

Accessory Order Form

HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S**
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

(1) Center Pusher

**PH14 - 60 - CP - ASSY**

①                      ②                      ③                      ④

- ① Series Name
- ② Cylinder Bore Size
- ③ Center Pusher
- ④ Order Name for Accessory  
- Based for 1 piece of product.

Specification

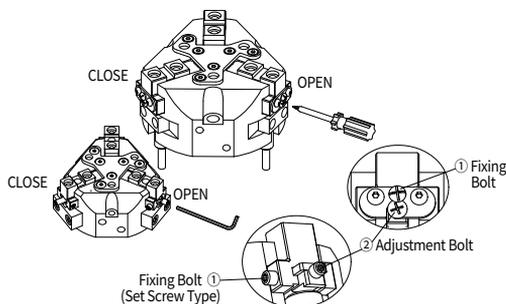
Item Name	PH14-30S	PH14-40S	PH14-50S	PH14-60S	PH14-80S	PH14-100S	PH14-125S
CYL Bore Size(mm)	30	40	50	60	80	100	125
Stroke(mm)	8	12	14	16	20	26	32
Effective Gripping Force(kgf)	Close	19.1	34.2	54.8	81.5	148	369
	Open	21.5	38.2	59.8	86.5	162	378
Air pressure : 5kgf/cm <sup>2</sup> Note 2)							
Fitting Size	M5			PT1/8			PT1/4
Weight(kgf)	0.2	0.38	0.6	0.75	1.37	2.35	4.5
Max. Attachment L(mm)	40	50	60	80	100	120	140
Max. Attachment H(mm) Note 3)							
Fluid	Clean Air Note 1)						
Pressure Range(kgf/cm <sup>2</sup> )	3 ~ 7						
Lubrication	Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)						
Temperature Range(°C)	Standard model : 5 ~ 60 High temperature model : 5 ~ 150						
Repeat Accuracy(mm)	±0.03			±0.08			
Max. Cycle Per Minute(C.P.M)	70			40			
Operation Type	Double Acting (Structure : Parallel operation by Wedge Plunger) (Guide : Metal Guide)						
Tolerance of Stroke(mm)	Open : -0.5 ~ +1 Close : -1 ~ +0.5						

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10µm degree of filtering.

Note 2) The position of the effective gripping force point is the end point of the Master Jaw.

Note 3) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

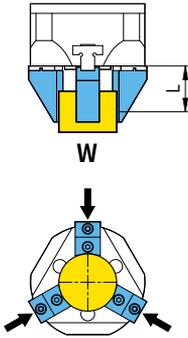
How to Adjust Sensor Dog



1. Operation position could be detected by proximity sensor and detecting position could be set by adjustment of sensor dog position inside of master jaws.  
(Use 1.5mm wrench or "+" screwdriver)
2. How to adjust  
 ① Release fixing bolt → ② Dog position adjustment → ① Lock fixing bolt
3. Keep on locking status for set screw type fixing bolt while product working.

## Gripping Force Graph (Close)

► Refer <GENERAL HAND Selection Guide> for how to read below graph.

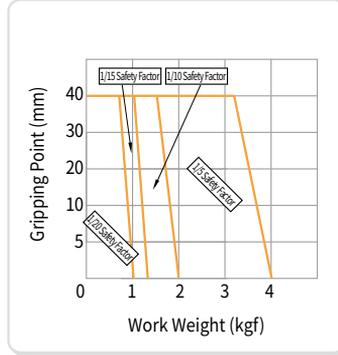


Close Grip State

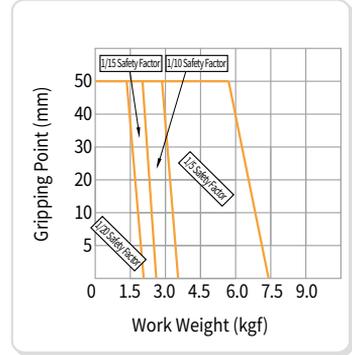
W: Work Weight

L: Attachment Length

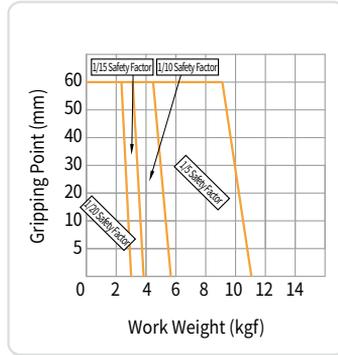
► PH14-30S



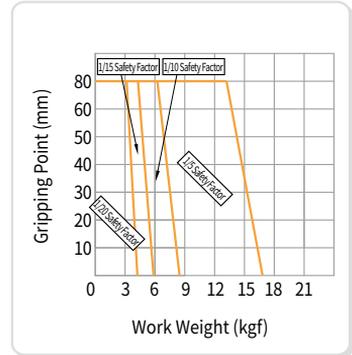
► PH14-40S



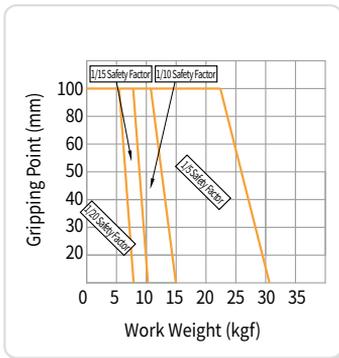
► PH14-50S



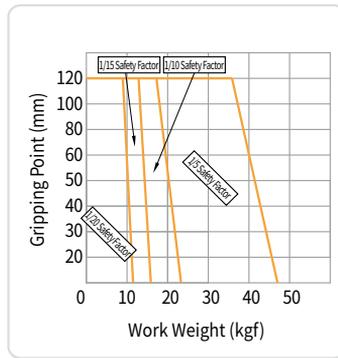
► PH14-60S



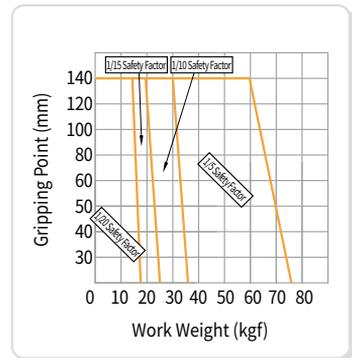
► PH14-80S



► PH14-100S



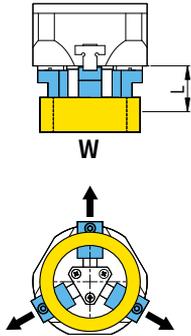
► PH14-125S



▲ **Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it with the maximum attachment length which specified.

Gripping Force Graph (Open)

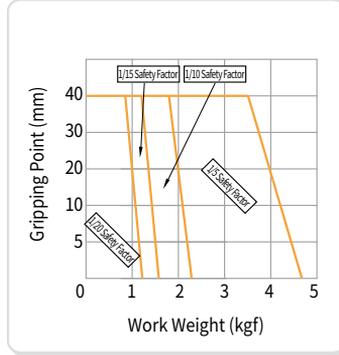
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



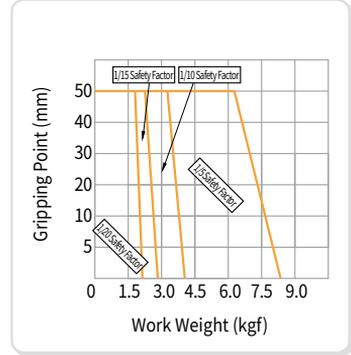
Open Grip State

W: Work Weight  
L: Attachment Length

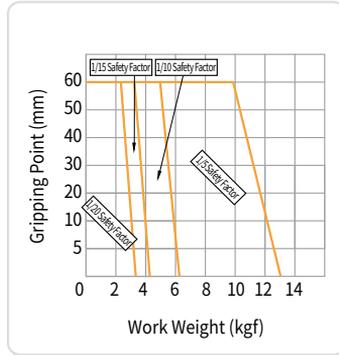
► PH14-30S



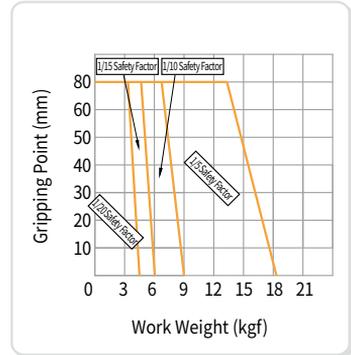
► PH14-40S



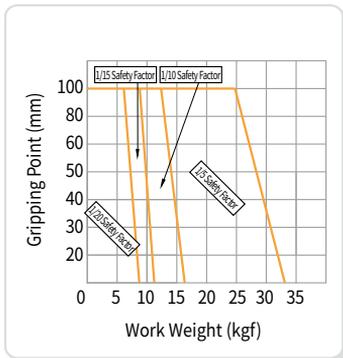
► PH14-50S



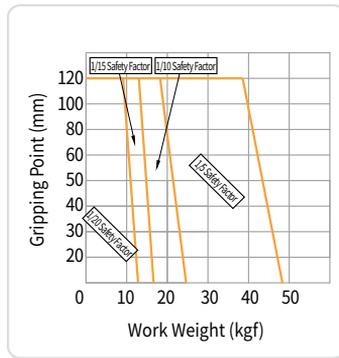
► PH14-60S



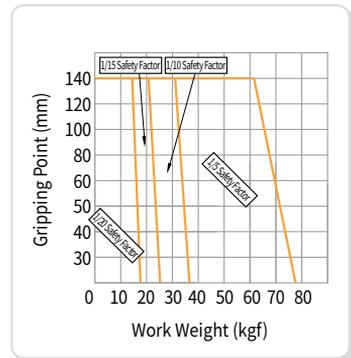
► PH14-80S



► PH14-100S



► PH14-125S



⚠ **Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S**
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH14-S Series

30S

40S

50S

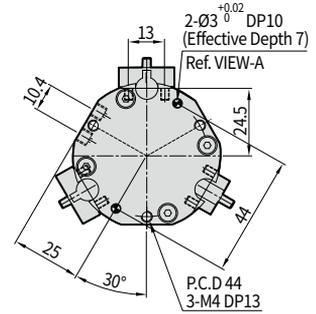
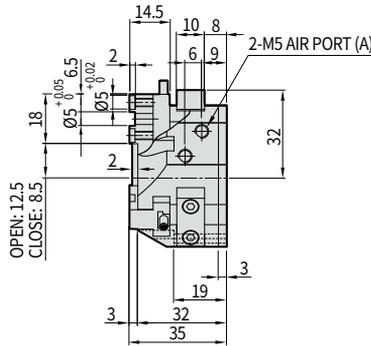
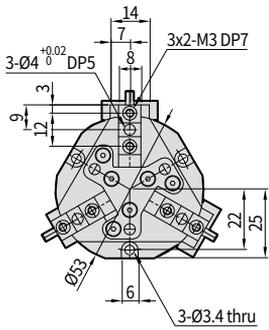
60S

80S

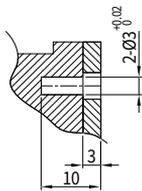
100S

125S

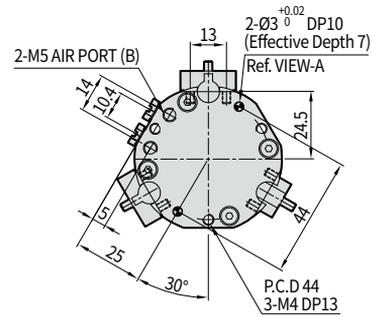
## PH14-30S



STANDARD TYPE

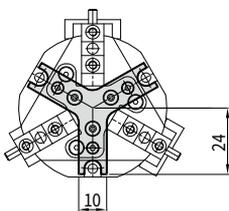


VIEW-A

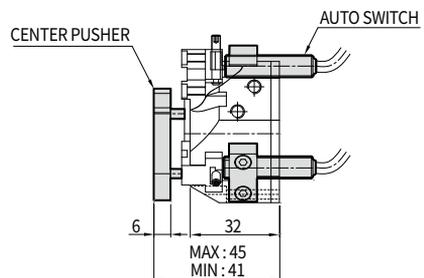


AP TYPE

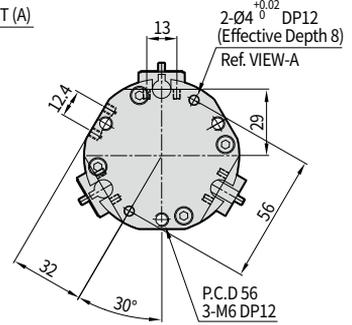
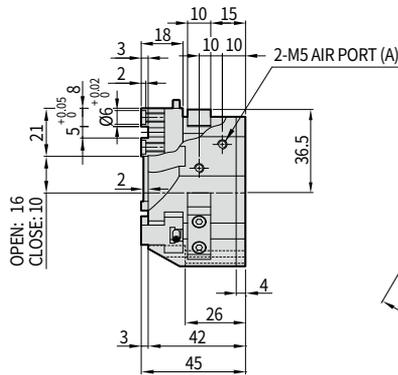
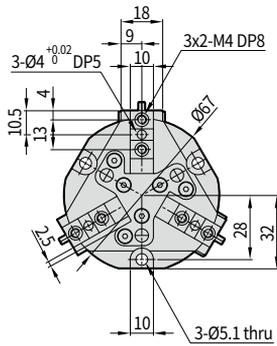
## PH14-30S Example of Auto Switch and Center Pusher installation



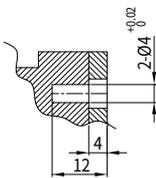
SPRING FORCE : 1.3 ~ 2.5 kgf



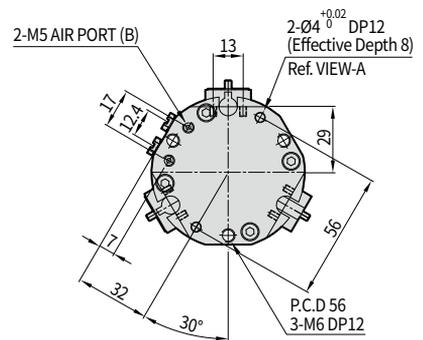
PH14-40S



STANDARD TYPE

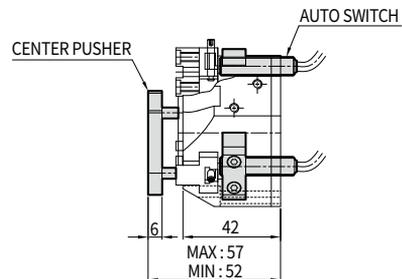
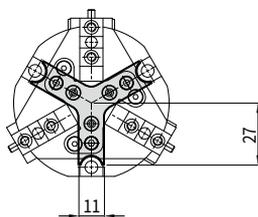


VIEW-A



AP TYPE

PH14-40S Example of Auto Switch and Center Pusher installation



SPRING FORCE : 1.5 ~ 3 kgf

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S**
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH14-S Series

30S

40S

50S

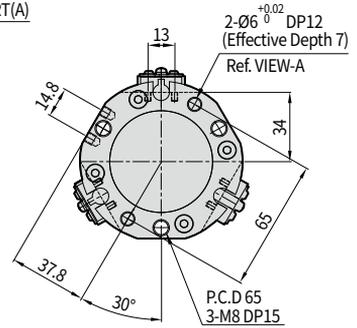
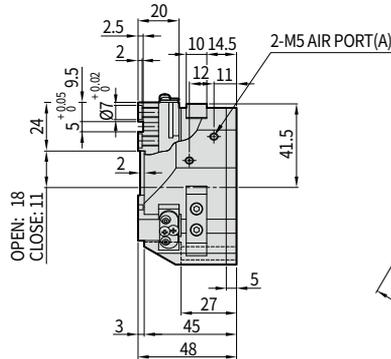
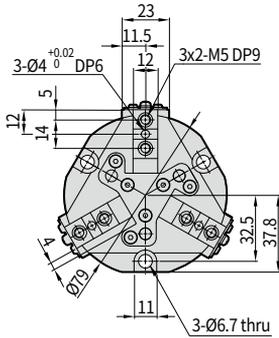
60S

80S

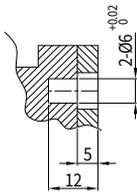
100S

125S

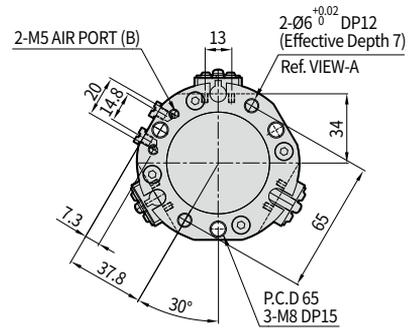
## PH14-50S



STANDARD TYPE

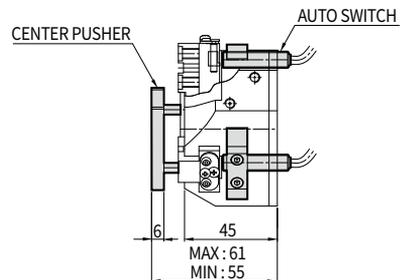
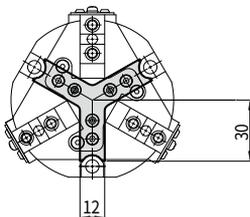


VIEW-A



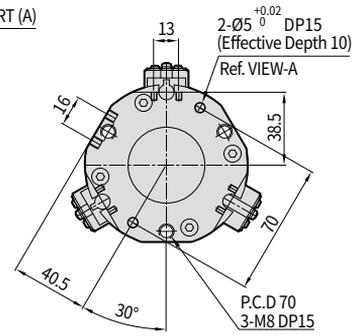
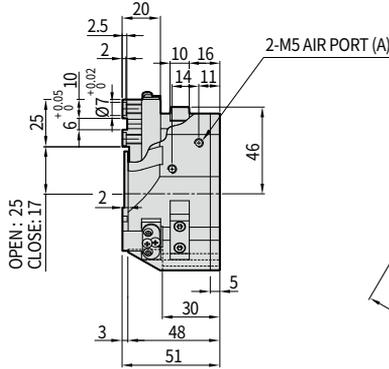
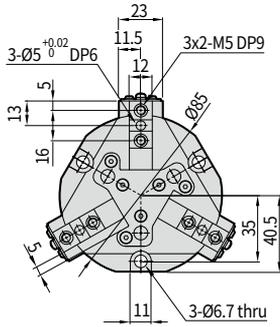
AP TYPE

## PH14-50S Example of Auto Switch and Center Pusher installation

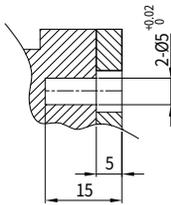


SPRING FORCE : 2.7 ~ 6.3 kgf

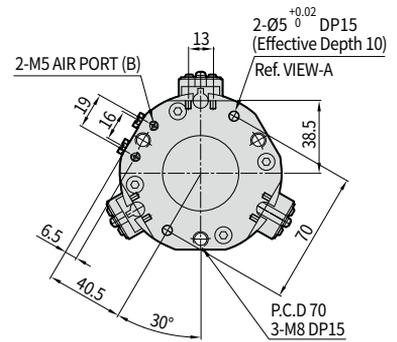
PH14-60S



STANDARD TYPE

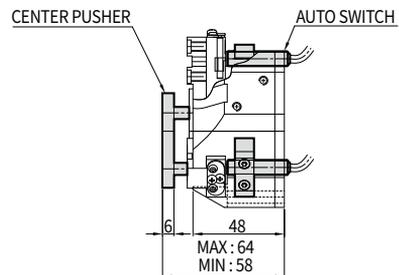
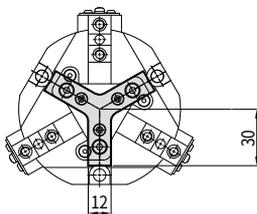


VIEW-A



AP TYPE

PH14-60S Example of Auto Switch and Center Pusher installation



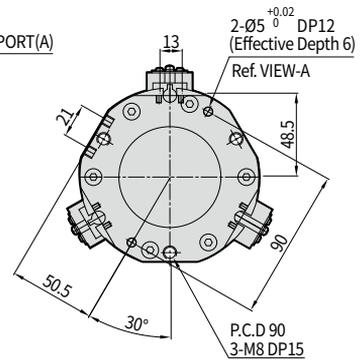
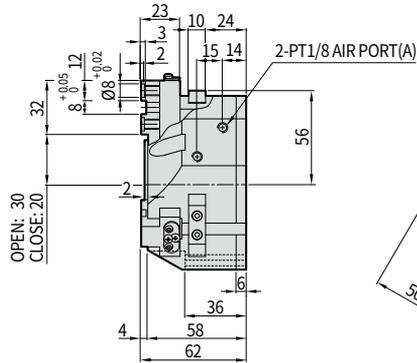
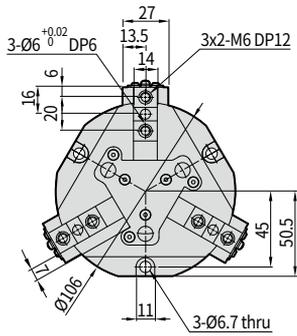
SPRING FORCE : 3.6 ~ 7.2 kgf

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S**
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

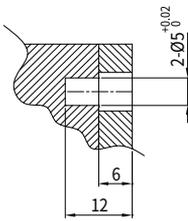
# PH14-S Series

30S 40S 50S 60S 80S 100S 125S

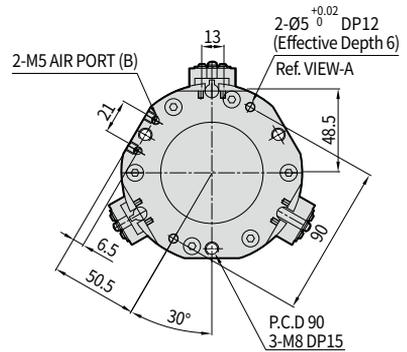
## PH14-80S



STANDARD TYPE

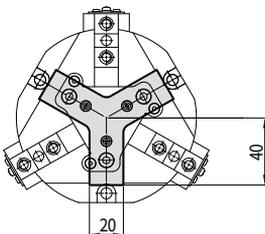


VIEW-A

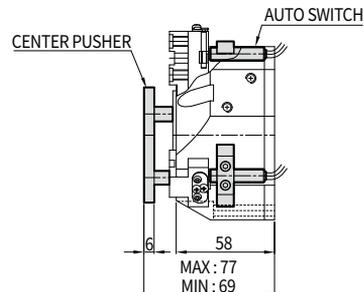


AP TYPE

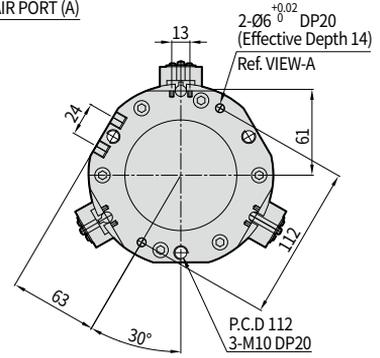
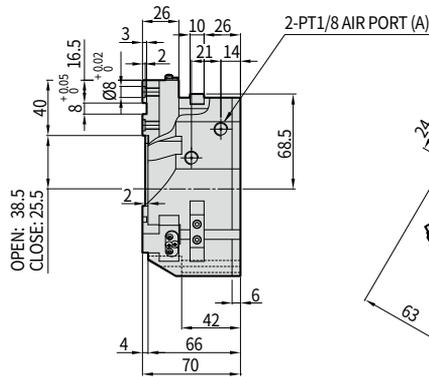
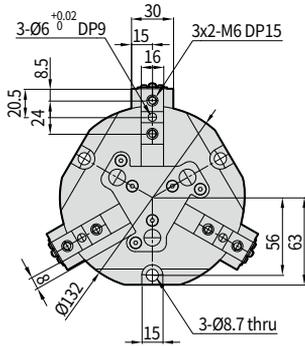
## PH14-80S Example of Auto Switch and Center Pusher installation



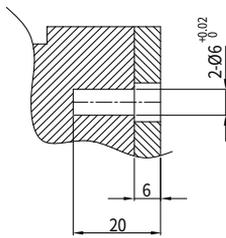
SPRING FORCE : 7.2 ~ 14.4 kgf



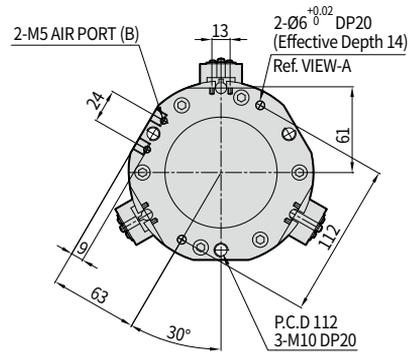
PH14-100S



STANDARD TYPE

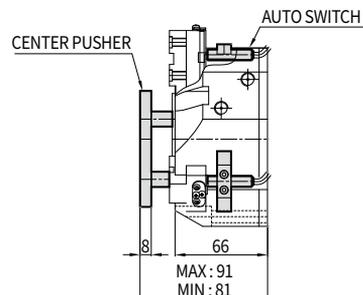
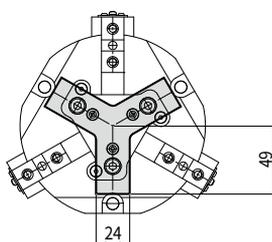


VIEW-A



AP TYPE

PH14-100S Example of Auto Switch and Center Pusher installation



SPRING FORCE : 9.9 ~ 18.9 kgf

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S**
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

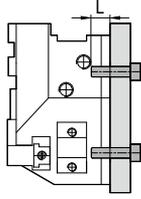


Installation Information

HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S**
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

1. Installation by body tap holes



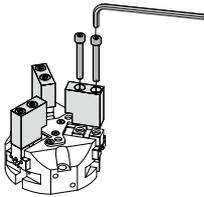
2. Installation by body through holes



Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH14-30S	M4×P0.7	25	13
PH14-40S	M6×P1	81	12
PH14-50S	M8×P1.25	157	15
PH14-60S	M8×P1.25	157	15
PH14-80S	M8×P1.25	157	15
PH14-100S	M10×P1.5	240	20
PH14-125S	M10×P1.5	240	20

Item	Fastening Bolt	Max Torque (kgf-cm)
PH14-30S	M3×P0.5	11
PH14-40S	M5×P0.8	51
PH14-50S	M6×P1	81
PH14-60S	M6×P1	81
PH14-80S	M6×P1	81
PH14-100S	M8×P1.25	157
PH14-125S	M8×P1.25	157

3. Attachment installation



Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH14-30S	M3×P0.5	11	7
PH14-40S	M4×P0.7	25	8
PH14-50S	M5×P0.8	51	9
PH14-60S	M5×P0.8	51	9
PH14-80S	M6×P1	81	12
PH14-100S	M6×P1	81	15
PH14-125S	M8×P1.25	157	15

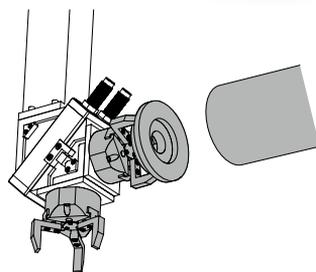
Parallel operation General  
Hand by Crank Lever

# PH14-CL Series

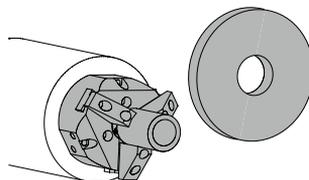
Smooth operation Ultra slim type  
General Hand



Application 1

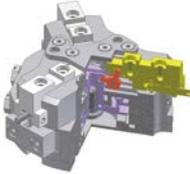


Application 2



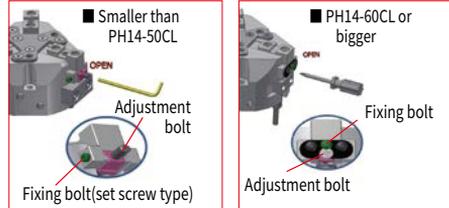
### Parallel operation by Crank Lever

- Synchronized operation by Crank Lever.
- Smooth operation than wedge structure & jam-less superior durability. (Rolling motion by Lever)
- Stable operation by enlarge of plunger supporting surface.



### Proximity Sensor applicable / Easy to control

- Proximity Sensor applicable.
- Easy sensing position control, even though the product is installed.



### Center Pusher (Optional)

- Shock absorption and positioning when gripping workpiece.
- Push to lathe chuck when releasing workpiece.

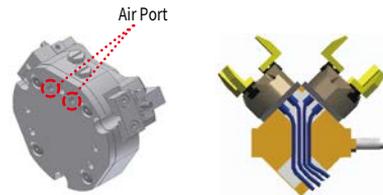


※ The center pusher can be purchased and installed separately.

Available for "CP" option

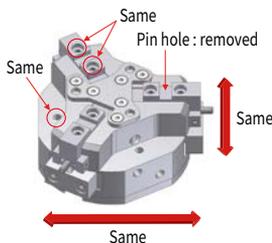
### Bottom Air Port (Optional)

- Convenience on side space by positioning side air port to bottom.
- Suitable for centralized air piping combination with Swivel Unit or Rotary cylinder.



### Dimensional compatibility with PH14-S

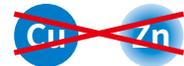
- Dimensional and installation position compatibility with PH14-S.



- ※ Caution
1. Central pin holes are not supplied.
  2. Depth of bolt tap and/or counter, length of master jaw could be different. Please check it before application.

### Various options for environmental

- Option for secondary battery manufacturing conditions.
  - Free materials from Copper and Zinc.
- Option for high temperature condition
  - Application of Viton seal for high temperature condition.



**+60 °C**

Standard

**+180 °C**

High temperature option

### Keep on gripping function by spring inside

- Spring inside : Adding more force on working direction.
  - Enhancement of gripping force and preventing dropping of workpiece.

Compressed Air + Spring Force



### Cautions

- Powerful spring inside.

\* For SF, SB option only.

**Warning**

- Powerful spring inside for SF, SB type. Highly not recommended removal of Head cover. Be careful repulsion of spring when inevitable disassemble.

# GENERAL HAND / Parallel Operation

## PH14-CL Series

### Features

NEW

- Parallel operation circular shape by Crank Lever structure.
- Stable operation by enlarge of plunger supporting surface.
- Smooth and stable operation of Master Jaw compare with Wedge Plunger structure.
- Dimensional and installation position compatibility with PH14-S.
- Easy centralized piping with bottom air port. (Optional)
- Various special options. (Heat resistance, secondary battery field)
- Spring inside for enhancement of gripping force. (Optional)
- Auto Switch installation. (Optional)



### Order Form

## PH14 - 40CL - E - P S - PNP - AP - CP

①

②

③

④

⑤

⑥

⑦

⑧

#### ① Series Name

#### ② Cylinder Bore Size and Stroke

Order	CYL Bore(mm)	Stroke(mm)
30CL	30	8
40CL	40	12
50CL	50	14
60CL	60	16
80CL	80	20
100CL	100	26
125CL	125	32

#### ③ Special Option

Order	Special Option
Blank	Standard
E	Secondary battery field
V	High temperature condition

\* For high temperature option, normal Auto Switch is not available.

#### ④ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage DC	Current	Body Length	Sensing Distance	Frequency	Protect Level
		Wires	Direction						
Blank		No Auto Switch provided							
P	Proximity	3-Wire	Horiz	10~30V	Max 200mA	32mm	1mm ± 10%	800Hz	IP 67
P2	Proximity	3-Wire	Horiz	10~30V	Max 200mA	16mm	1mm ± 10%	800Hz	IP 67

\* "P" could be projected from main body. (P2 is recommended)

#### ⑤ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

#### ⑥ Auto Switch Output

Order	Output
Blank	NPN
PNP	PNP

#### ⑦ Air Port Option & Operation Type

Order	Air Port Option & Operation Type
Blank	Standard (Side position)
AP	Additional air port on bottom
SF	Double Acting (Normal Close) 
SB	Double Acting (Normal Open) 

\* SB, SF options have spring inside so its could be used for the purpose of enhancement of gripping force .

\* For AP option selection, side air port will be supplied with plugged.

#### ⑧ Center Pusher

Order	Center Pusher
Blank	Non-Mounted
CP	Mounted

Accessory Order Form

(1) Center Pusher

**PH14 - 60 - CP - ASSY**

①                      ②                      ③                      ④

- ① Series Name
- ② Cylinder Bore Size
- ③ Center Pusher
- ④ Order Name for Accessory  
- Based for 1 piece of product.

Specification

Item Name	PH14-30CL	PH14-40CL	PH14-50CL	PH14-60CL	PH14-80CL	PH14-100CL	PH14-125CL	
CYL Bore Size(mm)	30	40	50	60	80	100	125	
Stroke(mm)	8	12	14	16	20	26	32	
Effective Gripping Force(kgf) <small>Note 2)</small> Air pressure : 5kgf/cm <sup>2</sup>	Close	20.5	42.9	68.9	103	173	261	
	Open	23	47.2	76.7	111	184	278	
	Close (SF)	26.2 ~ 29.0	53.6 ~ 60.3	86.1 ~ 94.5	132.1 ~ 146.8	221.8 ~ 240.4	336.3 ~ 357.9	-
	Open (SF)	14.5 ~ 17.4	29.8 ~ 36.5	51.1 ~ 59.5	67.2 ~ 81.9	117.0 ~ 135.6	180.8 ~ 202.5	-
	Close (SB)	11.4 ~ 13.6	24.1 ~ 29.8	36.8 ~ 47.1	53.9 ~ 69.4	94.6 ~ 119.8	149.6 ~ 180.3	-
Gripping Force from Spring Inside(kgf)	Open (SB)	29.9 ~ 32.3	60.3 ~ 66.0	98.5 ~ 108.8	144.6 ~ 160.1	237.6 ~ 262.8	358.5 ~ 389.2	-
	Close (SF)	5.7 ~ 8.5	10.6 ~ 17.4	17.2 ~ 25.6	29.0 ~ 43.7	48.8 ~ 67.5	75.6 ~ 97.2	-
Pressure Range(kgf/cm <sup>2</sup> )	Close (SB)	6.8 ~ 9.1	13.1 ~ 18.8	21.8 ~ 32.1	33.6 ~ 49.1	53.1 ~ 78.3	80.4 ~ 111.1	-
	Standard	Standard : 3 ~ 7						
Weight(kgf)	Spring Inside	Spring Inside : 4 ~ 7						
	Standard	0.2	0.38	0.6	0.75	1.37	2.35	4.5
Max. Attachment L(mm)	Spring Inside	0.8	1.3	1.8	3.2	6.2	11	-
Max. Attachment H(mm) <small>Note 3)</small>		40	50	60	80	100	120	140
Fitting Size		M5			PT1/8		PT1/4	
Fluid		Clean Air <small>Note 1)</small>						
Lubrication		Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)						
Temperature Range(°C)		Standard model : 5 ~ 60 High temperature model : 5 ~ 150						
Repeat Accuracy(mm)		±0.03				±0.08		
Max. Cycle Per Minute(C.P.M)		70				40		
Operation Type		Optional for Double or Single acting (Structure : Parallel operation by Crank Lever) (Guide : Metal Guide)						
Tolerance of Stroke(mm)		Open : -0.5 ~ +1 Close : -1 ~ +0.5						

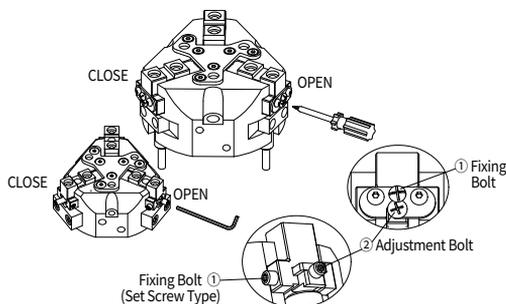
Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10µm degree of filtering.

Note 2) The position of the effective gripping force point is the end point of the Master Jaw.

For spring inside products (SB, SF) gripping force is different depend on each stroke positions due to the Restoring force of inside spring.

Note 3) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

How to Adjust Sensor Dog



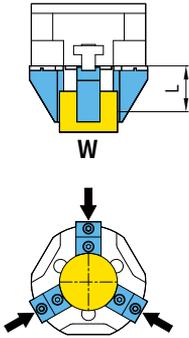
1. Operation position could be detected by proximity sensor and detecting position could be set by adjustment of sensor dog position inside of master jaws.  
(Use 1.5mm wrench or "+" screwdriver)
2. How to adjust  
① Release fixing bolt → ② Dog position adjustment → ① Lock fixing bolt
3. Keep on locking status for set screw type fixing bolt while product working.

HAND

PH01-A  
PH01-D  
PH01-G  
PH01J-C  
PH01K  
PH02  
PH02-H  
PH04  
PH05  
PH06  
PH06-L  
PH06-L2  
PH07  
PH08  
PH09  
PH10  
PH12  
PH14-S  
**PH14-CL**  
PH14-CF  
PH15-S  
PH15-CL  
PH15-CF  
PH15-W  
PH21  
PH22  
PH23  
PH25  
PH32  
PHC

## Gripping Force Graph (Close)

► Refer <GENERAL HAND Selection Guide> for how to read below graph.

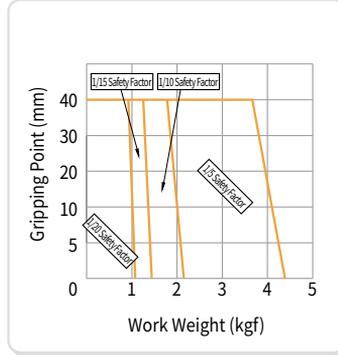


Close Grip State

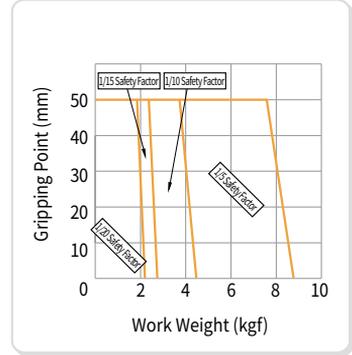
W: Work Weight

L: Attachment Length

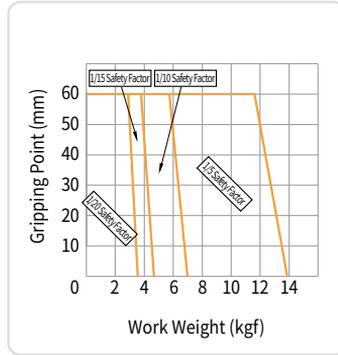
► PH14-30CL



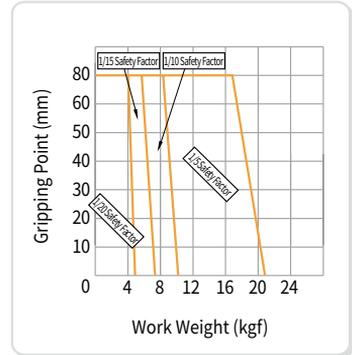
► PH14-40CL



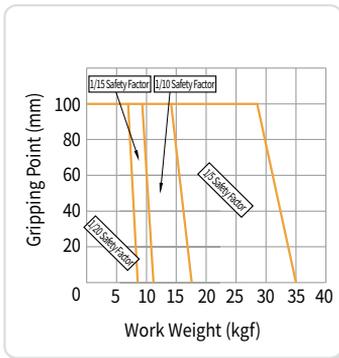
► PH14-50CL



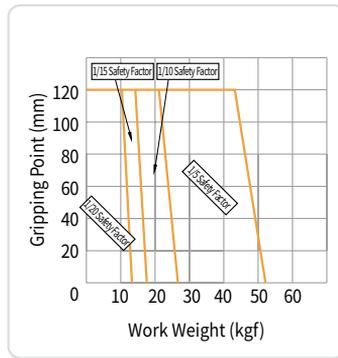
► PH14-60CL



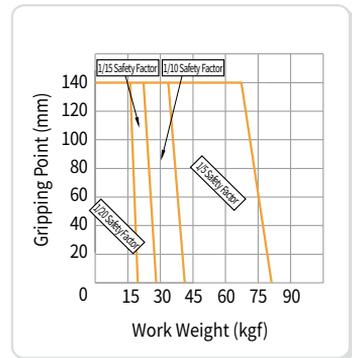
► PH14-80CL



► PH14-100CL



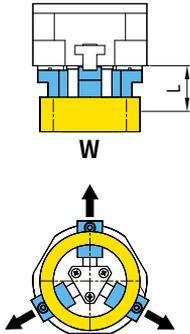
► PH14-125CL



▲ **Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it with the maximum attachment length which specified.

Gripping Force Graph (Open)

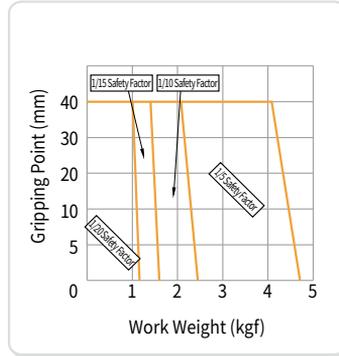
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



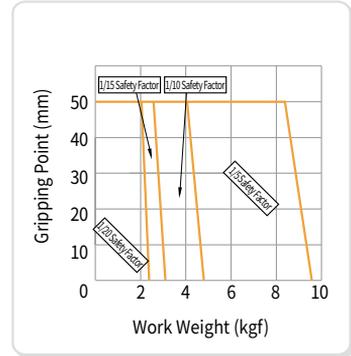
Open Grip State

W: Work Weight  
L: Attachment Length

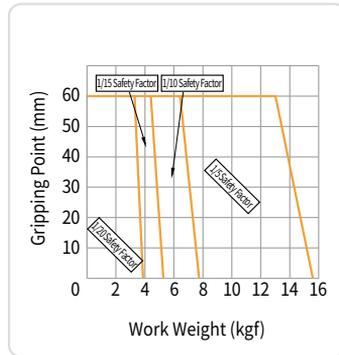
► PH14-30CL



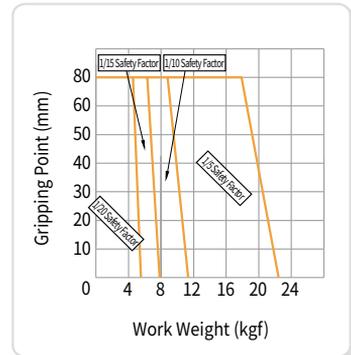
► PH14-40CL



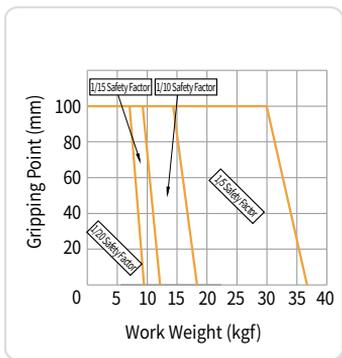
► PH14-50CL



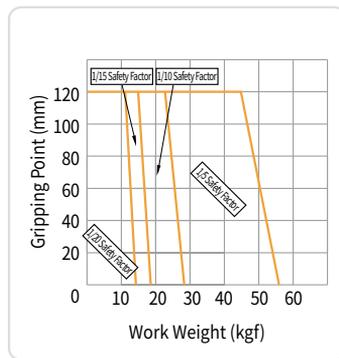
► PH14-60CL



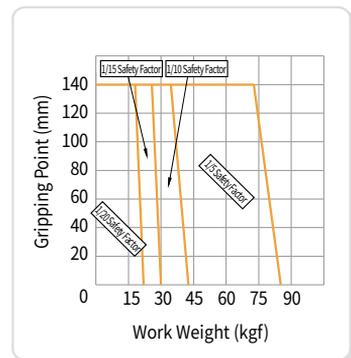
► PH14-80CL



► PH14-100CL



► PH14-125CL



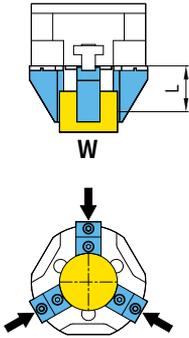
HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL**
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

▲ **Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

## PH14-CL-SF Gripping Force Graph (Close)

▶ Refer <GENERAL HAND Selection Guide> for how to read below graph.

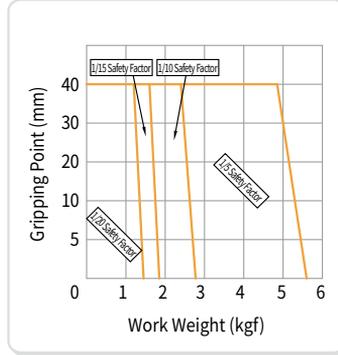


Close Grip State

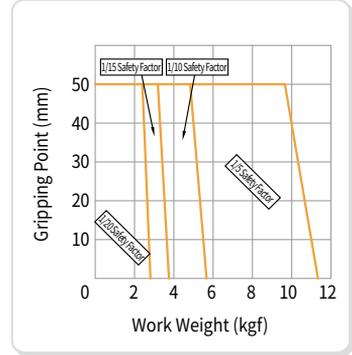
W: Work Weight

L: Attachment Length

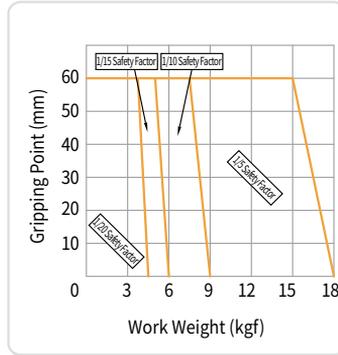
▶ PH14-30CL-SF



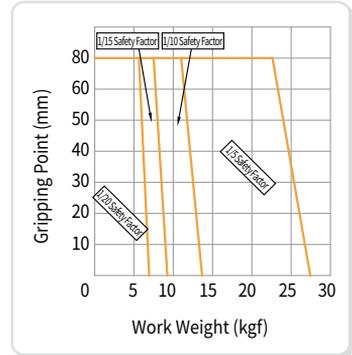
▶ PH14-40CL-SF



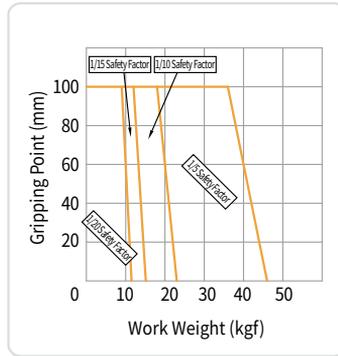
▶ PH14-50CL-SF



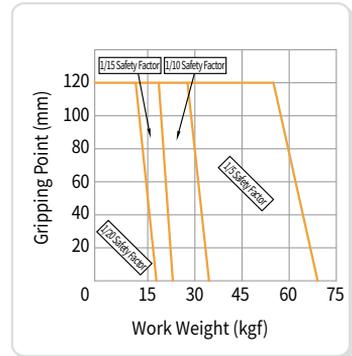
▶ PH14-60CL-SF



▶ PH14-80CL-SF



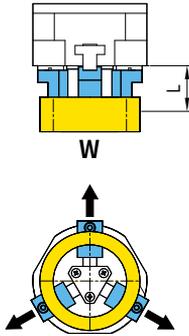
▶ PH14-100CL-SF



**⚠ Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it with the maximum attachment length which specified.

PH14-CL-SB Gripping Force Graph (Open)

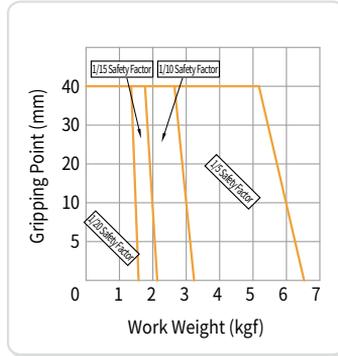
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



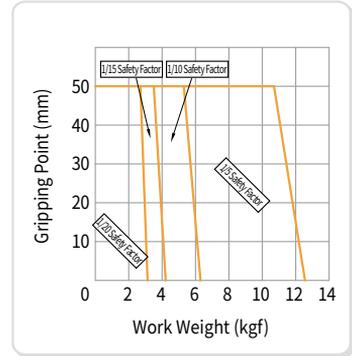
Open Grip State

W: Work Weight  
L: Attachment Length

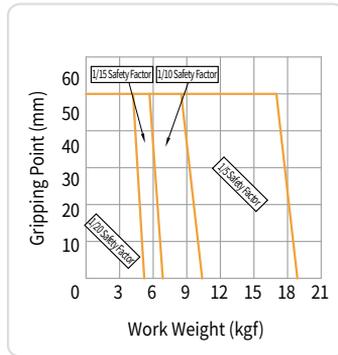
► PH14-30CL-SB



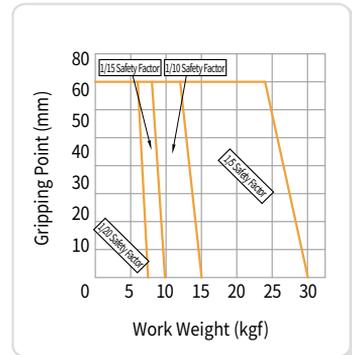
► PH14-40CL-SB



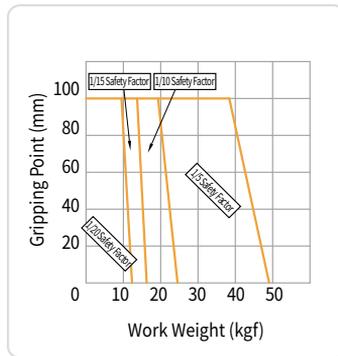
► PH14-50CL-SB



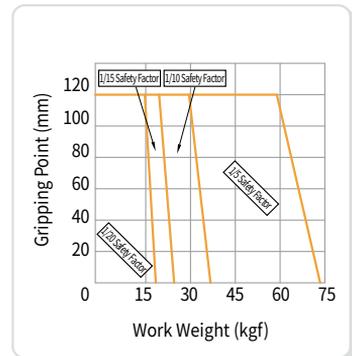
► PH14-60CL-SB



► PH14-80CL-SB



► PH14-100CL-SB



HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL**
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

⚠ **Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

# PH14-CL Series

30CL

40CL

50CL

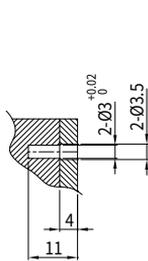
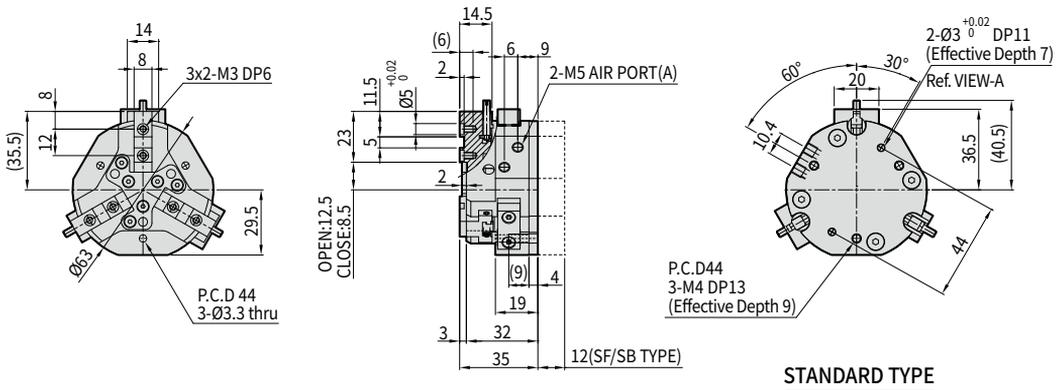
60CL

80CL

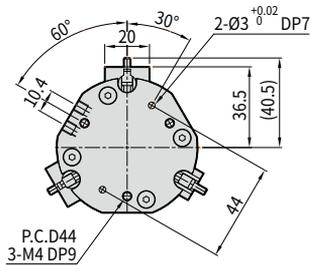
100CL

125CL

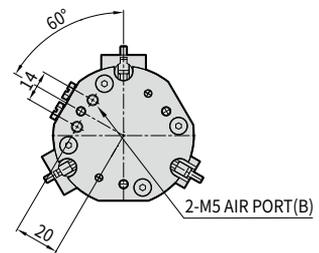
## PH14-30CL



VIEW-A

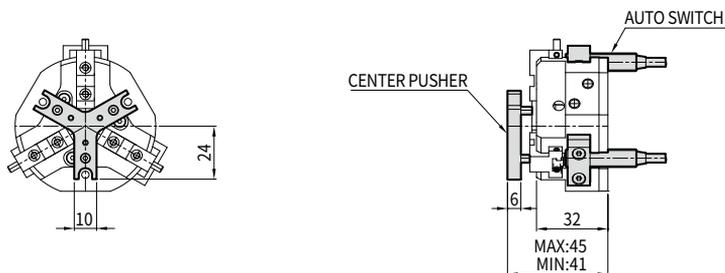


SF/SB TYPE



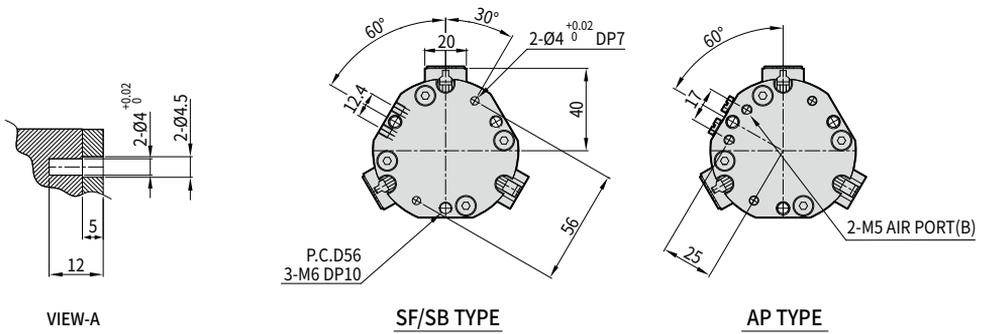
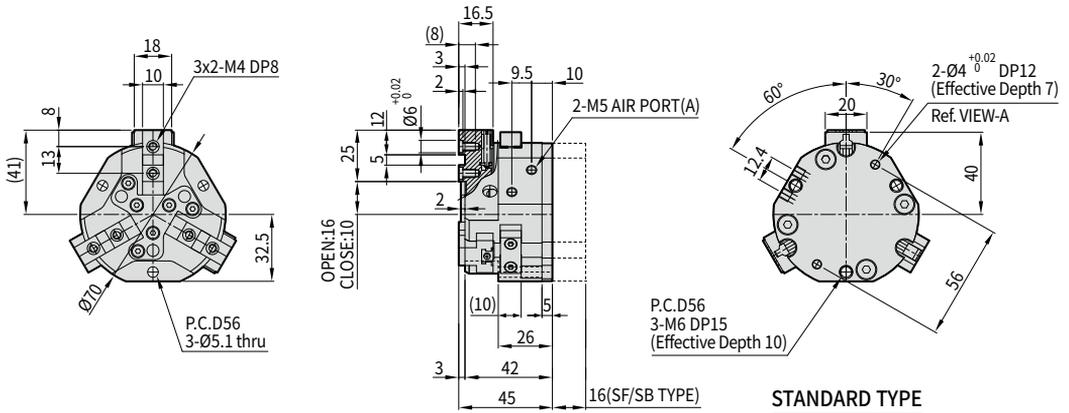
AP TYPE

## PH14-30CL Example of Auto Switch and Center Pusher installation

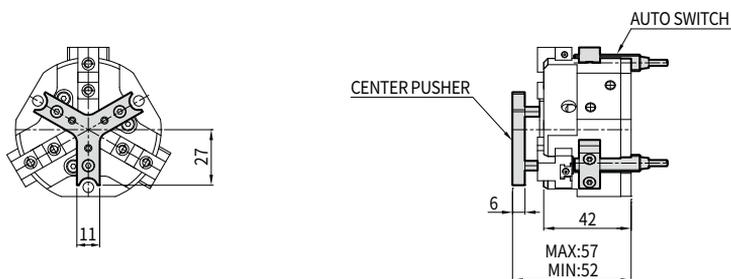


SPRING FORCE : 1.3 ~ 2.5 kgf

PH14-40CL



PH14-40CL Example of Auto Switch and Center Pusher installation



SPRING FORCE : 1.5 ~ 3 kgf

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL**
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH14-CL Series

30CL

40CL

50CL

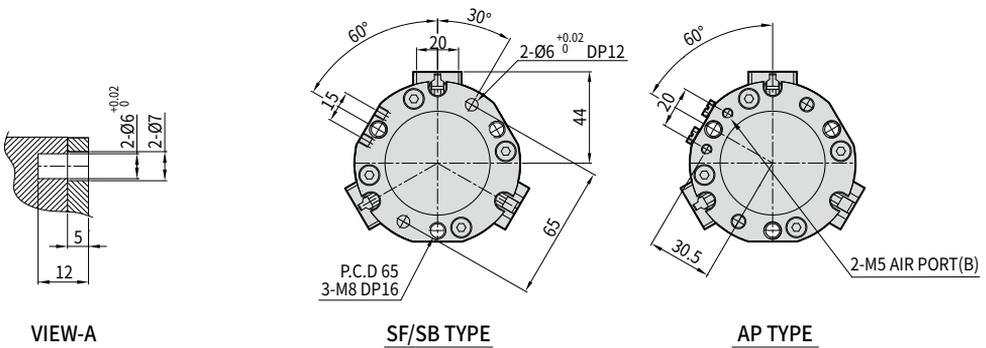
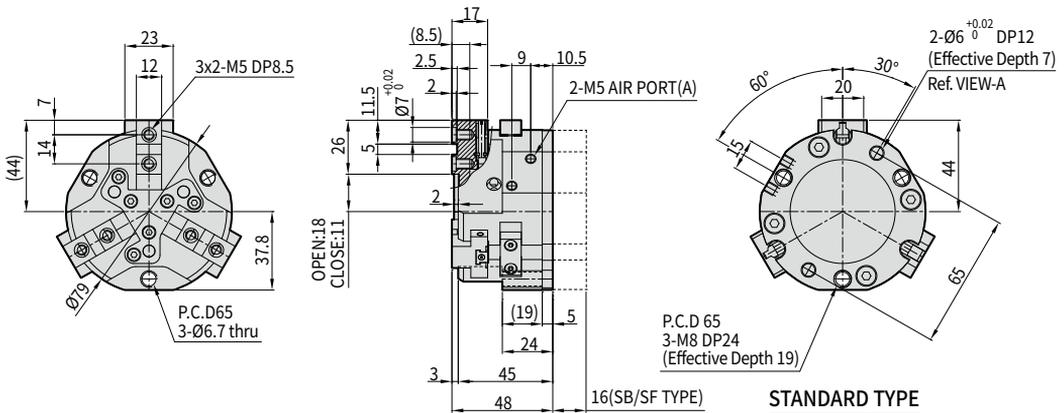
60CL

80CL

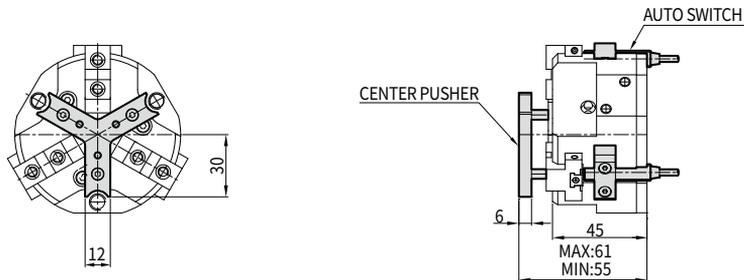
100CL

125CL

## PH14-50CL



## PH14-50CL Example of Auto Switch and Center Pusher installation



SPRING FORCE : 2.7 ~ 6.3 kgf



# PH14-CL Series

30CL

40CL

50CL

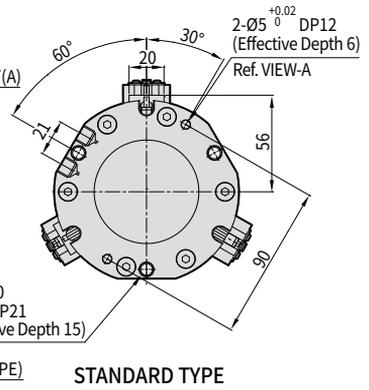
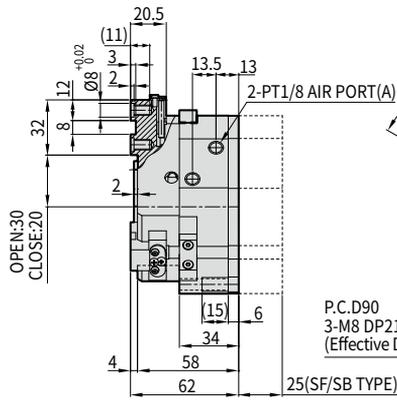
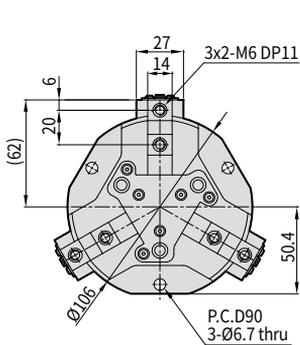
60CL

80CL

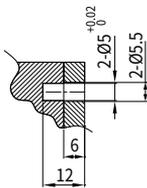
100CL

125CL

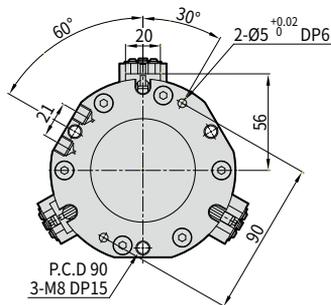
## PH14-80CL



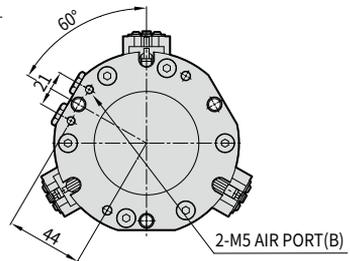
STANDARD TYPE



VIEW-A

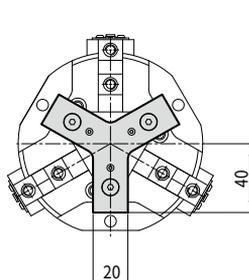


SF/SB TYPE

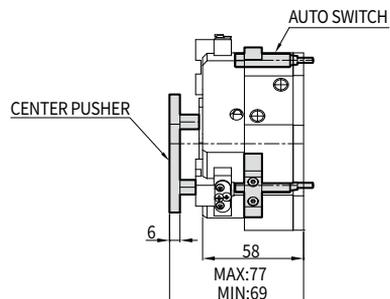


AP TYPE

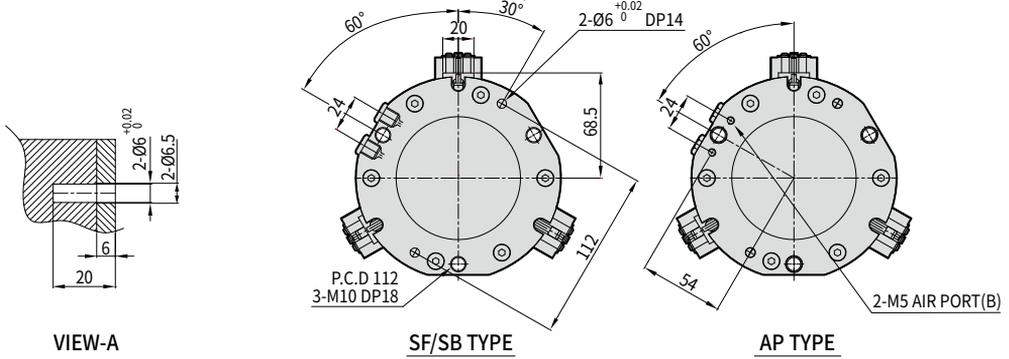
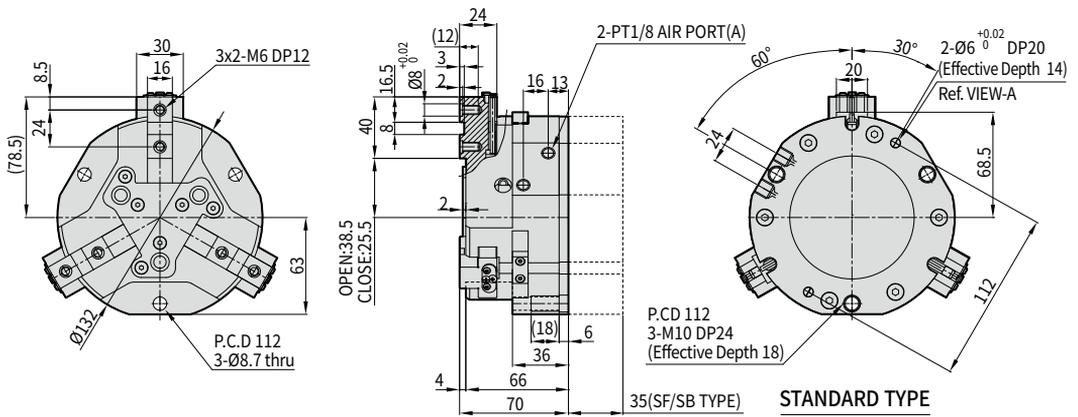
## PH14-80CL Example of Auto Switch and Center Pusher installation



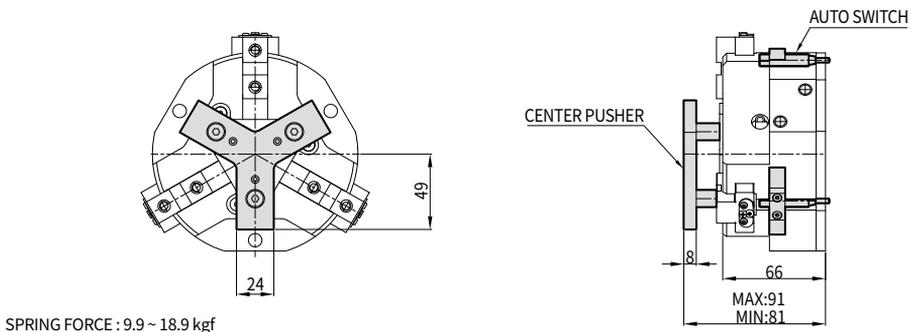
SPRING FORCE : 7.2 ~ 14.4 kgf



PH14-100CL



PH14-100CL Example of Auto Switch and Center Pusher installation



SPRING FORCE : 9.9 ~ 18.9 kgf

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL**
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH14-CL Series

30CL

40CL

50CL

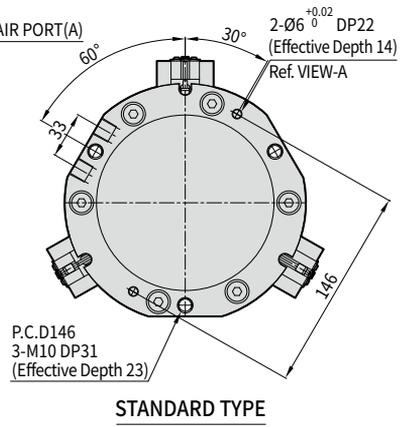
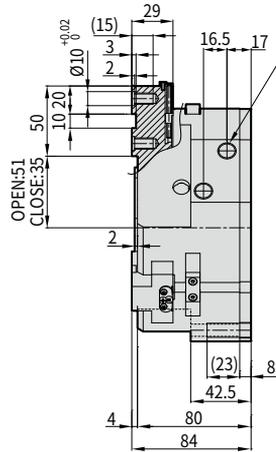
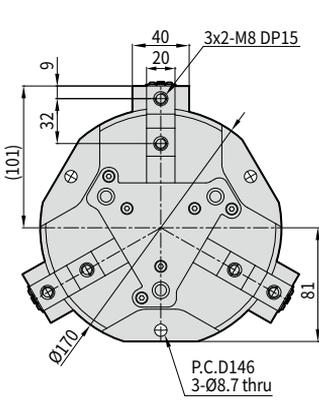
60CL

80CL

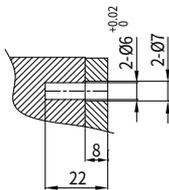
100CL

125CL

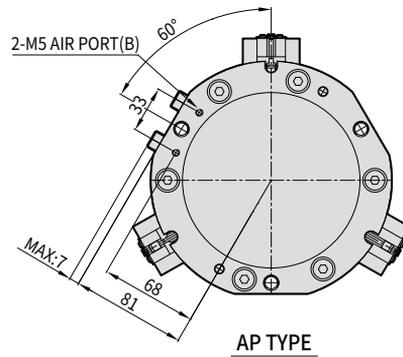
## PH14-125CL



STANDARD TYPE

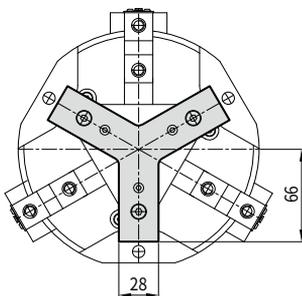


VIEW-A

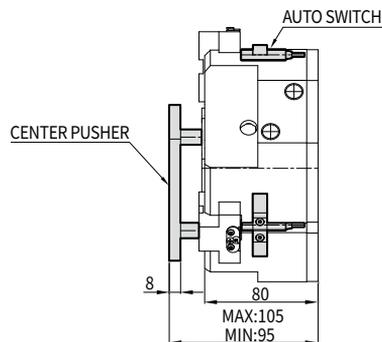


AP TYPE

## PH14-125CL Example of Auto Switch and Center Pusher installation



SPRING FORCE : 12.6 ~ 30.6 kgf

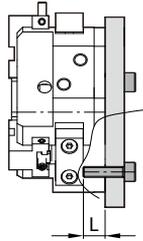


Installation Information

HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL**
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

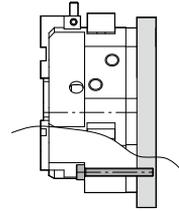
1. Installation by body tap holes



Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH14-30CL	M4×P0.7	25	13
PH14-40CL	M6×P1	81	15
PH14-50CL	M8×P1.25	157	24
PH14-60CL	M8×P1.25	157	25
PH14-80CL	M8×P1.25	157	21
PH14-100CL	M10×P1.5	360	24
PH14-125CL	M10×P1.5	360	31

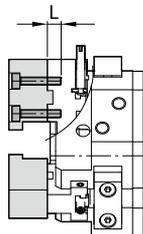
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH14-30CL-SF(SB)	M4×P0.7	25	9
PH14-40CL-SF(SB)	M6×P1	81	10
PH14-50CL-SF(SB)	M8×P1.25	157	16
PH14-60CL-SF(SB)	M8×P1.25	157	20
PH14-80CL-SF(SB)	M8×P1.25	157	15
PH14-100CL-SF(SB)	M10×P1.5	360	18

2. Installation by body through holes



Item	Fastening Bolt	Max Torque (kgf-cm)
PH14-30CL	M3×P0.5	11
PH14-40CL	M5×P0.8	51
PH14-50CL	M6×P1	81
PH14-60CL	M6×P1	81
PH14-80CL	M6×P1	81
PH14-100CL	M8×P1.25	157
PH14-125CL	M8×P1.25	157

3. Attachment installation



Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH14-30CL	M3×P0.5	11	6
PH14-40CL	M4×P0.7	25	8
PH14-50CL	M5×P0.8	51	8.5
PH14-60CL	M5×P0.8	51	9
PH14-80CL	M6×P1	81	11
PH14-100CL	M6×P1	81	12
PH14-125CL	M8×P1.25	157	15

## Parallel operation General Hand by Crank Lever

# PH14-CF Series

Ultra slim type General Hand with  
strong gripping force



### Various options for environmental

- Option for secondary battery manufacturing conditions.  
- Free materials from Copper and Zinc.



- Option for high temperature condition  
- Application of Viton seal for high temperature condition.

**+60 °C**

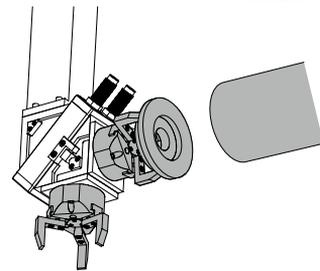
Standard



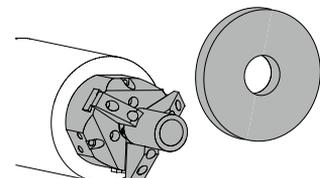
**+180 °C**

High temperature  
option

### Application 1

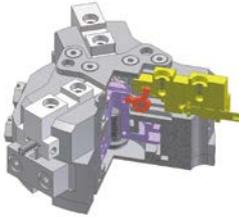


### Application 2



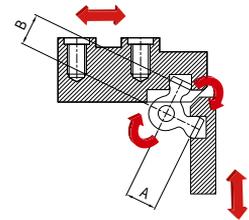
### Parallel operation by Crank Lever

- Synchronized operation by Crank Lever.
- Smooth operation than wedge structure & jam-less superior durability. (Rolling motion by Lever)
- Stable operation by enlarge of plunger supporting surface.



### Strong gripping force

- Enhanced gripping force.
  - Average +41% enhanced gripping force compare with PH14-S models.
  - Average -18% reduced stroke compare with PH14-S models.
- Gripping force enhanced from adjustment of crank lever ratio (A/B).



### Center Pusher (Optional)

- Shock absorption and positioning when gripping workpiece.
- Push to lathe chuck when releasing workpiece.

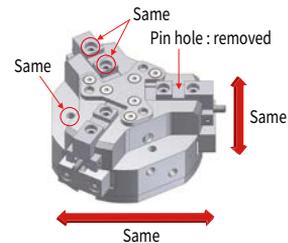


Available for "CP" option

※ The center pusher can be purchased and installed separately.

### Dimensional compatibility with PH14-S

- Dimensional and installation position compatibility with PH14-S.

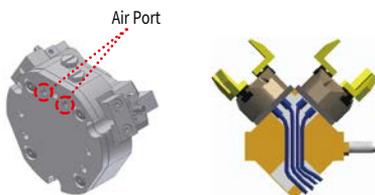


※ Caution

1. Central pin holes are not supplied.
2. Depth of bolt tap and/or counter, length of master jaw could be different. Please check it before application.

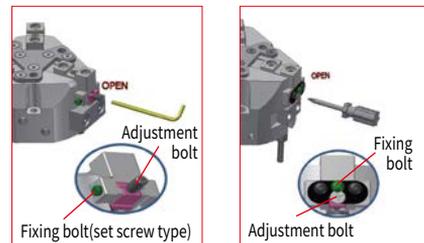
### Bottom Air Port (Optional)

- Convenience on side space by positioning side air port to bottom.
- Suitable for centralized air piping combination with Swivel Unit or Rotary cylinder.



### Proximity Sensor applicable / Easy to control

- Proximity Sensor applicable.
- Easy sensing position control, even though the product is installed.



■ Smaller than PH14-50CF

■ PH14-60CF or bigger

# GENERAL HAND / Parallel Operation

# PH14-CF Series

## Features

NEW

- Parallel operation circular shape by Crank Lever structure.
- Stable operation by enlarge of plunger supporting surface.
- Smooth and stable operation of Master Jaw compare with Wedge Plunger structure.
- Dimensional and installation position compatibility with PH14-S. (Caution : Stroke is different)
- Easy centralized piping with bottom air port. (Optional)
- High gripping performance from enhanced gripping force.
  - Average +41% enhanced gripping force compare with PH14-S models.
- Various special options. (Heat resistance, secondary battery field)
- Auto Switch installation. (Optional)



## Order Form

### PH14 - 40CF - E - P S - PNP - AP - CP

①

②

③

④

⑤

⑥

⑦

⑧

#### ① Series Name

#### ② Cylinder Bore Size and Stroke

Order	CYL Bore(mm)	Stroke(mm)
30CF	30	6
40CF	40	10
50CF	50	12
60CF	60	14
80CF	80	17
100CF	100	21
125CF	125	25

#### ③ Special Option

Order	Special Option
Blank	Standard
E	Secondary battery field
V	High temperature condition

\* For high temperature option, normal Auto Switch is not available.

#### ④ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage DC	Current	Body Length	Sensing Distance	Frequency	Protect Level
		Wires	Direction						
Blank		No Auto Switch provided							
P	Proximity	3-Wire	Horiz	10~30V	Max 200mA	32mm	1mm ± 10%	800Hz	IP 67
P2	Proximity	3-Wire	Horiz	10~30V	Max 200mA	16mm	1mm ± 10%	800Hz	IP 67

\* "P" could be projected from main body. (P2 is recommended)

#### ⑤ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

#### ⑥ Auto Switch Output

Order	Output
Blank	NPN
PNP	PNP

#### ⑦ Air Port Option

Order	Air Port Option
Blank	Standard (Side position)
AP	Additional air port on bottom

\* For AP option selection, side air port will be supplied with plugged.

#### ⑧ Center Pusher

Order	Center Pusher
Blank	Non-Mounted
CP	Mounted

Accessory Order Form

HAND

(1) Center Pusher

**PH14 - 60 - CP - ASSY**

①                      ②                      ③                      ④

- ① Series Name
- ② Cylinder Bore Size
- ③ Center Pusher
- ④ Order Name for Accessory  
- Based for 1 piece of product.

Specification

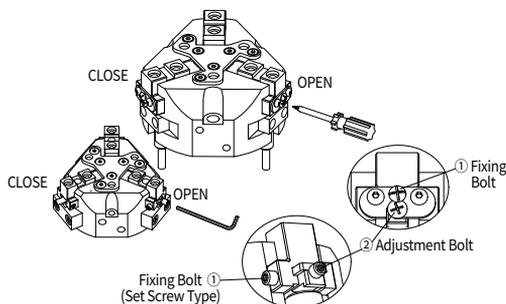
Item Name	PH14-30CF	PH14-40CF	PH14-50CF	PH14-60CF	PH14-80CF	PH14-100CF	PH14-125CF
CYL Bore Size(mm)	30	40	50	60	80	100	125
Stroke(mm)	6	10	12	14	17	21	25
Effective Gripping Force(kgf)	Close	27.3	49.9	77	115	208	514
	Open	30.7	54.9	85.8	124	221	545
Air pressure : 5kgf/cm <sup>2</sup> Note 2)							
Weight(kgf)	0.2	0.38	0.6	0.75	1.37	2.35	4.5
Max. Attachment L(mm)	40	50	60	80	100	120	140
Max. Attachment H(mm) Note 3)							
Fitting Size	M5			PT1/8		PT1/4	
Fluid	Clean Air Note 1)						
Pressure Range(kgf/cm <sup>2</sup> )	3 ~ 7						
Lubrication	Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)						
Temperature Range(°C)	Standard model : 5 ~ 60 High temperature model : 5 ~ 150						
Repeat Accuracy(mm)	±0.03			±0.08			
Max. Cycle Per Minute(C.P.M)	70			40			
Operation Type	Double Acting (Structure : Parallel operation by Crank Lever) (Guide : Metal Guide)						
Tolerance of Stroke(mm)	Open : -0.5 ~ +1 Close : -1 ~ +0.5						

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10µm degree of filtering.

Note 2) The position of the effective gripping force point is the end point of the Master Jaw.

Note 3) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

How to Adjust Sensor Dog

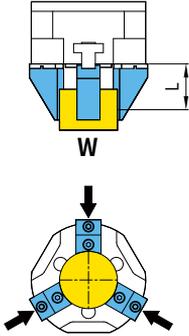


1. Operation position could be detected by proximity sensor and detecting position could be set by adjustment of sensor dog position inside of master jaws.  
(Use 1.5mm wrench or "+" screwdriver)
2. How to adjust  
 ① Release fixing bolt → ② Dog position adjustment →  
 ① Lock fixing bolt
3. Keep on locking status for set screw type fixing bolt while product working.

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF**
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

## Gripping Force Graph (Close)

► Refer <GENERAL HAND Selection Guide> for how to read below graph.

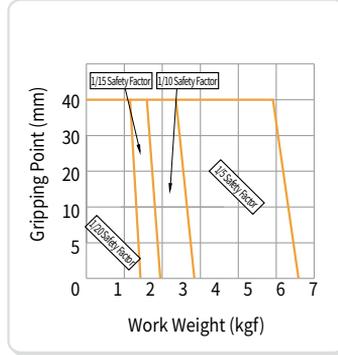


Close Grip State

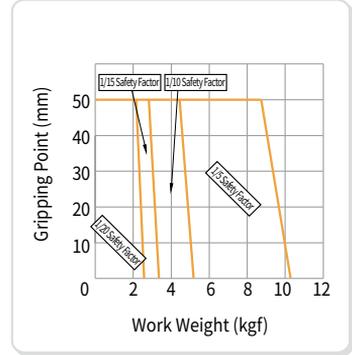
W: Work Weight

L: Attachment Length

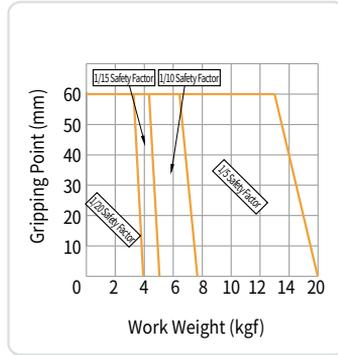
► PH14-30CF



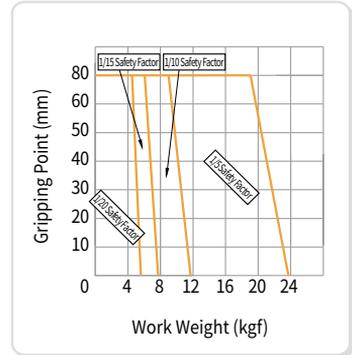
► PH14-40CF



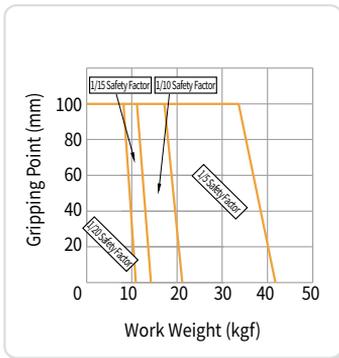
► PH14-50CF



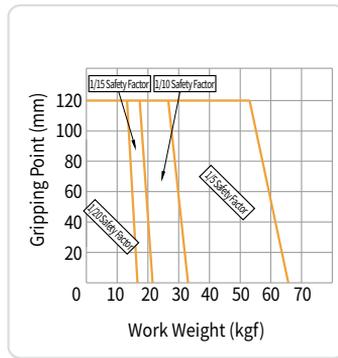
► PH14-60CF



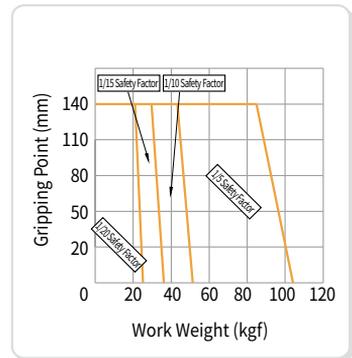
► PH14-80CF



► PH14-100CF



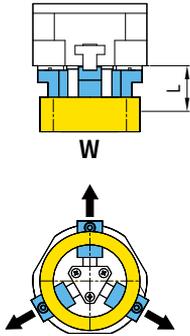
► PH14-125CF



▲ **Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it with the maximum attachment length which specified.

Gripping Force Graph (Open)

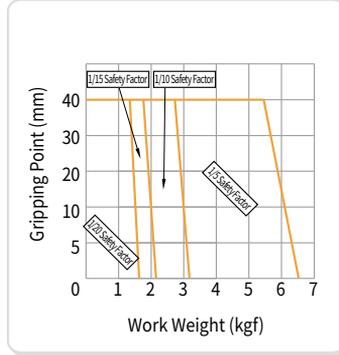
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



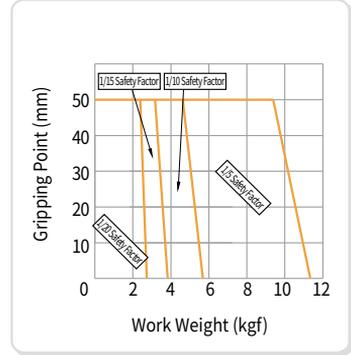
Open Grip State

W: Work Weight  
L: Attachment Length

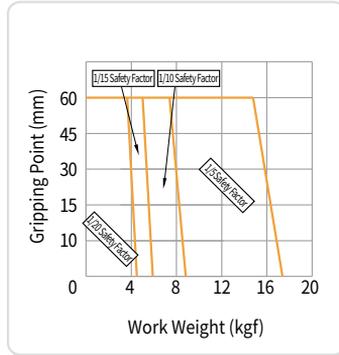
► PH14-30CF



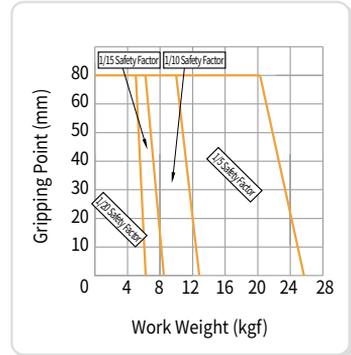
► PH14-40CF



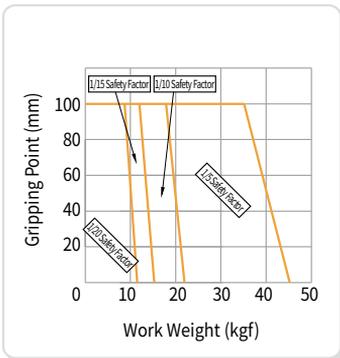
► PH14-50CF



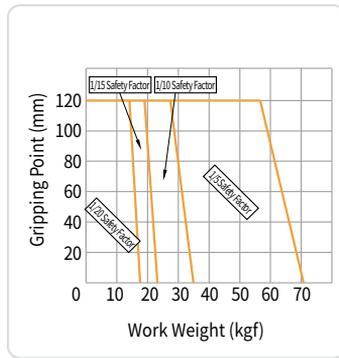
► PH14-60CF



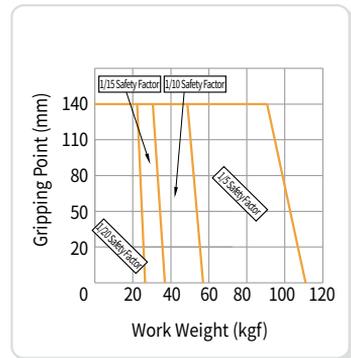
► PH14-80CF



► PH14-100CF



► PH14-125CF



▲ **Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF**
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC



30CF

40CF

50CF

60CF

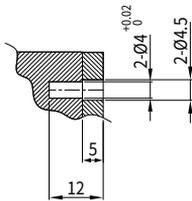
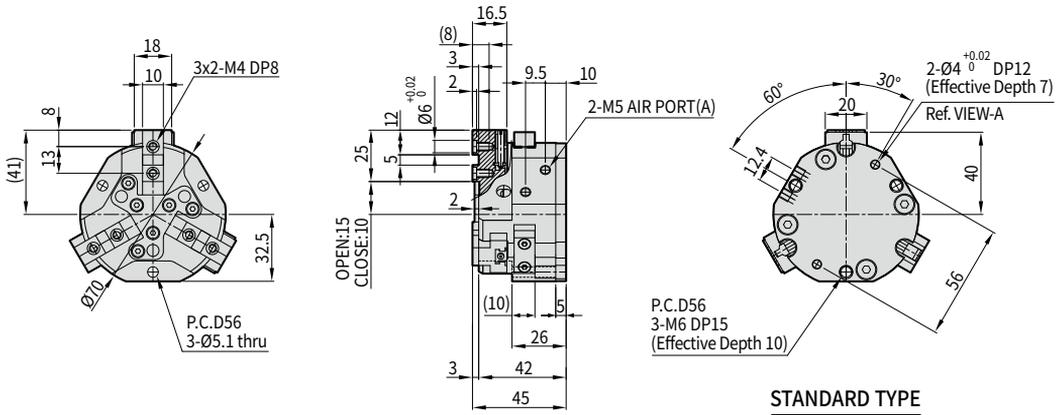
80CF

100CF

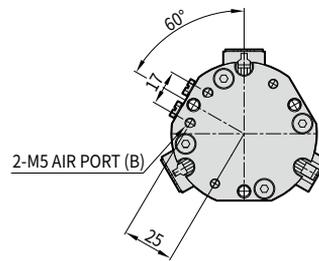
125CF

HAND

PH14-40CF

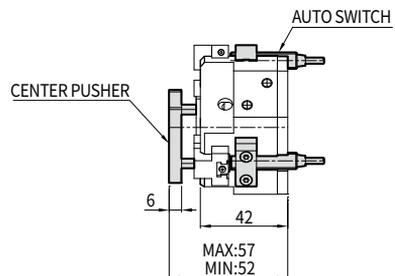
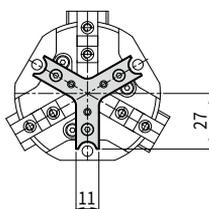


VIEW-A



AP TYPE

PH14-40CF Example of Auto Switch and Center Pusher installation



SPRING FORCE : 1.5 ~ 3 kgf

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF**
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH14-CF Series

30CF

40CF

50CF

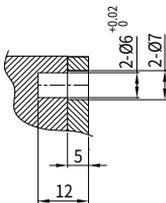
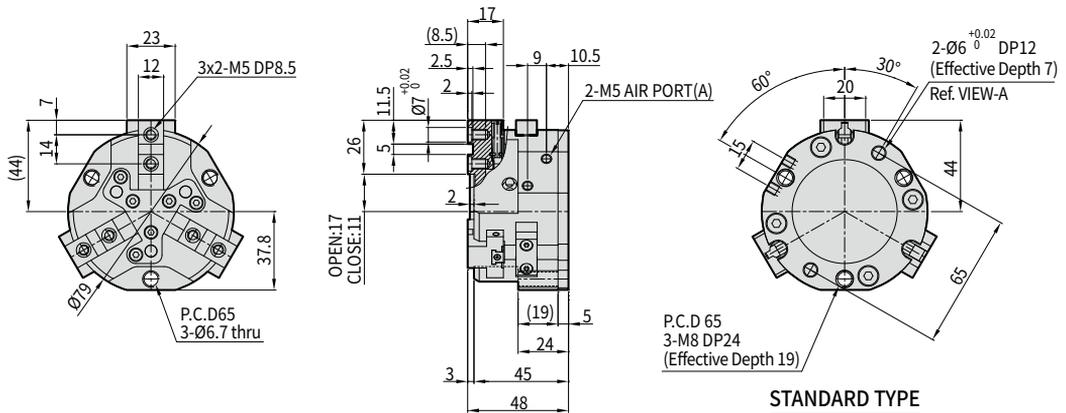
60CF

80CF

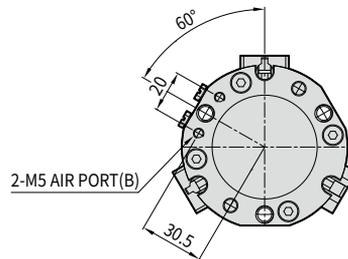
100CF

125CF

## PH14-50CF

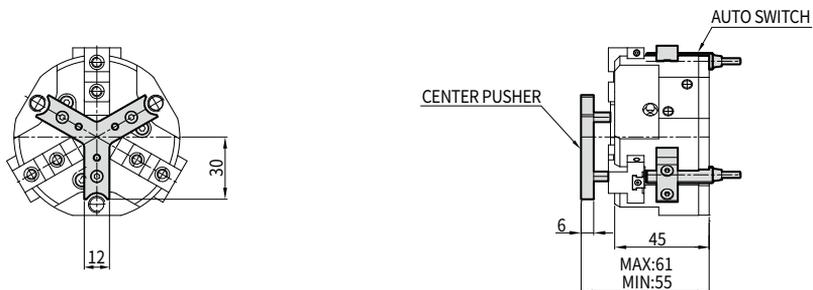


VIEW-A



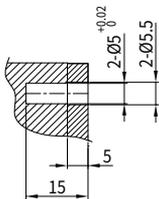
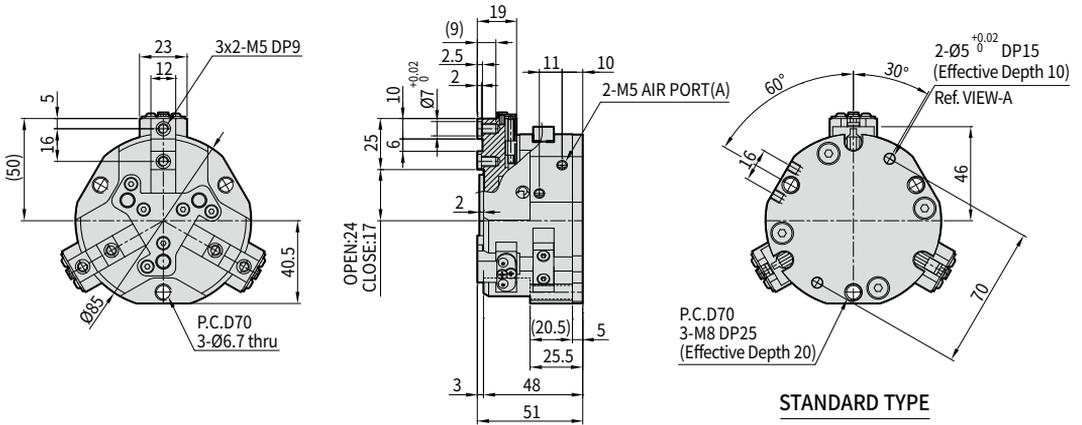
AP TYPE

## PH14-50CF Example of Auto Switch and Center Pusher installation

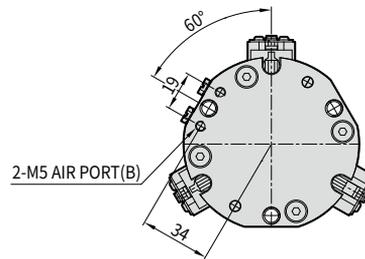


SPRING FORCE : 2.7 ~ 6.3 kgf

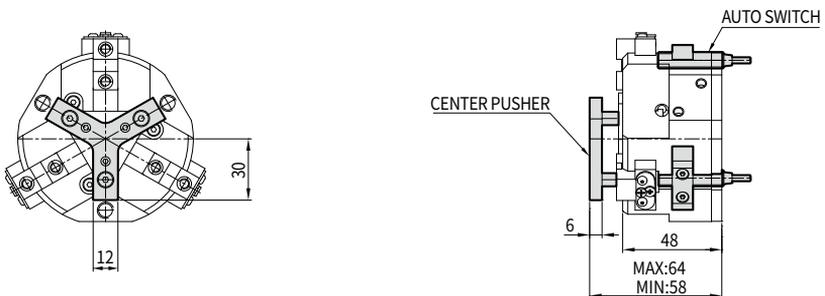
PH14-60CF



VIEW-A



PH14-60CF Example of Auto Switch and Center Pusher installation



SPRING FORCE : 3.6 ~ 7.2 kgf

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF**
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH14-CF Series

30CF

40CF

50CF

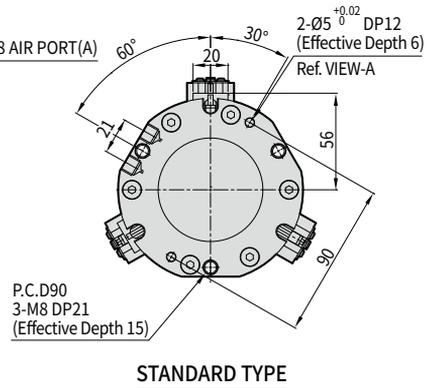
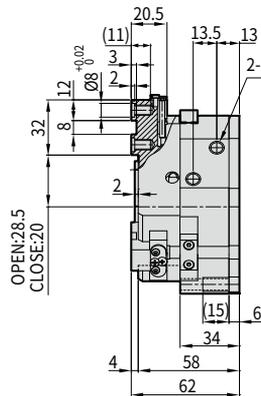
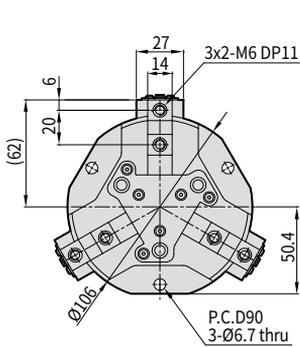
60CF

80CF

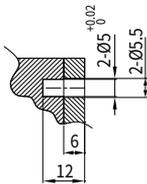
100CF

125CF

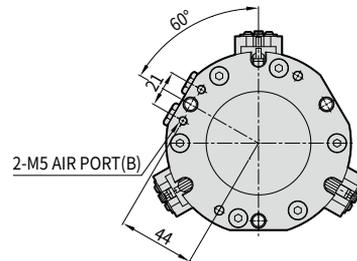
## PH14-80CF



STANDARD TYPE

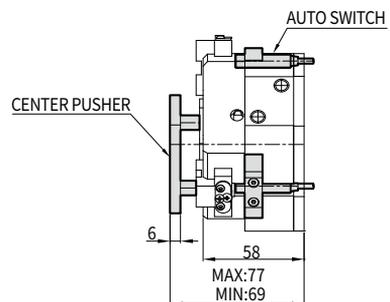
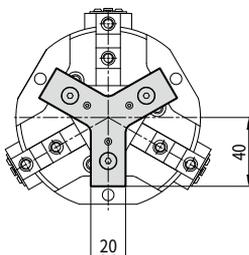


VIEW-A



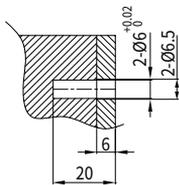
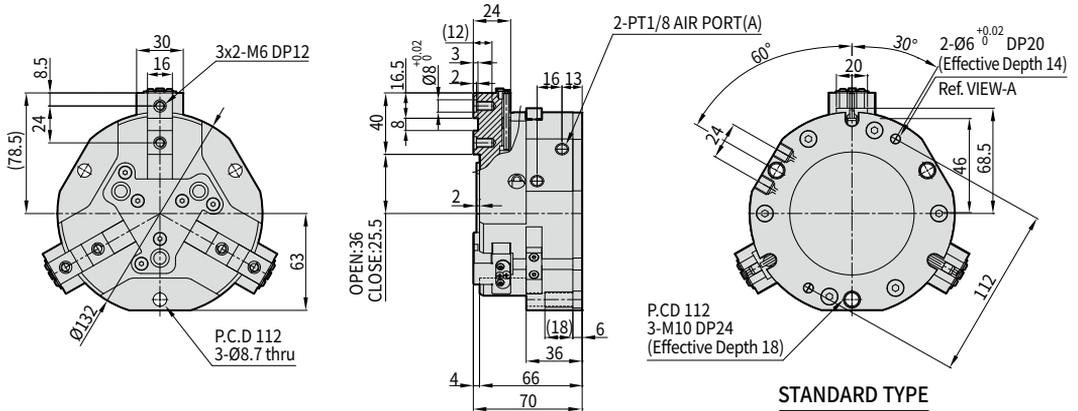
AP TYPE

## PH14-80CF Example of Auto Switch and Center Pusher installation

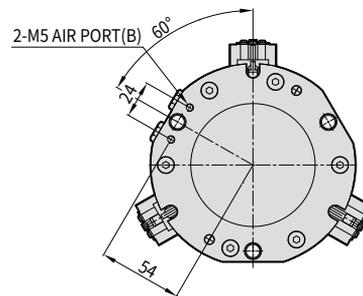


SPRING FORCE : 7.2 ~ 14.4 kgf

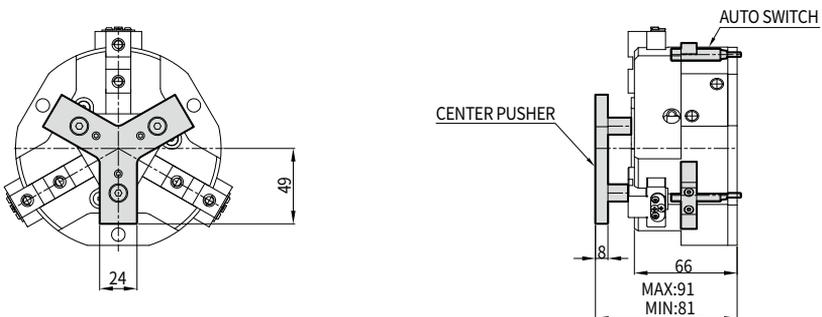
PH14-100CF



VIEW-A



PH14-100CF Example of Auto Switch and Center Pusher installation



SPRING FORCE : 9.9 ~ 18.9 kgf

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF**
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH14-CF Series

30CF

40CF

50CF

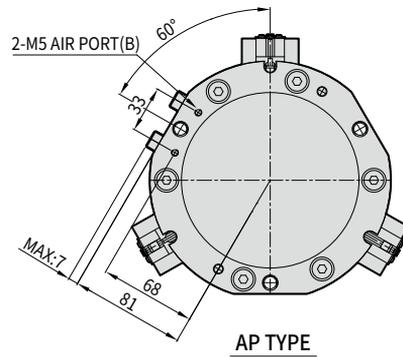
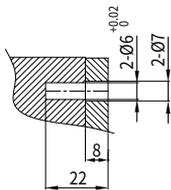
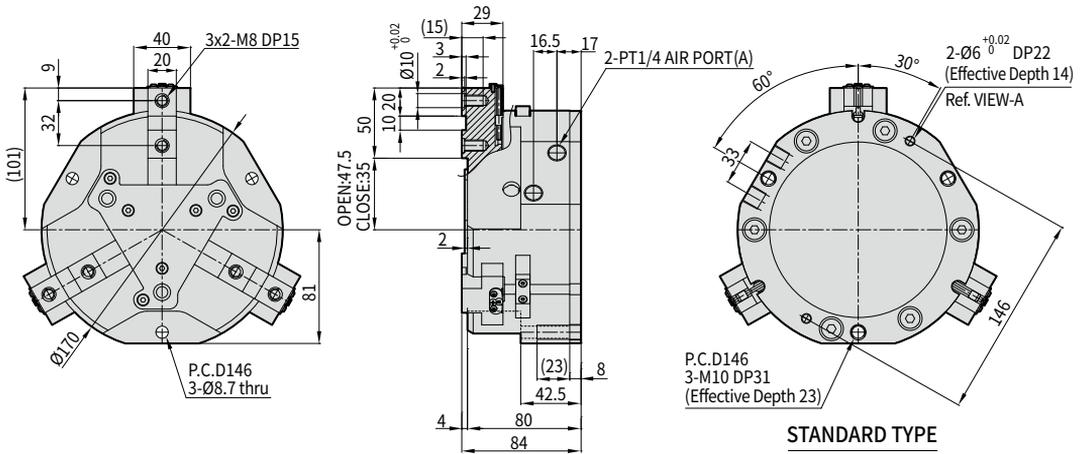
60CF

80CF

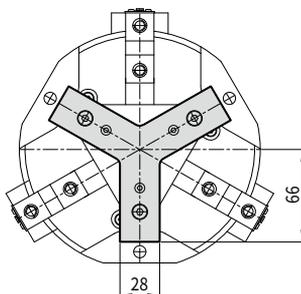
100CF

125CF

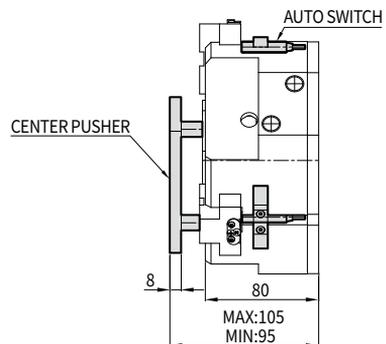
## PH14-125CF



## PH14-125CF Example of Auto Switch and Center Pusher installation



SPRING FORCE : 12.6 ~ 30.6 kgf

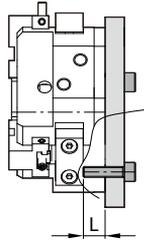


Installation Information

HAND

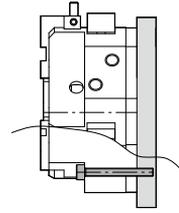
- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF**
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

1. Installation by body tap holes



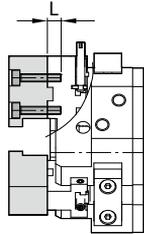
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH14-30CF	M4×P0.7	25	13
PH14-40CF	M6×P1	81	15
PH14-50CF	M8×P1.25	157	24
PH14-60CF	M8×P1.25	157	25
PH14-80CF	M8×P1.25	157	21
PH14-100CF	M10×P1.5	360	24
PH14-125CF	M10×P1.5	360	31

2. Installation by body through holes



Item	Fastening Bolt	Max Torque (kgf-cm)
PH14-30CF	M3×P0.5	11
PH14-40CF	M5×P0.8	51
PH14-50CF	M6×P1	81
PH14-60CF	M6×P1	81
PH14-80CF	M6×P1	81
PH14-100CF	M8×P1.25	157
PH14-125CF	M8×P1.25	157

3. Attachment installation



Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH14-30CF	M3×P0.5	11	6
PH14-40CF	M4×P0.7	25	8
PH14-50CF	M5×P0.8	51	8.5
PH14-60CF	M5×P0.8	51	9
PH14-80CF	M6×P1	81	11
PH14-100CF	M6×P1	81	12
PH14-125CF	M8×P1.25	157	15

# PH15 Series

Enlarged products lineup  
by release of Family products!

New Product

New Product



New products line up  
PH15-C, PH15-W series!

## PH15-CL Series

Enhanced gripping force and keep on gripping function from spring inside. (\* Optional)

### Dual Source

Compressed Air + Spring Force

Spring Inside →



## PH15-CF Series

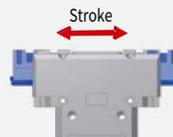
Adjustment of Crank Lever ratio for enhancement of gripping force  
**55% increased gripping force** compare with PH15-S Series

## PH15-W Series

**Enlarged stroke & maintaining gripping force** of PH15-S series

· Stroke (End to End) Unit : mm

Series	PH15-S	PH15-W
CYL Bore (mm)	40	40
	50	46
	60	52



Features of PH15 Series



**PH15-S Series**

- Solid structure of Wedge Plunger
- Stable gripping status without backlash
- Option for high temperature condition



**PH15-CL Series**

**NEW**

- Smooth and stable operation with Crank Lever structure
- Compatible for PH15-S series
- Option for Normal Open and Close
- Option for secondary battery manufacturing conditions



**PH15-CF Series**

**NEW**

- Smooth and stable operation with Crank Lever structure
- Compatible for PH15-S series
- Average +55% enhanced gripping force compare with PH15-S models  
※ Reduced stroke compare with PH15-S models
- Option for secondary battery manufacturing conditions

Model	Stroke (mm)			Close Gripping Force (kgf)			Open Gripping Force (kgf)		
	PH15-S	PH15-CL	PH15-CF	PH15-S	PH15-CL	PH15-CF	PH15-S	PH15-CL	PH15-CF
20	8	8	6	8.6	9.5	12.7	9.5	10.4	13.9
25	12	12	10	12.3	15.9	18.3	15	18.9	21.8
30	16	16	14.5	18.2	23.2	26	20.5	27.6	31
40	20	20	17	32.8	38.6	46.4	38	45.9	55.3
50	26	26	21	50.7	57.9	72.4	60.4	68.9	86.2
60	32	32	25.5	79.3	88.8	111	89.3	99.8	125
80	50	50	40	107	153	191	114	178	222
100	60	60	44	162	235	317	178	258	349



**PH15-W Series**

**NEW**

- Solid structure of Wedge Plunger
- Extended stroke compare with PH15-S models
- Maintaining gripping force for same bore size model of PH15-S

Model	Stroke (mm)		Close Gripping Force (kgf)		Open Gripping Force (kgf)	
	PH15-S	PH15-W	PH15-S	PH15-W	PH15-S	PH15-CL
40	20	40	32.8	30.4	38	36.1
50	26	46	50.7	49.7	60.4	57
60	32	52	79.3	82.1	89.3	91.3

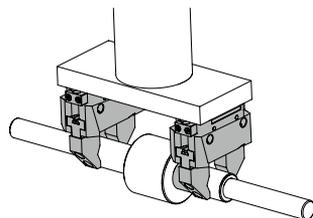
Parallel operation  
General Hand by Wedge Plunger

# PH15-S Series

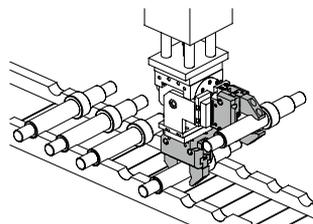
Ultra slim type General Hand  
overcome the limitation of height



Application 1

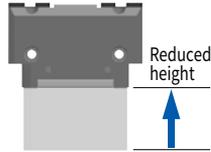


Application 2



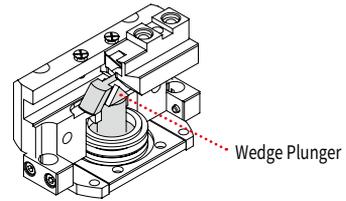
### Reduced height → Slim and light

- Superior space utility by dramatically reduced height.
- Stable gripping status.
- Combined with the swivel unit (ASU Series), it is suitable for configuring a loader for CNC lathes.



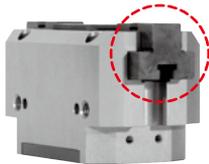
### Mid-size general hand of wedge plunger structure

- Compact and powerful gripping force with wedge plunger structure.
- Stable gripping status without backlash.



### High solidity structure with Metal Guide inside

- Sliding type guide with "T-Shape", improved allowable moment.
- Reduced malfunction caused from external dust or cutting oils.



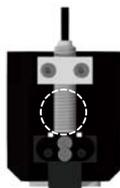
### Various installation options

- Various installation for customer convenience.
- 2 Direction total 4 ways of installation.

	Body TAP installation	Body Hole installation
Body bottom installation		
Body side installation		

### Auto Switch installation (Optional)

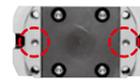
- Proximity Sensor applicable.
- Easy sensing position control, even though the product is installed.



### Provides installation repeatability



• Position hole on body side



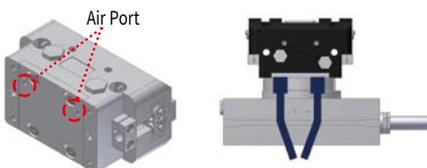
• Position hole on bottom



• Position hole on Master Jaw

### Bottom Air Port (Optional)

- Convenience on side space by positioning side air port to bottom.
- Suitable for centralized air piping combination with Swivel Unit or Rotary cylinder.



### Option for high temperature condition

- Option for high temperature condition.
- Application of Viton seal for high temperature condition.

**+60 °C**  
Standard



**+180 °C**  
High temperature option

# GENERAL HAND / Parallel Operation

# PH15-S Series

Newly released option - Bottom Air Port

## Features

- Parallel operation by Wedge Plunger structure.
- Compact size and light weight.
- Various installation options. (4-Ways)
- Suitable for handling heavy workpiece with strong gripping force.
- Easy centralized piping with bottom air port. (Optional)
- High temperature condition for heat resistance seals. (Optional)
- Auto Switch installation. (Optional)



## Order Form

**PH15 - 40S - □ - P S - PNP - AP**

①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

### ① Series Name

### ② Cylinder Bore Size and Stroke

Order	CYL Bore (mm)	Stroke (mm)	Order	
			P	P2
20S	20	8	<input type="radio"/>	<input type="radio"/>
25S	25	12	<input type="radio"/>	<input type="radio"/>
30S	30	16	<input type="radio"/>	
40S	40	20	<input type="radio"/>	
50S	50	26	<input type="radio"/>	
60S	60	32	<input type="radio"/>	
80S	80	50	<input type="radio"/>	
100S	100	60	<input type="radio"/>	

※ For "Blank", no Auto Switch is provided.

### ④ Available Auto Switches

### ⑤ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

### ⑥ Auto Switch Output

Order	Output
Blank	NPN
PNP	PNP

### ③ Special Option

Order	Special Option
Blank	Standard
V	High temperature condition

\* For high temperature option, normal Auto Switch is not available.

### ⑦ Air Port Option

Order	Air Port Option
Blank	Standard (Side position)
AP	Additional air port on bottom

\* For AP option selection, side air port will be supplied with plugged.

### ※ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage DC	Current	Body Length	Sensing Distance	Frequency	Protect Level
		Wires	Direction						
P	Proximity	3-Wire	Horiz	10~30V	Max 200mA	32mm	1mm ± 10%	800Hz	IP 67
P2	Proximity	3-Wire	Horiz	10~30V	Max 200mA	16mm	1mm ± 10%	800Hz	IP 67

\* "P" could be projected from main body.

\* For PH15-20S & PH15-25S model, P2 is recommended.

Specification

PH01-A  
PH01-D  
PH01-G  
PH01J-C  
PH01K  
PH02  
PH02-H  
PH04  
PH05  
PH06  
PH06-L  
PH06-L2  
PH07  
PH08  
PH09  
PH10  
PH12  
PH14-S  
PH14-CL  
PH14-CF  
PH15-S  
PH15-CL  
PH15-CF  
PH15-W  
PH21  
PH22  
PH23  
PH25  
PH32  
PHC

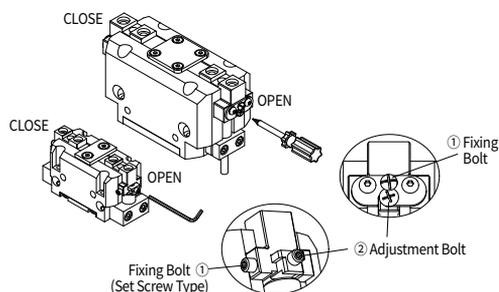
Item Name		PH15-20S	PH15-25S	PH15-30S	PH15-40S	PH15-50S	PH15-60S	PH15-80S	PH15-100S
CYL Bore Size(mm)		20	25	30	40	50	60	80	100
Stroke(mm)		8	12	16	20	26	32	50	60
Effective Gripping Force(kgf)	Close	8.6	12.3	18.2	32.8	50.7	79.3	107	162
	Open	9.5	15	20.5	38	60.4	89.3	114	178
Fitting Size			M5				PT1/8		
Weight(kgf)		0.13	0.27	0.43	0.75	1.3	2.4	5.0	9.2
Max. Attachment L(mm)		30	35	40	50	60	80	110	140
Max. Attachment H(mm)	Note 3)								
Fluid		Clean Air Note 1)							
Pressure Range(kgf/cm <sup>2</sup> )		3 ~ 7							
Lubrication		Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)							
Temperature Range(°C)		Standard model : 5 ~ 60 High temperature model : 5 ~ 150							
Repeat Accuracy(mm)		±0.03				±0.08		±0.1	
Max. Cycle Per Minute(C.P.M)		100				60		30	
Operation Type		Double Acting (Structure : Parallel operation by Wedge Plunger) (Guide : Metal Guide)							
Tolerance of Stroke(mm)		Open : -0.5 ~ +1 Close : -1 ~ +0.5							

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10µm degree of filtering.

Note 2) The position of the effective gripping force point is the end point of the Master Jaw.

Note 3) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

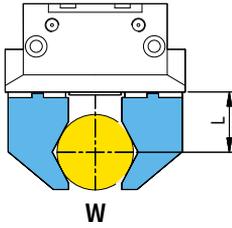
How to Adjust Sensor Dog



- Operation position could be detected by proximity sensor and detecting position could be set by adjustment of sensor dog position inside of master jaws.  
(Use 1.5mm wrench or "+" screwdriver)
- How to adjust  
 ① Release fixing bolt → ② Dog position adjustment → ③ Lock fixing bolt
- Keep on locking status for set screw type fixing bolt while product working.

## Gripping Force Graph (Close)

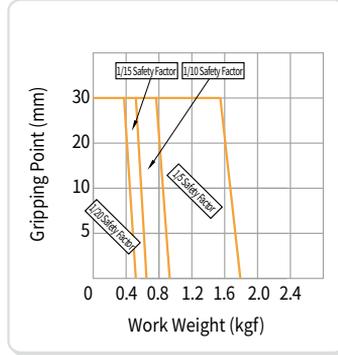
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



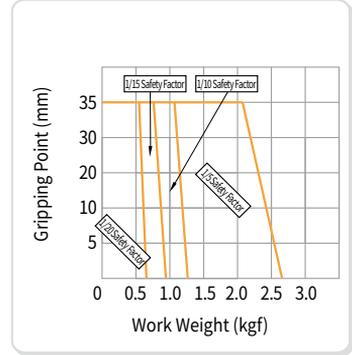
Close Grip State

W: Work Weight  
L: Attachment Length

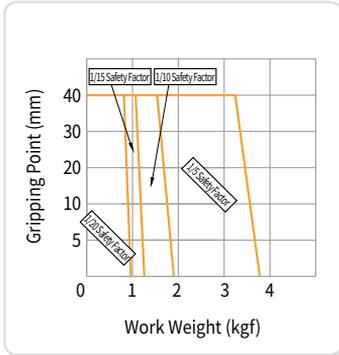
► PH15-20S



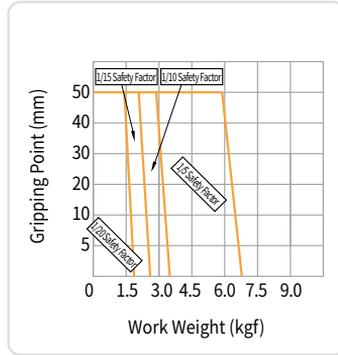
► PH15-25S



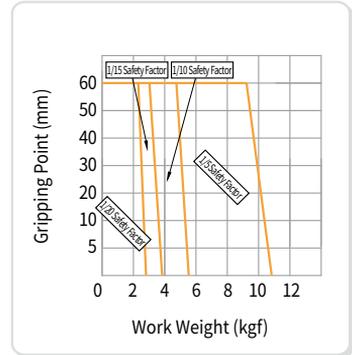
► PH15-30S



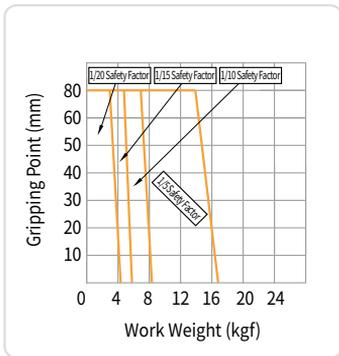
► PH15-40S



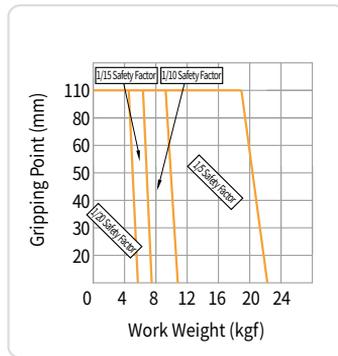
► PH15-50S



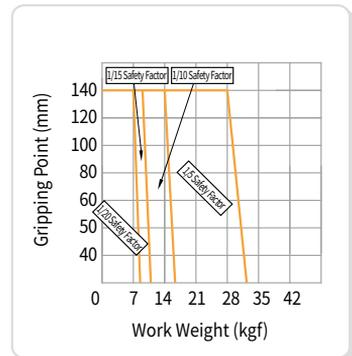
► PH15-60S



► PH15-80S



► PH15-100S

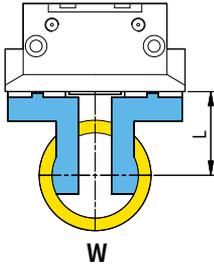


### ⚠ Caution

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

Gripping Force Graph (Open)

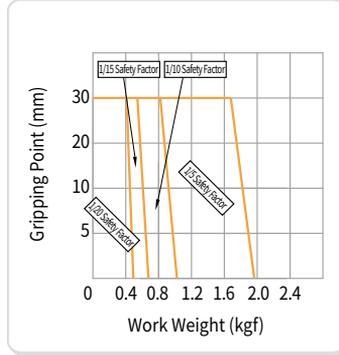
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



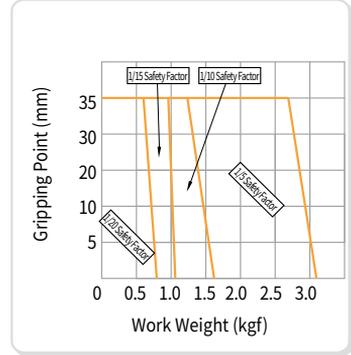
Open Grip State

W: Work Weight  
L: Attachment Length

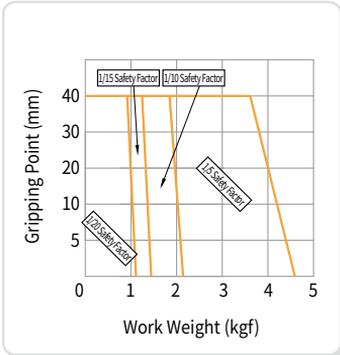
► PH15-20S



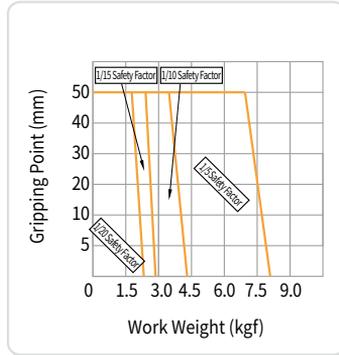
► PH15-25S



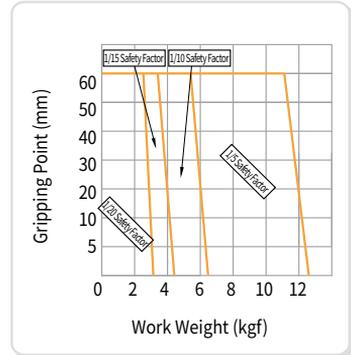
► PH15-30S



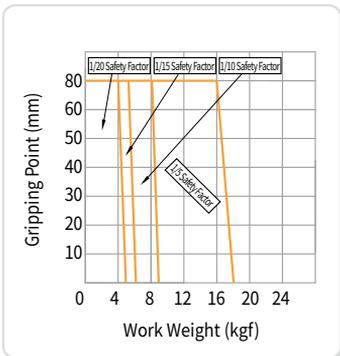
► PH15-40S



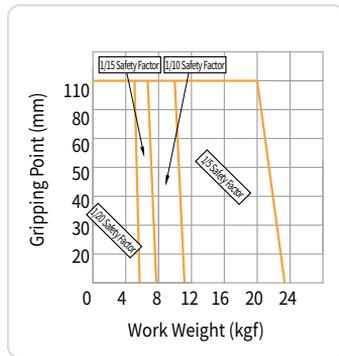
► PH15-50S



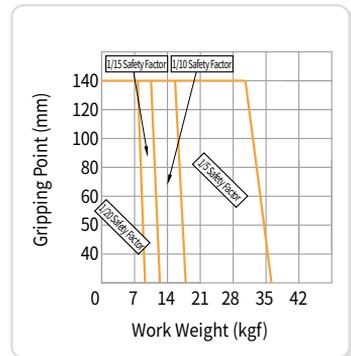
► PH15-60S



► PH15-80S



► PH15-100S



⚠ Caution

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S**
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH15-S Series

20S

25S

30S

40S

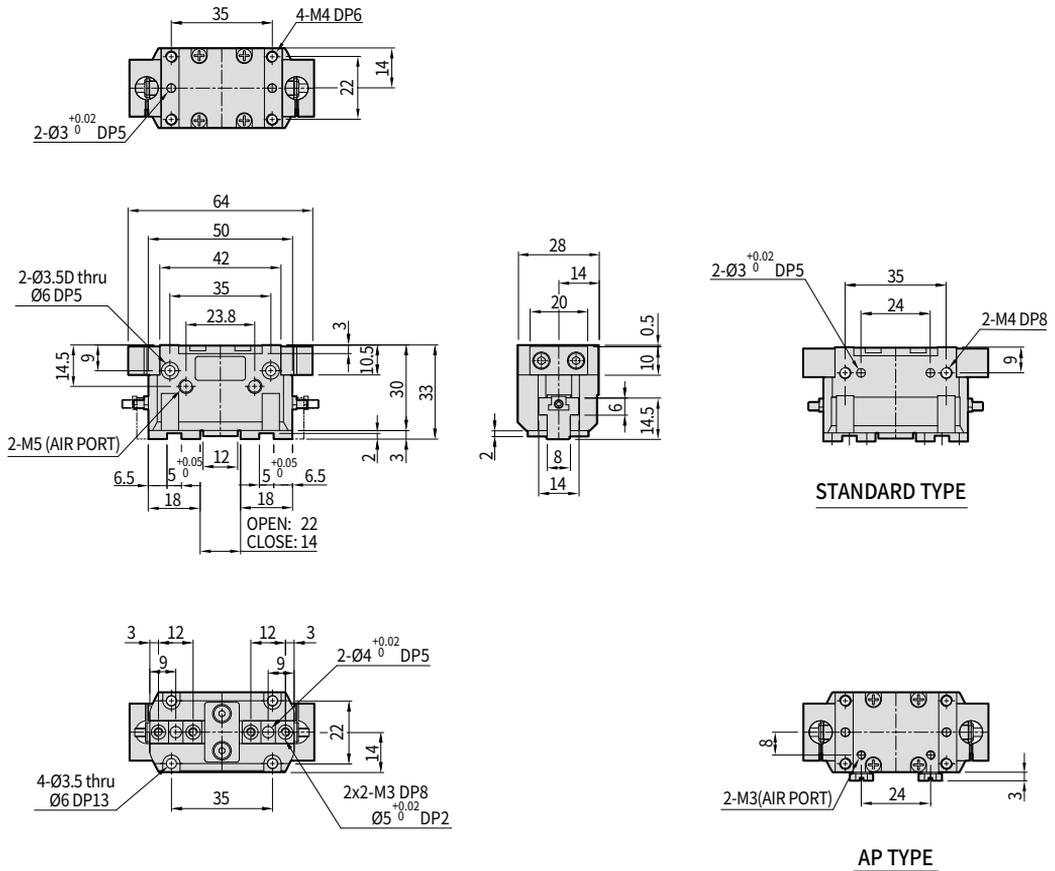
50S

60S

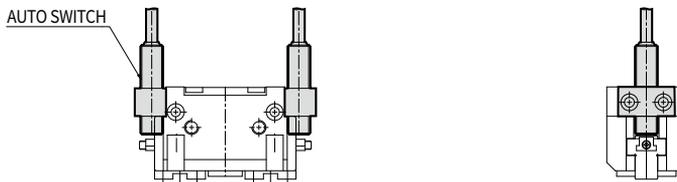
80S

100S

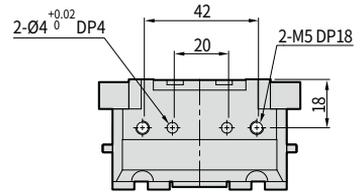
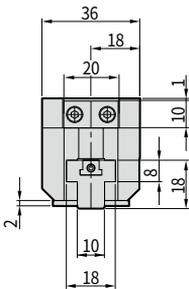
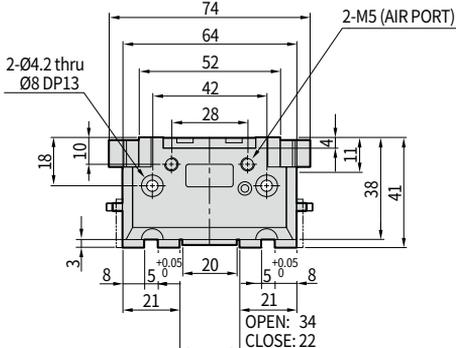
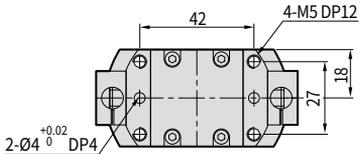
## PH15-20S



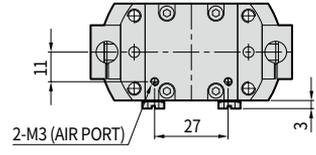
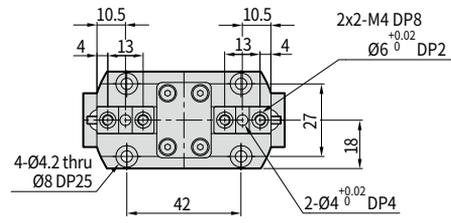
## PH15-20S Example of Auto Switch installation



PH15-25S

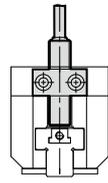
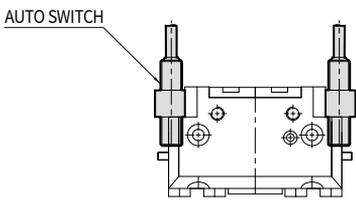


STANDARD TYPE



AP TYPE

PH15-25S Example of Auto Switch installation



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S**
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH15-S Series

20S

25S

**30S**

40S

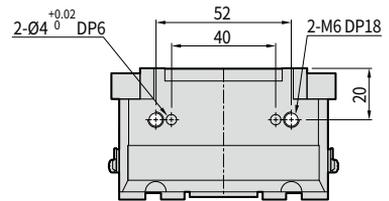
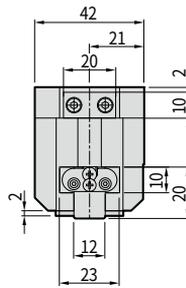
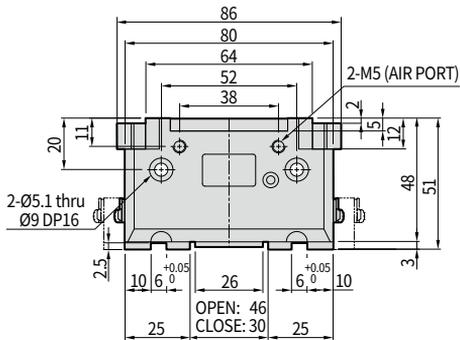
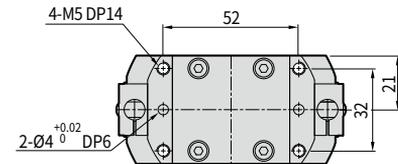
50S

60S

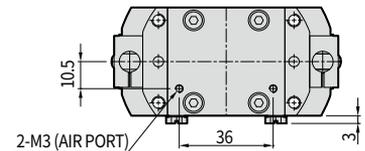
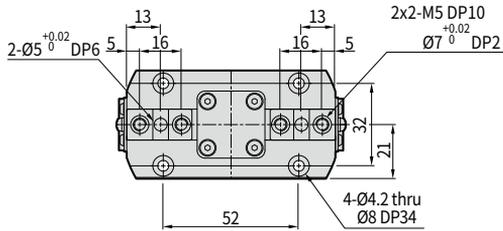
80S

100S

## PH15-30S

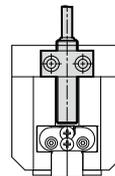
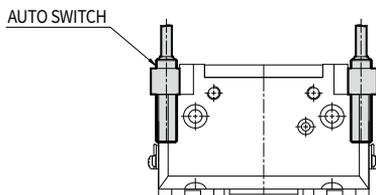


STANDARD TYPE



AP TYPE

## PH15-30S Example of Auto Switch installation



20S

25S

30S

40S

50S

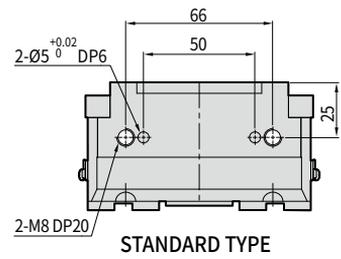
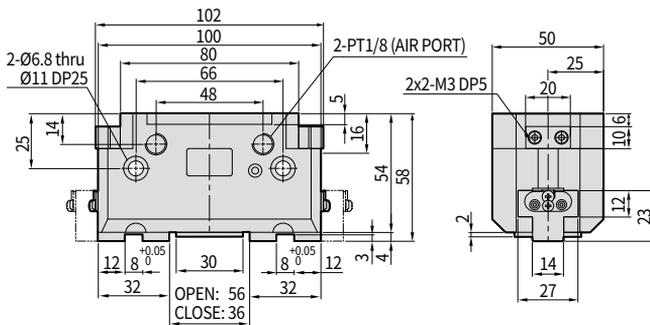
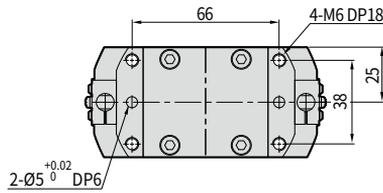
60S

80S

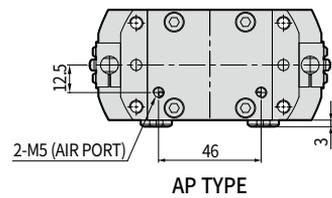
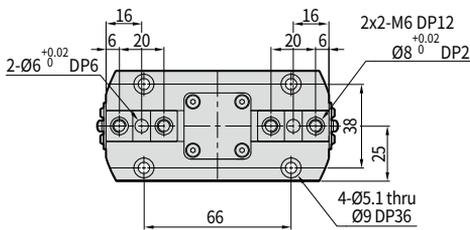
100S

HAND

PH15-40S

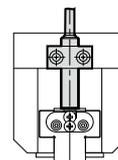
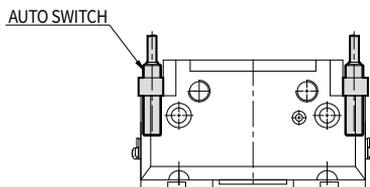


STANDARD TYPE



AP TYPE

PH15-40S Example of Auto Switch installation



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH15-S Series

20S

25S

30S

40S

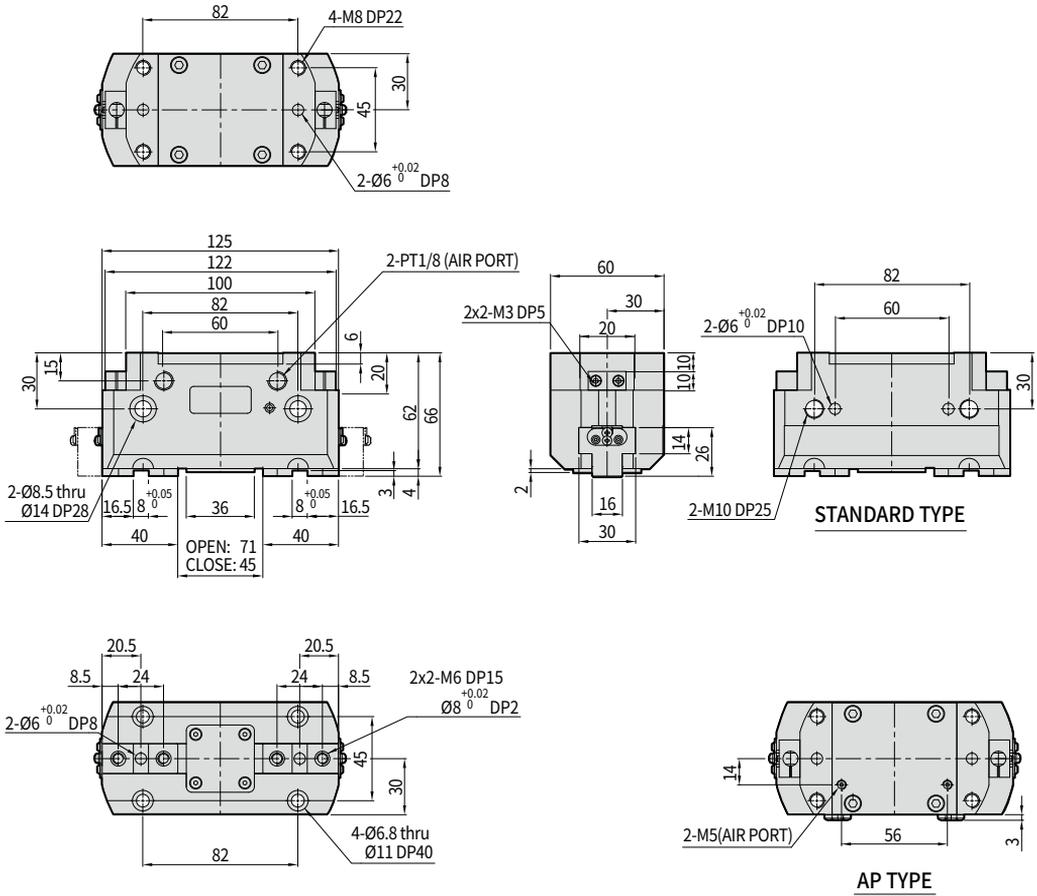
50S

60S

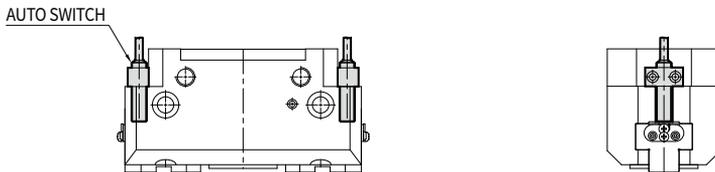
80S

100S

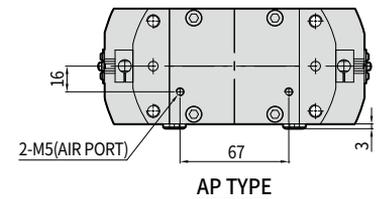
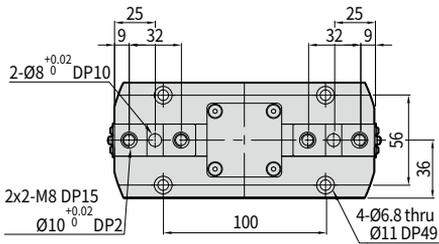
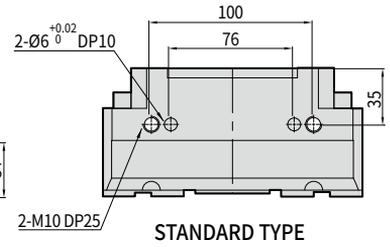
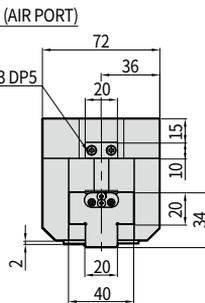
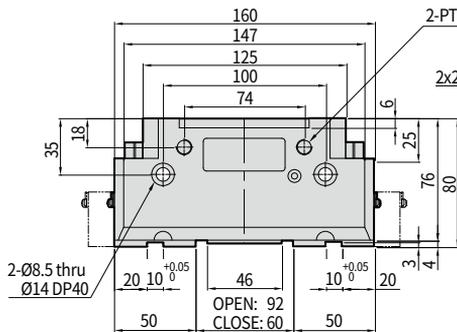
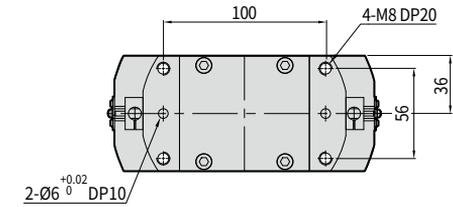
## PH15-50S



## PH15-50S Example of Auto Switch installation

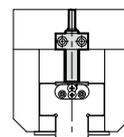
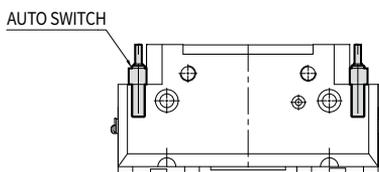


PH15-60S



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S**
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

PH15-60S Example of Auto Switch installation



# PH15-S Series

20S

25S

30S

40S

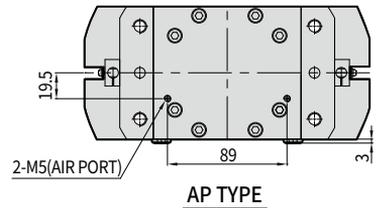
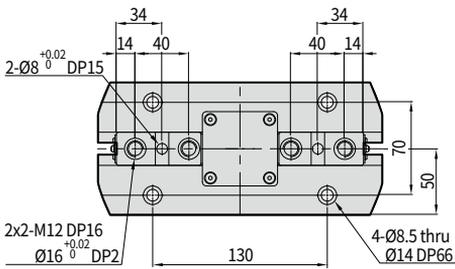
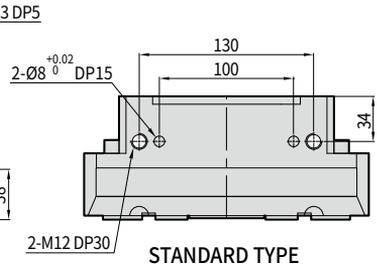
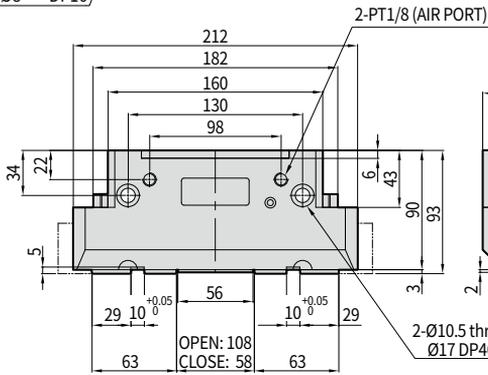
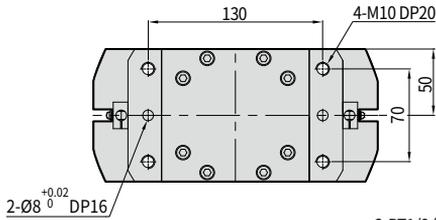
50S

60S

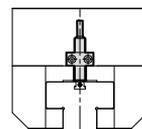
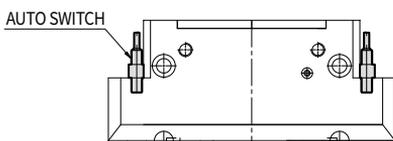
80S

100S

## PH15-80S

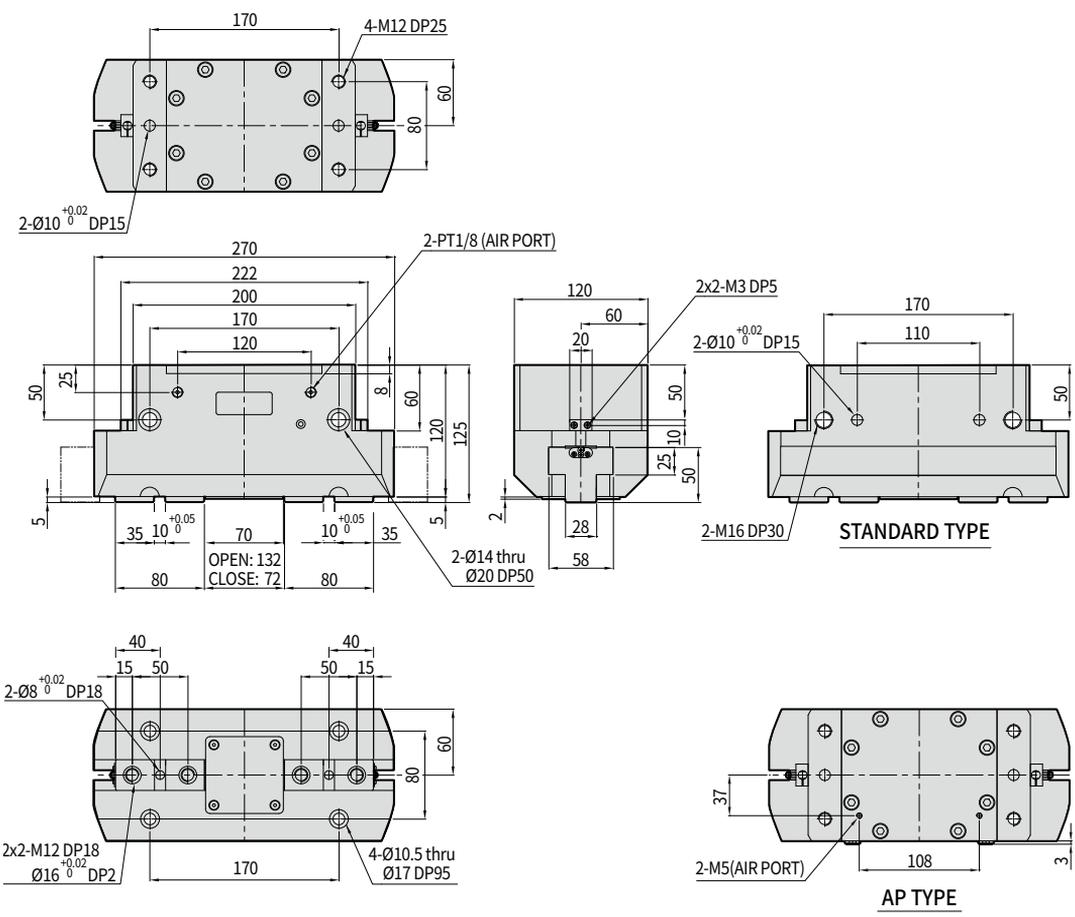


## PH15-80S Example of Auto Switch installation

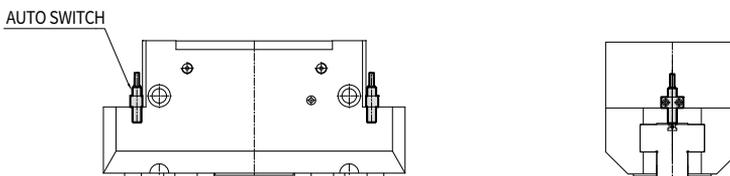


PH15-100S

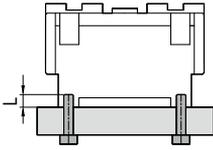
- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S**
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC



PH15-100S Example of Auto Switch installation

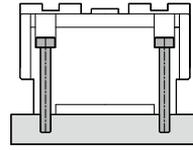


1. Installation by body tap holes



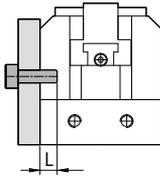
Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH15-20S	M4×P0.7	25	6
PH15-25S	M5×P0.8	51	12
PH15-30S	M5×P0.8	51	14
PH15-40S	M6×P1	81	18
PH15-50S	M8×P1.25	157	20
PH15-60S	M8×P1.25	157	20
PH15-80S	M10×P1.5	360	20
PH15-100S	M12×P1.75	670	25

2. Installation by body through holes



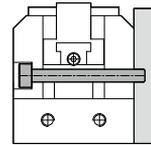
Item	Fastening Bolt	Max Torque (kgf·cm)
PH15-20S	M3×P0.5	11
PH15-25S	M4×P0.7	25
PH15-30S	M4×P0.7	25
PH15-40S	M5×P0.8	51
PH15-50S	M6×P1	81
PH15-60S	M6×P1	81
PH15-80S	M8×P1.25	157
PH15-100S	M10×P1.5	360

3. Installation by body tap holes



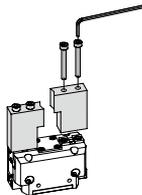
Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH15-20S	M4×P0.7	25	8
PH15-25S	M5×P0.8	51	15
PH15-30S	M6×P1	81	14
PH15-40S	M8×P1.25	157	14
PH15-50S	M10×P1.5	360	18
PH15-60S	M10×P1.5	360	18
PH15-80S	M12×P1.75	670	25
PH15-100S	M16×P2	1650	30

4. Installation by body through holes



Item	Fastening Bolt	Max Torque (kgf·cm)
PH15-20S	M3×P0.5	11
PH15-25S	M4×P0.7	25
PH15-30S	M5×P0.8	51
PH15-40S	M6×P1	81
PH15-50S	M8×P1.25	157
PH15-60S	M8×P1.25	157
PH15-80S	M10×P1.5	360
PH15-100S	M12×P1.75	670

5. Attachment installation



Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH15-20S	M3×P0.5	11	8
PH15-25S	M4×P0.7	25	8
PH15-30S	M5×P0.8	51	10
PH15-40S	M6×P1	81	12
PH15-50S	M6×P1	81	15
PH15-60S	M8×P1.25	157	15
PH15-80S	M12×P1.75	670	16
PH15-100S	M12×P1.75	670	18

MEMO

Handwriting practice area with horizontal dotted lines.

**HAND**

PH01-A
PH01-D
PH01-G
PH01J-C
PH01K
PH02
PH02-H
PH04
PH05
PH06
PH06-L
PH06-L2
PH07
PH08
PH09
PH10
PH12
PH14-S
PH14-CL
PH14-CF
<b>PH15-S</b>
PH15-CL
PH15-CF
PH15-W
PH21
PH22
PH23
PH25
PH32
PHC

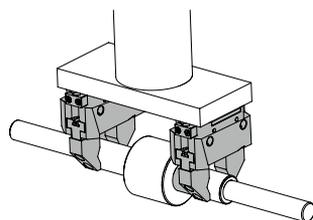
Parallel operation  
General Hand by Crank Lever

# PH15-CL Series

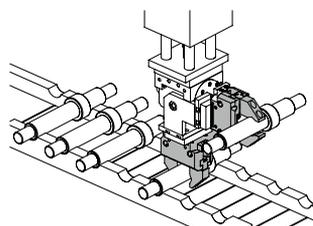
Ultra slim type General Hand  
smooth operation



Application 1



Application 2



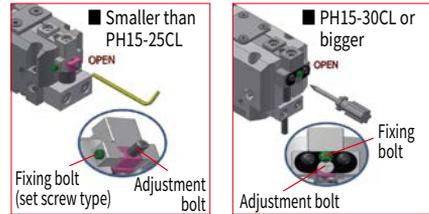
### Parallel operation by Crank Lever

- Synchronized operation by Crank Lever.
- Smooth operation than wedge structure & jam-less superior durability. (Rolling motion by Lever)
- Stable operation by enlarge of plunger supporting surface.



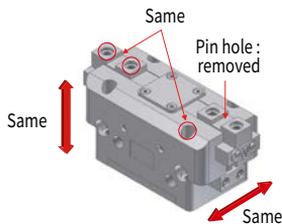
### Proximity Sensor applicable / Easy to control

- Proximity Sensor applicable.
- Easy sensing position control, even though the product is installed.



### Same install position with PH15-S

- Dimensional and installation position compatibility with PH15-S.
- ※ For Ø20, Ø25 models, installation position is same but the length of product is different. Please check interfere in advance.

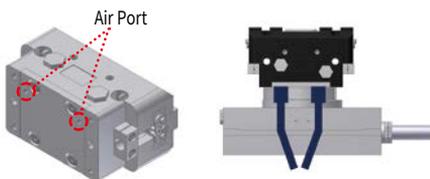


※ Caution

1. Central pin holes are not supplied.
2. Depth of bolt tap and / or counter, length of master jaw could be different. Please check it before application.

### Bottom Air Port (Optional)

- Convenience on side space by positioning side air port to bottom.
- Combined with the swivel unit (ASU Series), it is suitable for configuring a loader for CNC lathes.



### Various options for environmental

- Option for secondary battery manufacturing conditions.
  - Free materials from Copper and Zinc.
- Option for high temperature condition.
  - Application of Viton seal for high temperature condition.



### Keep on gripping function by spring inside

- Spring inside : Adding more force on working direction.
- Enhancement of gripping force and preventing dropping of workpiece.

#### Compressed Air + Spring Force



### Cautions

- Powerful spring inside.

\* For SF, SB option only.

**Warning**

- Powerful spring inside for SF, SB type. Highly not recommended removal of Head cover. Be careful repulsion of spring when inevitable disassemble.

# GENERAL HAND / Parallel Operation

# PH15-CL Series

## Features

NEW

- Parallel operation by Crank Lever structure.
- Stable operation by enlarge of plunger supporting surface.
- Smooth and stable operation than wedge structure.
- Dimensional and installation position compatibility with PH15-S.
  - ※ For Ø20, Ø25 models, installation position is same but the length of product is different. Please check interfere in advance.
- Easy centralized piping with bottom air port. (Optional)
- Auto Switch installation. (Optional)
- Spring inside for enhancement of gripping force. (Optional)
- Auto Switch installation. (Optional)



## Order Form

### PH15 - 40CL - E - P S - PNP - AP

①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

#### ① Series Name

#### ② Cylinder Bore Size and Stroke

Order	CYL Bore (mm)	Stroke (mm)	Order	
			P	P2
20CL	20	8	○	○
25CL	25	12	○	○
30CL	30	16	○	
40CL	40	20	○	
50CL	50	26	○	
60CL	60	32	○	
80CL	80	50	○	
100CL	100	60	○	

※ For "Blank", no Auto Switch is provided.

#### ④ Available Auto Switches

#### ⑤ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

#### ⑥ Auto Switch Output

Order	Output
Blank	NPN
PNP	PNP

#### ③ Special Option

Order	Special Option
Blank	Standard
E	Secondary battery field
V	High temperature condition

\* For high temperature option, normal Auto Switch is not available.

#### ⑦ Air Port Option & Operation Type

Order	Air Port Option & Operation Type
Blank	Standard (Side position)
AP	Additional air port on bottom
SF	Double Acting (Normal Close) 
SB	Double Acting (Normal Open) 

\* SB, SF options have spring inside so its could be used for the purpose of enhance-ment of gripping force.

\* For AP option selection, side air port will be supplied with plugged.

#### ※ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage DC	Current	Body Length	Sensing Distance	Frequency	Protect Level
		Wires	Direction						
P	Proximity	3-Wire	Horiz	10~30V	Max 200mA	32mm	1mm ± 10%	800Hz	IP 67
P2	Proximity	3-Wire	Horiz	10~30V	Max 200mA	16mm	1mm ± 10%	800Hz	IP 67

\* "P" could be projected from main body.

\* For PH15-20CL & PH15-25CL model, P2 is recommended.

Specification

HAND

PH01-A  
PH01-D  
PH01-G  
PH01J-C  
PH01K  
PH02  
PH02-H  
PH04  
PH05  
PH06  
PH06-L  
PH06-L2  
PH07  
PH08  
PH09  
PH10  
PH12  
PH14-S  
PH14-CL  
PH14-CF  
PH15-S  
PH15-CL  
PH15-CF  
PH15-W  
PH21  
PH22  
PH23  
PH25  
PH32  
PHC

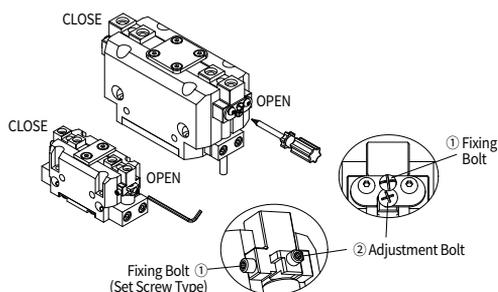
Item Name		PH15-20CL	PH15-25CL	PH15-30CL	PH15-40CL	PH15-50CL	PH15-60CL	PH15-80CL	PH15-100CL
CYL Bore Size(mm)		20	25	30	40	50	60	80	100
Stroke(mm)		8	12	16	20	26	32	50	60
Effective Gripping Force(kgf) Note 2) Air pressure : 5kgf/cm <sup>2</sup>	Close	9.5	15.9	23.2	38.6	57.9	88.8	153	235
	Open	10.4	18.9	27.6	45.9	68.9	99.8	178	258
	Close (SF)	12.4 ~ 16.4	20.7 ~ 25.1	30.2 ~ 38.6	49.8 ~ 59.4	75.3 ~ 93	115.6 ~ 135.5	184.1 ~ 224.4	283.8 ~ 329
	Open (SF)	3.5 ~ 7.5	9.7 ~ 14.1	12.2 ~ 20.6	25.1 ~ 34.8	33.8 ~ 51.6	53.1 ~ 73	106.5 ~ 146.8	164 ~ 209.2
	Close (SB)	5 ~ 6.3	6 ~ 10.1	9.1 ~ 14.9	15 ~ 24.7	21.9 ~ 35	31 ~ 58.8	70.3 ~ 115	136.3 ~ 182.7
Gripping Force from Spring Inside(kgf)	Open (SB)	13.6 ~ 14.9	24.7 ~ 28.8	35.9 ~ 41.6	59.9 ~ 69.5	91.8 ~ 105	129.8 ~ 157.6	216 ~ 260.6	310.3 ~ 356.7
	Close (SF)	2.95 ~ 6.91	4.79 ~ 9.25	7.02 ~ 15.4	11.19 ~ 20.84	17.38 ~ 35.09	26.82 ~ 49.74	31.15 ~ 71.49	48.9 ~ 94.13
Pressure Range(kgf/cm <sup>2</sup> )	Close (SB)	3.14 ~ 4.45	5.78 ~ 9.87	8.28 ~ 14.05	13.93 ~ 23.58	22.87 ~ 36.04	29.95 ~ 57.76	37.99 ~ 82.62	52.16 ~ 98.59
	Standard	Standard : 2 ~ 7							
Weight(kgf)	Spring Inside	Spring Inside : 4 ~ 7							
	Standard	0.13	0.27	0.43	0.75	1.3	2.4	5	9.2
Max. Attachment L(mm)		0.17	0.35	0.57	1.1	1.75	3.3	6.6	12.7
Max. Attachment H(mm)	Note 3)	30	35	40	50	60	80	110	140
Fitting Size		M5			PT1/8				
Fluid		Clean Air Note 1)							
Lubrication		Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)							
Temperature Range(°C)		Standard model : 5 ~ 60							
		High temperature model : 5 ~ 150							
Repeat Accuracy(mm)		±0.03		±0.08				±0.1	
Max. Cycle Per Minute(C.P.M)		100			60			30	
Operation Type		Options for Double or Single acting (Structure : Parallel operation by Crank Lever) (Guide : Metal Guide)							
Tolerance of Stroke(mm)		Open : -0.5 ~ +1							
		Close : -1 ~ +0.5							

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3~10µm degree of filtering.

Note 2) The position of the effective gripping force point is the end point of the Master Jaw. For spring inside products (SB, SF) gripping force is different depend on each stroke positions due to the Restoring force of inside spring.

Note 3) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

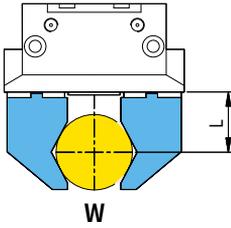
How to Adjust Sensor Dog



- Operation position could be detected by proximity sensor and detecting position could be set by adjustment of sensor dog position inside of master jaws.  
(Use 1.5mm wrench or "+" screwdriver)
- How to adjust  
 ① Release fixing bolt → ② Dog position adjustment → ③ Lock fixing bolt
- Keep on locking status for set screw type fixing bolt while product working.

## Gripping Force Graph (Close)

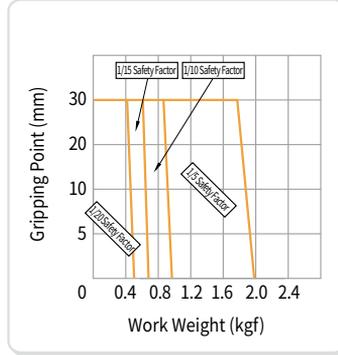
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



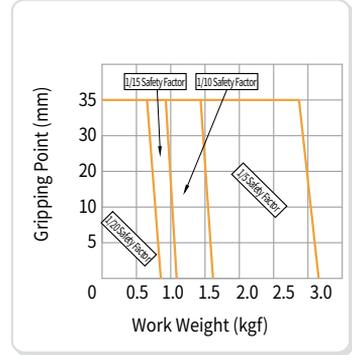
Close Grip State

W: Work Weight  
L: Attachment Length

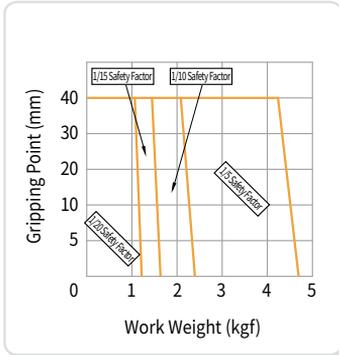
► PH15-20CL



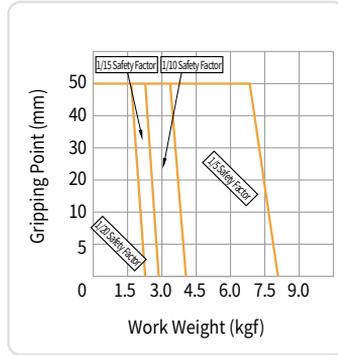
► PH15-25CL



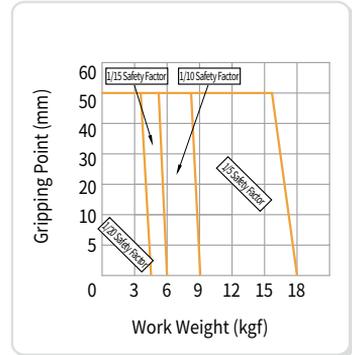
► PH15-30CL



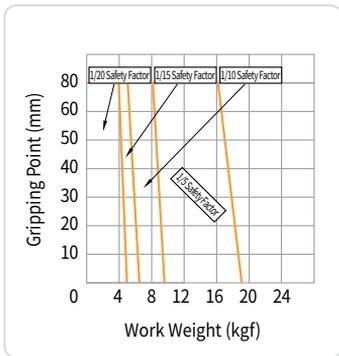
► PH15-40CL



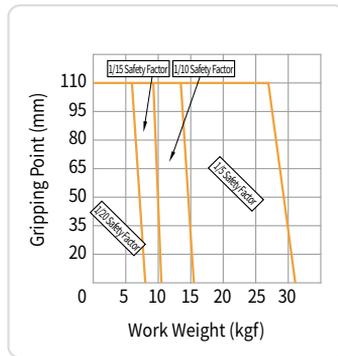
► PH15-50CL



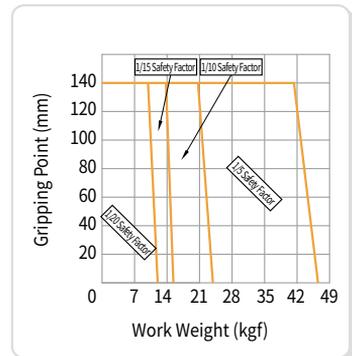
► PH15-60CL



► PH15-80CL



► PH15-100CL

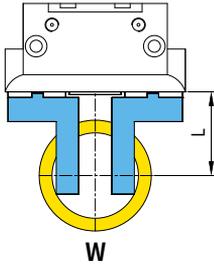


**▲ Caution**

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

Gripping Force Graph (Open)

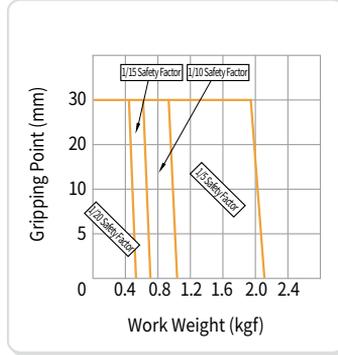
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



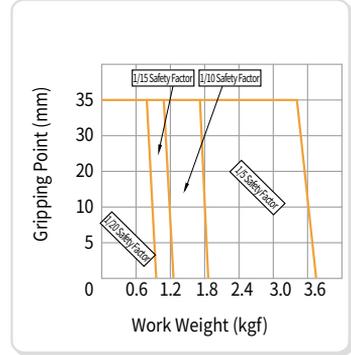
Open Grip State

W: Work Weight  
L: Attachment Length

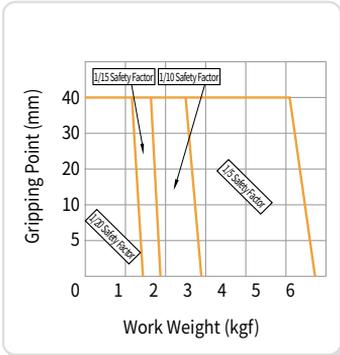
► PH15-20CL



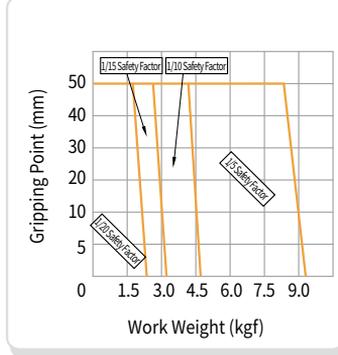
► PH15-25CL



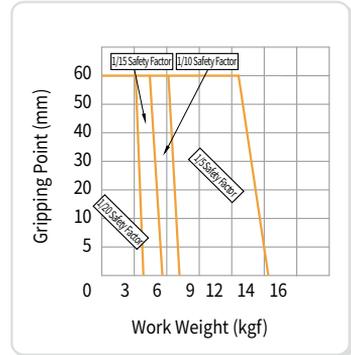
► PH15-30CL



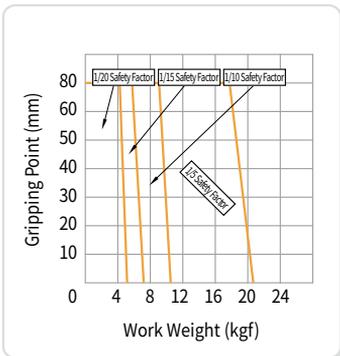
► PH15-40CL



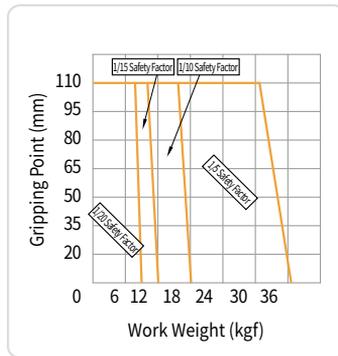
► PH15-50CL



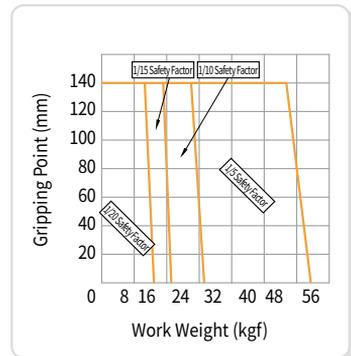
► PH15-60CL



► PH15-80CL



► PH15-100CL



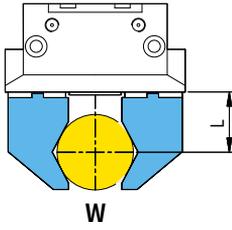
⚠ Caution

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL**
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

## PH15-CL-SF Gripping Force Graph (Close)

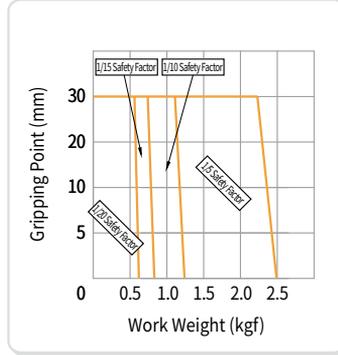
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



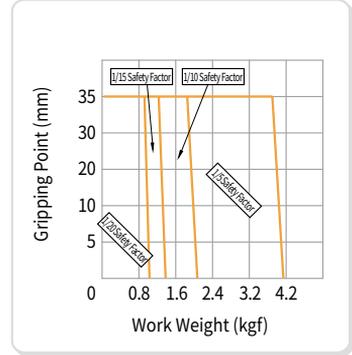
Close Grip State

W: Work Weight  
L: Attachment Length

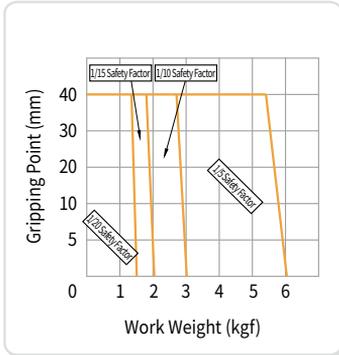
► PH15-20CL-SF



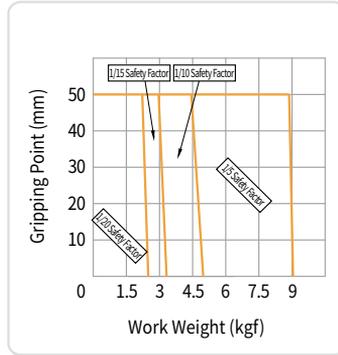
► PH15-25CL-SF



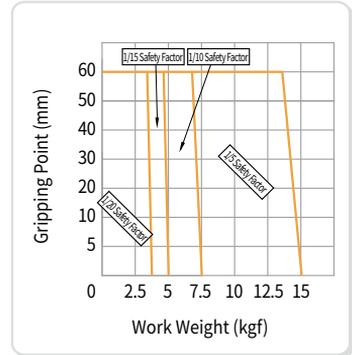
► PH15-30CL-SF



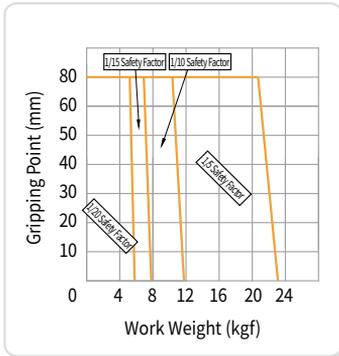
► PH15-40CL-SF



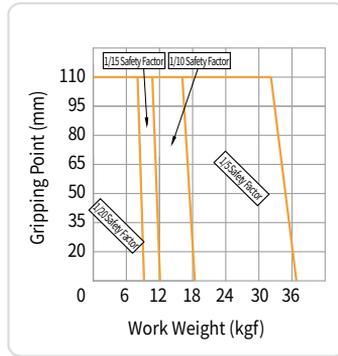
► PH15-50CL-SF



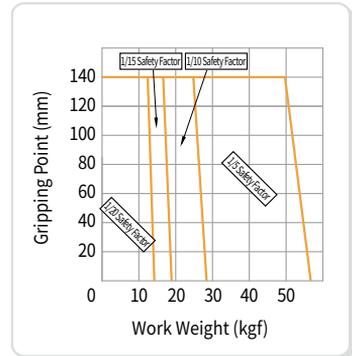
► PH15-60CL-SF



► PH15-80CL-SF



► PH15-100CL-SF

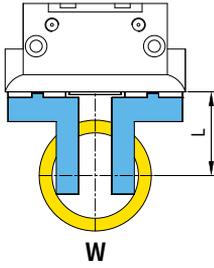


### ⚠ Caution

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

PH15-CL-SB Gripping Force Graph (Open)

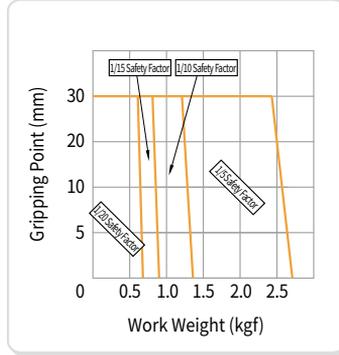
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



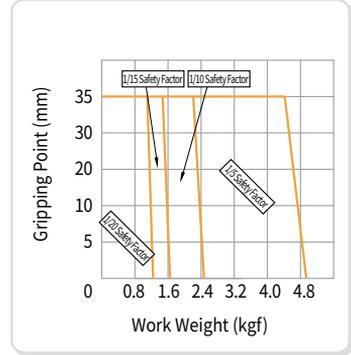
Open Grip State

W: Work Weight  
L: Attachment Length

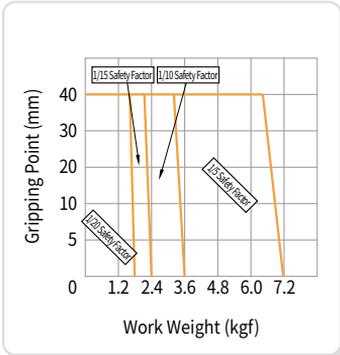
► PH15-20CL-SB



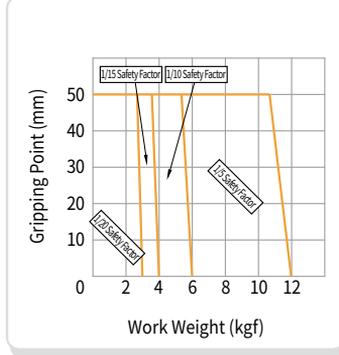
► PH15-25CL-SB



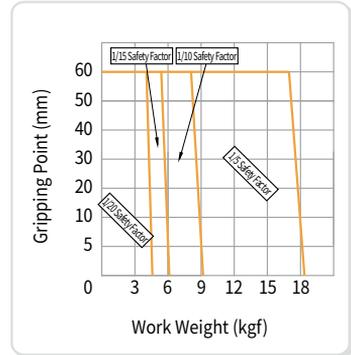
► PH15-30CL-SB



► PH15-40CL-SB



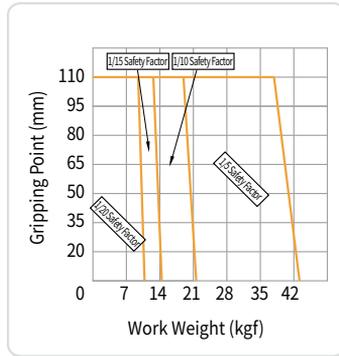
► PH15-50CL-SB



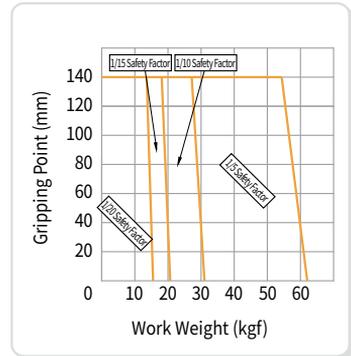
► PH15-60CL-SB



► PH15-80CL-SB



► PH15-100CL-SB



⚠ Caution

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL**
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH15-CL Series

20CL

25CL

30CL

40CL

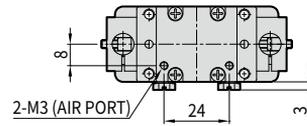
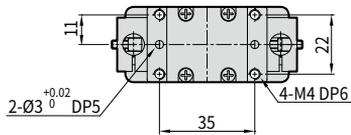
50CL

60CL

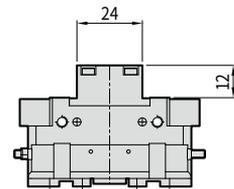
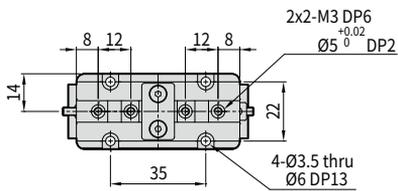
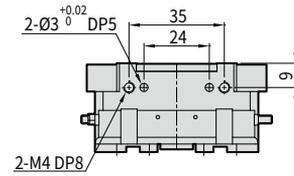
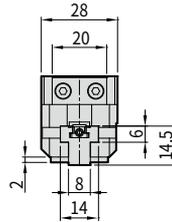
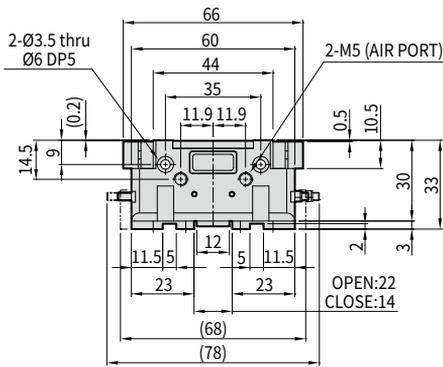
80CL

100CL

## PH15-20CL

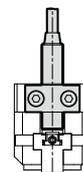
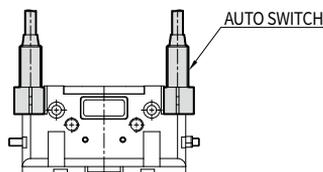


AP TYPE



SF/SB TYPE

## PH15-20CL Example of Auto Switch installation



20CL

25CL

30CL

40CL

50CL

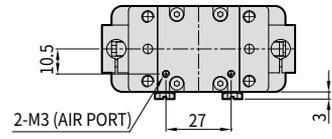
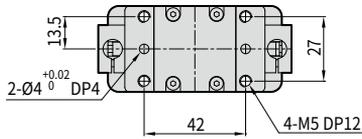
60CL

80CL

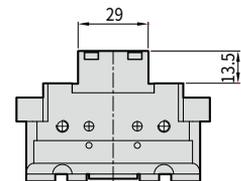
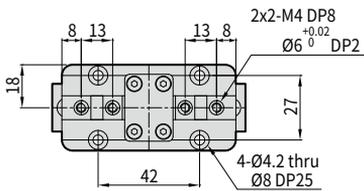
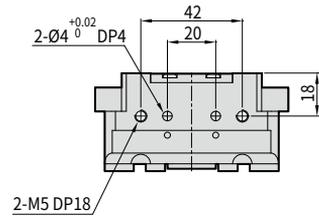
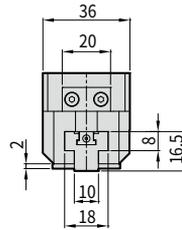
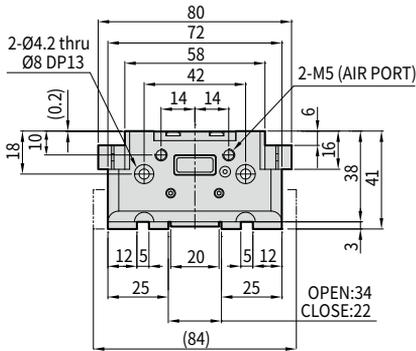
100CL

HAND

PH15-25CL

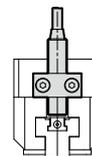
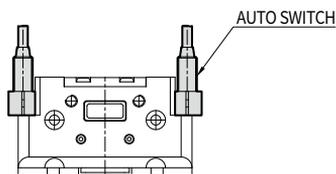


AP TYPE



SF/SB TYPE

PH15-25CL Example of Auto Switch installation



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL**
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH15-CL Series

20CL

25CL

30CL

40CL

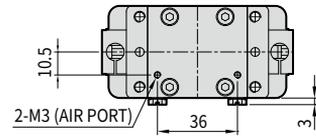
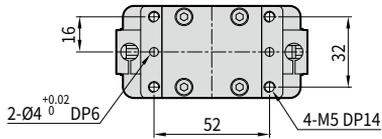
50CL

60CL

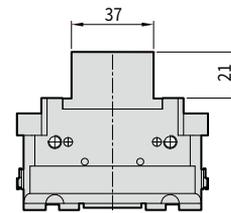
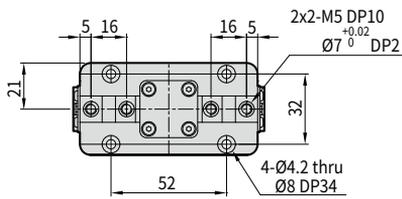
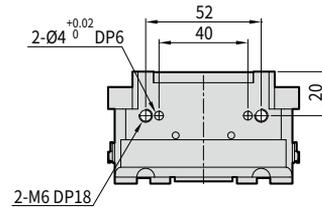
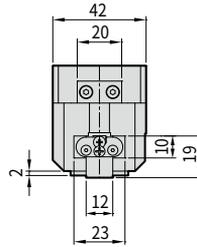
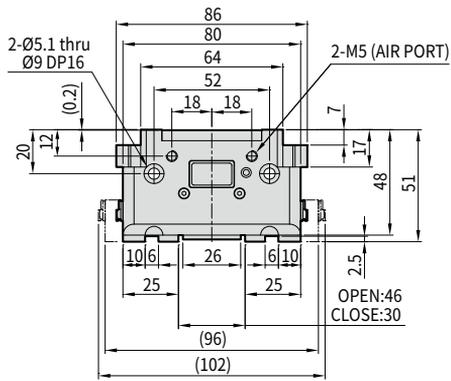
80CL

100CL

## PH15-30CL

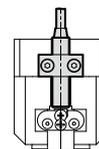
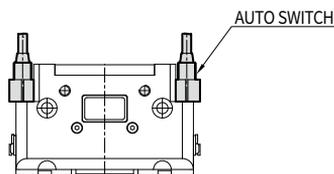


AP TYPE



SF/SB TYPE

## PH15-30CL Example of Auto Switch installation





# PH15-CL Series

20CL

25CL

30CL

40CL

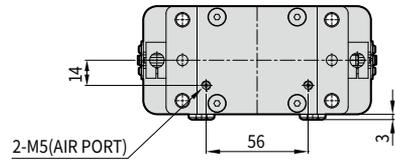
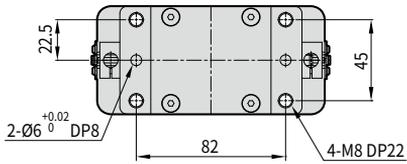
50CL

60CL

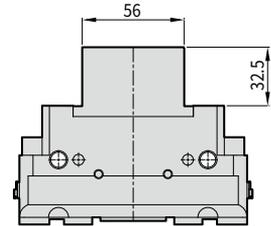
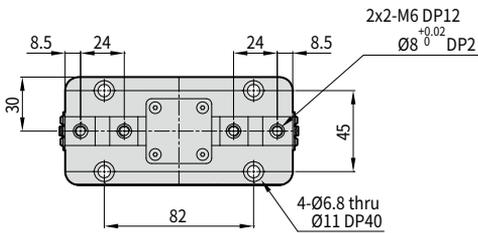
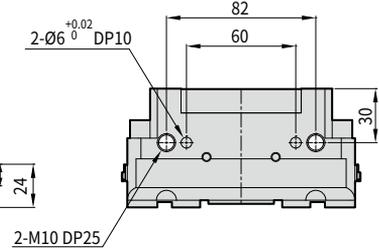
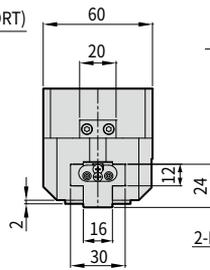
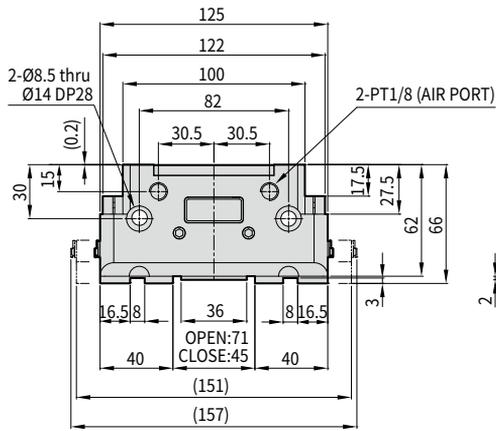
80CL

100CL

## PH15-50CL

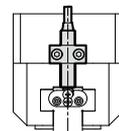
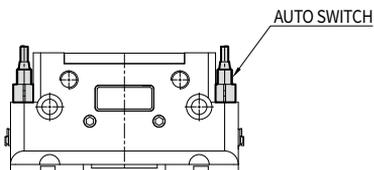


AP TYPE



SF/SB TYPE

## PH15-50CL Example of Auto Switch installation



20CL

25CL

30CL

40CL

50CL

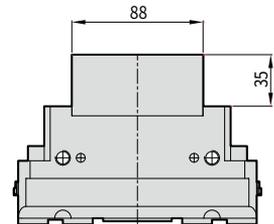
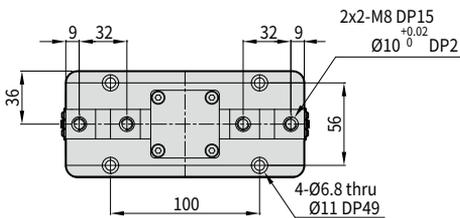
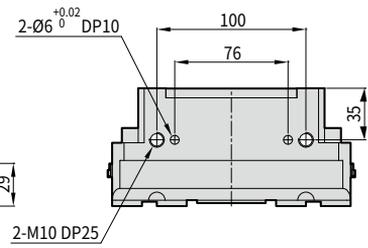
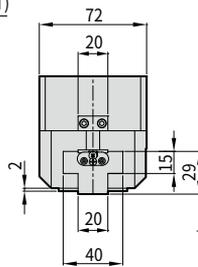
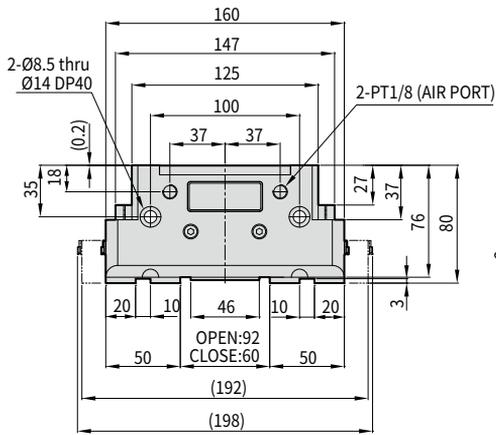
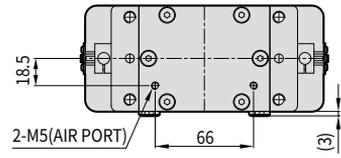
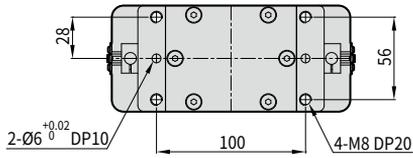
60CL

80CL

100CL

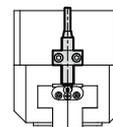
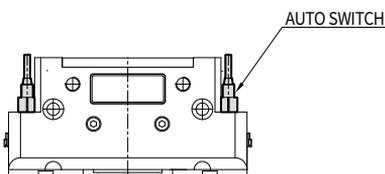
HAND

PH15-60CL



SF/SB TYPE

PH15-60CL Example of Auto Switch installation



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL**
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH15-CL Series

20CL

25CL

30CL

40CL

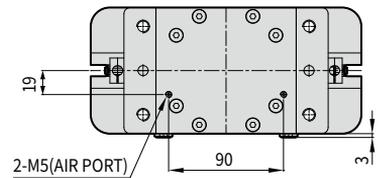
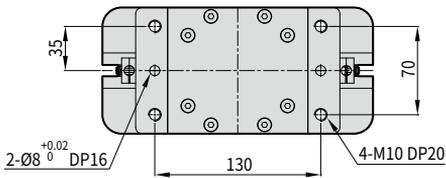
50CL

60CL

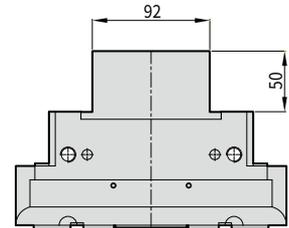
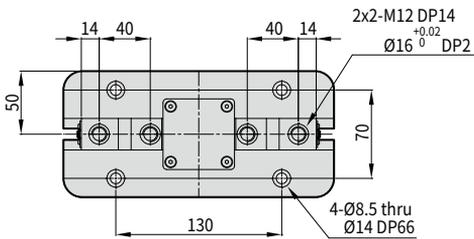
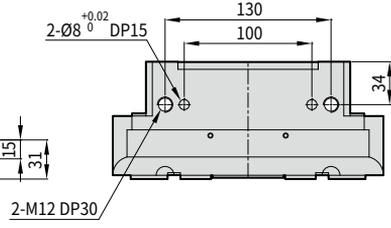
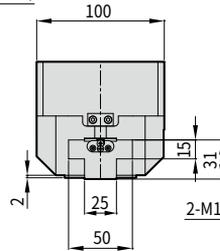
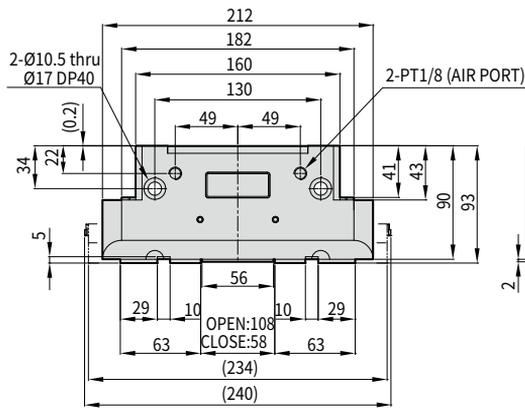
80CL

100CL

## PH15-80CL

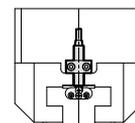
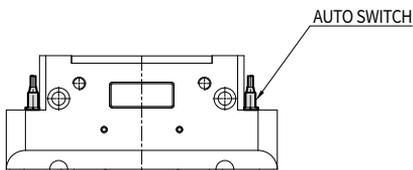


AP TYPE



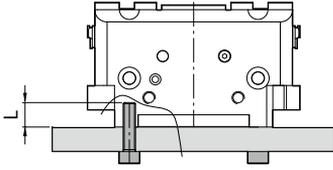
SF/SB TYPE

## PH15-80CL Example of Auto Switch installation





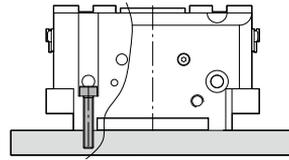
1. Installation by body tap holes



Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH15-20CL	M4×P0.7	25	6
PH15-25CL	M5×P0.8	51	12
PH15-30CL	M5×P0.8	51	14
PH15-40CL	M6×P1	81	18
PH15-50CL	M8×P1.25	157	20
PH15-60CL	M8×P1.25	157	20
PH15-80CL	M10×P1.5	360	20
PH15-100CL	M12×P1.75	670	25

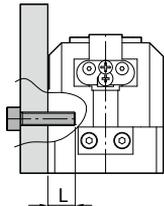
\* When install PH15-60 CL-SB(SF), be careful interference of fixing bolt to the opposite object.

2. Installation by body through holes



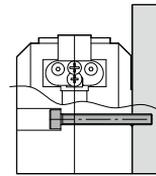
Item	Fastening Bolt	Max Torque (kgf·cm)
PH15-20CL	M3×P0.5	11
PH15-25CL	M4×P0.7	25
PH15-30CL	M5×P0.8	51
PH15-40CL	M6×P1	81
PH15-50CL	M8×P1.25	157
PH15-60CL	M8×P1.25	157
PH15-80CL	M10×P1.5	360
PH15-100CL	M12×P1.75	670

3. Installation by body tap holes



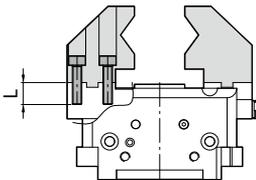
Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH15-20CL	M4×P0.7	25	8
PH15-25CL	M5×P0.8	51	18
PH15-30CL	M6×P1	81	18
PH15-40CL	M8×P1.25	157	20
PH15-50CL	M10×P1.5	360	25
PH15-60CL	M10×P1.5	360	25
PH15-80CL	M12×P1.75	670	30
PH15-100CL	M16×P2	1650	30

4. Installation by body through holes



Item	Fastening Bolt	Max Torque (kgf·cm)
PH15-20CL	M3×P0.5	11
PH15-25CL	M4×P0.7	25
PH15-30CL	M4×P0.7	25
PH15-40CL	M5×P0.8	51
PH15-50CL	M6×P1	81
PH15-60CL	M6×P1	81
PH15-80CL	M8×P1.25	157
PH15-100CL	M10×P1.5	360

5. Attachment installation



Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH15-20CL	M4×P0.7	25	8
PH15-25CL	M5×P0.8	51	18
PH15-30CL	M6×P1	81	18
PH15-40CL	M8×P1.25	157	20
PH15-50CL	M10×P1.5	360	25
PH15-60CL	M10×P1.5	360	25
PH15-80CL	M12×P1.75	670	30
PH15-100CL	M16×P2	1650	30

MEMO

Handwriting practice area with horizontal dotted lines.

**HAND**

PH01-A
PH01-D
PH01-G
PH01J-C
PH01K
PH02
PH02-H
PH04
PH05
PH06
PH06-L
PH06-L2
PH07
PH08
PH09
PH10
PH12
PH14-S
PH14-CL
PH14-CF
PH15-S
<b>PH15-CL</b>
PH15-CF
PH15-W
PH21
PH22
PH23
PH25
PH32
PHC

# Parallel operation General Hand by Crank Lever

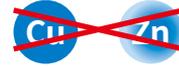
# PH15-CF Series

Ultra slim type General Hand with strong gripping force



## Various options for environmental

- Option for secondary battery manufacturing conditions.  
- Free materials from Copper and Zinc.



- Option for high temperature condition  
- Application of Viton seal for high temperature condition.

**+60 °C**

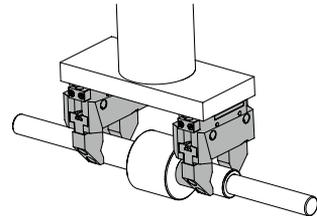
Standard



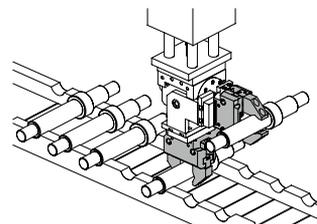
**+180 °C**

High temperature option

## Application 1

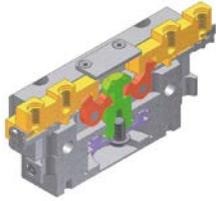


## Application 2



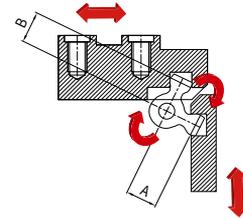
### Parallel operation by Crank Lever

- Synchronized operation by Crank Lever.
- Smooth operation than wedge structure & jam-less superior durability. (Rolling motion by Lever)
- Stable operation by enlarge of plunger supporting surface.



### Strong gripping force

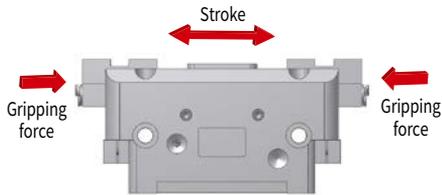
- Enhanced gripping force.
  - Average **+55%** enhanced gripping force compare with PH15-S models.
  - Average **-19%** reduced stroke compare with PH15-S models.
- Gripping force enhanced from adjustment of crank lever ratio (A/B).



### Various gripping force and stroke options

Model	PH15-CF
Stroke	Average - 19% Reduced
Gripping force	Average +55% Enhanced

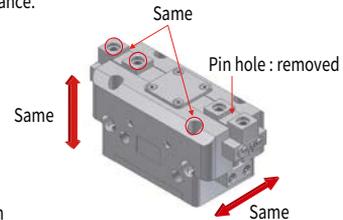
※ Compare with PH15-S Series



### Same install position with PH15-S

- Dimensional and installation position compatibility with PH15-S.

※ For Ø20, Ø25 models, installation position is same but the length of product is different. Please check interfere in advance.

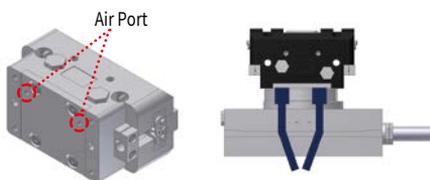


※ Caution

1. Central pin holes are not supplied.
2. Depth of bolt tap and / or counter, length of master jaw could be different. Please check it before application.

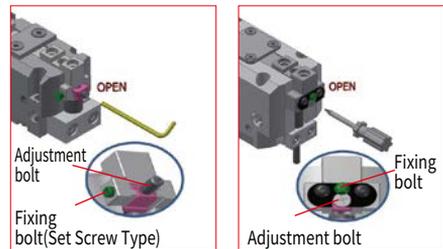
### Bottom Air Port (Optional)

- Convenience on side space by positioning side air port to bottom.
- Combined with the swivel unit (ASU Series), it is suitable for configuring a loader for CNC lathes.



### Proximity Sensor applicable / Easy to control

- Proximity Sensor applicable.
- Easy sensing position control, even though the product is installed.



■ Smaller than PH15-25CF

■ PH15-30CF or bigger

# GENERAL HAND / Parallel Operation

# PH15-CF Series

## Features

NEW

- Parallel operation by Crank Lever structure.
- Stable operation by enlarge of plunger supporting surface.
- Smooth and stable operation than wedge structure.
- Dimensional and installation position compatibility with PH15-S.
  - ※ For Ø20, Ø25 models, installation position is same but the length of product is different. Please check interfere in advance.
- Easy centralized piping with bottom air port. (Optional)
- High gripping performance from enhanced gripping force.
  - Average +55% enhanced gripping force compare with PH15-S models
- Various special options. (Heat resistance, secondary battery field)
- Auto Switch installation. (Optional)



## Order Form

### PH15 - 40CF - E - P S - PNP - AP

①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

#### ① Series Name

#### ② Cylinder Bore Size and Stroke

Order	CYL Bore (mm)	Stroke (mm)	Order	
			P	P2
20CF	20	6	<input type="radio"/>	<input type="radio"/>
25CF	25	10	<input type="radio"/>	<input type="radio"/>
30CF	30	14.5	<input type="radio"/>	
40CF	40	17	<input type="radio"/>	
50CF	50	21	<input type="radio"/>	
60CF	60	25.5	<input type="radio"/>	
80CF	80	40	<input type="radio"/>	
100CF	100	44	<input type="radio"/>	

※ For "Blank", no Auto Switch is provided.

#### ④ Available Auto Switches

#### ⑤ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

#### ⑥ Auto Switch Output

Order	Output
Blank	NPN
PNP	PNP

#### ③ Special Option

Order	Special Option
Blank	Standard
E	Secondary battery field
V	High temperature condition

\* For high temperature option, normal Auto Switch is not available.

#### ⑦ Air Port Option

Order	Air Port Option
Blank	Standard (Side position)
AP	Additional air port on bottom

\* For AP option selection, side air port will be supplied with plugged.

#### ※ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage DC	Current	Body Length	Sensing Distance	Frequency	Protect Level
		Wires	Direction						
P	Proximity	3-Wire	Horiz	10~30V	Max 200mA	32mm	1mm ± 10%	800Hz	IP 67
P2	Proximity	3-Wire	Horiz	10~30V	Max 200mA	16mm	1mm ± 10%	800Hz	IP 67

\* "P" could be projected from main body.

\* For PH15-20CF & PH15-25CF model, P2 is recommended.

Specification

PH01-A  
PH01-D  
PH01-G  
PH01-J-C  
PH01K  
PH02  
PH02-H  
PH04  
PH05  
PH06  
PH06-L  
PH06-L2  
PH07  
PH08  
PH09  
PH10  
PH12  
PH14-S  
PH14-CL  
PH14-CF  
PH15-S  
PH15-CL  
PH15-CF  
PH15-W  
PH21  
PH22  
PH23  
PH25  
PH32  
PHC

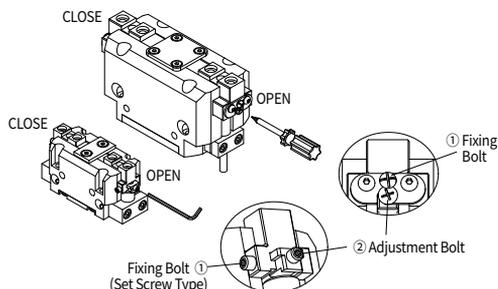
Item Name	PH15-20CF	PH15-25CF	PH15-30CF	PH15-40CF	PH15-50CF	PH15-60CF	PH15-80CF	PH15-100CF
CYL Bore Size(mm)	20	25	30	40	50	60	80	100
Stroke(mm)	6	10	14.5	17	21	25.5	40	44
Effective Gripping Force(kgf)	Close	12.7	18.3	26	46.4	72.4	111	317
	Open	13.9	21.8	31	55.3	86.2	125	349
Air pressure : 5kgf/cm <sup>2</sup> Note 2)								
Weight(kgf)	0.13	0.27	0.43	0.75	1.3	2.4	5	9.2
Max. Attachment L(mm)	30	35	40	50	60	80	110	140
Max. Attachment H(mm) Note 3)								
Fitting Size	M5			PT1/8				
Fluid	Clean Air Note 1)							
Pressure Range(kgf/cm <sup>2</sup> )	2 ~ 7							
Lubrication	Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)							
Temperature Range(°C)	Standard model : 5 ~ 60							
	High temperature model : 5 ~ 150							
Repeat Accuracy(mm)	±0.03			±0.08			±0.1	
Max. Cycle Per Minute(C.P.M)	100			60			30	
Operation Type	Double Acting (Structure : Parallel operation by Crank Lever) (Guide : Metal Guide)							
Tolerance of Stroke(mm)	Open : -0.5 ~ +1							
	Close : -1 ~ +0.5							

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10µm degree of filtering.

Note 2) The position of the effective gripping force point is the end point of the Master Jaw.

Note 3) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

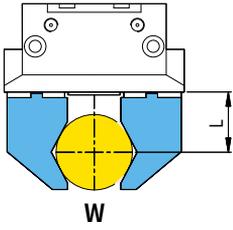
How to Adjust Sensor Dog



- Operation position could be detected by proximity sensor and detecting position could be set by adjustment of sensor dog position inside of master jaws.  
(Use 1.5mm wrench or "+" screwdriver)
- How to adjust  
 ① Release fixing bolt → ② Dog position adjustment → ① Lock fixing bolt
- Keep on locking status for set screw type fixing bolt while product working.

## Gripping Force Graph (Close)

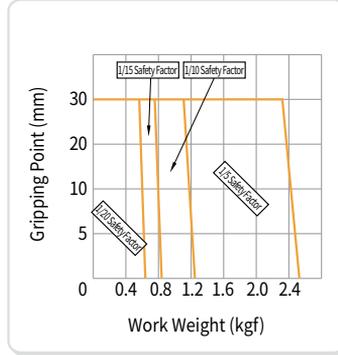
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



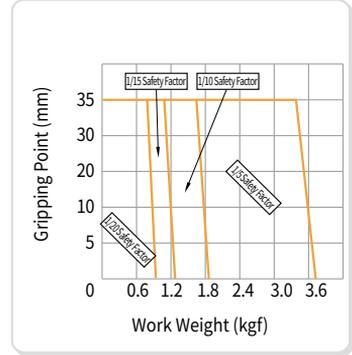
Close Grip State

W: Work Weight  
L: Attachment Length

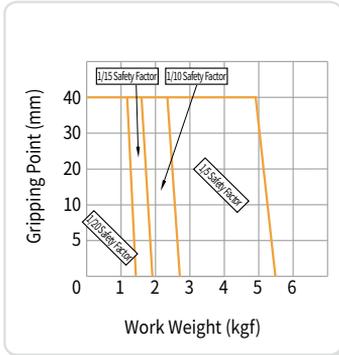
► PH15-20CF



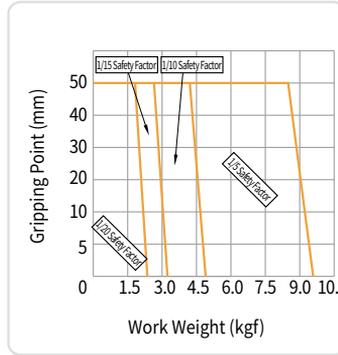
► PH15-25CF



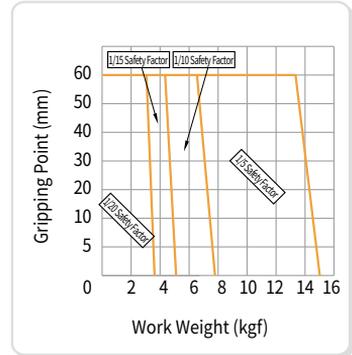
► PH15-30CF



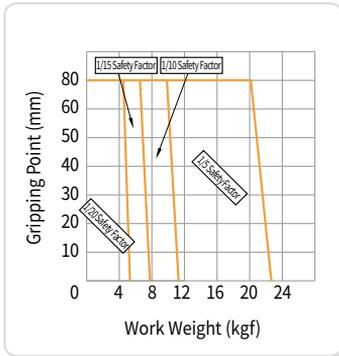
► PH15-40CF



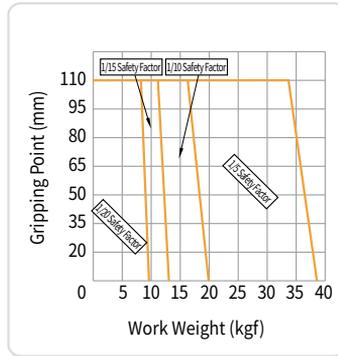
► PH15-50CF



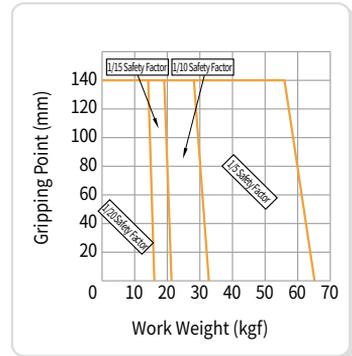
► PH15-60CF



► PH15-80CF



► PH15-100CF

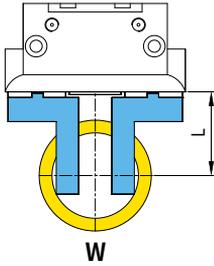


**▲ Caution**

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

Gripping Force Graph (Open)

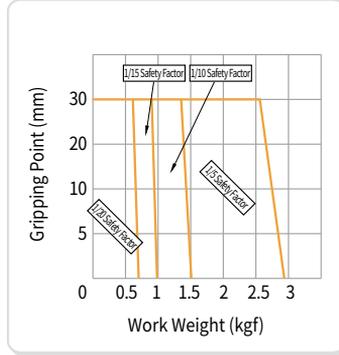
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



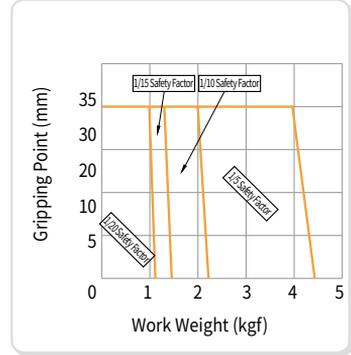
Open Grip State

W: Work Weight  
L: Attachment Length

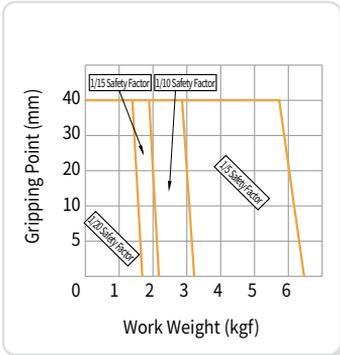
► PH15-20CF



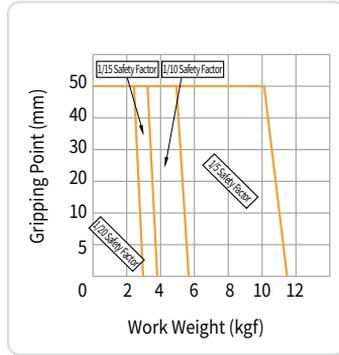
► PH15-25CF



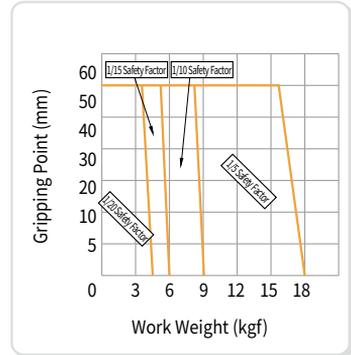
► PH15-30CF



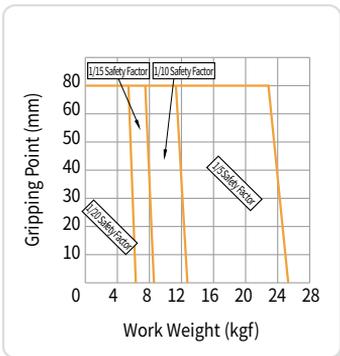
► PH15-40CF



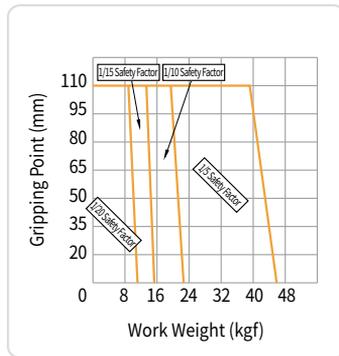
► PH15-50CF



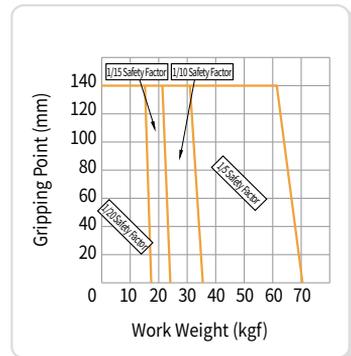
► PH15-60CF



► PH15-80CF



► PH15-100CF



HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF**
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

**⚠ Caution** If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

# PH15-CF Series

20CF

25CF

30CF

40CF

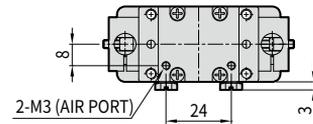
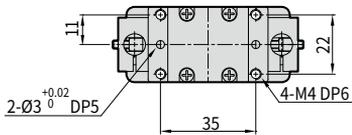
50CF

60CF

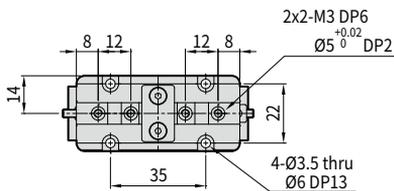
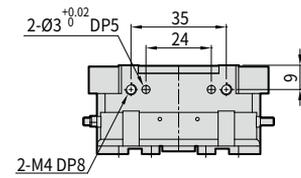
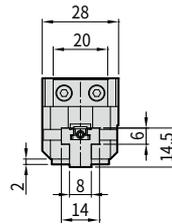
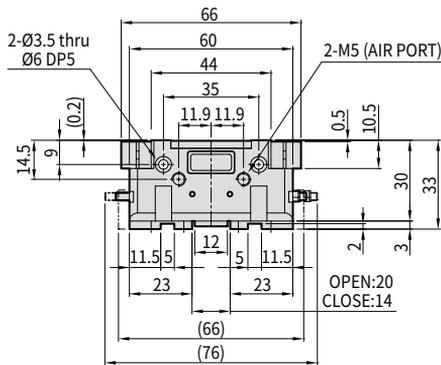
80CF

100CF

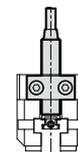
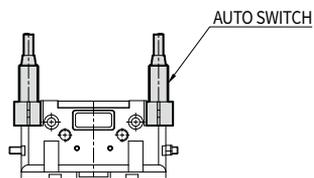
## PH15-20CF



AP TYPE



## PH15-20CF Example of Auto Switch installation



20CF

25CF

30CF

40CF

50CF

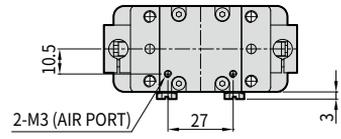
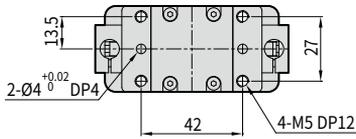
60CF

80CF

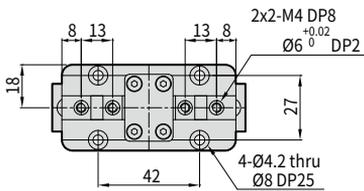
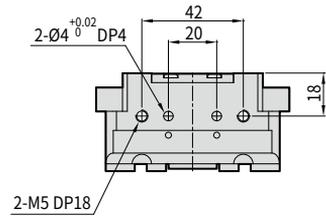
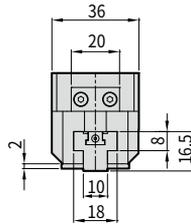
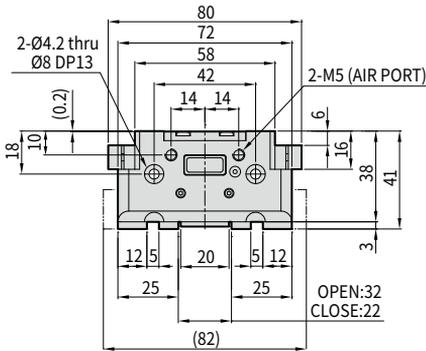
100CF

HAND

PH15-25CF

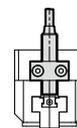
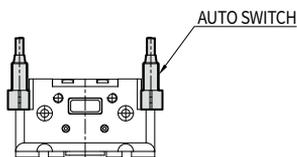


AP TYPE



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF**
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

PH15-25CF Example of Auto Switch installation



# PH15-CF Series

20CF

25CF

30CF

40CF

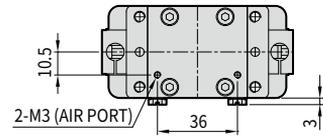
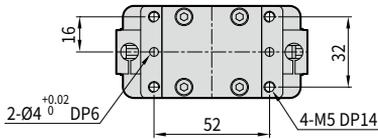
50CF

60CF

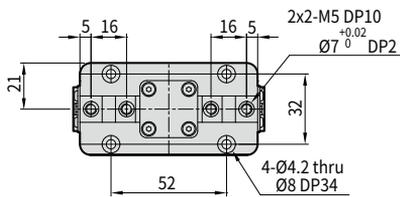
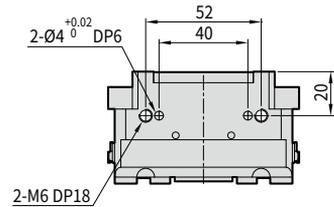
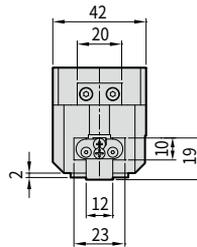
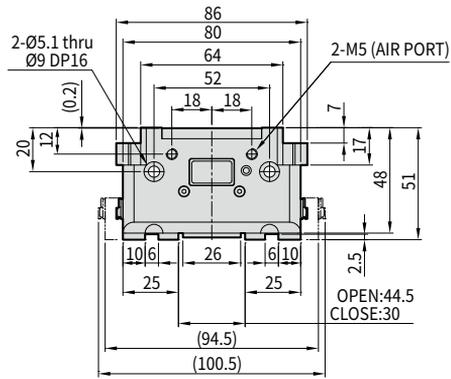
80CF

100CF

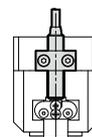
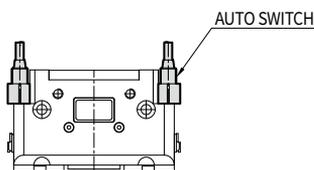
## PH15-30CF



AP TYPE



## PH15-30CF Example of Auto Switch installation



20CF

25CF

30CF

40CF

50CF

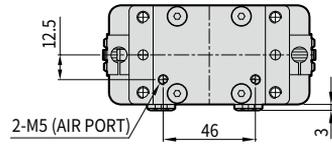
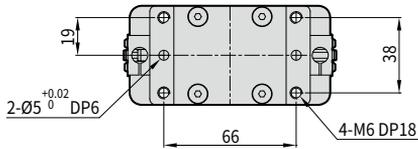
60CF

80CF

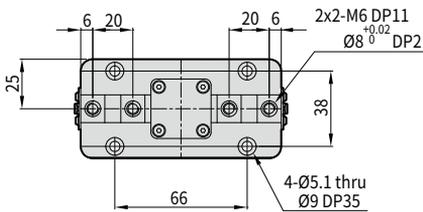
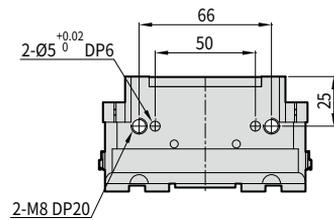
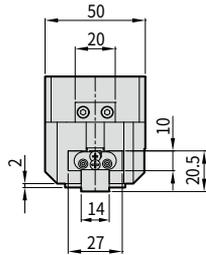
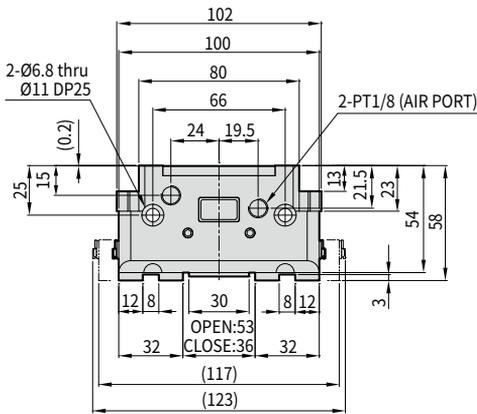
100CF

HAND

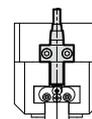
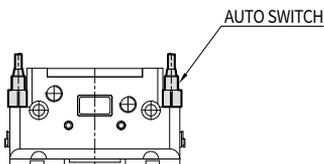
PH15-40CF



AP TYPE



PH15-40CF Example of Auto Switch installation



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF**
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

# PH15-CF Series

20CF

25CF

30CF

40CF

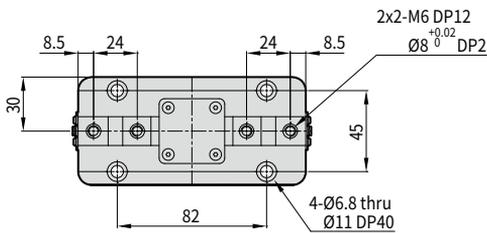
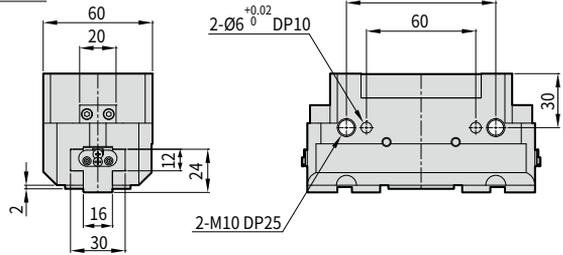
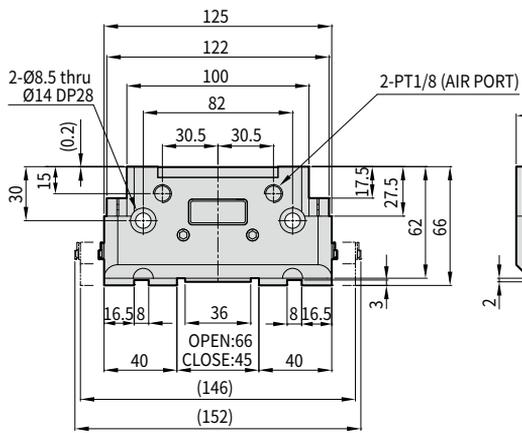
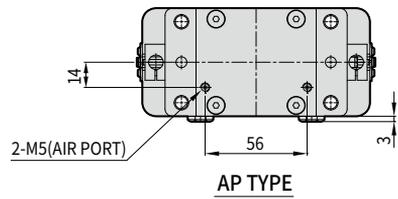
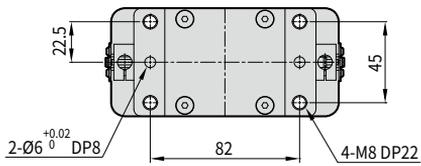
**50CF**

60CF

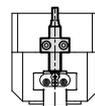
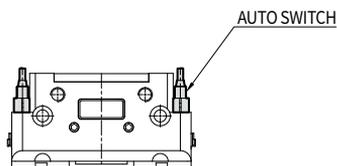
80CF

100CF

## PH15-50CF



## PH15-50CF Example of Auto Switch installation



20CF

25CF

30CF

40CF

50CF

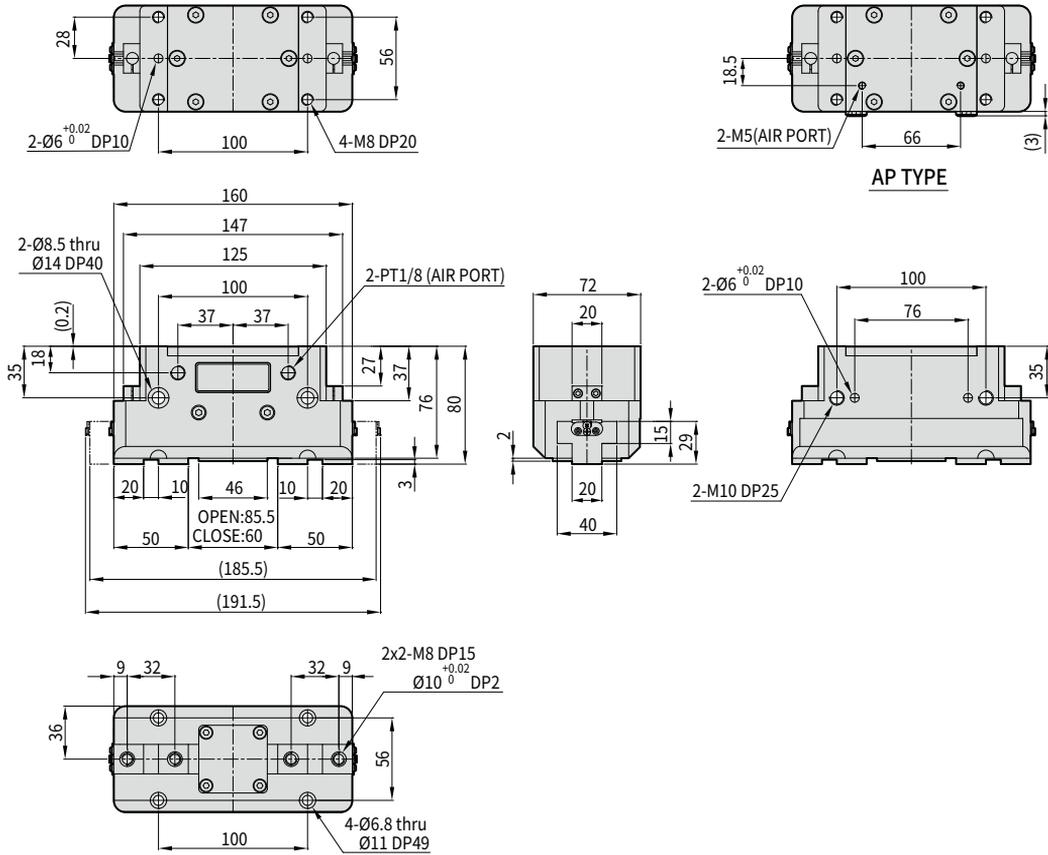
60CF

80CF

100CF

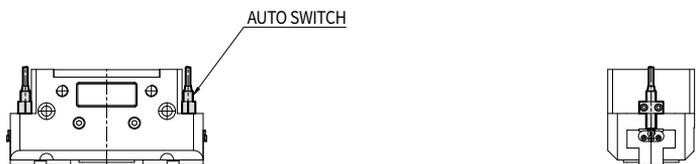
HAND

PH15-60CF



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF**
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

PH15-60CF Example of Auto Switch installation



# PH15-CF Series

20CF

25CF

30CF

40CF

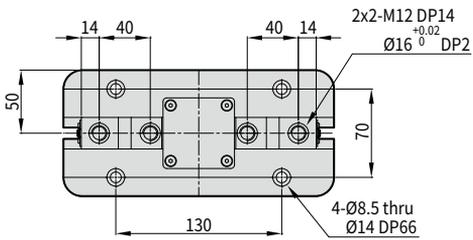
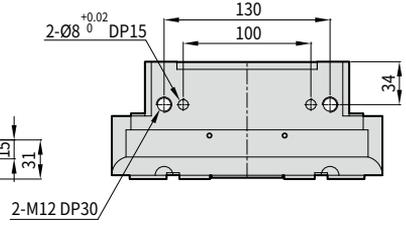
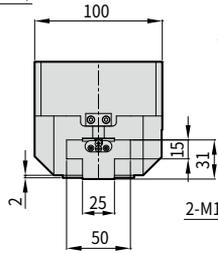
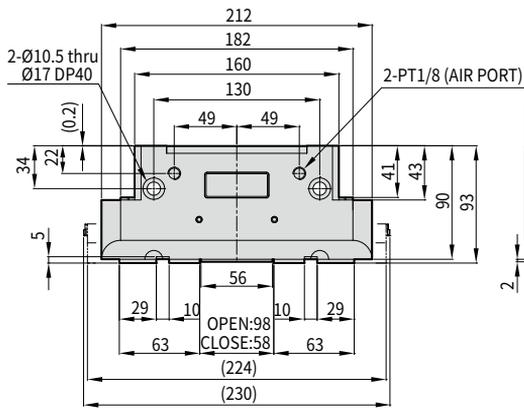
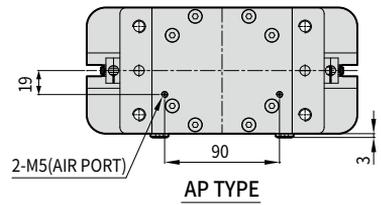
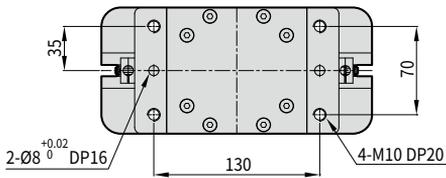
50CF

60CF

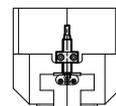
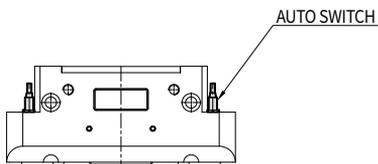
80CF

100CF

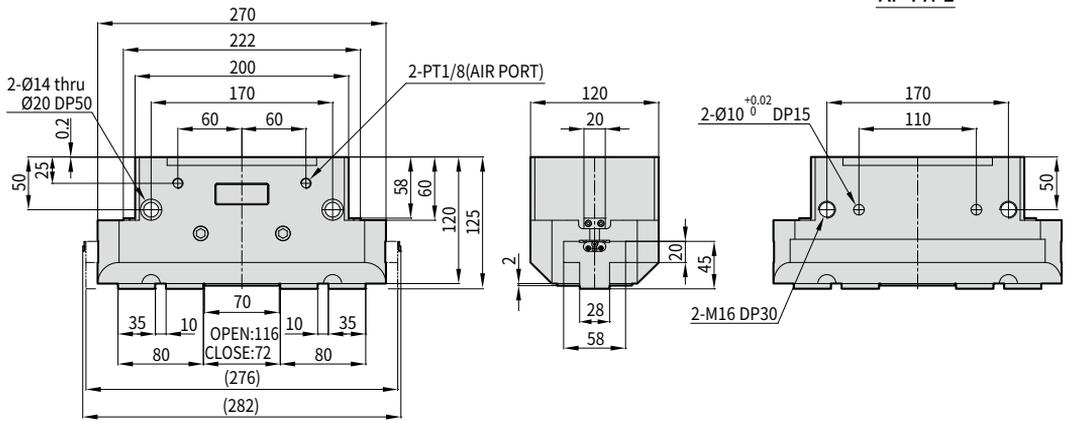
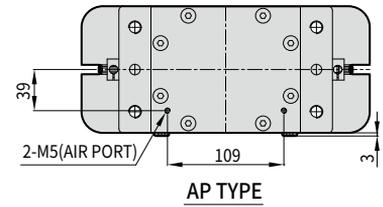
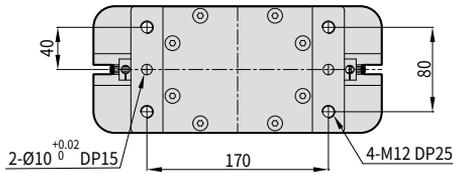
## PH15-80CF



## PH15-80CF Example of Auto Switch installation

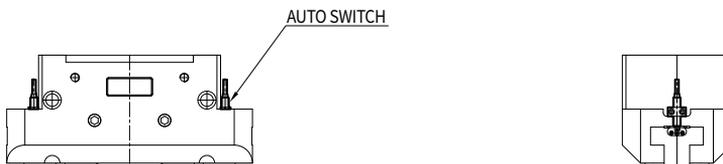


PH15-100CF

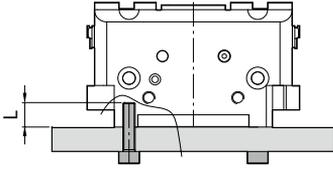


- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF**
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

PH15-100CF Example of Auto Switch installation

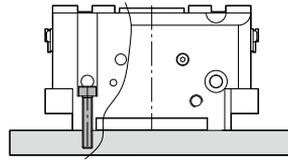


1. Installation by body tap holes



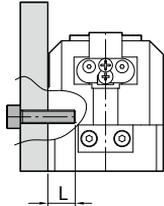
Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH15-20CF	M4×P0.7	25	6
PH15-25CF	M5×P0.8	51	12
PH15-30CF	M5×P0.8	51	14
PH15-40CF	M6×P1	81	18
PH15-50CF	M8×P1.25	157	20
PH15-60CF	M8×P1.25	157	20
PH15-80CF	M10×P1.5	360	20
PH15-100CF	M12×P1.75	670	25

2. Installation by body through holes



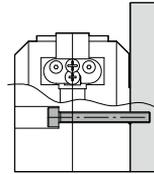
Item	Fastening Bolt	Max Torque (kgf·cm)
PH15-20CF	M3×P0.5	11
PH15-25CF	M4×P0.7	25
PH15-30CF	M5×P0.8	51
PH15-40CF	M6×P1	81
PH15-50CF	M8×P1.25	157
PH15-60CF	M8×P1.25	157
PH15-80CF	M10×P1.5	360
PH15-100CF	M12×P1.75	670

3. Installation by body tap holes



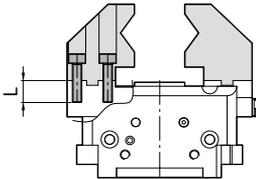
Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH15-20CF	M4×P0.7	25	8
PH15-25CF	M5×P0.8	51	18
PH15-30CF	M6×P1	81	18
PH15-40CF	M8×P1.25	157	20
PH15-50CF	M10×P1.5	360	25
PH15-60CF	M10×P1.5	360	25
PH15-80CF	M12×P1.75	670	30
PH15-100CF	M16×P2	1650	30

4. Installation by body through holes



Item	Fastening Bolt	Max Torque (kgf·cm)
PH15-20CF	M3×P0.5	11
PH15-25CF	M4×P0.7	25
PH15-30CF	M4×P0.7	25
PH15-40CF	M5×P0.8	51
PH15-50CF	M6×P1	81
PH15-60CF	M6×P1	81
PH15-80CF	M8×P1.25	157
PH15-100CF	M10×P1.5	360

5. Attachment installation



Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH15-20CF	M4×P0.7	25	8
PH15-25CF	M5×P0.8	51	18
PH15-30CF	M6×P1	81	18
PH15-40CF	M8×P1.25	157	20
PH15-50CF	M10×P1.5	360	25
PH15-60CF	M10×P1.5	360	25
PH15-80CF	M12×P1.75	670	30
PH15-100CF	M16×P2	1650	30

MEMO

Handwriting practice area consisting of 25 horizontal dotted lines.

**HAND**

PH01-A
PH01-D
PH01-G
PH01J-C
PH01K
PH02
PH02-H
PH04
PH05
PH06
PH06-L
PH06-L2
PH07
PH08
PH09
PH10
PH12
PH14-S
PH14-CL
PH14-CF
PH15-S
PH15-CL
<b>PH15-CF</b>
PH15-W
PH21
PH22
PH23
PH25
PH32
PHC

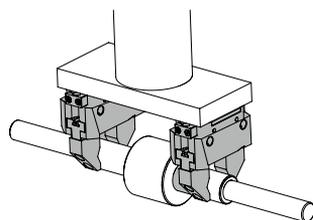
Parallel operation General  
Hand by Wedge Plunger

# PH15-W Series

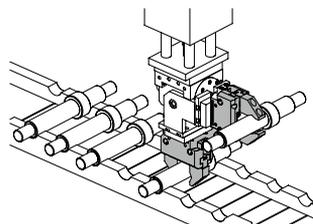
Extremely extended stroke type  
General Hand



Application 1



Application 2



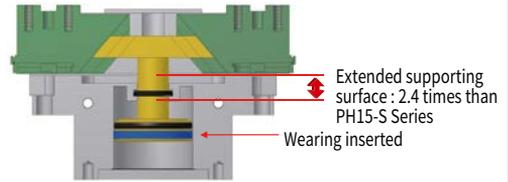
### Parallel operation by Wedge Plunger

- Compact size and large gripping force.
- Stable workpiece gripping status without backlash of Master Jaw.



### Improved stability

- Stable operation by enlarge of plunger supporting surface.
- Stable performance and improved durability by inserting wearing on piston.

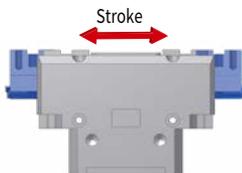


### Extremely extended stroke

- Extremely extended stroke maintaining Gripping force of PH15-S Series.
- Stroke. (End to End)

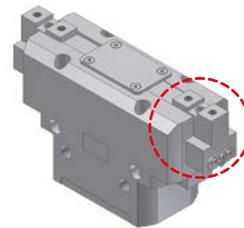
Model	PH15-S	PH15-W
CYL Bore	40	40
	50	46
	60	52

Unit : mm



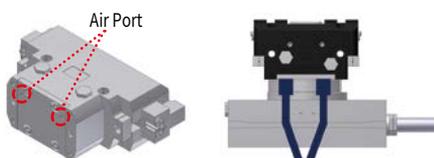
### Solid structure of Wedge Plunger

- Reduced failure from external dust or cutting oils by Solid structure of "T" shape sliding guide type.
- Enhanced durability by by enlarge of guide supporting surface.



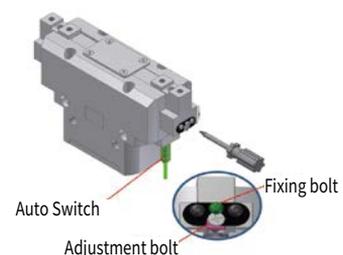
### Bottom Air Port (Optional)

- Suitable for centralized air piping combination with Swivel Unit or Rotary cylinder.



### Proximity Sensor applicable / Easy to control

- Proximity Sensor applicable.
- Easy sensing position control, even though the product is installed.



# GENERAL HAND / Parallel Operation

# PH15-W Series

## Features

NEW

- Parallel operation by Wedge Plunger.
- Enhanced operation stability and durability by enlarged plunger supporting surface and inserting of wearing.
- Compact size and light weight.
- Extremely extended stroke maintaining Gripping force of PH15-S Series.
- Easy centralized piping with bottom air port. (Optional).
- Option for high temperature condition.
- Auto Switch installation. (Optional)



## Order Form

### PH15 - 40W - □ - P S - PNP - AP

①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

#### ① Series Name

#### ② Cylinder Bore Size and Stroke

Order	CYL Bore(mm)	Stroke(mm)
40W	40	40
50W	50	46
60W	60	52

#### ③ Special Option

Order	Special Option
Blank	Standard
V	High temperature condition

\* For high temperature option, normal Auto Switch is not available.

#### ④ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage DC	Current	Body Length	Sensing Distance	Frequency	Protect Level
		Wires	Direction						
Blank		No Auto Switch provided							
P	Proximity	3-Wire	Horiz	10~30V	Max 200mA	32mm	1mm ± 10%	800Hz	IP 67
P2	Proximity	3-Wire	Horiz	10~30V	Max 200mA	16mm	1mm ± 10%	800Hz	IP 67

#### ⑤ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

#### ⑥ Auto Switch Output

Order	Output
Blank	NPN
PNP	PNP

#### ⑦ Air Port Option

Order	Air Port Option
Blank	Standard (Side position)
AP	Additional air port on bottom

\* For AP option selection, side air port will be supplied with plugged.

Specification

PH01-A  
PH01-D  
PH01-G  
PH01J-C  
PH01K  
PH02  
PH02-H  
PH04  
PH05  
PH06  
PH06-L  
PH06-L2  
PH07  
PH08  
PH09  
PH10  
PH12  
PH14-S  
PH14-CL  
PH14-CF  
PH15-S  
PH15-CL  
PH15-CF  
PH15-W  
PH21  
PH22  
PH23  
PH25  
PH32  
PHC

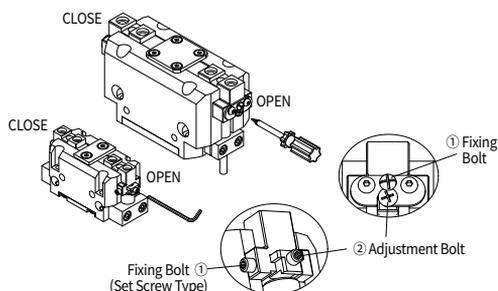
Item Name	PH15-40W	PH15-50W	PH15-60W
CYL Bore Size(mm)	40	50	60
Stroke(mm)	40	46	52
Effective Gripping Force(kgf)	Close	30.4	49.7
	Open	36.1	57
Air pressure : 5kgf/cm <sup>2</sup> Note 2)			82.1
Weight(kgf)	1.5	2.4	3.9
Max. Attachment L(mm)	50	60	80
Max. Attachment H(mm) Note 3)			
Fitting Size	PT1/8		
Fluid	Clean Air Note 1)		
Pressure Range(kgf/cm <sup>2</sup> )	3 ~ 7		
Lubrication	Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)		
Temperature Range(°C)	Standard model : 5 ~ 60		
	High temperature model : 5 ~ 150		
Repeat Accuracy(mm)	±0.1		
Max. Cycle Per Minute(C.P.M)	30		
Operation Type	Double Acting (Structure : Parallel operation by Wedge Plunger) (Guide : Metal Guide)		
Tolerance of Stroke(mm)	Open : -0.5 ~ +1		
	Close : -1 ~ +0.5		

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10µm degree of filtering.

Note 2) The position of the effective gripping force point is the end point of the Master Jaw.

Note 3) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

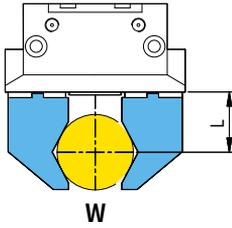
How to Adjust Sensor Dog



1. Operation position could be detected by proximity sensor and detecting position could be set by adjustment of sensor dog position inside of master jaws.  
(Use 1.5mm wrench or "+" screwdriver)
2. How to adjust  
 ① Release fixing bolt → ② Dog position adjustment → ① Lock fixing bolt
3. Keep on locking status for set screw type fixing bolt while product working.

## Gripping Force Graph (Close)

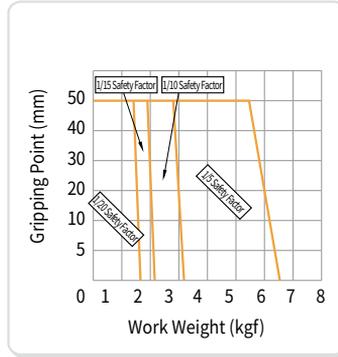
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



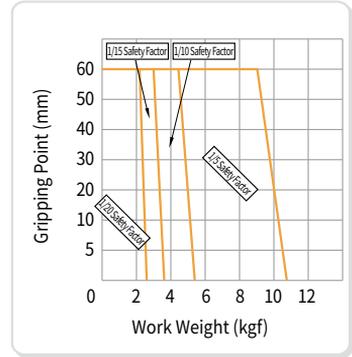
Close Grip State

W: Work Weight  
L: Attachment Length

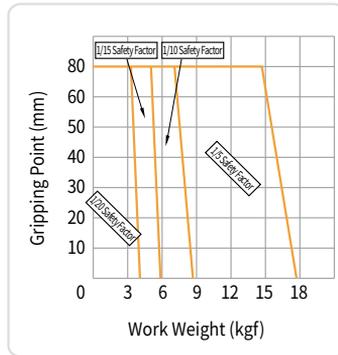
### ► PH15-40W



### ► PH15-50W



### ► PH15-60W

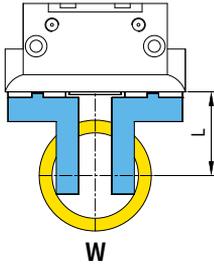


### ▲ Caution

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

Gripping Force Graph (Open)

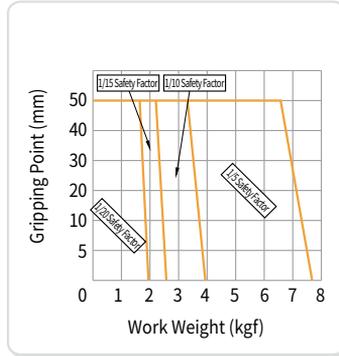
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



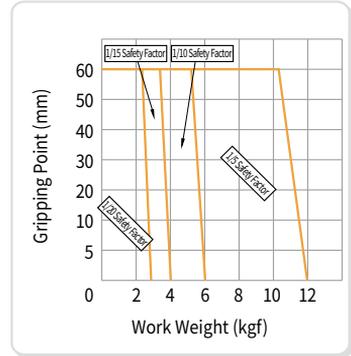
Open Grip State

W: Work Weight  
L: Attachment Length

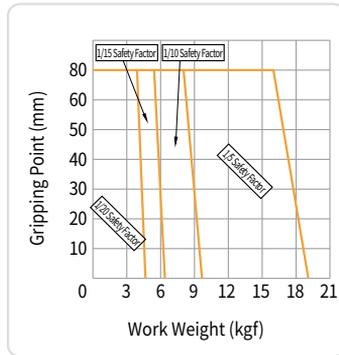
► PH15-40W



► PH15-50W



► PH15-60W



HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W**
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

⚠ Caution

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

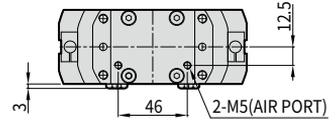
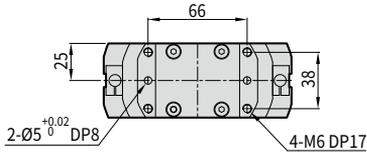
# PH15-W Series

40W

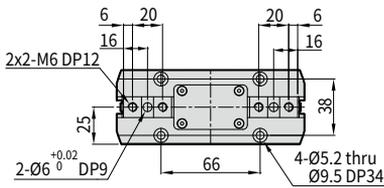
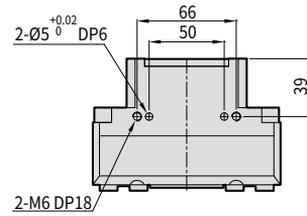
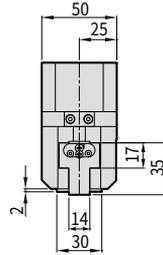
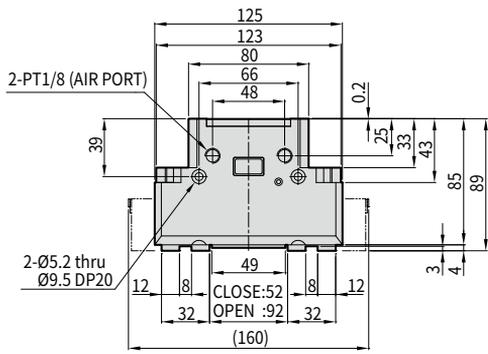
50W

60W

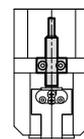
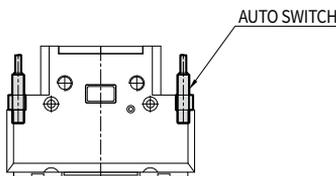
## PH15-40W



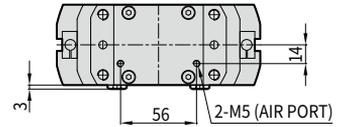
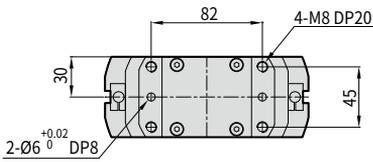
### AP TYPE



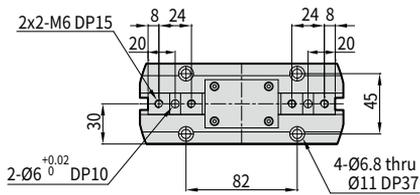
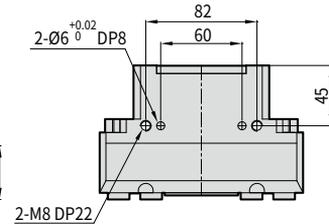
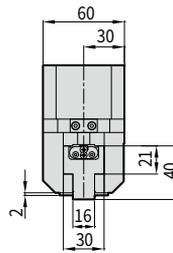
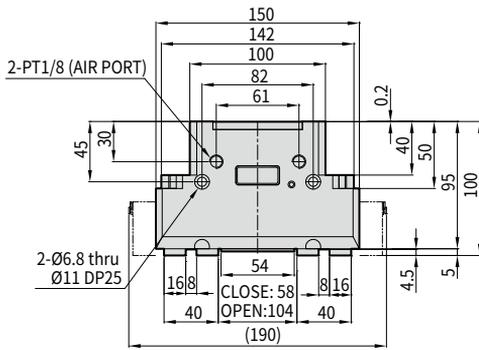
## PH15-40W Example of Auto Switch installation



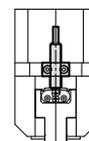
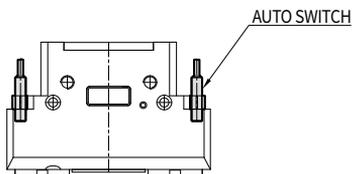
PH15-50W



AP TYPE



PH15-50W Example of Auto Switch installation



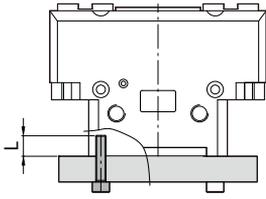
- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W**
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC



Installation Information

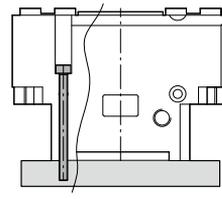
PH01-A  
PH01-D  
PH01-G  
PH01J-C  
PH01K  
PH02  
PH02-H  
PH04  
PH05  
PH06  
PH06-L  
PH06-L2  
PH07  
PH08  
PH09  
PH10  
PH12  
PH14-S  
PH14-CL  
PH14-CF  
PH15-S  
PH15-CL  
PH15-CF  
**PH15-W**  
PH21  
PH22  
PH23  
PH25  
PH32  
PHC

1. Installation by body tap holes



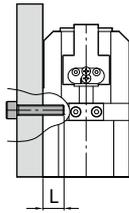
Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH15-40W	M6×P1	81	17
PH15-50W	M8×P1.25	157	20
PH15-60W	M8×P1.25	157	20

2. Installation by body through holes



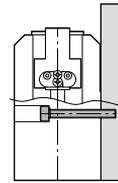
Item	Fastening Bolt	Max Torque (kgf·cm)
PH15-40W	M5×P0.8	51
PH15-50W	M6×P1	81
PH15-60W	M6×P1	81

3. Installation by body tap holes



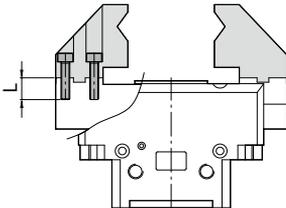
Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH15-40W	M6×P1	81	18
PH15-50W	M8×P1.25	157	22
PH15-60W	M8×P1.25	157	22

4. Installation by body through holes



Item	Fastening Bolt	Max Torque (kgf·cm)
PH15-40W	M5×P0.8	51
PH15-50W	M6×P1	81
PH15-60W	M6×P1	81

5. Attachment installation



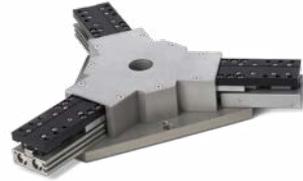
Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH15-40W	M6×P1	81	12
PH15-50W	M6×P1	81	15
PH15-60W	M8×P1.25	157	15

## GENERAL HAND / Parallel Operation

# PH21 Series

### Features

- Parallel operation by Link Lever structure.
- High precise and solidity by Linear guide application.
- Stable workpiece handling by linked 3-Jaws with linear motion guide.
- Miniaturization, lighten and generalization type by slim body.
- Useful for various size workpiece handling with long stroke range.
- Powerful gripping force comes from 6 times of cylinder thrust.
- Easy combination with other component through central hollow hole.
- Auto Switch installation. (Optional)



### Order Form

## PH21 - 12 - A2 L S

①

②

③

④

⑤

#### ① Series Name

#### ② Cylinder Bore Size and Stroke

Order	CYL Bore(mm)	Stroke(mm)	Order					
			A1	A2	A2C	B1	B2	B2B
12	12	80		○	○		○	○
20	20	100	○			○		
30	30	120	○			○		

※ For "Blank", no Auto Switch is provided.

#### ③ Available Auto Switches

#### ④ Auto Switch Cable Length

Order	Cable Length
Blank	1M
L	3M

#### ⑤ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

#### ※ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage		Current		Protect Level	Operation Time
		Wires	Direction	AC	DC	AC	DC		
A1	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2C	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
B1	Magnetic solid state	3-Wire	Horiz	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms
B2	Magnetic solid state	3-Wire	Horiz	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms
B2B	Magnetic solid state	2-Wire	Horiz	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms

Specification

HAND

PH01-A  
PH01-D  
PH01-G  
PH01J-C  
PH01K  
PH02  
PH02-H  
PH04  
PH05  
PH06  
PH06-L  
PH06-L2  
PH07  
PH08  
PH09  
PH10  
PH12  
PH14-S  
PH14-CL  
PH14-CF  
PH15-S  
PH15-CL  
PH15-CF  
PH15-W  
PH21  
PH22  
PH23  
PH25  
PH32  
PHC

Item Name		PH21-12	PH21-20	PH21-30
CYL Bore Size(mm)		12	20	30
Rod Size(mm)		6	10	16
Stroke(mm)		80	100	120
Effective Gripping Force(kgf)	Close	25	70	159
	Open	19	53	133
Fitting Size			PT1/8	
Weight(kgf)		3.9	7.8	15.3
Max. Attachment L(mm)		60	100	120
Max. Attachment H(mm)	Note 3)			
Fluid		Clean Air Note 1)		
Pressure Range(kgf/cm <sup>2</sup> )		3 ~ 7		
Lubrication		Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)		
Temperature Range(°C)		5 ~ 60		
Repeat Accuracy(mm)		±0.05		
Max. Cycle Per Minute(C.P.M)		40		
Operation Type		Double Acting (Structure : Parallel operation by Link Lever structure) (Guide : Linear Guide)		
Tolerance of Stroke(mm)		Open : -1 ~ +1.5		
		Close : -1.5 ~ +1		

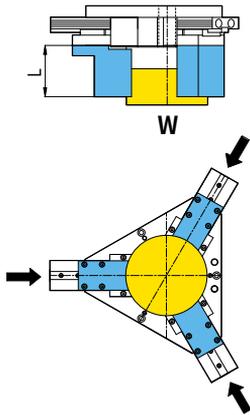
Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10µm degree of filtering.

Note 2) The position of the effective gripping force point is the end point of the Master Jaw.

Note 3) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

## Gripping Force Graph (Close)

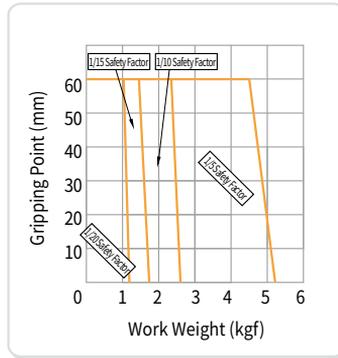
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



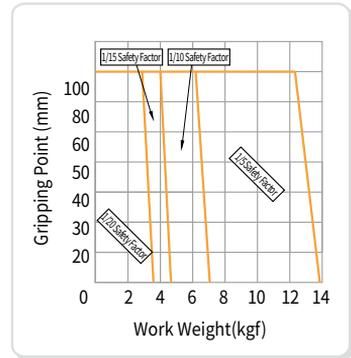
Close Grip State

W: Work Weight  
L: Attachment Length

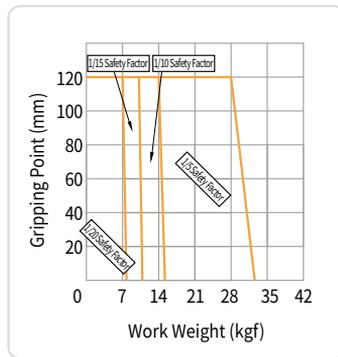
► PH21-12



► PH21-20



► PH21-30

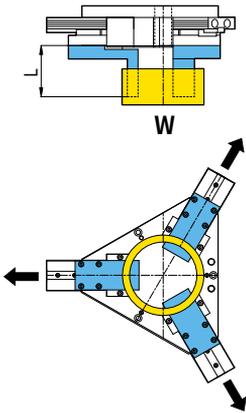


### ⚠ Caution

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

Gripping Force Graph (Open)

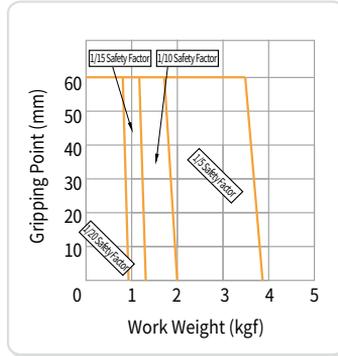
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



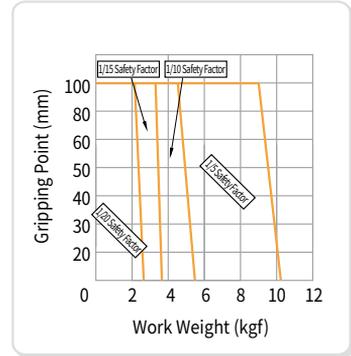
Open Grip State

W: Work Weight  
L : Attachment Length

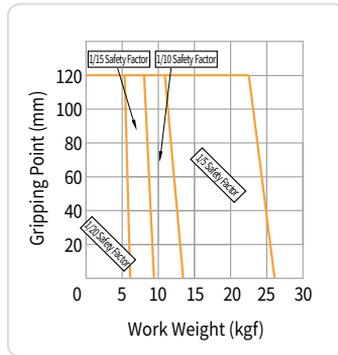
► PH21-12



► PH21-20



► PH21-30



HAND

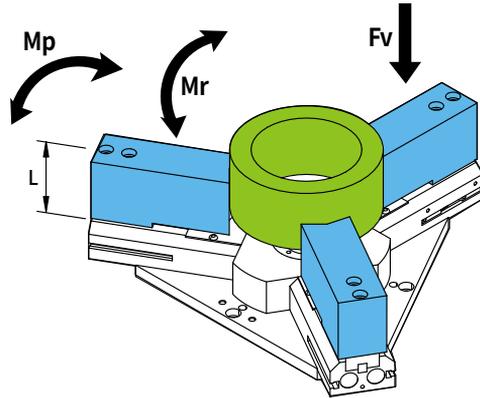
- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21**
- PH22
- PH23
- PH25
- PH32
- PHC

⚠ Caution

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

## Check of Allowable Moment and Weight

- ※ L : Distance between the center of guide and gripping point of work.
- ※ The moment center equals with guide center.



Item	Allowable Weight for Vertical Direction. Fv (kgf)	Maximum Allowable Moment (kgf-cm)	
		Pitching moment Mp	Rolling moment Mr
PH21-12	81	30	50
PH21-20	255	94	188
PH21-30	384	188	401

※ Above listed allowable moment and weight refer static values.

### Calculation of allowable weight for moment weight applied.

$$\text{Allowable Weight } F \text{ (kgf)} = \frac{\text{Maximum Allowable Moment } M \text{ (kgf-cm)}}{\text{The point of external load applied } L \text{ (cm)}}$$

### Example)

Checking of 3kgf weight(F) force to pitching moment direction(Mp) at the 50mm attachment point on PH21-12.

$$\Rightarrow \text{Allowable Weight } F \text{ (kgf)} = \frac{\text{Maximum Allowable Moment } M \text{ (kgf-cm)}}{\text{The point of external load applied } L \text{ (cm)}} = \frac{30}{5} = 6 \text{ kgf} > 3 \text{ kgf}$$

The allowable weight(6kgf) is bigger than applied weight (3kgf), so, it is applicable.

# PH21 Series

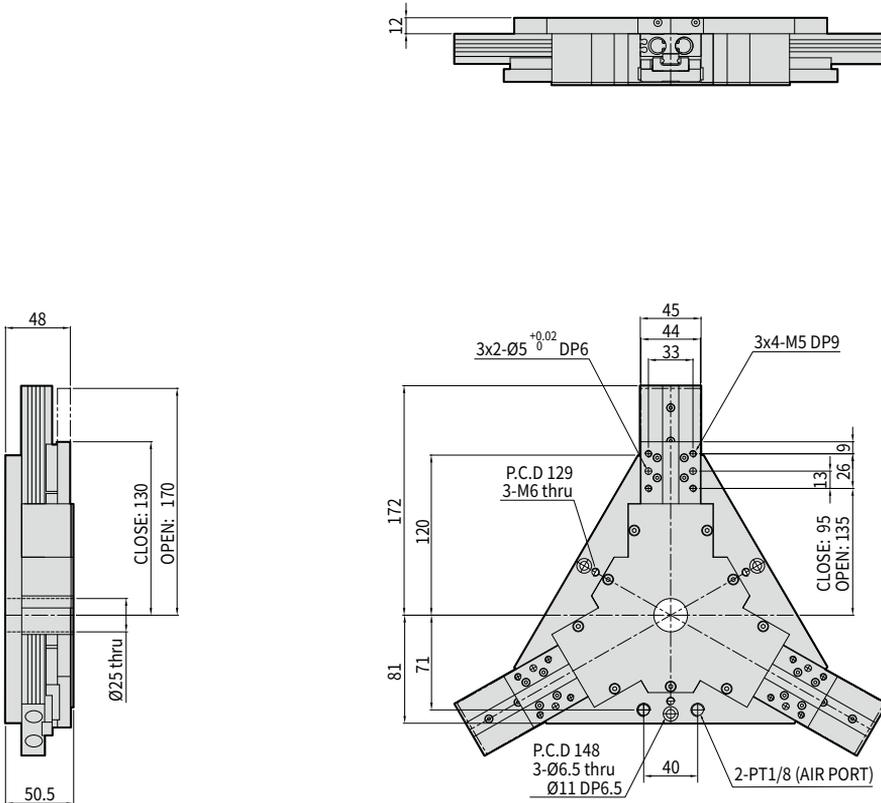
12

20

30

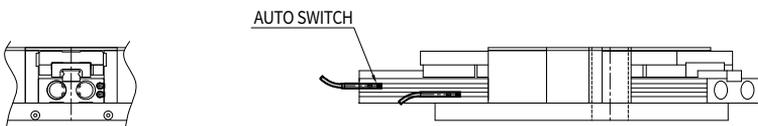
HAND

## PH21-12

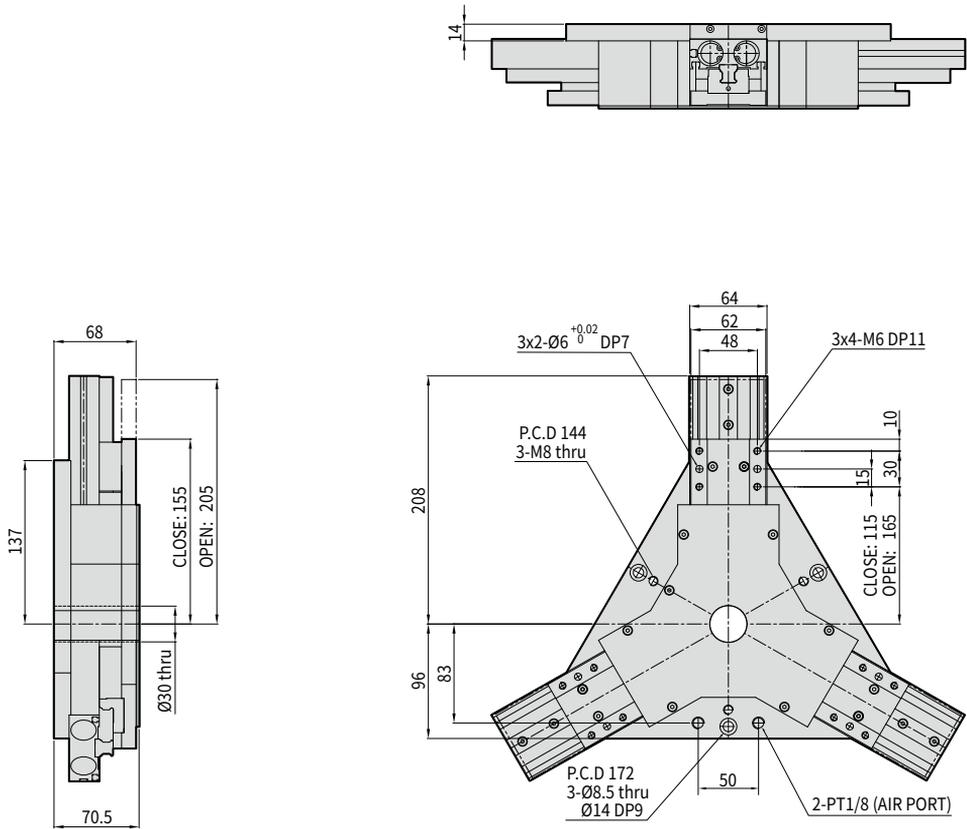


- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21**
- PH22
- PH23
- PH25
- PH32
- PHC

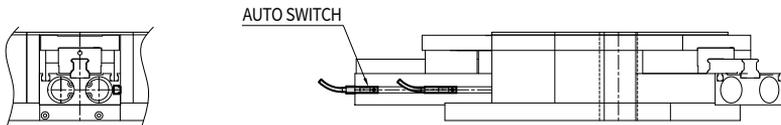
## PH21-12 Example of Auto Switch installation



## PH21-20

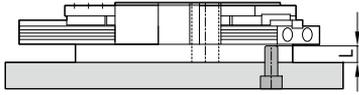


## PH21-20 Example of Auto Switch installation



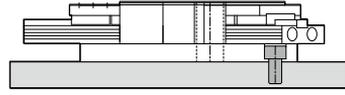


1. Installation by body tap holes



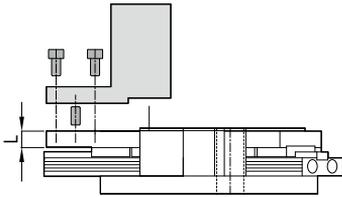
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH21-12	M6×P1	81	12
PH21-20	M8×P1.25	157	14
PH21-30	M10×P1.5	360	16

2. Installation by body through holes



Item	Fastening Bolt	Max Torque (kgf-cm)
PH21-12	M6×P1	81
PH21-20	M8×P1.25	157
PH21-30	M10×P1.5	360

3. Attachment installation



Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH21-12	M5×P0.8	51	9
PH21-20	M6×P1	81	11
PH21-30	M8×P1.25	157	14

MEMO

Handwriting practice area with horizontal dotted lines.

**HAND**

PH01-A
PH01-D
PH01-G
PH01J-C
PH01K
PH02
PH02-H
PH04
PH05
PH06
PH06-L
PH06-L2
PH07
PH08
PH09
PH10
PH12
PH14-S
PH14-CL
PH14-CF
PH15-S
PH15-CL
PH15-CF
PH15-W
<b>PH21</b>
PH22
PH23
PH25
PH32
PHC

## GENERAL HAND / Parallel Operation

# PH22 Series

### Features

- Parallel operation by synchronized of Rack and Pinion structure.
- High precision and solidity from double Linear guide application.
- Miniaturization, lighten and generalization type by slim body.
- Useful for various size workpiece handling with long stroke range.
- Powerful gripping force comes from 2 times of cylinder thrust.
- Option for secondary battery manufacturing conditions.
- Auto Switch installation. (Optional)



### Order Form

**PH22 - 30 - E - A3 L S**

①                      ②                      ③                      ④                      ⑤                      ⑥

#### ① Series Name

#### ② Cylinder Bore Size and Stroke

Order	CYL Bore(mm)	Stroke(mm)	Order									
			A2	A2C	A2V	A3	B2	B2B	B3B	B3C	B4	B4B
20	20	50	○	○	○		○	○	○	○		
30	30	100				○					○	○
40	40	150				○					○	○

※ For "Blank", no Auto Switch is provided.

#### ④ Available Auto Switches

#### ③ Special Option

Order	Special Option
Blank	Standard
E	Secondary battery field

#### ⑤ Auto Switch Cable Length

Order	Cable Length
Blank	1M
L	3M

#### ⑥ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

#### ※ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage		Current		Protect Level	Operation Time
		Wires	Direction	AC	DC	AC	DC		
A2	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2C	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2V	Magnetic reed switch	2-Wire	Ver	100V	24V	5~20mA	5~40mA	IP 67	1ms
A3	Magnetic reed switch	2-Wire	Ver	100V	24V	5~20mA	5~40mA	IP 67	1ms
B2	Magnetic solid state	3-Wire	Horiz	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms
B2B	Magnetic solid state	2-Wire	Horiz	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms
B3B	Magnetic solid state	2-Wire	Ver	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms
B3C	Magnetic solid state	3-Wire	Ver	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms
B4	Magnetic solid state	3-Wire	Ver	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms
B4B	Magnetic solid state	2-Wire	Ver	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms

\* Be careful of projection for vertical wire exposed type Auto Switch model. (Please refer technical information of Auto Switch)

Specification

HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22**
- PH23
- PH25
- PH32
- PHC

Item Name	PH22-20	PH22-30	PH22-40
CYL Bore Size(mm)	20	30	40
Stroke(mm)	50	100	150
Effective Gripping Force(kgf) Air pressure : 5kgf/cm <sup>2</sup> Note 2)	23.5	53	94
Open			
Fitting Size	M5	PT1/8	
Weight(kgf)	1.38	4.6	10.5
Max. Attachment L(mm)	60	120	160
Max. Attachment H(mm) Note 3)			
Fluid	Clean Air Note 1)		
Pressure Range(kgf/cm <sup>2</sup> )	3 ~ 7		
Lubrication	Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)		
Temperature Range(°C)	5 ~ 60		
Repeat Accuracy(mm)	±0.05		
Max. Cycle Per Minute(C.P.M)	40		
Operation Type	Double Acting (Structure : Parallel operation by Rack & Pinion structure) (Guide : Linear Guide)		
Tolerance of Stroke(mm)	Open : ±2		
	Close : ±2		

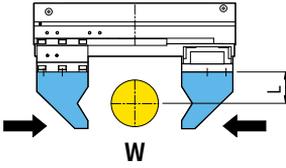
Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3~10µm degree of filtering.

Note 2) The position of the effective gripping force point is the end point of the Master Jaw.

Note 3) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

## Gripping Force Graph (Close)

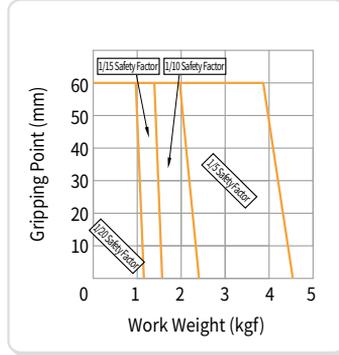
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



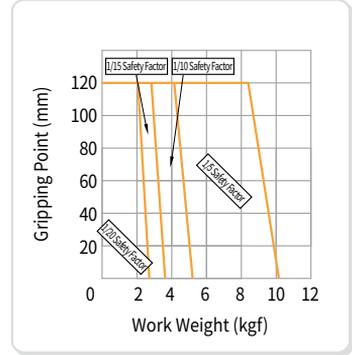
Close Grip State

W: Work Weight  
L: Attachment Length

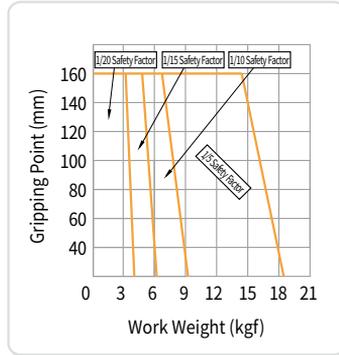
### ► PH22-20



### ► PH22-30



### ► PH22-40

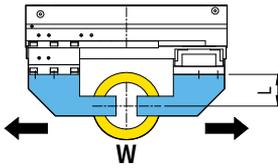


### ▲ Caution

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

Gripping Force Graph (Open)

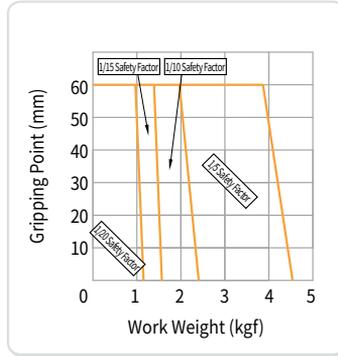
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



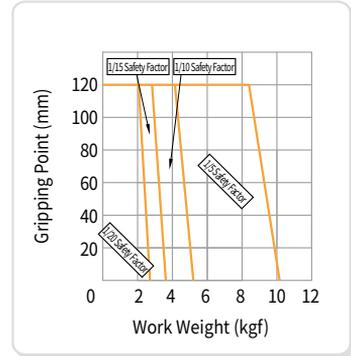
Open Grip State

W: Work Weight  
L: Attachment Length

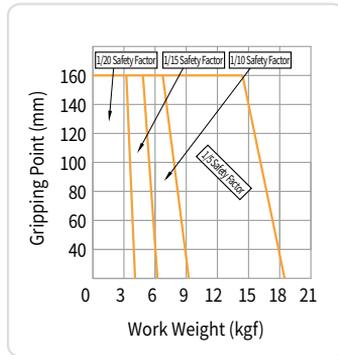
► PH22-20



► PH22-30



► PH22-40



HAND

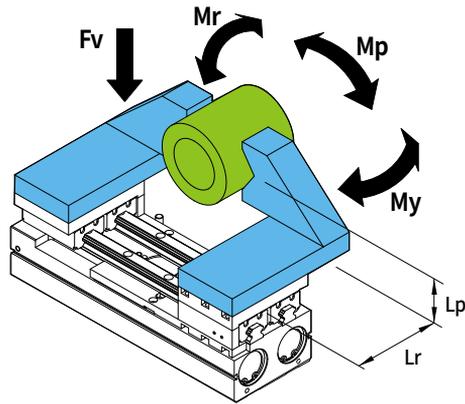
- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22**
- PH23
- PH25
- PH32
- PHC

⚠ Caution

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

## Check of Allowable Moment and Weight

- ※ L : Distance between the center of guide and gripping point of work.
- ※ The moment center equals with guide center.



Item	Allowable Weight for Vertical Direction. $F_v$ (kgf)	Maximum Allowable Moment (kgf-cm)		
		Pitching moment $M_p$	Yawing moment $M_y$	Rolling moment $M_r$
PH22-20	81	30	30	50
PH22-30	413	236	236	330
PH22-40	703	519	519	732

※ Above listed allowable moment and weight refer static values.

### Calculation of allowable weight for moment weight applied.

$$\text{Allowable Weight } F \text{ (kgf)} = \frac{\text{Maximum Allowable Moment } M \text{ (kgf-cm)}}{\text{The point of external load applied } L \text{ (cm)}}$$

### Example)

Checking of 5kgf weight( $F$ ) force to pitching moment direction( $M_p$ ) at the 100mm attachment point on PH22-30.

$$\Rightarrow \text{Allowable Weight } F \text{ (kgf)} = \frac{\text{Maximum Allowable Moment } M \text{ (kgf-cm)}}{\text{The point of external load applied } L \text{ (cm)}} = \frac{236}{10} = 23.6 \text{ kgf} > 5 \text{ kgf}$$

The allowable weight(23.6kgf) is bigger than applied weight (5kgf), so, it is applicable.

# PH22 Series

20

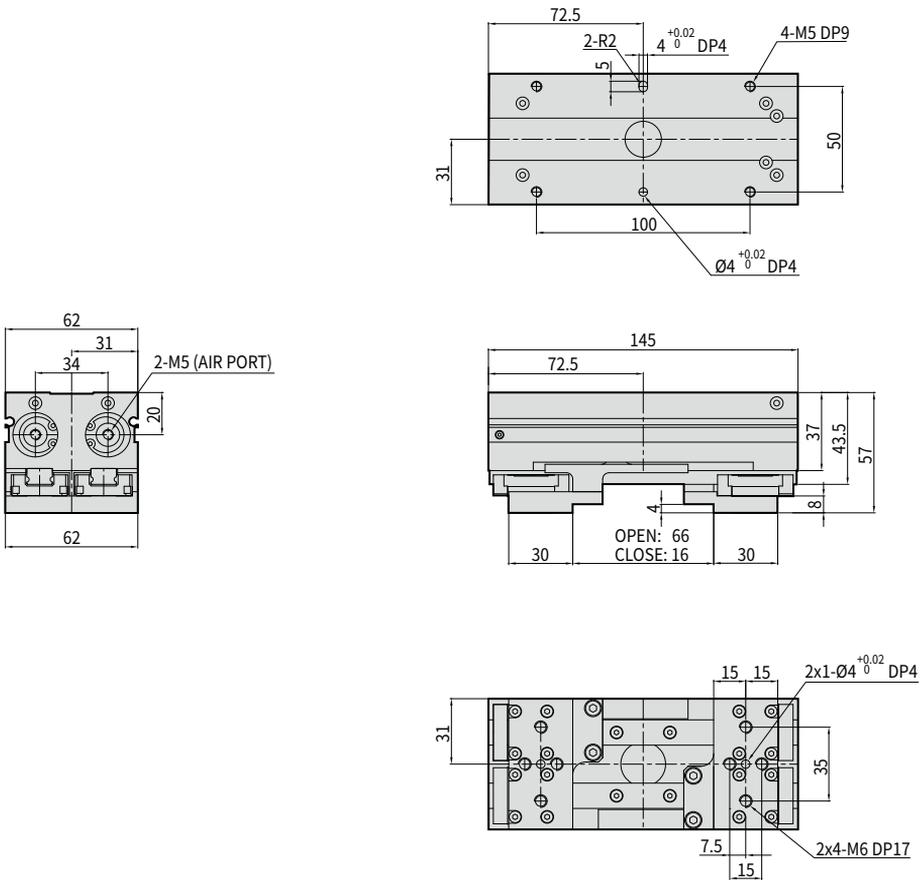
30

40

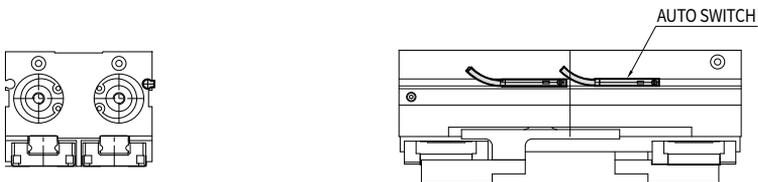
HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22**
- PH23
- PH25
- PH32
- PHC

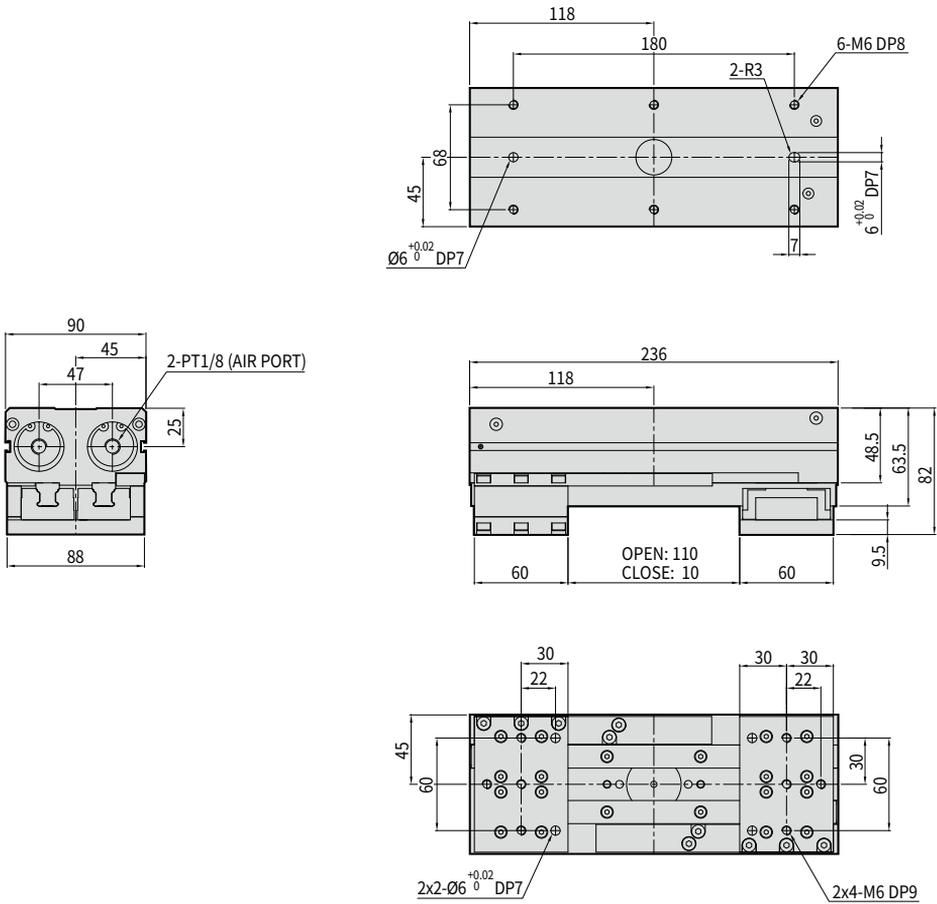
PH22-20



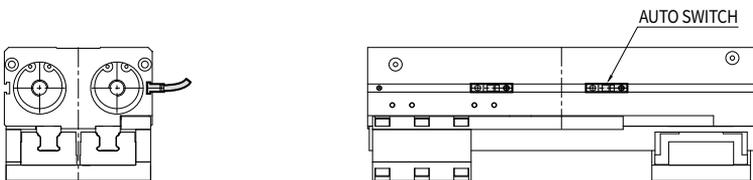
PH22-20 Example of Auto Switch installation



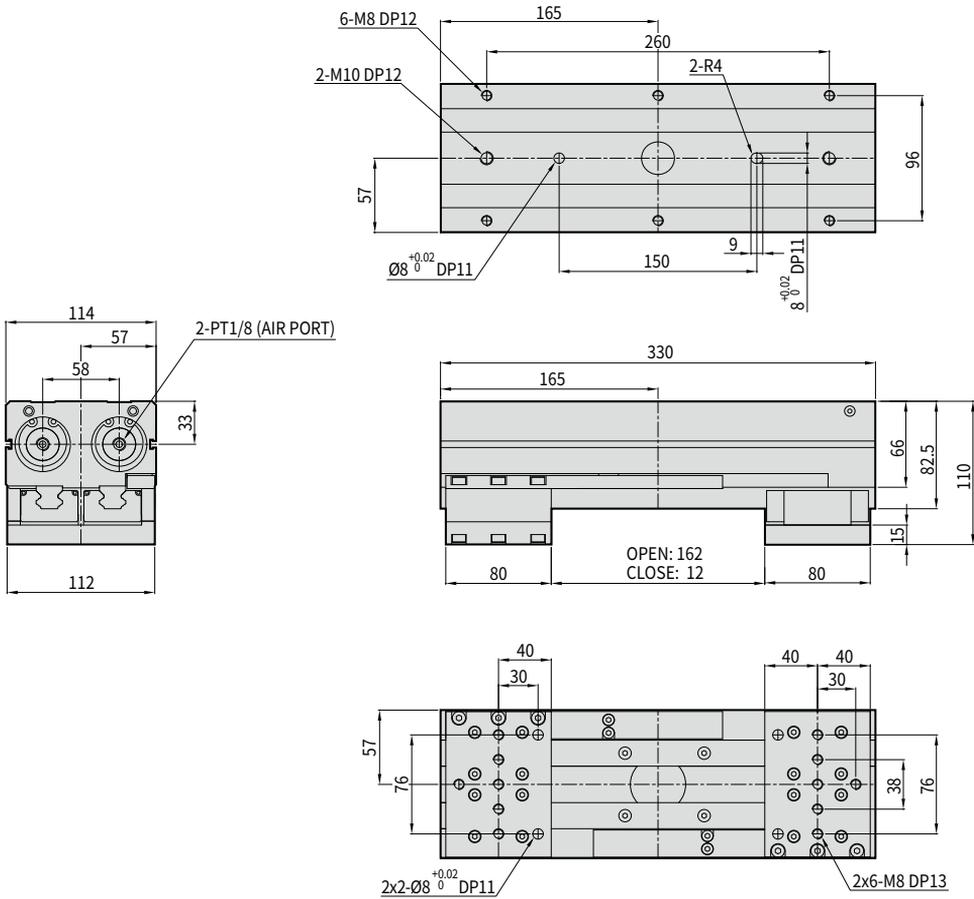
## PH22-30



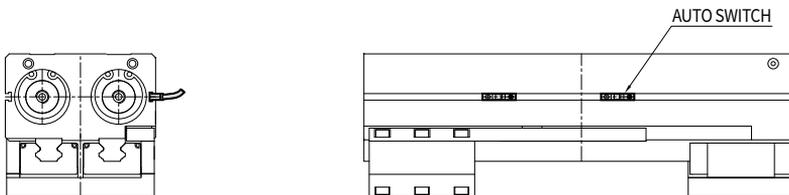
## PH22-30 Example of Auto Switch installation



PH22-40

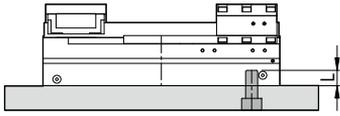


PH22-40 Example of Auto Switch installation



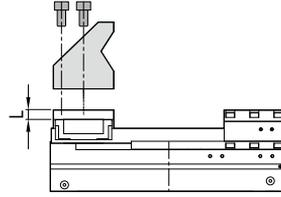
- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22**
- PH23
- PH25
- PH32
- PHC

1. Installation by body tap holes



Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH22-20	M5×P0.8	51	9
PH22-30	M6×P1	81	8
PH22-40	M8×P1.25	157	12

2. Attachment installation



Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH22-20	M6×P1	81	7
PH22-30	M6×P1	81	9
PH22-40	M8×P1.25	157	13

MEMO

Handwriting practice area consisting of 25 horizontal dotted lines.

**HAND**

PH01-A
PH01-D
PH01-G
PH01J-C
PH01K
PH02
PH02-H
PH04
PH05
PH06
PH06-L
PH06-L2
PH07
PH08
PH09
PH10
PH12
PH14-S
PH14-CL
PH14-CF
PH15-S
PH15-CL
PH15-CF
PH15-W
PH21
<b>PH22</b>
PH23
PH25
PH32
PHC

## GENERAL HAND / Parallel Operation

# PH23 Series

### Features

- Parallel operation by synchronized of Rack and Pinion structure.
- Extremely enhanced solidity by strong sliding guides.
- Miniaturization, lighten and generalization type by slim body.
- Useful for various size workpiece handling with long stroke range.
- Powerful gripping force comes from 2 times of cylinder thrust.
- Auto Switch installation. (Optional)



### Order Form

## PH23 - 20 - W - P □ S - PNP

①

②

③

④

⑤

⑥

⑦

#### ① Series Name

#### ② Cylinder Bore Size and Stroke

#### ③ Auto Switch Mounting Bracket

Order	CYL Bore(mm)	Stroke(mm)	Order		Available Auto Switches
			S	W	
20	20	80	○	○	S : Magnetic Sensor W : Proximity Sensor
25	25	100	○	○	
30	30	130	○	○	
40	40	180	○	○	
60	63	200	X	○	

※ For blank selection cannot mount auto switches.

#### ④ Auto Switch Specification

##### ※ Magnetic Auto Switch

Order	Sensing Type	Cable Spec		Voltage		Current		Protect Level	Operation Time
		Wires	Direction	AC	DC	AC	DC		
Blank		No Auto Switch provided							
A2	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2C	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2V	Magnetic reed switch	2-Wire	Ver	100V	24V	5~20mA	5~40mA	IP 67	1ms
B2	Magnetic solid state	3-Wire	Horiz	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms
B2B	Magnetic solid state	2-Wire	Horiz	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms
B3B	Magnetic solid state	2-Wire	Ver	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms
B3C	Magnetic solid state	3-Wire	Ver	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms

\* Be careful of projection for vertical wire exposed type Auto Switch model. (Please refer technical information of Auto Switch)

##### ※ Proximity Auto Switch

Order	Sensing Type	Cable Spec		Voltage	Current	Body Length	Sensing Distance	Frequency	Protect Level
		Wires	Direction	DC					
Blank		No Auto Switch provided							
P	Proximity	3-Wire	Horiz	10~30V	Max 200mA	32mm	1mm ± 10%	800Hz	IP 67
P2	Proximity	3-Wire	Horiz	10~30V	Max 200mA	16mm	1mm ± 10%	800Hz	IP 67

HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23**
- PH25
- PH32
- PHC

⑤ Magnetic Auto Switch Cable Length

Order	Cable Length
Blank	1M
L	3M

\* Proximity auto switch cable length is 2m. Please contact to office if needs longer.

⑦ Proximity Auto Switch Output

Order	Output
Blank	NPN
PNP	PNP

⑥ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

Accessory Order Form

(1) Auto Switch Mounting Bracket

**PH23 - 60 - W - ASSY**

①                      ②                      ③                      ④

① Series Name

④ Order Name for Accessory  
- Based for only one set for single side of product.

② CYL Bore

③ Auto Switch Mounting Bracket

Order	Bracket
S	For Magnetic Sensor
W	For Proximity Sensor

Specification

Item Name	PH23-20	PH23-25	PH23-30	PH23-40	PH23-60
CYL Bore Size(mm)	20	25	30	40	63
Stroke(mm)	80	100	130	180	200
Effective Gripping Force(kgf) <small>Air pressure : 5kgf/cm<sup>2</sup> Note 2)</small>	Close 17.6	28.3	37.9	79	225
Fitting Size	M5	PT1/8			
Weight(kgf)	2.8	4	7.5	11.3	17.3
Max. Attachment L(mm) <small>Note 3)</small>	80	100	160	200	300
Fluid	Clean Air <small>Note 1)</small>				
Pressure Range(kgf/cm <sup>2</sup> )	3 ~ 7				
Lubrication	Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)				
Temperature Range(°C)	5 ~ 60				
Repeat Accuracy(mm)	±0.15				
Maximum Operating Speed(mm/sec) <small>Note 4)</small>	150	130	100	100	60
Operation Type	Double Acting (Structure : Parallel operation by Rack & Pinion structure) (Guide : Linear Guide)				
Tolerance of Stroke(mm)	Open : -1 ~ +1.5 Close : -1.5 ~ +1				

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10µm degree of filtering.

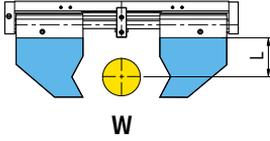
Note 2) The position of the effective gripping force point is the end point of the Master Jaw.

Note 3) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

Note 4) It is reference value of Master Jaw moving speed at P:6.5kgf/cm<sup>2</sup>, tube inner bore Ø4, tube length 1m case.

# Gripping Force Graph (Close)

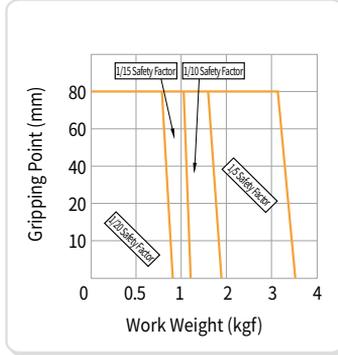
▶ Refer <GENERAL HAND Selection Guide> for how to read below graph.



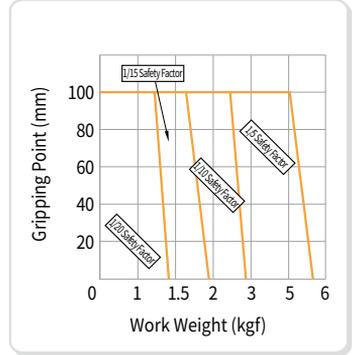
Close Grip State

W: Work Weight  
L: Attachment Length

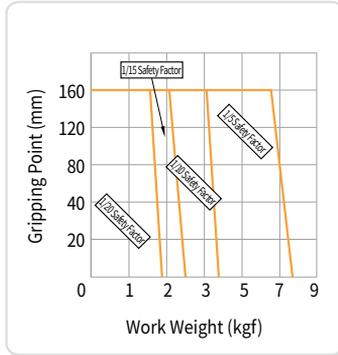
▶ PH23-20



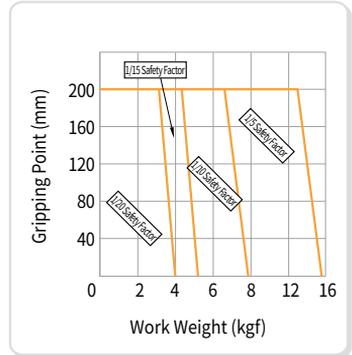
▶ PH23-25



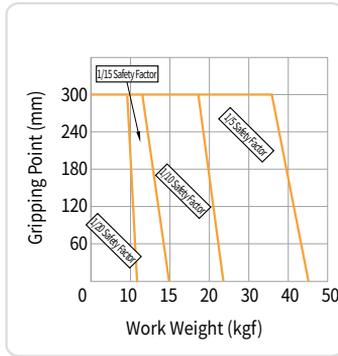
▶ PH23-30



▶ PH23-40



▶ PH23-60

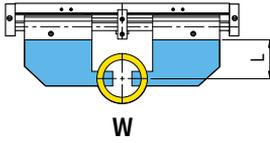


**▲ Caution**

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

Gripping Force Graph (Open)

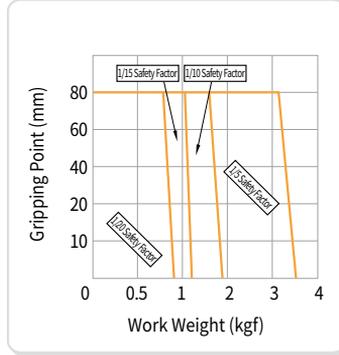
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



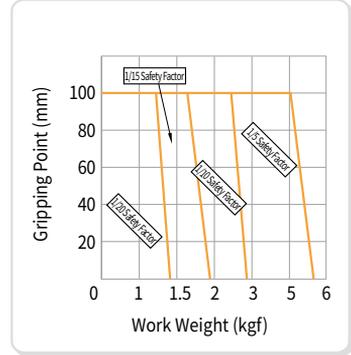
Open Grip State

W: Work Weight  
L: Attachment Length

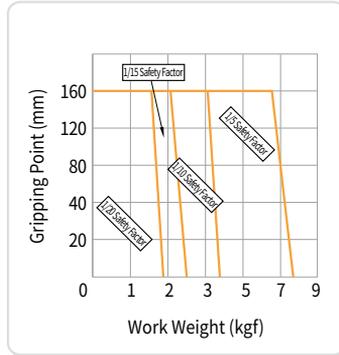
► PH23-20



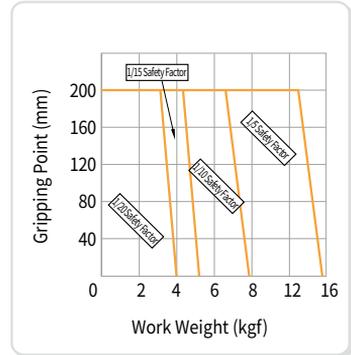
► PH23-25



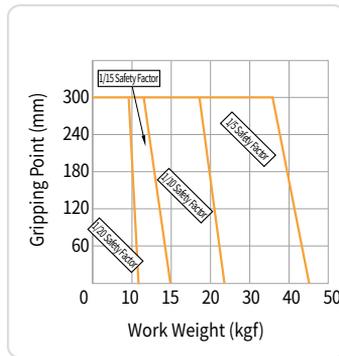
► PH23-30



► PH23-40



► PH23-60



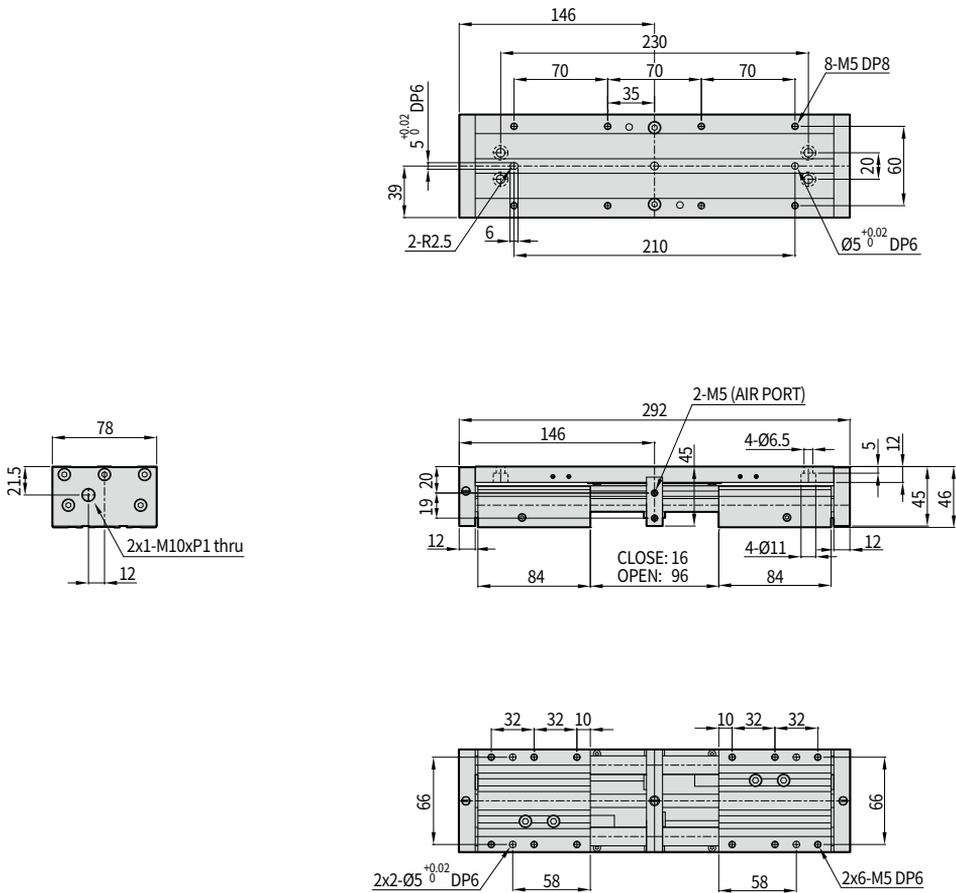
HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23**
- PH25
- PH32
- PHC

⚠ Caution

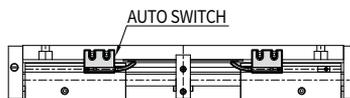
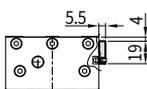
If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

## PH23-20

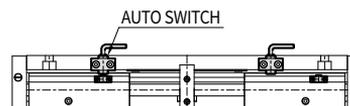
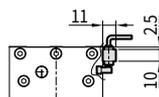


## PH23-20 Example of Auto Switch installation

### PH23-20-S MAGNETIC SENSOR

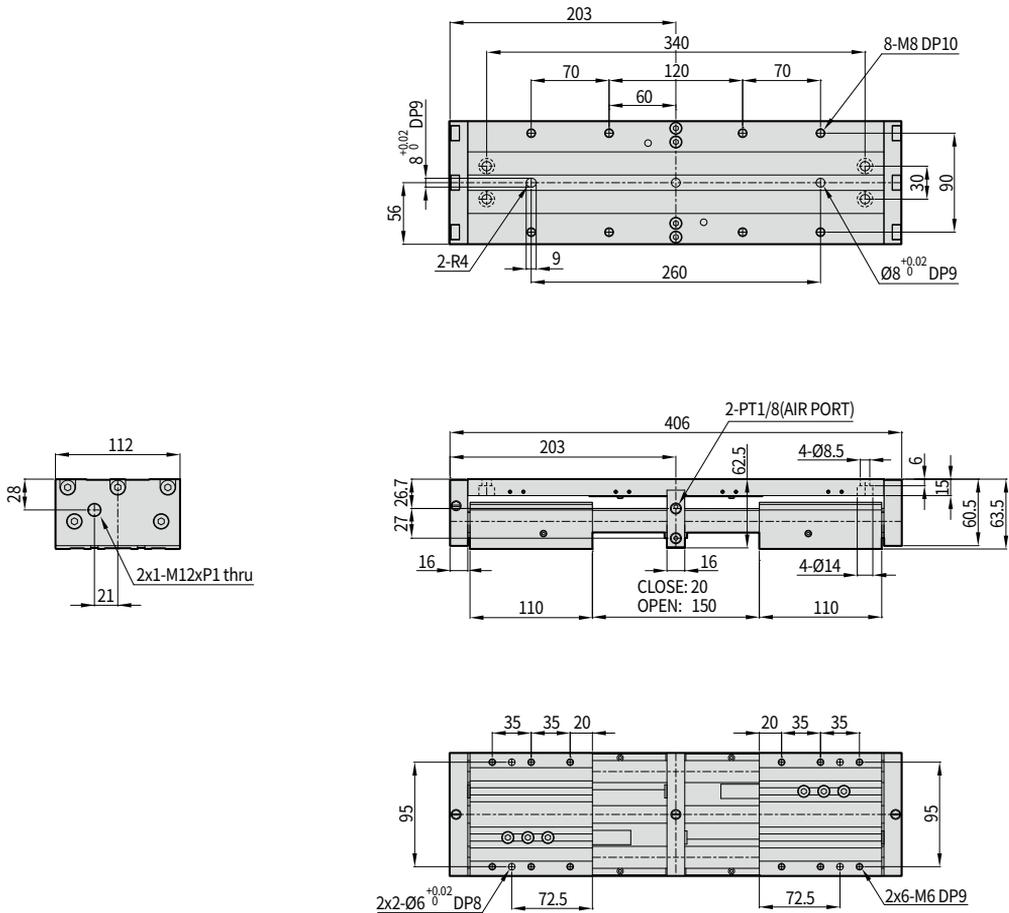


### PH23-20-W PROXIMITY SENSOR



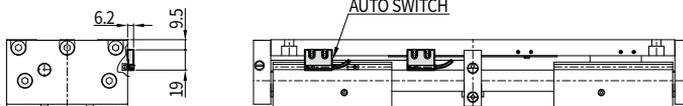


## PH23-30

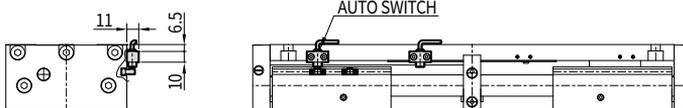


## PH23-30 Example of Auto Switch installation

### PH23-30-S MAGNETIC SENSOR

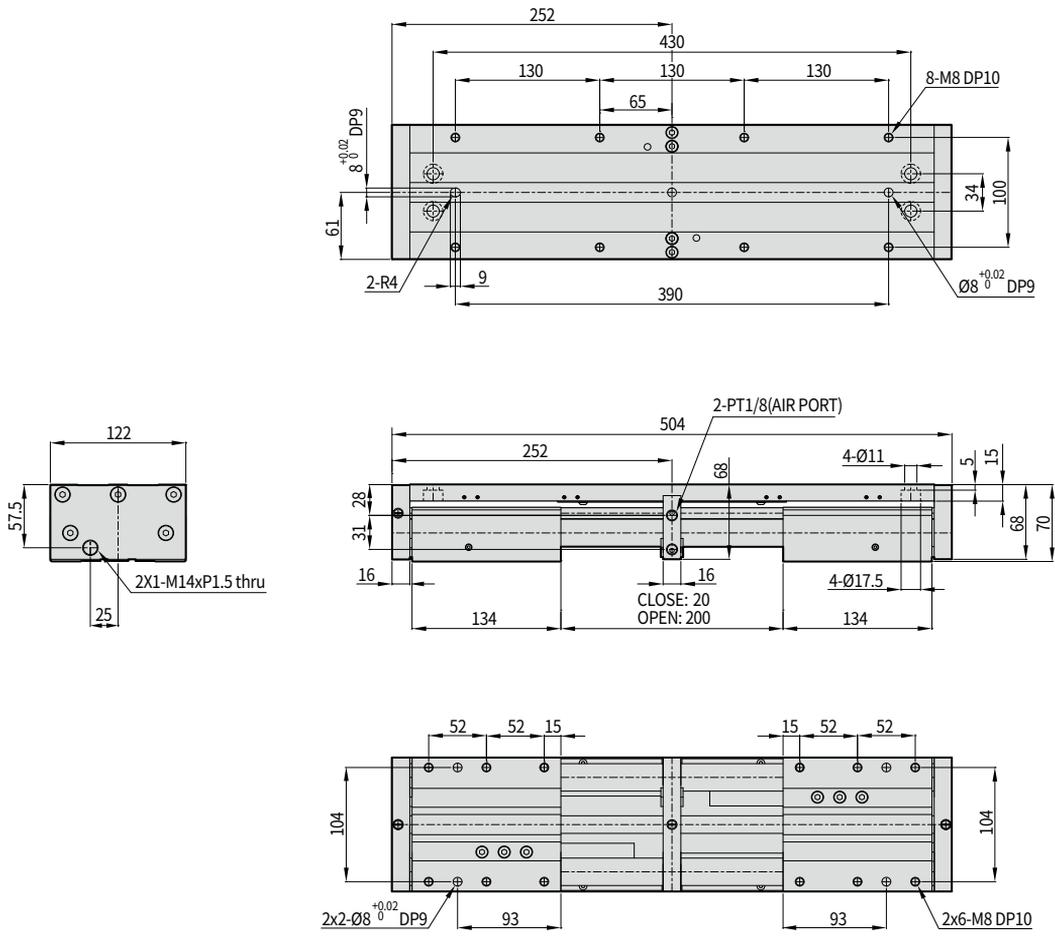


### PH23-30-W PROXIMITY SENSOR



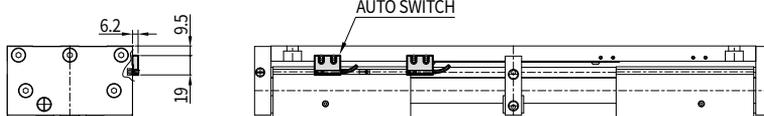
- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23**
- PH25
- PH32
- PHC

PH23-40

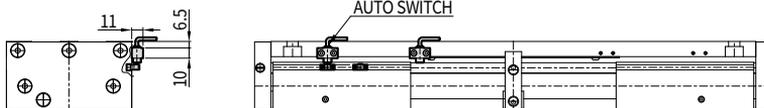


PH23-40 Example of Auto Switch installation

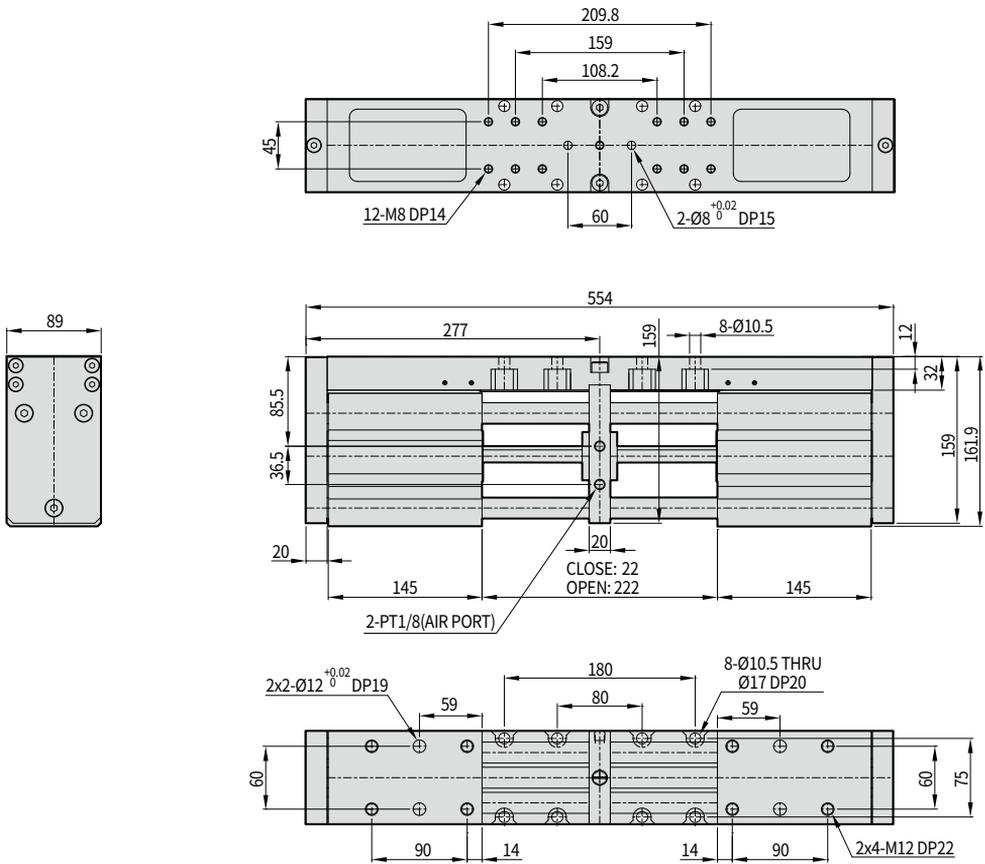
PH23-40-S MAGNETIC SENSOR



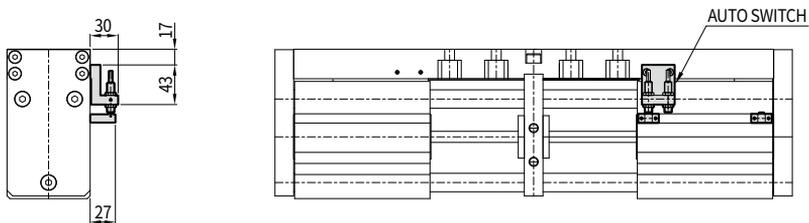
PH23-40-W PROXIMITY SENSOR



## PH23-60



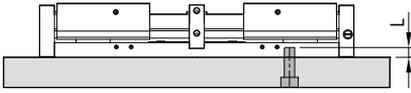
## PH23-60 Example of Auto Switch installation



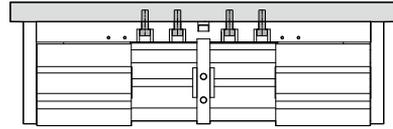
Installation Information

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23**
- PH25
- PH32
- PHC

1. Installation by body tap holes



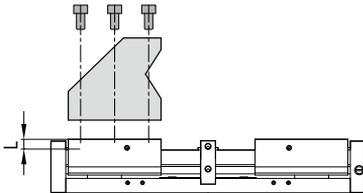
2. Installation by body through holes



Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH23-20	M5×P0.8	51	8
PH23-25	M6×P1	81	8
PH23-30	M8×P1.25	157	10
PH23-40	M8×P1.25	157	10
PH23-60	M8×P1.25	157	14

Item	Fastening Bolt	Max Torque (kgf-cm)
PH23-20		Not usable
PH23-25		Not usable
PH23-30		Not usable
PH23-40		Not usable
PH23-60	M10×P1.5	240

3. Attachment installation



Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH23-20	M5×P0.8	51	6
PH23-25	M6×P1	81	7
PH23-30	M6×P1	81	9
PH23-40	M8×P1.25	157	10
PH23-60	M12×P1.75	670	22

## GENERAL HAND / Parallel Operation

# PH25 Series

### Features

NEW

- Parallel operation by Rack & Pinion structure.
- Miniaturization, lighten and generalization type by slim body.
- Powerful gripping force comes from 2 times of cylinder thrust.
- 2 position air ports supplied basically.  
(For side Air Port : closed by plug as initial)
- Auto Switch installation. (Optional)



### Order Form

**PH25 - 08 - 16 - E - A2 L S**

① ② ③ ④ ⑤ ⑥ ⑦

#### ① Series Name

#### ② Cylinder Bore Size

#### ③ Stroke

Order	CYL Bore(mm)	Order (=Stroke(mm))
08	8	08, 16, 32
12	12	12, 24, 48
16	16	16, 32, 64
20	20	20, 40, 80

#### ④ Special Option

Order	Special Option
Blank	Standard
E	Secondary battery field

#### ⑤ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage		Current		Protect Level	Operation Time
		Wires	Direction	AC	DC	AC	DC		
Blank		No Auto Switch provided							
A2	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2C	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2V	Magnetic reed switch	2-Wire	Ver	100V	24V	5~20mA	5~40mA	IP 67	1ms
B2	Magnetic solid state	3-Wire	Horiz	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms
B2B	Magnetic solid state	2-Wire	Horiz	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms
B3B	Magnetic solid state	2-Wire	Ver	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms
B3C	Magnetic solid state	3-Wire	Ver	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms

\* Be careful of projection for vertical wire exposed type Auto Switch model. (Please refer technical information of Auto Switch)

#### ⑥ Auto Switch Cable Length

Order	Cable Length
Blank	1M
L	3M

#### ⑦ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

Specification

HAND

Item Name	PH25-08			PH25-12			PH25-16			PH25-20		
CYL Bore Size(mm)	8			12			16			20		
Stroke(mm)	8	16	32	12	24	48	16	32	64	20	40	80
Effective Gripping Force(kgf) Air pressure : 5kgf/cm <sup>2</sup> Note 2)	Close			9.6			17.1			26.7		
	Open			4.3								
Fitting Size	M3						M5					
Weight(kgf)	0.07	0.09	0.12	0.16	0.2	0.3	0.35	0.45	0.7	0.7	0.9	1.34
Max. Attachment L(mm)	40			60			80			100		
Fluid	Clean Air Note 1)											
Pressure Range(kgf/cm <sup>2</sup> )	1.5 ~ 7											
Lubrication	Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)											
Temperature Range(°C)	5 ~ 60											
Repeat Accuracy(mm)	± 0.05											
Max. Cycle Per Minute(C.P.M)	90											
Operation Type	Double Acting (Structure : Parallel operation by Rack & Pinion structure) (Guide : Linear Guide)											
Tolerance of Stroke(mm)	Open : -0.5 ~ +1											
	Close : 0 ~ +0.1											

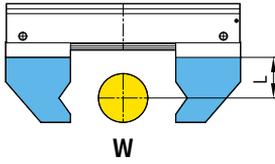
Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3~10µm degree of filtering.

Note 2) The position of the effective gripping force point is the end point of the Master Jaw.

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25**
- PH32
- PHC

## Gripping Force Graph (Close)

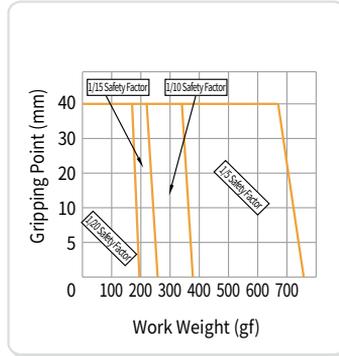
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



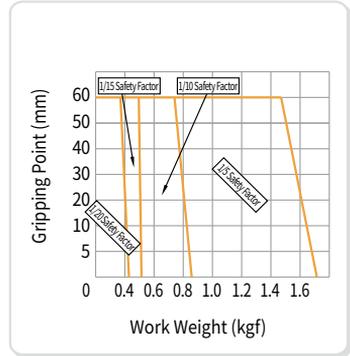
Close Grip State

W: Work Weight  
L: Attachment Length

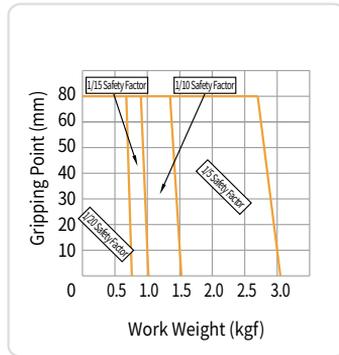
► PH25-08



► PH25-12



► PH25-16



► PH25-20

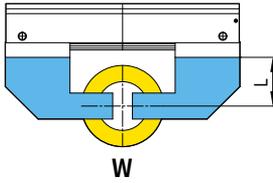


**▲ Caution**

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

Gripping Force Graph (Open)

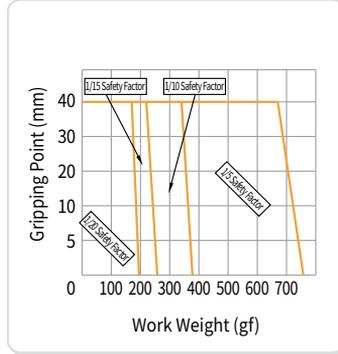
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



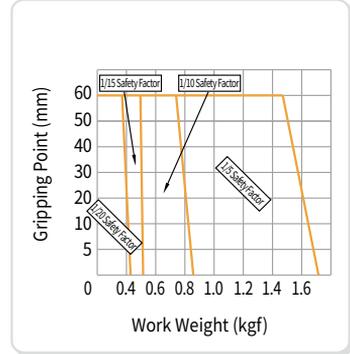
Open Grip State

W: Work Weight  
L: Attachment Length

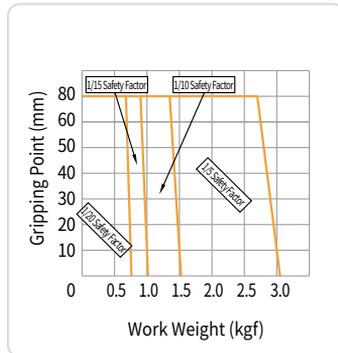
► PH25-08



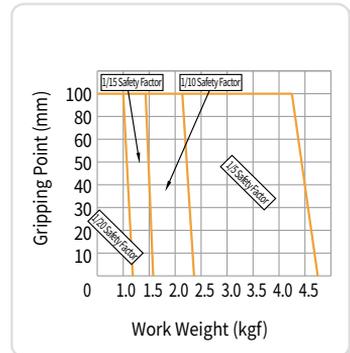
► PH25-12



► PH25-16



► PH25-20



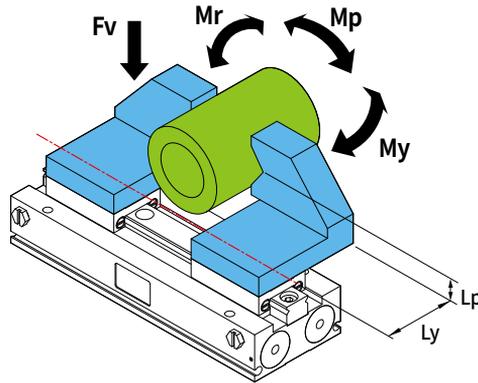
- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25**
- PH32
- PHC

⚠ Caution

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

## Check of Allowable Moment and Weight

- ※ L : Distance between the center of guide and gripping point of work.
- ※ The moment center equals with guide center.



Item	Allowable Weight for Vertical Direction. Fv (kgf)	Maximum Allowable Moment (kgf·cm)		
		Pitching moment Mp	Yawing moment My	Rolling moment Mr
PH25-08	14	1.5	1.5	4
PH25-12	16	2	2	6
PH25-16	47	9	9	23
PH25-20	71	16	16	42

※ Above listed allowable moment and weight refer static values.

### Calculation of allowable weight for moment weight applied.

$$\text{Allowable Weight } F \text{ (kgf)} = \frac{\text{Maximum Allowable Moment } M \text{ (kgf·cm)}}{\text{The point of external load applied } L \text{ (cm)}}$$

### Example)

Checking of 1kgf weight(F) force to pitching moment direction(Mp) at the 30mm attachment point on PH01-20A.

$$\Rightarrow \text{Allowable Weight } F \text{ (kgf)} = \frac{\text{Maximum Allowable Moment } M \text{ (kgf·cm)}}{\text{The point of external load applied } L \text{ (cm)}} = \frac{9}{2} = 4.5 \text{ kgf} > 2 \text{ kgf}$$

The allowable weight(4.5kgf) is bigger than applied weight (2kgf), so, it is applicable.

# PH25 Series

08

12

16

20

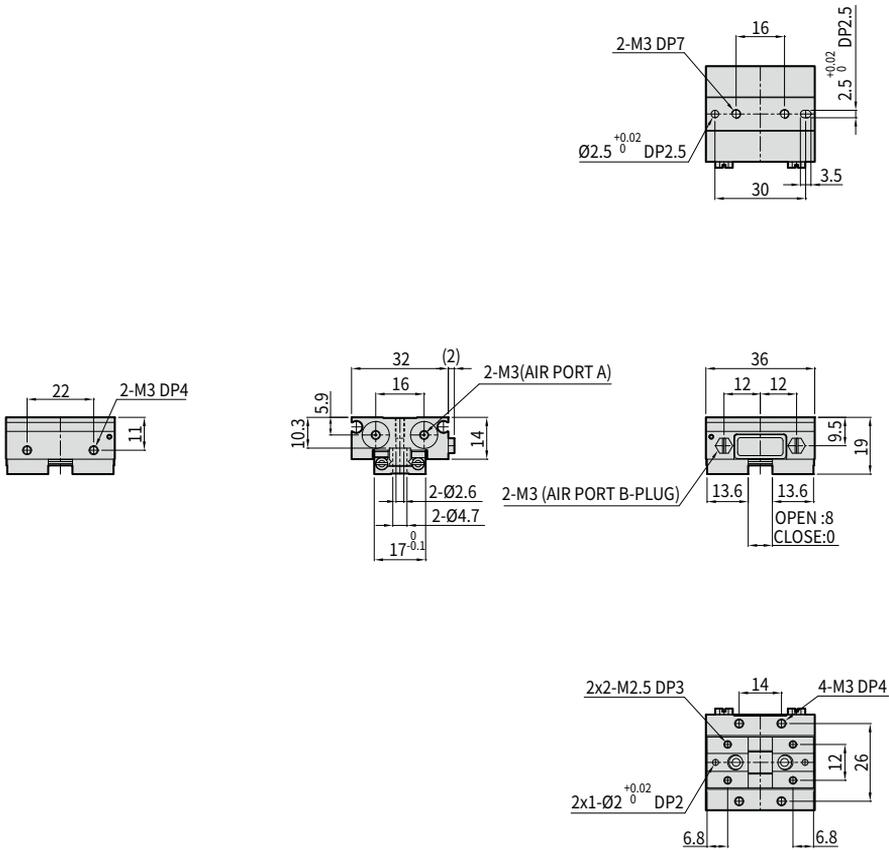
08

16

32

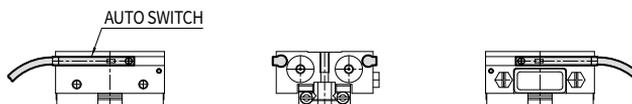
HAND

PH25-08-08



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25**
- PH32
- PHC

PH25-08-08 Example of Auto Switch installation



# PH25 Series

08

12

16

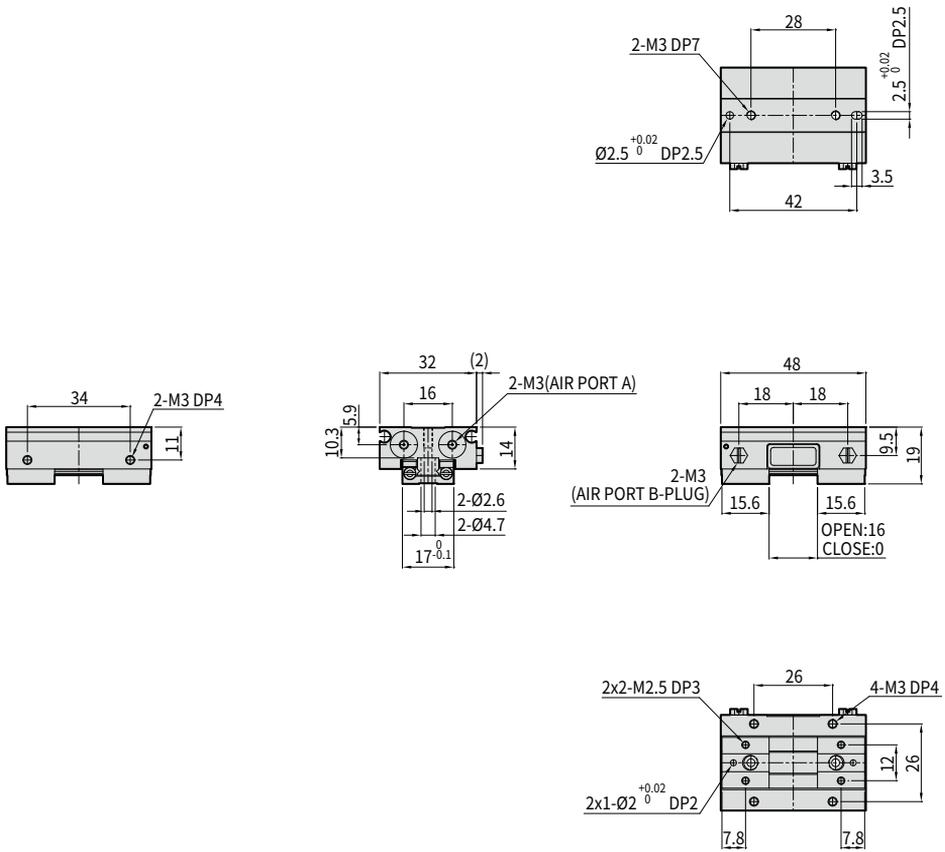
20

08

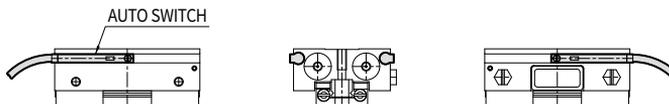
16

32

PH25-08-16



PH25-08-16 Example of Auto Switch installation



08

12

16

20

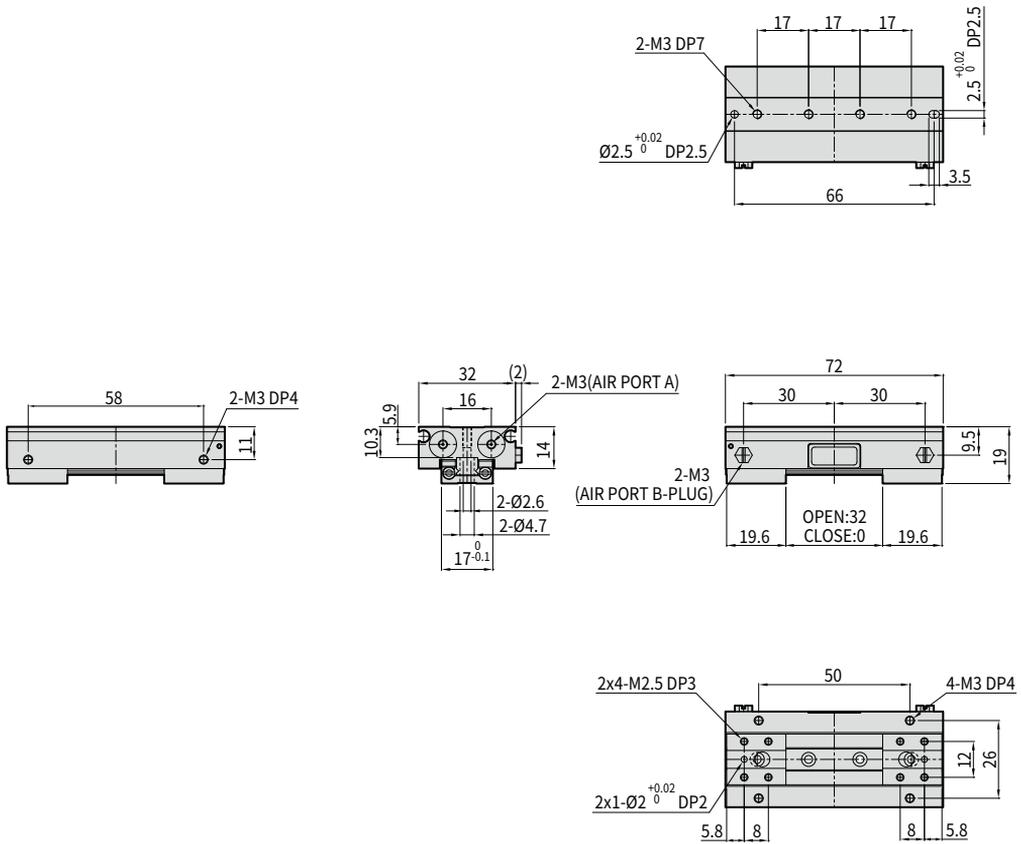
08

16

32

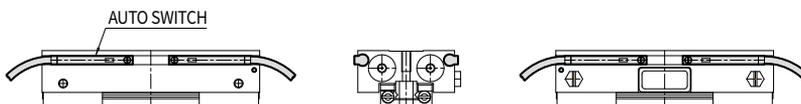
HAND

PH25-08-32



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25**
- PH32
- PHC

PH25-08-32 Example of Auto Switch installation



# PH25 Series

08

12

16

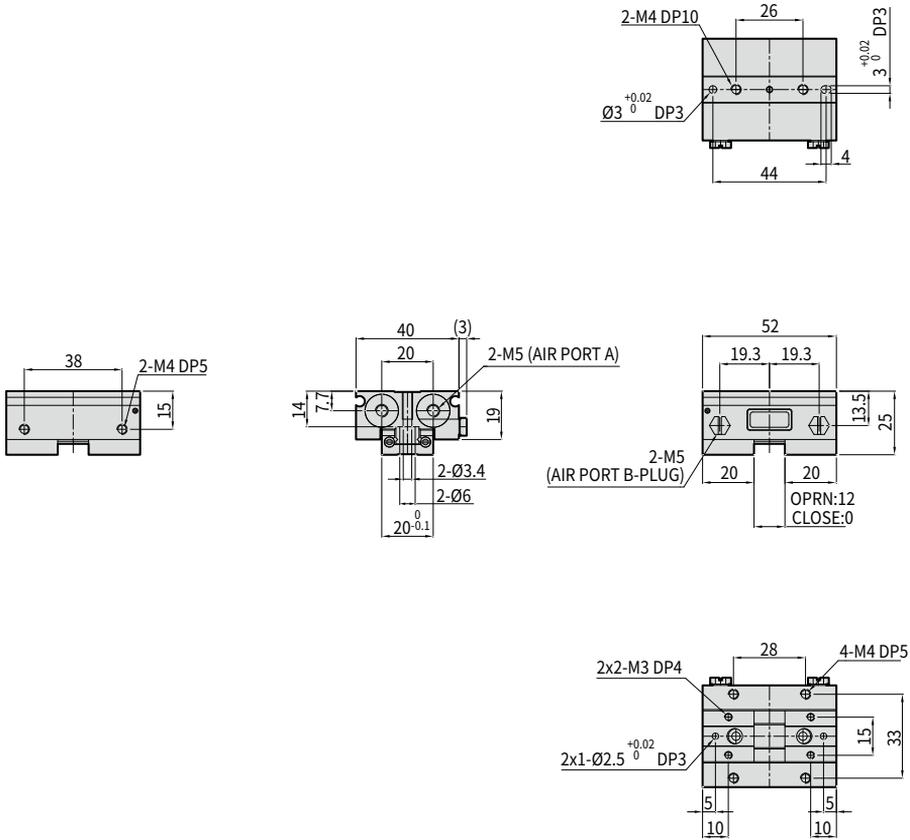
20

12

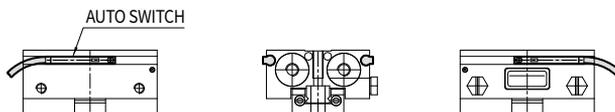
24

48

## PH25-12-12

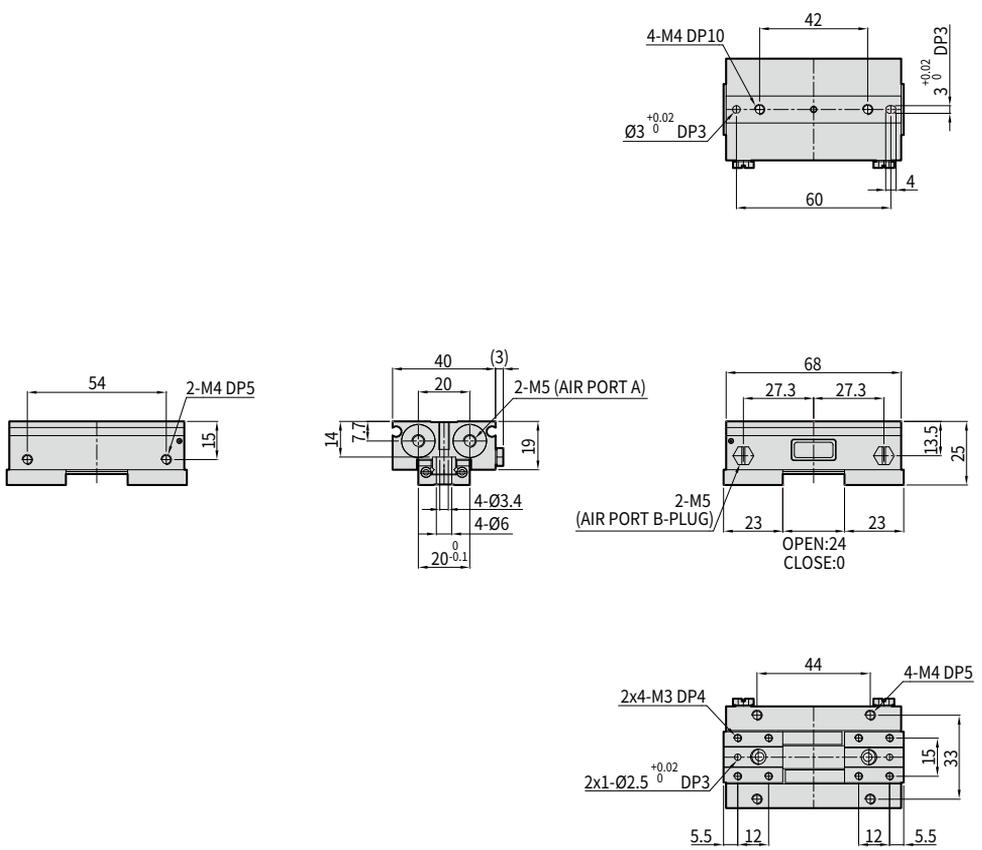


## PH25-12-12 Example of Auto Switch installation



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25**
- PH32
- PHC

PH25-12-24



PH25-12-24 Example of Auto Switch installation



# PH25 Series

08

12

16

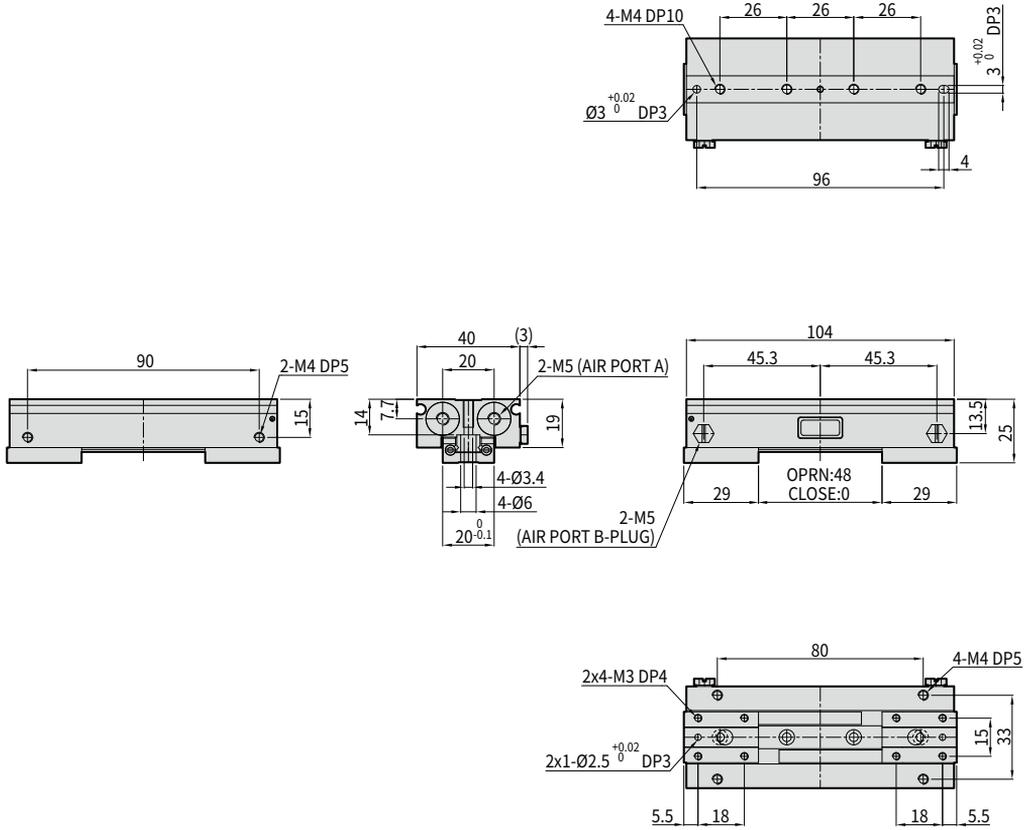
20

12

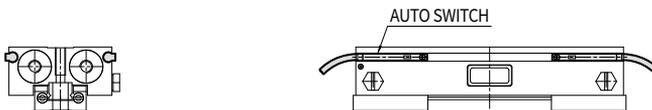
24

48

PH25-12-48

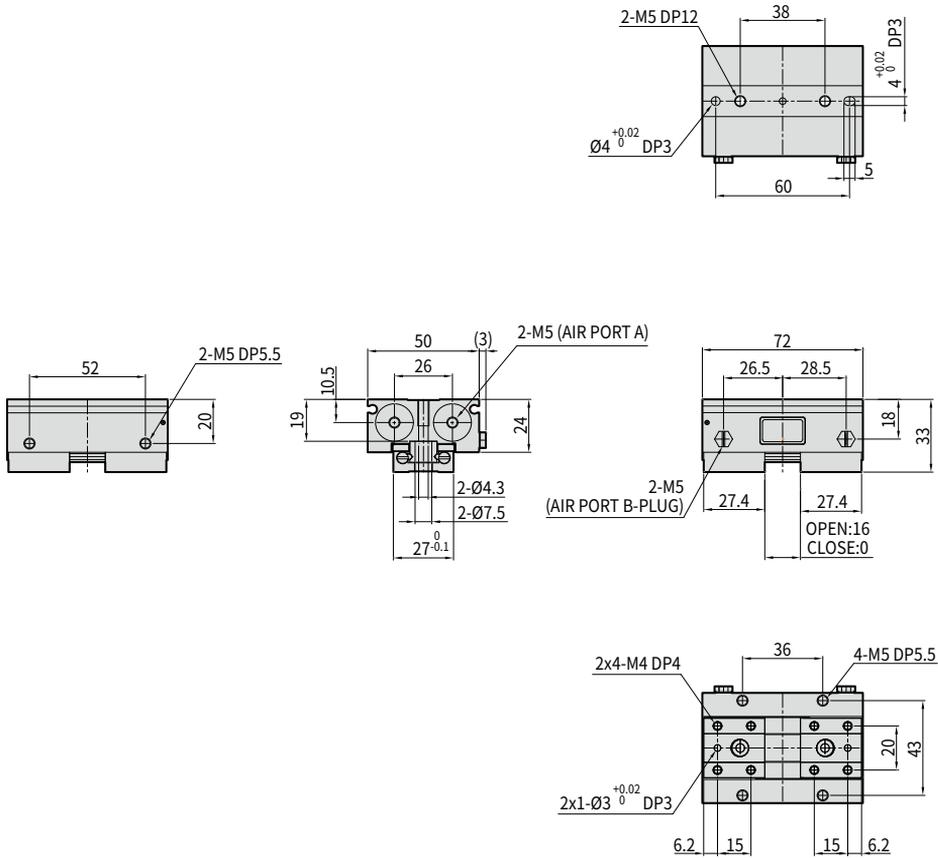


PH25-12-48 Example of Auto Switch installation

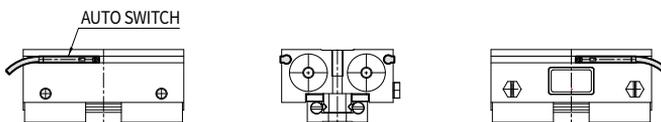


- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH25**
- PH32
- PHC

PH25-16-16



PH25-16-16 Example of Auto Switch installation

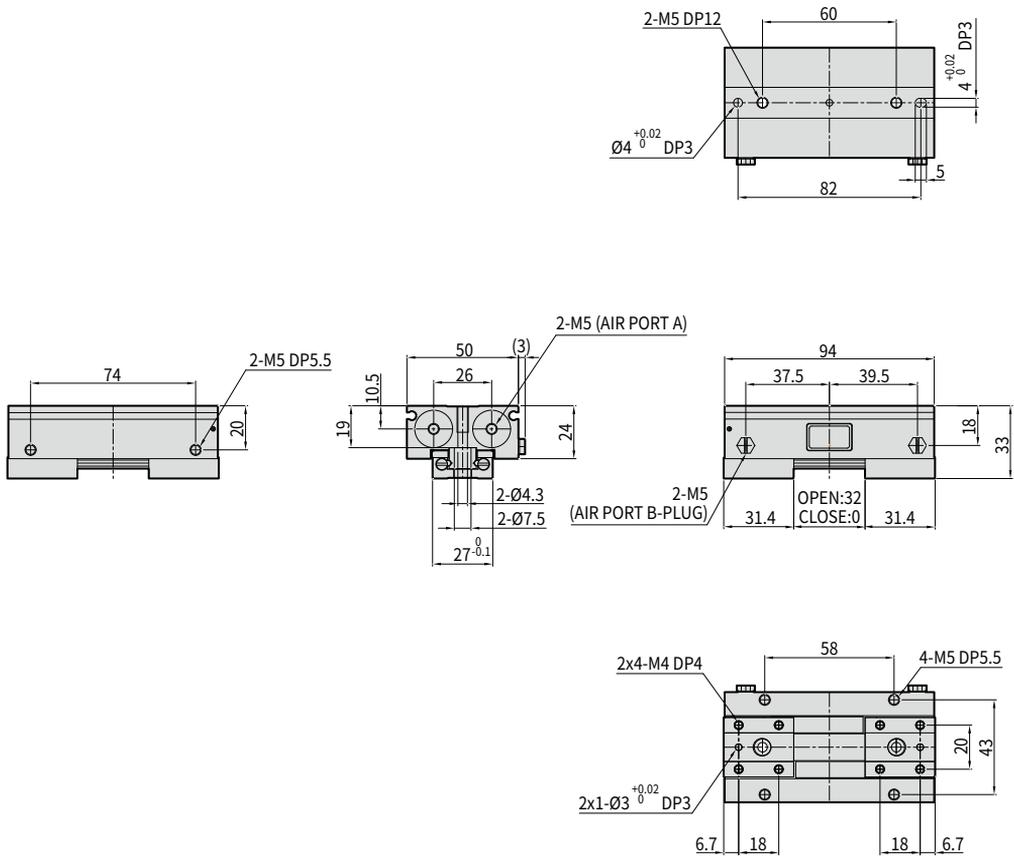


# PH25 Series

08 12 16 20

16 32 64

## PH25-16-32

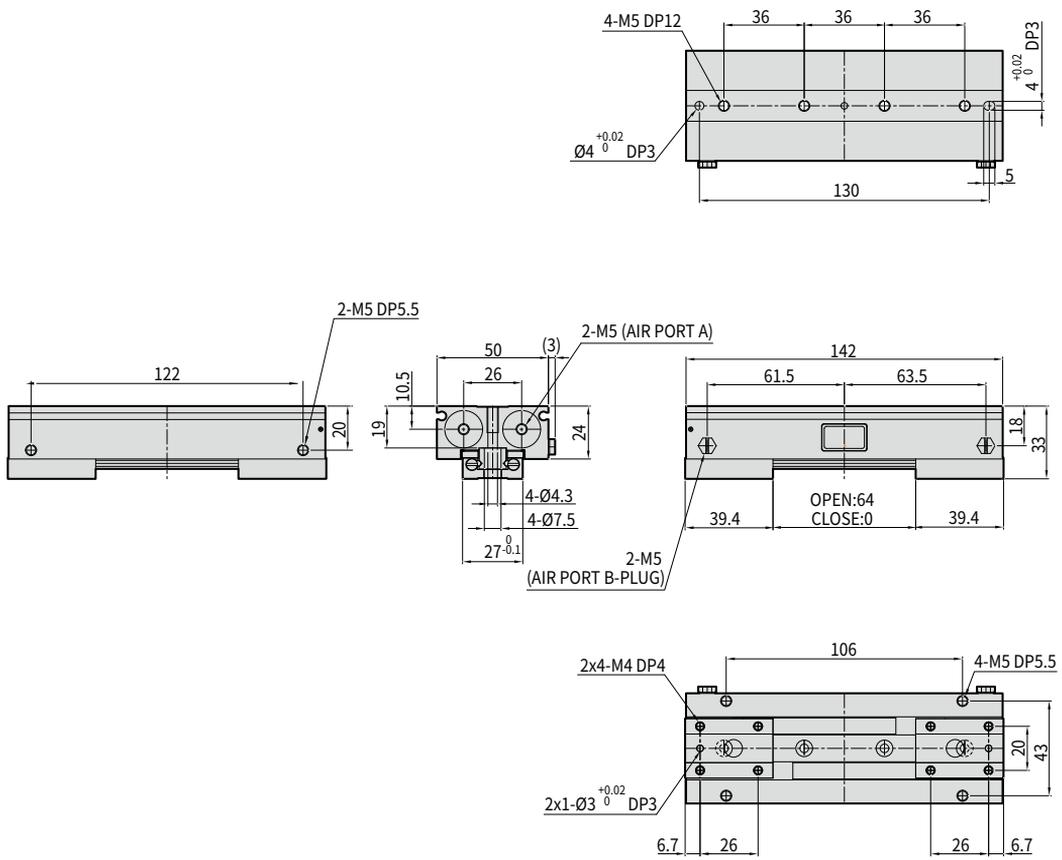


## PH25-16-32 Example of Auto Switch installation

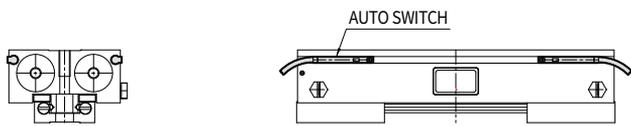


- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25**
- PH32
- PHC

PH25-16-64



PH25-16-64 Example of Auto Switch installation



# PH25 Series

08

12

16

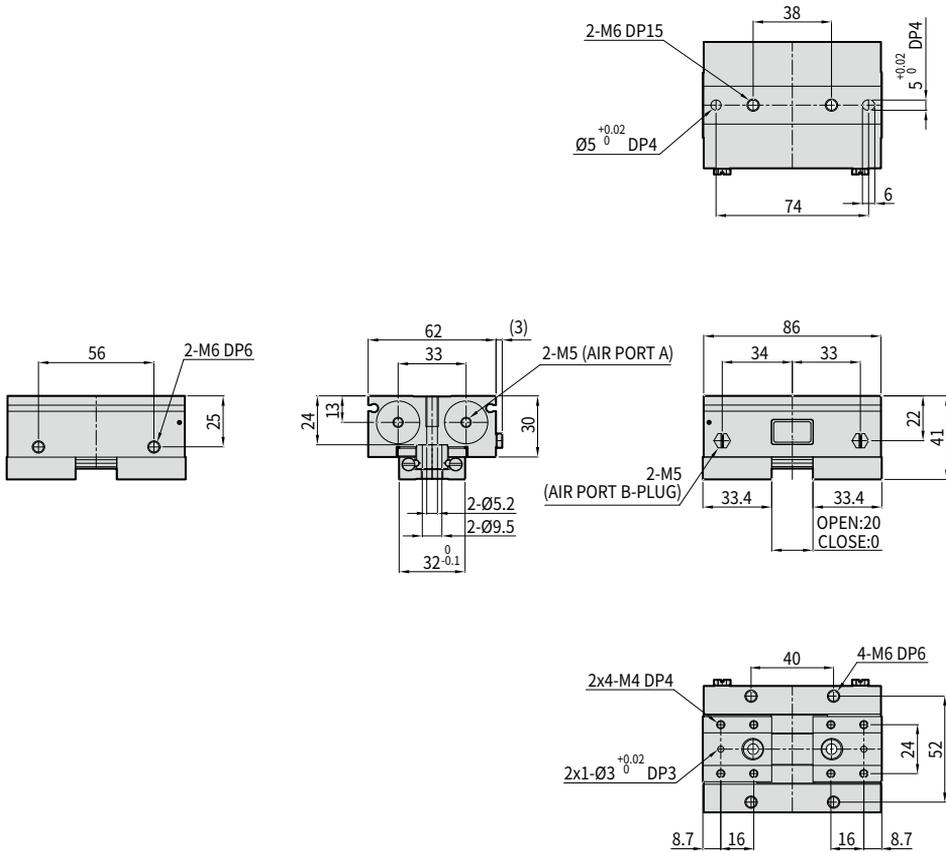
20

20

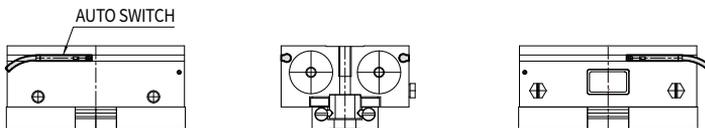
40

80

## PH25-20-20



## PH25-20-20 Example of Auto Switch installation



08

12

16

20

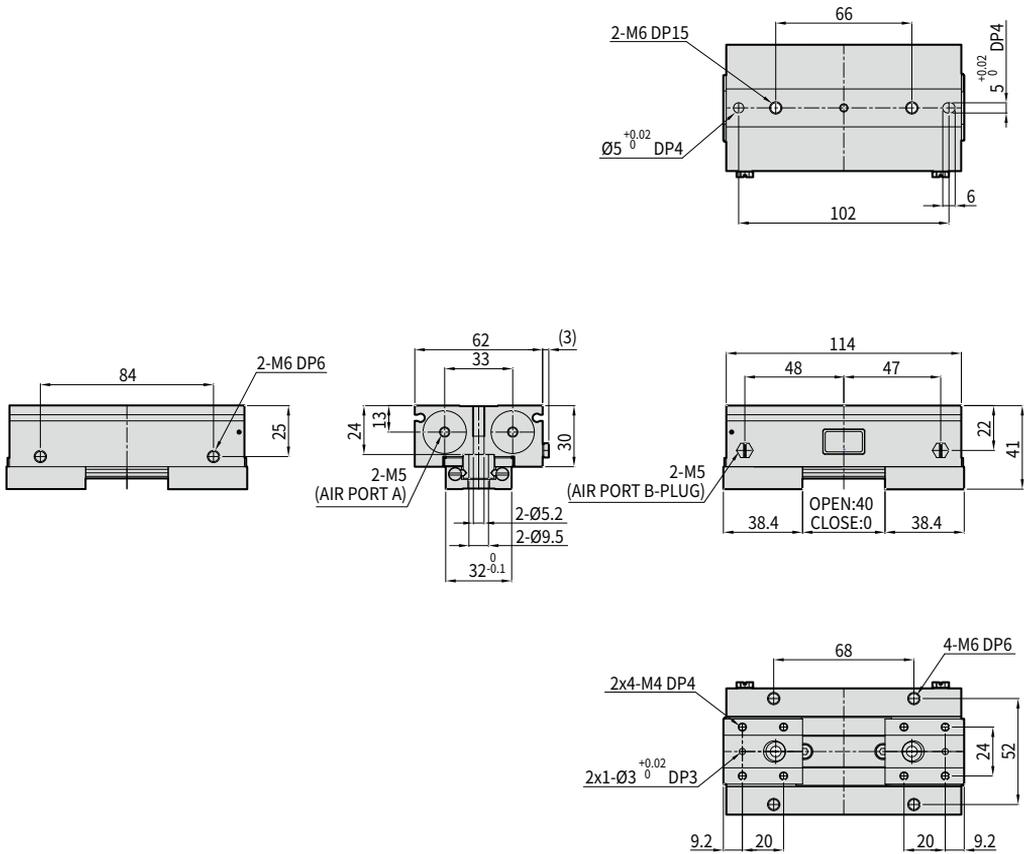
20

40

80

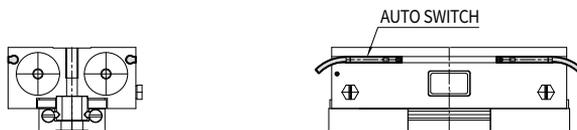
HAND

PH25-20-40



- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25**
- PH32
- PHC

PH25-20-40 Example of Auto Switch installation



# PH25 Series

08

12

16

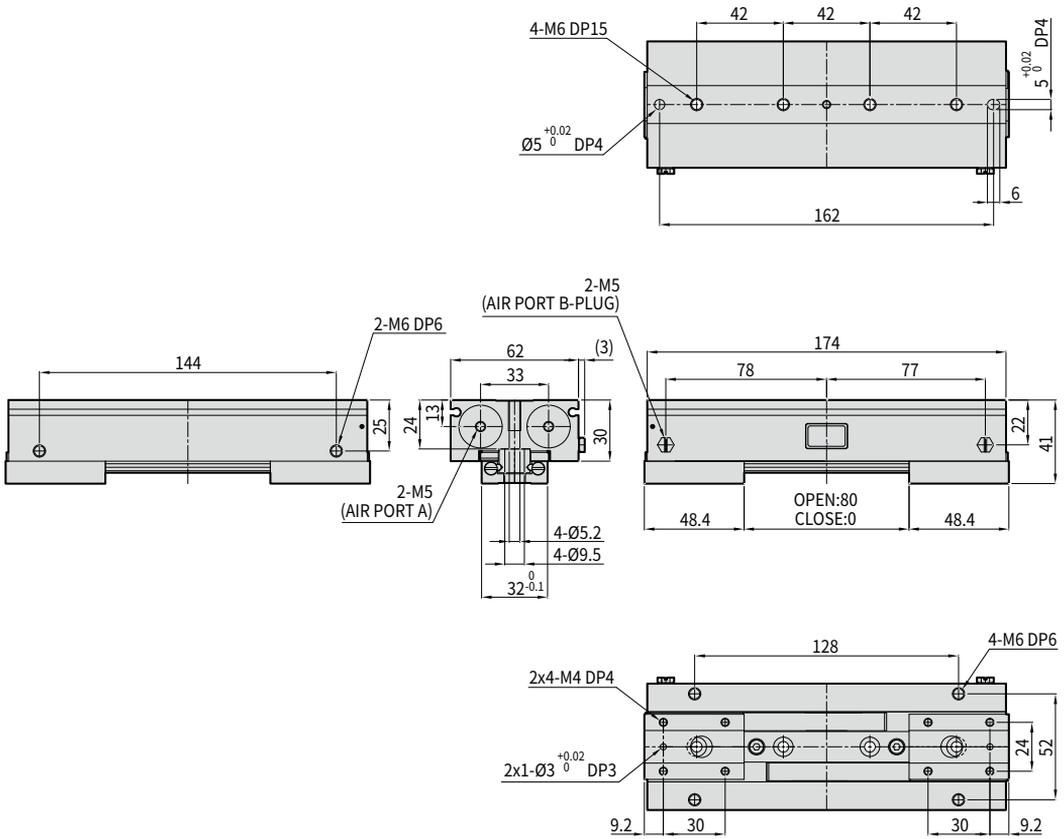
20

20

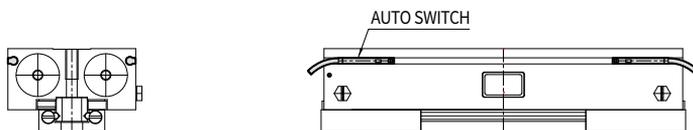
40

80

## PH25-20-80



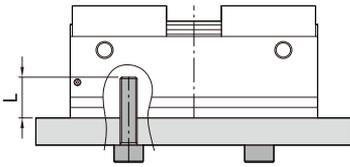
## PH25-20-80 Example of Auto Switch installation



Installation Information

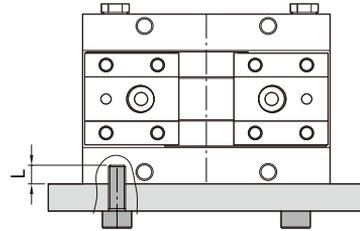
- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25**
- PH32
- PHC

1. Installation by body tap holes



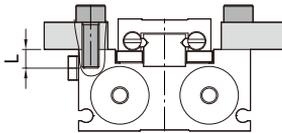
Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH25-08	M3×P0.5	11	7
PH25-12	M4×P0.7	25	10
PH25-16	M5×P0.8	51	12
PH25-20	M6×P1	81	15

2. Installation by body tap holes



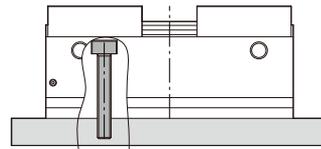
Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH25-08	M3×P0.5	11	4
PH25-12	M4×P0.7	25	5
PH25-16	M5×P0.8	51	5.5
PH25-20	M6×P1	81	6

3. Installation by body tap holes



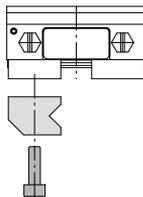
Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH25-08	M3×P0.5	11	5
PH25-12	M4×P0.7	25	6
PH25-16	M5×P0.8	51	5.5
PH25-20	M6×P1	81	6

4. Installation by body through holes



Item	Fastening Bolt	Max Torque (kgf·cm)
PH25-08	M2.5×P0.45	4.9
PH25-12	M3×P0.5	11
PH25-16	M4×P0.7	25
PH25-20	M5×P0.8	51

5. 실린더에 부착물 취부형태



Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PH25-08	M2.5×P0.45	4.9	3
PH25-12	M3×P0.5	11	4
PH25-16	M4×P0.7	25	4
PH25-20	M4×P0.7	25	4

Wide parallel type  
General Hand

# PH32 Series

---

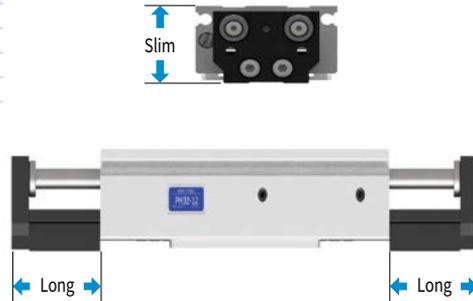
Ultra powerful gripping force from  
QUAD cylinder  
High solidity



### Compact size and Long Stroke

- Innovative Slim body dramatically reduced height.
- Longest stroke compare to own products for equal bore size models.

Bore Size	Stroke(mm)
12	60
16	90
20	120
25	150



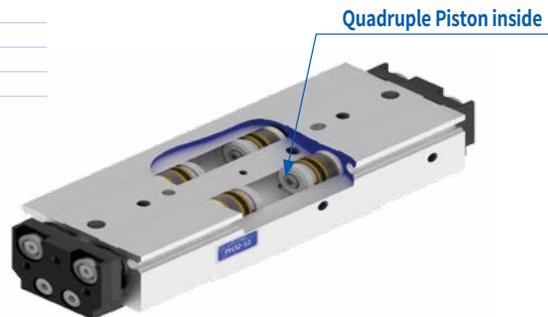
### Quad Piston Inside

- Powerful gripping force came from quad pistons inside.

Bore Size	PH06	PH32
12	5.1	16.9
16	9.1	30.1
20	14.1	47.1
25	-	73.6

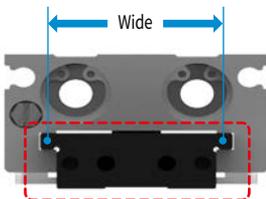
※ PH06 : Double Piston inside.

※ For Open direction gripping force at Air Pressure : 5kgf/cm<sup>2</sup>



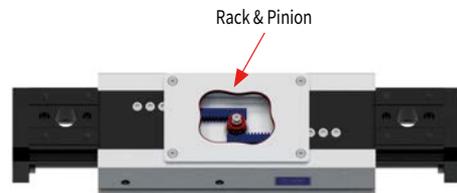
### Widen T-Slot Guide applied

- High solidity structure by T-Guide application.



### Synchronic operation by Rack & Pinion

- Parallel operation by Rack & Pinion structure.



## GENERAL HAND / Parallel Operation

# PH32 Series

### Features

NEW

- Parallel operation by synchronized of Rack and Pinion structure.
- Powerful gripping force comes from quadruple cylinders in one body.
- Suitable for handling various size workpiece by long stroke operation from centric of body.
- Auto Switch installation. (Optional)



### Order Form

## PH32 - 12 - A2 L S

①                      ②                      ③                      ④                      ⑤

#### ① Series Name

#### ② Cylinder Bore Size and Stroke

Order	CYL Bore(mm)	Stroke(mm)
12	12	60
16	16	90
20	20	120
25	25	150

#### ③ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage		Current		Protect Level	Operation Time
		Wires	Direction	AC	DC	AC	DC		
Blank		No Auto Switch provided.							
A2	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2C	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2V	Magnetic reed switch	2-Wire	Ver	100V	24V	5~20mA	5~40mA	IP 67	1ms
B2	Magnetic solid state (NPN)	3-Wire	Horiz	-	24V (4.5~28V)	-	100mA	IP 67	1ms
B2B	Magnetic solid state (NPN)	2-Wire	Horiz	-	24V (10~28V)	-	50mA	IP 67	1ms
B3B	Magnetic solid state (NPN)	2-Wire	Ver	-	24V (20~30V)	-	50mA	IP 67	1ms
B3C	Magnetic solid state (NPN)	3-Wire	Ver	-	24V (5~30V)	-	50mA	IP 67	1ms

\* Be careful of projection for vertical wire exposed type Auto Switch model. (Please refer technical information of Auto Switch)

#### ④ Auto Switch Cable Length

Order	Cable Length
Blank	1M
L	3M

#### ⑤ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

Specification

HAND

PH01-A  
PH01-D  
PH01-G  
PH01J-C  
PH01K  
PH02  
PH02-H  
PH04  
PH05  
PH06  
PH06-L  
PH06-L2  
PH07  
PH08  
PH09  
PH10  
PH12  
PH14-S  
PH14-CL  
PH14-CF  
PH15-S  
PH15-CL  
PH15-CF  
PH15-W  
PH21  
PH22  
PH23  
PH25  
PH32  
PHC

Item Name		PH32-12	PH32-16	PH32-20	PH32-25
Cylinder Bore Size(mm)		12	16	20	25
Rod Size(mm)		6	8	10	12
Stroke(mm)		60	90	120	150
Effective Gripping Force(kgf)	Close	12.7	22.6	35.3	56.6
	Open	16.9	30.1	47.1	73.6
Fitting Size		M5			
Weight(kgf)		0.7	1.5	2.8	5
Max. Attachment L(mm)	Note 3)	50	80	120	160
Fluid		Clean Air Note 1)			
Pressure Range(kgf/cm <sup>2</sup> )		3 ~ 7 (Guaranteed Resist Pressure : 10.5) Note 4)			
Lubrication		Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)			
Temperature Range(°C)		5 ~ 60			
Repeat Accuracy(mm)		± 0.08			
Max. Cycle Per Minute(C.P.M)		60			
Operation Type		Double Acting			
Tolerance of Stroke(mm)		Open : -0.5 ~ +1.5			
		Close : -1.5 ~ +0.5			

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3~10µm degree of filtering.

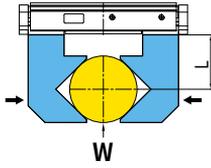
Note 2) The position of the effective gripping force point is the end point of the Master Jaw.

Note 3) For Max. Attachment L and H, please refer <GENERAL HAND Model Selection Guide>. (it is permitted length for 5kgf/cm<sup>2</sup> pressure applied)

Note 4) Guaranteed Resist Pressure : A pressure that does not cause an abnormality in parts when it is applied for 1 minute without any weight loaded.

## Gripping Force Graph (Close)

► Refer <GENERAL HAND Selection Guide> for how to read below graph.



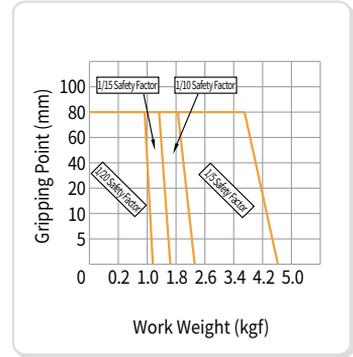
Close Grip State

W: Work Weight  
L: Attachment Length

► PH32-12



► PH32-16



► PH32-20



► PH32-25

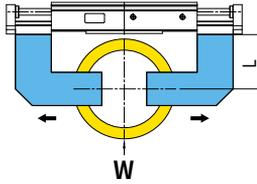


**▲ Caution**

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

Gripping Force Graph (Open)

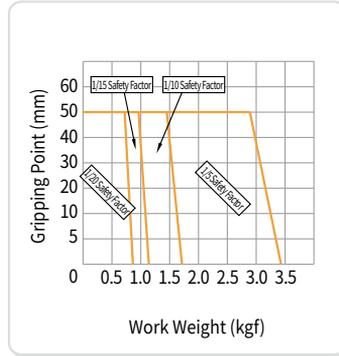
► Refer <GENERAL HAND Selection Guide> for how to read below graph.



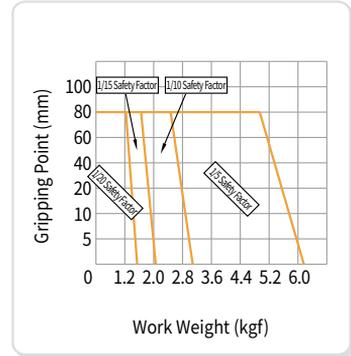
Open Grip State

W: Work Weight  
L: Attachment Length

► PH32-12



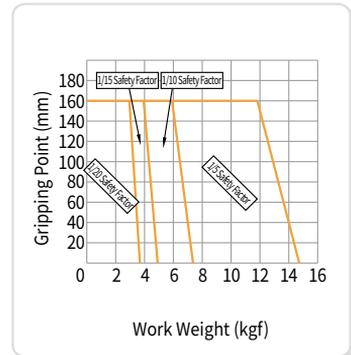
► PH32-16



► PH32-20



► PH32-25

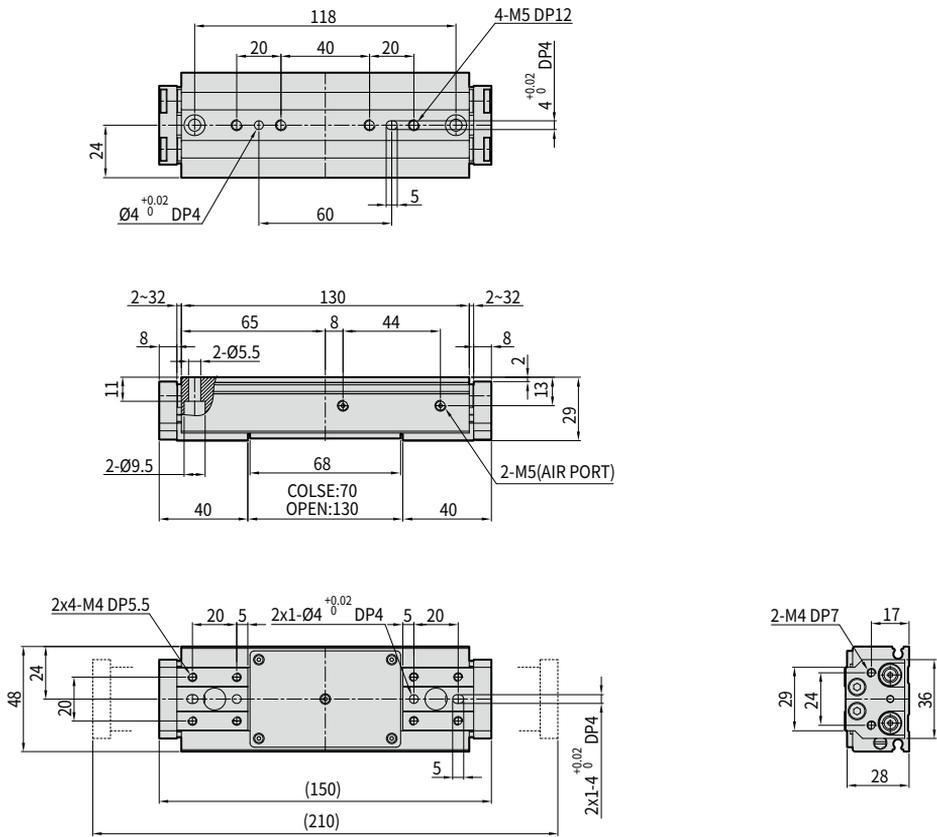


- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

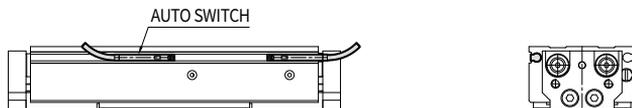
⚠ Caution

If using the attachment length longer than maximum length as specified on the graph, it may have an adverse effect on the guide and caused a problem of durability. Please use it within the maximum attachment length which specified.

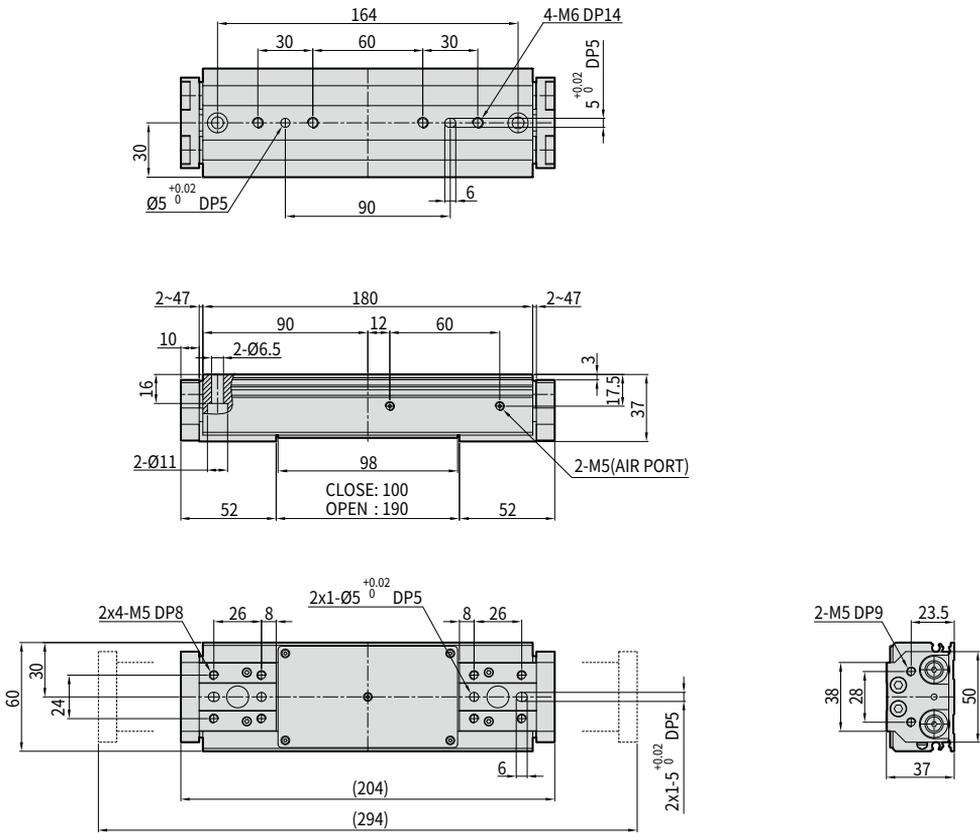
## PH32-12



## PH32-12 Example of Auto Switch installation

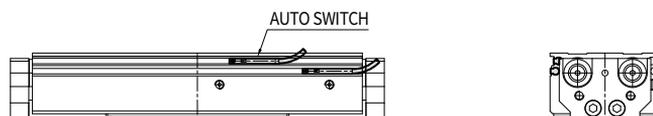


PH32-16



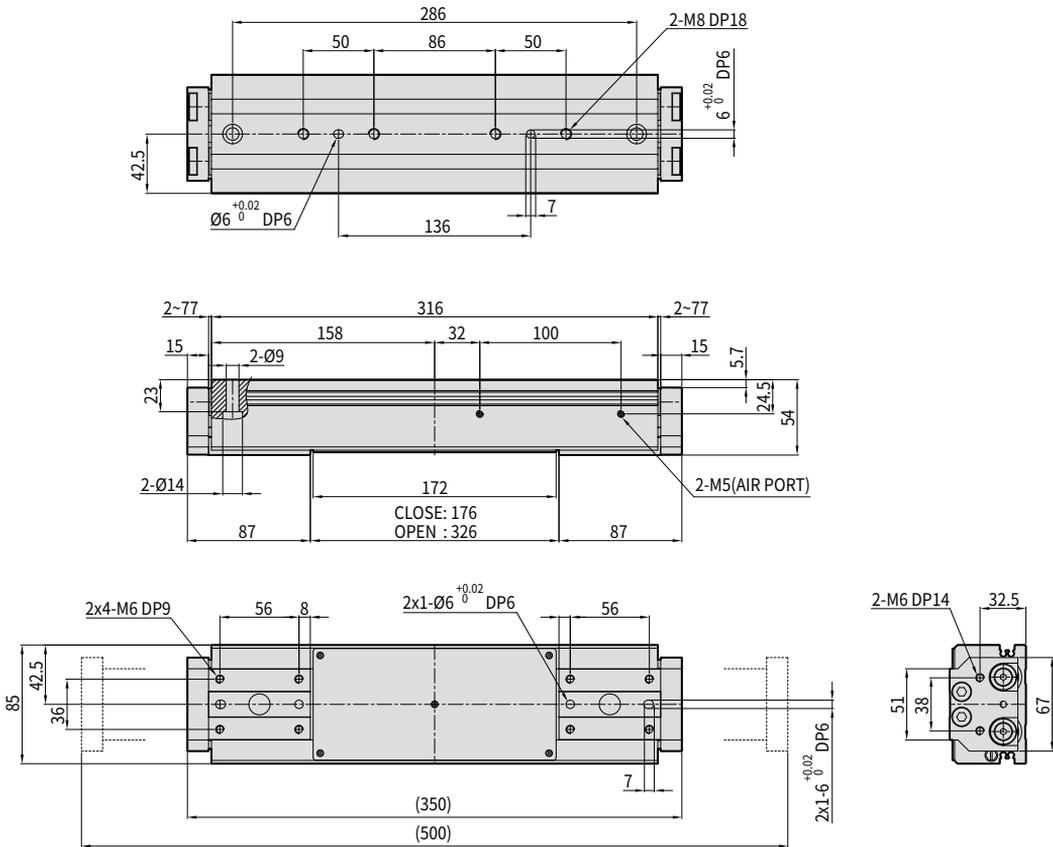
- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32**
- PHC

PH32-16 Example of Auto Switch installation

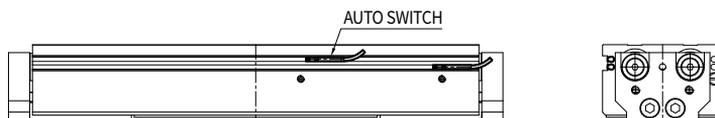




PH32-25

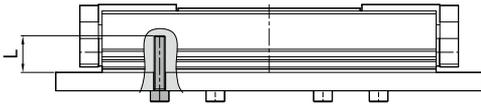


PH32-25 Example of Auto Switch installation



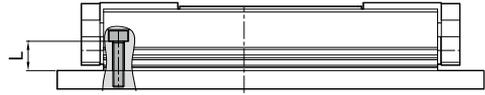
- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32**
- PHC

1. Installation by body tap holes



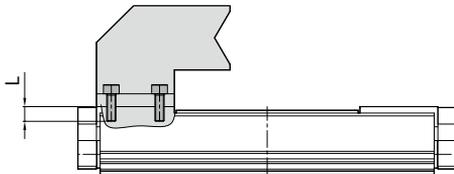
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH32-12	M5×0.8	51	12
PH32-16	M6×1	81	14
PH32-20	M8×1.25	157	18
PH32-25	M8×1.25	157	18

2. Installation by body through holes



Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH32-12	M5×0.8	51	11
PH32-16	M6×1	81	16
PH32-20	M8×1.25	157	18
PH32-25	M8×1.25	157	23

3. Attachment installation



Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
PH32-12	M4×0.7	25	5.5
PH32-16	M5×0.8	51	8
PH32-20	M6×1	81	9
PH32-25	M6×1	81	9

MEMO

Handwriting practice area consisting of 25 horizontal dotted lines.

**HAND**

PH01-A
PH01-D
PH01-G
PH01J-C
PH01K
PH02
PH02-H
PH04
PH05
PH06
PH06-L
PH06-L2
PH07
PH08
PH09
PH10
PH12
PH14-S
PH14-CL
PH14-CF
PH15-S
PH15-CL
PH15-CF
PH15-W
PH21
PH22
PH23
PH25
PH32
PHC

COMPACT HAND

# PHC Series

---

Ultra miniature GENERAL HAND  
operative both of vacuum and  
compressed air



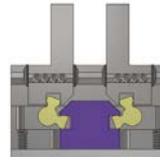
### Various configuration of Ultra miniature sereis

- Various products lineup.
- Selectable operation source (vacuum or compressed air) for the purpose.

Model	Pressure Range (P)	Acting Type	Classified
PHC01	-0.7 ~ -0.98	Normal Open	Parallel operate, Rectangular shape
PHC02	-0.7 ~ -0.98	Normal Open	Angular operate, Rectangular shape
PHC03	-0.7 ~ -0.98	Normal Open	Angular operate, Circular shape
PHC04	3 ~ 7	Normal Close	Angular operate, Circular shape

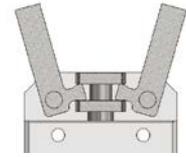
P = Kg<sub>f</sub>/cm<sup>2</sup>

- Parellel operation : PHC01 Type  
- Linear Guide applicated
- Angular operation : PHC02, 03, 04 Type  
- Direct CAM



[ PHC01 ]

High Precision  
Linear Guide

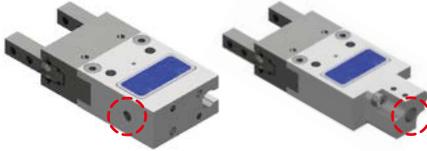


[ PHC02 ]  
[ PHC03 ]  
[ PHC04 ]

Direct CAM

### PHC01, PHC02 - Vacuum operating General Hand optimized for pick up cylinder module

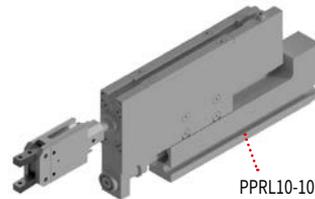
- Convenience for modularization by Air Port position options. (Adapter application)



※ Side air port will not be supplied for bottom air port option selected.

- Best combination with pick up cylinder operated by vacuum source.

※ For modularization, please contact to office.

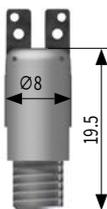


PPRL10-10

Application  
- Pick up Cylinder Combination

### PHC03, PHC04 - Circular General Hand for various options

- One Body, Various Options.



[ PHC03-06A ]  
[ PHC04-06A ]

- Same dimension specification for vacuum(PHC03) and compressed air(PHC04) source models.



A TYPE  
(2 Jaw)



B TYPE  
(3 Jaw)

- 2 and 3 Jaws options for various workpiece handling.

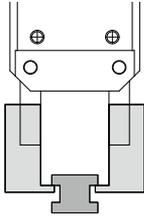
Please read it before use for your safe use.

## Safety Notes for PHC Series

### Warning

#### ■ Use the attachment of vacuum operating cylinder as like hanging workpiece by hooks.

Vacuum operating cylinder has very small gripping force. To prevent workpiece drop, design the attachment as like hook and use it the form of hanging.



### Notes in Design

#### ■ Make sure to use vacuum break when operation.

Do NOT use it force as workpiece to release when vacuum operating.

For vacuum operating cylinder, make sure to use vacuum break when it come back by cylinder.

#### ■ All products has spring inside of cylinder.

According to the character of spring, the gripping force will be different every stroke position.

The durability of spring might affect the lifespan products.

#### ■ Use vacuum-only products for vacuum-operated products.

Usage of not vacuum-only products in the vacuum line might lead vacuum leakage or malfunction. Make sure to use vacuum-only product for your safety use.

### Warning

### Notes for usage Environment

#### ■ Pay attention on the loss and/or maintain of vacuum.

If the distance between vacuum generator and cylinder is too far, it might lead vacuum leakage which be the reason of malfunction or not working.

Locate vacuum generator as close as possible to the cylinder.

#### ■ Establish measures for power failure.

If the vacuum pressure inside the cylinder is lost by vacuum pressure decreases, the work being transported may fall and cause damage to human body or machinery. Establish sufficient safety measures such as fall prevention measures when power failure or loss of vacuum pressure.

※ For more safety usage, please read <Basic Safety Notes for General Hand> also before use.

# PHC Series

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC**

Features

NEW

- Ultra miniature, slim structure for maximization of space utilization.
- PHC01 - Precise and stable operation by high precision linear guide application.
- PHC02, PHC03, PHC04 - Stabilized Direct CAM Link lever structure.
- Selective application of source(Vacuum, compressed air) for the purpose.
- Optimized for modularization combination with pick up cylinder.



Order Form

**PHC01 D5 - 08 A - B3B L S**

①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

① Series Name

③ Cylinder Bore Size

⑤ Available Auto Switches

Order	Shape	Operation	Pressure Range (Kgf/cm <sup>2</sup> )	Order	CYL Bore (mm)	Order	
						B3B	B3C
PHC01		Parallel	-0.7 ~ -0.98 (Vacuum pressure)	08	8	<input type="radio"/>	<input type="radio"/>
PHC02		Angular		06	6	<input type="radio"/>	<input type="radio"/>
				08	8	<input type="radio"/>	<input type="radio"/>
PHC03		Angular		3 ~ 7	06	6	
			08		8		
PHC04		Angular	06		6		
			08		8		

\* For more stable operation of vacuum source general hand, blow-off function is needed.

※ For "Blank", no Auto Switch is provided.  
 ※ PHC03, PHC04 cannot use auto switches.

※ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage		Current		Protect Level	Operation Time
		Wires	Direction	AC	DC	AC	DC		
B3B	Magnetic solid state (NPN)	2-Wire	Ver	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms
B3C	Magnetic solid state (NPN)	3-Wire	Ver	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms

\* Be careful of projection for vertical wire exposed type Auto Switch model. (Please refer technical information of Auto Switch)

② Air Port(Vacuum Port) Options (Only for PHC01, PHC02)

Order	Air Port Position	Item	Recommended Modularization
Blank	Standard (Side position) 	-	-
D4	For modularization (Bottom) 	PHC01-08 PHC02-06 PHC02-08	PPRL10
D5		PHC01-08 PHC02-08	PPRL13

- \* For modularization with Pick Up Cylinders, consulting with us is recommended.
- \* For PHC03, PHC04 cannot select this options. For modularization of these models, please contact to us.
- \* For other combination models, please contact to us.

④ Number of Master Jaws

Order	Num of Master Jaws
A	2 JAW
B	3 JAW

\* For PHC01 and PHC02 products, 2 jaws option only.

⑥ Auto Switch Cable Length

Order	Cable Length
Blank	1M
L	3M

⑦ Auto Switch Quantity

Order	Quantity
S	1PCS

## Specification

Item Name	PHC01	PHC02		PHC03		PHC04	
CYL Bore Size(mm)	8	6	8	6	8	6	8
Stroke	4 mm	-6.8 ~ 31.5°	-17 ~ 28°	-3.5 ~ 23°	-5.7 ~ 24°	-3.5 ~ 23°	-5.7 ~ 24°
Fitting Size <small>Note 2)</small>	M3						
Weight(kgf)	0.04	0.0115	0.016	0.0025	0.005	0.0025	0.005
Allowable Attachment Length(mm) <small>Note 3)</small>	15	20		15		20	
Fluid	Clean Air <small>Note 1)</small>						
Pressure Range(kgf/cm <sup>2</sup> )	-0.7 ~ -0.98					3 ~ 7	
Lubrication	Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)						
Temperature Range(°C)	5 ~ 60						
Repeat Accuracy	±0.01 mm			±0.1 °			
Max. Cycle Per Minute(C.P.M)	140			60			
Operation Type	Operation Type	Single Acting (Normal Open)				Single Acting (Normal Close)	
	Structure	Crank Lever		Link Lever			
	Guide and Operation	Ball Bearing Guide type Parallel operation		Metal Guide type Angular operation			
Tolerance of stroke	Open: -0.5 ~ +1mm Close: -1 ~ +0.5mm			Open: -2 ~ +5° Close: -5 ~ +2° (For single side master jaw)			

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10μm degree of filtering.

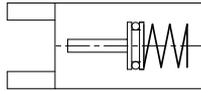
Note 2) For Air Port size by options, please refer each drawings.

Note 3) PHC01 : From end of body to center of gravity of workpiece.

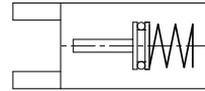
PHC02-04 : From end of Master Jaw hinge to center of gravity of workpiece.

Effective Gripping Force

PHC01  
(Normal Open)



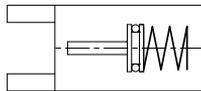
PHC02  
(Normal Open)



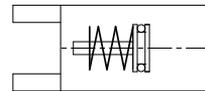
Cylinder Bore Size(mm)		8
Effective Gripping Force (kgf)	Close (Vacuum pressure) $V = -0.9 \text{ kgf/cm}^2$	0.25
	Open (Spring force)	0.1

Cylinder Bore Size(mm)		6	8
Effective Gripping Force (kgf)	Close (Vacuum pressure) $V = -0.9 \text{ kgf/cm}^2$	0.04	0.08
	Open (Spring force)	0.02	0.03

PHC03  
(Normal Open)



PHC04  
(Normal Close)



Cylinder Bore Size(mm)		6	8
Effective Gripping Force (kgf)	Close (Vacuum pressure) $V = -0.9 \text{ kgf/cm}^2$	0.04	0.07
	Open (Spring force)	0.02	0.04

Cylinder Bore Size(mm)		6	8
Effective Gripping Force (kgf)	Close (Spring force)	0.06	0.05
	Open (Compressed pressure) $P = 5 \text{ kgf/cm}^2$	0.35	0.57

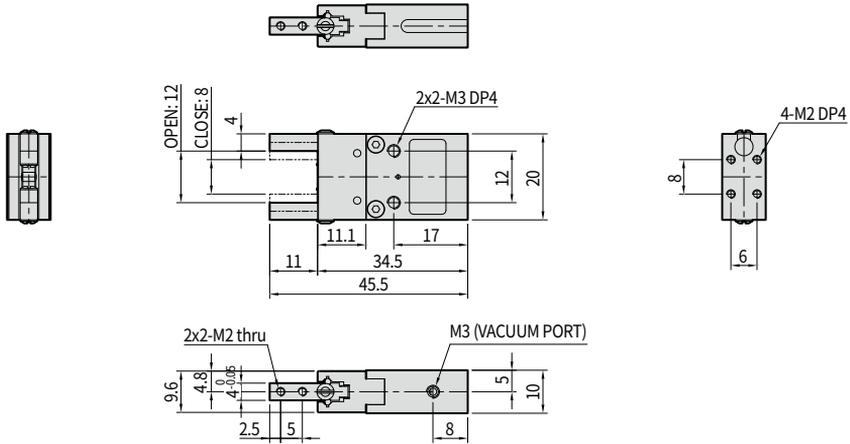
※ The position of the effective gripping force point is the end point of the Master Jaw.

※ Written gripping forces are theoretical value from end to end of stroke, its could be different for each positions due to the effect of spring force.

※ The gripping force from vacuum source is very small. Even though the attachment length is enough short, please use it hanging on type. (Ref. Cautions)

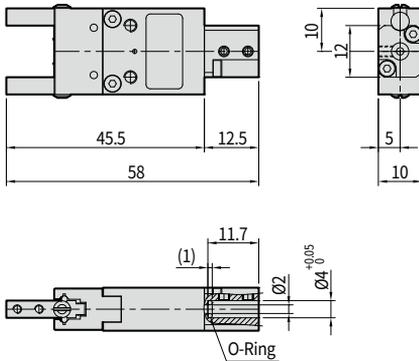
- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

## PHC01-08A

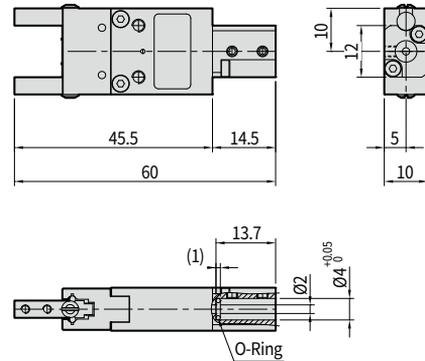


## PHC01D#-08A (Adaptor Type)

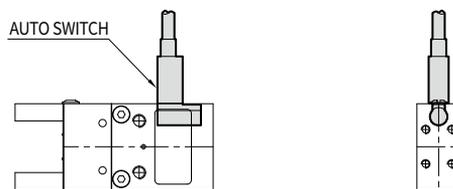
### PHC01D4-08A



### PHC01D5-08A



## PHC01-08A Example of Auto Switch installation



01

02

03

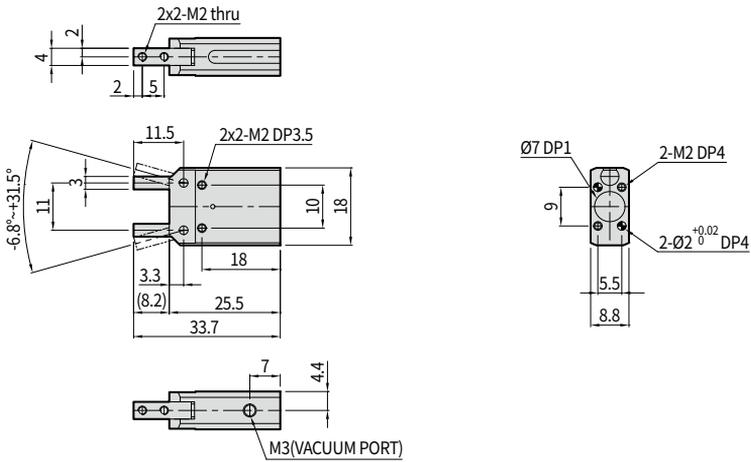
04

06A

08A

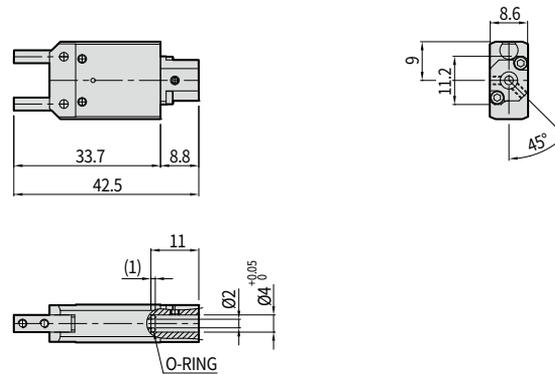
HAND

PHC02-06A

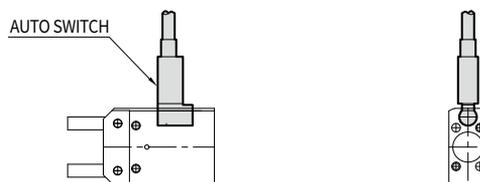


PHC02D#-06A (Adaptor Type)

PHC02D4-06A

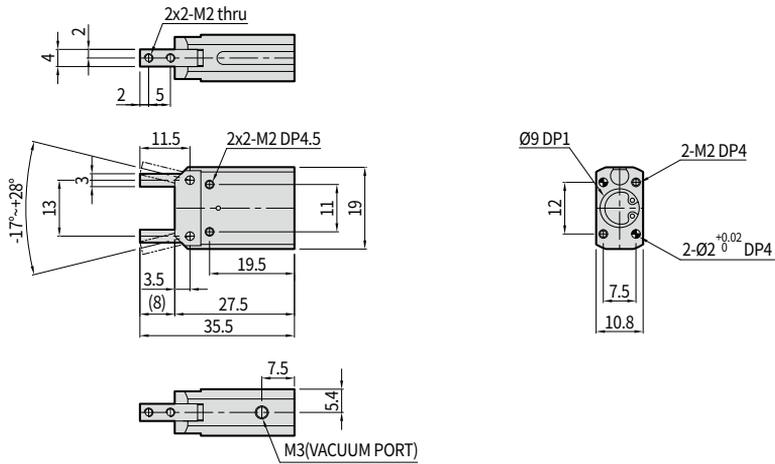


PHC02-06A Example of Auto Switch installation



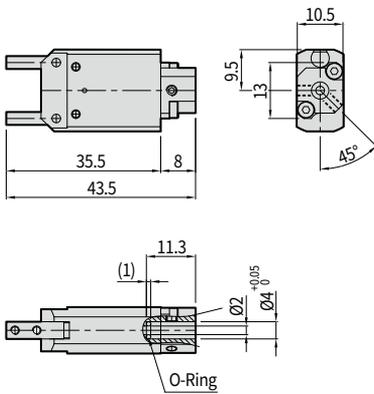
- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CF
- PH15-CL
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

## PHC02-08A

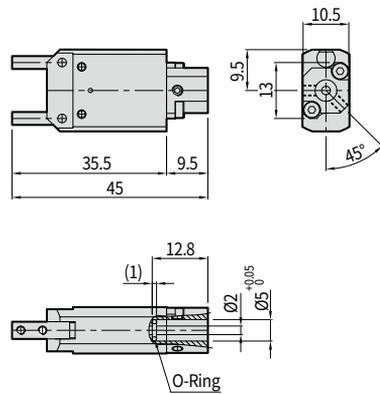


## PHC02D#-08A (Adaptor Type)

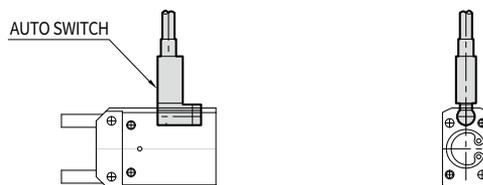
### PHC02D4-08A



### PHC02D5-08A



## PHC02-08A Example of Auto Switch installation

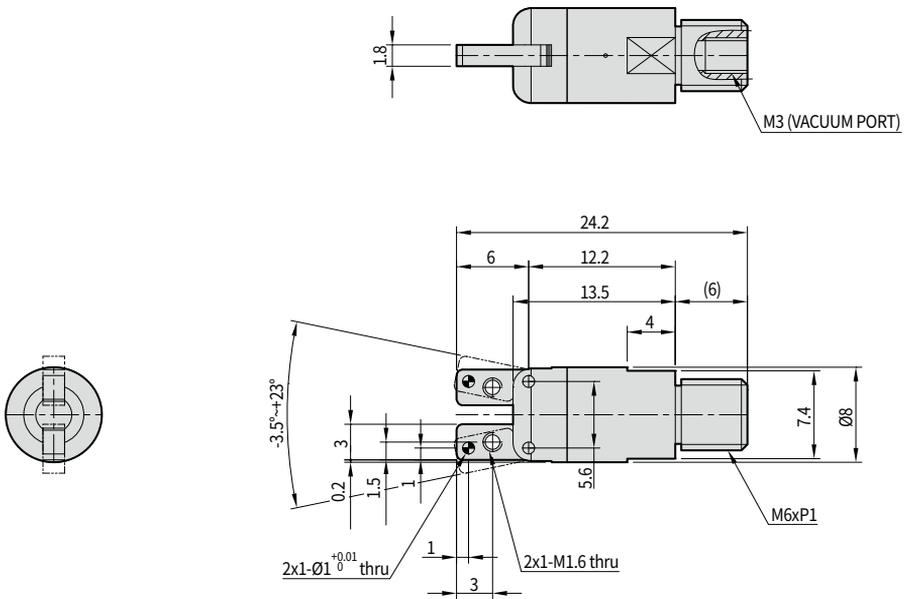


- 01
- 02
- 03
- 04
- 06A
- 06B
- 08A
- 08B

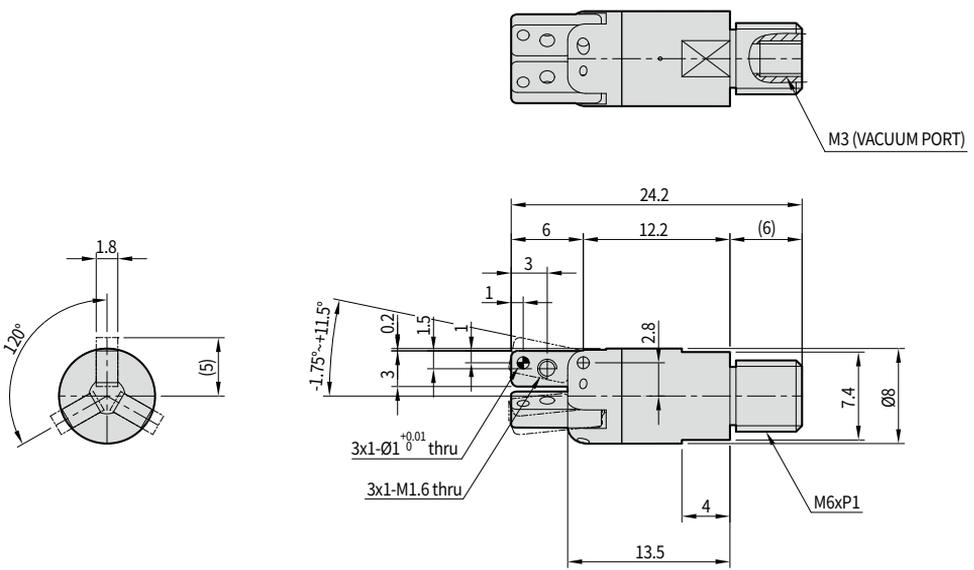
HAND

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

PHC03-06A / PHC04-06A



PHC03-06B / PHC04-06B



# PHC Series

01

02

03

04

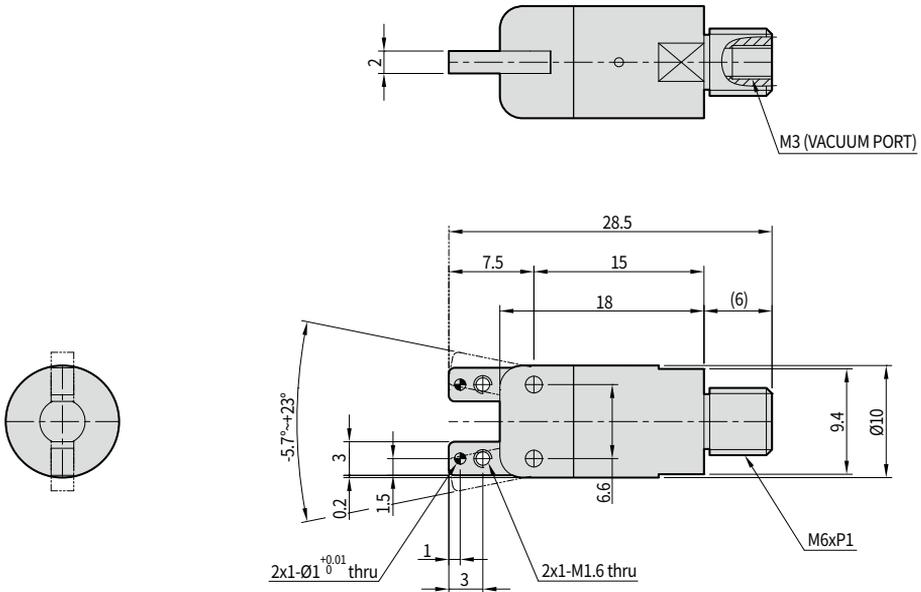
06A

06B

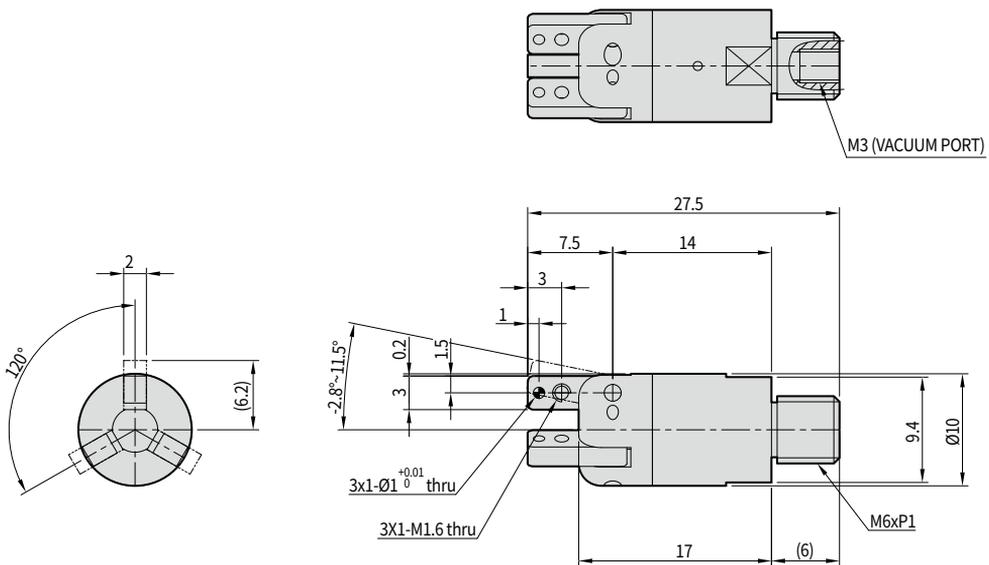
08A

08B

## PHC03-08A / PHC04-08A



## PHC03-08B / PHC04-08B

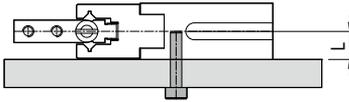


Installation information

- PH01-A
- PH01-D
- PH01-G
- PH01J-C
- PH01K
- PH02
- PH02-H
- PH04
- PH05
- PH06
- PH06-L
- PH06-L2
- PH07
- PH08
- PH09
- PH10
- PH12
- PH14-S
- PH14-CL
- PH14-CF
- PH15-S
- PH15-CL
- PH15-CF
- PH15-W
- PH21
- PH22
- PH23
- PH25
- PH32
- PHC

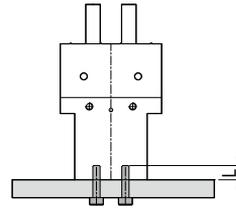
■ PHC01, PHC02 TYPE

1. Installation by body tap holes



Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PHC01-08	M3×P0.5	11	10
PHC02-06	M2×P0.4	1.5	3.5
PHC02-08	M2×P0.4	1.5	4.5

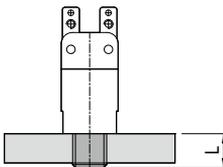
2. Installation by body tap holes



Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PHC01-08	M2×P0.4	1.5	4
PHC02-06	M2×P0.4	1.5	4
PHC02-08	M2×P0.4	1.5	4

■ PHC03, PHC04 TYPE

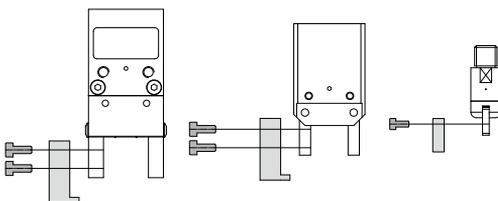
1. Installation by main body thread



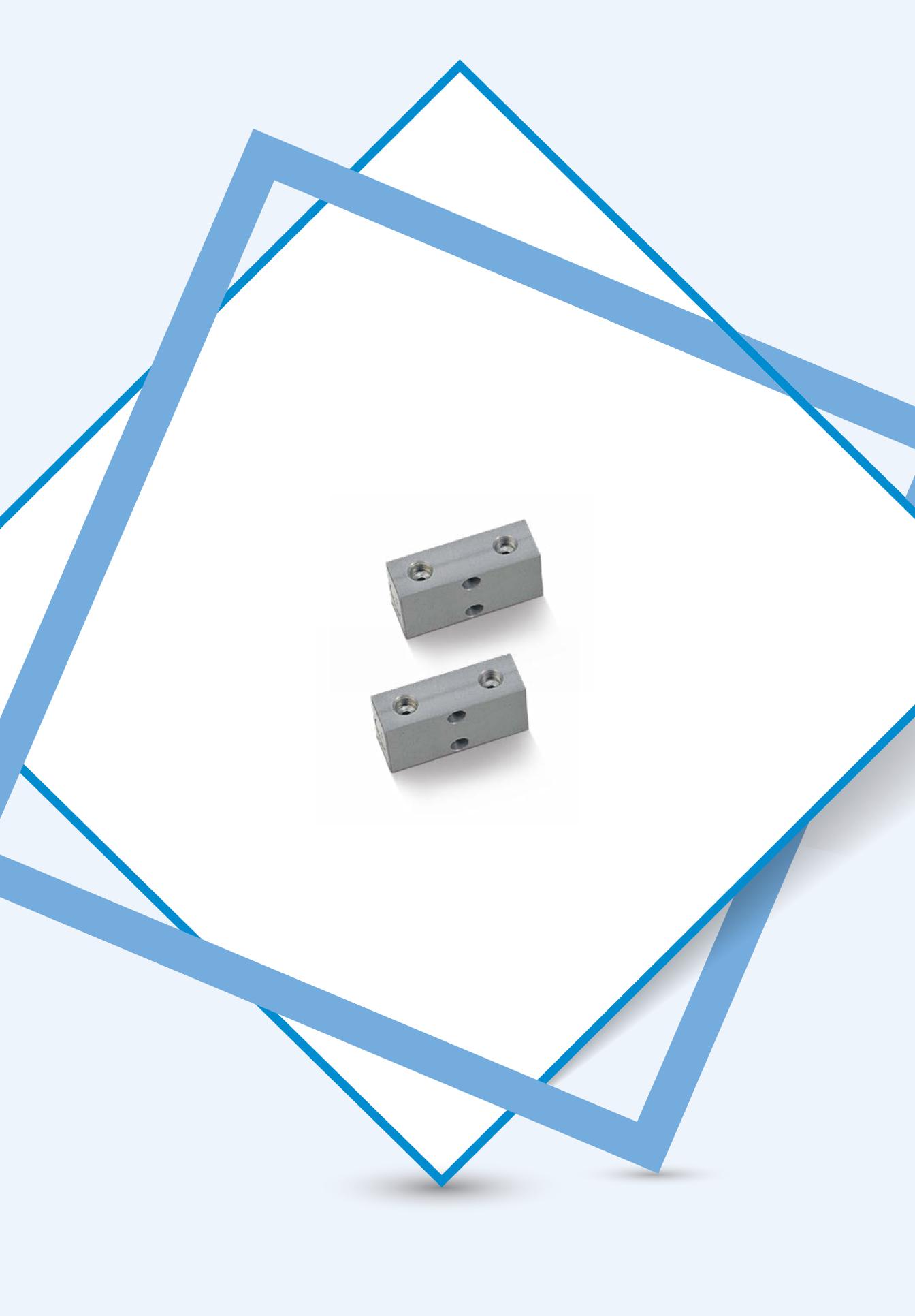
Item	Body Thread	Max Torque (kgf·cm)	Thread Length L (mm)
PHC03-06	M6×P1	81	6
PHC04-06			
PHC03-08	M6×P1	81	6
PHC04-08			

\* For direct inserting of PHC03 and PHC04, please pay attention for the direction of Master Jaws.

■ Attachment installation



Item	Fastening Bolt	Max Torque (kgf·cm)	Thread Length L (mm)
PHC01-08	M2×P0.4	1.5	4
PHC02-06	M2×P0.4	1.5	3
PHC02-08	M2×P0.4	1.5	3
PHC03-06	M1.6×P0.35	1.0	1.8
PHC04-06			
PHC03-08	M1.6×P0.35	1.0	2
PHC04-08			



**P&M Catalogue**

**CHECK VALVE**

# CHECK VALVE

## PCV Series

### Features

- For safety, PCV used in combination with Pneumatic actuators.
- A safety valve preventing the fall of workpieces by closing of airway in actuator in the event of blackout.
- When constructing the loader & unloader of the machine tool, it is used to prevent the workpiece from falling and to safely handle heavy workpiece.



### Order Form

**PCV 10**

①

②

① Series Name

② Spool Size

Order	Spool Size(mm)
10	10
12	12

### Specification

Item Name	PCV10	PCV12
Minimum Orifice(mm)	4	6.5
Valve Spool Stroke(mm)	4	7
Fitting Size		PT 1/8
Weight(kgf)	0.1	0.2
Outline Size(L×W×H, mm)	60×30×20	72×40×24
Fluid		Clean Air Note 1)
Pressure Range(kgf/cm <sup>2</sup> )		3 ~ 8
Temperature Range(°C)		5 ~ 60
Response Time(ms)		10

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10 $\mu$ m degree of filtering.

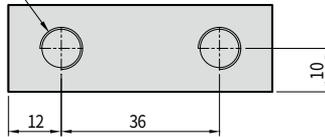
# PCV Series

10

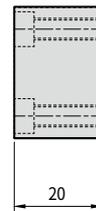
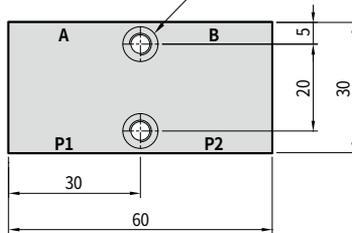
12

## PCV10

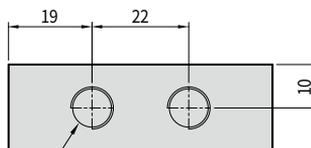
2-PT1/8 (A, B PORT)



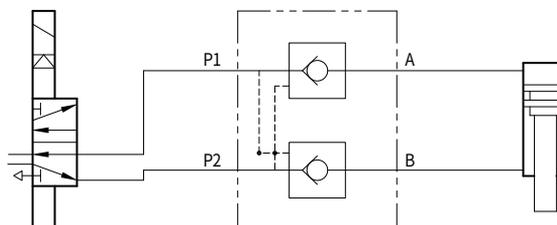
2-M5 thru  
Ø8 DP4.5



2-PT1/8 (P1, P2 PORT)



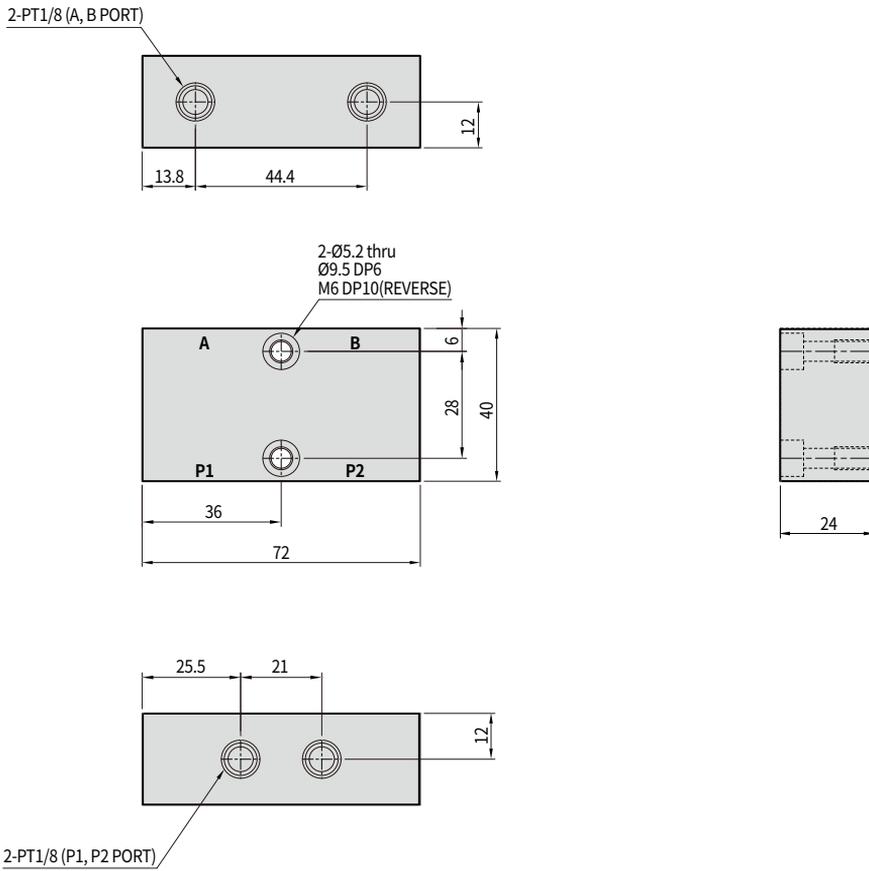
## PCV10 Circuit Diagram



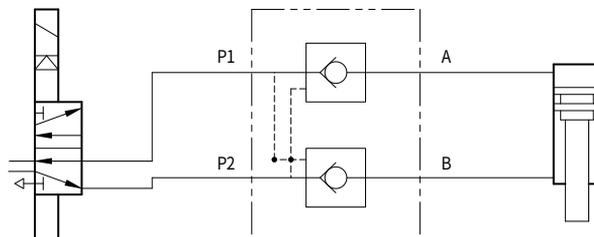
CHECK VALVE

PCV

PCV12

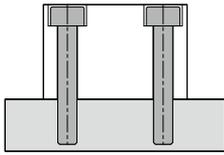


PCV12 Circuit Diagram



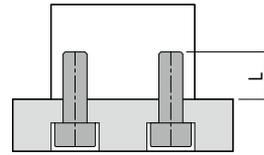
Installation Information

**1. Installation by body through holes**



Item	Fastening Bolt	Max Torque (kgf·cm)
PCV10	M4×P0.7	25
PCV12	M5×P0.8	51

**2. Installation by body tap holes**



Item	Fastening Bolt	Max Torque (kgf·cm)	Max Bolt Length L (mm)
PCV10	M5×P0.8	51	15.5
PCV12	M6×P1	81	10





**P&M Catalogue**

**SWIVEL UNIT &  
MODULE ASS'Y**

# SWIVEL UNIT Model Selection Guide

## 1. TORQUE Check

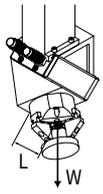
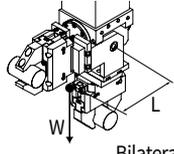
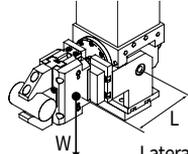
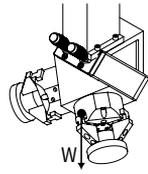
### ■ Torque calculation according to load type

– Dynamic load: load that requires force moving or rotating work

- ① Resistance load: Load of applied external forces such as friction force or gravity → Calculate resistance torque
- ② Accelerative load: Load created by inertia from constant speed rotation → Calculate inertial moment, acceleration

#### ▶ Calculate Resistance Torque

Table 1

Resistance Torque Calculation	Models	
	ASU-SH / ASU-R	ASU-N
<p><b>Need to Calculate</b></p> <p><math>Tr = 2 \times W \times L</math>                      W : Resistance Load                      L : Distance from the center of rotation to center of load</p>	<p>Lateral Load</p> 	 <p>Bilateral load</p>  <p>Lateral Load</p>
<p><b>Not Need to Calculate</b></p>  <p>Bilateral Load</p>	<p>For ASU-N type, always calculate load resistance</p>	

■ When exceeded allowable torque of product, cannot control rotation speed or cannot use constant speed rotation therefore, select product in the consideration of sufficient limit for torque.

## 2. Kinetic Energy Check

■ Calculate kinetic energy (shock absorption power) according to the inertia of the load, use within the specified allowable kinetic energy of rotary cylinder.

■ Use it within the specified allowable rotation time according to the inertia of load for each model.

■ Shock absorption power within the same specification is generally in the order of Shock Absorber > Air Cushion > urethane damper.

■ Shock absorption power is different depending on the type of Shock absorber or stopper, so use appropriate stopper equipment.

- ① Urethane Damper : Shock absorption by installing elastic body at urethane material at the end of stopper.
- ② Air Cushion : Shock absorption using the character of compressed air by adjusting volume of exhaustion air at the end of rotary. → According to the size of load, it is possible to control rotation speed but shock absorption power is not different.
- ③ Shock Absorber : The most excellent shock buffer and replaceable as stopper.

## 3. Allowable Load Check

■ Following axial load check may be required depending on usage conditions.

- ① Thrust load (vertical load) check  
: When the load is applied in thrust direction, use it within allowable thrust load of applied cylinder.
- ② Radial load (Horizontal load) check  
: When the load is applied in radial direction, use it within allowable radial load of applied cylinder.

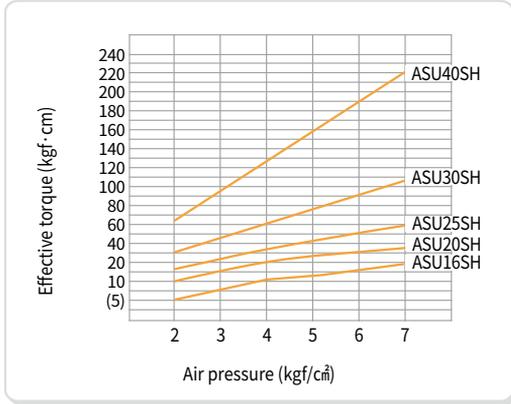
- ③ Moment check  
: When excessive moment is generated, check allowable moment of applied cylinder, and use it within allowable moment.

■ When a composite load is generated, calculate component force in each direction, and use it within allowable value for each direction.

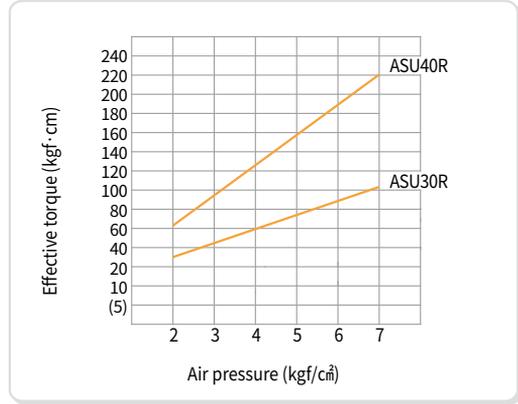
# SWIVEL UNIT Model Selection Guide

## Effective Torque by Model

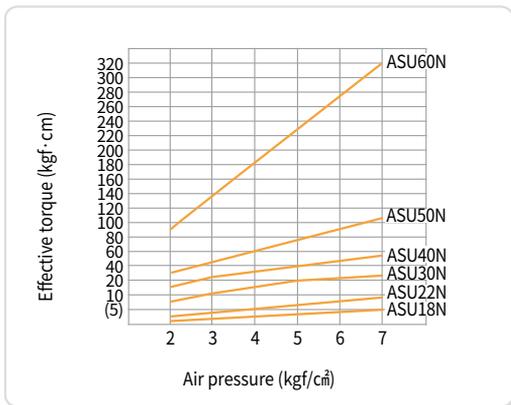
### ▶ ASU-SH Series



### ▶ ASU-R Series



### ▶ ASU-N Series



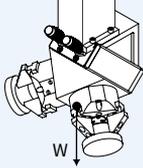
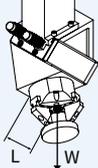
# SWIVEL UNIT Model Selection Guide

## Allowable Kinetic Energy by Model

- The following data represents inertial moment for the standard configuration of Swivel Unit.
- If the workpiece has complicated shape and/or its weight is much different from the following data, and/or if applied with different hand, the following figures may not be applicable. In such case, please contact our company for accurate inertial moment calculation.

### ■ ASU-R / ASU-SH

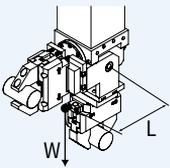
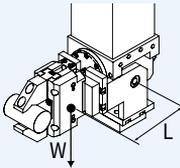
Table 2

Swivel Unit Configuration		Work Weight 1EA (kgf)	Bilateral Load			Lateral Load		
								
			Inertial Moment J (kgf·cm·s <sup>2</sup> )	Center Distance L (mm)	Total Load Weight W (kgf)	Inertial Moment J (kgf·cm·s <sup>2</sup> )	Center Distance L (mm)	Total Load Weight W (kgf)
ASU-R	ASU30R + PH14-50S + WORK	1.7	0.68	-	6.3	0.35	70	3.6
	ASU40R + PH14-60S + WORK	2.5	1.31	-	8.8	0.67	80	4.9
ASU-SH	ASU16SH + PH14-30S + WORK	0.4	0.07	-	1.6	0.04	50	0.9
	ASU20SH + PH14-30S + WORK	0.6	0.12	-	2.1	0.06	60	1.2
	ASU25SH + PH14-40S + WORK	1	0.35	-	4	0.18	70	2.2
	ASU30SH + PH14-50S + WORK	1.7	0.75	-	6.1	0.38	95	3.1
	ASU40SH + PH14-60S + WORK	2.5	1.53	-	9.6	0.78	95	5.5

※ This reference table based on the lower rotate time than 1 sec / 90 degree.

### ■ ASU-N

Table 3

Swivel Unit Configuration		Work Weight 1EA (kgf)	Bilateral Load			Lateral Load		
								
			Inertial Moment J (kgf·cm·s <sup>2</sup> )	Center Distance L (mm)	Total Load Weight W (kgf)	Inertial Moment J (kgf·cm·s <sup>2</sup> )	Center Distance L (mm)	Total Load Weight W (kgf)
ASU-N	ASU22N + PH15-20S + WORK	0.1	0.04	48	0.66	0.02	60	0.37
	ASU30N + PH15-25S + WORK	0.2	0.14	63	1.36	0.07	77	0.8
	ASU40N + PH15-30S + WORK	0.4	0.3	73	2.24	0.15	92	1.28
	ASU50N + PH15-40S + WORK	0.8	0.76	89	3.9	0.39	109	2.26
	ASU60N + PH15-50S + WORK	1.5	2.43	109	8.3	1.27	126	5.1

※ This reference table based on the lower rotate time than 1 sec / 90 degree.

# SWIVEL UNIT Model Selection Guide

## Allowable Kinetic Energy by Model

Table 4

Model		Allowable Kinetic Energy (kgf·cm)			Rotation Time Adjustment Range
		Urethane Damper	Air Cushion	Shock Absorber	
ASU-SH	16	-	-	3.8	0.4 ~ 1.5
	20	-	-	7	0.4 ~ 1.5
	25	-	-	9	0.4 ~ 1.8
	30	-	-	32	0.5 ~ 2.0
	40	-	-	72	0.7 ~ 2.0
ASU-R	30	-	-	37	0.5 ~ 2.0
	40	-	-	55	0.7 ~ 2.0
ASU-N	18	0.06	-	-	0.2 ~ 0.7
	22	0.1	-	-	0.2 ~ 0.8
	30	-	4.1	-	0.3 ~ 1.0
	40	-	9.2	-	0.4 ~ 1.2
	50	-	11.4	-	0.5 ~ 1.5
	60	-	-	32	0.7 ~ 2.0

※ Rotation time adjustment range (ASU-SH, ASU-R : sec/180°, ASU-N : sec/90°) could be changed according to the amount of load.

## Allowable Load by Model



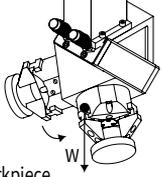
Table 5

Model		Allowable Load (kgf)		Allowable Moment M (kgf·cm)
		Radial Load Fr	Thrust Load Fa	
ASU-SH	16	22	8.6	34
	20	22	8.4	43
	25	48	16	66
	30	35	17	75
	40	46	20	157
ASU-R	30	101	20	166
	40	125	25	181
ASU-N	18	3.7	0.7	5.6
	22	5.6	1.1	10
	30	11	2.4	15
	40	16	3.3	20
	50	24	4	37
	60	61.5	12.3	125

※ Above allowable load refers maximum value can be affect at the shaft when dynamic load is not applied.

# SWIVEL UNIT Model Selection Guide

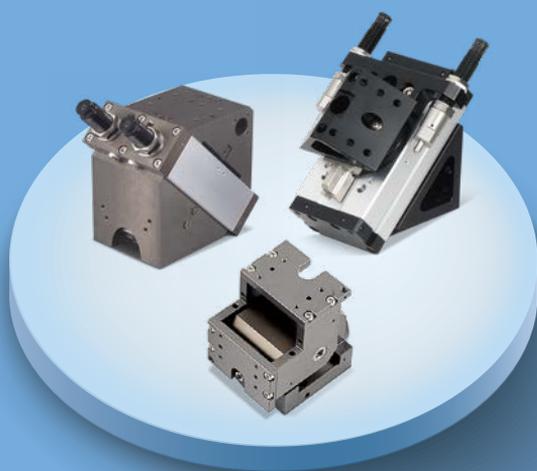
## Example of Model Selection

	Applicable Formula	Selection Example
Condition Check	<ul style="list-style-type: none"> <li>Applicable Rotary Unit Type</li> <li>Air pressure(kgf/cm<sup>2</sup>)</li> <li>Rotation time(sec/180°)</li> <li>Rotation angle(rad)</li> <li>Load shape</li> <li>Load weight(kgf)</li> <li>Distance from rotary center to the center of load weight</li> </ul>	<ul style="list-style-type: none"> <li>Applicable cylinder : ASU40R</li> <li>Air pressure(P) : 5 kgf/cm<sup>2</sup></li> <li>Rotation time(t) : 1.2 sec/180°</li> <li>Load shape : PH14-60S + circular workpiece (1 PCS weight = 2.5 kgf)</li> <li>Total load weight(W) : 8.8 kgf</li> </ul> 
Rotation Time Check	<ul style="list-style-type: none"> <li>Load rotation time t (sec/180°) <span style="float:right">Table 4</span></li> <li>Applicable when t is included in the range of tc</li> <li>tc : Allowable rotation time range of applicable cylinder (sec/180°)</li> </ul>	<ul style="list-style-type: none"> <li>t = 1.2 sec/180°</li> <li>tc = 0.7 ~ 2 sec/180°</li> <li>⇒ Applicable, as t(1.2) is within the range of tc (0.7 ~ 2)</li> </ul>
Torque Check	<ul style="list-style-type: none"> <li>Inertial moment calculation J (kgf·cm·s<sup>2</sup>) <span style="float:right">Table 3</span></li> <li>- PH14-60S + circular workpiece from standard configuration table → Check inertial moment</li> <li>Check required torque Td (kgf·cm) <span style="float:right">Table 1</span></li> <li>- Resistance Torque : <math>Tr = 2 \times W \times L</math></li> <li>- Acceleration Torque : <math>Ta = 10 \times J \times \omega a</math></li> <li style="text-align:center"><math>\omega a = \frac{2\theta}{t^2}</math></li> <li>- Total required torque : <math>Td = Tr + Ta</math> <span style="float:right">Table 2</span></li> <li>- Applicable when <math>Td &lt; Tc</math></li> <li>W : Load weight(kgf)</li> <li>L : Distance from the center of rotary to the center of load(mm)</li> <li>Tc : Allowable torque of applicable cylinder(kgf·cm)</li> <li>ωa : Angular acceleration(rad/sec<sup>2</sup>)</li> <li>t : Rotation time(sec/180°)</li> <li>θ : Rotation angle (rad) (90° = 1.57 rad / 180° = 3.14 rad)</li> </ul>	<ul style="list-style-type: none"> <li>J = 1.31 kgf·cm·s<sup>2</sup></li> <li>ASU-R series, Bilateral load</li> <li><math>Tr = 0</math></li> <li><math>\omega a = \frac{2 \cdot 3.14}{1.2^2} = 4.36 \text{ rad/sec}^2</math></li> <li><math>Ta = 10 \times 1.31 \times 4.36 = 57.1 \text{ kgf}\cdot\text{cm}</math></li> <li><math>Td = Tr + Ta = 57.1 \text{ kgf}\cdot\text{cm}</math></li> <li>When the air pressure 5 kgf/cm<sup>2</sup> on ASU40R</li> <li>Torque Tc = 158 kgf·cm</li> <li>⇒ As Td (57.1) &lt; Tc (158), ASU40R is applicable</li> </ul>
Kinetic Energy Check	<ul style="list-style-type: none"> <li>Load kinetic energy E (kgf·cm) <span style="float:right">Table 4</span></li> <li><math>\omega = \frac{2\theta}{t}</math></li> <li><math>E = \frac{1}{2} \times J \times \omega^2</math></li> <li>Applicable when <math>E &lt; Ec</math></li> <li>Ec : Allowable kinetic energy for applicable cylinder(kgf·cm)</li> <li>ω : Angular speed(rad/sec)</li> <li>t : Rotation time(sec/180°)</li> <li>θ : Rotation angle(rad)</li> </ul>	<ul style="list-style-type: none"> <li><math>\omega = \frac{2 \cdot 3.14}{1.2} = 5.23 \text{ rad/sec}</math></li> <li><math>E = \frac{1}{2} \times 1.31 \times 5.23^2 = 17.9 \text{ kgf}\cdot\text{cm}</math></li> <li>Allowable kinetic energy for ASU40R Ec</li> <li>Ec = 55 kgf·cm</li> <li>⇒ As E (17.9) &lt; Ec (55), ASU40R is applicable</li> </ul>
Allowable Weight Check	<ul style="list-style-type: none"> <li>Radial Load(Fr), Thrust Load(Fa), Allowable Moment(M) <span style="float:right">Table 5</span></li> <li>Applicable when Radial load : <math>Fr = W \times \cos 45^\circ &lt; Fcr</math></li> <li>Applicable when Thrust load : <math>Fa = W \times \sin 45^\circ &lt; Fca</math></li> <li>Applicable when Moment : <math>M &lt; Mc</math></li> <li>Fcr : Allowable radial load for applicable cylinder(kgf)</li> <li>Fca : Allowable thrust load for applicable cylinder(kgf)</li> <li>Mc : Allowable moment for applicable cylinder(kgf·cm)</li> </ul>	<ul style="list-style-type: none"> <li><math>Fr = 8.8 \times \cos 45^\circ = 6.2 \text{ kgf}</math></li> <li><math>Fa = 8.8 \times \sin 45^\circ = 6.2 \text{ kgf}</math></li> <li>Fcr = 125</li> <li>Fca = 25</li> <li>⇒ Fa (6.2) &lt; Fcr (125)</li> <li>As Fa (6.2) &lt; Fca (25), ASU40R is applicable</li> </ul>

※ For details about load resistance, please refer to [Table 1](#).



# SWIVEL UNIT & MODULE Series



## Application

Auto Loader of CNC Metalworking machines with 180° swing

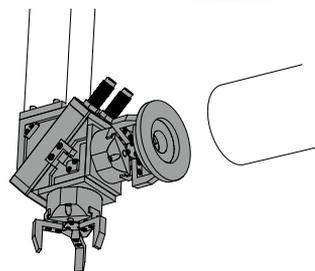
Various combination  
with PH14 Series



Swiveling component  
for auto loader of CNC machines



## Application



**Series Line Up [ Single Item ]**



**ASU-N**

- 90° tilting unit
- Best combination with PH15 Series
- Wide product line up from Ø18 to Ø60



**ASU-SH**

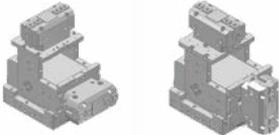
- 180° swing unit
- Best combination with PH14 Series
- Easy centralized piping with central hollow hole



**ASU-R**

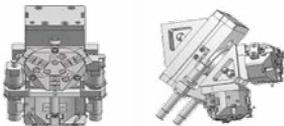
- 180° swing unit
- Best combination with PH14 Series
- Additional mounting bracket is not needed by private swivel arm for direct mount
- Customer convenience by air distributor inside design

**Series Line Up [ Module Item ]**



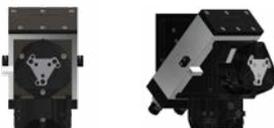
**ASU-N + PH15 Series Model**

- According to customer purpose, X and Y direction model selections



**ASU-SH + PH14 Series Model**

- Private mounting brackets for PH14-S Series
- Affordable solution for loader & unloader configuration



**ASU-R + PH14 Series Model**

- Direct mounting of general hand without additional mounting brackets
- Maximize space utility by reducing of radius of rotation

# SWIVEL UNIT

## ASU-N Series

### Features

- 90° Tilting unit of rack & pinion structure inside.
- Suitable to configure Auto Loader combination with 2 PCS of general hands.
- Affordable light weight to small robots.
- Auto Switch installation. (Optional)



### Order Form

## ASU 22N - P S - PNP

①                      ②                      ③                      ④                      ⑤

#### ① Series Name

#### ② Cylinder Bore Size

Order	CYL Bore(mm)
18N	18
22N	22
30N	30
40N	40
50N	50
60N	60

#### ③ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage DC	Current	Body Length	Sensing Distance	Frequency	Protect Level
		Wires	Direction						
Blank		No Auto Switch provided							
P	Proximity	3-Wire	Horiz	10~30V	Max 200mA	32mm	1mm ± 10%	800Hz	IP 67

#### ④ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

#### ⑤ Auto Switch Output

Order	Output
Blank	NPN
PNP	PNP

Specification

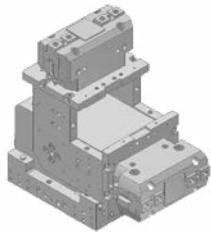
Item Name	ASU18N	ASU22N	ASU30N	ASU40N	ASU50N	ASU60N
Rotation Angle(°)	90					
Shock Absorbing	Urethane Damper		Air Cushion			Shock Absorber
Rotation Time(sec/90°)	0.2 ~ 0.7	0.2 ~ 0.8	0.3 ~ 1.0	0.4 ~ 1.2	0.5 ~ 1.5	0.7 ~ 2.0
Effective Torque(kgf·cm) P : Air Pressure(kgf/cm <sup>2</sup> )	0.7×P	1.3×P	3.7×P	7.7×P	15.1×P	45.8×P
Fitting Size	M3	M5			PT1/8	
Weight(kgf)	0.13	0.20	0.85	1.33	1.95	9.8
Maximum Radial Load(kgf)	3.7	5.6	11	16	24	61.5
Maximum Thrust Load(kgf)	0.7	1.1	2.4	3.3	4	12.3
Allowable Kinetic Energy(kgf·cm)	0.06	0.1	4.1	9.2	11.4	32
Fluid	Clean Air Note 1)					
Pressure Range(kgf/cm <sup>2</sup> )	3 ~ 7					
Lubrication	Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)					
Temperature Range(°C)	5 ~ 60					
Adjustable Rotary Angle Clearance(°)	±3					

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10µm degree of filtering.

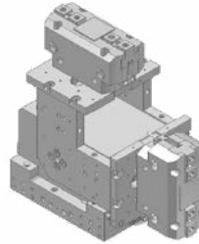
※ For detailed model selection, please refer <SWIVEL UNIT Model Selection Guide>.

# MODULE ASS'Y

## ASU-N+PH15-S ASS'Y



GENERAL HAND - Horizontal



GENERAL HAND - Vertical

### Order Form

## A22N1520S - X - S1 - PNP

①

②

③

④

### ① Series Name

Order	Module Configuration	General Hand Gripping Force(Kgf)		General Hand Gripping Stroke (mm)
		Open	Close	
A22N1520S	ASU22N+PH15-20S	9.5	8.6	8
A30N1525S	ASU30N+PH15-25S	15	12.3	12
A40N1530S	ASU40N+PH15-30S	20.5	18.2	16
A50N1540S	ASU50N+PH15-40S	38	32.8	20
A60N1550S	ASU60N+PH15-50S	60.4	50.7	26

\* The gripping force of the general hand means the value of the master jaw end point at the air pressure of 5kgf/cm<sup>2</sup>, and please note that it is not the maximum gripping force that the swivel unit can handle.

\* For the weight of the workpiece that the swivel module assembly can handle, it is necessary to check the attachment state, rotational speed, required torque, and allowable kinetic energy of the workpiece.

\* For the safe model selection, please refer <SWIVEL UNIT Model Selection Guide>.

### ② General Hand Direction

Order	Direction
X	 <p>Horizontal</p>
Y	 <p>Vertical</p>

### ③ Auto Switch Installation

Order	Swivel	Quantity	General Hand	Quantity
Blank	X	-	X	-
S1	○	2PCS	X	-
S2	X	-	○	4PCS
S3	○	2PCS	○	4PCS

\* ○ : Mounted    X : Non-Mounted  
\* Proximity sensor will be mounted.

### ④ Auto Switch Output

Order	Output
Blank	NPN
PNP	PNP

\* Same output with Swivel unit and PH15-S model.

# ASU-N Series

18N

22N

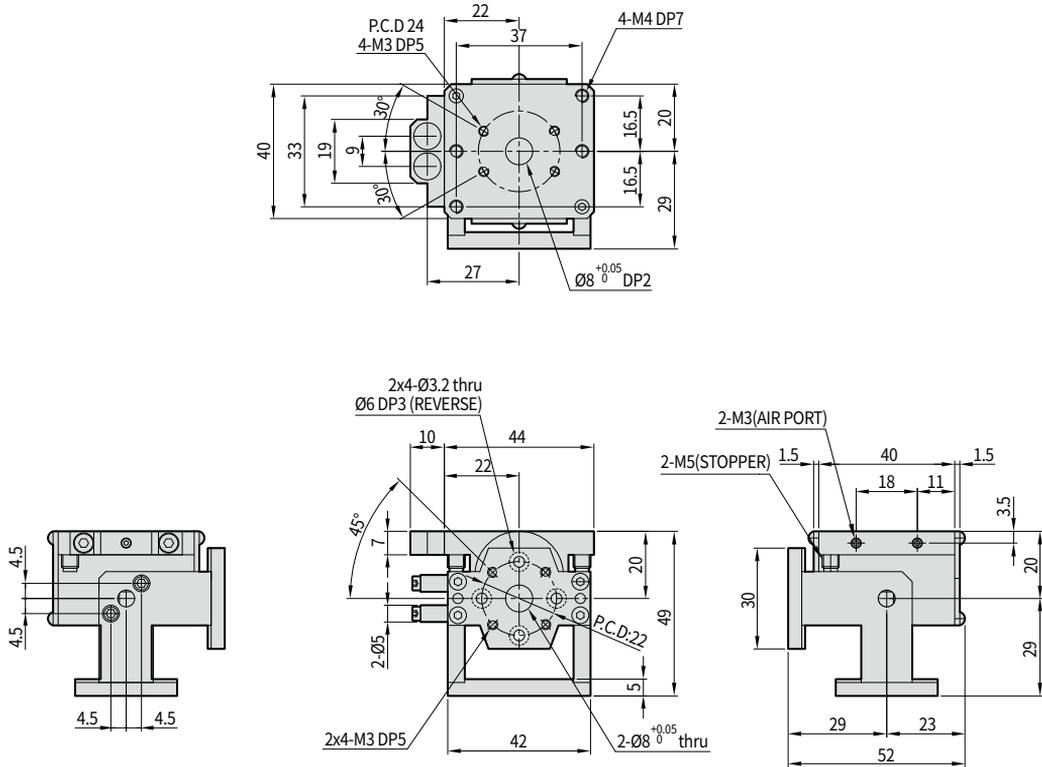
30N

40N

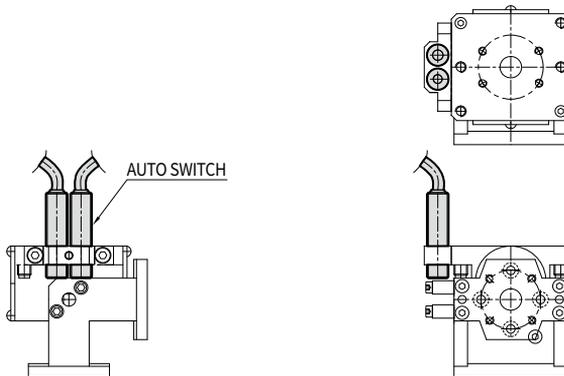
50N

60N

## ASU18N



## ASU18N Example of Auto Switch installation



SWIVEL UNIT

ASU-N

ASU-SH

ASU-R

# ASU-N Series

18N

22N

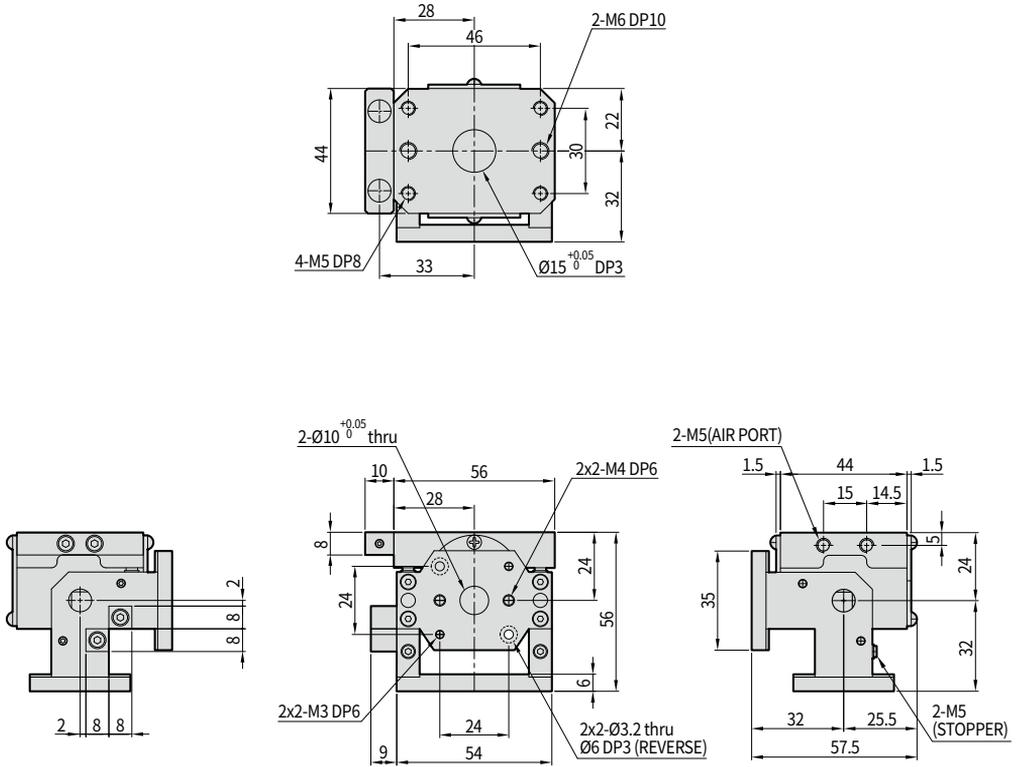
30N

40N

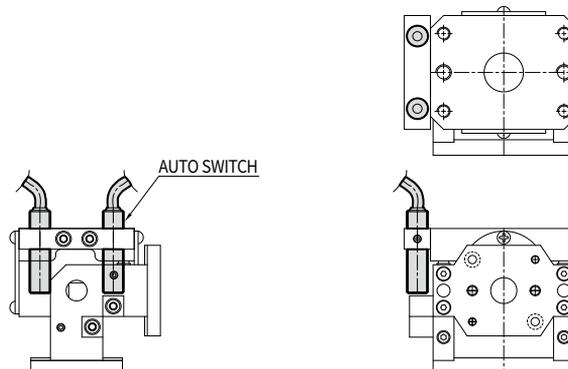
50N

60N

## ASU22N



## ASU22N Example of Auto Switch installation



18N

22N

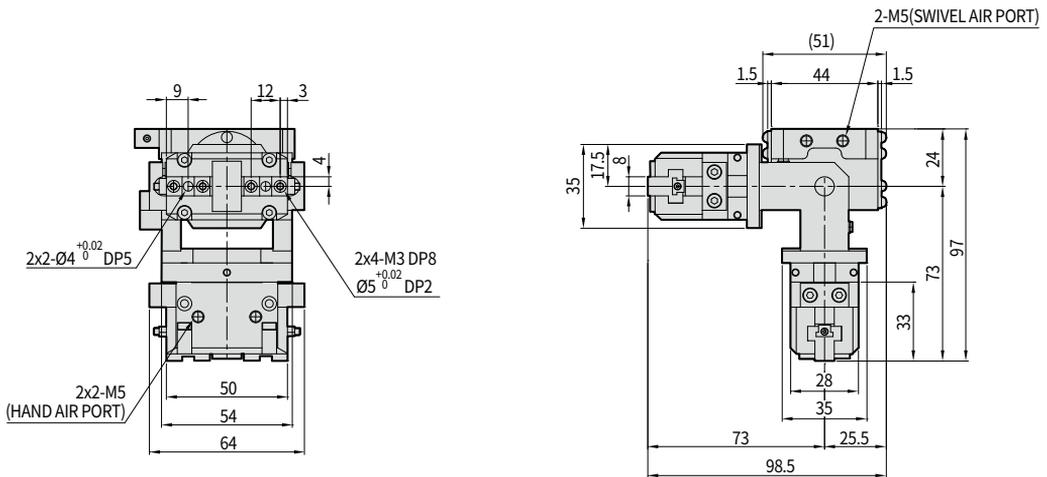
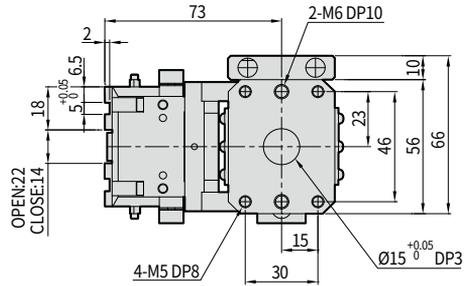
30N

40N

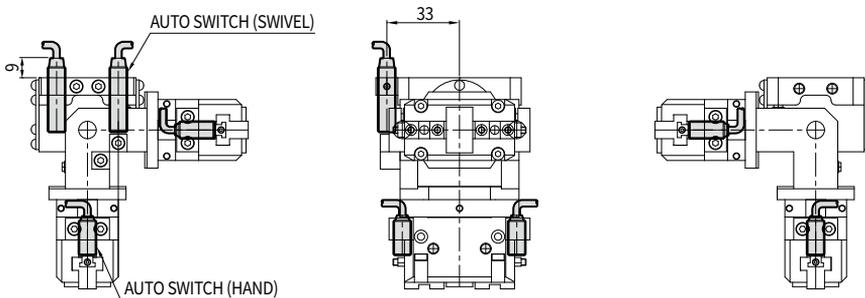
50N

60N

**MODULE**  
A22N1520S-X



**A22N1520S-X Example of Auto Switch installation**



SWIVEL UNIT

ASU-N

ASU-SH

ASU-R

# ASU-N Series

18N

22N

30N

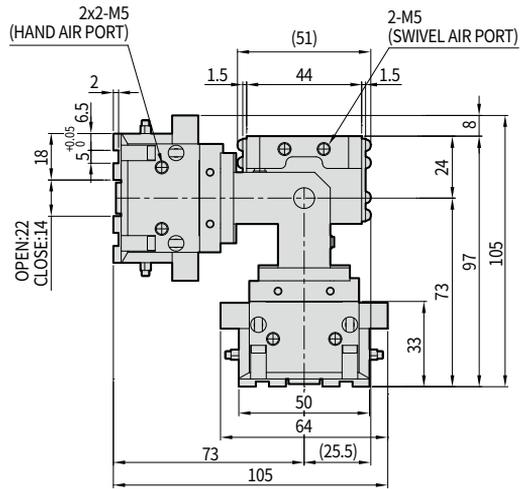
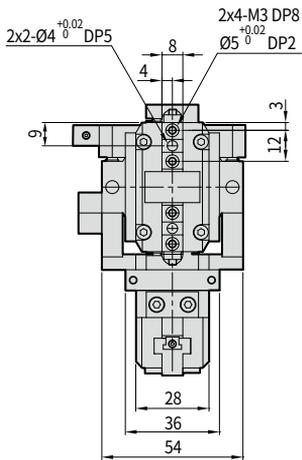
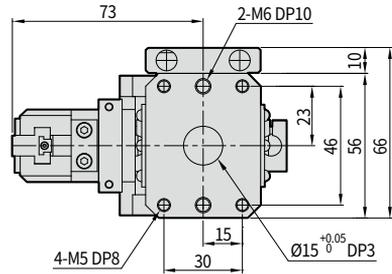
40N

50N

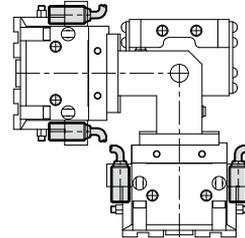
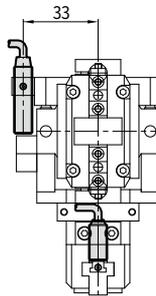
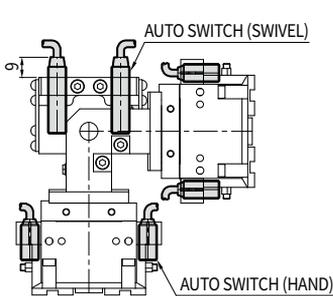
60N

## MODULE

A22N1520S-Y



## A22N1520S-Y Example of Auto Switch installation



18N

22N

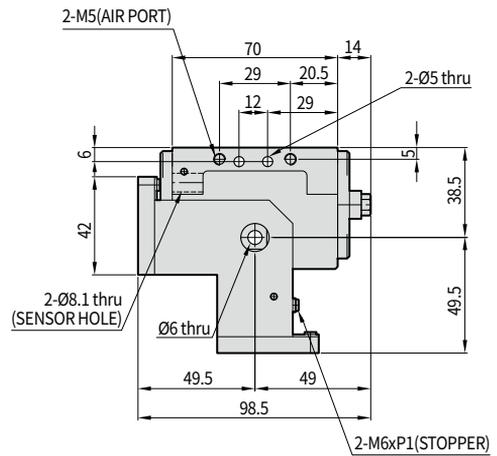
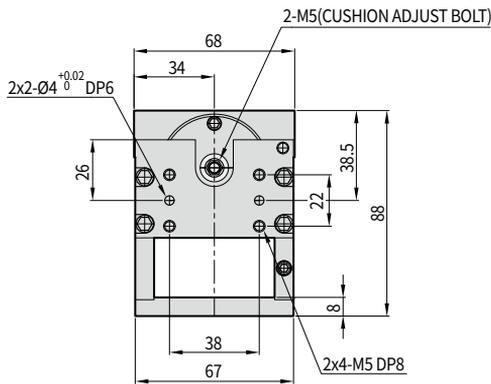
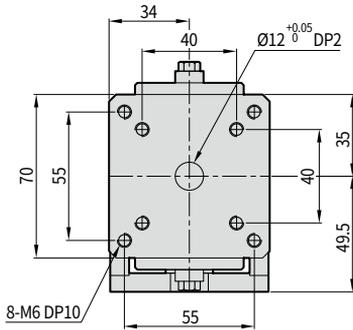
30N

40N

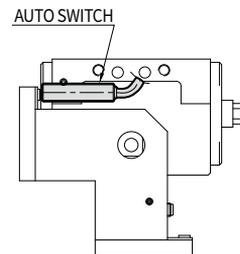
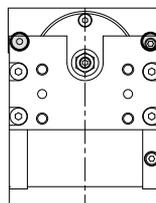
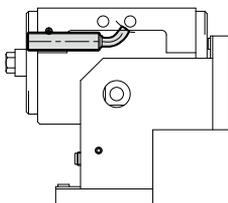
50N

60N

ASU30N



ASU30N Example of Auto Switch installation



SWIVEL UNIT

ASU-N

ASU-SH

ASU-R

# ASU-N Series

18N

22N

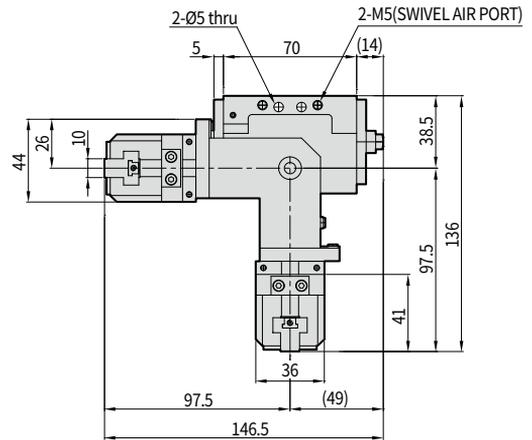
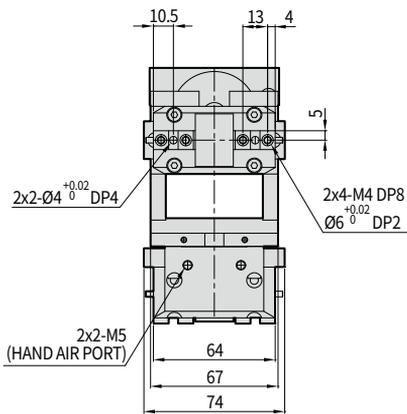
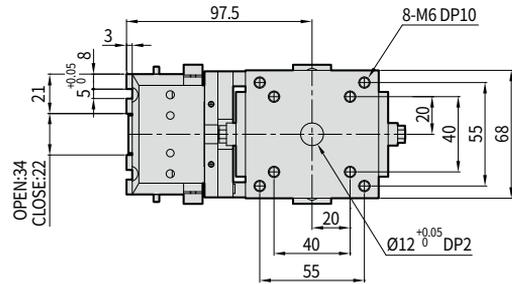
30N

40N

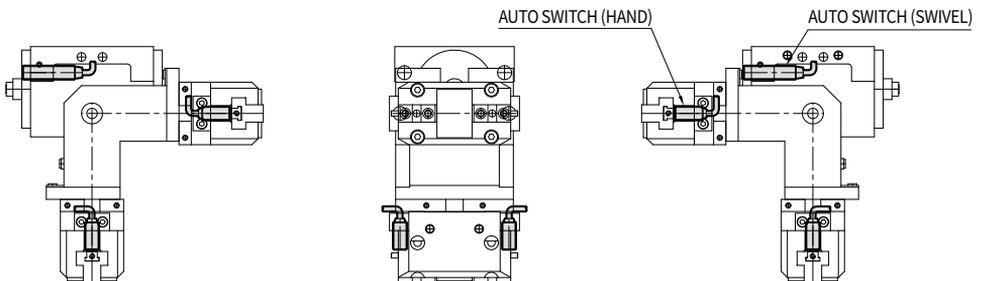
50N

60N

**MODULE**  
A30N1525S-X



## A30N1525S-X Example of Auto Switch installation



18N

22N

30N

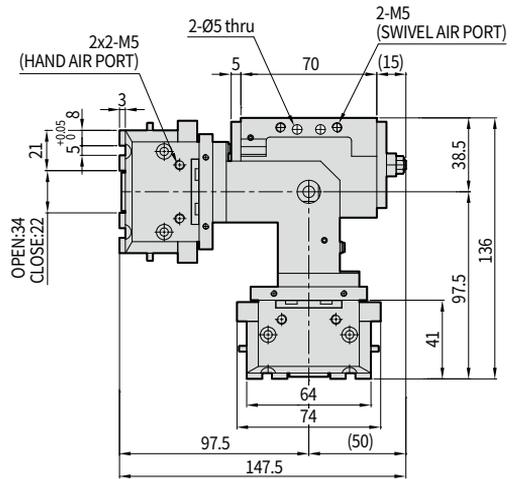
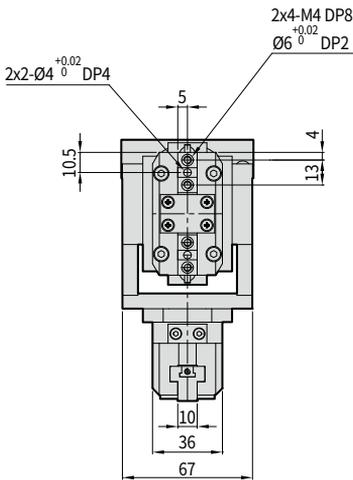
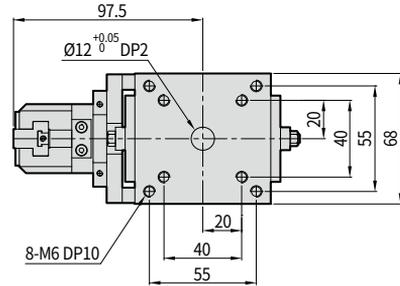
40N

50N

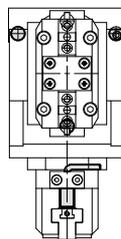
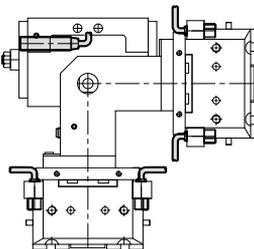
60N

MODULE

A30N1525S-Y



A30N1525S-Y Example of Auto Switch installation



AUTO SWITCH (HAND)

AUTO SWITCH (SWIVEL)

SWIVEL UNIT

ASU-N

ASU-SH

ASU-R

# ASU-N Series

18N

22N

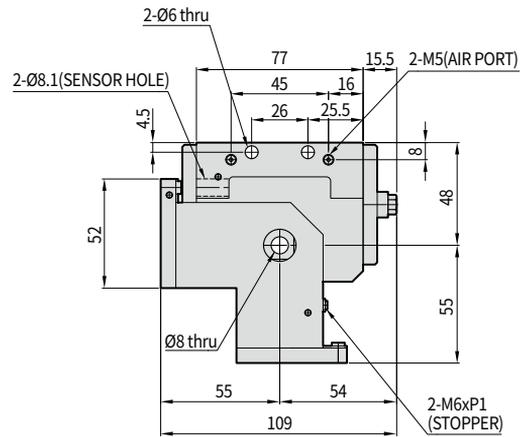
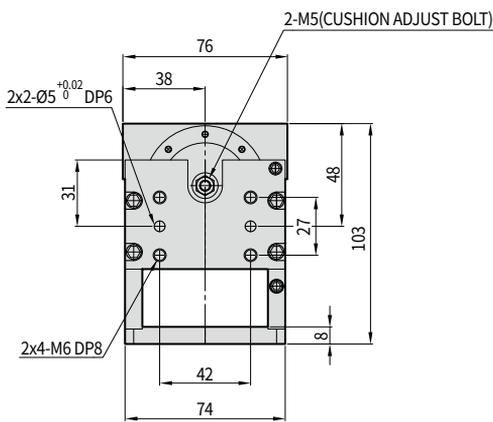
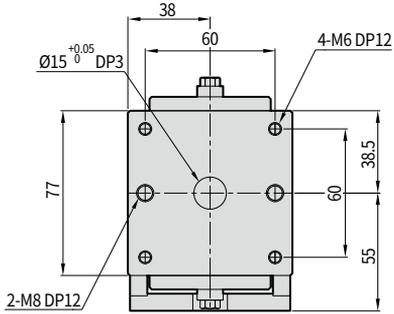
30N

**40N**

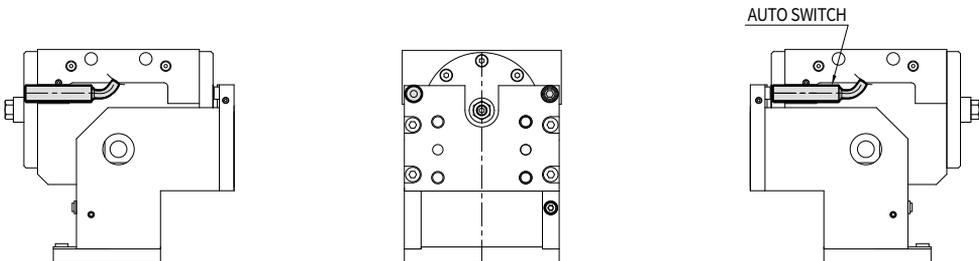
50N

60N

## ASU40N



## ASU40N Example of Auto Switch installation



18N

22N

30N

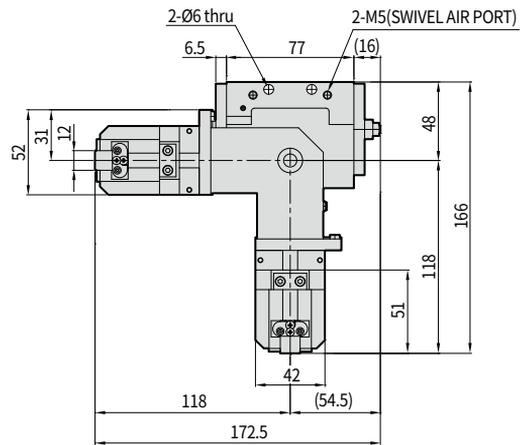
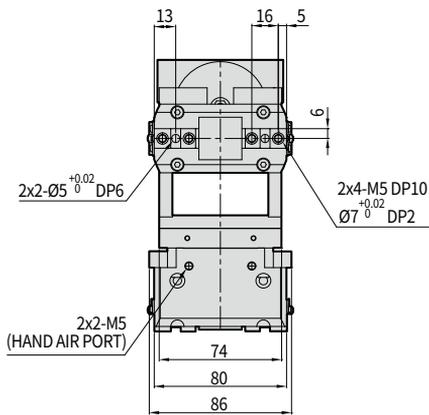
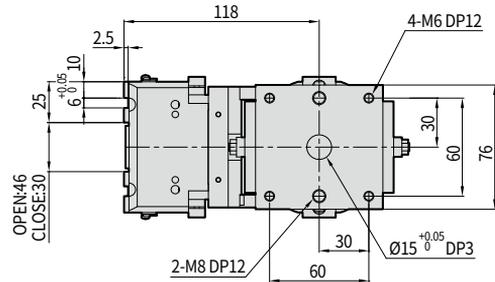
40N

50N

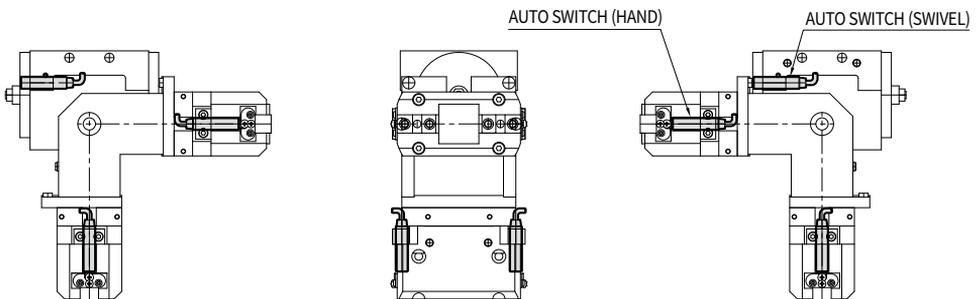
60N

MODULE

A40N1530S-X



A40N1530S-X Example of Auto Switch installation



SWIVEL UNIT

ASU-N

ASU-SH

ASU-R

# ASU-N Series

18N

22N

30N

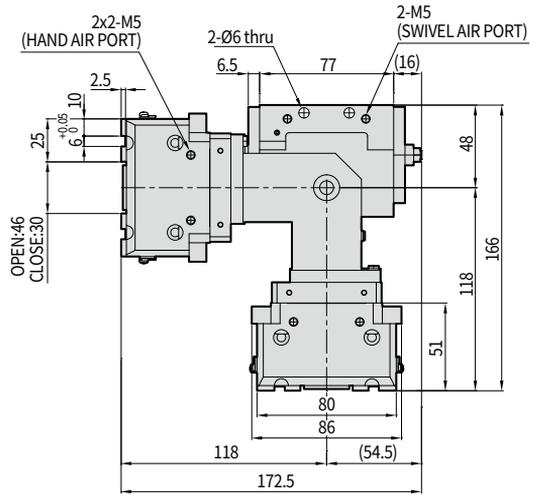
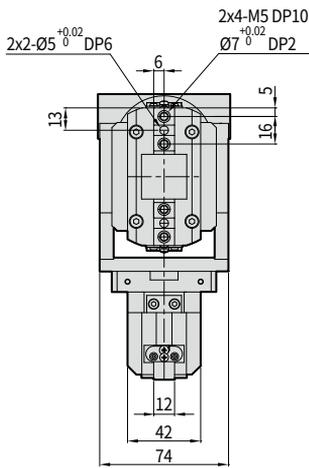
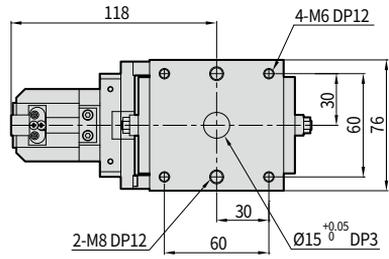
**40N**

50N

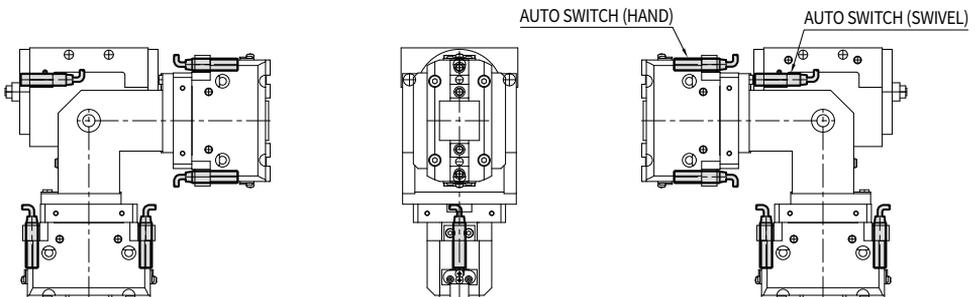
60N

## MODULE

A40N1530S-Y



## A40N1530S-Y Example of Auto Switch installation



18N

22N

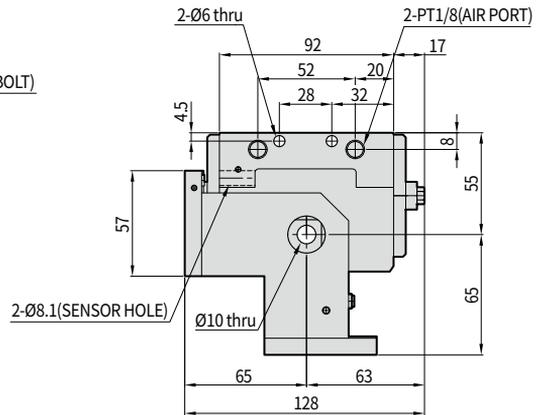
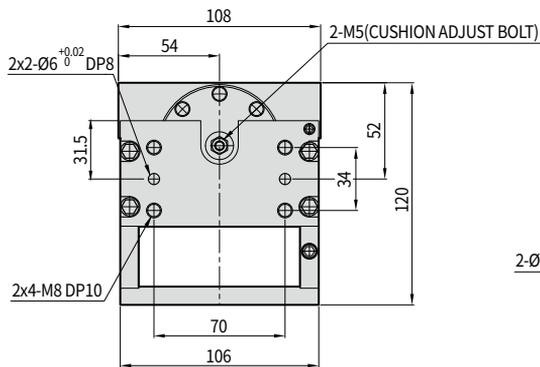
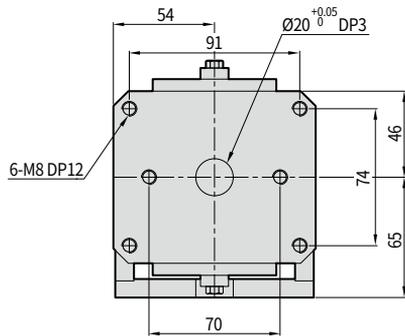
30N

40N

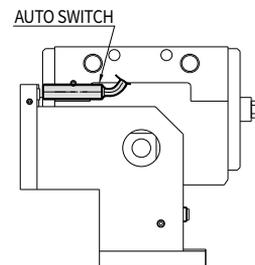
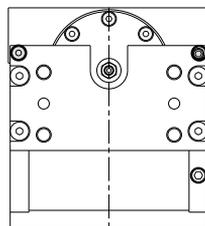
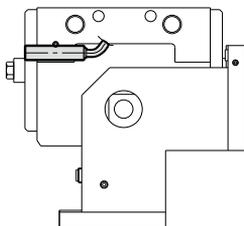
50N

60N

ASU50N



ASU50N Example of Auto Switch installation



SWIVEL UNIT

ASU-N

ASU-SH

ASU-R

# ASU-N Series

18N

22N

30N

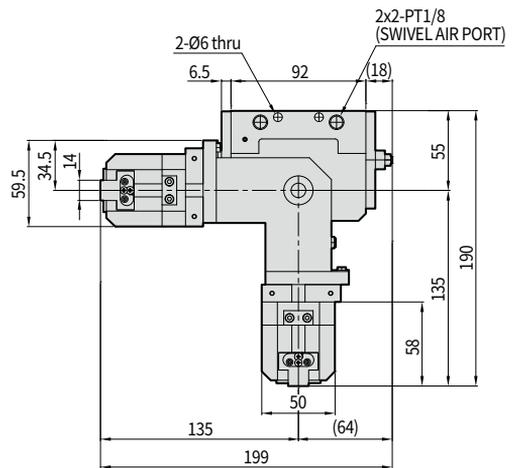
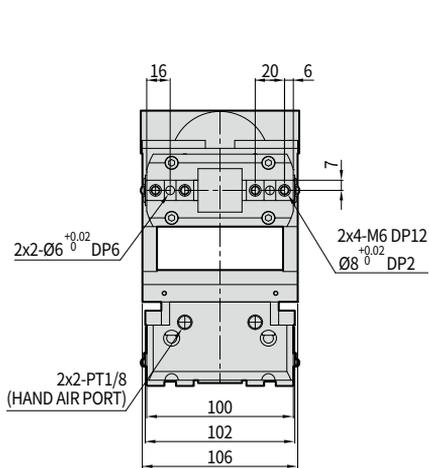
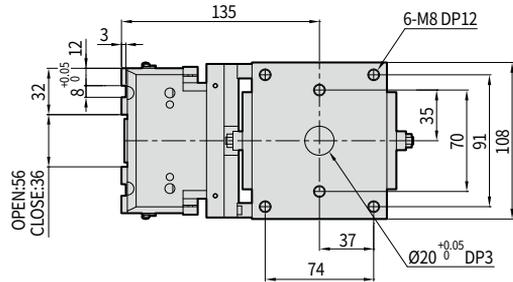
40N

50N

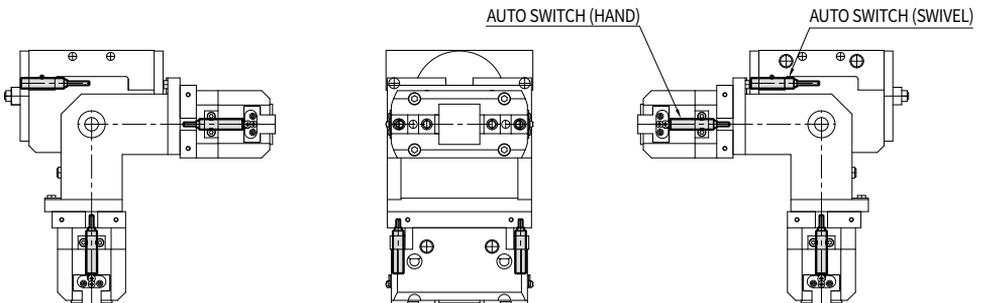
60N

## MODULE

A50N1540S-X



## A50N1540S-X Example of Auto Switch installation



18N

22N

30N

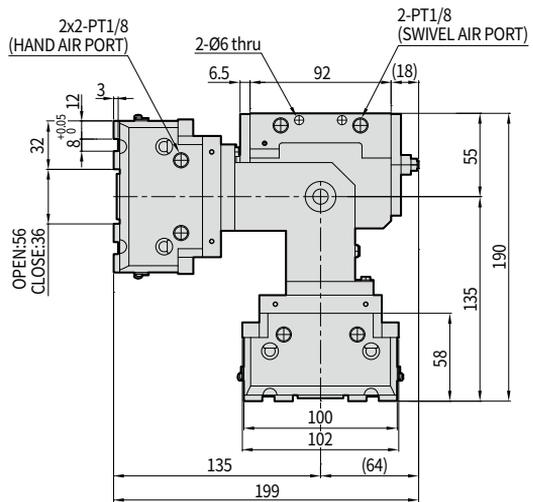
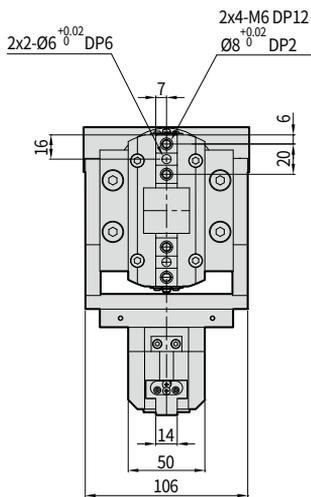
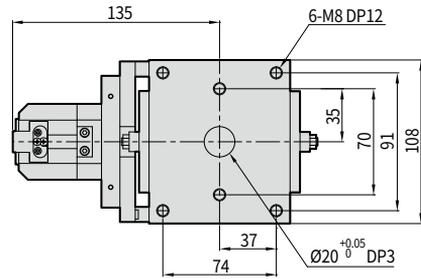
40N

50N

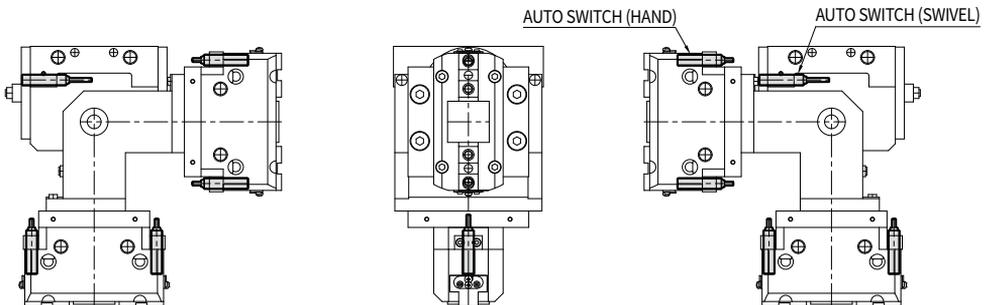
60N

MODULE

A50N1540S-Y



A50N1540S-Y Example of Auto Switch installation



SWIVEL UNIT

ASU-N

ASU-SH

ASU-R

# ASU-N Series

18N

22N

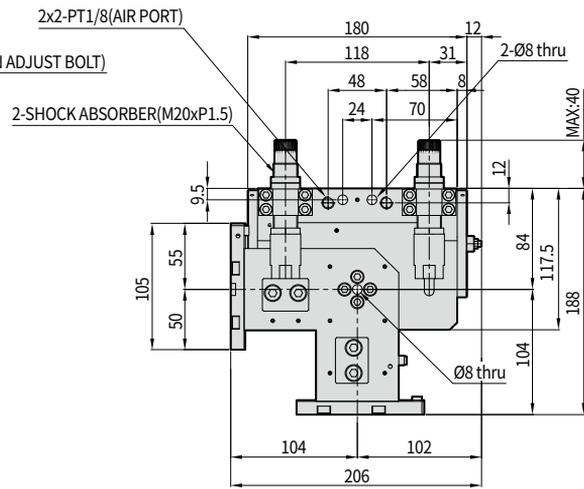
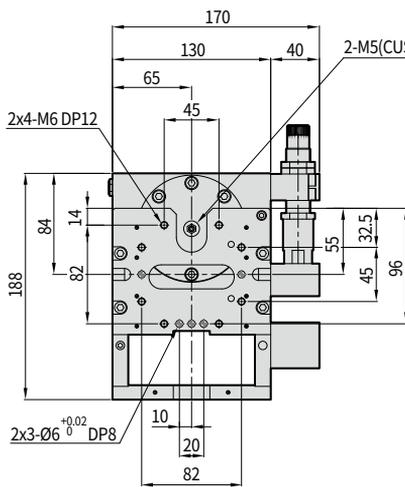
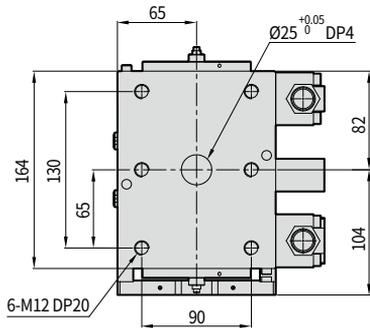
30N

40N

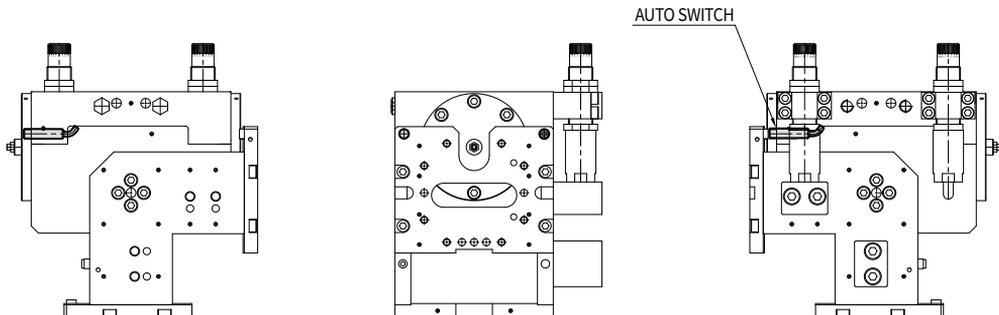
50N

60N

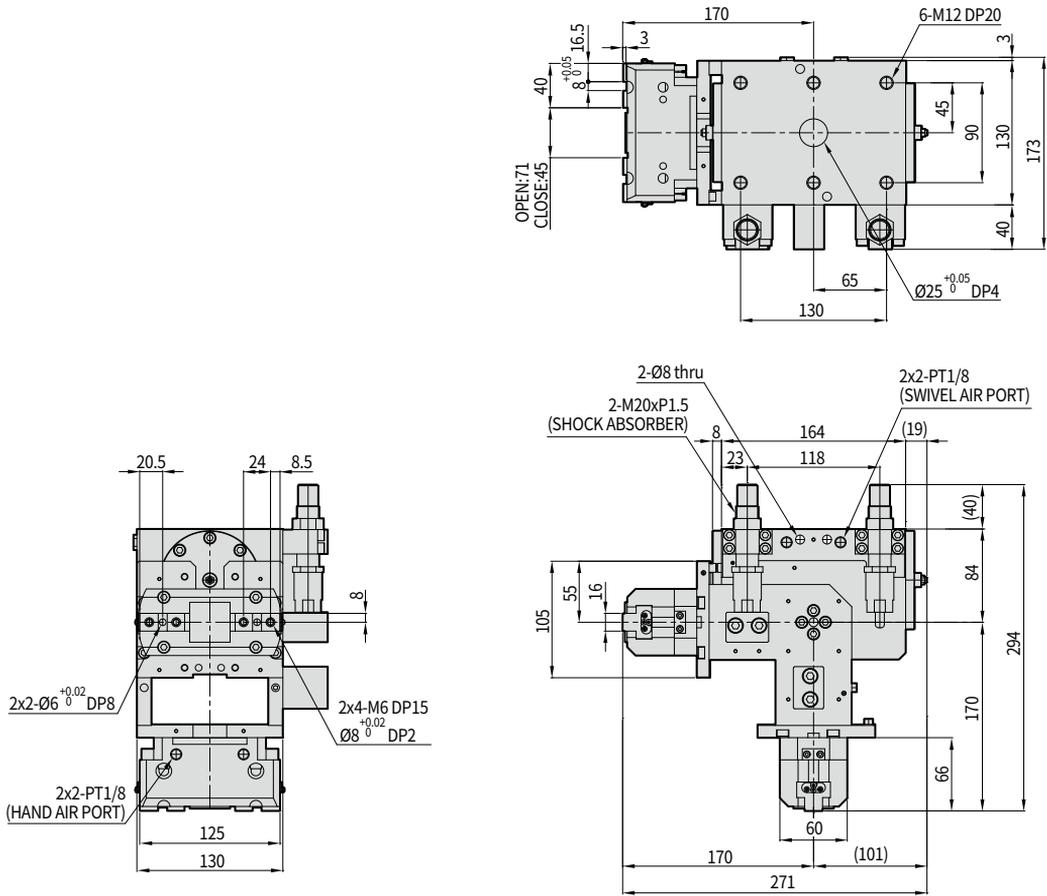
## ASU60N



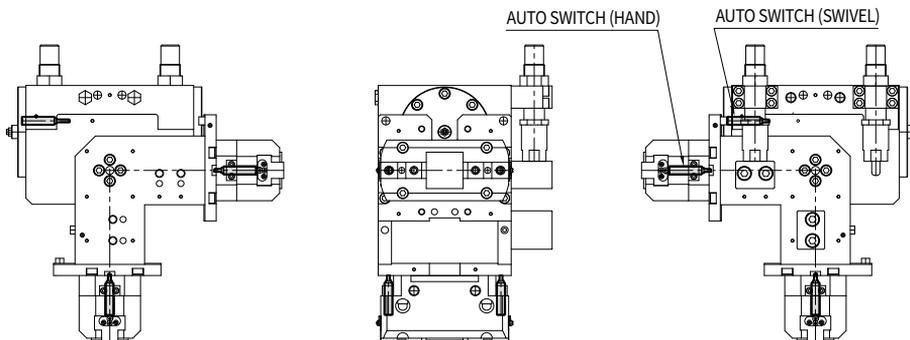
## ASU60N Example of Auto Switch installation



**MODULE**  
A60N1550S-X



**A60N1550S-X Example of Auto Switch installation**



SWIVEL UNIT

ASU-N  
ASU-SH  
ASU-R

# ASU-N Series

18N

22N

30N

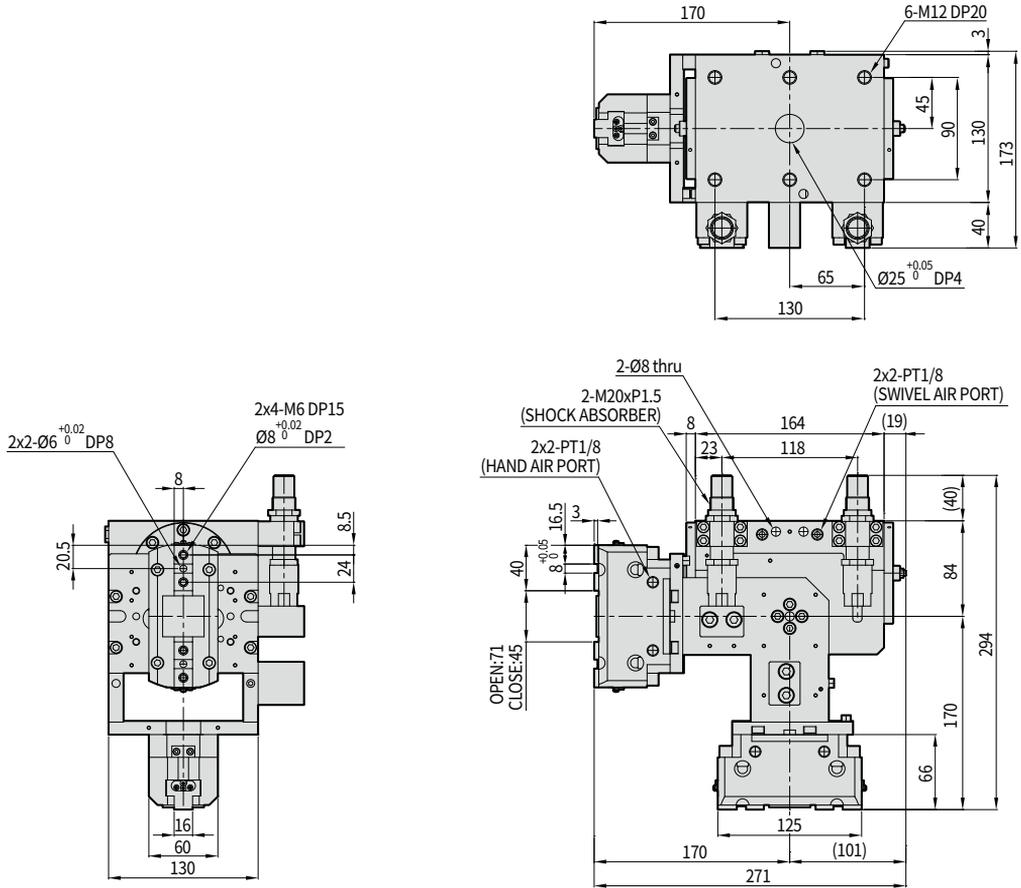
40N

50N

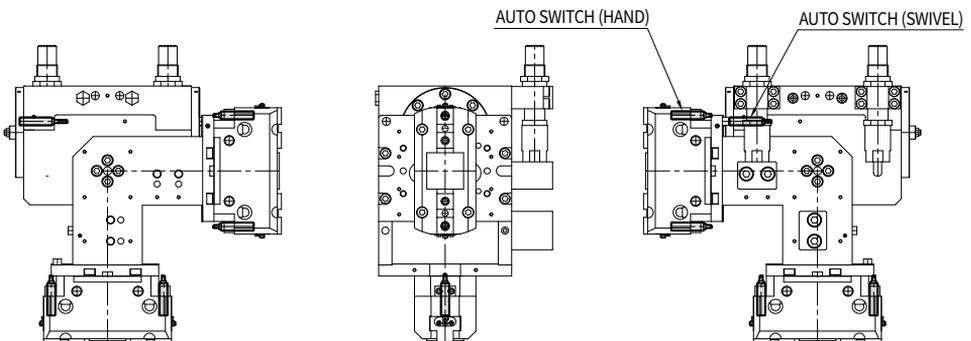
60N

## MODULE

A60N1550S-Y

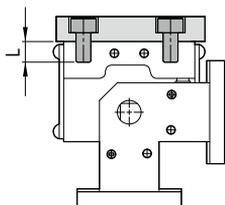


## A60N1550S-Y Example of Auto Switch installation



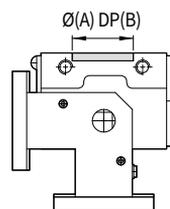
Installation Information

1. Installation by body tap holes



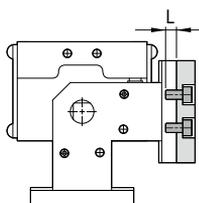
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
ASU18N	M4×P0.7	25	7
ASU22N	M5×P0.8	51	8
ASU30N	M6×P1	81	10
ASU40N	M6×P1	81	12
ASU50N	M6×P1	57	12
ASU60N	M12×P1.75	670	20

2. Mounting position determination



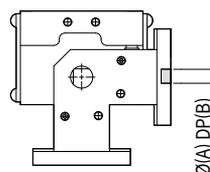
Item	Pin Hole A	Pin Hole Depth B (mm)
ASU18N	Ø8	2
ASU22N	Ø15	3
ASU30N	Ø12	2
ASU40N	Ø15	3
ASU50N	Ø20	3
ASU60N	Ø25	4

3. Attachment installation



Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
ASU18N	M3×P0.5	11	5
ASU22N	M4×P0.7	25	6
ASU30N	M5×P0.8	51	8
ASU40N	M6×P1	81	8
ASU50N	M8×P1.25	157	10
ASU60N	M6×P1	81	12

4. Attachment position determination



Item	Pin Hole A	Pin Hole Depth B (mm)
ASU18N	Ø8	5 (thru)
ASU22N	Ø10	6 (thru)
ASU30N	Ø4	6
ASU40N	Ø5	6
ASU50N	Ø6	8
ASU60N	Ø6	8

# SWIVEL UNIT

## ASU-SH Series

### Features

- Rack & Pinion inside double piston type rotary unit.
- Suitable to configure Auto Loader combination with 2 PCS of general hands.
- Shock absorber as standard.
- Easy centralized piping with central hollow hole.
- Auto Switch installation. (Optional)



### Order Form

## ASU 16SH - W - P □ S - PNP

①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

#### ① Series Name

#### ② Cylinder Bore Size

Order	CYL Bore(mm)
16SH	16
20SH	20
25SH	25
30SH	30
40SH	40

#### ③ Proximity Auto Switch Mounting Bracket

Order	Proximity Auto Switch Mounting Bracket
Blank	Non-Mounted
W	Mounted

\* For "Blank", magnetic sensing Auto Switch is available.

#### ④ Auto Switch Specification

##### ※Magnetic Auto Switch

Order	Sensing Type	Cable Spec		Voltage		Current		Protect Level	Operation Time
		Wires	Direction	AC	DC	AC	DC		
Blank		No Auto Switch provided							
A3	Magnetic reed switch	2-Wire	Ver	100V	24V	5~20mA	5~40mA	IP 67	1ms
B4	Magnetic solid state	3-Wire	Ver	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms
B4B	Magnetic solid state	2-Wire	Ver	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms

\* Be careful of projection for vertical wire exposed type Auto Switch model. (Please refer technical information of Auto Switch)

##### ※ Proximity Auto Switch

Order	Sensing Type	Cable Spec		Voltage	Current	Body Length	Sensing Distance	Frequency	Protect Level
		Wires	Direction	DC					
Blank		No Auto Switch provided							
P	Proximity	3-Wire	Horiz	10~30V	Max 200mA	32mm	1mm ± 10%	800Hz	IP 67

#### ⑤ Magnetic Auto Switch Cable Length

Order	Cable Length
Blank	1M
L	3M

\* Proximity auto switch cable length is 2m. Please contact to office if needs longer.

#### ⑥ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

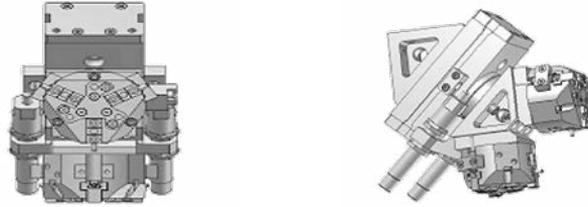
#### ⑦ Proximity Auto Switch Output

Order	Output
Blank	NPN
PNP	PNP



# MODULE ASS'Y

## ASU-SH+PH14-S ASS'Y



### Order Form

## A20SH1430S - S1 - PNP - CP1

①

②

③

④

#### ① Series Name

Order	Module Configuration	General Hand Gripping Force(Kgf)		General Hand Gripping Stroke (mm)
		Open	Close	
A16SH1430S	ASU16SH+PH14-30S	21.5	19.1	8
A20SH1430S	ASU20SH+PH14-30S	21.5	19.1	8
A25SH1440S	ASU25SH+PH14-40S	38.2	34.2	12
A30SH1450S	ASU30SH+PH14-50S	59.8	54.8	14
A40SH1460S	ASU40SH+PH14-60S	86.5	81.5	16

\* The gripping force of the general hand means the value of the master jaw end point at the air pressure of 5kgf/cm<sup>2</sup>, and please note that it is not the maximum gripping force that the swivel unit can handle.

\* For the weight of the workpiece that the swivel module assembly can handle, it is necessary to check the attachment state, rotational speed, required torque, and allowable kinetic energy of the workpiece.

\* For the safe model selection, please refer <SWIVEL UNIT Model Selection Guide>.

#### ② Auto Switch Installation

Order	Swivel	Quantity	General Hand	Quantity
Blank	×	-	×	-
S1	○	2PCS	×	-
S2	×	-	○	4PCS
S3	○	2PCS	○	4PCS

○ : Mounted    × : Non-Mounted

\* Proximity sensor will be mounted.

#### ③ Auto Switch Output

Order	Output
Blank	NPN
PNP	PNP

\* Same output with Swivel unit and PH14-S model.

#### ④ Center Pusher

Order	Center Pusher	Quantity
Blank	Non-Mounted	-
CP1	Mounted	1PCS
CP2	Mounted	2PCS

\* Order for additional Center Pusher, please refer accessory order form of mounted General Hand.

# ASU-SH Series

16SH

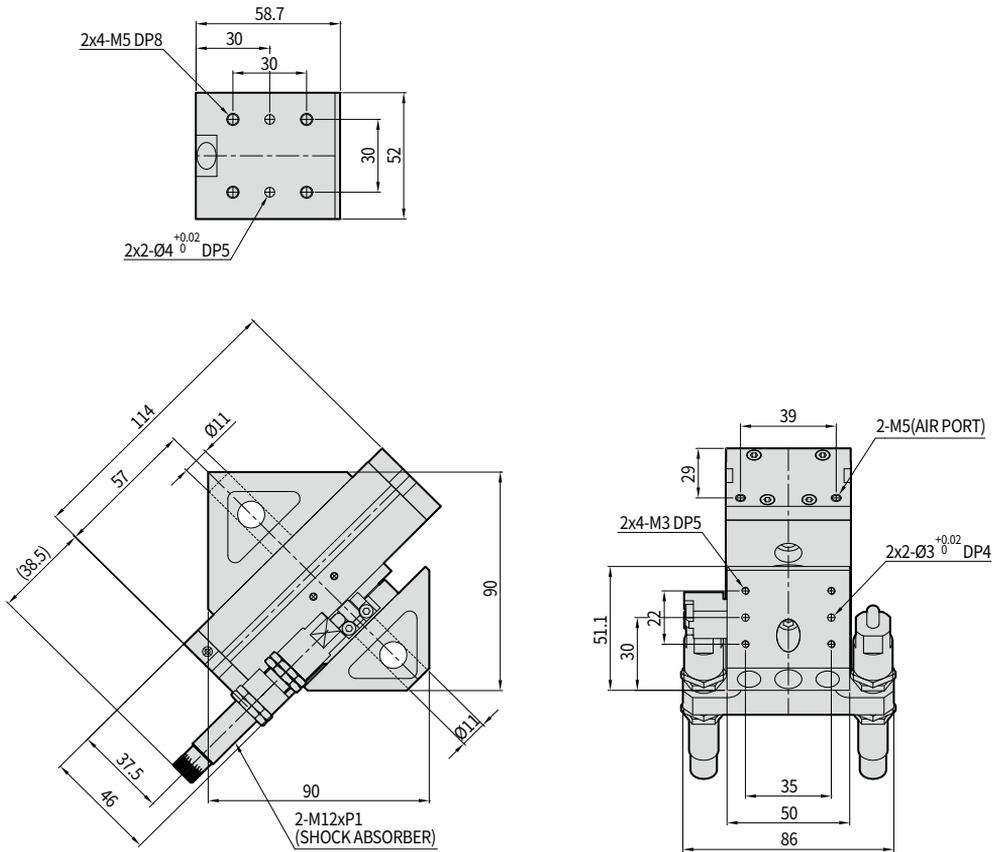
20SH

25SH

30SH

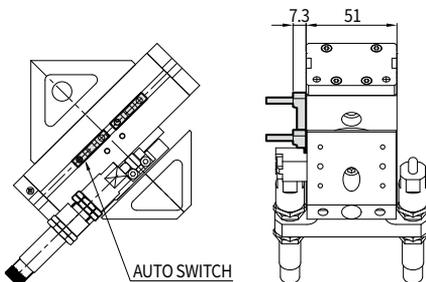
40SH

## ASU16SH

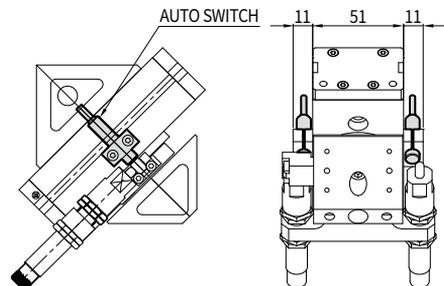


## ASU16SH Example of Auto Switch installation

### 1. MAGNETIC SENSOR



### 2. PROXIMITY SENSOR



SWIVEL UNIT

ASU-N

ASU-SH

ASU-R

# ASU-SH Series

16SH

20SH

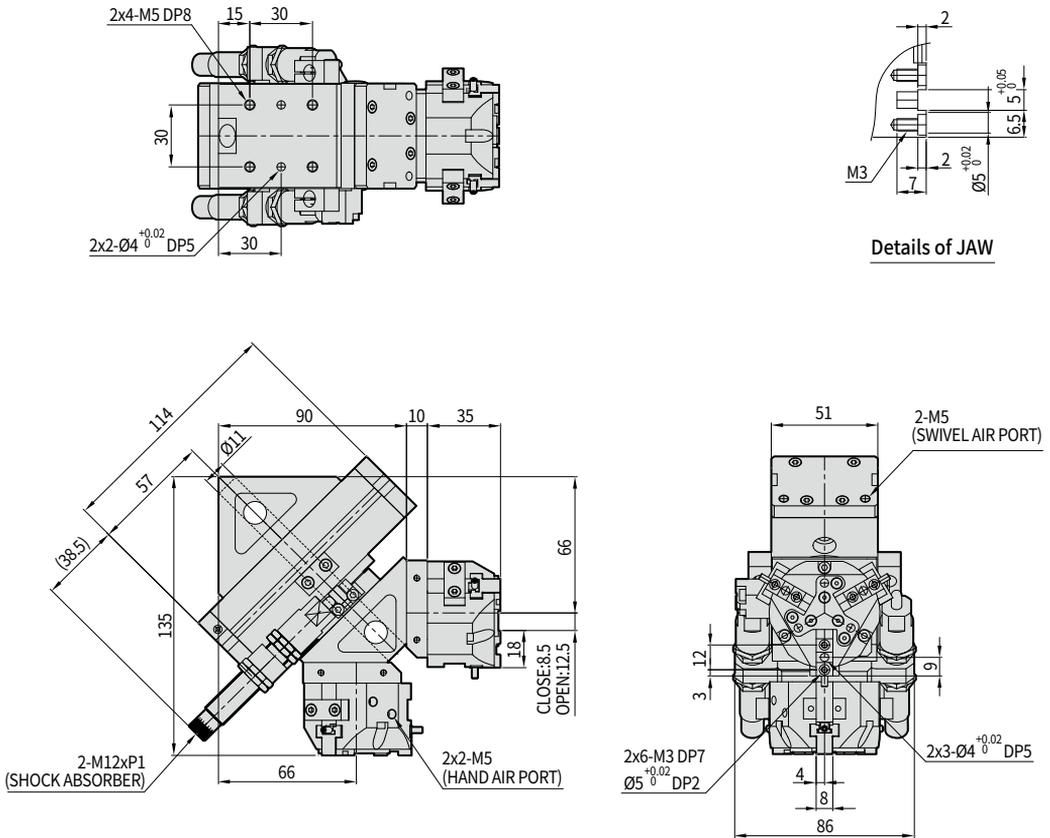
25SH

30SH

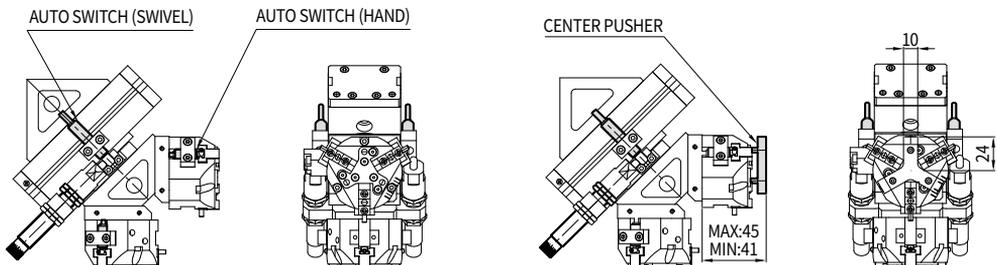
40SH

## MODULE

A16SH1430S



## A16SH1430S Example of Auto Switch installation



16SH

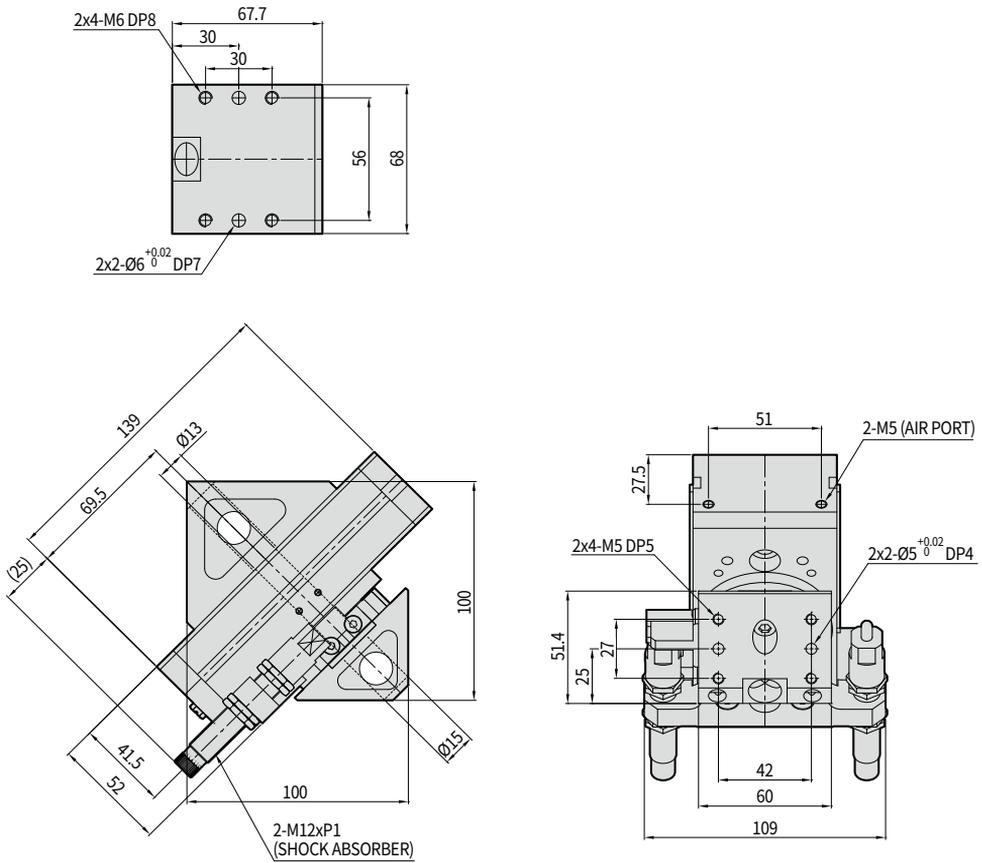
20SH

25SH

30SH

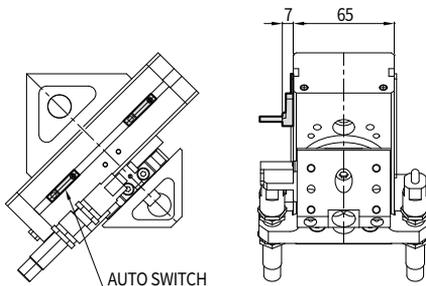
40SH

ASU20SH

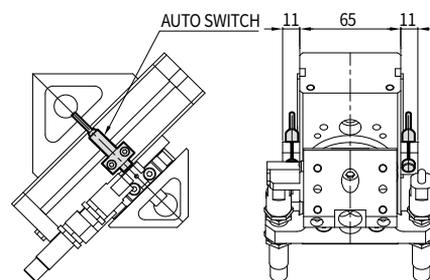


ASU20SH Example of Auto Switch installation

1. MAGNETIC SENSOR



2. PROXIMITY SENSOR



SWIVEL UNIT

ASU-N

ASU-SH

ASU-R

# ASU-SH Series

16SH

20SH

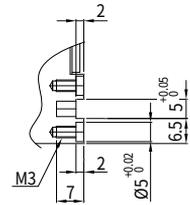
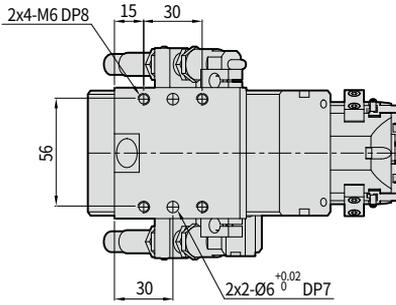
25SH

30SH

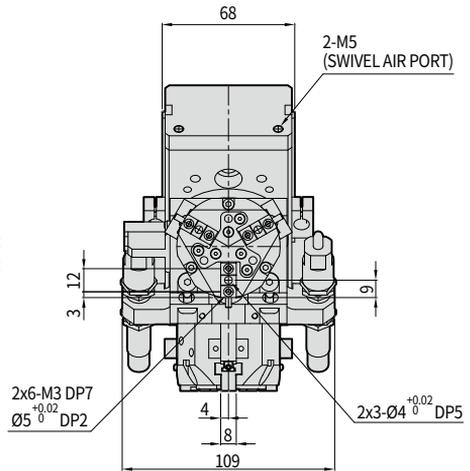
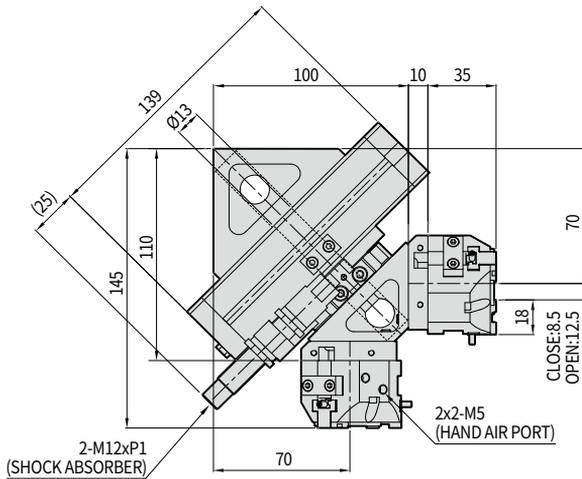
40SH

## MODULE

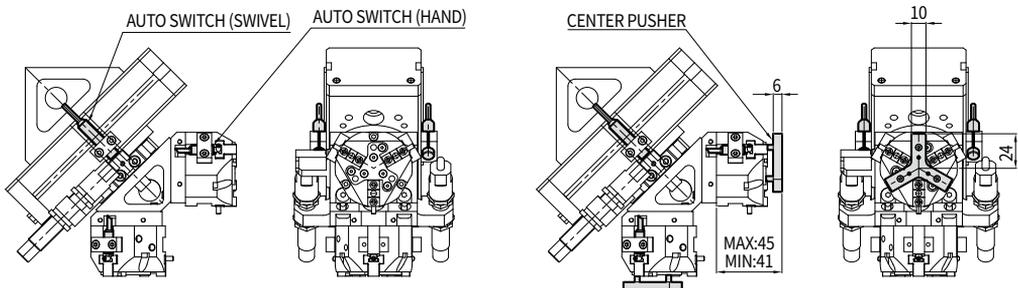
A20SH1430S



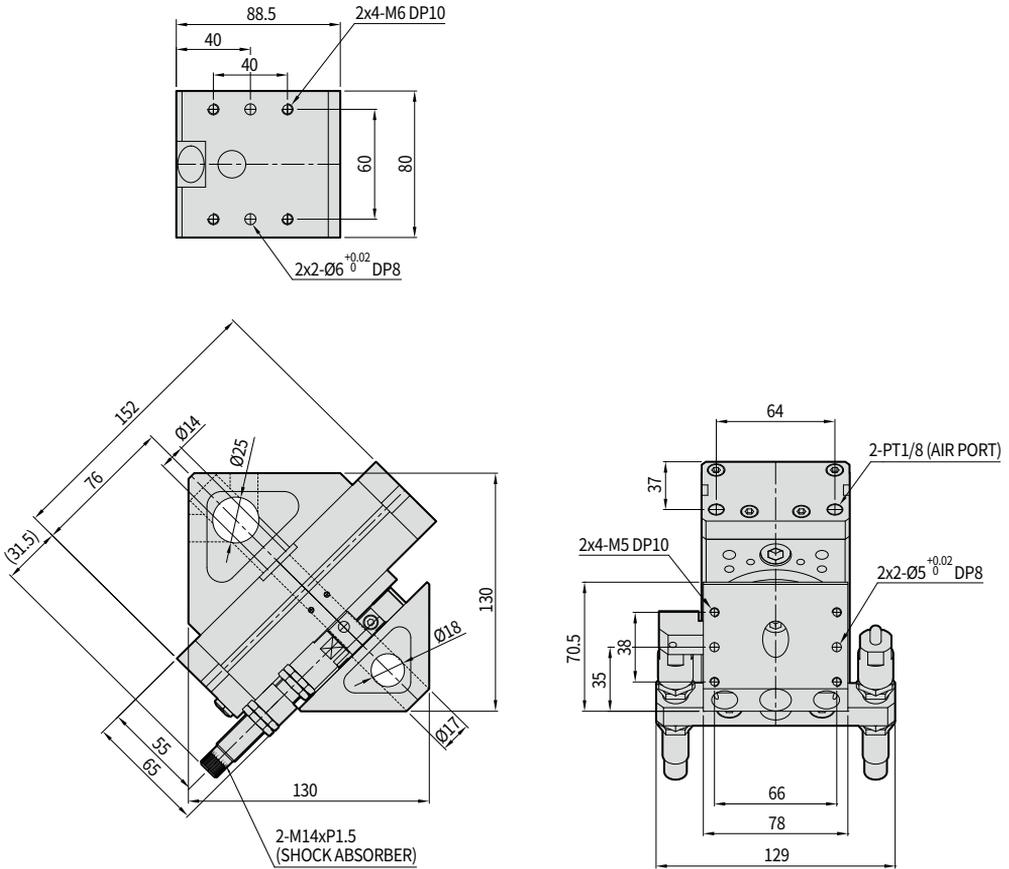
Details of JAW



## A20SH1430S Example of Auto Switch installation

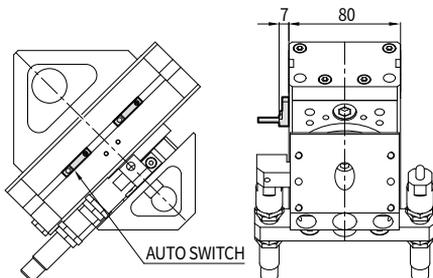


ASU25SH

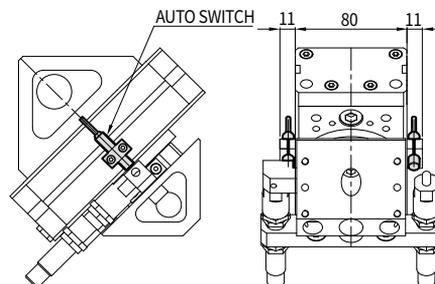


ASU25SH Example of Auto Switch installation

1. MAGNETIC SENSOR



2. PROXIMITY SENSOR



# ASU-SH Series

16SH

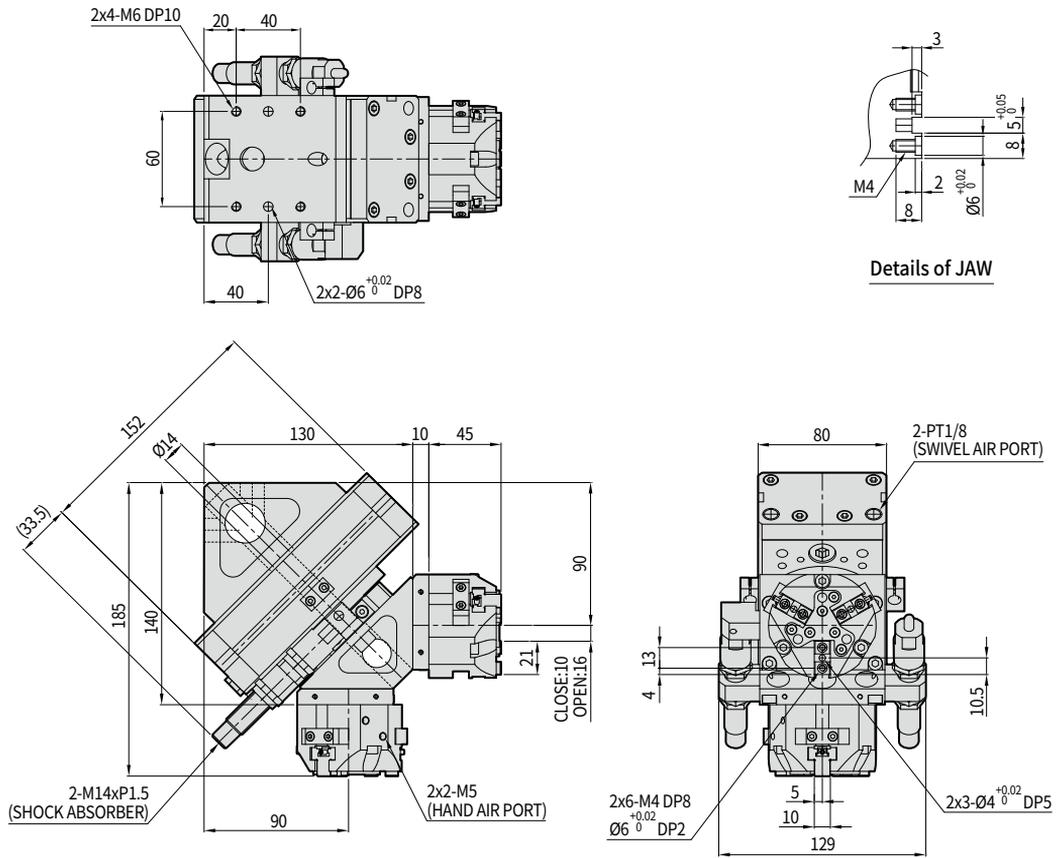
20SH

25SH

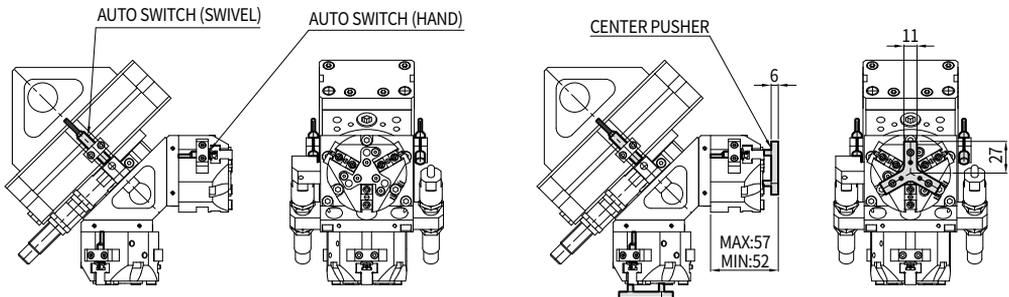
30SH

40SH

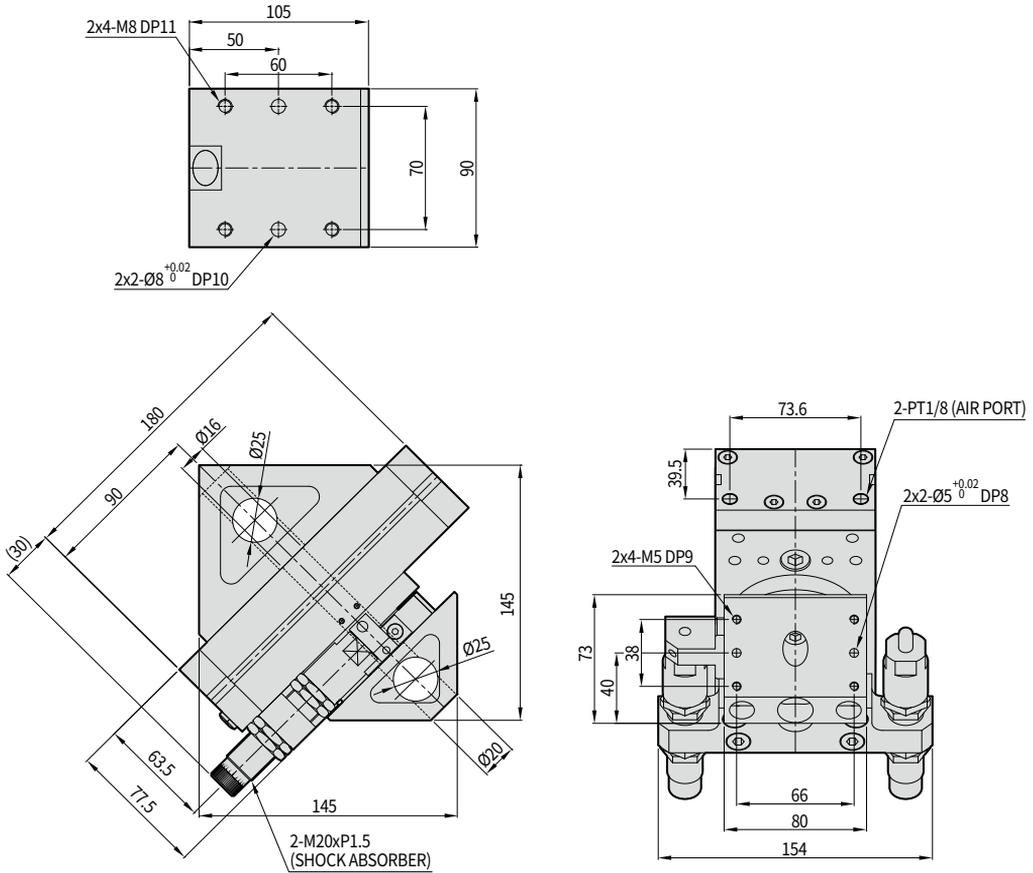
**MODULE**  
A25SH1440S



## A25SH1440S Example of Auto Switch installation

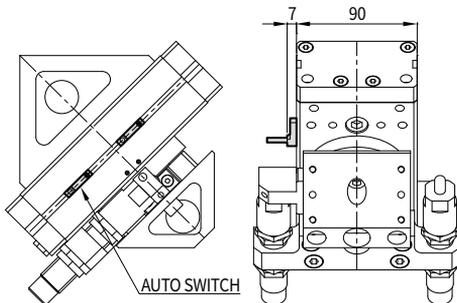


ASU30SH

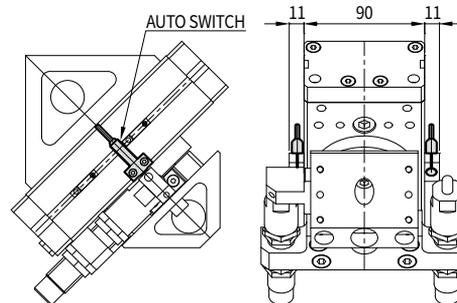


ASU30SH Example of Auto Switch installation

1. MAGNETIC SENSOR



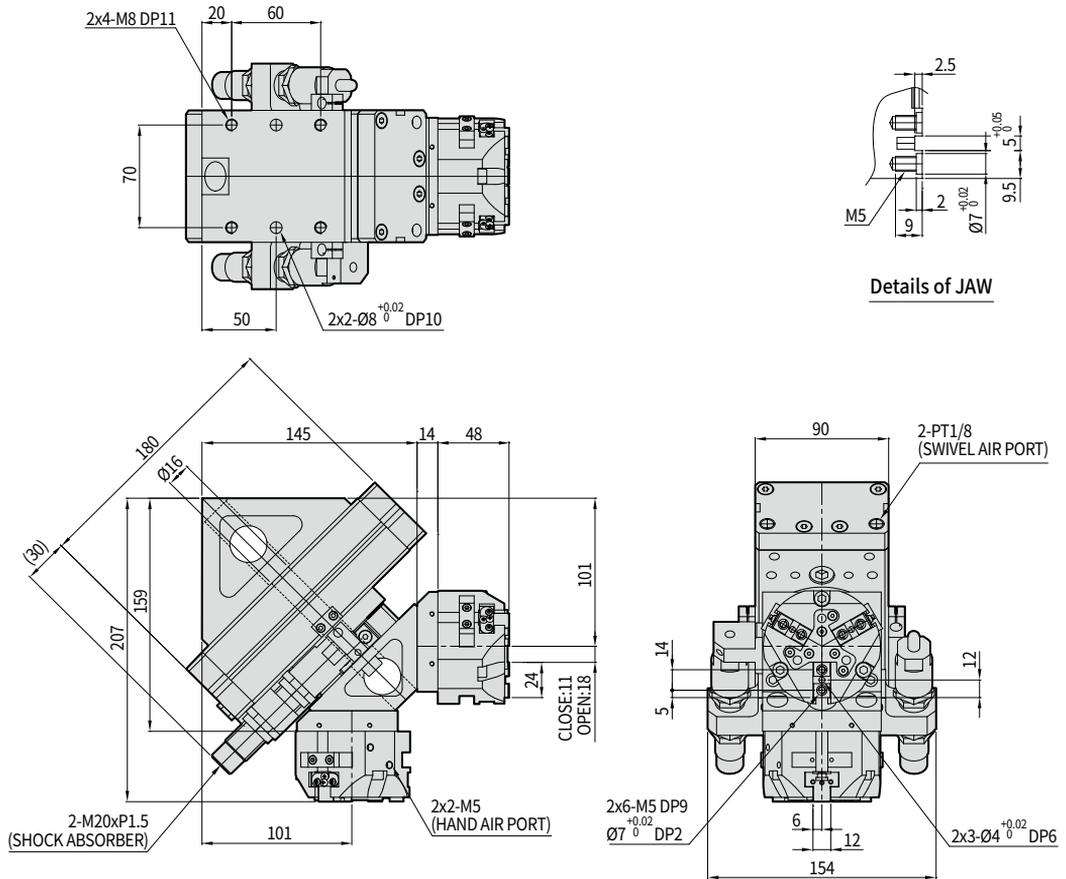
2. PROXIMITY SENSOR



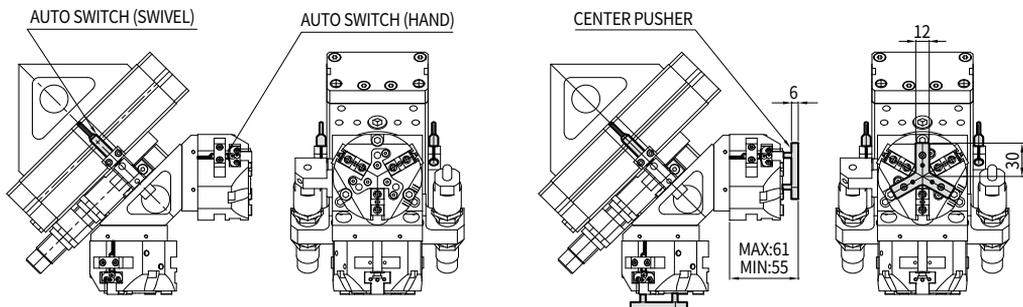
# ASU-SH Series

16SH 20SH 25SH 30SH 40SH

## MODULE A30SH1450S



## A30SH1450S Example of Auto Switch installation

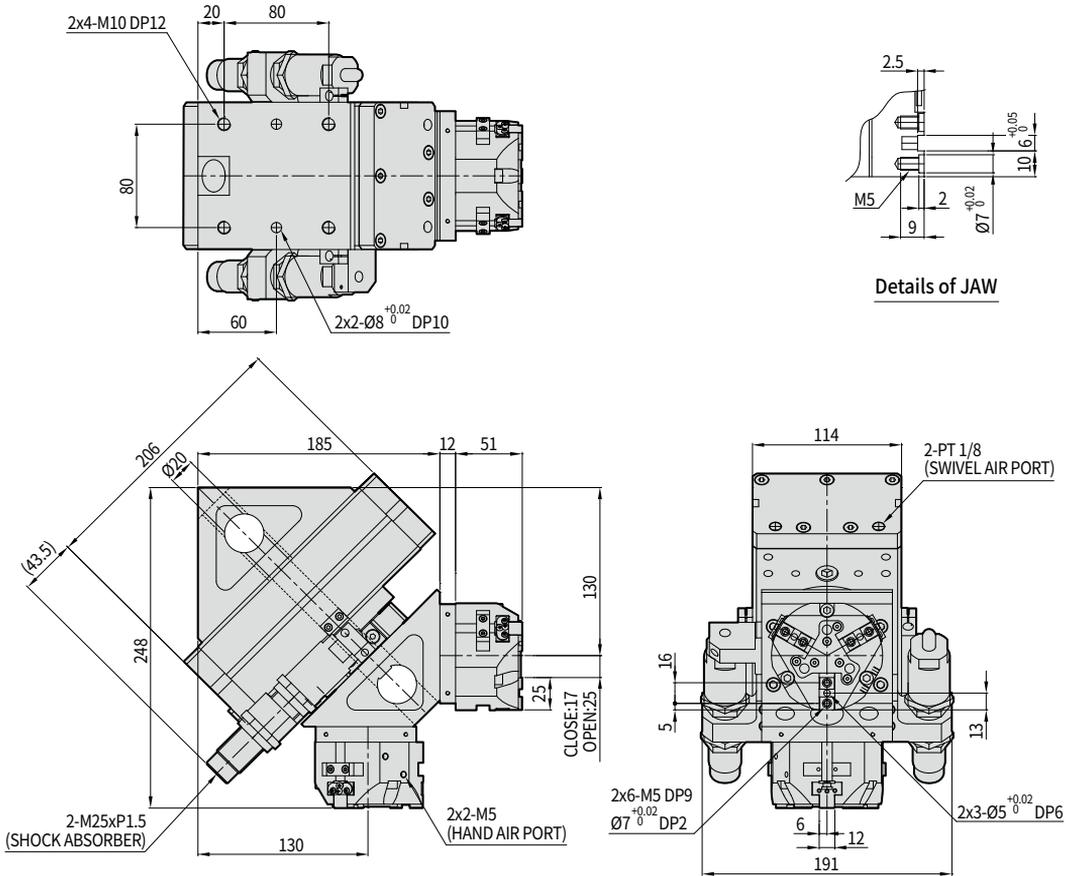




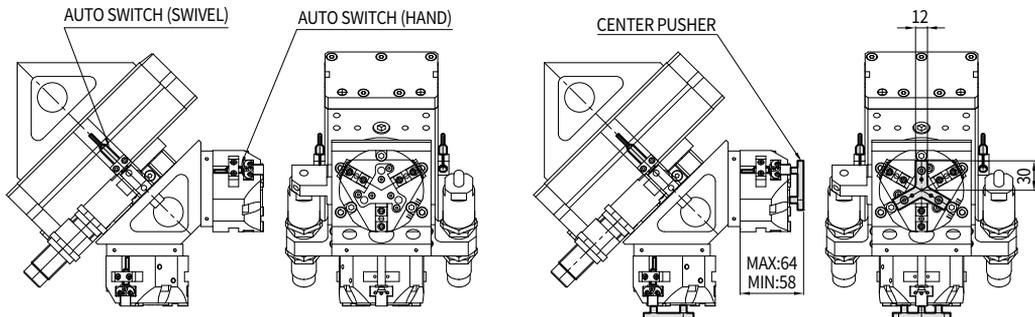
# ASU-SH Series

16SH 20SH 25SH 30SH 40SH

**MODULE**  
A40SH1460S

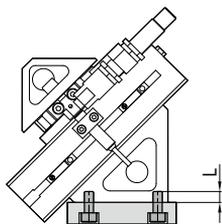


## A40SH1460S Example of Auto Switch installation



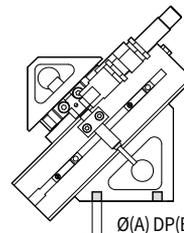
Installation Information

1. Installation by body tap holes



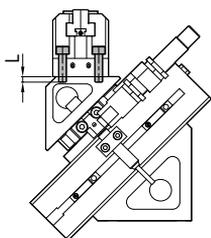
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
ASU16SH	M5×P0.8	51	8
ASU20SH	M6×P1	81	10
ASU25SH	M6×P1	81	14
ASU30SH	M8×P1.25	157	12
ASU40SH	M10×P1.5	360	12

2. Mounting position determination



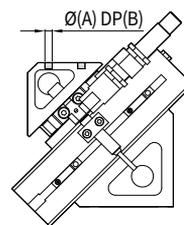
Item	Pin Hole A	Pin Hole Depth B (mm)
ASU16SH	Ø4	5
ASU20SH	Ø6	8
ASU25SH	Ø6	8
ASU30SH	Ø8	10
ASU40SH	Ø8	10

3. Attachment installation



Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
ASU16SH	M3×P0.5	11	5
ASU20SH	M5×P0.8	51	10
ASU25SH	M5×P0.8	51	12
ASU30SH	M5×P0.8	51	10
ASU40SH	M6×P1	81	12

4. Attachment position determination



Item	Pin Hole A	Pin Hole Depth B (mm)
ASU16SH	Ø3	4
ASU20SH	Ø5	4
ASU25SH	Ø5	8
ASU30SH	Ø5	8
ASU40SH	Ø6	10

Air distributor inside  
SWIVEL UNIT

# ASU-R Series

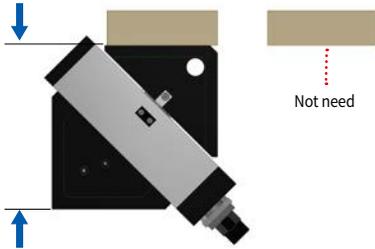
---

RACK & PINION Structure



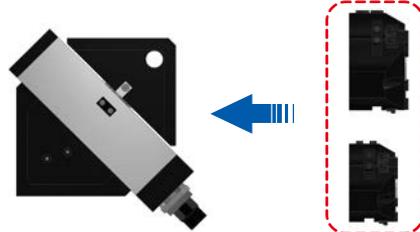
### Superior space utility

- Bracket for mounting General Hand not need.
- Reduced rotation range as much as removed adapter width.
- Superior rotary specification with compact structure.



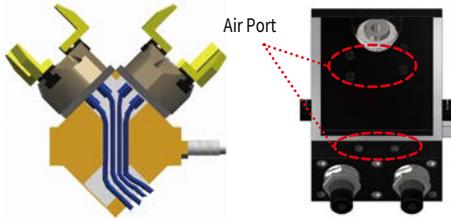
### Various optional General Hand

Item	Swivel Arm Spec	Available General Hand
ASU30R	40	PH14-40S
	50	PH14-50S
	60	PH14-60S
ASU40R	60	PH14-60S
	80	PH14-80S



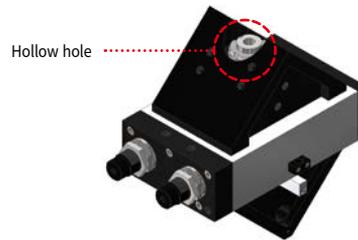
### Centralized air piping

- Air distributor inside.
- Extra piping not need.



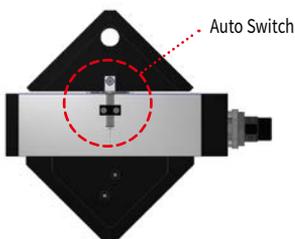
### Hollow shaft structure

- Easy centralized wiring with central hollow hole.



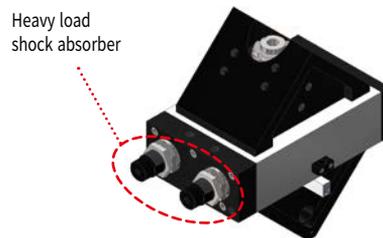
### Auto Switch installation (Optional)

- Proximity Sensor application.
- Easy sensing positioning from side.



### Heavy load shock absorber as standard

- 1.5 times performance compare to PRC-S.



# SWIVEL UNIT

## ASU-R Series

### Features

**NEW**

- Rack & Pinion inside double piston type rotary unit.
- Suitable to configure Auto Loader combination with 2 PCS of general hands.
- Superior rotary specification and space utility with compact structure.
- Extra piping not need with air distributor inside.
- Shock absorber as standard.



### Order Form

## ASU 30R - 60 - P S - PNP

①                      ②                      ③                      ④                      ⑤                      ⑥

① Series Name

② Cylinder Bore Size

Order	CYL Bore(mm)	Order	Available General Hand
30R	30	40	PH14-40S
		50	PH14-50S
		60	PH14-60S
40R	40	60	PH14-60S
		80	PH14-80S

③ Swivel Arm spec

④ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage DC	Current	Body Length	Sensing Distance	Frequency	Protect Level
		Wires	Direction						
Blank		No Auto Switch provided							
P	Proximity	3-Wire	Horiz	10~30V	Max 200mA	32mm	1mm ± 10%	800Hz	IP 67

⑤ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

⑥ Auto Switch Output

Order	Output
Blank	NPN
PNP	PNP

Accessory Order Form

(1) Shock Absorber

**ASU 30R - SH - ASSY**

①                      ②                      ③                      ④

- ① Series Name
- ② Cylinder Bore Size
- ③ Shock Absorber
- ④ Order Name for Accessory  
- Based for only one set for single side of product.

Specification

Item Name	ASU30R-40	ASU30R-50	ASU30R-60	ASU40R-60	ASU40R-80
CYL Bore Size(mm)	30		40		40
Rotation Angle(°)	180				
Shock Absorbing	Shock Absorber				
Shock Absorber Specification	M20×P1.5 (Heavy load spec)			M25×P1.5 (Heavy load spec)	
Rotation Time(sec)	0.5 ~ 2.0			0.7 ~ 2.0	
Effective Torque(kgf·cm) P : Air Pressure(kgf/cm <sup>2</sup> )	14×P			31×P	
Fitting Size	M5			PT 1/8	
Weight(kgf)	4.8	5	5	9.5	10
Maximum Radial Load(kgf)	101			125	
Maximum Thrust Load(kgf)	20			25	
Allowable Kinetic Energy(kgf·cm)	37			55	
Fluid	Clean Air Note 1)				
Pressure Range(kgf/cm <sup>2</sup> )	3 ~ 7				
Lubrication	Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)				
Temperature Range(°C)	5 ~ 60				

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10µm degree of filtering.

※ For detailed model selection, please refer <SWIVEL UNIT Model Selection Guide>.

SWIVEL UNIT  
ASU-N  
ASU-SH  
ASU-R

# MODULE ASS'Y

## ASU-R+PH14-S ASS'Y



### Order Form

## A30R1460S - S1 - PNP - CP1

①                      ②                      ③                      ④

※ Shock Absorber for ASU-R is installed as standard.

#### ① Series Name

Order	Module Configuration	General Hand Gripping Force(Kgf)		General Hand Gripping Stroke (mm)
		Open	Close	
A30R1440S	ASU30R-40+PH14-40S	38.2	34.2	12
A30R1450S	ASU30R-50+PH14-50S	59.8	54.8	14
A30R1460S	ASU30R-60+PH14-60S	86.5	81.5	16
A40R1460S	ASU40R-60+PH14-60S	86.5	81.5	16
A40R1480S	ASU40R-80+PH14-80S	162	148	20

- \* The gripping force of the general hand means the value of the master jaw end point at the air pressure of 5kgf/cm<sup>2</sup>, and please note that it is not the maximum gripping force that the swivel unit can handle.
- \* For the weight of the workpiece that the swivel module assembly can handle, it is necessary to check the attachment state, rotational speed, required torque, and allowable kinetic energy of the workpiece.
- \* For the safe model selection, please refer <SWIVEL UNIT Model Selection Guide>.

#### ② Auto Switch Installation

Order	Swivel	Quantity	General Hand	Quantity
Blank	×	-	×	-
S1	○	2PCS	×	-
S2	×	-	○	4PCS
S3	○	2PCS	○	4PCS

- \* ○ : Mounted    × : Non-Mounted
- \* Proximity sensor will be mounted.

#### ③ Auto Switch Output

Order	Output
Blank	NPN
PNP	PNP

- \* Same output with Swivel unit and PH14-S model.

#### ④ Center Pusher

Order	Center Pusher	Quantity
Blank	Non-Mounted	-
CP1	Mounted	1PCS
CP2	Mounted	2PCS

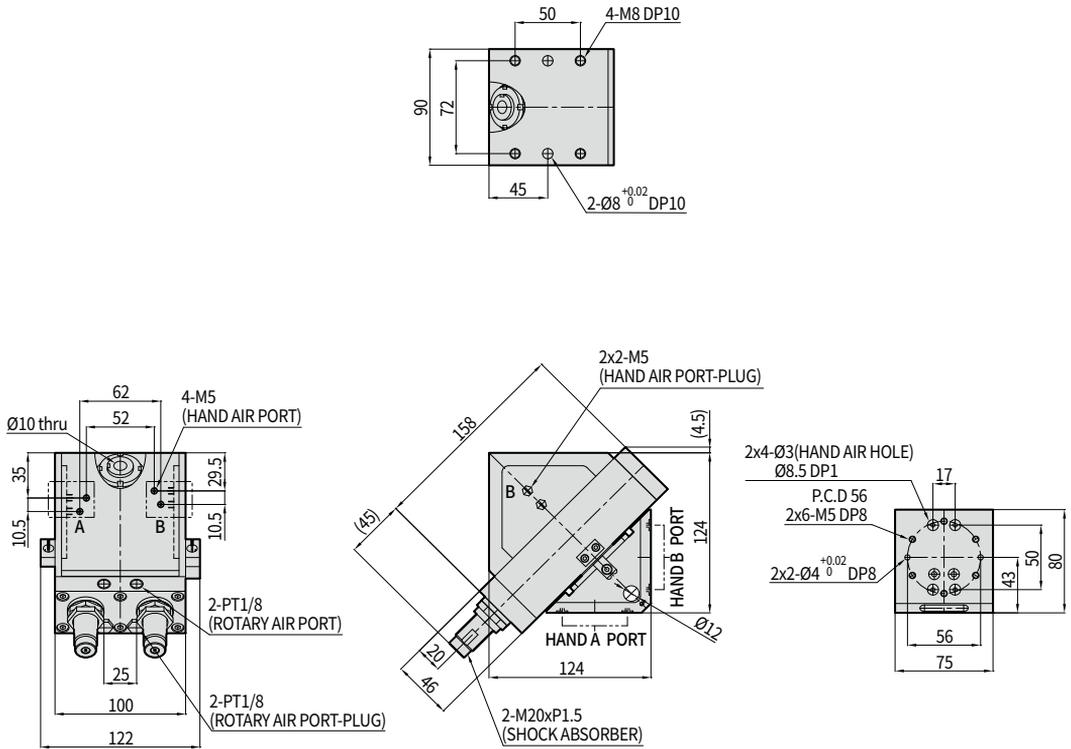
- \* Order for additional Center Pusher, please refer accessory order form of mounted General Hand.

# ASU-R Series

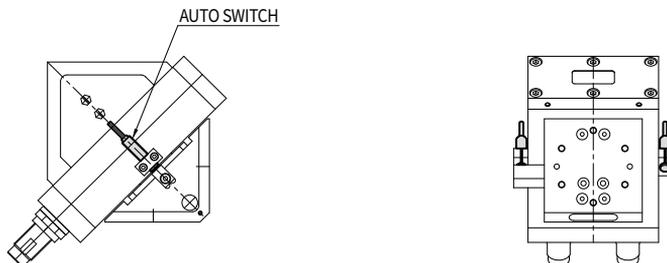
30R 40R

40 50 60

## ASU30R-40



## ASU30R-40 Example of Auto Switch installation



SWIVEL UNIT

ASU-N  
ASU-SH  
ASU-R

# ASU-R Series

30R

40R

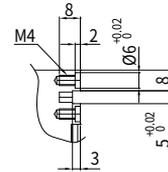
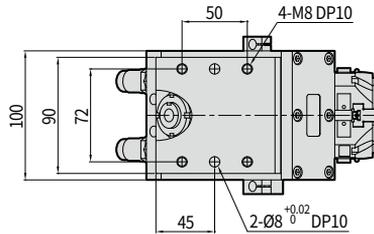
40

50

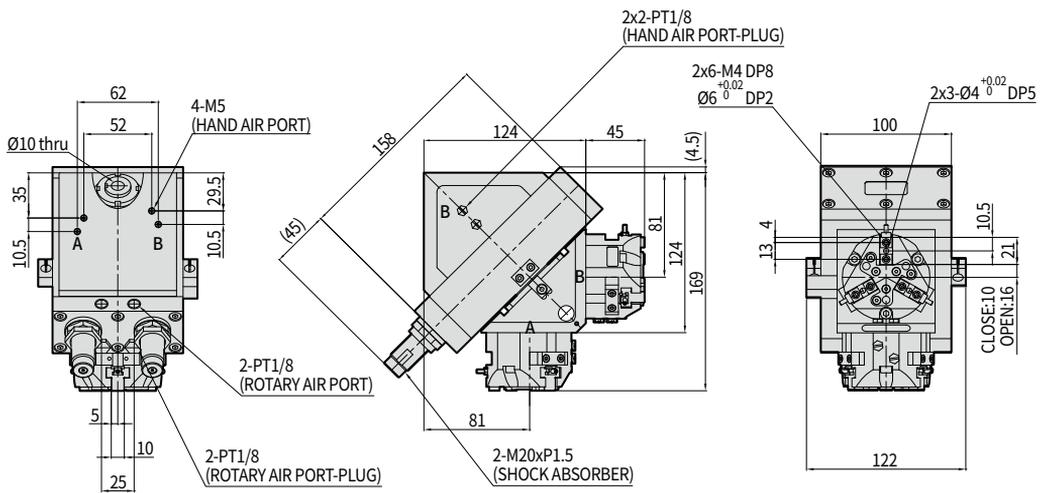
60

## MODULE

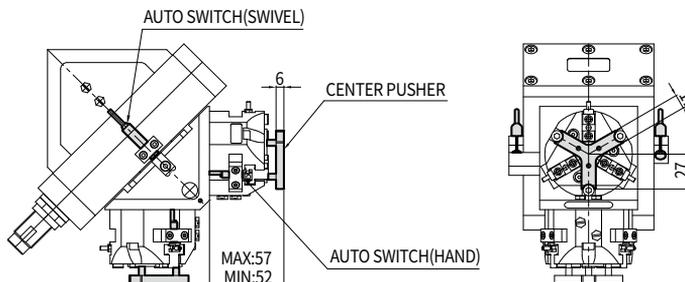
A30R1440S



Details of JAW



## A30R1440S Example of Auto Switch installation



30R

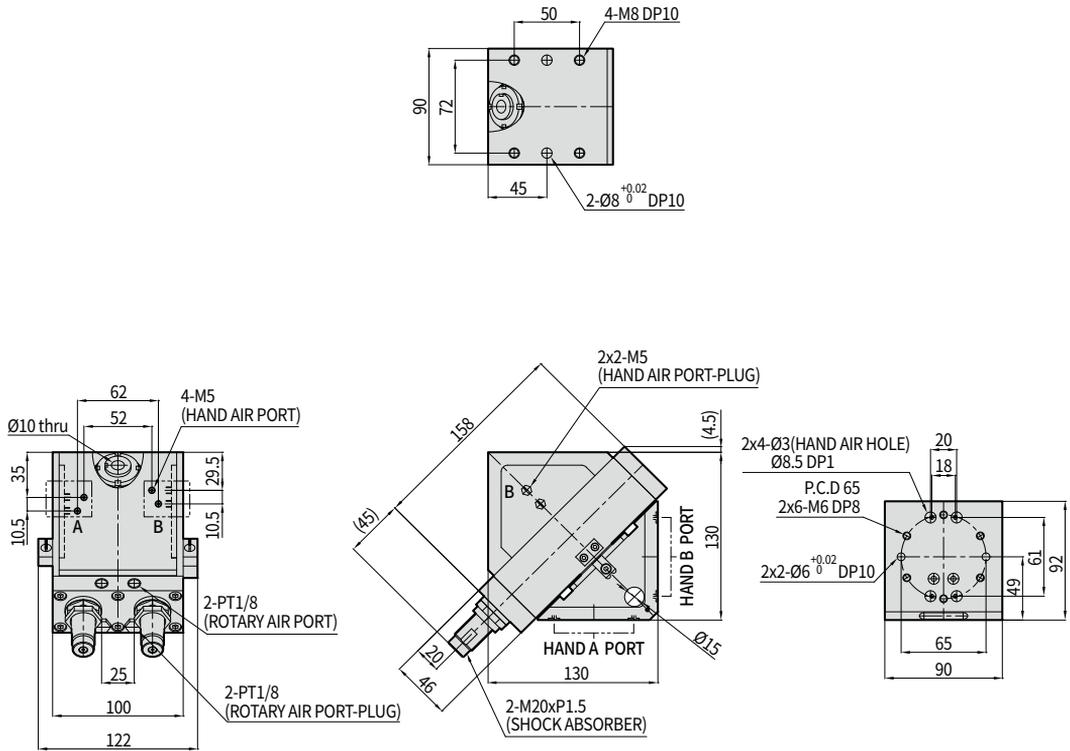
40R

40

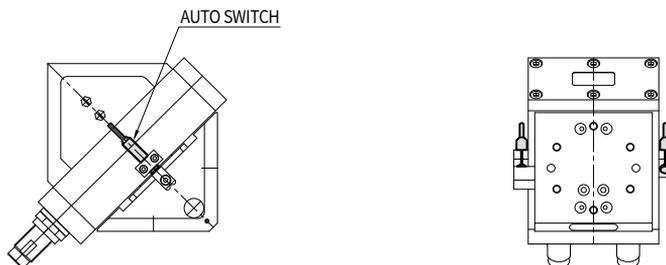
50

60

ASU30R-50



ASU30R-50 Example of Auto Switch installation



SWIVEL UNIT

ASU-N

ASU-SH

ASU-R

# ASU-R Series

30R

40R

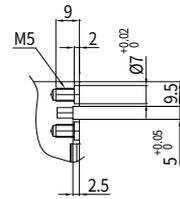
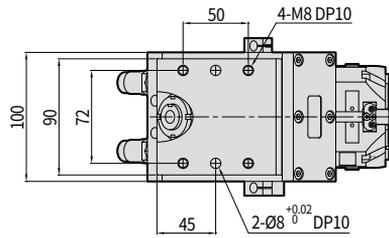
40

50

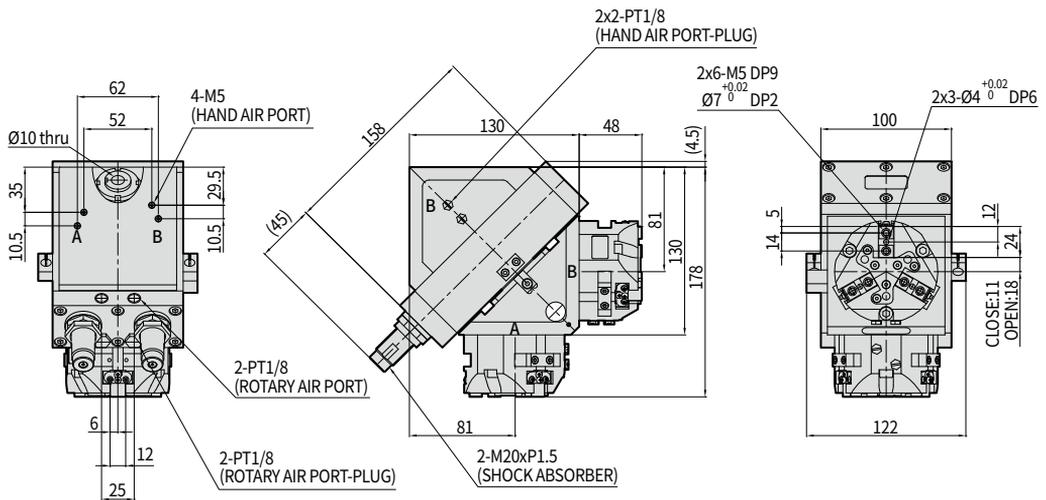
60

## MODULE

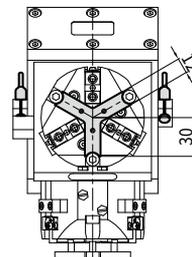
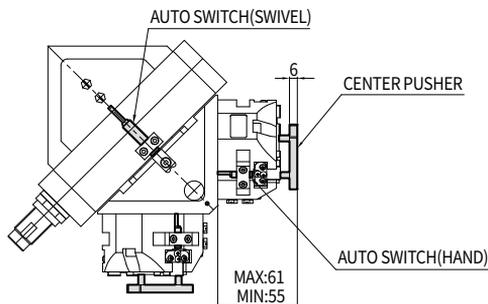
A30R1450S



Details of JAW



## A30R1450S Example of Auto Switch installation



30R

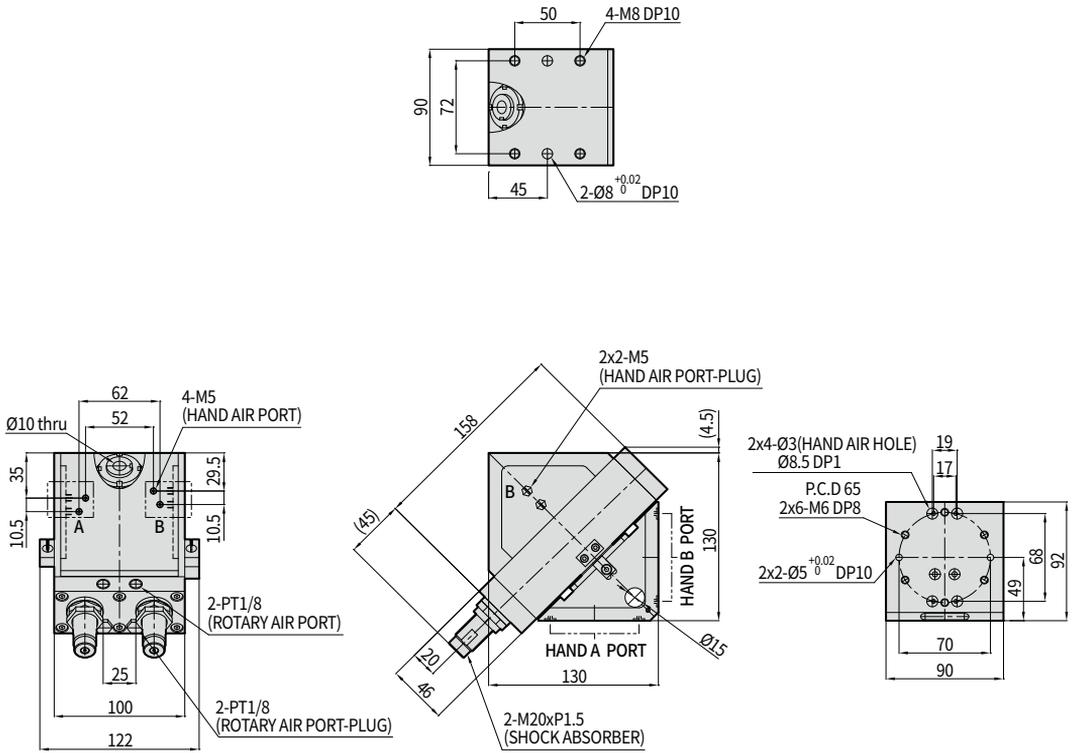
40R

40

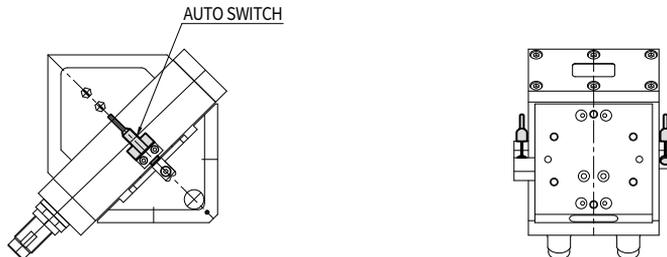
50

60

ASU30R-60



ASU30R-60 Example of Auto Switch installation



SWIVEL UNIT

ASU-N

ASU-SH

ASU-R

# ASU-R Series

30R

40R

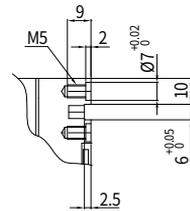
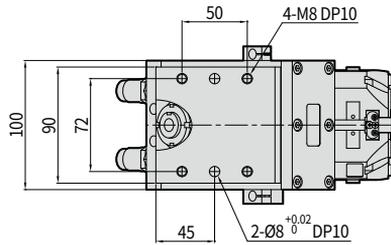
40

50

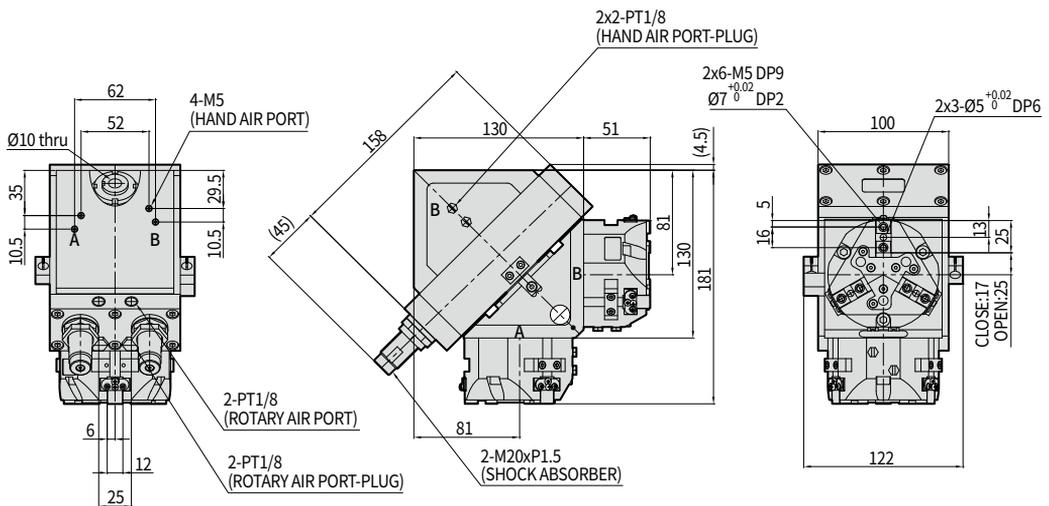
60

## MODULE

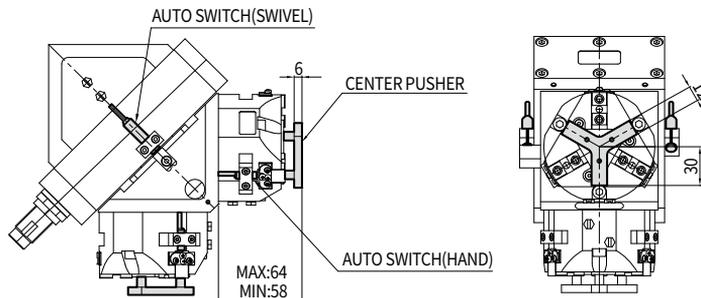
A30R1460S



Details of JAW



## A30R1460S Example of Auto Switch installation



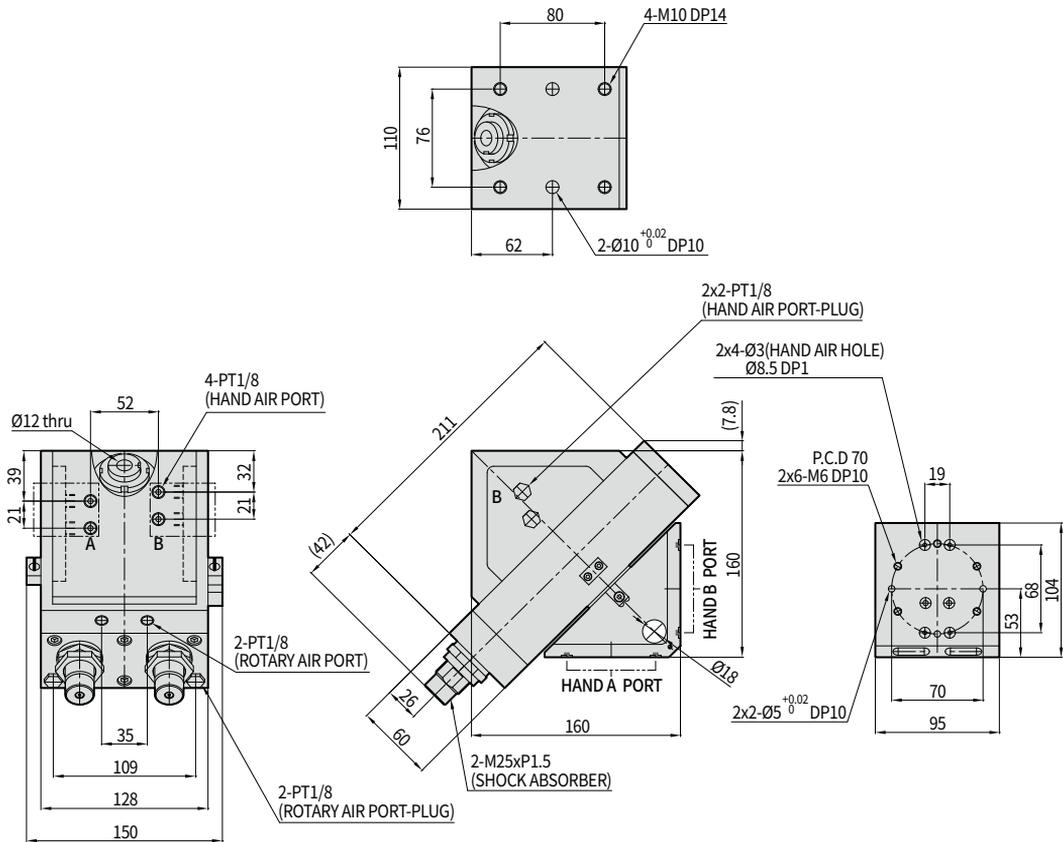
30R

40R

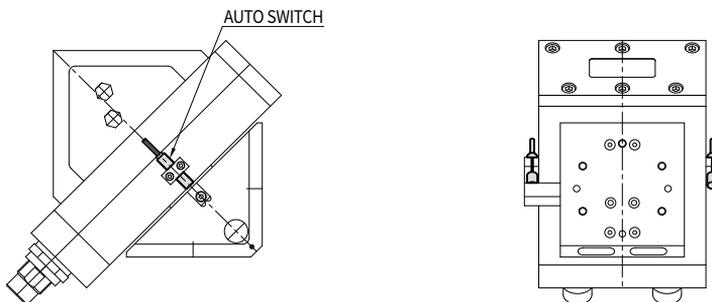
60

80

ASU40R-60



ASU40R-60 Example of Auto Switch installation



SWIVEL UNIT

ASU-N

ASU-SH

ASU-R



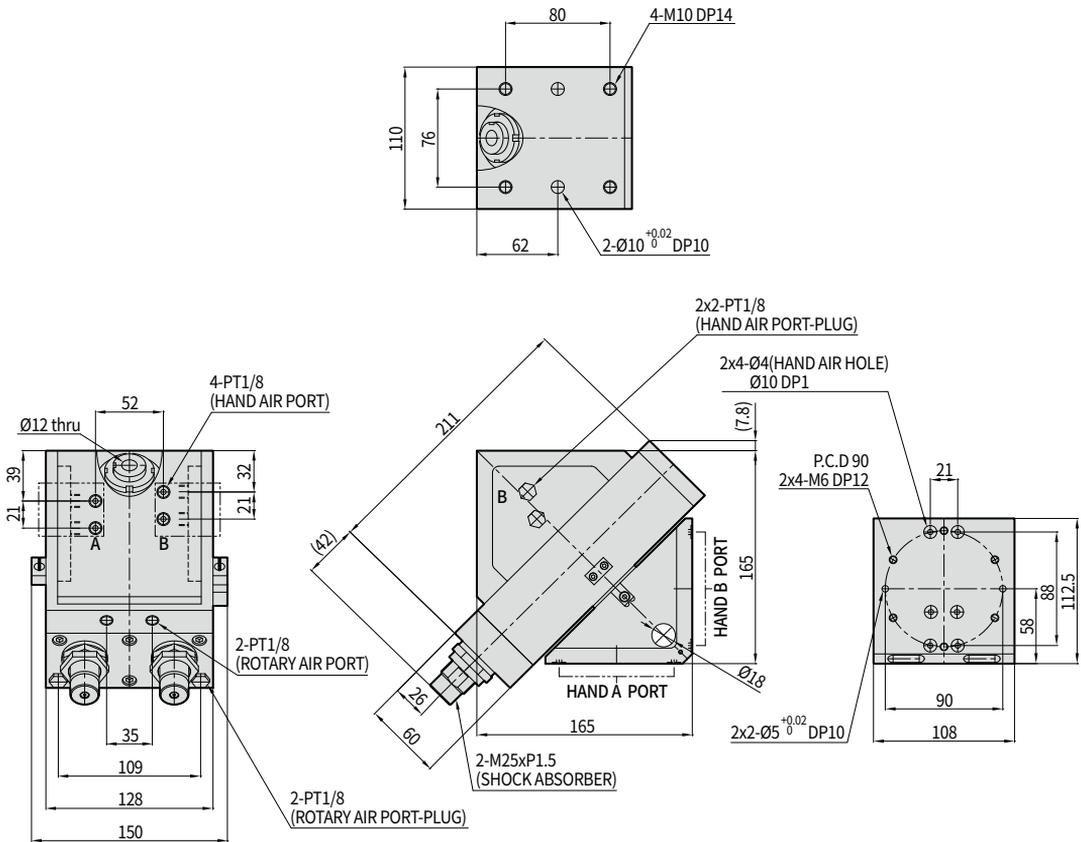
30R

40R

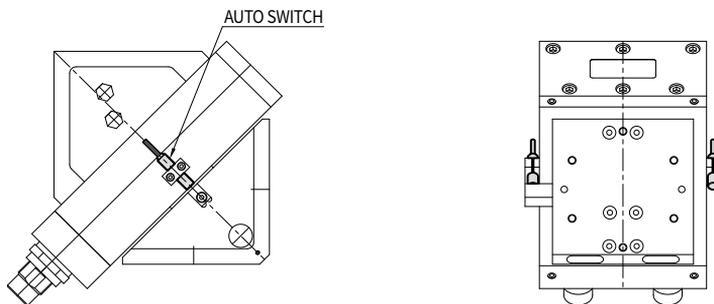
60

80

ASU40R-80



ASU40R-80 Example of Auto Switch installation



SWIVEL UNIT

ASU-N

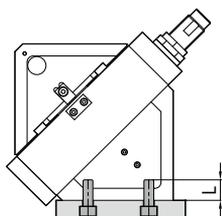
ASU-SH

ASU-R



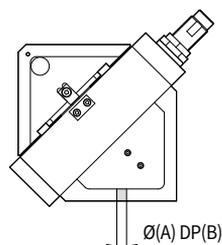
Installation Information

1. Installation by body tap holes



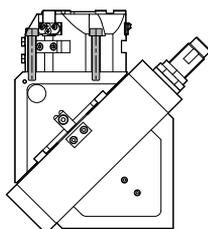
Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
ASU30R-40	M8×P1.25	157	10
ASU30R-50	M8×P1.25	157	10
ASU30R-60	M8×P1.25	157	10
ASU40R-60	M10×P1.5	360	14
ASU40R-80	M10×P1.5	360	14

2. Mounting position determination



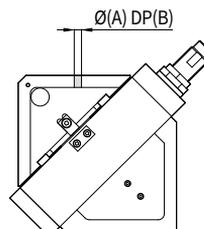
Item	Pin Hole A	Pin Hole Depth B (mm)
ASU30R-40	Ø8	10
ASU30R-50	Ø8	10
ASU30R-60	Ø8	10
ASU40R-60	Ø10	10
ASU40R-80	Ø10	10

3. Attachment installation



Item	Fastening Bolt	Max Torque (kgf-cm)	Max Bolt Length L (mm)
ASU30R-40	M5×P0.8	51	8
ASU30R-50	M6×P1	81	8
ASU30R-60	M6×P1	81	8
ASU40R-60	M6×P1	81	10
ASU40R-80	M6×P1	81	10

4. Attachment position determination



Item	Pin Hole A	Pin Hole Depth B (mm)
ASU30R-40	Ø4	8
ASU30R-50	Ø6	10
ASU30R-60	Ø5	10
ASU40R-60	Ø5	10
ASU40R-80	Ø5	10



**P&M Catalogue**

**GENERAL CYLINDER**

## GENERAL CYLINDER / Compact Cylinder

# PFT Series

### Features

- Space utility cylinder for compact design.
- Urethane damper to forward as standard.
- Various mounting ways by supplying both of counter and tap without selective options.
- Freely selective mounting direction by 4 sides Auto Switch slots.  
(Ø12, Ø16 : 3 sides only)



### Order Form

**PFT 20 E B - 50 - E - A2 L S**

①      ②      ③      ④      ⑤      ⑥      ⑦      ⑧      ⑨

#### ① Series Name

#### ② Cylinder Bore Size

Order	CYL Bore(mm)	Order (=Standard Strokes(mm))
12	12	05,10,15,20,25,30
16	16	05,10,15,20,25,30
20	20	05,10,20,30,40,50
25	25	05,10,20,30,40,50
32	32	05,10,20,30,40,50,75,100
40	40	05,10,20,30,40,50,75,100
50	50	10,20,30,40,50,75,100

#### ⑤ Standard Strokes

#### ⑥ Special Option

Order	Special Option
Blank	Standard
E	Secondary battery field

#### ③ Screw Options of Cylinder Rod

Order	Screw Type
Blank	Standard (Female screw)
E	Male screw

#### ④ Magnetic Option

Order	Magnetic Option
Blank	Standard (Without magnetic)
B	Magnetic inside

⑦ Auto Switch Specification

Order	Sensing Type	Cable Spec		Voltage		Current		Protect Level	Operation Time
		Wires	Direction	AC	DC	AC	DC		
Blank		No Auto Switch provided							
A2	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2C	Magnetic reed switch	2-Wire	Horiz	100V	24V	5~20mA	5~40mA	IP 67	1ms
A2V	Magnetic reed switch	2-Wire	Ver	100V	24V	5~20mA	5~40mA	IP 67	1ms
B2	Magnetic solid state	3-Wire	Horiz	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms
B2B	Magnetic solid state	2-Wire	Horiz	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms
B3B	Magnetic solid state	2-Wire	Ver	-	24V (10~28V)	-	Less than 50mA	IP 67	1ms
B3C	Magnetic solid state	3-Wire	Ver	-	24V (5~28V)	-	Less than 50mA	IP 67	1ms

\* Be careful of projection for vertical wire exposed type Auto Switch model. (Please refer technical information of Auto Switch)

⑧ Auto Switch Cable Length

Order	Cable Length
Blank	1M
L	3M

⑨ Auto Switch Quantity

Order	Quantity
Blank	2PCS
S	1PCS

Specification

Item Name	PFT12	PFT16	PFT20	PFT25	PFT32	PFT40	PFT50
CYL Bore Size(mm)	12	16	20	25	32	40	50
Rod Size(mm)	6	8	10	12	16	16	20
Standard Strokes(mm)	5 ~ 30		5 ~ 50		5 ~ 100		10 ~ 100
Theoretical Thrust(kgf) P : Air Pressure(kgf/cm <sup>2</sup> )	Forward	1.13×P	2.01×P	3.14×P	4.90×P	8.04×P	12.56×P
	Backward	0.84×P	1.50×P	2.35×P	3.77×P	6.03×P	10.55×P
Fitting Size	M5				PT1/8		PT1/4
Weight(kgf) <small>Note 3)</small>	0.043 +	0.060 +	0.094 +	0.130 +	0.180 +	0.273 +	0.428 +
S.T : Stroke(mm)	0.0014×S.T	0.0019×S.T	0.0026×S.T	0.0032×S.T	0.0042×S.T	0.0047×S.T	0.0071×S.T
Fluid	Clean Air <small>Note 1)</small>						
Pressure Range(kgf/cm <sup>2</sup> )	1.5 ~ 7 (Guaranteed Resist Pressure : 10.5)						<small>Note 2)</small>
Lubrication	Not Need (If need, use one sort of turbine oil : SPEC ISOVG 32)						
Temperature Range(°C)	5 ~ 60						
Moving Speed(mm/sec)	50 ~ 300						
Operation Type	Double Acting						
Stroke Tolerance for Forward Position(mm)	0 ~ +1						

Note 1) Clean Air : Fresh air containing solid matters with 0.3% of supersaturated moisture and 99.9% of liquid oil that passed through the 3-10µm degree of filtering.

Note 2) Guaranteed Resist Pressure : A pressure that does not cause an abnormality in parts when it is applied for 1 minute without any weight loaded.

Note 3) Body Weight : Weight of standard screw(female screw) type.

# PFT Series

12

16

20

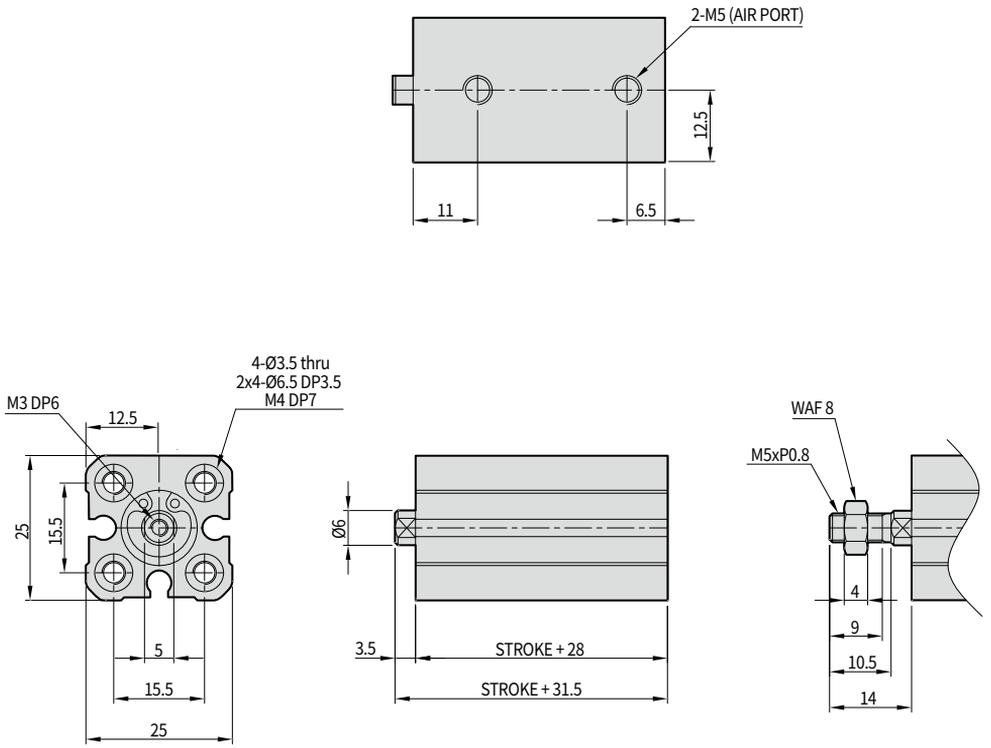
25

32

40

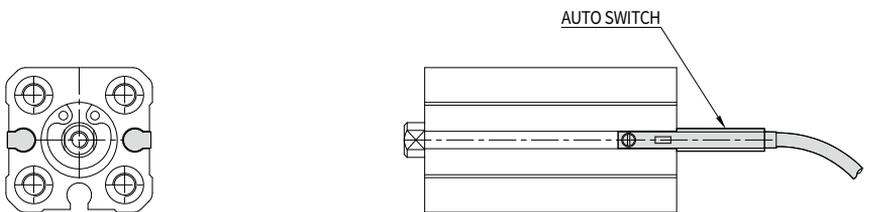
50

## PFT12



MALE SCREW TYPE

## PFT12 Example of Auto Switch installation



12

16

20

25

32

40

50

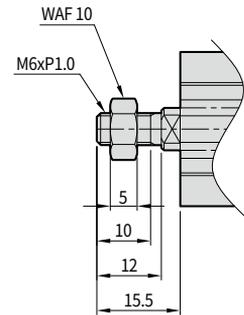
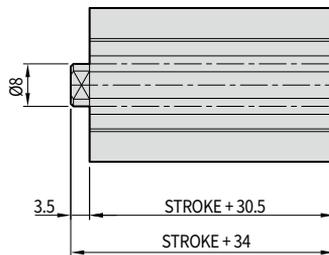
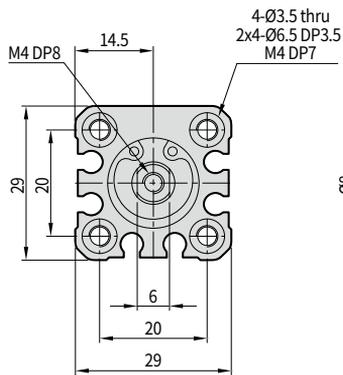
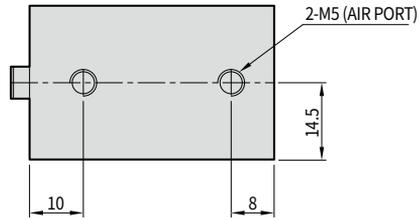
CYLINDER

PFT

PFTG

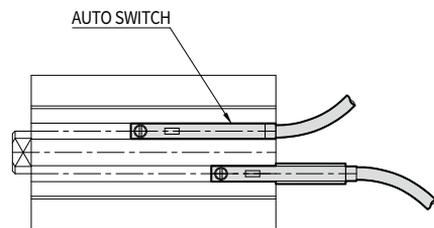
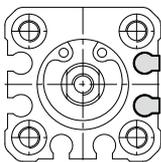
PSK

PFT16



MALE SCREW TYPE

PFT16 Example of Auto Switch installation



# PFT Series

12

16

20

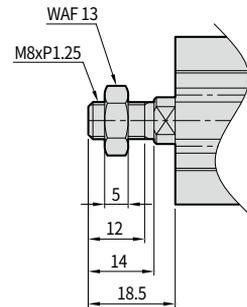
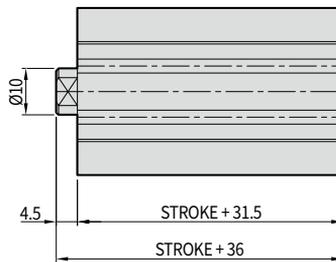
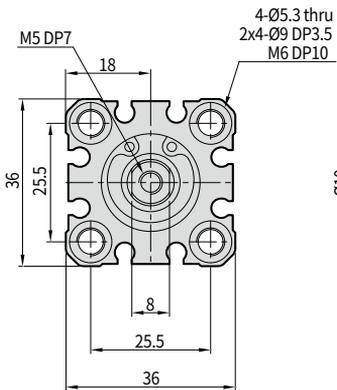
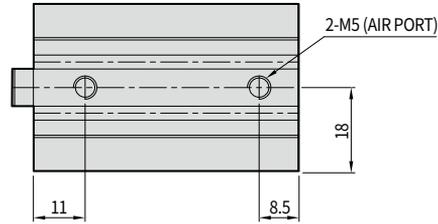
25

32

40

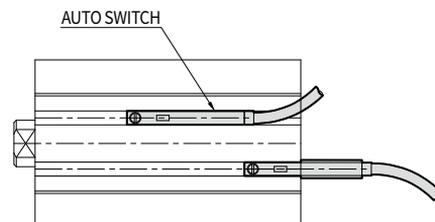
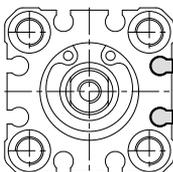
50

## PFT20



MALE SCREW TYPE

## PFT20 Example of Auto Switch installation



12

16

20

25

32

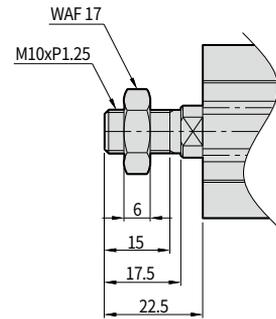
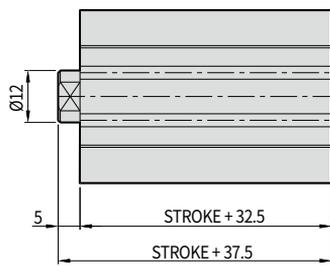
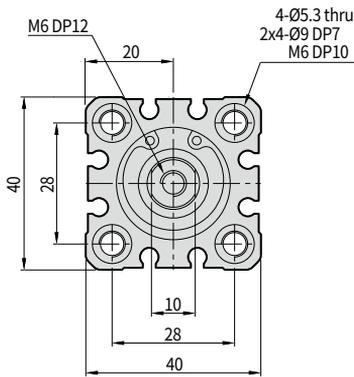
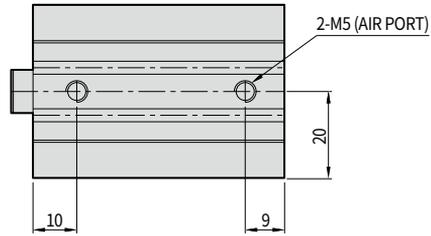
40

50

CYLINDER

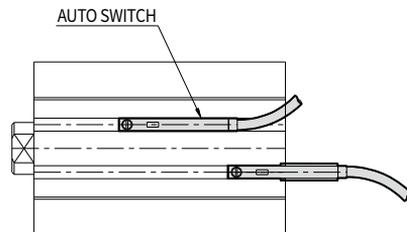
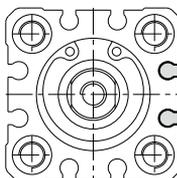
PFT  
PFTG  
PSK

PFT25



MALE SCREW TYPE

PFT25 Example of Auto Switch installation



# PFT Series

12

16

20

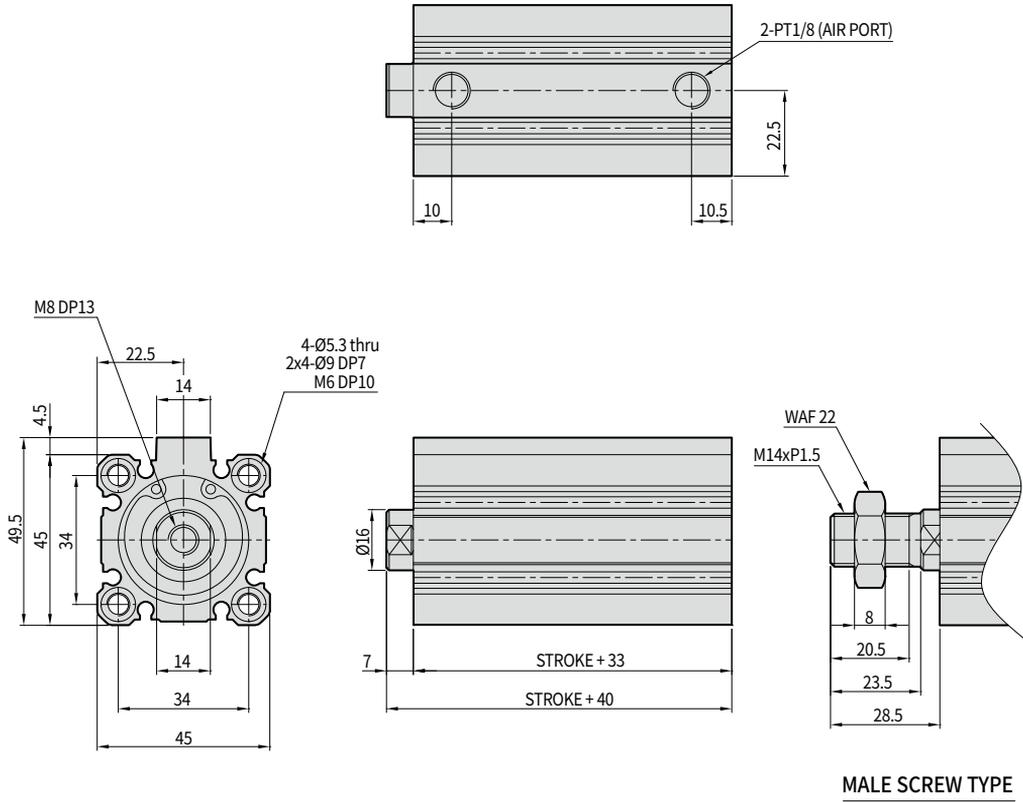
25

32

40

50

## PFT32



## PFT32 Example of Auto Switch installation

