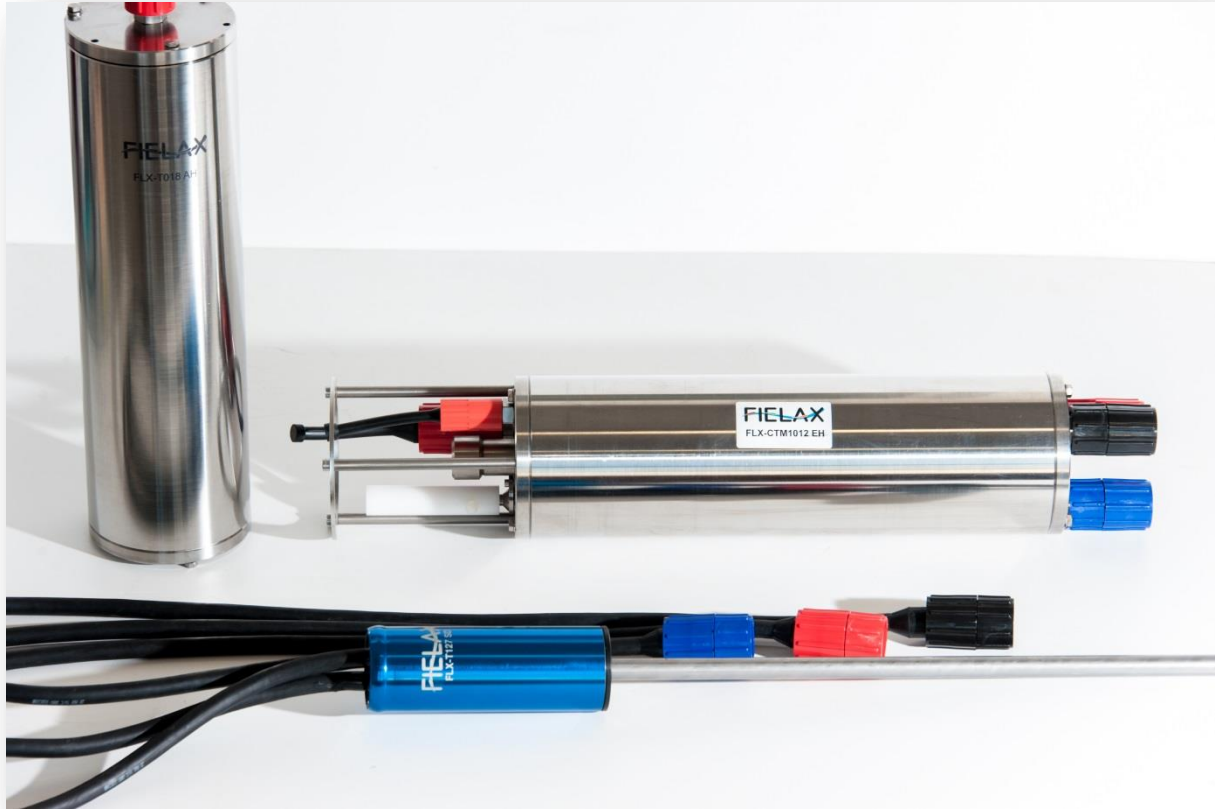


Product description

The HeatFlowProbe is a scientific device for the measurement of the thermal gradient and the in-situ thermal conductivity. With these two parameters, the heat flux density can be determined. The probe is designed to measure in-situ values in the sediments of the seafloor down to a penetration depth of 6 m. It is a follow-up of an instrument which has been in use for more than 10 years. Research interests in marine sciences related to e.g. gas hydrates at water depths less than 2000 m require longer penetration depths whereupon the development of this new HeatFlowProbe was indicated. The HeatFlowProbe described in this fact sheet is unique with respect to its innovative design:

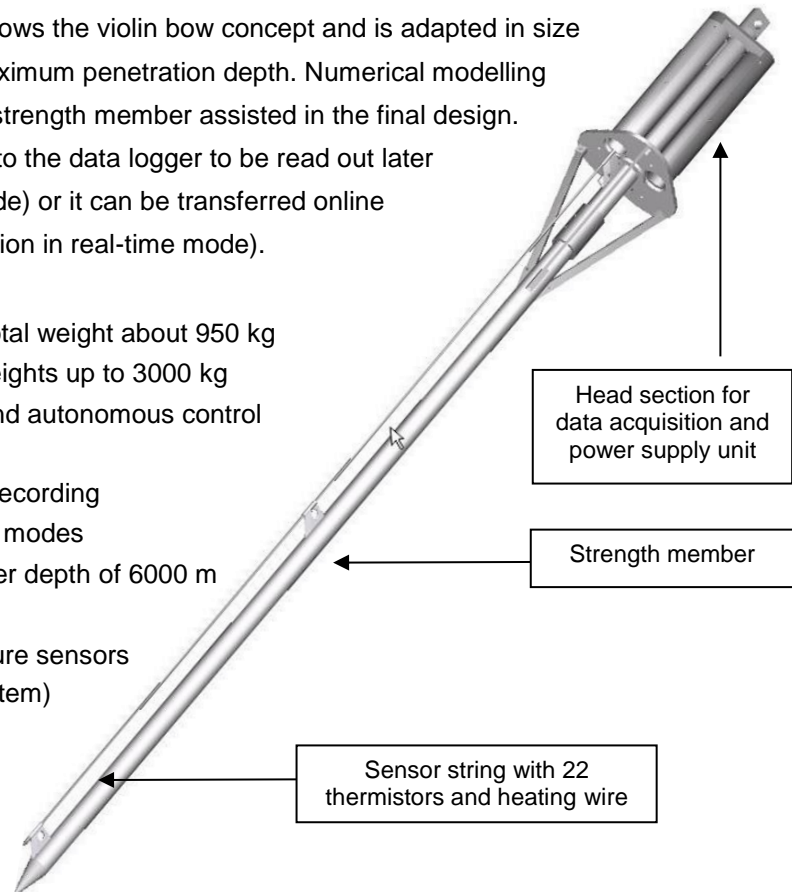
- Excellent performance was proven during several cruises
- High stability allows operation even in critical areas where e.g. carbonate crusts or gas hydrates may occur
- Measurement with a relative resolution < 1 mK
- 22 channels work at a sampling rate of 1 Hz
- Real-time data acquisition at a transmission rate of 2400 baud through deep sea cable
- The probe is operated in 'pogo-style', i.e. extended profiles can be acquired whilst minimizing the expenditure of time

Mechanical design

The mechanical design of the probe follows the violin bow concept and is adapted in size and material strength to the desired maximum penetration depth. Numerical modelling of the dimensions of sensor string and strength member assisted in the final design.

The acquired data can either be saved to the data logger to be read out later on board (operation in autonomous mode) or it can be transferred online to the ship via a deep sea cable (operation in real-time mode).

- 6 m lance, total length 8.4 m, total weight about 950 kg
- Weight stand with additional weights up to 3000 kg
- Power pack, data acquisition and autonomous control integrated in the probe
- Online or memory-based data recording
- Autonomous and online control modes
- Operation range down to a water depth of 6000 m
- Containerized dimensions
- Sensor string with 22 temperature sensors and heating wire (consumable item)



Instrumentation

The data acquisition system including the communication package is designed and built by our partners according to our specifications.

- Grade 5 Titanium pressure housings for data acquisition unit and power supply unit
- Measuring range $-2\text{ }^{\circ}\text{C}$ to $60\text{ }^{\circ}\text{C}$
- Resolution $< 1\text{ mK}$ from $-2\text{ }^{\circ}\text{C}$ to $30\text{ }^{\circ}\text{C}$
- Absolute accuracy up to $\pm 2\text{ mK}$ with in-situ calibration using a calibrated PT100 sensor in deep sea bottom water
- Sampling frequency 1 Hz
- Control of high energy heat pulse (ca. 270 W) for in situ thermal conductivity measurement
- Signal conditioning of analogue temperature signal
- A/D conversion with 20 bit resolution
- Recording of conditions during measurement: pressure, tilt, acceleration, temperature
- Real-time communication with deck unit through coax deep sea cable
- Battery and storage capacity allow continuous operation for 4-6 days

Processing Software FELLOW

- Processing software for the evaluation of temperature measurements
- Data visualization of acquired temperature data and status sensors
- Calculation of depth dependent thermal parameters
- Geothermal gradient calculation and heat flow estimation



Spare Parts and Options

- Deck unit (FSK) for online measurements
 - Communication with the HeatFlowProbe at the seafloor through coax deep sea cable
 - Data capture and storage on hard disk
 - Monitoring of conditions during measurement: pressure, tilt, acceleration, temperature
 - Real-time graphical display of data
- Additional weights (50kg/pcs.)
- Replacement sensor string: 6 m active length, 22 temperature sensors
- Lifting gear
 - 8to rotator with chain link and 17to shackle
 - Crow's foot
 - Load testing for all lifting points and lifting gear on request
- Trolleys for rigging and mounting (pair) (2016 plus model: stainless steel)

For more information please contact:



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