

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION TYPE CERTIFICATE DATA SHEET E00057EN	TCDS NUMBER E00057EN* REVISION: 1
	DATE: AUGUST 1, 1997 BMW ROLLS-ROYCE GmbH MODELS: BR700-710A1-10 BR700-710A2-20

Engines of models described herein conforming with this data sheet (which is part of Type Certificate Number E00057EN) and other approved data on file with the Federal Aviation Administration, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Federal Aviation Regulations, provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

TYPE CERTIFICATE (TC) HOLDER      BMW Rolls-Royce GmbH  
 Postfach 1246  
 61402 Oberursel  
 Germany

I. MODELS	BR700-710A1-10	BR700-710A2-20		
TYPE	Two spool axial flow engine consisting of a single stage fan, a ten stage axial flow compressor, an annular combustion chamber, a two stage axial flow high pressure turbine, a two stage axial flow low pressure turbine, an accessory gearbox, a thrust reverser and a Full Authority Digital Engine Control (FADEC).			
RATINGS (See NOTE 5)				
Maximum Continuous Thrust lbf/kN (See NOTE 18)	14,450/64.3	14,450/64.3		
Takeoff Thrust, lbf/kN (See NOTE 18)	14,750/65.6	14,750/65.6		
EQUIPMENT	In accordance with the Type Design Definition. Approved equipment is listed in BRR report E-TR150/95(FR), Issue 3 "Engine Equipment Classification"; or later approved issues and in BRR report E-TR427/96(FR), Issue 1, "Engine Equipment Classification"; or later approved issues for BR700-710A1-10 and BR700-710A2-20, respectively.			
OVERALL DIMENSIONS (mm/in)				
Length	4669/183.8	4669/183.8		
Diameter	1820/71.6	1820/71.6		
WEIGHT (DRY) (kg/lbs)				
	1851.2	1891		
	4081.2	4168.9		

\*

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LEGEND: "-" INDICATES "SAME AS PRECEDING MODEL"  
 "---" INDICATES "DOES NOT APPLY"  
 NOTICE: SIGNIFICANT CHANGES ARE BLACK-LINED IN  
 THE LEFT MARGIN.

CERTIFICATION BASIS

FAR 33, effective February 1, 1965, as amended by 33-1 through 33-15 inclusive, including draft FAR's 33.76 and 33.78, and FAR 34.

PRODUCTION BASIS  
IMPORT REQUIREMENTS

MODEL	APPLICATION DATE	TYPE CERTIFICATE ISSUED	TYPE CERTIFICATE CANCELED
BR700-710A1-10	Oct. 05, 1993	Sept. 16, 1996	
BR700-710A2-20	Sept. 07, 1994	Aug. 1, 1997	

To be considered for installation on United States registered aircraft, each engine to be exported to the United States shall be accompanied by a certificate of airworthiness for export, or certifying statement endorsed by the exporting cognizant civil airworthiness authority, which contains the following language:

These engines conform to the United States type design (Type Certificate Number E00057EN) and are in a condition for safe operation.

These engines have been subjected by the manufacturer to a final operational check and are in a proper state of airworthiness.

Reference FAR Section 21.500, which provides for the airworthiness acceptance of aircraft engines or propellers manufactured outside of the United States for which a United States type certificate has been issued.

Additional guidance is contained in FAA Advisory Circular 21-23, Airworthiness Certification of Civil Aircraft, Engines, Propellers, and Related Products, imported into the United States.

**NOTES**

NOTE 1. Maximum Rotational Speeds:

	BR700-710A1-10	BR700-710A2-20
Low Pressure Turbine N1 (%)		
-Maximum Take-off (See NOTE 18)	101.1	101.1
-Maximum Continuous	101.0	101.0
-Maximum Overspeed (20 sec.)	101.5	101.5
-Reverse Thrust (max. 30 sec.)	72.4	70.0
High Pressure Turbine N2 (%)		
-Maximum Take-off (See NOTE 18)	99.6	99.6
- Maximum Continuous	98.9	98.9
-Maximum Overspeed (20 sec.)	99.8	99.8

100% N1 equals 7431 RPM  
100% N2 equals 15898 RPM

NOTE 2. Temperature Limits

Turbine Gas Temperature (Trimmed) °C/°F	
Takeoff (See NOTE 18)	900/1652
Maximum Continuous	860/1580
Maximum prior to start	150/302
Starting	700/1292 (850/1562)**

Oil temperatures (°C/°F)	
Minimum for Starting	-30/-22
Minimum for Acceleration for take-off	20/68
Maximum	160/320

Fuel Temperatures (°C/°F)	
LP Pump Inlet, Max.	54/129
HP Pump Outlet, Max.	158°C/316°F (165°C/329°F)*

(\* Temporarily permitted for a period of not more than 15 minutes.)  
 (\*\* For BR700-710A1-10 only, starting in flight)

NOTE 3 Fuel and Oil Pressure Limits

Fuel Pressure	Minimum permissible fuel pressure at LP fuel pump inlet:	34.5 kPa/5.0 psig
Differential Oil Pressures:	Minimum Acceptance for Flight in the Range:	
	Idle to 72,3% N2:	241.2 kPa/35 psid
	72,3% N2 to 90% N2:	straight line interpolation from 241.2 kPa/35 psid to 310.3 kPa/45 psid
	Above 90% N2:	310.3 kPa/45 psid
	Minimum to Complete Flight:	
	Idle to 72,3% N2:	172.3 kPa/25 psid
	72,3% N2 to 90% N2:	straight line interpolation from 172.3 kPa/25 psid to 241.2 kPa/35 psid
	Above 90% N2:	241.2 kPa/35 psid

NOTE 4.

<b>Bleed Extraction:</b>
EPR = P50/P20: The amounts of bleed extraction from stages 5 and 8, respectively, are related to the core entry mass flow, W26. The amount of fan bleed extraction is related to the fan entry mass flow, W1A.

Power Range

Idle to 1.06 EPR  
 1.06 to 1.3 EPR  
 Above 1.3 EPR

	Normal Flow (%)			Maximum Flow (%)		
	Stage 5	Stage 8	Fan	Stage 5	Stage 8*	Fan
Idle to 1.06 EPR		7.8		3.0	12.1	0.6
1.06 to 1.3 EPR	4.4	4.2	0.2	8.3	7.9	1.6
Above 1.3 EPR	4.3		0.4	8.5	8.0	1.8

\* Stage 8 bleed is cleared for operation up to and including Maximum Continuous rating.

NOTE 5. The ratings are defined at sea level ISA standard day conditions and a defined test bed configuration for the air intake and exhaust systems with all optional bleeds closed and the aircraft service equipment drives unloaded, at a fuel low heat value of 43.179 kJ/kg (22.721 CHU/kg).

NOTE 6. ACCESSORY DRIVE PROVISIONS for BR700-710A1-10:

	Direction* of Rotation <sup>1</sup>	Transmission Ratio	Torque daNcm (lbs/in)	Weight kg (lbs)	Static Overhang Moment daNcm (lbs/in)	Maximum Power Extraction kW (hp)
Main Engine Fuel Pump including Fuel Metering Unit	CW	.530	2670 (2363)	20.5 (45.2)	395.45 (350)	26.9 (36.1)
Hydraulic Pump No. 1	CCW	.270	4180 (3700)	8.91 (19.64)	81 (71.7)	18.6 (24.9)
Hydraulic Pump No. 2	CCW	.275	4180 (3700)	8.91 (19.64)	81 (71.7)	18.6 (24.9)
Generator	CW	0.520	4125 (3651)	32.61 (71.9)	564.92 (500)	32.7 (43.9)
Generator FADEC <sup>2</sup>	CW	1.998		1.0 (2.2)	10 (8.85)	1.0 (1.34)
Starter <sup>3</sup>	CCW	0.986	8470 (7497)	15.56 (34.3)	227 (201)	
Oil Pump	CCW	0.408	518 (458)	9.07 (20)	66 (58.4)	3.2 (4.3)

\*CW: clockwise; CCW: counterclockwise, looking normal to pad along shaft

1) Looking normal to pad along shaft 2) Dedicated Generator (PMA) 3) Air Turbine Starter

NOTE 6. (Cont.) ACCESSORY DRIVE PROVISIONS for BR700-710A2-20:

	Direction* of Rotation <sup>1</sup>	Transmission Ratio	Torque daNcm (lbs/in)	Weight kg (lbs)	Static Overhang Moment daNcm (lbs/in)	Maximum Power Extraction kW (hp)
Main Engine Fuel Pump including Fuel Metering Unit	CW	.530	2670 (2363)	20.5 (45.2)	395.45 (350)	26.9 (36.1)
Hydraulic Pump No. 1	CCW	.335	3051 (2700)	6.57 (14.5)	61 (54)	10.3 (13.8)
Generator No. 1	CW	1.083	2830 (2505)	20.0 (44.2)	325 (287.6)	52 (69.7)
Generator No. 2	CCW	1.080	2830 (2505)	20.0 (44.2)	325 (287.6)	52 (69.7)
Generator FADEC <sup>2</sup>	CW	1.998		1.0 (2.2)	10 (8.85)	1.0 (1.34)
Starter <sup>3</sup>	CCW	0.986	8470 (7497)	15.56 (34.3)	227 (201)	
Oil Pump	CCW	0.421	518 (458)	9.07 (20)	66 (58.4)	3.2 (4.3)

\*CW: clockwise; CCW: counterclockwise, looking normal to pad along shaft

1) Looking normal to pad along shaft 2) Dedicated Generator (PMA) 3) Air Turbine Starter

NOTE 7. Operating and Service Instructions:

	<u>BR700-710A1-10</u>	<u>BR700-710A2-20</u>
Installation Drawing and Manual	E-TR206/95 Issue 6	E-TR364/95 Issue 1
Operating Instructions	OI-710-1BR	OI-710-2BR
Maintenance Manual	M-710-1BR	M-710-2BR
Engine Manual	E-710-1BR	E-710-2BR
Time Limits Manual	T-710-1BR	T-710-2BR

NOTE 8. The engines are equipped with a thrust reverser P/N 04G0001-029 (left hand engine) and P/N 04G0001-031 (right hand engine) for the BR700-710A1-10, and thrust reverser P/N 07G001-005 (left hand engine) and P/N 07G0001-007 (right hand engine) for the BR700-710A2-20. Operation of these thrust reversers is approved for ground use only. Use for power back is not approved.

NOTE 9. The BR700-710 series engines meets Federal Aviation Administration requirements for adequate turbine disk integrity and rotor blade containment and does not require external armoring. Certain engine parts are life limited. These limits are listed in the BR710 Time Limits Manual.

NOTE 10. FADEC: EEC P/N 1501KDC01-817 or later approved standards for the BR700-710A1-10. FADEC: EEC P/N 1520KDC01-605, or later approved standards for the BR700-710A2-20. The EEC software has been developed and verified in accordance with RTCA/DO-178B respectively ED-12B.

NOTE 11. Lightning and EMI protection capability of the electronic engine control system, are specified in the BR700-710A1-10 and BR700-710A2-20 Installation Manuals.

NOTE 12. Engine overhauls are permitted by the manufacturer only, as long as the Engine Manual is not available.

NOTE 13. Information on engine operation with FADEC system dispatch limitations is contained in report E-TR361/96 (FR) Issue 00 or later approved issues for BR700-710A1-10 and Report E-TR737/96(FR) Issue 1 or later approved issues for the BR700-710A2-20.

NOTE 14. The engine meets the smoke and hydrocarbon emission requirements of FAR 34 and the carbon monoxide and nitrogen oxide requirements of International Civil Aviation Organization Standards.

NOTE 15. The BR710 engine meets the fuel venting emissions requirements of FAR 34.

NOTE 16. Approved fuels and fuel additives are listed in the latest applicable issue of the applicable BR710 Operating Instructions.

NOTE 17. Approved oils are listed in the applicable BR710 Operating Instructions latest revision.

NOTE 18. Use of takeoff thrust for more than five minutes (not to exceed ten minutes) is approved for use only in the event of an inoperative engine due to shutdown or failure.

NOTE 19. The maximum permissible engine inlet distortion limit is specified in the applicable BR710 Installation Manual.

---THE END---