



Ports & Maritime





An introduction

Who we are

Cavotec is a multi-national group of companies serving the following industries: mining and tunnelling, ports and maritime, steel and aluminium, energy and offshore, airports and automation. In the early 1960's our main focus was the design and production of motorised cable reels primarily for manufacturers of tower cranes, harbour cranes and mining equipment.

Today, Cavotec is connecting mobile equipment around the world in many diverse applications.

Where we are

The Cavotec Group consists of 7 manufacturing "Centres of Excellence" located in Canada, France, Germany, Italy, Norway and Sweden and by 5 local manufacturing units located in Australia, China, Germany and the USA. For the distribution of products and providing support to customers Cavotec has 25 sales companies which, together with a network of distributors, serve more than 30 countries in five continents. The ultimate objective is to be perceived as "local everywhere".

How we work

Our aim is to work closely with our customers in order to build long-term partnerships. To achieve this aim we have created a working environment that attracts the best people, encourages them to stay and brings out their best qualities. By producing totally reliable systems and backing them with efficient service, we strive to create true customer satisfaction.



Our experience in the ports and maritime industry

The contribution of the Cavotec Group to the mechanisation and containerisation of ports and terminals started in 1963 with the development of advanced cable reeling systems. Soon after Cavotec developed Panzerbelt, an innovative system to completely protect cables while speeding up crane operation. Today 30% of all new ship-to-shore cranes are equipped with these cable reels and there are hundreds of Panzerbelt installations at major ports and terminals around the world.

The Cavotec Group also supplies other well-known equipment for use in ports and terminals such as Cavotec Gantrex crane runway products, marine propulsion slipring columns, electrical power connectors, power chains, permanent elevators and crane controllers. Presently, Cavotec is introducing a truly revolutionary new system for automatically mooring any type of ship. This system has already been successfully in operation in several installations in Australia and New Zealand.

Our major customers in this market segment are:

- ABB
- Fantuzzi-Reggiane
- Hyundai
- Kalmar
- Konecranes
- LA Port
- Miami Port
- Maersk
- MHI
- Mitsui
- NOELL
- P&O
- Samsung
- Sumitomo
- US Navy
- US Coast Guard
- ZPMC

Local throughout the world



As shown here the Cavotec Group is organized to support its customers around the world through its manufacturing units and sales companies. Each Cavotec manufacturing company, no matter where it is located, aims at being a market leader in its field by providing innovative and reliable products to Group customers. Each Cavotec sales company, in the 22 countries where they operate, aims at better serving its local market following the Group philosophy “to be local everywhere”.

MANUFACTURING NETWORK

Centers of Excellence

Canada
Cavotec Gantrex Canada
Crane Rail Systems

France
Cavotec RMS
Spring Driven Reels

Germany
Cavotec Alfo
Spring Driven Reels
Slipring Columns

Cavotec Fladung
Aircraft Support Systems
Physical Security Systems

Italy
Cavotec Specimas
Motorized Cable Reels
Panzerbelt Cable Protection
Slipring Columns

Norway
Cavotec Micro-control
Radio Remote Controls

Sweden
Cavotec Connectors
Electrical Plugs & Sockets

Local Manufacturing

Australia
Cavotec Australia
Motorized Cable Reels

China
Cavotec China
Product Assembly

Germany
Cavotec MoorMaster
Automated Mooring Systems

Sweden
Cavotec Sverige
Product Assembly

USA
Cavotec Gantrex USA
Product Assembly

Group Partners

Belgium
Gantry
Crane Rail Systems

Italy
Brevetti Stendalto
Cable Chains

Pirelli
Flexible Cables
Tratos Cavi
Flexible Cables
Amercable
Flexible Cables

New Zealand
Mooring Systems Ltd
Automated Mooring Systems

The Netherlands
De Jong
Permanent Elevators

SALES NETWORK

Cavotec Sales Companies

Cavotec Australia
 Cavotec BeNeLux
 Cavotec Brazil*
 Cavotec Chile
 Cavotec China
 Cavotec Denmark
 Cavotec Finland
 Cavotec France

Cavotec Germany
 Cavotec Hong Kong
 Cavotec Italy
 Cavotec Korea*
 Cavotec Latin America
 Cavotec Middle East
 Cavotec Norway
 Cavotec Russia*

Cavotec Singapore
 Cavotec Sweden
 Cavotec UK & Ireland
 Cavotec Gantrex Canada
 Cavotec Gantrex Mexico
 Cavotec Gantrex South Africa
 Cavotec Gantrex USA

* Branch Office





Cable Reels

Cavotec Specimas cable management systems form the most important range supplied by the Cavotec Group to ports and maritime industry. Motorised cable reels are usually divided into applications for horizontal and vertical reeling and for each application a distinction is made between intermittent duty and continuous duty. Cavotec Specimas has established its reputation in this market segment by supplying systems that are innovative, robust and compact with a specialised engineering staff to provide support where needed. For intermittent duty applications Cavotec normally recommends the Hydrodynamic System, while for continuous duty applications, Cavotec has designed a variable torque regulating system.



The Hydrodynamic System

This unique patented system provides a simple and rational solution for many cable and hose reel applications. The system is based on a torque unit in which reduction gear, clutch and brake are built into one closed unit. Furthermore, thanks to the clutch acting directly on the main drum shaft, an even torque output is guaranteed. This allows an even recovery of any type of cable independent of clutch slip or reeling speed. Another major advantage is that the torque can easily be readjusted on site, allowing the tension of the cable to be changed according to the actual requirements.

Cavotec Torque Control

The Cavotec Torque Control system provides a constant pull in the cable following a torque reference signal based on cable weight and length, speed and acceleration. The benefit is a longer cable life. The system can be used for single-phase and three-phase AC and for DC feed. The standard protection class is IP55 and it is suitable for environment temperatures up to +40 C°. Special ventilation and motor insulation are supplied for higher temperature ranges.



To guarantee maximum support to its customers Cavotec Specimas has a team of specialised engineers for 24/7 service demands anywhere in the world.



Automated Mooring Systems

Mooring Systems Limited (MSL) is a public listed company based in New Zealand. The company specialises in the design and production of revolutionary automated mooring systems for commercial and military vessels. The mooring systems have been adopted by important shipping and port companies, including well-known operators such as Patrick Shipping (Pty) Limited of Australia and the Port of Dover (UK). Since its commissioning this system has safely performed over 10,000 automatic mooring operations without ropes and without the intervention of mooring teams. In March 2004, Mooring Systems Limited entered into an alliance with the Cavotec Group granting them the license for the manufacture, marketing and service of their products.



MSL's new systems have captured all of the flexibility and characteristics of traditional mooring lines in a range of automated systems. Instead of a rope, the units use vacuum pads to provide the mooring attachment. Each pad has a measurable working load (20, 40 or 80 tonnes), providing a powerful physical attachment between ship and shore. MSL's vacuum pads have been tested and rated under the supervision of the international classification societies Det Norske Veritas (DNV) and Lloyds Register. Today, MSL's standard vacuum pads can adjust to extensive

surface irregularities and are able to slide under extreme loads without significant seal deformation or loss of attachment. Because the mooring units attach to the ship closer to the waterline and immediately counteract mooring forces, the system has a greater mooring efficiency than angled ropes. By using sophisticated internet based control software the system permits the user to monitor performance clearly communicating all essential mooring load information in real-time.

A typical MoorMaster installation ensures an "all secure" mooring within 12 seconds of unit activation.





Panzerbelt

Panzerbelt is a patented system developed by Cavotec Specimas in the mid-70's in order to give an efficient and economic protection to power cables against damages and problems caused by the increasing cross traffic in ports and terminals. Panzerbelt withstands traffic of all vehicles normally used in ports without permanent deformation. It prevents ingress of debris and water from entering into the channel and gives the highest degree of cable protection without the need of maintenance. The more than 300 installations at work today (2005) around the world, prove that the system is the right solution.



Panzerbelt is a cable protection system incorporating a continuous semi-flexible belt, fabricated from rubber with inlaid steel reinforcement, which lies over a channel cast in the quay. The belt is riveted to the quay surface along one edge, while the other remains free to be raised by a belt lifting device fitted to the crane. Steel reinforcement retains the flexibility of the belt in all directions, except transversely to the channel axis, so that the cable once in the channel, is totally protected from vehicles crossing the track and from objects falling into

the channel. It is also possible to convert an existing hinged plate design (both for conductor bars or cables) to Panzerbelt, a proven flexible and efficient covering system.

The system is available in two versions, Standard Panzerbelt and Super Panzerbelt. The latter offers an extra advantage as it allows heavy vehicles not only to pass over the belt, but also to have their wheels turning on top of it.



The flexible belt, together with the specially designed belt-lifting unit, ensures a smooth and trouble-free travel of the crane.



Rail Fastening Systems

Gantrex is a North American company specialised in the design, development and manufacture of a complete range of products related to rail fastening systems for both overhead and ground supported cranes. Additionally, the company offers a wide range of rail profiles and complete inspection, survey, installation and thermite and flash-butt welding services. Gantrex has 30 years of experience and reliability in the steel and aluminium industry and is supported by an experienced engineering and installation group. In 2002, Gantrex became a fully integrated member of the Cavotec Group and, in 2005, changed their name into Cavotec Gantrex.



The Gantrex soft-mounting crane rail fastening system is the proven solution for any crane runway problem. A complete range of weldable and boltable clips is available for all rail sizes. In addition, Gantrex provides both steel-reinforced continuous rail pad and molded crowned pad for intermittent-supported applications. The soft-mounting system ensures the longevity of the crane, wheels and rail support foundation.

In addition to the main core of products, Gantrex also provides continuous and intermittent steel soleplates configured to all rail applications. To provide unit responsibility, Gantrex also supplies adhesive anchors and a quality non-shrink epoxy grout specially pre-blended, packaged and produced for rail-on-concrete conditions.

The Cavotec Gantrex products are distributed by the Cavotec Group in the following countries: Australasia, North and South America, South Africa, Finland, Norway and Sweden.

Cavotec Gantrex offers a complete solution to any rail fastening application. Their range comprises of rails, rail clips, pads, soleplates, anchor bolts and special epoxy grout.





Power Connectors

The Cavotec Power Connectors, manufactured in Sweden, have been present in the field of industrial power supply for more than 20 years starting in the harsh environment of the Scandinavian mines and hydro-electric tunnels. Today the high quality, robustness and integral safety of the Cavotec Connectors have set the standard concerning high and low voltage power supply to many different types of equipment used not only in mining and tunnelling but also in hundreds of ports and maritime applications around the world. Cavotec mainly supplies low and high voltage connectors but also special types such as reefer plugs and sockets and the “RackMatic”, an innovative way of connecting to spreader applications.



Cavotec Connectors for low and high voltage applications are robustly designed, with a standard IP 66 protection and a standard maximum temperature of 80°C. The range of low voltage power connectors, available in a variety of sizes, are made in two different operation systems:

1. The “Push and Pull” system is preferred when the connectors have to be disconnected manually or automatically several times a day.

2. The “Screw Ring” system when the connectors are fitted with a screw ring for applications where they have to be disconnected by hand on a day-to-day or weekly basis.

The high quality, robustness and integral safety of the Cavotec Connectors have set the standard concerning high and low voltage power supply to many different types of equipment used in applications around the world.



Cavotec Connectors are able to withstand very severe working conditions, making them the preferred choice for ports around the world.



Cables

In order to supply a comprehensive selection of high quality cables specially adapted to working environments found in ports and maritime applications, the Cavotec Group decided to select specialised manufacturing partners enabling Cavotec to guarantee the very highest level of productivity and safety. Among the specialised cable manufacturing partners represented by the Group, we can mention such companies as Americable, Baude, Gore, Palazzo, Pirelli and Nexans. The cables shown on this page are a selection commonly used in ports and maritime applications and form part of the complete range of cables offered by the Cavotec Group.



All the cables offered by the Cavotec Group are divided in low and medium voltage. Low voltage cables are further divided into power or control cables as each single cable is designed to deal with specific applications. Medium voltage cables on the other hand are all power cables but the majority can be supplied with integrated fibre-optics as an option. The range of cables is such that Cavotec can supply any type of cable to suit any specific application.

Cavotec offers many different types of cables to meet specific operating requirements. For more detailed information please consult our 32 page flexible cables catalogue.



Heavy duty low voltage power cables



Light-weight low voltage control cables



Medium voltage power cables



Medium voltage power cables with FO



Marine Propulsion Systems

Since the early 1990's Cavotec Specimas has contributed to the development of a revolutionary ship propulsion system. This system uses "an outboard electric motor" instead of the traditional "on line shaft inboard diesel powered propulsion". To obtain the required 360 degrees manoeuvrability it was designed with a special slipping unit, developed and manufactured by Cavotec Specimas. This unit is able to transmit up to 4000 Amps 3kV, data-control through optical fibers or conventional rings and a special 400 bar multiway swivel for the hydraulic steering unit. The reliability of the system is vital and the 24 hour service availability is part of Cavotec's commitment to serve the over 100 Marine Propulsion Sliprings (MPS) installed all over the world in different types of ships, from cruise liners to ice breakers.



Installed on the top of the new marine propulsion systems, the MPS slipping system allows the pod and propeller to rotate the total 360 degrees. Its function is to transfer power from the diesel generators to the outboard electric motor and propeller. In addition the Cavotec Specimas MPS also transfers auxiliary power, control and data signals from the pod to the control room. To maintain the proper function of all mechanical parts the MPS also allows the transfer of hydraulics, oil, water and air necessary for the motor, mount and support of the steering angle sensors for the ships' steering system.



The MPS supplied by Cavotec Specimas is mounted on top of the Azipod unit. This configuration saves a large amount of space compared with traditional propulsion systems.



AMP Systems

The environment in ports all over the world is becoming more and more an issue. During last 15 years increasing attention has been paid how to reduce pollution coming from the diesel engines of ships which traffic, in ever increasing numbers, the ports and terminals of the world. The Cavotec Group, by using its experience and components widely applied in various industrial segments, has created a new approach to supplying power to ships without creating any pollution.

This system is called Alternative Maritime Power Supply.



This new system can be ship-based, shore-based or mounted on a floating platform. It consists of a cable management system and transformers that provide electrical power directly to the ship. The electrical connections are made through Cavotec Push & Pull Connectors which allow for rapid, safe and efficient connecting and disconnecting. They are fitted with the MWT (Multi-Way Technology) which is used on the female contacts allowing the system to take up to three times the maximum load for a short time.

Due to its reliability and safety, the Push & Pull connector type is used in harsh environments like military applications where, as an example, US Coast Guard is using it on a large scale for the electrical shore to ship supply(AMP)

Cavotec Push & Pull connectors ensure a fast, reliable and pollution-free power supply to the ship.





Spring Driven Cable Reels

Established in 1991 to manufacture spring driven reels and slipping columns, Cavotec Alfo in just five years, became a leading manufacturer in its sector and market-leader in Germany. Such a fast growth is the result of combining high quality components, cost-effective management and the use of standard materials produced in large numbers. This effective combination enables Cavotec Alfo to serve the market and meet both standard and special requirements at competitive prices and with short delivery times. Thanks to the global sales network of the Cavotec Group these high quality products are at work around the world in many diverse applications.



The Cavotec Alfo standard spring reels are built from modular components which allow a great number of combinations covering most common requirements. The clever design of the Cavotec Alfo spring driven cable reels guarantees the highest reliability even in the most difficult and demanding applications. Each unit features a well dimensioned shaft and bearings which accommodates an easy and fast exchange of springs. The cable feeding point can be placed on either side of the drum allowing for easy adaptation for horizontal or vertical applications.

The springs are made from high-grade special steel and are mounted inside a housing in order to avoid friction and wear. The slipping assembly is mounted in a solid glass-fibre reinforced plastic housing which withstands corrosion and mechanical wear.

Every unit meets all applicable IEC norms and standards and follows the latest EU requirements (CE-marking). All reels and slipping units have a protection grade of IP65/66.



Cavotec Alfo offers a complete range of spring driven cable reels for many varying applications. For more information please consult our 32 page product specific brochure.



Power Chains

Founded in 1976 in Monza, Italy the manufacturing company Brevetti Stendalto was the first to develop and manufacture the revolutionary cable chains in nylon. Today Brevetti is considered one of the most important manufacturers of nylon as well as steel cable chains in Europe. Their range of some 20 types of chains, which can be used in over 200 different types of application, are marketed by the Cavotec Group all around the world



The Cavotec Power Chains are a proven alternative for supplying power to overhead cranes. With this system power and control cables are carried safely and fully protected by a heavy-duty nylon chain over long travelling distances at high speeds. The main advantages of this system are that the cable length and weight are halved, it allows a speed of up to 200 m/h, it allows separation of power and control cables and has a very low and easy maintenance need.

Endurance tests carried out by leading crane manufacturers and the many applications at work have proven the reliability of the system and its clear economic advantages.

Power chains are frequently used for the trolley movement on RTG-cranes





Radio Remote Controls

Cavotec Micro-control, a full member of the Cavotec Group since 2004, has been involved since 1984 in the development and production of advanced radio remote control systems, including the latest unit for use in areas where explosions could occur. All systems have a high level of flexibility and are made from standard modules allowing for full customisation to meet specific customer requirements. Cavotec Micro-control radio remote control systems meet the most stringent safety and quality controls and are fully ATEX and IEC approved.



The MC 3000Eex provides a secure and flexible control of many different types of machinery in complete safety. Everything, from simple control functions to complete process supervision, can be done from the same system. This unit can solve most of the direct hydraulic and electric control functions and provide serial communication with most known PLC and frequency converters, if necessary using the TCP/IP protocol. In addition this unit has the option of cable control besides the standard radio control, providing an extra failsafe against shutdown.

All units can be delivered with simplex or duplex communication.

The base unit can be delivered with a serial interface for the most common bus standards on the market today. The base unit comes standard with EEx protection and with an intrinsically safe battery.



The MC 3000EEx is the first ever explosion proof RRC to obtain a full ATEX approval.



Crane Controllers

Gessmann is a company specialised in the production of high quality industrial controllers and switches to be used in crane operation systems, remote controls and several other applications. Gessmann production includes a large range of different controllers which can solve nearly all man-machine interface problems. As a result of the close cooperation established with its customers, several Gessmann solutions are specially designed for tailor-made applications. Gessmann Industrial Controllers are distributed by the Cavotec sales companies in Australia, China, Middle East, Norway, UK and the USA.



Industrial Controllers

Gessmann standard range of industrial controllers are used in many different types of crane applications, mobile electro-hydraulic applications, ship controllers and radio remote controllers. The modular design enables the switching device to be used universally. All controllers are resistant to oil, maritime climate, ozone and UV radiation.

Crane Control Units

Operators' chairs with equipment boxes are manufactured for many different applications and are in operation all around the world. The modular design allows combinations of specific features, seats and other adjustments in accordance with the customer's requirements.

All Gessmann controllers meet the following standards: IEC 9475-1, EN 60947 and DIN-VDE 0660-200



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Italy
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