BOMBARDIER
Toronto (de Havilland)
PROPRIETARY INFORMATION

PPS 1.40

PRODUCTION PROCESS STANDARD

Set-Up and Operation of Nut Plate Drillmotors

Issue 3
- This standard supersedes PPS 1.40, 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.

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1 Scope

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for the set-up, adjustment and operation of Nut Plate Drillmotors for drilling and countersinking anchor nut rivet holes.

1.1.1 This PPS complements the engineering drawings that specify its use as an authorized instruction and the procedure specified 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 1.33 - Countersinking for Flush Head Fasteners.

3.2 PPS 2.17 - Installation of Anchor Nuts.

3.3 PPS 13.26 - General Subcontractor Provisions.

4 Materials and Equipment

4.1 Materials

4.1.1 No materials specified.

4.2 Equipment

4.3 Nut plate drillmotor, collet assemblies and drills as listed in PPS 2.17 for the applicable type and size of anchor nut. Refer to Figure 1 for a general description of the nut plate drillmotor.

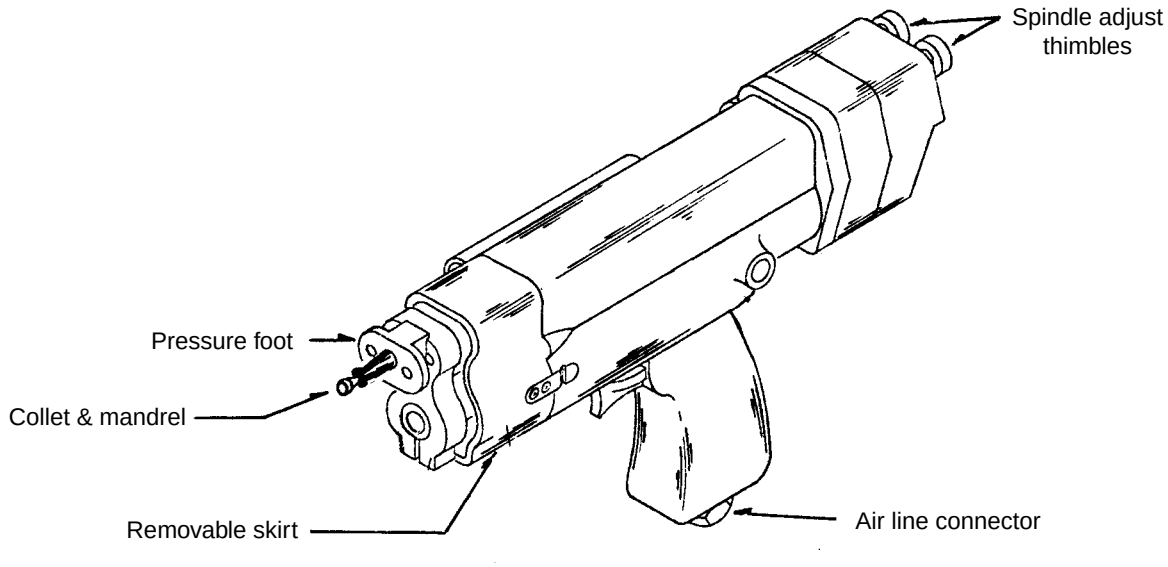

Figure 1 - General Description of Nut Plate Drillmotor

5 Procedure

5.1 General

5.1.1 The Nut Plate Drillmotor is an air operated, hydraulically controlled, portable tool that automatically clamps to the part and drills/countersinks two holes at the same time. Each Nut Plate Drillmotor is designed for a specific anchor nut configuration and rivet spacing.

5.2 Set-Up of Drillmotor

5.2.1 Install the collet, mandrel and collet bushing as follows (see Figure 2):

Step 1. Select the applicable collet, mandrel and collet bushing as listed in PPS 2.17 for the particular anchor nut to be installed.

Step 2. Momentarily connect an air line to the drillmotor to ensure that the lift finger is in the unclamped (fully forward) position. Disconnect the air line from the drillmotor immediately afterward.

Step 3. Remove the snap-on skirt from the front of the drillmotor.

Step 4. Loosen the pressure foot clamp screw and pressure foot bushing setscrew, if fitted (do not re-tighten the pressure foot clamp screw until drills have been installed according to paragraph 5.2.2).

Step 5. Screw the collet bushing into the pressure foot until the bottom of the bushing is flush or slightly recessed into the Pressure foot. Tighten the bushing setscrew (where fitted).

Step 6. Move the pressure foot slightly to one side of the collet lift finger to provide access to the collet bushing from the rear of the pressure foot.

Step 7. Assemble the collet and the collet return spring into the bushing from the rear of the pressure foot and re-align the collet bushing with the lift finger.

Step 8. Insert the mandrel into the collet from the front of the pressure foot and the screw mandrel into the lift finger as far as possible without expanding the collet. The end of the collet should be approximately even with the beginning of the taper on the mandrel. Tighten the setscrew in the lift finger just enough to secure the mandrel. Cut off any surplus on the threaded end of the mandrel flush with the lift finger.

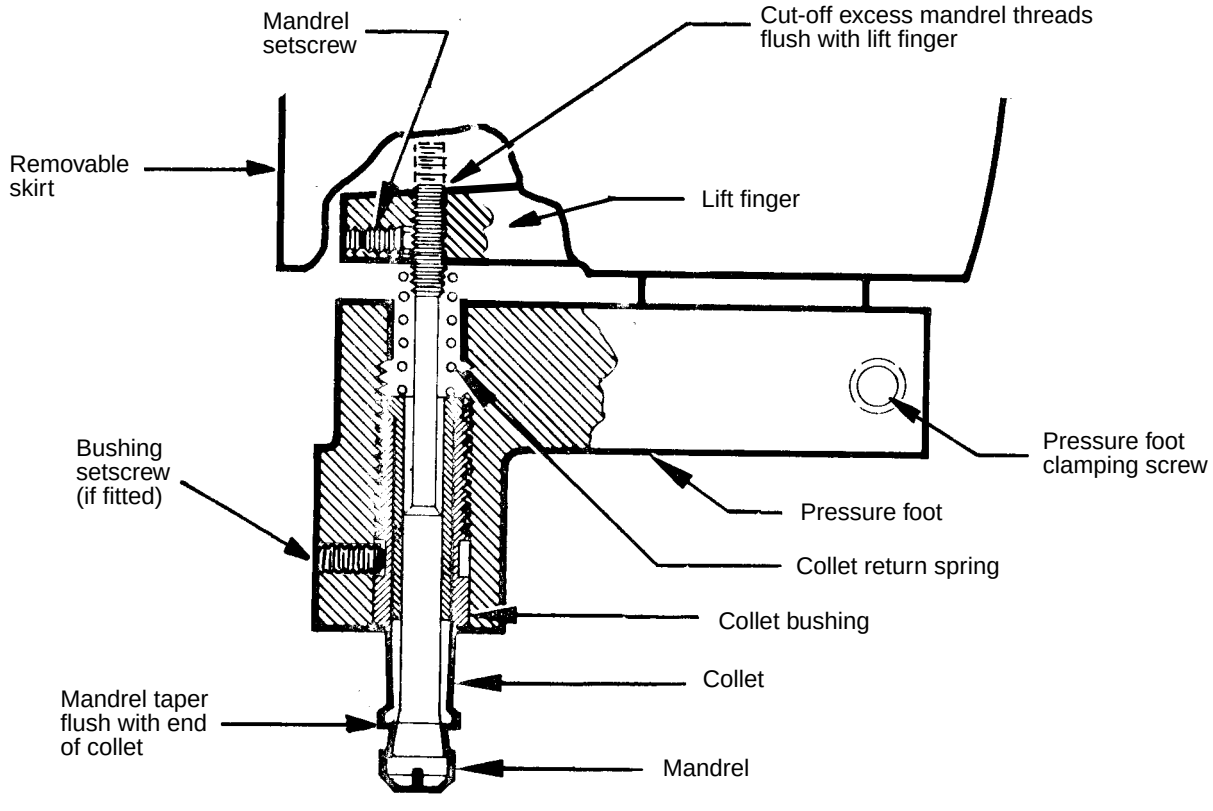

Figure 2 - Installation of Collet, Mandrel & Bushing

5.2.2 Install drill/countersinks as follows (see Figure 3):

Step 1. Select the appropriate drill/countersink as listed in PPS 2.17 for the particular anchor nut to be installed.

Step 2. Insert each of the two drills through the drill holes in the pressure foot and screw each drill onto its associated spindle.

Step 3. Hold the spindles in position by means of a wrench on the wrench flats and tighten the drills by inserting a rod through the hole in the drill body.

Step 4. Where the pressure foot clamp screw has been loosened to facilitate assembly of the collet and return spring, operate the drillmotor through 2 or 3 cycles, to align the pressure foot with the drills. Hold the trigger depressed with the tool at the bottom of its drilling stroke and tighten the clamp screw in the pressure foot.

Step 5. Replace the snap-on skirt on the front of the tool.

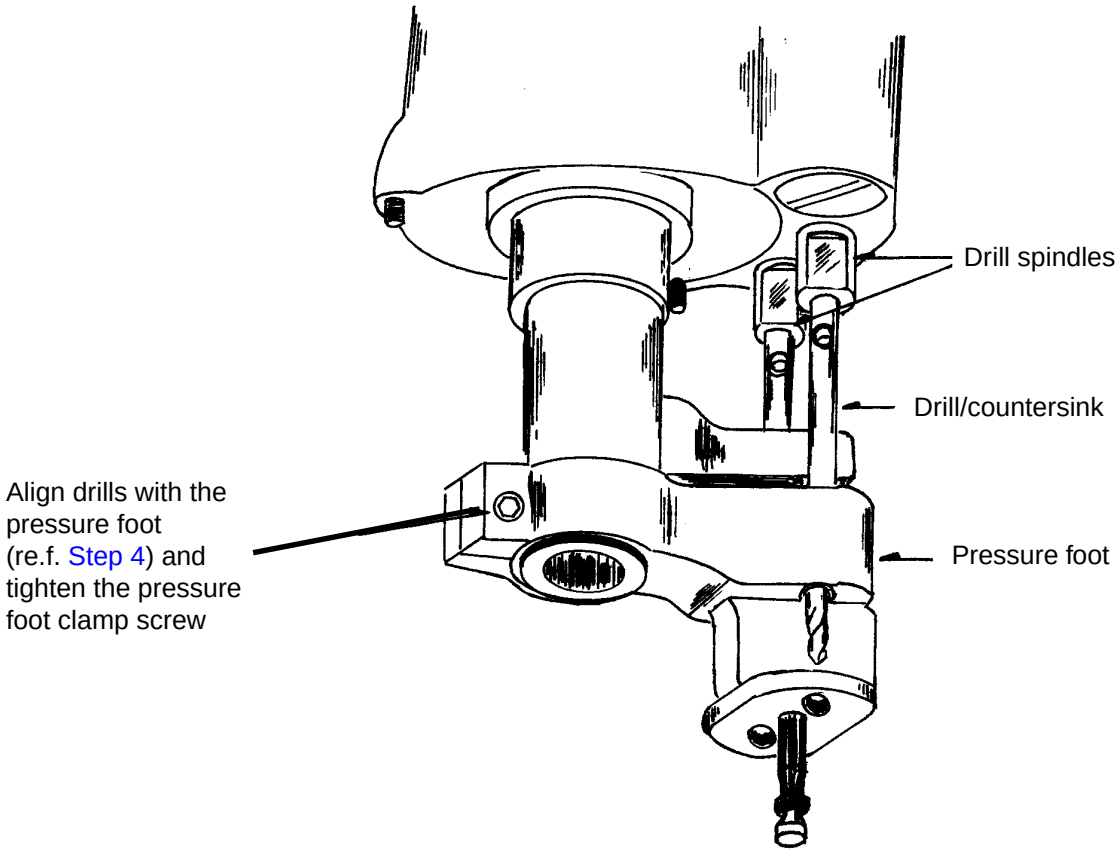

Figure 3 - Installation of Drill/Countersinks

5.2.3 Adjust the drill/countersink depth by means of the spindle adjustment thimbles on the back of the drillmotor. Pull back on the thimble until the adjustment locking splines clear the drillmotor housing and rotate clockwise or counter-clockwise, as applicable. Rotating the thimble CLOCKWISE increases the countersink depth. Rotating the thimble COUNTERCLOCKWISE decreases the countersink depth. An adjustment of one spline tooth results in a countersink diameter increase or decrease, as applicable, of approximately 0.002". Ensure that thimble and housing splines are aligned and thimble snaps fully into housing at each adjustment setting. Drill test holes in test pieces of similar material and gauge as that being used in production. to verify proper drill and countersink depth. Check hole diameters using a suitable gauge. Check countersink diameters a countersinking gauge according to PPS 1.33.

5.3 Operation of Nut Plate Drillmotors

5.3.1 Operate the nut plate drillmotor as follows (Figure 4):

Step 1. Insert the collet of the drillmotor into the pre-drilled or punched screw pilot hole.

Step 2. Hold the pressure foot firmly against the work and align the drill spindles so as to locate the rivet holes in the correct alignment according to the engineering drawing and press the trigger. The tool will automatically clamp to the work and begin drilling both mounting holes at the same time.

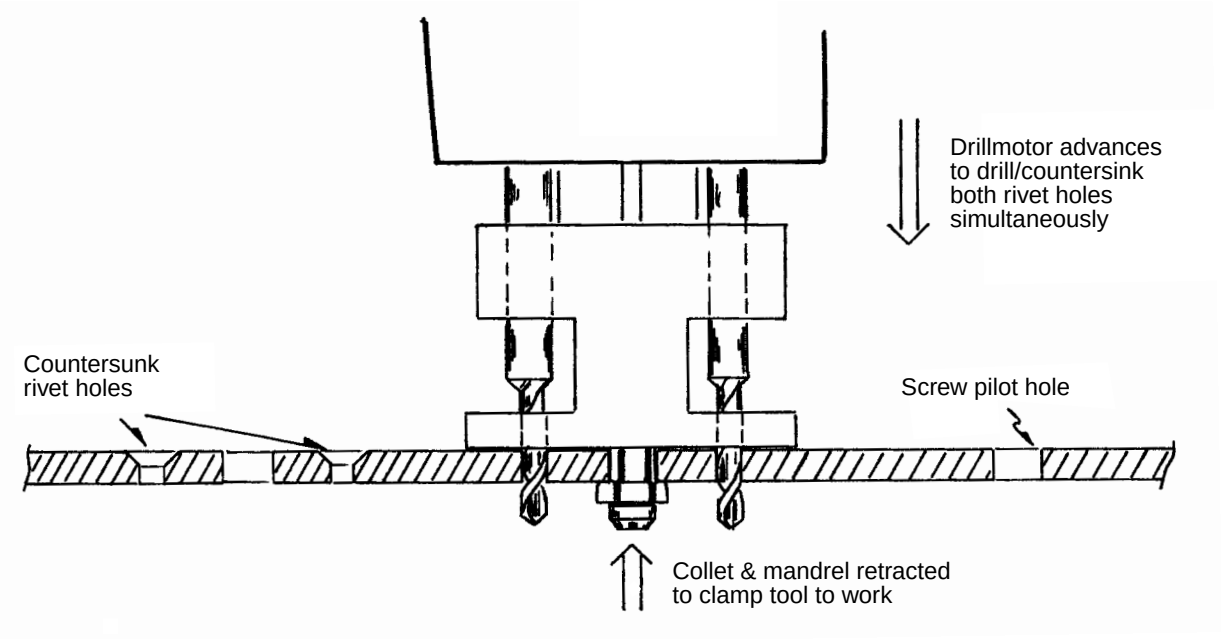

Figure 4 - Operation of Nut Plate Drillmotor

Step 3. Allow approximately 1 - 2 seconds dwell time at the end of the drill/ countersinking feed stroke and release the trigger to retract the drills and unclamp the work. When withdrawing the collet from a hole, take care to draw the collet straight out so as to avoid bending of the collet and mandrel.

6 Requirements

6.1 Drilled holes and countersinks must meet the requirements for size, concentricity, angularity and finish according to the engineering drawing, product specification or fastener PPS.

7 Safety Precautions

7.1 Ensure the drillmotor is disconnected from the air line when setting-up and adjusting the drillmotor as specified herein.

8 Personnel Requirements

8.1 Personnel responsible for the set-up, adjustment and operation of Nut Plate Drillmotors for drilling and countersinking anchor nut rivet holes 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

9.1 It is recommended that a few drops of light machine oil be injected daily into the drillmotor air inlet.

9.2 When the fluid level indicating rod, on the side of the tool, reaches the ADD FLUID mark on the housing, refill the drillmotor with hydraulic fluid according to the manufacturer's instructions.

9.3 Whenever the drillmotor functions incorrectly, adjust or repair according to the manufacturer's instructions.