



中国船级社
CHINA CLASSIFICATION SOCIETY

证书编号/Certificate No.
HB22PTA00004_01

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

Mikrolab GmbH
Dieter-Streng-Str. 1, 90766 Fuerth, Germany

产品名称/Product

电罗经和转向率信号输出系统
Electric Gyro-Compass and Rate of Turn Signal Output
电罗经
Electric 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,

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

本证书根据中国船级社规范和相关规定签发。所有证书页为一个整体，必须同时使用。纸质证书每页均须由本社盖章方为有效，电子证书含数字签名方为有效，本证书复印件无效。任何单位和个人均不应摘录或节选本证书的部分内容。有关方对所持证书的真实性有疑问时，可以向本社检验机构咨询。This Certificate is issued pursuant to the Rules of the Society and related regulation. All pages of the certificate are taken as a whole and are used simultaneously. No paper certificate page is valid without bearing the stamp of the Society, no electronic certificates is valid without the digital signature, and no copied form of the certificate is regarded as valid. Any part of the certificate is not to be extracted or abridged by any unit or individual in any form. Related parties who are doubted about the authenticity of the certificate may inquire of the Society or its offices.



Form No: T02.

联系方式/Contact Us, 见本社官方网站/See official web site of the Society (<http://www.ccs.org.cn>)

UTN:P022-78953812

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

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

国际航行海船/International sea-going ship, 国内航行海船/Domestic sea-going ship, 高速船舶/High speed ship

产品明细/Product Description**电罗经/Electric Gyro-Compass (M0001)**

名称/Name	属性(值)/Value	单位/Unit
型号/Type	CompassNet (Type 5026)	
艏向精度/Heading Accuracy	see additional pages	
系统组成/System Component	Data Distribution Unit (DDU), Converter and Amplifier Unit (CAU), NAVITWIN V Control and Display Unit (CDU), NAVIGAT 100 (Gyro-Compass), NAVIGAT 200 (Gyro-Compass), NAVIGAT 3000 (Fiber-Optic Sensor Unit),	
电源/Power Source	24 V DC, 2 loops	
外壳防护等级/Degree of Protection of Enclosure	IP 23 (DDU); IP 23 (CAU); IP 23 (frame mount)/IP45 (front side, console) (CDU); IP 23 (NAVIGAT 100); IP 23 (NAVIGAT 200); IP 23 (NAVIGAT 3000).	

批准的图纸/Approved Drawings

图纸批准号/ Drawings Approval No.: NP16A03215, NP17A00356

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. 在本证书有效期内，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. HB17T00052_01) 变更并换新。

This certificate is modified and renewed from the previous Type Approval Certificate No. HB17T00052_01.

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. CompassNet-System and Heading Management System NAVITWIN V description:

The CompassNet-System offers the possibility to connect other type approved Gyro-Compasses via CAU (Converter and Amplifier Unit) Type:5018 and CAB (Converter and Amplifier Board) Type:5018-5100. The Heading Management System NAVITWIN V is a central control and display device for multi-compass systems for the maritime navigation of vessels. (Data Distribution Unit type:5017; NAVITWIN V type:5019).

4. Application and limitation:

CompassNet and navigation data provided by the NAVIGAT 200 and/or the NAVIGAT 3000 are not allowed

to be used for the navigation of inland water vessels and river boats.
Installation to be performed according to the manufactures Operation, Installation and Service manual.

5. 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3页

Note: The certificate is attached with additional 3 page(s)

Product Description

1. Product Description

NAVIGAT 200 & NAVIGAT 100

Operational Characteristics	
Mean settling time	< 3h
Max. follow-up speed	100° /s
Freedom of roll and pitch with container Mod.10	±40°
Accuracies	
Heading resolution	0.1°
Sampling rate	≥50Hz
Linear mean settle point error	≤0.1° x secant latitude
Static heading error	≤0.1° x secant latitude
Dynamic heading error (range of operation within 70° S to 70° N latitude)	≤0.4° x secant latitude
Deviation after 3min. power interruption	≤2°
Rate of Turn resolution	≤0.5° /minute, ±5%
Rate of Turn damping	0 to 10 sec.

NAVIGAT 3000

Accuracies(under all operating conditions)	
Heading	≤0.4° secant latitude(RMS)
Roll and pitch angles	≤0.1° for angles ≤45° (95%)
Rate of turn	≤0.018° /minute
X and Y rates	≤0.4° /minute
Operational Characteristics	
Settling time/static alignment	≤210 seconds(Latitude≤45°)
Settling time/static alignment	≤10 minutes(Latitude≤78°)
Settling time/static at sea	≤30 minutes(Latitude≤78°)
Max. follow-up speed	100° /s

Components necessary for operation:

Designation	Main component	Type designation
NAVIGAT 200	Master compass	5026
	Gyrosphere	4911 or 5000 or 5000-AA(HSC)
	Container Mod.10/3 or Container Mod.10/4	4991-4000 5026-4000
NAVIGAT 100	Master compass	5026 -AA
	Gyrosphere	4911 or 5000 or 5000-AA(HSC)
	Container Mod.10/3 Or Container Mod.10/4	4991-4000 5026-4000
NAVIGAT 3000	Master compass	5021

The following units may be used:

Designation	Type designation
Converter and Amplifier Unit	5018
Converter and Amplifier Board	5018-5100
Data Distribution Unit	5017
DDU Processor Module	5017-2000
NAVITWIN V	5019
Steering repeater (console mounted)	5016AA
Steering repeater (console mounted)	4881
Steering repeater (console mounted)	4881AA
Steering repeater (console mounted)	5016AB
Steering repeater (console mounted)	4881AD
Repeater (bulkhead mounted)	5016AC
Repeater (bulkhead mounted)	4881AC
Repeater (bulkhead mounted)	4881AK
Bearing repeater	5016
Bearing repeater	4881AB
Bearing repeater	4881AM

Designation	Type designation
Bearing repeater stand	4622AB or 4622AC or 4622AD
Bearing repeater stand (Sperry)	1812783
Bearing repeater bracket	4890
Bearing repeater bracket (height adjustable)	4905
Terminal box	4884
Terminal box	4894
Rate-of-Turn Indicator (in housing with bracket)192mm	60402 Range +- 30°/min
Rate-of-Turn Indicator (console mounted) 192mm	60372 Range +- 30°/min
Rate-of-Turn Indicator (console mounted) 192mm	60421 Range +- 60°/min
Rate-of-Turn Indicator (console mounted) 192mm	60379 Range +- 90°/min
Rate-of-Turn Indicator (console mounted) 192mm	60380 Range +-300°/min
Rate-of-Turn Indicator (console mounted) 144mm	60368 Range +- 30°/min
Rate-of-Turn Indicator (console mounted) 144mm	60393 Range +- 60°/min
Rate-of-Turn Indicator (console mounted) 144mm	60369 Range +- 90°/min
Rate-of-Turn Indicator (console mounted) 144mm	60370 Range +-300°/min
Azimuth Device PV23	2535
Gyro Compass NAVITGAT X MK1	4914
Gyro Compass NAVITGAT X MK2	4991
Gyro Compass NAVITGAT 2100	4913
Gyro Compass NAVITGAT 2200	5023
Gyro Compass NAVITGAT 3000	5021
Compass Monitor NAVITWIN III	4923
Heading Management System NAVITWIN IV	4994
Voyage Data Printer(only in connection with NAVITWIN)	4805
Gyro Compass Control Unit	4926
Fluxgate Coil for Magnetic Compass	4863
Digital Tape Repeater	DTR600
Universal Digital Repeater (UDR)	4891
Multifunction Display NAVIDATA	4806 AC
Multifunction Display NAVIDATA	4806 AD
Multifunction Display NAVIDATA	4806 AE
Switch over box	4932
Splitter box	4936 or 4992
Optoisolator	55555
Power Supply	2568
Rate-of-Turn Indicator (console mounted) 96mm	60364 Range +- 30°/min
Rate-of-Turn Indicator (console mounted) 96mm	60366 Range +- 90°/min
Rate-of-Turn Indicator (console mounted) 96mm	60367 Range +- 300°/min

Software versions:

NAVIGAT 200	2.xxx
NAVIGAT 100	2.xxx
NAVIGAT 3000	10.xx
Converter and Amplifier Unit	2.xxx
Converter and Amplifier Board	2.xxx
Data Distribution Unit	2.xxx
DDU Processor Module	2.xxx
NAVITWIN V	2.xxx

Magnetic Clearance:

Magnetic Clearance	NAVIGAT 3000	NAVIGAT 100	NAVIGAT 200	CAU	CDU	DDU
To standard magnetic compass	0.75m	0.50m	0.50m	0.55m	0.45m	0.30m
To steering magnetic compass	0.50m	0.35m	0.35m	0.35m	0.35m	0.30m

2. Approval Test Report

no	Report No.	Date	Test Lab / Address
1.	5026-0141-26 C	2020-10-09	Northrop Grumman Sperry Marine B.V. / Woltmanstrasse 19, 200097 Hamburg, Germany
2.	5017-0141-03 rev B	2016-04-25	
3.	5026-0141-07 Rev B	2016-04-25	
4.	5026-0141-02 Rev B	2016-04-20	
5.	5026-0141-01 Rev A	2016-03-21	
6.	5017-0141-01_A1	2016-03-21	
7.	5019-0141-01 Rev B1	2016-04-05	
8.	5026-0141-04 Rev A	2016-03-21	
9.	5026-0141-05 Rev A	2016-03-16	
10.	5026-0141-03 Rev A	2016-04-12	
11.	5023-0141-02	2016-12-16	
12.	5026-0141-08	2017-04-26	
13.	5017-0141-17	2021-12-02	
14.	002-16	2016-04-12	Treo labor fuer umweltsimulation GmbH / Tempowerkring 19, 21079 Hamburg, Germany
15.	003-16	2016-02-09	
16.	16-042	2016-03-29	Bureau Veritas Consumer Products Services Germany GmbH / Thurn-und-Taxis-Strasse 18,D-90411 Nuernberg,Germany
17.	16-045	2016-03-29	
18.	EMCC-930106.1RE	2016-10-20	EMCCCons DR.RASEK GmbH Co.KG / Boelwiese 8,91320 Ebermannstadt,Germany
19.	146181-5000-546 A	2016-11-11	Northrop Grumman LITEF GmbH / Loerracher Strasse 18,79115 Freiburg,Germany
20.	146181-0000-546 B	2016-06-28	
21.	9049 15 48909 157	2016-03-02	Hein & Oetting Feinwerktechnik GmbH / Merkurring 86,22143 Hamburg-Germany