NAVITWIN IV
Heading Management System

Total Command Information at a Glance

Sperry Marine
NAVITWIN IV is Sperry Marine’s central, all-embracing multiple heading reference management system. It displays and monitors a minimum of 1 and a maximum of 4 heading sources (3 gyrocompass headings and 1 magnetic heading) from the following Sperry Marine range of heading sensors:

- NAVIGAT 2100 Fiber-Optic Gyrocompass and Attitude Reference System
- NAVIGAT X MK 1 Digital Gyrocompass
- NAVIGAT X MK 2 Digital Gyrocompass
- Jupiter magnetic compass (with fluxgate)

*Only in combination with one magnetic compass heading source. Dual and triple gyrocompass combinations are not configurable with NAVIGAT X MK 2.

Main Features
- Monitors and controls all heading sources of a multicompass heading reference system.
- Shows the current heading from all available heading sources on a colour TFT LCD (thin film transistor liquid crystal display) and allows the operator to select from these an active heading source for distribution to subscribers such as repeaters, autopilots, radars, ECDIS, etc.
- Monitors the difference between any two of the displayed headings. If the difference between the two headings exceeds a user-defined preset threshold, an audible and visual “Heading Difference Alarm” is actuated.
- Monitors the difference between the heading from the active heading source and the set heading (course to steer) on the autopilot. If the difference between the two headings exceeds a user-defined preset threshold, an audible and visual “Off Heading Alarm” is actuated.
- Accepts an automatic set heading input from an autopilot or a manual input.
- Reads the sine and cosine analogue signals from a Sperry Marine magnetic compass fluxgate and converts these into magnetic heading data in NMEA format.
- Provides automatic correction for magnetic variation and deviation.
- Automatic and controlled incremental takeover of the heading from an alternative source when the active heading source fails (DNV GAS).
- Alarm output relay actuated when the automatic takeover of the heading from an alternative source is initiated (see previous).
- Serial dimmer input for a remote central dimmer control.
- Provides an independent back-up magnetic heading source (TMC) for autopilots, repeaters, radar, etc.
- True heading and status protocol (THS).
- Selectable display colours. The display colours of the NAVITWIN IV control and display unit are selectable by the operator.

Displays
The following data can be displayed on the TFT LCD
- Gyro 1 heading
- Gyro 2 heading
- Gyro 3 heading
- Magnetic compass heading

- Speed, manual or auto (when provided)
- Position in lat. and lon. (when provided)
- Date and time, manual or auto (when provided)
- Alarms
- Heading difference alarm threshold
- Off heading alarm threshold
- North speed error correction

Data Inputs
- 3 gyrocompass headings: NMEA 0183 or PLATH protocol
- 1 magnetic heading, analogue: sine/cosine from fluxgate
- 1 magnetic heading, serial: NMEA 0183, PLATH protocol or NAVIPilot protocol
- Autopilot set heading: NMEA 0183 or NAVIPilot protocol
- Speed, position, time and date, magnetic variation from GPS: NMEA 0183

Signal and Status Inputs
- Magnetic compass heading from fluxgate (sine, cosine)
- Steering mode status (auto/man)
- External alarm acknowledgement status (mute)
- Heading offset 180°
- External dim

Data Outputs
- See Outputs in system configuration overviews.

Alarm and Status Outputs
- Power failure / general alarm
- Heading difference alarm
- Off heading alarm
- Watch alarm timer reset

Type Approval
NAVITWIN IV has been type approved by Germanischer Lloyd to the Marine Equipment Directive (MED) 96/98/EC (Wheelmark) and fulfills IMO Resolution A.694 (17) as well as IEC 60945, IEC 61162 and NMEA-0183.
Basic System Configuration with two Heading Sources (Gyro/Magnetic)

NAVITWIN IV
Heading Management System

Watch Alarm Timer Reset
Heading Diff Alarm
Off Heading Alarm
External Mute

Set Heading from Autopilot
Magnetic Compass Heading
Display Information

JUPITER
Magnetic Compass with Fluxgate

AND

NAVIGAT 2100
Fiber-Optic Gyrocompass System

Gyrocompass Heading G1

NAVIGAT X MK 1
Digital Gyrocompass System

Gyrocompass Heading G1

NAVIGAT X MK 2
Digital Gyrocompass System

Gyrocompass Heading G1

Switch-Over Unit

12 outputs NMEA TTL serial data: gyrocompass heading, magnetic compass heading, rate of turn, heading reference status to compass repeaters, NAVITWIN IV operational data.

4 outputs RS 422 serial data: gyrocompass heading, magnetic compass heading, rate of turn, heading reference status to compass repeaters, NAVITWIN IV operational data.

1 output RS 422 serial data IEC 61162-1 Fast: gyrocompass heading, magnetic compass heading, rate of turn, heading reference status to compass repeaters, NAVITWIN IV operational data.

2 outputs RS 422 serial data Superfast IEC 61162-1 or IEC 61162-2 (selectable): gyrocompass heading, magnetic compass heading, rate of turn, heading reference status to compass repeaters, NAVITWIN IV operational data.

1 output RS 422: proprietary to Navigation Data Printer NAVIPRINT

1 output RS 422 serial data: for DNV GAS applications.

2 outputs 6 steps/°: heading, Internal supply 24 VDC, max. 18 W. External supply 12 VDC to 70 VDC phase voltage.

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 output X-rate: ±10 V (NAVIGAT 2100 only).

1 output Y-rate: ±10 V (NAVIGAT 2100 only).

1 output Z-rate: ±10 V (NAVIGAT 2100 only).

1 status signal: alarm by automatic takeover of heading from an alternative source (DNV GAS).

1 mute output.

1 status signal: Gyro 1.

1 status signal: Gyro 2.

1 status signal: Magnetic.

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.

Inputs

Outputs

RS 422 (IEC 61162-1) from central dimmer
Power supply 18 - 36 VDC
Emergency power supply 18 - 36 VDC

Power supply 18 - 36 VDC
Emergency power supply 18 - 36 VDC
Basic System Configuration with three Heading Sources (Gyro/Gyro/Magnetic)

NOTE:
The above system configuration is one of three possible gyro/gyro/magnetic configurations. In addition to the Jupiter magnetic compass, further configurations can comprise either two NAVIGAT 2100 Fiber-Optic Gyrocompass Systems or two NAVIGAT X MK 1 Digital Gyrocompass Systems.
**SYSTEM CONFIGURATION**

**Maximum System Configuration with four Heading Sources (Gyro/Gyro/Gyro/Magnetic)**

**Inputs**
- Set Heading from Autopilot
- Magnetic Compass Heading
- Display Information
- Switch-Over Unit 1
- Switch-Over Unit 2

**Outputs**
- Watch Alarm Timer Reset
- Heading Diff Alarm
- Off Heading Alarm
- External Mute
- 12 outputs NMEA TTL serial data: gyrocompass heading, magnetic compass heading, rate of turn, heading reference status to compass repeaters, NAVITWIN IV operational data.
- 4 outputs RS 422 serial data: gyrocompass heading, magnetic compass heading, rate of turn, heading reference status to compass repeaters, NAVITWIN IV operational data.
- 1 output RS 422 serial data IEC 61162-1 Fast: gyrocompass heading, magnetic compass heading, rate of turn, heading reference status to compass repeaters, NAVITWIN IV operational data.
- 2 outputs RS 422 serial data Superfast IEC 61162-1 or IEC 61162-2 (selectable): gyrocompass heading, magnetic compass heading, rate of turn, heading reference status to compass repeaters, NAVITWIN IV operational data.
- 1 output RS 422: proprietary to Navigation Data Printer NAVIPRINT
- 1 output RS 422 serial data: for DNV GAS applications.
- 2 outputs 6 steps/°: heading.
- 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 output X-rate: ±10 V (NAVIGAT 2100 only).
- 1 output Y-rate: ±10 V (NAVIGAT 2100 only).
- 1 output Z-rate: 4 - 20 mA (NAVIGAT 2100 only).
- 1 status signal: alarm by automatic takeover of heading from an alternative source (DNV GAS).
- 1 mute output.
- 1 status signal: Gyro 1.
- 1 status signal: Gyro 2.
- 1 status signal: Magnetic.
- 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.

**NOTE:** The above system configuration is just one of several possible gyro/gyro/gyro/magnetic configurations. In addition to the Jupiter magnetic compass, the triple gyrocompass configuration may comprise any required combination of the NAVIGAT 2100 and NAVIGAT X MK 1 Gyrocompass Systems.
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**Environmental Requirements and EMC**

in accordance with EN 60945 (IEC 945 +A1)

**Magnetic clearance to:**
- standard magnetic compass 0.7 m
- steering magnetic compass 0.4 m

**Reduced magnetic clearance to:**
- standard magnetic compass 0.45 m
- steering magnetic compass 0.30 m

**Ambient temperature range:**
- operation -15°C to +55°C
- storage -25°C to +70°C

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**Console Version**

without a Console Frame

Ambient temperature range:
- operation -15°C to +55°C
- storage -25°C to +70°C

Weight approx. 1.7 kg with cable
Required depth approx. 150 mm
Protection grade installed IP23 to DIN 40050.
Supplied with an installation kit and a 3.2 m cable for connection to a terminal board.

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**Console Version**
in a Console Frame

Ambient temperature range:
- operation -15°C to +55°C
- storage -25°C to +70°C

Weight approx. 2.4 kg with cable
Required depth approx. 150 mm
Protection grade installed IP23 to DIN 40050.
Supplied with an installation kit and a 3.2 m cable for connection to a terminal board.

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**Bulkhead / Desktop Version**

with Bracket Attachment

Ambient temperature range:
- operation -15°C to +55°C
- storage -25°C to +70°C

Weight approx. 3.2 kg with cable
Protection grade installed IP23 to DIN 40050.
Supplied with a 3.2 m cable for connection to a terminal board.

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**Switch-Over Unit**

Ambient temperature range:
- operation -15°C to +55°C
- storage -25°C to +70°C

Weight approx. 4.5 kg with cable
Protection grade installed IP23 to DIN 40050.
Magnetic Clearance 0.3 m.

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