A SOLUTION STILL ACTUAL

The pneumo-hydraulic control units proposed by Bonesi Pneumatik have been developed with the purpose to join the advantages of the simplicity of the use of pneumatic cylinders to the possibility of a precise control of the movement, guaranteed by a hydraulic circuit.

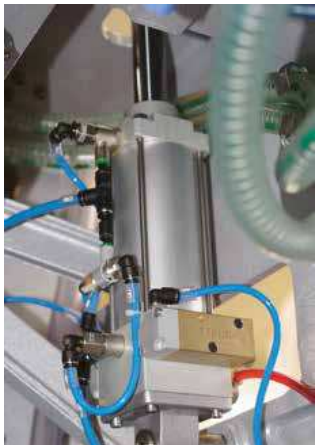
FABRIZIO GHIRARDI

The pneumo-hydraulic control units, composed by a pneumatic cylinder with a hydraulic circuit integrated inside the piston rod, allow a precise regulation of the speed and a control of the movement simple, solid and reliable. Appeared at the initial of years 70, the pneumo-hydraulic units have been developed by Generalmeccanica, in Milan, with the purpose to join the advantages of the use of pneumatic cylinders to the possibility of a precise control of the movement, guaranteed by an hydraulic circuit.

Some features

Generalmeccanica has developed and patented a range of actuators composed by a pneumatic double acting cylinder with a closed circuit for the oil coaxially integrated, realised internally the piston rod. The piston rod of the control unit, of diameter superior of that of a standard pneumatic cylinder, is made with a steel tube externally chromium plated. Inside the piston rod, thanks to the use of two tubes of lower section, are obtained two closed chambers in which is present the oil of the hydraulic circuit.

With the movement of the pneumatic piston, controlled by a standard 5 ways directional control valve, the oil in the circuit flows between the two chambers throughout the control group situated externally the cylinder. Using one or two one-way flow regulators, the speed of the piston rod, in the forward and/or in the return stroke, can be regulated very precisely and uniform. It is possible to reach minimum speed around 0.5 mm/s, keeping a movement fluid and constant, independently from the variation of the working loads.



A pneuno-hydraulic control unit on a machine for production of ophthalmic lens.

The control units can be equipped with hydraulic end of stroke cushions that allow a good absorption of the kinetics energy, coaxial to the movement. By the insertion in the control group of an interception valve of the oil, it is possible to obtain the function of quick stroke (skip) or of break (stop) both for the forward and for the return stroke. The directional control valves are available with pneumatic or solenoid control, spool construction very solid and reliable. The stop function is particularly useful to guarantee an immediate and safety break of the movement in case of emergency or necessity to break, in any position of the stroke. All control units are equipped with an oil tank, necessary to compensate the difference in volume between the two chambers and to compensate little leakages. The tank can be mounted directly on the control unit or used separately and connected by a flexible tubing. The control pneumo-hydraulic units are available with cylinders from bore 50 to200 mmand strokes up to 1.500 mm. For the mounting a wide range of accessories is available, like for the standard pneumatic cylinders.

Applications in the industry

The sector that first has took advantage from the pneumo-hydraulic control units has been that of the wood-working machines.

The Generalmeccanica catalogue in the years 70.

In fact, in order the control the movement of the tooling during the various operations of drilling, milling, tenoning and mortising the main OEM of wood-working machines have successful used the pneuom-jydraulic control units of Generalmeccanica to machine the solid wood.
Afterwards, also the manufacturers of machines for cutting the aluminium profiles, wood and PVC have found in the pneumo-hydraulic control units the best solution for the control of the movement of the cutting blades. The functions of quick approach of the piece to be machined, fine regulation during the cutting and quick return with hydraulic cushion are efficiently carry out on such working.
Therefore, manufacturers of machines and equipments on the various industrial sectors have introduced the pneumo-hydraulic control units in their automations, like foe example: machines for the production of ophthalmic lens, machines for wrapping, cutters of plastic films , automatic lines of polishing of brushes, pressing of brass taps, printing machines, machines for marble…

The recent pneumo-hydraulic control units according the ISO 15552 standards.

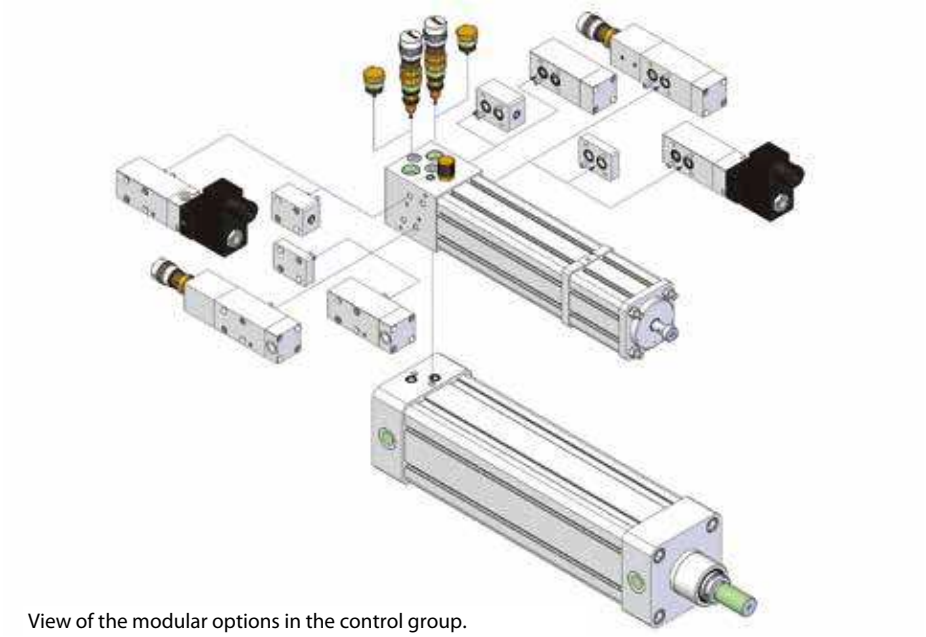
In all applications were the pneumo-hydraulic control units have been used they have guaranteed high level of solidity and reliability, also in the ambient most difficult. The machines still working since 20-25 years, some even 30 years, confirm the above. An appropriate example of use is that shown in the above initial picture: that is a pneomo-hydraulic control unit bore100 mm, stroke250 mmequipped with position transducer and loading cell used to control the movement of pressing and assembling of fans on electrical engines for conditioning systems on vehicles.

Evolution of the product

After several years of activity, on 2002 the property of Generalmeccanica has changed and it was incorporated in the activity of Bonesi Pneumatik, with headquarter and production unit in Legnano (MI). Therefore Bonesi Pneumatik acquired the Logo and the projects for the production of the pneumo-hydraulic control units, that for several years have been protected by various patents. The production of the original model of Generalmeccanica is still alive, both to guarantee the spare parts for the machines using them and for new applications were they can be used. During2017, inorder to improve the features and the appearance of such product, Bonesi Pneumatik has developed a new range of pneumo-hydraulic control units according the ISO 15552 standards.

The improvements of the features, the optimization of the functioning of the hydraulic circuit, the updating of the design by using aluminium extrusions that include grooves for the insert of magnetic sensors or position transducer, the integration of the oil tank in the control group are the main points for which the technical department of Bonesi Pneumatik have worked in order to realize the new range. Thanks to such improvements it has been possible to increase the range of applications of the pneumo-hydraulic control units, like, for example, the control of the movement of a motorised pressuring roller used to unwrap plastic film particularly thin and delicate, on winding machines and cutting machines for plastic materials. At last, it is possible to declare that the pneumo-hydraulic control units are still today a very good technical choice and the best solution to realize a movement not possible to be controlled by a simple pneumatic cylinder and more solid and cheaper of an electrical cylinder.

F. Ghirardi, sales area manager of Bonesi Pneumatik.



View of the modular options in the control group.