

Sperry SP-77 Autopilot and Flight Director



This is the SP77. Blue numbers indicate the flight director functions, red numbers are for the main autopilot.

The flight director (FD) and the autopilot (AP) are NOT connected. While the autopilot is driving the control surfaces when activated, the FD can be activated/deactivated independently and is just for reference.

The Sperry SP-77 is a very simple but reliable autopilot and flight director system. It basically works on the principle of CWS (Control Wheel Steering) and will maintain bank and/or pitch as you fly, thus relieving a lot of the cockpit workload from you.

For example: You are just departing Calgary Airport in Canada with a fully loaded 737-200 COMBI, heading to Fairbanks, Alaska. As you know, aircraft are flown by pitch, power setting and airspeed. You fly V2 + 15 until you reach a safe altitude.

Now you activate the Autopilot (ELEV + AIL). The autopilot will maintain your current heading and your current pitch. Since you control airspeed with the pitch, you see that your speed is increasing, but you want to climb with 220 kias. Pull back on the yoke until you maintain 220 kias. Suppose that this gives us a pitch of 9°. If you now release the yoke, the autopilot will trim the elevator to maintain 9° of pitch. No matter how fast you're flying or what power you are using, it will maintain 9° of pitch UNLESS you change something. This works the same with the aircraft's bank angle.

Autopilot Modes:

1. Mode Selector

MAN - will maintain current heading if HDG switch is in the middle position or will maintain a bank set by the yoke if the AIL switch is ON and HDG is OFF. If HDG SEL is selected the airplane will fly the heading selected on the captain's HSI.

VOR/LOC - will intercept a VOR/LOC. Until the signal comes alive the autopilot will maintain current heading or follow the heading bug depending on the position of the HDG switch.

AUTO APP - same as VOR / LOC but now the autopilot will intercept the ILS, it will also capture the glide slope and follow it down.

MAN G/S - same as above but with a higher sensitivity and also allows the AP to intercept the G/S from above.

2. A/B/C - Only hydraulic system B is enabled in this installation. Systems A and C have been labeled INOP by maintenance.

3. Heading Switch

OFF - heading is off, autopilot is only controlled by CWS.

Middle Position - Autopilot will maintain current heading.

HDG SEL - Autopilot will be driven by HDG bug on captains HSI. HDG SEL will revert automatically to the middle position if either AIL or ELV AP channels are turned OFF.

4. AIL Switch - Engages/Disengages the aileron channel of the autopilot.

5. ELEV Switch - Engages/Disengages the elevator channel of the autopilot.

6. Altitude Switch

OFF - CWS will fly pitch commands by yoke

ALT HOLD - autopilot will hold the current altitude. When higher forces on the yoke are detected the switch will return to the OFF position

TURB - higher sensitivity setting, the autopilot will maintain current pitch during turbulence.

Flight Director:

The flight director is used for reference on the ADI. It has no control over the autopilot:

1. Mode Selector:

OFF - FD is off.

HDG - FD will give bank information on how to fly a heading selected with the HDG bug.

VOR/LOC - FD will give bank information on how to fly a radial/localizer.

AUTO APP - FD will give bank & pitch information on how to fly a precision approach

MAN GS - FD will give bank & pitch information on how to fly a precision approach. Higher rates will be used.

GA - FD will provide pitch and roll information for a Go Around (predefined pitch attitude of 14° in combination with GA thrust)

2. ALT HOLD ON/OFF - FD bar will give pitch information to hold altitude. When ALT HOLD is on, the Pitch (3) Selector has no influence on the FD bar.

3. PITCH CMD - will set the pitch bar on the FD to a certain pitch between -10° and +15°