KONGSBERG

Advanced, semi- to fully-automated ship controls

Autopilot M100

Autopilot M100 provides optimal steering and speed control in all sea and weather conditions and under different vessel loads. The Autopilot M100 makes fully automated steering, positioning and manoeuvring functions available as different options from a single vessel control system. This reduces infrastructure footprint and installation costs.

The advanced manoeuvring product family is based on the decades of experience Kongsberg Maritime has with the delivery and support of advanced autopilot, track pilot and dynamic positioning systems in the merchant and offshore industries. Our advanced manoeuvring products range from a basic autopilot functionality to advanced vessel manoeuvring and transit control solutions, including fully automated docking and station-keeping.

HIGHLIGHTS:

- One system for control in all sailing conditions
- Automatic transition from transit to manoeuvring
- Tight integration between navigation and manoeuvring controls
- Flexible operator stations
- Optional all-speed functionality enabling heading and track control from zero speed
- Optional advanced motion prediction throughout the speed range

Functionalities

	Standard	Optional
Autopilot Heading	•	
Autopilot Course	•	
Track pilot		•
Speed pilot		•
All-speed heading and track control		•
Auto Crossing		•
Auto Docking		•
Motion prediction		•
Joystick		•
Station-keeping		•

Autopilot

The autopilot is a high-performance automated vessel heading and course control system. It can be installed as a standalone product or as part of a fully integrated Kongsberg Maritime bridge and manoeuvring control system. The functionality achieves turn rates gradually according to the vessel's size. This enables the smooth and optimised steering of the vessel with minimum counter rudder effect for lower fuel consumption and improved environmental friendliness along with reduced wear on steering gears.

While the function is engaged, the operator can change the set-point, turn radius and operating mode using the ergonomic operator input panel. The Fixed Course mode is designed for precise course keeping at speeds above approx. 5 knots.

Track pilot

The track pilot provides precise control of the vessel along a pre-planned, validated and monitored route, while compensating for environmental effects. Integration with K-Bridge ECDIS is required.

Speed pilot

Speed pilot provides automated control of the vessel's speed. The speed set-point can be entered manually from the system's operator panel. An advanced ETAS pilot is also available when integrated as part of a K-Bridge Track Control System.

All-speed pilot

The all-speed pilot is an add-on capability that enables the heading and track control functions to work seamlessly throughout the vessel's complete speed range and to/from complete stop. The function uses models and control algorithms valid at all speeds, making strict course-keeping possible for manoeuvring, cruising and in-between condition. This eases operations in several ways. For example, it makes it possible to sail safely along routes that include narrow passages without disengaging the autopilot or track pilot controller. In addition, with the all-speed function active, thrusters and propellers can be phased in and out optimally while the rudder angle is adjusted dependent on speed for more efficient operations.

Auto Crossing and Auto Docking

Auto Crossing and Auto Docking automate the end-to-end ferry journey by controlling the vessel's track, speed, and manoeuvring at and between dock terminals. At the push of a button, Auto Crossing handles the acceleration of the vessel to the desired transit speed on the selected route and continuously optimises the use of the propulsion units for efficient operations. When approaching the next terminal, the system notifies the captain to confirm Auto Docking or to take manual control if the function is unavailable. If the action is not confirmed, Auto Crossing will keep the vessel in a fixed and safe position distant from the dock.

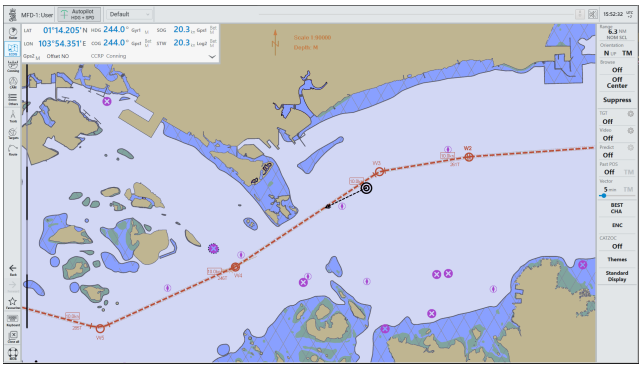
For more information about Auto Crossing and Auto Docking, please see our separate fact sheet.

Motion prediction

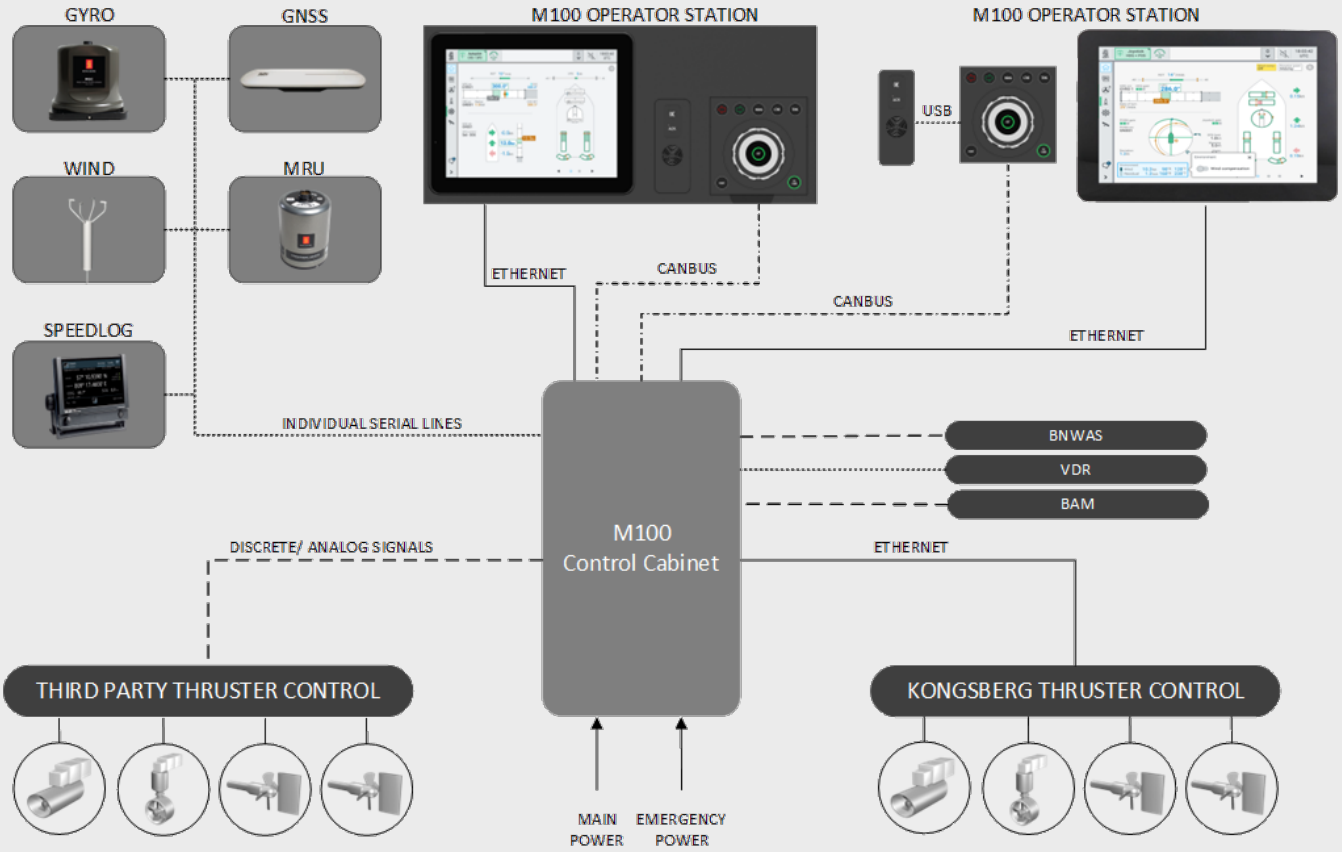
The motion prediction option requires integration with K-Bridge ECDIS. This function enables the operator to display predicted and past vessel positions on the K-Bridge chart for improved situational awareness during manoeuvring.

Integrated bridge

The integration of Autopilot M100 with K-Bridge ECDIS enables the Track Control and Motion Prediction functionalities, and an accurate visualisation planned turns when operating in Course mode.



K-Bridge ECDIS (Electronic Chart Display & Information System)



Joystick integration

The Autopilot M100 can be delivered and integrated with the Joystick M50 to enable additional functions for low-speed vessel manoeuvring and station-keeping. Station-keeping maintains the vessel's position using available thruster, sensor and position references. Changing the position and heading of the vessel is easily performed using the input devices or via the operator display.

For more information about the Joystick M50 system and functions, please see our separate product fact sheet.

Integration with the Mcon control system

Autopilot M100 can be tightly integrated with the Mcon propeller and thruster control system. Both systems will share the same touchscreen computer display. The tight integration of the solutions will ensure a smooth transition between manual and automated vessel control, further facilitated by the Mcon motorised levers.

Flexible installations

The Autopilot M100 operator station consists of few, small components that make the bridge layout very lean, simple and user-friendly. Our solutions' design offers the flexibility that enables us to fit the equipment in various operator station solutions according to user preferences and requirements. These include joystick integration in operator chair alongside other control devices, desktop mounting, or desk drop-in mounting. The operator station components can also be delivered as a small console.

System interface requirements

The type and number of sensors will vary according to operational requirements, class notation, and applicable safety and carriage requirements.

Autopilot M100 functions	Heading sensor	Speed sensor	Position sensor	Wind sensor	Motion reference unit	ECDIS	Steering interface	Propulsion interface	Bow thruster interface
Autopilot	•	•					•		
Track pilot	•	•	•			•	•		
Speed pilot		•						•	
All-speed pilot	•	•	•	•	•		•	•	•
Auto Crossing	•	•	•	•	•		•	•	•
Auto Docking	•	•	•	•	•		•	•	•
Joystick	•						•	•	•
Station-keeping	•		•	•	•		•	•	•

Technical data

CONTROL CABINET

- **Weight and dimensions**
  Weight: 35 kg
  Dimensions (h/w/d): 600mm x 600mm x 250mm
- **Power specifications**
  Main: 230 VAC
  Back-up: 24 VDC
- **Environmental specifications**
  Rating: IP54
  Operating temperature range: -15°C to +55°C
  Humidity: <97%, non-condensing

12" TOUCHSCREEN

- **Dimensions**
  209.0mm x 307.5mm
- **Power consumption**
  max. 1A/24V
- **Environmental specifications**
  Rating: IP22, IP56 (flush mounted)
  Operating temperature range: -25°C to +70°C

MULTI-PURPOSE INPUT DEVICE (MPID)

- **Dimensions**
  126.2mm x 126.2mm (cut-out size for top mounting)
  149mm x 149mm (cut-out size for flush mounting)
- **Environmental specifications**
  Rating: IP22
  Operating temperature range: -25°C to +55°C

TYPE APPROVAL

- Heading Control System
- Track Control System Category C when integrated with K-Bridge ECDIS
- Cyber security according to IACS UR E27

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