中国船级社
CHINA CLASSIFICATION SOCIETY

证书编号/Certificate No.
HB22PTA00004_05

型式认可证书
CERTIFICATE OF TYPE APPROVAL

兹证明本证书所述制造厂具备按照下列标准的要求生产本证书所列产品的能力和条件。
This is to certify that the manufacturer stated in the certificate meets the requirements of the standards listed below and is available with the ability and conditions to produce the products described in the certificate.

品牌拥有方/ Licensor

Northrop Grumman Sperry Marine B.V.
Woltmanstrasse 19, D-20097 Hamburg, Germany

授权制造企业/Authorized Manufacturer

iXblue S.A.S
Rue Paul Sabatier, 22300 Lannion, France

产品名称/Product

光纤陀螺罗经
Fiber Optic Gyro-Compass

认可标准/Approval Standard

1. 1974年国际海上人命安全公约及其修正案第V章第18条
Regulations 18, Chapter V of International Convention for the Safety of Life at Sea, 1974, as Amended
2. 1974年国际海上人命安全公约及其修正案第V章第19条
Regulations 19, Chapter V of International Convention for the Safety of Life at Sea, 1974, as Amended
3. 1974年国际海上人命安全公约及其修正案第X章第3条
Regulations 3, Chapter X of International Convention for the Safety of Life at Sea, 1974, as Amended
4. 国际海事组织大会决议IMO A.424（XI）《陀螺罗经性能标准》
IMO A.424□XI□Performance Standards for Gyro-Compasses
5. 国际海事组织大会决议A.694(17)《作为全球海上遇险和安全系统（遇险和安全系统）组成部分的船载无线电设备和电子助航设备的一般要求》
IMO Resolution A.694(17) General Requirements for Shipborne Radio Equipment Forming Part of the Global Maritime Distress and Safety System (GMDSS) and for Electronic Navigational Aids
6. 国际海事组织大会决议A.821（19）《高速船电罗经性能标准》
IMO Resolution A.821(19) Performance Standards for Gyro-compasses for High-speed Craft
7. MSC.191(79)《船载助航显示航行相关信息显示的性能标准》
MSC.91(79) Performance standards for the presentation of navigation-related information on shipborne navigational displays
8. IMO MSC.302(87)《通过驾驶室警报管理性能标准》
IMO MSC.302 (87) Adoption of performance standards for Bridge Alert Management
9. 国际海事组织海安会决议MSC.36(63) 国际高速船安全规则(HSC规则)
IMO Resolution MSC.36(63) ADOPTION OF THE INTERNATIONAL CODE OF SAFETY FOR HIGH SPEED CRAFT
10. 国际海事组织海安会决议MSC.97(73)通过2000年《国际高速船安全规则》（2000年HSC规则）；
IMO Resolution MSC.97(73) ADOPTION OF THE INTERNATIONAL CODE OF SAFETY FOR HIGH-SPEED CRAFT, 2000 (2000 HSC Code)
11. 国际海事组织海安会决议MSC.1/Circ.1349高速船对国际海上人命安全公约第V章第18条到第20条和国际高速船安全规则第13章的符合性

证书有效期至/ This Certificate is valid until **2026年01月16日/ Jan. 16,2026**

发证机构 Issued by 中国船级社汉堡分社 CCS Hamburg Branch
签发日期 Date 2022年04月18日 Apr. 18,2022

IMO Resolution MSC.1/Circ.1349 HIGH-SPEED CRAFT (HSC) COMPLIANCE WITH THE PROVISIONS OF SOLAS REGULATIONS V/18 TO V/20 AND CHAPTER 13 OF THE 2000 HIGH-SPEED CRAFT CODE
12. IEC 60945:2002/COR1:2008《船用航行和无线电通信设备及系统-通用要求-试验方法和试验结果的要求》
IEC 60945:2002/COR1:2008 Maritime Navigation and Radiocommunication Equipment and Systems –General Requirements – Methods of Testing and Required Test Results
13. IEC 62288：2014《海上导航和无线电通信设备及系统--船载导航显示器上与导航相关的信息的表示法---一般要求、试验方法和要求的试验结果》
IEC 62288:2014 Maritime navigation and radiocommunication equipment and systems - Presentation of navigation-related information on shipborne navigational displays - General requirements, methods of testing and required test results
14. IEC 62923-1:2018 《海上导航和无线电通信设备和系统-桥楼警报管理-第1部分：操作和性能要求、测试方法和要求的测试结果》
IEC 62923-1:2018 Maritime navigation and radiocommunication equipment and systems - Bridge alert management - Part 1: Operational and performance requirements, methods of testing and required test results
15. IEC 62923-2:2018 《海上导航和无线电通信设备和系统-桥楼警报管理-第2部分：警报和集群标识符以及其他附加功能》
IEC 62923-2:2018 Maritime navigation and radiocommunication equipment and systems - Bridge alert management - Part 2: Alert and cluster identifiers and other additional features
16. ISO 8728:2014《船舶与海上技术 船用陀螺罗经》
ISO 8728:2014 Ships and Marine Technology -- Marine Gyro-Compasses
17. ISO 16328:2014 《船舶与海上技术 高速船用陀螺罗经》
ISO 16328:2014 Ships and marine technology — Gyro-compasses for high-speed craft

用于/Intended for

船舶与海上设施/Ships and Offshore Installations, 高速船舶/High speed ship,

产品明细/Product Description

光纤陀螺罗经/Fiber Optic Gyro-Compass(M0001)

名称/Name	属性（值）/Value	单位/Unit
型号/Type	NAVIGAT 2500, NAVGAT 3500	
电源/Power Source	see additional pages	

批准的图纸/Approved Drawings

图纸批准号/ Drawings Approval No.: NP20PPP02102

产品认可试验报告/ Approval Test Report

试验报告编号/ Test Report No.： see additional pages
试验报告日期/ Test Report Date：

认可后的产品检验方式/ Method of Product Inspection after Approval

认可后的产品检验由制造厂按本社批准的产品检验计划进行，本社在文件审核合格后颁发船用产品证书。
After approval, product inspection should be carried out by the Manufacturer in accordance with the product inspection scheme approved by the Society, and the Marine Product Certificate is issued by the Society upon satisfactory documents review.

认可保持条件/ Maintenance Requirements of Approval

1.型式认可后，如果产品及其重要零部件的设计、所用材料或制造方法有所改变，且影响到产品的主要特性、特征；或产品的性能指标有所更改，且超过认可的范围，则有关图纸和文件应经检验机构审批。并在检验机构认为必要时，经本社检验人员见证有关试验和进行检查，其结果应能证实仍符合认可条件。
After type approval, if there are changes to the design, materials used or manufacturing method of the product and important components and such changes affect major characteristics and properties of the product, or property indexes of the product are changed and exceed the scope of approval, related drawings and documents are to be examined and approved by the concerned survey office. Where deemed necessary by the survey office, the surveyor to the Society will go to witness relevant tests and conduct inspection and the results should be able to demonstrate compliance with the approval conditions.

2.工厂的质量管理体系应保持有效运行，并且与认可时一致。如果质量管理体系发生改变，应经原体系认证机构审核并报本社批准。
The quality management system of the factory shall be ensure effective operation, and shall be the same as the situation of approval. If there are any changes to the quality management system, auditing of the original certification organization for quality management system and the society's approval shall be obtained.
3.认可证书有效期内，如果出现可能导致本社取消认可的情况，工厂应及时采取有效的纠正措施。
Within the validity of the approval certificate, if cases occur that may cause the Society to withdraw the approval, the manufacturer should take corrective actions in a prompt and effective manner.
4.在认可证书有效期内，本社检验人员可在未经事先通知的情况下对工厂的产品制造过程进行审核，以验证产品的生产是否符合业经本社批准的图纸和文件。工厂应予以配合。
Within the validity of the approval certificate, the surveyor to the Society may pay unannounced audit to the manufacturing process of the product in order to confirm whether it is in compliance with the drawings and documents approved by the Society. The factory should provide an active cooperation and necessary for the surveyor.
5.型式认可A证书获得者应接受本社每年一次的定期审核，定期审核日为认可证书期满之日对应的每一周年日，检查工作应在周年日的前后三个月内进行。
Those who have obtained the certificate of type approval A should be subject to periodical audit every year. The date of periodical audit shall be each anniversary date which corresponds to the date of expiry of the relevant certificate and the periodical audit shall be done within a time span of three months before and after the annual surveillance date.
6.本认可证书的有效期与品牌拥有方和产品制造企业之间的授权协议保持一致，但不得超过4年。
The period of validity of this certificate is consistent with that of the agreement between the licensor and the manufacturer(s), but in no case it can over 4 years.
7.在本证书有效期间，品牌拥有方和产品制造企业之间的授权协议的失效将自动导致本证书的失效。
During the period of validity, this certificate will automatically be ineffective in case of the invalidity of the authorization agreement between the licensor and the manufacturer(s).

备注/Remarks

1. 本证书由原型式认可证书（No. HB20PTB00016）变更并换新。
This certificate is modified and renewed from the previous Type Approval Certificate No. HB20PTB00016.

2. 本社已审核了产品厂无石棉声明，但本社的审核不免除产品厂按照合同关系向订货方保证产品无石棉的责任。
The declaration of asbestos-free submitted by manufacturer has been reviewed by the Society. However, liability of the manufacturer to guarantee the products are asbestos-free to purchaser under contract will not be exempted.

3. The NAVIGAT are without in-built display. They should be installed on board associated with a gyro compass repeater compliant with IEC 61162 series, IEC 60945 and the relevant requirements of ISO 16328.

4. It is Northrop Grumman Sperry Marine B. V's responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

中国船级社汉堡分社
CCS Hamburg Branch
注：本证书含有附页，共1页
Note: The certificate is attached with additional 1 page(s)

Product Description

1. Description of the system

The NAVIGAT Gyrocompasses are based on Fiber-Optic Gyroscope (FOG). They are solid-state strap-down gyrocompasses and motion sensors. They are 6-axis motion sensors that output true heading, attitude, and motion data.

	NAVIGAT 2500	NAVIGAT 3500
Power supply	24VDC	24VDC
Degree of Protection of Enclosure	IP66	IP66
Operational Characteristics		
Operational Range	±85° latitude	±85° latitude
Max. roll angle	±180°	±180°
Max. pitch angle	±90°	±90°
Max. angular rates, all axes	±250°/sec	±250°/sec
Max acceleration, all axes	±49.05 m/sec²	±49.05 m/sec²
Max. velocity	80 knots	80 knots
Accuracies (under all operating conditions)		
Heading	0.23°secant latitude (RMS)	0.15°secant latitude (RMS)
Roll and pitch angles	0.5° (RMS)	0.1° (RMS)
Rate of turn	0.06°/minute	0.06°/minute
X and Y rates	n/a	0.06°/minute
Heave	n/a	0.1 m / 10% (whichever is higher)
Alignment		
Rough heading data availability time at sea (after realignment)	5 minutes	5 minutes
Reliable heading data availability time at sea (after realignment)	25 to 30 minutes (with 0.23° heading accuracy)	25 to 30 minutes (with 0.15° heading accuracy)
Roll and pitch settling time	5 minutes (0.1° RMRS)	5 minutes (0.1° RMRS)
Communication Interfaces		
User Input/Output	RS422, Binary Digital Interface	RS422, Binary Digital Interface
Software Versions		
Firmware DSP	FrmWDSP4_INS-v2_x_y; x_y >= 82_21	FrmWDSP4_INS-v2_x_y; x_y >= 82_21
Firmware CINT	FrmWCINT_INS-v5_x_y; x_y >= 73_36	FrmWCINT_INS-v5_x_y; x_y >= 73_36
Magnetic clearance		
To standard magnetic compass	0.30 m	0.30 m
To steering mangetic compass	0.20 m	0.20 m

2. Approval Test Report

no	Report No.	Date	Test Lab / Address
1	00002432-A	20190312	iXblue S.A.S / Rue Paul Sabatier, 22300 Lannion, France
2	00002694-A	20190417	
3	00013940-A	20191112	
4	00014088-B	20191127	
5	00015185-A	20200427	
6	R022-BNN-11-105462-1/A (01)	20120313	EMITECH Laboratory / ZA de l'Observatoire, 3 Avenue des Coudriers, 78180 Montigny-le-Bretonneux, France
7	R022-BNN-12-100980-1/A (00)	20120314	
8	RC-032-BNC-12-106052-1-A	20121214	
9	M120954	20120120	Laboratoire national de métrologie et d'essais, / 29 avenue Roger Hennequin, 78197 Trappes Cedex, France
10	P108956-DMSI/1	20130729	
11	163508-742654	20191115	LCIE / 33 Avenue du Général Leclerc, 92260 Fontenay-aux-Roses, France
12	REP/2012/031-rev-A	20120911	Laboratoire CEM GERAC PARIS Île de France / 3, avenue Jean d'Alembert, ZAC de Pissaloup, 78190 TRAPPES, France