Douglas Electrical Components

Vacuum Freeze Dryer & Lyophilizer Feedthroughs

Douglas Electrical Components manufactures customized feedthroughs for several types of commercial equipment including lyophilizers, also known as vacuum freeze dryers. This equipment removes moisture content from food using a freezing and heating process under a vacuum pressure environment. The environmental conditions of the process ensure the highest quality end-product. Hermetic electrical feedthroughs are one less concern for design engineers when considering the areas of leakage.

Our hermetic epoxy ensures wires, terminals, cables, and connectors are sealed across the bulkhead, allowing customers to transmit power and signal in and out of the vacuum environment. Epoxy technology is trusted in various critical environments including semiconductor processing equipment, where a leak in the process can cause millions of dollars in lost profitability.

Hermetic epoxy allows for both design flexibility and high-density electrical connection points to reduce the number of feedthroughs in the process environment and thus potential leak paths.

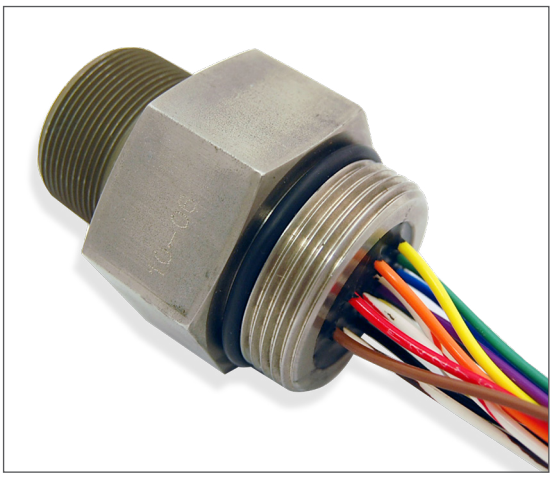
OPERATING CONDITIONS

- -200°F to 400°F
- 15,000 psi
- $1x10^{-8}$ Torr

QUALITY

- 100% quality control testing
- Leak Rate testing: $<1x10^{-9}$ cc-He/sec (std atm temp)
- Electrical testing to customers specifications including point-to-point continuity, insulation resistance, and High pot testing

Our hermetic electrical feedthroughs maintain the desired environment (vacuum pressure, temperature, and humidity) through the freezing, drying, and absorption processes.

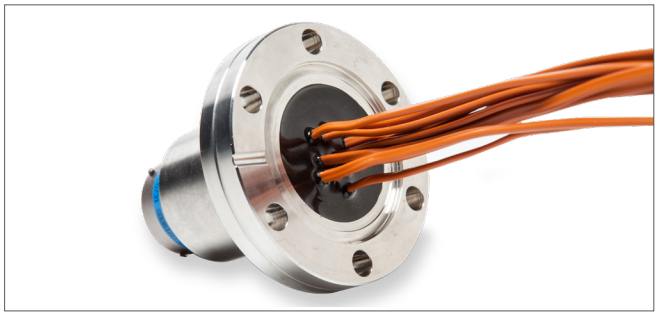


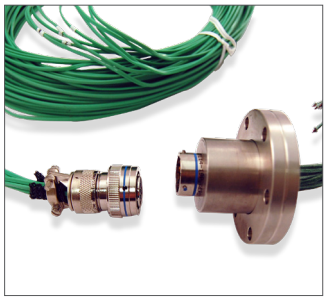
EPOXY TECHNOLOGY

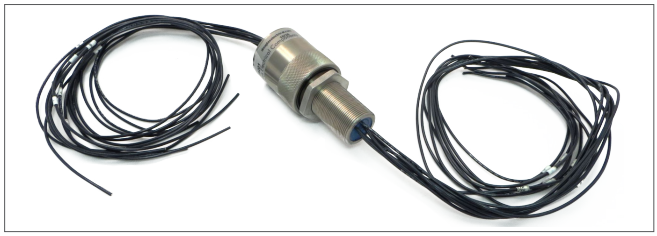
Our epoxy is rated for beyond the standard operating temperatures of lyophilizer equipment. The Douglas design team has performed various tests under pressure and temperature cycles to ensure a hermetic bond between the electrical interface and mechanical housing in harsh conditions including cryogenic temperature environments.

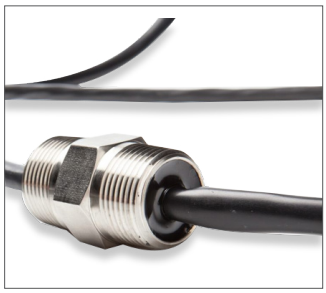
ELECTRICAL CONNECTIONS

Various electrical connection types are available through the portfolio. For OEM equipment, customers traditionally utilize a connector-to-wire configuration. The connector receptacle is typically installed in the ambient environment with a direct wire connection within the vacuum environment. Various connector types are available including circular connectors like M8, M12, and M23. Douglas can hermetically seal virtually any non-hermetic connector within bulkhead assembly or as a back-potted connector. Wire-to-wire and cable feedthroughs are also popular with integral connectors at each end. Integrate thermocouple wires and connectors directly into the hermetic feedthrough for accurate temperature monitoring of the chamber.









MECHANICAL INTERFACE

Various mechanical interfaces are possible including vacuum face seals. The mechanical design traditionally includes an O-ring to seal against the face of the bulkhead and a male thread long enough to both penetrate the bulkhead and leave enough room for sealing. The feedthrough is then installed by tightening a jamnut onto the threaded feedthrough and against the bulkhead to compress the O-ring on the interior wall.

Vacuum flanges such as QF and CF flanges are available in standard sizes. NPT Feedthroughs are also a simple, common mechanical interface for customers to design into their systems. Thermocouple feedthroughs and power stud feedthroughs are commonly specified with NPT mechanical interfaces. Douglas can also customize the mechanical interface mechanical interface for other thread and installation types. With in-house CNC machining, we can meet customer quality, cost, and lead time demands.

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