

SERVICE LETTER

In-Service Engineering

CRJ700/900/1000-SL-30-011 Rev D

ATA: 3012

DATE: 23 Dec. 2014

SUBJECT: Troubleshooting repeated or persistent L/R WING A/I–Caution Messages (with no associated Maintenance Diagnostic Computer (MDC) message)

MODEL: CL-600-2C10 and or CL-600-2D24 and or CL-600-2D15

APPLICABILITY: All

PURPOSE:

Provide guidance to Maintenance Technicians and Flight Crews for “L or R, or L&R, WING A/I” caution message posting at low power settings.

This service letter provides the CRJ700/705/900 operators with;

- Guidance/awareness to avoid unnecessary troubleshooting of “L/R WING A/I” caution messages (with no associated MDC message) posted on ground or during flight at low power settings,
- Optimized troubleshooting guidance for aircraft with persistence reports after following the Aircraft Flight Manual (AFM)/ Quick Reference Handbook (QRH) procedures.

DISCUSSION:

The primary function of the “L/R WING A/T” caution message is to identify a possible low heat condition, which is determined when either the left, right or both of the outboard wing anti-ice temperature sensors (WAITS) detects a low heat condition.

When the above caution message occurs, the crew shall follow related AFM and QRH procedures. Note that this message should disappear if the low heat condition goes away (when power settings are above 75% N2). In these cases no maintenance action is required.

Reports have been received of persistence of the “L/R WING A/T” caution messages after following AFM guidance.

A “L/R WING A/T” caution message is posted on EICAS if any of the following fault conditions occurs and “WAI ON”:

1. A Low Heat condition in the left and/or right slat (no MDC msg occurs)
2. Insufficient thermal compound on the wing anti-ice temperature sensor (WAITS) leading to a false reading (no MDC msg occurs)
3. A left or right wing anti-ice valve fails closed (MDC msg occurs)
4. Both channels of either the L or R inboard WAITS fail (MDC msg occurs)
Note: Message may have extinguished when crew selected Wing Anti-Ice Cross-Bleed Switch from the non-affected side (AFM and QRH).
5. Both channels of the AILC fail (MDC msg occurs)
6. The harnesses and/or splices of any of the WAITS are damaged (possible MDC msg occurs,)

For any of the fault conditions for which an MDC message is posted, maintenance should troubleshoot as per the Fault Isolation Manual (FIM).

Investigation Analysis

Conditions that drives a “L/R WING A/T” caution message with no associated MDC message;

Low Heat condition (Hysteresis effect) for the AILC, P/N GG670-80012-5 and GG690-80012-1:

If the OB WAITS measures a temperature less than 30 °C for more than 30 sec (slat retracted), then the AILC software will post a L or R WING A/T”

caution message and the L or R affected slat will be shown amber on the EICAS Anti-ice synoptic page. This condition will reset only if the temp goes above 34.4 °C.

If the OB WAITS measures a temperature momentarily goes below 30 °C and stays between 30 °C and 34.4 °C for more than 30 sec (slat retracted), then the AILC hardware will post a L & R WING A/I” caution message and both slats will be shown amber on the EICAS Anti-ice synoptic page. This condition will reset only if the temp goes above 34.4 C. A similar condition exists for slat extended except the temperature range is 40 and 44.4 °C.

Some of the other possible causes identified, which could lead to this WAI Caution with no MDC message condition, are;

- Outboard sensor correctly reading less than 34.4 °C (slat retracted) or 44.4 °C (slat extended) with WAIV correctly regulating temperature to the inboard sensor, but the valve is in a low flow regulation, and the aircraft is operating in ambient conditions around freezing during precipitation with WAI ON. This message would likely go away after throttle adjustment.
- Sensor installation suspected, particularly surface contact or thermal compound condition
- A minor leak along the piccolo tubes or tube slat inter-connections. Note that this may also be in combination with a DUCT MON(s) fault or ANTI-ICE DUCT (w) message. This message would likely go away after throttle adjustment.

BOMBARDIER ACTION:

Bombardier will initiate an update to the FIM to include the instructions of this troubleshooting guide.

Liebherr Aerospace introduced the common anti-ice leak controller (AILC) P/N GG690-80012-3, one feature of this box is to reduce the number of L/R WING A/I” caution message due to low heat. Although there has been reduction in the number of messages, operators are still reporting this message in service. Bombardier and Liebherr Aerospace will jointly be investigating this and other features of the AILC. For more information on this issue, refer to the Action Register # 546.

OPERATOR ACTION:

In order to avoid unnecessary removals and/or troubleshooting of the wing anti-ice system components, it is recommended that operators provide this information to the appropriate flight crew and maintenance personnel in order to promote awareness of the possible “L/R WING A/I” caution message with no associated MDC message.

Operators are recommended to follow the guidance of the “troubleshooting guide” attached in the appendix to this Service Letter, when troubleshooting “L/R WING A/I” caution messages with no associated MDC message.

When removing and installing WAITS as per AMM (task 30-12-06-000-801-A01, 30-12-06-400-801-A01) for removal and installation of IB WAITS, and per AMM (task 30-12-08-000-801-A01, 30-12-08-400-801-A01 and task 30-12-08-350-801-A01) for the removal and installation of the OB WAITS), operators are advised to pay attention to the following instructions;

- When installing a WAITS make sure that an excess of thermal compound squeezes out from around the full perimeter of the sensors. Remove the excess thermal compound; however make sure that a small amount remains visible on all the edges of the sensor. Refer to Figure 1, Wing Anti-Ice Temperature Sensor Installation
- Torque the screws on the sensors from 15 to 20 lbf-in (1.70 to 2.26 N-m).

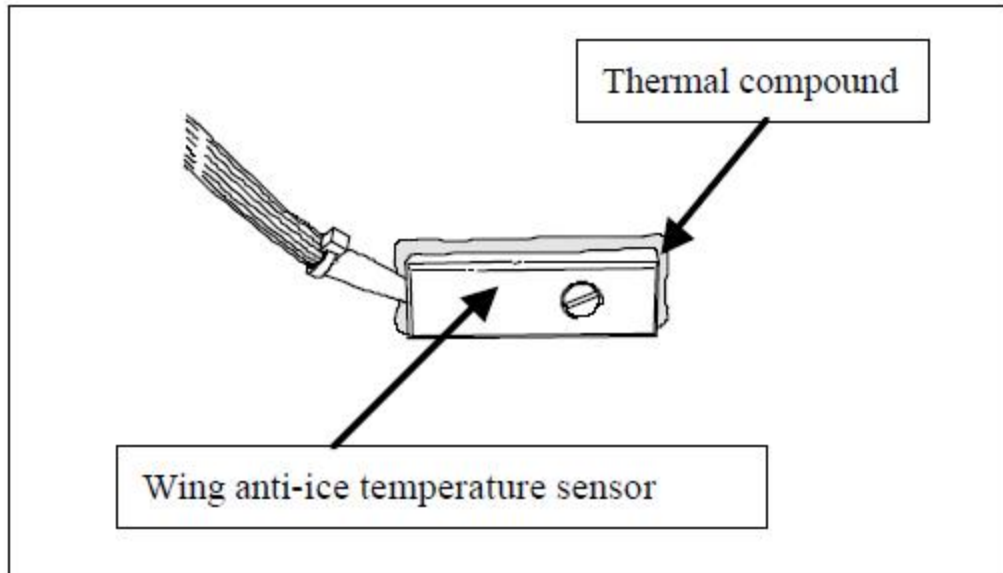


Figure 1. Wing Anti-Ice Temperature Sensor Installation

Please direct responses and inquiries regarding the content of this Service Letter to your Bombardier Aerospace Regional Aircraft Field Service Representative or the Technical Help Desk in Montreal at telephone number (514) 855-8500 or facsimile (514) 855-8501 or e-mail thd.crj@aero.bombardier.com

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APPENDIX

Troubleshooting Guide - L/R WING A/I – (Caution) message with no associated MDC Message

Use this guide whenever the “L/R WING A/I” caution message occurs persistently in flight or on ground to return the aircraft back to service.

Note: The FIM must be consulted before using this procedure.

Before doing this procedure, refer to the Standard Aircraft Configuration for Maintenance, AMM task 12-00-00-867-801 and Electrical/electronic Safety Precautions, AMM task 24-00-00-910-801.

Pre-Conditions:

1. On the MDC, select LRU TEST.
2. Select AILC.
3. Select TEST.
4. Select WING A/ICE TEST.
5. Select SELFTEST.
6. RUN SELFTEST.
7. Position the aircraft nose into the wind if necessary (so that both wings will have the same ambient conditions).
8. Make sure that the slats and flaps are extended to a take-off setting.
9. On the BLEED AIR panel, set the WING A/I CROSS BLEED to **NORMAL**.
10. On the ANTI-ICE panel, set the WING switch to **OFF**.
11. On the EICAS synoptic page, display the ANTI-ICE page.
12. On the MDC, display system parameter page.
13. Record OAT.
14. Do a WING A/ICE TEST, select WING LEADING EDGE TEMPERATURE and record the following:

AILC Self test	CH A TEMP	CH B TEMP
L IB TEMP SNSR		
R IB TEMP SNSR		
L OB TEMP SNSR		
R OB TEMP SNSR		

15. Compare this temperature with the OAT, if any of the sensors are out of range compared to the others; replace the sensor(s).

16. Verify that the temperature difference between channels A & B of the same sensor is being within 5 °C. If not, replace the sensor(s).
17. Operate the L and R engines, ensure the throttles are at the idle position or greater (preferably at N2 green band).
18. On the WING-ICE panel, select the WING switch ON.
Note: It is possible that during this procedure the L/R WING A/I caution messages may be posted, if there are any other message(s) stop this procedure and troubleshoot WAI system as per FIM and MDC.
19. Upon selection WING switch ON, WAIVs are operational and shown open on synoptic page, flow lines show green.
20. After 3 minutes, record the following parameters on the Self-Test “WING LEADING EDGE TEMPERATURE” from the MDC.

AILC Self test	CHA TEMP	CHB TEMP
L IB TEMP SNSR		
R IB TEMP SNSR		
L OB TEMP SNSR		
R OB TEMP SNSR		

21. Verify that the temperature difference between channels A & B of the same sensor are being within 5 °C (with engines on and aircraft facing into wind if necessary). If not replace the sensor(s).
Note: The regulating temperature for L IB and R IB WAITS is 80 °C +/- 9 °C (Continue with this procedure even if the temperature is out of this range. Note the temperatures).
22. On the BLEED AIR panel, select the WING A/I CROSS BLEED to FROM RIGHT, wait for 3 minutes
23. Record the following from the System Parameter Page

MDC System Parameters	TEMP
L OB L/E TEMP	
L IB L/E TEMP	
R OB L/E TEMP	
R IB L/E TEMP	

24. Verify that the temperature of R IB WAITS is greater than or equal to the L IB WAITS. If not replace the R IB WAITS, and re-perform this procedure again. If the same result occurs, then replace L IB WAITS.
25. On the BLEED AIR panel, select the WING A/I CROSS BLEED to **FROM LEFT**, wait for 3 minutes.
26. Record the following from the System Parameter Page

MDC	System	TEMP
Parameters		
L OB L/E TEMP		
L IB L/E TEMP		
R OB L/E TEMP		
R IB L/E TEMP		

27. Verify that the temperature of L IB WAITS must be greater than or equal to the R IB WAITS. If not replace the L IB WAITS, and re-perform this procedure again. If the same result occurs then, replace R IB WAITS.

If any of the WAITS consistently fails this test, then do a detailed inspection of the wing anti-ice telescopic ducts and flexible joints of that wing. Refer to TASK 30-11-00-200-801.