European Aviation Safety Agency

EASA
TYPE-CERTIFICATE
DATA SHEET

Number: E.065
Issue: 01
Date: 09 December 2008
Type: Rolls-Royce Deutschland Ltd & Co KG
Dart Series Engines

Variants

511-7E
514
514-7
528-7E
528D-7E
529-7E
529D-7E
529-7H
529D-7H
529-8E
529D-8E
529-8H
529D-8H
529-8X
529D-8X
529-8Y
529-D8Y
529-8Z
529D-8Z
532-7
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533-2
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542-4
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550-2
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552-7R

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I. General

1. Type/Variants:

Type: Dart

511-7E	529D-8H	532-7R	542-4
514	529-8X	533-2	542-4K
514-7	529D-8X	534-2	542-10
528-7E	529-8Y	535-2	542-10J
528D-7E	529-D8Y	535-7	542-10K
529-7E	529-8Z	535-7R	543-10
529D-7E	529D-8Z	536-2	543-10K
529-7H	532-7	536-2T	550-2
529D-7H	532-7L	536-7	552-2
529-8E	532-7N	536-7P	552-7
529D-8E	532-7P	536-7R	552-7R
529-8H			

2. Type Certificate Holder:

Rolls-Royce Deutschland Ltd & Co KG
(formerly Rolls-Royce Deutschland GmbH, formerly BMW Rolls-Royce GmbH)
Eschenweg 11, Dahlewitz
15827 Blankenfelde-Mahlow
Germany

EASA Design Organisation Approval No: EASA.21J.065

3. Manufacturer:

Rolls-Royce plc
P.O. Box 31
Derby, DE24 8BJ
United Kingdom

4. Certification Application Date:

Not known (before 7 September 1960 for first variants)

5. Certification Reference Date:

Not identified (before 7 September 1960 for first variants)

6. CAA UK/EASA Certification Date:

Variant	Original CAA UK Approval Date
511-7E	20 May 1960
514	7 September 1960
514-7	7 September 1960
528-7E	7 June 1960
582D-7E	6 November 1961
529-7E	2 June 1960
529D-7E	9 November 1961
529-7H	15 January 1965
529D-7H	15 January 1965
529-8E	2 June 1960
529D-8E	9 November 1961
529-8H	2 July 1964
529D-8H	2 July 1964
529-8X	16 July 1965
529D-8X	16 July 1965
529-8Y	7 May 1981
529D-8Y	7 May 1981
529-8Z	7 May 1981
529D-8Z	7 May 1981
532-7	2 November 1964
532-7L	3 November 1967
532-7N	20 September 1968
532-7P	19 September 1968
532-7R	12 Januar 1971
533-2	6 May 1974
534-2	13 February 1974
535-2	3 July 1981
535-7	15 September 1981
535-7R	21 May 1980
536-2	21 November 1979
536-2T	20 November 1975
536-7	24 October 1984
536-7P	29 April 1975
536-7R	20 November 1975
542-4	30 July 1965
542-4K	9 June 1969
542-10	5 February 1964
542-10J	1 February 1969
542-10K	1 February 1969
543-10	27 January 1972
543-10K	27 January 1972
550-2	21 October 1968
552-2	6 June 1985
552-7	6 June 1985
552-7R	6 June 1985

EASA Type Certification of the Dart series engines is granted, in accordance with Article 2 paragraph 3(a)(i) of EU Commission Regulation EC 1702/2003, on the basis of EU Member State approvals prior to 28 September 2003. Refer to note 9.

II. Certification Basis

Variant	Airworthiness Requirement
511-7E	BCAR Section C Issue 4
514	
514-7	
528-7E	
528D-7E	BCAR Section C Issue 5
529-7E	BCAR Section C Issue 4
529D-7E	
529-7H	BCAR Section C Issue 5
529D-7H	
529-8E	BCAR Section C Issue 4
529D-8E	BCAR Section C Issue 5
529-8H	
529D-8H	
529-8X	
529D-8X	
529-8Y	
529-D8Y	
529-8Z	
529D-8Z	
532-7	BCAR Section C Issue 5
532-7L	
532-7N	
532-7P	
532-7R	
533-2	
534-2	
535-2	
535-7	
535-7R	
536-2	
536-2T	
536-7	
536-7P	
536-7R	
542-4	
542-4K	BCAR Section C Issue 6
542-10	BCAR Section C Issue 5
542-10J	BCAR Section C Issue 6
542-10K	
543-10	
543-10K	
550-2	
552-2	
552-7	
552-7R	

III. Technical Characteristics

1. Type Design Definition:

The Engine Type Designs are defined in the following Drawing Introduction Sheets (DIS) or later approved issues:

Variant	DIS	Issue
511-7E	757	1
514	741	
514-7	799	
528-7E	774	
528D-7E	785	
529-7E	777	
529D-7E	786	
529-7H	858	
529D-7H	859	
529-8E	778	
529D-8E	787	
529-8H	835	
529D-8H	847	
529-8X	869	
529D-8X	870	
529-8Y	2016	
529-D8Y	2017	
529-8Z	2018	
529D-8Z	2019	
532-7	853	
532-7L	946	
532-7N	957	
532-7P	962	

Variant	DIS	Issue
532-7R	986	1
533-2	1028	
534-2	1029	
535-2	1030	
535-7	1066	
535-7R	2003	
536-2	1099	
536-2T	1060	
536-7	2041	
536-7P	1059	
536-7R	1061	
542-4	856	
542-4K	967	
542-10	773	
542-10J	943	
542-10K	944	
543-10	987	
543-10K	999	
550-2	904	
552-2	2039	3
552-7	2035	
552-7R	2036	

Changes to the Engine Type Design are introduced by approved Modification Bulletins.

2. Description:

Turbo-propeller engine consisting of a two stage centrifugal compressor, seven straight flow combustion chambers and a multiple stage axial flow turbine. The turbine drives the compressor directly and the propeller is driven by the compressor shaft via a two stage reduction gear.

Propeller Reduction Gear Ratio	Variant
0.086 : 1	511-7E, 514, 514-7
0.093 : 1	528-7E, 528D-7E, 529-7E, 529D-7E, 529-7H, 529D-7H, 529-8E, 529D-8E, 529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529-D8Y, 529-8Z, 529D-8Z, 532-7, 532-7L, 532-7N, 532-7P, 532-7R, 533-2, 534-2, 535-2, 535-7, 535-7R, 536-2, 536-2T, 536-7, 536-7P, 536-7R, 550-2, 552-2, 552-7, 552-7R
0.0775 : 1	542-4, 542-4K, 542-10, 542-10J, 542-10K, 543-10, 543-10K

3. Equipment:

The engine is approved for operation when fitted with the equipment listed on the engine's DIS.

4. Dimensions:

Variant	Overall Length	Overall Diameter
511-7E, 514, 514-7	2479 mm	963 mm
528-7E, 528D-7E	2480 mm	965 mm
529-7E, 529D-7E, 529-7H, 529D-7H, 529-8E, 529D-8E, 529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529-D8Y, 529-8Z, 529D-8Z	2466 mm	
532-7, 532-7L, 532-7N, 532-7P, 532-7R, 533-2, 534-2, 535-2, 535-7, 535-7R, 536-2, 536-2T, 536-7, 536-7P, 536-7R	2480 mm	965 mm
542-4	2527 mm	950 mm
542-4K	2546 mm	
542-10	2527 mm	
542-10J	2546 mm	
542-10K, 543-10, 543-10K	2527 mm	965 mm
550-2, 552-2, 552-7, 552-7R	2480 mm	

5. Dry Weight:

Variant	Basic Dry Weight	MOD 1850	MOD 1860
511-7E	521.6kg +- 1.25%	N/A	N/A
514	528.4kg +- 1.25%		
514-7	515.3 kg ± 1.25%		
528-7E	561.1 kg	573,3 kg	577.4 kg
528D-7E, 529-7E, 529D-7E, 529-7H, 529D-7H, 529-8E, 529D-8E, 529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529-D8Y,529-8Z,529D-8Z		N/A	
532-7, 532-7L, 532-7N, 532-7P			
532-7R		573.4 kg	
533-2, 534-2, 535-2, 535-7		N/A	
535-7R		573.4 kg	
536-2, 536-2T, 536-7, 536-7P		N/A	
536-7R		573.4 kg	
542-4, 542-4K, 542-10, 542-10J, 542-10K, 543-10, 543-10K	628.2 kg +- 1.25%	N/A	N/A
550-2	561.1 kg		
552-2, 552-7, 552-7R	577.4 kg		

6. Ratings:

Take Off Power Propeller Shaft

Variant	With W/M Injection				Without W/M Injection			
	Basic Engine	**MOD 1850**	**MOD 1860**	**Total Equivalent SHP**	**Basic Engine**	**MOD 1850**	**MOD 1860**	**Total Equivalent SHP**
	kW	kW	kW	kW	kW	kW	kW	kW
511-7E	1145	N/A	N/A	N/A	1171	N/A	N/A	N/A
514, 514-7					1245			
528-7E	1394	1423	1394		1369	1421	1402	
528D-7E		N/A				N/A		
529-7E 529D-7E 529-7H 529D-7H 529-8E 529D-8E 529-8H 529D-8H	1454		N/A		1424		1458	
529-8X	1484							
529D-8X	1514							
529-8Y 529-D8Y 529-8Z 529D-8Z	1484							
532-7	1484		1488		1368		1402	
532-7L	1521		1525					
532-7N 532-7P	1484		1488					
532-7R	1551	1579	1555			1421		
533-2	1454	N/A	1458			N/A		
534-2 535-2	1521		1525					
535-7	1618		1622					
535-7R	1551	1579	1555			1421		
536-2 536-2T		N/A	1525			N/A		
536-7P	1484		1488					
536-7R	1551	1579				1421		
536-7	1618	N/A	1622			N/A		

Take Off Power Propeller Shaft

Variant	With W/M Injection				Without W/M Injection			
	Basic Engine	MOD 1850	MOD 1860	Total Equivalent SHP	Basic Engine	MOD 1850	MOD 1860	Total Equivalent SHP
	kW	kW	kW	kW	kW	kW	kW	kW
542-4 542-4K 542-10 542-10J 542-10K 543-10 543-10K	2051	N/A	N/A	2256	1719	N/A	N/A	1902
550-2	1678			N/A	1581			N/A
552-2	1629				1616			
552-7	1659							
552-7R	1596							

Take Off Thrust

Variant	With W/M Injection			Without W/M Injection		
	Basic Engine	MOD 1850	MOD 1860	Basic Engine	MOD 1850	MOD 1860
511-7E	1.62 kN	N/A	N/A	1.58 kN	N/A	N/A
514 514-7	1.71 kN					
528-7E	2.13 kN	1.97 kN	2.17 kN	2.13 kN	1.96 kN	2.17 kN
528D-7E		N/A			N/A	
529-7E 529D-7E 529-7H 529D-7H 529-8E 529D-8E 529-8H 529D-8H	2.14 kN		2.19 kN	2.14 kN		2.19 kN
529-8X 529D-8X 529-8Y 529-D8Y 529-8Z 529D-8Z			2.22 kN			

Take Off Thrust

Variant	With W/M Injection			Without W/M Injection		
	Basic Engine	MOD 1850	MOD 1860	Basic Engine	MOD 1850	MOD 1860
532-7	2.29 kN	N/A	2.27 kN	2.13 kN	N/A	2.17 kN
532-7L	2.33 kN		2.32 kN			
532-7N, 532-7P	2.29 kN		2.27 kN			
532-7R	2.37 kN	2.18 kN	2.35 kN		1.96 kN	
533-2	2.25 kN	N/A	2.24 kN		N/A	2.16 kN
534-2	2.33 kN		2.32 kN			
535-2						2.17 kN
535-7	2.45 kN		2.43 kN			
535-7R	2.37 kN	2.18 kN	2.35 kN		1.96 kN	
536-2	2.33 kN	N/A	2.32 kN		N/A	2.16 kN
536-2T			2.33 kN	2.16 kN		2.17 kN
536-7P	2.29 kN		2.27 kN	2.13 kN		
536-7R	2.37 kN	2.18 kN	2.35 kN		1.96 kN	
536-7	2.45 kN	N/A	2.43 kN		N/A	N/A
550-2	2.31 kN		N/A	2.20 kN		
552-2	2.28 kN			2.26 kN		
552-7	2.31 kN					
552-7R	2.26 kN					

Intermediate Congestion Power and Thrust

Variant	Intermediate Congestion Power & Thrust					
	Basic	MOD 1850	MOD 1860	Basic	MOD1850	MOD 1860
	kW	kW	kW	kN	kN	kN
533-2, 534-2	1514	N/A	1536	N/A	N/A	N/A
536-2, 536-2T				2.16		2.22
536-7P				2.17		
536-7R		1562			2.01	
536-7		N/A	N/A		N/A	2.17

Max. Continuous Power and Thrust:

<table>
<tr><th rowspan="2">Variant</th><th colspan="4">Propeller Shaft</th><th colspan="3">Thrust</th></tr>
<tr><th>Basic Engine</th><th>MOD 1850</th><th>MOD 1860</th><th>Total equivalent SHP</th><th>Basic Engine</th><th>MOD 1850</th><th>MOD 1860</th></tr>
<tr><th></th><th>kW</th><th>kW</th><th>kW</th><th>kW</th><th>kN</th><th>kN</th><th>kN</th></tr>
<tr><td>511-7E, 514</td><td>1145</td><td rowspan="2">N/A</td><td rowspan="2">N/A</td><td rowspan="19">N/A</td><td rowspan="2">1.58</td><td rowspan="2">N/A</td><td rowspan="2">N/A</td></tr>
<tr><td>514-7</td><td>1146</td></tr>
<tr><td>528-7E</td><td rowspan="2">1369</td><td>1421</td><td rowspan="2">1402</td><td rowspan="2">2.13</td><td>1.96</td><td rowspan="2">2.17</td></tr>
<tr><td>528D-7E</td><td rowspan="5">N/A</td><td rowspan="5">N/A</td></tr>
<tr><td>529-7E, 529D-7E
529-7H,
529D-7H, 529-8E
529D-8E, 529-8H
529D-8H, 529-8X
529D-8X, 529-8Y
529-D8Y, 529-8Z
529D-8Z</td><td>1424</td><td>1458</td><td>2.14</td><td>2.19</td></tr>
<tr><td>532-7, 532-7L,
532-7N</td><td rowspan="4">1368</td><td rowspan="4">1402</td><td>2.13</td><td rowspan="4">2.17</td></tr>
<tr><td>532-7P</td><td>2.16</td></tr>
<tr><td>532-7R</td><td>1421</td><td>2.13</td><td>1.96</td></tr>
<tr><td>533-2, 534-2</td><td rowspan="3">N/A</td><td>2.16</td><td rowspan="3">N/A</td></tr>
<tr><td>535-2</td><td rowspan="3">1514</td><td>1536</td><td rowspan="3">2.17</td><td rowspan="3">2.22</td></tr>
<tr><td>535-7</td><td rowspan="2">1536</td></tr>
<tr><td>535-7R</td><td>1562</td><td>2.01</td></tr>
<tr><td>536-2, 536-2T</td><td rowspan="4">1368</td><td rowspan="2">N/A</td><td rowspan="4">1402</td><td>2.16</td><td rowspan="2">N/A</td><td rowspan="4">2.17</td></tr>
<tr><td>536-7P</td><td rowspan="3">2.13</td></tr>
<tr><td>536-7R</td><td>1421</td><td>1.96</td></tr>
<tr><td>536-7</td><td rowspan="4">N/A</td><td rowspan="4">N/A</td></tr>
<tr><td>542-4, 542-4K,
542-10, 542-10J,
542-10K, 543-10,
543-10K</td><td>1719</td><td>1902</td><td>N/A</td><td rowspan="3">N/A</td></tr>
<tr><td>550-2</td><td>1581</td><td rowspan="2">N/A</td><td>2.20</td></tr>
<tr><td>552-2, 552-7,
552-7R</td><td>1616</td><td>2.26</td></tr>
</table>

7. Control System:

The engines are equipped with engine control units as listed or later approved standards

Variant	Fuel Control Unit	W/M Control Unit	Propeller Control Unit
511-7E	Lucas CCU 36/29 AC	RK 23194	CU 86E
514, 514-7	Lucas CCU 36/27 AC	RK 20833	CU 98
528-7E, 528D-7E, 529-7E, 529D-7E, 529-7H, 529D-7H	Lucas CCU 39/38 AY	RK 40195	CU 84
529-8E, 529D-8E, 529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529-D8Y, 529-8Z, 529D-8Z	Lucas CCU 69/55 AY	RK 40196	CU 88
532-7, 532-7L	Lucas CCU 82/67 AS	RK 40195	CU 84
532-7N		RK 42153	
532-7P, 532-7R		RK 40195	
533-2	Lucas CCU 36/27 AS	RK 43708A	
534-2			N/A
535-2	Lucas CCU 82/67 AS	RK 39831	CU 84
535-7	Lucas CCU 39/38 AY	RK 45137A	
535-7R	Lucas CCU 82/67 AS	RK 40195	
536-2	Lucas CCU 36/27 AS	RK 43708A	N/A
536-2T		RK 47242	
536-7P, 536-7R, 536-7	Lucas CCU 39/38 AY	RK 45137A	
542-4, 542-4K	Lucas CCU 73/58 BU	RK38599, RK40898	CU 97
542-10, 542-10J, 542-10K		RK 38599	
543-10, 543-10K		RK 38301	6-0701-0007
550-2	Lucas CCU 516/111 BZ	RK 40404A	CU 106
552-2	Lucas CCU 520/113 CB Lucas CCU 519/112 CB	RK 48264A	CU99
552-7, 552-7R	Lucas CCU 509/110CA Lucas CCU 504/108 CA	RK 30403A	CU 84

8. Fluids

Approved fuels, refrigerants, additives and oils are listed in

Variant	Approved Fluids
511-7E	F-Da6-FaF/FoF
514	F-Da6-Av.
514-7	F-Da6-FaF/FoF
528-7E	F-Da7-FaF/FoF
528D-7E	F-Da7-FaF/FoF
529-7E, 529D-7E, 529-7H, 529D-7H	F-Da7-FaF
529-8E, 529D-8E, 529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529-D8Y, 529-8Z, 529D-8Z	F-Da7-G
532-7	F-Da7-FaF/FoF
532-7L	F-Da7-FaF
532-7N, 532-7P	F-Da7-FaF/FoF
532-7R	F-Da7-FoF
533-2, 534-2, 535-2	F-Da7-Av
535-7, 535-7R	F-Da7-FoF
536-2, 536-2T	F-Da7-Av
536-7P, 536-7R, 536-7	F-Da7-FoF
542-4, 542-4K	F-Da10-C
542-10, 542-10J, 542-10K, 543-10, 543-10K	F-Da10-YS
550-2, 552-2	F-Da7-Av
552-7, 552-7R	F-Da7-FoF

IV. Operating Limitations:

1. Temperature Limits:

Exhaust Gas Temperatures (EGT)

Variant	Momentary max. During Start	Take Off 5 min. Limit		Maximum Continuous		Maximum at Engine Speeds	
		Without W/M Injection	With W/M Injection	0-15000ft and 0-165 kts	Other Flight Conditions	10400 - 14500rpm	Idle Speed v 10400 rpm
511-7E	640 °C	595 °C		625 °C	590 °C	540 °C + 0.5 (IOAT)	525 °C
514	640 °C	595 °C	600 °C	650 °C	590 °C	540°C + 0.5 (IOAT)	525 °C
514-7	640 °C	595 °C	600 °C	650 °C	590 °C	540°C + 0.5 (IOAT)	525 °C

Variant	Momentary max. During Start	Take Off 5 min. Limit		Maximum Continuous	Maximum at Engine Speeds			Max. for idling at speeds< 10400 rpm	Maximum Overtemp. (5 sec. Limit)
		Without W/M Injection	With W/M Injection		15000 - 14000rpm	14000 - 13000rpm	13000 - 10400rpm		
528-7E, 528D-7E	930°C	810°C	860°C	850°C	785°C	760°C	730°C	550°C	950°C
529-7E, 529D-7E, 529-7H, 529D-7H, 529-8E, 529D-8E, 529-8H, 529D-8H		825°C							
529-8X, 529D-8X				870°C					
529-8Y, 529-D8Y				910					1000°C
529-8Z, 529D-8Z				920					
532-7	930°C	810°C	860°C	850°C	785°C	760°C	730°C	550°C	950°C
532-7L, 532-7N			905°C	885°C					1000°C
532-7P			925°C	910°C					
532-7R			905°C	885°C					
533-2			875°C	810°C					950°C
534-2			920°C						1000°C
535-2, 535-7, 535-7R				920°C					
536-2				810°C					
536-2T, 536-7P			940°C						
536-7R			905°C						
536-7			920°C						
542-4, 542-4K		865°C	940°C	915°C	840°C	800°C	770°C	600°C	
542-10			890°C	905°C					
542-10J, 542-10K			940°C	915°C					
543-10, 543-10K				865°C					
550-2		855°C	890°C	870°C	820°C			550°C	
552-2, 552-7, 552-7R		900°C (1)	930°C (1)	920°C	800°C	760°C	730°C	550°C	

(1) These operating limitations may be used for up to 10 minutes in the event of engine failure (BCAR Section C Issue 13).

Oil Temperatures

Variant	Minimum for Starting with		Minimum for Acceleration for Take Off		
	Approved Oil in AGB	DEF STAN 91-97/1 (previous DERD 2479) in AGB	Without W/M Injection	With W/M Injection	Maximum
	°C	°C	°C	°C	°C
511-7E, 514, 514-7	-30	-25	-15	40	110
528-7E, 528D-7E, 529-7E, 529D-7E, 529-7H, 529D-7H, 529-8E, 529D-8E, 529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529-D8Y, 529-8Z, 529D-8Z					120
532-7	-30	N/A	-15	40	120
532-7L				50	
532-7N, 532-7P				40	
532-7R				50	
533-2		-25			
534-2, 535-2				60(1) / 40(2)	
535-7		N/A		60	
535-7R				50	
536-2, 536-2T		-25		60(1) / 40(2)	
536-7P, 536-7R				50	
536-7				60	
542-4, 542-4K, 542-10 542-10J, 542-10K, 543-10, 543-10K		N/A		40	
550-2				40(3) / 70(4)	
552-2		-25		60	
552-7				65	
552-7R				50(3) / 50(4)	

(1) Aircraft static or rolling
(2) Release of aircraft brakes before engine exceeds 14500 rpm
(3) A/C moving
(4) A/C stationary

2. Permissible Rotational Speeds (1)

Variant	Take Off (5 min Limit) (2)	Maximum Continuous	Ground Idling at SL (3)(4)	Maximum Overspeed (20 sec. Limit)
511-7E, 514, 514-7	14500 + 200 rpm	14500 rpm	Incidental (5)	17000 rpm
528-7E, 528D-7E, 529-7E, 529D-7E, 529-7H, 529D-7H, 529-8E, 529D-8E, 529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529-D8Y, 529-8Z, 529D-8Z	15000 rpm			
532-7, 532-7L, 532-7N, 532-7P, 532-7R, 533-2, 534-2, 535-2, 535-7, 535-7R, 536-2, 536-2T, 536-7P, 536-7R, 536-7	15000 rpm		Incidental (3)	17000 rpm
542-4, 542-4K			8750+- 250 rpm	
542-10, 542-10J, 542-10K, 543-10, 543-10K			8500+- 250 rpm	16500 rpm
550-2, 552-2, 552-7, 552-7R			Incidental (5)	17000 rpm

(1) 511-7E, 514, 514-7:
The use of engine speeds between 7500 and 9500 rpm should be avoided whenever possible, especially during ground handling.
Running other than transitory in the engine speed range 13300 to 13700 rpm is only permissible if operationally necessary.

(2) 511-7, 514, 514-7:
Engine controls must be set to give a maximum rpm of 14500 with an oil temperature of 65°C.

(3) 511-7, 514, 514-7,
The ground idling at sea level static conditions with the fuel trimmer at full increase, is determined by the fuel flow which is to be adjusted to 140,9 ± 4.5 l/h.

(4) 528-7E, 532-7R, 535-7R, 536-7R:
The ground idling at sea level static conditions with the fuel trimmer at full increase, is determined by the fuel flow which is to be adjusted to:

- Basic Engine 163.7 ± 4.5 l/h
- With Mod 1860 140.9 ± 4.5 l/h
- With Mod 1850 145.5 ± 4.5 l/h

528D-7E, 529-7E, 529D-7E, 529-7H, 529D-7H, 529-8E, 529D-8E, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529D-8Y, 529-8Z, 529D-8Z, 532-7, 532-7L, 532-7N, 532-7P, 533-2, 534-2, 535-2, 535-7, 536-2, 536-2T, 536-7P:
The ground idling at sea level static conditions with the fuel trimmer at full increase, is determined by the fuel flow which is to be adjusted to:

- Basic Engine 163.7 ± 4.5 l/h
- With Mod 1860 140.9 ± 4.5 l/h

(5) 550-2, 552-2, 552-7, 552-7R:
The ground idling at sea-level static conditions with the fuel trimmer at the take-off trim position applicable to conditions of ISA and below is determined by the fuel flow which is to be adjusted to 140.9 ± 4.5 l/h

3. Oil system limits

Variant	Oil Consumption (Maximum)	Oil Pressure (gauge Pressure) Minimum to complete Flight at MCT conditions	Oil Tank Capacity		
			Maximum	Usable Oil	Feathering Supply
511-7E	0.57 l/h	82,7 kPa	14.8 l	5.1 l	4.5 l
514, 514-7			15.1 l	7.4 l	
528-7E, 528D-7E, 529-7E, 529D-7E, 529-7H, 529D-7H, 529-8E, 529D-8E, 529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529-D8Y, 529-8Z, 529D-8Z		62.1 kPa			
532-7, 532-7L, 532-7N, 532-7P 532-7R	0.57 l/h	62.1 kPa	15.1 l	7.4 l	4.5 l
533-2, 534-2, 535-2 535-7, 535-7R, 536-2, 536-2T, 536-7P, 536-7R, 536-7				7.4 l	
542-4, 542-4K, 542-10, 542-10J, 542-10K, 543-10, 543-10K			17 l	5.7 l	6.3 l
550-2			15.9 l	8.2 l	4.5 l
552-2, 552-7, 552-7R			15.1 l	7.4 l	

4. Fuel System Limits

Variant	Minimum Inlet Pressure (*gauge pressure*)		
	SL and 2286 m Altitude	2286 m and 7620 m	Min. Drainage Period after false start
511-7E, 514, 514-7, 528-7E, 528D-7E, 529-7E, 529D-7E, 529-7H, 529D-7H, 529-8E	62.1 kPa	89.6 kPa	2 min.
529D-8E	20.7 kPa	48.3 kPa	
529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529-D8Y, 529-8Z, 529D-8Z	62.1 kPa	89.6 kPa	
532-7, 532-7L, 532-7N, 532-7P, 532-7R, 533-2, 534-2, 535-2, 535-7, 535-7R, 536-2, 536-2T, 536-7P, 536-7R, 536-7	62.1 kPa	89.6 kPa	2 min.
542-4, 542-4K, 542-10, 542-10J, 542-10K, 543-10, 543-10K, 550-2	82.7 kPa	103.4 kPa	
552-2, 552-7	62.1 kPa	89.6 kPa	

5. Bleed Extraction

Variant	Range of RPM	Max. Air Delivery at MCT Power
511-7E, 514, 514-7	Unrestricted	1.88% of no-bleed mass flow
528-7E, 528D-7E, 529-7E, 529D-7E, 529-7H, 529D-7H, 529-8E, 529D-8E, 529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529-D8Y, 529-8Z, 529D-8Z		1.55% of no-bleed mass flow
532-7, 532-7L, 532-7N, 532-7P, 532-7R, 533-2, 534-2, 535-2, 535-7, 535-7R, 536-2, 536-2T, 536-7P, 536-7R, 536-7, 542-4, 542-4K, 542-10, 542-10J, 542-10K, 543-10, 543-10K, 550-2 552-2, 552-7, 552-7R	Unrestricted	1.55% of no-bleed mass flow

V. Operating and Service Instructions:

Variant	Installation Manual	Operating Instructions	Maint. Man.	OVHL Man.	TLM
511-7E	TSD 641	F-Da6-FaF/FoF	TSD 262	TSD 264	see TSD 264
514	TSD 1278	F-Da6-Av	M-Da6-Av		
514-7		F-Da6-FaF / FoF	TSD 262		
528-7E	TSD 1315	F-Da7-FaF / FoF	M-Da7-F	O-Da7-AC	see O-Da7-AC
528D-7E					O-Da7-AC
529-7E, 529D-7E, 529-7H, 529D-7H		F-Da7-FaF			
529-8E, 529D-8E, 529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529-D8Y, 529-8Z	TSD 1423	F-Da7-G	M-Da7-G	O-Da7-AC	O-Da7-AC
529D-8Z	TSD 1423	F-Da7-G	M-Da7-G	O-Da7-AC	O-Da7-AC
532-7	TSD 1315	F-Da7-FaF/FoF	M-Da7-F	O-Da7-AC	
532-7L		F-Da7-FaF			
532-7N		F-Da7-FaF/FoF			
532-7P, 532-7R		F-Da7-FoF			
533-2		F-Da7-Av	M-Da7-Av		
534-2, 535-2	EL-7				
535-7, 535-7R	TSD 1315	F-Da7-FoF	M-Da7-F		
536-2	EL-7	F-Da7-Av	M-Da7-Av		
536-2T	TSD 1315				
536-7P, 536-7R, 536-7		F-Da7-FoF	M-Da7-F		
542-4, 542-4K	TSD 1501	F-Da10-C	M-Da10-C	O-Da10-AC	
542-10, 542-10J, 542-10K, 543-10, 543-10K	TSD 1301	F-Da10-YS	M-Da10-YS		
550-2	TSD 1422	F-Da7-Av	M-Da8-HS	O-Da7-AC	
552-2	TSD 1315		M-Da7-HS		
552-7, 552-7R		F-Da7-FoF	M-Da7-F		

VI. Notes

1. 511-7E, 514, 514-7, 528-7E, 528D-7E, 529-7E, 529D-7E, 529-7H, 529-7H, 529-8E, 529D-8E, 529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529D-8Y, 529-8Z, 529D-8Z, 532-7, 532-7L, 532-7N, 532-7P, 532-7R, 533-2, 534-2, 535-2, 535-7, 535-7R, 536-2, 536-2T, 536-7P, 536-7R, 542-4, 542-4K, 542-10, 542-10J, 542-10K, 543-10, 543-10K, 550-2, 552-2, 552-7, 552-7R:
The ratings shown under III.6 are static ratings achieved at the following conditions:

- Sea level and ISA standard day conditions:
- All optional air bleeds closed
- Aircraft service accessory drives unloaded
- Rolls-Royce Jet Pipe assembly J56307 (or approved equivalent)

528-7E, 528D-7E, 529-7E, 529D-7E, 529-7H, 529-7H, 529-8E, 529D-8E, 529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529D-8Y, 529-8Z, 529D-8Z, 532-7, 532-7L, 532-7N, 532-7P7P, 532-7R, 533-2, 534-2, 535-2, 535-7, 535-7R, 536-2, 536-2T, 536-7P, 536-7R, 550-2, 552-2, 552-7, 552-7R::

- Test bed air intake: Flare J51797, Bullet J61617 (or approved equivalent)
- Exhaust cone assembly: RK 21556 or RK 25226 (or approved equivalent)

542-4, 542-4K, 542-10, 542-10J, 542-10K, 543-10, 543-10K:

- Test Bed air intake: Flare J94892 or J51797, Bullet J94898 or J61617 (or approved equivalent)
- Exhaust cone assembly: RK 21556 or RK 25226 (or approved equivalent)

2. 511-7E, 514, 514-7:
The rated performance is not sustained above ISA temperature conditions except when water/methanol is used for Take-off. It is a characteristic of the engine control system that there will be no increase in power with forward speed when water/methanol injection is being used. There will be an increase in power with forward speed when water/methanol injection is not being used, but the static ISA powers will not be substantially exceeded.

3. 511-7E, 514, 514-7, 528-7E, 528D-7E, 529-7E, 529D-7E, 529-7H, 529-7H, 529-8E, 529D-8E, 529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529D-8Y, 529-8Z, 529D-8Z, 532-7, 532-7L, 532-7N, 532-7P, 532-7R, 533-2, 534-2, 535-2, 535-7, 535-7R, 536-2, 536-2T, 536-7P, 536-7R, 542-4, 542-4K, 542-10, 542-10J, 542-10K, 543-10, 543-10K, 550-2, 552-2, 552-7, 552-7R:
The engine is only to be operated with constant speed propellers of approved types.

4. 511-7E, 514, 514-7:
Air may be bled from the compressor for the purpose of fuel heating and de-icer boots. The speed range at which bleed may be used is unrestricted, subject to limiting jet pipe temperature not being exceeded.

5. 532-7, 532-7L, 532-7N, 532-7P, 532-7R, 533-2, 534-2, 535-2, 535-7, 535-7R, 536-2, 536-2T, 536-7P, 536-7R:
Air may be bled from the compressor for the purpose of fuel heating. The speed range at which bleed may be used is unrestricted, subject to limiting jet pipe temperature not being exceeded.

550-2:
Air may be bled from the compressor for the purpose of fuel heating.

6. 511-7E, 514, 514-7, 528-7E, 528D-7E, 529-7E, 529D-7E, 529-7H, 529-7H, 529-8E, 529D-8E, 529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529D-8Y, 529-8Z, 529D-8Z, 532-7, 532-7L, 532-7N, 532-7P, 532-7R, 533-2, 534-2, 535-2, 535-7, 535-7R, 536-2, 536-2T, 536-7P, 536-7R, 550-2, 552-2, 552-7, 552-7R:
The torque meter which is built into the propeller reduction gear should not be used with a view to making an accurate assessment of power but it may be used as a power loss indicator.

7. 528-7E, 532-7R, 535-7R, 536-7R:
Modification 1850 introduces advanced technology features to the existing compressor assembly, these changes increase compressor efficiency and compression ratio which in turn improves specific fuel consumption. Turbine changes are also introduced to rematch the engine due to the revised compressor thermodynamics.
Mod. 1860 is similar to Mod. 1850, but improves compressor efficiency further.
When either of these Modifications is incorporated, the engine nameplate is to be marked with the inscription; 'Mod. 1850' or 'Mod. 1860'.

8. 528D-7E, 529-7E, 529D-7E, 529-7H, 529-7H, 529-7H, 529-8E, 529D-8E, 529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529D-8Y, 529-8Z, 529-8Z, 529D-8Z, 532-7, 532-7L, 532-7N, 532-7P, 533-2, 534-2, 535-2, 535-7, 536-2, 536-2T, 536-7P:
Mod 1860 introduces advanced technology features to the existing compressor assembly, these changes increase compressor efficiency and compression ratio, which in turn improves specific fuel consumption. Turbine changes are also introduced to rematch the engine due to the revised compressor thermodynamics. When either of these Modifications is incorporated, the engine nameplate is to be marked with the inscription;'Mod. 1860'.

9. The Dart series engines were covered previously under CAA-UK Type Certificate / Type Certificate Data Sheets and subsequently under LBA Engine Type Certificates / Type Certificate Data Sheets as listed in the table below.

Type	Variant	Previous Type	Previous RR Type Designation	CAA UK TC/TCDS	LBA TC/TCDS
Dart	511-7E	Dart 511	RDa6	2021	7036
	514, 514-7	Dart 514		2035	7037
	528-7E, 528D-7E	Dart 528	RDa7	2029	7038
	529-7E, 529D-7E, 529-7H, 529D-7H, 529-8E, 529D-8E, 529-8H, 529D-8H, 529-8X, 529D-8X, 529-8Y, 529-D8Y, 529-8Z, 529D-8Z	Dart 529		2031	7039
	532-7, 532-7L, 532-7N, 532-7P, 532-7R	Dart 530		2039	7023
	533-2, 534-2			2044	
	535-2			2045	
	535-7, 535-7R			2039	
	536-2			2044	
	536-2T			2047	
	536-7P, 536-7R, 536-7			2046	
	542-4, 542-4K, 542-10, 542-10J, 542-10K	Dart 540	RDa10	2034	7040
	543-10, 543-10K			2042	
	550-2	Dart 550	RDa8	2041	7041
	552-2	Dart 552	RDa7	2050	7002

10. With effect from 7 January 2002, the responsibilities of the Type Certificate Holder for the Dart series engines transferred from Rolls-Royce plc to Rolls-Royce Deutschland Ltd & Co KG. Coincident with this the ICAO Annex 8 responsibilities of the Authority of the State of Design transferred from the United Kingdom Civil Aviation Authority (CAA-UK) to the German Luftfahrt-Bundesamt (LBA).
The EASA Type Certificate EASA.E.065 transfers the Authority of the State of Design from the German Luftfahrt-Bundesamt (LBA) to EASA.
Airworthiness Directives issued prior and after the time of the transfers of the State of Design are still effective.