

Advanced Functions of Test Stands

Motorized test stand MX2/EMX/MH2 series are equipped with various functions, which are activated when used with force gauge and optional cable. These functions assist you to achieve high efficient testing, improved safety and more versatility for conducting a variety of measurement including crush resistance testing.

[Advanced Functions]

Function 1	Overload Prevention: Prevents the sensor from getting damaged due to overloading (It does not guarantee complete protection against overloading)
Function 2	Force control: Allows to set a force value to apply or to stop
Function 3	Measuring speed setting: Enables automatic speed change at a point of contact using the set force value
Function 4	Automatic measurement: Software recording and zeroing force gauge can be automatically done

Function 5	CONTACT DETECTION: Automatically detects the contact point of a sample
Function 6	BREAK DETECTION: Automatically detects the break of a sample and stops/returns force gauge

Function 7	Force-Displacement measurement: Measures force and displacement
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Function 8	Using external signal input and output: Allows communication with external devices
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Configuration required for Function 1 to 4

Motorized Test Stand MX2/EMX/MH2 series	Digital Force Gauge ZTS/ZTA series	Optional Cable CB-528
		

Function 1 Overload Prevention

	<p>Overload is a condition where a sensor is broken due to excess force applied over its capacity. Once it is overloaded, it requires repair to be able to measure again.</p> <p>This function automatically stops the motion of test stand in case the force gauge is loaded with over capacity. It is recommended to use this function especially when testing with a small capacity force gauge.</p> <p>* It does not guarantee complete protection against overloading. * Test carefully especially when testing speed is very fast or the sample is hard.</p>
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POINT	For overload prevention, [Function 2 Force control] is also useful. By setting the points lower than the capacity, it contributes to improved possibility of preventing overload by stopping before the capacity is exceeded.
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Function 2 Force control

This function uses the force set points to control motion of test stand such as stopping at the set force value, continue loading within the set values. (when tested in cycle mode)

It is useful especially for compression test to evaluate durability.

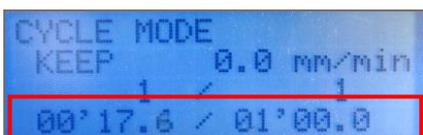
* There is a slight time lag between the timing of reaching the set force value and automatic stop of motion. Due to this lag, the actual force value applied may considerably exceed the set value when testing speed is fast and/or sample is hard.

Force Control: Stop at a set force value

The test stand stops moving when the force exceeds the set force value. Then it returns to the upper stroke limit position. Timer function can be used together to pause at the stopped position for the set time period.

Force Control: Keep between set force values

The test stand stops moving when the force reaches between the high and low set values (within OK range). It automatically adjusts its position to remain within the OK range when applied force is decreased/increased. It pauses for the set time period according to the timer function setting and then returns automatically to the upper stroke limit position.

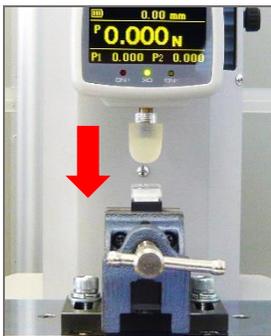
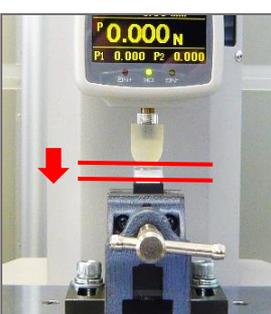
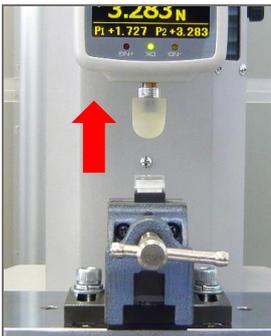
Operation 1	Operation 2	Operation 3
<p>Set the high and low values in force gauge.</p>  <p>High set point Low set point</p>	<p>Start the test stand. When it reaches the set value, it pauses for the set time period.</p> 	<p>After the set time period is finished, it returns to the upper stroke limit.</p>  <p>Time past Set time</p>

Function 3 Measuring speed setting

The low set value of force gauge can trigger automatic speed changes between traveling speed and measuring speed. Each speed for start, measuring and return can be individually adjusted to improve efficiency of testing procedures. (when tested in cycle mode)

* There is a slight time lag between the timing of reaching the set force value and changing speed of motion. Due to this lag, the actual force value applied may considerably exceed the set value when testing speed is fast and/or sample is hard.

* EMX series are equipped with speed shift point knob. The speed changes at the point reached first, either the low set value or the speed shift point. With samples require short stroke, the speed shift point is always activated first.

Operation 1	Operation 2	Operation 3
<p>START speed: Starts moving at the max. speed.</p> 	<p>MEASURING speed: Pushes slowly after the force value exceeds the set force value.</p> 	<p>RETURN speed: Goes back up at the max. speed.</p> 

Function 4 Automatic measurement

This function enables test stand to control operation of force gauge and software together.

Automatic Measurement 1 : Zeroing force gauge and sending data

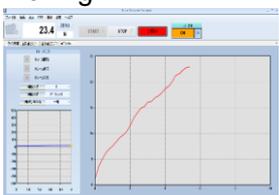
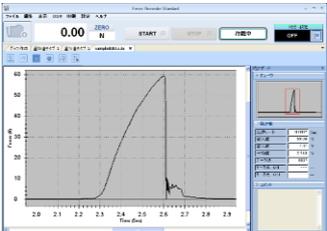
With the test stand function of ZERO ON START activated, the reading on force gauge is set zero at the timing of test stand starts moving. (when tested in cycle mode)

With SEND SIGNAL activated, it automatically outputs the measured data on force gauge to software at each cycle completion in cycle mode measurement.

Operation 1	Operation 2	Operation 3
<p>Activate ZERO ON START and SEND SIGNAL. Start measurement at cycle mode.</p> 	<p>The reading on force gauge display is reset to zero when test stand starts moving.</p> 	<p>At completion of each cycle, the measured data on force gauge is sent to PC.</p> 

Automatic Measurement 2: Drawing graphs

With the test stand function of RECORD TRIGGER activated, it automatically starts drawing a graph at the timing of test stand starts moving. When tested in cycle mode, it stops drawing at each completion of one cycle and repeats drawing for the set times of cycle mode.

Operation 1	Operation 2	Operation 3
<p>Activate RECORD TRIGGER and start measurement at cycle mode.</p> 	<p>The software starts drawing a graph simultaneously when the test stand starts moving.</p> 	<p>At completion of each cycle, it creates a graph data.</p> 

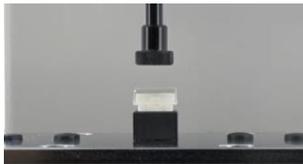
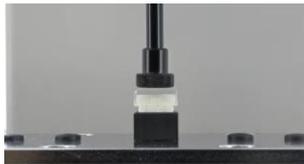
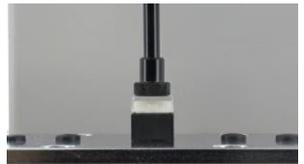
Configuration required for Function 5 and 6

Motorized Test Stand EMX series *1	Digital Force Gauge ZTA series	Optional Cable CB-528 or CB-718
		

*1 Models with firmware Ver.2.0 or later are available to use the functions. Models with earlier than Ver.2.0 are not available.

Function 5 CONTACT DETECTION *2

CONTACT DETECTION is activated when ZTA force gauge's SUB-COMPARATOR is ON, which allows detecting a contact point of a test sample, compressing it by a set displacement, and return to the starting position. This function is suitable when automatically compress (pull) it at a certain amount of displacement.

Operation 1	Operation 2	Operation 3
EMX test stand moves ZTA force gauge in the compression (tension) direction at a set start speed.	The displacement is reset to zero at the point exceeding the set sub-comparator value (=contact point) when a test sample is touched.	EMX test stand automatically moves the ZTA gauge to compresses (pulls) the sample by the set displacement from the contact point, and returns.
		

Function 6 BREAK DETECTION *2

BREAK DETECTION function automatically detects the sample breakage, and stop or return the force gauge. This function improves workability and prevents malfunction caused by colliding.

Operation 1	Operation 2	Operation 2
EMX test stands moves ZTA force gauge to Pull (compress) the sample.	The force gauge automatically stops (returns) once it falls below the set sub-comparator value when the sample is broken.	For compression, it automatically stops (returns) too.
		

*2 CONTACT DETECTION and BREAK DETECTION are not able to be used together.

Configuration required for Function 7 (Function 1 to 4 are also available)

Motorized Test Stand MX2/ MH2/EMX series with -FA option	Digital Force Gauge ZTA series	Optional Cable CB-718*1 (CB-728 for EMX with firmware earlier version than 2.0)
		

* This configuration is available only for EMX series with firmware Ver.2.0 or later. If your EMX series with firmware is earlier than ver.2.0, option cable CB-728 is required.

Function 7 Force-Displacement measurement

In force-displacement measurement, the test stand measures force as well as displacement which is measured by the travel distance of force gauge (compression and tensile). Analysis of force-displacement provides a higher level of measurement such as material characteristics and transition of force at certain travel distance.

Force - Displacement Measurement 1: Measures displacement (or force) at a set force (or displacement) point

With peak mode in force gauge, it measures the displacement where the peak force value has been detected. Force and displacement values can be selected for detecting the corresponding data in the software.

Operation 1

Force value and the displacement value appear on force gauge. In peak mode, it shows the peak force value and the displacement value of the point where the peak force value has been detected.



Operation 2

In the supplied software, force and displacement values can be transferred. Up to 3 points (force/displacement) can be set for detection.



Force - Displacement Measurement 2: Drawing graphs

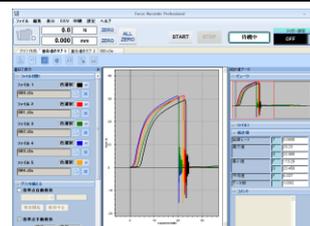
With optional software Force Recorder Professional on PC, connected with force gauge via USB, it draws force vs. displacement graphs to see FS curves.

* Optional software Force Recorder Professional is required.

* Force-displacement measurement unit FSA series are also available, which includes the necessary products.

Operation

It draws graphs with force in Y-axis and displacement in X-axis. At max. 2000Hz, it creates smooth graphs. Up to 5 graphs can be overlaid for comparison which allows to visually analyze the trends observed in curves.



Configuration required for Function 8

Motorized Test Stand MX2/MH2 series with -CN option	Digital Force Gauge ZTS/ZTA series	Optional Cable CB-706
		

Motorized Test Stand EMX series	Digital Force Gauge ZTS/ZTA series	Optional Cable CB-706
		

Function 8 Using external signal input and output

With optional function of external signal input and output (equipped in EMX), it allows communication with external devices.

Application example 1: Start and stop operations using external devices

It enables external devices to start and stop cycle mode with external contact signals from external devices.

Example 1	Example 2
<p>Combining with external equipment, start and stop motions can be controlled. E.g. Joining with the movement of conveyer, operating after chucking of jigs, etc.</p> 	<p>Combining with external switches such as a foot pedal switch, it improves efficiency in testing procedures.</p> 

Application example 2: Safety input

With external safety signals, it can operate together with safety interlock functions such as a safety shield. It can also be used to detect break point in testing cables.

Example 1	Example 2
<p>The test stand would not start when the door is opened and only start with the door closed. It prevents possible injuries from tested pieces and enables you to comply with a safety code.</p> 	<p>With both cable ends connected to the test stand, its motion can be stop at a break point. It can count the number of cycles before the break when used with timer function.</p> 

Application example 3: Utilizing external upper and lower stroke limit

With external signal, the test stand can be controlled with additional stroke limits in addition to the equipped limits. For measurements require fine control of stroke, its motion can be adjusted more specifically with external limit sensors.

* ZTA series force gauge has sub comparator function which allows extensive use by triggering operation of external devices at certain force value in addition to normal set points for judgement. (Requires optional cable CB-908 for external signal output.)

[Notes]

- Force gauge is not included but necessary to conduct force measurement.
- This product does not include a force gauge, optional attachments or optional cable.
- These products are designed for measurement purpose only.
- The contents may be changed without prior notice.
- Do not copy the contents without permission.
- Applications and information in this specification sheet are some examples for your information.
It may not apply in some cases due to the conditions and environment of measurement.
- Contact us for further information including details of output signal.

SHRADDHA IMPEX
Authorized Distributor

Email: shraddhaimpex@gmail.com / sales@shraddhaimpex.net

Web: www.shraddhaimpex.net

Contact: +91 9819530352 / +91 8591279918