

**Civil Aviation Authority  
United Kingdom**



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## TYPE-CERTIFICATE DATA SHEET

**UK.TC.E.00117**

for  
GE90 Series Engines

**Type Certificate Holder**  
General Electric Company  
GE Aviation  
1 Neumann Way  
Cincinnati, OH 45215  
United States of America

Model(s):

GE90-76B  
GE90-77B  
GE90-85B  
GE90-90B  
GE90-94B  
GE90-110B1  
GE90-113B  
GE90-115B

Issue: 01

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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 IM.E.002 at Issue 04 dated 18 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 GE90 Series Engines**

**I. General**

**1. Type / Variant or Model**

Type	Models
GE90	GE90-76B
	GE90-77B
	GE90-85B
	GE90-90B
	GE90-94B
	GE90-110B1
	GE90-113B
	GE90-115B

**2. Type Certificate Holder**

General Electric Company  
 GE Aviation  
 1 Neumann Way  
 Cincinnati, OH 45215  
 United States of America

**3. Manufacturer**

General Electric Company  
 GE Aviation  
 1 Neumann Way  
 Cincinnati, OH 45215-6310  
 USA

**4. Date of Application at FAA (Certificating Authority)**

Models	Application Date
GE90-76B, GE90-85B	16 December 1991
GE90-90B	10 August 1994
GE90-77B	20 November 1995
GE90-94B	05 March 1999
GE90-113B, GE90-115B	27 June 2000
GE90-110B1	09 January 2002

**5. Type Certification date at FAA (Certificating Authority)**

<b>Models</b>	<b>Issued/Amended date</b>
GE90-76B, GE90-85B	02 February 1995
GE90-90B	02 July 1996
GE90-77B	02 July 1996
GE90-94B	09 June 2000
GE90-113B, GE90-115B	30 July 2003
GE90-110B1	30 July 2003

**6. Date of Application at CAA (Validating Authority)**

<b>Models</b>	<b>Application Date</b>
GE90-76B, GE90-85B	22 February 2024
GE90-90B	22 February 2024
GE90-77B	22 February 2024
GE90-94B	22 February 2024
GE90-113B, GE90-115B	22 February 2024
GE90-110B1	22 February 2024

Application for CAEP/11 Compliance.

**7. Type Certification date at CAA (Validating Authority)**

<b>Models</b>	<b>Approval date</b>
GE90-76B, GE90-85B	08 November 2024
GE90-90B	08 November 2024
GE90-77B	08 November 2024
GE90-94B	08 November 2024
GE90-113B, GE90-115B	08 November 2024
GE90-110B1	08 November 2024

Application approval for CAEP/11 compliance.

**II. Certification Basis**

**1. Reference Date for determining the applicable airworthiness requirements.**

<b>Models</b>	<b>Application Date (*)</b>
GE90-76B, GE90-85B	24 January 1992
GE90-90B	14 November 1995
GE90-77B	10 April 1996
GE90-94B	14 December 1999
GE90-113B, GE90-115B	02 January 2001
GE90-110B1	08 May 2002

**2. State of Design Airworthiness Authority Type Certification Data Sheet Number**

FAA TCDS E00049EN

**3. State of Design Airworthiness Authority Certification Basis**

Refer to FAA TCDS E00049EN

#### 4. UK CAA Certification Basis

##### 4.1 Airworthiness Standards

Models	Airworthiness Standards
GE90-76B, GE90-77B, GE90-85B, GE90-90B, GE90-94B	JAR-E Change 8 (dated 4 May 1990) plus Orange Paper E/91/1 (dated 27 May 1991, which embodied NPA-E-8, E-14, and E-15)
GE90-110B1, GE90-113B, GE90-115B	JAR-E Change 10 (dated 15 August 1999)

##### 4.2 Special Conditions (SC)

Models	Airworthiness Standards
GE90-76B, GE90-77B, GE90-85B, GE90-90B	SC1: JAR-E800 Bird Ingestion: Special condition based on the new identified 2.5 lb medium bird and 8 lb large bird threats. SC2: JAR-E790 Ingestion of Rain and Hail: Special condition based on the new identified rain and hail threats.
GE90-94B	SC 1: JAR-E 800 Bird Ingestion: Special condition based on the NPAE-20 dated 3 December 1999. SC2: JAR-E 790 Inclement weather: Special condition requesting compliance with JAR-E 790 Chg. 10.
GE90-110B1, GE90-113B, GE90-115B	SC1: Medium and large Birds Ingestion SC2: Programmable Logic device SC3: Fan Blade Containment

##### 4.3 Equivalent Safety Findings (ESF)

Models	Airworthiness Standards
GE90-76B	JAR-E 740 (d)(1) - Time to accelerate from 10% to 95% T/O thrust. JAR-E 840(a)(1)(2) or (3) - Rotor Integrity JAR-E 640(b)(1) - Static Pressure Tests JAR-E 740(f) - Speed limitations at Maximum Continuous rating. JAR-E 740 (f)(4)(iii) - 60s transient Take off EGT. JAR-E-890 and E650 (b)(2) Thrust Reverser Tests
GE90-77B, GE90-85B, GE90-90B	JAR-E 740 (d)(1) - Time to accelerate from 10% to 95% T/O thrust. JAR-E 840(a)(1)(2) or (3) - Rotor Integrity JAR-E 640(b)(1) - Static Pressure Tests JAR-E-890 and E650 (b)(2) Thrust Reverser Tests
GE90-94B	JAR-E 740 (d)(1) - Time to accelerate from 10% to 95% T/O thrust. JAR-E 840(a)(1)(2) or (3) - Rotor Integrity JAR-E 640(b)(1) - Static Pressure Tests JAR-E-890 - Thrust Reverser Tests JAR-E 780 - Tests in Ice Forming Conditions
GE90-110B1, GE90-113B, GE90-115B	JAR-E 800(b)(3) - "Additional assessment", as of Special Condition 1 JAR-E 840 & JAR-E 850 - HPT Stage 2 Disk Rotor Integrity Compliance

**4.4 Deviations**

None

**4.5 Elect to Comply**

Models	Airworthiness Standards
GE90-76B, GE90-77B, GE90-85B, GE90-90B, GE90-94B	None
GE90-110B1, GE90-113B, GE90-115B	JAR-E 640 Pressure Loads as of amendment 11. JAR-E 840 Rotor Integrity as of amendment 11. JAR-E 510 Safety Analysis as of amendment 12

**4.6 Environmental Protection**

GE90-76B, GE90-77B, GE90-85B, GE90-90B, GE90-94B	CS 34.2 in accordance with Amendment 7 of ICAO Annex 16 Volume II. Compliance with the NOx regulation of ICAO Annex 16, Volume II, Part III, Chapter 2, paragraph 2.3.2
GE90-113B	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 11th September 2018. NOx levels in compliance with Part III, Chapter 2, paragraph 2.3.2 e) (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
GE90-110B1, GE90-115B	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). HC, CO levels in compliance with ICAO Annex 16 Volume II, Part III, Chapter 2, paragraph 2.3.2. 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).

**III. Technical Characteristics****1. Type Design Definition**

Type design definition for all modes are as defined by the applicable approved model list.

**2. Description**

Model	Description
GE90-76B, GE90-77B, GE90-85B, GE90-90B, GE90-94B	Dual rotor, axial flow, high bypass ratio turbofan. The 10-stage high pressure compressor is driven by a 2-stage high pressure turbine. The single stage fan and 3-stage low pressure compressor are driven by a 6-stage low pressure turbine. The engine includes the starter and the engine mount and does not include the thrust reverser
GE90-110B1, GE90-113B, GE90-115B	Dual rotor, axial flow, high bypass ratio turbofan. The 9-stage high pressure compressor is driven by a 2-stage high pressure turbine. The single stage fan and 4-stage low pressure compressor are driven by a 6-stage low pressure turbine. The engine includes the starter and the engine mount and does not include the thrust reverser.

### 3. Equipment

As defined by the applicable and approved Model Lists.

See also Note 1.

### 4. Dimensions

Models	Dimensions mm (Inches)		
	Overall Length Fan spinner to Nozzle Centre Body	Overall Width Maximum Envelope	Overall Height Maximum Envelope
GE90-76B, GE90-77B, GE90-85B, GE90-90B, GE90-94B	7283 (286.9)	3871 (152.4)	3952 (155.6)
GE90-110B1, GE90-113B, GE90-115B	7281 (286.7)	3769 (148.4)	3926 (154.6)

### 5. Dry Weight

Models	Dry Weight Kg (lbs)
GE90-76B, GE90-77B, GE90-85B, GE90-90B, GE90-94B	7892 kg (17400 lbs)
GE90-110B1, GE90-113B, GE90-115B	8761 kg (19316 lbs)

### 6. Ratings

Models	Sea Level Static Thrust			
	Take-off (5 minutes) - see Note 3 - daN (lbf)	Flat Rating Ambient Temperature °C (°F)	Maximum Continuous daN (lbf)	Flat Rating Ambient Temperature °C (°F)
GE90-76B	36062 (81070)	32.8 (91)	33553 (75430)	25 (77)
GE90-77B	36342 (81700)	32.8 (91)	33553 (75430)	25 (77)
GE90-85B	39531 (88870)	30 (86)	36133 (81230)	25 (77)
GE90-90B	41813 (94000)	30 (86)	40292 (90580)	25 (77)
GE90-94B	43281 (97300)	30 (86)	40292 (90580)	25 (77)
GE90-110B1	49268 (110760)	33 (92)	48930 (110000)	25 (77)
GE90-113B	50501 (113530)	30 (86)	48930 (110000)	25 (77)
GE90-115B	51395 (115540)	30 (86)	48930 (110000)	25 (77)



**7. Control System**

The engine is equipped with a Full Authority Digital Engine Control (FADEC) system.

**Configuration Type Box and FADEC Rating Plug P/N – See Note 5**

Models	Configuration Type Box	Models	FADEC Rating Plug
GE90-76B, GE90-77B, GE90-85B, GE90-90B,	320-837-701-0	GE90-76B	320 - 833-701-0
	320-839-501-0	GE90-77B	320 - 833-901-0
	320-892-101-0	GE90-85B	320 - 833-801-0
	320-892-201-0		320 - 834-201-0
	320-846-701-0	GE90-90B	320 - 834-001-0
	320-892-601-0	GE90-110B1	G01 - 390-801-011-0
	320-915-201-0		G02 - 390-803-001-0
320-921-501-0	G03 - 390-803-011-0		
GE90-94B	320-921-501-0	G04 - 390-803-021-0	
GE90-110B1	390-801-011-0 390-803-001-0 390-803-011-0 390-803-021-0	GE90-113B	G01 - 390-802-001-0
			G02 - 390-804-001-0
			G03 - 390-803-001-0
			G04 - 390-803-21-0
GE90-113B, GE90-115B	390-850-001-0 390-851-001-0 390-850-002-0 390-851-002-0	GE90-115B	G01 - 390-800-001-0
			G02 - 390-805-001-0
			G03 - 390-805-011-0
			G04 - 390-805-021-0

**FADEC Hardware (H/W) and Software (S/W) P/N – see note 5**

Models	H/W and S/W	H/W	S/W
GE90-76B	1838M16	1959M87 1838M16	1853M99
GE90-76B, GE90-77B, GE90-85B, GE90-90B,	n/a	1959M87 183M16	1853M99
GE90-94B	1959M87	1838M16	1853M99
GE90-110B1, GE90-113B, GE90-115B	n/a	1962M67	2041M27

**8. Fluids (Fuel, Oil)**

**8.1 Fuel:**

Refer to FAA TCDS E00049EN.

**8.2 Oil:**

Refer to FAA TCDS E00049EN.

## 9. Aircraft Accessory Drives

Models	Drive Pad	Rotation Facing Gearbox Pad	Gear Ratio to Core Speed	Horse-power Con. Pad Rating KW (HP)	Shear Torque Nm (in.lb)	Max Overhung Moment Nm (in.lb)
GE90-76B, GE90-77B, GE90-85B, GE90-90B, GE90-94B	IDG (120 KVA)	CCW <sup>(1)</sup>	0.7947	181.3 (243)	1130 - 1187 (10000-10500)	226.0 (2000)
	Hydraulic Pump	CCW	0.3783	63.5 (85)	480 - 548 (4250-4850)	26.0 (230)
	VSCF/PMG Generator	CCW	2.4126	43.3 (58)	395 – 508 <sup>(2)</sup> (3500-4500)	45.2 (400)
GE90-110B1, GE90-113B, GE90-115B	IDG (120 KVA)	CCW <sup>(1)</sup>	0.7947	181.3 (243)	1187 max (10500 max)	226.0 (2000)
	Hydraulic Pump	CCW	0.3783	63.5 (85)	480 - 548 (4250-4850)	26.0 (230)
	VSCF/PMG Generator	CCW	2.4126	43.3 (58)	141.2 max (1250 max)	45.2 (400)
All	IDG Overload Limits	226.8 KVA (304 HP) for 5 minutes per 1000 hours of operation 302.9 KVA (406 HP) for 5 seconds per 1000 hours of operation 373.0 KVA (500 HP) electrical fault				
	VSCF/PMG Overload limits	64.9 KVA (87 HP) for 5 minutes per 1000 hours of operation 86.5 KVA (116 HP) for 5 seconds per 1000 hours of operation 95.5 KVA (128 HP) electrical fault				

(1) Counter Clockwise

(2) Shear torque capability is a function of operator requirement. Consult GE for installed capability.

### Notes:

"KVA" stands for "1000 Volt Amperes".

100% core speed is 9,332 RPM

## 10. Maximum Permissible Air Bleed Extraction

		Allowable Bleed Limits (Percent)			
		Stage 4	Stage 7	Stage 10	Total
GE90-76B,	Below 23% N1K	7.8	1.8	13.6	15.4
	GE90-77B,	23% to 31% N1K	7.6	1.6	12.8
GE90-85B,	31% to 57.4% N1K	7.4	1.3	12.6	13.9
	GE90-90B,	57.4% to 80% N1K	7.2	1.3	12.6
GE90-94B	80% to 96.8% N1K	7.0	1.3	6.5	8.3
	Above 96.8% N1K	6.5	1.3	6.5	7.8
GE90-110B1,	Below 27% N1K	7.6	1.5	11.2	12.7
GE90-113B,	At 51% N1K	7.6	1.5	11.5	13.0

GE90-115B	At 80% N1K	7.6	1.5	12.0	13.5
	At 88% N1K	7.6	1.5	11.0	12.5
	At 93% N1K	7.6	1.5	8.0	9.1
	Above 93% N1K	7.6	1.5	7.3	9.1

"N1K" is defined as  $N1/(\sqrt{T_{amb}}/\sqrt{288K})$

#### IV. Operating Limitations

##### 1. Temperature Limits

Models	Maximum Indicated Exhaust Gas Temperature – T49 °C (°F)				
	Take-off (5 minutes) <i>- see Note 3 -</i>	Take-off Maximum Transient (1)	Maximum Continuous	Maximum Starting On Ground	Maximum Starting In Flight
GE90-76B <i>See Note 5</i>	975 (1787)	980 (1795)	925 (1697)	750 (1382)	825 (1517)
GE90-77B, GE90-85B, GE90-90B GE90-94B	1030 (1885)	n/a	1015 (1859) 1015 (1859)	750 (1382) (2)	825 (1517)
GE90-110B1, GE90-113B, GE90-115B	1090 (1994)	1095 (2003)	1050 (1922)	750 (1382)	825 (1517)

EGT is measured at the inlet of the LP Turbine; CTB is Configuration Type Box

- (1) Maximum transient for 60 seconds for GE90-76B, and 30 seconds for GE90-110B1, GE90-113B and GE90-115B  
 (2) 40 seconds start EGT exceedance is 825°C (1517°F) for the GE90-94B.

##### 1.1. Oil Temperature

Models	Maximum Oil Temperature °C (°F)	
	Continuous Operation	Transient (15 minutes maximum)
GE90-76B, GE90-77B, GE90-85B, GE90-90B, GE90-94B	124 (255)	135 (275)
GE90-110B1, GE90-113B, GE90-115B	132 (270)	143 (290)

##### 2. Speed Limits

Models	Maximum Permissible Speed rpm (%)			
	Low Pressure Rotor (N1)		High Pressure Spool (N2)	
	Take-off (5 Minutes) <i>-see Note 3-</i>	Maximum Continuous	Take-off(5 minutes) <i>-see Note 3-</i>	Maximum Continuous
GE90-76B	2465 (109.0)	n/a	10705 (114.7)	Na

		-see Note 12-		-see Note 12-
GE90-77B, GE90-85B, GE90-90B, GE90-94B	2465 (109.0)	2465 (109.0)	10918 (117.0)	10918 (117.0)
GE90-110B1, GE90-113B, GE90-115B	2602 (110.5)	2602 (110.5)	11292 (121.0)	11292 (121.0)

- (1) 100% N1 = 2261.5 rpm for GE90-76B, GE90-77B, GE90-85B, GE90-90B and GE90-94B  
100% N1 = 2355.0 rpm for GE90-110B1, GE90-113B and GE90-115B
- (2) 100% N2 = 9332.0 rpm for all models

### 3. Torque Limits.

Not applicable

### 4. Pressure Limits

#### Fuel Pressure Limits at Engine Pump Inlet:

Maximum allowable fuel pressure is 482.6 kPa (70 psig). Minimum allowable fuel pressure under normal operating conditions (fully operational aircraft fuel system) is 34.5 kPa (5.0 psia). At altitudes of 11582 m (38,000 feet) and below, transitory excursions of 15 seconds or less to a minimum fuel pressure of 20.7 kPa (3.5 psia) are allowable provided the average fuel pressure remains above 27.6 kPa (4.5 psia).

#### Oil Pressure Limits:

Low Pressure (differential): 69 kPa (10.0 psid).

See also Note 4.

### 5. Time Limited Dispatch (TLD)

The GE90 series engines are approved for Time Limited Dispatch (TLD).

Criteria pertaining to the dispatch and maintenance requirements for the engine control systems are specified in:

For the GE90-76B, GE90-77B, GE90-85B, GE90-90B and GE90-94B see General Electric Document GEK 103084 and the Airworthiness Limitations Section of the GE90 Engine Manual, which defines the various configurations and maximum operating intervals.

For the GE90-110B1, GE90-113B and GE90-115B the requirements are defined in the Airworthiness Limitations Section of the GE90-100 Engine Manual.

## V. Operating and Service Instructions

Manuals	GE90-76B, GE90-77B, GE90-85B, GE90-90B, GE90-94B	GE90-110B1, GE90-113B, GE90-115B
Engine Installation Manual	GEK 100704	GEK 109995
Engine Operating Instructions	GEK 100703	GEK 109994

Instructions for Continued Airworthiness (ICA)	GE90-76B, GE90-77B, GE90-85B, GE90-90B, GE90-94B	GE90-110B1, GE90-113B, GE90-115B
Engine Manual <sup>(1)</sup>	GEK100700	GEK109993
Illustrated Parts Catalogue	GEK100701-1	GEK110005
Standard Practices Manual	GEK9250	
Service Bulletins (SB)	As published by GE	As published by GE

(1) The EASA approved Airworthiness Limitations Section of the Instructions for Continued Airworthiness is published in the applicable Engine Manual", chapter 5 "Airworthiness Limitations".

## VI. Notes

- Note 1:** Dry weight includes basic engine, basic engine accessories and optional equipment as listed in the manufacturer's engine specification.
- Note 2:** Engine ratings are based on calibrated test stand performance under the following conditions:
- (1) Sea level static, standard pressure (101.3 kPa), 15°C
  - (2) No customer bleed or customer horsepower extraction
  - (3) Ideal inlet, 100% ram recovery
  - (4) Production aircraft flight cowling
  - (5) Production instrumentation
  - (6) Fuel lower heating value of 42798 kJ/kg
- Note 3:** The normal 5 minute take-off time limit may be extended to 10 minutes in the event of one engine inoperative.
- Note 4:** During negative-g operation only, it is permissible to operate below minimum oil pressure (69 kPa, differential pressure (10 psid) indicated) for a maximum of 15 seconds. Refer to Engine Operating Instructions, Section 8.
- Note 5:** Configuration type box and associated hardware and limitations:  
 GE90-76B engines with configuration type box number 320-839-501-0 must incorporate the HP/LP turbine hardware and associated changes per GE Service Bulletin 72-169. The FADEC incorporates a 30°C shunt. The corresponding untrimmed T49 are 1005°C (take-off), 1010°C (take-off with 60 second max. transient), and 995°C (max. continuous). GE90 engines with configuration type box part numbers 320-892-101-0 or 320-892-201-0 must incorporate the PT25 extended wedge ice shield per GE90 Service Bulletin 77-008 and must incorporate FADEC software P/N 1853M99P06 (version 9.1.9.7 or later), per GE90 Service Bulletin 73-040.  
 GE90 models with configuration type box numbers 320-837-701-0, 320-839-501-0, 320-892-101-0, 320-892-201-0, 320-846-701-0, 320-892-601-0, and 320-915-201-0, have a minimum permissible N2 of 6066 RPM for in-flight operation during icing conditions. GE 90 models with configuration type box number 320-921-501-0 have a minimum permissible N2 of 6310 RPM for in-flight operation during icing conditions.
- Note 6:** Demonstration of compliance to icing conditions of FAR 33.68 (JAR-E 780) is installation specific to the B777-200LR/300ER and B777 Freighter airplanes for the GE90-110B1/-113B/-115B model engines. Installation of these model engines on different airplane models or types will require a separate evaluation for compliance with icing condition requirements.
- Note 7:** For ground operation in icing conditions, requirements and limitations are specified in the Engine Operating Instructions.
- Note 8:** Life limits established for Engine Critical Parts are published in Chapter 5 of the Engine Manual.
- Note 9:** Power setting, power checks, and control of engine thrust output in all operations are based on GE engine charts referring to Fan Speed (N1). Speed sensors are included in the engine assembly for this purpose.
- Note 10:** Demonstration of compliance to thrust response is installation specific to the B777-200LR/300ER and B777 Freighter airplanes for the GE90-110B1/-113B/-115B model

engines. Installation of these model engines on different airplane models or types will require a separate evaluation for compliance with thrust response requirements.

**Note 11:** The GE90 variants incorporate the following general characteristics:

Models	Characteristics
GE90-76B	Basic Model
GE90-77B	Same as GE90-76B except for improved HPT/LPT flowpath and higher take-off thrust rating. Rating plug change.
GE90-85B	Same as GE90-76B except for higher thrust ratings. Rating plug change.
GE90-90B	Same as GE90-77B except for higher thrust ratings. Rating plug change.
GE90-94B	Same as GE90-90B except for improved 3D Aero HPC and higher thrust rating with increased rotor speeds and temperature limitations. Rating plug change.
GE90-110B1	Differs primarily from basic model in Fan, LPC, HPC, HPT and LPT hardware. Higher take-off thrust rating with increased rotor speeds and temperature limitations. Rating plug change.
GE90-113B	Same as GE90-110B1 except for higher thrust ratings. Rating plug change.
GE90-115B	Same as GE90-110B1 except for higher thrust ratings. Rating plug change.

- The GE90-75B model has been deleted from the FAA TC on 24 July 1995.
- The GE90-92B model has been deleted from the FAA TC on the 26 June 2000.

**Note 12:** GE90-76B model: according to the Equivalent Safety Finding in II.3.3, there are no limits for maximum continuous N1 and N2 speeds. For information purpose only: the values demonstrated during the FAR 33.87 (JAR-E 740) test were N1 = 2390 rpm and N2 = 10590 rpm.

**Note 13:** The engine is approved for use with the following Boeing thrust reverser part number:

Models	Boeing Thrust Reverser P/N
GE90-76B, GE90-77B, GE90-85B, GE90-90B, GE90-94B	315W1000
GE90-110B1, GE90-113B, GE90-115B	315W1298-1 Left Engine Left Hand 315W1298-2 Left Engine Right Hand 315W1298-3 Right Engine Left Hand 315W1298-4 Right Engine Right Hand

**Note 14:** The loads resulting from a fan blade release at the inner flow path line are specified in the Engine Installation Manual. The loads for a fan blade release at the outer most retention groove have been determined and are available from GE.

**Note 15:** For approval of repairs of fan blade composite material in the root section of the fan blade up to the inner annulus flow path line, see the Airworthiness Limitations Section of the applicable Engine Manual.

**Note 16:** The FADEC unit P/N originally defined both hardware and software. The hardware and software are now defined by separate P/Ns. The engine should be equipped with a FADEC defined either by the combined P/N or by the hardware and the software P/Ns.

### Section 3 Administration

#### I. Acronyms and Abbreviations

Acronym / Abbreviation	Definition
CS-E	Certification Specifications for Engines
EASA	European Union Aviation Safety Agency
EGT	Exhaust Gas Temperature
ESF	Equivalent Safety Finding
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FADEC	Full Authority Digital Engine Control
GE	General Electric
HPC/HPT	High Pressure Compressor/Turbine
H/W	Hardware
ICAO	International Civil Aviation Organisation
IDG	Integrated Drive Generator
JAA	Joint Aviation Authorities
JAR	Joint Aviation Requirements
LPC/LPT	Low Pressure Compressor/Turbine
PMG	Permanent Magnet Generator
P/N	Part Number
SC	Special Condition
S/W	Software
TC	Type Certificate
TCDS	Type Certificate Data Sheet
TLD	Time Limited Dispatch
VSCF	Variable Speed Constant Frequency



## II. Type Certificate Holder Record

TCH Record	Period
General Electric Company GE Aviation 1 Neumann Way Cincinnati, OH 45215-6301 United States of America	Since initial issue
Design Organisation Approval No.: NA	

## III. Amendment Record

TCDS Issue No.	TCDS Issue Date	Changes	TC Issue and Date
01	08 Nov 2024	<ul style="list-style-type: none"> <li>- 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.002 at Issue 04 dated 18 December 2019 and are therefore accepted by the UK under Article 15 of Annex 30 of the UK-EU Trade and Cooperation Agreement.</li> <li>- Section 2 (II) (1), (2), (3), and (4) added to provide information about certifying authority and certification basis applied by the certifying authority.</li> <li>- Section 2 (II) (4.6) updated with regards to the compliance with applicable engine emissions requirements (CAEP/11) according to Annex Part 21.B.85 (UK CAA major change approval UK.MAJ.00363).</li> </ul>	Issue 01 08 Nov 2024

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