

## FOR AUTOMATED DECORATION

CDDR Direct Drive and AKD PDMM Motion Controllers for accurate lacquering of screw caps



*View of Todema COLTAL machine for printing and decorating screw caps and cages for the beverage sector: this is the result of a close cooperation between Todeschini Mario srl engineers and designers and experts from Kollmorgen.*

**A fully servo-driven machine that can be used for various types of printing and lacquering. The machine has the capability to increase production whilst retaining high quality: today Todema meets the goal – Thanks to CDDR direct drive motors and to the KOLLMORGEN AKD PDMM motion controller.**

Todeschini Mario Srl company, known by the brand name Todema ([www.todema.it](http://www.todema.it)), was founded in 1960 in the province of Lecco and, since then, has acquired expertise in the manufacturing of industrial machinery and in the implementation of evolved automated systems. These automated systems include machines for the production of capsules, cages for bottling wine and other liquids, bending machines, lamination and printing systems, systems for the production of electro-welded chains, packaging systems and lines for the household appliances industry, as well as control systems that can be integrated in woodworking. The client portfolio ranges from a number of different industries, from the food sector to the metal and woodworking industry, and from different countries including Italy, Germany, Spain, USA, Argentina, Australia and New Zealand. During the past few years, the design and programming of automated and robotic lines has given a strong boost to the industrial processes covered by Todema.

“For this project, we contacted Kollmorgen because we needed to develop a system for colouring and printing screw caps for bottling wine and spirits. Our client required high-quality and production standards con-

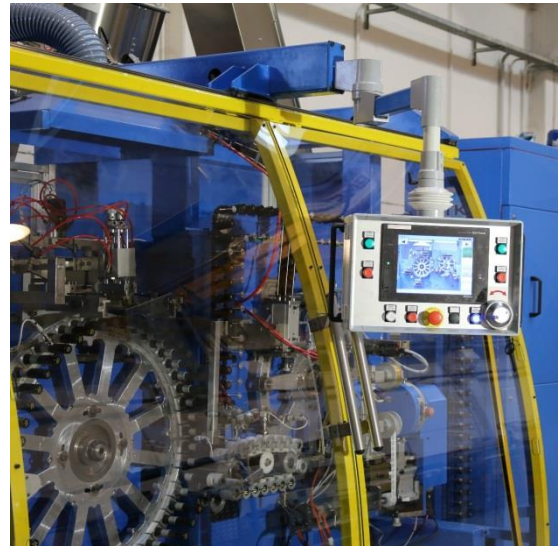
cerning rotogravure colouring, tampography, silk screen and hot foil printing. Our **objective was to build a fully servo-driven machine, which was going to be a first of its kind in this sector,**" Ing. Giovanni Todeschini, owner and Chief Technical Officer, explains.

*"Following a technical and economic analysis, we decided to rely on Kollmorgen because they were able to offer torque motors system and the related controls that could be easily integrated with our technology. Quality, versatility and assistance have beaten the competition" (G. Todeschini).*

The biggest challenge was to replace the traditional mechanical systems of our machine with mechatronic systems in order to obtain a new type of machine, which would be highly versatile and configurable by the client depending on their production needs. It was necessary to develop an integrated mechanical and electronic control system, achieving a seamless combination of the two engineering aspects. More specifically, the Todema design team, consisting of mechanical and electronic engineers, had to work quickly and systematically with KOLLMORGEN experts from the very first drafts of the project.

## COLTAL MACHINE

Aluminium screw caps are largely used for bottling spirits, mineral waters, oil and most recently wines too. Todema provides **COLTAL for the lacquering of cylindrical objects and capsules: lacquering and silk screen printing or embossing, from video, hot foil or tampographic with very high visual quality.** COLTAL is effective on various materials, such as Tin, Aluminium, Plastic and Poly-laminated materials. An **integrated servo-driven system fully controls the machine operation ensuring a check of the result even with variable or unforeseeable conditions,** such as the different quality and level of deformation of the materials, the type of friction or the difference in dyeing.



*In the fully servo-driven Coltal machine, the table control takes place by means of the Cartridge DDR motors, which are controlled by AKD drives. One of the advantages is the considerable increase in the production speed. The high quality of printing and embossed lacquering is noteworthy.*

*COLTAL machine technical specifications*

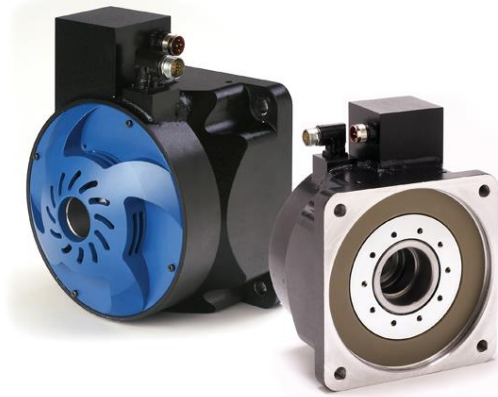
<b>SIZE</b>	1250 X 980 X 2600 mm
<b>PRODUCTION SPEED</b>	3500-5500 pc/hour (depending on the type of printing)
<b>SIZE OF CAPS</b>	Diam. 28/32 mm; H 15/65 mm
<b>DRYING</b>	Hot air oven drying or UV LED system
<b>PRINTING</b>	Silk screen printing, painting, pad printing, hot foil printing on top, embossed printing on top
<b>LOADING</b>	Automatic, 3-way gravity force with linear conveyor belt
<b>UNLOADING</b>	Expulsion with pressure air directly in the box
<b>INK RECYCLING</b>	Integrated system to keep the ink level by means of 3+3 peristaltic pumps
<b>MOTOR</b>	CDDR motors
<b>ACCESSORIES</b>	Drying accessories Video camera for checking the printing quality Viscometer for ink density automatic control Pallet machine for packaging the pieces.



**High performance in a small space: Direct Drive Cartridge DDR servomotors**

In order to check the exact positioning of the two spindle-holding tables without further mechanical parts, 2 [Direct Drive Cartridge DDR servomotors](#) are used together with the related AKD drives. Such motors allow a direct control of the motion, thus eliminating all the mechanical transmissions that used to generate too much elasticity in the motion. In order to ensure the required precision, a direct-drive motor system was needed. Cartridge motors are the quickest and simplest solution to implement. The quality of printing and embossed lacquering depends on the precision and accuracy of the machine movements, which are provided by the torque motors and the related Kollmorgen control systems. The dis-

posal of the mechanical transmission systems has considerably reduced the frequency of maintenance operations, need for spare parts and ease of maintaining the overall machine accuracy level over time.



*CDDR motor specifications:*

- 5-minute rapid mounting • 5 sizes ranging from 108 mm to 350 mm
- The direct transmission of the forces without mechanical components greatly reduces operation and maintenance costs
- 17 different lengths, 52 standard windings
- Continuous torques ranging from 4.57 Nm to 510 Nm
- Reduced cogging to enable a fluid rotation at low speed • Speed up to 2,500 rev/min
- The play free set-up improves the system response
- High-resolution integrated sinusoidal encoder (optional extra)
- The rotor of the Cartridge DDR motor uses machine bearings and it transmits the torque by means of an innovative tightening system. Traditional components of mechanical transmission are no longer necessary

**AKD PDMM: motion controller, PLC and servo-drive in a single device**

The process is controlled by a smart [AKD PDMM](#) system with integrated PLC and motion control for the development of a virtual master for the generation of the main reference, and electronic cams for the positioning and motion sequential control. This key development, which has led to a great reduction of costs in terms of hardware and installation, as well as space needed in the electrical cabinet (up to 30%) and wiring reduction, was made possible due to the cooperation with KOLLMORGEN from the very first steps of this project.

The [AKD servo amplifier](#) combines innovative technology and outstanding performance within very small dimensions. These servo amplifiers with multiple features provide solutions for nearly any application, from basic torque and speed control, to register control, through to fully programmable multi-axis applications with embedded [Kollmorgen Automation Suite™](#).

Universal AKDs set the standards for efficiency and power density. The ADK series has been designed with the versatility, connectivity and power needed to increase the machine performance as well as the speed of integration. The motor setup mainly occurs through plug-and-play and offers a wide range of feedback. Among the various possibilities of Ethernet connection, options for both open and closed protocols are available. Online diagnostics and the data verification enable faster and error-free programming. A wider power range, enclosed in a compact design, allows you to use these robust drives with a single interface.



*Multi-programmable motion controller: Integrated IPC, AKD PDMM, fully programmable.*

“Our client’s objective – Todeschini recalls – was a machine with a production of approximately 60/70 pieces per minute. **We largely exceeded that target**”.

### Recap

“Our clients are highly satisfied with COLTAL – Todeschini points out –, the **quality standards have been fully met and the production targets have exceeded our expectations by 15%**. Kollmorgen staff worked with us painstakingly and quickly to ensure that the components that we used were highly reliable and high-performing. Our initial objective has been fully achieved and in fact we have highly exceeded our expectations particularly in terms of accuracy and quality”.



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### Information about KOLLMORGEN

Kollmorgen is a leading provider of integrated automation and drive systems, as well as related components for machine manufacturers all over the world. With more than 70 years of experience in Motion Control design, application development and a strong knowledge in development of standard and special solutions, Kollmorgen had repeatedly provided top-of-the-range solutions in terms of performance, quality, reliability and ease-of-use, giving clients an actual marketplace advantage. For further information, contact [think@kollmorgen.com](mailto:think@kollmorgen.com) or visit our website [www.kollmorgen.com/uk](http://www.kollmorgen.com/uk)