NORTHROP GRUMMAN

NAVITWIN IV

Heading Management System

Total Command Information at a Glance

Sperry Marine

DESIGN AND STANDARD FEATURES

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 gyro-compass 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 gyro-compass 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

} through potential-free relay contacts rated 30 W max. or 125 V, 1 A

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.

CMA CGM's 9,145 TEU *MEDEA* is equipped with a Sperry Marine Navigation and Ship Contol System. Photo by kind permission of CMA CGM.

SYSTEM CONFIGURATIONS

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

Switch-Over Unit

Set Heading from Autopilot

Magnetic Compass Heading

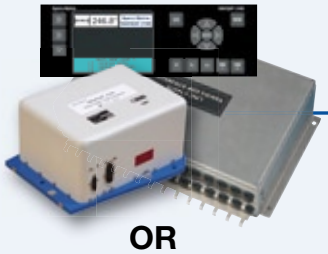
Magnetic Heading

JUPITER
Magnetic Compass with Fluxgate

Display Information

AND

NAVIGAT 2100
Fiber-Optic Gyrocompass System



Gyrocompass Heading G1

OR

NAVIGAT X MK 1
Digital Gyrocompass System

Gyrocompass Heading G1

OR

NAVIGAT X MK 2
Digital Gyrocompass System

Gyrocompass Heading G1

RS 422 (IEC 61162-1) from central dimmer

Power supply 18 - 36 VDC

Emergency power supply 18 - 36 VDC

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: 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.

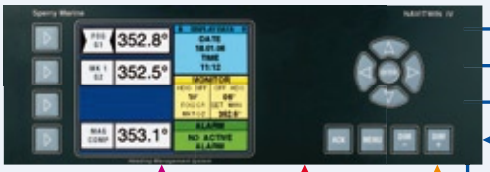
1 status signal: max. ROT exceeded.

1 status signal: power failure and general device error.

Inputs **Outputs**

Basic System Configuration with three Heading Sources (Gyro/Gyro/Magnetic)

NAVITWIN IV
Heading Management System



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

Switch-Over Unit

Set Heading from Autopilot

Magnetic Compass Heading

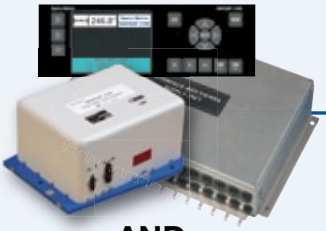
Magnetic Heading

Display Information

JUPITER
Magnetic Compass with Fluxgate

AND

NAVIGAT 2100
Fiber-Optic Gyrocompass System



Gyrocompass Heading G1

AND

NAVIGAT X MK 1
Digital Gyrocompass System

Gyrocompass Heading G2

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 Gyrocompass Systems.

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: 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.

RS 422 (IEC 61162-1) from central dimmer → 1 status signal: watch alarm.

Power supply 18 - 36 VDC → 1 status signal: max. ROT exceeded.

Emergency power supply 18 - 36 VDC → 1 status signal: power failure and general device error.

Inputs

Outputs

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

NAVITWIN IV
Heading Management System

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

Switch-Over Unit 2

Set Heading from Autopilot

Magnetic Compass Heading

Magnetic Heading

Display Information

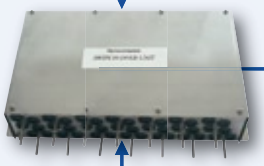
JUPITER
Magnetic Compass with Fluxgate

AND

Gyrocompass Heading G1

NAVIGAT 2100
Fiber-Optic Gyrocompass System

Switch-Over Unit 1



AND

Gyrocompass Heading G2

NAVIGAT 2100
Fiber-Optic Gyrocompass System

AND

Gyrocompass Heading G3

NAVIGAT X MK 1
Digital Gyrocompass System

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.

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

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.

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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.

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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.

Inputs **Outputs**

Sperry Marine

For more information, please contact:

AMERICAS

Charlottesville, VA USA
Tel: +1 434-974-2000
Fax: +1 434-974-2259
Melville, NY USA
Tel: +1 631-719-4736
Fax: +1 631-719-4630

ASIA

China, Shanghai
Tel: +86-21-5836-9978
Fax: +86-21-5836-9979
Hong Kong, Sheung Wan
Tel: +852-2581-9122
Fax: +852-2581-9967
Japan, Tokyo
Tel: +81 (0)-3-3863-7401
Fax: +81 (0)-3-3863-7455
Singapore
Tel: +65-6274-3332
Fax: +65-6271-3339
South Korea, Busan
Tel: +82-51-247-7455
Fax: +82-51-247-7454
Taiwan, Kaohsiung
Tel: +886-7-331-7786
Fax: +886-7-331-7924

CANADA

Nova Scotia, Halifax
Tel: +1 902-468-9479
Fax: +1 902-468-9480

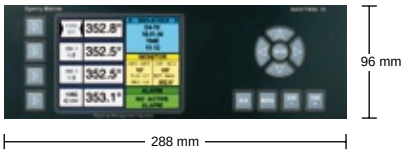
EUROPE

Belgium, Antwerp
Tel: +32-3-233-14-33
Fax: +32-3-225-05-53
Denmark, Copenhagen
Tel: +45-77-33-66-33
Fax: +45-77-33-66-11
Germany, Hamburg
Tel: +49 (0)40 299 00-0
Fax: +49 (0)40 299 00-146
Holland, Vlaardingen
Tel: +31(0)-10-4451600
Fax: +31(0)-10-4345015
Norway, Bergen
Tel: +47-55-94-94-94
Fax: +47-55-34-52-27
United Kingdom, New Malden
Tel: +44(0)20 8329 2000
Fax: +44(0)20 8329 2415

www.sperrymarine.northropgrumman.com

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.

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.

Bulkhead / Desktop Version

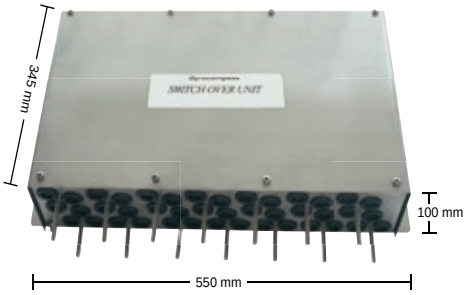
with Bracket Attachment

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.

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.

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

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.

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Over 200 Locations Worldwide

BR-0133A · 01/10