



BUILDING TRUST

Bellmond Technologies Pte Ltd

Product and Engineering Solutions
for Power Transmission, Sensing and Safety

Brian S. Swan
Managing Director

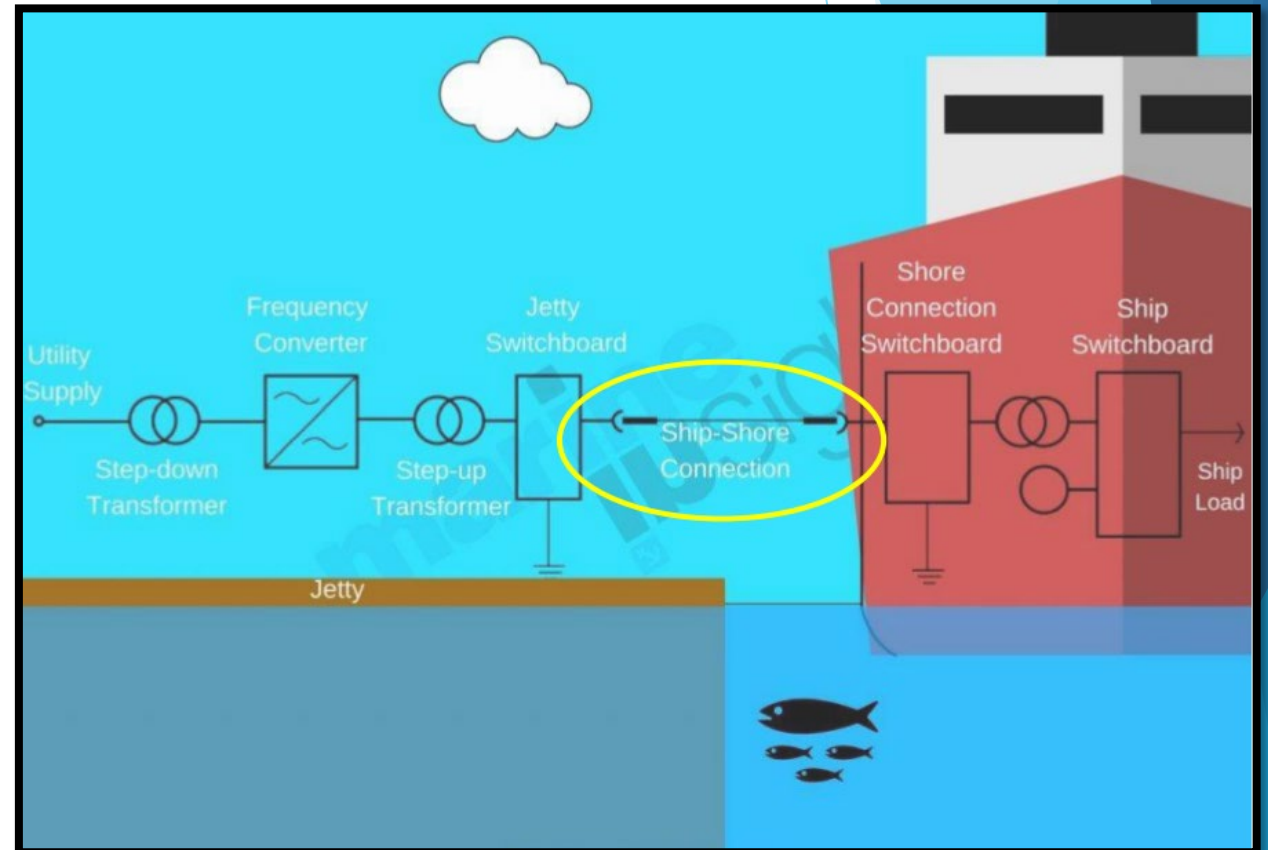
Prysmian
Group

 **BROSA**

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
-



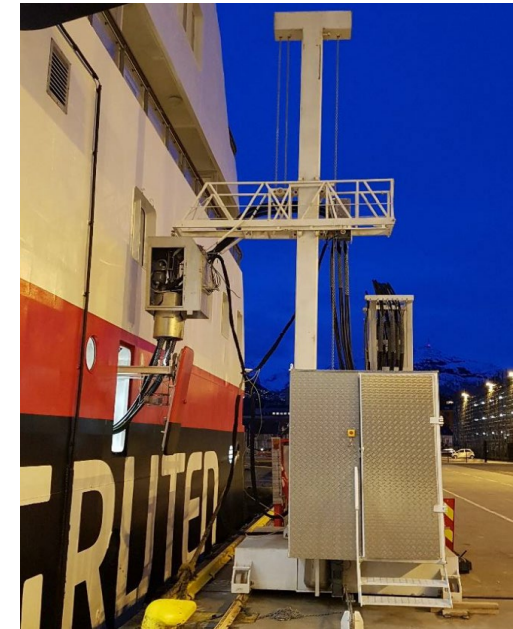
A Cable Connection used to plug ships into the main electrical power grid while berthed. This supplies a ship with enough power and services to let the vessel turn off its engines thus reducing carbon emissions, fuel consumption and noise.



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Different Technologies – Just One Cable Type

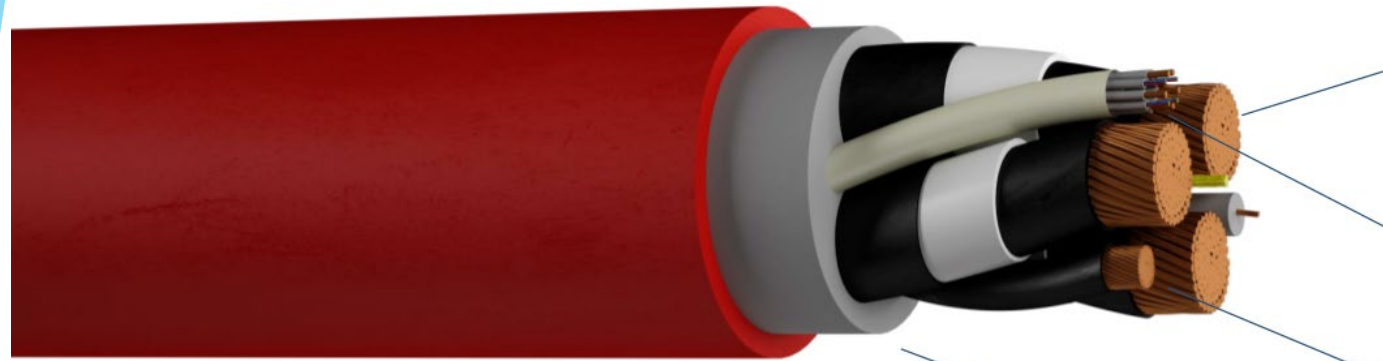




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Protolon(SC), Medium Voltage 6/10kV – 12/20kV



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



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Protolon(SC) – Just shut-down, and flooooooat!

Protolon(SC) is the perfect choice for MV and LV connection systems to supply the ship with electrical power.

As Protolon(SC) is feeding the vessels with electricity and digital data, the diesel engines can be turned off to save on fuel and pollution.

The cable is compliant to IEEE 80005 (BV certified) and suitable for permanent immersion in water.

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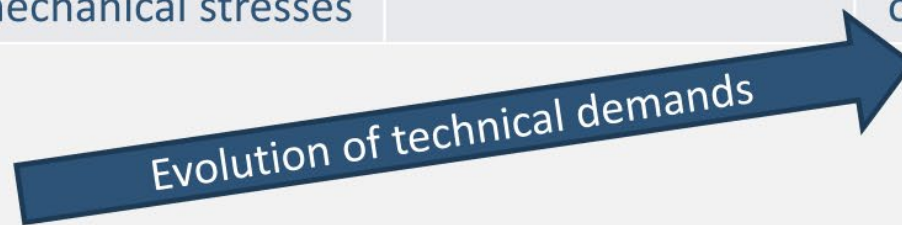


Power & Control Flexible Cables
For Cranes/Mining/Tunnelling

PROTOLON Family – The Real Deal

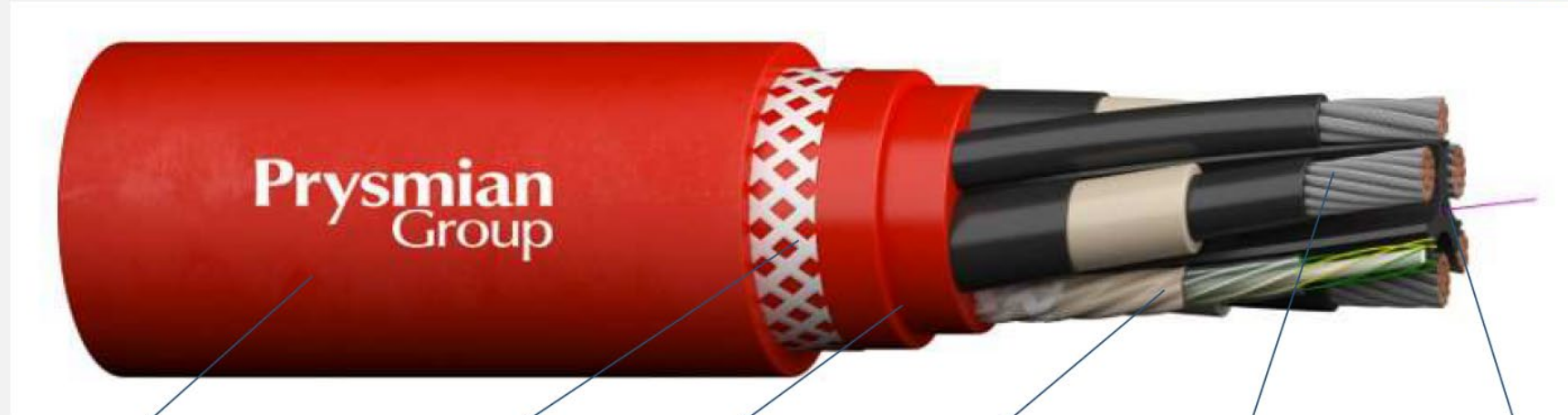


PROTOLON(SMK-200)	PROTOLON(SMK)	PROTOLON(SMK+HS)	PROTOLON(iQ)
Made for reeling operations with moderate mechanical stresses	Made for reeling operations with high to highest mechanical stresses	Made for High speed reeling operations	Made for Permanent Monitoring of reeling operations



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

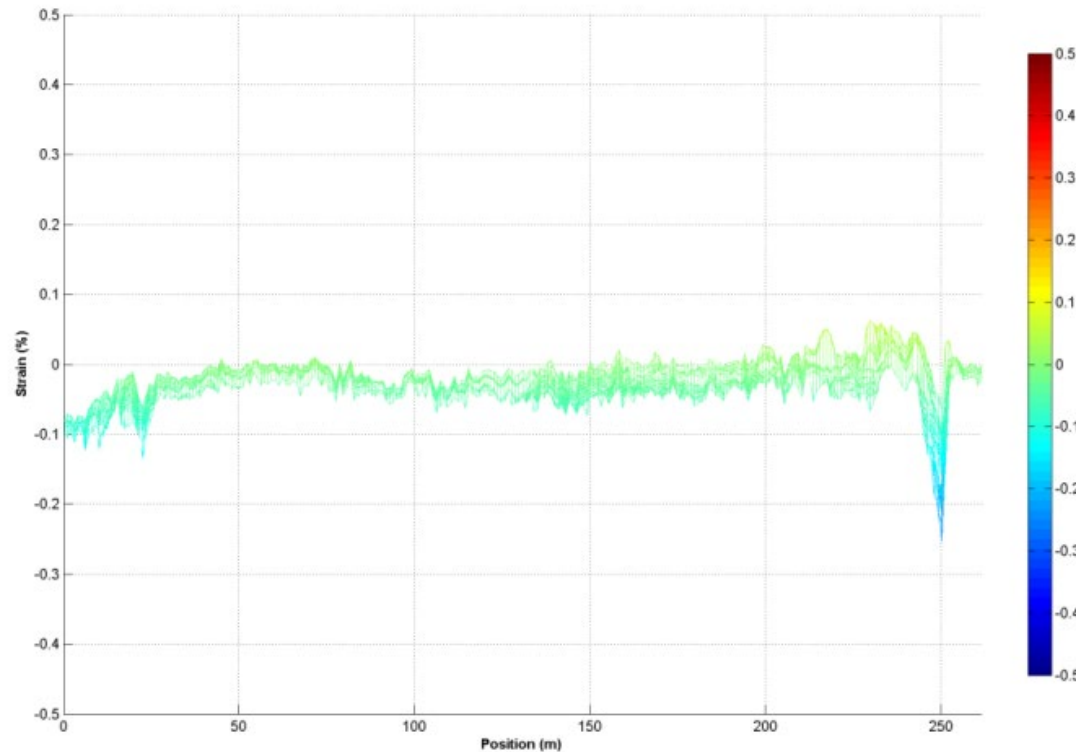
Power cores, super flexible tinned CU, with high grade EPR insulation

Cradle separator with IQ-Sensor fiber

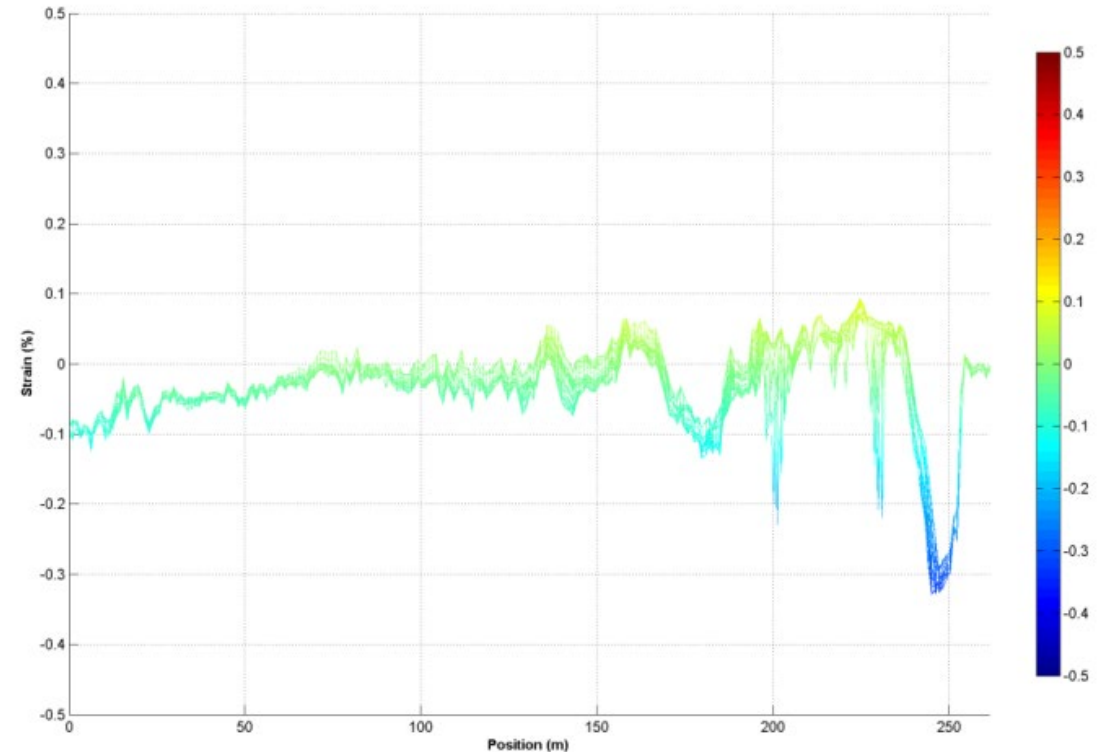
Protolon(iQ) 6/10kV, 3x70+2x35/2+1x(16E9+2E9ref) <RED>

- 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



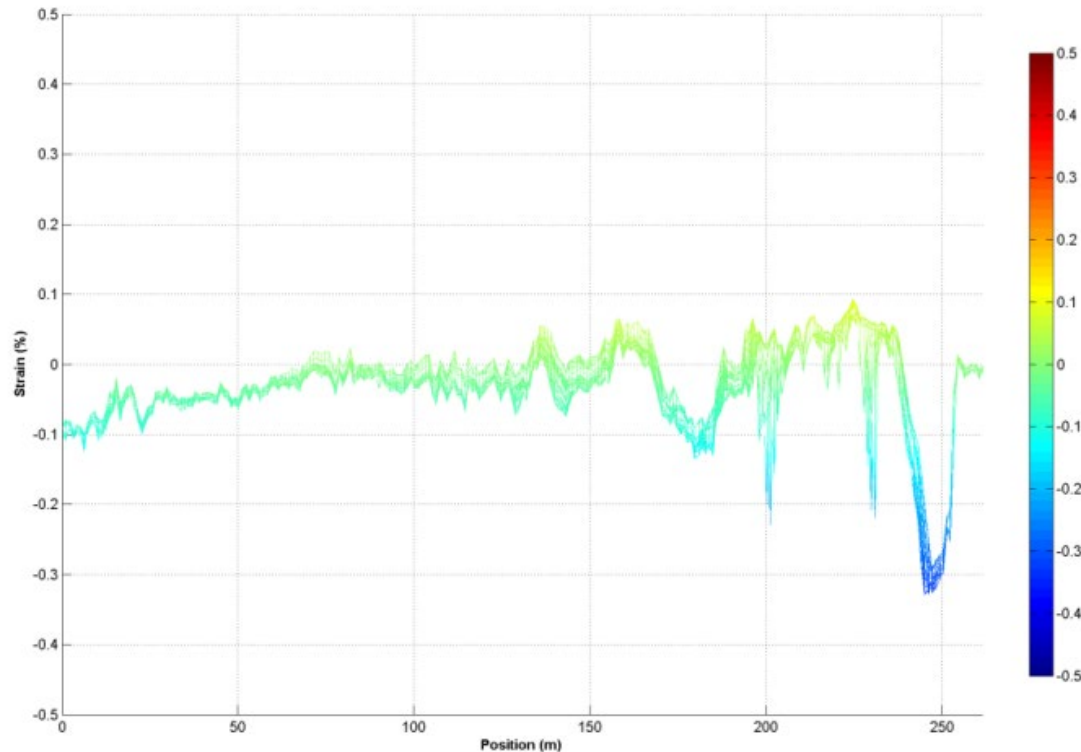
Strain - IQ1 : 27-May-2019



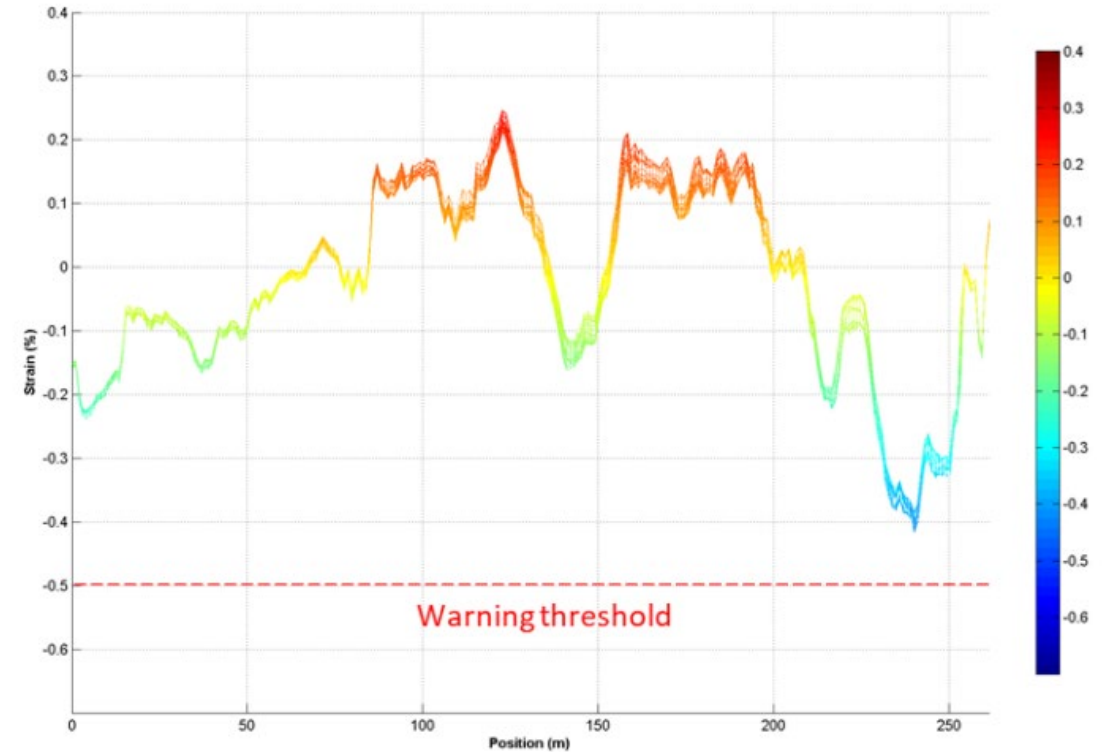
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Strain - IQ1 : 27-May-2019



Strain - IQ1 : 01-Aug-2020



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

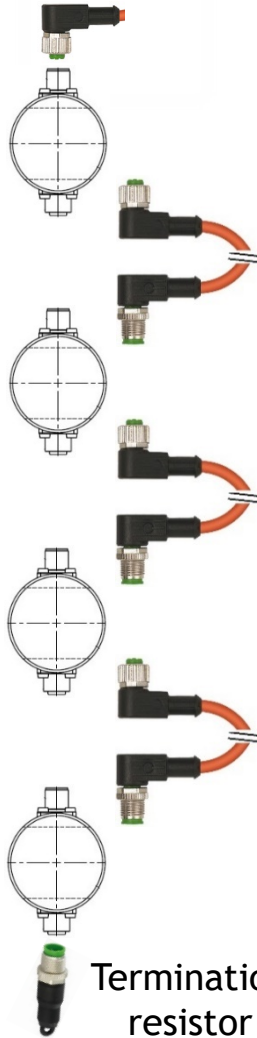
Safety issues for extended functions (e.g. SOLAS)

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

Obtaining the VGM of a container with a certified weighing system

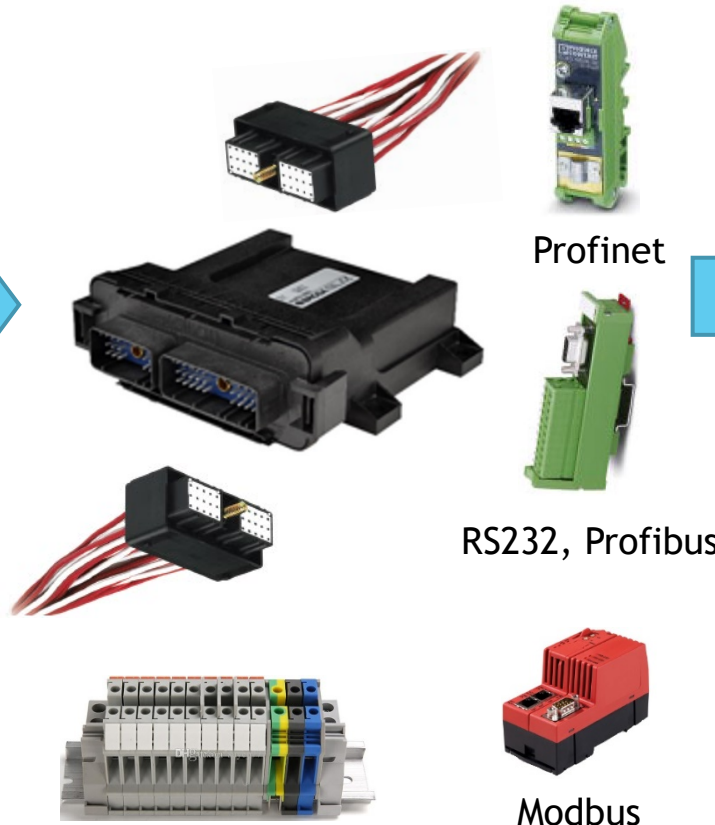


Load sensors with CAN in / CAN out



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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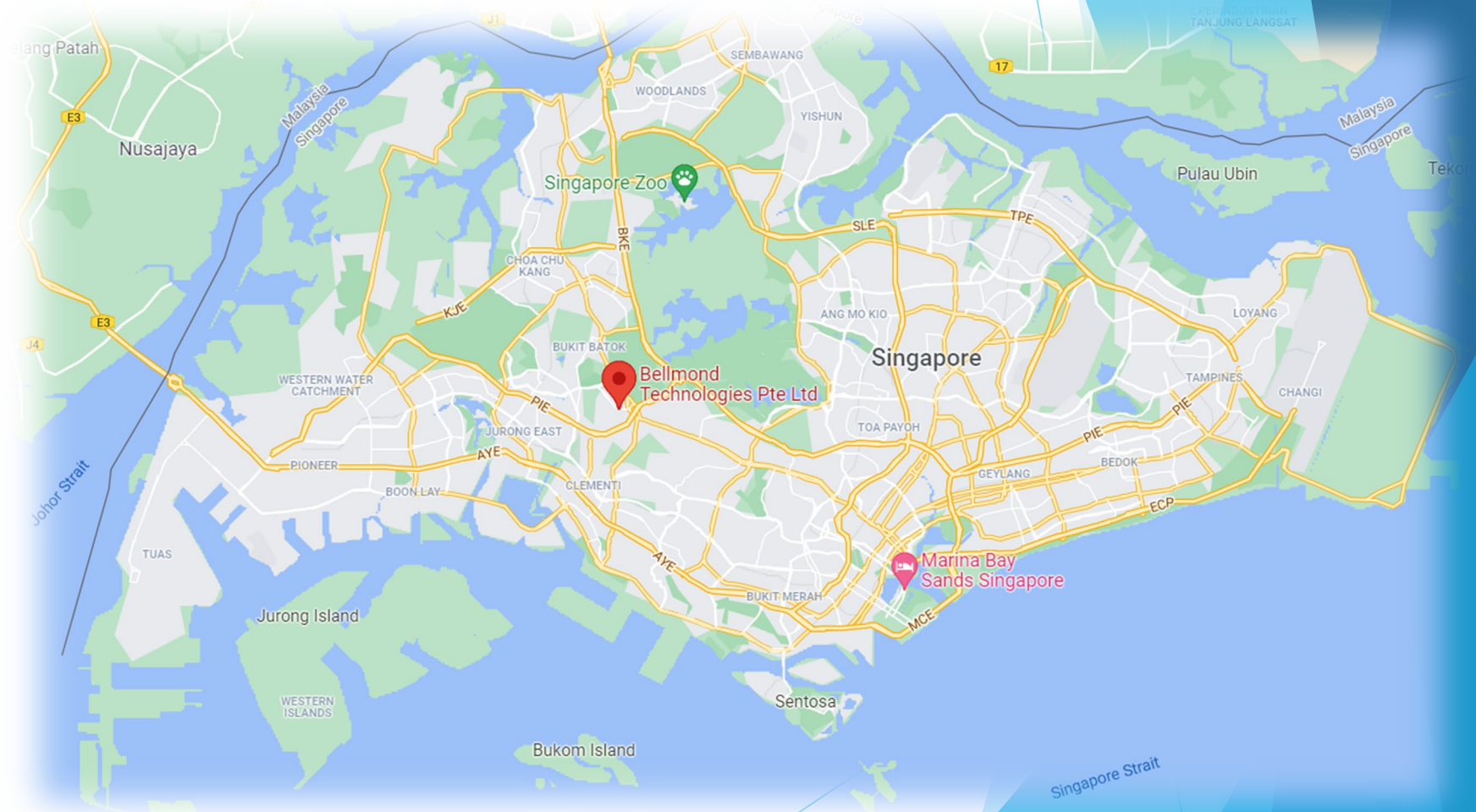
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