

MPS - Marine Propulsipon Sliprings



Manufactured by **Cavotec Specimas**



Specimas

Marine Propulsion Sliprings

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, general industry 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 27 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.



Aurotac Sliprings

Specimas, a Cavotec Group company, is since 1963 engineering and manufacturing cable reels, slipring assemblies and Panzerbelt cable protection systems for ports, marine, offshore and tunnelling applications.

MacGregor Sweden was the first marine customer who is installing our slipring assemblies since 25 years in their ship cranes.

Located 10 km from Milan, Specimas employs 70 persons of which 15 graduated or equivalent engineers. Specimas is committed to quality of the products as well as their service. More than 30.000 cable reels and slipring assemblies have been installed during the last 35 years.

Cavotec Group Organisation

As shown here the Cavotec Group is organised 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 27 countries where they operate, aims at better serving its local market following the Group philosophy "to be local everywhere".

Manufacturing network

Centres of Excellence

France

Cavotec RMS

Spring Driven Reels

Germany

Cavotec Alfo

Spring Driven Reels

Slipring Columns

Cavotec Fladung

Aircraft Support Systems

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

New Zealand

Cavotec MoorMaster

Automated Mooring Systems

Local Manufacturing

Australia

Cavotec Australia

Motorized Cable Reels

China

Cavotec China

Product Assembly

Germany

Cavotec Micro-control

Radio Remote Controls

Sweden

Cavotec Sweden

Product Assembly

USA

Cavotec USA

Product Assembly

Group Partners

Belgium

Gantry

Crane Rail Systems

Italy

Brevetti Stendalto

Cable Chains

Prysmian (Pirelli)

Flexible Cables

Tratos Cavi

Flexible Cables

Sales network

Cavotec Sales Companies

Cavotec Australia

Cavotec Belgium*

Cavotec BeNeLux

Cavotec Brazil*

Cavotec Canada

Cavotec Chile

Cavotec China

Cavotec Denmark

Cavotec Finland

Cavotec France

Cavotec Germany

Cavotec Hong Kong

Cavotec India

Cavotec Italy

Cavotec Korea

Cavotec Latin America

Cavotec Mexico

Cavotec Middle East

Cavotec Norway

Cavotec Russia*

Cavotec Singapore

Cavotec South Africa

Cavotec Sweden

Cavotec Turkey

Cavotec UK & Ireland

Cavotec USA

* Branch Office

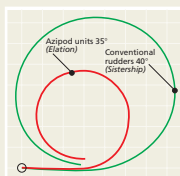
A revolutionary propulsion system

Since the early 1950's, Asea Brown Boveri (ABB) has been supplying electrical propulsion and power plants for half of the world's icebreakers and many special purpose vessels built by Kvaerner Masa Yard (KMY) in Finland.

AC/DC power plants and the Cyclo propulsion systems were introduced by ABB and KMY as a new technology early in 1983.

New propulsion systems have been developed by other large companies like Schottel-Siemens from Germany and Alstom from France operating under different names as: Azipod (registered trade name of ABB), SSP Propulsor (registered trade name of Siemens Schottel) or Mermaid (registered trade name of Alstom).

These systems incorporate an electrical motor azimuthing (slewing) through 360 deg installed inside the pod. The pod itself is installed outside the ship's hull.



The revolutionary advantages of the system are:

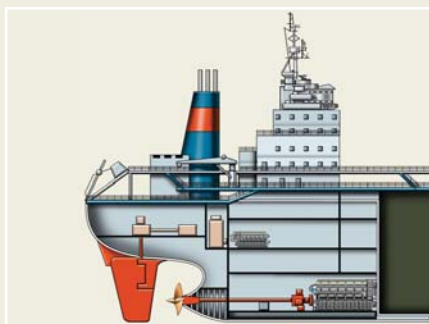
- excellent manoeuvrability and dynamic performance as the propeller can be directed in any direction within 360 deg.
- space and weight savings, no long shaftlines, reduction gears, rudder
- fuel savings through improved hydrodynamic efficiency
- low noise and vibrations by the use of optimised propeller wake field
- safety and redundancy



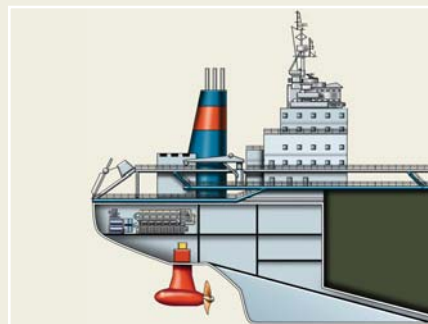
ABB Azipod propulsion system



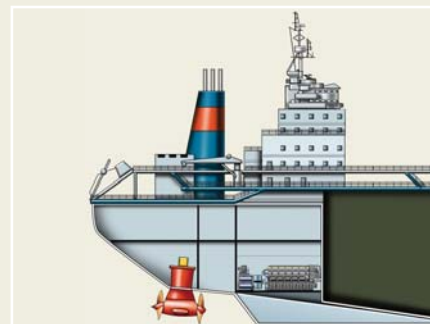
Siemens-Schottel SSP propulsion system



Traditional "on axis" shaft-propeller system with diesel engine



Azimutning propulsion drive (Azipod)



Azimutning propulsion drive (SSP Propulsor)

Two propulsion drives



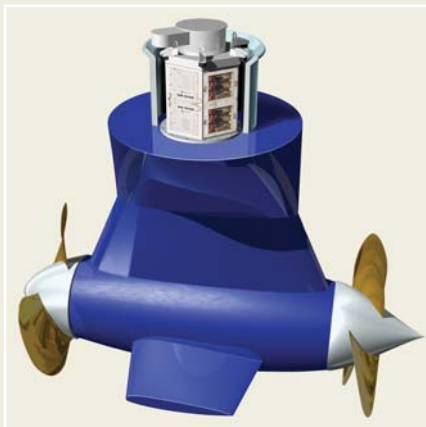
ABB azipod propulsion

Installed on top of the ABB Azipod system, the MPS slipping system allows the pod and propeller to rotate the total 360 degrees. Its function is to:

- Transfer power (example 3600 Amps, 1,5 KV) from the diesel generators to the revolving outboard electrical motor and propeller through brushes and rings
- Transfer auxiliary power, control signals and data signals or optical signals from the pod to the control

room, through silver brushes and rings and/ or optical swivel joint.

- Transfer hydraulic, oil, water and air necessary for the motor through a hydraulic swivel
- Mount and support the steering angle sensors for the ship steering system and the visual steering angle indicator
- Function as a part of the air cooling system of the motor



Siemens-schottel SSP propulsion

Installed on the top of the Siemens-Schottel SSP System, the MPS slipping system allows the pod and propeller to rotate the total 360 degrees. Its function is to:

- Transfer power (example 2000 Amps, 1,5 KV) from the diesel generators to the revolving outboard electrical motor and propellers through brushes and rings
- Transfer auxiliary power, control signals and data signals from the pod

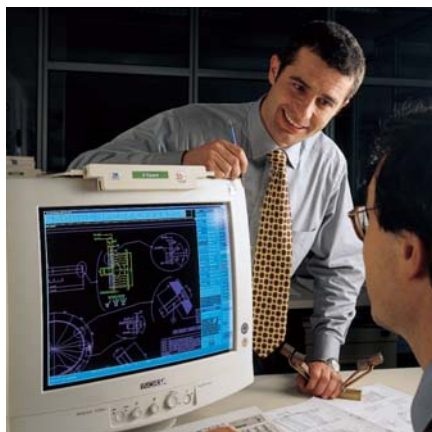
to the control room through brushes and rings and/or inductive systems.

- Transfer water and air necessary for the motor through a hydraulic swivel
- Mount and support the steering angle sensors for the ship steering system and the visual steering angle indicator



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Specimas Cavotec's contribution to a revolutionary propulsion system



The MPS slipring system is supplied in an IP 44 heavy robust steel housing for marine use and is pre-wired with cables or hoses according to the customer request.

In the early 90's, ABB Marine and Kvaerner Masa Yard of Finland approached Specimas for a R & D study concerning the power, data and hydraulic transmission for a revolutionary ship propulsion system using an outboard electrical motor instead of the traditional on line shaft inboard diesel powered propulsion. The 360 degrees manoeuvrability requires the installation of a slipring unit able to transmit up to 4000 Amps at 3 kV, data - control through optical fibers, or conventional rings and a special multi channel swivel for bilge, oil, grease and air.

After 3 years of tests and studies first on the Lunni ice breaking oil tanker and after that on the Botnica, in 1995 we received the first orders for the Fantasy Class Carnival Corporation, M/S Paradise and Elation.

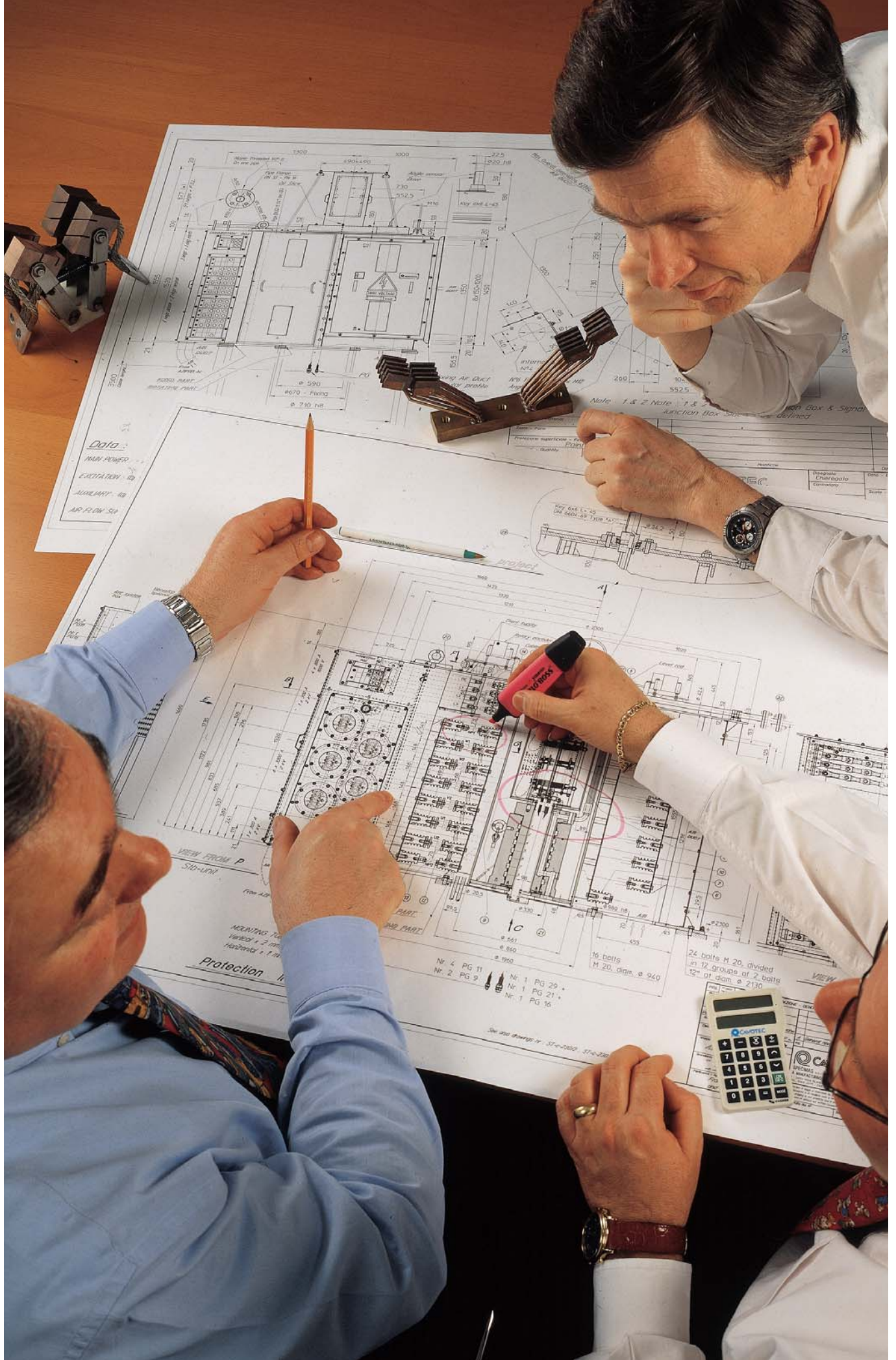
In 1999, Siemens-Schottel of Germany placed the first order for a similar system to power two TT-lines ferries and the Costa Classica cruise liners.

With a population of over 59 Marine Propulsion Sliprings (MPS) installed all over the world, in different type of ships from cruise liners, to ice-breakers, ferries, military ships, etc, Specimas – Cavotec is today the only supplier able to offer a complete system combining electrical, data and hydraulic transmission.

The reliability of the system is vital and the 24/24 hours service, availability is part of our strength to serve our customers navigating where ever, from Barrents Sea to the Coral Sea, from the North Sea to Panama, or from the Chinese Sea to the Tasmanian Sea.



The MPS slipring system is supplied in an IP 44 heavy robust steel housing for marine use and is pre-wired with cables or hoses according to the customer request.



Applications



The MPS sliprings are installed at the stern of the ship and according to the application can be single or twin, centrally located, or port and starboard side.



Designed, manufactured and tested to resist to forces of 5 G or more and strong vibrations, the MPS slipring is a vital component to the ship reliability.



In this photo of the main electrical control room, the "brain" of the ship, we can see how the MPS slinging system is integrated in the propulsion system of the ship in order to insure 100% reliability on a ship carrying around 2500 passengers and crew.



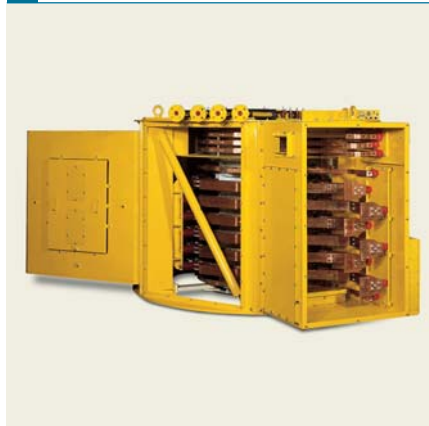
Specimas MPS - Marine Propulsion Sliprings

KK 940/8



Type:	KK 940/8
Main Power:	3500 Amp, 2 kV
Excitation:	500 Amp, 1 kV
Auxiliary power:	20 Amp and 10 rings, 500 V
Data transmission:	encoder and data lines in EMC enclosure (or FO link)
Hydraulic swivel:	7 channels - oil, grease, water and air (mounted inside center tube)
Approx.dimension:	diam. 1800 mm, height power unit 1500 mm, total height 2500 mm

KK 1120/8



Type:	KK 1120/8
Main Power:	3500 Amp, 2 kV
Excitation:	500 Amp, 1kV
Auxiliary power:	20 Amp and 10 Amp rings 500V
Data transmission:	encoder and data lines in EMC enclosure (or FO link)
Hydraulic swivel:	7 channels - oil, grease, water and air (auxiliary power, data transmission and hydraulic swivel mounted inside center tube)
Approx.dimension:	diam. 2300 mm, total height 1700 mm

KK 648/4/3 kV



Type:	KK 648/4/3 kV
Main Power:	1200 Amp, 3 kV
Auxiliary power:	50 Amp rings, 400 V
Data transmission:	encoder and data lines
Approx.dimension:	diam. 1400 mm, total height 1200 mm

KK 940/7/3 kV



Type:	KK 940/7/3 kV
Main Power:	1500 Amp, 3,3 kV
Auxiliary power:	20 and 10 Amp rings, 500 V as option silver plated rings, as option with double brushes
Data transmission:	encoder and data lines, gold plated rings in EMC enclosure (or FO link)
Hydraulic swivel:	7 channels - oil, grease, water and air (mounted inside center tube)
Approx.dimension:	diam. 1800 mm, height power unit 950 mm, total height 1650 mm

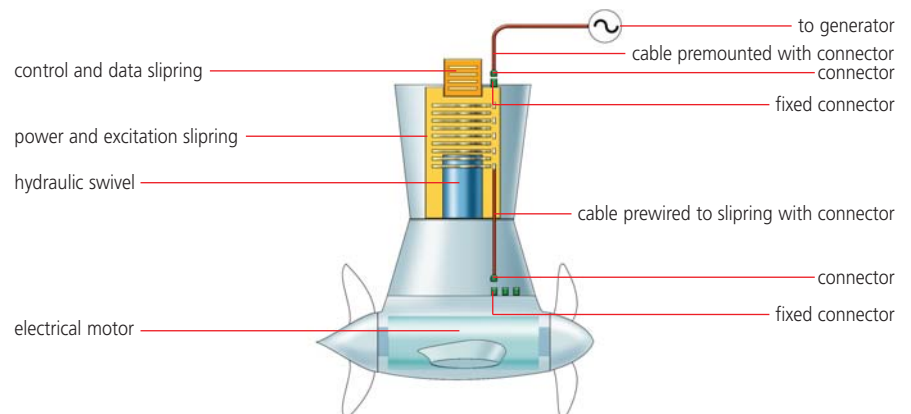
KK 648/7



Type:	KK 648/7
Main Power:	1900 Amp, 3 kV
Auxiliary power:	50 Amp rings, 400V
Data transmission:	encoder and data lines
Approx.dimension:	diam. 1400 mm, total height 1200 mm

Accessories

Specimas-Cavotec can supply a complete package with various accessories like cables, hoses, connectors, swivels etc. Example of a complete package.



A Specimas Team specialized in "MPS" research, control and service



Caspian Sea 1999

Continuous and high-tech research and tests are made in order to optimise materials for this specific high endurance application.

Working very closely to the various international certifying institutes we are able to stay updated with the latest specifications and technologies.

With a network of 22 own companies and various distributors our Group is present in 40 countries and we are able to supply service and commissioning worldwide in the shortest time.



The service teams headed by Mr. Peter Brandel, Sandro Teruzzi and Sorin Florenzio are available 717 days, 365 days per year with technical know how and spares.



Due to the absolute reliability required, sophisticated test instruments are used for the control of each single component. Each and every unit is tested and certified under witness form the classification societies before delivery.

Advantages of the Specimas MPS system



Hydraulic swivel

Reliable, proven and with long practical experience:

59 sliprings (March 31st 2001), with some sliprings having been in operation over 24.000 hours.

Complete package supplied on request: power, auxiliary power, control, data transfer, hydraulics, air cooling, steering angle sensing devices, pipes, cables pre-wired and connectors.

Easy and low maintenance with self cleaning brushes and rings.

Fast replacement of rings or brushes ,in case of necessity, without dismounting the complete slipring assembly.

Big tolerances, allowing for vertical and angular brush movements due to movements in the pod structure.

No metal to metal contact with wear, no risk of brushes getting stuck or bent due to movement in the pod structure, heat expansion or vibrations.

The vertical rings do not accumulate dirt as the horizontal plate rings do.

Many electrical contact points on the ring with excellent current distribution and less heat created.

Symmetric current distribution in the rings with many cable connection points.

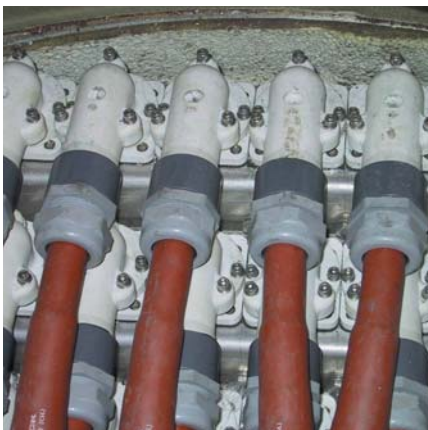
Heavy housing and structure, tested at resonance frequency up to 2G and at shock load up to 5G.

Easy to adapt design up to 9 KV and 4000 Amps

365 days service and spare parts availability via our 22 companies around the world.



Auxiliary power data and control slipring



Cavotec single pole 6kV connectors

Crusing with the MPS system

Reference list marine propulsion sliprings (MPS) at march 31st 2001

Ship / Project Name: Client	Yard	Units	Delivery	MW
Uikku Nermac	KMH *	1	1993	11,4
Lunni Neste	KMH	1	1995	11,4
Röthelstein		2	1994	0,56
Antarticaborg Wagenborg	KMT	2	1998	1,62
Articaborg Wagenborg	KMT	2	1998	1,62
Coast Guard		1	1998	0,25
Paradise CCL	KMH	2	1997	14
Elation CCL	KMH	2	1997	14
Europe Hapag Lloyd	KMH	2	1998	6,65
Voyager of the Seas RCI	KMT	2	1998	14
Botnica Coast Guard		2	1997	5
Atlantic Costa	KMH	2	1999	17,6
Explorer of the Seas RCI	KMT	2	1999	14
Amsterdam HAL	Finncantieri	2	1999	15,5
Carnival Spirit CCL	KMH	2	2000	17,6
Radiance of the Seas RCI	JLM	2	2000	19,5
Adventure of the Seas RCI	KMT	2	2000	14
Svalbard Coast Guard	Langsten	2	2000	5
Super Start Libra Star Cruise	JLM	2	2000	19,5
Carnival Pride CCL	KMH	2	2000	17,6
Antarticaborg Wagenborg		1	2000	1,62
Nils Holgersen TT-line	SSW	2	2000	11
Peter Pan TT-line	SSW	2	2000	11
Costa Classica Costa	Cammell Laird	1	2000	8
Cosco 1 Guangzhou	Guangzhou	2	2001/11	5
Brilliance of the Seas RCI	JLM	2	2001/13	19,5
Cosco 2 Guangzhou	Guangzhou	2	2001/20	5
Fortum Tanker 1 ex Neste	Sumitomo	1	2001/24	16
Fortum Tanker 2 ex Neste	Sumitomo	1	2001/29	16
HAL1 HAL	Finncantieri	2	2001/26	17,6
Carnival Legend CCL	KMH	2	2001/36	17,6
Eagle 4 RCI	KMT	2	2001/36	14
Super Star Scorpio Star Cruise	JLM	2	2001/42	19,5

* Marine Power Chain system (MPC)



Head Office

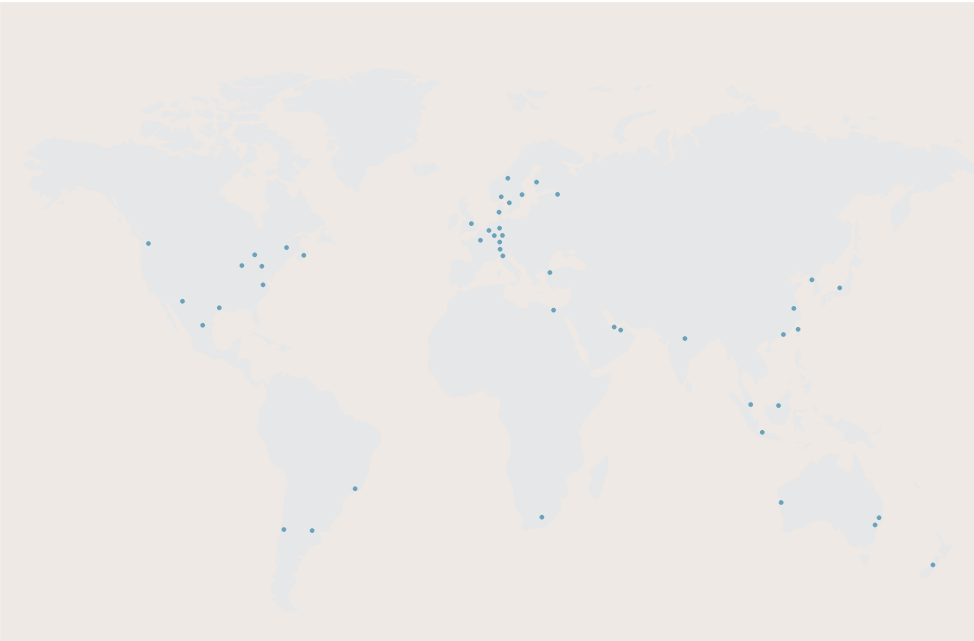
Cavotec MSL Holdings Ltd.
Cavotec MSL is listed on the **NZX**

Corporate Office

Cavotec (Swiss) SA
Via Serafino Balestra 27
CH-6900 Lugano, Switzerland

We are present in

- | | |
|-----------|-----------------|
| Argentina | Luxemburg |
| Australia | Malaysia |
| Belgium | Mexico |
| Brazil | The Netherlands |
| Canada | New Zealand |
| Chile | Norway |
| China | Russia |
| Denmark | Saudi Arabia |
| Egypt | Singapore |
| Finland | South Africa |
| France | Sweden |
| Germany | Switzerland |
| Hong Kong | Taiwan |
| India | Turkey |
| Indonesia | Qatar |
| Ireland | U.A.E. |
| Italy | U.K. |
| Japan | U.S.A. |
| Korea | |



For more information please visit our website www.cavotec.com
or contact us directly at info@cavotec.com