

SYNTAX 25 – UNIVERSAL TESTING MACHINE

Tensile & Compression Testing Frame

OVERVIEW

The SYNTAX 25 is a high-stiffness universal testing machine designed for demanding tensile and compression applications up to 100 kN. Based on the proven SYNTAX 100 kN mechanical architecture, it combines industrial-grade rigidity with a compact and cost-effective motorization, making it an excellent compromise between performance, versatility, and budget control.

Model	SYNTAX 25
Capacity (kN)	25 (100 kN frame)
Frame stiffness (kN/mm)	150
Screw type	Oversized preloaded ball screws
Number of guidance column	0
Number of ball screws	2
Transmission type	Gearbox with reinforced belt
Bearing type	Precharged and waterproof, full life greased
Accuracy (Class) Load Cell Measurement	Class 1 ($\geq 0.1\%$ FS) / Class 0.5 ($\geq 0.2\%$ FS) – ISO 7500-1
Crosshead position resolution (μm)	0,038
Maximum speed, max load (mm/min)	563
Minimum speed ($\mu\text{m}/\text{min}$)	1,5
Crosshead travel (mm) Without load cell and interface	1300
Test width (mm)	450
Working area height (mm)	296
Dimensions (W × D × H) mm	1020 × 470 × 1805
Weight (kg)	345
Power supply	230 V Single Phase
Power consumption (W)	320



KEY FEATURES

Maximum load capacity: 100 kN
Very high frame stiffness: 150 kN/mm
Heavy-duty lateral frame architecture
Compact DC servo motorization
Advanced digital controller
Large working area compatible with tooling, furnaces, and thermal chambers
Modular measurement and sensor architecture

Frame architecture:

- Lateral metallic structure derived from SYNTAX 100 kN
- Oversized preloaded ball screws for maximum rigidity

Transmission:

- Gearbox with reinforced belt transmission
- High-capacity, machine-tool-grade bearings

MOTORIZATION & MOTION CONTROL

Motor: DC servomotor with resolver

Speed range : From 1.5 $\mu\text{m}/\text{min}$ up to 563 mm/min

Crosshead position resolution: $\pm 0.038 \mu\text{m}$

Speed regulation: Digital closed-loop control

Power supply: 230 V + Earth

Power consumption: 320 W

PROTECTION & DESIGN

Side casing: Aluminum and transparent polycarbonate

Housing : 2 mm thick sheet metal structure

Ball screw protection : Polyurethane-coated protective covers (standard)

Front access : Easy handling, including when installed on dedicated pedestal

ERGONOMICS & DIMENSIONS

Working height: 296 mm or 1026 mm

Large working space:

Compatible with all tooling types
Suitable for thermal chambers and furnaces

Total vertical daylight / stroke: 1300 mm

Total dimensions:

- Width: 1020 mm
- Depth: 470 mm
- Height: 1805 mm
- Height with pedestal: +730 mm

Machine weight : 345 kg (without pedestal)

Remote control pad :

LCD display

Analog digital potentiometer for fast speed adjustment in manual mode

Emergency stop : Magnetic emergency button mounted on machine side

Tooling compatibility : More than **1300 tooling** references available

CONTROLLER & ELECTRONICS

GENERAL ARCHITECTURE

Remote BlackBox control unit

- Integrates power electronics and signal conditioning
- Compact footprint, installed next to the machine



Cooling system : Fan with dust filter

CONTROLLER VERSION

2.5 kHz control loop



CLOSED-LOOP CONTROL MODES

- Force rate (kN/s)
- Stress rate (MPa/s)
- Crosshead displacement (mm/s)
- Extensometer displacement (mm/s – multi-extensometer support)
- Strain rate (%Lc / %Le per second)

Control mode switching possible during the same test.

MEASUREMENT CHANNELS

Standard channels:

- Force
- Crosshead position

Additional channels : 3 or 7 free measurement channels

Supported sensor types:

- Load cells
- Analog extensometers (± 10 V, 4–20 mA)
- LVDT
- Encoders / incremental signals
- Magnetostrictive rulers
- Optical sensors

RESOLUTION & ACCURACY

Channel resolution:

- 10,000,000 digits
- Equivalent to 0.00001% of full scale

Force channel accuracy (ISO 7500-1:2016):

- Class 1 from 0.1% FS
- Class 0.5 from 0.2% FS

Crosshead position:

- Resolution: 0.1 μ m
- Accuracy: Class 0.2 according to ISO 9513

INTELLIGENT SENSOR PLUG (ISP)

- Automatic sensor recognition
- Plug & play configuration
- Calibration data stored in sensor EEPROM
- No operator manipulation required

ADDITIONAL INTERFACES & EXTENSIONS

- Hydraulic jaw control via automation unit
- Automatic arm extensometer control
- Mono- or bi-camera video extensometer
- External DAQ systems (HBM or equivalent)
- Non-contact sensors (laser, optical)
- Multi-zone furnaces and thermal enclosures
- Video camera and screen/workspace recording

SAFETY DOORS / SHIELDS (OPTIONAL)

Operation **without safety doors** is possible, subject to:

- Formal customer justification
- Compliance with Machinery Directive 2006/42/EC
- Documented risk analysis and impact assessment
- Written liability waiver toward 3R



Mandatory reassessment in case of change in machine use or test type

PEDESTAL / BASE (OPTIONAL)

Ergonomic working height (laboratory bench level)

Integrated storage shelves

Welded steel construction

Pedestal weight: 120 kg

Pallet truck handling compatible

Dimensions:

- Height: 430 mm or 730 mm
- Width: 895 mm
- Depth: 600 mm



LOAD CELLS

Available designs v : S-type or High-stiffness massive design

High-definition technology with:

- Mechanical decoupling
- Internal electronic compensation

Insensitive to transverse forces and bending moments

High axial stiffness → reduced shock at specimen break

Automatic identification via EEPROM

Electronic overload protection

Accuracy up to Class 0.5, linearity error < 0.1%

Compliant with ISO 7500-1 and ASTM E4