

## How To Use The Stage

### About the use environment of the stage.

Use environment : 10~50°C, 20~70%RH(non-dew condensation)

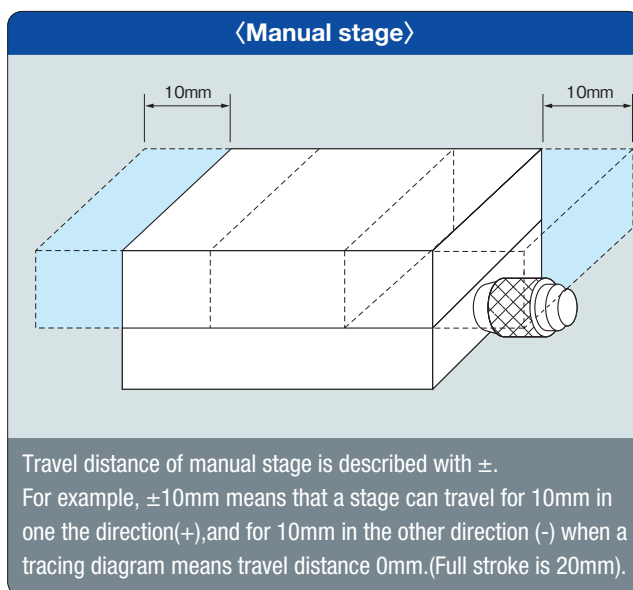
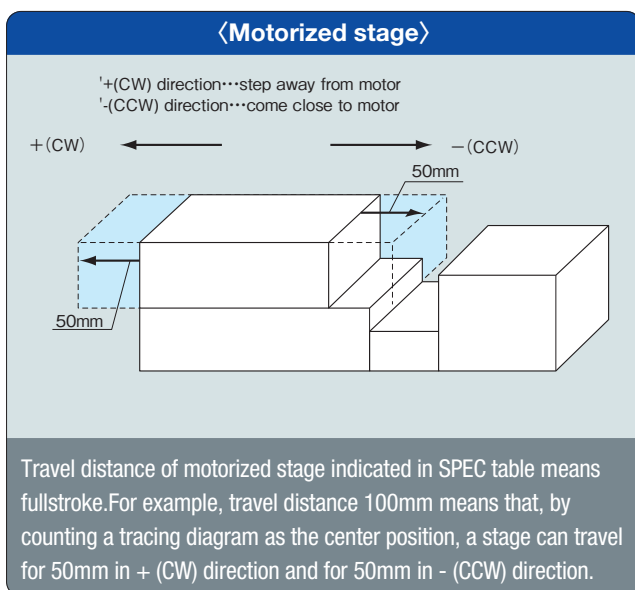
Recommendation use environment: 22±5°C, 20~70%RH(non-dew condensation)

Temperature will be change due to species of the stage, motion, performance conditions.

\*Don't use in following place.

- Under dust
- Around the fire
- Around the water or oil
- No salt and organic solvent
- No direct sunlight and radiation heat
- No corrosive gases and flammable gases
- No vibration

### Travel distance



### Supplied screws

- Our standard hexagon socket setscrews for assembly are attached.

### Screw tightening torque

Tightening torque reference list

Screw to be used are selected in accordance with SUS cap bolt.

Structure		
nominal diameter	kgf • cm	cN • m
M1.6	1.5	15
2	3.1	30
2.5 (2.6)	6.1	60
3	10.2	100
4	23.5	230
5	46.9	460
6	81.6	800

### Handling of the sensor board

Our sensor boards operate at 5 to 24 VDC, except for some models, if voltage or current exceeding the operating range is applied, or if there is incorrect wiring, risk of component burnout increases.

Please note the following when using.

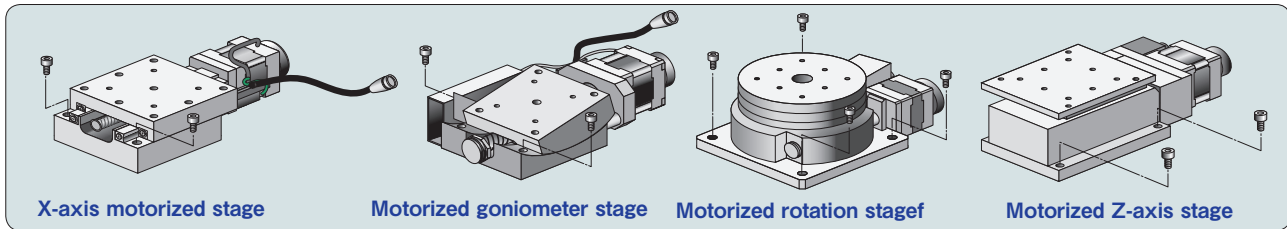
- Do not use the voltage and current exceeding the catalog description.
- Please be careful of miswiring, such as the wrong polarity of the voltage and connecting the power supply to the signal line.

In addition, when using the product as an embedded device, switching noise or surge voltage (electrostatic discharge, switching surge, etc.) may occur depending on the device configuration, which may cause the sensor to malfunction or burn out. If noise is expected, take measures recommended for general industrial equipment before use.

## How To Mount The Stage

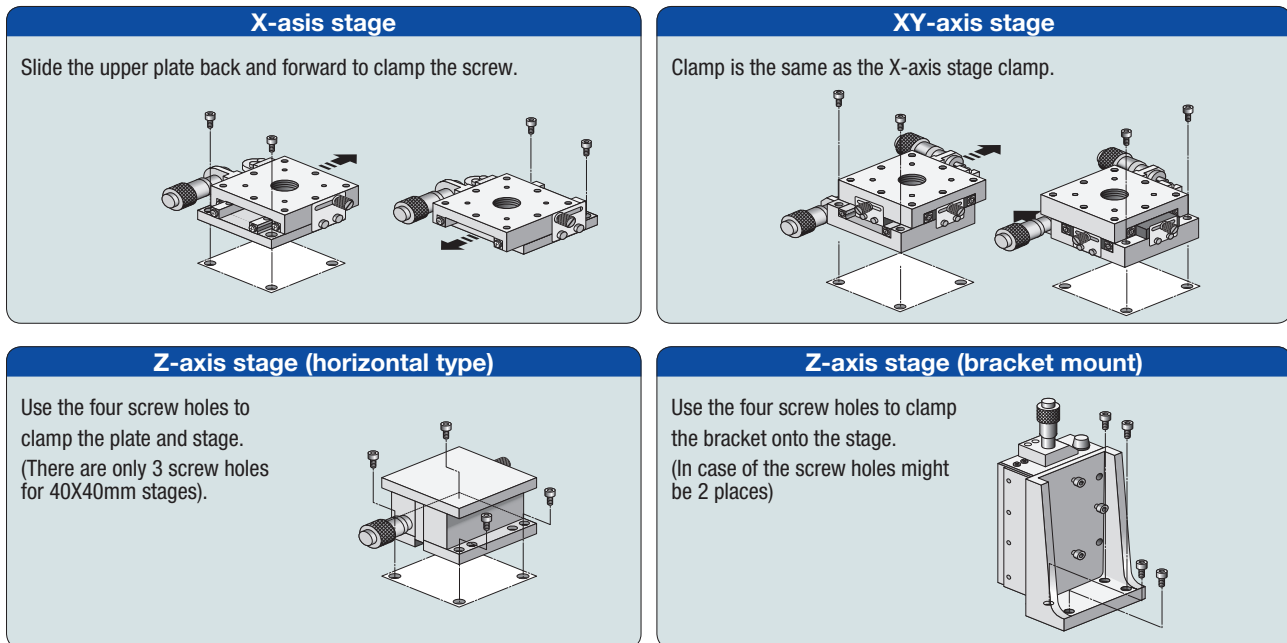
### ■ Mounting motorized stage

There is a stage that is moved its stage table depending on a model. Turn a motor knob to slide a surface.



### ■ Mounting manual stage

There is a stage that is moved its stage table depending on a model.

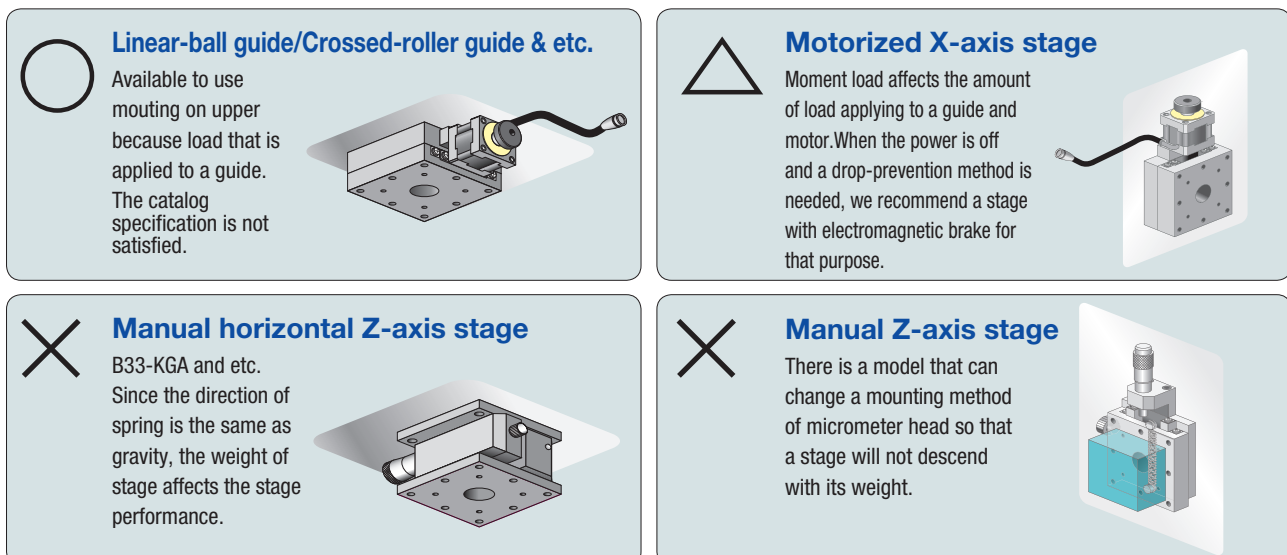


### ■ About the object that is mounted upper or lower the stage

When a stage is mounted on uneven or an object that is uneven, the stage table may deformed, and may also affected the accuracy.

### ■ Mounting surface & direction

The function is not satisfied due to a stage model and mouting direction. Please refer as belows for upper and side mounting.



## Grease for stages

Optimum grease is applied for all of our products for smooth operation.

Below list shows the standard grease.

Grease for vaccum is available depending on the model.

● GreaseChange P.027~

### Grease list

		Universal grease	Clean grease	Optical grease	For screw driving	For feeding screw	Molybdenum grease	Damper grease
	Viscosity increasing agent	Lithium soap	Lithium soap	Lithium soap	Lithium soap	Urea group	Li/Ca mixed	Lithium soap
	Base oil	Mineral oil	Synthetic fluid	Synthetic fluid	Mineral oil	—	Mineral oil	Synthetic fluid
	Features	For precision apparatus	Low-viscous resistance value Low-dusting Fretting resistance	Special grease for optical Prevent oozing	For precision apparatus High lubrication property Low torque	Mitsutoyo standard Superior in wear resistance Oxidation stability	Molybdenum dioxide additive High extreme pressure	Long term lubrication Prevent oozing
Linear guide	Cross roller guide	●						
	Linear ball guide(manual)		●					
	CAVE-X(motorized)		●					
	Linear ball guide(motorized)	●						
Slide guide	Slide guide	●	●					
	Dovetail groove			●				
Bearing	Slideways			●				
	Deep-groove bearing	●						
	Angular contact ball bearing	●						
	Cross roller bearing(sealed)*							
Driving part	Micrometer head					●		
	Feeding screw					●		
	Precision feeding screw							●
	Ball screw	●	●		●			
Contact part	Worm gear						●	
	Fulcrum part of a lever	●						
	Center bearing							
	Top of the micrometer head							
Screw part	Top of the feeding screw					●		
	Clamp knob							●

\*Cross roller bearing that is sealed is free from mentainance.

### Maintenance

#### ●Frequency of maintenance

No specific regularly independent of grease type.

Please check grease condition at lease per month, and apply as needed.

#### ●How to grease up

- 1.Wipe off old grease the area within view.
- 2.Apply grease to the guide ・ ball screw with syringes.
- 3.To move full stroke for two or more times .
- 4.Wipe away excess grease.

## Stage Dust Emergence Test

Considering clean room-use, we have implemented a dust emergence test with stepping motor controller, which composes of Suruga Seiki's automatic alignment system.

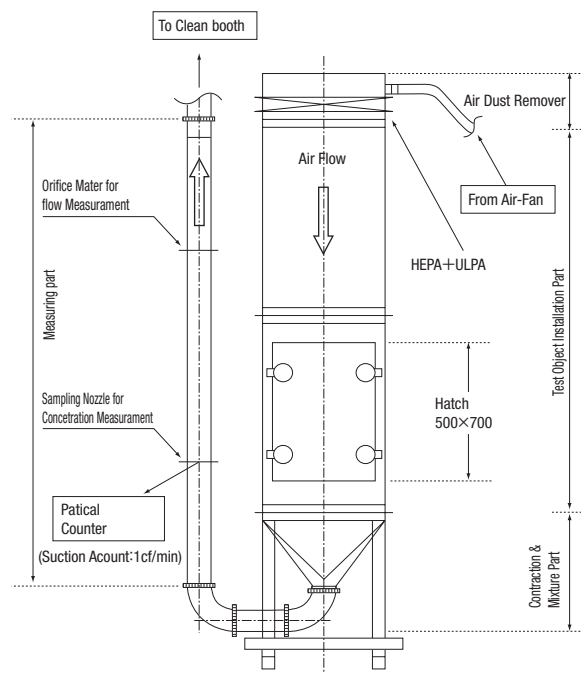
\*Judging the applicability to clean room-use may vary depending on entire equipment configuration, frequency of use and operating condition.

This data can be used as reference value for purpose of product selection.

With this test, Suruga Seiki's standard grease was applied.

We can change a grease to clean room-use grease (AFF grease manufactured by THK).

1. Test Type: Test for Dust Emergence Amount
2. Ambient Condition: Temperature (24~28°C), Humidity (48~54%)
3. Location of Test: Japan Air Cleansing Association Lab 5-27-1, Inari, Kusaka-city, Saitama
4. Test Object: Description <6-axis motorized stage ES6200>  
Dimension (H×W×D) 450×300×250
5. Test Subject: Amount of Particle Dust
6. Test Method: JIS B 9926 Clean room-Measuring method for dust amount generated from motion mechanism of application instrument  
Test Equipment:  
Vertical type test equipment for dust amount (figure 1)  
Light scattering particle measuring instrument:  
metOne205
7. Motion Terms: Details of one cycle (3 minutes)
  - I. Origin return process of each of 6-axis
  - II. Each of 6-axis travels from mechanical origin to initial position
  - III. Excute virtual contact sensing  
Repeat the following process five times.  
(Travel  $\theta_x$  to left 0.4° and to right by 0.2°, travel  $\theta_y$  to left 0.2° and to right by 0.2°, forward Z by 5 $\mu$ m )
  - IV. Execute virtual peak search  
Repeat the following process five times.  
(Travel X by 10 $\mu$ m, travel Y by 10 $\mu$ m, travel X by -10 $\mu$ m, travel Y by -10 $\mu$ m)
8. Result of Test: Test Object: 6-axis motorized stage  
Test Airflow (Q): 1.0[m<sup>3</sup>/min]



Range of Particle Diameter [ $\mu$ m]	Concentration of Particles in Background [pcs/m <sup>3</sup> ] (Cb) (95% two-sided confidence limit)	Average Concentration of Particles when electricity is on [pcs/m <sup>3</sup> ] (C) (95% two-sided confidence limit)	Average Amount of Particle Emergence $P=(C-C_b)Q$ [pcs/min] (P)
0.16 and higher, less than 0.3	8.8(6.0~12.6)	13.0(8.1~19.6)	Since the zone of 95% two-sided confidence limit at the time when electricity is on is overlapping with background (when it's stopped) and does not separate from it, it indicates that there was no significant dust emergence that can be differentiated from background.
0.3—0.5	2.4(1.0~4.6)	2.9(1.0~6.9)	
0.5—1.0	0.0(0.0~1.1)	2.9(1.0~6.9)	
1.0—5.0	0.0(0.0~1.1)	4.1(1.7~8.5)	4.1
5.0—10.0	0.0(0.0~1.1)	0.6(0.0~3.3)	Since the zone of 95% two-sided confidence limit at the time when electricity is on is overlapping with background (when it's stopped) and does not separate from it, it indicates that there was no significant dust emergence that can be differentiated from background.
10.0 and higher	0.0(0.0~1.1)	0.0(0.0~2.2)	

## Grease Change

Grease used for a positioning stage can be exchanged with grease applicable for a clean room and vacuum use.

### 〈Motorized Stage〉

Ordering with using option code may customize grease-changed for only SS manual Stage.

You may receive a product of which grease is changed

#### [Number of model and handling fee]

Model number ending code	-J	-K	-L
Name	Grease for Clean room	Grease for Clean room	Grease for vacuum
Model number	AFF	LG2	FOMBLIN
Maker	THK	NSK	Solvay Specialty Polymers Japan K.K.
Range or usable temperature	-40~120°C	-20~70°C	-20~250°C

\*KXT/CAVE-X(linear ball guide) series, KXS(slide guide) series apply Clean environment grease(AFF) in standard.

#### ■ Not-eligible products

- Motorized gonio stage, motorized rotation stage and horizontal Z-axis stage is not available changing.

#### [Grease Change Spot]

- Guiding surface (surface-sliding part, rubbing part, bearing part)
- Motion transmission direction converting spot (ball screw, worm and gearwheel part)

\*Ball screw, guide and bearing are processed with coating after cleansing in plant.

Separate quote may be prepared for cleansing, coating and surface treatment processes operated by manufacturers.

\*Grease change of stepping motor is not available.

#### [Accuracy Guarantee (Grease for Clean room)]

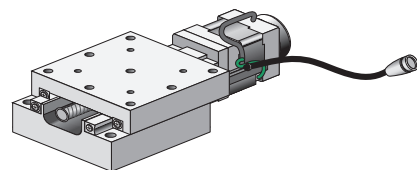
Since viscous resistance of grease increases, it becomes difficult for this grease to fulfill the same specification of standard grease type described on catalog. Furthermore, it tends to have bad tracking of micro-step feeding.

Having done accuracy measurement of all products that have changed grease, the following is the accuracy guarantee.

<Linear motion type> Halt performance data is 1.5 times of standard grease type described catalog

<Rotary motion type> Halt performance data is 2.0 times of standard grease type described catalog

Linear ball guide PG615	Catalog Product (Standard Product)	Grease-changed Product(Custom)
Positioning Accuracy	Within 5μm	Within 7.5μm
Repeatability	Within ±0.3μm	Within ±0.45μm
Lost Motion	Within 1μm	Within 1.5μm



#### [Accuracy Guarantee [Grease for vacuum]]

Shipping accuracy may vary due to viscous resistance of grease and etc. Also, it becomes difficult to maintain the MAX speed described in catalog. Please contact us for details.

## 〈Manual stage〉

Ordering with using option code may customize grease-changed for only SS manual stage.

You may receive a product of which grease is changed by ordering with a model number ending with -CRG1, 2 or 3."

### [Model number ending code]

Model number ending code	-J	-L
Name	Grease for Clean room	Grease for vacuum
Model number	AFF	FOMBLIN
Maker	THK	Solvay Specialty Polymers Japan K.K.
Range or usable temperature	-40~120°C	-20~250°C

### ■ Not-eligible products

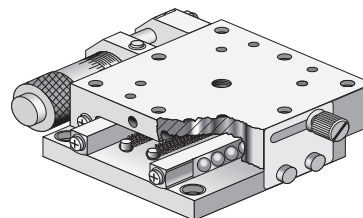
- Available only SS stage (BSS/BSB/BSL series)

### [Grease Change Spot]

Guiding surface (surface-sliding part, guide part)

Motion transmission direction converting spot (Micrometer head, Feeding screw, Leverage axis, Pin top)

\*Micrometer head is processed with coating after cleansing in plant.



### [Accuracy Guarantee (Grease for vacuum)]

Shipping accuracy may vary due to viscous resistance of grease and etc.

Please contact us for details.