

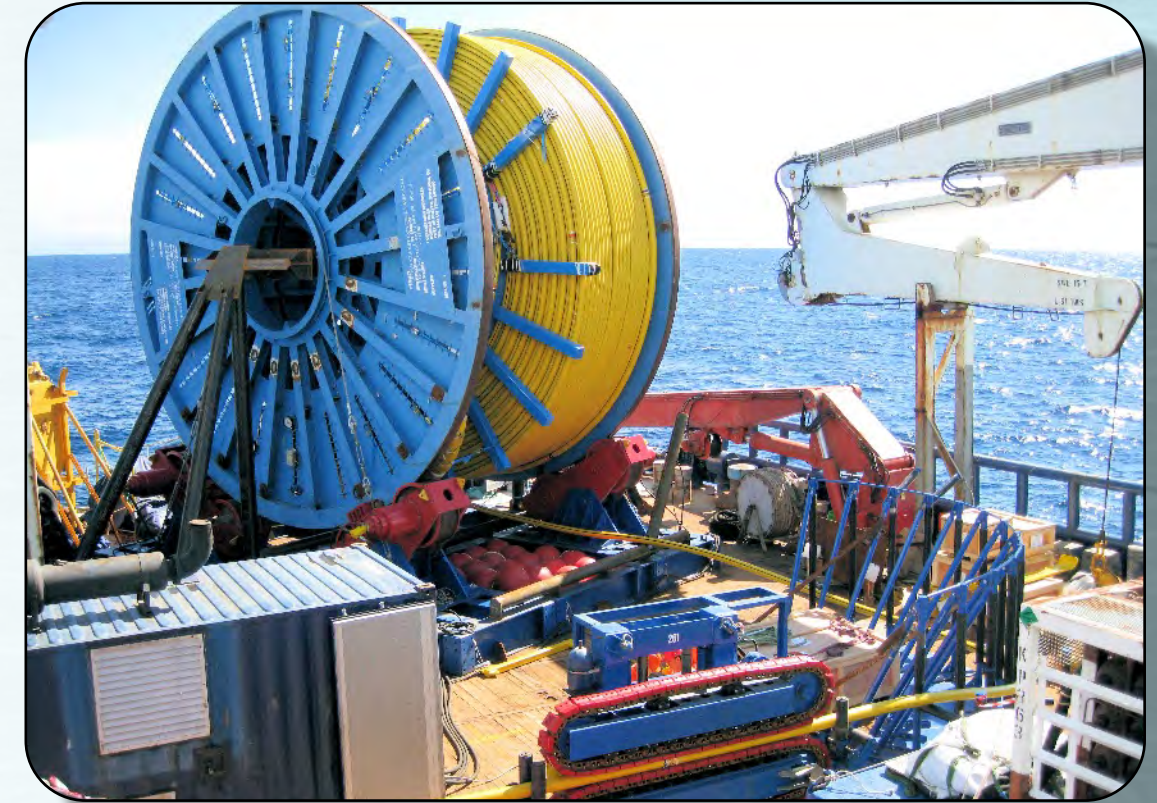
Acting as subcontractor we provide world wide our laying equipment, technicians and instrument in order to guarantee the engineering, installation procedures and laying management by using marine spreads and diving support normally available on site and supplied by the main Contractor and using the existing site organization with a consequent cost reduction.

Thanks to the continue improvement of our expertise we have designed and manufactured specific systems for laying operations control, testing and a complete range of accessories and ancillaries for system connection either to land or platforms.

In accordance to the above philosophy we are able to offer for a "Call-off Contract" for "Emergency repair & cables/umbilical monitoring" in Mediterranean sea, Red Sea, Arab Gulf, India, North Sea and West Africa.

بي سي اس كابلز ذ.م.م

**PCS CABLES LLC**



**LAYING & REPAIR**

### Contact in Iran

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## "CABLE LAYING"

Our Company can work either as sub-contractor and as main contractor and we can propose:

- Search for a qualified cable maker
- Preliminary underwater surveys, along cables course with data processing for the "Engineering & Installation Manual".
- Selection for the most adequate marine spread,
- Execution of preliminary works near the landing points.
- Cables laying, testing and monitoring, protection works, accessories installation, finishing and final test.
- "As built" documentation with the relevant data monitored and recorded during laying phases.

Our Company is also able to rent the following laying equipment as:

- Tensioners with pulling force from 2 up to 10 Tons according to the cable/umbilical data and water depth involved.
- Spoolers for reels of 1,20,120,200,350, 440 and 600 tons as per laying necessities.
- Modular Carousel/Turntable from 200 up to 4000 Tons
- Stingers with MBR 1m up to 3m
- Test & control instrument for cables/umbilical (Rigidimeter, Megger, Ohmeter, OTDR, D-T monitoring system, Hydraulic unit for test up to 700 Bar with recording system, etc.).

Any kind of additional equipment for pull-in on platform, on-shore winches, special floaters, rollers, workshop containers, etc.

## "CALL-OFF CONTRACT FOR CABLE REPAIR SERVICE"

Thanks to our in-house organisation and skilled technicians, we are also able to propose an innovative service of "Emergency Team" for the immediate damage localisation on submarine cables, providing world-wide the necessary joints and technicians for the execution of the repair within few working days from the damage.

This service could be entered in a "Call-off Contract" with the interested Companies, in order to determine the intervention and repair costs since the beginning.

Our "Emergency Team Service" guarantee the repair of damages on submarine cables in few days in any place around the world by our technicians and repair joint always available in our stocks. Also specific tests by our D-T equipment allows temperature monitoring on cables/umbilical in working conditions and without shout-down.

This innovative service may help in prevent possible future damages.

For more details see leaflet "Test&Check".

Thanks to the good relationship with diving companies, shipowners, cable manufacturer, and our past experience we are able to offer also for "Turn Key Contract works".

Our organization has benefits of several agents and contacts in USA, Egypt, Saudi Arabia, India, France and our Branch PCS Cables in Doha (Qatar) is at your disposal for any requirement and clarifications.



PCS can provide complete testing solution and equipment in order to fulfill any standard request for voltage up to 110 kV and different system requirements.

- POWER CABLES
- FIBRE OPTIC
- HYDRAULIC UMBILICAL

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Submarine Cables & Umbilical Laying, Maintenance and Repair Service

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**TEST & CHECK**



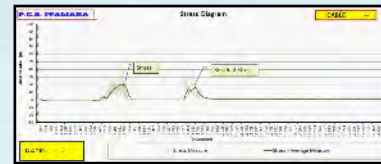
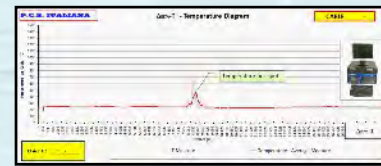
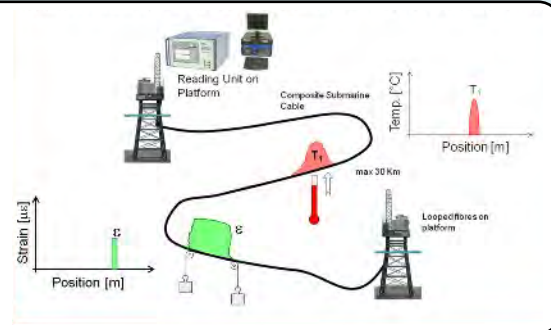


This "Integrated Monitoring System" can be used on critical or strategic cables to verify the "health" conditions of the system along its entire length in any moment with cable in working conditions or in the event of scheduled maintenance shutdown periods.

## ON-LINE MONITORING

### On-line Monitoring Capabilities

- Temperature monitoring
- Stress monitoring
- OTDR



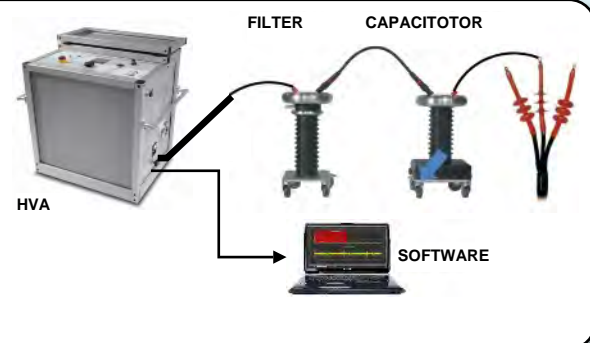
### DESCRIPTION:

Thanks to the implementation of new technologies and our know-how, we can now propose a specific service driven to monitor and evaluate "on-line" any composite submarine cable minimizing eventual "shut down" on strategic platforms. With this new service, we can record in advance an accurate "system health status" for composite cables (in working condition) by means of the existing fibers element; by scheduling such control after defined times (i.e. months or years) it will be possible to verify and assess any cable deterioration and anticipate any system failures.

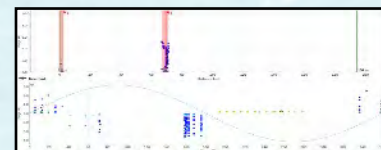
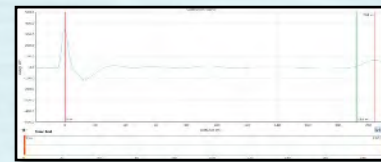
## OFF-LINE MONITORING

### Off-line Monitoring Capabilities

- Tan Delta
- DC
- Partial Discharge
- VLF
- Ecometer
- Insulation



ALL IN ONE SINGLE INSTRUMENT



### DESCRIPTION:

In case of stand-alone power cable, during scheduled "shut down" period we can intervene with our "partial discharge & Tan Delta" instrument in order to provide an "indicative health status" of the cable in reason of any possible site interference.

## POWER AND FIBRE OPTIC TEST

### CHECKS AND TESTINGS FOR SUBMARINE CABLES

In order to provide full assistance during laying phases for installation and testing of the accessories manufactured by us and to support our "Emergency Service" repair team, we have available a full range of equipment for check and testing on submarine cables such as:

- High pot AC VLF Test Equipment (94 kV) - Partial Discharges
- Ohmmeter (Megger 5 kV)
- Rigidimeter - DC (110 kV)
- Teleflex up to 30 km
- OTDR up to 130 km



## UMBILICAL TEST

### HYDRAULIC UMBILICAL TESTING LABORATORY

HUL is a containerized laboratory purposely studied and manufactured to provide suitable support during umbilical installation activities, for any repair work and emergency contingencies, search and localization of medium/hard type of damages, hoses/pipes flushing, glycol/transaqua analysis and pressure test, one set is mainly containerized and an additional model with reduced capabilities is wheeled whichever provide the following:

- "Data Log" system for recording of set pressures.
- Pumping system for flushing pipes/hoses complete with filtering system and control station with glycol/transaqua analysis
- Temperature monitoring equipment along cable/umbilical





Aim of P.C.S. Italiana S.r.l. is to be always complementary to Offshore Companies; to reach this goal PCS is expanding its activities including a full supportive organization dedicated to Diving with relevant equipment and personnel that may be of assistance underwater and also during the specific activities of submarine cables installation and repair.

This organization allows PCS to be immediately responsive and operative world-wide in support for the cables installation and repair activities either when diving is specifically required or necessary and where the diving shall be reduced due to safety or Client requirement by providing fully automated solutions for cables detection and cut.

Our complete diving equipment comprise the following:

01. Dive Control (containerized) fitted to manage Shallow Water (up to -50msw) and Mixed Gas (up to -75msw) diving activities. The System is capable to supply 3 Divers and Wet Bell.
02. LARS HD/Wet Bell is fitted for 2 Divers entering/egressing the water, operating up to -75msw. The Wet Bell is gas surface supplied through the dedicated umbilical and is fitted with 2 off 30m umbilical for Divers.
03. LARS Lite fitted for 2 Divers entering/egressing the water, operating up to -75msw.
04. Twinlock Air Chamber (containerized) consists of 2 locks (EL & ML) and gas control panel with TAC container fitted with independent Air bottles and 2 HP Air compressors.

The individual diving equipment comprises KMB 37 Helmets, KMB 18B Band Masks, umbilical, bailout, comms and video, complying with ACoP for Offshore Diving (IMCA D014-Rev.2-2014).

PCS Diving Spread also comprises uw weld/cut equipment, hydraulic tools for cable cutting/recovery and IRM diving operations.

To provide also reliable and "state-of-the-art" organization, PCS is also applying to the IMCA certification process.

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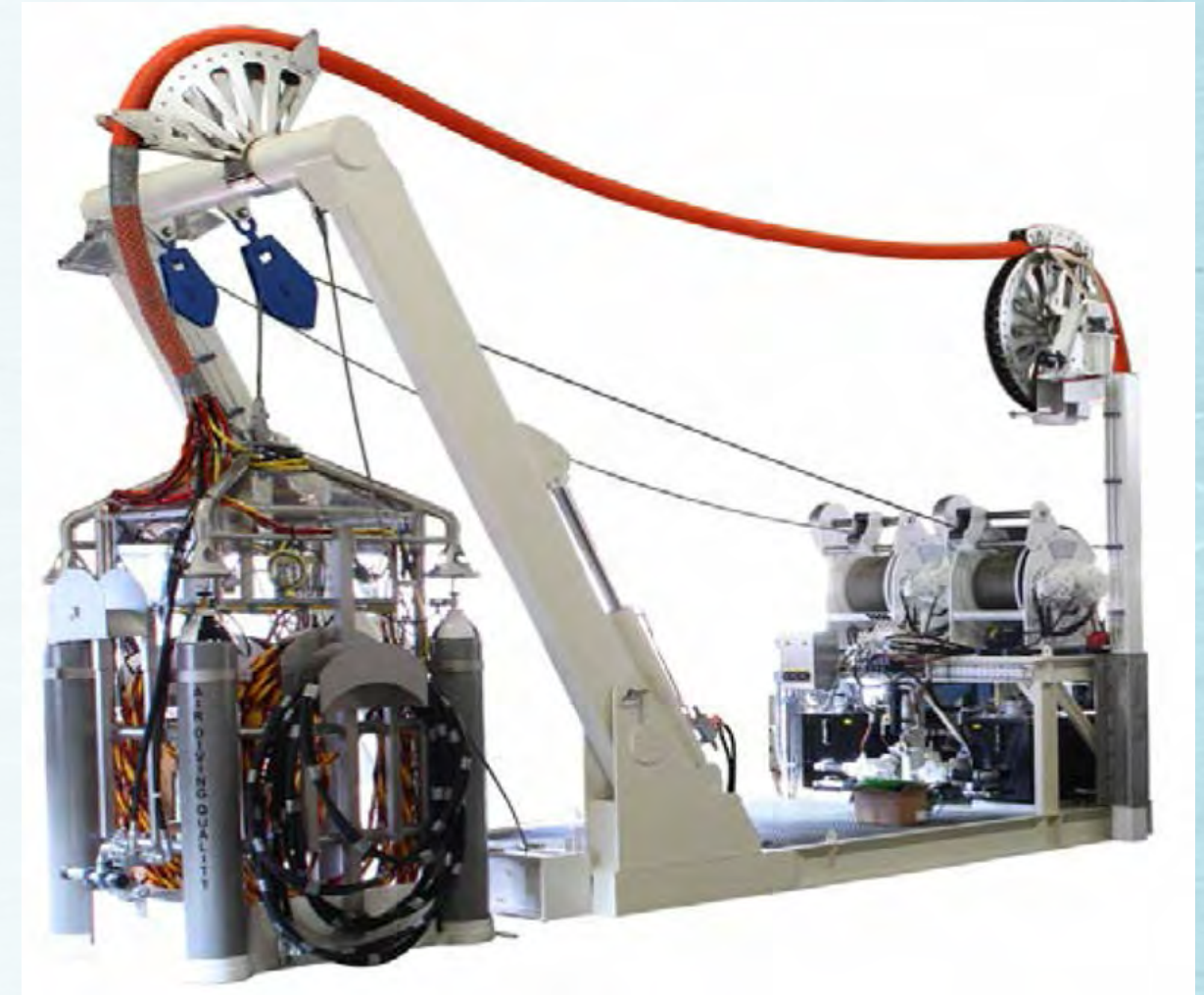


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**DIVING TEAM  
 &  
 OPERATIONS**

**2017  
 NEW**



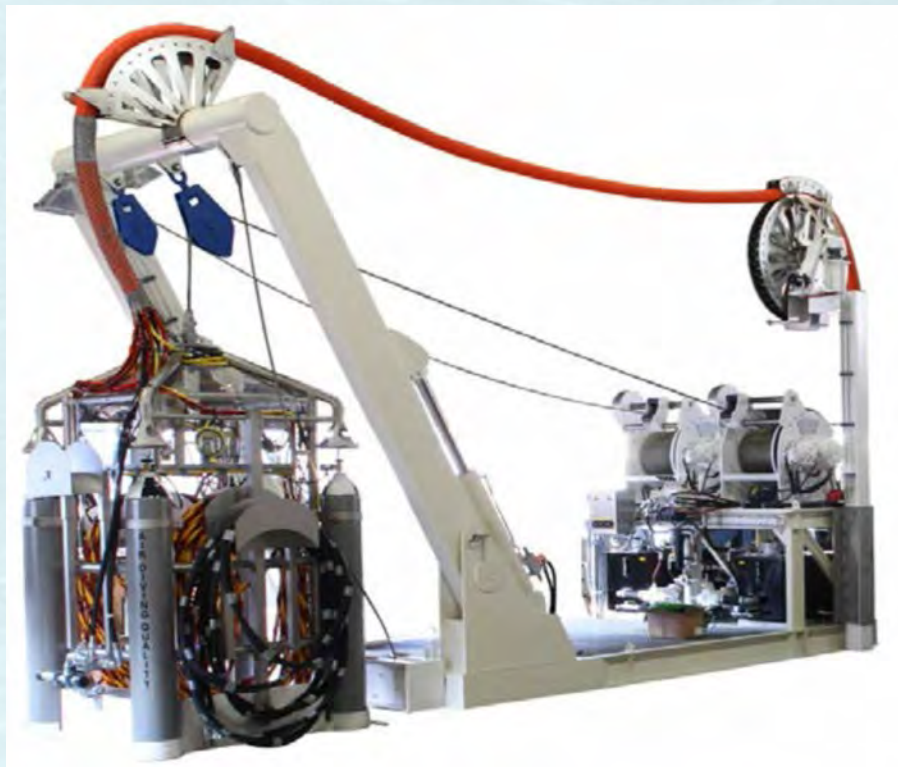


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**PCS CABLES LLC**



**1. DIVE CONTROL  
(CONTAINERISED)**



**2. LARS HD WET BELL**



**3. LARS LITE**



**4. TWINLOCK AIR CHAMBER  
(CONTAINERISED)**



To provide a complementary support to Offshore Companies, P.C.S. Italiana S.r.l. design and manufacture an extensive range of accessories for subsea power, fibre optic cables and umbilical.

Our Accessories department can grant a suited solution for power, optical, control composite cables and umbilical solutions considering either new connections or repair necessities.

Our standard range covers up to 69 kV and we are currently developing also the 150kV level.

All our accessories follows a "universal" approach thus to be applicable for different cable/umbilical manufacturer or level/size of installation in order to have one design that fits for several uses.

Thanks to this accessories philosophy we can propose quick and reliable intervention for cables installation and "Call-off Contract for Cable Repair Service" comprising:

- Terminations
- Junction boxes (straight or vertical on top of riser, both accessible for inspection or fully sealed and unaccessible)
- Submarine Joints (with shells or universal type) for power, composit and FOC cables and umbilical
- Hang-off for cables armour (three different solutions)
- Pulling heads, Bull-noses, centralizer, bending restrictor, etc.

Our submarine power joint have been tested at 120 m depth and optical submarine joint have been tested at 2000 m. Both of them through an independent laboratory.

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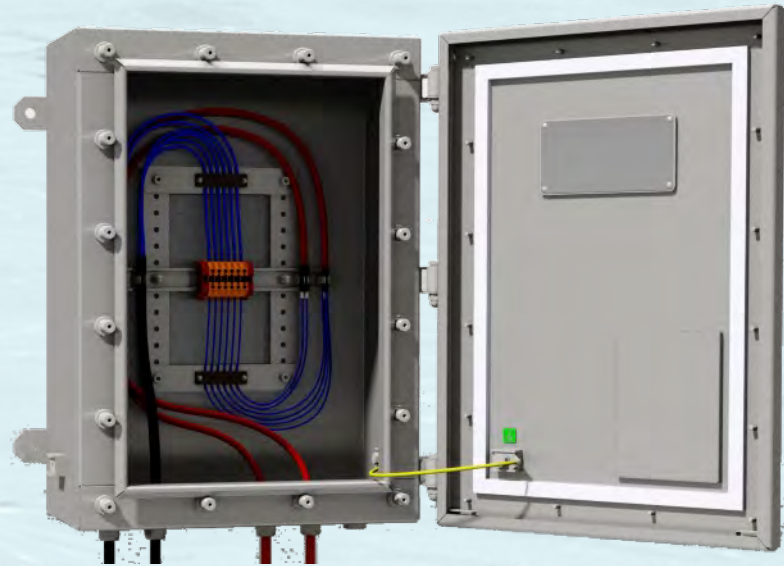


**ATEX**  
**JUNCTION BOX**

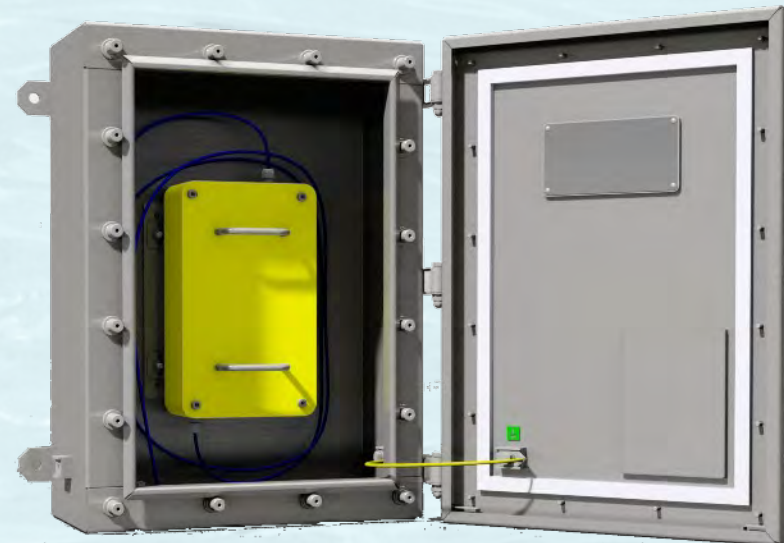
**2017  
NEW**







**CONTROL JB**



**FOC JB**

**Limit conditions for operation**

For use in an explosive atmosphere consisting of a mixture of air and flammable substances in the form of gas, vapours, mists (G), the environmental conditions of operation are:  $-20 \div +60$  [°C]

IP 65 and/or IP 66 protection type: Ex-nA (up to 15kV) , Ex-tc , Ex-e , Ex-tb , Ex-nA op pr

Certified by **CESI**

For use in an explosive atmosphere consisting of a mixture of air and combustible dust (D), the equipment provides a level of effective protection for powders with a particle size average from 75 [µm] to higher.



**POWER JB**

PCS has largely expanded its capabilities for Junction Box to support Customers in different requirements and necessities and all range of fully conformity certified Power Junction Boxes is now providing ATEX and IEC-Ex Certification to comply with latest requirements of the International Standard for Hazardous Areas.

OF Junction Boxes are fully conformity certified in line with latest issue of the ATEX Standard.

A new line of Control Junction Boxes has also been implemented to provide an entire suitability for type, solution and application range for Hazardous Areas application.

Ex-e; Ex-nA and Ex-Op types are available with IP Protection range covering both IP 65 and IP 66 for any offshore application.

Additional NEMA 4.x configuration is available.

Testing and Certification process carried out by **CESI**



**ATEX/IECEx**  
**POWER. CONTROL**  
**AND FIBRE OPTIC**



| ID | CODE    | L<br>.[mm]. | H<br>.[mm]. | D<br>.[mm]. |
|----|---------|-------------|-------------|-------------|
| 1  | EE01-Ex | 356         | 506         | 194         |
| 2  | EE02-Ex | 356         | 506         | 284         |
| 3  | EE03-Ex | 506         | 706         | 194         |
| 4  | EE04-Ex | 506         | 706         | 284         |
| 5  | EE05-Ex | 506         | 706         | 394         |
| 6  | EE06-Ex | 706         | 706         | 194         |
| 7  | EE07-Ex | 706         | 706         | 284         |
| 8  | EE08-Ex | 706         | 706         | 394         |
| 9  | EE09-Ex | 606         | 1206        | 394         |
| 10 | EE10-Ex | 606         | 1206        | 494         |
| 11 | EE11-Ex | 1006        | 1206        | 394         |
| 12 | EE12-Ex | 606         | 1406        | 394         |
| 13 | EE13-Ex | 606         | 1406        | 494         |
| 14 | EE14-Ex | 606         | 1606        | 394         |
| 15 | EE15-Ex | 606         | 1606        | 494         |
| 16 | EE16-Ex | 806         | 1606        | 394         |
| 17 | EE17-Ex | 806         | 1606        | 494         |
| 18 | EE18-Ex | 1206        | 1606        | 394         |
| 19 | EE19-Ex | 606         | 2106        | 394         |
| 20 | EE20-Ex | 606         | 2106        | 494         |
| 21 | EE21-Ex | 806         | 2106        | 394         |
| 22 | EE22-Ex | 806         | 2106        | 494         |
| 23 | EE23-Ex | 1206        | 2106        | 494         |
| 24 | EE24-Ex | 806         | 2456        | 394         |
| 25 | EE25-Ex | 806         | 2456        | 494         |
| 26 | EE26-Ex | 1206        | 2456        | 494         |



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Our standard range covers up to 69 kV and increasing up to 150kV is under construction. Umbilical could fit each Customer requirement for cables installation and "Call-off Contract for Cable Repair Service" comprising:

- Terminations
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Our submarine power joints have been tested at 120 m depth while optical submarine joint have been tested at 2000 m. through an independent laboratory.

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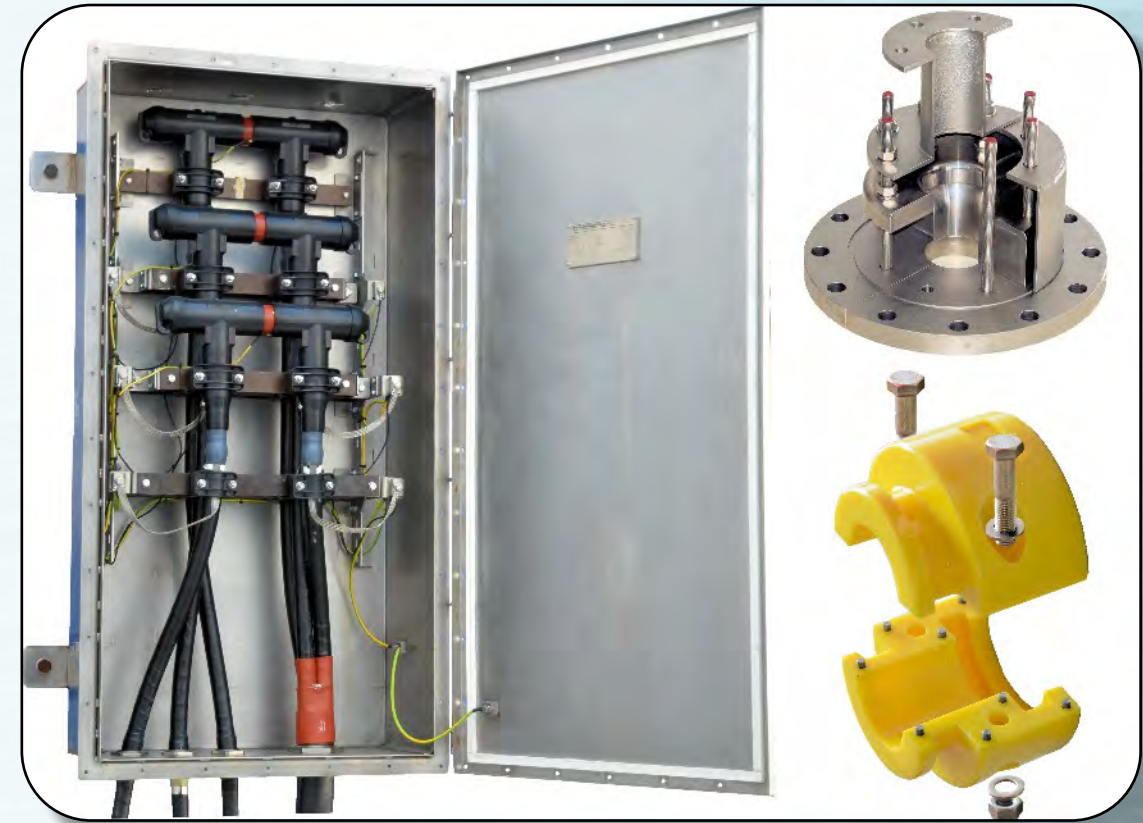


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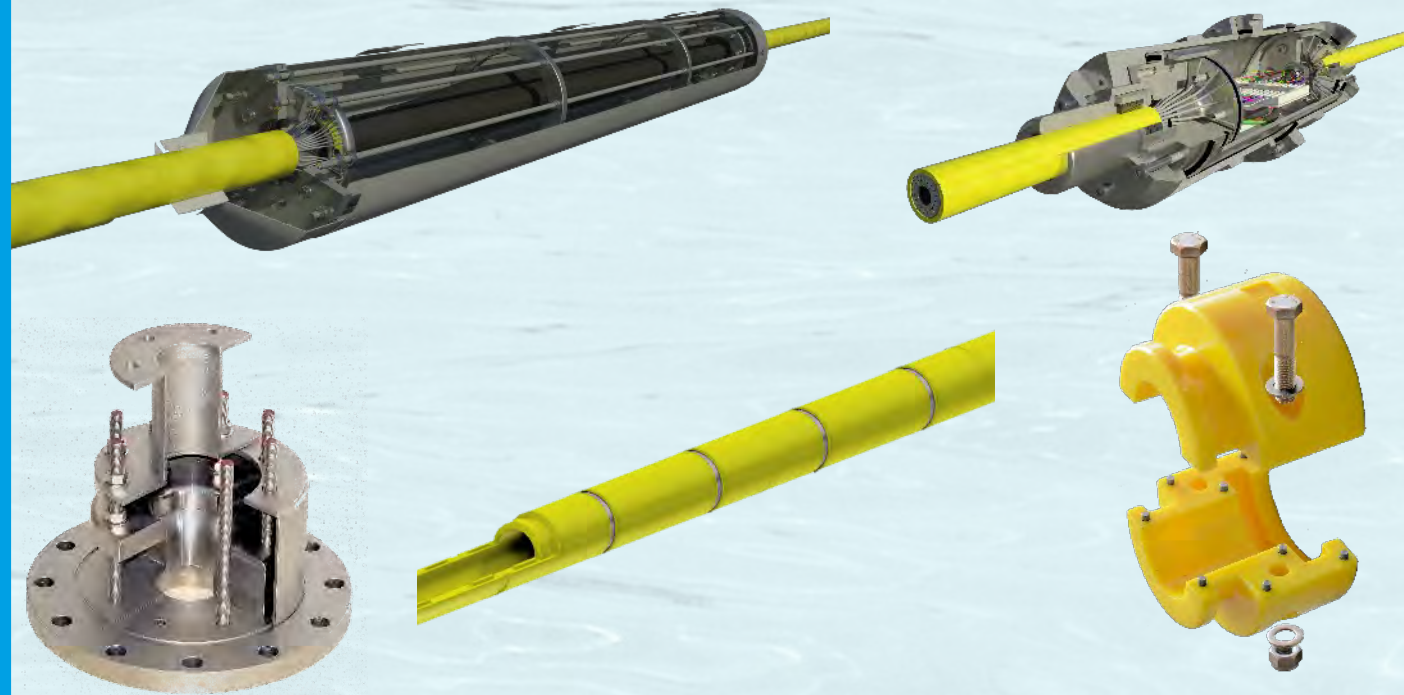


# ACCESSORIES & ANCILLARIES





**SUBMARINE CABLE ACCESSORIES**



**SUBMARINE JOINTS FOR MEDIUM VOLTAGE POWER CABLES**

A universal range of power submarine joints allow PCS to provide a unique solution that covers different ranges of insulation, voltages and size.

Joint is developed in cooperation with Nexans for the electrical part to provide to customers a reliable supplier for electrical joints.

The joint have been tested to an independent laboratory to verify the compatibility for application at 150 m depth with satisfactory results.

**SUBMARINE JOINTS FOR OPTICAL FIBRE CABLES**

With the same universal philosophy also the fibre optic submarine joint has a universal design and allows with the same design, the connection up to 96 fibres thus including the largest industry solutions.

This joint has been designed by PCS and tested in cooperation with Tratos Cavi to an independent laboratory in order to confirm its design compatibility for application until 2000 m depth.

**TOPSIDE HANG-OFF**

To provide a safe solution for cables hang-off on platform, PCS provide specific studies and design purposely the hang-off for topside application.

These ancillaries provide the Customer required pulling strength by use of proven quality material and supported by specific fatigue stress calculation.

**J-TUBE SEALS, CENTRALIZERS AND BEND RESTRICTORS**

From topside to bell-mouth, PCS can provide all ancillaries. J-tube seals or centralizers that can be also completed by suitable bend restrictors elements for an increased safety for cables at j-tube exit

**CABLES BULL-NOSES AND PULLING HEADS**

Cable bull-noses and pulling heads are designed and manufactured in reason of mechanical performances to be granted and cables dimensions.

**JUNCTION BOX**



**Ex** ATEX/IECEX  
POWER AND  
FIBRE OPTIC

| CODE   | H<br>[mm] | L<br>[mm] | D<br>[mm] |
|--------|-----------|-----------|-----------|
| EE01Ex | 494       | 509       | 266       |
| EE02Ex | 494       | 509       | 356       |
| EE03Ex | 794       | 509       | 266       |
| EE04Ex | 794       | 509       | 356       |
| EE05Ex | 794       | 809       | 266       |
| EE06Ex | 794       | 809       | 356       |
| EE07Ex | 1294      | 709       | 266       |
| EE08Ex | 1294      | 709       | 356       |
| EE09Ex | 1694      | 909       | 356       |
| EE10Ex | 1694      | 909       | 456       |
| EE11Ex | 1694      | 1309      | 356       |
| EE12Ex | 1694      | 1309      | 456       |
| EE13Ex | 1294      | 1109      | 356       |
| EE14Ex | 1294      | 1109      | 456       |
| EE15Ex | 2194      | 709       | 456       |
| EE16Ex | 2194      | 909       | 456       |
| EE17Ex | 2544      | 909       | 356       |
| EE18Ex | 2544      | 1309      | 356       |

**Limit conditions for operation**

For use in an explosive atmosphere consisting of a mixture of air and flammable substances in the form of gas, vapours, mists (G), the environmental conditions of operation are:  $-20 \div +60 [^{\circ}C]$

IP 65 and/or IP 66 protection type: Ex-nA (up to 15kV) , Ex-tc , Ex-e , Ex-tb , Ex-nA op pr

Certified by **CESI**

For use in an explosive atmosphere consisting of a mixture of air and combustible dust (D), the equipment provides a level of effective protection for powders with a particle size average from 75  $[\mu m]$  to higher.