Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Time or Relative time counts	24 hours 0 to 4095	±0.125% per hour	4	1s	UTC time preferred when available. Counter increments each four seconds of system operation
Pressure Altitude	-1000' to maximum certificated altitude -1000' to maximum certificated altitude +5000'	±100' to ±700' (refer TSO C124a, C51a)	1	5' to 35'	Data should be obtained from the air data computer when practicable
Indicated airspeed or Calibrated airspeed	50 KIAS or minimum value to Max V_{so}, and V_{so} to $1.2V_D$	±5% and ±3%	1	1kt	Data should be obtained from the air data computer when practicable
Heading (primary flight crew reference)	0 - 360º 0 - 360º and discrete 'true' or 'mag'	±2º	1	0.5º	When true or magnetic heading can be selected as the primary heading reference, a discrete indicating selection must be recorded

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Normal acceleration (vertical)	-3g to +6g	±1% maximum range excluding datum error of ±5%	0.125	0.004g	
Pitch attitude	±75º	±2º	1 or 0.25 for aeroplanes manufactured after 2002	0.5º	A sampling rate of 0.25 is recommended
Roll attitude	±180º	±2º	1 or 0.5 for aeroplanes manufactured after 2002	0.5º	A sampling rate of 0.5 is recommended
Manual radio transmitter keying or CVR/DFDR synchronisation reference	Discrete - 'on' or 'off'		1		Preferably each crew member but one discrete acceptable for all transmission provided the CVR/DFDR system complies with TSO C124a CVR synchronisation requirements

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Thrust/power on each engine (primary flight crew reference)	Full range forward	±2%	1 per engine	0.3% of full range	Sufficient parameters (e.g. EPR, N_1 or Torque, N_P) as appropriate to the particular engine be recorded to determine power in forward and reverse thrust, including potential overspeed conditions
Autopilot engagement	Discrete - 'on' or 'off'		1		
Longitudinal acceleration	±1g	±1.5% maximum range excluding datum error of ±5%	0.25	0.004 g	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Pitch control(s) position (non fly-by-wire systems)[1]	Full range	±2°	1 0.5 or 0.25 for aeroplanes manufactured after 2002	0.5% of full range	For aeroplanes that have a flight control break away capability that allows either pilot to operate the controls independently, record both control inputs. The control inputs may be sampled alternately once per second to produce the sampling interval of 0.5 or 0.25, as applicable
Pitch control(s) position (fly-by-wire systems)	Full range	±2°	1 0.5 or 0.25 for aeroplanes manufactured after 2002	0.275% of full range	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Lateral control(s) position (non fly-by-wire systems)[1]	Full range	±2°	1 0.5 or 0.25 for aeroplanes manufactured after 2002	0.2% of full range	For aeroplanes that have a flight control break away capability that allows either pilot to operate the controls independently, record both control inputs. The control inputs may be sampled alternately once per second to produce the sampling interval of 0.5 or 0.25, as applicable
Lateral control(s) position (fly-by-wire systems)	Full range	±2°	1 0.5 or 0.25 for aeroplanes manufactured after 2002	0.22% of full range	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Yaw control(s) position (non fly-by-wire systems)[1]	Full range	±2°	1 0.5	0.3% of full range	For aeroplanes that have a flight control break away capability that allows either pilot to operate the controls independently, record both control inputs. The control inputs may be sampled alternately once per second to produce the sampling interval of 0.5
Yaw control(s) position (fly-by-wire systems)	Full range	±2°	1 0.5	0.2% of full range	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Pitch control surface(s) position[1]	Full range	±2°	1 0.5 or 0.25 for aeroplanes manufactured after 2002	0.2% of full range	For aeroplanes fitted with multiple or split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately. The control surfaces may be sampled alternately to produce the sampling interval of 0.5 or 0.25
Lateral control surface(s) position[1]	Full range	±2°	1 0.5 or 0.25 for aeroplanes manufactured after 2002	0.3% of full range	For aeroplanes fitted with multiple or split surfaces, a suitable combination of surface position sensors is acceptable in lieu of recording each surface separately. The control surfaces may be sampled alternately to produce the sampling interval of 0.5 or 0.25

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Yaw control surface(s) position[1]	Full range	±2°	1 0.5	0.2% of full range	For aeroplanes fitted with multiple or split surfaces, a suitable combination of surface position sensors is acceptable in lieu of recording each surface separately. The control surfaces may be sampled alternately to produce the sampling interval of 0.5
Lateral acceleration	±1g	±1.5% maximum range excluding datum error of ±5%	0.25	0.004g	Twin engine aircraft only
Pitch trim surface position	Full range	±3%	1	0.6% of full range	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Trailing edge flap or cockpit control position	Full range or discrete each position	±3° or pilot's indicator	2	0.5% of full range	Flap position and cockpit control may each be sampled alternately at four second intervals, to give a data point every two seconds
Leading edge flap or cockpit control position	Full range or discrete each position	±3° or pilot's indicator	2	0.5% of full range	Left and right sides, or flap position and cockpit control may each be sampled at four second intervals, so as to give a data point each two seconds
Each thrust reverser position or equivalent for propeller aeroplane	Discrete - 'stowed', 'in transit', 'reverse'		1 per engine		Turbojet - two discretes enable the three states to be determined Turboprop - one discrete
Ground spoiler position or speed brake position	Full range or discrete each position	±2°	1 or 0.5 for aeroplanes manufactured after 2002	0.5% of full range	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Outside air temperature or total air temperature	-50ºC to +90ºC	±2º C	2	0.3º C	
Autopilot/autothrottle/AFCS mode and engagement status	Discretes - suitable combination		1		Discretes should show which systems are engaged and which primary modes are controlling the flight path and speed of the aircraft
Radio altitude	-20' to +2 500'	±2' or ±3% whichever is the greater below 500' and ±5% above 500'	1	1' + 5% above 500'	For autoland/ category III operations, each radio altimeter should be recorded, but arranged so that at least one is recorded each second.

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Localiser deviation, MLS azimuth, or GNSS latitude deviation.	±400 microamps or available sensor range as installed ±62º	As installed - ±3% recommended	1	0.3% of full range	For autoland/ category III operations, each radio altimeter should be recorded, but arranged so that at least one is recorded each second. It is not necessary to record ILS and MLS at the same time, only the approach aid in use need be recorded
Glideslope deviation, MLS elevation, or GNSS vertical deviation.	±400 microamps or available sensor range as installed +0.9º to +30º	As installed - ±3% recommended	1	0.3% of full range	For autoland/ category III operations, each radio altimeter should be recorded, but arranged so that at least one is recorded each second. It is not necessary to record ILS and MLS at the same time, only the approach aid in use need be recorded

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Marker beacon passage	Discrete - 'on' or 'off'		1		A single discrete is acceptable for all markers
Master warning	Discrete		1		Record the master warning and record each 'red' warning that cannot be determined from other parameters or from the cockpit voice recorder
Air/ground sensor (primary aeroplane sensor, nose or main gear)	Discrete - 'air' or 'ground'		1 (0.25 recommended)		
Angle of attack (if measure directly)	As installed	As installed	2 or 0.5 for aeroplanes manufactured after 2002	0.3% of full range	If left and right sensors are available, each may be recorded at four second intervals so as to give a data point each 0.5 second
Hydraulic pressure low, each system	Discrete - 'low' or 'normal' or available sensor range	±5%	2	0.5% of full range	
Groundspeed	As installed	Most accurate system installed	1	0.2% of full range	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
GPWS	Discrete - 'warning' or 'off'		1		A suitable combination of discretes unless recorder capacity is limited in which case a single discrete for all modes is acceptable
Landing gear position or landing gear cockpit control selection	Discrete		4		A suitable combination of discretes should be recorded
Drift angle	As installed	As installed	4	0.1°	
Wind speed and direction	As installed	As installed	4	1kt and 1°	
Latitude and longitude	As installed	As installed	4	0.002°	Provided by the Primary Navigation System Reference. Where capacity permits latitude/longitude resolution should be 0.0002°
Stick shaker and pusher activation	Discrete - 'on' or 'off'		1		A suitable combination of discretes to determine activation

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Windshear detection	Discrete - 'warning' or 'off'		1		
Throttle/power lever position	As installed Full range	As installed ±2%	1 per lever	 2% of full range	For aeroplanes with non-mechanically linked cockpit engine controls
Additional engine parameters	As installed	As installed	Each engine each second	2% of full range	EPR, N_1, N_2, EGT Where capacity permits, the preferred priority is - indicated vibration level, N_2, EGT, Fuel Flow, Fuel Cut-off lever position, and N_3, unless the engine manufacturer recommends otherwise

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
TCAS	Discretes	As installed	1		A suitable combination of discretes should be recorded to determine the status of - Combined Control, Vertical Control, Up Advisory, and Down Advisory. (refer ARINC Characteristic 735 - Attachment 6E, TCAS VERTICAL RA DATA OUTPUT WORD)
DME 1 and 2 distances	0 - 200NM	As installed	4	1NM	1 mile
Nav 1 and 2 selected frequency	Full range	As installed	4		Sufficient to determine selected frequency
Selected barometric setting	Full range	±5%	1 per 64 seconds	0.2% of full range	
Selected altitude	Full range	±5%	1	100'	
Selected speed	Full range	±5%	1	1kt	
Selected Mach	Full range	±5%	1	0.01	
Selected vertical speed	Full range	±5%	1	100ft/min	
Selected heading	Full range	±5%	1	1°	
Selected flight path	Full range	±5%	1	1°	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Selected decision height	Full range	±5%	64	1’	
EFIS display format	Discretes		4		Discretes should show the display system status (off, normal, fail, composite, sector, plan, navigation aids, weather radar, range, copy)
Multi-function/engine alerts display format	Discretes		4		Discretes should show the display system status (off, normal, fail) and the identity of display pages for emergency procedures need not be recorded
Thrust command	Full range	±2%	2	2% of full range	
Thrust target	Full range	±2%	4	2% of full range	
Fuel quantity in CG trim tank	Full range	±5%	1 per 64 seconds	1% of full range	
Primary navigation system reference	Discretes - ‘GNSS’, ‘INS’, ‘VOR/DME’, ‘MLS’, ‘Loran C’, ‘Omega’,		4		A suitable combination of discretes to determine the Primary Navigation

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
	'Localiser Glideslope'				System reference
Ice detection	Discrete - 'ice' or 'no ice'		4		
Engine warning each engine - vibration	Discrete		1		
Engine warning each engine - over temp	Discrete		1		
Engine warning each engine - oil pressure low	Discrete		1		
Engine warning each engine - over speed	Discrete		1		
Yaw trim surface position	Full range	±3%	2	0.3% of full range	
Roll trim surface position	Full range	±3%	2	0.3% of full range	
Brake pressure - left and right	As installed	As installed ±5%	1		To determine braking effort applied by pilots or by autobrakes
Brake pedal application - left and right	Discrete or analogue - 'applied' or 'off'	As installed ±5%	1		To determine braking applied by pilots
Yaw and side-slip angle	Full range	±5%	1	0.5º	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Engine bleed valve position	Discrete - 'open' or 'closed'		4		
De-icing or anti-icing system selection	Discrete - 'on' or 'off'		4		
Computed centre of gravity	Full range	±5%	1 per 64 seconds	1% of full range	
AC electrical bus status	Discrete - 'power' or 'off'		4		Each bus
DC electrical bus status	Discrete - 'power' or 'off'		4		Each bus
APU bleed valve position	Discrete - 'open' or 'closed'		4		
Hydraulic pressure each system	Full range	±5%	2	100psi	
Loss of cabin pressure	Discrete - 'loss' or 'normal'		1		
Computer failure - critical flight and engine control systems	Discrete - 'fail' or 'normal'		4		
HUD	Discrete - 'on' or 'off'		4		
Para-visual display	Discrete - 'on' or 'off'		1		

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Cockpit trim control input position - pitch	Full range	±5%	1	0.2% of full range	Where mechanical means for control inputs are not available, cockpit display trim positions should be recorded.
Cockpit trim control input position - roll	Full range	±5%	1	0.7% of full range	Where mechanical means for control inputs are not available, cockpit display trim positions should be recorded.
Cockpit trim control input position - yaw	Full range	±5%	1	0.3% of full range	Where mechanical means for control inputs are not available, cockpit display trim positions should be recorded.
Trailing edge flap and cockpit flap control position	Full range or discrete each position	±5%	2	0.5% of full range	Trailing edge flaps and cockpit flap control position may each be sampled alternately at

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of rule 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
					four second intervals to provide a sample each 0.5 second
Leading edge flap and cockpit flap control position	Full range or discrete each position	±5%	1	0.5% of full range	
Ground spoiler position and speed brake selection	Full range or discrete each position	±5%	0.5	0.3%of full range	
All cockpit flight control input forces - control wheel, control column, rudder pedal	Full range – control wheel- ±70lbs, control column ±85lbs, rudder pedals, ±165lbs.	±5%	1	0.3% of full range	For fly-by-wire flight control systems, where flight control surface position is a function of the displacement of the control input device only, it is not necessary to record this parameter

Notes:

1. For aeroplanes that can demonstrate the capability of deriving either the control input or control movement (one from the other) for all modes of operation and flight regimes only the surface position OR the control position need be sensed. For aeroplanes with non-mechanical control systems (fly-by-wire) both surface and control position must be recorded.