

SYNTECH 400 – UNIVERSAL TESTING MACHINE

The SYNTECH 400 kN is a high-capacity electromechanical testing frame. It is the only electromechanical system in this force range equipped with two ball screws, four guidance columns, and the rigid RIGI-DRIVE II transmission. Designed for demanding tensile and compression applications, it combines very high stiffness, precision motion control, and long-term reliability.

Model	SYNTECH 400
Capacity (kN)	400
Frame stiffness (kN/mm)	725
Screw type	Preloaded ball screws
Number of guidance column	4
Number of ball screws	2
Transmission type	RIGI-DRIVE II rigid transmission - High efficiency conical torques
Bearing type	Machine-tool grade bearings, sealed
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)	0,025
Maximum speed, max load (mm/min)	465
Minimum speed ($\mu\text{m}/\text{min}$)	1
Crosshead travel (mm) Without load cell and interface	1555 – HA : 1900
Test width (mm)	750
Working area height (mm)	560
Dimensions (W x D x H) mm	1492 x 1000 x 2485 – HA : 1492 x 1000 x 2850
Weight (kg)	2160 – HA : 2260
Power supply	400 V Three Phase
Power consumption (W)	4500

MECHANICAL FRAME

Maximum load capacity : 400 kN

Frame stiffness : 750 kN/mm

Guidance system : 4 massive guidance columns

Drive system : 2 ball screws with preloaded, backlash-free nuts

Transmission :

- RIGI-DRIVE II rigid transmission
- Maintenance-free, backlash-free
- High-efficiency bevel gear reducers

Bearings :

- Machine-tool grade bearings
- Sealed and greased for life
- Maintenance-free

MOTORIZATION & POWER SUPPLY

Motor type : Brushless servo motor with encoder

Safety : Power-off brake for enhanced operator safety

Speed range : From 1 $\mu\text{m}/\text{min}$ up to 465 mm/min

Cyclic performance : Up to 1 Hz at 1 mm stroke amplitude

Torque holding capability : Maintained over several months

Stabilization performance :

- Ultra-stable stabilization bearings
- Holding accuracy better than 0.0008% FS

Power supply : 400 V Three Phase

Power consumption : 4500 W

Electrical protection:

- Dedicated differential protection
- 30 mA (UPS) or 300 mA

PROTECTION, ERGONOMICS & DESIGN

Stainless steel and transparent polycarbonate side panels

Sheet metal enclosure with front LED backlighting

Ball screw protection as standard :

- Polyurethane-coated fabric bellows
- Rigid plastic protective slats

Stainless steel lower crosshead cover for daily operation protection

Easy front and lateral handling for installation and maintenance

CONTROL SYSTEM

CONTROLLER ARCHITECTURE

Remote BlackBox control unit, positioned next to the machine

Integrated power electronics and signal management

Compact footprint and full accessibility

Forced ventilation with air filtration

CLOSED-LOOP CONTROL MODES

Closed-loop control can be applied to :

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

Control modes can be switched during the same test, allowing both standard-compliant and free test procedures.

MEASUREMENT CHANNELS

Force channel and position channel
+3 additional configurable channels

Automatic recognition of :

- Force sensors
- Position sensors
- Incremental encoders
- Analog signals
- LVDT sensors



- Capacitive sensors
- Magnetostrictive sensors

ISP – Intelligent Sensor Plug

- Automatic sensor recognition
- Automatic parameter setup
- Automatic calibration

RESOLUTION & INTERFACE

Channel resolution : 10,000,000 points

- Equivalent to 0.00001% of full scale

Intuitive handheld remote control :

- LCD display
- Fine speed adjustment via digital potentiometer
- Step-by-step motion mode
- Jaw clamping management

STANDARD INPUT / OUTPUT

CONFIGURATION

FORCE MEASUREMENT

Main force input channel

Resolution : 10,000,000 points

Accuracy classes according to ISO 7500-1 :

- Class 1 : from 1/1000 (0.1% FS)
- Class 0.5 : from 1/500 (0.2% FS)

Additional force transducers supported with automatic recognition

POSITION MEASUREMENT

Absolute crosshead position input

Resolution : 0.025 μm

Accuracy class : Class 0.2 (ISO 9513)

ADDITIONAL MEASUREMENT CHANNELS

(Depending on controller configuration)

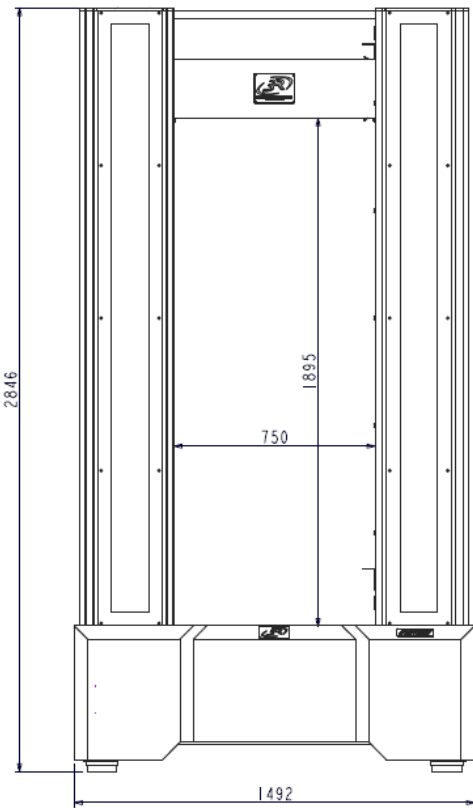
- Strain gauge bridge / analog extensometers (± 10 V)
- 4–20 mA analog signals
- LVDT sensors
- Incremental encoders
- Magnetostrictive rulers
- Optical sensors

Each channel supports automatic sensor recognition.

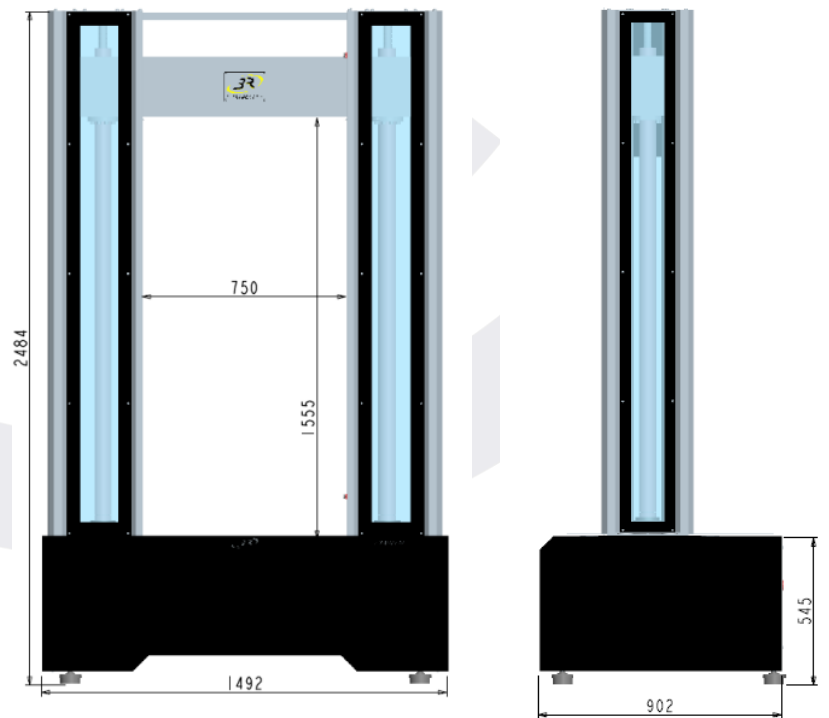
PC & EXTERNAL SYSTEM CONNECTIVITY

Direct PC connection enables :

- Control of hydraulic units for jaw actuation
- Control of automatic arm extensometers
- Serial connection for mono- or dual-camera video extensometers
- Connection of external multi-channel acquisition modules :
 - Strain gauges
 - LVDT
 - HBM or equivalent DAQ modules
 - Non-contact laser measurement
 - Thermocouples
 - ± 10 V analog I/O
- Control of multi-zone furnaces and thermal chambers
- Video camera integration and recording of :
 - Screen activity
 - Test area



SYNTECH 400 HA



SYNTECH 400 S