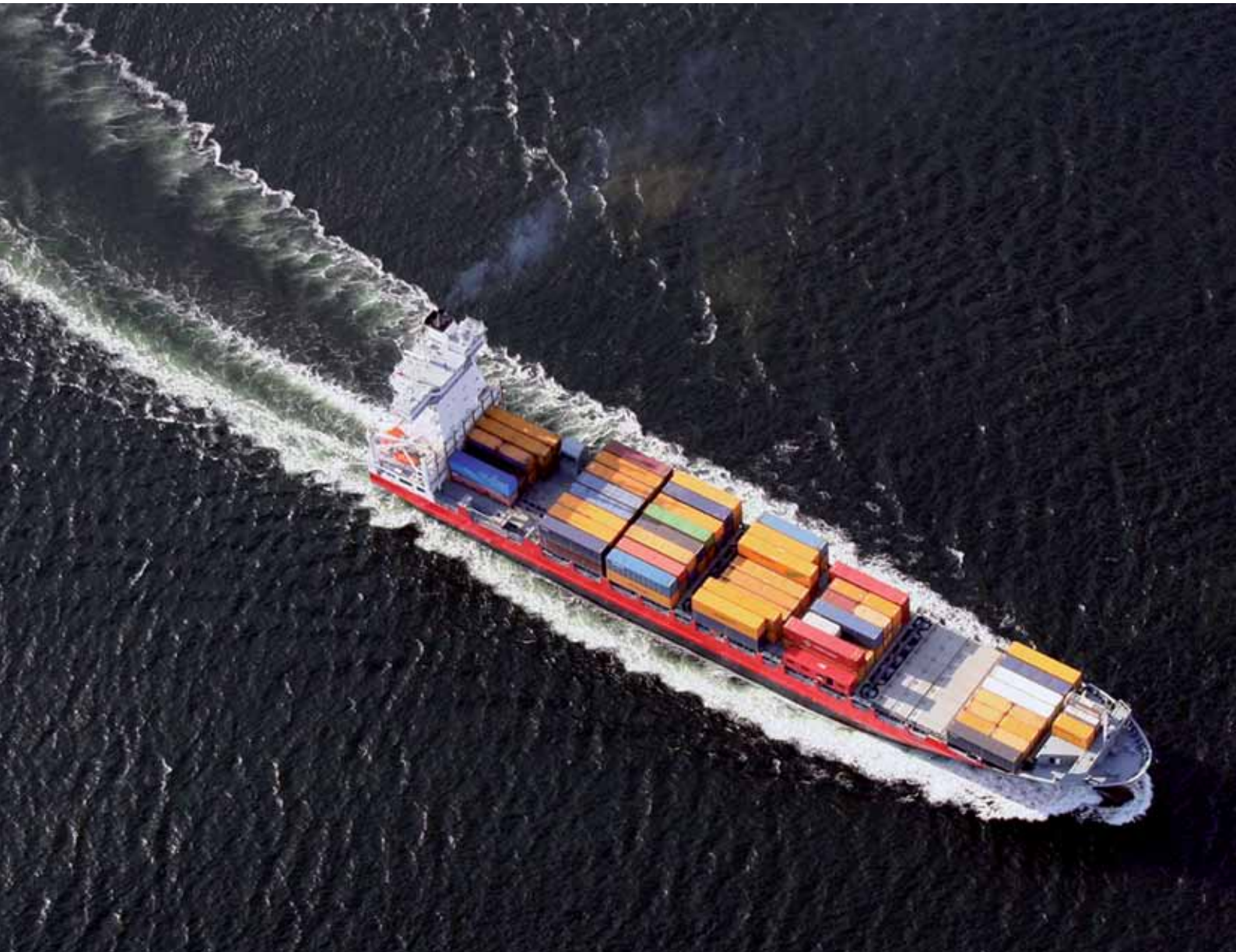


# NautoSteer<sup>®</sup> AS

Advanced Steering Gear Control System



# NautoSteer<sup>®</sup> AS

NautoSteer AS is a sophisticated steering gear control system for customers that require reliability, safety and an outstanding functional range. Modular system architecture allows for individual system configurations, while a common user-interface with take-over functions at any device supports an intuitive and user-friendly operation.

Within the last years safety requirements for steering gear control systems have certainly increased. Classification societies

require wire break monitoring for feedback-loops and rudder order commands. Others require steering failure monitoring.

These requirements are reasonable because it is essential to monitor and prevent any failures in the steering gear and steering gear control system - and thus any serious hazards for life, ship and environment. The new NautoSteer AS provides customers with maximum safety in manual and automatic steering gear control.

## Simple Change-Over of Steering Modes

As a central element of the NautoSteer AS system concept, the new Steering Mode Selector Switch contains only two modes.

In "Direct NFU" mode a dedicated non-follow-up tiller is used. This tiller controls the steering gear directly without use of any electronics. The CAN bus based steering gear control system is activated in "Main" mode. This mode allows steering the vessel with steering controls such as follow-up tillers, non-follow-up tillers or autopilot steering. The steering control is activated directly at the steering position with a take-over function. Alternatively a dedicated steering control position can be activated by use of a Steering Mode Operator Unit (give-over function).

The concept of having a "Direct NFU" and "Main" mode provides a clear fallback position in emergency situations as both modes work independent from each other. This supports the crew in fast and safe decision making when time is crucial.

The Steering Mode Selector Switch AS can be combined with the Steering Mode Operator Unit AS for indication of status information and activation of steering controls

## Built-In Reliability and Safety

The new NautoSteer AS advanced steering gear control system is designed according to fail to safe principles. No single failure in the system causes any unwanted rudder activity. All components of the system are connected via reliable CAN bus technology. Even a redundant CAN bus is used for all safety relevant components. Important safety features such as wire break monitoring, steering failure monitoring and data integrity monitoring are standard with the new NautoSteer AS.



## Your Benefit<sup>®</sup>

- Proven Anschütz steering performance
- Built-in reliability with CAN bus technology
- Fail to safe principle with integrated steering failure and wire-break monitoring
- Integrated data integrity monitoring
- Comfortable operation with take-over or give-over function of steering control positions
- Intuitive and harmonized design and common haptic of all components
- Central alarm reset and central dimming
- Flexible integration of further steering controls such as joystick or DP systems
- Ease of installation with simplified wiring and computer-based commissioning



## Simple Installation, Wiring and Commissioning

The installation and wiring of NautoSteer AS is fairly simple. Most of the equipment is only connected to the CAN bus and power supply. The wiring of this system is less error-prone compared to other conventional systems.

Commissioning of the system is done with computer based service and configuration software. This software provides tools that allow transparent configuration and adjustment of the system. In contrast to other steering control systems, the commissioning can be done by a single person.

## Flexible System Architecture

The new NautoSteer AS advanced steering gear control system consists of modular system architecture and fulfills individual customer requirements. It can be used for all vessels with single and dual rudders and on vessels with fore and aft bridges or fore and aft workstations. NautoSteer AS controls steering gears with solenoid valves and proportional actuators. Dynamic positioning and joystick systems can be integrated seamlessly. The system can even be modified or extended by simply adding components to the CAN bus.

The Override Signal Unit AS can be combined with NFU direct tillers or FU/NFU CAN bus tillers



Modular design - two follow-up tillers for independent and synchronous steering for a vessel with dual rudder systems



## Description of Steering Gear Control Systems

In the following some typical steering gear control systems are described.

### Dual NFU direct / and FU CAN bus steering gear control system for a vessel with single rudder

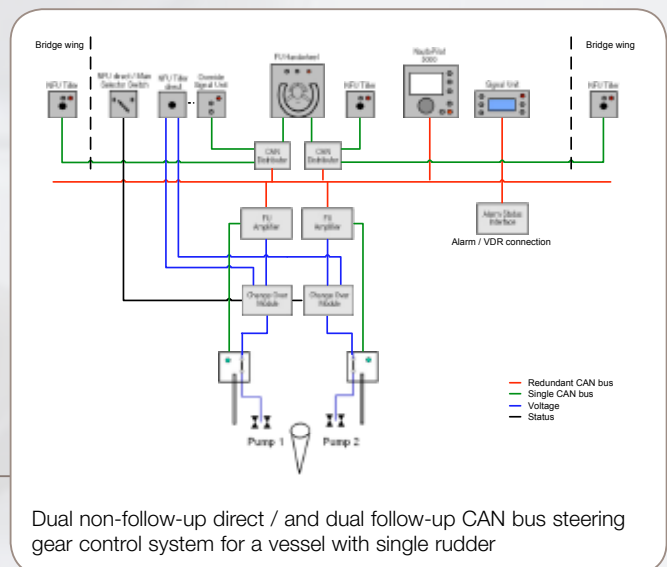
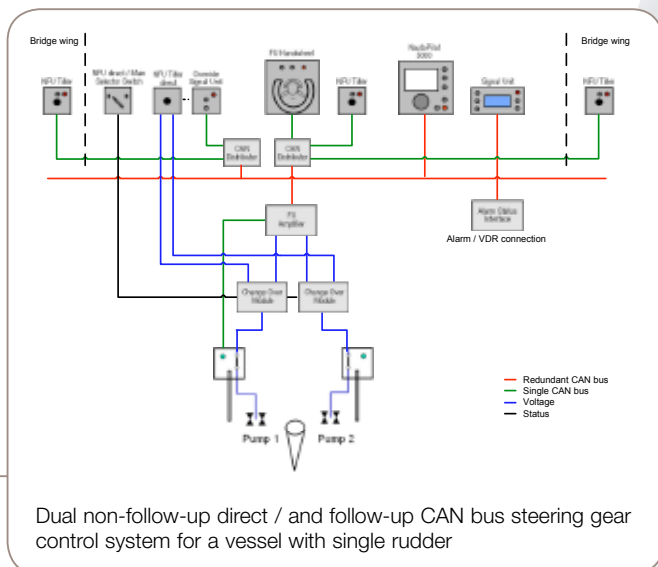
In “Direct NFU Mode” the dual “NFU Tiller direct” operates the valves/pumps of the steering gear directly. No feedback information or follow-up amplifiers are required. When “Main” is selected by use of the “Steering Selector Switch” the “FU Hand-wheel” and thus the CAN bus based steering gear control system is activated. Both valves/pumps of the steering gear are operated with one “FU Amplifier”.

Other controls, such as “NFU Tillers” on the wings or the “NautoPilot 5000”, can simply be activated at the steering control position with a take-over function.

The “NFU Tiller direct” is combined with an “Override Signal Unit”. This combination is used as an autopilot override or as general override to override all other steering controls.

### Dual NFU direct / and dual FU CAN bus steering gear control system for a vessel with single rudder

In addition to the steering gear control system described above this system consists of a dual follow-up CAN bus based steering gear control system. Both valves/pumps of the steering gear are operated with separate “FU Amplifiers”. This results in an additional redundancy in the “Main” mode besides the general redundancy of “Direct NFU” and “Main” mode.



### Dual NFU direct / and FU CAN bus steering gear control system for a vessel with dual rudders

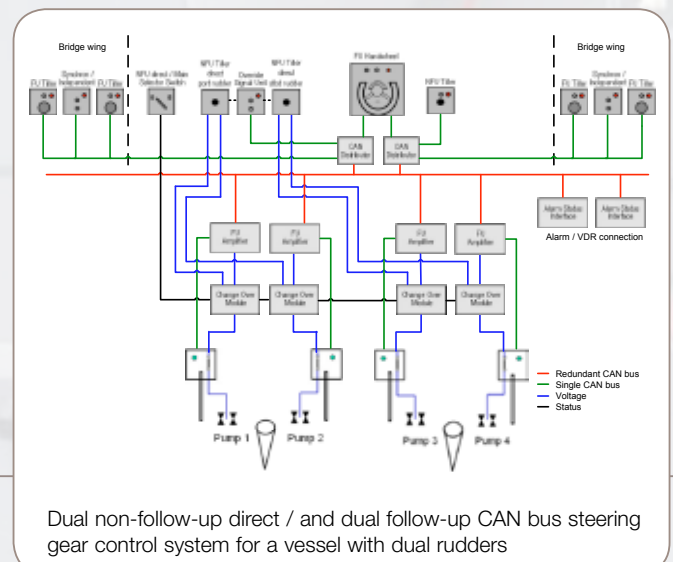
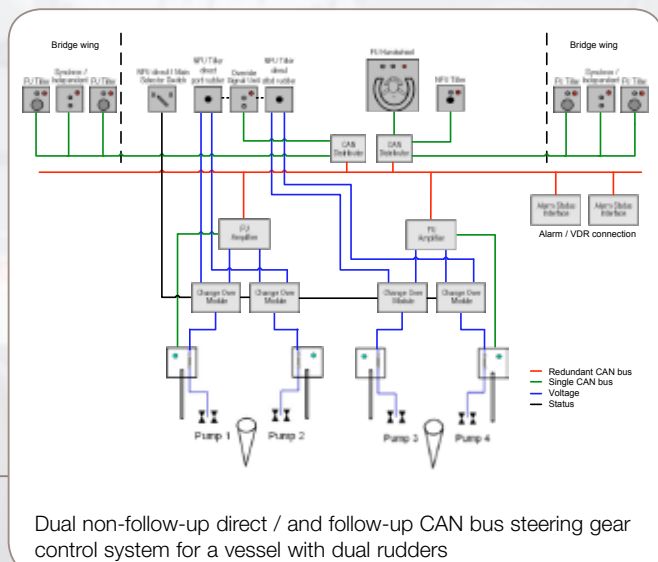
In "Direct NFU Mode" the two dual "NFU Tiller direct" operate the valves/pumps of the steering gear directly. Both rudders are controlled independently from each other. No feedback information or follow-up amplifiers are required. When "Main" is selected by use of the "Steering Selector Switch" the "FU Handwheel" and thus the CAN bus based steering gear control system is activated. Both valves/pumps of the steering gear are operated with one "FU Amplifier" per rudder.

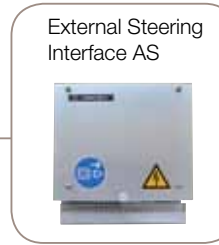
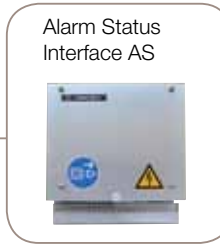
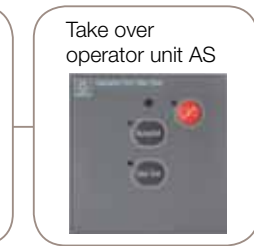
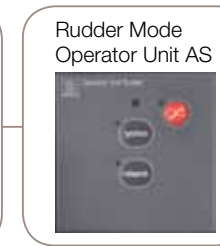
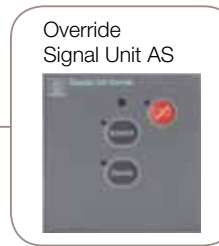
Other controls, such as "FU Tillers" on the wings or the "NautoPilot 5000", can simply be activated at the steering control position with a take-over function. By combining "NFU Tiller" or "FU Tiller" with a "Rudder Mode Operator Unit" the user can select between independent or synchronous control of the rudders.

The two "NFU Tiller direct" are combined with an "Override Signal Unit". This combination is used as an autopilot override or as general override to override all other steering controls.

### Dual NFU direct / and dual FU CAN bus steering gear control system for a vessel with dual rudders

In addition to the steering gear control system described above this system consists of a dual follow-up CAN bus based steering gear control system. Both valves/pumps of the steering gear are operated with separate "FU Amplifiers" per rudder. This results in an additional redundancy in the "Main" mode besides the general redundancy of "Direct NFU" and "Main" mode.

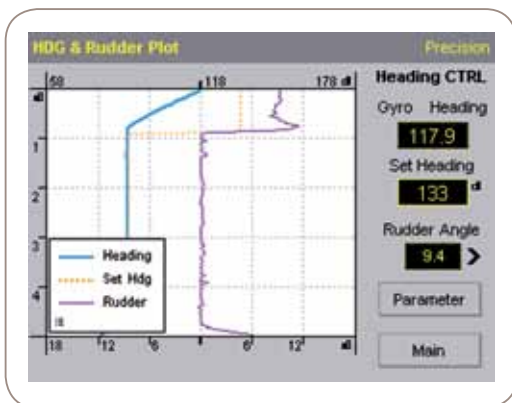




## NautoSteer AS - System Components

NautoSteer AS components have a modular mechanical design that allow for simple installation in consoles, frames and steering stands. Additionally NautoSteer AS is characterized by a modular functional design: Components can be combined to achieve functions according to customer requirements. Furthermore NautoSteer AS provides consistent haptic and operation, illumination, dimming and alerting.

Rudder activity and heading changes are displayed. Autopilot settings can directly be changed.



## NautoPilot® 5000 Series

The NautoSteer advanced steering gear control system includes the NautoPilot 5000, the new adaptive autopilot developed and manufactured by Raytheon Anschutz. NP 5000 is based on the proven Anschutz steering algorithms that are known for outstanding steering performance. It is specially designed for all commercial ships of 100 m length and above.

NP 5000 follows an intuitive operating philosophy. All main functions are operated via hard keys and all secondary functions via touch screen. The large graphical color display ensures a clearly arranged presentation of information. The menu structure is clear and transparent.

NP5000 helps to reduce fuel consumption. In economy mode the adaptive autopilot reduces rudder activity depending on weather and sea state conditions. Less rudder activity results in less fuel consumption. Additionally the steering performance of the vessel is graphically displayed by use of the integrated Heading and Rudder Plotter allowing simple adjustments of the autopilot for best steering performance and again efficient fuel consumption.



### ➔ Your Benefit®

- Precise steering
- Ease of use and intuitive handling
- Simple adjustment of autopilots parameters by use of a Heading and Rudder Plotter
- Reduced fuel consumption thanks to weather adaptivity
- New mode Course Control
- Cross Acceleration Monitor
- Approved for High Speed Crafts
- Approved as part of a Track Control System in combination with Raytheon Anschutz ECDIS

## Steering Stand ComPilot® 20

ComPilot 20 is the turn-key solution for an individual steering gear control system, allowing integration of various devices into the steering stand as needed. The modular hardware design of NautoSteer AS permits functional and economical adaptation to any applicable specification.

The unique design of the ComPilot 20 steering stand is suitable for free-standing arrangements as well as space-saving integration between desk segments. ComPilot 20 is completely wired and tested according to customer specification. As only the connection to the board cabling has to be done, this allows a fast, simple and cost efficient installation on board. Therefore, ComPilot 20 is perfectly suited for both, newbuild and retrofit projects.

ComPilot 20: Equipped according to customer needs



### Your Benefit®

- Wired, configured and fully tested
- Fast, simple and cost-efficient installation
- Modular design allows integration in existing and newbuild bridge consoles

## Customized Steering Frames

In addition to the ComPilot 20 steering stand, Raytheon Anschütz also offers customized steering frames in different sizes and configurations. These frames are wired, configured and fully tested in Raytheon Anschütz factory.

By using this, installation costs and commissioning time are considerably reduced.

Steering frames:

Wired, configured and tested for fast installation on board



## Rudder Angle Indicator System

Raytheon Anschütz rudder angle indicator systems are characterized by a diversity of different indicators to fulfil individual customer needs and regulations: Instruments in different sizes, scales, type of installations and protection grades. In addition three-face rudder angle indicators with a 270° panoramic indication are offered.

