

The challenges posed by systems which are in use round the clock

PMA® conduits have shown themselves to be functional, robust and user-friendly.

PMA

Combining OMRON cobots with PMA products results in a flexible system which has a long service life and is aesthetically pleasing.



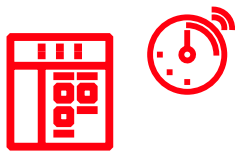
Specially developed for

**human-machine
collaboration**

Employing the power and precision of robots safely in conjunction with the human ability to solve problems has become an indispensable feature of every production environment. Collaborative robots have been specially developed by OMRON™ for joint human-machine interaction. They enhance efficiency in a range of industrial applications, at the same time guaranteeing workplace health and safety.

Collaborative robots have been designed to work safely together with their human operators; technological elements such as force feedback, low-inertia servomotors, elastic actuators and collision





The PMA® cable protection system

protects cables on machinery and robots

detection systems ensure that their performance and power is restricted to an appropriate level if robots and operators come into contact with each other. The safety functions and performance of collaborative robots are specified in the ISO 10218-1 and ISO 10218-2 safety standards as well as in the ISO TS-15066 technical specification.

In order to ensure that their customers' needs are met, Muller Technologies is on the lookout for

— Muller systems work round the clock. The toughness and reliability of every single component have to be taken into account; PMA corrugated hoses have shown that they are functional, rugged and user-friendly



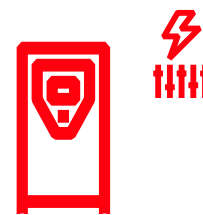
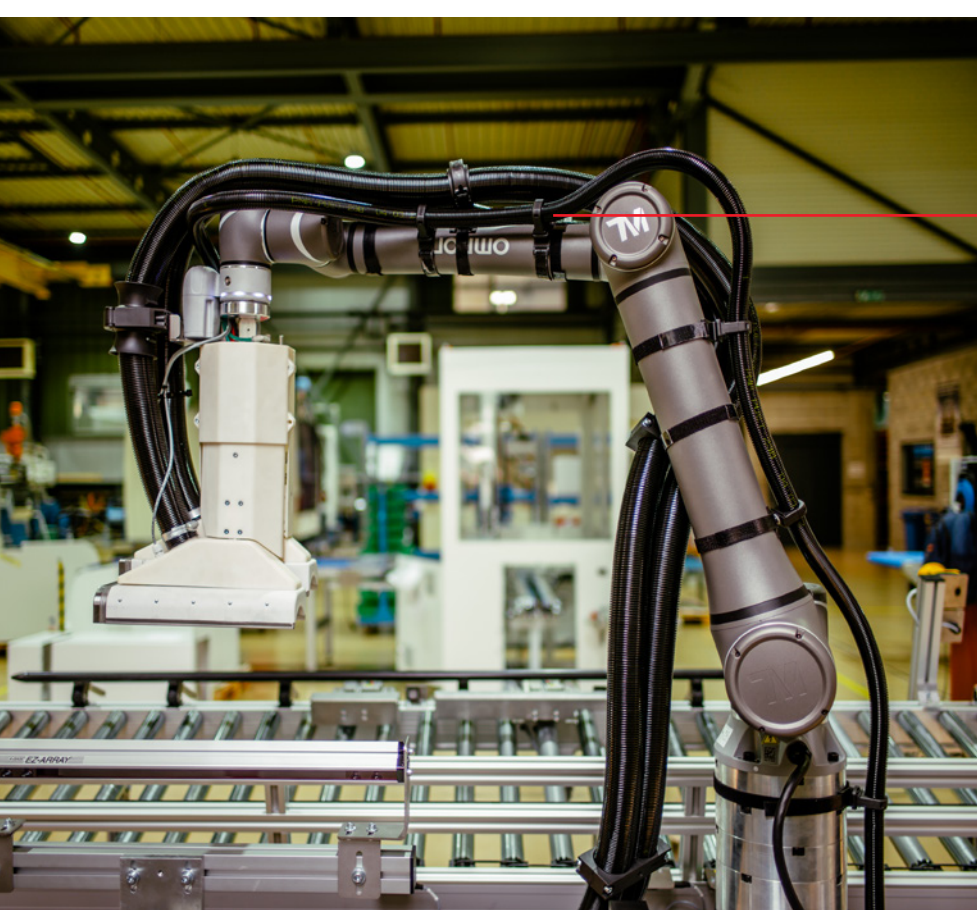
partners with whom they can develop their systems. The choice fell on an OMRON cobot; all that remained was to look for a partner for the cobot's cabling and protective sheathing. PMA very soon proved itself to be the ideal choice: the expectations of both companies were met, and collaboration got off to a smooth start. Initial testing was carried out on a robot to see whether PMA's conduits and the threaded fittings were suitable for use as a vacuum line. The test was more than satisfactory, leading to Muller's decision to continue working with PMA.

Muller's systems operate round the clock

Headquartered in Switzerland, Muller is one of the world's leading manufacturers of tools and automation technology for developing thin-walled plastic packaging.

Employing some 120 highly-qualified specialists at its Swiss and American production sites, the company offers its international customers a comprehensive range of services, such as product development and the design and engineering of components and labelling. Other important services are quality control and quality assurance, such as in-house testing, production records and automation systems, plus turnkey solutions including worldwide project coordination and customer care. The company's international presence means that it is able to assist businesses operating in the fields of food, non-food, healthcare and medical packaging in developing new types of packaging for their products.

Collaborative robots are increasingly being used in the packaging industry. Many of our customers are looking for this kind of technology – mainly in the constantly evolving North America region. In recent years, the trend has been to automate production



PMA® cable protection conduits provide

**maximum
safety**
and Swiss quality

lines as much as possible as companies struggle to find staff for the various product packaging tasks. To tackle this problem, Muller had to develop a system that was reliable, flexible, resilient in the longer term and economically viable for our various customers. The packaging step, as traditionally carried out by a human operator, involves direct contact between the person and the product. This contact gives rise to an additional constraint – namely, the need to scrupulously observe the currently applicable requirements for foodstuffs. In this context, collaborative robots were the natural choice for meeting all the requirements when it comes to replacing people by machines. Combined with the use of PMA products for vacuum functions and protection of the various cables, the end-result meets the customers' various expectations in all Muller's areas of business.

— PMA products have proven their worth because they are easy to use, suitable for all types of cobots and adaptable to the full range of movements. They are also watertight if employed as vacuum hoses.

PMA products, both employed and installed

The NW84 nominal size XTPC conduit is well suited for vacuum applications and, as the NW23 nominal size conduit, for a variety of electrical and compressed air lines. As regards support brackets, the great majority of 48 diameter brackets are BSH brackets; the 23 diameter brackets are BCCH brackets. Since this cobot's tool is designed to be adjustable, 48 nominal diameter BTK support brackets and 56 nominal diameter BSH support brackets are also integral to the system.

A system requiring minimal servicing

The BSH tube clamp

Most effective fastening and guidance of tubes using GN half-shells. Used as a support bracket for a variety of functional inserts (TK, KE) to reduce the mechanical load imposed on the cable packages and to increase service life

Highly-flexible XTPC multi-layer conduit

For robot applications involving strong tensional forces. Developed for highly-dynamic applications with tight bending radii; includes wear indication.

BTK Ball joint sleeve

For additional flexibility and to reduce the mechanical load on the conduit.





With its PMA cable protection range, ABB offers a comprehensive portfolio of conduits, threaded fittings and accessories for a vast range of markets and applications.



ABB PMA and MULLER

MULLER was looking for a company capable of offering a range of products for protecting cabling on tools with articulated arms. MULLER had already been in contact with PMA over rigid vacuum hoses. Collaboration with PMA was extended when it came to the cabling for the 6-axis robot. Because the systems are subject to high stresses, MULLER needed products which were durable for long periods of time. It is the range of movements which imposes stress on the systems' component parts. Because the systems are prototypes, the conduits and support brackets must also be suitable for use on different machines without requiring the basic design to be altered. Much time had been spent looking for a system needing minimum servicing time and effort. Combining OMRON cobots with PMA products results in a flexible system which has a long service life and is aesthetically pleasing.

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