

1. INTRODUCTION

This instruction sheet provides assembly and installation procedures for the AMP* AMPINNERGY System (5 and 8 wire) connectors and accessories listed in Figure 1.

NOTE

All dimensions are in millimeters [with inches in brackets]. Figures are for reference only and are not drawn to scale.

Reasons for reissue of this sheet are provided in Section 11, REVISION SUMMARY.

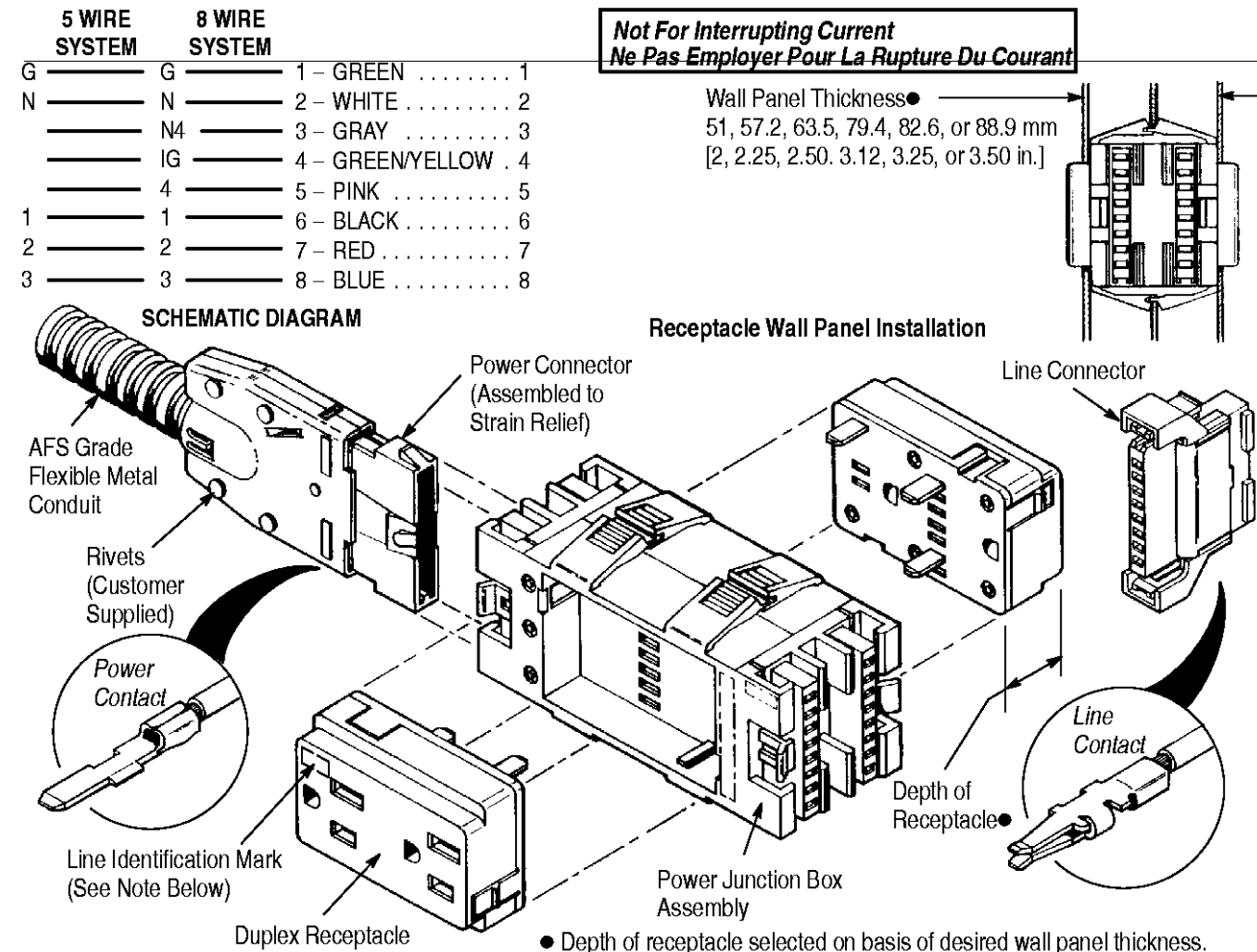
2. DESCRIPTION

AMPINNERGY System connectors consist of a possible eight-wire system: Lines 1, 2, 3, 4, a common ground, an isolated ground, a shared neutral, and an individual neutral. The system has the capability of providing service on both sides of a

workstation panel simply by installing pluggable duplex receptacles into a mounted junction box assembly.

A system with an isolated ground circuit is needed because sensitive electronic equipment is often affected by transient signals from other equipment connected to the common ground. These currents can often cause delicate circuits in equipment to malfunction. Systems connected to the isolated ground circuit have a "clean" grounding circuit. The isolated circuit is connected directly to the service entrance panel. With the eight-wire system, a customer has the option of using either a five- or eight-wire system.

The system is Underwriters Laboratories Inc. (UL) recognized which allows use as follows: 125Vac and 15A and 20A for service outlets and 125/250Vac and 20A for pass-thru power.



NOTE: Lines 1, 2, 3, and 4 duplex receptacles are marked by either 1, 2, 3, or 4. Duplex receptacles with the isolated ground are marked 1G, 2G, 3G, 4G, or 5G with an orange colored triangle (▲) following it.

Figure 1 (cont'd)

PART NO.	DESCRIPTION	WIRE SYSTEM	REMARKS
556124-1	JUNCTION BOX, SINGLE, SNAP-IN MOUNT	8	MATES with POWER CONN 555929-1 and 555930-1
556209-1	JUNCTION BOX, SINGLE, SNAP-IN MOUNT	5	MATES with POWER CONN 555929-3 and 555930-3
556888-1	JUNCTION BOX, SINGLE, BRACKET MOUNT	8	MATES with POWER CONN 555929-1 and 555930-1
556887-1	JUNCTION BOX, SINGLE, BRACKET MOUNT	5	MATES with POWER CONN 555929-3 and 555930-3
556132-1	JUNCTION BOX, SINGLE, LUG MOUNT	8	MATES with POWER CONN 555929-1 and 555930-1
556217-1	JUNCTION BOX, SINGLE, LUG MOUNT	5	MATES with POWER CONN 555929-3 and 555930-3
555843-1	JUNCTION BOX, MULTIPLEX, SNAP-IN MOUNT	8	MATES with POWER CONN 555929-1 and 555930-1
555844-1	JUNCTION BOX, MULTIPLEX, SNAP-IN MOUNT	5	MATES with POWER CONN 555929-3 and 555930-3
556946-1	JUNCTION BOX, MULTIPLEX, BRACKET MOUNT	8	MATES with POWER CONN 555929-1 and 555930-1
556886-1	JUNCTION BOX, MULTIPLEX, BRACKET MOUNT	5	MATES with POWER CONN 555929-3 and 555930-3
555847-1	JUNCTION BOX, MULTIPLEX, LUG MOUNT	8	MATES with POWER CONN 555929-1 and 555930-1
555848-1	JUNCTION BOX, MULTIPLEX, LUG MOUNT	5	MATES with POWER CONN 555929-3 and 555930-3
557635-1	JUNCTION BOX, MULTIPLEX, WIDE LUG MOUNT	8	MATES with POWER CONN 555929-1 and 555930-1
557634-1	JUNCTION BOX, MULTIPLEX, WIDE LUG MOUNT	5	MATES with POWER CONN 555929-3 and 555930-3
557802-2	JUNCTION BOX, TRI-PLEX, LUGLESS	8	MATES with POWER CONN 555929-1 and 555930-1
557950-1	JUNCTION BOX, QUAD-PLEX, LUGLESS	8	MATES with POWER CONN 555929-1 and 555930-1
556173-1	POWER DISTRIBUTION MODULE, 4 PORT	8	MATES with POWER CONN 555929-1 and 555930-1
556173-2	POWER DISTRIBUTION MODULE, 4 PORT	5	MATES with POWER CONN 555929-3 and 555930-3
556794-1	POWER DISTRIBUTION MODULE, 6 PORT	8	MATES with POWER CONN 555929-1 and 555930-1
556794-2	POWER DISTRIBUTION MODULE, 6 PORT	5	MATES with POWER CONN 555929-3 and 555930-3
406478-1	POWER DISTR MODULE, 4 PORT, LOW PROFILE	8	MATES with POWER CONN 555929-1 and 555930-1
406478-2	POWER DISTR MODULE, 4 PORT, LOW PROFILE	5	MATES with POWER CONN 555929-3 and 555930-3
406221-1	POWER DISTR MODULE, 6 PORT, LOW PROFILE	8	MATES with POWER CONN 555929-1 and 555930-1
406221-2	POWER DISTR MODULE, 6 PORT, LOW PROFILE	5	MATES with POWER CONN 555929-3 and 555930-3
555929-1	HOUSING BASE, POWER CONN, BLACK	8	ACCEPTS 555928-1, MATES with 555892-1 and 556124-1
555929-3	HOUSING BASE, POWER CONN, SOFT WHITE	5	ACCEPTS 555928-1, MATES with 555892-5 and 556209-1
555930-1	HOUSING, POWER CONN, BLACK	8	ACCEPTS 555928-1, MATES with 555892-1 and 556124-1
555930-3	HOUSING, POWER CONN, SOFT WHITE	5	ACCEPTS 555928-1, MATES with 555892-5 and 556209-1
555892-1	HOUSING, LINE CONN, BLACK	8	ACCEPTS 555485-1, MATES with 555929-1 and 555930-1
555892-5	HOUSING, LINE CONN, SOFT WHITE	5	ACCEPTS 555928-1, MATES with 555892-3 and 556209-1
555894-2	COVER, LINE CONN, GRAY	5 and 8	ASSEMBLED with 555892-1 and 555892-5
555928-1	POWER CONN CONTACT, STRIP FORM	5 and 8	USED in 555929 and 555930
555485-1	LINE CONN CONTACT, STRIP FORM	5 and 8	USED in 555892
555890-1	STRAIN RELIEF, RIGHT	5	ASSEMBLED with 555891-1, 12.7 [.50] GND for POWER CONN
555890-2	STRAIN RELIEF, RIGHT	8	ASSEMBLED with 555891-2, 14.2 [.56] GND for POWER CONN
555890-3	STRAIN RELIEF, RIGHT	5	ASSEMBLED with 555891-1, 12.7 [.50] GND for LINE CONN
555890-4	STRAIN RELIEF, RIGHT	8	ASSEMBLED with 555891-2, 14.2 [.56] GND for LINE CONN
555891-1	STRAIN RELIEF, LEFT	5	ASSEMBLED with 555890-1
555891-2	STRAIN RELIEF, LEFT	8	ASSEMBLED with 555890-2

PART NO.		DESCRIPTION	WIRE SYSTEM	REMARKS
15 A	20 A			
		51 mm [2 in.] WALL PANEL THICKNESS●		
556100-1	406248-1	DUPLEX RCPT ASSY, LINE 1	5 and 8	USED with POWER JUNCTION BOX ASSY 556124 and 556209
556101-1	406249-1	LINE 2		
556102-1	406250-1	LINE 3		
556103-1	406251-1	LINE 4	8	USED with POWER JUNCTION BOX ASSY 556124
556104-1	406252-1	LINE 1, ISOL GND		
556105-1	406253-1	LINE 2		
556106-1	406254-1	LINE 3		
556107-1	406255-1	LINE 4		

Figure 1 (cont'd)

PART NO.		DESCRIPTION	WIRE SYSTEM	REMARKS
15 A	20 A			
556108-1	406257-1	57.2 mm [2.25 in.] WALL PANEL THICKNESS● DUPLEX RCPT ASSY, LINE 1	5 and 8	USED with POWER JUNCTION BOX ASSY 556124 and 556209
556109-1	406258-1	LINE 2		
556110-1	406259-1	LINE 3		
556111-1	406260-1	LINE 4	8	USED with POWER JUNCTION BOX ASSY 556124
556112-1	406261-1	LINE 1, ISOL GND		
556113-1	406262-1	LINE 2		
556114-1	406263-1	LINE 3		
556115-1	406264-1	LINE 4		
556116-1	406265-1	63.5 mm [2.50 in.] WALL PANEL THICKNESS● DUPLEX RCPT ASSY, LINE 1	5 and 8	USED with POWER JUNCTION BOX ASSY 556124 and 556209
556117-1	406266-1	LINE 2		
556118-1	406267-1	LINE 3		
556119-1	406268-1	LINE 4	8	USED with POWER JUNCTION BOX ASSY 556124
556120-1	406269-1	LINE 1, ISOL GND		
556121-1	406270-1	LINE 2		
556122-1	406271-1	LINE 3		
556123-1	406272-1	LINE 4		
558056-1	406273-1	LINE 5		
406112-1	406226-1	79.4 mm [3.12 in.] WALL PANEL THICKNESS● DUPLEX RCPT ASSY, LINE 1	5 and 8	USED with POWER JUNCTION BOX ASSY 556124 and 556209
406113-1	406227-1	LINE 2		
406114-1	406228-1	LINE 3		
406115-1	406229-1	LINE 4	8	USED with POWER JUNCTION BOX ASSY 556124
406116-1	406230-1	LINE 1, ISOL GND		
406117-1	406231-1	LINE 2		
406118-1	406232-1	LINE 3		
406119-1	406233-1	LINE 4		
406120-1	406234-1	LINE 5		
406623-1	406632-1	82.6 mm [3.25 in.] WALL PANEL THICKNESS● DUPLEX RCPT ASSY, LINE 1	5 and 8	USED with POWER JUNCTION BOX ASSY 556124 and 556209
406624-1	406633-1	LINE 2		
406625-1	406634-1	LINE 3		
406626-1	406635-1	LINE 4	8	USED with POWER JUNCTION BOX ASSY 556124
406627-1	406636-1	LINE 1, ISOL GND		
406628-1	406637-1	LINE 2		
406629-1	406638-1	LINE 3		
406630-1	406639-1	LINE 4		
406631-1	406640-1	LINE 5		
406121-1	406235-1	88.9 mm [3.50 in.] WALL PANEL THICKNESS● DUPLEX RCPT ASSY, LINE 1	5 and 8	USED with POWER JUNCTION BOX ASSY 556124 and 556209
406122-1	406236-1	LINE 2		
406123-1	406237-1	LINE 3		
406124-1	406238-1	LINE 4	8	USED with POWER JUNCTION BOX ASSY 556124
406125-1	406239-1	LINE 1, ISOL GND		
406126-1	406240-1	LINE 2		
406127-1	406241-1	LINE 3		
406128-1	406303-1	LINE 4		

Figure 1 (end)

The components listed in Figure 1 are as follows:

Power Junction Box Assembly – has two main functions at each workstation: it provides electrical service, and it supplies feed-thru capabilities to and from other workstations. The assembly uses 5 or 8 power junction box connector contacts, and it provides three or four circuit options.

Duplex Receptacles – are pluggable modules that snap into a power junction box assembly and function as Line 1, 2, 3, or 4 receptacles, or as a Line 1G, 2G, 3G, 4G, or 5G receptacle with the isolated ground circuit. The receptacles are available in styles for six wall thicknesses.

Power Contact – is designed to be crimped to 12 or 10 AWG wire with **stranded** conductors.

Power Housing – (two-piece, unassembled) accepts power contacts crimped to wires and functions as a power connector. It mates with a line connector or power junction box assembly.

Line Contact – is designed to be crimped to 12 or 10 AWG wire with **stranded** conductors.

Line Housing – (two-piece, unassembled) accepts line contacts crimped to wires and functions as a line connector. It mates with the power connector only.

Strain Relief – two piece (unassembled) metal components that are used with both the power and line connectors, when used with flexible conduit, to provide strain relief.

3. CONTACTS AND TOOLING

The contacts are supplied in strip form and are terminated using miniature quick-change applicators. Applicator 567256-3 is used in the automatic AMPOMATOR* machine, in the AMP-O-ELECTRIC* Model "G" Terminating Machine 354500-1, and in other machines that accept miniature quick-change applicators.

Consult your local AMP representative for assistance in selecting the machine and applicator that will best suit your needs.

4. POWER CONNECTOR

A power connector consists of a two-piece power housing containing crimped power contacts. Each crimped contact must be inspected using the procedures listed in AMP Instruction Sheet 408-3198 before it can be inserted into a housing.

If the crimped contacts pass inspection, proceed as follows:

1. Orient crimped contact with base so that locking tab of contact will be aligned with slot in base.

2. Insert contact into base until the locking tab is bottomed in base. The latch of the base must catch over the contact, as shown in Figure 2. Be sure contact is in straight alignment with circuit cavity.

3. Rotate base 90° and align with housing – four tabs on base with four tabs on housing. Push base into housing until base bottoms.

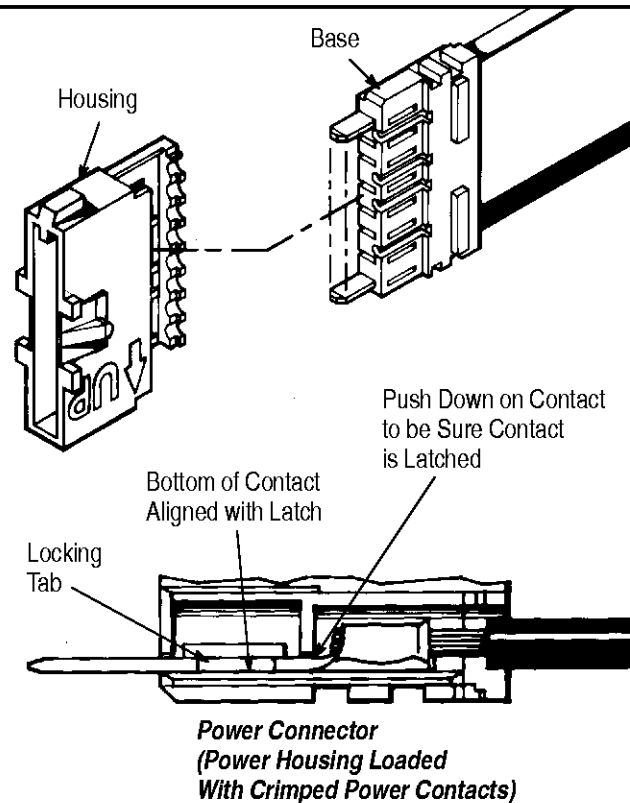


Figure 2

5. LINE CONNECTOR

A line connector consists of a two-piece line housing containing crimped line contacts. Generally, crimping and inspection procedures are the same as those described for the power contacts.

5.1. Line Contact Insertion

If the crimped contacts pass inspection (408-3198), proceed as follows:

1. Orient crimped contact with housing so that bottom of contact will be aligned with or face alignment groove.
2. Insert contact into housing until the stabilizing legs of contact bottom inside housing. The latch of the housing must catch under the contact, as shown in Figure 3. Be sure contact is in straight alignment with circuit cavity.

**Line Connector
(Line Housing Loaded
With Crimped Line Contacts)**

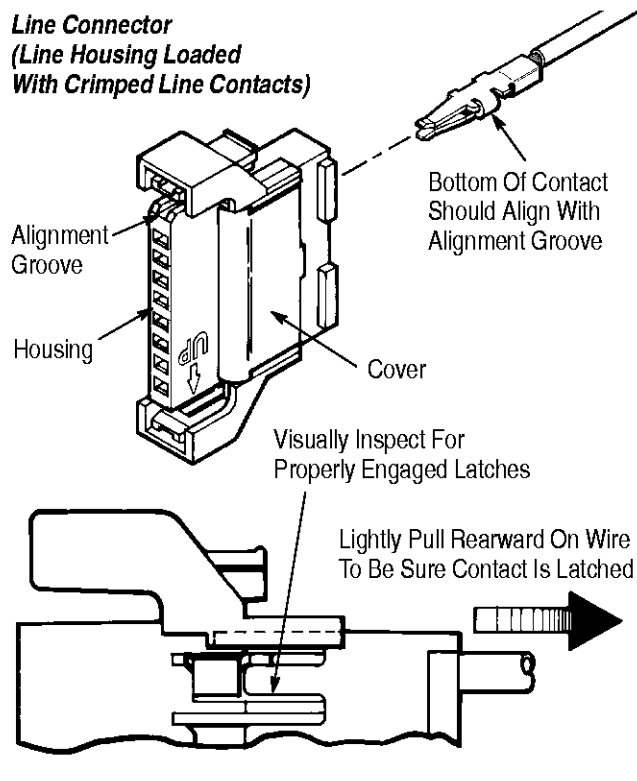


Figure 3

3. Align two edges on cover with two slots on front of housing. Slide cover over housing until bottomed.

5.2. Removing Line Contacts

Normally, line contacts do not have to be removed. Should it be necessary, however, the cover must first be unlatched. If the cover is not damaged, it can be reused. A small screwdriver should then be used to lift up the latch of the housing while, simultaneously, the contact is pulled from the housing.

6. HARNESS ASSEMBLIES

It is important that the instructions for fitting together the harness assemblies are followed carefully to ensure that the flexure of the flexible metal conduit does not interfere with the electrical or mechanical integrity of the installation.

Each harness assembly consists of two connector assemblies connected by flexible conduit. (By definition, a power harness consists of a line or power connector; when the strain relief halves have been fitted around the power harness and cable end, it is referred to as a power harness assembly.)

There are three important dimensions when considering the use of any harness assembly: (1) the distance of the overall harness assembly, measured

between the mating faces of each power connector, designated as L in Figure 4; (2) the length of the flexible metal conduit, designated as C in Figure 4, and, (3) the lengths of the wires (relative to the housing cavities into which the crimped contacts will be inserted). The wires are crimped to contacts and inserted into predetermined cavities of each power harness.

The suggested minimum length of a finished harness assembly is 305 mm [12 in.], or $L = 305$ [12]. A typical example for determining cut wire and conduit lengths for the harness assemblies are shown in Figure 4, using $L = 616.0$ [24.25].

The contacts that are crimped to the wire which will be used for the common ground are inserted into the cavity marked No. 1 of each power connector harness. The isolated ground circuit is connected only to earth ground and must continue on through each power connector. The contacts crimped to the wire which is to be used for the isolated ground are inserted into the No. 4 cavity of each power connector harness.

The materials for the assembly are listed in Paragraph 6.1. Assembly procedures are described in Paragraph 6.2.

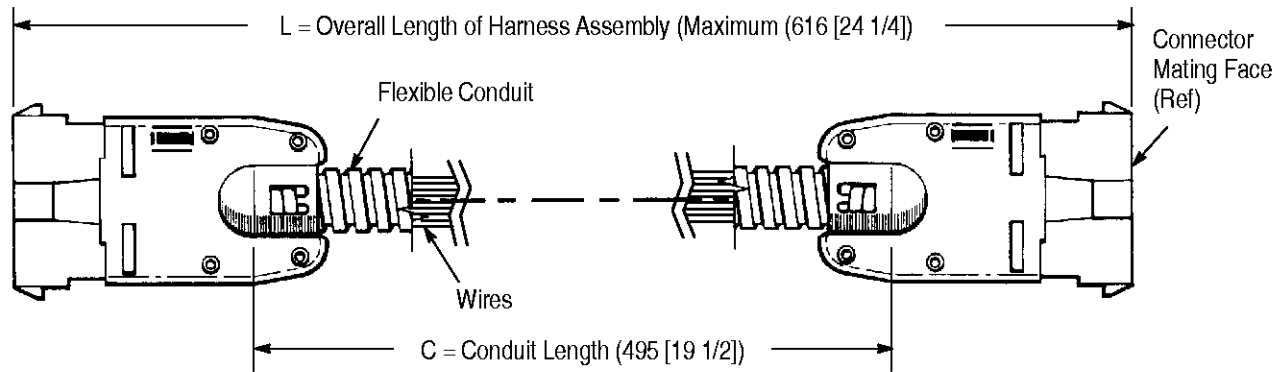
6.1. Materials Needed

In addition to the harness connectors (consisting of housings, contacts, and wires), the following materials are needed to assembly a harness assembly: (1) two right strain relief halves 555890-1 or -2; (2) two left strain relief halves 555891-1 or -2; (3) eight rivets, each 3.18 mm [.125 in.] in diameter and 12.7 mm [.50 in.] long, and manufactured from semi-tubular steel; (4) suitable rivet staking equipment; (5) the required length of flexible conduit, 12.7 mm [.50 in.] Trade Size (for 5 wire) and having a nominal 16.5 mm [.65 in.] outer diameter (OD) (International AFS 1/2) or 14.3 mm [.56 in.] Trade Size (for 8 wire) and having a nominal 18.3 mm [.72 in.] OD (International AFS 9/16), and two insulating bushings, one for each cable end. The rivets, rivet staking equipment, flexible conduit, wire, and the insulating bushings are customer supplied.

It is recommended that 3.18 mm [.125-in.] diameter by 12.70 mm [.500-in.] long semi-tubular steel rivets be used to assemble the strain relief halves to the power harness.

It is recommended that the flexible conduit be purchased from:

INTERNATIONAL METAL HOSE CO.
520 Goodrich Road
Bellevue, OH 44811
(AFS 1/2, AFS 9/16)



This illustration provides an example for calculating wire and conduit lengths for a 616 mm [24 1/4 in.] long harness assembly. The wire lengths are for a typical application, your application may require more wire. Adequate wire length **MUST BE ENSURED** to prevent stress on the wires and contacts during handling and installation.

Notice that specific elements have a minus factor. This factor is subtracted from the overall harness assembly dimension to obtain the length of the item (conduit or wire). The minus factor remains the same for all harness assemblies. The minus factor applies to **EACH** connector applied. A double ended cable assembly requires the minus factor to be doubled.

ITEM	ELEMENT	DIMENSIONS		
		OVERALL LENGTH OF HARNESS ASSEMBLY	MINUS FACTOR PER END	ITEM LENGTH
CONDUIT	TWO CONNECTORS	616 [24 1/4]	60.3 [2 3/8]	495.3 [19 1/2]
WIRE	CONNECTOR CONTACT CAVITY IDENTITY▪	4 and IG	25.4 [1]	565.2 [22 1/4]
		1 and N4	22.2 [7/8]	571.5 [22 1/2]
		2 and N	20.6 [13/16]	574.7 [22 5/8]
		3 and G	19.8 [25/32]	576.3 [22 11/16]

▪ Refer to Figure 5 for the connector contact cavity identity. These markings do NOT appear on the housing.

Figure 4

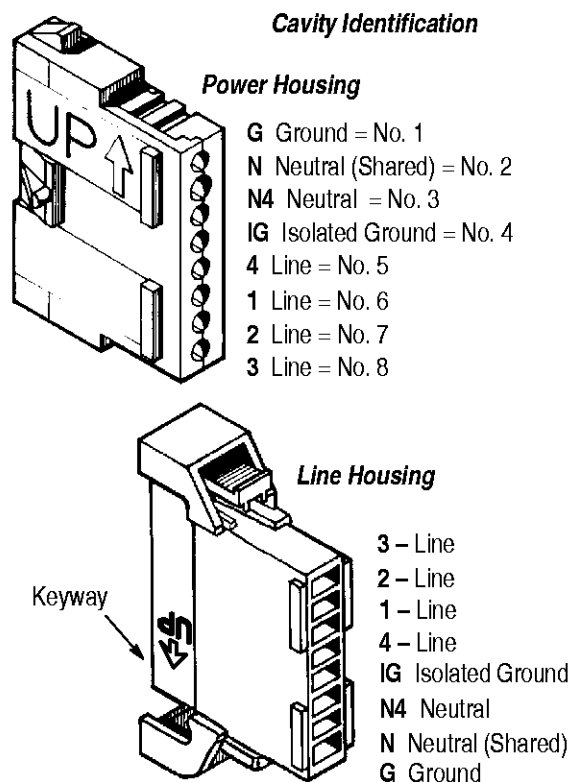


Figure 5

6.2. Assembly with Grounding

The finished harness assembly *with* ground should be a *minimum of 305 mm [12 in.] long*. Generally, the steps required to complete a finished assembly are somewhat detailed and should be followed in sequence. They include wire cutting and stripping, crimping the contacts, sliding the flexible conduit over the crimped contacts, matching each crimped contact with the correct housing cavity (especially when color-coded wires are used), and assembling the strain reliefs to the power harness. Before assembly begins, however, each wire should be matched with its respective cavity. The length of the finished harness assembly should be determined by using the information contained in Figure 4.

The following steps are listed in sequence to assemble the components of a flexible harness assembly.

1. If any of the wires are color-coded, match the wire with its respective cavity (into which the crimped contact is to be inserted) and find its length using the information contained in Figure 4.

NOTE

The cavities of the power housing are identified by numbers on the base. This will allow the cavities to be identified before the wires are cut to their predetermined lengths, as described in Figure 4.

NOTE

Number 10 AWG wire is used in the Neutral position (second slot from the top). There is a difference in slot width for the strain relief wire guide to compensate for this.

2. Strip each wire according to the information shown in Figure 6.A. Note that the wire to be used as the system ground is stripped 38 mm [1 1/2 in.], and the other wires are stripped 5.5 to 6.4 mm [7/32 to 1/4 in.].

3. Crimp the contacts to the stripped wires, using the instructions packaged with the applicator. After crimping, inspect each contact as prescribed in 408-3198. It is important that this step be performed before any contact is inserted into a housing cavity.

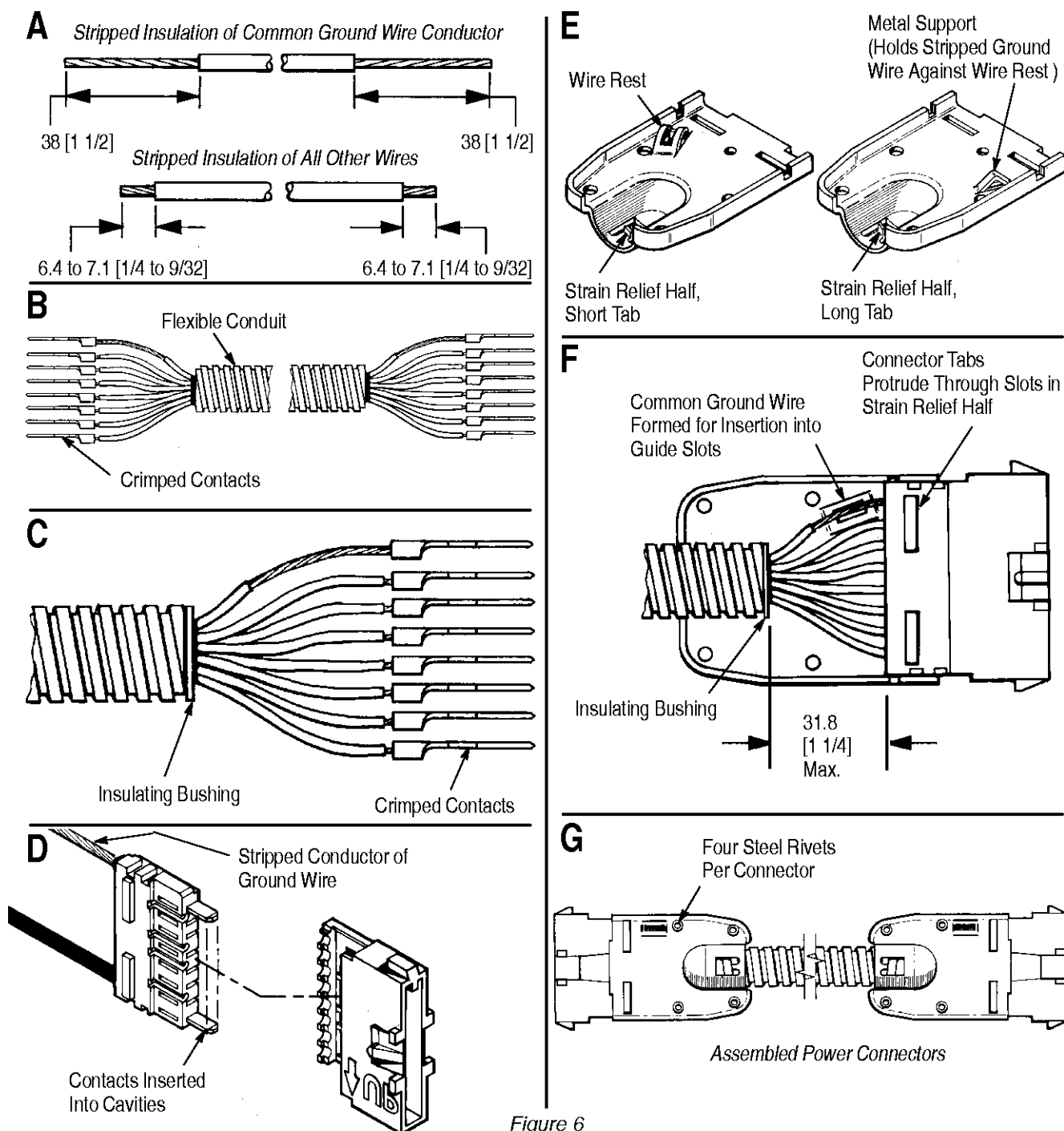


Figure 6

4. Slide the flexible conduit over all the crimped contacts and make sure the wires are positioned so that an insulating bushing can be added at each end. See Figure 6.B.

5. Next, snap an insulating bushing on one end of the flexible conduit as shown in Figure 6.C. Then snap an insulating bushing onto the opposite end of the conduit.

6. Insert each crimped contact into its predetermined cavity using the procedures described in either Paragraph 4 or 5. See Figure 6.D. Do not restrict the movement of the contacts within the housing in a way that would affect their performance. Ensure that each wire is in its correct cavity.

NOTE

*When bending or forming wires, hold wire at a position at least 6.35 mm [1/4 in.] beyond rear of connector before bending or forming wire in the desired direction. **Do not bend unsupported wires, doing so can put undue strain on the contacts retained inside the connectors.** Note that this especially applies to the ground wire crimped to the contact which is inserted in cavity G. The ground wire must be formed to fit between the guide slots (see Step 7).*

7. Assemble the left strain relief half (555891-1 or -2) around both the power connector and the flexible conduit; then, lay the stripped conductors

of the ground wire in between the guide slots of the strain relief half so that they are located on the wire rest. (The wire rest is shown in Figure 6.E.) Ensure that the tabs of the power connector protrude through the open slots and hole of the strain relief half. A properly positioned connector assembly is shown in Figure 6.F.

8. Holding the strain relief half so the ground wire remains in position, lay the right strain relief half (555890-1 or -2) over the other half and around the flexible conduit. When properly positioned, the second strain relief half will retain the stripped conductors of the ground wire between the slots and against the wire rest. The completed harness assembly (connected by flexible conduit) is shown in Figure 6.G.

9. Making sure that both strain relief halves remain in position, rivet the two together. If riveted properly, the metal strain relief halves will bottom against each other.

7. RECOMMENDATIONS FOR INSTALLING CONNECTORS

There are various ways the AMPINNERGY system can be used. Figure 7 illustrates some of these ways.

The AMPINNERGY power junction box assembly can also be used as a pass-thru assembly in applications where outlet service is not needed or is prohibited.

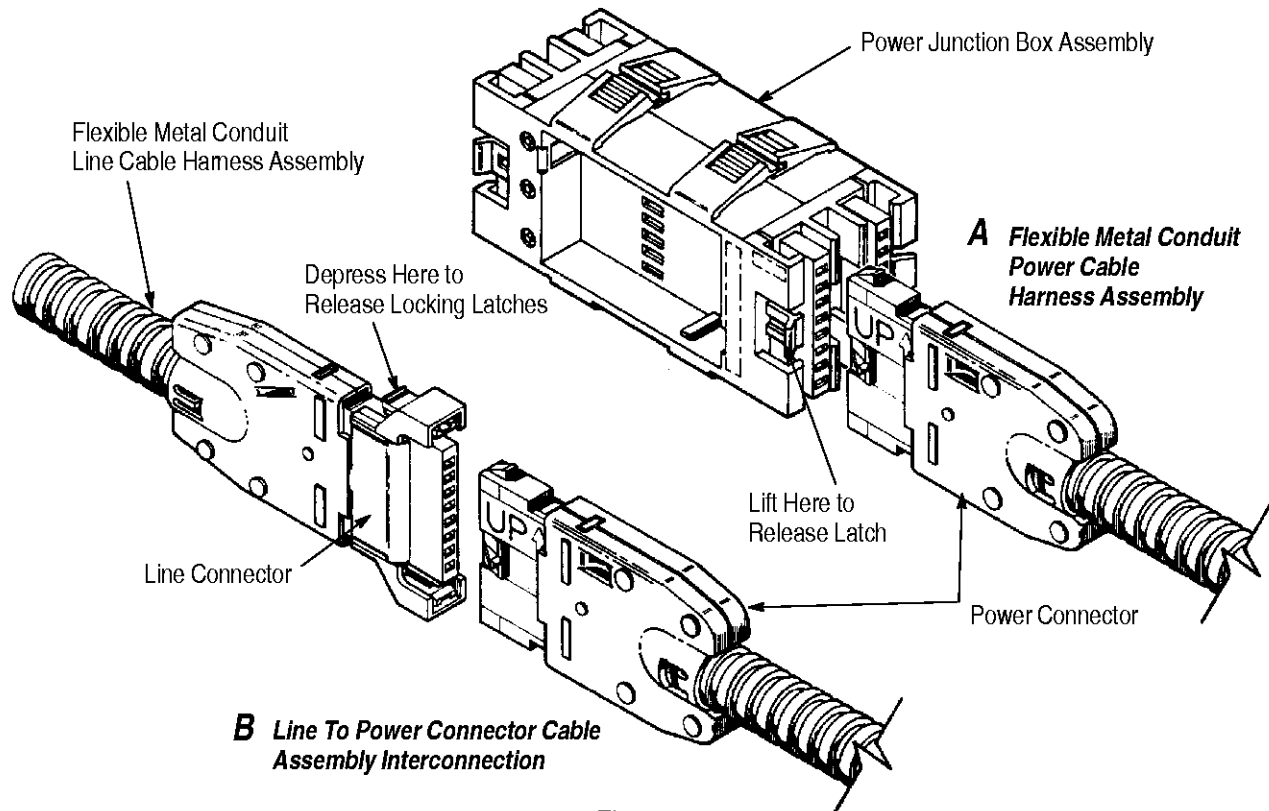


Figure 7

7.1. Power Cable Harness Assembly

A power connector using flexible metal conduit is shown in Figure 7.A. Provide the proper means to secure the power junction box assembly to the panel or structure. The assembly can also be secured with special custom-mounting features. When mating the wired power connector to the desired port of the power junction box assembly, be sure the latches of the connector are fully engaged.

To separate the connector from the assembly, lift the front latch on the junction box and pull the connector away from the assembly.

7.2. Line To Power Cable Harness Assembly

This arrangement (Figure 7.B) consists of a line connector cable assembly mating with a power connector cable assembly using flexible metal conduit. It is designed to serve as a quick-disconnect, power feed-thru connector assembly. These arrangements are normally used where the power junction box assembly is not needed.

8. INSTALLING DUPLEX RECEPTACLES

Any of the duplex receptacles listed by part number in Figure 1 is compatible with the power junction box assembly. No tooling is needed for insertion.

8.1. Insertion

1. Align the groove of the duplex receptacles with the key of the power junction box assembly, as shown in Figure 8.

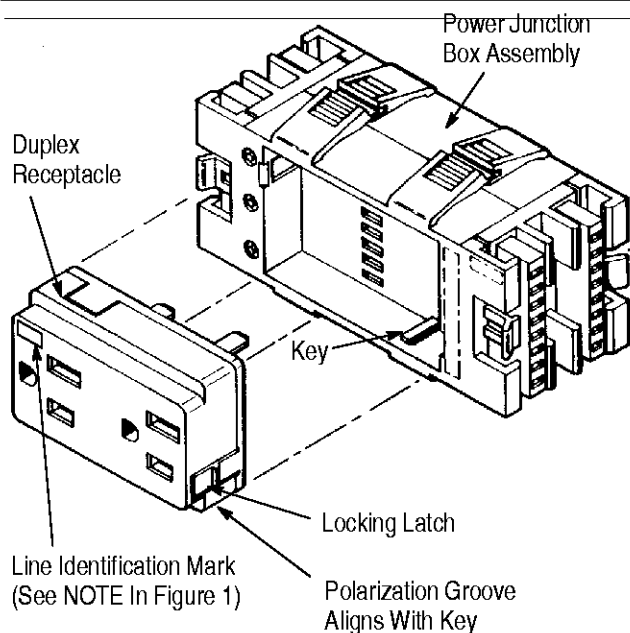


Figure 8

2. Snap the duplex receptacle firmly into the power junction box assembly until a loud snapping noise is heard. Ensure proper insertion by pulling back on the duplex receptacle.

8.2. Extraction

To extract a duplex receptacle, it is recommended that two flat-bladed screwdrivers be used.

1. Fit each screwdriver blade into the slot between the locking latch of the duplex receptacle and the side of the power junction box assembly as shown in Figure 9.
2. Simultaneously, rock downward each screwdriver handle as shown by the arrows in Figure 9 (about 45° angle). This will force the locking latches to open, releasing the duplex receptacle and lifting it in an upward direction.
3. Extract the receptacle from the power junction box assembly by pulling it straight out by hand.

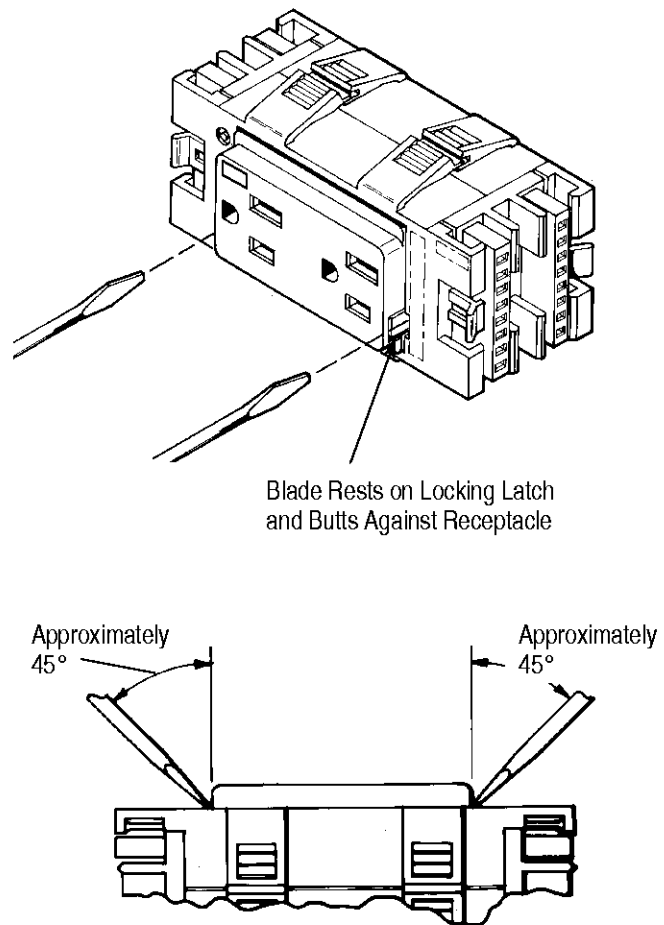


Figure 9

9. INSTALLATION OF POWER JUNCTION BOX ASSEMBLY

Install junction box in mounting bracket as follows:

1. Place bottom latches of the junction box into notches of bracket cutout (see Figure 10).
2. Push down on junction box (to depress bottom latches) and at the same time slowly rotate top of junction box toward and into bracket cutout until the junction box snaps and locks in position.

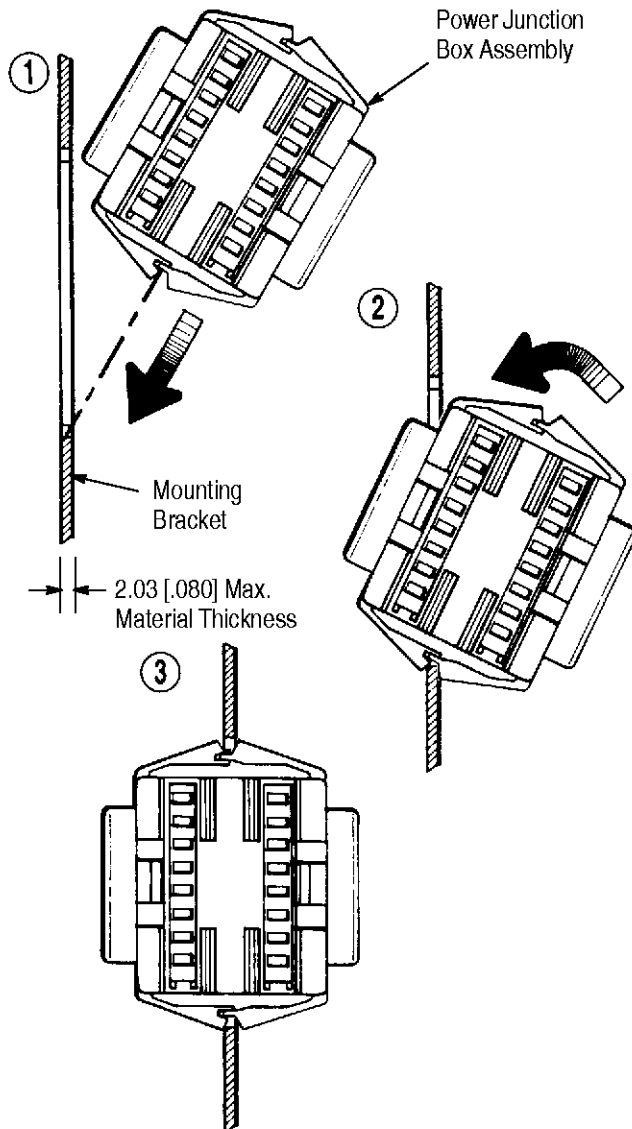


Figure 10

10. REMOVAL OF POWER JUNCTION BOX ASSEMBLY

Remove junction box from panel as follows:

1. Push down on the junction box (to depress bottom latches) and at the same time, push down the top latches, to clear panel (see Figure 11).

2. Rotate junction box out of mounting bracket.

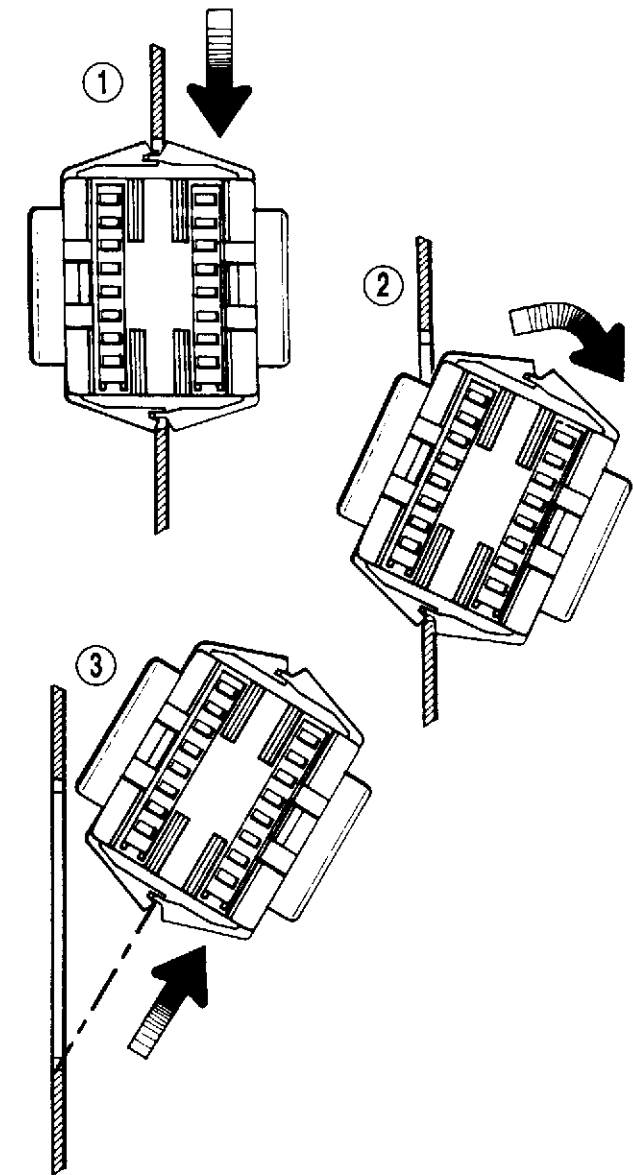


Figure 11

11. REVISION SUMMARY

Revisions to this document include:

Per EC 0990-1024-98:

- Added new wall thicknesses and duplex receptacle assembly part numbers
- Additional product line part numbers and descriptions added to Figure 1
- Updated Figure 4 table to include a minus factor and new length dimensions
- Revised cavity identification in Figure 5
- Updated format to current standards