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COMPONENT MAINTENANCE MANUAL

CONCORDE TS-C15 TEMPERATURE SENSOR

THIS DOCUMENT SUPPLEMENTS THE APPLICABLE AIRCRAFT
 MAINTENANCE MANUAL (AMM) AND THE APPLICABLE COMPONENT
 MAINTENANCE MANUAL (CMM) FOR THE BATTERY.

TITLE Component Maintenance Manual, TS-C15 Temperature Sensor				DWG NO. 5-0631	REV A
CAGE CODE 63017	DRAWN JT 7/10/17	CHECKED PH 7/17/17	APPROVED JBT 7/17/17	ISSUED JG 2/16/18	SHEET 1 OF 7

RECORD OF REVISIONS

Revision	Description	Date	Approved
NC	Initial Release		JBT
A	Corrected inspection requirements in section 7.c	2/15/18	JBT

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1. Scope: This Maintenance Manual Supplement provides the data required to insure satisfactory operation, maintenance, and repair of Concorde TS-C15 Temperature Sensors.
2. Purpose: This manual sets forth the instructions for determining continued airworthiness of a Concorde TS-C15 Temperature Sensors.
3. Application: Provides a battery temperature signal to on-board battery chargers for adjusting the charging voltage as the battery temperature changes and an alert to the pilot in the event of a Hot battery.
4. 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 dispatch 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. **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.
 - e. **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.
 - f. **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.
 - g. **CAUTION:** To prevent damage to the connector, arc burns on the hands, or explosion, batteries should never be connected or disconnected with the charger or analyzer operating. Batteries must be connected or disconnected only when the ammeter reads Zero. Push the "OFF" switch to shut down the charger or analyzer.
 - h. **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.

5. Airworthiness Limitations: The TS-C15 Temperature sensors are required for correct operation of the associated battery charger. Therefore, the sensor needs to be operational for the battery installation to be airworthy. The sensor is required for the Minimum Equipment List (MEL).

6. Installation and Removal:
NOTE: The following instructions are generic. See airframe manufacturer's maintenance manuals or STC for instructions specific to a particular aircraft or battery model.
 - a. Installation Procedure:
 - i. Install temperature sensor on battery per Concorde Drawing 5-0117 (TS-C15).
 - ii. Install battery in accordance with the aircraft maintenance manual.
 - iii. Connect temperature sensor to the aircraft temperature monitoring system using the connector in the aircraft.
 - iv. Annotate log book with sensor serial number and date of installation.
 - b. Removal Procedure:
 - i. Disconnect temperature sensor from the aircraft temperature monitoring system.
 - ii. Remove battery in accordance with the aircraft maintenance manual.
 - iii. Remove temperature sensor from battery in reverse order of installation sequence shown on Concorde Drawing 5-0117 (TS-C15).

7. Inspection Requirements:
 - a. Inspection Frequency:
 - i. Scheduled inspections: Same as battery.
 - ii. Non-scheduled inspections: A check of the sensor is required if it appears to be malfunctioning.
 - b. Inspection Procedure - Thermistors:
 - i. Equipment required:
 - (1) Controlled temperature environment, maintained at not less than 20°C (68°F) and not more than 35°C (95°F).
 - (2) Calibrated digital multi meter (DMM), accurate to ± 0.2% or better.
 - (3) Calibrated digital thermometer, accurate to ± 0.2% or better.
 - ii. Place sensor in controlled temperature environment.
 - iii. Affix thermometer probe to sensor and allow to temperature to stabilize.
 - iv. The TS-C15 contains 2 identical thermistors. Measure the resistance between pins 9-10 and 9-12 of the sensor using the DMM.

- v. Measure the temperature of the sensor using the digital thermometer.
- vi. Look up the allowable resistance range at this temperature using Table 1.
- vii. If the resistance falls within the allowable range of Table 1, return sensor to service. If not, replace sensor.

Table 1. Allowable Resistance Range vs Temperature

Temp. °C	Temp. °F	Minimum (ohms)	Maximum (ohms)
20.0	68.0	2866	3012
21.0	69.8	2877	3025
22.0	71.6	2889	3037
23.0	73.4	2901	3049
24.0	75.2	2913	3063
25.0	77.0	2925	3075
26.0	78.8	2937	3087
27.0	80.6	2948	3100
28.0	82.4	2961	3113
29.0	84.2	2974	3126
30.0	86.0	2985	3139
31.0	87.8	2998	3152
32.0	89.6	3010	3164
33.0	91.4	3023	3178
34.0	93.2	3035	3191
35.0	95.0	3047	3203

- c. Inspection procedure - Thermal switch (TS1):
 - i. Place digital thermometer probe in thermal contact with Temperature sensor TS-C15.
 - ii. Use a heat gun to increase the temperature of TS1 above 76.6°C (170°F).
 - iii. Measure resistance between pins 9-7.
 - iv. If the measured resistance is less than 1 megohm, reject the sensor.
 - v. Use freeze spray to decrease the temperature of TS1 below 65.5°C (150°F).
 - vi. Measure the resistance between pins 9-7.
 - vii. If the measured resistance is more than 1 ohm, reject the sensor.

8. Troubleshooting:

Symptom	Probable Cause	Corrective Action
No temperature reading (Infinite resistance across pins 9-10 or 9-12)	Sensor failure	Replace sensor
Sensor out of range	Sensor failure	Replace sensor
Thermal switch fails to open on rising temperature (>170F)	Switch failure	Replace sensor
Thermal switch fails to close on falling temperature (<150F)	Switch failure	Replace sensor

- 9. Replacement / Repair:
 - a. The temperature sensor is non-repairable.
 - b. Replacement may be made by removing and installing a new temperature sensor in accordance with the instructions of this supplement.
- 10. Personnel and Facilities:
 - a. The procedures in this maintenance manual must be performed by a certified aircraft maintenance technician at an FAA-authorized repair station or Concorde-authorized battery service center.
- 11. Storage Limitations: None.
- 12. Disposal: Temperature sensor contains no hazardous materials and may be disposed of in the regular trash.