Further Improve Reliability

YUASA SYSTEM ENDURANCE TEST SYSTEM

Bending  Torsion  Folding  Rolling  Tension

The Industry’s First Smaller Footprint General-purpose Machine

Desktop Model Endurance Test Machine

BEND  TWIST  FOLD  ROLL-UP  PUSH

Safety Note To ensure your safe and proper usage, please observe all the manuals before using these machines.
Further Improve Reliability

Multipurpose endurance test system
Yuasa System quickly gets the trend and test information, moreover we offer the endurance test system which can use in all process.
Our advantage is a wide range of know-how and high quality product, low cost.
To improve the reliability, we keep evolving.
A Wide Range of Endurance Tests with Our Smaller Machine

Desktop Model Endurance Test Machine
We can do various tests by changing the test jig. This machine is quiet and space-saving design.
Yuasa’s Desktop Model Endurance Test Machines provide 5 Basic Motions: bending, torsion, folding, rolling, and pushing / pulling are available for testing with our machines.

**BEND**

**TWIST**

**FOLD**

**ROLL-UP**

**PUSH**

**Bending Test**
In this test, a test piece is smoothly bended right and left under the preset test conditions.

**Torsion Test**
In this test, a test piece is smoothly twisted right and left under the preset test conditions.

**Folding Test**
In this test, a U-shaped test piece is smoothly moved under the preset test conditions.

**Rolling Test**
In this test, a test piece is smoothly rolled up and unrolled under the preset test conditions.

**Pushing / Pulling Test**
In this test, a test piece is smoothly pushed and pulled under the preset test conditions.

**Example of Test Pieces**
- **Linear Test Piece**
  - Cables (Electric Wires, Optical Fibers)
  - Harness
  - Cable Guides
  - Tubes
  - Wires
  - Fibers
- **Planar Test Piece**
  - Flexible Displays
  - Organic Electroluminescence Devices
  - Barrier Film
  - Flexible Printed Circuits
  - Flat Cables
# Bend

**SMALL**

**Desktop Model Endurance Test Machine**

**Bending Test (ø150 Faceplate)**

Using an object such as cable, harness, element wire and fine line as well as belt-shaped objects up to 30mm in width, various bending tests are conducted quickly and easily.

## Attachment  (Test Jig)

### Bend Radius: 10mm (Accessory)

A two-piece set of bend radius jig (mandrel) holds a test piece and bends it.

### Bend Radius: 40mm (max.)

Maximum bending radius is R40mm, operating range is up to ±180°.

## Test Pieces

- Linear Test Piece
- Planar Test Piece
- Harness
- Cable Guides
- Tubes
- Wires
- Fibers
- Flexible Displays
- Organic Electroluminescence Devices
- Barrier Film
- Flexible Printed Circuits
- Flat Cables

## Notes

- CE Marking

## Web

https://www.yuasa-system.jp/en

You can download the specification. If you have any question, please ask us.

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**Composition**

A wide range of bending tests confirming to JIS

Based on JIS, the machine offers many different tests such as cable tests using weights. Moreover, belt-shaped objects like FFCs and FPCs up to 30mm in width will be tested.

**Free bending angle up to ±180°**

A test piece and operating angle determine an operating angle. (ex. ø2mm Copper Wire : ±90° → 120r/min / ±180° → 60r/min)

**Connector test without bending radius**

Please ask us about the clamp jig.

*Refer to p.25 regarding the driving specification.

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A safety cover is available for the flexible area as an option. No weights are included.

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**TCDMLH-P150**

Desktop Model Endurance Test Machine (ø150 Faceplate)

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**SMALL**

**Desk Top Model Endurance Test Machine**

**Bending Test (ø150 Faceplate)**

**Notes**

- CE Marking
**SMALL Desktop Model Endurance Test Machine**

**Bending Test (Centripetal Clamp Faceplate)**

With an effective combination of the clamp and bending radius blocks (R-block), a wide range of bending tests will be performed. This machine is made for testing in smaller bend radii. There are some objects that can be tested with conventional mandrels.

**Attachment (Test Jig)**

Bending block is usable as clamp.

- **4R-block**
  - Operating Range: up to ±90°
  - Requirements for R-Adjustment: up to R10mm (Free setting per R0.5mm)

- **2R-block**
  - Operating Range: up to ±135°
  - Requirements for R-Adjustment: up to R10mm (Fixed), and up to R41mm (Free setting per R0.5mm)

- **1R-block**
  - Operating Range: up to ±180°
  - Requirements for R-Adjustment: R10 - 50mm (Free setting per R5mm)

**Composition**

A broad range of bending tests in smaller radii
This machine provides you many different tests that are impossible to conduct with conventional mandrels.

Up to four different bending radii for one R-block
In the case of 4R-block, setting up four different bending radii produces four different tests by changing the block positions from right to left, up and down. (Operating Range: up to ±90°)

A safety cover is available for the flexible area as an option. No weights are included.

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**Notes**

- CE Marking

**Test Pieces**

- Linear Test Piece
- Cable (Electric Wires, Optical Fibers)
- Harness
- Cable Guides
- Tubes
- Wires
- Fibers

**Planar Test Piece**

- Flexible Displays
- Organic Electroluminescence Devices
- Barrier Film
- Flexible Printed Circuits
- Flat Cables

**Web**

https://www.yuasa-system.jp/en

You can download the specification. If you have any question, please ask us.

*Refer to p.25 regarding the driving specification.
TWIST

**TCDMLH-TW**

**SMALL**

Desktop Model Endurance Test Machine

Torsion Test for Linear Object

This machine offers profitable tests for linear objects like cables and fibers.

**Attachment** (Test Jig)

Test Jig for Linear Object

Holding a test piece with the chuck jig, the output axis twists one end of the object while the jig frame secures the other end.

**Composition**

A wide range of torsion tests confirming to JIS

Based on JIS, this machine offers torsion tests of linear objects including cables, applying a tension from dead weights.

**Free size of test pieces up to ø10mm**

The size of test pieces is up to ø10mm. When using the sensor for detecting disconnection, the size is up to ø10mm in order to pass a lead through the jig.

The size is up to ø1mm, the clamp uses Pin Vise.

A safety cover is available for the flexible area as an option. No weights are included.

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**Notes**

- CE Marking

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**Web**

https://www.yuasa-system.jp/en

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You can download the specification. If you have any question, please ask us.
TWIST

TCDMLH-FT

Desktop Model Endurance Test Machine

Torsion Test for Planar Object

This machine realizes profitable tests for planar objects like flexible displays.

Attachment (Test Jig)

No-tension Torsion Test Jig for Planar Object

Holding a test piece with this clump jig, the output axis twists one edge of the object while the jig frame clamp secures the other edge.

Composition

No-tension Torsion Test Jig for Planar Object

Using a string to connect the fixing clamp and the twisting clamp, the fixing clamp reciprocates straight along with twisting. This system prevents developing a tension on a test piece.

4-point clamping

Twisting a planar object produces a tension at the center of it. In other words, the tension pulls the corners. To twist more effectively and smoothly, we introduce four separated clamps in the jig (patent-acquired).

Torsion tests without a tension

Using a string to connect the fixing clamp and the twisting clamp, the fixing clamp reciprocates straight along with twisting. This system prevents developing a tension on a test piece.

Test Pieces

- Planar Test Piece
- Flexible Displays
- Organic Electro Luminescence Devices
- Barrier Film
- Flexible Printed Circuits
- Flat Cables

Notes

- CE Marking

Web

https://www.yuasa-system.jp/en

You can download the specification. If you have any question, please ask us.
The bending load is applied by having one side of the sample move straight towards the other side. The sample only receives bending load so there are no applied tension or friction.

**Tension-Free U-shape Folding Test**

When conducting tests with equipments shown in the below diagram, a large tension occurs on the sample when the test starts. The cause of the tension is clear when drawing a circle with radius the same length as the sample on the movement track of the test machine, shown on right. As shown in red in the diagram, the length of the sample is too short against the movement track of the clamp. If one uses a rod, this becomes more apparent. This causes the unexpected breaks and disperse in the test results in actual tests.

**Attachment (Test Jig)**

**Basic Movement**

**Jig Movement**

Set the sample flat on the tilt clamp. The equipment will repeat flat and bend motion. When bending, the lift clamp moves downward so the sample would bend in natural U-shape. It is possible to perform vertical tests by setting the tilt clamp up right.

**Composition**

- **Tension-Free U-shape Folding Test Jig**

**Test Pieces**

- Flexible Displays
- Organic Electroluminescence Devices
- Barrier Film
- Flexible Printed Circuits
- Flat Cables

**Notes**

- CE Marking

**Web**

https://www.yuasa-system.jp/en

You can download the specification. If you have any question, please ask us.

*A refer to p.25 regarding the driving specification.*
FOLD

**SMALL**

**DLDMLH-FU**

*Desktop Model Endurance Test Machine*

**U-shape Sliding Plate Test**

This machine realizes profitable tests for planar objects like flexible displays.

**Attachment (Test Jig)**

**Single-lane Test Jig**

Folding test pieces in U-shape to clamp, the output axis reciprocates the lower clamp back and forth.

**Composition**

Clamping to wider test pieces
A test piece from 215mm in width to 3mm in thickness is available to test. Under the same thickness, this machine also tests at a time the two or more objects whose total length is up to 215mm.

**Free test conditions**
This machine offers you a large variety of flexible tests in which you can select a fold radius between 0.5 - 80mm in the case of 0mm objects in thickness, a stroke between 0 - 60mm, and a speed between 10 - 90r/min.

**Visible test**
By using a transparent holding plate, test pieces are checked easily.

*Refer to p.25 regarding the driving specification.

You can download the specification. If you have any question, please ask us.

https://www.yuasa-system.jp/en

**Notes**

You can download the specification. If you have any question, please ask us.
**FOLD**

**SMALL**

**DLDMLH-4U**

Desktop Model Endurance Test Machine

U-shape Sliding Plate Test (4-lane)

This machine offers profitable tests for linear objects like cables and fibers as well as planar ones such as flexible displays.

### Attachment (Test Jig)

4-lane Test Jig

Folding test pieces in U-shape to clamp, the output axis reciprocates the lower clamp back and forth.

### Composition

Four different test pieces for one trial

By using four lanes, you can conduct multiple tests as well as single test.

**Free fold radii**

Going up and down at the upper clamping positions, each lane makes various radii that you specify freely. A comparative trial is available on the same test pieces in different radii.

**Notes**

*Refer to p.25 regarding the driving specification.

A safety cover is available for the flexible area as an option.

**Test Pieces**

- Linear Test Piece
- Planar Test Piece

**Notes**

- CE Marking

**Web**

https://www.yuasa-system.jp/en

You can download the specification. If you have any question, please ask us.

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**Attachment (Test Jig)**

- 4-lane Test Jig
- Desktop Model Endurance Test Machine
- DLDMLH-4U

**Composition**

- Desktop Model Endurance Test Machine DLDMLH-4U
- 4-lane Test Jig DMX-4U
- U-shape Sliding Plate Test (4-lane)

**Test Pieces**

- Linear Test Piece
- Planar Test Piece

**Notes**

- CE Marking

**Web**

https://www.yuasa-system.jp/en

You can download the specification. If you have any question, please ask us.
**ROLL-UP**

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**SMALL**

**DLDMLH-FR**

Desktop Model Endurance Test Machine

Rolling Test for Planar Object

Using an object such as flexible displays, as well as cables and fibers, your original “Roll to Roll (R2R)” tests can be conducted.

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**Attachment (Test Jig)**

Rolling Test Jig for Planar Object

The rack and pinion actuator system repeatedly rolls up and unrolls a test piece by rotating and reversing a roller.

**Test Pieces**

- Flexible Displays
- Organic Electroluminescence Devices
- Barrier Film
- Flexible Printed Circuits
- Flat Cables

**Notes**

- CE Marking

Specify roller sizes from ø5 - ø100mm.

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**The Needs of Rolling Test**

Using a “R2R” manufacturing process, this machine provides evaluation tests as to a roll-up tension during rolling up and a friction between test pieces.

**R2R Process**

R2R (Roll to Roll) is a manufacturing process of producing electronic devices such as liquid crystal panels and solar cells at high throughput and low costs. It prints organic EL elements or circuit patterns on a roll of flexible material like plastic substrate or film that is transferred one roller to one another.

**Web**

https://www.yuasa-system.jp/en

You can download the specification. If you have any question, please ask us.

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**Composition**

- Desktop Model Endurance Test Machine DLDML111H
- ø5 Roller
- ø20 Roller
- ø50 Roller
- ø100 Roller

Flexible setting for rolling up

This machine rolls up a test piece at both normal rotation and reverse rotation. Additionally, you can freely change the roll-up capacity by adjusting the operation stroke.

The Tilt Clamp as an excellent holding

The driven clamp flexibly moves along with the vertical movements of a test piece to reduce damages from the clamping part.

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A safety cover is available for the flexible area as an option.

No weights are included.

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**Notes**

*Refer to p.25 regarding the driving specification.

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**Specifications of Base Unit**

BEND Test

- Bend Test

TWIST Test

- Torsion Test

PUSH Test

- Pushing / Pulling Test

ROLL-UP

- Rolling Test for Planar Object

FOLD Test

- Folding Test

**Attachment (Test Jig) Composition**

You can download the specification. If you have any question, please ask us.

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**SMALL**

Rolling Test for Planar Object

Desktop Model Endurance Test Machine

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**Web**

https://www.yuasa-system.jp/en

You can download the specification. If you have any question, please ask us.

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**Notes**

*Refer to p.25 regarding the driving specification.
**PUSH**

**DLDMLH-PP**

**SMALL**

Desktop Model Endurance Test Machine

**Pushing / Pulling Test**

For switches, SD cards, and USB memories used in many industrial applications, this machine offers endurance tests of pushing and/or pulling.

**Attachment** (Test Jig)

- **Pushing / Pulling Test Jig**
  - The output axis reciprocally pushes and pulls a test piece fixed on the XYZ table for testing its endurance. Please feel free to consult us about additional jigs attached to the output axis.

- **Pushing Test for Push-button Switch**
  - A proper jig is attached to the output axis to push a tested switch.

- **Inserting and Ejecting Test for Storage Media**
  - A proper jig is attached to the output axis to hold a tested media.

- **Operating Test for Limit Switch**
  - A proper jig is attached to the output axis to operate a tested switch.

**Composition**

**Desktop Model Endurance Test Machine**

**DLDMLH-PP**

**XYZ Table (Front)**

- **XYZ Table (+10mm to the Z-axis)**

**Pushing / Pulling Test Jig**

**DMX-PP**

**Notes**

- Smoothly linear reciprocating motion
- The linkable structure featuring a more smooth and stable operation continues to test with no damage to a test piece.

**Using the XYZ table**

- The positioning of test pieces on the XYZ table is configurable between the followings : XYZ table=60mm (back and forth), X=±7mm, Y=±7mm, Z=+10mm.

- *Refer to p.25 regarding the driving specification.*

**Web**

You can download the specification. If you have any question, please ask us.

https://www.yuasa-system.jp/en
Specifications of Base Unit

TCDM111LH (Rotary Reciprocating Unit)
A base unit for endurance tests: bending and torsion.

DLDM111LH (Linear Reciprocating Unit)
A base unit for endurance tests: folding, rolling, and pushing / pulling.

Reliable endurance and quietness
Both mechanical linkage and plastic gears promote endurance and low noise.

Flexible test conditions
TCDM111LH: up to ±270° (Operating Angle)
DLDM111LH: up to ±60mm (Stroke Capacity)
Both units work at up to 120r/min in the range above.

Fully automatic testing
A disconnection detector and preset counter are standard equipment.

Basic Specifications

<table>
<thead>
<tr>
<th></th>
<th>Rotary Reciprocating Unit</th>
<th>Linear Reciprocating Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>TCDM111LH</td>
<td>DLDM111LH</td>
</tr>
<tr>
<td>Power Supply</td>
<td>AC100V - 240V, 50/60Hz</td>
<td>100V (Cable: 2m)</td>
</tr>
<tr>
<td>Motor (Drive Source)</td>
<td>BLDC Motor (DC24V/3.5A/30W)</td>
<td>Gear head (1:20)</td>
</tr>
<tr>
<td>Operating Speed</td>
<td>10 - 120r/min (Free Setting)</td>
<td>300mm &gt; 90%</td>
</tr>
<tr>
<td>Operating Range</td>
<td>Angle: 0 - ±270° (Free Setting)</td>
<td>Stroke: 0 - ±60mm (Free Setting)</td>
</tr>
<tr>
<td></td>
<td>±20°: 0.12N·m</td>
<td>±60mm: 0.49N·m</td>
</tr>
<tr>
<td>Output Axis Capacity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>±270°: 0.88N·m</td>
<td>±120mm: 0.30N</td>
</tr>
<tr>
<td>Output Axis Spec</td>
<td>a: 10mm, 1mm (L)</td>
<td>M5-screw, 10mm (L)</td>
</tr>
<tr>
<td>Counter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disconnection Detection</td>
<td>One circuit (Criterion Value: 0 - 14Ω, Free Setting), Criterion Time: approx. 10mS (Fixed Value)</td>
<td></td>
</tr>
<tr>
<td>Auto Stop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency Stop</td>
<td>After pressing the button (Push-lock and turn-reset)</td>
<td></td>
</tr>
<tr>
<td>System Requirements</td>
<td>Temperature: -10 - +40°C, Humidity: 15 - 85% (Non-condensing)</td>
<td></td>
</tr>
<tr>
<td>Dimensions (Excluding projections)</td>
<td>290, 64mm x 344mm x 255,2mm (WxDxH)</td>
<td></td>
</tr>
<tr>
<td>Net Weight</td>
<td>17kg</td>
<td></td>
</tr>
</tbody>
</table>

*No test jig is included for each unit.

You can download the specification. If you have any question, please ask us.

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The Industry's First Smaller Footprint General-purpose Machine

Further Improve Reliability

YUASA SYSTEM ENDURANCE TEST SYSTEM

Bending Torsion Folding Rolling Tension

Desktop Model Endurance Test Machine

BEND TWIST FOLD ROLL-UP PUSH

To ensure your safe and proper usage, please observe all the manuals before using these machines.

Safety Note

*To improve our products, please note that their outer appearances and/or designs are subject to change without notice.

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