Certificate no.:
TAA00003RH

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Gyro-compass & repeaters

with type designation(s)
FLAGSHIP-15; FLAGSHIP-15A; FLAGSHIP-19 & FLAGSHIP-19A

issued to
Shanghai Flagship Marine Technology Co.,Ltd
Shanghai, **China**

is found to comply with
DNV rules for classification – Ships, offshore units, and high speed and light craft
SOLAS Consolidated Edition (2014)
IMO Resolution MSC.36(63) Adoption of the international code of safety for high-speed craft, 1994
IMO Resolution MSC.97(73) Adoption of the international code of safety for high-speed craft, 2000 (2000 HSC CODE)
MSC.191(79) Performance standards for presentation of navigation-related information on shipborne navigational displays
IMO Resolution MSC.302(87) Performance standards for Bridge Alert Management
Performance standards for gyro-compasses (IMO Res. A.424(XI))
IMO Res. 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
Performance standards for gyro-compasses for high-speed craft(IMO Res. A.821(19))

Application:

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

Issued at **Hamburg** on **2025-12-01**
This Certificate is valid until **2030-11-30**.
DNV local unit: **Shanghai**

for **DNV**

Approval Engineer: **Johannes Kindermann**

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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to USD 300 000.

Product description

Fiber-Optic Gyro-compass is a set of inertial equipment with Fiber Optic Gyroscope (FOG) as the core part. Through its own trial-axial FOG and trialaxial accelerometer, it can independently measure the ship's angular motion and linear motion information, making its own mathematics. The solution platform is stable on the geographic coordinate system, continuously provides the ship's course information to the outside, and has the ability to provide horizontal attitude information.

FOG Type	Name	Type	Weight	Dimension (mm)	Power Consumption
FLAGSHIP-15/15A	Main Compass	M15/15A	10kg	272×192×191	15W
FLAGSHIP-19/19A	Main Compass	M19/19A	3kg	138×113×89	8W
	Power Unit	FS-20P	5,6kg	302×259×150,3	50W-300W
	Control & Data Distribute Unit (DU)	FS-20D	4,5kg	322×255×130	10W-60W
	display and control unit (CU)	within DU	0,7kg	186×100×60	5W

There is a built - in display and control unit (CU) in the FS-20D, through which users can perform relevant configuration operations. The display and control unit can also be installed independently.
FS-20D supplies 3 inputs of compass messages，and it can select automatically or manually. 3 inputs can be fiber - optic gyro-compass, gyro-compass, magnetic compass, GPS compass, etc.
FS-20D supplies 5 groups outputs, 20 channels (to repeater, automatic pilot, ECDIS, radar, AIS, VDR, etc). The configuration of each channel is the same in same group, and different group can be configured independently.

Performance	**FLAGSHIP-15A**	**FLAGSHIP-15**	**FLAGSHIP-19A**	**FLAGSHIP-19**
Latitude range	0° to ±87.5°	0° to ±85°	0° to ±80°	0° to ±75°
Standard compass safe distance	50cm	50cm	40cm	40cm
Steering Compass safe distance	45cm	45cm	30cm	30cm
supplying power to FOG system condition only	≥65W	≥65W	≥50W	≥50W

Settling time (Mooring/Maritime)	10min / 30min	Heaving /Swing/Roll Accuracy	FLAGSHIP-15A: 5 cm / 5% (Max)
Heading Range	0° to 360°	Output interface	RS422，20 路
Roll Range	-180° to +180°	Output data frequency	Max 100Hz (Configurable)
Pitch Range	-90° to +90°	Output Protocol	IEC 61162-1/2 NMEA0183
ROT	± 0.1°/Min		
X. Y, Z angular rate dynamic range	0 to 600°/s	External auxiliary information input interface	RS422, GNSS (GGA VTG)
Acceleration dynamic range	±2g	Baud rate	4800 to 115200bps
Longitude range	180°E to 180°W	DC power Input Voltage	18V to 30V
Speed range	0 to 70kn	AC power Input	Voltage：100V to 240V
Vibration	IEC60945		Frequency:50 Hz /60 Hz'
Operation temperature	-10℃ to +55℃	Power	Out max of 150W for external devices, input power ≥300W
Storage temperature range	-30℃ to +70℃		
MTBF	30000h		

Application/Limitation

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV, 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 rules for classification of ships Pt.4 Ch.9 Control and monitoring systems.

Product certificate
If specified in the Rules, ref. Pt.4 Ch.9 Sec.1, the control and monitoring system in which the above listed hardware is used shall be delivered with a product certificate. For each such delivery the certification test is to be performed at the manufacturer of the application system before the system is shipped to the yard. The test shall be done according to an approved test program. After certification the clause for software control will be put into force.

Software control
All changes in software are to be recorded as long as the system is in use on board. Documentation of major changes is to be forwarded to DNV for evaluation and approval before implemented on board. Certification of modified functionality may be required for the particular vessel.

Type Approval documentation

Tests carried out

Environmental and EMC testing: IEC 60945 (2002) incl. Corrigendum 1 (2008)
- Interface testing: IEC 61162-1 (2024), IEC 61162-2 (2024)
- Presentation testing: IEC 62288 (2024)
- Bridge alert management testing: IEC 62923-1 (2018) and IEC 62923-2 (2018)
- Performance testing: ISO 8728 (2024) and ISO 16328 (2014)

Marking of product

According to IEC 60945, Sect.4.9:
The product to be marked with following information, where practicable:
- Identification of the manufacturer,
- Equipment type number or model identification under which it was type tested,
- Serial number of the unit,
- Compass safe distance.

Alternatively, the marking may be presented on a display at equipment start-up, and in case of fixed equipment compass safe distance may be given in the equipment manual.

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 A renewal assessment will be performed at renewal of the certificate.

Manufactured by:

Manufacturer: Shanghai Flagship Marine Technology Co.,Ltd
Place of manufacture: Room 101, Building 16, No. 218, Haiji No. 6 Rd., Pudong New District, Shanghai, P.R.China