SUPPLEMENTARY EQUIPMENT

NAVIGAT X MK 1 Digital Gyrocompass

- Comprises one single unit.
- Microprocessor controlled.
- Easy to install and easy to service.
- Control and display unit in front cover with 4-digit heading display and 6 operating keys.
- High-speed follow-up system 100°/sec.
- Rate of turn output..
- Integrated TMC interface.
- Compass monitor function.
- Will drive a maximum of 12 analogue repeaters.
- 7 independent serial outputs RS 422 & IEC 61162-1.
- Automatic north speed error correction.
- RS 422 SUPERFAST output.
- Second gyrocompass and magnetic compass inputs.
- Complies with IMO regulations A.424(XI), A.574(14), A.821(19) - High-Speed Code and ISO 8728.
- Type approved, also to the High-Speed Craft Code, in accordance with the EC Council Directive 96/98/EC.
- Rate of turn output type approved in accordance with the EC Council Directive 96/98/EC.

UNIVERSAL DIGITAL REPEATER

Environmental

Temperature range	-25°C to +70°C
Vibration	5 Hz to 50 Hz to IEC 945 / 16.5
Protection grade	front IP 65 to DIN 40050
	rear IP 23 to DIN 40050
Power Requirements	24 VDC (18 V to 36 V)
Power Consumption	7 W

Dimensions and Weight

Console Version		Watertight Housing with	
Front plate to DIN Standard	96 mm x 96 mm	Bracket Attachment	
	Width	185 mm	
Depth	125 mm	Height	156.5 mm
Weight	650 g	Depth	160 mm
		Weight	1450 g

Type approved in accordance with the EC Council Directive 96/98/EC.

Signal Input one RS 422 input with the following protocols:
- IEC 61162-1:
  heading gyro, heading magnetic, roll, pitch, rate of turn, X-rate, Y-rate, water speed, ground speed, transverse water speed, transverse ground speed, total/daily miles, wind speed, wind angle, rudder angle, depth, air temperature, water temperature, time.
- C.PLATH: heading gyro, heading magnetic, rate of turn, roll, pitch.
- Lehmkuhl: heading.
- NAVIPILOT: heading gyro, heading magnetic, set heading, speed.

Status Input opto-coupler, rating 24 V / 10 mA freeze mode, 180° heading change mode.
Signal Output one RS 422 with protocols for the Sperry Marine Voyage Data Printer.
Status Output open collector, rating 50V/500mA. Status change according to speed input (threshold can be set in the setup menu).
Special Feature Course to Steer Indicator

NAVIGAT 2100 Fiber-Optic Gyrocompass

- No moving parts.
- Solid-state technology.
- No maintenance during service life.
- High dynamic accuracy.
- Short settling time.
- Heading, roll, pitch and rate sensor.
- Meets all IMO recommendations including high-speed code.
- Data transmission by serial interface.
- IEC 61162-1 FAST & IEC 61161-2 SUPERFAST outputs.
- Second gyrocompass and magnetic compass inputs.
- Compass monitor and heading selector function to NAUT-AW.
- Automatic changeover to emergency power per GMDSS.
- Basic system comprises only three units: Sensor unit, Control and Display Unit and Interface and Power Supply Unit.
- Type approved, also to the High-Speed Craft Code, in accordance with the EC Council Directive 96/98/EC.
- The Rate-of-Turn output is type approved to the High-Speed Craft Code and in accordance with the EC Council Directive 96/98/EC and also fulfills IMO Resolution A.526(13)

JUPITER Magnetic Compass

A "class A" compass with 180 mm card diameter for installation in NAVIPOL binnacles. Also available with a flux gate and in an overhead mounting. Type approved in accordance with the EC Council Directive 96/98/EC.

ANALOGUE MAGNETIC COMPASS REPEATER

Magnetic compass heading console repeater with a 360° compass card. 192 mm x 192 mm. Weight 1.5 kg. Data transmission through RS 422 serial interface.

NORTHROP GRUMMAN

Steering Control Unit Control and Display Unit

Sperry Marine

www.sperrymarine.northropgrumman.com
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Fax: +47-55-34-52-27
United Kingdom, New Malden
Tel: +44(0)-20 8329-2000
Fax: +44(0)-20 8329-2415

Environment

Ambient temperature range
operation -15° C to +55° C
storage -25° C to +70° C
Protection grade
installed IP32 to DIN 40050
Environmental testing
to EN 60945 (IEC 945 +A1).

Power requirements

24 VDC (18 V to 36 V)
Max. ripple content
4 V pp, extreme values should not exceed 36 V or fall below 18 V
Power consumption 10 W max.
Reverse polarity protection built-in

Inputs

Rudder angle feedback signal
± 10 V ≙ ± 120° max. selectable rudder angle potentiometer resistance 2 kΩ
External steering system ± 10 V ≙ ± 120° max. rudder angle
Flux gate for magnetic compass
sine/cosine, Sperry Marine product
NAV/TRACK interface
serial interface for track steering via Sperry Marine VMS or standard waypoint steering with a position receiver
Speed input 200 p/nm or IEC 61162-1
180° turn command port and starboard
180° rotation of heading display (for ferries)
Gyro / magnetic selection
Override status
Mute
Status signals AUTO, NFU, Helm, Remote, Ext. System
Set heading and rudder limit or rate or radius control by joystick or pushbutton
Gyrocompass or electronic flux gate
two IEC 61162-1
Heading IEC 61162-1
Heading gyro HEHDT at 10 Hz
Heading magnetic HCHDT or HCHDM or HCHDG at 10 Hz
Navigation system data
NSD at 1 Hz

Outputs

DC solenoid valves

Outputs	two for port two for starboard (solid-state relays)
Type	plus or minus swiching
Voltage	12 VDC to 110 VDC
Rating	2.0 A max.
Additional outputs	optional

or

AC solenoid valves

Outputs	two for port two for starboard (solid-state relays)
Voltage	24 VAC to 230 VAC
Rating	1.0 A max.
Additional outputs	optional

Outputs and Interfaces

CAN in accordance with IEC 61162-3
for remote control and display units
Central alarm IEC 61162-1 bidirectional input/output
Voyage Data Recorder (VDR)
RS 422 9600 bps

Status and alarm outputs

System alarm	potential-free contacts
Off course alarm*	2 A maximum current
Override alarm*	250 V maximum voltage
Gyro / Mag. status*	
Ext. system status*	
Deadman's control*	
Mute*	

* max. 4 outputs selectable

Power failure alarm

Primary supply	potential-free contacts
Backup supply	2 A maximum current
	250 V maximum voltage

STEERING CONTROL UNIT

Dimensions
H 151 mm W 392 mm D 425 mm
Weight 3 kg
Cable connections screw-down terminals
Protection grade IP 32
Magnetic clearance 0.4 m

CONTROL AND DISPLAY UNIT

Front panel dimensions
288 mm x 144 mm to DIN standard
Installation depth 150 mm
Weight 1.5 kg
Front panel sealed foil keyboard, illuminated
Display graphic liquid crystal, illuminated
Minimum magnetic clearance (installed) to
standard magnetic compass ≤ 0.40 m
steering magnetic compass ≤ 0.40 m

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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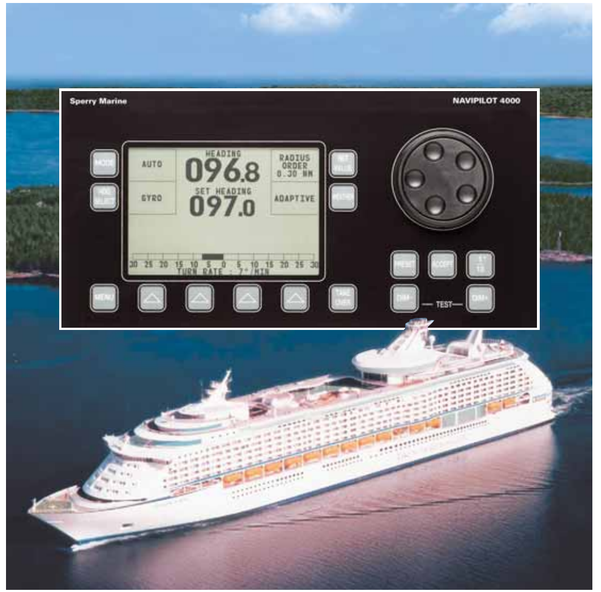
Sperry Marine ServiceNet
Over 400 Locations Worldwide

NORTHROP GRUMMAN

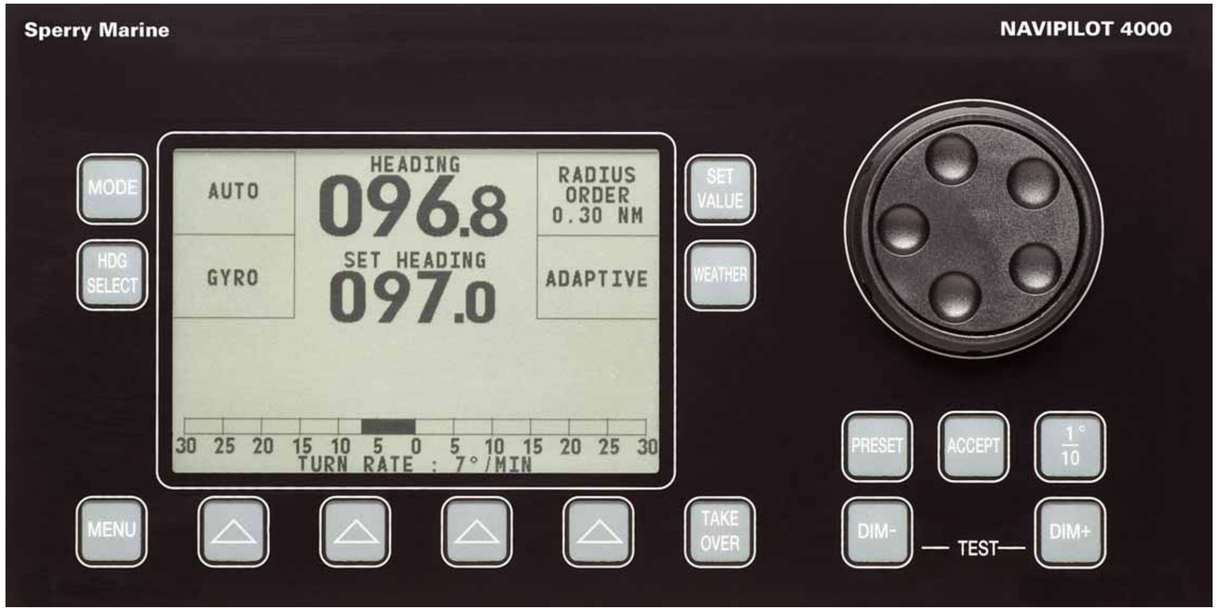
NAVIPILOT 4000

The Self-Tuning Adaptive Heading Control System



Sperry Marine

CONTROL AND DISPLAY UNIT



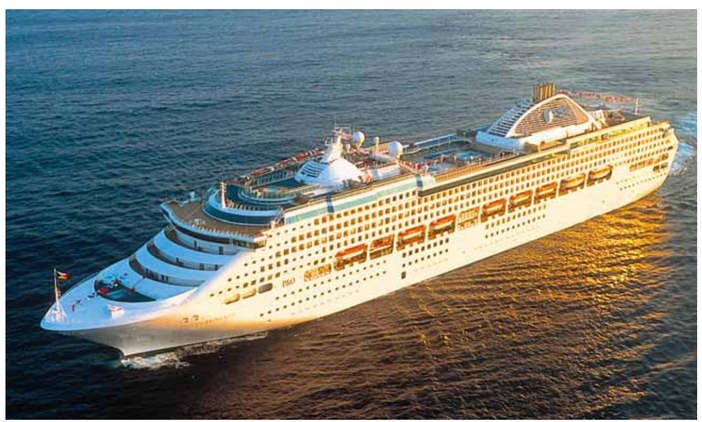
SYSTEM OVERVIEW

With the introduction of the **NAVIPILOT 4000 Self-Tuning Adaptive Heading Control System**, Sperry Marine continues its traditional philosophy of designing autopilots with the aim of increasing profit by reducing running costs. The innovative NAVIPILOT 4000 is the first autopilot which uses steering control network technology to control a ship and is capable of tuning itself to adapt automatically to the ship's load characteristics and the prevailing weather conditions, thus reducing operational demands and increasing fuel savings and operational safety.
Conceived with the most modern computer tools in accordance with IEC 61162-3 (NMEA 2000), the NAVIPILOT 4000 permanently indicates all information required by the most stringent navigation demands:

- Current heading (digital)
- Set heading
- Override status
- Selected heading source
- Steering modes AUTO, NAV or TRACK
- Parameters for
  - Rudder limit or
  - Rate-of-turn or radius (steering mode)
  - Weather
- Preset heading selection
- 1/10° increments of set heading

Additional Displays of:

- Load condition
- Speed (auto / man.)
- Rudder order
  or
- Actual rudder angle
  or
- Rate of turn
  or
- Cross track error
- Off course alarm
- Heading difference alarm



Bottom: Ocean Princess built by Fincantieri for P&O
Cover: Voyager of the Seas built by Kvaerner Masa Turku for RCCL.

SYSTEM CONFIGURATION

MAJOR ADVANTAGES

- Fully self-tuning, adaptive heading control.
- Manual selection of steering strategy to suit weather conditions.
- Rate and radius control modes.
- Gyrocompass heading interfaces: two RS 422
- Magnetic compass interfaces: IEC 61162-1, sine/cosine
- Serial interface for track steering via Sperry Marine VMS or standard waypoint steering with position receivers.
- Additional remote Control and Display Units possible.
- Operational data remain stored during power failure.
- Clearly arranged graphic liquid crystal display (LCD) with back lighting.
- Logical arrangement of sealed foil keyboard and ergonomic, user-friendly operation.
- Analogue selection of set heading by means of a cardinal control disk, and soft key selection of all other major parameters.
- Analogue output for thruster control, rudder propellers and water jets.
- System utilizes the NAVINET 4000 Steering Control Network.
- Only serial digital interfaces used.
- Display and controls illuminated.
- Meets the requirements of all major classification societies.
- EC type approved by GL Luxembourg to 98/85/EC (Wheel Mark) Specified Standards: ISO/IEC 11674 EN 61162-1, IEC 61162-1, EN 60945, IEC 60945 IMO Resolutions A.342 (X), A.694 (17), A.813 (19), MSC.64 (67) Annex 3

BASIC SYSTEM ⇐ ⇒ ***OPTIONAL EQUIPMENT***