



*The F-Scanner 1Dc line scanner is designed for industrial environments. It can be moved over a component's surface using a robot or an axis system.*

# F-Scanner 1Dc

## Inspecting cleanliness and coatings in motion

**Inline or robot-assisted 100-percent monitoring**

From the inspection of blank lubrication in press shops to the detection of even slightest contaminations on large and complex parts: The F-Scanner 1Dc laser scanners of the Fraunhofer IPM is an ideal tool for inspecting parts in motion. Depending on the application, either the component or the scanner itself moves.

### Fluorescence reveals even minor contaminations or thin coatings

The line scanner F-Scanner 1Dc, like all systems of the F-Scanner family, are based on the technology of fluorescence measurement. Fluorescence makes coatings and even the slightest organic residues on component surfaces visible and quantifiable. While the devices of the F-Scanner 2D series inspect surfaces two-dimensionally, the F-Scanner 1Dc projects individual lines onto the component surface, which can be more than 1 meter wide according to the application. Each laser line consists of 500 to 2 500 individual measuring points. The full-surface information is acquired by moving either the component or

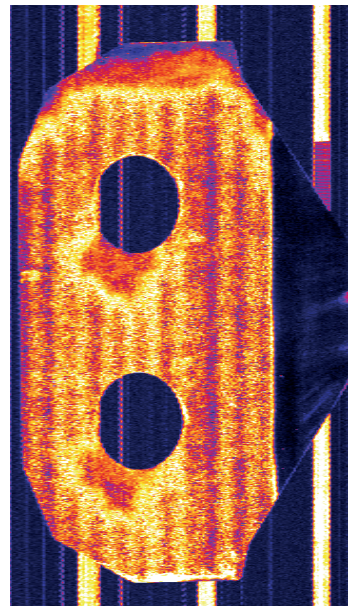
the scanner – as on a conveyor belt or with the aid of a robot or axis system.

### Resolution in the millimeter range

The high scanning speed of typically 200 to 400 projected lines per second is a decisive factor for such a setup. It enables resolutions in the millimeter range, even at high velocities. Based on the course of motion, e.g. communicated by an encoder signal, the lines are combined to form a high-resolution overall measurement reflecting the “coating or contamination landscape” on the component surface, providing the basis for quality control and process optimization.

### Advantages at a glance

- Spatially resolved 100-percent surface analysis
- Suited for rapidly moving large or complex components
- Flexible integration into production lines
- Suitable for application in harsh environments
- Various interfaces available (TCP/IP, Profinet ...)
- Automated image processing
- All-digital documentation for quality assurance
- Full CE documentation



*Left: F-Scanner 1Dc with laser protection shield for oil film measurement in the production line of a stamping plant. The two scanning units capture the entire blank surface at full processing speed.*

*Right: Example image of a spray-oiled sheet metal part with degreased area.*

### Ready to be deployed in the production line

The F-Scanner 1Dc is designed for use in industrial environments. To ensure maximum robustness, the housing is milled from a single block of aluminum, making it dust-, water-, and oil-tight. The equipment also includes shock absorbers, heat sinks (water or thermoelectric) and a mechanical lock with integrated reference body. Optimum signal quality is ensured by the optical separation of the excitation and detection channels (patent pending).

Laser safety of the entire system is achieved with minimum additional effort by means of an external interlock input, warning lights and key-actuated controls. An industrial PC with the F-Scanner software is provided for controlling the devices and for processing the measurement data. Communication between the sensor and line automation or the customer's data processing system can be realized via various interfaces such as TCP/IP or Profinet and data formats. Safety-relevant functions are controlled directly on the

device using secure inputs and outputs via the system's interlock logic. All interfaces (mechanical, electrical, software) can be adapted according to customer requirements.

### Designed for use on lightweight industrial robots

Due to its compact design and low weight, the F-Scanner 1Dc can be operated with lightweight industrial robots, cobots and linear axes. Unlike stationary operation, the measurement device itself moves rather than the part. This makes it possible to fully capture complex geometries, such as those found in lightweight construction structural components, and to scan specific areas of interest, such as bonding points. The combination of line scanner and robot or linear axis is also advantageous when dealing with large and oblong components, where the F-Scanner 2D might be constrained by the limited field of view.

### Typical specifications F-Scanner 1Dc

Fluorescence excitation	Typ. 405 nm
Aperture	Typ. 60°
Working distance	30 to 170 cm
Field of view	30 to 200 cm
Speed	200 to 400 lines per sec.
Resolution	Typ. 500 to 2500 points / line
Dimensions (LxHxW)	20 × 40 × 25 cm <sup>3</sup>
Weight	15 kg
Detection limit	Typ. < 0.01 g / m <sup>2</sup>
Detectable substances	Processing agents, e.g. oils, fats, cleaning agents, organic coatings

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