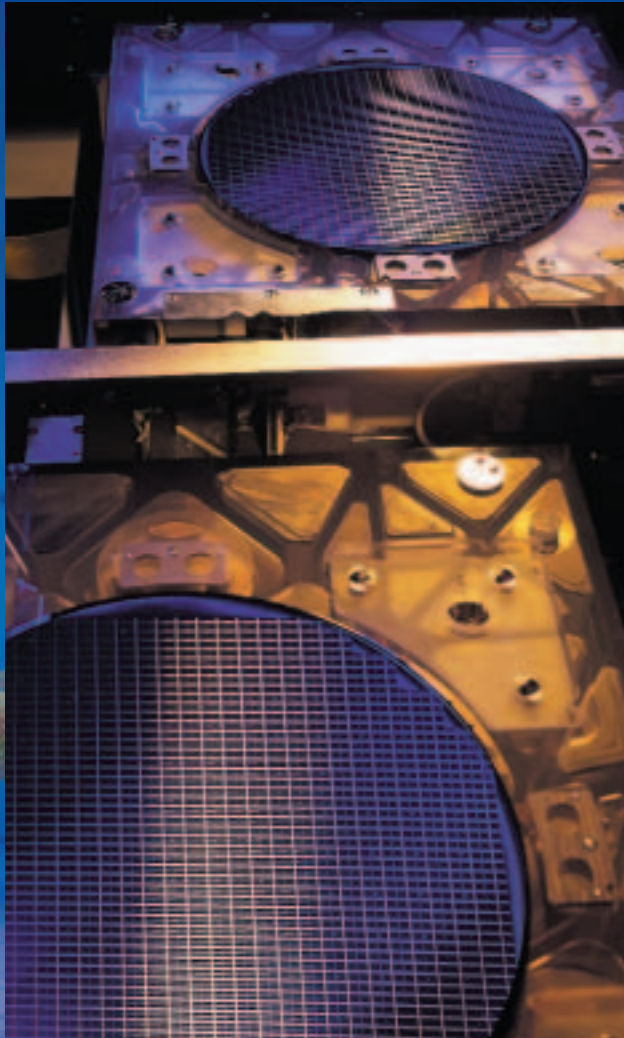


The progress in lithography technology to produce better chips

Beckhoff control system monitors new ASML wafer production units



→ The rapid innovation in the electronics industry generates many new products and services which play a major role in all aspects of society. This holds both for the information and telecommunications industry, as well as for many aspects of everyday life, such as transport, mobile phones, television etc. Technological developments in the semiconductor industry are just as quick. As one of the leading manufacturers of semiconductor production machines, ASML developed a production line for 300 mm wafers, the TWINSKAN range. The innovative PC-based control solution for monitoring and diagnosis of the complete system was realized with Beckhoff components.



To fulfill the promise of 300 mm wafer productivity, ASML has created TWINSKAN, the dual-stage platform that can be extended to the limits of optical lithography.

The application of digital electronics is rapidly expanding throughout the entire world. At the heart of these applications is the integrated circuit (IC or chip). The rapid progress in electronics is a direct result from revolutionary improvements in the products of the IC industry. Since the beginning of the IC production, an enormous progress has been made in the performance and cost per function of these devices. The performance of chips roughly improves by a factor of eight every five years and the production costs decrease by about a factor of 20, during the same period. ICs are complex structures of patterns that are printed on silicon, a semi-conducting material. A thin disk made of silicon, a wafer, is used for this. The most commonly used wafer today, typically has a size of 200 mm in diameter but the size of an IC is typically less than one square centimeter, so hundreds of ICs can be printed on one wafer.

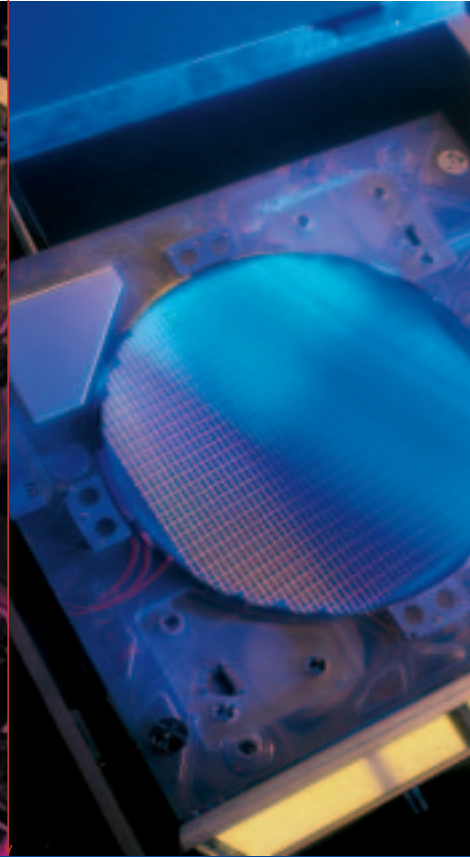
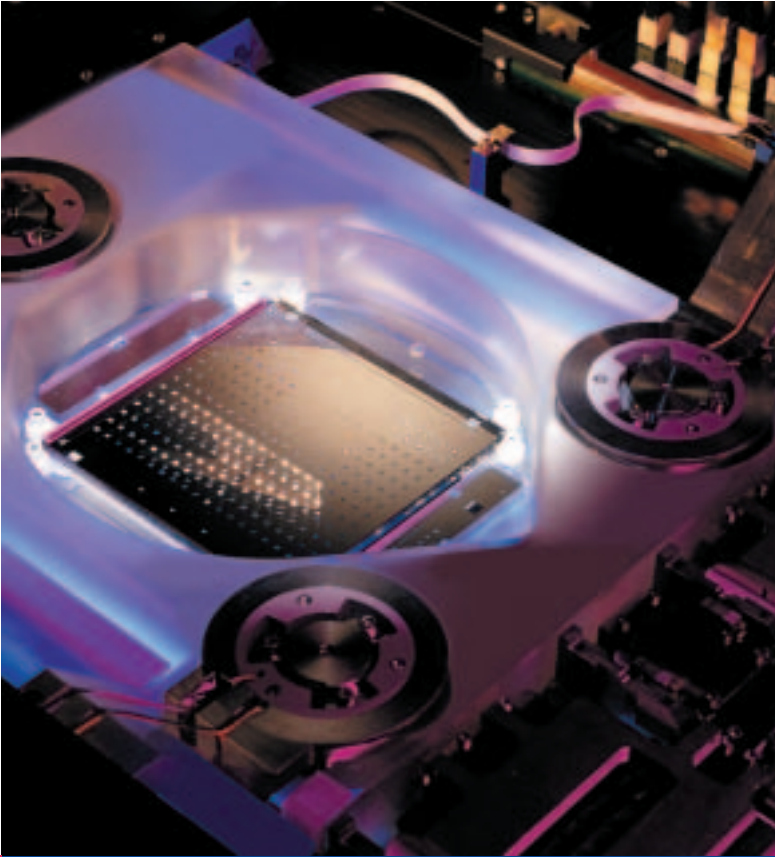
With TWINSKAN at the limits of optical lithography

The IC industry is able to innovate so rapidly because of the reduction in dimensions of the electrical components, such as transistors. This enables the increase in the performance such as the speed of microprocessors and the reduction of cost per bit for DRAMs. To build the integrated circuit, about 20 to 30 layers of patterns have to be superimposed to obtain a three dimensional structure.

With the introduction of TWINSKAN, ASML has launched a new era in lithography productivity. Thanks to revolutionary dual stages, balance mass compensation and advances in metrology technology, the promise of profitable 300 mm wafer processing is now a reality.

Two of everything: TwinCAT for TWINSKAN

With MBDS (Machine Based Diagnostic System), the new TWINSKAN series is equipped with a flexible monitoring and diagnostic system. MBDS monitors all safety and emergency systems and logs any alarms. At the same time, the current state of production is visualized on two display elements. An integrated assistant facilitates the setting of the diagnostic functions.



System integration expertise has enabled ASML to take the leadership position in the design and manufacture of imaging systems.

Among other requirements, the new control solution was expected to offer reliable monitoring of the safety circuits. The MTBF values (mean time between failure) of the system should be higher than the monitoring components. Furthermore, the system should enable flexible and easily expandable interfacing with the diagnostic sensors.

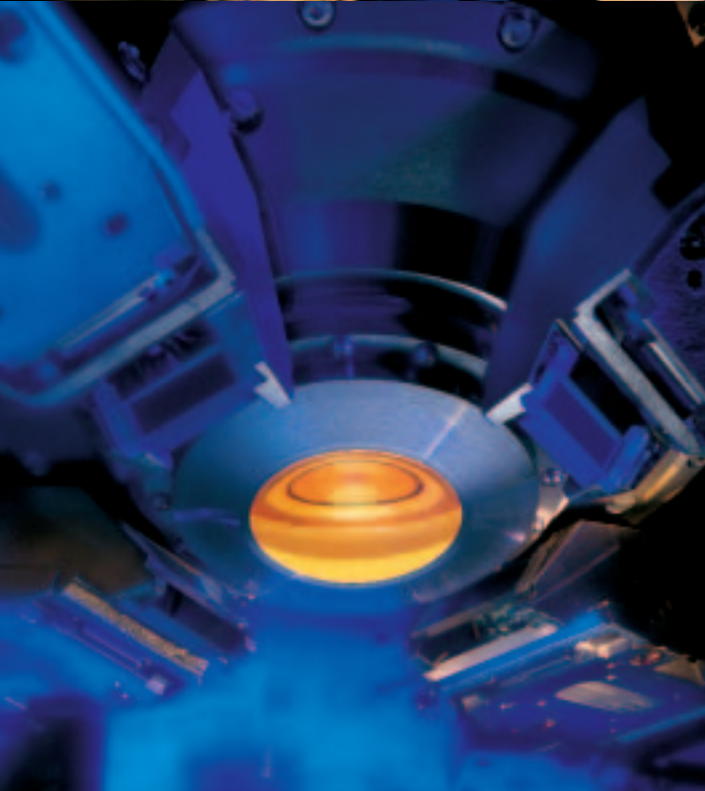
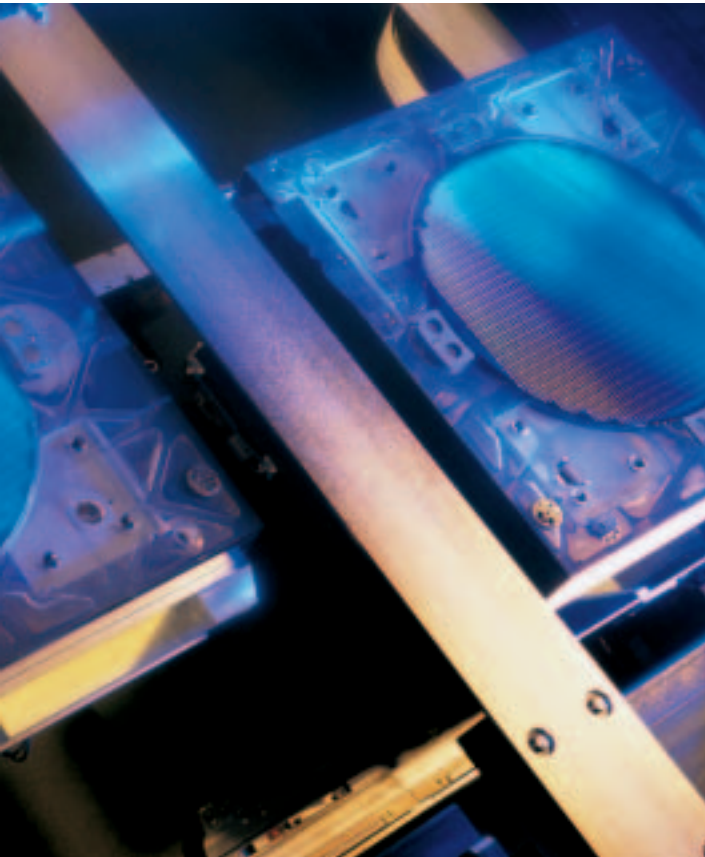
Following comprehensive evaluation, ASML selected the control system from Beckhoff. In cooperation with Industrial Automation Link, the exclusive Beckhoff partner in Holland, an automation concept consisting of Industrial PC, fieldbus communication via DeviceNet and software PLC was selected.

A further requirement for the hardware was small physical size. For this reason, the C6110 Industrial PC as the smallest device of the C6100 Control Cabinet PC range was selected. Two Control Panels with 10 inch TFT display for operation and visualization are connected to the system. The fully software-based control is realized via TwinCAT PLC. TwinCAT OPC deals with the interfacing to the Genesis 32 visualization software from Iconics. The I/Os for the monitoring and diagnostic functions of the TWINSCAN range are connected to a total of eight Bus Terminal stations. DeviceNet is used as a fieldbus. It is increasingly establishing itself as the standard for the semiconductor industry.

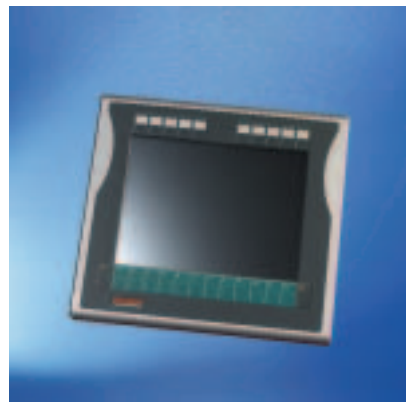
Control and visualization on a single PC

The use of a PC-based solution with standardized IT interfaces simplifies the integration of remote maintenance and remote access for data security. A further advantage is that control and visualization run on a single system, so that no further hardware is required.

The Control Panel can be configured to face right or left so that adjacent systems can be paired across a single operator aisle for ease of access. TWINSCAN's modular design provides numerous benefits: move-in time is greatly reduced, bringing productivity online faster than ever; access to functional parts is improved to maximize uptime; and, future developments can be more readily incorporated. Maintenance is facilitated and uptime is increased. Efficient human interaction with the equipment is equally important. Intuitive software screens and online help text keep the operator fully informed of system status and events.



The Industrial PC C6110 monitors all safety and emergency systems and logs any alarms.



The current state of production is visualized on two Control Panels.

Advanced technology systems of ASML

ASML is one of the world's leading providers of advanced technology systems for the semiconductor industry. The company offers an integrated portfolio of lithography, track and thermal systems mainly for manufacturing complex integrated circuits.

Headquartered in Veldhoven, the Netherlands, ASML is traded on Euronext Amsterdam and Nasdaq under the symbol ASML. In 2001 the company reported net sales of over EUR 1.84 billion and employs approximately 7,000 people in 50 locations throughout the world.

→ www.asml.com