

# Underwater cables for Oceanography & Seismic Systems



**The Quality Connection**

**LEONI**

# Cable Solutions

## for Marine Technologies

A consistent focus on the market, in-depth sector and product knowledge, decades of manufacturing experience and innovative products – that's LEONI, one of world's largest producers of special cable solutions. Amongst others the Business Unit "Industrial Solutions" supplies special industries like Marine Technologies with customized underwater cables for oceanographic and military applications.

### **What sets LEONI apart:**

#### **Research & Development**

We invite you to benefit from the globally interlinked know-how of the LEONI Group and the work done by our Corporate Research & Development department. By conducting research projects that transcend individual sectors we tap synergies within the group and thereby provide additional potential for innovation.

#### **A high degree of vertical integration in cable production**

This is something virtually no other cable manufacturer can boast: from ultra thin copper wire through to hybrid cable thick as an arm, everything is done in our own production plants. Optimized results are achieved by using components which are matching up.

#### **Cable systems**

We also offer ready-to-connect and ready-to-fit assembled cable systems and fully wired modules.

#### **Global presence**

We have our own production facilities in all of the world's key industrial regions and are therefore always in close proximity to you.

# Underwater cables

On the one hand, LEONI cables make sure an interference-free telemetry of seismic activities at the seabed. On the other hand, our cables deliver a reliable support with data and energy for underwater robots in oceanographic applications, both in fixed as well as in moving installations, when a robot is pulled through water even at the seabed.

The outstanding service of our cables is assured by making reference to the main characteristics for each application through the know how of our engineers, the big LEONI variety of jacket materials and the expertise in manufacturing of our different LEONI plants in Germany and Switzerland. We provide sea water resistant tensile strength cables with steel or aramid core for full loads of up to several tons, as well as towing and underwater cables, with standard design or either neutrally buoyant or floating.

## Our technical competence

### Which elements can we integrate into a towing and underwater cable?

- Power cores up to 6 kV
- Control cores, pairs, triples and quads
- Data elements up to CAT 7
- Bus cable elements
- Fiber optic elements
- Air, gas and fluid hoses
- All kinds of screening elements
- Strength members – steel and aramid – up to a load of 100 kN
- Cross-linked and non cross-linked sheathing materials

### Which cable characteristics can we realize?

- Standard towing cables up to a load of 100 kN
- Neutrally buoyant cables
- Floating cables
- Torque balanced cables
- Sea bottom layable cables
- Water blocked cables longitudinally up to 100 bars and transversally up to 5000 bars
- Hybrid cables
- Cable assemblies

On the following pages you will find some of our realized projects. All our cable solutions are individually designed and manufactured according to the customer special requirements.





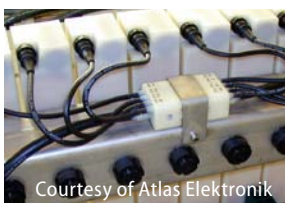
### Hybrid round cable for a sonar system

### Underwater cable for the connection between a light house and the shore

### Hybrid round cable



Description	<p>Developed for the connection of a control unit with the lateral sonar of a submarine.</p> <p>It contains the power supply, which is screened separately, as well as three data wire pairs.</p> <p>The cable is exposed to a water pressure of up to 40 bars in the depth during a diving session.</p>	<p>Designed for the connection between the shore and a light house.</p> <p>Due to the applied reinforcement by steel mesh wire the cable features a highly mechanical stability. This allows even installation in a stony riparian area without any problem.</p>	<p>This is a new development especially for use in a float, in order to allow for deeply submerged submarines the communication from deep areas.</p> <p>For this purpose the float carries various sensors, which allow communication in different networks. In a modified version a civil application could be thinkable and will thus be offered for example to marine engineering institutions for platforms or other facilities.</p> <p>The cable also provides towing the float, besides the data transmission task and supplies the required energy.</p>
Fields of application	<ul style="list-style-type: none"> <li>■ For outdoor</li> <li>■ For use in humid rooms as well as in sea- and brackwater</li> </ul>	<ul style="list-style-type: none"> <li>■ For outdoor and underwater use</li> </ul>	<ul style="list-style-type: none"> <li>■ For underwater applications with fiber optic element for data transmission and power supply</li> </ul>
Outer jacket	Polyether-Polyurethane	Polyether-Polyurethane	Polyether-Polyurethane
Mechanical characteristics	<ul style="list-style-type: none"> <li>■ Seawater resistant</li> <li>■ Transversally water blocked</li> <li>■ Halogen free</li> </ul>	<ul style="list-style-type: none"> <li>■ Seawater resistant</li> </ul>	<ul style="list-style-type: none"> <li>■ Seawater resistant</li> </ul>

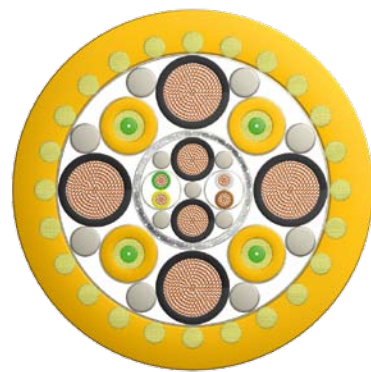
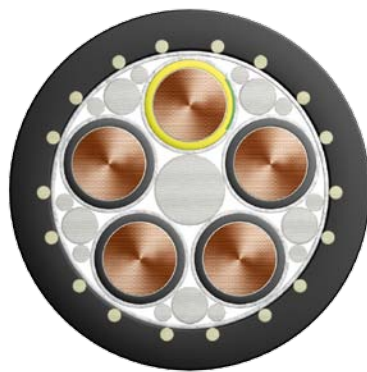




### Hybrid round cables for a scanning sonar

### Round cable for an electromagnetic measurement system

### Hybrid round cable for sea measurement applications



<p>The Scanning-Sonar head is an echo depth finder, which can cover a semi spherical area.</p> <p>The sonar functions at a frequency of 200 kHz and can display depth profiles of large areas.</p> <p>The cable adopts also the occurring towing forces by means of an aramid braid.</p>	<p>This partially longitudinal water tight cable provides power supply.</p> <p>Even at damages of the outer cable jacket the function remains intact.</p> <p>A tension-relieved hybrid design with aramid reinforced polyurethane double jacket.</p> <p>Connected components, such as plugs, couplings and distributors remain undamaged at a water pressure of up to 60 bars (no water intrusion).</p>	<p>Developed for the connecting vessels with a pipeline inspection robot.</p> <p>A tension-relieved hybrid design with aramid reinforced polyurethane double jacket.</p>	<p>Description</p>
<ul style="list-style-type: none"> <li>■ For outdoor and underwater use</li> </ul>	<ul style="list-style-type: none"> <li>■ For outdoor and underwater use</li> </ul>	<ul style="list-style-type: none"> <li>■ Hybrid round cable with tensile strength of min. 12 kN for pulling applications</li> </ul>	<p>Fields of application</p>
<p>Polyether-Polyurethane</p>	<p>Polyether-Polyurethane</p>	<p>Polyether-Polyurethane</p>	<p>Outer jacket</p>
<ul style="list-style-type: none"> <li>■ Seawater resistant</li> </ul>	<ul style="list-style-type: none"> <li>■ Seawater resistant</li> <li>■ Transversally water blocked</li> </ul>	<ul style="list-style-type: none"> <li>■ Seawater resistant</li> <li>■ For flexible installation</li> <li>■ Tearproved</li> </ul>	<p>Mechanical characteristics</p>



Courtesy by MENCK



## Towing cable for offshore applications

## Underwater fiber optic cable with steel reinforcement

## Deep sea cable



### Description

This offshore cable connects a master station with a submarine hammer, which fixes mechanical elements at the sea ground.

Because of the high mechanical load, the cable features double outer jacket with embedded aramid mesh.

A hybrid design with a fiber optics element and several copper conductors for the power supply of the optic-electric converters.

The cable has been installed already in the bay of Gdansk.

The deep sea cable is filled with a special gel. This ensures a form stable behavior at up to 500 bars lateral pressure.

### Fields of application

- For power and control supply
- For outdoor and underwater applications

- For fixed installation
- Installation in cable ducts and conduits as well as on cable racks or underground laying
- For a max. depth of 50 m under water (sea or fresh)

- For research **up to 5000 m** water depth

### Outer jacket

Polyether-Polyurethane

Polyethylene (HDPE)

Reinforced Polyurethane sheath

### Mechanical characteristics

- Halogen free
- Sunlight resistant

- Sea water resistant
- Longitudinally and laterally water resistant
- Oil, petrol, acid and leach resistant
- Crush resistant

- Sea water resistant
- 3.5 mill. bending cycles longitudinally and transversally watertight
- Pressure resistant up to 500 bars

### Approvals

UL 1581, sec. 1200  
VDE 0472, part 815

IEC 60794-3  
EN 187105  
DIN VDE 0888-3  
DIN VDE 0899

# LEONI Marine Technologies – Worldwide

More information of our sales network under [www.leoni-industrial-solutions.com](http://www.leoni-industrial-solutions.com)

Proximity to the customer is a key element of our corporate philosophy. This is the reason why you will find LEONI close to you wherever you are. Please don't hesitate to make use of our strong distribution network.



## LEONI Industrial Solutions – centres of competence

### Germany

- LEONI Elocab GmbH
- LEONI HighTemp Solutions GmbH
- LEONI Kabel GmbH
- LEONI Protec Cable Systems GmbH
- LEONI Special Cables GmbH

### France

- LEONI CIA Cable Systems S.A.S.

### Great Britain

- LEONI Tailor-Made Cable UK Ltd.

### Spain

- LEONI Special Cables Ibérica S.A.

### Slovakia

- LEONI Cable Slovakia spol. s.r.o.

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- LEONI Elocab Ltd.

### USA

- LEONI Engineering Products & Services Inc.

### India

- LEONI Cable Solutions (India) Private Limited

### China

- LEONI Special Cables (Changzhou) Co. Ltd.

### Japan

- LEONI Wire & Cable Solutions Japan K.K.

### Singapore

- LEONI Special Cables GmbH

You can find the contact details of our international partners on

[www.leoni-industrial-solutions.com](http://www.leoni-industrial-solutions.com)

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