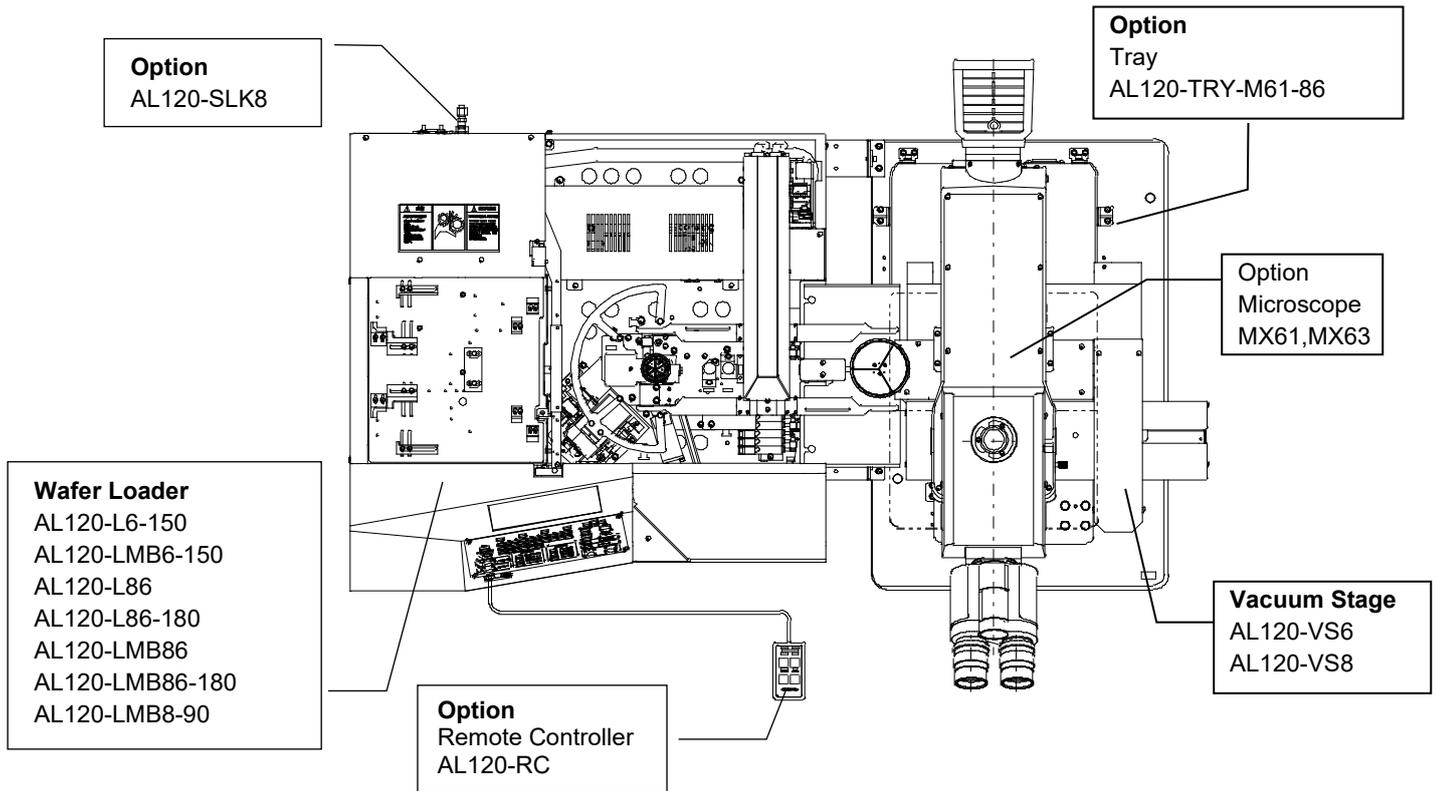


---

**Operation Manual**  
***Wafer Loader***  
**AL120-6**Series  
**AL120-86**Series

Thank you for purchasing the EVIDENT AL120 Series Wafer Loader.  
In order to fully utilize its performance and secure safety, please read this manual before operation.  
Please also keep it at hand during operation as well as for future reference.

# i Introduction



## AL120 Series Lineup

AL120 series products consist of a model name and an applicable wafer size.

Note that only the AL120 series products with the same wafer size can be combined.

(The remote controller is common to all the AL120 series products.)

Series name	Model name	Wafer size	Wafer thickness
<b>AL120-</b>	<b>LMB</b>	<b>6</b>	<b>-150</b>

**L:** Microscope Loading  
**LMB:** Microscope Loading, Top Macro Inspection and Back Macro Inspection  
**VS:** Vacuum Stage

**150:** Loading of 150 μm-thick wafers  
**180:** Loading of 180 μm-thick wafers  
**90:** Loading of 90 μm-thick wafers

**6:** Loading of 150mm wafers  
**86:** Loading of 200mm and 150mm wafers

	L6-150	LMB6-150	L86	L86-180	LMB86	LMB86-180	LMB8-90
Applicable wafer size	150 mm	150 mm	150/200 mm	150/200 mm	150/200 mm	150/200 mm	200 mm
Orientation flat alignment	Available	Available	Available	Available	Available	Available	Available
Top Macro inspection	N. A.	Available	N. A.	N. A.	Available	Available	Available
Back Macro inspection	N. A.	Available	N. A.	N. A.	Available	Available	Available
2nd Back Macro inspection	N. A.	Available	N. A.	N. A.	Available	Available	Available
Microscope	Available	Available	Available	Available	Available	Available	Available

The AL120 series consists of a wafer loader, a vacuum stage, and other products.

This manual does not cover custom-order specifications or microscopes.

To acquire a comprehensive understanding of both your loader and microscope, please refer to your microscope operation manual.

You must prepare yourself the table on which the loader is to be installed and the cassettes and wafers to be inspected and loaded by the loader.

This loader is designed to maximize its operability when it is installed on a table with a height of 700 mm.

The operability is designed based on the SEMI Standard S8.

Our company's designed operability is not guaranteed if the loader is installed on a table that does not satisfy the conditions specified above.

Please refer to the SEMI Standard S8 to select a table.

## 1. Precautions

Operators must follow the instructions in the Operation/Maintenance Manual. If these instructions are not followed, safety can not be assured, and malfunctions may occur.

The following 3 types of symbols are used in this Manual to draw operators' attention.



: Indicates critical advice in order to protect operators from injury as well as to protect the loader (including its peripherals) from damage.



: Indicates a cautionary advice to protect the loader from damage.



: Indicates useful information for operation.

## 2. Safety Precautions



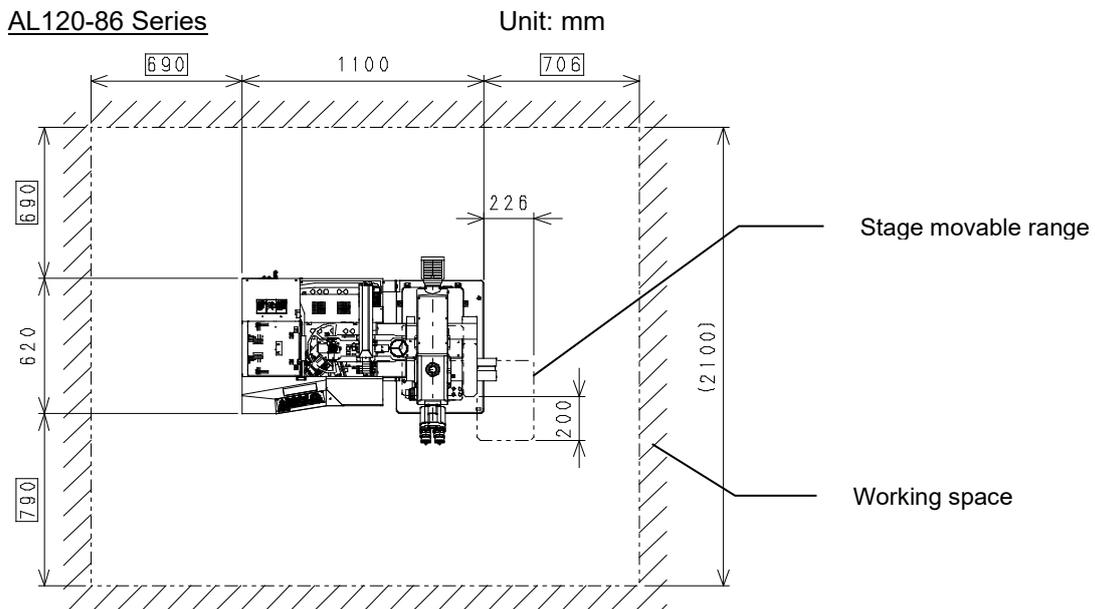
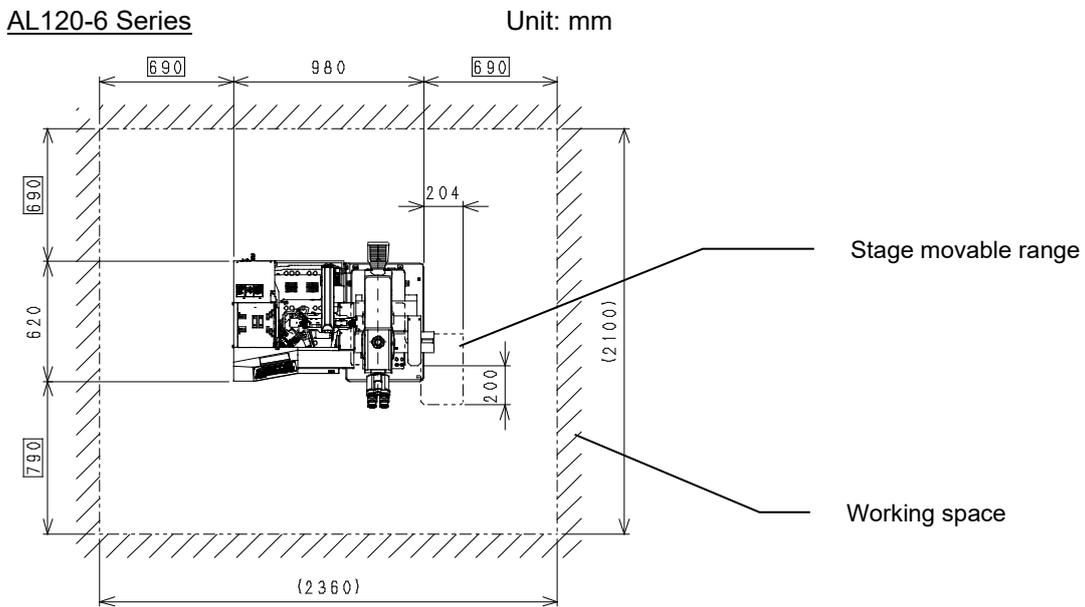
1. Use the loader within the scope of the specifications.
2. Use only the EVIDENT power cord provided with the loader. Otherwise the safety performance of the loader can not be assured.
3. The power cord plug must be easily accessible at any time. Immediately unplug the power cord if you find any abnormalities in the loader.
4. Bind wires and tubes to table legs and the like to prevent them from catching your feet.
5. Be sure to ground the loader. Otherwise our intended electric safety performance of the loader cannot be assured.
6. Never put any metallic objects in the vent. This could cause an electric shock or malfunction.
7. Place the loader and the microscope on a sturdy and level table (with a tilt angle of no more than 1 degree).
8. Wear gloves when clearing broken wafers.
9. Wafers under inspection could fall down when the vacuum supply is stopped. The check valve and buffer tank should be connected to maintain a vacuum even when the vacuum supply is stopped. Buffer tank and the check valve are not attached to Wafer Loader. When it is necessary, please contact it to nearest EVIDENT distributor.
10. Wafers could fall down if you touch them or apply a force to them during inspection. Do not touch wafers during inspection.
11. Undergo maintenance training before attempting to do maintenance on the loader.
12. Consult your nearest EVIDENT distributor if you need to move the loader. (The loader weight is approximately 44kg.)
13. Down flow that may cause a wafer to shake may cause the wafer transfer operation to be accompanied by physical danger. Take care that the wafer transfer operation is performed at a location where there is no such down flow.
14. Use a cassette that complies with the SEMI standard. If a deformed cassette is used, there is an increased risk of a wafer being damaged.



15. To get the best performance from this loader, make sure that there is at least the space shown below (with dimensions in ) around the loader during assembly and installation.

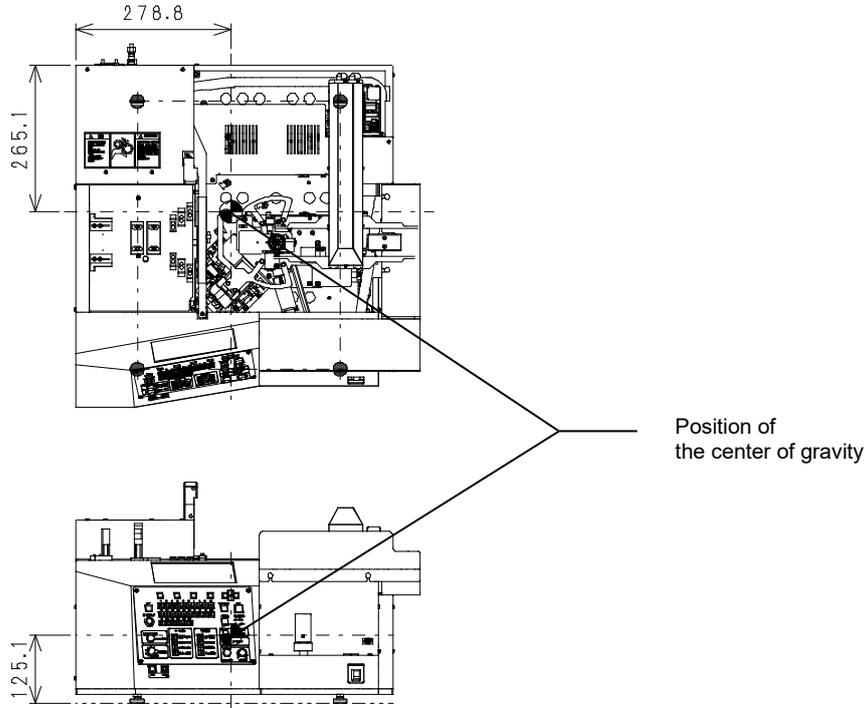
- The dimensions indicated by the dot-dot-dash lines show the stage's movable range.
- You can get more working space during maintenance or other work by changing the observation tube mounting direction and moving the stage.
- This installation space is determined according to the SEMI guideline (SEMI S8-0308). Provide adequate space for operating the loader according to your intended use by referring to the installation space and outer dimensions shown on the next page.

**Installation space**

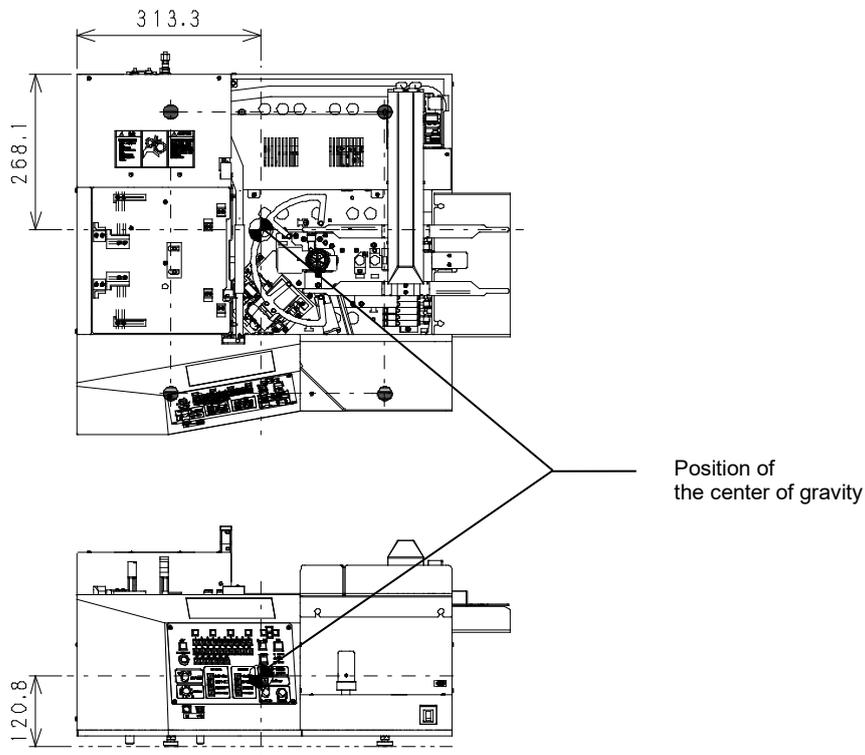


**Position of the Center of Gravity**

**AL120-6 Series**



**AL120-86 Series**



## Working Environment

Please prepare the table for the equipment at your side.

This equipment is designed so as to show the best performance in being set on the table of which height is approx. 700mm and thickness of work surface is more than 22mm.

This equipment is designed in accordance with the SEMI S8 standard.

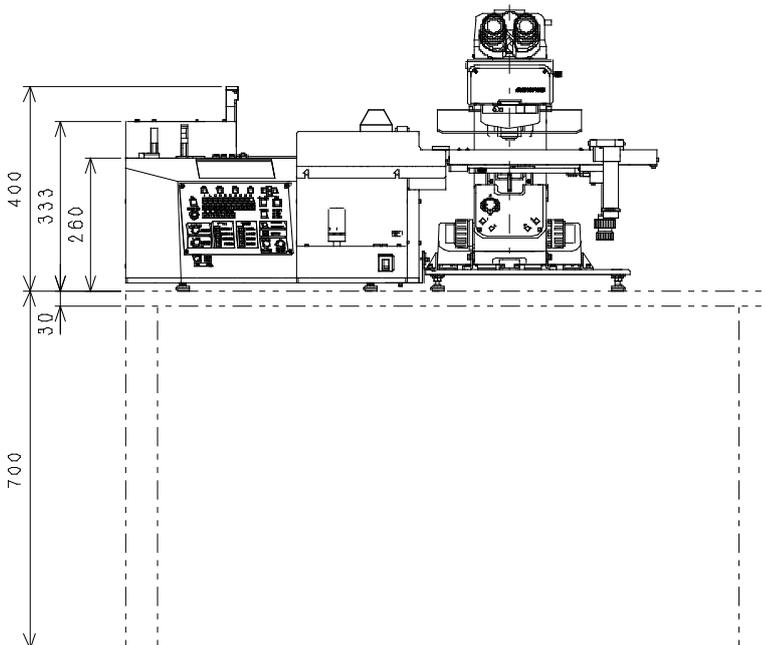
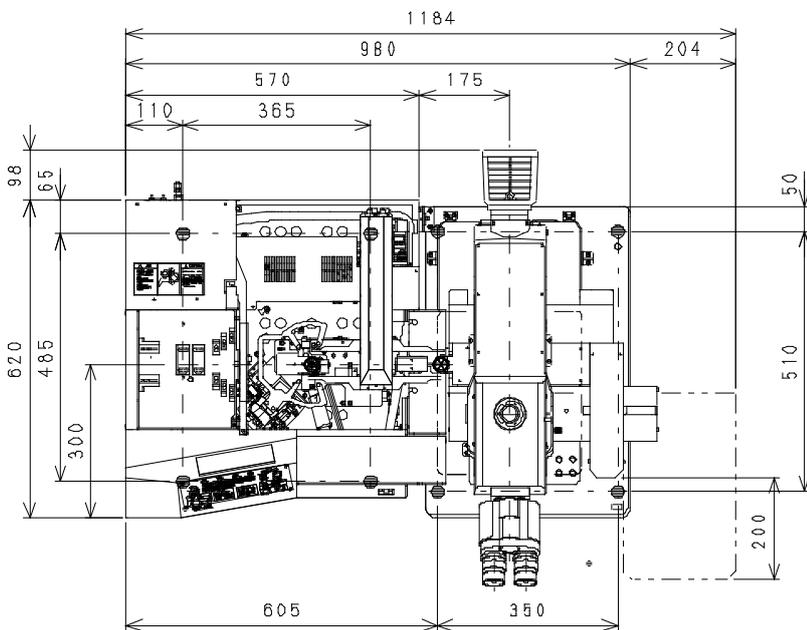
If any other tables are selected, the best performance can not be assured.

When selecting the table, please refer to the SEMI S8 standard.

### Part Dimensions

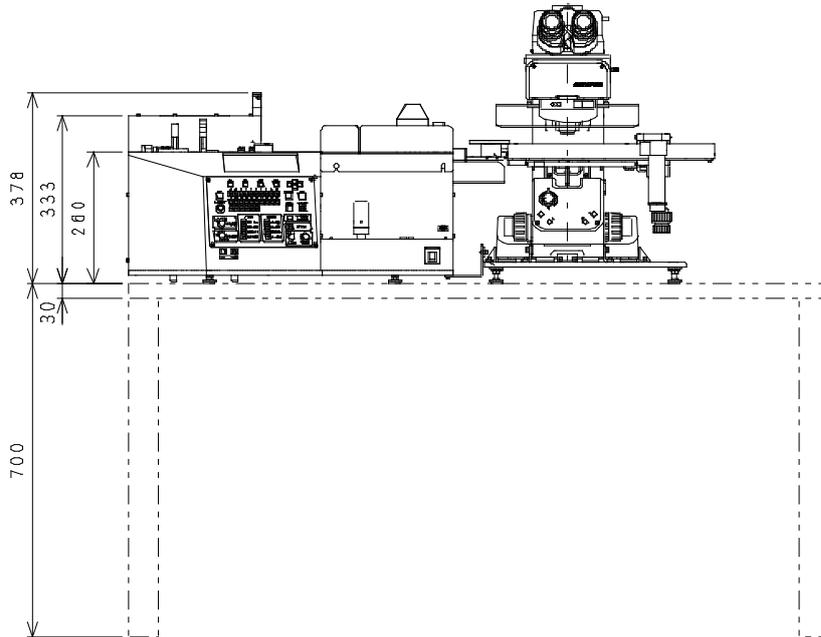
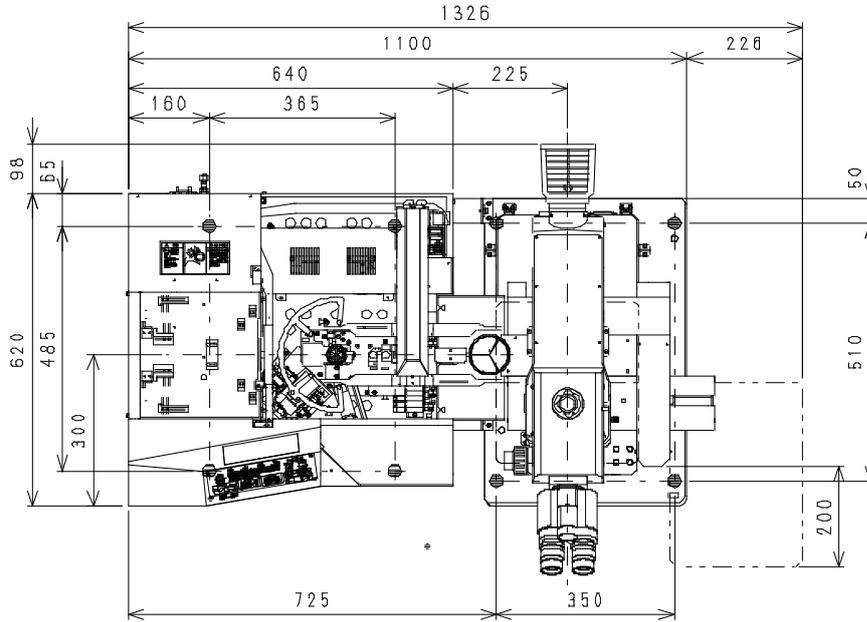
AL120-6 Series

Unit: mm



AL120-86 Series

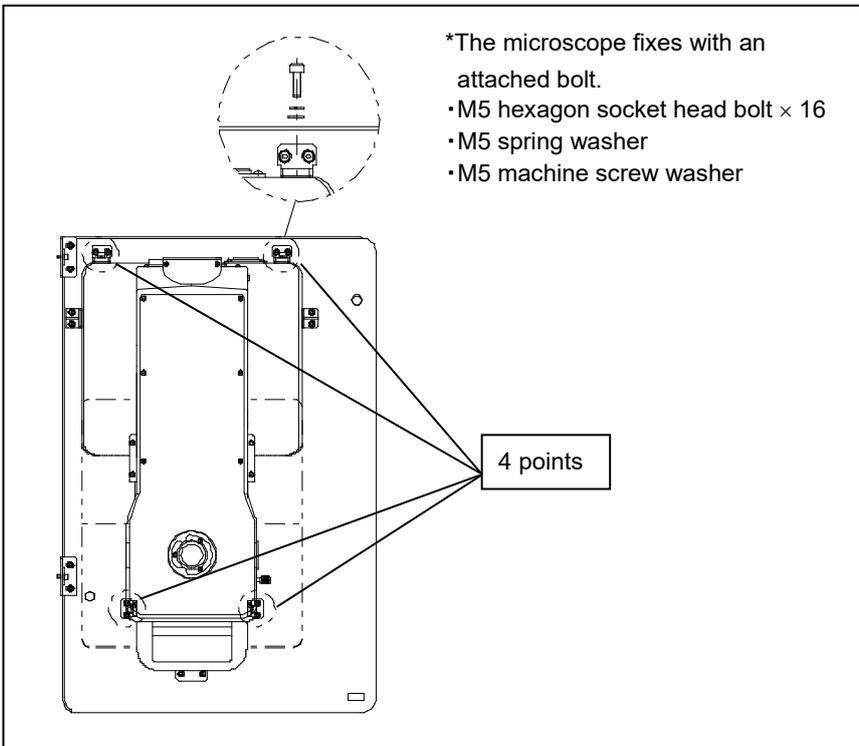
Unit: mm



## Earthquake Protection

(1) This loader should be secured to prevent it from falling off the table when an earthquake occurs.

### 1. The fixation method of the microscope



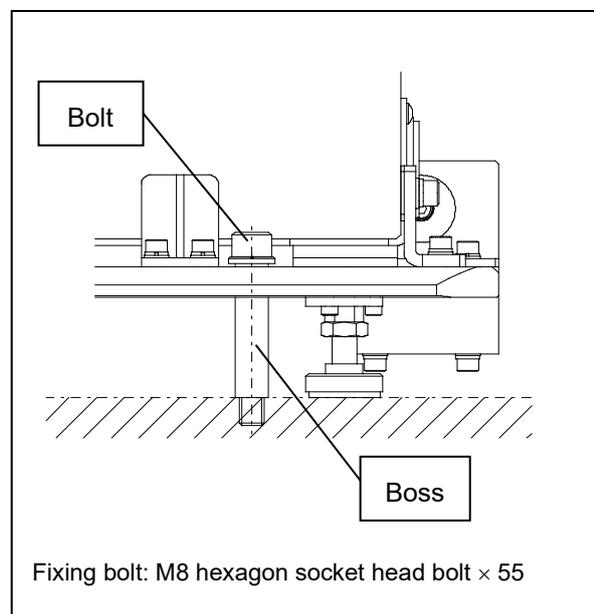
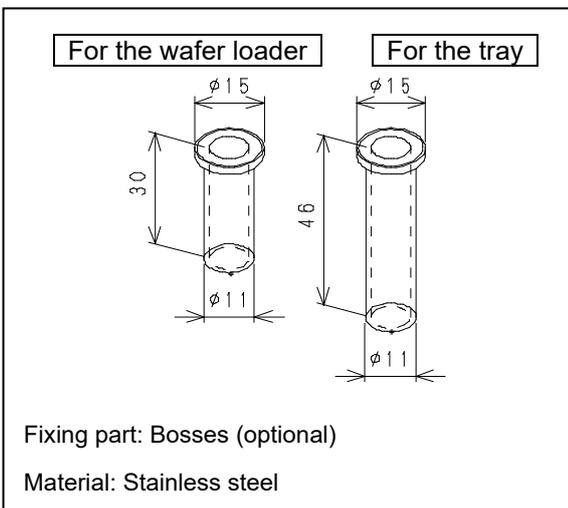
### 2. The fixation method of the Tray (AL120-TRY-M61-86) and Wafer Loader

The Tray (AL120-TRY-M61-86) and Wafer Loader has the holes for fixing the equipment.

Please fix the equipment on the tray and Wafer Loader not to be moved by unexpected force such as earthquake.

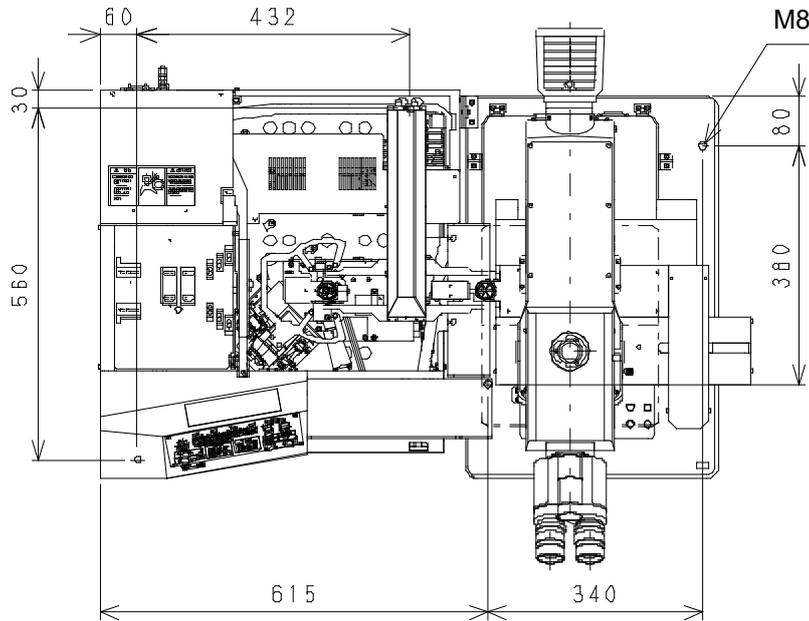
Use two M8 steel bolts and boss through the holes provided to secure the Tray and Wafer Loader to supporting surface (table etc.)

#### Fixing part (Recommended dimensions)

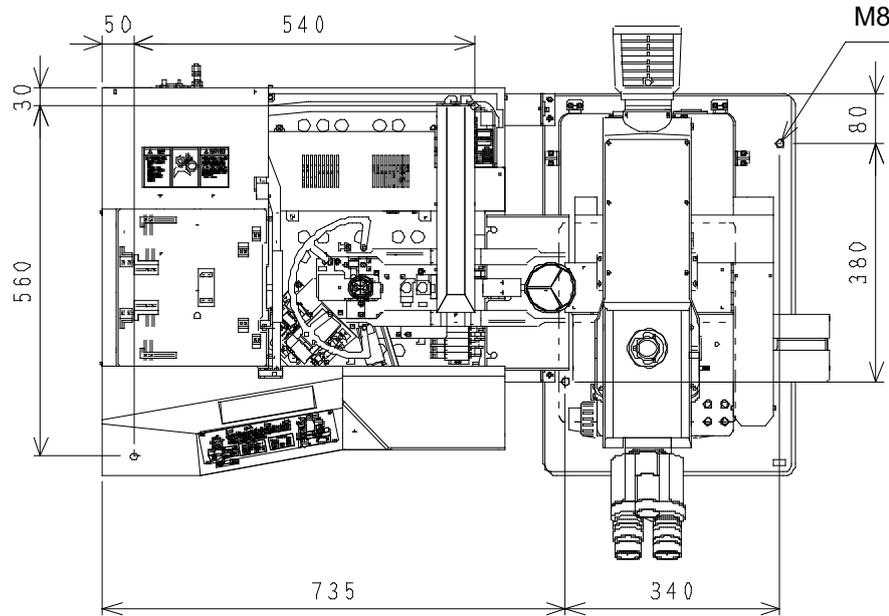


Fixed taps(M8) position dimensions

AL 120-6 Series



AL 120-86 Series





**Safety Symbols**

The following symbols are affixed to this loader.

In order to safely operate this loader, be sure to familiarize yourself with the meanings of individual symbols.



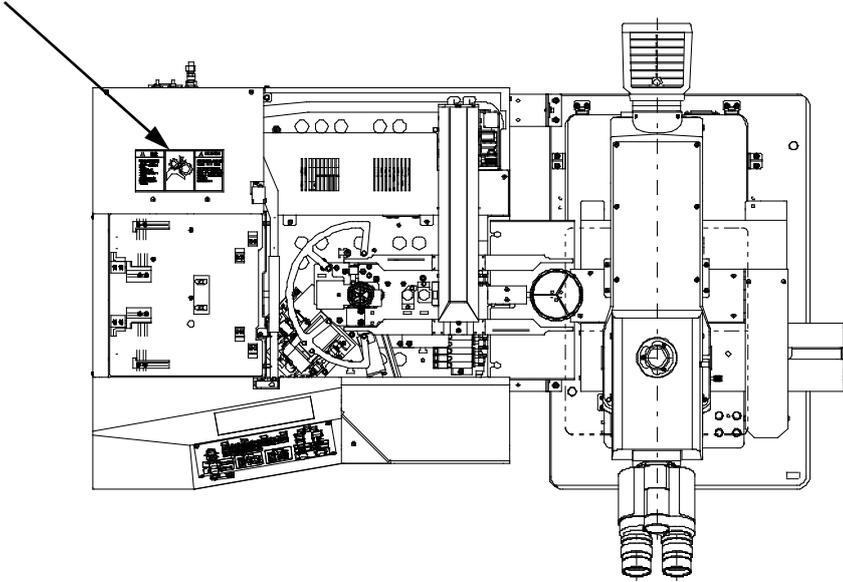
	Keep fingers clear.
	Main switch is ON.
○	Main switch is OFF.

**Warning Indication**

The warning indication is attached on the part to which you need to pay attention to ensure safety when operating/using the loader. Strictly follow the instructions.

<p><b>CAUTION</b>  <b>MECHANICAL HAZARD</b>                  CONTACT TO MOVING PARTS OF THE MECHANISM MAY RESULT IN SEVERE INJURY.                  KEEP HANDS AND GARMENTS CLEAR OF MOVING PARTS.                  CONSULT MANUAL FOR PRECAUTIONS DURING MAINTENANCE.</p>	
--	--

Position of warning indication label



If this warning label becomes dirty or peels off, contact your nearest EVIDENT distributor for replacement and servicing.



### 3. Before Starting Operations

In order to get the best performance from the loader, as well as to ensure safety, please follow the 3 points listed below.



1. **Never put your hands in the loader.**
2. **Do not deliberately place wafers or other objects in or remove from the loader while it is in operation.**  
 If excess force is applied to the wafer under inspection, it could lose its adhesiveness and could be damaged.
3. **Make sure that the main switch is turned off before removing a wafer for unavoidable reasons such as malfunctions.**

### 4. Maintenance and Storage



- Make sure that the main switch is turned off and the power cord is unplugged before doing any of the following operations.**
1. **Wipe each part of the loader using a soft cloth moistened with pure water.**  
 Wipe heavy dirt or stains with a clean paper moistened with commercially available absolute alcohol.  
 Never place absolute alcohol close to a flame as it is highly flammable.  
 Take care not to cause sparks by turning on or off an electric appliance or fluorescent lamp.
  2. **Wear gloves to protect your hands while cleaning the loader when for example a wafer is damaged.**
  3. **Periodically check the loader for wear (a wafer loading arm and deterioration of the drive mechanism), and replace the parts as needed. Contact your nearest EVIDENT distributor for repair.**



1. **Never disassemble the loader unnecessarily. This could affect the performance and function of the loader.**
2. **Contact your nearest EVIDENT distributor if you need MSDS.**
3. **Confirm and observe your local municipal ordinances or regulations when you dispose of the loader.**  
 If you have any questions, contact your nearest EVIDENT distributor.
4. **Lenses and solders used by this system are lead-free.**



## 5. Daily Check

1. Confirm the following points before operating the loader.

- (1) Vacuum supply pressure: -67KPa to -80KPa

When there are not a vacuum gauge and a regulator, please contact it to the EVIDENT distributor.

- (2) Make sure that there are no wafers or tools inside the wafer loader

2. Confirm the following points before starting the inspection.

- (1) Make sure that the power is on (Check the liquid crystal panel)

Turn the main switch ON and make sure that each arm position is initialized and the model name is shown on the liquid crystal panel.

The loader may have been set to skip initialization when the power is turned on. This is not a malfunction. The loader executes initialization when the [Start] button is pressed.

AL120-LMB8-90	ALL		
set the cassette			
No	Size	Thick	Comment
1.	200	750-400	
Recall	Wafer	Setting	Memory

- (2) Check the loader stop button

Press the loader stop button and make sure that the loader stops operation.

## 6. Conformity Standards

- (1) This equipment is carrying out conformity or evaluation to the following standard.
- (2) Although this equipment aims at using in the industrial environment, since it may not satisfy a performance when not used by the right operation method, please carry out the proper handling according to this manual.



**This equipment is an object for industrial environment (Class A). Other equipment may be affected if it is used in a housing environment.**

### FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, use, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



#### **FCC WARNING:**

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### SEMI

This equipment is carrying out evaluation to the guideline of the following SEMI standard.

- S2-0706: Safety Guidelines for Semiconductor Manufacturing Equipment
- S8-0308: Safety Guidelines for Ergonomics Engineering of Semiconductor Manufacturing Equipment

## ■ PROPER SELECTION OF THE POWER SUPPLY CORD

If no power supply cord is provided, please select the proper power supply cord for the equipment by referring to "Specifications" and "Certified Cord" below:

**CAUTION:** In case you use a non-approved power supply cord for Olympus products, Olympus can no longer warrant the electrical safety of the equipment.

### Specifications

Voltage Rating	125V AC (for 100-120V AC area) or, 250V AC (for 220-240V AC area)
Current Rating	6A minimum
Temperature Rating	60°C minimum
Length	3.05 m maximum
Fittings Configuration	Grounding type attachment plug cap. Opposite terminates in molded-on IEC configuration appliance coupling.

**Table 1 Certified Cord**

A power supply cord should be certified by one of the agencies listed in Table 1, or comprised of cordage marked with an agency marking per Table 1 or marked per Table 2. The fittings are to be marked with at least one of agencies listed in Table 1. In case you are unable to buy locally in your country the power supply cord which is approved by one of the agencies mentioned in Table 1, please use replacements approved by any other equivalent and authorized agencies in your country.

Country	Agency	Certification mark	Country	Agency	Certification mark
Argentina	IRAM		Italy	IMQ	
Australia	SAA		Japan	JET	
Austria	OVE		Netherlands	KEMA	
Belgium	CEBEC		Norway	NEMKO	
Canada	CSA		Spain	AEE	
Denmark	DEMKO		Sweden	SEMKO	
Finland	FEI		Switzerland	SEV	
France	UTE		United Kingdom	ASTA BSI	
Germany	VDE		U.S.A.	UL	
Ireland	NSAI				



**Table 2 HAR Flexible Cord**

APPROVAL ORGANIZATIONS AND CORDAGE HARMONIZATION MARKING METHODS

Approval Organization	Printed or Embossed Harmonization Marking (May be located on jacket or insulation of internal wiring)		Alternative Marking Utilizing Black-Red-Yellow Thread (Length of color section in mm)		
			Black	Red	Yellow
Comite Electrotechnique Belge (CEBEC)	CEBEC	⟨HAR⟩	10	30	10
Verband Deutscher Elektrotechniker (VDE) e.V. Prüfstelle	⟨VDE⟩	⟨HAR⟩	30	10	10
Union Technique de l'Electricite' (UTE)	USE	⟨HAR⟩	30	10	30
Instituto Italiano del Marchio di Qualita' (IMQ)	IEMMEQU	⟨HAR⟩	10	30	50
British Approvals Service for Electric Cables (BASEC)	BASEC	⟨HAR⟩	10	10	30
N.V. KEMA	KEMA-KEUR	⟨HAR⟩	10	30	30
SEMKO AB Svenska Elektriska Materielkontrollanstalter	SEMKO	⟨HAR⟩	10	10	50
Österreichischer Verband für Elektrotechnik (ÖVE)	⟨ÖVE⟩	⟨HAR⟩	30	10	50
Danmarks Elektriske Materialkontroll (DEMKO)	⟨DEMKO⟩	⟨HAR⟩	30	10	30
National Standards Authority of Ireland (NSAI)	⟨NSAI⟩	⟨HAR⟩	30	30	50
Norges Elektriske Materielkontroll (NEMKO)	NEMKO	⟨HAR⟩	10	10	70
Asociacion Electrotecnica Y Electronica Espanola (AEE)	⟨UNED⟩	⟨HAR⟩	30	10	70
Hellenic Organization for Standardization (ELOT)	ELOT	⟨HAR⟩	30	30	70
Instituto Portages da Qualidade (IPQ)	np	⟨HAR⟩	10	10	90
Schweizerischer Elektro Technischer Verein (SEV)	SEV	⟨HAR⟩	10	30	90
Elektriska Inspektoratet	SETI	⟨HAR⟩	10	30	90

Underwriters Laboratories Inc. (UL)  
Canadian Standards Association (CSA)

SV, SVT, SJ or SJT, 3 X 18AWG  
SV, SVT, SJ or SJT, 3 X 18AWG

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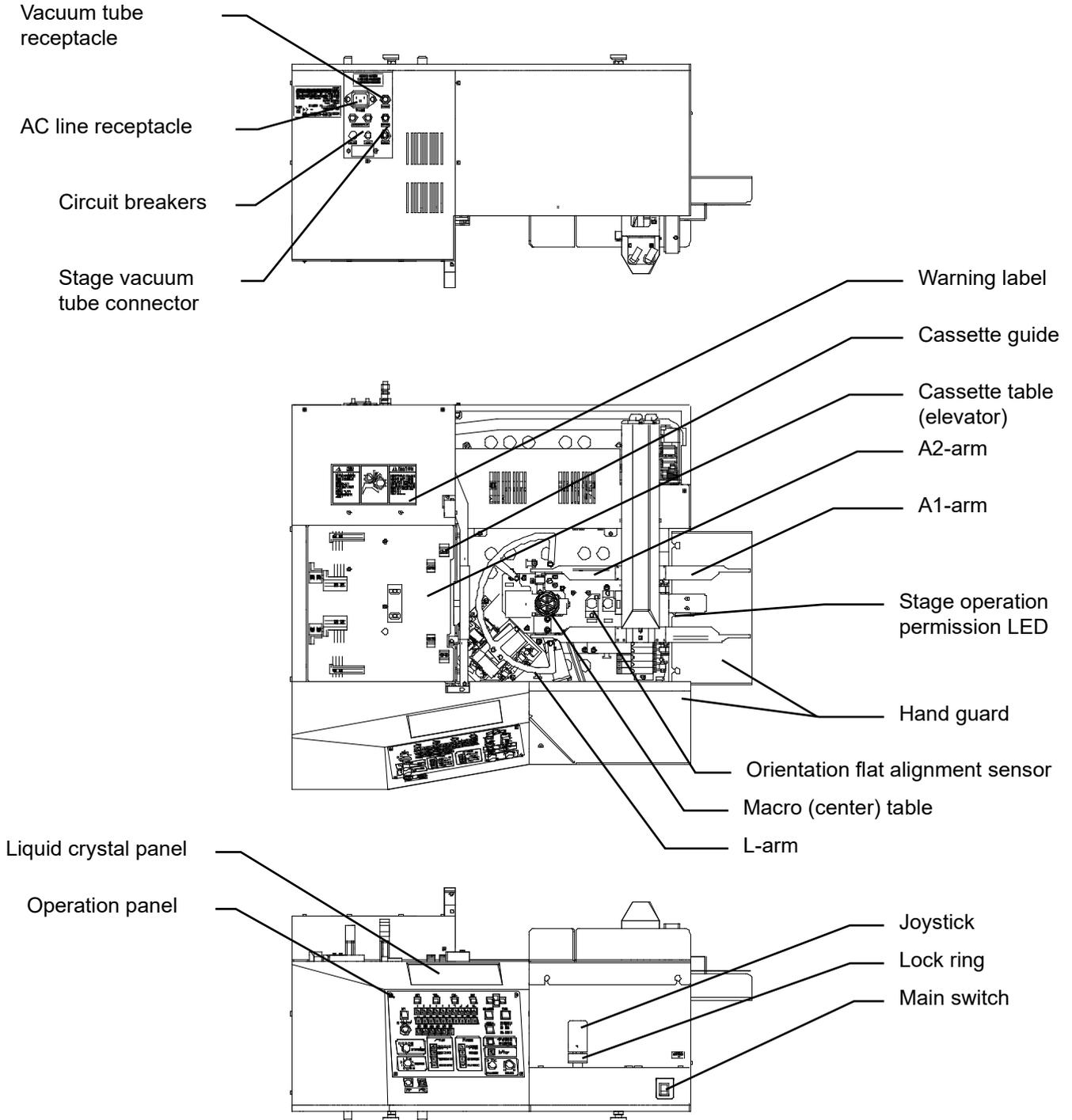
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# 1 Nomenclature

## 1-1 Wafer Loader Main Body

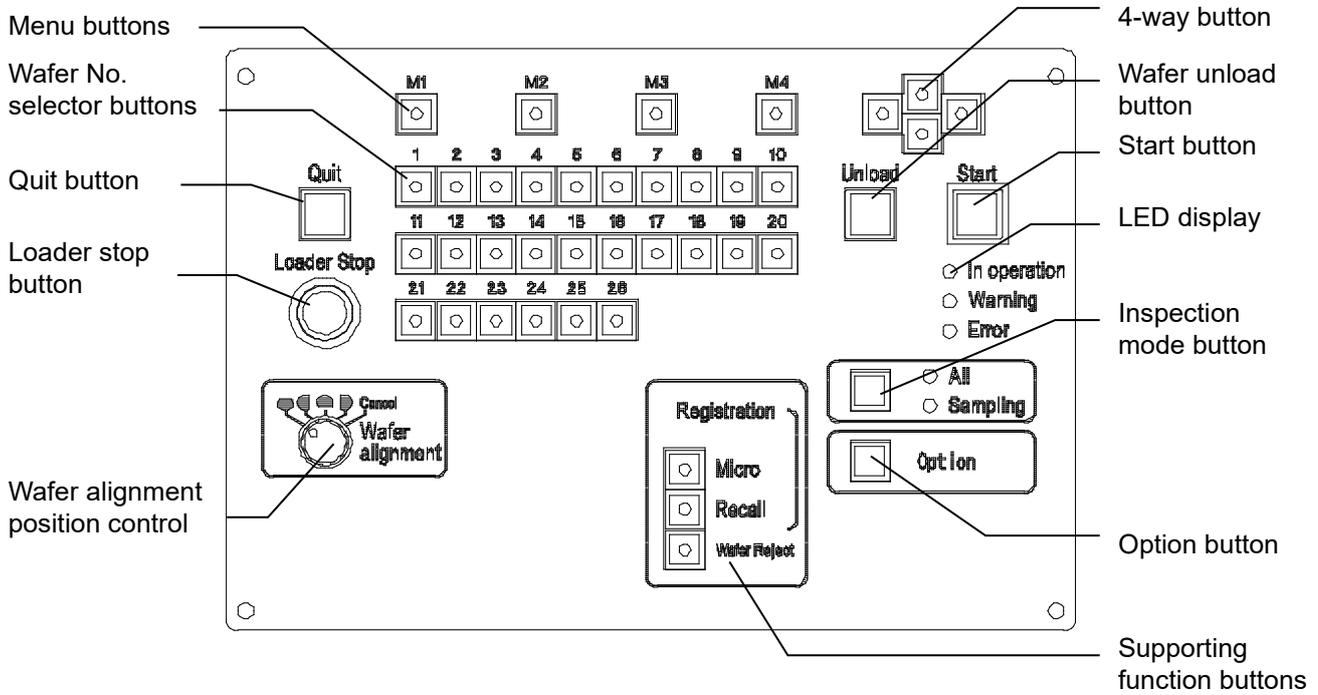


Your loader may not have all the units shown in the Figure.

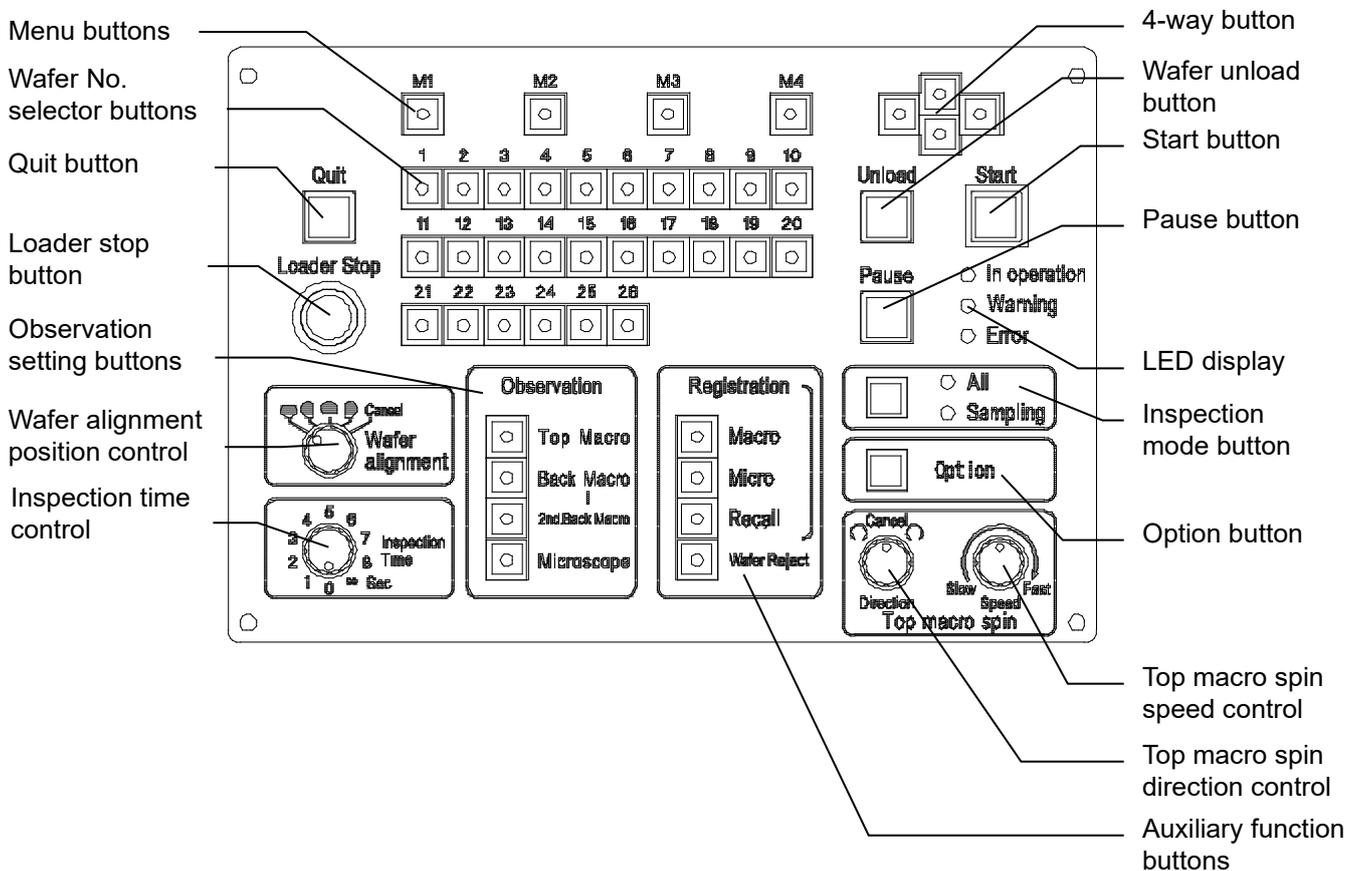
\*The L-arm and the joystick are integrated in the LMB models.

**1-2 Operation Panel**

**L type**

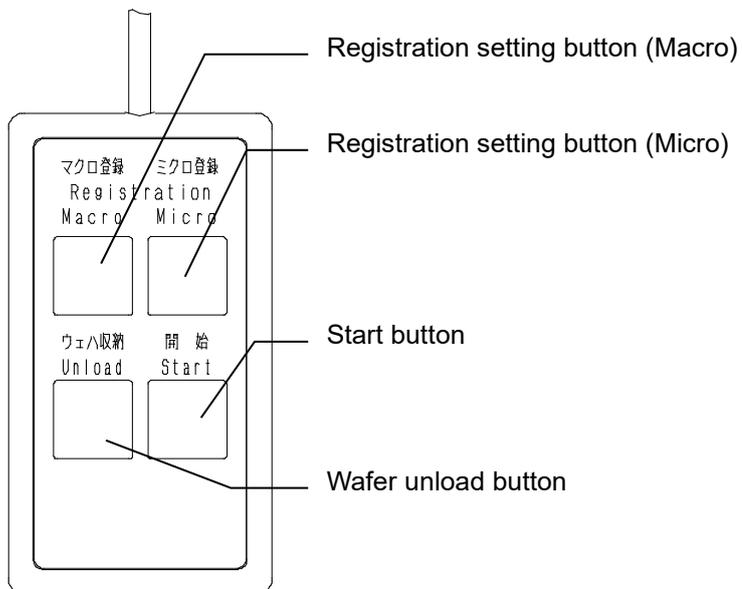


**LMB type**



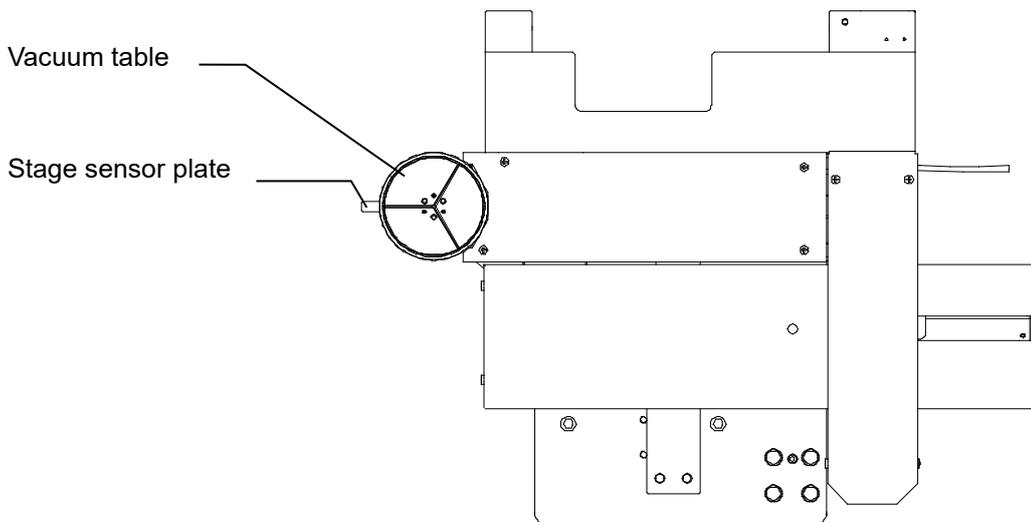
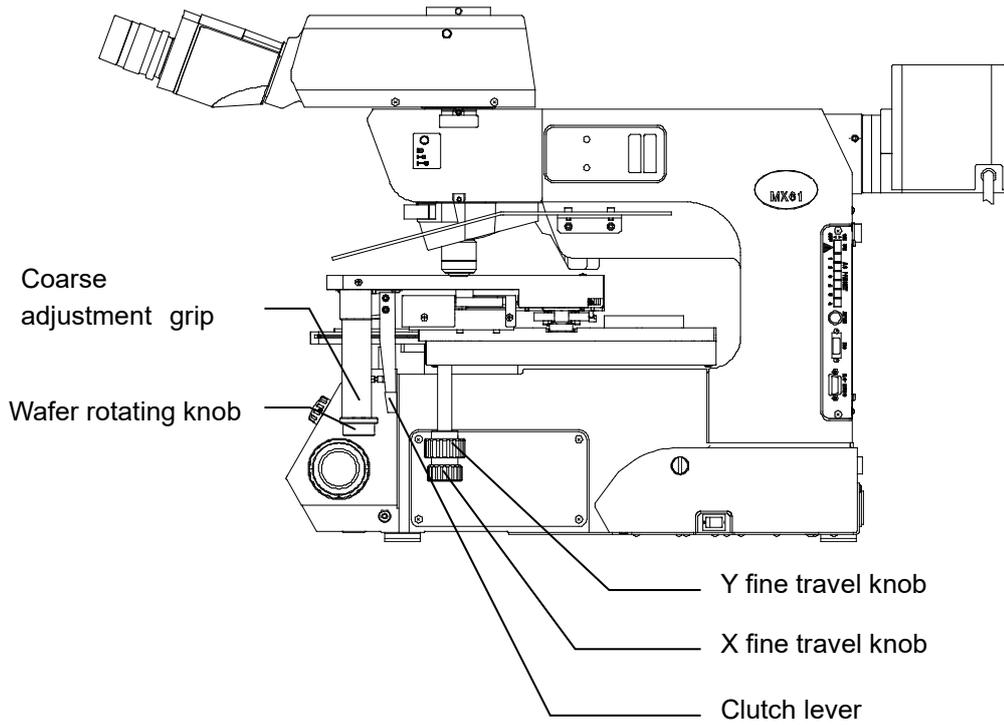
### 1-3 Remote Controller (Option)

Remote controller: AL120-RC



# 1-4 Vacuum Stage

Vacuum stage: AL120-VS6/AL120-VS8



# 2 Outline of Operation Procedures

## 1 Description of Symbols

The meanings of the symbols used in Chapter 2 and later are explained below.

- (1) \*: Calls attention to model-specific functions

This Operation Manual describes the LMB model that has all the inspection functions. The model names for functions available for certain models are indicated with the symbol \*.

For the availability of each type of inspection, please refer to the list of functions in “i Introduction.”

- (2) [ ]: Indicates the names shown on the wafer loader operation panel

Names in parentheses are the names shown on the wafer loader operation panel. For the names of the parts of the wafer loader operation panel, please refer to section **1-2 Operation Panel**.

- (3) : Indicates useful information on operations.

## 2 Operation Procedure

This section describes the operation procedure for the basic wafer inspections (registered in the menu mode).



**When you use any cassette or inspection wafers that are not registered in the menu mode, you need to newly register the inspection wafer.**

**For registration, please refer to “2 Registration of New Inspection Wafer Types (Cassettes to be Used and Wafer Thickness)” in “2 Adjustments” in the Maintenance Manual (page 2-2).**

The operation procedure flowchart is shown on the next page.

When selected, the Top Macro inspection, the Back Macro inspection, the 2nd Back Macro inspection and the Microscope inspection are repeated for the number of wafers to be inspected, as shown in the flowchart.

For details of each operation, refer to the reference pages and sections listed on the right-hand side of the flowchart.

-  If the wafer loader operation panel has been left untouched for about 10 seconds, it will automatically switch to standby mode and the liquid crystal panel will darken. In the standby mode, press one of the buttons on the operation panel (save for the Quit button, the Pause button, the Wafer No. selector button or the wafer unload button), and the operation panel will automatically return to normal mode and accept button input.



Operation Flow	Controls/Units	Reference page	section
Turn the main switch ON	Main switch	2-3	1
↓			
Set a cassette in place on the cassette table	Cassette guide and cassette setting	2-3	2
----- Select the type of inspection wafer	4-way button	2-3	3
----- Set the sequence (type of inspection)	[Observation] setup buttons	2-4	4
----- Set the inspection mode (All or Sampling)	Inspection mode button	2-4	5
----- Set the orientation flat and notch positions on the microscope	[Wafer alignment] position control	2-6	7
----- Set the inspection time * for the LMB model only	[Inspection Time] control	2-7	8
----- Set the wafer rotation direction during Top Macro inspection * for the LMB model only	[Top macro spin direction] control	2-7	9
----- Set the wafer rotation speed during Top Macro inspection * for the LMB model only	[Top macro spin speed] control	2-7	9
↓			
Press the Start button	[Start] button	2-9	1
↓			
Start transfer			
Top Macro inspection	* For the LMB model only, [Top macro spin direction] and [Top macro spin speed] settings can be changed.		
Back Macro inspection	* For the LMB model only, the [Back Macro Tilt Angle] setting can be changed.		
2nd Back Macro inspection	* For the LMB model only, the [Back Macro Tilt Angle] setting can be changed.		
↓			
----- Set the vacuum stage in place	Transfer of wafer onto the vacuum stage	2-11	5
Microscope inspection			
-----			
Temporarily register the inspection results	[Registration] setup buttons	2-12	6
-----			
Stop transfer	[Pause] button	2-13	1
	[Registration] setup buttons	2-13	2
	[Unload] button	2-14	3
	[Loader Stop] button	2-14	4
	[Quit] button	2-14	5

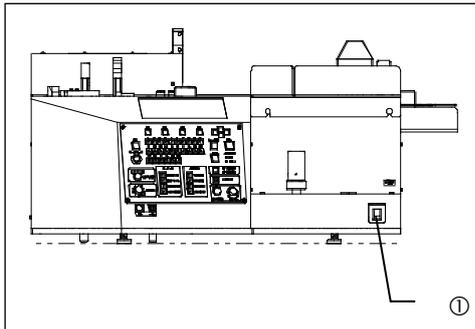
## 2-1 Procedure before Starting Transfer

### Preparation

Make sure that there are no wafers in the transfer path or on the vacuum stage.

If any wafer is in the transfer path, return the wafer to the cassette using tweezers or the like.

#### 1 Turning the Main Switch ON: Main Switch

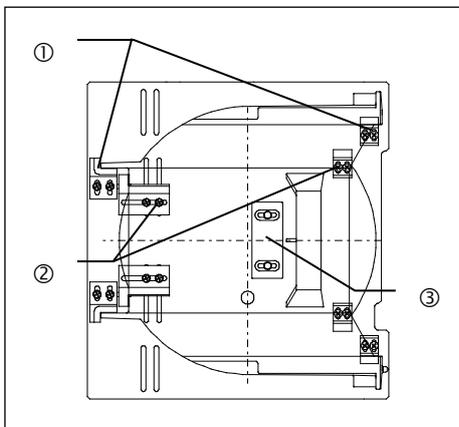


Turn the main switch ① ON.

At this time the units return to their initial positions if they are in other positions. (This is called initialization).

If the vacuum stage is not in the proper transfer position, the warning code W0002 is displayed. Set the vacuum stage in the transfer position.

#### 2 Cassette Setting



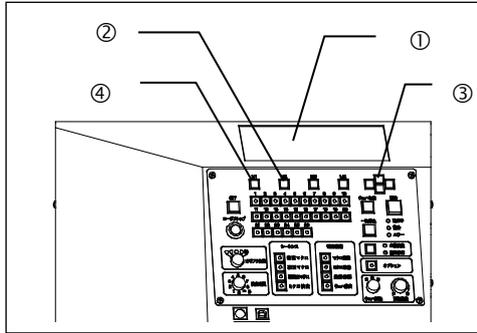
Set the cassette along a cassette guide suitable for the cassette size.

- ① 200mm wafer cassette guide
- ② 150mm wafer cassette guide
- ③ 200mm and 150mm wafer common cassette guide



- Set the cassette carefully to prevent wafers from popping out.
- If a deformed cassette is used, there is a risk that wafers could get damaged. When setting a cassette in position, make sure that you check to see if the cassette rattles due to deformation.
- We take no responsibility for the breakage of wafers or any other problems in setting the cassette.

### 3 Selecting the Type of Inspection Wafer: 4-way button



The initial menu appears on the liquid crystal panel ①.

- 1) To change the type of inspection wafer shown on the liquid crystal panel ①, press the [M2] ② <Wafer> button to bring the inspection wafer type selection screen.
- 2) Press the 4-way button ③, and the <x> mark moves to the number of the inspection wafer already registered.  
Move <\*> to the number of the type of wafer to be inspected, and press the [M1] ④ <OK> button to determine the setting.

\* Your loader may only have a setting for one type of wafer.

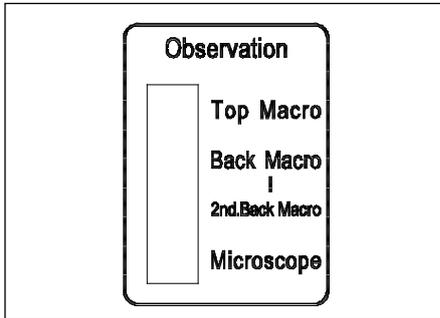
AL120-LMB86-90		ALL	
set the cassette			
No	Size	Thick	comment
1.	200	725-400	
Recall	Wafer	Setting	Memory

No	Size	Thick	Speed	comment
x1	200	725-400	High	
2	200	725-400	High	
3	200	725-400	High	
4	200	725-400	High	
5	200	725-400	High	
6	200	725-400	High	
OK	Cancel	PageUp	PageDn	

No	Size	Thick	Speed	comment
x1	200	725-400	High	
OK	Cancel	PageUp	PageDn	

\* Indication example when a setting for one type of wafer.

**4 Setting the Sequence (Inspection Type: [Observation] Button)**

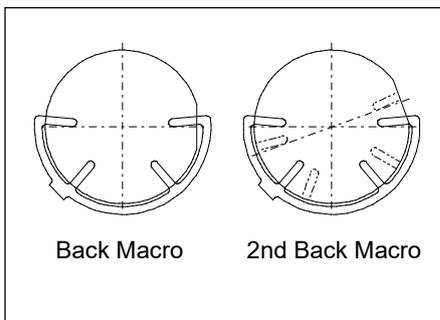


\* This function is available for the LMB model only.

The [Observation] setting buttons are used to specify an inspection sequence.

Specify the inspection sequence before initiating inspection. The selected sequence cannot be changed once inspection is started.

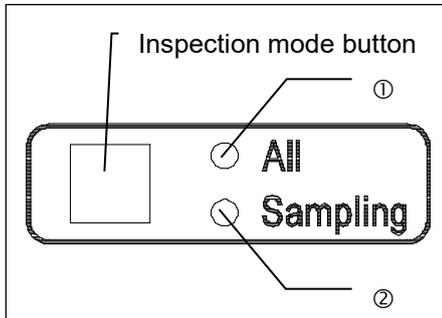
The LEDs in the selected [Observation] setting buttons light up.



The 2nd Back Macro inspection performs the Back Macro inspection again with the wafer rotated about 20 degrees counterclockwise on the macro table after the Back Macro inspection is completed. The 2nd Back Macro inspection enables inspection of the areas hidden by the rear arm during the Back Macro inspection.

**Ref.** The 2nd Back Macro inspection can be selected only when the Back Macro inspection is selected.

## 5 Setting the Inspection Mode



The following three inspection modes can be chosen.

- All (100%) inspection
- Sampling transfer P1 to P10 (Transfer pattern registration)
- Sampling inspection L1 to L10 (Inspection pattern registration)

(1) All (100%) inspection:

Press the inspection mode button to turn on the [All] LED ①.

(2) Sampling transfer P1 to P10 (Loading pattern registration):

1) Operation procedure

The loader can only transfer a wafer in the specified slot in the cassette.

- Press the inspection mode button until the desired pattern number from P1 to P10 appears on the liquid crystal panel. (The [Sampling] LED ② lights up.)

The number increases incrementally from P1 to P10 each time the up or down button of the 4-way button is pressed.

The number jumps from P1 to P5 and P5 to L1 as the right or left button of the 4-way button is pressed.

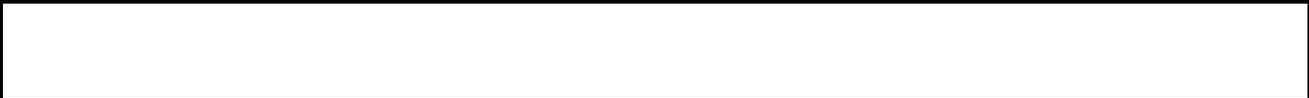
- The inspection sequence to be used is the one established before the [Start] button is pressed.
- Ten patterns can be registered in slots P1 to P10.
- Two wafers are transferred at a time. (While one wafer is under Micro inspection, the next wafer is transferred to the Macro inspection position.)

2) How to register sampling loading patterns (P1 to P10)

- Press the inspection mode button until the desired pattern number from P1 to P10 is displayed on the liquid crystal panel.
- Press the [M3] <Setting> button to display the setting registration screen.
- Specify the number of the wafer to be selectively transferred by using the Wafer No. selector button. (The LED in the selected Wafer No. selector button lights up.)

AL120-LMB86-90	P5
Set the cassette	
No Size Thick	Comment
1. 200  725-400	
Recall	Wafer Setting Memory

Inspection	P5	
	1-10	11-20 20-26
	1234567890	1234567890 123456
Wafer	0000000000	0000000000 000000
Exit	Setting Memory	



The button is alternately selected and deselected each time it is pressed.

- After the setting is completed, press the [M4] <Memory> button. A buzzer sounds to indicate that registration is complete.
- Press the [M1] <Exit.> Button to exit the setting registration screen.

(3) Sampling inspection patterns (L1 to L10)

1) Operation procedure

The loader can inspect only a wafer in the specified slot in the cassette according to a specified inspection sequence.

- Press the inspection mode button to display the pattern number (L1 to L10) that you want to register on the liquid crystal panel.

(The [Sampling] LED ② lights up.)

The number increases incrementally from P1 to P10 each time the up or down button of the 4-way button is pressed.

The number jumps from P1 to P5 and P5 to L1 as the right or left button of the 4-way button is pressed.

- Ten patterns can be registered in slots L1 to L10.
- One wafer is transferred at a time.

2) How to register sampling inspection patterns (L1 to L10)

- Press the inspection mode button to display the pattern number (L1 to L10) that you want to register on the liquid crystal panel.
- Press the [M3] <Setting> button to display the setting registration screen.
- Specify the number of a wafer to be subjected to sampling inspection with the [Wafer No.] button. The selected Wafer No. selector button will blink. Specify the inspection sequence for the selected wafer number and the LED in the selected inspection sequence button lights up. (The inspection sequence button is alternately selected and deselected each time it is pressed.)
- If you want to register other wafer numbers, specify the wafer numbers and the inspection sequence by using the [Wafer No.] buttons in the same way as described above.

AL120-LMB86-90 L1			
set the cassette			
No	Size	Thick	Comment
1.	200	725-400	
Recall	Wafer	Setting	Memory

	1-10	11-20	20-26
	1234567890	1234567890	123456
Macro	0000000000	0000000000	000000
Back	0000000000	0000000000	000000
Back2	0000000000	0000000000	000000
Micro	0000000000	0000000000	000000
Exit	Setting Memory		



The [Wafer No.] buttons are on for the numbers of wafers whose inspection sequences are already specified.

If you press the [Wafer No.] button for a wafer for which the inspection sequence is already specified, the LED in the specified inspection sequence button lights up.

With the LED turned on this way, you can change the inspection item by pressing the inspection sequence button. (Each time the inspection sequence button is pressed, the specified inspection sequence is alternately selected and deselected.)

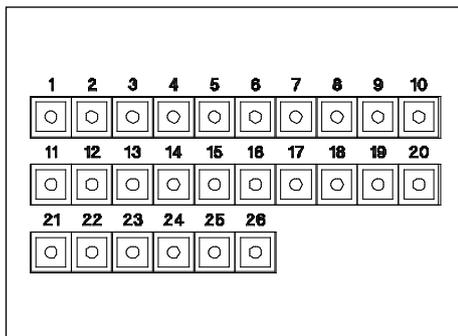
\* If the [Wafer No.] button for a wafer whose inspection sequence is already specified is pressed twice, the inspection sequence setting for this wafer number is cleared and the LED in the [Wafer No.] button goes off.

- After the settings have been completed, press the [M4]: <Memory> button. As the buzzer sounds, the registration process is completed.
- Press the [M1] <Exit> button to exit the setting registration screen.

### 6 Selecting Wafers for Inspection: Wafer No. Selector Button

You can specify the number of the wafer to be inspected in the sampling mode.

The button is alternately selected and deselected each time it is pressed. The LED in the selected button lights up.

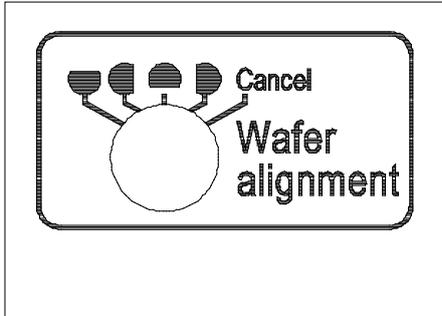


- Before the start of inspection, the LED in the Wafer No. selector button lights up to indicate that the corresponding wafer is to be inspected.
- During inspection, the LED in the Wafer No. selector button blinks.
- At the end of inspection, the LED in the Wafer No. selector button turns off.

**Ref.** This loader supports 25 wafers.

The button for the 26th wafer will not work even if pressed.

**7 Setting the Orientation Flat and Notch Positions on the Microscope: [Wafer alignment] Position Control**

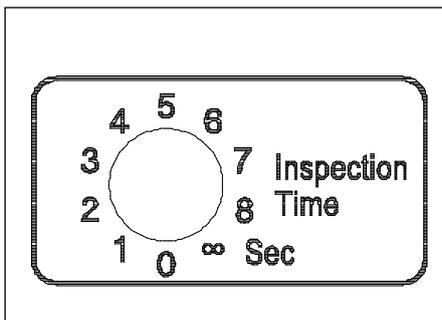


The orientation flat alignment position can be set to either four different points at intervals of 90 degrees (top, bottom, left and right), or to none.

**Ref.** The symbols on the operation panel indicate the orientation flat alignment positions on the vacuum stage.

Change the orientation flat alignment position before starting the orientation flat alignment operation. (Settings can be changed at any time.)

**8 Setting the Inspection Time: [Inspection Time] Control**



\* This function is available for the LMB model only.

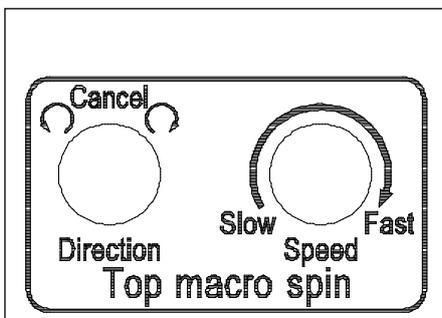
The time for holding a wafer in the inspection position can be set from 0 to 8 seconds (in 1-second steps), or to ∞. (Settings can be changed at any time.) Even during this period, the loader will proceed to the next operation when the [Start] button or the [Unload] button is pressed, or when the vacuum stage is set.

**Ref.** Setting the inspection time to 0 (zero) seconds disables the macro registration function.

**Ref.** If the inspection time is set to [∞], rotation is temporarily stopped when the Top Macro inspection has been left for more than one minute.

The operation is restarted by pressing the [Start] button.

**9 Detailed Settings for the Top Macro Inspection: [Top macro spin direction] and [Top macro spin speed] Controls**



\* These functions are available for the LMB model only.

(1) The [Top macro spin direction] control can be set to a wafer rotation to the left or to the right, or to no rotation during the Top Macro inspection. (Settings can be changed at any time.)

(2) The [Top macro spin speed] control can be set to a wafer rotation speed of from 3 to 30 seconds per rotation during the Top Macro inspection. (Settings can be changed at any time.)

**10 Setting Wafer Alignment when Unloading a Wafer**

When putting an inspected wafer into a cassette, the position of its orientation flat can be specified.

```
AL120-LMB86-90  ALL
Set the cassette
No|Size|Thick |Comment
1.|200 |725-400 |
Recall Wafer Setting Memory
```

```
Inspection      ALL
      1-10      11-20      20-26
      1234567890 1234567890 123456
Wafer 0000000000 0000000000 000000
Exit           Setting Memory
```

```
Condition setting
Centering unloading      :Disable
Alignment unloading      :Disable
Direction of orientation flat:Disable
Save Cancel
```

- (1) Displaying the setup screen
  - 1) When you are in the initial menu of the liquid crystal panel, press the [M3] <Setting> button.

- 2) When the submenu is displayed, press the [M3] <Setting> button.

- 3) The setup screen is displayed.
 

Move <X> to the setting you are dealing with by manipulating the up and down buttons of the 4-way button.

Move the cursor to the values of each item to be set by operating the right and left buttons of the 4-way button, and change the values with the up and down buttons of the 4-way button.

- Centering a wafer when unloading <Centering unloading>:
  - Disable or Enable
- Performing orientation flat alignment when unloading <Alignment unloading>:
  - Disable or Enable
- Setting the direction of orientation flat <Direction of orientation flat>
  - On the cassette opening side: [Front]
  - On the opposite side of the cassette opening: [Rear]
  - On the right side as seen facing the cassette opening:
    - [Right]
    - On the left side as seen facing the cassette opening: [Left]

\* The <Centering unloading> function can be used with the AL120-8 series. It cannot be used with the AL120-6 series.

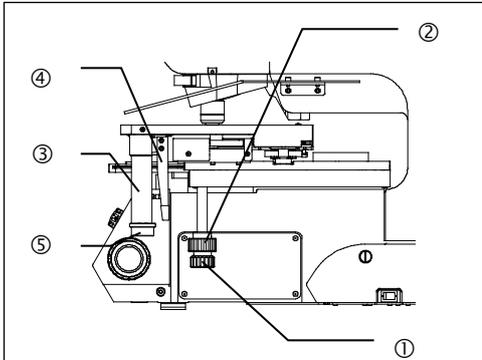


- 4) Press the [M1]: <Save> button to register the wafer alignment setting. This completes the wafer alignment setting at unloading.

To exit without registering the wafer alignment setting (without changing the current setting), press the [M2]: <Cancel> button.

## 2-2 Vacuum Stage

### 1 How to Move the Vacuum Stage



The vacuum stage can be moved by rotating the X fine travel knob ① and the Y fine travel knob ② in the lower right section of the stage. One turn of each knob moves the stage approx. 50 mm in the Y-axis direction or approx. 37 mm in the X-axis direction.

### 2 How to Use the Grip Handle

The drive of the X fine travel knob can be released by fully depressing the clutch ④ of the grip handle ③. While this clutch remains depressed, the stage can be moved freely.

Caution

- Moving the stage without depressing the clutch will affect fine travel accuracy.
- Forcing the grip handle downward will affect vacuum stage accuracy and damage the stage.

- Adhesion of clutch and belt

When the stage is left unmoved for long periods, the clutch and belt will adhere to each other. This could hinder smooth drive release operations. To fix this, fully depress the clutch while holding the X fine travel knob so that it cannot rotate, and move the lever from side to side.

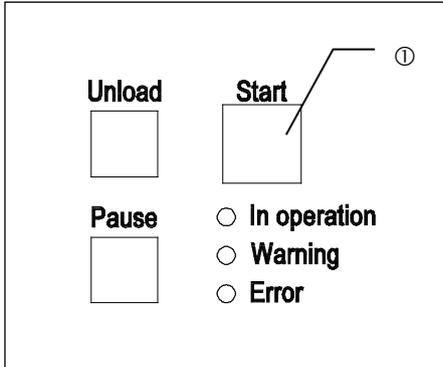
### 3 How to Use the Wafer Rotating Knob

A wafer can be rotated 360 degrees by rotating the wafer rotating knob ⑤ in the lower section of the grip handle.

One turn of the knob rotates the wafer approx. 180 degrees.

## 2-3 Start of Transfer

### 1 Start of Transfer: [Start] Button

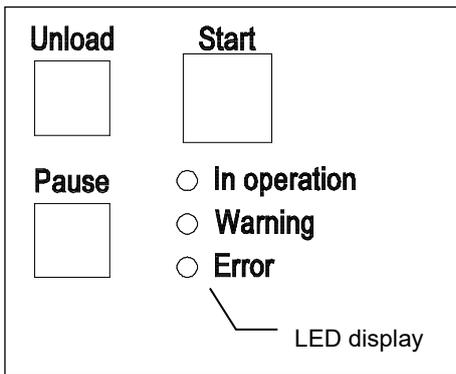


Press the [Start] ① button to start inspection.

**Ref.**

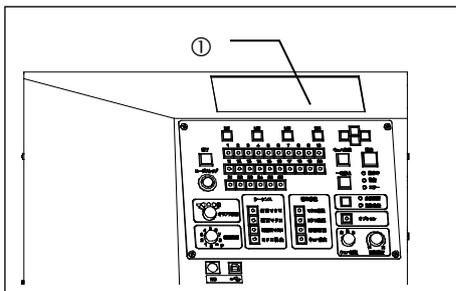
- You can also start inspection using the remote controller.
- Inspection starts when the stage is set to the wafer transfer position, even if the Microscope operation is not selected.
  - \* This function can be disabled by changing the setting.
- The loader may have been set to start inspection only after the type of inspection wafer is specified.

### 2 Status of the Loader in Operation



The status of the loader is indicated by LED lighting.

- “In operation”: Lit green to indicate that the loader is in operation.
- “Warning”: Lit yellow to indicate a warning.
- “Error”: Lit red and with a buzzer to indicate that an error has occurred.



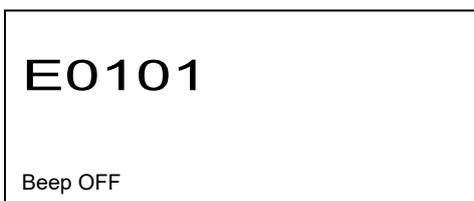
The liquid crystal panel ① shows the following information.



- When the loader is in operation: The panel shows the number of the wafer currently inspected in each inspection position.

On the macro (center) table <M\*\*>

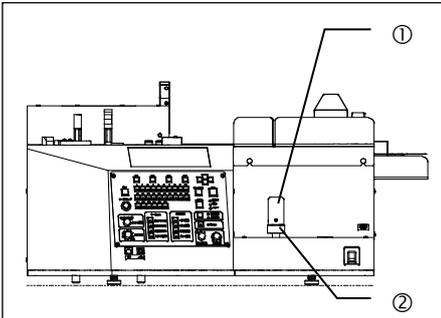
On the vacuum stage <S\*\*>



- When a warning has occurred: The panel shows the warning code number.
- When an error has occurred: The panel shows the error code number.

You can silence the buzzer by pressing [M1] <OFF>.

### 3 Top Macro Inspection



\* This function is available for the LMB model only.

- 1) The movement of the joystick ① tilts a wafer under Top Macro inspection. The wafer can be tilted up to 30 degrees in any direction.
- 2) The joystick is locked when its lock ring ② is rotated clockwise. (Use the lock ring to continue inspection at the same tilt angle.)

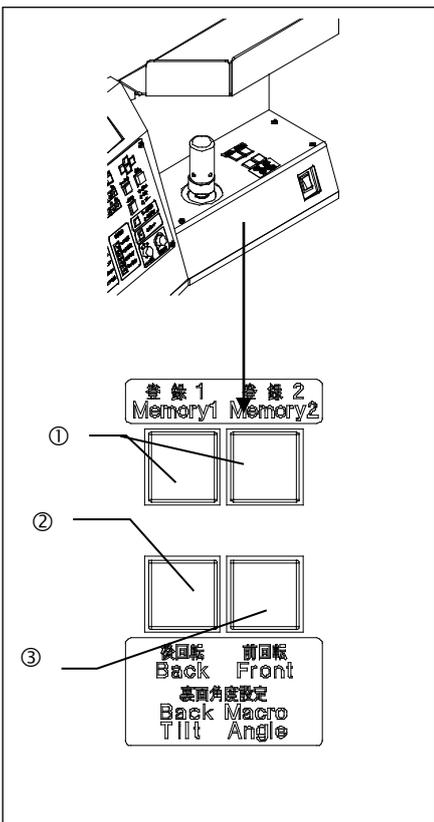


**Forcibly operating a locked joystick will weaken the locking force and make the joystick unable to hold a fixed position.**

**If the joystick is tilted abruptly, a wafer may bump into with the arm. Operate the joystick at 30 degrees per second or slower.**

**Ref.** You can change the [Speed] and [Direction] settings.

### 4 Back Macro Inspection and 2nd Back Macro Inspection: Setting the Back Macro Tilt Angle



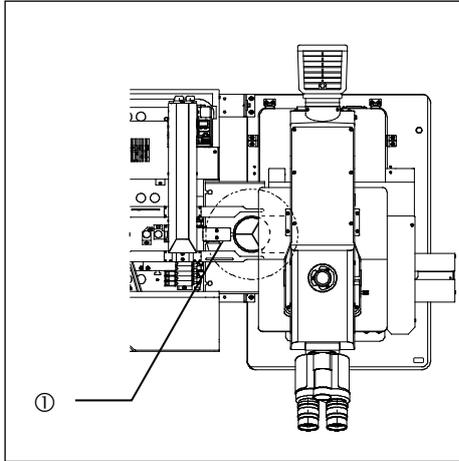
\* This function is available for the LMB model only.

- 1) The Back Macro Tilt Angle setting buttons can be reset in a 360 degree range during inspection.
- 2) The tilt angle can be changed by using the angle setting buttons ② and ③.
  - ②: Back rotation
  - ③: Front rotation
- 3) You can register two tilt positions.

Move the wafer to the desired tilt angle using the Back Macro Tilt Angle setting buttons, and then press and hold down the Memory button ① until the buzzer sounds.

**Ref.** The initial setting is 90°.

## 5 Transferring a Wafer onto the Vacuum Stage



To transfer a wafer onto the vacuum stage during the Microscope inspection, move the vacuum stage to the loader.

**Ref.** When the A-arm is lowered completely and the stage is ready to move, the green Stage Operation Permission LED ① on the stage detection sensor will light up.

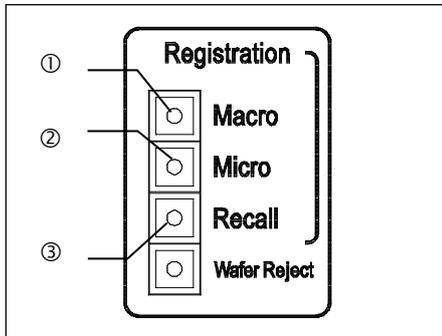
**Ref.** When the A-arm is lowered completely and the stage is ready to move, you can sound a buzzer by setting.

**Ref.** In the inspection sequence composed of the Top Macro inspection, the Back Macro inspection and the Microscope inspection, when the vacuum stage is moved to the wafer transfer position during the Top Macro inspection, the loader can proceed to the Microscope inspection by interrupting the Back Macro inspection.

### Caution

- Do not move the vacuum stage until the Stage Operation Permission LED lights up. Moving the stage is dangerous as a wafer may be released for transfer. If the stage is moved during transfer, a wafer may be transferred in an incorrect position and be damaged.
- By using the optional stage lock, the vacuum stage movement can be disabled until the wafer transfer is completed.
- If the vacuum stage is moved before the stage up and down movement is completed, the warning W0002 is shown on the liquid crystal panel.

## 6 Temporarily Registering the Inspection Results: [Registration] Button



The [Macro] ① and [Micro] ② buttons are used to register defective wafers. The registered wafers can be confirmed by pressing the [Recall] ③ button after the inspection is completed.

**Ref.** You can also perform this operation using the remote controller.

### (1) How to register

- Press the [Macro] ① button to register wafers under Top Macro or Back Macro inspection. Press the [Micro] ② button to register wafers under Microscope inspection. The buzzer sounds when registration is complete.
- Wafers can be registered only during inspection but cannot be registered during wafer transfer. If registration is needed, set the inspection time to 1 second or longer. (The inspection time setting function is not available for the L model.)
- Two wafers at a time are transferred when the inspection mode is All or Sampling (P1 to P10). Wafers on the microscope cannot be registered after the specified inspection time has elapsed. If registration is needed, set the inspection time to ∞.

### (2) How to confirm

- After inspection is completed, press the menu button [M1] <Recall> in the liquid crystal panel operating part or the [Recall] ③ button in the operating panel. The liquid crystal panel shows the registered data for each type of inspection. <1> is displayed for the registered wafer number.
- After confirmation, press the menu button [M1] <Exit> in the liquid crystal panel operating part. The loader returns to the initial screen and is ready for inspection.

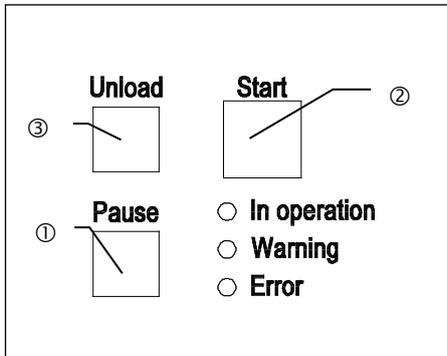
**Ref.** Registered data remains in the memory until the main switch is turned OFF or the next inspection is started.

AL120-LMB86-90	ALL
set the cassette	
No	Size Thick Comment
1.	200 725-400
Recall	Wafer Setting Memory

NG Wafer	0.OK	1.NG
	1-10	11-20 20-26
	1234567890	1234567890 123456
Macro	0000000000	0000000000 000000
Back	0000000000	0000000000 000000
Back2	0000000000	0000000000 000000
Micro	0000000000	0000000000 000000
Exit		

## 2-4 Stoppage of Transfer

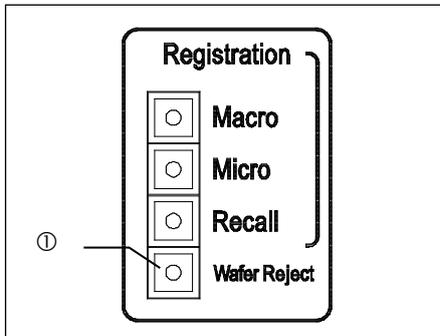
### 1 Temporarily Stopping the Loader during Inspection: [Pause] Button



The [Pause] button stops the wafer in the inspection position and cancels the inspection time setting.

The LED in the [Pause] ① button blinks during a pause. The loader will proceed to the next inspection when the [Start] ② button is pressed. The [Pause] button does not work when the inspection time is set to ∞.

### 2 Removing a Wafer with Tweezers during Inspection: [Wafer Reject] Button



The [Wafer Reject] ① button is used to remove a wafer in the inspection position. When the wafer is made removable by pressing the [Wafer Reject] ① button, the LED in the [Wafer Reject] button blinks. To remove a wafer, press the [Wafer Reject] ① button while the [Pause] button is pressed or while the wafer is waiting for a start command input with an inspection time of ∞. You can remove wafers which have numbers shown on the liquid crystal panel.

- The position from which a wafer can be removed differs depending on the sequence setting and the state of wafer transfer.

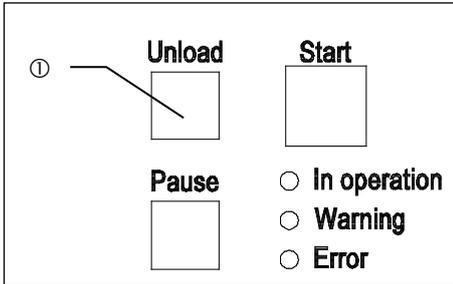
(1) When a wafer is on the stage, the wafer on the stage will be removed.

Press the [Wafer Reject] ① button, and you can remove a wafer from the vacuum stage. As you set the vacuum stage on the loader after removing a wafer, the next wafer will be automatically transported to the position where inspection is performed.

(2) If a wafer is located only at the position where macro inspection is performed, the wafer at this position is to be removed.

Press the [Wafer Reject] ① button, to remove a wafer. As you press the [Start] button after removing a wafer, the next wafer will be automatically transported to the position where inspection is performed.

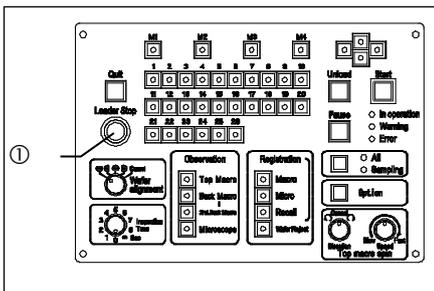
### 3 Unloading a Wafer during Inspection: [Unload] Button



The [Unload] ① button is used to unload a wafer from the transfer path in the loader (in the Top or Back Macro inspection position) into the cassette and transfer the next wafer. This operation is possible only when two or more types of inspection are selected in the sequence.

**Ref.** You can also perform this operation using the remote controller.

### 4 Stopping the Operation Immediately: [Loader Stop] Button

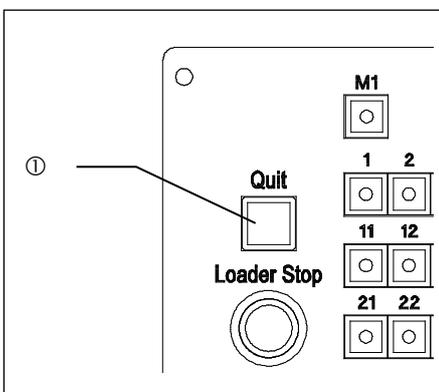


Pressing the Loader Stop button ① immediately stops loader operation.

To return to the normal state, turn the main switch OFF, remove the cause of the loader stoppage, and then turn the main switch back to ON.

**Ref.** If there are any wafers in the transfer path, refer to section 5-6 **Automatic Unloading**.

### 5 Terminating the Inspection: [Quit] Button



Pressing the [Quit] ① button terminates inspection halfway, unloads the inspected or transferred wafers into the cassette, and returns the loader to its initial state.

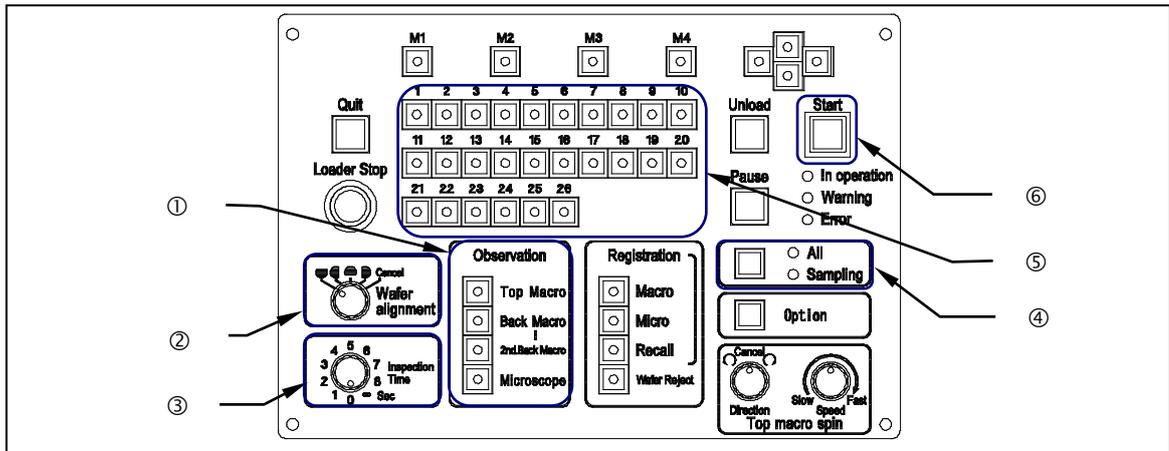
# 3 Inspections

## 3-1 Preparations

1. Make sure that there are no wafers in the transfer path or on the vacuum stage.  
If there are any wafers in the transfer path, return them to the cassette using tweezers or similar.
  2. Turn the main switch ON.  
The A-arm, the F-arm, the L-arm, the wafer presence sensor and other units return to their initial positions if they are in other positions.
- \* The loader can be set to skip initialization when power is turned on. (Refer to the test mode in the maintenance material.)
  - \* Wafers are not transferred to the microscope if the vacuum stage is not in the proper transfer position. Set the vacuum stage to the transfer position.

## 3-2 Inspection Operations

### 3-2-1 Microscope Inspection



1. Set a cassette on the cassette table.
2. Make sure that the [Microscope] LED in the Observation button is lit. (This step is not required for the L model) ..... ①  
If the [Microscope] ED is not lit, press the button to turn on the LED. If LEDs for other types of inspection are lit, turn them off by pressing their buttons.
3. Confirm the detailed settings for inspection.
  - 1) [Wafer alignment]: Indicates the specified orientation flat/notch positions on the stage. .... ②
  - 2) [Inspection Time]: Must be set to ∞ (infinite) when only the Microscope inspection is performed. .... ③
4. Set and confirm the inspection mode.
 

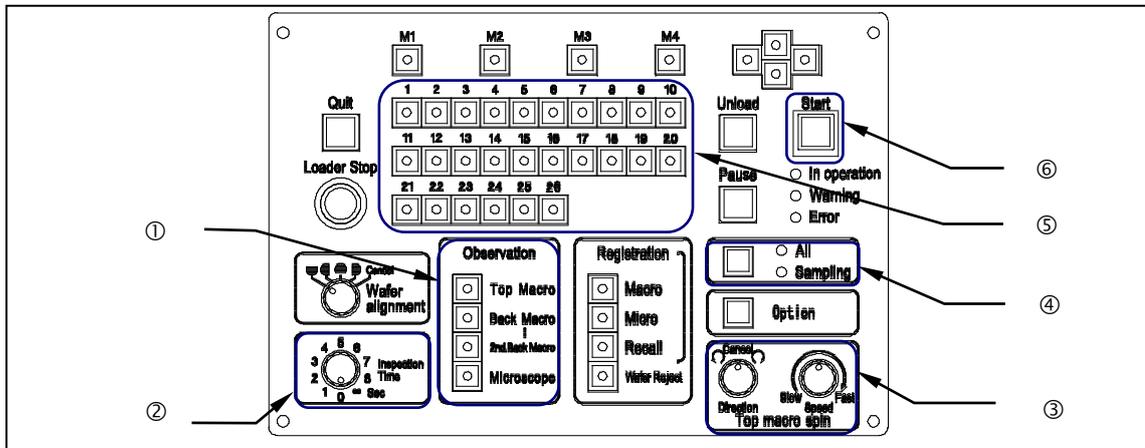
Select All or Sampling (P1 to P10) ..... ④

Set the inspection wafer number(s) as needed ..... ⑤



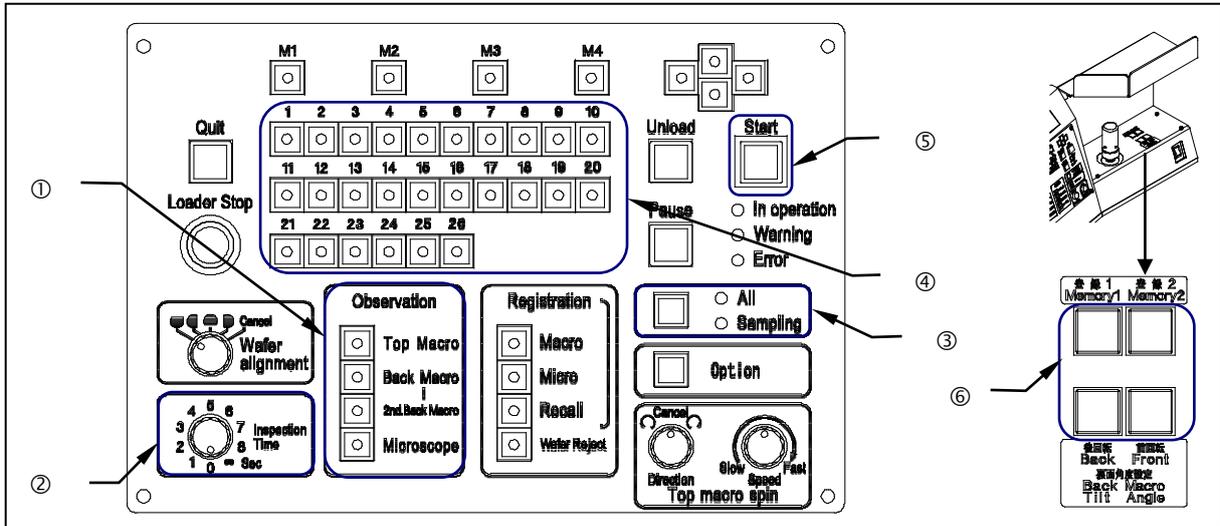
5. Set the vacuum stage to the wafer transfer position of the main unit.  
If the vacuum stage has already been set in place, reset it or press the [Start] button. ....Ⓢ
  
6. The first wafer is transferred from the cassette. After the orientation flat alignment (when it is selected), the wafer is transferred onto the vacuum stage.  
Do not move the stage until the wafer has completely transferred onto the vacuum stage.  
After the transfer is completed, the loader is able to perform the Microscope inspection of the first wafer.
  
7. The second wafer is transferred from the cassette. After the orientation flat alignment (when it is selected), the wafer waits for inspection.
  
8. When the first wafer inspection is completed, the inspected wafer is replaced by the second wafer after the vacuum stage is set to the wafer transfer position.  
If the first wafer inspection has already been completed and the vacuum stage has been set to the wafer transfer position before the second wafer is ready, reset the stage or press the [Start] button.
  
9. The first wafer is unloaded into the cassette.
  
10. The third wafer is transferred from the cassette. After the orientation flat alignment, the wafer waits for inspection. Steps 7 to 9 are repeated to transfer subsequent wafers for inspection.
  
11. After the last wafer is unloaded into the cassette, the operating units return to their initial positions and the loader stops.
  
12. Replace the cassette with the next one, and repeat the procedure from step 1.

**3-2-2 Top Macro Inspection**



1. Set a cassette on the cassette table.
2. Make sure that only the [Top Macro] LED in the Observation button is lit..... ①  
If the [Top Macro] LED is not lit, press the button to turn on the LED. If LEDs for other types of inspection are lit, turn them off by pressing their buttons.
3. Confirm the detailed settings for inspection.
  - 1) [Inspection Time]: Enables the setting of Macro inspection time. .... ②
  - 2) [Top Macro spin direction]: Enables the setting of wafer rotation direction during the Top Macro inspection..... ③
  - 3) [Top Macro spin speed]: Enables the setting of wafer rotation speed during the Top Macro inspection.③
4. Set and confirm the inspection mode.  
Select All or Sampling (P1 to P10)..... ④  
Set the inspection wafer number(s) as needed..... ⑤
5. Press the [Start] button, and the first wafer is transferred to the Top Macro inspection position..... ⑥  
You can change the wafer tilt direction for observation using the joystick.  
Release the lock ring before using the joystick.
6. After the specified inspection time has elapsed, the wafer is unloaded into the cassette, and the second wafer is transferred to the Top Macro inspection position.  
\* Press the [Start] button if the [Inspection Time] control is set to [ $\infty$ ].
7. Subsequent wafers are transferred automatically and sequentially.
8. After the last wafer is unloaded into the cassette, the operating units return to their initial positions and the loader stops.
9. Replace the cassette with the next one, and repeat the procedure from step 1.

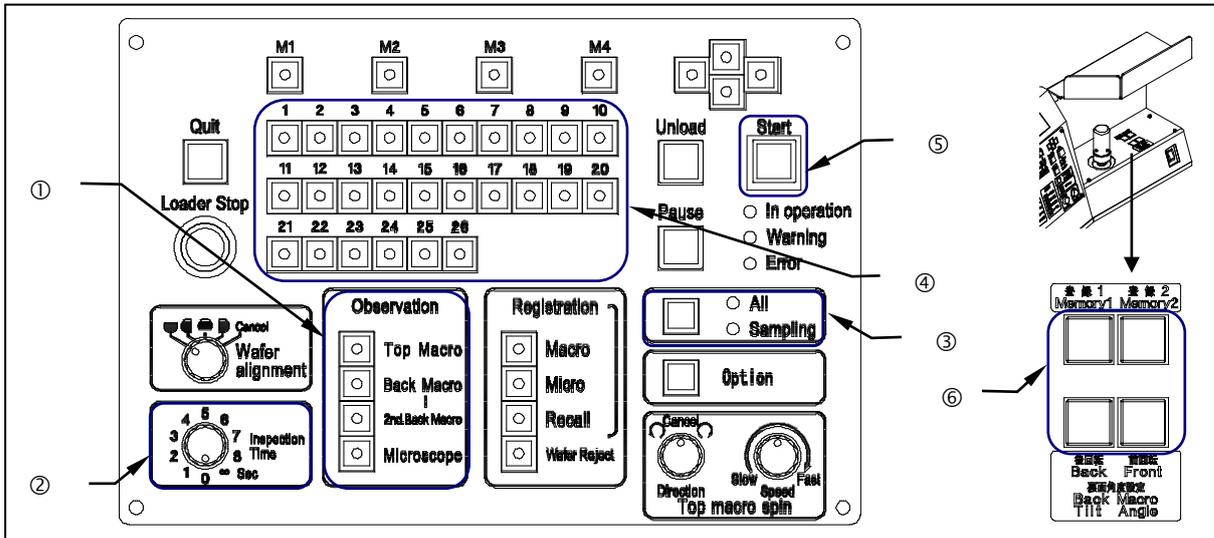
**3-2-3 Back Macro Inspection**



\* This function is available for the LMB model only.

1. Set a cassette on the cassette table.
2. Make sure that only the [Back Macro] LED in the Observation button is lit. (This step is not required for the L model.) ..... ①  
 If the [Back Macro] ED is not lit, press the button to turn on the LED. If LEDs for other types of inspection are lit, turn them off by pressing their buttons.
3. Confirm the detailed settings for inspection.
  - 1) [Inspection Time]: Enables the setting of Macro inspection time. .... ②  
 \* The inspection time is common to the Top Macro and Back Macro inspections.
4. Set and confirm the inspection mode.  
 Select All or Sampling (P1 to P10). .... ③  
 Set the inspection wafer number(s) as needed. .... ④
5. Press the [Start] button to transfer the first wafer to the Back Macro inspection position. .... ⑤  
 You can change the wafer tilt position (angle) for observation using the [Back Macro Tilt Angle] button. ... ⑥
6. After the specified inspection time has elapsed, the wafer is unloaded into the cassette, and the second wafer is transferred to the Back Macro inspection position.  
 \* Press the [Start] button if the [Inspection Time] control is set to [∞].
7. Subsequent wafers are transferred automatically and sequentially.
8. After the last wafer is unloaded into the cassette, the operating units return to their initial positions and the loader stops.
9. Replace the cassette with the next one, and repeat the procedure from step 1.

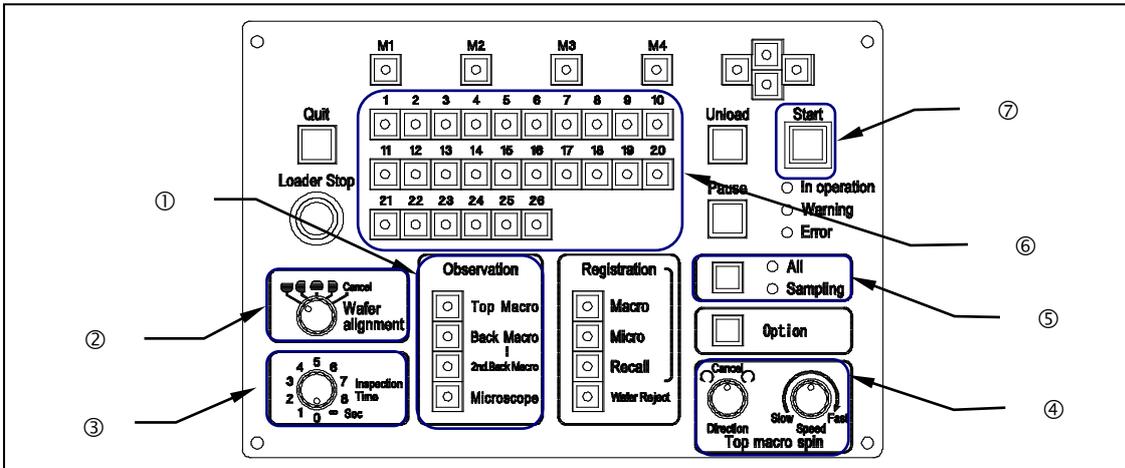
**3-2-4 Back Macro Inspection + 2nd Back Macro Inspection**



\* This function is available for the LMB model only.

1. Set a cassette on the cassette table.
2. Select the [Back Macro] and [2nd Back Macro] Observation buttons..... ①  
When the buttons are selected, the LEDs in the buttons light up.  
If the [Back Macro] and [2nd Back Macro] LEDs are not lit, press the buttons to turn on the LEDs. If LEDs for other types of inspection are lit, turn them off by pressing their buttons.
3. Confirm the detailed settings for inspection.
  - 1) [Inspection Time]: Enables the setting of Macro inspection time..... ②  
\* The inspection time is common to the Top Macro, Back Macro and 2nd Back Macro inspections.
4. Set and confirm the inspection mode.  
Select All or Sampling (P1 to P10)..... ③  
Set the inspection wafer number(s) as needed..... ④
5. Press the [Start] button to transfer the first wafer to the Back Macro inspection position. .... ⑤  
You can change the wafer tilt position (angle) for observation using the [Back Macro Tilt Angle] button.... ⑥
6. After the specified inspection time has elapsed, the wafer is placed on the macro table and rotated counterclockwise about 20 degrees, and the loader then proceeds to the 2nd Back Macro inspection.  
\* Press the [Start] button if the [Inspection Time] control is set to [∞].
7. After the specified inspection time has elapsed, the wafer is unloaded into the cassette, and the second wafer is transferred to the Back Macro inspection position.  
Subsequent wafers are transferred automatically and sequentially.
8. After the last wafer is unloaded into the cassette, the operating units return to their initial positions and the loader stops.
9. Replace the cassette with the next one, and repeat the procedure from step 1.

**3-2-5 Top Macro Inspection + Microscope Inspection**



\* This function is available for the LMB model only.

1. Set a cassette to the cassette table.
2. Select the [Top Macro] and [Microscope] Observation buttons.....①  
When the buttons are selected, the LEDs in the buttons light up.  
If the [Top Macro] and [Microscope] LEDs are not lit, press the buttons to turn on the LEDs. If LEDs for other types of inspection are lit, turn them off by pressing their buttons.
3. Set and confirm the detailed settings for inspection.
  - 1) [Wafer alignment]: Indicates the orientation flat/notch positions on the stage.....②
  - 2) [Inspection Time]: Enables the setting of Macro inspection time. ....③
  - 3) [Top Macro spin direction]: Enables the setting of wafer rotation direction during Top Macro inspection. ....④
  - 4) [Top Macro spin speed]: Enables the setting of wafer rotation speed during Top Macro inspection. ....④
4. Set and confirm the inspection mode.
 

Select All or Sampling (P1 to P10).....⑤

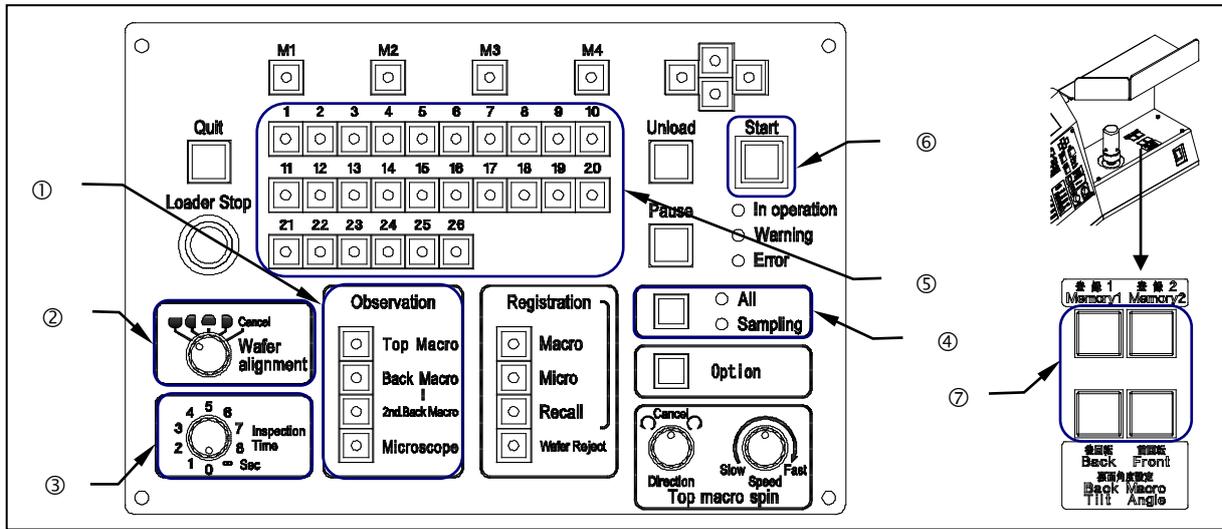
Set the inspection wafer number(s) as needed. ....⑥
5. Press the [Start] button to transfer the first wafer to the Top Macro inspection position. ....⑦  
Top Macro Inspection is started.
6. After the specified inspection time has elapsed, the macro table is lowered and the first wafer is transferred onto the vacuum stage.  
After the first wafer is transferred onto the vacuum stage, the second wafer is transferred to the Top Macro inspection position, and the Top Macro inspection of the second wafer is started. After the specified inspection time has elapsed for the Top Macro inspection of the second wafer, the macro table is lowered for the next wafer.

**Ref.**

\* Press the [Start] button if the [Inspection Time] control is set to [∞].

- 
- \* Wafers are not transferred onto the microscope if the stage is not in the wafer transfer position at the time of wafer transfer.
  - \* By setting the vacuum stage to the wafer transfer position during Top Macro inspection, Top Macro observation is terminated before the inspection time is completed. Microscope inspection is given preference and the wafer is transferred onto the vacuum table.
  - \* If Microscope inspection is not required, press the [Unload] button. The first wafer is unloaded into the cassette and the second wafer is transferred to the Top Macro inspection position.
7. Subsequent wafers are transferred automatically and sequentially.
  8. After the last wafer is unloaded into the cassette, the operating units return to their initial positions and the loader stops.
  9. Replace the cassette with the next one, and repeat the procedure from step 1.

**3-2-6 Back Macro Inspection + Microscope Inspection**



\* This function is available for the LMB model only.

1. Set a cassette on the cassette table.
2. Select the [Back Macro] and [Microscope] Observation buttons. ....①  
When the buttons are selected, the LEDs in the buttons light up.  
If the [Back Macro] and [Microscope] LEDs are not lit, press the buttons to turn on the LEDs. If LEDs for other types of inspection are lit, turn them off by pressing their buttons.
3. Set and confirm the detailed settings for inspection.
  - 1) [Wafer alignment]: Indicates the orientation flat/notch positions on the stage. ....②
  - 2) [Inspection Time]: Enables the setting of Macro inspection time. ....③
4. Set and confirm the inspection mode.
  - Select All or Sampling (P1 to P10). ....④
  - Set the inspection wafer number(s) as needed. ....⑤
5. Press the [Start] button to transfer the first wafer to the Back Macro inspection position. ....⑥  
You can change the wafer tilt position (angle) for observation using the [Back Macro Tilt Angle] button. ...⑦
6. After the specified inspection time has elapsed, the Back Macro inspection is completed, and the first wafer is transferred onto the vacuum stage.

After the first wafer is transferred onto the vacuum stage, the second wafer is transferred to the macro table position, and the loader starts Back Macro inspection of the second wafer. After the specified inspection time has elapsed for the Back Macro inspection of the second wafer, the L-arm is lowered for the next wafer.

**Ref.**

- \* Press the [Start] button if the [Inspection Time] control is set to [∞].
- \* Wafers are not transferred onto the microscope if the stage is not in the wafer transfer position at the time of wafer transfer.

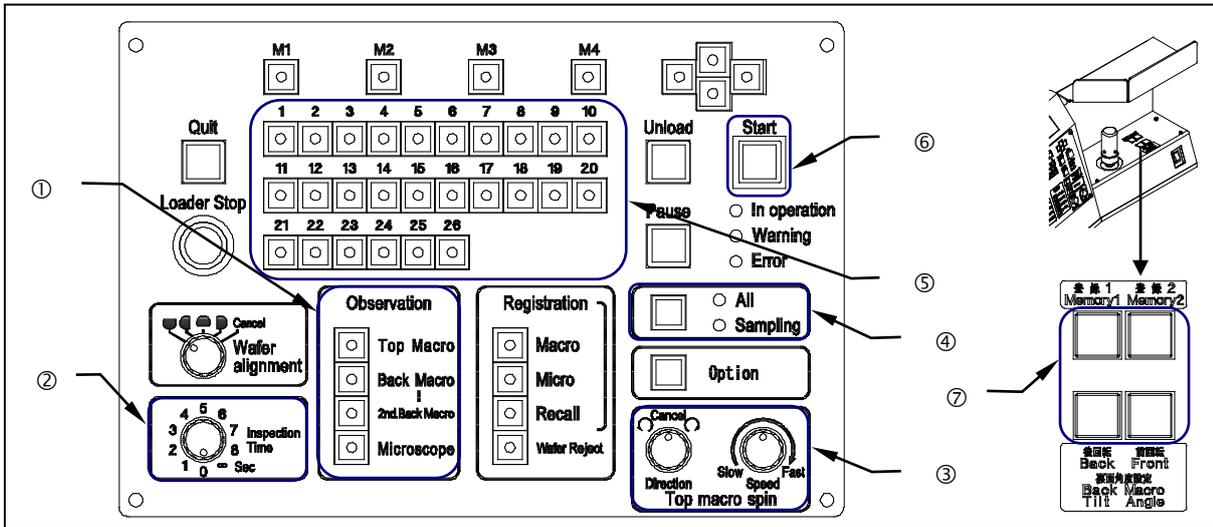


- \* By setting the vacuum stage to the wafer transfer position during Back Macro inspection, the Back Macro inspection is terminated before the inspection time is completed. Microscope inspection is given preference and the wafer is transferred onto the vacuum table.
  - \* If Microscope inspection is not required, press the [Unload] button. The first wafer is unloaded into the cassette and the second wafer is transferred to the Back Macro inspection position.
7. Subsequent wafers are transferred automatically and sequentially.
  8. After the last wafer is unloaded into the cassette, the operating units return to their initial positions and the loader stops.
  9. Replace the cassette with the next one, and repeat the procedure from step 1.

**Ref.**

- \* If [2nd Back Macro] is selected for the inspection sequence, refer to **[3-2-4 Back Macro Inspection + 2nd Back Macro Inspection]**.

**3-2-7 Top Macro Inspection + Back Macro Inspection**



\* This function is available for the LMB model only.

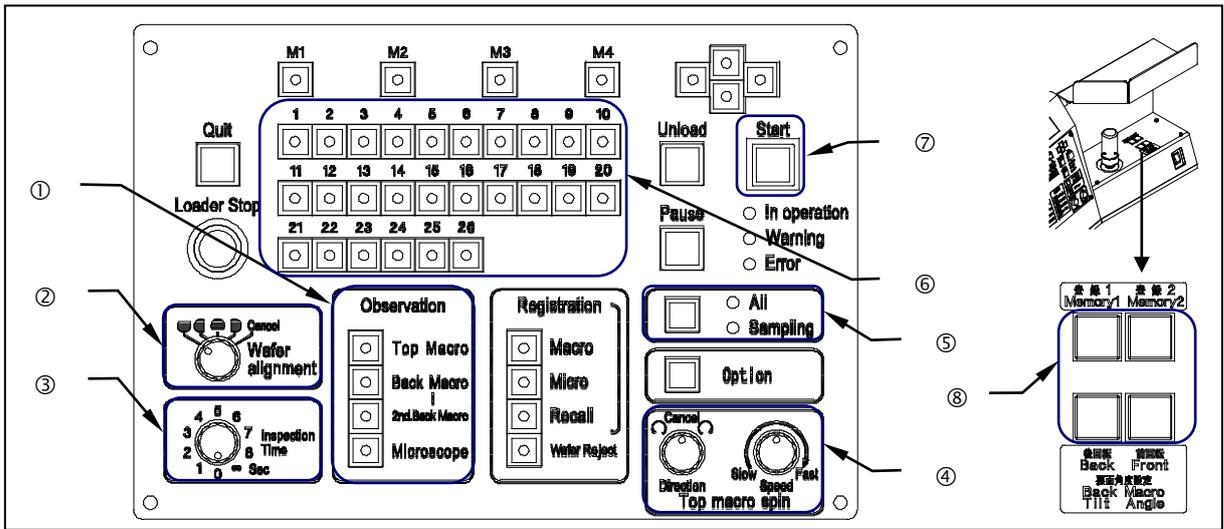
1. Set a cassette on the cassette table.
2. Select the [Top Macro] and [Back Macro] Observation buttons. ....①  
When the buttons are selected, the LEDs in the buttons light up.  
If the [Top Macro] and [Back Macro] LEDs are not lit, press the buttons to turn on the LEDs. If LEDs for other types of inspection are lit, turn them off by pressing their buttons.
3. Confirm the detailed settings for inspection.
  - 1) [Inspection Time]: Enables the setting of Macro inspection time. .... ②  
\* The inspection time is common to the Top Macro, Back Macro and 2nd Back Macro inspections.
  - 2) [Top Macro spin direction]: Enables the setting of wafer rotation direction during the Top Macro inspection. .... ③
  - 3) [Top Macro spin speed]: Enables the setting of wafer rotation speed during the Top Macro inspection. .... ③
4. Set and confirm the inspection mode.  
Select All or Sampling (P1 to P10). ....④  
Set the inspection wafer number(s) as needed. ....⑤
5. Press the [Start] button to transfer the first wafer is transferred to the Top Macro inspection position. ....⑥
6. After the specified inspection time has elapsed, the macro table is lowered and the loader proceeds to Back Macro inspection.  
You can change the wafer tilt position (angle) for observation using the [Back Macro Tilt Angle] button. ...⑦  
\* Press the [Start] button if the [Inspection Time] control is set to [∞].
7. After the specified inspection time has elapsed, the wafer is unloaded into the cassette, and the second wafer is transferred to the Top Macro inspection position.  
Subsequent wafers are transferred automatically and sequentially.
8. After the last wafer is unloaded into the cassette, the operating units return to their initial positions and the loader stops.



9. Replace the cassette with the next one, and repeat the procedure from step 1.

**Ref.** If [2nd Back Macro] is selected for the inspection sequence, refer to [3-2-4 Back Macro Inspection + 2nd Back Macro Inspection].

**3-2-8 Microscope Inspection + Top Macro Inspection + Back Macro Inspection + 2nd Back Macro Inspection**



\* This function is available for the LMB model only.

1. Set a cassette on the cassette table.
2. Select the [Top Macro], [Back Macro], [2nd Back Macro] and [Microscope] Observation buttons. All the Observation buttons are normally turned on (the LEDs are lit) when the power is turned on..... ①  
If any of the [Top Macro], [Back Macro], [2nd Back Macro] and [Microscope] LEDs are not lit, press the buttons to turn on the LEDs.

\* [2nd Back Macro] can be selected only when [Back Macro] is selected.

3. Set and confirm the detailed settings for inspection.
  - 1) [Wafer alignment]: Indicates the specified orientation flat/notch positions on the stage..... ②
  - 2) [Inspection Time]: Enables the setting of Macro inspection time..... ③
  - 3) [Top Macro spin direction]: Enables the setting of wafer rotation direction during Top Macro inspection..... ④
  - 4) [Top Macro spin speed]: Enables the setting of wafer rotation speed during Top Macro inspection..... ④
4. Set and confirm the inspection mode.
 

Select All or Sampling (P1 to P10)..... ⑤

Set the inspection wafer number(s) as needed..... ⑥
5. Press the [Start] button, and the first wafer is transferred to the Top Macro inspection position..... ⑦  
The loader begins Top Macro inspection.



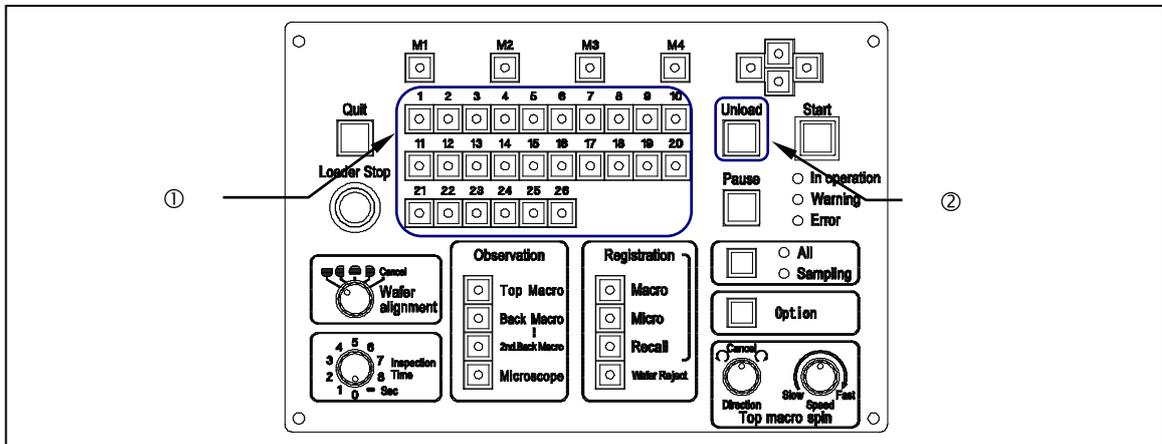
6. After the specified inspection time has elapsed, the macro table is lowered and the loader proceeds to Back Macro inspection.  
You can change the wafer tilt position (angle) for observation using the [Back Macro Tilt Angle] button. ...<sup>⑧</sup>  
\* Press the [Start] button if the [Inspection Time] control is set to [ $\infty$ ].
7. After the specified inspection time has elapsed, Back Macro inspection is completed and the first wafer is transferred onto the vacuum stage.
8. After the first wafer is transferred onto the vacuum stage, the second wafer is transferred to the Top Macro inspection position, and the loader starts the Top Macro inspection of the second wafer.
9. After the specified inspection time has elapsed for the Top Macro inspection of the second wafer, the macro table is lowered and the loader starts the Back Macro inspection of the second wafer.
10. After the specified inspection time has elapsed for the Back Macro inspection of the second wafer, the L-arm is lowered. The wafer is placed on the macro table and rotated counterclockwise about 20 degrees, and then the loader proceeds to the 2nd Back Macro inspection.
11. After the specified inspection time has elapsed for the 2nd Back Macro inspection of the second wafer, the L-arm is lowered, waiting for the next wafer.

**Ref.**

- \* Press the [Start] button if the [Inspection Time] control is set to [ $\infty$ ].
- \* Wafers are not transferred onto the microscope if the stage is not in the wafer transfer position at the time of wafer transfer.
- \* By setting the vacuum stage to the wafer transfer position during Top Macro or Back Macro inspection, the Macro inspection is terminated before the inspection time is completed. Microscope inspection is given preference and the wafer is transferred onto the vacuum table.
- \* If the Microscope inspection is not required, press the [Unload] button. The first wafer is unloaded into the cassette and the second wafer is transferred to the Top Macro inspection position.
- \* If [2nd Back Macro] is selected for the inspection sequence, refer to **[3-2-4 Back Macro Inspection + 2nd Back Macro Inspection]**.

### 3-3 Special Operations

#### 3-3-1 Changing the Wafer Selection Setting



1. You can change the inspection wafer number settings after inspection has started.
2. The wafer numbers can be changed when the [Pause] button is pressed, or while the wafers wait for a start command input when the inspection time is set to ∞. (You can change the setting when the LED in the [Pause] button is blinking.)
3. Select the wafer numbers using the Wafer No. selector buttons.
4. Press the [Start] button, and the wafers are transferred with the new wafer selection settings.
5. The original wafer selection settings are restored after the entire operation of the specified cassette has finished.
  - Settings can not be changed for the wafer being inspected, indicated by a blinking LED in the Wafer No. selector button.
  - When wafers that have been inspected are re-specified in the specification change process, the re-specified wafers are inspected again after inspecting the wafers that have been specified prior to the specification changes.



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# 4 Specifications

## 4-1 AL120-L6-150 and LMB6-150

Item	AL120-L6-150	AL120-LMB6-150
<b>1. Transferable Wafer Size</b>		
Applicable SEMI standard	SEMI M1-1105 Class 1.8: 150 mm mirror-polished single-crystal silicon wafer (with secondary flat) Class 1.13: 150 mm mirror-polished single-crystal silicon wafer	
Applicable wafer diameter	150 ± 0.2 mm	
Applicable wafer thickness	t = 675 um to 150 um (Wafers in a cassette must have uniform thickness and deflection.)	
Wafer deflection in a cassette	2 mm or less (Wafers in a cassette must have uniform thickness and deflection.)	
Applicable wafer warpage	0.1 mm or less	
Applicable wafer material	Silicon	
Applicable positioning shape	Orientation flat Class 1.8 = Primary flat length 57.5 ± 2.5 mm and secondary flat length 37.5 ± 2.5 mm Class 1.13 = Primary flat length 47.5 ± 2.5 mm	
Transferable wafer weight	As per the SEMI M1-1105 standard (28 g for a 150mm wafer)	
<b>2. Settable Cassette</b>		
Applicable cassette	150 mm plastic and metal wafer carrier that conforms to the SEMI E1.5-91 150 standard Standard cassette: Entegris PA182-60MB-06 * You may need to adjust the cassette guide when using other types of cassettes.	
Number of settable cassettes	1 cassette (for both loading and unloading)	
Cassette positioning	Drop-in type with a positioning guide adjustment function	
Maximum withstand load	2.0 kg (150mm wafers(25) + Cassette)	
<b>3. Macro Inspections</b>		
Top Macro inspection	Not available	Tilt drive type: Joystick direct drive
		Tilt angle: 30 degrees (max.)
		Wafer rotation direction: Clockwise, counterclockwise, and non rotating
		Wafer rotation speed: 3 to 30 seconds/rotation (continuously variable)
Back Macro inspection	Not available	Tilt drive type: Motorized drive
		Tilt angle: 360 degrees from horizon (stepless) Angle can be changed during inspection.
		Registered tilt positions: 2 positions
2nd Back Macro inspection	Not available	After the Back Macro inspection, the wafer is rotated counterclockwise about 20 degrees and inspected again.
Inspection time setting	Not available	From 0 to 8 seconds and ∞ The ∞ setting maintains the inspection state. Time can be set in 1 second steps.
		Common time setting for the Top Macro and Back Macro inspections



Item	AL120-L6-150	AL120-LMB6-150
<b>4. Microscope Inspection</b>		
Applicable microscope	EVIDENT MX61 , MX63	
Applicable microscope stage	AL120-VS6	
Microscopic observation method	Reflected light observation only	
Stage operation method	Manually-operated stage with XY coarse and fine adjustment and a 360-degree rotation mechanism (with an X-direction coarse travel clutch)	
Stage driving method	Belt drive	
Microscopic observation range	φ150 mm	
Stroke below stage	3 mm below the observation position	
Wafer table	Conductive PEEK resin	
Wafer holding method	Vacuum adsorption (Vacuum supplied by the loader)	
<b>5. Inspection Mode</b>		
All (100%) inspection	Continuous transfer (Two wafers at a time are transferred)	
Sampling transfer patterns	10 patterns (P1 to P10) can be registered. Transfer of specified wafers (Two wafers at a time are transferred) (When one wafer is being inspected under the microscope, the next wafer is being transferred to the macro (center) table position.)	
Sampling inspection patterns	Not available	10 patterns (P1 to P10) can be registered. Transfer and inspection of specified wafers (One wafer is transferred at a time)
Automatic skip function	Slots with no wafer are automatically skipped in both the All and Sampling modes.	
<b>6. Auxiliary Functions during Inspection</b>		
Wafer registration	Numbers of defective wafers registered in each type of inspection can be displayed.	
Pause	Not available	When the inspection time is set to 0 - 8 seconds, it can be extended by pausing the loader.
Wafer removal	Wafers can be removed by using tweezers or similar tools during inspection.	
Orientation flat alignment	Contactless detection using the opto-sensor Four orientation flat positions (the near, far, right and left sides) can be selected on the microscope stage at 90-degree intervals. Settings can be changed during inspection. (The position specified before the orientation flat alignment is effective.) Orientation flat alignment during unloading: Can be set using the memory button. (Settings can be changed during inspection.)	
Wafer alignment	Contactless alignment (optical)	
<b>7. Protective Functions</b>		
Immediate stoppage	Transfer is stopped by pressing the Loader Stop button (with the switch guard to prevent mistaken operation).	
Wafer popping	Wafers popping out of a cassette can be detected.	
Warnings and error display	The liquid crystal panel shows error codes and their details. An error log can be displayed and obtained.	
Wafers in the cassette	Any slanted wafers can be detected (1st-slot cross).	
Stage lock	The stage position can be locked until the wafer is transferred onto the microscope completely (option).	
Wafer protection in case of power failure	Wafers are held in case of power failure.	



Item	AL120-L6-150	AL120-LMB6-150
<b>8. Transfer Mechanism</b>		
Wafer transfer method	Wafer back side vacuum adsorption and mechanical arm transfer	
Wafer contact area material	Wafer removal arm(A1-arm,A2-arm): Conductive Teflon coating	
	-	Back macro arm (L-arm): Conductive Fluorine rubber
Transfer speed	Registered for each thickness of wafer transferred	
Noise level during transfer	80 dB(A) or lower	
<b>9. Dimensions and Weight</b>		
Loader dimensions	570 (W) × 620 (D) × 400 (H) mm	
Weight	Approx. 36.5 kg	Approx. 40 kg
<b>10. Loader Utilities</b>		
Loader power supply voltage	AC100 to 120 V ± 10%, 1.0 A AC220 to 240 V ± 10%, 0.5 A	
Power supply frequency	50/60 Hz ± 5 Hz	
Circuit breaker capacity	1.2 A	
Vacuum	-67 kPa to -80 kPa	
Vacuum connection tube	1/4-inch soft polyurethane tube with insert pipe joint	
Vacuum discharge	20 Liter/min. or more (including vacuum supply for the stage)	
<b>11. Operating Environment</b>		
Place of use	Indoor use (in a clean room)	
Altitude	2000 m or lower	
Temperature	19 to 25°C (Storage and transport temperature: 5 to 40°C)	
Humidity	40 to 80% (Storage and transport humidity: 40 to 80%)	
Pollution degree	2 (IEC60664)	
Installation category (Overvoltage category)	II (IEC60664)	
<b>12. Required Dimensions and Weight of the Entire System (Wafer loader main unit + Microscope + Microscope fixing tray + Stage)</b>		
MX61: MX61-F,MX-SWETTR,SWH10X,U-D5BDREMC,OB(BD),U-LH100-3,MX-BSH-ESD		
Footprint	980 (W) × 620 (D) mm	
Width	1184 (W) mm	
System weight	Approx. 84.9 kg	Approx. 88.5 kg
<b>4-2 AL120-L86, LMB86, L86-180, LMB86-180 and LMB-90</b>		



Item	AL120-L86	AL120-L86-180	AL120-LMB86	AL120-LMB86-180	AL120-LMB8-90
<b>1. Transferrable Wafer Size</b>					
Applicable SEMI standard	SEMI M1-1105 Class 1.13 , Class 1.9, Class 1.10				SEMI M1-1105 Class 1.9 Class 1.10
Applicable wafer diameter	$\phi 150 \pm 0.2$ mm, $\phi 200 \pm 0.2$ mm				$\phi 200 \pm 0.2$ mm
Applicable wafer thickness	t = 725 um to 400 um	t = 725 um to 180 um	t = 725 um to 400 um	t = 725 um to 180 um	t = 725 um to 90 um
Wafer deflection in a cassette	-	$\phi 150$ mm: 2 mm or less $\phi 200$ mm: 4 mm or less	-	$\phi 150$ mm: 2 mm or less $\phi 200$ mm: 4 mm or less	7 mm or less
Wafers in a cassette must have uniform thickness and deflection.					
Applicable wafer warpage	0.1 mm or less				
Applicable wafer material	Silicon				
Applicable positioning shape	$\phi 150$ mm: Orientation flat (double orientation flat not possible) $\phi 200$ mm: Notch and orientation flat				Notch and orientation flat
Transferable wafer weight	As per the SEMI M1-1105 standard (53 g for 200mm wafer)				53 g
<b>2. Settable Cassette</b>					
Applicable cassette	150 mm plastic and metal wafer carrier that conforms to the SEMI E1.5-91 150 standard Standard cassette: $\phi 150$ mm; Entegris PA182-60MB-06 $\phi 200$ mm; Entegris PA192-80M-06				<ul style="list-style-type: none"> <li>• 180 um or larger: Entegris PA192-80M-06</li> <li>• below 180 um: Dainichi Shoji AL-8 (Metal cassette)</li> </ul>
* You may need to adjust the cassette guide when using other types of cassettes.					
Number of settable cassettes	1 cassette (for both loading and unloading)				
Cassette positioning	Drop-in type with a positioning guide adjustment function				
Maximum withstand load	4.0 kg (200mm wafers(25) + Cassette)				
<b>3. Macro Inspection</b>					
Top Macro inspection	Not available	Tilt drive type: Joystick direct drive			
		Tilt angle: 30 degrees (max.)			
		Wafer rotation direction: Clockwise, counterclockwise, and non rotating			
Wafer rotation speed: 3 to 30 seconds/rotation (continuously variable)					
Back Macro inspection	Not available	Tilt drive type: Motorized drive			
		Tilt angle: 360 degrees from horizon (stepless) The angle can be changed during inspection.			
		Registered tilt positions: 2 positions			
2nd Back Macro inspection	Not available	After the Back Macro inspection, the wafer is rotated counterclockwise about 20 degrees and inspected again.			



Item	AL120-L86	AL120-L86-180	AL120-LMB86	AL120-LMB86-180	AL120-LMB8-90
Inspection time setting	Not available		From 0 to 8 seconds and ∞ The ∞ setting maintains the inspection state. The time can be set in 1 second steps. Common time setting for the Top Macro and Back Macro inspections		
<b>4. Microscope Inspection</b>					
Applicable microscope	EVIDENT MX61 , MX63				
Applicable microscope stage	AL120-VS8				
Microscopic observation method	Reflected light observation only				
Stage operation method	Manually-operated stage with X and Y coarse and fine adjustment and 360-degree rotation mechanism (with an X-direction coarse travel clutch)				
Stage driving method	Belt drive				
Microscopic observation range	φ200 mm				
Stroke below the stage	3 mm below the observation position				
Wafer table	Conductive PEEK resin				
Wafer holding method	Vacuum adsorption (Vacuum is supplied by the loader)				
<b>5. Inspection Mode</b>					
All (100%) inspection	Continuous transfer (Two wafers are transferred at a time)				
Sampling transfer patterns	10 patterns (P1 to P10) can be registered. Transfer of specified wafers (Two wafers at a time are transferred) (When a wafer is being inspected under the microscope, the next wafer is being transferred to the macro (center) table position.)				
Sampling inspection patterns	Not available		10 patterns (P1 to P10) can be registered. Transfer and inspection of specified wafers (One wafer at a time is transferred)		
Automatic skip function	Slots with no wafer are automatically skipped in both All and Sampling modes.				
<b>6. Auxiliary Functions during Inspection</b>					
Wafer registration	Numbers of defective wafers registered in each type of inspection can be displayed.				
Pause	Not available		When the inspection time is set to 0 to 8 seconds, it can be extended by pausing the loader.		
Wafer removal	Wafers can be removed by using tweezers or similar tools during inspection.				
Orientation flat alignment	Non-contact detection using the opto-sensor Four orientation flat positions (the near, far, right and left sides) can be selected on the microscope stage at 90-degree intervals. Settings can be changed during inspection. (The position specified before the orientation flat alignment is effective.) Orientation flat alignment during unloading: Can be set using the memory button. (Settings can be changed during inspection.)				
Wafer alignment	Contactless alignment (optical)				
<b>7. Protective Functions</b>					
Immediate stoppage	Transfer is stopped by pressing the Loader Stop button (with the switch guard to prevent wrong operation).				
Wafer popping	Wafers popping out of a cassette can be detected.				



Item	AL120-L86	AL120-L86-180	AL120-LMB86	AL120-LMB86-180	AL120-LMB8-90
Warnings and error display	The liquid crystal panel shows error codes and their details. An error log can be displayed and obtained.				
Wafers in the cassette	Any slanted wafers can be detected				
	1- slot cross	2- slot cross	1- slot cross	2- slot cross	
Stage lock	The stage position can be locked until the wafer is transferred onto the microscope completely. (option)				
Wafer protection in case of power failure	Wafers are held in case of power failure.				
<b>8. Transfer Mechanism</b>					
Wafer transfer method	Wafer back side vacuum adsorption and mechanical arm transfer				
Wafer contact area material	Wafer removal arm(A1-arm,A2-arm): Conductive Fluorine coating Macro (center) table: Conductive PEEK resin				
	-		Back macro arm(L-arm): Conductive Fluorine rubber		Back macro arm(L-arm): Conductive PEEK resin, Conductive Fluorine rubber
Transfer speed	Registered for each thickness of wafer transferred				
Noise level during transfer	80 dB(A) or lower				
<b>9. Dimensions and Weight</b>					
Loader dimensions	640 (W) × 620 (D) × 378 (H) mm				
Weight	Approx. 40.5 kg	Approx. 40.5 kg	Approx. 44 kg	Approx. 44 kg	Approx. 44 kg
<b>10. Loader Utilities</b>					
Loader power supply voltage	AC100 to 120 V ±10%, 1.0 A AC220 to 240 V ±10%, 0.5 A				
Power supply frequency	50/60 Hz ± 5 Hz				
Circuit breaker capacity	1.2 A				
Vacuum	-67 kPa to -80 kPa				
Vacuum connection tube	1/4-inch soft polyurethane tube with insert pipe joint				
Vacuum discharge	20 Liter/min. or more (including the vacuum supply for the stage)				
<b>11. Operating Environment</b>					
Place of use	Indoor use (in a clean room)				
Altitude	2000 m or lower				
Temperature	19 to 25°C (Storage and transport temperature: 5 to 40°C)				
Humidity	40 to 80% (Storage and transport humidity: 40 to 80%)				
Pollution degree	2 (IEC60664)				



Item	AL120-L86	AL120-L86-180	AL120-LMB86	AL120-LMB86-180	AL120-LMB8-90
Installation category (Overvoltage category)	(IEC60664)				
<b>12. Required Dimensions and Weight of the Entire System (Wafer loader main unit + Microscope + Microscope fixing tray + Stage)</b>					
MX61: MX61-F, MX-SWETTR, SWH10X, U-D5BDREMC, OB(BD), U-LH100-3, MX-BSH-ESD					
Footprint	1100 (W) × 620 (D) mm				
Width	1326 (W) mm				
System weight	Approx. 88.9 kg		Approx. 92.4 kg		

Note:

SEMI M1-1105

Class 1.8: 150 mm mirror-polished single-crystal silicon wafer (with secondary flat)

Class 1.13: 150 mm mirror-polished single-crystal silicon wafer

Class 1.8 = Primary flat length  $57.5 \pm 2.5$  mm and Secondary flat length  $37.5 \pm 2.5$  mm

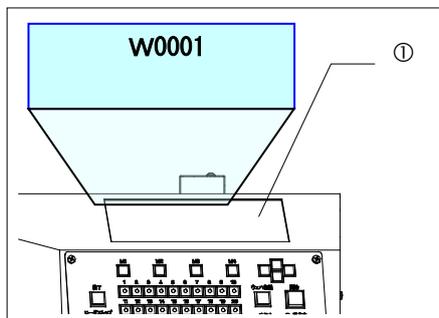
Class 1.13 = Primary flat length  $47.5 \pm 2.5$  mm



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# 5 Problems during Use and Solutions

## 5-1 When Warning Codes Are Displayed



While not a malfunction, if the loader determines that there is the possibility that normal wafer loading operations will be hindered, it issues a warning code on the liquid crystal panel ①, and halts operations.

In this event, take appropriate countermeasures listed below in **the Warning Codes** before pressing the [Start] button again. The loader will return to normal operation if the problem has been solved correctly.

### Warning Codes

Warning Code No.	Causes and Solutions	
W0001	Cause	<ul style="list-style-type: none"> <li>The cassette has not been set in the correct position.</li> </ul>
	Solution	<ul style="list-style-type: none"> <li>Reset the cassette in the correct position and press the [Start] button.</li> </ul>
W0002	Cause	<ul style="list-style-type: none"> <li>The stage has not been set in the correct position.</li> <li>The vacuum stage is not set after the inspection time has elapsed.</li> </ul>
	Solution	<ul style="list-style-type: none"> <li>Reset the stage properly to the wafer transfer position.</li> <li>[Note] Do not move the stage until the A-arm completes its up-and-down movement. Make sure that the stage operation permission LED is lit before moving the stage.</li> </ul>
W0003	Cause	<ul style="list-style-type: none"> <li>A foreign object (wafer) has been detected on the A1-arm.</li> <li>The wafer is detected as a foreign object due to vacuum pressure being too high.</li> </ul>
	Solution	<ul style="list-style-type: none"> <li>Remove the wafer or set the vacuum pressure within the specifications, and then press the [Start] button.</li> <li>[Note] To unload the wafer automatically, refer to 5-6 Automatic Unloading.</li> </ul>
W0004	Cause	<ul style="list-style-type: none"> <li>A foreign object (wafer) has been detected on the A2-arm.</li> <li>The wafer is detected as a foreign object due to vacuum pressure being too high.</li> </ul>
	Solution	<ul style="list-style-type: none"> <li>Remove the wafer or set the vacuum pressure within the specifications, and then press the [Start] button.</li> <li>[Note] To unload the wafer automatically, refer to 5-6 Automatic Unloading.</li> </ul>
W0005	Cause	<ul style="list-style-type: none"> <li>A foreign object (wafer) has been detected on the center (macro) table.</li> <li>The wafer is detected as a foreign object due to vacuum pressure being too high.</li> </ul>
	Solution	<ul style="list-style-type: none"> <li>Remove the wafer or set the vacuum pressure within the specifications, and then press the [Start] button.</li> <li>[Note] To unload the wafer automatically, refer to 5-6 Automatic Unloading.</li> </ul>
W0006	Cause	<ul style="list-style-type: none"> <li>A wafer has been left in the Back Macro inspection position during initialization.</li> <li>The wafer is detected as a foreign object due to vacuum pressure being too high.</li> </ul>



Warning Code No.	Causes and Solutions	
	Solution	<ul style="list-style-type: none"> <li>Remove the wafer or set the vacuum pressure within the specifications, and then press the [Start] button.</li> <li>[Note] To unload the wafer automatically, refer to 5-6 Automatic Unloading.</li> </ul>
W0007	Cause	<ul style="list-style-type: none"> <li>A wafer has been left on the stage table during initialization.</li> <li>The wafer is detected as a foreign object due to vacuum pressure being too high.</li> </ul>
	Solution	<ul style="list-style-type: none"> <li>Remove the wafer or set the vacuum pressure within the specifications, and then press the [Start] button.</li> <li>[Note] To unload the wafer automatically, refer to 5-6 Automatic Unloading.</li> </ul>
W0008	Cause	<ul style="list-style-type: none"> <li>A wafer protrudes from a cassette.</li> </ul>
	Solution	<ul style="list-style-type: none"> <li>Insert the wafer fully into the cassette and press the [Start] button.</li> </ul>
W0009	Cause	<ul style="list-style-type: none"> <li>The specified slot already contains wafers.</li> </ul>
	Solution	<ul style="list-style-type: none"> <li>Remove the wafers and press the [Start] button, or specify another slot to unload wafers.</li> </ul>
W0010	Cause	<ul style="list-style-type: none"> <li>The size of the specified wafer and the wafer to be transferred do not match.</li> </ul>
	Solution	<ul style="list-style-type: none"> <li>Remove the wafers and press the [Start] button, or specify another slot to unload wafers.</li> </ul>
W0011	Cause	<ul style="list-style-type: none"> <li>A wafer is improperly inserted into a slot inside a cassette; it is inserted diagonally.</li> </ul>
	Solution	<ul style="list-style-type: none"> <li>Insert the wafer by taking care that both edges of the wafer are in the same slot, and press the [Start] button.</li> </ul>
W0012	Cause	<ul style="list-style-type: none"> <li>The thickness of a wafer is different from the standard thickness value.</li> </ul>
	Solution	<ul style="list-style-type: none"> <li>Check to see if two wafers are inserted into the same slot or if the type of the wafer to be inspected is different from the selected wafer type. If two wafers are in the same slot, remove one and press the [Start] button. If the selected wafer type is wrong, press the [Exit] button and redo the wafer type selection process.</li> </ul>



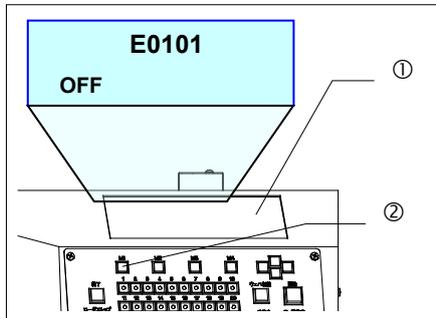
**If the loader is used at a low pressure (-53 KPa or lower) and with sudden changes in the vacuum pressure, the loader may be unable to detect any wafers remaining in the transfer path and may cause damage to the wafer(s).**

**If automatic unloading is performed in this state, the loader can not detect any remaining wafers and may cause damage to them. Remove the wafer using tweezers or similar tools and ensure that the cause is dealt with.**

**Automatic unloading may be unable to work. In this case, remove the wafer using tweezers or similar tools and check the vacuum pressure before discharging again.**

**Ensure proper vacuum pressure and discharge when using the loader.**

**5-2 When Error Codes Are Displayed**



When an error occurs, the loader detects the error and stops all operations. At the same time, a blinking error code appears on the liquid crystal panel ① and a buzzer sounds.

Press the [M1] menu button ② to silence the buzzer.

When there are no wafers in the transfer path, turn the main switch OFF and then turn it back to ON.

When there are wafers in the transfer path, turn the main switch OFF, remove the wafer(s) using tweezers or similar tools, and ensure that the cause is dealt with.



**When an adsorption error has occurred, the loader may be unable to hold wafers securely. Take care not to perform automatic unloading without dealing with the cause. Wafers may be damaged.**

If any similar errors occur during operation, please contact the EVIDENT distributor for your loader.

Please give the distributor the following information:

Product name:  
 Serial No.:  
 Error code:  
 Phenomenon:



**Error Codes**

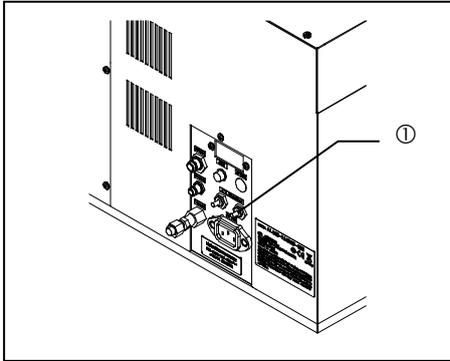
Error No.	Error details	Remarks
<b>A Vertical movement errors</b>		
E0101	A Vertical No sensor detection after movement to the upper point	U204
E0102	A Vertical No sensor detection after movement to the middle point	U205
E0103	A Vertical No sensor detection after movement to the lower point	U206
E0105	A Vertical Two or more sensors ON	U204,U205,U206
E0106	A Vertical Not in place at the start of operation	
E0107	A Vertical Movement set to an impossible position	
E0108	A Vertical No initialization within the specified time	U206
E0111	A Vertical Not in a position where it can be initialized	
E0112	A Vertical Driver origin signal cannot be detected	
E0113	A Vertical Overheating of motor driver	
<b>A Horizontal movement errors</b>		
E0201	A Linear No sensor detection after movement to the macro position	U203
E0202	A Linear No sensor detection after movement to the position before the cassette	U202
E0203	A Linear No sensor detection after movement to the cassette position	U201
E0205	A Linear Two or more sensors ON	U201,U202,U203
E0206	A Linear Not in place at the start of operation	
E0207	A Linear Movement set to an impossible position	
E0208	A Linear No initialization within the specified time	U203
E0211	A Linear Not in a position where it can be initialized	
E0212	A Linear Driver origin signal cannot be detected	
E0213	A Linear Overheating of motor driver	
<b>A Rotary movement errors</b>		
E0301	A Rotation No sensor detection after movement to the home position	U207
E0302	A Rotation No sensor detection after movement to Side 1	U208
E0303	A Rotation No sensor detection after movement to Side 2	U209
E0305	A Rotation Two or more sensors ON	U207,U208,U209
E0306	A Rotation Not in place at the start of operation	
E0307	A Rotation Movement set to an impossible position	
E0308	A Rotation No initialization within the specified time	U207
E0309	A Rotation Arm tilt sensor cannot be detected	U303
E0310	A Rotation Arm tilt sensor cannot be detected	U304
E0311	A Rotation Not in a position where it can be initialized	
E0312	A Rotation Driver origin signal cannot be detected	

Error No.	Error details	Remarks
E0313	A Rotation Overheating of motor driver	
A Suction error		
E0314	A1 No detection of the vacuum ON status within the specified time	U007
E0315	A1 No detection of the vacuum OFF status within the specified time	U007
E0316	A2 No detection of the vacuum ON status within the specified time	U008
E0317	A2 No detection of the vacuum OFF status within the specified time	U008
Orientation flat detection error		
E0401	M No orientation flat detection within the specified time	U013,U014,U021
E0402	M Overheating of the motor driver	
Back Macro rotary movement errors (for the LMB model only)		
E0501	L Rotation No sensor detection after movement to the home position	U401
E0502	L Rotation No status change of the home position sensor within the specified time	U401
E0503	L Rotation Not in place at the start of operation	U401
E0507	L Rotation Movement set to an impossible position	
E0508	L Rotation No initialization within the specified time	U401
E0511	L Rotation Not in a position where it can be initialized	
E0513	L Rotation Overheating of the motor driver	
Elevator movement errors		
E0601	E No sensor detection after movement to the upper limit	U101
E0606	E Not in place at the start of operation	
E0607	E Movement set to an impossible position	
E0608	E No initialization within the specified time	
E0609	E Motor step-out was detected during vertical movement.	U102、U103
E0610	E The wafer designated to be inspected does not match the wafer detection mapping.	
E0612	E The driver origin signal cannot be detected.	
E0613	E Overheating of the motor driver	
Top Macro vertical movement errors (for the LMB model only)		
E0701	M Vertical No detection of the upper limit sensor within the specified time	U301
E0702	M Vertical No detection of the lower limit sensor within the specified time	U302
E0705	M Vertical Two or more sensors ON	
E0706	M Vertical Not in place at the start of operation	
E0707	M Vertical Movement set to an impossible position	
E0708	M Vertical No initialization within the specified time	M302
E0709	M Vertical No detection of the vacuum ON status within the specified time	U009
E0710	M Vertical No detection of the vacuum OFF status within the specified time	U009



Error No.	Error details	Remarks
<b>Back Macro vertical movement errors (for LMB model only)</b>		
E0801	L Vertical No detection of the upper limit sensor within the specified time	U402
E0802	L Vertical No detection of the transfer sensor within the specified time	U403
E0803	L Vertical No detection of the lower limit sensor within the specified time	U404
E0805	L Vertical Two or more sensors ON or under point sensor ON Middle point sensor OFF	U402,U403,U404
E0806	L Vertical Not in place at the start of operation	
E0807	L Vertical Movement set to an impossible position	
E0808	L Vertical No initialization within the specified time	U402
E0809	L Vertical No detection of the vacuum ON status within the specified time	U011
E0810	L Vertical No detection of the vacuum OFF status within the specified time	U011
E0811	L Vertical Not in a position where it can be initialized	
<b>Vacuum stage error</b>		
E0909	Stage No detection of the vacuum ON status within the specified time	U010
E0910	Stage No detection of the vacuum OFF status within the specified time	U010
<b>Contact centering unit error (only for the wafer loader with AL120-CC)</b>		
E1101	Close position sensor cannot be detected within the specified time	
E1102	Open position sensor cannot be detected within the specified time	
E1103	Type sensor error	
E1105	Two or more sensors are ON	
E1106	Not at a specified position when the unit starts to operate	
E1107	Specified movement is out of the range of movement	
E1108	Initialization not completed within the specified time	
<b>Other errors</b>		
E1001	No wafers detected by the centering sensor	
E1002	Wafer shift exceeding the centering range	
E1003	No stage sensor detection during the A-arm vertical movement	
E1004	Abnormal operation detected by the CPU	
E1005	Wafer in an impossible position when the power is turned on	
E1006	During the centering operation at unloading, the amount of wafer displacement is beyond the range of centering	
E1007	"Loader stop" has been pressed	
E1008	Invalid slot number (CPU malfunctions when performing the mapping operation)	
E1009	A drop in the vacuum supply pressure (main pressure) was detected	

### 5-3 How to Reset the Circuit Breaker



- 1) Turn the main switch OFF, disconnect the power cord on the back side of the loader, and press the reset button ① (protruding part) of the circuit breaker that has tripped.
- 2) After the circuit breaker switch returns to the normal position, connect the power cord to **AC Line** again.
- 3) Turn the main switch ON and check that the loader operates normally.



**When the circuit breaker has tripped, disconnect the power cord immediately and remove the cause.**

### 5-4 After use of Loader Stop

When the Loader Stop switch is pressed, the loader stops operations immediately.

Turn the main switch OFF, disconnect the power cord on the back side of the Loader, remove the cause of the loader stop, and then turn the main switch back ON.

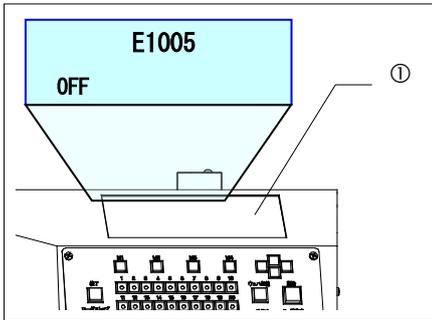
If any wafers remain in the loader, check the transfer safety. If there are no problems with transfer, refer to **5-6 Automatic Unloading**.

### 5-5 Power Failure

Wafers on transfer arms remain held by the vacuum when the power supply is cut in events such as blackouts. If there are no wafers in the transfer path of the loader, turn the main switch OFF then turn it back ON.

If there are any wafers in the transfer path, turn the main switch OFF and refer to **5-6 Automatic Unloading**.

## 5-6 Automatic Unloading



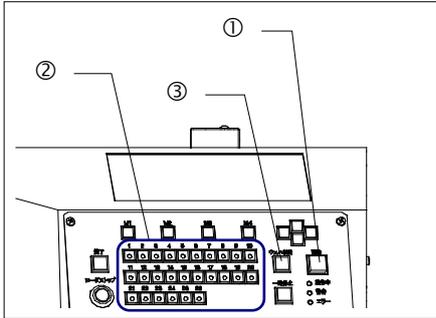
When the power is cut off with a wafer left in the transfer path in events such as an emergency halt, power failure, or occurrence of error, the wafer left in the transfer path can be unloaded automatically into the cassette following the procedure given below (5-6 1 to 4) or can be removed using tweezers.

If the wafer loader judges that wafers cannot be automatically unloaded, error No. E1005 (the position of the wafer is out of the allowable range) or No. 0111,0211,0311,0511 (the wafer is at a position where initialization is impossible) is displayed on the liquid crystal panel ①.

In this case, turn the main switch OFF and unload the wafer into the cassette using tweezers or similar tools

- When using the automatic unloading procedure after a warning or error has occurred, remove the cause of the warning or error before attempting automatic unloading. If automatic unloading is done before the cause is removed, it may cause damage to the wafers. If the cause is unknown, unload the wafers into the cassette using tweezers or similar tools, and then turn on the loader.
- Make sure that there are no wafers in the specified slot before using the automatic unloading procedure.
- Your loader may have been set to skip initialization when the power is turned on. Press the [Start] button to initialize the loader, and then follow the automatic unloading procedure.

## 1 During the Top Macro Inspection



When the loader has stopped with a wafer held on the macro table, the vacuum remains on. Unload the wafer according to the following procedure.

1. If the main switch is turned ON, the loader will not operate but will indicate the warning code [W0005], still holding the wafer.
2. **Removing the wafer using tweezers:**  
Press the [Start] button ① and the macro table lowers and becomes horizontal, and the vacuum turns off. Remove the wafer using tweezers or similar tools.
3. **Unloading the wafer automatically:**  
Using the Wafer No. selector buttons, specify the number of the cassette slot to unload the wafer.
4. The LED in the specified Wafer No. selector button lights up.
5. Press the [Unload] button ③.
6. After wafer mapping is completed, the wafer is automatically unloaded into the specified slot.

## 2 During the Back Macro Inspection

When the loader has stopped with a wafer held on the L-arm, the vacuum remains on. Unload the wafer according to the following procedure.

1. If the main switch is turned ON, the loader will not operate but will indicate the warning code [W0006], still holding the wafer.
2. **Removing the wafer using tweezers:**  
Press the [Start] button ①, and the wafer is transferred to the macro table and the vacuum turns off. Remove the wafer using tweezers or similar tools.
3. **Unloading the wafer automatically:**  
Using the Wafer No. selector buttons, specify the number of the cassette slot to unload the wafer.
4. The LED in the specified Wafer No. selector button lights up.
5. Press the [Unload] button.
6. After wafer mapping is completed, the wafer is automatically unloaded into the specified slot.

### 3 When a Wafer is on the A-arm

---

When the loader has stopped with wafers held on the A-arm, the vacuum remains on. Unload the wafer according to the following procedure.

When two wafers are held on the A-arm, unload the wafer on the macro table first.

1. If the main switch is turned ON, the loader will not operate but will indicate the warning code [W0003] or [W0004], releasing the wafers. The wafer is not held by vacuum at this time.
2. **Removing the wafer using tweezers:**  
Press the [Start] button and remove a wafer from A-arm using tweezers.
3. **Unloading the wafer automatically:**  
Using the Wafer No. selector buttons, specify the number of the cassette slot to unload the wafer.
4. The LED in the specified Wafer No. selector button lights up.
5. Press the [Unload] button.
6. After wafer mapping is completed, the wafer is automatically unloaded into the specified slot.
7. Repeat the procedure from step 2 to unload the remaining wafer. Mapping has already been executed at this time. You can specify only a vacant slot (with the LED lit in the Wafer No. selector button).

### 4 When a Wafer is on the Vacuum Stage

---

When the loader has stopped with a wafer held on the vacuum stage, the vacuum remains on. Unload the wafer according to the following procedure.

1. Set the vacuum stage to the transfer position.
2. If the main switch is turned ON, the loader will not operate but will indicate the warning code [W0007], releasing the wafer.
3. **Removing the wafer using tweezers:**  
Press the [Start] button and remove the wafer from the stage using tweezers.
4. **Unloading the wafer automatically:**  
Using the Wafer No. selector buttons, specify the number of the cassette slot to unload the wafer.



5. The LED in the specified Wafer No. selector button lights up.
6. Press the [Unload] button.
7. After wafer mapping is completed, the wafer is automatically unloaded into the specified slot.

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