

PULP AND PAPER

KPM Process Measurements

Innovative solutions for accurate measurement and process optimization



- Easy to use
- Low cost of ownership
- Self-diagnostic products
- Leading-edge design
- Local service
- High precision

Improve consistency to
maximize quality

Successfully manage and control consistency

ABB's innovative products enable pulp and paper mills to successfully manage and control consistency as well as secure reliable break detection of the paper machine. Our KPM measurement products represent the most progressive solutions in the field.

ABB has key competence concerning applications for consistency transmitters, samplers and sheet break detectors. The products are easy to use, offering several features for minimum maintenance and low cost of ownership. ABB's target is to introduce new revolutionary products to the market continuously to help customers improve their processes. Our KPM product line will help achieve considerable savings on fiber, energy and chemical costs, while improving production efficiency and paper quality. All products are supported by a global network of sales and support offices, which facilitates immediate support according to customers needs.

The best solution for accurate consistency control

Our KPM consistency transmitters offer an application specific solution to manage and control consistency in the best possible way. Our comprehensive product range (including rotary, blade, microwave and optical) enables the best selection for each application without compromise. All KPM consistency transmitters are unique innovative products, covered by several patents.

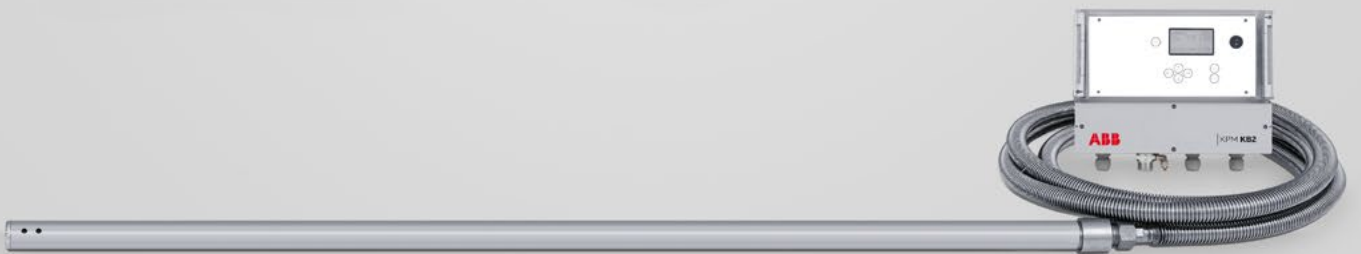
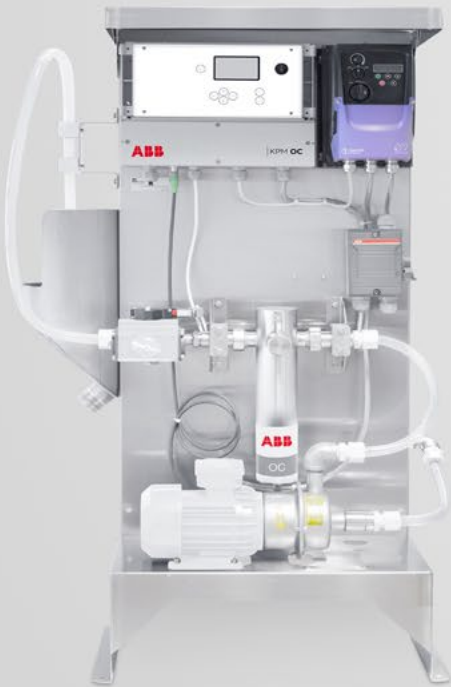
High performance sampling

With safe and representative sampling for screened and unscreened applications, ABB offers the widest portfolio of cost-effective, durable and versatile sample valves for all applications.

— We have the knowledge, products and experience to help customers achieve measurement objectives.

Reliable sheet break detection

KB2 Fiber-Optic Sheet Break Detector is the new generation sheet break detector with the latest RGB technology and enables 50 percent more light with effective power LED. This allows longer measurement distances and operation in high ambient light conditions. It is the perfect choice for installations in unclean, steamy and high temperature environments or where the space is limited.



KPM KC7 Microwave Consistency Transmitter



True-phase method measurement

The KPM KC7 transmitter uses well-tested microwave true-phase technology to measure the total consistency of mixed pulps. With a microwave signal utilizing phase vector modulation that contains a microwave-wide band sweep, KC7 is able to provide the highest measurement accuracy on the market today. The antennas have been designed to avoid microwave reflections in pipe and generate a self cleaning effect.

Accurate, total consistency measurement

KPM KC7 is unaffected by variations in pulp species, fiber length, freeness and in process conditions, unlike optical and shear force technologies. KPM KC7 measures fibers and fillers for total consistency, making it ideal to measure mixed pulps and has single point calibration.

Remote display unit

Remote electronics offers large display for easy operation and set-up. Intuitive, menu-driven interface features simple set-up, calibration and troubleshooting functions.

Two versions for wide range of installation options

Flow-through version is available in sizes 50-300mm (2-12"). Insertion style KC7 fits pipe size 250mm (10") and larger.

No maintenance

KPM KC7 needs no preventive maintenance; it has no wearing parts at all. The flow-through models do not have measurement parts inside the pipe to be hit by foreign particles. Depend on KPM KC7 for a reliable and maintenance-free product.

Specifications								
Sensor type	Microwave Consistency Transmitter							
Output signal	3x analog outputs 4 - 20 mA + HART							
Binary inputs	24 VDC, process stop, grade change (2) and sampler input							
Binary output	12 – 48 VDC max 10mA, dry contact							
Serial communication	USB PC-Interface, HART							
Measurement range in pulp & paper process	0-16% Cs							
Repeatability	0.01%							
Resolution	0.001% for sizes 50 – 300 mm (3" – 12") and insertion type (IT)							
Installation	Wafer type between flanges or Sandvik NS70 mm							
Length	100 mm (4") for all FT models							
Conductivity limits	50mm (2")	80mm (3")	100mm (4")	150mm (6")	200mm (8")	250mm (10")	300mm (12")	Insertion Type
	25mS/cm	25mS/cm	20mS/cm	20mS/cm	15mS/cm	15mS/cm	15mS/cm	25mS/cm
Process temperature	0 - 100 °C (32 - 212 °F)							
Process pressure	Pressure class PN25, recommendation >1,5 Bar (>22 psi), no air							
Process pH	2,5 – 11,5 pH.							
Ambient temperature	Sensor -20 to 60°C (-4 to 140°F), display unit -10 to 60°C (-14 to 140°F),							
Flow velocity	No effect, Insertion type max flow 5m/s (16.4 ft/s)							
Materials	Sensor: SS 316L; Window: Ceramic, Display: Polycarbonate							
Approvals	EMC, CE, PED (Directive 2014/68/EU, Article 13,1,(b) substances and mixtures							
Enclosure class	Sensor IP66 (Nema 4x), display unit IP65 (Nema 4)							
Power supply	86 to 264 VAC, 47 - 63Hz; 20VA							

KPM KC5 Rotating Consistency Transmitter



Revolutionary Direct Drive Servo Motor

The KPM KC5 Rotating Consistency Transmitter requires no compromising. With excellent consistency measurement performance, light weight construction, simple installation, and dramatically reduced maintenance, KPM KC5 is the most advanced consistency transmitter in the market.

Fast and accurate measurement

Through ABB's state-of-the-art torque measurement technology the KPM KC5 provides an accurate consistency measurement--instantly. Our sensitive, wide-range measurement sensor is applicable to all consistencies between 1.5-16 percent. Built-in temperature compensation assures performance in all process conditions.

Low installation costs

KPM KC5 is easy to install. Replace your existing model rotary transmitter with KPM KC5 using our special adapter to fit your current rotary installation. For new installations, use the measurement chamber that is provided with the transmitter. All required hardware is included.

No shutdown required

Built-in gate valve assembly allows you to extract transmitter on the fly, at full process pressure, without having to shut down or drain the line. Flange installation is also available as an alternate option.

Dramatically reduced maintenance

With no drive belt to change, the Direct Drive Servo Motor rarely requires routine maintenance. Our unique mechanical seal system enables infrequent, low-cost maintenance. Simply replace the seals, on site, in an hour or less.

Powerful self-diagnostics

Automatic maintenance features include reverse direction rotation to automatically loosen foreign objects. Calibration verification with Autozero is possible while the KPM KC5 is operating in the line.

Specifications	
Sensor type	Rotating consistency transmitter
Output signal	Analog output 4 - 20 mA + HART®, Foundation Fieldbus and Profibus PA with optional converter
Binary inputs	24 VDC (supplied from DCS), three for built-in calibration curves, one for process stop, one for sample button
Binary output	Alarm output; 24 VDC, 2A; Opening or closing dry contact
Power requirements	85 - 264 VAC, 47 - 63 Hz, 320W, Single phase.
Motor	Integrated Direct Drive Servo Motor
Measuring range	KPM KC5/5-S: 2-16% consistency KPM KC5/5-100: 1.5-5%
Sensitivity	Better than 0.003% Cs
Pressure rating	Sensor PN25 Gate valve DN80 for KC/5-S: PN10, PN16 or PN25, Gate valve DN125 for KC/5-100: PN16
Process temperature	0 - 120 °C (32-248°F)
Ambient temperature	Sensor 0 - 60°C (32-124°F), Display unit 0 - 50°C (32-122°F)
Flow velocity	0 - 5 m/s (0-15 f/s)
Seal water	Mill seal water, 6-8mm hose connection (1/4")
Housing	IP66 (better than NEMA 4X) enclosure.
Cabling	10m (32ft) interconnect cable from Sensor to Display Unit; 20m (65 ft) and 30m (98ft) optional
Gate valve	DN80 (3") AISI 316L standard, 254SMO and titanium available. PN10, PN16 or PN25 DN125 (5") AISI 316L, PN16
Process connection	Measurement chamber fits pipe diameters of 150 mm (6") and larger (KC/5-100, 200mm or larger), AISI 316L standard, SAF2205, titanium. Adapter available for other manufacturer's measuring vessels. All required installation hardware included in the delivery.
Sensor material	Wetted parts AISI 316L or titanium.
Dimensions (L*H*W) and weights	Sensor: 520 x 140 x 180 mm (20.5 x 5.5 x 7.1"), 14,8 kg (33 lbs); KC5-100, 19kg (42 lbs) Display Unit: 200 x 300 x 150 mm (7.9 x 12 x 6"); 6 kg (13 lbs) Installation assembly: 430 x 560 x 200 mm (17 x 22 x 8"), 19 kg (42 lbs) ; KC5-100, 28kg (62 lbs)

KPM KC3 Blade Consistency Transmitter



Reliable, damage resistant transmitter

KPM KC3 provides reliable and maintenance-free measurement. With its patented, shock resistant and seal-less transfer mechanism, KPM KC3 is the only transmitter in the market with no moving parts. It also boasts titanium parts for the wetted areas and an unbreakable diaphragm to stop process from entering transmitter.

Measures a wide consistency

KPM KC3 fits all applications, measuring a consistency range of 2-16 percent. Plus, the unique and highly-sensitive eddy probe accurately measures shear force.

Remote display unit

Remote display unit can be mounted to any desirable location. It has a large display and intuitive, menu-driven user interface, which features simple set-up, calibration and troubleshooting functions.

Simple calibration

One-touch calibration sequencing makes sampling, set-up and calibration easy. Built-in features include: time-stamping of samples for later evaluation and calibration, calibration calculation with multiple points and statistics, and remote selections for different pulp grades.

Low installation and lifetime costs

The installation is done via standard stainless steel mounting saddles, with titanium options available for upgrade. Service requirements are low because of the seal-less transfer mechanism with no moving parts or O-rings. All parts are field changeable without shutting down the process and emptying the process line.

Specifications	
Sensor type	Blade consistency transmitter
Output signal	2 -wire, 4 - 20 mA + HART®, Foundation Fieldbus and Profibus PA with optional converter
Measuring range	2 - 8% with standard blade 6 - 16% with medium consistency blade 2 - 3% with low consistency blade 2 - 8% with recycled unscreened blade
Sensitivity	Better than 0.01 % Cs
Process pressure	Max. 25 bar
Process temperature	0 - 120 °C
Ambient temperature	0 - 65 °C
Storage temperature	-50...+80 °C
Flow velocity	0.5 - 5 m/s (1.6 - 16 ft/s) standard blade 0.5 - 5 m/s (1.6 - 16 ft/s) medium consistency blade 0.5 - 5 m/s (1.6 - 16 ft/s) low consistency blade 0.5 - 5 m/s (1.6 - 16 ft/s) recycled unscreened blade
Weight	Transmitter 2.3 kg (5 lbs), Display unit 2.2 kg (4.9 lbs)
Process connection	Clamp connection to NS70 mounting saddle. Saddle welded onto process pipe. All required hardware included with the transmitter.
Process pipe size	100 mm (4") diameter or larger
Materials	All wetted parts titanium or Stainless steel. Mounting gaskets PTFE, Mounting saddle SS316L, SMO, Duplex, Titanium or FRP
Low voltage & emc	IEC 6100-4-3 and CISPR 11
Enclosure class	Sensor unit IP 66 (better than NEMA 4X), Display unit IP65 (NEMA 4X)
Damping	1 - 99 sec.
Calibration	Memory for 10 samples (FIFO). Built-in calibrator.
Build in curves	Seven (7) built-in calibration curves for softwood, hardwood, TMP, CTMP, groundwood, recycled, eucalyptus + one (1) user specific.
Binary inputs	Three (3) to select calibration curve and one (1) for sample button.

KPM KC9 Optical Consistency Transmitters



Widest consistency range

Optical consistency transmitters are typically the only choice for measuring total consistency range below 2 percent. ABB offers the latest design in optical consistency transmitters covering the widest consistency range for inline and bypass installations. The variety of sensors utilizing different measuring principles ensures that each application can be covered cost effectively without compromising measurement accuracy.

Robust design in AISI 316 steel & sapphire

KPM KC9 sensors are constructed of a stainless steel measurement cell and sapphire glass lenses to withstand the harsh process environments. The display unit and sensor have protection class of IP65 (Nema 4X).

KPM KC9 Inline Sensors

The KPM KC9 inline sensors can be installed directly to process pipe by using Sandvik NS40 process coupling. The sensor is available with optional retraction system, enabling sensor maintenance without interrupting the process. The inline consistency sensors are developed to measure single component fiber consistency in liquids from 0-14 percent.

KPM KC9 Bypass sensors

The bypass consistency sensors measure consistency in liquids from 0-5 percent. KPM KC9-25 and KPM KC9-50 are suitable for single component fiber consistency and KPM KC9-25 LC for very low consistency applications. KPM KC9-P is ideal for multicomponent stock total consistency measurement. KPM KC9-A includes additional ash consistency measurement.

Remote Display unit for operation

The sensors are pre-calibrated for quick and easy start up. After installation, one-point adjustment is performed against a laboratory test. The display unit has four selectable calibration models for applications with varying furnishes.

Technical specifications – KPM KC9 Optical Consistency Transmitters

Sensor type	Optical consistency transmitter							
Applications	KPM KC9-25, KC9-25 LC, KC9-50, KC9-IL and -IL V for clean pulps KPM KC9-25 K for white and green liquor KPM KC9-P for total consistency of mixed stock with fines and fillers KPM KC9-A for total and ash consistency of mixed stock with fines and fillers							
Output signals	3 x 4–20 mA, active, consistency, ash consistency (KPM KC9-A) and temperature							
Binary inputs	4 x closing dry contact, process stop, grade change (2), sampler input							
Binary output	2 x closing relays, 230 VAC, 110 VAC or 24 VDC for flushing control. 1 x dry contact opening/closing relay for system alarm.							
Power requirements	90–264 VAC, 50/60Hz + 3; 20VA (20W), connected to display unit.							
Sensor type KPM	KC9-25	KC9-25 LC	KC9-25 K	KC9-50	KC9-P	KC9-A	KC9-IL & -IL V	
Measurement range	Cs 0–2%	Cs 0–0,02%	Cs 0–5000 mg/l	Cs 0–5%	Cs 0–2%	Cs 0–2% Ash 0–1%	Cs 0–14%	
Process temperature	90° C (194° F)	60° C (140° F)	100° C (212° F)	90° C (194° F)	90° C (194° F)	60° C (140° F)	90° C (194° F)	
Minimum flow velocity	20 l/m (5 gpm)	20 l/m (5 gpm)	20 l/m (5 gpm)	60 l/min (16 gpm)	10 l/min (3 gpm)	10 l/min	Cs<1% 1m/s Cs>1% 1.5m/s	
Pressure class	PN25	PN25	PN25	PN25	PN25	PN25	PN25	
Process connection	Bypass 25 mm (1")	Bypass 25 mm (1")	Bypass 25 mm (1")	Bypass 50mm (2")	Bypass 25 mm (1")	Bypass 25 mm (1")	NS40 saddle	
Instrument air	If flushing valve is used, pressure 4 – 8 bar (60 – 120 psi), oil-free							
Process pressure	Minimum 1 bar (15 psi), turbulent flow							
Ambient temperature	Sensor, 0 - 60°C (32 - 140°F); Display Unit = - 10 to 60°C (-14 to 140°F)							
Interconnect cable	10 m cable from sensor to display unit, max 5 in series							
Materials	Wetted parts AISI 316, Windows: Sapphire, Display: Polycarbonate							
Conformance	73/23/EEC, 89/336/EEC, EN 61000-6-4:2001, EN 61000-6-2:2001, EN 61010-1:2001							
Enclosure class	IP 65 (Nema 4X)							
Dimensions (L x H x W) & Weight	KC9-2x	128 x 101 x 97 mm (5.0 x 4.0 x 3.8")	Weight: 2,6 kg (5.7 lbs.)					
	KC9-50	203 x 101 x 97 mm (8.0 x 4.0 x 3.8")	Weight: 2,6 kg (5.7 lbs.)					
	KC9-P&-A	128 x 101 x 97 mm (5.0 x 4.0 x 3.8")	Weight: 2,6 kg (5.7 lbs.)					
	KC9-IL	149 x 79 x 79 mm (5,9 x 3.1 x 3.1")	Weight: 1,0 kg (2.2 lbs.)					
	KC9-IL V	283 x 79 x 79 mm (11.1 x 3.1 x 3.1")	Weight: 1,0 kg (2.2 lbs.)					
	IL V Valve & Jack	362 x 284 x 110 mm (14.2 x 11.2 x 4.3")	Weight: 5,8 kg (12.8 lbs.)					
	Display	355 x 268 x 95 mm (14.0 x 11.2 x 3.7")	Weight: 2,7 kg (6.0 lbs.)					

KRA and KRT Retention Measurement



Retention control is important to papermakers due to the large influence it has on paper quality variability reduction. ABB's ultimate solution for monitoring and control of paper or board machine retention is KPM KRA and KRT Retention Measurement.

Benefits

- MD variation reduction in:
 - Basis weight
 - Moisture content
 - Ash content
- Web break reduction
- Faster grade changes and start-ups
- Optimization of retention chemicals

Retention Measurement System

ABB offers two options for paper and board machine retention monitoring and control: the KPM KRA sensor measures total consistency and ash consistency, while the KPM KRT sensor is for total consistency only. The measurement range for total consistency is 0-2.0 percent Cs and 0-1.0 percent for ash consistency.

Robust design and construction

The sensor is constructed of 316SS with an unbreakable stainless steel measurement cell, enabling the sensors to withstand harsh environments. The display unit and sensor have protection class of IP65 (Nema 4X) and do not need protective housing to withstand difficult conditions at the paper machine wet end.

Maintenance-free operations

Automatic flushing with water can be included to keep the sensors clean without maintenance. The optical sensor has a 3 mm gap between the lenses, which produces a self-cleaning effect due to the increased velocity. The white water sensor also has self-cleaning due to an automatic backflushing module.

Technical specifications – KPM KRA/KPM KRT retention sensor

Sensor type	Retention sensor with optical consistency transmitter
Measurement range	KPM KRT - Total Consistency 0 – 2.0%, minimum 0.005%, 50 ppm KPM KRA - Total Consistency 0 – 2.0%, minimum 0.005%, 50 ppm KPM KRA - Ash Consistency 0 – 1.0%, minimum 0.005%, 50 ppm.
Process temperature	10 - 60 °C (50 - 140 °F)
Process pressure	Max 10 bar (140 psi)
Sample flow rate	Minimum 10 l/min (2.5 gpm)
Process connection	Sample valve, diameter 21,3 mm with 3/4" tube connector
Sample line	Fluorinated ethylene propylene (FEP) recommended; max 4 bar (58 psi)
Output signals	3 × 4–20 mA, active, consistency, ash consistency (KPM KRA) and temperature
Binary inputs	4, closing dry contact, process stop, grade change (2), sampler input
Binary output	1 x closing or opening dry contact for general alarm.
Power requirements	Headbox sensor: 90-264 VAC 50/60+3 Hz; 20 VA White water sensor: 100-115 VAC or 200-240VAC, 50/60+2 Hz; 800 VA
Ambient temperature	0 – 50°C (32 - 122°F)
Flushing water	Mechanically or chemically purified, temperature 25-60 °C (77-140°F) Same as sample or max 20°C (68°F) warmer, Pressure 2–6 bar (30–90 psi)
Sealing water	Needed when sample pump included Same water will be used for flushing when pump included
Instrument air	Pressure 4 – 8 bar (60 – 120 psi), oil-free
Interconnect cable	From sensor to display unit, Included automatically, 1,0-2,0 meters
Sensor materials	Wetted metal parts AISI 316, Wetted tubing FEP
Conformance	73/23/EEC, 89/336/EEC, EN 61000-6-4:2001, EN 61000-6-2:2001, EN 61010-1:2001
Enclosure class	IP 65 (Nema 4x)
Dimensions (L x W x H)	Dimensions: 380 x 765 x 1170 mm (15 x 30 x 46") WW sensor in inch: (20 x 30 x 46")
Weight	Headbox sensor 26 kg (57 lbs) White water sensor 48 kg (106 lbs)

KPM KB2 Fiber-Optic Sheet Break Detector



Fast break detection

The KPM KB2's digital signal processing technology measures all signals at a thousand times per second. KPM KB2 is immune to ambient light changes by measuring the backlight intensity. The break detection delay is a minimum of 15 ms. With digital filtration, users can select how many measurement cycles are used for break alarm.

RGB and infrared light measurement

KPM KB2 has RGB or infrared light sources to perform superiorly on all paper and board grades and applications, regardless of color. The RGB color measurement can handle all sheet, wire and felt colors providing reliable break detection. In addition to open-draw applications, the breaks can be detected against felt, wire, or even against a cylinder.

Electronics located outside harsh environment

KPM KB2 is very reliable even in a 100 percent humidity environment. While the sensor head is exposed to high temperatures, the electronics unit is mounted outside the machine hood to convenient location using fiber optic cable.

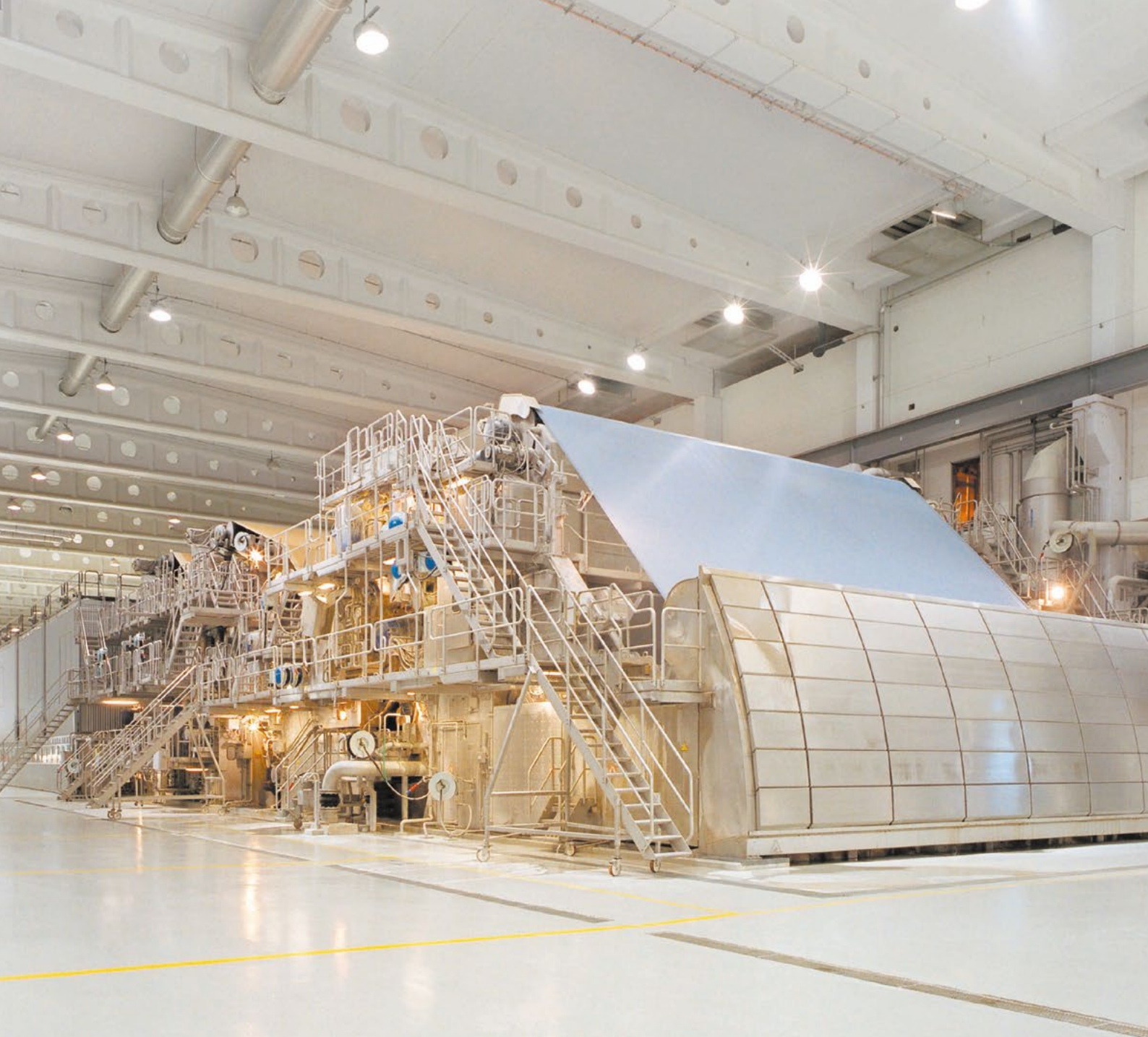
Non-contact optical measurement

With hundreds of installations worldwide, the KPM KB2 Fiber-Optic Sheet Break Detector is recognized as the best sheet break detector on the market. The non-contact sensor is placed above or under the web to be monitored. KPM KB2 is suitable for dirt, steam and high-temperature installations or where space is limited. The air-purged sensor head stays clean while monitoring for sheet breaks in the harshest environments.

Easy to set up

KPM KB2's large display and logical user interface allows easy setup of the break detection by selecting the measurements that give the highest signal difference. Break and maintenance alarms are wired to the PLC or DCS.

Specifications	
Ambient temperature	Sensor head and fiber optic cable: -10 to 180 °C (15 °F to 356 °F) Electronics unit: -10 to 60 °C (15 °F to 140 °F)
Fiber optic cable	KB2/6: 6 m (20'), KB2/9: 9 m (30') or KB2/12: 12m (40')
Fiber optic cable conduit	Requires flexible airtight conduit 19 mm (3/4") ID min, available as an option.
Conduit connection	19 mm (3/4 ") BSP
Installation	Sensor distance from the web 5...30 cm (2...12").
Led pulse frequency	1 kHz
Power supply	90 - 264 VAC, 50/60 Hz or 24 VDC
Power consumption	15 W
Enclosure class	IP 66 (Nema 4X)
Purge air connection	Dry instrument air, 6/4 mm (1/4") connector, normal consumption 80l/min
Digital outputs	2 x Closing or opening contact max. 250 VAC, 2A; 220VDC, 2 A for Break signal and Maintenance alarm
Alarm output delay	Min. 15 ms from the actual break
Analog outputs	Optional 3 pcs 4 - 20 mA max 600 ohm, Isolated
Dimensions (L x H x D) and weight	Electronics Unit 323 x 237 x 70 mm (12,7 x 9,3 x 2,8"), 3 kg (6,6lbs) Sensor head Ø 33 mm (1 1/4 ") SS316, pipe 1500 mm (59") long, 4 kg (9lbs)



KPM products comprise applications for consistency control, sampling and sheet break detection – and represent the most progressive solutions in the field. All products are supported by ABB's global network of sales, technical support and expert consultancy services.



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