



FLEXILAB

Ultra-modular test bench

Control of watch movement functions

- + Rotation tests
- + Measurement and control of torque applied during the cycle
- + Tensile-pressure tests
- + Measuring and controlling the force applied during the cycle
- + Flexibility
- + Evolutive device



► MECHANICAL AGING

► Control equipment

► Special Machinery

► Watchmaking tools

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AGEING AND MECHANICAL FATIGUE TEST BENCH



Modular positioning table

Scalable to customer requirements. All ageing tests based on element rotation, traction or pressure.



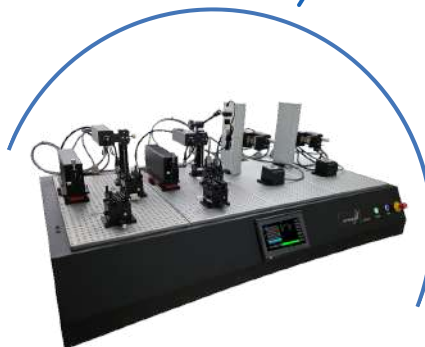
Module integration

The modules added to the table are independent and can be parameterized.

Tension-pressure module

Rotation module

Integral rotation and traction-pressure module



Scalable and flexible

The Flexilab is a system that can be upgraded according to customer requirements:

Rotating baseplate

Static, dynamic torque transducer

Force transducer

Vision module

Time measurement

...



Intuitive software

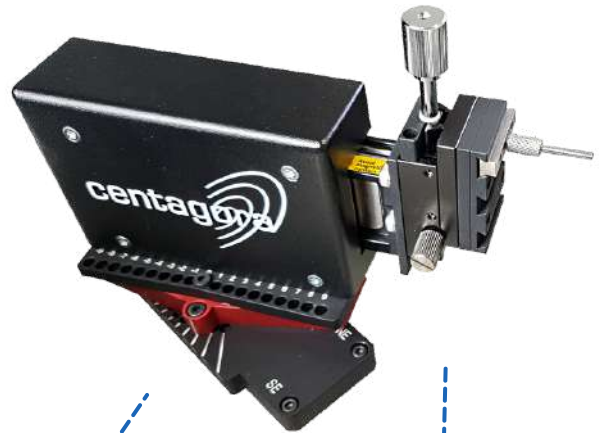
This interface lets you create all types of ageing cycles and observe variations in torque and force, and store and export all data (torque, force) measured during the experiment.





Two possible travel procedures

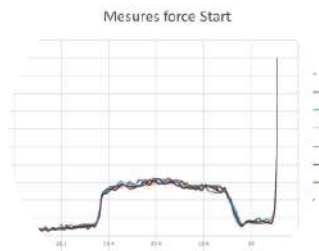
Position setpoint to be reached (mm) by manual teach-in and force setpoint to be reached (N).



Performance

Rated force: 20 N / 40 N
 Stroke: 30 mm / 80 mm
 Peak force: 40 N / 80 N
 Peak force: 60 N / 114 N
 Applied force measurement: ± 0.5 N / ± 1 N
 Linear positioning accuracy: ± 10 μ m
 Linear positioning resolution: 1 μ m
 Sampling: 0.002 sec

Adjustable angular positioning: ± 1
 Min: -50° Max: 50
 Max: 50° Angle



Parameters

Speed, acceleration and deceleration
 Position control when moving with force
 Force control when moving into position
 Maximum force setpoint (system safety)
 Measurement data export

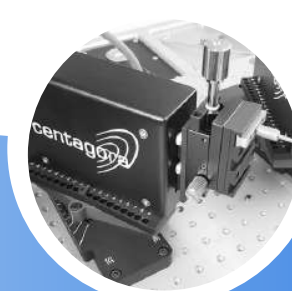
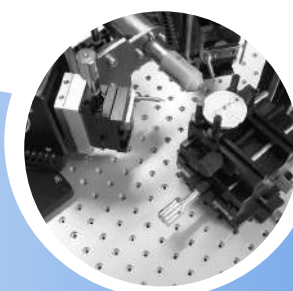
Pressure force sensor

nominal force	Precision	Breaking force
1 N	± 0.5 mN	5 N
5 N	± 2.5 mN	50 N
10 N	± 5 mN	50 N
20 N	± 10 mN	100 N

Possible options

Pressure force sensor

Optical ruler: optimized measurement of axis displacement
 Linear positioning repeatability: ± 0.5 μ m
 Linear positioning accuracy: ± 1 μ m
 Linear positioning resolution: 100 nm



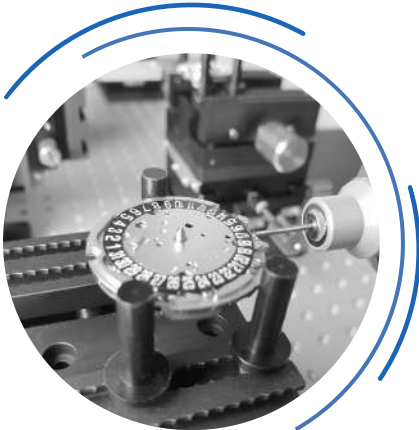
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ROTATION MODULE



Modular tools

Rotation module can be positioned vertically or horizontally.
Ergonomic XYZ slide adjustment
Modular tooling to suit every application.



Performances

Motor characterization

Torque measurement applied at $\pm 10\%$ of rated torque

Motor speed: 1 - 600 rpm-1

Available nominal torques (maximum working torque) :

3 mNm (± 0.3 mNm)

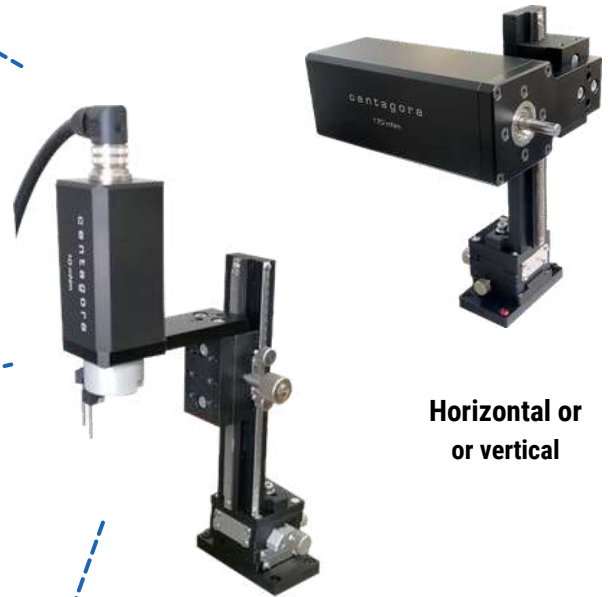
10 mNm (± 1 mNm)

23 mNm (± 2.3 mNm)

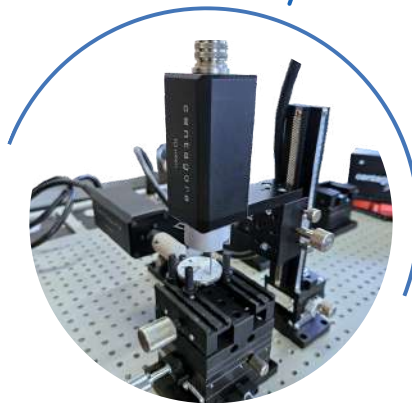
30 mNm (± 3 mNm)

Other torques available on request.

Alignment and height adjustment using XYZ precision slides.



Horizontal or
or vertical



Parameters

Speed

Acceleration

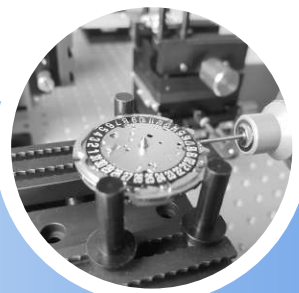
Deceleration

Maximum torque control before cycle stop
Maximum torque check before switching to next instruction

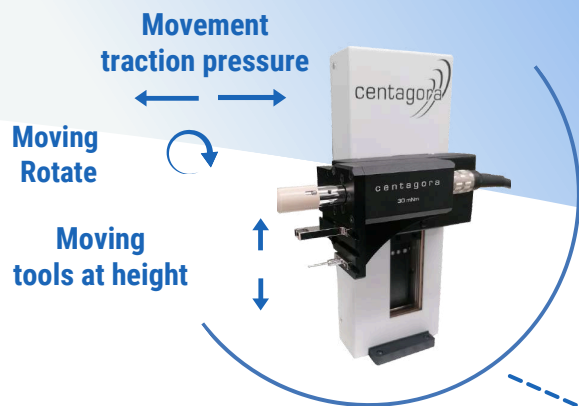


Option

Winding Test:
Faithful simulation of manual movement arming



INTEGRAL MODULE ROTATION AND TRACTION PRESSURE



Integral module

Module combining rotation, pressure traction and tool height adjustment.



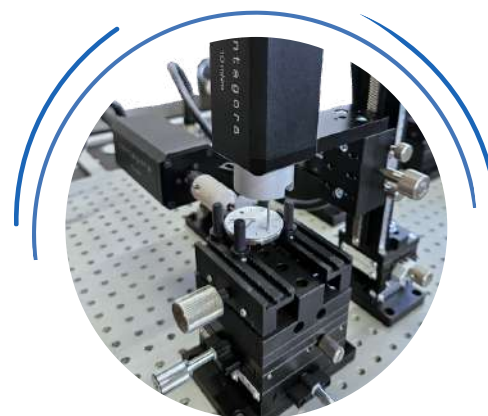
Types of aging in rotation

- Arm / Disarm
- Date correction
- Time setting
- Lantern crown gasket
- Chronograph counter



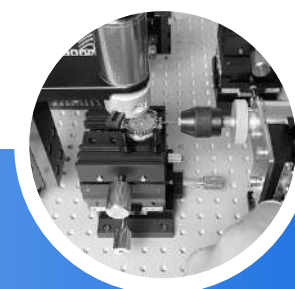
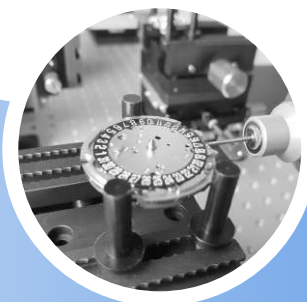
Types of tension-pressure aging

- Rattrapante
- Perpetual calendar corrector
- GMT corrector
- Crant age tige couronne
- Spring
- Sautoir
- Traction crown



Types of aging performed with rotation + traction-pressure

- Screwing / Unscrewing crown
- Screwing / unscrewing plunger
- Automatic insertion of tooling
- Cycle automation





Rotating base

The baseplate can be used to receive a movement, module or watch head, using suitable tools and fittings.

Clockwise and anti-clockwise rotation through 360°.

Angular accuracy $\pm 0.002^\circ$.



Linear Y positioning axis

Axis for shifting the rotary base to offset the plunger pressure angle according to the type of gauge to be tested.

Total stroke: 50 mm(+/-)



Rotary torque sensor

Measurement: 0 - 100 mNm

Accuracy: ± 0.5 mNm

Permissible working torque (peak): 150 mNm

Motor speed: 1 to 5'000 rpm

Rated torque: 20 mNm

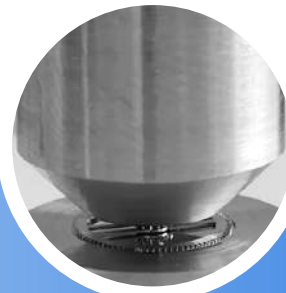
Max. axial force: 35 N



Hardware Vision + Protective enclosure

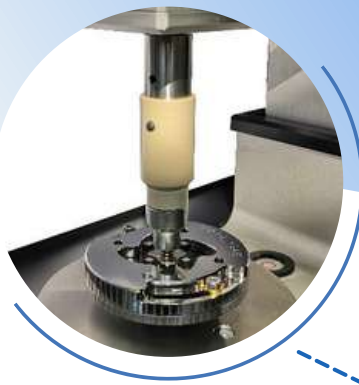
Hardware Vision: Programmable shots during the cycle

Protective enclosure: soundproof, dust-proof cover



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BARILAB MODULE: BARREL INSPECTION AND MEASUREMENT



Universal positioning and compliance tool

Universal positioning: gripping system
for holding any type of barrel.

Compliance tool: compensates for
eccentricity of $\pm 0.3\text{mm}$



Parameters available

Clockwise and counter-clockwise

Speed (1 to 600 rpm)

Number of revolutions

Acceleration - Deceleration

Torque setpoint to be reached

Sub-programs

Sub-program repetitions within a main program

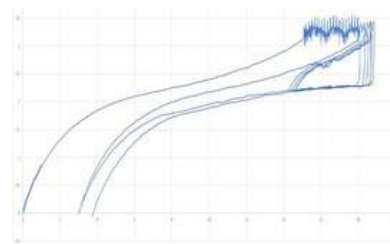
Time delays: pause or hold at a given angle,

number of revolutions or torque

No. of flange slip revolutions

Flange sliding speed

Slope coefficient for detection of maximum torque
before flange slip



Performance

Calculation of barrel-specific information

(Mgi, Mgs, Mgmax, Max torque before flange slip
number of revolutions before flange slip, M0.25, etc.)

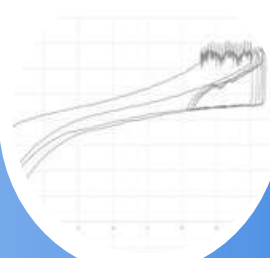
Real-time display of Mgi, Mgs, Mgmax evolution

Use of measured values as aging cycle variables:

Example:

1. Arm up to 110% of max torque before flange slip
2. Disarming after X revolutions of the barrel (24h disarming time)

Values can be exported to Excel in .txt format.



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MODULE TRACTION-TORSION : STRAPLAB V1.0



Bracelet ageing

Add-on module for creating different aging and control cycles on bracelets.



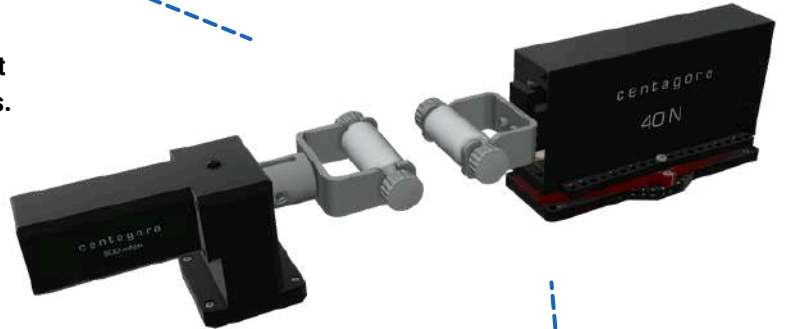
Parameters

Traction parameters :

- Displacement in position (mm)
- Force displacement (N)
- Speed, acceleration, deceleration
- Position control during displacement force displacement
- Force control when moving in position
- Maximum force setpoint (system safety)

Torsion parameters :

- Displacement in position (mm)
- Speed, acceleration, deceleration
- Torque control during displacement position
- Maximum torque setpoint (system safety)



Traction performance

- Linear positioning: $\pm 2 \mu\text{m}$
- Stroke: 80 mm
- Nominal force: 40 N
- Peak force: 80 N
- Peak force: 114 N
- Force measurement: $\pm 1 \text{ N}$
- Sampling: 0.005 sec
- Angular positioning: ± 10
- Vertical positioning
- Angular indexing interface



Torsion performance

- Rated torque: 80 cNm (800mNm)
- Motor characterization
- Torque measurement ($\pm 5 \text{ cNm}$) range 30 to 50 cNm
- Motor speed: 1- 600 rpm-1
- Brushless motor
- Maximum axial load resistance: 100N





Precision concentric movement holder

Concentric vice consisting of a fixed base and two movable jaws. This movement holder or universal vice can be mounted on a fixed base or on an XY slide.



Universal precision barrel and concentric vice gripper fixture

Universal barrel-gripping fixture:

Concentric fixture consisting of a fixed base and four movable dogs.

Allows gripping of any type of barrel.

Concentric vice :

Universal tool for holding the element (movement, additional module or watch head) to be tested on the rotating base. Flexible clamping diameter and height adjustment.



Universal chuck and drive head double eccentric fingers

Universal chuck :
Gripping range 0-6 mm

Drive head with eccentric fingers:
Tool for driving needles or an oscillating weight



Work crown and self-centering tool

Specific crown compatible with the self-centering tool. One version screws directly onto the winding stem, while the other attaches to the crown or push-buttons by tightening three screws.

The self-centering tooling is compliant enough to absorb an eccentricity of ± 0.3 mm on the crown.

