
FLIGHT Version: 15.1.0
Release: beta
Database: 53.8.0
Prop_Noise: 5.8.0
Build: 9971/73.61%
Licensed to: Owner

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JOB IDENTITY

Run Time: Friday 6 May 2022 at 14:51
Computer platform is MS Windows

MODEL REQUESTED

Airplane = A320-211 ; Version 1.4.3 ; TCDS FAA.A28NM
Engine = CFM56-5C4P; Version ; TCDS EASA.E.067
APU = 131-9
Conventional transport airplane

Airplane/Engine/Data are CLASSIFIED

BLOCK 0. AIRCRAFT

Body type = narrow
Overall length = 37.57 [m]
Overall Height = 12.28 [m] (nominal)
Equivalent diameter = 5.01 [m]
Slenderness l/deq = 7.50
Max cross-sect area = 19.69 [m²], 16.70 [m] from nose

BLOCK 1. FUSELAGE

Fuselage length = 37.570 [m]
Max width = 3.950 [m] (nominal)
Height = 3.950 [m] (nominal)
Eccentricity = 0.000

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Forebody length	=	6.089	[m]	[0.162 of fuse length]
Center length	=	18.293	[m]	[0.487 of fuse length]
Floor area	=	90.709	[m ²]	
Floor length	=	31.934	[m]	
Side area	=	130.870	[m ²]	
Aftbody length	=	13.188	[m]	[0.351 of fuse length]
Cross area	=	12.254	[m ²]	
Max cross area	=	13.778	[m ²]	
Lower upsweep angle	=	12.238	[degs]	
Mean upsweep angle	=	7.962	[degs]	

BLOCK 2. WING

Exposed area	=	100.137	[m ²]	
Reference area	=	124.543	[m ²]	
Virtual Area	=	125.622	[m ²]	
Wing span	=	34.100	[m]	(nominal)
Wing span	=	34.100	[m]	(winglet)
Tip chord	=	1.450	[m]	
Chord @ break	=	3.841	[m]	
Root chord	=	6.188	[m]	
Taper ratio	=	0.234		
Aspect ratio	=	9.337		(with reference area)
Aspect ratio	=	11.612		(with exposed area)
Aspect ratio	=	9.256		(with virtual area)
MAC	=	3.817	[m]	
y(MAC)	=	6.460	[m]	
xLE(MAC)	=	15.077	[m]	(from nose)
QC MAC point	=	16.032	[m]	(from nose)
MAC	=	3.647	[m]	(graphical meth)
y(MAC)	=	7.225	[m]	(graphical meth)
Sweep LE	=	28.328	[degs]	
Sweep QC	=	24.720	[degs]	
Sweep TE	=	17.511	[degs]	(inboard)
Sweep, C/2	=	20.890	[degs]	
Dihedral	=	4.763	[degs]	

Average t/c	=	0.124	
Root t/c	=	0.141	(estimated)
Tip t/c	=	0.112	(estimated)
Root LE radius	=	0.029	[m], (estimated)
Tip LE radius	=	0.010	[m], (estimated)
Root TE angle	=	17.046	[deg]
Tip TE angle	=	25.891	[deg]
Root max camber	=	0.010	[/chord] at x/c = 0.831
Tip max camber	=	0.010	[/chord] at x/c = 0.831
Ground clearance	=	0.198	(z/span at MLG)

Wing mounted LOW : tapered, swept-back

BLOCK 3. WING WIREFRAME:

Span	,	fuselage	=	2.000	[m]
Taper ratio	,	fuselage	=	1.000	
QC sweep angle	,	fuselage	=	0.000	[deg]
Span	,	inner sec	=	4.353	[m]
Taper ratio	,	inner sec	=	0.621	
QC sweep angle	,	inner sec	=	24.720	[deg]
Span	,	outer sec	=	10.697	[m]
Taper ratio	,	outer sec	=	0.377	
QC sweep angle	,	outer sec	=	24.699	[deg]

BLOCK 4. HORIZONTAL STABILIZER

Exposed area	=	23.012	[m ²]
Virtual area	=	27.900	[m ²]
Span	=	12.884	[m]
Tip chord	=	1.286	[m]
Root chord	=	3.109	[m] at wing-body intersection
Root chord	=	3.665	[m] at y-symmetry plane
Taper ratio	=	0.414	
Aspect ratio	=	7.213	(with ref. area)
Sweep LE	=	30.529	[degs]
Sweep C2	=	22.510	[degs]
Sweep QC	=	26.660	[degs]
Dihedral	=	5.524	[degs]
MAC	=	2.666	[m]
yLE(MAC)	=	2.705	[m]

xLE(MAC) = 33.196 [m]
Root thickness = 0.116
Tip thickness = 0.107
x-centroid = 34.915 [m]
y-centroid = 3.901 [m]
Trimmable H-tail = True

BLOCK 5. VERTICAL STABILIZER (Central Fin)

Area, planform = 22.564 [m2]
Height = 6.231 [m]
Root chord = 5.483 [m]
Tip chord = 1.781 [m]
Aspect-ratio = 1.720 [m] (span = height)
Sweep LE = 40.832 [degrees]
Sweep QC = 33.606 [degrees]
MAC = 3.946 [m]
yLE(MAC) = 2.586 [m]
xLE(MAC) = 32.322 [m] (with respect to V-Tail
leading edge)
Root thickness = 0.104
Tip thickness = 0.099
x-centroid = 34.569 [m]
z-centroid = 0.185 [m]

BLOCK 6. Control Surface: FLAP

INBOARD flap(s) chord = 1.040 [m] (average)
flap span = 3.585 [m]
aspect ratio = 3.449
x-centroid = 18.346 [m]
y-centroid = 3.937 [m]
2x flap area = 7.454 [m2]

OUTBOARD flap(s) chord = 0.732 [m] (average)
flap span = 7.780 [m]
aspect ratio = 10.636
x-centroid = 19.629 [m]
y-centroid = 9.640 [m]
2x flap area = 11.382 [m2]

total flap area = 18.836 [m2]
 flap_area/wing_area = 0.151
 total flap_span/span = 0.667
 In/outboard sealing = yyy

BLOCK 7. Control Surface: SLAT

INBOARD slat chord = 0.349 [m] (average)
 slat span = 3.192 [m] (one side)
 aspect ratio = 9.150
 2x slat area = 2.227 [m2]

OUTBOARD slat chord = 0.250 [m] (average)
 slat span = 10.194 [m]
 aspect ratio = 40.711
 2x slat area = 5.105 [m2]
 x-centroid = 17.789 [m]
 y-centroid = 11.252 [m]

total slat area = 7.333 [m2]
 slat_area/wing_area = 0.059
 total slat_span/span = 0.785

BLOCK 7.1 Slat/Flap Angles (Vflap1 = min flap-speed)

Config	Flap[deg]	Slat[deg]	Vflap1[kt]
0	0	0	210
1	0	18	190
2	10	18	180
3	15	22	170
4	20	22	160

BLOCK 8. Control Surface: AILERON

Area = 1.749 [m2]
 span = 3.103 [m]
 AVG chord = 0.564 [m]
 chord/wingchord = 0.213 (on average data)
 hinge point = 0.787 (x/c)
 inner span position = 13.238 [m] , 2y/b = 0.776

aspect-ratio = 5.505
x-centroid = 21.237 [m]
y-centroid = 14.841 [m]

BLOCK 8.1 Control Surface: SPOILERS

Area = 2.707 [m²]
span = 1.773 [m]
AVG chord = 0.763 [m]
aspect-ratio = 1.161
x-centroid = 17.943 [m]
y-centroid = 5.371 [m] (inboard)

Area = 8.875 [m²]
span = 6.383 [m]
AVG chord = 0.695 [m]
aspect-ratio = 4.590
x-centroid = 19.327 [m]
y-centroid = 9.906 [m] (outboard)

BLOCK 9. Control Surface: ELEVATOR

Area = 3.816 [m²]
span = 5.289 [m]
AVG chord = 0.721 [m]
chord/VT_chord = 0.328 (on average data)
hinge point = 0.672 (x/c)
aspect-ratio = 7.332
x-centroid = 35.723 [m]
y-centroid = 3.760 [m]

BLOCK 10. Control Surface: RUDDER

Area = 7.445 [m²]
span = 6.330 [m]
AVG chord = 1.215 [m]
chord/HT_chord = 0.334 (on average data)
hinge point = 0.666 (x/c)
aspect-ratio = 5.383

x-centroid = 35.647 [m]
z-centroid = 8.802 [m]

BLOCK 11. WINGLETS

Area = 0.374 [m2]
height = 0.947 [m]
root chord = 0.781 [m]
tip chord = 0.169 [m]
taper ratio = 0.216
cant angle = 0.000 [degs] (top)
x-centroid =

BLOCK 12. FLAP TRACKS

max cross area = 0.070 [m2]
max width = 0.236 [m]

Tracks Position and Length

unit	length[m]
1	2.561
2	2.561
3	2.561

BLOCK 13. NACELLES & ENGINES

Engines number = 2
NACELLE width = 2.322 [m]
NACELLE length = 3.256 [m]
NACELLE fore length = 0.891 [m]
INLET duct length = 0.814 [m]
INLET area = 2.389 [m2] 1 inlets/engine
INLET diameter = 1.744 [m] (average)
INLET scarf angle = 2.60 [deg]
FAN diameter = 1.836 [m]
FAN tip chord = 0.147 [m]
FAN blade count = 36
SPINNER diameter = 0.000 [m]
ground clearance = 0.623 [m] (inner engines)
moment arm = 6.079 [m] (inner engines)
arm/semi-span = 0.357
NOZZLE core diam = 1.032 [m] (average)
NOZZLE bypass diam = 1.440 [m] (average)

NOZZLE core plug = 1.141 [m]
NOZZLE bypass plug = 0.270 [m]
NOZZLE core area = 0.352 [m²] (core exhaust)
NOZZLE bypass area = 1.106 [m²] (bypass exhaust)

NOZZLE height = 1.720 [m]

BLOCK 14. MAIN UNDER-CARRIAGE

L-Gear units = 2
wheels/unit = 2
axels/unit = 1
Tyre Specs = 46.0 x 17.0 x 20.0
wheel diameter = 1.168 [m]
wheel width = 0.432 [m]
cavity diameter = 1.596 [m]
wheel cavity depth = 0.046 [m]
bogie width = 1.300 [m]
V-strut length = 2.060 [m]
V-strut diameter* = 0.216 [m]
O-strut length* = 1.748 [m]
O-strut diameter* = 0.130 [m]
ALL struts length* = 5.191 [m]
bay door area* = 1.160 [m²]
bay door length* = 1.168 [m]
bay door width* = 1.262 [m]
bay door depth* = 1.262 [m]
wheel track alignment = 0.0 [degs] at landing
folding type = sideway on retraction
** Geometrical Data Verified

BLOCK 15. NOSE UNDER-CARRIAGE

number of wheels = 2
Tyre Specs = 30.0 x 8.8 x 20.0
wheel diameter = 0.657 [m]
wheel width = 0.000 [m]
cavity diameter = 1.596 [m]
cavity depth = 0.046 [m]
bogie width = 0.615 [m]
V-strut length = 1.355 [m]
V-strut diameter* = 0.000 [m]
ALL struts length* = 3.591 [m]

bay door area* = 0.972 [m2]
bay door length* = 1.463 [m]
bay door width* = 0.471 [m]
bay door depth* = 0.710 [m]

** Geometrical Data Verified

BLOCK 16. UNDER-CARRIAGE SYSTEM

wheel track = 7.590 [m] (between tyre centers)
nose L-Gear = 5.070 [m] (from nose)
wheel base = 12.640 [m] (NLG-tyre center to
MLG-bogie center)
MLG centre/fuse_length = 0.471 [m]

BLOCK 17. Reference Points wrt NOSE (0,0)

wing leading edge = 12.673 [m]
H-tail leading edge = 32.333 [m]
V-tail leading edge = 30.087 [m]
x front engine = 11.360 [m]
y front engine = 6.079 [m]
z front engine = 1.720 [m]
xfan = 12.174 [m]
xnozzle = 14.616 [m]

BLOCK 18. Reference Points for Stability Analysis

Estimated CG position = 30.00 % MAC
CG from fuselage nose = 16.223 [m]
x(CG)/fuselage_length = 0.432
H-Tail Volume Coefficient = 0.850
V-tail Volume Coefficient = 0.091
Fuselage coefficient = 1.233
fuse_(length*width^2)/(Area*MAC)
Max. rudder deflection = 25.0 [degs]
Max. aileron deflection = 25.0 [degs]
Max. spoiler deflection = 60.0 [degs]

BLOCK 18b. Other data

Limit rotation, take-off = 19.78 degs, tail strike
Wing Strike at bank = 13.50 degs, zero-attitude
Wing Strike at bank = 13.21 degs, 10-deg attitude

BLOCK 19. AIRCRAFT VOLUMES

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Fuselage_nose      =      0.00 [m3]  
Fuselage_centre   =     224.17 [m3]  
Fuselage_tail     =      96.82 [m3]  
Wing-body blend   =       9.32 [m3]  
Fuselage          =    330.31 [m3]  
Wings             =       0.00 [m3]  
H-stabiliser/system =     0.00 [m3]  
V-stabiliser/system =     0.00 [m3]  
Engines/nacelle   =       0.00 [m3]  
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TOTAL volume      =       0.00 [m3]  
OEW/Volume        =       0.00 [kg/m3]
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** Warning: Aircraft Volumes NOT calculated **

BLOCK 20. Propeller Characteristics

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* Non existent for this airplane
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Note: Clearances/heights are average; add +/- 0.05 m to account for variation

due to weight, CG position and other factors

Note: Data with asterisk to be interpreted as "approximate" or "inferred"

** End FLIGHT Report 1510b5380, Run 575