Honeywell

TECHNICAL BULLETIN TB-151

INSTALLATION PROCEDURE FOR CRIMP CONTACT TERMINATED WIRING SYSTEMS

Series LP50 Switches, Indicators, and Matrices

A reliable Common Termination System (CTS) connection can be made only if all the components of this system, the parts and subassemblies, are properly designed, manufactured, and assembled. While the reliability of the design and fabrication is determined by the manufacturer, CTS assemblies are commonly fabricated in the field at customer locations. Most customers have extensive experience with this type of assembly and do not encounter any problems with installing Series LP50 Switches in their application. Other customers need help in setting up proper procedures and training people for the necessary assembly operations. This technical bulletin is intended to address this need.

A cross-section of a complete wire connection to the switch is shown on Fig. 1. Each wire of the harness coming to switch module is crimped to its socket contact, forming a contact-wire assembly. This assembly is attached to the corresponding pin contact of the switch. The socket contact is locked into the receptacle assembly housing, between retainer plate and retainer clip, by means of two locking tabs. The retainer clip is positioned in the housing between the retainer plate and the guide. The plate and guide are held together with two screws, forming the housing for all other parts. The rubber seal is cemented to the guide to protect the receptacle assembly from outside contamination. The two tabs of the retainer clip are the major means of firmly holding each contact-wire assembly to the switch. Located directly against the socket contact shoulders, tabs keep the sockets connected to the switch pin contacts and do not allow the wire-contact assembly to slide out of the receptacle, even if the wire is pulled.

If the wiring connection needs to be removed, as it is seen from Fig. 2, the retainer clip tabs can be spread out (retracted) beyond the shoulders of a socket by inserting a special tubular end of a socket contact removal (extraction) tool. In such a case, only friction will hold wire-contact assembly inside of the receptacle. The wire assembly, together with the tool, can be pulled out from the receptacle to disconnect one wire connection at a time.

Insertion of a new wire-contact assembly can be accomplished with a contact installing (insertion) tool, as it is shown on the Fig. 3. This tool is very similar to the extraction tool; however, the tip of its tubular end has a notch, making its edge look like an approximately half-a-circle arc. This feature creates a small opening on the side of the tool, next to the ends of the retaining clip tabs, when the tool is inserted (See Fig. 3). Prior to insertion, the wire–contact assembly is placed into the tubular part of the insertion tool. Then, it is pushed through the holes in the rubber seal, the retaining clip, and the retainer plate, onto the pin contact of the switch module.

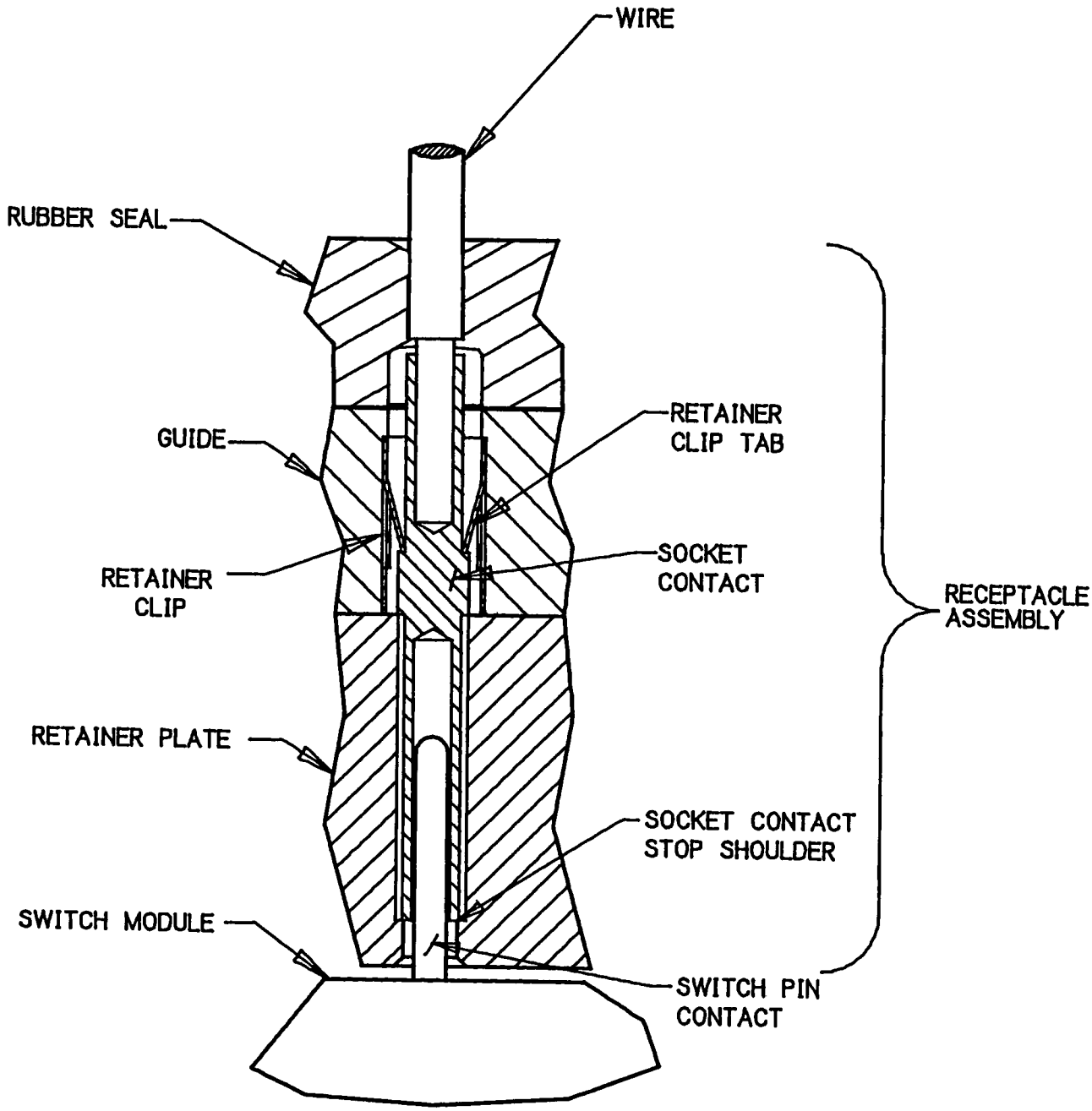

FIG. 1. SOCKET CONTACT IN PLACE

As it can be seen from the same Fig. 3, during the insertion process, the tip of the tool is pushing against the locking shoulder of the socket contact. While being inserted into the receptacle assembly, the socket contact spreads the tabs of the retaining clip. After passing the tabs, the contact is moved further, until it reaches its stop, the retainer plate. At this position, the insertion tool still spreads one of the retainer clip tabs out, while another tab becomes engaged with the contact locking shoulder, holding the contact in place. When the tool starts to retract from the receptacle assembly, this second tab will retain the contact in its final position. After the tool is retracted further, the first tab will engage also, and the locked socket contact will stay in the receptacle.

All components of this assembly are precision made and go together with a minimal effort. The following procedures are based on insertion and extraction tool manufacturers' assembly instructions and, when properly implemented, give excellent results. The following are the recommended CTS assembly procedures.

WIRE CRIMPING PROCEDURE

Crimping tool, PN 15191 with Positioner, PN 15192 (M22520/2-01 and M22520/2-14, correspondingly) is recommended for this operation.

1. Burn through the insulation with a hot wire stripper or use other approved stripping method. Do not remove the insulation at this point. This will protect the wire strands from splaying. Recommended wire strip length is approximately .22 inch.
2. Drop the contact to be crimped into the crimping tool with the contact crimp barrel facing up.
3. Remove the small piece of insulation from the wire, insert the bare wire into the open end of the contact and squeeze the crimp tool. The crimp tool will only release the contact when the full crimping cycle has been performed. Remove the crimped contact from the tool.
4. Check the visibility of the wire in the contact inspection hole that will indicate that the wire is crimped into the contact at the proper depth.

CRIMP CONTACT INSTALLING PROCEDURE

Installing and removal tool, PN 15190 (M81969/16-01) is recommended for this operation.

1. Holding the wire to form a slight curve, slide the wire into wider portion of the slot on the colored (red) side of the plastic tool, leaving the contact about ½ inch from the tool end.
2. Support the tool with forefinger and force (slide) the wire into the tubular area of the tool with the thumbnail, moving it to the end of the tool.
3. Pull the wire back though the tool until the tip of the tool seats against the contact shoulder.
4. Firmly holding the tool and the wire together by squeezing them in the slot serration area, position the contact and tool perpendicular to the rear rubber surface of the receptacle assembly. Align them with the appropriate cavity on the wire entry side of the connector and slowly push the contact into the cavity.
5. A firm stop will be evident when the contact positively seats in the connector and is locked into place. Release the wire and pull the tool from the cavity. A slight move of the wire in and out will assure that the contact is firmly seated.

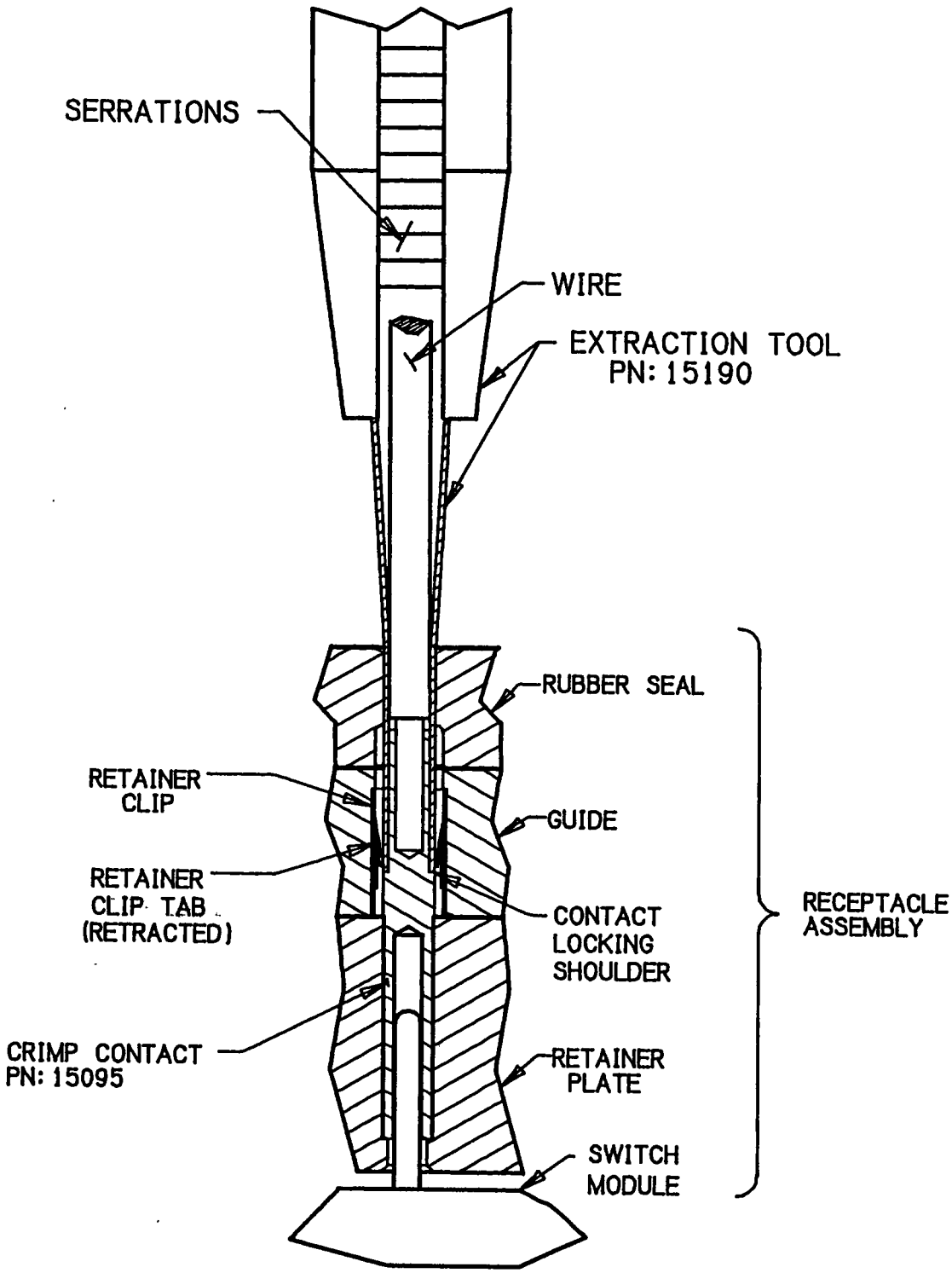

FIG. 2. EXTRACTION OF WIRE-CONTACT ASSEMBLY

CRIMP CONTACT REMOVING PROCEDURE

Installing and removal tool, PN 15190 (M81969/16-01) is recommended for this operation.

1. Holding the wire of the contact to be removed to form a slight curve, slide this wire into the full length of the slot on the white end of the plastic tool.
2. Align the tool perpendicular to the surface of the connector. Slide the tool into the cavity until the positive resistance is felt. The contact retaining clip is now in the unlocked position.
3. Simultaneously withdraw both the tool and the contact-wire assembly from the connector. Squeeze the wire with the fingers against the serration of the tool to simplify the removal process.

GENERAL RECOMMENDATIONS

Sometimes assembly personnel use their own "tricks" to facilitate work or apply excessive force during insertion or contact removal operations. While people usually develop their own individual techniques to perform the same operations, the basics of these recommendations should be followed.

1. If possible, make wire-contact assembly insertion operations with receptacles already installed in the switch module. Switch contact pins will align the socket contacts better and will positively define and support the proper contact position in the receptacle housing.
2. Never use excessive forces during contact insertion or contact removal operations. Normally, these forces do not exceed 2 or 3 pounds. Do not ever use force more than 6 pounds. If unusual resistance is encountered during any of these operations, stop, go back and check the wire-contact assembly, tool integrity and accuracy of your actions. Then make necessary corrections and repeat the operation.
3. Make sure that during assembly, only minimal wire pulling force is used at angles other than perpendicular to the rear surface of the receptacle. Socket contacts are installed in their holes with a radial gap for better alignment with the pins of the switch. If angular pull force is applied to the wire-contact subassembly, the contact will assume a "diagonal" position in its cavity. This may result in only one retaining clip tab supporting the contact in its position, which will greatly reduce the maximum holding force of the receptacle assembly. This is especially important if insertion is performed with receptacle separated from the switch.
4. While making wire harnesses be sure that all wire bundles are supported and no weight or other forces are transferred to the connector through the wires. Wires inserted into receptacles must be as close to perpendicular to the rear surface as possible. Allow for sufficient length of service loops to permit a minimum of two repairs of a crimp.
5. Do not influence contact insertion or removal by twisting or rotating the tool around its axis. Because the tubular part of the tool has a gap with exposed slot edges, these edges can catch the tabs of the retaining clip and deform or break them, making good contact retention impossible.

NOTE

Some customers use metal insertion and removal tools instead of the recommended plastic tool for receptacle assembly operations. While tools made for the corresponding contacts may be suitable, care must be taken that all electric power sources are disconnected during the assembly or disassembly operations.

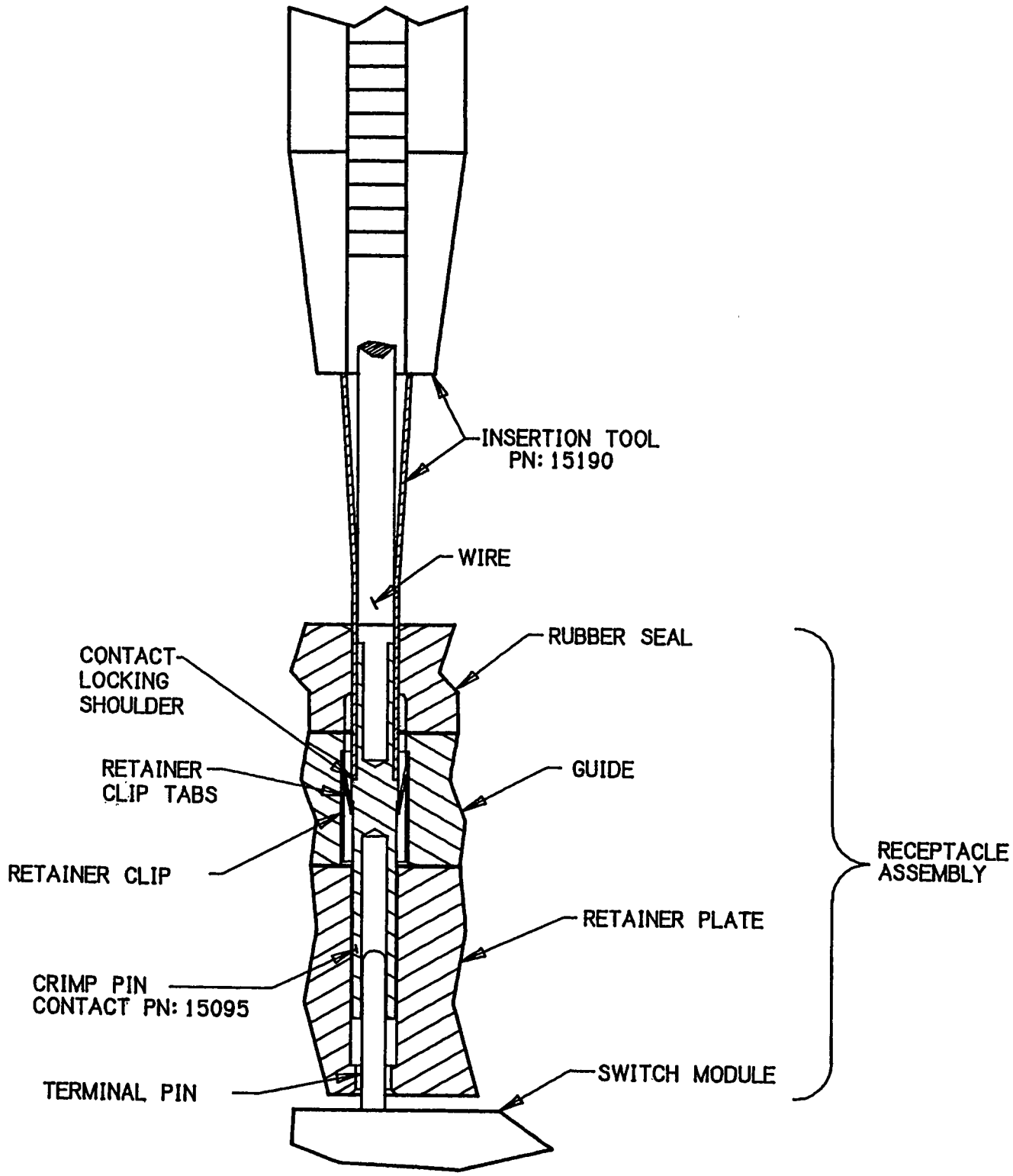

FIG. 3. INSERTION OF WIRE-CONTACT ASSEMBLY