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| TITLE: | Declaration of Design and Performance – AC32 |
| DOCUMENT NUMBER: | AC-DDP-500 |
| EQUIPMENT: | AC32 – Digital Air Data Computer |

## RECORD OF REVISIONS

| REV | DATE | REASON FOR REVISION | AUTHOR | CHECKED | APPROVED |
|---|---|---|---|---|---|
| 1.0 | 14-Oct-2003 | Initial issue | R. Wehrli | W. Schulz | - |
| 2.0 | 27-Jan-2005 | MOD00A HW version 2.0 / SW version 2.0 status added.<br>Weight of unit changed from 1000gms (2.2lbs) to 910gms (2.0 lbs)<br>Dimensions of the unit changed.<br>Power consumption value changed from 10 Watts to 7 Watts.<br>J(TSO) removed.<br>RTCA/DO-160D section 20<br>Env. Cat. RR changed to Cat. YY<br>RTCA/DO-160D section 22<br>Env. Cat. A3E3 changed to A3J33.<br>Other tests added in Part 9 - Level of compliance with TSO.<br>Master Drawing with No. 21 30041 14 changed with Master Drawing with No. 21 30139 14. | A. Gupta | R. Wehrli | - |
| 2.1 | 03-Nov-2005 | SW version 2.00 changed to SW version 2.10 | A. Gupta | R. Wehrli | - |
| 2.2 | 19-Jan-2006 | SW version 2.10 changed to SW version 2.11 | A. Gupta | R. Wehrli | - |
| 2.3 | 12-April-2006 | SW version 2.10 changed to SW version 2.20 | A. Gupta | R. Wehrli | - |
| 2.4 | 18-Dec-2006 | HW 2.20 / SW 2.30 versions changed<br>ETSO references added<br>AC-ATP-531 reference added<br>Environmental Categories changed due to additional qualification tests | R. Wehrli | A. Gupta | - |
| 2.5 | 11-Jun-2007 | DO-160D section 9.0 Cat. X corrected<br>HIRF test added<br>Weight corrected | R. Wehrli | A. Gupta | - |
| 2.6 | 18-Oct-2007 | SW version 2.30 changed to SW version 2.40 | A. Franklin | R. Wehrli | - |
| 2.7 | 12-Mar-2008 | Formal changes: corrected CMM No. to 34-16-30 and corrected Section 4 & 9 | M. Baumann | R. Wehrli | - |
| 2.8 | 22-Oct-2008 | SW version 2.40 changed to SW versions 2.41 / 2.42 / 2.43 | R. Wehrli | M. Baumann | - |
| 2.9 | 21-Nov-2008 | SW version 2.40 changed to SW versions 2.50 / 2.51 | R. Wehrli | M. Baumann | - |
| 3.0 | 19-Dec-2008 | SW version 2.50 changed to SW version 2.60 | R. Wehrli | M. Baumann | - |
| 3.1 | 17-Apr-2009 | HW versions 2.XX referenced<br>SW versions 1.53.1, 1.54.1, 2.00.1, 2.10.1, 2.11.1 and 2.20.1 added | R. Wehrli | M. Baumann | - |
| 3.2 | 11-Dec-2009<br>15-Dec-2009 | SW version 2.60 changed to SW version 2.70, HW version 2.20 changed to 4.20<br>update after review | B. Daudrich | R. Wehrli | - |
| 3.3 | 09-Dec-2010 | Reference to test report in level of compliance table corrected | R. Wehrli | M. Baumann | - |
| 3.4 | 02-Mar-2011 | Minor change HW 2.21 added | M. Baumann | R. Wehrli | - |
| 3.5 | 15-Mar-2012 | Minor change SW 2.71 added | W. Blei | U. Dembinski | - |
| 3.6 | 04-May-2012 | Minor change SW 2.71.1 added | M. Baumann | U. Dembinski | - |
| 3.7 | 08-May-2012 | Minor change SW 2.72 added | M. Baumann | R. Wehrli | - |

| REV | DATE | REASON FOR REVISION | AUTHOR | CHECKED | APPROVED |
|---|---|---|---|---|---|
| 3.8 | 12-Dec-2013 | Minor change SW 2.71.2 added | H. Richardt | P. Grichting | - |
| 3.9 | 13-Dec-2013 | Minor change SW 2.74 added | M. Schaffner | P. Grichting | - |
| 4.0 | 27-Feb-2014 | Minor change SW 2.81 added | H. Richardt | M. Pietrantuono | - |
| 4.1 | 17-Jun-2016 | Minor change SW 2.75 / HW 4.21 added, master drawing changed to Rev. C and corporate identity changed | M. Schaffner | H. Richardt | - |
| 4.2 | 19-Sep-2017 | Minor change SW 2.76 / HW 4.22 added<br>Supersonic capability added<br>RTCA/DO-160G section 20<br>Env. Cat. [XG] added<br>Formal changes | H. Richardt | A. Anwar | - |
| 4.3 | 18-Sep-2019 | Minor change SW 2.82 added | A. Shumilov | J. Garrett<br>H. Richardt | - |
| 4.4 | 27-11-2020 | Additional environmental tests according to MIL-STD 810G added under “other Tests” | A. Siva | A. Savin | - |
| 4.5 | 13-05-2022 | Incorporation of all AC32 HW/SW variants in a single document.<br>SW variant 2.74.1 added.<br>SW 2.76 / HW 4.22 (supersonic) removed. | J. Garrett | H. Richardt | A. Savin |
| 4.6 | 24-06-2022 | Update of chapter 2.1 and 9.2 and additional environmental tests according to RTCA DO-160G added under “other Tests” | A. Siva | H. Richardt | A. Savin |

## TABLE OF CONTENTS

**DECLARATION OF DESIGN AND PERFORMANCE**

# 1. Name and Address of Manufacturer

THOMMEN AIRCRAFT EQUIPMENT AG
Hofackerstrasse 48
CH-4132 Muttenz
Switzerland

# 2. Description and Identification

## 2.1 Introduction

This Declaration of Design and Performance (DDP) is applicable for all approved types of AC32, Digital Air Data Computers.

With revision 4.5 all previous revisions of the document (AC-DDP-500) issued for different variants of HW and SW are combined into one single document.

Sections 1 to 8 and 10 to 12 are common for all HW/SW variants.

Section 9 is divided into sub-sections according to HW/SW versions.

## 2.2 Description

The THOMMEN Digital Air Data Computer AC32 measures barometric altitude, airspeed and temperature in the atmosphere.

The AC32 has integrated solid-state pressure sensors for static and pitot pressure and provides up to 2 x 16 SSEC curves. RVSM compliance, is available as an option. AOA functionality is available with the HW/SW combination 4.21/2.75.

The computed air data parameters are transmitted by the ARINC 429 interface. Two transmit channels and two receive channels are available, with which also the Baro setting is carried out. An ICAO encoded altitude output is available as an option.

The AC32 is a modular design to improve flexibility and ease of maintenance. The power supply input is designed for 28 VDC. The low power consumption of less than 7 Watts and its low maximum weight of only 1000 grams (2.20 lbs) have been optimized for applications in state-of-the-art avionics.

The extensive built-in-test (BIT) guarantees safe operation. Using the RS232 maintenance interface, the THOMMEN Digital Air Data Computer AC32 can be configured by the manufacturer for different applications. The applications range from low cost general aviation up to business jets, regional aircraft, transporters and helicopters.

The THOMMEN Digital Air Data Computer AC32 meets or exceeds the requirements of the FAA (Federal Aviation Administration) and EASA (European Aviation Safety Agency) technical standard order (ETSO/TSO-C106 and ETSO/TSO-C88a) accuracy requirements.

## 2.3 Identification

| | |
|---|---|
| Type No. | AC32.XX.XX.XX.XX |
| HW/SW Modification: | Refer to Section 9 |
| Equipment Configuration Index Document: | AC-ECID-500 |
| Master Drawing No. | 21 30041 14 or 21 30139 14 |
| Weight: | 1000 grams (2.20 lbs) |
| Dimensions: | 82.8 x 80.7 mm (3.26 x 3.18 in)<br>length 202.0 mm (7.953 in) (excluding connectors) |

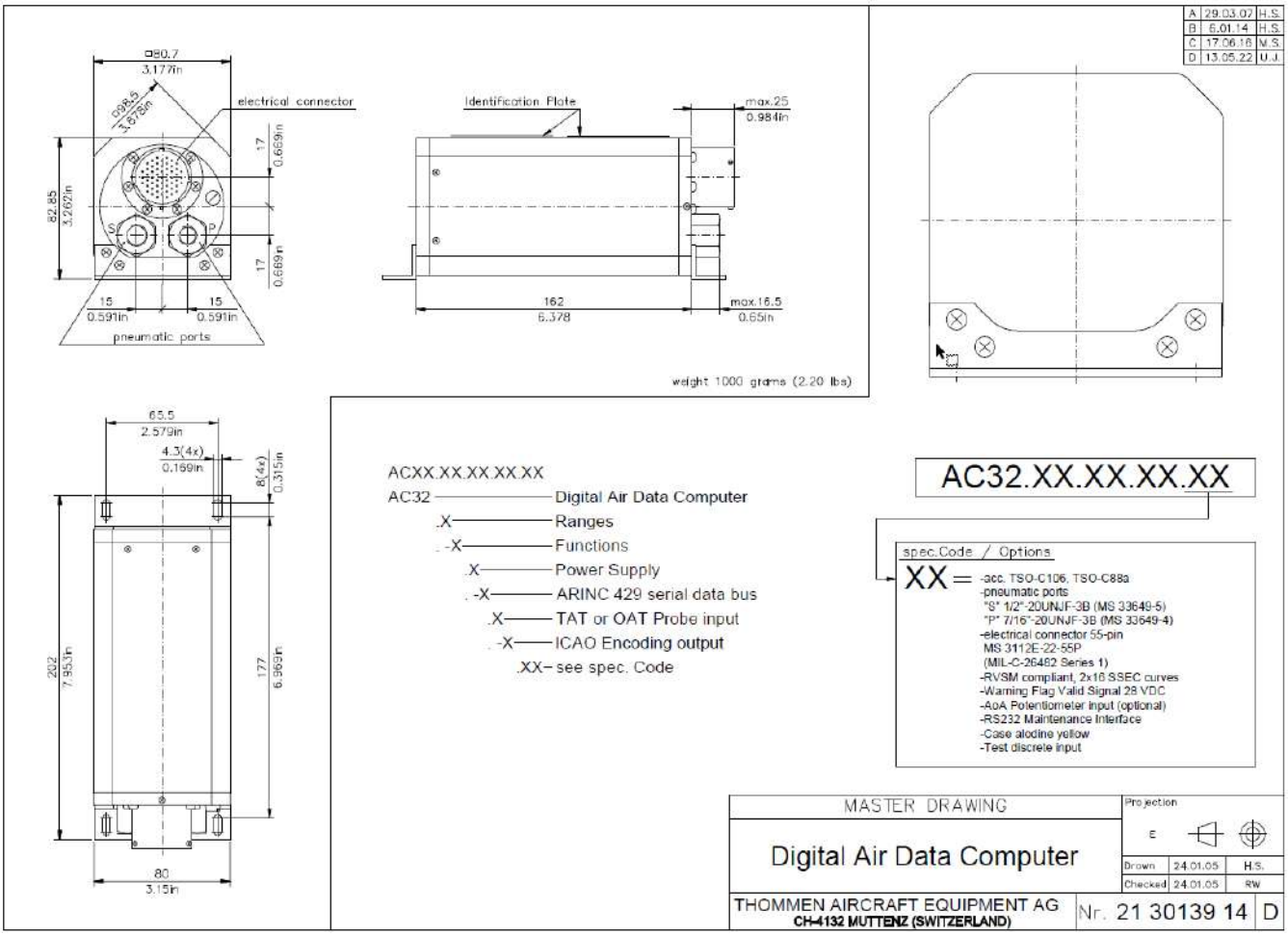


Fig 2.3.1 - AC32 – Digital Air Data Computer

NOTE:
Figure 2.3.1 shows a typical AC32. Variations for different HW and SW versions are not shown.

## 3. Specification Reference

| REFERENCE | ITEM |
|---|---|
| AC-SPE-500 (TAE document) | AC32 Specification Digital Air Data Computer |
| EUROCAE ED-14D / RTCA/DO-160D | Environmental Conditions and Test Procedures for Airborne Equipment |
| EUROCAE ED-14D / RTCA/DO-160G | Environmental Conditions and Test Procedures for Airborne Equipment |
| EUROCAE ED-12B / RTCA/DO-178B | Software Considerations in Airborne Systems and Equipment Certification |
| ETSO/TSO–C106 (SAE AS8002) | Air Data Computer |
| ETSO/TSO–C88a (SAE AS8003) | Automatic Pressure Altitude Reporting Code Generating Equipment |

## 4. Rated Performance

| REFERENCE | ITEM |
|---|---|
| ETSO/TSO–C106 (SAE AS8002) | Air Data Computer |
| ETSO/TSO–C88a (SAE AS8003) | Automatic Pressure Altitude Reporting Code Generating Equipment |
| RTCA/DO178B | Criticality Level Software: Level A |

## 5. Particulars of Approvals Held for the Equipment

| REFERENCE | ITEM |
|---|---|
| Z 34-17-01 | Type Certificate - issued by Federal Office for Civil Aviation Switzerland certifying compliance with ETSO- and TSO requirements |

## 6. Reference to Qualification Test Report

| REFERENCE | ITEM |
|---|---|
| AC-ENV-530 | AC32 Qualification Test Report |

## 7. Service and Instruction Manual Reference

| REFERENCE | ITEM |
|---|---|
| 34-16-30 | AC32 Component Maintenance Manual with Illustrated Parts List |

## 8. Conformance with ETSO/TSO

Thommen Aircraft Equipment AG (TAE) certifies that the instrument defined in Section 2 meets or exceeds the requirements of ETSO/TSO-C106 and ETSO/TSO-C88a.

The instrument was tested and passed according to the procedures and specifications set forth in the Aerospace Standards SAE AS8002, SAE AS8003, RTCA/DO-160D and RTCA/DO-160G. Refer to Section 9 for details of the environmental qualification category coverage.

The instrument software was successfully verified and validated in accordance with the procedures in EUROCAE ED-12B/RTCA/DO-178B.

# 9. Level of Compliance with ETSO/TSO

The following sub-sections define the level of compliance with ETSO/TSO for the HW/SW variants of the AC32.

## 9.1 AC32 with HW 1.XX to 2.XX, SW 1.XX to 2.XX, MOD0XX

**Master drawing number: 21 30041 14:**

HW/SW Modification: HW 1.XX / SW 1.XX, MOD00A
RTCA/DO-160D environmental category: [D1]CBB[(TB1)(TR)]XXFDFSZZAAZ[RR]M[A3E3]XXA

**Master drawing number: 21 30139 14:**

HW/SW Modification: HW 2.00 / SW 2.00, 2.10, 2.11, 2.20, MOD00A
RTCA/DO-160D environmental category: [D1]CBB[(TB1)(TR)]XXFDFSZZAAZ[YY]M[A3J33]XXA

**Master drawing number: 21 30139 14 A:**

HW/SW Modification: HW 2.20 / SW 2.30, MOD00A
RTCA/DO-160D environmental category:
[D2]BBC[(TB1)(TR)]/[(SL)(SM)]/[(UG)]XWFDFSZZAZZ[YY]M[A3J33]XAA

HW/SW Modification: HW 2.20 / SW 2.40, 2.41, 2.42, 2.43, 2.50, 2.51, 2.60, MOD00A
RTCA/DO-160D environmental category:
[D2]BBB[(TB1)(TR)]/[(SL)(SM)]/[(UG)]XWFDFSZZAZZ[YY]M[A3J33]XAA

HW/SW Modification: HW 2.XX / SW 1.53.1, 1.54.1, 2.00.1, 2.10.1, 2.11.1, 2.20.1, MOD00A
RTCA/DO-160D environmental category:
[D2]BBB[(TB1)(TR)]/[(SL)(SM)]/[(UG)]XWFDFSZZAZZ[YY]M[A3J33]XAA

HW/SW Modification: HW 2.21 / SW 2.41, MOD01A (for AC32.10.21.11.AN)
RTCA/DO-160D environmental category:
[D2]BBB[(TB1)(TR)]/[(SL)(SM)]/[(UG)]XWFDFSZZAZZ[YY]M[A3J33]XAA

| Environmental Criteria | Limiting Conditions and Related Specifications | Declarations, Design, Test | Deviations | HW 1.XX MOD 00A | HW 2.00 MOD 00A | HW 2.20 MOD 00A | HW 2.21 MOD 01A |
|---|---|---|---|---|---|---|---|
| **Temperature and Altitude**<br><br>*Temperature:*<br>Continuous operation<br>Ground Survival Temperature<br>Operating Low Temperature<br><br>Operating High Temperature<br><br>Short Time Operating High Temperature<br><br>In-Flight Loss of Cooling<br><br>Altitude<br><br>Decompression<br><br>Overpressure<br>static port of the instrument | RTCA/DO-160D Section 4.0 Cat. **[D1]**<br><br>from -20 to +70 °C<br>from -55 to +85 °C<br>Section 4.5.1<br>-20 °C / 24 h<br>Section 4.5.3<br>+55 °C / 48 h<br>Section 4.5.2<br>+70 °C / 48 h<br><br>Section 4.5.4<br><br>Section 4.6.1<br>50 000 ft<br>Section 4.6.2<br>50 000 ft<br>Section 4.6.3<br>-15 000 ft | Test to RTCA/DO-160D | NIL | YES | YES | N/A | N/A |
| **Temperature and Altitude**<br><br>*Temperature:*<br>Continuous operation<br>Ground Survival Temperature<br>Operating Low Temperature<br><br>Operating High Temperature<br><br>Short Time Operating High Temperature<br><br>Altitude<br><br>Decompression<br><br>Overpressure<br>static port of the instrument | RTCA/DO-160D Section 4.0 Cat. **[D2**]<br><br>from -55 to +70 °C<br>from -55 to +85 °C<br>Section 4.5.1<br>-55 °C<br>Section 4.5.3<br>+55 °C<br>Section 4.5.2<br>+70 °C<br><br>Section 4.6.1<br>50,000 ft<br>Section 4.6.2<br>50,000 ft<br>Section 4.6.3<br>-15,000 ft | Test to RTCA/DO-160D | limited to +55 °C<br><br>53,000 ft tested<br>53,000 ft tested | N/A | N/A | YES | YES |
| **Temperature Variation** | RTCA/DO-160D Section 5.0 Cat. **C**<br>2 °C / min. | Test to RTCA/DO-160D | NIL | YES | YES | N/A | N/A |
| **Temperature Variation** | RTCA/DO-160D Section 5.0 Cat. **B**<br>5 °C / min. | Test to RTCA/DO-160D | NIL | N/A | N/A | YES | YES |
| **Humidity**<br>up to 95 %rH | RTCA/DO-160D Section 6.0 Cat. **B** | Test to RTCA/DO-160D | NIL | YES | YES | YES | YES |
| **Operational Shocks and Crash Safety**<br><br>Operational Shock<br>*Crash Safety*:<br>Impulse<br>Sustained | RTCA/DO-160D Section 7.0 Cat. **B**<br><br>6g, 11 ms<br>Section 7.3<br>20g, 11 ms | Test to RTCA/DO-160D | NIL | YES | YES | YES | YES |
| **Vibration** | RTCA/DO-160D Section 8.0 Cat. **[(TB1)(TR)]** without shock mounts | Test to RTCA/DO-160D | NIL | YES | YES | N/A | N/A |
| **Vibration** | RTCA/DO-160D Section 8.0 Cat. **[(TB1)(TR)]/[(SL)(SM)]** Cat. **[UG]** / Curves F and F1 without shock mounts | Test to RTCA/DO-160D | NIL | N/A | N/A | YES | YES |
| **Explosion Proofness** | RTCA/DO-160D Section 9.0 Cat. **X** (Environment II) | no test required | -- | YES | YES | YES | YES |
| **Waterproofness** | RTCA/DO-160D Section 10.0 Cat. **X** | no test required | -- | YES | YES | N/A | N/A |
| **Waterproofness** | RTCA/DO-160D Section 10.0 Cat. **W** | Test to RTCA/DO-160D | NIL | N/A | N/A | YES | YES |

| Environmental Criteria | Limiting Conditions and Related Specifications | Declarations, Design, Test | Deviations | HW 1.XX MOD 00A | HW 2.00 MOD 00A | HW 2.20 MOD 00A | HW 2.21 MOD 01A |
|---|---|---|---|---|---|---|---|
| **Fluids Susceptibility** | RTCA/DO-160D Section 11.0 Cat. **F**<br>Solvent and cleaning Fluids<br>Lubricating Oils | Test to RTCA/DO-160D | NIL | YES | YES | YES | YES |
| **Sand and Dust**<br>particles as encountered in desert areas | RTCA/DO-160D Section 12.0 Cat. **D** | Test to RTCA/DO-160D | NIL | YES | YES | YES | YES |
| **Fungus Resistance**<br>growth as encountered in tropical climates | RTCA/DO-160D Section 13.0 Cat. **F** | Test to RTCA/DO-160D | -- | YES | YES | YES | YES |
| **Salt Spray**<br>exposure to salt-sea atmosphere | RTCA/DO-160D Section 14.0 Cat. **S** | Test to RTCA/DO-160D | NIL | YES | YES | YES | YES |
| **Magnetic Effect** | RTCA/DO-160D Section 15.0 Cat. **Z**<br>< 0.3m | Test to RTCA/DO-160D | NIL | YES | YES | YES | YES |
| **Power Input**<br><br>*Normal operating conditions*<br>Max. voltage<br>Nominal voltage<br>Min. voltage<br>Emergency operation voltage level<br><br>Ripple voltage<br>Momentary power interruptions<br><br>Normal surge voltage<br>Engine starting undervoltage operation<br><br>*Abnormal operating conditions*<br>Voltage steady state<br>Maximum<br>Minimum<br><br>Low voltage conditions<br>Momentary under voltage operation<br>Abnormal surge voltage | RTCA/DO-160D Section 16.0 Cat. **Z**<br><br>30.3 VDC<br>**28.0 VDC**<br>22.0 VDC<br>18.0 VDC<br><br><br><br>up to 1000 ms<br><br>up to 50 V for 50 ms<br><br>10.0 to 20.5 VDC<br><br><br><br>32.2 VDC<br>20.5 VDC<br><br>0 to 20.5 VDC<br><br>12.0 VDC up to 7 s<br>up to 80 V for 100 ms<br>up to 48 V for 1 s | Test to RTCA/DO-160D | NIL | YES | YES | YES | YES |
| **Voltage Spike** | RTCA/DO-160D Section 17.0 Cat. **A** | Test to RTCA/DO-160D | NIL | YES | YES | YES | YES |
| **Audio Frequency Conducted Susceptibility – Power Inputs** | RTCA/DO-160D Section 18.0 Cat. **A** | Test to RTCA/DO-160D | NIL | YES | YES | N/A | N/A |
| **Audio Frequency Conducted Susceptibility – Power Inputs** | RTCA/DO-160D Section 18.0 Cat. **Z** | Test to RTCA/DO-160D | NIL | N/A | N/A | YES | YES |
| **Induced Signal Susceptibility** | RTCA/DO-160D Section 19.0 Cat. **Z** | Test to RTCA/DO-160D | NIL | YES | YES | YES | YES |
| **Radio Frequency Susceptibility (Radiated and Conducted)** | RTCA/DO-160D Section 20.0 Cat. **[RR]** | Test to RTCA/DO-160D | NIL | YES | N/A | N/A | N/A |
| **Radio Frequency Susceptibility (Radiated and Conducted)** | RTCA/DO-160D Section 20.0 Cat. **[YY]** | Test to RTCA/DO-160D | NIL | N/A | YES | YES | YES |
| **Emission of Radio Frequency Energy** | RTCA/DO-160D Section 21.0 Cat. **M** | Test to RTCA/DO-160D | NIL | YES | YES | YES | YES |
| **Lightning Induced Transient Susceptibility** | RTCA/DO-160D Section 22.0 Cat. **[A3E3]** | Test to RTCA/DO-160D | NIL | YES | N/A | N/A | N/A |

| Environmental Criteria | Limiting Conditions and Related Specifications | Declarations, Design, Test | Deviations | HW 1.XX MOD 00A | HW 2.00 MOD 00A | HW 2.20 MOD 00A | HW 2.21 MOD 01A |
|---|---|---|---|---|---|---|---|
| **Lightning Induced Transient Susceptibility** | RTCA/DO-160D Section 22.0 Cat. **[A3J33]** | Test to RTCA/DO-160D | NIL | N/A | YES | YES | YES |
| **Lightning Direct Effects** | RTCA/DO-160D Section 23.0 Cat. **X** | no test required | -- | YES | YES | YES | YES |
| **Icing** | RTCA/DO-160D Section 24.0 Cat. **X** | no test required | -- | YES | YES | N/A | N/A |
| **Icing** | RTCA/DO-160D Section 24.0 Cat. **A** | Test to RTCA/DO-160D | NIL | N/A | N/A | YES | YES |
| **Electrostatic Discharge (ESD)** | RTCA/DO-160D Section 25.0 Cat. **A** (15 kV) | Test to RTCA/DO-160D | NIL | YES | YES | YES | YES |
| ***Other Tests*** Operating Low Temperature | RTCA/DO-160D Section 4.0 -30 °C / 24h | Test to RTCA/DO-160D | NIL | N/A | YES | N/A | N/A |
| ***Other Tests*** Dust Test | MIL-STD-810E Method 510.3 Procedure I | | NIL | N/A | YES | YES | YES |
| ***Other Tests*** Solar Radiation Test | MIL-STD-810E Method 505.3 Procedure I | | NIL | N/A | N/A | YES | YES |

## 9.2 AC32 with HW 4.2X, SW 2.7X, MOD00A (with environmental standards RTCA/DO-160D)

**Master drawing number: 21 30139 14 B:**

HW/SW Modification: HW 4.20 / SW 2.70, 2.71, 2.71.1, 2.71.2, 2.72, MOD00A
RTCA/DO-160D environmental category:
[F2]BBB[(TB1)(TR)]/[(SL)(SM)]/[UG]XWFDFSZZAZZ[YY]M[A3J33]XAA

**Master drawing number: 21 30139 14 D:**

HW/SW Modification: HW 4.20 / SW 2.74, 2.74.1, 2.81, 2.82, MOD00A
RTCA/DO-160D environmental category:
[F2]BBB[(TB1)(TR)]/[(SL)(SM)]/[UG]XWFDFSZZAZZ[YY]M[A3J33]XAA

HW/SW Modification: HW 4.21 / SW 2.75, MOD00A
RTCA/DO-160D environmental category:
[F2]BBB[(TB1)(TR)]/[(SL)(SM)]/[UG]XWFDFSZZAZZ[YY]M[A3J33]XAA

| Environmental Criteria | Limiting Conditions and Related Specifications | Declarations, Design, Test | Deviations | HW 4.20 MOD 00A | HW 4.21 MOD 00A |
|---|---|---|---|---|---|
| **Temperature and Altitude**<br><br>*Temperature:*<br>Continuous operation<br>Ground Survival Temperature<br>Operating Low Temperature<br><br>Operating High Temperature<br><br>Short Time Operating High Temperature<br><br>Altitude | RTCA/DO-160D Section 4.0<br>Cat. **[F2**]<br><br>from -55 to +70 °C<br>from -55 to +85 °C<br>Section 4.5.1<br>-55 °C<br>Section 4.5.3<br>+70 °C<br>Section 4.5.2<br>+70 °C<br><br>Section 4.6.1<br>55,000 / 80,000 ft | Test to RTCA/DO-160D (equivalent to RTCA/DO-160G) | NIL | YES | YES |
| **Temperature Variation** | RTCA/DO-160D Section 5.0<br>Cat. **B** (5 °C / min.) and<br>Cat. **C** (2 °C / min.) | Test to RTCA/DO-160D (equivalent to RTCA/DO-160G) | NIL | YES | YES |
| **Humidity**<br>up to 95 %rH | RTCA/DO-160D Section 6.0 Cat. **B** | Test to RTCA/DO-160D (equivalent to RTCA/DO-160G) | NIL | YES | YES |
| **Operational Shocks and Crash Safety**<br><br>Operational Shock<br><br>*Crash Safety*:<br>Impulse<br>Sustained | RTCA/DO-160D Section 7.0 Cat. **B**<br><br>6g, 11 ms<br><br>Section 7.3<br>20g, 11 ms | Test to RTCA/DO-160D (equivalent to RTCA/DO-160G) | NIL | YES | YES |
| **Vibration** | RTCA/DO-160D Section 8.0<br>Cat. **[(TB1)(TR)]/[(SL)(SM)]**<br>Cat. **[UG]** / Curves F and F1<br>without shock mounts | Test to RTCA/DO-160D | NIL | YES | YES |
| **Explosion Proofness** | RTCA/DO-160D Section 9.0 Cat. **X** (Environment II) | no test required | -- | YES | YES |
| **Waterproofness** | RTCA/DO-160D Section 10.0 Cat. **W** | Test to RTCA/DO-160D (equivalent to RTCA/DO-160G) | NIL | YES | YES |
| **Fluids Susceptibility** | RTCA/DO-160D Section 11.0 Cat. **F** | Test to RTCA/DO-160D (equivalent to RTCA/DO-160G) | NIL | YES | YES |
| **Sand and Dust**<br>particles as encountered in desert areas | RTCA/DO-160D Section 12.0 Cat. **D** | Test to RTCA/DO-160D (equivalent to RTCA/DO-160G) | NIL | YES | YES |
| **Fungus Resistance**<br>growth as encountered in tropical climates | RTCA/DO-160D Section 13.0 Cat. **F** | Test to RTCA/DO-160D (equivalent to RTCA/DO-160G) | NIL | YES | YES |

| Environmental Criteria | Limiting Conditions and Related Specifications | Declarations, Design, Test | Deviations | HW 4.20 MOD 00A | HW 4.21 MOD 00A |
|---|---|---|---|---|---|
| **Salt Spray**<br>exposure to salt-sea atmosphere | RTCA/DO-160D Section 14.0 Cat. **S** | Test to RTCA/DO-160D | NIL | YES | YES |
| **Magnetic Effect** | RTCA/DO-160D Section 15.0 Cat. **Z**<br>< 0.3m | Test to RTCA/DO-160D<br>See AC-ENV-530 (equivalent to RTCA/DO-160G) | NIL | YES | YES |
| **Power Input**<br><br>*Normal operating conditions*<br>Max. voltage<br>Nominal voltage<br>Min. voltage<br>Emergency operation voltage level<br><br>Ripple voltage<br>Momentary power interruptions<br><br>Normal surge voltage<br>Engine starting undervoltage operation<br><br>*Abnormal operating conditions*<br>Voltage steady state<br>Maximum<br>Minimum<br><br>Low voltage conditions<br>Momentary under voltage operation<br>Abnormal surge voltage | RTCA/DO-160D Section 16.0 Cat. **Z**<br><br><br>30.3 VDC<br>**28.0 VDC**<br>22.0 VDC<br>18.0 VDC<br><br><br>up to 1000 ms<br><br>up to 50 V for 50 ms<br>10.0 to 20.5 VDC<br><br><br><br><br>32.2 VDC<br>20.5 VDC<br><br>0 to 20.5 VDC<br>12.0 VDC up to 7 s<br>up to 80 V for 100 ms<br>up to 48 V for 1 s | Test to RTCA/DO-160D (equivalent to RTCA/DO-160G) | NIL | YES | YES |
| **Voltage Spike** | RTCA/DO-160D Section 17.0 Cat. **A** | Test to RTCA/DO-160D<br>See AC-ENV-530 (equivalent to RTCA/DO-160G) | NIL | YES | YES |
| **Audio Frequency Conducted Susceptibility – Power Inputs** | RTCA/DO-160D Section 18.0 Cat. **A, Z** | Test to RTCA/DO-160D<br>See AC-ENV-530 | NIL | YES | N/A |
| **Audio Frequency Conducted Susceptibility – Power Inputs** | RTCA/DO-160D Section 18.0 Cat. **Z** | Test to RTCA/DO-160D Section 18.0 Cat. **A, Z**<br>See AC-ENV-530 (equivalent to RTCA/DO-160G) | NIL | N/A | YES |
| **Induced Signal Susceptibility** | RTCA/DO-160D Section 19.0 Cat. **Z** | Test to RTCA/DO-160D | NIL | YES | YES |
| **Radio Frequency Susceptibility (Radiated and Conducted)** | RTCA/DO-160D Section 20.0 Cat. **[RR]** and Cat. **[YY]**<br><br>RTCA/DO-160G Section 20.0 Cat. **[XG]** | Test to RTCA/DO-160D<br><br>Test to RTCA/DO-160G (See Note 1) | YES | YES | N/A |
| **Radio Frequency Susceptibility (Radiated and Conducted)** | RTCA/DO-160D Section 20.0 Cat. **[RR]** and **[YY]** | Test to RTCA/DO-160D | NIL | N/A | YES |
| **Emission of Radio Frequency Energy** | RTCA/DO-160D Section 21.0 Cat. **M** | Test to RTCA/DO-160D | NIL | YES | YES |
| **Lightning Induced Transient Susceptibility** | RTCA/DO-160D Section 22.0 Cat. **[A3E3]** and **[A3J33]** | Test to RTCA/DO-160D | NIL | YES | YES |
| **Lightning Direct Effects** | RTCA/DO-160D Section 23.0 Cat. **X** | no test required | -- | YES | YES |
| **Icing** | RTCA/DO-160D Section 24.0 Cat. **A** | Test to RTCA/DO-160D (equivalent to RTCA/DO-160G) | NIL | YES | YES |
| **Electrostatic Discharge (ESD)** | RTCA/DO-160D Section 25.0 Cat. **A** (15 kV) | Test to RTCA/DO-160D<br>See AC-ENV-530 (equivalent to RTCA/DO-160G) | NIL | YES | YES |
| **Fire, Flammability** | RTCA/DO-160G Section 26.0 Cat. **C** | Test is N/A (AC32 case is made of metal on all sides and has no vent holes) | N/A | YES | N/A |

| Environmental Criteria | Limiting Conditions and Related Specifications | Declarations, Design, Test | Deviations | HW 4.20 MOD 00A | HW 4.21 MOD 00A |
|---|---|---|---|---|---|
| **Fire, Flammability** | RTCA/DO-160G Section 26.0 Cat. **X** | Test is N/A | N/A | N/A | YES |
| ***Other Tests*** Dust Test | MIL-STD-810E Method 510.3 Procedure I | | NIL | YES | YES |
| ***Other Tests*** HIRF Test | JAA INT/POL/27&29/1 Severe HIRF Environment with a 6dB attenuation due to installation | | NIL | YES | YES |
| ***Other Tests*** Operational Shock Crash Safety Shock | RTCA/DO-160E Cat.B, Sect.7.2: 20g, 11ms RTCA/DO-160E, Cat.B, Sect.7.3: 40g, 11ms | | NIL | YES | YES |
| ***Other Tests*** Vibration Test | MIL-STD-810F, 514.5, Proc. I, Cat. 14, Figure 6-1 & 6.2 (CH47 & UH60 sine-on-random) | | NIL | YES | YES |
| ***Other Tests*** Vibration Test | MI-24 Gunfire Vibration Profile (random) | | NIL | YES | YES |
| ***Other Tests*** Solar Radiation Test | MIL-STD-810E, Method 505.3, Procedure I | | NIL | YES | YES |
| ***Other Tests*** Vibration Test | Specific sinusoidal and random frequencies as applicable to category “R” (helicopters) per Tables 8-1 & 8-2b, Figure 8-6 and related procedures of RTCA DO-160D, Cat. R | | NIL | YES | YES |
| ***Other Tests*** Vibration Test | Test levels for performance and endurance tests are defined in section 6.2 in the AW129-QTP-530 The test will be performed according to related procedures of RTCA DO-160E, Cat. R (helicopters) | | NIL | YES | YES |
| ***Other Tests*** Exp. Modal survey & Gunfire Vibration Test | The accelerations are defined in the section 6.2.2 (Zone C/D) in the AW129-QTP-530 Test procedures are carried out according to MIL-STD-810F, Method 519.5 | | NIL | YES | YES |
| ***Other Tests*** Rate of Climb & Descent Test | Low Pressure (Altitude) acc. to MIL-STD-810G w/Change 1, Method 500.6. Test levels defined in section 6.1 in the AC-QTP 249_Rev1.3 | | NIL | YES | N/A |
| ***Other Tests*** Temperature Shock Test | Temperature Shock acc. to MIL-STD-810G w/Change 1, Method 503.6 Test levels defined in section 6.2 in the AC-QTP-249_Rev1.3 | | NIL | YES | N/A |
| ***Other Tests*** Vibration Test | Vibration acc. to MIL-STD-810G w/Change 1, Method 514.7 Test levels defined in section 6.7 in the AC-QTP-249_Rev1.3 (see Note 2) | | NIL | YES | N/A |
| ***Other Tests*** Gun Fire Vibration Test | Gunfire Shock acc. to MIL-STD-810G w/Change 1, Method 519.7 Test levels defined in Section 6.9 in the AC-QTP-249_Rev1.3 (see Note 2) | | NIL | YES | N/A |

| Environmental Criteria | Limiting Conditions and Related Specifications | Declarations, Design, Test | Deviations | HW 4.20 MOD 00A | HW 4.21 MOD 00A |
|---|---|---|---|---|---|
| ***Other Tests*** Operational Acceleration Test | Acceleration acc. to MIL-STD-810G w/Change 1, Method 513.7 Test levels defined in Section 6.6 in the AC-QTP-249_Rev1.3 (see Note 2) | | NIL | YES | N/A |
| ***Other Tests*** Handling Shock Test | Shock acc. to MIL-STD-810G w/Change 1, Method 516.7 Test levels defined in Section 6.8 in the AC-QTP-249_Rev1.3 | | NIL | YES | N/A |
| ***Other Tests*** Explosive Atmosphere Test | Explosive Atmosphere acc. to MIL-STD-810G w/Change 1, Method 511.6 Test levels defined in Section 6.5 in the AC-QTP-249_Rev1.3 (see Note 2) | | NIL | YES | N/A |
| ***Other Tests*** Sand and Dust Test | Sand and Dust acc. to MIL-STD-810G w/Change 1, Method 510.6 Test levels defined in Section 6.4 in the AC-QTP-249_Rev1.3 | | NIL | YES | N/A |
| ***Other Tests*** Salt Fog Test | Salt Fog acc. to MIL-STD-810G w/Change 1, Method 509.6 Test levels defined in Section 6.3 in the AC-QTP-249_Rev1.3 | | NIL | YES | N/A |
| ***Other Tests*** Attitude Test | Test defined in Section 6.11 in the AC-QTP-249_Rev1.3 | | NIL | YES | N/A |
| ***Other Tests*** Induced Signal Susceptibility | RTCA/DO-160G Section 19.0 Cat ZNE+ZCE AC-QTP-169_Rev1.0 AC-QTR-169_Rev1.0 Test results are valid with AW-169 harness | Test to RTCA/DO-160G | NIL | YES | N/A |
| ***Other Tests*** Radio Frequency Susceptibility | RTCA/DO-160G Section 20.0 Cat [Y L] and Window Effect acc. to §7.3.15 of ED-107A, AC-QTP-169_Rev1.0 AC-QTR-169_Rev1.0 Test results are valid with AW-169 harness | Test to RTCA/DO-160G | YES, see AC-QTR-169_Rev1.0 | YES | N/A |
| ***Other Tests*** Emission of Radio Frequency Energy | RTCA/DO-160G Section 21.0 Cat H, AC-QTP-169_Rev1.0 AC-QTR-169_Rev1.0 Test results are valid with AW-169 harness | Test to RTCA/DO-160G | NIL | YES | N/A |
| ***Other Tests*** Lightning Induced Transient Susceptibility | RTCA/DO-160G Section 22.0 Cat [Z3Z3Z3], AC-QTP-169_Rev1.0 AC-QTR-169_Rev1.0 Test results are valid with AW-169 harness | Test to RTCA/DO-160G | YES, see AC-QTR-169_Rev1.0 | YES | N/A |

NOTES:

1. DO-160D Cat Y is only ensured, when the powerlines are shielded or routed together with the interconnection cable.
2. The test was performed with a unit where the ICAO Encoding Output was not part of the configuration. Therefore, this function (ICAO encoding Output) is untested for this environmental test.

## 10. Statement of Criticality of Software

The AC32 software was developed to EUROCAE ED-12B / RTCA/DO-178B for:

Software Level A

## 11. Statement of Hardware Design Assurance

None

## 12. Declaration

The declaration in this document is made under the authority of Thommen Aircraft Equipment AG (TAE).

TAE cannot accept responsibility for equipment used outside the limiting conditions stated in Section 9 (Level of Compliance with ETSO/TSO) without its agreement.

TAE certifies that the information contained in this Declaration of Design and Performance is accurate.

| DECLARATION | | | | |
|---|---|---|---|---|
| Name | Signature | Date | Role | Name of company |
| D. Grosch |  | 30.06.2022 | Accountable Manager | Thommen Aircraft Equipment AG |

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