



Opticline – Optical Shaft Metrology

Fast and precise quality assurance  
in the production environment thanks  
to optical measuring systems.

Provided and supported by



# Your partner for measuring solutions

The Light & Production Division of Jenoptik is a global specialist in the optimization of manufacturing processes.

Our many years of experience and know-how in the field of industrial measurement technology and optical inspection, modern laser-based material processing and highly flexible robot-based automation enable us to develop tailor-made manufacturing solutions for our customers in automotive, aerospace, healthcare and other manufacturing industries.

As an experienced and reliable partner for high-precision, tactile and non-tactile production metrology, we support you with our global sales and services network.

Depending on the requirements, our tactile, pneumatic and optical measuring systems take on a wide range of tasks for the inspection of surface and form as well as the determination of dimensions, throughout every phase of the production process including final inspection or in the metrology lab. Our systems provide you with precise measured data within the shortest time frames.



Our Opticline measuring solutions present a wide range of evaluation options and numerous areas of application for measuring shaft-type workpieces. Thanks to the fast, optical non-contact measuring principle, measurements are performed with an extremely high level of flexibility, repeatability and accuracy.

## Successfully implemented solutions worldwide

- Turned and precision turned parts
- Components used in the automotive industry such as electric motors, drive trains, steering parts and turbochargers
- Blanks and pressed parts for metal processing
- High-precision workpieces used in medical technology such as implants, bone screws and tools
- Jets and injection technology
- Components used in the bearings industry
- Turbines and emergency power units
- Parts used in the textile and printing industries
- Applications in the aerospace industry
- Pneumatic and hydraulic parts, such as pumps
- Various electric motors, e.g. for fans, household appliances, positioning and drive systems

### Dimensional measurement

- Length
- Diameter
- Radius
- Angle

### Thread measurement

- Dimension
- Form

### Form measurement

- Straightness
- Roundness
- Cylinder form
- Conicity
- Flatness

### Profile forms

- Free form
- Tolerance range

### Position measurement

- Radial run-out/total radial run-out
- Axial run-out/total axial run-out
- Straightness
- Symmetry
- Parallelism
- Concentricity
- Coaxiality
- Perpendicularity

Please scan for detailed Opticline information



# Rapid and precise quality assurance directly in the production process

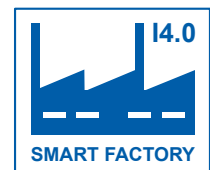
Opticline solutions are the result of our extensive expertise in optical and tactile shaft measuring technology. Our technologically innovative and pioneering systems have been impressing a broad range of users around the world for over 25 years.



## Networked measuring systems to support flexible production: Smart Factory

For production that is largely self-organized, we offer integrated systems that can be seamlessly incorporated into the production process. Recorded measuring values are forwarded directly to the processing machine so that the production process can be corrected in real time.

- Automated processes
- Accurate measurements
- Reliable measurement processes
- Flexible use
- Fast measuring times



### Precise and fast – Innovative measuring systems

- Complete measurements in seconds
- High-resolution and  $\mu\text{m}$  precise
- Automatic measurement runs
- Integrated tactile probing system (option)
- High-precision headstock for improved form measurement capability (option)

### Flexible and versatile – Simple workpiece change

- Tailstock with convenient functions for quick vertical adjustment and engaging
- Flexible clamping device attachment via Morse taper
- Open enclosure for fast loading
- Minimum set-up times

### Ideal for production – Robust hardware and software

- Camera with IP52 protection
- Enclosure with thermal insulation
- Intelligent functions for compensating negative environmental influences
- Integrated roller shutter (optional)
- Integrated measuring computer (optional)

### Durable and reliable –

#### Long-term gauging component capability

- Intelligent, automatic monitoring of the measuring system
- Integrated, automatic temperature compensation
- No setting master needed for daily use

### Safe and simple – Optimized for use in production

- Ergonomic design
- Optimized for operator-controlled inspections
- Light barriers for maximum safety
- Results display visible from a distance

### Intuitive and easy to understand –

#### Operating and evaluation software

- Fast test plan generation
- Numerous tools and wizards
- Clear representation of results
- Easy mapping of complex test characteristics and tasks
- Quick and easy program change
- Very little training required

# Opticline CS. Flexible, optical measuring systems for quality assurance on turned parts



Opticline CS305 for cost-effective measurement of turned parts



Fast worker self-control directly in the production environment



Door or light barrier protects the operator and ensures reliable measurements



Simple clamping of the workpiece between tips

Opticline CS series shaft measuring systems have been designed for production-related applications and offer a high degree of measuring performance and absolute precision from 2  $\mu\text{m}$  in an extremely compact design. They are available at an attractive price and are ideal for operator-independent workpiece checking within the production environment.

## System features

- Universal measuring instrument for dimensions, form, position, etc.
- Simple, fast and precise
- Compact design and simple operation
- Traceable quality control
- Sophisticated technology at an attractive price
- Supports flexible production processes
- Simple operation and programming
- Numerous analysis functions
- Simple workpiece changes
- Flexible measuring instrument for a variety of parts
- Reliable measuring processes and clear measurement results
- Statistics-oriented, informative reporting

Measuring capacity	CS155	CS305	CS308	CS314	CS608	CS614
Max. diameter [mm]	50	50	80	140	80	140
Length [mm]	150	300	300	300	600	600



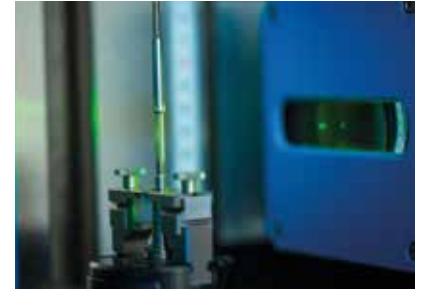
# Opticline C. Compact and robust systems for long-term gauge repeatability and reproducibility



Opticline C914 with optional, mobile gauge enclosure for flexible use in production



Simple, convenient starting of measurements for fast and reproducible measuring results



Workpiece-specific clamping devices for measuring small and very small parts



Integrated light barrier to protect operators in accordance with international safety standards



Simple operation of the measuring machine thanks to fast tailstock adjustment

Opticline C series shaft measuring systems offer maximum gauge repeatability and reproducibility from 1 µm. With different configurations, such as a high-precision C-axis or multi-sensor system, the performance capability can be customized to suit your requirements. The instruments thus offer the highest level of flexibility, accuracy and stability.

## System features

- Optimum precision properties in µm delivering measurements within seconds
- An individual camera offers bidirectional measurement for workpiece diameters of up to 80 mm
- Scaling of the optical system for measuring diameters of up to 140 mm without loss of resolution or quality
- Special tailstock and headstock design for rapid workpiece changes and maximum precision
- Simple and automatic workpiece alignment
- Real-time processing and fastest possible data transfer
- Self-monitoring functions for reliable use in production
- Low-maintenance, robust measuring system including camera with IP52 protection

## Product variants and options

- Tactile probing system T3D or TSP for measuring additional lengths and form test characteristics
- High-precision headstock for higher form gauge repeatability and reproducibility and improved rotational measurements
- Integrated measuring and evaluation computer
- Roller shutter to protect against negative environmental influences
- Pneumatic clamping solutions for greater flexibility and workpiece variety
- Table racks for practical loading at working height and additional storage space

Measuring capacity	C203	C305	C308	C314	C605	C608	C614	C908	C914	C1214
Max. diameter [mm]	30	50	80	140	50	80	140	80	140	140
Length [mm]	250	300	300	300	600	600	600	900	900	1200

# Opticline C1000. User-independent measurement of large shafts



Opticline C1023 with safety light barrier and roller shutter



Optional tactile probing system BTS for concentric lengths and axial run-outs



Opticline C1023-75AE: Measuring crank shafts with specially optimized camera system, high-precision C-axis and high-resolution measuring system for demanding measurements

The shaft measuring systems of the Opticline C1000 series offer you an ideal combination of precision, suitability for production, ergonomics and operator friendliness.

## System features

- Fast and reliable results for large and heavy workpieces
- Fast loading and unloading of different workpieces combined with maximum operator safety through a light barrier
- Protected from negative environmental influence by closed and lockable housing with integrated motor-driven roller shutters
- Elaborate design for high demands on production suitability: air-conditioned cabinet for power electronics and measuring computers, height adjustable operating panel with TFT screen and a lockable cabinet with drawers for printer, tools and accessories
- Easy to set up and use thanks to simple tailstock positioning via a digital position indicator

Measuring capacity	C1014	C1023	C1023-75AE
Max. diameter [mm]	140	230	230
Length [mm]	1000	1000	1000
Workpiece weight [N]	400	400	750

# Opticline CA. Flexible and automated shaft measurement in production



Example integration of Opticline CA618 with robots and loading station



Opticline VMS305 for measuring engine valves; integrated in a production line

Thanks to their special open machine concept, the high-precision Opticline CA systems are ideal for PLC measuring stations with manual loading and automated production.

## System features

- Outstanding precision characteristics and flexible in use, including for future workpieces and measuring tasks
- Ideal production suitability and reliability through long-term gauging component capability
- High-precision rotational axis with outstanding form measurement ability
- Automatic tailstock with a long stroke on precision guides
- Quick, easy and accurate workpiece clamping via a motorized tailstock
- Ideally suited for automated measuring of turned parts of different branches of industry and manufacturing
- Optional tactile measurement of length and axial run-out

## Customized solutions for flexible use

- Horizontal or vertical system design
- Project-specific housing solutions
- Various options for automated loading and clamping
- Various interfaces for machine integration and control
- Flexible integration into automated production processes
- Ideal accessibility for manual and automatic loading
- Active temperature control and compensation
- Simultaneous control of several production systems by a single operator
- Free software interfaces safeguard results and allow tool compensation for upstream processing machines
- Special systems for fully automatic measurement of valves or crankshafts

Measuring capacity	VMS305	CA305	CA310	CA314	CA605	CA610	CA614	CA614-AE	CA618	CA618-AE
Max. diameter [mm]	50	50	100	140	50	100	140	140	180	180
Length [mm]	300	300	300	300	600	600	600	600	580	580

# Opticline AMV. Professionals for concatenated use in production



Opticline AMV923V with robot loading in a vertical design



Opticline AMV923H for concatenated post-process work sequence measurement in a horizontal design

These Opticline AMV measuring systems designed specifically for concatenated use in production are available in horizontal and vertical designs depending on your requirements. They are ideal for the automated handling of large workpieces.

## System features

- Short measuring times for complex workpiece geometry
- Concatenated use in production; the integrated PLC connects to the superordinate loading system
- Fast correction of one or more processing machines with the help of intelligent software for tool correction

## Product variants

- Horizontal or vertical system design
- Customer-specific enclosures
- Various safety devices to protect the workers and the workpiece

Measuring capacity	AMV923H	AMV923V
Max. diameter [mm]	230	230
Length [mm]	805	830



# Opticline WMS. Precision for particularly large and heavy workpieces

The machine design of the optical measuring systems Opticline WMS enables them to handle above-average workpiece sizes weighing up to 120 kg.



Opticline WMS1023 in a vertical design

## System features

- Top resolution and measurement accuracy across the entire range thanks to a unique, cascaded camera system for workpieces with diameters of up to 320 mm
- Adaptation to your integration requirements: horizontal or vertical design
- Split-second measurements, even with very large workpieces
- Available for operator self-inspection and fully-automated use



Use in production, loading a crank shaft with operator self-inspection



Opticline WMS1332 in a horizontal design

Measuring capacity	WMS1023	WMS1332
Max. diameter [mm]	230	320
Length [mm]	1000	1300

# Multi-sensor technology for additional evaluation possibilities

Optionally, the shaft measuring systems of the Opticline product family can be extended with a tactile probing system. Tactile measurements can be seamlessly integrated into the optical measurement run and, depending on the design, are suitable for specific applications, such as measurements of axial run-out, grooves or bores. These additional evaluation possibilities add to the quality information within one single measurement run and offer higher flexibility.



Probing system T3D for Opticline C series

## New probing system T3D

- Tactile probing system for various 3D measurements
- Now also allows the measurement of grooves, positions and references as well as in holes and in blind holes
- Multi-sensor solution for increased efficiency and cost reduction with just one measuring system



Probing system BTS for Opticline C1000, AMV and WMS



Probing system TSP for Opticline C and CA series

## Data and temperature acquisition with external sensors

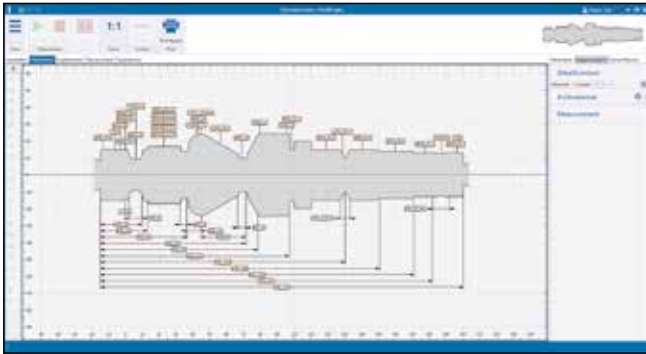


Barcode scanner for test plan selection and data input



Workpiece temperature detection

# Tolaris Optic. Operating and evaluation software for precise results in seconds



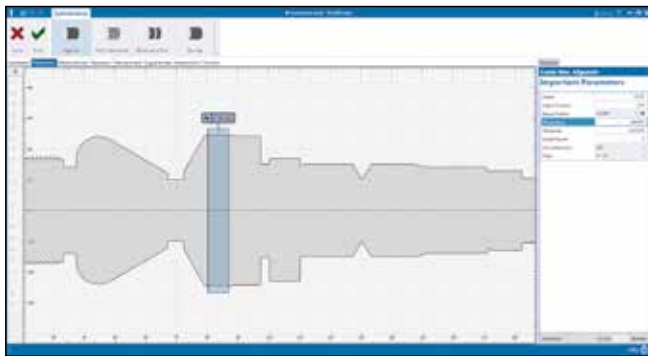
User interface: optimized view for operators

## User-friendly, intuitive operation

- Display and operating controls adapted to the requirement profiles of test plan designers and operators
- Wizards for easy creation of test plans and setting of test characteristics
- Clear presentation and subsequent processing of measurement results
- “Live” mode for direct feedback when creating test plans
- Scan of the part contour in different views

## Optimized measuring runs

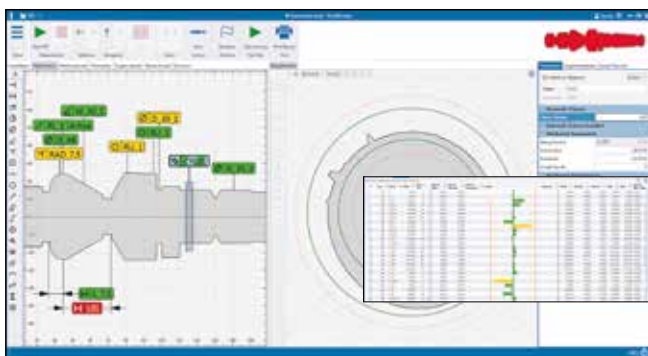
- Easy selection of new characteristics by clicking with the cursor; workpiece contour definition in accordance with drawing specifications
- Scanning and evaluation of workpiece contours in the shortest possible time
- Fast combination of any measurement functions in one test plan
- Fully automated measurement process with results displayed within seconds



Setting of test characteristics

## Reliable analysis of measurement results

- Various views for displaying measurement values on screen
- Extensive analysis functions
- Customizable documentation of measurement values
- Various export options for subsequent data processing or documentation
- Database tool for convenient saving and managing of measurement results
- Fast and reliable analysis and interpretation of measurement results by the operator
- Comprehensive and practice-oriented result tracing



Results display with detailed contour, results list

## Documented quality and seamless integration

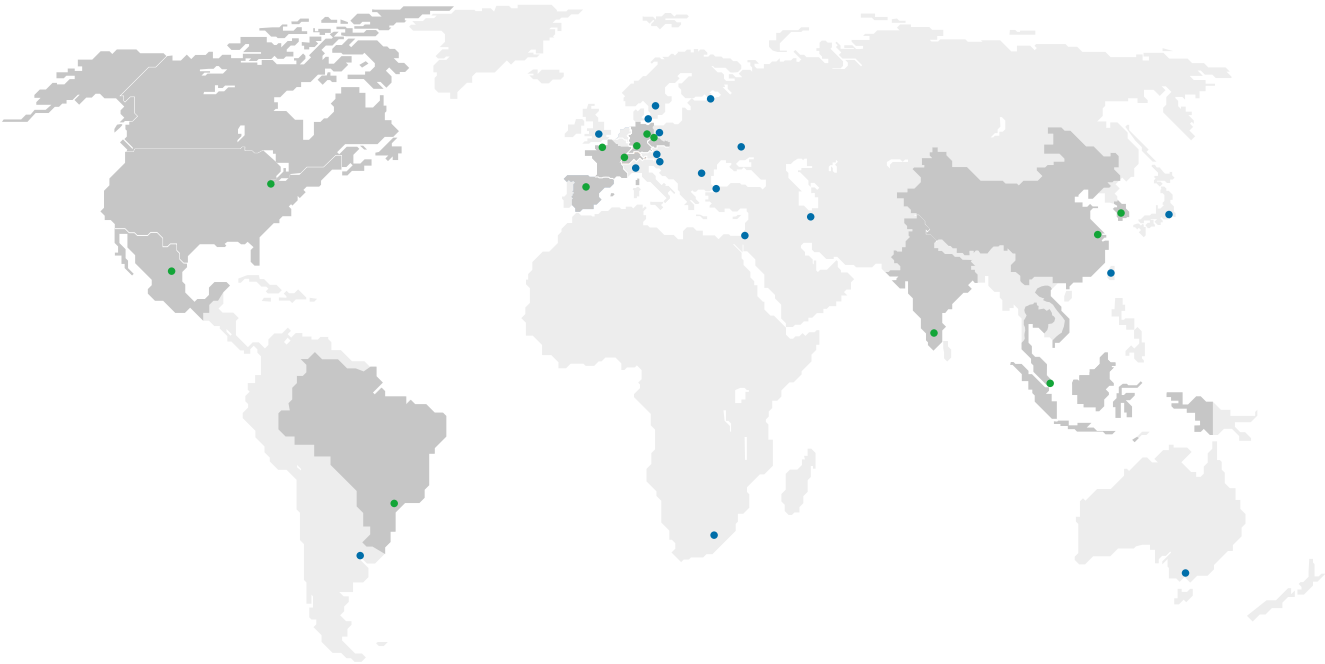
- Automated reporting
- Storage and management of measurement results
- Analysis tools for result tracing
- Certified interfaces (Q-DAS, AQDEF)
- Software interfaces via CSV and Script
- Connection of additional, external gauging components via interface box



Report and template editor

# We assist you worldwide.

Our qualified employees are available to assist you across the globe. We have subsidiaries and distribution partners in key industrial nations, meaning that we are always close by to offer you optimum support as a reliable partner.



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