

DMFT5-200

A 5 kV, 200 A electrical feedthrough system for topside applications

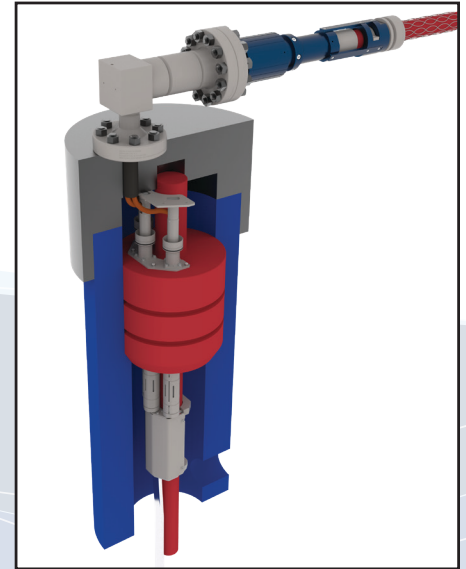
Three-Phase, Medium Voltage Electrical Feedthrough

Designed for offshore dry tree platforms, the patented DMFT5-200 is an innovative, modular system that provides reliable 3-phase connectivity from downhole Electrical Submersible Pumps (ESPs) to the surface. The interconnect system utilizes patented fire-resistant ceramic insulation technology, making it the only ESP wellhead penetrator capable of performing to the same pressure-integrity standards as the wellhead it is installed on. The DMFT5-200 enables operators to assemble and test the majority of the components onshore and easily refurbish modular sections, lowering costs both during installation and over the life of the tree. The fire-resistant penetrator is qualified for safe operation in potentially flammable atmospheres where the ATEX and IEC Ex standards apply, such as those found on offshore oil platforms.

Teledyne developed this solution to address a technology gap in the market for fire-resistant wellhead penetrators for surface trees.

The system consists of:

- DM5-200: Dry mate connector rated to 5 kV and 200 A
- FlameGuard™ P5-200: Ceramic, fire-resistant penetrator rated to 5 kV and 200 A
- P5-200: 5 kV, 200 A penetrator constructed with thermoplastic pins



FlameGuard™ Patented Ceramic Pin Technology

The material for the fire-resistant ceramic penetrator was developed in cooperation with Teledyne Scientific, an internal research and development lab with extensive expertise in material testing. The DMFT5-200 utilizes both ceramic and thermoplastic penetrator are utilized strategically to increase reliability and safety while minimizing costs. The ceramic penetrator is used in the outermost fire-resistant envelope and in metal-to-metal sealed envelope. The thermoplastic penetrator is located within the tree, where it is protected from external heat sources, such as fire. The penetrators can be reconfigured and interchanged, allowing the use of typical downhole sealing technologies such as spring seals and packing seals, and avoiding NPT threads and O-rings.

PRIMARY FEATURES AND BENEFITS

- **The industry's first fire-resistant power penetrator reduces risk to personnel and assets**
- **Patented modern, modular design allows bulk of assembly and testing onshore to lower installation costs**
- **Easily refurbishable components reduce cost over the life of the field**
- **Factory support and field installation assistance available globally**



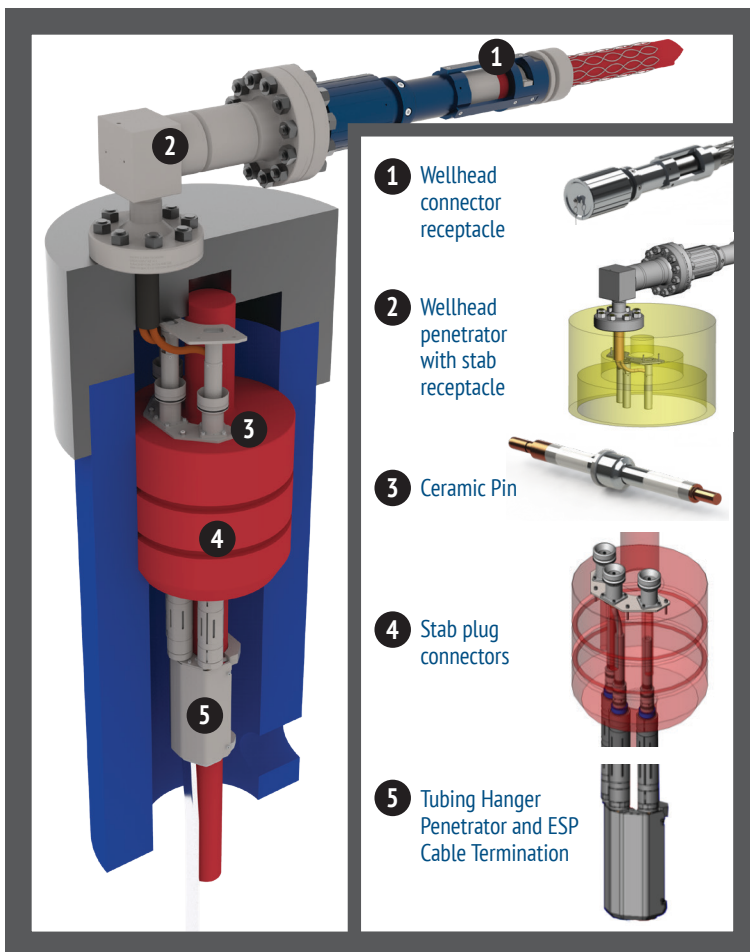
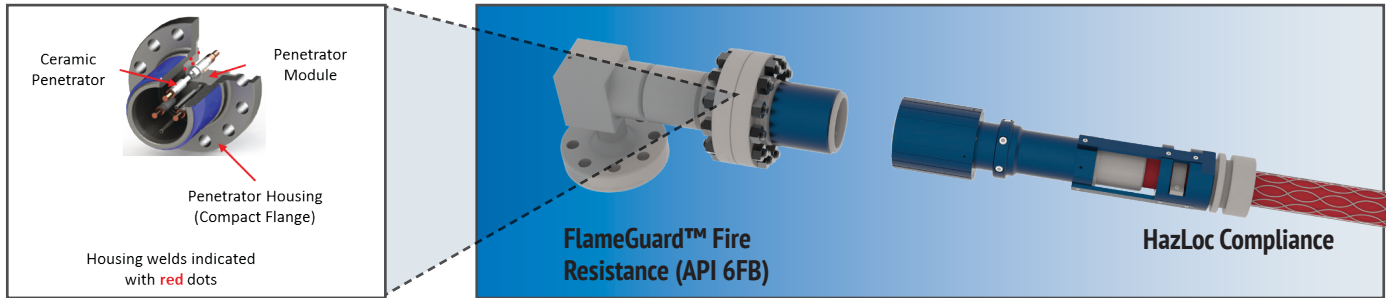
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Fire Resistance

Pressure barriers are fire resistant, conforming to API 6FB, Part II. This technology enables electrical interfaces to be held to the same standard as flanges, valves, and control lines in the fire resistant envelope. In addition, further qualification can be performed if required to meet onshore regulations.



TECHNICAL SPECIFICATIONS

GENERAL SPECIFICATIONS	
Working Pressure	5000 psi (345 Bar)
Rated Pressurization/Depressurization Rate ¹	1305 psi/min (90 Bar/min)
Voltage Rating [U _o /U (Um)] ¹	3/5 (6) kV AC
Current Rating	200 A
Operating Temperature ¹	-4 °F to 250 °F (-20 °C to 121 °C)
Storage Temperatures	-4 °F to 140 °F (-20 °C to 60 °C)
Steady state power frequency range ¹	35 to 70 Hz
Design Life	10 years
Hazardous Location Rating ²	Ex db IIB T6 Gb
Fire Resistance Rating	Per API 6FB, Part II
Short-Circuit Rating	6 kA for 1 second

¹ Based on existing qualification test data for the most common configuration; contact Teledyne Oil & Gas if your application requires a wider operating envelope.

² Certificate Numbers: Sira 18ATEX1068X, IECEx SIR 18.0055X

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TECHNICAL SPECIFICATIONS

DESIGN, FABRICATION, AND QUALIFICATION BASIS STANDARDS²

API Spec 6A	Specification for Wellhead and Tree Equipment
API Spec 6FB	Fire Test for End Connections
API Spec 17D	Design and Operation of Subsea Production Systems— Subsea Wellhead and Tree Equipment
API RP 11S6	Recommended Practice for Testing of Electric Submersible Pump Cable Systems
IEEE Std 43	IEEE Recommended Practice for Testing Insulation Resistance of Electric Machinery
IEC 60079-0	Explosive atmospheres - Part 0: Equipment - General requirements
IEC 60079-1	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures “d”
IEC 60502-2	Cables for rated voltages from 6 kV (Um = 7,2 kV) up to 30 kV (Um = 36 kV)
IEC 60502-4	Test requirements on accessories for cables with rated voltages from 6 kV (Um = 7,2 kV) up to 30 kV (Um = 36 kV)
IEC 61442	Test Methods for Accessories for Power Cables with Rated Voltages from 6 kV up to 30 kV
NACE MR0175 (ISO 15156)	Materials for use in H2S-containing environments in oil and gas production
NORSOK M-001	Materials Selection
NORSOK M-501	Surface preparation and protective coating
NORSOK M-710	Qualification of non-metallic sealing materials and manufacturers
Equinor TR3540	Surface Wellhead and Christmas Tree Systems
Equinor TR2385	Well Completion Equipment
Equinor TR0062	Material and Fabrication Requirements for Well Equipment

² Listed standards are provided for reference only and complete adherence is not implied. The specific applicability of standards and parts of standards is to be agreed upon with the client.



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