



alpha.ti 4.0



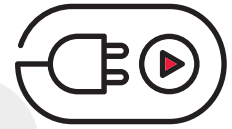
thickness measurement



“alpha.ti 4.0 is the result of our close to 20 years experience in measuring thicknesses, brought together into a single well-engineered system that unites simplicity with utmost precision.”

– Günter Lauven, Managing Director nokra –





alpha.ti

Laser-based thickness measurement

alpha.ti 4.0 – the future-proof investment

High-performance laser-based thickness measurement is key for competitiveness in many production processes. In the Industry 4.0 era, the demands placed on the digitalization of production data are steadily increasing. Higher data densities lead to an ever more sophisticated understanding of process, more efficient production and higher, documented quality.

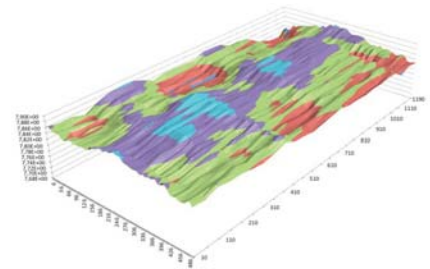
alpha.ti 4.0 is a milestone in laser-based thickness measurement: close to 20 years of experience have gone into this product, which was engineered from the ground up. Our top priority was making the system simple to integrate, simple to handle and simple to use. At the same time, accuracy and precision were increased even further, so as to ensure that QM-critical instrument capability is achieved even for the most demanding requirements. Equipped with an array of standard interfaces, alpha.ti 4.0 enables flexible, customized integration in the plant equipment environment.

Future software options – if desired even custom expansions – allow alpha.ti 4.0 to grow flexibly with new demands, for instance for data filtering or data aggregation in the context of Industry 4.0.

Advantages of laser-based thickness measurement

Independence of material and surface topography, rapid measuring, minimal operating costs and safe handling are just the most important advantages of laser-based thickness measurement over tactile and other non-contact methods. Thickness calibration using reference samples and the resulting depend-

encies on alloy management and the accuracy of the reference body are now a thing of the past. nokra's alpha.ti 4.0 laser thickness measuring system is wear-free and does not require any elaborate –and therefore costly – maintenance. This rapid, non-contact measuring method enables pinpoint measurement even on difficult surfaces and unusual or new topographies.



Laboratory standard

The simplicity and compact footprint of alpha.ti 4.0 means it can be used in new areas. Thus, cost-effective (plug & play) offline deployment in a measuring laboratory is possible with the same system used to measure thickness on the production line. Its optional sample scan mode delivers either a single measurement or a composite area thickness profile of an entire sample section, simply and easily – enabling you to efficiently optimize your processes through case-by-case evaluation or sampling, without online measuring.

Compact thickness measurement for the most demanding applications





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Whether process control, quality assurance or laboratory analysis: alpha.ti 4.0 is a milestone in the steel, aluminum, non-ferrous metals and plastics industries.





User-friendly class 2 laser



Fan-free IPC, long-term availability



10-year warranty on laser modules

Robust precision

The measuring accuracy of alpha.ti 4.0 stands out with a top value of 0.01% of the measuring range. The measuring ranges of 15/25/40 mm are available as standard, and nokra can realize alternative configurations as desired. For the first time, the housing compatibility of the sensors in conjunction with an ingenious installation mechanism allows rapid and simple sensor changes without requiring setup in the field. Thus, you can now use a single device for different measuring ranges depending on your production requirements.

The device is supplied with automatic adjustment as standard. This performs the thickness adjustment for the two laser sensors and ensures the traceability of the measured values. Together with the automatic monitoring function, it also enables verification of instrument capability at all times.

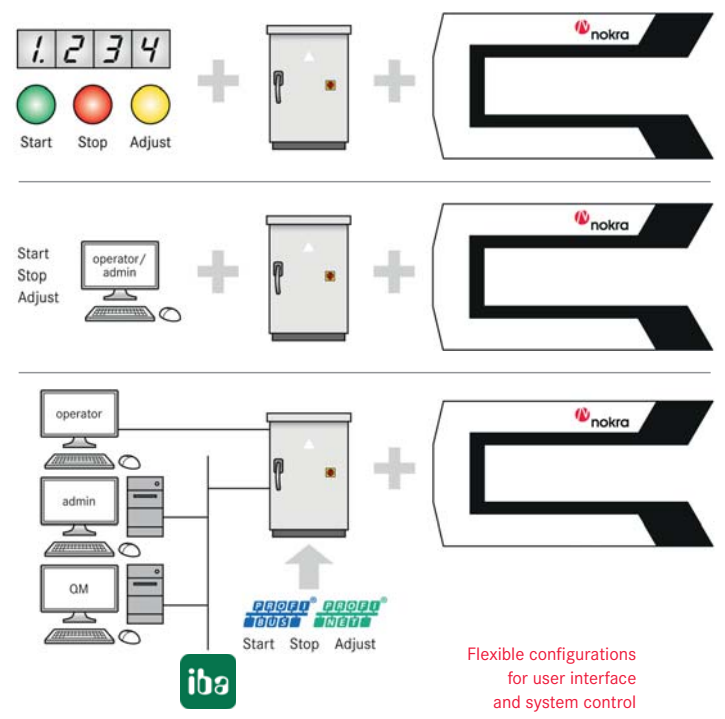
Ambient conditions under control

Mastery of industrial ambient conditions is an essential prerequisite for dependable, precise measuring results. Here as well, alpha.ti 4.0 raises the bar.

The high measuring accuracy of the laser sensors developed by nokra is temperature-independent between ambient temperatures of 10°C and 40°C. For more demanding applications, the sensors can be easily tempered; a regulated cooling device is not required. The heat insulation of the measuring fixture prevents thermal influences on measuring accuracy in the event of rapid changes in ambient temperatures. Significant changes in the interior of the measuring fixture are detected and the effect on the measurement is fully compensated by an automatic thickness adjustment.

Depending on the ambient conditions, the laser sensors are equipped with air knives that exploit the Coandă effect to generate laminar air

flows directly in front of the sensor windows using concealed nozzles. This ensures that the optical pathways are completely clear at all times. If it should ever become necessary to clean the sensor windows, the novel interchangeable panes offer rapid, tool-less exchange.



Flexible configurations for user interface and system control

Feature	alpha.ti 4.0-C-15	alpha.ti 4.0-C-25	alpha.ti 4.0-C-40
Measuring principle		laser triangulation	
Material thickness	0.01 mm - 5 mm	0.02 mm - 8 mm	0.05 mm - 15 mm
Material speed		> 0 m/min, speed independent	
Material temperature		≤ 100 °C	
Residual moisture		≤ 400 mg/m ² (equally distributed)	
Passline variation	± 5 mm	± 8 mm	± 12 mm
Passline angular deviation		± 1°*	
Measurement range	15 mm	25 mm	40 mm
Measurement resolution	0.2 µm	0.4 µm	0.6 µm
Linearity	± 1.5 µm	± 2.5 µm	± 4 µm
Measurement frequency		max. 67 kHz	
Integration time		1 ms - 1.000 ms	
Laser class		2	
Laser power		1 mW	
Laser wavelength		660 nm (red), 405 nm (blue, for non-metals)	
Measuring spot diameter		50 µm	
Laser lifetime		80,000 h @ 20 °C	
Gap height		190 mm*	
Gap width		120 mm	
Measurement gap depth		650/950/1150 mm*	
Passline height		≥ 480 mm*	
Cabinet size		600 mm x 400 mm x 1,100 mm (W x D x H)	
Standard features		<ul style="list-style-type: none"> automatic exposure & light control automatic thickness adjustment temperature independent sensor linearity alignment-free sensor express mounts quick-exchange sensor protection glasses measurement range change by sensor exchange possible system control via Profibus thickness value output via TCP/IP encoder input (AB-signal) ethernet service port user interface language German or English* 	
Safety features		safe inputs for safety door and emergency-off	
Documentation (English or German)		<ul style="list-style-type: none"> all documents are shipped on one CD overview drawing electrical drawing (EPLAN) operator & maintenance manual operator & maintenance training documents risk assessment declaration of conformity spare part and wear & tear part list 	
Options		<ul style="list-style-type: none"> sample scanning software module 5 mW laser power for optically non-cooperative materials (laser class 3R) sensor water cooling (material temperature > 100 °C) system control via Profinet thickness value analog output sensor air knives operator panel on cabinet, large display for measurement value UPS for Mikrobox-PC KVM-extender for Mikrobox-PC (without cabling) Windows-PC operator station including nokra user interface license manual, training documents and user interface texts in national language 	
Supply voltage		85 - 264 VAC, 50 - 60 Hz	
Power consumption		< 1 kW	
Free cable length cabinet - gauge		2/5/10 m	
IP protection class		IP65 (cabinet & gauge)	
Environment		<ul style="list-style-type: none"> cabinet & gauges: -5 °C to 45 °C* RH 0 - 95 % non-condensing 	
Instrument air		<ul style="list-style-type: none"> ≥ 4 bar, ~5 m³/h (for air knives only) ISO 8573-1, particle class 3, water class 3, oil class 3 	
Shipment and storage conditions		-10 °C to 60 °C, RH 0 - 95 % non-condensing	
Spare parts		<ul style="list-style-type: none"> sensor protection glass triangulation sensor 15 mm, 25 mm or 40 mm Siemens Mikrobox-PC, software preinstalled UPS battery nokra sensor-controller interface card 	

* others on request



Mastery of industrial ambient conditions is an essential prerequisite for dependable, precise measuring results. nokra stands for high-precision measurement-capable systems for 24/7 industrial use.



Versatile, individual – and just right

Steel, aluminum, non-ferrous metals – but also plastics, glass or carbon fiber and composite materials, mat and reflective: nokra's high-performance laser sensors adapt to the material characteristics in just microseconds. The true distance measurement of two surfaces using the highly precise nokra alpha.ti 4.0 thickness measurement offers virtually unlimited potential for use. Process control, quality assurance, laboratory analysis: the flexible configuration possibilities of both the user and signal interfaces, to-

gether with simple integration, make possible a pinpoint solution for any size business and application. Additionally, the O-frame design with traversing measuring track for measuring transverse profiles or with fixed measuring track – e.g. in case of cramped space next to the line – is also available.

And if you can't put together the solution you need from our product materials: nokra will be happy to prepare a proposal for customized functions.

Your partner

nokra Optische Prüftechnik und Automation GmbH was founded in 1991 as a spin-off from Fraunhofer Institute for Laser Technology (ILT) and Fraunhofer Institute for Production Technology (IPT) in Aachen. As a medium-sized technology company we develop, produce and distribute laser based measurement devices for automatic inline inspection of geometric properties of prod-

ucts in the metal, automotive and glass industry. Products to be inspected are rolled products (coils, plates, profiles) in the steel, aluminium and non-ferrous metal industry, large-diameter pipes as well as vehicle components, e.g. camshafts and crankshafts, axle supports, windscreens.



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