

DEVICES



GEOSTAR Series

ECHO-DYNAMOMETER SYSTEM GEOSTAR-111

APPLICATION

The system is designed to measure liquid level and casing pressure in oil&gas wells and register a surface dynamometer card of the down-hole pumping unit operation, monitor valve operation, estimate well production rate, pumping unit efficiency and BHP data.

The system allows to analyze the pump card and recognize pump failures and predict possible faults.

USAGE

Used by oil production, research and development (R&D) and well logging departments in the oil&gas producing companies.

ADVANTAGES

- **Gaseous liquid column and BHP calculation**
- Joints-based level calculation & collars data view
- **Conclusion about pump malfunction**
- Acoustic velocity calculation on gas composition
- Support for slow-moving pumping unit
- Torque graph calculation and CBE analysis
- Log-log, Horner, MDH analysis
- Lightweight and scalability with more sensors
- Multi-language registration unit
- High sensitivity of acoustic reception unit
- **Support for international measure units**
- Special patented software EDWin™

FUNCTIONS

- Real-time liquid level depth determination
- Pump card calculation
- Casing pressure direct measuring
- Powerful report system and flexible exports
- Comprehensive analysis of pumping unit
- Noise suppression and useful signal extraction
- Valve leakage and pressure buildup test
- Pressure transient analysis
- Smart checking for valve leakage
- Counterbalance effect measurement
- Echo signal filtering and spectrum analysis
- Watching for the current load on the polished rod

TECHNICAL CAPABILITIES

Echo level meter transducers

Registered liquid level range	8 - 6000 m* (30 - 20000 ft)
Measured pressure range	0 - 10 (20,40) MPa* (1500,3000,5800 psi)
Pressure full-scale error	1,0 %
Connection thread	NPT 2"
Max weight	4 kg (8.8 lb)

Acoustic generators (gas guns)

Valve (gas blowout)	0.1 - 40 MPa (15 - 5800 psi) / up to 4500 m (15000 ft)
Crimped rubber device	0 MPa / up to 2000 m (6500 ft)
Manual pump	0 - 0.5 MPa (74 psi) / up to 4000 m (13000 ft)
Air compressor GIG-103	0 - 0.8 MPa (120 psi) / up to 4500 m (15000 ft)
Gas cylinder GIG-104	0 - 3 MPa (450 psi) / up to 6000 m (20000 ft)

Polished rod dynamometer transducer DN-102

Load cell type	strain-gauge (tensometric)
Relative load measurement range	0 - 20000 kg (0 - 44000 lb)
Load measurement full-scale error / resolution	5 % / 1 kg (2.2 lb)
Position transducer type	accelerometer
Position measurement range / SPM range	0 .. 15 m (590 in.) / 0.2 - 20 SPM
Position measurement full-scale error / Position resolution	5 % / 2mm (0.08 in.)
Max weight	0.5 kg (1.1 lb)

Horseshoe dynamometer transducer DM-102

Absolute load measurement range	0 - 20000 kg (0 - 44000 lb)
Load measurement full-scale error / Load resolution	1 % / 1 kg (2.2 lb)
Max weight	1.8 kg (4 lb)
Interface for the remote units	RS-485 / Modbus RTU

Registration Unit

Working temperature range	-40 ° ... +50 °C
Non-stop operation time, at least	30 hr
Max number of stored echo cards / stored levels (w/o graph)	90 pcs / 2000 pcs
Max number of stored dyna cards	160 pcs
Flash memory extender*	4 Mb

*Depending on order and chosen on oilfield requirements

System can be completed with the current transducer and the pressure transient gauge on request.

GEOSTAR-111 ECHOMETER-DYNAMOMETER SYSTEM

Units of the system

Registration unit

CORE MAIN UNIT



Microprocessor-based registration unit BR-21M (hereinafter RU)

RU is designed to register, display, process and store the measurements. It has keyboard for the data input and display to visualize the operating information. RU operates from inner power supply (4 AA-batteries). RU can be supplied with flash memory extender. RU is completed with rough, field-oriented and waterproof case and built-in heater for display. Overall dimensions 210x100x40 mm. Weight 600 gm.

Dynamometer transducers

BASIC



DN-102

Polished rod transducer DN-102

Designed to measure the relative load values on the polished rod of the pumping unit. Transducer consists of strain gauge and accelerometer. It is clamped to the polished rod below the carrier bar. Transducer measures load and position. It allows to obtain the surface dynamometer card, a pump card and valve tests.

Advantages of transducer:

- 1) The reliability because transducer does not consist the movable parts
- 2) Easy and safe mounting of transducer (mounting&tuning time is about 10 seconds)
- 3) Dynamometer card is from the moment of install to the moment of removal for 1 minute.

Horseshoe transducer DM-102

Designed to measure the absolute load values. Direct load measure. High accuracy. **Application:** Transducer **DN-102** is used for the qualitative estimation of pumping unit operability and watching the downhole equipment condition.

Transducer **DM-102** is used for more accurate testing in the complicated cases.

Wireless models of transducers are available. DN-102R and DM-102R.

EXPERT



DM-102

Echo level meter transducers

BASIC



UPAS-22

GIG-104

Crimped rubber device

Acoustic signal reception units (ASRU)

Designed to register acoustic signal and measure the casing pressure.

There are available several models:

- **UPAS-22** – with microphone (high sensibility);
- **UPASM-01** – without microphone (for high pressure, high reliability);
- **AUGPS-102** – automatic echo level meter is designed to register the depth level in oil well on the user-defined scheme without operator. It is used to register the level/pressure buildup curve in the fully automatic mode. Operates in both - explosion and implosion modes.

Acoustic signal generation units (gas guns)

To produce the starting acoustic impulse there are used 5 models of generation units:

- **Valve unit** is to generate an acoustic impulse for the oil wells with casing pressure more than 0.1 MPa by its short time opening;
- **Crimped rubber device** is to measure liquid level up to 2000 meters in zero-casing pressure oil wells;
- **Manual pump** is to measure levels more 1000 meters in zero and low pressure oil wells;
- **GIG-103 (Air compressor)** is to measure levels up to 4500 meters in zero and low pressure oil wells. It works from the car's power. It pumps 1 MPa for 10 seconds;
- **GIG-104 (Gas Cylinder)** to measure levels up to 6000 meters in zero and low pressure oil wells. Used with the external gas balloon. Best and universal option.

EXPERT



Manual pump

GIG-103

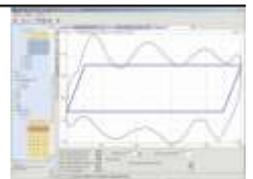
AUGPS-102

Software EDWin

Designed to process, modify and print the measurements received from the registration unit.

Software has a wide range of available functions.

SOFTWARE



Variants to order

UNITS	Available modifications for echo-dynamometer GEOSTAR-111										
	111.ED	111.EDF	111.ED.US	111.D	111.DH	111.E	111.EP	111.EM	111.EG	111.ALL	112
Registration Unit	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
UPAS-22	✓	✓	✓			✓	✓	✓	✓	✓	✓
Gas cylinder						✓			✓	✓	✓
Rubber device	✓	✓	✓			✓		✓		✓	
Manual Pump	✓	✓					✓	✓		✓	
Air compressor		✓					✓	✓		✓	
DN-102	✓	✓	✓	✓						✓	
DM-102		✓	✓		✓					✓	
AUGPS-102										✓	✓
Powermeter										✓	
Software EDWin	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

MODIFICATIONS