BOMBARDIER Toronto (de Havilland) **Proprietary Information**	**PPS 9.36** **Production Process Standard (PPS)**

Manual Crimping of Size 12 – 22 Contacts

Issue 20

- This standard supersedes PPS 9.36, Issue 19.
- Vertical lines in the left hand margin indicate technical changes over the previous issue.
- This PPS is effective as of the distribution date.
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Issue 20 - Summary of Changes (over the previous issue)

The following summaries are not detailed and are intended only to assist in alerting PPS users to changes which may affect them; refer to the applicable section(s) of this PPS for detailed procedure and requirements.

- Added new sub-section 3.1 and para. 3.1.1, to ensure correct usage of reference specifications.
- Created new sub-section 3.2, to identify PPS document references as Bombardier Toronto (de Havilland) process specifications.
- Added new para. 4.1.1, to prevent inappropriate material substitution.
- Replaced specific instructions for qualification of crimp tools with instruction to qualify crimp tools according to PPS 9.55.
- Added instruction to refer to the manufacturers' instructions for crimp tool operation.
- Added M39029/1-102 and M39029/31-627 contact identification information and crimping tool/positioner selection.
- Added filler wire requirements for 22D and 22M contact wire barrel sizes.

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1 Scope

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for crimping size 12 - 22 pin and socket contacts to electrical wires using hand operated crimp tools.

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 Procedure or requirements specified in a Bombardier BAPS, MPS, LES or P. Spec. do not supersede the procedure or requirements specified in this PPS.

1.1.3 Refer to PPS 9.19 for crimping size 16 - 22 contacts using automatic crimp tools.

1.1.4 Refer to PPS 9.20 for crimping size 8 - 0 contacts using pneumatic crimp tools.

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

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 General

3.1.1 Unless a specific issue is indicated, the issue of the reference documents specified in this section in effect at the time of manufacture shall form a part of this specification to the extent indicated herein.

3.2 Bombardier Toronto (de Havilland) Process Specifications

3.2.1 PPS 9.24 - Wire Stripping.

3.2.2 PPS 9.55 - Qualification of Crimp Tools.

3.2.3 PPS 10.16 - Installation of Heat Shrinkable Tubing and Identification Sleeves.

3.2.4 PPS 13.26 - General Subcontractor Provisions.

3.2.5 PPS 13.39 - Bombardier Toronto Engineering Process Manual.

4 Materials, Equipment and Facilities

4.1 Materials

4.1.1 Unless otherwise specified in this section, use only the materials specified; use of superseding or alternative materials is not allowed.

4.1.2 Heat shrinkable tubing, bulk length, M23053/5 (flexible crosslinked polyolefin). Shrink heat shrinkable tubing (sleeving) in place according to PPS 10.16.

4.2 Equipment

4.2.1 Crimp tools as specified in Table 2. Crimp tools must be qualified according to PPS 9.55 before use on production parts. For tool operation, refer to the manufacturers' instructions.

4.2.2 Crimp tool positioners as specified in Table 2 and para. 5.3.1.

4.3 Facilities

4.3.1 This PPS has been categorized as a "Controlled Special Process" according to PPS 13.39 and as such only facilities specifically approved according to PPS 13.39 are authorized to perform manual crimping of size 12 - 22 contacts according to this PPS.

4.3.2 Bombardier subcontractors must direct requests for approval to Bombardier Aerospace Supplier Quality Management. Bombardier Aerospace facilities must direct requests for approval to the appropriate internal Quality Manager.

4.3.3 Facility approval shall be based on a facility report, a facility survey and completion of a qualification test program, if required. The facility report must detail the materials and equipment to be used, the process sequence to be followed and the laboratory facilities used to show compliance with the requirements of this PPS. Any deviation from the procedure or requirements of this PPS must be detailed in the facility report. Based upon the facility report, Bombardier Toronto (de Havilland) Materials Technology may identify additional qualification and/or process control test requirements. During the facility survey, the facility requesting qualification must be prepared to demonstrate their capability. Once approved, no changes to subcontractor facilities may be made without prior written approval from Bombardier Aerospace Supplier Quality Management.

4.3.3.1 Unless otherwise specified by Bombardier Aerospace Supplier Quality Management, for approval of subcontractor facilities to perform manual crimping of size 12 - 22 contacts according to this PPS completion of a test program and submission of suitable test samples representative of production parts is required. Test samples must meet the requirements specified in section 6.

5 Procedure

5.1 General

5.1.1 Crimp style contacts as specified herein are used as a means of terminating wire conductors at electrical connectors and terminal junctions.

5.1.2 Refer to Figure 1 for a general description of crimp style contacts.

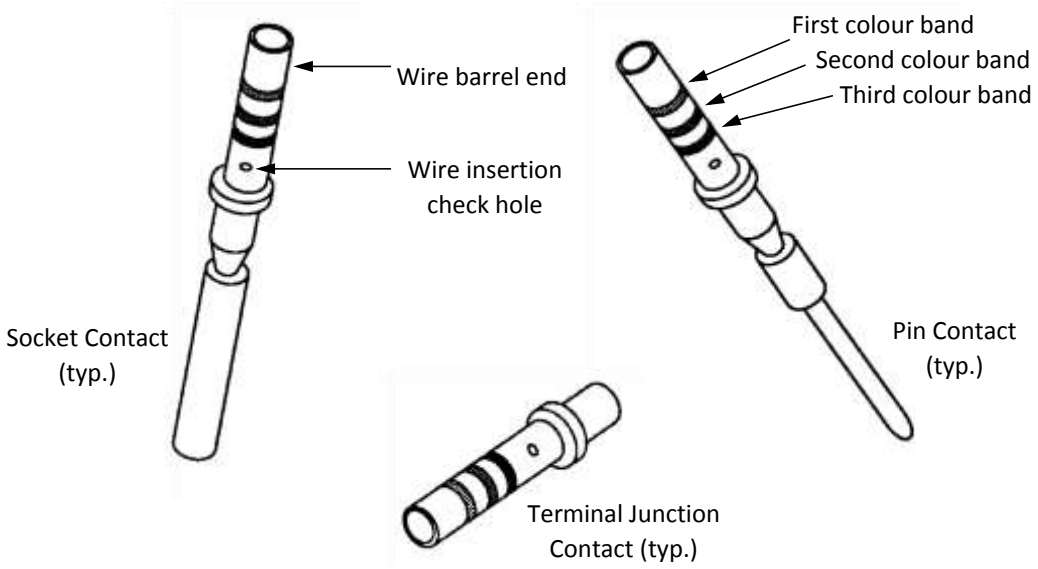

Figure 1. **General Description of Crimp Type Contacts**

5.1.3 Refer to Table 1 for identification of M39029 contacts.

5.1.3.1 All M39029 contacts are identified by means of a 3 digit bin code which corresponds to the last three digits in the M39029 part number. Each digit of the code is designated on the contact by a colour band as follows:

0 - black	1 - brown	2 - red	3 - orange	4 – yellow
5 - green	6 - blue	7 - violet	8 - grey	9 – white

5.1.4 Crimp tools to MIL-C-22520 may be hand or power actuated. The hand actuated crimp tools specified herein are plier type tools which crimp the contact wire barrel to the wire strands by means of depth controlled indenters and are controlled by a ratchet to ensure complete crimping. The indenter mechanism is depth controlled by means of selector knob which is preset for the specific contact size/wire gauge combination to be crimped.

- The M22520/1-01 tool incorporates a three position turret head which facilitates crimping of sizes 12, 16 and 20 contacts.
- The M22520/2-01 tool utilizes a series of replaceable positioners to locate and position the contact in the indenter mechanism and is capable of crimping sizes 20 through 28 contacts.

Table 1. **M39029 Contact Identification**

M39029 Contact	Contact Wire Barrel Size	Bin Colour Bands			Type
		1st	2nd	3rd	
M39029/1-102	16	brown	black	red	pin
M39029/1-507	22D	green	black	violet	pin
M39029/2-104	22	brown	black	yellow	pin
M39029/2-105	20	brown	black	green	pin
M39029/2-106	16	brown	black	blue	pin
M39029/3-107	22	brown	black	violet	socket
M39029/3-108	20	brown	black	grey	socket
M39029/3-109	16	brown	black	white	socket
M39029/4-110	20	brown	brown	black	pin
M39029/4-111	16	brown	brown	brown	pin
M39029/4-112	20	brown	brown	red	pin
M39029/4-113	12	brown	brown	orange	pin
M39029/5-115	20	brown	brown	green	socket
M39029/5-116	16	brown	brown	blue	socket
M39029/5-117	20	brown	brown	violet	socket
M39029/5-118	12	brown	brown	grey	socket
M39029/9-134	20	brown	orange	yellow	pin
M39029/9-135	20	brown	orange	green	pin
M39029/10-140	20	brown	yellow	black	socket
M39029/10-141	20	brown	yellow	brown	socket
M39029/11-144	22	brown	yellow	yellow	pin
M39029/11-145	20	brown	yellow	green	pin
M39029/11-146	16	brown	yellow	blue	pin
M39029/12-148	22	brown	yellow	grey	socket
M39029/12-149	20	brown	yellow	white	socket
M39029/12-150	16	brown	green	black	socket
M39029/16-168	20	brown	blue	grey	socket
M39029/18-178	20	brown	violet	grey	pin
M39029/22-190	28	brown	white	black	socket

Table 1. **M39029 Contact Identification**

M39029 Contact	Contact Wire Barrel Size	Bin Colour Bands			Type
		1st	2nd	3rd	
M39029/22-191	22	brown	white	brown	socket
M39029/22-192	20	brown	white	red	socket
M39029/22-193	16	brown	white	orange	socket
M39029/29-212	16	red	brown	red	pin
M39029/29-213	12	red	brown	orange	pin
M39029/30-217	16	red	brown	violet	socket
M39029/30-218	16	red	brown	grey	socket
M39029/30-219	12	red	brown	white	socket
M39029/31-223	20	red	red	orange	pin
M39029/31-224	20	red	red	yellow	pin
M39029/31-225	20	red	red	green	pin
M39029/31-226	20	red	red	blue	pin
M39029/31-227	20	red	red	violet	pin
M39029/31-228	16	red	red	grey	pin
M39029/31-229	16	red	red	white	pin
M39029/31-230	16	red	orange	black	pin
M39029/31-231	16	red	orange	brown	pin
M39029/31-232	16	red	orange	red	pin
M39029/31-233	16	red	orange	orange	pin
M39029/31-234	12	red	orange	yellow	pin
M39029/31-235	12	red	orange	green	pin
M39029/31-236	12	red	orange	blue	pin
M39029/31-237	12	red	orange	violet	pin
M39029/31-238	12	red	orange	grey	pin
M39029/31-239	12	red	orange	white	pin
M39029/31-240	20	red	yellow	black	pin
M39029/31-241	20	red	yellow	brown	pin
M39029/31-448	20	yellow	yellow	grey	pin
M39029/31-627	20	blue	red	violet	pin

Table 1. **M39029 Contact Identification**

M39029 Contact	Contact Wire Barrel Size	Bin Colour Bands			Type
		1st	2nd	3rd	
M39029/32-242	20	red	yellow	red	socket
M39029/32-243	20	red	yellow	orange	socket
M39029/32-244	20	red	yellow	yellow	socket
M39029/32-245	20	red	yellow	green	socket
M39029/32-246	20	red	yellow	blue	socket
M39029/32-247	16	red	yellow	violet	socket
M39029/32-248	16	red	yellow	grey	socket
M39029/32-249	16	red	yellow	white	socket
M39029/32-250	16	red	green	black	socket
M39029/32-251	16	red	green	brown	socket
M39029/32-252	16	red	green	red	socket
M39029/32-253	12	red	green	orange	socket
M39029/32-254	12	red	green	yellow	socket
M39029/32-255	12	red	green	green	socket
M39029/32-256	12	red	green	blue	socket
M39029/32-257	12	red	green	violet	socket
M39029/32-258	12	red	green	grey	socket
M39029/32-259	20	red	green	white	socket
M39029/32-260	20	red	blue	black	socket
M39029/32-449	20	yellow	yellow	white	socket
M39029/56-348	22D	orange	yellow	grey	socket
M39029/56-351	20	orange	green	brown	socket
M39029/56-352	16	orange	green	red	socket
M39029/56-353	12	orange	green	orange	socket
M39029/57-354	22D	orange	green	yellow	socket
M39029/57-355	22M	orange	green	green	socket
M39029/57-356	22	orange	green	blue	socket
M39029/57-357	20	orange	green	violet	socket
M39029/57-358	16	orange	green	gray	socket

Table 1. **M39029 Contact Identification**

M39029 Contact	Contact Wire Barrel Size	Bin Colour Bands			Type
		1st	2nd	3rd	
M39029/58-360	22D	orange	blue	black	pin
M39029/58-361	22M	orange	blue	brown	pin
M39029/58-362	22	orange	blue	red	pin
M39029/58-363	20	orange	blue	orange	pin
M39029/58-364	16	orange	blue	yellow	pin
M39029/58-365	12	orange	blue	green	pin
M39029/63-368	20	orange	blue	grey	socket
M39029/64-369	20	orange	blue	white	pin
M39029/85-455	16	yellow	green	green	pin
M39029/85-456	16	yellow	green	blue	pin
M39029/86-463	16	yellow	blue	orange	socket
M39029/86-464	16	yellow	blue	yellow	socket
M39029/92-531	22	green	orange	brown	socket
M39029/92-532	20	green	orange	red	socket
M39029/92-533	16	green	orange	orange	socket
M39029/92-534	16	green	orange	yellow	socket
M39029/92-535	12	green	orange	green	socket
M39029/92-536	12	green	orange	blue	socket

5.2 Stripping of Wire Insulation

5.2.1 Strip the insulation from the end of the wire and expose the bare conductor according to PPS 9.24 before crimping. Take care to avoid nicking or damaging the conductor.

5.2.2 If the diameter of the outermost layer of insulation is such that the insertion/extraction tool will not fit properly onto the wire (e.g., high temperature wires), strip as many of the outer layers of insulation as is necessary to ensure that the tool may be used properly. When doing so, ensure that the requirements of the following sub-paragraphs are met.

- Do not strip the insulation back more than 4" from the wire end.
- If the outermost layer of insulation is braided or fibrous and is susceptible to abrasion damage, cover the outermost layer of insulation with white heat shrinkable insulating sleeving (see Materials section, para. 4.1.2).

- The requirement for oversleeving may necessitate further stripping of the outer layers of insulation before oversleeving.
- If it is necessary to strip all layers of insulation, cover the bare conductor with white heat shrinkable insulating sleeving (see Materials section, para. 4.1.2).
- If there is any risk of exposure of the bare conductor at the junction where the heat shrinkable sleeving butts against the unstripped wire insulation, oversleeve the junction with a length of white heat shrinkable insulating sleeving (see Figure 2).
- If there is no risk of exposure of the bare conductor in the junction where the heat shrinkable sleeving butts against the unstripped wire insulation (e.g., the junction will be contained within the connector grommet), it is not necessary to oversleeve the junction (see Figure 3).

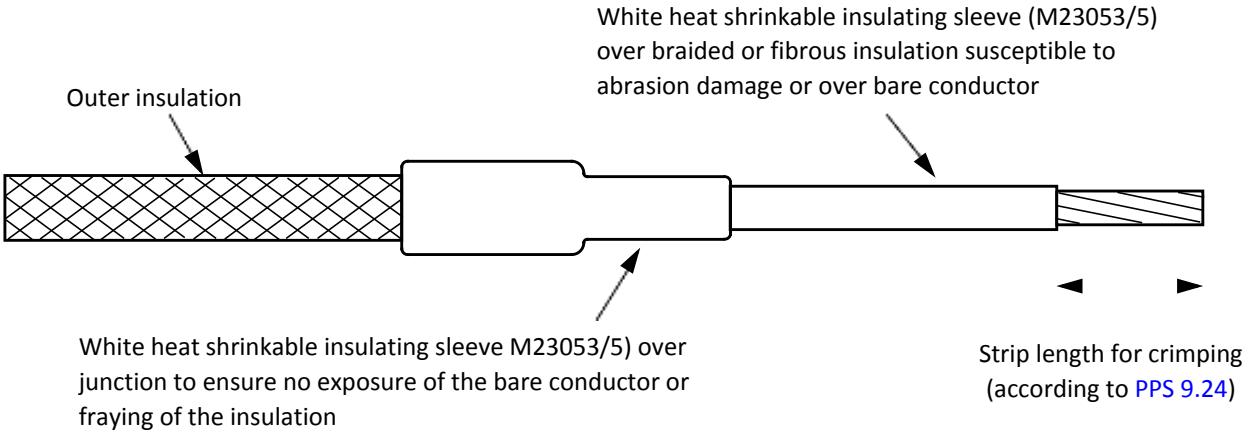

Figure 2. **Standard Preparation of High Temperature Wire**

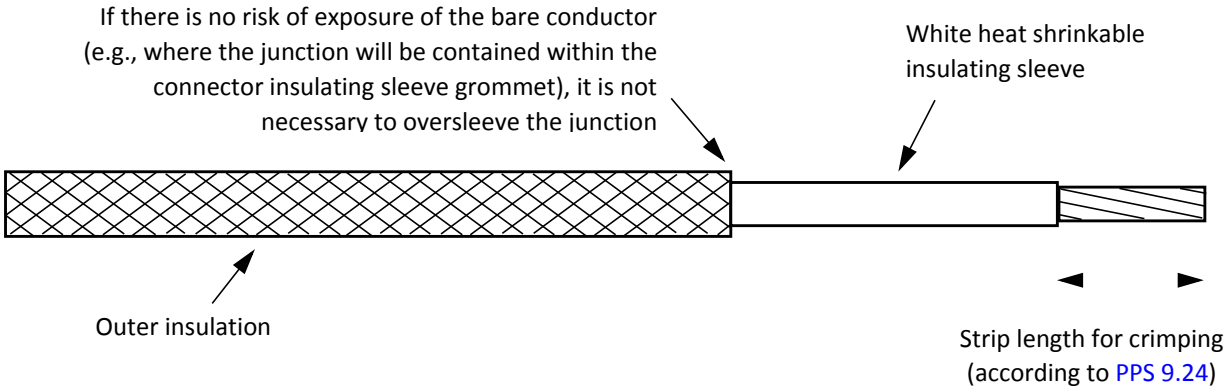

Figure 3. **Alternate Preparation of High Temperature Wire**

5.3 Set-up of Tools

5.3.1 Crimp tools and positioners for use with MS39029 contacts are specified in Table 2. For assembly to B0802050 ARINC600 connector assemblies, refer to Table 3 for crimp tools for crimping Cannon contacts and Table 4 for crimp tools for crimping Souriau contacts. For other contacts, use a

M22520/1-01 crimp tool with a M22520/1-05 positioner. The Daniels equivalents to the M22520 tools and positioners listed in Table 2. Table 3 and Table 4 are specified in Table 5.

5.3.2 Set up tools to M22520/1-01 (i.e., Daniels AF8 manual crimp tool and Daniels WA27F automatic crimp tool) as follows:

Step 1. Depress the turret latch to release the turret to the indexing position (see Figure 5).

Step 2. Rotate the turret to align the correct size positioner with the index mark on the turret head and push the turret back into the turret head until it snaps into the locked position.

Step 3. Set the wire size selector knob to the correct setting for the contact size / wire gauge combination, as specified by the data plate on the turret head.

5.3.3 Set up tools to M22520/2-01 and M22520/7-01 (i.e., Daniels AFM8 and MH860 manual crimp tools and Daniels WA22 and WA22P automatic crimp tools) as follows:

Step 1. Assemble the contact positioner into the tool and lock it into place (see Figure 5).

Step 2. Set the wire size selector knob to the correct setting for the contact size / wire gauge combination, as specified by the data plate on the positioner.

5.3.4 In order to produce an acceptable crimp, ensure that the wire size selector is set correctly for the particular contact/wire assembly being crimped. If the setting is too low, the crimp depth will be too deep and will break the wire strands inside the contact. If the setting is too high, the crimp depth will not be deep enough to positively retain the wire in service.

Table 2. **Crimp Tool and Positioner Selection for M39029 Contacts**

M39029 Contact	Crimp Tool	Positioner
M39029/1-102	M22520/1-01	M22520/1-02 (blue)
M39029/1-507	M22520/2-01	M22520/2-32
M39029/2-104	M22520/2-01	M22520/2-11
M39029/2-105	M22520/2-01	M22520/2-11
	M22520/1-01	M22520/1-02 (red)
M39029/2-106	M22520/1-01	M22520/1-02 (blue)
M39029/3-107	M22520/2-01	M22520/2-11
M39029/3-108	M22520/2-01	M22520/2-11
	M22520/1-01	M22520/1-02 (red)
M39029/3-109	M22520/1-01	M22520/1-02 (blue)

Table 2. **Crimp Tool and Positioner Selection for M39029 Contacts**

M39029 Contact	Crimp Tool	Positioner
M39029/4-110	M22520/1-01	M22520/1-02 (red)
	M22520/2-01	M22520/2-02
	M22520/7-01	M22520/7-02
M39029/4-111 & M39029/4-112	M22520/1-01	M22520/1-02 (blue)
	M22520/7-01	M22520/7-03
M39029/4-113	M22520/1-01	M22520/1-02 (yellow)
M39029/5-115	M22520/2-01	M22520/2-02
	M22520/1-01	M22520/1-02 (red)
	M22520/7-01	M22520/7-02
M39029/5-116 & M39029/5-117	M22520/1-01	M22520/1-02 (blue)
	M22520/7-01	M22520/7-03
M39029/5-118	M22520/1-01	M22520/1-02 (yellow)
M39029/9-134, M39029/9-135, M39029/10-140 & M39029/10-141	M22520/1-01	M22520/1-02 (red)
	M22520/2-01	M22520/2-02
M39029/11-144	M22520/2-01	M22520/2-23
M39029/11-145	M22520/2-01	M22520/2-08
	M22520/7-01	M22520/7-02
M39029/11-146	M22520/1-01	M22520/1-02 (blue)
	M22520/7-01	M22520/7-03
M39029/12-148	M22520/2-01	M22520/2-23
M39029/12-149	M22520/2-01	M22520/2-08
	M22520/7-01	M22520/7-02
M39029/12-150	M22520/1-01	M22520/1-02 (blue)
	M22520/7-01	M22520/7-03
M39029/16-168 & M39029/18-178	M22520/2-01	M22520/2-14
	M22520/7-01	M22520/7-02
M39029/22-190 & M39029/22-191	M22520/7-01	M22520/7-11
M39029/22-192	M22520/7-01	M22520/7-12

Table 2. **Crimp Tool and Positioner Selection for M39029 Contacts**

M39029 Contact	Crimp Tool	Positioner
M39029/22-193	M22520/7-01	M22520/7-13
M39029/29-212	M22520/1-01	M22520/1-02 (blue)
	M22520/7-01	M22520/7-03
M39029/29-213	M22520/1-01	M22520/1-02 (yellow)
M39029/30-217 & M39029/30-218	M22520/1-01	M22520/1-02 (blue)
M39029/30-219	M22520/1-01	M22520/1-02 (yellow)
M39029/31-223, M39029/31-224, M39029/31-225, M39029/31-226 & M39029/31-227	M22520/1-01	M22520/1-02 (red)
	M22520/2-01	M22520/2-02
	M22520/7-01	M22520/7-02
M39029/31-228, M39029/31-229, M39029/31-230, M39029/31-231, M39029/31-232 & M39029/31-233	M22520/1-01	M22520/1-02 (blue)
	M22520/7-01	M22520/7-03
M39029/31-234, M39029/31-235, M39029/31-236, M39029/31-237, M39029/31-238 & M39029/31-239	M22520/1-01	M22520/1-02 (yellow)
M39029/31-240, M39029/31-241, M39029/31-448, M39029/31-627 M39029/32-242, M39029/32-243, M39029/32-244, M39029/32-245 & M39029/32-246	M22520/1-01	M22520/1-02 (red)
	M22520/2-01	M22520/2-02
	M22520/7-01	M22520/7-02
M39029/32-247, M39029/32-248, M39029/32-249, M39029/32-250, M39029/32-251 & M39029/32-252	M22520/1-01	M22520/1-02 (blue)
	M22520/7-01	M22520/7-03

Table 2. **Crimp Tool and Positioner Selection for M39029 Contacts**

M39029 Contact	Crimp Tool	Positioner
M39029/32-253, M39029/32-254, M39029/32-255, M39029/32-256. M39029/32-257 & M39029/32-258	M22520/1-01	M22520/1-02 (yellow)
M39029/32-259, M39029/32-260 & M39029/32-449	M22520/1-01	M22520/1-02 (red)
	M22520/2-01	M22520/2-02
	M22520/7-01	M22520/7-02
M39029/56-348	M22520/2-01	M22520/2-07
	M22520/7-01	M22520/7-05
M39029/56-351	M22520/1-01	M22520/1-04 (red)
	M22520/2-01	M22520/2-10
	M22520/7-01	M22520/7-08
M39029/56-352	M22520/1-01	M22520/1-04 (blue)
	M22520/7-01	M22520/7-04
M39029/56-353	M22520/1-01	M22520/1-04 (yellow)
M39029/57-354, M39029/57-355 & M39029/57-356	M22520/2-01	M22520/2-06
	M22520/7-01	M22520/7-06
M39029/57-357	M22520/1-01	M22520/1-04 (red)
	M22520/2-01	M22520/2-10
	M22520/7-01	M22520/7-08
M39029/57-358	M22520/1-01	M22520/1-04 (blue)
	M22520/7-01	M22520/7-04
M39029/58-360, M39029/58-361 & M39029/58-362	M22520/2-01	M22520/2-09
	M22520/7-01	M22520/7-07
M39029/58-363	M22520/1-01	M22520/1-04 (red)
	M22520/2-01	M22520/2-10
	M22520/7-01	M22520/7-08

Table 2. **Crimp Tool and Positioner Selection for M39029 Contacts**

M39029 Contact	Crimp Tool	Positioner
M39029/58-364	M22520/1-01	M22520/1-04 (blue)
	M22520/7-01	M22520/7-04
M39029/58-365	M22520/1-01	M22520/1-04 (yellow)
M39029/63-368	M22520/2-01	M22520/2-08
M39029/64-369	M22520/2-01	M22520/2-08
M39029/85-455, M39029/85-456, M39029/86-463 & M39029/86-464	M22520/1-01	M22520/1-02 (blue)
	M22520/7-01	M22520/7-03
M39029/92-531	M22520/2-01	M22520/2-06
M39029/92-532	M22520/1-01	M22520/1-02 (red)
	M22520/2-01	M22520/2-02
	M22520/7-01	M22520/7-02
M39029/92-533 & M39029/92-534	M22520/1-01	M22520/1-02 (blue)
	M22520/7-01	M22520/7-03
M39029/92-535 & M39029/92-536	M22520/1-01	M22520/1-02 (yellow)

Table 3. **Crimp Tool Selection - Crimping Canon Contacts for B0802050 ARINC600 Connector Assemblies**

Cannon Contact	Crimp Tool	Positioner
030-1975-009	M22520/2-01	M22520/2-23
030-1975-010	M22520/2-01	M22520/2-23
030-2259-000	M22520/2-01	M22520/2-23
031-1302-000	M22520/2-01	M22520/2-08
031-1303-000	M22520/1-01	M22520/1-02
031-1308-000	M22520/1-01	M22520/1-11

Table 4. **Crimp Tool Selection - Crimping Souriau Contacts for B0802050 ARINC600 Connector Assemblies**

Souriau Contact	Crimp Tool	Positioner
8660-208	M22520/2-01	M22520/2-23
8660-209	M22520/2-01	M22520/2-23
8660-248	M22520/2-01	M22520/2-08
8660-249	M22520/1-01	M22520/1-02
8660-250	M22520/1-01	M22520/1-02
8660-6412	M22520/2-01	M22520/2-23

Table 5. **Equivalent Daniels Crimp Tools and Positioners**

M22520 Crimp Tool or Positioner	Daniels Part Number
M22520/1-01	AF8 or WA27F
M22520/1-02	TH1A
M22520/1-04	TH163
M22520/2-01	AFM8 or WA22
M22520/2-02	K1S
M22520/2-06	K41
M22520/2-07	K40
M22520/2-08	K13-1
M22520/2-09	K42
M22520/2-10	K43
M22520/2-11	K287
M22520/2-14	K340
M22520/2-32	K267-1

M22520 Crimp Tool or Positioner	Daniels Part Number
M22520/2-32	K496
M22520/7-01	MH860 or WA22P
M22520/7-02	86-1S
M22520/7-03	86-2
M22520/7-04	86-3
M22520/7-05	86-4
M22520/7-06	86-5
M22520/7-07	86-6
M22520/7-08	86-7
M22520/7-11	86-19
M22520/7-12	86-20
M22520/7-13	86-21

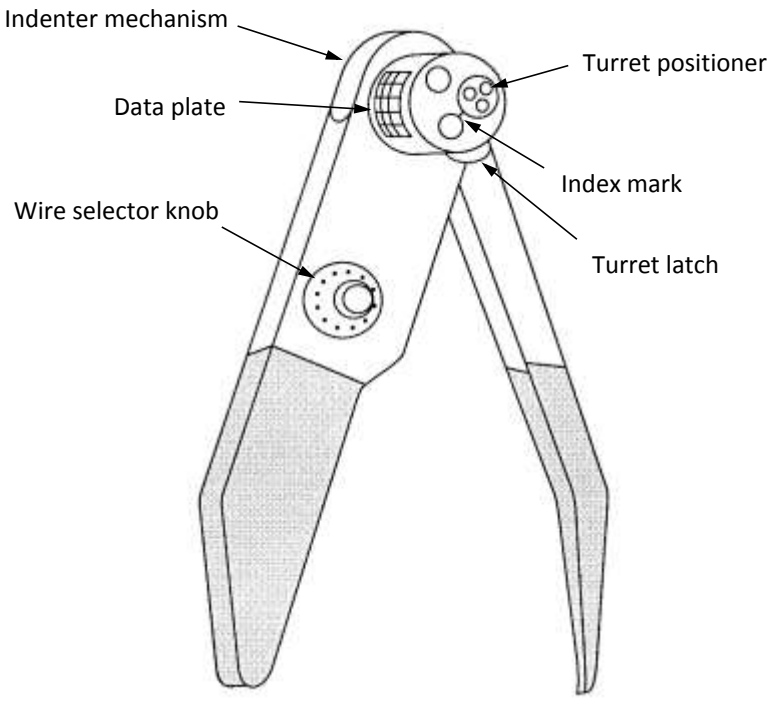

Figure 4. **M22520/1-01 Hand Actuated Crimp Tool**

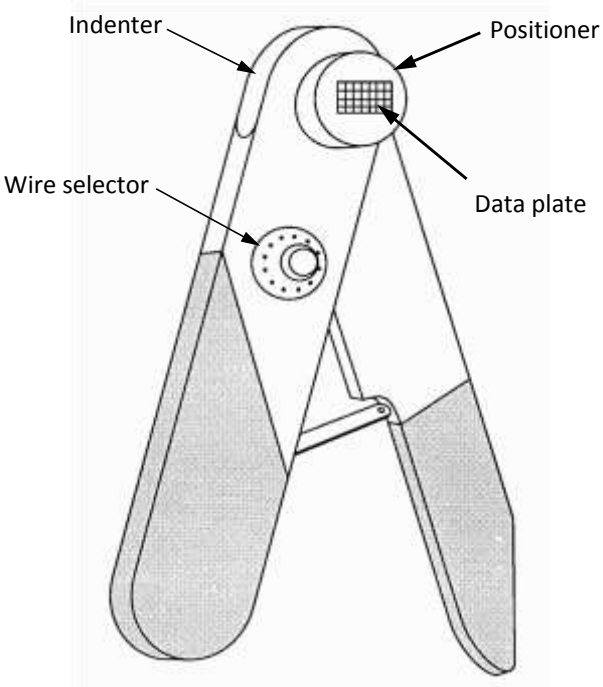

Figure 5. **M22520/2-01 Hand Activated Crimp Tool**

5.4 Crimping of Contacts

5.4.1 Use the tools specified in Table 2 to crimp M39029 contacts. For crimping of 800CT20 pins used for switch 800-R2-1, use a Daniels AFM 8 crimping tool with a Daniels K1S positioner.

5.4.2 Crimp contacts as follows:

Step 1. If using a manual tool, squeeze the tool handles together to cycle the tool to the open position.

Step 2. Set up the tool as specified in section 5.3.

Step 3. Insert the stripped wire end (including filler wire, if necessary according to Table 6) into the contact wire barrel. If Table 6 specifies the need for filler wire:

- Trim the filler wire as close to the end of the wire barrel as practical. The filler wire shall not protrude more than 1/32" from the wire barrel.
- The filler wire shall be qualified to the same specification as the lead wire.
- Set the wire selector to the same size as the contact being crimped, **not** the size of the wire.

Step 4. Ensure that the wire bottoms in the contact wire barrel before crimping.

Step 5. Insert the contact/wire assembly into the indenter opening so that the contact butts against the positioner.

Step 6. While maintaining a slight inward pressure on the wire, crimp the contact/wire assembly as specified below:

- If using a hand operated tool, squeeze the tool handles together until the ratchet releases and the handles return to the fully open position.
- If using an automatic crimp tool, depress the hand operated valve (or foot pedal) to make the crimp.

Step 7. Remove the crimped assembly from the tool. Check the first off crimped contact to verify that the crimp tool positioner being used produces a visually acceptable crimp. **Never** subject a crimped contact to a second crimping operation.

Step 8. If filler wire has been used, shrink a suitable length of M23053/5 heat shrinkable tubing onto the lead wire according to PPS 10.16 to “build-up” the wire outside diameter in the area of the rubber seal of the connector so that a hermetic seal is ensured.

Table 6. **Filler Wire Requirements**

Contact Wire Barrel Size	Lead Wire (AWG)						
	12	**14**	**16**	**18**	**20**	**22**	**24**
12	none needed		1 x 16	1 x 14	1 x 14	1 x 14 or 6 x 22	not allowed
16	not allowed		none needed			1 x 18	4 x 24 or 1 x 18
20	not allowed				none needed		
22	not allowed					none needed	
22D	not allowed					none needed	
22M	not allowed						none needed

Note 1. If filler wire is required, after crimping the contact shrink a suitable length of M23053/5 heat shrinkable tubing onto the lead wire according to PPS 10.16 to "build-up" the wire outside diameter in the area of the rubber seal of the connector so that a hermetic seal is ensured.

6 Requirements

6.1 Crimped contacts shall be subjected to periodic visual examination as specified in this section.

6.2 Wire strands shall be visible through the wire barrel check hole.

6.3 The insulation gap (see Figure 6) shall be no more than 1/16".

6.4 On contacts equipped with an insulation support cup, the wire insulation shall be fully inserted into the support cup.

6.5 Crimp indentations shall be equally spaced and uniform in appearance.

6.6 Crimp indentations shall be approximately centred on the wire barrel (see Figure 6). Indentations shall be no closer than 0.030" from the contact shoulder and no closer than 0.010" from the end of the wire barrel.

6.7 All wire strands shall be included in the contact wire barrel with no splayed or bird-caged strands.

6.8 If filler wire has been used (i.e., when crimping a smaller AWG wire into a larger AWG contact), ensure that a suitable length of M23053/5 heat shrinkable tubing has been shrunk onto the lead wire to "build-up" the wire outside diameter in the area of the rubber seal of the connector so that a hermetic seal is ensured.

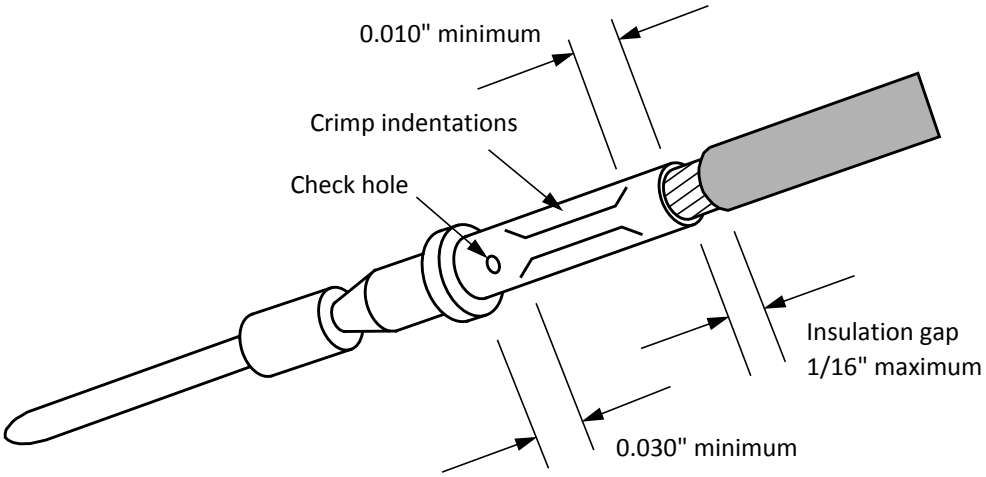

Figure 6. **Typical Crimped Contact**

7 Safety Precautions

7.1 The safety precautions specified herein are specific to Bombardier Toronto (de Havilland) to meet Canadian Federal and Provincial government environmental, health and safety regulations. It is recommended that other facilities consider these safety precautions; however, suppliers, subcontractors and partners are responsible for ensuring that their own environmental, health and safety precautions satisfy the appropriate local government regulations.

7.2 Observe general shop safety precautions when performing the procedure specified herein.

8 Personnel Requirements

8.1 This PPS has been categorized as a “Controlled Special Process” by PPS 13.39. Refer to PPS 13.39 for personnel requirements.