Further Improve Reliability

YUASA SYSTEM ENDURANCE TEST SYSTEM

Bending  Torsion  Folding  Rolling  Tension

Our product information is also available on https://www.yuasa-system.jp/en

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

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

YUASA SYSTEM ENDURANCE TEST SYSTEM
A Wide Range of Endurance Tests with Our Smaller Machine

We can do various tests by changing the test jig. This machine is quiet and space-saving design.

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Basic Motions

5 Basic Motions
5 different motions: bending, torsion, folding, rolling, and pushing / pulling / tension are available for testing with our machines.

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

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

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

ROLL-UP
In this test, a test piece is smoothly rolled up and unrolled under the preset test conditions.

PUSH / STRETCH
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
  - Tubing
  - Wires
  - Fibers
- Planar Test Piece...
  - Flexible Displays
  - Organic Electroluminescence Devices
  - Barrier Film
  - Flexible Printed Circuits
  - Flat Cables

Specifications of Base Unit

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

Tension Test
In this test, a test piece is smoothly stretched under the preset test conditions.
BEND

DMLHB-P150 / DMLHP-P150

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 bend it.

Bend Radius: 40mm (max.)
Maximum bending radius is R40mm, operating range is up to ±180°.

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

Notes
- CE Marking

It is possible to change the bend radius from 2.5mm - 40mm.

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

Please check the latest specification on the web.

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 FPCs and FPCs up to 30mm in width will be tested.

Free bending angle up to ±180°
A test piece and operating angle determines an operating angle (øx2mm Copper Wire : ±180° → 60r/min)

Connector test without bending radius
Please ask us about the clamp jig.

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

*Refer to p.20 regarding the driving specification.
BEND

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 R11mm (Free setting per R0.5mm)

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

Composition

Test Pieces
- Linear Test Piece
- Flexible Displays
- Harness
- Cable Guides
- Tubes
- Wires
- Fibers

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

Notes
- CE Marking

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

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

*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°)

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

*Refer to p.29 regarding the driving specification.
**TWIST**

DMLHB-TW / DMLHP-TW / DMLHPR-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.

Not following

**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.

**Notes**

- Pin Vise for the test piece up to ø1mm

*Refer to p.29 regarding the driving specification.

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

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

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

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**Web**

Please check the latest specification on the site.

**Models**

You can check the specifications of the units.
TWIST

DMLHB-FT / DMLHP-FT

**SMALL**

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 the dump jig, the output axis twists one edge of the object while the jig frame clamp secures the other edge.

**Composition**

- Desktop Model Endurance Test Machine DMLHB

No-tension Torsion Test Jig for Planar Object DML-FT

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.

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 (patented).

**Test Pieces**

- Planar Test Piece
- 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.*
**FOLD**

DMLHB-FS / DMLHP-FS  
DMLHB-FS-C / DMLHP-FS-C (Cartridge-type)  

**Desktop Model Endurance Test Machine**  
**Tension-Free U-shape Folding Test**

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.

---

**Attachment (Test Jig)**

- **Basic Movement**
  - Set the sample flat on the tilt clamp. The equipment will repeat flat and bend motion. When bending, the tilt 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.

- **Jig Movement**

---

**Issues During General Folding Test**

When conducting tests with equipments shown in the below diagram, a large tension occurs on the sample when the test starts. The causes of this 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 dispersion in the test results in actual tests.

---

**Test Pieces**  
- Planar Test Piece  
- Flexible Displays  
- Organic Electroluminescence Devices  
- Barrier Film  
- Flexible Printed Circuits  
- Flat Cables

**Notes**  
- CE Marking

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

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**Composition**

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

---

**Tension free test**
It is possible to fold without tension for planar objects like films and FPGs.

**Ideal bending test**
This machine can form ideal bending shapes by the elasticity of test pieces, or tiny one by guide plates. (patented)

**Sample evaluation during test**
It is possible to evaluate by microscope without take the sample from test machine by using cartridge attachment. The whole cartridge attachment with sample can remove from test jig. (patent pending)

*Refer to p.29 regarding the driving specification.*

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

DMLHP-CS

SMALL

Desktop Model Endurance Test Machine
Tension-Free™ Folding Clamshell-type

This test machine can examine by tiny bending radius. This test method doesn't occur the tensile stress to the test sample.

Attachment  (Test Jig)

Tension-Free™ Folding Clamshell-type Jig
This test jig can realize the tiny bending radius test without tensile stress because test sample is kept by the 2 plates of double-joint clamshell.

Sample-deformation process

Jig Movement

Deformation process focused on test sample shape

This test jig doesn't make the tensile stress occur to the test sample because rotary point is at the edge of plate. If the rotary point is different position, the tensile stress or compression stress will occur to the test sample.

Test Pieces
- Planar Test Piece
- Flexible Displays
- Organic Electroluminescence Devices
- Banner 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.

Composition

Tiny bending radius without tensile stress
It is possible to evaluate by tiny bending radius without tensile stress to the test sample by using Tension-Free™ Folding Clamshell-type Jig. (patent pending)

Sample evaluation during test
The plate can remove with leaving the test sample on the test jig, so if you inspect by microscope it is easy to restart the test with the same situation.

*Refer to p.29 regarding the driving specification.

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

DMLHB-FU / DMLHP-FU

SMALL
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.

Small bending radius

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 offer you a large variety of flexible tests in which you can select a fold radius between 0.5 - 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.

Notes
≫CE Marking

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

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

*A refer to p.20 regarding the driving specification.

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

DMLHB-4U / DMLHP-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

4-lane Test Jig
DMLHB-4U / DMLHP-4U

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

Notes
- CE Marking

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

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

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.

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

*Refer to p.29 regarding the driving specification.
ROLL-UP

DMLHB-FR / DMLHP-FR

SMALL → Desktop Model Endurance Test Machine

Rolling Test

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

Attachment (Test Jig)

Rolling Test Jig

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

Test Pieces
- Planar Test Piece
- Flexible Displays
- Organic Electroluminescence Devices
- Barrier Film
- Flexible Printed Circuits
- Flat Cables

Notes
- CE Marking

Specify roller sizes from ø5 - ø100mm.

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 another.

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.

Notes

DMLHB-FR
- Desktop Model Endurance Test Machine
- DMLHP-FR
- Rolling Test Jig
- DMX-FR

Web

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

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

Web

Please check the latest specification of the site.

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

*Refer to p.29 regarding the driving specification.

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

**DMLHB-PP / DMLHP-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.

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

**Composition**

- Pushing / Pulling Test Jig
  - Desktop Model Endurance Test Machine
  - XYZ Table (Front) XYZ Table (+10mm to the Z-axis)

**Positioning Space**

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>±7 mm</td>
<td>±7 mm</td>
<td>+10 mm</td>
</tr>
</tbody>
</table>

*Refer to p.29 regarding the driving specification.

**Web**

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

This is the best test method to evaluate the stretching test sample such as wearable devices or flexible devices.

Attachment (Test Jig)

Stretching Test Jig
Clamp the test sample horizontally, and it makes tensile stress occur repeatedly by operating the slider of driving unit.

Test Pieces
- Planar Test Piece
- Wearable Devices
- Flexible Devices

Composition

Best test method for stretchable materials
It is possible to evaluate the stretching test sample such as wearable devices or flexible devices.

A variety of test conditions
The stroke is maximum 120mm, e.g., the test sample which length is 30mm can be extended up to maximum 150mm.

*Refer to p.29 regarding the driving specification.

A safety cover is available for the flexible area as an option.
Specifications of Base Unit

DMLHB (Driving Unit Simple Operation Type)

This unit is suitable for long-time repeating tests.

DMLHP (Driving Unit Positioning Type)

It is possible to set a variety of test conditions, and it can operate freely at any position.

DMLHPR (Driving Unit Both 10 revolutions Positioning Type)

It is possible to operate freely within 10 revolutions on both sides. The appearance is the same as DMLHB.

Endurance and quietness

Both mechanical linkage structures (DMLHB) and plastic gears realize high endurance and low noise.

Various test conditions

- Simple operation type: Maximum operation angle ±270° (rotary reciprocation mode), maximum operation stroke ±60 mm, maximum operation speed 120 rec/min.
- Positioning type: Maximum operation angle ±270° (rotary reciprocation mode), maximum operation stroke 120 mm, 90 rec/min.

Fully automatic testing

A disconnection detector and preset counter are standard equipment.

Basic Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>DMLHB</th>
<th>DMLHP</th>
<th>DMLHPR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric Power</td>
<td>AC100–240 V (50/60 Hz) 100 W</td>
<td>AC100–240 V (50/60 Hz) 100 W</td>
<td>AC100–240 V (50/60 Hz) 100 W</td>
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<td>Reciprocating Speed</td>
<td>10–120 rec/min</td>
<td>5–120 rec/min</td>
<td>5–1280 deg/sec</td>
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<td>Reciprocating Angle / Distance</td>
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<td>0–±60 mm</td>
<td>±120 mm (in 0.1 mm increments)</td>
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<td>Reciprocating Angle / Distance</td>
<td>100 N</td>
<td>1.8 N·m</td>
<td>72 N</td>
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<td>Reciprocating Angle / Distance</td>
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<td>1.8 N·m</td>
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<td>±120 mm (in 0.1 deg increments)</td>
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<td>1.8 N·m</td>
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<td>Reciprocating Angle / Distance</td>
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<td>1.8 N·m</td>
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<td>±1.00 N·m</td>
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<td>Installation Environment</td>
<td>Temp. +5–+40°C / Hum. 41–104°F / 15–85% Rh (No condensation)</td>
<td>Temp. +5–+40°C / Hum. 41–104°F / 15–85% Rh (No condensation)</td>
<td>Temp. +5–+40°C / Hum. 41–104°F / 15–85% Rh (No condensation)</td>
</tr>
<tr>
<td>Counter</td>
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<td>8-digit display (Can set the target number)</td>
<td>8-digit display (Can set the target number)</td>
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<tr>
<td>Installation Environment</td>
<td>Temp. +5–+40°C / Hum. 41–104°F / 15–85% Rh (No condensation)</td>
<td>Temp. +5–+40°C / Hum. 41–104°F / 15–85% Rh (No condensation)</td>
<td>Temp. +5–+40°C / Hum. 41–104°F / 15–85% Rh (No condensation)</td>
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<td>Safety Interlock</td>
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<td>(Included cable: 2m)</td>
<td>(Included cable: 2m)</td>
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<tr>
<td>Weight</td>
<td>17 kg</td>
<td>17 kg</td>
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</tr>
</tbody>
</table>

Notes:
- CE Marking: Yes
- KC Mark: Yes

You can download the specifications. If you have any questions, please ask us.

https://www.yuasa-system.jp/en
Further Improve Reliability

The Industry’s First Smaller Footprint General-purpose Machine

Desktop Model Endurance Test Machine

YUASA SYSTEM ENDURANCE TEST SYSTEM

Bend Torsion Fold Roll Tension

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

YUASA SYSTEM CO., LTD.

Our product information is also available on https://www.yuasa-system.jp/en

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

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

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