BOMBARDIER
Toronto (de Havilland)
PROPRIETARY INFORMATION

PPS 7.03

PRODUCTION PROCESS STANDARD

Charging and Installation of Emergency Exit Light Battery Rack Assemblies

Issue 3
- This standard supersedes PPS 7.03, 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 charging of the following emergency exit light battery rack assemblies:

- Grimes #60-1321-1 (battery part number Grimes 61-0478) for Dash 8 Series 100, 200 & 300 aircraft.
- Grimes #60-5025-1 (battery part number Grimes 61-3800) for Dash 8 Series 400 aircraft.

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 Terminals.

3.2 PPS 13.26 - General Subcontractor Provisions.

4 Materials and Equipment

4.1 Materials

4.1.1 No materials required.

4.2 Equipment

4.2.1 Battery charger/analyzer, Christie Electric Corp. CASP/2000 (see Figure 1). The CASP/2000 charger/analyzer must be calibrated annually and identified as such by a calibration sticker.

4.2.2 Soldering iron, low power, 50 watts or less.

4.2.3 Shorting resistors, 5 watt, 1/2 ohm.

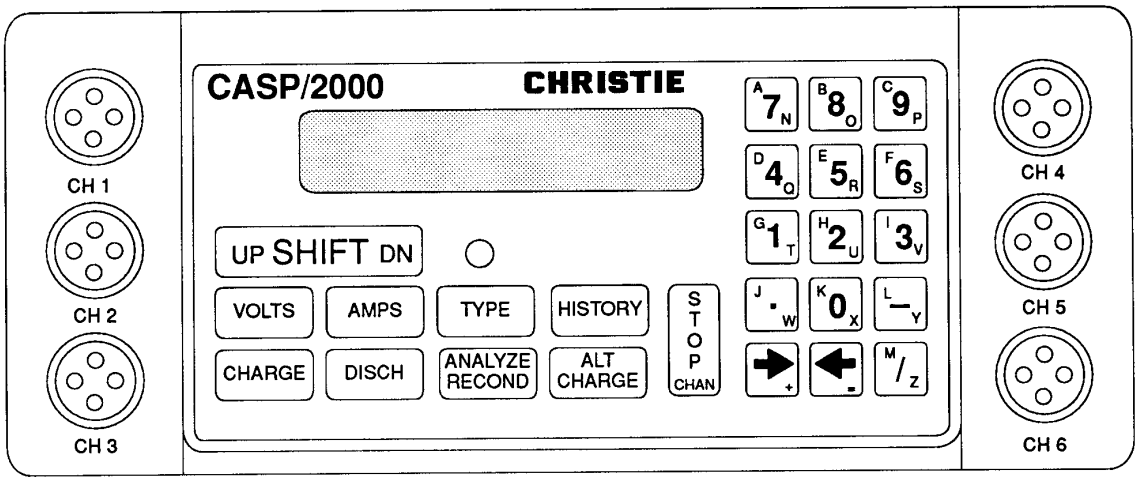

Figure 1 - CASP/2000 Control Panel

5 Procedure

5.1 Preparation of Batteries Before Charging or Installation

5.1.1 Carry out the following checks and pre-installation servicing before charging the battery:

- check the condition of the outer case and the electrical connector
- check the cleanliness of the battery and hardware
- check the condition of all cells

5.1.2 If necessary, clean the battery with a clean dry cloth and a nylon bristle brush.

5.1.3 Before charging, check the battery voltage. If the battery voltage is less than 5.4 volts dc the battery is unacceptable for charging and must be either returned to the manufacturer for reconditioning or submitted for removal and replacement of defective cells according to section 5.4.

5.2 Programming of Charger

5.2.1 Set-up the CASP/2000 charger for the battery to be charged as follows. Use the keypad to enter values as necessary. Use the SHIFT UP or SHIFT DN key with the keypad to enter letters. Only if the value shown is incorrect is it necessary to use keys to enter values. Press the right pointing arrow key to accept the value shown.

Step 1. Verify calibration of the CASP/2000 charger/analyzer before use.

Step 2. Turn on the CASP/2000 charger.

Step 3. Press SHIFT DN and then the U key.

Step 4. If the CASP/2000 display shows “Enter Table #: 111”, press the right pointing arrow key to accept. Otherwise, enter 111. At step 7, “Enter Table #” will come up again and in that case the correct value will depend upon the battery to be charged but in this case the value must be 111, regardless of which battery is to be charged.

Step 5. If the “Battery Type” shown is correct for the battery to be charged (i.e., either “GRIMES61-0478” or “GRIMES61-3800”, as applicable), press the right pointing arrow key to accept. Otherwise enter the appropriate battery type.

Step 6. If the “Enter Param” value is correct for the battery to be charged as specified in Table I (i.e., “011” for Grimes 61-0478 or “010” for Grimes 61-3800), press the right pointing arrow key to accept. Otherwise, enter the appropriate value.

Step 7. If the “Enter Table” value is correct for the battery to be charged as specified in Table I (i.e., “011” for Grimes 61-0478 or “010” for Grimes 61-3800), press the right pointing arrow key to accept. Otherwise, enter the appropriate value.

Step 8. If the “Enter Chrg Amps” value is correct for the battery to be charged as specified in Table I (i.e., “03.00” for Grimes 61-0478 or “02.00” for Grimes 61-3800), press the right pointing arrow key to accept. Otherwise, enter the appropriate value.

Step 9. If the “Enter Disch Amps” value is correct for the battery to be charged as specified in Table I (i.e., “03.00” for Grimes 61-0478 or “02.00” for Grimes 61-3800), press the right pointing arrow key to accept. Otherwise, enter the appropriate value.

Step 10. If the “Enter Alt Chrg Amps” value is correct for the battery to be charged as specified in Table I (i.e., “0.30” for Grimes 61-0478 or “0.25” for Grimes 61-3800), press the right pointing arrow key to accept. Otherwise, enter the appropriate value.

Step 11. If the “Enter Amp Hour” value is correct for the battery to be charged as specified in Table I (i.e., “03.00” for Grimes 61-0478 or “02.00” for Grimes 61-3800), press the right pointing arrow key to accept. Otherwise, enter the appropriate value.

Step 12. If the “Enter Min Amp Hour” value is correct for the battery to be charged as specified in Table I (i.e., “02.00” for Grimes 61-0478 or “01.70” for Grimes 61-3800), press the right pointing arrow key to accept. Otherwise, enter the appropriate value.

Step 13. If the “Enter # of cells” value is correct for the battery to be charged as specified in Table I (i.e., “06” for Grimes 61-0478 and Grimes 61-3800), press the right pointing arrow key to accept. Otherwise, enter 06.

Step 14. If the “Enter Chrg Code” value is correct for the battery to be charged as specified in Table I (i.e., “A91N” for Grimes 61-0478 and Grimes 61-3800), press the right pointing arrow key to accept. Otherwise, enter A91N.

Step 15. If the “Enter Chrg Time” value is correct for the battery to be charged as specified in Table I (i.e., “0300” for Grimes 61-0478 and Grimes 61-3800), press the right pointing arrow key to accept. Otherwise, enter 0300.

Step 16. If the “Enter Alt Chrg Time” value is correct for the battery to be charged as specified in Table I (i.e., “1600” for Grimes 61-0478 and Grimes 61-3800), press the right pointing arrow key to accept. Otherwise, enter 1600.

Step 17. Press the STOP key.

Table I - CASP/2000 Charger Set-Up Values

PARAMETER	BATTERY	
	GRIMES 61-0478	GRIMES 61-3800
Battery Type	GRIMES61-0478	GRIMES61-3800
Param	011	010
Table #	011	010
Chrg Amps	03.00	02.00
Disch Amps	03.00	02.00
Alt Chrg Amps	0.30	0.25
Amp Hour	03.00	02.00
Min Amp Hour	02.00	01.70
# of cells	06	
Chrg Code	A91N	
Chrg Time	0300	
Alt Chrg Time	1600	

5.3 Charging

5.3.1 Charge and re-charge batteries as follows:

Step 1. Connect the CASP/2000 charger/analyzer to the battery to be charged using the appropriate battery cable (with adapter, as applicable).

Step 2. Press the TYPE button to verify that the CASP/2000 recognizes the battery.

Step 3. For batteries being re-charged after being stored for 6 months, press the DISCH key to start a discharging cycle. The CASP/2000 charger will then discharge the battery to 5.4 volts dc and stop automatically. Do not proceed to the next step until the charger has completed the discharge cycle and stopped automatically. For charging batteries stored less than 6 months, this discharge cycle is not required.

Step 4. Press the SHIFT DN key and then the ALT CHARGE button to start slow charging the battery using the constant current charging method. This charging will take up to 16 hours to complete. The battery voltage can be checked during the charging process by pressing the VOLTS key. A fully charged battery will display at least 8.2 volts dc; if a minimum charge of 8.2 volts dc cannot be obtained, the battery is unacceptable and must be either returned to the manufacturer for reconditioning or submitted for removal and replacement of defective cells according to section 5.4. Pressing the STOP key will interrupt the charging process.

Step 5. For batteries which have been submitted for re-charging after storage for 6 months, repeat steps 3 and 4 a further two times to complete a total of three full discharge/charge cycles. For charging batteries stored less than 6 months, only a single charge cycle as specified in step 4 is required.

5.4 Removal and Replacement of Defective Cells

5.4.1 As an alternative to returning unacceptable batteries to the manufacturer for reconditioning, it is acceptable to remove and replace defective cells as follows:

Step 1. Check the individual cell voltages to determine the defective cell, or cells. After a fresh charge, the voltage of each cell should be 1.36 - 1.5 volts dc.

Step 2. Connect the appropriate battery cable to the CASP/2000 charger/analyzer and the battery.

Step 3. Press the TYPE button to verify that the CASP/2000 recognizes the battery.

Step 4. Press the DISCHARGE button to start the discharge cycle.

Step 5. After the discharge cycle has been completed, remove the battery outer casing and connect individual shorting resistors (see paragraph 4.2.3) across all the battery cells.

Step 6. Monitor the cell voltages and allow the cells to remain shorted out for at least 3 hours after all cell voltages have dropped to zero.

Step 7. De-solder the inter-cell connecting links of the cell to be removed according to PPS 9.07 using a low power soldering iron (see paragraph 4.2.2) and remove the cell.

Step 8. Install a discharged and shorted replacement cell. Petroleum jelly or silicone grease may be applied, sparingly, to the side of the cell to ease insertion. Ensure that the correct polarity is observed in the installed cell.

Step 9. Re-solder the inter-cell connecting links according to PPS 9.07 using a low power soldering iron (see paragraph 4.2.2).

Step 10. Charge the battery according to section 5.3.

6 Requirements

6.1 Only batteries which have been successfully charged according to section 5.3 may be released for installation. Ensure batteries are in a clean, charged condition before installation.

7 Safety Precautions

7.1 The electrolyte used in nickel cadmium batteries is a strong solution of potassium hydroxide that will burn body tissue and clothes on contact. Should electrolyte come into contact with the body, immediately rinse the affected area with large quantities of tap water. Neutralize with vinegar or a weak solution of boric acid and report to the Health Centre immediately. Soak up spilled electrolyte with sawdust and rinse the area with a weak solution of boric acid and then wash with water. Sawdust used to soak up the spill must be removed and burned.

7.2 As a precaution against short circuits which could cause severe burns, remove metal rings, metal watch bands and other metallic jewellery before working on batteries.

7.3 If there is any indication of thermal runaway or vicious cycling, stop the battery charging cycle immediately. Thermal runaway or vicious cycling is indicated by any of the following:

- *current increasing during the charging cycle*
- *battery voltage decreasing during the charging cycle*
- *a significant increase in battery temperature (i.e., battery temperature exceeds 100°F)*

8 Personnel Requirements

8.1 Personnel responsible for charging and installation of emergency exit light battery rack assemblies must have a good working knowledge of the procedure and requirements as specified herein and shall have exhibited their familiarity to their supervisor.

9 Storage

9.1 Store emergency exit light battery rack assemblies in a cool dry atmosphere.

9.2 Re-charge stored emergency exit light battery rack assemblies every 6 months.