



PS7000 Series · PISONICS

Ultrasonic Acoustic Impedance Density Meter

Technical Specification

Precision beyond limits



▲ PS7000 transmitter and flanged measuring spool

Product Overview

The PS7000 series is a new-generation non-nuclear online slurry density meter independently developed by PISONICS. It eliminates the radiation risk and licensing/maintenance burden of conventional gamma-ray density meters, and is purpose-built for accurate slurry density control in non-ferrous metallurgy, thermal power, coal washing, chemical & metallurgical processing, and potash/salt industries. Its innovative chirp acoustic-impedance algorithm delivers $\pm 1\%$ FS continuous measurement across the full 0–80% mass-concentration (0–3000 kg/m³) range.

Measuring Principle

The acoustic-impedance method relies on a core principle: when ultrasound meets a solid–liquid interface, the echo strength is governed by the impedance contrast across it, where acoustic impedance $Z = \text{density } \rho \times \text{sound speed } c$ — directly linked to slurry density. The PS7000 uses a single self-transmit/self-receive probe that emits chirp (linear-frequency-modulated) pulses and captures echoes in real time. The chirp's wideband nature penetrates bubble layers and suppresses multiple-reflection interference, so the host can resolve the impedance signature and reconstruct true slurry density.

Technical Specifications

Item	Specification
Model	PS7000 Series (Acoustic Impedance)
Measuring principle	Ultrasonic chirp acoustic-impedance method

Item	Specification
Measured medium	Solid-liquid two-phase slurry
Measuring range	0 ~ 3000 kg/m ³
Accuracy	±1% FS
Resolution	0.001 g/cm ³ or 0.1%
Output modes	Mass conc. / Volume conc. / Density / Baumé
Power supply	DC 24V or AC 220V ±20%, 4-wire
Power consumption	≤ 1 W
Ambient temperature	-30°C ~ +60°C
Medium temperature	0–80°C (high-temp up to 120°C)
Humidity	≤ 98%RH, non-condensing
Pipe diameter	DN50–DN1000 (larger customizable)
Mounting	Flange direct-insert / weld-in / split type (ANSI / DIN / JIS compatible)
Probe material	duplex steel + sapphire, Ra ≤ 0.4 μm
Optional liner	PTFE / rubber / ceramic
Temperature sensor	PT1000 (probe temperature)
Analog output	4-20 mA ×2 (load ≤ 500 Ω)
Digital communication	RS485 Modbus-RTU
Remote transmission	Optional 4G wireless module
Remote signal cable	Up to 500 m
Data logging	2,000 real-time + 400 log records
Output correction	Y = aX + b
Display	128×64 OLED, CN/EN, optional remote
Ingress protection	Pipe section IP68, host IP65
Ex rating	Exd II CT6Gb (optional)
Certification	EU CE
Dimensions	400 × 400 × 180 mm (host)
Weight	approx. 2.5 kg

Key Advantages

Feature	Customer Value
Chirp acoustic-impedance algorithm	Penetrates bubbles, removes multiple reflections, accurate two-phase density
Non-nuclear, zero radiation	No gamma-ray hazard or environmental licensing
Non-contact probe	Zero wear/clog, maintenance-free, life ≥ 5 years
Custom wear-resistant probe	316L/2205 + sapphire, Ra ≤ 0.4μm, anti-scaling
Flange-insertion mounting	Only 5D+2D straight run, no full-pipe requirement

Feature	Customer Value
Multiple liners	PTFE / rubber / ceramic for acid, alkali, abrasion
Integral or remote mounting	Wall / panel / pipe; remote signal up to 500 m
Bilingual OLED interface	Graphical menu, intuitive operation
Dual-mode output	4-20mA x2 + Modbus-RTU, PLC/DCS ready
4G remote (optional)	Cloud visualization, easy remote O&M
Mass data logging	2,000 + 400 records, non-volatile
Ex & CE certified	Optional Exd II CT6Gb, EU CE certified

Composition & Installation

The system comprises the meter instrument (ultrasonic probe + OLED window + cable interface), a custom test pipe spool, a remote display, and an infrared remote control. Both integral and remote mounting are supported: integral is recommended for general use and easy reading; remote mounting suits congested or non-full-pipe locations (in horizontal pipes the probe should sit at the bottom). Install on a straight run; no full-pipe condition is required.

Wiring:

- DC 24V power: + to 24V, - to ground.
- Analog output: dual 4-20mA on lo_1 / lo_2 terminals, observe +/- polarity.
- RS485: A (+), B (-), G (GND), up to 500 m.
- Probe signal to MEA; probe temperature to PT1000 (red +, white -).

Installation Notes:

- Site free of strong vibration, with stable ambient temperature; easy to service.
- Vertical mounting recommended — flow bottom-to-top at >1 m/s (higher for denser slurry); avoid low or static flow to prevent particle settling.
- For horizontal mounting, ensure the slurry at the sensor point is representative, unstratified and uniform, with flow >1 m/s.
- Locate away from pumps and fittings (valves, elbows); horizontal mounting requires 10D upstream / 5D downstream straight run (min 5D / 3D).
- On-site calibration is performed by sampling and weighing.

Typical Applications

Industry	Typical Applications
Non-ferrous metallurgy	Feed/discharge, flotation, thickener & cyclone outlet
Thermal power	Limestone prep, FGD desulfurization, recirculation
Coal washing	Heavy-medium density, product separation
Steel & coking	Desulfurization slurry, dedusting slurry
Chemical & potash	Brine, saturated crystal solution, two-phase flow
Mine tailings	Backfill discharge, grinding circuit density

Model Selection & Customization

Customization options include non-standard ranges, special liners (PTFE/rubber/ceramic), high-temperature type (medium up to 120°C), explosion-proof type (Exd II CT6Gb), remote display, and 4G transmission. Parameters are pre-calibrated to the specific solid and medium; on site, device address, baud rate, output type, 4/20mA endpoints, correction coefficients a/b, damping, and range limits are set via the IR remote menu.

Warranty & Service

From the shipping date, the host carries a one-year warranty and repair/maintenance a six-month warranty. Coverage is limited to the original purchaser or authorized distributor's users and excludes damage from misuse, modification, negligence, accident, or abnormal operating conditions. In-warranty faulty units are repaired free of charge — please contact after-sales service with a fault description.

Contact

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Note: Specifications are subject to change without notice.