

KMS-888 Shallow borehole microseismic/EM tool



Shallow borehole tool

KMS-888 Shallow borehole tool (SBHT) is a sensor assembly designed for electromagnetic (EM) and microseismic recording to obtain resistivity and velocity structure to reduce risk for oil and gas/geothermal E&P. The unit can be used for both general purpose acquisition and long term monitoring services. The SBHT includes a 3-axis geophone assembly, a KMS-029 digital fluxgate sensor system, and vertical electric field sensor E_z . $E_{x,y}$ can be optionally recorded at the surface. The tool is designed to provide input signal for the KMS-820 Data acquisition unit. The hermetic housing of the tool allows to use it in a test wells (or seismic shot hole) of about 30 m of depth in order to make measurements that are hardly possible on surface. Total depth range of the tool goes to 100 m depth/

Benefits are:

- Sensing EM field directly below the receiver
- Lower influence of surface EM noise.
- Ideal for monitoring applications

Product features

- Multi-physics: 3 component fluxgate magnetometer, $E_{x,y,z}$ and 3C geophone.
- GPS synchronized.
- Ruggedized and waterproof design for downhole application (50 m shot holes)
- Data is saved to SD card (16-32 Gbyte).
- Operation scheduler allows multi-physics & multi-method (MT, CSEM etc.) operation in ONE sensor drop.
- Standard sampling rate 1 kHz (adjustable)

Fluxgate magnetometer

- Low profile 3-component magnetometer DC-180 Hz.
- Low noise 32-bit acquisition module for high resolution applications.

Geophone

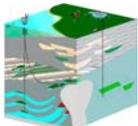
- High sensitivity >2 volts/second/inch.
- Low noise 3 component. (10 Hz)

Electric field

- E_z along plastic casing (20 m or 30 m) or multi-electrodes to 100 m
- E_x, E_y at surface

SHBT product kits:

1. Sensor package: tool and KMS-820
2. Well site kit: (Tripod, sheave wheel, cable reel, level adjustments)
3. Remote control: digital level, laptop, cable transition
4. Field remote recording: field container, web access box
5. Sensor installation kit: E-fields for multi-electrode borehole installation & surface
6. Software: KMSPro for CSEM or MT and/or Microseismic converter



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Product specifications (We reserve the right to change these)

SHBT tool	
Dimension	OD – 5.5 inches; length 5.3 feet
Well depth	20 – 30 m standard (leveled manually), 100 m optional (digital level)
Weight	< 13 kg (25 lbs.)
Temperature rating	0° C to 90° C
Shipping weight in transport container	42 kg (95 lbs.)
Fluxgate KMS-029	
ADC resolution	32 bit – data from SHBT, E-fields 24-bit
Signal bandwidth	DC to 180 Hz
Sampling rate	62.5, 250, 1000 Hz
Input signal dynamic range	-5 V ~ +5 V
DC offset removal	Patented external DC offset
Timing control	GPS synchronization by KMS-820
Total dynamic range	±78.0 μT
Dynamic range after compensation	±5.4 μT
Noise level @ 1 Hz	≤6 pT/√Hz
On-board sensors	Temperature, pressure, 3-axis acceleration
Power supply	±5, +3.3 V (from KMS-820)
Temperature rating	-30° C to 70° C
Digital interface	UART
Power consumption	425 mW
Geophone assembly	
Open-circuit sensitivity	85.8 V/m/s +5%, -3.5%
Frequency	10 Hz ±3.5%
Spurious frequency	240 Hz
Coil resistance	-5 V ~ +5 V
Open circuit damping	0.48 to 0.54
Sensitivity with 20 kΩ load	2.00 V/in/s (78.7 V/m/s) TYPICAL
Damping with 20 kΩ load	0.70 TYPICAL
Distortion from horizontal to ± 3° tilt	<0.15 % measured at 12 Hz with 0.7 in/s p-p
Distortion at horizontal	0.05% TYPICAL
Distortion from horizontal to ± 10° tilt	<0.15 % measured at 12 Hz with 0.7 in/s p-p
Distortion at vertical	0.05% TYPICAL
KMS-820 summary – see KMS-820 for latest data sheet	
Analog channels	6 – 3 used for electric fields
Digital interface	Connected to SBHT sensors
PRODUCT	
Kit 1: Sensor package	SBHT, KMS-820, Cable, transport case
Kit 3: Well site kit	Hoisting tripod (1000 lbs.), shiv wheel, cable reel, transport case
Kit 4: Remote digital level	Allows via PC to check and monitor the tool leveling
Kit 5: Field remote recording	Field container lockable, web access box
Kit 6: Sensor installation kit	Ring electrode for outside the casing (30), 500 m multi-stranded wire, LEMI-701 electrodes (8), extension cables (4)
Kit 7: Software	Optional: processing KMSPro (KMS-200) for MT or CSEM or microseismic
Training & commissioning	Usually requires 1 engineer and 1 geophysicist