

Rugged polyurethane hoses designed for robot dress packs

By Mark Eisenmenger

All-inclusive dress packs are rapidly gaining popularity in the industrial automation world for good reason. Offering great flexibility, reliability, durability and cost effectiveness, these all-in-one cable control solutions outperform the conventional "spaghetti" method of dressing robots with separate bundles of cables, hoses and tubes. Robots powered by all-inclusive dress packs run more efficiently and with less maintenance down time.

The integrated dress pack bundles in one highly flexible, protective sheet or jacket contain all the power and data cables needed to control and operate a robot as well as pneumatic and hydraulic hoses.

When designing optimized solutions, dress pack manufacturers like Troy, MI-based LEONI EPS use a wide range of high-pressure tubes and hoses offering protection against mechanical, thermal and/or chemical stress. "We dedicate the same amount of time to finding the right hoses as we do to identifying the perfect cables," says LEONI EPS sales engineer Chris Miller, whose company, affiliated with Kitchener, ON-based LEONI Elocab, has dressed out more than 5000 robots across North America. "In our all-inclusive umbilicals we combine tailor-made cables with high-performance specialty hoses. They have to make the perfect match – and need to get the job done without any costly flaws or failures."

At the heart of LEONI's pneumatics and hydraulics toolbox is a line of specially-formulated polyurethane (PUR) hoses, which has been developed and manufactured specifically for robotic applications. PUR provides mechanical resistance,

is even used as a protective sleeve for sensitive fibre optic and data control cables.

In LEONI's yellow dress packs, all components are extruded into the umbilical shell to form a linear spring system that absorbs and distributes the stresses and loads throughout the entire module – not through a single component.

Seven PUR colors are available to code and identify the media being transported in each hose. Manufacturing plants typically have codes for 'water in,' 'water out,' 'air in' and 'air out.' For 'bullet-proof' installation, LEONI's PUR hose also has arrow direction indicators so that the technician knows the direction of material flow. This provides an additional standard safety feature in the complex

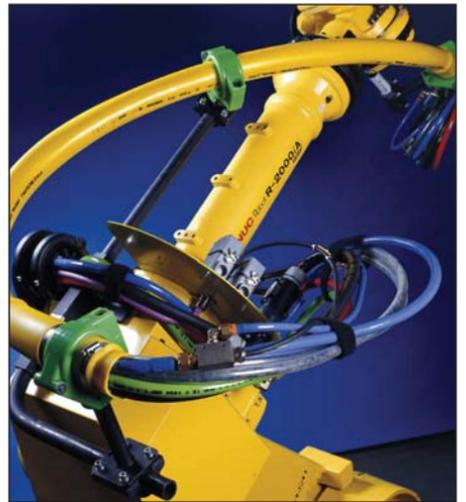
automated industrial environment. Typical media carried through the PUR hoses include air, water, oil, hot wax and cleaning solvents. The hose can also be used as protective sleeve for fibre optic and data control cables.

automated industrial environment.

In overhead tray applications, requirement for hose systems with a shelf life up to eight years are met. Other materials have a shorter lifespan, and begin degrading and leaking in a lot less than eight years. Some manufacturing facilities have miles of air lines running throughout the plant, so even small hose degradation can lead to large-scale loss of expensive compressed air.

Mark Eisenmenger is general manager of LEONI EPS, Troy, MI (leoni-tailormadecable.com).

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Polyurethane hoses from LEONI EPS are constructed of a fibre braid reinforcement sealed between two extruded PUR layers.

twisting and bending strengths, and chemical durability. PUR has an abrasion resistance 10x greater than conventional rubber.

The LEONI PUR hose is constructed with a three layer design: a fibre braid reinforcement sealed between two extruded polyurethane layers. This allows for tailoring the outer surface for high abrasion resistance and the middle layer to resist UV, hydrocarbon, bacteria and diluted alkaline solutions. The PUR manufacturing process is silicone-free, making the PUR hose suitable for use in the automotive industry.

LEONI's PUR hose offers a continuous working range from -20° to 80°C and low elongation (1.5% at 20°C and 150 psi). This allows the hose to also be used in a wide range of industrial applications. Maximum working pressure ranges from 250 to 350 psi – depending on the hose inside diameter, which varies from 1/4 to 1 in. With these properties the PUR hose performs well in high torsion and minimum bend operations. Since many robotic applications include spot welding, the PUR hose offers weld spark resistance and self-extinguishing properties.

Typical media carried through the hoses include air, water, oil, hot wax and cleaning solvents. In some cases, the PUR hose



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