



## DEVICES

### GEOSTAR Series

## ECHOMETER-DYNAMOMETER SYSTEM GEOSTAR-111



### APPLICATION

System is designed to measure liquid level and casing pressure in oil wells and to register surface dynamometer card of down-hole pumping unit operation, to control valves operation, to estimate well rate, BHP calculation. System allows to analyze the pump card and to recognize the pump failures.

### 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
- Pump card calculation
- High sensitivity of acoustic reception unit
- Math model dynamometer card calculation
- User-friendly interface and verbose menu
- Explosion and implosion mode for echometer mode
- Valve leakage and pressure buildup test
- **Support for international measure units**
- Special patented Windows™ software EDWin™
- Lightweight and scalability with more sensors
- Multi-language registration unit
- Support for slow-moving pumping unit

### FUNCTIONS

- Real-time liquid level depth determination
- On-site graph viewing of the registered data
- Casing pressure direct measuring
- **Conclusion about pump malfunction**
- Noise suppression and useful signal extraction
- Smart checking for valve leakage
- Counterbalance measurement
- **Acoustic velocity calculation on gas property**
- Echo signal filtering and spectrum analysis
- Watching for the current load on the polished rod
- Powerful report system
- Storing the registered data to transfer on PC

### TECHNICAL CAPABILITIES

#### Echometer transducers

Registered liquid level range	8 - 6000 m* (30 - 20000 ft)
Measured pressure range	0 - 10,20,40 MPa* (1450,2900,5800 psi)
Pressure full-scale error	1,0 %
Connection thread	NPT 2 3/8" (API 5CT/5B) or NPT 2" on order
Max weight	4 kg (8.8 lb)

#### Acoustic generators

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

#### 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 / Load resolution	5 % / 1 kg
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
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
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

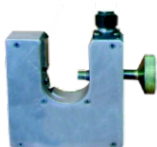


#### Microprocessor-based registration unit **BR-21M** (hereinafter RU)

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 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.

EXPERT



DM-102

#### Echometer transducers

BASIC



UPAS-22

Crimped rubber device

#### Acoustic signal reception units (ASRU)

Designed to register acoustic signal and measure the pressure.

There are available several models:

- **UPAS-22** – with microphone (high sensibility);
- **UPASM-01** – without microphone (for high pressure, high reliability);
- **AUGPS-112** – automatic echometer 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.

EXPERT



GIG-104

Manual pump

GIG-103

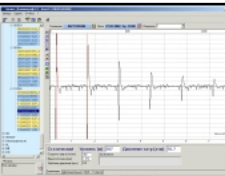
AUGPS-112

#### Acoustic signal generation units (ASGU)

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

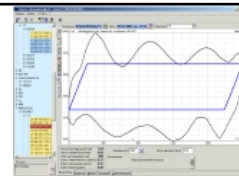
- **Valve unit** to generate an acoustic impulse in the oil wells with the casing pressure more than 0.1 MPa by its short time opening;
- **Crimped rubber device** to measure level up to 2000 meters in zero-casing pressure oil wells;
- **Manual pump** to measure levels more 1000 meters in zero and slow pressure oil wells;
- **GIG-103 (Air compressor)** to measure levels up to 4500 meters in zero and slow pressure oil wells. It works from the car's power. It pumps 1 MPa for 10 seconds;
- **GIG-104 (Gas Balloon)** to measure levels up to 6000 meters in zero and slow pressure oil wells. *It gives the best reflections from joints.*

SOFTWARE



#### Software EDWin

Designed to process, modify and print the measurements received from the registration unit. Software has a wide range of available functions.



#### Variants to order

UNITS	Available modifications for echometer-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	✓	✓	✓			✓	✓		✓	✓		
UPASM-01								✓		✓		
AUGPS-112										✓	✓	
Rubber device	✓	✓				✓	✓	✓		✓		
Manual Pump		✓					✓			✓		
Air compressor									✓	✓		
Gas balloon	✓	✓	✓							✓	✓	
DN-102		✓	✓	✓	✓					✓		
DM-102		✓	✓		✓					✓		
Software EDWin	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

MODIFICATIONS