XDi series series
Marine Bridge Instrumentation

XDi indicators library

Libraries are always made by DEIF !

The libraries for XDi can be:

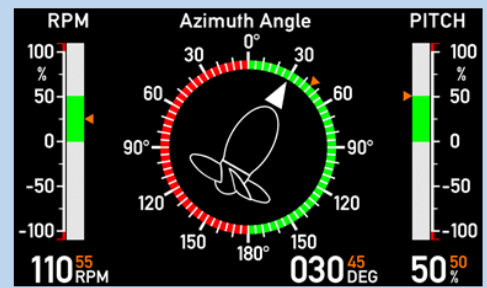- DEIF standard libraries
- Customized

USB update from PC

With a built-in USB interface on the rear side of the XDi, upgrading units with new libraries or other updates is a simple and easy procedure.

XDi D/M Standard library overview

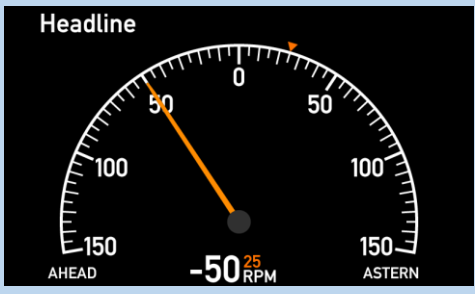| Indicator type	Data inputs	Library product class	Library number	Example
Azimuth	1-2	Dual (D)	001	
	3 or more*	Multi (M)	001	
Tunnel thruster	1-2	Dual (D)	011	
	3 or more*	Multi (M)	011	
Main propulsion	1-2	Dual (D)	021	
	3 or more*	Multi (M)	021	

- Azimuth angle (A&D)
- % RPM / RPM
- % Pitch
- Set-point (can be disabled)

- % RPM / RPM
- % Pitch
- % Thrust
- %Load
- Set-point (can be disabled)

- %Pitch and Propeller RPM
- %Pitch, Prop. & Engine RPM
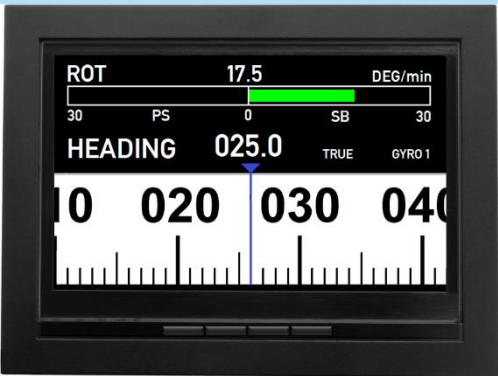- Set-point (can be disabled)

Selection of indicator setup profiles (VS) to support CAN, Analogue and Digital inputs

XDi D/M Standard library overview

| Indicator type	Data inputs	Library product class	Library number	Example
Rudder angle	1-2	Dual (D)	031	
	3 or more*	Not applicable	-	
RPM	1-2	Dual (D)	041, 042	
	3 or more*	Not applicable	-	
Universal digital	1-2	Dual (D)	051	
	3 or more*	Multi (M)	051	

- Standard rudder scales
- For FWD & AFT bridge
- Set-point (can be disabled)

- Standard RPM scales (ISO)
- 0   X RPM
- +/- RPM range
- 0   100% RPM w/digital RPM
- +/- 100% RPM w/digital RPM

- Single/Dual large digital
- %Pitch and actual RPM
- +/- RPM range
- Single, Dual, Multi Universal indicators

XDi-N Standard libraries

| Application	Data inputs	Library numbers	Indicator example
Anemometer, relative wind (Released)	NMEA0183 (1 to 6)	N 001	
Navigation Indication Heading Depth, speed Universal digital More…. (Planned for Q3-17)	NMEA0183 (1 to 6)	N 001 to 999	

Navigation libraries – expected content

- Heading repeaters (selection of types)
- Rate of turn
- Docking display(s)
- Speed
- Depth
- Position / date time
- WP information
- Navigation steering info
- Distance travelled
- Weather data
- Roll / Pitch / Heave
- More indicators over time   .
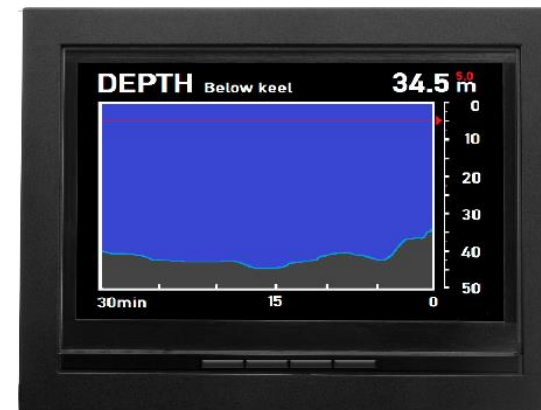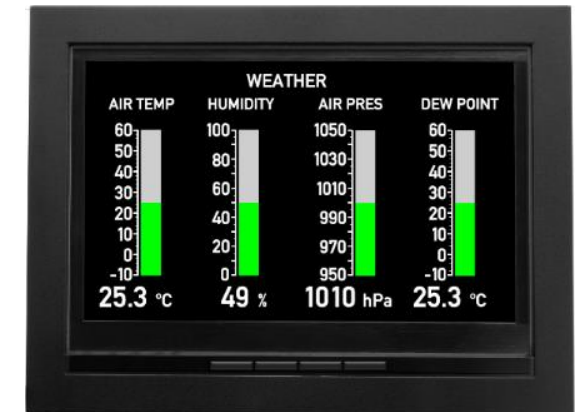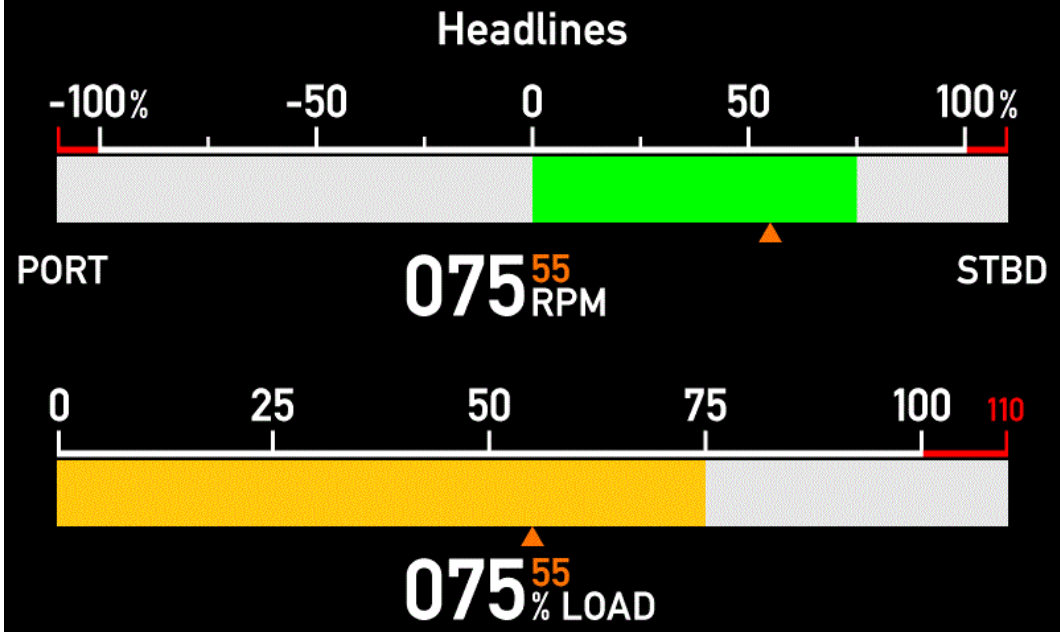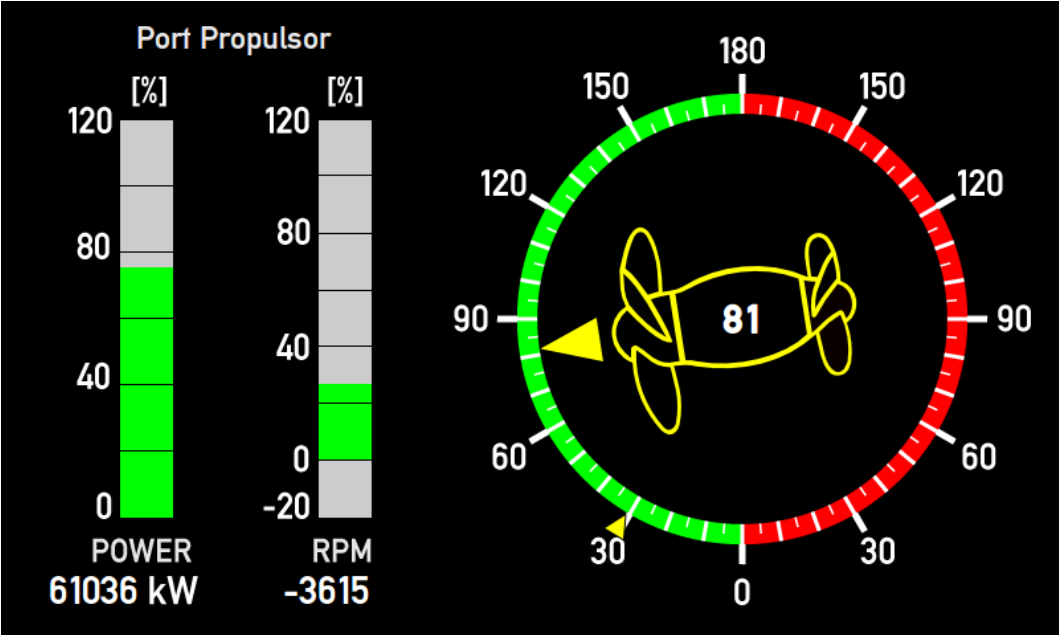
Class approved as indicators

Certificates:

- MED

- DNV GL

- CCS

- ABS

- RMRS

- RRR
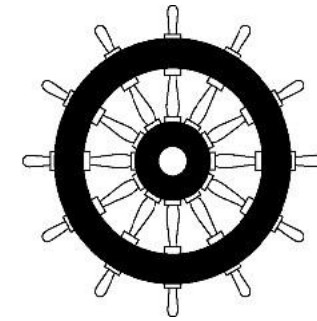
Double Pointer

Presentation of actual and set-point data (commanded data)

Customised Warning Marks

"RED sector"
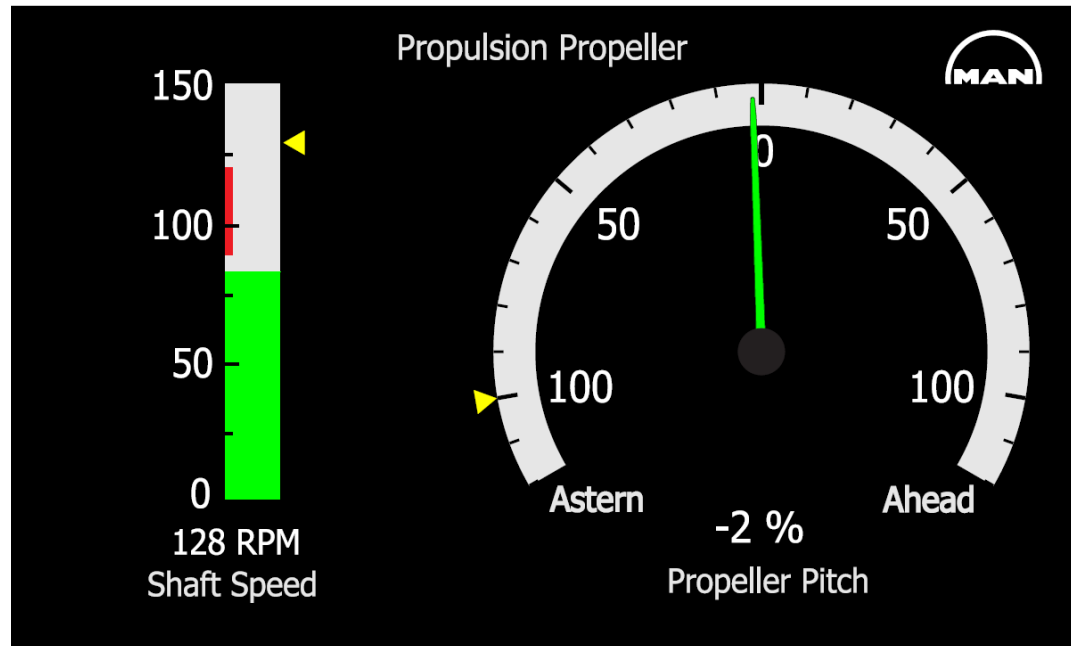
Up to 4 restricted bands   Colour change in restricted sector
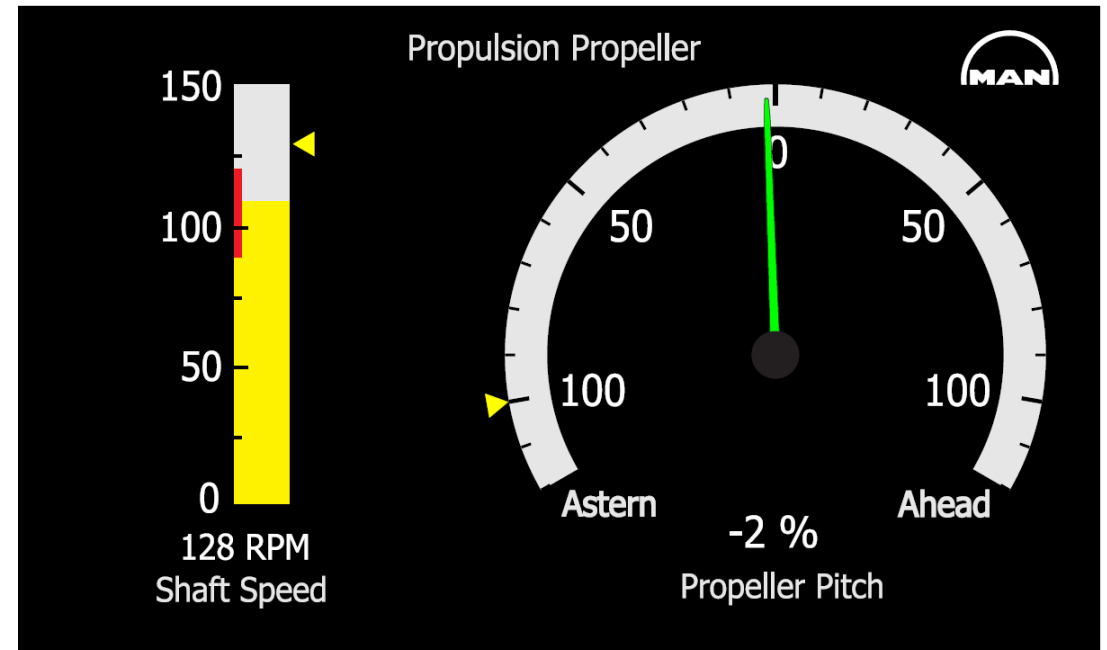
Bar graph colour shift

Bargraph colour shift
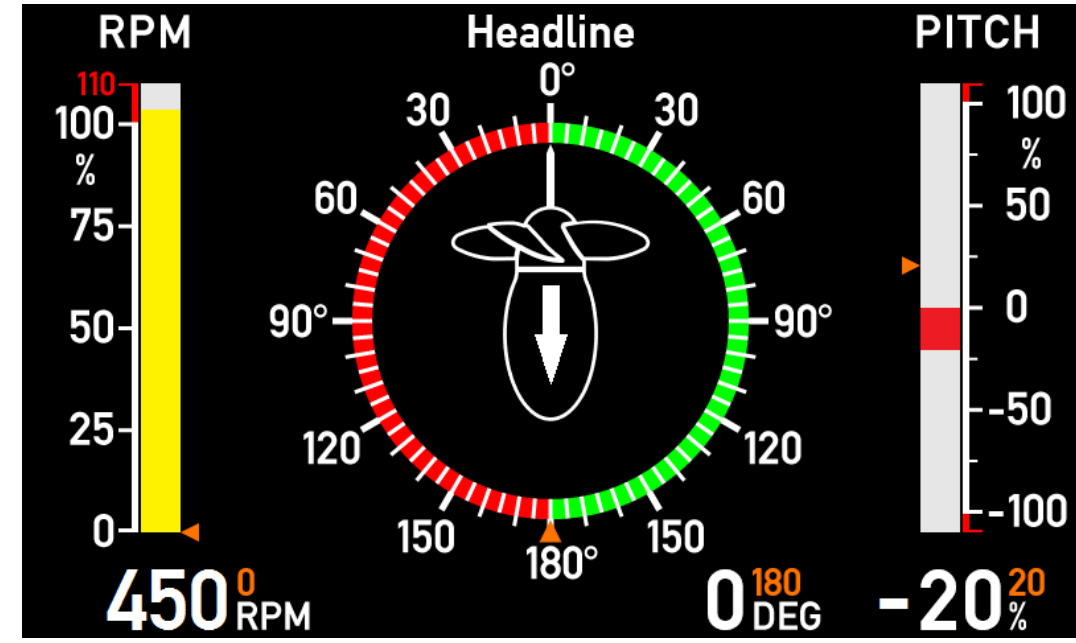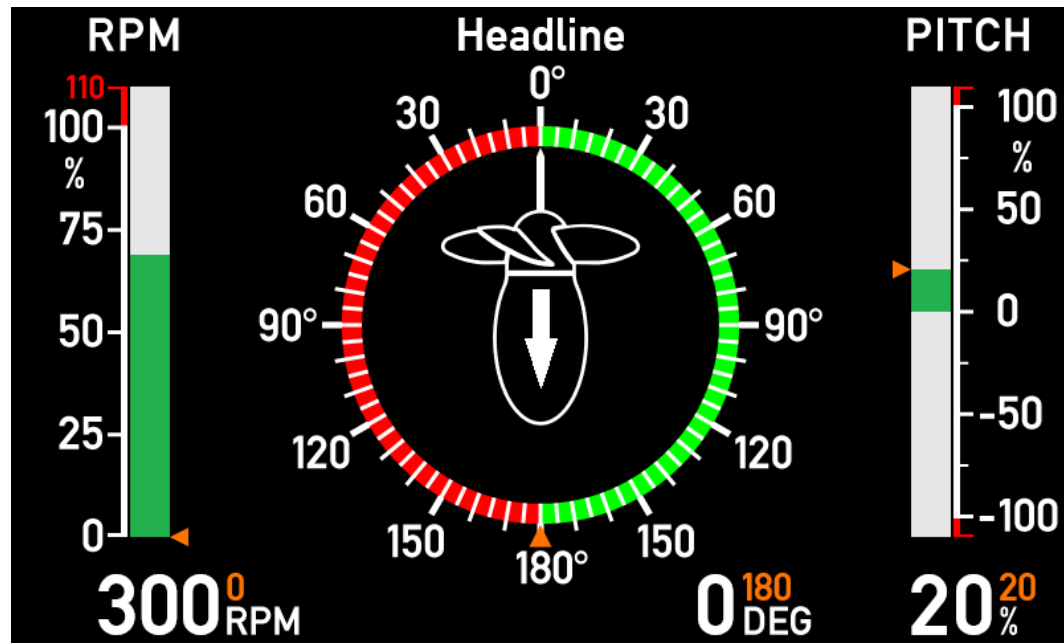
Options: +/- values, Out of range or Inside restricted bands

Headline on the Indicator

1. One or more selectable headlines
2. Selectable labels and/or units (dement on approvals!)
3. Warning marks (lines or bars)
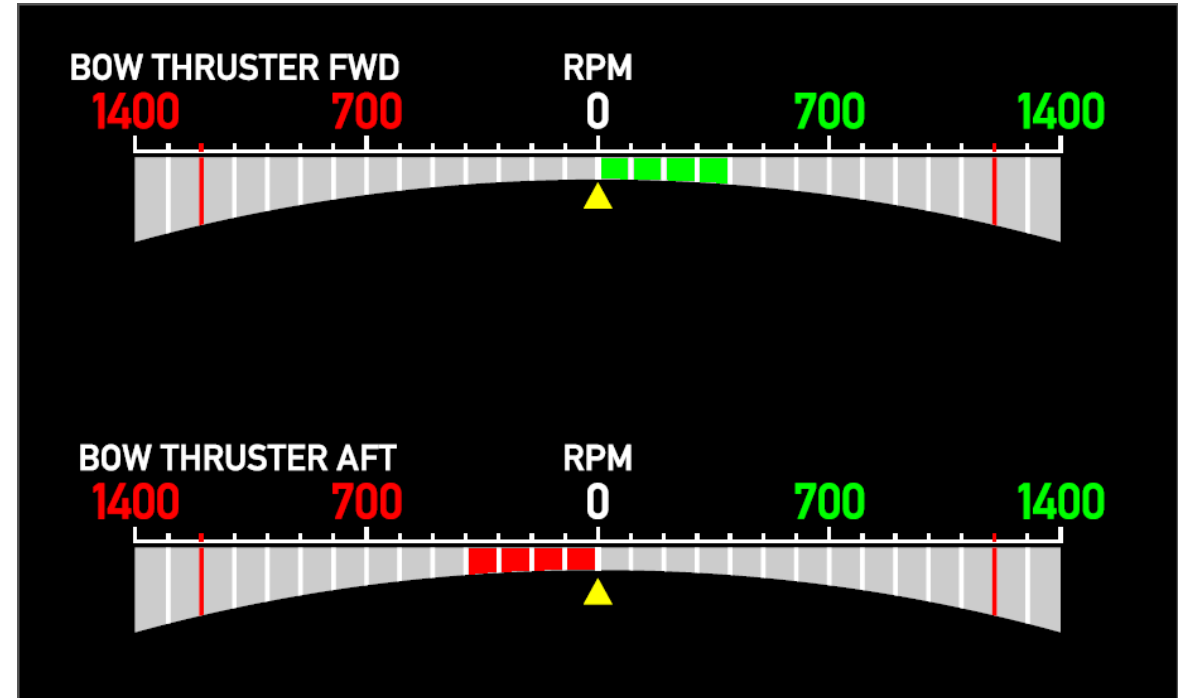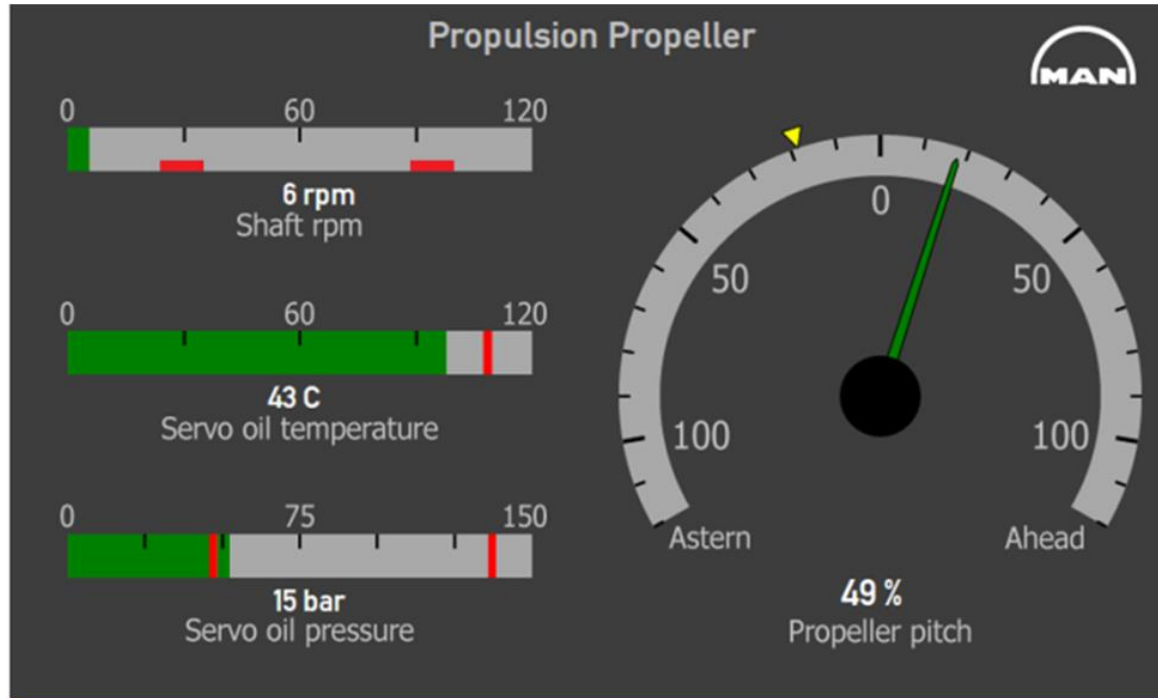
Circular warning marks
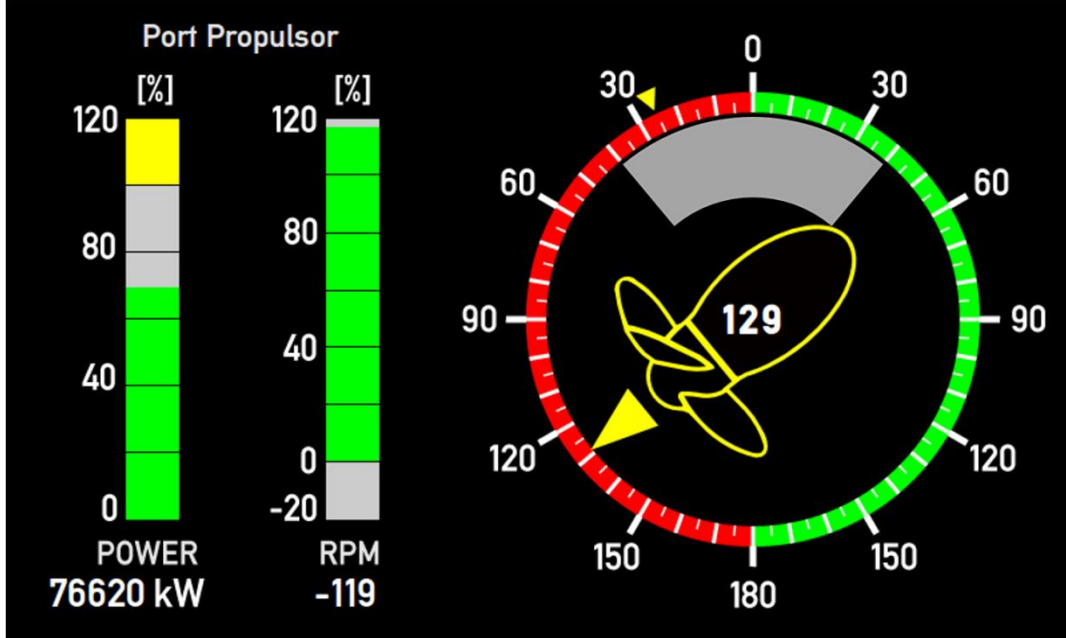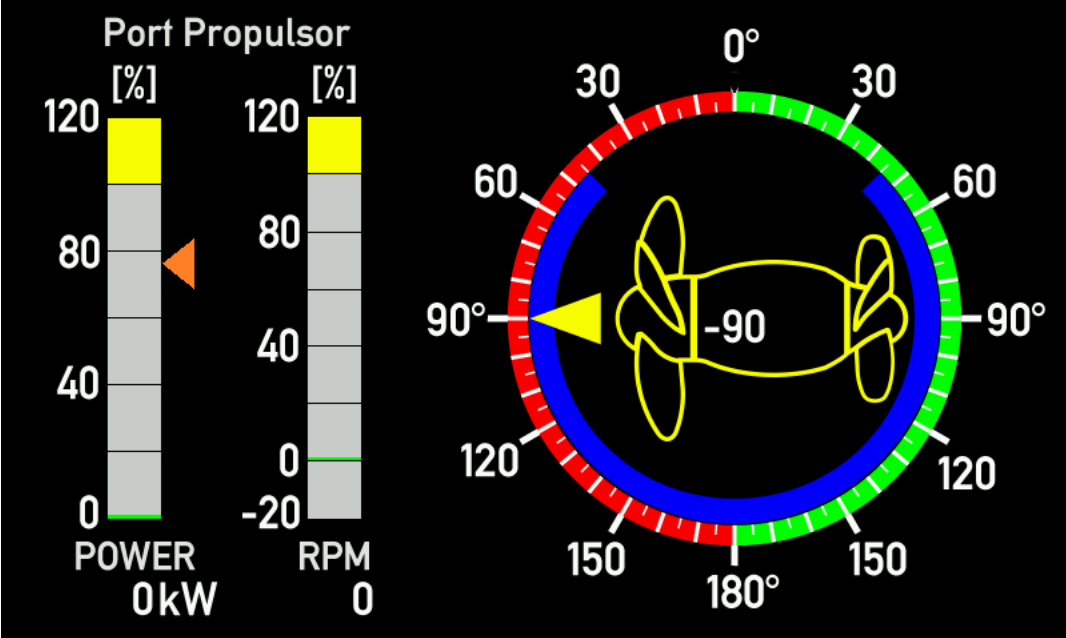
Dynamic disc pointer
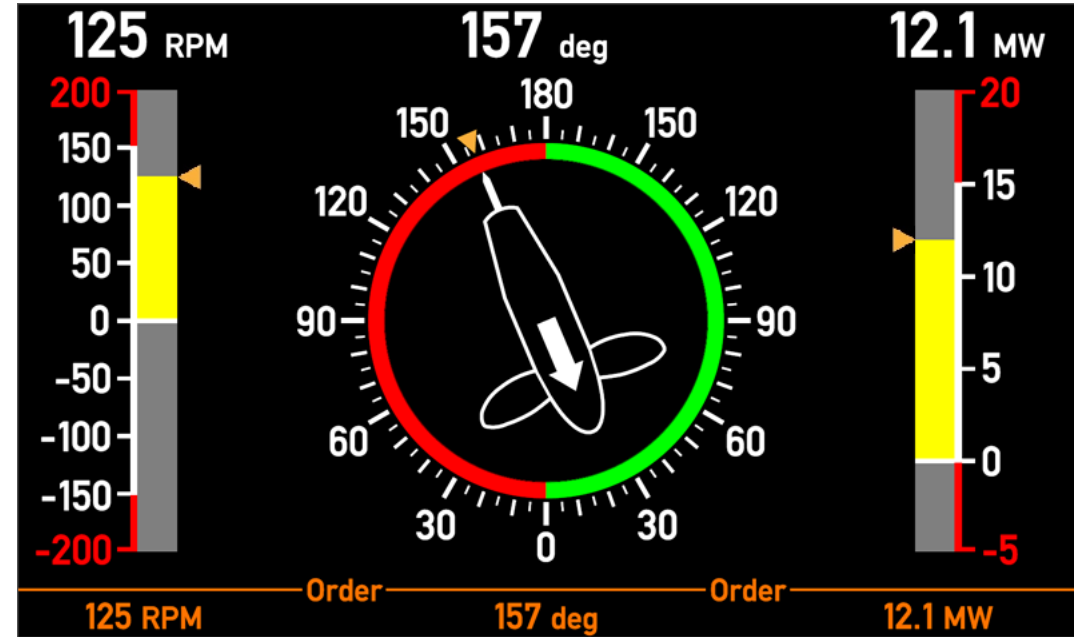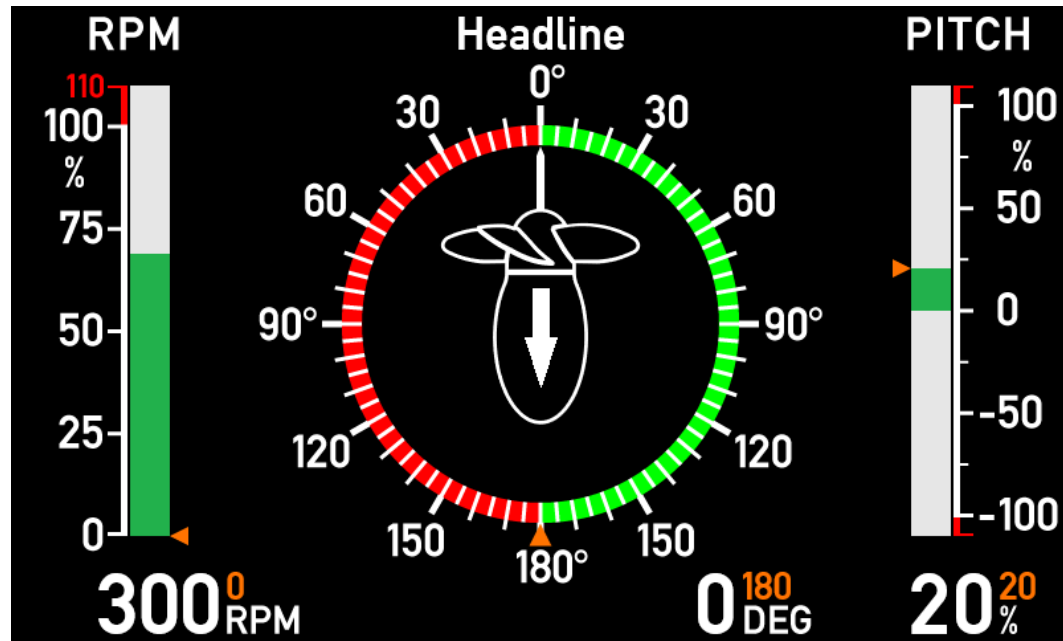
Options: Have force indicated by an Arrow controlled by e.g. % Pitch
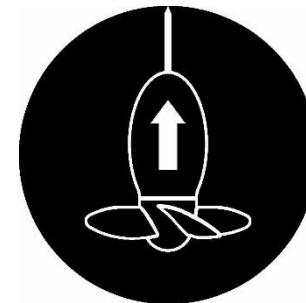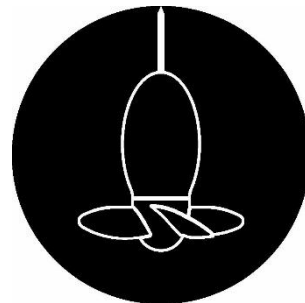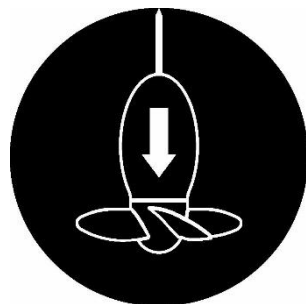
New Possibilities Day / Night Colour
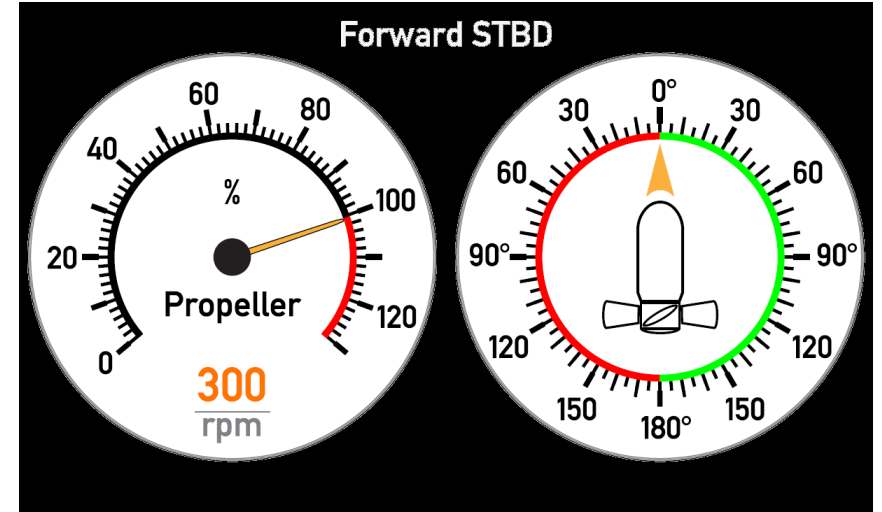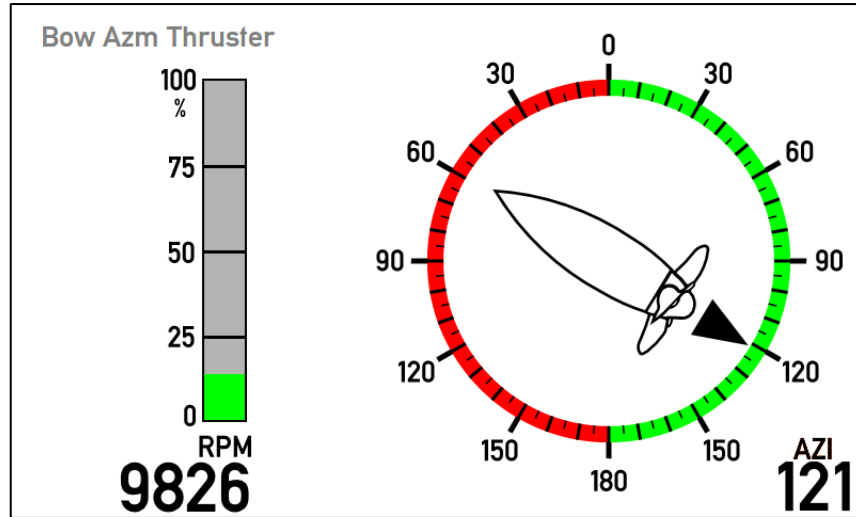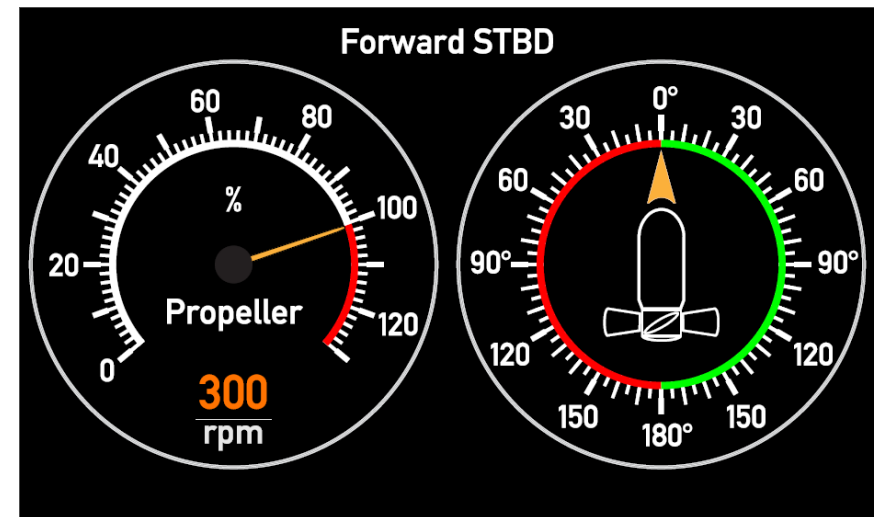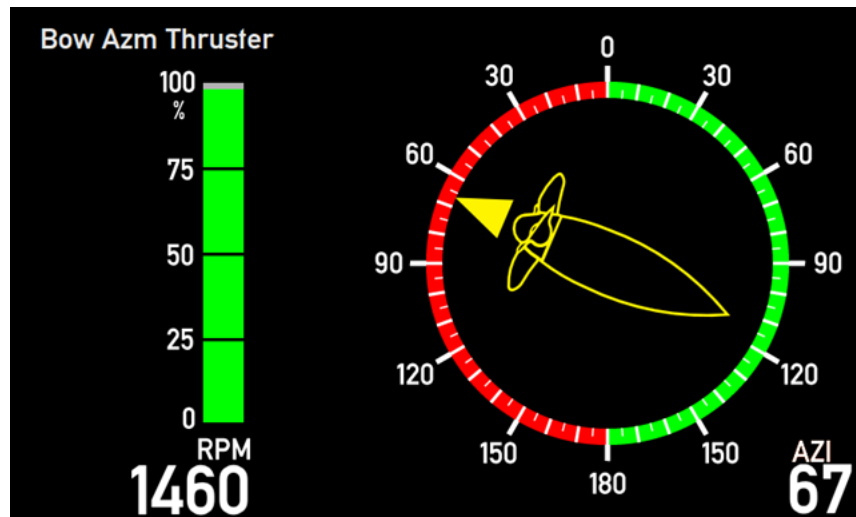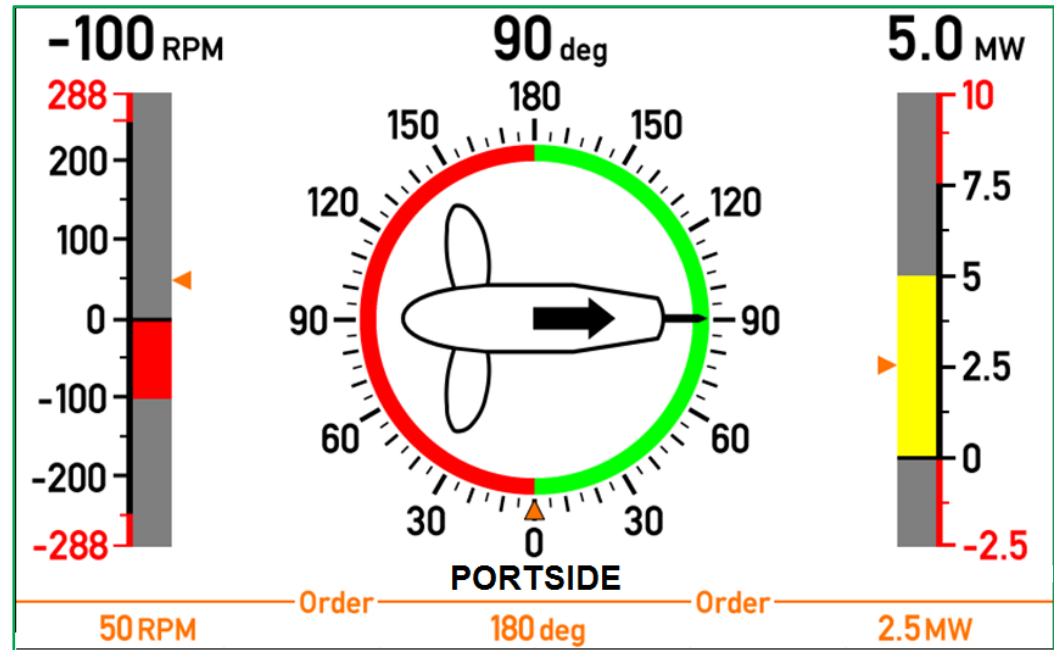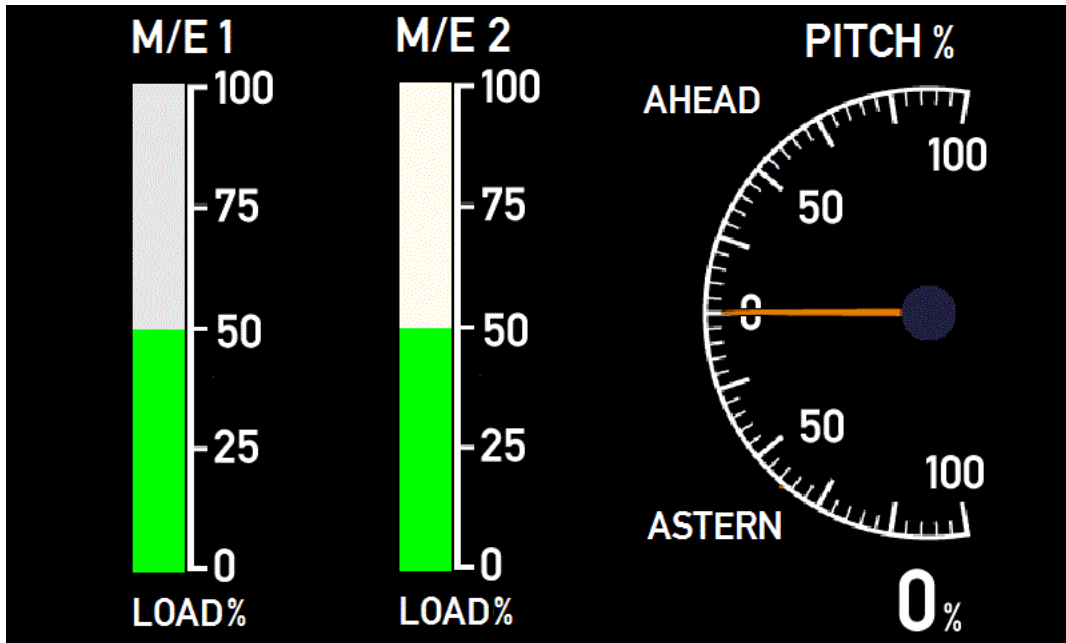
Special custom

Special customized - dynamic indicator
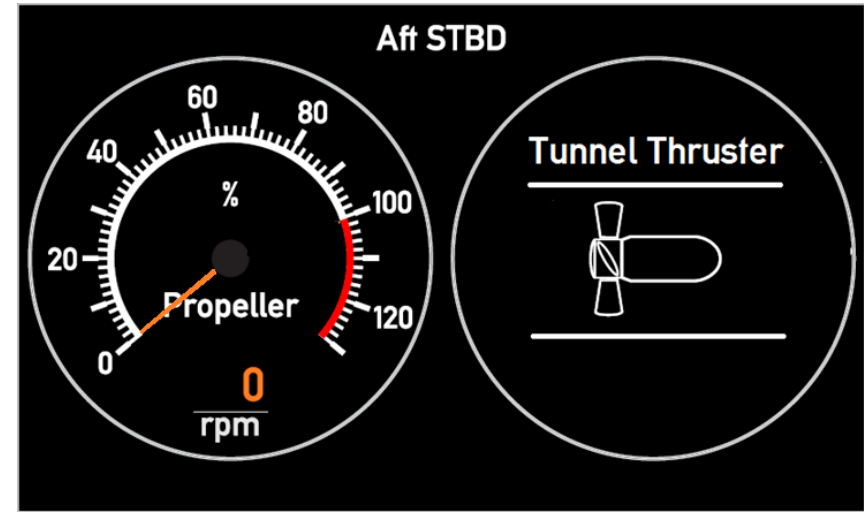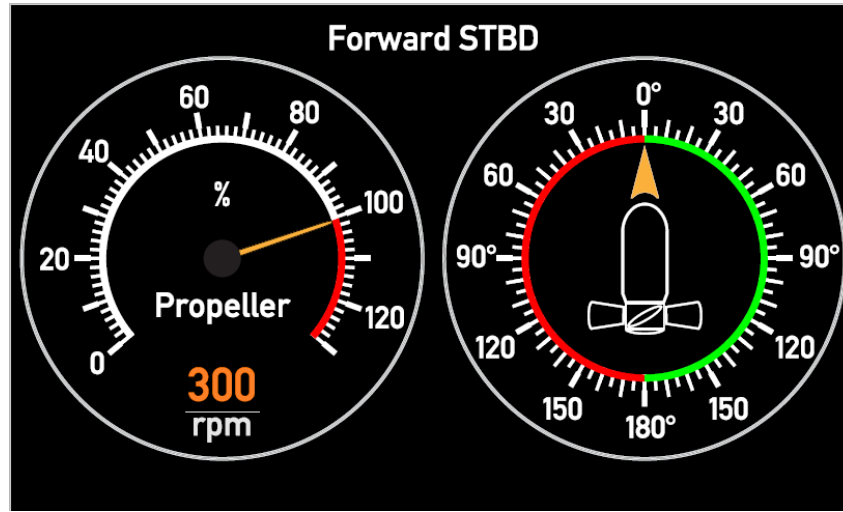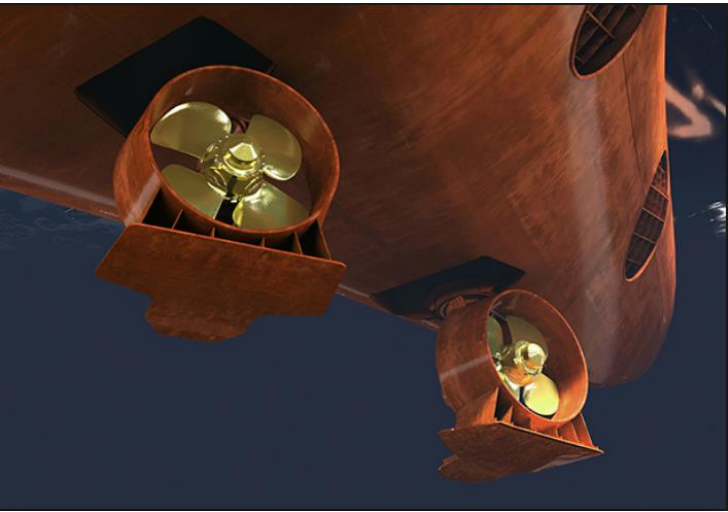
Retractable
Combi thruster

Azimuth
or
Tunnel thruster

Mode is Controlled by analogue inputs
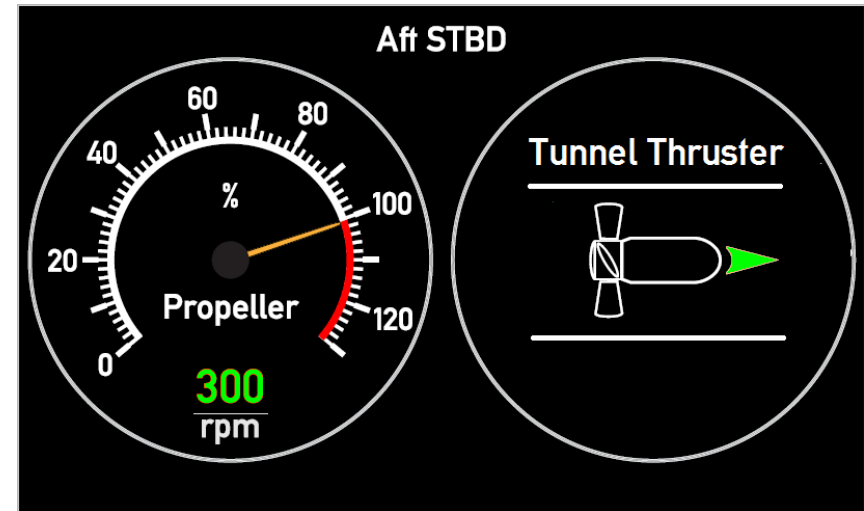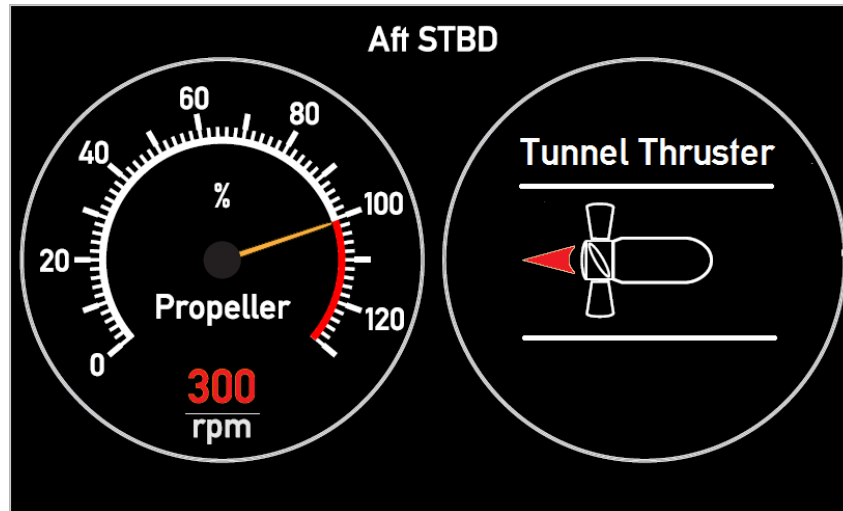
Advanced custom design
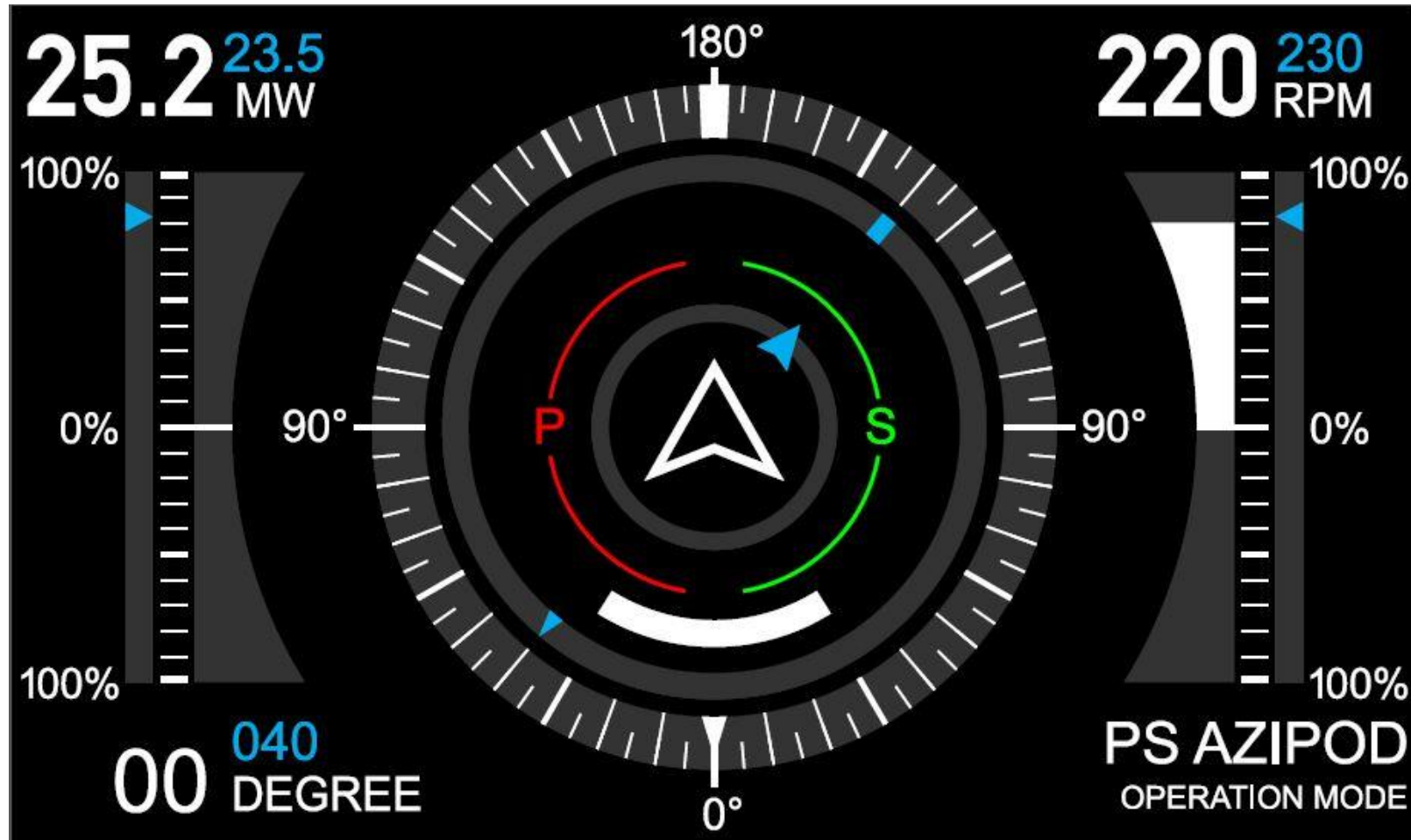
Advanced custom design

Universal indicators
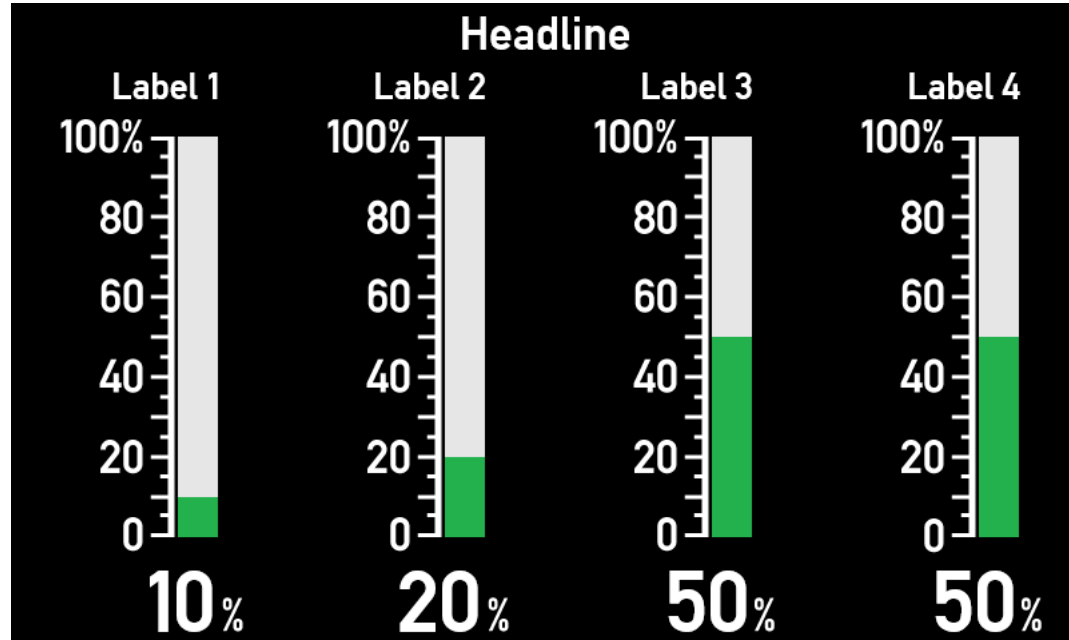
Universal bar graph
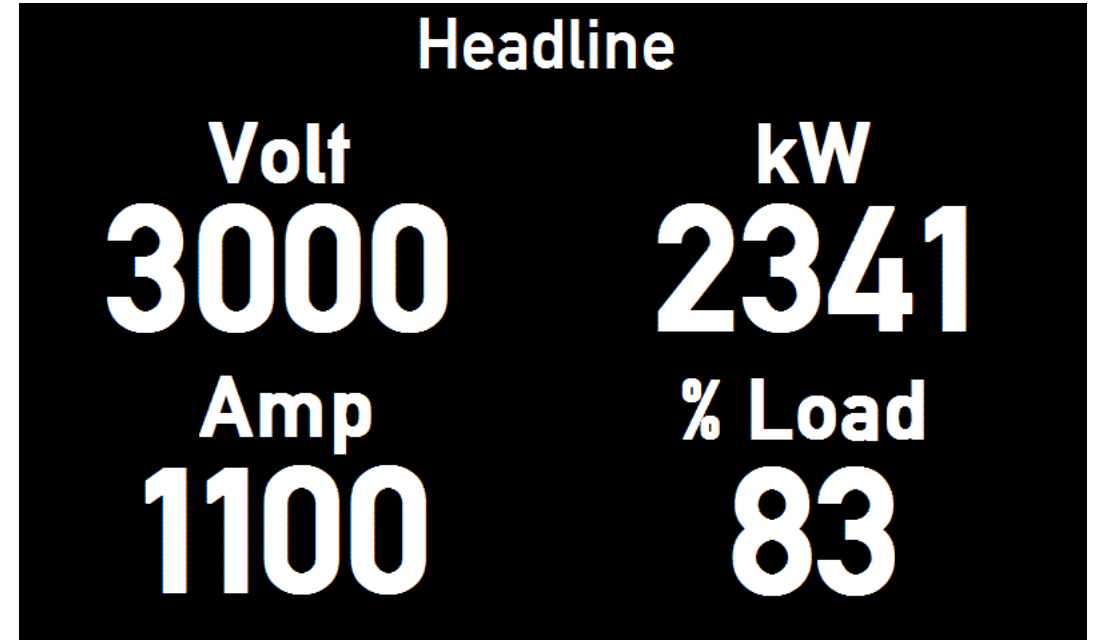
Universal digital

Input can be from CAN bus or Analogue inputs (mA or V)

Fish farm – Trim, List, Draft indicator

Out of trim

Trim OK

Special ship indicator
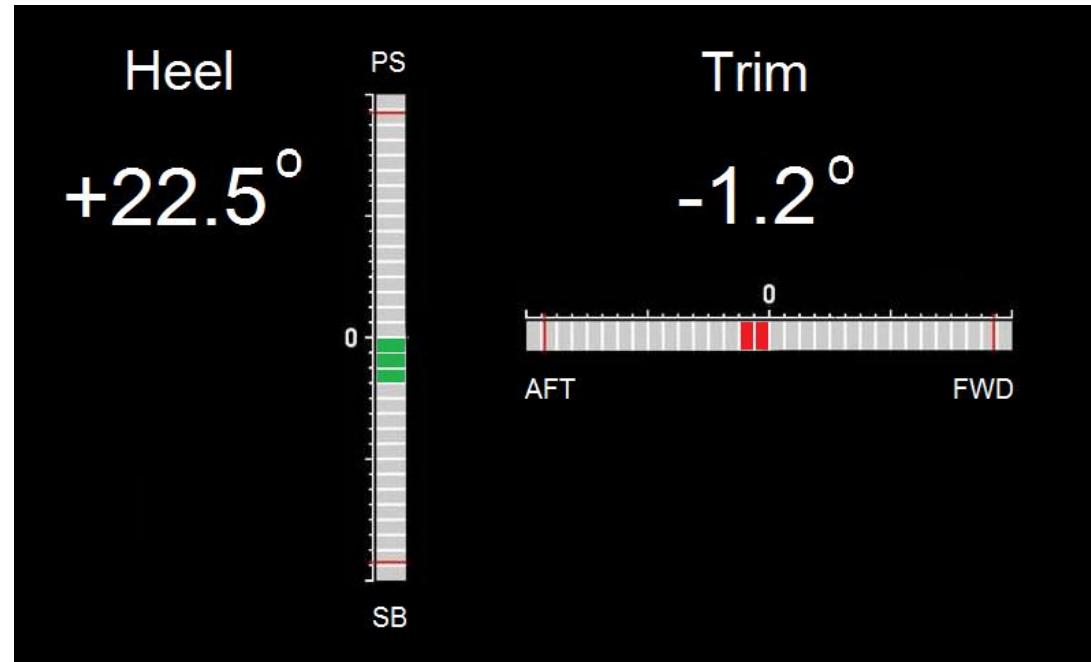
Customer Layout - Logo
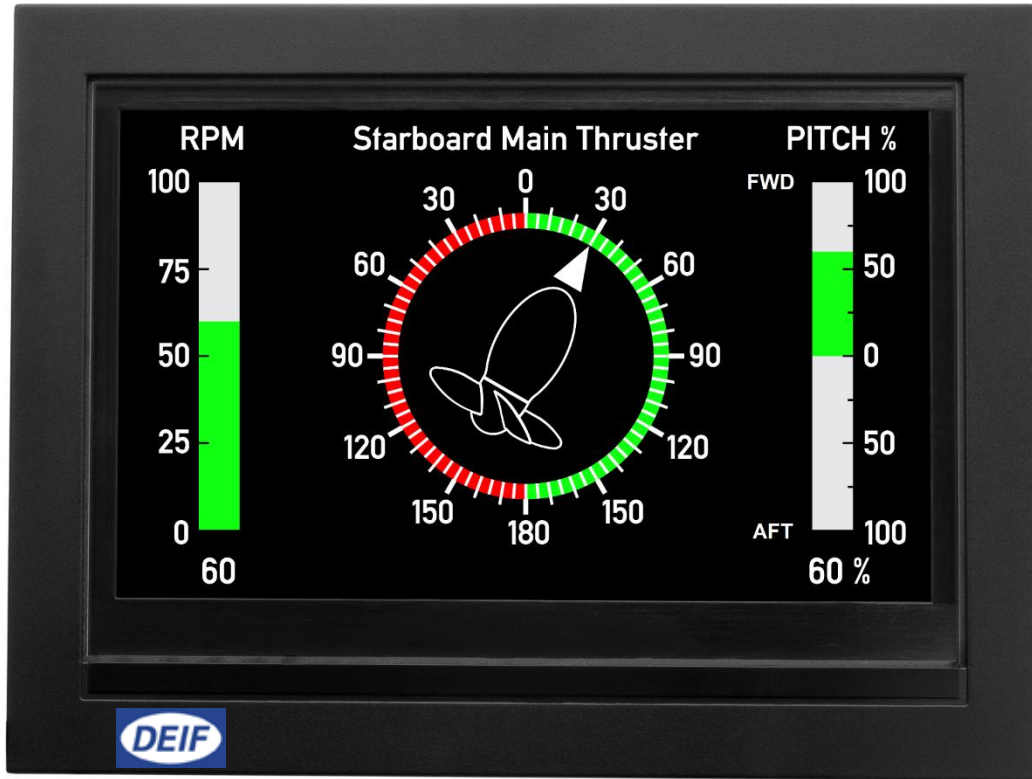
Logo printed on front frame*
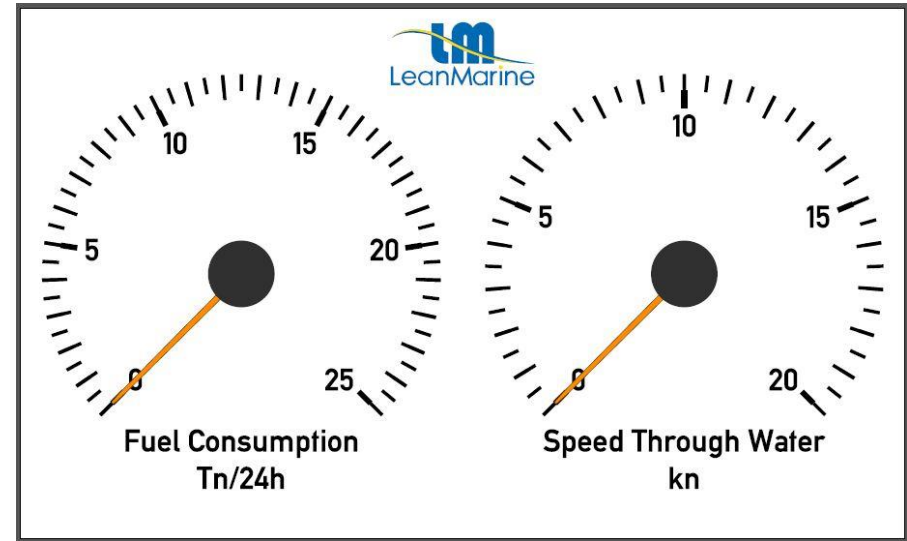
Logo on the indicator scale

* Recommended to have logo printed locally on spare front frames

New indicator design functions

Platform 2 offers new:

- New general design elements and functions

- Special elements and functions for XDi-N
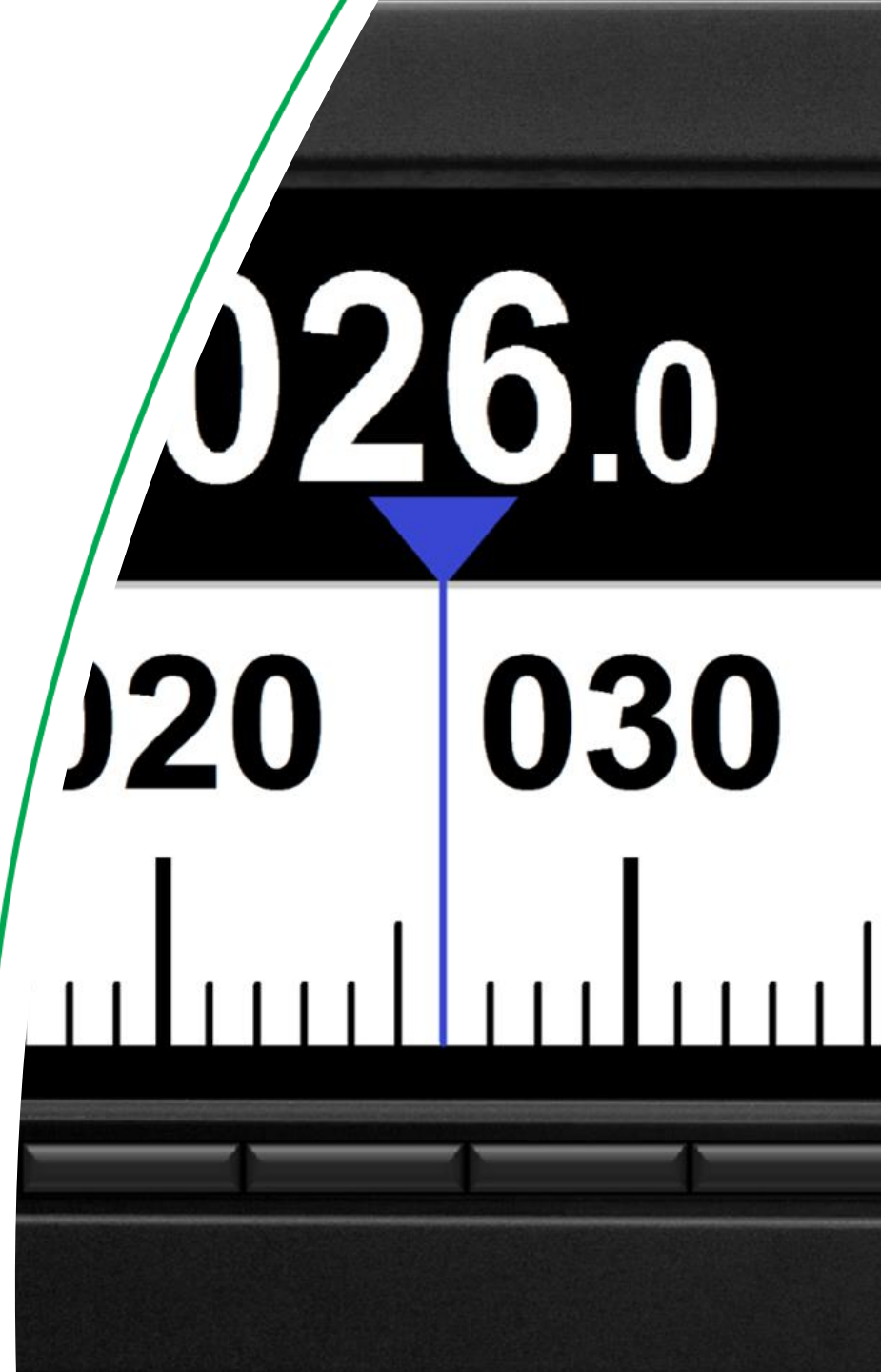
Mode Shift – 4 screens

Mode1. Relative wind

Mode 2. True wind (Ship)
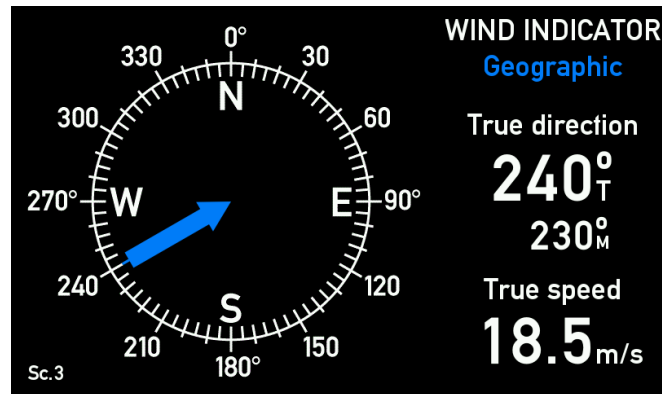
Mode3. Geographic true wind

Mode 4. Relative & True wind combi

The first button can be used to step through 4 modes. Each mode has 1 screen appointed
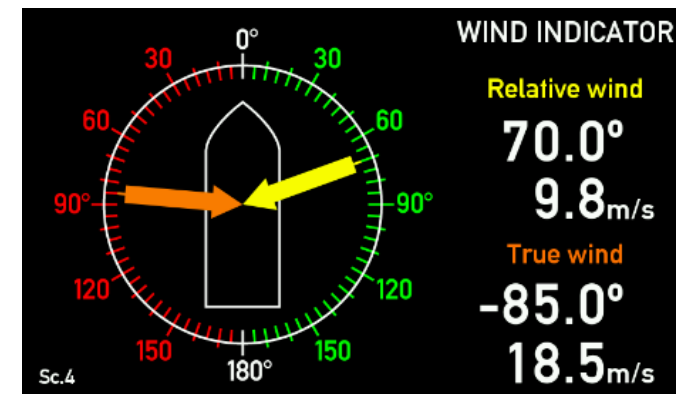
XDi examples – 4 screen wind (Aft bridge)

Aft bridge – example with Day colours

Relative and True wind
Aft bridge – Night colour

Sc.1 WIND INDICATOR — Relative wind — Rel. direction **70°** — Rel. speed **9.8** m/s

Relative wind

Sc.2 WIND INDICATOR — True wind — True direction **-85°** — True speed **18.5** m/s

True wind (Ship)

Sc.3 WIND INDICATOR — Geographic — True direction **240°**$_T$ **230°**$_M$ — True speed **18.5** m/s

Geographic true wind

Sc.4 WIND INDICATOR — Relative wind **70.0°** **9.8** m/s — True wind **-85.0°** **18.5** m/s
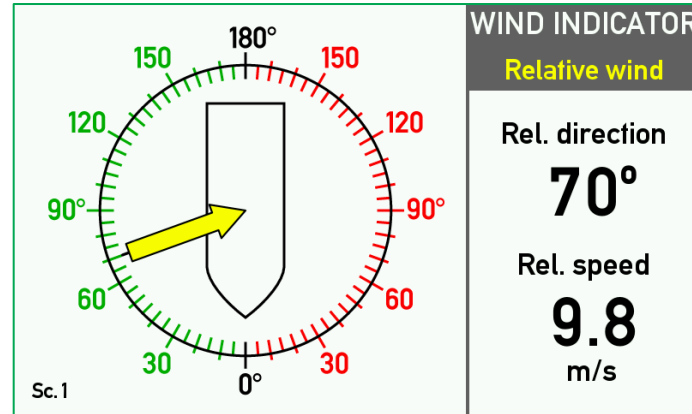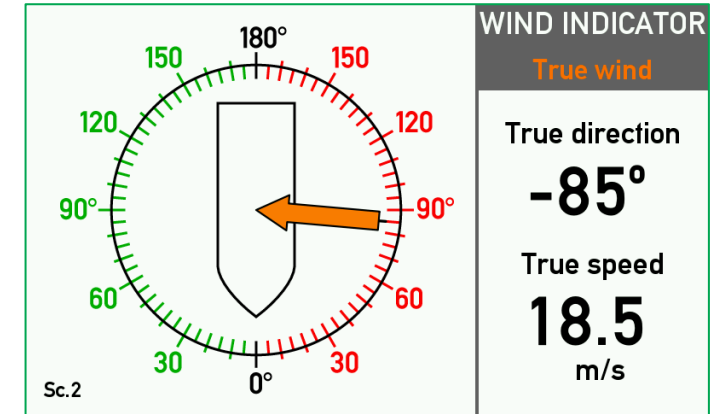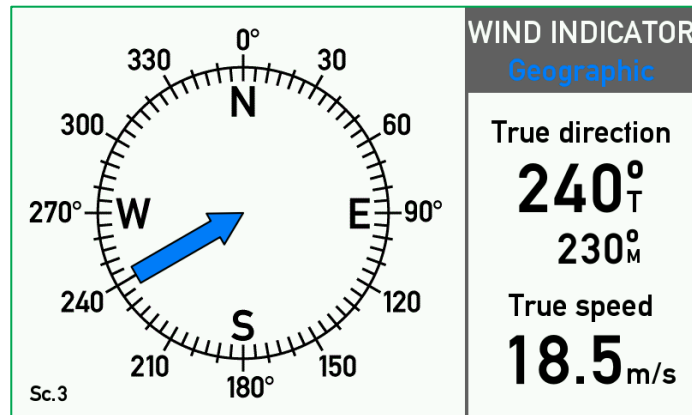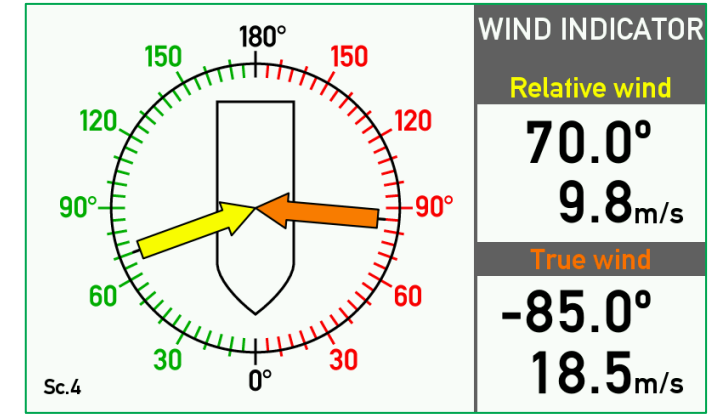
Relative & True wind combi

Docking display
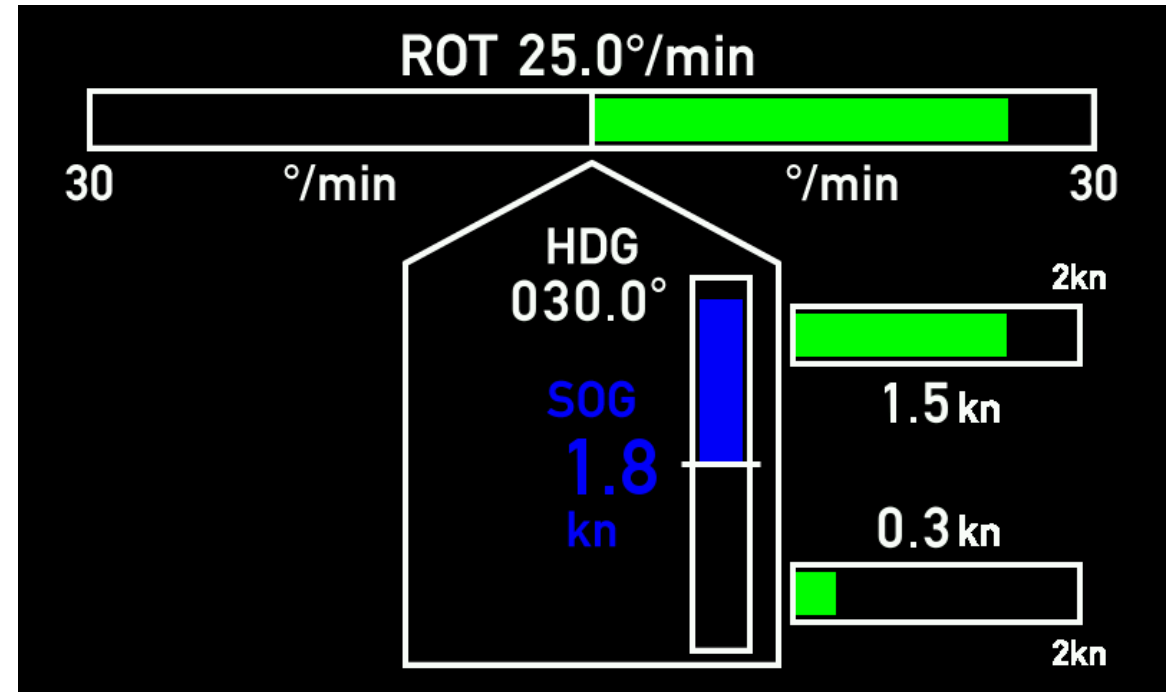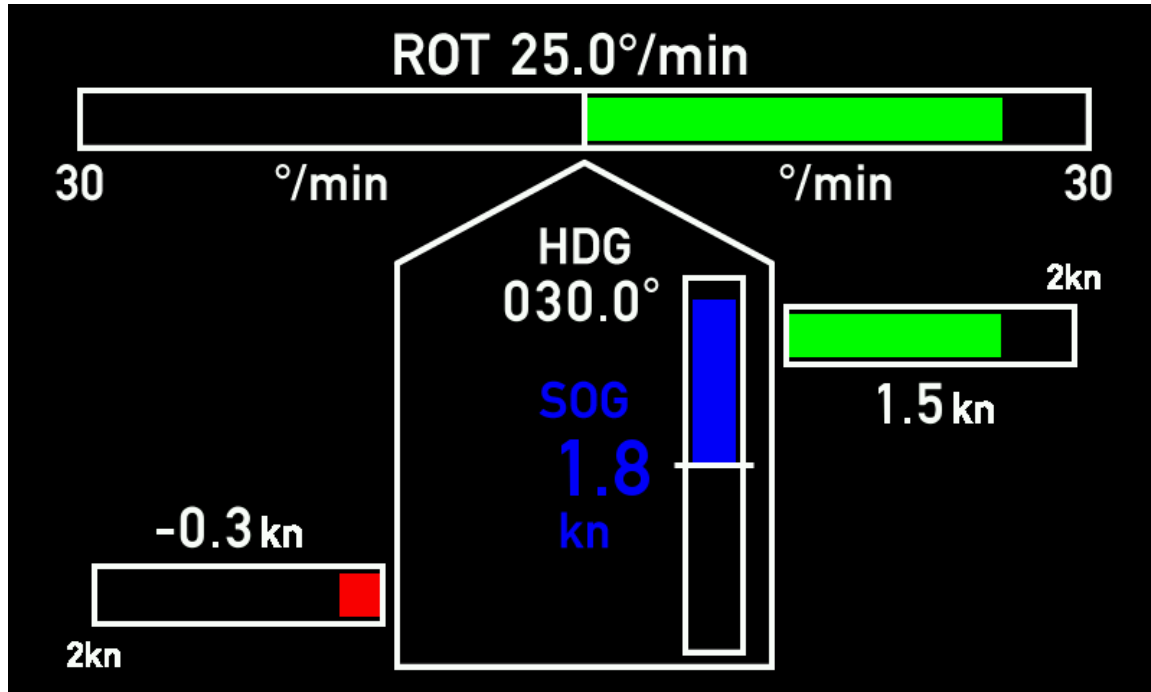
Controlled graphic elements
- Bar graph scales are controlled by the data values shown on the bar graph

Note:
- Graphical elements can also be controlled by a unit type.

New indicator type - Tape repeater

Very easily to read the actual heading at a glance

Acts as an endless tape.

Day / Dusk / Night design is possible.

Large compass repeater

Graphic presentation of historical data
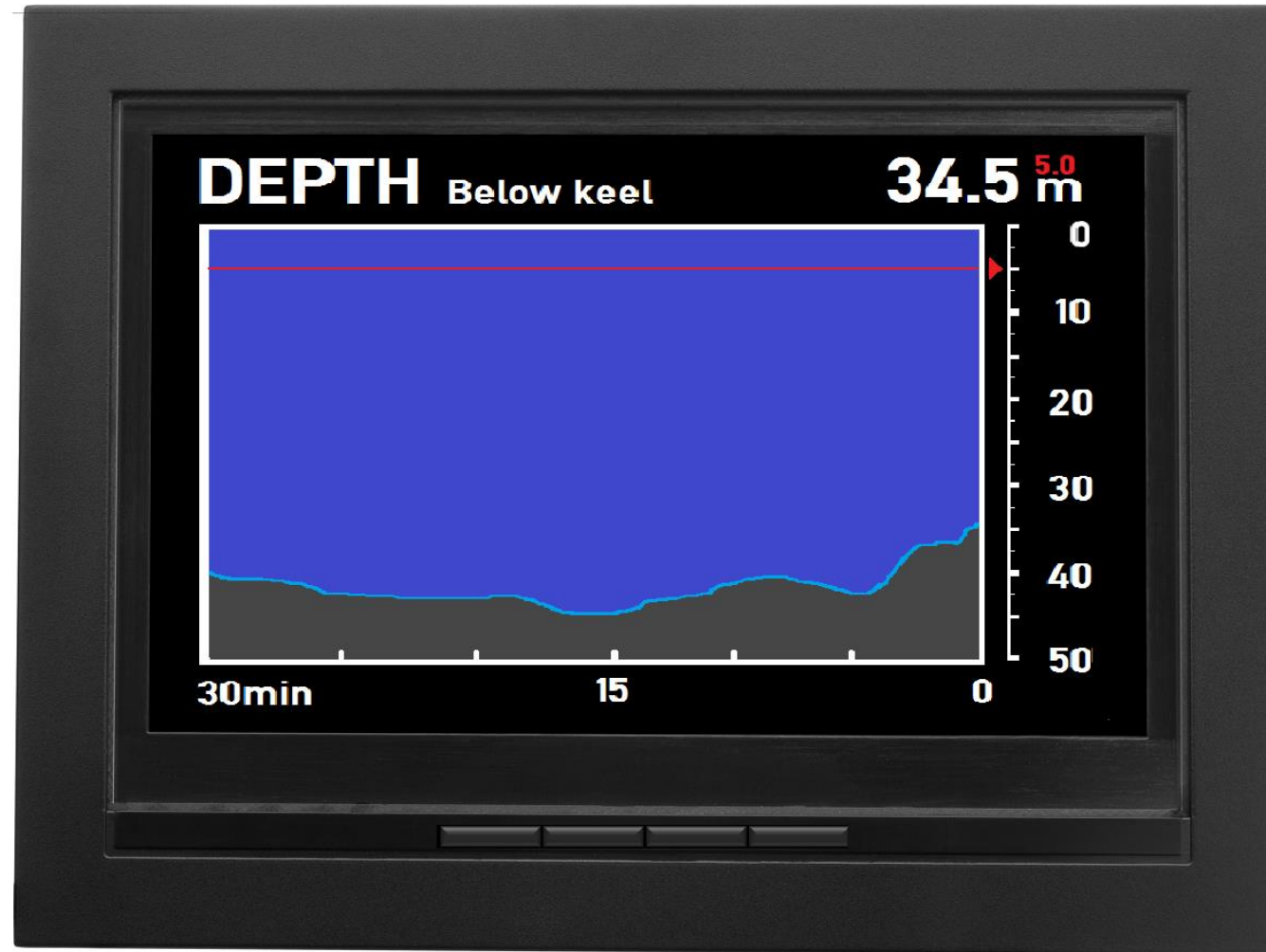
Graphic presentation of historical data
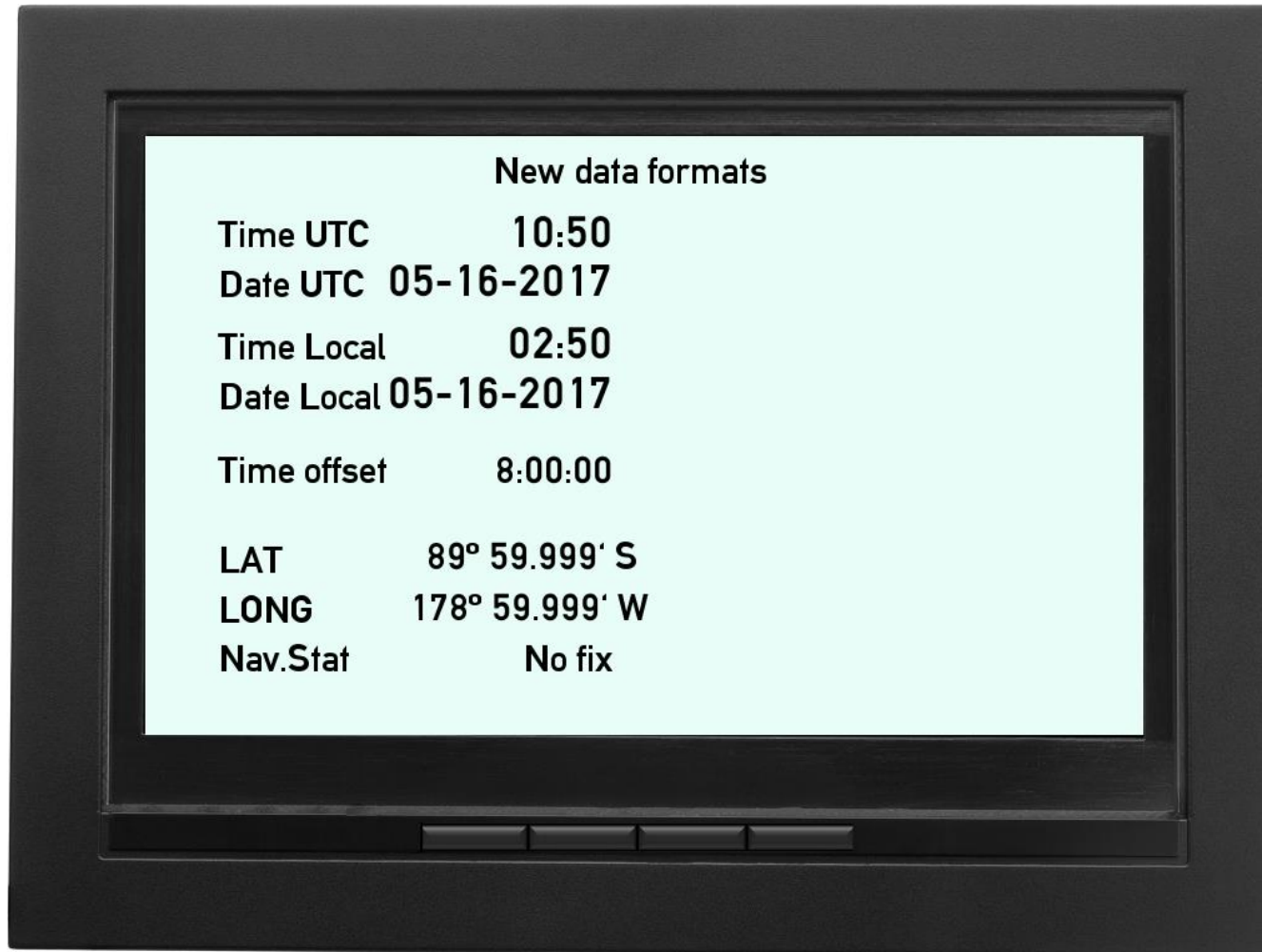
Test indicator

Time and date formats are included in: Unit profiles.

Can be changed via button 4

Interface options

Input and output

Standard input / output:
2 x CANopen / XDi-net ports

Optional input / output:
Extension modules

Input and output options

XDi144 or XDi192
with 2 extension slots
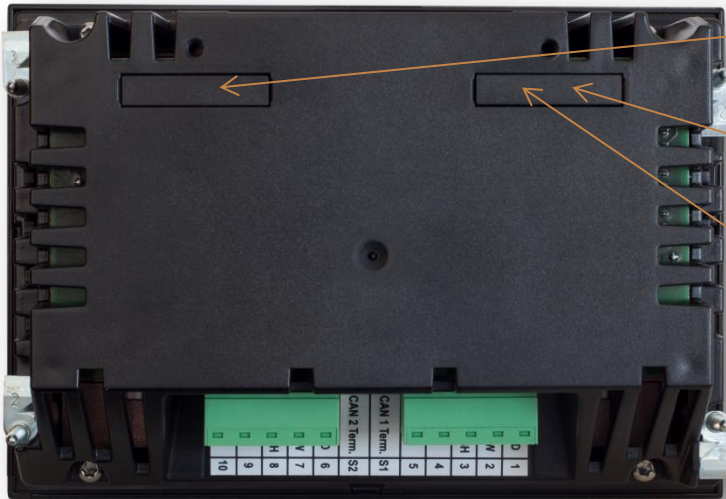
CAN 1 & CAN 2

XDi 96 has only one extension slot
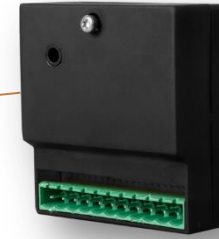
AX1
Analogue extension module
2 inputs (mA or V)
1 Dim. Input (V)
1 Voltage reference output

DX1
Digital extension module
2 digital inputs (RPM or dimmer)
2 relay outputs

NX1
NMEA0183 extension module
1 NMEA output (IEC61162-1)

XDi-N Extension modules

- Main XDi-N unit is default equipped with one NX2 NMEA module (Slot 2)
- XDi 144 N and XDi 192 N has one spare slots for an extra extension module
- Selected data are shared on XDi-Net (CANopen) and available for other indicators in the CAN network.
- Repeater XDi-N does not need the NX2 extension module – it can receive data via XDi-net!

NX2 NMEA
2nd module

or:

AX1 Analogue
2(3) input
Analogue dimmer
Ref. voltage out

NX1 NMEA output
1 RS422 output (NMEA)
2 contact inputs

DX1 Digital
2 opto-isolated inputs
(e.g. remote dimmer)
2 relay outputs

Slot1   Slot 2
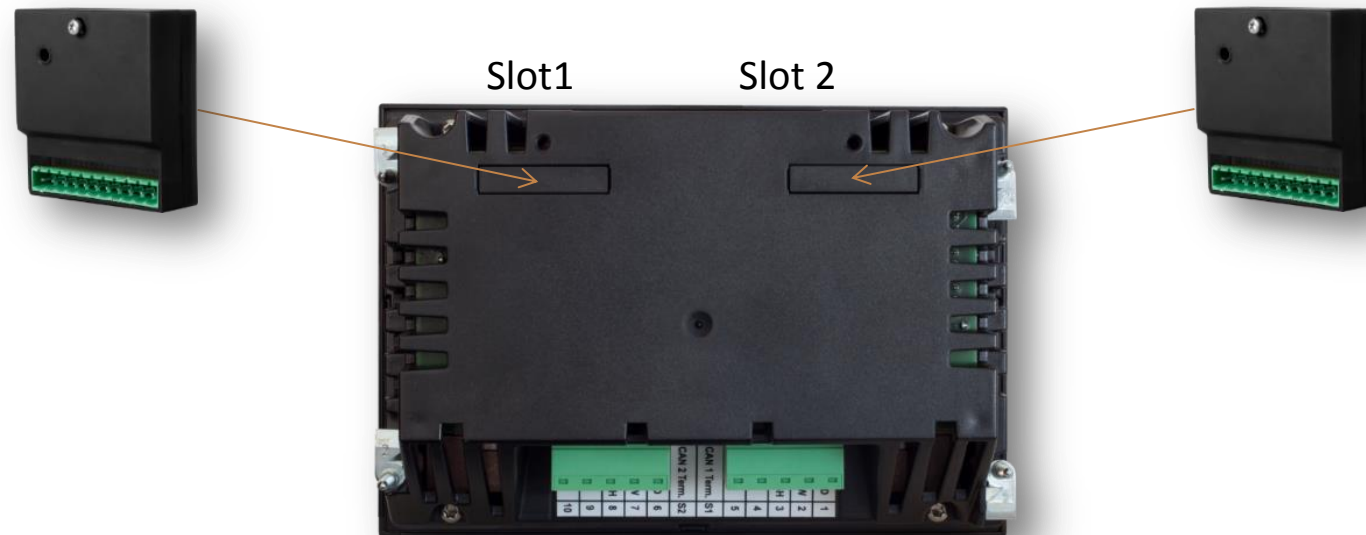
NX2 NMEA (Standard)
1 RS485 I/O port
2 RS422 input (NMEA)
1 RS422 output (NMEA)
2 contact inputs

AX1, DX1 or **NX1** can also
be used in Slot 2 if the
PP/VS supports it.

Input configuration

In general:
- Inputs and outputs must be supported by the selected Product Profile
and/or
- VI-setup profile

CAN input types – for use in PP or VS profiles
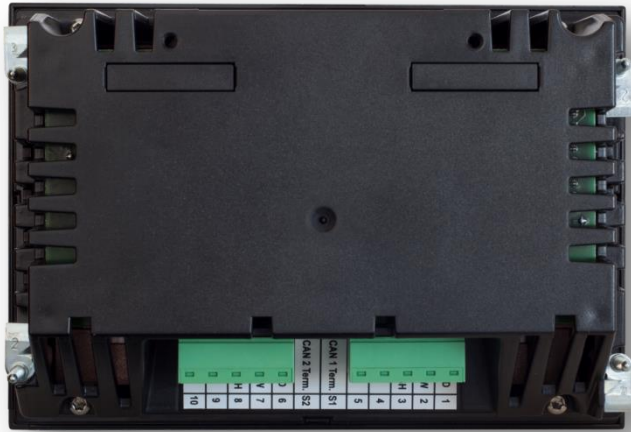
CAN 1 & CAN 2

Data type	CANopen			
	XDi-net	TPDO	RPDO	DAM-MPDO
Azimuth / rudder angle	X	X*	X	X
Pitch / Pitch%	X	X*	X	X
RPM, Load, .	X	X	X	X
Set-points Azimuth, RPM, Pitch .	X	X	X	X
Control flags	X	X	X	X
Dimmer	X	X	X	X
Day/(Dusk)/Night shift	(X)**	X	X	X

*) When a CAN transmitter (e.g. RTC300) is used as input source TPDO is the input type.
**) Normally controlled by dimmer level in auto mode.

CANopen TPDO/RPDO input scaling and setup can normally be reconfigured via the XDi installation menu.

XDi-net and DAM-MPDO contains absolute data and can't be reconfigured from XDi menu.

CAN output
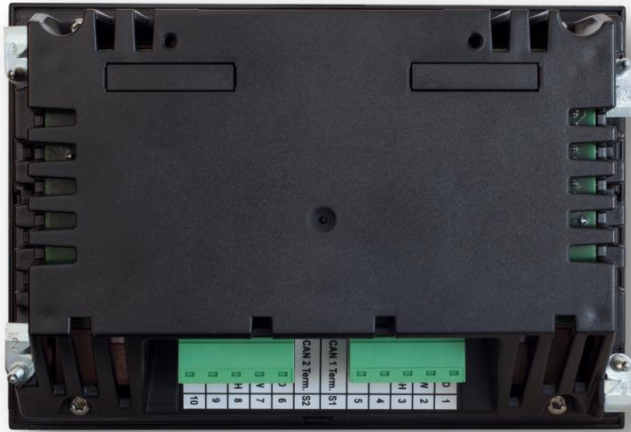
CAN 1 & CAN 2

Data type	CANopen TPDO
Azimuth, Rudder angle	X
RPM, Pitch%	X
Load, .	X
Set-points Azimuth, RPM, Pitch .	(x)*
Dimmer	X
Day/(Dusk)/Night shift	X

*) Data can be sent in a TPDO, but should normally come directly from the control system

TPDO1 output data are used for interfacing with the XL series – in sCAN mode.

New in Platform 2, release 2:
TPDO COBID, CAN1&2 and timing can be reconfigured via the XDi installation menu.

Note: Up to 3 variable data can be mapped into one TPDO
(this is fixed configured in the VS profile)

AX1 input types

AX1 Analogue extension module

Data type setup	Voltage	Relative to V_{ref}	Potentio-meter corr.	Current	SIN/COS +/-X	SIN/COS $X_{min}...X_0...X_{max}$
Range:	Max +/-30V	0 7.5V Max. +30V*	0 to 30V	Max +/-20mA	Max +/-30V Max +/-20mA 0 .V_{ref}*	2 12 22V 4 12 20mA
Azimuth angle	x	x	x	X	X	X
Rudder angle	X	X	X	X	(x)**	(x)**
Pitch / Pitch%,	X	X	X	X	-	-
RPM/RPM%, Load .	X	-	-	X	-	-
Control flag	(x)	(x)	-	(x)	-	-
Dimmer	X	X	-	-	-	-
Day/(Dusk)/Night shift	Auto	Auto	-	-	-	-

*) V_{ref} can be overwritten by an external voltage >7.5V and will still scare accordingly. (" 3-wire rudder function")

**) SIN/COS potentiometer is normally not used for normal rudder, but it can be used.

New in platform 2 release 2 (Q2-17)

DX1 input types

DX1 Digital extension module

Data type setup	RPM pickup	Digital input	Dimmer up/down
Range:	0 32V	0 32V	0 32V
RPM 0 to X	In1 or 2	-	-
RPM +/-	In1 & 2	-	-
Control flag	-	In1 or 2	-
Dimmer	-	-	In1 or 2
Day/(Dusk)/Night shift	-	-	Auto or In1 & 2

DX1 output types

DX1 Digital extension module

Relay output	Relay 1	Relay 2
Range:	ND / NE	ND / NE
Variable data - critical band	1 to 4	1 to 4
Inside or outside min/max value	X	X
Product warnings (e.g. data lost)	X	X
Product alerts (e.g. power 1 low)	X	X

Platform 2 Release 2: Relay function can trigger a graphical element on the display.

NX1 output types

NX1 NMEA output extension module

Data type	NMEA*
Azimuth, Rudder angle	X
RPM, Pitch%	X
Load, .	-
Set-points Azimuth, RPM, Pitch .	-
Dimmer	X
Day/(Dusk)/Night shift	X

*) NMEA sentences can be activated/deactivated via the XDi installation menu.
    (Default off in standard libraries)

More in platform 2 release 2 (Q2-17)

The new NX2 NMEA extension module

- **What is NMEA data ?**

- Standard serial data interface IEC 61162-1

- Serial data, one transmitter - multiple listeners

- Standard 4.8kbit/sec (9.6, 19.2 or 38.4kbps)

- Standard data format:

$WIMWV,70.0,R,21.0,N,A*27 CR,LF

Start   Talker ID   Sentence [Data, Type, Unit, Status] *Check sum

NMEA0183
Sentence examples

$HEHDG,90.0,02.0,W,05.0,E*68
$HEHDT,192.0,T*25
$HEROT,-10.0,A*37
$WIMWV,70.0,R,21.0,N,A*27
$WIMWV,75.0,T,46.0,N,A*17
$VWVHW,30.0,T,29.0,M,20.0,N,01.9,K*56
$GPVTG,1.5,T,,M,0010.0,N,00011.0,K,A*38
$IIDDC,N,99,N,C*78

All supported NMEA data are defined in the Product Profile and therefore independent of the selected VI.

NX2 interface module

Interface	Type	Protocol	Galvanic zone *)	Note
Data I/O bus	RS 485	NMEA0183	1 **	Switchable termination resistor
NMEA Input 1	RS422	NMEA0183	2	Opto-insulated
NMEA Input 2	RS422	NMEA0183	3	Opto-insulated
NMEA Output	RS422	NMEA0183	1 **	
Contact input	Digital in	-	1	External pushbutton input. Potential free contact input with pull up resistor (10kΩ) to internal +5V

*) All galvanic zone are separated from the base XDi-N unit, e.g. supply voltage 1 & 2, CAN1 & 2
**) Zone 1 has a Common terminal, this may be used to reduce "Common mode" level on the input.

NMEA data received via NX2 are absolute data (e.g. 233 RPM) and can be shared directly on XDi-net.

All supported NMEA data are therefore defined in the Product Profile and therefore independent of the selected VI.

XDi-N are even able to perform calculations of some data types (e.g. true wind) and share the result on XDi-net, NMEA out or CANopen (TPDO).

NMEA interface functions

- The default setup parameters for the NMEA inputs are defined in the Product Profile.
  - ✓ Supported sentences and priority input port(s)
  - ✓ Auto selection priority order
  - ✓ Predefined NMEA sentence routing (if any)

- Auto NMEA setup
  - ✓ Detects all available sources and make an automated selection if possible
  - ✓ In case of multiple input sources with the same data, manual selection is needed.

- Some data types can be calculated internally.
  - ✓ True wind with ships heading reference and geographic true wind
  - ✓ Calculate magnetic or true heading when magnetic variation is available

- Manual configuration of NMEA data inputs are also possible.

- NMEA data may be routed from any of the NMEA inputs to one of the outputs.

- Sharing of NMEA data on XDi-net (optional: NMEA output or CANopen TPDO

XDi-N benefits

- XDi-N design matches the XDi series

- Standard or customized virtual indicator designs

- XDi-net full compatible with the XDi series
  - ✓Data sharing
  - ✓Dimmer group synchronization
  - ✓Automated setup via CAN

- Flexible interface options NX2, NX1, AX1, DX1

- Up to 6(4) NMEA inputs and 2(4) outputs

- Cost effective repeaters - no NX2 interface needed

- Optimized Day/Night (Dusk) presentation

XDi-N heading indicator system (NMEA)

XDi 192 N

XDi 96 N

XDi 96 N

Heading True **026**.0 Gyro Deg
0 020 030 040

NMEA0183 in1

NMEA0183 in1

NMEA0183 in1

NMEA0183 wires

XDi 192 N

XDi144 N

°/min
10 0 10
20 20
30 30
000
PORT RATE OF TURN STBD

Heading True **026**.0 Gyro Deg
0 020 030 040

NMEA0183 in1

NMEA0183 in1

Gyro
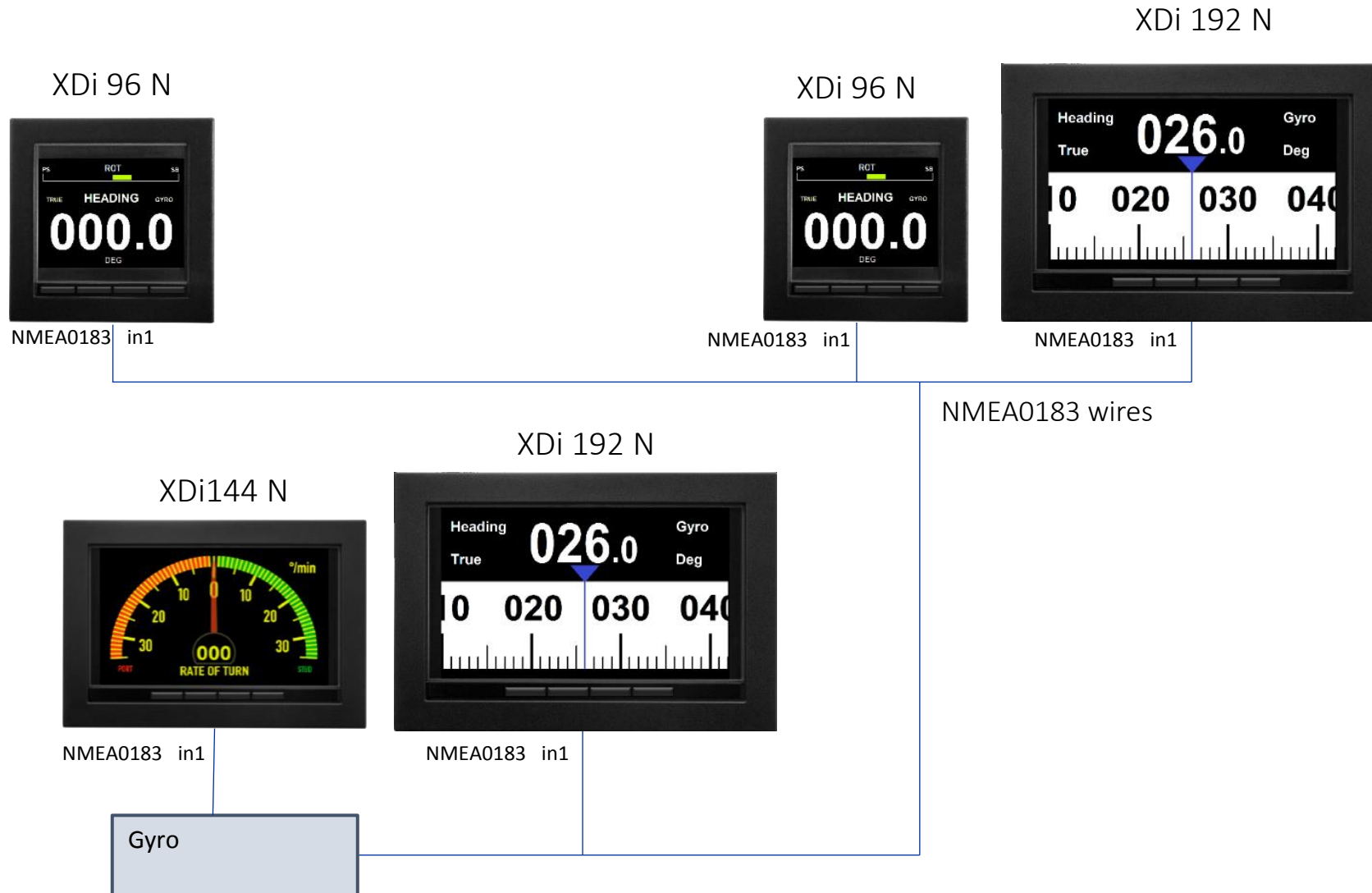
XDi-N heading indicator system (XDi-net)

XDi 192 N

XDi 96 N   XDi 144 N   XDi 96 N

Single or redundant
XDi-net (CANopen)

XDi 192 N

NMEA0183 in1

Gyro

Only this XDi-N needs
the NX2 NMEA0183
interface.
-
The rest is CAN
repeaters
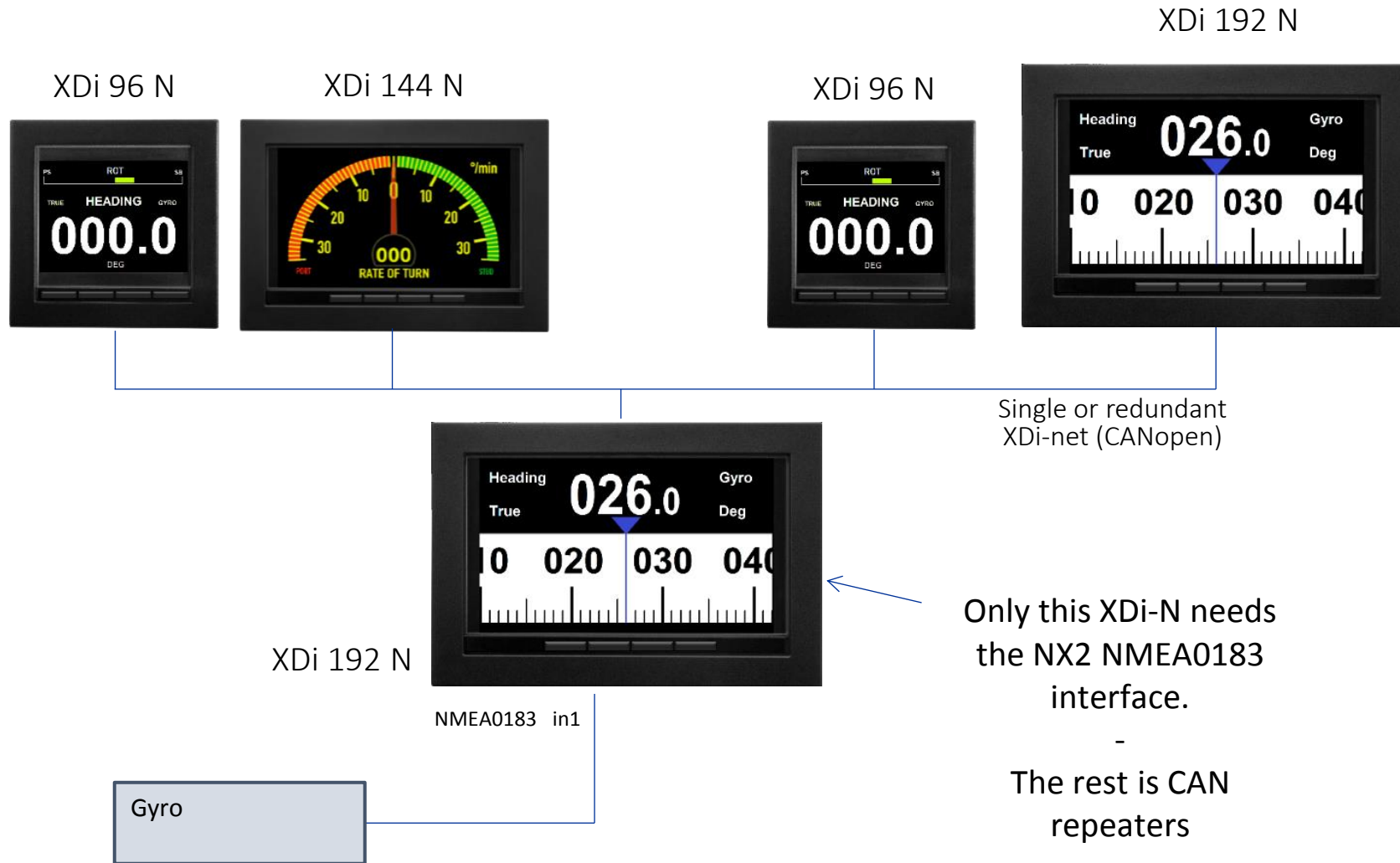
Solution 1 – NMEA Converter box

Bridge overhead panel

Central dimmer potentiometer

Navigation and dimming CAN 2

Azi1 data CAN1

Azi2 data CAN1

NMEA0183

Propulsion manufacture