



TYPE APPROVAL CERTIFICATE

Certificate no.:
TAA00001VK
Revision No:
3

This is to certify:

that the **Measurement Converter**

with type designation(s)

Discrete I/O Control DIO, Thermocouple Temp. Scanner TC20, RTD Temperature Scanner RTD8, I/O Module AX030210

issued to

Axiomatic Technologies Corporation
Mississauga, ON, Canada

is found to comply with

DNV rules for classification – Ships, offshore units, and high speed and light craft

Application:

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Type	Temperature	Humidity	Vibration	EMC	Enclosure
Discrete I/O Control DIO	B	B	B	A	C (IP67)
Thermocouple Temp. Scanner TC20	B	B	B	A	C (IP67)
RTD Temperature Scanner RTD8	B	B	B	A	C (IP67)
I/O Module AX030210	B	B	B	A	B (IP56)

Issued at **Hamburg** on **2023-11-09**

This Certificate is valid until **2028-05-28**.

DNV local unit: **Montreal**

Approval Engineer: **Jens Dietrich**

for **DNV**



Digitally Signed By: Papanuskas, Joannis
Location: DNV GL SE Hamburg, Germany

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Form code: TA 251

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Product description

Product	Type	Product Nos. (aliases)
<u>Thermocouple Temperature Scanner</u> -20 channels for Thermo Couples type B, E, J, K, N, R, S or T -Scan rate: 100ms per channel -Accuracy +/-1° (Cold jct. comp.).	TC20	234-1644, AXTC20, AXTC20CO, 1006454, AXTC20-07, AXTC20-08, AXTC20-01 or AXTC20-04, CATAX185000, AX185000-XX, 605-1986
<u>Discrete I/O Control Module</u> -12 Digital Inputs, 8 Relay Outputs. -Relay contact output rating: 2A@277VAC, 2A@30VDC (Ohmic).	DIO	234-0275, AXDIO128, AXDIO128CO or AXDIO128-03 CATAX031800, AX031800-XX, 605-1984
<u>RTD Temperature Scanner</u> -8 channels, configurable individually 2-, 3-, or 4-wire connection -Scan rate: 100ms per channel -Accuracy +/-1°.	RTD8	234-1645, AXRTD8, AXRTD8CO or AXRTD8-03, CATAX180300, AX180300-XX, 606-7496
<u>I/O Module</u> -10 universal inputs user selectable: 0-5V, 0-10V, 4-20 mA or 0-20 mA Digital inputs for interface to switches, etc. PWM signal, pulse or 16-bit counter inputs from sensors or diesel engine ECM's -2 voltage references can power external sensors -1 Resistive Input -1 Digital Input -8 analog outputs: (0-5V, 0-10V, +/-5V, +/-10V, 0-20 mA, 4-20 mA) -1 Form C Relay Output -12/24VDC input power (nominal) -1 Isolated CAN (SAE J1939)	AX030210	573-5839, 977000059, CATAX030210, AX030210-XX

Interfaces: RS232(partly), CAN SAE J1939, CANopen (CO models). IP56; Supply Voltage: 9...36V DC.

Approval conditions

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV, documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case, by inclusion in an instrument list. Reference is made to DNV Rules for Ships Pt.4 Ch.9, Control and Monitoring Systems.
 Installation instructions to be observed.

Type Approval documentation

Test reports:

Elite Engineering test report no 1201612-01, 1201612-02, 1201612-03, dated 2012-09-18;
 Elite Engineering test report no 1201614-01, dated 2012-09-13.

Documentation AXTC20:

UMAXTC20 – User Manual – TC20 Temperature Scanner, version 3.1.4, dated 2017-09-29
 PCB-10006-01-ES-R61 – Schematic for TC20 Temperature Scanner µP PCB Assembly dated 2012-04-16
 PCB-10007-02-ES-R54 – Schematic for RTD8 Temperature Scanner and TC20 Temperature Scanner Power PCB Assembly dated 2012-04-28; Thermocouple Module, dwg. Caterpillar 234-1644, Ch.05
 User Manual Model #234-1644. V1.0.1A; Dwg. AXTC20-MD, rev. A-D2.

Documentation AXDIO128:

UMAXDIO128 – User Manual – DIO I/O Control, version 3.0.0 dated 2011-12-20
 PCB-10002-01-ES – Schematic for DIO I/O Control Module dated 2012-02-10
 Discrete I/O Module, dwg. Caterpillar 234-0275, Ch.03; User Manual Model #234-0275, V1.0.0.

Documentation AXRTD8:

PCB-10007-01-ES-R61 – Schematic for RTD8 Temperature Scanner μ P PCB Assembly dated 2012-04-13.
PCB-10007-02-ES-R54 – Schematic for RTD8 Temperature Scanner and TC20 Temperature Scanner Power PCB Assembly dated 2012-04-28; Resistive THRM Device, dwg. Caterpillar 234-1645, Ch.06
User Manual Model #234-1645, V1.0.1A, dated 2017-05-24.
User Manual P/N AXRTD8, AXRTD8-03, V3.1.3A.
Type approval survey report for A-12954, DNV Montreal 2012-10-31.
Axiomatic Engineering White Paper, Version1, dated 2017-11-17.
Type approval retention survey report DNV GL Montreal, dated 2018-05-07.

Documentation AX030210:

Technical data sheet #TDAX030210-MTA (TDAX030210-11/19/19),
Elite Engineering Test Report No. 1902125-01 (EMC),
Elite Engineering Test Report No. 1902126-01 (Environmental),
Updated circuit diagram, AX030210, PCB-17021-01-R3, dated 2019-09-30.

Renewal 2023:

Additional Test Reports: Elite 2203472-01, issued 2023-02-23; Elite 2203471-01, Rev.A, issued 2023-03-31; Elite 2203471-02, Rev.A, issued 2023-03-31; Elite 22034471-03, Rev.A, issued 2023-03-31.
Additional Test Report TÜV 7169010216-001, Rev.1, dated 2022-04-25.
Additional data sheets: Techdoc no.7, 8 and 9.
Documentation AX185000: - Drawing N° CATAX185000-MD-A, dated 20 Jun 2022.- User manual UMCATAX185000, V 1.0.1, dated 24 July 2023.
Documentation: AX180300: Drawing N° CATAX180300-MD, rev.A-D3, dated 21 Apr 2023. User manual UMCATAX180300, V 1.0.1, dated 24 July 2023.
Documentation: AX031800: Drawing N°CATAX031800-MD, rev.A- Part Rev A, dated 27 Mar 2019.- User manual UMCATAX031800, V 1.0.2, dated 24 July 2023.

Tests carried out

Applicable tests according to DNV CG-0339, August 2021.

Marking of product

Supplier name, type designation, power supply, plug pin assignment, serial number.

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of this certificate.

END OF CERTIFICATE