

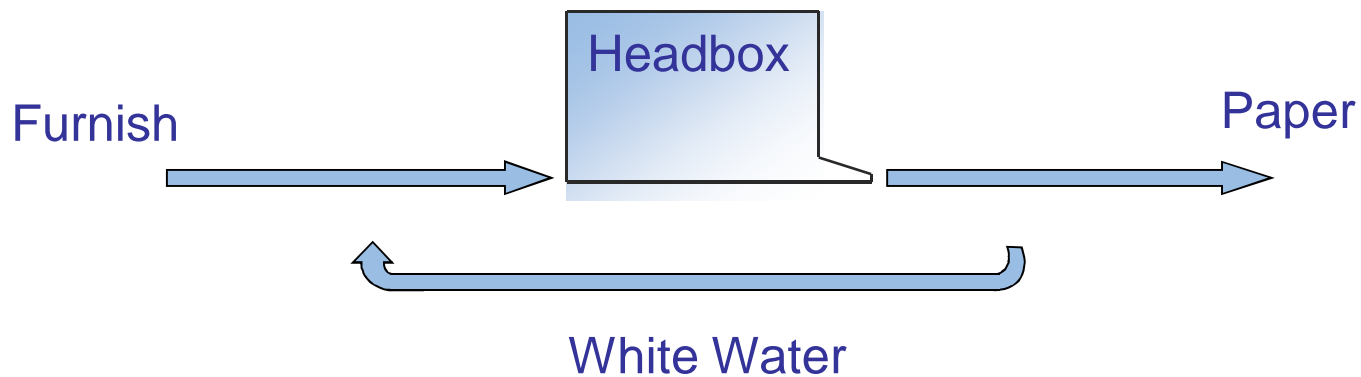
Retention Measurement Control

- n **KRT Total Consistency Retention Measurement**



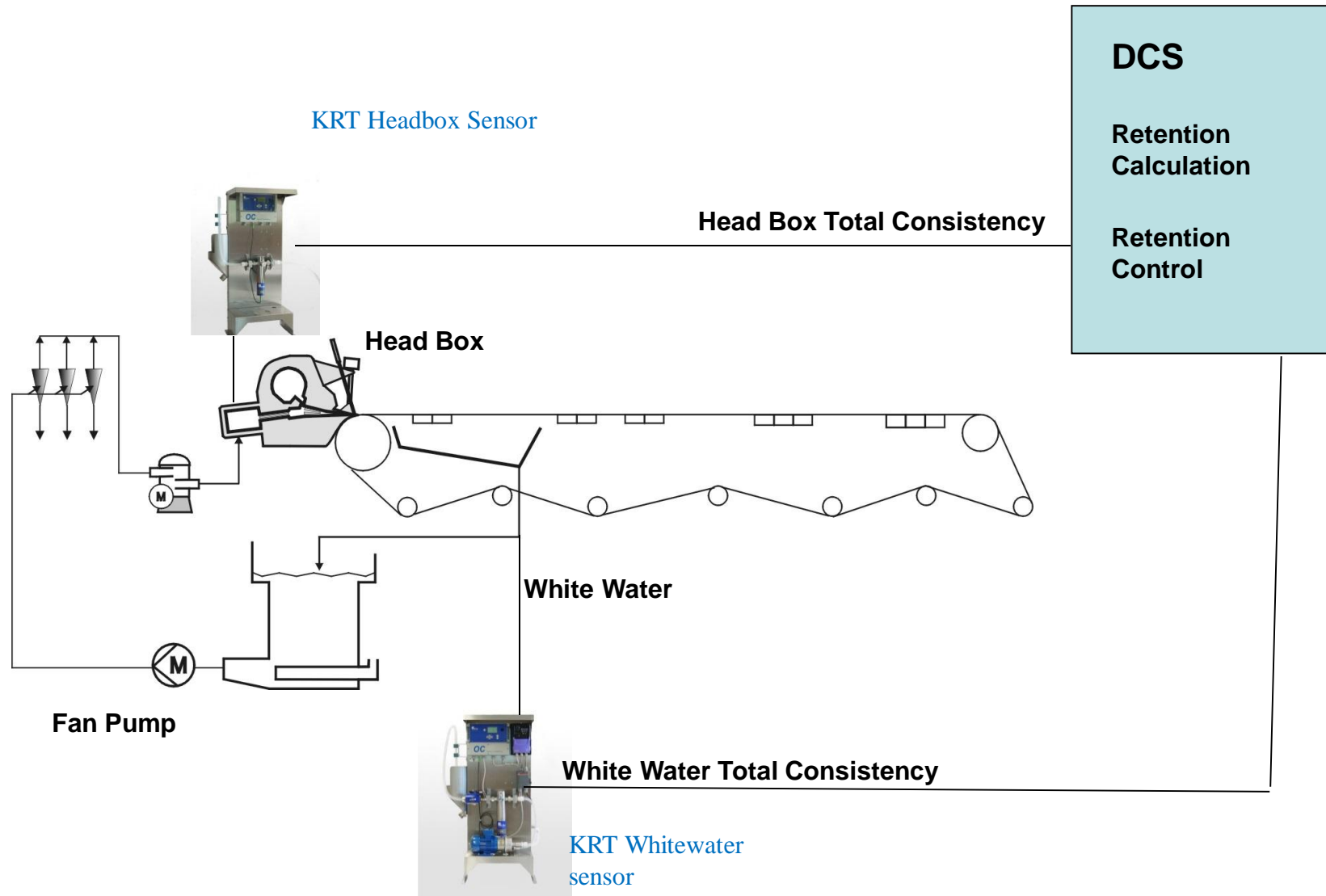
Total Retention calculation in DCS

Retention is Yield of PM wire section



$$\text{Total Retention} = ((C_{s_{HB}} - C_{s_{WW}}) / C_{s_{HB}}) * 100$$

Total Retention measurement and control system



Variable retention effects

- § Variations in paper MD properties
- § Basis Weight
- § Moisture
- § Ash-content

Retention levels

- § Total Retention 50 – 75 %
 - § Low basis weight, low retention
 - § High basis weight (Board), high retention 90 %
- § Filler Retention 20 – 50 %
- § Fiber Retention 90-100 %



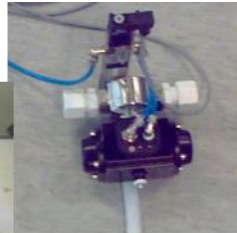
Retention Measurement

- n Information provided from HB and WW
 - § Total Cs%,
 - § Retention %
- n WW total consistency measurement
 - § Control and stabilization of WW consistency
 - § Quality variation reduction
 - § Paper grade changes faster
 - § Chemical optimization
 - § Less paper breaks
- n HB total consistency measurement
 - § Control of Headbox operations
 - § Slice control
 - § Paper grade changes faster
 - § Total retention control
- n Control implemented in DCS

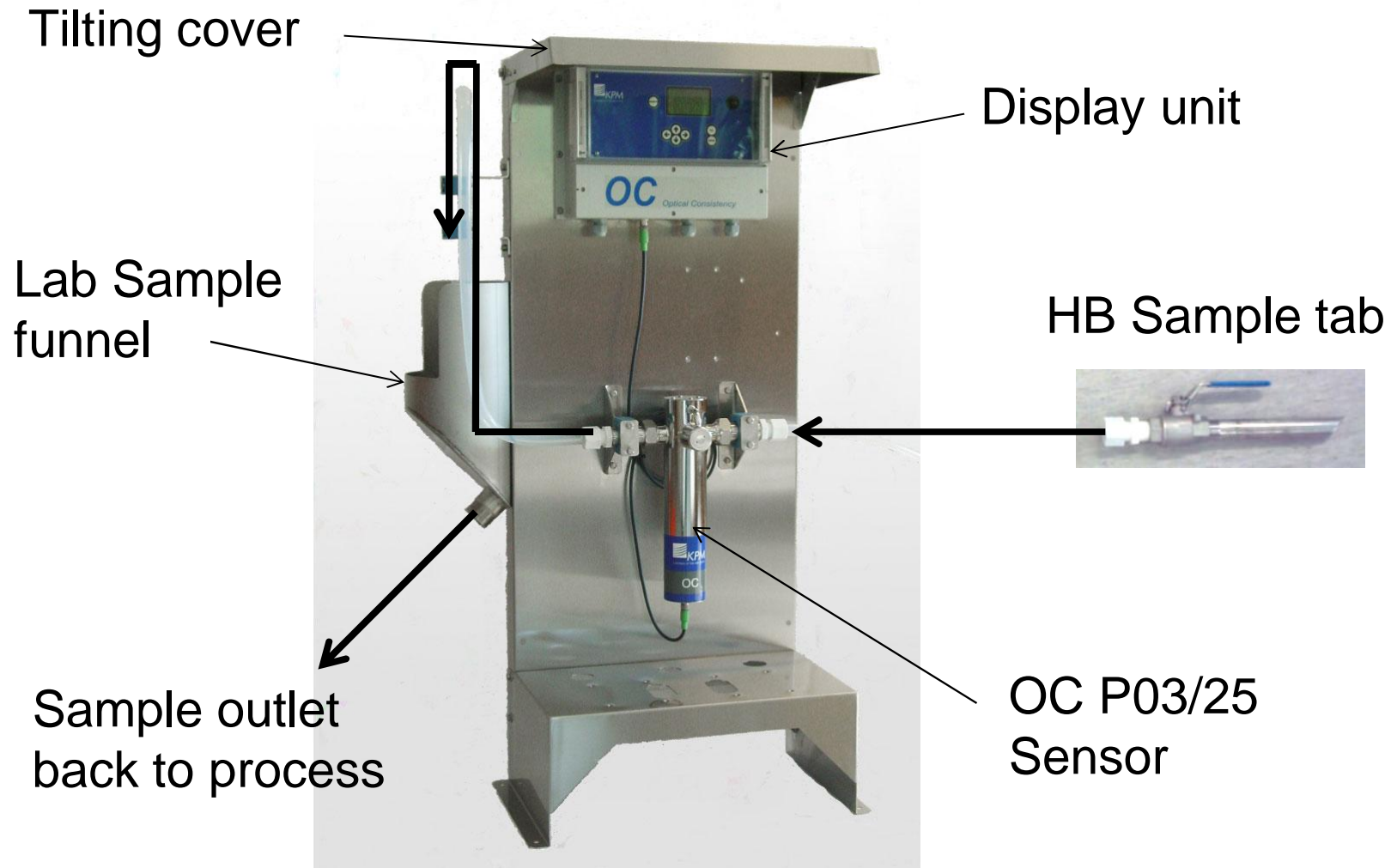


KRT Retention Measurement parts

- n Measurement Range: Total consistency 0-1.5 %
- n Headbox and Whitewater sensors
- n Automatic back-flushing of the Whitewater Sensor
- n Optional accessories:
 - § Sample tabs and lines
 - § Deaeration tank for WW
 - § Backflushing for WW
 - § Sample Pump for WW
 - § Lab sample funnel



KRT Headbox measurement unit

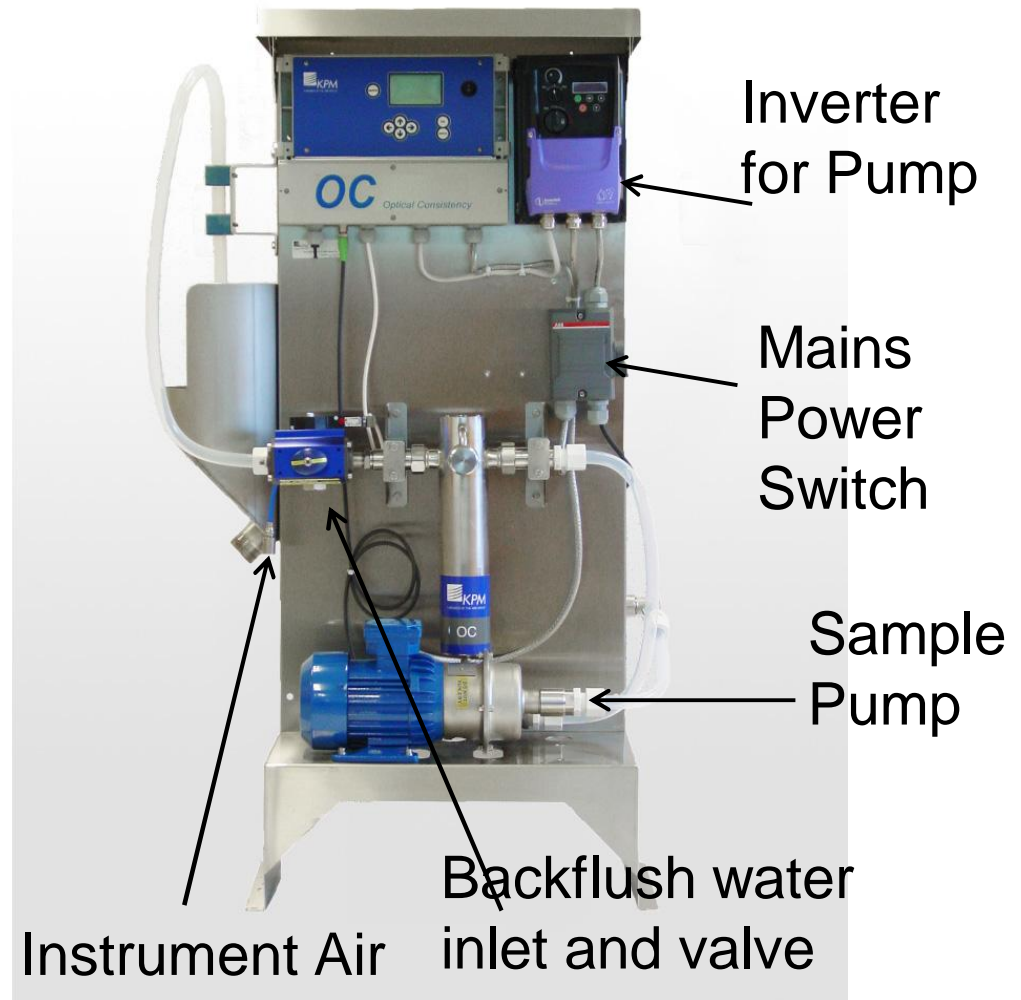


KRT Whitewater sensor connections and parts

WW Sample tab



Deaeration tank



Inverter for Pump

Mains Power Switch

Sample Pump

Backflush water inlet and valve

Instrument Air

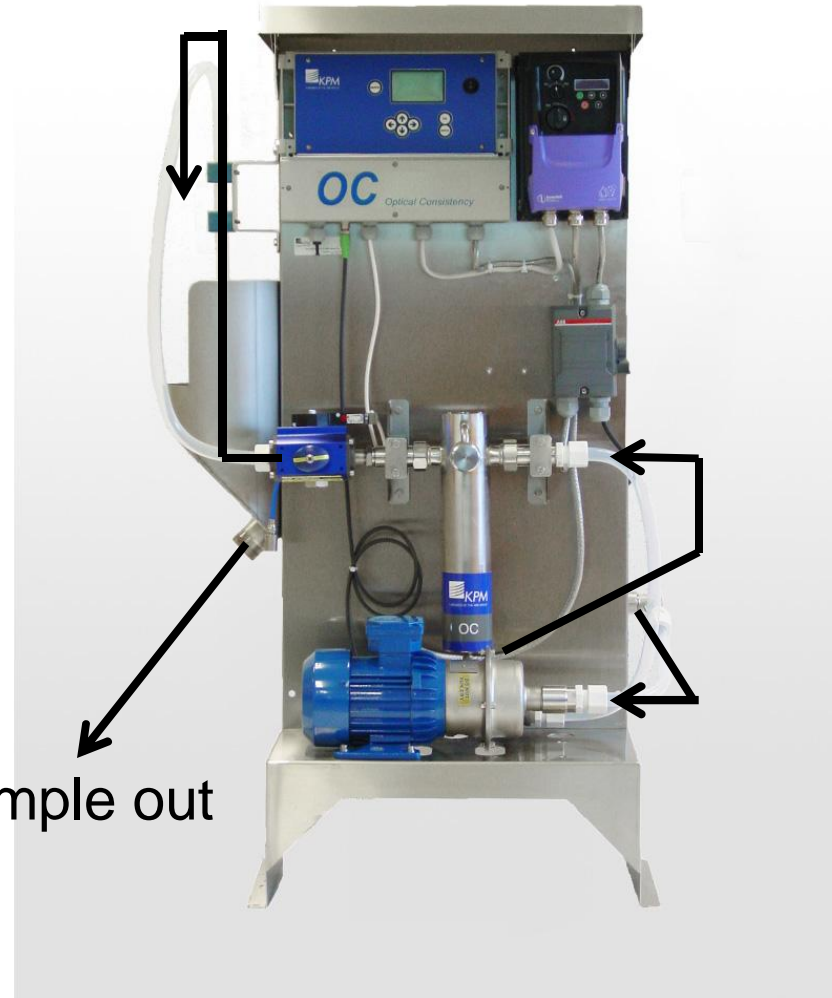


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KRT Backflushing flows

[Click for video](#)

WW Sample
tab



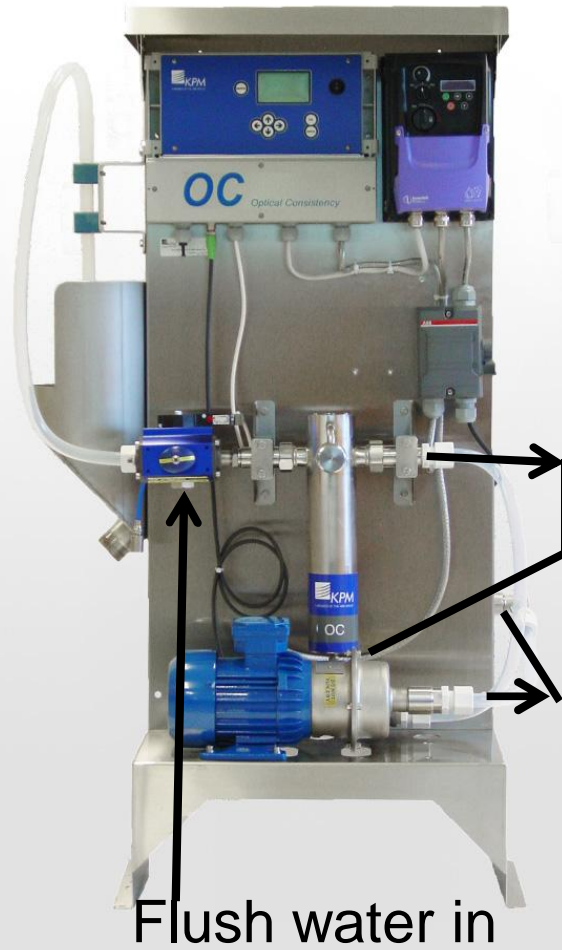
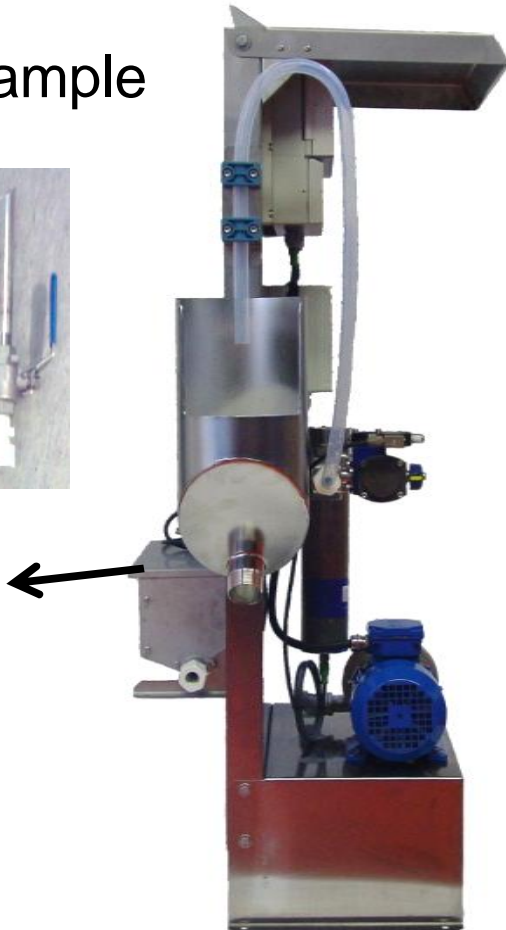
Sample out

KRT Backflushing flows

WW Sample
tab

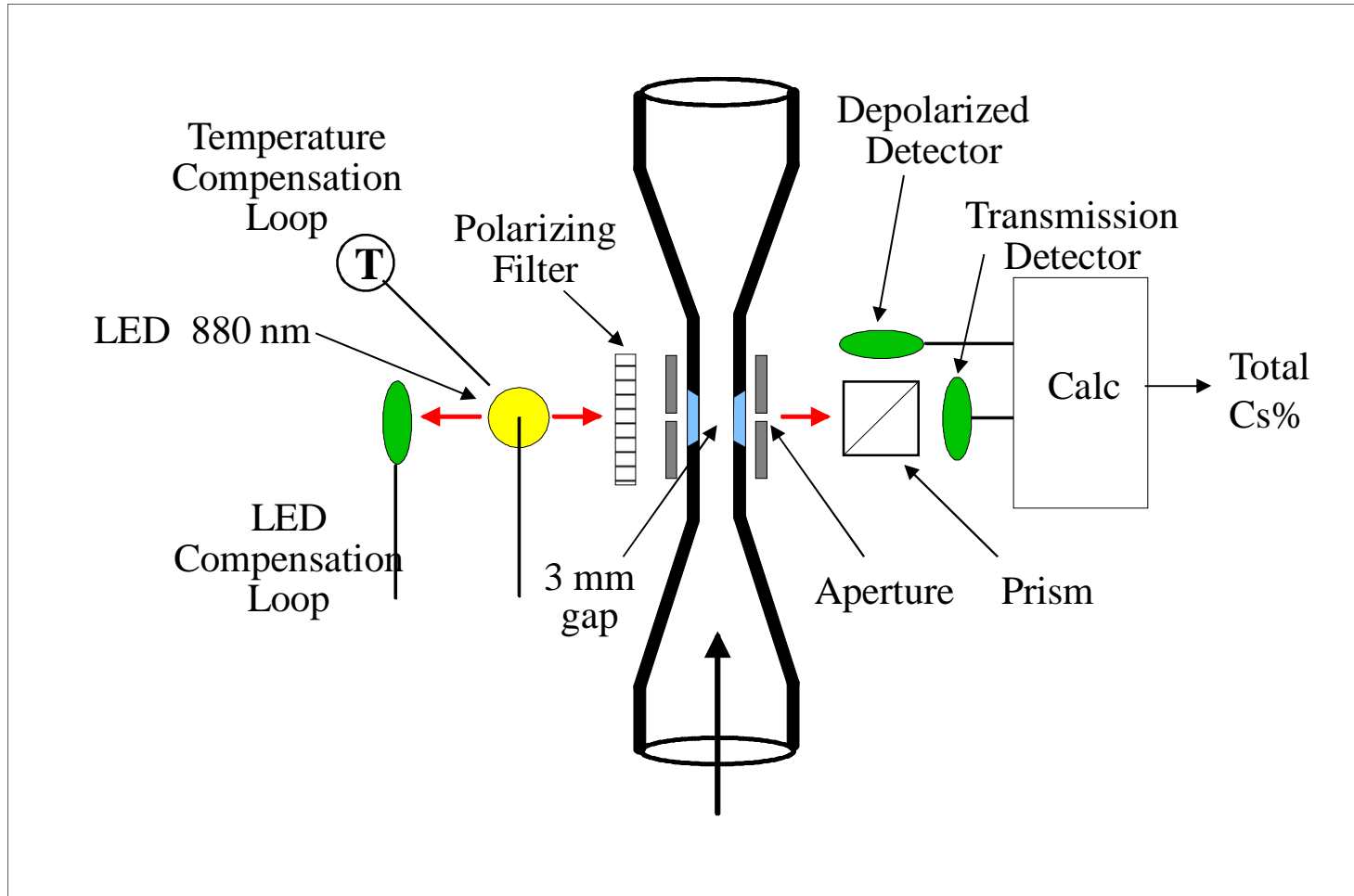


Flush
out

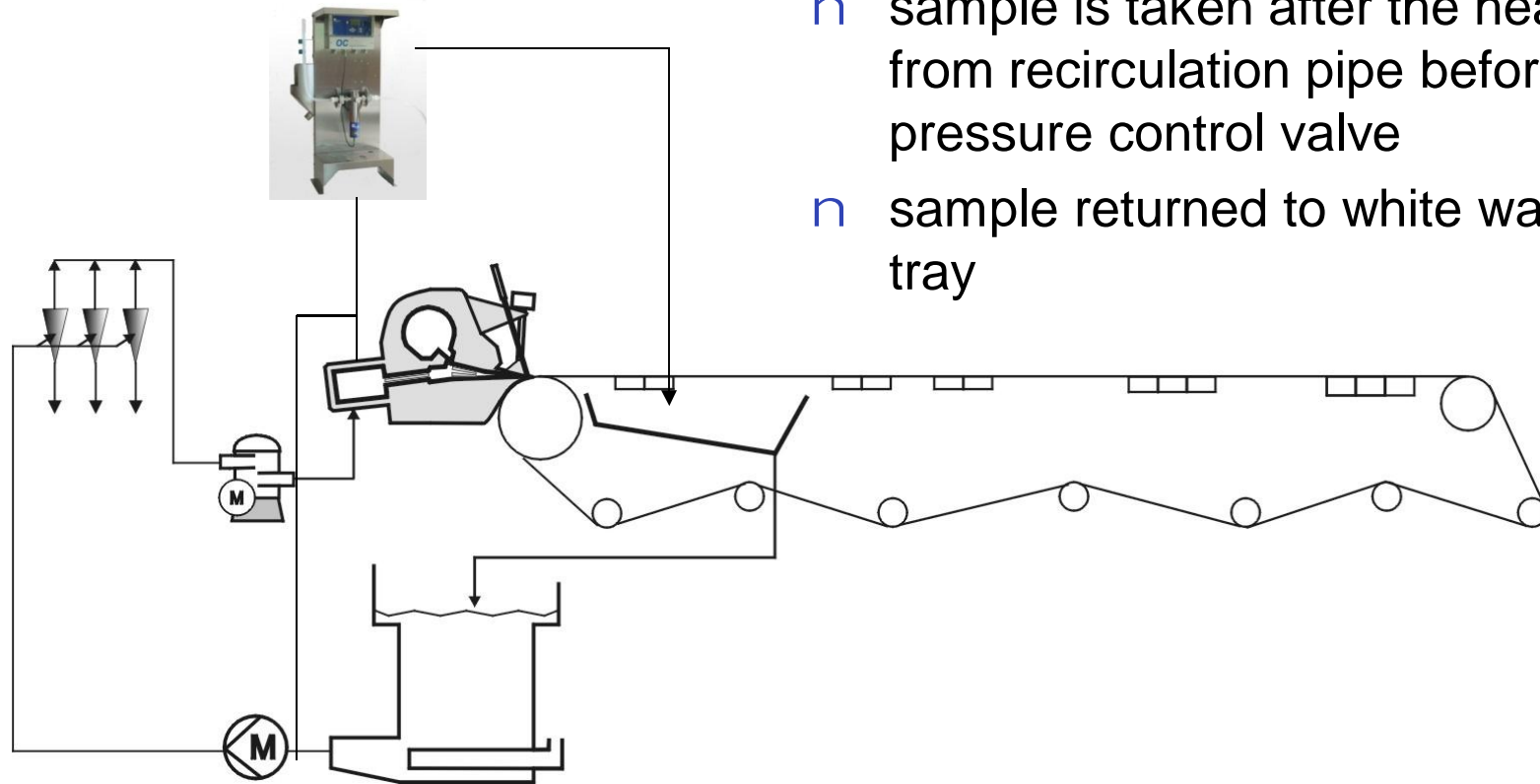


Flush water in

KRT Measurement principle

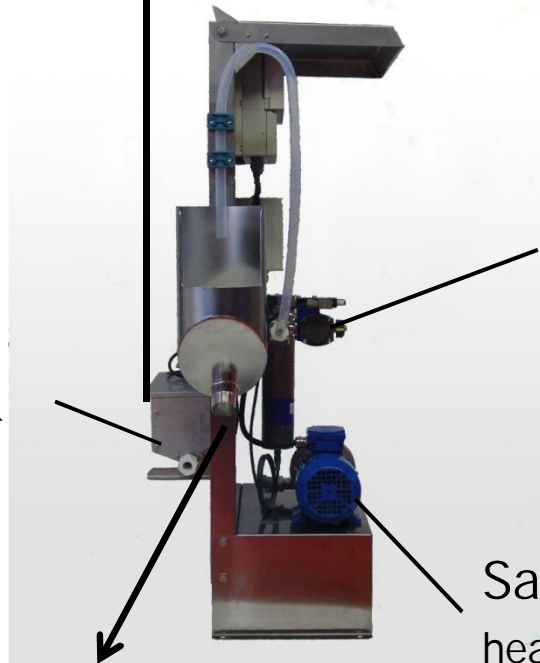
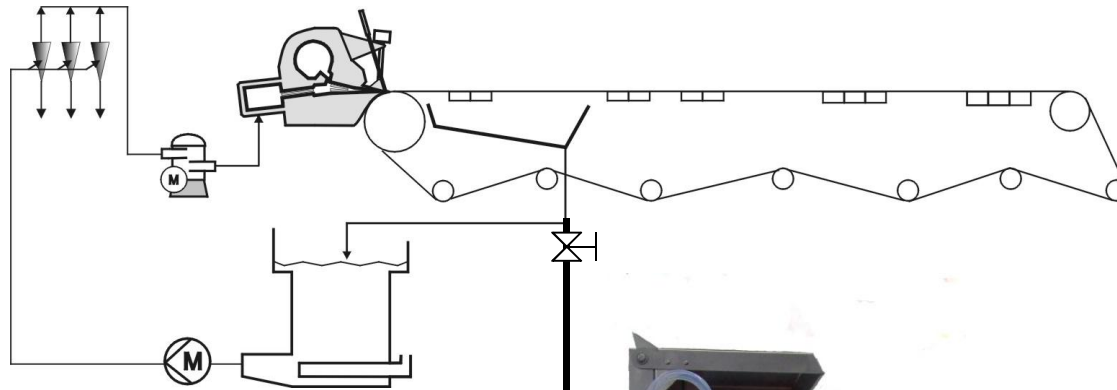


KRT Head box consistency measurement



- n sample is taken after the headbox from recirculation pipe before the pressure control valve
- n sample returned to white water tray

KRT Whitewater consistency measurement



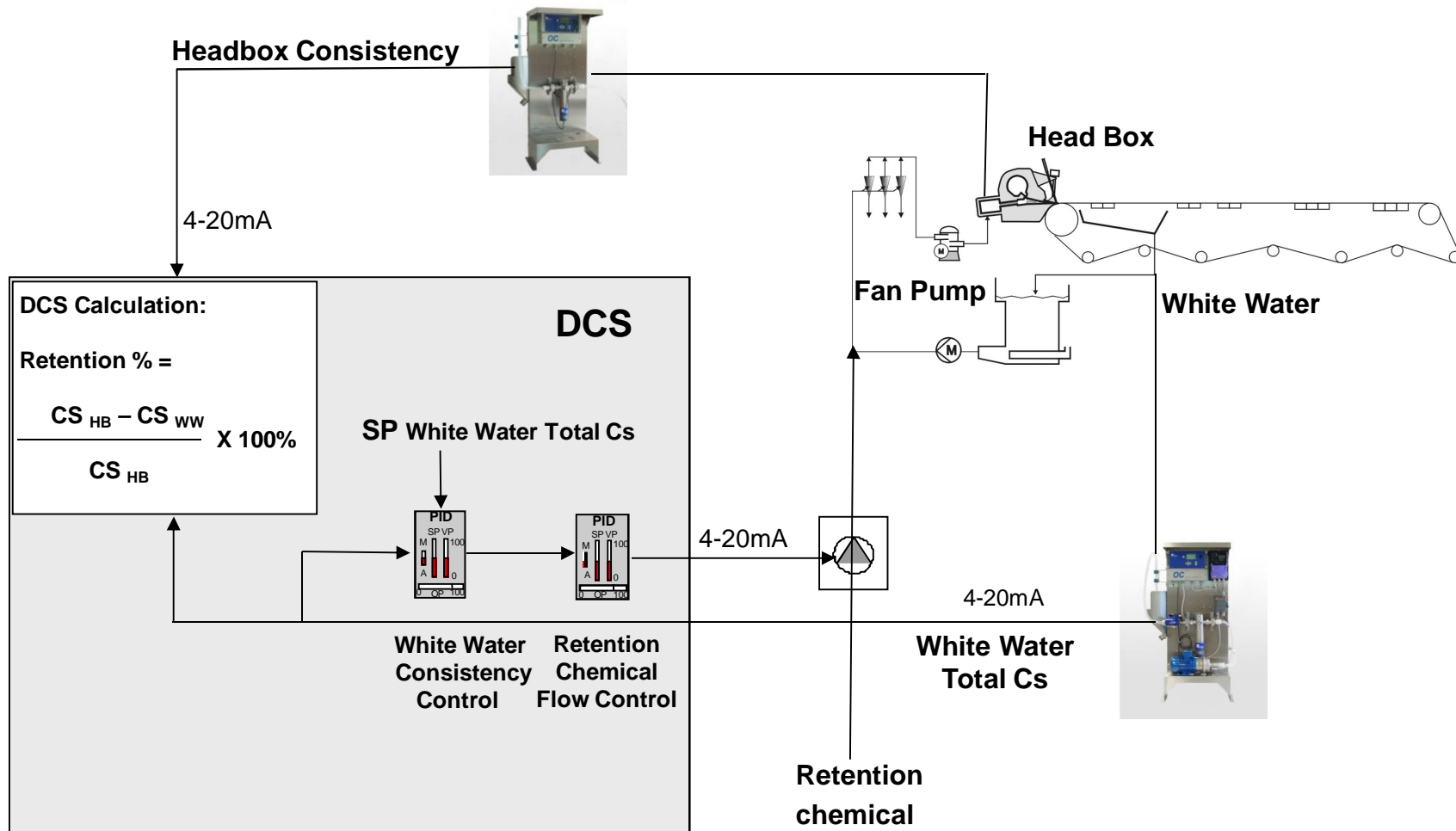
Flush valve
activates flush
automatically

De-aeration tank

Sample Pump (not needed if
head of 4 m (13 ft) available)

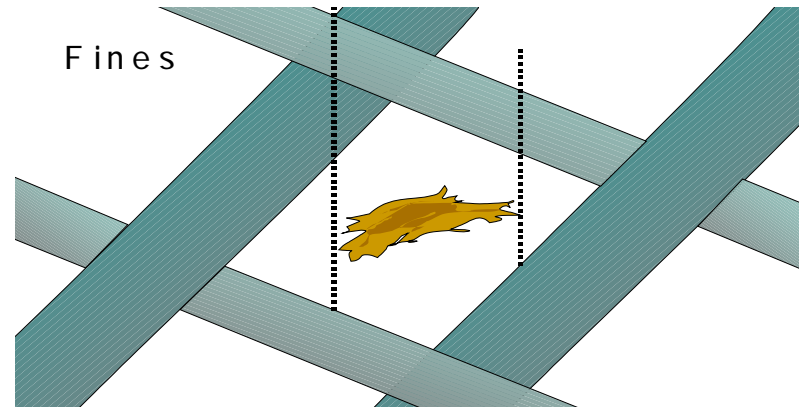
Sample out

Total Retention system and control



Retention Aids

Retention aids are those additives that promote the holding of all materials in the wet web and prevent them from getting to the discharge streams.



- They generally bridge small particles to larger ones that are then more easily retained.
- These additives can be of either positive or negative in charge with molecular weights and structures that vary widely.
- Because of their tendency to bring particles together and create voids in the wet web, they usually increase drainage. The opposite may occur if they bond water more tightly.
- Because the Fiber-Fines-Polymer structures are shear sensitive, they are most often added close to the head box in the thin stock.

Kasy King

Papermaking Process Consulting

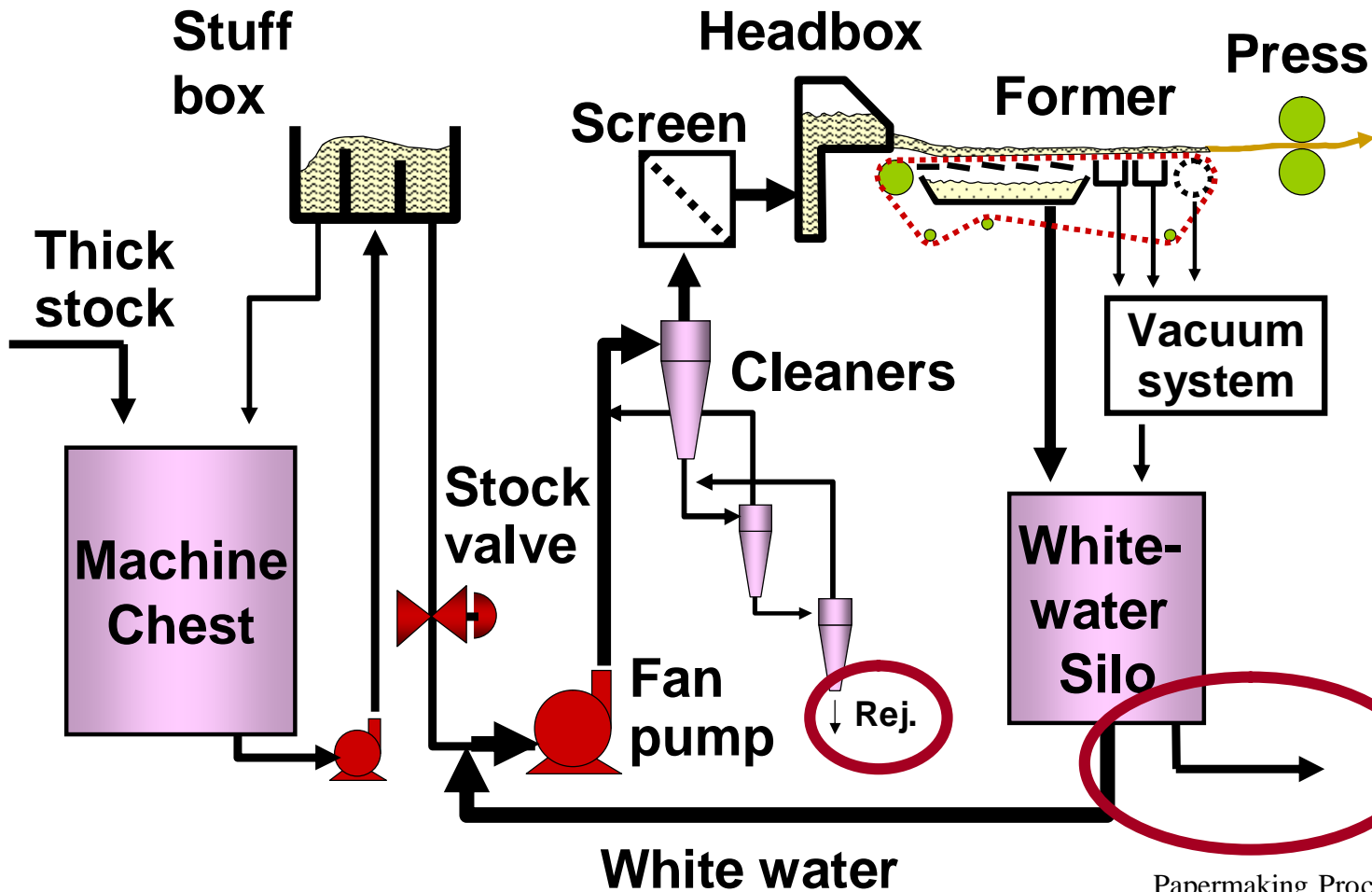
Wet End Chemistry Basics, UW Stevens Point Seminar, 11/11/08

Retention Aids

There are three types: Coagulant, Flocculent, Micro particulate:

- **Coagulants are Lower Molecular Weight with High Charge**
- **Flocculants are Higher Molecular Weight with Lower Charge**
- **Micro Particulates Utilize a Very Small Negatively Charged Colloidal Particle With a Flocculent.**

Additive Purpose and Points of Addition



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Wet End Chemistry Basics, UW Stevens Point Seminar, 11/11/08



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KRT Total Retention System

- n Cost savings by more stable paper quality and improved process control
- n Easy calibration of KRT retention sensors based on laboratory analysis
- n Water-proof sensors (IP65, Nema4X)
- n Complete system with all the installation material available
- n Retention calculation and control are configured in DCS, no extra hardware needed

Specifications

n	Sensor type	KRT retention sensor with OC P03/25 transmitter
n	Measurement range	Total Consistency 0 – 1.5 %, minimum 0.01 %, 10 ppm
n	Process temperature	Process temperature 10 - 60 °C (50 - 140 °F)
n	Process pressure	Max 10 bar (140 psi)
n	Sample flow rate	Minimum 10 l/min (2.5 gpm)
n	Process connection	Sample tab 3/4"
n	Output signal	4 - 20 mA
n	Binary inputs	5 binary inputs 24 VDC, process stop, inverter alarm, sampling, 2 for remote calibration selection
n	Binary outputs	3 relay outputs for alarm, pump and flushing control, Max 110VAC or 24VDC, 2 A
n	Ambient temperature	0 - 50°C (32 - 122°F)

Specifications

- n Flushing water Mechanically or Chemically purified, temperature 25 - 60 °C (77 - 129°F), pressure 2 – 6 bar (30 – 90 psi). Warm water recommended, temperature closely same as the process temperature
- n Instrument air Pressure 4 – 8 bar (60 – 120 psi)
- n Interconnect cable 2 m interconnect cable from Sensor to Display Unit
- n Weight Headbox sensor 26 kg, Whitewater sensor 35 kg
- n Conformance 73/23/EEC, 89/336/EEC, EN 61000-6-4:2001, EN 61000-6-2:2001, EN 61010-1:2001
- n Enclosure class IP65, Nema 4X
- n Power supply 99-127 VAC 48-62Hz; or 180-264VAC, 10A fuse