KWS200 Ultrasonic Sludge Density Meter

Sophisticated measurement of sludge density with new calculation principles and algorithms
KWS200 Ultrasonic Sludge Density Meter

KWS200 is an ultrasonic instrument that measures the density of suspended solid in liquid. It comprises of sensors, a controller, and a junction box. KWS200 with PCM (Process Condition Monitoring) algorithm measures not only the size of received signal, which is often measured by conventional ultrasonic density meters but also observes changes in sound velocity and temperatures in the process. As it monitors operational status and water status in pipe and then decides the validity of each measurement, it contributes to increasing stability and reliability of the measurement.

**EEAM**  
(Envelope Energy Average Method)  
Conventional ultrasonic attenuation density meter just determines density with amplitude of received signals. Unlike this, KWS200 is able to measure changes of concentration in a more sophisticated manner by adopting the patented EEAM (envelope energy averaging method), which measures not only the amplitude of received signals but also observes the shape of signal. It takes all energy as envelope and then converts it into density.

**PCM**  
(Process Condition Monitoring)  
PCM algorithm consists of SOS filter that measures sound velocity of measuring fluid (S.S. mixed water); temp filter that measures temperature; and signal filter that monitors quality of received signals. Operational status (process run /stop, pipe full /empty) is determined by the combination of SOS filter and Temp filter. Signal filter helps to decide the valid S.S. distribution. Since the PCM algorithm assimilates many measurements identifying changes of process condition (water status in pipe, and S.S. distribution pattern), its intelligence is designed to measure only valid S.S. concentration. Consequently, the performance is much more reliable and accurate, compare to conventional measurement.

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### Product Features
- Continuous measurement
- Process monitoring possible (run, stop, full, empty)
- 10,000 points Data Logging & Trend Mode
- EEAM (Envelope Energy Average Method)
- Various types of sensors
- In-situ measurement and calibration

### Application Industry
- Water, wastewater treatment
- Pulp and paper
- Food and beverage
- Chemical
- Mining

### Benefits
- Automates sludge discharge.
- Reduces the amount of polymers used in the dewatering process.
### Controller

<table>
<thead>
<tr>
<th>Model</th>
<th>KWS200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring Principle</td>
<td>Ultrasonic Attenuation and EEAM</td>
</tr>
<tr>
<td>Range</td>
<td>Standard: 2,000 ~ 200,000mg/ℓ (0.2—20%) Option: 2,000 ~ 400,000mg/ℓ (0.2—40%)</td>
</tr>
<tr>
<td>Measuring Mode</td>
<td>Process Mode - Real-time Mode</td>
</tr>
<tr>
<td>Resolution</td>
<td>100mg/ℓ (0.01%)</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±1% or ±2000mg/ℓ (whichever is greater)</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±1% of reading</td>
</tr>
<tr>
<td>Data Storage</td>
<td>10,000 points</td>
</tr>
<tr>
<td>Display</td>
<td>Density, Time, Pipe condition, Temperature, Flow condition, mA, Self testing, etc</td>
</tr>
<tr>
<td>Temperature</td>
<td>−20 to 60°C</td>
</tr>
<tr>
<td>Output</td>
<td>Analog 4—20mA max. 750Ω</td>
</tr>
<tr>
<td></td>
<td>Relay 3 SPD (5A, 250VAC), ER, R1, R2</td>
</tr>
<tr>
<td></td>
<td>Digital RS232C, RS485 (Option)</td>
</tr>
<tr>
<td>Power Source</td>
<td>Standard AC100~240V 50/60Hz ≤6W</td>
</tr>
<tr>
<td></td>
<td>Option DC24V</td>
</tr>
<tr>
<td>Material</td>
<td>Housing ABS (237W×241H×125D)</td>
</tr>
<tr>
<td></td>
<td>Window Polycarbonate</td>
</tr>
<tr>
<td>Enclosure</td>
<td>IP67</td>
</tr>
<tr>
<td>Certificate</td>
<td>CE</td>
</tr>
</tbody>
</table>

### Sensor

<table>
<thead>
<tr>
<th>Model</th>
<th>S2-S (Spool piece)</th>
<th>S2-T (Tank Mount)</th>
<th>S2-C (Clamp on)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>304SS</td>
<td>304SS</td>
<td>MC Nylon &amp; Aluminum</td>
</tr>
<tr>
<td>Transmitter &amp; Receiver</td>
<td>epoxy</td>
<td>epoxy (standard) 304SS (option)</td>
<td>epoxy</td>
</tr>
<tr>
<td>Pipe Size</td>
<td>50~600A</td>
<td>50~300A</td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>1MHz</td>
<td>1MHz</td>
<td>0.83 to 1.5MHz (Frequency Auto-selection)</td>
</tr>
<tr>
<td>Max. Pressure</td>
<td>10 bar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable Length</td>
<td>10m (100m max.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>−10 to 60°C</td>
<td>−10 to 60°C</td>
<td>−20 to 70°C</td>
</tr>
<tr>
<td>Enclosure</td>
<td>IP65/IP68 (Option)</td>
<td>IP68</td>
<td>IP68</td>
</tr>
</tbody>
</table>

### Junction Box

<table>
<thead>
<tr>
<th></th>
<th>Housing</th>
<th>ABS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>−10 to 80°C</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>450g</td>
<td></td>
</tr>
<tr>
<td>IP Rating</td>
<td>standard</td>
<td>IP65 (Option)</td>
</tr>
</tbody>
</table>

### System Layout

- Spool piece
- Clamp on
- Tank mount
- Junction Box
- Controller
- Power
General Drawings / Controller Crossline Drawing

**General Drawings**

- **MODEL**
  - E200-65A: 156 mm
  - E200-80A: 185 mm
  - E200-100A: 210 mm
  - E200-150A: 280 mm
  - E200-200A: 330 mm
  - E200-300A: 445 mm

- **PCD**
  - 130 mm

- **L**
  - 120 mm

- **n-Φh**
  - 4-19 mm

- **Bolt**
  - M16

**S2-S (Spool Piece type)**

- Sensor mounting port M33xP2.0
- drain G1" Screw

**S2-T (Tank mount)**

- Junction Box
- ABS

**Line of business**

- Rotary Paddle Type Level Switch
- Vibration Type Level Switch
- Swing Type Level Switch
- Acoustic Level Switch
- Capacitance Type Level Switch
- Capacitive Proximity Sensor
- Capacitance Type Level Indicator
- Diaphragm Type Level Switch
- Tilt Switch
- Leak Type Switch
- Microwave Type Switch
- Sounding Bob Type Level Indicator
- Flow Switch
- Conductance Type Level Switch
- Float Switch
- Float Type Level Indicator
- Ultrasonic Type Level Indicator
- Equipments For Conveyor Lines
- Dust Monitor System
- Zirconia Oxygen Analyzer
- Laser Type Level Indicator
- RADA R Type Level Indicator
- On-line Sensors for Accurate Liquid Analysis
- Ultrasonic Flow meter

*Please be sure to read USER'S GUIDE, Installation & Operation Instructions before using the instrument.

*The specifications herein may be subject to change without advance notice.

All-round Manufacturer of Level Controllers for Powder, Granules and Liquid

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Agent