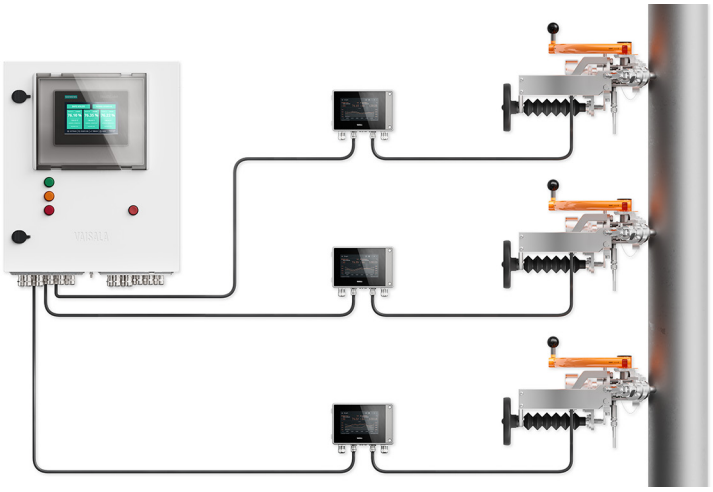
VAISALA

Polaris™ DD53 Digital Divert Control System



Features

- Completely digital system from refractometers to transmitters
- BLRBAC compliance for safe firing of black liquor
- Future proof with additional support for 3-sensor logic
- Compatible with PR53+Indigo520 and PR-23+DTR
- Industry standard communication interfaces for direct connection to control systems and Burning Management System (BMS)
- Digital signal transmission and microprocessor implemented diagnostics ensure error free operation
- Safety Integrity Level (SIL) rated critical components
- Eliminates false alarms as the system reacts only when the level of solids truly falls below the safe limit
- Easy to operate and clear multi-diagnostic messages
- Expandable with a remote Human Machine Interface (HMI) for direct control room access

The Vaisala Polaris DD53 Digital Divert Control System is designed to verify black liquor solids concentration before firing, helping pulp mills safeguard recovery boiler operation. It conforms to the recommended practices from Black Liquor Recovery Boiler Advisory Committee (BLRBAC), The Finnish Recovery Boiler Committee (FRBC), and The Swedish-Norwegian Recovery Boiler Committee (SNRBC) to support safe and consistent operation.

System overview

The DD53 system includes two or three Vaisala Polaris PR53SD Safe-Drive process refractometers in the main black liquor line with an Indigo520 transmitter. The system also supports PR-23 refractometers and indicating transmitter DTR. Modbus TCP connectivity allows for collection of detailed diagnostics data in addition to measurement values.

Installation

Vaisala Polaris PR53SD Safe-Drive process refractometers are installed with a Safe-Drive SDI5 isolation valve that allows for safe and easy insertion and retraction of the refractometers under full operating pressure without having to valve off the liquor piping or having to shut down the process. The Safe-Drive SDI5 isolation valve contains a steam wash system for automatic prism cleaning. The system also contains a Safe-Drive retractor tool for safe refractometer insertion and retraction.

Error free safe operation

Each refractometer is a completely independent measurement system with advanced integrated diagnostics functions. The DD53 system is completely microprocessor controlled with SIL rated processor unit and mission critical components. The digital signal transmission and microprocessor implemented diagnostics ensure error free operation.

DD53 technical data

Compatible devices

Device or series	Models
Process refractometers	PR53SD, PR-23-SD
Indicating transmitters	Indigo520, DTR

Operating environment

Property	Value
Operating temperature	+10 ... +40 °C (+50 ... +104 °F)
Maximum operating altitude	2000 m (approx. 6500 ft)
Operating humidity	0–90 %RH
Operating environment	Indoor use
Use in wet location	No
Pollution degree	2
IP rating	IP65

Inputs and outputs

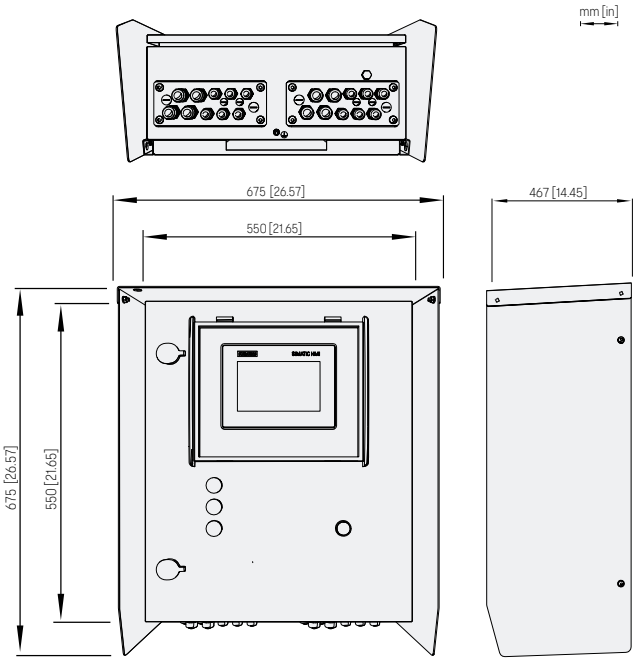
Property	Value
Operating voltage	86–240 V AC, 50 W, 50–60 Hz
Nominal input voltage range	100 V AC–240 V AC
Input voltage range	100 V AC–240 V AC -15 % ... +10 %
Overvoltage category	II
Circuit breaker rating	10 A / 250 V
Input relays 1-4	24 V DC / 7 mA, NO
Output relays 11-21	230 V AC / 3 A, NO
Supported protocol	Modbus TCP/IP

Compliance

Property	Description
Compliance marks	CE
Listing marks	US, Canada (pending)

Mechanical specifications

Property	Value
Enclosure material	Stainless steel AISI316
Enclosure dimensions	600 × 500 × 225 mm (23.6 × 19.7 × 8.9 in) Enclosure total depth with mounting bracket: 265 mm (10.4 in)
Display dimensions	214 × 158 mm (8.4 × 6.2 in)
Weight	30 kg (66 lbs)



DD53 dimensions with environmental cover

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