

Diamond Power Connector

Three-phase wet-mateable connector

The OneSubsea™ Diamond three-phase wet-mateable connector provides a highly reliable subsea connection system for high-horsepower motors and pumps (1.5 to 2.0 MW). This connector is available in configurations for ROVs and wellhead penetration.

For wellhead applications, the tubing hanger receptacle is configured with electron beam-welded contacts to form a gas barrier at the tubing hanger, and it is PR2 tested to API 6A requirements. For electric submersible pump (ESP) applications, the ESP cable (round or flat profile up to 2/0 AWG) terminates to a dry-mate connector at the rear of the tubing hanger wet-mate receptacle.

DESIGN

Protection is provided to the electrical contacts by oil-filled pressure-balanced enclosures. The connector uses a unique wet-mate technology to protect both pin and socket contacts while the connectors are unmated, allowing the connectors to be deployed subsea, open face, without the need for expensive protective connectors.

During mating, the receptacle connector male contact pin wiper establishes a seal with the front face of the plug connector, forming a continuous insulation system. The receptacle male contact pins first enter the plug's primary and then secondary diaphragms, where they make a connection with the plug socket contacts. This dual-protection system graduates the voltage field between the mated, energized connectors, eliminating the earthing effect of seawater.

METALIZED INSULATION SYSTEM

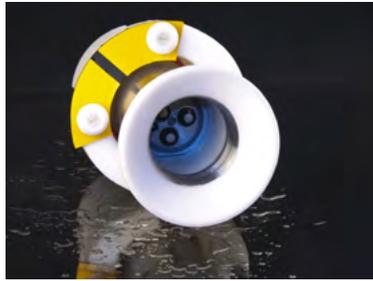
At high voltages, insulators often experience discharges at the interface to metallic housings where air voids are present, typically around O-rings. A proprietary process for metalizing polyetheretherketone (PEEK) insulators reduces the effects of electrical discharge, thereby extending the life of the insulator.

ROV INTERVENTION

ROV configurations feature built-in compliance at both plug and receptacle interfaces for ease of ROV make up. A push-pull four-finger latch system is incorporated with the abatement shoulder and debris seal. Orientation and sighting systems also are provided.

TERMINATION

Cables are terminated to the connector with precision crimps. Each crimp is secured to the connector by a boot seal that incorporates a latch mechanism capable of resisting high cable pull-out forces. The crimp and boot terminations provide a reliable, repeatable termination method. The connectors are terminated to an oil-filled subsea hose to form a jumper system. Jumper systems are filled with dielectric oil under vacuum during manufacturing and are pressurized for positive compensation at depth pressure.



*Top: ROV receptacle connector.
Bottom: ROV plug connector.*

APPLICATIONS

- Electric submersible pumps (ESPs)
- Subsea power distribution systems

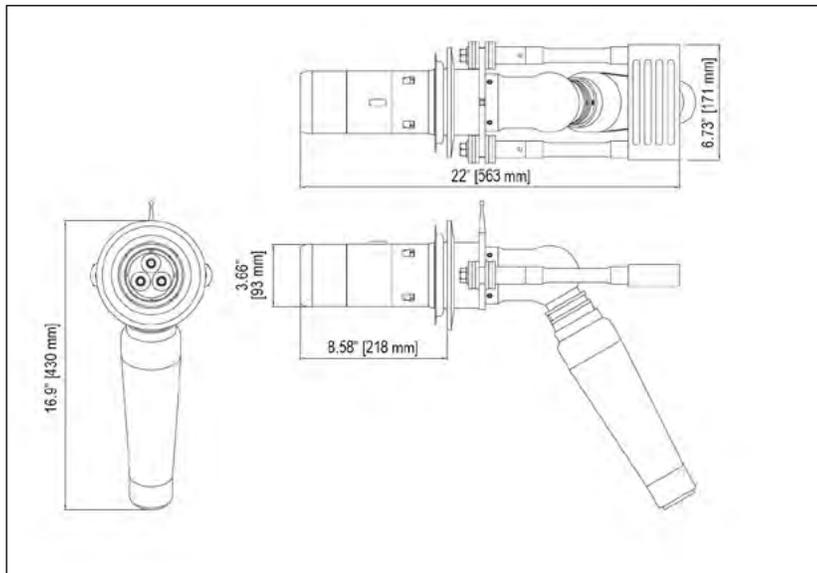
ADVANTAGES

- Pressure-balanced design to minimize stress across seals
- Male and female electrical contacts that are protected from environment
- Crimped cable terminations (no soldering required)
- Capability of repeated subsurface mates and de-mates without loss of operational integrity
- Resistance to ingress of sand and silt deposits
- Coatings to prevent risk of galling
- Maintenance-free design
- Partial discharge-free contacts to 8kV AC

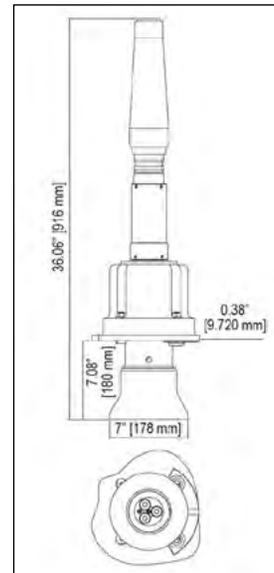
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TECHNICAL SPECIFICATIONS

OPERATING TEMPERATURE, ° F (° C)	32 to 176 (0 to 80)
STORAGE TEMPERATURE, ° F (° C)	-40 to 122 (-40 to 50)
MAX. OPERATING DEPTH, ft (m)	10,000 (3048)
NO. OF MATE/DE-MATE CYCLES (SUBSEA)	>100
DESIGN LIFE (SUBSEA), Y	25
NUMBER OF CONTACTS	3
MAX. CONNECTOR MATING FORCE, N (lbf)	<100 (<450)
VOLTAGE RATING, U₀/U/U_m	4.6/8.0/9.2
WITHSTAND TEST VOLTAGE, kV AC	16.1
POWER FREQUENCY TEST VOLTAGE, kV AC	18.5
BREAKDOWN VOLTAGE (>8 U₀), kV AC	>37
IMPULSE VOLTAGE LEVEL, kVp	>75
CURRENT RATING (CONTINUOUS), amp	220
INSULATION RESISTANCE AT 68° F (20° C), GΩ	>10
CONTACT RESISTANCE AT 68° F (20° C), mΩ	<2.5
HOUSING	Super-duplex stainless steel
CONTACTS	Gold-plated beryllium copper
INSULATION	Polyetheretherketone (PEEK)
SEALING SYSTEMS	Various compounded elastomers



Plug details.



Receptacle details.

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