



# AIRWORTHINESS DIRECTIVE

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*This Airworthiness Directive (AD) is issued pursuant to Canadian Aviation Regulation (CAR) 521.427. No person shall conduct a take-off or permit a take-off to be conducted in an aircraft that is in their legal custody and control, unless the requirements of CAR 605.84 pertaining to ADs are met. Standard 625 - Aircraft Equipment and Maintenance Standards Appendix H provides information concerning alternative means of compliance (AMOC) with ADs.*

**Number:**

CF-2023-77

**Effective Date:**

21 December 2023

**ATA:**

27

**Type Certificate:**

A-234

**Subject:**

Flight Controls – Horizontal Stabilizer – Unintended Horizontal Stabilizer Motion

**Applicability:**

Bombardier Inc. model BD-100-1A10 aeroplanes, serial numbers 20003 through 20500 and 20501 through 20936.

**Compliance:**

As indicated below, unless already accomplished.

**Background:**

There have been several in-service events where following a STAB TRIM FAULT advisory message and an Auto-Pilot disconnect, both pilot and co-pilot commands to trim the horizontal stabilizer nose-up resulted in a nose-down movement of the horizontal stabilizer.

In some events, the horizontal stabilizer reached the full aeroplane nose-down trim position before the crew recognized the nature of the problem, which resulted in increased crew workload and reduced safety margins.

If not correctly managed by the flight crew, an uncommanded horizontal stabilizer motion could result in the stabilizer reaching its full travel position, and consequently, the crew may not be able to regain control of the horizontal stabilizer, which would result in reduced controllability of the aeroplane and high control forces.

TCCA issued CF-2022-03 as a mitigating action to require the use of an Expanded Pitch Trim Pre-Flight Check, the use of Trim Malfunction procedures, the revision of the AP STAB TRIM FAIL caution and STAB TRIM FAULT advisory procedures to address this unsafe condition.

During the ongoing investigation by Bombardier and the supplier of the horizontal stabilizer pitch / roll trim switch (trim switch), Bombardier determined that one of the springs within the trim switch had failed. The supplier of the spring was changed in 2019. The majority of observed trim switch failures occurred in trim switches that were manufactured after 2019. Consequently, TCCA issued AD CF-2022-24 to remove and replace the defective springs in the affected fleet.

At that time, Bombardier also found an existing issue with the trim switch wiring installation. The problem with the trim switch wiring was identified as the main cause of the in-service unintended horizontal stabilizer motion events. On this aircraft, manual trim is accomplished by both enabling the trim function by pressing down on the trim switch, and also moving the switch up, down, left, or right, as required to command trim in pitch or roll. The current wiring of the system is such that an enable signal originating from either the pilot-side or the copilot-side trim switch will enable both sides. By design, the pilot-side trim commands have priority over the copilot-side trim commands. Thus, if trim is enabled via the copilot-side trim switch, and the pilot-side switch malfunctions, it is possible for trim to move uncommanded or opposite to the intended direction.

This AD requires changes to the trim switch wiring installation to address the unsafe condition ensuring that the pilot and co-pilot trim Enable/Arm switch signals remain segregated in both roll and pitch axes.

**Corrective Actions:**

**Horizontal Stabilizer Pitch Trim Switches Enable Rewire**

- A. Within 3000 hours air time or 5 years, whichever occurs first, from the effective date of this AD, modify the electrical circuitry connecting the trim switches to the aileron trim actuator and to the Horizontal Stabilizer Electronic Control Unit (HSTECU) in accordance with Section 2.B. of the Accomplishment Instructions of the applicable Bombardier Service Bulletin (SB) listed in Table 1 below.
- B. Following completion of paragraph A of this AD, test the aileron and horizontal stabilizer trim systems in accordance with section 2.C. of the accomplishment Instructions of the applicable SB listed in table 1 below.

**Table 1 – Applicable Bombardier SBs**

<b>Bombardier SB</b>	<b>Aeroplane Serial number</b>
100-27-22, Basic Issue, MODIFICATION – PITCH TRIM SYSTEM – INSTALLATION OF PITCH/ROLL TRIM SWITCH RELAYS, dated 29 December 2022, or later revisions approved by Transport Canada Chief, Continuing Airworthiness.	BD-100-1A10 aircraft, Serial No. 20003 to 20500.
350-27-012, Basic Issue, MODIFICATION – PITCH TRIM SYSTEM – INSTALLATION OF PITCH/ROLL TRIM SWITCH RELAYS, dated 29 December 2022, or later revisions approved by Transport Canada Chief, Continuing Airworthiness.	BD-100-1A10 aircraft, Serial No. 20501 to 20936

**Authorization:**

For the Minister of Transport,

*ORIGINAL SIGNED BY*

Jenny Young  
Chief, Continuing Airworthiness  
Issued on 7 December 2023

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