

3.4.2.4 FD Warnings

FD Warnings	Conditions
Pitch FD bar (or FPV) flashes 10 seconds	<ul style="list-style-type: none"> • If the ALT* mode is lost further to FCU altitude reference change of more than 250 ft. • When in APPR mode (G/S*, G/S, LAND, FINAL) FD reverts to V/S mode (pilot action or loss of vertical approach mode) • One AP or one FD is engaged while both AP/FD were previously off.
Pitch FD bar (or FPV) flashes permanently	Transmission of the GLIDE data is interrupted when in G/S, G/S* or LAND modes above 100 ft RA.
Roll FD bar (or FPV) flashes 10 seconds	<ul style="list-style-type: none"> • When in APPR mode (LOC*, LOC, LAND, APP NAV) FD reverts to HDG mode (Pilot action or loss of lateral approach mode). • One AP or one FD is engaged while both AP/FD were previously off.
Roll FD bar (or FPV) flashes permanently	Transmission of the LOC data is interrupted when in LOC, LOC* or LAND modes above 15 ft RA.

3.4.3 Autopilot (AP)

3.4.3.1 General

The AP:

- stabilizes the aircraft around its center of gravity
- acquires and tracks a flight path
- flies the aircraft to an automatic landing or go-around.

The AP commands the:


- position of the flight control surfaces for pitch, roll, and yaw
- nose wheel position.

3.4.3.2 AP Engagement

The Flight Crew can engage AP1 or AP2 by pressing the corresponding pushbutton on the FCU if the aircraft has been airborne for at least five seconds. When one AP is engaged, the corresponding FCU pushbutton comes on and AP1 (or 2) is displayed on the FMAs.

NOTE

- One AP can be engaged on the ground if the engines are not running. It disengages when one engine is started.
- Two APs may be engaged at a time (AP1 active, AP2 in standby), when the localizer/glide-slope or roll out or go-around mode is armed or engaged.

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- Only one AP can be engaged at a time in all other cases.
- If one **AP** pushbutton is set to on with both FDs off, the AP engages in HDG V/S or TRK FPA mode, depending upon which the pilot has selected on the FCU.
- If one **AP** pushbutton is set to on with at least one FD already on, the AP engages in the current active FD modes.
- AP engagement increases the break out force on the sidestick controllers and on the rudder pedals.

AP engagement is indicated by the lighting of the corresponding **FCU** pushbutton and by the appearance of “AP1” (or 2) on the PFD's Flight Mode Annunciator.

3.4.3.3 AP Disengagement

AP1 or 2 disengages when:

- The pilot presses the takeover pushbutton on the sidestick.
- The pilot presses the corresponding **AP** pushbutton on the FCU.
- The pilot pushes on the sidestick harder than a certain threshold or moves on the rudder pedals above a threshold.
- The pilot moves the pitch trim wheel beyond a certain threshold.
- The other AP is engaged, except when localizer/glideslope modes are armed or engaged, or when the rollout or go-around mode is engaged.
- Both thrust levers are set above the MCT detent and the aircraft is on the ground.
- The aircraft reaches the MDA- 50 feet (MDH-50 ft.), or 400 ft. AGL if no MDA/MDH, with APPR mode engaged and a non-ILS approach selected.
- One of the engagement conditions is lost.

Furthermore, in normal law with all protections available, the AP will disconnect if:

- High speed protection is active;
- Angle-of-attack protection is active (α prot + 1° is reached);
- Pitch attitude exceeds 25° up, or 13° down, or bank angle exceeds 45°;
- A rudder pedal deflection is more than 10° out of trim.

The standard way for the Flight Crew to disengage the AP is to press the takeover pushbutton on the sidestick.

When the AP is OFF, the associated **FCU** pushbutton goes off, and “AP1” (or AP2) disappears from the PFD's FMA.

3.4.3.4 AP Warnings

When the AP is disengaged, the system warns the pilot.

- If the pilot disengages it with the takeover pushbutton on the sidestick, the warnings are temporary.
- If the disengagement results from a failure, from the pilot pushing the pushbutton on the FCU, or from a force on the sidestick, the visual and audio warnings are continual.

		AP Disengagement	
		Take Over PB on Sidestick	By Other Means
Consequence	MASTER WARNING	Flashing red during 3 sec max	Flashing red
	ECAM	<ul style="list-style-type: none"> Red AP OFF message 9 second max 	Red warning AUTO FLT AP OFF
	AUDIO	<ul style="list-style-type: none"> Cavalry charge 0.5 sec min 1.5 sec max 	<ul style="list-style-type: none"> Continuous cavalry charge 1.5 sec min
	CLR PB on ECAM Control Panel	Extinguished	Illuminated
Action	MASTER WARNING	<ul style="list-style-type: none"> Extinguishes M.W Erases ECAM warning Stops audio if pressed within 1.5 sec 	<ul style="list-style-type: none"> Extinguishes M.W s Tops audio after 1.5 sec
	CLR PB on ECAM Control Panel	No effect	Extinguishes CLR pb erases ECAM message calls status
	TAKE OVER PB	<ul style="list-style-type: none"> Extinguishes M.W. Erases ECAM warning Stops audio if pressed within 1.5 sec. 	Extinguishes M.W. stops audio after 1.5 sec
ECAM Status Message		NO	YES

3.4.3.5 Autoland Warning

The autoland red warning flashes in LAND mode when:

- the radio altitude goes below 200 feet and
- the aircraft gets too far off the beam (LOC or GLIDE)
 - or both autopilots fail
 - or both localizer transmitters or receivers fail
 - or both glide slope transmitters or receivers fail.

3.4.4 Speed/Mach Control

In flight, either the AP/FD pitch control, or autothrust may acquire and hold a target speed or Mach number, depending on the engaged modes. Speed control is:

- Managed, when the target comes from the FMGS
- Selected, when the target comes from the SPD/MACH FCU window.