



MoorMaster™
AUTOMATED
MOORING
SYSTEMS

Cavotec is a leading engineering group that designs and manufactures automated connection and electrification systems for ports, airports and industrial applications worldwide. Our innovative technologies ensure safe, efficient and sustainable operations.

MoorMaster™ is a vacuum-based automated mooring technology that eliminates the need for conventional mooring lines. Remote controlled vacuum pads recessed in, or mounted on the quayside or pontoons, moor and release vessels in seconds.



MoorMaster™ is the only automated mooring system currently in daily use that requires no vessel modifications. With the first systems entering service in 1999, some 250 MoorMaster™ units at 46 applications have completed more than 265,000* mooring operations to date.

This automated ship to shore interface system has moored 80-metre Ro/Ro, Ro/Pax, e-ferries and bulk lakers, container vessels of up to 390m, and bulk carriers of more than 300m. A compelling and extensive track record unmatched by any other automated mooring technology.

MoorMaster™ benefits

Improved productivity

- Vessels moored in less than 30 seconds.
- More than 90% reduction in time taken to moor and detach vessels (to less than one minute).
- Improved operational efficiency due to reduced vessel motion from swell, surge and passing ships.
- Reduced operating times for tugs and harbour pilots.
- Reduced OPEX (mooring teams not needed).

Improved flexibility

- Any vessel can use the berth, even vessels that are longer than the berth.
- Mooring can be undertaken from any location, thereby removing the reliance on personnel present at the berth.

Reduced environmental impact

- More than 90% reduction in emissions during ship berthing due to reduced use of tugs and ship engines.
- Fast and simple connection to shore power.

Reduced infrastructure investment

- Improved pier utilisation due to closer vessel spacing.
- Quay length can be 'virtually' extended as vessels' bows can overhang the end of the quay.
- MoorMaster™ can reduce breakwater extension requirements.

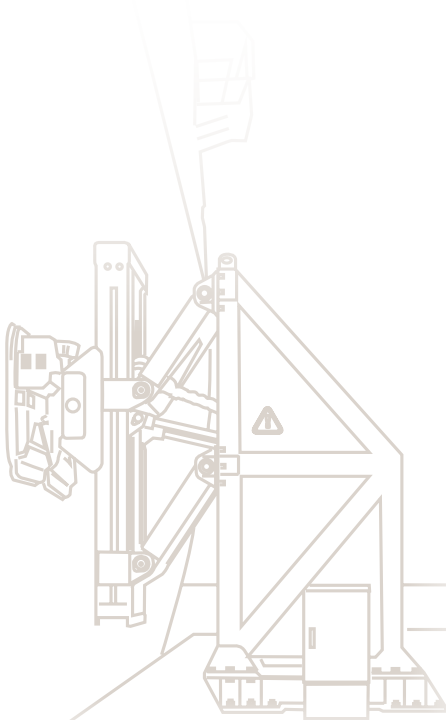
Improved safety

- Reduced risk of mooring accidents as personnel are removed from hazardous working areas.
- Real-time monitoring of mooring processes and forces.

MoorMaster™ features

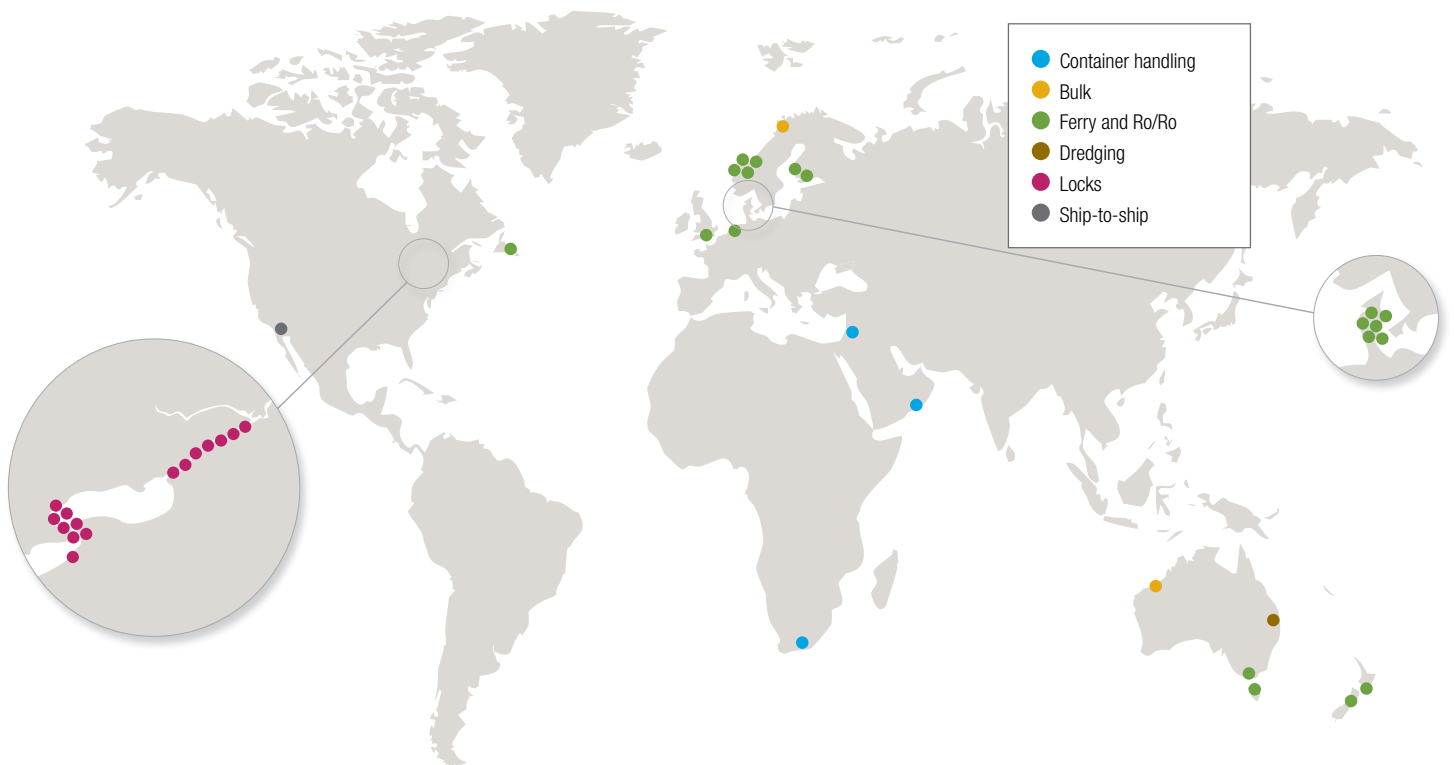
MoorMaster™ offers robust and compact design that can be adapted for most types of installation, vessel and mooring requirement.

- MoorMaster™ uses active controls that react to and reduce vessel motion by absorbing energy in its hydraulic system.
- Vertical ranging is accommodated with vertical rails or linkages. Units then step if the required vertical range exceeds system capabilities.
- Vessels are moored with one operator using a remote control system (radio and/or Wifi).
- Mooring forces and overall system status are monitored in real-time.
- Ships can be repositioned in the surge axis without needing to start their engines, and without pilots or tugs.
- Draft and tidal variations are managed automatically without human involvement.



MoorMaster™ references

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| ● Hou, Denmark | ● Anda, Norway | ● Bell Island, Canada | ● Port Ngqura, South Africa |
| ● Sælvig, Denmark | ● Lote, Norway | ● Portugal Cove, Canada | ● Brisbane, Australia |
| ● Spodsbjerg, Denmark | ● Helsinki, Finland | ● Portsmouth, UK | ● Utah Point, Port Hedland Australia |
| ● Taars, Denmark | ● Den Helder, Netherlands | ● Fishbourne, UK | ● LKAB, Narvik Norway |
| ● Ballen, Denmark | ● Picton, New Zealand | ● Nauvo, Finland | ● SLSMC & SLSDC, Canada & USA (16 locks) |
| ● Kalundborg, Denmark | ● Wellington, New Zealand | ● Parainen, Finland | ● US Navy |
| ● Lavik, Norway | ● Devonport, Australia | ● Berth 1, 3, 4, 5 & 6, Salalah Oman | |
| ● Oppedal, Norway | ● Melbourne, Australia | ● Quay 16, Beirut Lebanon | |



MoorMaster™ in practice

- Automatically moors super post-Panamax vessels of up to 19,200 TEU in surge conditions caused by long waves in less than 30 seconds – **Port of Salalah and Port of Ngqura.**
- Generated substantial cost savings by avoiding cost of constructing a breakwater – **Port of Beirut** container terminal.
- Moors dry bulk carriers of up to 305m, and entirely negates the effect of passing vessels, despite short jetties and strong currents – **Port Hedland (Australia) and Port of Narvik (Norway)** iron ore berths.
- Enable offshore ship-to-ship mooring operations ensuring the safe transfer of personnel and materiel at sea (currently in development) – **US Navy.**
- Safely hold general cargo vessels up to 220m through vertical travel of 14m – **St. Lawrence Seaway locks in Canada and the US** (sixteen locks).
- Improve turnaround times, personnel safety and reduce fuel consumption at ferry and Ro/Ro terminals – **Australia, Canada, Denmark, Finland, the Netherlands, New Zealand, Norway, and the United Kingdom.**
- Start recharging e-ferry batteries 20 seconds after arriving at the berth – **Norled ferry terminal Norway.**



*As of April 15, 2017.

We are present in:

Argentina	France	Norway	Switzerland
Australia	Germany	Qatar	Turkey
Bahrain	Hong Kong	Russia	UAE
Brazil	India	Singapore	UK
Canada	Italy	South Africa	USA
China	Japan	South Korea	
Denmark	The Netherlands	Spain	
Finland	New Zealand	Sweden	



info@cavotec.com
cavotec.com

Disclaimer: specifications are subject to change without notice