

SYNTAX 5 – UNIVERSAL TESTING MACHINE

Tensile & Compression Testing Frame

OVERVIEW

The SYNTAX 5 is a compact and versatile 5 kN universal testing machine, designed to offer the best compromise between performance, robustness, and budget. It combines the high stiffness of the SYNTAX frame architecture with a compact and economical motorization, making it ideal for laboratories, education, and industrial quality control.

Model	SYNTAX 5
Capacity (kN)	5
Frame stiffness (kN/mm)	—
Screw type	Preloaded ball screws
Number of guidance column	2
Number of ball screws	1
Transmission type	Gearbox with reinforced belt
Bearing type	Precharged and waterproff, 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)	0,05
Maximum speed, max load (mm/min)	568
Minimum speed ($\mu\text{m}/\text{min}$)	1,9
Crosshead travel (mm) Without load cell and interface	1000
Test width (mm)	-
Working area height (mm)	79
Dimensions (W × D × H) mm	450 × 600 × 1300
Weight (kg)	120
Power supply	230 V Single Phase
Power consumption (W)	160

KEY FEATURES

Nominal capacity: 5 kN

Compact, rigid two-column structure
Wide test space (1000 mm daylight)
High-resolution closed-loop control
New high-performance controller
Modular and future-proof measurement architecture
Large ecosystem of grips, fixtures, and extensometers

MECHANICAL FRAME

Nominal load capacity : 5 kN

Frame structure :

- Rear aluminum structure
- Oversized preloaded ball screws for high stiffness
- 2 precision guiding columns

Transmission :

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

Vertical test space (daylight) : 1000 mm

Dimensions (W × D × H) : 450×600×1300 mm

Machine weight : 120 kg

MOTORIZATION & MOTION CONTROL

Motor : DC servomotor with resolver

Speed range:

- From 1,9 µm/min up to 568 mm/min

Crosshead position resolution: ±0.1 µm

Speed regulation: Closed-loop digital control

Power supply : 230 V + Earth

Power consumption : 160 W

PROTECTION & DESIGN

Housing : 2 mm thick sheet metal enclosure

Screw protection : Polyurethane-coated protective covers (standard)

Working area protection : Stainless steel lower protection plate

Optional : Full protective safety shield

ERGONOMICS & USER INTERFACE

Remote control pad:

- LCD display
- Analog digital potentiometer for fast manual speed adjustment

Emergency stop : Magnetic emergency stop button mounted on machine side

Accessory compatibility : More than 1300 tooling references available

Operator-friendly layout:

- Compact footprint
- Easy access to grips and accessories

CONTROLLER & ELECTRONICS

GENERAL ARCHITECTURE

Remote “BlackBox” control unit

- Houses power electronics and signal conditioning
- Compact footprint
- Installed next to the machine for easy access

Cooling : Fan with dust filter



CONTROL PERFORMANCE

Control loop frequency: Up to 2.5 kHz

Closed-loop control modes:

- Force (kN/s)

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

Dynamic channel switching during the same test

MEASUREMENT CHANNELS

Standard channels:

- Force
- Crosshead position

Additional channels:

- 3 or 7 measurement channels (depending on controller version)

Supported sensor types:

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

RESOLUTION & ACCURACY

Channel resolution:

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

Force channel:

- ISO 7500-1:2016
 - Class 1 from 0.1% FS
 - Class 0.5 from 0.2% FS

Accuracy depends on load cell quality

Crosshead position:

- Resolution: 0.05 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 memory

No manual setup required

ADDITIONAL INTERFACES & EXTENSIONS

Hydraulic unit control (jaw actuation)

Automatic arm extensometer control

Video extensometer (mono or bi-camera)

External multi-channel DAQ systems (HBM or equivalent)

Non-contact sensors (laser, optical)

Temperature control (furnaces, thermal chambers)

Video monitoring and screen recording

LOAD CELLS

Available types : S-type or High-stiffness massive design

High-definition technology with:

- Mechanical decoupling
- Internal electronic compensation

High axial stiffness → reduced shock at specimen break

Automatic identification via EEPROM

Overload electronic protection

Accuracy:

- Up to Class 0.5
- Linearity error < 0.1%
- Compliant with ISO 7500-1 and ASTM E4

OPTIONAL PEDESTAL / BASE

Ergonomic working height

Integrated storage shelves

Welded steel construction

Pedestal weight: 120 kg

Compatible with pallet truck handling

Dimensions:

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





