

# Complete Marine Expertise

Any Ship. Any Task. Anywhere.



# Drive efficiency on board

## **Your vessel – supported**

To maintain a profitable and competitive business over the long term, your vessel must be operating with maximum capacity at all times. As such, you need absolute confidence that the technology you invest in is fully compatible with your vessel today, whatever its size, type or cargo, and offers the flexibility to deliver dependable performance as your requirements evolve. At Emerson, we've combined decades of marine experience with technological innovation to develop systems that support every type of ship and offshore unit, helping you make the most of every commercial opportunity.

## **Your challenge – solved**

We've been in the business long enough to know the challenges you face on a daily basis and the most effective ways to overcome them. As a result we can match our technology to your specific requirements

with one-stop-shop efficiency. Whatever issues you need solved our systems are designed to ensure that your vessel performs at its optimal capability and that your crew is working under the safest and most reliable conditions.

## **Your location – covered**

Operating a commercial vessel is certainly unpredictable; not only must you remain flexible to new market opportunities wherever they arise, but the realities of your business also include that the need for technical assistance can happen anywhere and at any time. That's why our global service network has grown to become the best in the business and extends to every major port and shipyard on your route. No matter where you are or what assistance you require, you can be sure that our experienced teams will be ready with the expertise and resources necessary for service, maintenance and upgrades.

Our mission is to provide innovative solutions to operate safely, efficiently and with peace-of-mind.





# Stem to stern solutions

## Integrated Control and Monitoring System

- **Dynamic Modules**  
Customized for your vessel
- **Enhanced Safety**  
With advanced alarm functions
- **Simplicity**  
Easy overview with flexible user interface

Aperio is our fully Integrated Control and Monitoring System that grants you complete overview of different tasks on board via an intuitive, simple and flexible user interface. The system can be customized and made scalable to your specific needs and is quick to install, easy to upgrade and designed to meet all marine application requirements. With advanced alarm functions you quickly receive alerts of any abnormality throughout the vessel, allowing you to call for action. The outcomes are better decisions based on reliable and timely information with improved operational continuity and a more streamlined efficient business.

## Valve Remote Control System

- **High Performance**  
Long lifetime at sea, tried-and-tested in world fleet
- **Cost Efficiency**  
Quick installation and low maintenance
- **Flexibility**  
Scalable for your needs and with compact design

Our Valve Remote Control System can be installed on all types of vessels and offshore applications and has for more than 50 years set the benchmark for marine industry valve operation and control. Our high quality, robust and compact Damcos actuators with the helical spline technique deliver high torque without radial impact on the valve spindle. The system enables you to enhance operational continuity on board and save operational costs with minimal maintenance and in compliance with environmental regulations. Featuring state-of-the-art Valve Control Technology, we provide custom-made solutions of hydraulic, electro-hydraulic (Damcos LPU), electric and pneumatic actuators scalable to your specific needs and with one-stop-shop efficiency.



## Fuel Management System

- **Improved Performance**

Fuel consumption and optimal engine performance

- **Cost Efficiency**

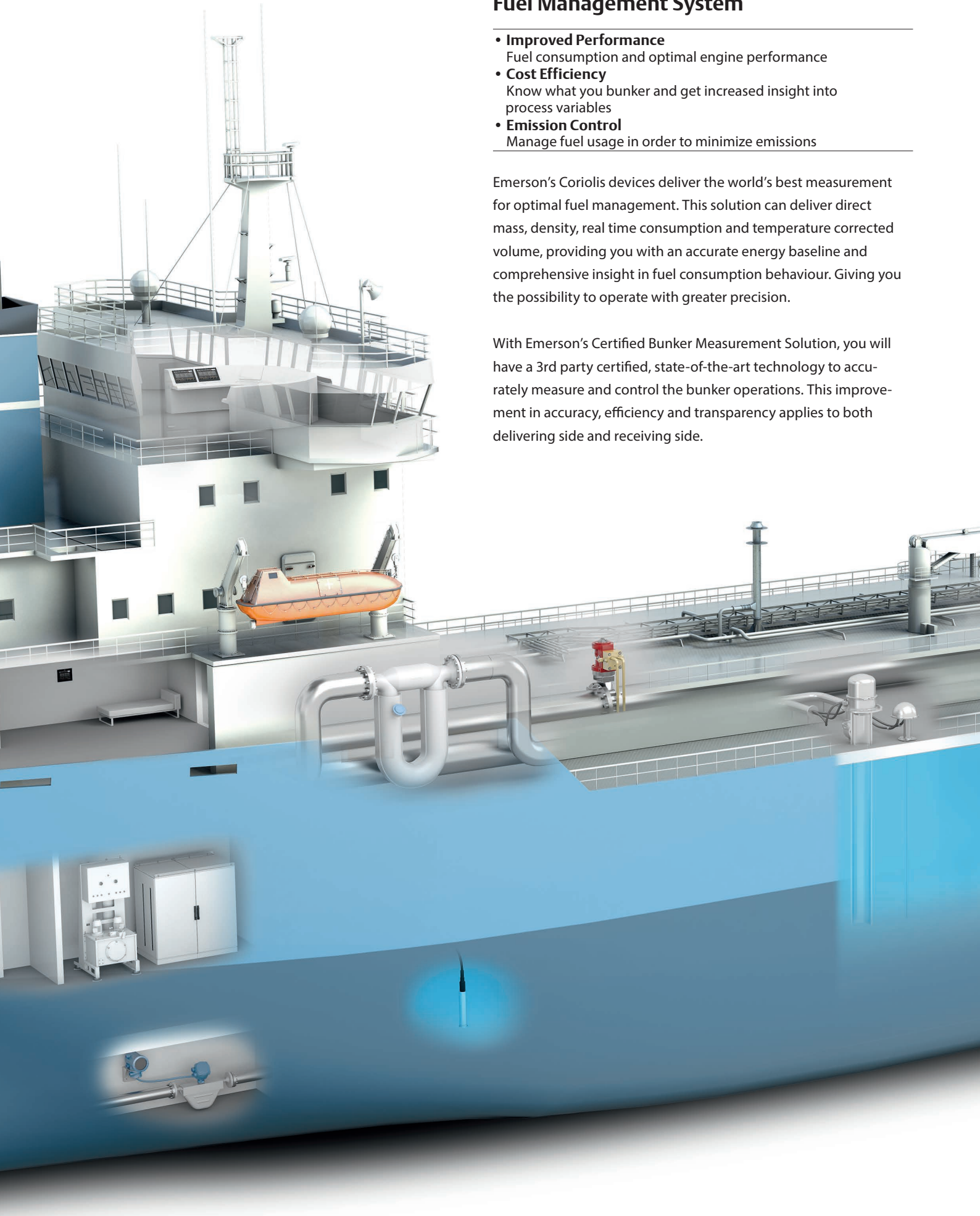
Know what you bunker and get increased insight into process variables

- **Emission Control**

Manage fuel usage in order to minimize emissions

Emerson's Coriolis devices deliver the world's best measurement for optimal fuel management. This solution can deliver direct mass, density, real time consumption and temperature corrected volume, providing you with an accurate energy baseline and comprehensive insight in fuel consumption behaviour. Giving you the possibility to operate with greater precision.

With Emerson's Certified Bunker Measurement Solution, you will have a 3rd party certified, state-of-the-art technology to accurately measure and control the bunker operations. This improvement in accuracy, efficiency and transparency applies to both delivering side and receiving side.



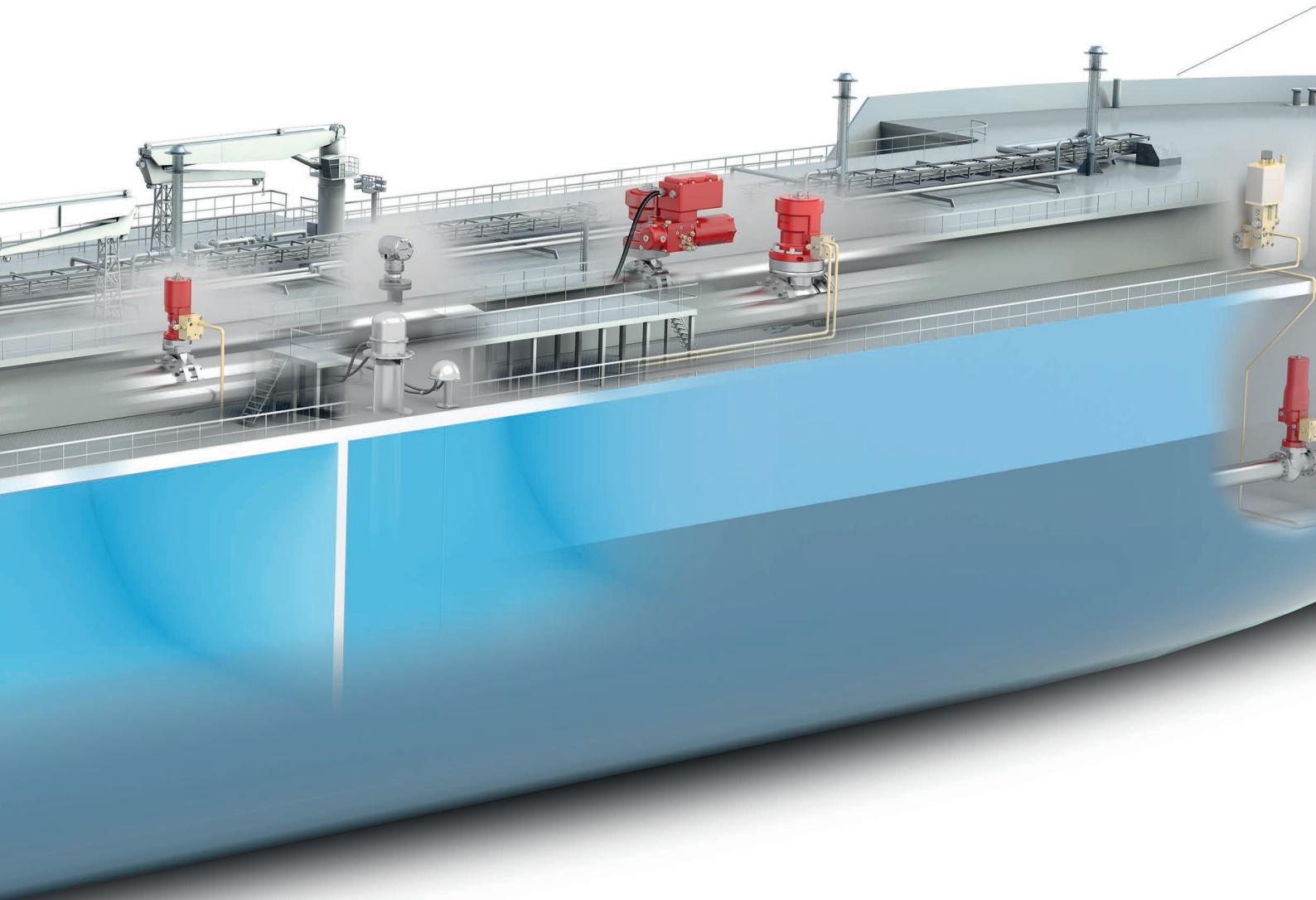
## Tank Level Gauging System

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- **Flexibility**  
Wide range of installation methods
  - **Cost Efficiency**  
Low need for maintenance
  - **Easy Access**  
Remote maintenance and troubleshooting
- 

We offer two technologies suitable for virtually all marine tank applications.

The Electro-Pneumatic System is a robust system with a single pipe connection and all electronics located in easy accessible safe areas, ensuring easy repair and low maintenance costs. The pressure based Level Transmitter with HART® capabilities enables flexible installation methods and is compatible with all commonly used liquids. This system has low need for maintenance and is used to measure the level in ballast and service tanks as well as for draft measurements and void space monitoring.



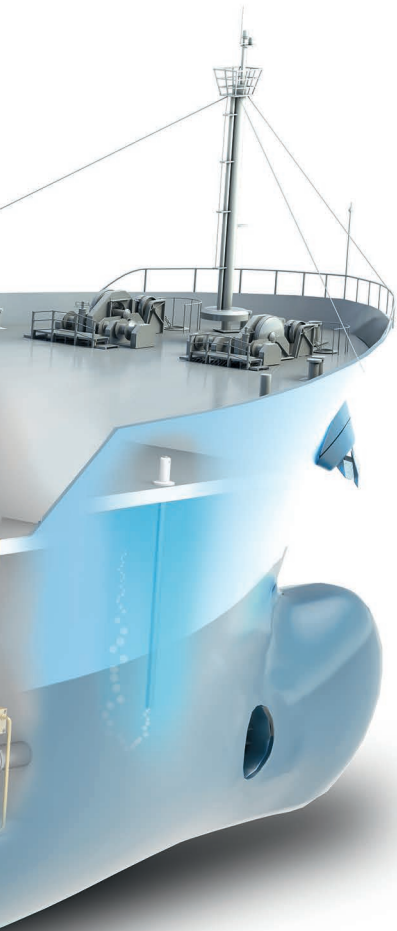


## Cargo Monitoring System

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- **Reliability**  
High level of accuracy
  - **Maximized Uptime**  
Accurate measurements under all conditions
  - **Easy Access**  
Quick installation and low maintenance
- 

The Cargo Monitoring System from Rosemount is a powerful radar solution with compact design. The system ensures safe, profitable and efficient cargo operation. In conjunction with the High Level and Overfill Alarm System you can confidently fill up to the maximum capacity in your tanks (95 and 98 %) without compromising on safety. With no moving parts inside the tank, the Cargo Monitoring System is easily accessible on deck and has a long operational lifetime and exceptionally low maintenance costs. The system is easy to install and integrate, designed to be flexible and scalable for the demands and requirements of all types of tankers with no compromise on reliability.



## Auxiliary Measurements

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- **Flexibility**  
With multiple measure solutions
  - **Cost Efficiency**  
Quick installation and low maintenance
- 

In order to meet your requirements we are able to customize our system solutions and can include Emerson's Wireless sensors as well as Rosemount pressure, temperature and ever-increasing range of other compatible transmitters. The utilized, marine approved, Wireless HART® technology support flexible and secure deployment for a broad variety of applications.

### *Specific for LNG Carriers:*

## Custody Transfer System & Overfill Alarm System

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- **Efficiency**  
With our 2in1 solution
  - **Accuracy**  
With advanced Radar Technology
  - **Flexibility**  
Tailored to meet individual requirements
- 

The Custody Transfer System from Rosemount for LNG carriers is the only dual measurement system using a single still pipe for both primary and secondary CTS. The advanced processing tool provides precise, redundant and reliable data for exceptional efficiency and control. The system is tailored to meet individual requirements and ensuring reliable measurements when loading and offloading.

Our High Level and Overfill Alarm System for LNG is also based on dual radar technology and replaces outdated float level systems. The system enables you to maximize capacity without compromising safety. With no moving parts inside the tank, the system is virtually maintenance-free.

### Your system - managed

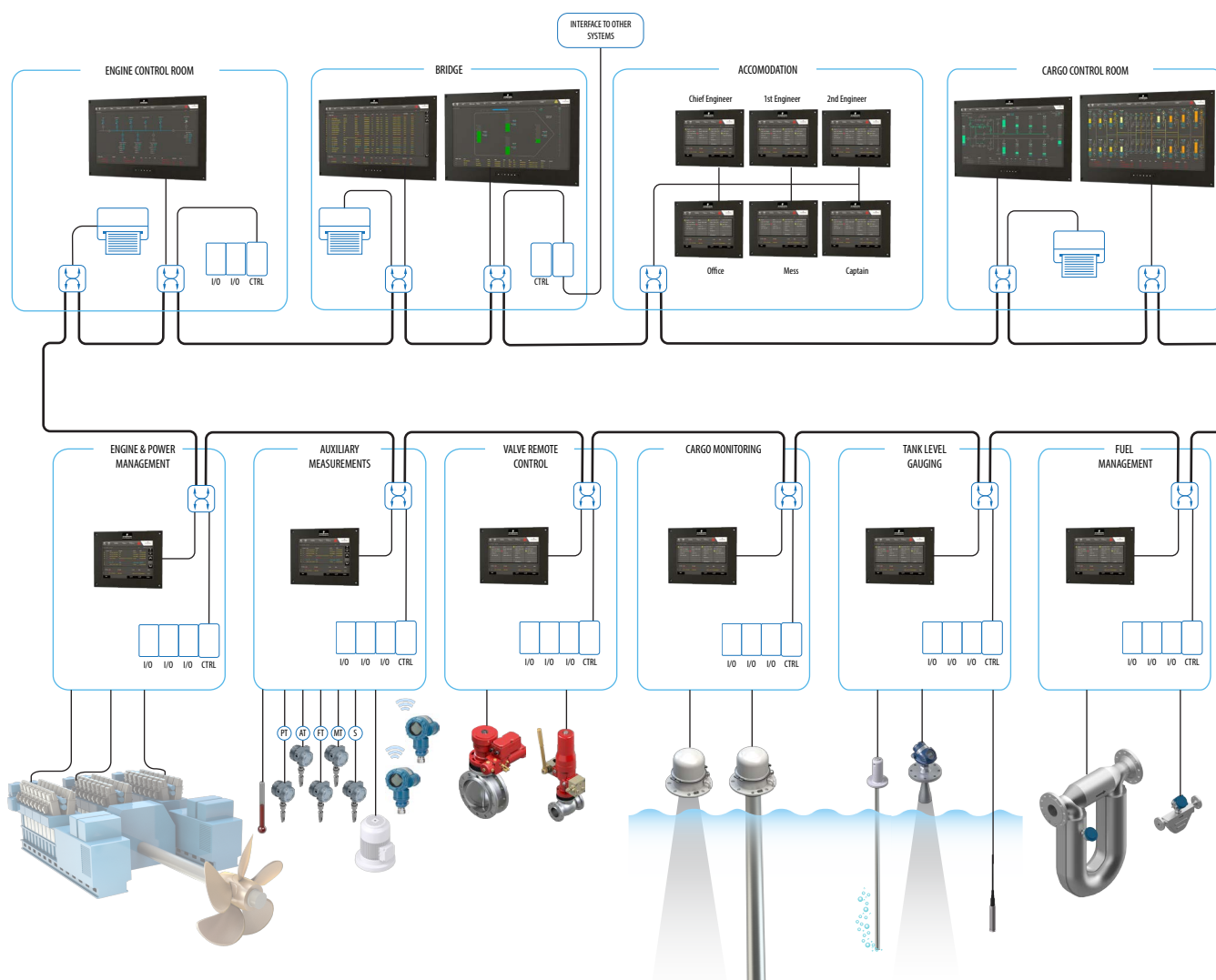
For your vessel to operate at maximum capacity, it's complex network of systems, processes and technologies must be carefully – and constantly – managed. Any disruption can cause damages and a drop in efficiency, resulting in costly setbacks and increased risk to your crew. That's why an Integrated Control and Monitoring System plays a crucial role in daily operations.

**Control** – by consolidating a vast array of information, the system significantly reduces complexity and enables you to confidently make better decisions and planning based on accurate, real-time data.

**Monitor** – the flexible user-friendly interface enables you to monitor everything from engines, generators, to switchboards and other service systems giving you fast access to information anywhere on the vessel. This gives you a deeper insight and confidence in daily operations.

**Alarm** – with the advanced alarm functions you are empowered to detect and defer abnormal situations, allowing you to solve issues before they become problems and further enhancing both efficiency and safety.

The solution is an advanced Integrated Control and Monitoring System.



# Complete Expertise within Marine

Emerson's marine solutions are developed for harsh sea environment to ensure reliable, efficient and safe operation on board any type of ship and offshore unit.

- Integrated control and monitoring
- Cargo monitoring and tank gauging
- Valve remote control
- Fuel management

What really sets us apart is our dedication to the marine sector and engineering excellence. This is reflected in all aspects of our organization, from design and production to application know-how and global service network.

What really drives us is to provide innovative solutions for our customers to operate safely, efficiently and with peace of mind.

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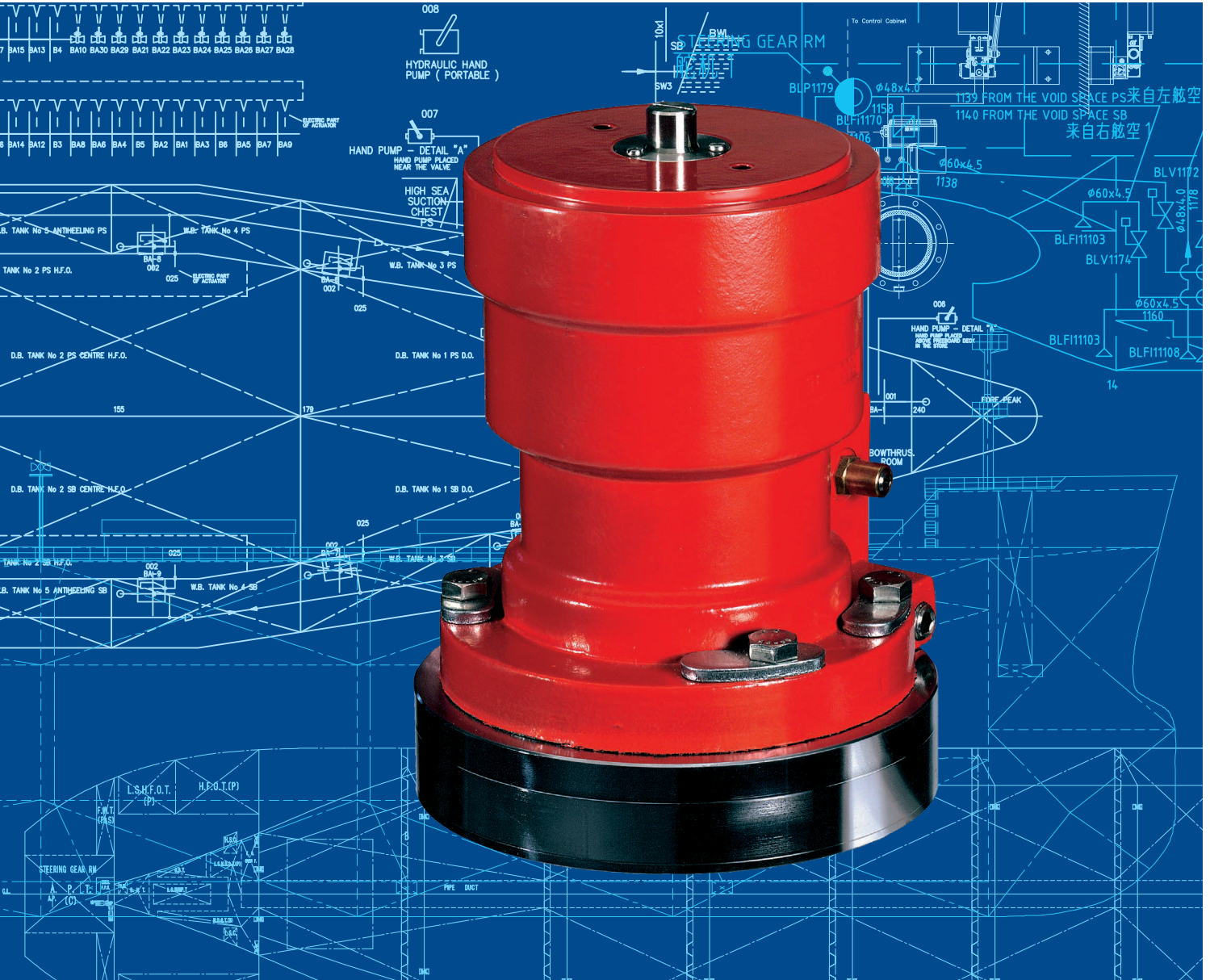
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# Valve Remote Control System

Complete, scalable and dedicated to marine needs



# Delivering peace of mind

The reason we've spent the last 50 years thinking about valve remote control (VRC) is so you don't have to. Whether you're a shipyard or a shipowner, we realize there's a limit to the amount of time you can or should devote to this subject. So we've poured our energy into developing a VRC system so good, you'll scarcely notice it's there.

## Reliability developed over five decades

Due to its proven reliability, the Valve Remote Control system sets the standard for the marine industry, and we offer both a hydraulic and an electro-hydraulic version.

Both are complete one-stop solutions that reflect a deep appreciation of marine customer needs and industry standards.

And both systems are built on a cost-effective modular design that allows a high degree of customization while delivering performance on all fronts.

## A familiarity with marine standards

The Damcos brand is part of Emerson's Marine solutions

Central to our success is a deep understanding of the marine industry. Naturally we comply

with all local and international classification and certification authorities. However, beyond requirements, our systems are engineered specifically with the characteristics of life at sea in mind. Which is why we place such a premium on compact size, energy efficiency, minimal maintenance and, above all, dependability.

It's also why we insist on producing all our own components and ensure these insights are represented throughout our product portfolio, giving you not only functional support but, ultimately, total peace of mind.



## Key benefits

- Unsurpassed quality and performance
- Meets all marine industry regulations
- Market's most compact actuator design
- System fully adaptable to your needs
- Minimal maintenance and running costs

## Minimizing environmental impact

- Our hydraulic VRC offers low energy consumption compared to pneumatic systems.
- LPU's are designed for low energy consumption and require a minimum of oil.
- All our actuators and accessories can be disassembled into small pieces and recycled (98% recyclable).
- Our actuators have a long lifetime (30 years for BRC). If oil is kept clean and particle free, only the sealing needs to be changed occasionally.
- We comply with ISO9001 quality standards and ISO14001 environmental code.

# Operating system – Centralized and flexible

Our operating system gives you a single-point overview of all valve and actuator positions throughout the vessel, and the same system is used for hydraulic and electro-hydraulic solutions.

Specifically, the system's Valve Control module is designed to manage all types of Damcos valve actuators in a marine environment.

Uniquely, our system allows you to control valves individually, letting

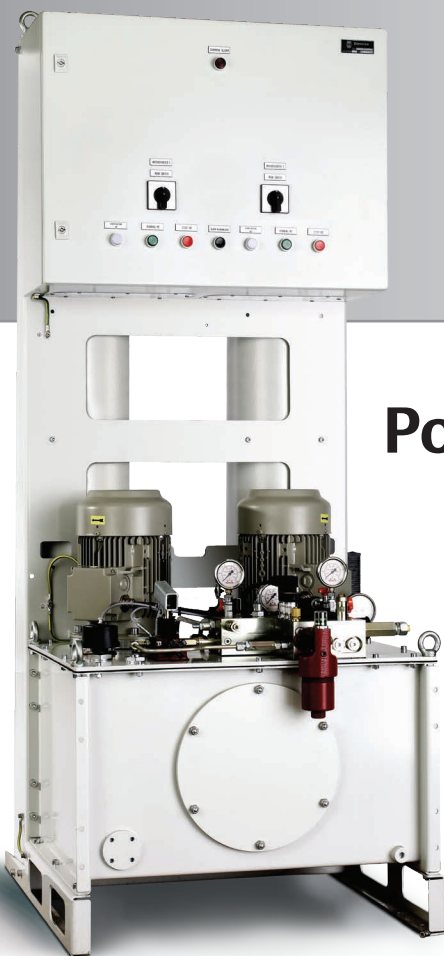
you carry out maintenance without shutting down the whole system.

## Compatible with other systems

We cater for both conventional mimic control as well as state-of-the-art touchscreen preferences, and our system can be fully integrated with a yard-specified marine tank management system.

Our Valve Control modules are simple and fast to install, and give you a high degree of flexibility and the ability to manage several parts of your valve system at one time.

Ultimately, our operating system offers intuitive and accurate centralized control, together with the ability to adjust parameters to your particular needs.



# Power unit – Secure and scalable

For those seeking a hydraulic VRC system, our power unit is built on a standard modular platform, proven for its reliability and safety. As such, it's possible to configure and scale the unit as requirements demand.

A built-in PLC lets you digitally control all aspects of the power unit and optimize performance.

In the event that performance is reduced, an override backup system automatically engages, allowing

you to keep operating ship valves.

Finally, the design of the unit allows for easy access to internal components, making repairs and testing fast and painless.

Overall the Damcos power unit is extremely safe, easy to install and support, and highly dependable.



# Actuators – Compact and adaptable

Damcos actuators set the benchmark for marine industry valve operation and control.

The key is a patented design that uses a helical spline system to deliver high torque without the need for large size – only Damcos actuators offer these advantages. In addition, since there are no radial forces on the valve stem, the valve lasts longer and needs less maintenance.

Our actuators are suitable for the most demanding of conditions, from high vibration to severe environments.

## Built-in quality

We provide actuators for all types of quarter-turn and linear valves. Damcos actuators operate at a standard working pressure of 135 bar and maintain a constant high-

torque output throughout the 90 degree rotation.

The actuators are equipped with a direct visual position indicator. It's also possible to adjust actuators without the need for demounting.

## Damcos actuators

### BRC



Double-acting balanced rotary actuator; quarter-turn.

### BRCF



Single-acting spring-return actuator; quarter-turn. The spring provides fail-safety.

### KC



Linear double-acting actuator. Comes with a direct position indicator and presents no external moving parts during operation.

### KF/KFR

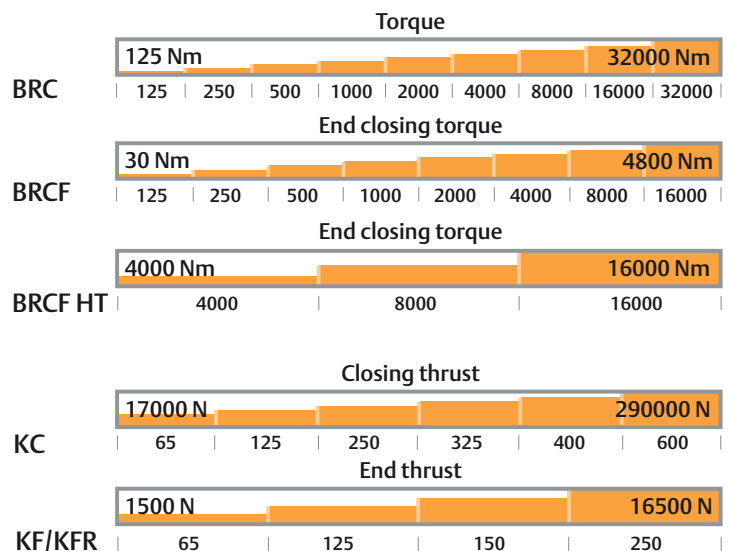


Linear single-acting spring-closing actuator. Equipped with a unique emergency system.



The Damcos BRCF HT is a small sized yet powerful actuator for large valves requiring very high torque. The BRCF HT provides high torque **when and where it's needed; at end-closing**, due to the unique spring piston design. The actuator has a high-quality compact design, a long lifetime and is easy to install.

## Damcos actuators series overview



# Control cabinet – Intelligent and lightweight

A hydraulic VRC system is supplied with a standardized solenoid valve cabinet, able to support up to 120 valve controls per cabinet.

Each valve can be isolated and independently controlled, thereby reducing downtime and making repairs easier.

The solenoid valves themselves are designed to minimize leakage.

## High-spec construction

In terms of functionality, we offer

premium volumetric position indicators (VPIs) as standard, including temperature compensation (TC) and pressure and temperature compensation (PTC), for pinpoint accuracy.

The cabinet hosts controllers as well as intelligent and standard I/O modules enabling all tank-related functions. Due to this kind of distributed intelligence, the response time is fully optimized. Moreover, with a 10" Damcos Vision

touchscreen mounted on the front of the cabinet, you will have a complete, stand-alone and intelligent control system that can also act as a backup for the workstations.

All this combines to ensure our solenoid cabinet gives a fast start up, reliable operation, high service performance and allows emergency operation from the cabinet.



*Even our smallest actuators can be powered locally thanks to our ultra compact LPUMs.*



# LPU and LPUM – Economical and versatile

Our electro-hydraulic VRC system works in combination with a Local Power Unit, which sits on the valve actuator itself. The main advantage of opting for this solution is the cost and space savings gained by eliminating the need for hydraulic piping, solenoid cabinets and a power unit.

Our LPU is exceptionally small, lightweight and works with all types

of Damcos actuators, including our largest models.

## Stand-alone performance

Each unit is fully equipped for local operation, with an oil level sight-glass, adjustable flow (250-1000ml/min) and external indicators.

Contained within the unit is a patented hydraulic pump able to perform at low speed, minimizing

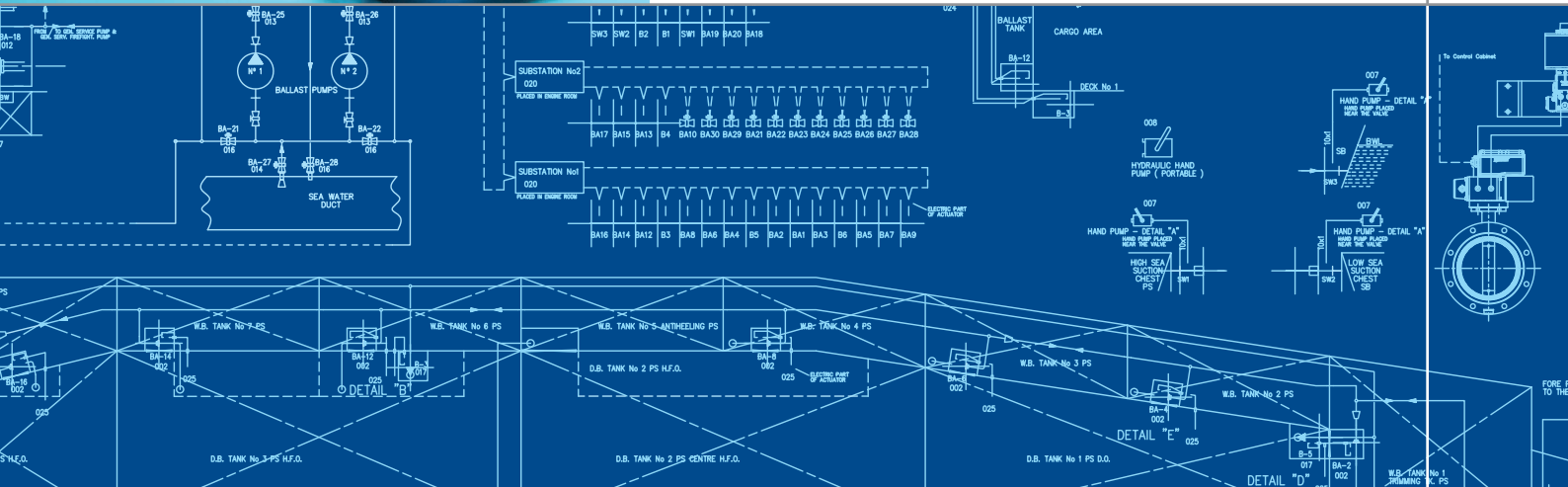
energy consumption without compromising operational performance.

Like all Damcos products, our LPUs require minimal maintenance and ensure maximum safety, with emergency operation always possible.



## Benefits for shipowners

- Highly reliable system, tried-and-tested in fleets around the world.
- Offers a high degree of customization, letting you adapt the system to your specifications.
- Unique, patented design minimizes operating and maintenance costs.
- Worldwide sales and service network.
- High performance and compact size gives more space for cargo.
- Exceptionally safe and environmentally sound.



## Benefits for shipyards

- The market's most compact design, grants significant space savings and affords new ship design possibilities.
- Customization provides flexibility and makes implementation easier.
- Unlimited mounting positions and vast application know-how make installation and commissioning fast and painless.

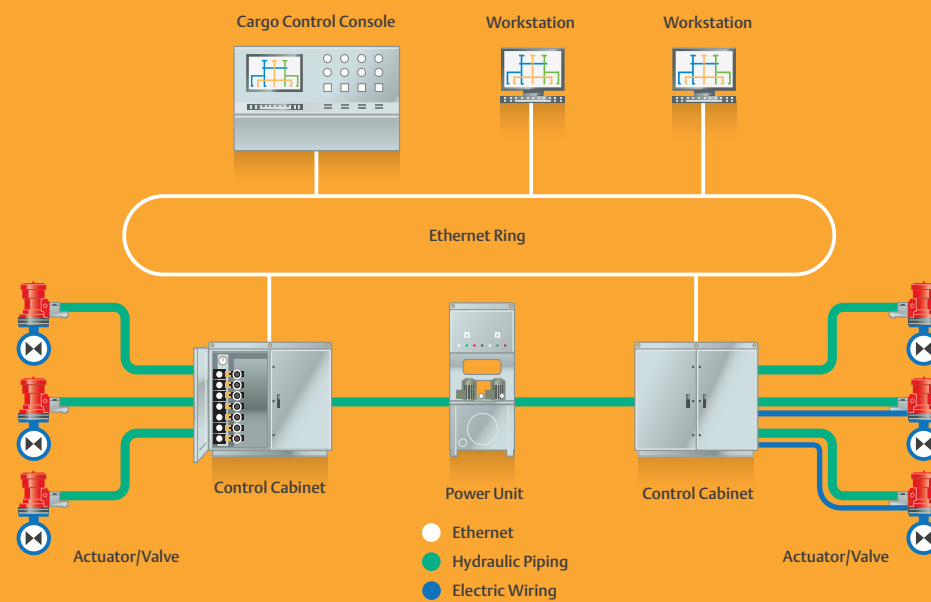




# Two proven systems

## Hydraulic VRC

**Highlights:** Industry-leading actuators · Minimal energy and oil use · Compatible with other control systems · Safe and durable

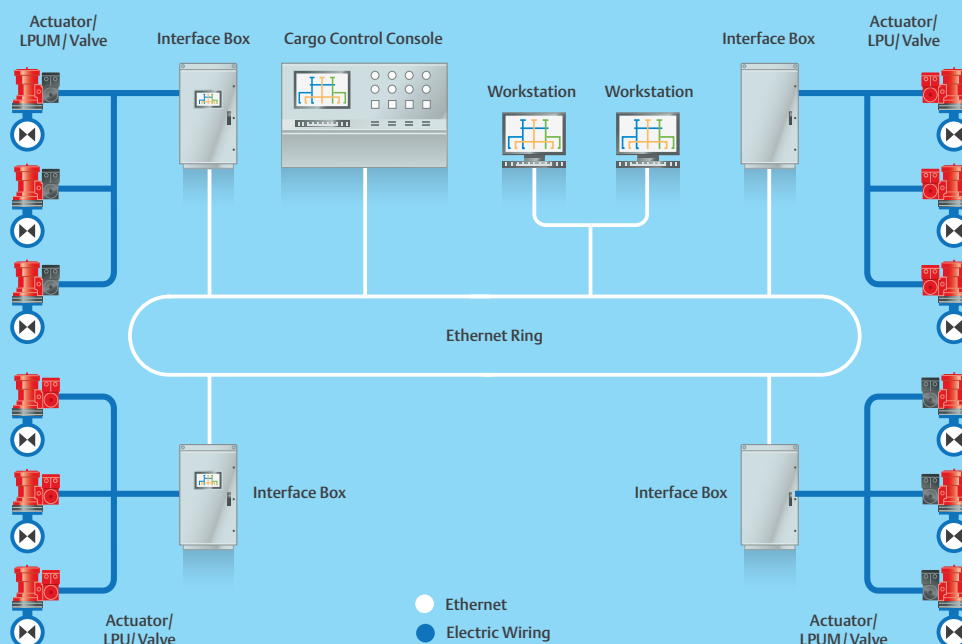


For those seeking reliability and accuracy, the Damcos hydraulic VRC is the perfect solution. Our system can be used on all types of ships and is available as a stand-alone system or as part of an extensive marine tank management system. The system itself consists of a power unit, solenoid cabinet, operating system and valve actuators.

This tried-and-tested design makes operation simple, efficient and cost effective, minimizing the amount of oil needed. One particular highlight is the patented design of our actuators. These are by far the most compact of their kind, delivering exceptionally high torque while minimizing size and weight. Finally, in environmentally conscious times, each aspect of our VRC system is designed to minimize consumption through operating efficiency and intelligent design.

## Electro-hydraulic system

**Highlights:** No hydraulic piping needed · Minimal energy and oil use · Lightweight and small LPUs · Compatible with hydraulic VRC · Safe and durable



The Damcos integrated electro-hydraulic VRC system is versatile and economical, while delivering the high-end performance marine customers need. The system requires only electrical power and no hydraulic piping, keeping installation costs down. In addition, the system can be used on all ship types, except tankers. For hazardous environments, our EEx-approved LPUs comply with ATEX directive 94/9/EC.

Rather than a solenoid-based system, the electro-hydraulic version operates actuators by means of a Local Power Unit (LPU), mounted directly to the actuator. This design requires only electrical power to the LPU. The total electro-hydraulic system is comprised of an interface box, valves, actuators and LPUs. Beyond stand-alone use, it's possible to integrate an electro-hydraulic VRC system with a marine tank management system or to use it in conjunction with a hydraulic VRC system.

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New Damcos high-torque actuator:  
Finally, the highest power  
comes in the smallest size



**DAMCOS**<sup>TM</sup>







## The ultimate combination made possible: the highest power; the smallest size

**The new Damcos BRCF 16000HT is the market's smallest and most powerful single-acting actuator for large valves and valves requiring very high torque.**

**You will be surprised how much power it is possible to provide in no more than 1235 mm height and 720 kg weight. But the small size and high power are not the only benefits of our latest actuator innovation.**

We have used our marine and offshore experience as well as our in-depth knowledge in mechanics and hydraulics, to design an actuator that is also easy to install and maintain. All this is achieved without compromising the reliability and accuracy required

in demanding daily onboard operations. The result: power and control in a compact and easy-to-install actuator that will prove to be a sound investment onboard any type of ship and offshore unit.

### **Torque where and when it's needed: at end-closing**

The unique spring piston design has two different effective diameters, each activated by the control block according to the actuator position, giving two possible torque levels from the same spring force. One piston diameter compresses the springs during the opening of the valve, the other piston diameter provides torque, where and when it's needed.



*As an extra safety feature, mechanical locks maintain the valve in the closed position, in the unlikely event of a hydraulic pressure drop inside the actuator.*

### **Longer life-time and improved safety**

Exact control of the hydraulic oil flow and pressure provides an optimized torque distribution over the valve movement, thus avoiding damage to valves and piping. This extends the lifetime of valves and piping and lowers maintenance cost. Environmental and onboard safety will also be improved, since risk of damage to the valve spindles will be minimized.

As an extra safety feature, mechanical locks maintain the valve in the closed position, in the unlikely event of a hydraulic pressure drop inside the actuator.

### **Easy installation and integration**

Thanks to its small size, the Damcos BRCF 16000HT can be fitted into narrow spaces and valve hubs without the need for pipe support, speeding up and cutting installation cost.

It uses Damcos' standard control block system, which conveniently integrates flush systems, filters, relieve valves and position indicators, making it a cost-efficient choice.

So if you have the need for a powerful actuator to handle your big size valves, we are happy to demonstrate how the BRCF-16000HT can improve your ship's or offshore unit's operation by providing power and reliability in a new innovative design with high quality and long lifetime efficiency.

– Emerson. Consider it solved.

Valve remote control is essential for a safe and reliable handling of valve actuation, both at sea and in port.

Damcos provides an extensive range of actuators for different types of valves and offers the most compact and space-saving actuators for all types of ships. Damcos Valve Remote Control is a vital part of Emerson's Marine Solution offering.

Our other brands include Rosemount Marine for Cargo Monitoring and LevelDatic and MAS2600 for Ballast & Service Tank Level Gauging.

Emerson's Marine Solution system is a complete solution for integrated control and monitoring, including alarm monitoring on any type of ship and offshore unit. The operator can be confident of integrity and quality in decisions with the full overview provided in a user-friendly interface. The result is safe operation and better throughput, based on robust, reliable and timely data.

We offer one-stop-shop efficiency with worldwide support in all phases, from design through to long-term profitable operation of the ship.

[www.emerson.com/marine](http://www.emerson.com/marine)

