



Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

Manufacturer	Team Italia Marine S.r.l.
Address	Via Einaudi 114/B, Fano (PU), 61032, Italy
Place of Production	System Ceramics SpA Via Ghiarola Vecchia, 73, Fiorano Modenese, Modena, 41042, Italy
Type	Programmable logic controller & I/O Modules
Description	Distributed I/O modules and CPU for monitoring and control systems
Trade Name	OM-XXX Series (See appendix)
Application	Marine, offshore and industrial applications for use in environmental categories ENV1 and ENV2 as defined in Lloyd's Register's Type Approval System, Test Specification Number 1 - 2013.
Specified Standard	Manufacturer's Specification.
Ratings	Power supply: +24V - 0.2A (18÷32V)
Additional Tests	Low Temperature test (0°C/2hrs)
Other Conditions	Final arrangements of the components in dedicated systems are to be in compliance with applicable Lloyd's Register Rules and Regulations and are

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Type Approval Certificate

subject to the Lloyd's Register Plan Approval Process. Type Approval of Products according to Test Specification No. 1 is essentially Type Approval of hardware. Examination of software aspects is restricted to functional operation as demonstrated in the Performance Test.

This certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register EMEA of any modification or changes to the equipment in order to obtain a valid Certificate.

Previous Version: 15/00076

The Design Appraisal Document LR23232468DA and its supplementary Type Approval Terms and Conditions form part of this Certificate.

APPENDIX to Certificate no. LR23232468TA

Model:	Main Features:
OM-110B	8 ch. PNP/NPN opto-isolated digital inputs 8 ch. 24Vdc – 0.5A PNP digital outputs, short-circuit protected. Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-115B	Specific firmware for handling switching of up to 8 cabins lights, push-buttons input, step by step relay output. 8 ch. NPN PNP digital inputs and 8 ch. 24Vdc 0.5A PNP output Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-120B	16 ch. 24Vdc PNP/NPN opto-isolated configurable digital inputs 16 ch. 24Vdc PNP digital outputs, short-circuit protected Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-125B	Feature 16 ch. NPN / PNP selectable opto-isolated digital inputs and 16ch. PNP digital outputs short-circuit protected with max. output 3A. Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-125B-WB01	Feature 16 ch. PNPO digital inputs, 16 ch. PNP digital outputs Equipped with a special version of firmware, featuring the watchdog functionality when used in conjunction with OM-320B-NL01 – Navigation Controller. Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface.
OM-130B	16 ch. 24Vdc PNP opto-isolated digital inputs with diodes against reverse current Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-135B	16 ch. 24Vdc PNP opto-isolated digital inputs with diodes against reverse current 16 ch. 24Vdc – 0.5A PNP digital outputs, short-circuit protected. Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-140B	16 ch. 24Vdc NPN opto-isolated digital inputs with diodes against reverse current Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-145B	16 ch. 24Vdc NPN opto-isolated digital inputs with diodes against reverse current 16 ch. 24Vdc – 0.5A NPN digital outputs, short-circuit protected. Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-145B-AL01	Remote I/O module featuring ISA-1 alarm sequence 16 ch. NPN opto-isolated digital inputs 16 ch. PNP digital outputs protected against short-circuit Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM.150B	16 ch. 24Vdc 0.5A PNP digital output, short-circuit protected Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-160B	16 ch. 24Vdc 1.0A dry contacts, three groups of independent relays Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-170B	16 ch. 230Vac opto-isolated digital inputs Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-210B	8 ch. Programmable differential inputs including digital filter: 4-20mA, 0-200mA, 0-40V. 2 ch. 0-40V frequency input: 2.5/3.5V switching threshold, bandwidth 6kHz res. 0.1Hz

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OM220B	4 ch. Programmable differential inputs, bandwidth 0 – 10Hz Thermocouple type; J (0-850°C), K (0-1200°C), T(0-450°C), R (0-1500°C), S (0-1700°C) Temperature resistors: PT100, PT200, PT500, PT1000, 0÷10kOhm Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-220B v.2018 *	4 ch. Differential analog inputs, individually programmed and interfaced with temperature sensor (T.C. T.R. PT100) Inputs: J, K, T, R and S thermocouples, 2 / 3 wires PT100, PT1000, 0÷10kOhm resistors 16bit conversion, 0÷10Hz bandwidth, resolution 0.1°C, Accuracy <0.2% FS. Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-230B	4 ch. Analog output channels, single or dual output signals: 0÷5V, 0÷10V, -5÷5V, -10÷10V 0,1 Ohm output impedance, 2mA output current. Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-230B v.2018 *	4 ch, analog output that can be used to control the devices by means of voltage modulated analog signals. Single or dual output signals 0÷5V, 0÷10V selectable via jumpers. Outputs: 0÷5V, 0÷10V, -5÷5V, -10÷10V, 0,1 Ohm output impedance, 2mA output current. Max. output frequency 1KHz, accuracy 1% FS. Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-240B v.2018 *	4 ch. Analog inputs and 4 ch. Analog outputs with same performance of OM-220B and OM-230B modules. Inputs: J, K, T, R and S thermocouples, 2 / 3 wires PT100 / PT1000, 0÷10kOhm resistors. Conversion 16bit, 0÷10Hz bandwidth, Resolution 0.1°C, Accuracy: 1% FS. Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-275B	4 ch. Software programmable outputs interfaced with 0÷10V or 4÷20mA analog devices
OM-320B	8 ch. 24Vdc, PNP outputs for switching 4, 8, 12, 16A loads Each channel is provided with thermal fuse, as a back-up protection Measuring of the current drained by the load, opening the circuit if the exceeds the threshold set. ON/OFF, overload and low current detection. Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-320 v.2018 *	8 ch. PNP outputs for switching 4, 8, 12, 16A loads, 8 ch. NPN / PNP digital inputs Measure the current consumption by load, opening the circuit if current exceeds the threshold set. ON/OFF, overload and low current detection. Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-320B-NL01	7 ch. Module for navigation light monitoring with 7 channels for driving LED or traditional lamps (60W max) and reading current consumption. Build-in fuse. The module can be operated locally in stand-alone mode. Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-320B-NL01 v.2018 *	Monitoring and control LED navigation lights The module learns the current consumption under normal operating condition giving an alarm whenever the current goes below a predefined threshold. 7 ch. Each of them can drive a LED or traditional navigation light (max. 60W). Built-in fuses providing independent protection. Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface

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OM-320B-DM01 v.2018 *	8 ch. Input NPN / PNP opto-isolated 8 Ch. Output (24V, max.16A), each can switch on/off and dim any PWM dimmable light (traditional or LED). The module can operate in stand-alone mode or integrated with monitoring system. Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-321C	Optional slave module, 32 ch. Additional I/O, 8+8ch. input opto-isolated NPN / PNP digital, 8+8 ch. output 24V 500mA. Full CAN2.0 A and B interfaces, CAN-Open / RS232 Interface
OM-405B	CANbus bridge, Ethernet 10/100Mbps port, CAN2.0 A and B interface, CAN-Open protocol, 2 RS232 / RS422 / RS485 serial ports
OM-410B	Computing module 120MHz microprocessor, x86 compatible, 24bits address space. Optional dry contact output network / CPU failure. Ethernet port 10/100Mbps – 2 Full CAN2.0 A and B interfaces, CAN-Open protocol, RS232 Interface.
OM-420B	Computing module 120MHz microprocessor, x86 compatible, 24bit address space. Optional dry contact output for network/CPU failure. 2 Ethernet ports 10/100Mbps, 2 Full CAN2.0 A and B interfaces, CAN-Open protocol, RS 232 Interface, 2 RS232 / RS422 /RS485 Serial ports, 1 Expansion slot for an additional RS232 or RS485 serial port.
OM-430B	Computing module 120MHz microprocessor, x86 compatible, 24bit address space. Optional dry contact output for network/CPU failure. 2 Ethernet ports 10/100Mbps, 2 Full CAN2.0 A and B interfaces, CAN-Open protocol, RS 232 Interface, 2 RS232 / RS422 /RS485 Serial ports, 1 Expansion slot for an additional RS232 or RS485 serial port.
OM-440B**	CPU main controller, 2Full CANbus 2.0 A and B ports, CAN-Open protocol, 2 Ethernet 10/100Mbps ports, RS232 serial port, 2 RS232 / RS422 / RS485 serial ports, expansion slot for an additional RS/232 or RS485 port. The module can interface with standard operator panel or a PC-based network via MODbus / TCP protocol
OM-450B	Serial CANbus bridge based on a powerful CPU designed to manage different communication protocols at a time. Featuring one full CAN2.0 A and B bus ports, Ethernet 10/100Mbps and two RS232 / RS422 / RS485 serial ports.
OM-961M	Master module: 12 CANbus slots, 4 connectors for redundant CANbus network Full interface with two OM-430B controllers and the double CANbus network, it handles the switchover between Master and backup controller, as well as primary and backup CANbus paths. Feature fail safe design, redundant power supply and several I/O channels for diagnostics purposes.



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OM-961S	Slave module: 8 CANbus slots, 4 connectors for redundant CANbus network. Used to handle the switchover between primary and secondary CANbus path at board or switchboard level. Feature fail safe design, redundant power supply and several I/O channels for diagnostics purposes.
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* CPU ARM Cortex M4, 144MHz, 32bit

** CPU ARM7 RISC Cortex A8, 500MHz, 32bit



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Certificate No:	LR23232468DA
Issue Date:	09/11/2023
Expiry Date:	08/11/2028
Reference:	PRJ11100411895

LLOYD'S REGISTER TYPE APPROVAL – DESIGN APPRAISAL DOCUMENT

Issue by: TRIESTE TECHNICAL SUPPORT OFFICE

Issued to: TEAM ITALIA MARINE S.R.L.

For: DISTRIBUTED I/O MODULES AND CPU FOR MONITORING AND CONTROL

Type: OM-XXX Series

The undernoted documents have been reviewed for compliance with the requirements of the Lloyd's Register Type Approval System Procedure TA14 Version 04 (Sep 2020) and this Design Appraisal Document forms part of the Certificate LR23232468TA.

APPROVAL DOCUMENTATION

Type Approval application checklist	09/12/2022
Request for Marine Services – Type Approval TAC2022/232a SQ349613	27/12/2022
Request for marine service TAC2022/232a SQ349613	24/04/2023
Production Quality Assessment – PRJ11100411895	27/06/2023
ISO 9001 :2015 – Onyx Marine Automation srl - Cert. No.18365/08/S	20/07/2020
ISO 9001 :2015 –System Ceramics SPA – Cert. No. 14887-2004-AQ-BOL-SINCERT	26/07/2023

TECHNICAL DOCUMENTATION

Onyx Marine Automation Datasheet OM-135B, OM-145B, OM-145B-AL01 Rev. 09	01/2013
Onyx Marine Automation Datasheet OM-320B-NL01 Rev.09	01/2013
Onyx Marine Automation Datasheet OM-405B Rev.09	01/2013
Onyx Marine Automation Datasheet OM-430B Rev.09	01/2013
Onyx Marine Automation Datasheet OM-961M, OM-961S, Rev. 09	01/2013
OM-145 Block Diagram	--
OM-320B Block diagram	--
OM-405 Block diagram	--
OM-430 Block Diagram	--
OM-961M-S Block Diagram	--
C128.MSC03 - Hardware Layout	11/05/2007
C128.MSC03 Rev.2 - Electronic modules OM-XXX Series Hardware Layout	20/02/2009
Onyx Marine Automation Datasheet OM-220B v.2018 Rev.13EN	09/2018
Onyx Marine Automation Datasheet OM-230B v.2018 Rev.13EN	09/2018
Onyx Marine Automation Datasheet OM-240B v.2018 Rev.13EN	09/2018
Onyx Marine Automation Datasheet OM-275B Rev.13EN	09/2018
Onyx Marine Automation Datasheet OM-320B v.2018 Rev.13EN	09/2018
Onyx Marine Automation Datasheet OM-320B-NL01 v.2018 Rev.13EN	09/2018
Onyx Marine Automation Datasheet OM-320B-DM01 v.2018 Rev.13EN	09/2018
Onyx Marine Automation Datasheet OM-321C Rev.13EN	09/2018
Onyx Marine Automation Datasheet OM-440B Rev.13EN	09/2018

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TEST REPORTS

E10 Test Program YR 2018 Electronic Modules Doc.N. C162.MSC22	-
TesLab Test Report no. 184082F	20/06/2018
TesLab Test Report no. 184083F	20/06/2018
TesLab Test Report no. 184082F	20/06/2018
TesLab Test Report no. 184084F	20/06/2018
TesLab Test Report no. 184081F	20/06/2018

Also all documentation listed on Design Appraisal Document associated with Type Approval Certificate No. C 15/00076.

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 Senior Specialist, Electrotechnical Systems
 Trieste Technical Support Office

Maurizio Crucil
 09 November 2023
 Maritime Operations
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Lloyd's Register EMEA

LR032.2022

Supplementary Type Approval Terms and Conditions

Type Approval certifies that a representative sample of the product(s) referred to herein has/have been found to meet the applicable design criteria for the use specified herein. It does not mean or imply approval for any other use, nor approval of any product(s) designed or manufactured otherwise than in strict conformity with the said representative sample.

Type Approval is based on the understanding that the manufacturer's recommendations and instructions and any relevant requirements of the Rules and Regulations are complied with.

Type Approval does not eliminate the need for normal inspection and survey procedures required by the Rules and Regulations.

Lloyd's Register EMEA reserves the right to cancel or withdraw this Type Approval Certificate in accordance with the Lloyd's Register Type Approval System Procedure.



CERTIFICATE NUMBER
EFFECTIVE DATE
EXPIRY DATE
ABS TECHNICAL OFFICE

23-2477539-PDA
30-Nov-2023
29-Nov-2028
Genoa Engineering Department

CERTIFICATE OF Product Design Assessment

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

TEAM ITALIA MARINE S.R.L.

located at

VIA L. EINAUDI NO.114/B, , FANO, PU, Italy, 61032

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: **Monitoring & Control Modules**

Model: **OM-xxxB Series**

Endorsements:

Tier: **2 - PDA Issued**

This Product Design Assessment (PDA) Certificate remains valid until 29/Nov/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

Giorgio Barbini

Giorgio Barbini, Engineer/Consultant

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010)

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Tier: 2 - PDA Issued

Product: Monitoring & Control Modules

Model: OM-xxxB Series

Endorsements:

Intended Service:

Shipboard Marine Distributed I/O Modules and CPU for Monitoring and Control Systems.

Description:

OM-110B (8 digital inputs + 8 digital outputs)
OM-115B (8 digital inputs + 8 digital outputs Lights controller)
OM-120B, OM-135B and OM-145B (16 digital inputs + 16 digital outputs)
OM-145B-AL01 (16 digital inputs + 16 digital outputs ISA-1 alarm sequence annunciator)
OM-130B and OM-140B (16 digital inputs)
OM-150B (16 digital outputs)
OM-160B (16 digital outputs)
OM-170B (16 digital inputs)
OM-210B (8 analog inputs)
OM-220B (4 analogue inputs)
OM-230B (8 analogue outputs)
OM-320B (8 power outputs)
OM-320B-NL01 (8 power outputs LED navigation lights controller)
OM-405B (Serial/CAN bridge module)
OM-410B and OM-420B (CPU main controller)
OM-430B (CPU main controller)
OM-961M (Dual CAN redundant controller, master)
OM-961S (Dual CAN redundant controller, slave)
OM-220B v.2018 (4 analog inputs I/O module, same as OM-280B without the output stage)
OM-230B v.2018 (4 analog outputs I/O module, same as OM-280B without the input stage)
OM-240B v.2018 (4 analog inputs + 4 analog outputs I/O module, same as OM-280B)
OM-275B (4 analog outputs I/O module)
OM-320B v.2018 (8 power outputs I/O module)
OM-320B-NL01 v.2018 (8 power outputs LED navigation lights controller)
OM-320B-DM01 v.2018 (8 power outputs Ambient lights controller)
OM-321C (16 digital inputs + 16 digital outputs)
OM-440B (CPU main controller)
Additional information is included in the attachment.

Rating:

Power supply: +24Vdc (18-32V)
Ambient Temperature Rating: + 5 °C to + 70 °C
RS232 Interface
DIN rail mount
Additional information is included in the attachment.

Service Restriction:

- Unit Certification is not required for this product.
- Tests and Approval are for hardware only.
- Each vessel installation is to be specifically approved through vessel specific drawings showing location, wiring, power supplies, etc. of all devices associated with the system.
- Modules and CPU can not be installed in enclosed spaces subject to generated heat from other equipment.
- No parts of the modules are to be accessed by the operator during the normal use.
- Unit certification for Software is required by the final user in accordance with 4-9-3/Table 2 of the Marine Vessels Rules. In particular the following tests are required in the presence of the attending Surveyor: Integration, Fault

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Tier: 2 - PDA Issued

Simulation, Factory Acceptance, On-board complete system, On-board integration, Software Version Record and Tests after modifications, if any.

- The scope of Type Approval is to comply with MSC.1/Circ.1221 dated 11 December 2006.

Comments:

The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.

Notes/Drawing/Documentation:

Drawing No. C162.MSC09.R05 Data Sheet Onyx Marine Automation - Technical Data OM-xxxB

Drawing No. Datasheet for OM-xxx Revision 13 dated Sept.2018

Drawing No. C122.04.TST01.R03 Test specification dated 30.06.2018

Drawing No. C162.MSC20.R02 Product reference table dated 12.11.2018

Drawing No. C128.MSC03.R02 Hardware Layout dated 20 February 2009

Drawing No. C162.MSC21.R01 Hardware layout dated 02.07.2018

Drawing No. C128.MSC01.R01 Test Program dated 20.08.2007

Drawing No. C162.MSC22.R02 Test program dated 09.11.2018

Drawing No. C000.USR02.R04 Installation Guide dated 18.05.2008

Drawing No. C162.MSC12.R01 Declaration Manufacturers Declaration with reference to EMI tests dated 18.07.2007

Drawing No. C162.MSC11.R01 Statement from System Electronics dated 14 August 2009

Test Report TesLab No. 27707A EMC for OM-120B dated 16.06.2007

Test Report TesLab No. R01-07 Environmental (without vibration) for OM-120B dated 01.03.2007

Test Report TesLab No. 092011A-2 Vibration for OM-160B dated 18.02.2009

Test Report TesLab No. 27707B EMC for OM-210B dated 16.06.2007

Test Report TesLab No. R02-07 Environmental (without vibration) for OM210-B dated 01.03.2007

Test Report TesLab No. 27707C EMC for OM-220B dated 16.06.2007

Test Report TesLab No. R03-07 Environmental (without vibration) for OM-220B dated 01.03.2007

Test Report TesLab No. 27707D EMC for OM-320B dated 16.06.2007

Test Report TesLab No. R04-07 Environmental (without vibration) for OM-320B dated 01.03.2007

Test Report TesLab No. 27707E EMC for OM-420B dated 16.06.2007

Test Report TesLab No. 092011A-1 Vibration for OM-420B dated 18.02.2009

Test Report TesLab No. R05-07 Environmental (without vibration) for OM-420B dated 01.03.2007

Test Report TesLab No. 29117 EMC Conducted radio frequency interferences for OM-120B, OM-210B, OM-220B, OM-320B and OM-410B dated 26.01.2009

Test Report TesLab No. 12A191F for OM-430B, OM-405B, OM-961S and OM-961M dated 07.12.2012

Test Report TesLab No. 184081F for OM-440B dated 20.06.2018

Test Report TesLab No. 184082F for OM-280B dated 20.06.2018

Test Report TesLab No. 184083F for OM-275B dated 20.06.2018

Test Report TesLab No. 184084F for OM-340B+OM-321B dated 20.06.2018

Terms of Validity:

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STANDARDS

ABS Rules:
2023 Rules for Conditions of Classification, 1-1-4/7.7, 1-1-A3, 1-1-A4, which covers the following:
2023 Marine Vessels Rules 4-9-9/13 (Table 1)
2023 Yachts 4-7-4/3.9 (4-7-2/Table 1)

National:
NA

International:
NA

Government:
NA

EUMED:
NA

OTHERS:
NA