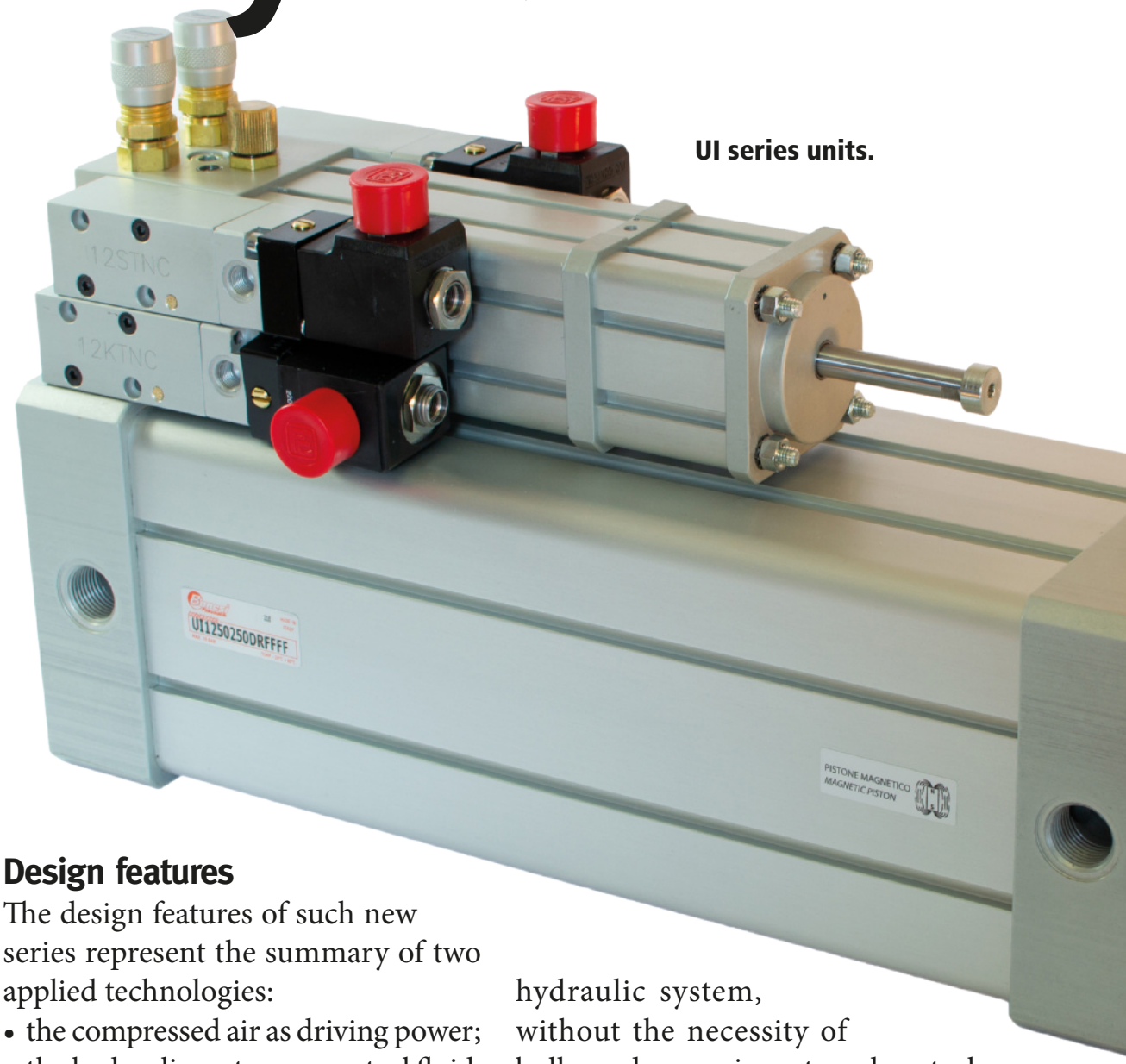
FEATURE FOCUS

Pneumo-hydraulic cont

Bernardino Corrielli

Thanks to their peculiarities, pneumo-hydraulics control units come up beside the standard pneumatic and electrical actuators.



UI series units.

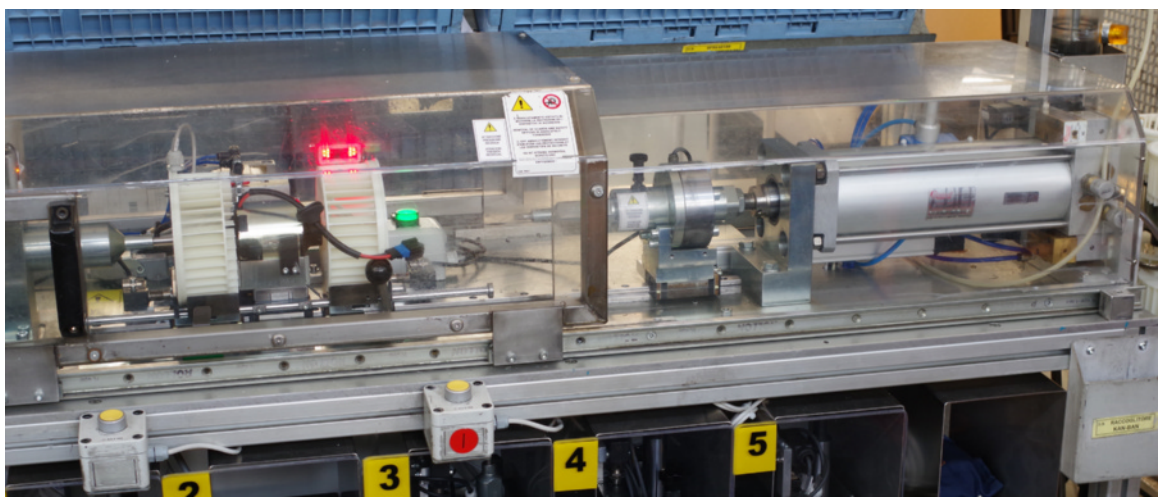
The pneumo-hydraulics control units actually proposed by **Bonesi Pneumatik** are the technological evolution of the patent deposited during the seventies by the Company Generalmeccanica in Milan developed with the purpose to combine the advantages of the simplicity of use of the pneumatic cylinders with the possibility of a precise control of the motion guaranteed by an oil-hydraulic circuit integrated inside the unit itself. Thanks to the use of the pneumo-hydraulics control units the functions of fast approach to the piece to be machined, a fine regulation during the phase of machining and the quick return with hydraulic deceleration can be efficiently achieved.
All the functions, better described here following, can be obtained both for the piston rod in forward and for the piston rod in return.

Design features

The design features of such new series represent the summary of two applied technologies:

- the compressed air as driving power;
- the hydraulic system as control fluid.

Thanks to the combination of the two technologies it is possible to activate such actuators with the simplicity of a standard pneumatic cylinder, but with the possibility of precise control of the motion guaranteed by the oil-hydraulic system, without the necessity of bulky and expensive external control units. The pneumo-hydraulics control units, made up 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 motion simple, strong and reliable. The actuators proposed by Bonesi Pneumatik are composed by a pneumatic double acting cylinder with a closed circuit for the flowing of the oil coaxially integrated, obtained inside the piston rod.
The piston rod of the unit, having a diameter increased in comparison to that of a standard pneumatic cylinder, is realised with a tube of high resistant steel externally chromium plated. Inside the piston rod, by using two tubing of lower sections and dif-

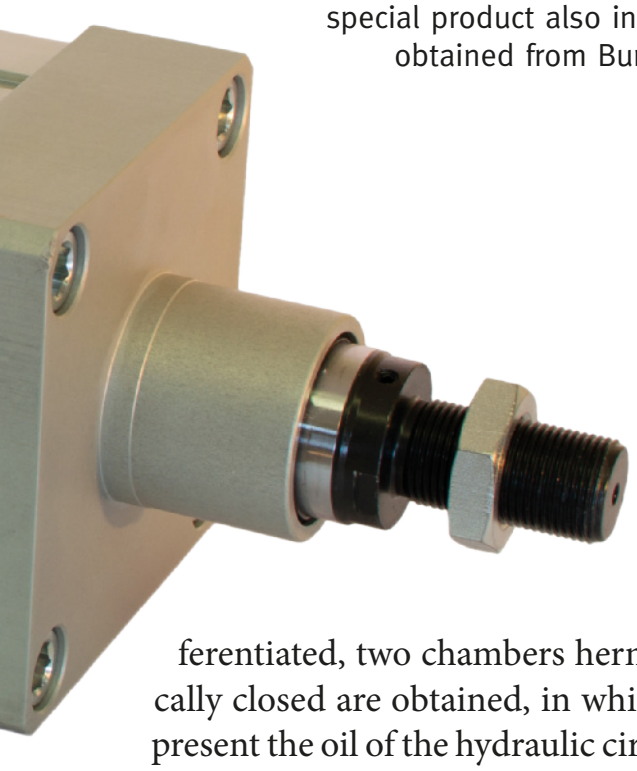


Application in automotive plant.

trol units

The excellence of a technology Made in Italy

Bonesi Pneumatik is a historical company in the field of the components for Pneumatic Automation and its catalogue includes, moreover the pneumo-hydraulic control units above mentioned, a wide range of manual, mechanical and solenoid operated valves, for assembling in line or sub bases, several series of cylinders to satisfy all the requirements of the manufacturers of machines, F.R.L. units, the most requested circuit accessories and already since years, with competence and dedication, constantly improves its activity on special product also in presence of limited quantities. In 2017 has obtained from Bureau Veritas the certification ISO 2001:2015.



Application for rising platform.

The range of bonesi pneumatik control units

During 2017, to update the product both technically and on the shape, Bonesi Pneumatik has developed a range of pneumo-hydraulic control units according to ISO 15552 standards. Among such restyling the main points on which the technical department of Bonesi Pneumatik has worked to realize the new range have been the improvement of the features, the optimization of the functioning of the hydraulic circuit, the updating of the design using aluminium extruded profiles that include the grooves for the insertion of the magnetic sensors or of a position transducer and the integration of the oil tank in the control group.

ferentiated, two chambers hermetically closed are obtained, in which is present the oil of the hydraulic circuit. With the motion of the pneumatic piston rod, controlled by standard 5 ways solenoid valves, the oil contained into the circuit is subject to circulation between the two chambers and it flows throughout the group of control positioned on board of the cylinder or externally, with the help of hydraulic tubing. Using one or two flow regulators, the speed of the motion of the piston rod, during the stroke in forward and/or in return, can be regulated in mode very precise and homogeneous.
It is possible to achieve minimum speeds around 0.5 mm/s, keeping in any case a motion fluid and constant, independently from the variation of the working loads and from the inlet pressure of the pneumatic circuit.

The hydraulic cushions of end of stroke

The units can be equipped with hydraulic cushions of end of stroke that allow an optimal absorption of the kinetic energy, coaxial in relation to the motion. Through the insertion of the shut-off valves of the oil in the control group it is possible to obtain functions of quick stroke (skip) and of break (stop) both for the forward stroke and for the return of the piston rod. The valves are available with pneumatic or solenoid piloting, in version normally closed or normally open. The stop function is particularly useful to guarantee an immediate and safe interruption of the motion in case of emergency or need of arrest, also multiple arrests and in various positions with possible precision of 0.1 mm. Every unit is equipped with a tank of oil, necessary to compensate the difference of volume between the two chambers during the circuiting. The tank can be positioned directly on the control unit (on board) or placed separately and connected through flexible tubing (remoted). As already mentioned, the system allows to obtain several functions on both the working strokes: speeds controlled and constant in spite of the variation of the working loads and of the inlet pressure. After years of activity, during the 2002, the Company Generalmeccanica has changed ownership and it has been incorporated by Bonesi Pneumatik, having headquarter and production plant in Legnano Milan, Italy). Bonesi Pneumatik therefore become owner of the Brand and of the projects for the production of the pneumo-hydraulics units, that for several years have been protected by various patents.

Applications in industry

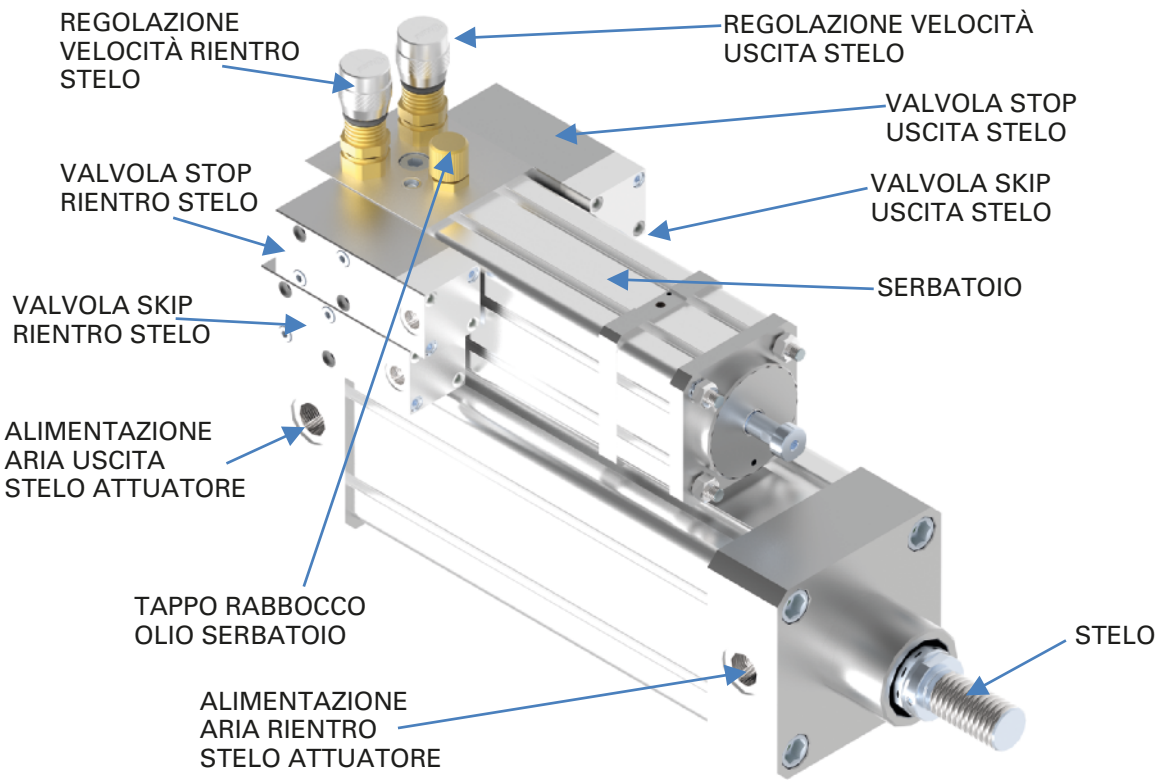
The sector that at first has took profit of the advantages offered by the pneumo-hydraulics control units was that of the woodworking machines. In fact, in order to control the motion of the tooling during the various machining, like for example drilling or milling, the units of Generalmeccanica have been successfully used by the main manufacturers of woodworking machines for the machining of the solid wood. Afterwards, also the manufacturers of machines for cutting profiles of aluminium, wood and PVC have found in the pneumo-hydraulic control units the ideal solution for the control of the motion of the cutting blade.

The functions of fast approach to the piece to be machined, fine regulation during the phase of cutting and quick return with hydraulic deceleration are efficiently effected for such kind of applications. Afterwards, manufacturers of machines and tooling in several industrial fields have included the pneumo-hydraulics control units in their automations, like, for example: equipments to machine ophthalmic lens, for the precise positioning of the working tool; winding machines and cutting units for plastic films, for the control of the tensioning of the film positioned on the stretching rollers; automatic polishing lines, for the controlled motion of the brushes; moulding of brass taps, to control the motion of the cutter of the raw material just casted; machines for gravure printing, to control the motion of the carriages moving the cylinders for printing; equipments to machine marble and granite, for the precise control of the motion of the spindle for polishing of slabs.

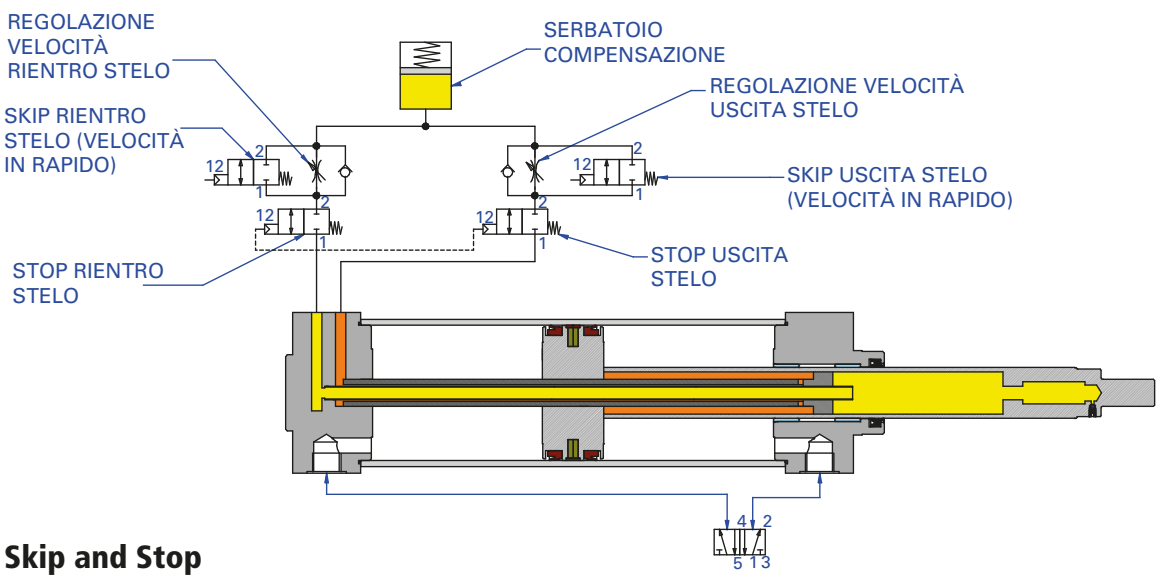
In every application where they have been used, the pneumo-hydraulic control units have guaranteed high performances of robustness and reliability, also in environments particularly heavy.

Recently, such kind of actuator has been very useful also in the field of the paper industry and in the field of the paper tissue in all those applications in which a standard pneumatic cylinder is not allowed to efficiently control the motion.

An example of use is the application of a pneumo-hydraulic control unit bore 100 mm, stroke 200 mm used for the rising of a platform. The use of such unit allows a precise control of the motion of ascent and descent of the platform and a stop of emergency at any point of the stroke by a block of the internal hydraulic circuit, chance not possible with a normal pneumatic cylinder. An other example of application is the pneumo-hydraulic control unit bore 100 mm, stroke 250 mm used in an assembling station for components in automotive sector. This unit, thanks to the control guaranteed by the integrated hydraulic circuit allows a precise coupling of the fan on the drive shaft of the electrical engine.



UI standard units.



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