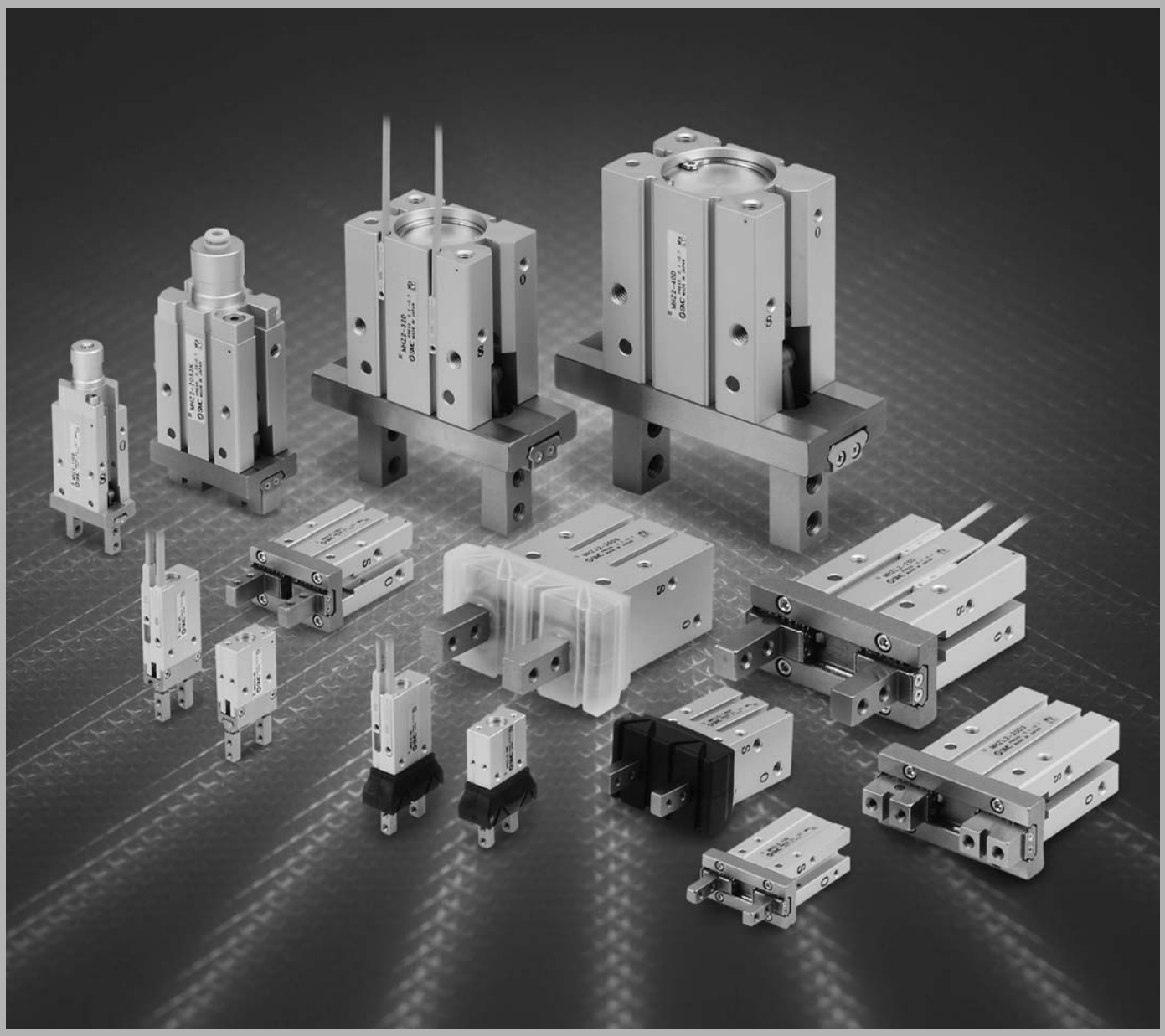
Parallel Style Air Gripper

Series MHZ

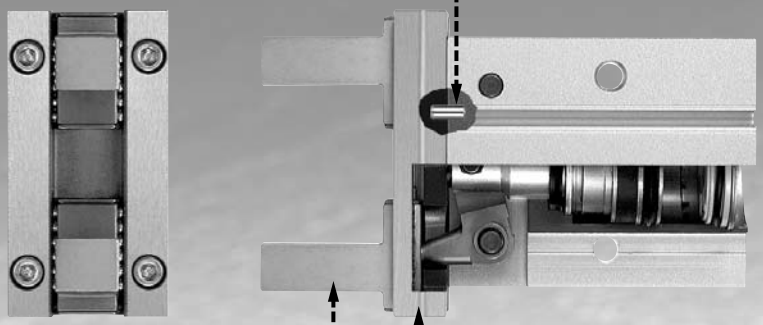


Integral linear guide used for high rigidity

• Linear guide slippage prevention

Guide slippage is prevented by two positioning dowel pins.

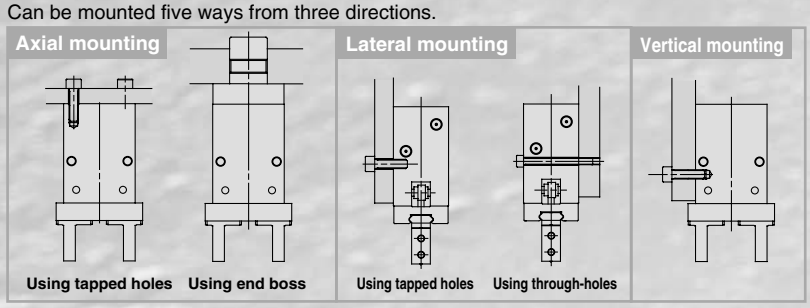
• Repeatability: ±0.01 mm



• Martensitic stainless steel

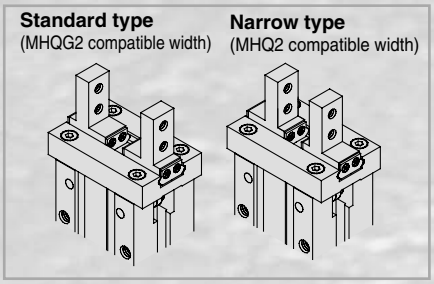
High degree of mounting flexibility

Can be mounted five ways from three directions.



Finger positions can be selected.

(Standard type/MHZ2)



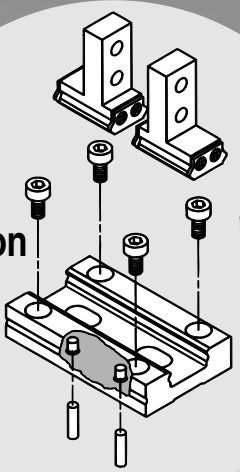
Series Variations

Series	Bore size (mm)	Action	Body option: Basic type: Side ported	Body option: End boss type: Side ported	Body option: End boss type: With One-touch fitting for coaxial tubing	Body option: End boss type: With One-touch fitting	Body option: End boss type: With M3 port	Body option: End boss type: With M5 port	Body option: End boss type: With hose nipple	Finger option: Basic type (tapped in open/close direction)	Finger option: Side tapped	Finger option: Through-holes in open/close direction	Finger option: Flat type finger
Compact series													
Standard MHZA2-6	6	Double acting Single acting (Normally open) Single acting (Normally closed)	●	●	●	●	●	●	●	●	●	●	●
With dust cover MHZAJ2-6	6	Double acting Single acting (Normally open) Single acting (Normally closed)	●	●	●	●	●	●	●				
Standard MHZ2	6	Double acting Single acting (Normally open) Single acting (Normally closed)	●	●	●	●	●	●	●	●	●	●	●
	10, 16 20, 25	Double acting Single acting (Normally open) Single acting (Normally closed)	●	●	●	●	●	●	●	●	●	●	●
	32, 40	Double acting Single acting (Normally open) Single acting (Normally closed)	●	●		●	●	●	●	●	●	●	●
Long stroke MHZL2	10, 16 20, 25	Double acting Single acting (Normally open) Single acting (Normally closed)	●	●	●	●	●	●	●	●	●	●	●
With dust cover MHZJ2	6	Double acting Single acting (Normally open) Single acting (Normally closed)	●	●	●	●	●	●	●				
	10, 16 20, 25	Double acting Single acting (Normally open) Single acting (Normally closed)	●	●	●	●	●	●	●				

and high precision

- **Body thickness tolerance: ±0.05 mm**
- **No guide protrusion in direction of body thickness**
- **Improved remounting accuracy**
  Positioning dowel pin holes provided
- **Top mounting centering location**
  Mounting is more secure with a depth 0.5 to 2 mm greater than conventional types.

Integral guide rail construction



Accommodates diverse workpiece diameters with a single unit

- Nearly double the standard stroke
- Long stroke are also compact and lightweight

Long stroke
MHZL2

Series	Opening/Closing stroke (mm) (Open-Closed)	Mass (g)	Body thickness (mm)
MHZL2-10	8 (4)	60	16.4
MHZL2-16	12 (6)	135	23.6
MHZL2-20	18 (10)	270	27.6
MHZL2-25	22 (14)	470	33.6

Values inside ( ) are for standard series MHZ2.

A wide variety of types and broad size variations

Compact series (without auto switch)

ø6

Standard

ø6

ø10 to ø25

ø32, ø40

With dust cover
ø10 to ø25

ø6

Long stroke
ø10 to ø25

Series MHZ
Model Selection

Model Selection

Selection Procedure

Step 1 Confirm gripping force → **Step 2** Confirm gripping point → **Step 3** Confirm external force on fingers

Step 1 Confirmation of Gripping Force

Confirmation of conditions → Calculation of required gripping force → Selection of model from gripping force graph

Example

Workpiece mass: 0.1 kg

Gripping method: External gripping

Gripping point distance: L = 30 mm

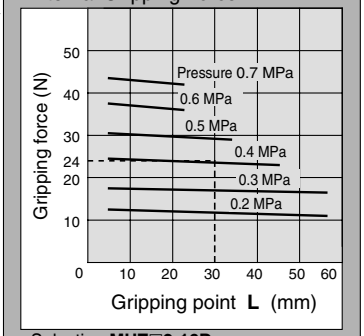
Operating pressure: 0.4 MPa

Guidelines for the selection of the gripper with respect to component mass

- Although conditions differ according to the work piece shape and the coefficient of friction between the attachments and the workpiece, select a model that can provide a gripping force of 10 to 20 times the workpiece weight, or more.
  Note) For further details, refer to the model selection illustration.
- If high acceleration, deceleration or impact forces are encountered during motion, a further margin of safety should be considered.

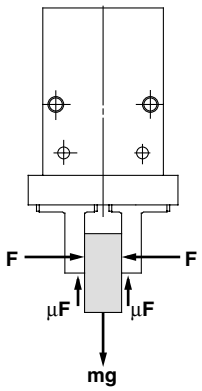
Example) When it is desired to set the gripping force at 20 times or more above the workpiece weight.
Required gripping force = 0.1 kg x 20 x 9.8 m/s^2 ≅ 19.6 N or more

MHZ□2-16
External Gripping Force



- Selecting **MHZ□2-16D**.
  A gripping force of 24 N is obtained from the intersection point of gripping point distance L = 30 mm and pressure of 0.4 MPa.
- The gripping force is 24.5 times greater than the workpiece mass, and therefore satisfies a gripping force setting value of 20 times or more.

Model Selection Illustration



When gripping a workpiece as in the figure to the left, and with the following definitions,
F: Gripping force (N)
μ: Coefficient of friction between the attachments and the workpiece
m: Workpiece mass (kg)
g: Gravitational acceleration (= 9.8 m/s^2)
mg: Workpiece weight (N)

the conditions under which the workpiece will not drop are

$$\underset{\text{Number of fingers}}{\underline{2}} \times \mu F > mg$$

and therefore,

$$F > \frac{mg}{2 \times \mu}$$

With **"a"** representing the extra margin, **"F"** is determined by the following formula:

$$F = \frac{mg}{2 \times \mu} \times a$$

"Gripping force at least 10 to 20 times the workpiece weight"

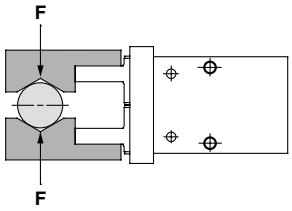
The "10 to 20 times or more of the workpiece weight" recommended by SMC is calculated with a safety margin of a = 4, which allows for impacts that occur during normal transportation, etc.

When μ = 0.2	When μ = 0.1
$F = \frac{mg}{2 \times 0.2} \times 4$	$F = \frac{mg}{2 \times 0.1} \times 4$
$= 10 \times mg$	$= 20 \times mg$
10 x Workpiece weight	20 x Workpiece weight

Note) • Even in cases where the coefficient of friction is greater than μ = 0.2, for reasons of safety, select a gripping force which is at least 10 to 20 times greater than the workpiece weight, as recommended by SMC.
• If high acceleration, deceleration or impact forces are encountered during motion, a further margin of safety should be considered.

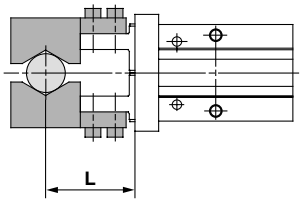
Step 1 Effective Gripping Force: Series MHZ□2/Double Acting/External Gripping Force

• Indication of effective gripping force
The effective gripping force shown in the graphs to the right is expressed as F, which is the thrust of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.



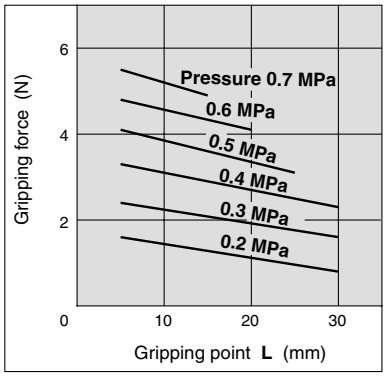
External Grip

MHZA2, MHZ2, MHZL2

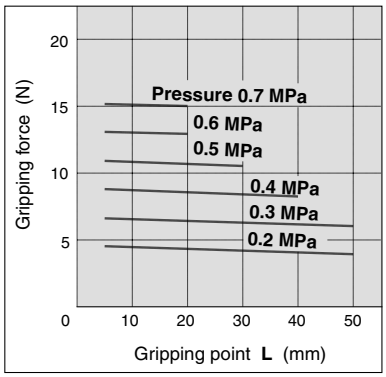


External Gripping Force

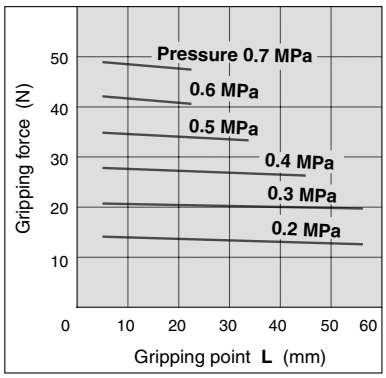
MHZ2-6D/MHZA2-6D



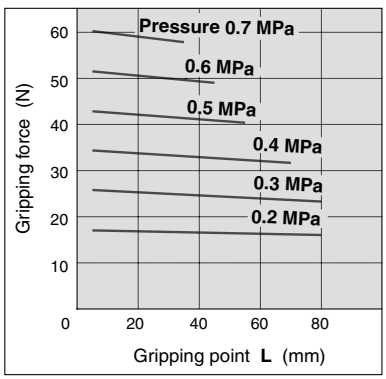
MHZ2-10D/MHZL2-10D



MHZ2-16D/MHZL2-16D

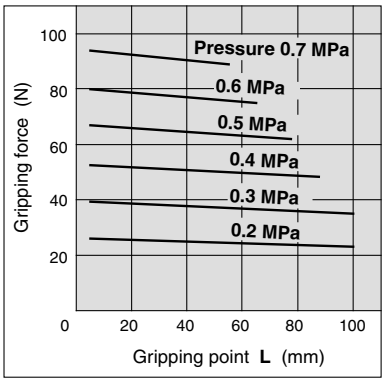


MHZ2-20D/MHZL2-20D

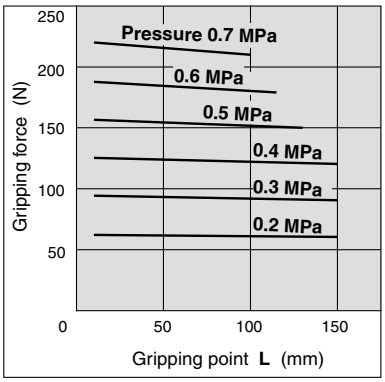


External Gripping Force

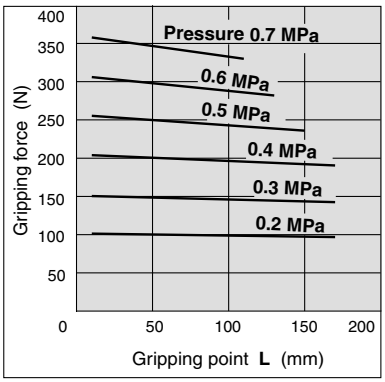
MHZ2-25D/MHZL2-25D



MHZ2-32D



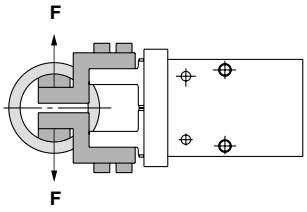
MHZ2-40D



Model Selection

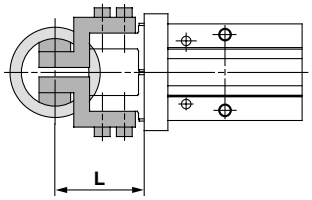
Step 1 Effective Gripping Force: Series MHZ□2/Double Acting/Internal Gripping Force

• Indication of effective gripping force
The effective gripping force shown in the graphs to the right is expressed as F, which is the thrust of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.



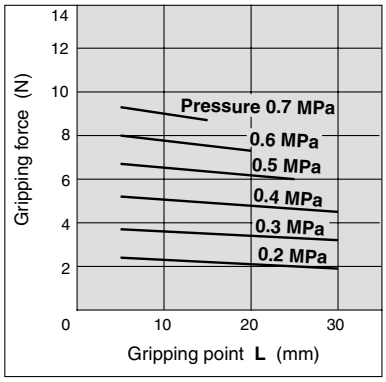
Internal Grip

MHZA2, MHZ2, MHZL2

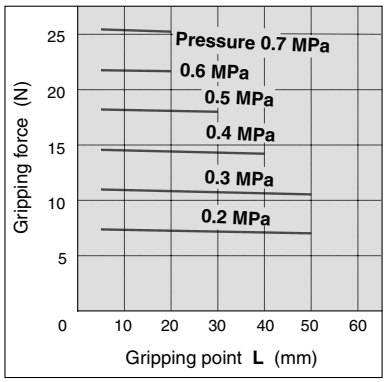


Internal Gripping Force

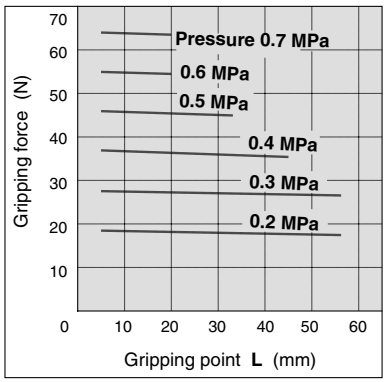
MHZ2-6D/MHZA2-6D



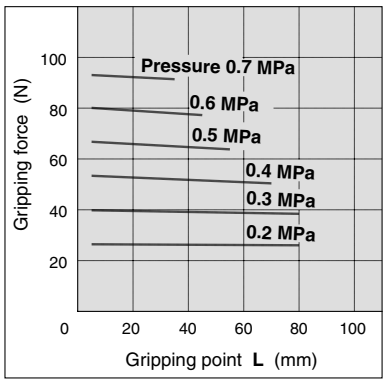
MHZ2-10D/MHZL2-10D



MHZ2-16D/MHZL2-16D

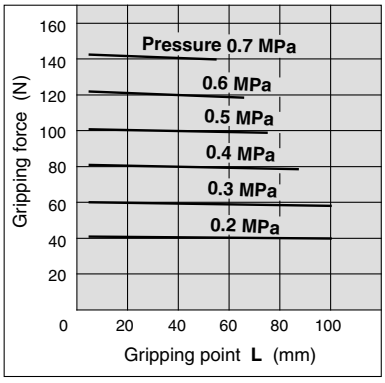


MHZ2-20D/MHZL2-20D

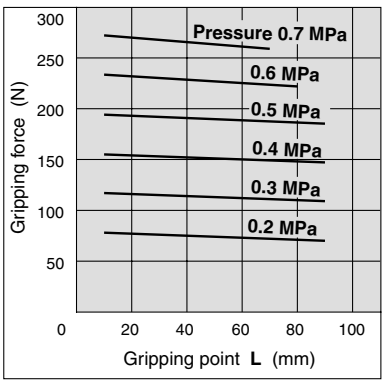


Internal Gripping Force

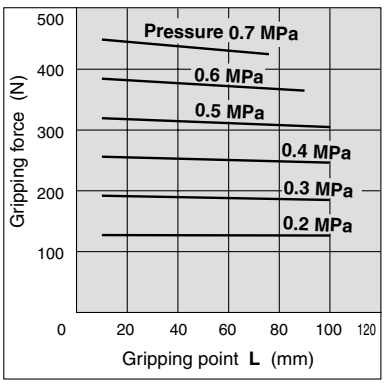
MHZ2-25D/MHZL2-25D



MHZ2-32D



MHZ2-40D



Step 1 Effective Gripping Force: Series MHZ□2/Single Acting/External Gripping Force

• Indication of effective gripping force
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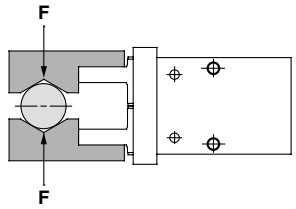
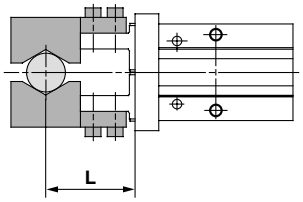


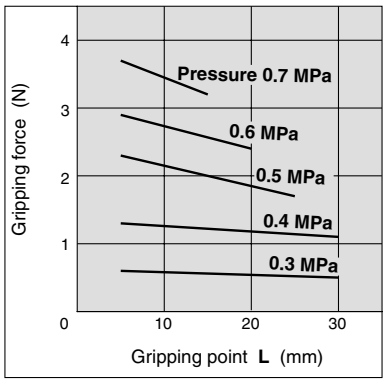
External Grip

MHZA2, MHZ2, MHZL2

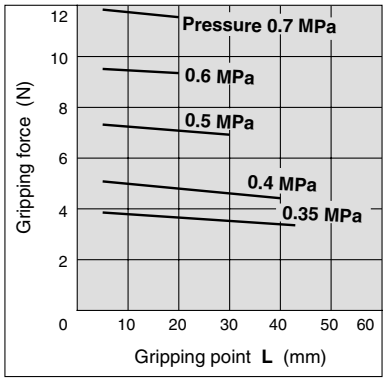


External Gripping Force

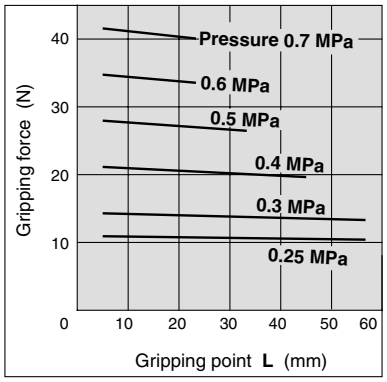
MHZ2-6S/MHZA2-6S



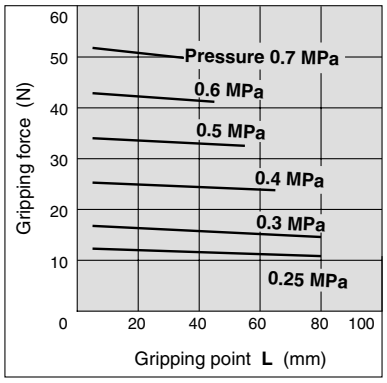
MHZ2-10S/MHZL2-10S



MHZ2-16S/MHZL2-16S

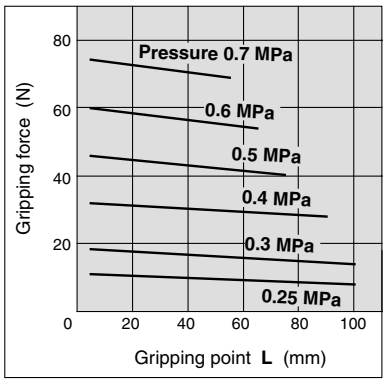


MHZ2-20S/MHZL-20S

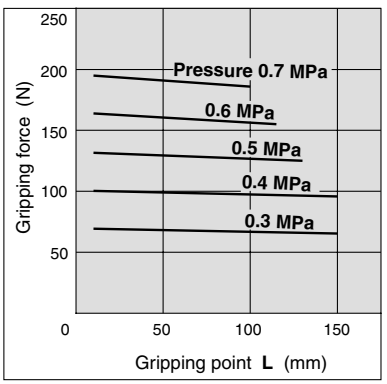


External Gripping Force

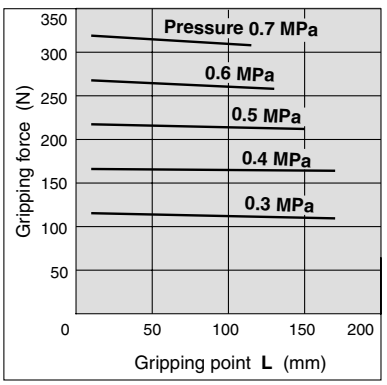
MHZ2-25S/MHZL2-25S



MHZ2-32S



MHZ2-40S



Model Selection

Step 1 Effective Gripping Force: Series MHZ□2/Single Acting/Internal Gripping Force

• Indication of effective gripping force
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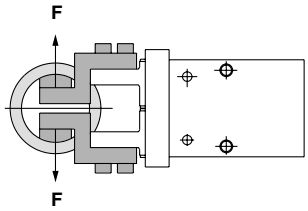
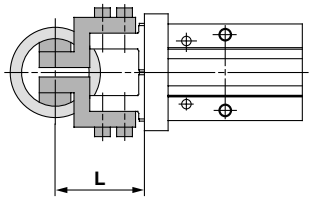


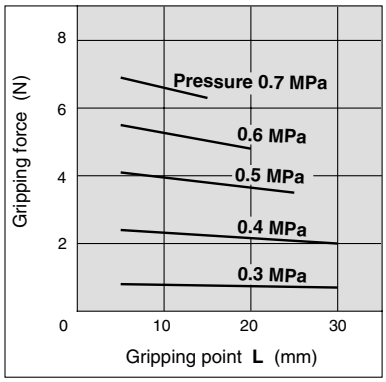
Internal Grip

MHZA2, MHZ2, MHZL2

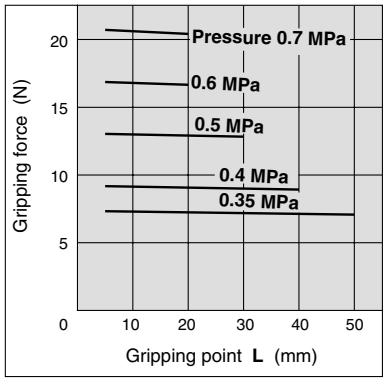


Internal Gripping Force

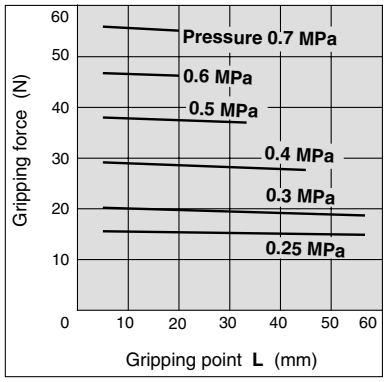
MHZ2-6C/MHZA2-6C



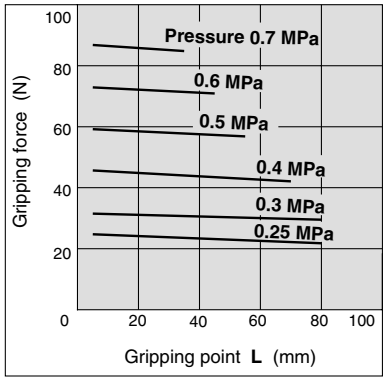
MHZ2-10C/MHZL2-10C



MHZ2-16C/MHZL2-16C

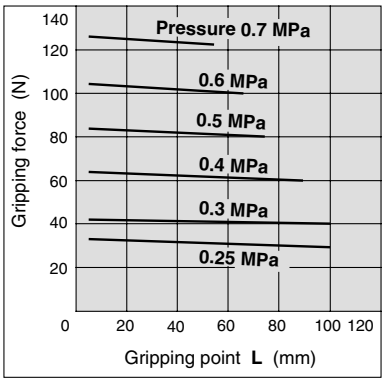


MHZ2-20C/MHZL2-20C

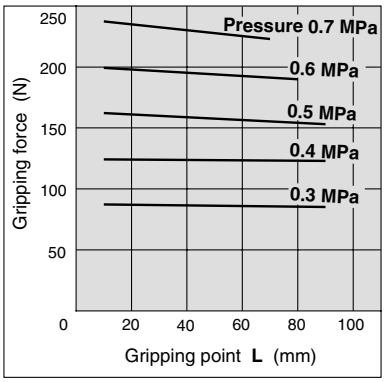


Internal Gripping Force

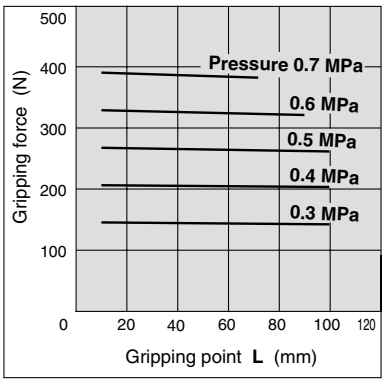
MHZ2-25C/MHZL2-25C



MHZ2-32C

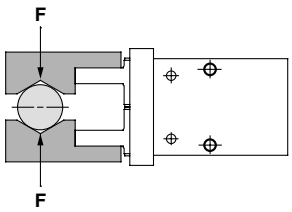


MHZ2-40C



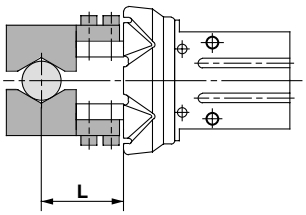
Step 1 Effective Gripping Force: Series MHZ□2/Double Acting/External Gripping Force

• Indication of effective gripping force
The effective gripping force shown in the graphs to the right is expressed as F, which is the thrust of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.



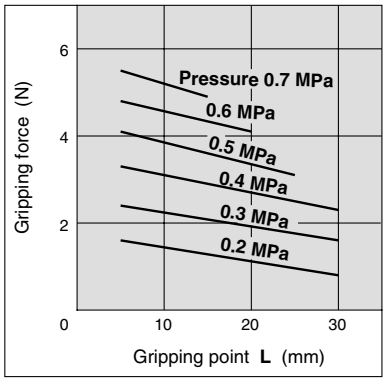
External Grip

MHZAJ2, MHZJ2, 11-MHZ2

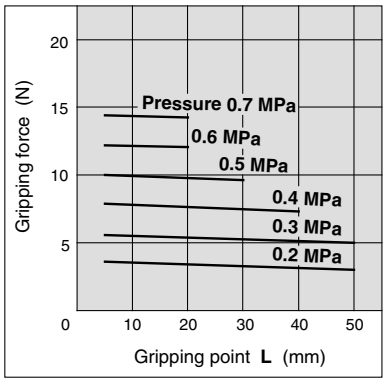


External Gripping Force

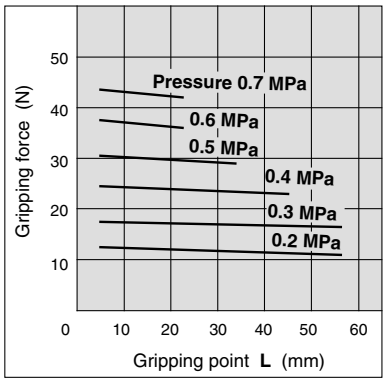
MHZJ2-6D/MHZAJ2-6D



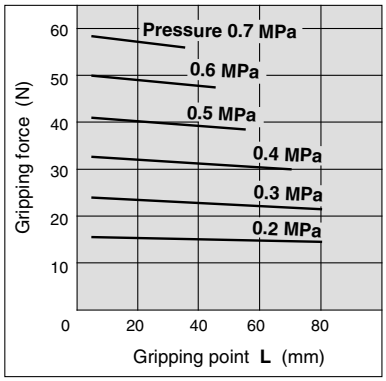
MHZJ2-10D/11-MHZ2-10D



MHZJ2-16D/11-MHZ2-16D

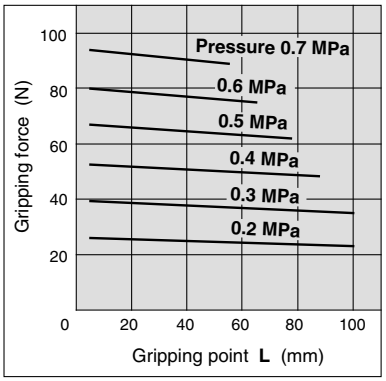


MHZJ2-20D/11-MHZ2-20D



External Gripping Force

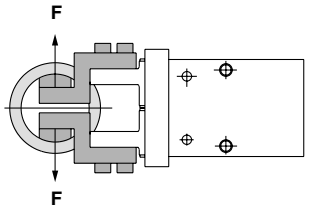
MHZJ2-25D/11-MHZ2-25D



Model Selection

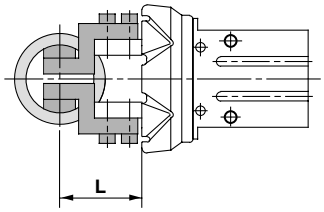
Step 1 Effective Gripping Force: Series MHZ□2/Double Acting/Internal Gripping Force

• Indication of effective gripping force
The effective gripping force shown in the graphs to the right is expressed as F, which is the thrust of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.



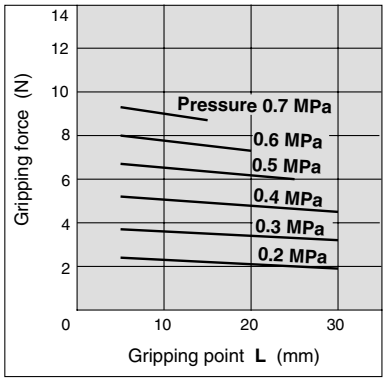
Internal Grip

MHZAJ2, MHZJ2, 11-MHZ2

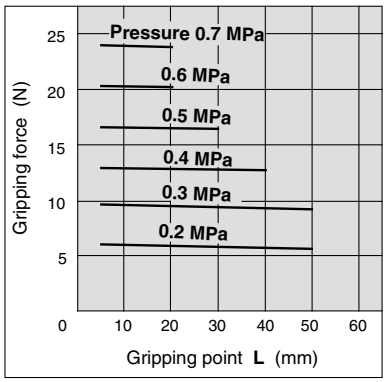


Internal Gripping Force

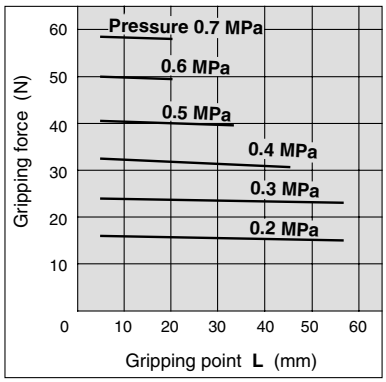
MHZJ2-6D/MHZAJ2-6D



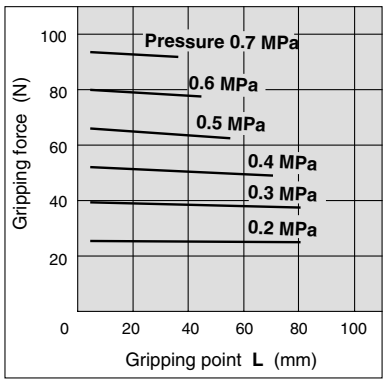
MHZJ2-10D/11-MHZ2-10D



MHZJ2-16D/11-MHZ2-16D



MHZJ2-20D/11-MHZ2-20D



Internal Gripping Force

MHZJ2-25D/11-MHZ2-25D