



COMMERCIAL MARINE

GLOBAL SOLUTIONS



ALLWEILER® HOUTTUIN™ IMO®



EXCELLENCE IN FLOW CONTROL

On the open seas or in the shipyard, we understand you need to have confidence in the reliability of your vessel's fluid handling applications.

For more than 70 years, CIRCOR has been collaborating with ship owners and operators like you to develop the best fluid handling solutions to address your toughest business challenges. We provide a variety of pumps, systems and support services for many specialized vessels, such as offshore, containers, tankers and more.

And we continue to invest in advanced technology to deliver the cutting-edge solutions you need for success today, like our Smart Technology CM-1000 Series intelligent sea water cooling system controller.

We have what it takes to handle your most complex fluid handling applications:

- › People - Our team of global experts has a deep understanding of your business challenges and knowledge of the industry.
- › Products – We offer a portfolio of pumps and systems with proven technology and efficiency from brands you know and trust like Allweiler®, Houttuin™ and Imo®.
- › Service – We're dedicated to the service and support of your vessels, whenever, and wherever you need us -- around the clock and around the globe, 24/7/365

All of this is our value to you and what we call -- **Total Savings of Ownership**

WHY CHOSE CIRCOR?

GLOBAL EXPERTISE AND SUPPORT FROM START TO FINISH

In today's demanding marine environment, you need a partner to help navigate your toughest business challenges. With CIRCOR's expertise and global reach, you can turn to us with confidence for even your most complex fluid handling applications to ensure smooth, reliable operation at sea and in the shipyard.

INDUSTRY EXPERTISE

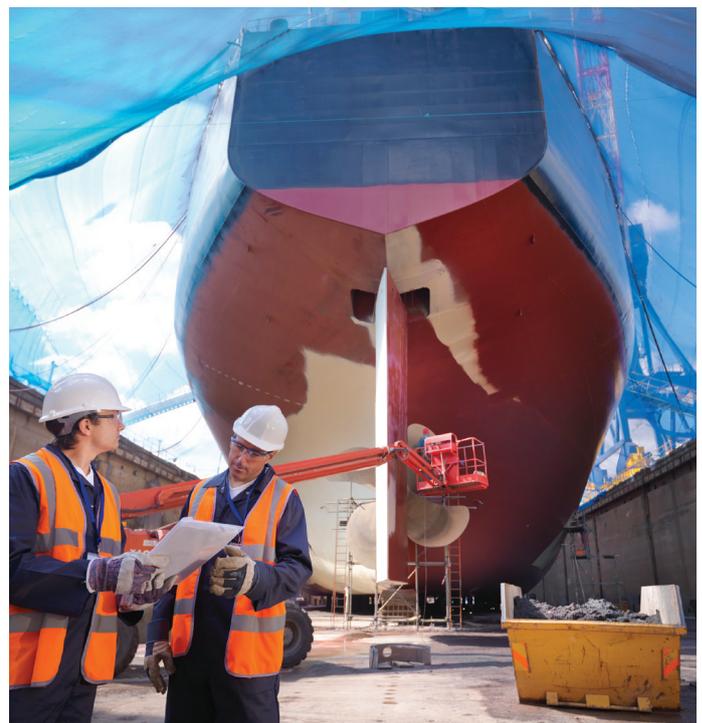
Your team of CIRCOR experts bring years of experience and deep knowledge in the marine industry, and stand ready to collaborate with you and your team on critical application needs. These specialists understand both the increasing operational and regulatory pressures you face, providing important insights on the issues that impact reliable vessel performance.

CUSTOM SOLUTIONS

Your team includes design engineers and technical specialists who focus on meeting your specific fluid-handling application needs, whether that involves a turnkey solution or custom pump system. You can trust our single point of service, from design and specifications through manufacturing at state-of-the-art production facilities to installation, confident that your solution will meet or exceed new regulatory requirements.

ONGOING SUPPORT

We're committed to unsurpassed service before, during and after the sale, understanding that you can't wait on a replacement part while at sea, thousands of miles from shore. You can count on CIRCOR's regional service centers, along with a global network of distributors, for continuous support, prompt response and delivery of vital parts around the clock and around the world.



SMART TECHNOLOGY FOR GREATER BUSINESS SUCCESS

INTELLIGENT SEA WATER COOLING WITH THE CM-1000 SERIES

Ship owners and operators face increasing pressures to run a profitable operation: reducing energy costs and maintaining uptime, while meeting the regulatory demands for lower carbon emissions. CIRCOR is leveraging smart technology to help address these tough business challenges, developing the Smart Technology CM-1000 Series, an intelligent controller for sea water cooling systems.

The CM-1000, designed to operate sea water pumps only as fast as needed for prevailing conditions, provides a greener, sustainable solution. With the addition of exclusive Active Valve Control functionality, the CM-1000 can also monitor real-time temperatures in the freshwater cooling loop, as well as the pumps' suction and discharge pressure, to regulate the flow of sea water to the coolers according to varying heat loads from the main engine and generators.

RESULTS LIKE NO OTHER

Consider the unique functionality and exclusive features of the CM-1000:

- › **Energy Savings of Up to 85%:** Variable Speed Operation reduces power consumption by maintaining optimal pump motor speed
- › **Maintenance Savings of Up to 50%:** Condition Monitoring prevents catastrophic breakdowns through early detection
- › **Increased Uptime:** Operation Monitoring extends mean time between failures by avoiding overload and partload operation
- › **Automatic Back-Up:** Individual pump controllers facilitate automatic switching from the operating pump to the standby pump, eliminating potential downtime
- › **Optimized Performance:** Active Valve Control eliminates the risk for human error while increasing energy savings and enhancing overall system efficiency
- › **Fast Payback:** The CM-1000 delivers short-term ROI and long-term savings by extending the service life of your pumps and minimizing fuel consumption year after year.

SMART TECHNOLOGY BRINGS ENERGY SAVINGS AND MORE TO MAERSK DRURY



CHALLENGE:

- › Facing increasing environmental regulatory pressures and fluctuating fuel costs, ship owner Reedeerei Stefan Patjens GmbH & Co. K.G. needed fuel and energy saving options.
- › Patjens agreed to retrofit its Maersk Drury vessel with the CIRCOR Smart Technology CM-1000 Series intelligent controller to test the savings potential.

SOLUTION:

- › The CM-1000 Series allows sea water cooling system pumps to operate at variable speed for energy savings.
- › A new Active Valve Control feature delivers additional savings by adjusting duty point for optimal operation and limiting the risk of pump cavitation.
- › Condition Monitoring and Operation Monitoring features also provide maintenance savings by preventing catastrophic breakdowns and increasing mean time between failure (MTBF).

THE RESULTS

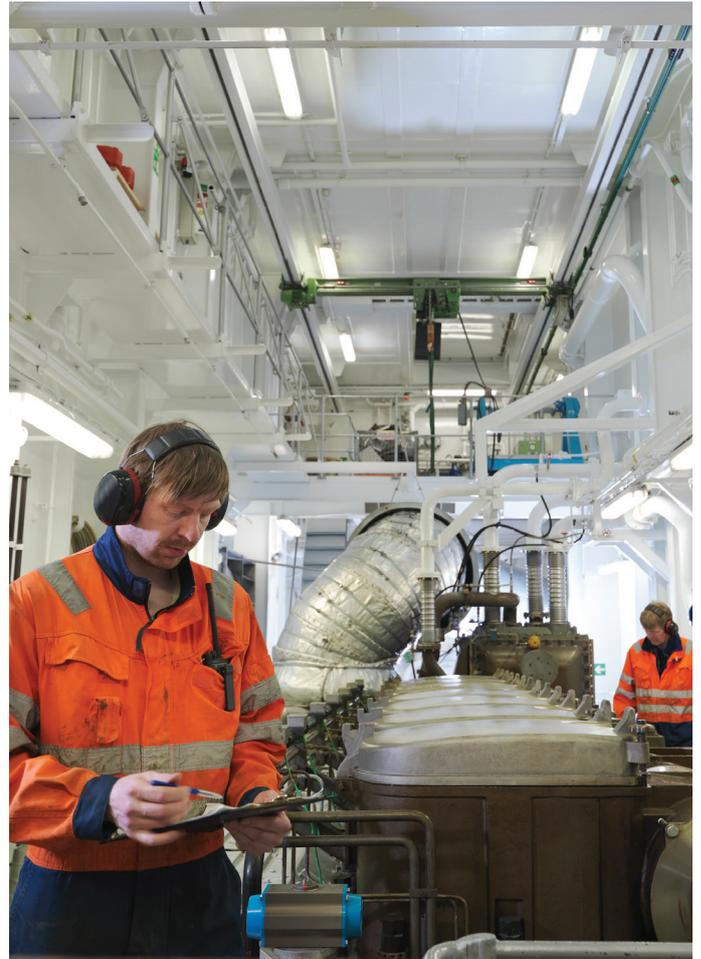
- › The Maersk Drury now operates with potential energy savings up to 85% and projected maintenance savings up to 50% annually over its previous design, with no system downtime during or since installation.
- › Patjens is considering similar installations for new builds to maintain a commitment to sustainability. This will allow its vessels to operate more efficiently and provide lessees with opportunities for increased profitability.

SUPPORT WHEN AND WHERE YOU NEED IT

GLOBAL AFTERMARKET SERVICES

To help you maintain reliable vessel performance even after the sale, CIRCOR stands ready to respond with full support of your needs for service and spare parts wherever you are in the world.

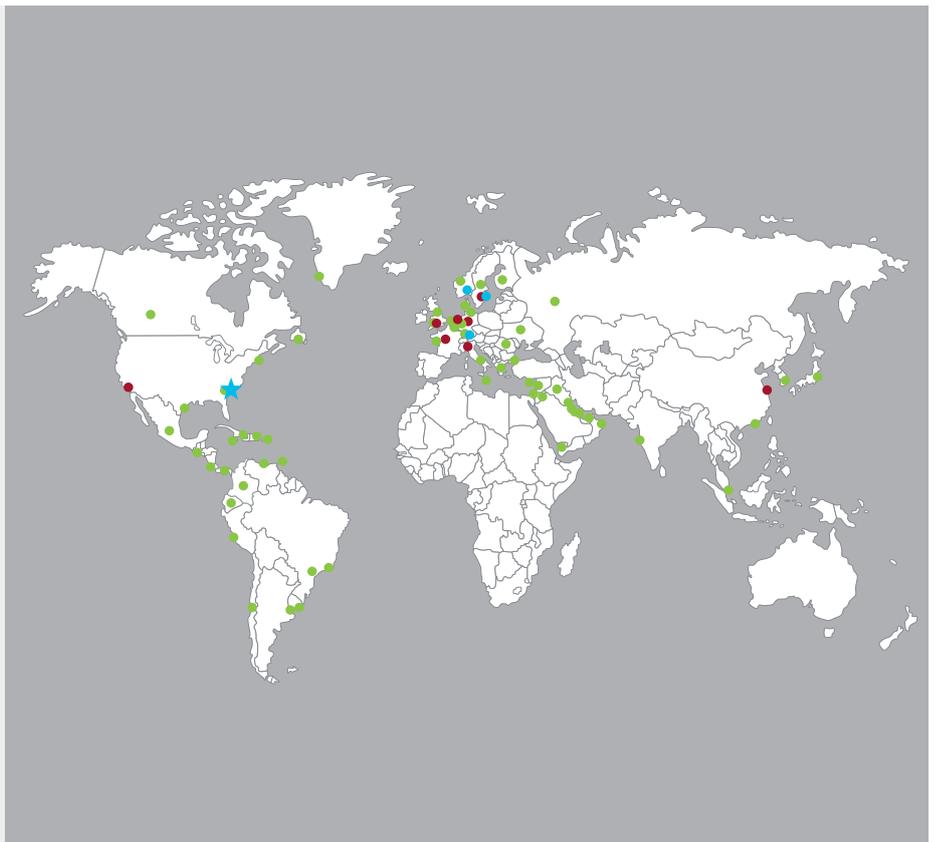
- › Quick response to customer request
- › 24/7/365 availability
- › Service onboard ships as well as factory service and repairs
- › Spare parts specifically designed and tested for CIRCOR products, ensuring the highest quality
- › Customized spare part inventory to ensure vessel's operation
- › Tailored spare parts agreement
- › Installation work attached to CM-1000 products
- › Extensive global distributor network



REDEFINING GLOBAL SOLUTIONS

CIRCOR maintains regional engineering and manufacturing facilities, along with a global network of distributors, to support you around the world and around the clock.

- ★ Global Headquarters
- Commercial Marine Main Offices
- Regional Manufacturing and Engineering Support Facilities
- Global Distributor Network



YOUR SINGLE GLOBAL SOURCE FOR APPLICATIONS THROUGHOUT THE SHIP

Regardless of vessel type, CIRCOR is your single source for the most extensive and efficient smart and pump technologies for fluid handling applications throughout the ship. We deliver a wide range of pumps and systems from the industry's most trusted names. Allweiler®, Houttuin™ and Imo®. Our engineering and technical specialist conduct extensive R&D and testing before manufacturing this extensive portfolio of products to meet the highest levels of manufacturing, product quality and reliability.



ANY VESSEL

ER ENGINE ROOM

- › Ballast
- › Cooling water (sea & fresh)
- › Hot-water circulation
- › Fuel & lubricating oil
- › Hydrophore
- › Boiler feed
- › Sewage & sanitary services
- › General service
- › Condensate
- › Firefighting
- › Bilge
- › Main LO circulation
- › Sludge
- › Gearbox services
- › Electric propulsion
- › Motor cooling
- › Trim/weight compensation

BR BOILER ROOM

- › Firefighting pumps
- › Weapons cooling
- › Hydraulics
- › Hot water circulation
- › Condensate transfer
- › Thermal oil circulation
- › Thermal oil filling
- › Boiler water feed
- › Fuel oil booster burner

EL, ANYWHERE IN THE WORLD.



DM DECK MACHINERY

- › Hydraulics
- › Air con
- › Water transfer
- › Winches lubrication
- › Firefighting water transfer
- › Cooling water transfer
- › Power pack circulation (equipment, complete unit)
- › Cargo handling

CS P CARGO SPACE / PROPULSION

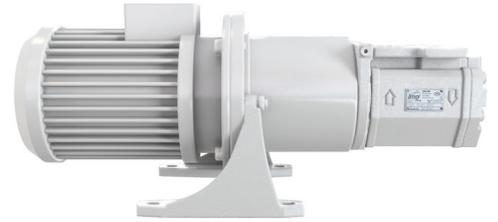
- › Aircraft fuel transfer
- › Firefighting
- › Wash down
- › Deluge
- › Hydraulics

PUMP TECHNOLOGIES FROM THE NAMES YOU KNOW AND TRUST ENGINEERED FOR INNOVATION AND RELIABILITY TO MEET YOUR APPLICATION NEEDS

CIRCOR engineers a wide variety of technologies to deliver innovative and reliable pumps and systems from the names you know and trust: Allweiler, Houttuin, Imo.

THREE-SCREW PUMP

Three-screw pumps from Allweiler® and Imo® are ideal for clean, lubricating fluids. The fluid film thickness and operating clearance provide higher pressure capabilities and efficiencies, with one of the highest overall efficiencies when handling heavy crude and pulse-free flow, as well as extremely low vibration and noise levels. The Imo OptiLine series uses no mechanical seals, eliminating leakage, for reduced costs, solid performance and a return on investment frequently less than three years.



PERFORMANCE DATA - PRODUCT RANGES

Capacity:	0.6 - 10,8 m ³ /h	Viscosity:	1.4 - 5,000 mm ² /s
Discharge pressure:	< 16 bar	Fluid temperature:	< 180°C

TWO-SCREW PUMP

Houttuin™ delivers one of the most robust pump designs, capable of handling a wide range of operating conditions. The unique two-screw pump can handle any Newtonian or non-Newtonian fluid under a wide range of conditions, including multiple phases, elevated temperatures and intermittent dry operation.



PERFORMANCE DATA - PRODUCT RANGES

Capacity:	1,100 m ³ /h	Viscosity:	0.6 - 5,000 mm ² /s
Discharge pressure:	< 16 bar	Fluid temperature:	< 140°C

PROPELLER PUMP

The ALLTRIMM propeller pump series is designed especially for ship building applications. These space-saving inline pumps for large flow rates and delivery heads of up to 20 meters have an integrated motor and reversible flow direction. Its advantages are reliability, high performance and corrosion-resistance.



PERFORMANCE DATA - PRODUCT RANGES

Delivery:	< 1,300 m ³ /h	Discharge pressure:	< 2.5 bar
Delivery head:	< 20 m	Fluid temperature:	sea < 40°C

CENTRIFUGAL PUMP

These pumps are equipped to handle a variety of liquids: neutral or aggressive, pure or contaminated, cold or hot, toxic or environmentally hazardous. They are typically used to pump hot or cold water, lubricating and heat transfer oil, emulsions and chemical products. The Allweiler® line has a dynamically balanced impeller that reduces vibration, with negligible axial thrust and good NPSH values.

PERFORMANCE DATA - PRODUCT RANGES

STANDARD PRODUCT LINE	Fluid temperature:	sea < 40°C
Delivery: < 3,900 m ³ /h	fresh < 100°C	
Delivery head: < 60 m	Suction Branch: < 500 mm	
Discharge pressure: < 10 bar	Discharge flange < 450 mm	



PROGRESSING CAVITY PUMPS

This simple, economical All-Optiflow pump design requires only one shaft seal. The strength of this pump is its ability to handle fluids contaminated with large amounts of abrasive solids. It has low NPSHr/NPIPr due to large internal cavities and low speed operation.

PERFORMANCE DATA - PRODUCT RANGES

Capacity: 1,850 m ³ /h	Viscosity: < 270,000 mm ² /s
Discharge pressure: 16 bar	Fluid temperature: < 100°C

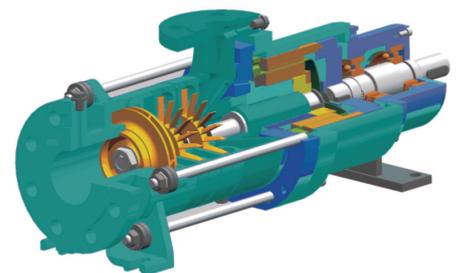


SIDE CHANNEL PUMPS

Side channel designs fill the hydraulic performance void between positive displacement pumps and centrifugal pumps. The centrifugal effect of the impeller, combined with the unique SERO internal flow patterns, allows our pumps to effectively handle fluids with gas entrainment of up to 50 percent. CIRCOR has partnered with SERO PumpSystems, the world's only exclusive manufacturer of side channel pumps, to provide our commercial marine customers with the unique advantages of this pump technology.

PERFORMANCE DATA - PRODUCT RANGES

Delivery: < 36 m ³ /h	Discharge pressure: 40 bar
Delivery head: < 350 m	Fluid temperature: 220°C





YOUR PARTNER FOR THE FUTURE

At CIRCOR, our commitment to you goes the distance. As a global company, you can count on the added value of our expertise in different applications, research and development resources. We also understand that every year brings new challenges and that's why we're always ready with advanced solutions, like our Smart Technology CM-1000 Series, to help maximize your success through greater efficiencies, reduced costs and unexpected downtime.

We are dedicated to delivering the best solutions to meet your needs, with the highest levels of reliability, efficiency, longevity – and the greatest total savings of ownership.



CIRCOR is a market-leading, global provider of integrated flow control solutions, specializing in the manufacture of highly engineered valves, instrumentation, pumps, pipeline products and services, and associated products, for critical and sever service applications in the oil and gas, power generation, industrial, process, maritime, aerospace, and defense industries.

Excellence in Flow Control

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