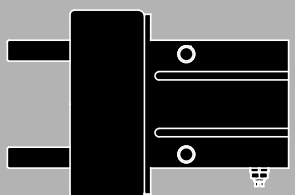


Wedge Cam Operation Slide Guide Air Gripper (2 Finger)

Series MHK2

ø12, ø16, ø20, ø25

Load Resistant, Dust Cover for Adverse Environments

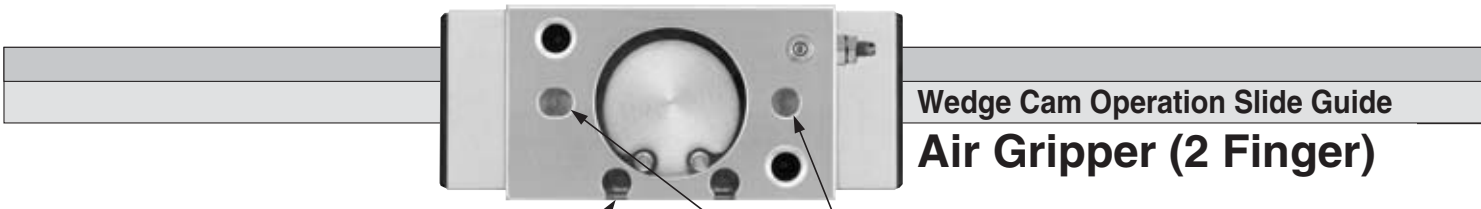
2 types of finger materials

Standard: Carbon steel
Optional: Stainless steel

3 types of dust cover materials

Standard: Chloroprene rubber (CR) ···Black
Optional: Silicon rubber (Si) ···White
Fluoro rubber (FKM) ···Black

Wedge Cam Operation Provides Dust Cover for Adverse



Wedge Cam Operation Slide Guide

Air Gripper (2 Finger)

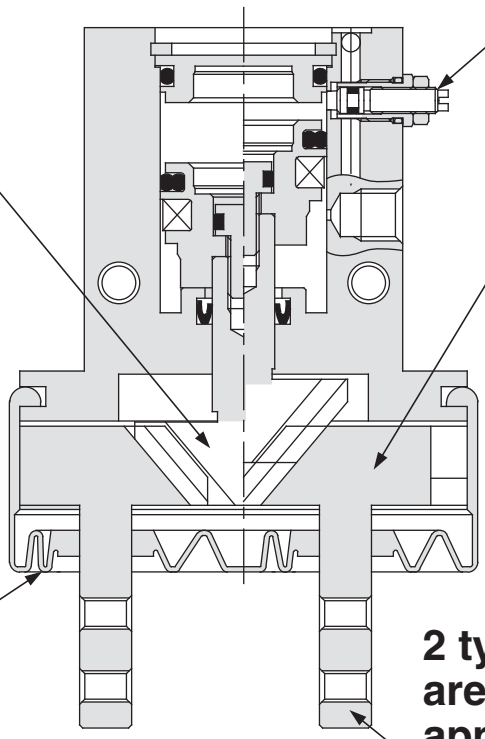
Pin hole for positioning on top side

Auto switch mountable

Grooves for auto switch are located on one side. Easy handling for adjustment and installation.

Built-in adjustment needle for finger speed

Possible to adjust the speed for finger closing direction.



Wedge cam structure

The wedge structure allows no lateral vibration along stroke direction once work is held.

High rigidity

Slide type guide bearing enables highly rigid finger motion.

High precision Repeatability: 0.01mm

Improved performance

Incorporation of dust cover prevents dust, water, etc. from entering the body and avoids generating dust and releasing grease from air gripper.

2 types of finger materials are available for different applications.

Standard: Carbon steel
Optional: Stainless steel

3 types of dust covers are available for use in different environments.

Standard: Chloroprene rubber (CR) ·····Black
Optional: Silicon rubber (Si) ···White
Fluoro rubber (FKM) ···Black

Longer strokes are now standard.

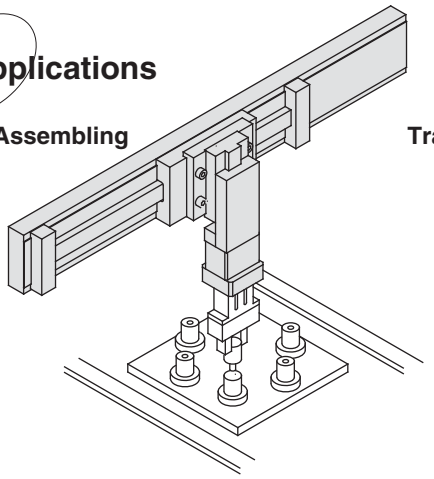
Bore size (mm)	Opening/Closing stroke (mm)	
	Long stroke	Standard stroke
12	11	4
16	14	6
20	18	10
25	22	14

High Precision and Rigidity. Environmental Conditions.

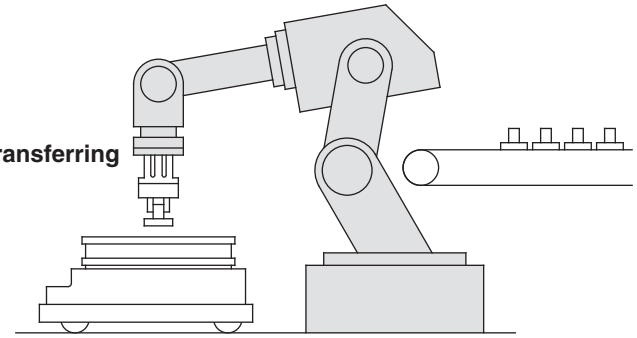
Series MHK2

Applications

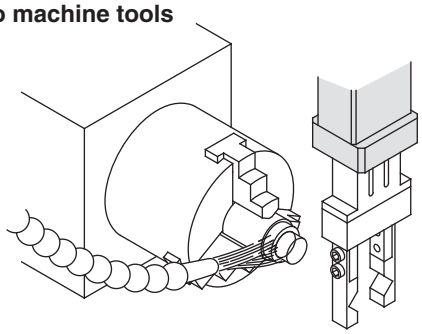
Assembling



Transferring

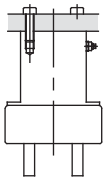


Loading/unloading work into machine tools



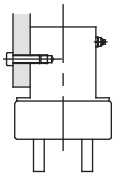
Universal Mounting

Axial mounting



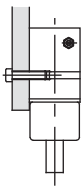
(Body tapped)

Vertical mounting

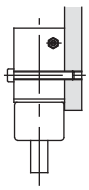


(Body tapped)

Lateral mounting



(Body tapped)



(Body through-hole)

Interchangeable with Series MHQG2

Variations

Series		Model	Bore size (mm)	Opening/Closing stroke (mm)	Options
Parallel opening/closing	Standard type series **MHK2**	**MHK2-12□**	12	4	■ Finger option Carbon steel (Standard), Stainless steel ■ Dust cover option Chloroprene rubber (Standard) Fluoro rubber Silicone rubber ■ Auto Switch Solid state switch D-M9N(V), D-M9P(V), D-M9B(V) Water resistant (2 colour indication) D-M9□A(V)
		MHK2-16□	16	6	
		MHK2-20□	20	10	
		MHK2-25□	25	14	
	Long stroke type series **MHKL2**	**MHKL2-12□**	12	11	
		MHKL2-16□	16	14	
		MHKL2-20□	20	18	
		MHKL2-25□	25	22	

Wedge Cam Operation Slide Guide
Air Gripper/2-Finger Type
Series MHK2
ø12, ø16, ø20, ø25

How to Order

Standard type MHK 2 – 20 D 1 F – M9B ☐ – ☐

Long stroke type MHKL 2 – 20 D 1 F – M9B ☐ – ☐

Number of fingers

2	2 fingers

Bore size

12	12 mm
16	16 mm
20	20 mm
25	25 mm

Action

D	Double acting
S	Single acting (Normally open)
C	Single acting (Normally closed)

Finger material

—	Carbon steel
1	Stainless steel

Dust cover material

—	Chloroprene rubber (CR)
F	Fluororubber (FKM)
S	Silicone rubber (Si)

Auto switch

—	Without auto switch (Built-in magnet)

Number of auto switches

—	2 pcs.
S	1 pc.

Made to Order
Refer to page 5-145 for details.

Applicable Auto Switches/Refer to Auto Switch Guide for further information on auto switches.

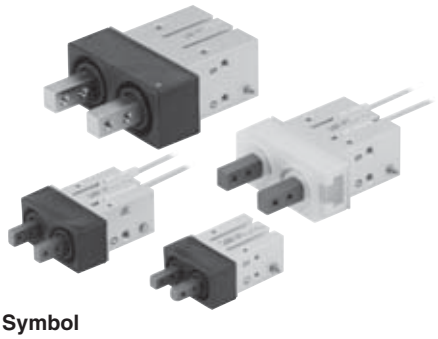
Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage			Auto Switch model		Lead wire length (m)*				Pre-wired connector	Applicable load	
								Electrical entry direction		0.5 (—)	1 (M)	3 (L)	5 (Z)			
					DC		AC	Perpendicular	In-line							
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	M9NV	M9N	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				M9PV	M9P	●	●	●	○	○		
				2-wire		12 V		M9BV	M9B	●	●	●	○	○	—	
	Diagnosis (2-color indication)			3-wire (NPN)		5 V, 12 V		M9NWV	M9NW	●	●	●	○	○	IC circuit	
				3-wire (PNP)				M9PWV	M9PW	●	●	●	○	○		
				2-wire		12 V		M9BWV	M9BW	●	●	●	○	○	—	
	Water resistant (2-color indication)			3-wire (NPN)		5 V, 12 V		M9NAV**	M9NA**	○	○	●	○	○	IC circuit	
				3-wire (PNP)				M9PAV**	M9PA**	○	○	●	○	○		
				2-wire		12 V		M9BAV**	M9BA**	○	○	●	○	○	—	

** Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance.

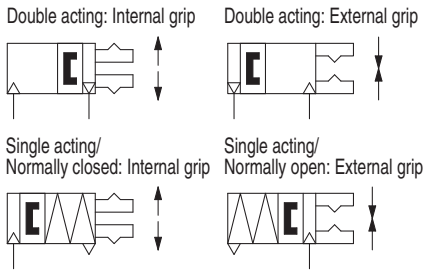
* Lead wire length symbols: 0.5 m ····· — (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

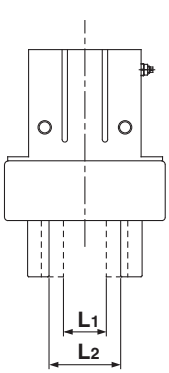
* Auto switches marked with a "○" symbol are produced upon receipt of order.

Note) When using the 2-color indicator type, please make the setting so that the indicator is lit in red to ensure the detection at the proper position of the air gripper.

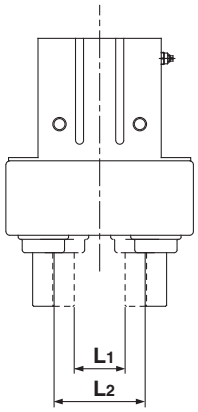


Symbol





Series MHK2



Series MHKL2

Made to Order

Made to Order: Individual Specifications
(For details, refer to pages 5159 to 5-161.)

Symbol	Specifications/Description
-X39	With grease nipple
-X41	Auto switch groove (Both-side type)

Made to Order

Made to Order

Symbol	Specifications/Description
-X4	Heat resistance (100°C)
-X5	Fluororubber seal
-X7	Closing direction spring assist
-X12	Opening direction spring assist
-X50	Without magnet
-X53	EPDM seal/Fluorine grease
-X63	Fluorine grease
-X64	Finger: Side tapped mounting
-X65	Finger: Through-hole mounting
-X77A	Dust cover adhesion
-X77B	Dust cover adhesion (Finger part only)
-X78A	Dust cover caulking
-X78B	Dust cover caulking (Finger part only)
-X79	Grease for food processing machines, Fluorine grease
-X79A	Grease for food processing machines

Specifications

Fluid			Air
Operating pressure	**Double acting**		0.1 to 0.6 MPa
	Single acting	**Normally open**	0.25 to 0.6 MPa
		Normally closed	
Ambient and fluid temperature			–10 to 60°C
Repeatability			±0.01 mm
Lubrication			Not required
Action			Double acting/Single acting
Auto switch (Option) Note)			Solid state auto switch (3-wire, 2-wire)

Note) Refer to Auto Switch Guide for further information on auto switches.

Option

Finger material	Carbon steel (Standard), Stainless steel
Dust cover material	Chloroprene rubber (CR) (Standard), Fluororubber (FKM), Silicone rubber (Si)

Model

Series MHK2/Standard Type

Action		Model	Bore size (mm)	Max. operating frequency (c.p.m)	Effective gripping force per finger (N) Note)	Opening/Closing stroke (mm) **L2–L1**	Width at closing (mm) **L1**	Width at opening (mm) **L2**	Weight (g)
Double acting		**MHK2-12D□**	12	120	External grip: 15 Internal grip : 16	4	9	13	75
		MHK2-16D□	16		External grip: 31 Internal grip : 36	6	14.6	20.6	113
		MHK2-20D□	20		External grip: 46 Internal grip : 56	10	16	26	235
		MHK2-25D□	25		External grip: 80 Internal grip : 86	14	19	33	440
Single acting	Normally open	**MHK2-12S□**	12		9	4	9	13	76
		MHK2-16S□	16		23	6	14.6	20.6	114
		MHK2-20S□	20		34	10	16	26	237
		MHK2-25S□	25		58	14	19	33	443
	Normally closed	**MHK2-12C□**	12		12	4	9	13	76
		MHK2-16C□	16		25	6	14.6	20.6	115
		MHK2-20C□	20		44	10	16	26	237
		MHK2-25C□	25		73	14	19	33	443

Series MHKL2/Long Stroke Type

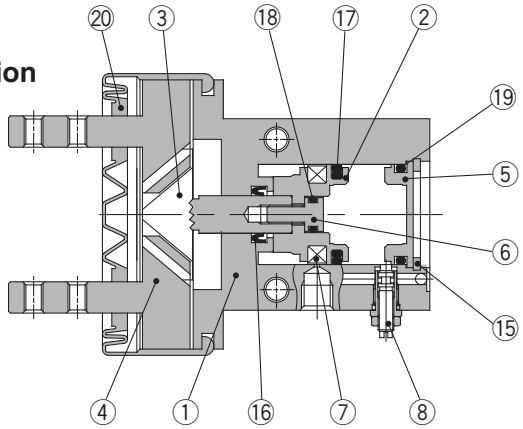
Action		Model	Bore size (mm)	Max. operating frequency (c.p.m)	Effective gripping force per finger (N) Note)	Opening/Closing stroke (mm) **L2–L1**	Width at closing (mm) **L1**	Width at opening (mm) **L2**	Weight (g)
Double acting		**MHKL2-12D□**	12	90	External grip: 14 Internal grip : 16	11	9	20	104
		MHKL2-16D□	16		External grip: 27 Internal grip : 30	14	14.6	28.6	164
		MHKL2-20D□	20		External grip: 45 Internal grip : 53	18	16	34	312
		MHKL2-25D□	25		External grip: 79 Internal grip : 90	22	19	41	562
Single acting	Normally open	**MHKL2-12S□**	12		9	11	9	20	105
		MHKL2-16S□	16		17	14	14.6	28.6	165
		MHKL2-20S□	20		32	18	16	34	314
		MHKL2-25S□	25		53	22	19	41	565
	Normally closed	**MHKL2-12C□**	12		11	11	9	20	105
		MHKL2-16C□	16		22	14	14.6	28.6	166
		MHKL2-20C□	20		40	18	16	34	314
		MHKL2-25C□	25		63	22	19	41	565

Note) At the pressure of 0.5 MPa, when gripping point L is 20 mm.
Single acting nomally open: External holding force, Single acting nomally closed: Internal gripping force.
Refer to "Effective Gripping Force" for the gripping force at each gripping position on pages 569 to 573.

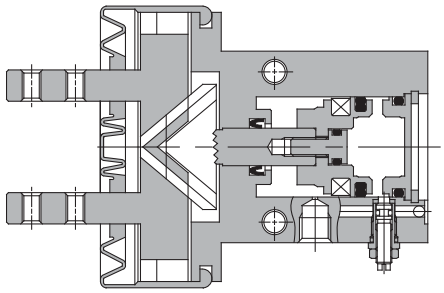
Construction

Double acting

Open condition

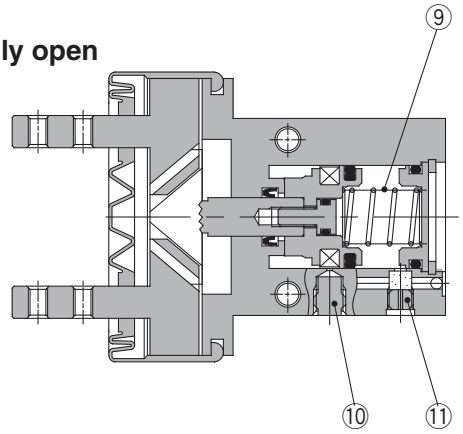


Closed condition

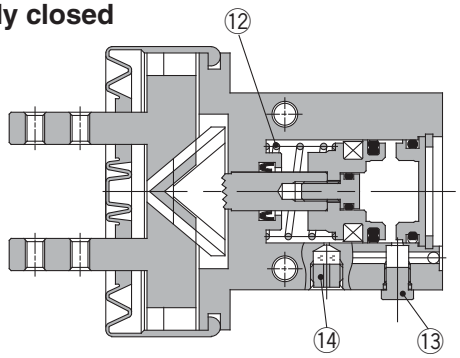


Single acting

Normally open



Normally closed



Component Parts

No.	Description	Material	Note
1	**Body**	Aluminium alloy	Hard anodised
2	**Piston**	Aluminium alloy	Hard anodised
3	**Cam**	Carbon steel	Heat treated, Specially treated
4	**Finger**	Carbon steel	Heat treated, Specially treated
		Stainless steel 304	Option
5	**Cap**	Aluminium alloy	Hard anodised
6	**Piston bolt**	Stainless steel	
7	**Rubber magnet**	Synthetic rubber	

No.	Description	Material	Note
8	**Needle assembly**		
9	**N.O. spring**	Piano wire	
10	**Plug**	Brass	Electroless nickel plated
11	**Exhaust plug**	Brass	Electroless nickel plated
12	**N.C. spring**	Piano wire	
13	**Plug assembly**	Brass	Electroless nickel plated
14	**Exhaust plug A**	Brass	Electroless nickel plated
15	**Type C retaining ring**	Carbon steel	Nickel plated

MHK2 Replacement Parts

Description			MHK2-12□	MHK2-16□	MHK2-20□	MHK2-25□	Main parts
Seal kit			MHK12-PS	MHK16-PS	MHK20-PS	MHK25-PS	⑯⑰⑱⑲
Piston assembly			MHK-A1201	MHK-A1601	MHK-A2001	MHK-A2501	②⑥⑦
Cam			P3318103	P3318203	P3318303	P3318403	③
Finger	Material	Carbon steel	P3318104	P3318204	P3318304	P3318404	④
		Stainless steel	P3318104-1	P3318204-1	P3318304-1	P3318404-1	
Needle assembly			MHK-A1206				⑧
Dust cover	Material	CR	MHK2-J12	MHK2-J16	MHK2-J20	MHK2-J25	⑳
		FKM	MHK2-J12F	MHK2-J16F	MHK2-J20F	MHK2-J25F	
		Si	MHK2-J12S	MHK2-J16S	MHK2-J20S	MHK2-J25S	

∗ Order 2 pieces per one finger unit.
Replacement part/Grease pack part no.: MH-G01 (30 g)

MHKL2 Replacement Parts

Description			MHKL2-12□	MHKL2-16□	MHKL2-20□	MHKL2-25□	Main parts
Seal kit			MHK12-PS	MHK16-PS	MHK20-PS	MHK25-PS	⑯⑰⑱⑲
Piston assembly			MHK-A1201	MHK-A1601	MHK-A2001	MHK-A2501	②⑥⑦
Cam			P3318111	P3318211	P3318311	P3318411	③
Finger	Material	Carbon steel	P3318112	P3318212	P3318312	P3318412	④
		Stainless steel	P3318112-1	P3318212-1	P3318312-1	P3318412-1	
Needle assembly			MHK-A1206				⑧
Dust cover	Material	CR	MHKL2-J12	MHKL2-J16	MHKL2-J20	MHKL2-J25	⑳
		FKM	MHKL2-J12F	MHKL2-J16F	MHKL2-J20F	MHKL2-J25F	
		Si	MHKL2-J12S	MHKL2-J16S	MHKL2-J20S	MHKL2-J25S	

∗ Order 2 pieces per one finger unit.
Replacement part/Grease pack part no.: MH-G01 (30 g)

Model Selection Example

Procedure

Confirmation of conditions → Select possible points according to the work length → Calculation of required gripping force → Selection of model from gripping force graph

Workpiece form:
Diameter x Length
ø28 x 35 mm round bar

Workpiece diameter: From dimensions of model that has opening width 28 mm or more.

MHK2-25D
MHKL2-16D
MHKL2-20D
MHKL2-25D

Work mass: 0.17 kg

Gripping method:
External gripping

Guidelines for the selection of the gripper with respect to workpiece mass

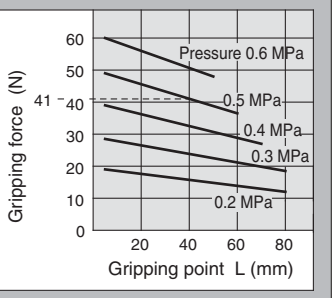
- Although conditions differ according to the workpiece shape and the coefficient of friction between the attachments and the workpiece, select a model that can provide a gripping force of 10 to 20 times the workpiece mass, or more.
- If high acceleration, deceleration or impact forces are encountered during motion, a further margin of safety should be considered.

Ex.) For setting the gripping force to be at least 20 times the workpiece mass:
Required gripping force = 0.17 kg x 20 x 9.8 m/s² ≈ 33 N

Gripping point 40 mm

Operating pressure: 0.5 MPa

MHKL2-20D
External Gripping Force

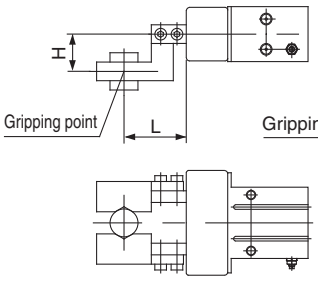


- **When MHKL2-20D** is selected, the gripping force is determined to be 41N according to the gripping point distance 40 mm and the pressure (0.5 MPa).
- The gripping force is 24.5 times the workpiece mass meeting the guideline that gripping force should be more than 20.

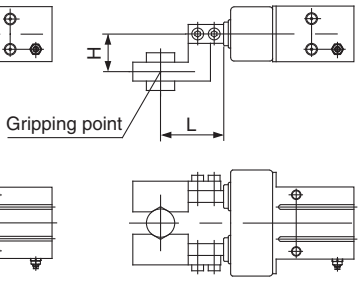
Gripping Point

External grip

Series MHK2

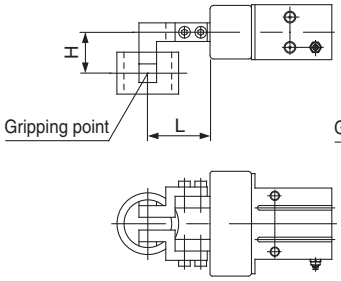


Series MHKL2

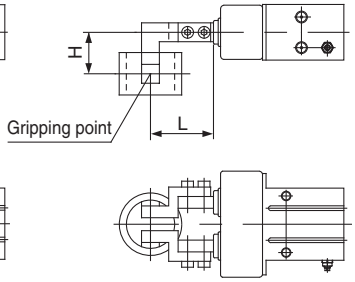


Internal grip

Series MHK2



Series MHKL2

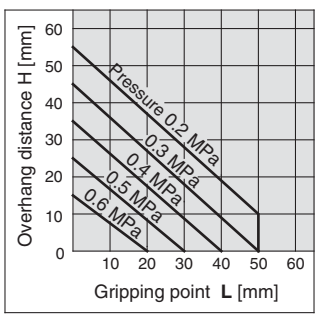


L: Gripping point distance
H: Overhang distance

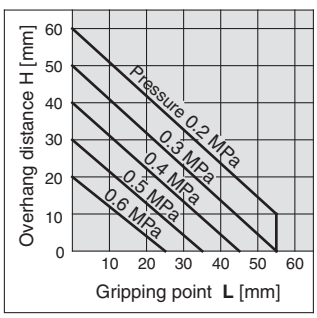
- Proper gripping points should be selected in accordance with the operating pressure. The distance to the gripping point L and the overhang distance H should be within the limited range given in the graphs below.
- When the gripping point distance becomes large, the finger attachment applies an excessively large load to the finger sliding section, causing excessive play of the fingers and possibly leading to premature failure.

Gripping Point Range Limit

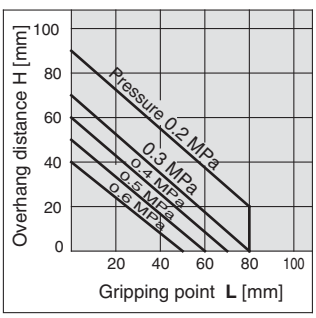
MHK2-12□
MHKL2-12□



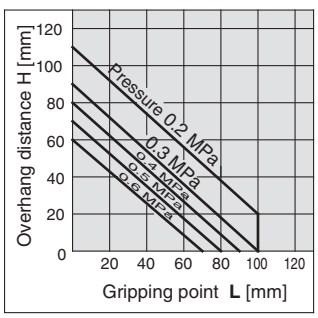
MHK2-16□
MHKL2-16□



MHK2-20□
MHKL2-20□



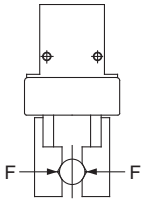
MHK2-25□
MHKL2-25□



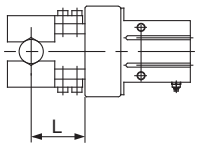
Note) Distance to the gripping point L of single acting type is shortened by spring return.
Use air gripper within gripping force line shown for each pressure in effective gripping force graph.

Effective Gripping Force: Series MHK2 Double Acting

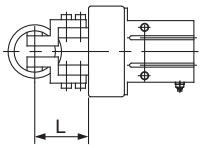
• Indication of effective gripping force
The effective gripping force shown in the graphs to the right is expressed as F, which is the thrust of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.



External grip
Series MHK2

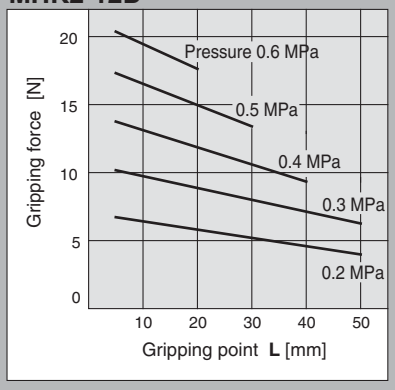


Internal grip
Series MHK2

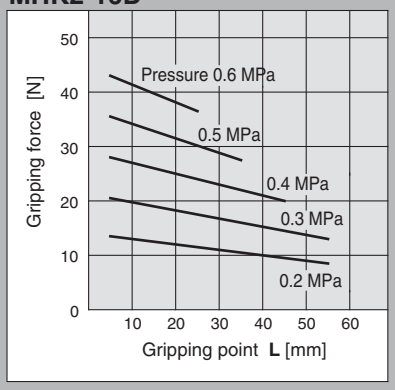


External Grip

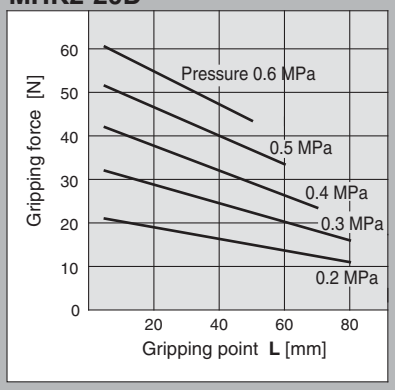
MHK2-12D



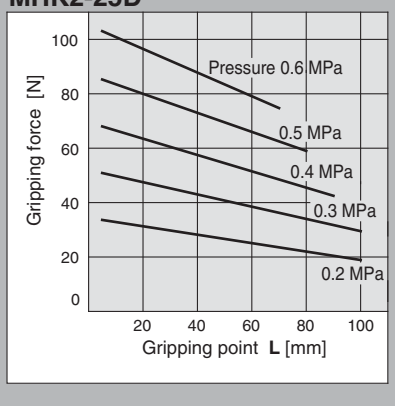
MHK2-16D



MHK2-20D

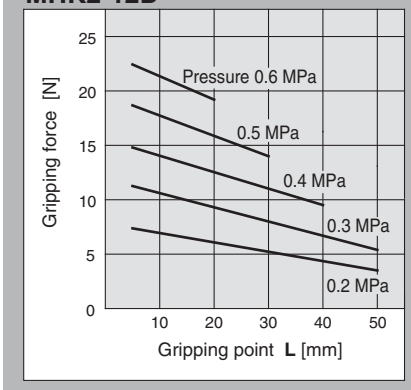


MHK2-25D

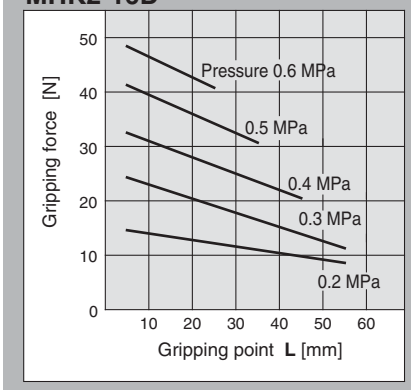


Internal Grip

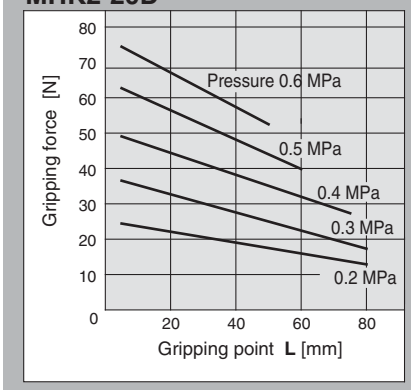
MHK2-12D



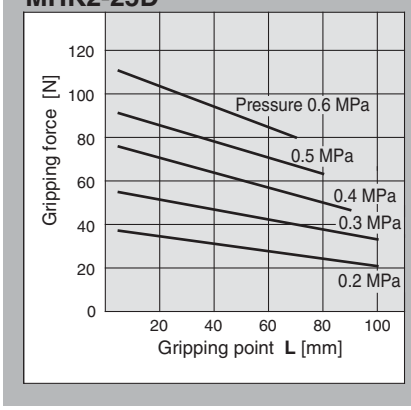
MHK2-16D



MHK2-20D

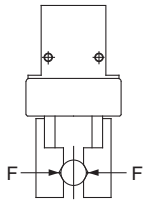


MHK2-25D

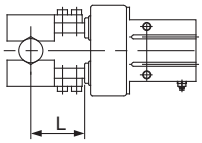


Effective Gripping Force: Series MHKL2 Double Acting

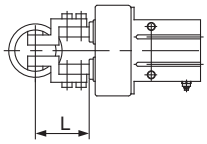
• Indication of effective gripping force
The effective gripping force shown in the graphs to the right is expressed as **F**, which is the thrust of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.



External grip
Series MHKL2

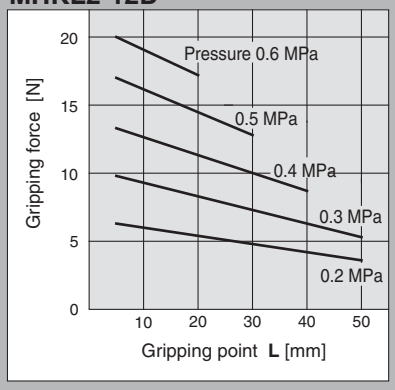


Internal grip
Series MHKL2

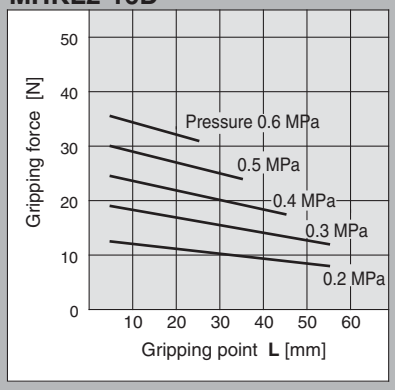


External Grip

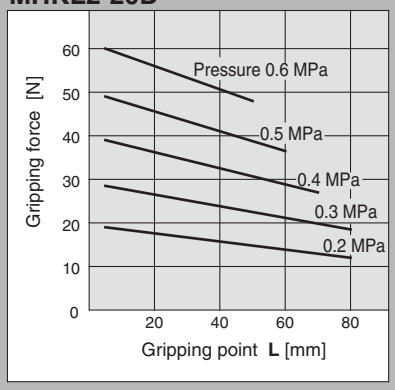
MHKL2-12D



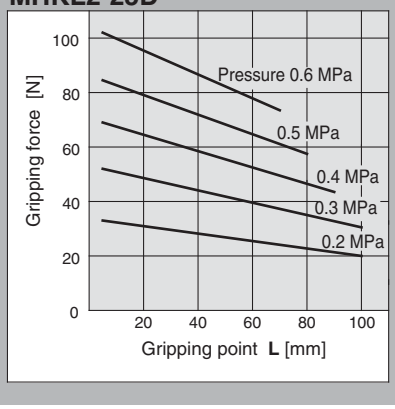
MHKL2-16D



MHKL2-20D

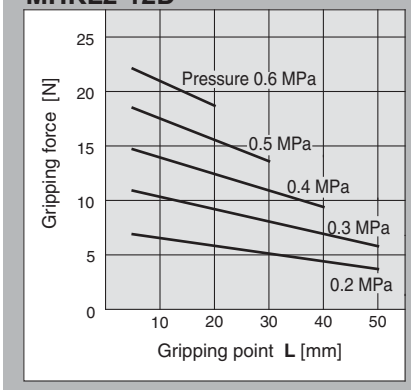


MHKL2-25D

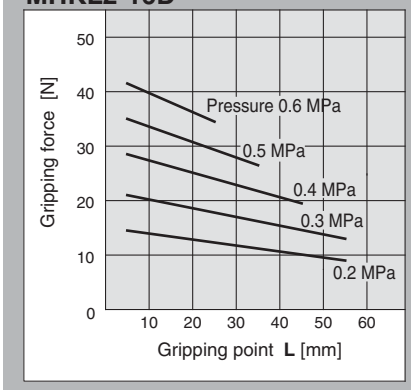


Internal Grip

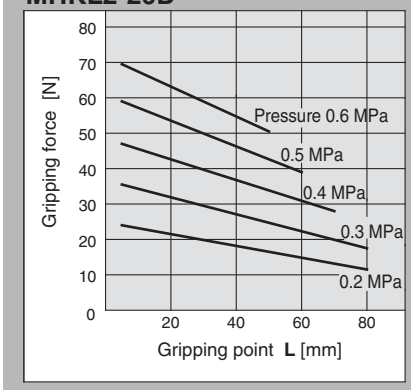
MHKL2-12D



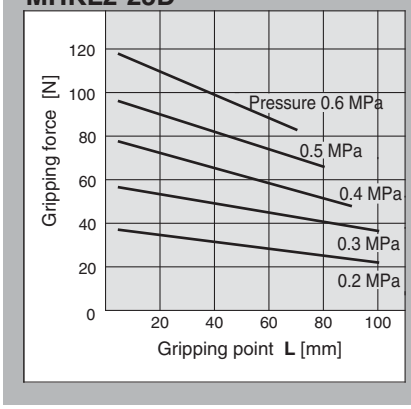
MHKL2-16D



MHKL2-20D

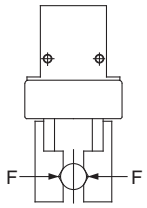


MHKL2-25D



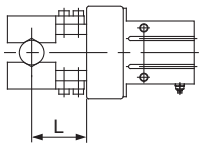
Effective Gripping Force: Series MHK2 Single Acting

• Indication of effective gripping force
The effective gripping force shown in the graphs to the right is expressed as **F**, which is the thrust of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

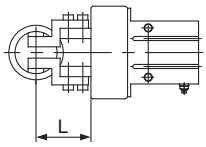


Note) In case of single acting type, the value is for stroke center.

External grip
Series MHK2



Internal grip
Series MHK2

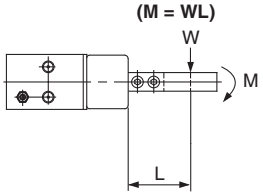


• Precautions when using the single acting type:
If a moment such as that illustrated below is applied to the finger, the finger might not be able to retract by the spring force alone.
Therefore, make sure to use the air gripper within the allowable moment that is indicated in the table below.

Allowable Moment

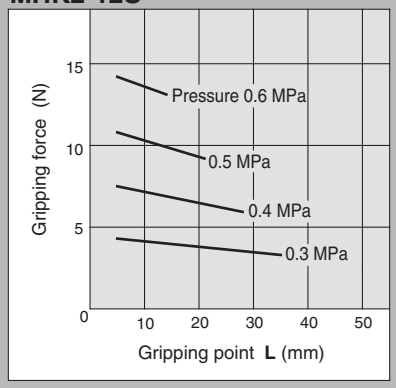
Model	Allowable moment (N·m)
MHK2-12S/C	0.05
MHK2-16S/C	0.12
MHK2-20S/C	0.25
MHK2-25S/C	0.49

M: Allowable moment
(M = WL)

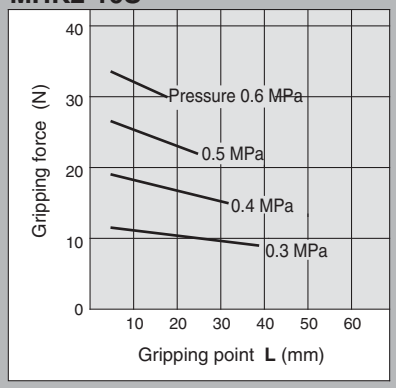


External Grip

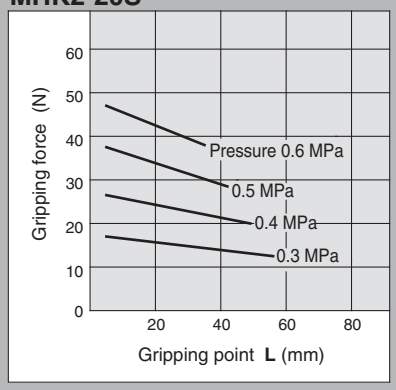
MHK2-12S



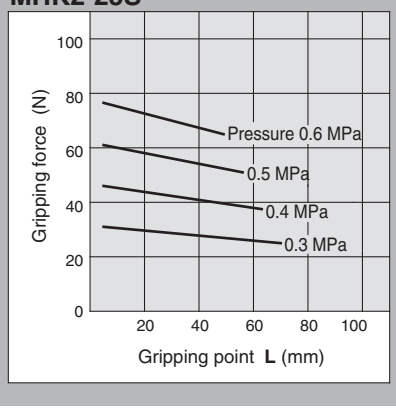
MHK2-16S



MHK2-20S

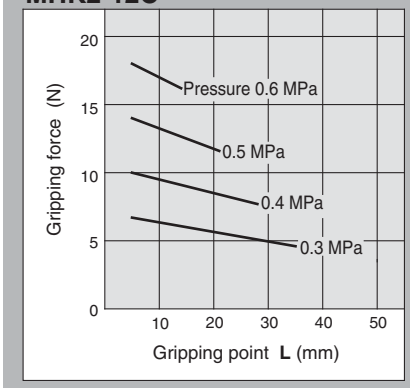


MHK2-25S

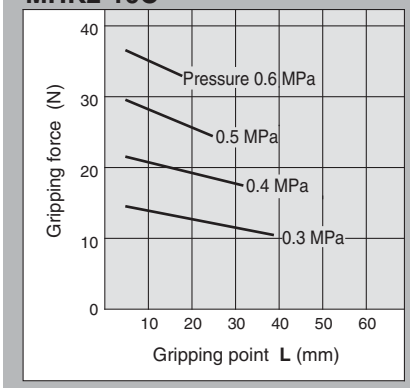


Internal Grip

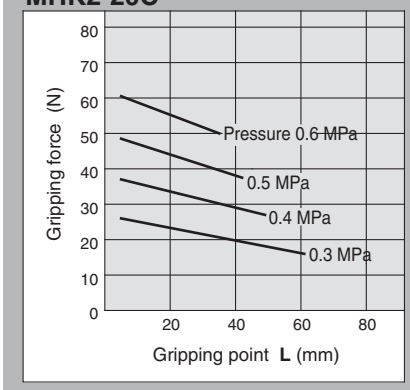
MHK2-12C



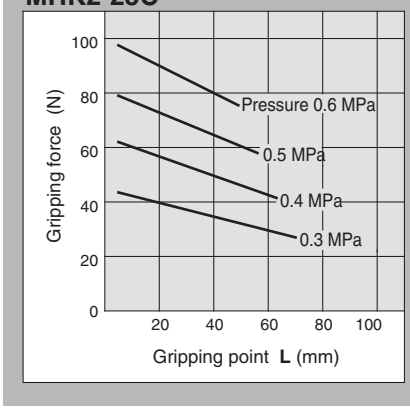
MHK2-16C



MHK2-20C

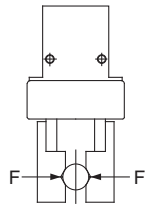


MHK2-25C



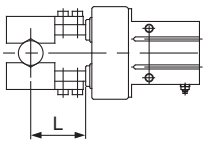
Effective Gripping Force: Series MHKL2 Single Acting

• Indication of effective gripping force
The effective gripping force shown in the graphs to the right is expressed as **F**, which is the thrust of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

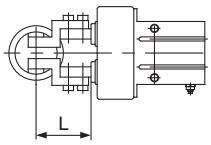


Note) In case of single acting type, the value is for stroke center.

External grip
Series MHKL2



Internal grip
Series MHKL2

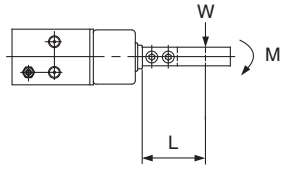


• Precautions when using the single acting type:
If a moment such as that illustrated below is applied to the finger, the finger might not be able to retract by the spring force alone.
Therefore, make sure to use the air gripper within the allowable moment that is indicated in the table below.

Allowable Moment

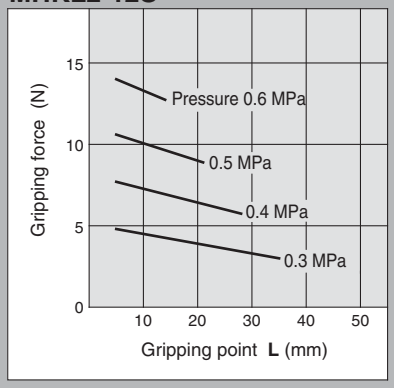
Model	Allowable moment (N·m)
MHKL2-12S/C	0.05
MHKL2-16S/C	0.12
MHKL2-20S/C	0.25
MHKL2-25S/C	0.49

M: Allowable moment
(M = WL)

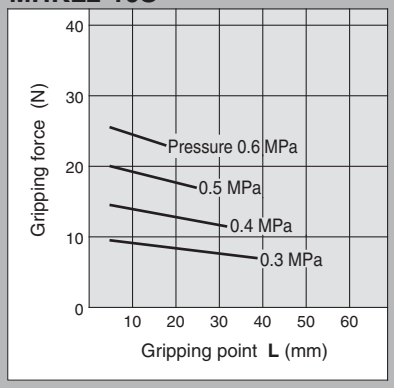


External Grip

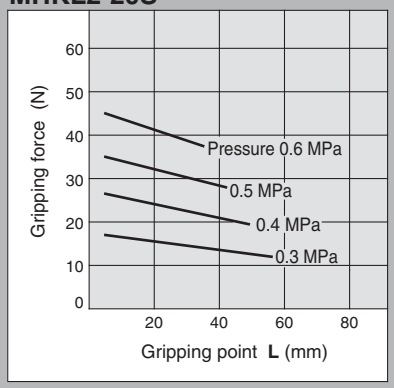
MHKL2-12S



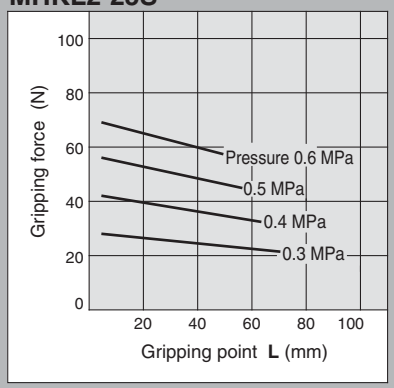
MHKL2-16S



MHKL2-20S

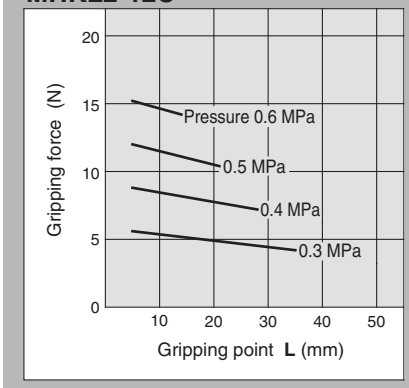


MHKL2-25S

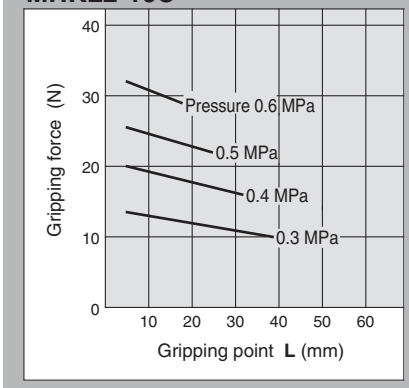


Internal Grip

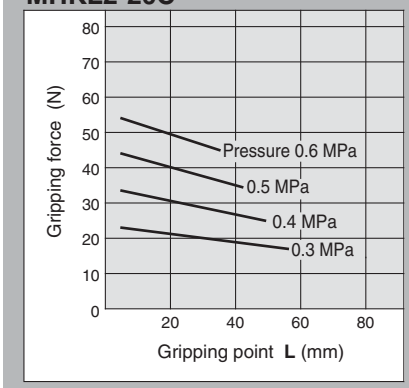
MHKL2-12C



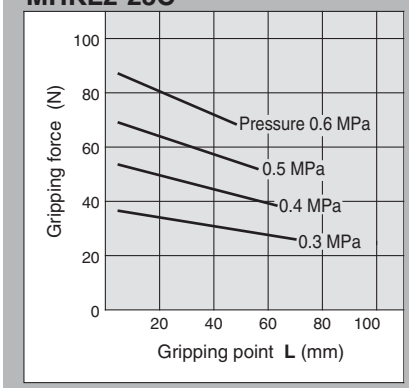
MHKL2-16C



MHKL2-20C

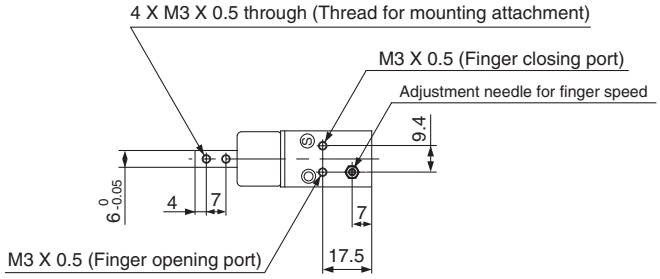


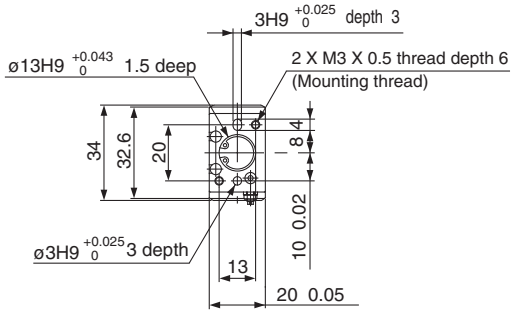
MHKL2-25C

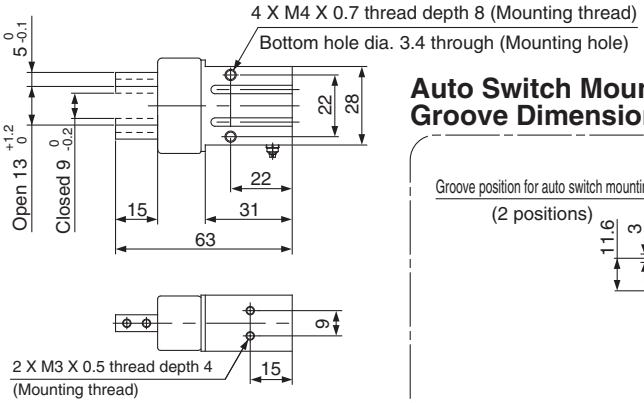


Dimensions

MHK2-12□/Standard model



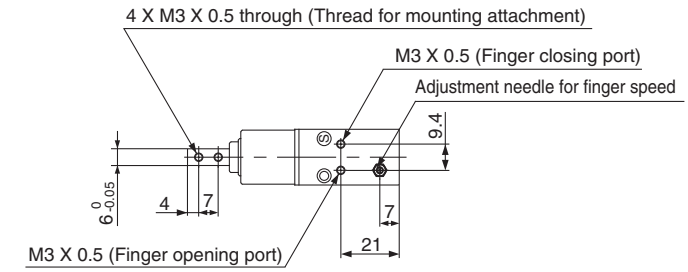


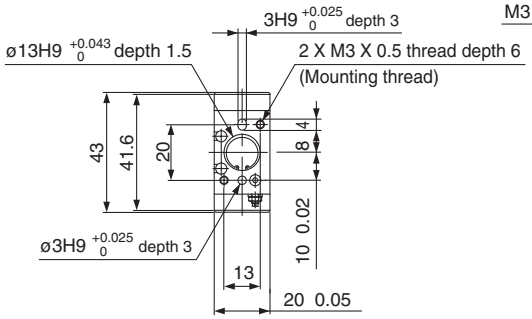


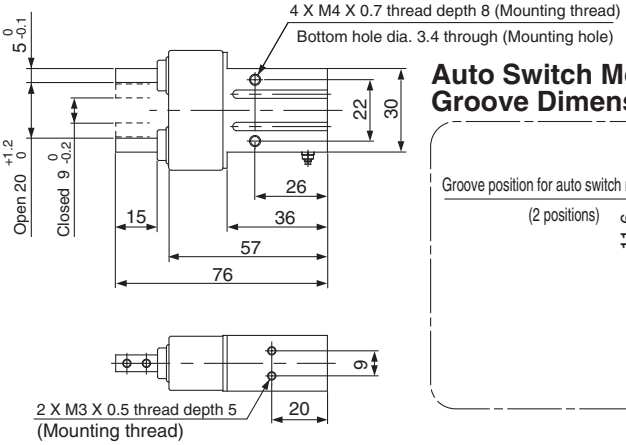
Auto Switch Mounting Groove Dimensions

Note) For single acting, one port is used as a breathing hole. Adjustment needle for finger speed is used as a plug.

MHKL2-12□/Long stroke model



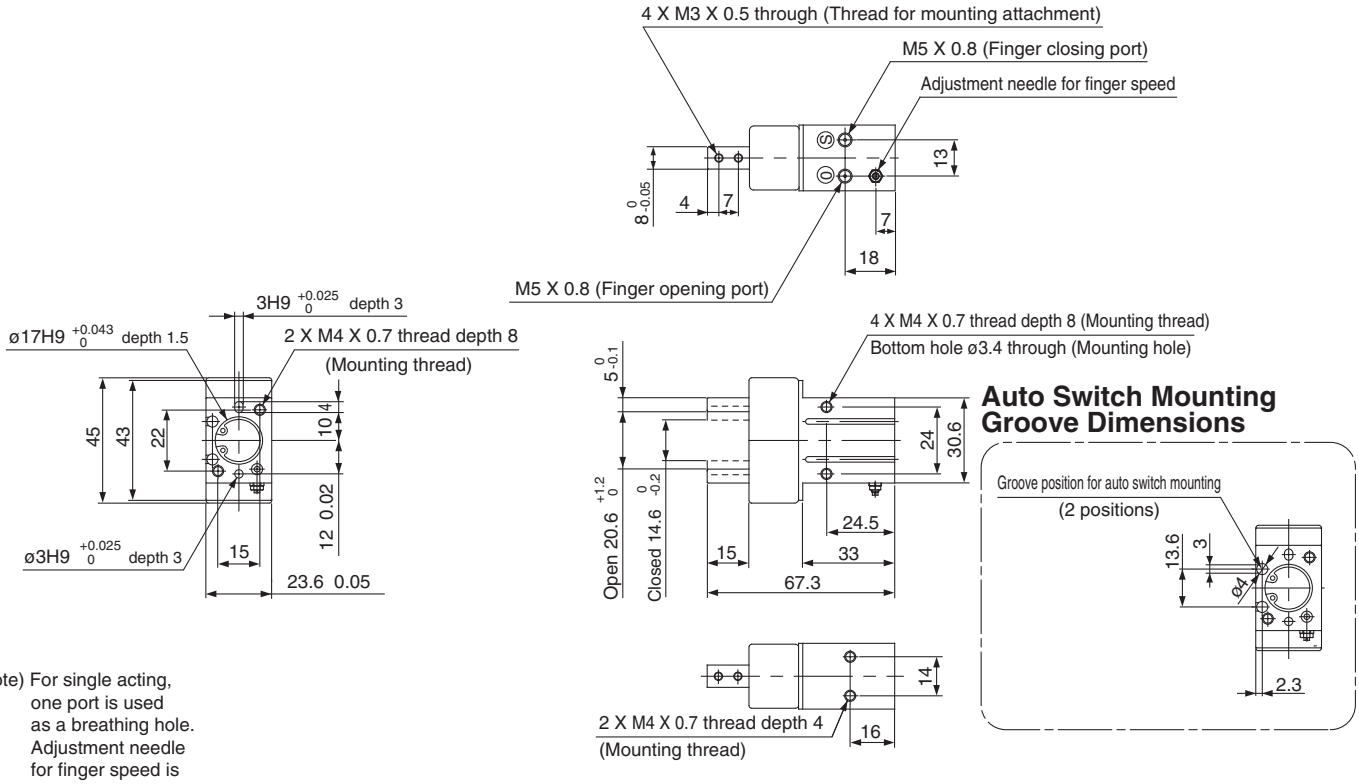




Auto Switch Mounting Groove Dimensions

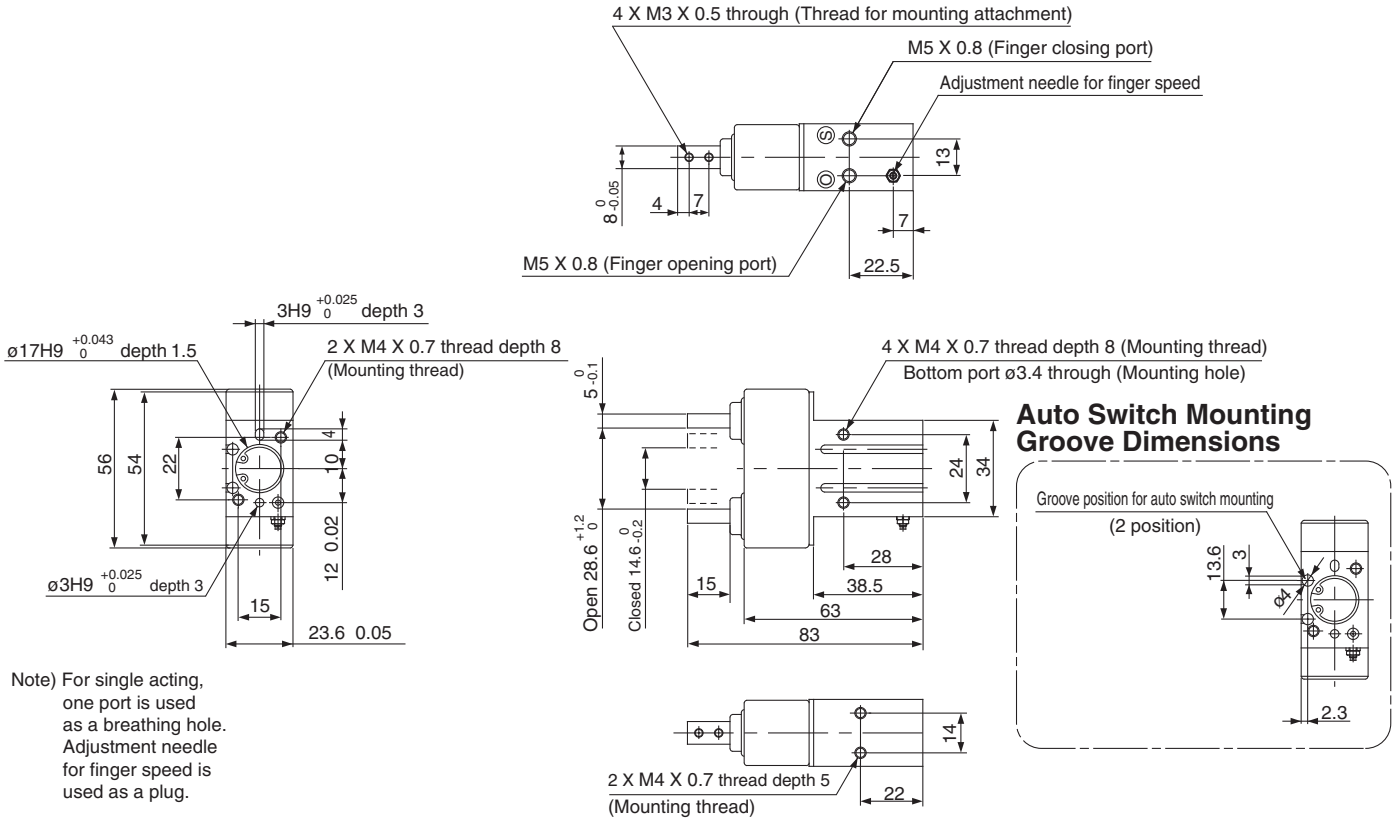
Note) For single acting, one port is used as a breathing hole. Adjustment needle for finger speed is used as a plug.

MHK2-16□/Standard model



Note) For single acting, one port is used as a breathing hole. Adjustment needle for finger speed is used as a plug.

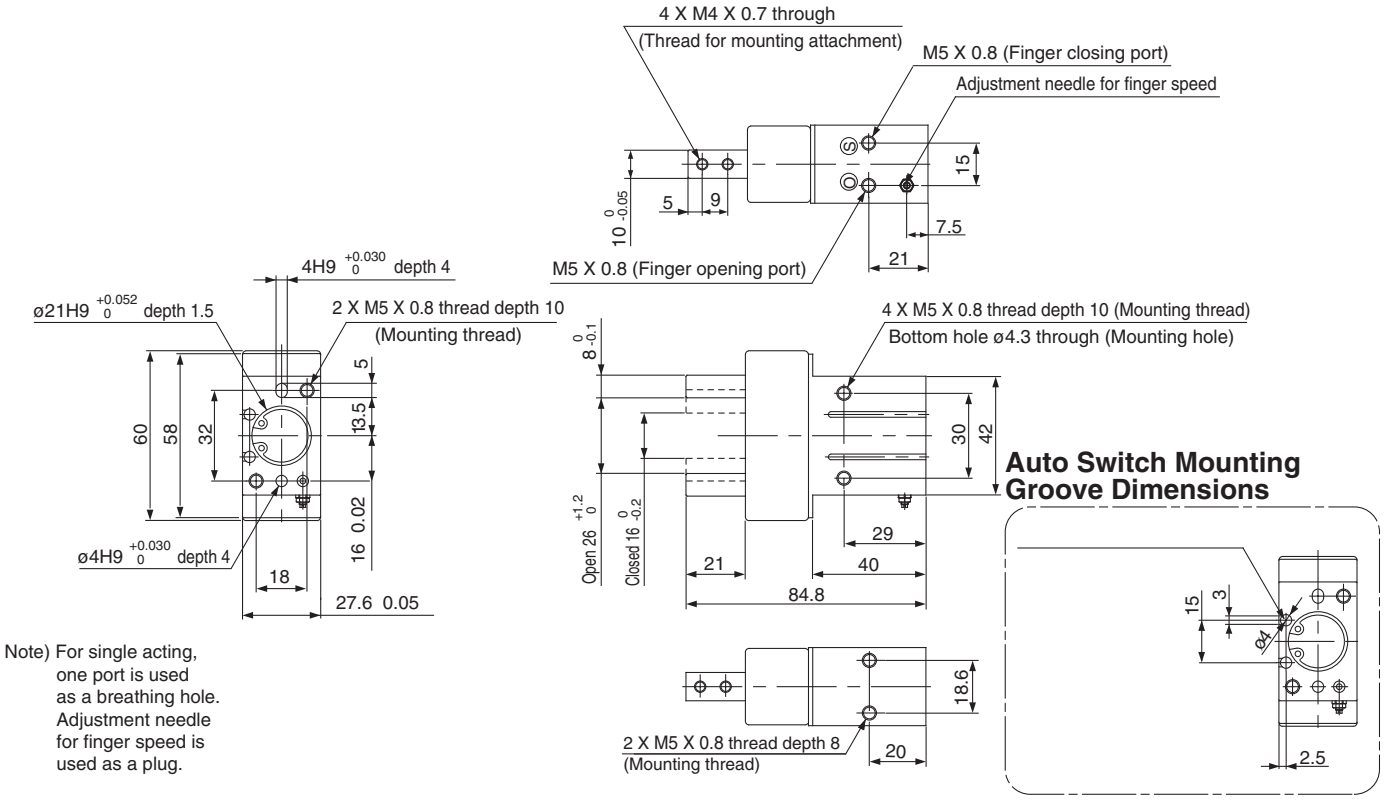
MHKL2-16□/Long stroke model



Note) For single acting, one port is used as a breathing hole. Adjustment needle for finger speed is used as a plug.

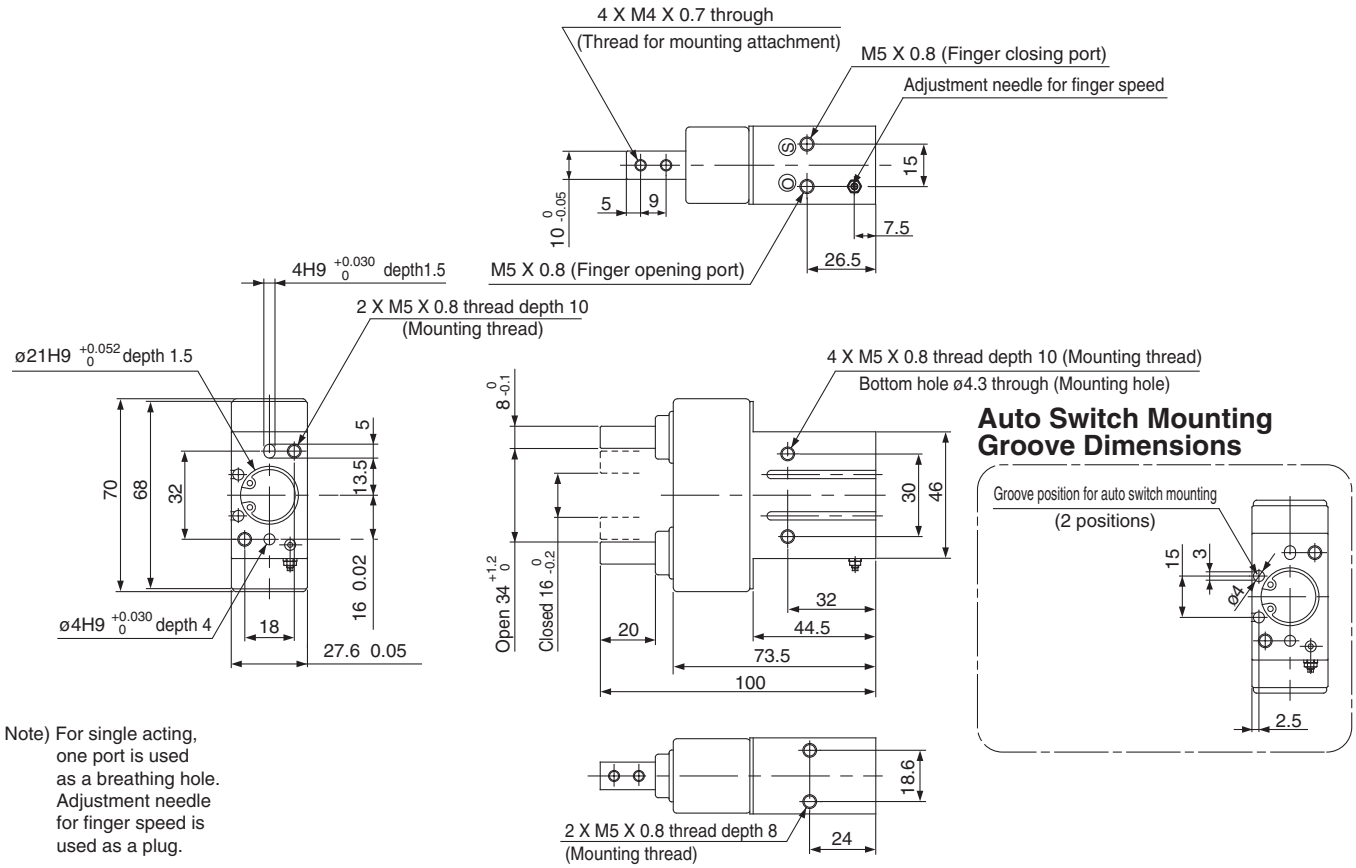
Dimensions

MHK2-20□/Standard model



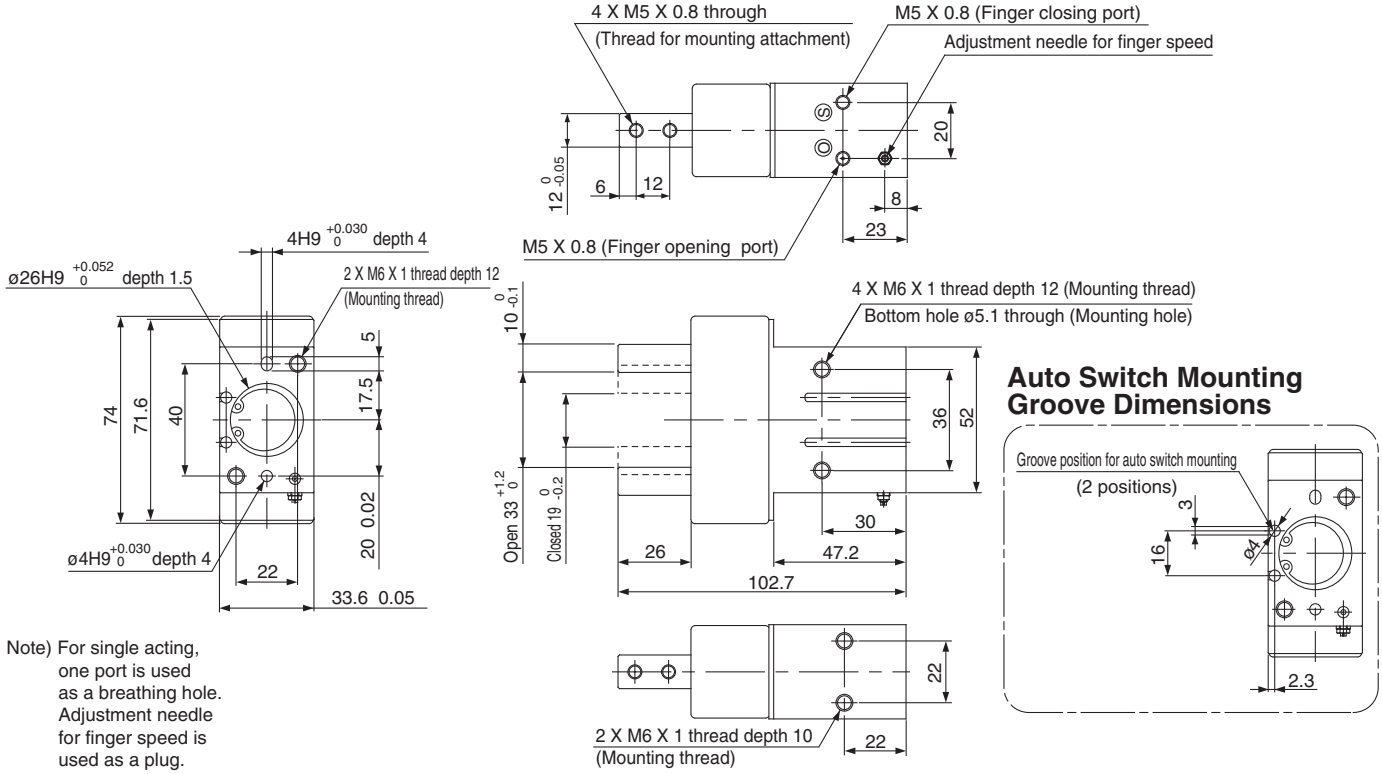
Note) For single acting, one port is used as a breathing hole. Adjustment needle for finger speed is used as a plug.

MHKL2-20□/Long stroke model



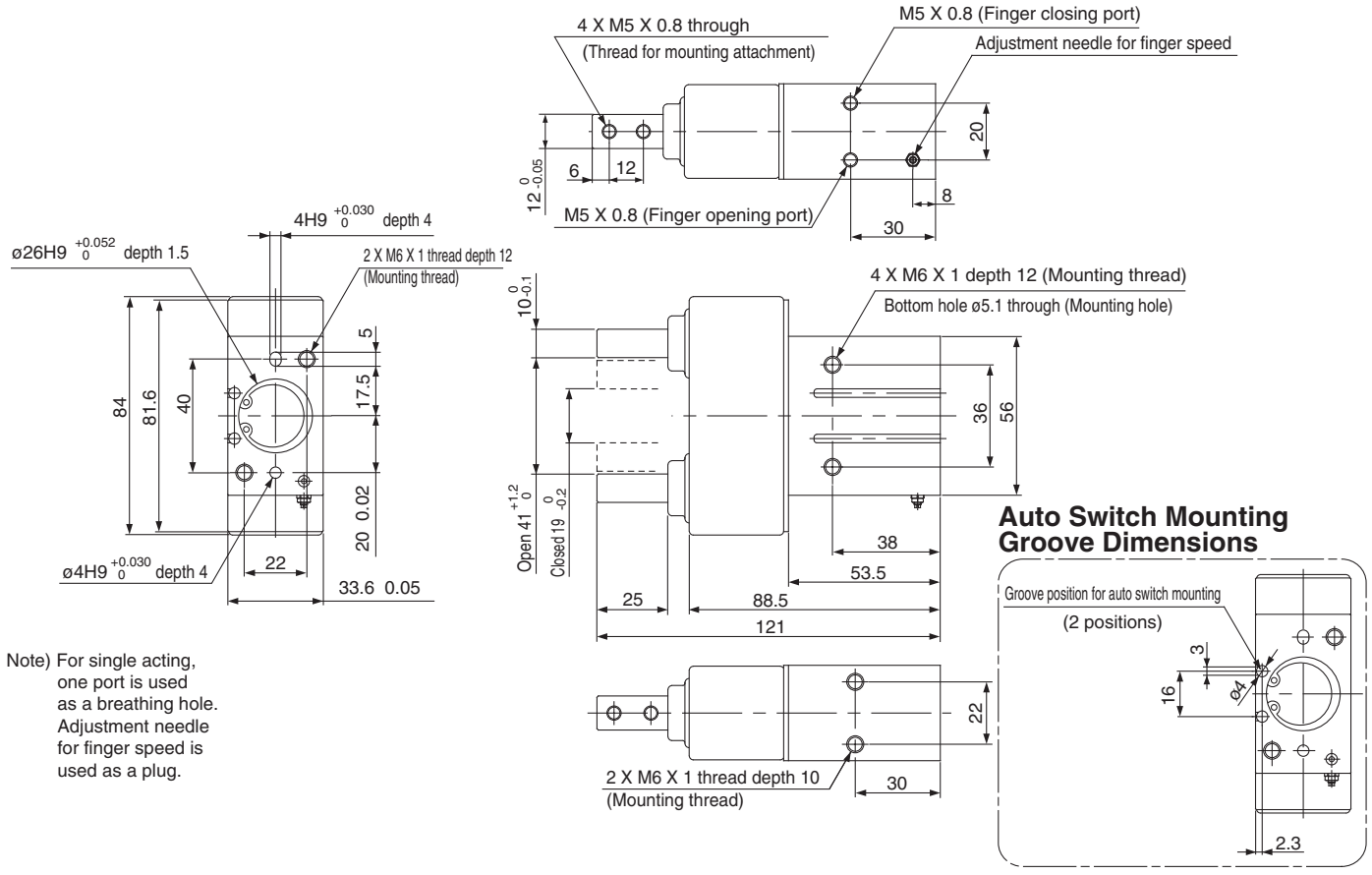
Note) For single acting, one port is used as a breathing hole. Adjustment needle for finger speed is used as a plug.

MHK2-25□/Standard model



Note) For single acting, one port is used as a breathing hole. Adjustment needle for finger speed is used as a plug.

MHKL2-25□/Long stroke model

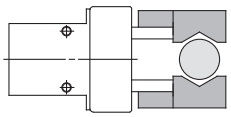
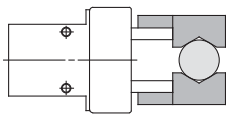
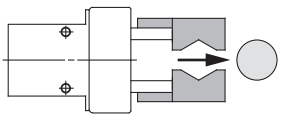
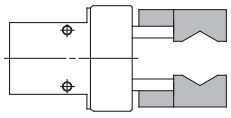
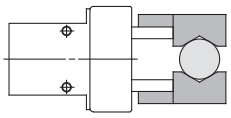
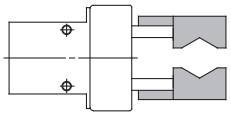
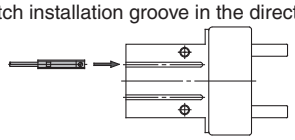
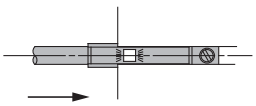
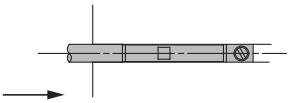
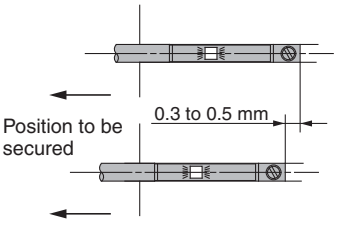
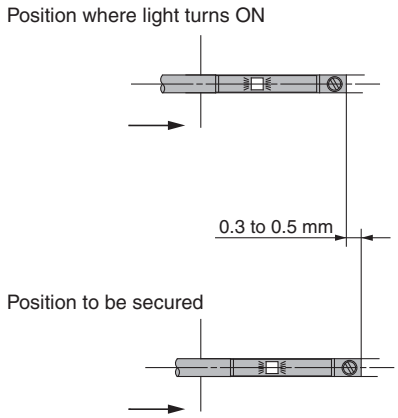


Note) For single acting, one port is used as a breathing hole. Adjustment needle for finger speed is used as a plug.

Series MHK2/MHKL2
Auto Switch Installation Examples and Mounting Positions

Various auto switch applications are possible through different combinations of auto switch quantities and detecting positions.

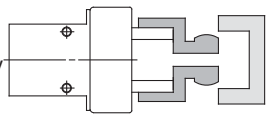
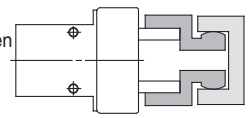
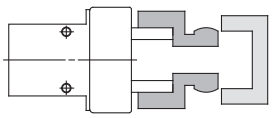
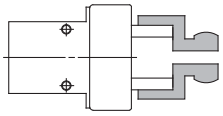
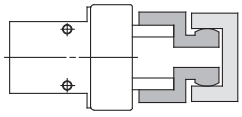
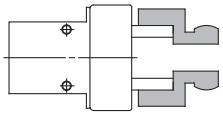
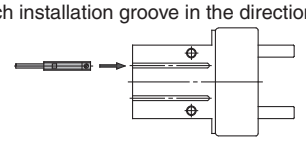
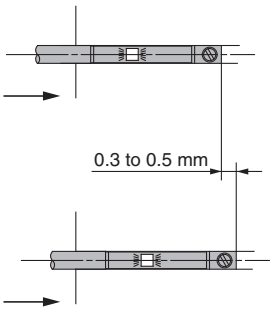
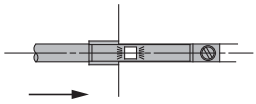
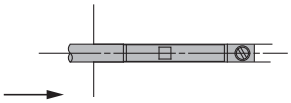
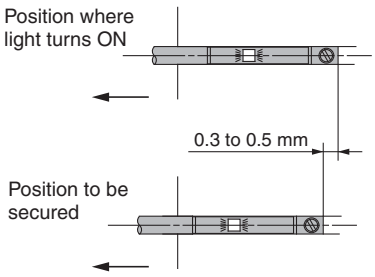
1) Detection when Gripping Exterior of Workpiece

Detection example			1. Confirmation of fingers in reset position	2. Confirmation of workpiece held	3. Confirmation of workpiece released
Position to be detected			Position of fingers fully opened 	Position when gripping a workpiece 	Position of fingers fully closed 
Operation of auto switch			Auto switch turned ON when fingers return. (Light ON)	Auto switch turned ON when gripping a workpiece. (Light ON)	When a workpiece is not held (Abnormal operation): Auto switch to turn ON (Light ON)
Detection combinations	One auto switch ＊ One position, any of ①, ② and ③ can be detected.		●	●	●
	Two auto switches ＊ Two positions of ①, ② and ③ can be detected.	Pattern A	●	●	—
		Pattern B	—	●	●
		Pattern C	●	—	●
How to determine auto switch installation position			Step 1) Fully open the fingers. 	Step 1) Position fingers for gripping a workpiece. 	Step 1) Fully close the fingers. 
At no pressure or low pressure, connect the auto switch to a power supply, and follow the directions.			Step 2) Insert the auto switch into the auto switch installation groove in the direction shown in the following drawing. 		
			Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates.  Step 4) Slide the auto switch further in the direction of the arrow until the indicator light goes out.  Step 5) Move the auto switch in the opposite direction and fasten it at a position 0.3 to 0.5 mm beyond the position where the indicator light illuminates. 	Step 3) Slide the auto switch in the direction of the arrow until the light illuminates and fasten it at a position 0.3 to 0.5 mm in the direction of the arrow beyond the position where the indicator light illuminates. 

Note 1) It is recommended that gripping of a workpiece be performed close to the center of the finger stroke.
Note 2) When holding a workpiece close at the end of open/close stroke of fingers, detecting performance of the combinations listed in the above table may be limited, depending on the hysteresis of an auto switch, etc.

Various auto switch applications are possible through different combinations of auto switch quantities and detecting positions.

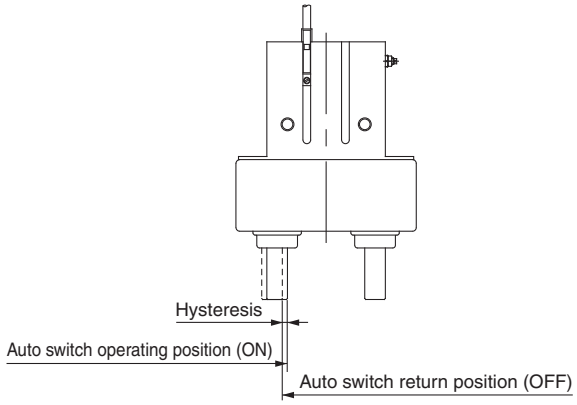
2) Detection when Gripping Interior of Workpiece

Detection example	1. Confirmation of fingers in reset position	2. Confirmation of workpiece held	3. Confirmation of workpiece released
Position to be detected	Position of fingers fully closed 	Position when gripping a workpiece 	Position of fingers fully opened 
Operation of auto switch	Auto switch turned ON when fingers return. (Light ON)	Auto switch turned ON when gripping a workpiece. (Light ON)	When a workpiece is not held (Abnormal operation): Auto switch to turn ON (Light ON)
Detection combinations: One auto switch ※ One position, any of ①, ② and ③ can be detected.	●	●	●
Detection combinations: Two auto switches ※ Two positions of ①, ② and ③ can be detected. — Pattern A	●	●	—
Pattern B	—	●	●
Pattern C	●	—	●
How to determine auto switch installation position	Step 1) Fully close the fingers. 	Step 1) Position fingers for gripping a workpiece. 	Step 1) Fully open the fingers. 
At no pressure or low pressure, connect the auto switch to a power supply, and follow the directions.	Step 2) Insert the auto switch into the auto switch installation groove in the direction shown in the following drawing. 		
	Step 3) Move the auto switch in the direction of the arrow and fasten it at a position 0.3 to 0.5 mm beyond the position where the indicator light illuminates. 	Step 3) Slide the auto switch in the direction of the arrow until the indicator light illuminates.  Step 4) Slide the auto switch further in the direction of the arrow until the indicator light goes out.  Step 5) Move the auto switch in the opposite direction 0.3 to 0.5 mm in the direction indicated by the arrow from its location when the indicator light comes on again. 	

Note 1) It is recommended that gripping of a workpiece be performed close to the center of the finger stroke.
Note 2) When holding a workpiece close at the end of open/close stroke of fingers, detecting performance of the combinations listed in the above table may be limited, depending on the hysteresis of an auto switch, etc.

Auto Switch Hysteresis

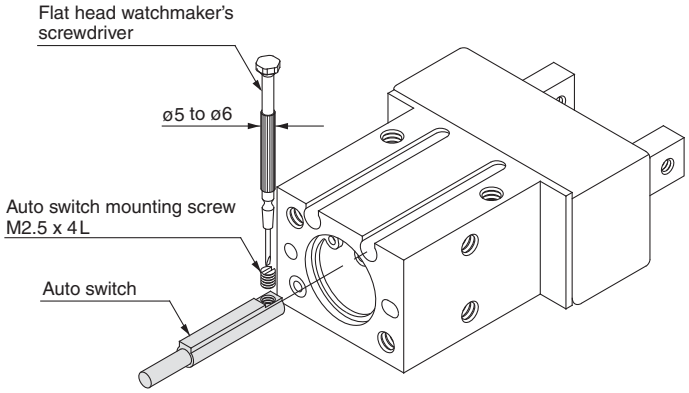
Auto switches have hysteresis similar to micro switches. Use the table below as a guide when adjusting auto switch positions, etc.



Model \ Auto switch	Max. hysteresis (mm) D-M9□(V) D-M9□A(V) M9□W(V)
MHK□2-12	0.1
MHK□2-16	0.1
MHK□2-20	0.3
MHK□2-25	0.2

Auto Switch Mounting

To set the auto switch, insert the auto switch into the installation groove of the gripper from the direction indicated in the following drawing.
After setting the position, tighten the attached auto switch mounting set screw with a flat head watchmaker's screwdriver.

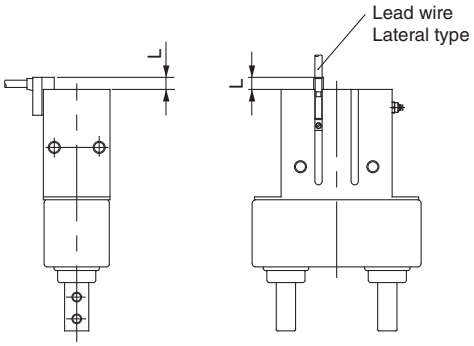


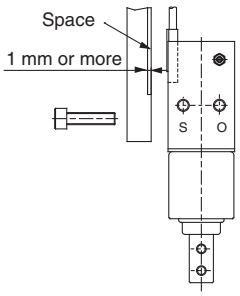
Note) Use a watchmaker's screwdriver with a grip diameter of 5 to 6 mm to tighten the auto switch mounting screw.
The tightening torque should be about 0.05 to 0.15 N·m.

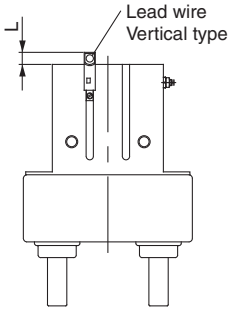
Protrusion of Auto Switch from Edge of Body

- The amount of auto switch protrusion from the body's end surface is as shown in the table below.
- Use the table as a guideline for mounting.

Note) When auto switch for MHK2, MHKL2 is set on mounting side as figure below, allow for at least 1 mm on mounting plate since the auto switch is protruded from edge of gripper.







(mm)

Air gripper model \ Auto switch model \ Lead wire type \ Finger position		In-line electrical entry type		Perpendicular electrial entry type	Perpendicular electrial entry type
		D-M9□ D-M9□W	**D-M9□A**	**D-M9□V D-M9□WV**	**D-M9□AV**
MHK2-12□	Open	—	—	—	—
	Closed	3	5	—	3
MHK2-16□	Open	—	—	—	—
	Closed	3	5	1	3
MHK2-20□	Open	—	—	—	—
	Closed	1	3	—	1
MHK2-25□	Open	—	—	—	—
	Closed	2	4	—	2
MHKL2-12□	Open	—	—	—	—
	Closed	3	5	—	3
MHKL2-16□	Open	—	—	—	—
	Closed	3	5	1	3
MHKL2-20□	Open	—	—	—	—
	Closed	1	3	—	1
MHKL2-25□	Open	—	—	—	—
	Closed	1	3	—	1

Note) There is no protrusion if no values are entered in the table.

Made to Order: Individual Specifications 1

Made to Order

Symbol

1 With Grease Nipple -X39

Lubrication from grease cup to interior is possible.

How to Order

MHK Standard part number **–X39**

With Grease Nipple

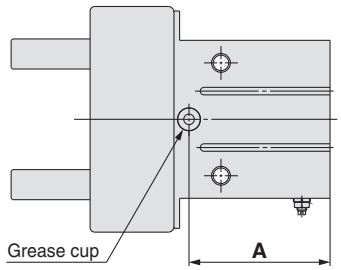
Specifications

Bore size (mm)	16, 20, 25
Action	Double acting, Single acting (Normally open, Normally closed)
Lubricant grease	MHK standard grease (MH-G01)
Grease nipple position	Refer to the dimensions and figure below.
Specifications/dimensions other than the above	Same as the standard type

Note 1) Fill lubricant to the bearing from the grease cup in order to prevent foreign particles from getting in. The use of special grease MH-G01 for MHK is recommended.
Note 2) Not compatible with ø12.

Dimensions (Dimensions other than specified below are the same as the standard type.)

Series MHK2
Series MHKL2



(mm)

Model	A
MHK2-16□□□-X39	30.5
MHK2-20□□□-X39	44.5
MHK2-25□□□-X39	45
MHKL2-16□□□-X39	36
MHKL2-20□□□-X39	42
MHKL2-25□□□-X39	47.5

Made to Order: Individual Specifications 2

Made to Order

Symbol

2 Grooves for Auto Switch on Both Sides -X41

It is possible to select the auto switch mounting side. A maximum of 4 auto switches are mountable.

How to Order

MHK2
MHKL2 – Bore size □ □ □ – Switch type □ – **X41**

- Action
- Finger option
- Dust cover option
- Auto switch type
  * Refer to the standard type.
- Suffix for auto switch

Nil	2 pcs.
S	1 pc.
n	n pc.

* Possible to mount up to 4 auto switches

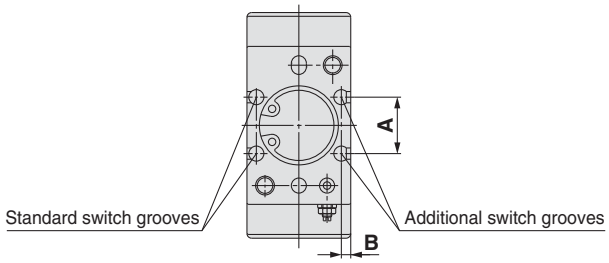
- Grooves for Auto Switch on Both Sides

Specifications

Bore size (mm)	12, 16, 20, 25
Additional switch groove position	Refer to the dimensions and figures below.
Specifications/dimensions other than the above	Same as the standard type

Dimensions (Dimensions other than specified below are the same as the standard type.)

Series MHK2
Series MHKL2



(mm)

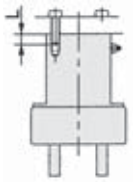
Model	A	B
MHK2-12□□□-X41 **MHKL2-12□□□-X41**	10.4	1.8
MHK2-16□□□-X41 **MHKL2-16□□□-X41**	12.8	1.6

* Dimensions A and B of other models are same as standard switch grooves.

Mounting Air Grippers/Series MHK2

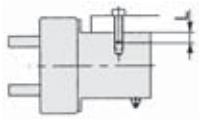
Pssible to mount from 3 directions.

Axial Mounting (Body tapped)



Model	Applicable bolts	Max. tightening torque N·m	Max. screw-in depth L mm
MHK2 -12□ MHKL2-12□	M3 x 0.5	0.88	6
MHK2 -16□ MHKL2-16□	M4 x 0.7	2.1	8
MHK2 -20□ MHKL2-20□	M5 x 0.8	4.3	10
MHK2 -25□ MHKL2-25□	M6 x 1	7.3	12

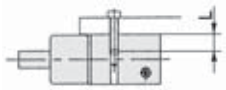
Vertical Mounting (Body tapped)



Model	Applicable bolts	Max. tightening torque N·m	Max. screw-in depth L mm
MHK2 -12□	M3 x 0.5	0.59	4
MHKL2-12□	M3 x 0.5	0.74	5
MHK2 -16□	M4 x 0.7	0.88	4
MHKL2-16□	M4 x 0.7	1.3	5
MHK2 -20□ MHKL2-20□	M5 x 0.8	3.3	8
MHK2 -25□ MHKL2-25□	M6 x 1	5.9	10

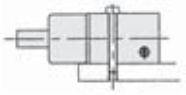
Lateral mounting (Body tapped and through-hole)

Body tapped



Model	Applicable bolts	Max. tightening torque N·m	Max. screw-in depth L mm
MHK2 -12□ MHKL2-12□	M4 x 0.7	2.1	8
MHK2 -16□ MHKL2-16□			8
MHK2 -20□ MHKL2-20□	M5 x 0.8	4.3	10
MHK2 -25□ MHKL2-25□	M6 x 1	7.3	12

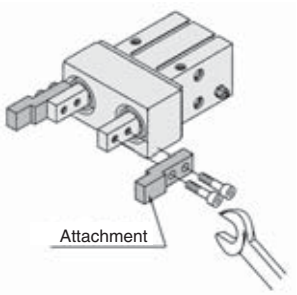
●Body through-hole



Model	Applicable bolts	Max. tightening torque N·m
MHK2 -12□ MHKL2-12□	M3 x 0.5	0.88
MHK2 -16□ MHKL2-16□		
MHK2 -20□ MHKL2-20□	M4 x 0.7	2.1
MHK2 -25□ MHKL2-25□	M5 x 0.8	4.3

How to Mount the Attachment to the Finger

- To mount the attachment to the finger, make sure to use a wrench to support the attachment so as not to apply undue strain on the finger.
- Refer to the table below for the proper tightening torque on the bolt used for securing the attachment to the finger.



Model	Applicable bolts	Max. tightening torque N·m
MHK2 -12□ MHKL2-12□ MHK2 -16□ MHKL2-16□	M3 x 0.5	0.59
MHK2 -20□ MHKL2-20□	M4 x 0.7	1.4
MHK2 -25□ MHKL2-25□	M5 x 0.8	2.8