Training equipment for sports and rehabilitation centres

Pneumatic fitness

The fitness market is booming. Training centres are springing up like mushrooms. There are lots of fitness equipment manufacturers, but only a few who produce pneumatically assisted equipment that is gentle on joints and muscles. Finnish company HUR is one of the pioneers of this technology and uses cylinders and pre-assemblies from Festo.

Training equipment that can adapt to muscle power, such as leg presses, shoulder presses or multi gyms that enable gentle and smooth movement and resistance, is the fitness equipment of choice, particularly for rehabilitation after accidents and operations or for older people. It is easy to adjust and simulates the natural movement of the muscle when working against a resistance. The use of Festo pneumatic products in the training devices from HUR permits these gentle movements – without any inertia effect. Compressed air means that the resistance in the equipment can always be perfectly adapted to the power output of the muscles, regardless of the speed of the movement. HUR offers its customers tailored equipment solutions and concepts, whether for use in physiotherapy, rehabilitation clinics, retirement homes, fitness studios, hotels or in-company gyms.

The name HUR stands for Helsinki University Research – and the development of the training equipment by the company founders is indeed based on scientific findings. They named their system Natural Transmission™. It is the result of scientifically based product development involving biomechanics experts from numerous universities the world over.

Avoiding the inertia effect

With effective equipment-based training, the power output changes – in line with the natural human movement. Conventional training equipment with weight plates tries to achieve this through the use of eccentric cams. Additional power has to be applied to accelerate or decelerate the weight at the beginning and end of a movement. The faster the weights are moving, the more pronounced this effect is. The power output at weight training equipment therefore changes as a function of the performance level during the exercise. The result is a less than optimum training effect, particularly during fast movements when the inertia distorts the load on the muscles. This has a negative effect on the joints.

Weight plates replaced by pneumatics

However, fast movements and short response times are very important in sport and in daily life. The company therefore uses pneumatics instead of weight plates. The result: no inertia. This offers decisive advantages, especially for rehabilitation patients and senior citizens. Starting the resistance close to 0 and increasing it in increments of 100 g or 1 kg helps this group of people to achieve visible successes quickly, and motivates them to permanently integrate training in their everyday life.

Benefits of pre-assembly module and standards-based cylinder

Depending on the piece of equipment, up to six standards-based cylinders DSBC from Festo with low friction and therefore low noise generation are used. “We achieved this using a special bearing cap,” explains Markus Högnäs, Plant Manager at HUR in Kokkola. The cylinders are activated using valves VUVG. Festo supplies these to the fitness equipment manufacturer together with pressure sensors and pressure regulators as pre-assembly modules. The resistance of the cylinders has low friction to ensure precise and prolonged training. The cylinders were tested over 10 million cycles without any noticeable signs of wear. All the pneumatic components comply with the ISO and VDMA standard.

“Using standards-based industrial parts may be more expensive, but it guarantees that you can get spare parts at a fair price anywhere in the world within a reasonable time,” says Markus Högnäs. This is especially important for HUR, since it exports 90% of its annual production of 2,500 pieces of training equipment. ■

www.festo.com/dsbc
www.festo.com/vuvg

HUR Oy

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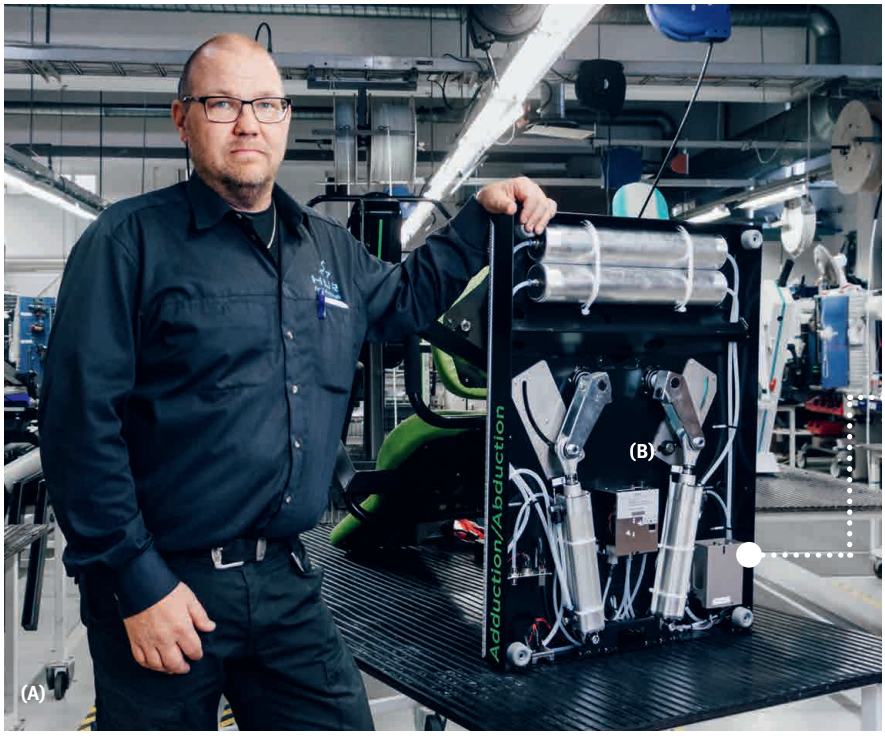
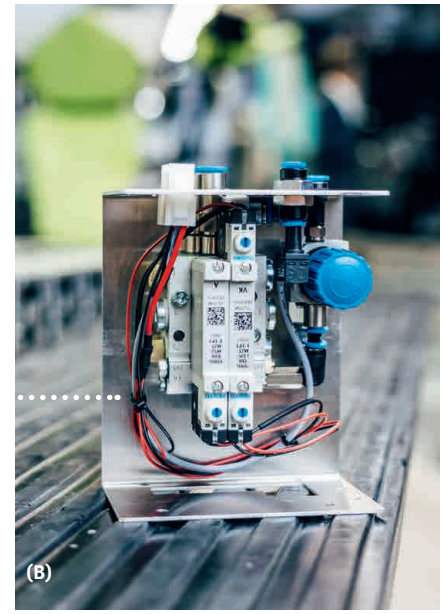
Area of business:
Manufacture of pneumatically assisted fitness equipment and development of integrated fitness concepts for fitness and rehabilitation centres





(A) Pneumatic fitness: no inertia effect in training equipment with the standards-based cylinder DSBC and the pre-assembly for controlling the actuators. (pictured: Markus Högnäs, Plant Manager at HUR).

(B) Customised pre-assemblies: supplied as a complete module, they reliably control the pneumatic drives.

"The resistance in the training equipment always adapts perfectly to the power output of the muscles thanks to compressed air."

Markus Högnäs, Plant Manager at HUR