



(((ECHOMETER)))

Model H

ECHOMETER LIQUID LEVEL INSTRUMENT MODEL H

- ADVANCED ACOUSTIC LIQUID LEVEL DEPTH INSTRUMENT
- DIGITAL SIGNAL ACQUISITION, PROCESSOR AND DISPLAY UNIT
- ENHANCED INTERPRETATION OF ACOUSTIC DATA
- NEW ANOMALY MARKER ANALYSIS FOR GAS AND GAS LIFT WELLS
- CERTIFIED FOR USE IN HAZARDOUS ENVIRONMENTS



Echometer Model H

The Echometer Model H is a stand alone, battery powered microprocessor controlled digital acoustic signal processor, recorder and display unit. When installed and used in accordance with instructions it is designed for operation in hazardous environments.

Model H Features

INTERPRETATION OF REFLECTIONS – The Echometer Model H permits better interpretation of reflections from downhole anomalies through application of digital filtering and processing that improve the ability of the operator to distinguish downhole obstructions from enlargements. The response from the liquid level (or a reduction in annulus area) is opposite to the response from an enlargement such as a hole in the casing or perforations.

FILTER OPERATION - Fluid level instruments are designed to include various filters, which can be used to accent signals that correspond to these frequency ranges. Selecting the proper digital filter will result in more accurate determination of the number of tubing collar reflections from the surface to the liquid level. The Model H records the signal with the highest possible resolution and frequency content so that signal analysis and interpretation is optimized using digital signal processing techniques.

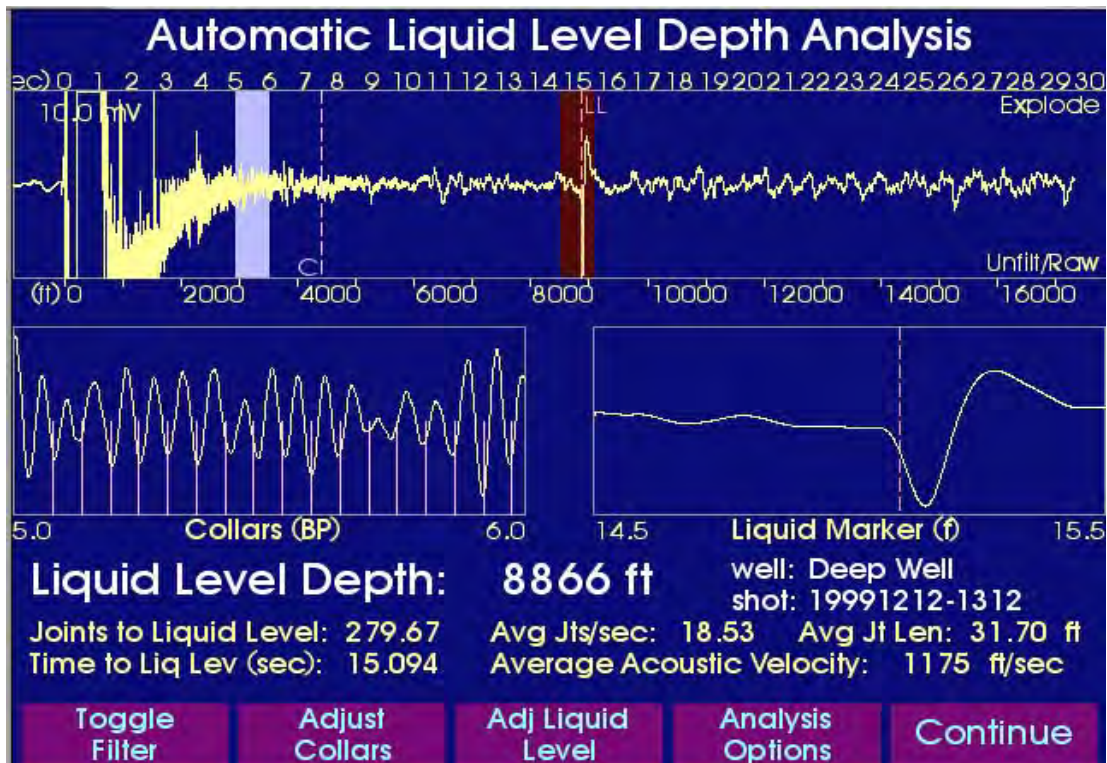
CONVENIENCE FEATURES – The Model H has been designed to facilitate and speed up acquisition of data by minimizing the number of steps to obtain a liquid level depth measurement. This is achieved by setting up the program for the “Quick Shot” mode so that once the instrument is powered up, it takes only three “clicks” to display the signal analysis screen.

The user manages the data acquisition and controls the flow of the program from the Main Menu. Wells can be organized in logical groups to facilitate access to the well files and specific acoustic shots.

Using the Model H Laptop Manager software is a more efficient tool for entry of well data and management of the acoustic records.

Before acquisition of the record, the software monitors the background acoustic noise in the well and displays a color bar indicating the acoustic signal level, and warns the user to increase the pressure differential between the chamber and the wellbore when the noise exceeds the preset threshold level.





Model H Acquisition Options

The Model H user has two options to acquire data: 1) Quick Shot Mode -Once the instrument is powered up, it takes only three “clicks” to display the signal acquisition screen and 2) Named Well Mode – The user may specify a pre-entered well file name where the acquired data is stored.

Model H Analysis Options

DEEP WELL ANALYSIS – Through Automatic Analysis of the fluid level records in a deep well, the software analyzes the record to identify the most likely signals that could correspond to the echo from the liquid level and highlights the most probably signal with a vertical dashed indicator within the dark band. This signal is also displayed with an expanded time scale.

The time scale is converted to a distance scale using the average acoustic velocity computed from a count of the collar echoes from time zero to the time indicated by the vertical dashed line labeled “C”. This dashed line indicates the point in the record where the amplitude of the collar echoes is equal to the amplitude of the background noise. Past this point in time the collar echoes cannot be identified with certainty.

GAS LIFT WELL ANALYSIS – When an acoustic record is acquired in a gas lift well, the program will perform the automatic analysis using the collar count procedure to determine the liquid level.

ANOMALY MARKER METHOD – The purpose of this method is to accurately calculate the distance to the liquid level echo using the known distance to one or more specific echoes that are generated by wellbore changes in diameter (hereafter defined as “anomalies”) that exist in the wellbore at known distances from the wellhead. This method accounts for the variation of acoustic velocity that is commonly observed in most deep wells due to the variation of temperature, pressure and gas composition in the wellbore.

Specifications of the Model H

The entire instrument is contained in a weatherproof, dustproof plastic housing having dimensions of 11 by 10 by 5 inches and weighs 11 pounds (5 kg).

The instrument is designed to be operated wearing work gloves.

The panel incorporates both soft-keys and a navigational 5-button star input keypad. A row of “soft-key” buttons below the LCD are used to execute the actions described in the labels at the bottom of the screen.

BATTERY – The Echometer Model H instrument will operate from the self-contained rechargeable battery. Battery MUST NOT be recharged while instrument is located in a hazardous area. The battery is rated at 9 Amp-Hour. The Model H current drain is approximately .825 Amps operating and .325 Amps standby. Thus the battery operating ON-time is approximately 10.9 hours.

Certifications

The Model H Instrument is certified **IEC EX Ia IIB T4** and **CLASS 1 DIV 1 GROUPS C & D**.

Please contact Echometer Company for more information regarding certifications.

Gas Guns

CERTIFIED ONLY - When operating the Echometer Model H instrument in a hazardous area the wellhead attachments must be certified intrinsically safe and approved for use in the classified area.

COMPACT GAS GUN - The compact gas gun is manually operated either in the **COMPRESSION** (Explosion) mode or the **RAREFACTION** (Implosion) mode. The operator should use the Compression (explosion) technique when the casing pressure is less than approximately 100 psig. The Rarefaction (implosion) technique may be used whenever the casing pressure is sufficient to obtain a good record.

5000 PSI GAS GUN - The 5000 psi gas gun is normally operated in the implosion mode and has an excellent noise canceling microphone. The 5000 psi gas gun is designed to operate efficiently in high pressure wells up to 5000 psi.





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