

# WellConnect™

## Subsea WHO Electrical Penetrator - V2

The Wellhead Outlet (WHO) Penetrator is a Dry Mateable Subsea Electrical Connector designed to provide continuous electrical connection through Wellhead equipment. Typically this will be from a Tree mounted Wet mateable Connector to a Diver/ROV Connector situated at the Junction Box. The Connector is mounted to a Flange which is then mounted to a pre-machined face on the Wellhead equipment. The mating half of the Connector is terminated to an Oil Filled Subsea Jumper via an Omnitec Mk 2 interface or Subsea Connector.

### Operational Requirements

Location within Completion:	Subsea, Wellhead
Rated Pressure:	20,000 Psi
Test Pressure:	30,000 Psi
Working Temperature Range:	-4°F to 311°F (-20°C to 155°C)
Storage Temperature Range:	-40°F to 158°F (-40°C to 70°C)
Deployment Water Depth:	0-10,000ft (0-3,048m)

### Mechanical Requirements

Crimp Termination Strength:	>75% UTS of Cable
Cable Pull Out Force:	>1300 lbf (5783N)
Connection Cycle Life:	>100
Sealing:	M-M Primary, Elastomeric Secondary
Orientation:	Keyed interfaces

### Electrical Specification

Maximum Working Voltage:	1000 Vdc
Test Voltage:	2500 Vdc
Maximum Working Current:	5A
Max Contact Resistance at 20°C:	<2.5m Ω
Insulation Resistance at 20°C:	> 10G Ω
Insulation Resistance at 121°C:	> 500M Ω
Number of Contacts:	2
Electrical Insulation Thermoplastic, Elastomer or Dielectric Fluid	

### Material Specification

Housing Options:	Stainless Steel 316 SAF 2205, 17-4PH
	Stainless Steel or HS Cupronickel in compliance with ISO15156/NACE MR0175
Insulation:	Contact Gold Plated Copper Alloy
Seal Options:	PEEK 450G or Equivalent

Stainless Steel 316 SAF 2205, 17-4PH  
 Stainless Steel or HS Cupronickel in compliance with ISO15156/NACE MR0175  
 Contact Gold Plated Copper Alloy  
 PEEK 450G or Equivalent  
 Hydrogenated Nitrile Rubber, Flurosilicone, Rubber or Silicone

### Design Philosophy

Ease of Termination  
 Electrical Contacts: 1+1 (1 live +1 earth)  
 Crimp Termination  
 Pressure Testable  
 Independent Design Review Validation

### Interfaces

WHO Interface API and Grayloc Sealing Flanges, as per customers requirements.  
 Including as minimum; 1-11/16", 2-1/16" - API BX 150, 152 Ring Tree Cable Termination 1/8" Encapsulated/Hydraulic Tube or 1/4" Encapsulated/Hydraulic Tube  
 Oil Filled Jumper/Hose Termination Omnitec Mk 2 Fitting or Subsea Connector



### Qualification Testing

Contact Resistance  
 Insulation Resistance  
 Proof Voltage  
 Hydrostatic Pressure Test  
 PR2 Test (Pressure & Thermal Cycle)  
 Vibration Test  
 Gas Test  
 Reverse Pressure Test  
 Individual Seal Test

### Key Performance Features

Flexible Design Suiting any Wellhead Prep  
 Ease of termination  
 Earth Continuity  
 2 Live Contacts