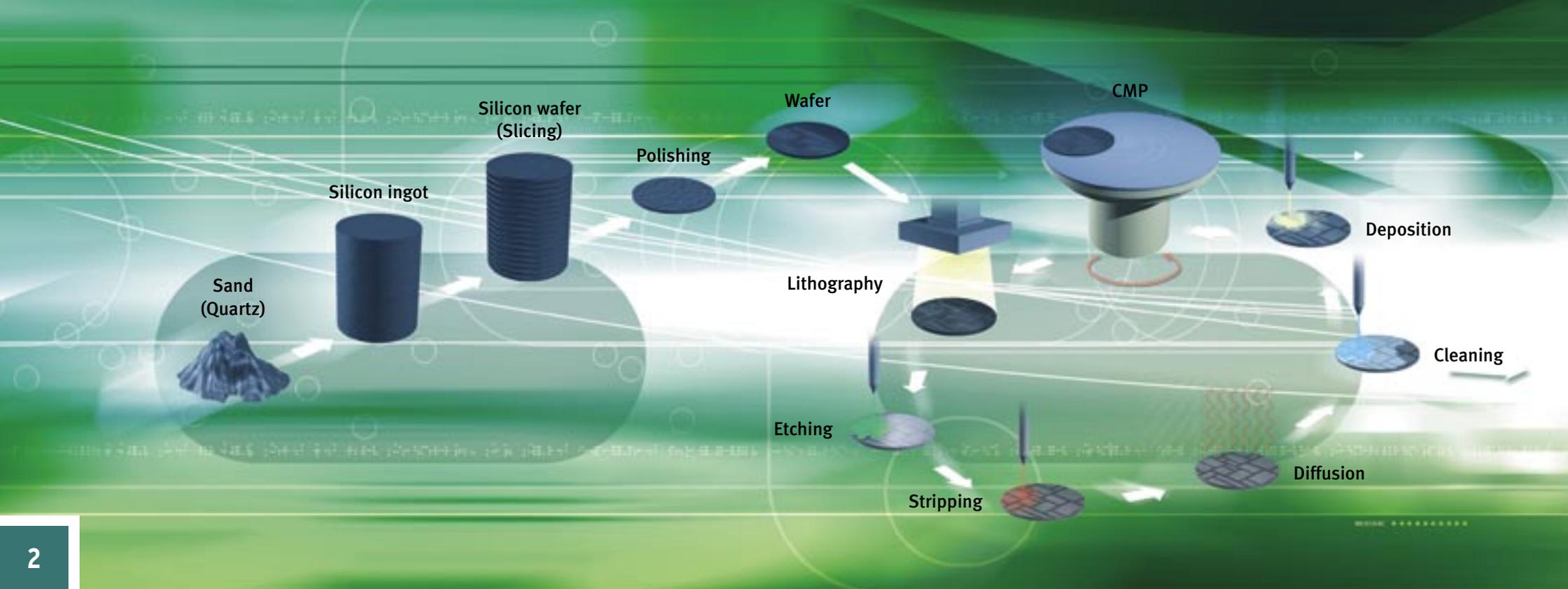


Smart Solutions for the Semiconductor & Electronics Industry

Advanced Industrial Automation

OMRON



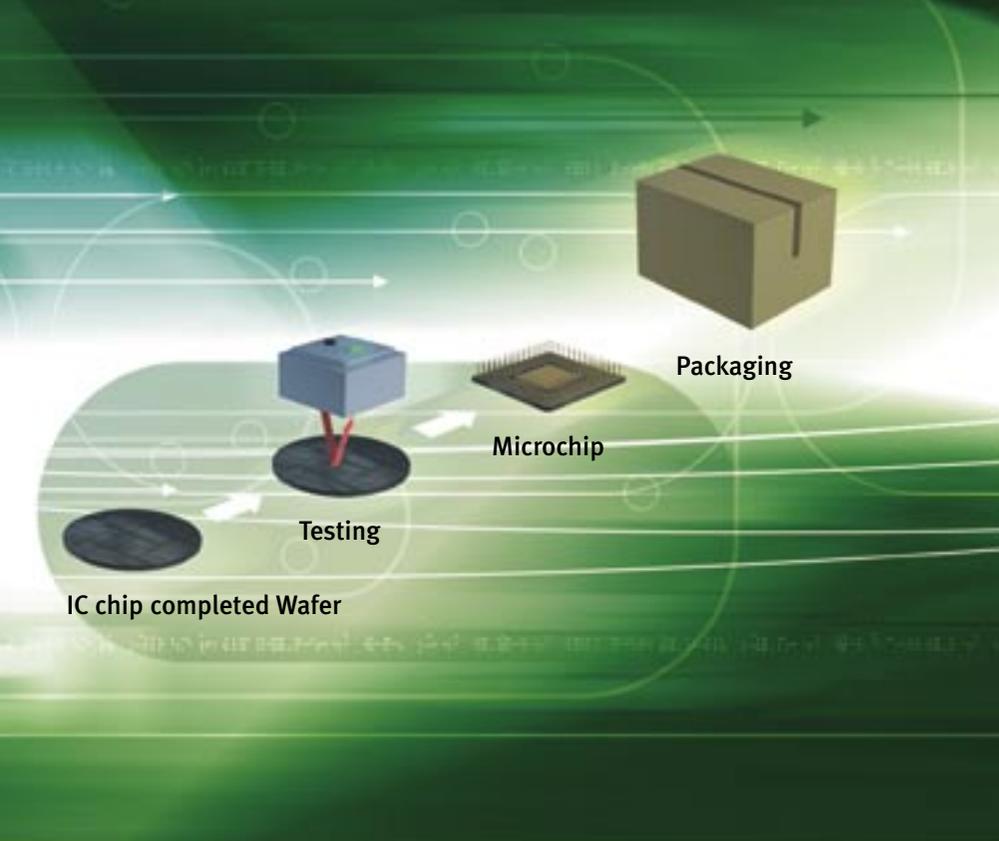
SMART SOLUTIONS FOR THE SEMICONDUCTOR & ELECTRONICS

In the semiconductor electronics business the ever-advancing miniaturisation of electronic products requires smaller, purer and thinner chip technologies. Manufacturers continuously have to increase their productivity and in accordance with Moore's Law, reduce the costs per chip by a third every year. This results in ever-smaller structure widths and the development and manufacturing of silicon wafers with large diameters.

Omron is a well-established global player and solutions provider of advanced technologies in the semiconductor industry. Through long-term partnerships with the market leaders in machine building and with influential entities such as SEMI, we have acquired the necessary knowledge and know-how to become a leading player for equipping these machines with products that include sensors, PLCs and servo-drives

and safety components. In fact we can supply every component that you need to successfully develop and market your innovations for the semiconductor industry.

With a foundation of technology and know-how accumulated over decades of experience in the Factory Automation (FA) industry, Omron has built a variety



INDUSTRY

of software tools and many lines of FA devices centering on PLCs. These powerful resources can meet any requirements in our customers' manufacturing facilities, from systems that control the entire plant, to production lines, equipment, and practical applications.



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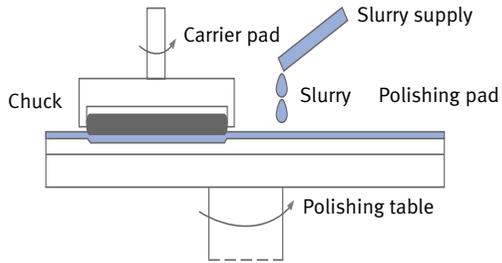
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FRONT-END PROCESS

Wafer etching and cleaning are critical processes in the production of microelectronic devices. One of the most important breakthroughs in wet-process technology is the process-reliable level measurement. Naturally, extreme chemical resistance and high-temperature tolerances are characteristics of all the com-

ponents used in these processes. Omron's sensors are designed to meet these stringent requirements. Chemical mechanical polishing (CMP) has become the process of choice for preventing distortion during the lithographic process, because it planes the wafer surface to a flat, uniform finish. To do this, CMP

systems use an abrasive, suspended in chemical slurry that levels wafer topography. The very nature of CMP demands specially designed products that can perform processes like wafer identification and security monitoring of critical handling areas. Omron has a range of sensors designed to cover all aspects of the CMP process.



ETCHING / CLEANING / CMP

SEMI standard field-bus



DeviceNet offers

- Highest reliability for process operations
- Top efficiency through producer/consumer communications according to requirements
- Data exchange with intelligent devices according to Multimaster principle and configuration with Message Service
- Preventive maintenance (MTBR) supported by DeviceNet modules with integrated data recording

Wafer tracing and tracking



Omron has developed an RFID system for use in the semiconductor industry. This system is used for tracking and tracing new types of wafers, and incorporates a special 2-D code. Branch specific uses

- SEMI protocol integrated
- Special building forum for direct implementation of the FOUF

Detecting lost wafers



The E3X-HB digital fibre sensor offers

- Secure presence detection control of the wafer on various pads
- Very high chemical resistance
- Very compact design

Liquid level detection



The E32-D36F and E32-D82F feature

- Dripping detection and prevention mechanism
- Air bubbles detection and prevention
- Detection of high-temperature fluids with direct medium contact
- Special Teflon (PFA) housing with excellent chemical and oil resistance

Temperature controller



The E5R features

- Multi-channel temperature control in a modular format
- High precision
- Fast cycle times
- Field-bus communication

Guard interlocking



The D4NL features

- Compact plastic housing
- High interlock force 1300N
- Wide range of contacts
- SEMI S2 compliant solution
- CE, UL/CSA conformity
- Contacts and indicator for diagnostics

FRONT-END PROCESS

The move to 300mm-wafer production has placed even more demands on this process in terms of high-precision distance measurement to the silicon wafer surfaces. In addition, the very dynamic and precise

positioning of the wafers are important aspects in this field. The products that Omron has designed for use in lithographic systems are built with extremely high operating precision in mind.

Precise distance measuring



Wafer mapping for 300mm wafer



Drive technology for motion control



Safeguard monitoring



Production monitoring



Wafer positioning (in centre)



LITHOGRAPHY

The Z300 displacement sensor provides

- Highly accurate measurements on reflective and transparent surfaces
- Precision measurement even down to the nm level

The E32-A03/A04 fibre optic sensor provides

- Assured process recognition, even for micro-thin wafers
- Beam divergence $<2^\circ$
- Very compact design
- Suitable for robotic systems

Sigma servo system offers

- Highest dynamic performance
- Extremely precise positioning
- Multi-axes motion control
- Very compact design

G9SA safety relay unit provides

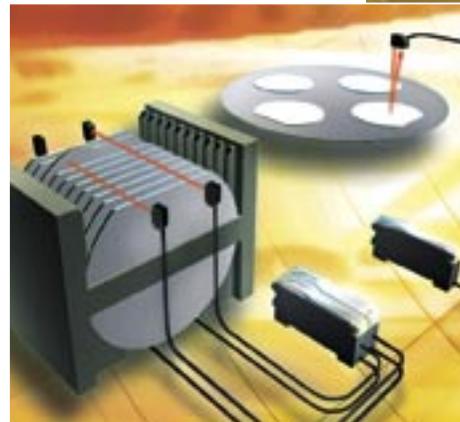
- Time delay for servo control safe stop category 1
- Expansion modules for easy application
- Up to 8 safety contacts
- Feedback and LED for diagnostics
- Semi S2, CE, UL and CSA compliant

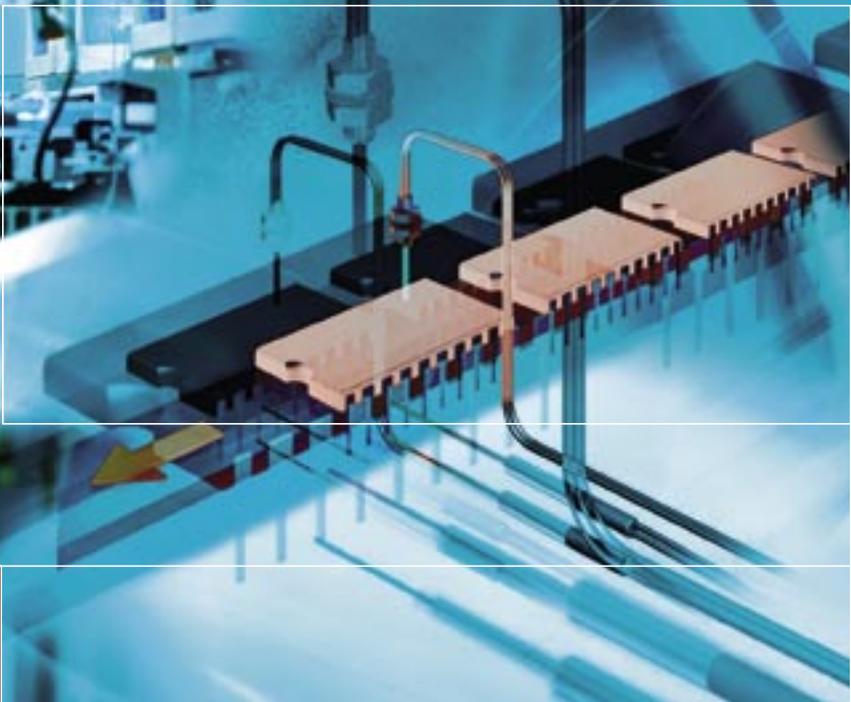
V530-R160 fixed type reader solution for highly degraded codes offers

- Cost-effective production monitoring for wafers and PCBs

F210 high-speed vision system provides

- Precise wafer positioning (in centre)
- Notch and flat detection





BACK-END PROCESS

The progressive miniaturisation of semiconductor technology also means ever-smaller chip sizes. In order to meet these demands during manufacture, components used in the quality control processes must be reliable, fast and tough to withstand the harsh environments they encounter. Omron's sensors meet these harsh demands.



Chip presence detection



Chip detection



Lead frame detection



Special fibre optics



Digital fibre optics amplifier



DIE BONDING / IC TESTING

The E3X-DA6-L high-speed digital fibre sensor ensures

- Detection of the presence of even the smallest chips
- Highest process speeds
- Application-oriented sensor technology
- Heat resistance to harsh environments

The ZX laser sensor provides

- High-precision distance measurement or simple object presence in tape
- Special sensor heads for highly reflective objects
- Very fast evaluation times

Both the E3C and the E3T can provide

- Colour independent positioning
- Background suppression
- Very compact set-up

The E32 series offers

- Very reliable recognition of the smallest objects
- Heat resistant to harsh environments
- Varying application oriented design

E3X-DA-S and E3X-MDA

- Highest evaluation speeds $\lt; 50\mu\text{s}$
- External teaching
- Field-bus communication
- Two-channel amplifier in half the size
- Conforms to wet process approvals according to SEMI S2-200
- UL991 for compliance with Safety Interlock Systems for Wet Processes
- Power tuning for easy operation

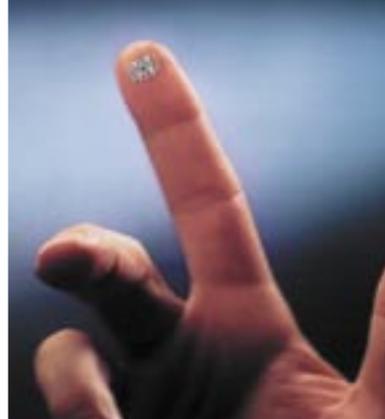


Bild: Unaxis

ICs are individually tested before shipment to ensure that they meet the required quality levels. New testing methods are needed to deal with the ever-growing complexity of ICs, and Omron is continuously developing products that are optimised to meet the highest demands of testing, from manufacturing speed and reliability to precision detection of the smallest components.



PRINTED CIRCUIT BOARDS

Everything about the manufacturing process of Printed Circuit Boards (PCBs) – from component mounting and soldering to testing the final product – requires systems that are fast, flexible and totally reliable. Omron has a range of products that are used in areas of this process where precise positioning and dynamic, process-reliable identification is essential. Especially with exposure systems there are extremely high

requirements for PCB alignment at very high throughput times. Drilling machines with 400 holes/min. require special digital drives and high-speed sensors for broken drill detection. Soldering systems require high temperature sensors, advanced temperature controllers and precise servo drives for positioning.

EXPOSURE



Wafer handling process



The F3SN safety light curtain is

- User-friendly
- Chemically resistant

Total machine control



CJ1 PLCs offer

- Extensive range of I/O units for machine automation
- Unsurpassed flexibility in machine modularisation
- Transparent communication on any network

Drive technology for positioning and handling



The Sigma servo system offers

- Highest dynamic performance
- Extremely precise positioning
- Multi-axes motion control

Process secure PCB detection



The E3S-LS3N provides

- Precise presence and edge recognition, also with drilling and milling
- Background suppression

UV measurement



The F3UV features

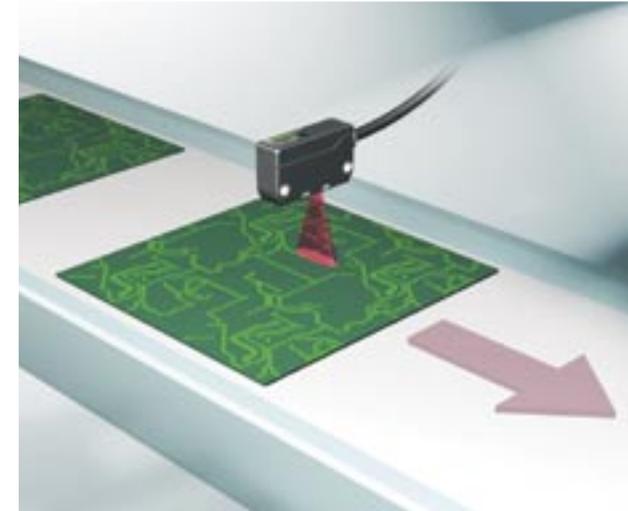
- Intensity registration by exposure systems
- High thermal resistance

Positioning and alignment

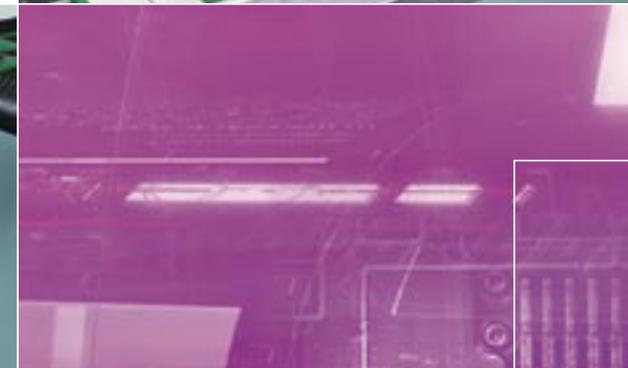
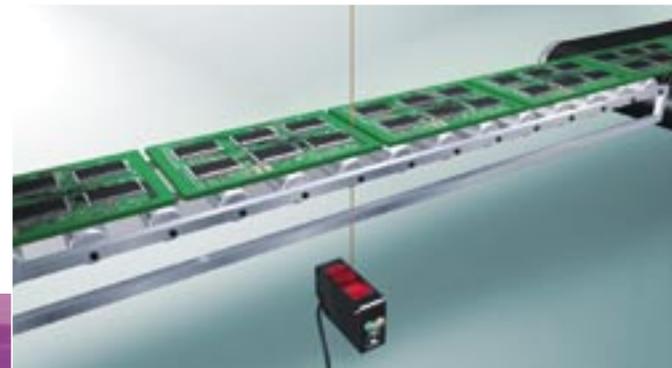


The F210/250 vision sensors provide

- Film and PCB positioning
- Quality control



/ ETCHING / DRILLING





DATA STORAGE

The equipment used for manufacturing the established Compact Disc (CD) and the much newer Digital Versatile Disc (DVD) is almost identical from a production point of view. So is the demand for speed and reliability in the production processes. Omron's sensors are increasingly being

used in these applications because they meet the stringent demands required throughout the manufacturing and quality control process. Identifying coatings, carrier positioning and media-independent object identification are just some of the processes where Omron's sensors are being used.

Positioning and presence detection



- The E3T photoelectric sensor features**
- Precise height and presence detection
 - Background suppression
 - Colour independent
 - Very compact design

Precise recognition of the coating layer

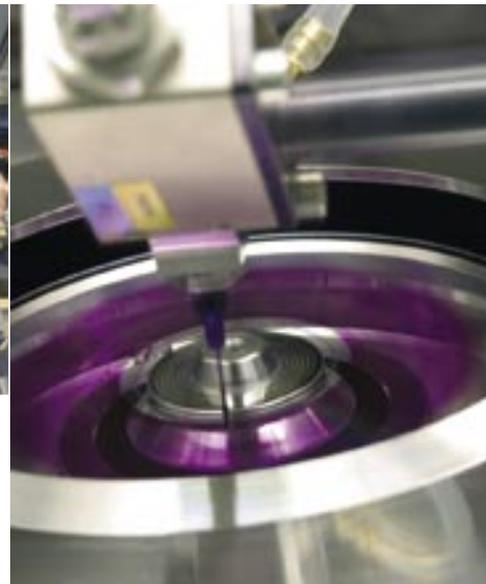
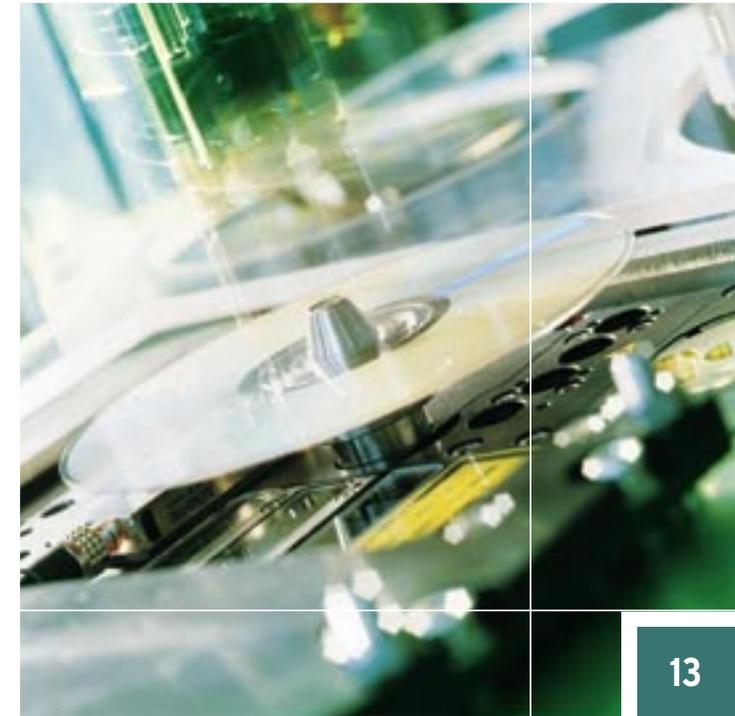


- The E3X-DA-S digital fibre sensor features**
- Special fibre optics technology
 - Fine-tuned specially for checking the coating
 - Very compact design

Tilt measuring



- The ZX and the Z300 laser sensor can be used for**
- Measuring highly reflective surfaces
 - Super precise calculation of the height differences
 - Eccentricity control
 - Precise positioning of CD's / DVD's



CD / DVD



FLAT PANEL DISPLAYS

Information technology requires a medium to make information visible, and flat panel displays are fulfilling this need. The demand for flat panel displays from the computer, communications and automobile industries is making this market segment one of the fastest growing around. Manufacturing a

flat panel display is a high-tech process, and handling and identifying the very thin substrate is very challenging, especially when measuring the contours and thickness to check its suitability for processing. Omron has a range of sensors designed especially to handle these challenging processes.

Thickness measurement
of glass substrate



Layer thickness measurement



Edge detection



Heat resistant and
vacuum applications



Substrate handling



Non-contact safety guarding



LCD / PDP

The Z300 displacement sensor offers

- Exceptional functionality for precise thickness measurement of substrates

The Z5FM film thickness sensor provides

- Precise layer thickness measurement for transparent layers
- Inline measuring because of high process speed

The E3C-LDA photoelectric laser sensor features

- Very precise positioning
- A wide range of models to choose from

Special fibre optics for heat resistant applications features

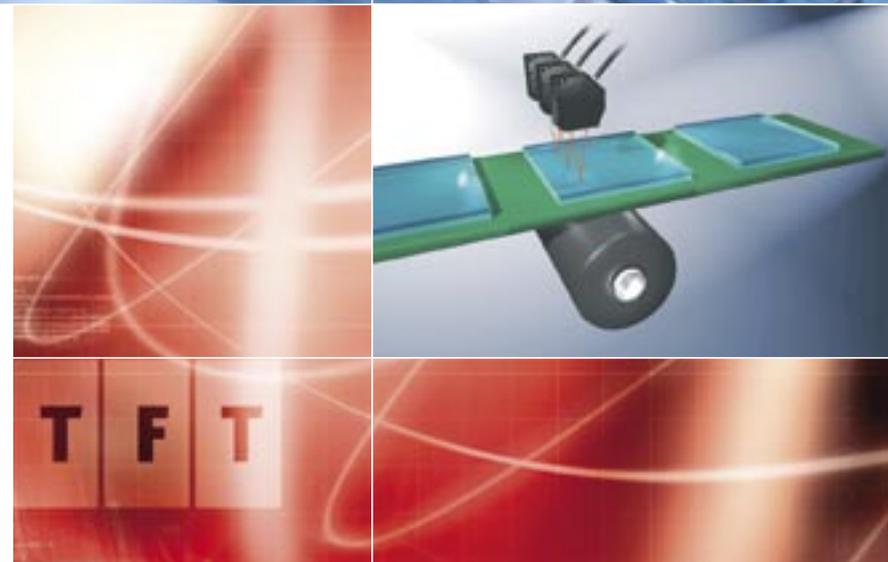
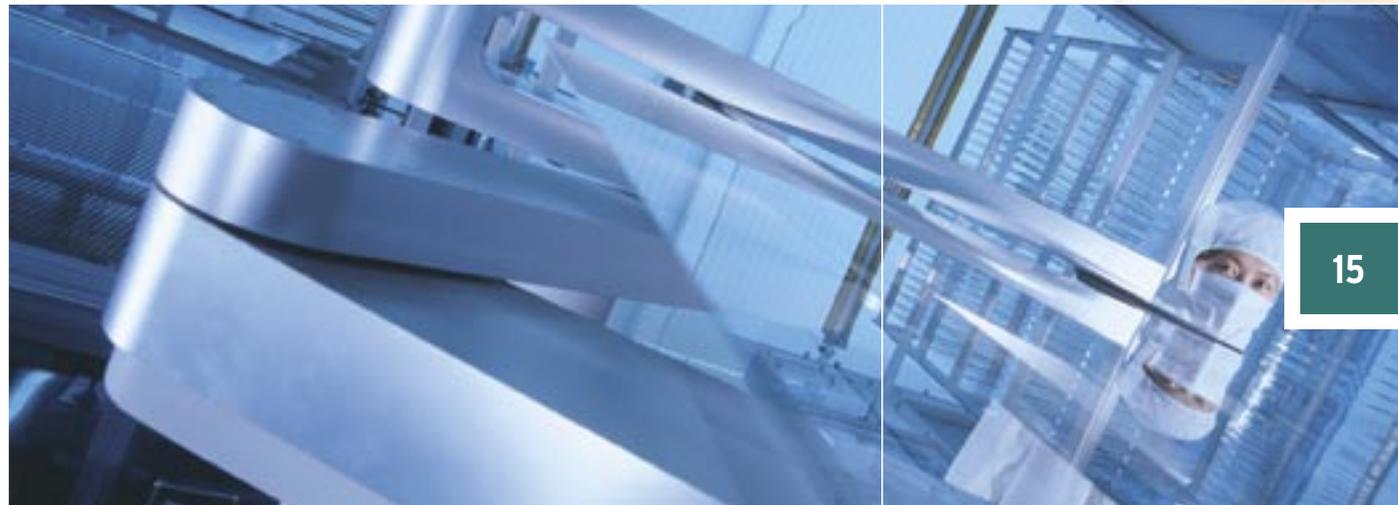
- Heat resistant fibre optics for high temperature range of 150°C to 400°C
- Special metal protection tubes for mechanical strength

The E32-L16 fibre optic can be used for

- Very precise positioning of LCD glass substrate
- Stable detection of inclined LCD surfaces

The D40B features

- Non-contact safety switch system
- Safety category 3
- Economical plastic solution
- SEMI S2, CE, UL/CSA applicable



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