Technical specifications

Measuring ranges:	0 - 5 mm; 0 - 30 mm: 0 - 100 mm; optional measuring ranges up to 1000 mm
Accuracy:	+/- 0.2 % of the measuring range
Resolution:	0.1 % of the measuring range
Measuring speed:	up to 50 measurements per second
Digital smoothing filter:	numerically adjustable time constant

DELTA MASTER 3 sensor:
High resolution CCD matrix camera, laser line projector and image processor

Dimensions/weight:	330 x 230 x 110 mm; approx. 5 kg
Operating temperature:	-10 to +50 °C
Laser protection class:	class 1 with laser protection tube

Evaluation unit:
high end-PC in 19" industrial housing, with 15" colour monitor, keyboard with trackball,
graphic operating and visualisation interface

Power data:	190 to 240 VAC, 50/60 Hz, 250 W
Interfaces:	1 x parallel, 2 x serial, PS2, USB
Number of sensors:	standard up to 8, modularly extendable

System options

Measuring accuracy:	extension by combined measuring techniques or special mechanical solutions
Large digit display:	in different versions
Evaluation unit:	installed in 19" PC cabinet
Printer:	log printer
Traverses:	with control for different sheet widths
Remote maintenance:	via analogue or digital modem connection

Interface options

Signal outputs:	opto decoupled, programmable
BUS interface:	e.g. Siemens Profibus modules
Networking:	network connection
Control:	analogue outputs as current or voltage interface

You will find the addresses of our numerous
foreign representatives in the Internet.

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DELTA MASTER Camera-based thickness measurement

The DELTA MASTER 3 system with its two-dimensional image evaluation offers accurate thickness measurements not only for materials with smooth and flat surfaces but also for materials with heavily structured surfaces. The integrated laser intensity control automatically adapts to the brightness of the surface so that a colour-independent measurement is possible.

Application examples

- Bitumen sheets
- Rubber and caoutchouc
- Mineral wool
- Foams
- Felts

For online monitoring and control of production

The task

A high percentage of all production goods is made from materials manufactured in continuous sheets. The continuous manufacture of sheets is a process which, although easy to automate, requires continuous monitoring of the sheet thickness.

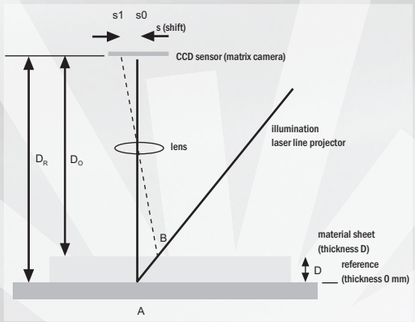
The solution

Typical applications can be found installed at companies which produce rubber, bitumen and foam sheets and mineral wool. The continuously produced jet black to light sheets are fed over a reference roller and monitored over the whole width of the sheet by several DELTA MASTER sensors.

The measuring technology

The DELTA MASTER 3 sensors are based on the principle of optical triangulation. A semiconductor laser projects a fine measuring line onto the surface of the material. The image of this line is recorded by a geometrically ultra-stable matrix CCD camera and evaluated with progressive digital image processing methods.

An optical model of the surface is calculated and the material thickness determined from this which corresponds to that measured by conventional tactile, mechanical measuring instruments. A material thickness is measured without contact up to 50 times per second at any sheet speed even on difficult surfaces on which conventional spot laser triangulation sensors fail due to the surface structure. The DELTA MASTER sensor determines the material thickness from the distance between the sensor and the material surface. Various calibration, difference and compensation methods guarantee accurate and stable measurements even under harsh industrial conditions.



The measuring system

The modular structure of the DELTA MASTER 3 system allows easy adaptation to the respective production conditions. This applies both for the number of measuring points and for the measuring technique used such as thickness measurement against a reference roller (plate) with permanently installed or traversing sensors and difference thickness measurement with one sensor above and one below the material sheet.

Your benefits

- area measurement rather than spot measurement
- controlled laser intensity
- accuracy and temperature stability of the CCD chip
- no dangerous radioactive radiation
- no diversion via area weight
- modularly expandable system

The possibilities

The DELTA MASTER 3 graphic visualisation and operation interface allows production motoring tailored to the setpoints and tolerances of the individual products. The Product Management option offers simple management of the individual products with regard to nominal thickness, tolerances and other settings for every measuring point. The programmable storage of measuring results allows continuous logging of the entire production in the sense of ISO 900x requirements. Numerous interfaces for process control, log printout, warnings, large digit displays and so on are available as options and allow adaptation to practically every production line.

The application

The DELTA MASTER 3 system offers accurate thickness measurements both for materials with smooth, flat surfaces and materials with heavily structured surfaces. The systems are camera-based and serve for online monitoring and control of the production of bitumen sheets, mineral wool, felts, rubber and caoutchouc sheets, floorings, carpets, open-pore foams, composite materials and much more besides.

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