OMNETICS
CONNECTOR CORPORATION

Robotics' small and rugged interconnection systems

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Robotic applications are being applied to industrial, military and everyday applications throughout the world. Many types of advanced sensors have stimulated a whole new way of designing equipment.

The development of new End-Of-Arm (EOA) instruments provide systems that handle previously difficult functions. We are seeing electronic units moving computer chips and sensors out to the extremities of the robotic arm that is used for pick-and-placement of minute sizes and somewhat fragile items. With the use of optical sensing equipment, the newer industrial machines can do multiple manufacturing steps that were previously religated to hand assembly done under microscopes.

Robotic designs have fulfilled significant challenges in our space technologies from surveillance device operation to operating deep in space on the Mars Rover.

As many of the robotic devices evolve, we have employed mechanical devices for operating more detailed and delicate capabilities. Motor functions and sensor detection often requires miniature cable and wiring to run in and out of processing centers within the system.

Cable and connectors used must be extremely small and light weight while maintaining extreme ruggedness; some must operate in unique environmental conditions.

One solution for small and rugged interconnection is exhibited in the use of the Metal-Nano-D connector.

These connectors are built to meet Military Specification 83513 and offer .050" pitch (1.25 mm) and perform in continual rugged conditions useful in automated machinery. Board mounted versions mate up with pre-wired connector/cables for instrument wiring. Temperature ranges can exceed +200ºC and locking screws or latches hold things together during machine operation. What's unique? Most standard designs are off-the-shelf at reasonable costs.

A new generation of Nano-circular connectors have been employed to significantly reduce weight and size while utilizing pin and socket elements that have passed the tests specified in Military Specifications and are currently utilized in successfully achieving Military Qualifications for Nano-connector specifications MIL-DTL-32139. Internal alignment keys (part of the insulator) enhance blind-mating and insures scoop-proof mating system. The gold-plated pin and sockets utilized, have higher insertion and withdrawal forces that further helps insure connector retention in rugged environmental applications.

For direct mounting or insert molding connector formats are available in the basic insulator shape and can be built-into probe handles, sensor heads or docking stations. Overmolded systems bonded to the cable provide stand-alone, pre-wired connector to cable designs. Panel mount models are used for placement in docking-connector formats and match the cable series connectors. Pin counts and wiring style is adapted to the

application required. For example, two power pins and multiple signals assist power demanding detectors or release mechanisms at the end of the robotic arm, while the signal wires send pressure and clamping data back to the robotic control unit. This is all done in one flexible cable.

Omnetics Nano 360 connectors are set at .025 mil.s (.635mm) and are initially available in pin counts of 6,11,16, and 28 positions or more. Weights run .6 to 2.3 grams with wire. Prototype designs are connected quickly using basic insulator models to insure the total system functions to the designer's requirements.

As designers' "Form and Fit" requirements evolve a final shape and connector housing can be added to the basic connector. No changes to the basic circuit design is required to adjust the physical functions of mounting and mating systems are finalized.

Detailed design specifications and connector size and diameters are available on the Omnetics website at www.omnetics.com.