

型号认可证数据单
THE VALIDATION DATA SHEET

编号/No: VTC0321E

版次/Revision: 5

型号/Type: Trent 1000 & Trent 7000 series

型别/Model:

Trent 1000-A2
Trent 1000-C2
Trent 1000-D2
Trent 1000-E2
Trent 1000-G2
Trent 1000-H2
Trent 1000-J2
Trent 1000-K2
Trent 1000-L2
Trent 1000-AE3
Trent 1000-CE3
Trent 1000-D3
Trent 1000-G3
Trent 1000-H3
Trent 1000-J3
Trent 1000-K3
Trent 1000-L3
Trent 1000-M3
Trent 1000-N3
Trent 1000-P3
Trent 1000-Q3
Trent 1000-R3
Trent 7000-72
Trent 7000-72C

批准人/Approved By:



职务/Title: Deputy Director General

日期/Date: 2026 年 5 月 13 日

本数据单是型号认可证（编号：VTC0321E）的组成部分，它规定了符合中国民用航空局的适航要求所颁发此型号认可证的产品状态和限制。

This data sheet, which is part of Validation of Type Certificate (No: VTC0321E), prescribes condition and limitation under which the product for which the Type Certificate was issued meets the airworthiness requirements of the Chinese Civil Aviation Regulation.

型号认可证持有人/Validation of Type Certificate Holder:

Rolls-Royce Deutschland Ltd & Co KG
Eschenweg 11
Dahlewitz
15827 Blankenfelde-Mahlow, Germany

第1部分 概述

SECTION 1 GENERAL

1. CAAC 认可数据单和型号合格证数据单/CAAC Validation Data Sheet and Type Certificate Data Sheet:

	中国民用航空局认可数据单号、版次和颁发日期 CAAC Validation Data Sheet Number, Revision and issuance date	型号合格证数据单号、版次和颁发日期 Type Certificate Data Sheet Number, Revision and issuance date
当前 Current	No.VTC0321E, 版次5/Rev 5 2026年05月13日	EASA TCDS E.036, Issue: 21 1 Apr 2025
历史 History	No.VTC0321E, 版次4/Rev 4 2025年02月21日	EASA TCDS E.036, Issue: 20 2 Apr 2024
	No.VTC0321E, 版次3/Rev 3 2023年5月22日	EASA TCDS E.036, Issue: 18 13 Oct 2022
	No.VTC0321E, 版次2/Rev 2 2022年11月10日	型别 Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2, Trent 1000-J2, Trent 1000-K2, Trent 1000-L2, Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3, Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3, Trent 1000-R3 对应 EASA 数据单: EASA TCDS E.036, Issue: 16 05 Nov 2019 型别Trent7000-72, Trent7000-72C 对应EASA的数据单: EASA TCDS E.036, Issue: 15 30 Apr 2019
	No.VTC0321E, 版次1/Rev 1 2022年10月8日	EASA TCDS E.036, Issue: 16 05 Nov 2019
	No.VTC0321E, 版次0/Rev 0 2016年3月18日	EASA TCDS E.036, Issue: 06 06 May 2015

注：上表中出口国局方型号合格证数据单信息仅供参考
Note: Above TCDS information of Certification Authority is only for reference

CAAC认可数据单修订记录/CAAC VTCDS Change Record

CAAC 认可数据单版次/ CAAC VTCDS Revision	相对上一版的修订记录 Change Record	备注 Remark
Rev 5	- 增加 Trent7000-72 和 Trent7000-72C 的涡轮燃气温度修正包线 23 (EASA 大改批准书 10086445)。 Addition of TGT trim Profile 23 for Trent7000-72 and Trent7000-72C (EASA Major Change Approval 10086445). - 增加第 3 部分管理信息。 Add Section 3 ADMINISTRATIVE INFORMATION.	
Rev 4	增加 Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3, Trent 1000-K3, Trent 1000-L3 的涡轮燃气温度修正包线 20 (EASA 大改批准书 10084218)。 Addition of TGT trim Profile 20 for Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3, Trent 1000-K3, Trent 1000-L3 (EASA Major Change Approval 10084218).	
Rev 3	- 增加 CAEP/11 非挥发性颗粒物要求的符合性 (Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3, Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3, Trent 1000-R3, Trent7000-72, Trent7000-72C)。 Introduction of CAEP/11 for nvPM compliance (Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3, Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3, Trent 1000-R3, Trent7000-72, Trent7000-72C) . - 将 Trent7000-72 和 Trent7000-72C 的最小启动滑油温度限制从-20℃更改为-40℃。 Changing to the minimum starting oil temperature limit of Trent7000-72 and Trent7000-72C from -20 deg C to -40 deg C. - 勘误: 更正 Trent7000-72 和 Trent7000-72C 的最大滑油温度。 Correction of errors: Trent7000-72 and Trent7000-72C maximum oil temperature. - 增加最大涡轮燃气温度修正下调值 (注释 12)。 Addition of the maximum TGT Trim pull down values (Note 12).	
Rev 2	- 增加下列型别: Add the following models: Trent7000-72 and Trent7000-72C - 在 Trent7000-72 and Trent7000-72C 发动机型号设计定义中增加 MB 72-AK210 的改装要求。 Add the requirement of MB 72-AK210 into the Trent7000-72 and Trent7000-72C Type Design Definition. - 勘误, 删除注释“Trent 1000-E 发动机的型号定义总是包含 SB	

	72-G319”及相关引用内容。 Correct error, delete the note “Trent 1000-E model Engine type definition always embodies SB 72-G319” and related reference statement.	
Rev 1	1. 增加下列型别: Add the following models: Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3, Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3 Trent 1000-R3 2. 发动机型号定义从第二版更改到第三版并增加MB 72-K117的改装要求。 Change of DIS Issue 2 to Issue 3 and add the requirement of MB 72-K117 3. 更改型号合格证持有人地址 Change of TC Holder’s address 4. 更改型号合格证持有人，由罗尔斯·罗伊斯公司更改为罗尔斯·罗伊斯德国公司 Transfer of TC from Rolls-Royce plc to Rolls-Royce Deutschland Ltd & Co KG 5. 增加 CAEP/10 非挥发性颗粒物要求的符合性 Introduction of CAEP/10 for nvPM compliance 6. 修订中华人民共和国国家标准“3号喷气燃料”(GB 6537) Revise National Standard of the People’s Republic of China “No.3 Jet Fuel” (GB 6537)	

2. 类别/Category: 发动机/Engine
3. 认可当局/Validation Authority: 中国民用航空局/CAAC
审定当局/Certifying Authority: 欧盟航空安全局/EASA
4. 型号合格证持有人:
Type Certificate Holder: 罗尔斯·罗伊斯德国公司
Rolls-Royce Deutschland Ltd & Co KG
5. ETOPS: 适用/Applicable
6. CAAC专用要求:
CAAC Special Requirements: 中华人民共和国国家标准“3号喷气燃料”
(GB 6537)
National Standard of the People’s Republic of China “No.3 Jet Fuel” (GB 6537)

第2部分 数据单

SECTION 2 DATA SHEET

I. 概述/General

1. 型别/ Model

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2

Trent 1000-J2, Trent 1000-K2, Trent 1000-L2

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3,

Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3,

Trent 1000-R3

Trent7000-72, Trent7000-72C

此发动机型别批准按照以下额定值和运行限制在大型飞机上使用，发动机符合动力装置安装要求中规定的安装标准。

These engine models are approved for use on Large Aeroplanes at the ratings and within the operating limitations specified below, subject to compliance with the powerplant installation requirements appropriate to approved installations.

2. 型号合格证持有人/Type Certificate Holder

Rolls-Royce Deutschland Ltd & Co KG

Eschenweg 11

Dahlewitz

15827 Blankenfelde-Mahlow

Germany

DOA ref.: EASA.21J.065

到2019年2月20日/Formerly (until 20 February 2019)

Rolls-Royce plc

62 Buckingham Gate

London

SW1E 6AT

United Kingdom

之前的DOA/former DOA ref.: EASA.21J.035

3. 制造商/Manufacturer

Rolls-Royce plc

4. 申请日期/Date of Application

发动机型别/Engine Models

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2,

Trent 1000-H2, Trent 1000-J2, Trent 1000-K2, Trent 1000-L2

申请日期/Application Date : 2012年5月16日/16 May 2012

发动机型别/Engine Models

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3,
Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3,
Trent 1000-R3

申请日期/Application Date : 2013年11月22日/22 November 2013

发动机型别/Engine Models

Trent7000-72, Trent7000-72C

申请日期/Application Date : 2014年10月7日/7 October 2014

5. 审定基准日期/Certification Reference Date

2004年9月30日/30 September 2004

6. EASA颁证日期/EASA Type Certification Date

发动机型别/Engine Models

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2,
Trent 1000-H2, Trent 1000-J2, Trent 1000-K2, Trent 1000-L2

2013年9月10日/10 September 2013

发动机型别/Engine Models

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3,
Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3,
Trent 1000-R3

2016年7月11日/11 July 2016

发动机型别/Engine Models

Trent7000-72, Trent7000-72C

2018年7月20日/20 July 2018

II. 审定基础/Certification Basis

1. EASA审定基础/EASA Certification Basis

1.1. 适航标准/Airworthiness Standards:

适用于全部型别/For all models

- CS-E: 初始版本, 2003年10月24日
CS-E: original issue, dated 24 October 2003
- 限时派遣: CS-E 1030第三修正案
Time Limited Dispatch : CS-E 1030 amendment 3
- 双发延程: CS-E 1040第三修正案
ETOPS: CS-E 1040 amendment 3

1.2. 专用条件/Special Conditions (SC)

无 none

1.3. 等效安全/Equivalent Safety Findings

适用于全部型别/For all models

- CS-E 740 150小时持久试验/150 Hour Endurance Test
- CS-E 740(f) 无最大连续转速限制声明或显示/Non declaration or display of Maximum Continuous

Speed Limitation

- CS-E 790 吸雨吸雹/Ingestion of Rain and Hail

发动机型别/Engine models

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2, Trent 1000-J2, Trent 1000-K2, Trent 1000-L2, Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3, Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3, Trent 1000-R3, Trent7000-72, Trent7000-72C

- CS-E 840和CS-E 850 高压轴基本可靠性/HP Shaft Prime Reliability

发动机型别/Engine models

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3, Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3, Trent 1000-R3

- CS-E 740 (e) 和 (f)(4)(v) 滑油系统限制/Oil system limits
- CS-E 740(f)(1) 为更高N3转速限制的CS-E 740做的补充测试/Supplementary test to CS-E 740 for higher rotational N3 limitation

发动机型别/Engine models

Trent7000-72, Trent7000-72C

- CS-E 740 (h)(1) 150小时持久试验/150 Hour Endurance Test

1.4. 环境保护/Environmental Protection

发动机型别/Engine Models

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2, Trent 1000-J2, Trent 1000-K2, Trent 1000-L2

排放物及燃油排放: ICAO附件16第II卷第III部分 (第三版, 2008年7月) 第7修正案2011年11月7日。

Emissions and Fuel Venting: ICAO Annex 16, Volume II, Parts III (3rd Edition, July 2008), Amendment 7 dated 17 November 2011

发动机型别/Engine Models

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3, Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3, Trent 1000-R3, Trent7000-72, Trent7000-72C

排放物及燃油排放: CS-34第4修正案按照欧盟立法决定 2021/011/R (适用于2021年7月25日) 实施, 适用于2021年1月1日的ICAO附件16第II卷第10修正案于2021年4月27日在欧盟立法中实施。NO_x标准符合ICAO附件16第II卷第III部分, 第二章, 2.3.2 e) 节 (CAEP/8)。非挥发性颗粒物最大质量浓度等级符合ICAO附件16第II卷第III部分, 第四章, 4.2.2.1节。非挥发性颗粒物质量和数量排放符合ICAO附件16第II卷第III部分, 第四章, 4.2.2.2 a) 1) and 4.2.2.2 b) 1) 节 (CAEP/11 对生产中的发动机标准)。符合性被证明符合ICAO附件16第II卷第10修正案第III部分, 第四章, 4.2.2.2 a) 2) 和 4.2.2.2 b) 2) 节中的非挥发性颗粒物标准 (CAEP/11 对新型号发动机的标准)。

Emissions and Fuel Venting: CS-34 Amendment 4 as implemented by ED Decision 2021/011/R (applicable 25 July 2021), ICAO Annex 16, Volume II, Amendment 10 applicable 1 January 2021 as implemented into EU Legislation 27 April 2021. NO_x standard in accordance with ICAO Annex 16 Volume II, Part III, Chapter 2, §2.3.2 e) (CAEP/8). Maximum nvPM mass concentration levels in compliance with 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). Compliance has also been demonstrated with the nvPM standard from ICAO Annex 16 Volume II,

Amendment 10, Part III, Chapter 4, paragraph 4.2.2.2 a) 2) and 4.2.2.2 b) 2) (CAEP/11 New-Type standard).

2. CAAC认可审定基础/CAAC Validation Certification Basis

接受EASA的审定基础，另外包括以下CAAC附加技术条件：

CAAC validation certification basis includes EASA certification basis and CAAC Additional Technical Conditions which are as follows:

2.1. CAAC型号认可证颁发之前EASA发布的所有适用的适航指令均须遵守。

All applicable airworthiness directives (ADs) issued by EASA prior to issuance of the CAAC VTC shall be complied with.

2.2. 中华人民共和国国家标准“3号喷气燃料”(GB 6537)。

National Standard of the People's Republic of China "No.3 Jet Fuel" (GB 6537).

2.3. 基于CAAC和EASA适航标准和环境保护要求、条款解释、使用情况、政策和指导性资料之间的差异所确定的下列附加要求。

Based on the differences in the airworthiness standards, environmental requirement, applications, service experiences, policies, and guidance materials between CAAC and EASA, requirements below shall be complied with.

- 按照CCAR 33.4和A33.3(c)条款要求，为申请获得安装在已批准ETOPS飞机上的发动机资格，持续适航文件必须包括发动机状态监控程序。

Per CCAR 33.4 and A33.3(c), for seeking eligibility for the engine to be installed on an airplane approved for ETOPS, the Instructions for Continued Airworthiness must include procedures for engine condition monitoring.

- 按照CCAR 33.69条款要求，电点火系统必须至少有二个点火器和二条独立的次级电路。

Per CCAR 33.69, the electric ignition system must have at least two igniters and two separate secondary electric circuits.

- 按照CCAR 33.88(a)条款要求，完成超温试验。

Per CCAR 33.88(a), the over-temperature test shall be completed.

- 按照CCAR 33.90条款要求，须在符合型号设计的原始型发动机上进行初始维修检查相关的试验。

Per CCAR 33.90, an IMI test is required to be carried out on the original engine model of a type design.

III. 技术特性/Technical Characteristics

1. 型别设计定义/Type Design Definition

依照Trent1000型号合格证数据单进行运行的最低发动机型号设计标准列于下表中。

The minimum standard of Engine Type Design for operation in accordance with the Trent 1000 Type Certificate Data Sheet are defined in the following documents:

型别/Model	发动机型号定义/Engine Type Definition
Trent 1000-A2	DIS 2327 Issue 3
Trent 1000-C2	DIS 2328 Issue 3
Trent 1000-D2	DIS 2329 Issue 3
Trent 1000-E2	DIS 2330 Issue 3
Trent 1000-G2	DIS 2331 Issue 3
Trent 1000-H2	DIS 2332 Issue 3
Trent 1000-J2	DIS 2333 Issue 3

Trent 1000-K2	DIS 2334 Issue 3
Trent 1000-L2	DIS 2335 Issue 3
Trent 1000-AE3	DIS 2372 Issue 3 plus MB72-K117
Trent 1000-CE3	DIS 2373 Issue 3 plus MB72-K117
Trent 1000-D3	DIS 2357 Issue 3 plus MB72-K117
Trent 1000-G3	DIS 2360 Issue 3 plus MB72-K117
Trent 1000-H3	DIS 2361 Issue 3 plus MB72-K117
Trent 1000-J3	DIS 2362 Issue 3 plus MB72-K117
Trent 1000-K3	DIS 2363 Issue 3 plus MB72-K117
Trent 1000-L3	DIS 2364 Issue 3 plus MB72-K117
Trent 1000-M3	DIS 2365 Issue 3 plus MB72-K117
Trent 1000-N3	DIS 2367 Issue 3 plus MB72-K117
Trent 1000-P3	DIS 2368 Issue 3 plus MB72-K117
Trent 1000-Q3	DIS 2370 Issue 3 plus MB72-K117
Trent 1000-R3	DIS 2369 Issue 3 plus MB72-K117
Trent7000-72	DIS 2379 issue 2 plus MB 73-K233, MB 72-K150, MB 72-K200 and MB 72-AK210
Trent7000-72C	DIS 2378 issue 1 plus MB 73-K233, MB 72-K150 , MB72-K200 and MB 72-AK210

另外, Trent7000-72和Trent7000-72C, 详见注释11。

Additionally, for Trent7000-72 and Trent7000-72C, see note 11.

2. 描述/Description

Trent 1000发动机是一款三转子高涵道比轴流涡扇发动机。低压、中压和高压压气机分别由各自的涡轮驱动。低压压气机风扇由2.85m后掠叶片和出口导向叶片组成。燃烧系统由一个环形燃烧室及18个燃油喷嘴组成。

The Trent 1000 engine is a three shaft high bypass ratio, axial flow, turbofan with Low Pressure, Intermediate Pressure and High Pressure Compressors driven by separate turbines through coaxial shafts. The LP Compressor fan diameter is 2.85m with a swept fan blade and OGV's. The combustion system consists of a single annular combustor with 18-off fuel spray nozzles.

从发动机后部向前看, 低压和中压组件分别逆时针方向旋转, 高压组件顺时针方向旋转。压气机和涡轮特征如下:

The LP and IP assemblies rotate independently in an anti-clockwise direction, the HP assembly rotates clockwise, when viewed from the rear of the engine. The Compressor and Turbine have the following features:

压气机/Compressor	涡轮/Turbine
低压/LP – 单级/Single stage	低压/LP –6 级/6 stage
中压/IP – 8 级/8 stage	中压/IP –单级/Single stage
高压/HP – 6 级/6 stage	高压/HP –单级/Single stage

发动机控制系统利用EEC (发动机电子控制器) 通过数字化数据总线与机身界面连接。发动机还有EMU (发动机监测单元) (给飞机提供监测的振动信号)。

The engine control system utilize an EEC (Electronic Engine Controller) which has an airframe interface for digital bus communications. An EMU (Engine Monitor Unit) is fitted (to provide vibration signals to the aircraft).

3. 设备/Equipment

型号设计定义包括的具体设备：参考安装手册。

For details of equipment included in the type design definition: refer to Installation Manual.

飞机TC持有人提供的安装在发动机上或由发动机驱动的短舱设备和其他具体设备信息：参考安装手册。

For details of equipment and nacelle hardware supplied by the Airframe TC holder that may be mounted on or driven by the engine: refer to Installation Manual.

注释：发动机取证时使用了反推装置。注意反推装置不属于发动机型号设计的一部分，而是随飞机进行取证。

Note: The engine is certified for use with an operable Thrust Reverser Unit. Note that the Thrust Reverser Unit does not form part of the engine type design and is certified as part of the aircraft type design.

4. 尺寸/Dimensions

发动机型别/Engine Models

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2, Trent 1000-J2, Trent 1000-K2, Trent 1000-L2, Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3, Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3, Trent 1000-R3

总长度/Overall Length mm (ins)	4771 (187.8)
最大半径/maximum Radius mm (ins)	1899 (74.8)

发动机型别/Engine Models

Trent7000-72, Trent7000-72C

总长度/Overall Length mm (ins)	4775 (188.0)
最大半径/maximum Radius mm (ins)	1837 (72.3)

长度-从整流罩尖部开始，到尾部轴承箱内安装法兰盘后部。

Length - tip of spinner to rear of the tail bearing housing inner plug flange.

半径-从中线开始，不包括余油放泄管。

Radius - from centre line, not including drains mast.

5. 净重/Dry Weight

发动机型别/Engine Models

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2, Trent 1000-J2, Trent 1000-K2, Trent 1000-L2

最大发动机净重/Maximum dry engine weight (kg)	5947
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包括作为发动机部分取证的短舱EBU组件，但不包括液体。

Including nacelle EBU items certified as part of the engine but not including fluids

发动机型别/Engine Models

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3
Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3
Trent 1000-R3

最大发动机净重/Maximum dry engine weight (kg)	6114
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包括作为发动机部分取证的短舱EBU组件，但不包括液体。

Including nacelle EBU items certified as part of the engine but not including fluids

发动机型别/Engine Models

Trent7000-72, Trent7000-72C

最大发动机净重/Maximum dry engine weight (kg)	6445
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包括作为发动机部分取证的短舱EBU组件，但不包括液体。

Including nacelle EBU items certified as part of the engine but not including fluids

6. 额定值/Ratings

ISA海平面静止条件推力额定值如下/The ISA sea-level static thrust ratings are:

额定值/Rating		Trent 1000-A2 Trent 1000-AE3	Trent 1000-C2 Trent 1000-CE3	Trent 1000-D2 Trent 1000-D3	Trent 1000-E2
推力 kN (lbf)	起飞(净) (5分钟) Take-Off (net) (5 minutes)	307.8 (69,194)	331.4 (74,511)	331.4 (74,511)	265.3 (59,631)
	等效无辅助设备发动 机起飞值 Equivalent Bare Engine Take-Off	310.9 (69,885)	334.7 (75,239)	334.7 (75,239)	268.0 (60,253)
	最大连续值 (净) Maximum Continuous (net)	287.9 (64,722)	309.3 (69,523)	309.3 (69,523)	261.8 (58,866)
	等效无辅助设备发动 机最大连续值 Equivalent Bare Engine Maximum Continuous	290.8 (65,382)	312.3 (70,217)	312.3 (70,217)	264.6 (59,481)

额定值/Rating		Trent 1000-G2 Trent 1000-G3	Trent 1000-H2 Trent 1000-H3	Trent 1000-J2 Trent 1000-J3	Trent 1000-K2 Trent 1000-K3
推力 kN (lbf)	起飞(净) (5分钟) Take-Off (net) (5 minutes)	320.6 (72,066)	284.2 (63,897)	347.5 (78,129)	347.5 (78,129)
	等效无辅助设备发动	323.7 (72,777)	287.1 (64,551)	350.9 (78,886)	350.9 (78,886)

	机起飞值 Equivalent Bare Engine Take-Off				
	最大连续值 (净) Maximum Continuous (net)	287.9 (64,722)	261.8 (58,866)	319.5 (71,818)	319.5 (71,818)
	等效无辅助设备发动机最大连续值 Equivalent Bare Engine Maximum Continuous	290.8 (65,382)	264.6 (59,481)	322.6 (72,519)	322.6 (72,519)

额定值/Rating		Trent 1000-L2 Trent 1000-L3	Trent 1000-M3	Trent 1000-N3	Trent 1000-P3
推力 kN (lbf)	起飞(净) (5分钟) Take-Off (net) (5 minutes)	331.4 (74,511)	354.6 (79,728)	354.6 (79,728)	331.4 (74,511)
	等效无辅助设备发动机起飞值 Equivalent Bare Engine Take-Off	334.7 (75,239)	358.1 (80,494)	358.1 (80,494)	334.7 (75,239)
	最大连续值 (净) Maximum Continuous (net)	309.3 (69,523)	323.3 (72,691)	323.3 (72,691)	309.3 (69,523)
	等效无辅助设备发动机最大连续值 Equivalent Bare Engine Maximum Continuous	312.3 (70,217)	326.5 (73,409)	326.5 (73,409)	312.3 (70,217)

额定值/Rating		Trent 1000-Q3	Trent 1000-R3	Trent7000-72	Trent7000-72C
推力 kN (lbf)	起飞(净) (5分钟) Take-Off (net) (5 minutes)	347.5 (78,129)	360.4 (81,028)	324.0 (72,834)	324.0 (72,834)
	等效无辅助设备发动机起飞值 Equivalent Bare Engine Take-Off	350.9 (78,886)	363.9 (81,802)	327.9 (73,178)	327.9 (73,178)
	最大连续值 (净) Maximum Continuous (net)	319.5 (71,818)	323.3 (72,691)	289.2 (65,005)	289.2 (65,005)
	等效无辅助设备发动机最大连续值 Equivalent Bare Engine Maximum Continuous	322.6 (72,519)	326.5 (73,409)	292.8 (65,830)	292.8 (65,830)

参考第VI章注释1,2,3.

Refer to Section VI Notes 1, 2 and 3.

7. 控制系统/Control System

发动机安装了全权限数字电子控制系统 (FADEC) 和发动机监测单元 (EMU)。

The engine is equipped with a Full Authority Digital Engine Control (FADEC) system and an Engine Monitoring Unit (EMU).

其他信息参考安装及操作手册。参考VI章注释4和5。

Refer to the Installation Manual and Operating Instructions for further information. Refer to Section VI Notes 4 and 5.

8. 流体 (燃油, 滑油, 冷却剂, 添加剂) /Fluids (Fuel, Oil, Coolant, Additives)

8.1. 燃油和添加剂/Fuel and Additives

参考使用说明中批准的燃油及添加剂规范信息。

Refer to the Operating Instructions for information on approved fuel and additive specifications.

8.2. 滑油/Oil

参考使用说明中批准的滑油规范信息。

Refer to the Operating Instructions for information on approved oil specifications.

9. 航空器附件传动装置/Aircraft Accessory Drives

发动机型别/Engine Models

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2,
Trent 1000-J2, Trent 1000-K2, Trent 1000-L2

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3

Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3

Trent 1000-R3

发动机附件传动齿轮箱可搭配两个可变频率起动发电机 (VFSG) 和一个液压泵来为航空器提供电能和液压动力。这些单元是航空器机体的一部分, 需按航空器适航标准认证。发动机安装说明给出安装运行的数据要求, 包括扭矩和功率限制。

The engine's accessory gearbox may be fitted with two Variable Frequency Starter Generators (VFSG) and one Hydraulic Pump to provide electrical and hydraulic power to the aircraft. These units are part of the airframe, and certified under Aircraft Airworthiness Standards. The Engine Installation Manual details installation and operational requirements, including torque and power limitations.

发动机型别/Engine Models

Trent7000-72, Trent7000-72C

发动机附件传动齿轮箱可搭配一个整体驱动发电机 (IDG) 和两个液压泵来为航空器提供电能和液压动力。这些单元是航空器机体的一部分, 需按航空器适航标准认证。发动机安装说明给出安装运行的数据要求, 包括扭矩和功率限制。

The engine's accessory gearbox may be fitted with an Integrated Drive Generator (IDG) and two Hydraulic Pumps to provide electrical and hydraulic power to the aircraft. These units are part of the airframe, and certified under Aircraft Airworthiness Standards. The Engine Installation Manual details installation and operational requirements, including torque and power limitations.

10. 最大允许引气/Maximum Permissible Air Bleed Extraction

只有Trent7000-72和Trent7000-72C型发动机为机身提供用于客舱换气的压缩空气 (“客舱引气”)。所有Trent 1000型发动机 (包括Trent7000-72 and Trent7000-72C) 都为机身部件防冰 (“短舱防冰引气”)

提供压缩机空气。防冰引气通过调节活门控制气流量。

Only the Trent7000-72 and Trent7000-72C engine models supply compressor air to the airframe for the purpose of cabin ventilation (“Cabin Bleed”). All of the Trent 1000 engine models (including the Trent7000-72 and Trent7000-72C) supply compressor air for the purpose of anti-icing of airframe components (“Nacelle Anti-Ice Bleed”). The anti-icing bleed flow demand is modulated via a regulating valve.

10.1 正常和非正常情况下热防冰引气/Thermal Anti-Icing Bleed Off takes for Normal and Abnormal operation

发动机型别/Engine Models:

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2, Trent 1000-J2, Trent 1000-K2, Trent 1000-L2

发动机功率设置 TET (K) Engine Power Setting TET(K)	最大整流罩热防冰气流量 %核心机流量 (W26) Maximum Cowl Thermal Anti Ice Flow % Core Mass Flow (W26)
空转至1430/Idle to 1430	2.67
1430至1785/1430 to 1785	2.67至1.25线性变化/2.67 to 1.25 varying linearly
1785至1820/1785 to 1820	1.25至0.54线性变化/1.25 to 0.54 varying linearly
1820及以上/1820 and above	0.54

“W26”表示流过发动机核心机的空气流量。

“W26” represents the air mass flow through the core of the engine.

发动机型别/Engine Models:

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3
Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3
Trent 1000-R3

发动机功率设置 TET (K) Engine Power Setting TET(K)	最大整流罩热防冰气流量 %核心机流量 (W26) Maximum Cowl Thermal Anti Ice Flow % Core Mass Flow (W26)
空转至1015/Idle to 1015	2.9
1015至1765/1015 to 1765	2.9至2.1线性变化/2.9 to 2.1 varying linearly
1765至1810/1765 to 1810	2.1至0.5线性变化/2.1 to 0.5 varying linearly
1810以上/ above 1810	0.5

发动机型别/Engine Models:

Trent7000-72, Trent7000-72C

发动机功率设置 TET (K) Engine Power Setting TET(K)	最大短舱防冰气流量 %核心机流量 (W26) Maximum Nacelle Anti Ice Flow % Core Mass Flow (%W26)
空转至1175/Idle to 1175	0.86
1175至1725/1175 to 1725	0.86 至 0.82 线性变化 /0.86 to 0.82 varying linearly
1725至1750/1725 to 1750	0.82 至 0.54 线性变化 /0.82 to 0.54 varying linearly
1750至1830/1750 to 1830	0.54 至 0.39 线性变化 /0.54 to 0.39 varying linearly
1830以上/ above 1830	0.39

10.2 正常和非正常情况下发动机引气系统 (EBAS) 提取/Engine Bleed Air System (EBAS) offtakes for Normal and Abnormal operation

发动机型号/Engine Models:

Trent7000-72, Trent7000-72C

EBAS 包含为客舱通风的环境控制系统 (ECS) 和为飞机防冰的引气。它们通过中压压气机第8级 (IP8) 或高压压气机第6级 (HP6) 提供。

%W26代表在高压压气机进口处流过发动机核心机的空气流量百分比。引气流量在下列设置点之间线性变化。

EBAS comprises both the Environmental Control System (ECS) for cabin ventilation and bleed air for aircraft anti-ice purposes. It is fed either from IP compressor stage 8 (IP8) or from HP compressor stage 6 (HP6).

%W26 represents the percentage of air mass-flow through the core of the engine at the HPC entry. Bleed flows vary linearly between the points listed.

发动机功率设置 TET (K) Engine Power Setting TET(K)	最大正常环控系统引气计划 %W26 Maximum Normal ECS Bleed Schedule %W26	引气来源 Bleed Source
空转至1260/Idle to 1260	15.8	高压6级/HP6
1260至1600/1260 to 1600	15.8至5.6(线性)/15.8 to 5.6(linear)	高压6级/HP6
1600至1708/1600 to 1708	5.6至4.3(线性)/5.6 to 4.3(linear)	中压8级/IP8
1708至1740/1708 to 1740	4.3至3.2(线性)/4.3 to 3.2(linear)	中压8级/IP8
1740至1835/1740 to 1835	3.2至2.35(线性)/3.2 to 2.35(linear)	中压8级/IP8
1835以上/ above 1835	2.35	中压8级/IP8

发动机功率设置 TET (K) Engine Power Setting TET(K)	最大非正常环控系统引气计划 %W26 Maximum Abnormal ECS Bleed Schedule %W26	引气来源 Bleed Source
空转至1500/Idle to 1500	16.9	高压6级/HP6
1500至1655/1500 to 1655	16.9至11.3(线性)/16.9 to 11.3(linear)	高压6级/HP6

1655至1708/1655 to 1708	11.3至9.5(线性)/11.3 to 9.5(linear)	中压8级/IP8
1708至1725/1708 to 1725	9.5至7.2(线性)/9.5 to 7.2(linear)	中压8级/IP8
1725至1835/1725 to 1835	7.2至4.95(线性)/7.2 to 4.95(linear)	中压8级/IP8
1835 以上至红线/ above 1835 to red line	4.95	中压8级/IP8

IV. 使用限制/Operating Limitations

1. 温度限制/Temperature Limits

1.1 大气运行包线/Climatic Operating Envelope

发动机可在环境温度不大于ISA+40° C时使用。更多运行包线，包括发动机进口的进气畸变细节请参考安装手册。

The engine may be used in ambient temperatures up to ISA +40° C. Refer to the Installation Manual for details of the Operating Envelope, including the air inlet distortion at the engine inlet.

1.2 涡轮燃气温度-修正值/Turbine Gas Temperature – Trimmed (°C)

	最大修正涡轮燃气温度(显示) (详见注释 12) /Maximum trimmed TGT (displayed)(See note 12)
最大地面起动和停车/Maximum during ground starts and shutdown:	700
最大空中再点火/Maximum during in-flight relights:	900
最大起飞(5分钟限制) /Maximum for take-off (5 min. limit) :	900
最大连续(无限时间) /Maximum Continuous (unrestricted duration) :	850
最大超温(20秒限制) /Maximum over-temperature (20 second limit) :	920

参考第VI章 注释 6 and 7。

Refer to Section VI Notes 6 and 7.

1.3 燃油温度/Fuel temperature (°C)

发动机型号/Engine Models:

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2,
Trent 1000-J2, Trent 1000-K2, Trent 1000-L2

最小燃油温度: -45

Minimum fuel temperature: minus 45

最大燃油温度: 65

Maximum fuel temperature: 65

更多信息请参考安装手册。

Refer to the Installation Manual for additional information.

发动机型号/Engine Models:

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3
Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3

Trent 1000-R3

启动前最小燃油温度: -54

Minimum fuel temperature before start: minus 54

发动机加速最小燃油温度: -45

Minimum fuel temperature for engine acceleration: minus 45

最大燃油温度: 65

Maximum fuel temperature: 65

更多信息请参考安装手册。

Refer to the Installation Manual for additional information.

发动机型号/Engine Models:

Trent7000-72, Trent7000-72C

最低燃油温度 (14600英尺或以下): -44

Minimum fuel temperature: (at, or below 14,600ft): minus 44

最低燃油温度 (14600英尺以上): -54

Minimum fuel temperature: (above 14,600ft): minus 54

最大燃油温度: 55

Maximum fuel temperature: 55

更多信息请参考安装手册。

Refer to the Installation Manual for additional information.

1.4 滑油温度/Oil temperature (°C)

滑油回油温度/Combined oil scavenge temperature:

发动机型号/Engine Models

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2,
Trent 1000-J2, Trent 1000-K2, Trent 1000-L2

限制值/Limit		燃油进口温度 Fuel Inlet Temperature
发动机启动最小值 Minimum for engine starting	-40	
加速功率的最小值 Minimum for acceleration to power	40	燃油进口温度-23°C及以上 For fuel inlet temperature minus 23°C and higher.
	从40到77 线性变化/ Varies linearly from 40 to 77	燃油进口温度在-23°C到-45°C之间. For fuel inlet temperature between minus 23°C and minus 45°C.
无限制使用的最大值 Maximum for unrestricted use	193	
最大瞬态值 (15分钟)	201	

Maximum transient (15 minutes)		
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发动机型别/Engine Models

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3
Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3
Trent 1000-R3

限制值/Limit		燃油进口温度 Fuel Inlet Temperature
发动机起动最小值 Minimum for engine starting	-40	
加速功率的最小值 Minimum for acceleration to power	40	燃油进口温度-23℃及以上 For fuel inlet temperature minus 23℃ and higher.
	从40到90 线性变化 /Varies linearly from 40 to 90	燃油进口温度在-23℃到-45℃之间. For fuel inlet temperature between minus 23℃ and minus 45℃.
无限制使用的最大值 Maximum for unrestricted use	196	
最大瞬态值（15分钟） Maximum transient (15 minutes)	201	

发动机型别/Engine Models

Trent7000-72, Trent7000-72C

限制值/Limit		燃油进口温度 Fuel Inlet Temperature
发动机起动最小值 Minimum for engine starting	-40	
加速功率的最小值 Minimum for acceleration to power	40	燃油进口温度-11℃及以上 For fuel inlet temperature minus 11℃ and higher.
	从40到106线性变化 /Varies linearly from 40 to 106	燃油进口温度在-11℃到-54℃之间. For fuel inlet temperature between minus 11℃ and minus 54℃.
无限制使用的最大值 Maximum for unrestricted use	191.8	
最大瞬态值（15分钟） Maximum transient (15 minutes)	197.3	

2. 压力限制/Pressure Limits

2.1 燃油压力/Fuel pressure (kPa)

发动机型号/Engine Models

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2,
Trent 1000-J2, Trent 1000-K2, Trent 1000-L2

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3

Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3

Trent 1000-R3

最小绝对进口压力（在发动机进气口处测量）：

Minimum absolute inlet pressure (measured at engine inlet):

	kPa	psi
发动机运行中的稳态条件 Steady state conditions with engine running:	34.5 + 蒸汽压力 34.5 + Vapour Pressure	5 + 蒸汽压力 5 + Vapour Pressure
发动机运行中的瞬态条件（2秒）： Transient conditions with engine running (2 seconds):	13.8 + 蒸汽压力 13.8 + Vapour Pressure	2 + 蒸汽压力 2 + Vapour Pressure

当飞机增压泵不工作时，在运行高度不超过35000尺、运行时间不超过600分钟时发动机运行最小燃油压力限制下降至3.4 psi。

For engine operation with the aircraft boost pumps inoperative the engine minimum fuel pressure limit is reduced down to 3.4 psi at altitudes of up to 35000 feet for up to 600 minutes.

更多信息参考安装手册。

Refer to the Installation Manual for additional information.

进口最大压力（在吊架接口处测量）：

Maximum pressure at inlet (measured at the pylon interface):

	kPa	psi
发动机运行中的稳态条件 Steady state conditions with engine running:	483	70
发动机运行中的瞬态条件（2秒）： Transient conditions with engine running (2 seconds):	966	140
发动机停车后静态 Static after engine shut down:	1172	170

发动机型号/Engine Models

Trent7000-72, Trent7000-72C

最小绝对进口压力（在发动机进口处测量）：

Minimum absolute inlet pressure (measured at engine inlet):

	kPa	psi
发动机运行中的稳态条件 Steady state conditions with engine running:	34.5 + 蒸汽压力 34.5 + Vapour Pressure	5 + 蒸汽压力 5 + Vapour Pressure

更多信息参考安装手册。

Refer to the Installation Manual for additional information.

进口最大压力（在吊架接口处测量）：

Maximum pressure at inlet (measured at the pylon interface):

	kPa	psi
发动机运行中的稳态条件 Steady state conditions with engine running:	276	40
发动机运行中的瞬态条件（2秒）： Transient conditions with engine running (2 seconds):	689	100
发动机停车后静态 Static after engine shut down:	689	100

2.2 滑油压力/Oil pressure (kPa)

最小滑油压力/Minimum oil pressure:

发动机型别/Engine Models

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2,
Trent 1000-J2, Trent 1000-K2, Trent 1000-L2, Trent7000-72, Trent7000-72C

	kPa	Psi
地面慢车到74%中压转速 Ground idle to 74% IP rpm	207	30
在74%至100%中压转速之间 Between 74% and 100% IP rpm	从207到621线性变化 Varies linearly from 207 to 621	从30到90线性变化 Varies linearly from 30 to 90
在100% 中压转速以上 Above 100% IP rpm	621	90

发动机型别/Engine Models

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3
Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3
Trent 1000-R3

	kPa	Psi
地面慢车到74%中压转速 Ground idle to 74% IP rpm	207	30
在74%至100%中压转速之间 Between 74% and 100% IP rpm	从207到621线性变化 Varies linearly from 207 to 621	从30到90线性变化 Varies linearly from 30 to 90

在100% 中压转速以上 Above 100% IP rpm	621	90
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见注释10。

See note 10.

3. 最大允许转子转速/Maximum Permissible Rotor Speeds:

当飞机静止，发动机在慢车推力以上维护运行时，控制系统自动适用于低压转速禁飞区的温度。详情参考维护手册。

When maintenance running is performed above idle thrust with the aircraft static, the control system automatically applies a temperature dependent LP speed Keep Out Zone. Refer to the Maintenance Manual for details.

发动机型别/Engine Models

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2,
Trent 1000-J2, Trent 1000-K2, Trent 1000-L2

转子/Rotor	高压/HP	中压/ IP	低压/LP
参考速度/Reference speeds, 100% rpm	13391	8937	2683
最大起飞（5分钟限制，参考第VI章，注释3） Maximum for Take-off (5 minute limit, refer to Section VI, note 3)	101.0%	103.5%	101.5%
最大连续（参考第VI章,注释8） Maximum Continuous (Refer to Section VI, note 8)	99.5%	100.8%	101.5%

（数据考虑了仪表精度）

(Data makes allowance for instrumentation accuracies)

发动机型别/Engine Models

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3
Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3
Trent 1000-R3, Trent7000-72, Trent7000-72C

转子/Rotor	高压/HP	中压/ IP	低压/LP
参考速度/Reference speeds, 100% rpm	13391	8937	2683
最大起飞（5分钟限制，参考第VI章，注释3） Maximum for Take-off (5 minute limit, refer to Section VI, note 3)	101.5%	103.5%	101.5%
最大连续（参考第VI章,注释8） Maximum Continuous (Refer to Section VI, note 8)	99.5%	100.8%	101.5%

（数据考虑了仪表精度）

(Data makes allowance for instrumentation accuracies)

4. 安装假设/Installation Assumptions:

具体信息参阅安装手册。

Refer to Installation Manual for details.

5. 限时派遣/Time Limited Dispatch:

所有发动机型别/All Engine Models

发动机限时派遣依照CS-E 1030批准。每个可派遣状态的最大放行间隔在安装手册中规定。

These engine models have been approved for Time Limited Dispatch in accordance with CS-E 1030. The maximum rectification period for each dispatchable state is specified in the Installation Manual.

6. 双发延程飞行能力/ETOPS Capability:

发动机型别/Engine Models

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2,
Trent 1000-J2, Trent 1000-K2, Trent 1000-L2

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3

Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3

Trent 1000-R3

依照CS-E 1040批准发动机具有最长330分钟的最大连续推力及15分钟的持续功率双发延程飞行能力。双发延程飞行不需要任何特殊发动机限制, 标记, 标牌或配置。本批准不构成对可进行ETOPS运行的批准。

These engine models are approved for ETOPS capability in accordance with CS-E 1040 for a Maximum Approved Diversion Time of 330 minutes at MCT thrust plus 15 minutes at hold power. ETOPS does not require any special engine limitation, marking, placard, or configuration. This approval does not constitute an approval to conduct ETOPS operations.

发动机型别/Engine Models

Trent7000-72, Trent7000-72C

依照CS-E 1040第3修正案批准发动机具有最长330分钟的最大连续推力及15分钟的持续推力双发延程飞行能力, EASA批准的时间是2018年12月19日, 证件号是10068130。双发延程飞行仅限于包含MB72-K203和NMSB Trent 1000 72-AK269构型的发动机。双发延程飞行不需要任何其它特殊发动机限制, 标记, 标牌或配置。需要进行发动机性能监控。本批准不构成对可进行ETOPS运行的批准。

The engine is approved for ETOPS capability in accordance with CS-E1040 amendment 3 by EASA Certificate 10068130 dated 19th December 2018 for a Maximum Approved Diversion Time of 330 minutes at Maximum Continuous thrust plus 15 minutes at hold thrust. ETOPS is restricted to engines incorporating MB72-K203 and NMSB Trent 1000 72-AK269. ETOPS does not require any other special engine limitation, marking, placard, or configuration. Engine Condition Monitoring is required. This approval does not constitute an approval to conduct ETOPS operations.

V. 操作及服务说明/Operating and Service Instructions

发动机型别/Engine Models

Trent 1000-A2, Trent 1000-C2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2,

Trent 1000-H2, Trent 1000-J2, Trent 1000-K2, Trent 1000-L2

文档/Document	文件参考号/Document Reference
安装手册包括发动机控制系统派遣单 Installation Manual including Engine Control System Dispatch Statement	DNS193530
使用说明/Operating Instructions	OI-Trent 1000-B787C1
发动机手册/Engine Manual	E-Trent-10RRC
维修手册/Maintenance Manual	B787-81205-Axxxx
时间限制手册/Time Limits Manual	T-Trent-10RRC
服务通告/Service Bulletins	Trent 1000 — 按需

注释：维修手册是由飞机主机厂针对飞机运营人特别编制的，“xxxx”表示航空公司用户代码。

Note: The Maintenance Manual is compiled by the Airframer and is specific to Aircraft Operators, “xxxx” denotes the Airlines customer code.

发动机型别/Engine Models

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3
Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3
Trent 1000-R3

文档/Document	文件参考号/Document Reference
安装手册 Installation Manual	EDNS01000566257
使用说明/Operating Instructions	OI-Trent 1000-TEN-B787
发动机手册/Engine Manual	E-Trent-10RRT
维修手册/Maintenance Manual	B787-81205-Axxxx
时间限制手册/Time Limits Manual	T-Trent-10RRT
服务通告/Service Bulletins	Trent 1000 — 按需

注释：维修手册是由飞机主机厂针对飞机运营人特别编制的，“xxxx”表示航空公司用户代码。

Note: The Maintenance Manual is compiled by the Airframer and is specific to Aircraft Operators, “xxxx” denotes the Airlines customer code.

发动机型别/Engine Models

Trent7000-72, Trent7000-72C

文档/Document	文件参考号/Document Reference
安装手册 Installation Manual	EDNS01000696188
使用说明/Operating Instructions	EDNS01000696186
发动机手册/Engine Manual	E-T7000-1RR
维修手册/Maintenance Manual	Airbus A330 Customer Aircraft Maintenance Manual
时间限制手册/Time Limits Manual	T-T7000-1RR
服务通告/Service Bulletins	Trent 1000 — 按需

注释: 维修手册是由飞机主机厂编制。

Note: The Maintenance Manual is compiled by the Airframer.

VI. 注释/Notes

1. 第III章第6节中提到的等效无辅助设备发动机的起飞和最大连续推力来自于经批准的净起飞和最大连续推力, 不包括由于进气道、冷喷管、热喷管、外涵道气流泄漏和机体后的损失。

The Equivalent Bare Engine Take-off and Maximum Continuous thrusts quoted in Section III sub level 6 are derived from the approved Net Take-off and Net Maximum Continuous thrust by excluding the losses attributable to the inlet, cold nozzle, hot nozzle, by-pass duct flow leakage and the after body.

2. 额定值基于无飞机附件功率提取, 也没有引气。

The Ratings are based on having no power offtakes to aircraft accessories nor air bleeds.

3. 起飞额定值和相关运行限制可在一发失效时使用最多不超过10分钟。

The take-off rating and the associated operating limitations may be used for up to 10 minutes in the event of an engine failure.

4. 除 Trent7000-72 and Trent7000-72C 外的所有型别, 控制和监测系统软件符合 EUROCAE ED-12B/RTCA DO178B标准中的下列级别:

All Models except Trent7000-72 and Trent7000-72C. The control and monitoring system software meets the following levels according to EUROCAE ED-12B/RTCA DO178B:

- EEC等级为A级
EEC is designated Level “A”.
- EMU等级为E级, 除驾驶舱振动值显示为C级
EMU is designated Level “E”, except that the flight deck vibration display is Level “C”.

Trent7000-72 and Trent7000-72C. 控制和监测系统软件符合下列级别:

Trent7000-72 and Trent7000-72C. The control and monitoring system software meets the following levels:

- EEC等级为EUROCAE ED-12B/RTCA DO178B的A级。
EEC is designated EUROCAE ED-12B/RTCA DO178B Level “A”.
- EMU等级为EUROCAE ED-12C/RTCA DO178C的C级。
EMU is designated EUROCAE ED-12C/RTCA DO178C Level “C”.

5. 电磁干扰(EMI), 高强度辐射场(HIRF)和闪电防护能力信息参考安装手册。

Refer to Installation Manual for details of Electro-Magnetic Interference (EMI), High Intensity Radiated Fields (HIRF) and Lightning capability.

6. 发动机批准在无意情况下超过最大燃气温度限制工作一段时间, 而不需要进行专门的维护。导致超温的原因需要调查并改正。

The maximum exhaust gas over temperature limit is approved for inadvertent use for the periods specified without requiring maintenance action. The cause of the over temperature must be investigated and corrected.

7. 涡轮燃气温度由位于低压涡轮第1级导叶的热电偶测量所得。
Turbine Gas Temperature is measured by thermocouples positioned at the 1st stage Nozzle Guide Vane of the LP Turbine.
8. 数据单中的最大连续转速限制不在驾驶舱飞行面板上显示，并已在审定计划中达成一致。
The Maximum Continuous Speed limitations defined in this Data Sheet are not displayed as limitations on the Aircraft flight deck. Non-display of these limitations was agreed during the certification programme.
9. 时间限制手册中包含了持续适航文件中适航限制章节的内容。
The EASA approved Airworthiness Limitations Section of the Instructions for Continued Airworthiness is published in the applicable “Time Limits Manual”.
10. 为Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3, Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3, Trent 1000-R3定义的最小滑油压力显示修正/指示 kPa(psi)以确保驾驶舱的显示与其他机型一致。
The minimum oil pressure limits defined for Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3, Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3, Trent 1000-R3 shows trimmed/indicated kPa (psi) to ensure cockpit display is consistent with the other engine models.
11. 第III章技术特性中Trent7000-72和Trent7000-72C的型号定义列出了服役的最低型号定义。它包括CS-E审定标准(DIS)，CS-25机体审定所要求的改装和国外局方认可所要求的改装。
The Engine Type Definition listed in Section III. Technical Characteristics for the Trent7000-72 and Trent7000-72C lists the minimum engine type definition for service. This includes the CS-E certification standard (DIS), modifications required for Airframe CS-25 certification and modification required for engine foreign authority validation.
12. 为了在所有发动机型别上提供一致的驾驶舱最大修正涡轮燃气温度（TGT）指示，测量的TGT通过修正进行修改。TGT修正包线被编入数据输入插头（DEP）的程序中，数据输入插头安装在发动机电子控制器（EEC）上。EEC处理测量的TGT并计算指示的TGT。最大TGT下调值是最大允许值，最大允许值对应最大批准的涡轮温度。
The measured TGT is modified by trimming to provide consistent cockpit maximum trimmed TGT indications across all engine models. The TGT trim profile is programmed into the Data Entry Plug (DEP), which is fitted to the Engine Electronic Controller (EEC). The EEC processes the measured TGT and calculates the indicated TGT. The maximum TGT pull-down is the maximum value permitted, which corresponds to the maximum cleared turbine temperature.

Trent 1000-A2, Trent 1000-AE2, Trent 1000-C2, Trent 1000-CE2, Trent 1000-D2, Trent 1000-E2, Trent 1000-G2, Trent 1000-H2, Trent 1000-J2, Trent 1000-K2, Trent 1000-L2			
涡轮燃气温度修正包线 /TGT Trim Profile	起飞（2分钟/5分钟）/ Take-Off (2 minute / 5-minute)	最大连续/ Maximum continuous	最大排气超温（20秒） /Maximum exhaust gas overtemperature (20 seconds)

基础的（包线 15） / Basic (Profile 15)	-81K / -74.5K	-101.5K	-72K
SB73-K177 (包线 16)/ SB73-K177 (Profile 16)	-77.5K / -69.5K	-97.5K	-68K

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3, Trent 1000-K3, Trent 1000-L3			
涡轮燃气温度修正包线 /TGT Trim Profile	起飞（2分钟/5分钟） / Take-Off (2 minute / 5-minute)	最大连续/ Maximum Continuous	最大排气超温（20秒） /Maximum exhaust gas overtemperature (20 seconds)
基础的（包线17） / Basic (Profile 17)	-55K / -53.5K	-84K	-52.5K
SB 73-K827 (包线20)/ SB 73-K827 (Profile 20)	-58.5K / -54.5K	-84.5K	-53K

Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3, Trent 1000-R3			
涡轮燃气温度修正包线 /TGT Trim Profile	起飞（2分钟/5分钟） / Take-Off (2 minute / 5-minute)	最大连续/ Maximum Continuous	最大排气超温（20秒） /Maximum exhaust gas overtemperature (20 seconds)
基础的（包线17） / Basic (Profile 17)	-55K / -53.5K	-84K	-52.5K

Trent7000-72, Trent7000-72C			
涡轮燃气温度修正包线 /TGT Trim Profile	起飞（2分钟/5分钟） / Take-Off (2 minute / 5-minute)	最大连续/ Maximum Continuous	最大排气超温（20秒） /Maximum exhaust gas overtemperature (20 seconds)
基础的（包线17） / Basic (Profile 17)	-55K / -53.5K	-84K	-52.5K
SB72-K336 (包线22)/ SB72-K336 (Profile 22)	-84K / -72.5K	-101.5K	-76.5K
SB73-L176 (包线23)/ SB73-L176 (Profile 23)	-78K / -70K	-105.5K	-69.5K

第3部分 管理信息

Section 3 ADMINISTRATIVE INFORMATION

I. 型号认可证持有人记录/ Validation of Type Certificate Holder Record

序号/No.	时间/Time	持证人名称/ Name of Validation of Type Certificate Holder
1	2016年03月18日至2022年10月8日/ From March 18, 2016 to October 8, 2022	罗尔斯 罗伊斯公司/Rolls-Royce plc
2	2022年10月8日之后/ After October 8, 2022	罗尔斯 罗伊斯德国公司/ Rolls-Royce Deutschland Ltd & Co KG

-结束-

-END-