TYPE-CERTIFICATE DATA SHEET

No. IM.E.109

for

250-C28 series engines (see Note 1)

Type Certificate Holder

Rolls-Royce Corporation
450 South Meridian Street
Indianapolis, Indiana 46225-1103
USA

For Models:

250-C28B, 250-C28C, 250-C30, 250-C30G, 250-C30G/2, 250-C30M, 250-C30P, 250-C30S, 250-C40B, 250-C47B, 250-C47M, 250-C47B/8 and 250-C47E/4.

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I. General

1. Type/ Model/ Variants (see Note 1)

250-C28B, 250-C28C, 250-C30, 250-C30G, 250-C30G/2, 250-C30M, 250-C30P, 250-C30S, 250-C40B, 250-C47B, 250-C47M, 250-C47B/8 and 250-C47E/4.

2. Type Certificate Holder

Rolls-Royce Corporation
450 South Meridian Street
Indianapolis, Indiana 46225-1103
USA

3. Manufacturer

As stated in paragraph 2.

4. Date of Application

250-C28B, 250-C28C, 250-C30, 250-C30G, 250-C30G/2, 250-C30M, 250-C30P and 250-C30S: these models were certified by individual European Member States prior to EASA and not subjected to the JAA validation process. Application dates are not available.

250-C40B, 250-C47B and 250-C47M (Application to JAA): 25 April 1996

250-C47B/8 (Application to EASA): 26 June 2014

250-C47E/4 (Application to EASA): 02 May 2016

5. EASA Type Certification Date

Model	Certification date
250-C28B	19 January 1979 (CAA – UK)
250-C28C	
250-C30	
250-C30G	13 November 1991 (LBA – Germany)
250-C30G/2	06 July 1993 (LBA – Germany)
250-C30M	29 May 1984 (DGAC – France)
250-C30P	03 September 1982 (LBA – Germany)
250-C30S	07 October 1982 (CAA – UK)
250-C40B	19 April 2002 (JAA validation recommendation date)
250-C47B	4 August 1999 (JAA validation recommendation date)
250-C47M	
250-C47B/8	12 February 2016 (EASA)
250-C47E/4	10 May 2017

II. Certification Basis

1. State of Design Authority Certification Basis

Refer to FAA Type Certificate Data Sheet E1GL

2. Reference Date for determining the applicable airworthiness requirements

2 October 1973

3. EASA Certification Basis

For 250-C28B, 250-C28C, 250-C30, 250-C30G, 250-C30G/2, 250-C30M, 250-C30P and 250-C30S models: same as stated in Section II.1 as per Article 3 of (EU)748/2012.

3.1. Airworthiness Standards

250-C47B, 250-C47M, 250-C40B and 250-C47B/8:

- JAR-E Effective 15 September 1972 as amended by Blue Papers No. 553, 555, 558, 559, 565, 566 and 616.
- JAR-E Change 8 plus Orange Paper E/91/1 dated 27 May 1991 and E/93/1 dated 17 May 1993 for paragraph E50, E150(c)(1), E530(f), E740.

250-C47E/4:

- JAR-E Effective 15 September 1972 as amended by Blue Papers No. 553, 558, 559, 565 and 566.
- JAR-E Change 8 plus Orange Paper E/91/1 dated 27 May 1991 for paragraphs E150(c)(1), E530(a), (b), (c), (f), (g), (h) and E740.
- CS-E amdt 4 dated 12 March 2015 for paragraphs E20, E25, E40, E50, E60, E70, E80, E90, E100, E500, E510, E520, E560, E570, E670, E700, E730, E745, E810, E860.

3.2. Special Conditions (SC)

250-C40B:

- 30-Second and 2-Minute One Engine Inoperative Rating

3.3. Equivalent Safety Findings

250-C47B, 250-C47M, 250-C40B, 250-C47B/8 and 250-C47E/4:

- JAR-E Chapter C4-4 para. 20.1 Rotor Integrity
- JAR-E Chapter C4-4 para. 2. Pressure Tests

250-C40B:

- JAR-E 740 Endurance Tests

3.4. Deviations

250-C47B, 250-C47M and 250-C40B:

- Blue Paper No.559 C4-2, 2.2.1(c) Oil System

3.5. Environmental Protection

250-C40B, 250-C47B and 250-C47M:

- Fuel venting – Environmental protection requirements of ICAO Annex 16 Volume II, second edition, as applicable to turboshaft engines.

250-C47B/8:

- Fuel Venting – Environmental protection requirements of Amendment 7 of ICAO Annex 16 Volume II, Part II, Chapter 2, effective 17 November 2011, as applicable to turboshaft engines.

250-C47E/4:

- Fuel Venting – Environmental protection requirements of Amendment 8 of ICAO Annex 16 Volume II, Part II, Chapter 2, effective 1 January 2015, as applicable to turboshaft engines.

III. Technical Characteristics

1. Type Design Definition

Model	Assembly Drawing P/N
250-C28B	6895000
250-C28C	6898600
250-C30	6890000
250-C30G	23039781
250-C30G/2	23053999
250-C30M	23005219
250-C30P	23062065
250-C30S	23005290
250-C40B	23063378
250-C47B	23063392
250-C47M	23065460
250-C47B/8	M250-10672
250-C47E/4	M250-10761

2. Description

The engine is a free turbine turboshaft engine of modular design and incorporates a single stage centrifugal compressor, a combustor chamber with 1 fuel nozzle, a two-stage high pressure axial turbine, a two-stage free power turbine. Model 250-C47E/4 features a dual channel FADEC. Models 250-C47B, 250-C47M, 250-C40B and 250-C47B/8 feature a single channel electronic control system with a hydromechanical manual backup system. All other models are fully hydromechanically controlled.

3. Equipment

The engine equipment list is included in the Type Design Definition. The engine mounts and the starter-generator are supplied by the airframer.

4. Dimensions

Model	Length (m)	Width (m)	Height (m)
250-C28B	1.24	0.65	0.65
250-C28C	1.10	0.56	0.65
250-C30	1.10	0.56	0.65
250-C30G	1.10	0.56	0.65
250-C30G/2	1.10	0.56	0.65
250-C30M	1.10	0.56	0.65
250-C30P	1.10	0.56	0.63
250-C30S	1.10	0.56	0.65
250-C40B	1.10	0.56	0.65
250-C47B	1.10	0.56	0.64
250-C47M	1.10	0.56	0.65
250-C47B/8	1.10	0.56	0.64
250-C47E/4	1.10	0.56	0.65

5. Dry Weight

Model	Weight (kg)
250-C28B	108.0
250-C28C	107.0
250-C30	115.1
250-C30G	115.6
250-C30G/2	118.7
250-C30M	114.2
250-C30P	112.4
250-C30S	114.6
250-C40B	127.0
250-C47B	126.3
250-C47M	126.3
250-C47B/8	126.3
250-C47E/4	131.5

Dry weight includes basic engine, fuel pump, ignition, fuel control systems and electrical harness.

6. Ratings

The engine ratings are based on Sea Level ISA static conditions with no customer bleed or external power extraction.

Model	Take-Off Power (5 minutes, kW)	Maximum Continuous Power (kW)	Continuous OEI Power (kW)	30-Min OEI Power (kW	2.5 Min OEI Power (kW)	2-Min OEI Power (kW)	30-Sec OEI Power (kW)
250-C28B	373	373	-	373	410	-	-
250-C28C	373	373	-	373	410	-	-
250-C30	485	485	-	485	522	-	-
250-C30G	485	485	-	485	522	-	-
250-C30G/2	485	415	485	485	522	-	-
250-C30M	485	447	-	-	-	-	-
250-C30P	485	447	-	485	522	-	-
250-C30S	485	485	-	485	522	-	-
250-C40B	533	457	533	533	-	574	611
250-C47B	485	447	-	-	-	-	-
250-C47M	485	447	-	-	-	-	-
250-C47B/8	485	447	-	-	-	-	-
250-C47E/4	485	447	-	-	-	-	-

7. Control System

Model 250-C47E/4 features a dual channel FADEC. Models 250-C47B, 250-C47M, 250-C40B and 250-C47B/8 feature a single channel electronic control system with a hydromechanical manual backup system. All other models do not have an electronic control system and are fully hydromechanically controlled.

8. Fluids (Fuel, Oil, Coolant, Additives)

Refer to the relevant engine Operation and Maintenance Manual for approved fluids.

9. Aircraft Accessory Drives

250-C28B and 250-C28C models:

	Rotation *	Speed ratio to turbine	Max shaft torque (Nm)		Maximum overhung moment (Nm)
			Continuous	Static	
Driven by gas producer turbine:					
Tachometer	CCW	0.0825	0.8	5.6	0.5
Starter-generator	CW	0.2351	62.1	124.3	16.9
Driven by power turbine:					
Tachometer	CCW	0.1257	0.8	5.6	0.5
Power take-off	CW	0.18	663.0	1129.8	11.3
Spare	CW	0.36	8.9	44.6	16.9

* CW: Clockwise, CCW: Counter Clockwise

250-C30, 250-C30G, 250-C30G/2, 250-C30M, 250-C30P, 250-C30S, 250-C40B, 250-C47B, 250-C47M, 250-C47B/8 and 250-C47E/4 models:

	Rotation*	Speed ratio to turbine	Max shaft torque (Nm)		Maximum overhung moment (Nm)
			Continuous	Static	
Driven by gas producer turbine:					
Tachometer	CCW	0.0825	0.8	5.6	0.5
Starter-generator	CW	0.2351	62.1	124.3	16.9
Spare	CCW	0.2351	62.1	124.3	16.9
Driven by power turbine:					
Tachometer	CCW	0.137	0.8	5.6	0.5
Tachometer (250-C30G, -C30G/2 and -C40B only)	CCW	0.2168	0.5	3.6	0.5
Power take-off	CW	0.1963	850.1	1129.8	11.3
Power take-off (250-C30G only)	CW	0.3105	538.4	714.2	11.3
Power take-off (250-C30G/2 only):					
Front drive (2.5 min OEI limit maximum)	CCW	0.3105	547.5	728.0	42.9
Rear drive	CW	0.3105	37.3	37.3	1.1
Power take-off (250-C40B only):					
Front drive (30 sec OEI limit maximum)	CCW	0.3105	626.4	728.0	42.9
Front drive (30 min OEI limit maximum)	CCW	0.3105	585.7	728.0	42.9
Rear drive	CW	0.3105	37.3	37.3	1.1
Power take-off (250-C47B, -C47B/8 and -C47E/4 only):					
Front drive	CCW	0.1963	850.1	1129.8	109.5
Rear drive	CW	0.1963	850.1	1129.8	11.3
Power take-off (250-C47M only):					
Front drive	CCW	0.1963	850.1	1129.8	11.3
Rear drive	CW	0.1963	850.1	1129.8	11.3
Spare (250-C30P and -C47E/4 only)	CW	0.3925	8.9	44.6	16.9

* CW: Clockwise, CCW: Counter Clockwise

10. Maximum Permissible Air Bleed Extraction

External air bleed may not exceed 4.0% of the core air flow for the 250-C28B and 250C28C models.

For all other models, external air bleed may not exceed 4.5% of the core airflow.

11. Time Limited Dispatch

The 250-C47E/4 engine is not approved for Time Limited Dispatch in accordance with CS-E 1030.

Not applicable to any other engine.

IV. Operating Limitations

1. Temperature Limits (see Note 11)

All temperatures are in given in °C.

Model	30-Sec OEI	2-Min OEI	2.5 Min OEI	30-Min OEI	Continuous OEI	Take-Off (5 min)	Maximum Continuous	Maximum transient	Starting (10 seconds)
250-C28B	-	-	810	791	-	791	791	810 to 871 (6 seconds)	810 to 927
250-C28C	-	-	810	791	-	791	791	810 to 871 (6 seconds)	810 to 927
250-C30	-	-	826	798	-	768	768	826 to 906 (12 seconds	826 to 927
250-C30G	-	-	826	798	-	768	768	826 to 906 (12 seconds	826 to 927
250-C30G/2	-	-	826	798	768	768	716	826 to 906 (12 seconds	826 to 927
250-C30M	-	-	-	-	-	768	716	768 to 871 (12 seconds)	826 to 927
250-C30P	-	-	826	798	-	768	716	768 to 871 (12 seconds)	826 to 927
250-C30S	-	-	826	798	-	768	768	826 to 906 (12 seconds	826 to 927
250-C40B	871	827	-	798	779	779	727	798 to 906 (12 seconds)	843 to 927
250-C47B	-	-	-	-	-	779	727	779 to 906 (12 seconds)	843 to 927
250-C47M	-	-	-	-	-	779	727	779 to 906 (12 seconds)	843 to 927
250-C47B/8	-	-	-	-	-	779	727	779 to 906 (12 seconds)	843 to 927
250-C47E/4	-	-	-	-	-	779	727	779 to 906 (12 seconds)	843 to 927

A momentary peak of 1 second maximum at 927°C during starting is allowed for all engines.

2. Speed Limits (see Note 11)

Model	Output shaft speed				Gas producer speed	
	Max transient (up to 15 sec)	Maximum sustained	Min transient (up to 15 sec)	Minimum sustained	Max transient (up to 10 sec)	Maximum sustained
250-C28B and -C28C: 100% output shaft speed = 6016 rpm 100% gas producer speed = 50940 rpm	Varies linearly from 115% at autorotation to 105% at takeoff	Varies linearly from 113% at autorotation to 103% at takeoff	-	-	105%	104%
250-C30, -C30M, -C30P, -C30S and -C47M: 100% output shaft speed = 6016 rpm 100% gas producer speed = 51000 rpm	119%	107.10%	71.80%	91.50%	106.5%	105%
250-C30G: 100% output shaft speed = 9518 rpm 100% gas producer speed = 51000 rpm	119%	107.1%	71.8%	91.5%	106.5%	105%
250-C30G/2: 100% output shaft speed = 9545 rpm 100% gas producer speed = 51000 rpm	118.7%	106.8	71.6%	91.3%	106.5%	105%
250-C40B: 100% output shaft speed = 9598 rpm 100% gas producer speed = 51000 rpm	118%	106.3%	71.2%	90.7%	106.5%	105%
250-C47B, -C47B/8, -C47E/4: 100% output shaft speed = 6317 rpm 100% gas producer speed = 51000 rpm	113.3%	102.1%	68.4%	87.1%	106.5%	105%

3. Torque Limits (see Note 11)

All torque values are given in Nm.

Model	up to 2 sec	up to 10 sec	up to 16 sec	30-Sec OEI	2-Min OEI	2.5 Min OEI	30-Min OEI	Continuous OEI	Take-Off (5 min)	Maximum Continuous
250-C28B	-	677	-	-	-	663	628	-	628	628
250-C28C	-	830	-	-	-	663	628	-	628	628
250-C30	-	-	1189	-	-	850	800	-	800	800
250-C30G	-	-	706	-	-	540	506	-	506	506
250-C30G/2	-	-	706	-	-	548	533	504	504	416
250-C30M	930	864	-	-	-	-	-	-	800	710
250-C30P	930	864	-	-	-	850	800	-	800	710
250-C30S	-	-	1189	-	-	850	800	-	800	800
250-C40B	-	-	706	626	602	-	586	555	555	458
250-C47B	930	864	-	-	-	-	-	-	800	710
250-C47M	930	864	-	-	-	-	-	-	800	710
250-C47B/8	930	864	-	-	-	-	-	-	800	710
250-C47E/4	930	864	-	-	-	-	-	-	800	710

4. Pressure Limits

4.1 Fuel Pressure

The minimum required fuel pressure varies as a function of fuel type, fuel temperature and altitude; method for determining fuel pressure is included in the relevant Installation Design Manual (see section V of this TCDS).

The maximum fuel pressure is 172 kPa for all models, except for the 250-C47E/4, for which the maximum fuel pressure is 344 kPa.

4.2 Oil Pressure

Operating oil gauge pressure (kPa)			Minimum oil pump inlet pressure
94% gas generator speed and above	between 79% and 94% gas generator speed	below 79% gas generator speed	
793 to 896	620 to 896	344 to 896	17 kPa

V. Operating and Service Instructions

Model	Installation Design Manual	Operation and Maintenance Manual	Overhaul Manual
250-C28B	16W5	16W2	16W3
250-C28C	16W5C	16W2	16W3
250-C30	14W5	14W2	14W3
250-C30G	14W5G	14W2	14W3
250-C30G/2	14W5G/2	14W2	14W3
250-C30M	14W5M	14W2	14W3
250-C30P	14W5P	14W2	14W3
250-C30S	14W5 + Suppl A	14W2	14W3
250-C40B	CSP24001	CSP21000	CSP22001
250-C47B	CSP24002	CSP21001	CSP22001
250-C47M	CSP24003	CSP21004	CSP22001
250-C47B/8	CSP24002	CSP21001	CSP22001
250-C47E/4	CSP24040	CSP21017	CSP22011

VI. Notes

Note 1: The 250-C28 model is the original Type designation certified by the State of Design Authority. All other models are variant from this Type. This model however has not been subjected to an EASA or JAA validation process, nor has it been previously validated by a European country.

Note 2: A magnetic oil drain plug (chip detector) indicator lamp is an installation requirement.

Note 3: : For 250-C40B, -C47B, -C47B/8 and -C47M models, the functionality of the Power Turbine overspeed protection system is to be verified prior to each flight.

Note 4: The ejector tube assembly for the Model 250-C28B is airframe mounted.

Note 5: Approved emergency fuels for each of the 250 engine models are provided in the Operation and Maintenance manuals. The 250-C28B, -C28C and -C30P models are limited to the amount of fuel required to operate the engine for not over 6 hours during any overhaul period.

Emergency use of aviation gasoline is permitted in Models 250-C30, -C30S, -C30M, -C30G, and -30G/2 for a maximum of 6 hours during any overhaul period provided aircraft boost pumps are available and turned on.

Emergency use of aviation gasoline is permitted in Model 250-C40B, -C47B, -C47B/8, -C47E/4 and -C47M for a maximum of 6 hours during any overhaul period. It is not

necessary to purge the unused fuel from the system before refueling with different type fuels. No fuel control adjustment is required when switching fuels.
Fuels containing Tri-Cresyl-Phosphate additives shall not be used. The approved anti-icing additives are provided in the Operation and Maintenance Manual for each engine model.

Note 6: Model 250-C30, -C30S and -C30G engines are equipped with dual ignition. All other models have a single ignition system. A dual ignition kit is available for the Model 250-C28B and -C28C engines.

Note 7: The EASA-approved Airworthiness Limitations Section of the Instructions for Continued Airworthiness is published in the Operation and Maintenance Manual, chapter 05 "Airworthiness Limitations". Distributor Information Letters (DIL) 190 and 202 establish acceptable crack limits suitable for return to service of first stage and second stage turbine wheels, respectively, in time continued (repaired) engines.

Note 8: The Engines produced under this type certificate are approved for operation with unprotected inlets having been tested in accordance with Group I and Group II Foreign Objects Ingestion criteria of FAA Advisory Circular AC 33-1B.

Note 9: Compliance with Rolls-Royce Alert Commercial Engine Bulletin CEB-A-73-3018 (Disarm N2 Electronic Overspeed Control System) and any subsequent approved revisions are an installation requirement for the Model 250-C30M and -C30P engines.

Note 10: For 250-C40B, -C47B, -C47B/8 and -C47M models, the software for the electronic engine control has been developed and tested in accordance with the provisions of Flight Critical category (level 1) of RTCA DO 178A, and RTCA DO 178B for the 250-C47E/4 model.

Note 11: Maintenance actions are required after transient temperature, speed and torque excursions, as described in the Operation and Maintenance Manual.

SECTION: ADMINISTRATIVE

I. Acronyms and Abbreviations

n/a

II. Type Certificate Holder Record

Rolls-Royce Corporation

III. Change Record

Issue	Date	Changes	TC issue
Issue 01	12 February 2016	Initial Issue	Initial Issue, 12 February 2016
Issue 02	10 May 2017	Addition of the 250-C47E/4 model	Issue 02, 10 May 2017
Issue 03	19 June 2017	Typographical error in address of TC Holder	Issue 03, 19 June 2017
Issue 04	12 October 2017	Withdrawal of Special Condition “Transient over-temperature, over-speed and over-torque limit approval” for 250-C47B/8 and 250-C47E/4 engines. Increase in N1 speed transient.	Issue 03, 19 June 2017

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