Zumbach

SWISS PRIME MEASURING SINCE 1957

3-Axis Laser Measurement.
The Solution for Accurate Diameter and Ovality Measurement.

ODAC® 33TRIO

Diameter Scanner and Flaw Detector in One Unit

ZUMBACH, pioneer of on-line measurement and its triple-axis ODAC TRIO 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® 33TRIO 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.

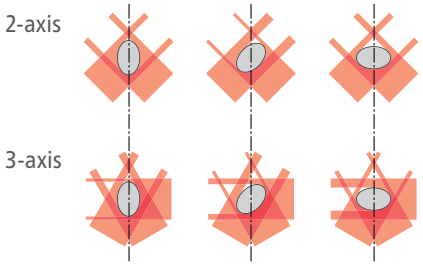
Main Advantages

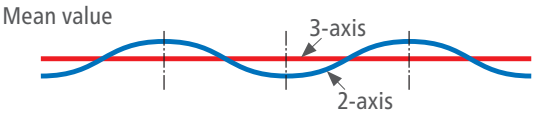
- 9000 measurements per second (FF version)
- 3 synchronized measurement axes on 1 single plane
- Single scan monitoring – up to 9000 scans/second
- Reliable detection of the ovality
- Detects any deviation from roundness of oval and out-of-round with polygonal shape (multi-lobe)
- Yields highly accurate 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

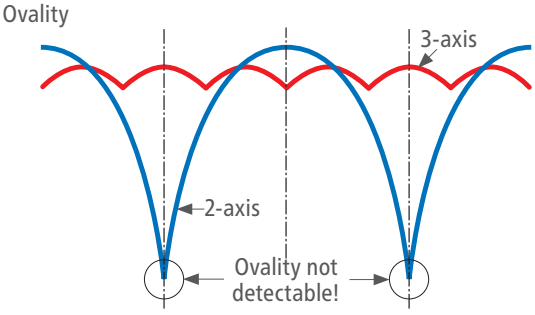
Display unit (option): VISU-Touch or LOC 01

Comparison of 3- and 2-axis measurement:

Orientation of the object

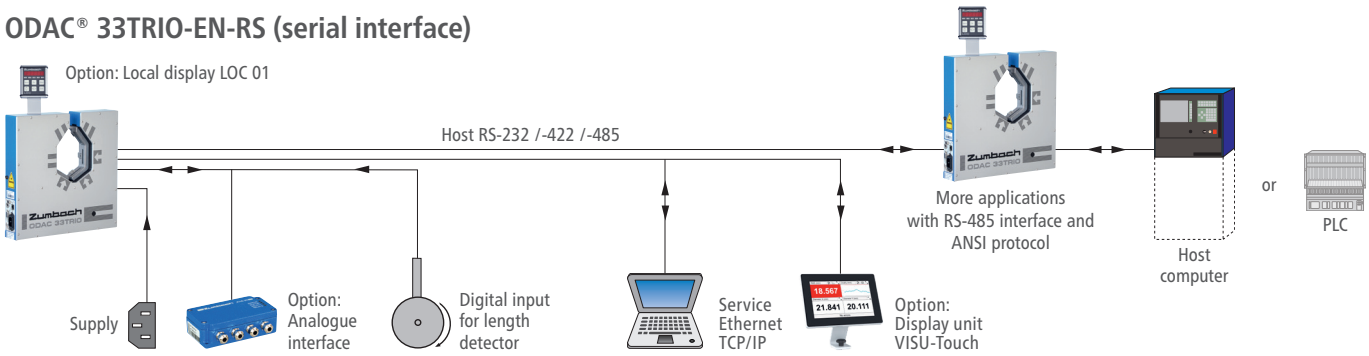






System Overviews

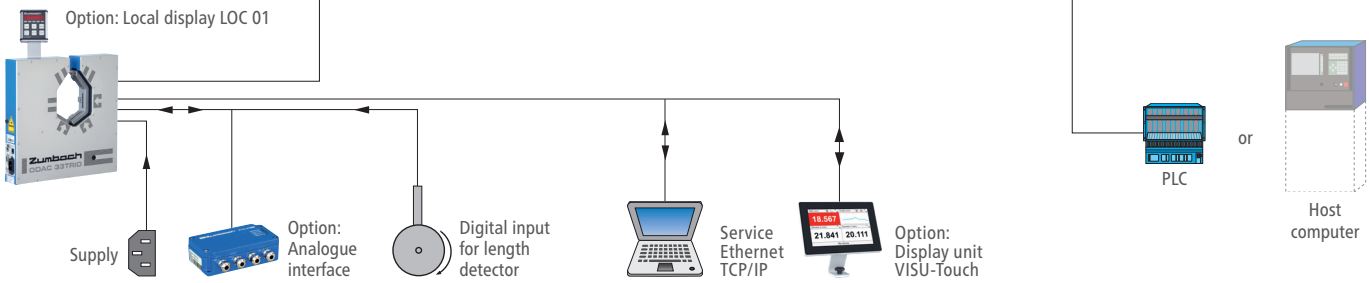
ODAC® 33TRIO-EN-RS (serial interface)



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® 33TRIO-EN-DP (Profibus DP), -EN-PN (Profinet IO) or -EN-EI (EtherNet/IP)

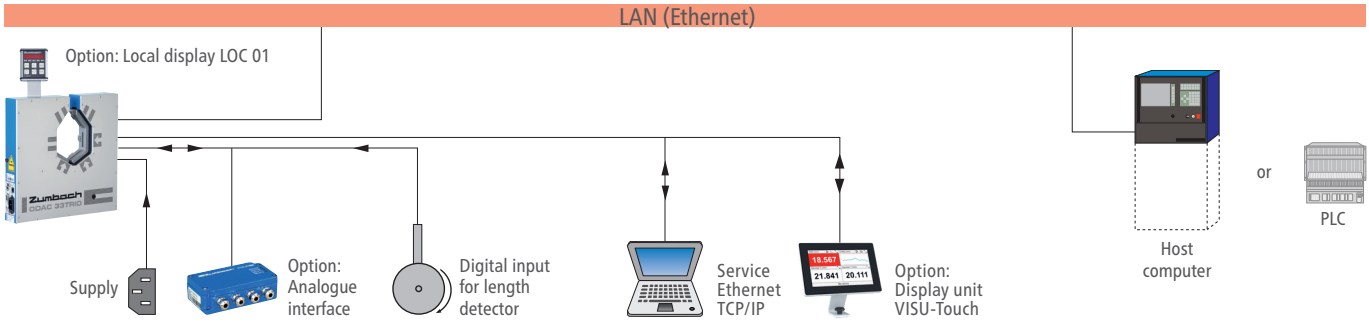
Profibus DP / Profinet IO / EtherNet/IP



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.

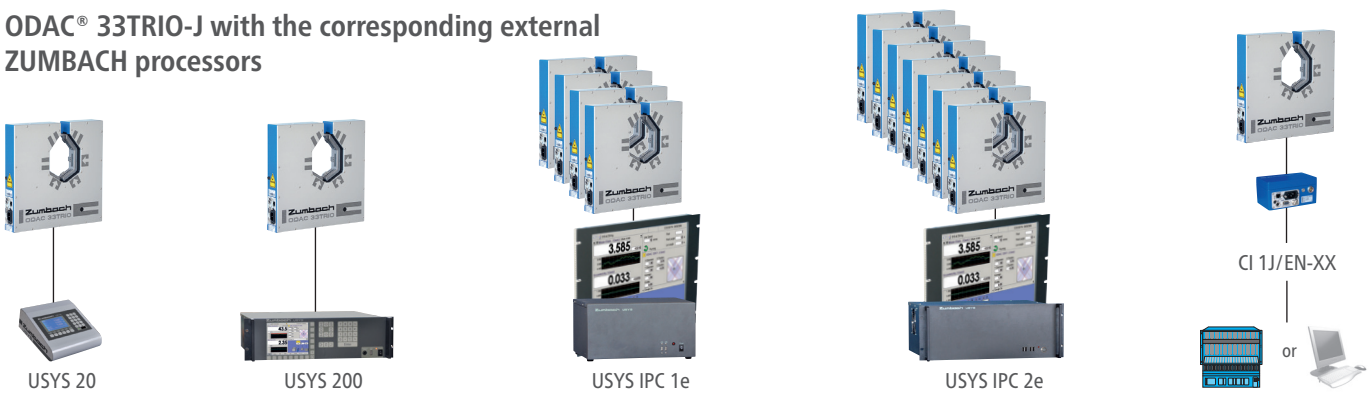
ODAC® 33TRIO-EN-EN (Ethernet)

LAN (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® 33TRIO-J with the corresponding external ZUMBACH processors

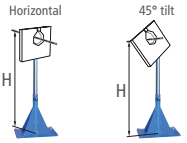


Accessories

Description	Order Number

Floor stand ST2-ODAC 34XY/33TRIO — **ST02.089.72250**
Floor stand ST2-ODAC 34XY/33TRIO 45° — **ST02.089.72260**
Vertically adjustable.

Line height (H): 900…1200 mm
(35.43...47.24 in.)



Swivel floor stand ST6-ODAC 33TRIO — **ST06.142.33000**
Vertically adjustable.

Line height (H): 880…1180 mm (34.64...46.46 in.)
Swivel angle: 90° (upward)

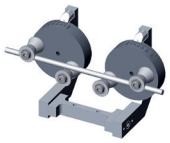
Mountable support for ST2 — **ST02.060.190**
Lateral support, including rotary holder (USY.0002.910) for table top version of the USYS 20 processor.

Guide VF34-ODAC33 — **ODAC.331.400**
Vertically adjustable, with ceramic rollers (V shape) for measured object diameter up to 33 mm (1.30 in.).

Guide VR33-ODAC33 — **ODAC.331.410**
Vertically adjustable, with rotating steel rollers (V shape) for measured object diameter up to 33 mm (1.30 in.).

Limiting socket VF33-ODAC33 — **ODAC.331.420**
The ceramic limiting socket is only a device to delimit the measuring field.
It has no guiding function.

Guide VRG33B-ODAC33 /-F /-B — **ODAC.331.430-X**
Steel rollers (V shape) with counter rollers. Infinitely adjustable onto the product diameter from 0…33 mm (0…1.3 in.). These guides are very suitable to damp product vibrations.
3 guide versions are available for the fixation onto the measuring head as follows:
on both side: order no.: **ODAC.331.430**
on the front side: order no.: **ODAC.331.430-F**
on the back side: order no.: **ODAC.331.430-B**



Guide VFG30-ODAC33 — **ODAC.331.440**
Vertically adjustable, with ceramic rollers (V shape) for measured object diameter up to 30 mm (1.18 in.).

Guide VRG30-ODAC33 — **ODAC.331.450**
Vertically adjustable, with rotating steel rollers (V shape) for measured object diameter up to 33 mm (1.18 in.).

Set of calibration standards — **ODAC.9500.77000**
Delivered in a protection box, comprising:
– Calibration standard holder
– Calibration standard ø 2 and 28 mm
– Certificate, other calibration standards on request.

Local display LOC 01 — **LOC.011.01000**
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.

VISU-Touch — **VISU.001.01XXX**
The VISU-Touch is a rugged and compact 7" touch screen. This universal PoE (Power over Ethernet) powered touch screen enables display of the integrated web interface of the connected measuring head. It is supplied with a holder for fixing on the measuring head. Not for ODAC J versions.

Ethernet cable — **A15 608 8XXX**
Ethernet network cable cat. 6 S/FTP with RJ45 connectors.
(XXX in the order number stands for: x 0.1 m, e.g. A15 608 8025 stands for 25 x 0.1 m and thus a cable that is 2.5 m long). Not for ODAC J versions.

PoE Injector 48 V, 24 W — **N2.7860.1000**
Power over Ethernet supply for devices that do not support PoE or a long Ethernet cable.
Not for ODAC J versions.

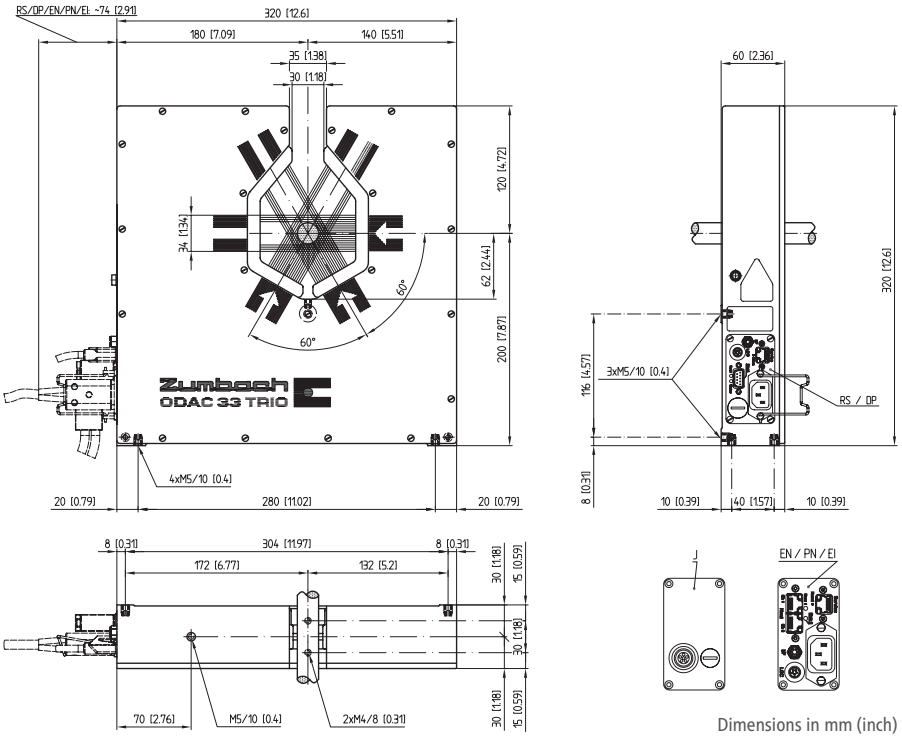
Analogue interface AI4-R — **ODAC.001.100**
Interface with 4 analogue, 5 digital and 2 relay outputs.
Direct connection of the digital input (proximity switch).
Not for ODAC J versions.

Signal cable L2 Bus 1DR22 x 02R — **A13 252 0150**
For the connection between the Profibus DP interface and the customer's data acquisition system. Only for DP version.

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

Proximity switch — **A16 100 0110**
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.)

Dimensions



Dimensions in mm (inch)

Technical Data

Model ODAC 33TRIO-	EN-RS	EN-DP	EN-EN	EN-PN	EN-EI	J
Measurement						
Measuring field M [1]	34 x 34 x 34 mm (1.34 x 1.34 x 1.34 in.)					
Min. object ø	0.15 mm (.006 in.) (standard and F version); FF version: 0.20 mm (.008 in.)					
Scanning frequency	3 x 600 scans/s (standard); F version: 3 x 1500 scans/s; FF version: 3 x 3000 scans/s					
Scanning speed	98.3 m/s (322.5 ft./s) (standard); F version: 245.7 m/s (806.3 ft./s); FF version: 491.5 m/s (1612.5 ft./s)					
Width of laser beam [3] [5]	3 mm (.12 in.) (standard); xN (Narrow Beam version) 0.3 mm (.012 in.)					
Repeatability (3 σ)	0.30 µm (.000012 in.) (standard and F version); FF version: 0.45 µm (.000018 in.) *(averaging time 0.1 s)* 0.15 µm (.000006 in.) (standard and F version); FF version: 0.20 µm (.000008 in.) *(averaging time 1 s)*					
Measurement error	± 1 µm (.00005 in.) ± 0.08 ‰					
Resolution [2]	0.1 µm (.000005 in.)					
Light source [4]	VLD (Visible Laser Diode) 630-680 nm, laser class 2 (device)					
Interfaces / Connections						
Interface Service	Ethernet TCP/IP, RJ45 10/100BaseT, galvanically isolated					Only J interfaces to Zumbach processors: USYS 20, USYS 200, USYS IPC 1e, USYS IPC 2e, CI 1J/EN-RS/-DP/-EN/-PN/-EI
Interface Host	RS-232/-422/-485, D-sub. connectors 9p./m, galvanically isolated	Profibus DP (RS-485), D-sub. connector 9p./f, galvanically isolated	Ethernet TCP/IP, 2 x RJ45 10/100BaseT, galvanically isolated	Profinet IO, 2 x RJ45 10/100BaseT, galvanically isolated	EtherNet/IP, 2 x RJ45 10/100BaseT, galvanic. isolated	
Data rate max. standard	200/s	50/s	200/s	50/s	200/s	
Data rate max. F version	188/s	125/s	188/s	125/s	150/s	
Data rate max. FF version	125/s	125/s	125/s	125/s	100/s	
Interface LOC	Only for Zumbach local display LOC 01					
Interface I/F	Can be used for the connection of a remote interface (e. g. AI4-R) or as digital input for length detector (e.g. proximity switch according to EN 60947-5-6, NAMUR)					
Indicator of contamin. windows	Flashing LED on the measuring head					
LED Service interface	Indicates link and traffic					–
LED Host interface	Indicates traffic	Indicates traffic and error	Indicates link and traffic	Indicates link, traffic, system error and bus error	Indicates link, traffic, module status and network status	–
Energy supply						
Mains voltage	100-240 VAC					Supplied by the processor unit (24 VDC / 8 W)
Operating range	85-265 VAC typically					
Mains frequency	50/60 Hz					
Operating range	47-63 Hz typically					
Power	30 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 [6]	Case IP 65, connection plate IP 40					
Weight	5.5 kg (12 lbs)					

[1] M stands for measuring field height. In practice, the largest object diameter corresponds to Measuring Field Height minus instability of position.

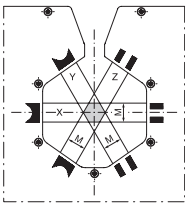
[2] System resolution is the smallest practical value on the last digit of the display.

[3] Measured in the measuring plane, incl. lateral Jitter of the scans.

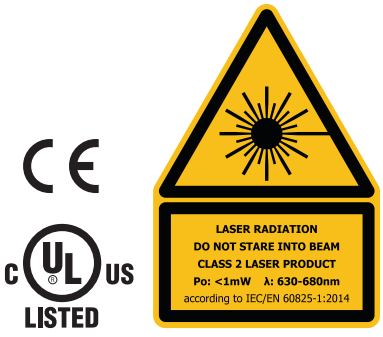
[4] Maximum power of the laser can be read on the warning label.

[5] The xx**N-F** versions (Narrow beam) is recommended in case of products with very uneven surfaces, for the contour measurement and detection of surface defects, such as lumps and neckdowns.

[6] Conformity not verified by UL.



• Technical specifications are subject to change without notice



Ordering Information

When ordering, please specify the following:

1 **Measuring head models: ODAC 33TRIO-EN-RS/-DP/-EN/-PN/-EI, ODAC 33TRIO-J**

2 **Connection cable**

2a The connection between **ODAC 33TRIO-EN-RS** and the higher level system is to be provided by the customer (via serial interface).

2b For the **ODAC 33TRIO-EN-DP** versions, the connection to a higher level system is made with the signal cable # A13 252 0150.

2c For the **ODAC 33TRIO-EN-EN/-PN/-EI** versions, the connection from the measuring head to the customer's Ethernet port, must be provided by the customer.

2d **Length** of the connection cable between **ODAC 33TRIO-J** and the processor.
Available lengths: 1, 2, 5, 10, 15, 20, 25 and 30 m (3.3, 6.6, 16.4, 32.8, 49.2, 65.6, 82 and 98.5 ft.); Longer cables on request.

3 **Processor model** (Data acquisition system), only for **ODAC 33TRIO-J**: USYS 20, USYS 200, USYS IPC 1e, USYS IPC 2e, CI 1J/EN-RS, CI 1J/EN-DP, CI 1J/EN-EN, CI 1J/EN-PN, CI 1J/EN-EI. Please ask for corresponding data sheets.

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