



BUILDING TRUST

Bellmond Technologies Pte Ltd

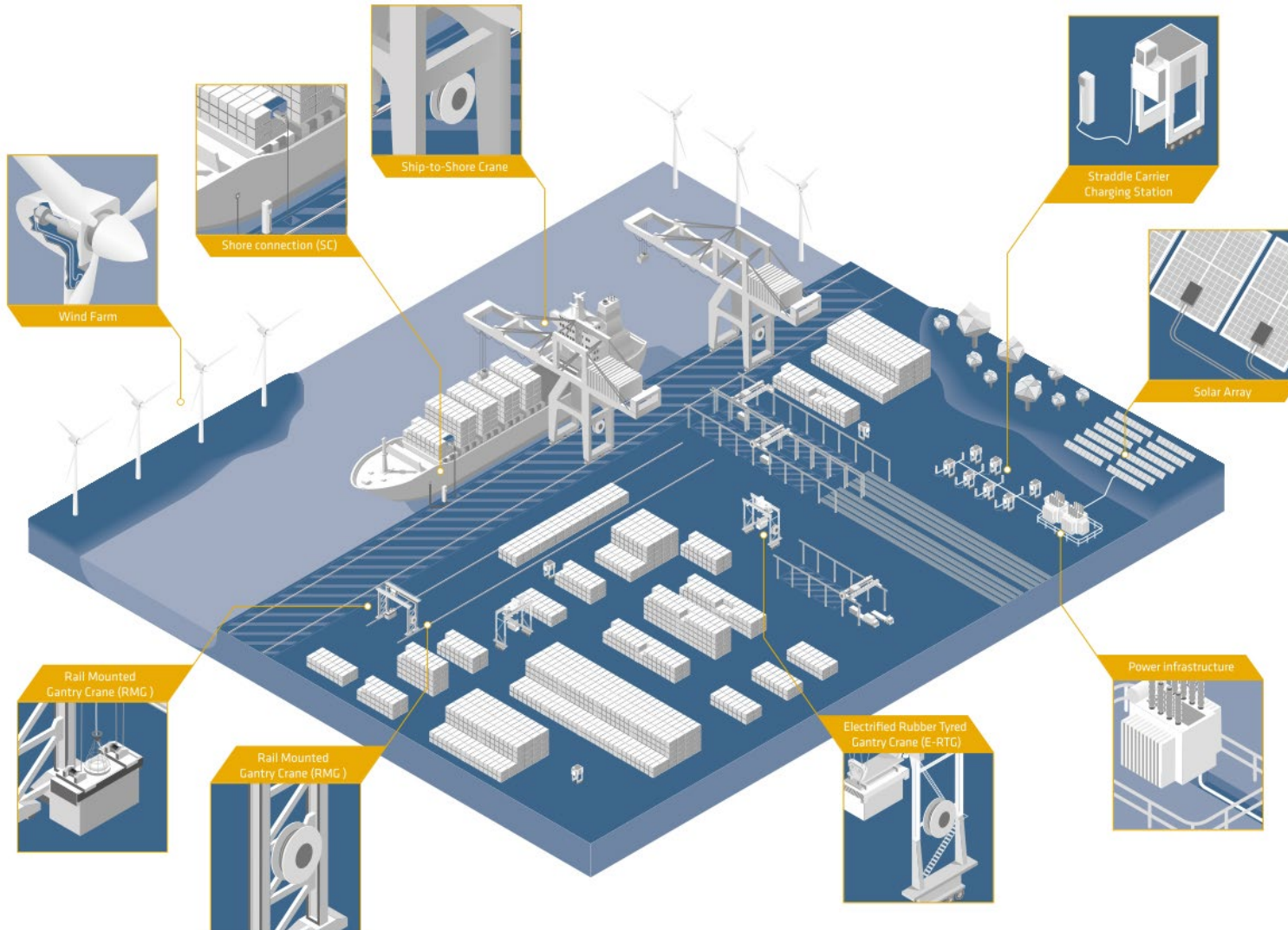
Solutions for Green Power Transmission,
Sensing and Safety.

Brian S. Swan
Managing Director

Prysmian
Group

 **BROSA**

Green Portfolio, Linking Port Operations to Sustainability



Shore Connection

E-RTGC

Green-Labeled for Crane

EV Charging

Renewable Energy Generation

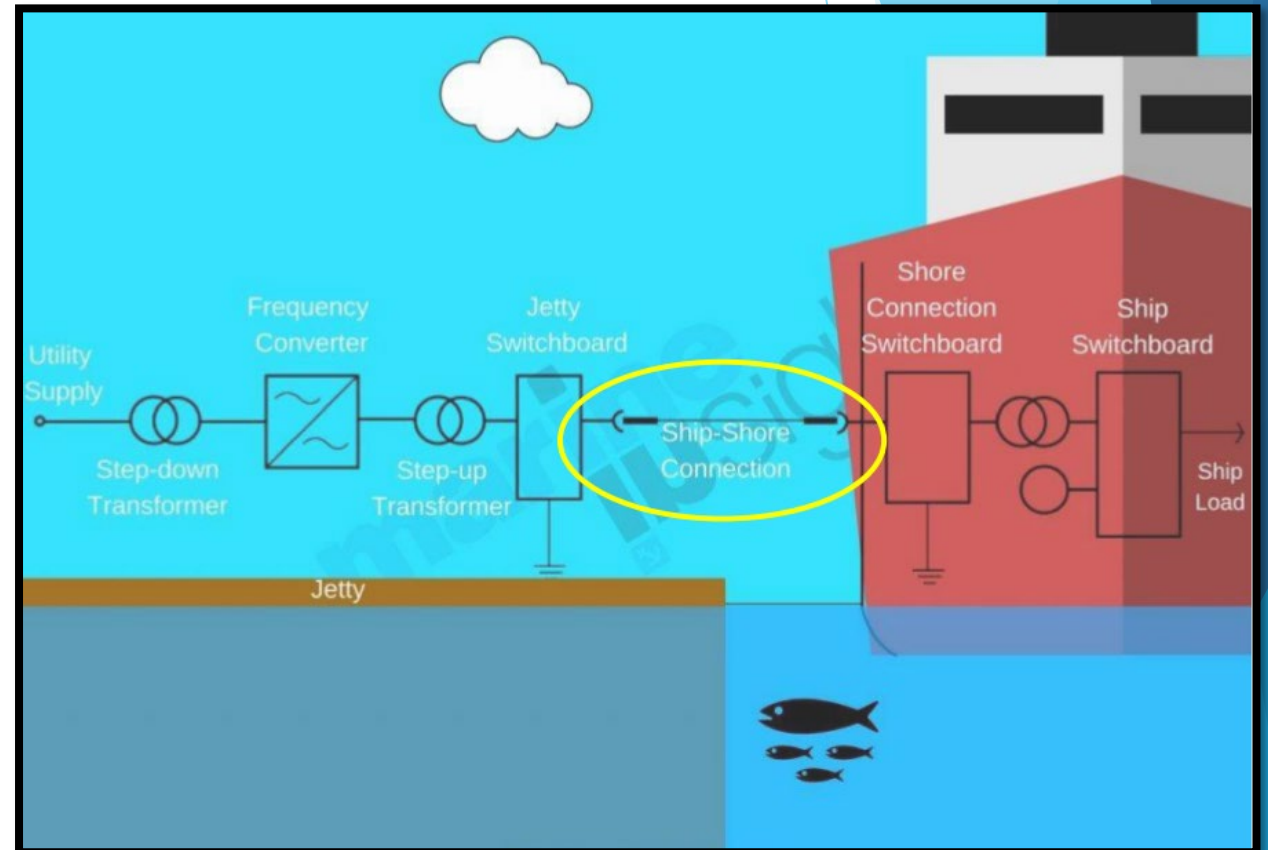
Power Distribution

Protolon(SC) Reeling Cables for Shore Connection Systems

Many different names for the same basic technology:

- High-Voltage Shore Connection (HVSC)
- Alternative Maritime Power (AMP)
- Cold Ironing
- Shore-to-Ship Power
-

A Cable Connection used to plug ships into the main electrical power grid while berthed. This supplies a ship with enough power and services to let the vessel turn off its engines thus reducing carbon emissions, fuel consumption and noise.

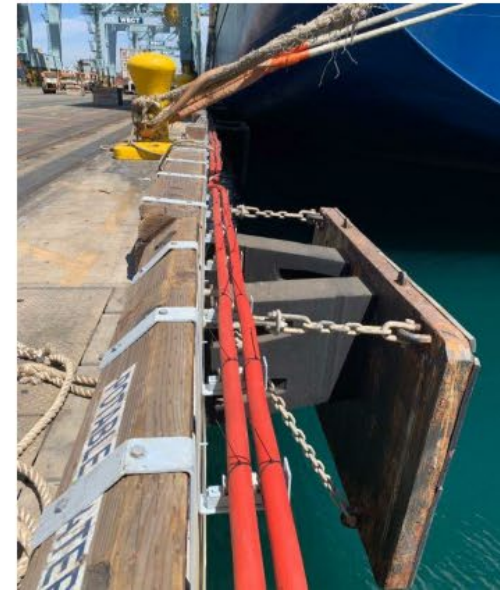




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Different Technologies – Just One Cable Type



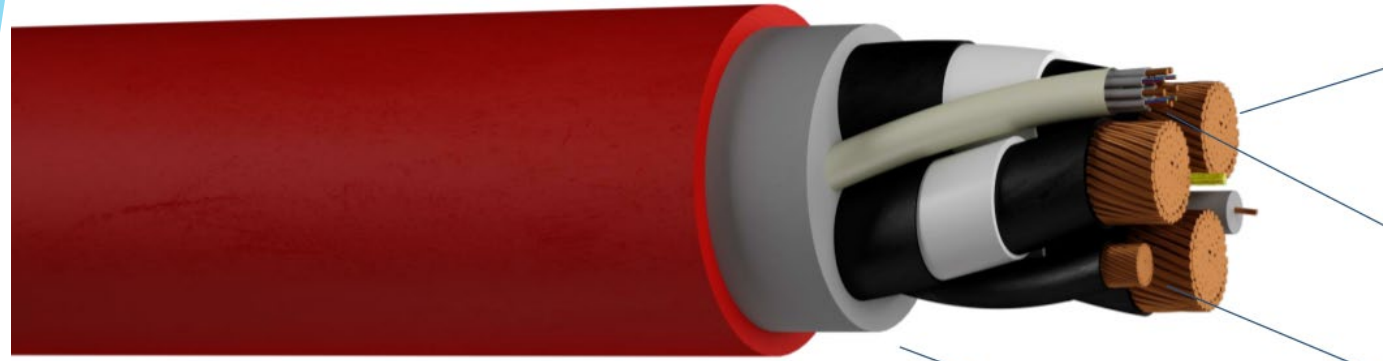


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Protolon(SC)

Medium Voltage 6/10kV – 12/20kV



Power cores, flexible bare CU class 5 with EPR rubber insulation and semi-conductive layers

Composite element with Optical Fibers and Control cores

Ground core, flexible bare CU class 5 with semi-conductive layer

Inner sheath of water-resistant EPR rubber

Outer sheath of water- and abrasion-resistant CPE rubber





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Protolon(SC)
Low Voltage 0.6/1.0kV



Power cores, flexible bare CU class 5 with EPR rubber insulation

Ground core, flexible bare CU class 5 with Green/Yellow insulation

Control core, flexible bare CU class 5 with ERP insulation

Inner sheath of water-resistant EPR rubber

Outer sheath of water- and abrasion-resistant CPE rubber





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Protolon(SC)
Reeling Cables for Shore Connection Systems

Main Features:

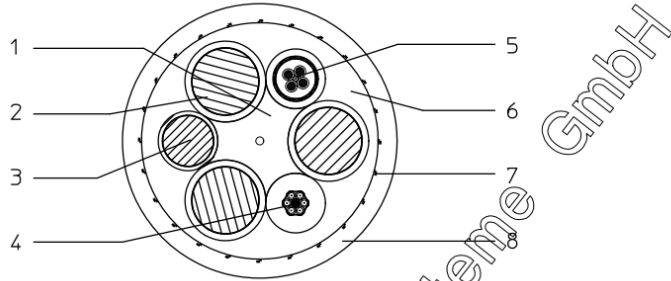
- Compliant to international standard **IEC/ISO/IEEE 80005** and **Bureau-Veritas certified**
- Suitable for all vessels' types (container ships, cruise vessels, RoRo and RoPax vessels, LNG, etc.)
- Designed for **reeling application** but also suitable on **semi-fixed systems**
- Flexible and mechanically robust for **high reliability**
- Resistant to UV, ozone and moisture
- The only cable on the market fit for **permanent immersion in water**
- Delivered with pre-mounted plugs or terminations on request



Power & Control Flexible Cables
For Cranes/Mining/Tunnelling

E-RTGC

Cordaflex(SMK) 0.6/1.0kV, 3x120+1x70+1x(4x2.5)C+1x(6E9/125)



- (1) rubber cradle separator
- (2) 3 power cores 120mm²
 - tinned copper conductor, extra finely stranded
 - foil
 - PROTOLON(MSI)-insulation
 - black number printing
- (3) 1 earth conductor 70mm²
 - tinned copper conductor, extra finely stranded
 - foil
 - PROTOLON-insulation
 - green/yellow
- (4) 1 optical fiber element (6E9/125µm)
 - central carrier
 - 6 optical fibers (E9/125µm) in single loose buffer tubes
 - rubber covering
- (5) 1 KV element (4x2.5)C
 - 4 control cores 2.5mm²
 - tinned copper conductor, extra finely stranded
 - ETFE-insulation (with white number printing)
 - rubber covering
 - tape spinning
 - screen in form of a braid of tinned copper wires
 - foil-/non woven spinning
 - rubber covering
- (6) CR - inner sheath
- (7) reinforcement polyester yarn braid
- (8) CR - outer sheath

cable diameter: 64.9mm (+/- 2.0mm)
cable weight: approx. 8100kg/km

#5 Fibre Optic Options

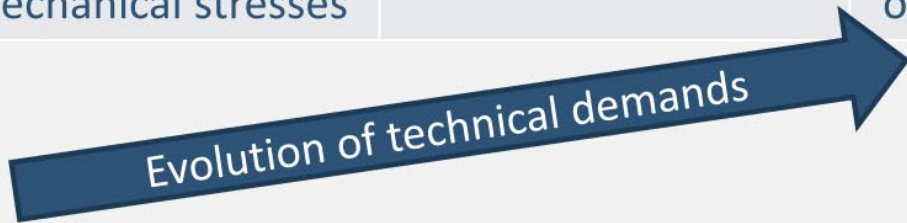
Quantity: 6, 12, 18 or 24 fibres
Type: 50/125, 62.5/125, E9/125

PRYSMIAN KABELSYSTEME GmbH

PROTOLON Family – The Real Deal

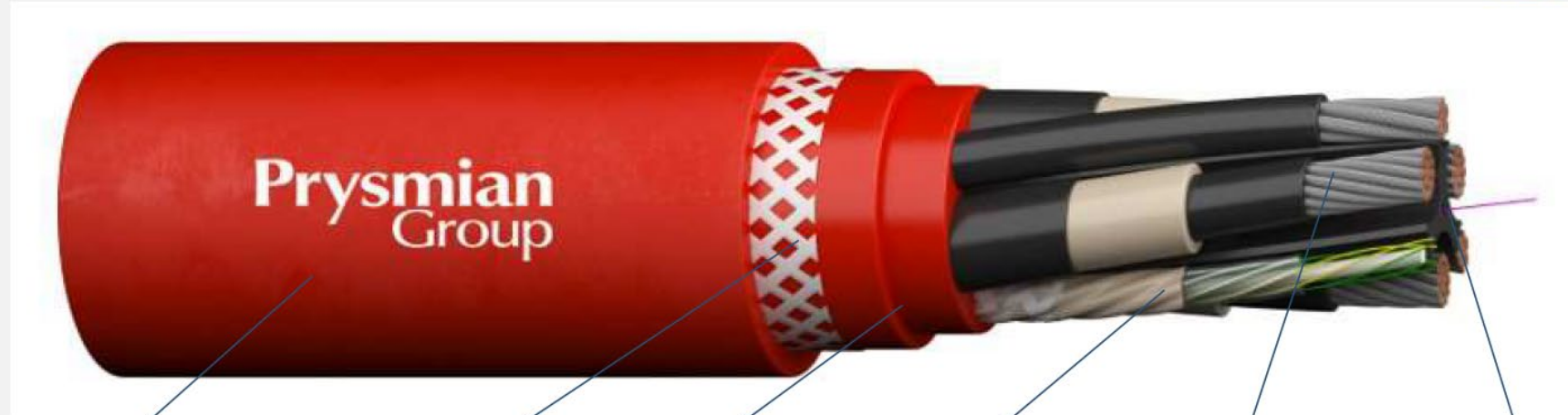


| PROTOLON(SMK-200) | PROTOLON(SMK) | PROTOLON(SMK+HS) | PROTOLON(iQ) |
|---|--|---|---|
|  |  |  |  |
| Made for reeling operations with moderate mechanical stresses | Made for reeling operations with high to highest mechanical stresses | Made for High speed reeling operations | Made for Permanent Monitoring of reeling operations |



PROTOLON(iQ) – Measure – Control – Predict

MV reeling cable with well-known PROTOLON(SMK) design!
Enhanced with IQ function



High grade outer Sheath – type PCP (better than 5GM5)

Anti-torsion braid

High grade inner Sandwich – type PCP (better than 5GM5)

FO element with commodity and IQ-ref. fibers

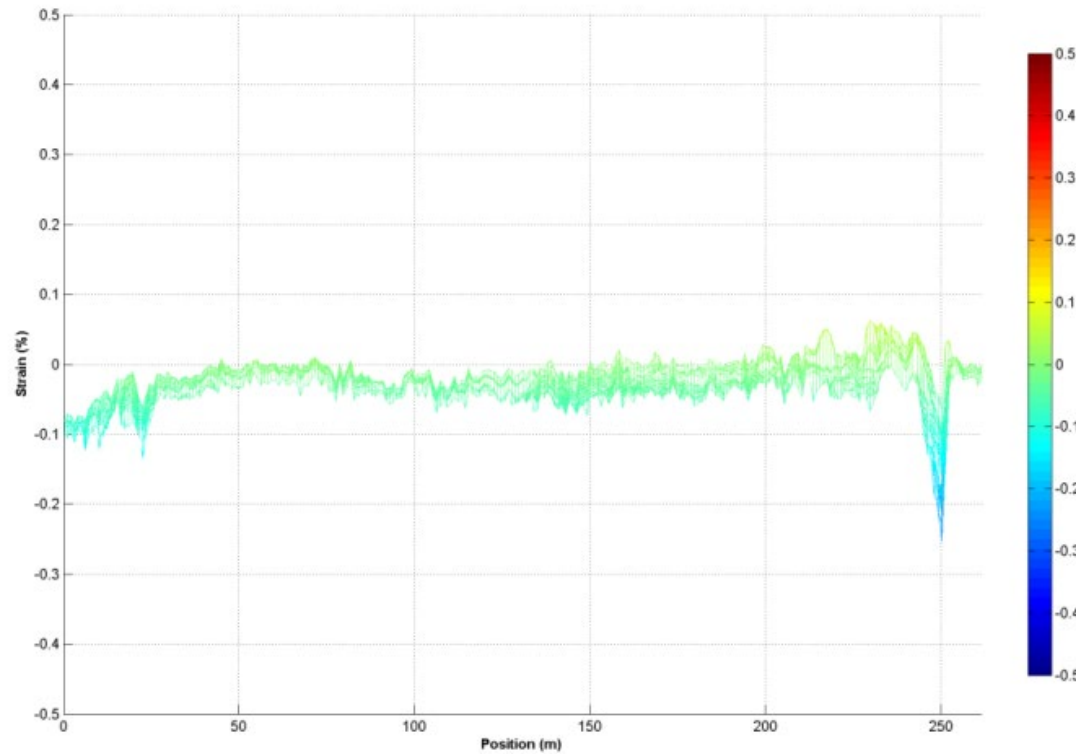
Power cores, super flexible tinned CU, with high grade EPR insulation

Cradle separator with IQ-Sensor fiber

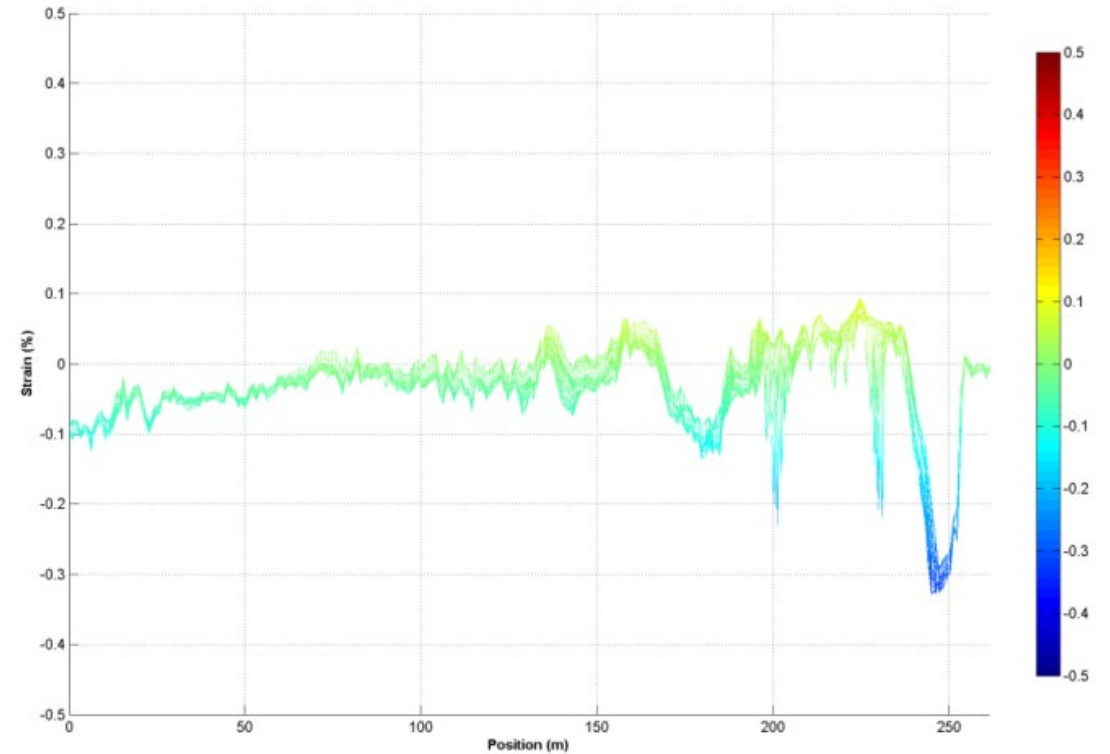
Protolon(iQ) 6/10kV, 3x70+2x35/2+1x(16E9+2E9ref) <RED>

- Installation date: 14/05/2019 - 17/05/2019
- Monitoring - phase 1: 18/05/2019 - 29/07/2019
- Monitoring - phase 2: 19/12/2019 - 24/02/2020
- Monitoring - phase 3: 25/02/2020 - 15/11/2020

Strain - IQ1 : 18-May-2019



Strain - IQ1 : 27-May-2019



Load Cells
Anti-Snag/Overload & Weighing Systems
Ex-Proof Sensors



Why Safety & Weighing Systems?

Safety systems on lifting equipment is a **mandatory** requirement when loads are lifted

Monitoring of Safe Working Limits and Operational Limits at all times

Safety Systems must comply with Safety Standards

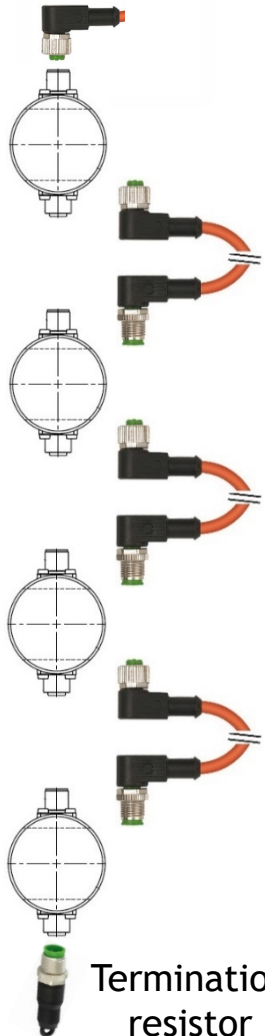
Safety issues for extended functions (e.g. SOLAS)

- Detection of wrongly declared Container Weights
- Improvement of Ship Stowage Plans

Obtaining the VGM of a container with a certified weighing system

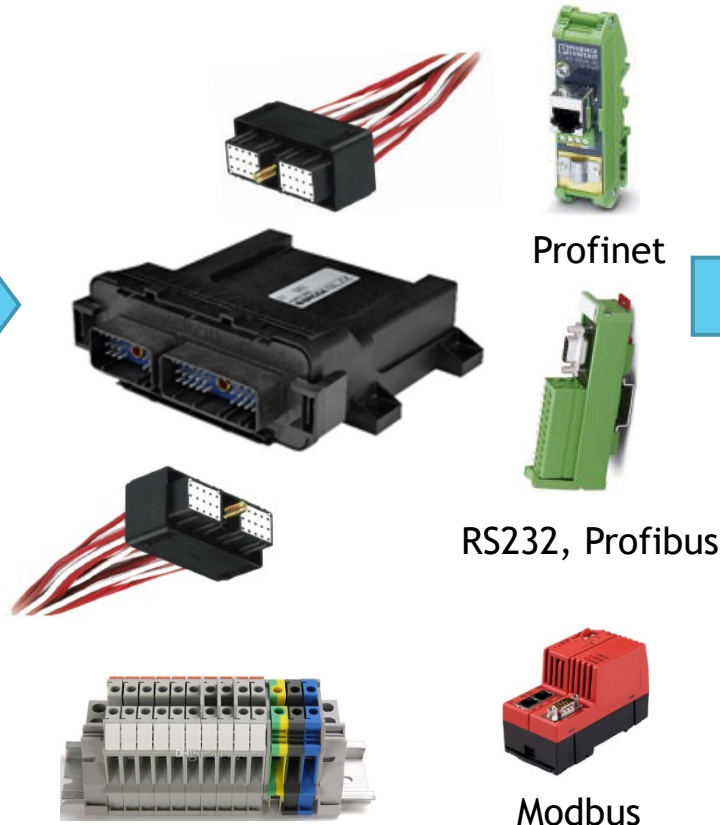


Load sensors with CAN in / CAN out



Connection cables 5 pin male / female connectors

Electronic system 0656
with connectors and accessories



Profinet

RS232, Profibus

Modbus



Operator's display



Crane PLC



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