

Power Umbilicals

Providing connections to power and control critical subsea assets

Medium voltage power cables included in umbilical designs provide a safe and efficient method for distributing power to subsea equipment such as pumps and subsea processing equipment.

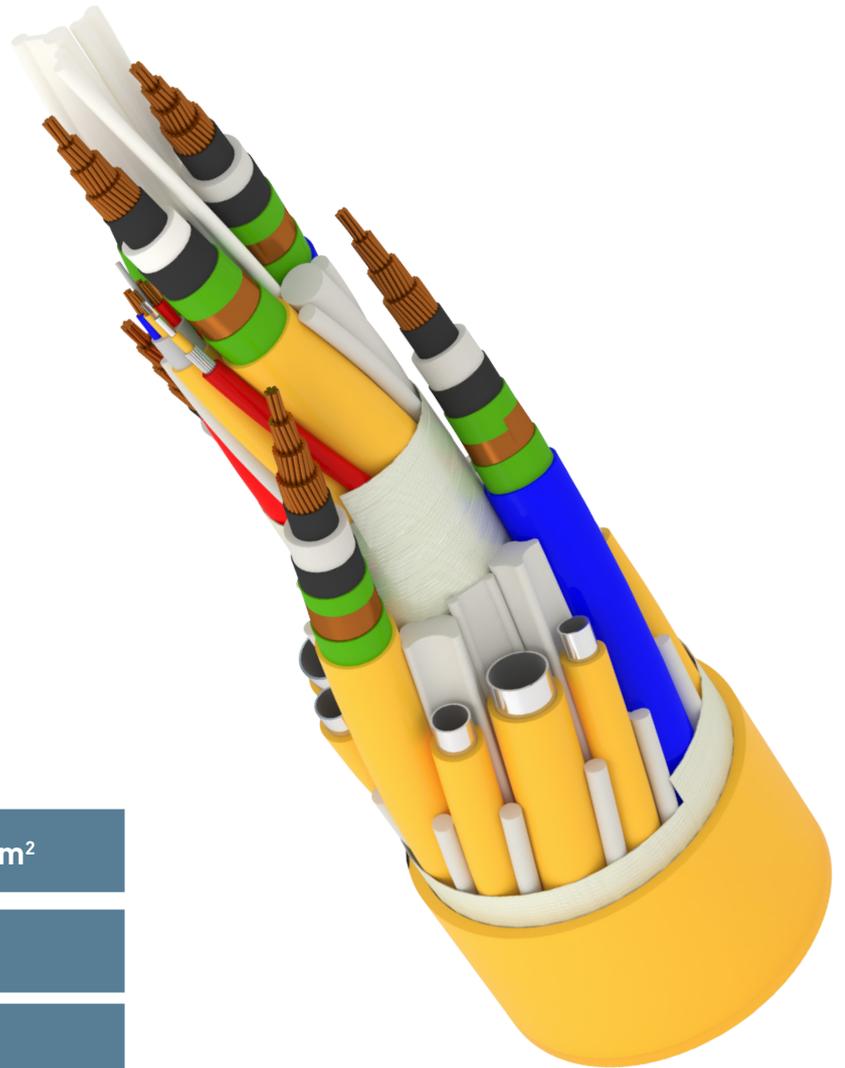
Further power, control, and communication functions may be supported with the inclusion of low voltage electrical and fiber optic cables into a power umbilical design.

FEATURES

MV cable sizes from 16 mm² to 1,000 mm²

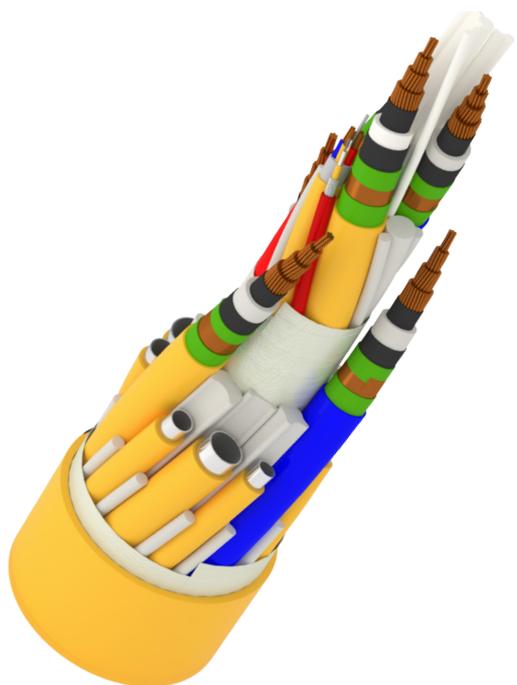
Working voltages up to 46 kV

Ultra deepwater applications



Power Umbilicals

The inclusion of power transmission functions to a production control umbilical allows operators to overcome flow assurance challenges presented by deep water, long offsets and low reservoir pressures. The depth and breadth of Oceaneering experience enables supply of reliable power umbilicals that support economic production from challenging projects.



Advantages and Characteristics

- » Multiphase AC power cables with voltage ratings up to 46 kV for pumps and compressors
- » Catalog of low voltage and fiber optic cables for complementary power and signaling or temperature, strain, and partial discharge monitoring
- » Designs can incorporate Oceaneering's thermoplastic hoses or steel tubes for hydraulic control or supply of fluids used in subsea pumps or other systems
- » Strength members for deep and ultra-deep water dynamic applications
- » Detailed steady state and transient electromagnetic and thermal analysis carried out to determine system limitations and safe operating conditions
- » World class manufacturing, extensive track record and expert project management

Parameter	Value
Maximum diameter	12.6 in / 320 mm (maximum outside diameter to date)
Strength member	Typically galvanized steel armor wire, helically wound
Manufacturing length limitations	None. Qualified splicing and jointing processes are available.
Axial, bending, and torsional stiffness	Optimized during design
Tension/Torsion Factor	Designs are torque balanced.
Design Life	25 years, as standard. Longer life can be provided.
Packing, transportation, load out	Determined by umbilical characteristics and client requirements Reel, carousel
Installation methods	Umbilicals designed to suit client's installation method
Industry Specification Compliance	ISO 13628-5 / API 17E NORSOK U-001 DNV-OS-F101

Electrical Cables

Medium Voltage Cables

Oceaneering supplies Medium Voltage (MV) power cables in a range of conductor sizes, material options and voltage ratings. Our MV power cables provide a reliable method of distributing power in subsea environments.

Parameter	Value
Conductor configurations	Single sheathed core or triad
Conductor Size	24.8 in ² - 155 in ² / 8 AWG - 2,000 kcmil
Conductor material	Compacted, water blocked, stranded copper
Core Insulation Material	EPR or XLPe
Outer Jacket Material	HDPe
Maximum Operating Voltage	6 kV - 36 kV (IEC compliant) 5 kV - 46 kV (ICEA compliant)
Operating Temperature	14° F - 185° F / -10° C - 85° C (EPR) 14° F - 194° F / -10° C - 90° C (XLPe)
Screen/Shield	Semiconducting EPR or XLPe conductor and insulation screen/shield. Copper or tinned copper metallic screen.
Industry Specification Compliance	ISO 13628-5 / API 17E IEC 60502 Part 2 ICEA S-93-639, S-94-649, S-97-682 Cigre TB490

Fiber Optic Cables

Oceaneering supplies fiber optic cables with a range of fiber modes and quantities. Fiber optic cables can also be included in an umbilical's design to provide temperature and strain and/or partial discharge monitoring for operational monitoring of power umbilicals.

Parameter	Value
Fiber modes	Single mode Cut-off shifted single mode Multi mode
Number of fibers	1 - 96
Construction	Loose tube assembly
Sheath material	Polyethylene
Reinforcement	Galvanized steel wire armor or aramid yarn
Industry Specification Compliance	ISO 13628-5 / API 17E ITU-T G.652, G.654, or G.651 and G.976 IEC 60793 and 60794

Low Voltage Cables

Oceaneering supplies low voltage electrical cables for use in power umbilicals. The cable includes a fully belted design which is suitable for use in deep water environments. Also available are design options which can reduce common mode and differential mode induced voltages, which are unavoidable in certain power umbilical applications.

Parameter	Value
Conductor configurations	Pair / Triple / Quad / Other Multicore Designs
Conductor Size	3.9 in ² 7.8 in ² // 13 AWG - 1/0 AWG
Maximum Operating Voltage	3.6 kV (IEC Compliant) 5 kV (ICEA Compliant)
Screen/Shield	Multiple screen/shield options available
Reinforcement	Optional metallic wire and/or aramid yarn
Industry Specification Compliance	ISO 13628-5 / API 17E IEC 60502 Part 1, ICEA S-95-658, ICEA S-96-659





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