NORTHROP GRUMMAN

NAVIGAT X MK 1

Microprocessor Controlled Digital Gyrocompass System

The Leader in the Advanced Technology Class

Sperry Marine

DESIGN AND STANDARD FEATURES

With a watchful eye on the demands made on navigation and ship control technology emerging from the 21st century, Sperry Marine has created a new generation of advanced marine gyrocompasses: the ***NAVIGAT X MK 1 Digital Gyrocompass System***.

The first of its type to be designed as a single unit and of unparalleled compactness in a polyurethane hard foam housing, is of low weight and allows this gyrocompass to be installed on any bridge, from large yachts to the most capacious merchant marine vessels.

Ship's cables are connected directly to terminals within the gyrocompass housing, greatly facilliating installation. All electronic components are plug-in modules, thus providing fast and easy service. Digital heading information is derived as an absolute value from a 13 bit shaft encoder. The NAVIGAT X MK 1 has a control and display unit installed in the front access cover. When required, the control and display unit can be removed from the access cover and installed at a location (e.g. bridge console) remote from the gyro-compass.

Standard Features

- Comprises one single unit.
- Control and display unit in front cover with 4-digit heading display and 6 operating keys.
- Easy to install and easy to service.
- High-speed follow-up system 100°/sec.
- Type approved rate-of-turn output.
- Automatic static north speed error correction.
- Highly accurate digital heading data transmission by shaft encoder.
- Self-synchronizing repeater compasses.
- ±180° electronic alignment error correction in setup program.
- Can be installed at any location.
- Will drive a maximum of 12 analogue repeaters.
- 180° heading offset function for shuttle vessels.
- 7 independent serial outputs RS 422 & IEC 61162-1 and IEC 61162-2.
- 2 independent 6 steps/° heading outputs (0.5 A).
- Complies with IMO regulations A.424(IX), A.694(17), A.821(19) - HSC (High-Speed Craft) and ISO 8728.
- Outputs to Navigation Data Printer:
  - Heading
  - Heading source gyro/magnetic
  - Rudder angles of two independent rudders.
- Complies with NAUT-AW.
- Insensitive to horizontal acceleration.
- Twin rotors and liquid damping system eliminates latitude error.
- High MTBF (mean time between failures) and low power consumption.
- All repeater compasses with serial interface.
- Automatic emergency power changeover and status alarm.
- Gyro system remains north stabilized during power interruptions of up to 3 minutes.
- Single point suspension of the gyrosphere container eliminates the well-known adverse effects associated with gimbals.
- Monitoring and alarm functions for all voltages, gyroscope current and follow-up system.

The unique method of supporting the well-proven Sperry Marine gyrosphere by means of mere buoyancy ensures north stabilization during short power failures.

For operation in extremely heavy seas where highly accurate heading information is absolutely essential, the NAVIGAT X MK 1 Mod. 7 gyrocompass, equipped with a special gyrosphere container, is recommended. Here, the unique centering pin retaining arrangement for the gyrosphere is mounted in an additional gimbal system, which allows the NAVIGAT X MK 1 Mod 7 gyrocompass an almost unlimited freedom of roll and pitch (±90°).

Type Approval

NAVIGAT X MK 1 has been type approved by the German Federal Maritime and Hydrographic Agency (BSH) to the Marine Equipment Directive (MED) 96/98/EC (Wheelmark) and fulfills IMO Resolutions A.424 (XI) and A.526(13) as well as IEC 61162.

A special version, NAVIGAT X MK 1 HSC, is available to meet the demands of high-speed craft, and has been type approved to the High-Speed Craft Code in accordance with Marine Equipment Directive (MED) 96/98/EC (Wheelmark) by the German Federal Maritime and Hydrographic Agency (BSH).

The rate-of-turn outputs of NAVIGAT MK 1 and NAVIGAT X MK 1 HSC have been type approved by the German Federal Maritime and Hydrographic Agency (BSH) to Marine Equipment Directive (MED) 96/98/EC (Wheelmark) and also fulfill IMO resolution A.526(13).

Performance

Linear mean settle point error	< 0.1° secant latitude
Static error	< 0.1° secant latitude
Dynamic error	< 0.4° secant latitude (in sea state conditions)

Performance in accordance with IMO A.694(17), IMO A.821(19), ISO 8728 and ISO 16328(2001)

Freedom of Roll and Pitch

NAVIGAT X MK 1 Mod. 7 ±90°
NAVIGAT X MK 1 Mod. 10 ±40°

Power Requirements

24 VDC (18 V to 36 V)
and/or 115/230 VAC ±10% 50 Hz / 60 Hz
The single-unit gyrocompass includes automatic switchover to 24 V emergency power supply in accordance with GMDSS Rules for INMARSAT/SES Terminals.

Operational Data

Ambient temperature range	operation -10°C to +55°C storage -25°C to +70°C (without supporting fluid)
Settling time	≤ 3 hours (0.7°)
Gyrocompass follow-up rate	100°/sec.
Heading display	digital with 4 digits
Power failure alarm	visible and audible and potential-free contact, max. 30 VDC / 1.0 A, max. 125 VAC / 0.5 A
Mean time between failure	40 000 hours (MTBF)
North speed error correction: static, input IEC 61162-1, or manual.	
Built-in test equipment	standard

Power Consumption

	DC	AC
Start-up	80 W	125 VA
Operation	45 W	75 VA
Each analogue repeater	7 W	7 VA
Each universal digital repeater	5 W	5 VA

Protection Grade

Gyrocompass	IP 23 in accordance with IEC/EN 60529

Environmental Requirements and EMC

in accordance with EN 60945 (IEC 945 + A1)

Magnetic clearance to

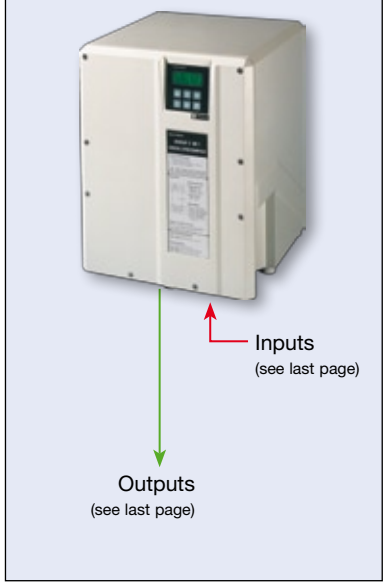
standard magnetic compass	0.6 m
steering magnetic compass	0.4 m

Reduced magnetic clearance to

standard magnetic compass	0.3 m
steering magnetic compass	0.3 m

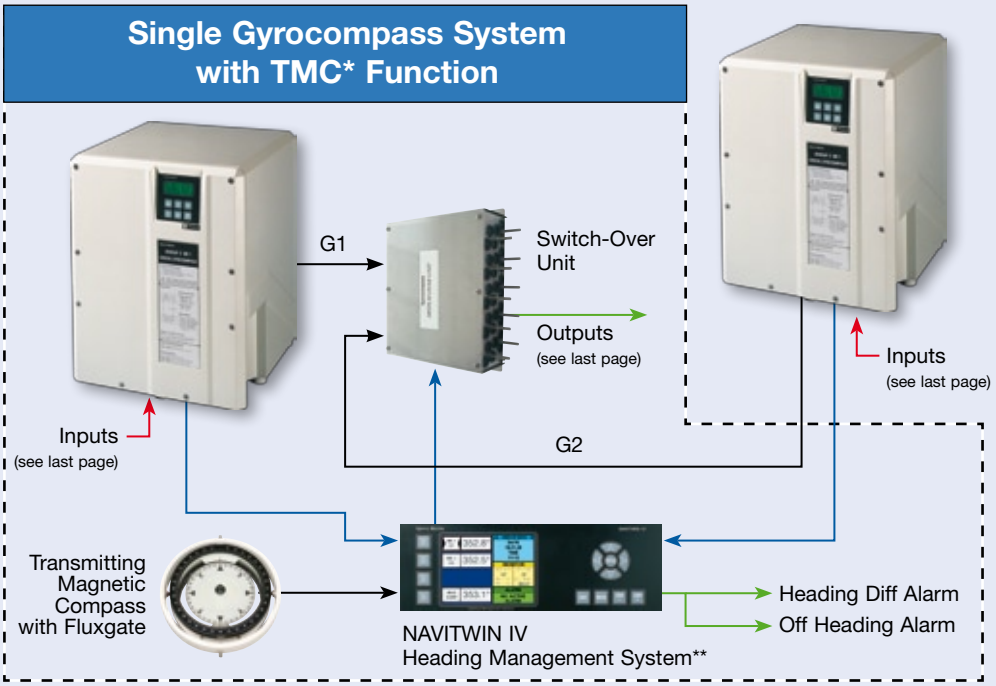
NAVIGAT X MK 1 Digital Gyrocompass System

Basic Single Gyrocompass System

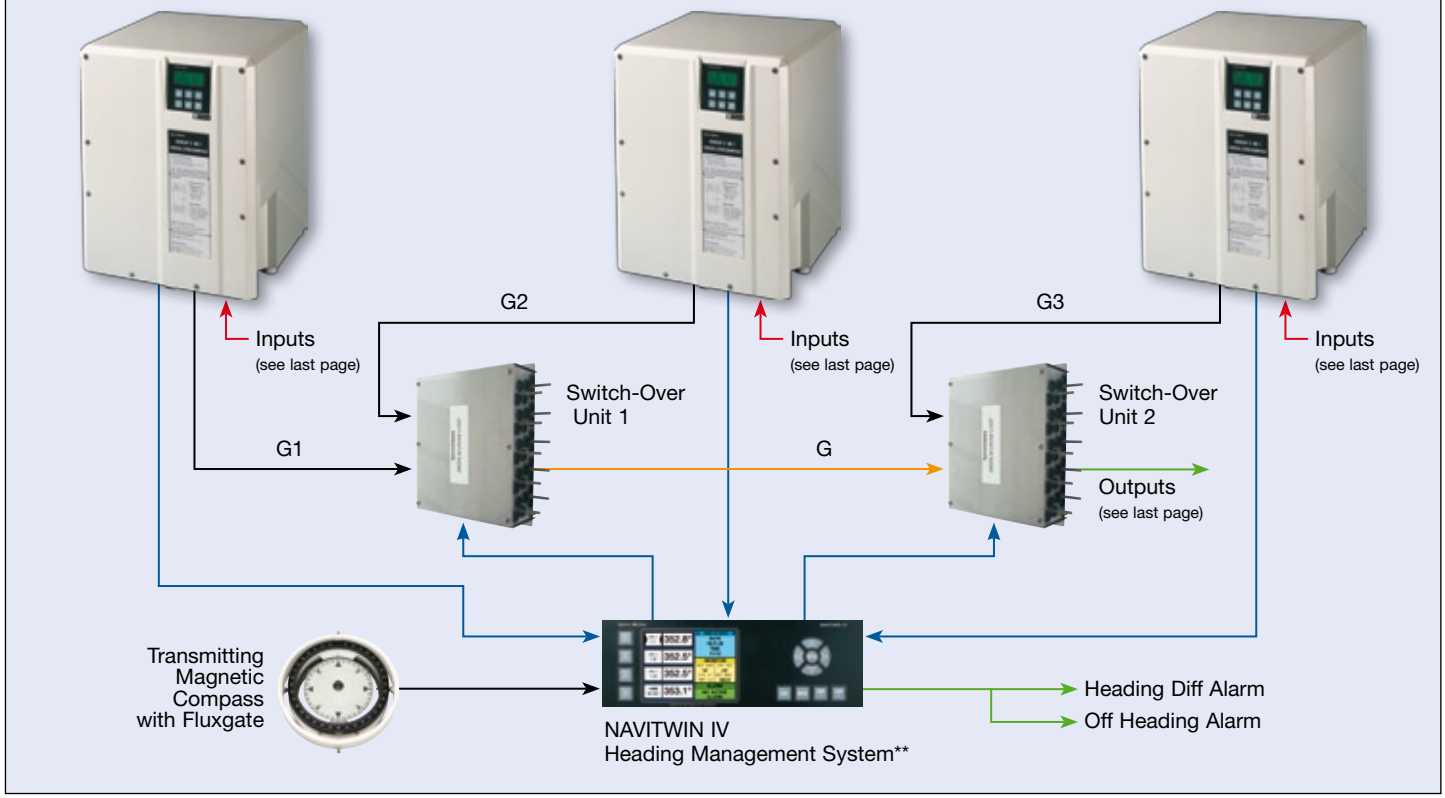


Dual Gyrocompass System with TMC* Function

Single Gyrocompass System with TMC* Function



Triple Gyrocompass System with TMC* Function



* **T**ransmitting **M**agnetic **C**ompass. In TMC systems, the NAVITWIN IV Heading Management System provides an independent back-up magnetic heading source for distribution to autopilots, repeaters, radars and other peripheral appliances when required.

** With selectable and programmable automatic heading takeover in accordance with DNV GAS.

Sperry Marine

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NAVIGAT X MK 1

Inputs

Position:
1 input IEC 61162-1

Speed:
1 input IEC 61162-1
or 200 pulses/nm

Rudder angle:
2 analogue inputs
from feedback unit

Rate of turn time constant:
1 input from external selector

External mute

Power

24 VDC (18-36 VDC) backup supply

115/230 VAC main supply

Optional

Remote Control and Display Unit

Outputs

12 outputs NMEA TTL: gyrocompass heading, magnetic compass heading, rate of turn, heading reference status to compass repeaters.

4 outputs Sensor Data RS 422: gyrocompass heading, rate of turn, position, speed, heading reference status.

1 output IEC 61162-1 Fast: gyrocompass heading, rate of turn, heading reference status.

2 outputs RS 422 Superfast IEC 61162-1 or IEC 61162-2 selectable: gyrocompass heading, rate of turn, heading reference status.

1 output RS 422 proprietary to Navigation Data Printer NAVIPRINT

2 outputs 6 steps/°: heading. Internal supply 24 VDC, max. 18 W. With external supply: 12, 24, 35, 50 and 70 VDC.

1 output rate of turn: selectable output of ±30, 90 and 300°/min. or customized from ±0.1 to 999.9 mV/°/min. (± 10 V, 10 mA max.).

1 status signal: AC power.

1 status signal: DC power.

1 status signal: watch alarm.

1 status signal: max. ROT exceeded.

1 status signal: power failure and general device error.

1 mute output

Dimensions and Weight

Width	404 mm
Height	520 mm
Depth	420 mm

NAVIGAT X MK 1 Mod. 10	25 kg
NAVIGAT X MK 1 Mod. 7	28 kg

Sperry Marine, with worldwide headquarters in Charlottesville, VA, and major engineering and support offices in Melville, NY, New Malden, England, and Hamburg, Germany, is part of the Northrop Grumman **Electronic Systems** sector.

Sperry Marine ServiceNet
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