mtu NautIQ – Marine automation solutions

CONTROLLING THE POWER.

A Rolls-Royce solution

Marine automation solutions

CONTROLLING THE POWER
mtu NautIQ

Our engines are powerful and technologically advanced. But in order to offer the best efficiency, reliability, safety, and environmental compatibility, they need more than just power. They need intelligent electronic management. Modern engine management systems handle the control and monitoring of the hardware and enable perfect performance. Our ship automation systems ***mtu*** NautIQ are designed to offer the ideal combination of performance and precision individually for your applications from a wide range of solutions.

Delivering actionable insights through digital solutions with digital platform ***mtu*** Go

Our digital platform ***mtu*** Go is being developed as the primary source for you and your service network to analyze system data quickly, determine important action steps, and plan them optimally. With a growing number of ***mtu*** Go features you can easily connect, remotely monitor, efficiently maintain and proactively manage your engines, systems, assets and global fleets like never before.

www.mtu-go.com

mtu NautIQ Master

INTEGRATED PLATFORM MANAGEMENT SYSTEM

01

mtu NautIQ Master is an Integrated Platform Management System and offers the optimal solutions to meet a wide range of requirements for all types and sizes of vessels. Typically used on military and complex commercial projects.

Integrated Platform Management System (IPMS)
With marine naval design becoming more sophisticated, and more capability being integrated with fewer people on board, only proven designs and software functionality can truly meet the demands within modern project time scales and risk profiles. As world experts in the field of integration, we introduce ***mtu*** NautIQ Master, the latest evolution of our powerful IPMS solution, allowing more COTS product integration. It is a true System of Systems capable platform.

This powerful mix of ***mtu*** NautIQ Master distributed processing and highly redundant architecture, coupled to industry standard equipment and protocols allows for a truly supportable platform, with minimal obsolescence risk. This reduces platform cost, integration time and commissioning/installation issues, whilst retaining the survivability and power of the original ***mtu*** NautIQ Master, with its scalability and flexibility in terms of system architecture.

- Multiple operator workstations running WINMON™
- Integrated Propulsion Control System (PCS)
- Damage Control System (DCS)
- Multi-level redundant networking including fibre optics
- Integrated Automatic Power Management System (APMS)
- Equipment Health Monitoring and Dynamic Analysis
- Remote Data Collection and Control Units
- On Board Training Systems (OBTS)

mtu **NautIQ Master overview**
mtu NautIQ Master offers advanced bespoke solutions designed to suit the complex automation and integration requirements for operators of specialist vessels.
mtu NautIQ Master is capable of providing a fully integrated turnkey electrical and automation solution, being a scalable and feature rich system capable of incorporating the following sub-systems and plug in modules:

- Alarm, Monitoring and Control System
- Integrated Platform Management System
- Integrated Navigation Bridge System
- Integrated Vessel Management System
- Integrated Communications
- Digital CCTV Surveillance
- Propulsion Control
- On Board Training System
- Power Management
- Condition Based Monitoring System
- Damage Control System

mtu **NautIQ Master – IPMS Incorporates:**

Propulsion
The Propulsion Control System (PCS) sits on a separate network that can be fully integrated into the IPMS. It accommodates all propulsion configurations including gas turbine, diesel and electric drives. Fixed and Controllable Pitch Propeller (CPP) shaft arrangements as well as Azimuth pods can be accommodated.

Fluids
Monitoring and management of fluid systems such as fuel, lube oil, cooling systems, ballast, bilges, aircraft refuelling and fire systems. Integration into damage control system.

Electrical
Remote monitoring of electrical systems, generators & switchboards with automatic management of load requirements, blackout starts and duty set rotation. Advanced integration of propulsion system.

HVAC
Remote or automated operation of ventilation and extraction systems, maintenance of ambient atmosphere for comfort and life preservation.

Damage Control
Graphical presentation of safety systems with remote or automated operation of hatch, door and ventilation closure; extraction systems; bilge and flood control; fire fighting systems; fire suppression systems; and resource deployment.

Resilient Networks
Dual redundant networking of alternative architectures to meet specific customer requirements, including ARCNET or Ethernet over standard cable or managed fibre optic arrangements.

Simulation
Sophisticated training simulation that makes use of ship trial data or pre-defined scenarios on selected workstations. Work stations utilise replica mimic sets without the need to create an alternative software programme and run with actual ship data.


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mtu NautIQ Core

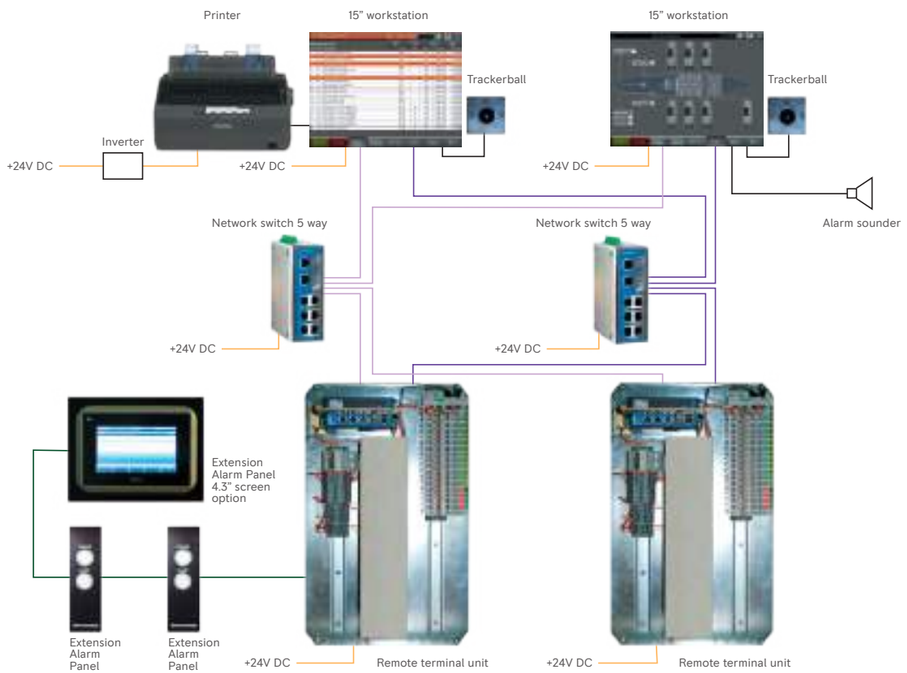
ALARM AND MONITORING SYSTEM

02

mtu NautIQ Core Alarm and Monitoring System (AMS) option is an entry-level system that offers a reliable and highly cost-effective solution and is designed using pre-engineered building blocks incorporating built-in expansion for future proofing. A selection of display systems are available to meet operational requirements and console design.

mtu NautIQ Core has been specifically created to deliver COTS (Commercial Off-The-Shelf) solutions for all shipping sectors including: bulk carriers, container ships, tankers, passenger ships, offshore support vessels, tugs and salvage vessels, inland waterway and small leisure craft.

The standard ***mtu*** NautIQ Core packages are future-proofed allowing for later integration of additional hardware, software and auxillary equipment through the vessels lifetime.



Key Features:

Cost Efficient
- Placing Remote Terminal Units (RTU) near the process reduces cabling
- Pre-engineered solution reduces engineering costs
- Self-diagnostic features help to improve maintenance scheduling

User-Friendly
- Unified interface across devices
- Intuitive HMI
- Simple modular design

Flexible
- Option to interface with external systems
- Modular design allows for customisation
- Up to 50% expansion available within each RTU

Safe and Reliable
- Multiple levels of redundancy
- BITE safeguards the network while WINMON™ safeguards the vessels systems
- COTS hardware with no moving parts

WINMON™ – Lloyd's Award for Software Innovation
Information to the right place defines survival, safe operation, efficiency and ability to respond. WINMON™ is the tool that combines a Tile Layered Graphic approach (TLG) for simplified information presentation.

A user friendly interface for operation and maintenance places the package ahead of its rivals. Together with the flexibility to integrate third party software packages, the system develops into a comprehensive ship management tool.

mtu NautIQ Gate

Opens up a new world of connectivity
mtu NautIQ Gate has been specifically created to deliver compact and modular solutions for all shipping sectors including: smaller passenger ships, offshore support vessels, tugs and salvage vessels, inland waterway and luxury yachts. The standard ***mtu*** NautIQ Gate packages are future-proofed allowing for later integration of additional hardware, software and auxiliary equipment through the vessel's lifetime.

The ***mtu*** NautIQ Gate unit is the latest design from the ***mtu*** ship automation solutions featuring unparalleled flexibility across the entire range of legacy, current and future ***mtu*** NautIQ installations.

Comprising ***mtu*** NautIQ Gate_Master and ***mtu*** NautIQ Gate_Slave boards, the NautIQ Gate platform allows a single unit to be built with the correct number of interfaces. The ***mtu*** NautIQ Gate platform allows connection to Ethernet and/or ARCNET networks via single or preferably, dual interfaces. This allows ***mtu*** NautIQ Gate to function not only within any ***mtu*** NautIQ system but it can also be used to retrofit most other manufacturers' old, unsupportable systems.

mtu NautIQ Foresight

FROM BRIDGE TO PROPELLER

03

mtu NautIQ Foresight is an Equipment Health Management System. It allows you to monitor and have full control over the technical condition of your vessel and your complete fleet.

mtu NautIQ Foresight, an Equipment Health Management System (EHMS), is an integral part of our maintenance support system, enabling condition-based data to be received, measured, processed, analyzed, and stored.
Stored data can also be displayed graphically, and analyzed data used to improve operational availability and optimize maintenance costs.

mtu NautIQ Foresight collects and analyzes data from ***mtu*** systems and third party key components on the vessel, taking into account additional factors, such as navigational data. The aim is to achieve maximum vessel availability, while keeping fuel consumption and CO_2 emissions to a minimum.

Key Features:

Improved vessel availability
The innovative system ensures maximum availability of the ship.

Peaked performance
Increases system performance through optimal interaction from „bridge to propeller“.

Optimized life cycle costs
Helps prevent unscheduled maintenance and reduce fuel consumption.

CO_2 avoidance
The ***mtu*** NautIQ Foresight systems make an important contribution to reducing fuel consumption and thus CO_2 emissions.

mtu NautIQ Foresight

IMPROVED VESSEL AVAILABILITY

The ***mtu*** NautIQ Foresight maintenance strategy is based on three pillars and maximizes the availability of ship and fleet.

Scheduled maintenance
Scheduled maintenance strategy contains the manufacturer's maintenance specifications according to the agreed load profile.

Predictive maintenance
Predictive maintenance strategy performs analysis with real-time and long-term data as well as data of an ideal system condition and reports anomalies to the crew.

Corrective maintenance
In the event of an alarm, corrective maintenance strategy supports the crew with fault tree analysis, videos and related documentation.

Peaked performance
Monitoring of fuel oil consumption and measurement of torque is the first step to building up the knowledge about the current vessel status. In combination with the health monitoring data, the performance of the vessel can be analysed and improved.
With the aid of weather and navigation data, conclusions can be drawn about the hull condition. Additionally, the optimal speed can be determined.
Performance monitoring system enables fuel cost optimisation and contributes to reduced emissions.

Optimized life cycle costs
Maximized availability and peaked performance optimize life cycle costs. Due to the improved plannability, downtimes are reduced to a minimum and unplanned maintenance is turned into planned maintenance.

Reduced emissions
mtu NautIQ Foresight bundles all ship operational data in one system. The combination of engine, power generation, draft and weather data enable in-depth analytics of the vessel's movement and its performance. In the next step, the operation of the vessel can be adjusted in order to run the asset and its equipment efficiently and therefore in an environment-friendly manner.

mtu NautIQ Bridge

FULLY INTEGRATED BRIDGE SOLUTION

04

mtu NautIQ Bridge is a fully integrated bridge solution. Created in partnership with yacht specialists Team Italia, this outstanding ensemble raises overall ship performance, improves safety and offers a new level of customer experience.

Integration from bridge to propeller

One platform: Full integration
The navigation equipment and all the yacht subsystems necessary to monitor and control the entire vessel can be seamlessly integrated in one platform. There is no need to modify third party equipment or subsystems integrated into ***mtu*** NautIQ Bridge.

- Easy and consistent user interface to navigation equipment
- In-depth integration of propulsion system
- Multicontrol system – consistent control through a single device
- Touchscreen controls – allow easy HMI customization and software updates
- Equipment health monitoring and vessel optimization
- Connectivity & remote diagnostic of equipment condition

One design: Elegant, intuitive, user-optimized
All the information is presented in one elegant and user-optimized design. Easy and consistent user interface to navigation equipment.

- Total Navigation Control, simplified management
- Innovative design and functionality
- Safe and user-friendly thanks to consistent user interface
- Seamless user interface across all integrated subsystems

One source: Dependability for builders and owners
All the technology and services come from one source.

- One face to the customer for complete vessel operating system
- Global service support, anytime, anywhere
- Seamless integration of product and technology
- Scalable, to integrate additional functions
- High flexibility for updates and upgrades

Fully integrated *mtu* solution
From bridge to engine room

One face to the customer
For complete vessel operating system

Global service support
Anytime, anywhere

Scalable
To integrate additional functions

Seamless integration
Of product and technology

Unique innovation
Customized design and product features

mtu NautIQ BlueVision NG_Basic

THE AUTOMATION SYSTEM FOR YOUR PROPULSION SYSTEM 05

mtu NautIQ BlueVision NG_Basic is a non-classifiable monitoring and remote control system, incorporating a simple design and complete basic functionality.

The automation system for the propulsion system consists of monitoring control and remote control. It is configured by an engineering system and is connected via interfaces to the engine control system, the transmission system, the propulsion system and the auxiliary systems.

mtu NautIQ BlueVision NG_Basic
Primarily used in smaller yachts, ***mtu*** NautIQ BlueVision NG_Basic is designed for ***mtu*** Series 2000 and Series 4000 engines. It comes with 1 to 4 shafts / engines and fixed pitch propeller (FPP) propulsion plants. It features compact hardware for easy installation and commissioning. Local operating panels (LOP) offer basic functionality for installation in the engine room.

Key Features:

Compact hardware
Compact size makes for easy installation and commissioning

Connected control
Of all components installed throughout the ship

Local Operating Panels (LOP)
For installation in the engine room

Integrated ZF autotroll
Function for ZF gear boxes

Pininfarina Bridge Components
With the optional available Pininfarina bridge components we have responded to the increasingly exacting aspirations of yacht buyers. With this design line we offer an entirely new design concept for control lever, digital touch displays, control panels and analogue display instruments featuring unified and distinctive styling.

designed by pininfarina

Emotional design meets engineering proficiency: our bridge components from the cooperation with the Italian designer Pininfarina.

mtu NautIQ BlueVision NG_Advanced

THE EXTENDED MONITORING AND CONTROL SYSTEM 06

Our standard automation systems are delivered ready for installation, perfectly matched to your propulsion system, giving you a complete package where everything is fine-tuned to your requirements: powerful engine performance, maximum efficiency, uncompromising reliability and green credentials.

The modular system design allows for a flexible configuration: intelligent data technology ensures reliable data exchange and reduces the need for excessive cabling. Optimized interfaces between the propulsion and automation systems result in complete integrated solutions that guarantee security, efficiency and reliability – and all from one source.

mtu NautIQ BlueVision NG_Advanced
The extended monitoring and control system is available for ***mtu*** Series 2000 and Series 4000 engines. It comes with 1 to 4 shafts / engines and fixed pitch propeller (FPP) propulsion plants.

Our highly developed hardware is individually configured according to the respective application and customer requirements. That means components are designed with Commercial Off-The-Shelf products (COTS) to create modular, scalable solutions that work for you.

Key Features:

Type-approved components
LOP, control lever, display and instruments.

Connected control
Of all components installed throughout the ship.

Local Operating Panels (LOP)
Comes with a color display and advanced functionalities such as clutch and speed control.

Compact hardware
Compact size makes for easy installation and commissioning.

Data communication
Via redundant Ethernet ring bus.

1

2

1 Control Lever (CL)
2 Operating Panel (PAN)
3 Color Display MTD2

3

mtu NautIQ BlueVision NG_Avantgarde

A SOPHISTICATED SOLUTION

07

mtu NautIQ BlueVision NG_Avantgarde provides the most sophisticated and extensively developed solution for standard propulsion automation and includes a monitoring and remote control system package for your ***mtu*** engines and systems.

Without exception, we can always supply a complete system individually tailored to suit your vessel – all from a single source. ***mtu*** NautIQ BlueVision NG_Avantgarde provides optimum complete solutions which guarantee safety, efficiency and reliability.

mtu NautIQ BlueVision NG_Avantgarde enables you to get an excellent overview of what matters most on your ship, allowing you to manage the ship's propulsion plant easily. The system is designed for ***mtu*** Series 2000 and Series 4000 engines and one to four engine propulsion plants.

Key Features:

Type-approved components
LOP, control lever, display and instruments.

Compact hardware
Compact size makes for easy installation and commissioning.

Connected control
Of all components installed throughout the ship.

A clear vision
The sophisticated color screen gives you a crystal-clear overview of what's happening on your propulsion system.

Grafical User Interface (GUI)
24 " - 16:9, Color Display

mtu NautIQ Genoline NG

MADE FOR ONBOARD POWER GENERATION PLANTS. 08

With the ***mtu*** NautIQ Genoline NG system, your engine and generator set are optimized to work at their best, whatever the operating conditions.

The modular system's design ensures optimum adaptation of the diesel engine and generator set to the variety of operating conditions that exist for onboard power generation. ***mtu*** NautIQ Genoline NG is available for ***mtu*** Series 2000 (on request) and Series 4000 engines.

Features:

Maximum reliability
Availability and maintenance-friendly design for minimal downtime.

Low lifecycle costs
Effective operation, low fuel consumption and long service intervals.

Ultimate compatibility
All ***mtu*** components are integrated, thoroughly tested and supported. Everything's designed to work together, which means less maintenance downtime for you.

Reduced emissions
Advanced technology meets applicable emissions and environmental regulations.

mtu **NautIQ Genoline NG is compatible with the following applications:**

- Diesel-electric propulsion plant non-classified and classified
- Special applications
- MIL
- Shock
- EMC

Some of the features of *mtu* NautIQ Genoline NG

- It controls and monitors the diesel engine and generator and provides the required interface
- Modular system guarantees optimum adaption of the diesel engine to the diversity of operation conditions in onboard power generation
- Easy to integrate and install
- It is available with ***mtu*** Factory acceptance test as well as a fully classified version
- Simple interface handling
- The interface provides analog and binary signals (I/O), CANopen, J1939, Modbus TCP/IP and ModBus RTU.

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