Zumbach

SWISS PRIME MEASURING SINCE 1957

ODAC® / USYS®

In-line & Off-line Dimensional & Quality Control

ODAC® – Laser Diameter & Dimension Measuring Gauges

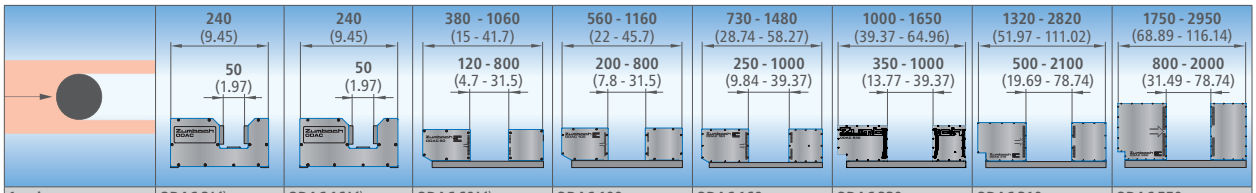
USYS® – Universal Data Acquisition, Processing & Display Systems

ODAC® LASER MEASURING HEADS

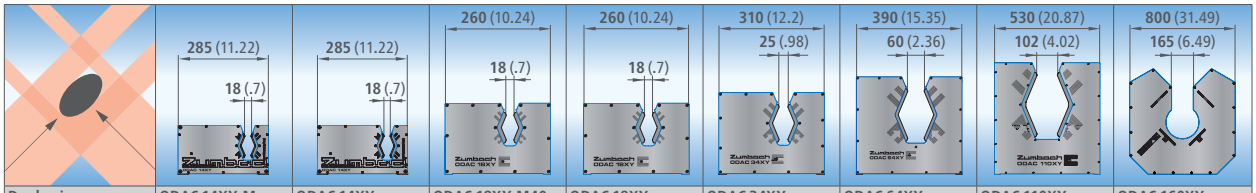
Highest accuracy, robustness, reliability and functionality distinguish all the laser measuring heads from ZUMBACH. Known for precision, quality and ease of use, the laser measuring heads are among the best of their class.
The technological basis considered for these measuring heads is always of the latest cutting edge technology 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 capabilities are features such as single scan calibration (CSS), single scan monitoring and high data rate output of up to 333* data packages per second.
The measuring heads can be used with all line speeds. Vibrations during production have no noticeable influence on measurements.

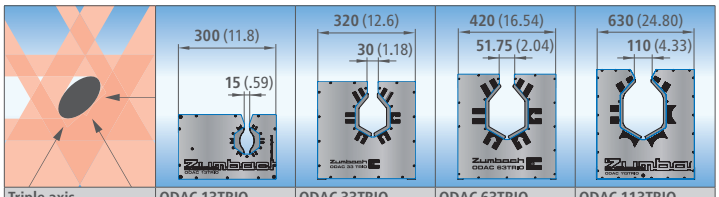
* Depending on the measuring head model, the number of transmitted measured values as well as the baud rate of the interface.



1-axis	ODAC 2J [1]	ODAC 16J [1]	ODAC 60J [1]	ODAC 100	ODAC 160	ODAC 230	ODAC 310	ODAC 550
Measuring field	2 mm (.079 in.)	16 mm (.64 in.)	60 mm (2.36 in.)	100 mm (3.94 in.)	160 mm (6.3 in.)	230 mm (9.05 in.)	310 mm (12.2 in.)	550 mm (21.65 in.)
Min. product diameter	0.012 mm (.0005 in.)	0.05 mm (.002 in.)	0.2 mm (.007 in.)	0.25 mm (.01 in.)	0.5 mm (.02 in.)	0.75 mm (.03 in.)	1 mm (.04 in.)	2 mm (.08 in.)
Scanning frequency /s	240	240 or 480	1000 / 2000	1000 / 2000	1000 / 2000	1000 / 2000	1000 / 2000	1000 / 2000
Scan speed m/s, (ft./s)	18.8 (61.7)	24 or 48 (79 or 158)	157.7 (517.4)	219 (718)	328 (1076)	473 (1552)	606 (1988)	1056 (3464)
Fast version m/s, (ft./s)	–	–	315.4 (1034.8)	438 (1437)	656 (2152)	946 (3104)	1212 (3976)	2112 (6929)
Repeatability* µm (in.)	0.15 (.000006)	0.15 (.000006)	0.25 (.000010)	0.35 (.000014)	0.4 (.000016)	0.6 (.000024)	1 (.00004)	3 (.00012)
Measurement error µm (in.)	± 0.3 (± .000012)	± 0.5 (± .00002) ± 0.1 ‰	± 2 (± .00008)	± 2 (± .00008)	± 3 (± .00012)	± 5 (± .0002)	± 25 (± .00098)	± 50 (± .002)
Modular design			•	•	•	•	•	•



Dual axis	ODAC 14XY-M	ODAC 14XY	ODAC 18XY-M40	ODAC 18XY	ODAC 34XY	ODAC 64XY	ODAC 110XY	ODAC 160XY
Measur. field (mm/in.)	3 x 3 (.12 x .12)	16 x 16 (.64 x .64)	18 x 18 (.71 x .71)	18 x 18 (.71 x .71)	34 x 34 (1.34 x 1.34)	64 x 64 (2.52 x 2.52)	110 x 110 (4.33 x 4.33)	160 x 160 (6.3 x 6.3)
Min. product diameter	0.015 mm (.0006 in.)	0.06 mm (.0024 in.)	0.04 mm (.0016 in.)	0.08 mm (.003 in.)	0.15 mm (.006 in.)	0.25 mm (.01 in.)	0.5 mm (.02 in.)	0.5 mm (.02 in.)
Scanning frequency /s	2 x 500	2 x 500	2 x 1200	2 x 1200 / 2500	2 x 1200 / 2500	2 x 1200 / 2500	2 x 1200 / 2500	2 x 500 –
Scan speed m/s (ft./s)	65.8 (215.9)	65.8 (215.9)	67.8 (222.4)	67.8 (222.4)	117.9 (386.8)	207.5 (680.8)	354.6 (1163.4)	328 (1076)
Fast version m/s, (ft./s)	–	–	–	141.3 (463.6)	245.6 (805.8)	432.3 (1418.3)	738.8 (2423.8)	656 (2152)
Repeatability* µm (in.)	0.07 (.0000027)	0.07 (.0000027)	0.05 (.000002)	0.05 (.000002)	0.08 (.0000032)	0.25 (.00001)	0.25 (.00001)	0.4 (.000016)
Measurement error µm (in.)	± 0.3 (± .000012)	± 0.8 (± .000032) ± 0.15 ‰	± 0.5 (± .00002) ± 0.1 ‰	± 0.5 (± .00002) ± 0.1 ‰	± 1 (± .00004) ± 0.08 ‰	± 2 (± .00008) ± 0.1 ‰	± 5 (± .0002) ± 0.05 ‰	± 3 (± .00012)



Triple axis	ODAC 13TRIO	ODAC 33TRIO	ODAC 63TRIO	ODAC 113TRIO
Measuring field	16 x 16 x 16 mm (0.63 x 0.63 x 0.63 in.)	34 x 34 x 34 mm (1.34 x 1.34 x 1.34 in.)	64 x 64 x 64 mm (2.52 x 2.52 x 2.52 in.)	110 x 110 x 110 mm (4.33 x 4.33 x 4.33 in.)
Min. product diameter	0.06 mm (.0024 in.)	0.15 mm (.006 in.)	0.25 mm (.01 in.)	0.5 mm (.02 in.)
Scanning frequency /s	3 x 600 / 1500 / 3000	3 x 600 / 1500 / 3000	3 x 600 / 1500 / 3000	3 x 600 / 1500 / 3000
Scan speed m/s, (ft./s)	52.6 (172.6)	98.3 (322.5)	173 (567.6)	295.5 (969.5)
Fast version / FF m/s (ft./s)	131.5 (431.4) 263 (862.9)	245.7 (806.3) 491.5 (1612.5)	432.5 (1419) 865 (2837.9)	738.8 (2423.7) 1477.5 (4847.4)
Repeatability* µm (in.)	0.04 (.0000016)	0.15 (.000006)	0.3 (.000012)	0.4 (.000016)
Measurement error µm (in.)	± 0.5 (± .00002) ± 0.1 ‰	± 1 (± .00005) ± 0.08 ‰	± 2 (± .00008) ± 0.1 ‰	± 5 (± .0002) ± 0.05 ‰

* For 3 Sigma and 1 s averaging time

[1] Available only in ODAC J versions

All dimensions in mm and (inches) resp. (µm) 1µm = 0.001mm

Flexible communication integration

- RS (-232 /-422 /-485)
- DP (Profibus DP)
- EN (Ethernet TCP/IP)
- PN (Profinet IO V2.3)
- EI (EtherNet IP)
- J (digital, for connection to USYS® processors)
- Local display
- Analog interface
- Integrated web server
- OPC-UA via external OPC UA server gateway software

OUTSTANDING ADVANTAGES

ODAC® Laser Scanners

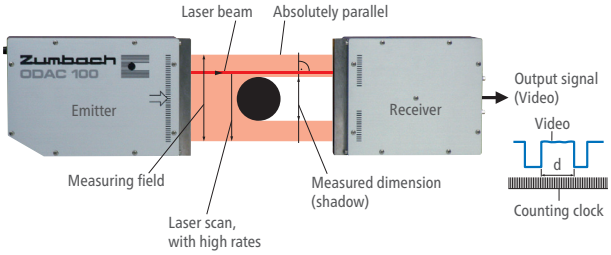
- Very high scan rate (measuring frequency) up to 3000/sec. per axis
- High precision measurement
- Permanent calibration
- Integrated fault detection function
- No safety problems
- High insensitivity to dirt and dust
- Close to zero maintenance

USYS® Processors

- For each application and each budget the optimal model
- Extremely fast and powerful thanks to special ZUMBACH hardware and real-time software
- Industrial, easy to operate
- Rugged and stable evaluation and processing system
- Programmes on flash disc (no hard disc)
- Process specific configuration and software packages
- Flexible for extension

MEASURING PRINCIPLE AND TECHNOLOGY

A focused laser beam is scanning the object at a high rate. The time of obscuration is captured with a resolution of 0.00001 mm (.0000004 in.) as a dimension (shadow) and then further processed.
Material, colour, temperature etc. of the object has no influence on the measurement.

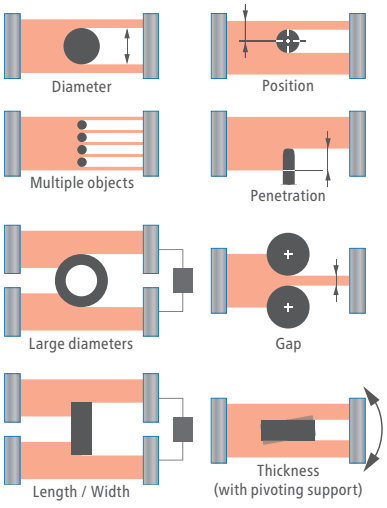


Adaptive signal processing in the measuring units increase accuracy

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 9000/9001 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.

Typical measuring modes



A Complete Line of USYS® Processors

A complete line of devices for the data processing, display, statistics, process control and networking is available for any specification and budget. All USYS® processors are industrial, stable, easy to operate and extendable. They can process multiple ODAC® heads plus other sensors, including speed and event inputs.

Fast Real Time

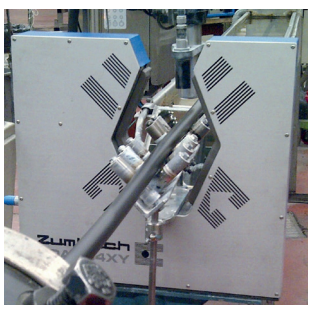
The unique CPXX pre-processors in ODAC® sensors or USYS® processors enable, at the same time, fast, accurate and consistent readings thanks to sophisticated filter and computation algorithms.
Up to 3000 measurements/s can be processed, depending on the measuring head.

The SIGMA EXPERT Controller

Most USYS® processors are available with this self-adapting controller type, which guarantees tighter product tolerances and optimum material savings.

DATA ACQUISITION, PROCESSING AND DISPLAY SYSTEMS

Low cost system for 1 measuring head LED display	Economic system for 1 head LCD display	System for 1 head, Colour TFT LCD screen	Processor for OEM's or flexible system integration. Separate display unit	Processor for OEM's or flexible system integration. Separate display unit	Nomenclature: • = Standard ○ = Option	
VISU-Touch	**USYS® 20**	**USYS® 200 USYS®-Touch**	**USYS® IPC 1e**	**USYS® IPC 2e**	**Features**	
7" touch screen	4.2" • monochrome	6.4" • LCD colour 15" touch screen	Separate 19" touch screen •	Separate 19" touch screen •	Screen	Operation / Peripherals
•	•	•	•	•	System editor	
			•	•	Terminal for SPC charts	
	•	•	•	•	Remote display	
	•	•	•	•	Input external start/stop	
	•	•	•	•	Input external pause	
		•	•	•	Input external keyboard	
	•	•	•	•	Input line speed detection	
	•	•	•	•	Start/Stop / Pause	Measurement Data Processing
0.1 µm	0.1µm	0.01µm	0.01µm	0.01µm	Resolution	
			•	•	Wall thickness meas. with 2 ODAC heads	
	•		•	•	Wall thickness measurement with ultrasonics	
•	•	•	•	•	Capacitance measurement	
•	•	•	•	•	Measurement gap width	
•	•	•	•	•	Penetration depth	
			•	•	Hot/cold measurement	
	•	•	•	•	Serial communication	Communication
•	•	•	•	•	Ethernet (TCP/IP protocol)	
•		•	•	•	Web Server	
	•	○	○	○	Data Log	
		○	○	○	Report Manager	
		○	○	○	OPC UA	
		3 •	6 •	8 •	USB	
	•	•	•	•	Serial printer, RS-232	
		•		•	Parallel printer	
		•	•	•	Ethernet printer	
	2 •	2 •	6 •	6 •; 4 ○	Serial outputs	
	2 •	2 •	2 •; 4 ○	2 •; 8 ○	Analog outputs	
		•	•	•	Product library	
1 •	1 •	1 •	2 •	5 •	Number of connectable measuring heads	
	1 •	2 •	2 •	2 •	Number of event inputs for sparks, lumps etc.	
"•"	•	•	•	•	Alarm + / Alarm –	Diagnostics and Alarms
"•"	•	•	•	•	General alarm	
"•"	•	•	•	•	Pre-alarm	
"•"	•	•	•	•	Self diagnosis	
		•	•	•	Statistic alarm	
			•	•	Hot/cold controller	Controller
	○	○	•	•	Static controller (SRD)	
		○	•	•	SIGMA EXPERT	
		○	•	•	Cpk pilot	
	•	•	•	•	Simple statistics	Statistics
		○	•	•	SPC with control charts	
	•	•	•	•	Package report	
		•	•	•	Data Log	
		•	•	•	Job Report	



CONVINCING SOLUTIONS

The list of all possible applications and specific benefits of the various ZUMBACH systems is practically endless. The following represents some of the most typical applications:

Cable industry
- **Diameter & ovality measurement / control**
- **Average wall thickness**
- **Width / Height**

– Bare wire
– Cores
– Bundles
– Fillers
– Jackets
– Sectors
– Flat cables
– MV and HV cables
– Automotive cables
– Data cables
– Optical fibres
– Coatings

Wire Drawing
- **Diameter & ovality measurement / control**
- **Turbo Air Guard for dry lubrication**

– Wet lubrication
– Dry lubrication
– Copper wire
– Steel wire
– Steel cord
– Special wires
– Profile wires

Medical, Food, Cosmetic, Packaging
- **Diameter & Ovality**
- **Multi strand**

– Hoses
– Rods
– Tubes
– Blown film diameter
– Sausage casings

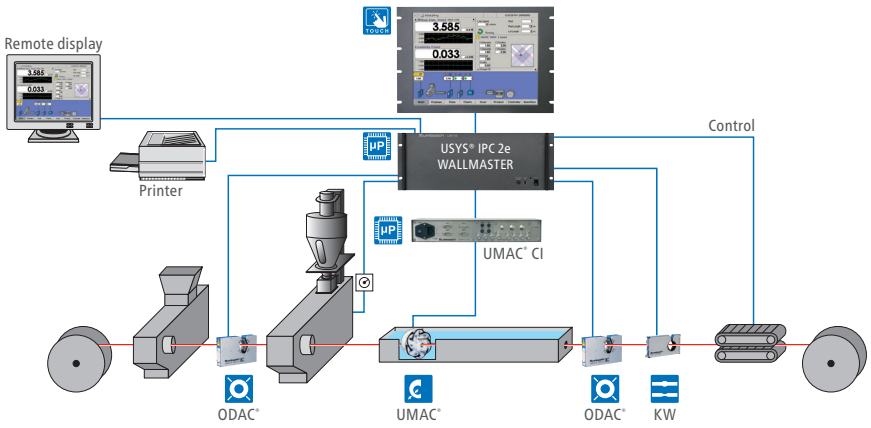
Plastic & rubber extrusion
- **Diameter & ovality measurement / control**
- **Width / Height**
- **Multi strand**

– Tubing
– Tubes
– Hoses
– Large tubes / pipes
– Profiles
– Ribbons
– Multi strands
– Blown Film Diameter

Measurement of Insulations or Jackets on Cables

For the extrusion of cores or jackets the USYS® IPC WALLMASTER system offers many possibilities thanks to its flexibility and easy handling. All parameters, thickness, eccentricity, diameter and ovality, can be controlled.

- For core insulation
- For jackets, also when loose or non-round
- For co-extrusion
- Automatic calibration with DIACAL system
- Hot / cold compensation

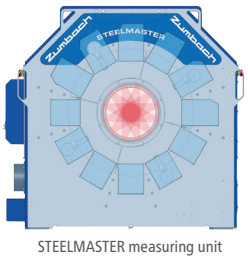


Steel & Metal Industry

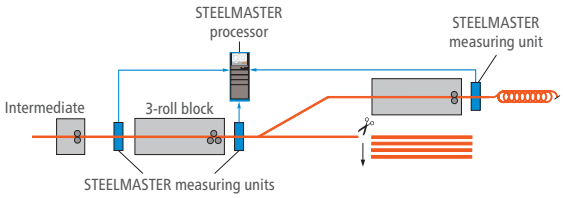
- **STEELMASTER SMR, SMO or SMS systems**
- **1 to 6 measuring axes** (ODAC® measuring heads)

– Hot rolled long products
– Wire rod, Bar
– Profiles
– Tubes / seamless pipe
– Cold rolled and drawn products

- **EPM – "Enhanced Profile Measurement"** (patent pending) **The Measuring Method for Special Product Geometries**



Typical configuration of a combined Bar / Rod mill with 3 STEELMASTER measuring units and 1 common STEELMASTER processing and display unit.



Scanning a multitude of shadow edges around the entire periphery captures the product shape. This is achieved with several ODAC® measuring heads, scanning synchronously with high accuracy. Also polygonal faults or other irregular geometries are accurately detected.

ODAC® / STEELMASTER – SYSTEMS FOR THE STEEL AND METAL INDUSTRY

Hot Processes

For heavy operating conditions in the area of steel and metal industry, in particular for hot rolling, ZUMBACH offers the special STEELMASTER program.
1 up to 6 ODAC® scanners form the heart of the measuring units SMS (static), SMO (oscillating) or SMR (rotating). The STEELMASTER electronics and software process the measuring data for display, process monitoring, statistics and for the data exchange with the customer's network.

Cold Processes

For cold processes, including cold rolling, drawing, peeling, grinding and for quality control (NDT) and sorting, ODAC® scanners with respective protection and USYS® or STEELMASTER processors are used, depending on the case.

► Ask for special literature for above applications.

COMMUNICATION AND NETWORKING

Today, the ability of sensors or processors to communicate with other computers or networks is essential. ZUMBACH offers a variety of ODAC versions, interface units and USYS® software to satisfy almost any need and concept.

USYS® Data Log

The USYS® Data Log is a WINDOWS™ based software for easy data collection from one or several ZUMBACH processors and for saving the data in text or Excel™ files. USYS® Data Log communicates to the ZUMBACH processors via a serial RS-232 port or an Ethernet TCP/IP connection.

Windows™ and Excel™ are trademarks of Microsoft Corporation.

USYS® Report Manager

The USYS® processor can store in a local or external memory the detailed statistical data calculated for the Piece, Lot and SPC periods. In this way it is possible to recover and visualize the data of previous productions and reproduce the quality control printed reports.

USYS® OPC UA Server

Values from a USYS® processor of type USYS® 200, USYS®-Touch or USYS® IPCe are available to higher-level customer systems via OPC UA thanks to the OPC UA server integrated in the USYS® software. This also includes the management of data from devices that are connected to the USYS® processor, which thus acts as a gateway between the devices and higher-level customer systems.

USYS® Web Server

With this software integrated by default, a USYS® processor can be addressed via an Ethernet TCP/IP network (LAN, Intranet, Internet), using a standard browser.

• All technical data are subject to change without notice.

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