

Supplement 13

MSP-85 Mode Select Panel

All computed modes for the APS-85 system are selected on the MSP-85.

The upper row of pushbuttons is for lateral modes (with the exception of CLIMB), and the bottom row is for vertical modes.

Pressing a pushbutton for an unselected mode clears all noncompatible modes and causes the new mode to latch, if all required conditions for the mode are met (an indication light within each mode pushbutton comes on). Flight control system modes are annunciated on the top two rows of the EADI. Active modes are annunciated in green and armed modes and submodes in white, outboard of the active modes. When a new mode is selected or captured it flashes for 5 seconds before becoming steady. Selection of a lateral mode brings the command bars into view. If the autopilot is engaged without a selected mode, basic lateral and vertical modes are automatically selected.

In addition to the MSP-85, VERT SYNC and GA modes may be selected from pilot/copilot control wheels.

Lateral Modes:

1/2 BANK - Used with HDG and NAV modes, it provides a maximum of 12.5° roll limit. The mode clears after LOC capture.

HDG - Used to select heading hold mode, can be used with any vertical mode.

Roll limit is 25°.

NAV - Used to select navigation mode, can be used with any vertical mode. Roll limit is 15° for captured LOC and 25° for VOR, LRN and RNV. Automatic crosswind correction is provided with crab angle of up to 30°. NAV capture angle is up to 90° (HDG submode prior to NAV capture).

APPR - Used to select approach mode, can be used with any vertical mode prior to GS capture. Roll limit is 15° for captured LOC. NAV capture angle is up to 90°. Automatic crosswind correction crab angle is up to 30°. The approach course corresponds with the course selected on the EHSD. With ILS approach, GS is armed after LOC capture.

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Vertical Modes:

ALTS (annunciated on the EADI) - Altitude (pre)select mode; the mode is automatically armed whenever the altitude preselector/alerter setting is changed, the autopilot is engaged, or with selection of a flight director mode. It can be used with any lateral mode. Capture range is 0 to 50,000 ft altitude, ± 6000 fpm vertical speed, 0.2 g flight load and 100 ft maximum overshoot.

The system goes to basic pitch hold mode and rearms for ALTS if a new altitude is dialed on the preselector/alerter during altitude capture prior to track, or to ALT hold mode if a new altitude is dialed after altitude capture and track (and rearms for ALTS).

ALT - Used to select altitude hold mode, can be used with any lateral mode. Engage range is -1000 ft to 55,000 ft altitude and ± 1000 fpm vertical speed.

CLIMB - Used to select climb mode, can be used with any lateral mode. It flies a pre-programmed IAS/MACH profile appropriate to the aircraft. Pressing the pushbutton once, selects a normal 240 kias/0.66 Mi climb (**CLM** annunciated on the EADI); pressing CLIMB twice selects high speed climb of 250 kias up to 10,000 ft, increasing to 275 kias at 15,000 ft, then 0.72 Mi (**CLM H** annunciated on the EADI).

DESCEND - Used to select descend mode, can be used with any lateral mode. It flies a pre-programmed IAS/MACH profile appropriate to the aircraft. Pressing the pushbutton once, selects a normal 0.72 Mi/250 kias descent (**DES** annunciated on the EADI); pressing DESCEND twice selects high speed 0.78 Mi/300 kias (decreasing to 250 kias between 13,000 ft and 10,000 ft) descent (**DES H** annunciated on the EADI).

VS - Used to select vertical speed mode, can be used with any lateral mode. When selecting VS, the VS reference is synchronized to the aircraft vertical rate. VS can be modified by either the VSI bug or the autopilot pitch wheel (at 100 ft increments). The engage range is ± 6000 fpm. If VMO/MMO is inadvertently exceeded VMO/MMO bell triggers vertical safety mode of IAS hold of V_{MO} -2 kt.

SPEED - Used to select IAS/MACH hold mode, can be used with any lateral mode. Below 30,000 ft, IAS is selected, above 30,000 ft MACH is selected. A second press of SPEED pushbutton shifts between IAS and MACH. Reference airspeed can be changed by rotating pitch wheel or, for IAS only, with the airspeed bug on the on-side airspeed indicator.

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Special Modes:

VERT SYNC (flight director only) - Activated by pressing VERT SYNC button on the control wheel, to change the vertical reference value of the flight director. It can be used with pitch, VS, ALT and speed modes. It also changes the vertical portion of go around mode to the current aircraft pitch angle (**G/A** annunciator on the EADI goes out).

VERT SYNC does not disengage the autopilot and is not intended to change vertical reference when autopilot is engaged

G/A - Activated by pressing G/A button on the control wheel, it disengages the autopilot, cancels selected lateral and vertical modes, provides heading hold mode at time of G/A selection with up to 5° of bank and provides 9° pitch up command.

Second press of G/A button cancels flashing **AP** message on the EADI.

The autopilot can be reengaged after establishing G/A attitude to follow flight director commands (basic modes without synchronizing the EHSI heading cursor).

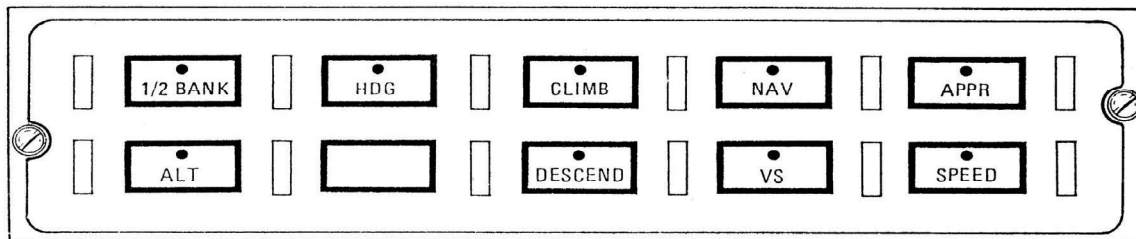


Figure 6-13-4. MSP-85 Mode Selector Panel

FLIGHT IN ICING CONDITIONS

NOTE

Before flight into known icing conditions, initiate continuous ignition prior to activating engine/nacelle anti-ice system. Use anti-icing continuously during flight in expected icing conditions (OAT of 5°C or below, and visible moisture in any form is present. Such as: clouds, fog with visibility of one mile or less, rain, snow, sleet and ice crystals). If ice has already accumulated, deice one engine at a time due to possibility of engine flameout resulting from ice ingestion. Activation of anti-ice system at high thrust settings may require thrust lever adjustments to maintain ITT within limits. **FLT** light should be on whenever flight conditions require use of anti-ice system.

With visible moisture and freezing temperatures, ice will form on windshield, windshield wipers, wing and empennage leading edges and engine nacelles. At night, ice is recognized with ice detector lights glowing red on the windshield. Stall speed may increase slightly with ice accumulations but the speed margin between stall warning buffet onset and the stall does not change. Resultant increase of weight and drag may reduce airspeed and increase thrust requirements with consequent reduction in range.

During icing conditions:

- A. Maintain comfortable margin above normal stall speed.
- B. Activate ice-protection systems in addition to pitot-static, AOA probe and SAT/TAS, windshield heat and anti-ice systems, as necessary. As soon as ice accumulation is detected on the windshield or on the wing leading edge, operate the de-ice system and continue its operation for as long as the aircraft remains in icing conditions.
- C. If necessary, change altitude rapidly by climb or descent (terrain clearance permitting) to exit layered cloud (stratus) formations or very course to exit vertical cloud (cumulus) formations.
- D. Do not operate wing and tail deicing system at ambient temperatures below - 40°C (-40°F) to avoid cracking the boots.
 1. **IGN ON** pushbutton - PRESS ON (lights - ON); leave ON while using ANTI-ICE
 2. ANTI-ICE pushbuttons - PRESS ON (**NAC, GND & FLT** lights - ON)
 3. WINDSHIELD HEAT switches - ON
 4. DE-ICE switches - AS REQUIRED