XDi series

FLEXIBLE DISPLAY INDICATORS

GAME CHANGER IN BRIDGE INSTRUMENTATION

Taking your power control & monitoring solutions to a new level

A front-runner in marine bridge instrumentation, DEIF consistently invests in R&D and has developed a number of innovative products at our research centre and manufacturing site in Skive, Denmark.

Increasingly, vessels shift from using analogue indicators to CANbus-based instrumentation. DEIF's complete range is now available with this compatibility also, just as we design and develop complete customised instrumentation system solutions.

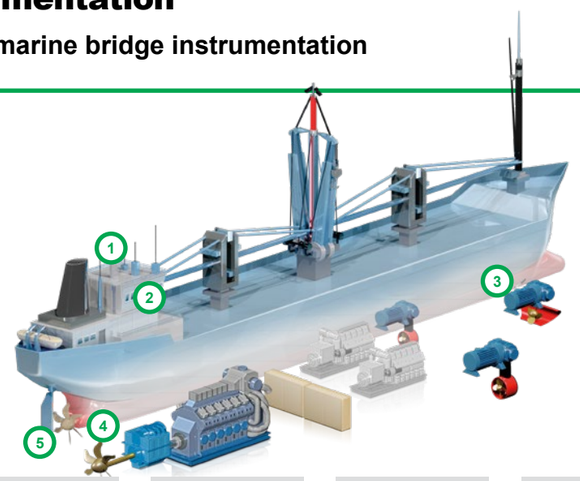
To that end, our latest development is the patented illuminated indicator display series, XDi. The virtual display series is free of practical mechanical limitations and logistic concerns and comes with libraries of more than 100 preinstalled indicator layouts and functionalities for you to select and setup on board. Moreover, the indicators also enable graphic solutions for new combinations of propulsion or navigation data. For example by combining RPM, PITCH and Azimuth Angle on one indicator screen or combining Speed, Heading and Depth on one or several screens.

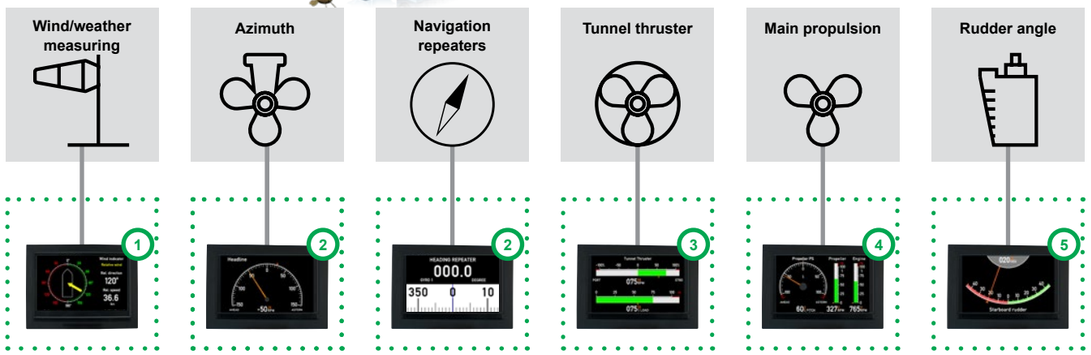
Saving you panel space and installation time, giving you more choices, greater flexibility and the ability to configure and make on-site repairs, XDi is the ultimate all-in-one solution.

In plain terms, a game changer.

Bridge instrumentation

A front-runner in marine bridge instrumentation





Game changers & customised solutions

Based on patented X-coil or display technology, DEIF's range of illuminated indicators is available for both analogue and CAN bus-based applications.

The below diagram shows a CAN-based system in which the thruster room XDi unit measures RPM and shares data on the CAN bus using the XDi-net protocol.

On the bridge, the analogue dimmer on one indicator is shared via CAN to control both indicators as a group.

Relevant indicators

XDi

XDi-N

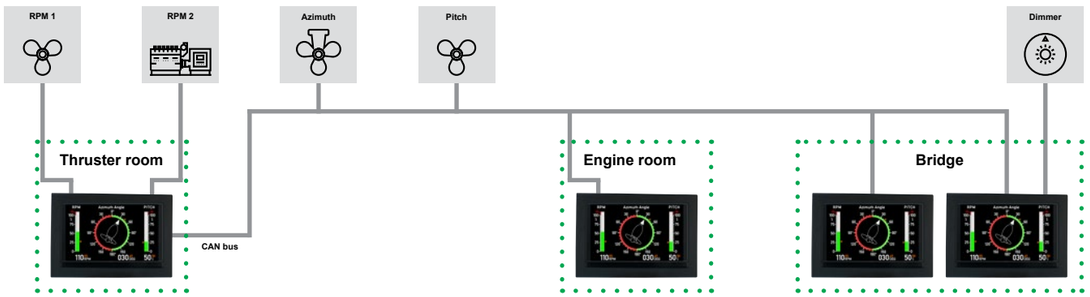
XL

BRW-2

BW

TRI-2

Azimuth thruster application



One indicator for all thruster modes

Switch between indicator modes – automatically

»The XDi has reduced the number of indicators, installation time, and simplified operation«

Johan Spruyt
R&D Engineer
ZF Marine Krimpen

Game changer cuts costs

Until recently, renowned ZF Marine Krimpen used traditional indicator technology for its retractable azimuth thruster solutions. Individually customised to each customer, this required numerous indicators for each azimuth propeller – one for each operation mode.

Reducing installation time and costs, DEIF's virtual indicator solution, the XDi, now allows ZF Marine Krimpen to automatically change the indicator scale depending on which mode the retractable azimuth thruster is in.

"With the XDi, we take up much less space in the bridge operator panel and also simplify daily operation since there is just one thruster indicator display regardless of operation mode", R&D Engineer Johan Spruyt from ZF Marine Krimpen states.

ZF Marine Krimpen

Formally known as HRP Thruster Systems, ZF Marine Krimpen has been active on the thruster market since 1973. The company designs and produces a wide range of steerable thrusters for all types of applications throughout the marine industry.

Emission-free harbour towing duties

with advanced DEIF indicator solution

The customised XDi-N solution utilises the mode shift function, making it possible to shift between up to 4 predefined screens presenting combinations of relevant data.

BMA Technology

Cost-effective customisation

Particulate emissions from shipping are increasingly seen as a problem that needs to be addressed. Local authorities, ports, and the IMO are all expected to introduce regulatory demands to reduce emissions, not least from port vessels such as tugboats. In a bid to reduce emissions and take a decisive step towards greener shipping, Turkish ship designer and builder Navtek Naval Technologies is building the world's first zero-emissions tugboat, the NV-712 zero-emission electric tug, or ZeeTug for short.

When Turkish marine system integrator BMA Technology needed a propulsion control solution for the ZeeTug, the world's first zero-emissions all-electric tugboat, they turned to DEIF. In addition to the highly customisable, advanced indicator XDi 192 N, DEIF provided assistance and support as needed throughout the prestigious project.

The customised XDi-N solution utilises the mode shift function, making it possible to shift between up to 4 predefined screens presenting combinations of relevant data.

ZeeTugs

Operates in the Marmara Sea in the port of Tuzla in Istanbul. A total of four conventional tugboats are considering to be replaced with ZeeTugs; the first vessel was delivered in March 2020.

XDi variants

Solutions customised to your requirements

Variants

XDi Dual
1 or 2 input values displayed.


XDi 96 Dual


XDi 144 Dual


XDi 192 Dual

XDi Multi
Application-dependent no. of input values displayed.


XDi 96 Multi

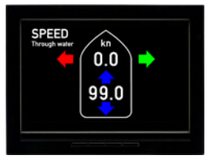

XDi 144 Multi


XDi 192 Multi

XDi-N
With NX2 NMEA input/output module (share on XDi-net).


XDi 96 N


XDi 144 N



XDi 192 N

XDi Dual / Multi versus **XDi-N**

XDi-D / M	XDi-N (platform 2)
► Analogue, digital and CAN interface and reduced NMEA0183 functionallity	► Analogue digital and CAN interface NMEA0183 interface (IEC61162-1) Incl. data calculation Routing NMEA data from input to output
► Hidden buttons (setup only)	► 4 front pushbuttons for operation
► Presents <u>one</u> fixed virtual indicator from library (D, M)	► Presents either one fixed virtual indicator *or* Toogle between up to 4 screen virtual indicators using the pushbuttons and/or XDi-net or CAN
	► Prioritised input fall-back function (2 or 3 inputs)
	► Shift units presented on display (Unit profile shift via CAN)
	► Dimmer/Colour control via front buttons
► New option: Front frame w/4 pushbuttons for dimmer/colour control only. (Platform 2 required)	► Optional front frame without buttons

Flexible display indicator - Dual and Multi

The game changer in illuminated bridge instrumentation

DEIF's XDi illuminated indicator display series is a compact, easy-to-install, versatile and user-friendly revolution in bridge instrumentation.

The ultimate all-in-one solution, the XDi saves you panel space and installation time, gives you greater choice, more flexibility and the ability to configure and make repairs on-site.

With the XDi series, we have replaced mechanical scales and pointers with high quality displays, taking indicator performance to a new level without compromising DEIF customisation standards and maintaining approvals for all relevant applications.

XDi features high accuracy analogue readout (no mechanical or parallax's reading error), high precision digital readings, wide viewing angle and optimised day and night colour pallets, even a custom dusk pallet.

The XDi series comes in three different sizes with Dual, Multi or Navigation libraries. You can order XDi with a DEIF standard indicator library – or you can have your own customised. Already a market-leader with record delivery times, the XDi series also enables us to ship your orders even faster.

Depending on functionality, all units are MED-certified. Approvals from major classification societies are available depending on application. DEIF has developed the XDi series cooperating closely with DNV GL.

Features

- TFT graphical LED 3.5, 5 or 7" display
- Multiple virtual indicator layouts selectable from library
- Standard and custom indicator designs
- Displays 1 or more values
- 96, 144 or 192 DIN cutouts
- XDi-Net – a short-cut to CAN open
- Double CAN bus as standard
- Reduced wiring and installation
- Instant repairs on board
- Analogue and digital readout combined
- XDi-net group dimmer and day/night colour shift
- Customized indicator designs available on request
- Redundant power inputs
- Optional analogue or digital input
- Optional NMEA or relay output
- MED and other relevant class approvals
- Optional double CAN connectors for daisy chaining
- Optional IP66 protection
- Optional dimmer control from front buttons

Variants	No. of input values
XDi Dual	1 or 2
XDi Multi	Application-dependent

Accessories

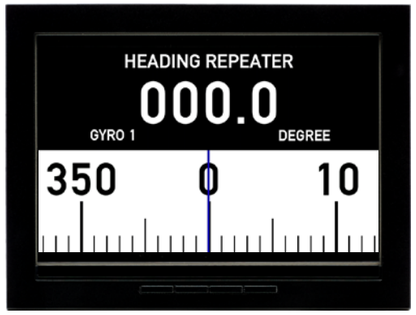
- AX1 analogue extension module
- DX1 digital extension module
- NX1 NMEA output extension module
- NX2 NMEA I/O extension module
- Front frames
- 4-button front frame kit
- Dimmer potentiometer kit
- Azimuth/rudder transmitters RTA 602, RTC 300 or RTC 600

Approvals

ABS CCS DNV-GL RS Wheelmark RRR NK Korean Register

Flexible display indicator – navigation

Advanced navigation indicators and repeaters



Offering a number of advanced functions, including direct access to the main functions using the pushbuttons on the front, the XDi Navigation version (XDi-N) is the top model of DEIF's display-based indicator range.

With the XDi-N you can implement the same design across your bridge and combine propulsion and steering indication with a number of navigation indicators. Use DEIF's standard libraries or have your own created. Utilise the two standard CAN busses and the XDi-net data sharing and system integration functions to optimise your system with centralised group control functions.

XDi-N
XDi-N with one or two NX2 NMEA input/output modules will in most cases cover all the needs for NMEA I/O and data sharing via XDi-net (CANbus).

XDi-N CAN repeater
The XDi-N CAN repeater recieves data via XDi-net (CANbus) and therefore requires no NX2 NMEA input/output modules.

NMEA data interface
NMEA data in compliant with IEC 61162-1 and IEC 61162-2 is standard for the XDi-N which supports more than 80 different data types, including dimming control.

NMEA setup features:
- Automatic NMEA input scanning and selection
- Input overview with easy access to make changes
- NMEA sentence routing from input to output
- NMEA output configuration

XDi-N features

Same featues as XDi Dual and Multi as well as:

- Up to six NMEA inputs & up to four outputs
- NMEA data offset and averaging functions
- Dimmer controllable using front/external pushbuttons, analogue, NMEA or CAN/XDi-net.
- 3 level priority data fall-back function
- True wind data calculation
- Calculate magnetic or true heading
- Toggle between up to four predefined indicator screens using the mode function
- Mode shift function. Define a mode group and have several XDi units shift screen as a group. Use the CANbus to shift screens in several indicators in a mode shift group.
- Quick-switch between measuring units either locally or for the entire system

Variants	Extension modules
XDi-N Main	NX2
XDi-N Repeater	None required

Additional XDi-N accessories

- Wind sensor WSS 500 series or WSS 750
- Wind sensor extension cables
- IP66 connector box kit
- IP67 connector kit (WSS/WSS-L)

Approvals

ABS CCS DNV-GL RS Wheelmark RRR NK Korean Register

Indicator libraries

Game-changing functionality made simple

Choose an XDi with a pre-installed standard or customised indicator library matching your applications.

Library

The library contains a range of indicators and product profiles. During installation, the setup wizard guides you through the selection process.

Product Profile – PP

The library contains one or more PP's to ease the installation setup. A PP contains default parameters for the CAN bus, dimmer groups and input type, warning and sound. NMEA settings are predefined in PP's when relevant. Default parameters can be changed from the XDi menu.

Virtual Indicator – VI

A library may contain more than 100 predefined virtual indicators. The VI contains the graphical design which can be either DEIF standard designs or unique custom designs placed in a custom library made by DEIF. The graphical design is fixed to comply with the relevant marine standards and cannot be changed by the user. In XDi-N it is possible to have up to 4 screen designs in one VI to toggle in between.

Virtual Indicator Setup – VS

Each virtual indicator has one or more VS profiles to select for easy configuration. Each VS defines a unique setup for all inputs, outputs, controls and selectable headlines for the related virtual indicator. Default parameters can be changed from the XDi menu.

Setup

Setup Wizard
An automatic guide makes setup very easy, even without prior training.

Surveyor Information
Select the info screen for a complete status of the selected and locked set-up.

On-site choices

Red marking
Define and set up to 4 scale markings on site, if activated in library.

Indicator headline
Integrated selectable headlines reduces variants.

Day & night scales

Day

Night

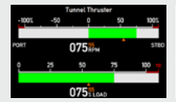
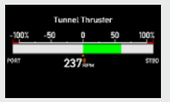
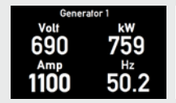
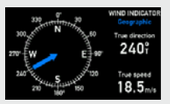
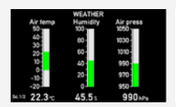
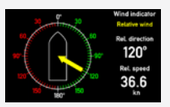
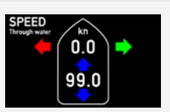
Standard library contains both day and night designs. Dusk design can be included on request.

Front-button control

Front buttons for easy screen toggling, dimming and unit shift. Make a change on one XDi-N unit or all XDi-N units in a group by the push of one button.

Standard indicator libraries

Select functionality and indicator type

Propulsion (owner 1)	Library class	Library number	Examples
Azimuth	Dual (D)	001	 
	Multi (M)	001	
Tunnel thruster	Dual (D)	011	 
	Multi (M)	011	
Main propulsion	Dual (D)	021	 
	Multi (M)	021	
Rudder angle / Waterjet	Dual (D)	031, 032	 
	Not applicable	-	
RPM	Dual (D)	041, 042	 
	Not applicable	-	
Universal digital	Dual (D)	051, 052	 
	Multi (M)	051, 052	
Navigation (owner 2)	**Library class**	**Library number**	**Examples**
Wind	Navigation	001	 
Weather	Navigation	011	 
Navigation (owner 3)	**Library class**	**Library number**	**Examples**
Heading	Navigation	001	 
Rate of Turn	Dual (D)	002	 
Speed and Depth	Navigation	011	 

Customised indicator libraries & logo branding

Full or partial customisation

Categorised according to application types, the indicators you need may be placed in different standard libraries. Since XDi units can hold just one library at a time, you will find it beneficial to order your XDi with the correct library.

Customisation level 1

If you often use the same combination of standard indicators, for instance from the azimuth, tunnel thruster and rudder libraries, it may well prove beneficial for you to have your own customised library created which contains your preferred indicators (copied from standard libraries without changes). DEIF offers to compile and pre-install such a custom library in your indicators for a small one-off fee.

Customisation level 2

To match your system needs and reduce setup time during installation it may be cost-effective for you to have some of the standard indicators or default setup parameters slightly changed. The fee is slightly higher than for customisation level 1.

Customisation level 3

Full customisation is for those requiring unique designs in line with their company profile. DEIF's knowledge and experience in this field secures optimised graphical designs and system integration for the entire custom library. Please contact DEIF for a quotation based on your requirements.

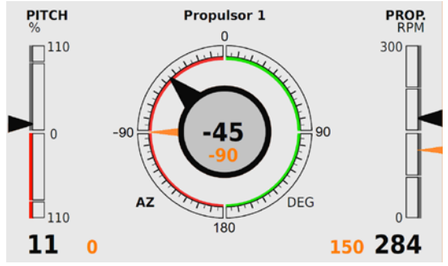
Logo on front frame

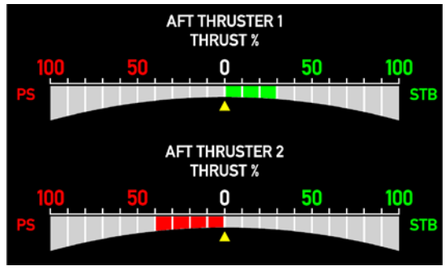
For those looking to brand XDi with their own company logo, DEIF recommends placing the logo on the removable front frame. Logos can be added to the virtual indicator designs, but will take up valuable display space, thus reducing flexibility and readability.

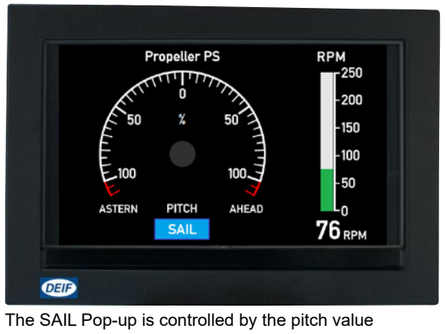
Typical customized features

- Virtual Indicator design
- Product and Input Profiles set up to match customer's system
- Critical bands
- Relay output controlled by critical band
- Pop-ups and change of graphical symbol controlled by input or value

Examples of customised indicators







The SAIL Pop-up is controlled by the pitch value

Easy updating

DEIF standard libraries contain a selection of indicators presenting dual or multiple data in a common design line. The different indicator types are collected in application-specific libraries to make selection and ordering easier. The standard indicators for applications requiring wheel-marking are approved according to the Marine Equipment Directive (MED).
The collection of standard indicators and application types will increase over time, based on user requests.

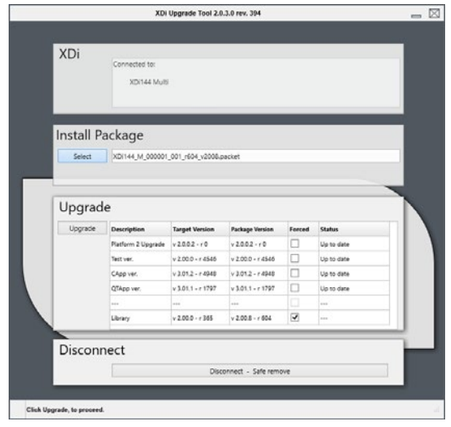
Updating is simple

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. No need to worry if you've ordered an XDi with the wrong library: All standard and your customised libraries are available for free download and can easily be uploaded to your XDi.

No wait for repairs & spare parts

Because the XDi has an integrated library of virtual indicators, solutions and settings, fault issues can be resolved immediately by trained personnel. Keeping a spare unit of each size on board allows the ship crew to replace faulty units and have systems up and running again in no time.

Updating the XDi



Extension modules

Add the functionality you need

Maximum one extension module for XDi 96 and two for XDi 144/192.
The ‘quick snap-on’ extension modules can be delivered separately or together with your XDi unit.

AX1
Analogue extension module

- 2 analogue inputs, current or voltage
- 1 voltage input, which can be used for dimmer
- 1 voltage reference output for external potentiometer

DX1
Digital extension module

- 2 digital inputs for RPM pick-up sensors or remote dimmer
- 2 relay outputs for external alarm or control

NX1
NMEA0183 output module

- 1 NMEA0183 output for data transfer to VDR, DP system or navigation.
- 2 contact inputs for remote push button control

NX2
NMEA0183 input/output module

- 2 NMEA inputs
- 1 NMEA output
- 1 NMEA configurable input or output
- 2 contact inputs for remote push button control

How it works

A quick guide to the principles behind the XDi technology

The installation wizard starts automatically and guides you through the initial setup. Once you’ve confirmed your selection, the indicator will start normal operation and the setup is locked. Locking your indicator choice and settings is the basis for your MED approval.

Define & Secure
Assign a CAN NodeID and XDi will flag on the CAN bus that it is available and not setup.

Automatic setup:
The XDi is now capable of receiving configuration from your CAN control system. On completion, the configuration will be locked and normal operation can be initiated.

Manual setup:
Follow the wizard instructions to setup your application, including making adjustment, setting red markings etc.

Finalising the setup secures your configuration. The indicator now complies with approvals and regulations for bridge indicator systems.

Manual setup

Product Profile

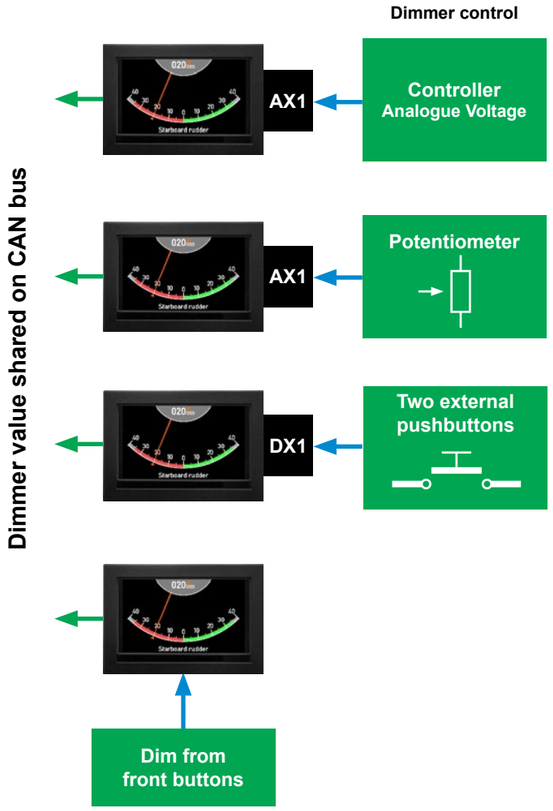
Virtual Indicator

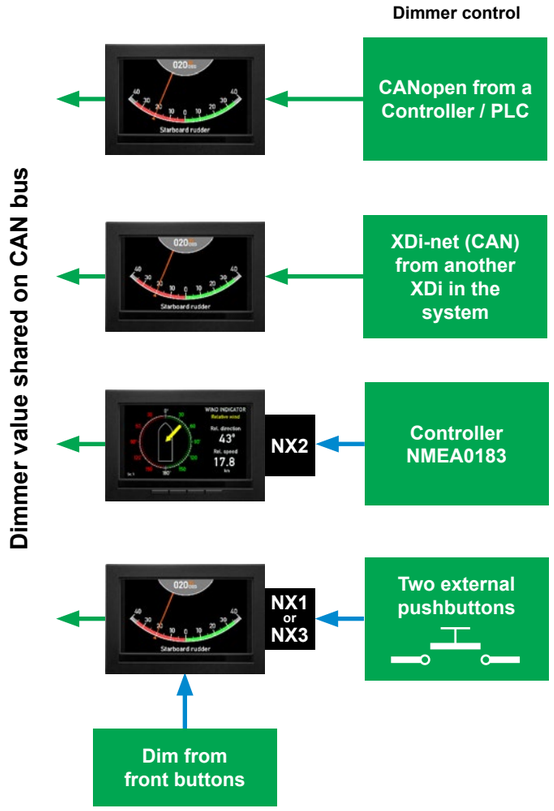
Virtual Indicator setup

Note: XDi-N with NX2 module has easy, direct access to NMEA setup when finalising the wizard

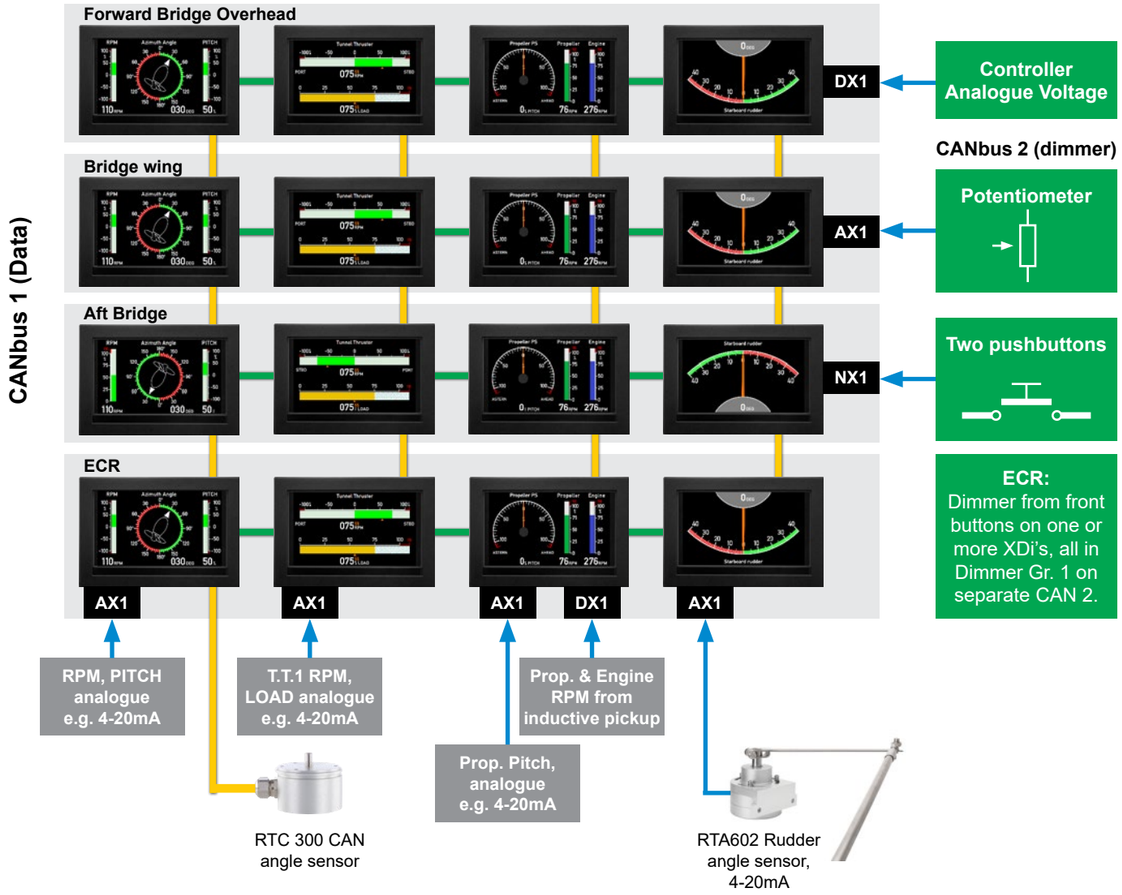
Automatic setup via CAN

Dimmer and input configuration examples





Propulsion system



Description Propulsion solution drawing

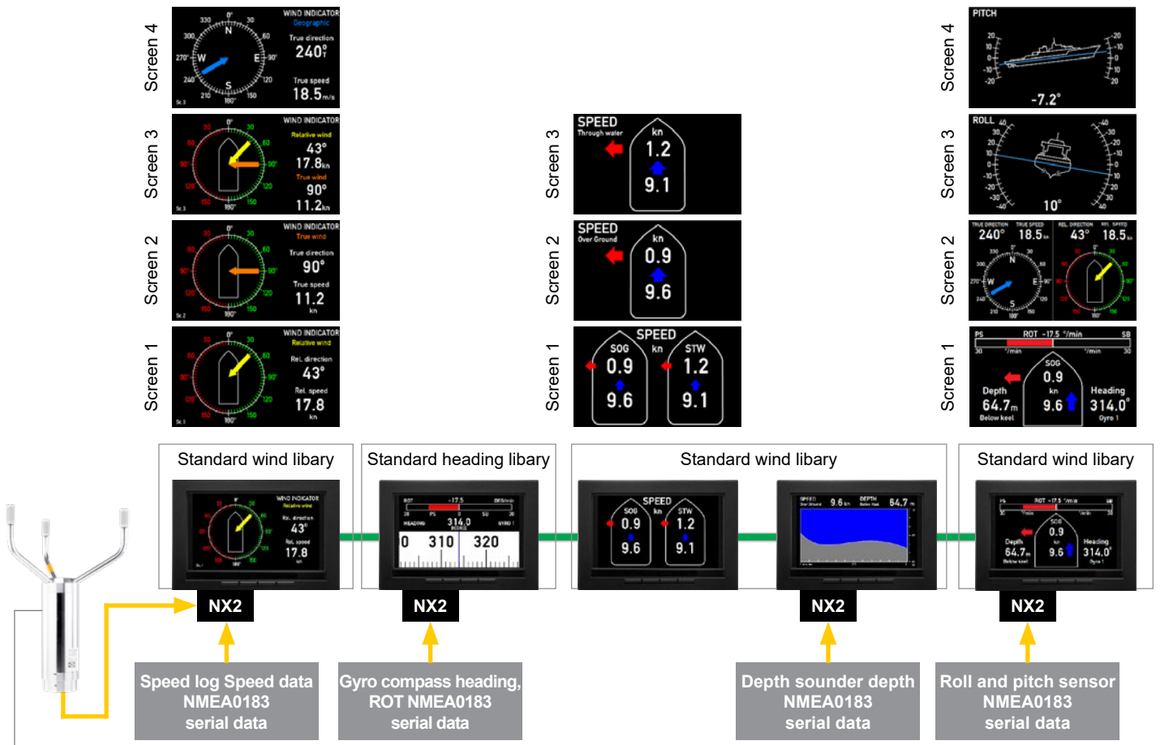
Illustration of a basis propulsion system that can be easily extended with more propulsion devices.

One XDi in the engine control room (ECR) is used both as an indicator, but also as an analogue to CAN converter to simplify installation and calibration. After installation the XDi in the ECR is the only indicator that may need to be calibrated via the XDi installation menu. All the other indicators in the system receives calibrated data via the CAN bus and they will therefor show the right values.

In this example the azimuth angle is measured using the RTC 300 CAN angle sensor, it is directly connected to CAN bus 1, if there is a need for zero calibration of the sensor it is only necessary to make calibration on one XDi and use the synchronize function to calibrate the rest of the XDi's via CAN.

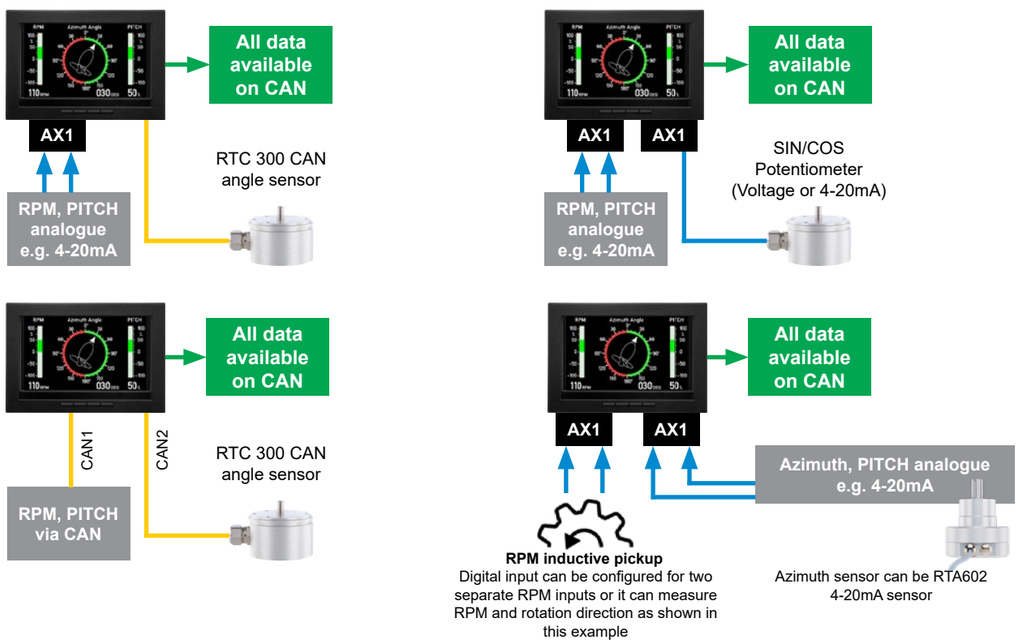
Different types of dimming are presented in this example: Dimmer voltage, dimmer potentiometer, external pushbuttons or dimming from the pushbuttons on the XDi front (option). All examples are using CAN bus 2 as the dimmer bus.
To make system configuration and installation easy the XDi-net plug and play protocol is used on all CAN lines.

Navigation system



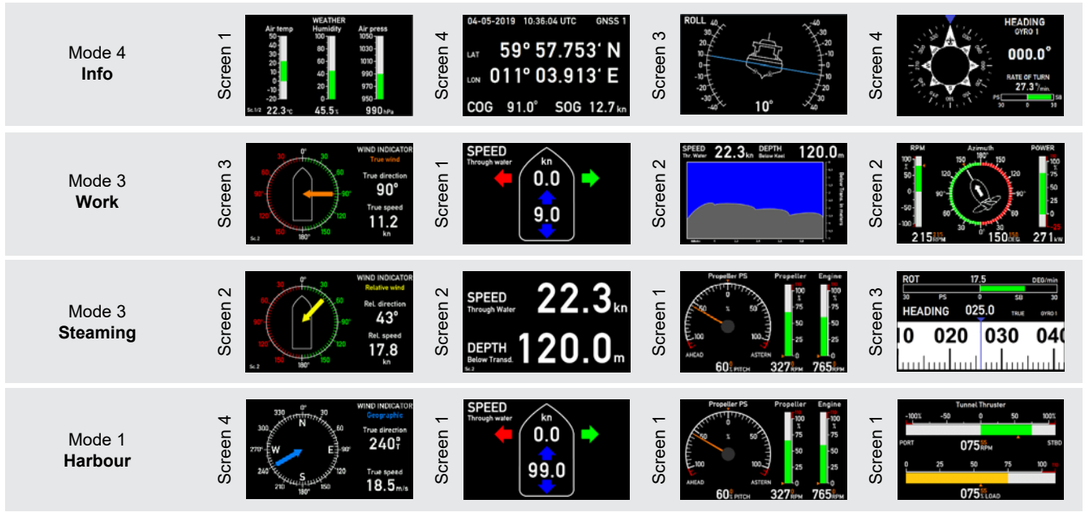
All five indicators are connected on the same CANbus using XDi-net. NMEA data are shared via CANbus.
XDi-net allows front buttons to control dimmer level on all indicators in a group.

Azimuth systems



Navigation system

Mode shift function



Description Propulsion solution drawing

Virtual indicators in an XDi-N library can contain up to 4 screens, each screen can be assigned to a mode from 1 to 4. By default Mode 1 will contain screen 1 and so on. But it is possible to assign any of the screens to a given mode number.

In a single XDi-N indicator this function can be used to change the toggling order of the screens or to hide some screens that you don't want to use in the actual installation. When XDi is connected via CAN bus it is possible to group a number of XDi indicators in the same mode group, when the mode/screen is toggled on one XDi the other indicators will follow.

In the example above the 4 XDi indicators is setup to form a system with 4 modes. Harbour mode, Steaming mode, Work mode and Info mode.

The screen that the captain want to see in each mode is assigned to this mode number, please note that the same screen can be assigned to more than one mode. The mode groups and screen assignment can be setup from the quick menu.
When the ships mode of operation changes the push on one button is all it takes to change screen on all indicators in the system.

A mode shift can be toggled using the left push button on any of the 4 indicators in the system, but it is also possible to connect an external pushbutton on any of the 4 indicators (NX1 or NX2 module is required). In a customized XDi indicator library it is also possible to open for mode control via the DX1 digital module, where the 2 digital inputs can be setup to select mode 1, 2, 3 and 4.

XDi can also form part of an integrated control system where the mode/screen of one or more XDi indicators can be controlled via CANopen or via the digital control inputs.

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