



The ESM301 and extended length ESM301L are highly configurable motorized test stands for tension and compression testing applications up to 300 lbf (1.5 kN) for laboratory and production environments. The stands can perform a wide range of tests, including break testing, cycling, limit testing to a load or distance, load holding, elongation testing, tensile testing, compression testing, and more. Satisfy various test methods through an easy-to-use menu, allowing the configuration of test speed, force and distance limits, cycling, preload, and many other functions. The stands can be controlled via its console or PC.

Functions are offered individually through a unique “build-your-own” configuration platform. Order any combination of functions to customize the stand to specific requirements. Functions not ordered originally can be activated in the field. A password can be set to protect against unauthorized changes. Modular mechanical design allows the test frame and controller to be separated for various mounting configurations.

## Standard Features

- LCD display with UP, DOWN, STOP, & emergency stop buttons & variable function keys
- Selectable speed units of measurement (in/min & mm/min)
- Password protection of test parameters
- Integrated travel limit switches
- Removable fixture mounting plate with matrix of threaded holes
- Stepper motor-driven, produces 0% speed variation with load
- Mounting holes for bench mounting
- Unique mechanical design significantly reduces column bending

< The ESM301 and ESM301L are shown in typical configurations with Series 5 digital force gauges and G1061 wedge grips

## Optional Hardware Features

### ■ Multi-function cable, Series 5/4 to controller (09-1162)

Connects a Series 5 or Series 4 force gauge to the controller. This single cable is used to transmit set points, overload signals, and force data.

### ■ Serial cable, controller to PC (09-1056)

Sends force and travel data on a single cable via RS-232 to a PC.

### ■ Column extensions (ESM301-002-1, -2, -3)

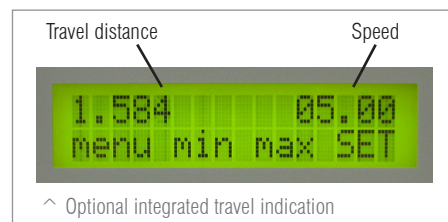
Increase clearance between the force gauge and test stand base. Available in 6" (150 mm), 12" (300 mm), 24" (600 mm), and custom lengths. Bench mounting kit recommended.

### ■ Bench mounting kit (ESM301-003)

Facilitates safe mounting to a work bench. Consists of a set of mounting adapters, and four sets of hardware with Allen key to accommodate surfaces of various thickness. Recommended when ordering column extensions.



^ Digital controller features a backlit LCD screen with menu choices for ease of setup and operation



^ Optional integrated travel indication



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Specifications subject to change without prior notice

## Optional Controller Features

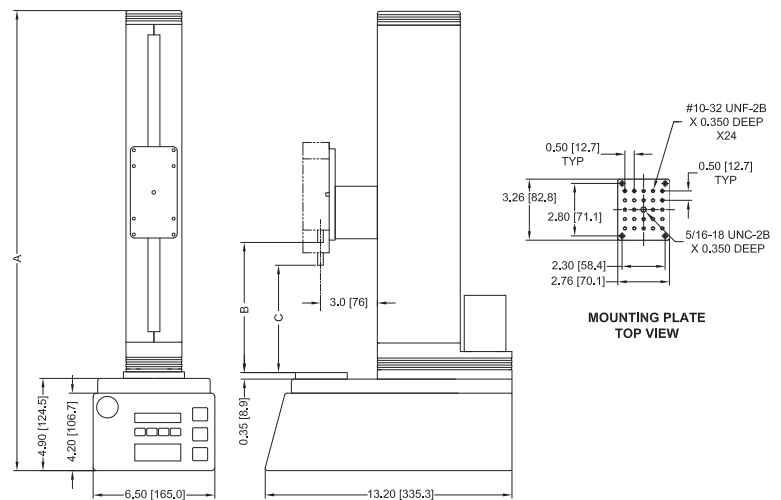
Any of the below option packages may be purchased at time of order or may be enabled in the field at a later date through a simple activation process. A complete options package is also available, including all of the below features at a discounted price. The stands are shipped in Demo Mode, during which time all available features are enabled for 160 hours of operation.

Feature	Part No.	Description	Requirements
Computer control	EF010	A bi-directional RS-232 port is provided to interface with a PC. Users can write a custom program utilizing a library of ASCII commands or control the stand via a PC using legacy Nexygen TCD software (not available from Mark-10).	<ul style="list-style-type: none"> <li>- Series 5 force gauge</li> <li>- 09-1056 serial cable</li> <li>- 09-1162 cable</li> <li>- ESM301(L)-001 integrated travel indication</li> <li>- EF011 programmable travel set points</li> </ul>
Travel indication	ESM301-001 ESM301L-001	Travel is indicated on the front panel, and an RS-232 port is supplied. Position indication is provided via an internal linear scale, producing significantly higher accuracy than with conventional rotary encoder-based designs. Backlash and nonlinearity are virtually eliminated.	<ul style="list-style-type: none"> <li>- Order upfront, not field installable</li> </ul>
Programmable travel limits	EF011	The ESM301 can stop at or cycle between programmable upper and lower travel distances.	ESM301-001 or ESM301L-001 travel indication option
Overload protection	EF012	Protects a force gauge against overload. Program the desired percentage of full scale of the gauge. Adjustable analog output voltage setting allows the ESM301 to interface with virtually any gauge with analog output.	<ul style="list-style-type: none"> <li>- Series 5 or Series 4 force gauge</li> <li>- 09-1162 cable</li> </ul>
Auto return	EF013	The crosshead moves to a limit switch, force set point, travel position, or break, then stops and reverses direction at full speed to the other limit.	<ul style="list-style-type: none"> <li>- Reversing at force set point: Series 5 / 4 force gauge and 09-1162 cable</li> <li>- Reversing at travel limit: EF011 programmable travel limits option</li> <li>- Reversing at break: EF019 break detection option and 09-1162 cable</li> </ul>
Cycling / dwell time	EF014	Same as auto-return, but with the ability to program up to 100,000 cycles. Programmable dwell time for upper and lower limits (set independently) can be set up for up to 10,000 seconds.	Same as auto-return. Requires EF016 for independent up and down speeds.
Independent Up and Down Speeds	EF016	Configurable speeds for up and down directions .	-
Low Speed Extension	EF017	Extends the speed range to 0.02 - 13 in/min (0.5 - 330 mm/min).	-
High Speed Extension	EF018	Extends the speed range to 0.5 - 45 in/min (13 - 1100 mm/min).	-
Break Detection	EF019	Crosshead stops at a sudden drop in force. Programmable percentage of peak force.	<ul style="list-style-type: none"> <li>- Series 5 force gauge firmware V1.7+</li> <li>- 09-1162 cable</li> <li>- Test stand firmware V2.0+</li> </ul>
Load Holding	EF020	Dynamically adjusts the crosshead position to maintain a programmed load for an indefinite or specified period of time.	<ul style="list-style-type: none"> <li>- Series 5 force gauge firmware V1.7+</li> <li>- 09-1162</li> <li>- Test stand firmware V2.0+</li> <li>- If a specified time is required, order EF014 cycling option</li> </ul>
Preload / Sample Touch	EF021	Stops the crosshead and/or zeroes the travel display at an initial preload - useful in tensile, compression, spring, elongation, and other applications. Preload is programmable as a percentage of force gauge full scale. Three modes: (1) stop, (2) stop and zero, and (3) zero without stopping.	<ul style="list-style-type: none"> <li>- ESM301-001 or ESM301L-001 travel indication option</li> <li>- Series 5 force gauge firmware V1.7+</li> <li>- 09-1162 cable</li> <li>- Test stand firmware V2.0+</li> </ul>
Complete Options Package	Includes all Controller Features listed above		

## Specifications

Load capacity: 300 lbf (1.5 kN) 200 lbf (1 kN)	Up to 24 in/min (610 mm/min) > 24 in/min (> 610 mm/min)
Speed range: Standard Optional	0.5-13 in/min (13-330 mm/min) 0.02 - 45 in/min (0.5 - 1100 mm/min)
Maximum travel ESM301 ESM301L	11.5 in (292 mm) 18 in (457 mm)
Speed setting accuracy	±0.2%
Speed variation with load	±0% [Stepper motor driven]
Limit switch repeatability	0.001 in [0.03 mm]
Travel accuracy	±0.002 in [0.05 mm]
Travel repeatability	0.001 in [0.02 mm]
Travel resolution	0.001 in / 0.02 mm
Power	Universal input 80-240 VAC, 50/60 Hz
Weight (w/o options): ESM301 ESM301L	34 lb (15.4 kg) 39.5 lb (23.7 kg)
Included accessories:	Ext. rod, small hook, medium hook, #10-32 coupler, compression plate, gauge mounting hardware, tool kit

## Dimensions in (mm)



Model	A	B (Series 3)	C (Series 5/4)
ESM301	24.5 [622]	3.5 - 15.0 [89 - 381]	2.3 - 13.8 [58 - 351]
ESM301L	31.5 [800]	3.5 - 21.5 [89 - 546]	2.3 - 20.3 [58 - 516]

## Ordering Information

Hardware	
ESM301 <sup>1</sup>	Motorized test stand, 11.5" travel <sup>1</sup>
ESM301L <sup>1</sup>	Motorized test stand, 18" travel <sup>1</sup>
ESM301-001 <sup>2</sup>	Travel indication with RS-232 output, for ESM301 <sup>2</sup>
ESM301L-001 <sup>2</sup>	Travel indication with RS-232 output, for ESM301L <sup>2</sup>
ESM301-002-1 / -2 / -3	Column extension, 6" / 12" / 24"
ESM301-003	Bench mounting kit
09-1162 <sup>3</sup>	Multi-function cable, Series 5/4 to ESM301 <sup>3</sup>
09-1056 <sup>3</sup>	Serial cable, ESM301 to PC <sup>3</sup>
Controller Options	
EF010 <sup>4</sup>	Computer control via RS-232 <sup>4</sup>
EF011 <sup>5</sup>	Programmable travel limits <sup>5</sup>
EF012	Integrated overload protection (requires 09-1143 cable)
EF013	Auto return
EF014	Cycling / dwell time
EF016	Independent up and down speeds
EF017	Extended speed range, low
EF018	Extended speed range, high
EF019 <sup>6</sup>	Break detection <sup>6</sup>
EF020 <sup>6</sup>	Load holding <sup>6</sup>
EF021 <sup>6</sup>	Preload / sample touch <sup>6</sup>
EFCOMP	Complete options package for ESM301
EFCOMP-L	Complete options package for ESM301L

- ESM301/ESM301L contains a universal power supply (80 - 240V) and includes a power cord with US plug. Add suffix 'E' for Euro plug, 'U' for UK plug, or 'A' for Australian plug.
- Factory installation only. Also available as a retrofit.
- If force data output is required, both the 09-1162 and 09-1056 cables are required.
- Requires: Series 5 force gauge, 09-1056 serial cable, 09-1162 multi-function cable, ESM301(L)-001 travel indication, and EF011 programmable travel limits.
- Requires ESM301(L)-001 integrated travel indication option.
- Firmware version 2.0+ required.