

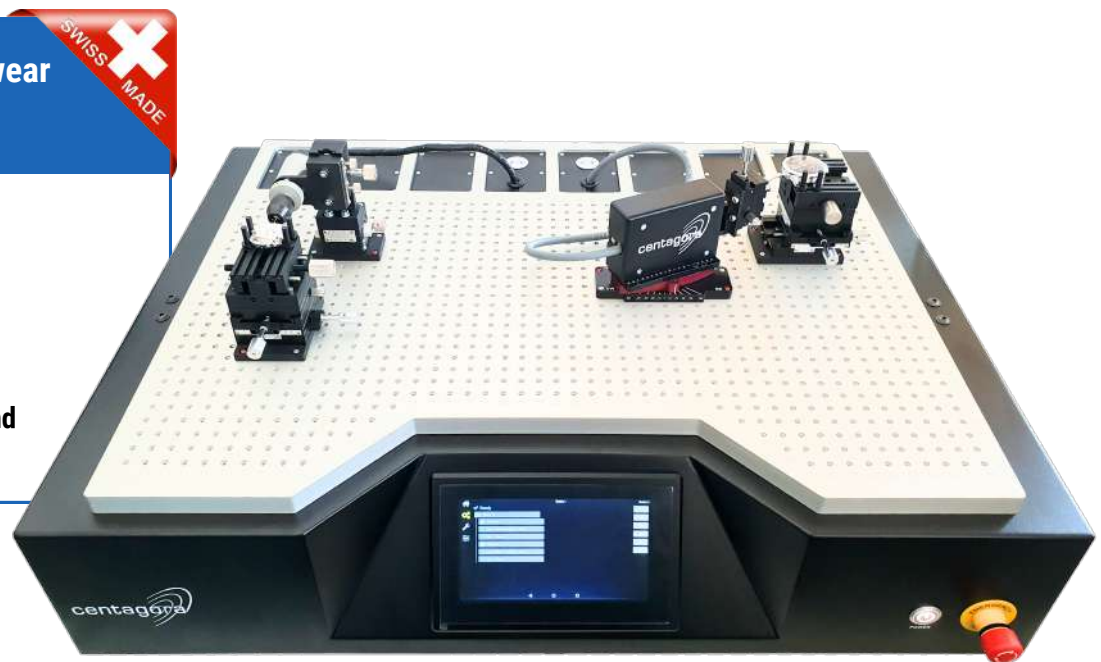
# FLEXILAB

Ultra modular test bench  
Rotation, Traction or Compression

Inspection of the wear  
of a part



- + Total aging process
- + Configurable cycles
- + Inspection of the force and torque during cycle



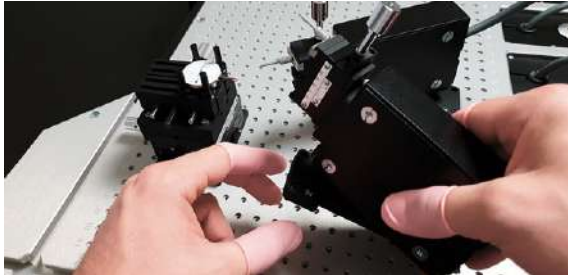
▶ AGING PROCESS

▶ Special machinery

▶ Inspection equipment

▶ Watchmakers tools

All ageing tests based on the rotation, traction or pressure of a component.



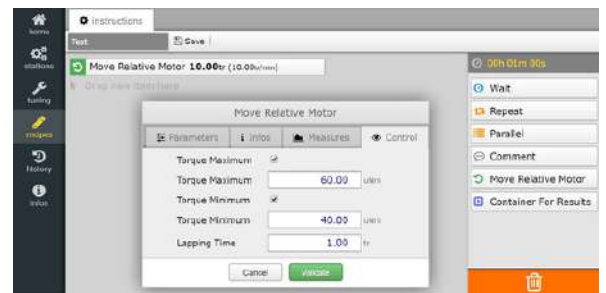
Modular positioning table for indexing different modules



Gripping tools for all types of mechanical components

The added modules are completely **independent** and **programmable** with **Servo Spin** software:

- + Configuration of linear and rotary stations to customer requirements
- + Flexible control of individual stations
- + Communication via web browser without software installation (PC, MAC, Linux compatible)

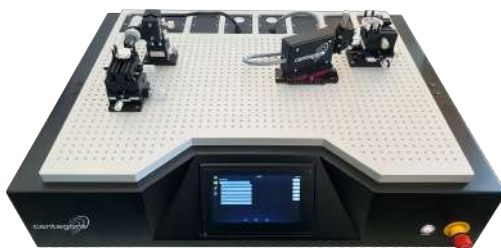


### Servo Spin software:

- User-friendly, flexible cycle creation
- Data acquisition in .txt format

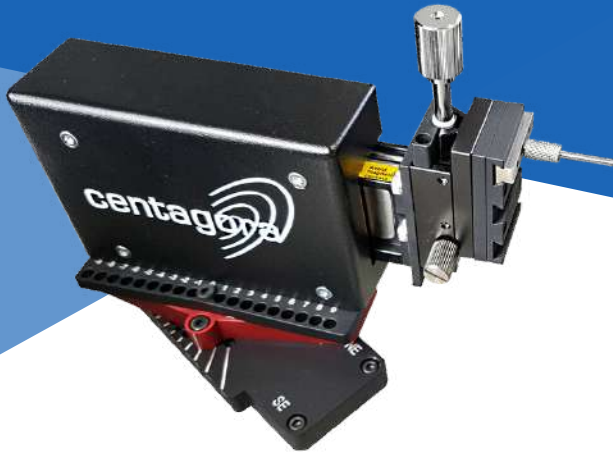
This interface enables **variations in torque and force** to be observed, and **all data** (speed, acceleration, torque, force) measured during the experiment **to be stored and exported**.

**On-board intelligence** allows the device to operate independently, eliminating any disruption caused by PC updates or shutdowns.



System adaptable to customer requirements





Two possible **movement procedures**

- **Target position (mm)**
- **Force setpoint to be reached (N)**

### Performance

- + Rated force: **20 N / 40 N**
- + Travel: **30 mm / 80 mm**
- + Maximum force: **40 N / 80 N**
- + Peak force: **60 N / 114 N**
- + Applied force measurement: **± 0.5 N / ± 1 N**
- + Linear positioning precision: ± 10 µm
- + Linear positioning resolution: 1 µm
- + Range: 0.002 sec



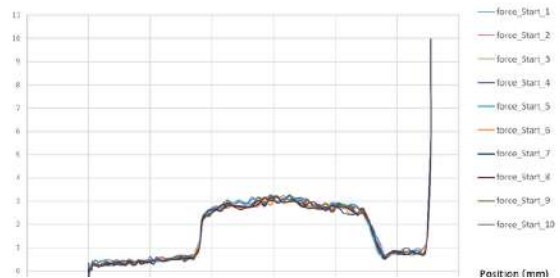
Quick start-up time by manual learning of the different positions to be reached

### Parameters

- + Speed
- + Acceleration
- + Deceleration
- + Position control during forceful displacement
- + Control of force during a movement in position
- + Maximum force setting (safety of the system)



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



Export of measurement data

### Option pressure force sensor

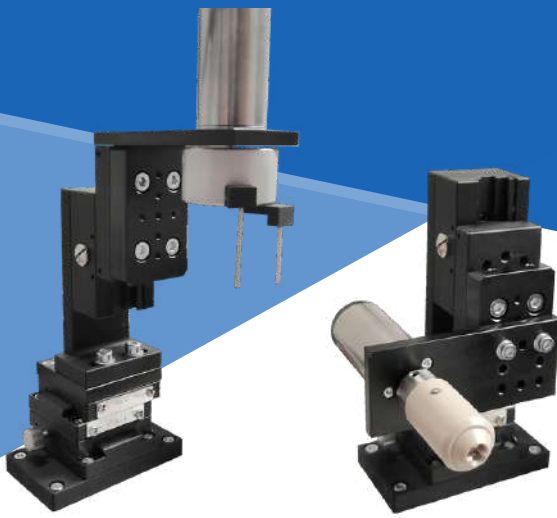
Nominal Force	Precision	Breaking force
<b>1 N</b>	<b>± 0.5 mN</b>	<b>5 N</b>
<b>5 N</b>	<b>± 2.5 mN</b>	<b>50 N</b>
<b>10 N</b>	<b>± 5 mN</b>	<b>50 N</b>
<b>20 N</b>	<b>± 10 mN</b>	<b>100 N</b>

### Optical rule option

#### Optimization of axis displacement measurement

- + Repeatability of linear positioning: ± 0.5 µm
- + Linear positioning accuracy: ± 1 µm
- + Linear positioning resolution: 100 nm





### Positioning the rotation module vertically or horizontally



Ergonomic XYZ slide adjustment



Modular tooling for every application

### Performance

- + 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 ( $\pm 0.3$  mNm)
  - 10 mNm ( $\pm 1$  mNm)
  - 23 mNm ( $\pm 2.3$  mNm)
  - 30 mNm ( $\pm 3$  mNm)
  - Other torques available on request
- + Alignment and height adjustment with XYZ precision slides

### Parameters

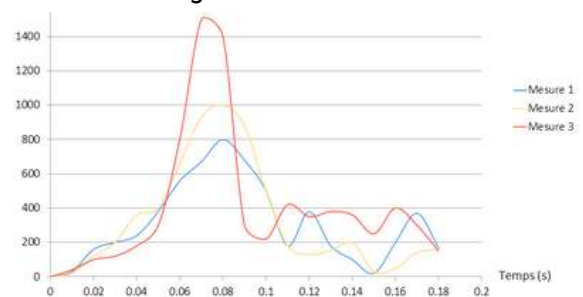
- + Speed
- + Acceleration
- + Deceleration
- + Maximum torque control before cycle stop
- + Maximum torque control before next instruction

## Option Winding Test

### Faithful simulation of manual movement arming



Reproduction of the acceleration peaks produced at the crown during the manual winding phase of the movement.



The software interface enables speed to be controlled as a function of time using setpoint curves.



## Integral rotation and traction pressure module



Module combining rotation, pressure traction and tool height adjustment



### Types of aging performed

#### Rotation

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

#### Traction -pression

- + Rattrapante
- + Perpetual calendar corrector
- + GMT corrector
- + Crown stitching
- + Spring
- + Jumpers
- + Traction crown

#### Rotation + Traction-pressure

- + Screwing / unscrewing crown
- + Screwing / unscrewing plunger
- + Automatic tool insertion
- + Cycle automation



Automatic insertion of rotary drive axis



Automatic insertion of linear drive axis



## Available extensions



### Rotary base

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

- + 360° clockwise and counter-clockwise rotation
- + Angular accuracy  $\pm 0.002^\circ$ .



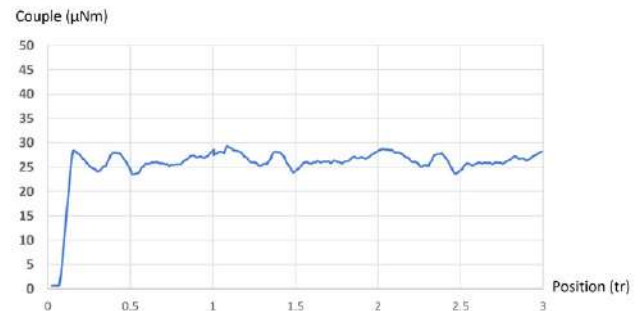
### Concentric precision vice

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



### Static torque sensor

Rated torque	Precision	Eligible	Rupture
5 mNm	$\pm 0.005$ mNm	6.5 mNm	25 mNm
10 mNm	$\pm 0.020$ mNm	13 mNm	50 mNm
20 mNm	$\pm 0.100$ mNm	26 mNm	100 mNm



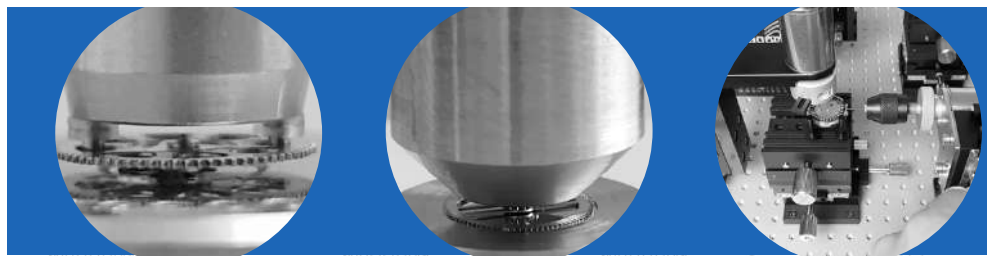
### Harware Vision

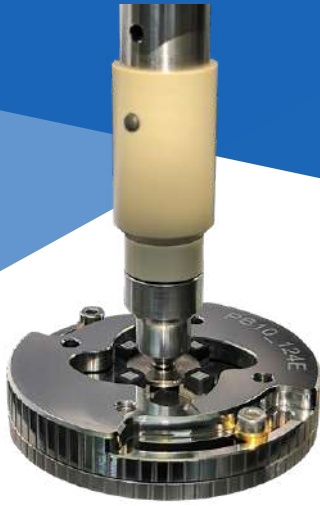
programmable shots during the cycle



### Protective enclosure

Soundproof and dust-proof hood





### BARILAB V2.2 EXTENSION Barrel measurement and control

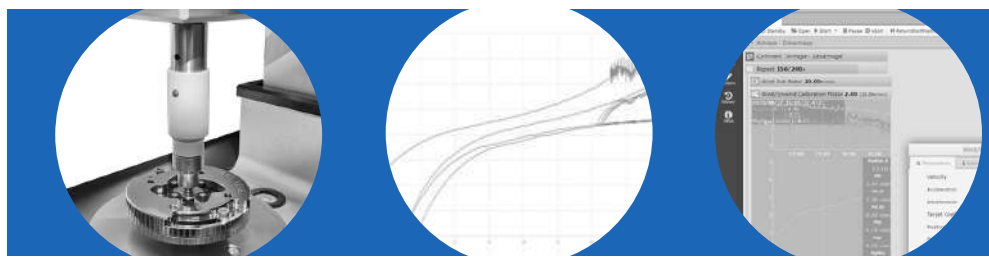
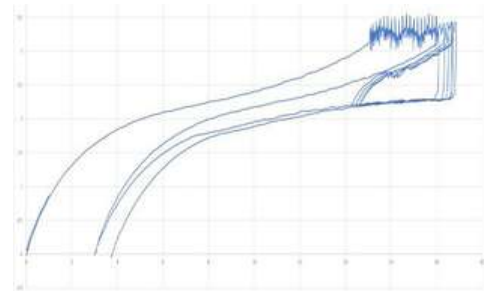
Additional software module for creating different aging and control cycles on barrels

#### 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 visualization of Mgi, Mgs, Mgmax trends
- + Use of measured values as aging cycle variables:  
Example:
  1. Arm up to 110% of max torque before flange slip
  2. Disarming after X cylinder revolutions (24h disarming time)
- + Values can be exported to Excel in .txt format

#### Available parameters

- + Clockwise and counter-clockwise
- + Rotation speed (1 to 600 rpm)
- + Number of revolutions
- + Acceleration - Deceleration
- + Torque setpoint to be reached
- + Sub-programs
- + Sub-program repeats within a main program
- + Timers: 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 max torque before flange slip



## Traction - torsion module : STRAPLAB V1.0



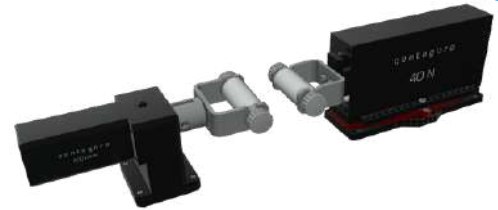
### STRAPLAB EXTENSION V2.2 Bracelet aging

#### Traction parameters

- + Displacement in position (mm)
- + Force displacement (N)
- + Speed
- + Acceleration
- + Deceleration
- + Position control when moving in force
- + Force control when moving in position
- + Maximum force setpoint (system safety)

#### Parameters Torsion

- + Position displacement (mm)
- + Speed
- + Acceleration
- + Deceleration
- + Torque control when moving position
- + Maximum torque setpoint (system safety)



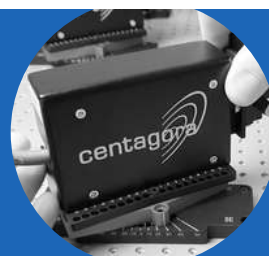
Module additionnel permettant de créer différents cycles de vieillissement et de contrôle sur les bracelets

#### Performance Traction

- + 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:  $\pm 10$
- + Vertical positioning
- + Angular indexing interface

#### Performance Torsion

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



### Global split chuck

Universal 3-jaw chuck with motor shaft adapter. Gripping range 0-6 mm.



### Universal barrel gripping system

Concentric fixture consisting of a fixed base and four movable dogs. This set-up enables all types of barrel to be gripped.



### Self-centering crown impression tool

Self-centering tool for driving a working crown. This tool is compliant enough to absorb an eccentricity of  $\pm 0.3$  mm on the crown.



### Working crown

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.



### Drive head double eccentric fingers

Tool for driving needles or an oscillating weight. The offset of the two pins is adjustable.

