BOMBARDIER
Toronto (de Havilland)
PROPRIETARY INFORMATION

PPS 9.11

PRODUCTION PROCESS STANDARD

Termination of Electrical/Electronic Interconnect Wiring using the Berg Mini PV System

Issue 3
- This standard supersedes PPS 9.11, Issue 2.
- Vertical lines in the left hand margin indicate changes over the previous issue.
- Direct PPS related questions to PPS.Group@aero.bombardier.com or (416) 375-4365.
- This PPS is effective as of the distribution date.

Signed original on file. Validation of paper prints is the responsibility of the user.

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	Quality	

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1 Scope

1.1 This Production Process Standard (PPS) specifies the procedures and requirements for terminating electrical/electronic interconnect wiring using the BERG Mini PV interconnection system.

1.1.1 This PPS complements the engineering drawings that specify its use as an authorized instruction. The procedure specified in this PPS must be followed to ensure compliance with all applicable specifications. In general, if this PPS conflicts with the engineering drawing, follow the engineering drawing. The requirements specified in this PPS are necessary to fulfil the engineering design and reliability objectives.

1.1.2 Refer to PPS 13.26 for the subcontractor provisions applicable to this PPS.

1.1.3 Procedure or requirements specified in a Bombardier BAPS, MPS, LES or P. Spec. **do not** supersede the procedure or requirements specified in this PPS. Similarly, the procedure and requirements specified in this PPS are not applicable when use of a BAPS, MPS, LES or P. Spec. is specified.

2 Hazardous Materials

2.1 Before receipt at Bombardier Toronto (de Havilland), all materials must be approved and assigned Material Safety Data Sheet (MSDS) numbers by the Bombardier Toronto (de Havilland) Environment, Health and Safety Department. Refer to the manufacturer's MSDS for specific safety data on any of the materials specified in this PPS. If the MSDS is not available, contact the Bombardier Toronto (de Havilland) Environment, Health and Safety Department.

3 References

3.1 PPS 9.07 - Soldering of Electrical and Electronic Connections.

3.2 PPS 9.24 - Wire and Cable Stripping.

3.3 PPS 13.26 - General Subcontractor Provisions.

3.4 PPS 15.01 - Part Marking.

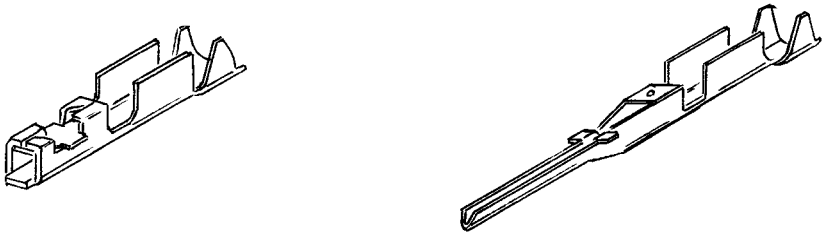
3.5 PPS 15.02 - Identification Coding of Electrical and Electronic Wires and Cables.

4 Materials and Equipment

4.1 Materials

4.1.1 Electrical wire as specified on the engineering drawing.

4.1.2 BERG crimp style contacts as specified on the engineering drawing or EDA wiring list. Refer to Figure 1 for a general description of the BERG crimp style contacts.

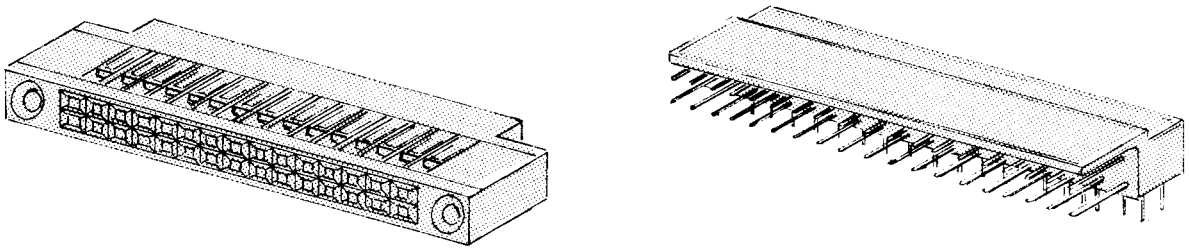


MINI PV RECEPTACLE CTW PIN CONTACT

Figure 1 - General Description of Berg Contacts

4.1.3 BERG mini-latch connectors as specified on the engineering drawing or EDA wiring list. Refer to Figure 2 for a general description of the BERG mini-latch connector.

4.1.4 BERG printed circuit board headers as specified on the engineering drawing or EDA wiring list. Refer to Figure 2 for a general description of the BERG printed circuit board header.



MINI-LATCH CONNECTOR PRINTED CIRCUIT BOARD HEADER

Figure 2 - Berg Printed Circuit Boards Connectors and Headers

4.2 Equipment

4.2.1 Contact extraction tool, BERG HT 80.

4.2.2 Hand operated crimping tools:

- Mini PV Receptacles - BERG HT 73 (18-20 AWG wire)
  BERG HT 208 (22-26 AWG wire)
- CTW Pin Contacts - BERG HT 102 (22-26 AWG wire)

5 Procedure

5.1 General

5.1.1 The BERG printed circuit board interconnect termination system detailed herein consists of 3 basic components as listed below:

- Crimp style contacts (Receptacles and Pins)
- Bulkhead type mini-latch connectors.
- Printed circuit board headers.

5.1.2 Crimp style contacts are crimped in place using hand operated tools which simultaneously form the wire crimp and wrap/crimp the insulation support lugs around the wire insulation. The hand tool crimp depth is pre-set and the tool is cycle controlled by a ratchet to ensure complete crimping without further adjustment or set-up.

5.1.3 BERG contacts are stamp-formed from thin gauge brass strip and must be handled carefully at all stages of assembly and installation to avoid bending and/or breaking of the contact.

5.1.4 Crimped contacts are insertable into the mini-latch connectors by hand with no tooling required.

5.1.5 Printed circuit board headers are soldered to the printed circuit board connections and provide a means of direct mating of the bulkhead connector to the printed circuit board.

5.1.6 Before assembling of wires to electrical contacts, strip the wire insulation from the wire end to expose the bare conductor according to PPS 9.24.

5.2 Crimping of Mini PV Receptacles

5.2.1 Crimp PV receptacles to 22 - 26 AWG wire using the BERG HT 208 hand tool as follows (see Figure 3):

Step 1. Squeeze the tool handles together to release the ratchet and fully open the handles.

Step 2. Holding the tool in your left hand, pull back on contact holder lever to rotate the holder out of crimp head.

Step 3. Place the contact end of the receptacle onto the tang of the spring steel locator with the crimp lugs of the contact facing up and insert the receptacle into the holder until it bottoms against the locator.

Step 4. Carefully squeeze the tool handles together until the first click on the ratchet is heard.

Step 5. Insert the stripped wire end into the receptacle until the wire is felt to butt against the locator tang.

Step 6. Squeeze the handles fully together to crimp the receptacle and release the ratchet to return the handles to the fully open position.

Step 7. Pull back on the holder lever to rotate the holder out of the crimp head.

Step 8. Pull the crimped assembly off the locator and visually check the crimped receptacle for conformance to the requirements of Figure 8.

Step 9. Release the contact holder to position the receptacle in the crimp head.

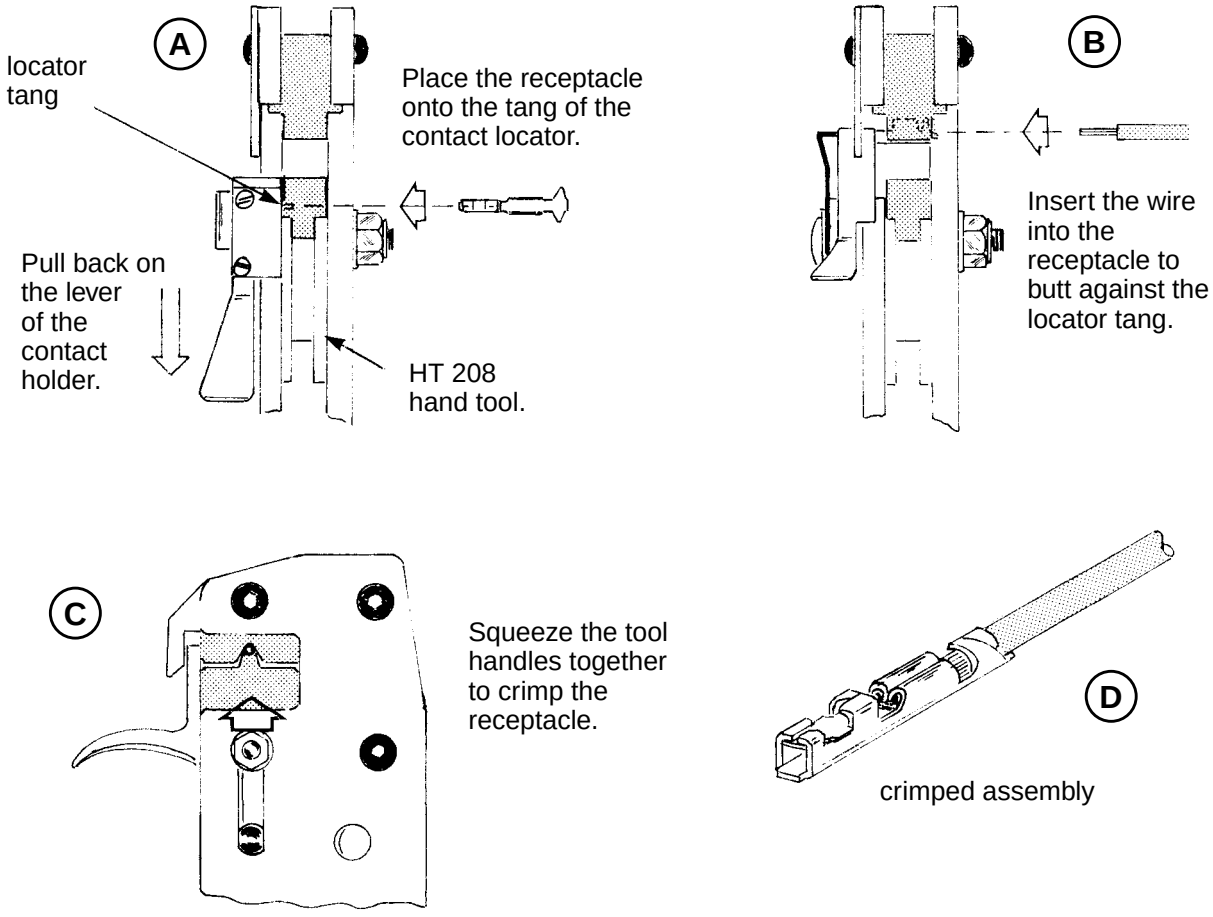


Figure 3 - Crimping PV Receptacles to 22 - 26 AWG Wire

5.2.2 Crimp PV receptacles to 18 - 20 AWG wire using the BERG HT 73 hand tool as follows (see Figure 4):

Step 1. Loosen the knurled lock screw on the front face of the tool.

Step 2. Close the tool handles fully to the last click on the ratchet.

Step 3. Adjust the insulation crimp die by means of the thumbwheel on the back of the tool so that the insulation crimp is a close fit (without binding) on the insulation O.D. of a piece of wire of the same type and gauge as the wire to be terminated.

Step 4. Tighten the lock screw securely by hand to lock the insulation crimp adjustment in place.

Step 5. Squeeze tool handles together to release ratchet and fully open handles.

Step 6. Place contact end of receptacle into contact holder with crimp lugs of contact facing up (i.e., towards end of tool) and push the receptacle into the holder until it bottoms against the spring steel locator.

Step 7. Carefully squeeze the tool handles together until the first click on ratchet is heard.

Step 8. Insert the stripped wire end into the receptacle so that the wire insulation butts against the face of the crimp die.

Step 9. Squeeze the tool handles fully together to crimp the receptacle and release the ratchet to return the handles to the fully open position.

Step 10. Pull the crimped assembly our of the locator and visually check the crimped receptacle for conformance to the requirements of Figure 8.

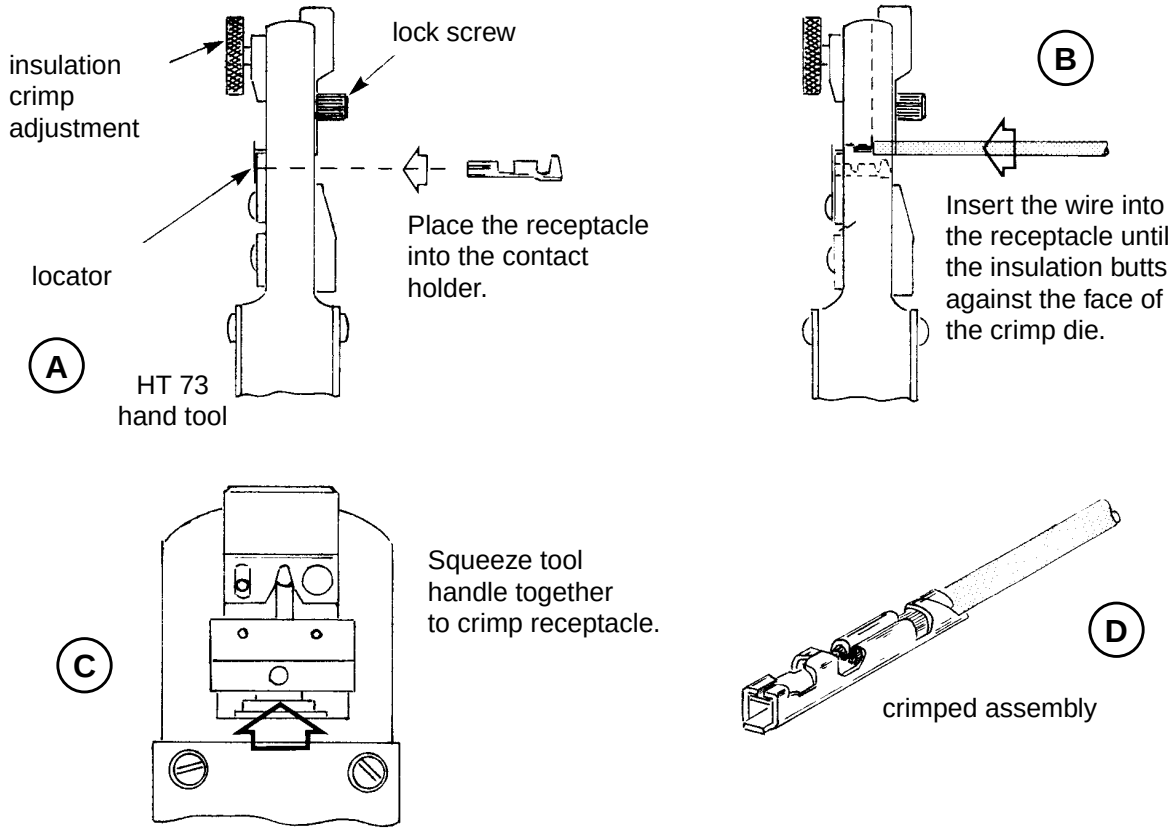


Figure 4 - Crimping PV Receptacles to 18 - 20 AWG Wire

5.3 Crimping of CTW Pin Contacts (See Figure 5)

5.3.1 Crimp CTW pin contacts onto the wire using the BERG HT 102 hand tool as follows.

Step 1. Squeeze the tool handles together to release the ratchet mechanism and fully open the handles.

Step 2. Depress the spring loaded contact holder and insert the pin end of the contact into the correct locator hole (according to data plate on tool) for the wire size to be crimped.

Step 3. With the crimp lugs facing up (i.e., towards the end of the tool) carefully push the contact into the locating hole until it bottoms against the holder. Release the contact holder and check that the contact remains fully seated in the holder.

Step 4. Insert the stripped wire end into the upper die block until the insulation is felt to butt against the movable wire stop in the centre of the die block.

Step 5. Hold the wire carefully in position and squeeze the handles fully together to crimp the contact and release the ratchet mechanism to return the handles to the fully open position.

Step 6. Pull the crimped assembly out of the contact holder and visually check the crimped contact for conformance to the requirements of Figure 8.

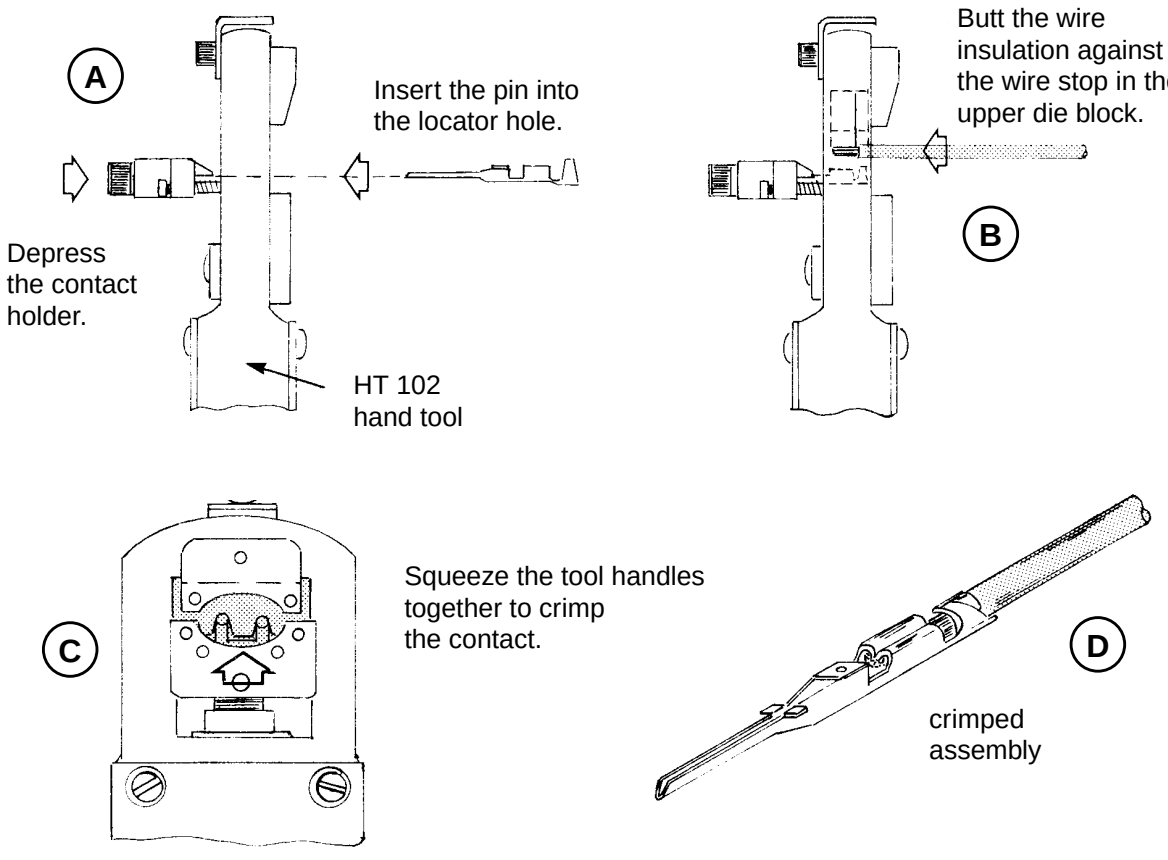


Figure 5 - Crimping CTW Pin Contacts

5.4 Assembly of Contacts to Mini-Latch Connectors (See Figure 6)

5.4.1 Insert BERG contacts by hand, with the spring contact facing up (i.e., towards the latch), into the correct contact position in the mini-latch connector and push in until the latch snaps into place behind the receptacle contact spring or pin contact retaining lug. Pull back **gently** on the wire of each inserted contact to verify proper contact seating.

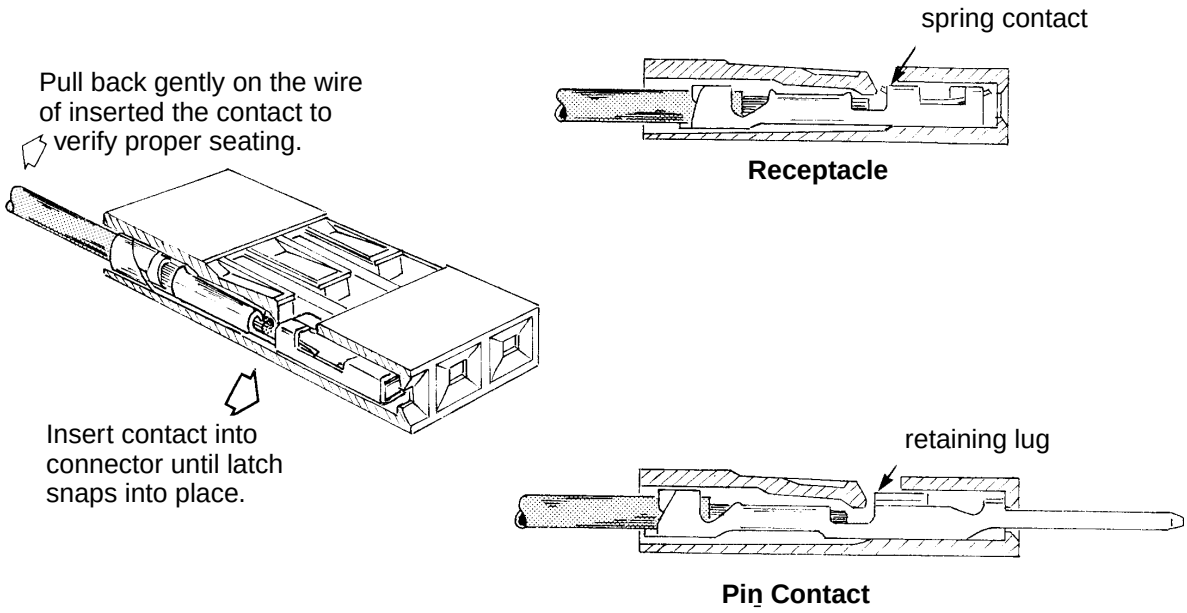


Figure 6 - Assembly of Contacts to Connector

5.5 Assembly of Printed Circuit Board Headers

5.5.1 Solder printed circuit board headers in place on the printed circuit board according to the engineering drawing and PPS 9.07.

5.6 Removing Contacts From Connectors

5.6.1 If necessary, remove contacts from connectors using the BERG HT 80 extraction tool as follows (see Figure 7). In order to avoid damaging or destroying the connector latch mechanism, it is imperative that only the tooling and procedure specified herein are used.

Step 1. Hold the extraction tool at right angles to the connector with the tang joggle facing toward the front of the connector.

Step 2. Insert the tang into the connector in front of the appropriate latch and carefully push in until the tool shoulder bottoms against the connector.

Step 3. Push the tool down towards the front of the connector until it is flat against the connector body so that the tang lifts the retaining latch up to release the contact.

Step 4. Pull contact assembly straight back out of connector and release the latch from the extraction tool.

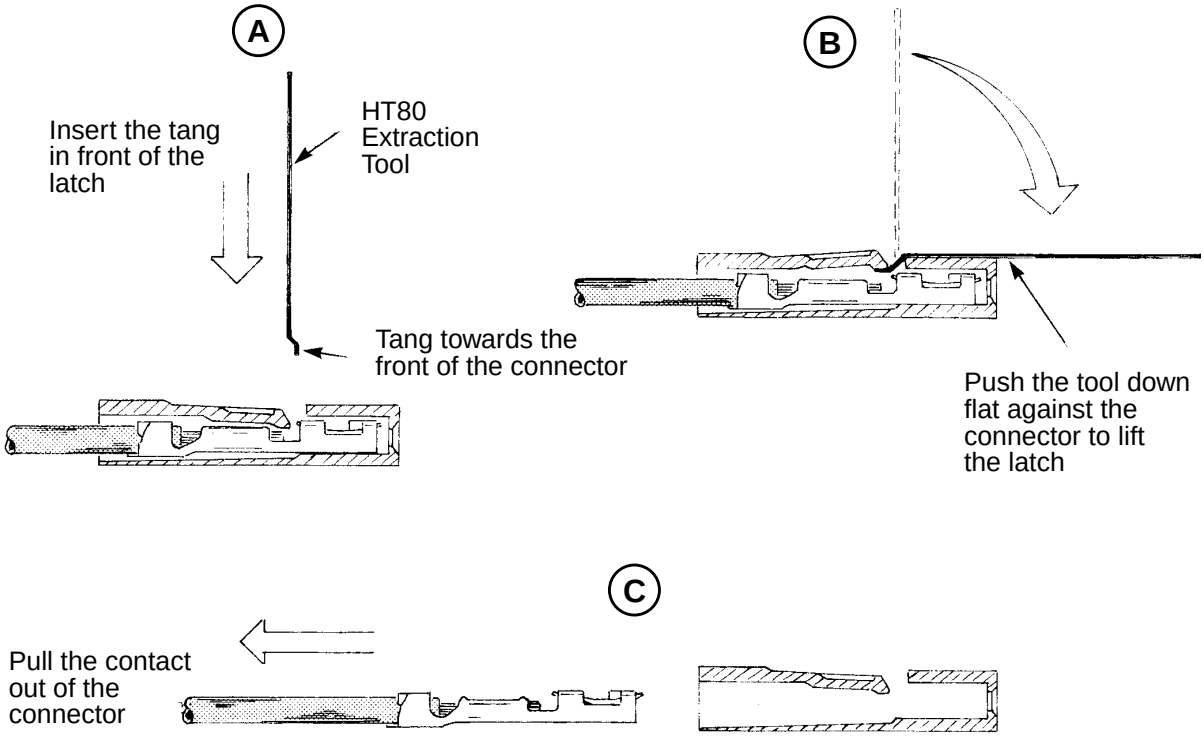


Figure 7 - Removing Contacts from Connectors

6 Requirements

6.1 Visually check each crimp contact pin and receptacle for conformance to the requirements of Figure 8, after crimping.

6.2 Check proper contact seating by **gently** pulling on the wire of each contact after insertion into the connector. Refer to Figure 8 for a general description of a properly inserted and latched contact.

6.3 Part mark completed assemblies according to PPS 15.01.

6.4 Identification coding of wires shall be carried our according to PPS 15.02.

7 Safety Precautions

7.1 The procedures specified herein present no specific safety hazards when performed according to accepted plant safety regulations.

8 Personnel Requirements

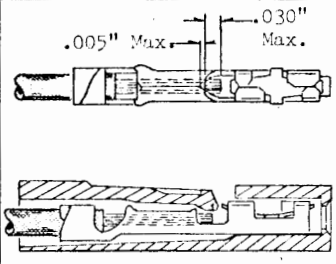
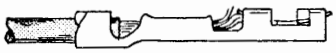
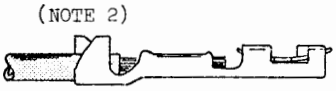
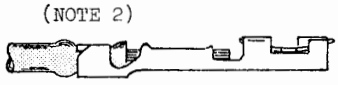
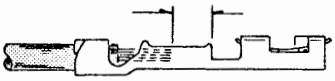
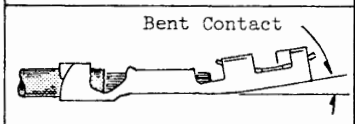
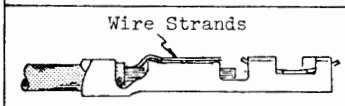
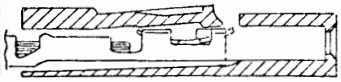
8.1 Personnel responsible for terminating electrical/electronic interconnect wiring using the BERG Mini PV interconnection system must have a good working knowledge of the procedure and requirements as specified herein and must have exhibited their familiarity to their supervisor.

9 Maintenance of Equipment

9.1 It is recommended that periodically checks be made on all crimping tools, to ensure that the closed height of the crimping dies is correct to manufacturers instructions. Carry out this check with the tool in the fully closed position. Repair or replace crimp tools which fail to meet the dimensional gauging requirements.

9.2 It is recommended that crimping tools be kept clean and free from dirt or shop swarf at all times.

9.3 It is recommended that moving parts of crimp tools be lightly oiled periodically, as considered necessary. Wipe off excess oil on all exposed surfaces using a clean rag.

VISUAL APPEARANCE (Note 1)	DESCRIPTION	CORRECTIVE ACTION
	Correct Installation: 1. Wire strands flush with the end of the wire crimp within -0.005 to +0.030. 2. All the wire strands are within the wire crimp. 3. Wire insulation is fully through the insulation crimp. 4. Latch mechanism snaps freely into place.	none required
	Wire strip length too long, wire strands will foul connector latch.	replace contact
	Insulation partially or completely out of insulation crimp.	replace contact
	Insulation crimp lugs not fully crimped onto wire insulation.	Re-adjust the insulation crimp on the tool and replace contact.
	Wire insulation bulged or cut due to insulation crimp being too tight.	Re-adjust the insulation crimp on the tool and replace contact.
	Insufficient wire grip within wire crimp.	replace contact
	Up to 5° bend. 5° - 10° bend. More than 10° bend.	none required straighten contact replace contact
	1 or more wire strands outside of wire crimp.	replace contact
	Contact fails to enter connector or fouls on latch mechanism to prevent latch seating properly.	Check the contact for evidence of distortion. Check connector for damaged or broken latch.

Note 1. Receptacles illustrated in this table as examples; pin contact requirements identical.
Note 2. Applicable only to contacts crimped using the HT73 hand tool.

Figure 8 - visual Examination of Crimped/Inserted Contacts