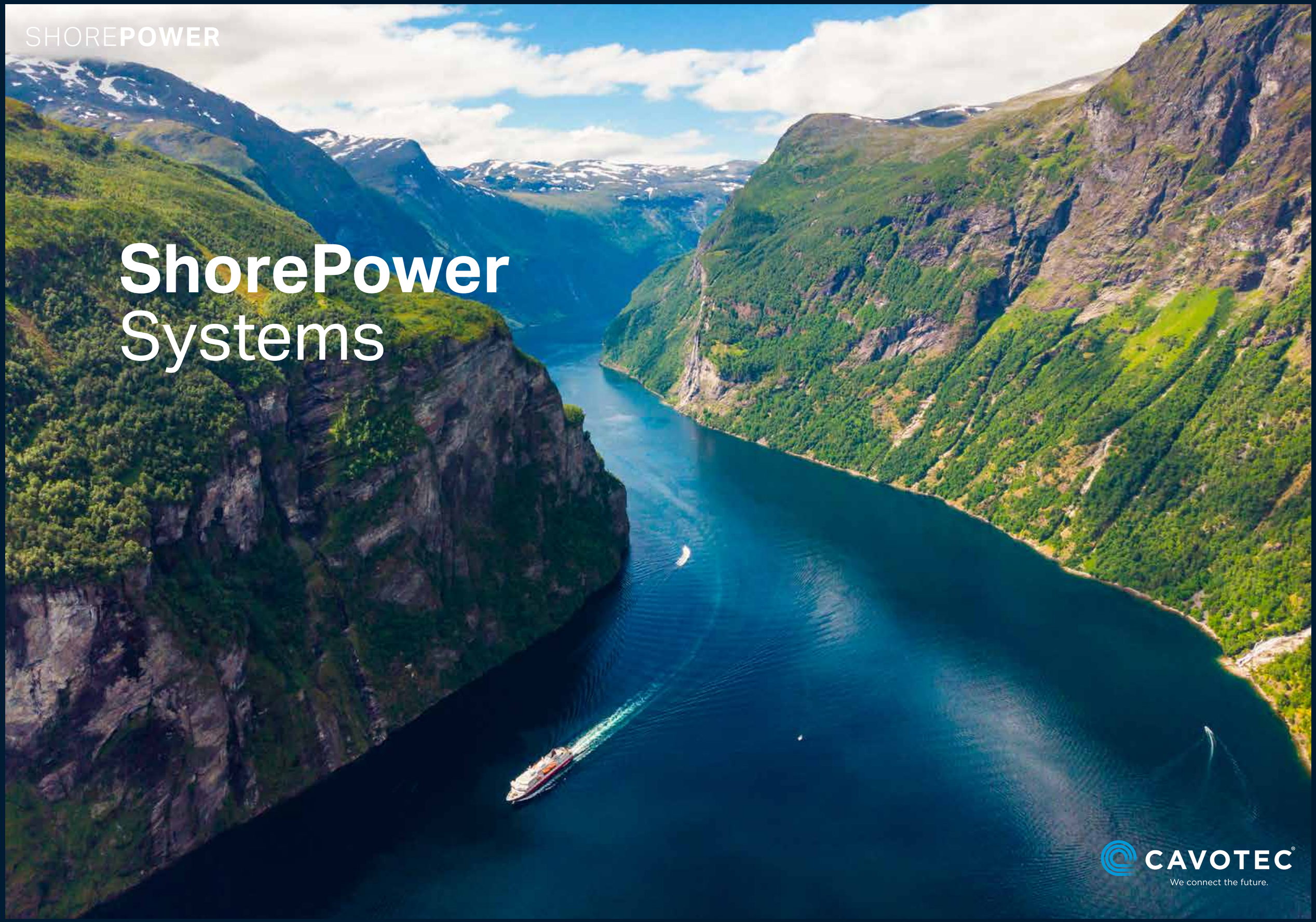
SHOREPOWER

ShorePower Systems



CAVOTEC®
We connect the future.

ShorePower technologies help port authorities and shipping lines significantly reduce emissions of NOx, Sox, PM and noise from ships in ports.

Cavotec is a leading cleantech company that designs and delivers connection and electrification solutions to enable the decarbonization of ports and industrial applications. Backed by more than 40 years of experience, our systems ensure safe, efficient and sustainable operations for a wide variety of customers and applications worldwide.

ShorePower benefits

ShorePower technologies, also called cold ironing or Alternative Maritime Power (AMP), enable the connection of ships in port to shore side electricity to power on board services. This enables ships' diesel generators to be switched off, thereby reducing noise and emissions, (such as particulate matter, nitrogen oxides, sulphur oxides, carbon oxides, and volatile organic compounds).

Since 2012, an international standard on ShorePower has been in place to ensure worldwide compatibility between ports and vessels.

Shore connection is included in California's CARB regulations, which require 80 per cent of vessels' power to come from ShorePower by 2020.

EU Directive 2014/94/EU on the Deployment of Alternative Fuel Infrastructure requires European ports to progressively equip berths with ShorePower connection technologies, and for all ports, with certain exceptions, to be ShorePower-ready by 2025.

Cavotec's proven ShorePower expertise

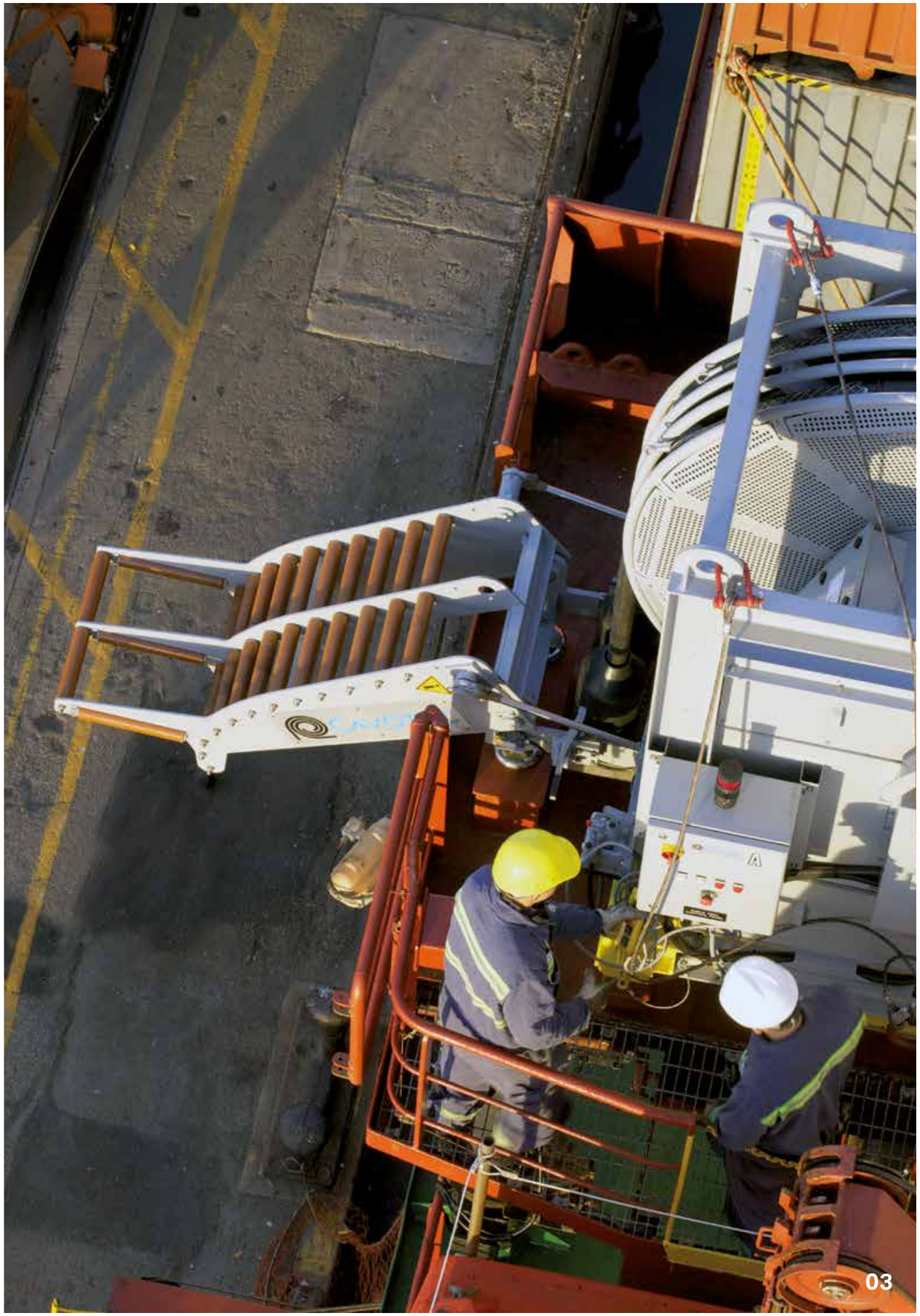
Cavotec is the world leading supplier of ShorePower cable management systems.

Cavotec pioneered the AMP technology with the supply of the world's first operational system in Sweden in 1985.

Since then, Cavotec has continued to develop innovative fixed, mobile, shore-based and shipbased ShorePower interface systems compliant with international standards.

The group supplies systems for new ships and retrofits existing vessels.

Cavotec's worldwide network of sales offices and manufacturing bases give our customers unique support and after-sales service.



ShorePower
Ship side —
For container and bulk vessels

Cavotec ShorePower systems for container and bulk vessels are compliant with international standards.

Power**Fit**

Cavotec PowerFit is a semi-fixed ShorePower system housed in a 40ft shipping container, and mounted onto the vessel. This self-contained solution includes a cable management system, PowerAMPReel, a shore connection control panel and other electrical equipment needed for shore connection. In addition, a step down transformer can also be housed in the PowerFit for low voltage vessels.

PowerFit provides the following benefits:

- Low CAPEX retrofit solution
- Highly flexible
- Optimised footprint to enable implementation of ShorePower in vessels with space constraints
- AMP cable range of up to 45m

Power**AMPReel**

Cavotec PowerAMPReel is a fixed ShorePower system mounted on a chassis and fixed on the vessel.

This solution consists of a motorised cable management system including AMP connectors and cables, a cable drum with a slip ring, a motor reducer, an optical fibre accumulator, an electrical control panel and a pivotable hydraulic cable guide.

PowerAMPReel provides the following benefits:

- Ideal for new-build vessels
- Easy and fast to operate
- AMP cable range of up to 55m

Retrofit solutions

With the development of regulations and the growing number of terminals equipped with shorepower, several shipping lines are steadily retrofitting their vessels for ShorePower connection.

Cavotec provides a variety of turnkey solutions, port and/or starboard side, for retrofitting vessels, including:

- Fixed wire PowerFit, with change over panel in one of the two containers or in the steering room
- Plug-in PowerFit, with ship junction box and change over panel in steering room

Cavotec designs systems that:

- Minimise CAPEX and optimise OPEX.
- Ensure fast project execution for a reduced operation interruption
- Ensure flexible and trouble free Shore Connection System
- Enhance operational efficiency with faster connection to the grid

ShorePower
Shore side —
For container and bulk terminals

Power**Wrap**

To power on board ShorePower cable management systems, a ShorePower pit or vault needs to be installed on the quayside to connect to the power grid. Some 250 Cavotec PowerWrap units are installed at ports worldwide.

The Cavotec PowerWrap consists of:
- PowerCover : a spring loaded cover for easy access
- Stainless steel junction box
- AMPSockets fully compliant with IEC standards
- Optical fibre connectors
- Prefabricated fibreglass pit

PowerWrap offers the following advantages:
- Minimum footprint
- Minimum CAPEX due to fibreglass pre-formed enclosure, making substantial savings in terms of on-site labour and civil works
- Easy operations: PowerCover allows operators to easily open the cover with a lift weight of only 15kg (35lbs)

Power**Extend**

PowerExtend is a self-propelled battery-driven mobile system. Wherever a vessel is moored, even if vessels' power cables are not aligned with, or fail to extend to a ShorePower pit, PowerExtend provides an extension for safe connection.

- Limited number of ShorePower pits reduces CAPEX
- Narrow design allows navigation between wharf face and STS crane without disrupting operations
- Movable system enabling use at different connection points and berths
- Self-propelled, battery driven unit that recharges when connected to the PowerExtend
- No additional equipment required to move the unit
- Complies with shore connection standards
- Zero emission solution

Power**Extend**

PowerExtend exists also as a manual mobile ShorePower cable management system. It offers the flexibility to move the point of ShorePower connection away from crane operations.

- Long cable length outreach
- Movable system, towable by truck
- Easy implementation, no civil works required on berths
- Improved operational safety

ShorePower
Shore side —
For passenger terminals

Based on 40 years' experience of designing and manufacturing cable management solutions, Cavotec has developed a wide range of AMP cable management systems optimising OPEX and CAPEX, while ensuring optimum safety standards.

ShorePower for Ro/Ro vessels and ferries

According to the international shore connection standard, ShorePower cables for Ro/Ro and passenger vessels must be connected from the shore to the ship, rather than using on board systems.

Power**Reach** and Power**Reach** NxG

- 30 seconds to connect and disconnect.
- No onshore personnel requirement. Fully radio remote controlled from on board ship

Power**Range**

- 30 seconds to connect and disconnect.
- High operational flexibility and safety with telescopic boom, operated with radio remote control system
- Able to connect vessels' different hatch positions
- Adjusts to tidal, weather conditions
- Highly accurate hatch connection

ShorePower for cruise ships

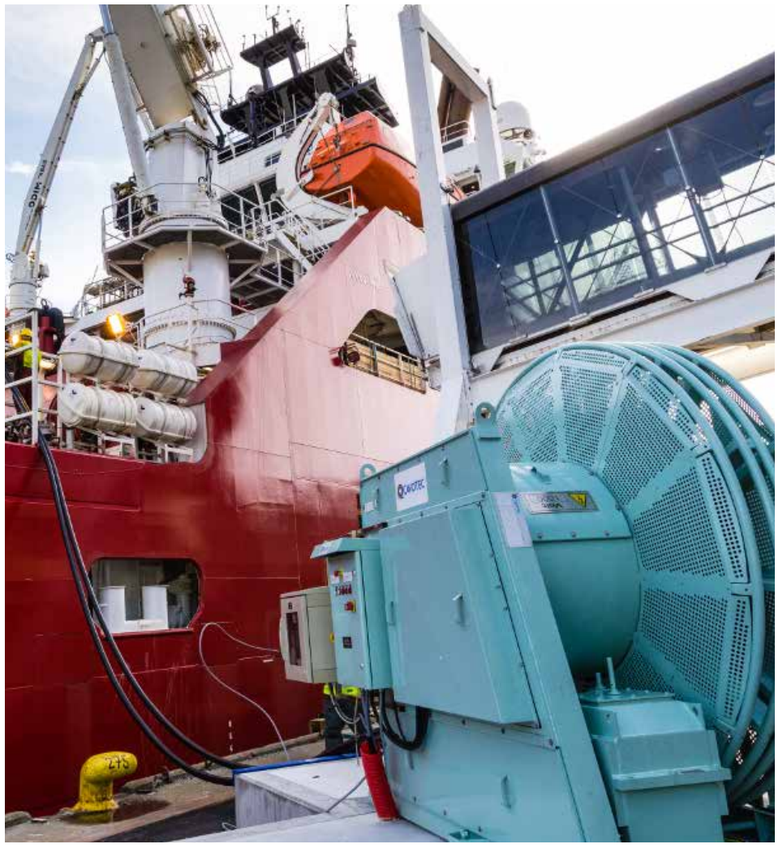
The receiving panel of the socket outlet is typically stored in a dedicated room on the cruise ship lower decks, which is accessible from the shore via a watertight hatch, and get connected to PowerMove.

Power**Move**

PowerMove is a mobile ShorePower system that connects cruise vessels to ShorePower quickly and safely. It offers the following benefits:

- Reliability: proven technology with a large number of units successfully operating for many years at cruise terminals worldwide
- Limited civil works costs: this above ground solution does not require the digging of trenches along the quayside
- High operational flexibility along the berth: accommodating a wide range of vessels, regardless of connection point location
- Easy storage: when not in use, PowerMove can be moved from the quayside and parked elsewhere

ShorePower
Shore side — Other applications

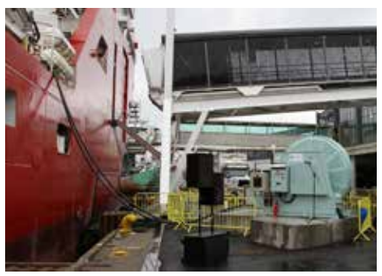


ShorePower for Offshore Service Vessels

Offshore Service Vessels (OSV) typically stay at berth for several weeks at a time when difficult weather conditions impede navigation. With shore connection, OSV operators achieve fuel savings and drastic reductions in emissions during such periods.

Power**Run** Low voltage

- Compliance with Shore Connection Low Voltage standard PAS IEC 80005-3
- Easy connection thanks to motorised cable reel
- Easy installation
- Safe connection thanks to cable tension control



ShorePower for research vessels and drilling platforms

When research vessels and drilling platform are in port, they are connected to the grid. Cavotec provides cable storage solutions for those applications requiring no regular connection and disconnection.

Power**Store**

- Optimised storage system to protect AMP cables
- Easy and quick installation
- Minimised footprint on quay side
- Easily movable solution

ShorePower for yachts

The power requirement of super-yachts is increasing with the emergence of a growing number of onboard luxury devices. Cavotec cable management systems safely connect such yachts to the grid at their home marinas.

Power**Run** Medium Voltage

- Easy installation and high flexibility with skid mounted option
- Minimised footprint
- Customised enclosure based on marina esthetism requirement

ShorePower for naval applications

From aircraft carriers to frigates, and transport to patrol vessels, naval ships have widely different electrical and operational requirements. Cavotec has developed an extensive range of shore power systems, with customised and robust units that meet the demanding specifications of naval applications.

Power**Range**

- 30 seconds to connect and disconnect.
- High operational flexibility and safety with telescopic boom, operated with radio remote control system
- Able to connect vessels' different hatch positions
- Adjusts to tidal, weather conditions
- Highly accurate hatch connection

Have Cavotec contact you!

To discuss your specific requirements for making your operations safer, more efficient and more sustainable.

Simply book a call at
www.cavotec.com/contact-us

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