KÜNDIG CONTROL SYSTEMS
The Gauge Manufacturer for Film Extrusion SWISS MADE

S-100

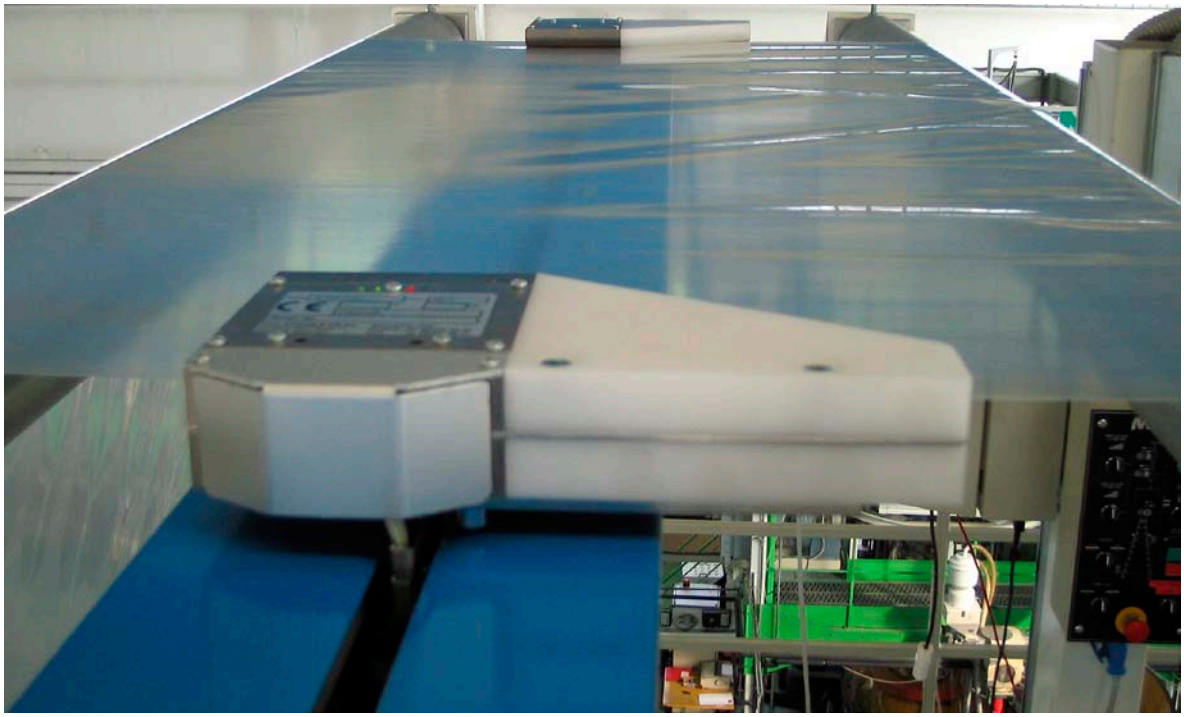
Capacitive Thickness Measurement for Barrier Films

S-100

The S-100 is an online thickness measuring system for blown film lines that measures the thickness of the film with nearly no contact.

This measuring system has been developed to capacitive measure barrier film with a high percentage of PA and/or EVOH. The S-100 TWIN measures the lay-flat width and the web position of the film at the same time.

The measuring sensors can be installed at any preferred position after the collapsing frame. Because of its compact design, the system always finds enough place and can be easily installed in any machine.



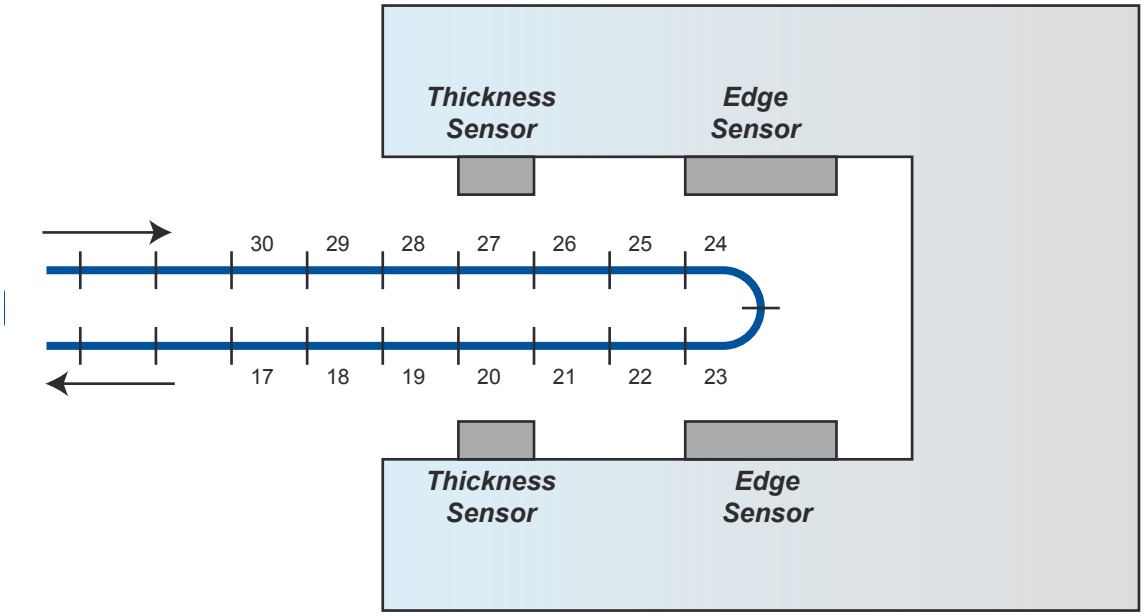
The installation work is minimal and can be easily done by factory technicians. The system is therefore rapidly and immediately put into service. Furthermore, its construction provides maintenance free service, high reliability and long usage life.

The S-100 is a capacitive thickness measuring system that measures barrier film without any additional settings or calibration. This also avoids costs for authorizations, adjustments, cleaning and disposal that are frequent with other conventional measuring devices.

The working principle

The thickness sensor measures the total thickness of the double film that is located in the stray field of the measuring capacitor.

The exact distribution of the thickness in the complete film perimeter is determined in the following way:



The complete film perimeter will be divided in several sections. The thickness sensor measures the sum of the upper and lower film sections. The rotating movement of the haul-off or the die causes a continuous variation of the measured sections.

1. Measured Value: $d_{t20+27} = d_{20} + d_{27}$
2. Measured Value: $d_{t21+28} = d_{21} + d_{28}$
3. Measured Value: $d_{t22+29} = d_{22} + d_{29}$

⋮

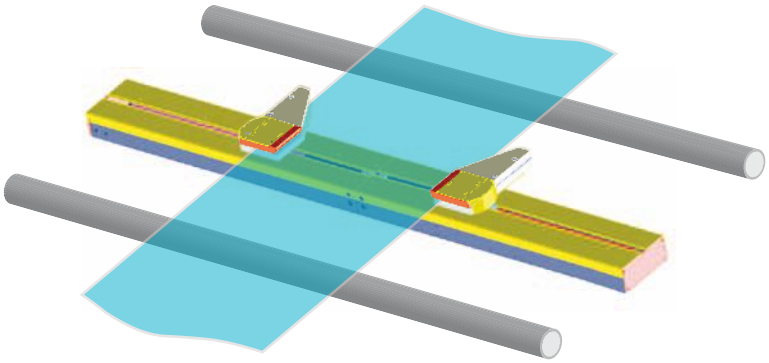
With this system of equations, the software of the data processor calculates the exact thickness of every film section by means of algorithms.

On machines with reversing haul-off or die, the profile displacement caused by the change of rotating direction is calculated and corrected through correlated algorithms.

Versions / Extensions

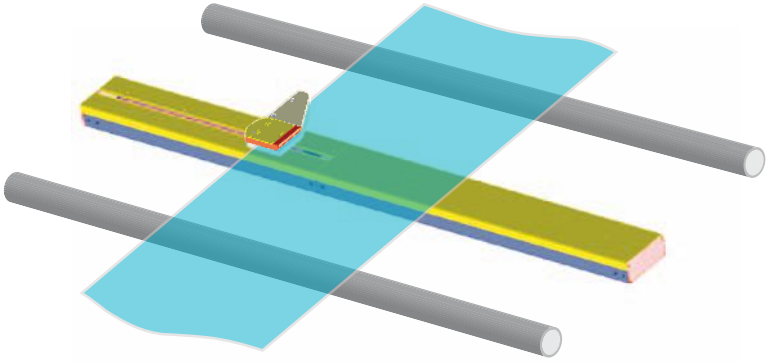
S-100 TWIN

On machines with reversing haul-off or die. The reversing angle must represent at least 240°.



S-100 SINGLE

On machines with rotary haul-off or die.



Comparison between S-100 TWIN and S-100 SINGLE

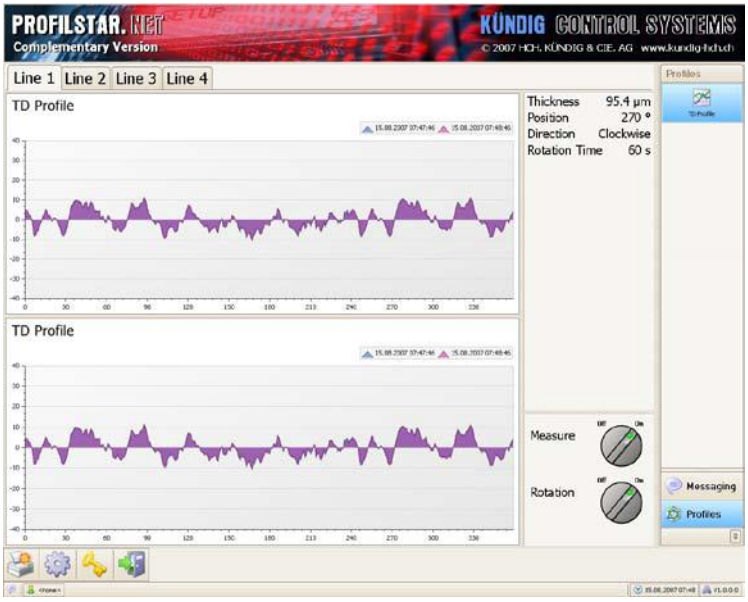
	Barrier film	Const. rotating die / haul-off	Oscillating die / haul-off	Layflat measurement	Web position measurement
S-100 TWIN	✓	✓ ↰	✓	✓	✓
S-100 SINGLE	✓	✓	✗	✗	✗

↰ 2 measured profiles per rotation

Connections and interfaces

PROFILSTAR.NET

The PROFILSTAR.NET is a complete visualization system for process optimization and quality control. Up to 16 lines, equipped with Kündig thickness gauges and / or layflat control systems, can be connected to one PROFILSTAR.NET unit.



PCD-LINK via RS-422 or UDP/IP Ethernet

The proven PCD-LINK protocol, used for the communication between control system and any Kündig measuring device, is now available via RS-422 and also via UDP/IP Ethernet with the new data processor. So it is still compatible with existing host computers but at the same time offers a new and very cost efficient version.
Both ports can be used at the same time, for example one port for the control system and the other port to record the data.

KCS-API and KCS-Process

For a fast and easy integration of Kündig measuring devices into Windows based control systems, we now offer a KCS-API (Application Programming Interface) in the widely used programming language C. The KCS-API is delivered as a DLL (Dynamic Link Library) and a KCS Process (Windows application) that acts as a driver.

Analog output

Still available is a connection with an analog signal. In this case, the measured thickness value is transmitted as an analog signal, while the rotation signals are presented in a digital form.

S-100 Technical data

Electrical interface values

Power supply	230 VAC ± 10%, 50-60 Hz
Power consumption	max. 110 VA
Nominal current	0.5 A
Switch-on peak current	1.5 A

Ambient temperature

Data processor	max. 55 °C
Measuring head	max. 70 °C
Transport and storage	-40 °C bis 70 °C

Thickness measurement

Measuring principle	Capacitive thickness measurement Suitable for all electrically non-conducting material
Measuring frequency	400 kHz
Measuring range	5 to 300 µm * > 300 µm upon request
Measuring interval	200 ms
Resolution	0.1 µm *
Accuracy after calibration	5 to 10 µm * ⇨ 0.2µm > 10 µm * ⇨ 1%
Temperature drift	Compensated

Ambient conditions

Ambient temperature	23 °C ± 2 °C
Measured film	LDPE-film at 50 °C approx.

* Thickness of single film

Calculation of amortization

Material output _____kg/h	X	Operation time _____h/day	X	Operation time _____days/year	X	Material price _____€/kg	=	Material throughput _____€/year			
				Material throughput _____€/year	X	Oprimization _____%/100	=	Material savings _____€/year			
				Investment _____€	:	Material savings _____€/year	=	Amortization time _____years			

Questionnaire application technology

Company

Address

Zip Code | City | Country

Contact person | E-mail

Phone | Fax

We are interested in

- ❑ Online thickness gauge
- ❑ Online thickness gauge and automatic profile control
- ❑ Offline system for film thickness
- ❑ Width measurement
- ❑ Width measurement and control
- ❑ Meter weight control

Specifications of existing line

Film width:	Min. _____ mm	Max. _____ mm
Film thickness:	Min. _____ µm	Max. _____ µm
Throughput:	Min. _____ kg/h	Max. _____ kg/h
Line speed:	Min. _____ m/min	Max. _____ m/min
Extrusion:	❑ Monoextrusion __ Components	❑ Coextrusion __ Layers __ Components per layer
Processed materials:	_____	
IBC:	❑ Yes	❑ No
Gusseted films:	❑ Yes	❑ No
Die:	❑ Fixed ❑ Reversing	❑ Rotating
Haul-off:	❑ Fixed ❑ Reversing	❑ Rotating
Width of roll at haul-off:	_____ mm	
Rotation time:	Min. _____ min	Max. _____ min
Power supply:	_____ VAC _____ Hz (single phase)	
Existing measuring and control units:	❑ Thickness gauge ❑ Width measurement ❑ Meter weight control	❑ Profile control system ❑ Width control ❑ Line speed control
Brand of existing line:	_____	

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KÜNDIG CONTROL SYSTEMS
The Gauge Manufacturer for Film Extrusion SWISS MADE

Product overview

K-300 Rotomat KT
Online thickness gauge with rotating scanner

KNC-400 Clingfree
Online thickness gauge for sticky
and sensitive films

KNC-600 Linear Scanner
Online thickness gauge for cast film

K-300 CF Gauge
Online thickness gauge
for quality supervision

S-50
Online thickness gauge
for quality supervision

S-100
Capacitive online thickness gauge
for barrier films

GBS-103W
Nuclear online thickness gauge
for barrier films

FE-7
Width measurement and control
for lines with or without IBC

FILMTEST
Offline measurement for quality control

PROFILSTAR.NET
Visualization for quality supervision and control

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