



# INSTRUMENTATION & CONTROLS

Custom designed hermetic solutions for instrumentation, sensors, controls, and more.

Every year, we design and deliver hundreds of thousands of instrumentation-specific sealed connectors, and hermetic electrical feedthroughs for sensors, analyzers, and control systems. Feedthroughs are engineered to withstand pressures as high as 15,000 psi and voltages up to 35kV.

While this industry can serve a variety of markets, Douglas Electrical Components has experience designing and manufacturing to service across them, including: Automotive, MIL/Aero, Medical, Oil/Gas/Energy, Semiconductor, UHV, HVAC/R, and Industrial.

## TECHNICAL ADVANTAGES

- Wide range of liquid and gas compatibility
- Design flexibility to integrate custom housings and materials
- Hermetic cable assemblies operating in harsh, hazardous environments
- Can seal any housing material or geometry, often using customer-supplied material.
- Up to 2-inch NPT wire feedthroughs to accommodate large numbers of power leads.
- Ability to seal power, signal, coaxial and fiber optics in a single bulkhead fitting.
- Designs with or capable of hazardous locations approval

## OPERATING CONDITIONS

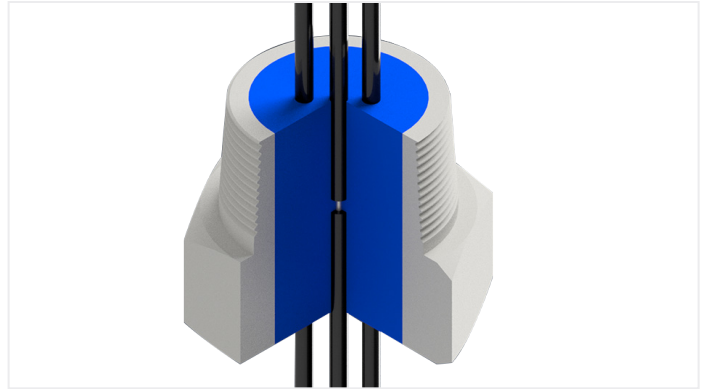
- Operating temperatures range from 4 K (LHe) through high temperatures of 200°C
- Pressures up to 15,000 PSI
- Chemical/Gas/Radiation/Saltwater compatibility is excellent

## QUALITY

- 100% quality control testing
- Leak Rate testing:  $<1 \times 10^{-9}$  cc-He/sec (std atm temp)
- Electrical testing to customers specifications including point-to-point continuity, insulation resistance, and High pot testing

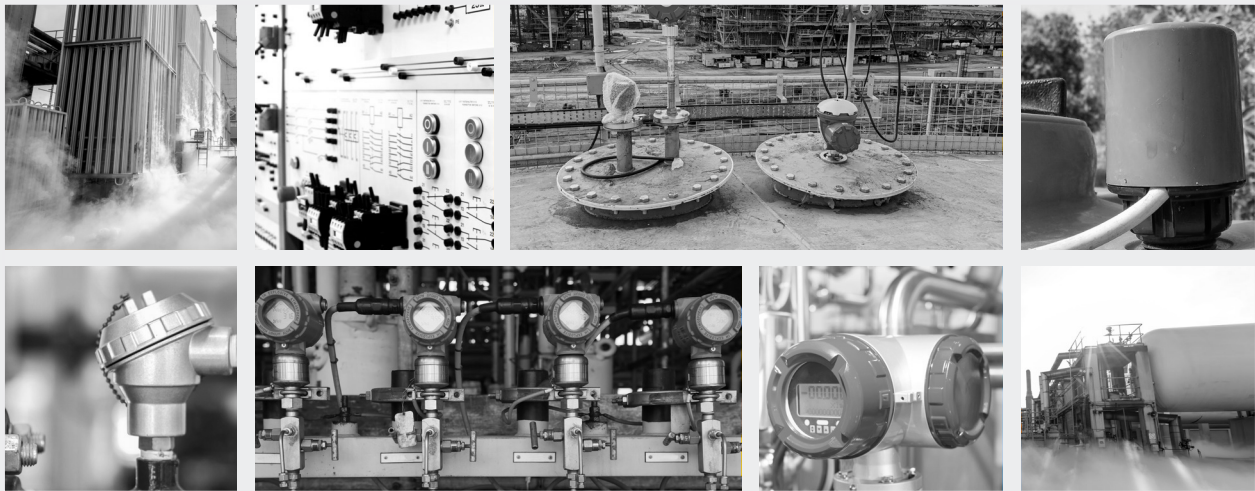
## OUR TECHNOLOGY

Hermetic sealing combines epoxy resin and a housing material such as stainless steel to encapsulate an electrical conductor such as a pin, stranded wire, or threaded stud. The conductor feeds through the opening with the epoxy curing to create a hermetic seal. Various types of epoxies can be used, which can yield varying results in hermetic performance, chemical compatibility, and outgassing. Our designs enable customers to increase signal density, mix conductor types, and integrate connectors and terminals for a hermetically sealed connection for power or signal.



## COMMON SENSORS & INSTRUMENTS

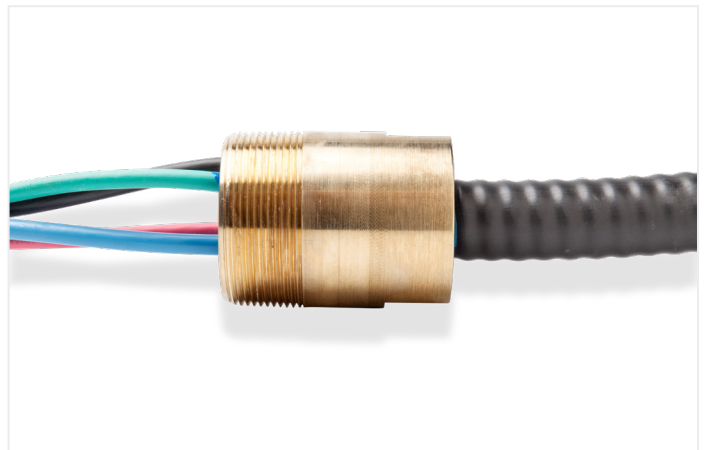
- Gas chromatographs
- Resolvers and [magnetic bearing](#) sensor assemblies
- Level and flow switches, sensors, and transducers
- [Cryogenic](#) tank level equipment and hydrogen sensing
- LiDAR and GPS assemblies
- Integral housing hermetic seals
- Medical instruments, tools, and equipment
- Test & measurement devices
- Fiber optic sensors
- Pressure, temperature, position, humidity, and vibration transducers including seals creating [explosion-proof](#) rated assemblies



## CERTIFICATION CAPABILITIES

Capable of meeting the following international hazardous location standards for flame proof, increased safety, pressurized and oil filled enclosures.

- IEC/EN 60079-0, IEC/EN 60079-1, IEC/EN 60079-2, IEC/EN 60079-6 and IEC/EN 60079-7
- ATEX Ex d, ATEX Ex e, ATEX Ex de, ATEX Ex pD
- CSA 22.2, CSA E60079
- UL 1203, UL 886, UL 674, UL 913
- FM 3611, FM 3615, FM 3620, FM 3610



**STANDARD WIRE BUSHINGS**  
**UL1203 CLASS | DIVISION | EXPLOSION-PROOF**

Douglas Electrical Components manufactures UL1203 Class I Division 1 Explosion proof NPT feedthrough bushings for hazardous locations. Our standard NPT wire bushings are pre-wired epoxy feedthrough. This eliminates the need for pouring cement or epoxy in the field, ensures a factory-tested seal, and saves time in the field or factory. These feedthroughs are commonly designed into oil and gas applications including wellhead monitoring systems, gas analyzers, compressors, and other instrumentation and controls

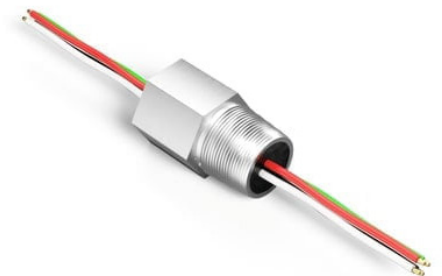


**SPECIFICATIONS**

Housing Material	Stainless-steel, Brass, or Aluminum
Sealing Material	7113/1481 Epoxy
Wire Gauge	24 AWG to 3/0 AWG
Thread Sizes	1", 1/2", 3/4" NPT; contact factory for hermetic rating
Leak check testing	<1x10 <sup>-8</sup> cc-He/sec (std atm temp). Contact factor for more options.
Operating temperature	-40°F to 225°F (-40°C to 107°C)

**COMING SOON: 57754 SERIES**

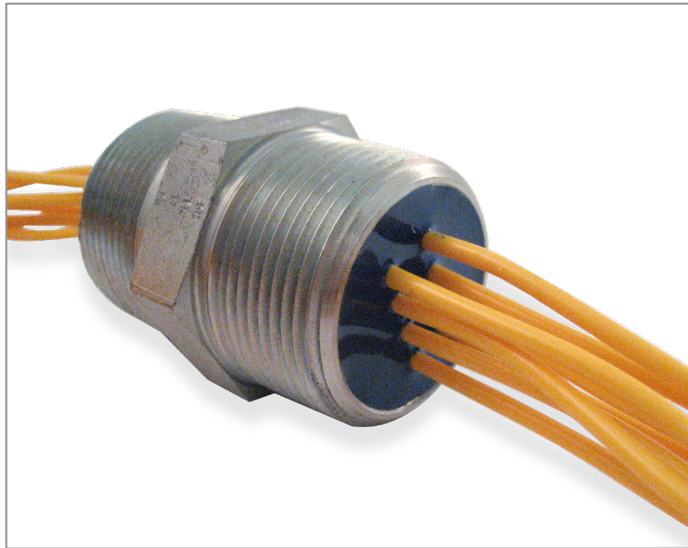
- IECEX/ATEX Ex db IIC Gb certified
- Standard NPT and Metric threads in brass, aluminum, or stainless steel
- Various wire types and temperature ratings
- Certain configurations also available with UL1203 Explosion-proof rating
- Ability to reference file for customized designs



## DUCTORSEAL™ SERIES

### HERMETIC WIRE FEEDTHROUGHS

- Create high-density hermetic electrical feedthroughs with integral wires, and cables to UL/cUL Class I Div 1 Explosion-proof ratings
- Use the same wire and insulation types already approved for use elsewhere in your system
- High-voltage cables > 30,000 V
- Full cable harness options with connectorization available performed by IPC-620 operators
- Custom bifurcated fiber assemblies with a combination of optical and copper conductors
- Ingress Protection exceeds IP-69K and NEMA 6P with designs rated for cryogenic temperatures



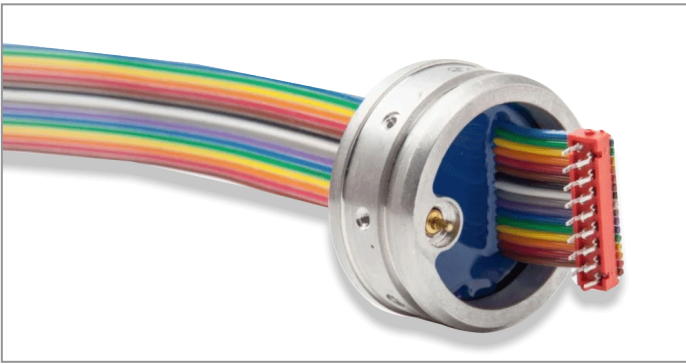
## OPTISEAL™ SERIES - HERMETIC FIBER OPTIC FEEDTHROUGHS

- $<1 \times 10^{-9}$  cc/sec per feedthrough
- Pressures of 15,000 psi
- Operating temperatures range from 4 K (LHe) through high temperatures of 200°C
- Custom bifurcated fiber assemblies with a combination of optical and copper conductors for complex camera systems
- Achieve a custom hermetic fiber optic seal no matter the cable construction, configuration or jacket the assembly requires
- Combine various types of optical fiber into a single hermetic feedthrough

## BPC SERIES HERMETIC BACKPOTTED CONNECTOR

- Create hermetic, moisture-tight connectors from commercially available non-hermetic connector designs
- Plug-and-play drop-in assembly
- Seal the connector as-is, or integrate other mechanical and electrical features including optical fibers
- Increased availability by hermetically sealing non-hermetic connectors in stock or readily available versus hermetic connectors with long lead times
- Improve electrical insulation and shielding in certain applications





## CIRCUITSEAL™ SERIES - HERMETIC CIRCUIT ASSEMBLIES

- Hermetically seal flex circuit, rigid, flat flex cable (FFC) or terminal headers to create a drop-in hermetic solutions
- Minimize the number of components required to electrically connect between two separate environments.
- Incorporate active and passive components in the assembly

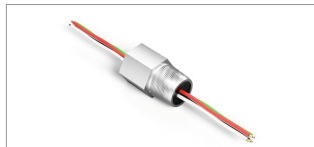
## EXAMPLES OF OUR UNIQUE CAPABILITIES



**Hermetic NPT Wire bushing**  
Explosion-proof rated wire bushing with brass fitting and labeled conductors



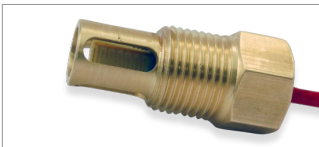
**DuctorSeal Wire Feedthru**  
Multi-conductor hermetic wire feedthrough with NPT Threads



**Explosion-proof NPT Wire Bushing**  
Side view of Explosion-proof NPT wire bushing with standard aluminum housing



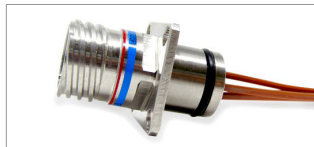
**Sealed Electronics Cavity**  
Hermetically sealed housing from flex circuit to pins



**Sensor Hermetic Assembly**  
Hermetically sealed electrical feedthrough from PCB to cable in threaded housing.



**Multi-Fiber Type Feedthrough**  
Hermetic fiber optic NPT feedthrough with SM and MM fiber in the same mechanical interface.



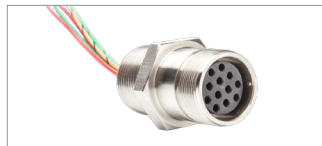
**Hermetic 38999 Assembly**  
Create a customized hermetic seal for pressure applications



**Turnkey Terminated NPT Cable Feedthrough**  
Designed for plug-and-play application



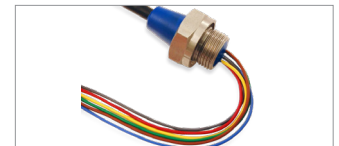
**NPT Explosion-Proof Cable Assembly**  
Explosion-proof conduit seal with NPT threads can be designed for hazardous locations.



**RBTW Waterproof Connector with NPT and Wire Leads**  
Designed for environments that are submerged in water/liquid



**Flex Circuit Sealed**  
Hermetically sealed flex circuit assembly with custom housing



**Fiber Optic Feedthrough**  
Fiber Optic Feedthrough with Epoxy Strain Relief Extension



**Hermetically Sealed M12 Connector Assembly**  
Hermetically sealed M12 connector assembly with integral wires and inline connector



**Electrical Feedthrough Harness**  
Customized electrical feedthrough with integral housing, wire, and electrical connection.



**Custom Ribbon Cable Feedthrough**  
Ribbon cable feedthroughs create a simple plug-in design for customers integrating electronics inside a housing.



**Hermetically Sealed Sensor**  
Hermetically sealed sensor assembly where the sensing element is exposed to the operating environment, but the housing and wire are hermetically sealed.



Douglas Electrical Components

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