AVENTICS

MAREX SHIP AND VALVE CONTROLS

TEL

Pneumatics It's that easy

Ship Controls - It's that easy



At first a supplier of pneumatic components for commercial shipbuilding, AVENTICS Marine today offers a wide scope of products for control applications at sea or inland waters. Long since, the pneumatic range of products has been completed by modular, classification approved ship controls with joystick option, valve control systems and components for Selective Catalytic Reduction. At the same time, while limited commodity availability and the increasing prominence of environmental aspects call for innovative engineering, the operating conditions at sea have not changed: safety and robustness remain paramount. AVENTICS products are developed and manufactured in Germany in accordance with the highest quality standards.

Our innovative, tailor-made system solutions are able to fulfill demands as different as in commercial and recreational shipbuilding industry. OEMs, shipyards, system integrators and ship operators all over the world rely on our engineering expertise and service throughout the full lifecycle of their vessels. Our products can be found on work boats, mega yachts, pleasure boats, passenger vessels or freight carriers of any size.

Read on to find out more about AVENTICS Marine products.

Innovative products solutions for every customer case

Pneumatics



- Mounting units for two and four-stroke engines
- Remote and local controls
- Clutch controls
- Compressed air
- preparation Working logic
- Valves
- Cylinders, actuators & positioners
- Spare parts & service
- Proactive maintenance

Pneumatic components retain their importance for marine engines, with AVENTICS air preparation, starting air valves, and start/stop units in use on two- and four-stroke engines for decades now. Moreover, our pneumatic servo-positioners contribute to engine efficiency as their accuracy allows them to precision-adjust the timing of the fuel injection.

Ship Controls



For

- Commercial vessels
- Workboats
- Pleasure boats
- To control FPP systems
- CPP systems
- Waterjets
- Hybrid systems and more
- Via
- Control heads
 - Joysticks Including
- Alarm & Monitoring

AVENTICS Marine engineers have responded to changes in engine and propulsion technology by developing the Marex ship control into a state-of-the art system solution offering engine remote control, joystick operation, and monitoring functions. With Marex ECS we have introduced an easy-toinstall control system designed specifically for smaller pleasure crafts – the first remote control system which can be adjusted using a smartphone or laptop.

Valve Control Systems



Selective Catalytic Reduction (SCR)



- Valve controls
- Tank sounding systems
- Compressed air preparation
- SOS units
- Control cabinets & monitoring
- Back up systems
- Data interface to ship management systems

On larger vessels, intelligent electro-pneumatic valve control systems are used to control fluid tanks of all kinds (e.g. fuel, fresh water or bilge). This AVENTICS product range includes control cabinets, butterfly valves and actuators, SOS units, and backup panels; options such as remote touchscreen operation, monitoring, and data bus communication provide flexible interfaces able to interact with today's ship management systems.

- Low and high pressure solutions
- For two or four-stroke engines
- Pump starter panels
- Urea supply and dosing units
- Control units
- Soot blowing and venting units

In exhaust gas purification, AVENTICS products are integrated into systems which transfer the principles of selective catalytic reduction (SCR) from automotive and power generation to marine applications, substantially reducing levels of nitrogen oxide in exhaust emitted by ships' engines.

Pneumatics – automation for large engines

They are the first choice for large engines: our pneumatic components, undaunted by the rough conditions of the open sea, prove their reliability day by day and allow operation in unattended machinery space.

Solutions for two- and four-stroke engines

Air preparation

The day-to-day life of a sailor: in the middle of operations, the filter in the air conditioning unit needs to be serviced. No problem if you use one of our redundant systems. We create complete mounting units for compressed air with a pressure of up to 30 bar and we can offer the components with type approval.

Optional components

- Pressure reducers
- Filters with integrated drain valve
- Air dryers operating according to the "cold regenerated adsorption" method
- Safety valves
- Antifreezers



Pressure reducing station

Starting air valves

Good start for large engines. Our compact units with large nominal diameters reliably control the starting air supply and can be operated by hand or electropneumatically.



▲ 30 bar starting air valve



▲ 3/2 way valves with manual operation

Start/Stop unit

Reliable control directly on the engine: the control heads for common rail engines, or the start/stop valves for the manual operation of conventional engines, use robust technology for failproof operation.





▲ Start/Stop unit at marine engine

Traditional pneumatics have a firm place in ship history, and their story continues

Fuel injection timing

To ensure that the fuel rack on the cylinder moves smoothly, we offer complete monitoring units for compact installation directly on the cylinder.

Our servo positioners align themselves accurately based on the control pressure, and the electronic control valves reliably convert electric control signals into pneumatic pressure and mechanical movements.



Fuel injection timing unit

Cylinder cutoff

Thanks to a logic control valve, this mounting unit will allow you to turn off the cylinders, for instance for maintenance purposes.



Cylinder cutoff

Working logic

For the reversing of large engines, we also offer complete working logic assemblies or monitoring units that can be installed directly at the engine. Using our logic valves and cylinders, the resulting units work accurately and move the camshaft with precision.



Pneumatic switching unit

Marex OS – for a safe journey

Sometimes, the smartest way to get around on board is taking a bus. Microprocessor-controlled CAN bus technology opens up the way for new electronic concepts in shipbuilding. The most important keyword: modularity.

Individually configurable and tailored to the propulsion and ship type, Marex OS offers extensive control functions for marine engines and transmissions with fixed or controllable pitch propellers or waterjet applications. CAN bus data communication allows for powerful capabilities and safety in operation. Thanks to the modular setup and numerous parameters, which can be adjusted comfortably within the software, Marex OS is suitable for any type and size of ship. Taking the short path. In a plugand-play housing.

An open professional system Marex OS

Work vessels with classification, passenger liners, coastal cargo ships and yachts can all rely on one of our most proven products. The Marex OS hardware consists of modular units, made extremely powerful by the bus connection. Our systems are easily integrated and provide efficient, secure control.



Advantages

- Easy installation thanks to pre-assembly
- System reliability thanks to one self-monitoring CAN bus per drive train
- Operating elements also suitable for outdoor installation
- Approval of drawing and FAT upon request
- Open for any engine, gearbox and propeller maker

"Our customers rely on our application know-how and expertise. It is our commitment to offer safe and reliable solutions for their challenges. On commercial vessels or pleasure boats, our ship control solutions stand out by exclusive design and flexibility."

> Patrick Staber Sales Manager KAM Marine

Marex OS System Setup

Marex OS – System



Integrated Functions

- Engine control, speed curves and engine stall protection
- Gear operation, reversing maneuver curves
- Control of PTO and PTI, Trolling and Slip & Grip
- Multi-engine systems

- Calculated ship speed
- Shaft brake control
- Internal software PLC to add special functions
- Standard interface for DP system, Autopilot and VDR

Marex ECS – the easy control system



Marex ECS combines user convenience with excellent functionality and good looks. Its timeless appearance blends in smoothly with any ship design, pleasure craft or work boat. State-of-the-art CAN bus technology is used to control single or twin diesel engine applications smoothly from up to four control stations. Needless to say that verified quality and the highest production standards ensure a maximum of reliability and safety in operation. After a simple start-up procedure, Marex ECS is good to go. Optionally, control features can be adapted for a gentle operation which will protect engine and gearbox. Thanks to the integrated WiFi, the adjustments are easily made on a smartphone, tablet computer or laptop.

- Plug-in solution
- Color-coded cabling
- Auto-configuration
- Fine-adjustment via WiFi
- Intuitive operation



Time-saving installation and start up with possibility to fine-adjust

Marex 3D – a new dimension of precision and comfort

Intuitively precise Marex 3D

Harbor docking and undocking is becoming easier and safer than ever before. The 3-axis joystick of this intuitive maneuvering aid allows for the simultaneous operation of engines and thrusters. Steer your ship in any direction with precision and comfort in the 3D mode, simply by pushing or turning the joystick. A smart control will coordinate the drives and also hold the heading as an option.

Alternatively, engines and thrusters can be controlled separately. In the Thruster mode, moving the joystick will operate only the thrusters, while the engines are controlled via a control head.

In combination with Marex OS or ECS, Marex 3D is a flexible solution for ships of all sizes with the option of up to 6 joystick stations. A perfect match also as a refit with existing Marex control systems.

Benefits of Marex 3D

- Slow-speed maneuvering with unmatched precision thanks to vessel-specific calculation principle
- Heading mode option
- Approved by major OEMs
- Compatible with Marex OS and ECS
- Ergonomic design
- Can be combined with any common thruster type

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The Marex 3D is designed for use on yachts, speedboats, and pleasure craft of any size. It can be installed with conventional shaft-line, fixed-propeller applications in combination with digital and proportional thrusters.

"After the sea trial, skippers are thrilled about their experience with Marex 3D and never want to sail without joystick again."

> Julian Reddemann Engineer Customer Projects Marine



Marex VCS – the pneumatic valve control and tank sounding system



Undefeated in TCO analysis thanks to cost effective procurement, reliable continuous operation, and low operation expenses: our pneumatic valve control systems feature a proven concept, ongoing personal support through to commissioning, and a global service network.

The system's advantage lies in its simple structure, requiring only one control cabinet and – in the best-case scenario – one closed-loop pipeline. Fully pneumatic, our entire control system does not need any electrical connections or power supplies for the basic system. Even the position feedback of the individual valves is given pneumatically.

System solutions tailored to each individual project

The system has a modular architecture, making it easier to realize your desired application in very little time. Through our questionnaires, we can rapidly determine the required functions and adapt our system to the specific requirements for your type of vessel. Both, basic components as well as operating and control modules are quickly coordinated and programmed. Our system solution has proven itself in real-life situations thanks to its fail-proof operation. However, should the need arise, our service organization is within easy reach anywhere in the world.

- Cost effective solution
- Low operating pressures from 5 to 7 bar
- Actuators with active position feedback for installation inside and outside the tank
- Single- or double-acting and proportional

"Pneumatics - It's that easy: Environment-friendly control media are up to date and future-oriented. Marex VCS combines knowhow in pneumatics with flexible design and ease of use. This is what our customers expect."

> Jayant Moese Assembly Mechanic

> > RVENTICS

Our solution for the remote operation of fluid-controlling valves and fluid level measurement



Compressed air preparation

- Pressure reduction and regulation
- Filtering, drying and air reservoir

Control cabinets, pneumatic or electro-pneumatic

- Pneumatic design including only pneumatic operating, indicating and control elements
- ATEX-compliant components for applications in hazardous areas.
- Electro-pneumatic design including the production of electric signals for further processing.
 Additional options:
 - Touch screen operation
 - Visualization and monitoring of status
 - Data interface to ship management or external tank sounding systems
 - Optional integration of AVENTICS Tank Sounding



Back-up control For access-limited butterfly valves.

SOS units

Design and integration outside the engine room for the emergency operation of safety-relevant valves.

Actuators

- Various sizes
- Special submersible design for space-saving installation inside tanks.
- With or without pneumatic position feedback.

Fuel bunkering safety system

Fuel bunkering can be hazardous under rough conditions as the ship moves up and down. AVENTICS offers a pneumatic safety system which monitors the strain on the fuel line and switches the valve to the safe state if necessary.

Marex Tank Sounding System

- Pneumatic fluid level measurement system based on the bubble-type principle.
- Available as a separate function or in combination with the Valve Control System.
- The basic function can be realized pneumatically, further options are available through an electropneumatic control cabinet:
 - Touch panel operation
 - Data interface to ship management systems
 - Fluid volume calculation
 - Draft measurement
 - De-icing of ballast tanks



 Control cabinet for Tank Sounding

Selective Catalytic Reduction – Our contribution to a cleaner environment

Special care is being taken to protect the environment from air pollution. AVENTICS products contribute to fulfill the IMO MARPOL NOx regulation which is the dominant guideline for marine industries. Stricter rules have been issued with IMO NOx Tier III.



2-stroke engine with SCR unit under construction

The SCR (Selective Catalytic Reduction) principle is a technology which can reduce NOx in the exhaust gas by a chemical reaction process. The nitrogen oxides (NOx) are reduced into nitrogen (N2) and water (H2O) using ammonia (NH3) or urea at a suitable temperature on the surface of the catalyst. SCR systems differ with regard to the operating temperatures and pressure in the exhaust gas line. Low- and high pressure SCR units are available to clean the exhaust gas of 2- or 4-stroke-engines.



"SCR systems are my passion. With our competence we contribute to improve commercial shipping's environmental footprint. Long-term relationships to our key customers, trust and sense of quality are the basis of our success."

> Hak Lae Kim Sales Manager

Our responsibility for the future

AVENTICS is offering pneumatic solutions for various tasks within the SCR process.



Soot blowing units

Pneumatic units for low-pressure SCR systems:

- Compressed air preparation
- Urea supply units
- Urea dosing units
- Pump starter panel
- Soot blowing units

Pneumatic units for high pressure SCR systems:

- Compressed air preparation
- Urea supply units
- Urea dosing units
- Urea regulating units
- Venting and sealing units



Urea dosing units for low pressure applications



▲ Urea dosing units for high pressure applications

Trust is good; service is even better

For more than 60 years, the quality of our products has been undisputed in the market. The services we offer alongside our products are the decisive step toward earning your satisfaction.

Our Service Team is ready to receive your inquiries. It provides expert advice on the phone or by email and will organize on-site assistance if necessary. Or it can direct you to one of our service points all over the world.

For the operators of ships with pneumatically controlled 2-stroke-engines, we have created the PneuMare proactive maintenance concept: Supported by a vast network of service partners, it offers you continuous, worldwide support over the full operation life of the ship's engine, planned ahead whenever a ship is undergoing routine maintenance.

For refits or conversions of existing control systems we are by your side – from project engineering to the commissioning. Take advantage of our expertise and contact us for all questions related to

- Spare parts and maintenance
- Troubleshooting
- Repairs
- Commissioning
- Propulsion plant optimizations
- Refits and conversions

We design and manufacture in collaboration with





CCS





"Following a project from the first sketch up to the point where you feel the salty spray is unbelievable..."



Nikolas Kwoczek,

Engineer Customer Projects Marine

marineservice@aventics.com

Practice makes perfect

Powerful equipment offers an ocean of possibilities. At the same time, a simple question can easily take the wind out of the sails for running operations. In any case, help can be found at the Marex Academy, the training center for pneumatic and electronic applications.

How do I connect and adjust a DC servomotor? How do I address a controllable pitch propeller? How do I define an alarm point? Equipment operation, product expertise, and background knowledge are the focus of numerous training sessions that we offer to you as well as to the technicians from our service network. For you as a customer, the training sessions always address recurrent questions from real-life situations. The content is structured into modules which build on each other and are based on the latest training methods. The modules are available in several languages upon request. Catalog and training registration forms available online at **www.marex-shipcontrols.com.**

We offer

- Individual training courses, tailored to fit your needs
- An overview of product functions
- Original components training
- Optional on-site training at your premises
- Commissioning support, including test runs
- Participant certification in after-sales expertise



▲ AVENTICS Marine - Sales and Service Network

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