

Series MHS3

ø16, ø20, ø25, ø32, ø40, ø50, ø63, ø80, ø100, ø125

How to Order

Cylinder Bore Size

ø16 to ø25

MHS 3 - 20 D - F9N

Number of fingers
3 3 fingers

Cylinder bore size
16 16mm
20 20mm
25 25mm

Action
D Double acting

Number of auto switches

Nil	2 pcs.
S	1 pc.

Auto switch type

Nil Without auto switch (built-in magnet)

Auto switch specifications

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch models		Lead wire length (m)*			Applicable loads
					DC	AC	Electrical entry direction		0.5 (Nil)	3 (L)	5 (Z)	
							Perpendicular	In-line				
Solid state	—	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	F9NV	F9N	●	●	—	Relay, PLC
				3 wire (PNP)					F9PV	F9P	●	
				2 wire	12V	F9BV	F9B	●	●	—		
						—	F9BA	—	●	○	—	

* Lead wire length symbols: 0.5m Nil (Example) F9B
3m L (Example) F9BL
5m Z (Example) F9BZ

D-F9BA is available only as "L".

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

Note 1) Take note of hysteresis with 2 color indication type switches.

Note 2) Refer to pages 53 through 65 for detailed auto switch specifications.

Cylinder Bore Size

ø32 to ø125

MHS 3 - 50 D - Y59A

Number of fingers
3 3 fingers

Cylinder bore size
32 32mm
40 40mm
50 50mm
63 63mm
80 80mm
100 100mm
125 125mm

Action
D Double acting

Number of auto switches

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

Auto switch type

Nil Without auto switch (built-in magnet)

Auto switch specifications

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch models		Lead wire length (m)*			Applicable loads
					DC	AC	Electrical entry direction		0.5 (Nil)	3 (L)	5 (Z)	
							In-line	Perpendicular				
Solid state	—	Grommet	Yes	3 wire (NPN)	24V	5V, 12V	Y69A	Y59A	●	●	○	IC circuit
				3 wire (PNP)					Y7PV	Y7P	●	
				2 wire	12V	Y69B	Y59B	●	●	○	—	
						Y7NWW	Y7NW	●	●	○		
				3 wire (PNP)	5V, 12V	Y7PWW	Y7PW	●	●	○	IC circuit	
						Y7BWW	Y7BW	●	●	○		
2 wire	12V	—	Y7BA	—	●	○	—					

* Lead wire length symbols: 0.5m Nil (Example) Y59B
3m L (Example) Y59BL
5m Z (Example) Y59BZ

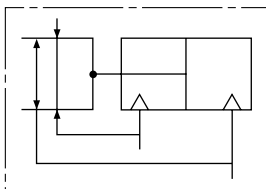
D-Y7BA is available only as "L".

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

Note 1) Take note of hysteresis with 2 color indication type switches.

Note 2) Refer to pages 53 through 65 for detailed auto switch specifications.

Symbol



Models and Specifications



Model	MHS3-16D	MHS3-20D	MHS3-25D	MHS3-32D	MHS3-40D	MHS3-50D	MHS3-63D	MHS3-80D	MHS3-100D	MHS3-125D																						
Cylinder bore size mm	16	20	25	32	40	50	63	80	100	125																						
Fluid	Air																															
Operating pressure MPa (psi)	0.2 to 0.6 (29 to 87)					0.1 to 0.6 (14 to 87)																										
Ambient and fluid temperature	-10 to 60°C (14 to 140°F)																															
Repeatability mm	±0.01																															
Max. operating frequency c.p.m.	120				60			30																								
Lubrication	Non-lube																															
Action	Double acting																															
Effective gripping force N (lb) at pressure of 0.5MPa (7.2psi)	<table border="1"> <tr> <td>External gripping force</td> <td>14 (3.1)</td> <td>25 (5.6)</td> <td>42 (9.4)</td> <td>74 (16.6)</td> <td>118 (26.5)</td> <td>187 (42)</td> <td>335 (75)</td> <td>500 (112)</td> <td>750 (169)</td> <td>1,270 (285)</td> </tr> <tr> <td>Internal gripping force</td> <td>16 (3.6)</td> <td>28 (6.3)</td> <td>47 (10.6)</td> <td>82 (18.4)</td> <td>130 (29)</td> <td>204 (46)</td> <td>359 (81)</td> <td>525 (118)</td> <td>780 (175)</td> <td>1,320 (297)</td> </tr> </table>										External gripping force	14 (3.1)	25 (5.6)	42 (9.4)	74 (16.6)	118 (26.5)	187 (42)	335 (75)	500 (112)	750 (169)	1,270 (285)	Internal gripping force	16 (3.6)	28 (6.3)	47 (10.6)	82 (18.4)	130 (29)	204 (46)	359 (81)	525 (118)	780 (175)	1,320 (297)
External gripping force	14 (3.1)	25 (5.6)	42 (9.4)	74 (16.6)	118 (26.5)	187 (42)	335 (75)	500 (112)	750 (169)	1,270 (285)																						
Internal gripping force	16 (3.6)	28 (6.3)	47 (10.6)	82 (18.4)	130 (29)	204 (46)	359 (81)	525 (118)	780 (175)	1,320 (297)																						
Opening/closing stroke mm (dia.)	4	4	6	8	8	12	16	20	24	32																						
Weight g (oz)	60 (2.1)	100 (3.5)	140 (4.9)	237 (8.4)	351 (12.4)	541 (19.1)	992 (35.0)	1,850 (65)	3,340 (118)	6,460 (228)																						

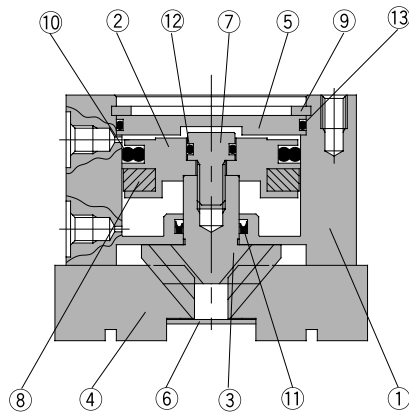
Note 1) Values for $\phi 16$ to $\phi 25$ are with gripping point L = 20mm, for $\phi 32$ to $\phi 63$ with gripping point L = 30mm, and for $\phi 80$ to $\phi 125$ with gripping point L = 50mm.

Refer to the "Effective Gripping Force" data on pages 10 through 12 for the gripping force at each gripping position.

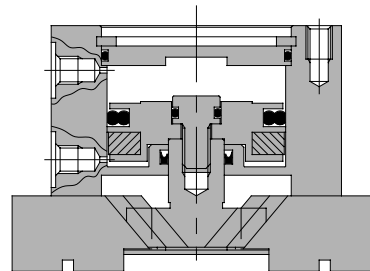
Note 2) Open and closed diameter values apply for external gripping of work pieces.

Construction

Closed condition



Open condition



Parts list

No.	Description	Material	Note
1	Body	Aluminum alloy	Hard anodized
2	Piston	Aluminum alloy	Hard anodized
3	Cam	Carbon steel	Heat treated, Specially treated
4	Finger	Carbon steel	Heat treated, Specially treated
5	Cap	Aluminum alloy	Hard anodized
6	End plate	Stainless steel	
7	Piston bolt	Stainless steel	

No.	Description	Material	Note
8	Rubber magnet	Synthetic rubber	
9	C type snap ring	Carbon steel	Nickel plated
10	Piston seal	NBR	
11	Rod seal	NBR	
12	Gasket	NBR	
13	Gasket	NBR	

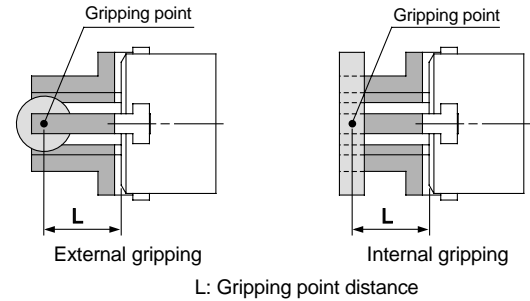
Replacement parts/Seal kits

Kit number										Contents
MHS3-16D	MHS3-20D	MHS3-25D	MHS3-32D	MHS3-40D	MHS3-50D	MHS3-63D	MHS3-80D	MHS3-100D	MHS3-125D	
MHS16-PS	MHS20-PS	MHS25-PS	MHS32-PS	MHS40-PS	MHS50-PS	MHS63-PS	MHS80-PS	MHS100-PS	MHS125-PS	A set of the above Nos. 10, 11, 12 and 13

* Seal kits are sets consisting of items 10, 11, 12 and 13, which can be ordered using the kit number for each cylinder bore size.

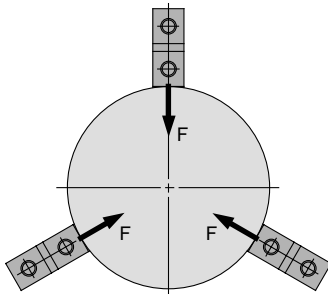
Gripping Point

- The work piece gripping point distance should be within the gripping force ranges given for each pressure in the effective gripping force graphs below.
- If operated with the work piece gripping point beyond the indicated ranges, an excessive offset load will be applied to the sliding section of the fingers, which can have an adverse effect on the service life of the product.

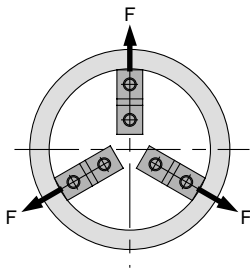


Effective Gripping Force

- Expressing the effective gripping force
The effective gripping force shown in the graphs to the right is expressed as F, which is the impellent force of one finger when all 3 of the fingers and attachments are in full contact with the work piece as shown in the figure below.



External gripping

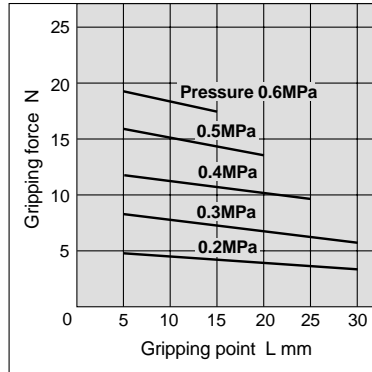


Internal gripping

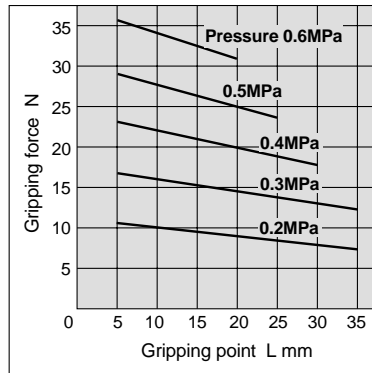
Note: 1N = 0.2248lbr
1in = 25.4mm
1MPa = 145psi

External gripping force

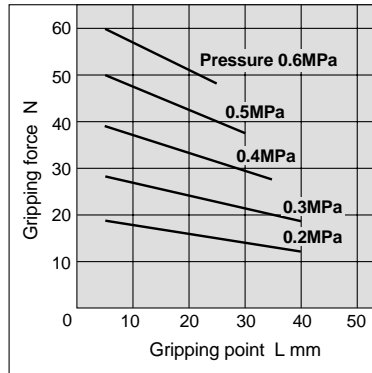
MHS3-16D



MHS3-20D

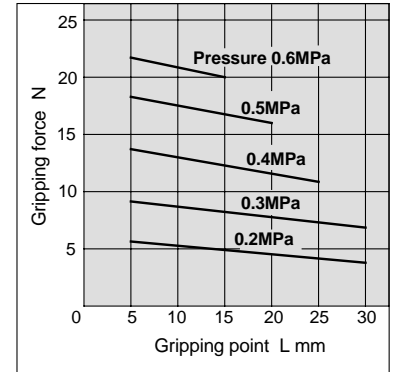


MHS3-25D

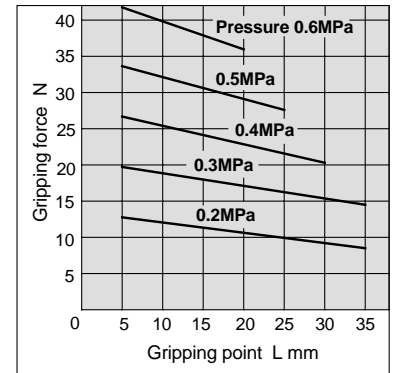


Internal gripping force

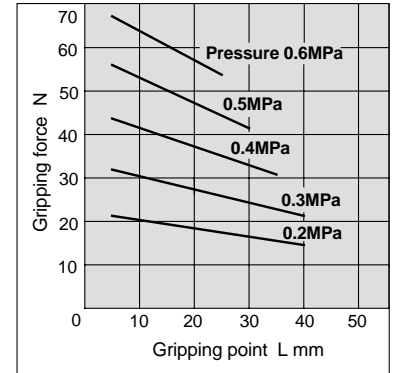
MHS3-16D



MHS3-20D

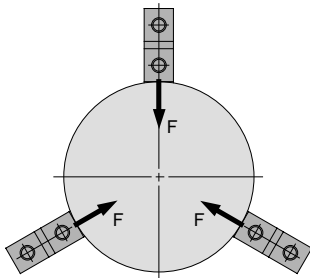


MHS3-25D

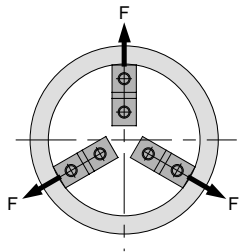


Effective Gripping Force

- Expressing the effective gripping force
- The effective gripping force shown in the graphs to the right is expressed as F, which is the impellent force of one finger when all 3 of the fingers and attachments are in full contact with the work piece as shown in the figure below.



External gripping



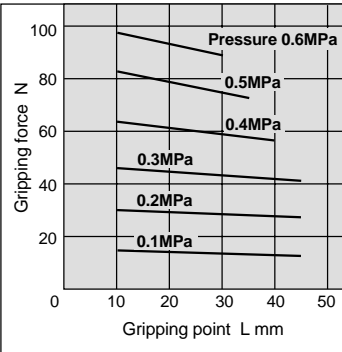
Internal gripping

1N: Approx. 0.102kgf
1MPa: Approx. 10.2kgf/cm²

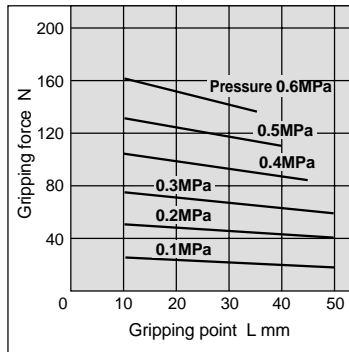
Note: 1N = 0.2248lbf
1in = 25.4mm
1MPa = 145psi

External gripping force

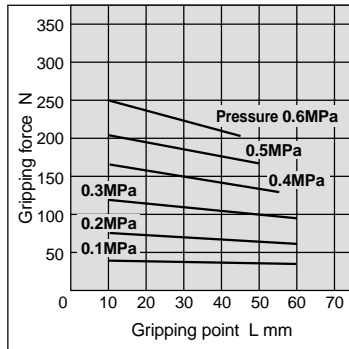
MHS3-32D



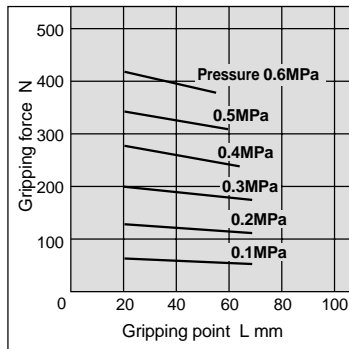
MHS3-40D



MHS3-50D

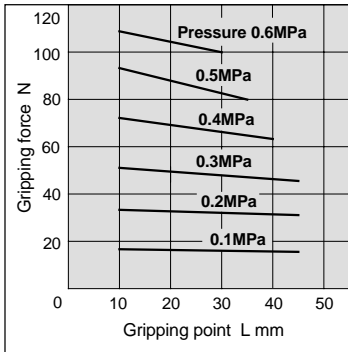


MHS3-63D

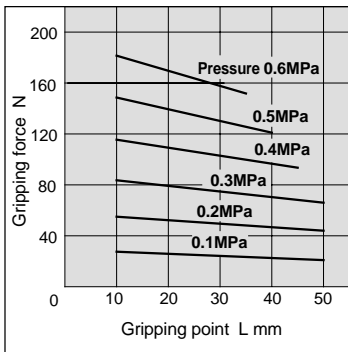


Internal gripping force

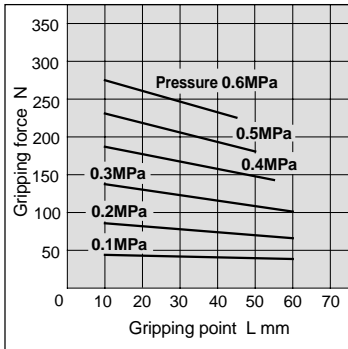
MHS3-32D



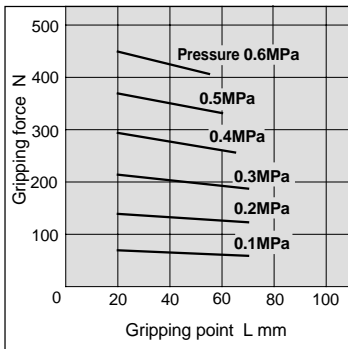
MHS3-40D



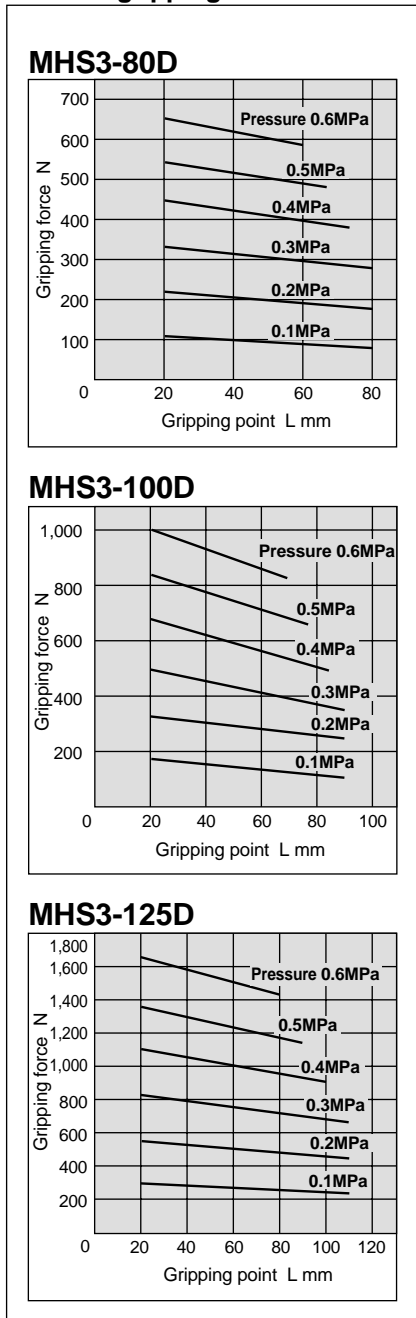
MHS3-50D



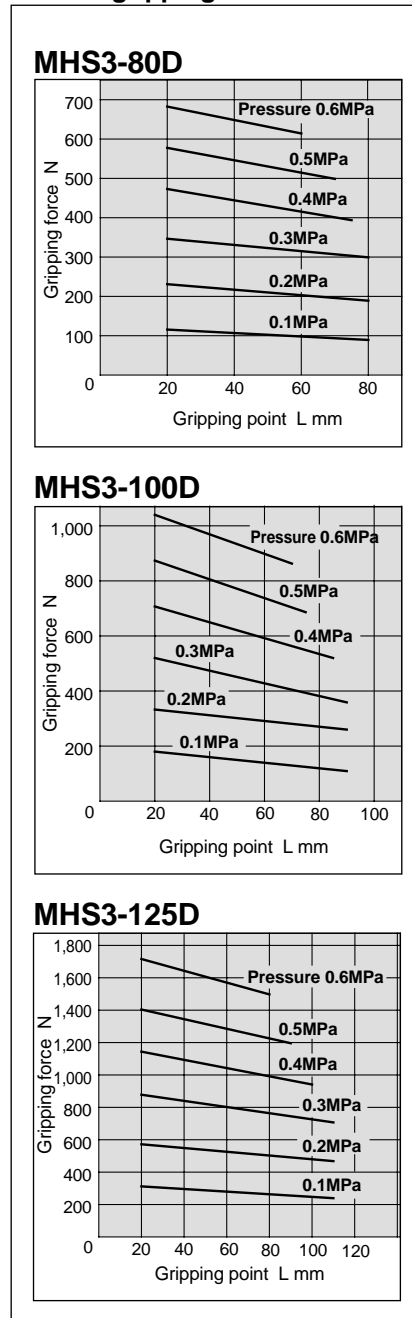
MHS3-63D



External gripping force



Internal gripping force

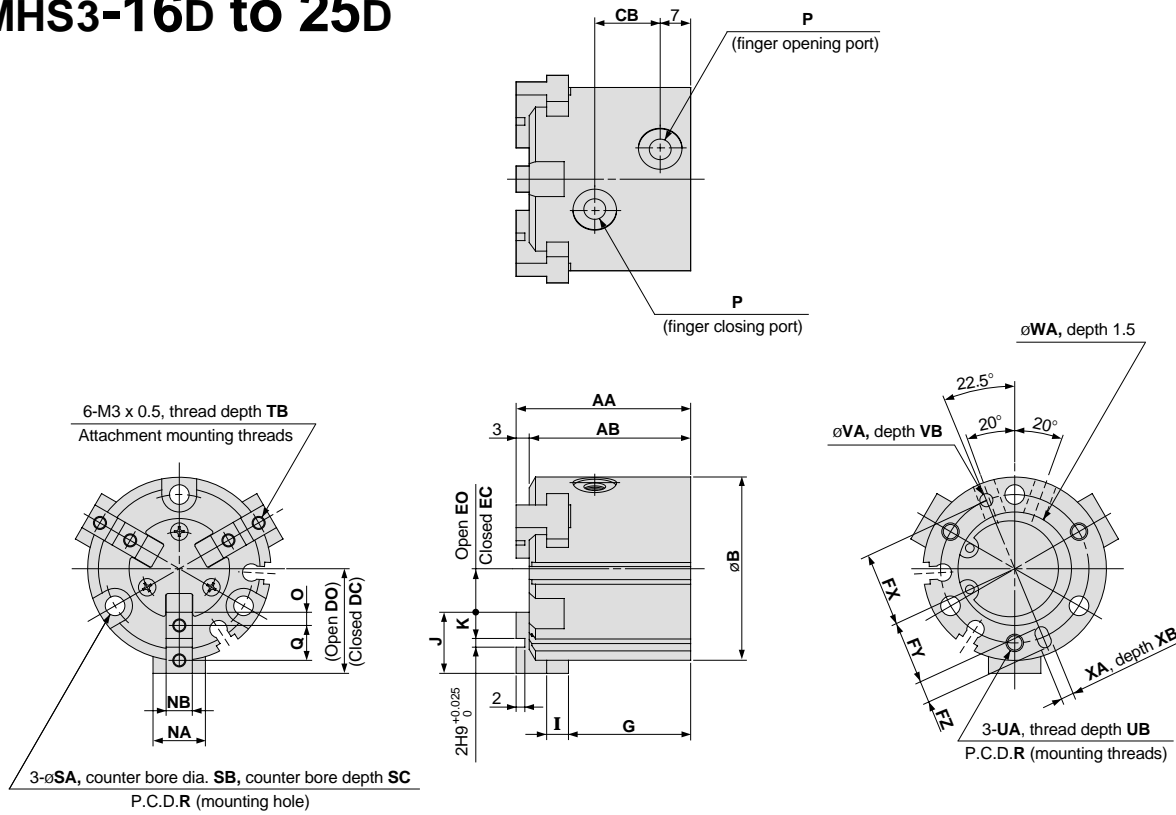


Note: 1N = 0.2248lbr
 1in = 25.4mm
 1MPa = 145psi

Dimensions (mm)

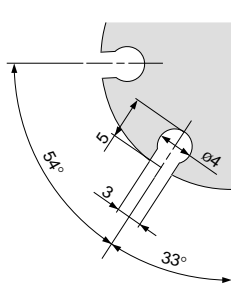
1 in = 25.4mm

MHS3-16D to 25D

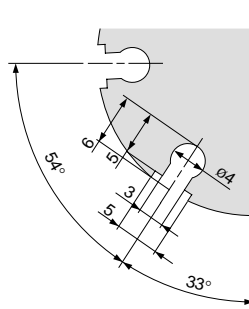


Auto switch mounting groove positions (2 locations)

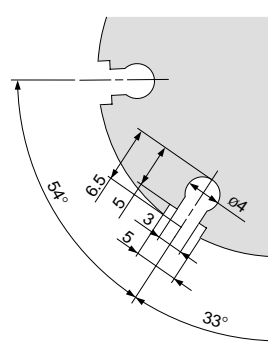
MHS3-16D



MHS3-20D



MHS3-25D



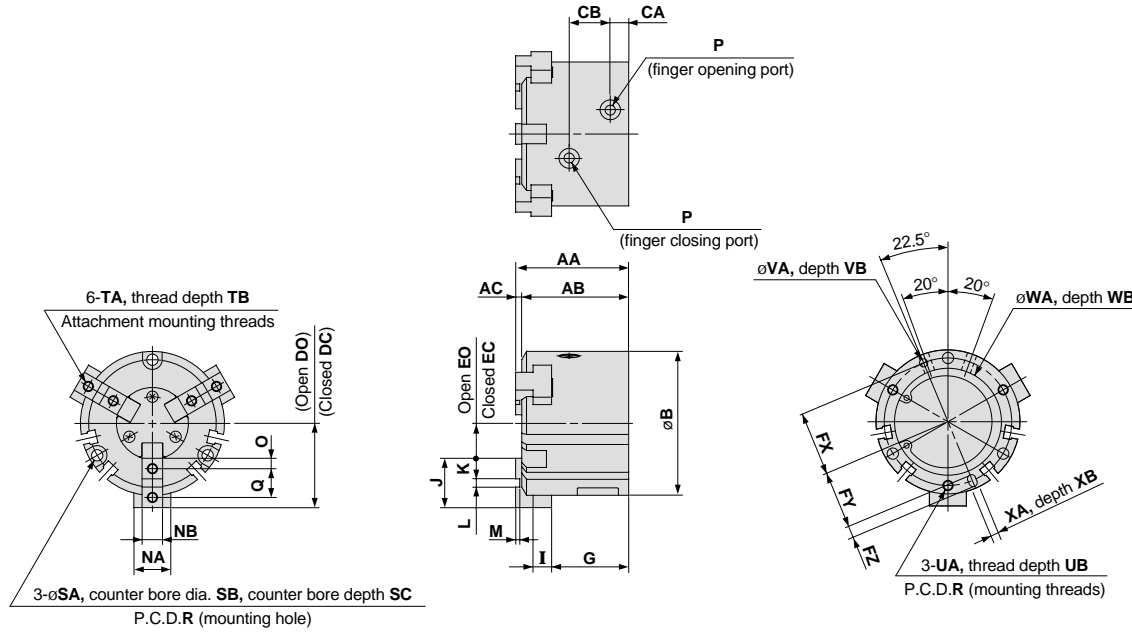
Model	AA	AB	B	CB	DC	DO	EC	EO	FX	FY	FZ	G	I	J	K	NA	NB	O	P	Q	R
MHS3-16D	35	32	30	11	15	17	5	7	12.5	11	3	25	4	10	4	8	5h9 ₀ ^{-0.030}	2	M3 x 0.5	6	25
MHS3-20D	38	35	36	13	18	20	6	8	14.5	13	3	27	5	12	5	10	6h9 ₀ ^{-0.030}	2.5	M5 x 0.8	7	29
MHS3-25D	40	37	42	15	21	24	7	10	17	14.5	5	28	5	14	6	12	6h9 ₀ ^{-0.030}	3	M5 x 0.8	8	34

Model	SA	SB	SC	TB	UA	UB	VA	VB	WA	XA	XB
MHS3-16D	3.4	6.5	8	5	M3 x 0.5	4.5	2H9 ₀ ^{+0.025}	2	17H9 ₀ ^{+0.043}	2H9 ₀ ^{+0.025}	2
MHS3-20D	3.4	6.5	9.5	6	M3 x 0.5	6	2H9 ₀ ^{+0.025}	2	21H9 ₀ ^{+0.052}	2H9 ₀ ^{+0.025}	2
MHS3-25D	4.5	8	10	6	M4 x 0.7	6	3H9 ₀ ^{+0.025}	3	26H9 ₀ ^{+0.052}	3H9 ₀ ^{+0.025}	3

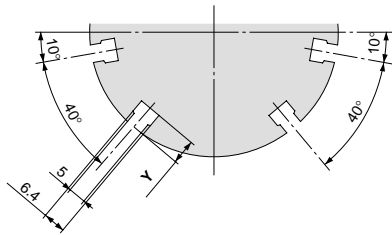
Dimensions (mm)

1in = 25.4mm

MHS3-32D to 80D



Auto switch mounting groove positions (4 locations)



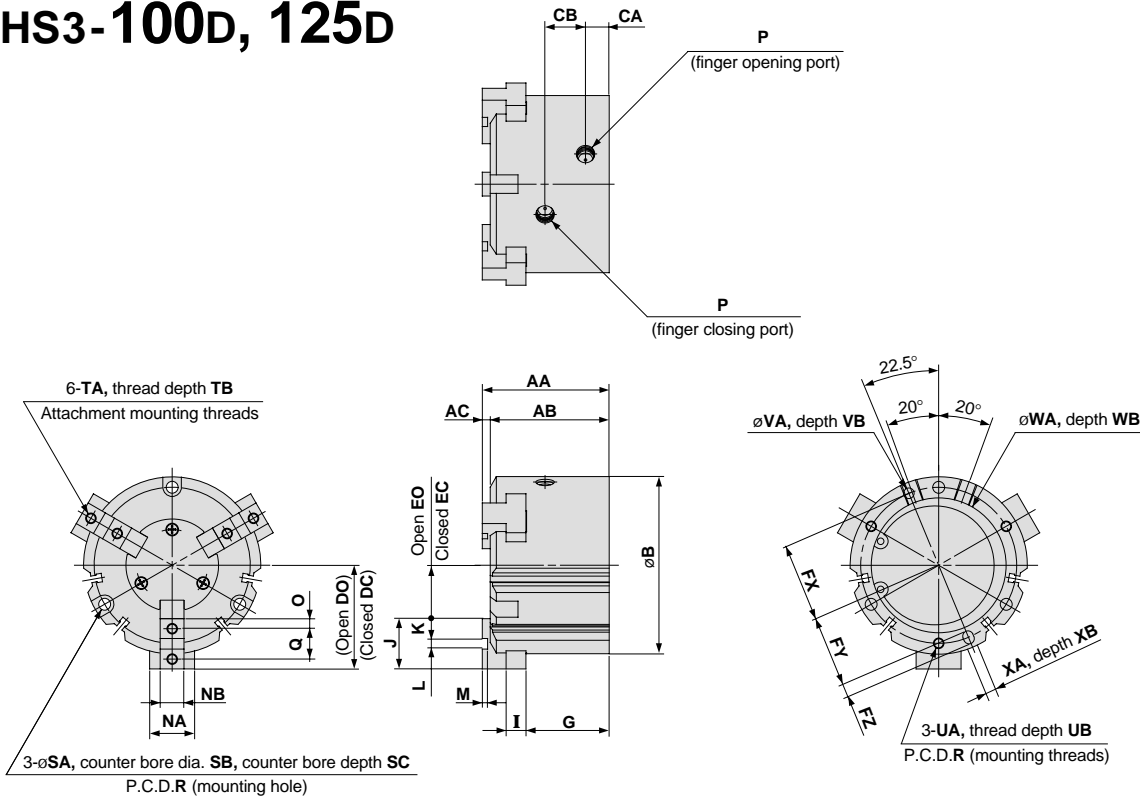
Model	AA	AB	AC	B	CA	CB	DC	DO	EC	EO	FX	FY	FZ	G	I	J	K	L	M	NA	NB
MHS3-32D	44	41	3	52	8	16	28	32	8	12	22	19.5	5	30.5	6	20	9	2H9 ^{+0.025} ₀	2	14	8h9 ⁰ _{-0.036}
MHS3-40D	47	44	3	62	9	17	31	35	10	14	26.5	23.5	6	32	7	21	9	3H9 ^{+0.025} ₀	2	16	8h9 ⁰ _{-0.036}
MHS3-50D	55	52	3	70	9	20	35	41	11	17	31	28	6	37.5	9	24	10	4H9 ^{+0.030} ₀	2	18	10h9 ⁰ _{-0.036}
MHS3-63D	66	62	4	86	12	22	43	51	15	23	38	34.5	7	44	11	28	11	6H9 ^{+0.030} ₀	3	24	12h9 ⁰ _{-0.043}
MHS3-80D	82	77	5	106	13.5	27	53.5	63.5	21.5	31.5	47.5	43.5	8	56	12	32	12	8H9 ^{+0.036} ₀	4	28	14h9 ⁰ _{-0.043}

Model	O	P	Q	R	SA	SB	SC	TA	TB	UA	UB	VA	VB	WA	WB	XA	XB	Y
MHS3-32D	4.5	M5 x 0.8	11	44	4.5	8	9	M4 x 0.7	8	M4 x 0.7	6	3H9 ^{+0.025} ₀	3	34H9 ^{+0.062} ₀	2	3H9 ^{+0.025} ₀	3	6
MHS3-40D	4.5	M5 x 0.8	12	53	5.5	9.5	9	M4 x 0.7	8	M5 x 0.8	7.5	4H9 ^{+0.030} ₀	4	42H9 ^{+0.062} ₀	2	4H9 ^{+0.030} ₀	4	8
MHS3-50D	5	M5 x 0.8	14	62	5.5	9.5	12	M5 x 0.8	10	M5 x 0.8	10	4H9 ^{+0.030} ₀	4	52H9 ^{+0.074} ₀	2	4H9 ^{+0.030} ₀	4	7
MHS3-63D	5.5	M5 x 0.8	17	76	6.6	11	14	M5 x 0.8	10	M6 x 1	9	5H9 ^{+0.030} ₀	5	65H9 ^{+0.074} ₀	2.5	5H9 ^{+0.030} ₀	5	7.5
MHS3-80D	6	Rc 1/8	20	95	6.6	11	19	M6 x 1	12	M6 x 1	12	6H9 ^{+0.030} ₀	6	82H9 ^{+0.087} ₀	3	6H9 ^{+0.030} ₀	6	8

Dimensions (mm)

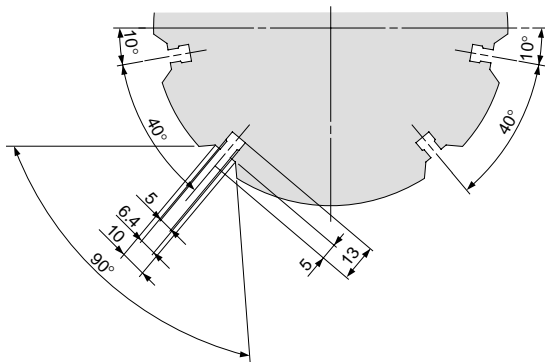
1in = 25.4mm

MHS3-100D, 125D

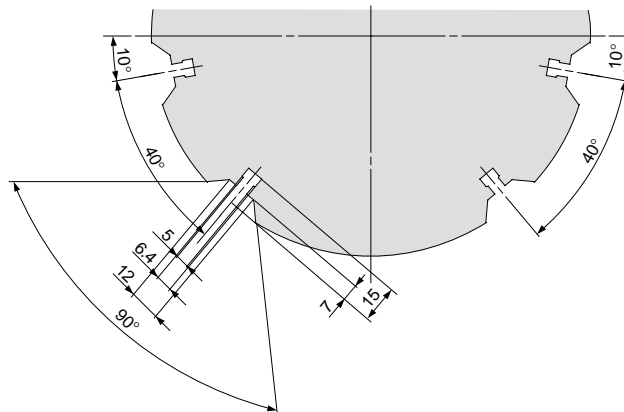


Auto switch mounting groove positions (4 locations)

MHS3-100D



MHS3-125D



(mm)

Model	AA	AB	AC	B	CA	CB	DC	DO	EC	EO	FX	FY	FZ	G	I	J	K	L	M	NA	NB
MHS3-100D	96	90	6	134	18	30.6	66	78	28	40	59	54	10	63	15	38	15	8H9 ^{+0.036} ₀	4	34	18h9 ⁰ _{-0.043}
MHS3-125D	122	114	8	166	23.5	38	82	98	30	46	74	68	12	84	18	52	21	10H9 ^{+0.036} ₀	6	40	22h9 ⁰ _{-0.052}
Model	O	P	Q	R	SA	SB	SC	TA	TB	UA	UB	VA	VB	WA	WB	XA	XB				
MHS3-100D	7.5	Rc 1/4	23	118	9	14	21	M8 x 1.25	16	M8 x 1.25	16	8H9 ^{+0.036} ₀	6	102H9 ^{+0.087} ₀	4	8H9 ^{+0.036} ₀	6				
MHS3-125D	10.5	Rc 3/8	31	148	11	17.5	34	M10 x 1.5	20	M10 x 1.5	20	10H9 ^{+0.036} ₀	8	130H9 ^{+0.100} ₀	6	10H9 ^{+0.036} ₀	8				