CERTIFICATE NUMBER	23-2374337-PDA
EFFECTIVE DATE	09-Mar-2023
EXPIRY DATE	08-Mar-2028
ABS TECHNICAL OFFICE	Hamburg Engineering Department

CERTIFICATE OF

Product Design Assessment

This is to certify that a representative of this Bureau did, at the request of

BACHMANN ELECTRONIC GMBH

located at

KREUZAECKERWEG 33, , A-6800 FELDKIRCH, Austria

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

Product:	**Programmable Controller, I/O Units, Operator & Communication...**
Model:	**M1 Controller**
Endorsements:	
Tier:	**3 - Type Approved, unit certification not required**

This Product Design Assessment (PDA) Certificate remains valid until 08/Mar/2028 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

American Bureau Of Shipping

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Tier: 3 - Type Approved, unit certification not required

Product: **Programmable Controller, I/O Units, Operator & Communication Interfaces**
Model: **M1 Controller**
Endorsements:

Intended Service:
Programmable logic controllers that utilize a programmable memory for internal storage of commands and instructions for specific functions, such as logic, sequencing, counting, and controlling of several equipment via digital or analog inputs/outputs for ACC, ACCU, and ABCU Class Vessels, and offshore and industrial controls.

Description:
The components cover power supplies, central processing units, interfaces, accessories for input/ output, programming and diagnostic. For more details refer to certificate attachment.

Rating:
Power Supply: 24 V DC
Degree of Protection: IP20
Operating Temperature: -25°C to +60 °C

Service Restriction:
1. Unit Certification is not required for the original equipment manufacturer. However, unit certification in accordance with 4-9-3/Table 2 and 4-9-9/Table 2 is required by the user to customize this equipment where this equipment is used for Category II or III services in 4-9-3/Table 1.
2. If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.
3. The equipment fulfills the EMC requirements for installation on bridge or deck zone with EMI filter (min. 2 x 1.8 mH) except for module GMP232/x2 that is approved for installation in the power distribution zone only.

Comments:
1. The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.
2. Tests and approval are for hardware only. Each particular application/ installation is to be specifically approved in conjunction with the relevant system in which the units are being used.
3. Manufacturer is to keep evidence of quality plan for software, inspection of hardware components from sub-suppliers and quality plan for software, inspection of hardware components from sub-suppliers and quality control in production. Applicable testing in accordance with MVR 4-9-3/9.5 Table 2 and 4-9-9/15.7 Table 2 based on the category of the computer-based system is to be witnessed by the ABS Surveyor.

Notes/Drawing/Documentation:
Drawing No. 02, Test Setup, 19.01.2016
Drawing No. 04, Test Report, Vibration, Tüv Süd GmbH, 07.03.2016
Drawing No. 05, Test Report, Power Supply, Bachmann In-house Laboratory, 19.01.2016
Drawing No. 06, Test Report, High Voltage, Bachmann In-house Laboratory, 19.01.2016
Drawing No. 07, Test Report, Compass safe distance, Bachmann In-house Laboratory, 19.01.2016
Drawing No. 08, Test Report, Environmental, Bachmann In-house Laboratory, 12.03.2016
Drawing No. 09, Test Report, Flammability, Bachmann In-house Laboratory, 19.01.2016
Drawing No. 10, Test Report, Environmental, 12.03.2016
Drawing No. 11, Test Report, Vibration, Tüv Süd GmbH, 06.04.2016
Drawing No. 12, Test Report, Vibration, Tüv Süd GmbH, 16.02.2016
Drawing No. 13, Test Report, Environmental, 19.01.2016
Drawing No. 14, Test Report, EMC, Bachmann In-house Laboratory, 19.01.2016
Drawing No. PVA200_en, Description, Function Module
Drawing No. SCT202_en, Description, Safety-Module
---------- Reval. 2021----------
Drawing No. systemoverview_11_2019_en, M1 Controller Technical Datasheets & System Overview

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Drawing No. 1,8,12_Report_Witness_Marine008_REV000, DNV GL Witnessing
Drawing No. 13,14,15,16,17,18_EMC_Interference_Marine008_REV001, EMC Test Report, Bachmann In-house Laboratory, 18-12-2019
Drawing No. 14,19_Marine009, EMC Test (6GHz), TüV Süd GmbH, 02-07-2020
Drawing No. 19,20_Emission_Marine008_REV000, Conducted & Radiated Emissions test, TüV Süd Gmbh, 13-12-2020
Drawing No. 1_M1_System_und_Runtime_SW-Versionierung_Marine008_REV000, System Software Versioning
Drawing No. 21_Flammability_Marine008_REV000, Flammability Test, Bachmann In-house Laboratory, 17-12-2019
Drawing No. 22_optional_Compass_safe_distance_Marine008_REV000, Compass Safe Distance Test (optional), 05-02-2020
Drawing No. 2_Test_Configuration_Marine008_REV000, Test Configuration
Drawing No. 5,6,11_Clima_Marine008_REV002, Climatic Test Report, Bachmann In-house Laboratory, 31-03-2020
Drawing No. 7_Vibration_Marine008_REV000, Vibration Test Report, TüV Süd GmbH, 31-01-2020
Drawing No. 9,10_High_Voltage_Isolation_Marine008_REV000, High Voltage Test, Bachmann In-house Laboratory, 12-12-2019
Drawing No. ABS_Overview_DocNo, Test Overview
---------- Reval. 2023 ----------
Drawing No. CM202, Technical Datasheet, Revision: 000
Drawing No. GMP232/x2, Technical Datasheet, Revision: 000
Drawing No. Test_procedure_Marine012_REV002, Issue date: 16.12.2022, Type Test Plan, Revision: 002, Pages: 0
Drawing No. No3,4_Power_Supply_Failure_and_Variation_Test_Report_Marine012_REV000, Issue date: 05.12.2022, Revision: 000
Drawing No. No5,6,11_Dry_Heat_Damp_Heat_Cold_Test_Report_Marine012_REV000, Issue date: 05.12.2022, Revision:000
Drawing No. No7_Vibration_TR_713252021-00_Marine012_REV001,TÜV SÜD Product Service GmbH, Issue date: 27.04.2022, TÜV SÜD Product Service GmbH, Revision: 001
Drawing No. No9,10_Insulation_Resistance_and_High_Voltage_Test_Report_Marine012_REV000, Issue date: 05.12.20, Revision: 000
Drawing No. No13 - 18_EMC_Interference_Test_Report_Marine012_REV000, Issue date: 05.12.2022
Drawing No. No14_EMC_Interference_TR-713278061-00_Marine012_REV000, GMP232/x2, TÜV SÜD Product Service GmbH, Issue date: 09.06.2022 Page 204-206
Drawing No. No14_EMC_Interference_TR-14312-24452-01 Ed.2_Marine012_REV000,CM202,TÜV SÜD Product Service GmbH , Issue date: 09.06.2022 Page 204-206
Drawing No. EMV, No19,20_EMC_Emission_Test_Report_Marine012_REV000, Issue date: 05.12.2022
Drawing No. No22_Compass_Safe_Distance_433-22_V1U_Test_Report_Marine012_REV000, TREO, Issue date: 15.12.2022, Marine012, Revision: 000

Terms of Validity:
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STANDARDS

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ABS Rules:
2023 Marine Vessel Rules: 1-1-4/7.7, 1-1-A3, 1-1-A4, 4-8-3/1.7, 4-8-3/1.11.1, 4-8-3/1.17, 4-9-9/13.1, 4-9-9/Table 1 & Table 2
2023 Mobile Offshore Unit Rules: 1-1-4/9.7, 1-1-A2, 1-1-A3, 4-3-1/11, 4-3-1/15, 4-3-1/17

National:
NA

International:
NA

Government:
NA

EUMED:
NA

OTHERS:
NA

Product Design Assessment (PDA) Certificate for Component Details

PDA Certificate No: 23-2374337-PDA
Company: Bachmann Electronic GmbH
Product/Equipment: Programmable Controller, I/O Units, Operator & Communication Interfaces
Models: M1 Controller
Issuance Date: 9-Mar-23
Expiration Date: 8-Mar-28

Product description

The following parts of the M1 – Controller systems are covered:

Module	Description	Properties
AI2xx/xx	Analog Input	Max. 8 inputs
AIC206,AIC212,AIC214	Condition Monitoring	max. 12 inputs, 2 counters
AIO288/x	Analog Input/ Output	8 inputs or 8 outputs
AIO2xx	Analog Input/ Output	Max 16 main channels
AIO2xx/SI	Analog Input/ Output	Max 8 main channels,
AO2xx/xx	Analog Output	Max. 8 Outputs
BS2xx/x	Backplanes	Max 16 slots
CF200/xx	Storage Media	Compact Flash Type I, 64 MB up to 8 GB
CNT204/x	Counter	Max. 4 inputs
CM202	CAN bus	CAN bus Master
GIO212	General I/O Module	12 main channels
DA3284-C	Analog/ Digital input/ output	8 analog outputs, 4 inputs, 16 digital inputs/ outputs
DI2xx/xxx	Digital Input	Max. 32 inputs
DIO2xx/x	Digital Input/ Output	Max. 80 inputs/ outputs
DIOxx-C	CAN bus	Max. 32 digital inputs/ outputs
DO2xx	Digital Output	Max. 32 outputs
DOR206/xxx	Digital Relay Output	6 Outputs voltage switching from 24 V DC up to 230 V AC
DPM200	Profibus	Profibus master
EM2xx	Ethernet Master	3 external ETH ports
FM2xx	Fastbus Master	Max. 2 ports
FS2xx/x	Fastbus Slave Max.	2 ports, power supply optional
GM260	Grid Measurement	3 voltage, 6 current inputs
GMP232/x and GMP232/x2	Grid Measurement protection	3 voltage, 3 current inputs and 2 relay outputs
GSP274	Grid Synchronization protection	7 voltage, 4 current,4 digital inputs and 4 digital, 2 relay outputs
ISI2xx/x	Encoder Interface	Max. 4 inputs, 2 analog outputs
LM201, S20x	Dummy	Dummy Module
MC2xx	CPU	Up to 1.6 GHz clock rate
MH230	CPU	Up to 2.3 GHz clock rate
MX2xx/x	CPU	Up to 200 MHz clock rate
NT25x	Power Supply	3 output voltages 5 V DC, 15 V DC and -15 V DC
PTAI216	Temperature Recording	4 Analog inputs, 12 inputs for Pt100/Pt1000 sensors
PVA204	Proportional Valve Amplifier	4 Coils, 24 V DC, 2.5 A
PVA208	Proportional Valve Amplifier	8 Coils, 24 V DC, 2 A
RS204/x	Interface	4 data ports
SCT202	Safety Pulse Counter	2 Channels, max. input frequency 5 kHz
SDI208	Safety digital input Module	Max 8 channels
SDO204	Safety digital output	Max 4 channels
SAI205	Safety analog input	Max 10 inputs
SLC284	Safety logic controller	Max 12 main channels
TI214x/x	Temperature Recording	14 Inputs for Pt100/1000 sensors as well as J/K thermo