COP-05 Heading Wheel Panel

Hardware Module Description

Kongsberg Maritime Part no.603550

300985/B
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Document history

Document number: 300985		
Rev. A	September 2006	First version.
Rev. B	January 2007	Minor corrections.

Note

Comments

To assist us in making improvements to the product and to this manual, we welcome comments and constructive criticism.
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Glossary

CPLD	Complex Programmable Logic Device
DI	Digital Input
DO	Digital Output
ESD	Electrostatic Discharge
GND	Ground
IE	Instrumentation Earth
IO	Input/Output
LED	Light Emitting Diode
PE	Protective Earth
PWM	Pulse Width Modulation
USB	Universal Serial Bus

1 OVERVIEW

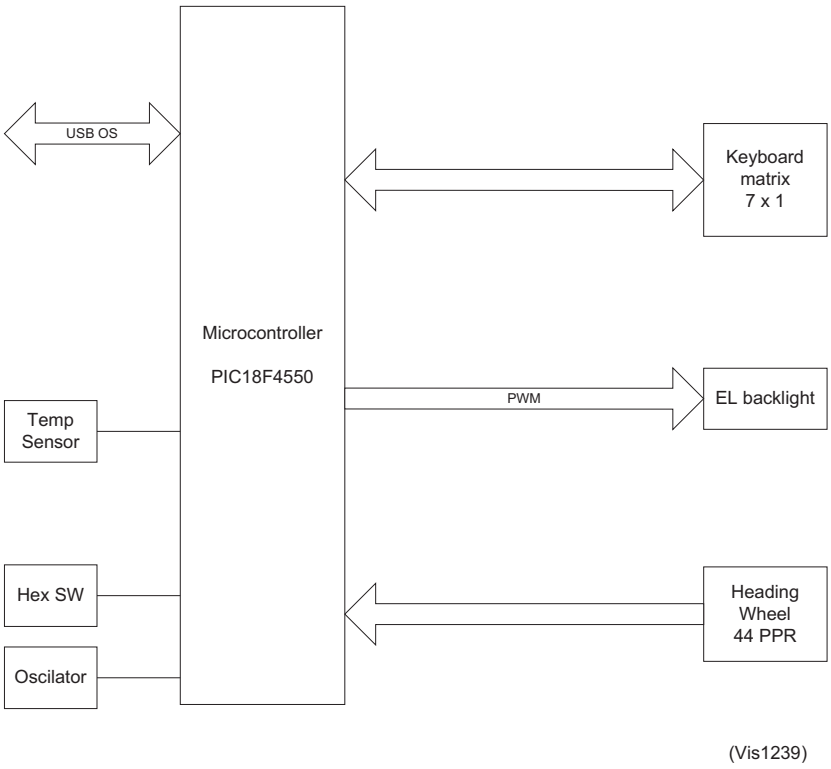
The COP-05 Heading Wheel Panel contains a heading wheel with seven buttons integrated in the circular heading wheel cover.

Backlight for buttons and heading wheel can be dimmed from the operator station the panel is a part of.

The COP-05 Heading Wheel Panel is powered from USB with 5 Vdc.

2 FUNCTION

Figure 1 COP-05 Heading Wheel Panel function diagram



The COP-05 Heading Wheel Panel comprises a heading wheel with seven buttons.

The COP-05 Heading Wheel Panel is built around a micro controller handling mainly the communication via USB handling mainly I/O for keyboard buttons and lamps.

The COP-05 Heading Wheel Panel electronics part is encapsulated to resist ESD and dust.

See Figure 1 for block/function diagram of the COP-05 Heading Wheel Panel.

2.1 Data communication (X3)

The panel module communicates with a controller computer through a single USB. The controller computer is the master and polls the panel module at given time intervals.

2.1.1 Address switch

The panel has a fixed address digit that is panel-type specific. In addition the panel is provided with a hexadecimal switch, which defines the lower part of the address for the panel. Allowed addresses are 0 to F. Address 0 (default) is used when only one

of this panel type is used or for the first one if more panels of the same type are used. The second panel of this type will then have the address 1 etc.

The table below defines the hexadecimal-switch values and corresponding functions.

Table 1 Address switch values and functions

Value	Function
0	Default Product ID (First panel of this type)
1	Sub-panel 1 Product ID (Second panel of this type)
2	Sub-panel 2 Product ID (Third panel of this type)
3	Sub-panel 3 Product ID (Fourth panel of this type)
4	Sub-panel 4 Product ID (Fifth panel of this type)
5	Sub-panel 5 Product ID (Sixth panel of this type)
6	Sub-panel 6 Product ID (Seventh panel of this type)
7	Sub-panel 7 Product ID (Eight panel of this type)
8	No function
9	No function
A	No function
B	No function
C	No function
D	No function
E	For development and manufacturer use only (Loads fixed Product ID via Boot Loader to regain communication contact)
F	For service use only (Reloads software via Boot Loader)

2.1.2 COM LED

A green LED is located on the rear side of the panel and is blinking as long as the communication on the USB is OK.

2.2 Heading Wheel

The Heading Wheel comprises one heading wheel and seven buttons. Three of these buttons are located in front. The other four are located on each side of the Heading Wheel.

See also figure *Front layout of the COP-05 Heading Wheel Panel* on page 10.

- **Heading Wheel**

  This is used for setting a new course.

- **Set/Activate** button

  This button is used for initiating or allowing new course changes.

- **Heading** buttons (arrow buttons)

  For adjusting the new course with ± 0.1 degrees.

- **Rate of Turn/Turn Radius** buttons

  For adjusting Rate Of Turn (ROT) or Turn Radius.

- **Distance to Turn** buttons

  For adjusting Distance To Turn.

2.3 Backlight

The backlight is integrated in the panel film and has yellow colour. The backlight intensity can be adjusted from the computer via USB, and the function is implemented in the module using PWM.

2.4 Temperature sensor

A temperature sensor is provided within the module to monitor the operation temperature. If the temperature rises above a specified limit, a system alarm is given.

3 TECHNICAL SPECIFICATIONS

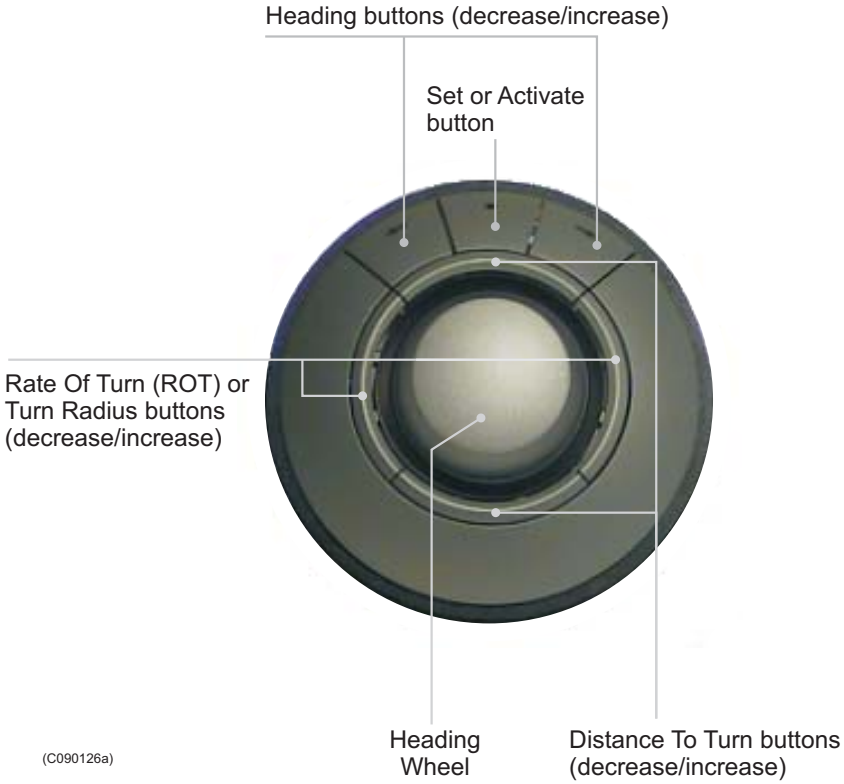
Table 2 Technical specifications

Power specifications	
Input voltage	5 Vdc
Power consumtion	0.5 W nom, 1.0 W maximum
Current consumtion	260 mA nom, 500 mA max
Connectors	
USB B (X3)	USB B-type connector
USB interface	
Standard	USB ver 2.0
Data transfer rate	12 Mbit/s
Mechanical specification	
Size without strain relief and heading wheel (WxHxD)	110 x 110 x 38 mm
Size with strain relief and without heading wheel (WxHxD)	110 x 110 x 76 mm
Weight	0.55 kg
IP	IP22
Environmental requirements	
Operating temperature	-15 - +55 °C
Storage temperature	-25 - +70 °C
Refer to Kongsberg Maritime Environmental Specification, reg. no.: 848-161011	
Life cycle specifications	
MTBF	not yet available

4 CONFIGURATION

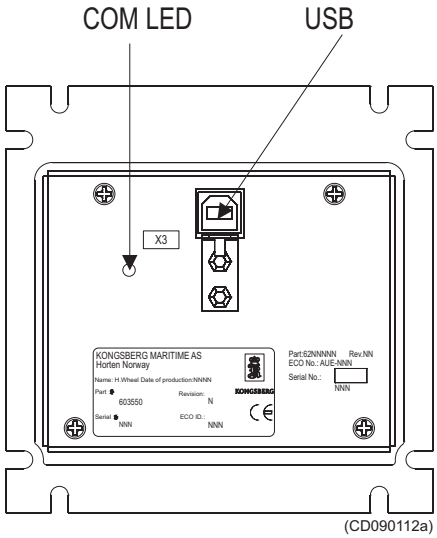
The illustration below shows the front layout of the COP-05 Heading Wheel Panel.

Figure 2 Front layout of the COP-05 Heading Wheel Panel



The illustration below shows the location of the LED and the connector on the rear of the COP-05 Heading Wheel Panel.

Figure 3 Rear layout of the COP-05 Heading Wheel Panel



4.1 X3 - USB connector

X3 is a vertical, type B USB connector with metal shell. The USB cable can be strapped to the cable support to obtain strain relief (see Figure *Rear layout of the COP-05 Heading Wheel Panel* on page 10).

Table 3 X3 - USB connector terminal allocation

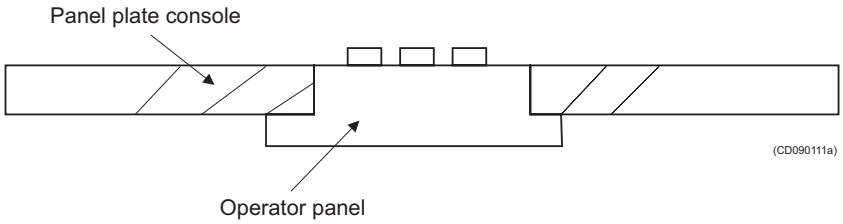
Pin no.	Name	Function
1	VBUS	Power supply, positive terminal
2	D-	Data signal, negative terminal
3	D+	Data signal, positive terminal
4	GND	Power supply, ground reference
Shell	Shield	Cable shield

5 INSTALLATION

5.1 Mechanical preparation before installation

1 Make a cut-out in the panel plate according to dimensions shown in drawing HA464138 located in Attachment 1.

2 Attach bolts to the panel plate on its rear side for the four fixing nuts of the COP-05 Heading Wheel Panel.



5.2 Electrical installation

1 Set correct USB address for the module on the hexadecimal switch.

2 Place the COP-05 Heading Wheel Panel in its position and fasten the four nuts attaching the COP-05 Heading Wheel Panel to the panel plate.

3 Connect the USB cable to the X3 connector.

4 Strap the cable to the strain relief.

5 Provided the corresponding operator station (computer and monitor) is up and running, verify that the COP-05 Heading Wheel Panel is functioning OK.

6 REPLACEMENT

1. Remove bolts that fixes the panel plate to its console body.
2. Place the panel plate in a position you can gain access on both sides.
3. Unstrap the USB cable from the strain relief and remove the USB cable plug from the COP-05 Heading Wheel Panel.
4. Release the four nuts attaching the COP-05 Heading Wheel Panel to the panel plate.
5. Lift the COP-05 Heading Wheel Panel out of the panel plate.
6. Label the old panel with its error symptoms and put it aside.
7. Set the correct USB address for the new module on its hexadecimal switch.
8. Place the COP-05 Heading Wheel Panel in its position and fasten the four nuts attaching the COP-05 Heading Wheel Panel to the panel plate.
9. Connect the USB cable plug to the X3 connector.
10. Strap the USB cable to the strain relief.
11. Provided the corresponding operator station (computer and colour monitor) is up and running, verify that the COP-05 Heading Wheel Panel is functioning OK.

7 ATTACHMENT

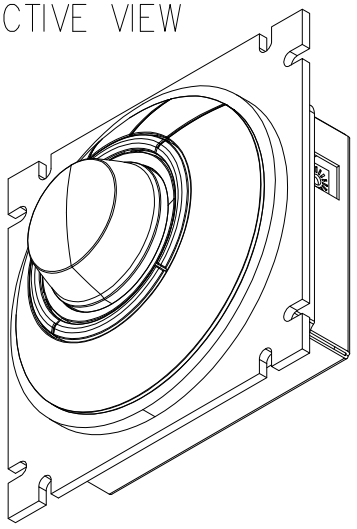
HA464138/A

HEADING WHEEL PANEL, DIMENSIONS AND CUTOUT, STANDARD MODULE DRAWING

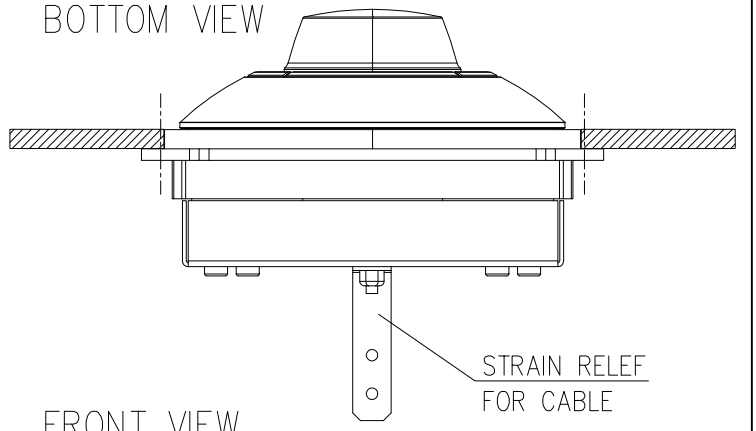
DOC.NO.: S-0653-E

ECO: AOE-011890

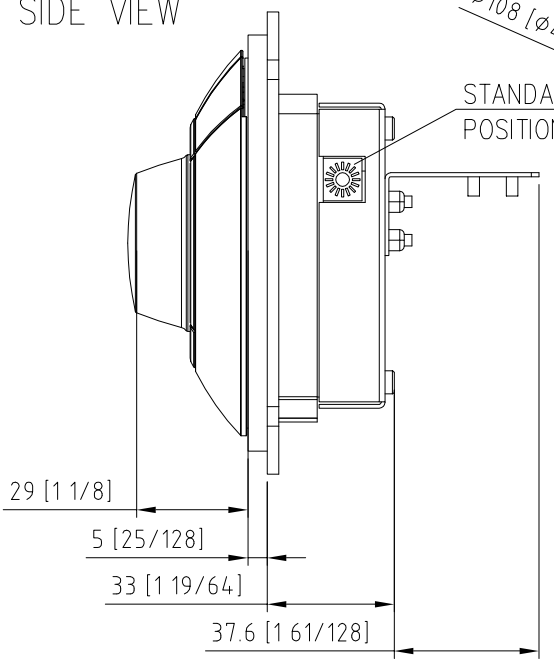
PERSPECTIVE VIEW



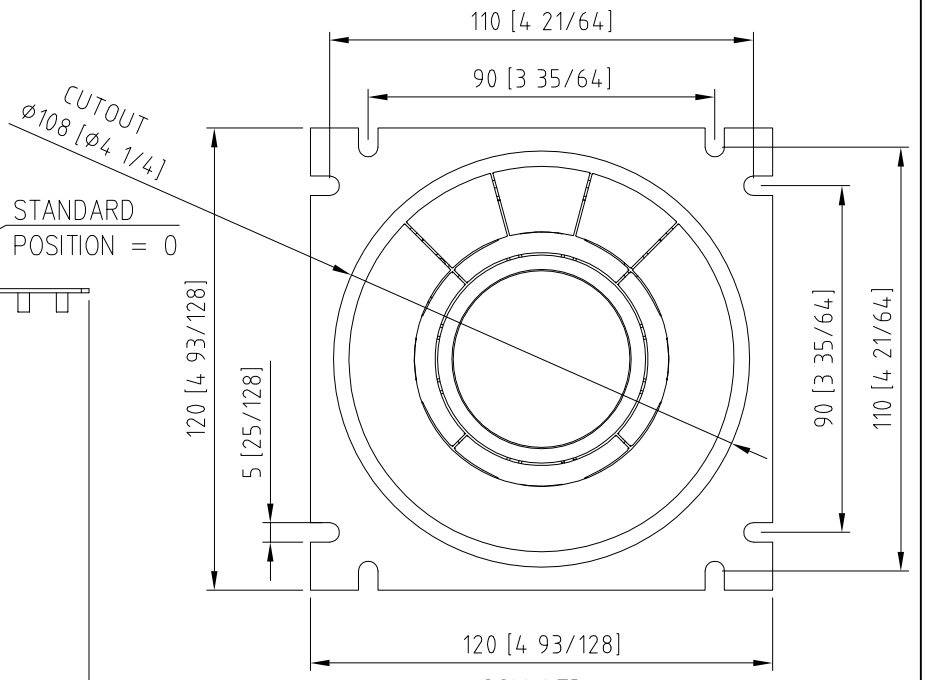
BOTTOM VIEW



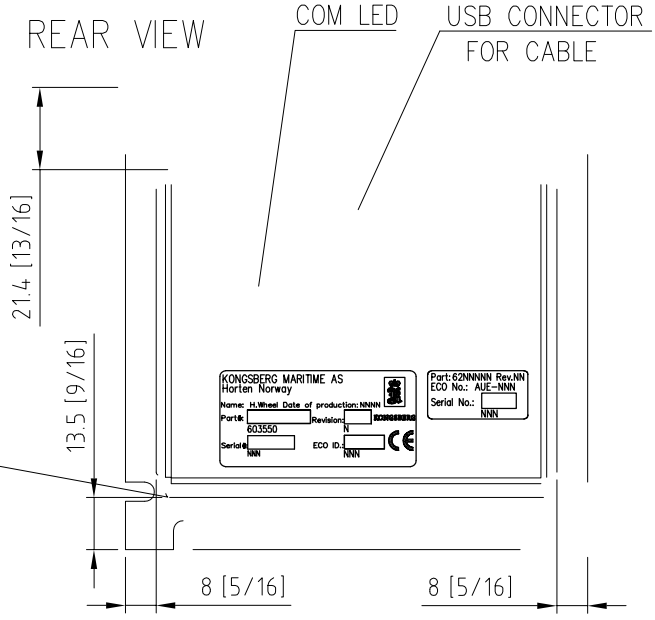
SIDE VIEW



FRONT VIEW



REAR VIEW



ISSUE	CHANGE	DATE	SIGN
A	1.PROD.ISSUE	05-11-02	BSK

HEADING WHEEL

DIMENSIONS AND CUTOUT
STANDARD MODULE DRAWING

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	TRACED	APPROVED 1
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