



Dynamic Power Umbilical For Wave Energy Buoy System

DE REGT Marine Cables has worked closely with the world's leading renewable energy organisations to deliver a range of subsea solutions for wave power transfer and export.

The engineering and manufacture of the dynamic power umbilical for Ocean Power Technologies' PowerBuoy® wave energy device marked a key milestone in DE REGT Marine Cables investment in the offshore renewables sector.

The PowerBuoy® converts ocean wave energy into useable electric power for utility-scale grid connect applications. DE REGT Marine Cables dynamic power umbilical incorporates 3.3kV 3phase power cores and fibre optic cables for

data transfer and provides the interface between the PowerBuoy® and the underwater substation pod which collects and transforms the power.

Dynamic Power Umbilical for Ocean Power Technologies' PowerBuoy Wave Energy Device

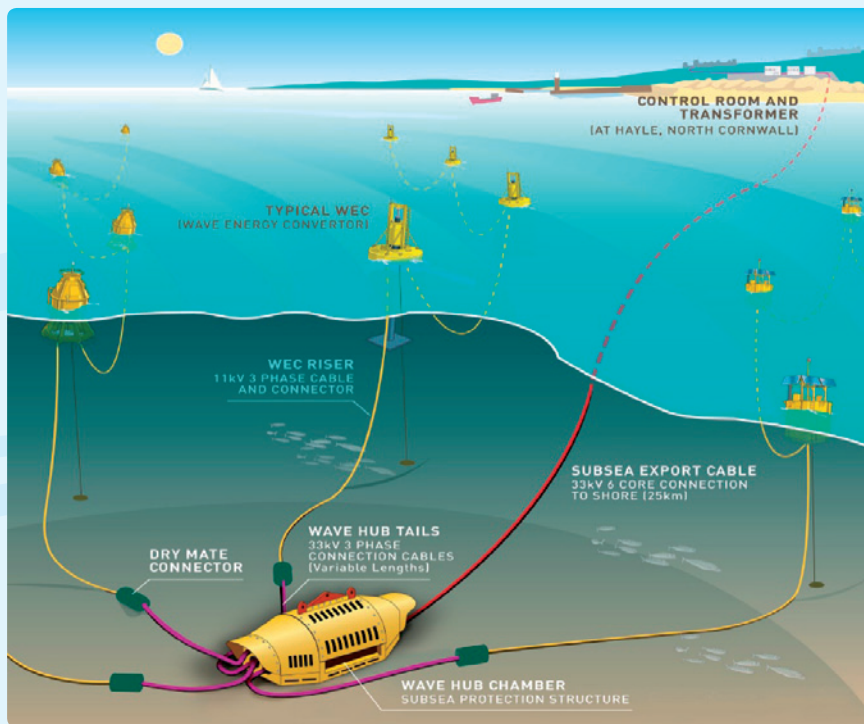


Wave Energy Converting systems must withstand some of the harshest environmental conditions on earth. Salt water and blistering solar effects present a variety of corrosion and integrity challenges, whilst stormforce winds and swells generate extreme dynamic wave motion. These constant factors place intense loads on the system

and require high flexure endurance of the cable. DE REGT Marine Cables has significant experience in the design and engineering of dynamic power and signal cables for a range of offshore energy and towed marine applications where similar environmental challenges are faced.

DE REGT Marine Cables robust life of field design for the PowerBuoy umbilical incorporates:

- 3.3kV 3-phase cable split into 2 cores (6 cores total)
- Rated to 750kW
- 4 stainless steel tubes each containing 4 fibre optics
- 800kN break strength

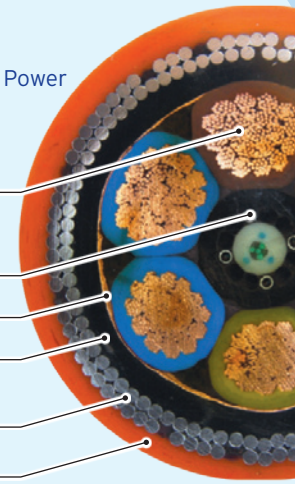


Wave hub energy test centre

Mechanical data

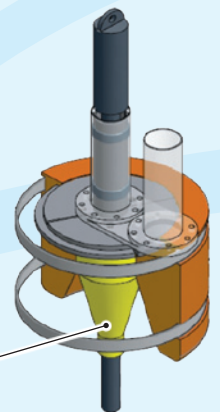
60mm² CU, 3.3kV Subsea Power Umbilical (72mm OD)

- 6 x 60mm² 3.3kV Power Cores: Stranded CU conductor; EPDM insulation
- 4 x Fibre Optic Cables with 4 off 9/125- μ m single mode fibres (in gel filled stainless tube)
- Filler wires and CU shield
- 3mm Polyethylene inner sheath (armour wire bedding)
- Armour package comprising double layer galvanised steel wire
- 4mm Polyethylene outer sheath



High strength termination assembly

DE REGT Marine Cables developed an innovative installation technique for the project. A custom designed buoyant termination mechanism was employed that reduced installation costs by eliminating the need for an ROV or diver during installation at sea. To ensure the 20 year lifetime requirement, Trelleborg's BSR was applied on the termination components.



Specially designed floating mechanism

Qualification testing

DE REGT Marine Cables performed extensive inhouse qualification testing on the umbilical system including the floats used to hold the cable in an "s-curve" once installed. The tests included elongation, rotation and torque measurements of the cable while undergoing specified load patterns. Tensile failure testing determined the ultimate strength. Tension-tension fatigue of the product was undertaken and 1 million bending cycles along the floats was performed to simulate the constant bending motion the umbilical will see throughout its lifetime.

DE REGT Marine Cables is a leading worldwide provider of custom designed and manufactured umbilical systems and specialised marine cables for a broad range of applications in the oil and gas sector, seismic and defence market and the growing offshore renewables industry.

For more details on DE REGT Marine Cables capabilities and services please contact: DE REGT Marine Cables B.V., Zaag 2-4, 2931 LD Krimpen aan de Lek, PO Box 2100, 2930 AC Krimpen aan de Lek, The Netherlands, T +31 (0)180 668 800, E info@deregtcables.com