

Zumbach

SWISS PRIME MEASURING SINCE 1957

ODEX[®] 10



**Non-Contact Eccentricity, Concentricity
and Diameter Gauge**

AN INNOVATIVE CONCEPT

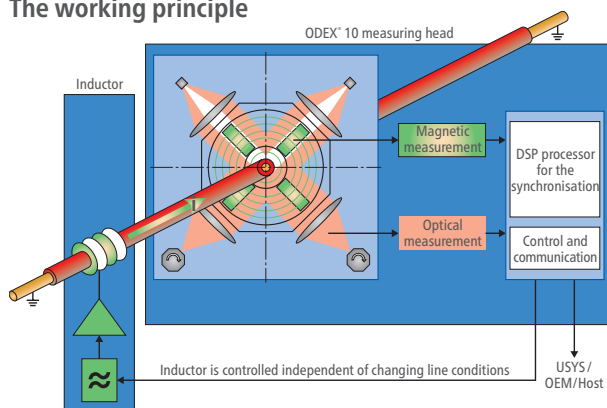
Highly Advanced, Extremely Accurate, and Comprehensive Gauging System for the Market

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 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
- Flexible communication integration (see "Main data")
 - Interface Service
 - Interface Host
 - Interface J: For FFT analysis on USYS

The working principle

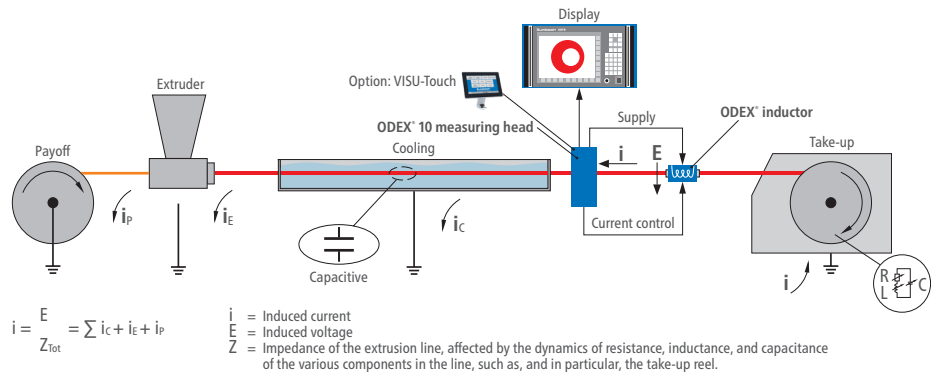


ODEX[®] 10 combines electromagnetic and laser scanning principles. The acquisition of the outer diameter is achieved with high frequency laser scanning, while the measurement of the conductor position within the insulation is performed by measuring the strength of the magnetic field around the conductor, 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.

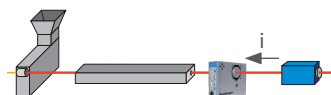
Due to the ultra-compact design and superior electromagnetic sensing system, the ODEX[®] can operate with very low currents and still achieve an optimal signal-to-noise ratio. This is vital when the grounding of the conductor is poor, when no galvanic grounding is possible, or when the resistance or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



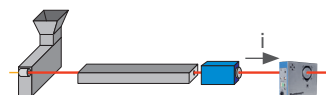
Flexible configuration

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

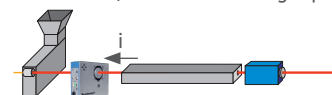
A) With the inductor after the ODEX[®] sensor.



B) With the inductor before the ODEX[®] sensor.



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

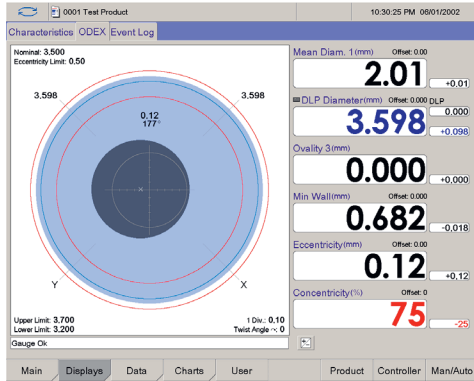


VISUALISATION AND NETWORKING

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

1. With USYS 200 processor and display unit
2. With USYS IPC CELLMASTER® or JACKETMASTER processor and display units
3. Host computer or PLC networking via:
 - Serial interfaces, Profibus DP, Ethernet TCP/IP, Profinet IO or EtherNet/IP

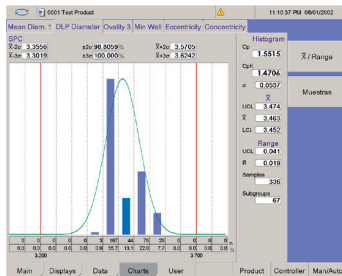
Monitoring all quality parameters when using USYS processors



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 KW etc., can be processed, visualized, and stored. Thus, flawless quality control is guaranteed.

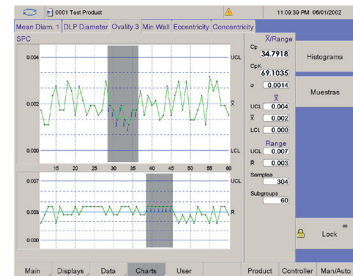
ODEX main screen



Histogram



Strip charts



SPC charts

ELECTRONICS

The electronics unit acts as the interface to the end user, be that through a Zumbach USYS processor/display, VISU-Touch web display or through any of the optional host interfaces. The electronics unit has as standard a Webserver interface allowing full unit operation and configuration over any connected Web browser. A standard Ethernet TCP/IP (PoE) Power over Ethernet service port allows for unit configuration or networking to a customer network.

In addition are 3 x digital relay outputs, 2 x length encoder inputs and 2 x digital inputs for statistics control. The electronics unit has its own integrated power supply for direct connection to local mains power supplies.

ACCESSORIES



Fine height adjustment FHV1
For floor stand ST 1.

Levelling feet mounting set
To be mounted on the existing
base plate of the floor stand.

Floor stand ST1-ODEX 10
Vertically adjustable stand.
Line height: 820...1120 mm (32.3...44.1 in.)



Floor stand ST2-ODEX 10 Inductor
Vertically adjustable stand.
Line height: 820...1120 mm (32.3...44.1 in.)



VISU-Touch for ODEX
The VISU-Touch is a rugged
and compact 7" display unit.

Ethernet cable
Ethernet network cable cat. 6 S / FTP
with RJ45 connectors.



PoE Injector 48 V, 24 W
Power over Ethernet supply
for devices that do not support
PoE or a long Ethernet cable.



Limiting socket VF10-ODEX10
Limits wire vibration if excessive.

MAIN DATA

Measuring field M ¹⁾	16 mm x 16 mm (.63 in.)					
Cable outside diameter range	0.08...10 mm (.0034 in.)					
Min. conductor diameter	0.05 mm (.002 in.)					
Diameter accuracy	+/- 0.1 µm (.000004 in.), averaging time 0.2 s					
Repeatability ²⁾	+/- 0.05 µm (.000002 in.), averaging time 1 s					
Eccentricity accuracy	+/- 0.5 µm (.00002 in.), averaging time 0.2 s					
Repeatability ²⁾	+/- 0.5 µm (.00002 in.), averaging time 1 s					
Resolution ³⁾	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 ⁴⁾	VLD (Visible Laser Diode) 630-680 nm, laser class 2 (device)					
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 Interface Host					
Ambient temperature	Operating: 0...45° C, Transport / Storage: -20...50° C					
Max. atmospheric humidity	95% (non condensing)					
Altitude	0...3000 m (0...9843 ft.) over sea level					
Pollution level	2 (only light non-conductive pollution)					
Type of protection	Case IP 52 for vertical mounting otherwise IP 40, connection plate IP 40					
Power supply	90...265 VAC, 47...63 Hz typically					
Power consumption (with inductor)	Max. 92 VA (with low PoE load)					
Weight	Measuring head 9.4 kg (20.7 lbs) / Inductor 5.3 kg (11.7 lbs)					
ODEX	-EN-RS	-EN-DP	-EN-EN	-EN-PN	-EN-EI	-J
Interface Service	Ethernet TCP/IP, RJ45 10/100BaseT, galvanically isolated					For spectral analysis (FFT) on USYS IPC 1e and USYS IPC 2e.
Interface Host	RS-232/-422/-485, D-sub. connector, 9 p./m, galvanically isolated	Profibus DP (RS-485), D-sub. connectors 9 p./f, galvanically isolated	Ethernet TCP/IP, 2 x RJ45, 0/100 BaseT, galvanically isolated	Profinet IO, 2 x RJ45, 10/100BaseT, galvanically isolated	EtherNet/IP, 2 x RJ45, 10/100BaseT, galvanically isolated	

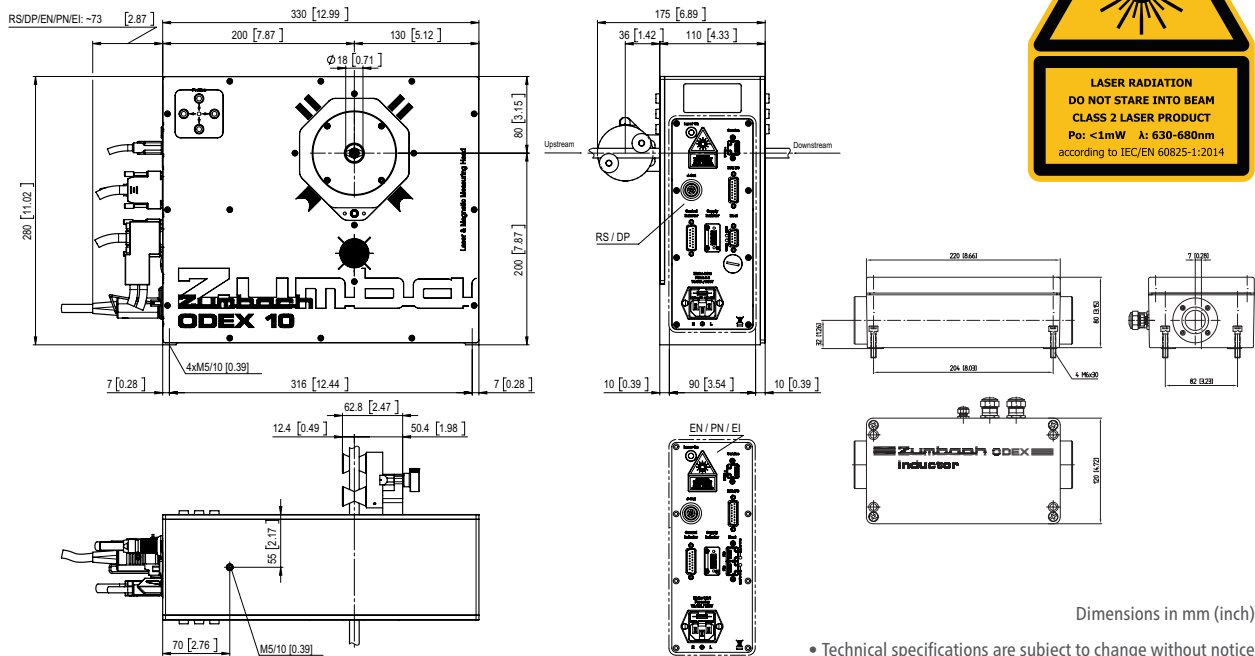
¹⁾ M stands for measuring field height. In practice the largest object diameter corresponds to the measuring field height minus instability of position

²⁾ Values within ± 3 Sigma (99.7%)/U₉₅

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

⁴⁾ The maximum laser power is indicated in the safety regulations

DIMENSIONS



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