

12.1 AEROPLANE GENERAL

12.1.1 Introduction

The Dash 8-Q400 is a high wing aeroplane manufactured by Bombardier Aerospace with shared interests from several partners (Figure 12.1-1). It is powered by two 5071 shaft horsepower PW 150A turboprop engines. Each engine drives a six bladed propeller. The Dash 8 is a two pilot transport category aeroplane approved for instrument flight and in SAS versions approved for operation to a maximum altitude of 25,000 feet.

In SAS versions the aeroplane seats from 58 to 72 passengers and two cabin crew members in addition to the pilot, copilot, and flight observer. In SAS version It has a maximum take-off mass of:

- 27987 kg (Basic Gross Mass)
- 28998 kg (Intermediate Gross Mass)
- 29257 kg (High Gross Mass)

The aeroplane has an Active Noise and Vibration Suppression (ANVS) system.

12.1.2 General

The fuselage (Figure 12.1-1) is constructed in three main parts:

- Forward
- Center
- Aft

The forward section includes the flight deck, which has the majority of controls, instruments, and indications. Circuit breaker panels are located on the flight deck aft bulkhead, and behind the pilot's and copilot's seats.

There is a forward baggage compartment on the right forward part of the fuselage, and an aft baggage compartment forward of the aft pressure bulkhead. Both baggage doors open outwards and can only be opened from the outside. The passenger compartment doors and one type II/III exit can be opened from either the inside or outside.

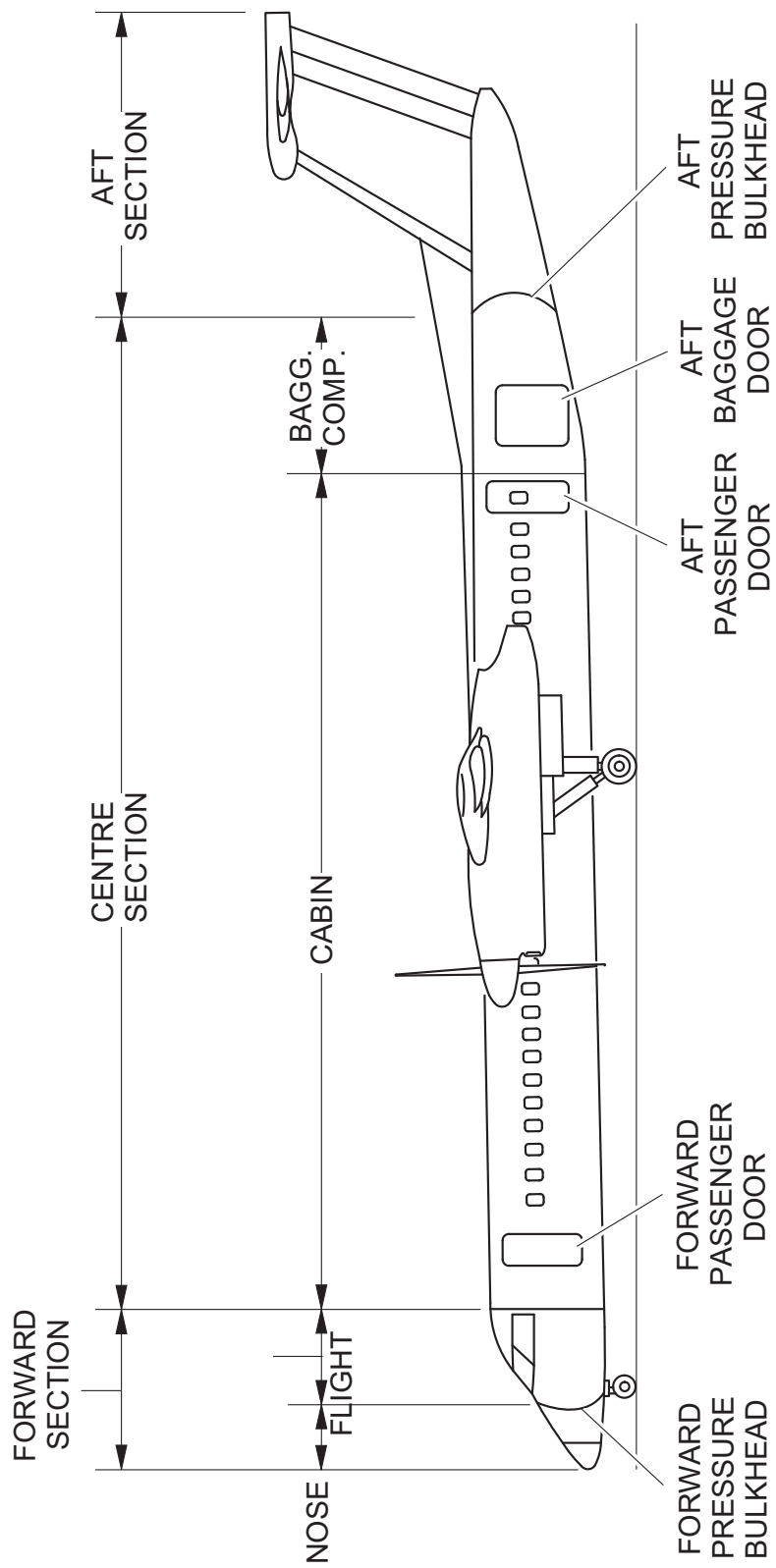
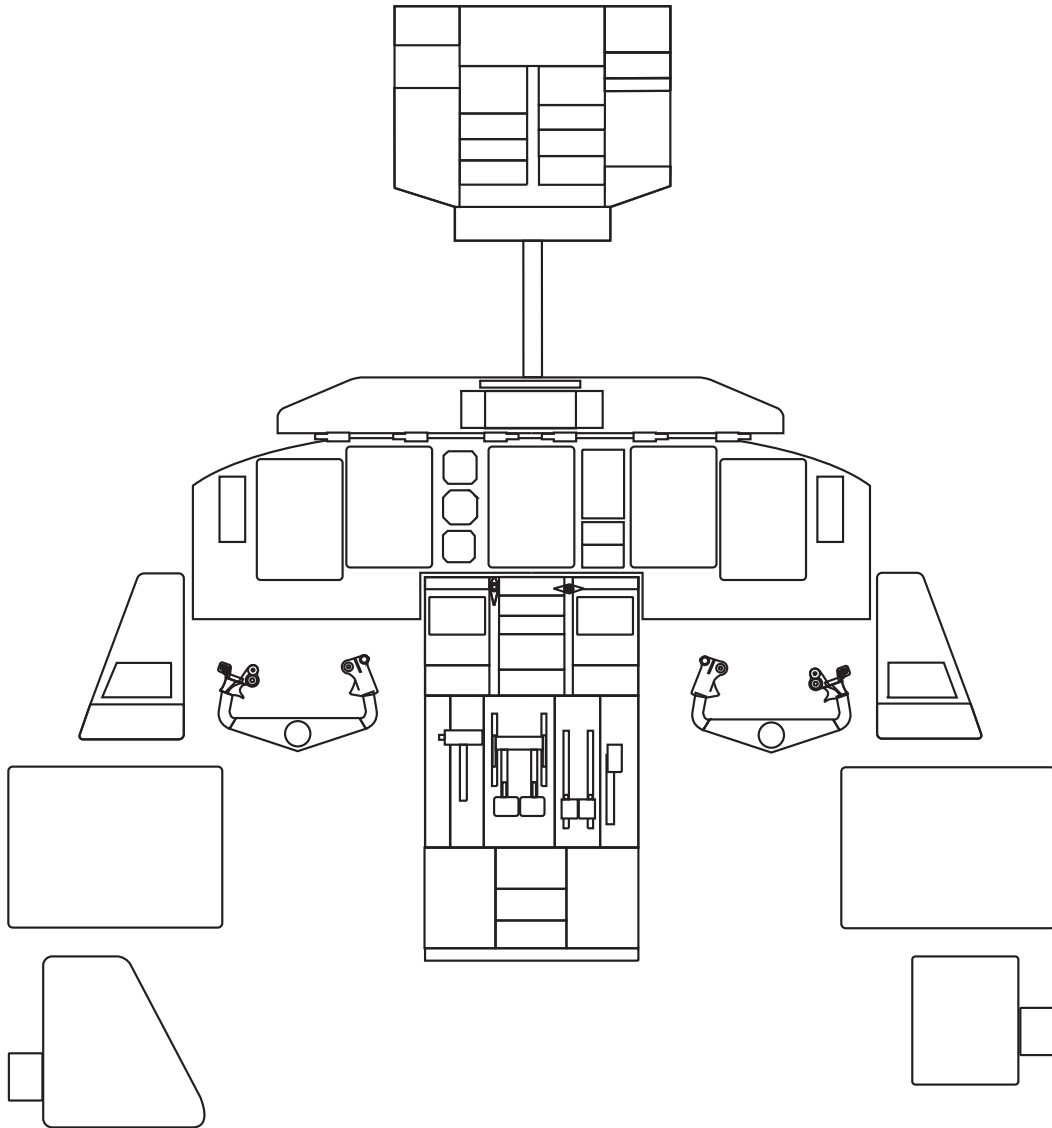
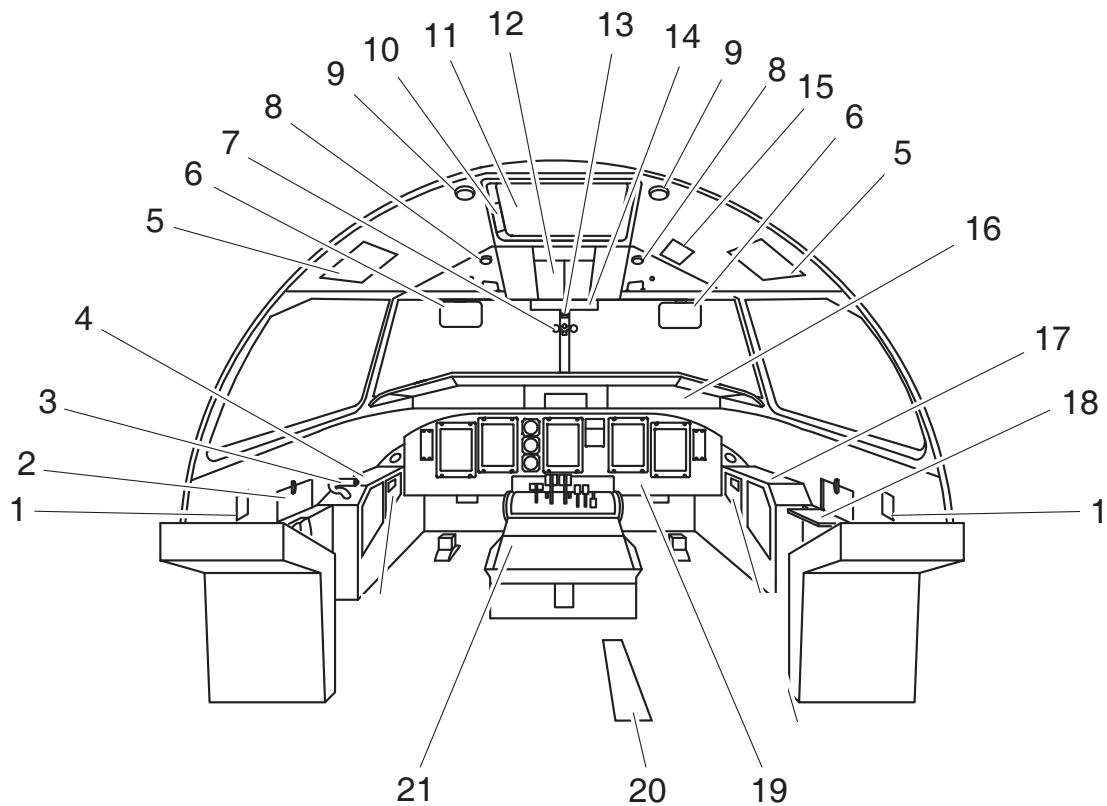


Figure 12.1-1 Fuselage Sections

12.1.3 Controls and Indications - General

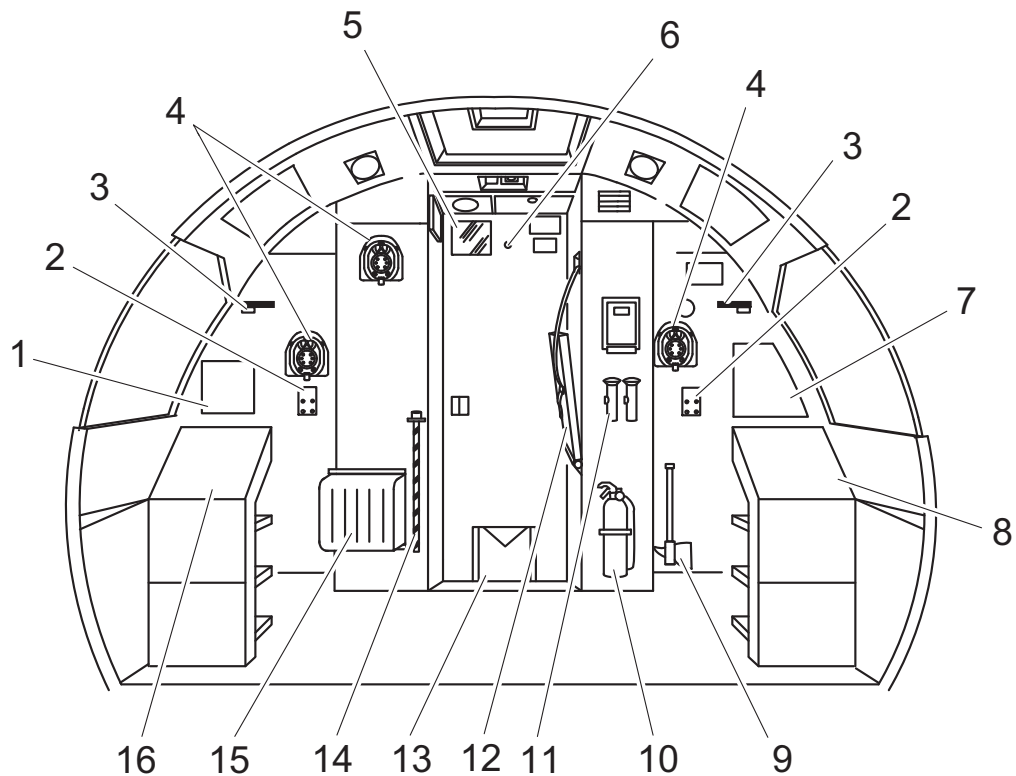




LEGEND

- | | |
|------------------------------------|--|
| 1. Flow Control Levers. | 12. Overhead Console. |
| 2. Pilot's Map Table (Closed). | 13. Standby Compass. |
| 3. Steering Hand Control. | 14. Caution & Warning Panel. |
| 4. Pilot's Side Panel. | 15. Landing Gear Alternate Release Door. |
| 5. Life Vest Stowage. | 16. Glareshield. |
| 6. Sun Visor. | 17. Copilot's Side Panel. |
| 7. Eye Level Indicator. | 18. Copilot's Map Table (Open). |
| 8. Utility Light. | 19. Instrument Panel. |
| 9. Dome Light. | 20. Landing Gear Alternate Extend Door. |
| 10. Emergency Escape Rope Storage. | 21. Centre Console. |
| 11. Emergency Exit. | |

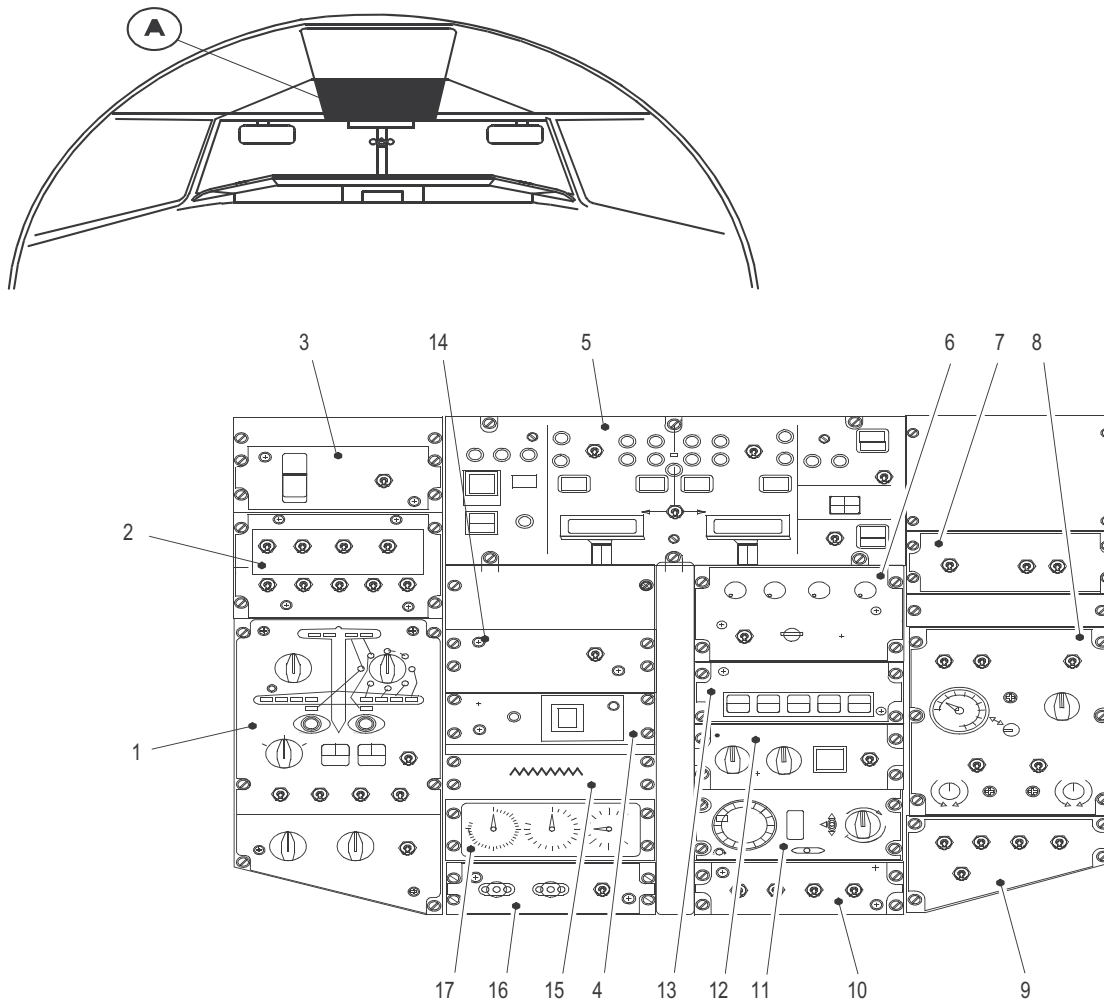
Figure 12.1-2 Flight Deck and Equipment Layout



LEGEND

1. Variable Frequency AC Circuit Breaker Panel.
2. Headset Jacks.
3. Circuit Panel Light.
4. Oxygen Mask.
5. Mirror.
6. Viewer.
7. Avionics Circuit Breaker Panel.
8. Left DC Circuit Breaker Panel.
9. Fire Axe.
10. Fire Extinguisher.
11. Flashlights.
12. Observer's Seat.
13. Weight and Balance Manual.
14. Landing Gear Emergency Extension Handpump Handle.
15. Protective Breathing Equipment (PBE).
16. Right DC Circuit Breaker Panel.

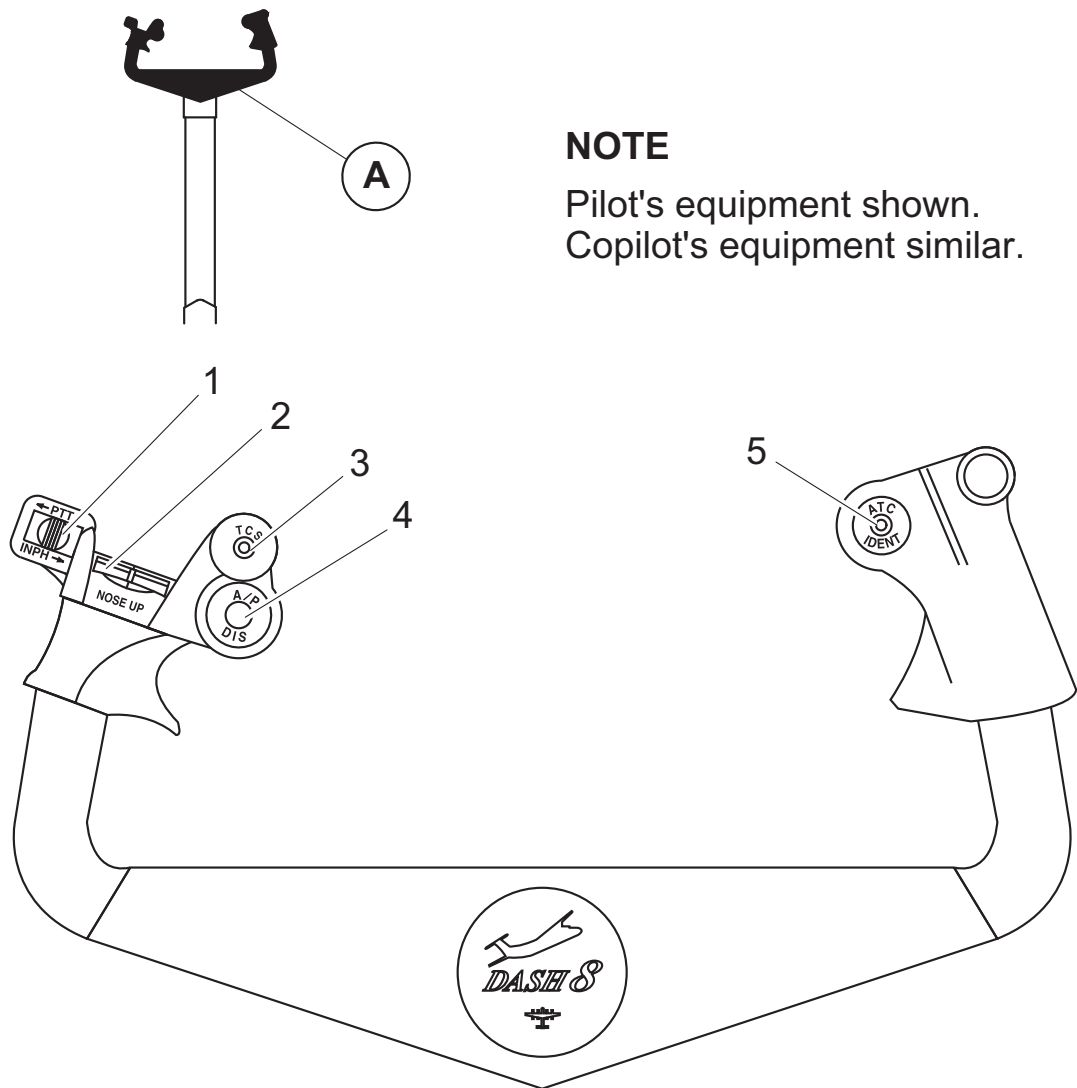
Figure 12.1-3 Aft Flight Deck and Equipment Layout



LEGEND

- | | |
|---|------------------------------------|
| 1. Ice protection panel. | 10. Exterior lights panel (Right). |
| 2. DC Control panel. | 11. Cabin altitude panel. |
| 3. Audible evacuation panel. | 12. Engine start panel. |
| 4. Flight data recorder. | 13. APU Panel. |
| 5. Fire protection panel. | 14. PFD Altimeter units panel. |
| 6. Panel lighting panel. | 15. Altitude/differential placard. |
| 7. AC Control panel. | 16. Exterior lights panel (Left). |
| 8. Air conditioning panel. | 17. Cabin altitude indicator. |
| 9. Emer. lights (Caution/Advisory) panel. | |

Figure 12.1-4 Overhead Console



LEGEND

1. Transmit/Interphone PTT Switch.
2. Elevator Trim Switch.
3. Tactile Control Steering Pushbutton.
4. Autopilot Disengage Pushbutton.
5. ATC Ident Pushbutton.

Figure 12.1-5 Handwheel

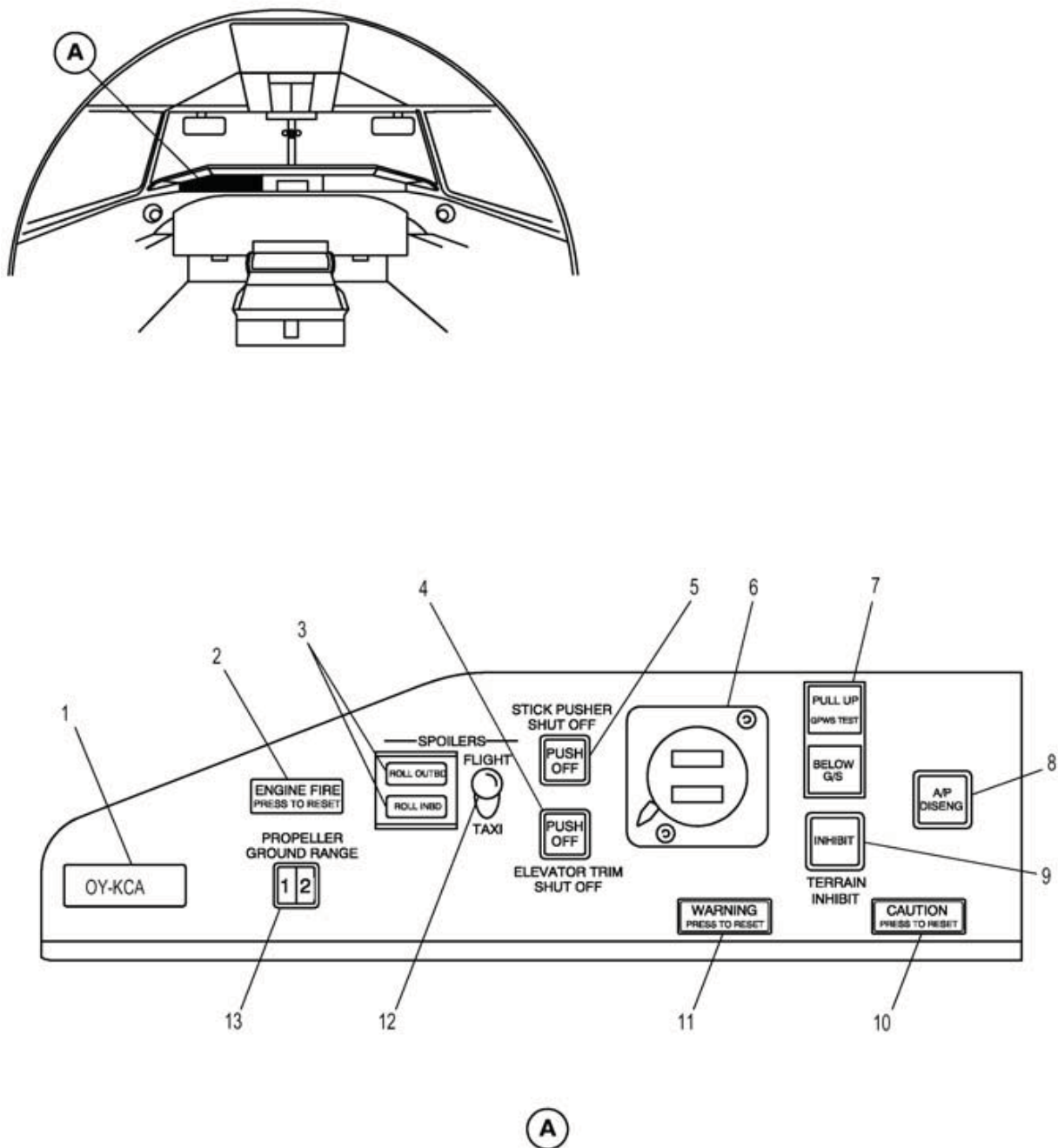
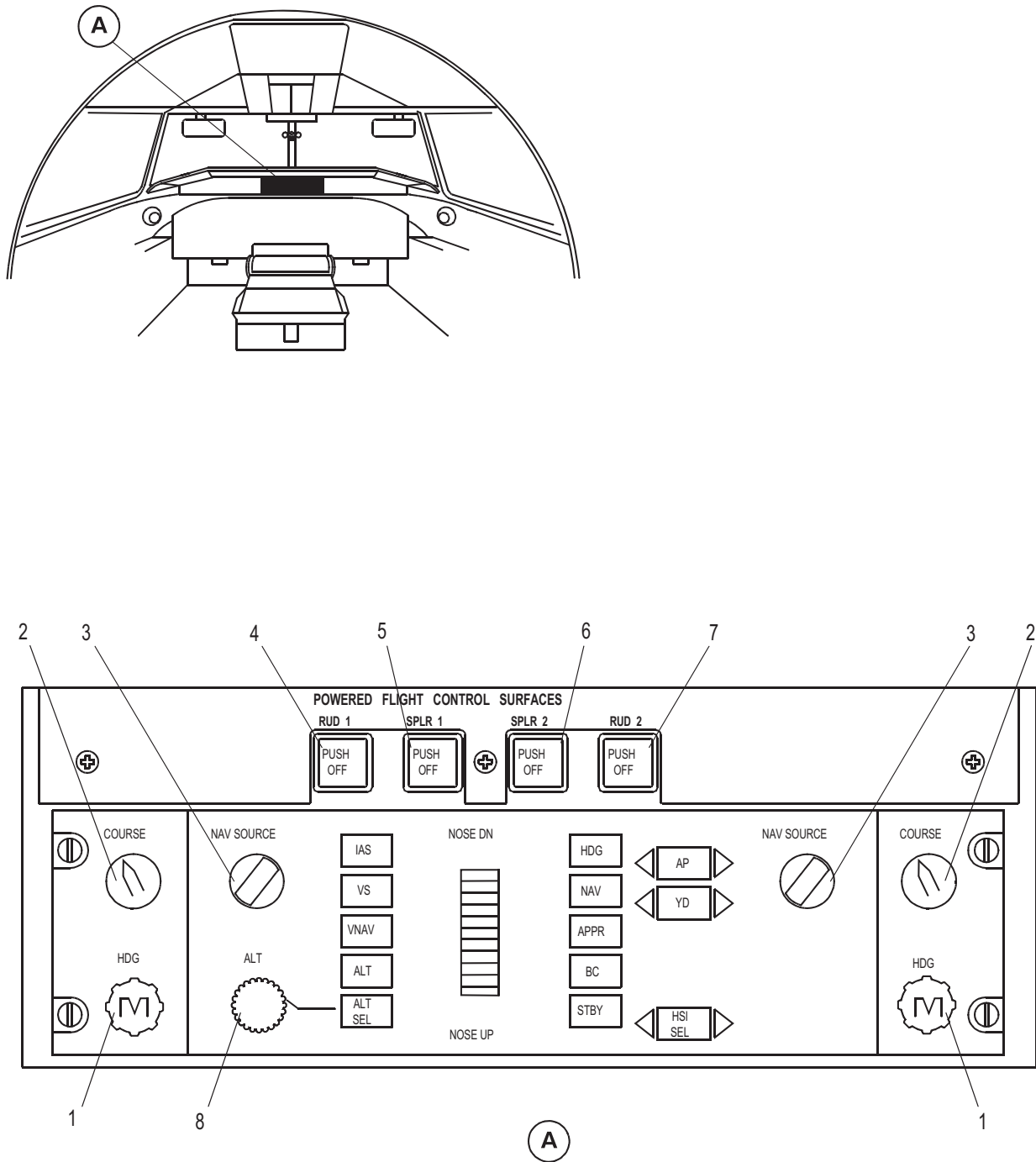


Figure 12.1-6 Left Glareshield Panel

LEFT GLARE SHIELD CALLOUTS

1. AEROPLANE IDENTIFIER
2. ENGINE FIRE PRESS TO RESET SWITCHLIGHT
3. ROLL OUTBD & ROLL INBD SPOILERS LIGHT
4. ELEVATOR TRIM PUSH OFF SWITCHLIGHT
- | 5. STICK PUSHER OFF SWITCHLIGHT
6. CLOCK
7. PULL UP GPWS TEST LIGHT & BELOW G/S LIGHT
8. A/P DISENGAGE LIGHT
9. TERRAIN INHIBIT SWITCH
10. CAUTION PRESS TO RESET SWITCHLIGHT
11. WARNING PRESS TO RESET SWITCHLIGHT
12. FLIGHT/TAXI SWITCH
13. PROPELLER GROUND RANGE LIGHTS

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1 2 3 4 5 6 7 8

Figure 12.1-7 Center Glareshield Panel

CENTER GLARESHIELD CALLOUTS

1. HDG SELECTION KNOB
2. COURSE SELECTION KNOB
3. NAV SOURCE SELECTION KNOB
4. RUD 1 PUSH OFF SWITCHLIGHT
5. SPLR 1 PUSH OFF SWITCHLIGHT
6. SPLR 2 PUSH OFF SWITCHLIGHT
7. RUD 2 PUSH OFF SWITCHLIGHT
8. ALT SELECTION KNOB

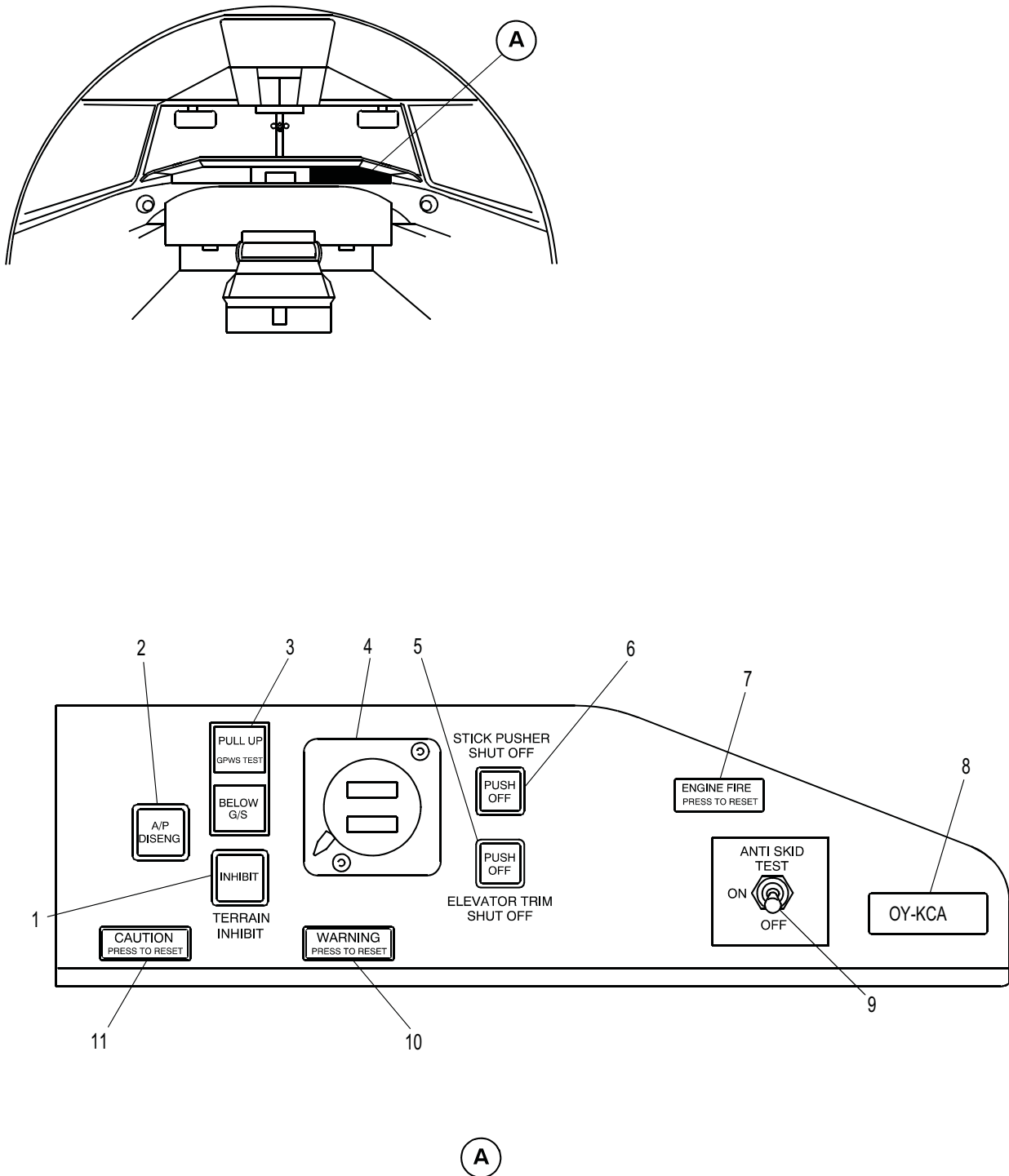


Figure 12.1-8 Right Glareshield Panel

RIGHT GLARE SHIELD CALLOUTS

1. TERRAIN INHIBIT SWITCH
2. AP DISENGAGE LIGHT
3. PULL UP GPWS TEST LIGHT & BELOW G/S LIGHT
4. CLOCK
5. ELEVATOR TRIM PUSH OFF SWITCHLIGHT
- | 6. STICK PUSHER OFF SWITCHLIGHT
7. ENGINE FIRE PRESS TO RESET SWITCHLIGHT
8. AEROPLANE IDENTIFIER
9. ANTI SKID SWITCH
10. WARNING PRESS TO RESET SWITCHLIGHT
11. CAUTION PRESS TO RESET SWITCHLIGHT

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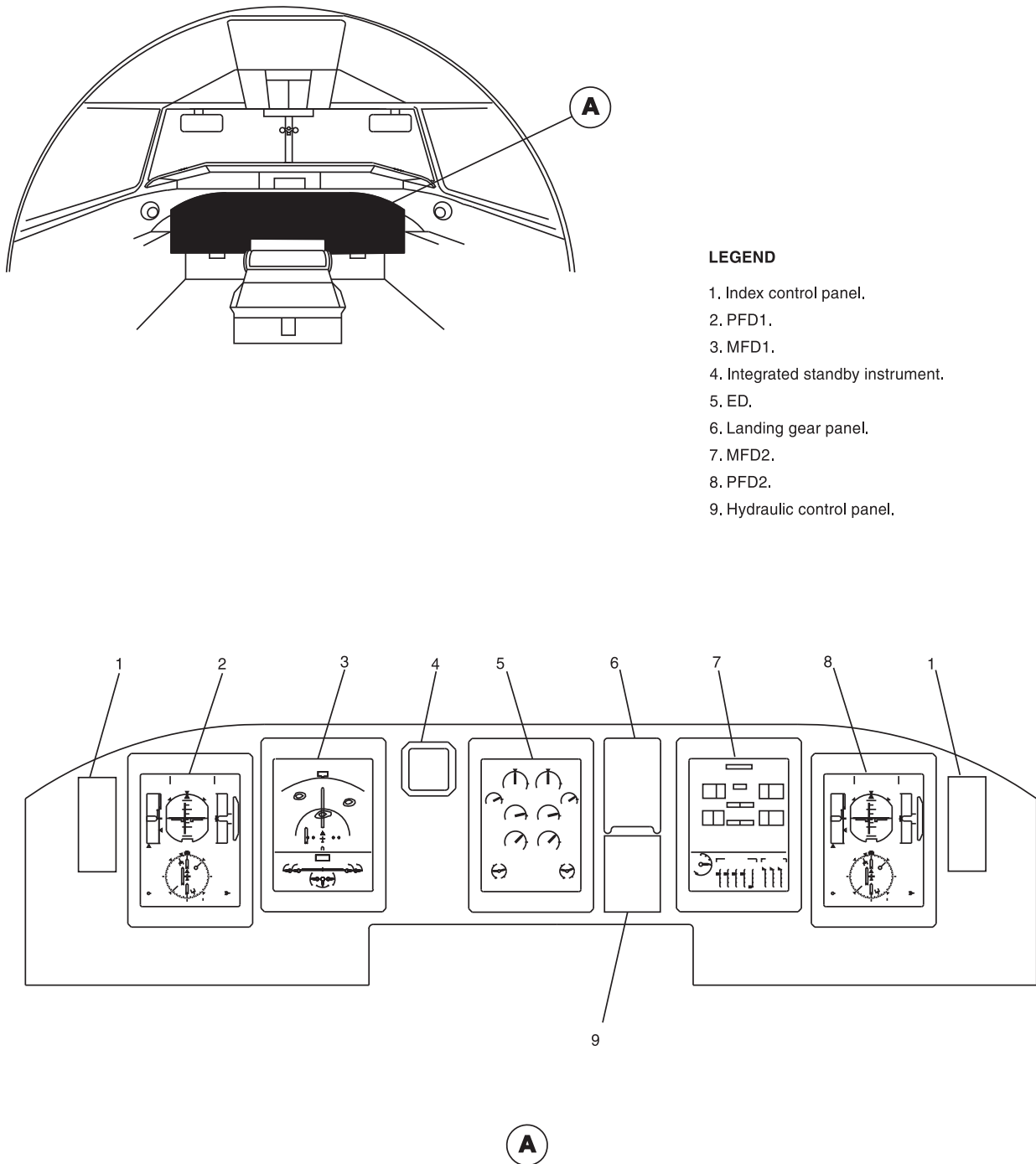
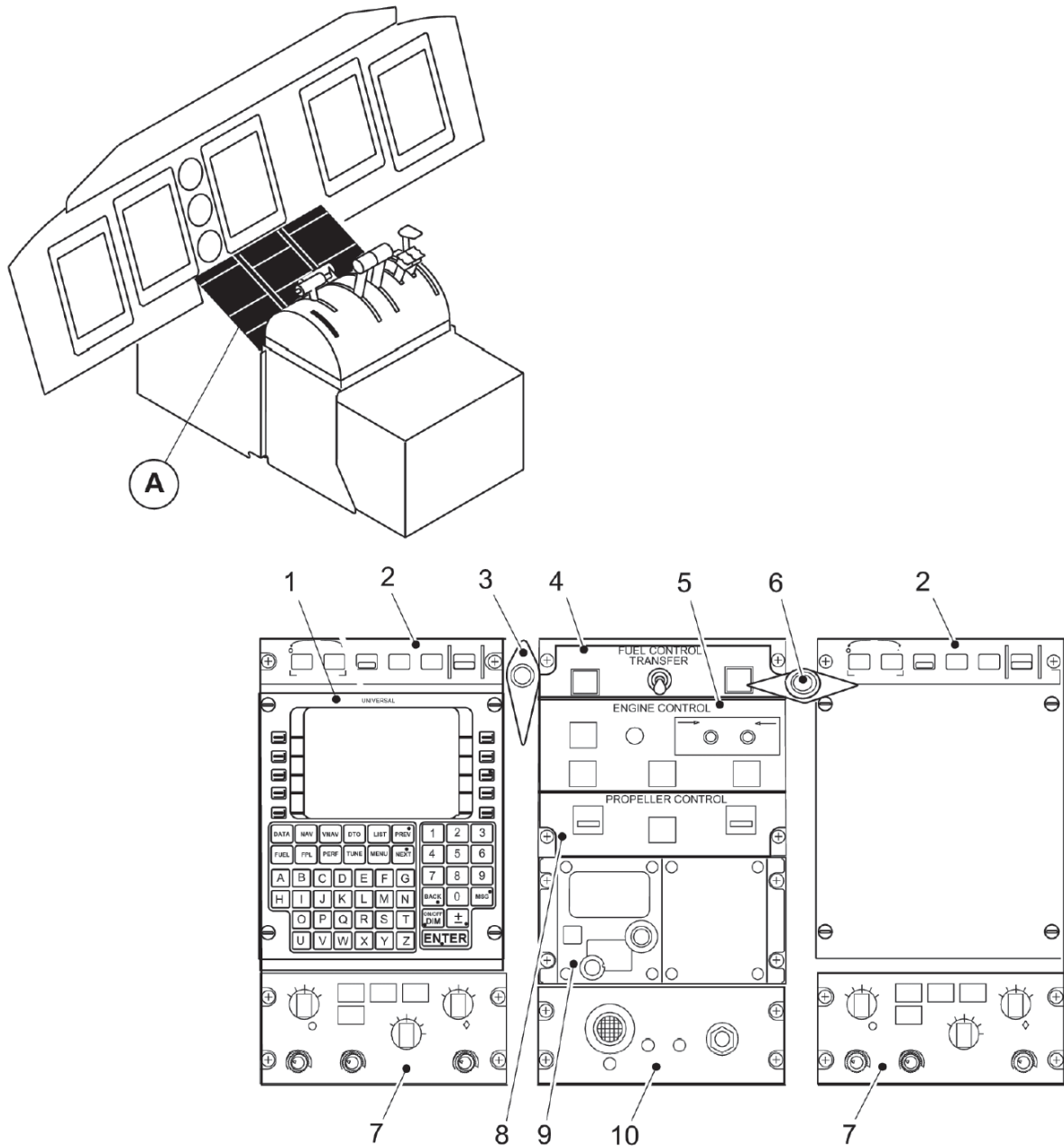


Figure 12.1-9 Instrument Panel

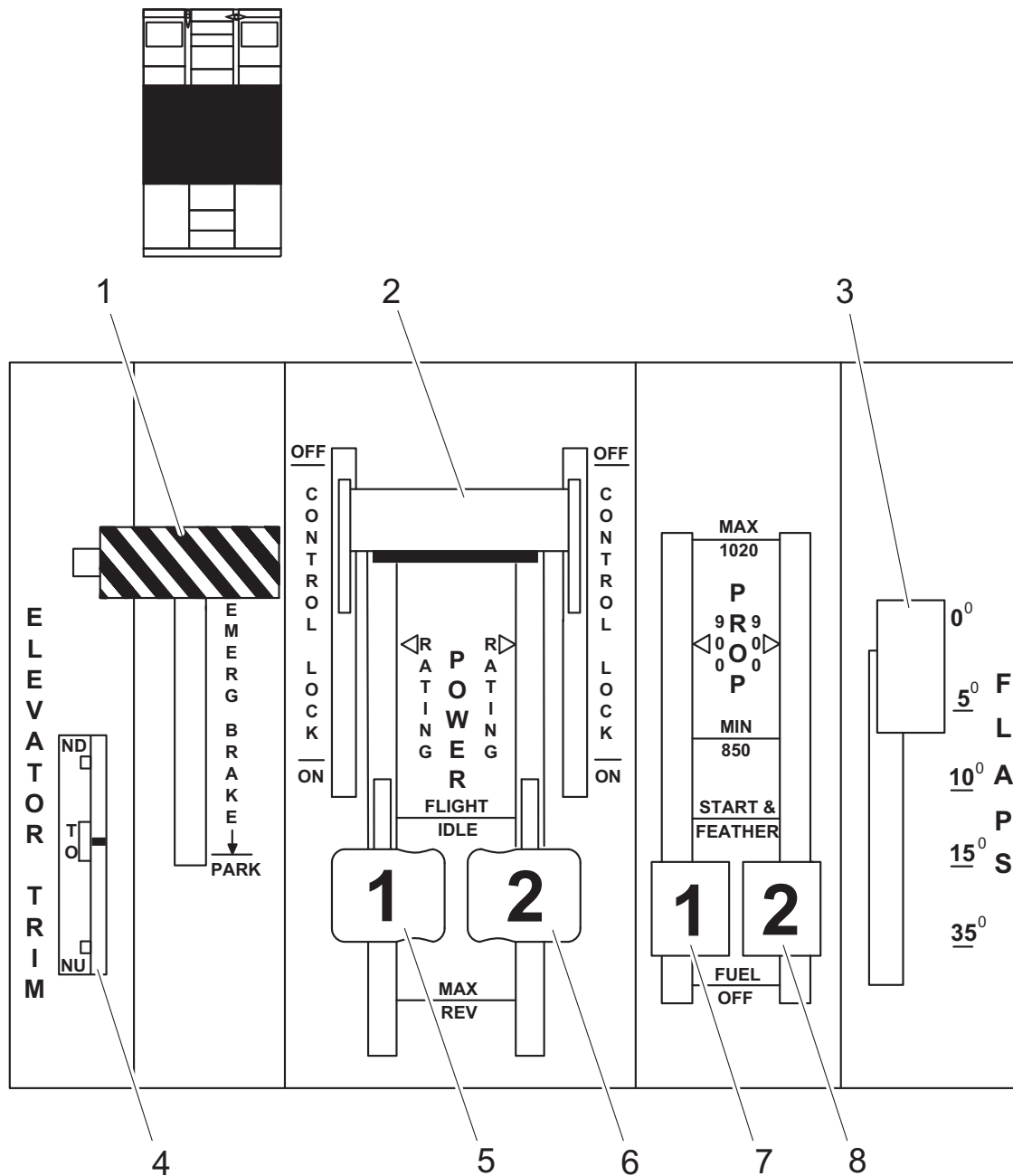


LEGEND

1. Flight management system (FMS).
2. Attitude and heading reference control panel (AHCP).
3. Pitch disconnect handle.
4. Fuel control panel.
5. Engine control panel.
6. Roll disconnect handle.
7. Electronic flight instrumentation system control panel (EFCP).
8. Propeller control panel.
9. Standby control head (VHF 1).
10. Cockpit voice recorder panel.

A

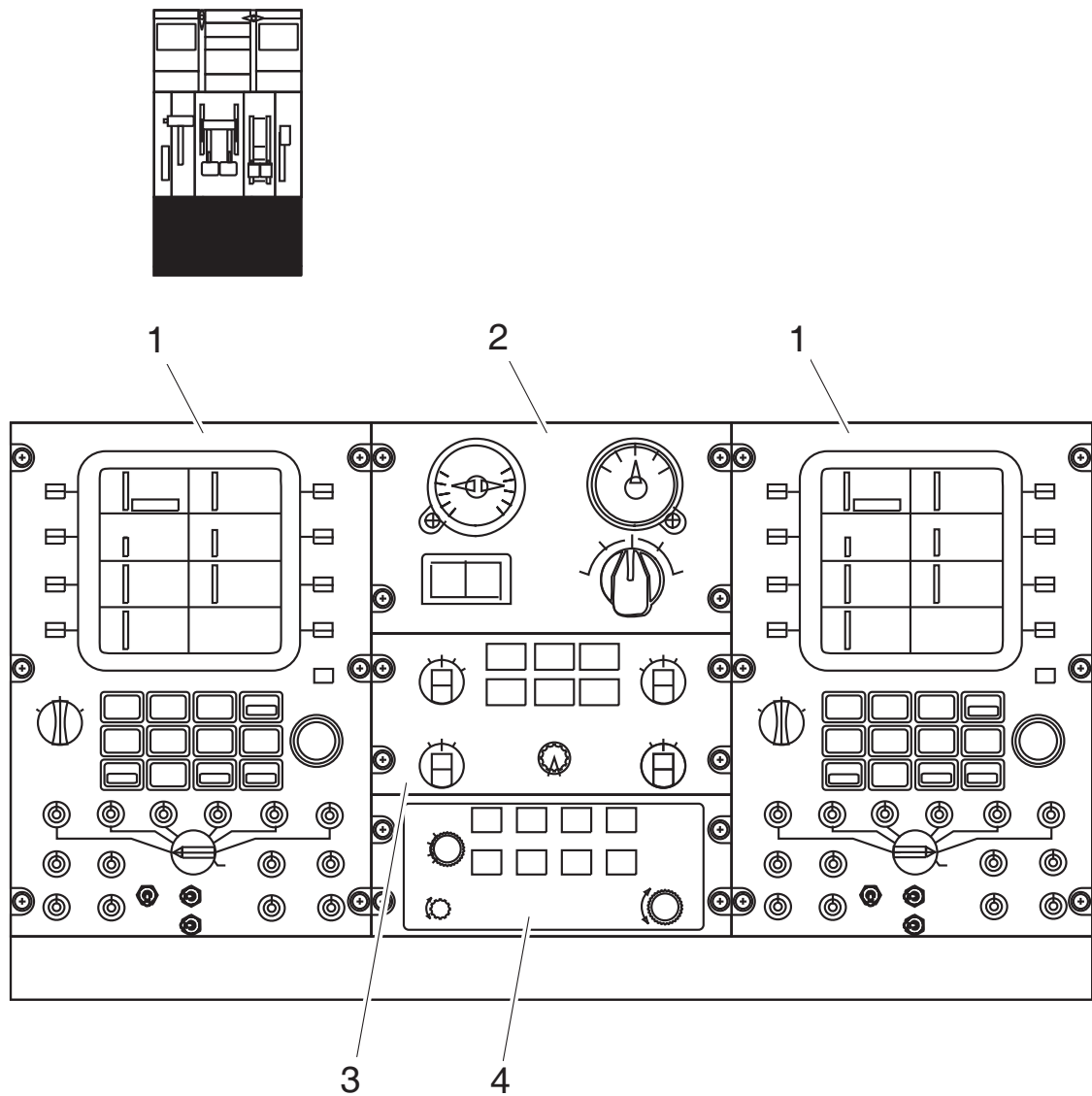
Figure 12.1-10 Forward Center Console



LEGEND

- | | |
|-----------------------------|------------------------|
| 1. Emergency Brake Lever. | 5. #1 Power Lever. |
| 2. Control Lock Lever. | 6. #2 Power Lever. |
| 3. Flap Selector Lever. | 7. #1 Condition Lever. |
| 4. Elevator Trim Indicator. | 8. #2 Condition Lever. |

Figure 12.1-11 Center Console



LEGEND

1. Audio and Radio Control Display Unit (ARCDU).
2. Trim Control Panel.
3. Engine and System Integrated Displays Control Panel (ESCP).
4. Weather Radar Control Panel.

Figure 12.1-12 Aft Center Console

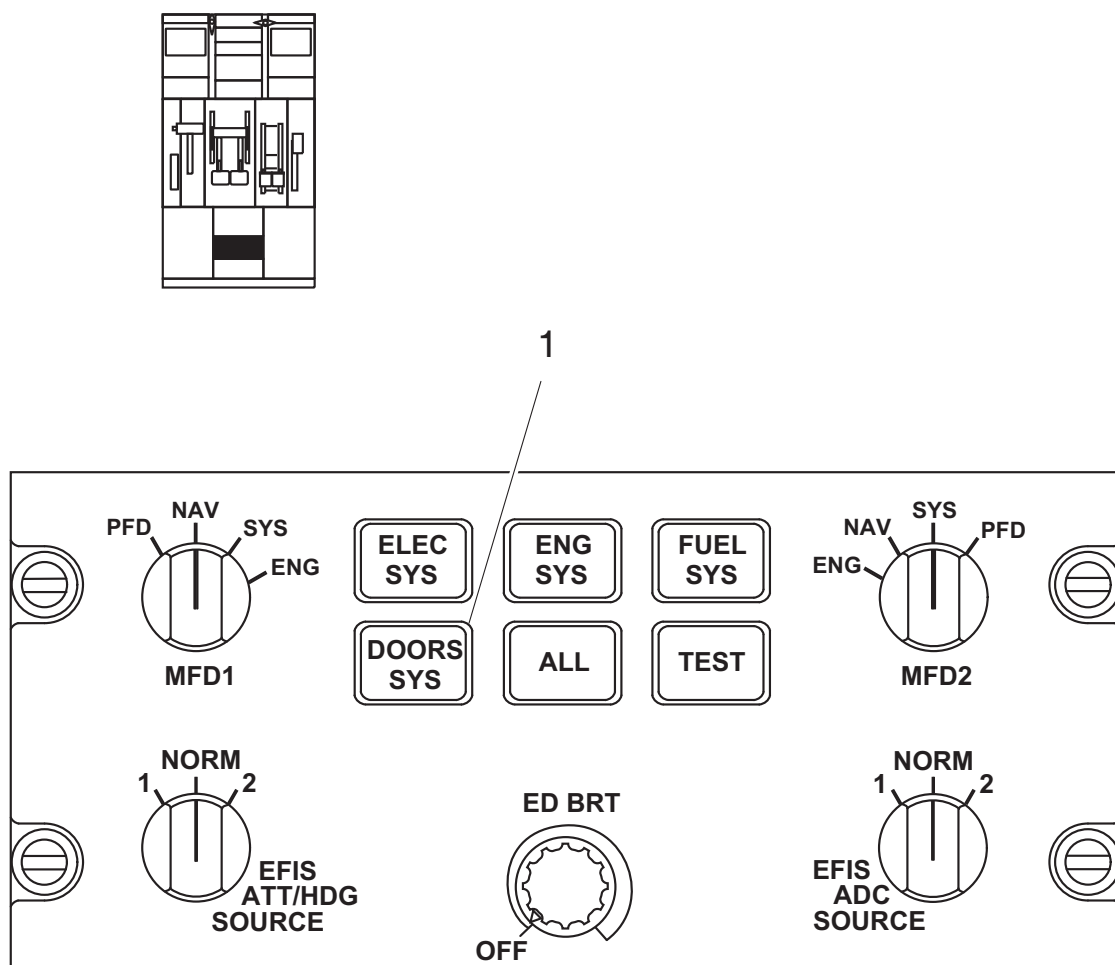
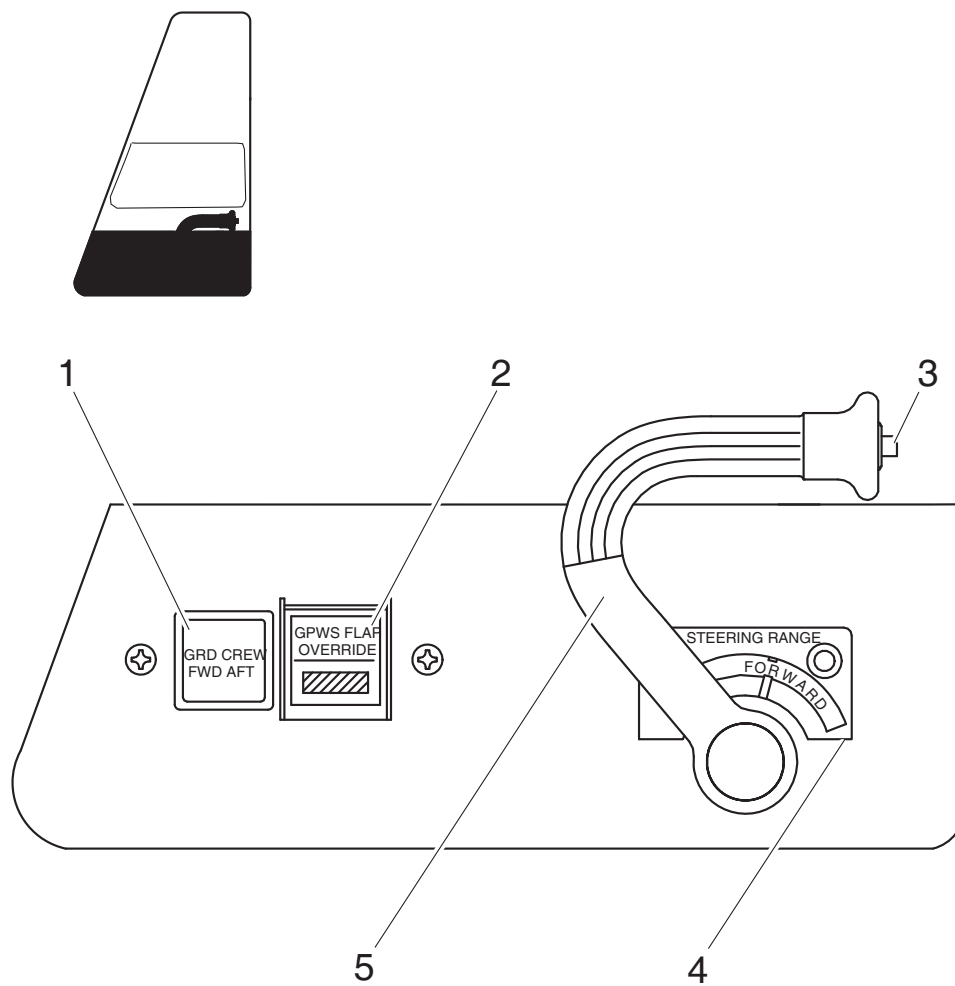


Figure 12.1-13 Aft Center Console

ESCP CALLOUTS PERTAINING TO DOORS

1. DOORS SYS PUSHBUTTON (momentary action)

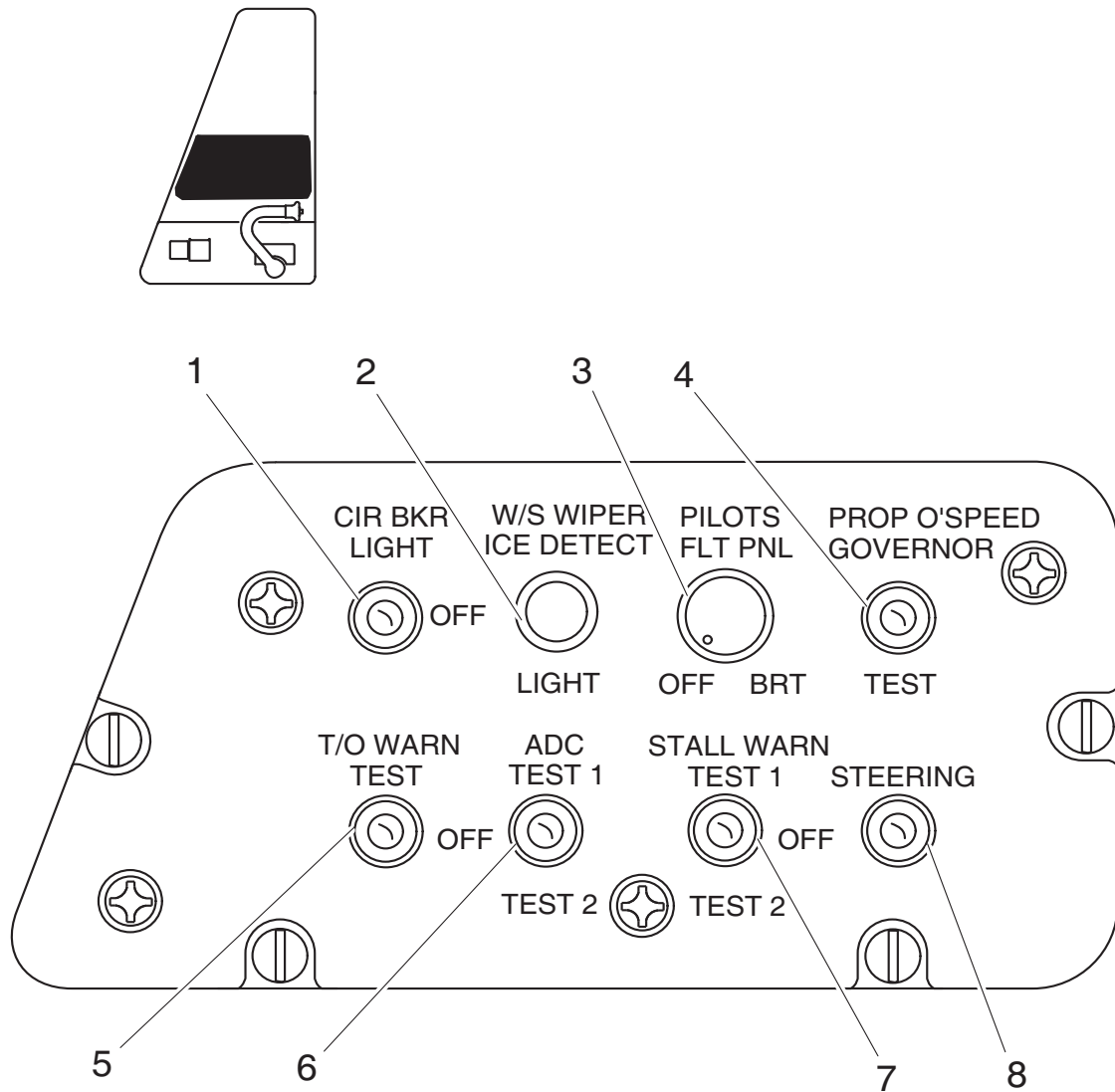
- PUSH** - shows doors system page on the MFD (upper area) with MFD 1 or MFD 2 set at SYS
- no action with another push



LEGEND

- 1. Ground Crew Connection Annunciator.
- 2. GPWS Flap Override Switchlight.
- 3. Push to Talk (PTT) Switch.
- 4. Steering Range Label.
- 5. Steering Hand Control.

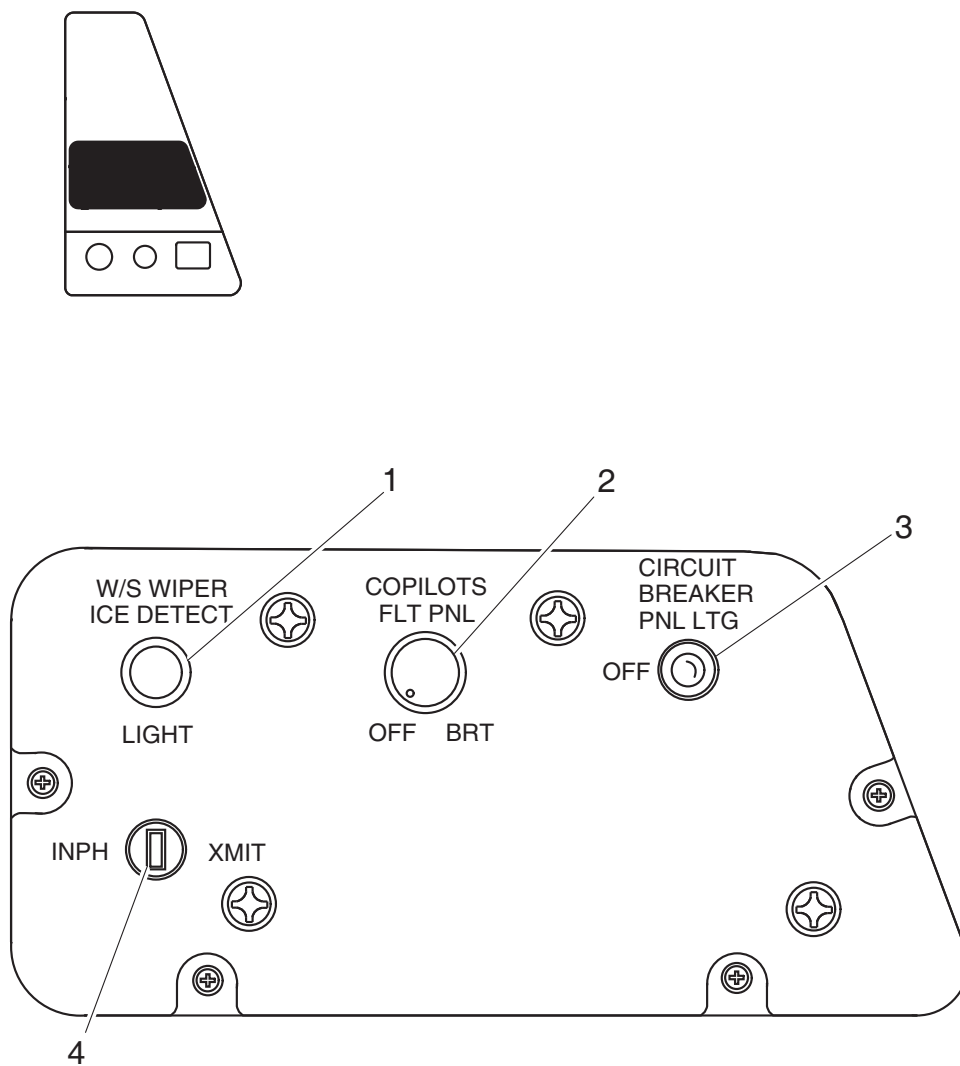
Figure 12.1-14 Steering Handwheel Console



LEGEND

1. Circuit Breaker Panel Lighting Control Toggle Switch.
2. Windshield Wiper Ice Detection Light Pushbutton.
3. Pilot's Side Panel Dimmer Knob.
4. Propeller Overspeed Governor Test Toggle Switch.
5. Takeoff Warning System Test Toggle Switch.
6. Air Data Computer Test Toggle Switch.
7. Stall Warning Test Toggle Switch.
8. Nosewheel Steering Toggle Switch.

Figure 12.1-15 Pilot's Side Panel

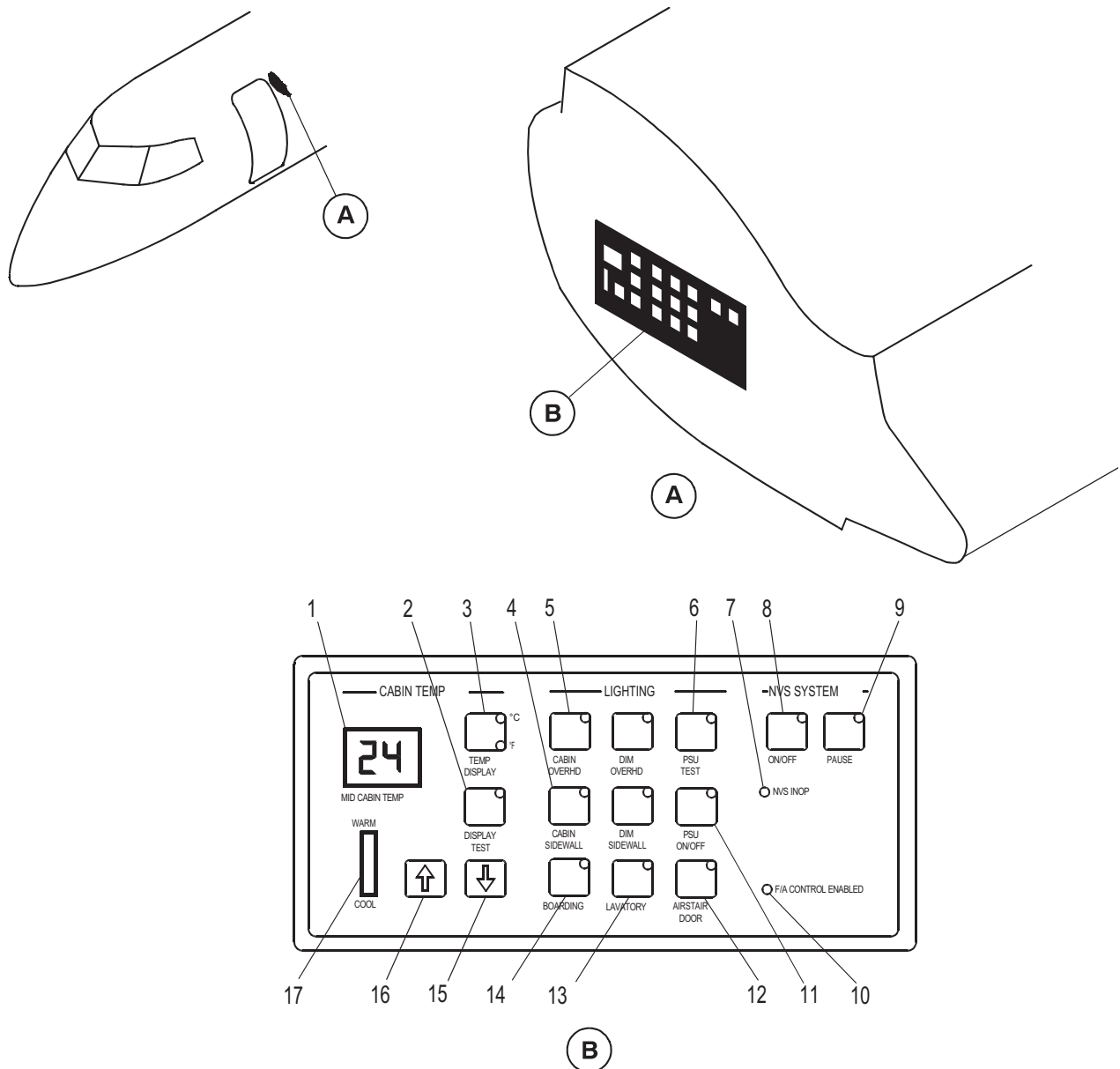


LEGEND

1. Windshield Wiper Ice Detection Light Pushbutton.
2. Copilot's Side Panel Dimmer Knob.
3. Circuit Breaker Panel Lighting Control Toggle Switch.
4. Microphone Interphone/Transmit Toggle Switch.

Figure 12.1-16 Copilot's Side Panel

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LEGEND

- | | |
|---|-------------------------------------|
| 1. Temperature display. | 11. PSU Power switch. |
| 2. Temp. display test switch. | 12. Airstair steps lighting switch. |
| 3. Temperature scale switch. | 13. Lavatory lighting switch. |
| 4. Cabin sidewall lighting switch. | 14. Boarding lights switch. |
| 5. Cabin overhead lighting switch. | 15. Temperature decrease switch. |
| 6. PSU Test switch. | 16. Temperature increase switch. |
| 7. NVS Inoperative advisory light. | 17. Temperature scale. |
| 8. NVS On/Off switch. | |
| 9. NVS Pause switch. | |
| 10. F/A control enabled advisory light. | |

Figure 12.1-17 Cabin (F/A) Attendant's Panel

Towing Switch

Description.

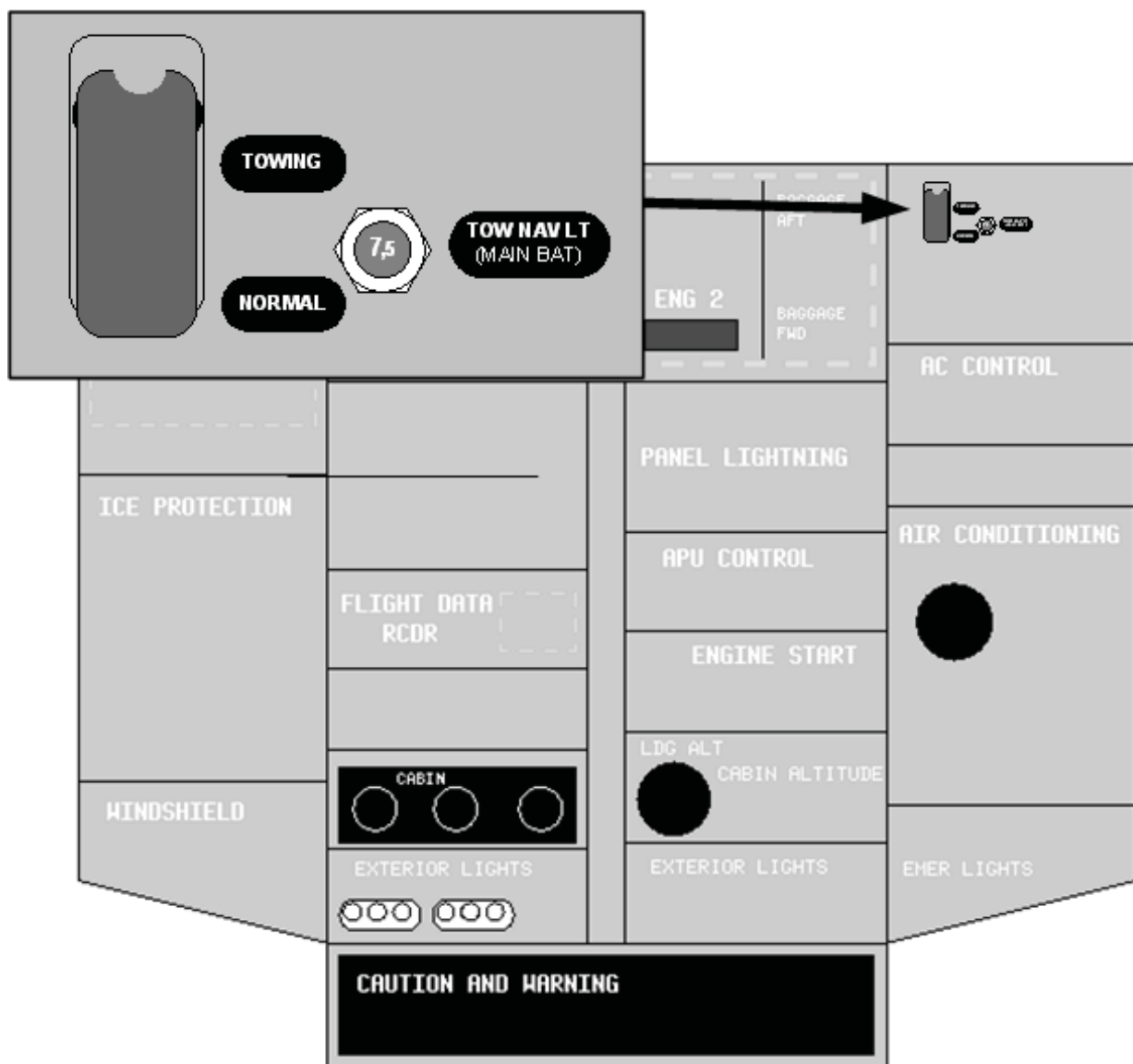
The TOW-NAV Lt Switch is a standard 2-position switch with a Guard that forces it to NORMAL (the other is TOWING).

In addition there is a 7,5 Amp Circuit Breaker for the Power.

Power is taken directly from the main battery at a point behind the DC CONTROL panel and feed via the TOW Circuit Breaker & Switch to a point behind the EXTERIOR LIGHTS panel.

The towing personnel shall only flip the guard and place the switch in TOW.

After towing is done, the guard is closed and the Switch goes to normal.



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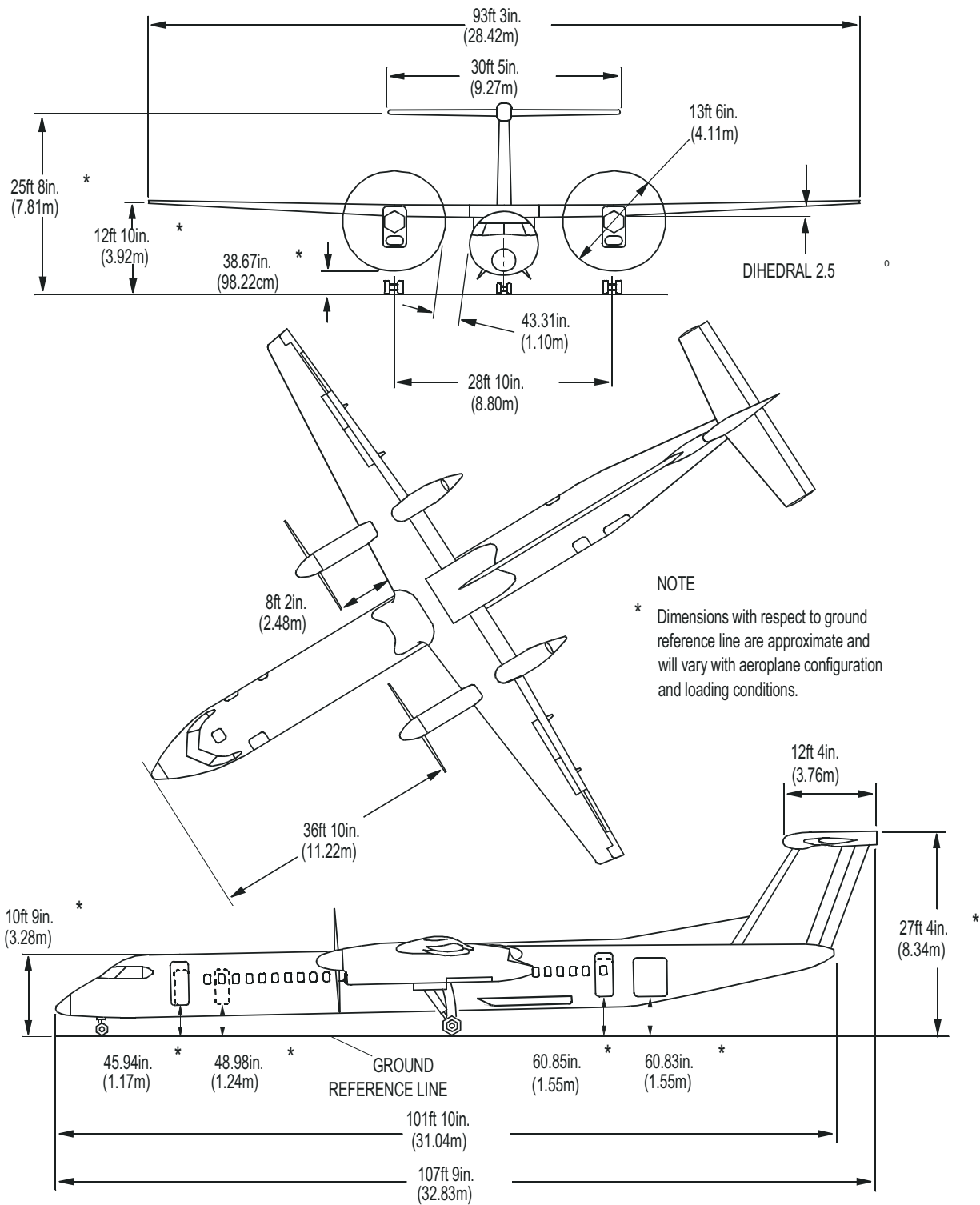


Figure 12.1-18 Aeroplane Dimensions

12.1.4 Description

12.1.4.1 Aeroplane Dimensions

The Dash 8 Q400 has a wing span of 28.42 m and a length of 32.83 m (Figure 12.1-18). The six bladed propellers are 4.12 m in diameter, and clears the fuselage by 1.1 m). The wheel track is 8.80 m and the nose wheel to main wheel distance is 13.94 m. Using a nose steering of 70° requires a minimum 25.7 m of pavement for a 180° turn (Figure 12.1-19).

The height to the bullet fairing, on top of the vertical stabilizer is about 8.26 m depending on the aeroplane loading. The height to the wing tips is about 3.9 m.

12.1.4.2 Structural Design

The airframe structure is made from high strength aluminum alloys. The fuselage skins are chemically milled and riveted to stringers and frames. Steel structural alloy is used in the landing gear and certain airframe components. Other structural components are made from various approved aluminum, steel or titanium materials. Magnesium is used in selected interior regions of the flight deck, cabin and engine.

Composite panels include the:

- Radome (Fiberglass/honeycomb core)
- Nose Equipment Bay (Aramid fiber)
- Wing to Fuselage Fairings (Fiberglass)
- Tailcone (Aramid fiber)
- Tailcone with optional APU (Titanium)
- Bullet Fairing (Mybrid composite Glass/Aramid fiber)
- Dorsal Fin (Mybrid composite Glass/Aramid fiber)
- Stabilizer leading edge (Aramid fiber covered by rubber de-ice boots)
- Ice Protection Panels

12.1.5 Forward Section

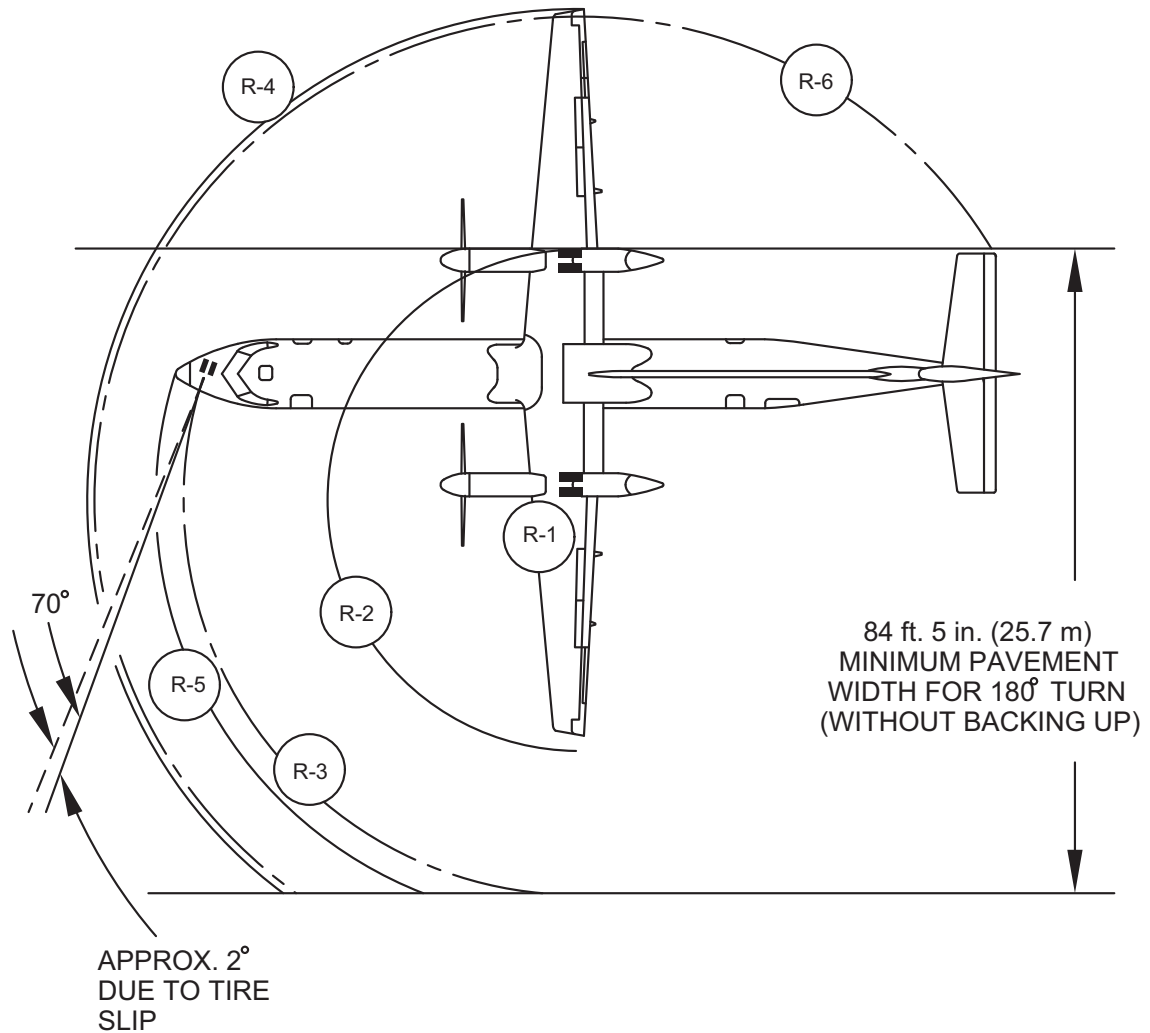
12.1.5.1 Nose

The nose is in front of the forward pressure bulkhead. It contains the nose wheel well and an unpressurized equipment deck, and the weather radar radome.

12.1.5.2 Flight Deck

The flight deck extends from the forward pressure bulkhead to a fixed bulkhead aft of the flight crew seats. The windshield panels are laminated glass and the side window panels are a combination of laminated glass and plastic.

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ITEM	RADIUS
R-1 INNER GEAR	4 ft. 9 in. (1.52 m)
R-2 OUTER GEAR	33 ft. 10 in. (10.32 m)
R-3 NOSE GEAR	50 ft. 7 in. (15.41 m)
R-4 WING TIP	64 ft. 9 in. (19.74 m)
R-5 NOSE	54 ft. 10 in. (16.73 m)
R-6 ELEVATOR TIP	62 ft. 9 in. (19.13 m)

Figure 12.1-19 Aeroplane Turning Radius

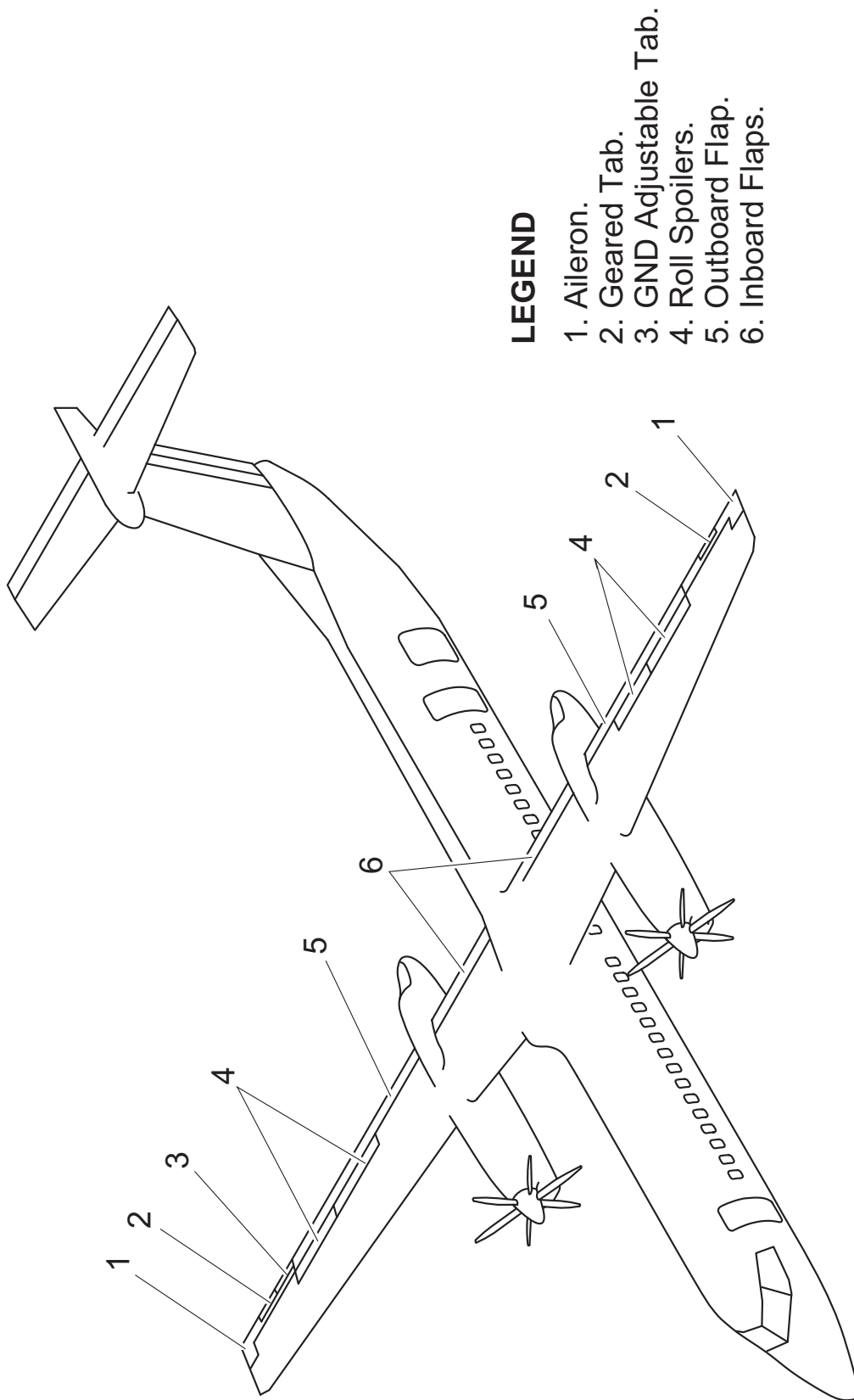


Figure 12.1-20 Wing Detail

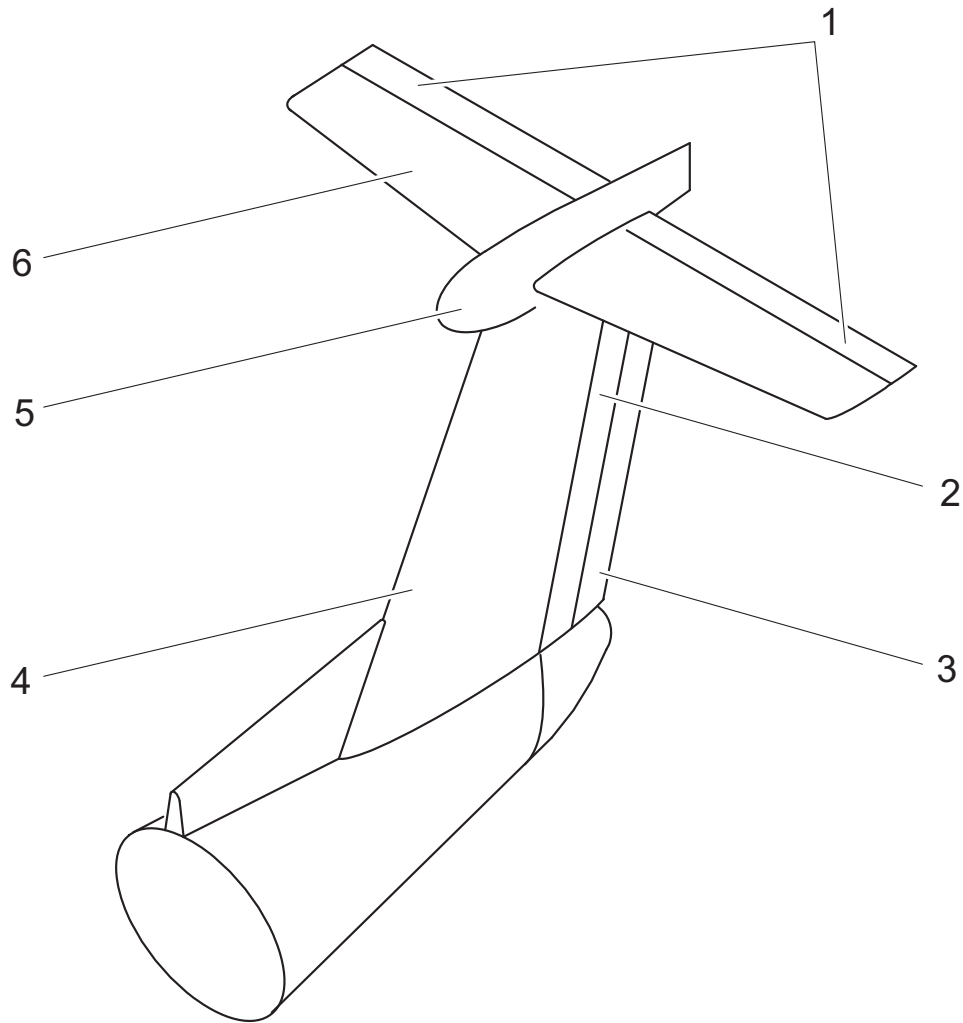
12.1.6 Wings

A single, high aspect ratio, cantilevered wing is joined to the upper midsection of the fuselage (Figure 12.1-20), and includes:

- Integral fuel tanks
- Nacelles and main gear mounting structures
- Ailerons
- Flaps
- Spoilers

The portions of the wing outboard of the engine nacelles are tapered and have a 2.5° dihedral. Pneumatic deicer boots are installed on the leading edges of the center wing sections and outboard from the landing lights. The wing has single slotted flaps extending from the side of the fuselage to inboard of the ailerons.

Conventional ailerons are installed for lateral control and work with differential lateral control spoilers on the upper wing skin. The spoilers also have a ground mode. When set the spoilers extend on landing to reduce lift.



LEGEND

- 1. Elevators.
- 2. Fore Rudder.
- 3. Trailing Rudder.
- 4. Vertical Stabilizer.
- 5. Bullet Fairing.
- 6. Horizontal Stabilizer.

Figure 12.1-21 Empennage

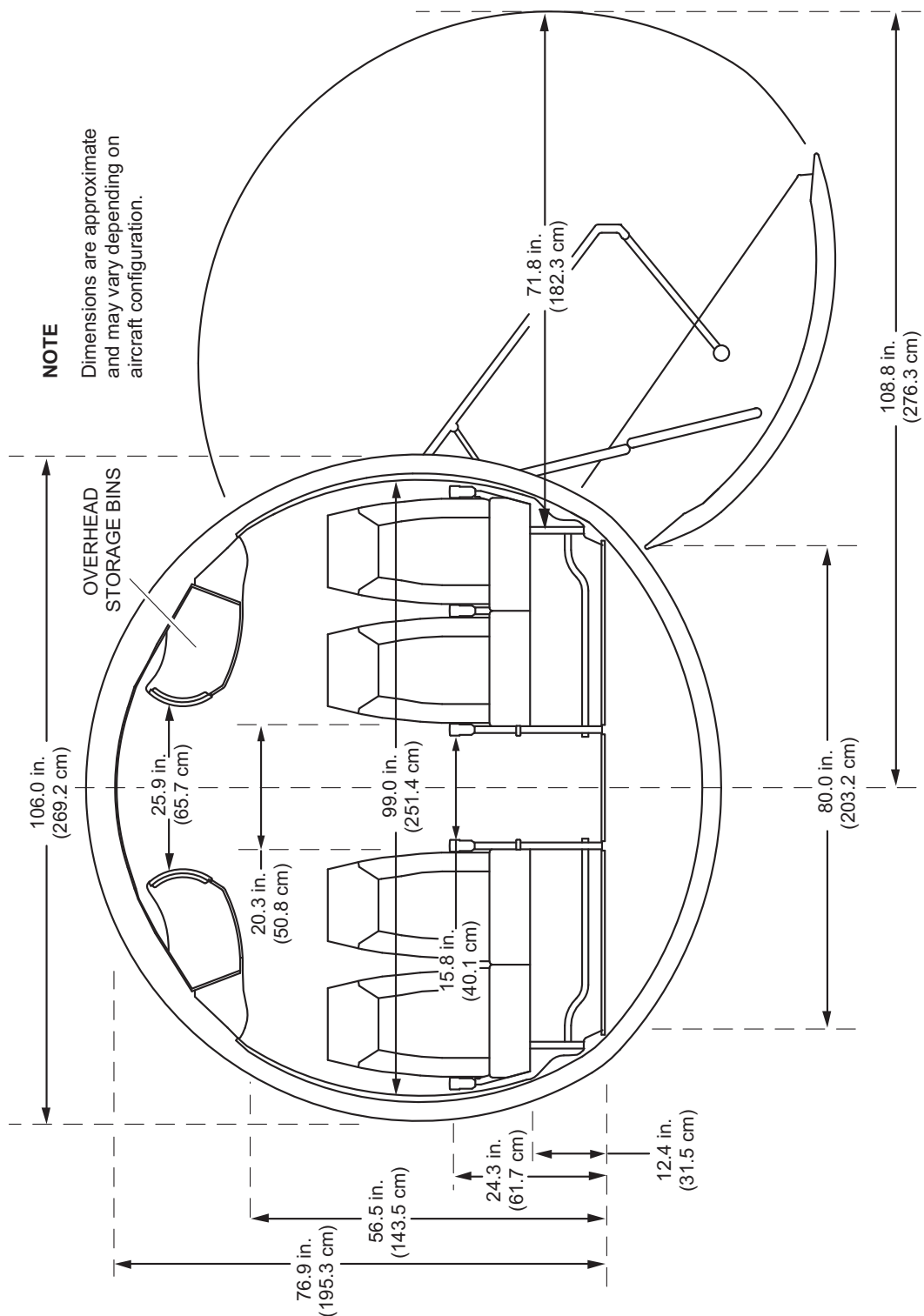


Figure 12.1-22 Fuselage Cross Section

12.1.7 Centre Section

The passenger cabin has a constant cross-section and bulkheads with a slightly flattened bottom (Figure 12.1-22).

12.1.8 AFT Section

The aft section is unpressurized and is swept up from the center section. It consists of the rear pressure dome and the supporting structure for the empennage. This area houses the air conditioning packs and the APU. There is access to the interior of the aft fuselage section for inspection and maintenance.

Empennage

The empennage has a horizontal stabilizer with separate right and left elevators, and a vertical stabilizer with fore and trailing rudders. The empennage is mounted on the aft fuselage section (Figure 12.1-21).

Horizontal Stabilizer

The fixed incidence horizontal stabilizer is attached to the top of the vertical stabilizer. The leading edges are made from composite material and have pneumatic deicer boots bonded to them.

Elevators

Both elevators normally operate together, but can function independently if the pitch disconnect system is operated. The elevators are hydraulically operated with artificial feel. Hydraulic actuators are used for trimming.

Vertical Stabilizer

The vertical stabilizer and rearmost portion of the fuselage are constructed as one piece. The leading edge is made from composite material and has a pneumatic deicer boot, with two chambers, bonded to it. A composite bullet fairing is installed on top of the vertical stabilizer.

Rudder

The rudder has a fore and trailing section. The fore rudder is hinged to the rear vertical stabilizer spar and the trailing rudder is hinged to the trailing edge of the fore rudder. The trailing rudder is geometrically arranged to give a deflection twice that of the fore rudder. Two hydraulically powered actuators operate the rudder.