



THE METRIX LINE

Dimensional control



setsmart
KEP TECHNOLOGIES

INDUSTRIAL CONTROL

KEP Technologies is a full solution provider. With **SETSMART** we offer a range of advanced standard and customized industrial control solutions with end-to-end project management, as required.

We are confident that with KEP Technologies you will find a dedicated industrial control solution with the performance needed to accurately control your parts and assemblies production. This being the case no matter which of our below market segments you may work in.

MARKETS

We address all industrial markets including:

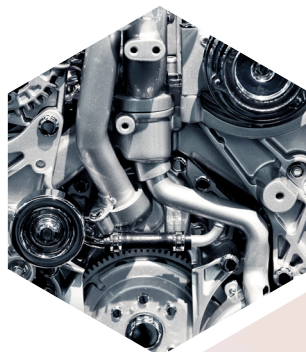
AERONAUTICS

Small and medium series parts - Delicate materials or surface finishes - Parts with complex geometry - Ventilation openings.



AUTOMOTIVE

Dimensions and geometry of parts to be assembled, including engine parts - Delicate materials or surface conditions - Detection of drifts and rapid corrective actions.



DEFENSE

Dimensions and geometry of projectiles, barrels - Thickness of nuclear fuel pellets.



TOBACCO

Online control of cigarette diameters.



MEDICAL & PHARMACEUTICAL

Dimensions and geometry of medical device components - Orthopedic prostheses - Control of spray nozzles - Control of film thickness.



COSMETICS

Spray nozzle aperture control.

PACKAGING

Dimensions and geometry of primary and secondary packaging.

ELECTRONICS & CONSUMER GOODS

Control of film thickness - Sorting and checking of seal dimensions - Sorting and checking of electronic component dimensions - Gas or liquid nozzles - etc

THE KEP TECHNOLOGIES ADVANTAGE

Each METRIX solution incorporates three essential elements to ensure the best Industrial Control for Smart Industry - Smart Control, Measurement Versatility and Quality Results. We know that solutions providing these benefits will deliver the highest value to our customers

SMART CONTROL With various options for automation, statistical data analysis, feedback loops for manufacturing machines.

MEASUREMENT VERSATILITY With one solution : multiple specifications controlled on one part and multiple types of parts can be controlled.

QUALITY RESULTS High accuracy and high precision transducers to meet and surpass your control requirements.



In addition to our core product offer, we are able to provide customized solutions by harnessing the engineering and project management expertise of our highly skilled organization.

THE METRIX LINE

METRIX solutions offer perfect control over the dimensions and geometry of your products whilst respecting the most demanding dimensional tolerances. Their use allows you to deliver cost-efficient, high quality products that will delight your customers.

They are based on a variety of contact or contactless transducers, and on pneumatic, electromechanical or optical principles, to perfectly address your product control challenges.

The METRIX range offers comprehensive and precise solutions fully compliant with Industry 4.0 concepts, specifically:

- Measurement automation
- Insertion of measurement systems at the core of the manufacturing process
- Statistical treatment of measurement data
- Feedback loops for manufacturing machines

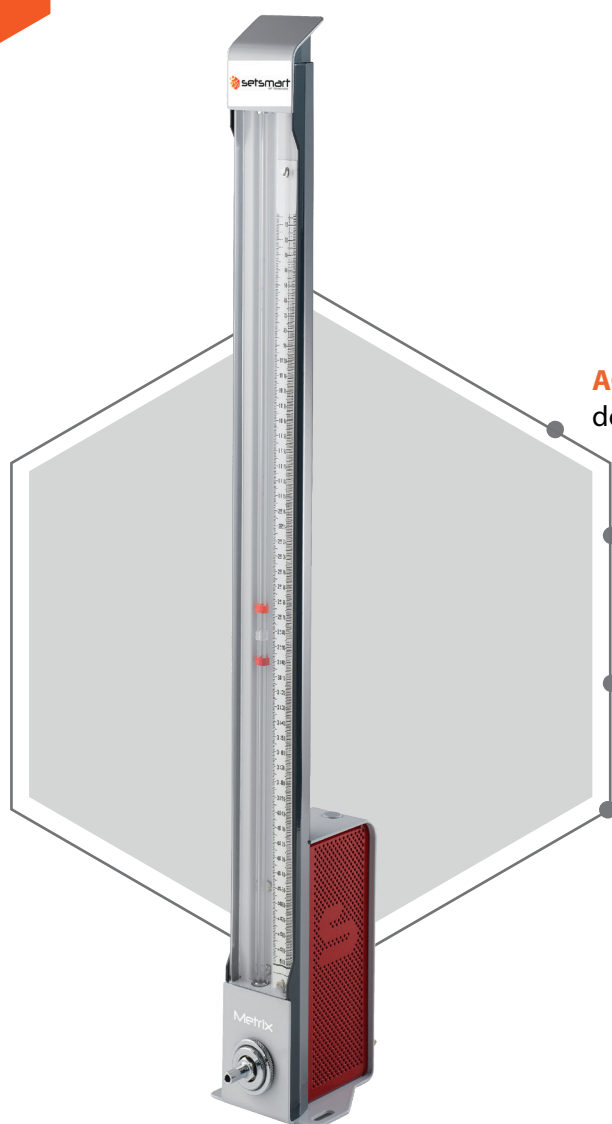
METRIX solutions contribute to the reliability and cost efficiency of your industrial control processes, enabling valuable human resources to be re-assigned to alternative, value-added work.

All solutions in the METRIX family can be adapted to your specific control needs.



METRIX ONE

YOUR ACCESSIBLE SOLUTION FOR PNEUMATIC DIMENSION CONTROL



ACCURATE AND PRECISE DIAMETER MEASUREMENTS

down to micrometers or better, and low R&R

FAST AND EASY CONTROL

quick testing (within seconds), independent of the operator's skills

MATERIAL-FRIENDLY CONTROL

with contactless pneumatic sensors that preserve the material's integrity

MADE-TO-MEASURE ANYWHERE

Installation possible in any work environment

METRIX ONE FOR SMALL APERTURES

Measurable diameter	0.2 to 3 mm (others on request)
Measurement uncertainty	+/-10 to +/-150 μm^*

METRIX ONE FOR LARGER DIMENSIONS

Measurable dimension	2 to 300 mm
Measurement uncertainty	+/-0.1 to +/-3 μm^{**}
Controllable tolerance interval	15 to 200 μm

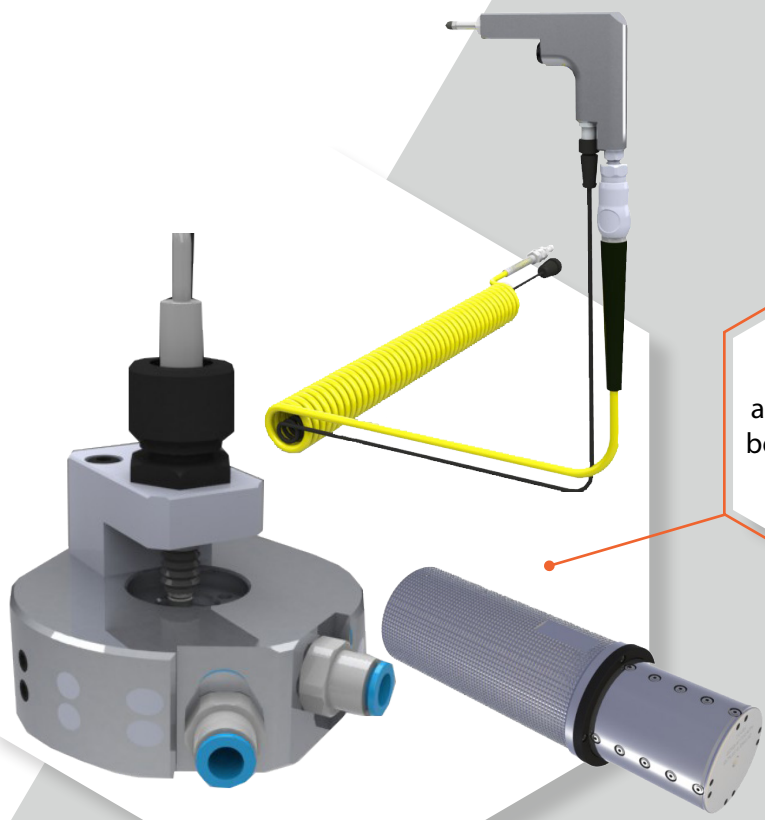
GENERAL

Dimensions of the base column (H / D / L)	730 / 112 / 96 mm
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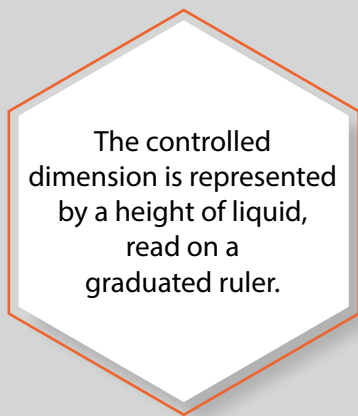
* Depends on the measured diameter and on the calibrant's dimension uncertainty

** Depends on the tolerance interval to be controlled, and on the calibrant's dimension uncertainty

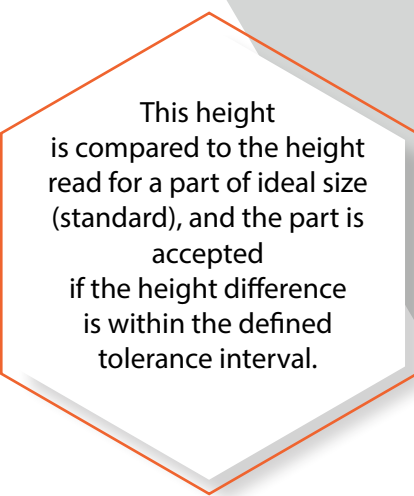
DIMENSIONAL CONTROL



A **specific measuring tool** is applied to the part to be checked (ring, gun, plug).



The controlled dimension is represented by a height of liquid, read on a graduated ruler.



This height is compared to the height read for a part of ideal size (standard), and the part is accepted if the height difference is within the defined tolerance interval.

METRIX OD

FOR PRECISE OUTER DIAMETER CONTROL



ACCURATE AND PRECISE DIAMETER MEASUREMENTS

down to micrometers or better, and low R&R

FAST AND EASY CONTROL

quick testing (within seconds), independent of the operator's skills

ULTRA HIGH PRECISION

with contact (tactile) transducers, also allowing for more measurement points over a smaller area

PRESERVATION OF THE CONTROLLED PART'S INTEGRITY

with contactless pneumatic sensors, that can also be used for online continuous control

UNATTENDED OPERATION

with automation, allowing operators to focus on value-added work

CONTACTLESS

Technology	Pneumatic
Measurement uncertainty – moving part	+/- 5 μm or better
Measurement uncertainty – static part	+/-0.1 to +/-3 μm^*

CONTACT

Technology	LVDT
Tactile transducers resolution	0.1 μm
Measurement uncertainty – static part	+/- 5 μm or better

GENERAL

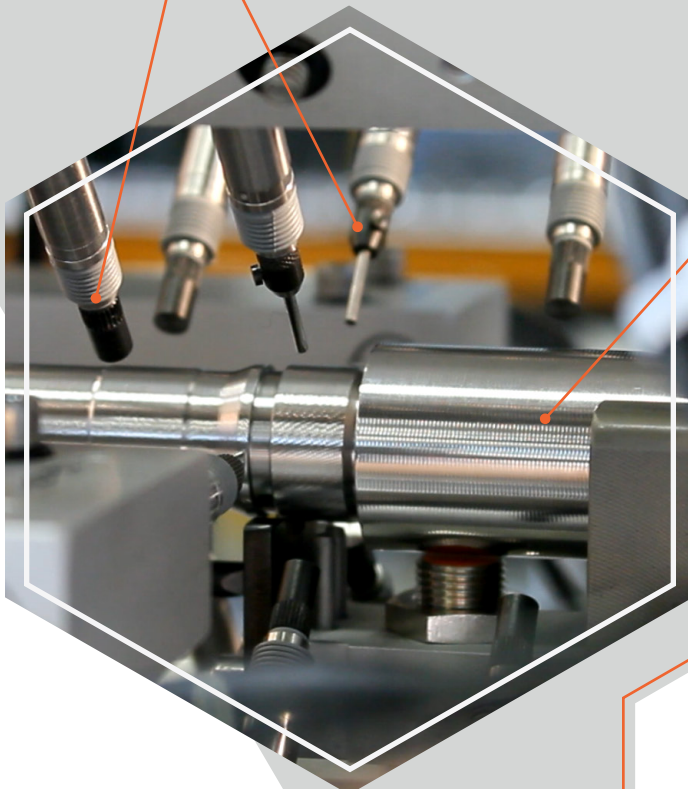
Type of control	Diameter, Concentricity and more on request
Measurement cycle time	Within seconds

* Depends on the tolerance interval to be controlled, and on the standard part's dimension uncertainty

OUTER DIAMETER CONTROL

Various contact or contactless measurement transducers are used to fit your control requirements in terms of accuracy, density of measurement points, or parts robustness. Contactless transducers allow for online control, on continuously moving parts.

Positioning the controlled part is achieved by **automated systems**, making the use and measurements of METRIX OD user-independent.



Software provides information for quick decisions (good /bad / unclear) and more detailed analysis (e.g. parts profiles, statistics).

METRIX ID

FOR THE MOST DEMANDING INNER DIAMETER CONTROL



ACCURATE AND PRECISE DIAMETER MEASUREMENTS

Down to micrometers or better, and low R&R

VERSATILE MEASUREMENT

Adaptable to parts of varying diameters, shapes, and control depths. One base unit can be connected to various sensors for multiple measurements.

FAST AND EASY CONTROL

Quick testing (within seconds), independent of the operator's skills

MADE-TO-MEASURE ANYWHERE

Installation possible in any work environment

METRIX ID FOR SMALL APERTURES

Measurable diameter	0.2 to 3 mm (others on request)
Measurement uncertainty	± 10 to $\pm 150 \mu\text{m}^*$

METRIX ID FOR LARGER BORES OR TUBES

Measurable diameter	2 to 300 mm
Measurement uncertainty	± 0.1 to $\pm 3 \mu\text{m}^{**}$
Controllable tolerance interval	15 to 200 μm

GENERAL

Type of control	Diameter, Conicity, Ovalization
Measurement cycle time	Within seconds
Dimensions of the base unit (H / D / L)	330 / 185 / 95 mm

* Depends on the measured diameter and on the calibrant's dimension uncertainty

** Depends on the tolerance interval to be controlled, and the standard part's dimension uncertainty

INNER DIAMETER CONTROL

The base unit provides compressed air to the sensor and **compares the measurement** with the calibrated value.

Sensors for small apertures
(like spray nozzles) are directly connected on the part to be controlled.

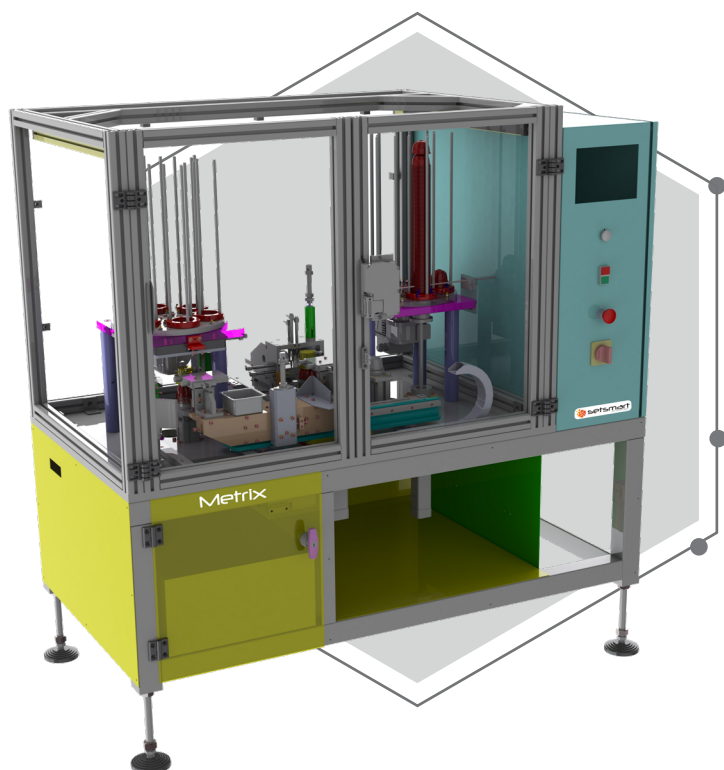
Sensors for larger bores or tubes are inserted in the controlled part, at a set depth. Their diameters and lengths depend on the controlled part.

They bear two or more control points to **check more than one diameter and detect defects like conicity or ovalization.**

Software provides simple information (good / bad / unclear) and statistical analysis.

METRIX GEO

YOUR VERSATILE SHAPE CONTROL SOLUTION



VERSATILE SHAPE AND GEOMETRY MEASUREMENTS

- Of straightness, perpendicularity, parallelism, roundness, coaxiality, concentricity, depths of grooves, etc
- Of various types of objects : the number and positions of sensors are tailored to the part's design

ACCURATE AND PRECISE CONTROL

Based on contact (tactile) transducers, contactless pneumatic transducers or a combination of both

OPTION FOR UNATTENDED OPERATION

With automation, allowing operators to focus on value-added work

CONTACTLESS

Technology	Pneumatic
Measurement uncertainty	+/- 5 μ m or better*

CONTACT

Technology	LVDT
Tactile transducers resolution	0.1 μ m
Measurement uncertainty	+/- 5 μ m or better*

GENERAL

Type of control	Straightness, perpendicularity, parallelism, roundness, coaxiality, concentricity, depths of grooves, etc
Measurement cycle time	Within seconds

* Depends on the part controlled, and on the calibrant's dimension uncertainty

SHAPE DEFECT CONTROL

Contact transducers provide ultra high precision measurements. They allow for many measuring points within a small area.

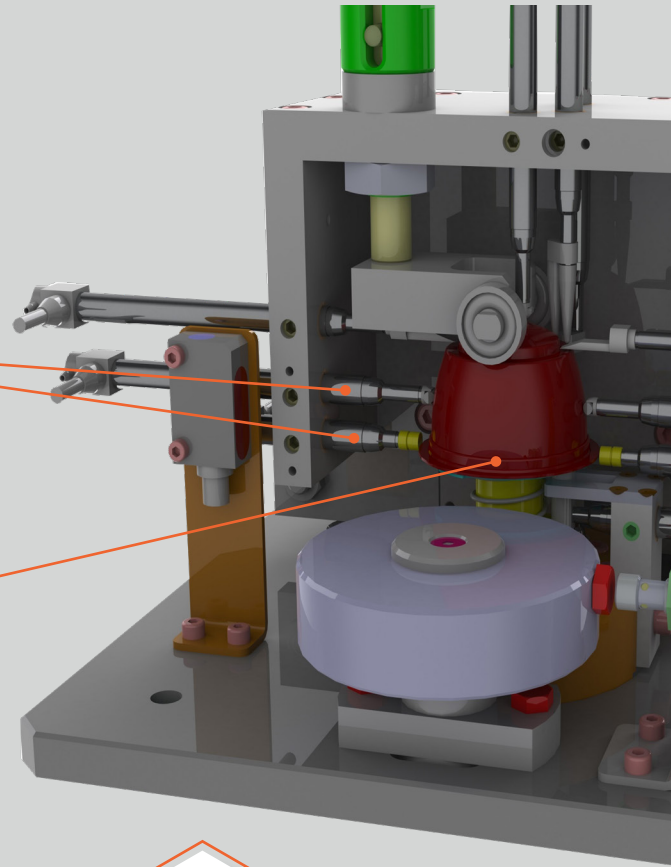
Unlike optical methods, they can **measure parts regardless of their color or surface condition.**

The controlled part is placed on a rotating stand. If sensors detect a fluctuation of it's diameter, the part is deformed.

The loading, measurement, unloading, marking and sorting **of the part can be automated.**

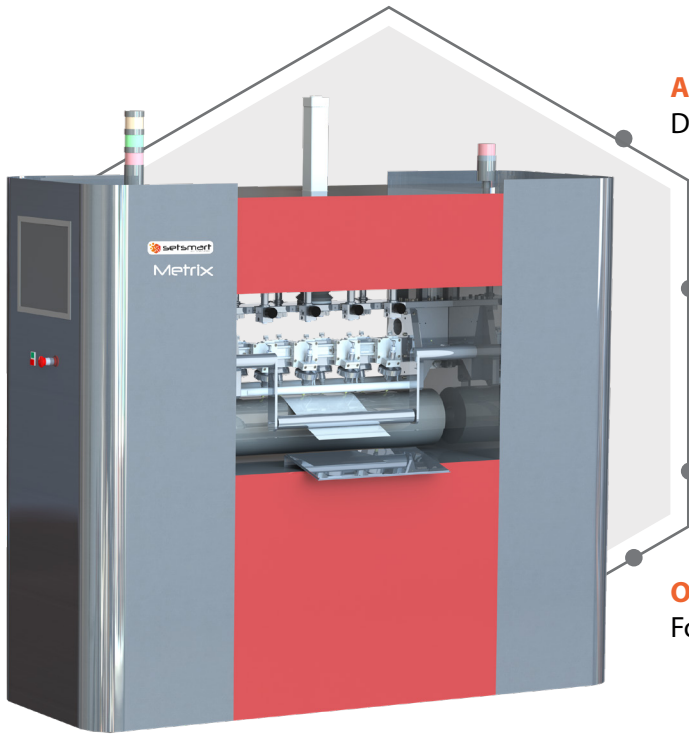
Contactless pneumatic transducers can be used to **control outside shapes (with air rings) or inside shapes (with air plugs).**

The air plug shown here controls the coaxiality of two bores.



METRIX FILM

FOR CONTACTLESS THICKNESS CONTROL



ACCURATE AND PRECISE THICKNESS MEASUREMENTS

Down to micrometers or better, and low R&R

VERSATILE MEASUREMENT

Applicable to various shapes (e.g. plates, films, pads, tablets, pellets) and independent of the material's color or brightness

MATERIAL-FRIENDLY CONTROL

With contactless pneumatic sensors that preserve the material's integrity

ONLINE MEASUREMENT OPTION

For automated measurement of moving parts or films

PERFORMANCE

Measurement uncertainty

+/- 5µm

Thickness variation range

Up to 100 µm

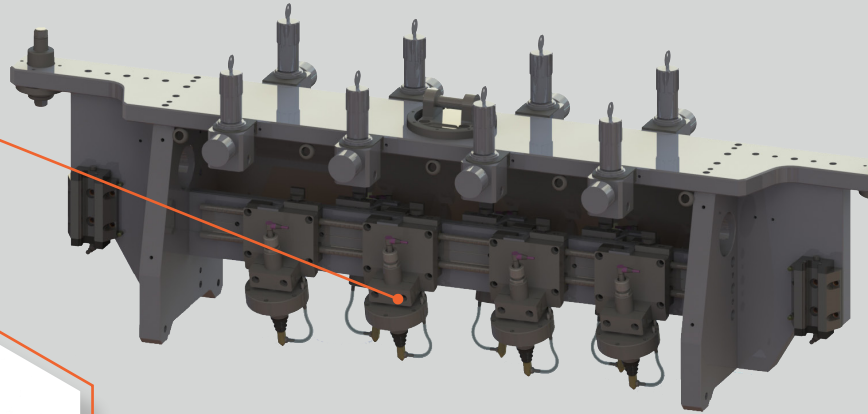
GENERAL

Data acquisition rate

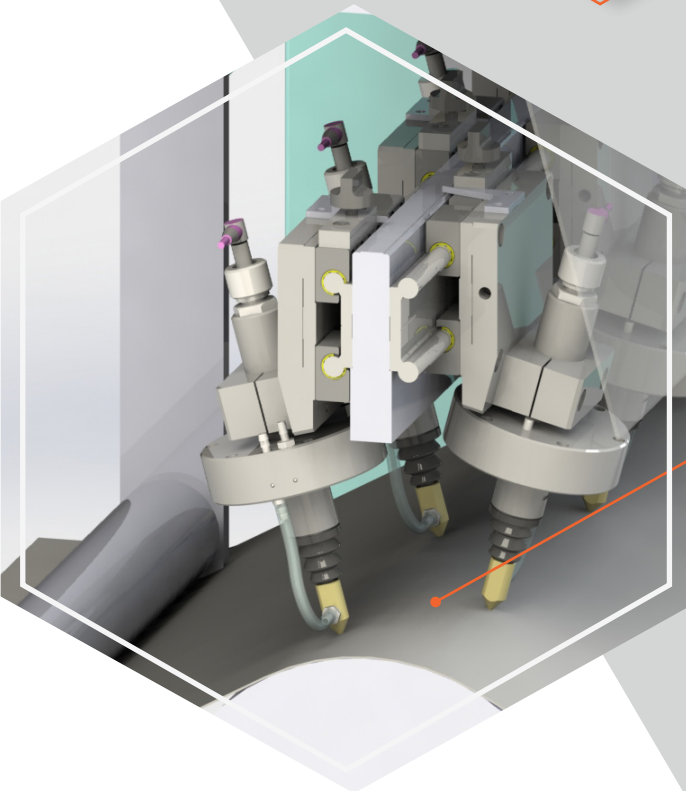
50 milliseconds
(e.g. a measurement every 2 mm at a scrolling speed of 2.5 m/min)

THICKNESS CONTROL

METRIX FILM's sensors are a unique combination of LVDT and pneumatic transducers. They allow for contactless measurements with **great accuracy and precision, over a large range.** Two sensors can be placed near the top and bottom of the controlled part, manually or automatically.



Options of:
Feedback loop to set the manufacturing parameters and correct thickness deviations.
Vision control to detect stains or color defects.



Continuous control of soft materials is achieved by placing sensors near the film that is stretched between rollers.

The **high data acquisition rate leads to many measurement points.** Data treatment allows the reconstitution of the film's thickness profile.



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