BOMBARDIER
Toronto (de Havilland)
PROPRIETARY INFORMATION

PPS 2.31

PRODUCTION PROCESS STANDARD

Installation of Panel Fastener Assemblies

Issue 5
- This standard supersedes PPS 2.31, Issue 4.
- 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.

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1 Scope

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for the installation of panel fastener assemblies.

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 1.09 - Drilling and Reaming.

3.2 PPS 1.33 - Countersinking for Flush Head Fasteners.

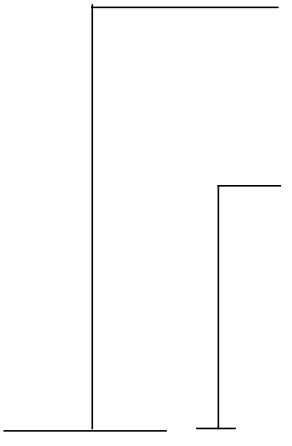
3.3 PPS 2.01 - Installation of Solid Rivets.

3.4 PPS 13.26 - General Subcontractor Provisions.

4 Materials and Equipment

4.1 Materials

4.1.1 Panel fastener assemblies as specified on the engineering drawing. Refer to Figure 1 for a part number breakdown. Refer to Figure 2 for a general description of a panel fastener assembly.

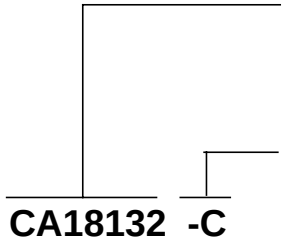


Stud Type Designation

B0209021 = Flush head, 100° csk hex recess, slotted
CA2000 Series = Flush head (CA2020 & CA2023) or Pan Head (CA2021 & CA2022), 4-40 thread
CA18121-TW = Flush head, 8-32 thread, tri-wing driver recess

Stud Grip Length

B0209021:	CA18121:	CA 2000 Series:
-1 = 0.125" - 0.187"	-1 = 0.150" - 0.220"	-0 = 0.090" - 0.124"
-2 = 0.188" - 0.250"	-2 = 0.221" - 0.290"	-1 = 0.125" - 0.187"
-3 = 0.251" - 0.312"	-3 = 0.291" - 0.360"	-2 = 0.188" - 0.250"
-4 = 0.313" - 0.375"	-4 = 0.361" - 0.430"	-3 = 0.251" - 0.312"
-5 = 0.376" - 0.437"	-5 = 0.431" - 0.500"	-4 = 0.313" - 0.375"
-6 = 0.438" - 0.500"	-6 = 0.501" - 0.570"	-5 = 0.376" - 0.437"
-7 = 0.501" - 0.562"	-7 = 0.571" - 0.640"	-6 = 0.438" - 0.500"
-8 = 0.563" - 0.625"	-8 = 0.641" - 0.710"	-7 = 0.501" - 0.562"
-16 = 1.063" - 1.125"		

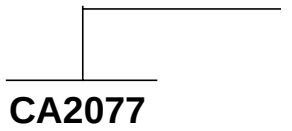


Retaining Ring Designation

B0209020 = wire form, Elgiloy wire
CA2035 = wire form, Elgiloy wire
CA18132 = solid, 3 tab

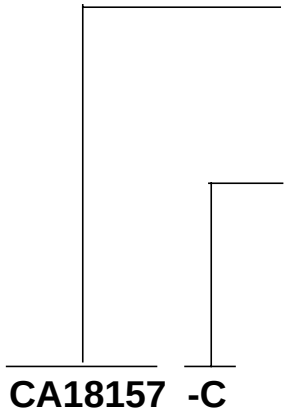
Finish of Retaining Ring

B0209020:	CA2035:	CA18132:
No letter = Passivated	No letter = Passivated	No letter = Passivated -C = Cadmium plate



Shim Type Designation

CA2077 = Two lug, anodized aluminum (for use with CA2000 series or B0209022-001 receptacles)



Receptacle Type Designation

B0209022-001 = 2 lug 0.020" radial float, CRES (historically called out as B0209022)
CA2010 = 2 lug, 0.020" radial float, CRES
CA18157 = 2 lug, 0.025" radial float, CRES, lightweight, replaceable barrel

Finish of Receptacle Cage

No letter = Passivated
C = Cadmium plated (CA2010 and CA18157, only)

Figure 1 - Part Number Breakdown

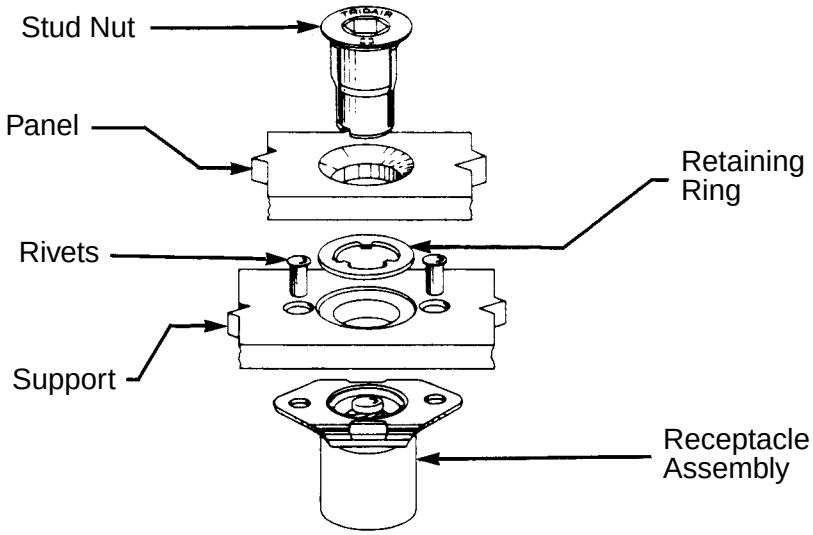


Figure 2 - General Description of Panel Fastener Assembly (typ.)

4.2 Equipment

4.2.1 Installation tools: CA18132-T11 and CA2000-T11.

4.2.2 Receptacle removal tool, CA18157-T10.

4.2.3 Rivet locating drill jigs (e.g., as specified in Table 2).

5 Procedure

5.1 General

5.1.1 Panel fastener assemblies are structural panel fasteners used to secure access panels which require frequent opening for maintenance and inspection.

5.1.2 For the purposes of this PPS the part of the assembly in which the fastener stud is installed is termed the *panel* and the part to which the receptacle is riveted is termed the *support*.

5.2 Preparation of Parts

5.2.1 Prepare stud holes in the panel as follows:

Step 1. Drill the stud hole to size specified in Table 1 according to PPS 1.09.

Step 2. For flush head studs, countersink the stud hole to size specified in Table 1 according to PPS 1.33. The countersink diameter specified in Table 1 is for reference only; ensure that the stud head protrusion meets the requirements of para. 6.2.

Table 1 - Preparation of Panel

STUD NUMBER	HEAD STYLE	DRILL SIZE FOR STUD HOLE	REFERENCE COUNTERSINK DIAMETER
B0209021	flush head	3/16"	0.334" - 0.340"
CA18121-TW	flush head	1/4"	0.403" - 0.409"
CA2000 Series	flush head	3/16"	0.334" - 0.340"
	pan head	3/16"	N/A

5.2.2 Prepare supports as follows (see Figure 3):

Step 1. Drill the stud hole to the size specified in Table 2.

Step 2. Drill rivet holes for receptacle according to PPS 2.01. Use a drill jig (e.g., as specified in Table 2), to locate the rivet holes.

Step 3. Countersink the rivet holes according to PPS 2.01 on the side of the support which is to mate with the panel.

Step 4. Counterbore the stud hole as specified in Table 2 on the side of the support which is to mate with the panel.

Table 2 - Preparation of Support

RECEPTACLE NUMBER	TS.519.11.20 DRILL JIG	DRILL SIZE FOR STUD HOLE	COUNTERBORE DIAMETER	COUNTERBORE DEPTH
B0209022	MK 36	3/16"	5/16"	0.20" - 0.25"
CA18157	MK 34	1/4"	13/32"	0.25" - 0.28"
CA2010	MK 36	3/16"	5/16"	0.20" - 0.25"

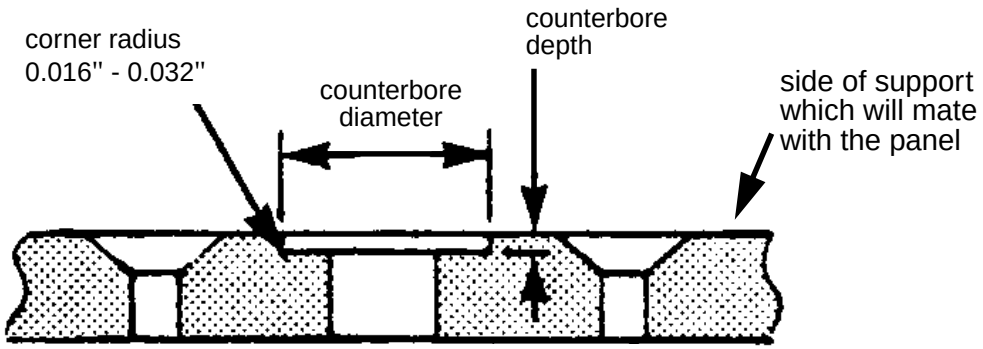


Figure 3 - Preparation of Support

5.3 Installation of Studs

5.3.1 Install CA18121-TW studs as follows:

Step 1. Insert the stud into the stud hole of the panel.

Step 2. Insert two tabs of the retaining ring into two of the grooves in the stud shank (see Fig. 4-A).

Step 3. Lower a CA18132-T11 installation tool onto the stud so that it straddles the unset tab (see Fig. 4-B).

Step 4. Swing the tool in the direction of the unset tab to set it into the groove in the stud shank (see Fig. 4-C).

Step 5. Lift the installation tool vertically from the stud (see Fig. 4-D).

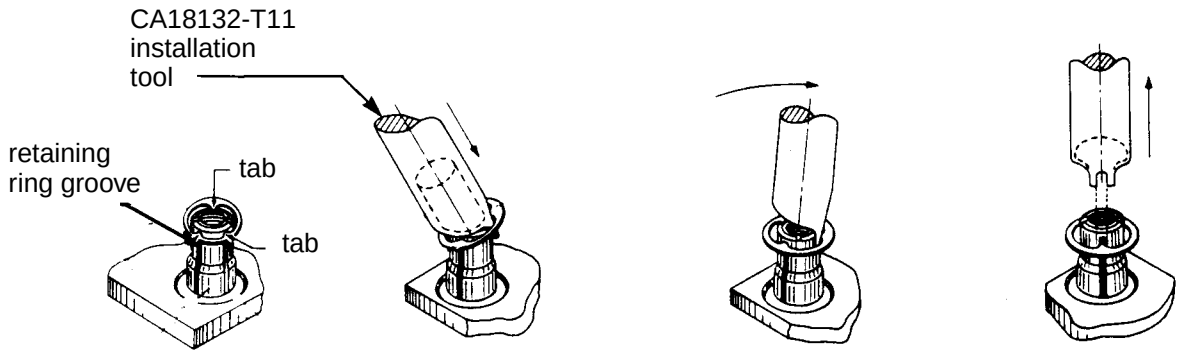


Fig. 4-A Fig. 4-B Fig. 4-C Fig. 4-D

Figure 4 - CA18132 Tab Retaining Ring Installation

5.3.2 Install B0209021 and CA2000 series (flush head and pan head) studs as follows:

Step 1. Insert the stud into the stud hole of the panel.

Step 2. Ensuring that the coined side of the retaining ring is facing the head of the stud nut (as mounted on a CA2000-T11 installation tool), insert the pilot of the tool completely onto the stud nut threads. Wire form retaining rings are mounted by the manufacturer on CA2000-T11 installation tools to ensure proper installation.

Step 3. Slide the retaining ring onto the stud nut (see Figure 5).

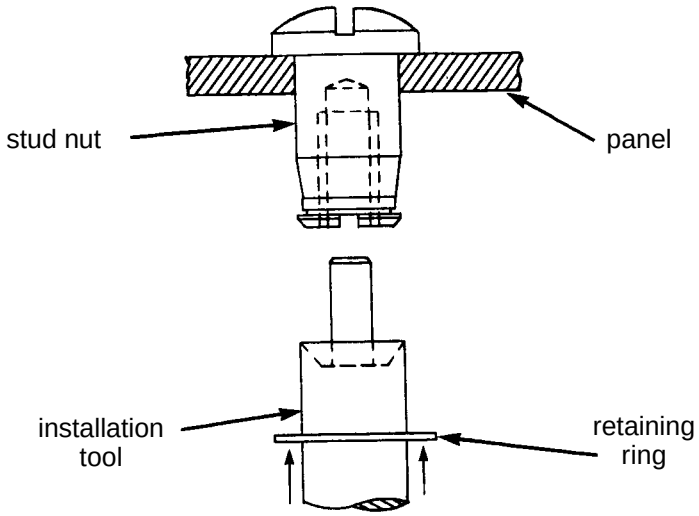


Figure 5 - B0209020/CA2035 Wire Form Retaining Ring Installation

5.4 Installation of Receptacles

5.4.1 Install receptacles as follows:

Step 1. For B0209022 and CA2010 receptacles, install the receptacle with a shim (CA2077) if the grip range (the sum of the panel and support thicknesses plus any compressed gasketing material, shim, paint, etc.) is less than the minimum grip of the stud nut.

Step 2. Rivet receptacles to the support according to PPS 2.01 using the rivets specified by the engineering drawing. Orient the rivets so that the **shop** head will be formed on the countersunk side of the support which is to mate with the panel.

Step 3. On the side of the support which is to mate with the panel, shave the **shop** heads of installed rivets flush with the surface to obtain proper seating of the panel.

5.5 Fastener Removal

5.5.1 If necessary, CA18121-TW studs may be removed as follows:

Step 1. Lower the installation tool onto the stud so that it straddles one of the retaining tabs (see Fig. 6-A).

Step 2. Swing the tool away from the tab to remove the tab from the stud shank (see Fig. 6-B).

Step 3. Remove the tool and retaining ring from the stud shank (see Fig. 6-C).

Step 4. Remove the stud from the panel.

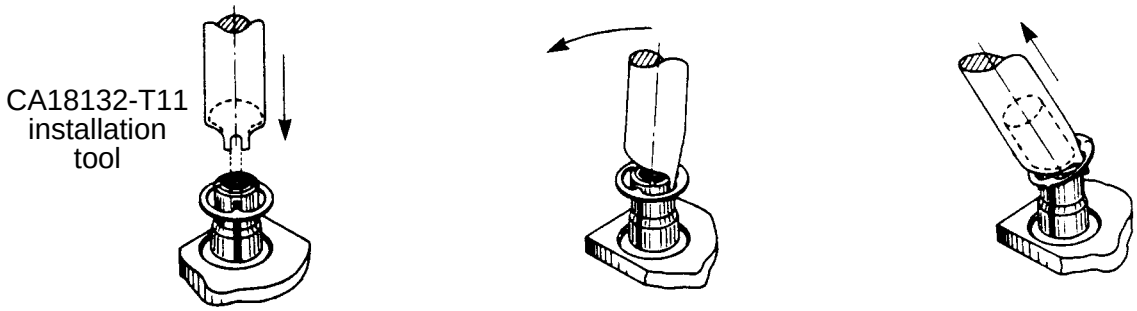


Fig. 6-A Fig. 6-B Fig. 6-C

Figure 6 - CA18132 Tab Retainer Ring Removal

5.5.2 If necessary, B0209021 and CA2000 series studs may be removed and replaced as follows:

Step 1. Carefully pry the wire form retainer ring off the stud with a suitable tool so as not to mark or damage the panel.

Step 2. Remove the stud from the panel.

5.5.3 If necessary, CA18157 receptacle barrels may be removed as follows:

Step 1. Insert a CA18157-T10 removal tool between the cage and the barrel so that it straddles one of the two lugs.

Step 2. Apply a downward pressure on the tool to snap the barrel out of the cage see Figure 7).

Step 3. Manually snap a new barrel into place.

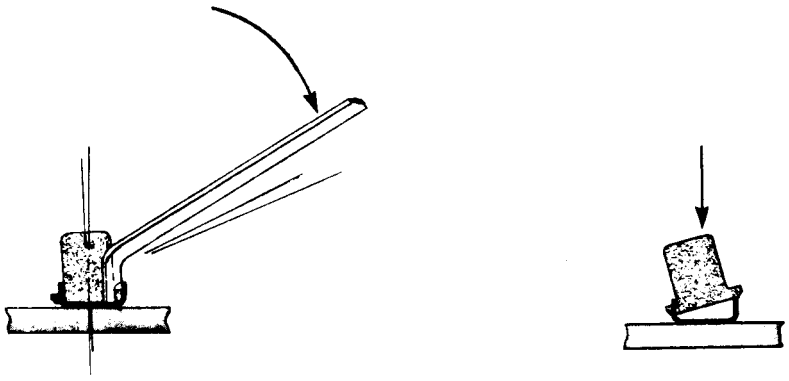


Figure 7 - CA18157 Receptacle Barrel Replacement

6 Requirements

6.1 In the locked position, panel fastener assemblies must be seated tightly without radial or axial play.

6.2 Fro flush head studs, in the locked position stud heads must be flush to 0.007" below flush with the panel.

7 Safety Precautions

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

8 Personnel Requirements

8.1 Personnel responsible for installation of panel fastener assemblies must have a good working knowledge of the procedure and requirements as specified herein and must have exhibited their competency to their supervisor.