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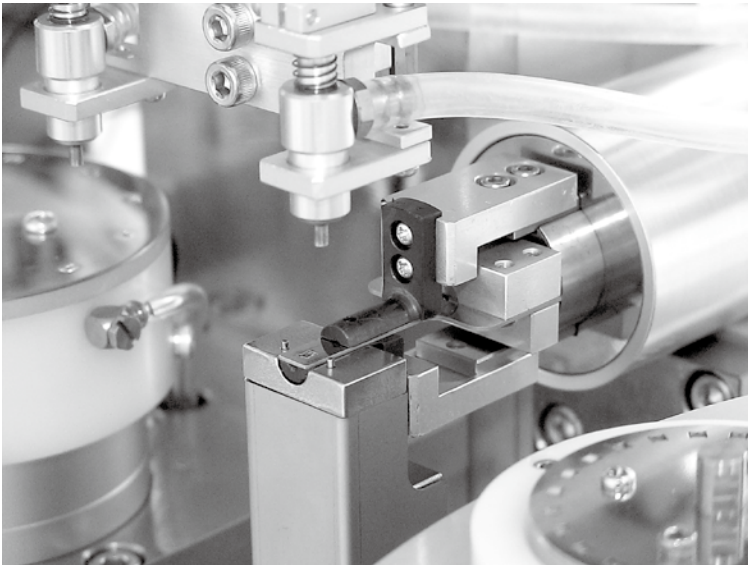
(Turn over unit)

Using our turn over unit enables simple and high-speed turn over, which was not possible before.

One drive type

This product was developed for the purpose of performing simple turn over with easy control.

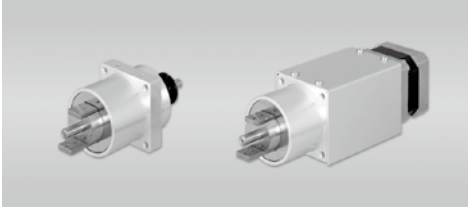
Mechanism to perform necessary operation for flipping with one motor. Easy-to-use turn over unit.



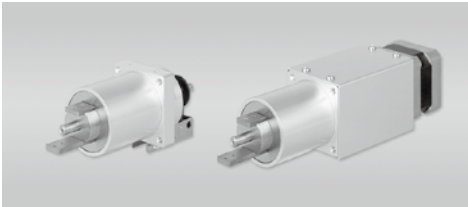
While handling automatic equipment for small to minute parts, our MEG has been nurturing the technology that allows highly accurate stable operation even with high speed based on cam technology over a long period of time and, at the same time, accumulating the know-how to handle minute parts. Among them, further miniaturization and increasing range of functions of microscopic products are expected and we have been devoting ourselves in researching products that are ahead of the time.

Now, this is an era when MEMS technology win

attention and microscopic products with high performance and multiple functions are developed. Originally, minute parts were for implementation of only on the right face, the opportunity to use on the faces other than the right face increased. Along with this trend, necessity of inversion process at the production site becomes the important key. This product was developed with the theme "space-saving, high-speed and high safety turn over unit". Please utilize MEG turn over unit for the product for the next generation.



One drive type X6410



One drive type X6412



One drive type X6414, X6416

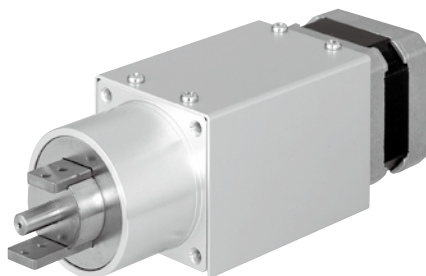
Turn over unit

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Turn over unit

Turn over of the part seems simple at a glance, however, it is complicated considering air actuator structure without stability even with low speed, and requires a large space. MEG turn over unit has the original method that enables accurate flipping even with high speed. This product can be actively used for various purposes including manufacturing, inspection, and packaging.

	Slider stroke (mm)			
	8	16	32	48
With motor, with sensor	x	x		
With motor, without sensor	x	x		
Without motor, with sensor	x	x	x	x
Without motor, without sensor	x	x	x	x



One drive

High-speed and safe flipping

Based on the cam mechanism with high position repeatability accuracy and achieved stepping drive that enables frequent start-up and stop with excellent responsiveness.

Easy control (One drive)

Achieve turn over by only rotating one stepping motor 180°. Control is also simple. Easy-to-handle unit.

Long life

Slider is unlimited orbit type linear guide and light with no unreasonable force applied. Cam mechanism has a mechanism with actual performance over a long time and long life unit.

Energy-saving flipping

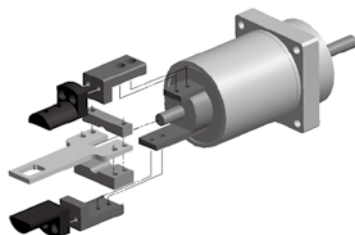
Although a large space was required for flipping, the flipping method by one point (supply and eject at the same position) is space-saving.

Achieve reasonable device

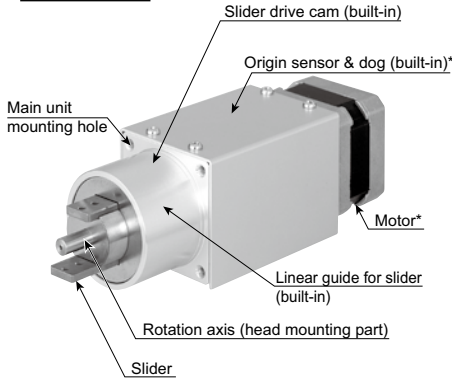
Compare to the existing flipping, which requires complicated process, flipping is enabled only by this unit and reasonable.

Example of application

Application CAD data of demonstration machine is downloadable from the website.



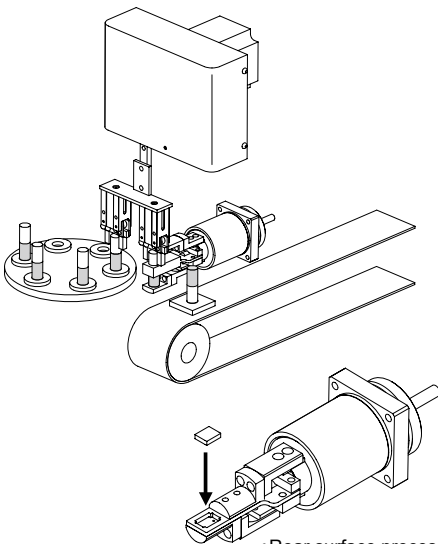
One drive



Note) * stands for option or is to be provided by customers.

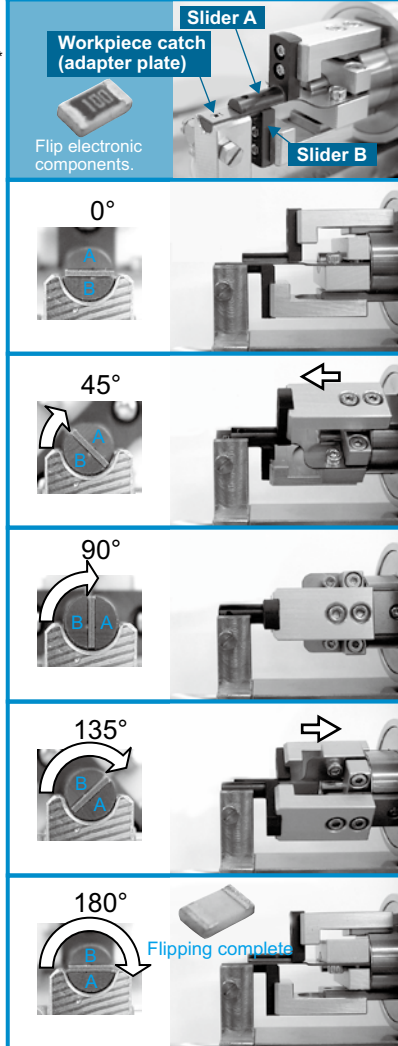
How to utilize

Flipping of workpiece at the interim process



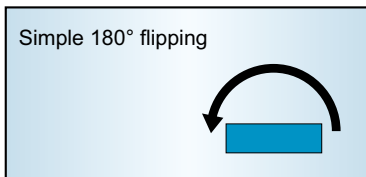
- Rear surface processing
- Rear surface printing
- Rear surface inspection
- Rear surface packaging

One drive type operation details



Model selection

Model list



Type	Model No.	Mechanism/features	Page
One drive	X641□	<p>X6410, X6412 X6414, X6416</p> <ul style="list-style-type: none"> • Turn over only by rotating the rotation axis 180°. • Drive motor, type without origin sensor • Abundant stroke variations 8, 16, 32, and 48 mm 	G-6

One drive	X641□-MS	<ul style="list-style-type: none"> • Reasonable unit equipped with a stepping motor to rotating shaft • High-speed flipping • With origin sensor • Abundant stroke variations 8, 16 mm 	G-6
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* There are combinations such as motor only and sensor only other than the above.

- For restriction of applications and safety precautions, see G-14.
- For precautions, see G-12.

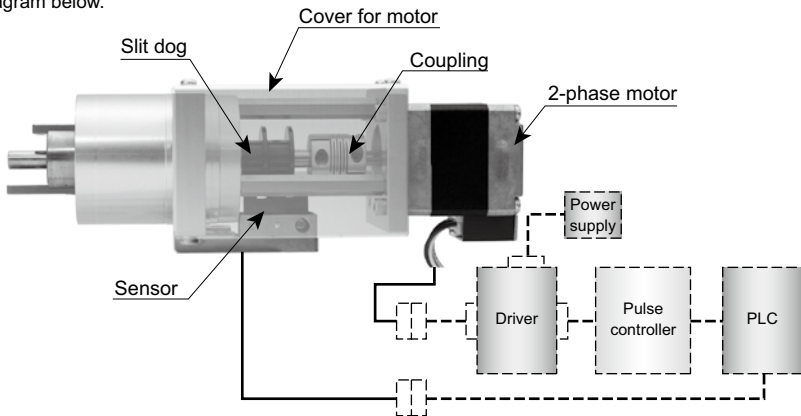
■ **Basic specifications**

Type	Model No.	Slider stroke (mm)	Cycle time (sec)	Stepping motor	Operation detection sensor	Page
One drive	X6410	8	At least 0.1			G-6
	X6410-M			×		
	X6410-S				×	
	X6410-MS			×	×	
	X6412	16	At least 0.2			G-6
	X6412-M			×		
	X6412-S				×	
	X6412-MS			×	×	
	X6414	32	At least 0.4			G-6
	X6414-S				×	
X6416	48	At least 0.4			G-6	
X6416-S				×		
Remarks			*1	*2	*2	

■ **Remark description**

*1 Flipping operation that rotates one rotation axis for 180°.

*2 X6410 and X6412 with motor and sensor are shown in the diagram below.



* - - - - - Provided by customer

X641□

PAT.PEND



X6410-S



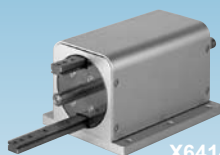
X6410-MS



X6412-S



X6412-MS



X6414 / X6416

- High speed flipping of workpieces by one point (supply and ejection position).
- Flipping of workpieces within the limited space, which contributes to downsizing of the device.
- Flipping operation with one motor. Achieve easy control.
- New 2-phase motor is available for the model with motor. Compared to the conventional 5-phase motor, reasonable system can be constructed with the equivalent capability.

■ Variations

Model No.	Motor for rotation	Rotation detection sensor	(mm) Slider stroke			
			8	16	32	48
X641□			x	x	x	x
X641□-M	x		x	x		
X641□-S		x	x	x	x	x
X641□-MS	x	x	x	x		

(× stands for "included" or "available")

Product number configuration

X6410 - M S O33A

Model No.
X6410: 8 mm stroke
X6412: 16 mm stroke
X6414: 32 mm stroke
X6416: 48mm stroke

No code: Without motor, sensor
M: With motor (Option)
S: With detection sensor (Option)

Motor code
O33A: PK233PA (2-phase)
(Only the model with motor)



Basic specifications

Model No.	X6410-□□	X6412-□□	X6414-□□	X6416-□□
Slider stroke	8 mm	16 mm	32 mm	48 mm
1 cycle time (Note 1)	At least 0.1 sec	At least 0.2 sec	At least 0.4 sec	At least 0.4 sec
Frequency of use (max)	180 cpm	150 cpm	120 cpm	120 cpm
Slider operation method	Groove cam method			
Cam curve	Modified sine			
Slider backlash (front and back direction)	Approx. 0.1 mm			
Operation detection (Note 2)	Two photomicrosensors incorporated (with slid dog)			
	SUNX PM-U24 (NPN Type)		OMRON EE-SX 673A (NPN Type)	
Head rotation range	Unlimited			
Drive motor (Note 3)	2-phase stepping motor (Oriental Motor)			
Motor model	PK233PA		(Note 4)	
Motor torque	0.16N•m (max. holding torque)			
Product mass	Single body 0.3 kg (MS 0.6 kg)		Single body 1.7 kg (S 1.8 kg)	
Working temperature	5 to 50°C			
Lubrication	Filling grease (Low particle emission) Non-lubrication use			

Note 1. Operation to make a half turn of the rotation axis

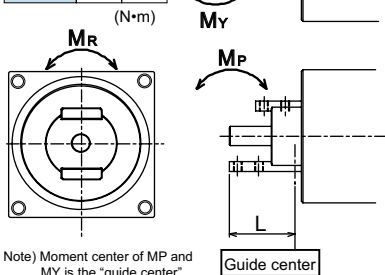
Note 2. Sensor is an option. Connector EE-1001 is attached to OMRON EE-SX673A.

Note 3. For the type with motor (option)

Note 4. Use the motor equivalent to 5-phase PK566 (motor torque 0.83N•m).

Static allowance moment of slider

Model No.	X6410	X6414
	X6412	X6416
MP	0.42	1
MY	0.1	1.2
MR	0.49	2



Note) Moment center of MP and MY is the "guide center" position.

Model No.	X6410	X6412	X6414	X6416
L	24	30	79	95

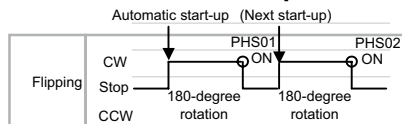
(mm)

Motor specifications (X6410, X6412 with motor)

Name	2-phase stepping motor
Manufacturer	Oriental Motor
Model	PK233PA (One side axis)
Basic step	1.8°
Max. holding torque	0.16 N•m
Rated current (A/phase)	1.2
Accessory	Connection cable (0.6m) LC2U06B

- The stepping motor driver is to be provided by the customer.
Driver: CMD2112P
Connection cable set: LCS01CMK2
- For details of the motor, see the catalog for the CMK Series available from Oriental Motor Co., Ltd.

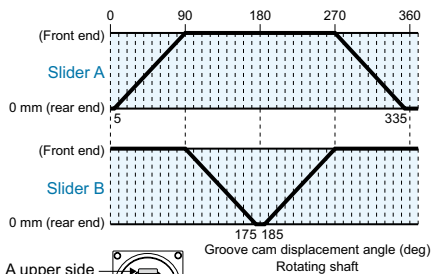
Control chart example



*PHS01: Origin one sensor PHS02: Origin two sensors

X641

Slider operation timing

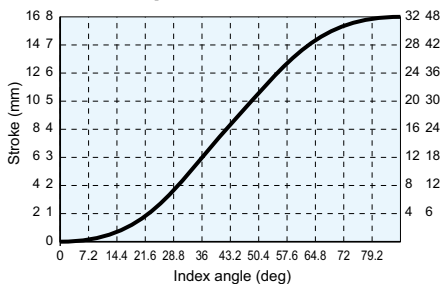


A upper side
B lower side



* 0° position is the state shown in the diagram on the left.

Slider operation stroke

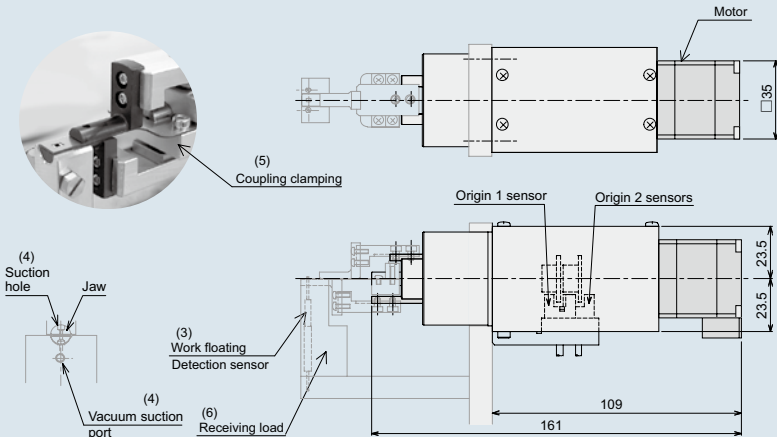


* For the actual rotation angle, add 5° (stationary angle) to the above index angle.
* Refer to G-7 to find the stroke of each model.

Example of use (with motor)

(mm)

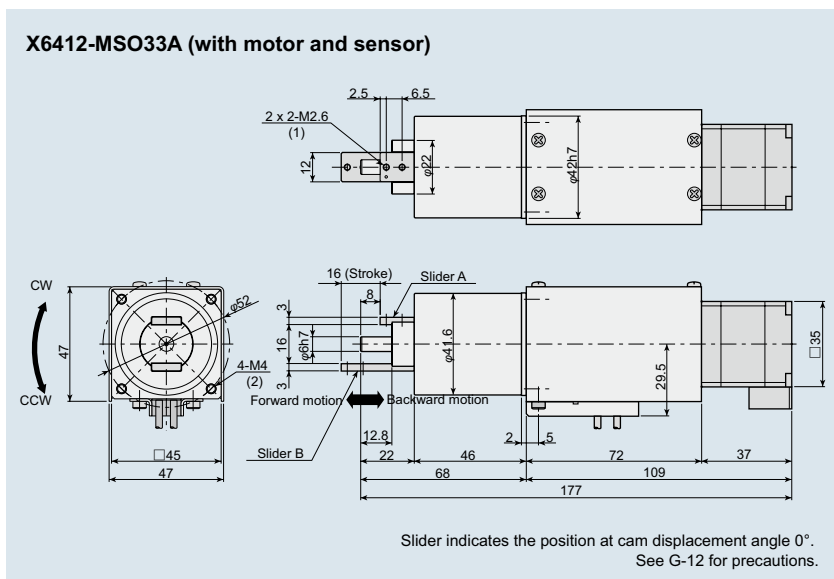
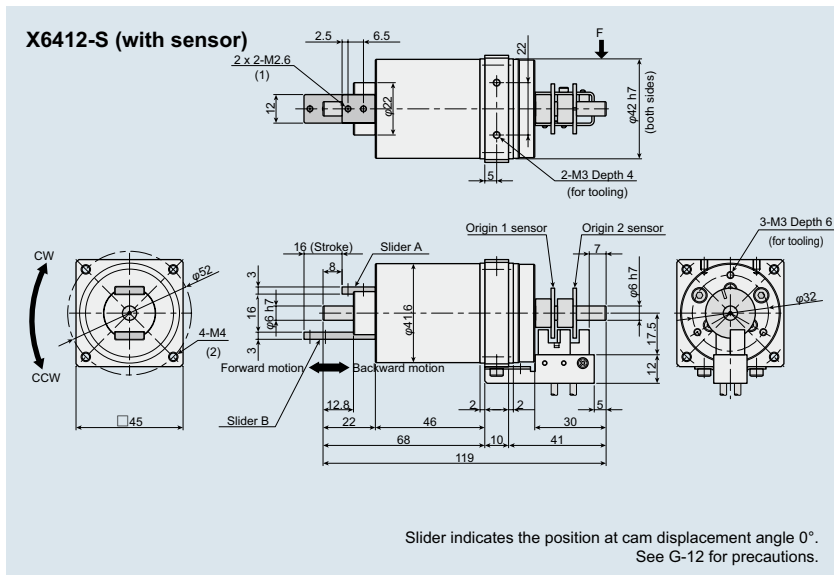
X6410-MSO33A (with motor and sensor)



• Support design by application CAD data, which is convenient for tooling design.

Dimensional drawing

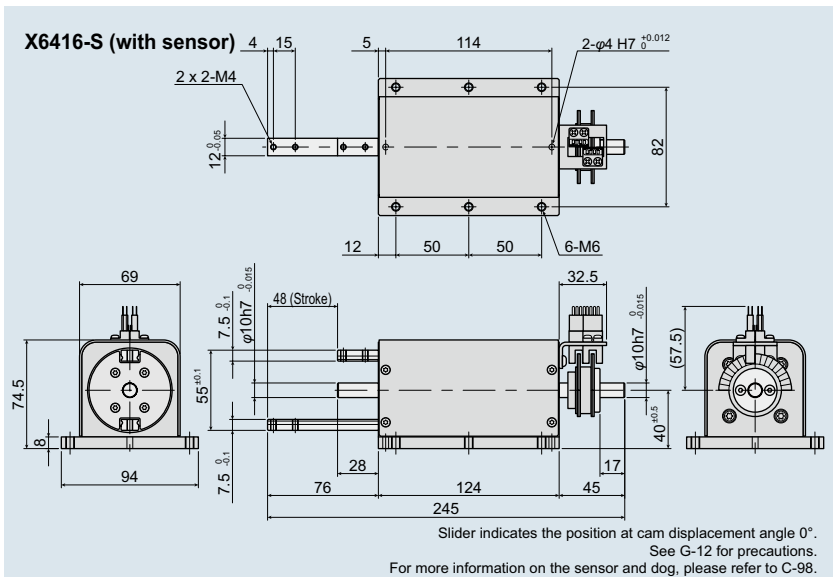
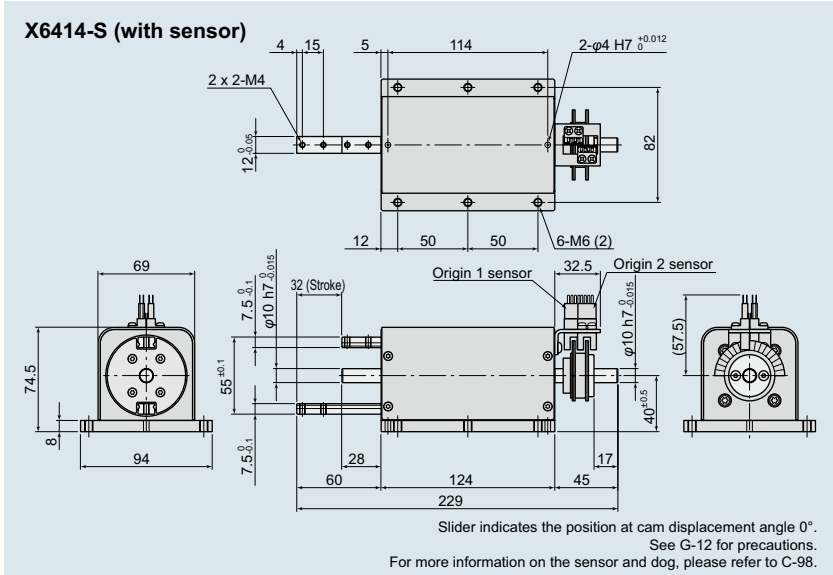
(mm)





■ Dimensional drawing

(mm)



Precautions

■ Precautions for selection

- This product has no dust proof construction.
- Rotation axis can be rotated unlimitedly. Connect a motor for control such as stepping motor to the rotation input shaft and perform positioning control.
- When installing motor by customer, use coupling so that excessive load will not be applied to the rotating shaft.

Design and manufacture tooling parts to be

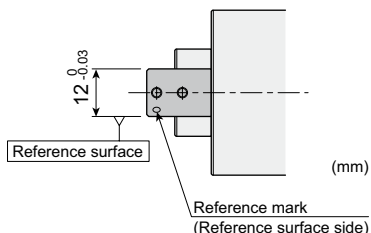
- installed to rotating shaft and slider are performed by customer. (Support design by convenient application CAD data.)
- Install the body horizontally. Using slider facing upward and vertically may cause intrusion of foreign matters into the internal of body resulting in malfunction and shortened life.
- Driver for stepping motor is not supplied with the product.

X641 □

- Slider performs front and back operation by grooved cam. When workpiece and slider interfere, the life of tooling part and this product may be shortened and result in the deterioration of accuracy. If there is a risk of interference, take a measure such as detection of workpiece floating. (G-8 case example of use (3))
- While upper side of slider reaches to the forward movement end, rotate the entire head 90-degree. It is recommended to provide vacuum suction hole to the jaw for stable flipping and the bottom side slider constantly suck the workpiece. (G-8 use case example (4))
- The position of slider operation and rotating shaft is a fixed relationship and individual adjustment is not possible.

■ Mounting precautions

- Use (1) tap hole of slider tip to secure the jaw. Install slider of X6410, X6412, X6414, and X6416 with the reference surface shown in the diagram below as a location face.



- Install rotation axis by coupling clamping method in order to prevent from causing deformation of shaft and secure flipping position accuracy when receiving a workpiece. (G-8 Case example of use (5))
- Use (2) mounting tap to fix the body. F face can become location face.
- Ensure that the mount is provided with rigidity. Failure to follow this instruction may affect the position repeat accuracy or performance.
- Take measures against noise. Without taking measures against noise, motion failure may occur.
- There is no position adjustment mechanism of product itself.
- Overhang of jar or workpiece holder of X6410 and X6412 must be within 80 mm from the end surface ($\phi 42$) of the body as guidance.
- Overhang of jar or workpiece holder of X6414 and X6416 must be within 150 mm from the end surface of the body as guidance.
- When float load of PPU head is applied to the tip, make sure to install load receiver. (G-8 case example of use (6))

■ Precautions for use

- Ensure that the motor heat generation does not exceed 70°C. A higher temperature may cause premature deterioration of the internal parts, leading to reduced life and deterioration of accuracy.
- Ensure that the acceleration/deceleration time is at least 30 ms. Otherwise, excessive load may be applied to the mechanism part, causing shorter life.
- Be sure to detect the origin with the sensor after the completion of each cycle. This product and device may be damaged.
- For handling of the motor, read the catalog or instruction manual of the motor for proper operation.
- If there is any possibility of interference with any peripheral device that operates at the same time, be sure to provide interlock.
- Do not modify or alter the product. If this product is disassembled, the functions and performance of the product cannot be reproduced.
- Before use, read and understand the instruction manual for correct use.
- Refer to the following page to find the specification of the sensor, etc.
X6410, X6412 : D-15
X6414, X6416: C-98

■ General information

- The product specifications described in this catalog is subject to change without notice along with improvement of the product.

Applications

1. Restriction of applications

Turn over unit is the product to flip the front and back of the workpiece by slider, which is operated by grooved cam, and by rotating the rotating shaft and the slider that is installed on the rotating shaft.

2. Safety precautions

DANGER

- Do not use the product for the following applications.
 1. Medical devices related to the support and maintenance of human life and body
 2. Mechanisms and machinery used for the purpose of moving and transporting people
 3. Important security components of machinery
This product is not developed or designed for applications that require a high degree of safety. Use of this product for such applications may cause death.
- Do not use the product in a place where hazardous substances such as combustible or flammable substances exist.
There is a possibility of the product catching fire.
- Never modify the product. Doing so may cause injury due to abnormal operation, electric shock, fire, etc.
- Do not perform improper disassembly/assembly that affects the product's basic structure, performance, or functions.
- Do not pour water on the product. Pouring water on the product, washing it or using it immersed in water may cause injury due to abnormal operation, electric shock, fire, etc.

WARNING

- Be sure to confirm the safety of the operating range of devices before supplying power to and operating the product. If the power is supplied improperly, there is a risk of electric shock and injury caused by contact with a movable part.
- Keep away from the operating range of machinery when a product is in operation or ready to operate. Failure to do so may result in injury due to unexpected operation of the product.
- Do not touch the terminal blocks or switches while the power is turned on. There is a risk of abnormal operation and electric shock.
- Do not damage any of the cables.
Damaging, forcibly bending, pulling, winding, putting under heavy objects or pinching cords may lead to electric shock or abnormal operation due to leakage or defective continuity.
- Do not throw the product into the fire. The product may explode or poisonous gases may be discharged.
- Be sure to completely remove the supply of electricity before performing various tasks such as maintenance, inspection, service, or replacement.

⚠ CAUTION

- Do not apply sudden shocks from outside. Doing so may cause unexpected force to be applied and result in failure of the product or personal injury.
 - Do not use this product in places subjected to direct sunlight (ultraviolet light) or dust, iron, iron powder, or in an atmosphere containing organic solvent, phosphate-ester hydraulic oil, sulphurous acid gas, chlorine gas, acids, etc. The product may stop functioning in a short period of time, or the performance may be deteriorated and the lifetime of the product may be significantly reduced.
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- Use protective covers to prevent the moving parts of machinery from coming in direct contact with human body.
 - As you incorporate the products into your system, add all safety information to the instruction manual of your system and make sure the operators of the system follow the instructions.
Be sure to add to the instruction manual all new safety information that needs to be provided as a result of the incorporation.