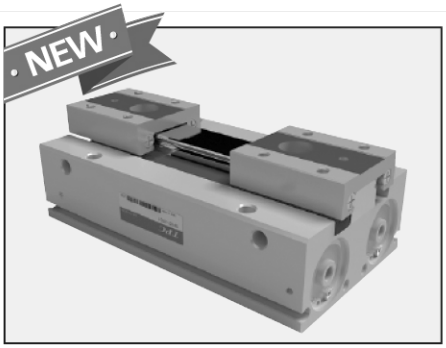
NFB2 Series

Compact Air Chuck / Bore Size : Ø8, Ø12, Ø16, Ø20



- Space-saving air chuck cylinder
- Compact design
- Powerful gripping force with double piston
- Various port sizes available
- Various opening & closing strokes
- High mounting flexibility

How to Order

NFB2 — 12 D 1 R — W9H S

1 2 3 4 4 6 4

1 Air Chuck Series
New
Finger
Block
2 : Number of blocks

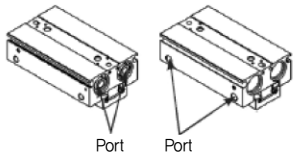
2 Bore Size - Opening & Closing Stroke(mm)

Title	Bore Size
8	8
12	12
16	16
20	20

3 Action
D : Double-acting

4 Stroke
Blank : Short stroke
1 : Mid stroke
2 : Long strokeBody Option

5 Body Option
Blank : Axial ported
R : Side ported



6 Auto Switch
Blank : None (built-in magnet)
W9H : Micro solid state switch (horizontal)
W9V : Micro solid state switch (vertical)

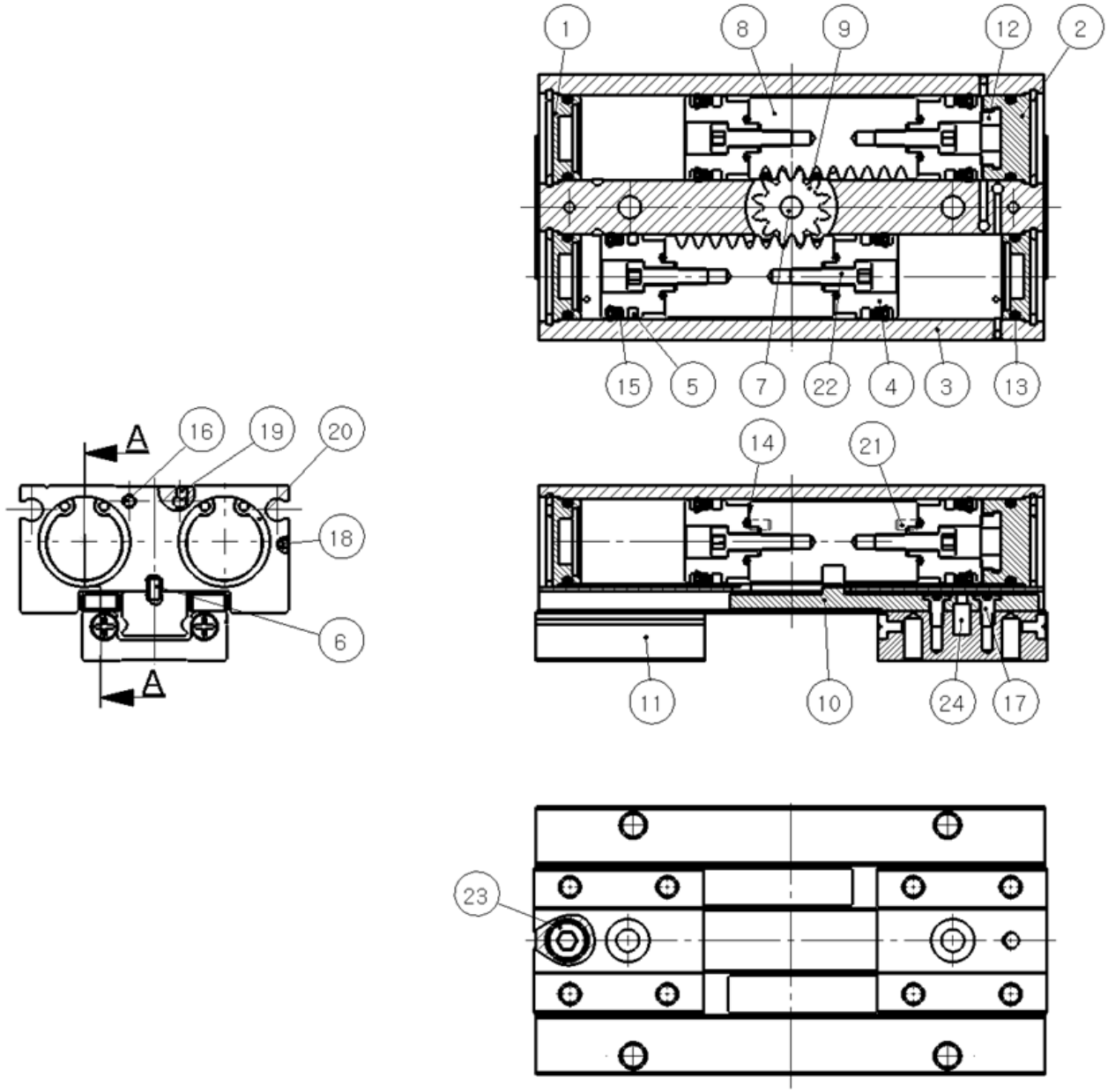
7 Number of Switches
Blank : 2 pcs
S : 1 pc
N : N pcs

Specifications

Model		NFB2-08D	NFB2-12D	NFB2-16D	NFB2-20D
Bore Size (mm)		8	12	16	20
Fluid		Air			
Operating Pressure (MPa)		0.15 ~ 0.7	0.1 ~ 0.7		
Operating Temp.		5℃ ~ 60℃ (40℉ ~ 140℉) (Non-freezing)			
Repeatability (mm)[1]		±0.05			
Critical Performance Measure(C.P.M)	Short	120			
	Mid	120			
	Long	60			
Lubrication		Unnecessary			
Action		Double-Acting			
Gripping Force[2]		19	48	90	143
Opening & Closing Stroke (mm)	Short	8	12	16	20
	Mid	16	24	32	40
	Long	32	48	64	80
Main Body Weight (gf)	Short Stroke	60	140	330	610
	Mid Stroke	78	189	424	818
	Long Stroke	112	270	616	1,220
Max. Gripping Length (mm)		40	60	80	100
Port Size		M3		M5	
Auto Switch for Opening & Closing Checking		W9H, W9V (Solid state)			

Note1) Value measured while no lateral load is applied on the block
If applied, it can go up to maximum ±0.15mm due to rack and pinion backlash effect.
Note2) Value measured when pressure = 0.5MPa and gripping point L = 20mm

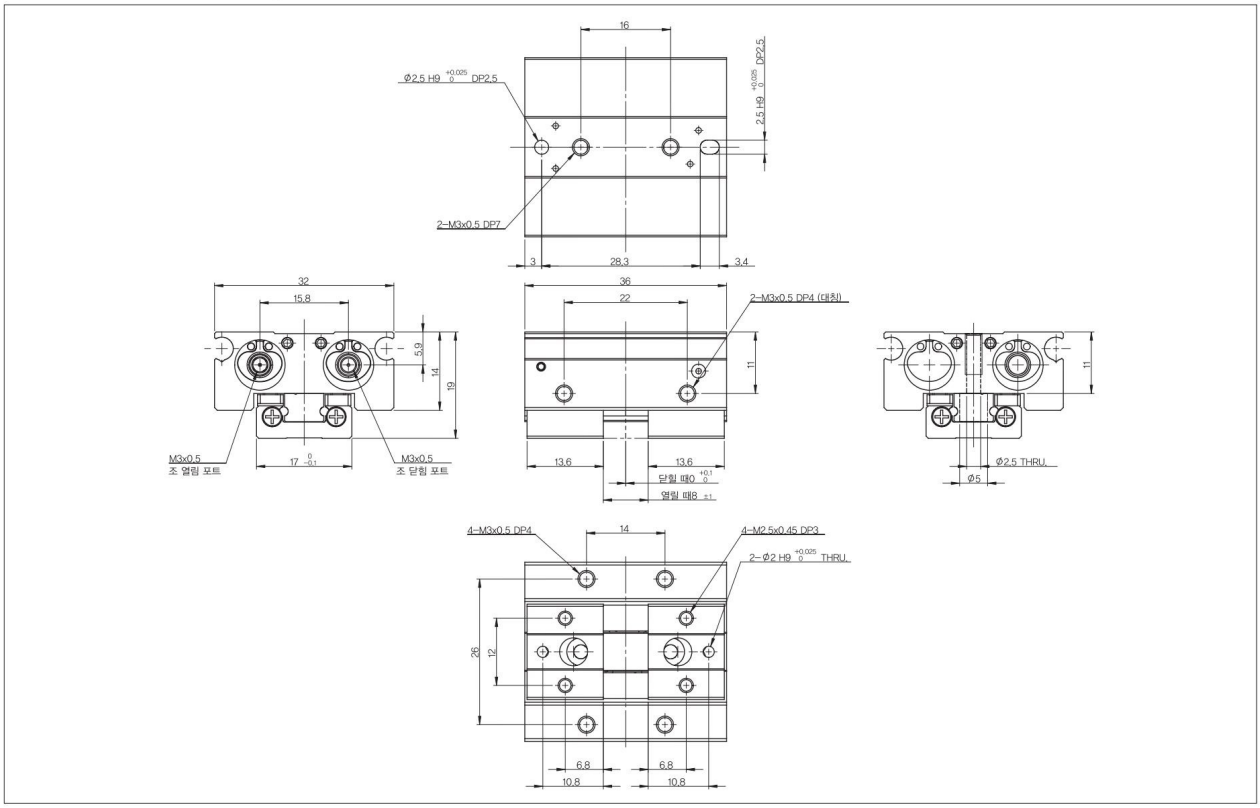
Structure / Part list



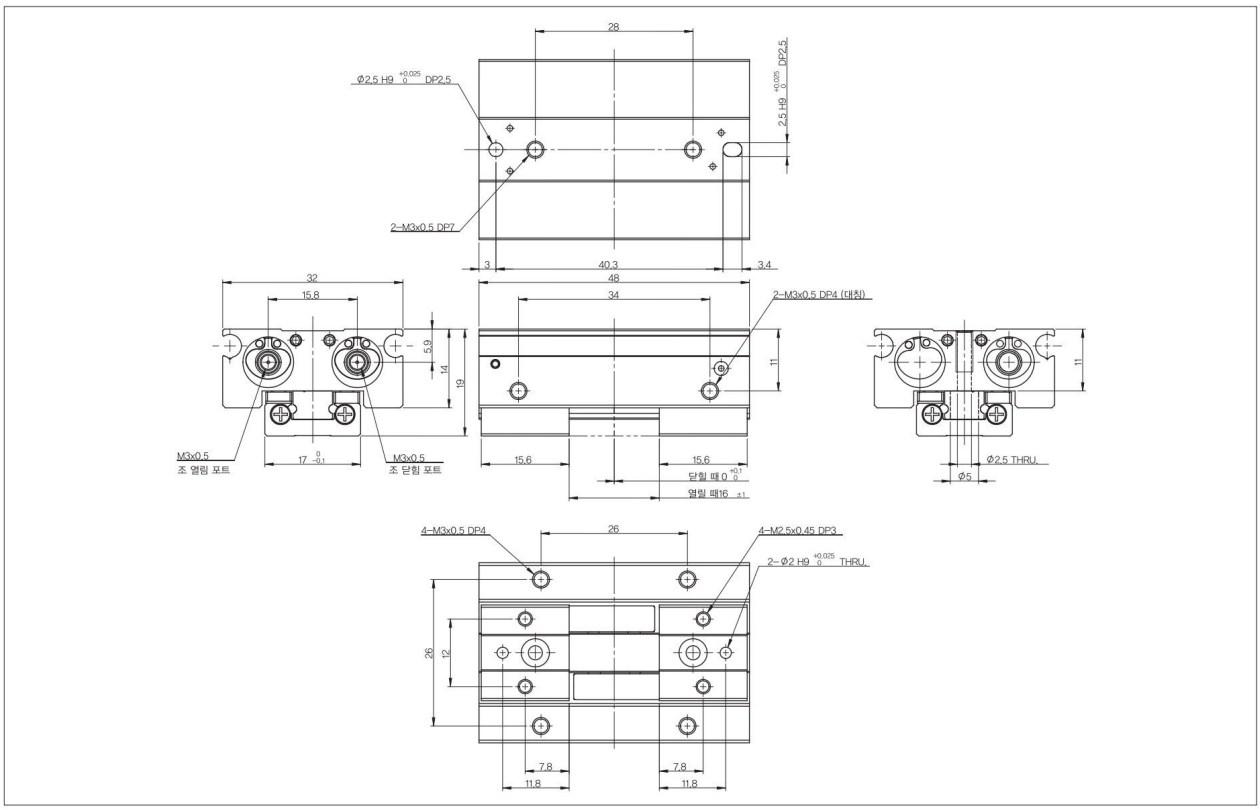
#	Part Name	Material	#	Part Name	Material
1	HEAD COVER-A	Aluminum Alloy	13	GASKET	NBR
2	HEAD COVER-B	Aluminum Alloy	14	GASKET	NBR
3	BODY	Aluminum Alloy	15	PINSTON PACKING	NBR
4	PISTON	Aluminum Alloy	16	SET SCREW	Alloy Steel
5	WEAR RING	Synthetic Resin	17	Flat Head Screw BOLT	Wrought Steel
6	Parallel PIN	Bearing Steel	18	STEEL BALL	Stainless Steel
7	PINION PIN	Bearing Steel	19	STEEL BALL	Stainless Steel
8	RACK	Stainless Steel	20	SNAP RING	Spring Steel
9	PINION	Carbon Steel	21	MAGNET	Rare earth element
10	JOINT	Stainless Steel	22	Hexagon Socket Head BOLT	Alloy Steel
11	LM RAIL	Stainless Steel	23	Hexagon Socket Head BOLT	Alloy Steel
	LM BLOCK	Stainless Steel	24	DOWEL PIN	Alloy Steel
12	BUMPER	Urethane			

NFB2

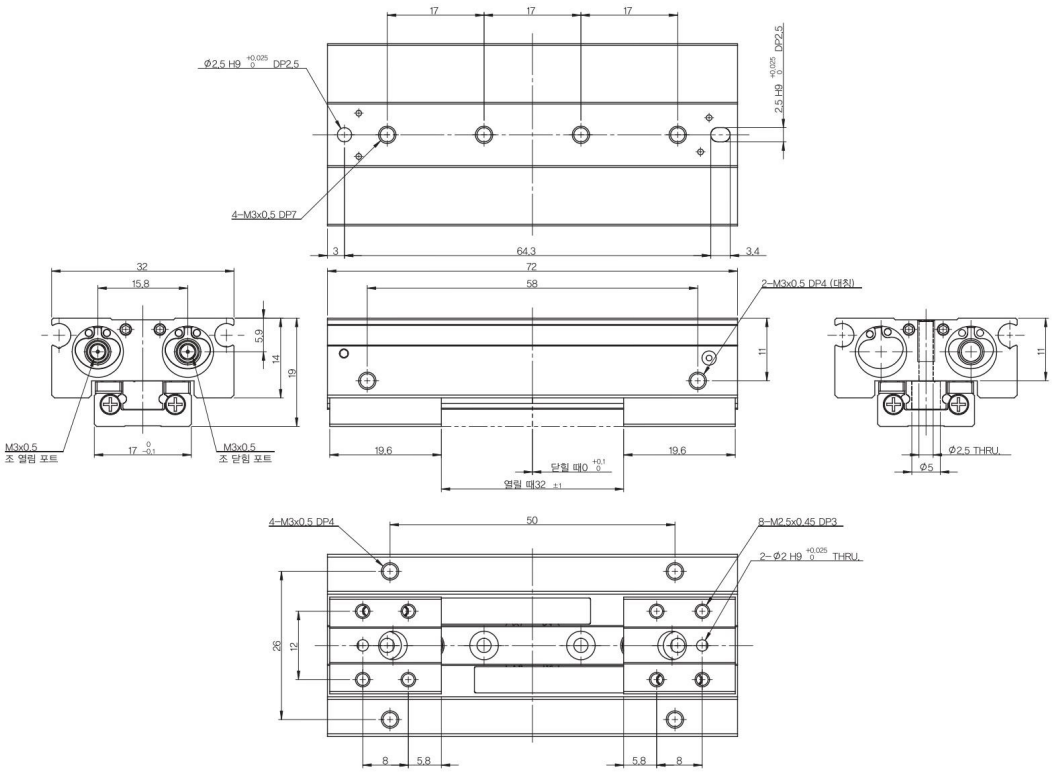
NFB2-8D



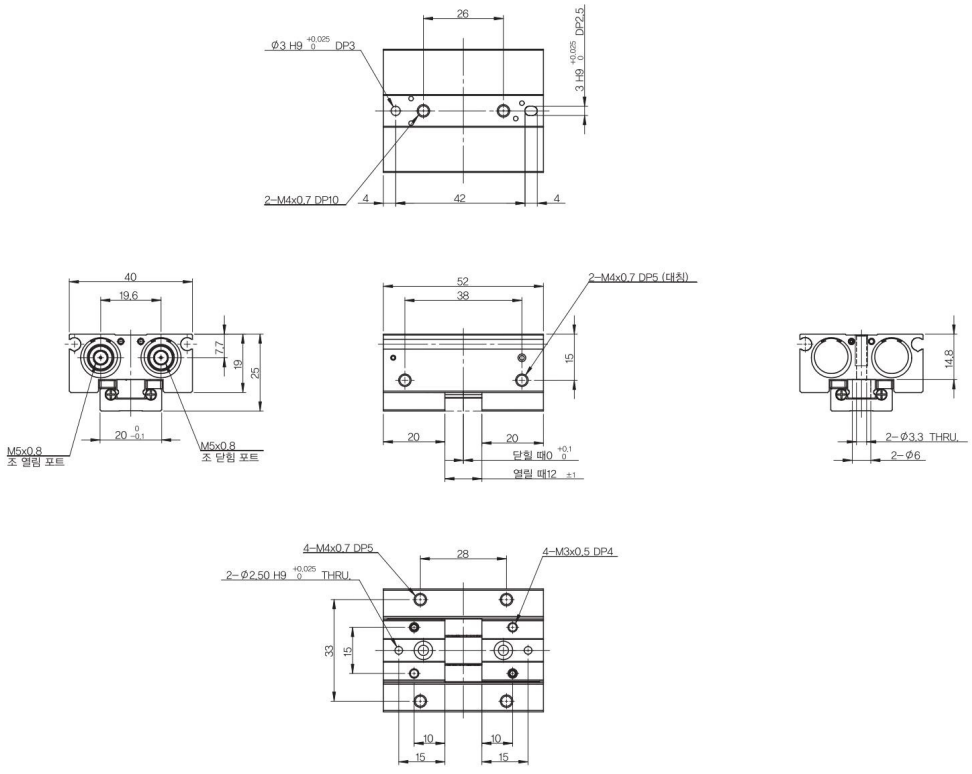
NFB2-8D1



NFB2-8D2

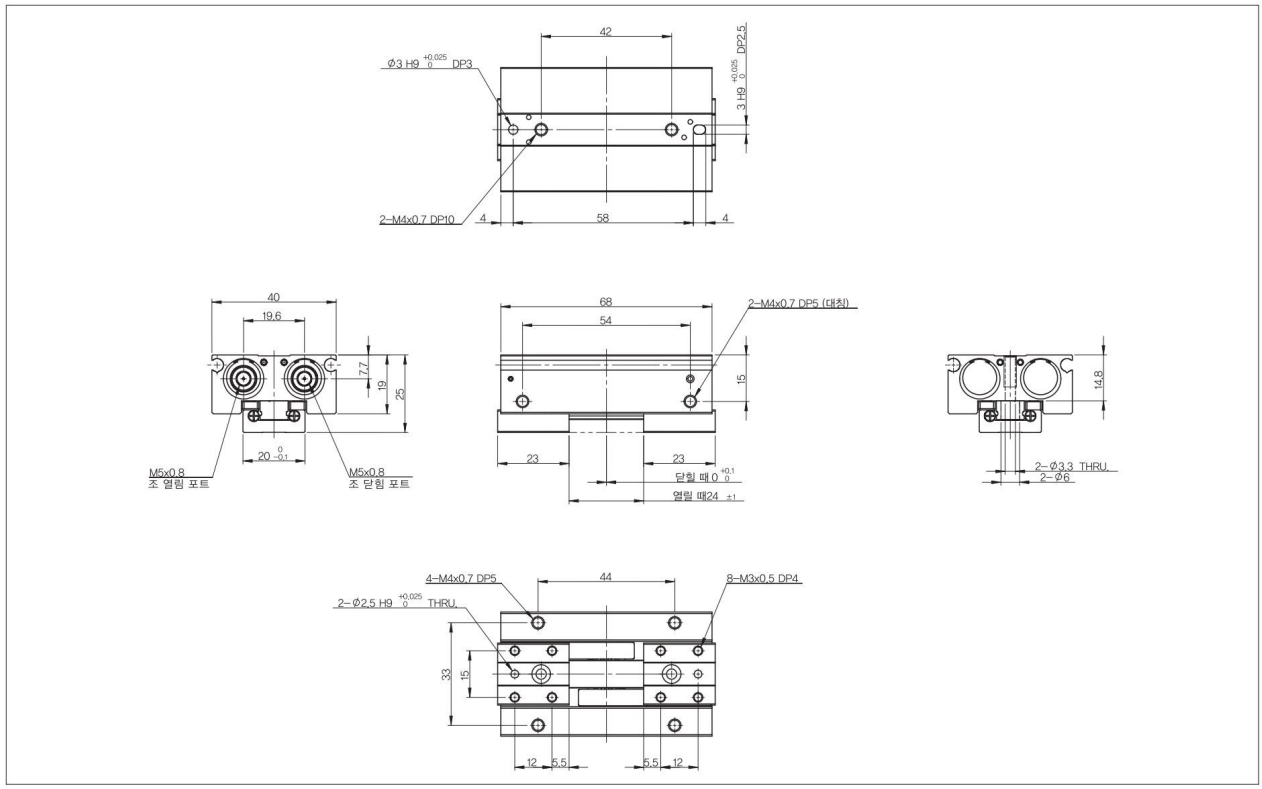


NFB2-12D

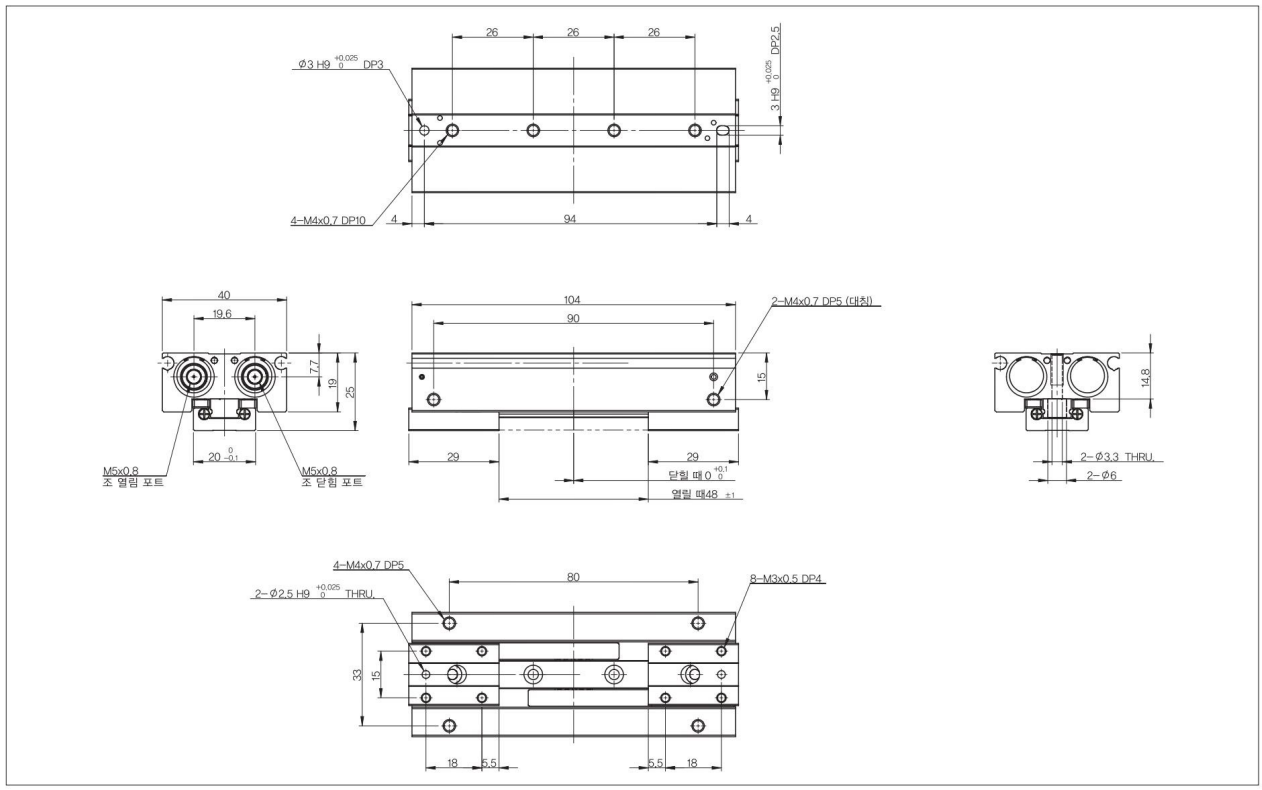


NFB2

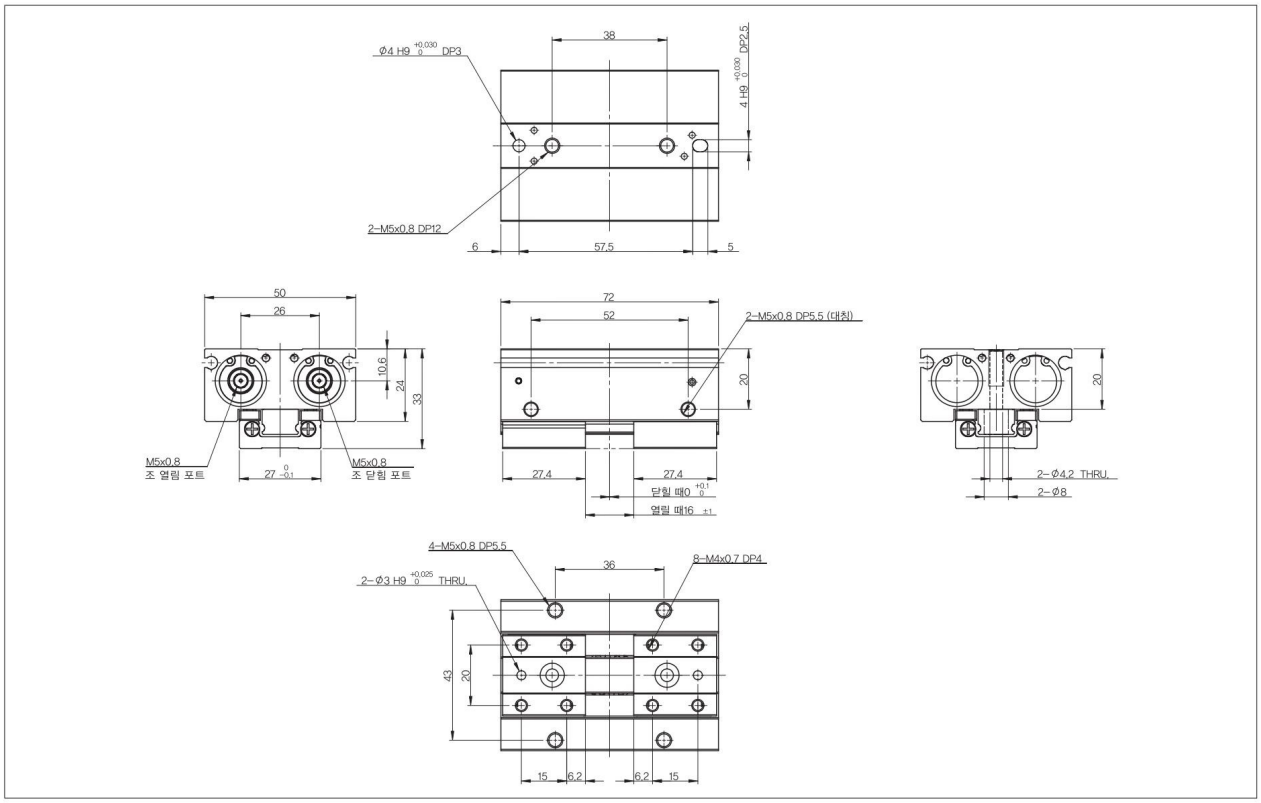
NFB2-12D1



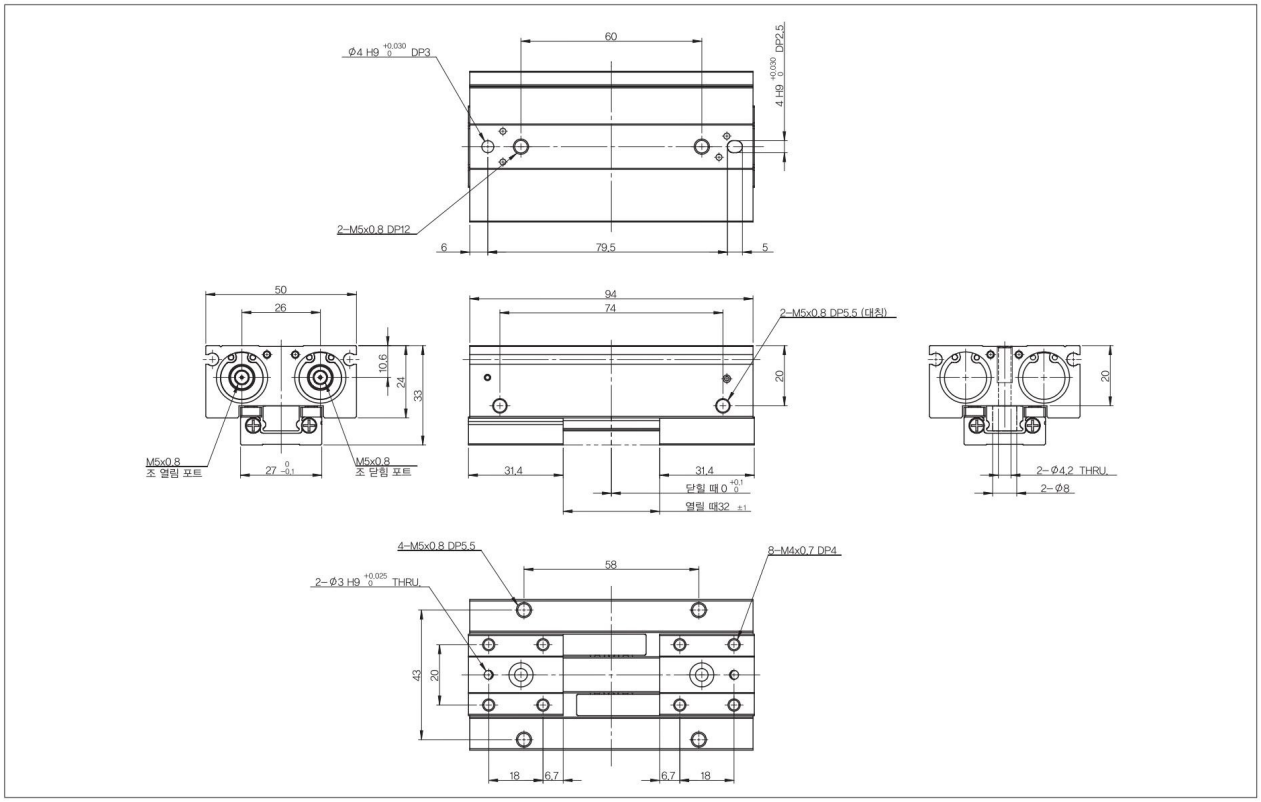
NFB2-12D2



NFB2-16D

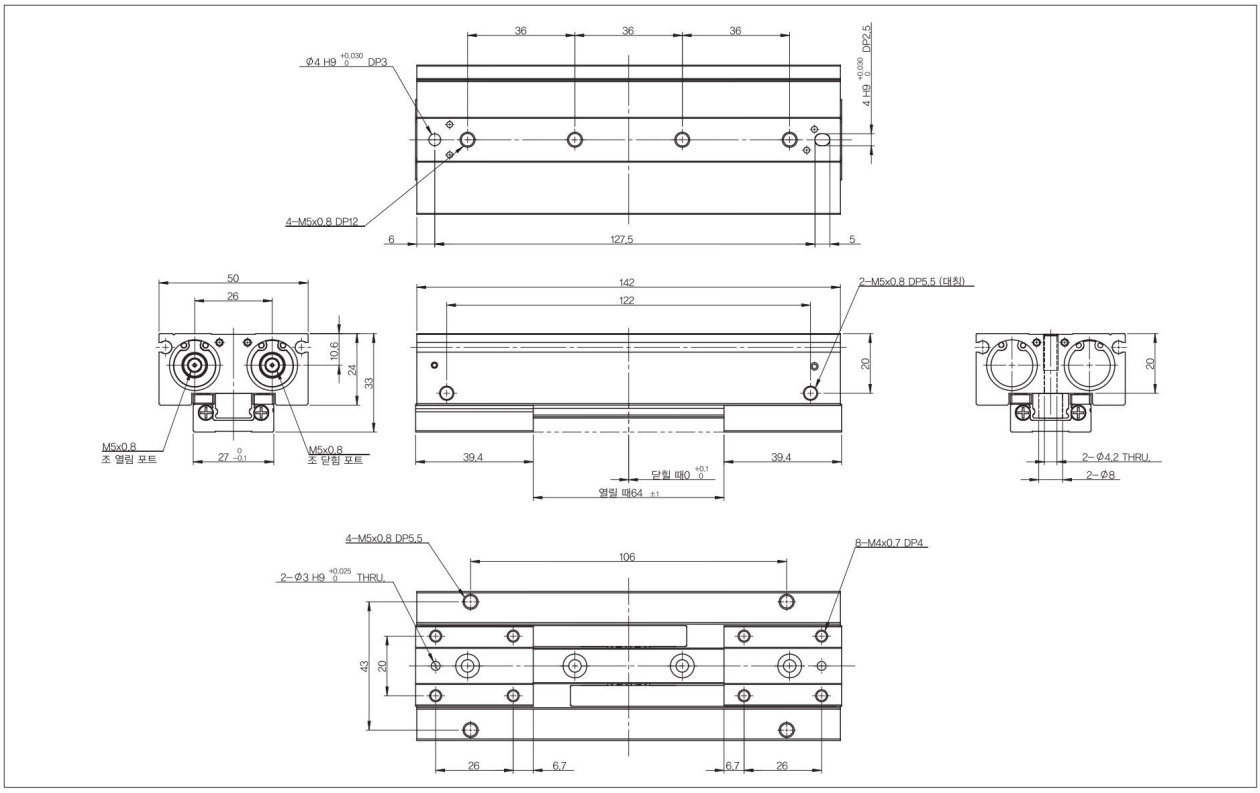


NFB2-16D1

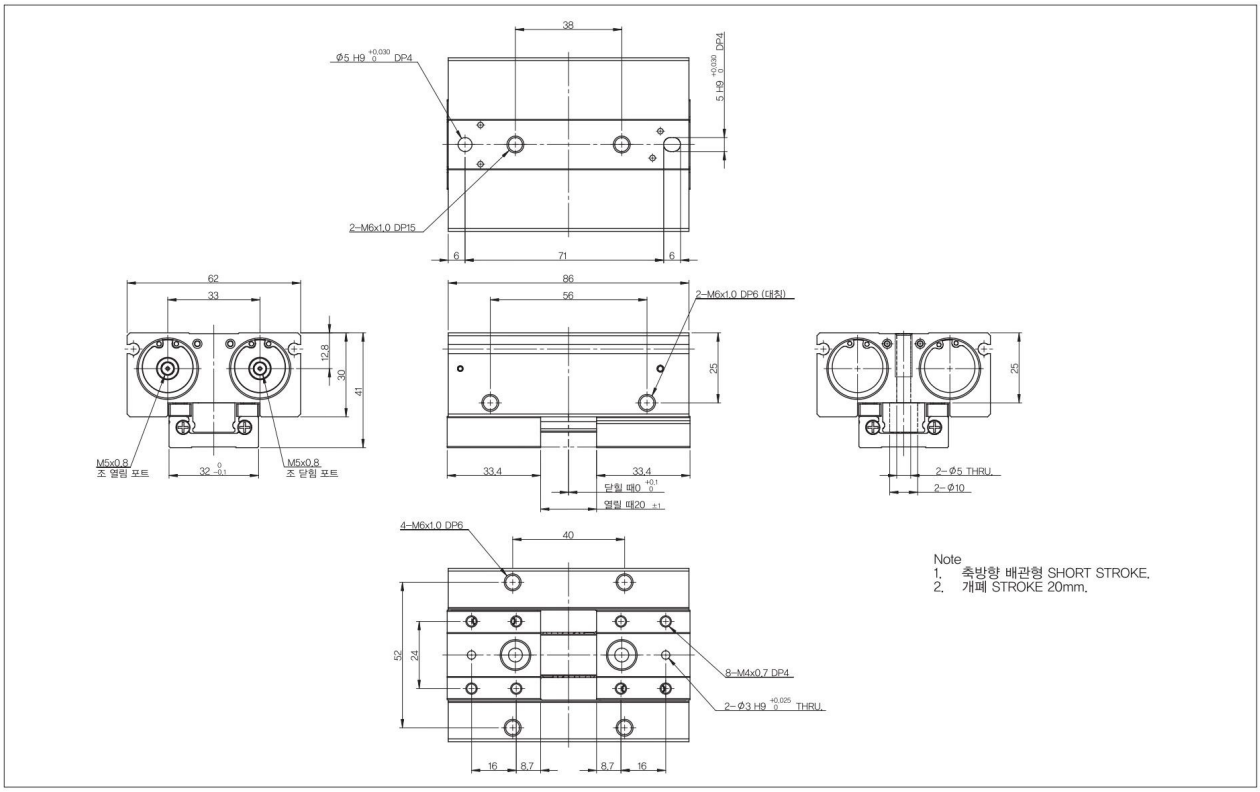


NFB2

NFB2-16D2

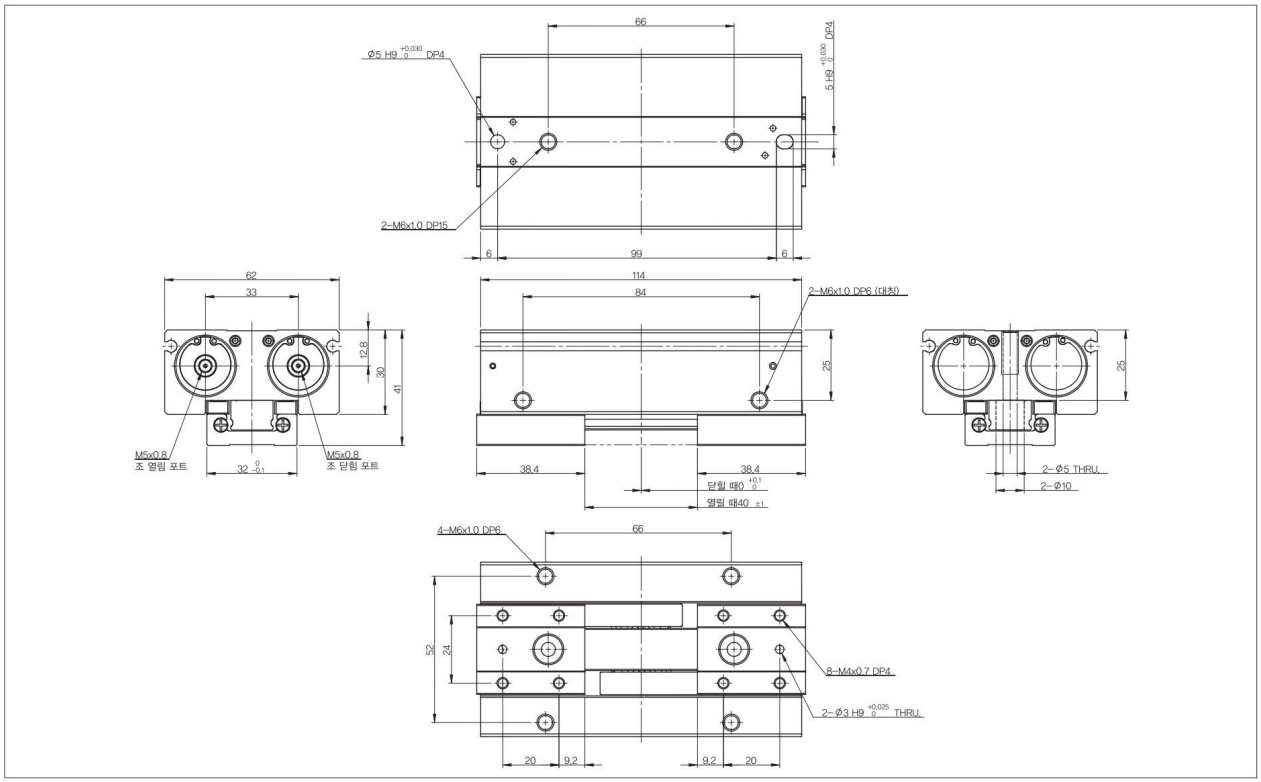


NFB2-20D

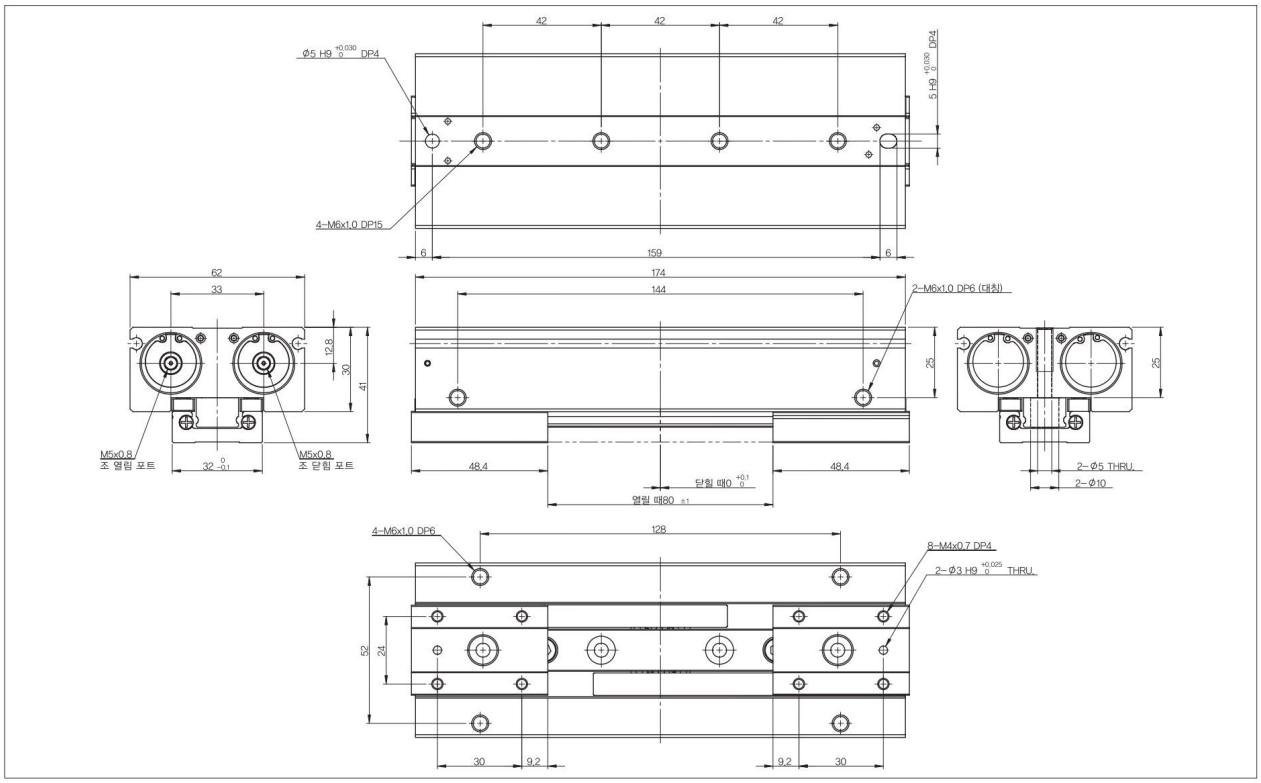


Note
1. 축방향 배관형 SHORT STROKE.
2. 개폐 STROKE 20mm.

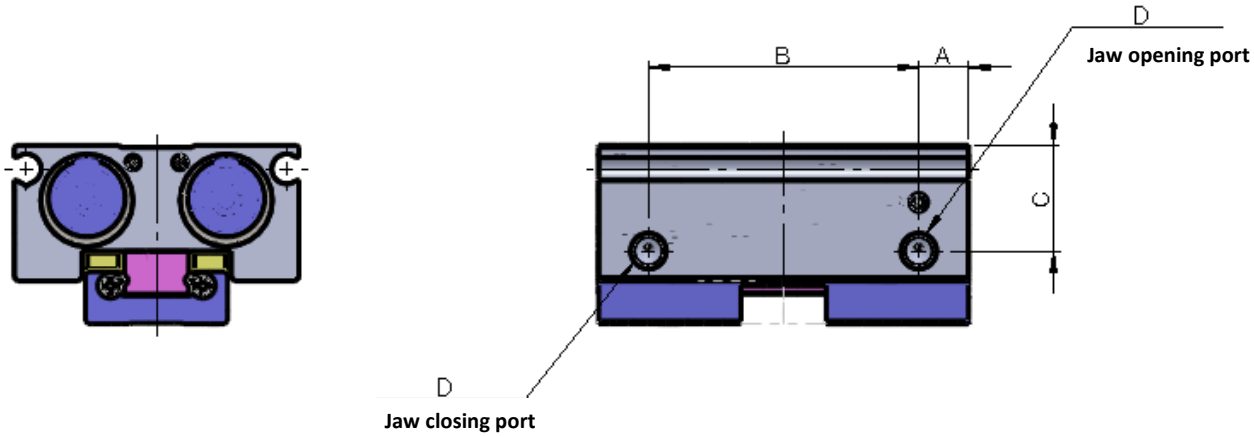
NFB2-20D1



NFB2-20D2



Side Piping Dimensions (R type)



(unit:mm)

Model	A	B	C	D
NFB2-8DR	5.5	25	11	M3x0.5
NFB2-8D1R		37		
NFB2-8D2R		61		
NFB2-12DR	7	38	14.8	M5x0.8
NFB2-12D1R		54		
NFB2-12D2R		90		
NFB2-16DR	9	54	19	M5x0.8
NFB2-16D1R		76		
NFB2-16D2R		124		
NFB2-20DR	10	66	23	M5x0.8
NFB2-20D1R		94		
NFB2-20D2R		154		

Effective Gripping Force (N) According to the Gripping Length L

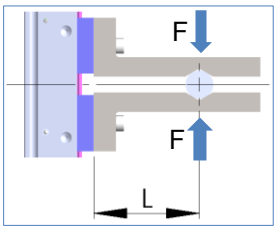
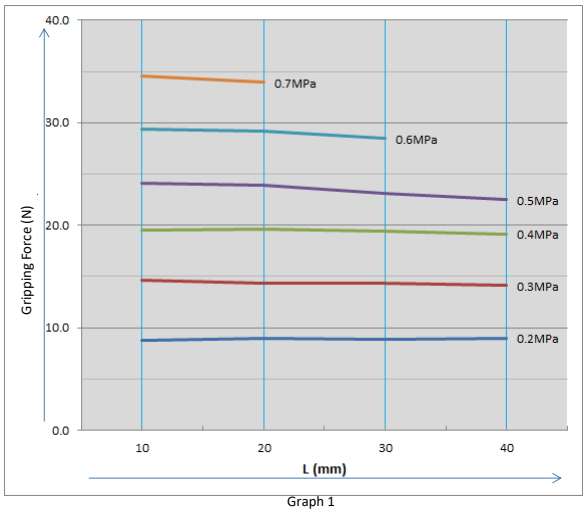
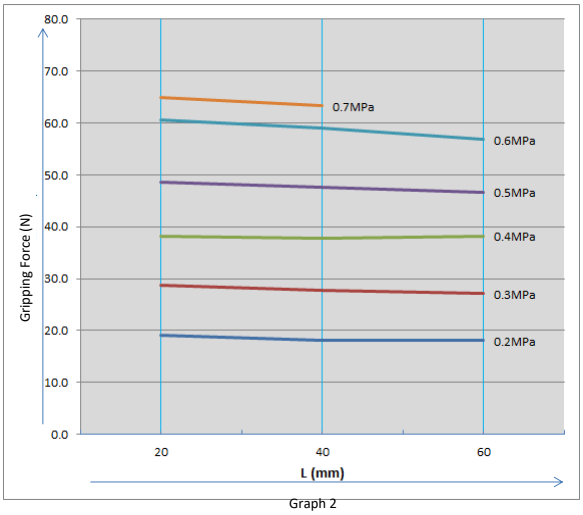


Figure 1.

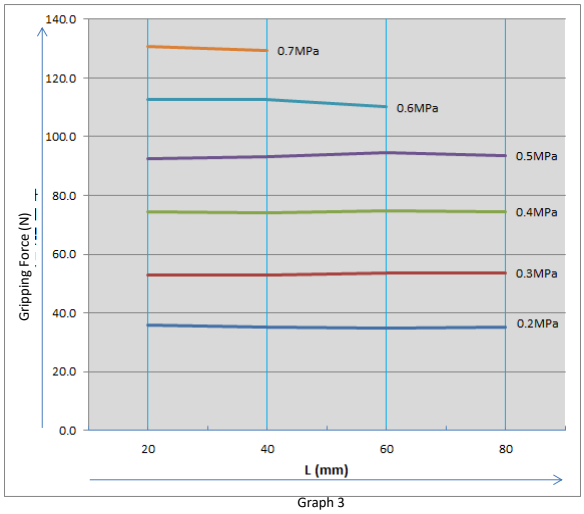
▶ The graph shows the effective gripping force (N) of one set.
▶ Gripping force is same as outer gripping force and inner gripping force.
▶ As shown in Fig. 1, please observe the maximum grip length per inner diameter.
(Ø8-40mm, Ø12-60mm, Ø16-80mm, Ø20-100mm)
Note) L = Gripping point length



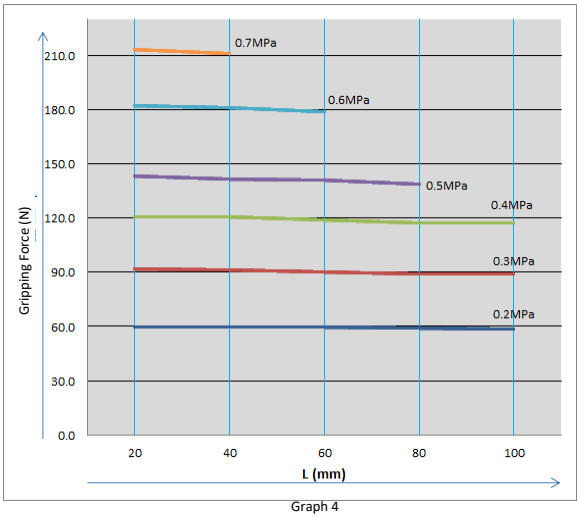
Graph 1



Graph 2



Graph 3



Graph 4

Gripping Point Range Limit

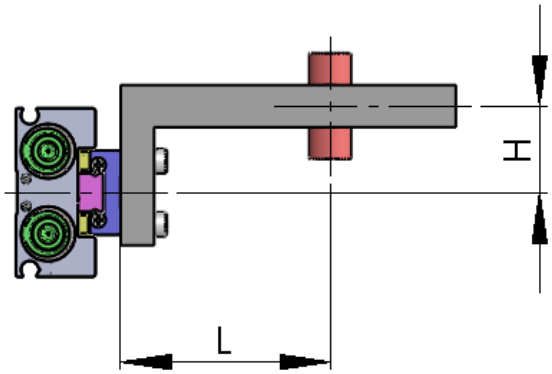


Figure 2.

▶ Ensure that the sum of the gripping point length and overhang is within the limit range as shown in Table 1

▶ If used beyond the limit, this can cause adverse effects on life expectancy.

Note) L = Gripping point length
H = Overhang Amount

Chart 1.

Unit : mm

Model	Classification	Working Pressue (MPa)					
		0.2	0.3	0.4	0.5	0.6	0.7
NFB2-8D□	L + H ≤	40	32	22	17	12	10
NFB2-12D□	L + H ≤	60	50	40	30	25	20
NFB2-16D□	L + H ≤	80	75	55	42	32	27
NFB2-20D□	L + H ≤	100	90	72	58	44	38

Note) When using NFB2-12D □ and 0.5MPa, the sum of the gripping point length (L) and the overhang amount (H) shall be 30 or less.
ex) L = 30, H = 0
H = 30, L = 0
L = 15, H = 15

Allowable load and moment

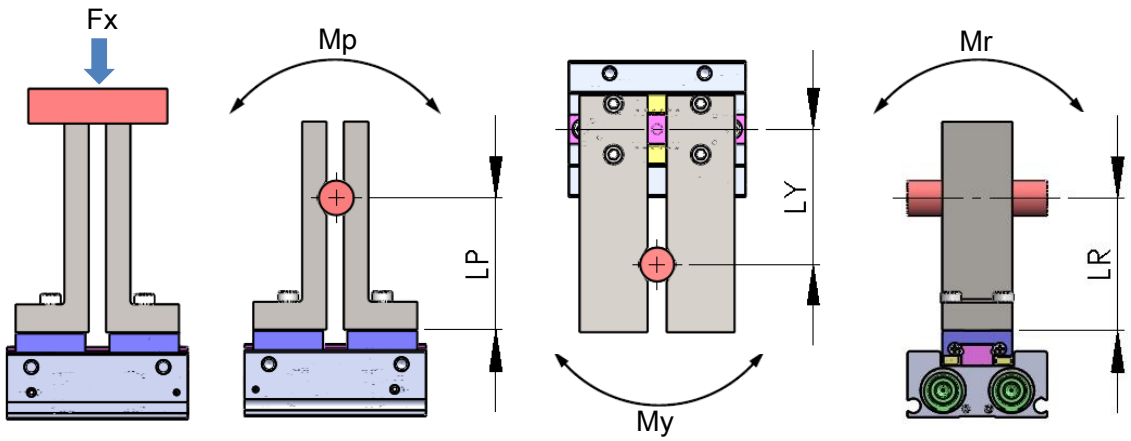


Figure 3.

Chart 2.

L* = Center point distance at which load is applied

Model	Allowable Vertical Load F(N)	Max. Allowable Load(N·m)		
		Pitch Moment Mp	Yaw Moment My	Roll Moment Mr
NFB2-8D□	57	0.43	0.43	0.86
NFB2-12D□	91	0.69	0.69	1.37
NFB2-16D□	170	1.29	1.29	2.57
NFB2-20D□	249	1.89	1.89	3.77

Allowable load calculation (when moment load is applied)

$$\text{Allowable Load F(N)} = \frac{\text{M(Max.Allowable Moment)(N} \times \text{M)}}{\text{Gripping Position Distance L} \times 10^{-3}}$$

Calculation Example

NFB2-16D specification, when a static load of 20N acting on the yawing moment is applied at the jig length l = 40MM

$$\text{Allowable Load F(N)} = \frac{1.29}{40 \times 10^{-3}}$$

$$= 32.3 \text{ N (Able to Use)}$$

Precautions

Be sure to read over the precautions before handling.

Precautions for selection

Caution

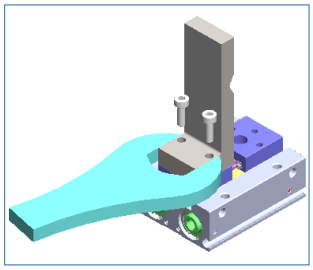
- **Use the load within 1/10 to 1/20 of the effective gripping force.**

Precautions Before Attaching

Caution

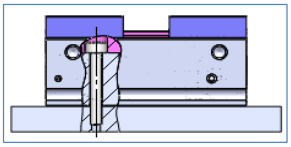
- **Do not apply shock to the jaw body attachment surface.**
  This can cause the Jaw to shake and result in malfunction.
- **Be careful that it does not touch your body while it is in operation.**
- **When attaching the attachment to Jaw, support it with a wrench.**
- **When attaching the product, fix it using the appropriate screws.**
  Tightening exceeding the limit will cause malfunction,
  and the shortage will cause the position to shift or drop.

1. Mounting on Jaw



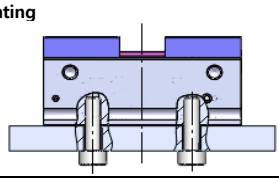
Model	Bolt	Max. tightening torque N.m	Max. screw-in depth (ℓ mm)
NFB2-8D□	M2.5x0.45	0.43	3
NFB2-12D□	M3x0.5	0.84	4
NFB2-16D□	M4x0.7	1.96	4
NFB2-20D□	M4x0.7	1.96	4

2. Body Through-Hole



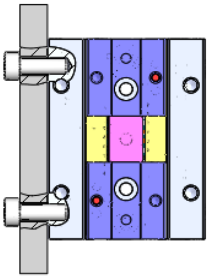
Model	Bolt	Max. tightening torque N.m	Max. screw-in depth (ℓ mm)
NFB2-8D□	M2.5x0.45x15L	0.43	4
NFB2-12D□	M3x0.5x20L	0.84	5.2
NFB2-16D□	M4x0.7	1.96	-
NFB2-20D□	M5x0.8	3.92	-

3. Body Bottom Mounting



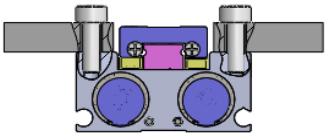
Model	Bolt	Max. tightening torque N.m	Max. screw-in depth (ℓ mm)
NFB2-8D□	M3x0.5	0.43	7
NFB2-12D□	M4x0.7	0.84	10
NFB2-16D□	M5x0.8	1.96	12
NFB2-20D□	M6x1	5.95	15

4. Body Side Mounting



Model	Bolt	Max. tightening torque N.m	Max. screw-in depth (ℓ mm)
NFB2-8D□	M3x0.5	0.43	4
NFB2-12D□	M4x0.7	0.84	5
NFB2-16D□	M5x0.8	1.96	5.5
NFB2-20D□	M6x1	5.95	6

5. Body Top Mounting



Model	Bolt	Max. tightening torque N.m	Max. screw-in depth (ℓ mm)
NFB2-8D□	M3x0.5	0.43	4
NFB2-12D□	M4x0.7	0.84	5
NFB2-16D□	M5x0.8	1.96	5.5
NFB2-20D□	M6x1	5.95	6

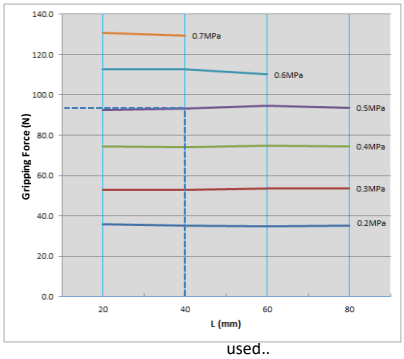
Model Selection Method

Caution: Use the load within the limits of use.
If used beyond the operating limits, the offset load aplied to the guide portion may become excessive, causing excessive vibration, deterioration of the guide, which may adversely affect the life span.

1 Terms of Use

List the conditions for use.	• Used model • Workpiece weight W (kgf) • Workpiece gripping point L (mm) • Moment load • Working pressure MPa	• Air chuck: NFB2-16D1 • Workpiece weight W: 2kgf • Workpiece gripping point L: 40mm, H: 0mm • Yawing moment load • Working pressure P: 0.5 MPa

2 Calculation of required gripping force and confirmation of effective gripping force

Find the required gripping force (N) to hold the workpiece. The effective gripping force is obtained from the graph. Compare the required gripping force with the effective gripping force.	• Required holding force F = W / (2 x μ) x a μ = Coefficient of friction between attachment and work 0.2 a = margin 4 • In graph 3, the gripping point L is 40 mm, Obtain the effective gripping force at the intersection of 0.5 MPa pressure. Note) Even when the coefficient of friction is greater than 0.2, select 10 to 20 times the workpiece weight for safety.	• Required Gripping Force F = 2 / (2 x 0.2) x 4 = 20N  used..

3 Locate the workpiece point

Check the gripping point of the workpiece. Check the gripping point length (L) and overhang (H). Make sure it is available within a limited range by specification.	· L + H ≤ Gripping point range limit · In Table 1, find the value of NFB2-16D □, 0.5MPa.	· L + H ≤ 42, L : 40, H : 0, workpiece gripping point is less than 40, so it can be used.

4 Check the allowable moment

Find the allowable load (N) when a moment load is applied. Compare the allowable load with the work load.	· Allowable Load F(N) = My(Max. Allowable moment) Gripping Position Distance L x 10^-3 Note) Refer to Table 2. for maximum allowable moment.	· Allowable Load F(N) = 1.29 / (40 x 10^-3) = 32.3N · Work Load F(N) = 2 x 9.8 = 19.6N . Allowable load is larger than work load, so it can be used. (Please use 75% of the allowable load) Note) 1kgf = 9.8N