

FIBER Series 6000

Highest precision in the draw tower

The FIBER Series 6000 includes innovative devices for the diameter measurement of optical fibers in the drawing process, for the detection of airlines, measurement of the fiber temperature, for the determination of the concentricity of the coating as well as the detection of the smallest lumps and neckdowns.

Highest precision in the draw tower

Gauge head technology

The continuous quality control in the optical fiber manufacturing requires a reliable and efficient measurement technology. SIKORA sets standards in this area. This high quality of optical fiber is demanded, to reliably transport large amounts of data over long distances, without any loss of data.

Diameter measurement of bare and coated optical fibers (FIBER LASER 6003)

The FIBER LASER 6003 is an innovative device for diameter measurement of optical fibers directly in the drawing tower. The unique measuring principle assures an accuracy of 0.05 μm at a repeatability of 0.02 μm . 2,500 measurements per second with high single value precision and a short exposure time of 1.2 μs always guarantees the highest accuracy. The measuring principle is based on diffraction analysis. It allows for a non-contact, optical measurement of diameters without moving parts. Calibration is not necessary.

Product Diameter	50 to 500 μm
Accuracy	$\pm 0.05 \mu\text{m}$
Repeatability	0.02 μm
Exposure Time	0.2 μs
Measuring Rate	2,500 /sec
Power Supply	100 - 240 V AC $\pm 10 \%$, 50/60 Hz
Interfaces	Serial interface RS485, Setup and diagnosis interface RS232, LAN (EtherNet), 4 analog outputs (uni-/bipolar) or optional Profibus-DP, alternatively industrial field busses such as CANopen, EtherNet/IP, DeviceNet, ProfiNet IO
Dimensions	150 x 65 x 225 mm (width x height x depth)
Weight	ca. 3 kg

*in the center of the 3 mm measuring area

Diameter measurement with airline detection (FIBER LASER 6003 AIRLINE)

This multi-purpose device is used for the measurement of the diameter and the detection of smallest airlines (air pockets in the fiber) from 0.5 μm diameter. The FIBER LASER 6003 AIRLINE, typically installed prior to the coating, is factory-calibrated and keeps it absolute accuracy for the entire life-cycle.

As FIBER LASER 6003 – plus airline detection	
Feature	Airline Detection
Smallest detectable Airline	0.5 μm (diameter)

Measuring Rate	700 Hz
Dimensions	150 x 95 x 225 mm (width x height x depth)
Weight	ca. 4 kg

Evaluation of coating concentricity (FIBER 6003 CCE)

In order to precisely evaluate the concentricity of the coating, the FIBER LASER 6003 can optionally be equipped with an additional function. This FIBER LASER 6003 CCE (Coating Concentricity Evaluation) is installed after the coating cup and provides information on the coating concentricity as well as diameter values.

As the FIBER LASER 6003 CCE replaces the FIBER LASER 6003 within the drawing tower for the diameter measurement of the coated fiber, an additional diameter gauge head is not necessary.

As FIBER LASER 6003 – plus coating concentricity evaluation	
Feature	Coating Concentricity Evaluation
Dimensions	150 x 65 x 225 mm (width x height x depth)
Weight	ca. 3 kg

Measurement of the fiber temperature (FIBER TEMP 6003)

The FIBER TEMP 6003 is a standalone gauge for the measurement of the fiber temperature during the drawing process.

The gauge head can be installed at the cold (measuring range 40° to 120 °C) or at the hot end (measuring range 500° to 1,500 °C) of the fiber line. To ensure the right temperature at both positions, two FIBER TEMP 6003 devices should be installed, for the highest stability of the process. The measurement at the hot end provides an important process parameter for the control of the furnace. With the FIBER TEMP 6003 at the cold end, the temperature of the fiber can be optimally adjusted and kept stable before it enters the coating. Furthermore, the required helium cooling can be reduced to a minimum, resulting in a cost reduction. In combination with the FIBER ECONCONTROL, the temperature measurement is displayed and also available in the trend diagram.

Product Diameter	100 to 500 µm
Accuracy	1 °C for the cold end
Measuring Rate	100/sec
Temperature Range	Cold: 40° to 120 °C Hot: 500° to 1.500 °C
Power Supply	100 - 240 V AC ± 10 %, 50/60 Hz
Interfaces	RS485, RS232, LAN (EtherNet); optionally: Profibus-DP, analog interface or alternatively industrial field busses such as CANopen, EtherNet/IP, DeviceNet, Profinet IO
Dimensions	150 x 30 x 225 mm (width x height x depth)
Weight	ca. 1 kg

100 % lump detection on the surface of optical fibers (FIBER LUMP 6003 / 6003 MICRO)

Lump detectors are essential for continuous quality control in drawing towers. The 3-axis FIBER LUMP 6003 reliably detects lumps and neckdowns with a height/depth of 10 µm and a length of 500 µm.

For even higher quality requirements, SIKORA offers the FIBER LUMP 6003 MICRO. The device detects non-conformities on the optical fiber surface from a length of 50 µm to 100 %. This performance is achieved by the integration of 6 measuring axes. Both gauge heads detect faults from a height of 5 µm.

Absolute perfection for the detection of lumps/neckdowns guarantees the SIKORA double sensor technology. All faults are documented regarding height, length, number and position. The lump detectors are available for product diameters from 100 to 500 µm and can be easily integrated into a new or already existing drawing tower. The lump detectors can either be connected to the SIKORA processor system FIBER ECOCONTROL or to a line computer.

Product diameter	FIBER LUMP 6003: 100 - 500 µm FIBER LUMP 6003 MICRO: 100 - 500 µm
Min. detectable fault height	5 µm
Min. fault length	FIBER LUMP 6003: 500µm FIBER LUMP 6003 MICRO: 50 µm
Speed range	1 to 3.000 m/min
Interfaces	RS485, RS232 (Diagnostic); optionally Profibus-DP or alternatively fault contact or analog input, lump/neckdown tolerance, industrial field busses such as CANopen, Ethernet/IP, DeviceNet, ProfiNet
Power supply	100 - 240 V AC ± 10 %, 50/60 Hz
Permissible ambient temperature	+5 to 50 °C

Tension measurement (FIBER TENSION 6003)

The FIBER TENSION 6003 serves as a supplementary measuring device for an even faster, more robust and improved tension measurement to validate and control this important measuring and control parameter. This is made possible by the remarkable measuring rate of up to 50 kHz and the use of a measuring principle which takes the refractive properties of glass into account.

The use of the stand alone device is particularly attractive for manufacturers of high-end solutions where the process is controlled by the tension. The FIBER TENSION 6003 is predestined for optical fibers being processed into premium optical fiber cables for which particularly high requirements and standards exist.

The integrated measuring principle is based on the principle of birefringence. The FIBER TENSION 6003 can be used for both hot and cold measurement of the bare fiber, independent of production influences such as the position of the fiber in the measuring field, the production speed and the vibration or oscillation of the fiber. Installed before or after cooling, the system generates reliable and stable measuring values and thus enables direct control of the tension.

Measuring Range (Object Diameter)	2 mm
Repeatability	± 0.1 g
Measuring Rate	up to 50 kHz
Measuring Range (Tension)	20 to 400 g (for standard telecom fibers; other product diameters and materials on demand)
Measuring Field	± 2 mm
Power Supply	PoE+ (Power over Ethernet) 24 V DC ± 10 %

Interfaces	USB service interface, Ethernet (LAN) Optional: industrial fieldbus (e.g. Profinet IO, EtherNet/IP, Profinet DP, CANopen, DeviceNet), 2 analog inputs, 2 analog outputs, 2 digital inputs, 2 digital outputs
Dimensions	320 x 250 x 86 mm
Weight	ca. 7 kg

Your Benefits

FIBER LASER 6000 / AIRLINE / CCE

- Continuous measurement and control of the drawing process
- Optimal quality control during the production
- Measurement of the diameter, position, traction, vibration frequency and spinning
- "Airline" detection (Airline option)
- Analysis of the coating concentricity (CCE option)
- No calibration (no moving parts)

FIBER LUMP 6000/FIBER LUMP 6000 MICRO

- Highest reliability due to double sensor technology
- Detection of smallest lump from 5 µm
- 6-axis-detection allows for the detection of lumps and neckdowns on the whole optical fiber circumference

Technical Articles

Optical Fiber

[1,000,000 km of optical fiber cables in the ocean – SIKORA assures the quality of data transfer](#)

Optical Fiber Cable

[SIKORA: Quality assurance at the production of optical fiber cables](#)

Sea Cable

[SIKORA assures Process stability and reliability during subsea cable production](#)