VARIO couple ®

your essential metrology tool

Torque and force measurement instrument

CLA ▲
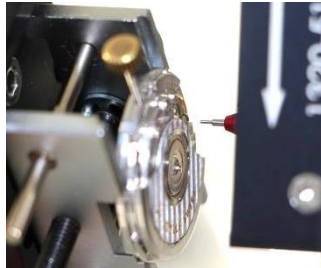*à la pointe de l'automation*

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Over the years, the VARIOcouple became the reference in force and torque analysis of low stress system. Used in both Research & Development laboratories and Quality Control, the VARIOcouple's main applications are not anymore for watchmakers but also for stepper motors, rotary dynamometers, flowmeters, and the spring industry.

Measurement principle

The part to be measured is fixed on the central axis of the VARIOcouple by means of an intermediary support (grips, chucks, plate, mandrel, universal sample holder).

A magnification camera, located in the measurement axis, then centers the object and prepares it for evaluation. The sensor is precisely positioned with the help of a micrometer displacement table consisting of three axes of freedom: X, Y and Z.

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Measurement is carried out through an intermediary arm, needle or a pulley, which connects the axis to a force sensor, or to a torque sensor fitted coaxially to the test piece.

A servomotor, providing speeds of 0.02 to 10 rpm or 60 rpm, drives this axis of the apparatus.

During the measurement of force or torque, the software directly displays the curve of force as a function of time. To better simulate the real life conditions of usage, diverse mechanical, recording, and synchronization accessories are also available.

Examples of practical applications

Energy accumulator	Overload and sliding Barrel spring torque Number of turns and yield Wear
Counter and transmission	Torque within gear systems Yield Frequency analysis Determination of residual torques Torque needed for various functions
Dispatching and regulation	Development of new escapements Development of balance-spring Calculation of spring stiffness
Display	Cannon-pinion, friction Torque taken by the date system Torque to drive the disc
Manual and automatic winding	Movement winding by the crown Sliding brace quality Friction measurement in bearing structures Winding torque for the mass Static torque of the mass

Complete software

The instrument is entirely computerized and controlled by a software that allows for acquisition and analysis of force and torque. The software includes the following functions and measurements:

- Continuous sensor load monitoring as a function of position
- Operation over angle or time mode
- Automatic sensor calibration
- Sensor protection using software threshold
- Manual or automatic barrel mode
- Yield of barrel
- Fatigue mode
- Possibility to filter curve
- High angular precision
- Reciprocating mode
- Frequency analysis (FFT)
- Direct integration of images and text into the multimedia file format

Sensors

The VARIOcouple is completed with a large range of torque and force sensors allowing torque measurements of less than 1 µNm and up to 1 Nm.
All these sensors are bidirectional, inductive or resistive type with a good linearity and negligible hysteresis.

Nominal capacity of the sensors

Torque sensors		
TSF-000	±100	µN.m
TSF-005	±500	µN.m
TSF-01	±1	mN.m
TSF-05	±5	mN.m
TSF-1	±10	mN.m
TSF-2	±20	mN.m
TSF-5	±50	mN.m
TSF-10	±100	mN.m
TSF-30	±300	mN.m
TSF-100	±1	N.m

Force sensors		
SC-002	±20	mN
LC-01	±0.1	N
LC-1	±1	N
LC-5	±5	N
LC-10	±10	N

OVERVIEW:

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SERVICES :

Through its engineers, who are measurement technology specialists, CLA provides consultancy and expertise to support its customers in their industrial development.