

More than half of all existing wells are estimated to require sand control or sand management throughout their lifetime. High-velocity or turbulent fluid flow generates large drag forces, dislodging unconsolidated sand particles. The free-flowing particles can erode downhole and surface equipment, including well-control barriers. When wells sand-up, the productivity declines, disposal of produced sand is a significant cost associated operation. Remedial procedures require hours of rig time. In a worst-case scenario, this can lead to dangerous uncontrolled production and well abandonment. To address the industry problem ESP Safety developed **Echo Ultrasonic Sand & Particle Monitor**. The efficiency of oil and gas wells improved by 300% on the sites where **Echo** has been installed.

Echo monitors liquid (water) and solid particles in gas flow and solid (sand) particles in oil pipeline. Employing ultrasonic technology **Echo** detects the acoustic noise generated by sand and other particles when they collide into the walls of pipeline and notify operator if their concentration reaches above safe level. Being the next generation of smart instruments **Echo** uses digital signal processing algorithms to provide real time data to operator. The device can be easily integrated into any system via digital or analog interfaces or wireless.

Enhanced acoustic sensitivity, maximum reliability, low maintenance cost and long service life make **Echo** the perfect choice for gas and oil pipeline at any climate, from Polar to Tropical. The device comes in two versions: for onshore and subsea applications.

In addition to our **Sand Particle Monitor** we also offer sand management system to maximize production while managing sand at acceptable rates. The system monitors pressure, particles, vibration, flow, temperature and other wellhead parameters, analyze the data and automate the process. Contact your sales representative for more information.



DRILLING AND PRODUCTION PLATFORMS



LNG/LPG PROCESSING AND STORAGE FACILITIES



OIL, GAS AND MULTIPHASE PIPELINES



OIL AND GAS WELLS

Features and Benefits

ENHANCED ACOUSTIC SENSITIVITY

Combination of superb sensing element, digital signal processing algorithm with advanced filtering techniques allow device to detect the smallest particles in the flow and distinguish them from background noise from process equipment.

MAXIMUM RELIABILITY

Rigorous self diagnostics, data averaging and use of filtering techniques provide fail to safe reliable operation.

LOW MAINTENANCE COST

Echo requires minimum maintenance on site, which makes it an easy choice for operator.

LONG SERVICE LIFE

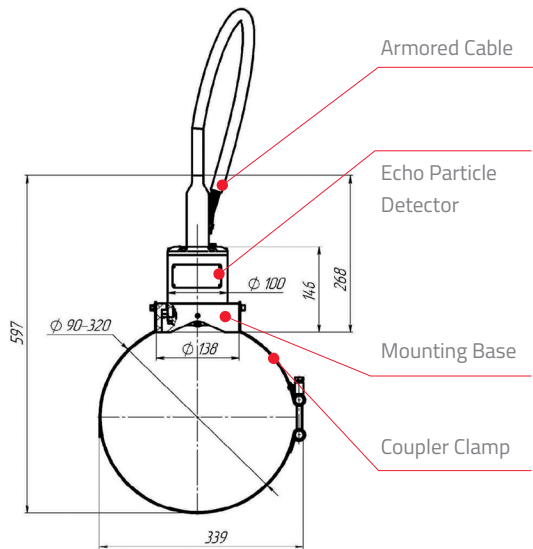
The life expectancy for Echo is 10 years with warranty of 2 years.

NON-INTRUSIVE MOUNTING

The installation is very simple and easy, no need in cutting or welding and shutting down a process. Connect Echo by supplied clamp to pipe or for subsea installation, place it in a funnel and you are ready to go.

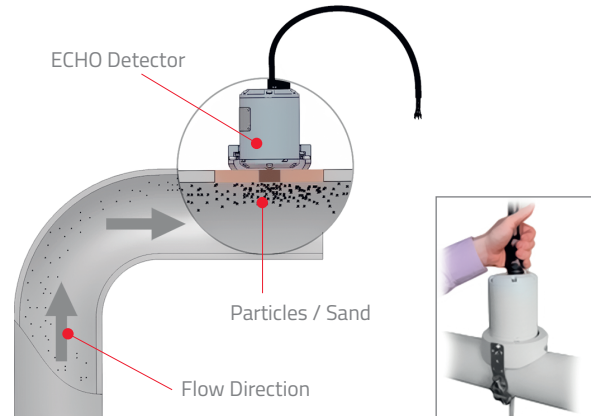


DIMENSIONS IN MILLIMETERS (MM)



EASE OF INSTALLATION

The installation is very simple, no need in cutting or welding and shutting down a process. Connect Echo by supplied clamp to pipe or for subsea installation, place it in a funnel and you are ready to go. Installation point is downstream of a bend/elbow, where the turbulent flow profile is fully developed.



OPERATIONAL CHARACTERISTICS

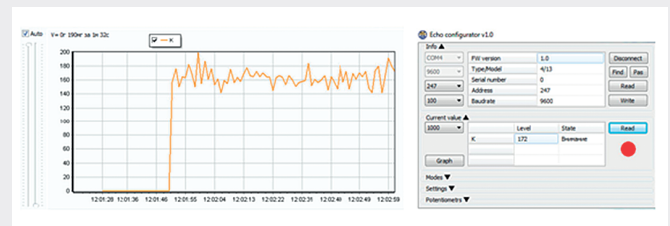
Method of Operation	Passive acoustic
Uncertainty Minimum	$\pm 3\%$ (with sand injection calibration)
Flow Velocity	~ 1 m/s
Particle Size	$\geq 10 \mu\text{m}$ - in gas $\geq 20 \mu\text{m}$ - in oil
Data Storage	90 days with a recording interval of 10 seconds
Operating Temperature	-60C to $+80\text{C}$ (-76F to 185F)
Pipeline Surface Temperature	-100C to $+290\text{C}$ (-148F to 554F)
Humidity Range	Up to 100%, non-condensing (Withstands up to 100% RH for short periods)
Storage / Transportation Temperature	-50C to $+50\text{C}$ (-58F to 122F)
Ingress Protection	IP66 / IP 68
Life Time / Warranty	10 years/ 2 years

MECHANICAL CHARACTERISTICS

Material	316 Stainless Steel
Conduit Connection	$\frac{3}{4}$ " NPT
Dimensions	5.75" x Φ 3.94" (146 mm x Φ 100 mm)
Mounting base size for pipes from m100 to 300 mm	5.75" (Φ 138 mm)
Weight with mounting base	No more then 13.23lb (6 kg)

THE SOFTWARE

The device comes with software which lets you to visualize and quantify the data about sand production (Grams per second/ Grams per cubic meter), access it in real time as well as historical trends, change configuration and perform calibration.



ELECTRICAL CHARACTERISTICS

Input Voltage	$+24\text{VDC}$ (Nominal) $+18$ to 32 VDC
Power Consumption	$\leq 2,4$ W 4-20mA, industry standard analog output
Output from Echo	Digital RS-485 Modbus RTU Dry contact relay HART Detector has repeatability less than 1%
Repeatability	The signal read by the sensor will have the same values, with a deviation of less than 1%, as the signal generated by a calibrated sound generator.
Warm up time	30 Seconds