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# TYPE-CERTIFICATE DATA SHEET

No. **IM.E.113**

**for Engine**

GE Passport 20 Series Engine

**Type Certificate Holder**

General Electric Company

GE Aviation

One Neumann Way

Cincinnati, OH 45215-6310

United States of America

For Models:

Passport 20-17BB1A

Passport 20-18BB1A

Passport 20-19BB1A



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## **I. General**

### **1. Type / Models**

GE Passport 20 Series Engine:

<b>Models</b>
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. Manufacturers**

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

### **4. Date of Application**

<b>Model</b>	<b>Application Date</b>
Passport 20-17BB1A	09 June 2016
Passport 20-18BB1A	
Passport 20-19BB1A	

### **5. EASA Type Certification Date**

<b>Model</b>	<b>EASA Certification Date</b>
Passport 20-17BB1A	18 December 2018
Passport 20-18BB1A	
Passport 20-19BB1A	

## **II. Certification Basis**

### **1. State of Design Authority Certification Basis**

<b>Model</b>	<b>State of Design Authority Certification Basis</b>
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. EASA Certification Basis

### 3.1. Airworthiness Standards

Model	EASA Airworthiness Standards
Passport 20-17BB1A	<ul style="list-style-type: none"> <li>▪ CS-E Amendment 3, dated 23 December 2010, including:                             <ul style="list-style-type: none"> <li>- CS-E 1030 Time Limited Dispatch</li> </ul> </li> </ul>
Passport 20-18BB1A	
Passport 20-19BB1A	

### 3.2. Special Conditions (SC)

Model	Special Conditions (SC)
Passport 20-17BB1A	<ul style="list-style-type: none"> <li>▪ Endurance Test 15 seconds Transient Over-temperature</li> </ul>
Passport 20-18BB1A	
Passport 20-19BB1A	

### 3.3. Equivalent Safety Findings (ESF)

Model	Equivalent Safety Findings (ESF)
Passport 20-17BB1A	<ul style="list-style-type: none"> <li>▪ Test points for minimum response time to 95% of rated Take-off Power</li> <li>▪ Endurance Test Schedule</li> </ul>
Passport 20-18BB1A	
Passport 20-19BB1A	

### 3.4. Deviations

None.

### 3.5. Environmental Protection

Model	Environmental Protection Standards
Passport 20-17BB1A	CS-34 Amendment 3 as implemented by ED Decision 2019/014/R (29th July 2019); ICAO Annex 16 Volume II, Amendment 9 (1st January 2018) as implemented into EU legislation 11/09/2018; NOx levels in compliance with Part III, Chapter 2, paragraph 2.3.2e) (CAEP/8) of the above mentioned Annex. Maximum nvPM mass concentration levels in compliance with Part III, Chapter 4, paragraph 4.2.2 (CAEP/10) of the above mentioned Annex.
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
Passport 20-18BB1A	GE Passport 20-18BB1AG01/G02 GE Passport 20-18BB1AG03/G04
Passport 20-19BB1A	GE Passport 20-19BB1AG01/G02 GE Passport 20-19BB1AG03/G04

#### 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 <sup>(*)</sup> (mm)	Width <sup>(*)</sup> (mm)	Height <sup>(*)</sup> (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

Center of gravity location (Engine only):

Model	LH Engine (mm)			RH Engine (mm)		
	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 <sup>(*)</sup> (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 -:

Model	Take-off (5 minutes)		Maximum Continuous	
	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 <sup>(1)</sup>	Gear Ratio to Core Rotor	Drive Shaft (rpm)	Maximum 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 <sup>(2)</sup>
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 <sup>(3)</sup>	0.3466	6821	N/A	N/A	N/A	N/A	N/A

100 percent core engine speed is 19680.1 rpm.

**Notes:**

<sup>(1)</sup> Rotation is defined facing the pad.

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

<sup>(3)</sup> 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

Model	Maximum Indicated Permissible Turbine Exhaust Gas Temperature (EGT)					
	Take-off (5 min) see Notes 4 and 5  (°C)	Maximum 15-sec EGT Excursion – Max 20 Excursions (*)  (°C)	Maximum Continuous  (°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.

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

### 2. Speed Limits

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

<sup>(1)</sup> 100% N1 rotor speed is 6032.4 rpm

<sup>(2)</sup> 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**

**Note 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.

**Note 2.** The EASA approved Airworthiness Limitation Section of the Instructions for Continued Airworthiness is published in the Chapter 5 of the GE Line Maintenance Manual, GEK 112062.

**Note 3.** Engine ratings are based on a calibrated test stand, under the conditions specified below – see also Note 3:

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

**Note 4.** Take-off time Limit:

The normal 5-minute take-off time limit may be extended to 10 minutes for engine out contingency.

**Note 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.

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

**Note 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

**Note 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

**Note 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: ADMINISTRATIVE**

**I. Acronyms and Abbreviations**

CS-E Certification Specifications for Engines  
EEC Electronic Engine Control  
ESF Equivalent Safety Finding  
ETOPS Extended Range Operation with Two-Engine Aeroplanes  
FAA Federal Aviation Administration  
FADEC Full Authority Digital Engine Control  
FMU Fuel Metering Unit  
GE General Electric  
HP High Pressure  
PMA Permanent Magnet Alternator  
PMG Permanent Magnet Generator  
SC Special Condition  
TCDS Type Certificate Data Sheet  
TLD Time Limited Dispatch  
VFG Variable Frequency Generator

**II. Type Certificate Holder Record**

Not applicable

**III. Change Record**

Issue	Date	Changes	TC issue
Issue 01	18 December 2018	Initial Issue	Initial Issue, 18 December 2018
Issue 02	13 December 2019	Introduction of CAEP/10 for nvPM compliance (EASA Major Change approval 10072045)	

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