

PSM

Ultrasonic Particle
Size Analyzer



DF- PSM Ultrasonic Particle Size Analyzer

I. Product Overview

DF- PSM Ultrasonic Particle Size Monitor (PSM) is an inline instrument measures size of particle within slurry. It can provide accurate and real-time analysis of particle size, PSM is applied to measure particle size distribution from 25 μ m to 295 μ m with P80 standard. By using the feedback information of PSM, grinding circuit optimization, product quality improvement, recovery rate improvement and energy consumption reduction can be achieved.



II. Operating Principle

PSM inhales relatively stable and representative slurry stream by generating vacuum space through sample conditioning unit, then conduct degassing procedure. Slurry after degassing flow through the ultrasonic attenuation measuring unit (ultrasonic transducer) for measurement, finally, the slurry sample flow back to original process. During measuring period, the detector emits ultrasonic pulse with multiple frequencies to penetrate the sample, and receive several attenuation parameters from the ultrasonic pulses. Those parameters are directly related to the particle size distribution within slurry. The parameters will be considered as variables in each size fraction to calculate the concentration and particle size of slurry.

III. Product Features

- High measuring accuracy

The change of ultrasonic attenuation in slurry is the result of interaction of all solid particles. Instead of interpolation method, PSM directly measures ultrasonic attenuation, the ultrasonic attenuation resolution is up to 0.1dB. Meanwhile, PSM uses air separation technology to

eliminate the influence of bubbles in the slurry and ensures better measurement accuracy.

- Application of multiple fraction and multi-stream

PSM can analyze up to 5 slurry particle size distributions at the same time, and provides concentration detection without extra expenses. The signal processing technology with large dynamic range enables PSM not only provides 3 channels of slurry particle size detection but also suitable for different processes with different slurry natures. PSM can perfectly fulfill particle size requirements at overflow of primary, secondary and tertiary grinding process.

- Representative samples

Abundant field application experience ensures representativeness and negotiability of sampling. Different sampling methods such as reduction sampler, pipe sampler, etc. are adopted. Samplers are the designing result of constant improvement on the basis of abundant practical experience, not only practicable and reliable, but also possess with long period wear resistance.

- Participate in closed-loop control for better effect

The measurement of PSM is fast, consistent and representative. It makes closed-loop control of grinding automation system possible, so as to improve the mill capacity under the condition of satisfying the particle size requirement and bring substantial economic benefits.

IV. Technical Parameter

Operating mode

Operating principle	Multi-frequency ultrasonic attenuation measurement
Functions	
<ul style="list-style-type: none"> ● Auto 	Follow measuring sequence and measuring time cycle set up by the user
<ul style="list-style-type: none"> ● Manual 	Choose stream through control panel, HMI or remote control
Measuring Media	2-phase turbid liquid such as iron slurry, Molybdenum slurry, copper slurry, lead-zinc slurry, slag slurry, raw cement slurry
Measurement output	5 particle size fractions and 1 concentration through each stream Weight percentage output, plus/ minus sieve, stay same with lab sieve
Performance	
Multi-stream application	1~3 streams (2-stream or 3-stream equipment need additional stream switch)

Particle size	
Measuring range	Particle size under 1mm. 295 μ m to 25 μ m in P80
Typical precision	Absolute error < 1.0% (1 σ)
Concentration	
Measuring range	4~60% w.t (1-70%vol, depends on the dry ore density)
Typical precision	Absolute error < 1.0% (1 σ)
Refresh time	<4s

Output

Analog output	4 ~ 20mA
communication	PROFIBUS general (optional)

Nominal operating condition

Installation condition	
Installation platform	3.5m \times 2.8m horizontal space, 2.5m vertical space for base, the base shall be capable for hold up 1500kg weight
Ambient condition	
Ambient temperature	-10 ~ +50 $^{\circ}$ C
Ambient humidity	0~98% relative humidity (no condensing)
Operating vibration	<10g, 20Hz
Site condition	
Ordinary water requirement	Normal industrial water standard, 2.5 ~ 3.0m ³ /h, pressure 350 ~ 550kPa
Standard water requirement	Potable water, about 12 L/d
Gas supply requirement	Clean, dry gas supply 0.1 ~ 0.15 m ³ /h, pressure 550 ~ 700kPa
Corrosivity	Corrosive slurry PH<12.5
Design	
Material	All parts contact with slurry is made from polymer or mild steel encapsulated with rubber

Protection level	IP55
Weight	Around 880kg
Dimension	1800mm(L)×1200mm(W)×1800mm(H)
Display & Control	
Monitor	Industrial HMI
Display mode	Real-time data, curve mode, status display, parameter setup and alarming information
Programming	
Operating buttons	Start & Stop, Motor start & stop, stream shift, sampling calibration, flushing, alarming reset, etc.
Function keys	Configuration interface shift, stream setup, instrument status, alarm, navigation key, numeric key, function key, delete key, enter key, decimal point, direction key (up, down, left, right)
Status indication lamps	Power indicating lamp, work indicating lamp, communication status lamp, alarm status lamp
Power supply	380V AC; 50/60 Hz; 3-phase; 6kW

Note: Product technical parameters provided above are standard type, practical information shall subject to real conditions at site.

V. Product Applications

Grinding process of non-ferrous metal, ferrous metal and other industries, including:

- Iron ore, magnetite ferrous mining
- Gold, copper, molybdenum, lead-zinc etc.
- Coal cinder, slag slurry and other non-metal mineral processing



Particle size measurement at cyclone overflow in iron processing plant



Particle size measurement at cyclone overflow in copper processing plant



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