Hartmann & König
STROMZUFÜHRUNGS AG

Ports & Container

We energize mobility. Worldwide.

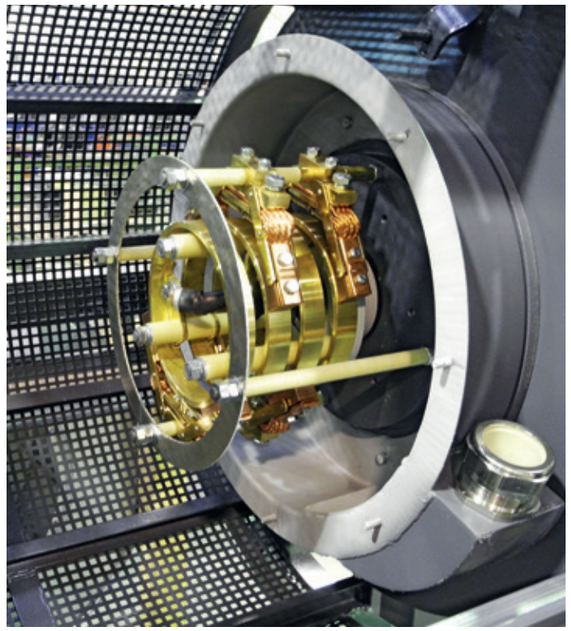
Company profile & product portfolio

Expertise meets customer needs

As one of the leading manufacturers of motorized cable reels, spring cable reels, and slip ring bodies, Hartmann & König Stromzuführungs AG supplies mobile consumers worldwide with technologically advanced systems for energy and data transmission. The high-quality „Made in Germany" cable reels are used on STS and gantry cranes, deck and construction cranes, excavators or hoisting equipment of all types – and wherever mobile consumers require a reliable supply of electricity, data or other media.

Our expertise is reflected in an impressive product portfolio of state-of-the-art cable reels and slip ring bodies. Innovative capability, reliability as well as the flexibility of a medium-sized company contributed to the success of Hartmann & König.

Our expertise in the area of energy supply to mobile consumers is based on 70 years of experience in the development and production of cable reels and slip ring systems.
We support our customers with a dedicated team of engineers and designers, who can develop a solution for the most challenging applications. In this way, we offer virtually all types of motorized cable reels for spiral or cylindrical winding and unwinding of cables, ropes or hoses tailored to customer requirements.



Ports & Container market requirements

Highest quality standards

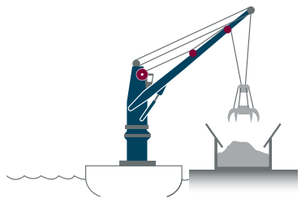
Today, more than 90 % of goods transhipments worldwide are transported by sea. Energy and data transmission systems that are customised for the technical tasks to be performed play a key role in ensuring the efficiency of port and container terminals. Dependable and low-maintenance electrical power supply components are therefore critically important when it comes to ensuring smooth operation and minimising downtimes.

Cable reels and slip ring bodies by Hartmann & König are powerful and robust in equal measure. This makes them ideal for long-term use under the most diverse climatic conditions in ports across the globe.

As a specialist in the development of intelligent power supplies, Hartmann & König has been supplying Mobile Harbour Cranes, RMGs and RTGs as well as Ship-to-Shore and Intermodal Cranes with environmentally friendly energy for decades. For harbour and container terminals, we construct motorized cable reels with high safety classes and optimum corrosion protection to withstand even the most extreme environmental conditions. For example, we use flanges and reel bodies made of hot-galvanised steel or stainless steel to maximise the service life of these components even in aggressive sea weather conditions. Hartmann & König meets the highest quality standards – for satisfied customers worldwide.

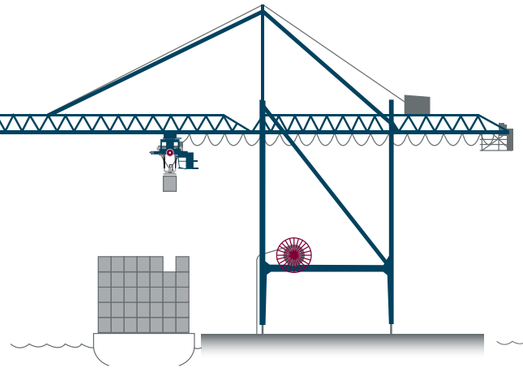
H&K power supply solutions for Ports & Container market

Deck Cranes & Offshore Applications



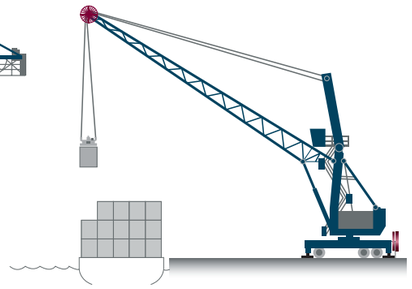
In order to move heavy loads on board ships, our motorized cable reels equipped with turbo couplings and cylindrical gears can be relied upon to supply power to the most diverse types of Deck Cranes. At the same time, rope reels stabilise the rotary and slewing movements of grabs and spreaders.

Ship-to-Shore Container Cranes (STS)



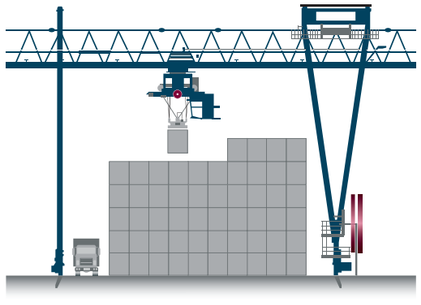
To enable efficient loading and unloading of large ships, Ship-to-Shore cranes master logistical feats of approximately 400-900 tons per hour every day. Motorized cable reels are used to facilitate the vertical movements of spreaders as well as the horizontal mobility of the container crane itself.

Maritime Cranes



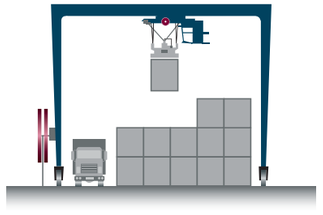
Mobile Harbour Cranes are among the most flexible and powerful transhipment machines anywhere in the world today and their lifting capacity of 300 tons allows them to handle containers, general and bulk cargo. Motorized cable reels are used to supply power to spreaders and for the electrification of cranes.

Rail Mounted Gantry Cranes (RMG)



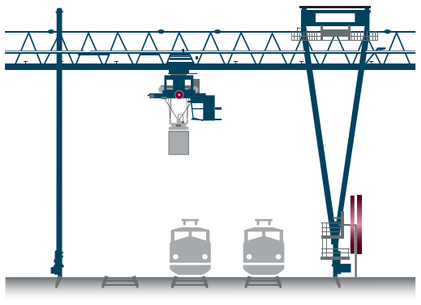
Rail Mounted Gantry Cranes (RMG) provide for efficient and space-saving positioning of containers in sequence. Thanks to their very high lifting and trolley speeds, the motorized cable reels by H&K enable short cycle times while guaranteeing maximum horizontal mobility.

Rubber Tyred Gantry Cranes (RTG)



Rubber Tyred Gantry Cranes (RTG) are used in the same way as RMGs for stacking containers. Thanks to their rubber tyres, they are the most flexible gantry cranes worldwide. To facilitate their conversion to more eco-friendly electrical power, H&K can offer tried and tested solutions for the use of motorized cable reels.

Intermodal Cranes



Intermodal Cranes serve as flexible interfaces for the transhipment of goods between ports, inland ports and the hinterland. They are used primarily for handling standardised containers on trucks or railways and they operate in a similar manner to RMGs.

Ship-to-Shore Container Cranes (STS)

Efficient container handling

Ship-to-Shore Cranes perform logistical feats to enable efficient loading and unloading of vessels every day. Given the continuous growth of cargo handling by sea and the ever-increasing size of container ships, optimised cranes are essential to ensure efficient container handling.

Motorized cable reels by Hartmann & König are used to supply energy and data to STS cranes, thereby enabling short cycle times due to high lifting and trolley speeds as well as horizontal flexibility of the crane itself. Since space is often limited, we construct width winding cable reels for fast vertical spreader movements. Wherever possible, we provide spiral winding motor cable reels to enable higher trolley speeds.

Ship loaders and unloaders for ocean-going ships and inland waterway vessels have been designed to optimise and maximise economic handling of bulk materials.

A wide range of rail mounted loading and unloading machines of each size installed at berths enable efficient handling of bulk goods. Motorized cable reels by Hartmann & König are designed to accomplish numerous tasks that include horizontal movements, distances up to 60 m, acceleration of 0.2 m/s² and slip ring bodies of up to 1000 A.

Specifications for STS applications

Performance	power supply for fast vertical spreader movements	power supply for horizontal travel of STS cranes
Travel speed	up to 240 m/min	up to 180 m/min
Max. acceleration	up to 1 m /s²	0,5 m/s²
Installation height	up to 60 m	up to 20 m
Drive unit	frequency inverter drives; magnetic coupling	frequency inverter drives; magnetic coupling
Slip ring body	power supply + control signal + fibre optic rotary joints	power supply + control signal + fibre optic rotary joints
Coiling length	up to 60 – 70 m	up to 600 m
Feed-in	end	mid/end
Cable reel dimensions	up to 2 m	up to 9,5 m
Ambient temperature	from -25° C up to +40° C	from -25° C up to +40° C
Accessories	roller payout guide with slack and tight cable control; deflection and guide pulleys; cable centre feed funnel	roller payout guide with slack and tight cable control; deflection and guide pulleys; cable centre feed funnel

Maritime Cranes

Maximum flexibility

Due to their compact design, Mobile Harbour Cranes are the world's most flexible and powerful cargo handling equipment in ports and container terminals. Today, Mobile Harbour Cranes can be electrified by means of powerful motorized cable reels, largely keeping their flexibility and agility within the quay infrastructure.

Offering a wide variety of energy and data transfer solutions, Hartmann & König develops and manufactures state-of-the-art motorized cable reels and slip ring bodies specifically to customer requirements. Cable reels mounted on cantilever arms for fast vertical spreader movements can be driven by frequency inverter or hydraulically driven – for maximum lifting speeds of up to 240 m/min and optimum torque.

Cable reel specifications for Mobile Harbour Cranes

Performance	power supply for fast vertical spreader movements	horizontal travel – electrification of Mobile Harbour Crane
Travel speed	up to 240 m/min	60 m/min
Max. acceleration	up to 1 m/s²	0,2 - 0,3 m/s²
Installation height	up to 100 m	5 - 6 m
Drive unit	frequency inverter drive; hydraulic drive	frequency inverter drive; magnetic coupling
Slip ring body	power supply + control signal + fibre optical rotary joints	power supply
Coiling length	up to 100 m	up to 60 m
Cable reel dimensions	3 - 4 m	5 - 6 m
Ambient temperature	from -25° C up to +45° C	from -25° C up to +40° C
Accessories	–	roller payout guide; deflection & guide pulleys; cable centre feed funnel

Proven RTG solutions

Eco-friendly power for RTGs

Rubber Tyred Gantry Cranes (RTG) are used in particular for efficient stacking of standard containers. Since they are mobile, RTGs were originally powered by diesel generator systems. In recent years, there has been a clear trend towards the electrification of RTGs. Therefore, motorized cable reels are important components when it comes to retrofitting RTG cranes worldwide with the aim of significantly reducing overall fuel consumption.

Shutting down diesel generators is not only the better environmental solution, but may be a growing economic argument for port operators.

Advantages at a glance:

- Cost-effective solutions due to lower energy consumption
- Better efficiency in comparison to diesel generators
- Protection against volatile oil prices
- No time loss due to refuelling
- Reduced maintenance downtimes
- Significant reduction in CO_2 emissions
- Environmentally friendly due to the elimination of various harmful emissions

Specifications for RTG electrification

Performance	power supply for horizontal travel of RTGs
Travel speed	up to 140 m/min
Max. acceleration	0,25 m/s²
Installation height	5 - 8 m
Drive unit	magnetic coupling; frequency inverter drives
Slip ring body	power supply
Coiling length	up to 200 m
Feed-in	end
Cable reel dimensions	5 - 6 m
Ambient temperature	from -25° C up to +40° C
Accessories	roller payout guide with slack and tight cable control; deflection and guide pulleys; cable centre feed funnel

Rail Mounted Gantry Cranes (RMG)

Tailor-made robust solutions

Rail Mounted Gantry Cranes (RMG) ensure the efficient and space-saving positioning of standard containers between container corridors. They incorporate both a sturdy design for low-maintenance cargo handling and tailor-made power supply solutions to guarantee reliable just-in-time logistics all over the world. Intermodal Cranes are comparable with RMGs in terms of design and functionality. Therefore, they are equipped with similar, environmentally friendly power transmission components.

Motorized cable reels by H&K are proven systems for energy and data transfer. They enable short cycle times due to high hoist and trolley speeds as well as horizontal flexibility of gantry cranes.

Specifications for RMG applications

Performance	power supply for horizontal travel of RMG's
Travel speed	up to 180 m/min
Max. acceleration	0,5 m/s²
Installation height	up to 12 m
Drive unit	frequency inverter drive; magnetic coupling
Slip ring body	power supply + control signal + fibre optical rotary joints
Coiling length	up to 400 m
Feed-in	mid/end
Cable reel dimensions	8 - 9 m
Ambient temperature	from -25° C up to +40° C
Accessories	roller payout guide with slack and tight cable control; deflection and guide pulleys; cable centre feed funnel

Deck Cranes and Offshore Applications

Seaworthy and sturdily designed

The ability to move containers, general and bulk cargo as well as heavy loads on board freight vessels and offshore platforms requires energy to operate cranes and grabs of different sizes and functionalities. All technical equipment used at sea must meet the strictest requirements in terms of ruggedness and salt-water resistance to ensure that it can operate reliably for many years even under extremely harsh environmental conditions.

For this reason, we manufacture reel bodies and flanges from stainless steel or hot-galvanised sheet steel with special coatings to protection class IP 66, or higher if required. Our rugged motorized cable reels with cylindrical gears and turbo couplings guarantee a reliable supply of energy to Deck Cranes of all types. Last but not least, rope cable reels by Hartmann & König are used to stabilise the rotary and slewing movements of grabs and spreaders.

Specifications for Deck Crane applications

Performance	power supply for fast vertical spreader movements
Travel speed	up to 100 m/min
Max. acceleration	1 m/s²
Installation height	up to 50 m
Drive unit	magnetic coupling; turbo coupling
Slip ring body	power supply + control signal
Coiling length	up to 80 m
Cable reel dimensions	4 - 5 m
Ambient temperature	from -25° C up to +40° C
Accessories	deflection and guide pulleys

Shore-side power supply

Green environment solutions

The use of shore-side power supply for docked container ships and cruise liners is a key technology behind environmentally friendly energy consumption of these types of vessels. Previously, most ships relied on diesel-powered generators on board to remain operational during necessary maintenance and layover periods in port.

However, the introduction in recent years of stricter international environmental requirements and directives aimed at cutting ship emissions and noise pollution in harbours has helped bring about a rethink on the part of port operators.

Shore-side power supply uses land-based transformer stations and lines to the quay with connected loads of up to 12 MW to supply power to the ocean-going giants. On the vessel itself, motorized cable reels can be installed on container ships, for example, inside a container in the lowest level (container solution), whereas other applications supply the entire on-board electricity network from the deck (skid solution). For both applications, we offer customised cable reel applications.

Specifications for container solutions

Performance	spiral/cylindrical winding motorized cable reels for power supply of vessels and cruise ships
Travel speed	up to 12 m/min
Max. acceleration	0,2 m/s²
Coiling length	up to 80 m
Feed in	end
Cable reel dimensions	2 - 3 m high single or double cable reels
Installation height	up to 25 m
Slip ring body	power + control signal + fibre optic rotary joints
Ambient temperature	from -25 °C up to +40 °C
Accessories	cable guide
Drive unit	frequency inverter drive

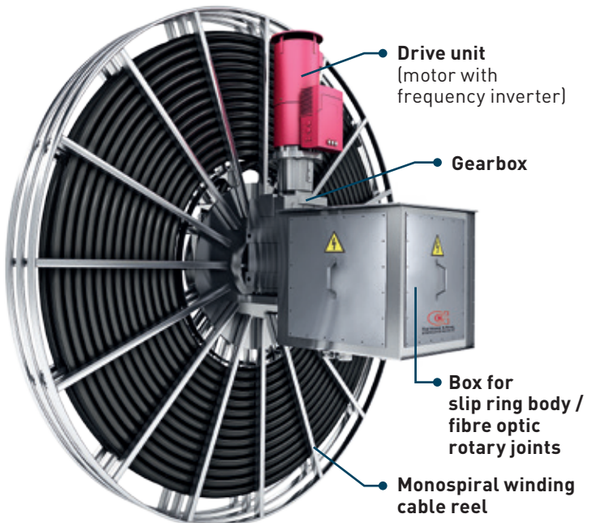
Motorized cable reels: state-of-the-art technology

Reliable energy and data transfer

Motorized cable reels by H&K are technologically advanced and sturdily designed – for both continuous operation in ports and container terminals and reliable power supply to deck and construction cranes, excavators, and hoisting devices. They are designed to meet requirements for high speeds, dynamic processes, large cable cross sections and high tractive forces. The configuration of cable reels and gears is tailored to the required travel speeds and distances.

Virtually all types of drive units:

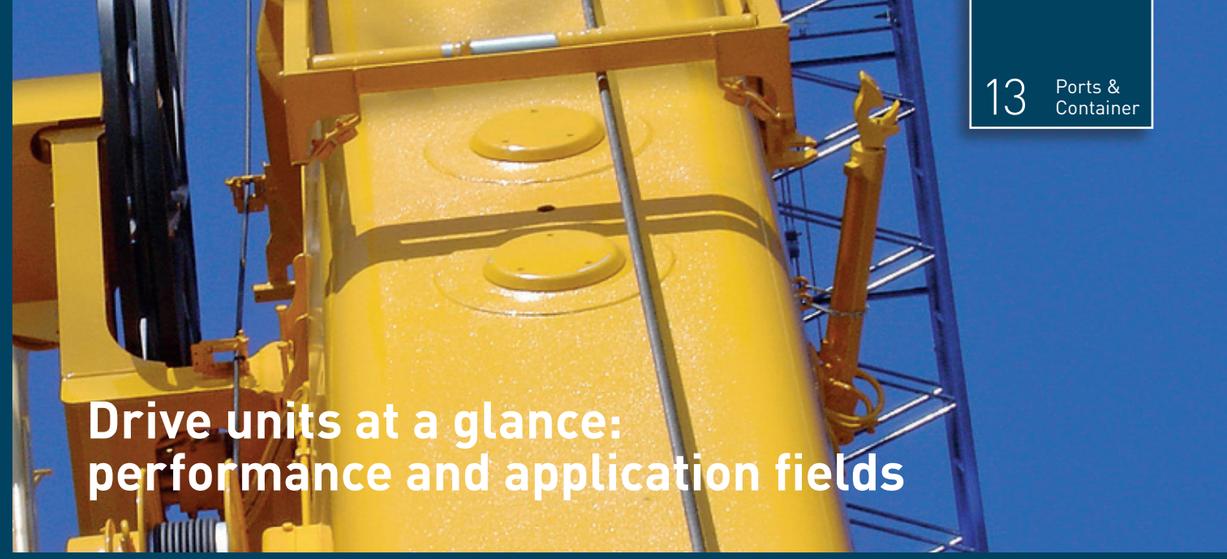
- Three-phased standard motors with brake
- Torque motor
- Frequency inverter drives
- Hydraulic drives
- Magnetic coupling size 1.8 – 88
- Turbo coupling size 274 + 366
- Bevel or flat gearboxes



Precise and variable torque control

Our motorized cable reels with variable torque drives are used in particular for plants with long travel distances (i.e. gantry cranes), and proportionate small cable cross-sections (medium voltage cables). Our frequency inverter drive achieves precise speed and torque control of three-phase-current asynchronous motors or servomotors. Due to the constant pull on the cable, pulling forces can be minimised. Consequently, frequency inverter drives enable a longer cable lifetime as well as increased reliability of the whole cable reel system, especially for highly dynamic processes.

- Horizontal cable payout with cable lengths up to 1000 m possible
- Speed up to 200 m/min
- Spiral winding cable reels, outer diameter 2500 – 9,500 mm
- Drive via bevel gearbox and three-phase motors
- Variable driving torque for maintaining cable quality
- Power outputs ranging from 1.5 kW to 22 kW
- Slip ring body and cable type for low voltage up to 1 kV and medium voltage between 1 kV – 25 kV
- Optional with fibre optic rotary joints; special cables



Drive units at a glance: performance and application fields

	Magnetic coupling	Frequency inverter motor	Turbo coupling	Hydraulic motor drive
Electrical connection	simple	simple (motor + fan)	simple (motor + brake)	–
Torque control	–	yes	–	–
Control options	–	yes	–	by customer
High rotation	++	+++	+	+++
Rotation speed	max. 950 rpm	max. 1450 rpm	max. 750 rpm	max. 3000 rpm
Performance/ moment of torque	1,8 to 25 Nm	0,75 kW (5 Nm) to 15 kW (60 Nm)	20 Nm (274) to 30 Nm (366)	up to 22 kW
Moment of inertia	high	low	high	low
Low environmental temperature	standard up to -40° C (lower than -25° with heating unit)	standard up to -25° C (lower temp. with special solutions)	up to -20° C	standard up to -25° C
High environmental temperature	standard up to +40° C	standard up to +40° C, higher temp. up to +50° C with additional deduction	up to +40° Celsius	standard up to +40° C, higher temp. with additional deduction
Industrial/ outdoor environment	suitable	suitable	suitable	suitable
Port	suitable	suitable	suitable	suitable
Ship/Sea	suitable	less suitable	suitable	suitable
Price/Performance	++	+++	++	++

Slip ring systems

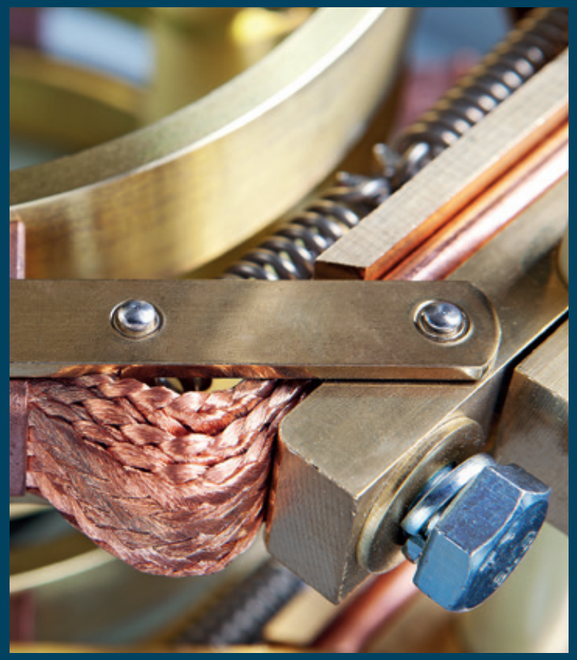
Applications

Hartmann & König manufactures slip ring systems and rotary joints for use in cable reels and in stand-alone applications. They are required wherever energy, data, control signals and other media must be supplied from a rotating to a stationary part.

By using a modular design for open or enclosed slip ring systems (with or without bearing), we can provide cost-efficient assemblies on time, and according to our customers' needs. Moreover, we offer special slip ring systems to supply large diameter rotating tower cranes with power and control signals.

Design

- Refers to the number of electrical contacts, the mechanical size, specific voltage requirements and the protection class
- Slip ring contacts are suitable for current transmissions from mA up to 1000 A as well as low voltage and medium voltage
- Enclosed design in protection class IP 65 or higher
- Slip ring bodies solid or split and arranged on top of each other
- Standard material combination: metal (brass) ring and copper-graphite brush for power supply; higher quality for data transfer with rhodium rings in combination with silver brushes
- Brushes are exchangeable and available separately



Accessories

Extensive accessories programme

Hartmann & König offers a comprehensive range of accessories for its motorized cable reels, such as roller payout guides with or without control function, deflector and guide pulleys, cable grip, end limit switches, spooling devices or heating units for slip ring housings. More accessories on request.

Roller payout guide, optional with slack and tight cable control

- Cable guides with a control function can be equipped with non-contact proximity switches or mechanical limit switches
- Proximity switches can be operated with 15 – 250 VAC or 15 – 30 VDC connected voltage.

Double cable deflector sheaves and pulleys

- For cable deflection of cylindrical or spiral winding cable reels (optional with or without cross roller)
- For passing over the feed-in centre feed funnel

Cable centre feed funnel

- For cable entry and strain relief at the feed-in point
- For medium voltage cable up to 24 kV or up to max. 1 kV cables

Installation & After-Sales Service

Individual support guaranteed

Here at Hartmann & König, we see ourselves as partners to our customers. Therefore, our customer service begins long before the cable reel or slip ring system has been supplied. As a specialist for energy and data transfer systems, we provide our customers with comprehensive advice based on the appropriate cable reel specifications, cables and hoses as well as installation conditions and requirements.

Our After-Sales Service not only supplies spare and wear parts, but is also the point of contact for customers who need regular service or support to solve technical issues. Despite the fact that our products are reliable, extremely rugged and required minimal maintenance, we do offer an extensive spare parts service for several decades.

H&K trained staff provides customer care around the clock. No distance is too great for our experienced service experts to implement your complex installation projects or maintenance tasks on site.

Questonnaire cable reels

01. Track length of consumer

L = ... m

02. Which cable length should be wound on the reel?

l = ... m
(for cable fixed point in the middle of track, cable length is half track length)

03. Coiling type

❑ spiral

❑ cylindrical

❑ 3.2.3 coiling

04. Cable type

cross section .....

..... mm²

cable Ø .....

..... mm

cable weight .....

..... kg/m

05. Power and current rating

..... kW

..... A

06. Duty cycle in %

.....

07. How many insulated slip rings are needed?

.....
(our reels are always provided with non-insulated earth ring)

08. Specific application

.....
(e.g. construction crane, EOT crane, travelling platform, etc.)

09. Installation

❑ stationary

❑ on a mobile unit

10. Cable payout

❑ horizontal

❑ vertical

❑ suspended version
(see arrangement examples)

11. Mounting height

..... m
(from center reel to ground)

12. Drive unit:

❑ spring

❑ counterweight

❑ electric motor

13. Operating voltage and type of current for motor

.....

..... V

14. Operation frequency per hour

..... /h

15. Operation time per day ?

.....

..... h

16. Travelling speed

.....

..... m/min

17. Acceleration

.....

..... m/s²

18. Cable deposit

❑ between the tracks

❑ outside the tracks

19. Payout direction

❑ right

❑ left
(always viewed from slip ring)

20. Arrangement of reels
(for figures, see next page)

❑ A ❑ E

❑ B ❑ F

❑ C ❑ G

❑ D ❑ H

21. Extraordinary ambient conditions:

❑ mounting height above 1000 m

❑ sea level .....

❑ underground .....

❑ humidity..... %

strong vibrations

❑ yes

explanation .....

.....

❑ no

Noise level in db according to DIN 45633

sheet.1 .....

temperature range in ° C

from .....

to .....

Ambient air

❑ sand dust

❑ coal dust

❑ salty water

Other media or application areas

.....

.....

22. Painting
priming and cover coat according to RAL 7040 (standard colour)

❑ hot-dip galvanised

❑ sand blasting

❑ other surface treatments

❑ sea water protection

.....

For large cable reels please send us a drawing or sketch of the installation or attachment conditions.

Arrangement examples

Figures A and B

Cable reel on mobile unit. Cable deposit on the ground or on a continous surface. Horizontal cable payout is towards one or two sides.
Figure B via a deflector pulley.

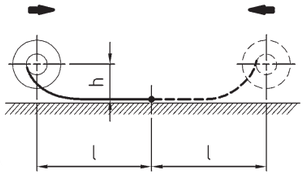


fig. A

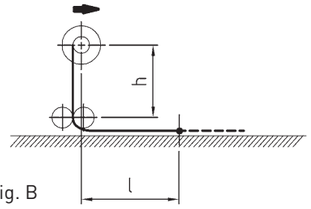


fig. B

Figures C and D

Cable reel on mobile unit. Cable deposit on supports for l_1 up to 1 m. For l above 1 m to max 3 m, the cable is kept on rollers or on smooth supports rounded upwards.
Figure D via a deflector pulley.

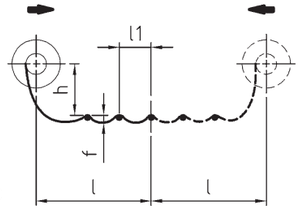


fig. C

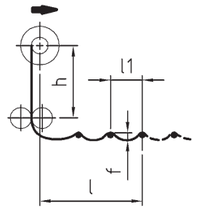


fig. D

Figure E

Cable reel on mobile unit or on a fixed point. Horizontal cable payout is towards one or two sides. (f is dependent on cable cross-section and on tensile force).

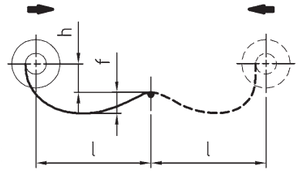


fig. E

Figure F

Cable reel is stationary. Horizontal cable payout towards one side or two sides, cable is deposited as above in figures C and D, however on rollers.

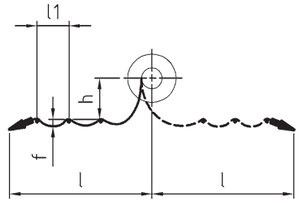


fig. F

Figure G

Cable payout is vertical or approximately downwards.
l = lifting height or payment length
L = cable length = l + l_2 + 2 safety windings

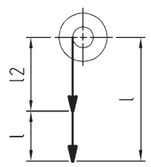


fig. G

Figure H

Cable payout is vertical, otherwise like figure G.

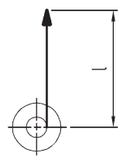


fig. H

Technical progress reserved.

Hartmann & König
STROMZUFÜHRUNGS AG

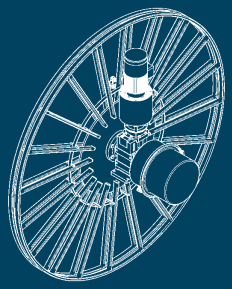
Customer service worldwide

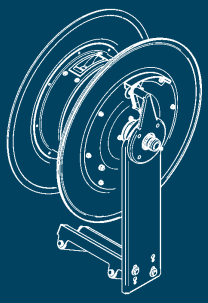
High-performance sales network

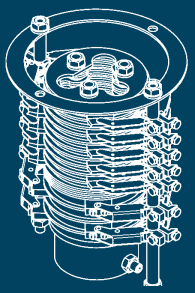
Hartmann & König is an international company.
Our commitment to quality "Made in Germany" begins with a professional initial consultation, includes development and production with a high degree of in-house production, and continues long after the final delivery. Our technical sales engineers advise and support customers throughout the project. Consequently, we can offer customised solutions that draw on our 70 years of experience and expertise.

By expanding our international network of sales representatives Hartmann & König is entering new regional markets for its technologically advanced, high-qualitative cable reels and slip ring bodies. Our distribution network is closely integrated in long-term relationships, which allows us to ensure reliable service and the best possible technical support to our customers across the globe.

Extensive know-how, direct availability of our key experts to customers, and a spirit of partnership have fostered the successful implementation of projects all over the world. Renowned international customers in the fields of crane and port technology as well as plant and machine construction among others, profit from our wide range of products with standard and custom solutions.







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