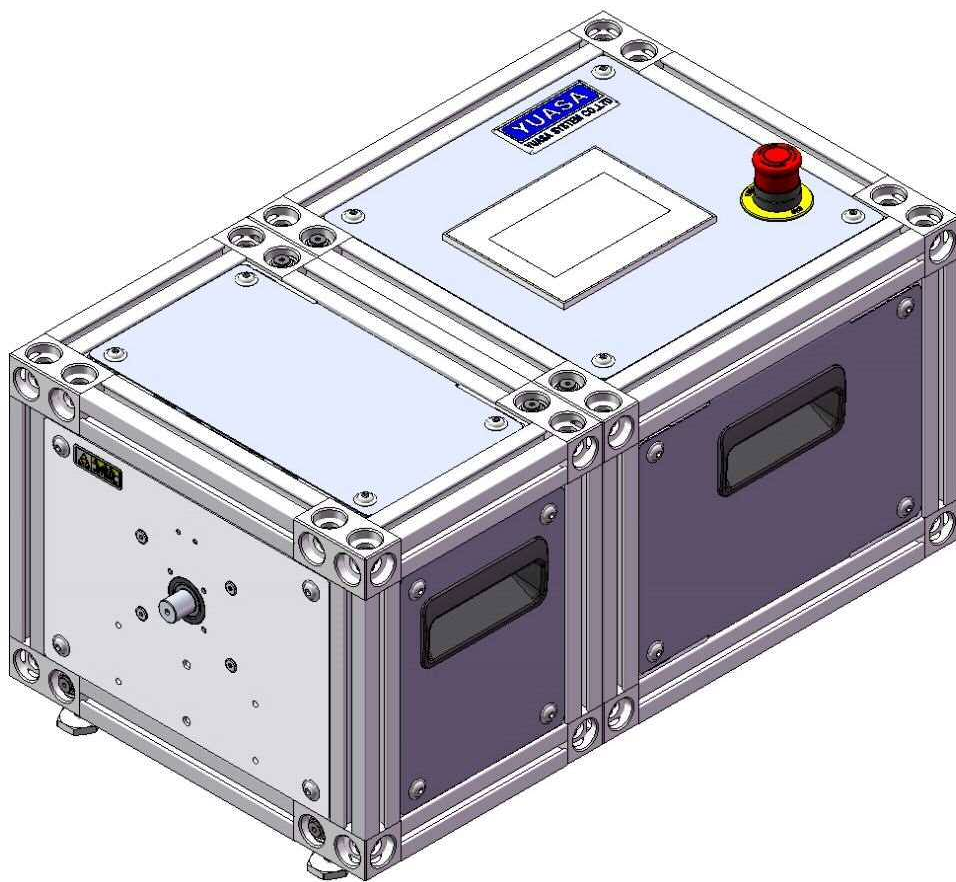


INSTRUCTION MANUAL
Endurance Testing Machine
DR11MR

ETDR11MRM0001/04



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 a personal 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 to tighten each screws as described in this manual.
- WARNING** : Make sure the Emergency Stop Button is maked 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** : Do not change installation environment (temperature and humidity) rapidly.
- CAUTION** : Isolate the machine from sunlight.
- CAUTION** : Isolate the machine from any noise.
- CAUTION** : Isolate the machine from any dust.
- CAUTION** : Isolate the machine from large vibration.
- CAUTION** : Immediately stop the machine upon any sign of abnormal operation.
- NOTICE** : Make sure to tighten the screws as described in the manual.
- NOTE** : In some cases, illustrations with different shapes may be included.
- NOTE** : In some cases, a description different from your equipment may be included.
- NOTE** : The scraps should be disposed as general waste by skilled professionals.

Icons on this manual.

◇ Tap the touch panel display



◇ Press the touch panel display



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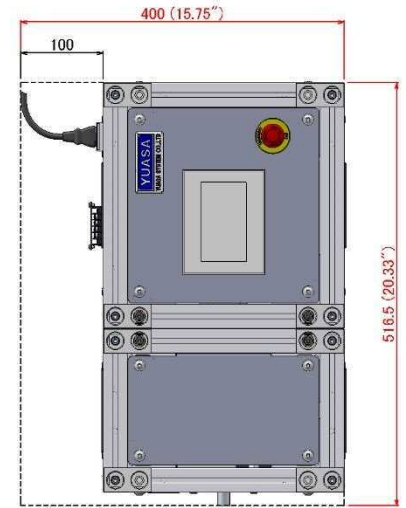
[- NOTICE -]

We make absolutely sure about the contents of this user manual.
However, if you have some questions or find some incorrect, please contact us.

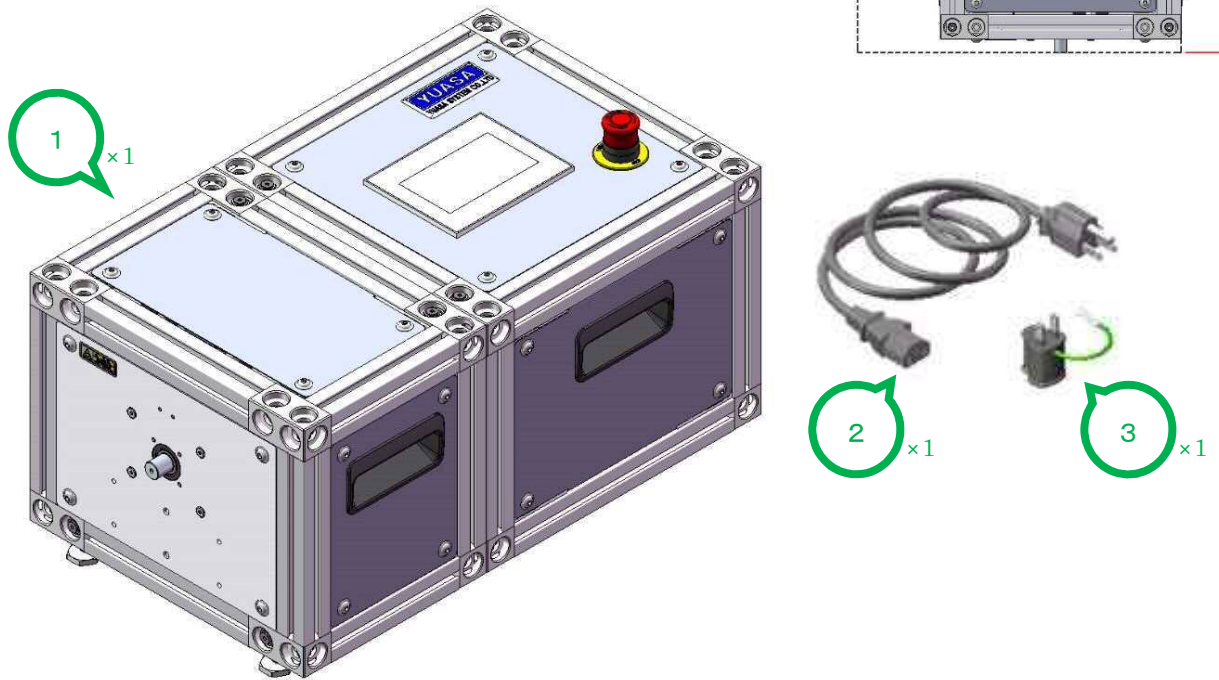
1. GENERAL DESCRIPTION

1.1 UTILITY INFORMATION

POWER	100~240 V / 50 or 60 Hz / 1 Phase / 100 VA
MASS	About 20 kg (About 44.09 lb)
INSTALLATION ENVIRONMENT	Temperature : +5~+40 ° C (41~104 ° F) Humidity : 15~85 %RH (No Condensation)
SOUND LEVEL	Max. 80 dB

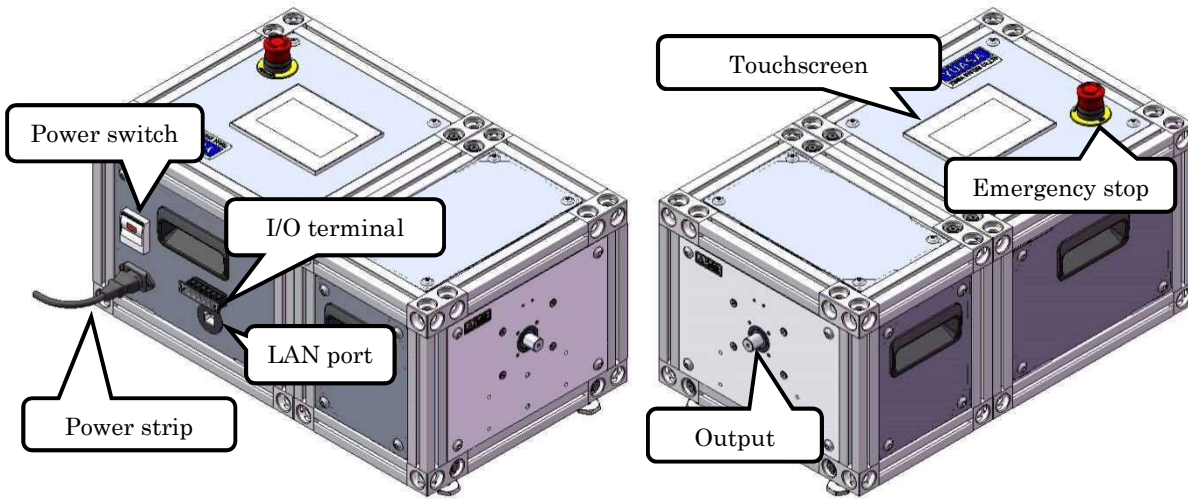


1.2 STRUCTURE and COMPONENTS



No	NAME	NUM.	NOTE
1	DR11MR	1	Main body
2	Power strip	1	2 m
3	Adapter	1	“3P” to “2P + Ground cable”

1.3 OUTLINE



1.4 INSTALLATION

Prepare the setting space according to the specifications of testing jigs

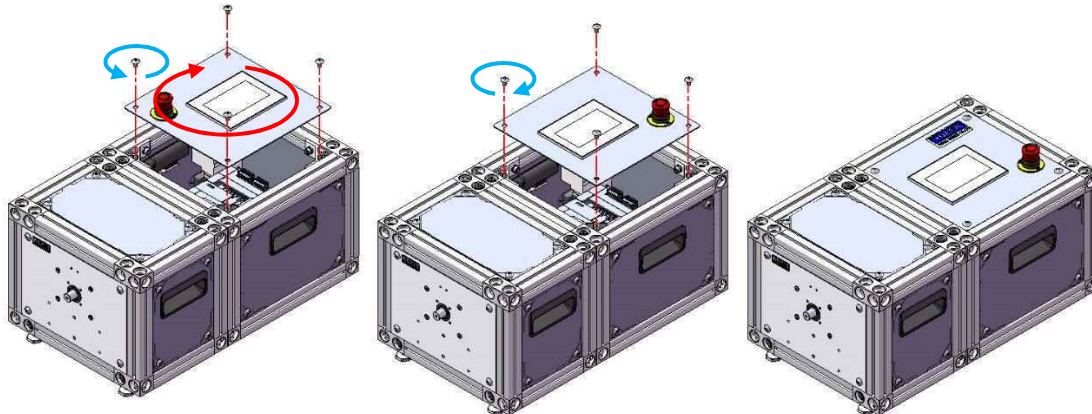
- WARNING** Use only an included power strip.
- WARNING** Make sure to wire so as not to damage the power strip.
- WARNING** Ground a ground cable for safety.
- CAUTION** Install them on the strong rack, they might rock the rack.
- CAUTION** Do not hold the terminals or the power strip when move the DR11MR.
- CAUTION** Make sure not to squash finger between the DR11MR and the rack or the wall.

1.4.1 ORIENTATION: OPERATION PANEL

The operation panel can be turned according to the testing jig.

CAUTION Make sure the wiring of the operation panel never over twisting or squashing.

- 1) Remove the operation panel.
- 2) Turn the operation panel.
- 3) Tighten screws to hold the operation panel.

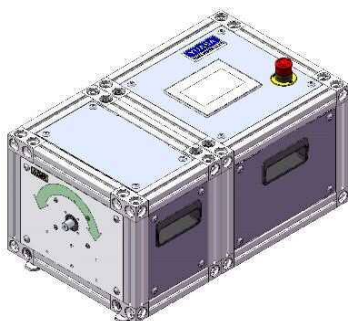


1.4.2 MOTION MODE SELECTION

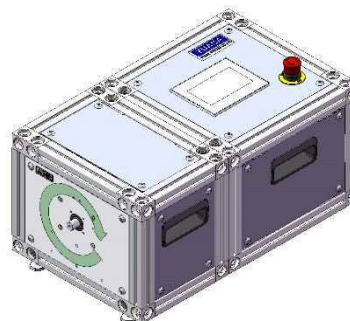
Can select the output mode from “Reciprocation Mode” or “Rotation Mode”.

Refer to “3.1.1 MOTION MODE” for detail.

【Reciprocation Mode】



【Rotation Mode】



1.5 SPECIFICATIONS

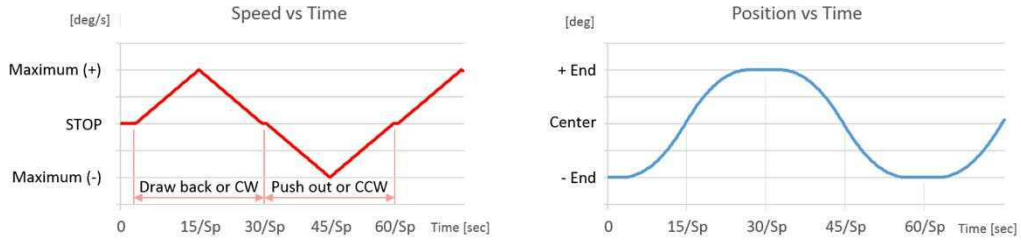
1.5.1 ACCELERATION CHARACTERISTIC

NOTICE DR11MR may moves with two-stages acceleration as below.

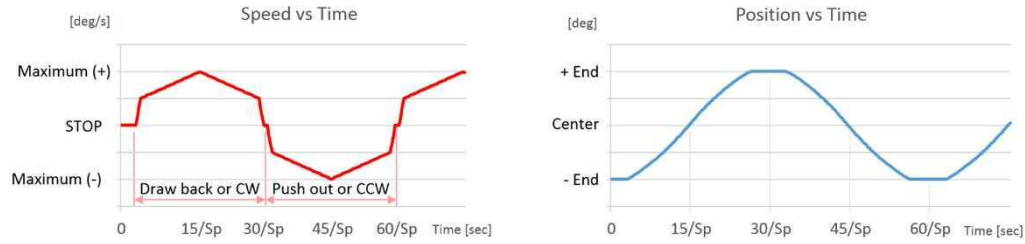
NOTE SP: Reciprocating speed [deg/sec]

Triangle Waveform

Moving with Constant Acceleration

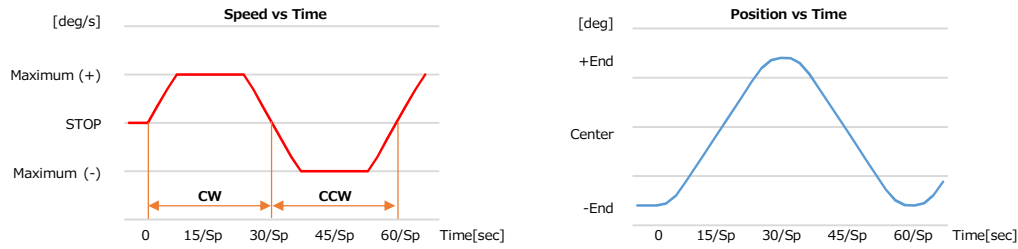


Moving with Two-Stages Acceleration (in case of short stroke and low reciprocating speed)

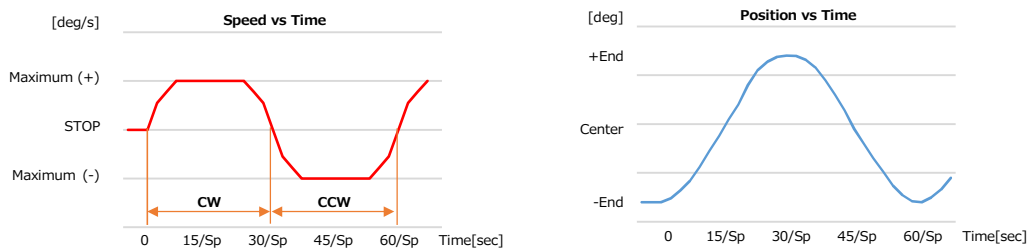


Trapezoid Waveform

Moving with Constant Acceleration



Moving with Two-Stage Acceleration (in case of short stroke and low reciprocating speed)



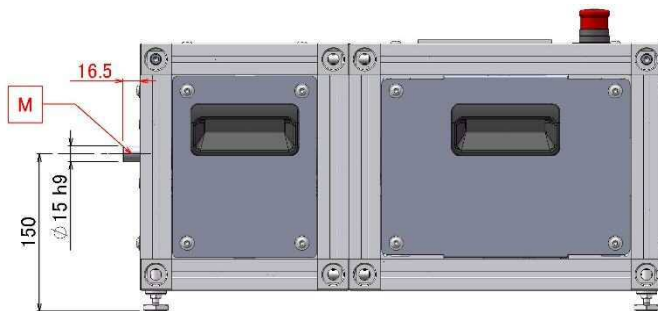
1.5.2 MOTION MODE

DR11MR supplies Rotary “Reciprocation” or Simple “Rotation” to a testing jig.

CAUTION Function may be limited by kind of test jig or sample.

NOTE Output shaft: Diameter is $\phi 15$ mm and Length is 16.5 mm.

COUNTER	8-digits display (Can set the target number)
SPEED	1 ~ 1200 [deg/sec]
RECIPROCATING ANGLE	7.0 ~ ± 3600.0 [deg.] (in 0.1 deg. increments)
UNIDIRECTIONAL ROTATION	CW or CCW (No angle limit)
POSITIONING ACCURACY	0.05 [deg.] (by backlash)
PERMISSIBLE TORQUE	6.5 [N·m]
STATIC RATED MOMENT	1.5 [N·m]
PERMISSIBLE MOMENT of INERTIA	2.0×10^{-3} [kg·m ²]



- Permissible Torque : It mean maximum power that the testing jig will transform samples.
- Static Rated Moment : It mean maximum mass (add up test jigs and samples) that attachable to output shaft.
⇒ Calculate it from each masses and each center of gravity positions.

Ex. Bending Jig + Bending Radius Jig (R10)

◇ Test jigs

- Center of gravity position : 25 mm
- Mass : 0.77 kg

◇ Samples

- Clamped position : 63.5 mm
- Mass : 1.0 kg

Static Rated Moment
 $= 0.77 \times 9.81 \times 0.025 + 1.0 \times 9.81 \times 0.0635$
 $= 0.81$ [N·m] < 1.5 [N·m]

- Permissible Moment of Inertia: It is index for checking relations of reciprocating speed and angle.
⇒ Refer to an attached sheet (instruction manuals and specifications of each testing jigs) for detail.

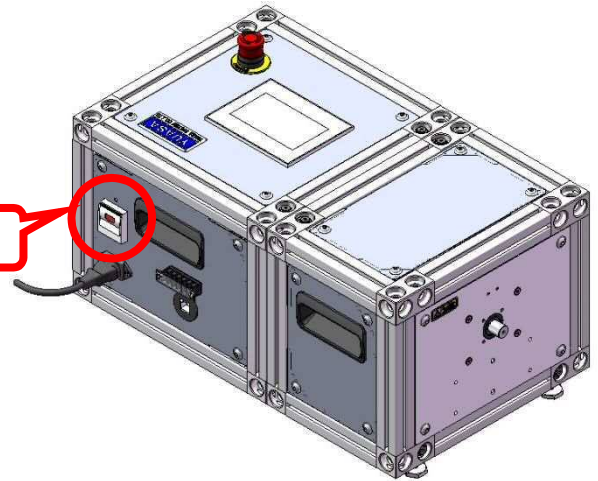
2. OPERATING INSTRUCTION

2.1 BOOT UP

- 1) Connect a power strip (inlet) to outlet.
WARNING Ground a ground cable for safety.
- 2) Turn on the power switch.
- 3) The “HOME” screen boot up, over.
NOTE The endurance testing machine boots up automatically when electricity supplied.

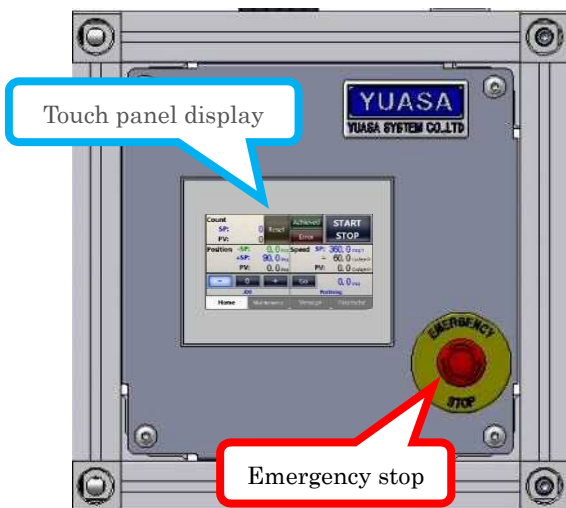
2.2 SHUT DOWN

- 1) Make sure that every equipment stop.
- 2) Turn off the power switch.
NOTE There is no unique procedure of shut down.



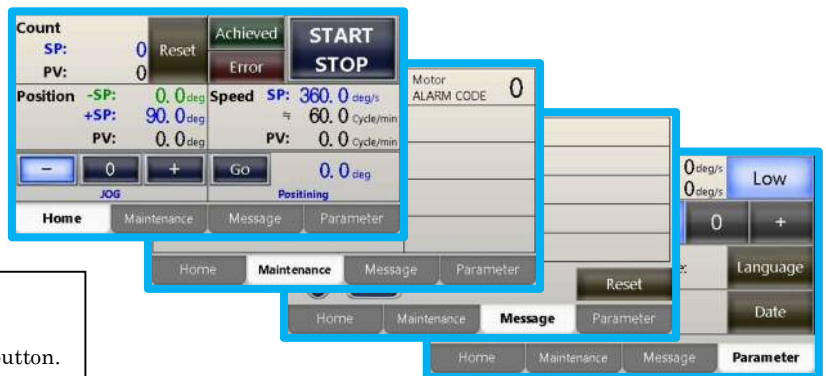
2.3 OPERATION PANEL

Operate the endurance testing machine with the touch panel display.



Tap each menu button to change the screen.
Refer to each instruction for detail, below.

- Home Screen:
3. SETTING and TESTING CONDITON
- Maintenance Screen:
4. MAINTENANCE and INSPECTION
- Message Screen:
4. MAINTENANCE and INSPECTION
- Parameter Screen:
3. SETTING and TESTING CONDITION



Tap the numeric display for each setpoint.
The keypad will be shown on the screen.
Enter the setpoint value and tap the “ENT” button.

0.0			
7	8	9	AC
4	5	6	DEL
1	2	3	+/-
0	.	ENT	

- NOTE Tap the “Language” button, the “language selection” window will pop up.
Can select language from English, Japanese, Korean or Chinese.

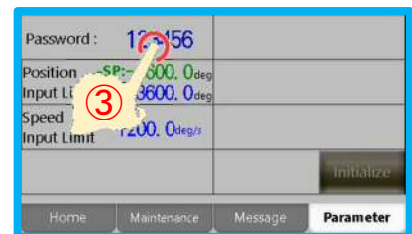
2.4 PASSWORD

Must input password to change some parameter, below

The default password is “123456”, but should change it to personal one.

2.4.1 CHANGING PASSWORD

- 1) Tap the ‘SETTING’ icon twice to display the “SETTING” screen.
- 2) Tap the ‘PASSWORD “*”’, then input the current password.
- 3) Tap again the ‘PASSWORD’ to input a new password.



3. SETTING and TEST CONDITION

3.1 TEST CONDITION

Various test conditions can be set for DR11MR.

Refer to attached sheets (instruction manuals and specifications) of each testing jigs, for detail.

Motion Mode	Reciprocation		Rotation
Acc./Dec.	Triangle	Trapezoid	Trapezoid
Operation	Reciprocate between -SP and +SP		Rotate in one direction
Count up	Add in one reciprocation		Add in 360deg
Position	SP : 7.0 ~ ±3600.0 [deg.]		SP : None
	PV : Show present value		PV : None
Speed	1 ~ 1200 [deg/s]		1 ~ 1200 [deg/s] Plus value is CW Minus value is CCW

3.1.1 MOTION MODE

CAUTION Stop the operation of DR11MR before changing the setting.

NOTE Have to input the password to change parameter.

- 1) Tap the “Parameter” twice to display the “Parameter” screen.
- 2) Tap any ‘Motion Mode’ button, then input the password.
- 3) Select the motion mode.



①

“Reciprocation” Home Screen



②

“Rotation” Home Screen



③



CAUTION Required returning to the origin position when “Rotation” changed to “Reciprocation”.

3.1.2 ACCELERATION / DECELERATION

CAUTION Stop the operation of DR11MR before changing the setting.

NOTE Have to input the password to change parameter.

- 1) Tap the “Parameter” twice to display the “Parameter” screen.
- 2) Tap the “Acc./Dec.” setting, then input the password.
- 3) Tap and select the motion mode.



①



②



③

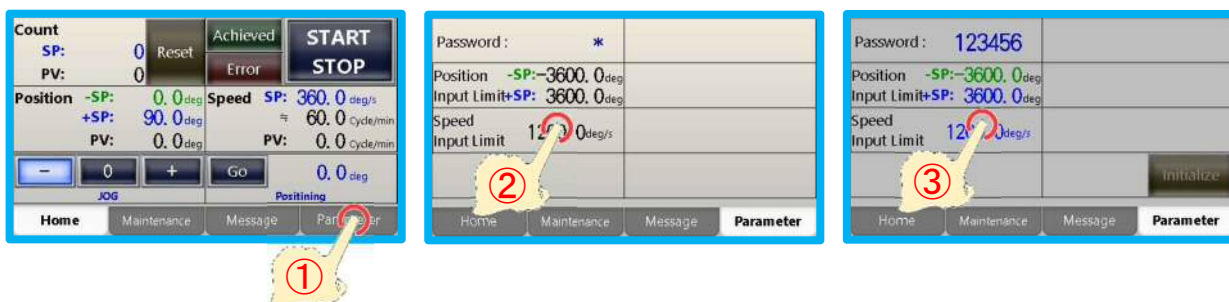
3.1.3 SAFETY LIMIT for INPUTABLE VALUE

INTERLOCK Can set limit value to prevent from setting a wrong condition.

CAUTION Make sure that DR11MR is stopped before setting.

NOTE Have to input the password to change parameter.

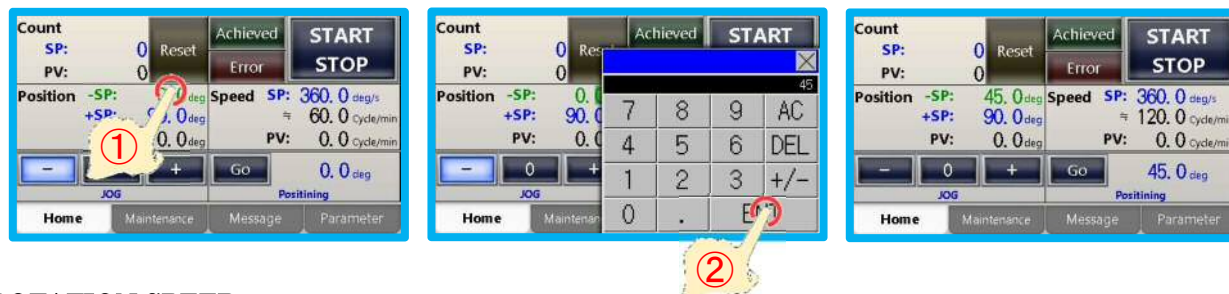
- 1) Tap the “Parameter” twice to display the “Parameter” screen.
- 2) Tap the “Input limit” setting, then input the password.
- 3) Set each limit according to the testing jig.



3.2 EACH END POSITION

- 1) Tap the “Position” setting, the “Numeric Keypad” window will pop up.
- 2) Input the reciprocation angle, then tap the “ENT” button.

CAUTION Refer to a instruction manual and a specification of the testing jig.



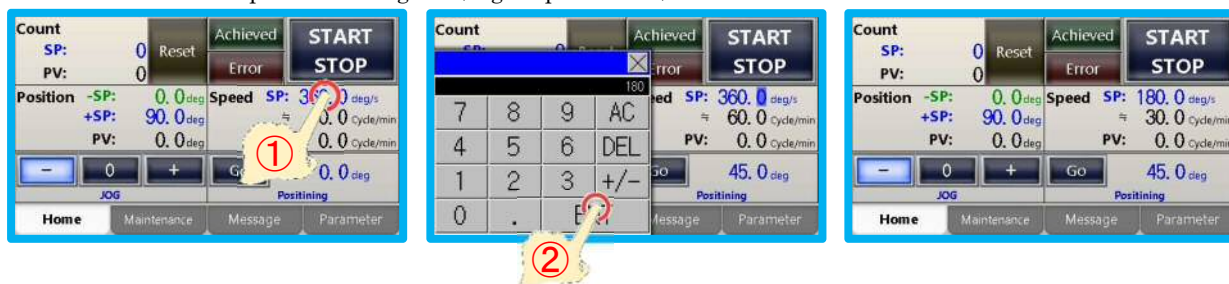
3.3 ROTATION SPEED

- 1) Tap the “Speed” setting, the “Numeric Keypad” window will pop up.
- 2) Input the speed, then tap the “ENT” button.

CAUTION Refer to attached instruction manual and specification of the testing jig.

NOTICE Number shown on the screen is set value. Check present value with the stopwatch etc. because present value may change by load.

NOTICE The speed is in “deg/sec (degree per second)”.



Reference: Speed Conversion Table [deg/sec to reciprocation/min (cycle/min)]

Triangle Waveform

r/min \ deg	10	20	30	40	50	60
45	30	60	90	120	150	180
90	60	120	180	240	300	360
180	120	240	360	480	600	720
270	180	360	540	720	900	1080
360	240	480	720	960	1200	---
450	300	600	900	1200	---	---
540	360	720	1080	---	---	---

Trapezoid Waveform

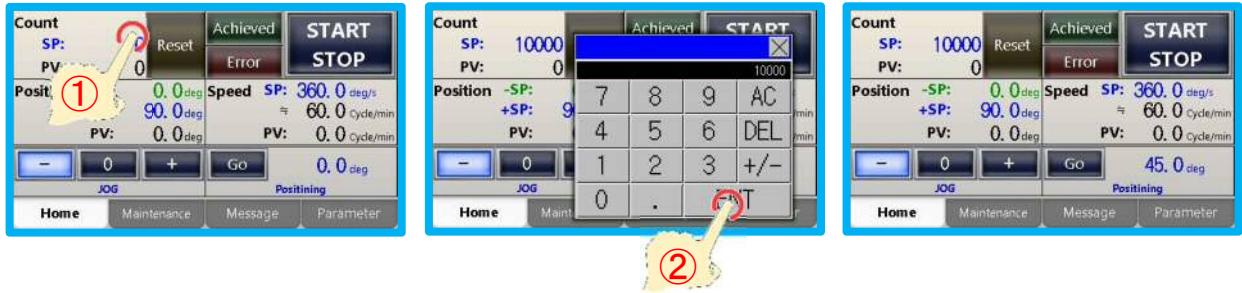
r/min \ deg	10	20	30	40	50	60
45	15.6	32.2	50	69.3	90	112.5
90	31.1	64.3	100	138.5	180	225
180	62.1	128.6	200	277	360	450
270	93.2	192.9	300	415.4	540	675
360	124.2	257.2	400	553.9	720	900
450	155.2	321.5	500	692.4	900	1125
540	186.3	385.8	600	830.8	1080	---

3.4 PRESET COUNTER

NOTE DR11MR will stop when reaches to the target number.

- 1) Tap the “Count” setting, the “Numeric Keypad” window will pop up.
- 2) Input the preset number (target number), then tap the “ENT” button.

NOTE Input “zero” as the target number if you do not use the preset counter (only count).



3.4.1 RESET COUNT

NOTE Change the target number or reset the present count to continue operation.

- 1) Press the “Reset” button three seconds, counter (Count PV) will reset to zero.

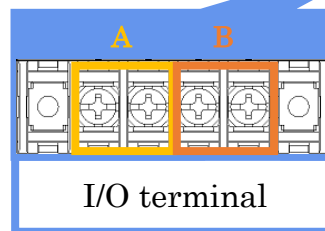
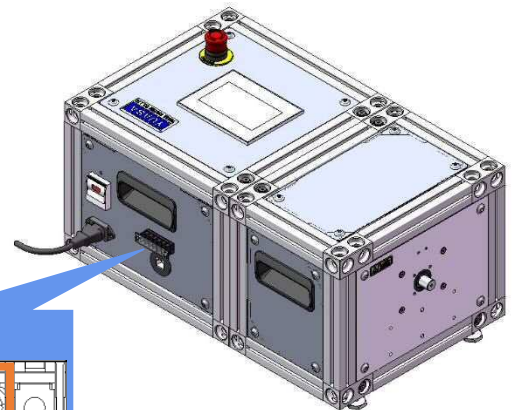


3.5 STOP SIGNAL

Can stop the endurance testing machine automatically if input any signal to the I/O terminal.

CAUTION Do not apply the voltage. Can connect only the dry contact.

- ex. If the testing equipment input the signal with error.
⇒ “A”
- ex. If the testing equipment shut off the signal with error.
⇒ “B”
- ex. If connect the sample which turns on electricity with error.
⇒ “A”
- ex. If connect the sample which turns off electricity with error.
⇒ “B”



3.6 OPERATION

- NOTICE** All of set points can change anytime regardless of operation state.
- INTERLOCK** Cannot operate the endurance testing system without any cover for the test jig.

3.6.1 START

- 1) Tap the “START / STOP” button, the “confirmation” window will pop up.
- 2) Tap the “Start” button to start operation.



3.6.2 STOP

- 1) Tap the “START / STOP” button to stop operation.

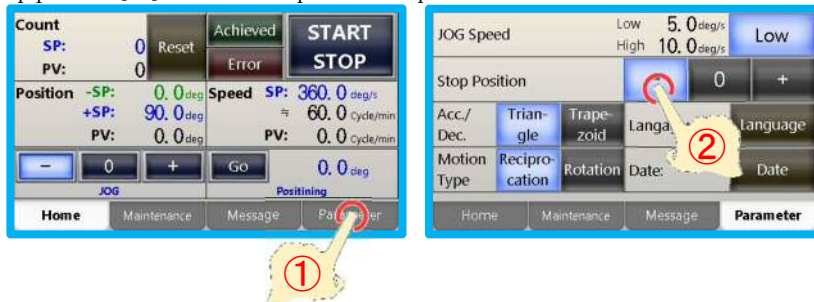


3.6.2.1 STOP POSITION

Can select the stop position that the position to stop after finish a test.

- 1) Tap the “Parameter” icon to display the “Parameter” screen.
- 2) Select the stop position from “-” or “0” or “+”.

- NOTE** Stop position [-]: DR11MR stop on the set position “-SP”.
- NOTE** Stop position [0]: DR11MR stop on the center position between “-SP” and “+SP”.
- NOTE** Stop position [+]: DR11MR stop on the set position “+SP”.



3.6.3 JOG

- 1) DR11MR move slowly when pressing the “JOG” button, then it automatically stops on each target position.

- NOTE** Target position [-]: DR11MR move to the set position “-SP”.
- NOTE** Target position [0]: DR11MR move to the center position between “-SP” and “+SP”.
- NOTE** Target position [+]: DR11MR move to the set position “+SP”.
- NOTE** Can select the jogging speed from “Low” or “High” at the “Parameter” screen.



3.6.4 POSITIONING

- 1) Tap the “Positioning” setting, the “Numeric Keypad” window will pop up.
- 2) Input a position, then tap the “ENT” button.
- 3) Tap the “Go” button to locate the output shaft to the set position.



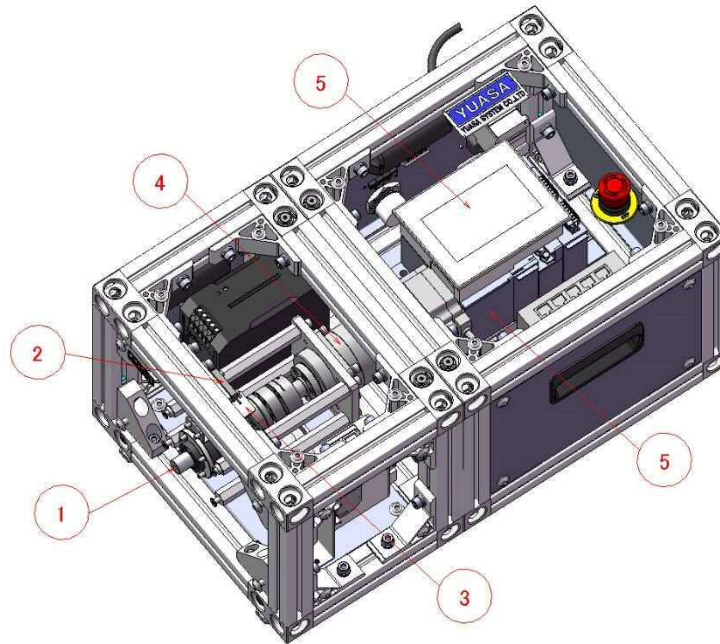
【MEMO】

4. MAINTENANCE and INSPECTION

4.1 INSPECTION

This endurance testing machine is maintenance-free.

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

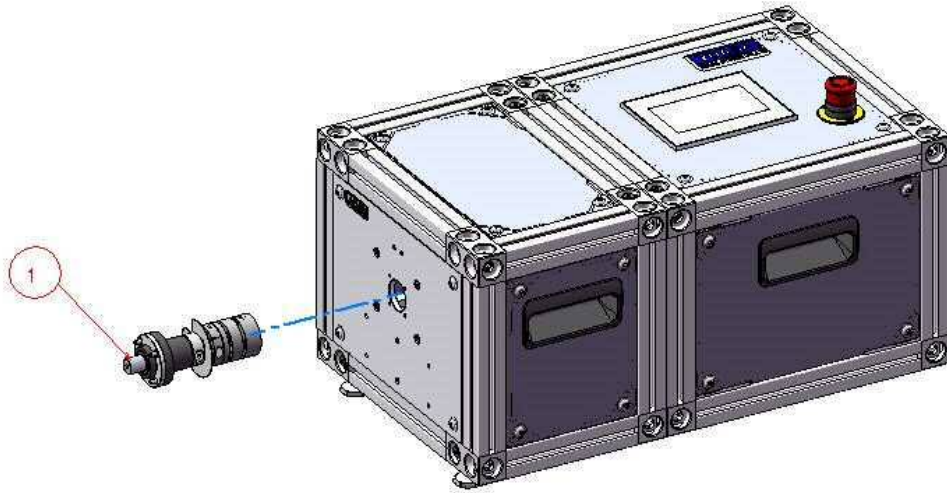


No	REGION	INSPECT	SCHEDULE
-	Exterior	Wipe or vacuum out all debris.	Weekly
1	Driving Shaft	Check it moves smoothly, with hand or low speed operation. (without wobble, noise and dirt)	Monthly
2	Magnetic Proximity Switch	Check the endurance testing machine are not operated without the cover for the test jig.	Monthly
3	Proximity Switch	Check the rotary count synchronize with motion at slow speed.	Monthly
4	Motor Unit	Check it moves silently, without noise.	Monthly
5	Software (PLC)	Check the set value data is not lost.	Yearly

CAUTION Check the all items after a long-term stop.

No	NAME	TYPE	Num.	MANUFACTURE	NOTE
1	Rotary Reciprocating Shaft	ET105003A0004	1	YUASA SYSTEM	
2	Magnetic Proximity Switch	RS-1NO-1000	1	NA Co., Ltd.	
3	Proximity Switch	PM-Y45	1	Panasonic	
4	Motor	AZM46AK-FC20DA	1	Oriental motor	
5	PLC Battery	Q6BAT	1	Mitsubishi	Replacement period: each 3 years

4.1.1 PARTS LIST



No	NAME	TYPE	Num.	MANUFACTURE	NOTE
1	Rotary Reciprocating Shaft	ET105003A0004	1	YUASA SYSTEM	

4.2 ERROR MESSAGE and CORRECTIVE ACTION

Confirm the message that are shown on the “Message” view.
Correct each errors according to the instructions, below.



ERROR MESSAGE	CORRECTIVE ACTION
F005: Motor Error	Remove any error factors, debris or error of connector (Controller to Driving unit). NOTE Turn OFF the power supply switch, then turn ON after waiting 10 seconds.
F006: Motor Comm Error	Remove any error factors, debris or error of connector (Controller to Driving unit). NOTE Turn OFF the power supply switch, then turn ON after waiting 10 seconds.
F007: Lost the Motor Original Position	Returning to the origin.
F010: Emergency Stop	Release the lock of emergency stop button (turn the button).
F011: Jig Cover Open	Attach the cover (for the test jig) to unlock the safety interlock.
F020: External Stop signal (A)	Open the terminal, the circuit.
F021: External Stop signal (B)	Open the terminal, the circuit.

4.3 TROUBLESHOOTING

If error is not shown on the “Message” view, refer to the troubleshooting as below.

WARNING Make sure the power is switched off and the machine is completely stopped before open each covers.

NOTE Confirm “I/O” screen as necessary.

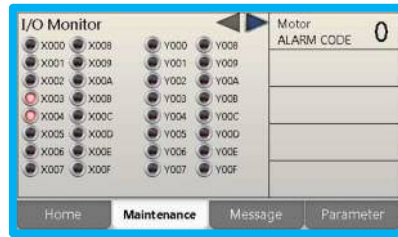
PROBLEM	PROBLEM CAUSE	CORRECTIVE ACTION
Equipment will not boot up.	<ul style="list-style-type: none"> ·The plug isn't sticking. ·It isn't the 1 phase. 	<ul style="list-style-type: none"> ·Confirm the electricity circuit.
Equipment will not operate.	<ul style="list-style-type: none"> · Value of preset count is less than present value. ·Magnetic proximity switch is dirty. ·Magnetic proximity switch is broken. 	<ul style="list-style-type: none"> ·Reset the preset value. ·Reset the counter, present value. ·Clean up the magnetic proximity switch. ·Change to the new one.
Strange motion or noise in operation.	<ul style="list-style-type: none"> ·Movement sound echoes in the machine. ·Equipment are dirty. ·Equipment are broken. 	<ul style="list-style-type: none"> ·Check the source of sound. ·Check positional relation, the machine and jigs. ·Clean up equipment. ·Please contact us.

NOTE The case except the above, please contact us.

4.3.1 I/O CHECK

NOTE Can confirm each signal status with the I/O Monitor in Maintenance screen.

We may ask for the confirmation of the Maintenance screen to improve the problem.



4.4 PARAMETER LIST

NOTE Must input password to change parameters written in red.

Parameter		Summary	Range/(Default)
JOG Speed		Select the JOG speed	Low Speed / High Speed (Low Speed)
JOG Speed	Low	Slow speed of JOG	5.0 ~ 10.0 deg/s (5.0 deg/s)
	High	High speed of JOG	5.0 ~ 360.0 deg/s (10.0 deg/s)
Stop Position		The stop position when operation is stopped	“ - ” / “ 0 ” / “ + ” (“ - ”)
Acc./Dec.		Acceleration and deceleration waveform during operation	Triangle / Trapezoid (Triangle)
Motion Mode		Motion mode of DR11MR	Reciprocation / Rotation (Reciprocation)
Language		Language Selection	Japanese / English / Korean / Chinese (English)
Date		Date Setting	---
Input Limit	Position -SP	Input limit of "-SP" on HOME screen.	-3600.0 ~ +SP-0.1 deg (0 deg)
	Position +SP	Input limit of "+SP" on HOME screen.	-SP + 0.1 ~ +3600.0 deg (+90.0 deg)
	Speed	Input limit of "Speed" on HOME screen.	1 ~ 1200 deg (360 deg/s)
Password		Change the password. Use for start and restart.	--- (123456)

~ Further Improve Reliability



<http://www.yuasa-system.jp> ~

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