



**Declaration of Design and Performance  
AD3x / AD42**

**AD-DDP-400**

Revision: 4.3

TITLE:	Declaration of Design and Performance
DOCUMENT NUMBER:	AD-DDP-400
EQUIPMENT:	AD3x / AD42
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### RECORD OF REVISIONS




REV	DATE	REASON FOR REVISION	AUTHOR	CHECKED	APPROVED
1.0	14-Oct-2003	Initial issue	R. Wehrli	W. Schulz	
1.1	31-Aug-2004	RTCA/DO-160D Env. Cat. YY (Sec 20) MOD01B Status added. J(TSO) removed Master Drawing revised to Rev A Power consumption value changed from 10 Watts to 8 Watts (All the deviation are indicated by bar in the beginning)	A.Gupta	R. Wehrli	
1.2	13-Jan-2005	RTCA/DO-160D Section 22 Env. Cat. A3J33	A.Gupta	R. Wehrli	
2.0	14-Jan-2005	HW Version 2.0 / SW Version 2.0 status added. Other Tests added in Part 9 – Level of compliance with TSO	A.Gupta	R. Wehrli	
2.1	01-Nov-2005	SW Version 2.0 changed to SW Version 2.1	A.Gupta	R. Wehrli	
2.2	18-Jan-2006	SW Version 2.1 changed to SW Version 2.11	A.Gupta	R. Wehrli	
2.3	12-April-2006	SW Version 2.1 changed to SW Version 2.2	A.Gupta	R. Wehrli	
2.4	20-Dec-2006	- SW 2.20 changed to SW 2.30 - HW changed to Versions 2.01 / 2.10 / 2.20 / 2.30 - Environmental Categories changed due to additional qualification tests	R. Wehrli	A. Gupta	
2.5	18-Oct-2007	SW Version 2.30 changed to SW Version 2.40	A.Franklin	R. Wehrli	
2.6	21-Nov-2008	SW Version 2.40 changed to SW Versions 2.50 / 2.51	R. Wehrli	A.Franklin	
2.7	19-Dec-2008	SW Version 2.50 changed to SW Version 2.60	R. Wehrli	A.Franklin	
2.8	17-Apr-2009	HW versions 2.XX referenced SW versions added 1.53.1/1.54.1/2.00.1/2.10.1/2.20.1	R. Wehrli	M.Baumann	
2.9	11-Dec-2009 15-Dec-2009	SW Version 2.60 changed to SW Version 2.70, HW Version 2.31 to 4.10; update after review	B. Daudrich	R. Wehrli	
3.0	18-Apr-2005	HW Version 3.0 / SW Version 3.0 status added. (Barometric setting with Potentiometer)	A.Gupta	R. Wehrli	
3.1	17-Apr-2009	HW Version 3.01/ SW version 3.00.1 added	R. Wehrli	M.Baumann	
3.2	14-Oct-2009	- HW versions 2.31 & 2.32 added - Do160, Sect.5, Cat. B & Sect. 8, Cat. [UG] & Sect.10 Cat. W & sect. 24, Cat. A and Other tests: Altitude, Decompression, HIRF, Bonding Test added in 9 - Sect. 2 & 4 updated	M.Baumann	R.Wehrli	
3.3	09-Dec-2010	Formal corrections after review	R. Wehrli	M. Baumann	
3.4	10-Mar-2012	Minor change SW 2.71 added	W. Blei	M. Baumann	
3.5	08-May-2012	Minor change SW 2.72 added	M. Baumann	R. Wehrli	
3.6	21-Jan-2013	Minor change SW 2.73 added	W. Blei	A.Weiz	
3.7	21-Nov-2013	Minor change SW 2.74 added	M.Schaffner	P.Grichting	
4.0	18-Dec-2006	new issue for HW version 4.XX / SW Version 4.XX	R. Wehrli	A. Gupta	



# Declaration of Design and Performance AD3x / AD42

**AD-DDP-400**

Revision: 4.3

REV	DATE	REASON FOR REVISION	AUTHOR	CHECKED	APPROVED
4.1	03-May-2007	- Type changed to AD42 - DO-160D Section 9.0 Cat. X corrected	R. Wehrli	A. Gupta	
4.2	16-Aug-2007	certified status updated	R. Wehrli	A. Gupta	
4.3	09-Sept-2019	Incorporation of all AD3x and AD42 HW/SW variants in a single document. New HW/SW variant added (HW 4.10 / SW 2.74, MOD01A).	 J. Garrett	 H. Richardt	 A. Anehila

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**Declaration of Design and Performance  
AD3x / AD42**

**AD-DDP-400**

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**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 types of AD3x and AD42, Air Data Displays.

This revision (revision 4.3) combines all previous revisions of this document (AD-DDP-400), issued for different variants of HW and SW, 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 Air Data Displays AD32/AD42 measure barometric altitude, airspeed and temperature in the atmosphere. They have integrated solid-state pressure sensors for static and pitot pressure. The THOMMEN Air Data Display AD30 (repeater) is without sensors (it repeats the baro-metric altitude only).

The AD32 and AD42 are RVSM compliant. The AD32 additionally provides up to 2 x 16 SSEC curves.

For all variants the corrected altitude is displayed on a high contrast LCD in digital format and with a stepper motor driven pointer. The AD3x variants from HW 2.3x (and also with HW4.10) and the AD42 flight instrument provide integral lighting with day/night/NVG capability controlled by an external day/night/NVG master switch and with different lighting voltages (0-5 VAC/VDC / 0-28 VAC/VDC).

The computed air data parameters are transmitted by the ARINC429 interface. Two transmit channels and two receive channels are available, with which also the synchronisation of a dual altimetry system can be realized (baro setting and alerter synchronisation, only with AD42).

The AD3x has an integrated altitude alerter. The AD42 has a referential altitude alerter setting knob to control external altitude alerter functionality. The AD32/AD42 can be set to operate as a self-sensing standby instrument or to display altitude from an external Air Data Computer source. The AD30 can be set only to operate as a repeater.

All digital baro setting knobs have a push-to-reset function as standard. The baro-potentiometer variant of the AD32 gives the barometric setting with an analogue potentiometer without push-to-reset functionality. The scale/unit setting allows selection of English (imperial) and metric operation. An ICAO encoded altitude output is available as an option.

The AD3x/AD42 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 10 Watts and its low maximum weight of 1250 grams (2.75 lbs) have been optimised for applications in state-of-the-art avionics.

The extensive built-in-test (BIT) guarantees safe operation. Using the RS232 maintenance interface, the THOMMEN Air Data Displays AD3x/AD42 can be configured by the manufacturer for different applications. The applications range from business aviation to regional aircraft, transporters and helicopters.

The THOMMEN Air Data Display variants AD3x/AD42 meet or exceed the requirements of the FAA (Federal Aviation Administration) and EASA (European Aviation Safety Agency) technical standard orders accuracy requirements as shown below:

	ETSO/TSO-C10b	ETSO/TSO-C106	ETSO/TSO-C88a
AD30	YES	N/A	optional
AD32	YES	YES	optional
AD42	YES	YES	optional

### 2.3 Identification

Type No.

AD30.XX.XXX.XX.X.XX  
 AD32.XX.XXX.XX.X.XX  
 AD42.XX.XXX.XX.X.XX

HW/SW Modification:

Refer to Section 9

Equipment Configuration Index Document:

AD-ECID-400

Master Drawing No.

21 30040 14 A (for AD3x)  
 21 30432 14 (for AD42)

Weight:

1250 grams (2.75 lbs)

Dimensions:

82.8 x 82.8 mm (3.26 x 3.26 in), ARINC 408 3ATI  
 length 188 mm (7.4 in) (excluding connectors)

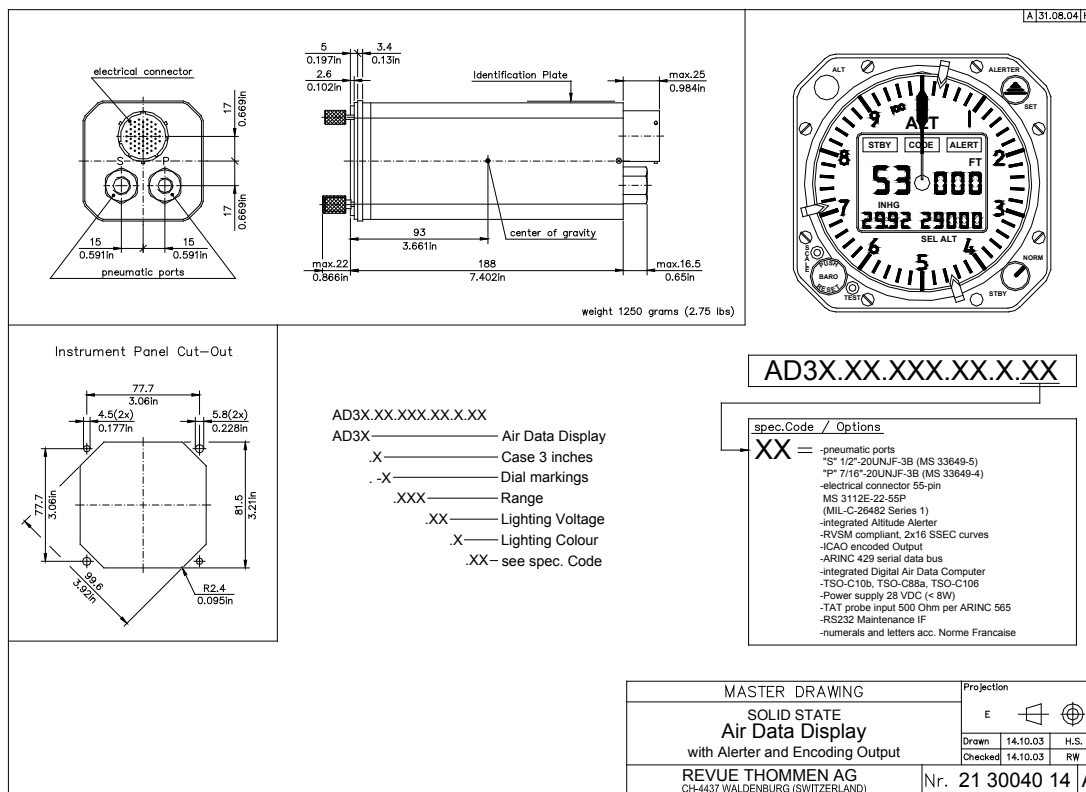


Fig 2.3.1 - AD32 - Air Data Display

**NOTE:**

Figure 2.3.1 shows a typical AD32. Variations for different HW and SW versions are not shown.



### 3. Specification Reference

REFERENCE	ITEM
AD-SPE-400 (TAE document)	AD3x Specification RVSM Air Data Display
AD-SPE-401 (TAE document)	AD42 Specification Air Data Display
EUROCAE ED-14D/RTCA/DO-160D	Environmental Conditions and Test Procedures for Airborne Equipment
EUROCAE ED-12B/RTCA/DO-178B	Software Considerations in Airborne Systems and Equipment Certification
ETSO/TSO-C10b (SAE AS392C)	Altimeter, Pressure Actuated Sensitive Type
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-C10b (SAE AS392C)	Altimeter, Pressure Actuated Sensitive Type
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 34-16-01	Type Certificate - issued by Federal Office for Civil Aviation Switzerland certifying compliance with ETSO- and TSO requirements
EASA.210.01190	AD32 Air Data Display, SD31 Airspeed Indicator (Repeater)
EASA.210.762	AD42 Air Data Display, SD31 Airspeed Indicator (Repeater)

### 6. Reference to Qualification Test Report

REFERENCE	ITEM
AD-ENV-430	AD3x/AD42 Qualification Test Report
AD-ATP-431	AD42 Acceptance Test Procedure

## 7. Service and Instruction Manual Reference

REFERENCE	ITEM
34-16-10	AD3x Component Maintenance Manual with Illustrated Parts List
34-16-40	AD42 Component Maintenance Manual with Illustrated Parts List

## 8. Compliance with ETSO/TSO

Thommen Aircraft Equipment AG (TAE) certifies that the instruments defined in Section 2 meet or exceed the requirements of ETSO/TSO-C10b, ETSO/TSO-C106 and ETSO/TSO-C88a.

The instruments were tested and passed according to the procedures and specifications set forth in the Aerospace Standards SAE AS392C, SAE AS8002, SAE AS8003 and RTCA/DO-160D. Refer to Section 9 for details of the environmental qualification category coverage.

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

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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 AD3x/AD42

A. AD3X with HW 1.XX, 2.XX and 3.XX, SW 1.XX, 2.00 up to 2.60 and 3.XX

Master drawing number: 21 30040 14 A

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

HW/SW Modification: HW 1.3X / SW 1.XX, MOD00A/01B (with Cat [A3E3])  
RTCA/DO-160D environmental category: [D1]CBB[(TB1)(TR)]XXFDFSZZAAZ[YY]M[A3J33]XXA

HW/SW Modification: HW 2.00 and 2.01 / SW 2.00 up to 2.20, MODXXX  
RTCA/DO-160D environmental category: [D1]CBB[(TB1)(TR)]XXFDFSZZAAZ[YY]M[A3J33]XXA

HW/SW Modification: HW 2.30 / SW 2.10, 2.30 and 2.60, MOD00A  
RTCA/DO-160D environmental category: [D1]CBB[(TB1)(TR)]XXFDFSZZA[(A)(Z)]Z[YY]M[A3J33]XXA

HW/SW Modification: HW 2.01 / SW 2.40 to 2.51, MOD00A  
RTCA/DO-160D environmental category: [D1]CBB[(TB1)(TR)]XXFDFSZZA[(A)(Z)]Z[YY]M[A3J33]XXA

HW/SW Modification: HW 2.31 up to 2.32 / SW 2.60, MOD00A  
RTCA/DO-160D environmental category: [D1]CBB[(TB1)(TR)]XXFDFSZZA[(A)(Z)]Z[YY]M[A3J33]XXA

HW/SW Modification: HW 2.XX / SW 1.53.1/1.54.1/2.00.1/2.10.1/2.20.1, MOD00A  
RTCA/DO-160D environmental category: [D1]CBB[(TB1)(TR)]XXFDFSZZA[(A)(Z)]Z[YY]M[A3J33]XXA

HW/SW Modification: HW 3.00 and 3.01 / SW 3.00 and 3.00.X, MOD00A (Master drawing number: 21 30152 14)  
RTCA/DO-160D environmental category: [D1]CBB[(TB1)(TR)]XXFDFSZZAAZ[YY]M[A3J33]XXA

HW/SW Modification: HW 2.00/2.01/2.30/2.31/2.32 / SW 1.53.1/1.54.1/2.00.1/2.10.1/2.20.1/2.60, MOD00A  
RTCA/DO-160D environmental category: [D1]BBB[(TB1)(TR)]/[(UG)]XWFDZSZZAZZ[YY]M[A3J33]XAA



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Environmental Criteria	Limiting Conditions and Related Specifications	Declarations, Design, Test	Deviations	<HW 1.30 MOD 01B	HW 2.00 HW 2.01	HW 2.30	HW 2.31 HW2.32	HW 3.00 HW 3.01
<b>Temperature &amp; Altitude</b>  <i>Temperature:</i> Continuous operation Ground Survival Temperature Operating Low Temperature  Operating High Temperature  Short Time Operating High Temperature  In-Flight Loss of Cooling  Altitude  Decompression  Overpressure static port of the instrument	RTCA/DO-160D Section 4.0 Cat. <b>[D1]</b>  from -20 to +70 °C from -55 to +85 °C Section 4.5.1 -20 °C / 24 h Section 4.5.3 +55 °C / 48 h Section 4.5.2 +70 °C / 48 h Section 4.5.4  Section 4.6.1 50 000 ft Section 4.6.2 50 000 ft Section 4.6.3 -15 000 ft	See test report AD-ENV-430	NIL	YES	YES	YES	YES	YES
<b>Temperature Variation</b>	RTCA/DO-160D Section 5.0 Cat. <b>C</b> 2 °C / min.	See test report AD-ENV-430	NIL	YES	YES	YES	YES	YES
<b>Temperature Variation</b>	RTCA/DO-160D Section 5.0 Cat. <b>B</b> 5 °C / min.	See test report AD-ENV-430	NIL	N/A	YES	YES	YES	N/A
<b>Humidity up to 95 %rH</b>	RTCA/DO-160D Section 6.0 Cat. <b>B</b>	See test report AD-ENV-430	NIL	YES	YES	YES	YES	YES
<b>Shock and Crash Safety</b>  Operational Shock <i>Crash Safety:</i> Impulse Sustained	RTCA/DO-160D Section 7.0 Cat. <b>B</b>  6g, 11 ms Section 7.3 20g, 11 ms	See test report AD-ENV-430	NIL	YES	YES	YES	YES	YES
<b>Vibration</b>	RTCA/DO-160D Section 8.0 Cat. <b>[(TB1)(TR)]</b> without shock mounts	See test report AD-ENV-430	NIL	YES	YES	YES	YES	YES
<b>Explosion</b>	RTCA/DO-160D Section 9.0 Cat. <b>X</b> (Environment II)	no test required	--	YES	YES	YES	YES	YES
<b>Waterproofness</b>	RTCA/DO-160D Section 10.0 Cat. <b>X</b>	no test required	--	YES	YES	YES	YES	YES
<b>Fluids Susceptibility</b>	RTCA/DO-160D Section 11.0 Cat. <b>F</b> Solvent and cleaning Fluids Lubricating Oils	See test report AD-ENV-430	NIL	YES	YES	YES	YES	YES
<b>Sand and Dust</b> particles as encountered in desert areas	RTCA/DO-160D Section 12.0 Cat. <b>D</b>	See test report AD-ENV-430	NIL	YES	YES	YES	YES	YES



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Environmental Criteria	Limiting Conditions and Related Specifications	Declarations, Design, Test	Deviations	<HW 1.30 MOD 01B	HW 2.00 HW 2.01	HW 2.30	HW 2.31 HW2.32	HW 3.00 HW 3.01
<b>Fungus</b> growth as encountered in tropical climates	RTCA/DO-160D Section 13.0 Cat. <b>F</b>	Only non-nutrient materials used	--	YES	YES	YES	YES	YES
<b>Salt Spray</b> exposure to salt-sea atmosphere	RTCA/DO-160D Section 14.0 Cat. <b>S</b>	See test report AD-ENV-430	NIL	YES	YES	YES	YES	YES
<b>Magnetic Effect</b>	RTCA/DO-160D Section 15.0 Cat. <b>Z</b> < 0.3m	See test report AD-ENV-430	NIL	YES	YES	YES	YES	YES
<b>Power Characteristics DC</b>  <i>Normal operating conditions</i> Max. voltage Nominal voltage Min. voltage Emergency operation voltage level  Ripple voltage Momentary power interruptions  Normal surge voltage Engine starting undervoltage operation  <i>Abnormal operating conditions</i> Voltage steady state Maximum Minimum  Low voltage conditions Momentary under voltage operation Abnormal surge voltage	RTCA/DO-160D Section 16.0 Cat. <b>Z</b>  30.3 VDC <b>28.0 VDC</b> 22.0 VDC 18.0 VDC  up to 1000 ms  up to 50 V for 50 ms 10.0 to 20.5 VDC  32.2 VDC 20.5 VDC  0 to 20.5 VDC 12.0 VDC up to 7 s up to 80 V for 100 ms up to 48 V for 1 s	See test report AD-ENV-430	NIL	YES	YES	YES	YES	YES
<b>Voltage Spikes</b>	RTCA/DO-160D Section 17.0 Cat. <b>A</b>	See test report AD-ENV-430	NIL	YES	YES	YES	YES	YES
<b>Audio Frequency Conducted Susceptibility</b>	RTCA/DO-160D Section 18.0 Cat. <b>A</b>	See test report AD-ENV-430	NIL	YES	N/A	N/A	N/A	YES
<b>Audio Frequency Conducted Susceptibility</b>	RTCA/DO-160D Section 18.0 Cat. <b>A, Z</b>	See test report AD-ENV-430	NIL	N/A	YES	YES	YES	N/A
<b>Induced Signal Susceptibility</b>	RTCA/DO-160D Section 19.0 Cat. <b>Z</b>	See test report AD-ENV-430	NIL	YES	YES	YES	YES	YES
<b>Radio Frequency Susceptibility</b>	RTCA/DO-160D Section 20.0 Cat. <b>[RR]</b>	See test report AD-ENV-430	NIL	YES	N/A	N/A	N/A	N/A



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Environmental Criteria	Limiting Conditions and Related Specifications	Declarations, Design, Test	Deviations	<HW 1.30 MOD 01B	HW 2.00 HW 2.01	HW 2.30	HW 2.31 HW2.32	HW 3.00 HW 3.01
<b>Radio Frequency Susceptibility</b>	RTCA/DO-160D Section 20.0 Cat. [YY]	See test report AD-ENV-430	NIL	N/A	YES	YES	YES	YES
<b>Radio Frequency Emission</b>	RTCA/DO-160D Section 21.0 Cat. M	See test report AD-ENV-430	NIL	YES	YES	YES	YES	YES
<b>Lightning Induced Transient Susceptibility</b>	RTCA/DO-160D Section 22.0 Cat. [A3E3]	See test report AD-ENV-430	NIL	YES	N/A	N/A	N/A	N/A
<b>Lightning Induced Transient Susceptibility</b>	RTCA/DO-160D Section 22.0 Cat. [A3J33]	See test report AD-ENV-430	NIL	N/A	YES	YES	YES	YES
<b>Lightning Direct Effects</b>	RTCA/DO-160D Section 23.0 Cat. X	no test required	--	YES	YES	YES	YES	YES
<b>Icing</b>	RTCA/DO-160D Section 24.0 Cat. X	no test required	--	YES	YES	YES	YES	YES
<b>Icing</b>	RTCA/DO-160D Section 24.0 Cat. A	See test report AD-ENV-430	NIL	N/A	YES	YES	YES	N/A
<b>Electrostatic Discharge (ESD)</b>	RTCA/DO-160D Section 25.0 Cat. A (15 kV)	See test report AD-ENV-430	NIL	YES	YES	YES	YES	YES
<b>Other Tests</b>	none	--	--	YES	N/A	N/A	N/A	N/A
<b>Other Tests</b> Operating Low Temperature	RTCA/DO-160D Section 4.0 -30 °C / 24h	See test report AD-ENV-430	NIL	N/A	YES	YES	YES	YES
Vibration (HAWK spectrum) endurance test 16 2/3 h	max. 5 g	See test report AD-ENV-430	NIL					
Shock and Crash Safety: Operational Shock Crash Safety: Impulse	15g, 11 ms 30g, 11 ms	See test report AD-ENV-430	NIL					
<b>Other Tests</b> Operating Low Temperature	RTCA/DO-160D Section 4.0 -30 °C / 24h	See test report AD-ENV-430	NIL	N/A	YES	YES	YES	N/A
Vibration (HAWK spectrum): endurance test 16 2/3 h sine vibration test 15 min.	max. 5 g max. 7.5 g	See test report AD-ENV-430	NIL					
Shock and Crash Safety: Operational Shock Crash Safety: Impulse	15g, 11 ms 30g, 11 ms	See test report AD-ENV-430	NIL					
G-Test (acceleration)	max. -10 g	See test report AD-ENV-430	NIL					

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**B. AD42 (all variants)**

HW/SW Variant: HW 4.00\_X, SW 4.00\_X, MOD 00A (AD3x)  
 RTCA/DO-160D environmental category: [B2]BBC[UG]EWFDFSZZAZ[YY]M[A3J33]XAA

HW/SW Variant: HW 4.00 / SW 4.00 and 4.01, MOD 00A (AD42)  
 RTCA/DO-160D environmental category: [B2]BBC[UG]XWFDFSZZAZZ[YY]M[A3J33]XAA

Environmental Criteria	Limiting Conditions and Related Specifications	Declarations, Design, Test	Deviations	HW 4.00_B HW 4.00_C	HW 4.00
<b>Temperature &amp; Altitude</b>  <i>Temperature:</i> Continuous operation Ground Survival Temperature Operating Low Temperature  Operating High Temperature  Short Time Operating High Temperature  Altitude  Decompression  Overpressure static port of the instrument	RTCA/DO-160D Section 4.0 Cat. <b>[B2]</b>  from -30 to +70 °C from -55 to +85 °C Section 4.5.1 -30 °C Section 4.5.3 +70 °C Section 4.5.2 +70 °C Section 4.6.1 50 000 ft Section 4.6.2 50 000 ft Section 4.6.3 -15 000 ft	See test report AD-ENV-430	LCD limited to - 30 °C	YES	YES
<b>Temperature Variation</b>	RTCA/DO-160D Section 5.0 Cat. <b>B</b> 5 °C / min.	See test report AD-ENV-430	NIL	YES	YES
<b>Humidity up to 95 %rH</b>	RTCA/DO-160D Section 6.0 Cat. <b>B</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Shock and Crash Safety</b>  Operational Shock <i>Crash Safety:</i> Impulse Sustained	RTCA/DO-160D Section 7.0 Cat. <b>C</b>  6g, 11 ms Section 7.3 20g, 11 ms	See test report AD-ENV-430	NIL	YES	YES
<b>Vibration</b>	RTCA/DO-160D Section 8.0 Cat. <b>[UG]</b> Curves F and F1 without shock mounts	See test report AD-ENV-430	NIL	YES	YES
<b>Explosion</b>	RTCA/DO-160D Section 9.0 Cat. <b>E</b> (Environment II)	See test report AD-ENV-430	no test required	YES	N/A



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Environmental Criteria	Limiting Conditions and Related Specifications	Declarations, Design, Test	Deviations	HW 4.00_B HW 4.00_C	HW 4.00
<b>Explosion</b>	RTCA/DO-160D Section 9.0 Cat. <b>X</b> (Environment II)	See test report AD-ENV-430	no test required	N/A	YES
<b>Waterproofness</b>	RTCA/DO-160D Section 10.0 Cat. <b>W</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Fluids Susceptibility</b>	RTCA/DO-160D Section 11.0 Cat. <b>F</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Sand and Dust</b> particles as encountered in desert areas	RTCA/DO-160D Section 12.0 Cat. <b>D</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Fungus</b> growth as encountered in tropical climates	RTCA/DO-160D Section 13.0 Cat. <b>F</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Salt Spray</b> exposure to salt-sea atmosphere	RTCA/DO-160D Section 14.0 Cat. <b>S</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Magnetic Effect</b>	RTCA/DO-160D Section 15.0 Cat. <b>Z</b> < 0.3m	See test report AD-ENV-430	NIL	YES	YES
<b>Power Characteristics DC</b>  <i>Normal operating conditions</i> Max. voltage Nominal voltage Min. voltage Emergency operation voltage level  Ripple voltage Momentary power interruptions  Normal surge voltage Engine starting undervoltage operation  <i>Abnormal operating conditions</i> Voltage steady state Maximum Minimum  Low voltage conditions Momentary under voltage operation Abnormal surge voltage	RTCA/DO-160D Section 16.0 Cat. <b>Z</b>  30.3 VDC <b>28.0 VDC</b> 22.0 VDC 18.0 VDC  up to 1000 ms  up to 50 V for 50 ms 10.0 to 20.5 VDC  32.2 VDC 20.5 VDC  0 to 20.5 VDC 12.0 VDC up to 7 s up to 80 V for 100 ms up to 48 V for 1 s	See test report AD-ENV-430	NIL	YES	YES
<b>Voltage Spikes</b>	RTCA/DO-160D Section 17.0 Cat. <b>A</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Audio Frequency Conducted Susceptibility</b>	RTCA/DO-160D Section 18.0 Cat. <b>Z</b>	See test report AD-ENV-430	NIL	N/A	YES





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Environmental Criteria	Limiting Conditions and Related Specifications	Declarations, Design, Test	Deviations	HW 4.00_B HW 4.00_C	HW 4.00
<b>Induced Signal Susceptibility</b>	RTCA/DO-160D Section 19.0 Cat. <b>Z</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Radio Frequency Susceptibility</b>	RTCA/DO-160D Section 20.0 Cat. <b>[YY]</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Radio Frequency Emission</b>	RTCA/DO-160D Section 21.0 Cat. <b>M</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Lightning Induced Transient Susceptibility</b>	RTCA/DO-160D Section 22.0 Cat. <b>[A3J33]</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Lightning Direct Effects</b>	RTCA/DO-160D Section 23.0 Cat. <b>X</b>	See test report AD-ENV-430	no test required	YES	YES
<b>Icing</b>	RTCA/DO-160D Section 24.0 Cat. <b>A</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Electrostatic Discharge (ESD)</b>	RTCA/DO-160D Section 25.0 Cat. <b>A</b> (15 kV)	See test report AD-ENV-430	NIL	YES	YES
<b>Other Tests</b>				YES	YES
HIRF-Test	JAA INT/POL/27&29/1 Severe HIRF Environment with a 6dB attenuation due to installation	See test report AD-ENV-430	NIL		

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C. AD3X with HW 4.10, SW 2.7X, MOD 0XX

HW/SW Modification: HW 4.10 / SW 2.70 up to 2.74, MOD00A  
RTCA/DO-160D environmental category: [F1]BBB[(TB1)(TR)]/[UG]XWFD FSZZAZZ[YY]M[A3J33]XAA

HW/SW Modification: HW 4.10 / SW 2.74, MOD01A  
RTCA/DO-160D environmental category: [F1]BBB[(TB1)(TR)]/[UG]XWFD FSZZAZZ[YY]M[A3J33]XAA

Environmental Criteria	Limiting Conditions and Related Specifications	Declarations, Design, Test	Deviations	HW 4.10 MOD 00A	HW 4.10 MOD 01A
<b>Temperature &amp; Altitude</b>  <i>Temperature:</i> Continuous operation Ground Survival Temperature Operating Low Temperature  Operating High Temperature  Short Time Operating High Temperature  Altitude	RTCA/DO-160D Section 4.0 Cat. <b>[F1]</b>  -20 / -30 to +70 °C -55 to +85 °C Section 4.5.1 -20 °C / -30 °C Section 4.5.3 +55 °C Section 4.5.2 +70 °C Section 4.6.1 55 000 / 80 000 ft	See test report AD-ENV-430	NIL	YES	YES
<b>Temperature Variation</b>	RTCA/DO-160D Section 5.0 Cat. <b>B</b> (5 °C / min.) and Cat. <b>C</b> (2 °C/min.)	See test report AD-ENV-430	NIL	YES	YES
<b>Humidity up to 95 %rH</b>	RTCA/DO-160D Section 6.0 Cat. <b>B</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Shock and Crash Safety</b>  Operational Shock <i>Crash Safety:</i> Impulse Sustained	RTCA/DO-160D Section 7.0 Cat. <b>B</b>  6g, 11 ms Section 7.3 20g, 11 ms	See test report AD-ENV-430  Similarity to 3-inch-Instruments - see Testreport 3A-87-1	NIL	YES	YES
<b>Vibration</b>	RTCA/DO-160D Section 8.0 Cat. <b>[(TB1)(TR)]</b> and Cat. <b>[UG]</b> / Curves F and F <sub>1</sub> without shock mounts	See test report AD-ENV-430	NIL	YES	YES
<b>Explosion</b>	RTCA/DO-160D Section 9.0 Cat. <b>X</b> (Environment II)	See test report AD-ENV-430	no test required	YES	YES



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Environmental Criteria	Limiting Conditions and Related Specifications	Declarations, Design, Test	Deviations	HW 4.10 MOD 00A	HW 4.10 MOD 01A
<b>Waterproofness</b>	RTCA/DO-160D Section 10.0 Cat. <b>W</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Fluids Susceptibility</b>	RTCA/DO-160D Section 11.0 Cat. <b>F</b> Solvent and cleaning Fluids Lubricating Oils	Similarity to 2-inch- instruments - see Testreport FI-ENV-020	--	YES	YES
<b>Sand and Dust</b> particles as encountered in desert areas	RTCA/DO-160D Section 12.0 Cat. <b>D</b>	Similarity to 2-inch- instruments - see Testreport FI-ENV-020	--	YES	YES
<b>Fungus</b> growth as encountered in tropical climates	RTCA/DO-160D Section 13.0 Cat. <b>F</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Salt Spray</b> exposure to salt-sea atmosphere	RTCA/DO-160D Section 14.0 Cat. <b>S</b>	Similarity to 2-inch- instruments - see Testreport LF 97-1	--	YES	YES
<b>Magnetic Effect</b>	RTCA/DO-160D Section 15.0 Cat. <b>Z</b> < 0.3m	See test report AD-ENV-430	NIL	YES	YES
<b>Power Characteristics DC</b>  <i>Normal operating conditions</i> Max. voltage Nominal voltage Min. voltage Emergency operation voltage level  Ripple voltage Momentary power interruptions  Normal surge voltage Engine starting undervoltage operation  <i>Abnormal operating conditions</i> Voltage steady state Maximum Minimum  Low voltage conditions Momentary under voltage operation Abnormal surge voltage	RTCA/DO-160D Section 16.0 Cat. <b>Z</b>  30.3 VDC <b>28.0 VDC</b> 22.0 VDC 18.0 VDC  up to 1000 ms  up to 50 V for 50 ms 10.0 to 20.5 VDC  32.2 VDC 20.5 VDC  0 to 20.5 VDC 12.0 VDC up to 7 s up to 80 V for 100 ms up to 48 V for 1 s	See test report AD-ENV-430	NIL	YES	YES



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Environmental Criteria	Limiting Conditions and Related Specifications	Declarations, Design, Test	Deviations	HW 4.10 MOD 00A	HW 4.10 MOD 01A
<b>Voltage Spikes</b>	RTCA/DO-160D Section 17.0 Cat. <b>A</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Audio Frequency Conducted Susceptibility</b>	RTCA/DO-160D Section 18.0 Cat. <b>A and Z</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Induced Signal Susceptibility</b>	RTCA/DO-160D Section 19.0 Cat. <b>Z</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Radio Frequency Susceptibility</b>	RTCA/DO-160D Section 20.0 Cat. <b>[RR]</b> and Cat. <b>[YY]</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Radio Frequency Emission</b>	RTCA/DO-160D Section 21.0 Cat. <b>M</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Lightning Induced Transient Susceptibility</b>	RTCA/DO-160D Section 22.0 Cat. <b>[A3J33]</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Lightning Direct Effects</b>	RTCA/DO-160D Section 23.0 Cat. <b>X</b>	See test report AD-ENV-430	no test required	YES	YES
<b>Icing</b>	RTCA/DO-160D Section 24.0 Cat. <b>A</b>	See test report AD-ENV-430	NIL	YES	YES
<b>Electrostatic Discharge (ESD)</b>	RTCA/DO-160D Section 25.0 Cat. <b>A</b> (15 kV)	See test report AD-ENV-430	NIL	YES	YES
<b>Other Test</b>  Dust Test	  MIL-STD-810E Method 510.3 Procedure I	  Similarity to 2-inch- instruments - see Test report FI-ENV-020	  --	  YES	  YES
<b>Other Tests</b>  Operating Low Temperature  Altitude  Decompression  Vibration (HAWK spectrum): endurance test 16 2/3 h sine vibration test 15 min.  Shock and Crash Safety: Operational Shock Crash Safety: Impulse  G-Test (acceleration)	  HAWK requirements  RTCA/DO-160D Section 4.0 -30 °C / 24h Section 4.6.1 53 000 ft Section 4.6.2 53 000 ft  max. 5 g max. 7.5 g  15g, 11 ms 30g, 11 ms  max. -10 g	  See test report AD-ENV-430	  NIL  NIL  NIL  NIL	  YES	  YES

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Environmental Criteria	Limiting Conditions and Related Specifications	Declarations, Design, Test	Deviations	HW 4.10 MOD 00A	HW 4.10 MOD 01A
<i>Other Test</i>  HIRF-Test	JAA INT/POL/27&29/1 Severe HIRF Environment with a 6dB attenuation due to installation	See test report AD-ENV-430	NIL	N/A	YES

**10. Statement of Criticality of Software**

The AD3x / AD42 software was developed to EUROCAE ED-12B/RTCA/DO-178B rigor 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
A. Anehila		09-Sept-2019	Head of Engineering	Thommen Aircraft Equipment AG



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