

## SYNTECH 150 – UNIVERSAL TESTING MACHINE

The SYNTECH 150 kN is a high-performance electromechanical test frame designed for demanding tensile and compression applications. It is the only electromechanical frame in this force range equipped with two ball screws and two massive guiding columns, combined with the rigid RIGI-DRIVE II transmission.

Model	SYNTECH 150
Capacity (kN)	150
Frame stiffness (kN/mm)	200
Screw type	Preloaded ball screws
Number of guidance column	2
Number of ball screws	2
Transmission type	RIGI-DRIVE II rigid transmission - High efficiency conical torques
Bearing type	Precharged and waterproff, full life greased
Accuracy (Class) Load Cell Mesurement	Class 1 ( $\geq 0.1\%$ FS) / Class 0.5 ( $\geq 0.2\%$ FS) – ISO 7500-1
Crosshead position resolution ( $\mu\text{m}$ )	0,03
Maximum speed, max load (mm/min)	560
Minimum speed ( $\mu\text{m}/\text{min}$ )	1,25
Crosshead travel (mm) Without load cell and interface	1300 - <b>HA : 1800</b>
Test width (mm)	650
Working area height (mm)	430
Dimensions (W x D x H) mm	1207 x 525 x 2017 - <b>HA : 1207 x 525 x 2517</b>
Weight (kg)	850 - <b>HA : 950</b>
Power supply	230 V Single Phase
Power consumption (W)	3000

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## MECHANICAL FRAME CHARACTERISTICS

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**Maximum frame capacity** : 150 kN

**Frame stiffness** : 200 kN/mm

**Guiding system** : 2 massive chrome-plated guiding columns

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

**Transmission** :

- **RIGI-DRIVE II** rigid transmission
- Maintenance-free, backlash-free
- High efficiency bevel-gear reducers with minimized clearance

**Bearings** :

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

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## MOTORIZATION & POWER SUPPLY

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**Motor type** : Brushless servo motor with high-resolution encoder

**Safety** : Power-off brake for enhanced operator safety

**Crosshead speed range** : From 1.25  $\mu\text{m}/\text{min}$  up to 560 mm/min

**Dynamic performance** : Cyclic testing up to 1 Hz at 1 mm amplitude

**Torque holding capability** : Stable torque maintained over several months

**Position stability** :

- Ultra-stable holding stages
- Holding accuracy better than **0.0008% FS**

**Power supply** :

- 230 V + Earth
- Power consumption: **3000 W**
- Dedicated differential protection: **30 mA ASI or 300 mA**

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## PROTECTION, ERGONOMICS & DESIGN

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Side panels in stainless steel and transparent polycarbonate

Sheet-metal enclosure with front LED backlighting

Ball screw protection included as standard:

- Polyurethane-coated fabric bellows
- Rigid plastic lamellae

Lower crosshead protected by stainless-steel plate for daily operation

Easy front and side handling for installation and maintenance

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## CONTROL SYSTEM

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### GENERAL ARCHITECTURE

Remote BlackBox control unit installed next to the machine

Power electronics and signal processing integrated

Compact footprint with full accessibility

Forced ventilation with dust filtration

### CONTROL PERFORMANCE

**Closed-loop control frequency** : 2.5 kHz

**Closed-loop control modes available on** :

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

Control mode switching possible within the same test, enabling both standard-compliant and free testing procedures

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## MEASUREMENT CHANNELS & SENSORS

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### Standard channels :

- 1 force channel
- 1 position channel
- 3 free measurement channels

### Automatic recognition of connected sensors

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

### ISP – Intelligent Sensor Plug :

- Automatic sensor identification
- Automatic software configuration
- Automatic calibration

### Resolution :

- 10,000,000 points per channel
- Equivalent to 0.00001% of full scale

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## INPUT / OUTPUT CONFIGURATIONS

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### FORCE MEASUREMENT

**Resolution :** 10,000,000 points

### **Accuracy :**

- Class 1 from 1/1000 (0.1% FS) – ISO 7500-1
- Class 0.5 from 1/500 (0.2% FS) – ISO 7500-1

Additional load cells supported with automatic recognition

(Accuracy depends on machine size and connection type – please consult us for details.)

### CROSSHEAD POSITION MEASUREMENT

Absolute position measurement

**Resolution :** 0.03  $\mu\text{m}$

**Accuracy :** Class 0.2 according to ISO 9513

### ADDITIONAL MEASUREMENT CHANNELS

### Depending on controller version :

- Strain gauge bridges / analog extensometers ( $\pm 10$  V)
- 4–20 mA signals
- LVDT
- Incremental encoders
- Magnetostrictive rulers
- Optical sensors

Each channel supports automatic sensor recognition.

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## PC & EXTERNAL SYSTEM CONNECTIVITY

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Direct PC connections allow:

Hydraulic power unit control for grips

Automatic arm extensometer control

Serial connection for mono or dual-camera video extensometers

### Connection of external multi-channel acquisition systems :

- Strain gauges
- LVDT
- HBM modules or equivalent
- Non-contact laser measurement
- Thermocouples
- $\pm 10$  V inputs / outputs

Control of multi-zone furnaces and thermal chambers

Video camera connection and recording of screen and test area

