

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Programmable Electronic System

with type designation(s)
M1 - Controller System

Issued to

Bachmann electronic GmbH
Feldkirch, Austria

is found to comply with
DNV GL rules for classification – Ships

Application :

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

Location classes:

Temperature	B, D only for cold climate modules
Humidity	B
Vibration	B
EMC	A, B-with minimum 2x1.8 mH Common Mode Filters
Enclosure	Required protection according to DNV Rules shall be provided upon installation on board

This Certificate is valid until **2021-06-21**.

Issued at **Hamburg** on **2016-06-22**

DNV GL local station: **Augsburg**

Approval Engineer: **Dariusz Lesniewski**

for **DNV GL**

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Duy Nam Le
Head of Section

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.

Product description

The following components of the M1 – Controller system are covered:

AI2xx/xx	Analog input module	Max 8 Inputs
AIC2xx	Condition monitoring module	12 analog Inputs
AIO2xx	Analog I/O module	Up to 16 Inputs/Outputs (galvanic isolation)
AIO2xx/SI	Analog I/O module	Up to 8 Inputs/Outputs (galvanic isolation)
AO2xx/xx	Analog output module	Max 8 Outputs
BS2xx/x	Backplane with different slot(s)	Max 16 slots
CF200/xxxx	Compact flash card	64MB to 4 GB
CFA200/x	CFast Card	4 GB to 16 GB
CM202	CAN-Bus module (Master)	2 ports
CS200/x	CAN-Bus module (slave)	2 ports optional with power supply
CNT204/x	Counter module	Max 4 ports
DA3284C	CAN-Bus module (analog/digital I/O)	Several analog and digital I/O ports
DI2XX/xxx	Digital input module	Max 32 Inputs
DIO2xx/x	Digital input/output module	Max 80 in/outputs
DIOxx-C	CAN-Bus module (digital I/O)	Max 48 in/outputs
DIOxxx-C	CAN-Bus module (digital I/O)	Max 64 in/outputs
DNM201	DeviceNet master fieldbus	Master module
DO2xx/xx	Digital output module	Max 32 outputs
DOR206/xxx	Digital relay output module	6 outputs from 24VDC to 230VAC
DPM200	Profibus module	Profibus Master
EM2xx	Ethernet master module	3 external ETH ports
FCS214/x	Fiber copper switch	4 copper ports and 1 fiber port
FM2xx	Fastbus master module	Multimode and HCS possible
FS2xx/x	Fastbus slave module	Multimode and HCS possible
GIO212	General I/O module	12 Inputs/Outputs
GM260	Grid measurement module	
GMP232/x	Grid measurement protection module	3 analog inputs and 2 relay outputs
GSP274	Grid measurement, synchronisation and protection module	
ISI2xx/x	Encoder interface module	2 analog, 2 init and 2 trig ports optinal
LM201,LM20,S201	Dummy module	Dummy module
MC205	CPU module	Max 600 MHz
MC210	CPU module	Max 1.6 GHz
ME203/xxx	CPU module	Max 33MHz clock rate
MH212/x	CPU module	Max 2x1,2GHz clock rate
MPC2xx/x	CPU module	Max 933MHz clock rate
MPE2xx/x	CPU module	Max 700MHz clock rate
MX2xx/x	CPU module	Max 433MHz clock rate
NT2xx	Power supply 24/48VDC	24VDC and 48VDC possible
PCC20x/xx	PC-Card	Max 64MB
PN23	Profinet module	3 profinet ports
PTAI216	Temperature recording module	16 analog inputs
TCO2xx-C	Temperature recording module	Max 16 inputs and 24 outputs
TI214/x	Temperature recording module	Possible types:Pt100/1000, J,K,N,S
PVA202/PVA204	Proportional valve amplifier	2 coils / 4 coils

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PVA206/PVA208	Proportional valve amplifier	6 coils / 8 coils
RS204/x	Interface module RS232,422,485,TTY	4 data ports
SDI208	Safety digital input module	16 Inputs – can be used redundantly in pairs
SDO204	Safety digital output module	8 outputs – can be used redundantly in pairs
SWI205/x	Ethernet-Switch	5 ETH ports
SLC284	Safety logic controller	16 inputs can be used redundantly in pairs 8 outputs can be used redundantly in pairs
SCT202	Safety counter module	

Cold Weather option for all CPU Modules possible marked by /W

Cold Climate modules marked by CC and/or ❄.

The equipment fulfils the EMC requirements for installation on bridge or deck zone with EMI filter (min 2x1.8mH, e. g. Phoenix Contact NEF 1-10-2788977)

Software (firmware) version: M-Base V. 3.xx, M-Base V. 4.xx

Application/Limitation

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

Product certificate

Each delivery of the application system is to be certified according to Pt.4 Ch.9 Sec.1. The certification test is to be performed at the manufacturer of the application system according to an approved test program before the system is shipped to the yard. After the certification the clause for application software control will be put into force.

Clause for application software control

All changes in software are to be recorded as long as the system is in use on board. The records of all changes are to be forwarded to DNV GL for evaluation and approval. Major changes in the software are to be approved before being installed in the computer

Type Approval documentation

Bachmann Electronic's project MARINE 003, project No. 10992, dated 22.07.2009, including the following reports:

- EMC-Test Report No. 453-1109, dated 09.11.2009
- EMC-Test Report No. 403-0109, dated 29.01.2009
- EMC-Test Report No. 424-0308, dated 11.03.2008

Bachmann Electronic's project MARINE 004, project No. 12482, dated august 2011, including the following reports:

- Test configuration.pdf, rev.01, dated 03.08.2011
- Power supply failure.pdf, rev.00, dated 16.05.2011
- Dry heat.pdf, ref.00, dated 18.07.2011
- Damp heat.pdf, rev.00, dated 18.07.2011
- Vibration: Test Report No.71386807, dated 04.08.2011
- Insulation resistance.pdf, rev.00, dated 25.07.2011
- High voltage.pdf, rev.00, dated 25.07.2011
- (Burst-Fast transit, Surge-Voltage), rev.00, dated 05.05.2011
- Electromagnetic fields (Radiated/conducted emission) Test Report No. 14312-03974-1, rev.1, dated 28.07.2011
- Flammability, rev.00, dated 06.05.2011
- Compass safe distance, rev.00, dated 19.08.2011

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Bachmann Electronic `s project MARINE 005, Document Dossier MARINE005
Bachmann Electronic `s project MARINE 006, Document Dossier MARINE006

Retention survey report No. A-11743/11744, dated 12.07.2011
Type Approval Assessment Report issued at Augsburg on 2016-04-19

Tests carried out

Applicable tests according to Class Guideline, DNVGL-CG-0339

Marking of product

Each product shall be provided with visible marking, giving at least the following information:

- Manufacturer's name
- Type designation

Periodical assessment

The scope of the retention/renewal survey 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 survey 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.

Retention survey is to be performed at renewal of this certificate and at least once in the period of validity of the certificate.

END OF CERTIFICATE