



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

May 18, 2021

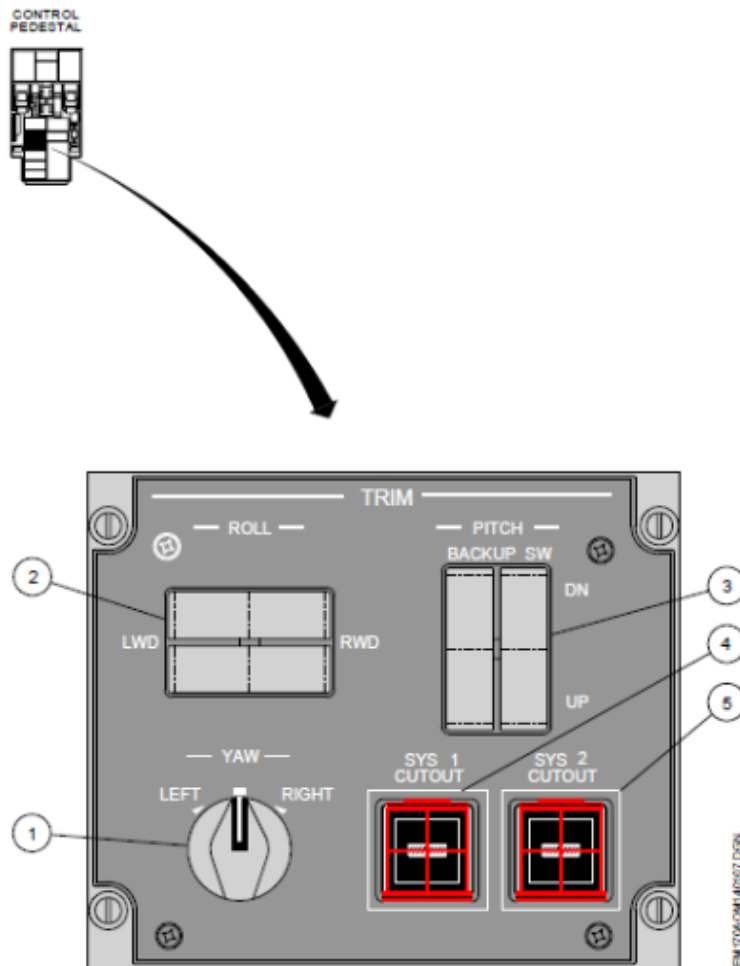
Attachment 5 - Embraer AOM Pitch Trim {Excerpts}

OPERATIONAL FACTORS

DCA20IA014



TRIM PANEL



1 - YAW TRIM KNOB (SPRING-LOADED TO NEUTRAL)

- Actuates the yaw trim to left or right.
- Manual pilot trim commands are limited to 3 s.

2 - ROLL TRIM SWITCH (SPRING-LOADED TO NEUTRAL)

- Actuates the roll trim to left or right.

14-08-05

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**EMBRAER 170
175**

AIRPLANE OPERATIONS MANUAL

SYSTEMS DESCRIPTION
Flight Controls

- Manual pilot trim commands are limited to 3 s.

3 - PITCH TRIM BACK-UP SWITCH (SPRING-LOADED TO NEUTRAL)

- Operation of the switch while the autopilot is engaged causes the autopilot to disengage.
- Manual pilot trim commands are limited to 3 s.

4 - PITCH TRIM SYS 1 CUTOUT BUTTON (GUARDED)

PUSH IN: disables the HS-ACE channel 1.
PUSH OUT: enables the HS-ACE channel 1.

5 - PITCH TRIM SYS 2 CUTOUT BUTTON (GUARDED)

PUSH IN: disables the HS-ACE channel 2.
PUSH OUT: enables the HS-ACE channel 2.



STABILIZER TRIM

MANUAL TRIM

The manual trim is commanded through switches installed on the control columns or a backup switch located on the main pedestal. Signals from either the control columns switches or the backup switch controls the electric trim motor.

The backup trim switch and the control wheel trim switches are dual split switches which have a 7 s time limitation when actuated separately. If only one half of the switch is actuated for more than 7 s, that switch is automatically deactivated. The aural warning "TRIM" triggers for 7 s when the control wheel trim or backup trim switches have failed or when only half of switch is pressed. If the failure persists for more than 7 s, the aural message is deactivated and the applicable advisory pitch trim switch fail message is displayed on EICAS.

In order to avoid a possible pitch trim runaway condition, manual pilot trim commands are limited to 3 s. After the control wheel trim or backup trim switches have both halves pressed for more than 3 s, the timer stops the horizontal stabilizer control surface movement and if the switch remains pressed, the aural warning "TRIM" triggers. When the switch is no more pressed, the aural warning stops. In case of stick shaker activation, the HS-ACE is prevented from responding to any pitch trim commands by a stick shaker signal from the AFCS.

Stabilizer Trim priority Logic

The HS-ACE responds to all trim commands with the following priority:

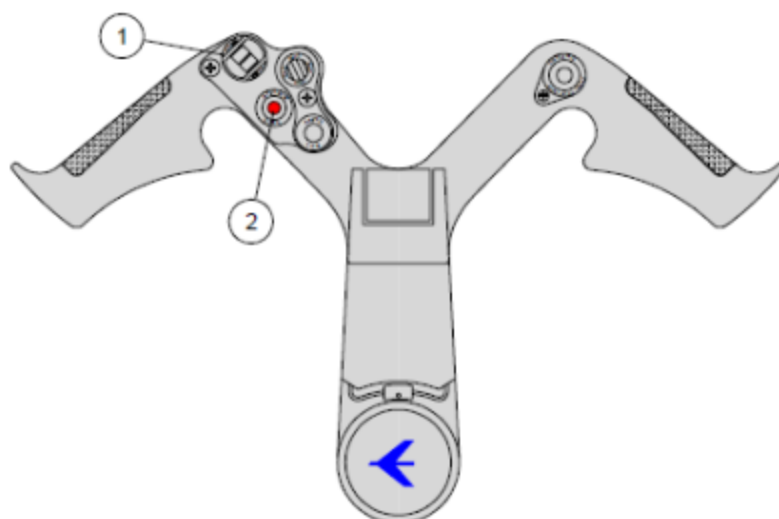
1. Backup switches.
2. Captain.
3. First Officer.
4. FCM (auto-trim) commands.

AUTOPILOT TRIM

The autopilot can directly operate the electric trim motor when the autopilot is engaged. If the autopilot trim function is inoperative, the autopilot cannot be engaged. If this function is lost during autopilot operation, the autopilot will disengage.



CONTROL WHEEL



EMB170/COM1401034.DGN

1 - PITCH TRIM SWITCH (SPRING-LOADED TO NEUTRAL)

- Trims the airplane when the autopilot is not engaged.
- If only half of the switch is actuated for more than 7 s, the switch will be automatically deactivated.
- Manual pilot trim commands are limited to 3 s.

NOTE: Captain's pitch trim switch actuation has priority over the first officer's.

2 - AP/TRIM DISCONNECT BUTTON

Trim

- Disables both HS-ACE channels when the switches remain pressed, thus disconnecting the autopilot and stopping any active trim command.
- Releasing the button will activate the channel again.

Autopilot

- Refer to Automatic Flight.

EMERGENCY AND ABNORMAL PROCEDURES

NON ANNUNCIATED

PITCH TRIM RUNAWAY

AP/TRIM DISC Button..... PRESS AND HOLD
Pitch Trim SYS 1 and SYS 2
CUTOUT Buttons..... PUSH IN

AP/TRIM DISC Button..... RELEASE

WARNING: DO NOT OPEN THE SPEEDBRAKE.

NOTE: Continuous turns helps to alleviate excessive pitch up tendencies.

Prepare to overcome unwanted pitch change:

Pitch Trim SYS 1 CUTOUT Button..... PUSH OUT
PITCH TRIM Switch..... ACTUATE

PITCH TRIM NORMAL?

No

Yes

NOTE: Manual trim command through Pitch Trim Switches is available with at least one functional HS-ACE channel. With one HS-ACE channel available expect the following differences on the pitch trim indication on EICAS:

- Pitch trim readout display showing amber dashes.
- Pitch trim scale without the solid green pointer.

END

Pitch Trim SYS 1 CUTOUT Button..... PUSH IN
Pitch Trim SYS 2 CUTOUT Button..... PUSH OUT

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- Pitch trim scale without the solid green pointer.

END