

# PROTOLON MV

Reeling cables for high speed travel and accelerations in extreme conditions





# EXCEPTIONAL LONGEVITY

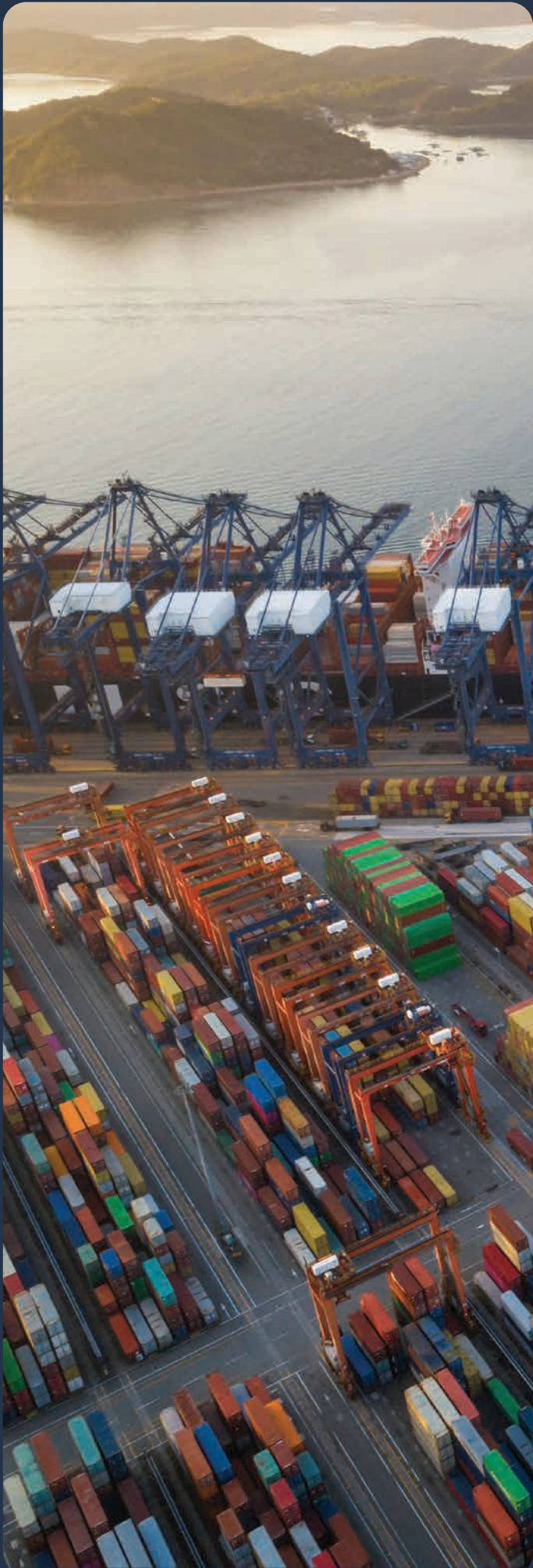
PROTOLON® MV reeling cables deliver a longer operational lifespan than standard alternatives, helping reduce downtime and total cost of ownership.

# UNIQUE PERFORMANCE

PROTOLON® MV reeling cables deliver a longer operational lifespan than standard alternatives, helping reduce downtime and total cost of ownership.

# EXCELLENT FIBRE OPTIC EFFICIENCY

With our state-of-the art optical fibre solutions we can ensure safe, reliable and multifunctional operation qualities for years to come.



# LONGER LIFE. LOWER COST. THAT'S THE PROTOLON® MV ADVANTAGE

Minimize downtime and maximize efficiency with cables built to perform in the demanding, fast-paced environments of industrial seaports.

Our PROTOLON® MV range is engineered for reliability, offering a variety of options tailored to different reeling speeds, flexibility levels, and resistance to extreme cold—each one tough enough to handle the harshest conditions.

Add PROTOLON® (SC) Shore Connection cables to keep vessels powered during loading and unloading operations, ensuring seamless energy supply and uninterrupted productivity. In short: more uptime, more efficiency—and more profit.

# WHAT WE OFFER

Our PROTOLON® MV reeling cables are engineered for heavy-duty, flexible applications—particularly in ports and mining—where they must withstand harsh environmental conditions and intense mechanical stress. These cables deliver reliable performance and long service life, making them a valuable solution for a wide range of industry professionals, including OEMs, specifiers, contractors, installers, and terminal operators.

In mobile applications, reeling cables are subjected to forced motion during winding and unwinding, which can lead to high tensile loads and twisting. Excessive elongation may transfer stress to the electrical conductors, potentially causing damage or permanent deformation.

To mitigate these risks, we offer the PROTOLON® (IQ) System—a smart monitoring solution that detects and reports sudden irregularities in cable behavior. This enables root-cause analysis and supports risk-based decision-making to prevent failures before they occur.

To complete the portfolio, the PROTOLON® range also includes Shore Connection cables, which supply sustainable power to docked cargo ships—eliminating the need to run diesel engines during loading and unloading. This not only reduces fuel consumption and emissions but also supports greener port operations.

A smart solution for both business and the environment.



# Service beyond the ordinary

As the world's leading cable manufacturer, we offer more than just products — we deliver comprehensive, end-to-end solutions.

Our team of highly skilled and experienced experts enables us to provide a full spectrum of services, including custom cable design, precision cutting, on-site project management, and industry-leading technical support — at every stage of your journey with us.

With a strong presence at the forefront of both the energy and fiber optic sectors, we have the capability to engineer, assemble, and deliver tailored solutions with exceptional speed and reliability.

Partnering with us means gaining a strategic advantage — through innovation, efficiency, and unwavering support.



# ENGINEERED TO ENDURE. PROVEN TO PERFORM.

Our high-performance crane cables are engineered and manufactured at our Centers of Excellence in Germany, backed by over a century of expertise. With a proven track record in more than 100 ports worldwide, these cables deliver consistent, long-term performance you can rely on. Discover the quality that sets us apart.



## Speed Tailored for Your Application

PROTOLON XPRT reeling cables are available in configurations for 200, 240, and 300 m/min, ensuring optimal performance for your specific speed requirements.



## A smart cable saving the day

The PROTOLON(IQ) reeling cable is made for permanent monitoring of reeling operations to avoid unexpected downtime and financial losses.



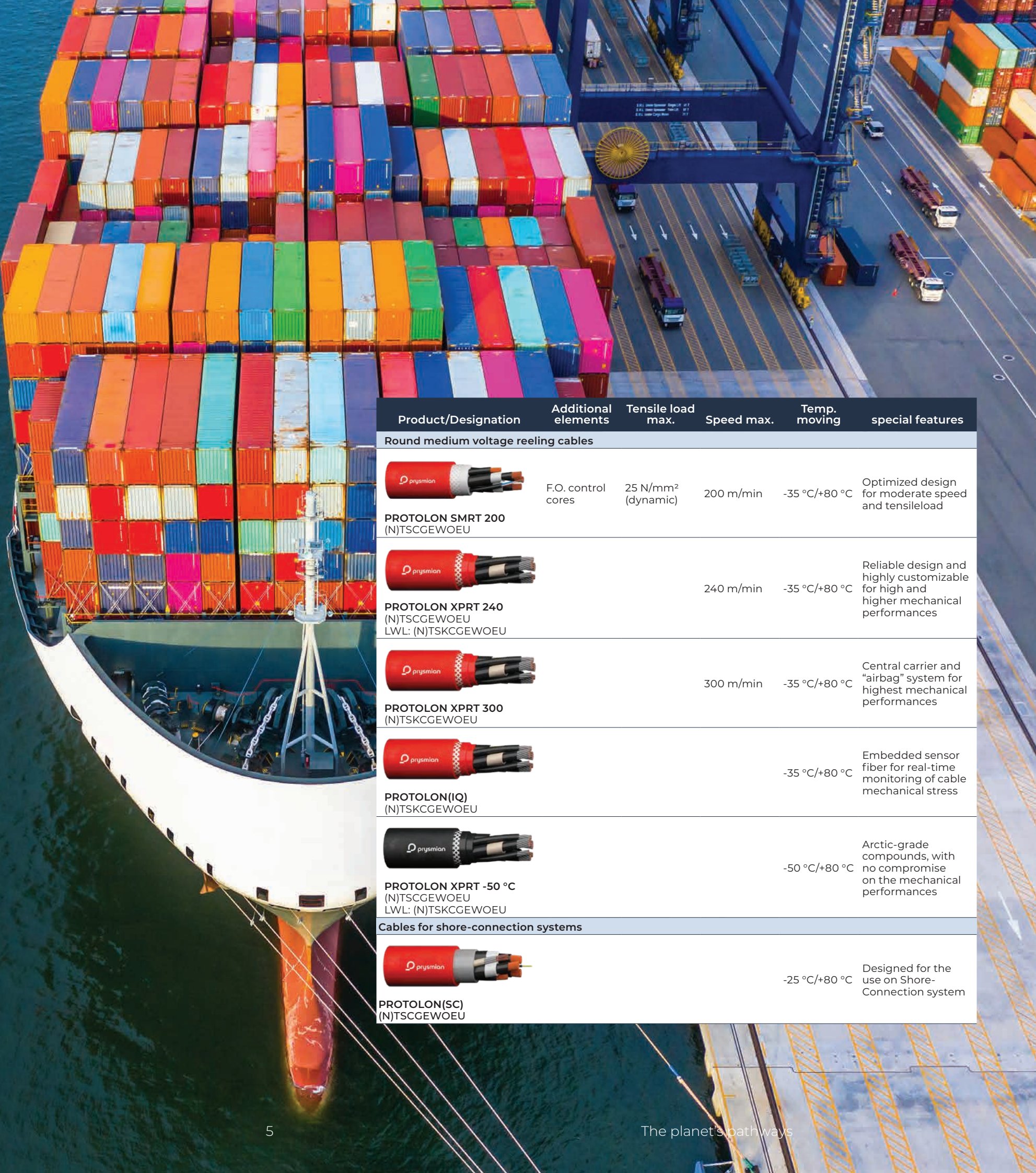
## Engineered for Extreme Cold







PROTOLON XPRT -50 °C cables deliver full flexibility even at an incredible -50 °C. Already known for superior cold-weather performance, we've pushed the limits even further.



## Power Down. Stay Connected.

PROTOLON(SC) Shore Connection cables keep your vessel sustainably powered while docked—eliminating the need to run diesel engines and reducing emissions.



Product/Designation	Additional elements	Tensile load max.	Speed max.	Temp. moving	special features
Round medium voltage reeling cables					
 PROTOLON SMRT 200 (N)TSCGEWOEU	F.O. control cores	25 N/mm <sup>2</sup> (dynamic)	200 m/min	-35 °C/+80 °C	Optimized design for moderate speed and tensileload
 PROTOLON XPRT 240 (N)TSCGEWOEU LWL: (N)TSKCGEWOEU			240 m/min	-35 °C/+80 °C	Reliable design and highly customizable for high and higher mechanical performances
 PROTOLON XPRT 300 (N)TSKCGEWOEU			300 m/min	-35 °C/+80 °C	Central carrier and "airbag" system for highest mechanical performances
 PROTOLON(IQ) (N)TSKCGEWOEU				-35 °C/+80 °C	Embedded sensor fiber for real-time monitoring of cable mechanical stress
 PROTOLON XPRT -50 °C (N)TSCGEWOEU LWL: (N)TSKCGEWOEU				-50 °C/+80 °C	Arctic-grade compounds, with no compromise on the mechanical performances
Cables for shore-connection systems					
 PROTOLON(SC) (N)TSCGEWOEU				-25 °C/+80 °C	Designed for the use on Shore-Connection system





Success story

#1

## THE AUSTRALIAN EXPERIENCE

- Location:** An open-cast iron mine located in the Port Hedland shire in Western Australia.
- Application:** A reeling cable installed on a stacker-reclaimer.
- Travelling distance:** 1,000 metres
- Challenge:** The customer previously had to replace their high-cost reeling cable nearly every year—an unsustainable and expensive cycle. They were looking for a long-term, cost-effective solution that wouldn't compromise on quality.
- Solution:** A PROTON(IQ) system was implemented, featuring an 11/11 kV cable. The system quickly identified a significant cable twist. By adjusting the reel's guiding system and using the PROTON(IQ) to monitor cable stress levels periodically, mechanical deformation was completely eliminated. The cable has been operating flawlessly since 2016, with a payback time of less than two years—delivering both reliability and long-term savings.

## THE SINGAPORE EXPERIENCE

Success story

#2

- Location:** The Singapore container terminal.
- Application:** A reeling cable on an automated gantry crane.
- Travelling distance:** 275 metres
- Challenge:** The cable in place developed kinks which led to production downtime.
- Solution:** A PROTON(IQ) 6/10 kV cable was installed together with the monitoring system. Mechanical and thermal stress on the cable is monitored continuously, 24/7. If any issue arises, it is detected almost in real time, allowing immediate corrective action. The system has been in uninterrupted operation since May 2019, with no faults detected to date.





## FOR AN OUTSIDE OBSERVER: WHAT A BEAUTIFUL BAY VIEW!

But port operations are anything but romantic. It's a high-demand, high-stakes business where maximum asset utilization is key to success. Every single component must perform—especially the cable, because nothing runs without power.

In just the past five years, we've delivered over 1,220 km of PROTON XPRT cables to customers worldwide. With an average operating length of 400 meters per facility, that means more than 3,000 devices are powered by PROTON XPRT.

From Los Angeles to Busan, Hamburg to Durban—our cables are hard at work in all of the Top 100 container seaports, as well as in countless cranes and intermodal facilities across the globe.

PROTON XPRT stands out for its exceptional reliability, top-tier performance, and long service life—a reputation backed by consistently high customer satisfaction.



## THE CHINESE EXPERIENCE

- Location:** An automation terminal in Qingdao Qianwan located on China's Yellow Sea coast.
- Application:** A reeling cable installed on an automated rail mounted gantry crane.
- Travelling distance:** 420 metres
- Challenge:** For this fully automated crane the customer needed a small cross-section cable which could handle a long distance gantry speed of 270 metres/minute.
- Solution:** A PROTON(SMK) 6/10 kV high-speed cable (3x25+2x25/2+24E9) is in use. Thanks to its integrated support element, the cable effectively withstands and manages mechanical stresses such as extreme tension, elevated pressure, and torsion. It has been operating continuously and without issues since 2019.





# PROTOLON SMRT

## 3.6/6 kV, 6/10 kV, 8.7/15 kV, 12/20 kV

MEDIUM VOLTAGE REELING CABLE FOR MEDIUM MECHANICAL STRESS.

200 m  
PER MINUTE

### Application:

Flexible medium-voltage reeling cable designed for use under moderate mechanical stress. Suitable for applications involving moderate travel speeds, dynamic tensile loads, frequent directional changes across multiple planes, churning over rollers, and torsional stress.

Primarily used in mobile equipment such as container cranes and other large, moving machinery.

PROTOLON(SMK-200)	
Global data	
Brand	PROTOLON SMRT
Type designation	(N)TSCGEWOEU
Standard	Based on DIN VDE 0250-813
Design features	
Conductor	Plain copper, finely stranded class 5
Insulation	PROTOLON HS – High grade special insulation compound based on high-quality EPR, better than 3GI3
Electrical field control	Inner semiconductive layer of EPR, outer semiconductive layer of modified NBR, Easy-Strip
Core arrangement	Cores layed up around conductive filler, earth conductor and FO element into the interstices
Inner sheath	Rubber, special compound, mechanical properties acc. to 5GM3
Reinforcement	Polyester anti-torsion braid
Outer sheath	PROTOFIRM outer sheath – Abrasion and tear-proof high grade rubber compounds based on PCP, better than 5GM5

PROTOLON SMRT			
Electrical parameters			
Rated voltage U0/U (kV)	Max. permissible operating voltage (kV)		AC test voltage (kV)
	AC	DC	
3.6/6	4.2/7.2	5.4/10.8	11
6/10	6.9/12	9/18	17
8.7/15	10.4/18	13.5/27	24
12/20	13.9/24	18/36	29
Data transmission		Integration with up to 24 fiber optics, single-mode E9 or multi- mode G62.5 or G50	
Current carrying capacity		Acc. to DIN VDE 0298, part 4	
Chemical parameters			
Oil resistance		Acc. to DIN EN 60811-404 and DIN VDE 0473-811-404, para. 10	
Weather resistance		Unrestricted use outdoors and indoors, resistant to ozone, UV, moisture and cold temperatures	
Thermal parameters			
Max. operating temperature of the conductor		90 °C	
Max. short circuit temperature of the conductor		250 °C	
Ambient temperature for fixed installation		min. -50 °C, max. +80 °C	
Ambient temperature in fully flexible operation		min. -35 °C, max. +80 °C	
Mechanical parameters			
Max. tensile load on the conductor		Static: 20 N/mm² Dynamic: 25 N/mm²	
Bending radii min.		Acc. to DIN VDE 0298, part 3	
Travel speed		Reeling operation: 160 m/min (center-feed) 200 m/min (end-feed)	



# PROTOLON XPRT / PROTOLON XPRT-LWL

## 1.8/3 kV / 3.6/6 kV, 6/10 kV, 8.7/15 kV, 12/20 kV

MEDIUM VOLTAGE REELING CABLE.

240 m  
PER MINUTE

### Application:

Flexible medium-voltage reeling cable designed for use under high to extreme mechanical stress. Ideal for demanding applications involving high travel speeds, dynamic tensile loads, frequent directional changes across multiple planes, churning over rollers, and torsional forces.

Primarily used in mobile equipment, such as fast-moving container cranes and other large, dynamic machinery.

PROTOLON XPRT / PROTOLON XPRT-LWL	
Global data	
Brand	PROTOLON XPRT PROTOLON XPRT-LWL
Type designation	(N)TSCGEWOEU LWL: (N)TSKCGEWOEU
Standard	Based on DIN VDE 0250-813
Certifications / Approvals	GOST-R/-K/-B, Fire Certificate of Russia Federation
Design features	
Conductor	Electrolytic copper tinned, very finely stranded, class FS
Insulation	PROTOLON HS - High grade special insulation compound based on high-quality EPR, better than 3GI3
Electrical field control	Inner semiconductive layer of EPR, outer semiconductive layer of modified NBR (Easy Strip design)
Core arrangement	Three-core design, with earth split into 3 interstices.
	LWL: Three core design with cradle separator, earth and FO element in interstices
Inner sheath	PROTOFIRM Sandwich Special compound based on EPR/PCP, quality at least 5GM3
Anti-torsion braid	Reinforced braid made of polyester threads
Outer sheath	PROTOFIRM outer sheath – Abrasion and tear-proof high grade rubber compound based on PCP, better than 5GM5

PROTOLON XPRT / PROTOLON XPRT-LWL			
Electrical parameters			
Rated voltage U0/U (kV)	Max. permissible operating voltage (kV)		AC test voltage (kV)
	AC	DC	
1.8/3	2.1/3.6	2.7/5.4	6
3.6/6	4.2/7.2	5.4/10.8	11
6/10	6.9/12	9/18	17
8.7/15	10.4/18	13.5/27	24
12/20	13.9/24	18/36	29
Data transmission		Special designs with twisted shielded pairs or individually screened control elements available on request. LWL: Integration with up to 24 fiber optics, single-mode E9 or multi-mode G62.5 or G50	
Current carrying capacity		Acc. to DIN VDE 0298, part 4	
Chemical parameters			
Oil resistance		Acc. to DIN EN 60811-404 and DIN VDE 0473-811-404, para. 10	
Weather resistance		Unrestricted use outdoors and indoors, resistant to ozone, UV, moisture and cold temperatures	
Water resistance		According to HD 2216	
Thermal parameters			
Max. operating temperature of the conductor		90 °C	
Max. short circuit temperature of the conductor		250 °C	
Ambient temperature for fixed installation		min. -50 °C, max. +80 °C	
Ambient temperature in fully flexible operation		min. -35 °C, max. +80 °C	
Mechanical parameters			
Max. tensile load on the conductor		Static: 20 N/mm <sup>2</sup> Dynamic: 25 N/mm <sup>2</sup>	
Bending radii min.		Acc. to DIN VDE 0298, part 3	
Travel speed		Reeling operation: 240 m/min	



# PROTOLON XPRT

## 6/10 kV, 8.7/15 kV, 12/20 kV

MEDIUM VOLTAGE REELING CABLE FOR HIGH SPEED MOVING CRANES.

### Application:

Flexible medium-voltage reeling cable with integrated fibre optics for the combined transmission of power and data. Designed for use under high to extreme mechanical stress, including very high travel speeds, dynamic tensile loads, frequent directional changes across multiple planes, churning over rollers, and torsional forces.

Especially suitable for fast-moving container cranes operating at speeds above 240 m/min.

300 m  
PER MINUTE

PROTOLON XPRT	
Global data	
Brand	PROTOLON XPRT
Type designation	(N)TSCGEWOEU
Standard	Based on DIN VDE 0250-813
Design features	
Conductor	Electrolytic copper tinned, very finely stranded, class FS
Insulation	PROTOLON HS+, lead-free, with optimized wall thickness, better than 3GI3
Electrical field control	Inner semiconductive layer of EPR, outer semiconductive layer of modified NBR (Easy Strip design)
Core arrangement	Three core design with cradle separator and aramid support element in the centre, earth and FO element in interstices
Inner sheath	PROTOFIRM Sandwich – double layer inner sheath with increased thickness. Special compound based on EPR/PCP, quality at least 5GM3
Anti-torsion braid	Reinforced braid made of polyester threads
Outer sheath	PROTOFIRM outer sheath – Abrasion and tear-proof high grade rubber compounds based on PCP, better than 5GM5



# PROTOLON(IQ)

## 3.6/6 kV, 6/10 kV, 8.7/15 kV, 12/20 kV

MEDIUM VOLTAGE REELING CABLE WITH INTEGRATED SENSOR FIBER.

### Application:

Flexible medium-voltage reeling cable with integrated sensor fibre for real-time detection and analysis of mechanical and thermal stress during gantry operations. Designed for use under high to extreme mechanical loads, including high travel speeds, dynamic tensile forces, frequent directional changes across multiple planes, churning over rollers, and torsional stress.

Primarily intended for large mobile equipment such as fast-moving gantry cranes, automated stacking cranes, ship loaders, and similar systems that require continuous cable condition monitoring to enable predictive maintenance and minimize unplanned downtime.

240 m  
PER MINUTE

PROTOLON(IQ)	
Global data	
Brand	PROTOLON(IQ)
Type designation	(N)TSKCGEWOEU
Standard	Based on DIN VDE 0250-813
Design features	
Conductor	Electrolytic copper tinned, very finely stranded, class FS
Insulation	PROTOLON HS - High grade special insulation compound based on high-quality EPR, better than 3GI3
Electrical field control	Inner semiconductive layer of EPR, outer semiconductive layer of modified NBR, (Easy Strip design)
Sensor fiber	Special single-mode sensor fiber (IQ), for monitoring the mechanical and thermal conditions of the cable
Core arrangement	Three core design with cradle separator, earth and FO element in the interstices
Inner sheath	PROTOFIRM Sandwich Special compound based on EPR/PCP, quality at least 5GM3
Anti-torsion braid	Reinforced braid made of polyester threads
Outer sheath	PROTOFIRM outer sheath – Abrasion and tear-proof high grade rubber compound based on PCP, better than 5GM5

PROTOLON(IQ)			
Electrical parameters			
Rated voltage U0/U (kV)	Max. permissible operating voltage (kV)		AC test voltage (kV)
	AC	DC	
1.8/3	2.1/3.6	2.7/5.4	6
3.6/6	4.2/7.2	5.4/10.8	11
6/10	6.9/12	9/18	17
8.7/15	10.4/18	13.5/27	24
12/20	13.9/24	18/36	29
Data transmission		Integration with up to 24 fiber optics, single-mode E9 or multi- mode G62.5 or G50	
Current carrying capacity		Acc. to DIN VDE 0298, part 4	
Chemical parameters			
Oil resistance		Acc. to DIN EN 60811-404 and DIN VDE 0473-811-404, para. 10	
Weather resistance		Unrestricted use outdoors and indoors, resistant to ozone, UV and moisture	
Thermal parameters			
Max. operating temperature of the conductor		90 °C	
Max. short circuit temperature of the conductor		250 °C	
Ambient temperature for fixed installation		min. -50 °C, max. +80 °C	
Ambient temperature in fully flexible operation		min. -35 °C, max. +80 °C	
Mechanical parameters			
Max. tensile load on the conductor		Static: 20 N/mm <sup>2</sup> Dynamic: 30 N/mm <sup>2</sup>	
Bending radii min.		Acc. to DIN VDE 0298, part 3	
Travel speed		Gantry (reeling operation): up to 240 m/min.	



240 m  
PER MINUTE

# PROTOLON XPRT -50°C / PROTOLON XPRT -LWL -50°C

## 1.8/3 kV / 3.6/6 kV, 6/10 kV, 8.7/15 kV, 12/20 kV

MEDIUM VOLTAGE REELING CABLE.

### Application:

Flexible medium-voltage reeling cable designed for use under high to extreme mechanical stress, including high travel speeds, dynamic tensile loads, frequent directional changes across multiple planes, churning over rollers, and torsional forces.

Primarily intended for mobile equipment such as fast-moving container cranes and other large, dynamic machinery.

### LWL (Optional):

Available with integrated fibre optics for the combined transmission of power and data, enabling advanced communication and control capabilities.

PROTOLON XPRT -50 °C / PROTOLON XPRT -LWL -50 °C	
Global data	
Brand	PROTOLON XPRT -50 °C PROTOLON XPRT -LWL -50 °C
Type designation	(N)TSCGEWOEU LWL: (N)TSKCGEWOEU
Standard	Based on DIN VDE 0250-813
Certifications / Approvals	GOST-R/-K/-B, Fire Certificate of Russia Federation
Design features	
Cross section range	3C+3G (also + control or BUS) LWL: 3C+2G+FO (also + control or BUS)
Conductor	Electrolytic copper tinned, very finely stranded, class FS
Insulation	Special compound based on high-quality EPR for extreme cold conditions down to -50 °C
Electrical field control	Inner and outer semi-conductive layer
Core arrangement	Three-core design, with earth split into 3 interstices.
	LWL: Three core design with cradle separator, earth and FO element in interstices
Sheath system	Inner sheath and outer sheath made of special rubber compound type PCP (better than 5GM5) for extreme cold conditions down to -50 °C With integrated reinforcement made of polyester braid for torsion protection



SHORE-  
CONNECTION

# PROTOLON(SC)

## 6/10 kV

MEDIUM VOLTAGE CABLE FOR SHORE-CONNECTION SYSTEMS.

### Application:

These cables are suitable for use in High Voltage Shore Connection Systems (HVSC), both onboard the vessel and onshore, to supply ships with electrical power from the shore. They incorporate control cores and optional fibre optics to accommodate a wide range of vessel types and operational requirements.

The cable is also suitable for permanent immersion in water, ensuring reliable performance in harsh marine environments.

PROTOLON(SC)	
Global data	
Brand	PROTOLON(SC)
Type designation	(N)TSCGEWOEU
Standard	Based on DIN VDE 0250-813, based on IEC/ISO/IEEE 80005-1
Design features	
Conductor / PE-Conductor	Bare copper, finely stranded class 5 acc. to IEC 60228 / DIN EN 60228
Insulation	Basic material EPR, type 3GI3, acc. to DIN VDE 0207 Part 20
Electrical field control	Inner and outer layer of semicon-ductive rubber compound
Control core	Cores made of bare copper, finely stranded class 5 acc. to IEC 60228 / DIN EN 60228, with EPR insulation
Core arrangement	Three core design laid around a central support element
Support element	Aramid yarns and rubber covering
Inner sheath	Vulcanized rubber compound, basic material EPR, type: GM1b acc. to DIN VDE 0207 part 21.
Outer sheath	Abrasion and tear-proof high grade rubber compound, basic material CM/CPE acc. to DIN VDE 0207 part 21

PROTOLON(SC)	
Electrical parameters	
Rated voltage	6/10 kV
Max. permissible operating voltage AC	6.9/12 kV
AC Test Voltage	21 kV
Data transmission	Integration with up to 24 fiber optics, single-mode E9 or multi-mode G62.5 or G50
Current carrying capacity	Acc. to DIN VDE 0298, part 4
Chemical parameters	
Flame propagation	DIN EN 60332-1-2
Oil resistance	Acc. to DIN EN 60811-404 and DIN VDE 0473-811-404, para.10
Weather resistance	Unrestricted use outdoors and indoors, resistant to ozone, UV and moisture. Water resistant
Thermal parameters	
Max. operating temperature of the conductor	90 °C
Max. short circuit temperature of the conductor	250 °C
Ambient temperature for fixed installation	min. -40 °C, max. +80 °C
Ambient temperature in fully flexible operation	min. -25 °C, max. +80 °C
Mechanical parameters	
Max. tensile load on the conductor	Static: 20 N/mm² Dynamic: 25 N/mm²
Bending radii min.	Acc. to DIN VDE 0298, part 3
Additional tests	Acc. to IEC/ISO/IEEE 80005-1





## The Planet's Pathways

As the worldwide leader in the cable industry, Prysmian believes in the effective, efficient and sustainable supply of energy and information as a primary driver in the development of communities.

With this in mind, we provide major global organisations in many industries with best-in-class cable solutions, based on state-of-the-art technology. Through three renowned commercial brands – Prysmian, Draka and General Cable – based in almost 50 countries, we're constantly close to our customers, enabling them to further develop the world's energy and telecoms infrastructures, and achieve sustainable, profitable growth.

In our energy business, we design, produce, distribute and install cables and systems for the transmission and distribution of power at low, medium and high voltage.

In telecoms, Prysmian is a leading manufacturer of all types of copper and fibre cables, systems and accessories – covering voice, video and data transmission.

Drawing on over 130 years' experience and continuously investing in R&D, we apply excellence, understanding and integrity to everything we do, meeting and exceeding the precise needs of our customers across all continents, at the same time shaping the evolution of our industry

**Prysmian Nederland**  
Schieweg 9, 2627 AN Delft  
[info.nl@prysmian.com](mailto:info.nl@prysmian.com)  
Tel. 088 808 4444

[www.prysmian.com](http://www.prysmian.com)

Follow us



© All rights reserved by Prysmian 2025

Technical data, dimensions and weights are subject to change. All sizes and values without tolerances are reference values. Specifications are for product as supplied by Prysmian: any modification or alteration afterwards of product may give different result. The information contained within this document must not be copied, reprinted or reproduced in any form, either wholly or in part, without the written consent of Prysmian. The information is believed to be correct at the time of issue. Prysmian reserves the right to amend this specification without prior notice. This specification is not contractually valid unless specifically authorised by Prysmian.