TYPE APPROVAL CERTIFICATE

Certificate No:
TAA00000N2
Revision No:
2

This is to certify:

That the Control and Monitoring System

with type designation(s)
G-DATA/ Mega-Guard/ Maxi-Guard

Issued to
Praxis Automation Technology B.V.
Leiderdorp, Zuid-Holland, **Netherlands**

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.

Location classes:

Temperature	**B /D see Application / Limitation.**
Humidity	**B**
Vibration	**A**
EMC	**B**
Enclosure	**Required protection according to the Rules to be provided upon installation on board.**

Issued at **Høvik** on **2021-10-29**

This Certificate is valid until **2023-09-18**.
DNV local station: **Netherlands CMC**

Approval Engineer: **Sergey Gilmiyarov**

for **DNV**
Digitally Signed By: Sneen, Ståle
Location: DNV Høvik, Norway
on behalf of

Jan Tore Grimsrud
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

G-DATA/ Mega-Guard/ Maxi-Guard Control and Monitoring System, consisting of:

1. Operator Work Station (OWS) comprises the following components:
   - Model 6001 Marine Personal Computer; including redundant network i/f (98.6.001.7xx.x)
   - Model 6001 Marine Personal Computer; including redundant network i/f (98.6.001.8xx)
   - 8-port NMEA interface (98.6.040.804) (temp. class D)
   - Panel PC 10” (98.6.022.84X.X) (temp. class D)
   - Panel PC 17” (98.6.022.87X.X) (temp. class D)
   - Panel PC 19” (98.6.022.82X.X) (temp. class D)
   - Panel PC 22” (98.6.022.88X.X) (temp. class D)
   - Panel PC 26” (98.6.022.89X.X) (temp. class D)
   - TFT colour Graphic screen (98.6.02x.6xxx)
   - Operator Keyboard (93.6.02x.00x)
   - Engineering Keyboard (76.0.200)
   - Keyboard/Tracker ball (93.6.02x.x0x)
   - Tracker ball controller (98.6.022.632) (temp. class D)
   - Ethernet HUB/Router (76.0.81x)
   - Ethernet switch 24-port (76.0.84x)
   - Ethernet switch 8-port (76.0.85x)
   - Ethernet switch 8-port (98.6.040.802) (temp. class D, compass safe dist. 41cm)
   - Ethernet switch 18-port (98.6.040.803) (temp. class D, compass safe dist. 32cm)
   - DIN module media converter RJ45/Fiber ST (98.6.040.806) (temp. class D)
   - 6010 Fieldbus Driver Board (98.6.010.7xx)
   - 8-port NMEA Interface (98.6.040.804)

   The OWS is intended used for control and graphic presentation of the below typical applications, subject to product certification:
   - Alarm, control and monitoring
   - Electrical power management
   - Main engine control
   - Pump and valve control
   - Duty alarm system
   - Patrol alarm system
   - PID control
   - Graphic presentation of ship’s data
   - Dynamic positioning (Note 1)

2. Extension Alarm System (EAS) for the remote alarm indication consisting of:
   - Local Operator Panel (98.6.02x.6xx)
   - Local Operator Panel (93.0.96x)
   - TFT 5.7” Touch Operator Panel (93.0.98x)
   - 3 / 8 Channel LED Panel (93.0.31x)
   - Fire Alarm Panel (98.6.021.60x)
   - Watch Entrance Unit (93.0.35x, 93.0.36x and 93.0.37x)
   - Reset Box (type 93.0.35x)
   - Bedroom Buzzer (93.0.35x and 93.0.36x)

3. Process Control Units (PCU/DPU) Maxi-Guard/Mega-Guard DIN Rail Model (also called SAU) for processing of inputs, outputs, alarms and control loops, consisting of:
   - Model 6030, 12 x Digital input / 8/12 x Digital output, DIN rail model (98.6.030.7xx)
   - Model 6030, 18 x Digital input / 18 x Digital output, DIN rail model (98.6.030.8xx)
   - Model 6032, 24 x Digital Input unit, DIN rail model (98.6.032.7xx)
   - Model 6032, 36 x Digital Input unit, DIN rail model (98.6.032.8xx)
   - Model 6034, 16 x Analog input /mixed input output, DIN rail model (98.6.034.7xx)
   - Model 6034, 24x Analog input /mixed input output, DIN rail model (98.6.034.8xx)
   - Model 6049, Control Processor with redundant network i/f, DIN rail model (98.6.049.7xx)
   - Model 6049, Control Processor redundant network i/f, DIN rail model (98.6.049.8xx)
   - Display Panel (98.6.02x.6xx)
   - Serial Interface Converter (91.6.040.40x)
   - Serial Interface Converter (91.6.040.80x)
   - USB to NMEA Interface (98.6.040.80x) (temperature class D)

- Sensor Supply Module (98.6.010.7xx)
- Alarm Panel 16 Ch. (93.0.92x)
- Window Wiper Panel (93.0.95x)
- Window Wiper I/O Module (98.6.030.80x)
- LCD Operator Panel (93.0.96x.x)
- Navigation Lights Panel (type 93.0.93x)
- DIN I/O-module 24ssdo(nav.lights bulb/LED) (98.6.030.804)
- 5,7" TFT Operator Panel (93.0.980/981) (temp. class D)
- HCS Operator Control Panel (93.0.99X)
- DP Thruster Controller (type 98.6.049.801)

4. Bridge Manoeuvring system (BMS/PCS) consisting of:
   - All models mentioned under PCU
   - Bridge/Control Room control Lever and Telegraph Panel (98.6.02x.62x)
   - BMS Telegraph Panel (98.6.02x.62x)
   - Bridge Order Printer Panel (98.6.02x.63x)
   - Telegraph and Safety Panel (98.6.02x.63x)
   - Governor Panel (98.6.02x.60x)
   - Emergency Stop DIN Module (98.6.034.7xx)
   - Electronic Drive Unit (98.6.010.7xx)
   - Electronic Actuator (98.0.3xx)
   - 7" TFT Operator Panel (98.6.02x.6xx)
   - 5,7" TFT Operator Panel (93.0.980/981) (temp. class D)
   - 8" TFT Operator Panel (98.6.02x.64x) (temperature class D)
   - BMS Indication/Command Panel (98.6.02x.62x)
   - BMS Command Panel (98.6.02x.64x)
   - BMS Indication Module (98.6.034.7xx)
   - PCS Control lever (98.6.022.621x) (temperature class D)
   - Control lever (98.6.022.623x) (temp. class D, compass safe dist. 43cm)
   - Joystick controller (98.6.022.631) (temp. class D)
   - PCS Azimuth control lever (98.6.022.622x) (temp. class D)
   - Azimuth control lever (98.6.022.624x) (temp. class D, compass safe dist. 53cm)
   - Joystick controller (98.6.022.631)

5. UPS module comprising of:
   - UPS input module (93.4.504/505) (temp. class D, compass safe dis. 23cm)
   - UPS distribution module (93.4.503) (temp. class D, compass safe dist. 28cm)

6. AHS: Anti Heeling System (AHS) comprising of:
   - All models mentioned under OWS
   - All modules referenced under PCU
   - Inclinometer (98.0.23x)

7. PMS: Power Management System comprising of:
   - All models referenced under PCU
   - PMS input/output module, DIN rail module (98.6.034.7xx)
   - PMS input/output module, DIN rail module (98.6.034.8xx)
   - Local operator panel as referenced under EAS
   - 7” TFT operator panel as referenced under BMS/PCS
   - 8" TFT Operator Panel (98.6.02x.64x) (temperature class D)

   The PMS is intended used for the below power management functions, subject to product certification:
   - Standby start
   - Synchronizing
   - Preferential trip
   - Overload trip
   - Reverse Power trip
   - Low/High Frequency trip
   - Low/High Voltage trip
   - Load sharing
   - Low load stop
   - Manual start/stop

– Safety system

8. BNWAS: Bridge Navigational Warning & Alarm System comprising of:
   - Local Operator Panel (98.6.02x.6xx and 93.0.96x)
   - TFT 5.7" Touch Operator Panel (93.0.98x)
   - DIN IO-Module BNWAS (98.6.030.805)

   Any protection functions are to be implemented in dedicated units for each equipment being protected and which are independent of corresponding control/alarm functions.

9. Basic software/firmware:

Device	Pro-series	E-series	Description
MPC	CAMMAN.EXE (rev.4.xx, 5.xx) MEGA-GUARD.EXE (rev.6.xx)	MEGA-GUARD (rev.6.xx)	Marine Personal Computer, data collection, central visualization and HMI
XP, TCP	60XX_xxx.HEX (rev.1.xx, 2.xx, 3.xx, 4.xx)	app-xxx; loader-xxx (rev2.x)	Data processing
Local Operator Panel /LCD Panel	LOP_xxx.HEX (rev. 1.xx)	app-xxx; loader-xxx (rev2.x)	Data processing, Local data visualization and local HMI
Functional keyboard	Functional keyboard (rev. 2.xx, 3.xx)	Functional keyboard (rev. 2.xx, 3.xx)	Dedicated (limited) operator keyboard
I/O Modules (DIN, DIN/DOUT, AIN, MIXED)	-	IO Module (rev. 2.x)	Data acquisition
Stand-alone Panels		PANEL (rev.1.x)	Stand-alone panels (Alarm Panel and Window Wiper) data processing and visualization

Application/Limitation

The type approval covers hardware and basic software/firmware listed above.

Software update notification

When the type approved software is revised (affecting all future deliveries) DNV is to be informed by forwarding updated software version documentation. If the changes are judged to affect functionality for which rule requirements apply a new functional type test may be required and the certificate may have to be renewed to identify the new software version.

Note 1: Application software for dynamic positioning is not included in this type approval certificate.

EMC in the range 2 GHz to 6 GHz according to DNV-CG-0339, August 2021 has not been documented. EMC up to 6 GHz must additionally be documented for installation on ships contracted for construction on or after 2022-01-01.

Plan approval

The following documentation is to be submitted for approval for each application

– Reference to this type approval certificate
– System block diagram/topology drawing
– Power supply arrangement (may be part of the block diagram)
– Functional description of application software
– List of controlled and monitored points including data transferred on communication links/network
– Functional failure analysis of integrated system including network (applies to deliveries required to comply with DNV GL rules issued January 2016 and later)
– Test program for manufacturing survey

Product certification

Each delivery of the application system is to be certified according to DNV rules Pt.4 Ch.9 Sec.1. The certification test shall be performed at the manufacturer of the application system before the system is shipped to the yard. After certification all changes are to be managed and recorded in accordance with DNV rules Pt.4 Ch.9 and Pt.7 Ch.1.

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 major changes are to be forwarded to DNV for evaluation and approval. Major changes in the software are to be approved before being installed in the computer. A Certification of Application Functions may be required for the particular vessel.

The following devices are tested to temperature location class D:

- Marine PC, Compass max safe distance 56 cm
- Control Processor E-series 4xLAN, Compass max safe distance 44 cm
- HCS Operator Control Panel, Compass max safe distance 50 cm
- DIN IO-module (nav.lights bulb-LED), Compass max safe distance 46 cm
- TFT 5.7 Touch Operator Panel, Compass max safe distance 24 cm

Type Approval documentation

Test report from IWECO 5166053-88-1 dated November 1988.
Functional Specification Version 2.2 page 1-42.
Drawing NP873720, NP873740, S6001, S60035, S6003D, S6004B, S6005C, S6007C, S6008B, Flow Diagram FDA, -DDBS.

At renewal/extension 2002: Ring binders “G-Data, Maxi/Mega-Guard / Control, Monitoring & Alarm System Project Binder vol 1-3” containing:

Vol.1:

1. Letter to DNV
2. Company profile
3. Colour Brochures G-Data, Maxi-Guard, Mega-Guard
4. Test specification: Env. Test Report, Type Approval Test
5. TA certificate copies
6. Software History Rev. list Rev. 1.8, dated 02-09-18
7. Reference List

Vol.2:

1. Maxi-Guard Operator Work Station/ Extension Alarm System/ Operator Guide
2. Mega-Guard Operator Work Station/ Extension Alarm System/ Operator Guide
3. Mega-Guard Process Control Unit/ Operator Guide
4. Mega-Guard Power Management System/ Operator Guide
5. Mega-Guard Propulsion Control System (for 2-stroke engines) Operator Guide

Vol.3:

1. KEMA test report 93130-KRQ/EMC 99-4334 (EN45001)
2. Test Forms G-MOWS/G-CAM
3. Test Forms G-ELPA
4. Test Forms G-EGOV
5. Test Forms G-PROP
6. Notes to the CISPR16 (EMC) tests for LOP and Electronic Actuator

Software Revision History List Rev.1.10 dated 2004-10-19.
Software Revision List_Rev1 20.doc. Dated 2007-01-26. (Electronic file in 262.1-002808)
Certification Retention Survey Report; DNV Id. No.: ROT 07.2477.1. Dated: 2007-01-15. DNV Rotterdam

At renewal/extension 2009: Ring binders “G-Data, Maxi/Mega-Guard / Control, Monitoring & Alarm System Project Binder vol 1-4” containing:

Vol.1:

1. Company Profile
2. Product Overview
3. Type Approval Certificates
4. Software Revision List
5. Reference list
6. Operator Guide Mega-Guard Operator Work Station
7. Operator Guide Maxi-Guard Operator Work Station
8. Operator Guide Mega-Guard Process Control Unit (DPU/SAU)
9. Operator Guide Mega-Guard Process Control Unit (DPU/SAU)

Vol.2:

1. Operator Guide Bridge Manoeuvring System
2. Operator Guide Power Management System
3. Operator Guide ARPA
4. Operator Guide ECDIS

Vol.3:

1. Operator Guide Dynamic Positioning
2. Test Reports

Vol.4:

1. Test Reports
2. Front Sheets Binders
3. Proposal Text TA Certificate

DNV Rotterdam Certificate retention survey report for A-10266, dated: 2009-04-03
Software Revison List_Rev1.21.doc. Dated 2008-01-25.

At renewal/extension 2011:

1. Environmental test report ship automation system from Praxis, rev.1.2, dated 21-jun.2011
2. Vibration tests on a control processor module accoridng to the test standard IEC 60068-2-6:2007 from Sebert Trillingstechniiek B.V, report M11.001-2011.7016, rev.01 dated 8-apr-2011.
3. Climate tests on a control processor module according to the test standard GL and Lloyds from Sebert Trillingstechniek B.V, report M11.002-2011.7063, dated 16-may-2011.
4. Report EN61000-4-3 and EN61000-4-6 from BICON, report id PRA-20091214-X1 dated 2010-04-01.
5. Report IEC60945:2002 [Radiated emission] from BICON, report id PRA-20110411-X1, dated 2011-05-02.
6. Report IEC60945:2002 [Radiated emission] EN61000-4-3 and EN61000-4-6 from BICON, report id PRA-20110411-X2, dated 2011-04-28.
7. Mega Guard EMC tests report from Praxis, rev.1.0, dated 21-jun-2011
8. Mega Guard Dry heat test report from Praxis, rev.1.0, dated 08-jun-2011
9. Mega Guard Low temperature test report from Praxis, rev.1.0, dated 21-jun-2011
10. Renewal survey report dated 13-apr-2011.
11. Software Revison List_Rev1.22.doc. Dated 2009-08-26.
12. Software Revison List_Rev1.23.doc. Dated 2011-11-24.

At renewal/extension in 2014:

1. Environmental Test Report Ship Automation System Rev.1.2 dated August 19. 2013
2. Environmental Test Report Ship Automation System Rev.1.3 dated November 14. 2013
3. Compiled EMC test report for 8.4” TFT monitor (emc 84 tft.pdf)
4. Compiled EMC test report for NMEA to USB interface (emc nmea usb.pdf)
5. Compiled EMC test report for PCS control lever (emc pcs.pdf)
6. Compiled EMC test report for Azimuth control lever (emc azimuth.pdf)
7. Detailed Software Description List to Certificate Number A-12560 dated 1. September 2013
8. DNV Rotterdam Certificate retention survey report for A-12560, dated: 2013-11-19

At renewal/extension in 2016:

1. Test program: Environmental test report Rev.1.2 dated December 4. 2015
2. Test report Power supply failure and power supply variation Rev. 1.2 dated November 29. 2016
3. Test report vibration M15.001-P15.001 Rev.01 dated 26. November 2015
4. Test report vibration M16.002-P16.001, dated 31. March 2016
5. Test report damp heat Rev.1.0 dated February 26. 2016
6. Test report dry heat Rev.1.1 dated December 4. 2015
7. Test report low temperature Rev.1.0 dated February 22. 2016
8. Test report EMC Rev. 1.2 dated February 26. 2016
9. Test report EMC, Bicon PRA-20151120-X1-01-EMC, dated 2016-03-15
10. Test report acoustic noise 5,7” TFT, Bicon PRA-20151120-X1-01-ANS, dated March 15. 2016
11. Test report compass safe distance control lever, Bicon PRA-20151120-X1-01CSD dated March 15. 2016
12. Test report compass safe distance 18-port switch, Bicon PRA-20151120-X1-08-CSD dated March 15. 2016
13. Test report Power supply failure and power supply variation Rev. 1.1 dated November 29. 2016
14. Test report vibration M16.001-P16.001 dated 31. March 2016
15. Test report damp heat Rev.1.0 dated April 28. 2016
16. Test report dry heat Rev.1.1 dated April 28. 2016
17. Test report low temperature Rev.1.0 dated April 26. 2016
18. Test report EMC Rev. 1.1 dated April 28. 2016

19. Test report EMC, Bicon PRA-20160415-X1, dated 2016-05-03

At renewal/extension in 2019:

01 - Test reports 5.1 - Marine PC V2
02 - Test reports 5.2 - Control Processor E-series 4xLAN V2
03 - Test reports 5.3 - HCS Operator Control Panel V2
04 - Test reports 5.4 - DIN IO-module (nav.lights bulb-LED) V2
05 - Test reports 5.5 - TFT 5.7 Touch Operator Panel V2
06 - Type Approval Power Failure and Variation Test Report - 2018 - R1.00
07 - Type Approval Damp Heat Test Report - 2018 - R1.00
08 - Type Approval Dry Heat Test Report - 2018 - R1.00
09 - Type Approval Low Temp Test Report - 2018 - R1.00
10 - Type Approval EMC Test Report - 2018 - R1.00
11 - M18.001-P18.001 Praxis Automation Report (vibr)
12 - BICON Report PRA-20180824-X1-EMC
13 - BICON Report PRA-20180824-X1-01-ANS
14 - BICON Report PRA-20180824-X1-01-CSD
15 - BICON Report PRA-20180824-X1-02-ANS
16 - BICON Report PRA-20180824-X1-02-CSD
17 - BICON Report PRA-20180824-X1-03-CSD
18 - BICON Report PRA-20180824-X1-04-CSD
19 - BICON Report PRA-20180824-X1-05-CSD
20 - Type Approval Inclination Test Report - 2018 - R1.00
21 - Type Approval Visual & Performance Test Report - 2018 - R1.00
Type Approval Test Descriptions - 2018 - R1.10

DNV periodical assessment report for TAA00000N2 dated 2021-08-03

Tests carried out

- Applicable tests according to DNV standard for certification 2.4.
- Applicable tests according to DNVGL-CG-0339 (ed. Nov. 2016) – applies for components added to certificate after 2016.

Marking of product

Each component is marked/labelled with model number (indicated as “P/N”)

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 at least every second year and at renewal of this certificate.

END OF CERTIFICATE