Zumbach

SWISS PRIME MEASURING SINCE 1957

Modular Laser Measuring Head for Diameter, Width, Height. Measuring Field = 160 mm (6.3 in.).

ODAC® 160

Modern single axis measuring head from the ODAC® laser measuring unit series. Highest accuracy, robustness, reliability and functionality distinguish all the laser heads from ZUMBACH. The ODAC® 160 is manufactured with a modular design. It is available with a support rail or as individual emitter and receiver parts when a maximum of flexibility is required to install the head in any position. The measuring head can also be installed in constricted confines or several emitter/receiver pairs can be mounted in the same plane. ODAC® 160 models 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 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.

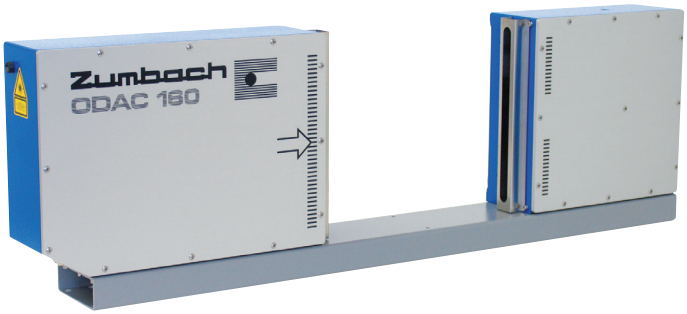
Adaptive signal processing in the measuring units increase accuracy

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.

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)

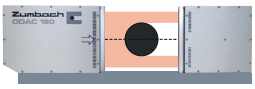


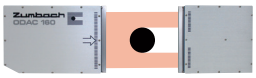
Main advantages

- Very high scan rate (measuring frequency)
  Standard: 1000/s, Version F: 2000/s
- High precision measurement
- High insensitivity to dirt and dust

Flexible mounting

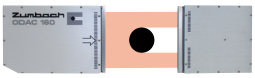
With or without rail, different measuring distances



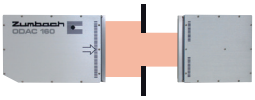


Types of measurement

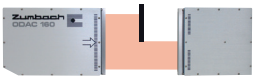
1 Diameter



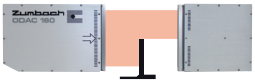
2 Slit width



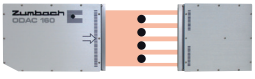
3 Penetration depth



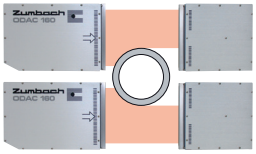
4 Height



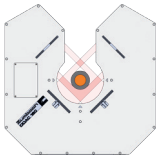
5 Multiple products



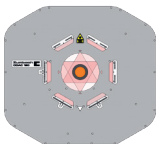
6 Dual scanning with large measuring field (synchronized)



7 Dual scanning XY (synchronized)

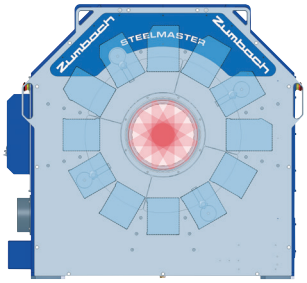


8 Triple scanning TRIO (synchronized)

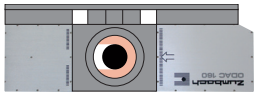


Special applications

Measurement of hot steel



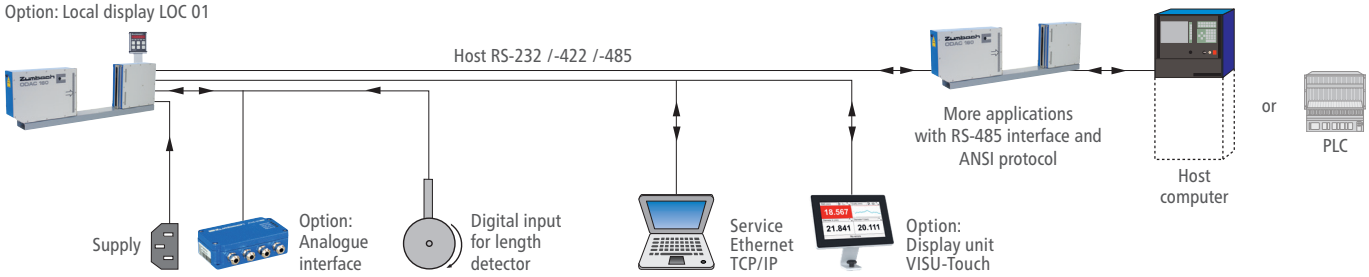
CV measurement



► Ask for special data sheets on CV or STEELMASTER hot steel systems

System Overviews

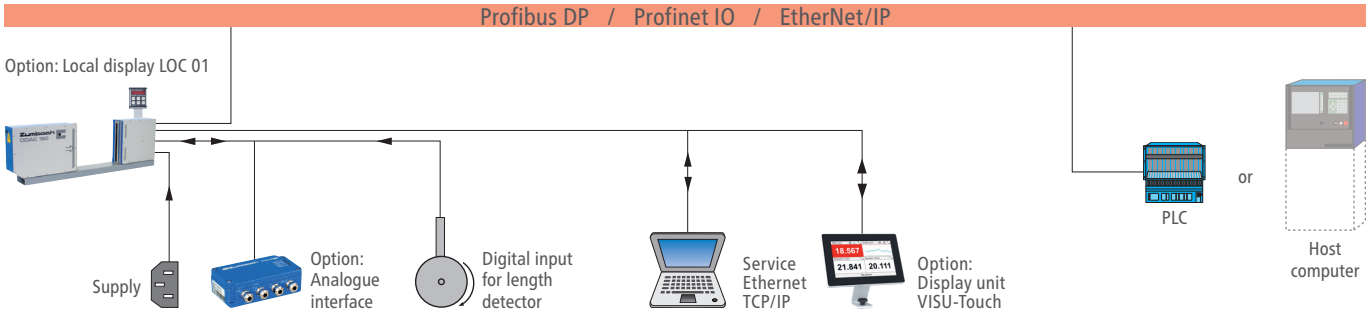
ODAC® 160EN-RS (serial interface)



The built-in processor allows the acquisition and filtering 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, ASCII or the network capable ANSI software protocols are selectable according to choice.

ODAC® 160EN-DP (Profibus DP), -EN-PN (Profinet IO) or -EN-EI (EtherNet/IP)

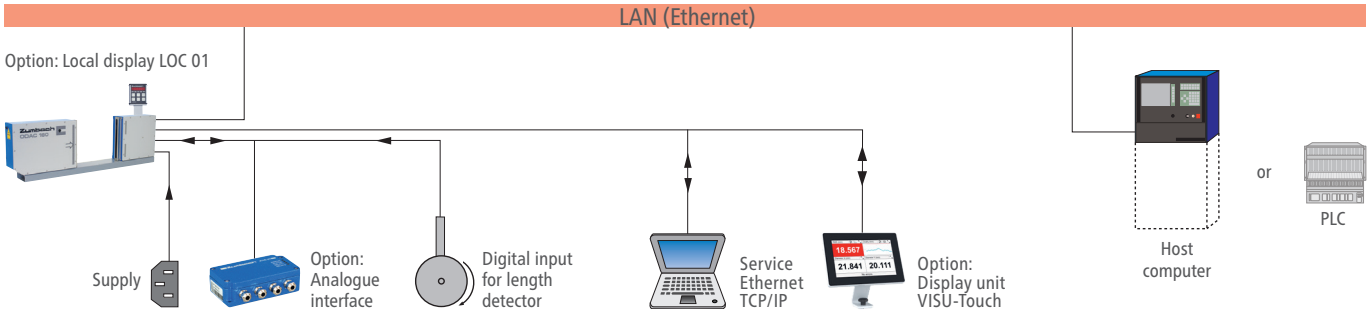
Profibus DP / Profinet IO / EtherNet/IP



The built-in processor allows the acquisition and filtering of the measured values, as well as statistic functions, parameter selection and many other functions. These versions communicate via the integrated Profibus DP or Profinet IO 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.

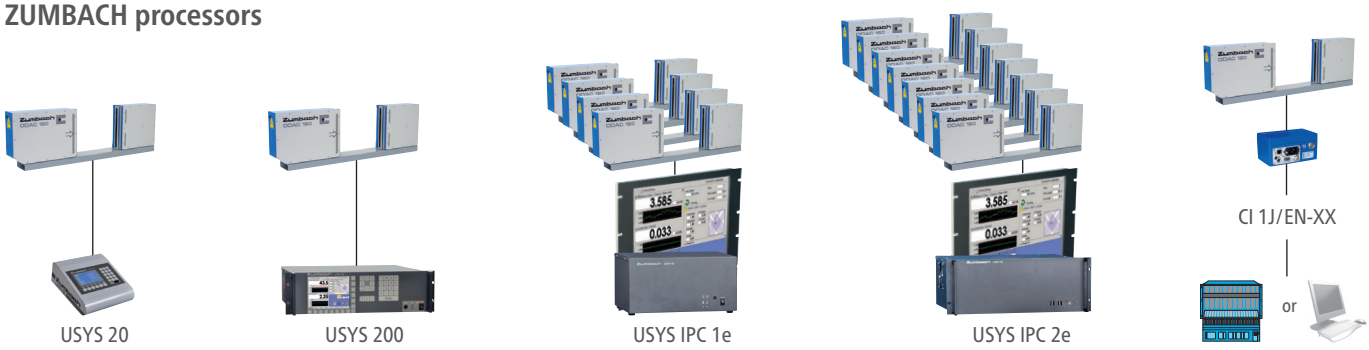
ODAC® 160EN-EN (Ethernet)

LAN (Ethernet)



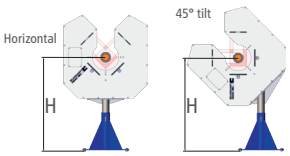
The built-in processor allows the acquisition and filtering of the measured values, as well as statistic functions, parameter selection and many other functions. The EN version communicates via the integrated EN interface with a higher level system. The selectable ZUMBACH protocols (ODAC or ASCII) are integrated and transmitted in the well known TCP/IP protocol. TCP/IP allows the data transfer through existing networks such as LANs and others.

ODAC® 160Jxx with the corresponding external ZUMBACH processors

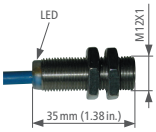


Accessories

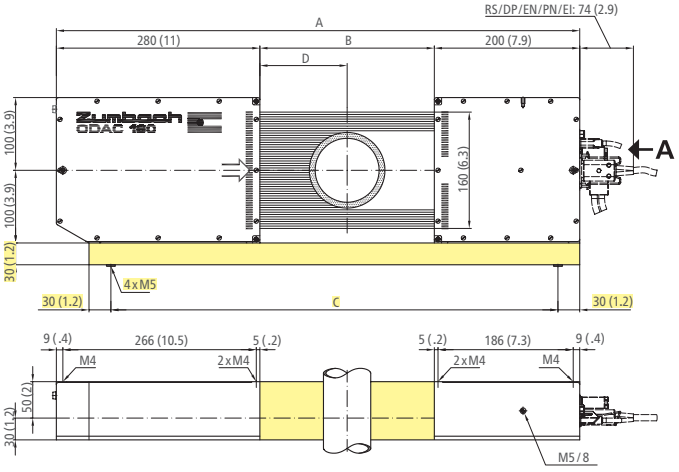
Description	Order Number
Floor stand ST2-ODAC 160.DT125 Vertically adjustable. Line height (H): 900...1200 mm (35.4...47.25 in.)	**ST02.200.30000**
Floor stand ST2-ODAC 160.DT125 90° Vertically adjustable. Line height (H): 900...1200 mm (35.4...47.25 in.)	**ST02.200.30010**
Floor stand ST1-ODAC 160XY **Floor stand ST1-ODAC 160XY 45°** Vertically adjustable. Line height (H): 900...1100 mm (35.4...43.3 in.)	**ST01.194.48600** **ST01.194.48610**
Mountable support for ST2 Lateral support, including rotary holder (USY.0002.910) for table top version of the USYS 20 processor.	**ST02.060.190**
Rotary holder USYS 20	**USY.0002.910**
Fixation set for wall mounting (with pivot arm)	**USY.0002.920**
Fixation set for table top	**USY.0002.930**
Set of calibration standards ODAC 160 **Set of calibration standards ODAC 160XY** **Set of calibration standards ODAC 160TRIO** Delivered in a protection box, comprising: – Calibration standard holder, certificate – Calibration standard ø 2 and 100 mm (.8 and 3.94 in.) Other calibration standards on request.	**ODAC.9501.49000** **ODAC.9501.49100** **ODAC.9501.49200**

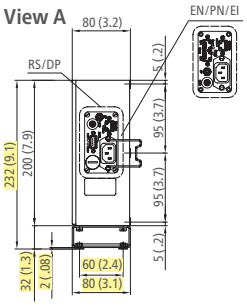


Limiting socket VF160-ODAC160	**ODAC.1601.400**
Air curtain LV.G-ODAC 160 (only for single axis heads)	**ODAC.1601.920**
Blower unit GE 7, 0.55kW	**GE.701.07000**
Deviation unit ODAC 160-90°	**ODAC.1601.940**
Local display LOC 01 Is mounted directly on the measuring head. Requires connection cable # ODAC.9167.00004 between LOC 01 and the measuring head. Not for ODAC J versions.	**LOC.011.01000**
VISU-Touch 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.	**VISU.001.01XXX**
Ethernet cable 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.	**A15 608 8XXX**
PoE Injector 48 V, 24 W Power over Ethernet supply for devices that do not support PoE or a long Ethernet cable. Not for ODAC J versions.	**N2.7860.1000**
Analogue interface AI4-R Interface with 4 analogue, 5 digital and 2 relay outputs. Direct connection of the digital input (proximity switch). Not for ODAC J versions.	**ODAC.001.100**
Signal cable L2 Bus 1DR22 x 02R For the connection between the Profibus DP interface and the customer's data acquisition system. Only for DP version.	**A13 252 0150**
Connector 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.	**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



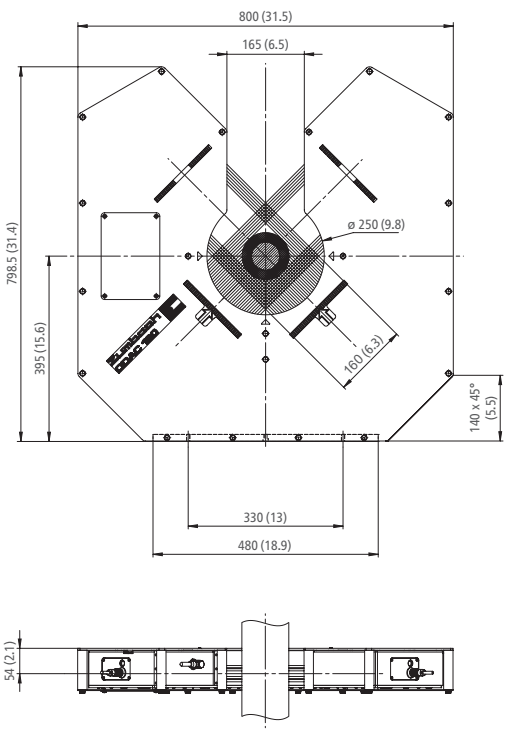


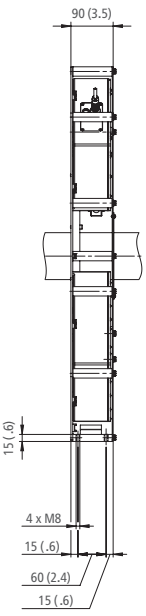
Model	A	B	C	D*
ODAC 160xx.DT125	730 (28.74)	250 (9.84)	625 (24.61)	125 (4.92)
ODAC 160xx.DT250	980 (38.58)	500 (19.69)	875 (34.45)	250 (9.84)
ODAC 160xx.DT375	1230 (48.43)	750 (29.53)	1125 (44.29)	375 (14.76)
ODAC 160xx.DT500	1480 (58.27)	1000 (39.37)	1375 (54.13)	500 (19.69)

xx = Version **J** or **JS** or **EN-RS, -DP, -EN, -PN, -EI**

* Measuring distance

C = Version with rail





Dimensions in mm (inch)

Technical Data

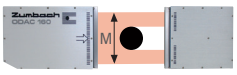
Model ODAC 160		J EN-xx	JP EN-xxP	JN EN-xxN	JC EN-xxC	JSx XY-xx [8] / TRIO-xx [9]
Measurement						
Version		Standard	Profile measurement	"Narrow Beam" [7]	Measurement with CV tube	Same with synchronization input
Measuring field M [1]		160 mm (6.3 in.)	160 mm (6.3 in.)	160 mm (6.3 in.)	150 mm (5.9 in.)	see J/JP/JN
Min. object ø		0.5 mm (.02 in.)	1.5 mm (.06 in.)	0.5 mm (.02 in.)	0.5 mm (.02 in.)	see J/JP/JN
Scanning frequency scans/s	standard	1000	1000	1000	500	500
	F version	2000	2000	2000	–	–
Scanning speed		328 m/s (1076 ft./s); F version: 656 m/s (2152 ft./s)				
Width of laser beam [6]		5 mm (0.2 in.)	5 mm (0.2 in.)	0.8 mm (.03 in.)	5 mm (0.2 in.)	see J/JP/JN
Repeatability (3 σ) at measuring distance D and averaging time (s)	125 mm (4.92 in.)	0.8 µm (0.1 s) (.000032 in.)	0.4 µm (1 s) (.000016 in.)		1.2 µm (0.1 s) (.000048 in.)	0.6 µm (1 s) (.000024 in.)
	250 mm (9.84 in.)	1.0 µm (0.1 s) (.000039 in.)	0.5 µm (1 s) (.000020 in.)		1.4 µm (0.1 s) (.000056 in.)	0.7 µm (1 s) (.000028 in.)
	375 mm (14.76 in.)	1.2 µm (0.1 s) (.000048 in.)	0.6 µm (1 s) (.000024 in.)		1.7 µm (0.1 s) (.000066 in.)	0.8 µm (1 s) (.000032 in.)
	500 mm (19.69 in.)	1.4 µm (0.1 s) (.000056 in.)	0.7 µm (1 s) (.000028 in.)		2.0 µm (0.1 s) (.000078 in.)	1.0 µm (1 s) (.000039 in.)
Measurement error centric at measuring distance D [2]		125 mm (4.92 in.) ± 3 µm (.00012 in.)				
		250 mm (9.84 in.) ± 4 µm (.00016 in.)				
		375 mm (14.76 in.) ± 5 µm (.00020 in.)				
		500 mm (19.69 in.) ± 6 µm (.00024 in.)				
Measurement error within the measuring zone [3]		2 x value of the centric measurement error (ODAC 160xxP: 4 x value of the centric measurement error)				
Measuring zone (width x height)		80 x 152 mm (3.15 x 6 in.)	160 x 152 mm (6.3 x 6 in.)	80 x 152 mm (3.15 x 6 in.)	40 x 145 mm (1.57 x 5.7 in.)	see J/JP/JN
Resolution [4]		0.1 µm (.000005 in.)				
Light source [5]		VLD (Visible Laser diode) 630-680 nm, laser class 2 (device)				
Types of meas. (see page 2)		1, 2, 3, 4, 5			1, 2	1, 6, 7

Interfaces / Connections						
Model ODAC 160	**EN-RSx**	**EN-DPx**	**EN-ENx**	**EN-PNx**	**EN-EIx**	**Jx**
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. JSx interfaces via Synchrobox CI 2/3JS/1J to the ZUMBACH processors. Data rate max. 63/s.
Interface Host	RS-232/-422/-485, D-sub. connectors 9p./m. galvani. 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, galvanically isolated	
Data rate max. standard	333/s	63/s	333/s	63/s	125/s	
Data rate max. F version	333/s	125/s	333/s	125/s	200/s	
Data rate max. C version	167/s	63/s	167/s	63/s	63/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 (relay output 30 VAC/VDC, 0.5 A as option)					
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 / 5 W)
Operating range	85-265 VAC typically	
Mains frequency	50/60 Hz	
Operating range	47-63 Hz typically	
Power	20 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 [10]	Case IP 65, connection plate IP 40
Weight	Emitter: 5.9 kg (13 lbs.), Receiver: 3.5 kg (7.7 lbs.), Rail (DT125): 3.1 kg (6.8 lbs.)

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



[2] Valid for object diameter bigger than "Min. object ø" and smaller than 95% from "measuring field M". The centre of the object is at the "measuring distance D" as well as in the middle of the "measuring field M".

[3] The measured borders of the object must be within this measuring zone. The centre of this measuring zone is at the "measuring distance D" as well as in the middle the "measuring field M".

[4] System resolution is the smallest practical value on the last digit of the display (adjustable).

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

[6] Measured in the measuring plane, including lateral Jitter of the scans.

[7] The xx**N** 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.

[8] Comprises inter alia: 2 ODAC 160JSxK, 1 synchro box CI 2JS/1J; Scanning frequency: 2 x 500/s. All XY models are also available in the versions: standard, profile measurement and "narrow beam" with the interfaces Jx and EN-xxx.

[9] Comprises inter alia: 3 ODAC 160JSxK, 1 synchro box CI 2JS/1J; Scanning frequency: 3 x 500/s. All TRIO models are also available in the versions: standard, profile measurement and "narrow beam" with the interfaces Jx and EN-xxx.

[10] Conformity not verified by UL.

- Technical specifications are subject to change without notice

Ordering Information

When ordering, please specify the following:

1 Models: **ODAC 160Jx, -JSx, -*JXY* or ODAC160EN-RSx, -DPx, -ENx, -PNx, -EIx**
Versions: Standard, **P** (Profile measurement), **N** (Narrow Beam), **C** (CV tube measuring), **K** (Components, without rail) specify the measuring distance **D** (see page 3), **F** (Fast, with higher scan frequency)

2 **Connection cable**

2a The connection between **ODAC 160EN-RS** and the higher level system is to be provided by the customer (via serial interface).

2b For **ODAC 160EN-DP**, the connection to a higher level system is made with the signal cable # A13 252 0150.

2c For the **ODAC 160EN-EN/-PN/-EI** version, the connection from the measuring head to the customer's Ethernet port can be made with a standard RJ45 Patch cable.

2d **Length** of the connection cable between **ODAC 160Jx** and the processor. Available lengths: 1, 2, 3, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50 m, each 10 m up to 200 m, 220 m, 240 m (3.3, 6.6, 10, 16, 33, 50, 65, 82, 98, 115, 131, 147, 164 ft., each 33 ft. up to 656 ft., 722 ft., 787 ft.). Longer cables on request.

2e For **"K" versions** (without rail): Length of the connection cable between emitter and receiver. Available lengths: 0.76, 0.96, 1.16, 1.5, 2, 3, 4, 5, 6, 8 m (2.5, 3.15, 3.8, 5, 6.5, 10, 13, 16.4, 19.7, 26.2 ft.). Minimum length = 2 x measuring distance D + 0.4 m (1.3 ft.). Order no. B.ODAC.821.32xx.

3 **Processor model** (Data acquisition system), only for **ODAC 160Jx**:
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.
► Ask for corresponding data sheets.

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