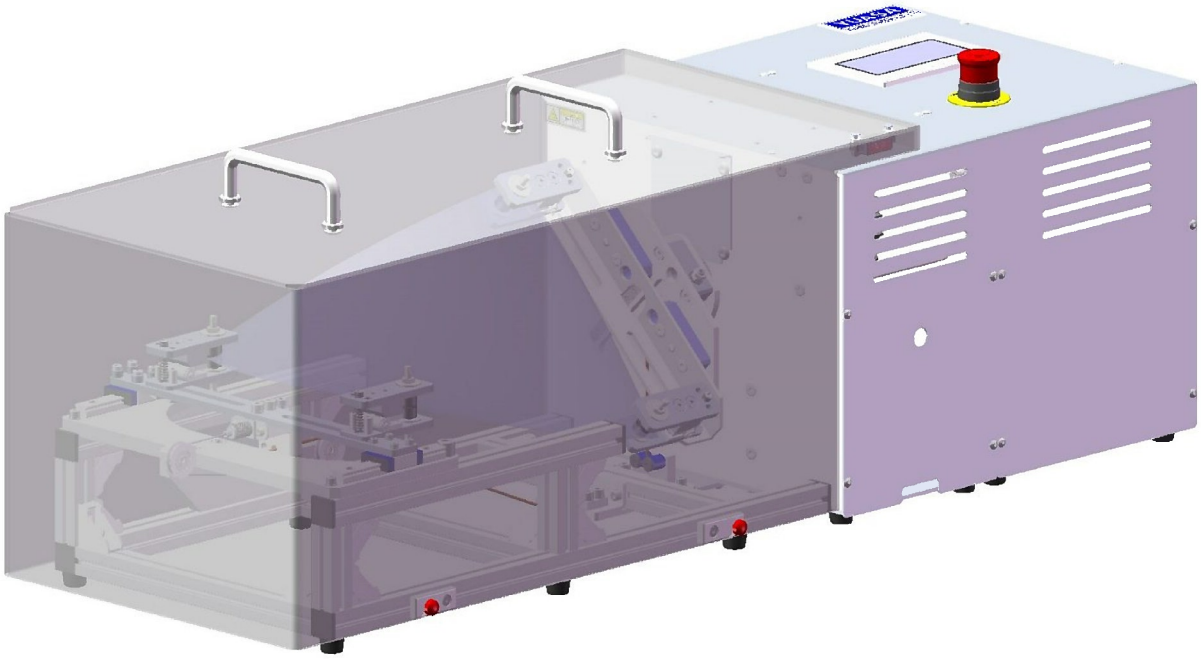
INSTRUCTION MANUAL
TEST JIG, TENSION-FREE TORSION

ET241M001-001/01

YouTube



Safety precaution are classified into five categories

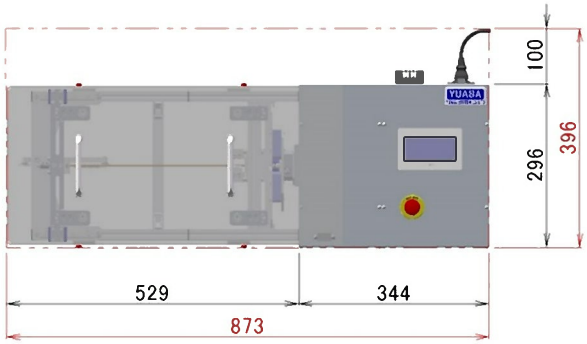
WARNING : Death or serious injury may result from not following product installation instruction.
CAUTION : Minor injury, as well as damage to the product may result from not following product instruction.
NOTICE : Inaccurate data may result from not following the test instructions.
NOTE : General knowledge.
INTERLOCK : Effect of the interlock system for safety.

INTERLOCK : Install the safety cover and prevent access to any moving parts.
WARNING : Installing, operating, maintaining or inspecting must be carried out by skilled and professional engineers.
WARNING : Make sure the Emergency Stop Button is made work, and the machine is completely stopped before adjust the testing condition and change the part.
WARNING : Make sure the power is switched off, and the machine is completely stopped before carrying out maintenance and inspection.
WARNING : Do not use products beyond its capacity as specified in the specification.
WARNING : Do not remodel.
CAUTION : Immediately stop the machine upon any sign of abnormal operation.
NOTICE : Make sure to tighten the screws as described in the manual.
NOTE : The scraps should be disposed as general waste by skilled professionals.

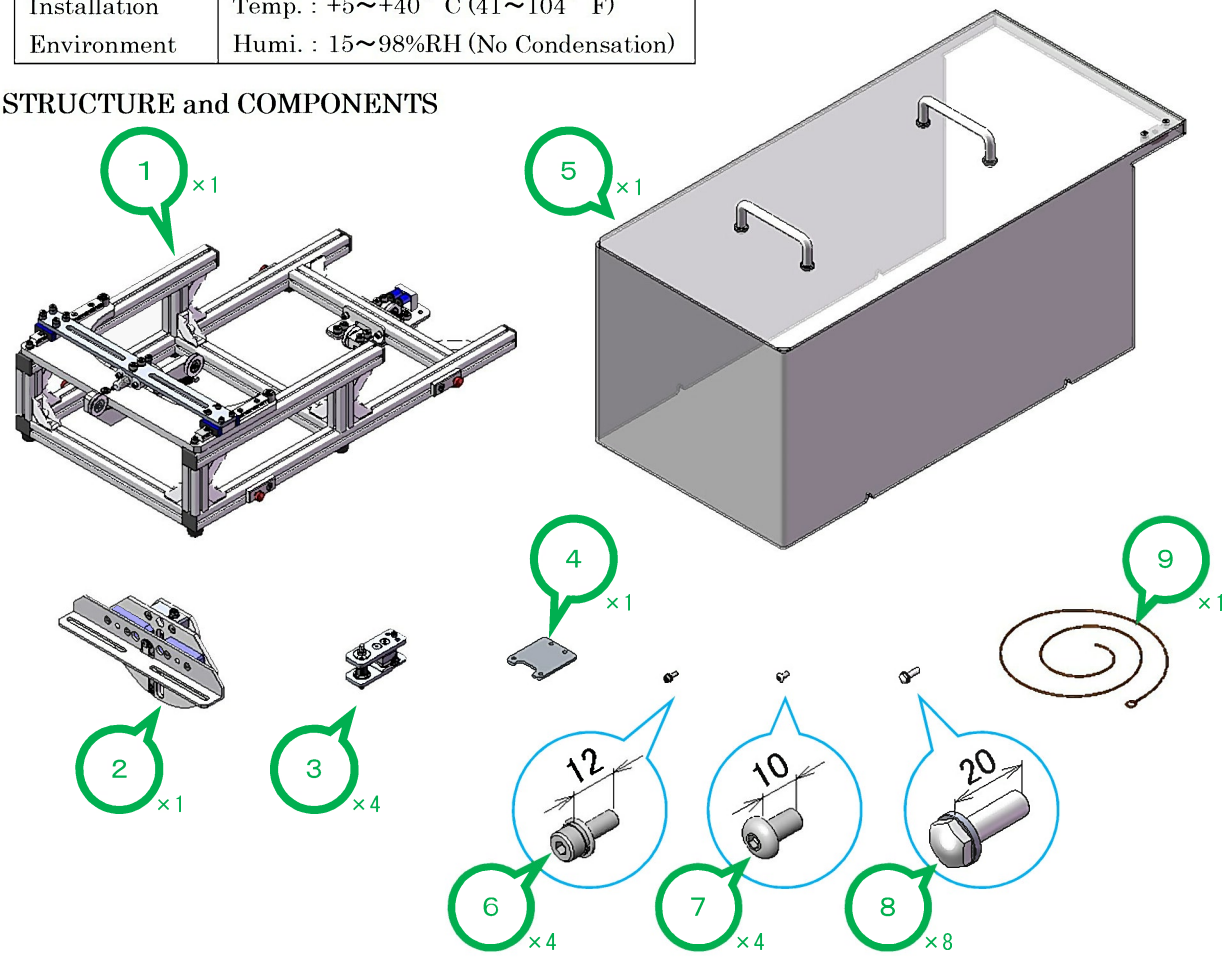
YUASA
YUASA SYSTEM CO., LTD.

◇ OVERVIEW

Sample's Size	Thicness : Max. 1 mm Width : 30～210 mm Length : 60～300 mm
Twisting Angle	0～90 ° (In Tention-Free mode)
Rec. Speed	Max. 90 r/min
Twisting Torque	Max. 1.0 N·m
Mass	DLDM111LH : About 17 kg (37.5 lb) Test Jig : About 8 kg (15.5 lb) Cover : About 4 kg (8.5 lb)
Installation Environment	Temp. : +5～+40 ° C (41～104 ° F) Humi. : 15～98%RH (No Condensation)



◇ STRUCTURE and COMPONENTS



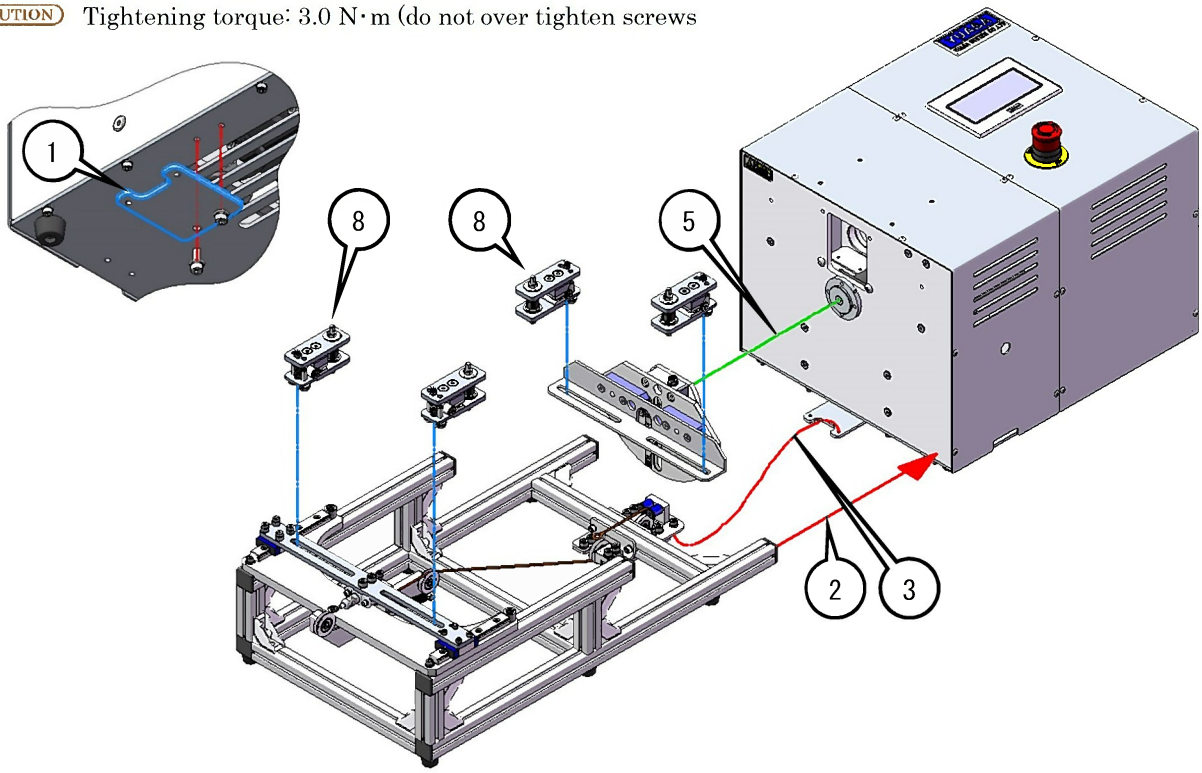
№	NAME	TYPE	MANUFACTURE (MATERIAL)	NOTE
1	Basic unit, follower	ET241A001-001	YUASA SYSTEM	
2	Swing plate	ET202A007-002	YUASA SYSTEM	
3	Spinnable clamp	ET242A001-004	YUASA SYSTEM	
4	Plate bracket	ET200P013-003	YUASA SYSTEM	
5	Safety cover	ET500P003-030	YUASA SYSTEM	
6	Cap screw +SW +PW	M4x12	(Steel)	
7	Button head screw	M5x10	(Steel)	
8	Screw +SW	SSTBC6-20 + WSSS12-6-2	MISUMI	
9	Controlling String	ET265A002-001	YUASA SYSTEM	

NOTE Explain words in this instruction manual.

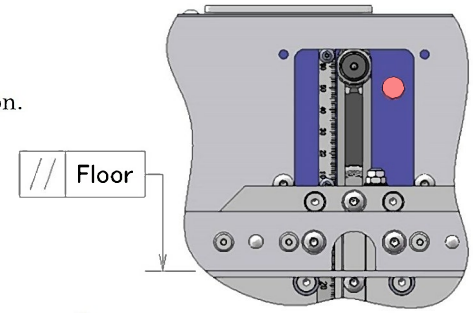
- Swing plate : It will be attached to driving shaft directly.
- Spinnable Clamp : It will spin according to the sample.
- Controlling String : It pulls the following slider automaticaly.

◇ **INSTALLATION** [Tool: 3 mm Allen wrench]

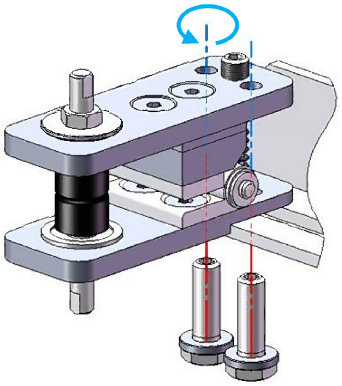
1) Attach the Plate bracket underTCDM111LH.
   NOTE Cap screw +SW +PW M4x12 (2 sets)
   CAUTION Tightening torque: 3.0 N·m (do not over tighten screws



2) Set the controlling string temporarily.
3) Press the basic unit to TCDM111LH, then fix them.
   NOTE Cap screw +SW +PW M4x12 (2 sets)
   CAUTION Tightening torque: 3.0 N·m (do not over tighten screws)
4) Insert the locking latch into TCDM111LH to lock it in neutral position (±0 ˚).
5) Attach the swing plate to the driving shaft horizontally.
   NOTE Button head screw M5x10 (4 pieces)
   CAUTION Tightening torque: 3.0 N·m (do not over tighten screws)
   NOTE By testing condition, it should be attached in tilted position.
   Ex.) One-side torsion test, etc.
6) Put out the locking latch, and attach the cover.



7) Hook the controlling string to the idler (the swing plate).
8) Attach spinnable clamps to the swing plate and the following slider temporarily.
   NOTE Turn screws in CCW to fix the spinnable clamp.



◇ SETTING of TEST CONDITIONS [Tool: 3 mm Allen wrench, 8 mm spanner]

◆In case that twist the sample equally in CW and CCW.

NOTE Reffer to P.5, if twist the sample in one side or unevenly.

CAUTION Cannot move the driving shaft, TCDM111LH, with hand when the driving shaft located in each turning ends. Move the driving shaft with operation panel other than each turning ends.

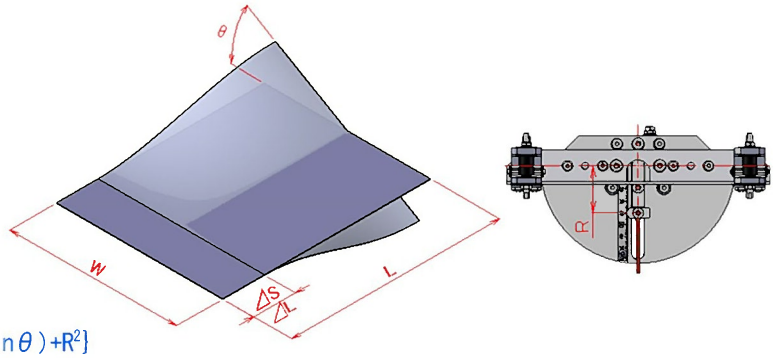
1) Calculate the testing condition to adjust the idler (the swing plate).

NOTICE Can calculate change amont of the sample and moving distance of the following slider as below.

NOTICE Confirm the change amount of the sample with the testing system actually.

NOTE Can check the position of idler roughly with attached list.

- Sample's length : L
- Sample's width : W
- Twisting angle : θ
- Posision of idler : R
- Change amount (Sample) : ⊿L
- Movind distance (Slider) : ⊿S



$\Delta L = L - \sqrt{\{L^2 - \pi W(\theta/360)^2\}}$

$\Delta S = A + B + R - 120$

$*A = \sqrt{\{14400 - R(240\cos\theta + 12\sin\theta) + R^2\}}$

$*B = 6\tan^{-1}(R\sin\theta / A)$

ex. Twist the sample (Length: 130 mm, Width: 100 mm) in ± 30 deg.

⊿L= 130-√{(130)²-100π(30/360)²}= 2.663 mm

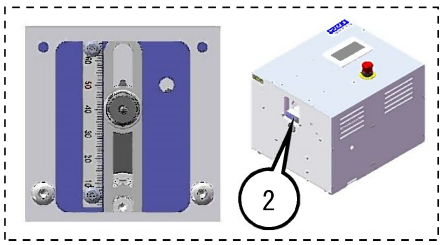
Confirm the list and substitute "R" to "17+α". (*In this case, R=17.3)

*A= √{14400-[17.3]x(240cosθ+12sinθ)+[17.32]²}= 104.880

*B= 6tan⁻¹(6A/[17.3]sinθ)= 0.494

⊿S= 104.880+0.494+17.3-120= 2.674 ⊿L≒⊿S

2) Set the reciprocating angle (TCD111LH).



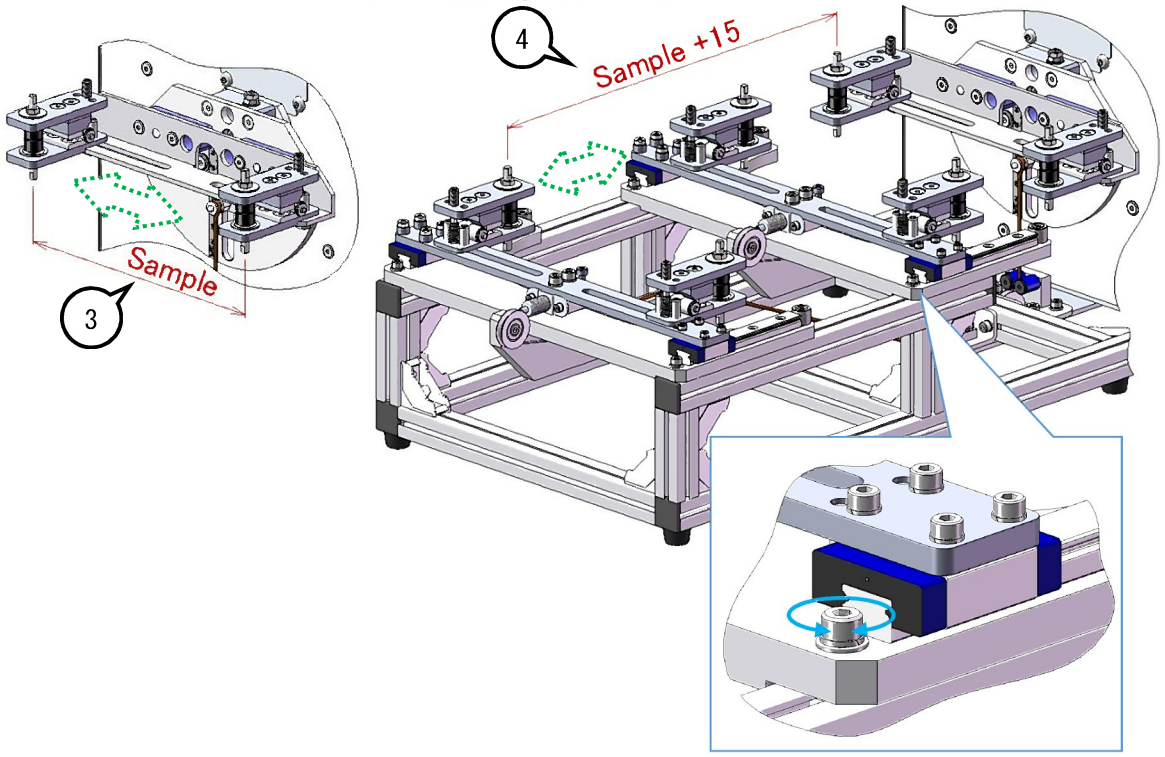
3) Adjust spinnable clamps according to the sample.

CAUTION Tightening torque: 3.0 N·m (do not over tighten screws)

4) Adjust the base plate (the following slider) according to the sample.

CAUTION When the following slider is on rearmost position, the distance between a couple of spinnable clamps is 15 mm longer than the sample.

CAUTION Tightening torque: 3.0 N·m (do not over tighten screws)



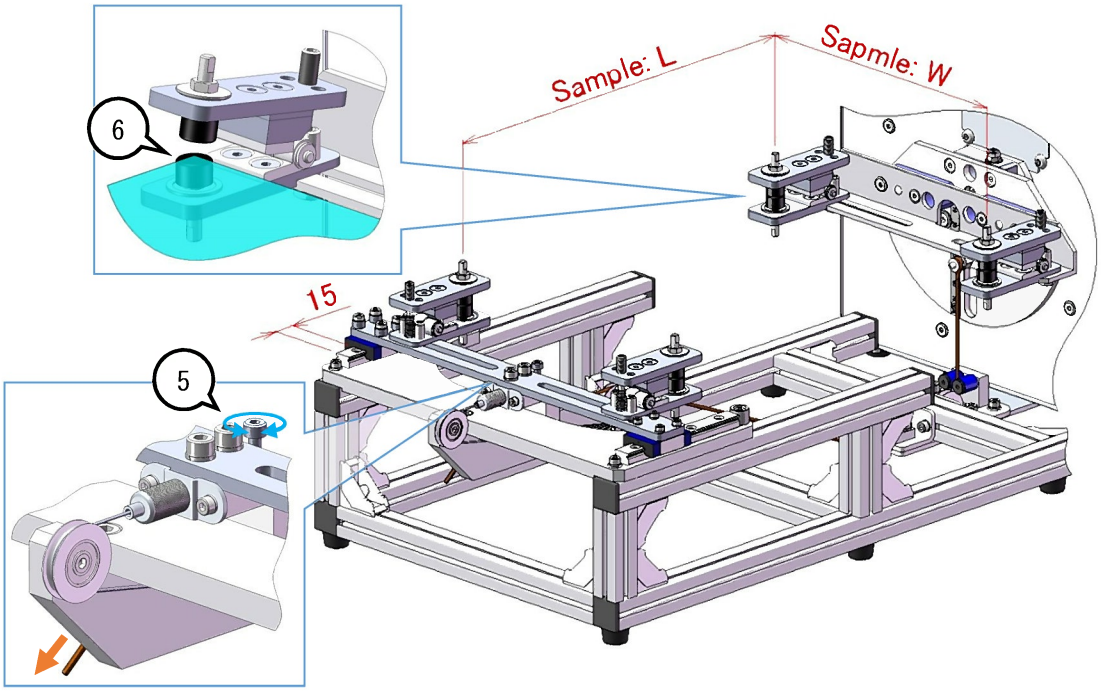
5) Adjust the controlling string (the following slider) according to the sample.

CAUTION Tightening torque: 2.0 N·m (do not over tighten screws because the controlling string will break)

6) Pinch the sample with spinnable clamps.

NOTE Can change clamping force with supporting screws and springs.

NOTICE Tightening torque varies according to the sample or test condition.



7) Check interference each components with low speed or hand moving.

INTERLOCK Cannot operate TCDM111LH when the cover, test jig, is open.

◆In case that twist the sample in one side or unevenly.

NOTE Reffer to P.3, if twist the sample equally in CW and CCW.

CAUTION Cannot move the driving shaft, TCDM111LH, with hand when the driving shaft located in each turning ends. Move the driving shaft with operation panel other than each turning ends.

1) Calculate the testing condition to adjust the idler (the swing plate).

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NOTE Can check the position of idler roughly with attached list.

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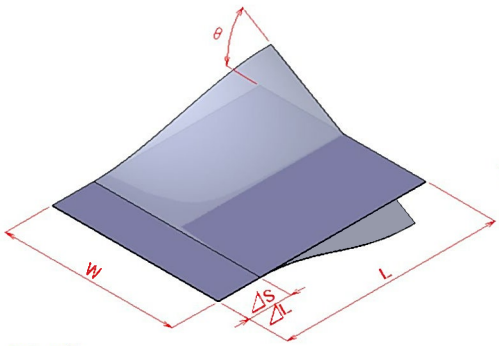
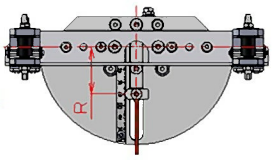
- Twisting angle : θ
- Posision of idler : R
- Change amount (Sample) : ΔL
- Movind distance (Slider) : ΔS





$\Delta L = L - \sqrt{\{L^2 - \pi W(\theta/360)^2\}}$

$\Delta S = A + B + R - 120$

$*A = \sqrt{\{14400 - R(240\cos\theta + 12\sin\theta) + R^2\}}$

$*B = 6\tan^{-1}(R\sin\theta / A)$

ex. Twist the sample (Length: 130 mm, Width: 100 mm) in 30 deg.

$\Delta L = 130 - \sqrt{\{(130)^2 - 100\pi(30/360)^2\}} = 2.663$ mm

Confirm the list and substitute "R" to "17+α". (*In this case, R=17.3)

$*A = \sqrt{\{14400 - [17.3]x(240\cos\theta + 12\sin\theta) + [17.32]^2\}} = 104.880$

$*B = 6\tan^{-1}(6A/[17.3]\sin\theta) = 0.494$

$\Delta S = 104.880 + 0.494 + 17.3 - 120 = 2.674$ $\Delta L \fallingdotseq \Delta S$

2) Set the reciprocating angle (TCD111LH).

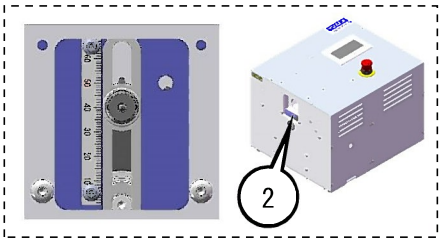
CAUTION Set it based on total twisting angle.

Ex. Twist the sample in one side, 90 deg.

・・・±45°

Twist the sample between +30 deg. and -60 deg.

・・・±45°



NOTE In this chapter, the testing system twists the sample in one side, 30 deg.

3) Move the driving shaft to turning end.

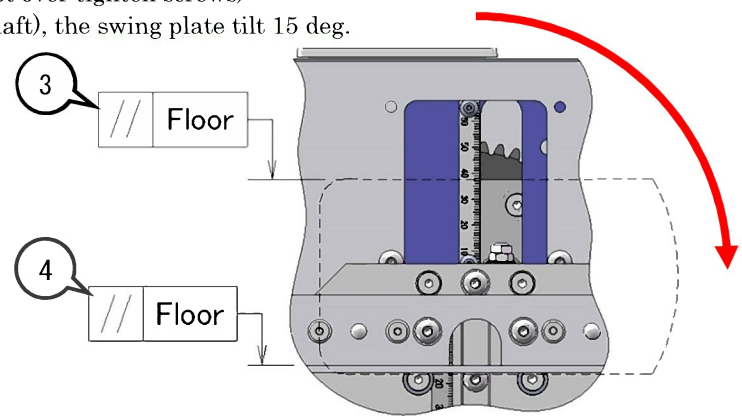
NOTE In this chapter, the driving shaft turn to CCW-end.

4) Adjust the swing plate horizontally.

NOTE Button head screw M5x10 (4 pieces)

CAUTION Tightening torque: 3.0 N・m (do not over tighten screws)

NOTE In neutral position (the driving shaft), the swing plate tilt 15 deg.



5) Adjust spinnable clamps according to the sample.

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6) Adjust the base plate (the following slider) according to the sample.

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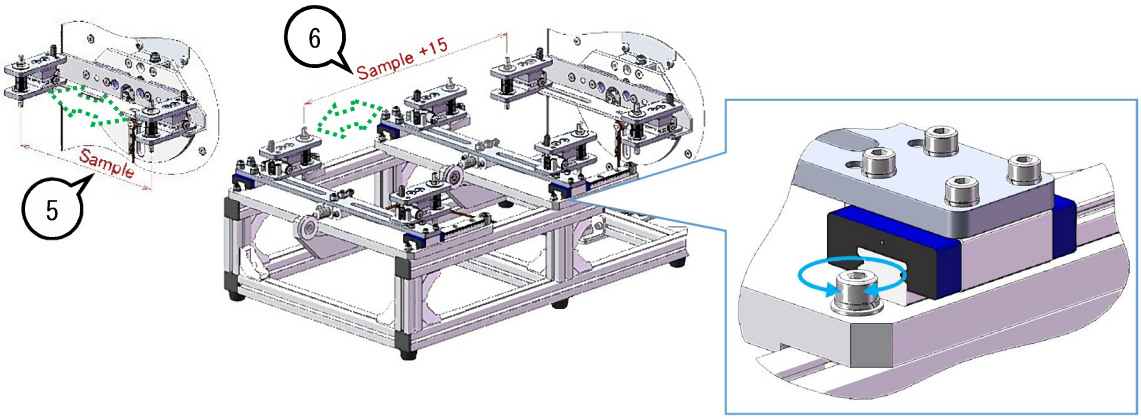

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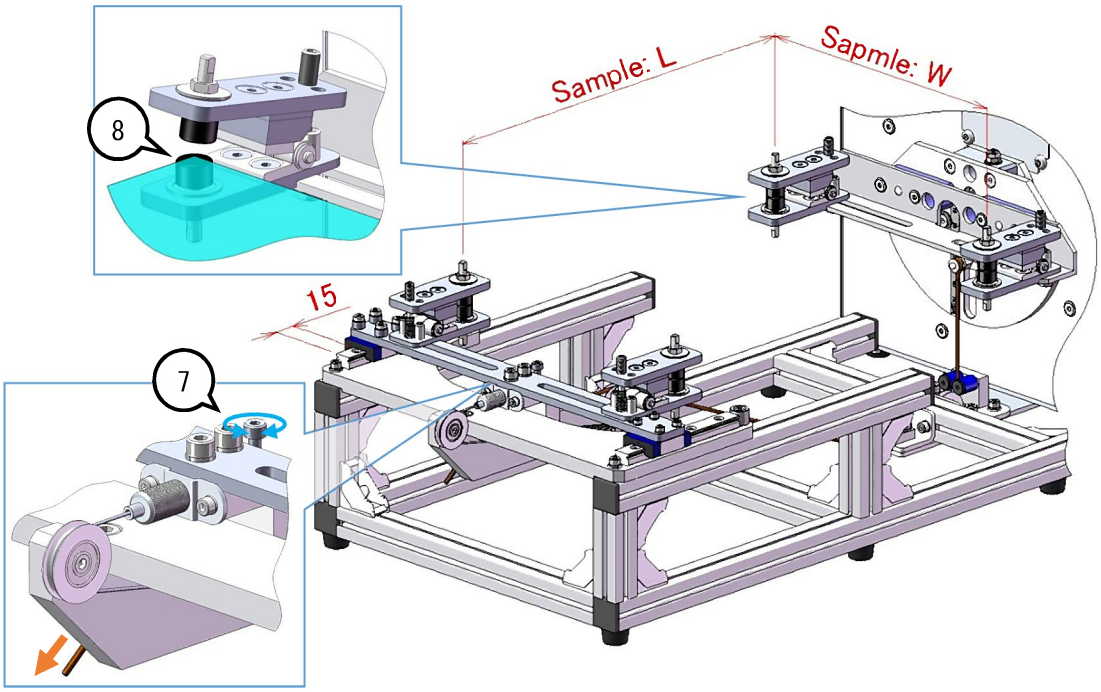


9) Check interference each components with low speed or hand moving.

INTERLOCK Cannot operate TCDM111LH when the cover, test jig, is open.

◇Safety Cover (Test-Jig-Cover)

WARNING Install a safety cover and prevent access to any moving parts.

CAUTION Fix the safety cover surely to prevent accidents by of the vibration.

INTERLOCK Cannot operate equipment with the operation panel whenever the safety cover opened.

◆ Attach the cover on the test jig. [Tool: ---]

1) Loosen four screws with Knurled Resin Head.

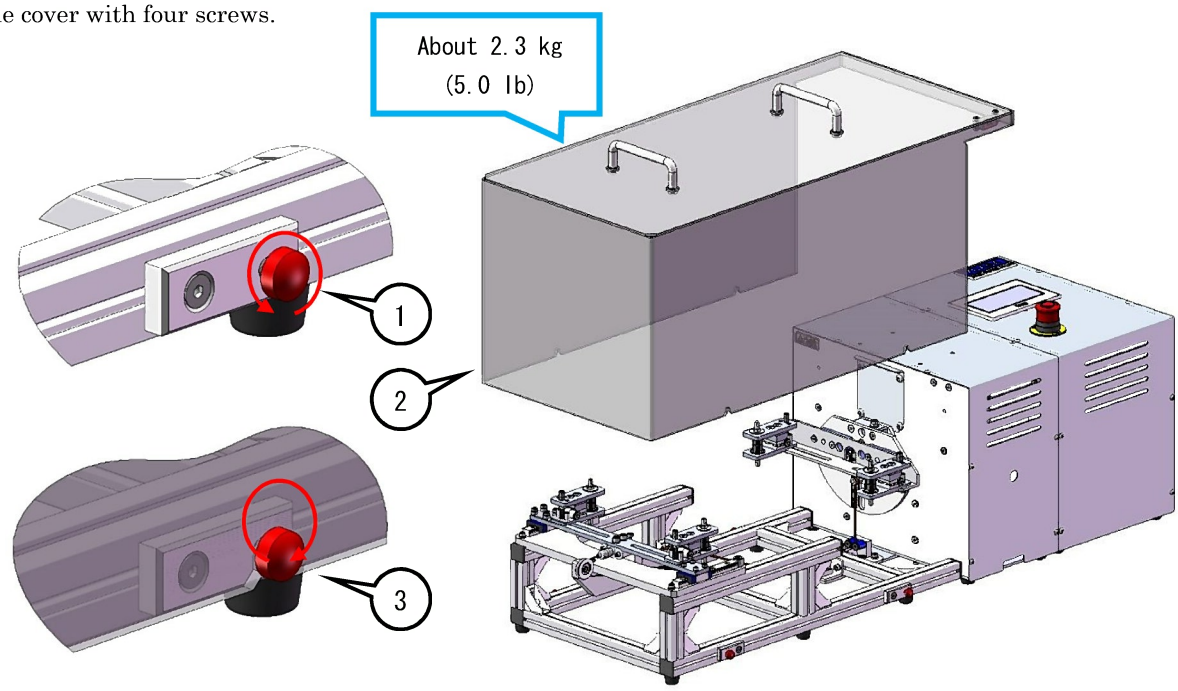
NOTE Do not remove screws.

2) Attach the cover on the test jig.

NOTE Confirm direction of the cover as below.

CAUTION Confirm screws are fit in the ditch of the cover.

3) Fix the cover with four screws.



◇Maintenance and Inspection

This Jig is maintenance-free.

Change to the new one if some components will go bad or break because of using condition or requirement.

Representative components

№	NAME	TYPE	Num.	MANUFACTURE (MATERIAL)	NOTE
1	Spinnable Clamp	YS242A001-004	2	YUASA SYSTEM	
2	C-rube Linear Way	MLG12C2R300HS1	2	IKO	
3	Controlling String	ET265A002-001	1	YUASA SYSTEM	
4	Button head screw	M5x10	4	(Steel)	
5	Screw with Knurled Resin Head	CRKR4-15	4	MISUMI	

YouTube

YouTube help to understand how to set up the test jig.
Please cover the communication fee.

Quick Reference with Website

Add a keyword into the address bar from our website to access the quick reference.

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

http://www.yuasa-system.jp/manuals/ET241M001-001

～ Further Improve Reliability

YUASA SYSTEM CO., LTD.

http://www.yuasa-system.jp ～

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