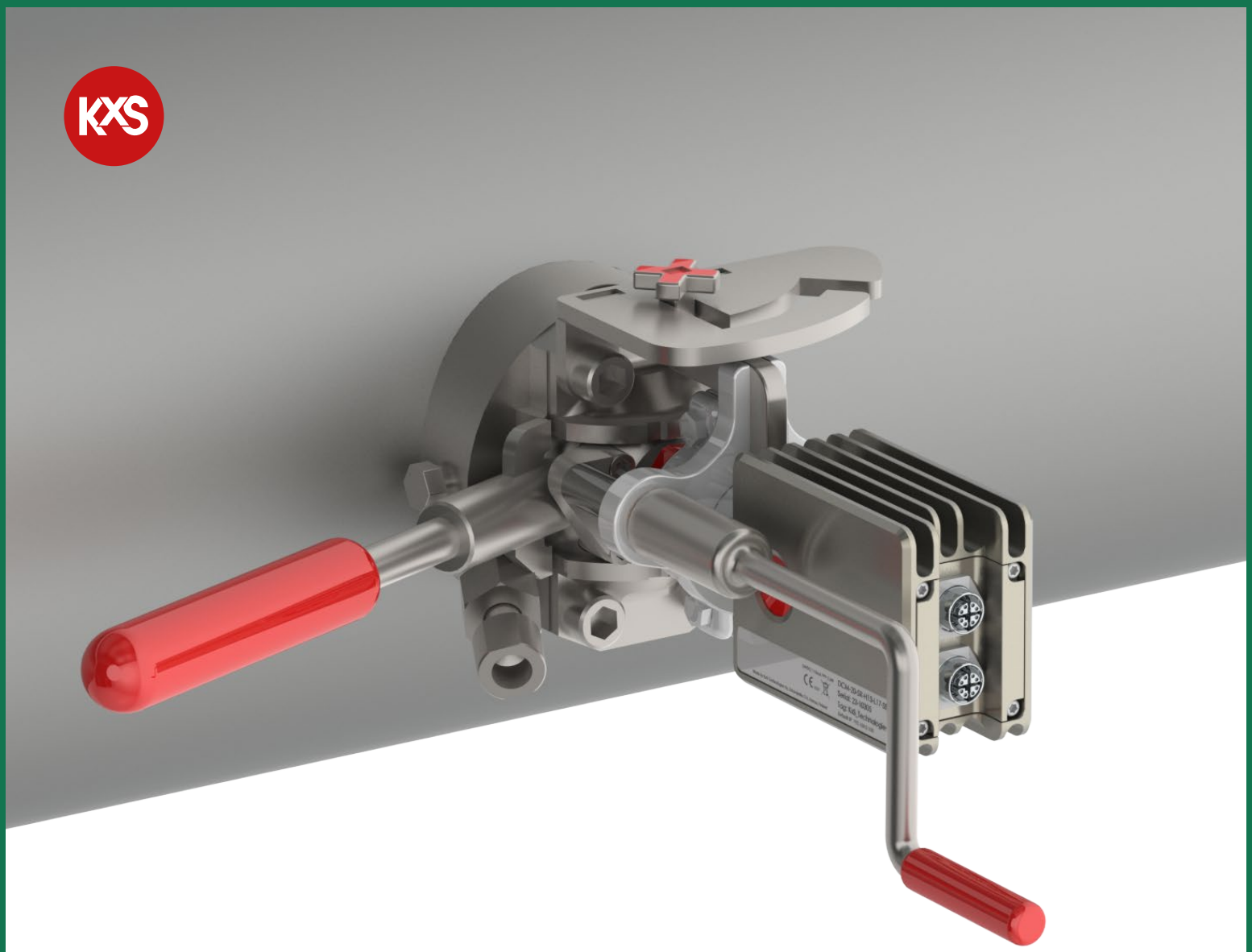


Patented 6th generation process refractometer – from true experts

KxS Retractable refractometer DCM-20 PASVE® for Kraft pulp mills

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Technology that is built on over 40 years of industry-leading experience

With KxS Technologies, customers rely on decades of proven expertise. The KxS Retractable Refractometer DCM-20 PASVE® is engineered on a strong foundation of pulp industry know-how and application experience, bringing this heritage into a new generation of robust and reliable process measurement.

The refractometer features the proprietary PASVE® isolation valve, an industry standard since the 1980s with over 75,000 units installed worldwide. The DCM-20 PASVE® design provides secure connection to the process, maximum operator safety and simple, risk-free sensor insertion and removal without process shutdown.

The most maintenance-free pulp industry refractometer

KxS DCM-20 PASVE® is engineered to last longer than any other pulp industry refractometer without maintenance. It detects true buildup on prism, eliminating excessive prism washes and prism erosion, extending the equipment lifespan.

Optical stability like no other

The KxS DCM-20 PASVE® is built with advanced CMOS-based optics and 6th generation optical image recognition, meaning the signal noise ratio is very good. This leads to more precise and reliable measurement even in the most challenging applications.

Universal sensor for all applications

No need for multiple models. All DCM-20 PASVE® sensors are interchangeable, covering the full R.I. range of 1.32…1.56 and all pulp mill dry solids content measurement applications up to 85 %.

- Weak liquor from pulp washers
- Black liquor to evaporators
- Black liquor to recovery boiler
- Green liquor TTA in causticizing
- Fiber line filtrates in Brown Stock Washing



Purpose-built systems for kraft pulp mill applications

KxS offers three specialized DCM-20 PASVE® system configurations, each engineered to meet the specific demands of applications with the highest level of optical reliability. The DCM-20 PASVE® system for black liquor in evaporators and recovery boilers is our most widely used configuration (see image below). Other system variants are for:

- **Green liquor**: designed to resist heavy scaling and maintain accurate readings using prism wash with hot condensate water
- **Brown stock washing filtrates**: optimized for suspensions with abrasive content and minimal wash needs

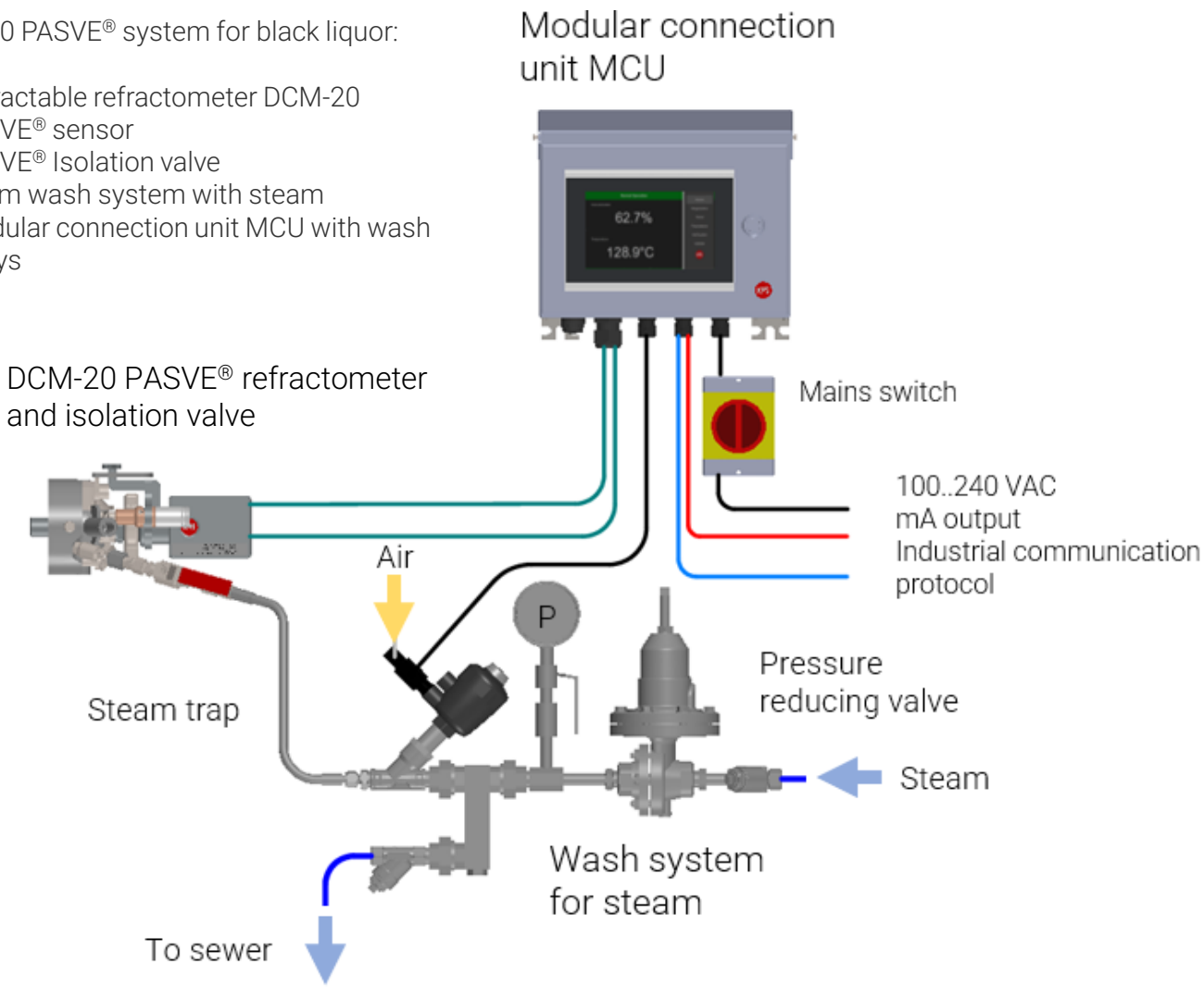
All pulp mill applications are covered with same interchangeable sensor, reducing complexity in spare unit management.

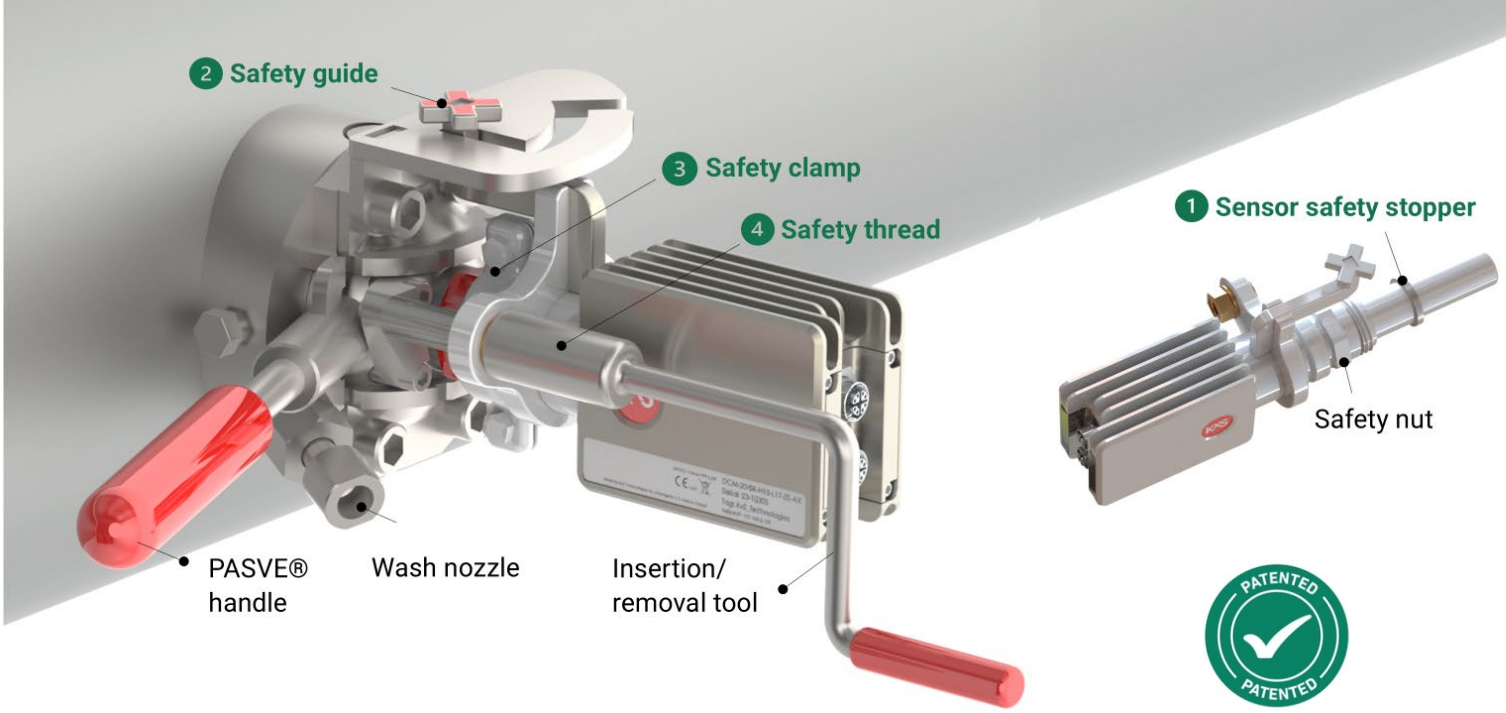
BLRBAC-compliant black liquor divert control system

KxS Black liquor divert control system BLD combines two or three DCM-20 PASVE® retractable refractometers with a dedicated Divert control unit (DCU) to provide continuous black liquor solids supervision, prism wash management and automatic divert protection. The system is designed according to BLRBAC recommended practices and supports SNRBC and FRBC three-refractometer configurations.

DCM-20 PASVE® system for black liquor:

- Retractable refractometer DCM-20 PASVE® sensor
- PASVE® Isolation valve
- Prism wash system with steam
- Modular connection unit MCU with wash relays





Patented KxS DCM-20 PASVE® safety design

KxS has designed the DCM-20 PASVE® system with patented (patent FI131493) safety features to protect both your process and your personnel. At the heart of the system is the PASVE® isolation valve, a field-proven solution trusted by the pulp industry with over 75,000 installations worldwide.

Four independent safety layers safeguard operator and prevent unintended sensor removal:

1. Sensor safety stopper
2. Safety guide
3. Safety clamp
4. Safety thread

⚠ All safety functions are dependent on following KxS-specific user safety instructions.

What makes DCM-20 PASVE® practically maintenance-free?

KxS DCM-20 PASVE® system is designed to operate longer and more reliably—with virtually no need for routine maintenance.

This is a result of expertise, smart engineering, and advanced optical performance tailored for the toughest pulp mill conditions.

- Durable, industry-proven construction withstands high temperatures, scaling, pressure fluctuations, and chemical exposure.
- Most modern CMOS-based optics is accurate, and stable without sensitivity to light scatter.
- Advanced 6th generation image detection identifies only real fouling, triggering wash cycles only when truly needed. This reduces unnecessary washing that can cause prism erosion.
- Nozzle made of SAF2507 super duplex stainless steel for superior wear resistance and fully embedded in the hot process zone, maintaining high temperature and preventing clogging.



Installation flexibility and operation safety

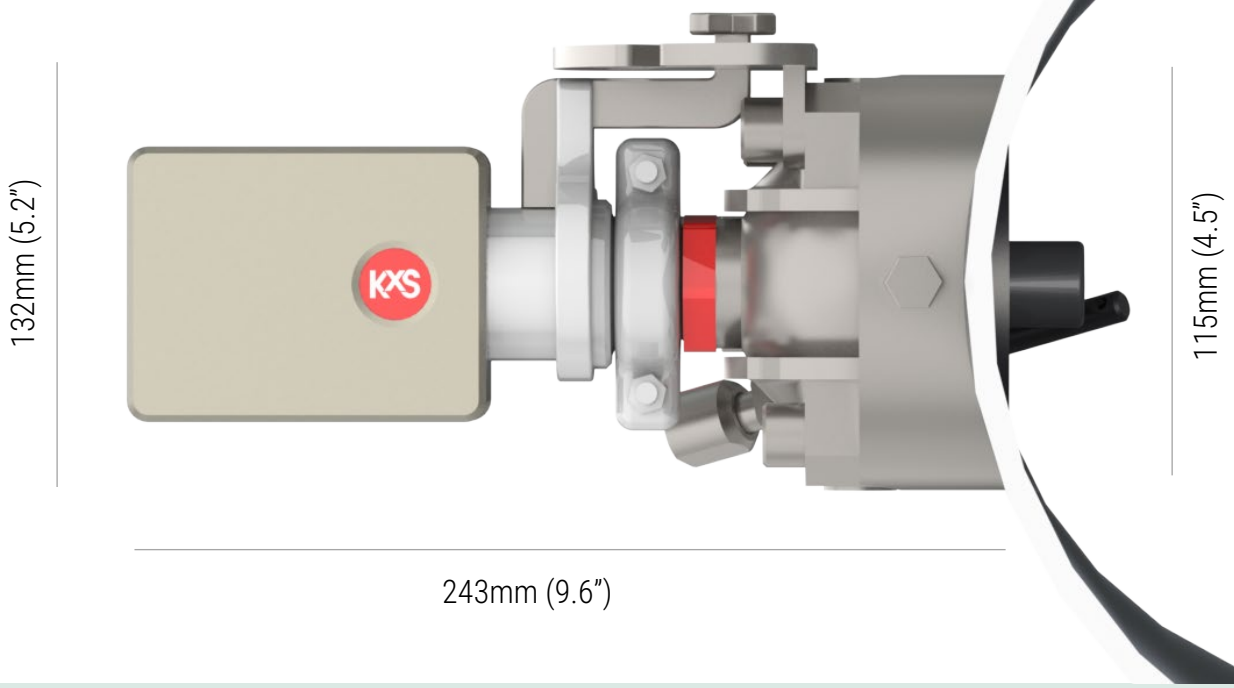
The KxS DCM-20 PASVE® is the smallest retractable process refractometer system — and it is in a league of its own.

The ultra-compact, lightweight design requires only 400 mm x 400 mm x 300 mm of free space around it for installation and safe insertion and removal. This makes it ideal for tight and challenging installation environments where space is limited.

Whether you are retrofitting an existing system or designing a new process line, the DCM-20 PASVE® offers unmatched installation ease and flexibility.

- Sensor 2.0 kg (4.4 lbs)
- PASVE® valve 5.0 kg (11 lbs)

For vertical pipelines of 3” and larger and horizontal pipelines of 2” and larger.



Reliability. Expertise. Personal service.

At KxS, we know that reliable process measurement goes beyond the refractometer itself. It requires a combination of expert guidance, precise installation, and tailored support to meet the unique challenges of each application.

Whether you are working with black liquor, green liquor, or brown stock washing filtrates, choosing the right components and installing them correctly is essential. That is why we offer dedicated expertise throughout the entire lifecycle of your DCM-20 PASVE® system—from configuration and installation to optimization and long-term support.

KxS Retractable refractometer DCM-20 PASVE® specifications

Refractive Index range:	Standard range, n_D=1.3200...1.5600 (0...90 % dry solids including concentrated acacia- and eucalyptus-based black liquor)
Output units:	Conc% / g/l / Refractive Index
Measurement precision:	± 0.05 %wt
Measurement accuracy:	± 0.0006 Refractive Index
Speed of response:	1 sec. undamped
Optics:	No mechanical adjustments and digital measurement with 4000-pixel CMOS camera 589 nm wavelength (sodium D-line), light emitting diode (LED) Built-in Pt-1000 temperature sensor (linearization according to IEC 751) Proprietary 6th generation image recognition algorithm for precise optical image and intelligent prism fouling detection
Temperature compensation:	Automatic, individual zero-point calibration
Calibration:	NIST traceable calibration, verification with standard R.I. liquids
Wetted parts:	SAF 2205/EN 1.4462 Duplex stainless steel sensor and PASVE® isolation valve SAF2507/EN 1.4410 Super duplex stainless steel wash nozzle Sapphire prism, PTFE gasket Sensor housing: AISI316/EN 1.4404 Stainless Steel
Process installation:	For vertical pipelines of 3” and larger and horizontal pipelines of 2” and larger
Process connection:	Union-L 1” sensor connection
Process pressure:	Max. 40 bar, 580 psi
Process temperature:	-40°C (-40°F)...180°C (356°F) continuous process temperature
Ambient temperature:	Sensor -15°C (-40°F)...65°C (149°F); Modular Connection Unit MCU -10 °C (14°F)...45°C (113 °F)
Sensor protection class:	IP67, Nema 4
Installation:	Indoor/Outdoor, unclassified area
Sensor weight:	2.0 kg (4.4 lbs)
PASVE® isolation valve weight:	5.0 kg (11 lbs)

Outputs and connections:

Digital M12 connector:	24VDC power supply Modbus TCP for user interface and PLC connection Standard cable length 10 m (33 ft), max 70 m (230 ft)
Analog M12 connector:	24VDC power supply 2 pcs independent 4-20 mA user configurable outputs Standard cable length 10 m (33 ft), max, 200 m (660 ft). Max. load 1000 Ohm
Sensor power consumption:	Max. 2.5W
Options:	Modular Connection Unit (MCU) with enclosure and relays for prism wash Independent 7” Web HMI, full color touch screen interface Prism wash with steam or hot condensate water Direct integration with Rockwell’s PLC for Ethernet IP communications

KxS Technologies Oy
Polaris Business Park
Capella Building
Vänrikinkuja 3
02600 Espoo, FINLAND
kxstechnologies.com
info@kxstechnologies.com

KxS Technologies USA
1400 Roaring Fork
78641 Leander TX
USA
kxstechnologies.com
info@kxstechnologies.com

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