

# ODEX<sup>®</sup> 10



Non-Contact Eccentricity, Concentricity  
and Diameter Gauge

## AN INNOVATIVE CONCEPT

### Highly Advanced, Extremely Accurate, and Comprehensive Gauging System for the Market

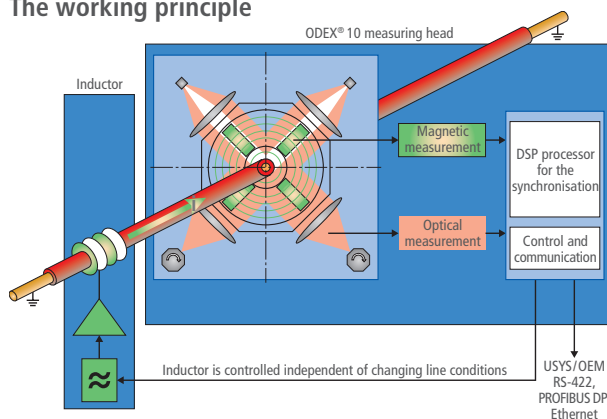
ODEX® 10 (pat. pend.) is a novel concept from ZUMBACH for very accurate and reliable monitoring of insulation diameter and conductor eccentricity/concentricity during extrusion or other insulating processes of ferrous and non-ferrous conductors.

ZUMBACH's extensive experience with thousands of inductive EX-TEST and METREX® monitors, and ODAC® laser diameter sensors led to this most advanced system. The ODEX® measures eccentricity, diameter and ovality within a few microns ( $1\mu\text{m} = 0.001\text{mm}$  [.00004 in.]). In applications of modern data cables CAT 5...8 and many other cable products, this often decides if the product passes or fails Quality Control Requirements.

Because of the outstanding linearity, the ODEX® can be mounted stationary in most applications and without the need of a servo or mechanical tracking system to keep the product centred.

- Modern Design incorporates Fast and Sophisticated Signal Processing
- Very fast!
  - 2400 simultaneous laser & magnetic measurements/s
- For outside diameters as small as 0.08 mm (.003 in.)
- No recalibration
- As easy to operate as a diameter gauge
- Extremely compact – only 110 mm wide (4.3 in.)
- Flexible – works on ferrous and non-ferrous conductors
- True minimum wall measurement
- Easy installation
- Advanced digital signal processing (DSP)
- Robust and insensitive to dirt
  - Superior immunity to dirt, like ZUMBACH laser gauges
  - No servo mechanisms needed
- RS, PROFIBUS DP and Ethernet versions

### The working principle

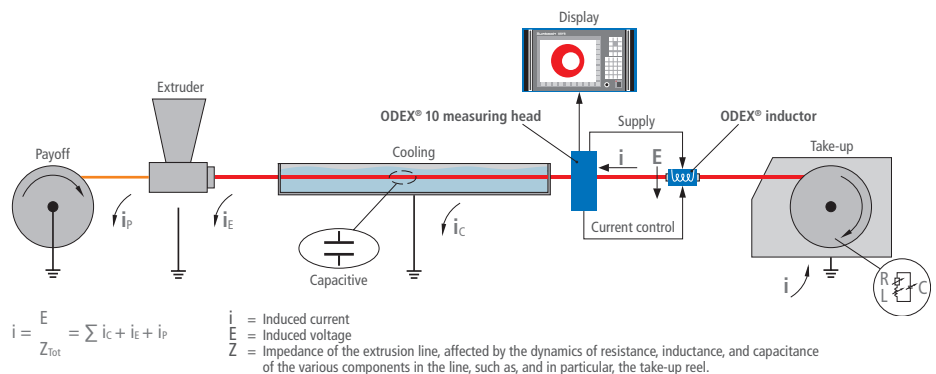


ODEX® 10 combines electromagnetic and laser scanning principles. The acquisition of the outer diameter is achieved with high frequency laser scanning, while the measurement of the conductor position within the insulation is performed by measuring the strength of the magnetic field around the conductor, utilizing a sophisticated array of measuring coils. Both measurements are performed simultaneously at high rates, minimizing inaccuracies caused by wire vibrations, and on the same plane, i.e. same spot on the product, eliminating measurement errors due to product twists.

### Induced current

A particularity for a measurement of this kind is the need for a current to be induced into the conductor, in order to generate a magnetic field. With the ODEX®, this current is induced by a high frequency inductor, connected to and controlled by the ODEX® head.

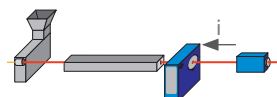
Due to the ultra-compact design and superior electromagnetic sensing system, the ODEX® can operate with very low currents and still achieve an optimal signal-to-noise ratio. This is vital when the grounding of the conductor is poor, when no galvanic grounding is possible, or when the resistance or the inductance of the wire at the take-up is changing.



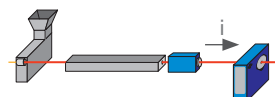
### Flexible configuration

Depending on the process and particular space conditions, grounding condition in the line etc., the ODEX® system can be placed at various locations:

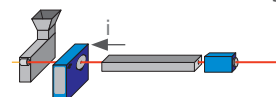
A) With the inductor after the ODEX® sensor.



B) With the inductor before the ODEX® sensor.



C) With the ODEX® sensor directly after the extruder (when there is enough space).



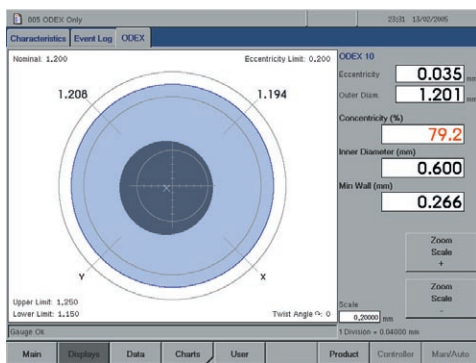
# VISUALISATION AND NETWORKING

The concentricity and diameter data can be processed in several ways:

1. With USYS 200 processor and display unit<sup>1)</sup>
2. With USYS 2100 processor and display unit<sup>1)</sup>
3. With USYS 8100 CELLMASTER® or JACKETMASTER processor and display units<sup>1)</sup>
4. With USYS IPC processor<sup>1)</sup>
5. Host computer or PLC networking via:
  - Serial interfaces or
  - PROFIBUS DP or
  - Ethernet
6. Option: 4 analogue outputs with AI 4-ODAC<sup>1)</sup>

<sup>1)</sup> Respective data sheets available on request

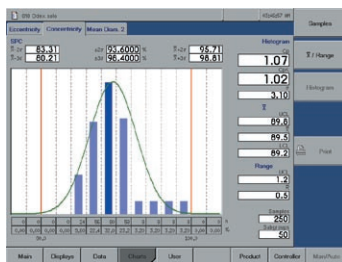
## Monitoring all quality parameters when using USYS 200, 2100 or 8100 processors



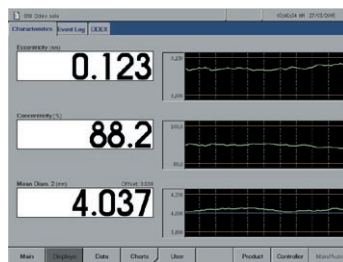
ODEX main screen

The measured values from the ODEX® 10 can be displayed in graphical or numerical form.

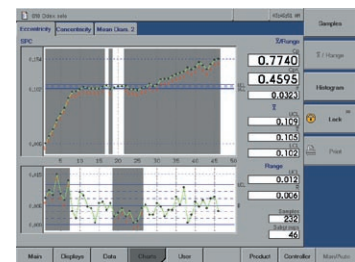
The parameters of other connected instruments like additional diameter gauges ODAC®, spark testers, capacitance measuring systems CAPAC®, lump/neckdown detectors etc., can be processed, visualized, and stored. Thus, flawless quality control is guaranteed.



Histogram

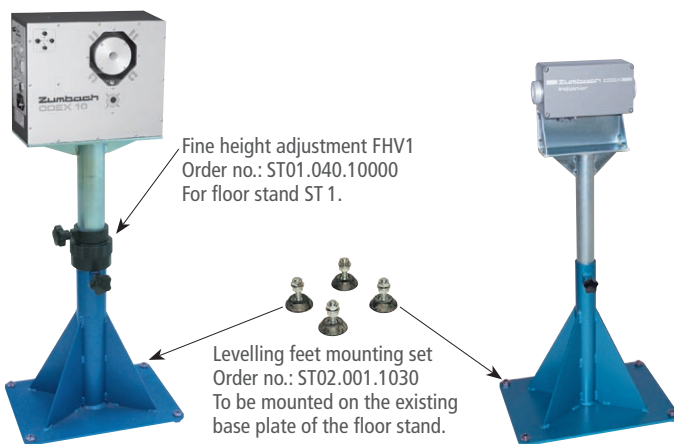


Strip charts



SPC charts

# ACCESSORIES



Fine height adjustment FHV1  
Order no.: ST01.040.10000  
For floor stand ST 1.

Levelling feet mounting set  
Order no.: ST02.001.1030  
To be mounted on the existing  
base plate of the floor stand.

Floor stand ST1-ODEX 10  
Order no.: ST01.450.12500  
Vertically adjustable stand\*.  
Line height: 820...1120 mm (32.3...44.1 in.)

Floor stand ST2-ODEX 10 Inductor  
Order no.: ST02.450.62510  
Vertically adjustable stand.  
Line height: 820...1120 mm (32.3...44.1 in.)



Limiting socket VF10-ODEX10  
Order number: ODEX.101.400  
Limits wire vibration if excessive.



Analogue interface AI 4-ODAC  
Order number: ODAC.000.100  
Features 4 analogue and 5 digital  
outputs.

## MAIN DATA

Measuring field M <sup>1)</sup>	16 mm (.63 in.)
Cable outside diameter range	0.08...10 mm (.003 ... .4 in.)
Min. conductor diameter	0.05 mm (.002 in.)
Diameter accuracy	+/- 0.1 µm (.000004 in.), averaging time 0.2 s
Repeatability <sup>2)</sup>	+/- 0.05 µm (.000002 in.), averaging time 1 s
Eccentricity accuracy	+/- 0.5 µm (.00002 in.), averaging time 0.2 s
Repeatability <sup>2)</sup>	+/- 0.5 µm (.00002 in.), averaging time 1 s
Resolution <sup>3)</sup>	0.01 µm (.0000004 in.)
Scanning frequency (optical)	2 x 1200 Scans/s
Magnetic reading rate	4 x 1200/s
Measuring time	One synchronized optical/magnetic measurement in 10 µs
Light source <sup>4)</sup>	VLD (Visible Laser Diode) class 2
Interface "Port 1" (Service)	RS-232/-422/-485. Sub-D 9 pol/m connector
Interface "Port 2" (Host)	RS-232/-422/-485 or PROFIBUS DP, RS-485 or Ethernet
Interface "Port 3"	Reserve
Interface "Port 4"	Analogue interface AI 4-ODAC (option)
Laser warning lamp	Illuminates when the measuring head is switched ON
Indicator of contaminated windows	Indication of contaminated windows when LED is blinking
Status LED	Indicates data transfer on "Port 2" (Host)
Power supply	85...264 VAC, 47...63 Hz
Power consumption (with inductor)	Max. 50 VA
Ambient temperature	Operating: 0...45° C (32...113° F), Transport / Storage: -20...50° C (- 4...122° F)
Atmospheric humidity	95% non condensing
Altitude	0...2500 m (0...8200 ft.) over sea level
Type of protection	Housing IP 65, Connection plate IP 40, Inductor IP 65
Weight	Measuring head 9.4 kg (20.7 lbs) / Inductor 5.3 kg (11.7 lbs)

<sup>1)</sup> M stands for measuring field height. In practice the largest object diameter corresponds to the measuring field height minus instability of position

<sup>2)</sup> Values within ± 3 Sigma (99.7%)/U<sub>95</sub>

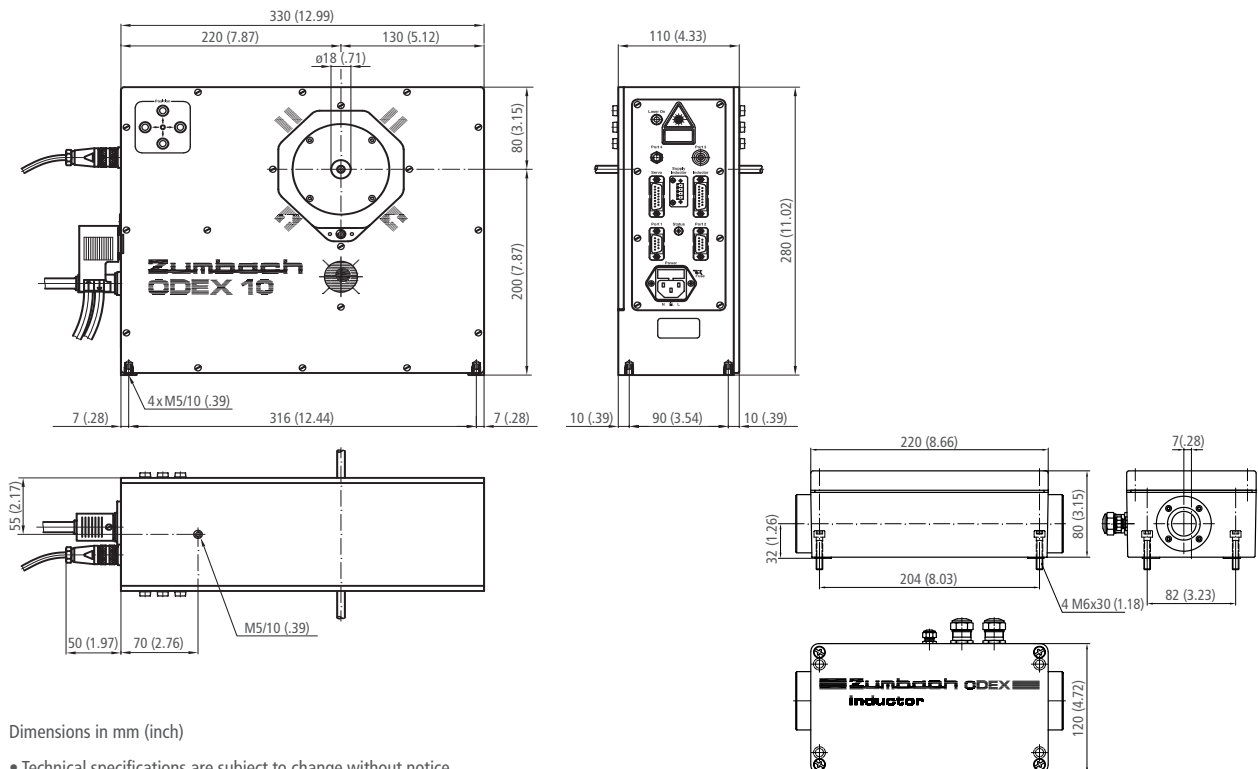
<sup>3)</sup> Systems resolution, i.e. smallest practical value at the last digit of the display (selectable)

<sup>4)</sup> The maximum laser power is indicated in the safety regulations

All units, which are equipped with lasers, were designed to meet the regulations CDRH (USA), BS 4803, EN 60825-1:2007, DIN / VDE 0837 and SEV TP 76 / 1A-D. They hold the warning and explanatory labels prescribed by EN 60825-1:2007.



## DIMENSIONS



**Switzerland (H.Q.)**  
 Zumbach Electronic AG  
 P.O. Box  
 CH-2552 Orpund  
 Phone: +41 (0)32 356 04 00  
 Fax: +41 (0)32 356 04 30  
 E-mail: sales@zumbach.ch

**USA**  
 Zumbach Electronics Corp.  
 140 Kisco Avenue  
 Mount Kisco, NY 10549-1407  
 Phone: +1 914 241 7080  
 Fax: +1 914 241 7096  
 E-mail: sales@zumbach.com

**UK**  
 Zumbach Electronics Ltd.  
 Cromwell Business Centre  
 Milton Keynes, MK16 9QS  
 Phone: +44 (0)870 774 3301  
 Fax: +44 (0)870 774 3302  
 E-mail: sales@zumbach.co.uk

Other ZUMBACH companies in  
 Argentina, Belgium, Brazil, China,  
 France, Germany, Great Britain,  
 India, Italy, Spain and Taiwan, plus  
 agents in more than 40 countries.

[www.zumbach.com](http://www.zumbach.com)