Sperry Marine

NORTHROP GRUMMAN

NAVIGAT X MK 1

Microprocessor Controlled Digital Gyrocompass System

Design and Standard Features

OVERVIEW

With a watchful eye on the demands made on navigation and ship control technology emerging from the 21st Century, Northrop Grumman Sperry Marine has created the NAVIGAT X MK 1 Digital Gyrocompass System.

Ship's cables are connected directly to terminals within the gyrocompass housing, greatly facilitating 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 gyrocompass.

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
- Will drive a maximum of 12 analogue repeaters
- 180° heading offset function for shuttle vessels
- Automatic emergency power changeover and status alarm
- 7 independent serial outputs RS 422, IEC 61162-1 and IEC 61162-2
- 2 dependent 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
- Twin rotors and liquid damping system eliminates latitude error
- High Mean Time Between Failures (MTBF) of 40.000 hours and low power consumption
- All repeater compasses with serial interface
- 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 (gyrosphere current, temperature, elapsed operation time)

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

A special version, NAVIGAT X MK 1 HSC, is available to meet the demands of high-speed craft (HSC). 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 Germanischer Lloyd (GL) in accordance with the Marine Equipment Directive (MED) 96/98/EC (Wheelmark) and fulfills IMO Resolutions A.424(XI) and A.694(17) as well as IEC 61162.

The NAVIGAT X MK 1 HSC has been type approved to the High-Speed Craft Code by Germanischer Lloyd (GL) in accordance with the Marine Equipment Directive (MED) 96/98/EC (Wheelmark).

The rate-of-turn outputs of NAVIGAT X MK 1 and NAVIGAT X MK 1 HSC have been type approved by Germanischer Lloyd (GL) in accordance with the Marine Equipment Directive (MED) 96/98/EC (Wheelmark) and also fulfills IMO resolution A.526(13).

PERFORMANCE

Linear mean settle point error (RMS):	≤0.1° secant latitude
Static error (RMS):	≤0.1° secant latitude
Dynamic error (RMS):	≤ 0.4° secant latitude

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

FREEDOM OF ROLL & 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

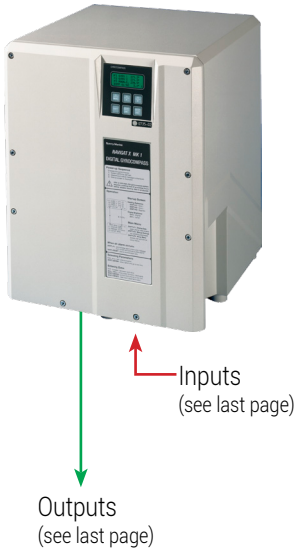
The single-unit gyrocompass includes automatic swtichover to 24 V emergency power supply in accordance with GMDSS Rules.

OPERATIONAL DATA

Ambient temperature range	
Operation:	-10°C to +55°C
Storage:	-25°C to +70°C
(without supporting fluid)	
Settling Time:	< 3 hours
Gyrocompass follow-up rate:	100°/sec
Heading Display:	digital with 4 digits

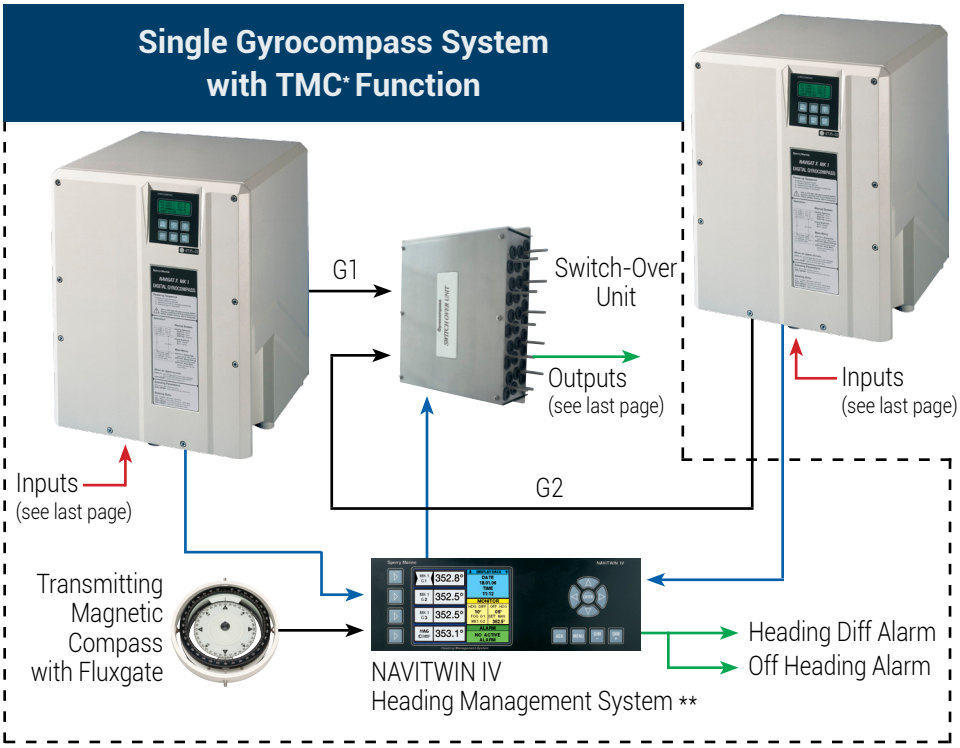
System Configurations

Basic Single Gyrocompass System

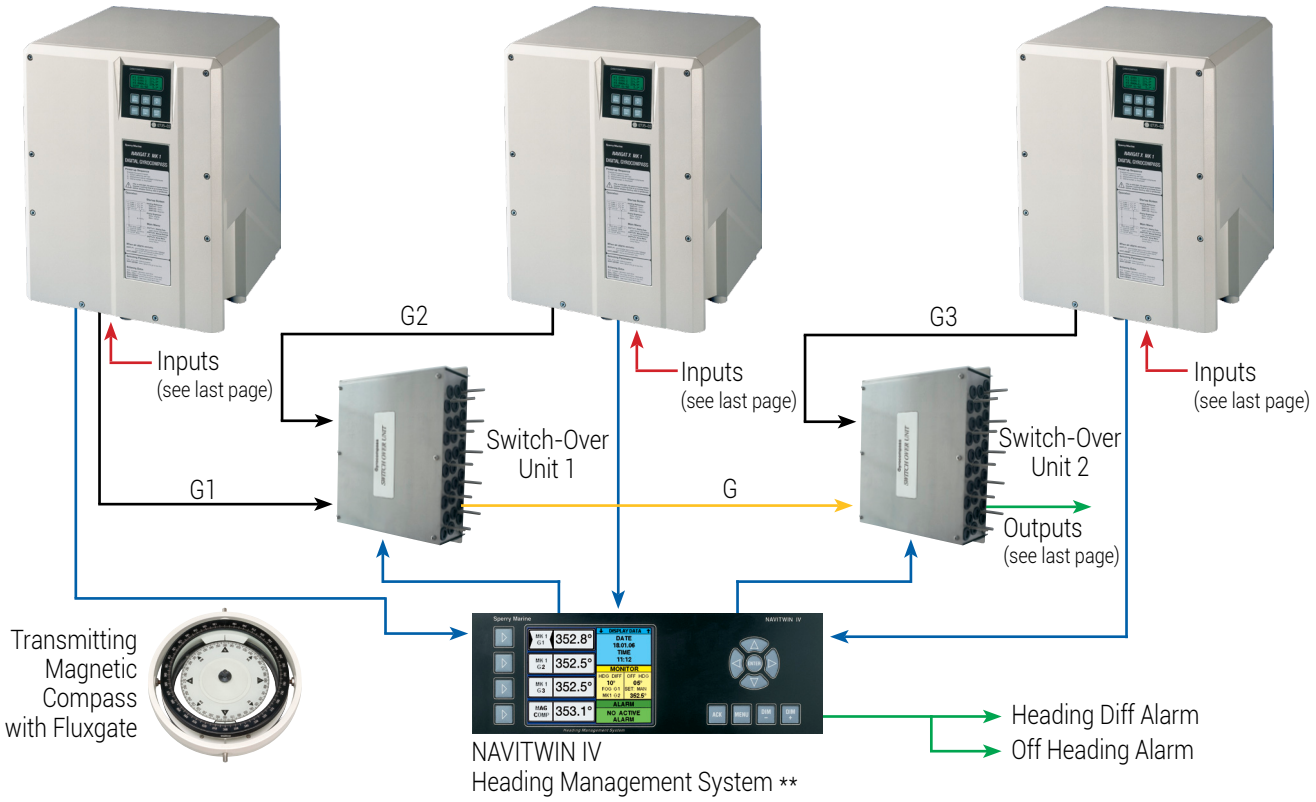


Dual Gyrocompass System with TMC* Function

Single Gyrocompass System with TMC* Function



Triple Gyrocompass System with TMC* Function



*Transmitting Magnetic Compass. 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 Grounding Avoidance System (DNV NAUT OC and AW)

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OPERATIONAL DATA

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:	automatic or manual
Built-in test equipment:	standard

POWER CONSUMPTION

	DC	AC
Start-up:	80W	125VA
Operation:	45W	75VA
Each analogue repeater:	6W	6VA
Each universal digital repeater:	5W	5VA

PROTECTION GRADE

Gyrocompass:	IP 23 in accordance with IEC/EN 60529

ENVIRONMENTAL REQ. & EMC

In accordance with EN 60945 (IEC 945 + A1)

Magnetic clearance to:	
standard magnetic compass	0.6m
steering magnetic compass	0.4m
Reduced magnetic clearance to:	
standard magnetic compass	0.3m
steering magnetic compass	0.3m

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

1 output Furuno AD10: gyrocompass heading

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

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