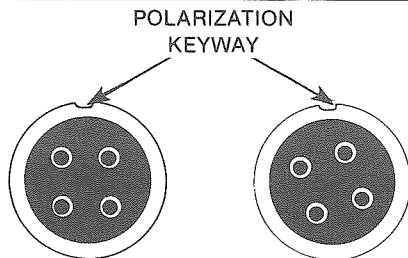


Figure 2. Standard Contact Pattern (4-Pole) 30 and 60 Amp

Figure 3. S4 Contact Pattern (4-Pole) 30 and 60 Amp

**NOTE:** NPQ Series motor plugs identified by the addition of Suffix S4 to the catalog number are supplied with the plug contact pattern rotated 22½ degrees for special polarity application.

NPQ Series motor plugs with a rotated contact pattern (Suffix S4) are compatible only with cord connectors 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 copper wire with this motor plug.

2. Select mounting location and style.

### Panel Mounting:

Select mounting location that will provide suitable strength and rigidity and also allow enough clearance for connection and removal of mating cord connector. Drill four mounting holes and conductor access holes as shown in Figure 4. Pull all phase and ground wires through access hole.

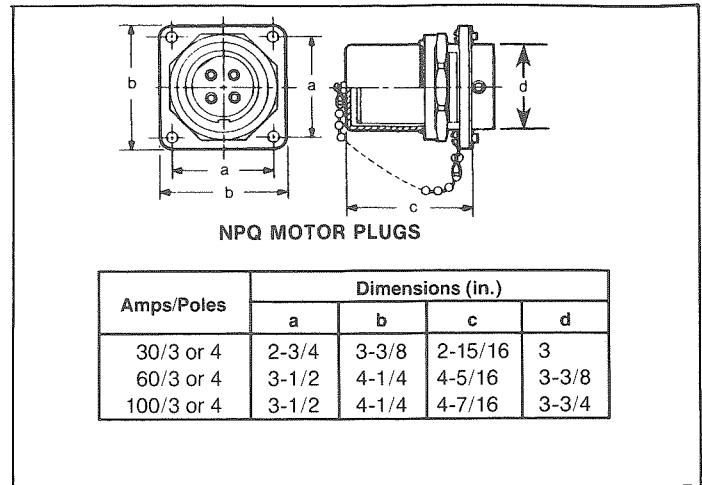


Figure 4. Panel Mounting

### Back Box Mounting:

Select a mounting location that will provide suitable strength and rigidity for supporting the back box; motor plug and all contained wiring. Be sure that enough height is provided to allow ample insertion and withdrawal clearances for cord connectors. Securely fasten the back box assembly (ordered separately). Pull all phase and ground wires into the back box, providing sufficient length to connect to the NPQ Series motor plug.

3. Slide flange gasket then flange adapter and clamping nut over phase and ground conductors.

**NOTE:** The gasket and flange adapter may be temporarily connected to the back box or panel to facilitate installation.

4. Strip conductor insulation to the dimensions shown in Figure 5. A conductor strip gage is also located on the motor plug housing. These dimensions will allow the conductor to bottom in the contact wire well and the conductor insulation to extend into the insulated housing.

### CAUTION

Do not damage the conductor when removing its insulation.

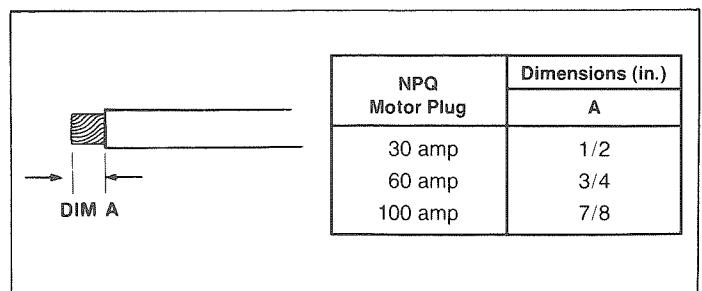


Figure 5. Conductor Insulation

5. Connect wires, identified by color in center column of Table 1 to contacts identified by number noted in column to the right. White wire is connected to contact identified by #2. Connect other contacts in accordance with color of wires.

\* Canadian Electric Code — A voluntary code for adoption and enforcement by Regulatory Authorities.

Conductors are identified by the color of insulation on each individual conductor. These colors agree with those given in Section 210-5 of the National Electrical Code and/or rule 4-036 of the Canadian Electrical Code, for multi-wire branch circuits; an additional wire, uninsulated or identified green, is for grounding and complies with Sections 250-42 and 250-45 of the National Electrical Code and/or rules 10-400 and 10-408 of the Canadian Electrical Code. If conductors are not identified with exactly these colors, these colors may be assumed in making proper connections.

**TABLE 1**

Motor Plug Style	Color of Wire	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.

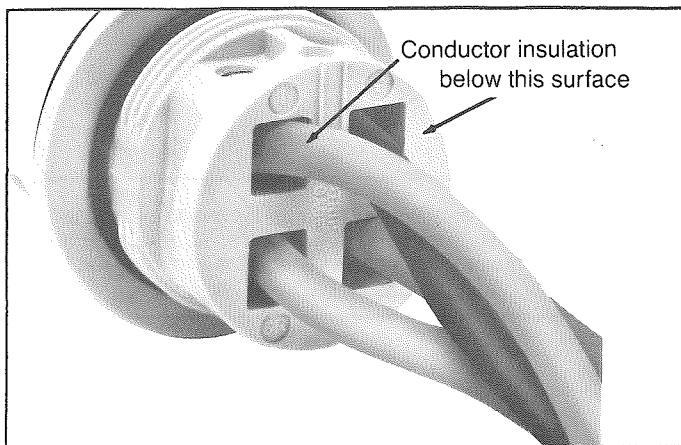
\* White wire or terminal must not be used for grounding. If one conductor is uninsulated, or identified green, this wire is for grounding the portable device. If no green or bare wire is available, another wire may be connected through motor plug and cord connector connections to conduit or some other non-current-carrying conductor permanently grounding in accordance with Article 250 of the 1981 National Electric Code, and/or Section 8 of the Canadian Electrical Code.

\*\* Use pressure type termination.

- 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 the torque values listed in Table 2.

**TABLE 2**

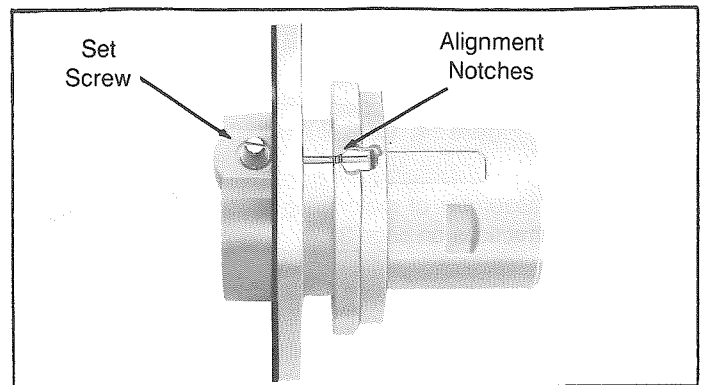
Assembly Amperage	Minimum Required Contact Screw Torque (In.-Lbs)
30	30
60	40
100	50



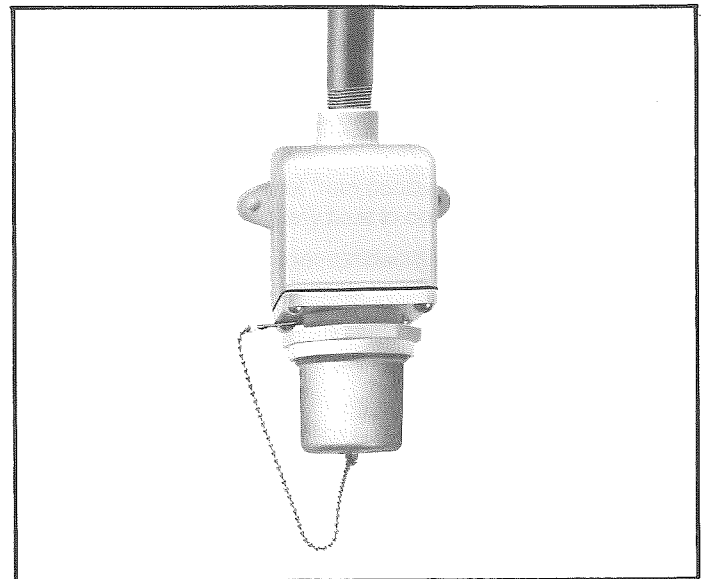
**Figure 6. Conductor Installation**

## MOTOR PLUG ASSEMBLY

- Slide the clamping nut over motor plug housing. Rethread flange adapter onto motor plug housing until housing seats firmly against O-ring seal and alignment notches on housing and flange adapter are positioned correctly. (See Figure 7.) Tighten motor plug housing set screw securely to 10 in. lbs. torque.
- Insert motor plug mounting screw through plug cap chain eyelet then through motor plug mounting flange. (See Figure 8.)
- Install completed assembly onto back box assembly or panel surface making sure that the flange gasket is properly positioned between the motor plug and mounting surface. Sequentially tighten the four mounting screws to 20 in. lbs. torque.



**Figure 7.**



**Figure 8.**

## CRIMP/SOLDER TERMINATION

NPQ Motor Plugs with crimp/solder termination contacts are identified by the addition of a Suffix T to the catalog number.

- Remove all contacts (except the grounding contact) from the motor plug housing 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 retaining clips from contacts and retain for reassembly.

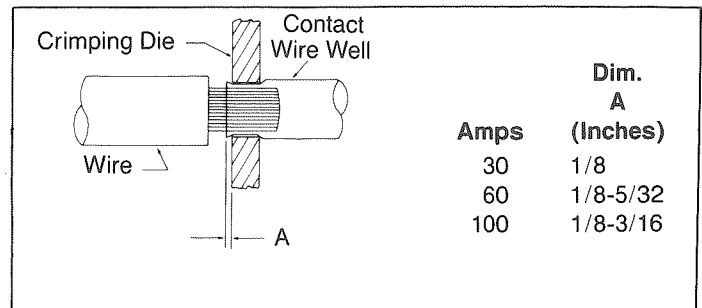


Figure 11. Crimp Connection

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

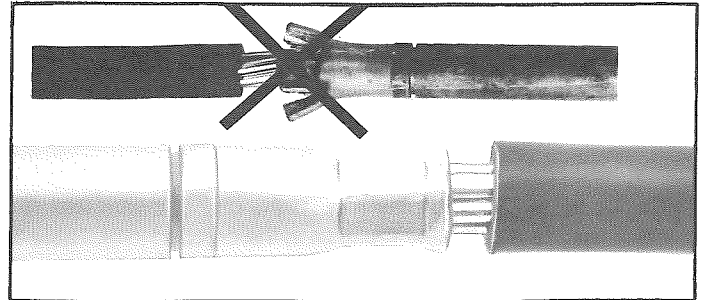


Figure 12. Crimp Connections

**Solder Connection:**

**CAUTION**

Do not solder pressure connection type contacts. Use only crimp type contacts for soldering.

Reliable solder connections require the use of proper soldering techniques.

- Remove O-ring gasket from contact and wipe off silicon lubricant before applying any heat to contact.
- Remove insulation from conductor as shown in Figure 5 and wire brush contact wire well.
- Hold contact securely 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 cable 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.

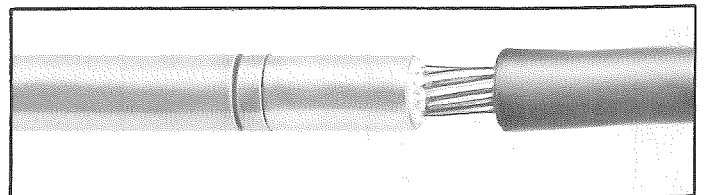
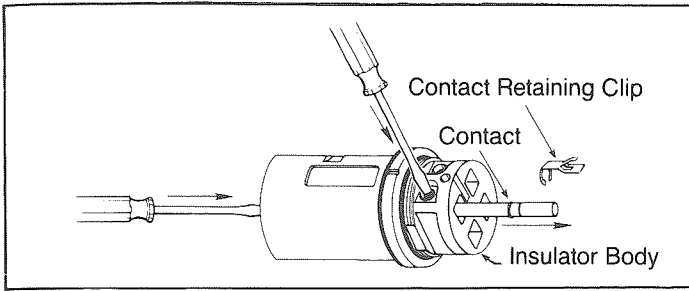


Figure 13. Solder Connection

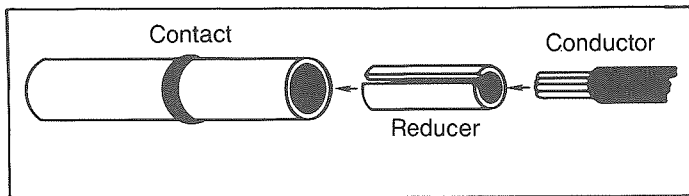


**Figure 9. Contact Removal**

2. Follow steps 1 through 5 of Wiring Connection instructions.
3. Connect the conductors into each contact wire well by either crimp or solder connection method, follow the established system wiring pattern. Grounding conductors are not crimped or soldered but held securely with 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 NPQ Series motor plugs 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.

**TABLE 3  
Crimp Chart For All ARKTITE Receptacles & Motor Plugs  
30, 60, 100 Amp**

Rating (Amp)	Wire Size (AWG)	Conductor Construction		Reducer Required		Thomas & Betts Co. Crimp Dies*	
		Class	Dia.(in.)	OD	ID	Code No.	Crimp No.
30	#10	B	.116	.180	.137	21	11732
	#10	G, H, I, K, M	.126	.180	.137	21	11732
	#8	B	.146	None		21	11732
	#8	G, H, I, K, M	.167	None		21	11732
60	#8	G, H, I, K, M	.167	.270	.190	29	11734
	#6	B	.184	.270	.190	29	11734
	#6	G, H, I, K, M	.210	.250	.216	29	11734
	#4	B	.232	None		29	11734
	#4	G, H, I, K, M	.266	None		29	11734
100	#4	B	.232	.375	.312	42	11737
	#4	G, H, I, K, M	.266	.375	.312	42	11737
	#2	B	.292	.375	.343	42	11737
	#2	G, H, I, K, M	.336	.375	.343	42	11737
	#1	B	.332	.375	.343	42	11737
	#1	G, H, I, M	.378	None		42	11737
	#1/0	B	.372	None		42	11737

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

- 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 into position through the rear of the receptacle housing. 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.

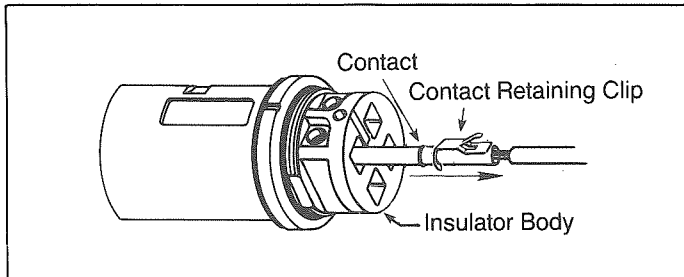


Figure 14. Contact Installation

5. Complete assembly of motor plug following Motor Plug 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 motor plug or connector appear to be missing, broken, or show 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. Check tightness of all screws before using.
6. Inspect housings and replace those which are broken.
7. Check contacts for signs of excessive burning or arcing and replace if necessary.

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

### ELECTRICAL RATING

Maximum Voltages: 600 VAC  $\neq$  50-400 Hz, 250 VDC

Maximum Continuous Current: 30, 60 or 100 Amperes.

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*All statements, technical information and recommendations contained herein are based on information and tests we believe to be reliable. The accuracy or completeness thereof are not guaranteed. In accordance with Crouse-Hinds "Terms and Conditions of Sale", and since conditions of use are outside our control, the purchaser should determine the suitability of the product for his intended use and assumes all risk and liability whatsoever in connection therewith.*

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