

Three technologies that follow are related to the same innovation and offered in a single package.

- 4.12 Harsh Environment Protection Housing
- 4.13 Quick Disconnect for High Pressure Mate - De-Mate
- 4.14 Dust Tolerant Quick Disconnect With Self-Sealing Barrier

4.12 Harsh Environment Protection Housing

Statement: Novel ruggedized housing for an electrical or fluid umbilical connector that prevents intrusion of dust, sand, dirt, mud, and moisture during field use under harsh conditions.

Problem: In harsh environments, connectors are exposed to intrusion of dust, sand, dirt, mud, and moisture.

Solution: Connectors are designed with special protective leads to withstand harsh environment and rough handling, such as being stepped on or rolled over by wheelbarrows or light vehicles.

Technology description: The technology consists of a pair of hand-sized protective umbilical interface housings, each containing a connector with an integrated end cap. When the end cap covers the connector, the connector is protected. Each housing has a unique lever assembly connected to the end cap that, when squeezed, flips the end cap up to expose the connector. When in the up position, the two end caps face each other. To mate the connectors, the levers on both housings are squeezed, raising the end caps, and the two umbilicals are joined and twisted to couple them. Once the connectors are mated, the levers on both housings are released. This simultaneously seals both the umbilicals and the end caps. When dealing with cryogenic connectors, a purge can be applied to the housings to prevent icing when the connectors are de-mated.

Benefits of the product: This technology offers several benefits:

- Protection - securely shields connectors from dust, dirt, mud, and moisture.
- Rugged - withstands harsh environments and rough use (e.g., being dropped, stepped on, or rolled over).
- Cryogenic fluids transfer - housing can be purged to avoid icing when de-mated (e.g., liquefied natural gas).
- Scalable - can be sized up or down for different-sized connectors.
- Ergonomic - designed to be easily held in one hand; requires minimal pressure to open and close.
- Modular - connectors can be installed and swapped in modular, universal housing.

Areas of application: The technology has several potential applications where reliable electrical/fluid connections must be made:

- Desert operations.
- Mining operations.
- Cryogenic fluid, oil and refinery operations.

Comment: This technology is directly related to **4.13 Quick Disconnect for High Pressure Mate - De-Mate**, and **4.14 Dust Tolerant Quick Disconnect With Self-Sealing Barrier** technologies. It has great potential where reliable electrical/fluid connections have to be made.