Diameter Scanner and Flaw Detector in One Unit
ZUMBACh, pioneer of on-line measurement and its triple-axis ODAC® 13TRIO laser diameter gauges belong to the market leaders of super fast diameter measuring devices. 3 synchronized measurement axis in 1 single plane provide comprehensive measurement coverage, peak-precision diameter and ovality measurement as well as precise and super-fast flaw detection capabilities. Such combinations will help to reduce system costs due to the combination of diameter measurement and flaw detection into one single measuring device. Thanks to the compact design, the ODAC® 13TRIO measuring heads can be used in virtually every manufacturing process in the wire and cable industry, the plastics and rubber industry as well as the steel and metal industry. Known for precision, quality and ease of use the laser measuring heads from ZUMBACh are among the best of their class. The technological basis considered for these measuring heads is always of the latest cutting edge technology, with laser diodes as light sources combined with intelligent and powerful measured-value processors which facilitate a simple and flexible integration. Our long-standing experience as a pioneer of in-line measuring technology, combined with high production figures result in a product with an excellent price-performance ratio.

Amongst the outstanding features are features such as single scan calibration (CSS), single scan monitoring and high data rate output of up to 200* data packages per second. The measuring heads can be used with all line speeds. Vibrations during production have no noticeable influence on measurements.

Adaptive signal processing in the measuring units increase accuracy
All the measuring heads of the ODAC® series have adaptive signal processing (patent DE3111356), which makes subsequent regular re-calibrations superfluous. Only in instances of component exchange or compliance to calibration regulations ISO 9001 etc. would re-calibration be required. All the relevant parameters for accuracy are continuously monitored by the measuring system and automatically compensated. This is valid in particular also for possible long-term changes of the behaviour of the scanner motor or the measuring electronics.

* Depending on the measuring head model, the number of transmitted measured values as well as the baud rate of the interface.

Main Advantages
- 9000 measurements per second (FF version)
- 3 synchronized measurement axes on 1 single plane
- Single scan monitoring – up to 9000 scans/second
- Reliable detection of the ovality
- Detects any deviation from roundness of oval and out-of-round with polygonal shape (multi-lobe)
- Yields highly accurate mean value, regardless of the orientation of the product ovality
- Computes accurate values of circumference and cross section (important for fittings of tubes and hoses)
- Increased measurement accuracy and reliability
- High dirt and dust tolerance
System Overviews

**ODAC® 13TRIO-EN-RS (serial interface)**

The built-in processor allows the acquisition and monitoring of the measured values, as well as statistic functions, parameter selection and many other functions. The RS version communicates via the integrated RS interface with a higher level system, like USYS from Zumbach, Host computer (or PLC). The Zumbach protocols ODAC or Host are selectable according to choice. The service interface (Ethernet TCP/IP) is used for configuring the measuring system.

**ODAC® 13TRIO-EN-EN (Ethernet)**

The built-in processor allows the acquisition and monitoring of the measured values, as well as statistic functions, parameter selection and many other functions. The EN version communicates via the integrated EN interface with a higher level system. The measured values and parameters are integrated and transferred using a selectable Zumbach protocol (ODAC or Host protocol) in standardized packages of the TCP/IP. TCP/IP allows the data transfer through existing networks such as LANs and others.

**ODAC® 13TRIO-J with the corresponding external ZUMBACH processors**

**ODAC® 13TRIO-EN-DP (Profibus DP), -EN-PN (Profinet IO) or -EN-EI (EtherNet/IP)**

The built-in processor allows the acquisition and monitoring of the measured values, as well as statistic functions, parameter selection and many other functions. These versions communicate via the integrated Profibus DP, Profinet IO or EtherNet/IP interface with a higher level system. These interfaces are designed for high speed data transfer at the sensor actuator level. At this level, controllers such as programmable logic controllers (or PLC’s) exchange data via a fast serial (Profibus DP) or Ethernet (Profinet IO) connection with their distributed peripherals such as drivers, valves or intelligent slaves like ODAC measuring heads from Zumbach.
## Accessories

<table>
<thead>
<tr>
<th>Description</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor stand ST2-ODAC 14XY/13TRIO</td>
<td>ST02.061.14000</td>
</tr>
<tr>
<td>Floor stand ST2-ODAC 14XY/13TRIO 45°</td>
<td>ST02.061.14010</td>
</tr>
<tr>
<td>Vertically adjustable.</td>
<td></td>
</tr>
<tr>
<td>Line height (H): 900…1200 mm (35.43…47.24 in.)</td>
<td></td>
</tr>
<tr>
<td>Mountable support for ST2</td>
<td>ST02.060.190</td>
</tr>
<tr>
<td>Lateral support, including rotary holder (USY.0002.910) for table top version of the USYS 20 processor.</td>
<td></td>
</tr>
</tbody>
</table>

**Guide VF6-ODAC13**
- With ceramic rollers (V shape) for measured object diameter up to 6 mm (.24 in.).
- ODAC.131.400

**Guide VR6-ODAC13**
- With steel rollers (V shape) for measured object diameter up to 6 mm (.24 in.).
- ODAC.131.410

**Guide VR1M-ODAC13**
- With ceramic rollers (V shape) for measuring object diameter < 1 mm (.04 in.).
- Small objects must be guided through the center of the measuring field.
- ODAC.131.450

**Mountable support for ST2**
- ODAC.131.930 (back)

**Set of calibration standards**
- Delivered in a protection box, comprising:
  - Calibration standard holder
  - Calibration standard ø 0.5 and 10 mm
  - Certificate
- Other calibration standards on request.
- ODAC.9500.32000

**Local display LOC 01**
- Is mounted directly on the measuring head.
- Requires connection cable # ODAC.9167.00004 between LOC 01 and the measuring head.
- Not for ODAC J versions.
- LOC.011.01000

**Signal cable L2 Bus TDR22 x 02R**
- For the connection between the Profibus DP interface and the customer’s data acquisition system. Only for ODAC DP version.
- A13 252 0150

**Analogue interface AI 4-ODAC**
- Interface with 4 analogue and 5 digital outputs.
- Direct connection of the digital input (proximity switch). Not for ODAC J versions.
- ODAC.000.100

**Connector**
- Counter connector for digital input "I/F".
- Connection of a proximity switch. It is not required, if the analogue interface AI 4-ODAC is already used.
- Not for ODAC J versions.
- A10 125 0070

**Proximity switch**
- The proximity switch is used for the length detection.
- Main data:
  - Standard: EN 60947-5-6 (NAMUR, NC)
  - Switching distance max. 2 mm (.08 in.), flush mounting
  - Ambient temperature: -25...100° C (-13...212° F)
  - Protection: IP 67, Connection: PVC cable 2 m (6.5 ft.)
- A16 100 0110

## Dimensions

![Dimensions Diagram](image-url)

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS/DP/EN/PN/EI: -74 (2.91)</td>
<td></td>
</tr>
<tr>
<td>J: -45 (1.77)</td>
<td></td>
</tr>
<tr>
<td>210 (8.27)</td>
<td></td>
</tr>
<tr>
<td>H: 300 (11.81)</td>
<td></td>
</tr>
<tr>
<td>90 (3.54)</td>
<td></td>
</tr>
<tr>
<td>30 (1.18)</td>
<td></td>
</tr>
<tr>
<td>200 (7.87)</td>
<td></td>
</tr>
<tr>
<td>56 (2.20)</td>
<td></td>
</tr>
<tr>
<td>9 (0.35)</td>
<td></td>
</tr>
<tr>
<td>17.5 (0.69)</td>
<td></td>
</tr>
<tr>
<td>7 (0.28)</td>
<td></td>
</tr>
<tr>
<td>265 (10.43)</td>
<td></td>
</tr>
<tr>
<td>286 (11.26)</td>
<td></td>
</tr>
<tr>
<td>17.5 (0.69)</td>
<td></td>
</tr>
<tr>
<td>10 (0.39)</td>
<td></td>
</tr>
<tr>
<td>40 (1.57)</td>
<td></td>
</tr>
<tr>
<td>10 (0.39)</td>
<td></td>
</tr>
<tr>
<td>24 (0.94)</td>
<td></td>
</tr>
<tr>
<td>23/4 M10 (0.39)</td>
<td></td>
</tr>
<tr>
<td>M5x0.8 (0.36)</td>
<td></td>
</tr>
<tr>
<td>3M4 (0.18)</td>
<td></td>
</tr>
<tr>
<td>Counterbore for front side mounting 3xM4, DIN 912</td>
<td></td>
</tr>
<tr>
<td>Dimensions in mm (inch)</td>
<td></td>
</tr>
</tbody>
</table>
### Technical Data

<table>
<thead>
<tr>
<th>Model ODAC 13TRIO-</th>
<th>EN-RS</th>
<th>EN-DP</th>
<th>EN-EN</th>
<th>EN-PN</th>
<th>EN-EI</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measurement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring field M</td>
<td>16 x 16 x 16 mm (0.63 x 0.63 x 0.63 in.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min. object e</td>
<td>0.06 mm (0.0024 in.) (standard and F version); FF version: 0.08 mm (0.0032 in.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scanning frequency</td>
<td>3 x 600 scans/s (standard); F version: 3 x 1500 scans/s; FF version: 3 x 3000 scans/s</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scanning speed</td>
<td>52.6 m/s (172.6 ft./s) (standard); F version: 131.5 m/s (431.4 ft./s); FF version: 263 m/s (862.9 ft./s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width of laser beam</td>
<td>0.4 mm (.016 in.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability (3σ)</td>
<td>0.12 µm (.0000048 in.) (standard and F version); FF version: 0.30 µm (.000012 in.) (averaging time 0.1 s)</td>
<td>0.04 µm (.000016 in.) (standard and F version); FF version: 0.12 µm (.0000048 in.) (averaging time 1 s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement error</td>
<td>± 0.5 µm (.00002 in.) ± 0.1 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1 µm (0.00005 in.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light source</td>
<td>VLD (Visible Laser Diode), laser class 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Interfaces / Connections**

<table>
<thead>
<tr>
<th>Interface Service</th>
<th>Ethernet TCP/IP, RJ45 10/100BaseT, galvanically isolated</th>
<th>Only J interfaces to Zumbach processors: USYS 20, USYS 200, USYS IPC 1e, USYS IPC 2e, CI 1J/EN-RS/-DP/-EN/-PN/-EI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface Host</td>
<td>RS-232/-422/-485, D-sub. connectors 9p./m, galvanically isolated, Profibus DP (RS-485), D-sub. connector 9p./m, galvanically isolated, Ethernet TCP/IP, RJ45 2 x RJ45, 10/100BaseT, galvanically isolated, Profinet IO, 10/100BaseT, galvanically isolated, EtherNet/IP, 10/100BaseT, galvanically isolated, EtherCAT, galvanically isolated.</td>
<td>Only for Zumbach local display LOC 01.</td>
</tr>
<tr>
<td>Data rate max. standard</td>
<td>200/s 50/s 200/s 50/s 200/s</td>
<td>200/s 50/s 200/s 50/s 200/s</td>
</tr>
<tr>
<td>Data rate max. F version</td>
<td>188/s 125/s 188/s 125/s 125/s</td>
<td>125/s 125/s 125/s 100/s</td>
</tr>
<tr>
<td>Interface LOC</td>
<td>Only for Zumbach local display LOC 01.</td>
<td>Only for Zumbach local display LOC 01.</td>
</tr>
</tbody>
</table>

**Indicators of contamin. windows**

- Flashing LED on the measuring head
- Display traffic, module and network status

**Energy supply**

- Power supply: 220 VA
- Operating range: typically 85...265 VAC
- Mains frequency: 47...63 Hz
- Power output: 25 VA

**Operation conditions / Miscellaneous**

- Ambient temperature: Operating: 0...45°C (32...113°F), Transport / Storage: -20...50°C (-4...122°F)
- Max. atmospheric humidity: 95% (non condensing)
- Altitude: 0...3000 m (0...9843 ft.) over sea level
- Type of protection: Case IP 65, connection plate IP 40
- Weight: 3.9 kg (8.6 lbs)

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1 M stands for measuring field height. In practice, the largest object diameter corresponds to Measuring Field Height minus instability of position.
2 System resolution is the smallest practical value on the last digit of the display.
3 Measured in the measuring plane, incl. lateral Jitter of the scans.
4 Maximum power of the laser can be read on the warning label.

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### Ordering Information

**When ordering, please specify the following:**

1. **Measuring head models**: ODAC 13TRIO-EN-RS/-DP/-EN/-PN/-EI, ODAC 13TRIO-J
2. **Connection cable**
   - The connection between ODAC 13TRIO-J and the higher level system is to be provided by the customer (via serial interface).
   - For the ODAC 13TRIO-EN-DP versions, the connection to a higher level system is made with the signal cable # A13 252 0150.
3. **Processor model**
   - Data acquisition system, only for ODAC 13TRIO-J: USYS 20, USYS 200, USYS IPC 1e, USYS IPC 2e, CI 1J/EN-RS, CI 1J/EN-EN, CI 1J/EN-PN, CI 1J/EN-EI. Please ask for corresponding data sheets.

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  - UK, sales@zumbach.co.uk
- **USA**, sales@zumbach.com
  - USA, sales@zumbach.com

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All units, which are equipped with lasers, were designed to meet the regulations CDRH (USA), IEC/EN 60825-1:2014 and DIN / VDE 0837.

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**CAUTION**

- All units, which are equipped with lasers, were designed to meet the regulations CDRH (USA), IEC/EN 60825-1:2014 and DIN / VDE 0837.
- They hold the warning and explanatory labels prescribed by CDRH or IEC/EN 60825-1:2014.

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**Technical specifications are subject to change without notice.**