MEPAC

(Parallel air chuck)

Parallel air chuck for accurate grasping

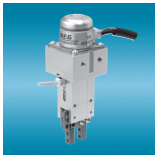
The ability to grasp accurately can be confirmed by uncompromising design concept.
The quality of MEPAC, which was evaluated by receiving the Invention Award and actual results of hundreds of thousands of products, is the result of continuing to be particular about making chuck more chuck like.
Please utilize the assured function of MEPAC to FA.

In order to perform planning and designing of automated assembly system and machine, element technology for “accurate grasping” must be established and build reliability. We established this element technology by developing high-performance, high-quality parallel air chuck with multitudes of patents while struggling from ensuring reliability because we are a manufacturer of automated assembly system. The latest mechanism, such as two-piston drive, spring preloader, and double overlap roller guide, received the authoritative Intension Award from The Japan Society for the Advancement of Inventions. MEPAC can be said to be a positively unparalleled chuck with precise structure that cannot be perceived from the external appearance. Please use MEPAC parallel air chuck of MEG for automated assembly system and component design and production.

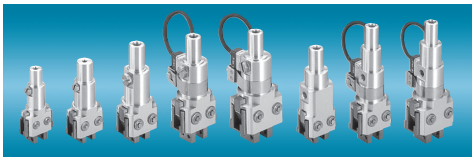
Eco model


Eco

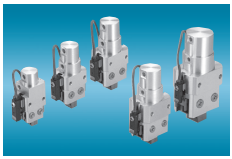

ECO-Multi


Motorized (Unclamp unit)

Average model

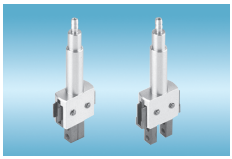

Standard

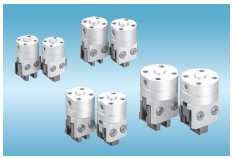

Taste

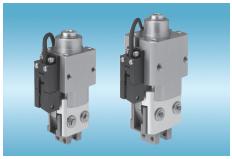

All-purpose


Smart

Personality model


Micro


Short


Floating

MEG parallel air chuck

Index

Model selection

Eco model	Single action	Eco		Small-size with large stroke. For both inside/outside clamp. Multi-purpose.
		ECO-Multi		For both inside/outside clamp. Multi-purpose. Sensor is also prepared.
	Reciprocating	ECO-Multi		For both inside/outside clamp. Multi-purpose. Sensor is also prepared.
	Mecha	Eco Mecha		External drive system. For both inside/outside clamp.
		ECO-Multi (Mecha)		External drive system. Sensor is also prepared. For both inside/outside clamp.
	Motorized	Unclamp unit		Motorized by combining with Mecha type. Easy with solenoid valve feeling.
Average model	Single action	Standard		Basic type. High clamp force.
		Taste		High clamp force. Side installation is possible.
		All-purpose		Wide stroke, compact, and high clamp force.
		Smart		Long-term stable clamp with endless track linear guide.
	Reciprocating	Standard		Basic type. High clamp force.
		Taste		High clamp force. Side installation is possible.
		All-purpose		Wide stroke, compact, and high clamp force.
		Smart		Long-term stable clamp with endless track linear guide.
Personality model	Single action	Micro		Ultra-small
		Short		Few overhang by short trunk shape.
		Floating		With up and down floating mechanism. Collision safe and supply detection is possible.

- For restriction of applications and safety precautions, see A-98.
- For precautions, see A-72 and the subsequent pages.

		Stroke (mm)							No. of sensors	Page
		4	5	6	8	10	12	16		
	NO & NC	×		×						A-6
	NO & NC With sensor	×		×	×				1, 2	A-14
	With sensor	×		×	×				1, 2	A-14
	NO & NC	×								A-6
	NO & NC With sensor	×		×					1, 2	A-14
	With sensor	×		×					1, 2	A-24
	NO	×	×	×						A-30
	NC	×		×						
	With sensor		×	×					1	
	NO				×	×				A-42
	With sensor				×	×			1, 2	
	NO			×	×	×	×	×		A-46
	NC			×	×	×	×	×		
	With sensor			×	×	×	×	×	1, 2	
	NO	×		×						A-52
	With sensor	×		×					1, 2	
		×	×	×						A-30
	With sensor		×	×					1	
					×	×				A-42
	With sensor				×	×			1, 2	
				×	×	×	×	×		A-46
	With sensor			×	×	×	×	×	1, 2	
		×		×						A-52
	With sensor	×		×					1, 2	
	NO	×								A-56
	NC	×								
	NO	×		×						A-60
	NC	×		×						
	NO	×		×						A-66
	NC	×		×						
	With sensor	×		×					Each x1	

■ CAUTION

Note 1. Although reciprocating of standard can be used with the open hand, clamping force becomes weaker due to the thin piston diameter in order to increase opening velocity. In order to use with open hand, select from all-purpose type as far as possible.

Model selection

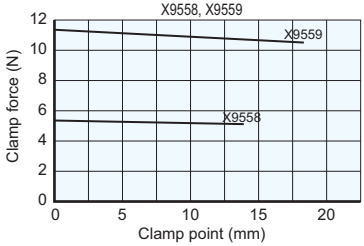
■ Basic specifications Single action

Type	Model No.	Stroke (mm)	Clamp force rough indication (N) 0.4 MPa NO	NC	Clamp force range (N) 10 20 30 40 50 60 70 80 90 100 110	Mass (g)	Page
Eco	X9608B	4	4.2	1		18	A-6
	X9610-04	4	7.2	1.3		31	
	X9610-06	6	7.2	1.3		31	
ECO-Multi	X9608-N	4	4.2	1		19	A-14
	X9612-N	6	10.4	1.9		37	
	X9618-N	8	34	2.5		90	A-14
ECO-Multi Mecha	X9608-M	3		2		21	A-14
	X9612-M	4		4		41	
	X9618-M	6		4.3		100	A-14
Eco Mecha	X9610M	4		3.2		34	A-6
Standard	X9558	4	5.0			18	A-30
	X9559	4	8.5	10.0		28	
	X9560	4	13.0	13.5		46	
	X9561	5	18.0			62	
	X9562	6	24.0	27.0		90	
Taste	X9563T	8	38.0			211	A-42
	X9564T	10	68.0			383	
All-purpose	X9660	6	10.5	18.0		75	A-46
	X9661	8	18.0	24.0		120	
	X9662	10	26.0	32.0		170	
	X9663	12	40.0	50.0		260	
	X9664	16	70.0	80.0		480	
Smart	X9670	4	16.0			76.5	A-52
	X9672	6	31.0			183	
Micro	X9600	4	3.0			20	A-56
	X9605	4		3.0		20	
Short	X9558B	4	5.0	4.5		22	A-60
	X9559B	4	8.5	10.0		32	
	X9560B	4	13.0	13.5		50	
	X9562B	6	24.0	27.0		110	
Floating	X9560FL	4	13.0	13.5		71	A-66
	X9562FL	6	24.0	27.0		151	
Remarks				Eco is spring force.	Clamp force within the working pressure range as described in the product specification	Excluding sensor	

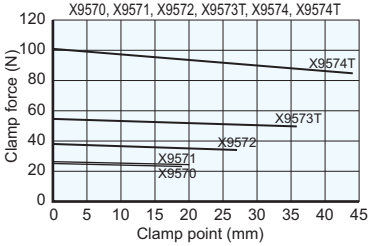
■ Basic specifications Reciprocating type

Type	Model No.	Stroke (mm)	Clamp force rough indication (N) 0.4 MPa	Clamp force range (N) 10 20 30 40 50 60 70 80 90 100 110	Mass (g)	Page
ECO-Multi	X9608-D	4	4.9		19	A-14
	X9612-D	6	12.2		37	
	X9618-D	8	37		90	
Standard	X9570	4	20.5		57	A-30
	X9571	5	24.5		78	
	X9572	6	34.5		112	
Taste	X9573T	8	52.5		237	A-42
	X9574T	10	87.5		428	
All-purpose	X9660	6	20.5		75	A-46
	X9661	8	24.5		120	
	X9662	10	34.0		170	
	X9663	12	52.5		260	
	X9664	16	87.5		480	
Smart	X9670	4	16.0		76.5	A-52
	X9672	6	31.0		183	
Remarks				Clamp force within the working pressure range as described in the product specification	Excluding sensor	

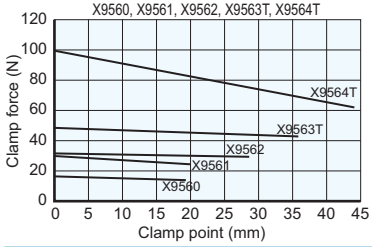
When closing by single action (NO) Effective clamp force (at 0.5 Mpa)
X9558, X9559



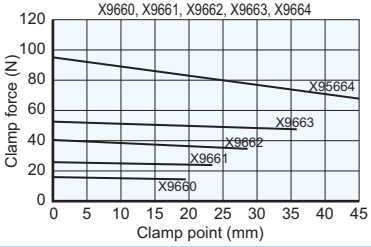
When closing by reciprocating Effective clamp force (at 0.5 MPa)
X9570, X9571, X9572, X9573T, X9574, X9574T



When closing by single action (NO) Effective clamp force (at 0.5 Mpa)
X9560, X9561, X9562, X9563T, X9564T



When all-purpose is closed Effective clamp force (at 0.5MPa)
X9660, X9661, X9662, X9663, X9664



MEPAC (Parallel air chuck)

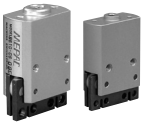
Eco type *ECO Mecha type*

Single-action type eco model is derived from MEPAC parallel air chuck with actual results of over 20 years.
Compact model supports wide stroke although it is with minimal size and achieved standardization of NO and NC mechanism that was not possible with the existing single action. In addition, spring force clamp is also enabled. Economy chuck that contributes toward space-saving and energy saving of the production site.
Eco Mecha type is constant clamp type by embedded spring. This is the model to drive clamp release externally, and achieve assured handling in a place where air piping is difficult.

Eco type

ECO Mecha type

Eco type



	4mm	6mm
Single action Constantly open (NO), Constantly closed (NC)	×	×

Air clamp & spring force clamp enabled

The smallest in the industry with 6mm stroke (by in-company investigation)

Support wide stroke with short body.

Abundant clamp specifications with a single body

Both outside clamp & inside clamp are enabled. Dual use of air clamp & spring force clamp are enabled.

Environmentally friendly “Energy-saving”

No air is necessary for return process with single action. Enables to reduce air consumption.

Space-saving of the device

Achieve compact handling without requiring an air piping space at return process by introducing the single action structure.

ECO Mecha type

	4mm
Single action Constantly open (NO)	×

Inside clamp & outside clamp enabled

Airless, no piping

Convenient clamp to use at air-less place or where piping is difficult.

Abundant clamp specifications with a single body

Both outside clamp & inside clamp are enabled.

Environmentally friendly

Mechanism to open without pressing mechanical operator. Opening and closing by using motor mechanism enables the construction of energy-saving and low-noise system without using air.

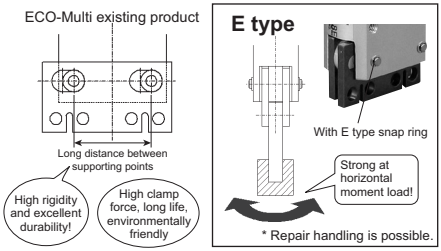
Space-saving of the device

Achieve compact handling with no need for air piping space.

Original roller guide mechanism

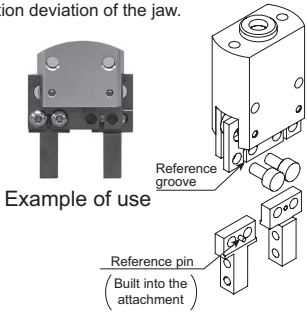
Maintain a long distance between rollers and assured chucking with smooth operation.

Original roller guide mechanism



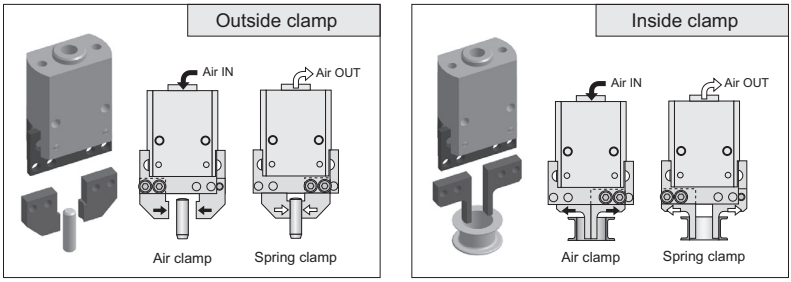
Prevent position deviation of the jaw

With reference groove on the finger tooling part. This type can be used for improving position reproduction of the jaw and preventing from position deviation of the jaw.



Eco type

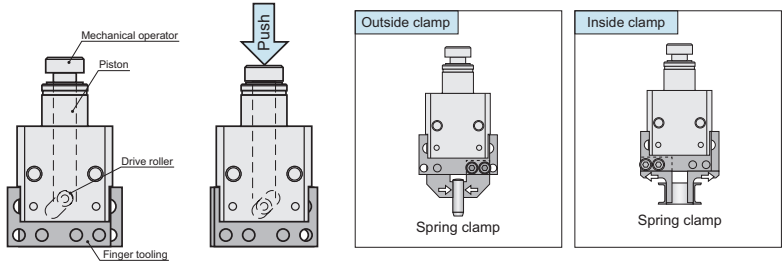
■ Clamp specifications



ECO Mecha type

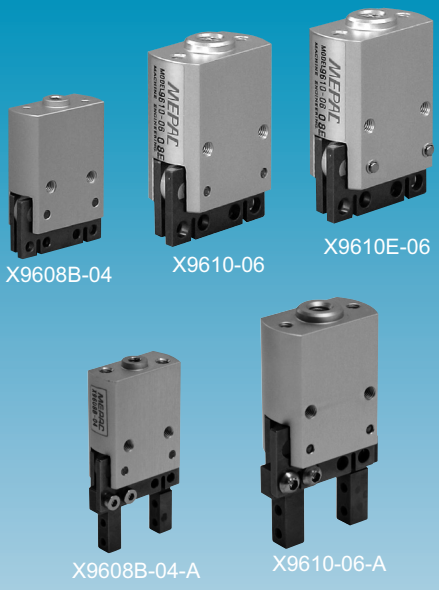
■ Open/Close motions

When the mechanical operator is pressed externally, the piston is slided and the drive roller pushes the finger tooling to release the clamp.



MEPAC (Parallel air chuck)

Eco type X9608B, X9610



Attachment is available. Refer to dimensional drawing to find the details.

- The smallest in the industry with 6 stroke (by in-company investigation)
- X9608B is the lightest in the industry. Minimum chuck enabling to grasp firmly even with the small body.
- Abundant clamp specifications with single body. Depending on the installation position of the jaw, both outside clamp and inside clamp are possible.

■ Variations

Model No. \ Stroke (mm)	4	6	
X9608B-04	×		
X9610-04	×		
X9610-06		×	
X9610E-04	×		(E type)
X9610E-06		×	(E type)

Product number configuration

X9610 - 06 - A

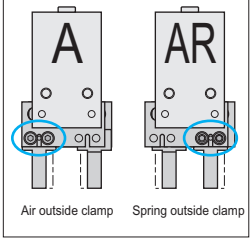
Model No.
X9608B
X9610
X9610E

Stroke
04: 4 mm
06: 6 mm

Attachment
No code: Without option
A : With attachment
AR : Attachment reverse installment

X9610E (E type)

With snap ring



* Re-mounting is possible by customer.

■ Basic specifications

Operating method	Single action type/Parallel air chuck
Fluid for use	Clean air (Filtered compressed air)
Working pressure range	0.3 to 0.5 MPa
Ambient temperature	5 to 50°C
Lubrication	Lithium type grease
Piping connection port	M3 x 0.5, M5 x 0.8
Frequency of use	Max. 180 cpm
Repetitive position accuracy	±0.01 mm
Stroke allowance	0 to +0.3 mm

* Refer to precautions in A-72 and in the subsequent pages as well.

■ Attachment single item

Product code of the attachment single item is described below.

Model No.	Product code of attachment single item
X9608B	CE-A08S
X9610	CE-A10S

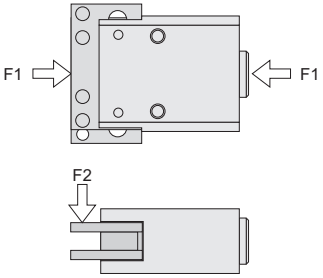
* Blank product is also available. Please contact us for detailed information.

■ Model

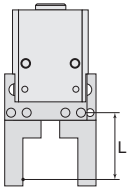
Type	Model No.	Stroke (mm)	Effective clamp force (N)		Max. allowable load (N)		Mass (g)
			Air	Spring	F1	F2	
Single action	X9608B-04	4	4.2	1	5	2.5	18 (24)
	X9610-04 X9610E-04	4	7.2	1.3	10	5	31 (42)
	X9610-06 X9610E-06	6	7.2	1.3	10	5	31 (42)
Remarks			*1		*2, 3, 4		*5, 6

■ Remark description

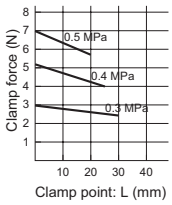
*1. “Air” of effective clamp force is the value when air pressure is 0.4 MPa and clamp point L is 20 mm.
*2. The maximum allowance load is the static allowance load and it is not within the range in which finger tooling can be operated.
*3. The maximum allowance load is a rough indication and it is not a guaranteed value. Reduce external force as much as possible.
*4. Direction of the maximum allowance load is shown in the figure on the right.
*5. Attachment mass is 6 g for X9608B, and 11 g for X9610 (1 set).
*6. Mass ( ) includes attachment.



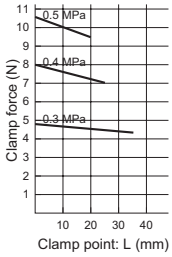
■ Effective clamp force



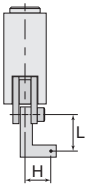
X9608B



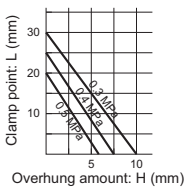
X9610



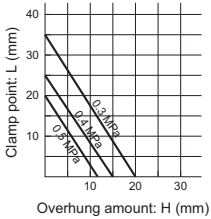
■ Clamp point



X9608B



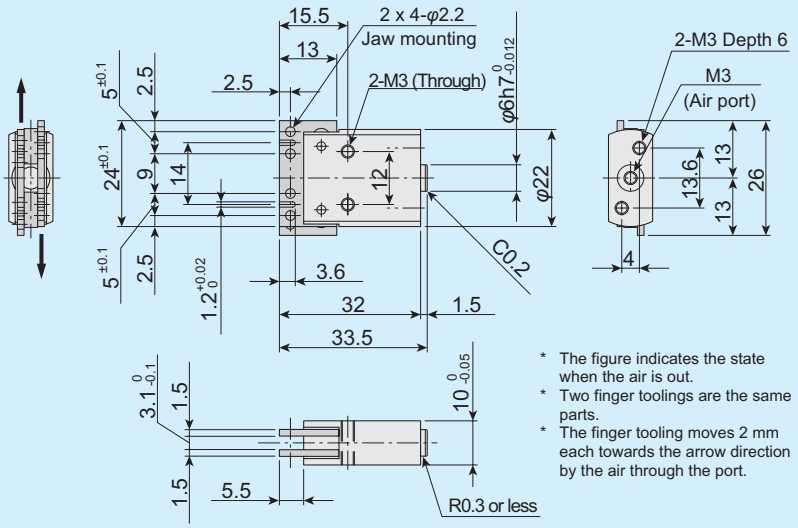
X9610



Eco type

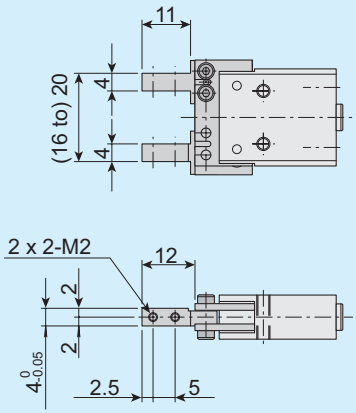
■ Dimensional drawing (mm)

X9608B-04



* The figure indicates the state when the air is out.
* Two finger toolings are the same parts.
* The finger tooling moves 2 mm each towards the arrow direction by the air through the port.

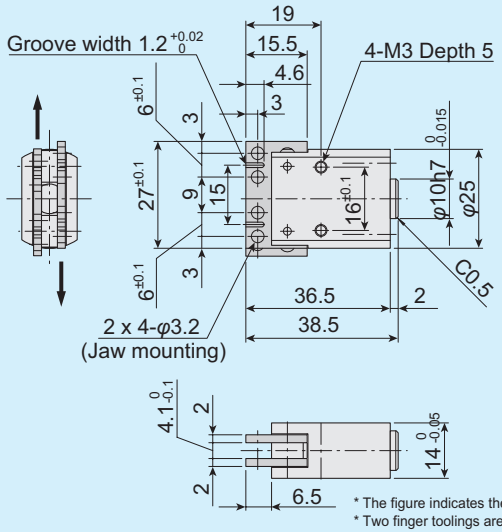
X9608B-04-A



* The attachment installation direction of X9608B-04-AR becomes opposite to what is shown in the figure.

(mm)

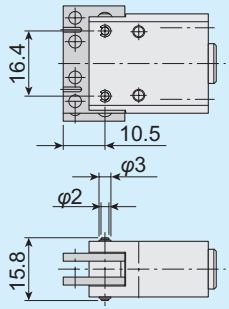
X9610



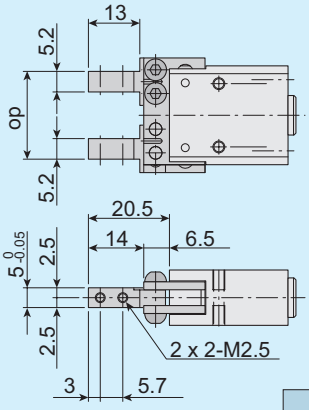
	h1	h2
X9610-04	14.5	29
X9610-06	15	30

* The figure indicates the state when air is out.
* Two finger toolings are the same parts.
* When air is filled, the finger tooling moves towards the arrow direction.

X9610E



X9610-□-A



	op
X9610-04	22.2 to 18.2
X9610-06	23.2 to 17.2

* Attachment installation direction of Model-AR becomes opposite to what is shown in the figure.

ECO Mecha type X9610M

Attachment is available.
Refer to dimensional drawing to find the details.

- Airless, no piping
- Abundant clamp specifications with one body
- Environmentally friendly, “energy-saving, low-noise”

■ Variations

Model No. \ Stroke (mm)	4
X9610M, X9610EM	×

■ Basic specifications

Operating method	Single action type/Parallel air chuck
Drive system	By external pressure
Clamp method	By compression spring
Ambient temperature	5 to 50°C
Lubrication	Lithium type grease
Stroke ratio	Piston: Jaw = 1:2
Frequency of use	Max. 120 cpm
Repetitive position accuracy	±0.01 mm

* Refer to precautions in A-72 and in the subsequent pages as well.

Product number configuration

X9610M - A

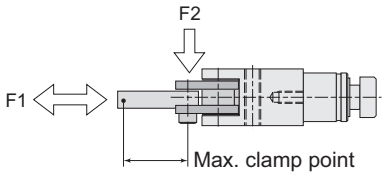
Model No.
X9610M
X9610EM

Attachment
No code: Without option
A: Attachment
AR: Attachment reverse installation

■ Model

Type	Model No.	Stroke (mm)	Theoretical clamp force (N)	Operating force (N)	Max. clamp point (mm)	Max. allowable load (N)		Mass (g)
						F1	F2	
Single action (External)	X9610M X9610EM	4	3.2	16	25	10	5	34
Remarks		*1	*2	*3		*4, 5		

■ Maximum clamp point and maximum allowance load

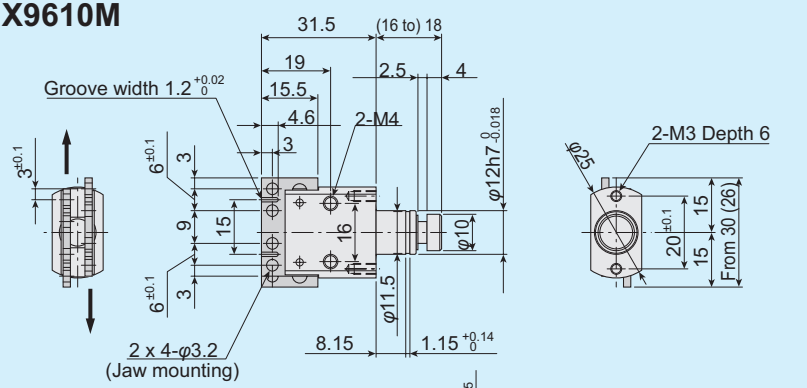


■ Remark description

*1. Position of 0.5 mm between gaps of mechanical operator and chuck body.
*2. Position of 20 mm length of the jaw.
*3. Necessary force to completely open the finger.
*4. The maximum allowance load is the static allowance load and it is not within the range in which finger tooling can be operated.
*5. The maximum allowance load is a rough indication and it is not a guaranteed value. Reduce external force as much as possible.

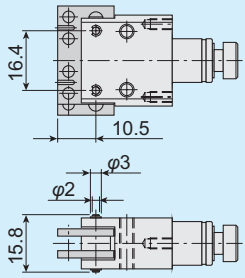
■ Dimensional drawing (mm)

X9610M

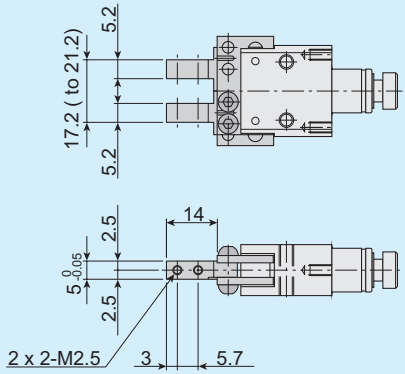


* Figure shows the state when the finger tooling are pushed by the spring.
* Two finger toolings are the same parts.
* Finger tooling moves towards the arrow direction when the mechanical operator is pushed.

X9610EM



X9610M-A

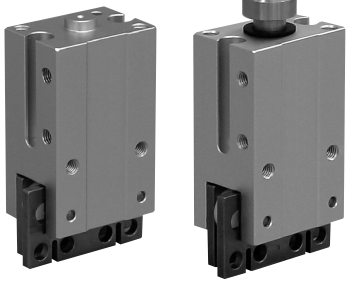


* Attachment installation direction of X9610M-AR becomes opposite to what is shown in the figure.

ECO-Multi type

We launched ECO type and are making achievements as chucking parts for industrial machinery such as many automatic assembly machines and inspection machines, etc. Eco-Multi type succeeded excellent user-friendliness such as “enabling dual use of outside clamp and inside clamp”, and was developed as a chuck to support more extensive clamp specifications and usability.

Single action **Reciprocating** **Mecha**



ECO-Multi type

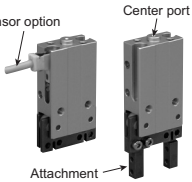
	Stroke (mm)			
	3	4	6	8
Single action constantly open (NO), constantly closed (NC)		××	××	×
Reciprocating constantly open (NO), constantly closed (NC)		××	××	×
Mecha constantly open (NO), constantly closed (NC)	××	××	×	

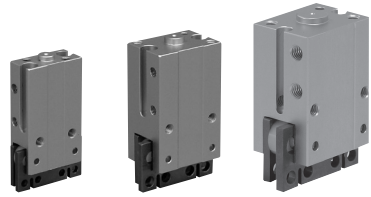
×× indicates that there is an E type.
E type is a model with E type retainer ring to the finger tooling guide pin.

With E type snap ring

Abundant function

Main body	Operating method	Center port option	Attachment	Sensor option
φ8	Single action	Without	Without	Without
φ12	Reciprocating	With	With	1 sensor
φ18	Mecha			2 sensors





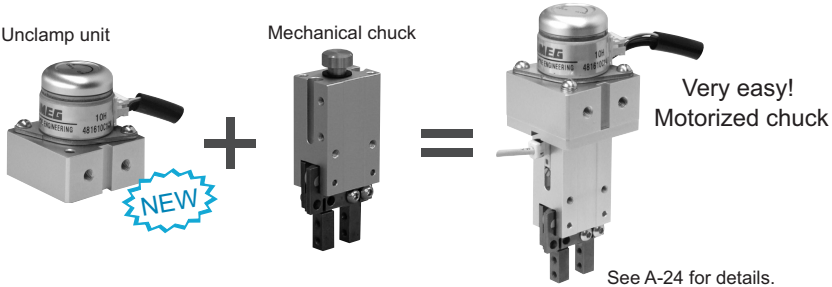
4 mm stroke　6 mm stroke　8 mm stroke

NEW Variation

Mechanical chuck is motorized!　Easy to use with solenoid valve feeling.

Unclamp unit that motorizes the mechanical chuck.

Unclamp unit　Mechanical chuck

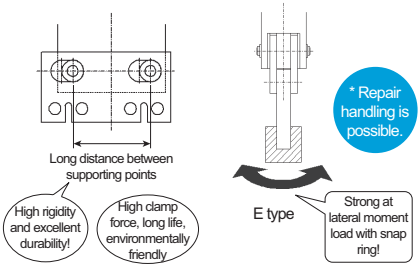


See A-24 for details.

Original roller guide mechanism

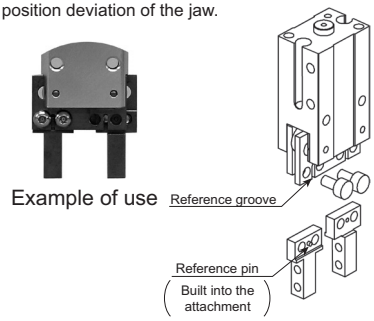
Maintain a long distance between rollers and assured chucking with smooth operation.

Original roller guide mechanism



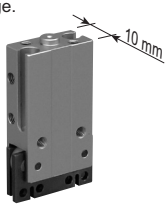
Prevent position deviation of the jaw

With reference groove on the finger tooling part. This type can be used for improving position reproduction of the jaw and preventing from position deviation of the jaw.



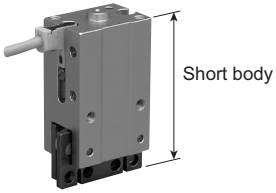
Extremely-thin body with 4 mm stroke

Although the body is extremely-thin at 10 mm, it has a high clamp force with the built-in φ8 cylinder. Play an important in utilizing conveniently for small pitch multiple usage.



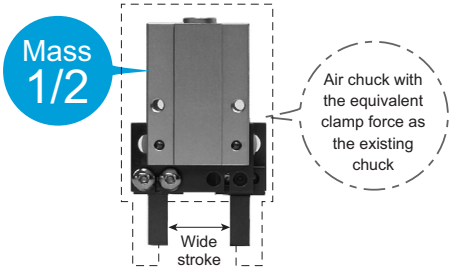
The smallest in the industry as an air chuck with 6 mm stroke sensor (by in-company investigation)

Wide stroke specifications, which supports sensor installation even though it has a short body. Building a compact device is possible.



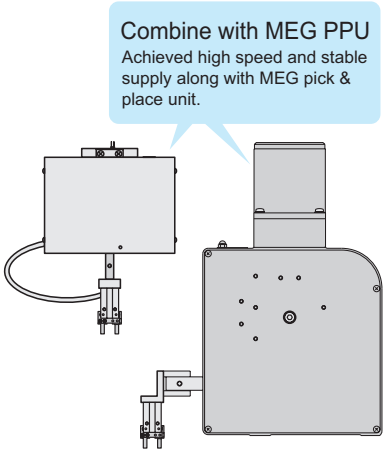
8 mm stroke ultra-lightweight

Mass 1/2 compared to the existing chuck with the equivalent clamp force.

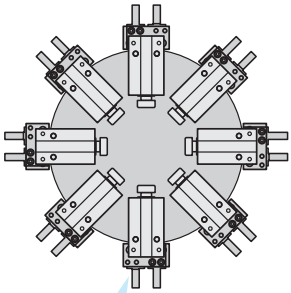


ECO-Multi type

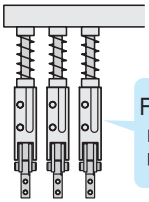
■ Application example



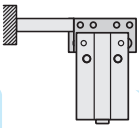
Combine with MEG PPU
Achieved high speed and stable supply along with MEG pick & place unit.



As a jig of index table
Easy to hold by using the Mecha type.



For multiple heads of robot
Downsizing robot head is possible with high clamp force.



As a cylinder with guide
Contribute toward space-saving as a cylinder with guide.
Can be conveniently utilized for workpiece pusher, etc.

Proposal of solenoid valve that achieve high speed stable carrying of workpieces

With highly-responsive solenoid valve

By using solenoid valve that is the most suitable for high-speed handing, it can achieve a stable supply over a long period of time.

Direct operated solenoid valve:
Kuroda Pneumatics Ltd.

Recommendation

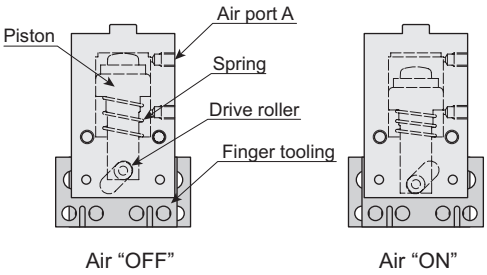
Model No. VA01PSC24

Long life of 3 hundred million times

■ Open/Close motions

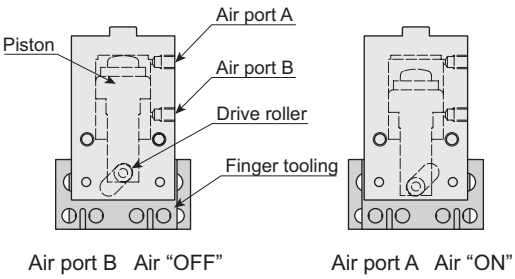
Single action type

When the air comes in from the air port, it will push the piston and then the drive roller will push the finger tooling to close.



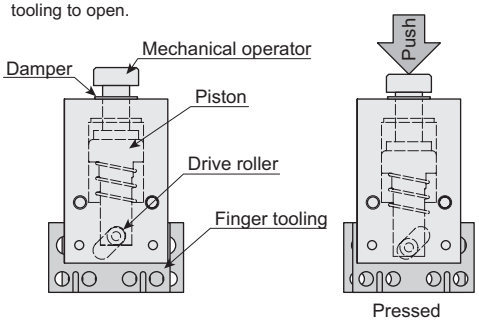
Reciprocating type

When the air comes in from air port A, it will push the piston and then the drive roller will push the finger tooling to close.

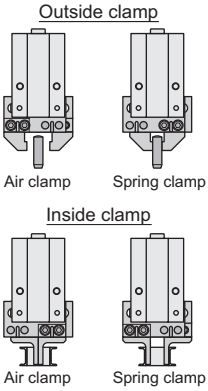


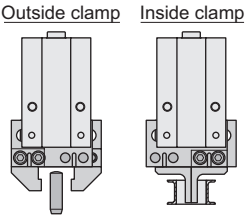
Mecha type

When the mechanical operator is pressed externally, the internal piston is pushed and the drive roller pushes the finger tooling to open.

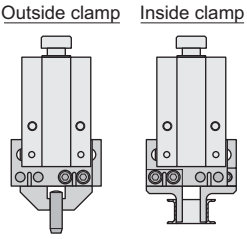


■ Clamp specifications



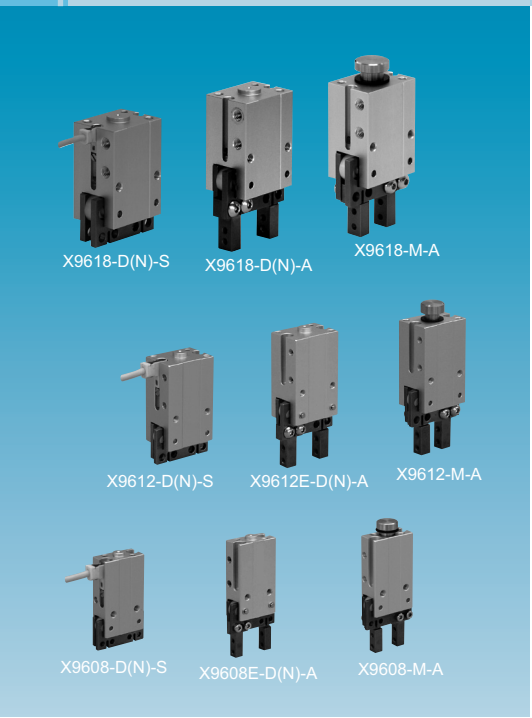


* Clamp force by B port air becomes weak and does not exercise full performance.



* Clamp by external force may cause premature failure of the chuck.

ECO-Multi type X9608, X9612, X9618

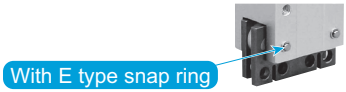


- Three drive methods; single action, reciprocating, and Mecha are prepared for three types of cylinder diameter; φ8, φ12, and φ18. Type can be selected according to the application.
- Abundant clamp specifications with single body. Both outside clamp and inside clamp are available just by changing the position of the jaw.

■ Variations

Model No. \ Stroke (mm)	3	4	6	8	Attachment	Sensor	E type
X9608-N(D)		×			×	×	×
X9608-M	×				×	×	×
X9612-N(D)			×		×	×	×
X9612-M		×			×	×	×
X9618-N(D)				×	×	×	
X9618-M			×		×	×	

E type has E type snap ring to finger tooling guide pin.
Model No. X96□□E



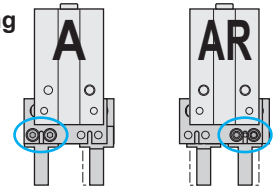
Product number configuration

X9608-D-C-A-SS-D14L1

- Model No.: X9608, X9612, X9618, X9608E, X9612E
- D: Reciprocating; N: Single action; M: Mecha
- Center port Option: No code: N/A; C: Center port
- Attachment: No code: Without option; A: With attachment; AR: Attachment reverse installation
- Supplied sensor: No code: None; S: 1 sensor; SS: 2 sensors
- Sensor specification: No code: E34L1 (2 lines 1m, right angle); E33L1: E33L1 (3 lines 1m, right angle); D13L1: D13L1 (2 lines 1m, rearward); D14L1: D14L1 (2 lines 1m, rearward)
  * Lead line length of 3 m is also prepared. Use "3" for the last number of the code. Example: D14L3
  * For more information on the sensor, please refer to A-90.

Single action, reciprocating

* Caution is necessary that Mecha type is opposite to what is shown in the figure.
* Re-mounting is possible by customer.



Single action: Air outside clamp
Reciprocating: Air outside clamp

Single action: Spring outside clamp
Reciprocating: Air inside clamp

Basic specifications (single action, reciprocating)

Operating method	Single action type, reciprocating type/Parallel air chuck
Fluid for use	Clean air (Filtered compressed air)
Working pressure range	0.3 to 0.5 MPa
Ambient temperature	5 to 50°C
Lubrication	Non-lubrication
Piping connection port	M3 x 0.5, M5 x 0.8
Frequency of use	Single 120 cpm / Reciprocating 180 cpm
Repetitive position accuracy	±0.01 mm
Stroke allowance	0 to+0.3 mm

* Refer to precautions in A-72 and in the subsequent pages as well.
* Be sure to install flow controls.

Basic Specifications (Mecha)

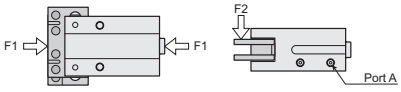
Operating method	Single action type/Parallel air chuck
Drive system	By external pressure
Clamp method	By compression spring
Stroke ratio	Piston: Finger tooling = 1:2 (1:1.7 for X9618)
Frequency of use	Single action Max. 120 cpm
Ambient temperature	5 to 50°C
Repetitive position accuracy	±0.01 mm
Operating force (min)	X9608: 13N, X9612: 16N, X9618: 25N

Model

Type	Model No.		Stroke (mm)	Effective clamp force (N)		Max. allowable load (N)		Mass (g)	Sensor Number of installations
				Air	Spring	F1	F2		
Single action	X9608-N	X9608E-N	4	4.2	1	5	2.5	19 (25)	2
	X9612-N	X9612E-N	6	10.4	1.9	10	5	37 (48)	2
	X9618-N		8	34	2.5	30	15	90 (114)	2
Recipro-cating	X9608-D	X9608E-D	4	4.9	-	5	2.5	19 (25)	2
	X9612-D	X9612E-D	6	12.2	-	10	5	37 (48)	2
	X9618-D		8	37	-	30	15	90 (114)	2
Mecha	X9608-M	X9608E-M	3	-	2	5	2.5	21 (27)	2
	X9612-M	X9612E-M	4	-	4	10	5	41 (52)	2
	X9618-M		6	-	4.3	30	15	100 (124)	2
Remarks	*1			*2, 3		* 4, 5, 6		*7, 8	

Remark description

*1. X96□□E is E type.
*2. "Air" of effective clamp force is the value when air pressure is 0.4 MPa and clamp point L is 20 mm.
*3. Reciprocating is when the air is filled into the port A.
*4. The maximum allowance load is the static allowance load and it is not within the range in which finger tooling can be operated.
*5. The maximum allowance load is a rough indication and it is not a guaranteed value. Reduce external force as much as possible.
*6. Direction of the maximum allowance load is shown in the figure below.
*7. Mass ( ) includes attachment.
*8. Attachment mass is 6 g for X9608, 11 g for X9612, and 24 g for X9618 (1 set).



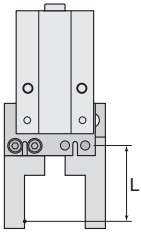
Attachment single item

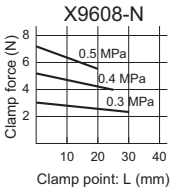
Product code of the attachment single item is described below.
* Blank product is also available. Please contact us for detailed information.

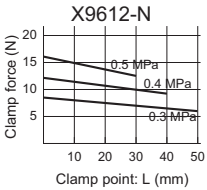
Model No.	Product code of attachment single item
X9608	CE-A08S
X9612	CE-A12S
X9618	CE-A18S

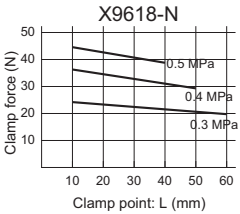
ECO-Multi type

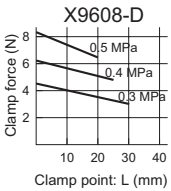
■ Effective clamp force

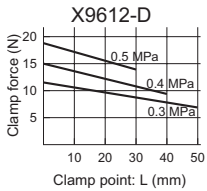


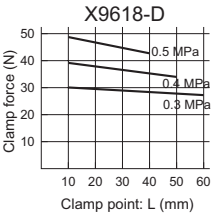






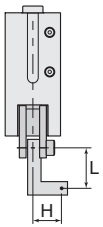


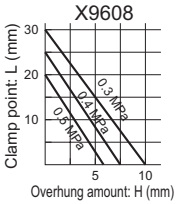


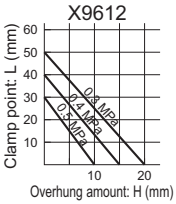


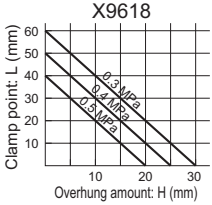
* In case of spring force clamp, L dimension is
X9608: 20mm, X9612: 30mm,
X9618: 40mm (max)

■ Clamp point



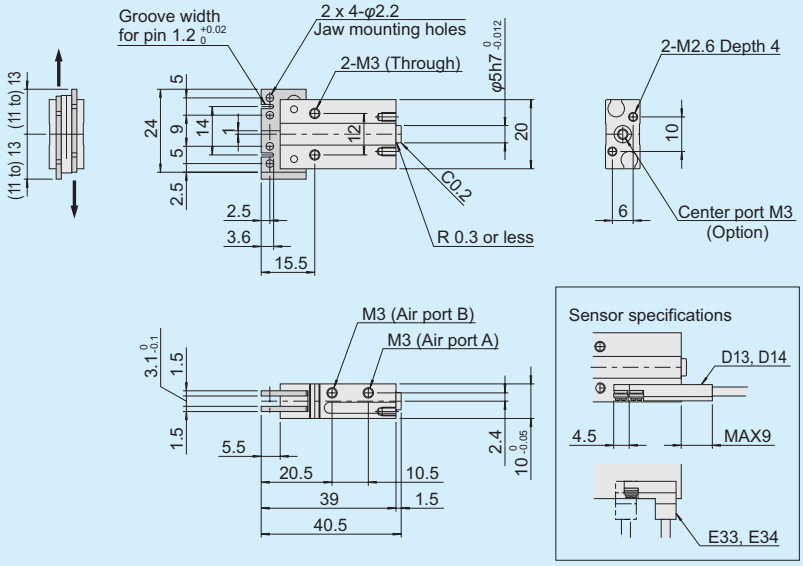




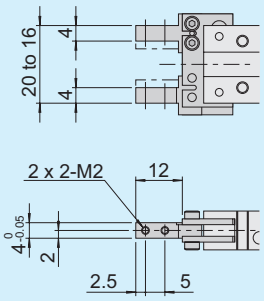


■ Dimensional drawing (mm)

X9608-N X9608-D

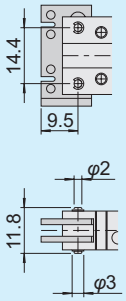


-A Attachment installation

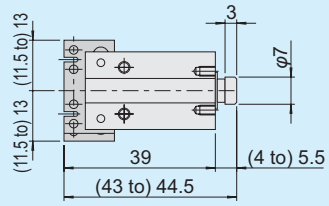


* Attachment installation direction of Model-AR becomes opposite to what is shown in the figure.

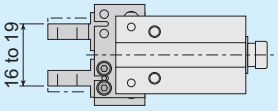
X9608E



X9608-M



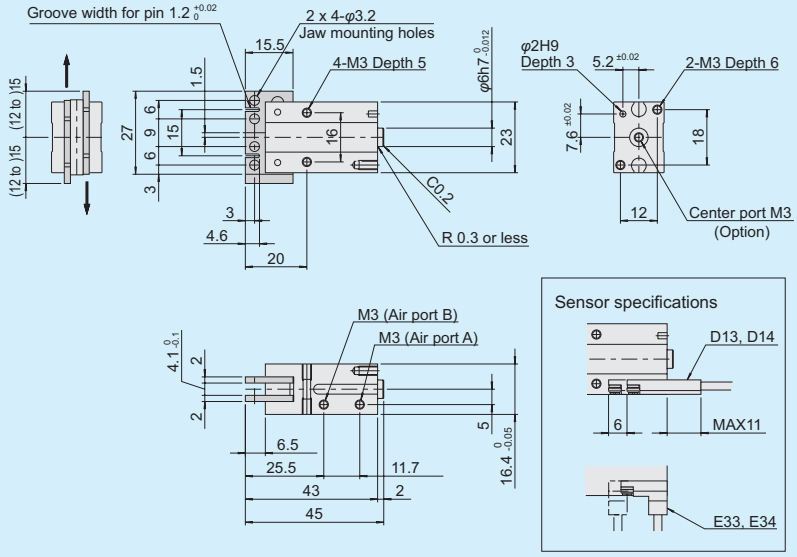
X9608-M-A



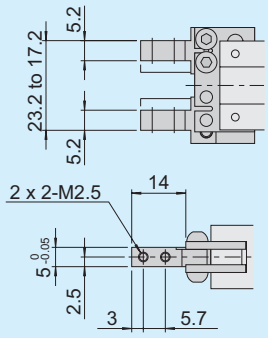
ECO-Multi type

■ Dimensional drawing (mm)

X9612-N X9612-D

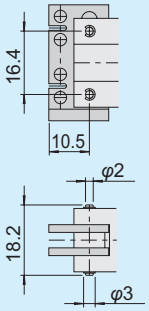


-A Attachment installation

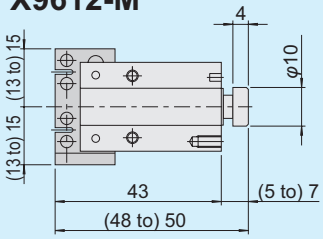


* Attachment installation direction of Model-AR becomes opposite to what is shown in the figure.

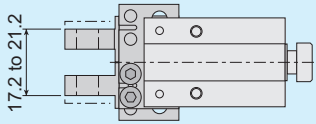
X9612E



X9612-M

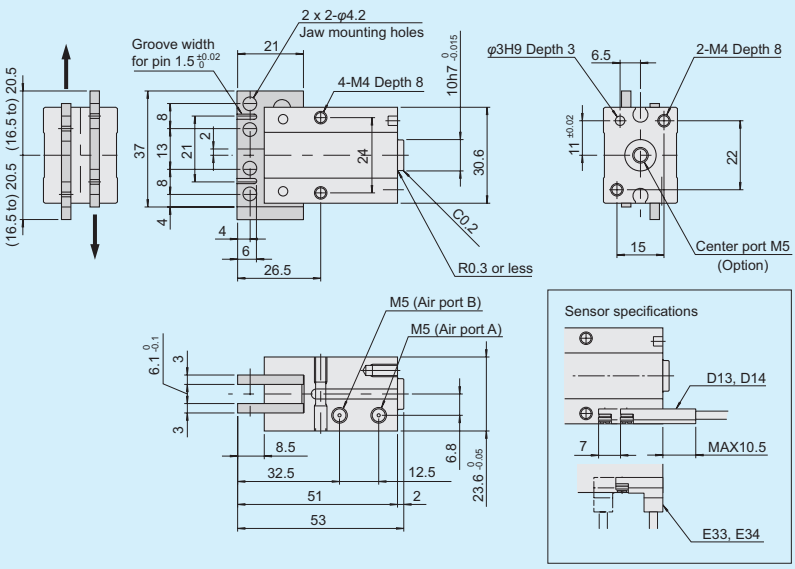


X9612-M-A

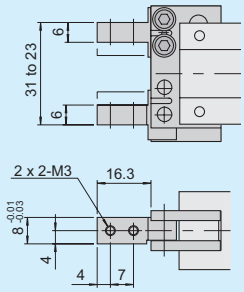


■ Dimensional drawing (mm)

X9618-N X9618-D

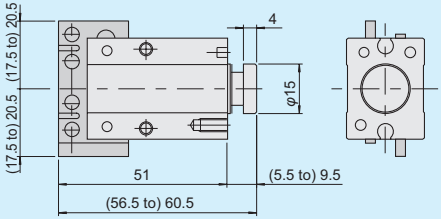


-A Attachment installation

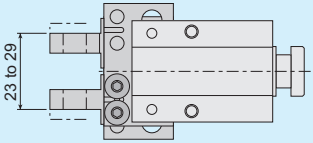


* Attachment installation direction of Model-AR becomes opposite to what is shown in the figure.

X9618-M



X9618-M-A



Unclamp unit ECO-Multi Mecha type

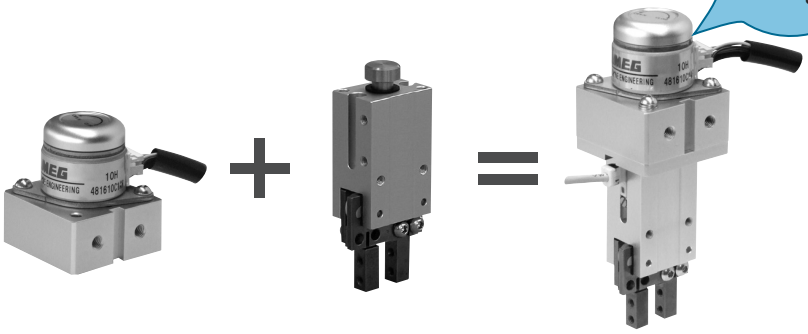
Very easy!

Motorized chuck

Unclamp unit

Motorized chuck can be configured by installing unclamp unit to mechanical chuck.

Easy to use with **solenoid valve** feeling!

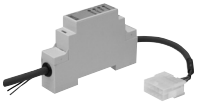


Unclamp　　Mechanical chuck　　Airless chuck

Convenience of solenoid valve
Open/close with ON/OFF signal by means of dedicated controller. Can be used conveniently equivalent to the existing solenoid valve.

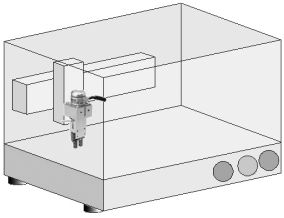
Frequency 60 cpm
Can be used from 1 second cycle time.
High-speed response pulse motor drive.

Power consumption 1/20
* By in-house investigation
Compared to air chuck, power consumption is 1/20 by holding workpiece without conducting. No worry about piping loss and air leak.

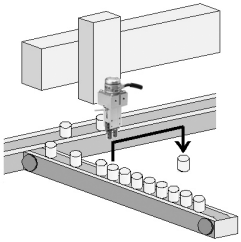


Controller
MPC010-UCP

■ Example of use



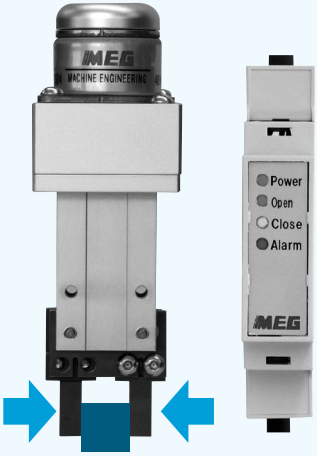
For desk machine



Taking out workpiece

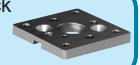
0 minute setting

(No need to make control adjustment at all)

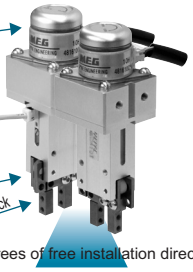


- Connector standard equipment
  Does not take much time for connection.

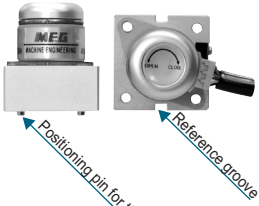
- Ultra-small Width 17.4 mm
  Already installed driver & controller software.
- Operates by open/close signal input.
  Very easy!
- Grasps by Mecha and releases electronically.
  No speed adjustment necessary
- Bracket dedicated to the chuck is prepared. Does not require time or effort for installation.



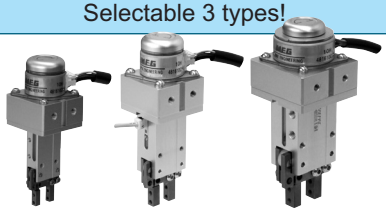
- Easy centering work
- Open/close check with no current flow
- Safe with alarm output
- Chuck sensor can be used.
- Long life chuck for one hundred million times
- Dual use of inside clamp and outside clamp are enabled.



UCP main body



Selectable 3 types!



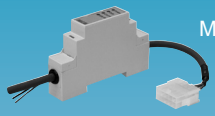
Open/close stroke	**3 mm**	**4 mm**	**6 mm**
Clamp force	**2 N**	**4 N**	**4.3 N**
Unclamp unit model	UCP2504	UCP2504	UCP3506
Parallel air chuck	X9608-M-A	X9612-M-A	X9618-M-A

Unclamp unit UCP2504, UCP3506

PAT.PEND

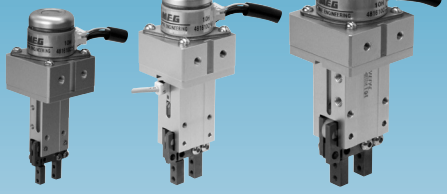
UCP2504

UCP3506



MPC010-UCP

Example of installation



Set mass 130 g
UCP2504
X9608-M-A

Set mass 152 g
UCP2504
X9612-M-A-S

Set mass 297 g
UCP3506
X9618-M-A

- This type can be utilized as an airless chuck by combining with ECO-Multi Mecha type. In the environment with no air. Use for when there is a concern over response delay due to long piping. For the place where there is a concern over air leak.
- Operate by open/close signal input Easy to use as with solenoid valve feeling.
- Easy centering work by manual handle even when the electricity is off.

Unclamp unit code configuration

UCP2504 - C - BK08

Code	Controller
No code	Not attached
C	Controller attachment

Model No.
UCP2504
UCP3506

Compatible model

Code	Bracket for chuck
No code	Not attached
BK08	Attachment for X9608-M
BK12	Attachment for X9612-M
BK18	Attachment for X9618-M

* Chuck is not included.
  Please prepare the chuck separately according to the model indicated in the table below.

Chuck code configuration

X9618-M - A - SS - E33

Model No.
X9608-M
X9608E-M
X9612-M
X9612E-M
X9618-M

Code	Attachment
No code	Not attached
A	Attached

Code	Supplied sensor
No code	None
S	1 sensor
SS	2 sensors

Code	Sensor specifications
No code	E34L
E33	E33L

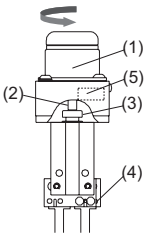
* See A-18 for details.
* Refer to A-17 for details of the installation direction of the jaw.

Specifications

Operating method	UCP2504	UCP3506
Drive system	Pulse motor Continuous current drive	
Open/close motion speed	0.16 sec/each	
Open/close frequency	60 cpm	
Origin sensor	Photomicrosensor incorporated (open edge)	
Power consumption	At operation 16 W (average 6 W), at stand-by 1 W	
Used grease	Lithium type grease	
Working temperature	5 to 40°C	
Product mass	95 g	152 g

Chuck model	X9608-M	X9612-M	X9618-M
Stroke (mm)	3	4	6
Clamp force (N)	2	4	4.3
Mass (g)	8	10	21
Chuck mass (g)	27	52	124

* For more information on the chuck, please refer to A-18.
* Refer to precautions in A-72 and in the subsequent pages as well.
* Stroke allowance is ±0.3 mm.
* Attachment is included in the chuck mass.
* Chuck and bracket are to be installed by the customer.

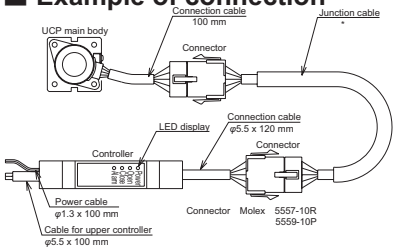


Open
When the pulse motor (1) is rotated, the built-in open/close shaft (2) pushes the pusher (3) of mechanical chuck , and open the chuck finger (4).

Close
When the open/close shaft (2) moves backward, the pusher is returned by the action of the spring incorporated in the chuck, and the finger tooling is closed.

Detect
The origin position of the open/close shaft is detected every time by the built-in photosensor (5) to check the operation.

Example of connection



* For UCP main body and controller, the cable is not flexible type.
* The minimum bend radius of the connection cable of the controller is R33 mm.
* The junction cable is to be provided by the customer. Commercially available junction cable can be used.
* Do not use a junction cable longer than 2 meters.

Controller specifications

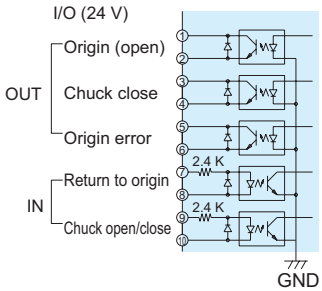
Model	Driver & controller
	MPC010-UCP
Number of control chucks	1 chuck/unit
Control method	Open loop, detect the origin (open end) every time
Operational program	Installed (No need for software setting)
Open/close position specification	Not specified (open end/close end full stroke operation)
Chuck side sensor	No input (Upper controller control)
LED display	Power ON, open end, close end, alarm
Power supply voltage	24 VDC ±0.5 V
Working temperature	5 to 40°C
Mass	70 g

* Actual product has a version code of the software at the end of product code. Example: MPC010-UCPA

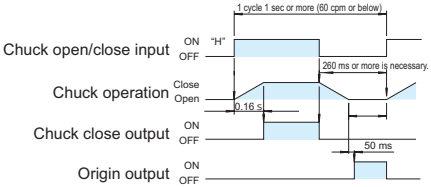
Input/output specifications

IN	1	Return to origin
IN	2	Chuck open (OFF)/close (ON)
OUT	1	Origin (open end)
OUT	2	Chuck close end
OUT	3	Origin error alarm (step-out detection)

Input/output circuit



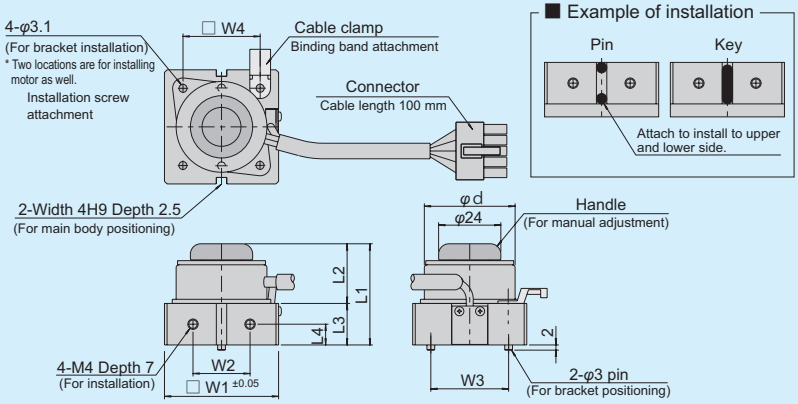
Timing chart



* Return-to-origin signal is in a range between 1 ms and 10 ms.

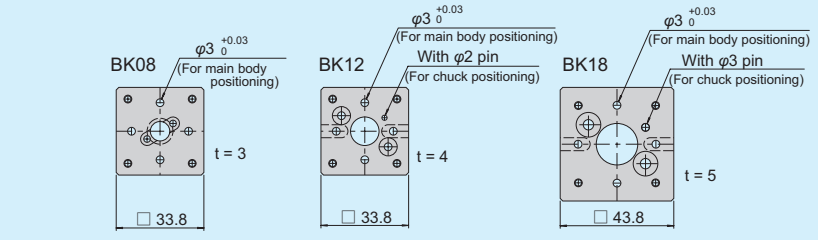
Unclamp unit

■ Dimensional drawing (mm)

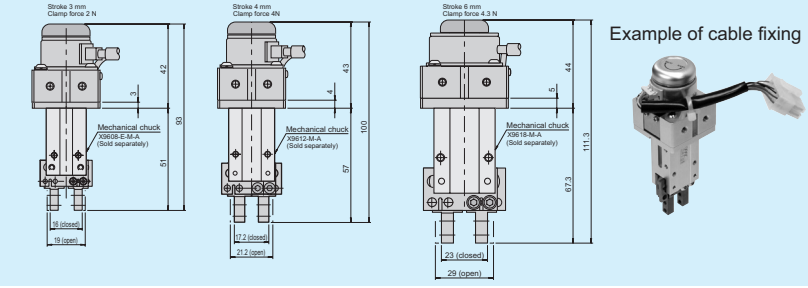


Model No.	Length				Diameter	Width			
	L1	L2	L3	L4	d	W1	W2	W3	W4
UCP2504	39	23	16	8	25	34	16	22	24.8
UCP3506	39	23	16	8	35	44	22	30	29.7

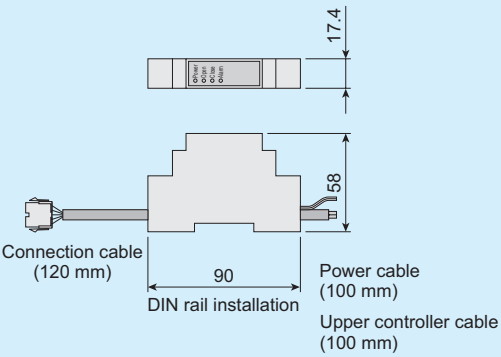
■ Bracket dimensional drawing (mm)



■ Chuck set dimensional drawing (mm)

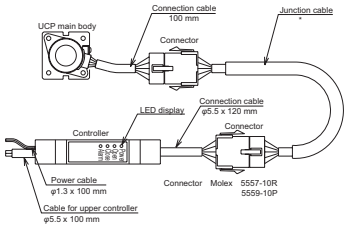


■ Controller dimensional drawing (mm)



■ Relay cable

Example of connection



CAUTION
- Do not use a cable longer than 2 m for the unclamp unit.
- Refer to the brochure of the manufacturer for the details.

Example of use

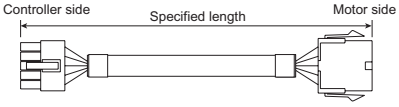
A desired length can be specified for the motor relay harness.
- You can select either a cable for the fixed application or a cable for the movable application.
- The length can be specified in increments of 0.1 m from the minimum 0.2 m length.

Manufacturer: MISUMI Corporation

Name: Motor relay harness

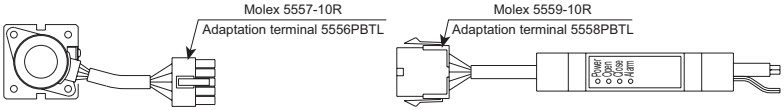
Model: STOP-AS1- A - 1.5

Type of cable	Cable length
A: for fixing	0.2 to 2 m
B: for movable	(0.1 m unit specified)

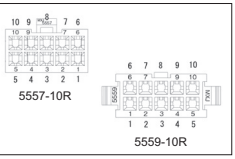


■ Connector

The following types of connectors are used for the unclamp unit and controller.



Name	Pin
Motor	1
Motor	2
Motor	3
Sensor	4
-	5
Motor	6
Motor	7
Sensor	8
Sensor	9
-	10



- Please prepare the connectors and terminals for relay by yourself.
- Use a lead wire of the thickness specified below.
  - ・Rough indication of lead cross sectional area 0.12 mm²
  - ・AWG No.26
  - ・Current value 1.2 A
- Use the specified crimp tool.
  Molex 57026-5000 (for L1007)
  Molex 57027-5000 (for UL1015)
- Be sure to turn off the power supply before starting electric connection work.

Standard type

Standard type with two jaws called MEPAC basic. There are reciprocating type and single action type, and both types are highly accurate parallel slide air chuck developed by original mechanism that was originally developed not to burden operation and precision machining. Achieved light and assured action and downsizing and lightweight.
We are making achievements as chucking parts for industrial machinery such as automatic assembly machine and carrier device, including industrial robots.

	Stroke (mm)		
	4	5	6
Single action Constantly open (NO)	×	×	×
Single action Constantly closed (NC)	×		×
Reciprocating	×	×	×
Single action (NO) With sensor		(1)	(1)
Reciprocating With sensor		(1)	(1)

* The figure within ( ) stands for the number of sensor installations (max).

Stable clamp performance

With the mechanism to open and close parallel, the contact surface of the chuck to workpiece stays constant. Stable chucking even when there is variation in clamp dimension and with different shape.

Light in operation and excellent high-speed response performance.

Apply parallel air swing action lever structure. In addition, built in super-small precise roller that operates smoothly and lightly in the sliding parts. No engaging phenomena, excellent high-speed responsiveness, and a mechanism that provides the ability to obtain sufficient clamp force concurrently.

Excellent installation adjustment

By fixing shank part of the body, position adjustment of the height and rotation direction is possible and speedy set-up can be achieved.

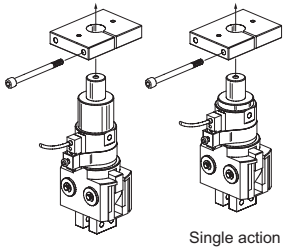
Small, light, and long life

Achieved high performance with a small body of the original structure. Downsizing of device is possible. No unreasonable force is applied to operation direction, and excellent durability and initial performance is maintainable over a long period of time.

Operation detection

Both reciprocating and single action with sensor are available.

Example of installation



Reciprocating　　Single action

* See A-74 for details.

■ Open/Close operation

Reciprocating

When the air comes in from Port A, the large piston pivots the anchor type action lever to [Close].

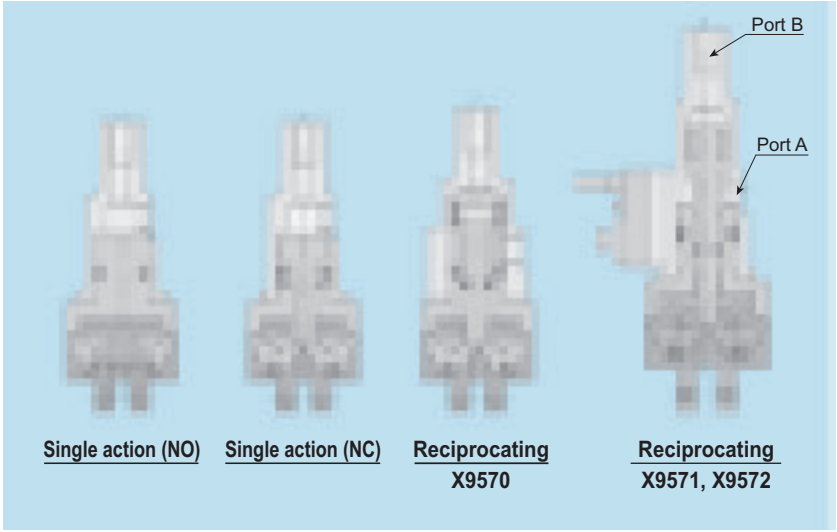
When the air comes in from Port B, the small piston pivots the anchor type action lever towards the opposite direction and [Open] the finger tooling.

Reciprocating type X9570 has different piston structure and port becomes opposite.

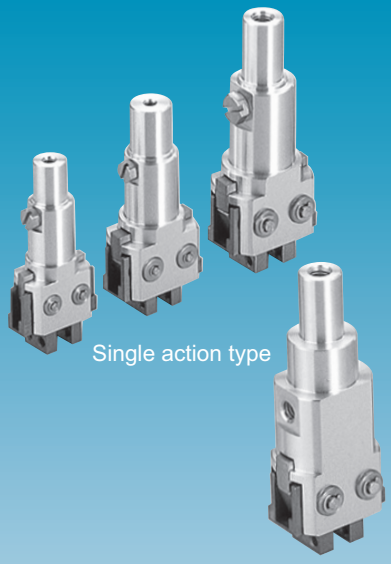
Single action

Spring is built-in between finger toolings or between the large piston and the small piston for single action and the structure becomes NO (constantly open), or NC (constantly close).

■ Structural chart



Standard X95□□ (Type without sensor)



- Abundant types can be selected from minimum to large workpiece.
- Reciprocating type and single action type (NO, NC) are available. Type can be selected according to the application.

■ Variations

Model No. \ Stroke (mm)	4	5	6
X95□□-NO	×	×	×
X95□□-NC	×		×
X95□□ (Reciprocating)	×	×	×

* Refer to A-38 to find the type with sensor.

Product number configuration

X95□□-□□

Model No. Size code

No code: Reciprocating
NO: Single action (constantly open)
NC: Single action (constantly closed)

■ Basic specifications

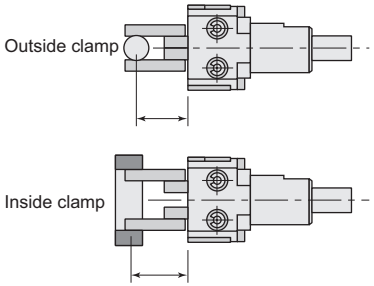
Operating method	Single action type, reciprocating type/ Parallel air chuck
Fluid for use	Clean air (Filtered compressed air)
Working pressure range	0.3 to 0.5 MPa
Ambient temperature	5 to 50°C
Lubrication	Non-lubrication or lubrication equivalent to Turbin oil JIS#90.
Piping connection port	M5 x 0.8
Frequency of use	Max. 60 cpm
Repetitive position accuracy	±0.05 mm

* Refer to precautions in A-72 and in the subsequent pages as well.

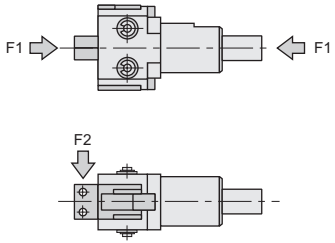
■ Model

Type		Model No.	Cylinder diameter (mm)	Stroke (mm)	Theoretical clamp force (N)	Max. clamp point (mm)	Max. allowable load (N)		Mass (g)
							F1	F2	
Single action	Constantly open	X9558-NO	8	4	5.0	13	13	7	18
		X9559-NO	10	4	8.5	17	16	10	28
		X9560-NO	12	4	13.0	19	23	13	46
		X9561-NO	14	5	18.0	20	30	20	62
		X9562-NO	16	6	24.0	28	37	27	90
	Constantly closed	X9559-NC	10	4	10.0	17	16	10	28
		X9560-NC	12	4	13.5	19	23	13	46
		X9562-NC	16	6	27.0	28	37	27	90
Reciprocating		X9570	12	4	20.5	19	23	13	57
		X9571	14	5	24.5	20	30	20	78
		X9572	16	6	34.0	28	37	27	112
Remarks		*1, 2		*3	*4, 5		*6, 7		

● **Maximum clamp point**



● **Maximum allowance load**

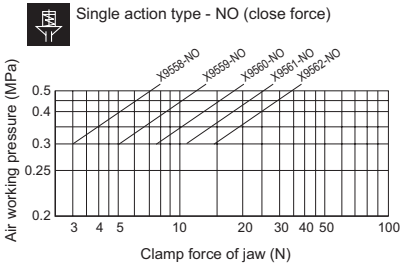


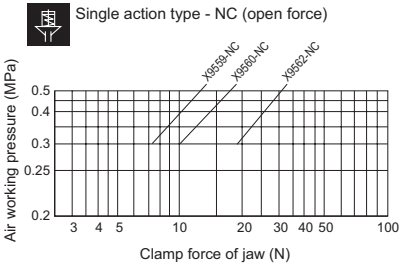
■ Remark description

*1 For the type without sensor, sensor cannot be installed afterward.
*2 Centering for workpiece will not be performed when NO type is used with inside clamp.
*3 Stroke allowance is about 0 to +1 mm.
*4 Clamp force is theoretical value with air pressure of 0.4 MPa.
*5 For reciprocating type, it is the clamp force on the closed side. Clamp force on the open side is 1/2 to 1/3 of the clamp force on the closed side.
*6 The maximum allowance load is the static allowance load and it is not within the range in which finger tooling can be operated.
*7 The maximum allowance load is a rough indication and it is not a guaranteed value. Reduce external force as much as possible.

Standard X95□□ (Type without sensor)

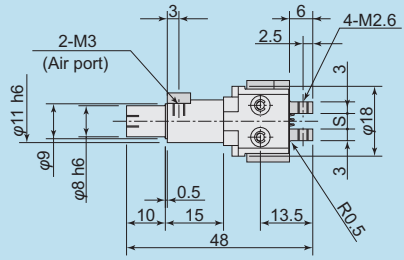
■ Single action type Clamp force

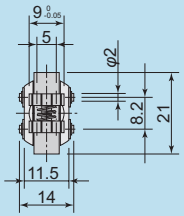




■ Dimensional drawing (mm)

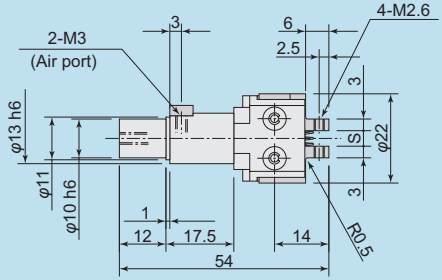
X9558-NO

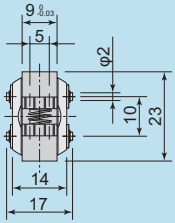




	Open	Close
S	4	0

X9559-NO (NC)



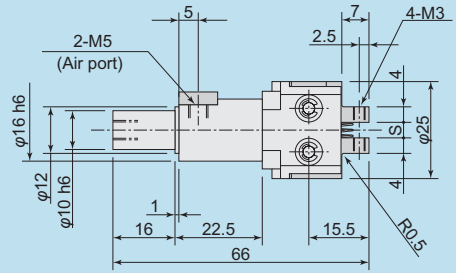


	Open	Close
S	4	0

* No spring between finger toolings for NC.

(mm)

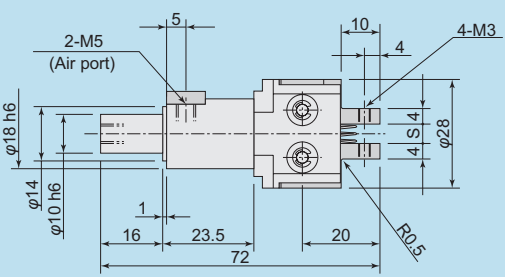
X9560-NO (NC)



	Open	Close
S	4	0

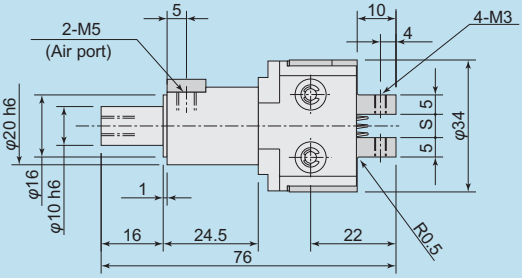
* No spring between finger toolings for NC.

X9561-NO



	Open	Close
S	5	0

X9562-NO (NC)



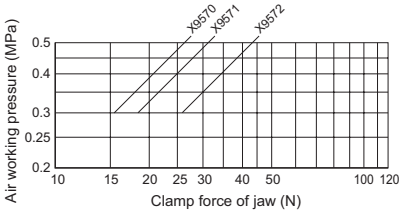
	Open	Close
S	6	0

* No spring between finger toolings for NC.

Standard X95□□ (Type without sensor)

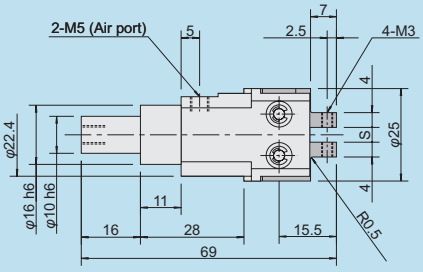
■ Reciprocating type Clamp force

Reciprocating type



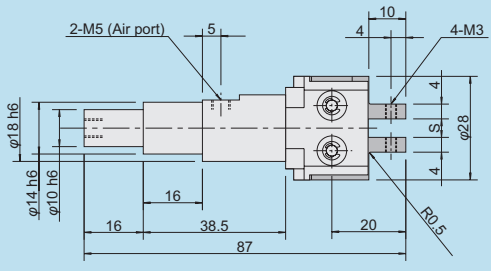
■ Dimensional drawing (mm)

X9570



	Open	Close
S	4	0

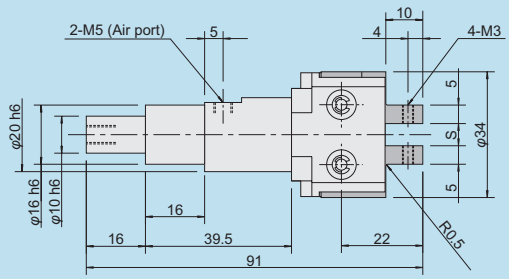
X9571



	Open	Close
S	5	0

(mm)

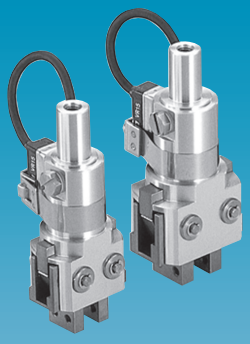
X9572



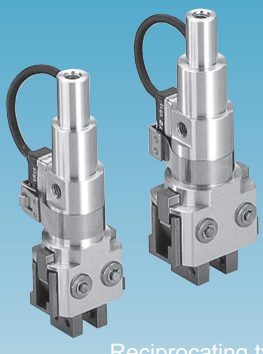
	Open	Close
S	6	0

MEPAC (Parallel air chuck)

Standard X95□□S (Type with sensor)



Single action type



Reciprocating type

- Abundant types can be selected from minimum to large workpiece.
- Reciprocating type and single action type (NO) are available. Type can be selected according to the application.
- The open end position of finger tooling can be detected by open/close operation check sensor.

■ Variations

Model No. \ Stroke (mm)	5	6
X956□S-NO	×	×
X957□S (Reciprocating)	×	×

Product number configuration

X95□□S-□□-□

Model No. Size code — No code: Reciprocating; NO: Single action (constantly open) — No code: Without sensor; S: With 1 sensor

■ Basic specifications

Operating method	Single action type, reciprocating type/ Parallel air chuck
Fluid for use	Clean air (Filtered compressed air)
Working pressure range	0.3 to 0.5 MPa
Ambient temperature	5 to 50°C
Lubrication	Non-lubrication or lubrication equivalent to Turbin oil JIS#90.
Piping connection port	M5 x 0.8
Frequency of use	Max. 60 cpm
Repetitive position accuracy	±0.05 mm

■ Sensor specifications

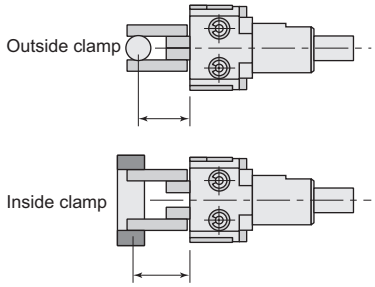
Model	VR15
Working voltage range	Common use of 10 to 125 VAC and 10 to 100 VDC
Working currency range	6 to 40 mA
Maximum open/ close capacity	(AC) 2 VA, (DC) 1 W
Motion time	1 msec or below
Impact resistance	30G
Indicator light	LED Light up when it's ON
Working temperature range	-10 to +60°C
Cord length	5 m

* Refer to A-84 to find how to handle sensor.
* Refer to precautions in A-72 and in the subsequent pages as well.

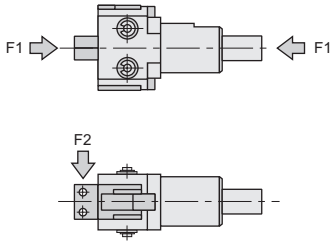
■ Model

Type		Model No.	Cylinder diameter (mm)	Stroke (mm)	Theoretical clamp force (N)	Max. clamp point (mm)	Max. allowable load (N)		Mass (g)	Sensor Number of installations
							F1	F2		
Single action	Constantly open	X9561S-NO	14	5	18.0	20	30	20	62 (94)	1
		X9562S-NO	16	6	24.0	28	37	27	90 (122)	1
Reciprocating		X9571S	14	5	24.5	20	30	20	78 (110)	1
		X9572S	16	6	34.0	28	37	27	112 (144)	1
Remarks		*1		*2	*3, 4		*5, 6		*7	*8

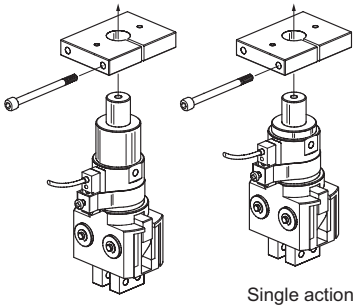
• Maximum clamp point



• Maximum allowance load



■ Example of installation



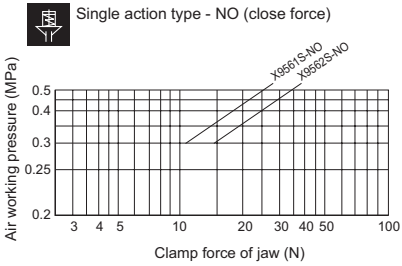
Reciprocating　　Single action

■ Remark description

*1 Centering for workpiece will not be performed when NO type is used with inside clamp.
*2 Stroke allowance is about 0 to +1 mm.
*3 Clamp force is theoretical value with air pressure of 0.4 MPa.
*4 For reciprocating type, it is the clamp force on the closed side. Clamp force on the open side is 1/2 to 1/3 of the clamp force on the closed side.
*5 The maximum allowance load is the static allowance load and it is not within the range in which finger tooling can be operated.
*6 The maximum allowance load is a rough indication and it is not a guaranteed value. Reduce external force as much as possible.
*7 The mass given in ( ) is the value of the product provided with a sensor.
*8 Angle for installing sensor is every 90 degrees from the position indicated in the dimensional drawing.

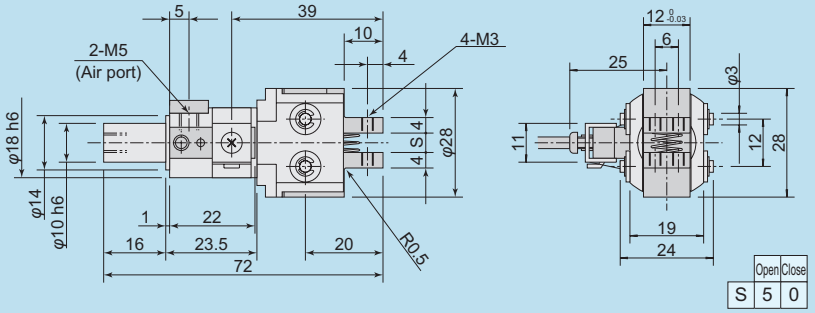
Standard X95□□S (Type with sensor)

■ Single action type Clamp force

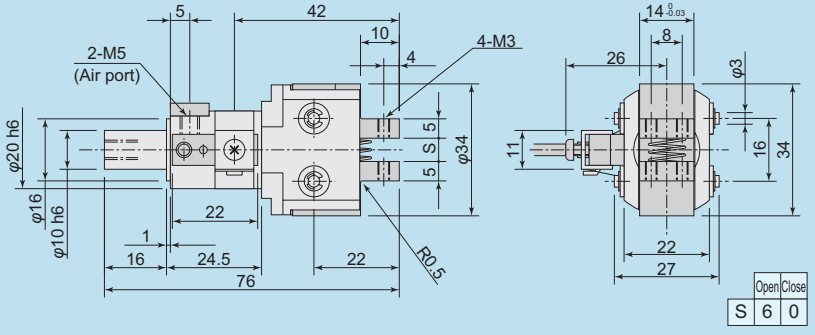


■ Dimensional drawing (mm)

X9561S-NO-S

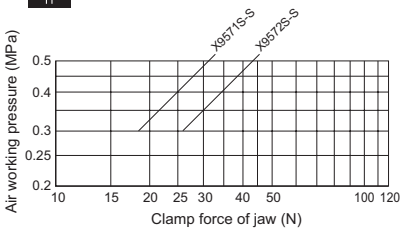


X9562S-NO-S



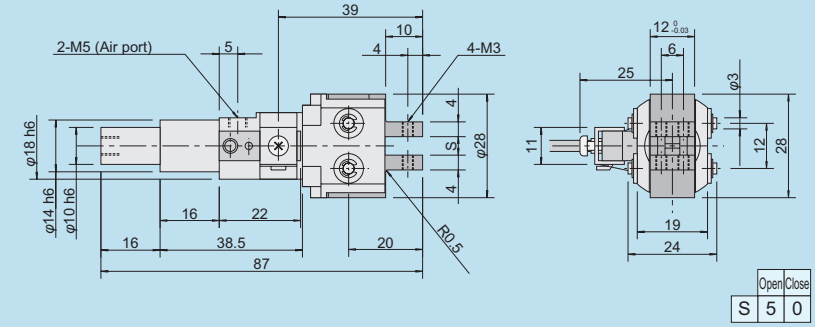
■ Reciprocating type Clamp force

Reciprocating type

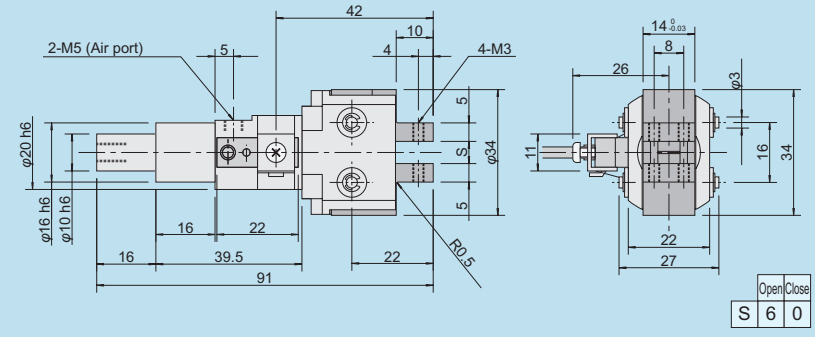


(mm)

X9571S-S



X9572S-S



Taste type

Standard type with two jaws called MEPAC basic, which is relatively a large-size model. There are reciprocating type and single action type, and both types are highly accurate parallel slide air chuck developed by original mechanism that was originally developed not to burden operation and precision machining. Achieved light and assured action and downsizing and lightweight.
We are making achievements as chucking parts for general industrial machinery such as automatic assembly machine and carrier device, including industrial robots.

	Stroke (mm)	
	8	10
Single action Constantly open (NO)	×	×
Reciprocating	×	×
Single action (NO) With sensor	(2)	(2)
Reciprocating With sensor	(2)	(2)

* The figure within () stands for the number of sensor installations (max).

Stable clamp performance

With the mechanism to open and close parallel, the contact surface of the chuck to workpiece stays constant. Stable chucking even when there is variation in clamp dimension and with different shape.

Light in operation and excellent high-speed response performance.

Apply parallel air swing action lever structure. In addition, built in super-small precise roller that operates smoothly and lightly in the sliding parts. No engaging phenomena, excellent high-speed responsiveness, and a mechanism that provides the ability to obtain sufficient clamp force concurrently.

Side installation is possible.

In addition to fixing shank part of the body, installation by using tapped hole and through hole on the side are possible.

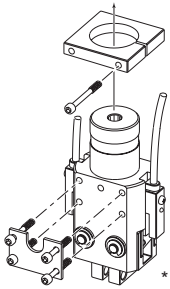
Small, light, and long life

Achieved high performance with a small body of the original structure. Downsizing of device is possible. No unreasonable force is applied to operation direction, and excellent durability and initial performance is maintainable over a long period of time.

Operation detection

Both reciprocating and single action with sensor are available.

Example of installation



* See A-74 for details.

■ Open/Close operation

Reciprocating

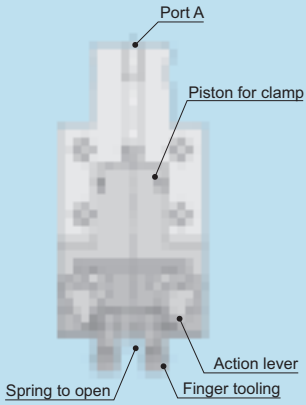
When the air comes in from Port A, the large piston pivots the action lever to [Close].

When the air comes in from Port B, the small piston pivots the action lever towards the opposite direction and [Open] the finger tooling.

Single action

Spring is built-in between finger toolings for single action and the structure becomes NO (constantly open).

■ Structural chart



Single action

Reciprocating (With sensor)

■ Basic specifications

Operating method	Single action type, reciprocating type/ Parallel air chuck
Fluid for use	Clean air (Filtered compressed air)
Working pressure range	0.3 to 0.5 MPa
Ambient temperature	5 to 50°C
Lubrication	Non-lubrication or lubrication equivalent to Turbin oil JIS#90.
Piping connection port	M5 x 0.8
Frequency of use	Max. 60 cpm
Repetitive position accuracy	±0.05 mm

■ Sensor specifications

Model	CS101-A
Power supply voltage	12 to 24 VDC ±10% (Ripple P-P 10% or less)
Working voltage/ current	At 24 VDC, max. 100 mA
Voltage drop	At 24 VDC, max. 1 V
Impact resistance	50G
Vibration resistance	Double amplitude 1.5 mm, 10 to 55 Hz, for 2 hours
Indicator light	LED Light up when it's ON
Working temperature range	-10 to +60°C
Cord length	1.5 m

* Refer to A-86 to find how to handle sensor.
* Refer to precautions in A-72 and in the subsequent pages as well.

MEPAC (Parallel air chuck)

Taste X95□□T

- Side installation is possible by using the mounting hole for the main body.
- Reciprocating type and single action type (NO) are available. Type can be selected according to the application.
- Position of finger tooling can be detected by open/close operation check sensor.

■ Variations

Model No. \ Stroke (mm)	8	10
X956□T	×	×
X957□T	×	×

With sensor

Product number configuration

X95□□T-□□

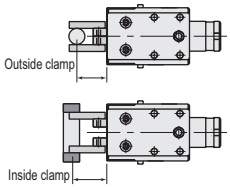
Model No. Size code

No code: Without sensor
S: With 1 sensor
SS: With 2 sensors

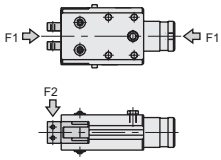
■ Model

Type		Model No.	Cylinder diameter (mm)	Stroke (mm)	Theoretica clamp force (N) 0.4 MPa	Max. clamp point (mm)	Max. allowable load (N) F1	Max. allowable load (N) F2	Mass (g)	Sensor Number of installations
Single action	Constantly open	X9563T	20	8	38.0	36	40	33	211 (263)	2
		X9564T	25	10	68.0	43.5	60	40	383 (435)	2
Recipro-cating		X9573T	20	8	52.5	36	40	33	237 (289)	2
		X9574T	25	10	87.5	43.5	60	40	428 (480)	2
Remarks		*1			*2		*3, 4		*5	

● Max. clamp point



● Maximum allowance load

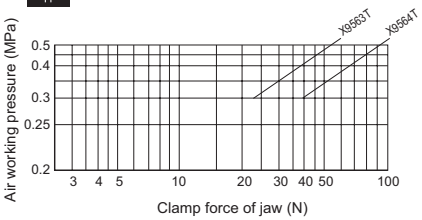


■ Remark description

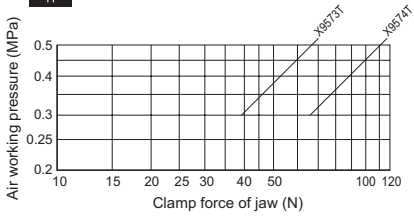
*1 Inside clamp is not possible with NO type.
*2 For reciprocating type, it is the clamp force on the closed side. Clamp force on the open side is 1/2 to 1/3 of the clamp force on the closed side.
*3 The maximum allowance load is the static allowance load and it is not within the range in which finger tooling can be operated.
*4 The maximum allowance load is a rough indication and it is not a guaranteed value. Reduce external force as much as possible.
*5 The mass given in ( ) is the value of the product provided with two sensors.

Clamp force

Single action type (close force)

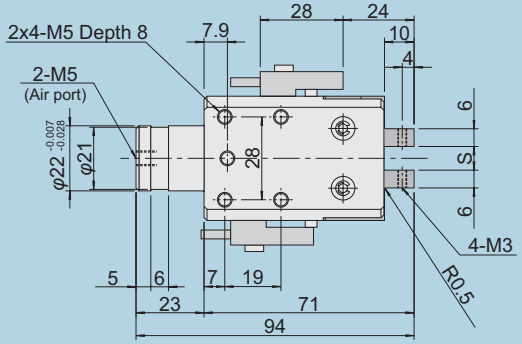


Reciprocating type



Dimensional drawing (mm)

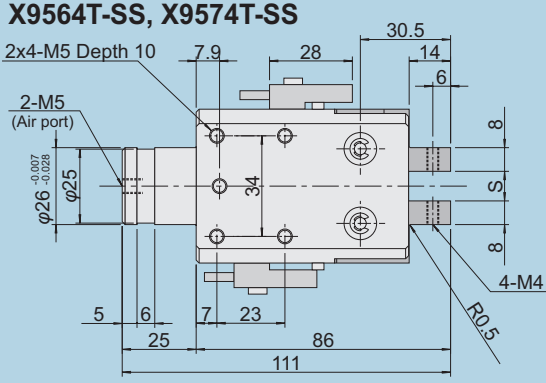
X9563T-SS, X9573T-SS



Open	Close
S 8	0

* For X9563T, one side of the port has a plug, and spring between finger toolings.

X9564T-SS, X9574T-SS



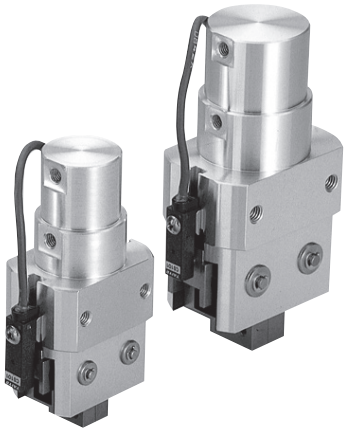
Open	Close
S 10	0

* For X9564T, one side of the port has a plug, and spring between finger toolings.

MEPAC (Parallel air chuck)

All-purpose type

MEPAC parallel air chuck all-purpose type succeeded excellent functions of MEPAC series, and was designed to be more user-friendly, and compatible to broader range of applications. We received a favorable reception since release in 1986 and we are making an achievement as a chucking parts for general industrial machinery such as automatic assembly machine and carrier devices, including industrial robots.



	Stroke (mm)				
	6	8	10	12	16
Single action Constantly open (NO)	×	×	×	×	×
Single action Constantly closed (NC)	×	×	×	×	×
Reciprocating	×	×	×	×	×
Single action (NO) With sensor	(2)	(2)	(2)	(2)	(2)
Single action (NC) With sensor	(2)	(2)	(2)	(2)	(2)
Reciprocating With sensor	(2)	(2)	(2)	(2)	(2)

* The figure within ( ) stands for the number of open end detection sensor installations (max).

Original mechanism with which we are proud of the light operation

In addition to highly efficient swing action lever structure, engaging phenomena was suppressed by adopting ultra-small precision roller to the sliding part and achieving light operation. Excellent high-speed responsiveness, maintain high efficiency and exercise sufficient clamp force.

The number of sensors can be selected.

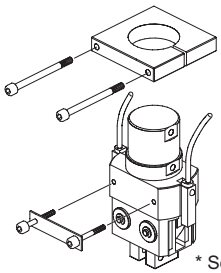
With one sensor or two sensors. The number of sensors to set to the main unit can be selected at ordering. Operation of the chuck uses the method to notify by switching ON and lightening the luminous diode. Operation can be checked, therefore, it is highly reliable design allowing handling at ease.

Received recognition for always stable clamp performance

MEPAC is parallel open and close motion with the constant contact surface of the chuck. Stable chucking even when there is variation in clamp dimension and with different shape.

Excellent installation characteristics

By fixing shank part of the body, position adjustment of height and rotation direction is possible. In addition, it is possible to perform side installation by using mounting tap on the side.



* See A-75 for details.

■ Open/Close operation

Reciprocating

When the air comes in from Port A, the large piston pivots the action lever and [Close] the finger tooling.

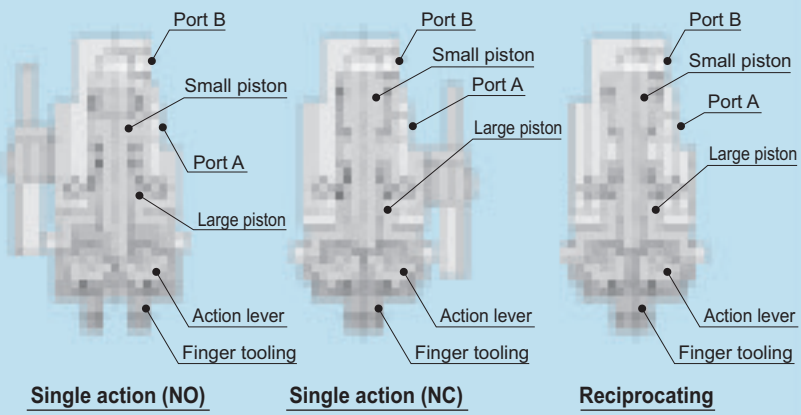
When the air comes in from the Port B, the small piston pivots the action lever and [Open] the finger tooling.

Single action

For constantly open (NO), spring is built-in on the upper part of the small piston and open by air OFF.
When the air comes in from Port A, the large piston pivots the action lever to [Close].

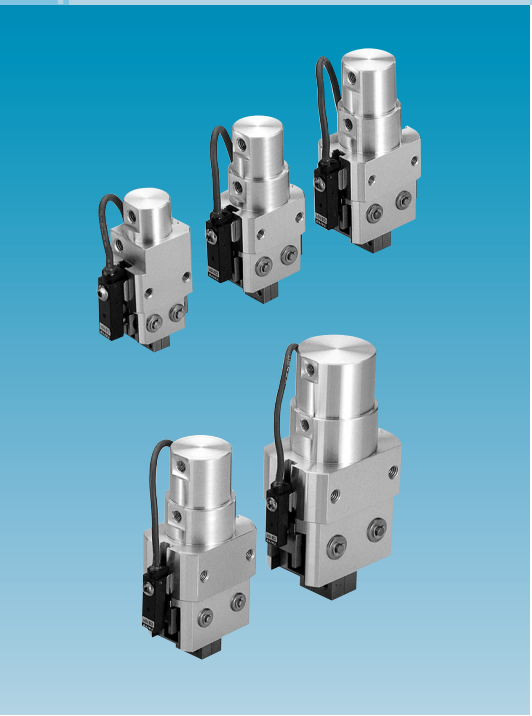
For constantly close (NO), spring is built-in between the large piston and the small piston, and close by air OFF.
When the air comes in from Port B, the small piston pivots the action lever and [Open] the finger tooling.

■ Structural chart



MEPAC (Parallel air chuck)

All-purpose X966□



- Stroke is large compared to standard type, therefore, wider range of use.
- Side installation is possible by using the mounting hole of the main body.
- Position of finger tooling can be detected by open/close operation check sensor.

■ Variations

Model No. \ Stroke (mm)	6	8	10	12	16
X966□-NO	×	×	×	×	×
X966□-NC	×	×	×	×	×
X966□-DO	×	×	×	×	×

With sensor

Product number configuration

X966 □ - □□ - □□

Model No. / Size code / NO: Single action (constantly open) NC: Single action (constantly closed) DO: Reciprocating / No code: Without sensor S: With 1 sensor SS: With 2 sensors

■ Basic specifications

Operating method	Single action type, reciprocating type/ Parallel air chuck
Fluid for use	Clean air (Filtered compressed air)
Working pressure range	0.3 to 0.5 MPa
Ambient temperature	5 to 50°C
Lubrication	Non-lubrication or lubrication equivalent to Turbin oil JIS#90.
Piping connection port	M5 x 0.8
Frequency of use	Max. 60 cpm
Repetitive position accuracy	±0.05 mm

■ Sensor specifications

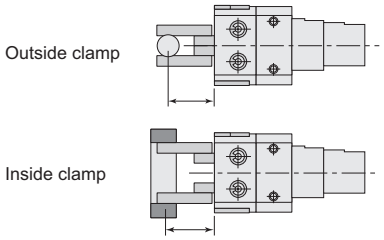
Model	CS101-A
Power supply voltage	12 to 24 VDC ±10% (Ripple P-P 10% or less)
Working voltage/ current	At 24 VDC, max. 100 mA
Voltage drop	At 24 VDC, max. 1 V
Impact resistance	50G
Vibration resistance	Double amplitude 1.5 mm, 10 to 55 Hz, for 2 hours
Indicator light	LED Light up when it's ON
Working temperature range	-10 to +60°C
Cord length	1.5 m

* Refer to A-86 to find how to use sensor.
* Refer to precautions in A-72 and in the subsequent pages as well.

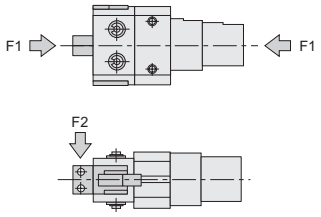
■ Model

Type		Model No.	Cylinder diameter (mm)	Stroke (mm)	Theoretical clamp force (N)	Max. clamp point (mm)	Max. allowable load (N)		Mass (g)	Sensor Number of installations
							F1	F2		
Single action	Constantly open	X9660-NO	12	6	20.5	19.0	23	13	75 (127)	2
		X9661-NO	14	8	24.5	22.5	30	20	120 (172)	2
		X9662-NO	16	10	34.0	28.0	37	27	170 (222)	2
		X9663-NO	20	12	52.5	36.0	40	33	260 (312)	2
		X9664-NO	25	16	87.5	46.0	60	40	480 (532)	2
	Constantly closed	X9660-NC	12	6	15.5	19.0	23	13	75 (127)	2
		X9661-NC	14	8	20.0	22.5	30	20	120 (172)	2
		X9662-NC	16	10	28.0	28.0	37	27	170 (222)	2
		X9663-NC	20	12	49.0	36.0	40	33	260 (312)	2
		X9664-NC	25	16	81.0	46.0	60	40	480 (532)	2
Reciprocating		X9660-DO	12	6	20.5	19.0	23	13	75 (127)	2
		X9661-DO	14	8	24.5	22.5	30	20	120 (172)	2
		X9662-DO	16	10	34.0	28.0	37	27	170 (222)	2
		X9663-DO	20	12	52.5	36.0	40	33	260 (312)	2
		X9664-DO	25	16	87.5	46.0	60	40	480 (532)	2
Remarks				*1	*2, 3		*4, 5		*6	

• Maximum clamp point



• Maximum allowance load



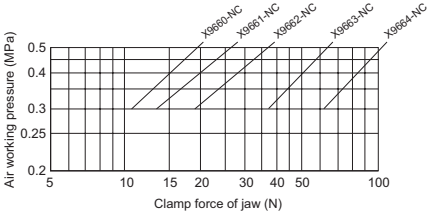
■ Remark description

*1 Stroke allowance is about 0 to +1 mm.
*2 Clamp force is theoretical value with air pressure of 0.4 MPa.
*3 Open force of reciprocating type is 1.1 to 1.3 times of close force.
*4 The maximum allowance load is the static allowance load and it is not within the range in which finger tooling can be operated.
*5 The maximum allowance load is a rough indication and it is not a guaranteed value. Reduce external force as much as possible.
*6 The mass given in ( ) is the value of the product provided with two sensors.

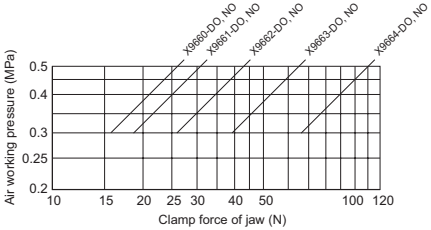
All-purpose X966□

■ Clamp force

Single action type - NC (open)

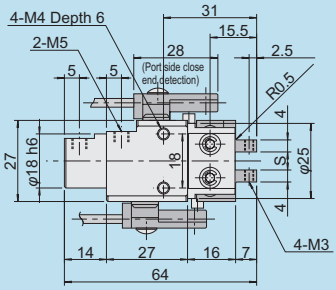


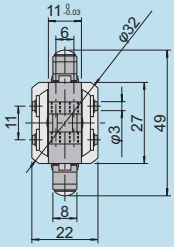
Single action type－NO (close)
Reciprocating －DO (close)



■ Dimensional drawing (mm)

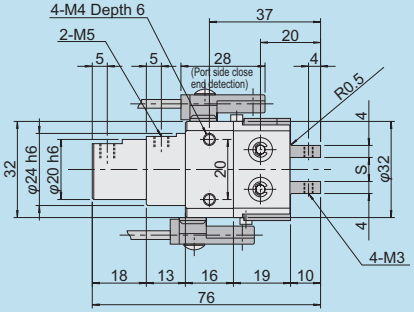
X9660-□-SS

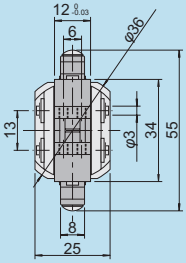




	Open	Close
S	6	0

X9661-□-SS

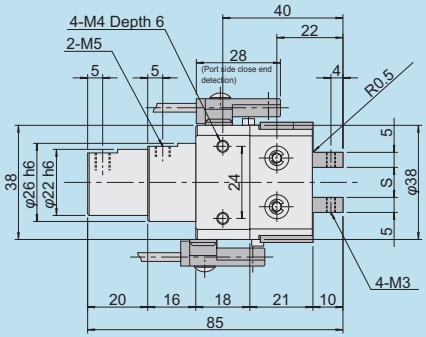


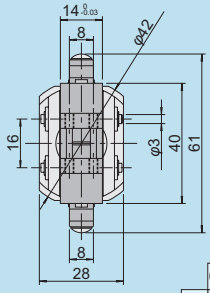


	Open	Close
S	8	0

(mm)

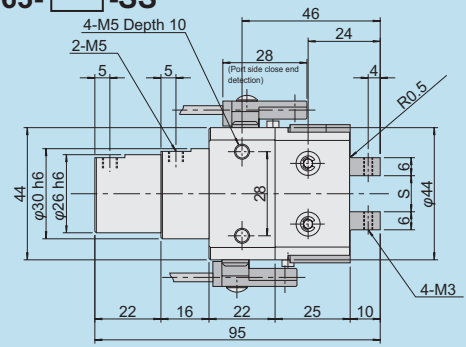
X9662-□-SS

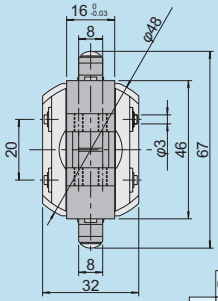




	Open	Close
S	10	0

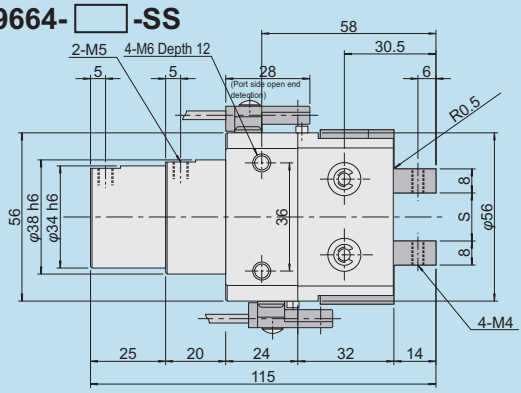
X9663-□-SS

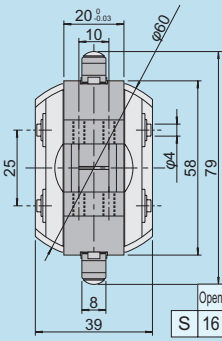




	Open	Close
S	12	0

X9664-□-SS



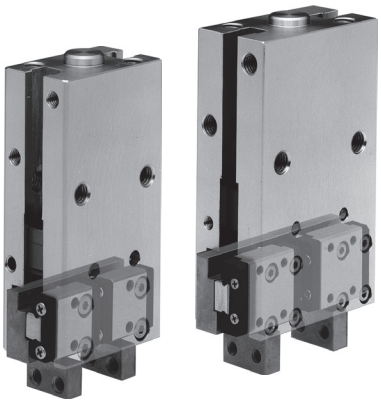


	Open	Close
S	16	0

MEPAC (Parallel air chuck)

Pursued highly accurate soft clamp MEPAC — Smart type by introducing evolving linear guide.

MEPAC-Smart type air parallel chuck remains the excellent clamp function of MEPAC series intact, incorporated “linear guide” with higher accuracy and excellent sliding characteristic, and achieved high performance and user-friendliness.
The next generation chucking unit derived from persistent questioning mind toward “refinement”.



	Stroke (mm)	
	4	6
Single action Constantly open (NO)	×	×
Reciprocating	×	×
Single action (NO) With sensor	(2)	(2)
Reciprocating With sensor	(2)	(2)

* The figure within ( ) stands for the number of open/close end detection sensor installations (max).

■ Highly accurate finger guide pursued accuracy. Keyword is “∞”.

Endless track linear guide is built-in and accuracy was improved and low air pressure operation became possible. Accurate handling with no back-lash and soft clamp embodies lofty ideal of engineers in machine design.

■ Excel at combination with clamp mechanism having an established reputation.

Introduced existing mechanism, which has established a reputation with good conduction efficiency, to the lever that transmits thrust to the finger tooling. Smooth transmission assists chucking.

■ Easy mount design to respond to various requests from engineers.

With three-surface mounting tap with compact square body. Easy installation and the specification allows responding to various requests of engineers from design to customization.

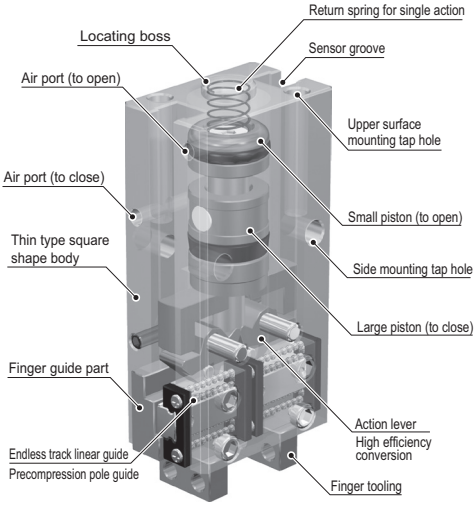
■ With flexible and stable clamp, “good feeling”.

Introduced short and wide finger tooling. Achieved stable clamp by shortening overhang up to clamp point of the workpiece.

■ Response to reliance of users by long life.

Excellent mechanism reduces “engaging” and “back-rash” and secure high clamp accuracy. Furthermore, long-life with ten million times or more, and respond to reliance of the user.

Structural chart



Basic specifications

Operating method	Single action type, reciprocating type/Parallel air chuck
Fluid for use	Clean air (Filtered compressed air)
Working pressure range	Single action 0.2 to 0.5 MPa/Reciprocating 0.1 to 0.5 MPa
Ambient temperature	5 to 50°C
Lubrication	Non-lubrication or lubrication equivalent to Turbin oil JIS#90.
Piping connection port	M5 x 0.8, M3 x 0.5
Frequency of use	Max. 120 cpm
Repetitive position accuracy	±0.01 mm
Lubrication (linear guide)	With low particle emission grease

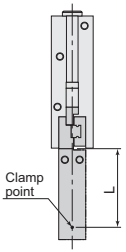
* Refer to precautions in A-72 and in the subsequent pages as well.

Standard sensor specifications

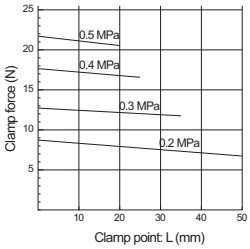
Name	Contact two-wire type sensor	
Model	0H	
Load voltage	12/24 VDC	100 VAC
Loading current	5 to 50 mA	7 to 20 mA

* Refer to descriptions from A-88 to the subsequent pages to find the detail of option sensor such as non contact.
* Refer to the descriptions from A-88 to the subsequent pages to find how to handle sensor.

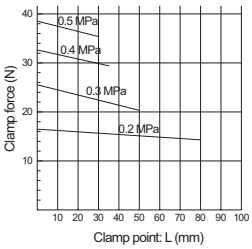
Effective clamp force (close)



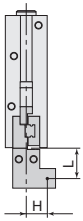
X9670



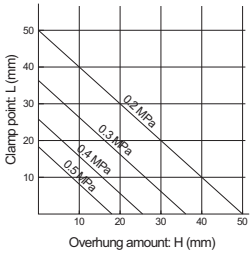
X9672



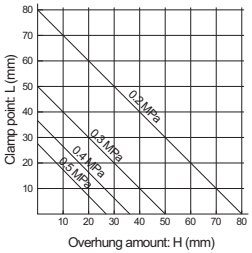
Clamp point



X9670



X9672



MEPAC (Parallel air chuck)

Smart X967□

- Endless track linear guide is built-in and accuracy was improved and low pressure operation became possible.
- Side installation is possible by using the mounting hole of the main body.
- Position of finger tooling can be detected by open/close operation check sensor.

■ Variations

Model No. \ Stroke (mm)	4	6
X967□-NO	×	×
X967□-DO	×	×

With sensor

Product number configuration

X967□-□□-□□-□

- Model No.
- Size code
- NO: Single action (constantly open) DO: Reciprocating
- No code: Without sensor S: With 1 sensor SS: With 2 sensors
- Option sensor Model

Standard sensor 0H (Contact 2-wire)

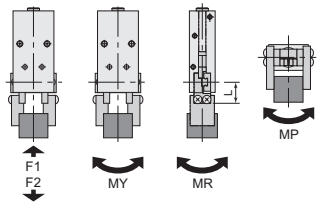
For more information on the sensor, please refer to A-88.

■ Model

Type		Model No.	Cylinder diameter (mm)	Stroke (mm)	Theoretical clamp force (N)	Mass (g)	Sensor Number of installations
Single action	Constantly open	X9670-NO	12	4	16	76.5	2
		X9672-NO	16	6	31	183.0	2
Reciprocating		X9670-DO	12	4	16	76.5	2
		X9672-DO	16	6	31	183.0	2
Remarks				*1	*2	*3	

*1 Stroke allowance is about 0 to +1 mm.
*2 Clamp force is a theoretical value with air pressure 0.4 MPa.
*3 The mass given is the value of the product provided without sensor.

■ Allowance load and allowance moment

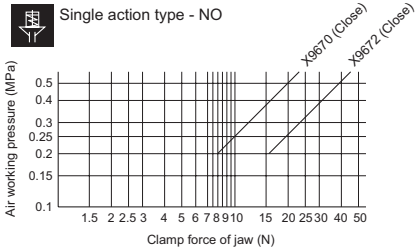


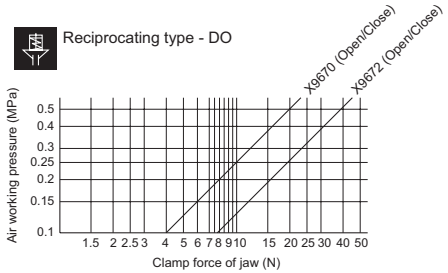
1 N·m = 0.102 kgf·m

	Allowance vertical load (N)		Allowance moment (N•m)			Moment Center
Model	F1	F2	MY	MR	MP	L (mm)
X9670	245	55	0.27	0.63	0.4	14
X9672	568	111	0.88	1.73	1.36	19

* Load and moment in the table are static values.

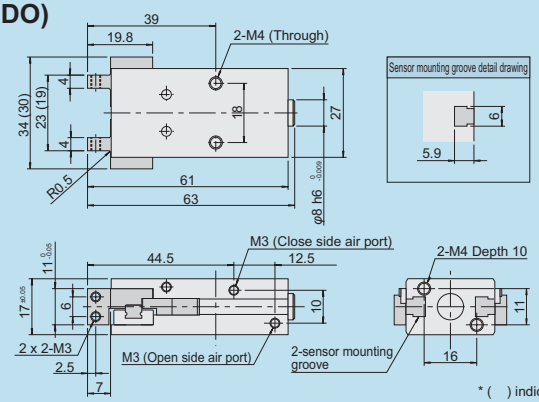
Clamp force





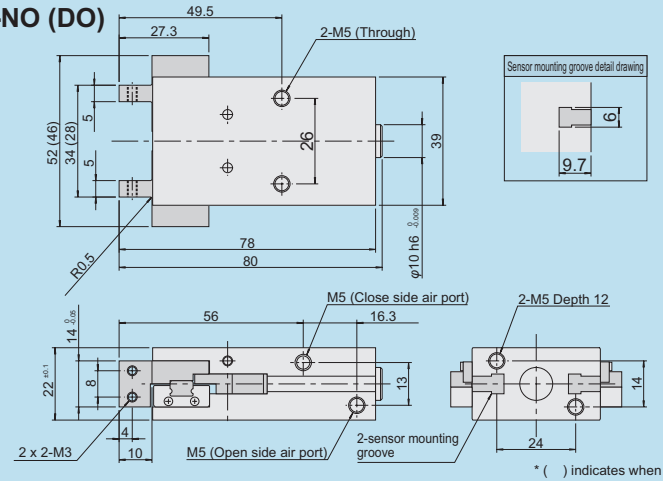
Dimensional drawing (mm)

X9670-NO (DO)



* ( ) indicates when closing.

X9672-NO (DO)



* ( ) indicates when closing.

Micro type

Thickness is only 10 mm, mass 20 g. [Ultra-small] two jaws parallel air chuck as small as a female pinkie finger. In the past, for supply of relatively light-weight small-size parts, vacuum chuck has been used, but there have been many cases of chucking mistake depending on the shape of the parts and state of finish. In order to prevent such mistakes, and perform more accurate and assured chucking, parallel air chuck is the best. Featured Micro MEPAC developed by gathering all efforts of MEG design and fabrication method together as an ultra delicate tip of a finger for FA equipment that demand supply of minute workpiece.

■ Delicate as tweezers

Small but it is MEPAC. Built-in original mechanism inside the ultra-small body. Very stable ideal air parallel motion with constant contact face of the chuck against workpiece. Achieved delicate but assured clamp.

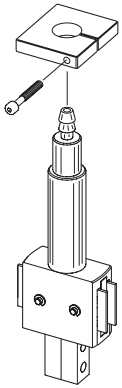
■ Strong at speeding up and easy handling.

Ultra lightweight and small inertia enables speed up. Furthermore, the design, which integrates chuck body and barb fitting, allows to perform easy piping work.

■ Ultra-small and flat. Mastered smallness.

It is not only that the size is small. Ultra-flat shape, which the excellent manufacturing technology enabled first time. Using by space-saving became possible by enabling alignment with narrow pitch.

■ Example of installation



* See A-76 for details.

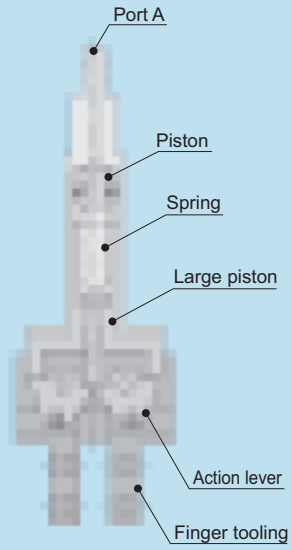
■ Open/close operation

Single action

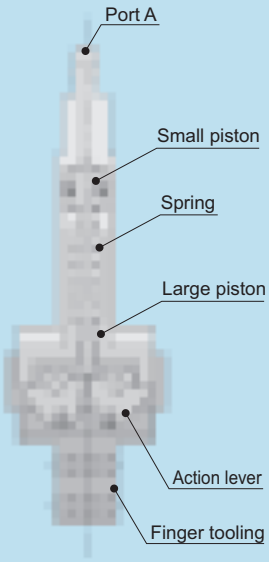
For constantly open (NO), when the air comes in from the port, the piston pushes the large piston, and then, the action lever pivots to [Close].

For constantly closed (NC), when the air comes in from the port, the small piston pivots the action lever to [Open].

■ Structural chart



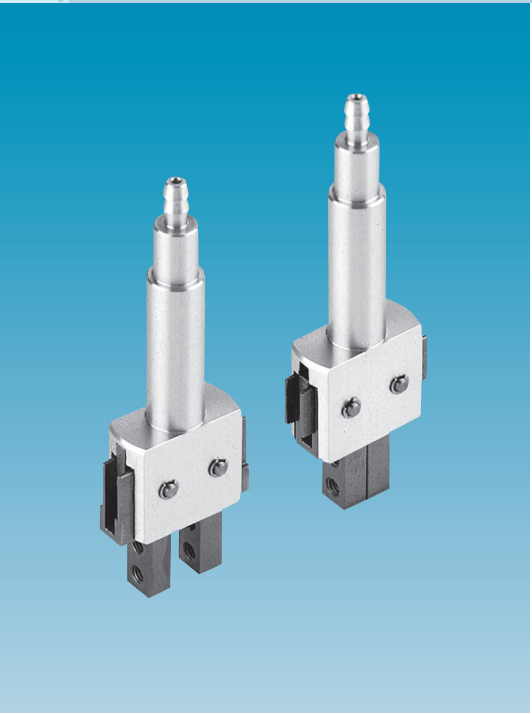
Single action (NO)



Single action (NC)

MEPAC (Parallel air chuck)

Micro X960□



- Thickness is only 10 mm, mass 20 g. [Ultra-small] two jaws parallel air chuck as small as a female pinkie finger.

■ Variations

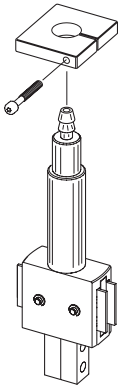
Model No. \ Stroke (mm)	4	NO (constantly open)	NC (constantly closed)
X9600	×	×	
X9605	×		×

Product number configuration

X960 □

Model No. Size code

■ Example of installation



■ Basic specifications

Operating method	Single action type/Parallel air chuck
Fluid for use	Clean air (Filtered compressed air)
Working pressure range	0.4 to 0.5 MPa
Ambient temperature	5 to 50°C
Lubrication	Non-lubrication or lubrication equivalent to Turbin oil JIS#90.
Piping connection port	With fitting for φ4 x φ2.5 tube
Frequency of use	Max. 40 cpm
Repetitive position accuracy	±0.05 mm

* Refer to precautions in A-72 and in the subsequent pages as well.

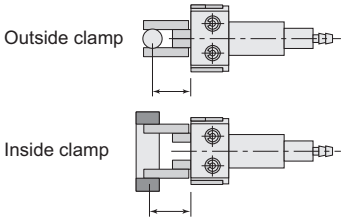
■ Model

Type		Model No.	Cylinder diameter (mm)	Stroke (mm)	Theoretical clamp force (N)	Max. clamp point (mm)	Max. allowable load (N)		Mass (g)
							F1	F2	
Single action	Constantly open	X9600	6	4.0	3.0	17.0	10	3	20
Single action	Constantly closed	X9605	6	4.0	3.0	17.0	10	3	20
Remarks				*1	*2		*3, 4		

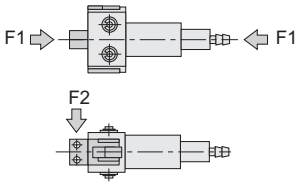
■ Remark description

*1 Stroke allowance is about 0 to +1 mm.
*2 Clamp force is theoretical value with air pressure of 0.5 MPa.
0.4 MPa X9600: 2.4 N X9605: 1.4 N
*3 The maximum allowance load is the static allowance load and it is not within the range in which finger tooling can be operated.
*4 The maximum allowance load is a rough indication and it is not a guaranteed value. Reduce external force as much as possible.

● **Maximum clamp point**

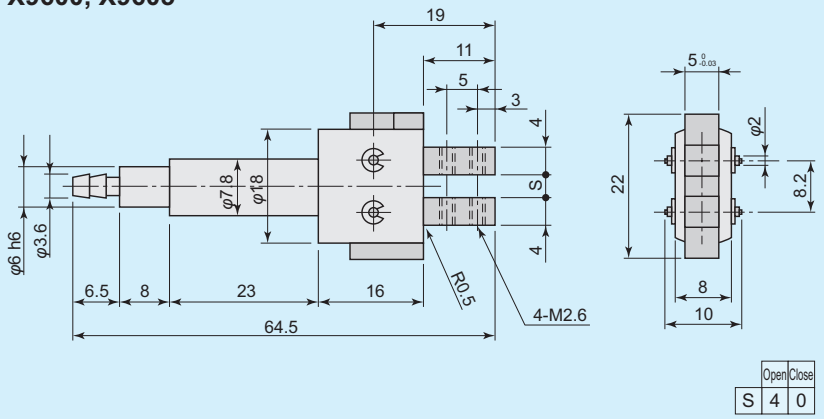


● **Maximum allowance load**



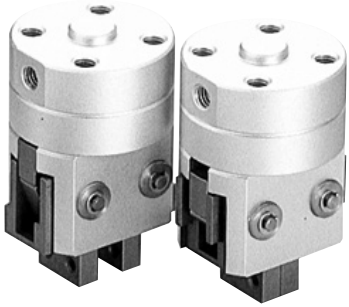
■ Dimensional drawing (mm)

X9600, X9605



Short type

MEPAC with [ultra-short] two jaws, which was developed as a parallel air chuck that can exercise large clamp power even in the narrow space. Elaborate design by holding down the length of body. Enables to use in a narrow space with few overhang by the short trunk shape. In addition, lightweight and simple. Already being active in various automatic assembly machines and carrier devices including industrial robots.



	Stroke (mm)	4	4	4	6
	Clamp force (N)*	5	8.5	13	24
Single action Constantly open (NO)		×	×	×	×
Single action Constantly closed (NC)		×	×	×	×

* Clamp force is the value for NO type at 0.4 MPa.

Ultra-short but stable clamp

Although the body dimension is small, the clamp force is larger and highly accurate by parallel open and close motion by means of MEPAC original overlap roller guide method. Stable chucking even when there is variation in clamp dimensions and with irregular shape.

The characteristics are light and engaging-free operation.

No engaging phenomena due to the highly efficient in operation by swing action lever mechanism and introduction of ultra-small precision roller. Light operation, excellent high-speed responsiveness, and exercise sufficient clamp force.

Ultra-short and highly accurate

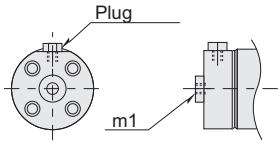
Short body dimensions allows shortening of the dimensions from installation part to workpiece clamp part, and the pursuit of stable supply accuracy by suppressing overhang amount.

Long life despite small size

Highly economically efficient parallel air chuck, which can be used over a long period of time with excellent durability and constantly smooth movement by the mechanism unique to MEPAC, which does not allow functioning with unreasonable force towards the operation direction.

Center port option

As an option, center port type is available.



■ Open/close operation

Constantly open (NO)

When the air comes in from Port A, the large piston pivots the action lever to [Close].

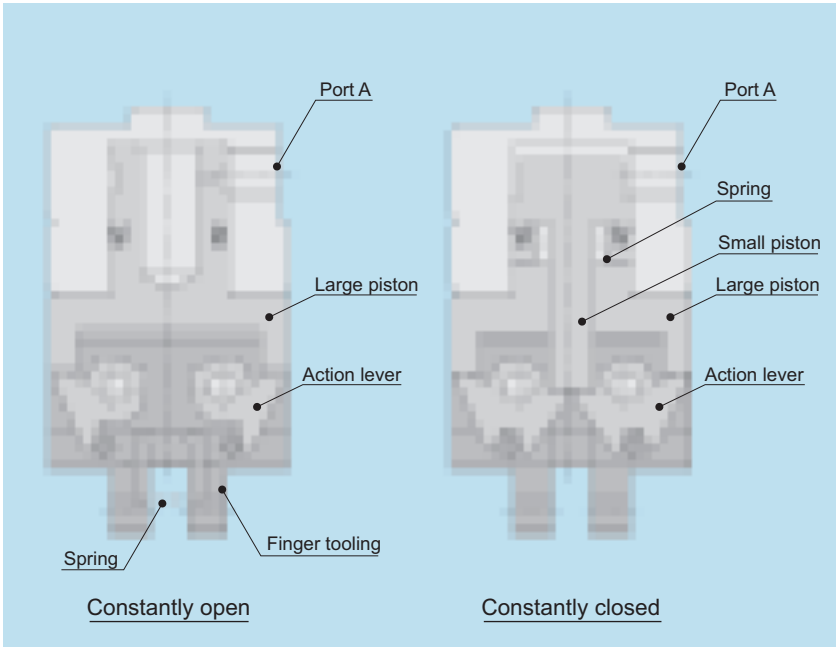
When the air comes out from Port A, the finger tooling became [Open] by spring of the finger tooling, and the large piston is returned.

Constantly closed (NC)

When the air comes in from Port A, the small piston pivots the action lever to [Open].

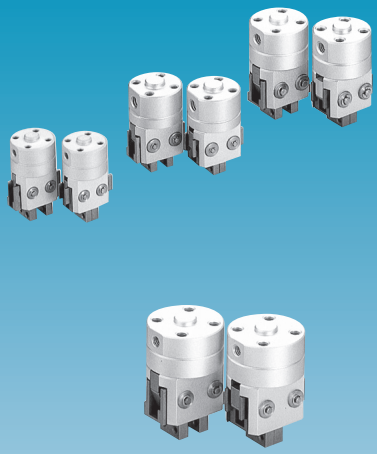
When the air comes out from Port A, the small piston is returned by the spring on the upper side of the large piston, and the large piston pivots the action lever to [Close].

■ Structural chart



MEPAC (Parallel air chuck)

Short X95□□B



- Parallel air chuck that enables to used in a narrow space with few overhang by the short trunk shape.
- Side installation is possible by using the mounting hole of the main body.

■ Variations

Model No. \ Stroke (mm)	4	6
X95□□B-NO	×	×
X95□□B-NC	×	×

Product number configuration

X95□□B-□□-□

- Model No.
- Size code
- Short
- NO: Single action (constantly open)
- NC: Single action (constantly closed)
- C: Center port
- No code: Standard port

* Center port is an option. Refer to page A-65.

■ Basic specifications

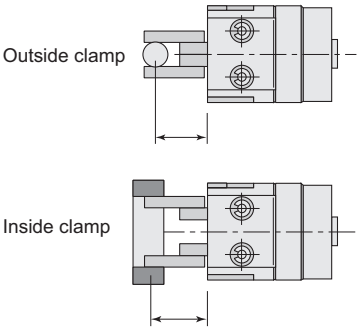
Operating method	Single action type/Parallel air chuck
Fluid for use	Clean air (Filtered compressed air)
Working pressure range	0.3 to 0.5 MPa
Ambient temperature	5 to 50°C
Lubrication	Non-lubrication or lubrication equivalent to Turbin oil JIS#90.
Piping connection port	M5 x 0.8 M3 x 0.5
Frequency of use	Max. 60 cpm
Repetitive position accuracy	±0.05 mm

* Refer to precautions in A-72 and in the subsequent pages as well.

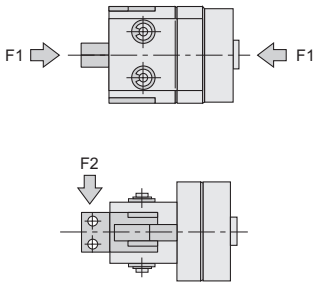
■ Model

Type		Model No.	Cylinder diameter (mm)	Stroke (mm)	Theoretical clamp force (N)	Max. clamp point (mm)	Max. allowable load (N)		Mass (g)
							F1	F2	
Single action	Constantly open	X9558B-NO	8	4.0	5.0	13.0	13	7	22
		X9559B-NO	10	4.0	8.5	17.0	16	10	32
		X9560B-NO	12	4.0	13.0	19.0	23	13	50
		X9562B-NO	16	6.0	24.0	28.0	37	27	110
	Constantly closed	X9558B-NC	8	4.0	4.5	13.0	13	7	22
		X9559B-NC	10	4.0	10.0	17.0	16	10	32
		X9560B-NC	12	4.0	13.5	19.0	23	13	50
		X9562B-NC	16	6.0	27.0	28.0	37	27	110
Remarks		*1		*2	*3		*4, 5		

● **Maximum clamp point**



● **Maximum allowance load**



■ Remark description

*1 Centering for workpiece will not be performed when NO type is used with inside clamp.

*2 Stroke allowance is about 0 to +1 mm.

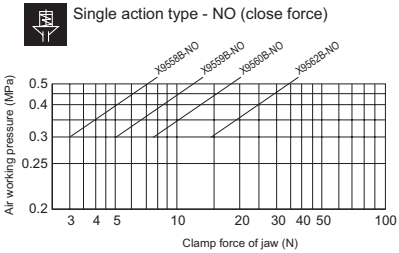
*3 Clamp force is theoretical value with air pressure of 0.4 MPa.

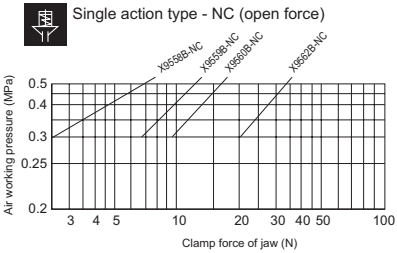
*4 The maximum allowance load is the static allowance load and it is not within the range in which finger tooling can be operated.

*5 The maximum allowance load is a rough indication and it is not a guaranteed value. Reduce external force as much as possible.

Short X95□□B

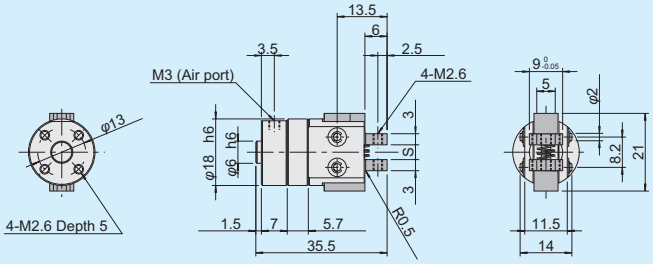
■ Clamp force





■ Dimensional drawing (mm)

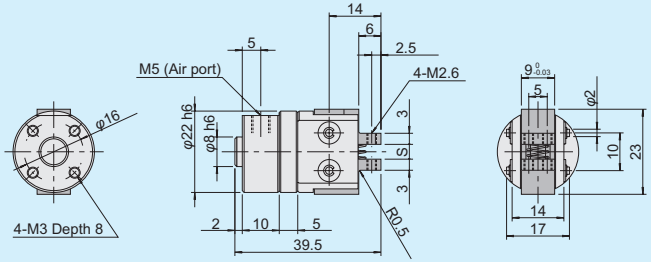
X9558B-NO (NC)



* No spring between finger toolings for NC.

	Open	Close
S	4	0

X9559B-NO (NC)

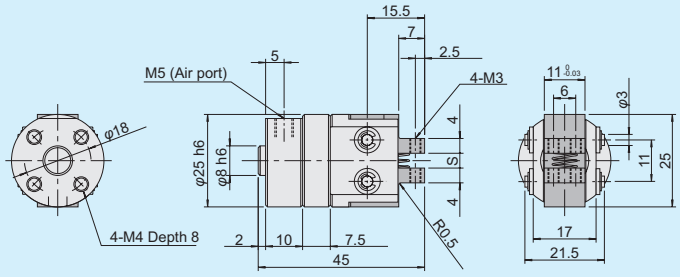


* No spring between finger toolings for NC.

	Open	Close
S	4	0

(mm)

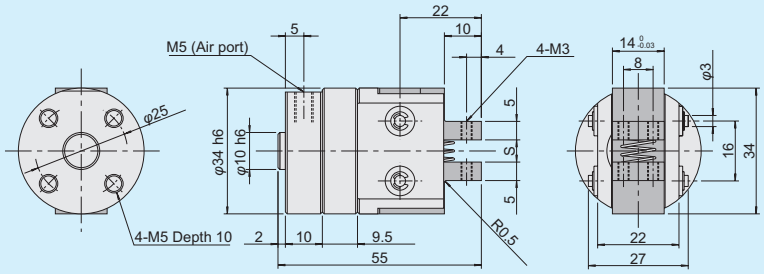
X9560B-NO (NC)



* No spring between finger toolings for NC.

	Open	Close
S	4	0

X9562B-NO (NC)

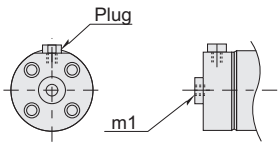


* No spring between finger toolings for NC.

	Open	Close
S	6	0

Center port

- Center port has a plug to standard port and m1 is added to the main body upper surface center.

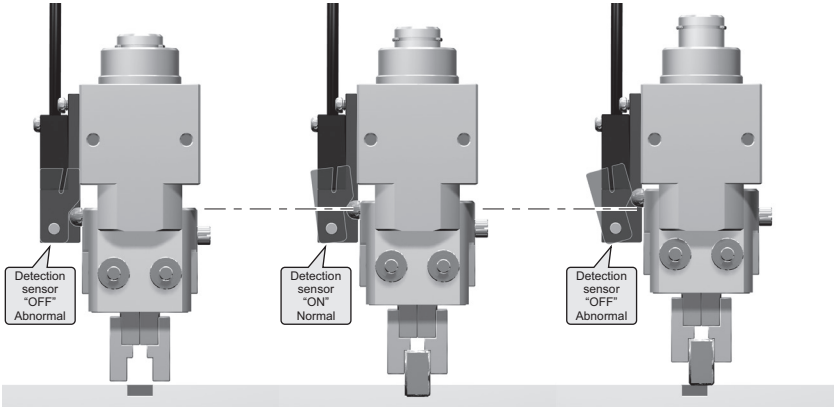


Model No.	m1
X9558B	M3
X9559B	M5
X9560B	M5
X9562B	M5

MEPAC (Parallel air chuck)

Evolving MEPAC — Floating type
Enabled collision safety by mounting floating mechanism.

MEPAC series received deep trust for chucking part for multitudes of general industrial machinery from many users, and obtained new function, which is said to be “collision safety”. MEPAC-Floating type parallel air chuck has a built-in floating mechanism to the excellent function of MEPAC series. Epoch-making chucking unit, which protects chuck and workpiece from collision, and at the same time, enables supply detection by chuck main body.



Without workpiece position (Normal position) | Supply normal position | Lifting position

	Stroke (mm)	
	4	6
Single action Constantly open (NO)	×	×
Single action Constantly closed (NC)	×	×
Single action (NO) With sensor	(1)	(1)
Single action (NC) With sensor	(1)	(1)

* The figure within ( ) stands for the number of open end detection sensor installations (max).

■ Logic of “The Three Arrows” that contributes toward low-cost and energy-saving.

Integrated three elements; chuck, floating mechanism, supply detection sensors. For chucking mechanism, many parts used to be required, however, this product allows easy setup just by installing loading unit. Significant contribution toward work labor saving.

■ Mounted floating mechanism, “muscle” for safety and quality.

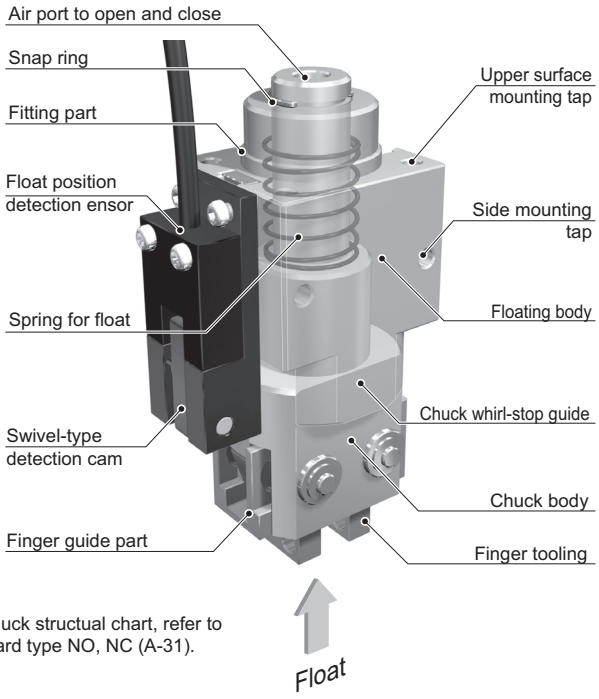
Mounted up and down floating mechanism inside the body. When interfering due to accidental supply mistake, protect chuck and workpiece from overload such as conveyance thrust and shock load, and enabled “collision safety” of chucking part.

■ Remain well-established clamp mechanism and long life intact

Introduced existing mechanism, which has established a reputation with good conduction efficiency, to the lever that transmits thrust to the finger tooling. Floating guide part achieved smooth and excellent wear and abrasion resistance by special hard anodic oxidation coatings. Furthermore, long-life with ten million times or more, and respond to reliance of the user.

■ Epoch-making mechanism of playing two roles in one machine enabling supply detection as well.

With or without workpiece and abnormal supply are detected by float position detection sensor. Achieved supply detection along with supply. Epoch-making mechanism hidden in the compact body does not allow to make compromising quality.

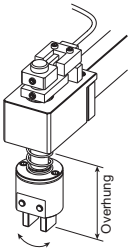


* For chuck structual chart, refer to standard type NO, NC (A-31).

■ Comparison with the existing method

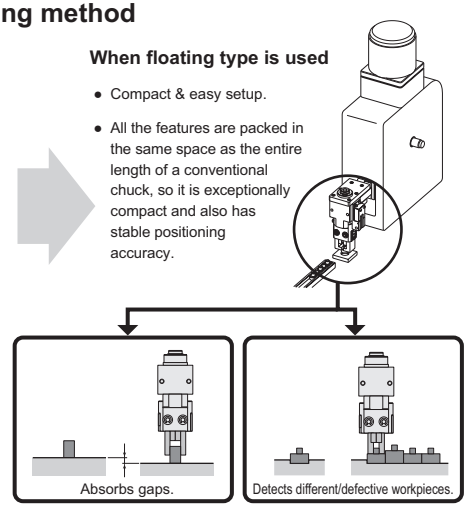
Existing method

- Many parts are required such as slide guide spring, sensor, dog, and whirl-stop guide for upper part of the chuck.
- The amount of overhang from the floating guide part to the position where workpiece is clamped was large and an expensive guide to secure position repeat accuracy used to be introduced.



When floating type is used

- Compact & easy setup.
- All the features are packed in the same space as the entire length of a conventional chuck, so it is exceptionally compact and also has stable positioning accuracy.



MEPAC (Parallel air chuck)

Floating X956□FL

- When interfering due to accidental supply mistake, protect chuck and workpiece from conveyance thrust and shock load.
- Single type (NO, NC) are available. Type can be selected according to the application.
- With or without workpiece and abnormal supply is detected by float position detection sensor.

■ Variations

Model No. \ Stroke (mm)	4	6
X956□FL-NO	×	×
X956□FL-NC	×	×

With sensor

Product number configuration

X956□FL-□□-□□

- Model No.
- Size code
- NO: Single action (constantly open)
  NC: Single action (constantly closed)
- No code: Without float sensor
  FL: With float sensor
- No code: Without finger open detection sensor
  S: With finger open detection sensor

■ Basic specifications

Operating method	Single action type/Parallel air chuck
Fluid for use	Clean air (Filtered compressed air)
Working pressure range	0.3 to 0.5 MPa
Ambient temperature	5 to 50°C
Lubrication	Non-lubrication or lubrication equivalent to Turbin oil JIS#90.
Piping connection port	M5 x 0.8
Frequency of use	Max. 60 cpm
Repetitive position accuracy	±0.1 mm
Rotation direction accuracy	Within ±0.4°
Accessory	Spring pack (spring for middle to high load, snap ring)

* Refer to A-83 to find the detail of spring pack.

■ Sensor specifications

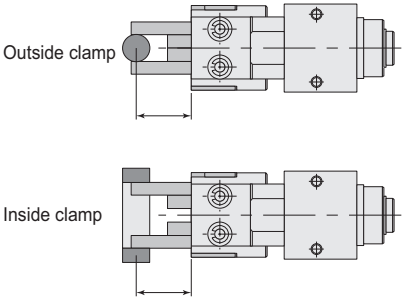
Name	Float position detection sensor	Finger tooling open end detection sensor
Model	FLS-01	CS101-A (TAIYO)
Detection method	Photo transmission type	Scrap of iron short range type
Power supply voltage	5 to 24 VDC ±10% (Ripple P-P 10% or less)	12 to 24 VDC ±10% (Ripple P-P 10% or less)
Power consumption	15 mA or smaller	100 mA or smaller
Indicator light	LED lights up when it's ON	
Cord length	1.0 m	1.5 m
		* Close end detection is disabled.

* Refer to descriptions in A-86 and in the subsequent pages to find how to handle sensor.
* Refer to precautions in A-72 and in the subsequent pages as well.

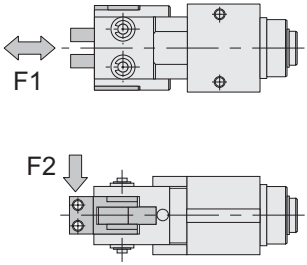
■ Model

Type		Model No.	Cylinder diameter (mm)	Stroke (mm)	Theoretical clamp force (N)	Float amount (mm)	Load 0 st/5 st (N)	Max. clamp point (mm)	Max. allowable load (N)		Mass (g)	Number of open end sensor installations
									F1	F2		
Single action	Constantly open	X9560FL-NO	12	4	13.0	5	3.7/4.5	19	23	13	71 (116)	1
		X9562FL-NO	16	6	24.0	5	4.2/5.0	28	37	27	151 (196)	1
	Constantly closed	X9560FL-NC	12	4	13.5	5	3.7/4.5	19	23	13	71 (116)	1
		X9562FL-NC	16	6	27.0	5	4.2/5.0	28	37	27	151 (196)	1
Remarks		*1		*2	*3		*4, 5, 6, 7			*8, 9	*10	

● **Maximum clamp point**



● **Maximum allowance load**



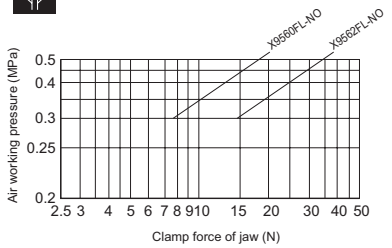
■ Remark description

*1 Centering for workpiece will not be performed when NO type is used with inside clamp.
*2 Stroke allowance is about 0 to +1 mm.
*3 Clamp force is theoretical value with air pressure of 0.4 MPa.
*4 This is the load of a standard spring. For more information on the supplied spring, please refer to A-83.
*5 “0 st/5 st” indicated as the float load shows the free state and the position on the float end.
*6 The float load represents the value including the mass of the chuck main body. Use the following figures as a rough indication of the float load when using in the horizontal direction.
X9560FL: Float load-0.5
X9562FL: Float load-1.0
*7 When frictional resistance of workpiece and jaw is 0.3 or more, check the finger tooling operation according to A-83 “Spring pack”.
*8 The maximum allowance load is a static allowance load and it is not within the range in which finger tooling and floating mechanism can be operated.
*9 The maximum allowance load is a rough indication and it is not a guaranteed value. Reduce external force as much as possible.
*10 The mass given in ( ) is the value of the product provided with sensor.

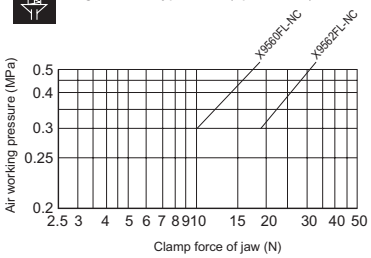
Floating X956□FL

■ Clamp force (theoretical value)

Single action type - NO (close force)

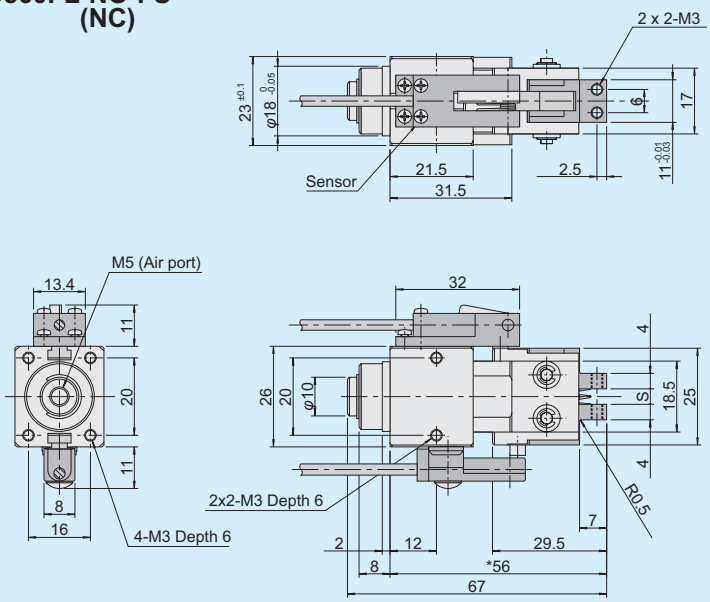


Single action type - NC (open force)



■ Dimensional drawing (mm)

X9560FL-NO-FS (NC)

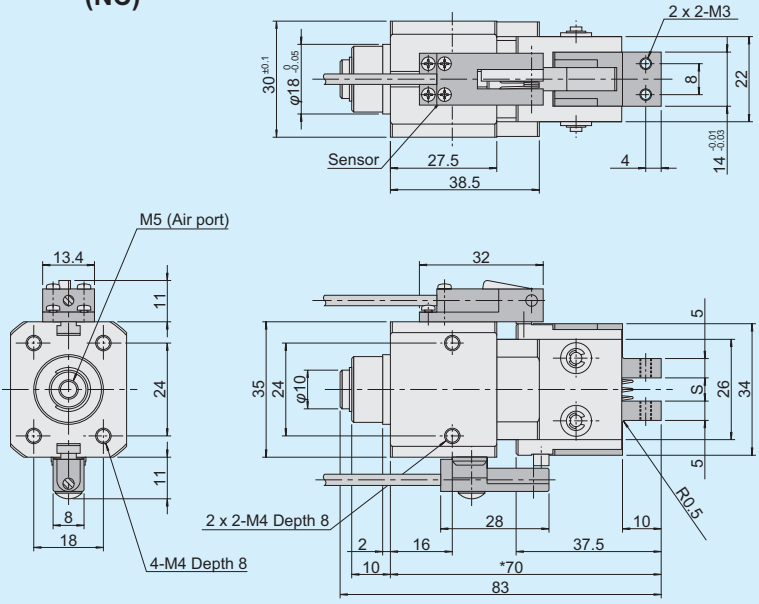


* stands for the maximum value.
* No spring between finger toolings for NC.

	Open	Close
S	4	0

(mm)

X9562FL-NO-FS (NC)



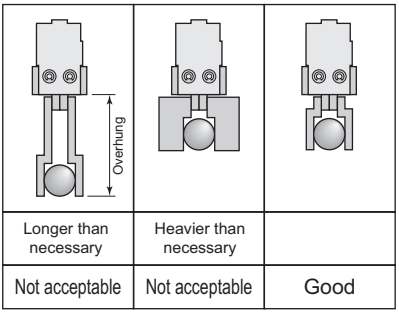
* stands for the maximum value.
* No spring between finger toolings for NC.

	Open	Close
S	6	0

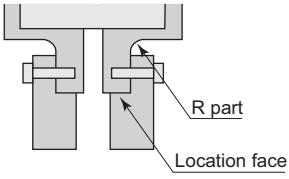
Design precautions

■ Finger tooling part (all types)

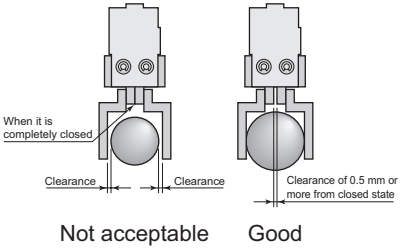
- The finger tooling attachment is to be provided by the customer.
- Use caution to avoid excessive shock load applied to the finger tooling when using.
  Do not strike the finger tooling and the workpiece against the supply part. It may cause damage.
- Install finger tooling attachment so that workpiece can be grasped within the range of finger tooling width. Overhang load of lateral direction cause engaging on the sliding part and may cause premature abrasion.
- Make lightweight and short finger tooling attachment.
  * The overhang amount should be within the specified value as defined in the production specification of each type.
- The mass with which holding and carrying are possible is about 10% of the theoretical clamp force. In addition, depending on the quality of the material, shape, and carrying condition of the workpiece and finger tooling attachment, the mass with which carrying is possible becomes smaller.



- Location face for installation of the finger tooling attachment is shown in the figure below. The base part of the finger tooling has a round shape, which cannot become an location face. (Excluding economy type)



- When finger tooling is completely closed, clamp force cannot be obtained.
  It is recommended to have 0.5 mm or more of allowance. (Clamp when it is closed)



Note) Set minimum value for allowance of workpiece clamp part. (Clamping at closed state)

Note) For clamping at open state, remain opening margin of 0.5 mm, and set the clamp part allowance of workpiece to the maximum value.

Note) This shall exclude the case when workpiece is deformed.

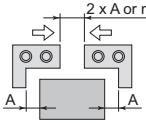
■ Floating type (X956□FL)

- Confirm the float load of the basic specification and review the following items. If the following items are applicable, adopt different supply method.
  - When workpiece may be deformed.
  - When workpiece insertion force may be insufficient.
  - When failure in open and close operation may occur when frictional resistance of the clamp part is large and large float load is incurred.
- This product does not have functions to absorb large shock load such as shock absorber and to stop thrust of the loading unit side as stopper. Make sure to install stroke end stopper on the loading unit side.

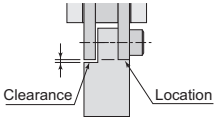
- Float position detection sensor is the simplified method to indirectly detect the state when workpiece is gripped by using the height of the chuck.
  If the following items are applicable, adopt different method.
  - When float position of chuck may not be stable regardless of whether there is a workpiece and the state when the workpiece is gripped. (Lack of rigidity on the peripheral part of the chuck, inclusion of foreign matter, allowance of workpiece, etc.)
  - When detection of with or without workpiece is not possible with product inspection at post-process.
- This product is equipped with a floating mechanism that allows functioning to all directions.
- Use float amount within the float amount of basic specification x 0.9. In case the amount may be insufficient, adopt different supply method.
- The ability of the floating mechanism cannot be exercised fully with vertical state when finger tooling faces upward, therefore, it cannot be used.
- Float load may become larger depending on the speed of loading unit.

■ Eco, ECO-Multi (X9608, X961□)

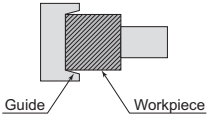
- Before grasping workpiece, take careful note of jaw design in order to avoid jaws from interfering with each other.



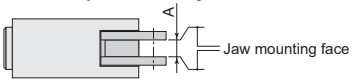
- The jaw location faces are shown in the diagram below. Clearance is needed so that a jaw does not contact the mounting surface for the opposite finger tooling.



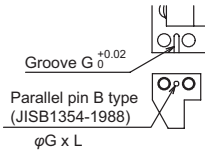
- When installing lateral direction guide of the workpiece, it is recommended to use the method shown in the diagram below.



- The length of the installation screw of the jaw must be within the A dimensions from the jaw installation surface. If the dimension is more than that, the finger tooling on the opposite side is pressed and may cause damage.



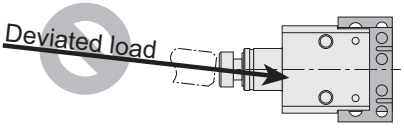
- Reference groove of the finger tooling can be used as a installation standard.
  Install the parallel pin (JISB1354-1988B) into the attachment first and then slide into the slot.
  Do not use impact or excessive force to install.
  The pin is to be provided by the customer.



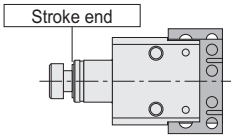
Model No.	G (mm)	L (mm)
X9608	1.2	4
X9612	1.2	5
X9618	1.5	8

■ Eco Mecha, ECO-Multi Mecha (X9608M, X961□M)

- Please push the mechanical operator without applying large shock. Large shock may cause clamp failure and/or short life.
- The direction of force applied to the mechanical operator should be the same as the axis of motion for the mechanical operator. Deviated load may cause premature failure due to friction, etc.



- Do not press the mechanical operator so far that it impacts the stroke end. This will press the body and may cause motion failure and shortened life.



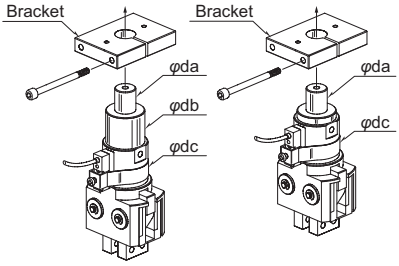
Mounting precautions

■ All models

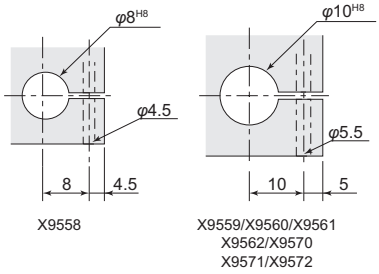
- The bracket is to be provided by the customer.

■ Standard (X95□□)

- Use φda and φdb (reciprocating only) of shank part of the body for fixing chuck. Do not perform fixing on the other parts because it may cause deformation of the body and malfunction.
- When fixing with φdb, in order to prevent deformation within the cylinder, use the coupling clamping method as shown in the figure.



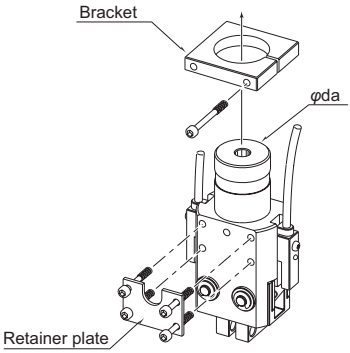
Reference drawing (bracket) (mm)



- If sensor is not used, use φdc as a supporter (fitting of anti-vibration).
- Height and angle of the bracket can be adjusted by coupling clamping method.

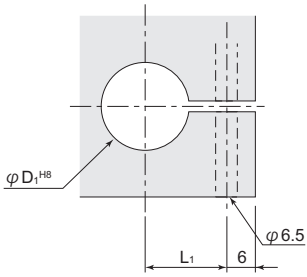
■ Taste (X95□□T)

- Please use the shank part φda of the body or mounting face and mounting holes to fix the chuck. Do not perform fixing on the other parts because it may cause deformation of the body and malfunction.
- When fixing with φda, in order to prevent deformation within the cylinder, use the coupling clamping method as shown in the figure.



- Height and angle of the bracket can be adjusted by coupling clamping method.

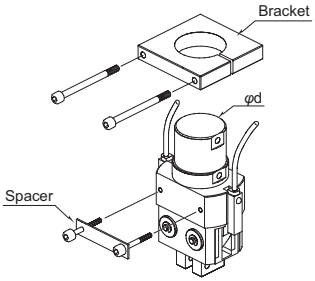
Reference drawing (bracket) (mm)



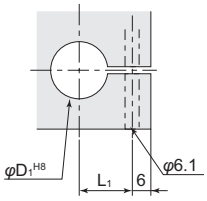
Model No.	D_1	L_1
X9563T/73T	22	17
X9564T/74T	26	19

■ All-purpose (X966□)

- For installation on the side, secure the product by using the tap hole on the side of the main body. If the surface on which the chuck is installed is not flat, deformation is caused to the cylinder part, resulting in malfunction of the product.
- When the fixing bolt cannot be passed through from the opposite side, insert the spacer with wide bearing surface, use bolt with one level smaller in diameter and fix the bolt from the chuck side. Tap bottom hole pass completely through to the other side.
- When installing the shank, clamp the (φd) part by using the coupling clamping method in order to prevent from causing deformation within the cylinder. This method has an advantage of being able to adjust height and direction easily.



Reference drawing (bracket) (mm)

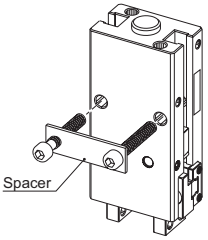


Model No.	D_1	L_1
X9660	18	15
X9661	20	16
X9662	22	17
X9663	26	19
X9664	34	23

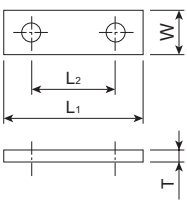
■ Smart (X967□)

- For installation on the side, secure the product by using the tap hole on the side of the main body. If the surface on which the chuck is installed is not flat, deformation is caused to the cylinder part, resulting in malfunction of the product.
- When the fixing bolt cannot be passed through from the opposite side, insert the spacer with wide bearing surface, use bolt with one level smaller in diameter and fix the bolt from chuck side. (Tap bottom hole pass completely through to the other side.)

  * This fixing method cannot be used for the model with sensor. The sensor and screw may interfere and cause sensor malfunction.



Reference drawing (spacer) (mm)



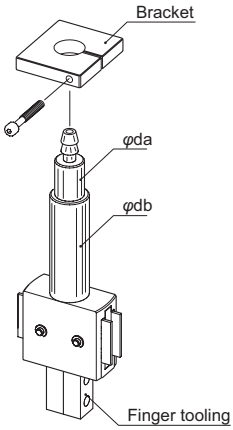
Model No.	L_1	L_2	W	T
X9670	26	18	12	4
X9672	38	26	15	4

- For model with sensor, malfunction may occur due to influence from surrounding magnetized object. Read the sensor specifications in A-88 and in the subsequent pages and install properly.

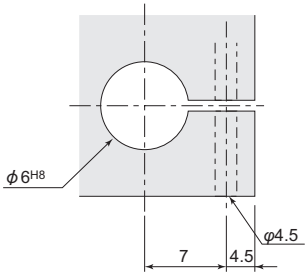
Mounting precautions

■ Micro (X960□)

- Use φda of the shank part of the body for fixing chuck. Do not perform fixing with φdb because it may cause deformation of the cylinder integrated parts and malfunction.
- Height and angle can be easily adjusted by using the coupling clamping method.



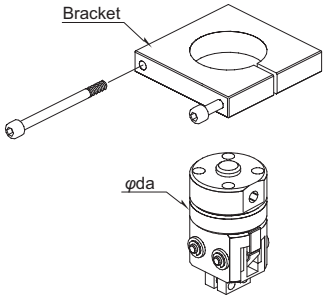
Reference drawing (bracket) (mm)



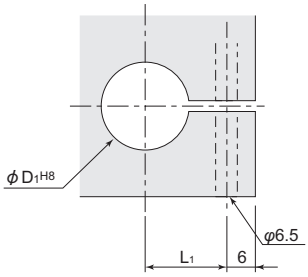
- If chuck became unstable due to inertia, design to install anti-vibration to φdb part after fixing the φda part.

■ Short (X95□□B)

- For fixing the chuck, use the tap hole for installation on the end face of the body.
- Although it is possible to fix the φda part with the coupling clamping method, use it by increasing the bracket accuracy in order to prevent from causing deformation of cylinder integrated part.



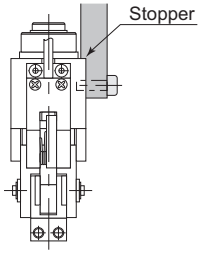
Reference drawing (bracket) (mm)



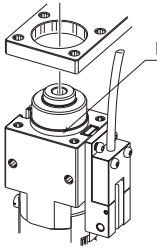
Model No.	D_1	L_1
X9558B	18	15
X9559B	22	17
X9560B	25	18.5
X9562B	34	23

■ Floating (X956□FL)

- For installation on the side, secure the product by using the tap hole on the side of the body. It is recommended to fit a stopper on the upper installation plane to receive the float load.



- For installation on the upper face, use the mounting tap hole on the end face of the body.



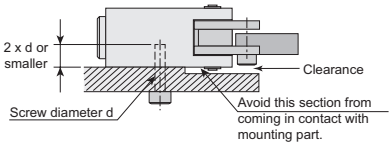
⚠CAUTION

- The fitting part cannot be secured by split clamping. Failure to observe this instruction may result in malfunction.

- If the surface on which the chuck is installed is not flat, deformation is caused to the cylinder part, resulting in malfunction of the product.

■ Eco, ECO-Multi (X9608, X961□)

- For installation on the side, secure the product by using the tap hole on the side of the body. If the surface on which the chuck is installed is not flat, deformation is caused to the cylinder part, resulting in malfunction of the product.
  In addition, the area near the finger tooling is likely to be deformed. Allow for a margin so that the mounting part does not come in contact. The effective screw length must be 2 x d or lower.



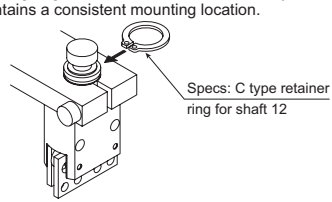
- The tapped holes on the body surface extend all the way through, however, please do not clamp the gripper body with small-diameter screws. Installation may become unstable and lead to malfunction.

■ Economy Mecha (X9610M)

- Please use the shank or mounting face and mounting holes for installation when the product is being installed in the machine, such as PPU and robot.

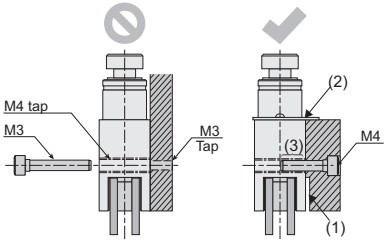
Shank part mounting

- Inside the shank part has a mechanism in which the piston slides, therefore, the coupling clamping method must always be used (diagram below). If the clamp is overtightened, it may cause the shortened life and poor performance.
- This product is not designed to allow the mechanical operator to touch the body. If the mechanical operator can touch the body while adjusting the equipment or during operation, a retaining ring can be used to ensure the body maintains a consistent mounting location.



Mounting with face and mounting holes

- If the installation face of the chuck is not level, piston part may be deformed, which causes malfunction.
- The surface installation hole extend all the way through, however, please do not clamp the gripper body with small-diameter screws such as M3 screws. Installation may become unstable and lead to malfunction. (Bottom left diagram)
- In the case of side installation, the area near the finger tooling is likely to be deformed. Allow for a margin so that the mounting part does not come in contact. (Bottom right diagram (1))
- This product is not designed to allow the mechanical operator to touch the body. If the mechanical operator can touch the body while adjusting the equipment or during operation, an extra support plate can be used to ensure the gripper maintains a consistent mounting location. (Bottom right diagram (2))
- Effective length of screw for side installation must be within 8 mm (Diagram below (3)).



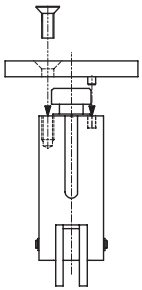
Mounting precautions

■ Unclamp unit

Installation of chuck and bracket

- Place the bracket over the top face of the chuck, and secure them with the chuck installation screw.

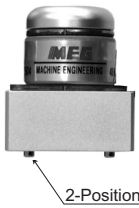
- The reference pin for the chuck is supplied with the bracket.
  Insert the reference pin into the reference hole for the chuck.
  (Excluding X9608-M)



Installation of bracket

- Place the unclamp unit over the bracket. The open/close direction of the chuck and the direction of the product mounting tap hole can be changed every 90 degrees.

- Insert the positioning pin for the bracket of the unclamp unit into the positioning hole of the bracket properly.



- The supplied cable clamp is for fixing the connection cable. Install it in consideration of the installation place of the product and routing of the cable.
  (Tightening torque 0.8 N･m)

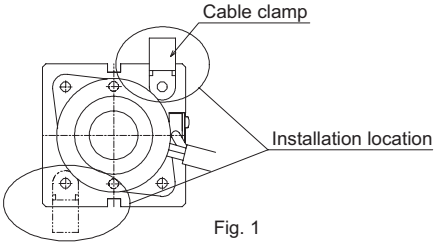


Fig. 1

Product installation

- Use the mounting tap hole for installing the product onto the PPU and robot.

- If the installation plane of the installation member is not level, deformation is caused to the product, resulting in the malfunction of the product.

- The reproducibility of the installation position can be improved by fitting a key or pin in the reference groove. Do not drive the key (pin) into the reference groove. Failure to observe this instruction may result in premature failure of the product.

- Too frequent use of the product (near the specification range limit) may increase the temperature of the product. It is recommended to use aluminum for the installation member to improve heat radiation.

- Avoid the interference of the supplied cable clamp with the neighboring area of the installation. The cable clamp installation position may be changed but use caution in doing this so as to enable correct wiring.

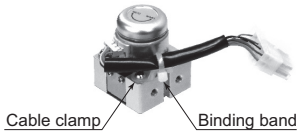
- Take measures so that a load by bending and pulling is not applied to the cable and connector.

- If the connection cable of the product and controller is not long enough, use a junction cable. Comply with the description in the instruction manual for handling of the junction cable.

- The connection cables of the product and controller are not a flexible cable. When the product and controller are moved in use, use a flexible junction cable.

- Do not use a junction cable longer than 2 meters.

- Secure the cable using the supplied cable clamp and binding band so that a load is not applied to the base of the cable. Refer to Fig. 1 and Fig. 2 and secure the cable in consideration of the routing of the wiring.



- Do not bend the cable at its base and binding part.

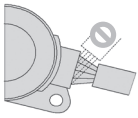
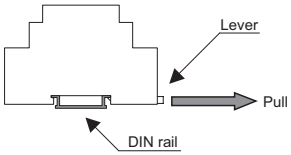


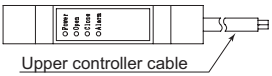
Fig. 2

■ Controller for unclamp unit

- When multiple number of controllers are used, install the controllers 20 mm or more away from each other, keeping a distance of 25 mm or more between the controller main body and other equipment or other structure. When the ambient temperature rises due to the heat generation of the controller and exceeds the working ambient temperature range, there is a risk that the controller is damaged.
- To prevent the damage to the controller, install the controller at a place where the following conditions are met.
  - Indoors (This product is designed and manufactured so as to be incorporated in equipment)
  - At a place where no condensation occurs
  - At a place where explosive gas, flammable gas and corrosive gas are not present
  - At a place where the controller is not exposed to direct sunlight
  - At a place where the controller is not exposed to dust or conductive debris (chip, debris of electric cable, etc.)
  - At a place where the controller is not exposed to the sprinkling of water, oil and other liquid
  - At a place where heat is easily released
  - At a place where the controller is not subjected to continuous vibration, and excessive impact
  - Do not use the controller in an environment under the effect of radiation, magnetic field, and vacuum.
  - When the controller is installed in a closed place like a control panel or a place where there is a heating element near it, be sure to provide a vent hole. If the ambient temperature rises due to the heat of the controller beyond the working temperature range, the controller could be damaged.
  - If there is a vibration source near the installation place and vibrations are transmitted to the controller, install a shock absorber. Otherwise, the controller may be damaged.
  - If there is a large noise source (such as a high-frequency welder and large electromagnetic switch) near the controller, take measures against noise by inserting a noise filter in the wiring line or connecting to other power supply line. Otherwise, the motor may malfunction.
- Pull the lever, and insert the controller into the DIN rail, and return the lever at a desired position for fixing it.



- When there is a risk that the product is subjected to vibration and shock, install a commercially available DIN rail clamp on both sides of the product, and secure the rail tightly.
- Take measures so that a load by bending and pulling is not applied to the cable. Use caution to avoid a load to the base of the cable, in particular, by securing the cable or by other means.
- Keep the cable away from the power source of other electric equipment as far as possible. If the cable is bundled with or installed near the power line of other electric equipment, the product is adversely affected by the induced current.
- The power supply circuit and input circuit are equipped with a reverse connection protection circuit but make sure that there is no faulty wiring connection. Check that LED lamp is turned on.
- The bend radius shall be R33 mm or more.



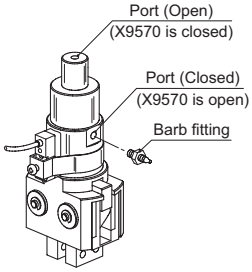
Piping precautions

■ All types (Air type)

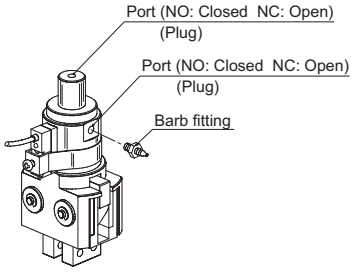
- Please use barb fittings for piping as much as possible by considering inertia force. One-touch connect fittings, etc. may be too big for this product and may conflict with supporter and bracket.
- Install speed controller to the piping line, make sure to adjust the finger open/close speed, and clamp as soft as possible. If the product is used with more than necessary speed, it will increase impact load and may cause adverse effect on accuracy and service life.

■ Standard (X95□□)

(1) Piping of reciprocating standard type
There are two ports for air piping in this product. Perform piping for both ports.

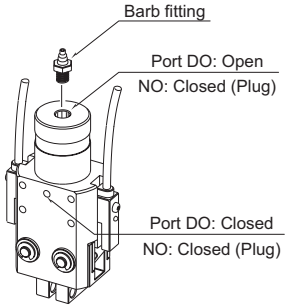


(2) Piping of single action standard type
There are two ports for air piping in this product. Both are for clamp, therefore, perform piping according to usability.



■ Taste (X95□□T)

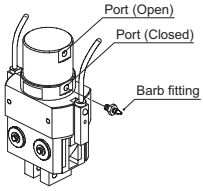
(1) Piping
There are two ports for air piping in this product. In the case of the single-action type, connect a tube only to one port, and in the case of the reciprocating type, connect tubes to both ports. In the single-action type, fit a plug on the unneeded port after the completion of piping connection.



■ All-purpose (X966□)

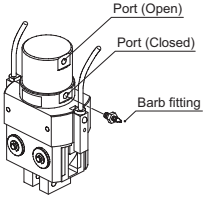
(1) Piping of reciprocating all-purpose type

There are two ports for air piping in this product. Perform piping for both ports.



(2) Piping of single action all-purpose type

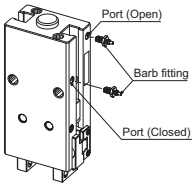
There are two ports for air piping in this product. Both are for clamp, perform piping according to the model. Do not plug the unneeded port.



■ Smart (X967□)

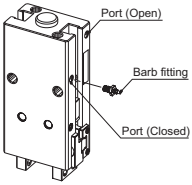
(1) Piping of reciprocating smart type

There are two ports for air piping in this product. Perform piping for both ports.



(2) Piping of single action smart type

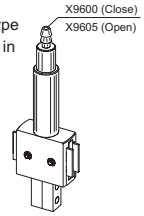
There are two ports for air piping in this product. Perform piping for closed port. Do not plug the open port.



■ Micro (X960□)

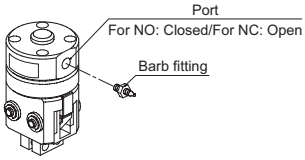
(1) Insert the pneumatic hose surely up to the base of the fitting and take care not to bend the hose from the opening when chuck moves.

Piping of single action micro type
There is one port for air piping in this product.



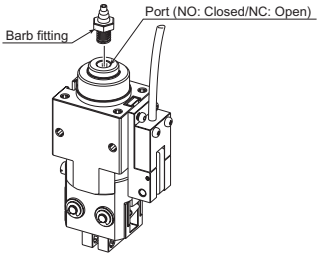
■ Short (X95□□B)

(1) Piping of single action short type
There is one port for air piping in this product.



■ Floating (X956□FL)

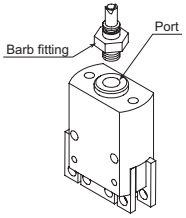
(1) There is one port for air piping in this product.



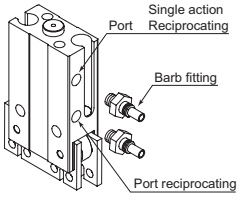
- Since the air piping port is also floated, secure the joint firmly, and use a soft-type air tube (soft nylon, polyurethane).
- Measures for whirl-stop in tightening the joint should be taken on the main body of the chuck. (Do not perform with finger tooling and floating main body.)

■ Eco, ECO-Multi

- Be sure to install flow controls.
- Eco type has one port for air piping.



- ECO-Multi type has two ports for air piping.



- Hexagon type of fitting may be protruded from the main body side of X9608. If there is interference, use small fitting. (Reference CKD. FTS4-M3)

Notes on handling

■ All models

- MEPAC is comprised of precision parts. Handle with care to prevent any dent on or deformation of the body.
- Do not disassemble. If this product is disassembled, the functions and performance of the product may not be reproduced.
- Before use, read and understand the instruction manual for correct use.
- The specification and the shape of this product is subject to change without notice along with improvement of the product.

■ Standard (X95□□)

- Read sensor specification A-84 to find the detail of the sensor.
- Sensor is adjusted so that it is turned ON by finger tooling open at shipping.

■ Taste (X95□□T)

- Read sensor specifications A-86 to find the detail of the sensor.

■ All-purpose (X966□)

- Read sensor specifications A-86 to find the detail of the sensor.
- When using two sensors, use the sensor for checking finger tooling (close) on the air port side in order to avoid interference with tube fitting.
- When this product is shipped from the factory, the sensor is built-in and set for each NO, NC, and DO type. Please contact us when any changes will be made for specification for some reason in order to maintain the performance.

■ Floating (X956□FL)

- Read sensor specifications A-86 and A-96 to find the detail of the sensor.
- Do not use a spring other than specified.
- Do not use the product at the float end (stroke end of the floating mechanism). The chuck may be damaged or finger tooling malfunction may occur due to shock.

■ Floating (option)

Spring pack

When the spring load of the floating mechanism is too weak in the use of this product and it is not possible to achieve the intended function of the product, use the spring supplied with the product for efficient use of this product.
(The standard spring is incorporated in this product at the time of purchase.)

1. Description of spring pack

Chuck model	Description of spring pack
X9560FL	Middle load (blue) (1), snap ring (1)
X9562FL	Middle load (blue), high load (yellow) 1 for each, snap ring (1)

2. Basic usage

(N)

Spring type / Chuck model	Float load 0 st/5 st	
	Middle load (blue)	High load (yellow)
X9560FL	5.7 / 7	–
X9562FL	6.2 / 7.5	7.9 / 10

* "0 st/5 st" indicated as the float load shows the free state and the position on the float end.

* The float load represents the value including the mass of the chuck main body. Use the following figures as a rough indication of the float load when using in the horizontal direction.

X9560FL: Float load - 0.5
X9562FL: Float load - 1.0

3. Precautions for use

- If the spring load for the float is too large, operation of the finger tooling is adversely affected (slow motion, no motion). Therefore, check the following conditions.

  Usable condition
  Finger tooling open/close thrust > Float load x μ x S

  μ: Friction coefficient of workpiece and jaw
  S: Safety rate 1.5 to 2

(N)

	Finger tooling open/close thrust	
Chuck model	Normal open (NO)	Normal close (NC)
X9560FL	5	3
X9562FL	9	5

4. Replacement of spring for float

- The spring for the float can be replaced only by a maintenance personnel.
- Turn off the power supply and air supply, and then remove this product from the equipment.
- The replacement should be performed in an environment where cutting chips or the like do not get into the product.
- After the replacement, perform the centering of the chuck, which was re-installed on the equipment and sensor adjustment correctly.
- During the replacement, use caution not to scratch or damage the surface of the chuck main body and floating main body.

5. Procedure of replacement

* Explanation of spring replacement is described in the instruction manual.

- Put a mark as shown as a guide to show the direction of rotation of the floating main body and chuck.
- Grip the snap ring firmly with longnose pliers (JIS B4631 Nominal size 150) with the chuck floated, hold it firmly and gently pull it out. In doing this, use caution not to damage the shaft. Damage to the shaft may decrease the life of the product due to malfunction and premature abrasion of the product.
  - * When the snap ring is removed, the chuck is popped out by the force of the spring. Hold the chuck by hand firmly during replacement work.
  - * Dispose of the removed snap ring because it may have been damaged or deformed.
- Pull out the chuck from the floating main body.
  - * Do not wipe off grease adhered to the chuck main body.
- Replace the spring.
- Insert the chuck into the floating main body with the mark aligned.
- Insert the supplied snap ring into the groove and push it by hand all the way to the full depth.
  - * Make sure that snap ring is not wobbling.
- Check that the float moves smoothly.
  - * If the float movement is jerky, there is a possibility of the inclusion of foreign matter. If this happens, remove the chuck again, remove the cause for the abnormal condition on the sliding part.

Open/close operation check sensor VR15

Refer to A-95 to find the detail of sensor band.

- Inexpensive reed switch with contact.
- Response differential is relatively large as 2 mm or below, easy handling with 2-wire type wiring.

■ Specifications

Model	VR15
Name	Magnetic proximity sensor
Working voltage range	Common use for 10 to 24 VAC.
Working currency range	6 to 40 mA
Maximum open/close capacity	(AC) 2 VA, (DC) 1 W
Motion time	1 msec or below
Impact resistance	30G
Indicator light	LED Light up when it's ON
Working temperature range	-10 to +60°C
Cord length	5 m
Mass	32 g

* Sensor band is not included.

⚠ WARNING

- Electrical power must be turned off before wiring. Failure to observe this instruction may result in a fire hazard and electrical shock hazard.
- Connect the wiring correctly.
  Faulty electric wiring causes fire, electrical shock hazard, and malfunction of the product.
- Please make sure the sensor cable is not bent or pulled during operation. Electrical shock and/or malfunction may occur.

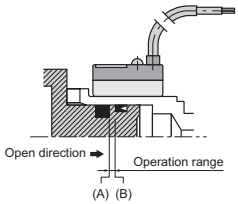
1. Be sure to read the instruction manual prior to sensor wiring.
2. Turn off the switch of the device to be connected prior to wiring.

■ Installation location

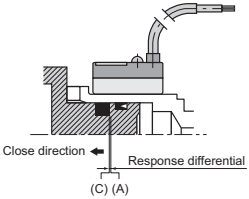
- Provide a magnetic shield with an iron plate or the like at a place where a strong magnetic field is generated.
- Keep the sensor and outer periphery of chuck main body away from ferromagnetic objects (such as iron). Keep away from a ferromagnetic material at least 10 mm as guidance.

■ Description of operation

- The purpose of this operation is to install the magnetic proximity sensor with reed switch (and indicator lamp built-in) to the outer periphery of the chuck body so that when the piston (with magnet) moves to the sensor, the reed switch will operate and the position of the cylinder stroke can be detected externally without contact.



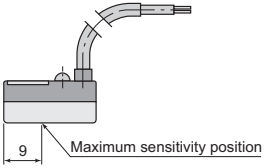
- Piston moves towards the arrow indicated direction and when the magnet gets to (A) position, the sensor is turned on.
  This ON status will continue between position (A) and position (B). This is the operational range.



- When the piston moves towards the arrow indicated direction from the position where (A) is on, the sensor will stay ON until position (C) is reached. This range between (A) and (C) is called the response differential.

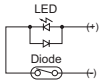
■ Sensor maximum sensitivity position

Maximum sensitivity position of the sensor is located 9 mm from the tip of the sensor.
The most sure method for detection is to install the sensor so that magnet is located at the maximum sensitivity position.



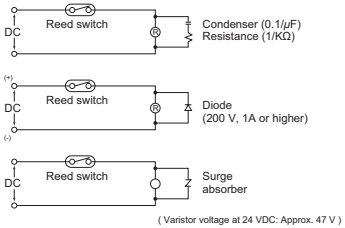
■ Precautions for use

- Please wire according to the correct lead colors. Make sure to turn off the device power of the electric circuit on the connection side before wiring.



(+): White (Brown)
(-): Black (Blue)

- Take measures so that a load by bending and pulling is not applied to the sensor cord. Use caution to avoid a load to the base of the sensor cord, in particular, by securing the sensor cord or by other means.
- Do not perform series connection of the sensor. Due to the voltage drop of the sensor itself, the indicator light may not be lit or load may not be operated.
- Do not perform parallel connection of the sensor. Signal is outputted normal but indicator light may not be lit.
- Keep the sensor cable away from the power source of other electric equipment as far as possible. If the cable is bundled with or installed near the power line of other electric equipment, the sensor and load are adversely affected by the induced current.
- When sensor with indicator light is used with direct current, connect white code to (+) side and black code to (-) side, respectively.
- When extending the sensor cable to 10 m or more, welding may occur when sensor is closed. Connect choke coil (L= Approx. 2 mH equivalent product) in series close to the sensor.
- Do not use with above the working voltage and current of the sensor and load that exceeds connection capacity.
- Do not connect power source directly to the sensor. Make sure to connect via specified load such as relay sequencer.
- When a large amount of circumferential voltage surge occur, or when the coil (such as relay of approx. 4VA or more), which generates a large amount of surge voltage is used as a load, install protection circuit parallel to the load in order to protect the sensor.



(Varistor voltage at 24 VDC: Approx. 47 V)

- Caution is necessary as indicator light may not be lit when using with below the working voltage and current of the sensor.

Open/close operation check sensor CS101-A

- This is high frequency oscillation type sensor.
- With small response differential and high repetitive detection accuracy, detection of minute difference in clamp is possible.

■ Specifications NPN Type

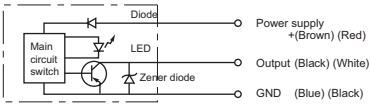
Model	CS101-A
Name	Sensor for scrap of iron short range
Power supply voltage	12 to 24 VDC ±10% (Ripple P-P 10% or less)
Working voltage/ current	At 24 VDC, max. 100 mA (NPN open connector output)
Voltage drop	At 24 VDC, max. 1 V
Impact resistance	50G
Vibration resistance	Double amplitude 1.5 mm, 10 to 55 Hz, for 2 hours
Indicator light	LED Light up when it's ON
Working temperature range	-10 to +60°C
Cord length	1.5 m
Wiring method	0.12 m^2 3 cores Outer diameter φ2.9 mm Cabtyre cord

■ Installation location

- Provide a magnetic shield with an iron plate or the like at a place where a strong magnetic field is generated.
- Keep the sensor away from ferromagnetic objects (such as iron). Keep away from a ferromagnetic material at least 20 mm as guidance. Otherwise, the sensor may malfunction.

■ Precautions for use

- Please wire according to the correct lead colors. Make sure to turn off the device power of the electric circuit on the connection side before wiring. Faulty electrical wiring and short circuit of the load may result in damage to the electric circuit on the side of the load and sensor. Even short periods of circuit shortage may cause the output circuit to burn out. Wiring with the power on may lead to the damage to the electric circuit on the side of the sensor and the load.



- Take measures so that a load by bending and pulling is not applied to the sensor cord. Use caution to avoid a load to the base of the sensor cord, in particular, by securing the sensor cord or by other means.
- Keep the sensor cable away from the power source of other electric equipment as far as possible. If the cable is bundled with or installed near the power line of other electric equipment, the sensor and load are adversely affected by the induced current.

⚠ WARNING

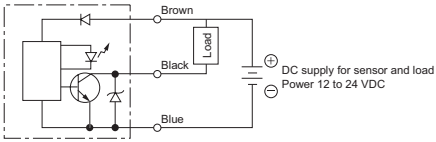
- Electrical power must be turned off before wiring. Failure to observe this instruction
- may result in a fire hazard and electrical shock hazard.
  Connect the wiring correctly.
- Faulty electric wiring causes a fire, electrical shock hazard, and malfunction of the product.
  Please make sure the sensor cable is not bent or pulled during operation. Electrical shock and/or malfunction may result.

1. Be sure to read the instruction manual prior to sensor wiring.
2. Turn off the power of the device to be connected prior to wiring.

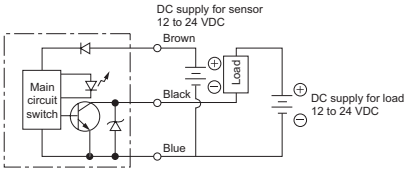
■ Connection method

1. Basic circuit

- In the case that the power supply of the sensor and the load is the same

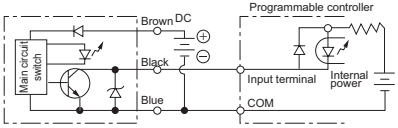


- In the case that the power supply of the sensor and the load is different

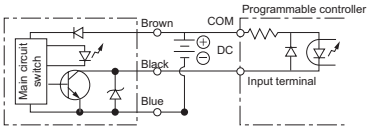


2. Connection with programmable controller (sequencer)

- In the case that the sequencer incorporates the electric power supply inside

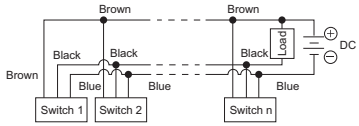


- In the case that the sequencer does not incorporate the electric power supply inside

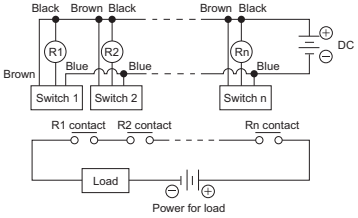


3. Parallel connection

- The operating status of the sensor can be checked by the indicator light of the sensor. Please note that the leakage current of the output is increased by the number of switches in the case of parallel connection.



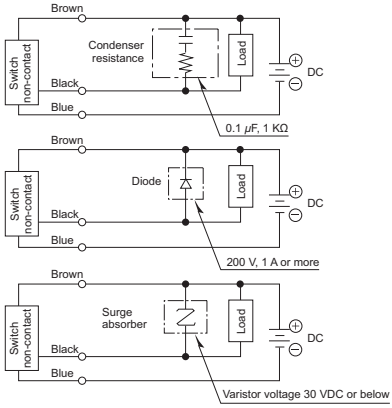
4. Series connection



■ Protection of output circuit

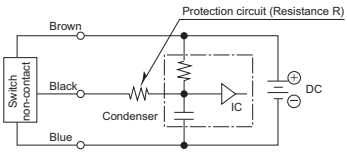
When inductive load wiring (i.e. relay, solenoid) is connected for use

- Be sure to provide a protection circuit on the load side since a surge voltage is generated when the sensor is turned off.



When a capacitive load (capacitor, etc.) is connected for use

- Be sure to provide a protection circuit since a rush current is generated when the sensor is turned on.



Note) The value of R [Ω] must not be below the value obtained by the following formula.

$R=\frac{V}{0.2}$ [Ω] V: Power supply voltage

- When the lead wire connection is too long (approx. 20 m), or when there is noise due to a poor electric environment, insert a noise filter in the power supply line.

Open/close operation check sensor 0, 2, 3, H/V

List of sensor and display method

Sensor type	Descriptions	Remarks
0 H	Contact two-wire lead type, cable straight from sensor	Standard
0 V	Contact two-wire lead type, right angle cable	Option
2 H	Non-contact two-wire lead type, cable straight from sensor	Option
2 V	Non-contact two-wire lead type, right angle cable	Option
3 H	Non-contact three-wire lead type, cable straight from sensor	Option
3 V	Non-contact three-wire lead type, right angle cable	Option

Product number configuration

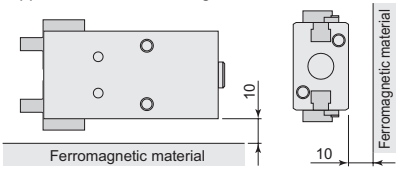
X9670-DO-SS-2H

Refer to chuck product code in A-52. Option: Sensor model

Installation location

- Provide a magnetic shield with an iron plate or the like at a place where a strong magnetic field is generated.
- Do not bring a ferromagnetic material (such as iron) close to the periphery of the sensor. Keep away from a ferromagnetic material at least 10 mm as guidance.

Approach limit of ferromagnetic material



- Keep the chuck away from each other when they proximate by at least 20 mm as guidance.

Installation of sensor

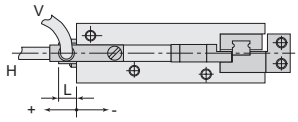
- Slide the sensor into the sensor mounting groove of the main body, move the sensor along with the groove, and tighten the screw mount at the specified position.
- Please use a precision adjustable torque screwdriver to tighten the screws at 0.1 to 0.2 N•m (1 to 2 kgf•cm).

⚠WARNING

- Electrical power must be turned off before wiring. Failure to observe this instruction may result in a fire hazard and electrical shock hazard.
- Connect the wiring correctly.
  Faulty electric wiring causes a fire, electrical shock hazard, and malfunction of the product.
- Please make sure the sensor cable is not bent or pulled during operation. Electrical shock and/or malfunction may occur.

1. Be sure to read the instruction manual prior to sensor wiring.
2. Turn off the power of the device to be connected prior to wiring.

■ Sensor protrusion dimensions



(mm)

Sensor model	X9670		X9672		Sensor body length
	Open end	Close end	Open end	Close end	
0 H	6	-3	0	-8	22.5
0 V	6	-3	0	-8	
2 H	6	-3	-1	-8	18.5
2 V	5	-3	-3	-7	
3 H	5	-3	-2	-6	18.5
3 V	7	-3	-1	-9	

- Distances suggested above are estimates.
- For safest setup and operation, please position the sensor towards minus side for opening and the plus side for the closing.
- Indicates protrusion dimension of the sensor body.
- Keep space of at least L plus 10 mm to avoid interference between sensor protrusion part and other components.

■ Specifications

- Contact sensor

Item	Contact sensor type	
	0 H, 0 V	
Applications	Programmable controller, for relay	
Load voltage	12/24 VDC	100 VAC
Loading current	5 to 50 mA	7 to 20 mA
Internal drop voltage	2.4 V or smaller	
Lamp	LED (Light up when it's ON)	
Cable length	1 m (Oil proof type vinyl cap, Tire cord 2 cores 0.2 mm²)	
Maximum shock	294 m/S² (30G)	

- Non-contact sensor (3H, 3V NPN Type)

Item	Non-contact sensor type	
	2H, 2V	3H, 3V
Applications	Dedicated to programmable controller	Programmable controller, for relay
Power supply voltage	-	10 to 28 VDC
Load voltage	10 to 30 VDC	30 VDC or below
Loading current	5 to 20 mA (Note 1)	100 mA or smaller
Consumption current	-	At 24 VDC 10mA or below (When it is ON)
Internal drop voltage	4 V or smaller	At 100 mA 0.5 V or smaller
Lamp	LED (Light up when it's ON)	
Leakage current	1mA or smaller	10 μA or smaller
Cable length	1 m (Oil proof type vinyl cap, Tire cord 2 cores 0.2 mm²)	1 m (Oil proof type vinyl cap, Tire cord 3 cores 0.2 mm²)
Maximum shock	980 m/S² (100G)	

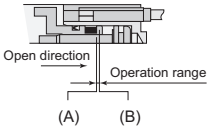
- Common specification

Insulation resistance	20 MΩ or greater with 500 VDC megger
Dielectric strength voltage	Apply pressure for 1 minute with 1000 VAC and there must be no abnormality.
Ambient temperature	-10 to +60°C
Protective construction	IEC standard IP67, JIS C0920 (waterproof type), oil proof

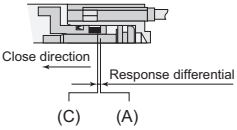
Note 1) The above mentioned load current is the maximum value: 20 mA is at the temperature of 25°C When switch operating ambient temperature is higher than 25°C, the current will become lower than 20 mA. (When the temperature is 60°C, the current will become 5 to 10 mA.)

■ Description of operation

- The purpose of this operation is to install the magnetic proximity sensor with reed switch (and indicator lamp built-in) to the outer periphery of the cylinder body so that when the piston (with magnet) moves to the sensor, the reed switch will operate and the position of the cylinder stroke can be detected externally without contact.
- Piston moves towards the arrow indicated direction and when the magnet gets to (A) position, the sensor is turned on.
  This ON status will continue between position (A) and position (B). This is the operational range.

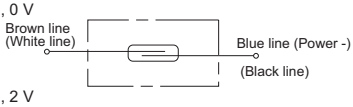


- When the piston moves towards the arrow indicated direction from the position where (A) is on, the sensor will stay ON until the position (C) is reached. This range between (A) and (C) is called the response differential.

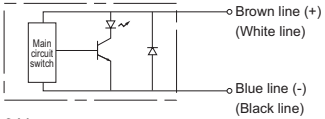


■ Sensor internal circuit diagram

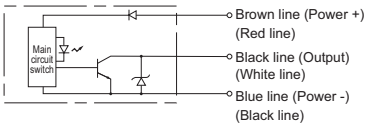
- 0 H, 0 V



- 2 H, 2 V



- 3 H, 3 V



- Refer to descriptions in A-92 and in the subsequent pages for precautions for connection, wiring, and use.

Open/close operation check sensor D13, E33, D14, E34

List of sensor and display method

Sensor type	Descriptions	Remarks
E34L1	Non-contact two-wire lead type 1m, right angle cable	Standard
D14L1	Non contact 2 conductors type 1m, cable straight from sensor	Option
E33L1	Non-contact three-wire lead type 1m, right angle cable	Option
D13L1	Non-contact three-wire lead type 1 m, cable straight from sensor	Option

* Lead line length of 3 m is also prepared. Use “3” for the last number of the code. Example: D14L3

Product number configuration

X9608-D-SS-D14L1

Refer to chuck product code in A-18.

No code: E34L1 attachment
D14L1: D14L1 attachment
E33L1: E33L1 attachment
D13L1: D13L1 attachment

Installation location

- Provide a magnetic shield with an iron plate or the like at a place where a strong magnetic field is generated.
- If a strong magnetic object (such as iron) is close to the sensor, it may cause the magnetic power of the cylinder piston to be reduced and the sensor may not function. Please replace such object with non-magnetic material (such as aluminum).
  * If a magnetized object (such as iron) moves close to the chuck it may also cause the sensor to not function properly.
  * If there are volumes of iron powder close to the sensor, it may also cause the sensor to not function properly.
- If the chucks are mounted side by side very closely, their cylinder magnets may conflict with each other and the sensor may indicate the wrong operation. The solution is to maintain a minimum distance (roughly 20 mm) between chucks, or take preventive measures against being influenced by magnetic effect of the contiguous chuck. Please check sensor operation thoroughly before operation.

Installation of sensor

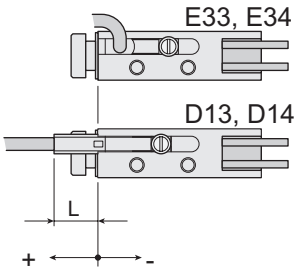
- Slide the sensor into the sensor mounting groove of the main body, move the sensor along with the groove, and tighten the screw mount at the specified position.
- Please use a precision adjustable torque screwdriver to tighten the screws at 0.1 to 0.2 N•m (1 to 2 kgf•cm).

⚠ WARNING

- Electrical power must be turned off before wiring. Failure to observe this instruction may result in a fire hazard and electrical shock hazard.
- Connect the wiring correctly.
  Faulty electric wiring can cause fire, electrical shock hazard, and malfunction of the product.
- Please make sure the sensor cable is not bent or pulled during operation. Electrical shock and/or malfunction may occur.

1. Be sure to read the instruction manual prior to sensor wiring.
2. Turn off the power of the device to be connected prior to wiring.

■ Sensor protrusion dimensions



L (mm)

Sensor model	X9608		X9608M		X9612		X9612M		Sensor body length
	Open end	Close end	Open end	Close end	Open end	Close end	Open end	Close end	
D13	9	5	9	5	11	5	11	5	24
D14	9	5	9	5	11	5	11	5	24
E33	-2	-4	-2	-4	1	-4	1	-4	15
E34	-2	-4	-2	-4	1	-4	1	-4	15

- Distances suggested above are estimates.
- For safest setup and operation, please position the sensor towards minus side for opening and the plus side for the closing.
- Indicates protrusion dimension of the sensor body.
- Keep space of at least L plus 10 mm to avoid interference between sensor protrusion part and other components.
- Please note that the E33 and E34 have opposite sensor sliding directions for closing end detection. (Insert from lead wire side)
- Check the dimensional drawing for X9618 and other products.

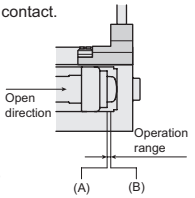
■ Specifications

Item	Non contact sensor type	
	D13, E33	D14, E34
Power supply voltage	5 to 28 VDC	-
Load voltage	28 VDC or smaller	10 to 28 VDC
Loading current	0.1 to 40 mA	5 to 20 mA
Internal drop voltage	0.5 V or smaller	5 V or smaller
Leak current	50 μA or smaller (24 VDC)	1 mA or smaller (24 VDC, 25°C)
Motion time	1 ms or smaller	
Return time	1 ms or smaller	
Insulation resistance	100 MΩ or greater at 500 VDC Mega (between housing and cable)	
Withstand voltage	1500 VAC for 1 minute (between housing and cable)	
Shock durability	294 m/S^2	
Vibration resistance	Amplitude1.5 mm,10 to 55 Hz (2 hours for each direction of X, Y, Z)	
Wiring method	PVC 0.15 mm^2 , 3-core, OD φ2.6 mm	PVC 0.2 mm^2 , 2-core, OD φ2.6 mm
Protective construction	IP67 (IEC standard) JIS C0920	
Output protection circuit	Exist	
Indicator light	LED (Light up when it's ON)	
Applications	Programmable controller, for small relay	
Mass	10 g	

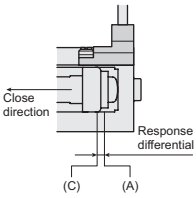
*D13, E33 NPN Type

■ Description of operation

- The purpose of this operation is to install the magnetic proximity sensor with reed switch (and indicator lamp built-in) to the outer periphery of the cylinder body so that when the piston (with magnet) moves to the sensor, the reed switch will operate and the position of the cylinder stroke can be detected externally without contact.
- Piston moves towards the arrow indicated direction and when the magnet gets to (A) position, the sensor is turned on.
  This ON status will continue between position (A) and position (B). This is the operational range.

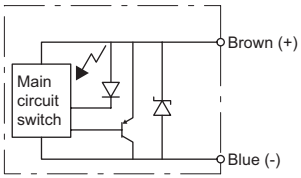


- When the piston moves towards the arrow indicated direction from the position where (A) is on, the sensor will stay ON until the position (C) is reached.
  This range between (A) and (C) is called the response differential.

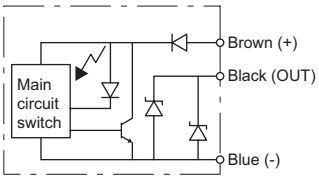


■ Sensor internal circuit diagram

Circuit diagram of D14 and E34



Circuit diagram of D13 and E33



Open/close operation check sensor 0, 2, 3, H/V D13, E33, D14, E34

■ Wiring of contact sensor

1. Caution in connection

- When using for DC, connect so that the brown line (white line) is on the ⊕ side and blue line (black line) is on the ⊖ side.
  When connected conversely, the sensor will operate but the lamp will not lit.
- When connecting to relay of AC, programmable controller input, if half-wave rectification is performed on these circuits, the sensor lamp may not lit. In this case, the lamp is lit by reversing the polarity of the sensor lead wire.

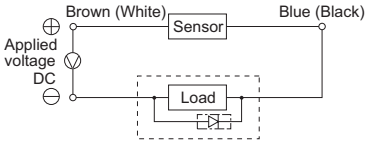
2. Contact capacity

Avoid using load that exceeds maximum contact capacity of sensor. When falling below the rated current value, the lamp may not be lit.

3. Contact protection

- When using induction load such as relay, be sure to provide contact protection circuit as shown in the following diagram.

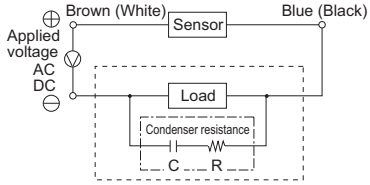
● Using diode



User wiring

Protection circuit
General rectifying diode
Hitachi V06C or equivalent product

● Using condenser and resistance



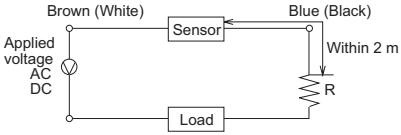
User wiring

Protection circuit (Spark quenching circuit)
Recommended value C condenser 0.033 to 0.1 μF
Rresistance 1 to 3 KΩ
Okaya Electric Industries manufactured XEB1K1
or equivalent product

- When wiring is too long, it will become wiring capacity, and incoming current occurs. As a result, sensor may be damaged or the life is shortened. Therefore, when wiring length exceeds the value in the right chart, be sure to provide contact protection circuit as shown in the diagram below.

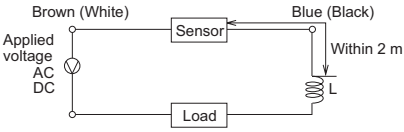
Voltage	Wiring length
DC	50 m
AC	10 m

● Using resistor



● Incoming current limiting resistor
R = Large resistance as high as load circuit side permits

● Using choke coil

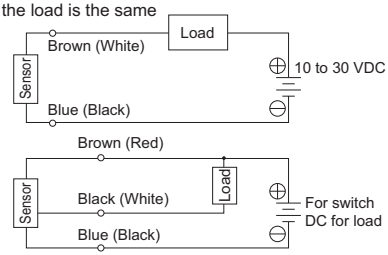


● Choke coil
L = a few hundred of μH to several mH
Must be excellent in high-frequency property

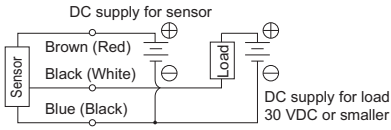
■ Wiring of non-contact sensor

1. Basic circuit

● In the case the power supply of the sensor and the load is the same



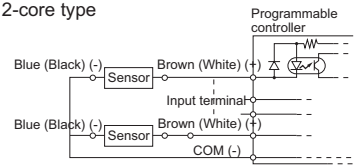
● In the case the power supply of the sensor and the load is different



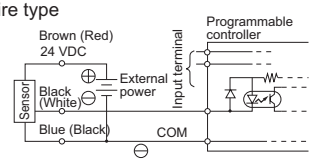
2. Connection with programmable controller (sequencer)

● In the case that the sequencer incorporates the electric power supply inside

2-core type

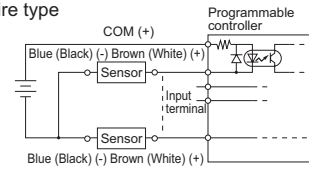


3-wire type

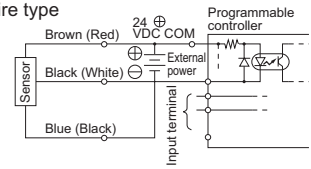


● In the case that the sequencer does not incorporate the electric power supply inside

2-wire type



3-wire type

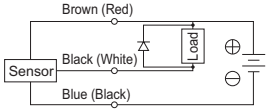


3. Output protection circuit

- When inductive load wiring (i.e. relay, solenoid) is connected for use

● Be sure to provide a protection circuit on the load side since a surge voltage is generated when the sensor is turned off.

3-wire type



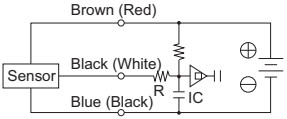
Example of surge clamping element for induction load

● Diode
D = Hitachi manufactured
V06C or equivalent product

- In the case that a capacitive load (capacitor, etc.) is connected for use

● Be sure to provide a protection circuit since a rush current is generated when the sensor is turned on.

3-wire type



Note) The value of R [Ω] must not be below the value obtained by the following formula.

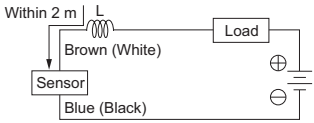
$R = \frac{V}{0.05}$ [Ω] V: Power supply voltage

- When using cables of 10 m or longer length

● Please design the circuit with protection as shown below:

● Use choke coil

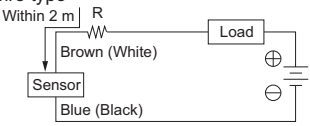
2-wire type



● Choke coil
L = a few hundred of μH to several mH
Must be excellent in high-frequency property

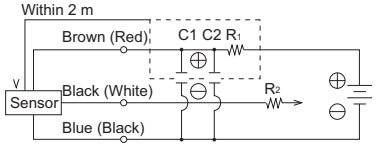
● Use resistor

2-wire type



● Incoming current limiting resistor
R = Large resistance as high as load circuit side permits

3-wire type



Power noise absorption circuit
C_1=20 to 50 μF
Electrolytic capacitor (Pressure resistance 50 V or higher)
C_2=0.01 to 0.1 μF
Ceramic condenser
● Incoming current limiting resistor
R1 = 20 to 30 Ω
R2 = Use large resistance as high as the load side circuit permits.

Open/close operation check sensor 0, 2, 3, H/V D13, E33, D14, E34

■ Wiring precautions

- Please wire according to the correct lead colors. Make sure to turn off the device power of the electric circuit on the connection side before wiring. Faulty electrical wiring and short circuit of the load may result in damage to the electric circuit on the side of the load and sensor. Even short periods of circuit shortage may cause the output circuit to burn out. Wiring with the power on may lead to the damage to the electric circuit on the side of the sensor and the load.

- Take measures so that a load by bending and pulling is not applied to the sensor cord. Use caution to avoid a load to the base of the sensor cord, in particular, by securing the sensor cord or by other means.
  Keep the sensor cable away from the power source of other electric equipment as far as possible. If the cable is bundled with or installed near the power line of other electric equipment, the sensor and load are adversely affected by the induced current.

■ Precautions for use

- Use caution in wiring connection so that the lead wire is not subjected to repeated bending stress and tensile force. Use high-flex cables such as electric wire for robot for the movable part.

- Parallel connection [0, 2, 3, H/V only]

・When multiple two-wire type sensors are connected for use, leakage current will increase by the number of connections. Therefore, make sure to confirm the specification of the load and determine the number of connections. However, the lamp of the sensor may become darker or may not be lit.

・For two-wire type sensor, up until one sensor is turned on and turned off, the voltage of both ends of the sensor, which was connected in parallel, will drop up to the internal drop voltage value when the sensor is ON and fall below the load voltage range. As a result, other sensors will not be turned on. Therefore, make sure to check input specification of the programmable controller, which is the connection load, before use.

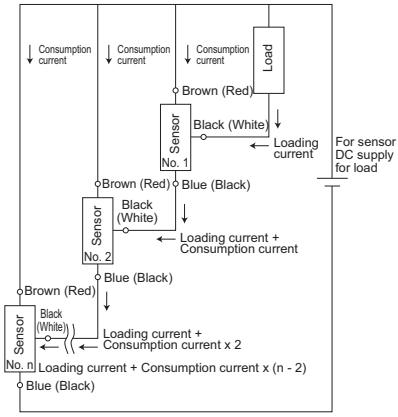
・Leakage current value of the three-wire non-connection type sensor is very small (10 μA or smaller), therefore, it will not cause problem during the normal use.

- Series connection [0, 2, 3, H/V only]

・When multiple two-wire type sensors are connected in series, voltage drop at the sensor becomes the total of voltage drop at all connected sensors. The voltage applied to the load side is the power voltage minus the voltage drop at the sensors. Make sure to check the specification of the load and determine the number of connections.

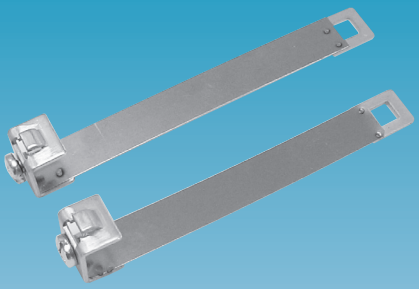
・When multiple three-wire type sensors are connected for use in series, voltage drop at the sensor becomes the total of voltage drop at all connected sensors, same as the above two-wire type sensors. In addition, the current flows in the sensor is the total of consumption current and load current of the connected sensor as shown in the diagram below. Therefore, in order to avoid exceeding maximum load current of the sensor, make sure to check the specification of the load and determine the number of connections.

・The lamp is lit when all sensors are turned ON.



- There is a case when D13, E33, D14, and E34 cannot be used by combining with load, therefore, avoid connecting multiple sensors (direct and parallel connection).

Sensor band for sensor VR15



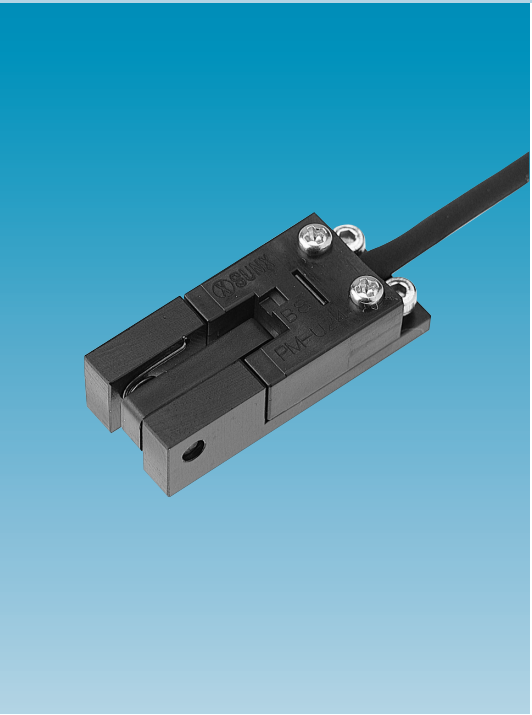
- This is a sensor band for open/close operation check sensor VR15.
- Apply to the type with standard sensor.

Chuck model	Band model
X9561S	φ18 band
X9571S	
X9562S	φ20 band
X9572S	

■ NOTE

- Refer to A-84 to find the specification of sensor VR15.

Float position detection sensor FLS-01



- Compact type adopted photo sensor with built-in amplifier.
- Simple mechanism to detect by slit groove of swivel-type detection cam.
- Small response differential and high repetitive detection accuracy, and detection of minute difference in position is possible.

■ Specifications NPN Type

Model	FLS-01
Name	Photo sensor with swivel-type detection cam
Photo type	PM-U24 (SUNX)
Power supply voltage	5 to 24 VDC ±10% (Ripple P-P 10% or less)
Power consumption	15 mA or smaller
Output	NPN transistor/open collector
Impact resistance	Durable at 1500 G, 3 times
Vibration resistance	Double amplitude 1.5 mm, 10 to 2000 Hz, for 2 hours
Indicator light	LED Turn on when light enters
Cord length	1.0 m (Cabtyre cable)
Light incidence range	1 mm (At float position)
Position repetition accuracy	Within 0.1 mm
Response differential	Within 0.1 mm

⚠WARNING

- Electrical power must be turned off before wiring. Failure to observe this instruction may result in a fire hazard and electrical shock hazard.
- Connect the wiring correctly.
  Faulty electric wiring can cause fire, electrical shock hazard, and malfunction of the product.
- Please make sure the sensor cable is not bent or pulled during operation. Electrical shock and/or malfunction may occur.

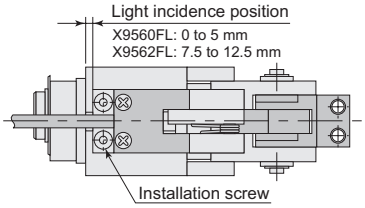
1. Be sure to read the instruction manual prior to sensor wiring.
2. Turn off the power of the device to be connected prior to wiring.

■ Place of installation

- No particular measures for ambient light resistance are taken. Take some appropriate measures so that the photo sensor is not exposed to direct sunlight.

■ Installation of sensor

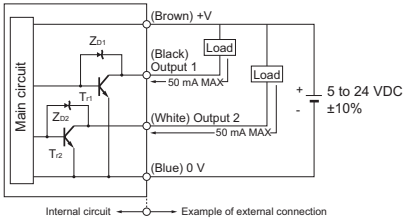
1. Insert the sensor into the sensor installation groove of the main body.
2. Set the float position at the normal supply position.
3. Move the sensor along the groove.
4. Set the sensor at the center of the range in which the indicator light of the sensor lights up, and tighten the installation screw.



* Carry out adequate adjustments and checking by making allowance for the dimensional tolerance of the workpiece before the use of the product.

■ Connection method

1. Input and output circuit diagram

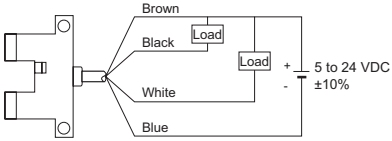


Code: Z_{D1}, Z_{D2}: Zener diode for absorption of surge voltage
T_{r1}, T_{r2}: NPN output transistor

Output operation

	Color of lead wire	Output operation
Output 1	Black	Turned ON when light enters.
Output 2	White	Turned ON when light is blocked.

2. Connection diagram



■ Wiring precautions

- The power supply reverse connection protection circuit and output short circuit protection circuit are not provided. So use added caution to make the wiring connection correctly.
- If a commercially available switching regulator is used for the power supply, be sure to ground the frame ground (F. G.) terminal.
- When a device (switching regulator, inverter motor, etc.) which could become a noise source is used near the sensor installation place, be sure to ground the frame ground (F. G.) terminal of the device.
- Avoid parallel arrangement and use of the same raceway with a high-voltage line and power line. Otherwise, malfunction may be caused due to induction.
- Avoid a transient state (50 ms) when the power is turned on.
- Take measures so that a load by bending and pulling is not applied to the sensor cord. Use caution to avoid a load to the base of the sensor cord, in particular, by securing the sensor cord or by other means.
- Keep space of at least 10 mm from the sensor end face to avoid interference between the base of the sensor cord and peripheral components.

Applications

1. Restriction of applications

This MEPAC (parallel air chuck) is a product to clamp workpiece installed by automatic machine by clamp unit, which is operated by compressed air. (Mecha type is external drive.)

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

- Do not throw the product into the fire.
  Product may be damaged or poisonous gases may be discharged.

⚠ CAUTION

- Do to apply force to the main body and press fit or draw out the workpiece. Product may be damaged and injury may occur.
- Do not spin the body with high speed. Due to the decrease in clamp force by centrifugal force, the workpiece falls off, which may result in a personal injury.
- Do not apply exponential shock. Otherwise, the chuck may be damaged or the finger malfunctions, and the workpiece falls off due to decrease in clamp force, which may result in a personal injury.
- Do not use the floating type at the float end (stroke end of the floating mechanism). If it is used at the float end, the chuck may be damaged or the finger malfunctions, and the workpiece falls off, which may result in a personal injury.
- When mounting the product, ensure reliable retention and securing. Otherwise, fall or abnormal operation of the product may cause 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.
- Be sure to confirm the safety of the operating range of devices before supplying air to and operating the product. If the air is supplied improperly, there is a risk of 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.
- Be sure to completely remove the supply of air before performing various tasks such as maintenance, inspection, service, or replacement.

⚠ CAUTION

- Magnet is built-in the main body of ECO-Multi type, type with standard sensor, and smart type.
  Use the type without sensor such as Eco type in the environment that is not favorable for a magnetic substance (accumulation of iron dust, cylinder sensor in the neighborhood, workpiece).

- Use protective covers to prevent the moving parts of machinery from coming in direct contact with human body.

- When working on the product, ensure safety by wearing protective gloves, safety glasses, safety shoes, etc. as required.

- When the product has become unserviceable or unnecessary, dispose of it properly as industrial waste.

- 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.

3. Types of open/close operation and applications

- There are three types of MEPAC: single action constantly open type, single action constantly closed type, and reciprocating type.

- Follow the instructions described below to use single action type and reciprocating type chuck.

Type / Clamp direction	Single action			Reciprocating
	Eco type	NO type (Constantly open)	NC type (Constantly closed)	
				
	Enabled	Enabled	Disabled	Enabled
	Enabled	Disabled	Enabled	Enabled (Only 2F standard is not possible)

⚠ CAUTION

- There is a type that workpiece falls off when air runs out while being clamped, which may cause injury and damage.
  Carefully consider fail safe and make a selection.

⚠ WARNING

- Do not increase air pressure and finger tooling open/close speed more than necessary. Shock load is doubled, which may cause damage or injury.

- When applying weight to finger attachment more than necessary, shock load is doubled, which may cause damage on the chuck or injury.