TYPE-CERTIFICATE DATA SHEET

EASA.P.087

for
R391 series propellers

Type Certificate Holder
GE Aviation Systems Ltd, trading as Dowty Propellers

Anson Business Park
Cheltenham Road East
Gloucester GL2 9QN
United Kingdom

For Models:
R391/6-132-F/3
R391/6-132-F/10

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I. General

1. Type / Models

R391 / R391/6-132-F/3 and R391/6-132-F/10

2. Type Certificate Holder

GE Aviation Systems Ltd, trading as Dowty Propellers
Anson Business Park
Cheltenham Road East
Gloucester GL2 9QN
United Kingdom

Design Organisation Approval No.: EASA.21J.008.

3. Manufacturer

Dowty Propellers (a part of GE Aviation Systems Ltd.).

4. Date of Application

R391/6-132-F/3	R391/6-132-F/10
17 March 1991	15 July 1997

Note: Application was made to CAA-UK for certification before EASA was established.

5. EASA Type Certification Date

R391/6-132-F/3	R391/6-132-F/10
1 April 1997	29 May 2001

Before issue of this EASA Type Certificate Data Sheet, the Type Certification of the R391/6-132-F/3 and R391/6-132-F/10 propellers were covered by CAA-UK Propeller Type Certificate Number 116.

II. Certification Basis

1. Reference Date for determining the applicable airworthiness requirements

17 March 1991.

2. EASA Certification Basis

2.1. Airworthiness Standards

R391/6-132-F/3	R391/6-132-F/10
JAR-P Change 7 dated 22 October 1987 and special requirements of CAA-UK letter of 12 April 1991 (ref. 9/216/1661/CAA11/PDG/1).	JAR-P Change 7, dated 22 October 1987 including Orange Paper P/96/1 effective 8 August 1996 and special requirements of CAA-UK letter of 14 July 1999 (ref. 9/80/Dowty/C27/CO1/1-A).

2.2. Special Conditions (SC)

SC1 – Composite Blades
SC2 – The Failure Analysis
SC3 – Bird Strike
SC4 – Lightning Protection

2.3. Equivalent Safety Findings (ESF)

None.

2.4. Deviations

None.

III. Technical Characteristics

1. Type Design Definition

Design Definition	List of Parts	Equipment Set Drawing
R391/6-132-F/3 (C-130J)	697039001-015 or later approved issues	697055001 issue 15A or later approved issues
R391/6-132-F/3 (LM-100J)	697039001-380 or later approved issues	697055001 issue 15A or later approved issues
R391/6-132-F/10	697091001-000 or later approved issues	697090001 issue 1C or later approved issues

2. Description

The Propeller is a variable-pitch, constant-speeding, feathering, reversing type, using hydraulic control and counterweights, with six composite blades. Beta control provides manual pitch selection for aircraft braking and ground manoeuvring. An integrated, full authority, engine/propeller electronic control system is provided by the engine manufacturer. The propeller electronic control software meets the Level 'A' (critical) standard of EUROCAE ED12B / RTCA DO-178B.

The R391/6-132-F/3 Propeller must be installed in accordance with Propeller Maintenance Manual 1093 (C-130J) and 1113 (LM-100J). The R391/6-132-F/10 Propeller must be installed in accordance with Propeller Maintenance Manual 1097.

3. Equipment

3.1 The standard of the associated equipment approved for use with these propeller types is defined by the propeller equipment set drawing defined above and published in Propeller Maintenance Manuals as follows:

Type Definition	R391/6-132-F/3	R391/6-132-F/10
PMM Publication	1093 and 1113	1097

3.2 The equipment set comprises the following LRUs:

R391/6-132-F/3	**R391/6-132-F/10**
Propeller Assembly Spinner (de-iced and anti-iced) Auxiliary Pump Overspeed Governor (OSG) Beta Tube Assembly Pitch Control Unit (PCU) Brush Block Bracket Assembly De-icing Timer Unit (DITU) De-ice Harness Propeller Control Harness #1 Propeller Control Harness #2 Auxiliary Pump Harness	Propeller Assembly Spinner (de-iced and anti-iced) Auxiliary Pump Overspeed Governor (OSG) Beta Tube Assembly Pitch Control Unit (PCU) Brush Block Bracket Assembly De-icing Timer Unit (DITU)

3.3 FADEC software standard: See Section 7.

4. Dimensions

Propeller diameter: 411,5 cm

5. Weight

R391/6-132-F/3	**R391/6-132-F/10**
Propeller complete with spinner 326 kg approximate (reference only)	Propeller complete with spinner 326 kg approximate (reference only)

6. Hub / Blade Combinations

Combinations	R391/6-132-F/3 (C-130J)	R391/6-132-F/3 (LM-100J)	R391/6-132-F/10
Blade Part No	697039275, or later	697040261-23, or later	697039294, or later
Hub Part No	697039259, or later	697040221, or later	697039293, or later

7. Control System

7.1 Hydraulically-actuated blade pitch is controlled by the PCU, which is electronically controlled by the FADEC. The OSG, using flyweights in conjunction with blade counterweights, prevents propeller overspeed.

7.2 FADEC Software Standards

These are the original certification software standards. The equipment may be used with later approved software standards controlled in accordance with Rolls-Royce Corporation (R-RC) documents as follows:

R391/6-132-F/3	R391/6-132-F/10
(R-RC) AE21D03V3 Software Accomplishment Summary (R-RC) EDR 16555 Software Configuration Index (R-RC) EDR 17435 Plan for Software Aspects of Certification (R-RC) EDR 16655A	(R-RC) 23074041 Software Accomplishment Summary (R-RC) EDR 19395 Software Configuration Index (TRW) J542/0025, Issue 1.3 Plan for Software Aspects of Certification (TRW) J542/0001, Issue 1

7.3 DITU Software Standards

These are the original certification software standards. The equipment may be used with later approved software standards controlled in accordance with Hispano-Suiza Canada (H-SC) documents as follows:

R391/6-132-F/3	R391/6-132-F/10
(H-SC) 40555-519 Software Accomplishment Summary (H-SC) 40019 Software Configuration Index (H-SC) 40017 Plan for Software Aspects of Certification (H-SC) 40013	(H-SC) 34555-701 Software Accomplishment Summary (Dowty) C27J-00196 Software Configuration Index (Dowty) C27J-00197 Plan for Software Aspects of Certification (Dowty) C27J-00195

8. Adaptation to Engine

Flange with 15 studs, attachment nuts and 3 dowels.

9. Direction of Rotation

Rotation is right hand tractor (clockwise when viewed in the direction of flight).

IV. Operating Limitations

Operation of the propeller system outside of the limitations stated below is prohibited unless permitted by revision of the aircraft flight manual.

1. Approved Installations

The R391/6-132-F/3 propeller model is intended for use in Lockheed Martin C-130J Hercules (military aircraft) and Lockheed Martin LM-100J Hercules (civil aircraft). The R391/6-132-F/10 propeller model is intended for use in Alenia C-27J Spartan (military aircraft).

2. Maximum Take Off Power and Speed

The following propeller speed information applies to both R391/6-132-F/3 and R391/6-132-F/10 propeller models:
Take-off Propeller Speed (100%): 1020,7 rpm

3. Maximum Continuous Power and Speed

The following propeller speed information applies to the both R391/6-132-F/3 and R391/6-132-F/10 propeller models:
Maximum Propeller Continuous Speed: 1020.7 rpm

3.1 Overspeed

Maximum Propeller Transient Overspeed (112%): 1143 rpm
Maximum Propeller Continuous Overspeed (103.5%): 1057 rpm

4. Propeller Pitch Angle

The R391 propeller models have variable pitch capability. Pitch control is provided by a governor.

4.1. Driving Power

The following driving power and torque information, measured between engine and gearbox, applies to the both R391/6-132-F/3 and R391/6-132-F/10 propeller models:

4.1.1 Torque Limits:

Take-off Engine Torque (100%)	2348 Nm
Maximum Continuous Engine Torque (100%)	2348 Nm
Maximum Permitted Transient Engine Torque (111.6%)	2621 Nm

4.1.2 Power Limits:

Take-off Engine Power (100%)	3509 kW
Maximum Continuous Engine Power (100%)	3509 kW

4.2. Cross-Wind Limitations

The cross-wind ground and flight limitations are as stated in the Propeller Operating Limitations, (as declared in Propeller Maintenance Manual 1093 and 1113 for the R391/6-132-F/3 propeller and Propeller Maintenance Manual 1097 for the R391/6-132-F/10 propeller, and stated in the applicable Aircraft Flight Manual.

V. Operating and Service Instructions

Instructions and information on unit Description, Operation, Fault Isolation, Servicing, Removal/Installation, Adjustment Test, Cleaning/Painting and Repairs are covered in Propeller Maintenance Manual 1093 (C-130J) and 1113 (LM-100J) for the R391/6-132-F/3 propeller and Propeller Maintenance Manual 1097 for the R391/6-132-F/10 propeller.

Assembly / disassembly are covered in the following Component Maintenance Manuals (CMM):

	CMM CHAPTER NUMBERS		
COMPONENT MAINTENANCE MANUALS	**R391/6-132-F/3 (C-130J)**	**R391/6-132-F/3 (LM-100J)**	**R391/6-132-F/10**
Propeller	61-10-43	61-10-75	61-10-51
Spinner	61-10-44	61-10-44	61-10-52
Beta Tubes	61-20-45	61-20-45	61-20-50
Pitch Control Unit	61-20-42	61-20-42	61-20-51
Overspeed Governor	61-20-43	61-20-43	61-20-52
Auxiliary Pump	61-20-44	61-20-44	61-20-53
Brush Block Bracket Unit	30-60-03	30-60-03	30-60-07
De-icer Timer Unit	30-60-04	30-60-04	30-60-06

VI. Notes

1. The propeller approval does not consider compliance with the aircraft de-icing requirements.

2. Component life limitations are specified in the approved Airworthiness Limitations section of the Propeller Maintenance Manual.

3. Mandatory Propeller inspections are specified in the Airworthiness Limitations section of the Propeller Maintenance Manual.

4. The Propeller restoration time and calendar life are specified in the Airworthiness Limitations section of the Propeller Maintenance Manual.

5. The hydraulic fluids for use in the propeller and its control system are specified in the Airworthiness Limitations section of the Propeller Maintenance Manual.

6. The propeller and its control system are approved with an overspeed 'get-home' capability to cater for propeller control malfunctions (see 'Operational Limits', Maximum Continuous Propeller Overspeed).

7. Propellers and propeller equipment covered by this TCDS that have been in use with an operator not controlled by a civil Airworthiness Authority (this naturally includes military use) may only be converted for civil use with the written approval of Dowty Propellers. This approval is necessary because parts may have been operated beyond the operational limits approved by EASA. Before a Certificate of Airworthiness is issued for an aircraft, to which a converted Dowty propeller or propeller equipment is installed, an EASA Form 1 must be issued. This requires the application of Dowty Propellers Alert Service Bulletins C130J-61-89 for the R391/6-132-F/3 propeller and C27J-61-37 for the R391/6-132-F/10 propeller, covering conversion to civil use.

SECTION: ADMINISTRATIVE

I. Acronyms and Abbreviations

N/A

II. Type Certificate Holder Record

N/A.

III. Change Record

Issue	Date	Changes	TC issue
Issue 01	17 October 2008	Initial Issue.	17 October 2008
Issue 02	11 March 2014	Added harnesses to the R391/6-132-F/3 propeller. (EASA Major Change Approval 10048430)	
Issue 03	11 December 2018	New blade tip paint scheme in order to ensure segregation of the civil fleet (LM-100J) from the military fleet (C-130J). (EASA Major Change Approval 10066967)	

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