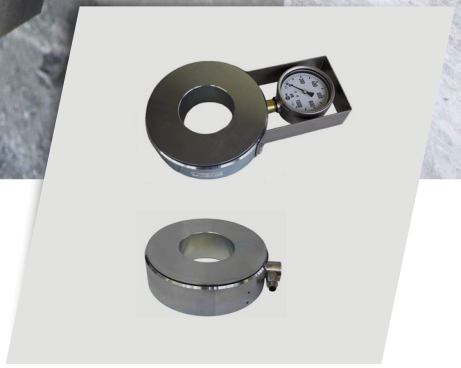
K LOAD CELL



Küchler Technik

kuechler-technik.ch

ANCHOR AND FORCE GAGES IN GEOTECHNICAL ENGINEERING DESCRIBED

In rock and foundation engineering anchors are used as components that stabilize the soil by absorbing longitudinal and lateral forces. The metrological testing and monitoring of the preload force of anchors as supporting elements of a building is therefore highly important especially when concerning permanent anchors.

For light soil and rock anchors, the preload force is usually ensured in the course of installation using a torque wrench with a set reference torque. With this approach, it is however advisable to check the wrench torque by installing force gages at individual anchors.

The preload force should always be monitored by anchor force gages for light soil and rock anchors with large play over its length and in difficult build forms and where in general a traction device is used for tensioning. They also have the advantage of observing the development of the preload force, which with other methods, such as the lifting test, is only possible with great difficulty and complication.

Permanently installed anchor force gages offer not only the possibility to continuously determine the preload force but also have the advantage of being able to record the measured values remotely, or automatically query a given measurement rhythm through a data logging system.

APPLICATION EXAMPLES

– Inspection and long-term monitoring of the acting forces on the anchor head

– Monitoring of anchor and support loads in shoring, underground cavities, in tunnels and galleries, in embankment construction, in open excavations, retaining walls, excavation installations and surface or underground mining

– Inspection of pile loads

Küchler anchor force gages are hydraulic force gages that provide the measured values either analog or digital and are display on the measurement display device. The force gages prepared for the anchor force are extremely precise. They create and directly display tensioning forces at the anchor head simply and economically. The anchor force gages are used for continuous monitoring of forces applied to anchors and other back-anchoring rods and cables.

The force transmission piston is designed according to the purpose of the measurement. The force acting on the piston is converted into hydraulic pressure and transferred to the connected measurement display device. The measurement device scale can be displayed in different units, e.g. kN, daN and others. The piston is maximum 0.5mm

K LOAD CELL

WITH MANOMETER

Direct display analog Küchler anchor force measurement devices

can be used when the anchor head area is accessible, so that the display device (manometer) can be read.

The measurement accuracy of the analog Küchler anchor force measurement device is ± 1 % of the rated power, the temperature error per 10 K is approx. 0.1 % of the rated power range.

ELECTRIC

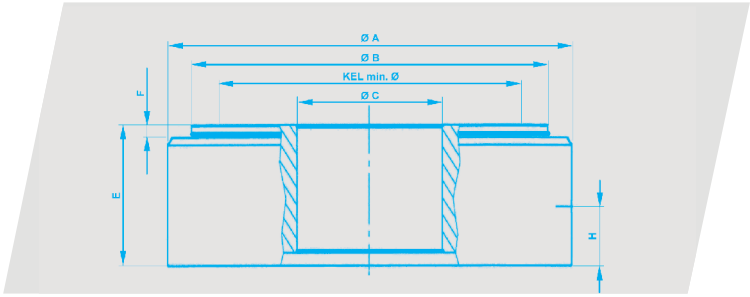
Hydraulic-electric anchor force measuring device

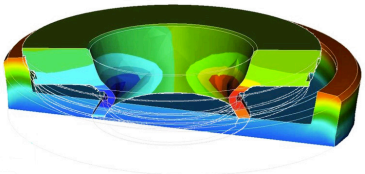
can be used when the anchor head area is inaccessible, the force is converted by a pressure sensor into an electrical signal 4… 20 mA. The signal can be displayed via the portable digital display device "ViSens».

The measurement accuracy of the hydr./ elect. anchor force measuring devices is ± 0.5 % of the rated power, the temperature error per 10K is approx. 0.1% of the rated power range.

MEASURING RANGES AND DIMENSIONS

preliminary dimensions





FEM calculation

The design data is evaluated and the measurement behavior simulated using the finite element method (FEM).

Design	Rated load kN	Dimension in mm			Dimension in mm		
		Ø A	Ø B	Ø C	D	E	F
Manometer	600	220	194	90	19	55	5
Digital	1 000	220	194	90	19	55	5
Digital	1 000	220	194	105	19	55	5
Digital	1 500	220	194	90	19	55	5
Digital	2 000	315	295	165	20	75	5
Digital	2 500	315	295	165	20	75	5

K HAND-HELD READER

Küchler hand-held display ViSens for anchor force measurement

The Küchler KMD hand-held reader has self-recognition and is very easy to use. The Küchler KMD hand-held reader has a rechargeable battery and is ready to use in approx. 6 hours.

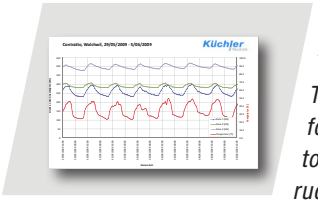
Measurement system for sensor input
0 ... 10 VDC, 4 ... 20 mA, 2-L / 3-L

Display
5-digit LCD display, powered via 9V battery

Accuracy
± 0.05 %

Scope of delivery
Measurement device incl. rechargeable battery, charger, case and connection cable

ACCESSORIES



EVALUATION SOFTWARE

The evaluation enables the anchor forces as well as the temperatures to be analyzed over the entire construction period.

EXTENSION CABLE

Measuring cable extension (10 m, 20 m, 50 m, 100 m)

CLAMPING TOOL

ANGLE PLATES

Available in 15°/20°/30°

CABLE COLLECTION BOX

ANCHORING PLATE

200 x 200 x 20 mm

K REGISTRATION WITH DATA LOGGER

Our target is to implement tamper-proof data storage, diverse access rights or an alarm with internal system monitoring.

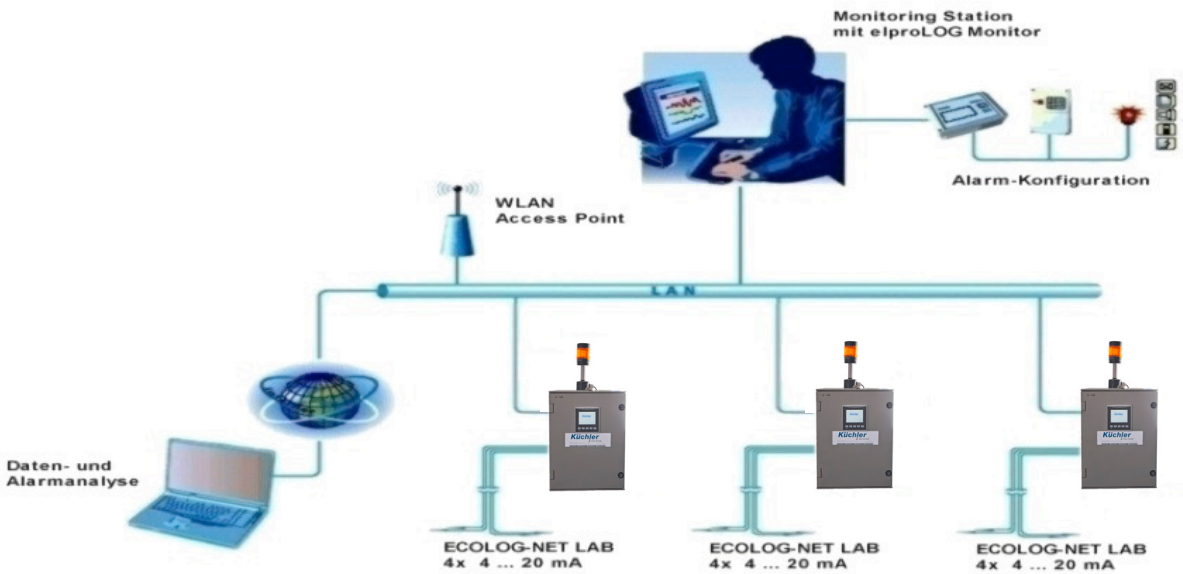
Monitor programs display current measurement values, web servers make these values available in the Internet for all authorized persons and simultaneously send alarm information to selected recipients and all conceivable media.

Our goal is to offer customers the most optimum solution for almost all applications.

Data loggers are ideal for recording force measurements via the network. The data logger records the data in the internal memory. The data can be downloaded to the PC via the LAN network. The system provides maximum data security even during a power outage or network failure as the measured values continue to be recorded due to the built-in battery. There are several built-in alarm options for a local alarm or alarm via the network.

SPECIFICATION

- **– LAN /WLAN with TCP/IP-protocol**
- **– USB port for local communication**
- **– Large data storage with 64 000 measurement values**
- **– Voltage supply for the LAN network is required**
- **– Battery power supply in case of a power failure**
- **– Programmable interval and alarm conditions**
- **– Data security in case of power failure**
- **– 4 or 64 channel data logger**



Load cell

Data logger