Fabric / Air temperature measurement and monitoring at heat treatment process

Temperature sensor TDS -R
Temperature sensor TDS -A
PLEVA Process Box PPB

up to 8 set of temperature sensors TDS at one process box
FEATUERS OF PRODUCT

- Non-contact measurement of fabric / air temperature in hot environment
- Fast response time
- Not sensitive to soiling
- No calibration
- No color effect
- No condensation

BENEFIT FOR CUSTOMER

- Continuous process monitoring
- Reliable calculation of fixation time
- High reproducibility of the fabric

Application

Monitoring and control of the drying, heat setting and heat treatment process increase productivity, saves energy and guarantees a quality finish. Precise measurement and reliable parameters are relevant preconditions for constant quality in textile production.

In modern finishing processes of textiles more and more special chemicals are applied. These modern processes requires a controlled and reproducible process guidance. The use of fabric temperature sensors TDS in the dryer is absolutely essential.

Sensors

The temperature sensors TDS are used for non contact measurement of the surface temperature of materials. The special design of the sensor allows it to be used inside a heat treatment machine (e.g. dryer / stenter / oven) up to temperatures of 400 °C.

Several TDS sensors are mounted in a heat treatment machine, distributed over the length and width, depending on the particular measurement task. The sensors should be fitted above the material web and approx. 60 mm away from it.

TDS sensor types

TDS ST measuring range 0..250 °C
- Type TDS ST-A (connection axial)
- Type TDS ST-R (connection radial)

TDS HT measuring range 0..400 °C
- Type TDS HT-A (connection axial)
- Type TDS HT-R (connection radial)

The measurement area then has a diameter of 300 mm. A flexible metal conduit is flanged onto the sensor. It protects the wiring electromechanically.

TDS sensor measuring area

TDS sensor type -A (axial)

Sensor type TDS -R (radial)
**PLEVA Process Box PPB**

The new PLEVA Process box is designed to connect multiple PLEVA sensors to one micro processor box fitted outside of the heat treatment machine.

- up to 8 fabric/air temperature sensors TDS
- optional 1 air humidity sensor FSX
- optional 1 residual moisture sensor RR

The new process box type PPB is equipped with the latest state of processor technology and improved EMC protection. The modular electronics is easily expandable for additional sensors. The box is with compatible mounting dimension to previous panel.

**Mode of operation**

In the example depicted of a tentering frame having 9 zones, the temperature patterns of the products heated are being subjected to different technological processes.

The tentering frame is equipped with TDS sensors in each field from no. 2 to 9. In the diagram below, the air temperature is setted to 175 °C. The required fixing temperature is 170 °C.

**Fixing of dry fabric**

The product quickly heats up and attains its fixing temperature in the 3rd processing zone. The fixing process begins now.

**Drying and fixing of wet material**

The product is initially heated up to the wet bulb temperature. There is a state of equilibrium for the product between the energy which is absorbed by the dryer and the energy required for evaporating away the moisture content in the fabric. After the level of moisture has fallen to residual moisture values, the temperature of the product then continues to rise and reaches the required fixing temperature at the 6th processing zone.

**Drying**

The product is heated up to the wet bulb temperature. The speed of the dryer must be controlled, in order to ensure that the product only continues to heat up on reaching the end of the dryer.
Fabric / Air temperature sensors

Type TDS -A • TDS -R

PLEVA Process Box

Type PPB

Accessories

Type GR95

Type MB03

Technical Data

**Sensor TDS**

- Ambient temperature: Type TDS ST-A • TDS ST-R
- Measuring range: 0.250°C
- Accuracy measuring range: +/- 1%
- Measuring area: 140 mm at 20 mm distance
- Cable length (standard): 200 mm at 60 mm distance
- Cable length (optional): 5 m / 7 m / 10 m
- Weight TDS sensor: 0.5 kg without flexible tube
- Weight flexible tube: 0.3 kg per m flexible tube

**PLEVA Process Box PPB**

- Sensors maximal: 8x TDS, 1x FSX, 1x RR
- Ambient temperature: max. 50 °C
- Power supply: 24V DC (+/- 10%)
- Power consumption: max. 45 VA
- Current: max. 1.6 Amps
- Communication: RS485 serial
- Protocols: MODBUS, PLEVA, MININET
- Analogue outputs: 8 signals 0/4 .. 20mA (with board MP1) (isolated)
- Weight approx.: 10 kg

**GR95**

- Grommet through the dryer wall
- for flexible metal conduit of sensor TDS
- Type: GR95
- Material: steel
- Weight: 0.54 kg

**Bracket type 3**

- Bracket of sensor TDS
- for mounting in the dryer
- Type: MB03
- Material: steel
- Weight: 0.37 kg

**Types of PLEVA Process Box**

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<thead>
<tr>
<th>PLEVA Process Box</th>
<th>TDS</th>
<th>FSX</th>
<th>RR</th>
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<tbody>
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<td>OPTION OUTPUTS:</td>
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<td>x x x 1</td>
<td>= Analogue outputs signals 0/4..20mA for each sensor isolated + Communication Bus RS485</td>
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<td>= Communication Bus RS485 (no analog outputs)</td>
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Available machines, measuring and control systems for different applications

- **StraightLiner** for high-tech automatic straightening
- **StructureDetector** for distortion analysis, pick/course density and width measurement
- **Add’nDry** for coating, drying and heat-treatment processes with multiple sensors
- **Dens’nDry** for drying and fixation processes and pick/course density
- **DrumDryControl** for cylinder dryers
- **SizeControl** for controlled size pick-up
- **PadderControl** for continuous dyeing and cold pad batch dyeing
- **Sensors** for fabric temperature, exhaust humidity, oxygen, application and residual moisture

Specifications are subject to alteration without notice.