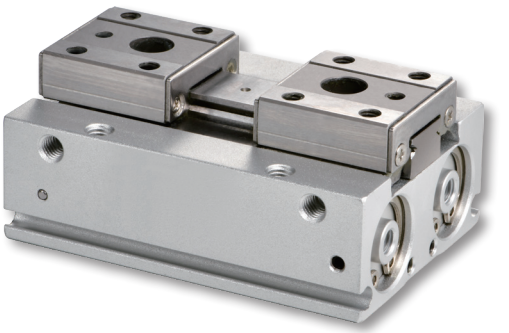
HDF series Low Profile Air Gripper

Product features/ Code of order

CHELIC

Feature

- Space saving and compact
- Double piston
- Height reduced 50% than HDZ



Specification

Item \ Bore size (mm)		Ø12	Ø16	Ø20
Action		Double acting		
Fluid		Air		
Pressure range	kgf / cm² (kPa)	1.5 ~ 7(150 ~ 700)		
Ambient and fluid temperature	°C	0 ~ 60		
Max. operating frequency	time/min	100		
Lubrication	Cylinder	Lubrication free type		
	Slide rail	Lubrication required		
Closing stroke	mm	12, 24, 48	16, 32, 64	20, 40, 80
Port size		M5 x 0.8P		
Sensing device		With magnet		

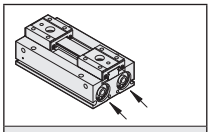
Code of order **HDF R 16 x 32 – 9D 2**

1 2 3 4 5

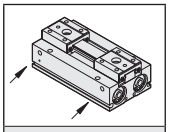
1

Mark	Model
None	Axial piping type
R	Side piping type

Image



None: Axial piping type



R: Side piping type

2

Mark	Bore size (mm)
12	Ø12
16	Ø16
20	Ø20

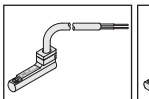
3

Bore size (mm)	Stroke (mm)
Ø12	12, 24, 48
Ø16	16, 32, 64
Ø20	20, 40, 80

4

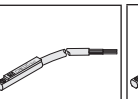
Mark	Sensor switch
None	Without sensor switch
8G	CS-8G
8GN	CS-8GN
8GP	CS-8GP
9D	CS-9D
9B	CS-9B
9H	CS-9H
9DN	CS-9DN
9DP	CS-9DP

Image



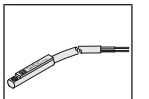
Please refer to P.8-2.16

CS-9B



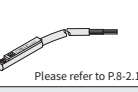
Please refer to P.8-2.16

CS-9D



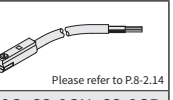
Please refer to P.8-2.16

CS-9H



Please refer to P.8-2.14

CS-9DN, CS-9DP



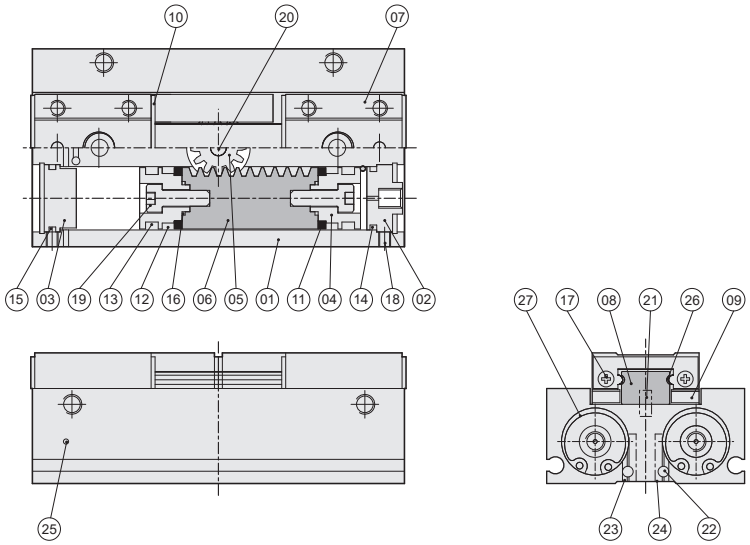
Please refer to P.8-2.14

CS-8G, CS-8GN, CS-8GP

5

Mark	Sensor quantity
1	With 1 sensor switche
2	With 2 sensor switches

Internal structure



Components and material list

No.	Item	Material	No.	Item	Material	No.	Item	Material
01	Body	Aluminum alloy	10	Roller block	Stainless steel	19	Piston rod screw	Alloy steel
02	Front cover	Aluminum alloy	11	Magnetic	Rare earth material	20	Gear pin	Bearing steel
03	Rear cover	Aluminum alloy	12	Wear ring	POM	21	Slide rail pin	Bearing steel
04	Piston	Aluminum alloy	13	Piston packing	NBR	22	Main air vent steel ball	Stainless steel
05	Gear shaft	Carbon steel	14	Front cover O-Ring	NBR	23	Front bottom air vent steel ball	Stainless steel
06	Gear	Stainless steel	15	Rear cover O-ring	NBR	24	Rear bottom air vent steel ball	Stainless steel
07	Slide base	Stainless steel	16	Piston O-ring	NBR	25	Side air vent steel ball	Stainless steel
08	Rail	Bearing steel	17	Roller block screw	Alloy steel	26	Steel ball	Stainless steel
09	Slide table stir slice	Stainless steel	18	Front cover screw	Alloy steel	27	Clip	Spring steel

Note: Gear rack material is POM (Polyoxymethylene) for HDF 12 & HDF 16

Packing and O-ring material list

Unit: mm

Item / Model / Quantity	Piston packing	Front cover O-ring	Rear cover O-ring	Piston O-ring
	4	2	2	4
HDF Ø12	DYP - 12	Ø10 x Ø1	Ø10 x Ø1	Ø4 x Ø1
HDF Ø16	DYP - 16	Ø13.5 x Ø1.5	Ø14.5 x Ø1.5	Ø7.4 x Ø1.2
HDF Ø20	DYP - 20	Ø17.5 x Ø1.5	Ø17.5 x Ø1.5	Ø5.8 x Ø1.9

Product weight

Model	HDF 12 x 12	HDF 12 x 24	HDF 12 x 48
Weight (kg)	0.15	0.19	0.27
Model	HDF 16 x 16	HDF 16 x 32	HDF 16 x 64
Weight (kg)	0.35	0.44	0.65
Model	HDF 20 x 20	HDF 20 x 40	HDF 20 x 80
Weight (kg)	0.64	0.85	1.22

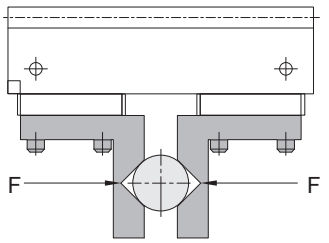
Note: All of above are theoretical data. Weight tolerance about±5%

Selection procedure

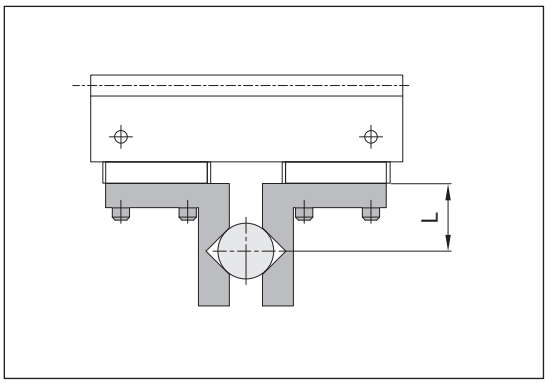
1 Confirm gripping force >> 2 Confirm gripping point >> 3 Confirm external force on fingers

1 Confirm gripping force

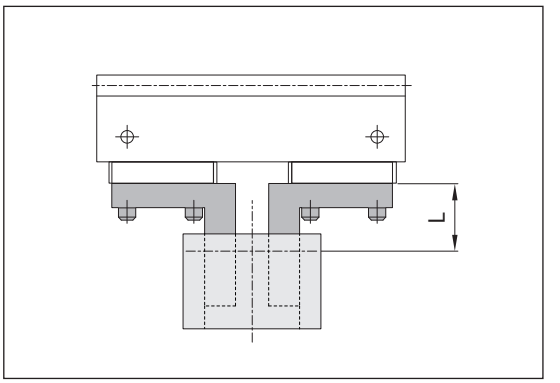
- Confirm gripping force: HDF series
- Expressing the effective gripping force



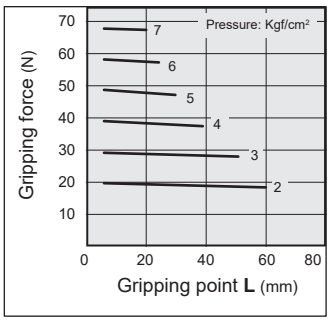
External gripping



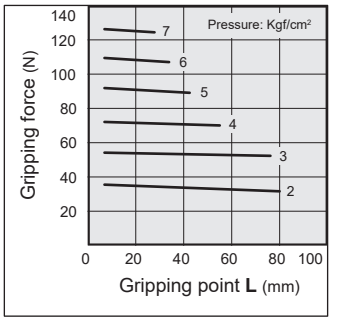
Internal gripping



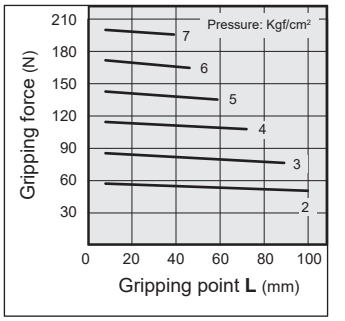
HDF 12



HDF 16



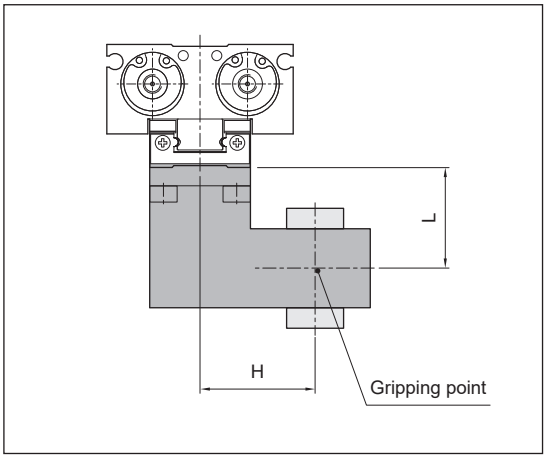
HDF 20



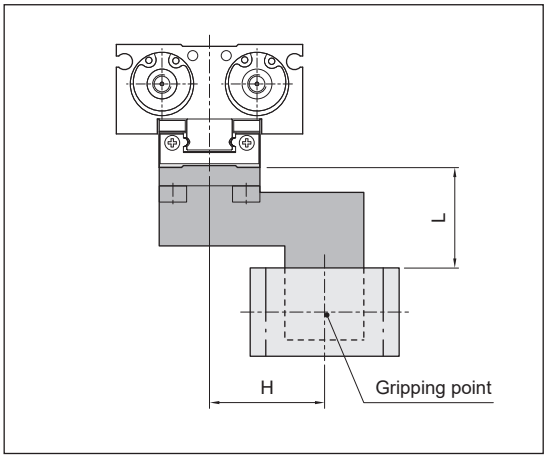
② Confirm gripping point

- Confirmation of the gripping position: HDF series
- The gripping position of a workpiece should be operated so that the amount of overhang(H) will stay the range given in the graphs below.
- If the gripping position of a workpiece over the range limits, this will have an adverse effect on the life of the gripper

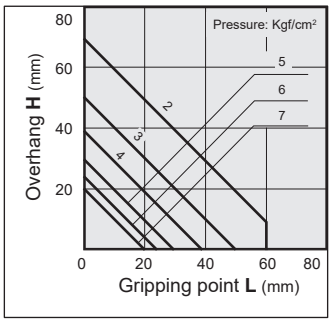
External gripping



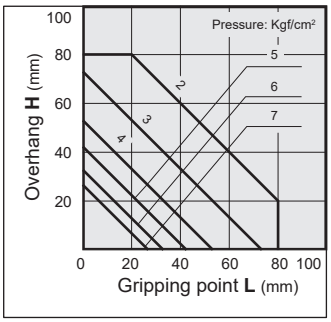
Internal gripping



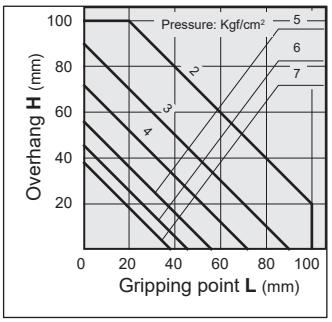
HDF 12



HDF 16

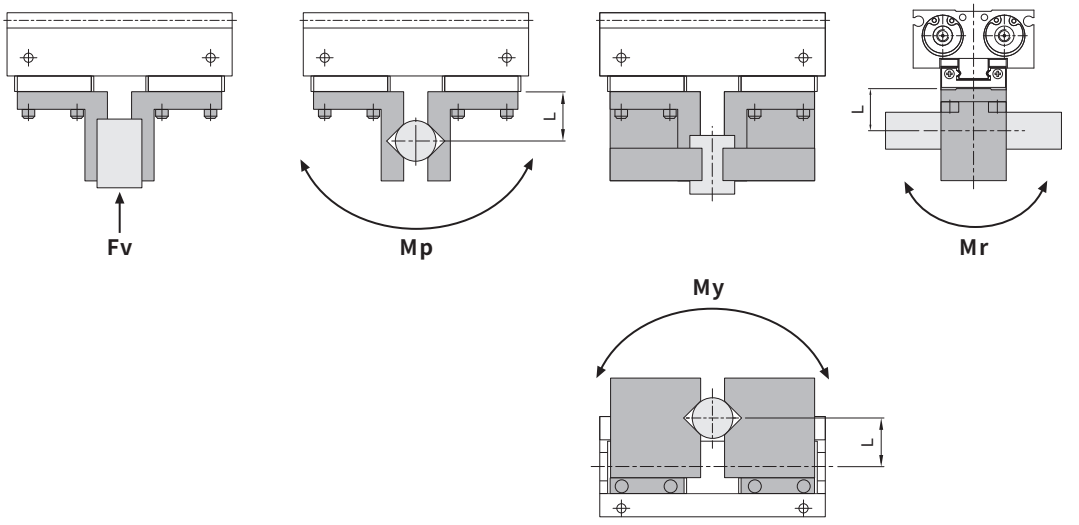


HDF 20



③ Confirm external force on fingers

- Confirmation of external force on fingers: HDF series



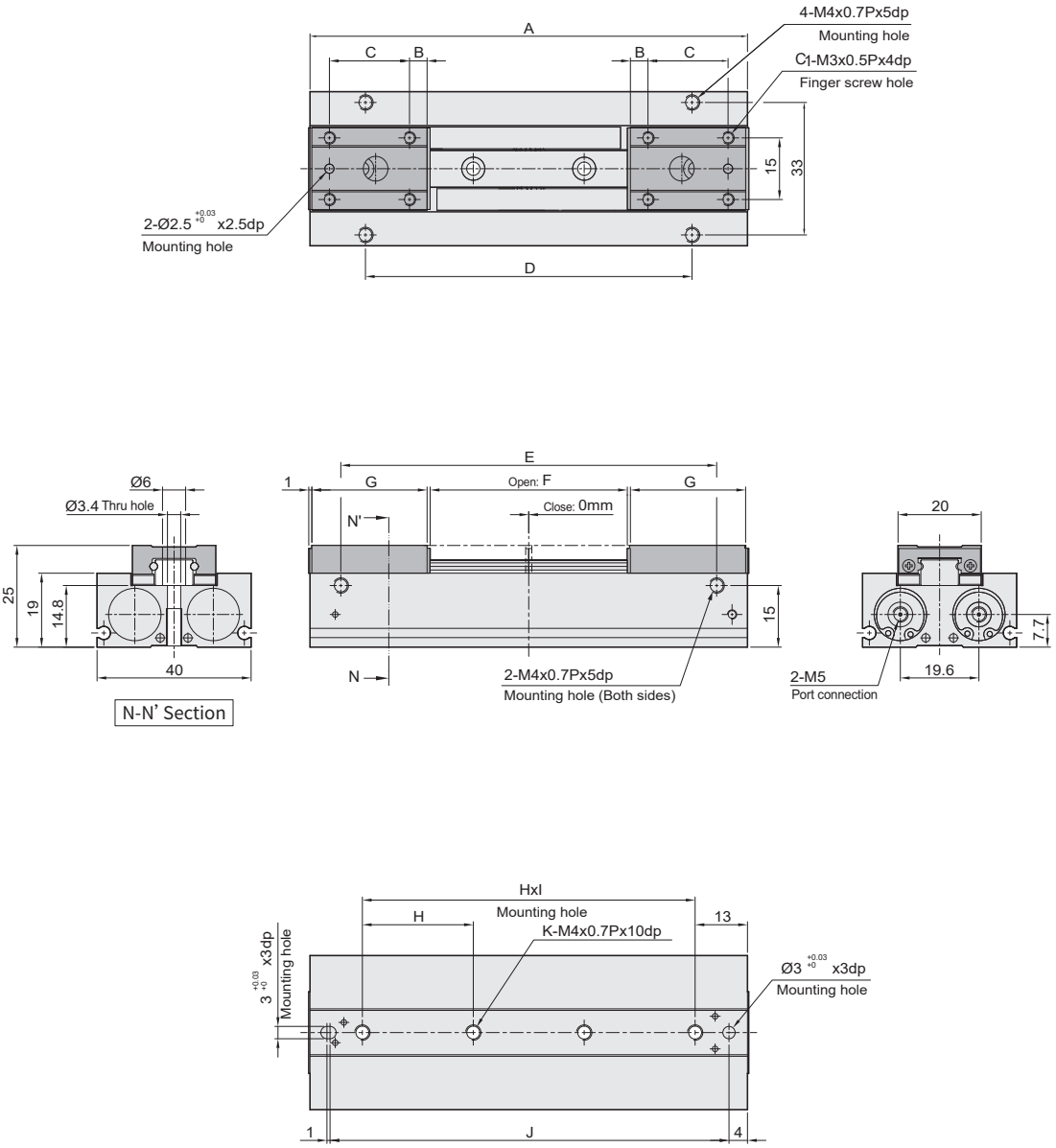
L: Distance to the point at which the load is applied

Model	Allowable vertical load Fv(N)	Maximum allowable moment		
		Mp (N·m)	My (N·m)	Mr (N·m)
HDF 12	98	0.68	0.68	1.4
HDF 16	176	1.4	1.4	2.8
HDF 20	294	2	2	4

Note: the load and moment values in the table is static values

Calculation of allowable external force (when moment load is applied)	**Calculation examples**
Allowable load F(N) = $\frac{\text{M(Maximum allowable moment) (N · m)}}{\text{L x } 10^{-3}}$	When a load f= 10 N operating,which applies pitch moment to point 30mm from the end of the HDF-12 Allowable load F = $\frac{1.4}{10 \text{ x } 10^{-3}}$ = 46.6 (N) F = 46.6 > 10 can be used

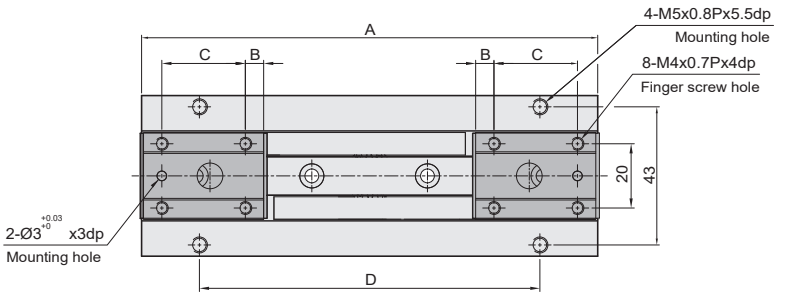
HDF 12

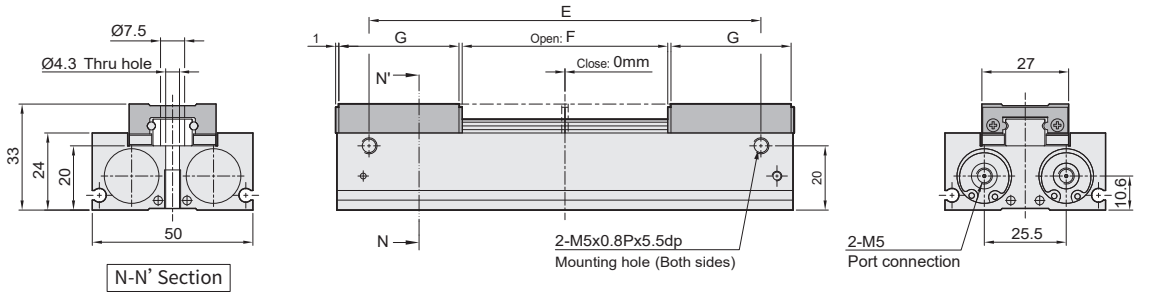


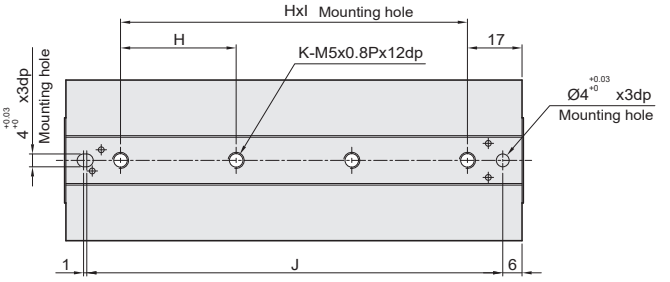
Unit: mm

Model \ Mark	A	B	C	C_1	D	E	F	G	H	I	J	K
HDF 12 x 12st	52	9	-	4	28	38	12	18	26	1	43.5	2
HDF 12 x 24st	68	4.5	12	8	44	54	24	21	42	1	59.5	2
HDF 12 x 48st	104	4.5	18	8	80	90	48	27	26	3	95.5	4

HDF 16



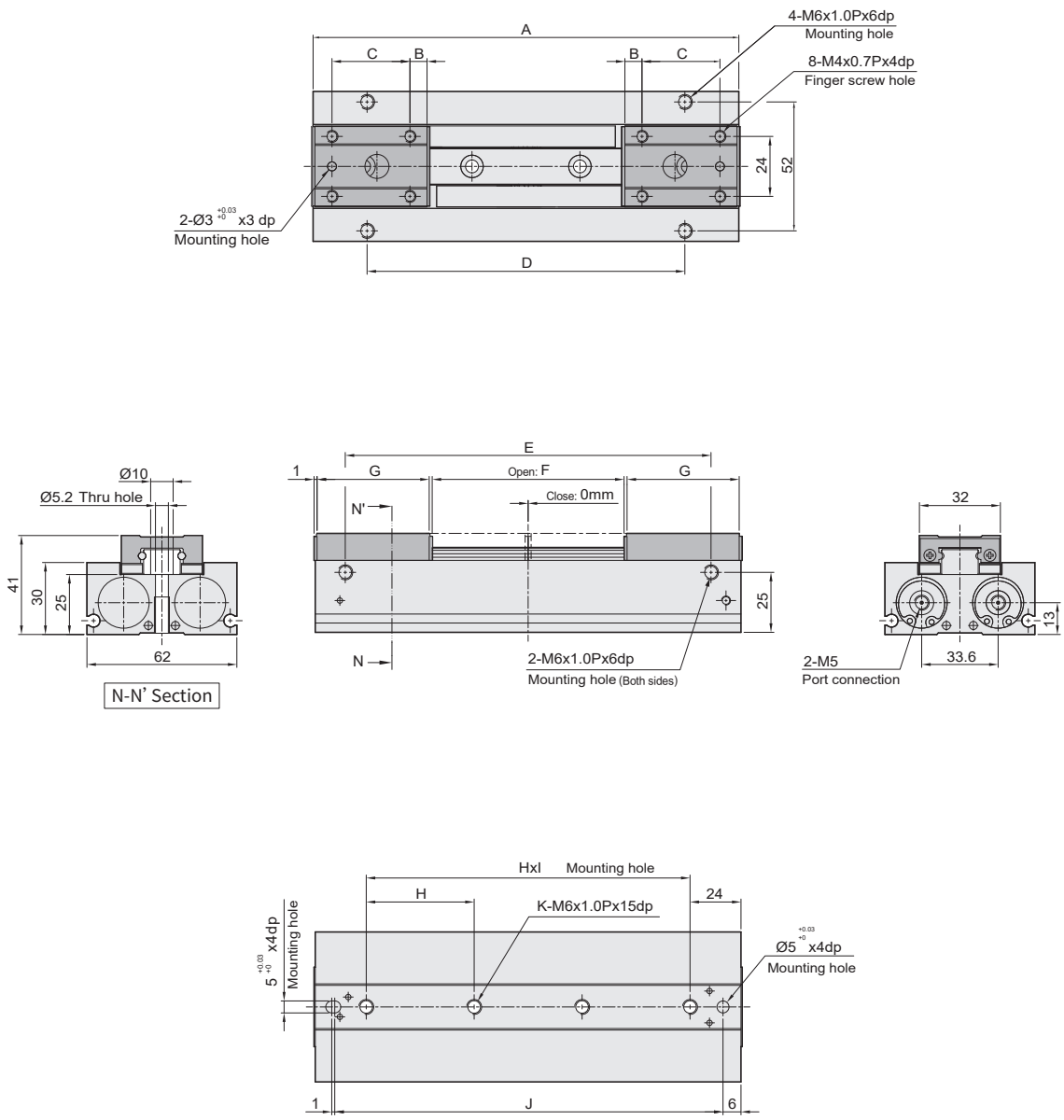




Unit: mm

Model \ Mark	A	B	C	D	E	F	G	H	I	J	K
HDF 16 x 16st	72	5.2	15	36	52	16	25.4	38	1	59.5	2
HDF 16 x 32st	94	5.7	18	58	74	32	29.4	60	1	81.5	2
HDF 16 x 64st	142	5.7	26	106	122	64	37.4	36	3	129.5	4

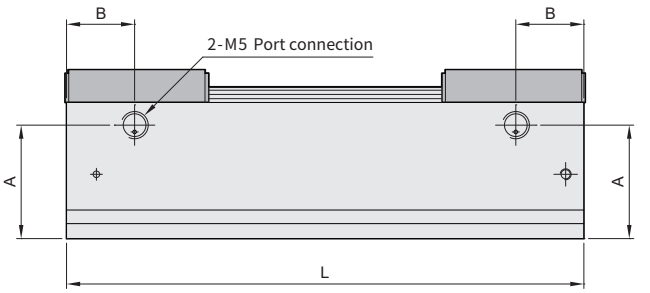
HDF 20



Unit: mm

Model \ Mark	A	B	C	D	E	F	G	H	I	J	K
HDF 20 x 20st	86	7.6	16	40	56	20	31.2	38	1	73.5	2
HDF 20 x 40st	114	8.1	20	68	84	40	36.2	66	1	101.5	2
HDF 20 x 80st	174	8.1	30	128	144	80	46.2	42	3	161.5	4

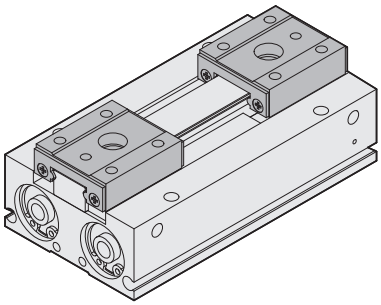
Side piping type

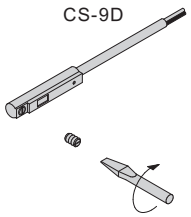


Unit: mm

Model \ Mark	L	A	B
HDF 12x12 ST	52	15	7
HDF 12x24 ST	68		
HDF 12x48 ST	104		
HDF 16x16 ST	72	20	10
HDF 16x32 ST	94		
HDF 16x64 ST	142		
HDF 20x20 ST	86	19	8.3
HDF 20x40 ST	114		
HDF 20x80 ST	174		

Sensor switch mounting type

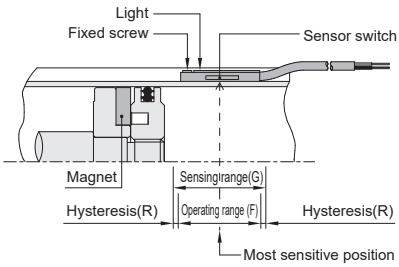




Sensing range

Sensor switch is fixed on the cylinder body. The magnetic piston head will activate the sensor switch when it enters the operating range. It has 0.5mm differential.

Sensor switch setting and operating range



Operating range

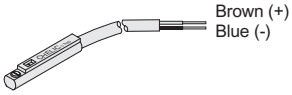
When piston head moves the switch setting and adjustment will be based on the responding range generated by the magnetic field and the switch.(Please refer to the below table)

Unit: mm

Model	CS-9D(B/H)	
Bore size	Operating range (F)	Hysteresis(R)
12	8	1
16	10	1.2
20	11	1.2

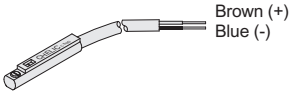
Sensor switch introduction

CS-9D



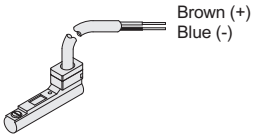
Voltage: DC 5~120V
AC 5~120V

CS-9H



Voltage: DC 5~240V
AC 5~240V

CS-9B



Voltage: DC 5~120V
AC 5~120V