DQG

Differential Quantum Gravimeter

The DQG (Differential Quantum Gravimeter) from Exail is an industrial quantum sensor capable of simultaneously measuring gravity and its vertical gradient with a precision that can reach, under favourable environmental conditions, down to 2 Eötvös in 60 min. This technology provides valuable solutions for near-surface geophysics and civil engineering, enabling the detection of large masses at long range (such as magma pockets) and smaller objects at short range (tunnels, pipelines, cavities).

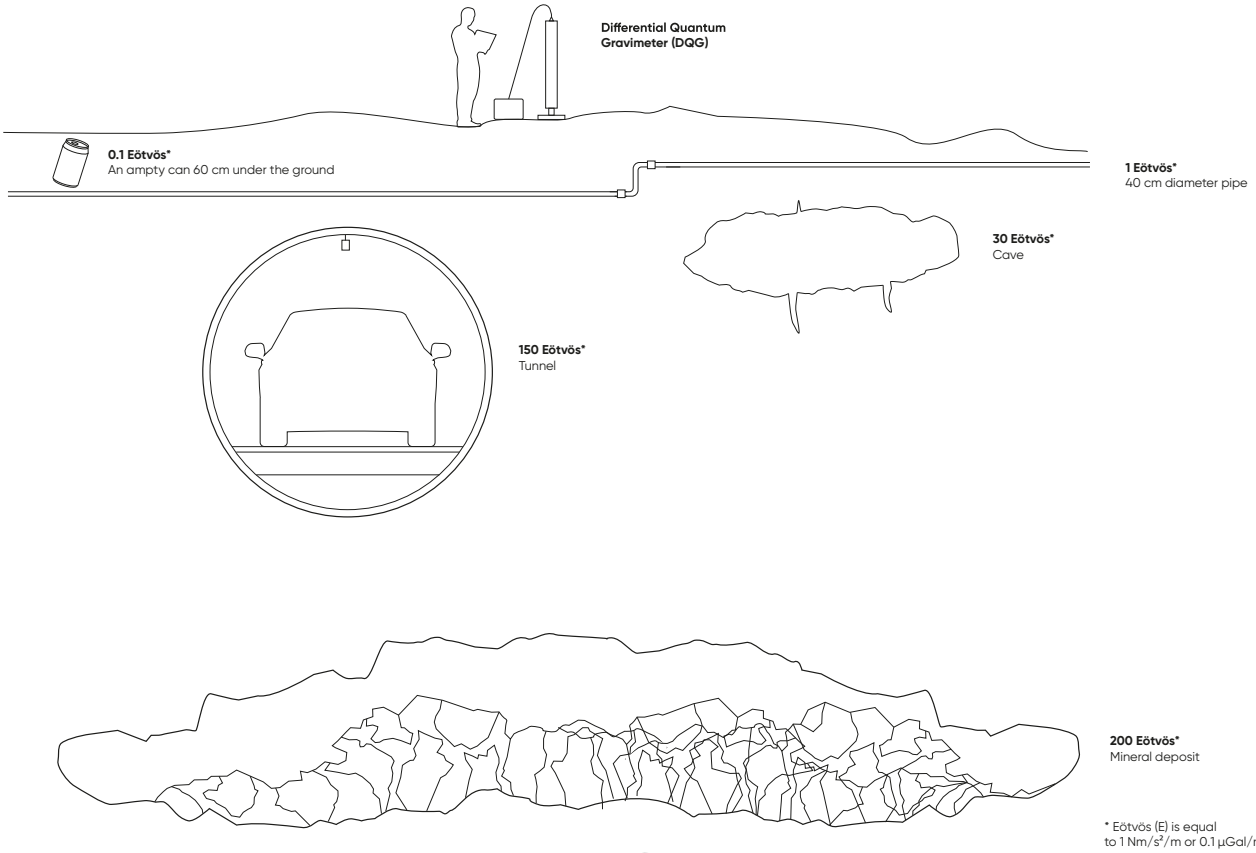


BENEFITS

- Fibered components no optical alignment required
- Sensor head orientation-independent operation
- Excellent robustness to ground vibrations
- High reliability (lifetime > 50,000 h)
- Sensor head can be moved up to 15 m from the supply rack

APPLICATIONS

- Natural resources management
- Geodesy
- Volcanology
- Subsurface imaging
- Civil engineering



* Eötvös (E) is equal to 1 Nm/s²/m or 0.1 µGal/m

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TECHNICAL SPECIFICATIONS

Performance	Gravity	Gravity gradient
Typical precision at a quiet site	500 Nm/s²/√t [1][2] 50 Nm/s² in 1.5 min 20 Nm/s² in 10 min 10 Nm/s² in 40 min	100 E[4]/ √t [1][2] 10 E in 1.5 min 4 E in 10 min 2 E in 60 min
Long-term stability	≤ 20 Nm/s²	≤ 2 E
Trueness	≤ 150 Nm/s² [3]	≤ 20 E [3]
Repeatability	≤ 50 Nm/s²	≤ 10 E
Cycling frequency	1.72 Hz	

Physics package

Number of boxes	4
Total mass	< 170 kg
Dimensions of sensor head	1 module: Diameter 82 cm x Height 141 cm / (tripod incl.)
Dimensions of control unit	1 module: Height 87 cm x Width 63 cm x Length 63 cm
Dimensions of AC unit	1 module: Height 87 cm x Width 30 cm x Length 63 cm
Warm-up time (typical)	2 h (start/stop function enabling rapid setup once warmed up)
Nb of connections	< 10
Length of cable between sensor head and laser system	15 m

System interface & control

Control system	Internal computer (Linux OS) / optional additional linux OS laptop
User interface	Dedicated software
Remote control and monitoring	With TeamViewer
Data format	.csv (All corrections (tides, ocean loading, atmospheric pressure) are recorded for easy post-processing

Environmental & physical specifications

Operating temperature / Storage temperature	[0 ; 40] °C / [5 ; 30] °C
Humidity	60 %

AC/DC power requirements

Operating voltage	47-57 V DC
External AC power supply	230 V or 110 V
Operating power consumption	600 W

(1) Guaranteed precision measured at Exail premises: 800 Nm/s²/√t Typical precision measured at quite site 500 Nm/s²
(2) Allan deviation with a white-noise behaviour of 500 Nm/s²/√t or below between 50 and 600 s integration time
(3) By measurement / Error budget characterized at Exail premises prior to shipment and corresponding accuracy table delivered with the test report
(4) : 1 E=1 Nm/s²/m

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