

Well Integrity Surface Diagnostic – Echometer Acoustic

Fluid Level Measurement

The **ECHOUSTIC** equipment consisting of a Well Analyzer is used in conjunction with a compact Gas Gun/microphone assembly to determine the liquid level depth in a well. An acoustic pulse is generated at the surface of the well. The acoustic pulse travels through the gas and is reflected by changes in area including tubing collars and the liquid level.

The TWM & TAM (Total Asset Management) software automatically processes this acoustic data to determine fluid level depth.

This portable system is based on a precision analog to digital converter controlled by a notebook computer with Windows-based application. The Well Analyzer acquires, stores, processes, displays and manages the data at the well site to give an immediate analysis of the well's condition.

Applications

Determine fluid level in well tubing and casing;

- Determine static tubing Fluid level in shut in well
- Determine fluid level in well casing with sustained casing pressure SCP or failing GLV issues.
- For annulus kill/corrosion inhibitor fluid displacement volume determination before top up



- Determination Static Bottom Hole Pressure (SBHP) / Static Gradient Pressure

Benefits

- Quick determination of liquid level in tubing and well annuli
- No in-well intervention by wireline or slickline, alternative to static gradient survey (SGS)
- Combinable with annulus pressure diagnostic to determine if any tubing / casing communication.
- Easily transportable, light weight unit
- Simple rig up and minimised well shut in operation period

Description of Features

ECHOUSTIC is a surface deployed unit designed to detect liquid level depth in tubing

and annulus of a well. The equipment consists of gas gun assembly install to the ½” NPTF port on top of a tree cap or a casing wing valve.

The gas gun with its 164cm³ (10cu.in) volume gas chamber generates an acoustic pulse which travels down the casing annulus/tubing gas and is reflected by collars and the liquid level. The reflected acoustic pulse is converted into an electrical signal by the gas gun microphone and processed by the TWM software.

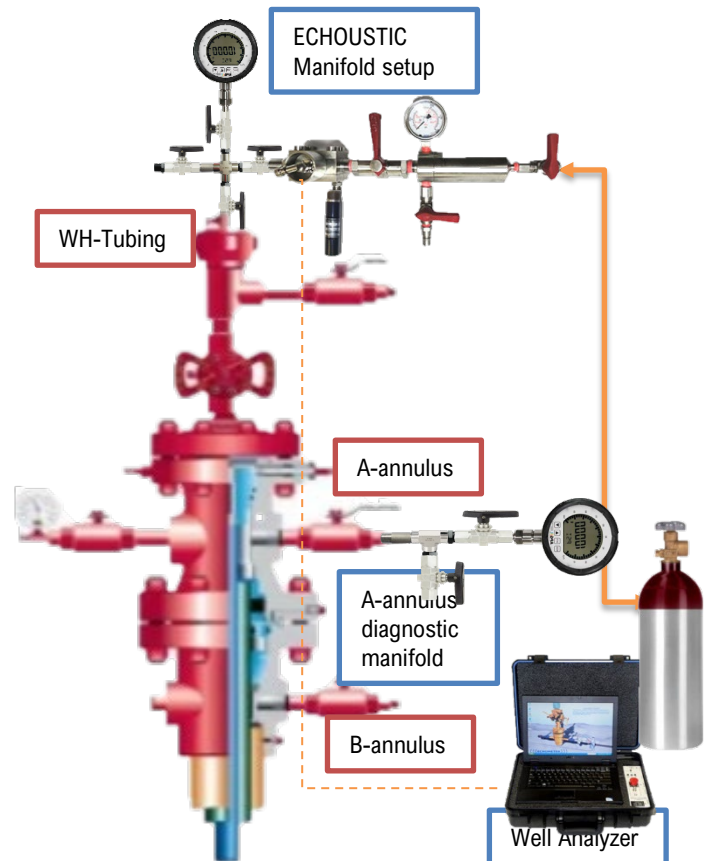
The compact gas gun can be operated in explosion or implosion mode. High pressure gas from the well can be released into the compact gas gun gas chamber to create the initial pulse for the implosion mode, while an external gas supply is charge slightly higher than casing annulus/tubing pressure into the gas gun gas chamber to generate the acoustic pulse for the explosion mode.

Static Bottom Hole Pressure (SBHP)

Another valuable use of fluid level shots is to acquire the SBHP (Static Bottom Hole Pressure). Knowing the instantaneous gas flow rate, simulation of the fluids column gradient (psi/ft) of the gaseous fluid column can be calculated by applying a field derived correlation developed by Total Asset Management (TAM) and in-house correcting calculation sheet.

With this value known, hydrostatic calculations can be computed to solve for downhole pressures anywhere along the wellbore by summarizing the surface casing pressure, gas

column pressure and gaseous fluid column pressure at the desired depth.



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Specifications

Dimensions	L 52 mm	W 52 mm	H 30 mm
Weight	35 kg (total)		
Gas Gun assembly	EX Zone 2 12 Cubic Inch Volume Chamber Dimensions 2" Square x 16" Long Gas Type: CO ₂ , N ₂ , O ₂ Pulse type: Explosion / Implosion Activation Type: Manual Only Rated: 5000 psi Weight 11 lbs 5000 psi Pressure Transducer Dual Disc Noise Cancelling Microphone Material: Stainless Steel and Electronics		
- Max working pressure	5000 psi	345 bar	
- Connection inlet	½" NPTM		
- Cabling	50m Shielded cable		
Data Acquisition Unit	Safe Zone Ex- Battery operated Approximate Dimensions – 20" x 20" x 20" (50.8 cm x 50.8 cm x 50.8 cm)		
- Data Acquisition	Laptop with Well Analyzer (EX-Battery operated) c/w TWM software upgraded to TAM total asset Management 1.7 and In-House QC z-factor input spreadsheet. Revision-1		
- Voltage / Current	230 V / 16 A		
Other Accessory	1/2" NPT manifold assembly 10000 psi recorded digital Gauge ½" FNPT Ball valve		
- Nitrogen gas	2200 psi 50L/ 10L nitrogen gas cylinder c/w gas cylinder rack		

