



INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

COMPONENT MAINTENANCE MANUAL

**CONCORDE VALVE REGULATED LEAD-ACID
EMERGENCY BATTERY AUTHORISED UNDER TSO-C173**

THIS MANUAL IS APPLICABLE TO THE FOLLOWING BATTERY TYPES.

RG-1835-1 and RG-1835-1[]
RG-1835-2 and RG-1835-2[]

The data/information contained herein has been reviewed and approved for general release on the basis that this document contains no export-controlled information

TITLE: Component Maintenance Manual, Concorde Valve Regulated Lead-Acid Emergency Battery, RG-1835 Series				DWG NO. 5-0282	REV
CAGE CODE 63017	DRAWN JBT 10/15/08	CHECKED EFK 10/16/08	APPROVED JBT 10/16/08	ISSUED AT 10/28/08	SHEET 1 OF 13

RECORD OF REVISIONS

Rev. No.	Description	Date	Appd.

TITLE Component Maintenance Manual, Concorde Valve Regulated Lead-Acid Emergency Battery, RG-1835 Series	DWG. NO. 5-0282	REV
CAGE CODE 63017	SHEET 2 OF 13	

SERVICE BULLETIN LIST

Number	Brief Description	Type Affected

TITLE Component Maintenance Manual, Concorde RG-1835 Series, Valve Regulated Lead-Acid Emergency Battery	DWG. NO. 5-0282	REV
CAGE CODE 63017		SHEET 3 OF 13

Contents

1.	Scope:	5
2.	Purpose:	5
3.	Application:	5
4.	Definitions:	5
5.	Precautions:	5
6.	Airworthiness Limitations:	6
7.	Deviations:	7
8.	Inspection Requirements and Overhaul Schedule:	7
9.	Test Procedure:	7
10.	Troubleshooting:	8
11.	Servicing discharged batteries:	8
12.	Replacement / Repair:	9
13.	Facilities:	9
14.	Storage Limitations:	9
15.	Boost charging procedure:	10
16.	Schematic and Wiring diagram.	10
17.	Disassembly	11
18.	Assembly	11
19.	Disposal:	11
20.	Illustrated Parts List	12

TITLE	Component Maintenance Manual, Concorde RG-1835 Series, Valve Regulated Lead-Acid Emergency Battery	DWG. NO.	5-0282	REV	
CAGE CODE	63017	SHEET	4 OF 13		

1. Scope: This Maintenance Manual Supplement provides the additional data required to insure satisfactory operation, maintenance, and repair of the Concorde RG-1835 Series valve regulated lead-acid battery installation. The battery LRU is made up of two shop replaceable components.
 - a. The front shell contains the connector to mate with the aircraft, and a diode assembly to limit the inrush current and prevent discharge of the battery to feed the DC buss.
 - b. The side shell contains the battery, optional heaters and heater controls.
 - c. The designation of the battery is dictated by which side shell is installed. See envelope drawings for full specifications.

2. Purpose: This manual sets forth the instructions for determining continued airworthiness of a Concorde valve regulated lead-acid emergency power battery.

3. Application: Instrument backup or emergency power.

4. Definitions:
 - a. Valve regulated battery - A lead-acid battery in which there is no free electrolyte. This battery requires no maintenance of the liquid level and recombines the gases formed on charge within the battery to reform water. The battery may be used in any attitude without danger of leakage or spilling of electrolyte.
 - b. Rated capacity C1 - Quantity of electricity in Ampere-hours (Ah) which the cell or battery is capable of delivering in 1 h, throughout its normal service life, after full charge, under conditions defined with regard to temperature and end discharge voltage.
 - c. End Point Voltage (EPV) - Unless otherwise stated, during discharge the battery voltage corresponding to a mean voltage per cell of 1.67 Volts for lead-acid batteries.

5. Precautions:
 - a. **CAUTION:** Aircraft batteries are certified to have certain minimum capacity for emergency operations in the event of a electrical generator system failure. Never "jump start" an aircraft that has a discharged or 'dead' battery.
 - b. **WARNING: ELECTRIC SHOCK HAZARD.** Do not touch uninsulated portion of the connector or the battery terminals. A possibility of serious electrical shock exists.
 - c. **WARNING: ELECTRIC SHOCK HAZARD.** Do not lay tools or other metal objects on the battery as arcing or explosion could occur. Remove conductive jewelry before working around battery, charger, or test equipment.
 - d. **CAUTION: ELECTRIC BURN HAZARD.** Do not wear conductive rings, belt buckles, or other jewelry when working with batteries, chargers, or test equipment. Do not lay tools or other metal objects on the battery as

TITLE	Component Maintenance Manual, Concorde RG-1835 Series, Valve Regulated Lead-Acid Emergency Battery	DWG. NO.	5-0282	REV
CAGE CODE	63017	SHEET	5 OF 13	

- arcing and severe burns could occur.
- e. **WARNING:** Batteries on charge or discharge produce hydrogen gas, which can explode if ignited. Do not smoke, use an open flame, or cause sparking near a battery. Charge, service or test a battery only in a well ventilated area. The use of exhaust fans may reduce the risk of explosion.
 - f. **WARNING:** Batteries contain sulfuric acid which will cause burns. **DO NOT TOUCH EYES AFTER TOUCHING BATTERY.** Do not get acid in your eyes, or on your skin, or clothing. In the event of acid in the eyes, flush thoroughly with clean cool water for several minutes. Get professional medical attention. Refer to battery MSDS for additional information.
 - g. **WARNING:** Wear proper eye, face and hand protection at all times when working with batteries. Know the location and use of emergency eyewash and shower nearest the battery charging area.
 - h. **CAUTION:** To prevent damage to the connector, arc burns, or explosion, batteries should never be connected or disconnected while being charged or discharged. Batteries must be connected or disconnected only when the circuit is open. Ensure the aircraft battery switch, external power source, or the charger/analyzer is in the "OFF" position before connecting or disconnecting the battery. Battery terminal protectors should be installed whenever the battery is not connected in the aircraft or to the test equipment.
 - i. **CAUTION:** Batteries contain hazardous materials. Know the location and proper use of emergency response materials. Refer to battery Material Safety Data Sheet (MSDS) for additional information.
 - j. **Caution / Warning:** Only constant potential charging may be done on the aircraft. **DO NOT** constant current charge a battery on the aircraft. There may be a serious risk of injury to personnel and / or damage to the aircraft or aircraft systems due to high voltage and generation of explosive gases when charging constant current.
6. Airworthiness Limitations:
- a. For batteries covered by TSO-C173 the following limitation applies:
Note: The conditions and tests for the TSO approval of this battery are minimum performance standards. Those installing this battery, on or in a specific type or class of aircraft, must determine that the aircraft installation conditions are within the TSO standards. TSO articles must have separate approval for installation in an aircraft. The article may be installed only according to 14CFR part 43 or the applicable airworthiness requirements. Nickel-cadmium and lead-acid battery safety concerns include the possibility of fire and venting violently.
 - b. There are no airworthiness limitations associated with the installation of a Concorde valve-regulated lead-acid battery in an aircraft.

TITLE	Component Maintenance Manual, Concorde RG-1835 Series, Valve Regulated Lead-Acid Emergency Battery	DWG. NO.	5-0282	REV	
CAGE CODE	63017	SHEET	6 OF 13		

7. Deviations:
- a. All items qualified to this TSO were tested in accordance with Change 1 to DO-293.
 - b. All batteries that contain heater blankets are TSO approved with a deviation regarding the insulation material on the heater blankets. This insulation material is approved under an equivalent level of safety determination.

8. Inspection Requirements and Overhaul Schedule:

- a. Inspection Requirements:
 - i. Scheduled inspections:
 - (1) An initial check of the emergency capacity is required 12 months after installation or after 2000 hours of operation, whichever occurs first.
 - (2) After the initial check, a check of emergency capacity is required after 12 months or after every additional 1000 hours of operation.

NOTE: The inspection schedule may be adjusted after the useful battery life is established in a particular operation. After the useful life of a battery is established for a particular aircraft or operating mode, the actual useful life period in months or hours may be substituted for the above schedule.

9. Test Procedure:

- a. Charge the battery:
 - i. Special tools:
 - (1) Advanced Power Products Beta D-50 Aircraft Battery Analyzer P/N 4126, or equal.
 - (2) Advanced Power Products Alpha C-25 Battery Charger P/N 4142, or equal.
 - (3) Advanced Power Products CA15-50 Charger/analyzer P/N 4159, or equal.

Warning: Contact Concorde for determination of equal test equipment. Some brands of battery chargers will destroy the battery.

- (4) Depending on the type of charger available, charge the battery Constant Potential (CP). Charge at 2.35 volts/cell or 28.2 volts for 24 volt batteries until the charge current stabilizes for 1 hour.
- b. Capacity test:
 - i. Stabilize the battery at 15°C (59°F) or higher. The battery must be at the temperature for at least 24 hours.
 - ii. Discharge the battery at the rate specified to the end point voltage specified by the airframe or equipment manufacturer. If no rate or end point voltage is specified, discharge at the C1 rate on the label to an end point voltage of 1.67 volts/cell, or 20 volts for 24 volt batteries.

TITLE	Component Maintenance Manual, Concorde RG-1835 Series, Valve Regulated Lead-Acid Emergency Battery	DWG. NO.	5-0282	REV	
CAGE CODE	63017	SHEET	7 OF 13		

- iii. Record the time to EPV.
- iv. The battery is acceptable for continued use if the ampere hour capacity (actual time of discharge x ampere rate of discharge) is greater than 85% of the nominal rated capacity (C1) shown on the label. If the battery passes the capacity test, recharge and return it to service. If the battery fails the capacity test perform a conditioning procedure (15.b.). After the battery has been conditioned perform a second capacity test. If the battery passes, recharge and return to service. If the battery fails replace it.

NOTE: Airframe or accessory equipment manufacturers may specify a different capacity requirement.

- c. Return to service: Charge the battery as above. If the battery gets very hot (external case temperature greater than 55°C (130°F) during charging, it should be replaced.
- d. Component Overhaul Schedule: No component overhaul required for this type product.

10. Troubleshooting:

Symptom	Probable Cause	Corrective Action
Low voltage / no voltage	Battery partially or fully discharged.	Charge in accordance with Section 10.
	Battery circuit breaker tripped.	Reset circuit breaker.
Battery does not hold charge	Battery beyond serviceable life.	Replace battery or replace front shell.
Battery gets hot while recharging.	Battery beyond serviceable life.	Replace battery or replace front shell.

11. Servicing discharged batteries:

- a. Uninstalled recharging:
 - i. Remove the battery from the aircraft.
 - ii. Special tools:
 - (1) Advanced Power Products Alpha C-25 Battery Charger, P/N 4142; Advanced Power Products CA15-50 Charger/analyzer P/N 4159; or equal.

Warning: Contact Concorde for determination of equal test equipment. Some brands of battery chargers will destroy the battery.

- iii. Depending on the type of charger available, charge the battery Constant Potential (CP). Charge at 28.2 volts for 24 volt batteries until the charge current stabilizes for 1 hour.

TITLE	Component Maintenance Manual, Concorde RG-1835 Series, Valve Regulated Lead-Acid Emergency Battery	DWG. NO.	5-0282	REV	
CAGE CODE	63017	SHEET	8 OF 13		

NOTE: Batteries that have been allowed to stand in a deeply discharged state may not accept a CP recharge. See conditioning procedure in paragraph 15.b for handling those batteries.

- 12. Replacement / Repair:
 - a. Recommended replacement interval - The entire battery assembly should be replaced after 5 years or 5000 hours of operation or whichever occurs first.
 - b. Replacement may be made by removing and installing a new battery in accordance with the instructions of this supplement.
 - c. Repairs should be performed only by a Concorde approved battery shop.
 - i. Repair consists of removing the side shell and replacing it with a new side shell. After replacement, charge and test the new battery pack.

- 13. Facilities:
 - a. Valve regulated batteries may be serviced in any battery facility, including nickel-cadmium service facilities. The battery is sealed to prevent cross contamination of the electrolyte.

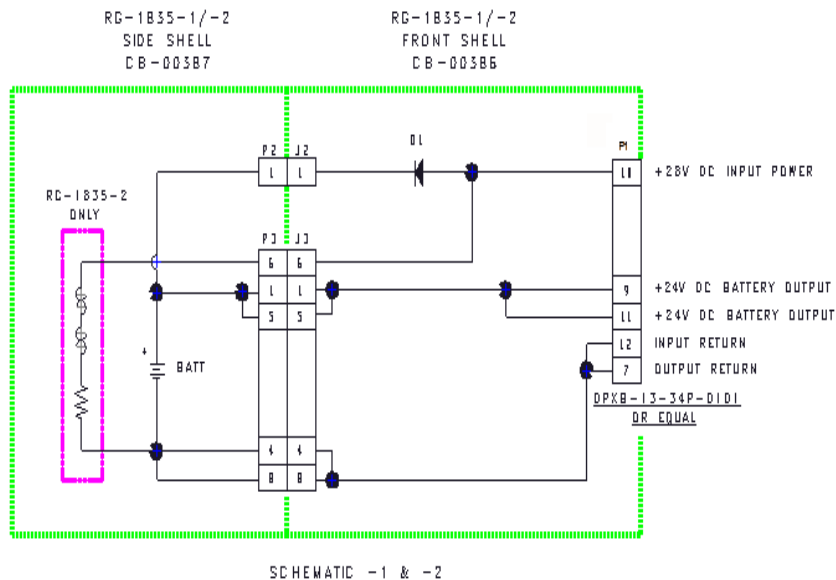
- 14. Storage Limitations:
 - a. Batteries are serviced and charged at the factory prior to shipment.
 - i. For maximum battery life, boost charge when open circuit voltage is below 25.0 volts for 24 volt batteries. The normal voltage for a fully charged battery is approximately 26 volts for 24 volt batteries.
 - ii. Batteries that have not been recharged when stored for long periods are to be conditioned (15.b) and tested (9) before being placed in service.

TITLE	Component Maintenance Manual, Concorde RG-1835 Series, Valve Regulated Lead-Acid Emergency Battery	DWG. NO.	5-0282	REV	
CAGE CODE	63017	SHEET	9 OF 13		

15. Boost charging procedure:
- i. Special tools: Advanced Power Products Alpha C-25 Battery Charger, P/N 4142; Advanced Power Products CA15-50 charger/analyzer, P/N 4159; or equal.
 - ii. Depending on the type of charger available, charge the battery Constant Potential (CP). Charge at 28.2 volts for 24 volt batteries until the charge current stabilizes for 1 hour.
- b. Conditioning procedure:
- Warning:** The battery must be removed from the aircraft prior to performing a conditioning charge.
- i. Special tools:
 - (1) Advanced Power Products Beta D-50 Aircraft Battery Analyzer P/N 4146 or 4159, or equal.
 - (2) Advanced Power Products Alpha C-25 Battery Charger P/N 4142 or 4159, or equal.

Warning: Contact Concorde for determination of equal test equipment. Some brands of battery chargers will destroy the battery.
 - ii. Procedure:
 - (1) Discharge the battery at the C1 rate to an end point voltage of 18 volts for 24 volt batteries.
 - (2) Constant current charge at the C1 /10 rate for 16 hours.
WARNING: This procedure may damage the battery if performed on a repetitive basis.
 - (3) Allow the battery to cool down for 8 hours.
 - (4) Retest the battery following the inspection procedure (9).

16. Schematic and Wiring diagram.



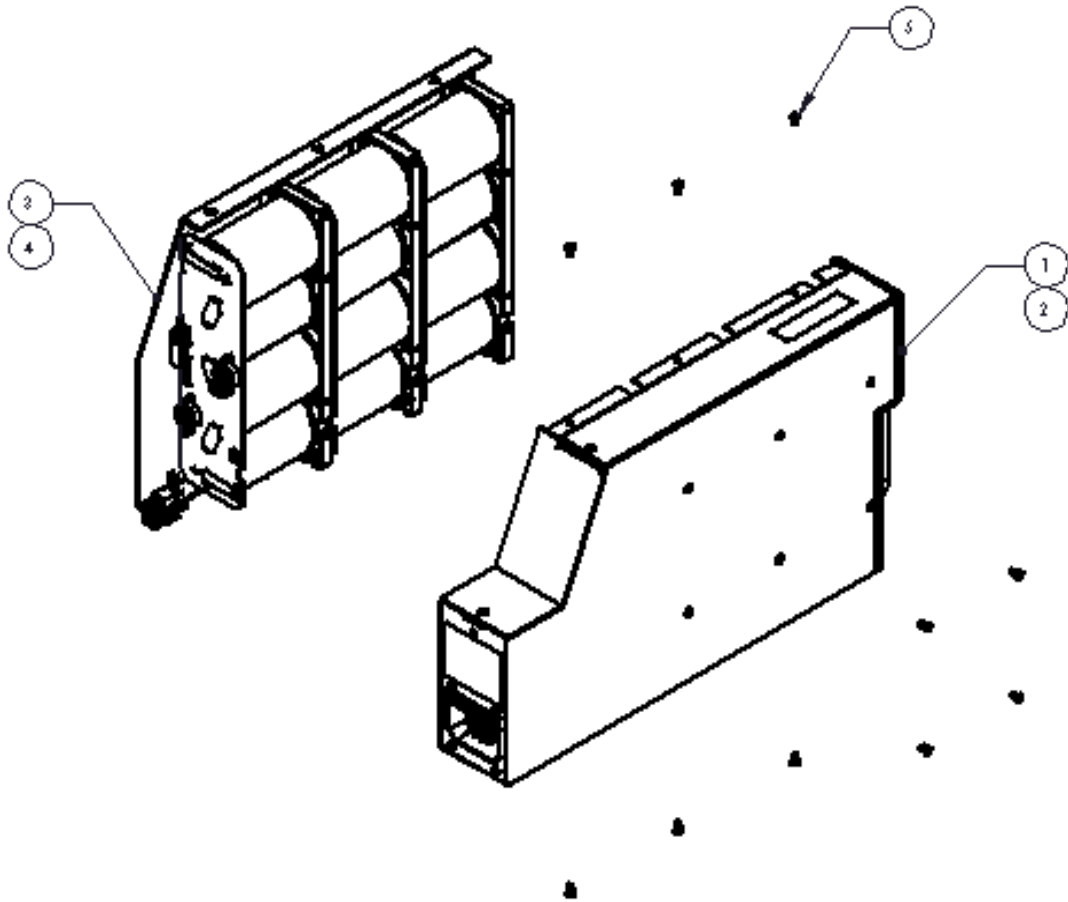
TITLE	Component Maintenance Manual, Concorde RG-1835 Series, Valve Regulated Lead-Acid Emergency Battery	DWG. NO.	5-0282	REV	
CAGE CODE	63017	SHEET	10 OF 13		

17. Disassembly:
- a. General: Disassembly is only required in order to change the side shell of the battery in the event of a battery failure.
 - b. Safety: The safety rules may differ from one country to another. Only local rules apply.
 - c. Equipment -
 - i. Standard tools - Phillips screwdriver
 - ii. Special Tools, Fixtures & Equipment: None
 - d. Procedure:
 - i. Remove the twelve (12) phillips screws attaching the side shell to the front shell. The six (6) screws on the side shell itself are not to be removed. Take care not to strip the Phillips head.
 - ii. Slide the side shell out of the front shell.
 - iii. Disconnect the quick disconnect connectors of the front shell wiring harness from the side shell connectors.
18. Assembly:
- a. Safety: The safety rules may differ from one country to another. Only local rules apply.
 - b. Equipment - Standard tools
 - i. Phillips screwdriver
 - c. Procedure:
 - i. Unpack the new or rebuilt front shell and inspect for damage.
 - ii. Connect the wiring harness of the front shell to the mating connector in the side shell. The connectors are keyed so that they will only mate in the proper orientation.
 - iii. Slide the side shell [] mating flanges into the front shell assembly [1] taking care not to pinch any of the wires.
 - iv. Apply Loctite no. 242 [8] to the threads of the twelve (12) phillips head screws [7].
 - v. Insert and tighten all six screws. Torque to 10 in-lbs (1.1 Nm).
 - vi. After replacing the battery pack, charge and test the assembly
 - vii. Enter the new S/N of the side shell in the aircraft log book with the date of replacement.
19. Disposal:
- a. Batteries contain lead, sulfuric acid, and other hazardous materials.
 - b. Lead acid batteries are recyclable.
CAUTION: Some aircraft batteries are encased in aluminum containers. These containers must be removed prior to recycling.
 - c. Dispose of all spent batteries in accordance local laws and regulations. See battery Material Safety Data Sheet (MSDS) for additional information.

TITLE	Component Maintenance Manual, Concorde RG-1835 Series, Valve Regulated Lead-Acid Emergency Battery	DWG. NO.	5-0282	REV	
CAGE CODE	63017	SHEET	11 OF 13		

20. Illustrated Parts List:

Figure and Item	Part Number	Airline Stock Number	Nomenclature	Eff Code	Units per Assy
01	RG-1835-1		RG-1835-1 Battery Assembly		
-1	CB-00386-1		RG-1835-1 Front Shell Assembly		1
-6	CB-00387-1		RG-1835-1/-2 Side Shell Assembly		1
-5	6432-1		Screw, 100° Flat Head, 4-40x1/4, SST		12
-8	9738-1		Loctite, Blue No. 242		AR
01	RG-1835-2		RG-1835-2 Battery Assembly (heated)		
-2	CB-00386-2		RG-1835-2 Front Shell Assembly		1
-6	CB-00387-2		RG-1835-1/-2 Side Shell Assembly		1
-5	6432-1		Screw, 100° Flat Head, 4-40x1/4, SST		12
-8	9738-1		Loctite, Blue No. 242		AR



Series, Valve Regulated Lead-Acid Emergency Battery	5-0282
CAGE CODE 63017	SHEET 12 OF 13

**CONCORDE BATTERY
CORPORATION**
2009 San Bernardino Road
West Covina, CA 91790
Tel. 626-813-1234

www.concordebattery.com

TITLE	Component Maintenance Manual, Concorde RG-1835 Series, Valve Regulated Lead-Acid Emergency Battery	DWG. NO.	5-0282	REV	
CAGE CODE	63017	SHEET	13 OF 13		