

	NAVIGATION ADIRS	1.34.10	P 1
		SEQ 001	REV 15

DESCRIPTION

The Air Data and Inertial Reference System (ADIRS) supplies temperature and anemometric, barometric and inertial parameters to the EFIS system (PFD and ND) and to other user systems (FMGC, FADEC, PRIM, SEC, FWC, SFCC, ATC, GPWS, CMC, CPC).

The system includes :

- three identical ADIRU's (Air Data and Inertial Reference Units).

Each ADIRU is divided in two parts, either of which can work separately in case of failure in the other :

- the ADR (Air Data Reference) part which supplies barometric altitude, airspeed, Mach, angle of attack, temperature and overspeed warnings.
- the IR (Inertial Reference) part which supplies attitude, flight path vector, track, heading, accelerations, angular rates, ground speed and aircraft position.

Note : *The ADIRU gives the true heading instead of magnetic heading :*

- above 82.5° North
- above 73.5° North between 92.5° and 117.5° West (magnetic polar region)
- above 60.5 ° South

- one ADIRS control panel (ADIRS MSU) on the overhead panel for selection of modes (NAV, ATT, OFF) and indications of failures.

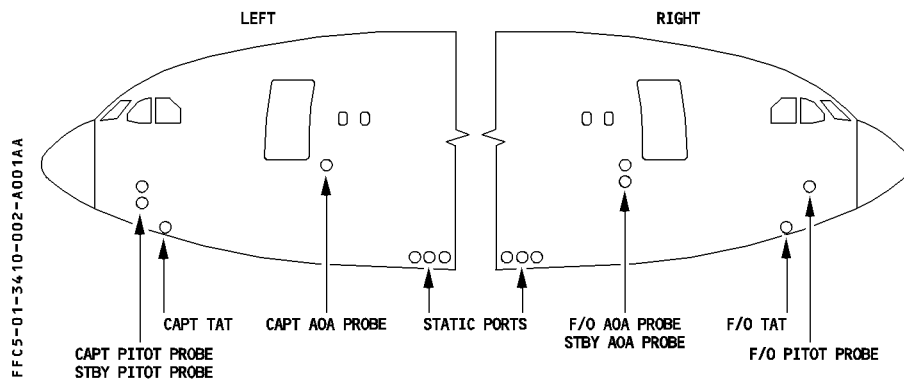
The IR is initialized through the FMGES.

- four types of sensors :
 - pitot probes (3)
 - static pressure probes (STAT) (6)
 - angle of attack sensors (AOA) (3)
 - total air temperature probes (TAT) (2)

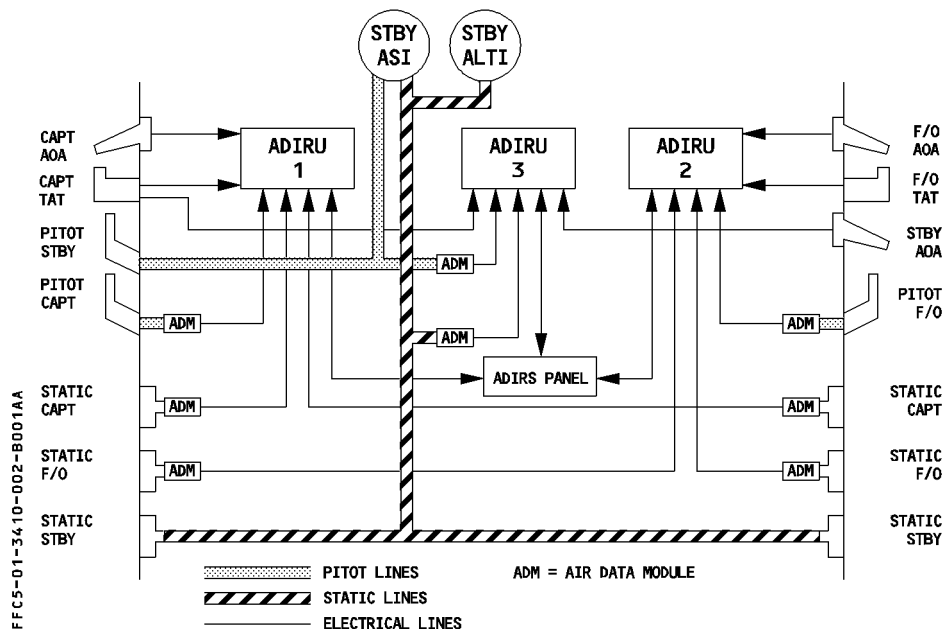
These sensors are electrically heated to prevent from icing up.

- eight ADMs (Air Data Modules) which convert pneumatic data from pitot and static probes into numerical data for the ADIRUs.
- a switching facility for selecting ADR3 or IR3 for instrument displays in case of ADIRU 1 or 2 failure.
- a MAG/TRUE pushbutton switch for polar navigation.
- AC BUS provides normal electrical supply. DC BUS provides a back up possibility through internal inverter.

PROBES LOCATION

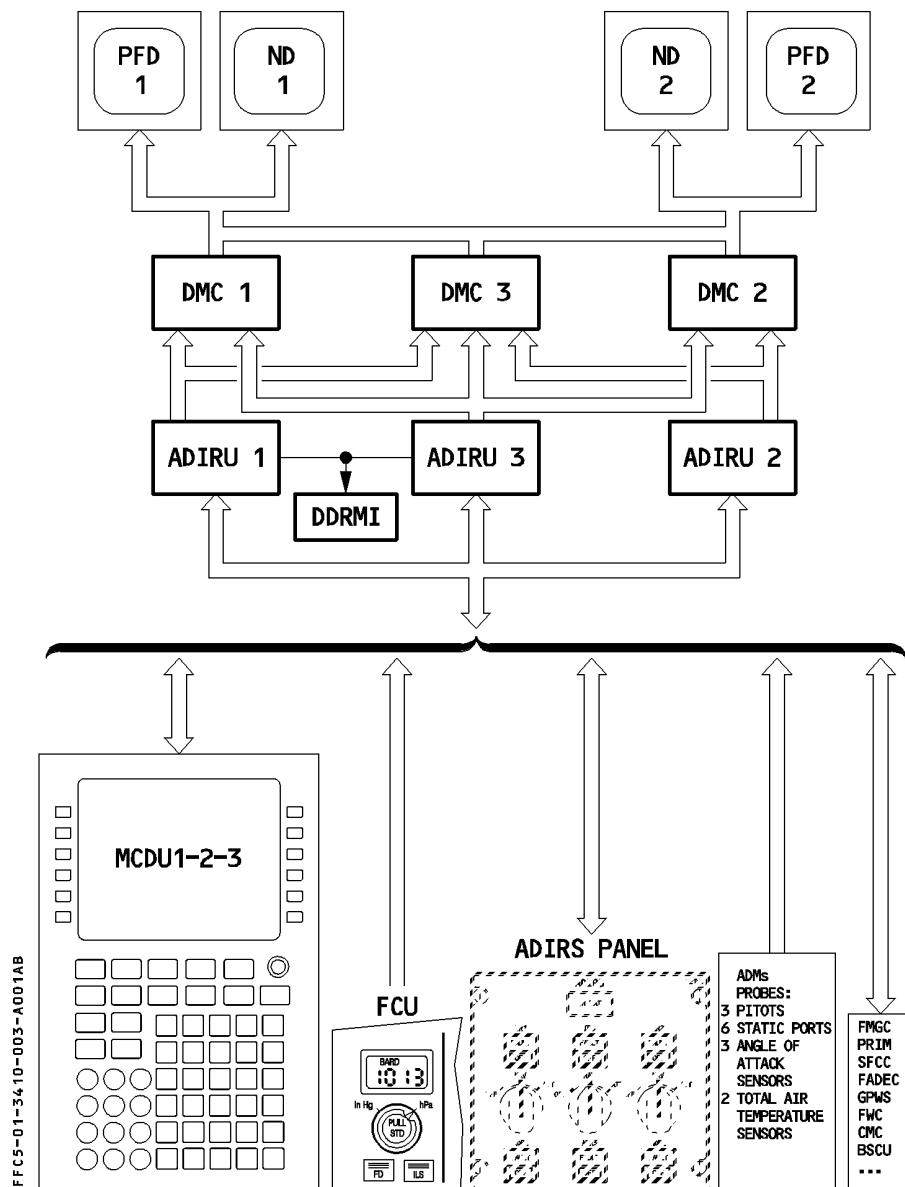


PROBES SCHEMATIC



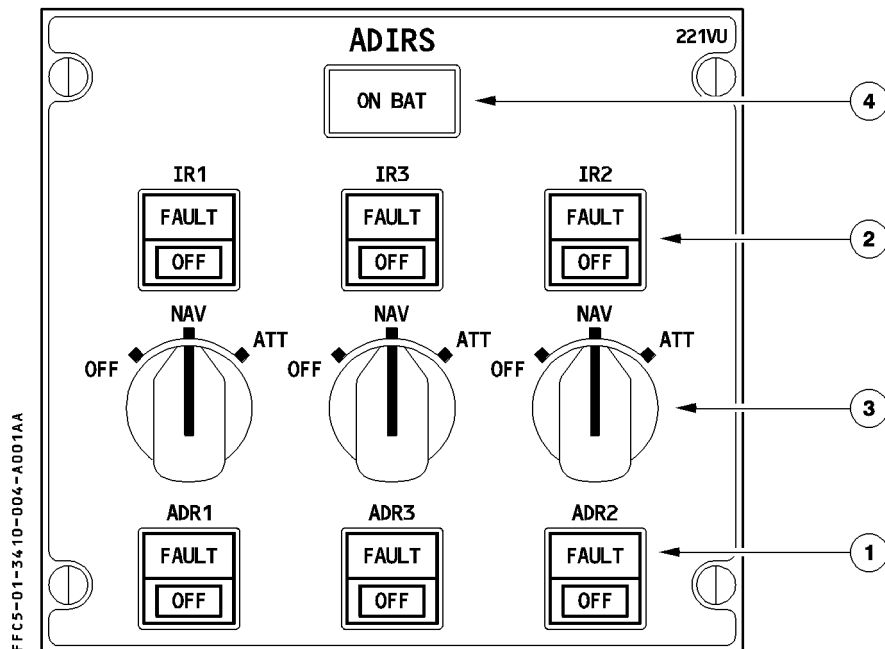
Note : ADIRU 1 is supplied by CAPT probes,
ADIRU 2 is supplied by F/O probes,
ADIRU 3 is supplied by STBY probes and CAPT TAT

ADIRS SCHEMATIC



CONTROLS AND INDICATORS

OVERHEAD PANEL



① ADIR 1 (2) (3) pb sw

- OFF : Air data output disconnected.
 FAULT It : This amber light comes on with an ECAM caution if a fault is detected in the air data reference part.

② IR 1 (2) (3) pb sw

- OFF : Inertial data output disconnected.
 FAULT It : This amber light comes on with an ECAM caution when a fault affects the respective IR.
 Steady : the respective IR is lost.
 Flashing : the attitude and heading information may be recovered in ATT mode.

	NAVIGATION ADIRS	1.34.10	P 5
		SEQ 001	REV 09

③ IR 1 (2) (3) mode rotary sel

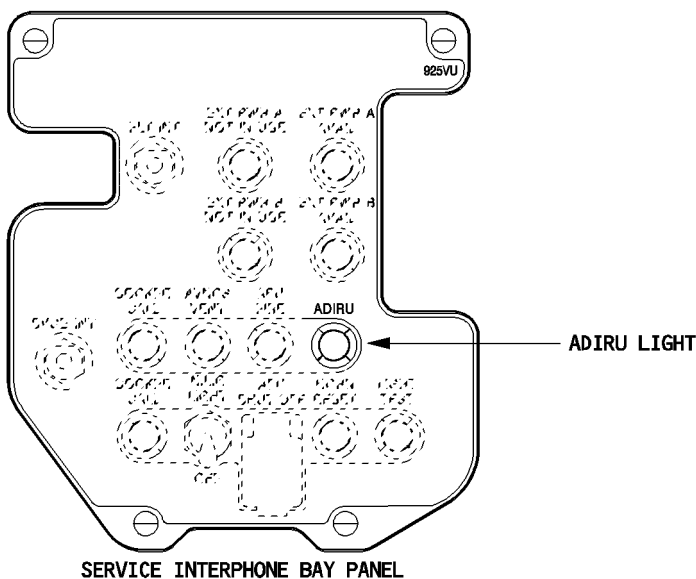
- OFF : The ADIRU is not energized.
ADR and IR data are not available.
- NAV : Normal mode of operation.
Supplies full inertial data to aircraft systems.
- ATT : IR mode supplying only attitude and heading information if the system loses its ability to navigate.
The heading must be entered through the MCDU and has to be reset frequently (about every 10 minutes).

④ ON BAT It

Comes on amber when one or more IRS is supplied only by the aircraft battery. It also comes on for a few seconds at the beginning of the alignment but not for a fast realignment .

Note : If, when the aircraft is on the ground, at least one ADIRU is supplied by aircraft batteries :

- an external horn sounds
- The ADIRU light comes on amber on the SERVICE INTERPHONE BAY panel.





NAVIGATION

ADIRS

1.34.10

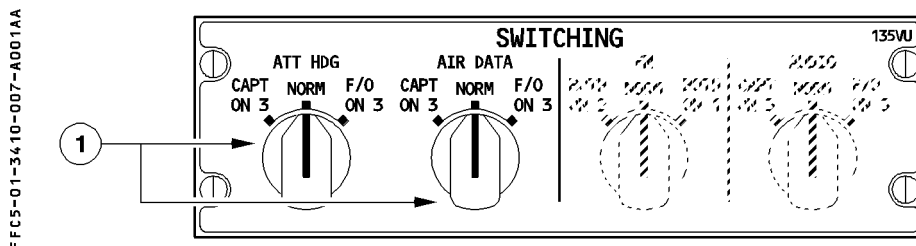
P 6

SEQ 001

REV 07

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PEDESTAL



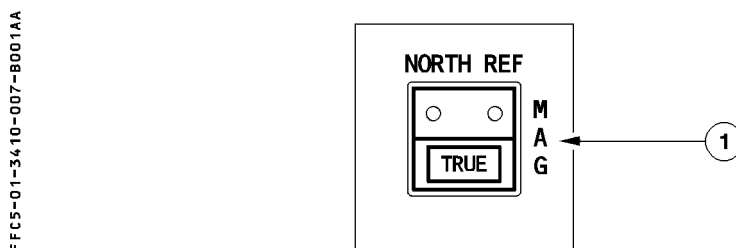
①ATT HDG and AIR DATA sel

NORM	:	ADIRU 1 supplies data to PFD1, ND1, DDRMI and ATC 1. ADIRU 2 supplies data to PFD2, ND2 and ATC2.
CAPT ON 3	:	ADR 3 or IR 3 replaces ADR 1 or IR 1.
F/O ON 3	:	ADR 3 or IR 3 replaces ADR 2 or IR 2.

MAIN INSTRUMENTS PANEL

At high latitude above 82.5° North or 60.5° South (or entering the north magnetic polar region : latitude 73.5° N and longitude between 117.5° W and 92.5° W) the ADIRUs replace magnetic heading by true heading on EFIS and DDRMI.

In addition the GRID track appears on ND. When the aircraft is in close proximity to these regions (latitude above 82° North or 60° South or approaching the north polar region : 73° N and longitude between 90° W and 120° W) the ADIRU will trigger a message on ND "SELECT TRUE REF" requesting to change north reference.

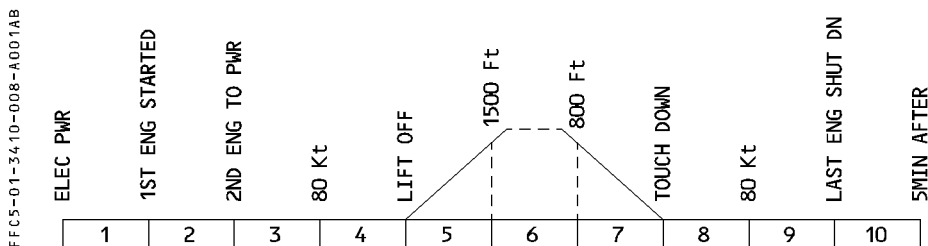


①NORTH REF pb sw

TRUE (in)	:	Pressing this pushbutton selects the true heading for instrument display. TRUE light comes on blue. The ND displays GRID track values if position is above 65° N or S.
MAG (out)	:	Magnetic heading is selected.

	NAVIGATION ADIRS	1.34.10	P 8
		SEQ 001	REV 09

WARNINGS AND CAUTIONS



E/WD : FAILURE TITLE conditions	AURAL WARNING	MASTER LIGHT	SD PAGE CALLED	LOCAL WARNING	FLT PHASE INHIB
STALL WARNING (No ECAM message) An aural stall warning is triggered when the AOA is greater than a predetermined angle This angle depends on – the Slats/Flap position – the Speed/Mach – the F/CTL law (normal, alternate/direct)	Cricket + STALL (synthetic voice)	MASTER WARN	NIL	NIL	NIL
OVERSPEED – VMO/MMO aircraft speed/mach greater than VMO + 4 kt/MMO + 0.006 – VLE aircraft speed greater than VLE + 4 kt with L/G not unlocked or L/G doors not closed – VFE aircraft speed greater than VFE + 4 kt with slats or/and flaps extended.	CRC				
ADR 1(2)(3) FAULT	SINGLE CHIME	MASTER CAUT		ADR FAULT It	1, 4, 8, 10
ADR 1+2 (1+3)(2+3) FAULT				IR FAULT It	1, 4, 5, 7, 8, 10
IR 1(2)(3) FAULT					1, 4, 8, 10
IR 1+2 (1+3)(2+3) FAULT				CHECK HDG (on ND and PFD)	4, 8
HDG DISCREPANCY difference between heading on CAPT and F/O displays greater than 5° in TRUE or than 7° in MAG	CHECK ATT (on PFD)				
ATT DISCREPANCY difference between roll or pitch angle displayed on CAPT and F/O PFD greater than 5°	CHECK ALT (on PFD)				
ALTI DISCREPANCY difference between altitude displayed on CAPT and F/O PFD greater than : – 500 ft if baro ref STD is selected – 250 ft if ONH is selected					

	NAVIGATION ADIRS	1.34.10 P 9	
		SEQ 001	REV 09

EWD : FAILURE TITLE conditions	AURAL WARNING	MASTER LIGHT	SD PAGE CALLED	LOCAL WARNING	FLT PHASE INHIB
EXTREME LATITUDE A/C enters in polar area, the crew must select true reference	SINGLE CHIME	MASTER CAUT	NIL	NIL	4, 5, 7, 8
BARO REF DISCREPANCY discrepancy between F/O and captain baro ref					3,4,8
IR NOT ALIGNED Problem detected during IR alignment					NIL
FM/IR POS DISAGREE discrepancy between a/c position computed by FMs and given by IRs					1, 2, 3, 4, 5, 7, 8, 9, 10

MEMO DISPLAY

- IRS IN ALIGN XXX
- IR XXX IN ATT ALIGN
messages appear in green during an IR alignment.
The message IRS IN ALIGN becomes amber if engines are running or flashes green if IRS alignment is faulty.
- TRUE NORTH REF appears in green when the NORTH REF pushbutton switch is at TRUE. The message is pulsing during 10 seconds in phase 1 or 2 or at slats extension.
- ADIRS SWTG appears in green when either AIR DATA or ATT HDG selector is not in NORM position.