ESP Asset Integrity

SUBSEA

ECHO-UW

SUBSEA PARTICLE DETECTOR

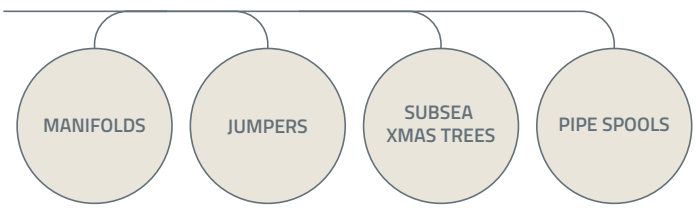
More than half of all existing wells are estimated to require sand control or sand management throughout their lifetime. High-velocity or turbulent fluid flow generates large drag forces, dislodging unconsolidated sand particles. The free-flowing particles can erode downhole and surface equipment, including 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-UW** has been installed.

The **Echo-UW** detects liquid (water) and solid particles in gas flow and solid (sand) particles in oil pipeline. Employing ultrasonic technology the **Echo-UW** detects acoustic noise generated by sand and other particles when they collide into the walls of pipeline and notify operator if their concentration reaches above acceptable level. The output signals from **Echo-UW** sand detector are transmitted directly to a control system for online data monitoring via SI IS Level 2 or SI IS Level 3 communication protocols. Being the next generation of smart instruments the **Echo-UW** uses advanced digital signal processing algorithms to provide reliable, high-resolution data to operator.

The **Echo-UW** non-intrusive device can be easily tied into any existing system or implemented into new pipeline installation.

ESP Safety's sand detector is recommended to be installed in combination with our erosion-corrosion detectors to minimize sand intrusion (the main cause of erosion corrosion), detect early signs of corrosion and extend life of pipelines.

Applications



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 30 years.

NON-INTRUSIVE MOUNTING

The installation is very simple and easy, no need in cutting or welding and shutting down a process. The Echo-EC system comes with the funnel which is attached to the pipe by a crane vessel either with ROV or diver for existing installations. This design provides a secure fit while maintaining pipeline integrity.

ROV DEPLOYABLE/RETRIEVABLE

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ESPAsset Integrity

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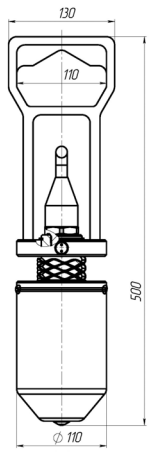
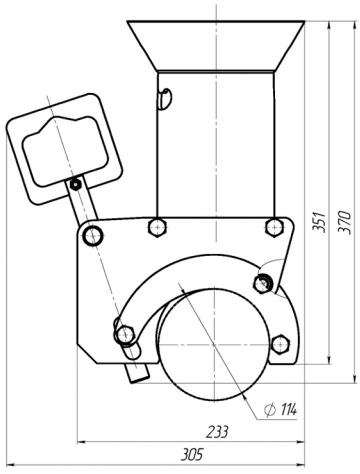
ELECTRICAL CHARACTERISTICS

Input Voltage	+24VDC (Nominal)+18 to 32 VDC
Power Consumption	≤ 2-4 W (depends on redundancy) Inrush current ≤ 2 x nominal current, < 1sec
Electronics Configuration	Single or Dual (fully redundant)
Output Signals	4-20mA (SIIS level 1) CANopen CiA 443 (SIIS level 2) Digital RS-485 Modbus RTU
Communication Bid Rate	**Modbus** 9600 bps (default) 4800,19200,115000 (by request) **Canbus** 20 kbps (default) 10, 50, 83.3,100,125, 250, 500, 800, 1000 (by request)

DIMENSIONS IN MILLIMETERS (MM)



Echo-UW Dimensions



Funnel dimensions

OPERATIONAL CHARACTERISTICS

Principle of Operation	Passive acoustic
Flow Regime	Oil, gas, water, multiphase
Units of measurement	g/s
Calibration	factory calibrated
Uncertainty	± 3-10 % (depending on flow and calibration)
Repeatability	detector has repeatability less than 1% The signal read by the sensor will have the same values with a deviation less than 1%.
Flow Velocity	~ 1 m/s
Particle Size	≥ 10 µm - in gas ≥ 20 µm-in oil
Depth	4,500 m (14,760 ft)
External Pressure	30 MPa
Operating Temperature	-20C to +80C (-76F to 185F)
Pipe Surface Temperature	-100C to +290C (-148F to 554F)
Storage Temperature	-50C to +50C (-58F to 122F)
Design Life	30 years

MECHANICAL CHARASTERISTICS

Dimensions	20" x Ø 5" (500 mm x Ø 130 mm)
Enclosure Material	Titanium/UNS S31803/2205 Duplex SS
Weight in Air	13 lbs (6 kg)-Titanium 22 lbs (10 kg) -UNS S31803/2205 Duplex SS
Weight in water	10 lbs (4.62 kg)-Titanium 19 lbs (8.73 kg) -UNS S31803/2205 Duplex SS
ROV Handle Type	D-Handle as standard (T-handle, Fishtail handle, O-handle available by request)
Coating	Xylan 1070, F4210 yellow (detector), Xylan 1070, F1677 orange (ROV handle)
Interface Connector Type	Omnitec MKII Tronic Connector ODI Connector
Sealing Type	EB welding and O-rings

FUNNEL ASSEMBLY

Funnel Dimensions	15" x Ø 9" (370 mm x Ø 233 mm)
Enclosure Material	UNS S31803/2205 Duplex SS
Weight in Air	19 lbs (8.5 kg)
Weight in Water	16 lbs (7.42 kg)
Coating	Xylan 1070, F4210 yellow
Pipe Diameter	> 6 "

APPROVALS AND STANDARDS

ISO 13628-6
ISO 15156 / NACE MR 0175
Material Certificate 3.1 according to EN 10204
NORSOK M-501, M630, M650
ISO 3506-1 / 3506-2
API 17-F