

# End of Arm Tooling for Robots

## Vacuum Modular Kit

Accommodates up to 16 vacuum cups/ plungers

# HML

Flexible frame-based end effector

※ Adjusting range of the framework base is up to 210mm (8.26 inches)

- Easy to install on arm end of robot.
- Center profile and Cup-mount profile respectively have 2 sizes of lengths which compatible each other.
- Mounting flange adapters are provided for arm end of every robot of different manufacturers.
  - ※ Robots of which payload up to about 13 lbs. (6kgs)
- U-shaped framing profiles made of aluminum are light-weight and robust.
- The scales in metric are put on a profile.
- Contact us for special-sized profiles for your application.



Model Designation for Vacuum Modular Kit (Example)



- Kit contents
  - Piping flange ×1
  - Center framing profile ×1
  - Cup-mount profile ×2~8
  - Mounting washer for vacuum cup ×4~16
  - Mounting nuts for vacuum cup ×4~16
  - A set of mounting attachments

Aluminum vacuum module

⑦. No. of vacuum cup

Code	-P04	-P06	-P08	-P10	-P12	-P14(※2)	-P16(※2)
No. of vacuum cups	4	6	8	10	12	14	16
Panel mounting thread size	M10, M12, M14						

Code	-P04	-P06	-P08	-P10	-P12(※2)	-P14(※2)
No. of vacuum cups	4	6	8	10	12	14
Panel mounting thread size	M16					

※1) Two vacuum cups per one profile  
 ※2) If -T144 is selected, you cannot specify these numbers

⑥. Adjustable max. width of cup-mount profile

Code	T120	T206	T122	T204
Max. width (mm)	120	206	122	204
Panel mounting thread size	M10, M12, M14			
Wrench flats of nus for panel mount	Hex. 24		Hex. 26	

⑤. Panel mounting thread size of Vacuum cup

Code	-M10	-M12	-M14	-M16
Size	M10×1	M12×1	M14×1	M16×1

※ Take a look at the page below for the panel-mount thread size for model selection of HML. Wrong size of profile does not accommodate the vacuum cups you want to install.

④. Adjustable max. width of Center profile

Code	-T144	-T210
Max. (mm)	144	210

③. Rotational positioning

Code	Rotational positioning
C	If rotational positioning is needed when it is installed on the P.C.D. 31.5 M5 flange robot
No entry	No positioning is needed

②. Height of piping flange

Code	-L47	-L67
Height (mm)	47	67

- ※) The module kit does not include vacuum cups. Place an order for the cup type separately.
- ※) Multiple vacuum cups are needed for the vacuum cup module.
- ※) Vacuum cup is installed to the module using one out of two panel-mount nuts attached.
- ※) Specify 6mm O.D. fitting type vacuum cups to install on HML frame.  
Refer to "Vacuum cup and size/panel-mounting thread size conforming to HML modular kit".
- ※) Vacuum modular kit should be delivered with cup-mount framing profiles being installed tentatively.  
Install vacuum cups as per your application and install attached tubing and push-in fitting according to the manual.
- ※) Ask us for the module with vacuum cups.
- ※) Consult us when vacuum generator VYR type being used together.

< Ordering example ① >

- Frame set  
**HML -L47 C -T144 -M14 T120 -P06** 1set  
① ② ③ ④ ⑤ ⑥ ⑦
- Vacuum cup (Swivel joint & Filter installed model)  
**VPC30-6BN-6J-FH-F15** 6 pcs.

< Ordering example ② >

- Frame set  
**HML -L67 -T210 -M16 T204 -P04** 1set  
① ② ④ ⑤ ⑥ ⑦
- Vacuum cup  
**VPHC40-9LS-6J** 4 pcs.

# Parts list and how to install vacuum cups

■ Install and adjust vacuum cups according to the following HML assembly manual

● Parts list of Modular Kit

**Piping flange :**

is to directly be installed on mounting face with P.C.D.  $\phi 31.5$  or converting attachments are offered to install on other pitches of flanges.

**Center framing profile :**

accommodates multiple Cup-mount framing profiles, up to 8 profiles for panel-mount thread sizes of M10, M12 and M14, and 7 for M16.

**Cup-mount framing profile :**

2 vacuum cups is to be installed on the profile. (for instance, 2 profiles accommodates 4 vacuum cups)  
1 fastening plate fixes 1 cup-mount framing profile. A set of 1 vacuum cup mounting bracket and 1 vacuum cup mounting nut is included.

**Vacuum cup mounting bracket and nut :**  
to install vacuum cups. Select the right size depending on the panel-mount thread size of vacuum cup.

**Assembly attachments :**

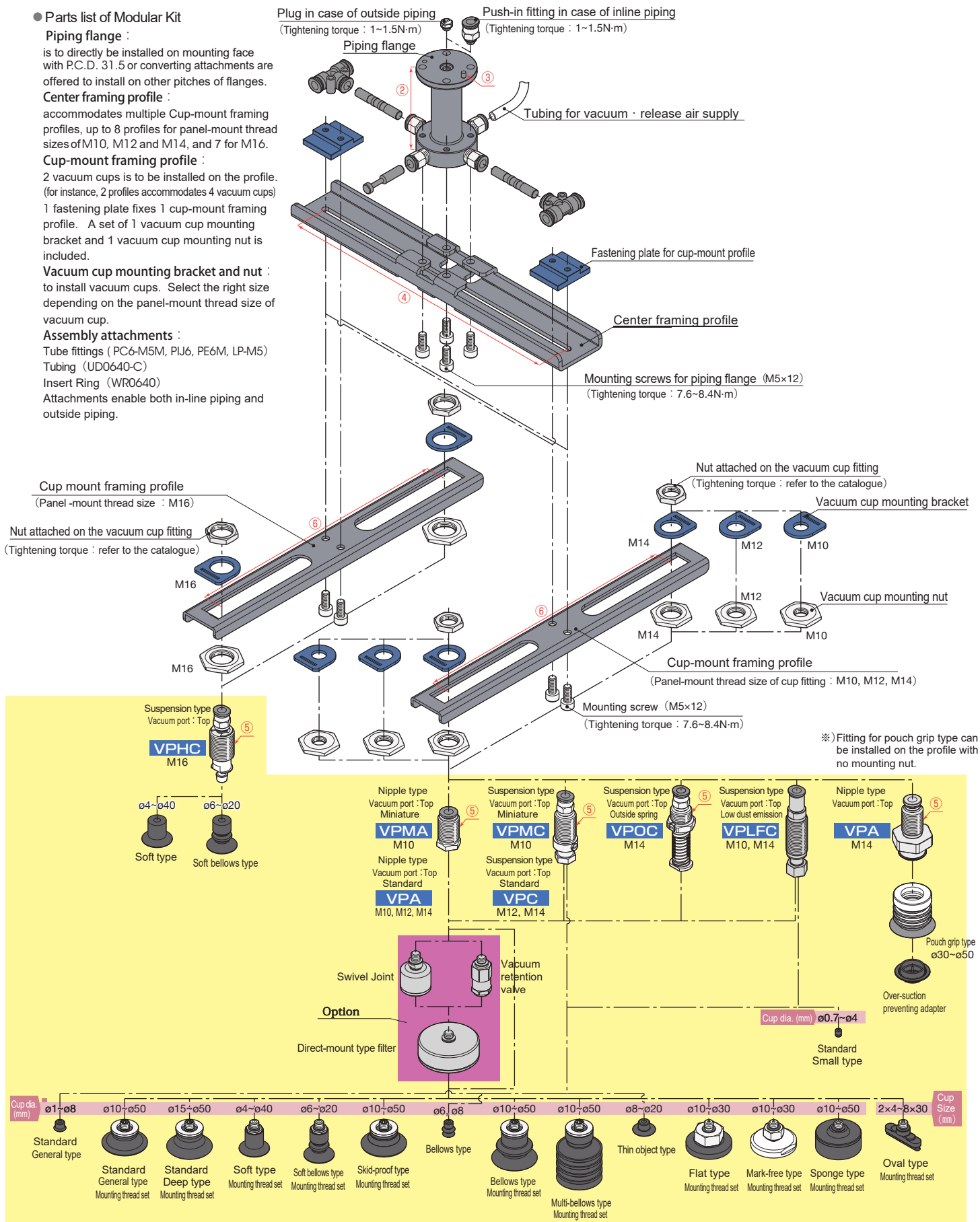
- Tube fittings (PC6-M5M, PU6, PE6M, LP-M5)
- Tubing (UD0640-C)
- Insert Ring (WR0640)
- Attachments enable both in-line piping and outside piping.

Plug in case of outside piping  
(Tightening torque : 1~1.5N·m)

Push-in fitting in case of inline piping  
(Tightening torque : 1~1.5N·m)

(Tightening torque : 1~1.5N·m)

(Tightening torque : 1~1.5N·m)



※) ②~⑥ indicated in the above assembly chart means ②~⑥ of the model designation for vacuum modular kit.



Vacuum cup type and size/panel-mounting thread size conforming with HML modular kit

■ Vacuum supply port : Push-in fitting with 6mm O.D.

※1	Vacuum cup fitting		⑤ ※2	Vacuum cup type and diameter/size (mm)														
	type	Code		Standard			Soft	Soft Bellows	Skid-proof	Bellows	Multi-Bellows	Pouch-grip	Thin object	Flat	Mark Free	Sponge	Oval	
				Small	General	Deep												
Hex. 24	Nipple Standard type	VPA	M10		ø6, ø8													
			M12	ø10, ø15	ø15	ø4~ø15	ø6~ø15	ø10	ø6, ø8	ø10		ø8~ø20	ø10, ø15	ø10				
			M14		ø20~ø50	ø20~ø40	ø20	ø20~ø50	ø20~ø50	ø30~ø50			ø20~ø30	ø20, ø30	ø10~ø50	2x4-8x30		
	Suspension Inside spring type	VPC	M10															
			M12		ø1~ø8					ø6, ø8			ø8~ø20					
			M14		ø10~ø50	ø15~ø50	ø4~ø40	ø6~ø20	ø10~ø50	ø10~ø50			ø10~ø30	ø10~ø30	ø10~ø50	2x4-8x30		
	Suspension Outside spring type	VPOC	M10															
			M12															
			M14		ø20~ø50	ø20~ø40	ø20	ø20~ø50	ø20~ø50				ø20~ø30	ø20, ø30	ø10~ø50	2x4-8x30		
	Suspension Low dust type	VPLFC	M10	ø0.7~ø4	ø6~ø15	ø15	ø4~ø15	ø6~ø15	ø10	ø6~ø15	ø10		ø8~ø20	ø10, ø15	ø10			
			M12															
			M14		ø20~ø50	ø20~ø40	ø20	ø20~ø50	ø20~ø50				ø20~ø30	ø20, ø30	ø10~ø50	2x4-8x30		
Hex. 26	Suspension inside spring	VPHC	M16				ø4~ø40	ø6~ø20										

※1) Shows wrench flats (metric) of installing nut for the vacuum fitting.

※2) ⑤ stands for the size of panel-mount thread on the fitting.

■ Vacuum supply port : Barb fitting with 4mm I.D.

※1	Vacuum cup fitting		⑤ ※2	Vacuum cup type and diameter/size (mm)														
	type	Code		Standard			Soft	Soft Bellows	Skid-proof	Bellows	Multi-Bellows	Pouch-grip	Thin object	Flat	Mark Free	Sponge	Oval	
				Small	General	Deep												
Hex. 24	Nipple Miniature type	VPMA	M10		ø20~ø50	ø20~ø40	ø20	ø20~ø50	ø20~ø50				ø20~ø30	ø20, ø30	ø10~ø50	2x4-8x30		
			M12															
			M14															
	Nipple Standard type	VPA	M10															
			M12		ø20~ø50	ø20~ø40	ø20	ø20~ø50	ø20~ø50				ø20~ø30	ø20, ø30	ø10~ø50	2x4-8x30		
			M14															
	Suspension Miniature type	VPMC	M10		ø10~ø50	ø15~ø50	ø4~ø40	ø6~ø20	ø10~ø50	ø10~ø50				ø10~ø30	ø10~ø30	ø10~ø50	2x4-8x30	
			M12															
			M14															
	Suspension Inside spring type	VPC	M10															
			M12		ø1~ø8				ø6, ø8			ø8~ø20						
			M14		ø10~ø50	ø15~ø50	ø4~ø40	ø6~ø20	ø10~ø50	ø10~ø50			ø10~ø30	ø10~ø30	ø10~ø50	2x4-8x30		
Suspension Outside spring type	VPOC	M10																
		M12																
		M14		ø20~ø50	ø20~ø40	ø20	ø20~ø50	ø20~ø50				ø20~ø30	ø20, ø30	ø10~ø50	2x4-8x30			
Suspension Low dust type	VPLFC	M10	ø0.7~ø4	ø6~ø15	ø15	ø4~ø15	ø6~ø15	ø10	ø6~ø15	ø10		ø8~ø20	ø10, ø15	ø10				
		M12																
		M14		ø20~ø50	ø20~ø40	ø20	ø20~ø50	ø20~ø50				ø20~ø30	ø20, ø30	ø10~ø50	2x4-8x30			
Hex. 26	Suspension inside spring	VPHC	M16				ø4~ø40	ø6~ø20										

※1) Shows wrench flats (metric) of installing nut for the vacuum fitting.

※2) ⑤ stands for the size of panel-mount thread on the fitting.

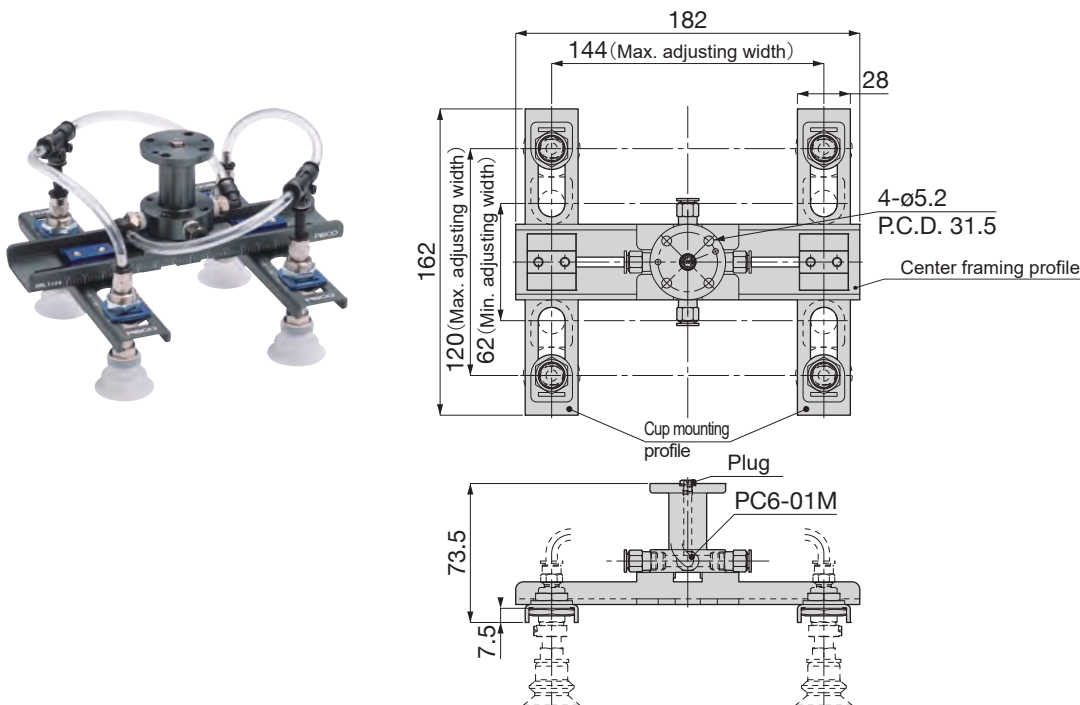


## Vacuum cup installation example

■ No. of vacuum cups : 4 ( panel-mounting thread size : M10, M12, M14)

Model code : **HML-L47-T144-M14T120-P04**

Weight : 490g

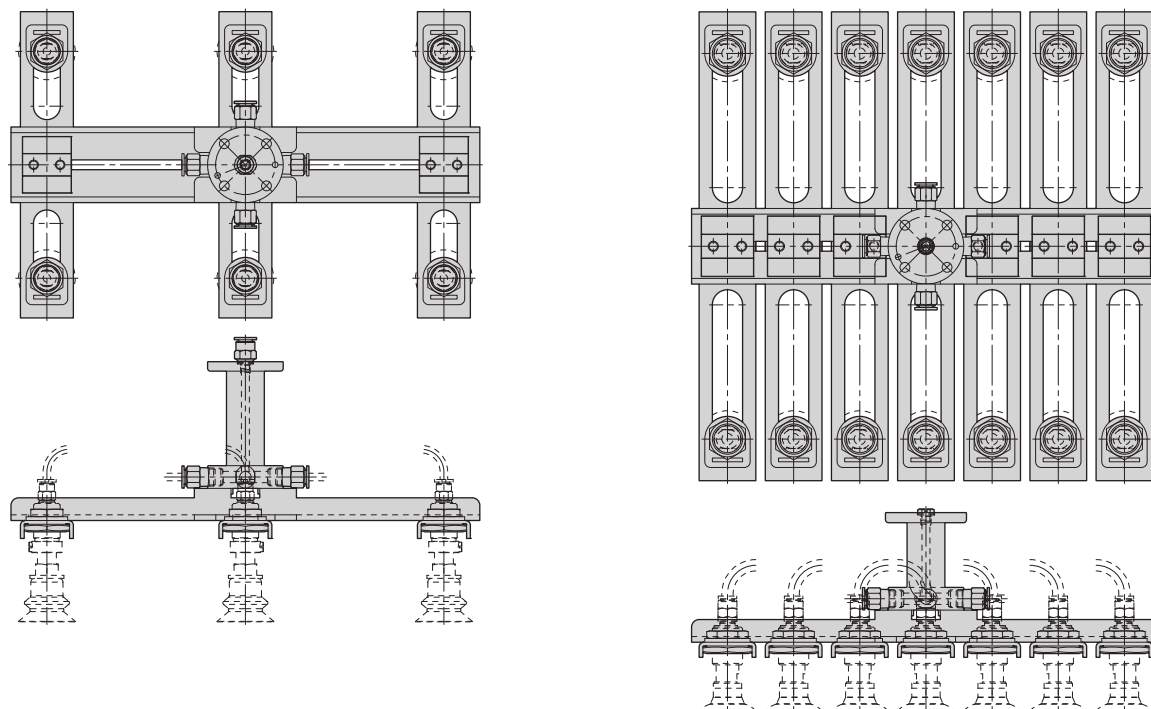


■ No. of vacuum cup : 6 ( mounting thread size : M10, M12, M14)

Model code : **HML-L67-T210-M14T120-P06**

■ No. of vacuum cup : 14 ( mounting thread size : M16)

Model code : **HML-L47-T210-M16T204-P14**





# Dimensions of parts

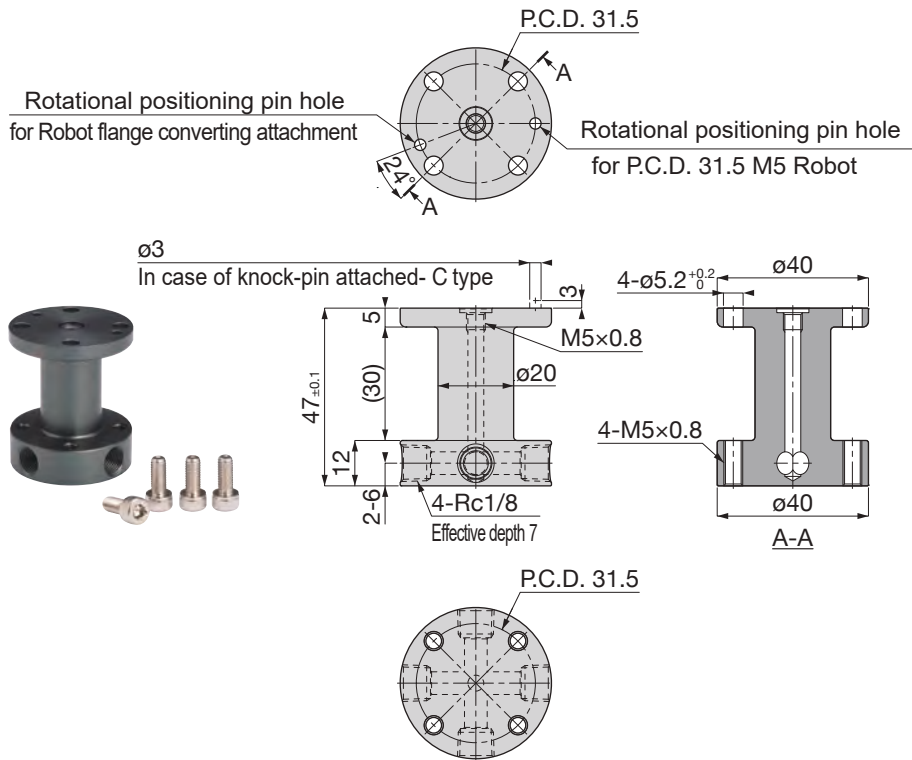
## 1 Piping flange

Flange height 47mm model : **HML-TB-M5-31.5-47**

**HML-TB-M5-31.5-47C**

Weight : 85g

85g



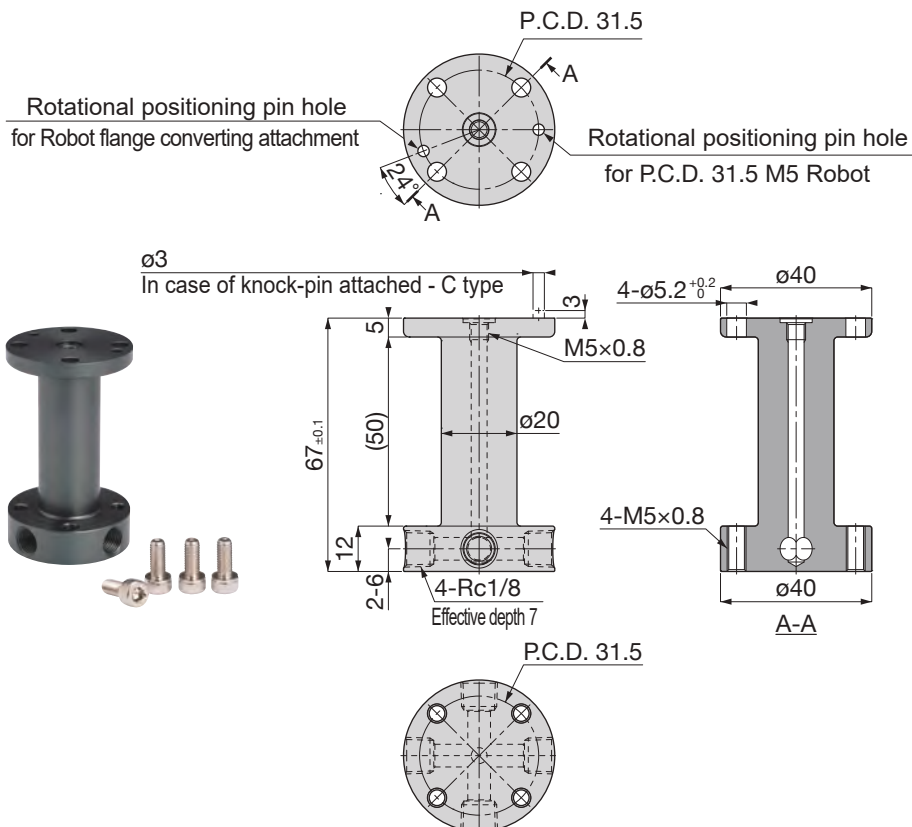
※Piping flange comes with 4 hex. socket head bolts (M5x12) but tube fittings nor plugs are not attached.

Flange height 67mm model : **HML-TB-M5-31.5-67**

**HML-TB-M5-31.5-67C**

Weight : 102g

102g

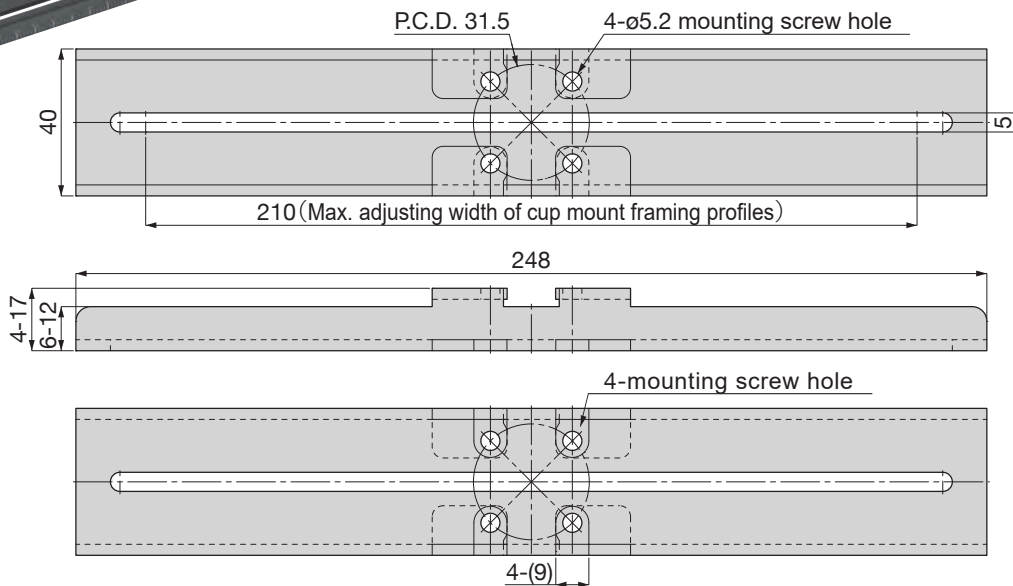


※Piping flange comes with 4 hex. socket head bolts (M5x12) but tube fittings nor plugs are not attached.

**2** Center framing profile

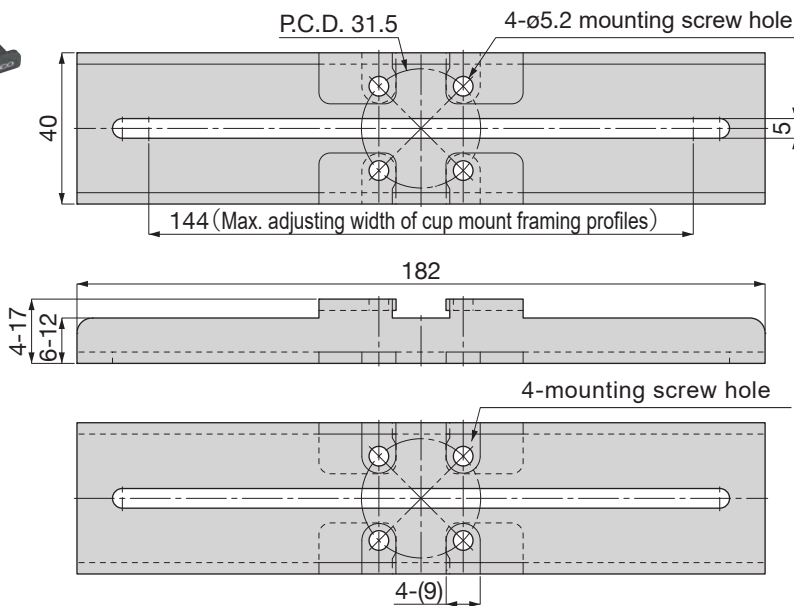
Max. adjusting width 210mm model : **HML-MB-M5-210**

Weight : 102g



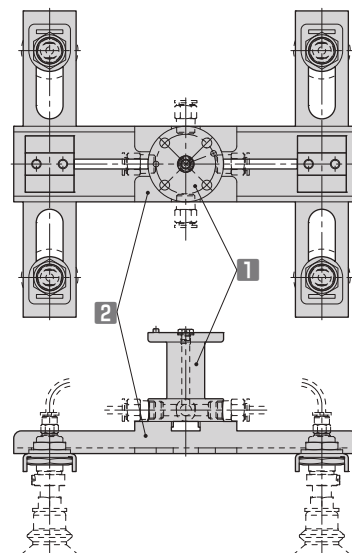
Max. adjusting width 144mm model : **HML-MB-M5-144**

Weight : 77g



Make sure the positions of part **1** and **2** are correct at assembly referring to the chart on the right

※) Piping flange **1** comes with 4 hex. socket head bolts (M5×12)  
The tightening torque of the hex. socket bolts should be 7.6~8.4N·m

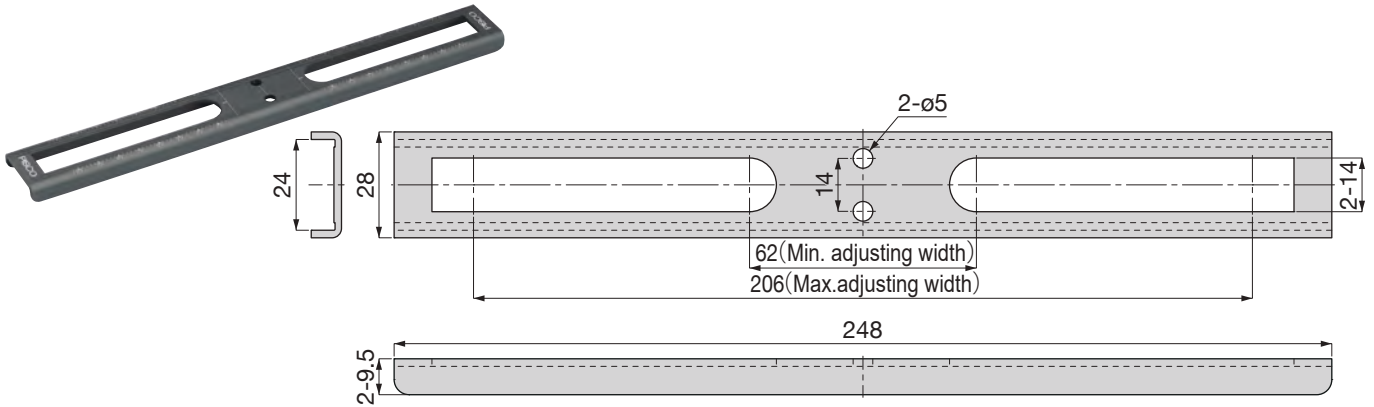




3 Cup-mount framing profile (Panel mounting thread size of vacuum cup fitting : M10, M12, M14)

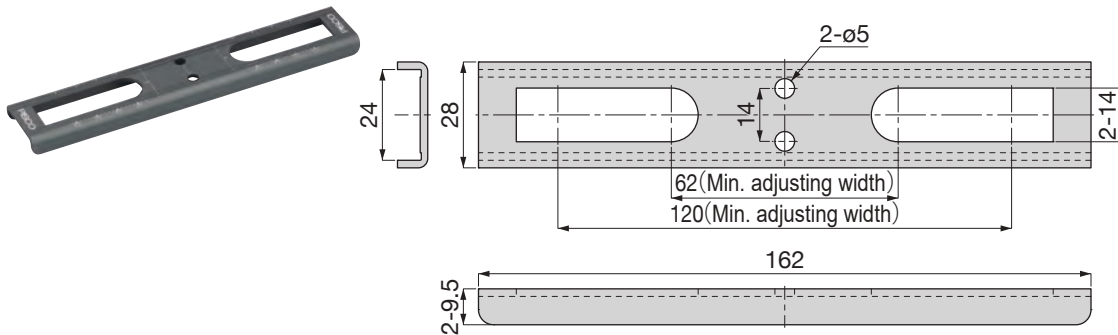
Max. adjusting width 206mm model : [HML-PB-H24-206](#)

Weight : 40g



Max. adjusting width 120mm model : [HML-PB-H24-120](#)

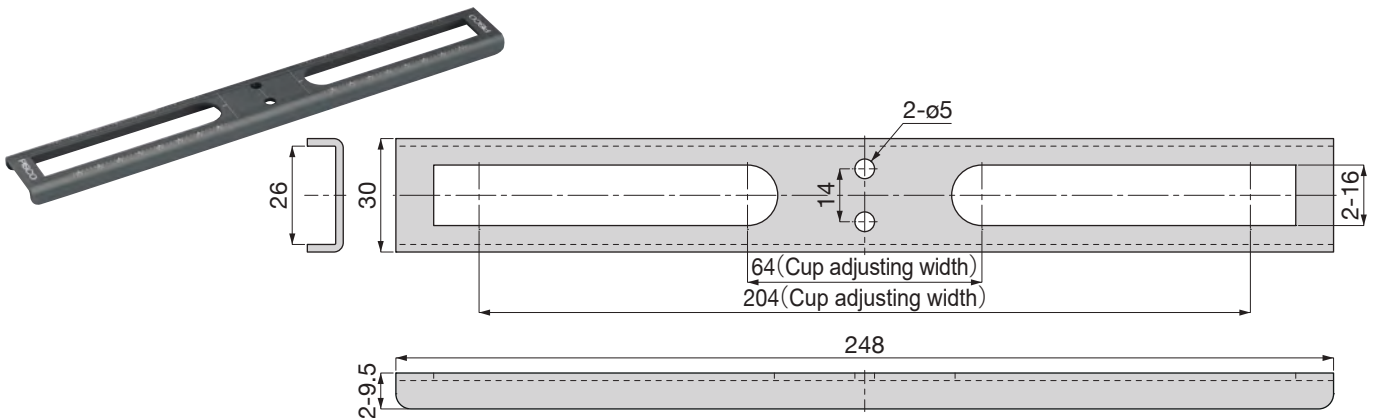
Weight : 28g



3 Cup-mount framing profile (Panel mounting thread size of vacuum cup fitting : M16)

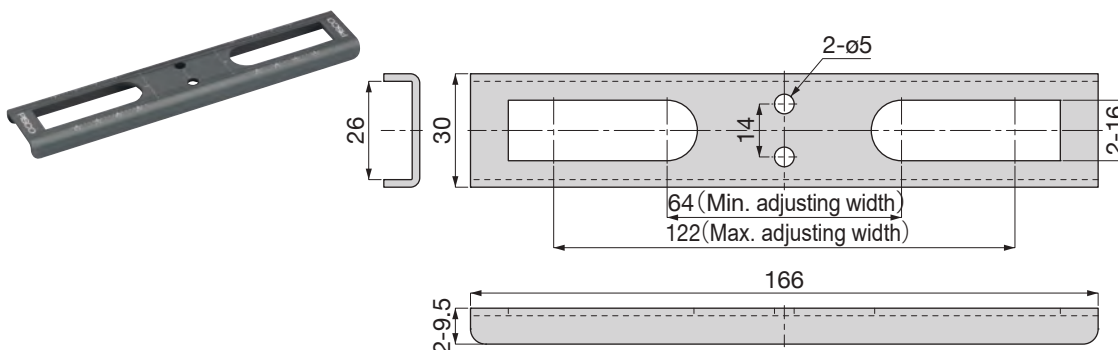
Max. adjusting width 204mm model : [HML-PB-H26-204](#)

Weight : 41g



Max. adjusting width 122mm model : [HML-PB-H26-122](#)

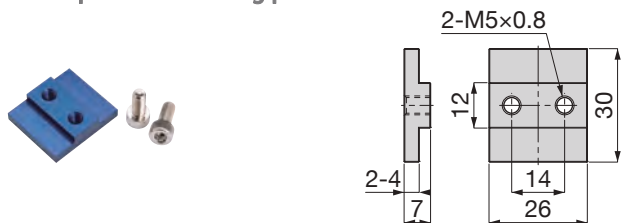
Weight : 30g





**4 Fastening plate for cup-mount framing profile** (Model : **HML-TN-M5-14**)

Weight : 17g



※The model comes with 2 hex. socket head bolts as attachment

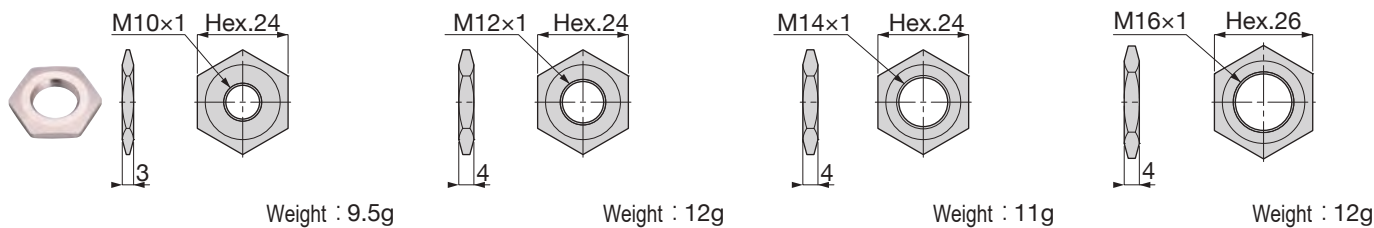
**5 Vacuum cup mounting bracket**

Model : **HML-N-M10-H24**

Model : **HML-N-M12-H24**

Model : **HML-N-M14-H24**

Model : **HML-N-M16-H26**



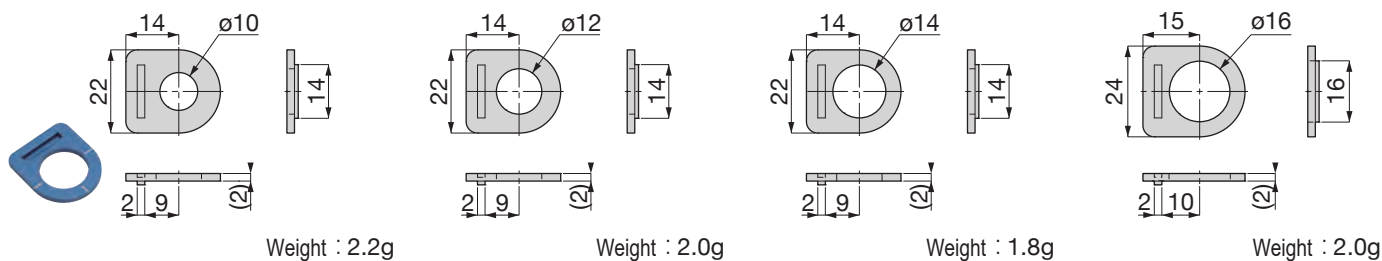
**6 Vacuum cup mounting bracket**

model : **HML-W-M10-M14**

Model : **HML-W-M12-M14**

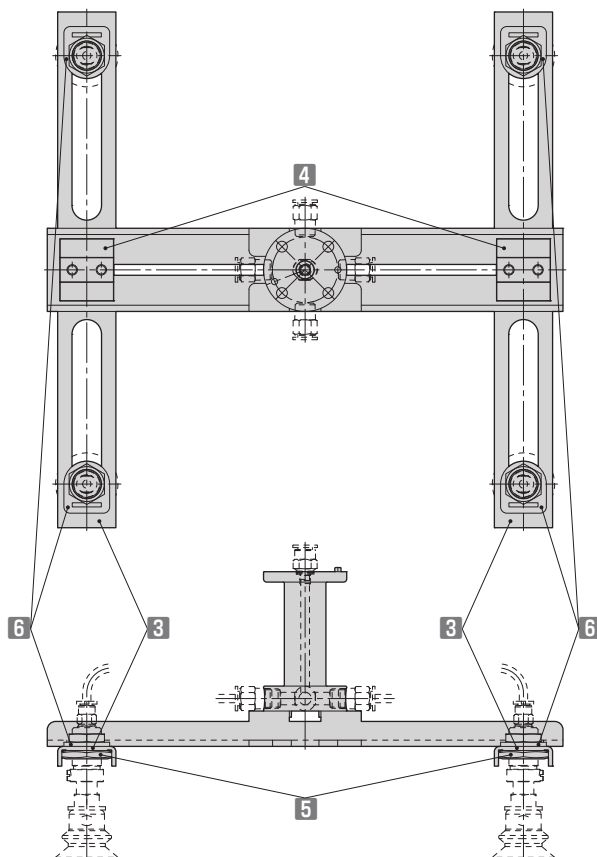
Model : **HML-W-M14-M14**

Model : **HML-W-M16-M16**



**i** Make sure the positions of part **3**, **4**, **5** and **6** are correct referring to the chart described below.

※) The fastening plate (**4**) contains 2 hex. socket head bolts (M5x12)  
The tightening torque for the hex. socket bolts should be 7.6~8.4N·m





## Dimensions of Robot flange converting Attachment (Attachment with no rotational position)

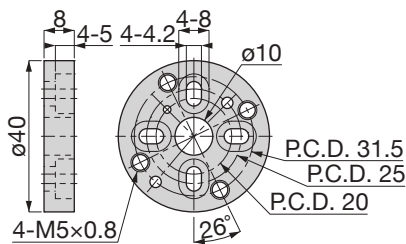
## ■ Converting attachment list (P.C.D. side)

model	P.C.D. (mm) - Robot flange side	Mounting screw - Robot flange side	Rotating direction position shift (deg)
RFA002M01	20, 25 (common)	M4	26°
RFA002M07	25	M5	28°
RFA002M04	27		—
RFA002M03	31.5	M4	25°
RFA002M08	40	M6	28°
RFA002M06	50		—
RFA002M02	53.5, 60 (common)	M5	—
RFA002M09	63	M6	—

## ■ For robot with P.C.D. 20, 25 M4 flange

Model : **RFA002M01**

Weight : 26g

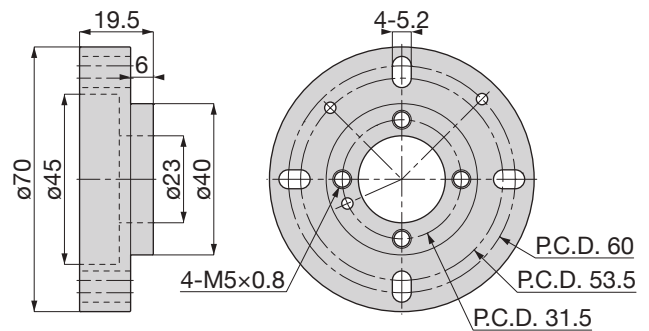


※) 4 hex. socket bolts (M4×8) are attached

## ■ For robot with P.C.D. 53.5, 60 M5 flange

Model : **RFA002M02**

Weight : 116g

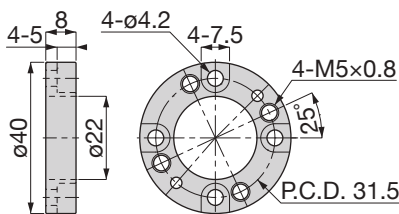


※) 4 hex. socket bolts (M5×20) are attached

## ■ For robot with P.C.D. 31.5 M4 flange

Model : **RFA002M03**

Weight : 21g

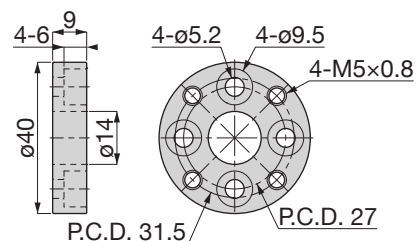


※) 4 hex. socket bolts (M4×8) are attached

## ■ For robot with P.C.D. 27 M5 flange

Model : **RFA002M04**

Weight : 32g

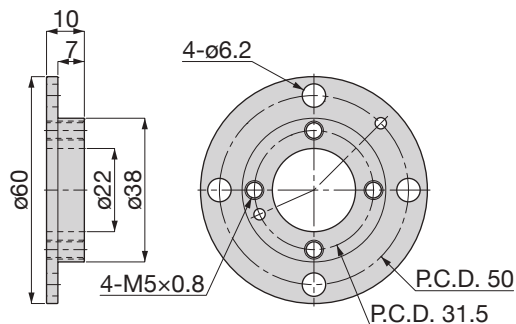


※) 4 hex. socket bolts (M5×8) are attached

## ■ For robot with P.C.D. 50 M6 flange

Model : **RFA002M06**

Weight : 48g

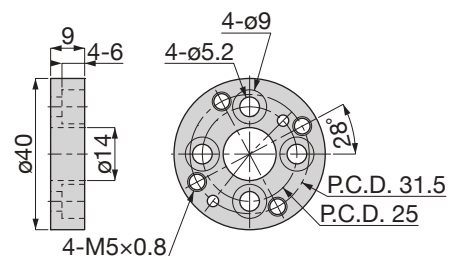


※) 4 hex. socket bolts (M6×8) are attached

## ■ For robot with P.C.D. 25 M5 flange

Model : **RFA002M07**

Weight : 32g



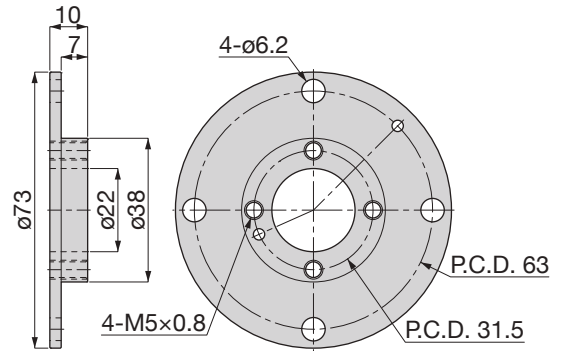
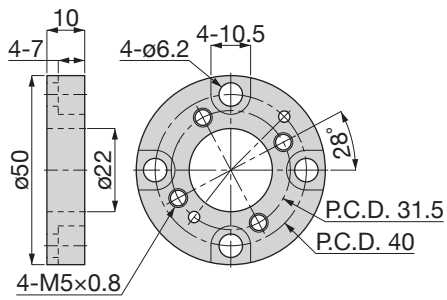
※) 4 hex. socket bolts (M5×8) are attached

■ For robot with P.C.D. 40 M6 flange  
 Model : **RFA002M08**

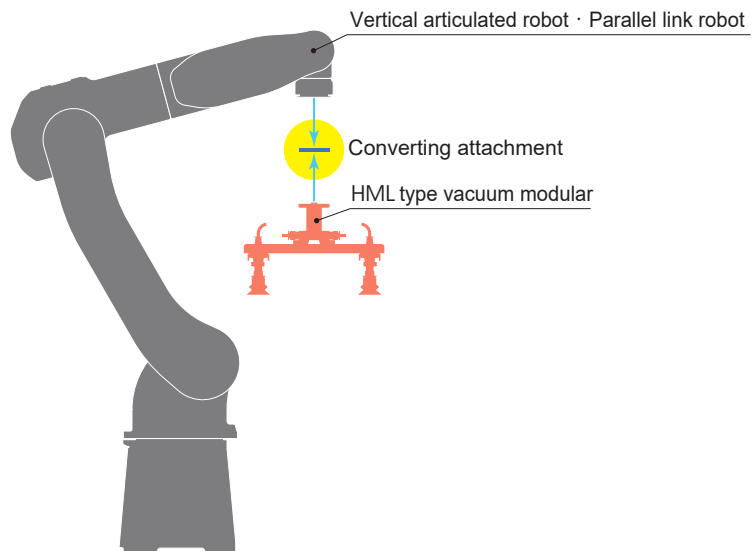
Weight : 50g

■ For robot with P.C.D. 63 M6 flange  
 Model : **RFA002M09**

Weight : 60g



※) 4 hex. socket bolts (M6x8) are attached





## Dimensions of converting attachment for robot flange (attachment with rotational positioning)

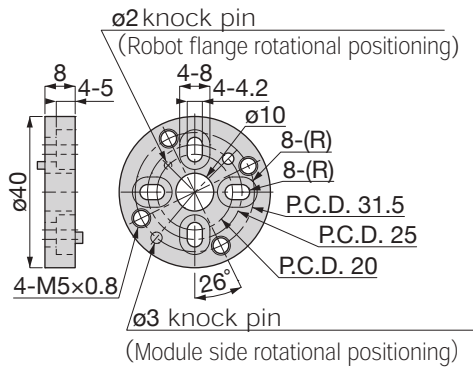
## ■ Converting attachment list (P.C.D. side)

Model	P.C.D. (mm) Robot flange side	Mounting screw Robot flange side	Rotational positioning			Rotating direction position shift (deg)
			Position	Pin dia. (mm)	Projection (mm)	
RFA002M01-20C	20	M4	45° on P.C.D.	ø2	3	26°
RFA002M01-25C	25					
RFA002M07-C	27					
RFA002M04-C	27	M5	location 21.5mm from center			28°
RFA002M05-C	31.5	M4	45° on P.C.D.	ø3	3	25°
RFA002M08-C	40	M6				28°
RFA002M06-C	50					
RFA002M02-53.5C	53.5	M5				—
RFA002M02-60C	60					
RFA002M09-C	63					

## ■ For robot with P.C.D. 20 M4 flange

Model : **RFA002M01-20C**

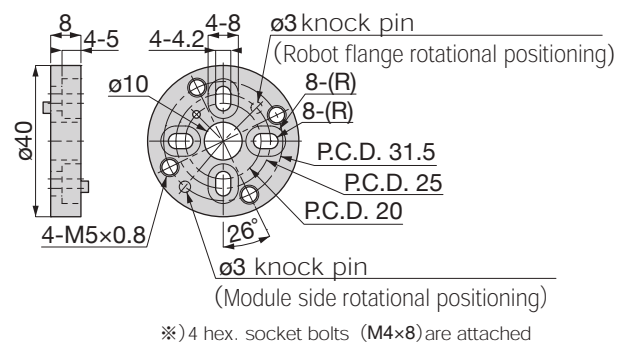
Weight : 27g



## ■ For robot with P.C.D. 25 M4 flange

Model : **RFA002M01-25C**

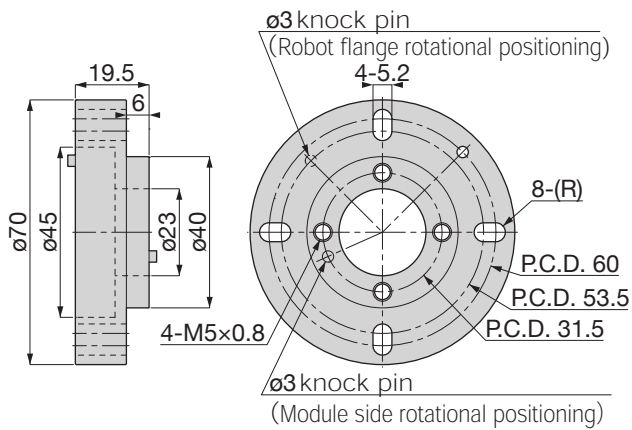
Weight : 27g



## ■ For robot with P.C.D. 53.5 M5 flange

Model : **RFA002M02-53.5C**

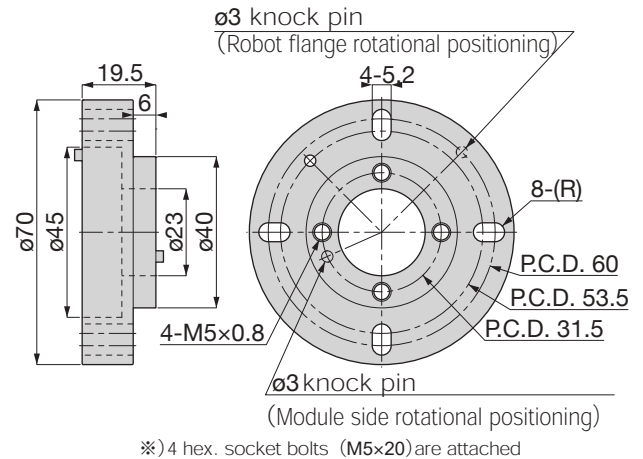
Weight : 117g



## ■ For robot with P.C.D. 60 M5 flange

Model : **RFA002M02-60C**

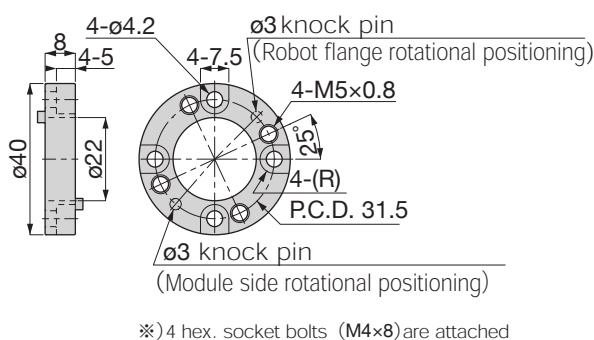
Weight : 117g



## ■ For robot with P.C.D. 31.5 M4 flange

Model : **RFA002M03-C**

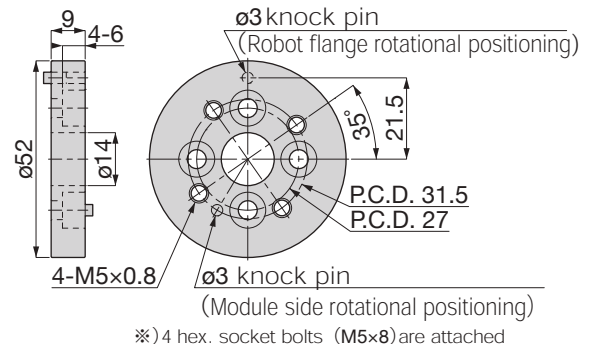
Weight : 22g



## ■ For robot with P.C.D. 27 M5 flange

Model : **RFA002M05-C**

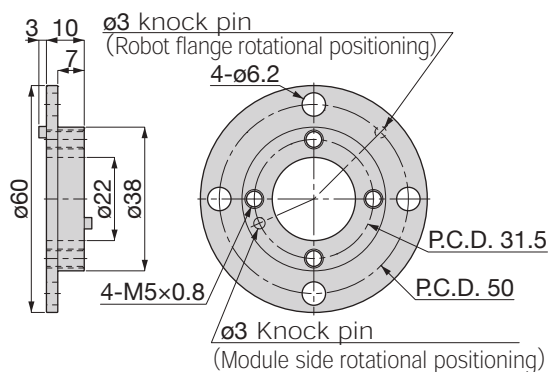
Weight : 54g



■ For robot with P.C.D. 50 M6 flange

Model : **RFA002M06-C**

Weight : 49g

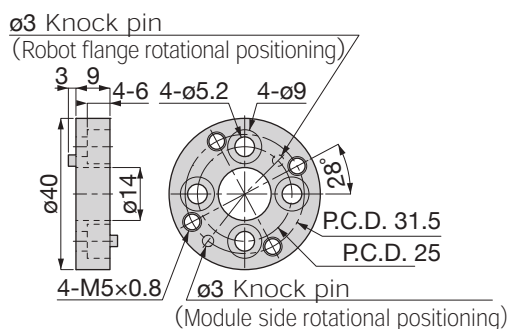


※) 4 hex. socket bolts (M6x8) are attached

■ For robot with P.C.D. 25 M6 flange

Model : **RFA002M07-C**

Weight : 33g

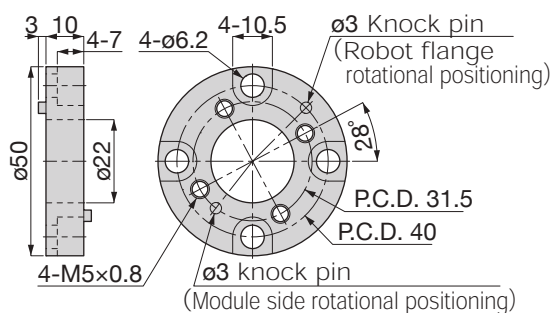


※) 4 hex. socket bolts (M5x8) are attached

■ For robot with P.C.D. 40 M6 flange

Model : **RFA002M08-C**

Weight : 51g

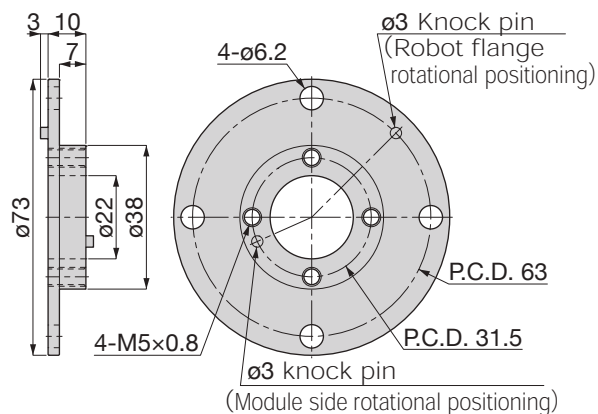


※) 4 hex. socket bolts (M6x8) are attached

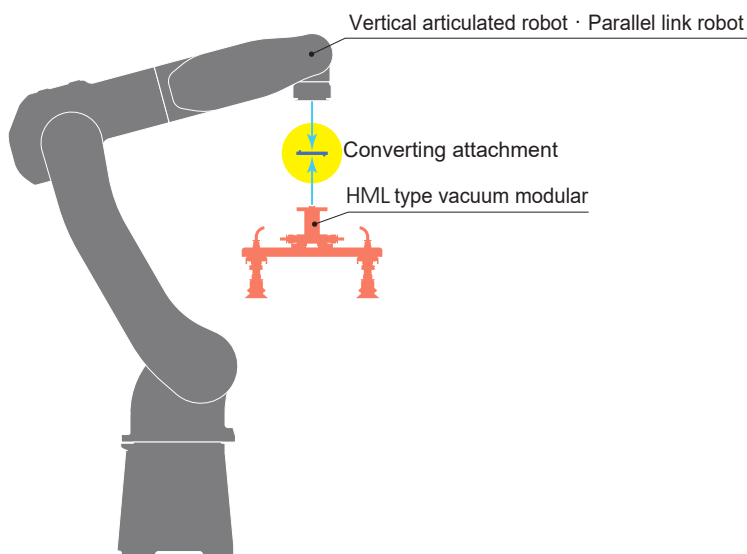
■ For robot with P.C.D. 63 M6 flange

Model : **RFA002M09-C**

Weight : 61g



※) 4 hex. socket bolts (M6x8) are attached



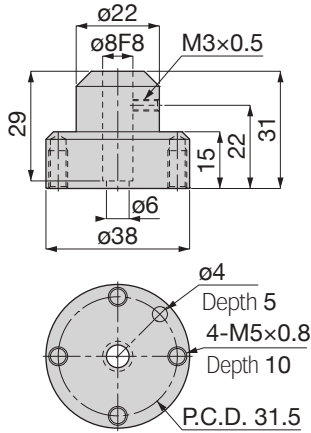




### Dimensions of Converting attachment for SCARA robot

■ For robot with  $\varnothing 8$  axis

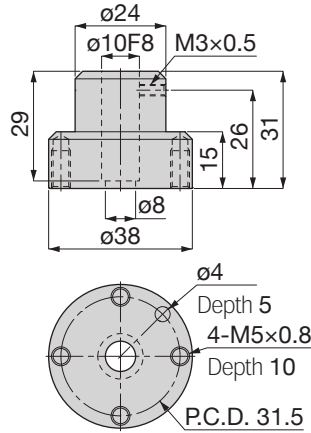
Model : **SCH001M01** Weight : 56g



※) A set screw (M3x6) is attached

■ For robot with  $\varnothing 10$  axis

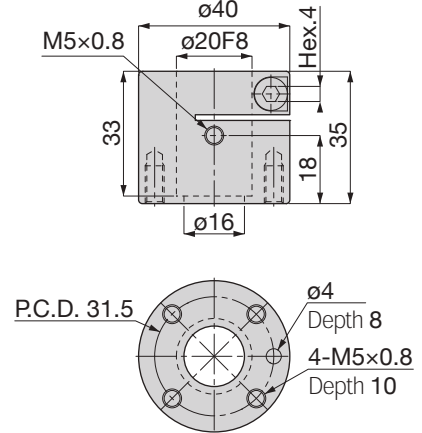
Model : **SCH001M02** Weight : 57g



※) A set screw (M3x6) is attached

■ For robot with  $\varnothing 20$  axis

Model : **SCH001M05** Weight : 85g



※) A hexagon socket setscrew (M5x15) and a set screw (M5x8) is attached

