Civil Aviation Authority
United Kingdom

TYPE-CERTIFICATE DATA SHEET

UK.TC.E.00081

for

GE Passport 20 Series Engine

Type Certificate Holder

General Electric Company

GE Aviation

One Neumann Way

Cincinnati, OH 45215-6310

United States of America

Model(s):	Passport 20-17BB1A Passport 20-18BB1A Passport 20-19BB1A
Issue:	2
Date of issue:	08 November 2024

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Section 1 General (All Models)

I. General

This Type-Certificate Data Sheet (TCDS) is the concise definition of the type-certificated product accepted and or approved by the CAA in the UK for the affected types and models.

This TCDS includes:

1. Details of the type design that affect the TCDS that have been approved or accepted by the CAA in the UK from 01 January 2021.

2. Details of the type design that affected the TCDS and were approved or accepted by EASA before 01 January 2021 and were incorporated into EASA TCDS EASA.IM.E.113 at Issue 02 dated 13 December 2019 and are therefore accepted by the UK under Article 15 of Annex 30 of the UK-EU Trade and Cooperation Agreement.

Section 2
GE Passport 20 Series Engines

I. General

1. Type / Variant or Model

GE Passport 20 Series Engine:

Models
Passport 20-17BB1A
Passport 20-18BB1A
Passport 20-19BB1A

2. Type Certificate Holder

General Electric Company
GE Aviation
One Neumann Way
Cincinnati, OH 45215-6310
United States of America

3. Manufacturer

PC108
GE Aviation
One Neumann Way
Cincinnati, OH 45215-6310
United States of America

4. Date of Application at FAA (Certificating Authority)

Model	Application Date
Passport 20-17BB1A	22 May 2012
Passport 20-18BB1A	22 May 2012
Passport 20-19BB1A	15 April 2014

5. Type Certification date at FAA (Certificating Authority)

Model	Certification date
Passport 20-17BB1A	29 April 2016
Passport 20-18BB1A	29 April 2016
Passport 20-19BB1A	29 April 2016

6. Date of Application at CAA (Validating Authority)

Model	Application Date
Passport 20-17BB1A	09 June 2016
Passport 20-18BB1A	09 June 2016
Passport 20-19BB1A	09 June 2016

7. Type Certification date at CAA (Validating Authority)

Model	Certification Date
Passport 20-17BB1A	18 December 2018
Passport 20-18BB1A	18 December 2018
Passport 20-19BB1A	18 December 2018

II. Certification Basis

1. State of Design Authority Certification Basis

Model	State of Design Authority Certification Basis
Passport 20-17BB1A	See FAA TCDS E00091EN
Passport 20-18BB1A	
Passport 20-19BB1A	

2. Reference Date for determining the applicable airworthiness requirements.

Model	Reference Date for Applicable Airworthiness Requirements
Passport 20-17BB1A	31 December 2013
Passport 20-18BB1A	
Passport 20-19BB1A	

3. UK CAA Certification Basis

3.1 Airworthiness standards

Model	CAA Airworthiness Standards
Passport 20-17BB1A	- CS-E Amendment 3, dated 23 December 2010, Including: - CS-E 1030 Time Limited Dispatch.
Passport 20-18BB1A	
Passport 20-19BB1A	

3.2 Special Conditions (SC)

Model	Special Conditions (SC)
Passport 20-17BB1A	- Endurance Test 15 seconds Transient Over-temperature
Passport 20-18BB1A	
Passport 20-19BB1A	

3.3 Equivalent Safety Findings (ESF)

Model	Equivalent Safety Findings (ESF)
Passport 20-17BB1A	- Test points for minimum response time to 95% of rated Take-off Power - Endurance Test Schedule
Passport 20-18BB1A	
Passport 20-19BB1A	

3.4 Deviations

None

3.5 Environmental Protection

Model	Environmental Protection Standards
Passport 20-17BB1A	In accordance with Article 9 of Assimilated Regulation (EU) 2018/1139, as amended, meeting the requirement of ICAO Annex 16 Volume II, Amendment 10 applicable 01 January 2021. NOx standard in accordance with ICAO Annex 16 Volume II, Part III, Chapter 2, $ 2.3.2 e) (CAEP/8). Maximum nvPM mass concentration levels in compliance with ICAO Annex 16 Volume II, Part III, Chapter 4, paragraph 4.2.2.1 nvPM mass and number emissions in compliance with Part III, Chapter 4, paragraph 4.2.2.2 a) 1) and 4.2.2.2 b) 1) (CAEP/11 In-Production standard.
Passport 20-18BB1A	
Passport 20-19BB1A	

III. Technical Characteristics

1. Type Design Definition

Model	Type Design Definition (Approved Part List)
Passport 20-17BB1A	GE Passport 20-17BB1AG01/G02 GE Passport 20-17BB1AG03/G04 GE Passport 20-17BB1AG05/G06
Passport 20-18BB1A	GE Passport 20-18BB1AG01/G02 GE Passport 20-18BB1AG03/G04 GE Passport 20-18BB1AG05/G06
Passport 20-19BB1A	GE Passport 20-19BB1AG01/G02 GE Passport 20-19BB1AG03/G04 GE Passport 20-19BB1AG05/G06

2. Description

The GE Passport 20 engine is a high bypass dual-rotor, axial-flow turbofan. The bypass ratio of the engine is 5.6:1 with an overall pressure ratio of 45:1. The High-Pressure Compressor (HPC) pressure ratio is 23:1. The HPC is driven by a two stage High Pressure Turbine (HPT). The 10-stage HPC includes five blisk stages for weight reduction. The integrated front fan and three stage Low Pressure Compressor (LPC) is driven by a four stage Low Pressure Turbine (LPT). A Low Emission combustor (LEC) is used for weight and emissions advantage. Combustor case has integrated OGV diffuser for weight reduction. The accessory drive system extracts energy from the high-pressure, high-speed rotor to drive the engine accessories and the engine- mounted aircraft accessories. The engine is equipped with a dual channel Next Gen Full-Authority Digital. Engine Control (FADEC) control system which provides enhanced fault isolation and capability for engine functionality and diagnostics.

3. Equipment

Refer to the engine part list.
See Notes 7 and 8.

4. Dimensions

Overall dimensions:

Model	Length(*) (mm)	Width(*) (mm)	Height(*) (mm)
Passport 20-17BB1A	3366	1380	1318
Passport 20-18BB1A			
Passport 20-19BB1A			

(*) Length is taken from fan spinner to aft centerbody flange; width and height are maximum envelopes Centre of gravity location (Engine only):

	LH Engine (mm)			RH Engine (mm)		
Model	Station (axial)	Waterline	Buttline	Station (axial)	Waterline	Buttline
Passport 20-17BB1A	5525	2466	2560	5532	2466	2510
Passport 20-18BB1A						
Passport 20-19BB1A						

5. Dry Weight

Model	Weight(*) (kg)
Passport 20-17BB1A	2065.7
Passport 20-18BB1A	
Passport 20-19BB1A	

(*) Weight includes basic engine, basic engine accessories, and optional equipment as listed in the manufacturer's engine specifications.

6. Ratings

Static thrust, at sea level - see Notes 1, 3 and 4 -:

	Take-off (5 minutes)		Maximum Continuous	
Model	Rating - see Note 4 - **(daN)**	Flat Rating Ambient Temperature **(°C)**	Rating **(daN)**	Flat Rating Ambient Temperature **(°C)**
Passport 20-17BB1A	7893	35	7480	25
Passport 20-18BB1A	8200		7813	
Passport 20-19BB1A	8416	30	7813	

7. Control System

Model	FMU	EEC	Pressure Sub-system	FADEC Software (*)	Data Entry Plug	Fuel Pump
Passport 20-17BB1A	2496M14	2500M36	2474M65	2575M73	2531M61	2496M12
Passport 20-18BB1A						
Passport 20-19BB1A						

(*) Earlier Part Number shown.
Refer to the latest revision of GE Passport 20 Service Bulletin SB73-0002 for the detailed information pertaining to the minimum approved FADEC software version that needs to be installed.

Model	Two Ignition Exciters	Two Igniter Plugs
Passport 20-17BB1A	2488M61	2519M29
Passport 20-18BB1A		
Passport 20-19BB1A		

8. Fluids (Fuel, Oil Coolant, Additives)

Fuel:
Refer to GE Passport Service Bulletin 73-0001 and its latest revision for detailed information pertaining to fuels and additives. This Service Bulletin lists the eligible fuels and additives conforming to GE Aviation Specification D50TF2. Eligible fuel classifications are:
Class A – Aviation Kerosene
Class C – Low Freeze Kerosene
Class D – High Flash Kerosene
Class E – Low Flash Kerosene
NOTE: Class B – (Jet B, JP4) is prohibited.

Oil:
Refer to GE Passport 20 Service Bulletin 79-0001 and its latest revision for detailed information pertaining to lubricant brands and additives. This Service Bulletin lists the approved oils conforming to GE Aviation Specification D50TF1. Eligible fuel classifications are:
Class A, Class B, Class C, Class E, Class F and Class G

9. Aircraft Accessory Drives (All models)

Accessory	Rotation (1)	Gear Ratio to Core Rotor	Drive Shaft (rpm)	Maxi-mum Weight (kg)	Maximum Overhung Moment (Nm)	Shear Torque (Nm)	Cont. Pad Rating (kW)	Over-Load (kW)
VFG	CW	0.8523	16773	41.27 Wet	59.77 Wet	474.54	76.1	89.5 (2)
Air Turbine Starter	CW	0.5714	11246	9.50 Dry	6.40 Dry	847.38	N/A	N/A
Fuel Pump	CW	0.3844	7565	13.08 Dry	13.39 Dry	342.34	63.0	N/A
PMA	CW	0.9143	17993	2.73 Dry	0.62	N/A	0.52	N/A
PMG	CCW	0.9143	17993	1.49 Dry	0.75 Dry	N/A	0.82	N/A
Lube Unit	CW	0.2406	4734	12.08 Wet	13.55	192.52	3.58	N/A
Hydraulic Pump	CCW	0.2406	4734	9.23 Dry	10.53 Dry	305.06	19.2 at idle speed 33.6 at max speed	29.7 at idle speed 51.8 at max speed
Core Turn Cranking Pad	CW (3)	0.3466	6821	N/A	N/A	N/A	N/A	N/A

100 percent core engine speed is 19680.1 rpm.

Notes:

(1) Rotation is defined facing the pad.

(2) VFG Overload ratings for 2 minutes. 172 HP at flight idle, 5 sec - 81.5 HP at flight idle, up to 5 min.

(3) 0.5 inch (12.7 mm) square drive.

10. Maximum Permissible Air Bleed Extraction (All models)

Stage 4	
PS3 (kPa)	Percent W25
0	5.00
414	5.00
414	10.00
1710	10.00
1944	9.60
1944	8.20
2317	8.20
3378	6.10
4020	5.50
> 4020	5.50

Stage 7	
PS3 (kPa)	Percent W25
0	2.40
483	2.40
621	2.30
814	1.70
1551	1.05
2517	0.75
4137	0.50
> 4137	0.50

Stage 10	
PS3 (kPa)	Percent W25
0	10.00
414	10.00
414	15.00
1172	15.00
1772	11.60
3130	8.00
3130	4.60
> 3130	4.60

IV. Operating Limitations

1. Temperature Limits

	Maximum Indicated Permissible Turbine Exhaust Gas Temperature (EGT)					
Model	**Take-off (5 min)** see Notes 4 and 5 **(°C)**	**Maximum 15-sec EGT Excursion – Max 20 Excursions** (*) **(°C)**	**Maximum Continuous s s (°C)**	**Ground Starts (manual or auto) (°C)**	**Inflight Starts (manual or auto) (°C)**	**Inflight Starts (high power fuel cut) (°C)**
Passport 20-17BB1A	1035	1077	995	750	875	975
Passport 20-18BB1A						
Passport 20-19BB1A						

(*) Before maintenance action is required. Operator needs to maintain the count of excursions.

	Oil Temperature Limits	
Model	**Continuous (°C)**	**Transient (15 minutes) (°C)**
Passport 20-17BB1A	160	165
Passport 20-18BB1A		
Passport 20-19BB1A		

2. Speed Limits

	Maximum Permissible Engine Rotor Speeds	
Model	**Low Pressure Rotor (N1) (rpm)**	**High Pressure Rotor (N2) (rpm)**
Passport 20-17BB1A	6260 (103.7%) (1)	22625 (114.9%) (2)
Passport 20-18BB1A		
Passport 20-19BB1A		

(1) 100% N1 rotor speed is 6032.4 rpm

(2) 100% N2 rotor speed is 19680.1 rpm

3. Torque Limits

Not applicable

4. Pressure Limits

4.1 Fuel Pressure

Fuel Pressure Limits at the Engine Pump Inlet:

1. Aircraft Boost Pump Operative : The minimum pressure at the engine fuel pump inlet with aircraft boost pumps operative is true vapour pressure plus 5 psia (34.5 kPa) with aircraft boost pump operative to a maximum of 50 psia (345 kPa). The maximum vapour to liquid ratio at the engine fuel pump inlet with aircraft boost pumps operative is zero.
2. Aircraft Boost Pump Inoperative: The engine fuel system operation is restricted with the aircraft boost pumps inoperative as outlined in the GE Passport 20 Installation Manual GEK 112054.

4.2 Oil Pressure

Oil Pressure Limits:
See Figure 8.2.6 of the GE Passport 20 Specific Operating Instructions GEK 112053 for definition of minimum and maximum oil pressures.

It is permissible to operate below minimum oil pressure for a maximum of 20 seconds during negative G operations. Refer to GE Passport 20 Operating Instructions GEK 112053 for a definition of minimum oil pressure.

5. Time Limited Dispatch (TLD)

The engine is approved for Time Limited Dispatch in accordance with CS-E 1030.Criteria pertaining to the engine control systems' dispatch and maintenance requirements have been specified in GEK 119289 FADEC Control System Time Limited Dispatch Summary Document and Chapter 5 Airworthiness Limitation section of the GEK 112062 Line Maintenance Manual. These documents define the various configurations and maximum operating intervals.

6. ETOPS Capability

n/a

V. Operating and Service Instructions

Manuals	Passport 20
Engine Installation Manual	GEK 112054
Engine Operating Instructions	GEK 112053

Instructions for Continued Airworthiness (ICA)	Passport 20
Line Maintenance Manual	GEK 112062
Engine Shop Manual	GEK 112063
Fault Isolation Manual (FIM)	See Line Maintenance Manual
Overhaul Manual (OHM)	See Engine Shop Manual
Standard Practices Manual (SPM)	GEK9250
Consumable Products Manual (CPM)	See Standard Practices Manual
Non-Destructive Test Manual (NDTM)	See Standard Practices Manual
Components Maintenance Manuals (CMM)	As published by GE
Service Bulletins (SB)	As published by GE

VI. Notes

(1). The GE Passport 20 engine models are limited to installation on the Bombardier Aerospace Global-7500 and Global-8000 model aircrafts only with respect to the installed power response characteristics. Any configuration changes that could significantly and adversely affect power response will have to be reassessed.

(2). The CAA accepted Airworthiness Limitation Section of the Instructions for Continued Airworthiness is published in the Chapter 5 of the GE Line Maintenance Manual, GEK 112062.

(3). Engine ratings are based on a calibrated test stand, under the conditions specified below:
1. Sea level static, standard pressure (101.3 kPa), 15°C
2. No customer bleed or customer power extraction
3. Ideal engine Inlet, 100 % ram recovery.
4. Production aircraft cowling
5. Production instrumentation
6. Fuel lower heating value of 42799 kJ/kg.

(4). Take-off time Limit:
The normal 5-minute take-off time limit may be extended to 10 minutes for engine out contingency.

(5). Exhaust Gas Temperature (EGT) shunting: The GE Passport 20-17BB1A model incorporates an EGT shunt of 31°C at fan speeds above idle. Thus, for an indicated EGT of 1035°C, the measured EGT is 1004° C.

(6). For operating in Icing conditions, requirements, limitation and notes are specified in the latest version of GE Passport Specific Operating Instructions GEK 112053.

(7). The following equipment are provided as part of the Passport 20 engine type design, but have specific aircraft level requirements:

1. Fire Detector, Fan Cowl – GE part no. 2580M13P01 / 2580M13P02
2. Fire Detector, Accessory Gear Box – GE part no. 2516M97P01
3. Fire Detector, Low Pressure Turbine Sensor – GE part no. 2516M98P01

(8). The following parts or equipment are not part of the Passport 20 engine type design, but are required to be compatible with the engine under its certification basis:

1. Thrust Reverser, LH
2. Thrust Reverser, RH
3. Pre-Cooler System
4. Engine Driven Hydraulic Pump
5. Variable Frequency Generator
6. Permanent Magnetic Generator
7. Air Management System
   A. Bleed Pressure Sensor
   B. Bleed Monitoring Pressure Sensor
   C. Pressure Regulating Shut-off valve.
   D. Fan Air Valve

(9). Engine Mount System Provisions: The GE Passport 20 engine models contains the following engine mount system parts that need to meet Aircraft level requirements:

1. Yoke - Forward and Aft
2. Link - Forward and Aft
3. Pin, Pylon
4. Bolt, Shoulder Link – Forward and Aft
5. Thrust Link
6. Bolt, Shoulder Thrust Link
7. Pin, Pylon Thrust Link

Section 3 Administration

I. Acronyms and Abbreviations

Acronym / Abbreviation	Definition
ARINC	Aeronautical Radio, Incorporated
AGB	Accessories Gearbox
CNA	Common Nozzle Assembly
DIS	Drawing Introduction Sheet
EASA	European Union Aviation Safety Agency
ESF	Equivalent Safety Finding
EBU	Engine Build Unit
EEC	Engine Electronic Controller
EMI	Electro Magnetic Interference
FADEC	Full Authority Digital Engine Control
HP	High Pressure
ICAO	International Civil Aviation Organisation
IDG	Integrated Drive Generator
IP	Intermediate Pressure
LP	Low Pressure
rpm	Revolutions per Minute
SC	Special Conditions
TCDS	Type Certificate Data Sheet
TC	Type Certificate
TGT	Turbine Gas Temperature
CAA	Civil Aviation Authority
VGF	Variable Frequency Generator
PMA	Permanent Magnet Alternator
PMG	Permanent Magnet Generator

II. Type Certificate Holder Record

TCH Record	Period
General Electric Company GE Aviation One Neumann Way Cincinnati, OH 45215-6310 United States of America	

III. Amendment Record

TCDS Issue No.	TCDS Issue Date	Changes	TC Issue and Date
1	21 June 2023	Section 1 is added to provide explanatory notes about the details of the type design that affect the TCDS, that have been approved or accepted by the CAA in the UK from 01 January 2021 and that the design changes accepted by EASA before 01 January 2021 were incorporated into EASA TCDS EASA.IM.E.113 at Issue 02 dated 13 December 2019 were therefore accepted by the UK under Article 15 of Annex 30 of the UK-EU Trade and Cooperation Agreement. Section 2 (II) (1), (2), added to provide information about certifying authority and certification basis applied by the certificating authority. Section 2 (III) Design Definition Modifications following introduction of Oil Drain Mast Seals (UK CAA – Major change approval UK.MAJ.00276)	Issue 1 21 June 2023
2	08 November 2024	Introduction of CAEP/11 for nvPM compliance (UK CAA – Major change approval UK.MAJ.00368)	Issue 1 21 June 2023

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