

SYNTECH 700 – UNIVERSAL TESTING MACHINE

The SYNTECH 700 kN is a high-capacity electromechanical tensile test frame designed for demanding industrial and research applications. It is the only electromechanical system in this load range featuring four ball screws, four guide columns, and the RIGI-DRIVE II rigid transmission, ensuring exceptional stiffness, accuracy, and durability.

Model	SYNTECH 700
Capacity (kN)	700
Frame stiffness (kN/mm)	1250
Screw type	Preloaded ball screws
Number of guidance column	4
Number of ball screws	4
Transmission type	RIGI-DRIVE II rigid transmission - High efficiency conical torques
Bearing type	Machine-tool grade bearings, sealed
Accuracy (Class) Load Cell Mesurement	Class 1 ($\geq 0.1\%$ FS) / Class 0.5 ($\geq 0.2\%$ FS) – ISO 7500-1
Crosshead position resolution (μm)	0,017
Maximum speed, max load (mm/min)	312
Minimum speed ($\mu\text{m}/\text{min}$)	0,7
Crosshead travel (mm) Without load cell and interface	1700 - HA : 2150
Test width (mm)	750
Working area height (mm)	545
Dimensions (W x D x H) mm	1492 x 1000 x 2650 - HA : 1492 x 1000 x 3100
Weight (kg)	3400 - HA : 3550
Power supply	400 V Three Phase
Power consumption (W)	5500

MECHANICAL FRAME

Maximum load capacity : 700 kN

Frame stiffness : 1 250 kN/mm

Guidance system : 4 massive guide columns for maximum lateral rigidity

Drive screws :

- 4 precision ball screws
- Preloaded, backlash-free ball nuts

Transmission :

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

Bearings :

- Machine-tool grade bearings
- Sealed design, maintenance-free

MOTORIZATION & POWER SUPPLY

Motor type : Brushless servo motor with encoder for high dynamic performance

Safety : Power-off brake for enhanced operator safety

Speed range : From 0.7 $\mu\text{m}/\text{min}$ up to 312 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 : 3 \times 400 V + Neutral + Earth

Power consumption : 5500 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

Channel resolution : 10,000,000 points

- Equivalent to 0.00001% of full scale

OPERATOR INTERFACE

- 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 : 0.017 μm

Accuracy class : Class 0.2 (ISO 9513)

ADDITIONAL MEASUREMENT CHANNELS

(Depending on controller configuration)

- Strain gauge bridge / analog extensometers ($\pm 10\text{ V}$)
- 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
 - $\pm 10\text{ V}$ analog I/O
- Control of multi-zone furnaces and thermal chambers
- Video camera integration and recording of :
 - Screen activity
 - Test area

