ODI

Subsea Power Solutions

Product selection guide

NAUTILUS™
CONNECTOR

SUBSEA ELECTRICAL
PENETRATORS

WELL BORE
CONNECTORS

TELEDYNE ODI
Everywhereyoulook™

Subsea Power Systems:

Teledyne ODI designs complex engineered solutions for subsea interconnect applications, meeting challenges brought on by high pressures, temperatures, and voltage. Teledyne ODI offers a comprehensive line of subsea electrical interconnect products.

The product line includes:

- Standard Power Connectors: 1.7 kV
- Subsea Power Connectors: 7 kV to 15 kV
- Electrical Penetrators and Umbilical Terminations

These products will accommodate a variety of pressure, depth, and voltage ratings. All wet mate connectors are based on Nautilus™ technology: a patented, field-proven design providing a reliable sealing and mating mechanism throughout the life of the connector. Electrical penetrators and terminations are developed in conjunction with Teledyne Scientific and Imaging, a world-class research and development lab specializing in materials science. For project requirements that may go above and beyond the current product ratings, Teledyne Oil & Gas provides a New Product Development team staffed with scientists, engineers, and materials experts to design a custom product or system.

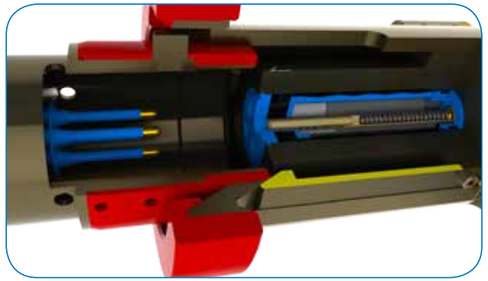
Applications include:

- Subsea control systems
- Subsea instrumentation
- Pumping, processing, and boosting equipment

Wet Mate Connector Design Features:

- A patented shuttle pin design with dual independent seals and oil reservoirs that provide redundant sealing mechanisms for a reliable connection over the life of the connector
- Qualified for mate/demate cycles at pressure in a turbid environment
- Designed with the benefit of advanced material science testing and certification

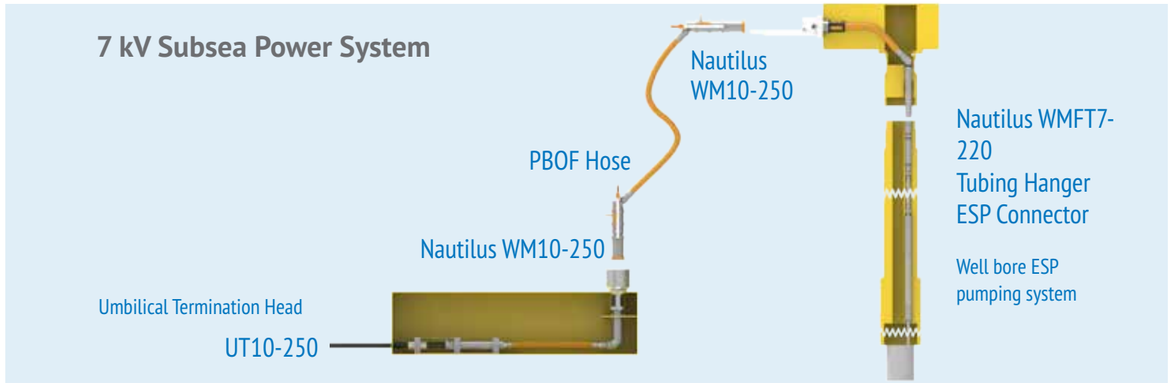
Standard Nautilus™ Mating Process

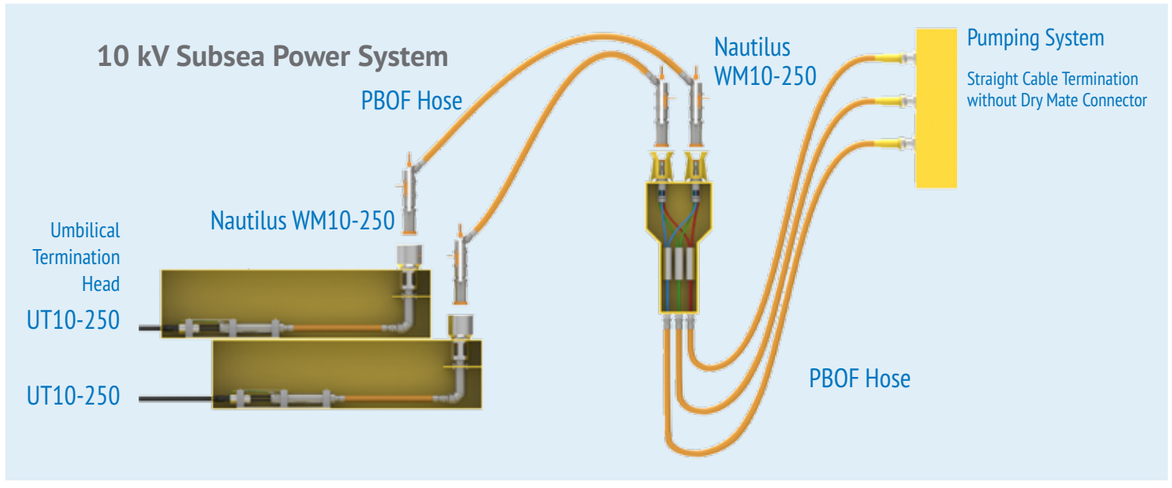


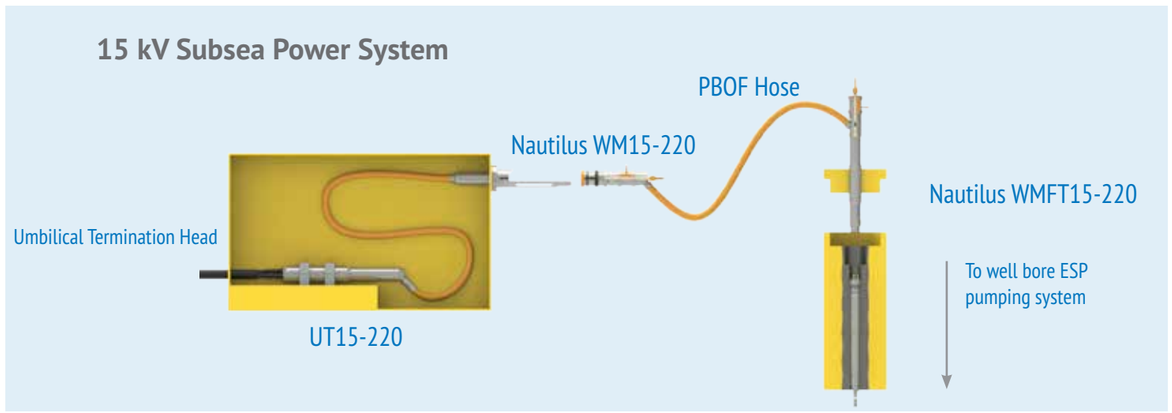
Unmated

Mated

Subsea Power Systems:







Note: layouts shown for example only. Additional system configurations available.

Wet Mate Power Connectors:

	Product Line	Product Application	Number of Circuits	Configurations	Voltage Ratings (Uo/U (Um))	Current Ratings	Max Operational Temperature	Max Operational Pressure	Design Life (years)
	Nautilus WM1.7-30	Subsea	4,7,12-way	ROV, Manual Mate, and Stab Mate	1/1.7 (2) kV	30 A	50 °C	10,000 PSI	30
	Nautilus WM1.7-60	Subsea	4-way	ROV, Manual and Stab	1/1.7 (2) kV	60 A	40 °C	4,350 PSI	25
	Nautilus WM10-250	Subsea	3-way	ROV, Stab	6/10 (12) kV	250 A	Recept: 30 °C Plug: 80 °C	Recept: 4,350 PSI external Plug: 5,300 PSI internal	10
	Nautilus WM15-220	Subsea	3-way	ROV, Stab	8.7/15 (17.5) kV	220 A	25 °C	4,350 PSI	20
	Nautilus WMFT7-220	Well Bore	3-way	Stab	4.0/7.0 (8.0) kV	220 A	121 °C	15,000 PSI	10
	Nautilus WMFT15-220	Well Bore	3-way	Stab	8.7/15 (17.5) kV	220 A	110 °C	4,350 PSI	10

Electrical Penetrators & Terminations:

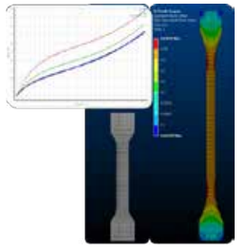
	Product Line	Product Application	Number of Circuits	Configurations	Voltage Ratings (Uo/U (Um))	Current Ratings	Operational Temperature	Operational Pressure	Design Life (years)
	P1.7-30	Subsea Penetrator	4,7,12-way		1/1.7 (2) kV	30 A	50 °C	10,000 PSI	30
	UT10-250	Umbilical Termination	3-way	ROV	6/10 (12) kV	250 A	30 °C	4,350 PSI	25
	P10-250	Subsea Penetrator	1-way		6/10 (12) kV	250 A	121 °C	12,880 PSI	20
	P10-250-3	Subsea Penetrator	3-way		6/10(12)kV	250 A	50 °C	10,000 PSI	25
	P10-250	Subsea Penetrator/ Wetmate Plug	3-way	ROV	6/10 (12) kV	250 A	80 °C	5,300 PSI	10
	UT15-220	Umbilical Termination	3-way		8.7/15 (17.4) kV	220 A	25 °C	4,350 PSI	20

Subsea Innovation:

The Technology Development center, headquartered in Daytona Beach, FL, houses a state-of-the-art subsea engineering center, test lab, and ocean simulation lab, staffed with teams of mechanical and electrical engineers, materials experts, and reliability engineers.

Capabilities include:

- Finite Element Analysis (Structural, thermal, electrical, vibration)
- Subsea engineering and circuit board design
- Reliability Engineering and Accelerated Life Testing (ALT)
- Molding design and process development



Subsea Reliability Testing:

The test lab at the Teledyne Oil & Gas Technology Development Center features the following capabilities:

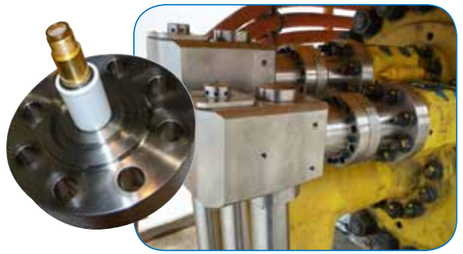
- 14 Hyperbaric chambers with ratings up to 40,000 PSI
- 6 thermal chambers capable of -70 °C to +165 °C
- High Voltage Testing
  - Partial Discharge – 100 kVAC
  - High Voltage Capabilities – 100 kVAC, 40 kVDC
  - High Current Capabilities – Up to 2,000 A, continuous
  - Temperature Rise
- Vibration Testing (Environmental Stress Screening)
- Multi-stress testing to simulate subsea conditions

Materials Science Expertise:

Teledyne Oil & Gas works closely with research partner Teledyne Scientific to provide cutting-edge materials expertise for challenging applications.

Teledyne Scientific has a unique heritage that traces back to its foundation in the 1960s as the Rockwell International Science Center. From deep space, where Teledyne provides infrared imagers for space telescopes, to the deep sea, Teledyne Scientific successfully serves the Oil and Gas industry with advanced research & development for demanding and specialized environments.

TELEDYNE
SCIENTIFIC & IMAGING



Development of the world's first subsea High Pressure/ High Temperature ceramic penetrator enabled by close cooperation between Teledyne Oil & Gas and Teledyne Scientific

Subsea Power Accessories:

Parking Positions and Long-term Protective Caps:

The long-term protective caps safe-guard the exposed plug connector pins when operational scenarios require extended time subsea. Parking positions allow for storage of Electrical Flying Leads's and long-term protective caps.

Test Connectors:

A complete suite of test plugs and receptacles is available for both bulkhead and cable end (flying) configurations. The test connectors are suited for surface testing only and not intended for subsea use.

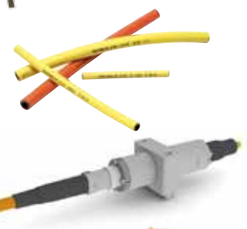
Transportation Protection Caps:

Primarily used to protect the connector face from damage or exposure during shipping and storage, the transportation protection caps are available for both plug and receptacle connectors. Not intended for subsea use.

Related Product Offerings From Teledyne ODI:

Modular Connectorized Distribution Unit (MCDU):

A modular family of subsea distribution units.



Pressure-Balanced, Oil-Filled (PBOF) Hose Assemblies:

PBOF hose assemblies with attached connectors or sensors on one end or both ends.

Field Assembled Cable Terminations (FACT):

Electric, optical, and hybrid cable termination assemblies in 1-way through 7-way configurations. Compact size available.

Optical & Hybrid Wet Mate Interconnects:

Highly reliable optical and hybrid configurations.

Related Product Offerings From Teledyne Oil & Gas:

DGO – High Differential Pressure Interconnects & Penetrators:

- Multiple shell and insert configurations in glass reinforced epoxy with glass-to-metal sealing for high temperature / high pressure challenges.

Impulse - Dry Mate Submersible Electrical Assemblies:

- Multiple design configurations for subsea instrumentation. Expertise in complex molding and encapsulation design assembly.

Cormon - Corrosion and Sand Erosion Monitoring, Pressure and Temperature Sensing Solutions:

- Multiple in-line intrusive sensor configurations for high resolution, real-time data collection on metal loss, pressure/temperature, and sand particle detection.

Global Presence

Teledyne Oil & Gas is a global organization with manufacturing facilities and service and test centers around the world. A team of 30+ cross-trained, multi-lingual field service technicians remain ready 24/7 for routine and emergency deployments anywhere Teledyne products are being used.

A member of Teledyne Marine

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