

"ECHO" PARTICLE DETECTOR

The Echo Particle Detector developed by ESP is based on cutting edge technology. It provides data which enables the customer to maximize the potential of the facility by giving real time data and enabling to make swift decisions based on the data

This detector can be used for oil and gas fields located both onshore and under water.

The Echo detector has a piezoelectric sensing element within its enclosure, which pick ups the noise frequency generated by the particles hitting the inner wall of the pipeline where the detector is installed



"ECHO" PARTICLE DETECTION

Benefits Include:

- » Onshore and Subsea Application
- » Self-Diagnostic function inbuilt
- » Real time measurement
- » Inbuilt digital signal processing unit
- » Inbuilt event Archive
- » Non-intrusive clamp-on type mounting
- » Industry Standard Outputs
- » Dedicated Software
- » Ultrasonic Acoustic technology
- » Internationally certified for "Ex d" and "Ex ia"
- » Minimum Particle size detected $0.2 \mu\text{m}$
- » Excellent external noise immunity

Use and Features of ECHO:

The particle detector is used in primarily in the oil and gas industry. Its primary objective is identifying and quantifying presence of particles coming in oil, gas or multiphase.

Main uses of the Echo detector include:

- Sand management
- Asset optimization
- Monitoring of sand screen integrity
- Well testing
- Establishing MSFR (Maximum Sand Free Rate)/MASR (Maximum Acceptable Sand Rate) of production

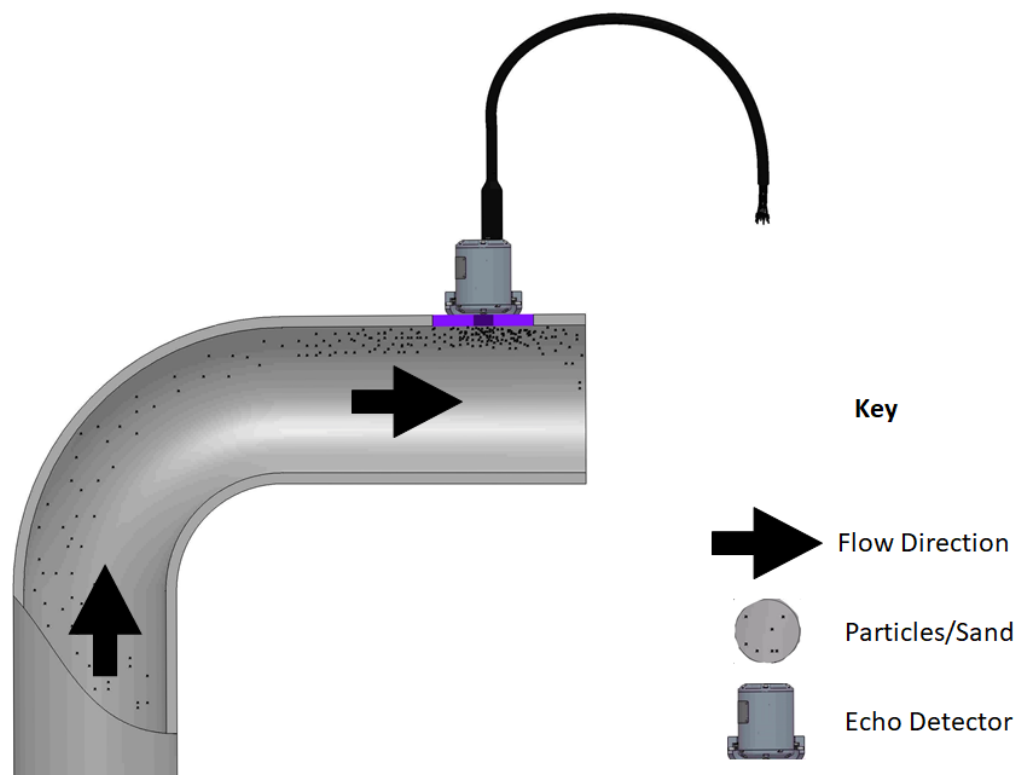
This Echo gives the operator the unparalleled advantage of receiving real time information of particle production.

Principle of Operation

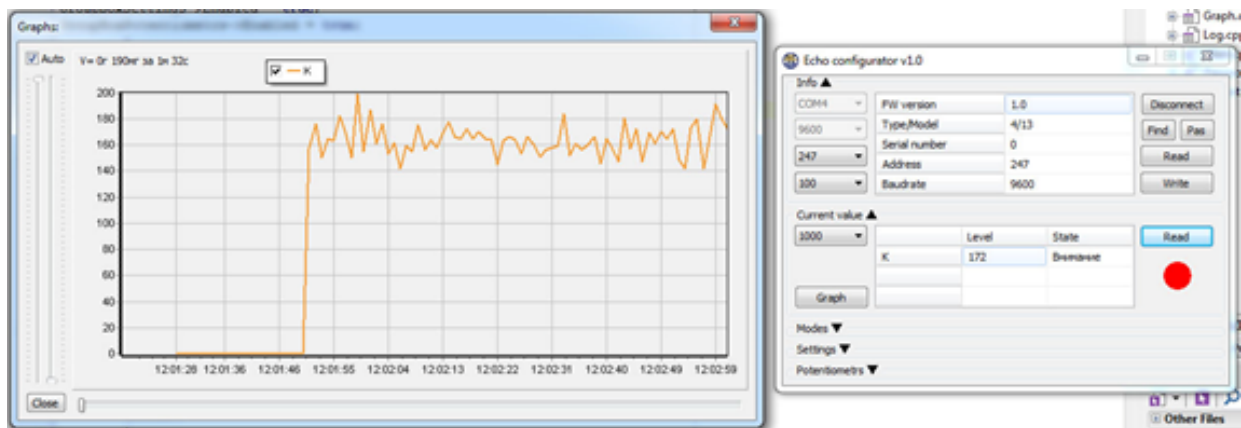
The detector is based on the ultrasonic acoustic principle sensing. The sensing elements pick up the noise generated by particle/sand flow at the time of impact on the inner wall of the pipe. The sensor data is then transmitted via means of 4-20mA, RS-485, HART and relays

This noise is subsequently processed in the onboard digital processing unit or in the case of the intrinsically safe version of the device transmitted to processing and interfacing unit, installed at the operating/desired location.

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Dedicated Software:



The software which is provided by ESP for use with the Echo system is incredibly easy to view and use by the operator for viewing particle production, trends and analyzing the data received.

Feature Include:

- Visualization and quantification of particle production (Grams per second/ Grams per cubic meter)
- Real time data
- Historical trends
- Log events in order to correlate results of any actions performed

Mounting:

One of the devices greatest benefits is that it is non intrusive clamp on type.

Meaning no cutting, welding or shutting down a process is required in order to install it.

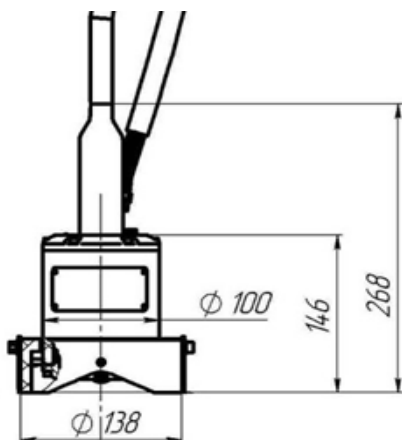
Simply clamp it on to the pipe, via means of metals clamps or in case of a subsea installation, place it in a funnel and you are ready to go.



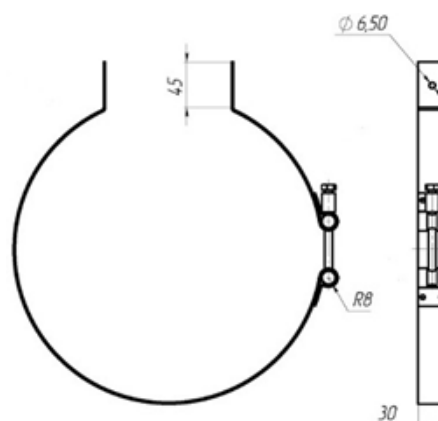
Specification:

Principle of operation	Passive ultrasonic sensor with piezoelectric element
Sensor type	Ultrasonic Accoustic
Minimum Flow Velocity	0.3 m/s
Measurement time interval	Permanent
Controlled environment:	- Oil - Multiphase - Gas - Water
Particles Monitored:	- Sand - Condensed moisture - Any solid formations
Minimum Particle Size	≥ 10 μm (gas) ≥ 20 μm (oil)
Repeatability	< 1 %
tq	± 3 % (with sand injection calibration)
Electrical Specification	
Input Power	24 VDC (18 to 32 VDC)
Power Consumption	<2.5W / 1.2W*
Outputs	- 4-20mA, - Configurable Relays (alarm, fault) - RS-485 (ModBus RTU) - HART
Event archive (inbuilt)	Up to 90 days based on 5 s averaging interval
Local Indication	3 colour LED (normal, alarm, fault)
Self-diagnostics sensitivity function	Yes
Humidity	up to 100 %
Operating Temperature Range	-60°C to +85°C
Ingress Protection	IP66/IP68
Explosion Proof Mark	1Ex db IIC T4 Gb/ 0Ex ia IIC T6 Ga**
Mechanical Characteristics	
Dimensions	5.75" x Ø 3.94" (146 mm x Ø 100 mm)
Cable Entry	1 Cable Entry 3/4" NPT / (2 entries upon request)
Enclosure material	SS316/ Aluminum

a) Detector Dimensions



b) Mounting Base Dimensions



Notes:
* Ex (ia) model
**Process & Interface Unit required for (ia) version