

Electric Grippers

Series LEH



Step Motor (Servo/24 VDC)

- **With drop prevention function**
(Self-lock mechanism is provided for all series.)
Gripping force of the workpieces is maintained when stopped or restarted. The workpieces can be removed with manual override.
- **Compact body sizes and long stroke variations**
Gripping force equivalent to the widely used air grippers is available.
- **Possible to set position, speed and force.** (64 points)

Z Type (2 fingers) ▶Page 423

Compact and light, various gripping forces

Series LEHZ

Size	Stroke/ both sides [mm]	Gripping force [N]	
		Basic	Compact
10	4	6 to 14	2 to 6
16	6		3 to 8
20	10	16 to 40	11 to 28
25	14		
32	22	52 to 130	—
40	30	84 to 210	—

- **Energy-saving product**
Power consumption reduced by self-lock mechanism.

- **With gripping check function**
Identify workpieces with different dimensions/detect mounting and removal of the workpieces.

ZJ Type (2 fingers) ▶Page 437

With dust cover (Equivalent to IP50)
3 types of cover material (Finger portion only)

The image displays four pneumatic grippers of the LEHZJ series, arranged in two rows. The top row shows two grippers: a larger one on the left and a smaller one on the right. The bottom row shows two more grippers, also of different sizes, with their respective cables. The grippers are white with black accents and have a compact, rectangular design. The cables are white and feature a standard industrial connector.

Series *LEHZJ*

Size	Stroke/ both sides [mm]	Gripping force [N]	
		Basic	Compact
10	4	6 to 14	3 to 6
16	6		4 to 8
20	10	16 to 40	11 to 28
25	14		

F Type (2 fingers) ▶Page 449

Can hold various types of workpieces with a long stroke.

Series LEHF

Size	Stroke/ both sides [mm]	Gripping force [N]
10	16 (32)	3 to 7
20	24 (48)	11 to 28
32	32 (64)	48 to 120
40	40 (80)	72 to 180

(): Long stroke

S Type (3 fingers) ▶Page 462

Can hold round workpieces.

Series LEHS

Size	Stroke/ both sides [mm]	Gripping force [N]	
		Basic	Compact
10	4	2.2 to 5.5	1.4 to 3.5
20	6	9 to 22	7 to 17
32	8	36 to 90	—
40	12	52 to 130	—

Step Motor (Servo/24 VDC) Controller/Driver

▶Step data input type Series LECP6

- 64 points positioning
- Input using controller setting kit or teaching box



▶CC-Link direct input type Series LECPMJ*

* Not applicable to CE.



▶Programless type Series LECP1

- 14 points positioning
- Control panel setting



▶Pulse input type Series LECPA



▶Page 538

Electric Gripper 2-Finger Type

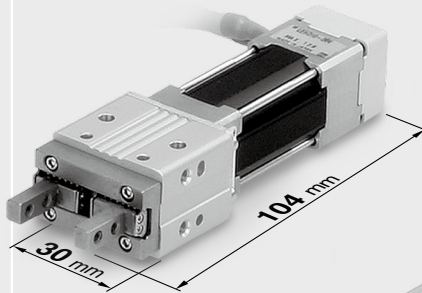
Series **LEHZ**/Size: 10, 16, 20, 25, 32, 40

Series **LEHZJ**/Size: 10, 16, 20, 25

Series **LEHF**/Size: 10, 20, 32, 40

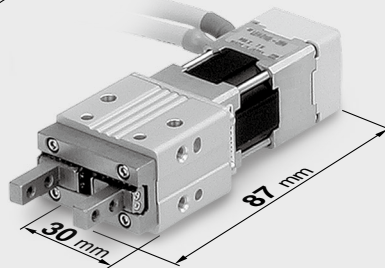
● Compact and lightweight Various gripping forces

Weight: **165 g**
(LEHZ10)



Compact

Weight: **135 g**
(LEHZ10L)

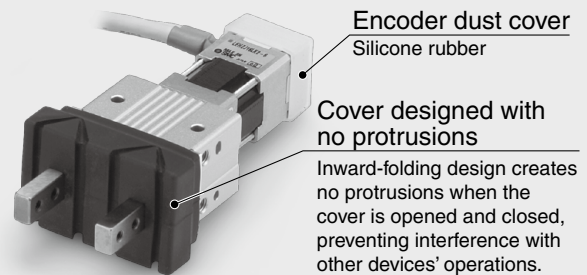


● Sealed-construction dust cover (Equivalent to IP50)

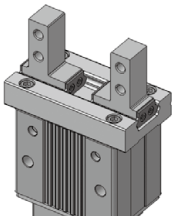
- Prevents machining chips, dust, etc., from getting inside
- Prevents spattering of grease, etc.

● 3 types of cover material (Finger portion only)

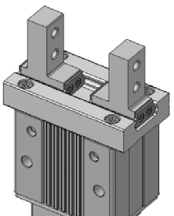
- Chloroprene rubber (black): Standard
- Fluororubber (black): Option
- Silicone rubber (white): Option



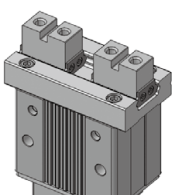
Finger options



Side tapped mounting



Through-hole in open/close direction

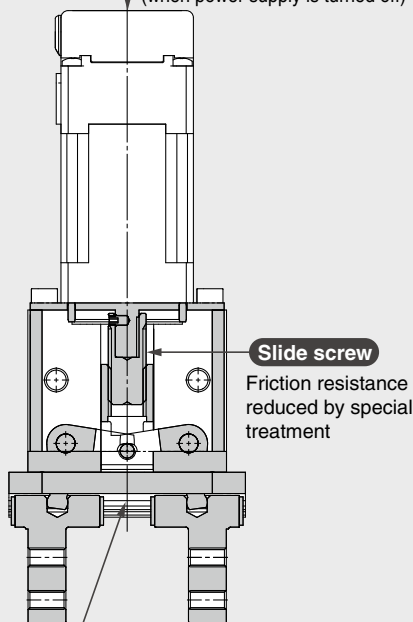


Flat fingers

Series LEHZ

Manual override screw

For opening and closing the fingers
(when power supply is turned off)

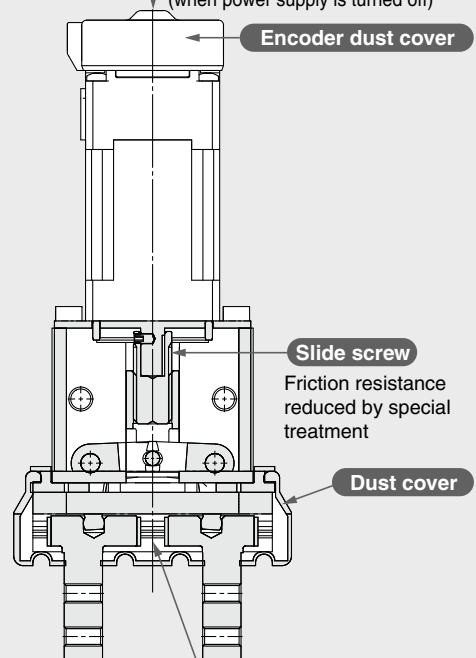


Linear guide

Series LEHZJ

Manual override screw

For opening and closing the fingers
(when power supply is turned off)



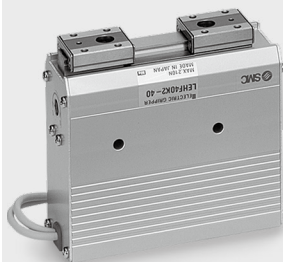
Linear guide

Electric Gripper 3-Finger Type

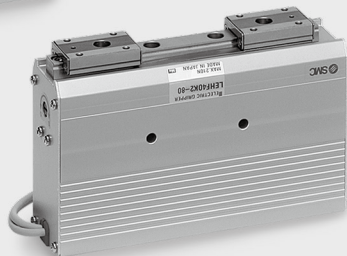
Series **LEHS**/Size: 10, 20, 32, 40

- Can hold various types of workpieces with a long stroke.

Stroke:
Max. **40** mm

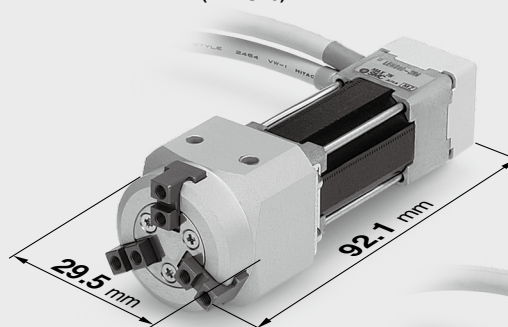


Long stroke
Stroke:
Max. **80** mm

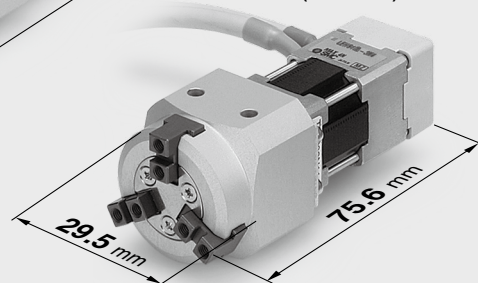


- Can hold round workpieces.

Weight: **185** g
(LEHS10)



Compact
Weight: **150** g
(LEHS10L)



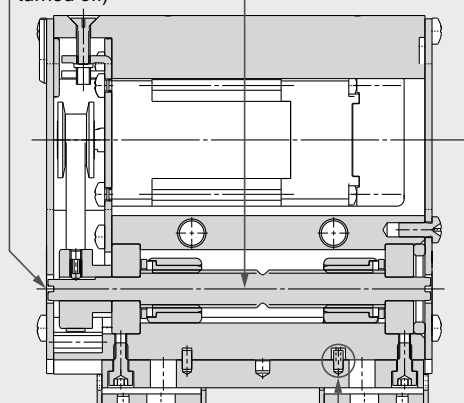
Series **LEHF**

Manual override screw/Both sides

For opening and closing the fingers (when power supply is turned off)

Slide screw

Friction resistance reduced by special treatment



Linear guide

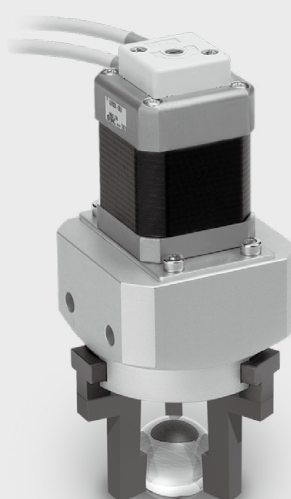
Linear guide misalignment prevention

Misalignment of the linear guide is prevented with 2 positioning pins.

Series **LEHS**

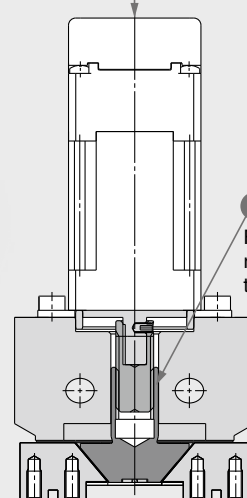
Manual override screw

For opening and closing the fingers (when power supply is turned off)



Slide screw

Friction resistance reduced by special treatment



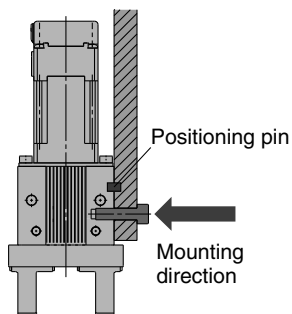
With wedge cam structure

Compact and large gripping force can be obtained through the wedge cam structure.

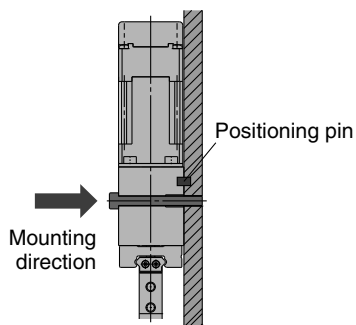
<Mounting Variations>

Series **LEHZ/LEHZJ**

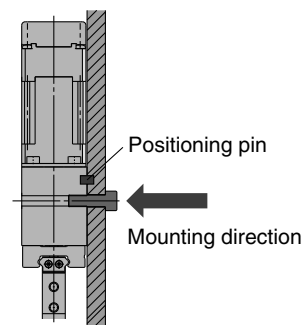
A When using the thread on the side of the body



B When using the thread on the mounting plate

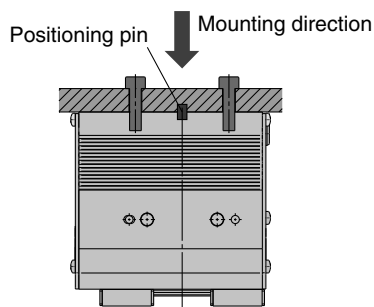


C When using the thread on the back of the body

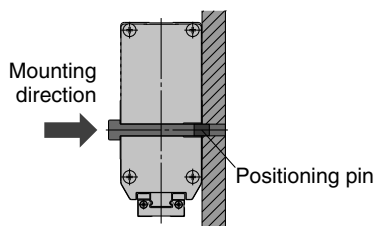


Series **LEHF**

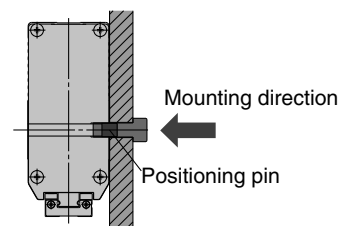
A When using the thread on the body



B When using the thread on the mounting plate

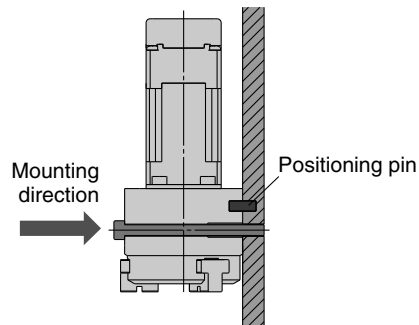


C When using the thread on the back of the body

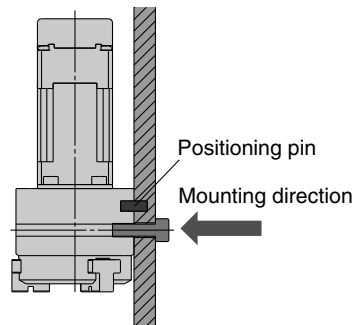


Series **LEHS**

A When using the thread on the mounting plate

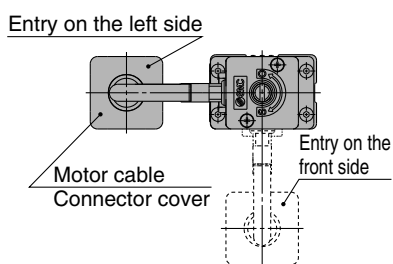


B When using the thread on the back of the body

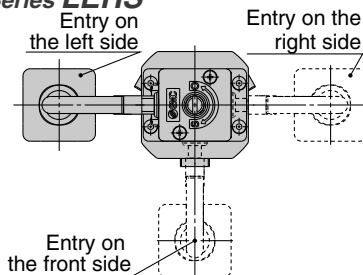


Motor cable mounting direction can be selected.

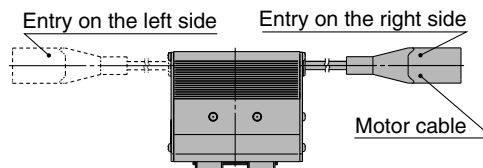
Series **LEHZ/LEHZJ**



Series **LEHS**

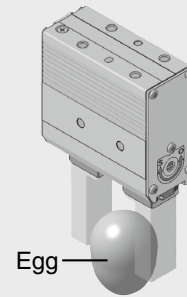
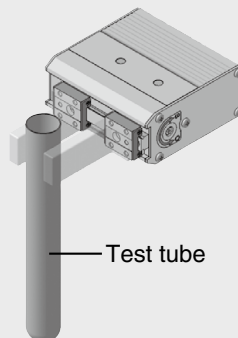
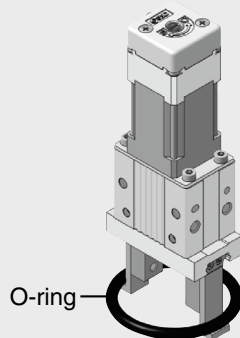


Series **LEHF**



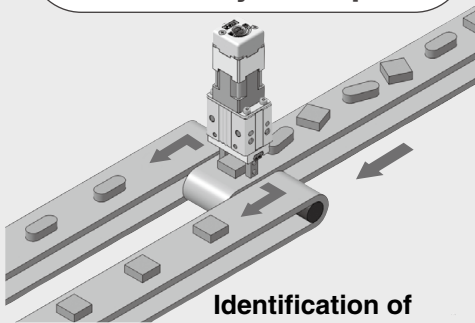
Application Examples

Gripping of components that are easily deformed or damaged



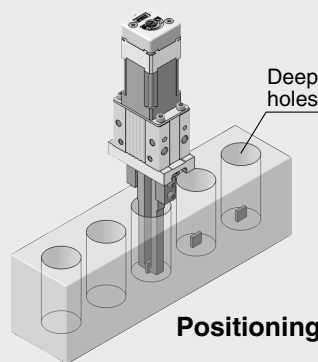
Speed and gripping force control and positioning

Alignment and selection of randomly lined parts

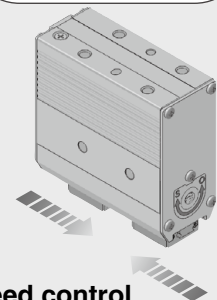


Identification of workpieces with different dimensions

Gripping in a narrow space

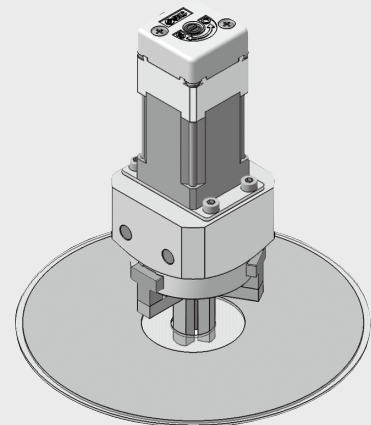
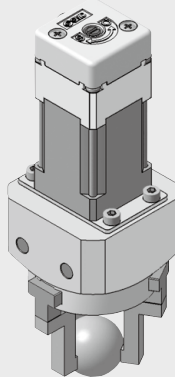
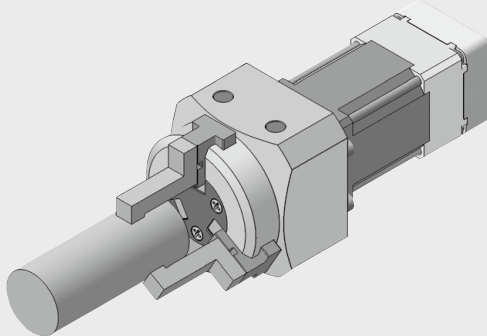


Soft touch/ High frequency



Speed control and positioning (Minimum stroke)

Gripping of cylindrical and spherical parts



Speed and gripping force control

LEFS
LEFBLEJS
LEJB

LEL

LEM

LEY
LEYGLES
LESHLEPY
LEPS

LER

LEH

LEY-X5

11-LEFS

11-LEJS

25A-

LEC□

LECS□

LECS-T

LECYM
LECYU

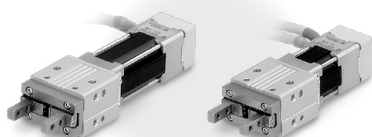
Motorless

LAT3

Step Motor (Servo/24 VDC)

Electric Gripper 2-Finger Type *Series LEHZ*

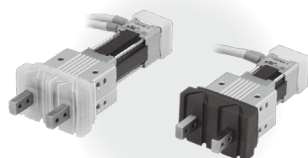
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How to Order	Page 429
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Construction	Page 432
Dimensions	Page 433
Finger Options	Page 436



Step Motor (Servo/24 VDC)

Electric Gripper 2-Finger Type/With Dust Cover *Series LEHZJ*

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Construction	Page 446
Dimensions	Page 447



Step Motor (Servo/24 VDC)

Electric Gripper 2-Finger Type *Series LEHF*

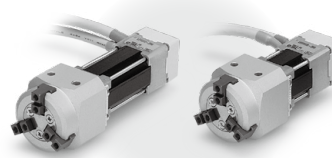
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Specifications	Page 455
Construction	Page 456
Dimensions	Page 457



Step Motor (Servo/24 VDC)

Electric Gripper 3-Finger Type *Series LEHS*

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How to Order	Page 465
Specifications	Page 467
Construction	Page 468
Dimensions	Page 469



Specific Product Precautions	Page 471
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Step Motor (Servo/24 VDC) Controller

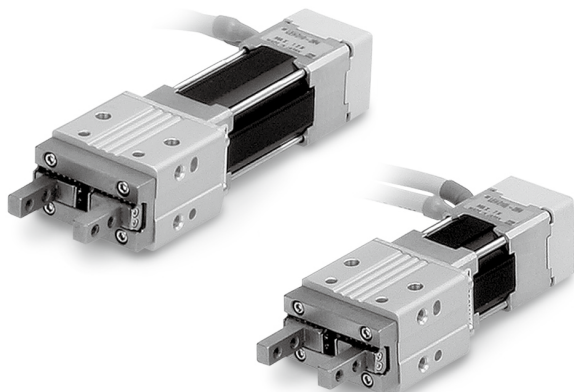


Step Data Input Type/ <i>Series LEC</i> P6	Page 551
Controller Setting Kit/ <i>LEC-W2</i>	Page 560
Teaching Box/ <i>LEC-T1</i>	Page 561
CC-Link Direct Input Type/ <i>Series LEC</i> PMJ	Page 591
Controller Setting Kit/ <i>LEC-W2</i>	Page 595
Teaching Box/ <i>LEC-T1</i>	Page 596
Gateway Unit/ <i>Series LEC-G</i>	Page 563
Programless Controller/ <i>Series LEC</i> P1	Page 567
Step Motor Driver/ <i>Series LEC</i> PA	Page 581
Controller Setting Kit/ <i>LEC-W2</i>	Page 588
Teaching Box/ <i>LEC-T1</i>	Page 589

Grippers

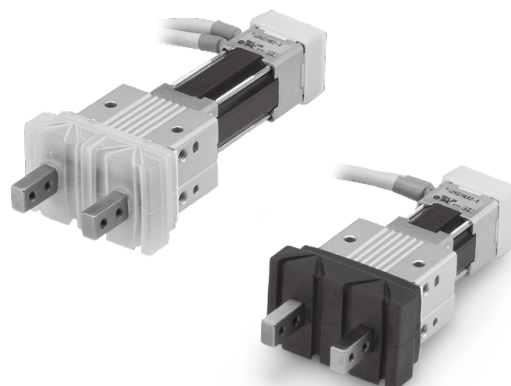
2-Finger Type Series LEHZ

Step Motor (Servo/24 VDC)



2-Finger Type/With Dust Cover Series LEHZJ

Step Motor (Servo/24 VDC)



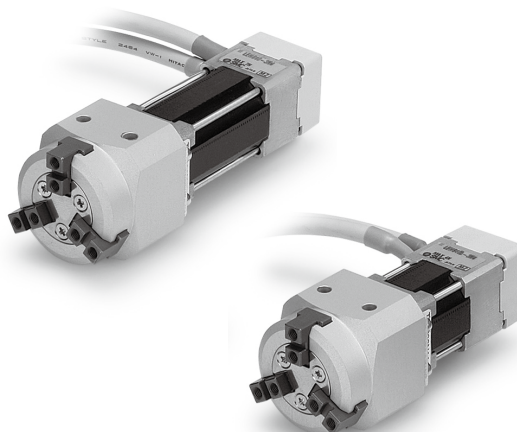
2-Finger Type Series LEHF

Step Motor (Servo/24 VDC)



3-Finger Type Series LEHS

Step Motor (Servo/24 VDC)



LEFS
LEFB

LEJS
LEJB

LEL

LEM

LEY
LEYG

LES
LESH

LEPY
LEPS

LER

LEH

LEY-X5

11-LEFS

11-LEJS

25A-

LEC□

LECS□

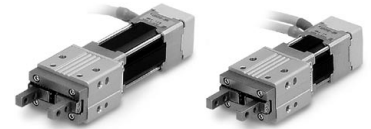
LECS-T

LECYM
LECYU

Motorless

LAT3

Model Selection



Series LEHZ ▶ Page 429

Selection Procedure



Step 1 Check the gripping force.



Example

Workpiece mass: 0.1 kg

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

- Although conditions differ according to the workpiece 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 ^{Note)} the workpiece weight, or more.

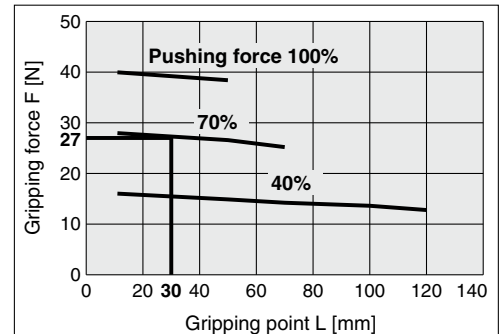
Note) For details, refer to the calculation of required gripping force.

- If high acceleration 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
 $= 0.1 \text{ kg} \times 20 \times 9.8 \text{ m/s}^2 \approx 19.6 \text{ N}$ or more

LEHZ20



When the LEHZ20 is selected.

- A gripping force of 27 N is obtained from the intersection point of gripping point distance $L = 30 \text{ mm}$ and pushing force of 70%.
- Gripping force is 27.6 times greater than the workpiece weight, and therefore satisfies a gripping force setting value of 20 times or more.

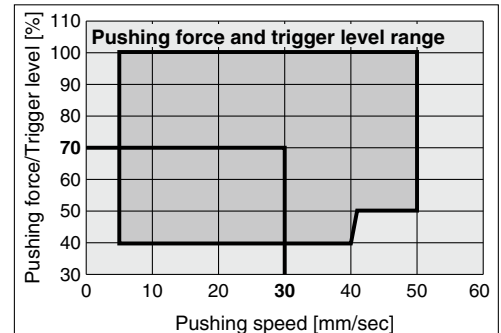
Pushing force: 70%

Pushing force is one of the values of step data that is input into the controller.

Gripping point distance: 30 mm

Pushing speed: 30 mm/sec

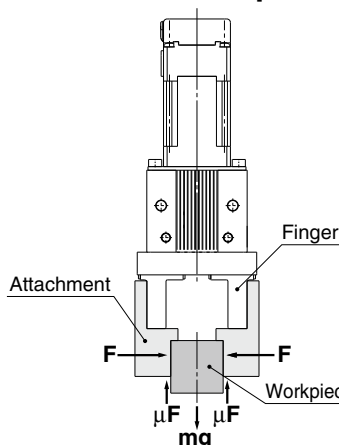
LEHZ20



- Pushing speed is satisfied at the point where 70% of the pushing force and 30 mm/sec of the pushing speed cross.

Note) Confirm the pushing speed range from the determined pushing force [%].

Calculation of required gripping force



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 ($= 9.8 \text{ m/s}^2$)

mg : Workpiece weight (N)

the conditions under which the workpiece will not drop are
 $2 \times \mu F > mg$

Number of fingers

and therefore, $F > \frac{mg}{2 \times \mu}$

With "a" representing the 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 margin of "a" = 4, which allows for impacts that occur during normal transportation, etc.

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

<Reference> Coefficient of friction μ (depends on the operating environment, contact pressure, etc.)

Coefficient of friction μ	Attachment – Material of workpieces (guideline)
0.1	Metal (surface roughness Rz3.2 or less)
0.2	Metal
0.2 or more	Rubber, Resin, etc.

Note) • Even in cases where the coefficient of friction is greater than $\mu = 0.2$, 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 or impact forces are encountered during motion, a further margin should be considered.

Selection Procedure

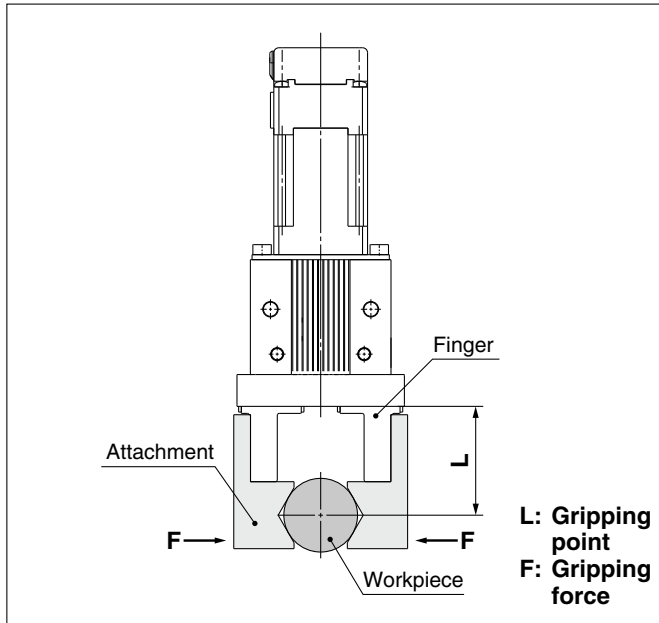
Step 1 Check the gripping force: Series LEHZ

● Indication of gripping force

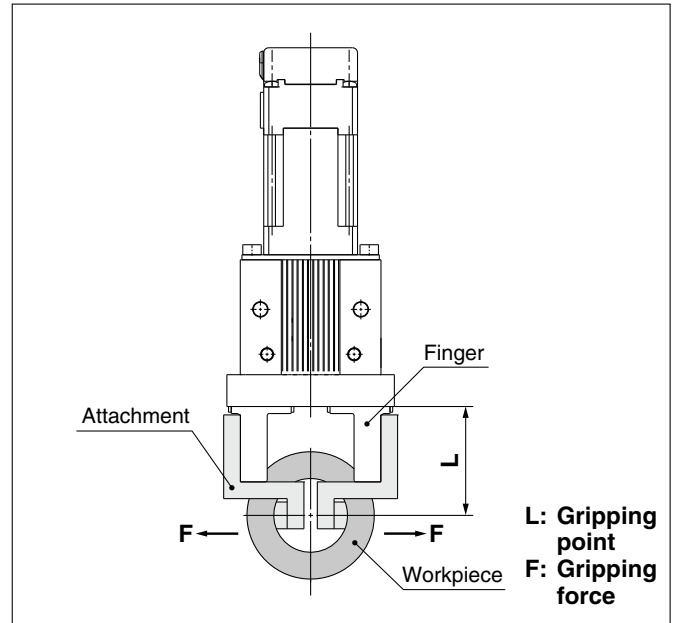
The gripping force shown in the graphs below is expressed as “F”, which is the gripping force of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

- Set the workpiece gripping point “L” so that it is within the range shown in the figure below.

External Gripping State



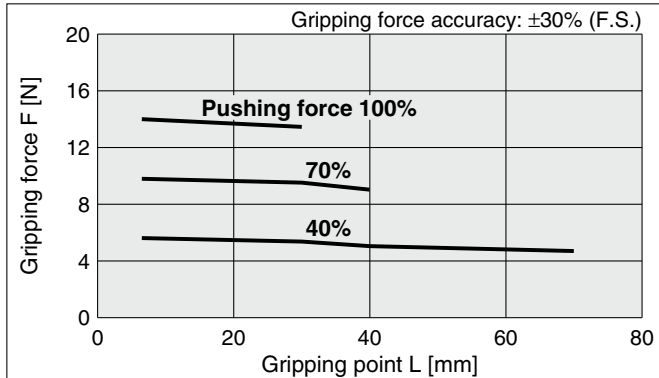
Internal Gripping State



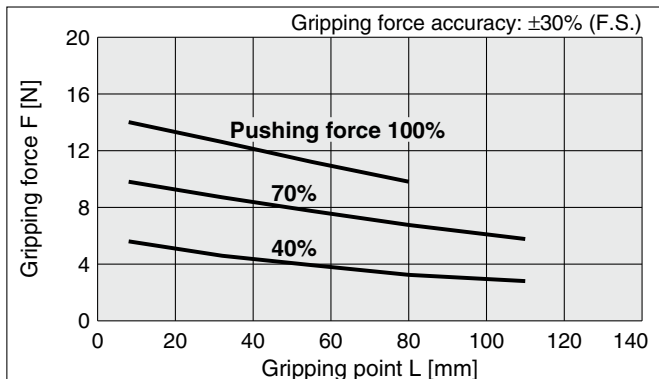
Basic

* Pushing force is one of the values of step data that is input into the controller.

LEHZ10



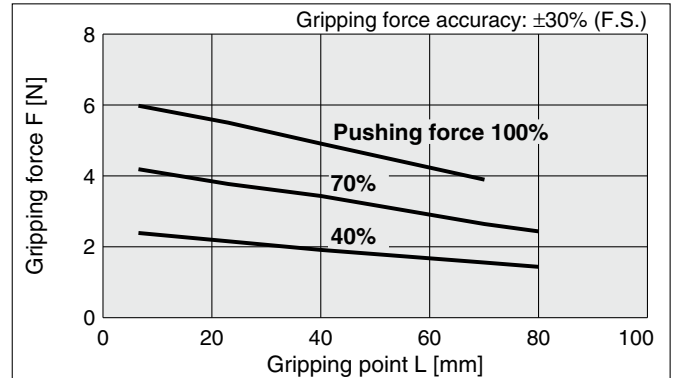
LEHZ16



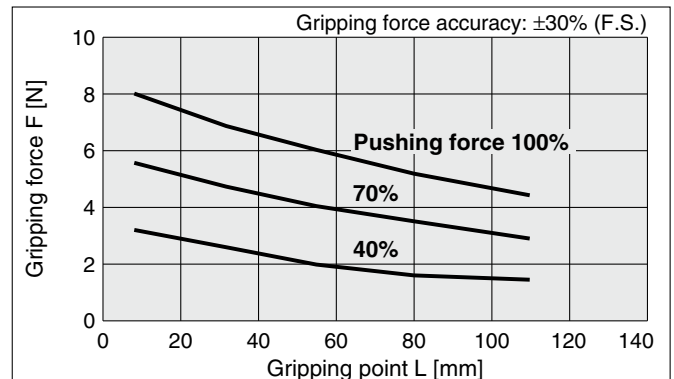
Compact

* Pushing force is one of the values of step data that is input into the controller.

LEHZ10L



LEHZ16L



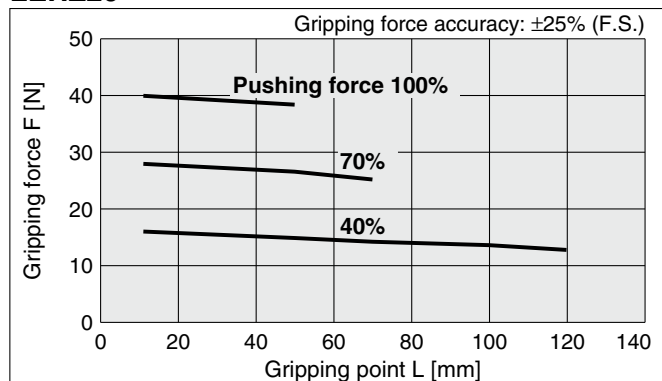
Selection Procedure

Step 1 Check the gripping force: Series LEHZ

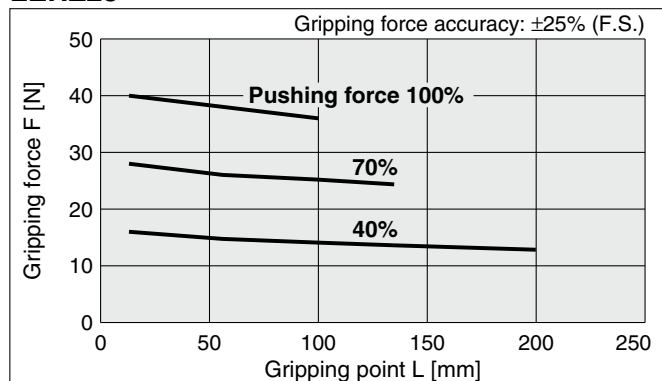
Basic

* Pushing force is one of the values of step data that is input into the controller.

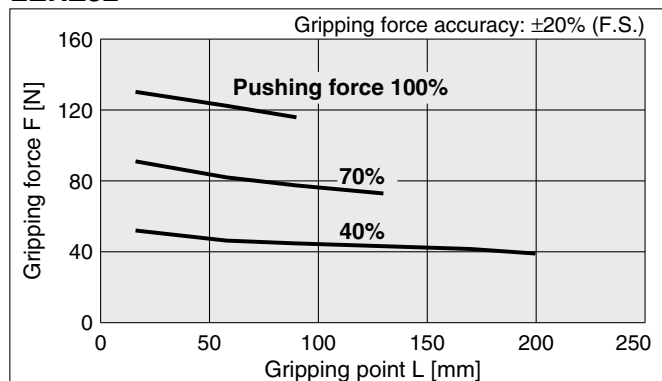
LEHZ20



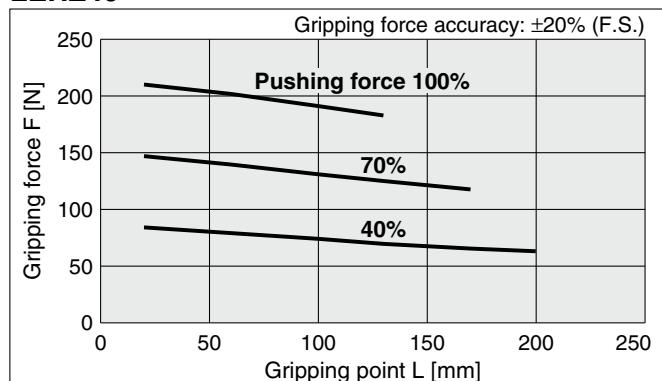
LEHZ25



LEHZ32



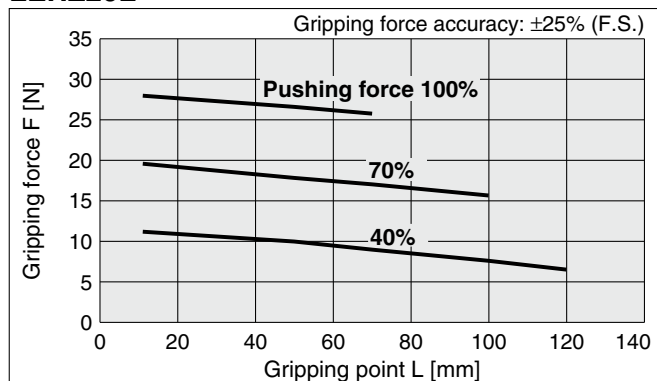
LEHZ40



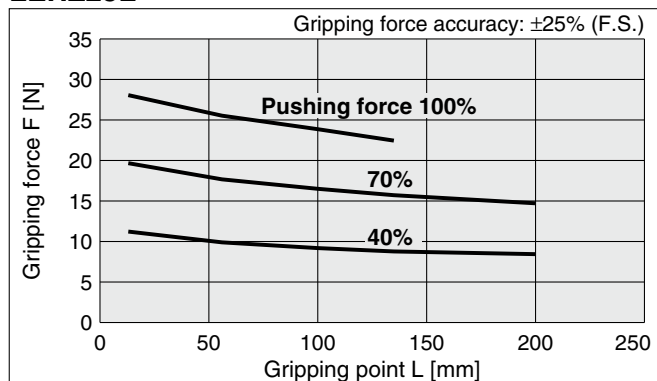
Compact

* Pushing force is one of the values of step data that is input into the controller.

LEHZ20L



LEHZ25L



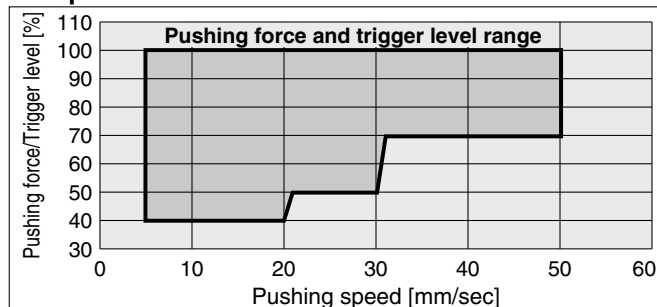
Selection of Pushing Speed

- Set the [Pushing force] and the [Trigger LV] within the range shown in the figure below.

Basic



Compact

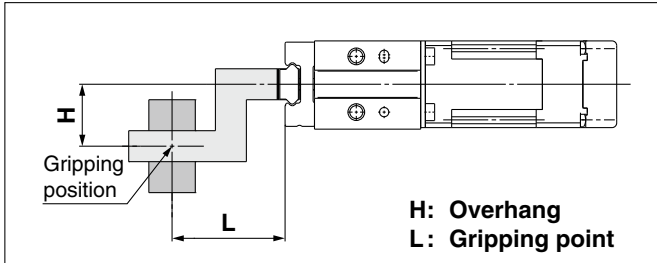


Selection Procedure

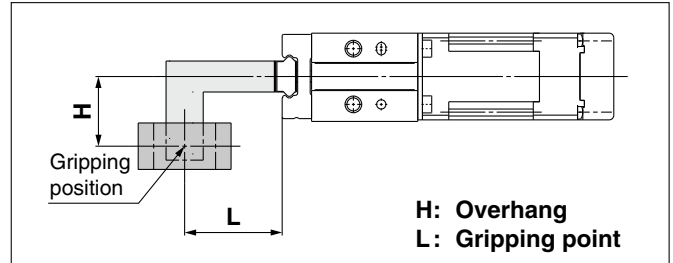
Step 2 Check the gripping point and overhang: Series LEHZ

- Decide the gripping position of the workpiece so that the amount of overhang "H" stays within the range shown in the figure below.
- If the gripping position is out of the limit, it may shorten the life of the electric gripper.

External Gripping State



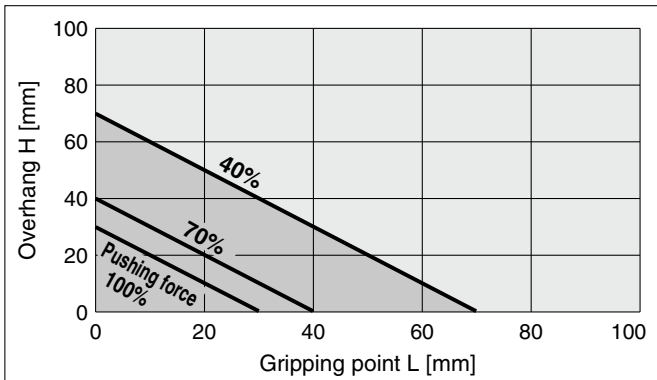
Internal Gripping State



Basic

* Pushing force is one of the values of step data that is input into the controller.

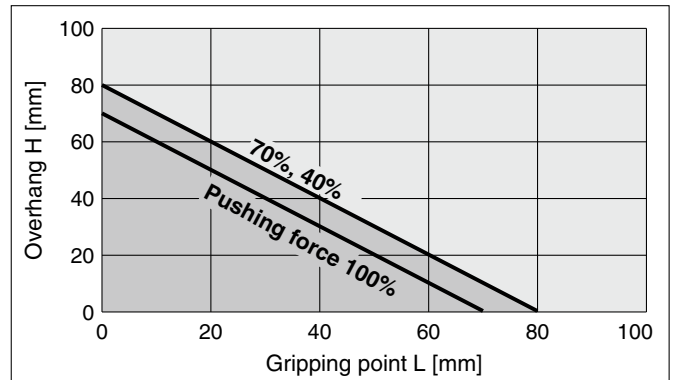
LEHZ10



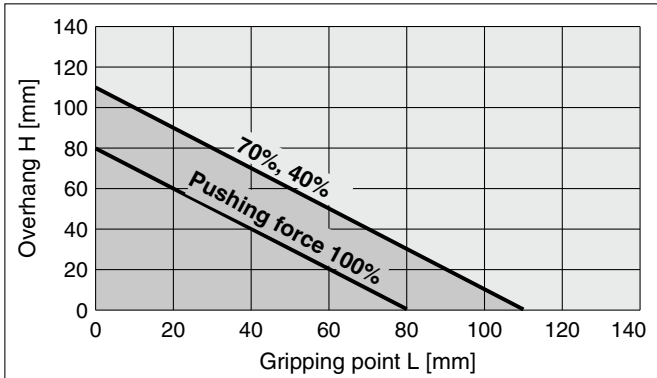
Compact

* Pushing force is one of the values of step data that is input into the controller.

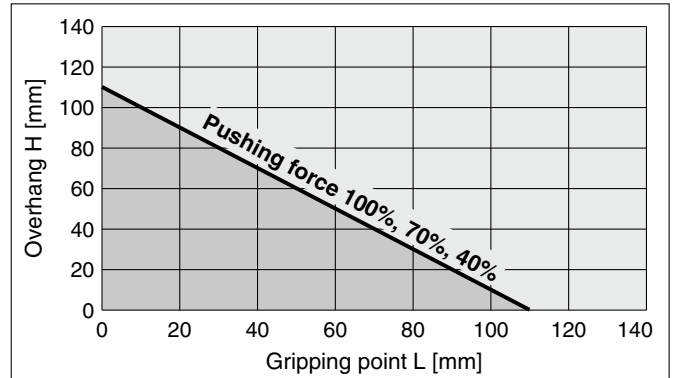
LEHZ10L



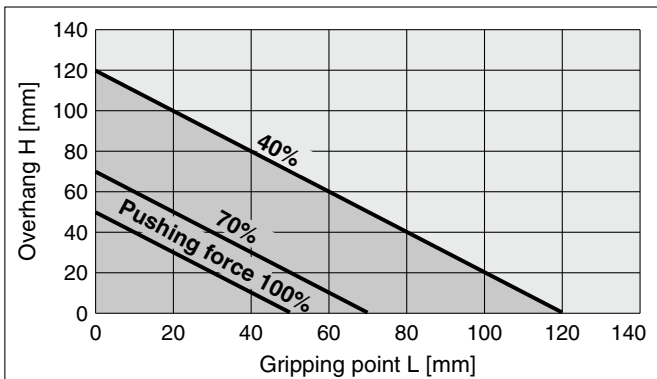
LEHZ16



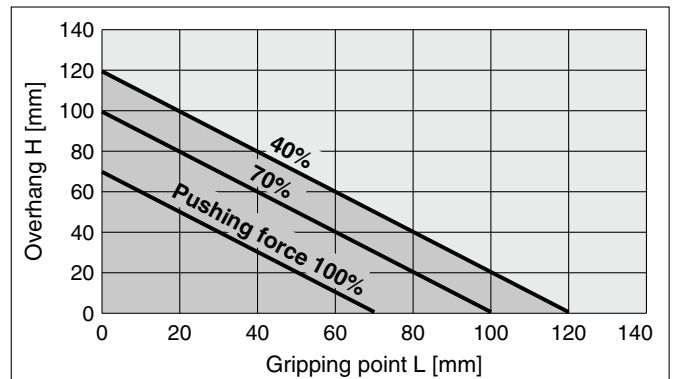
LEHZ16L



LEHZ20



LEHZ20L



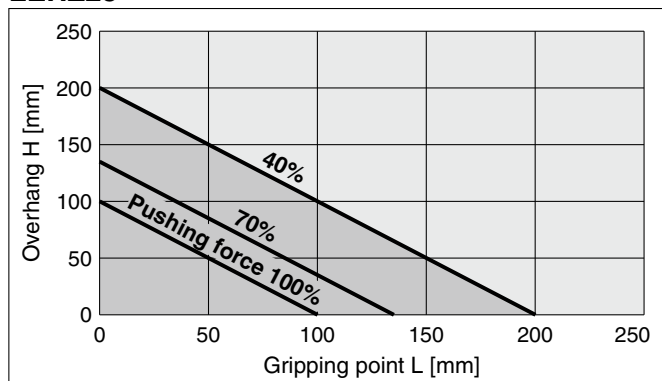
Selection Procedure

Step 2 Check the gripping point and overhang: Series LEHZ

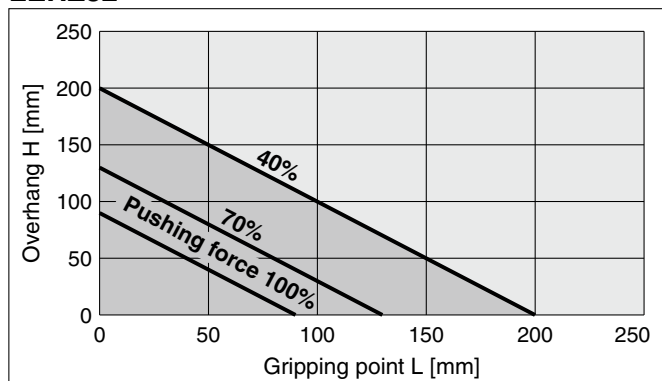
Basic

* Pushing force is one of the values of step data that is input into the controller.

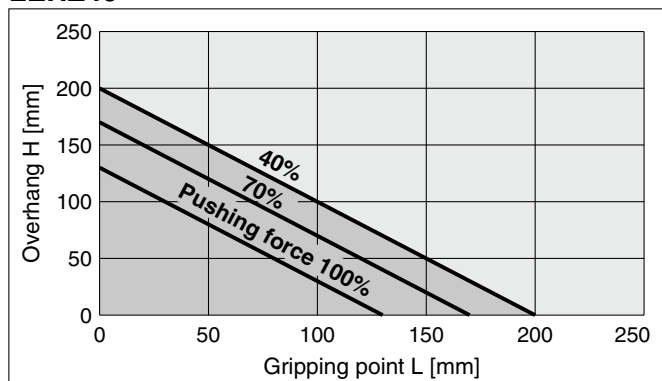
LEHZ25



LEHZ32



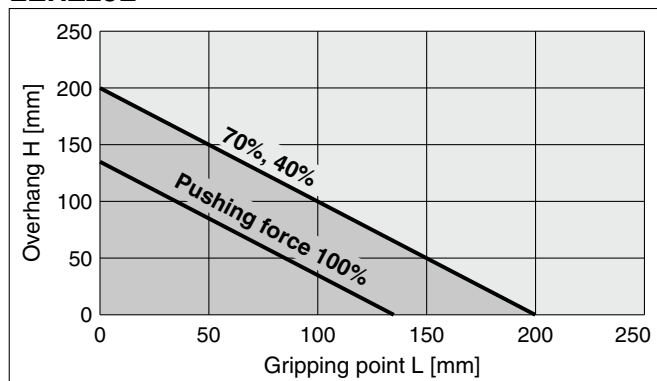
LEHZ40



Compact

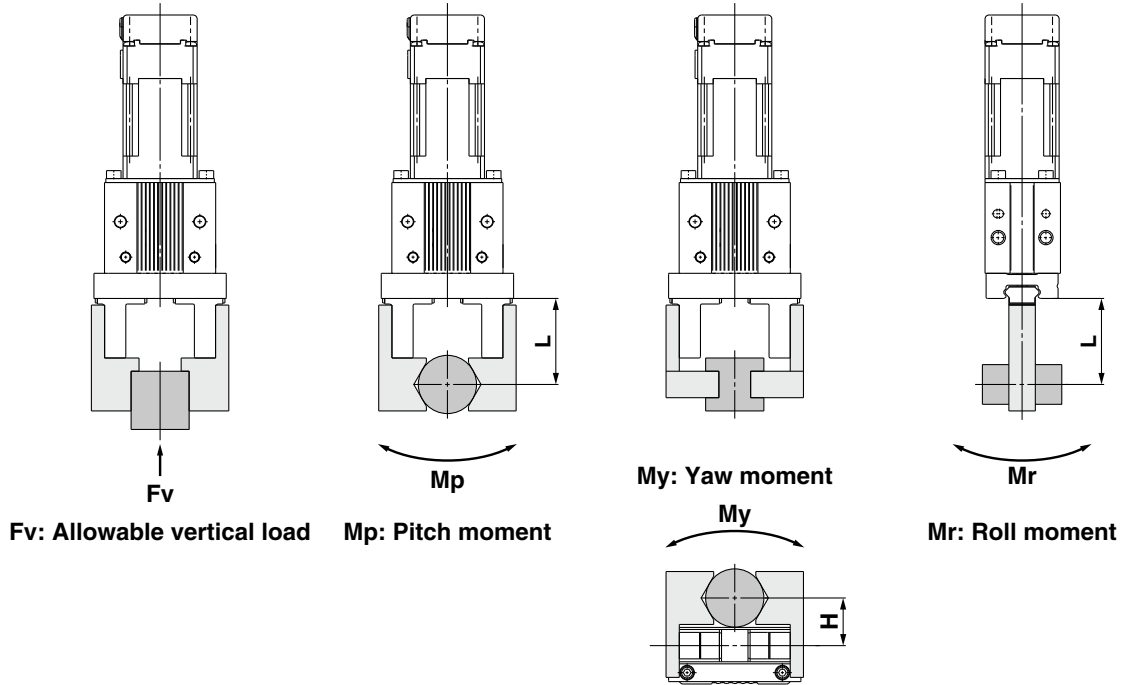
* Pushing force is one of the values of step data that is input into the controller.

LEHZ25L



Selection Procedure

Step 3 Check the external force on fingers: Series LEHZ



H, L: Distance to the point at which the load is applied [mm]

Model	Allowable vertical load Fv [N]	Static allowable moment		
		Pitch moment: Mp [N·m]	Yaw moment: My [N·m]	Roll moment: Mr [N·m]
LEHZ10(L)K2-4	58	0.26	0.26	0.53
LEHZ16(L)K2-6	98	0.68	0.68	1.36
LEHZ20(L)K2-10	147	1.32	1.32	2.65
LEHZ25(L)K2-14	255	1.94	1.94	3.88
LEHZ32(L)K2-22	343	3	3	6
LEHZ40(L)K2-30	490	4.5	4.5	9

Note) Values for load in the table indicate static values.

Calculation of allowable external force (when moment load is applied)	Calculation example
$\text{Allowable load } F \text{ [N]} = \frac{M \text{ (Static allowable moment) [N·m]}}{L \times 10^{-3} \text{ (*)}}$ <p>(*) Constant for unit conversion)</p>	<p>When a static load of $f = 10 \text{ N}$ is operating, which applies pitch moment to point $L = 30 \text{ mm}$ from the LEHZ16K2-6 guide. Therefore, it can be used.</p> $\text{Allowable load } F = \frac{0.68}{30 \times 10^{-3}} = 22.7 \text{ [N]}$ <p>Load $f = 10 \text{ [N]} < 22.7 \text{ [N]}$</p>

Electric Gripper 2-Finger Type

Series **LEHZ** LEHZ10, 16, 20, 25, 32, 40

How to Order

LEHZ 10 K 2 - 4 - S 1 6N 1

1
2
3
4
5
6
7
8
9
10
11
12

① Size

10
16
20
25
32
40

② Motor size

Nil	Basic
L (Note)	Compact

Note) Size: 10, 16, 20, 25 only

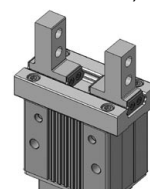
③ Lead

K	Basic
---	-------

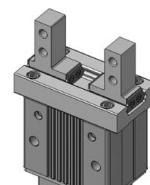
④ 2-finger type

Finger options

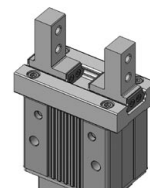
Nil: Basic
(Tapped in open/close direction)



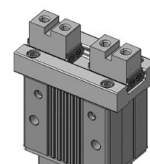
A: Side tapped mounting



B: Through-hole in open/close direction



C: Flat fingers



⑤ Stroke [mm]

Stroke/both sides	Size
4	10
6	16
10	20
14	25
22	32
30	40

⑥ Finger options

Nil	Basic (Tapped in open/close direction)
A	Side tapped mounting
B	Through-hole in open/close direction
C	Flat fingers

⑦ Motor cable entry

Nil	<p>Basic (Entry on the left side)</p> <p>Motor cable Connector cover</p>
F	<p>Entry on the front side</p> <p>Motor cable Connector cover</p>

⚠ Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEH series and the controller LEC series.

The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result, it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.

② CC-Link direct input type (LECPMJ) is not CE-compliant.

[UL-compliant products]

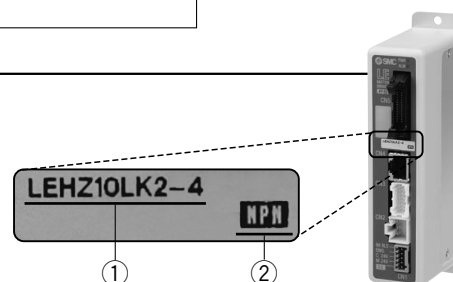
When conformity to UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.

The actuator and controller/driver are sold as a package.

Confirm that the combination of the controller/driver and the actuator is correct.

<Check the following before use.>

- ① Check the actuator label for model number. This matches the controller/driver.
- ② Check Parallel I/O configuration matches (NPN or PNP).



* Refer to the operation manual for using the products. Please download it via our website, <http://www.smcworld.com>

Electric Gripper 2-Finger Type **Series LEHZ**

Step Motor (Servo/24 VDC)



8 Actuator cable type*1

Nil	Without cable
S	Standard cable
R	Robotic cable (Flexible cable)*2

*1 The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.

*2 Fix the motor cable protruding from the actuator to keep it unmovable. For details about fixing method, refer to Wiring/Cables in the Electric Actuators Precautions.

9 Actuator cable length [m]

Nil	Without cable
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only)
Refer to the specifications Note 3) on page 431.

10 Controller/Driver type*1

Nil	Without controller/driver	
6N	LECP6	NPN
6P	(Step data input type)	PNP
1N	LECP1	NPN
1P	(Programless type)	PNP
MJ	LECPMJ*2	—
	(CC-Link direct input type)	
AN	LECPA*3	NPN
AP	(Pulse input type)	PNP

*1 For details about controller/driver and compatible motor, refer to the compatible controller/driver below.

*2 Not applicable to CE.

*3 When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-□) on page 587 separately.

12 Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately.

11 I/O cable length*1, Communication plug





Nil	Without cable (Without communication plug connector)*3
1	1.5 m
3	3 m*2
5	5 m*2
S	Straight type communication plug connector*3
T	T-branch type communication plug connector*3

*1 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected. Refer to page 559 (For LECP6), page 573 (For LECP1) or page 587 (For LECPA) if I/O cable is required.

*2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.

*3 For the LECPMJ, only "Nil", "S" and "T" are selectable since I/O cable is not included.

Compatible Controller/Driver

Type	Step data input type	CC-Link direct input type	Programless type	Pulse input type
				
Series	LECP6	LECPMJ	LECP1	LECPA
Features	Value (Step data) input Standard controller	CC-Link direct input	Capable of setting up operation (step data) without using a PC or teaching box	Operation by pulse signals
Compatible motor	Step motor (Servo/24 VDC)			
Maximum number of step data	64 points		14 points	—
Power supply voltage	24 VDC			
Reference page	Page 551	Page 591	Page 567	Page 581

Specifications



Model			LEHZ10	LEHZ16	LEHZ20	LEHZ25	LEHZ32	LEHZ40
Actuator specifications	Open and close stroke/both sides [mm]		4	6	10	14	22	30
	Lead [mm]		251/73 (3.438)	249/77 (3.234)	246/53 (4.642)	243/48 (5.063)	242/39 (6.205)	254/43 (5.907)
	Gripping force [N] <small>Note 1) Note 3)</small>	Basic	6 to 14		16 to 40		52 to 130	84 to 210
		Compact	2 to 6	3 to 8	11 to 28		—	—
	Open and close speed/ Pushing speed [mm/s] <small>Note 2) Note 3)</small>		5 to 80/5 to 50		5 to 100/5 to 50		5 to 120/5 to 50	
	Drive method		Slide screw + Slide cam					
	Finger guide type		Linear guide (No circulation)					
	Repeated length measurement accuracy [mm] <small>Note 4)</small>		±0.05					
	Finger backlash/ one side [mm] <small>Note 5)</small>		0.25 or less				0.5 or less	
	Repeatability [mm] <small>Note 6)</small>		±0.02					
	Positioning repeatability/one side [mm]		±0.05					
	Lost motion/one side[mm] <small>Note 7)</small>		0.25 or less				0.3 or less	
	Impact/Vibration resistance [m/s²] <small>Note 8)</small>		150/30					
	Max. operating frequency [C.P.M]		60					
	Operating temperature range [°C]		5 to 40					
Operating humidity range [%RH]		90 or less (No condensation)						
Electric specifications	Weight [g]	Basic	165	220	430	585	1120	1760
		Compact	135	190	365	520	—	—
	Motor size		□20		□28		□42	
	Motor type		Step motor (Servo/24 VDC)					
	Encoder		Incremental A/B phase (800 pulse/rotation)					
	Rated voltage [V]		24 VDC ±10%					
	Power consumption/ Standby power consumption when operating [W] <small>Note 9)</small>	Basic	11/7		28/15		34/13	36/13
		Compact	8/7		22/12		—	—
	Max. instantaneous power consumption [W] <small>Note 10)</small>	Basic	19		51		57	61
		Compact	14		42		—	—

Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Moving force should be 150% when releasing the workpiece. Gripping force accuracy should be ±30% (F.S.) for LEHZ10/16, ±25% (F.S.) for LEHZ20/25 and ±20% (F.S.) for LEHZ32/40.

Note 2) Pushing speed should be set within the range during pushing (gripping) operation. Otherwise, it may cause malfunction. The open/close speed and pushing speed are for both fingers. The speed for one finger is half this value.

Note 3) The speed and force may change depending on the cable length, load and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)

Note 4) Repeated length measurement accuracy means dispersion (value on the controller monitor) when the workpiece is repeatedly held in the same position.

Note 5) There will be no influence of backlash during pushing (gripping) operation. Make the stroke longer for the amount of backlash when opening.

Note 6) Repeatability means the variation of the gripping position (workpiece position) when the gripping operation is repeatedly performed by the same sequence for the same workpiece.

Note 7) A reference value for correcting an error in reciprocal operation which occurs during the positioning operation.

Note 8) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)

Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. Test was performed in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)

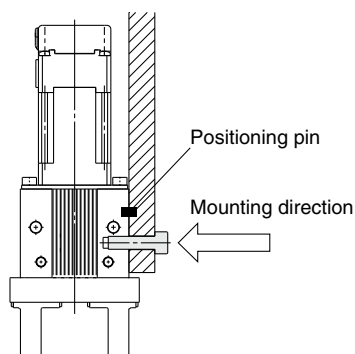
Note 9) The power consumption (including the controller) is for when the gripper is operating.

The standby power consumption when operating is for when the gripper is stopped in the set position during operation, including the energy saving mode when gripping.

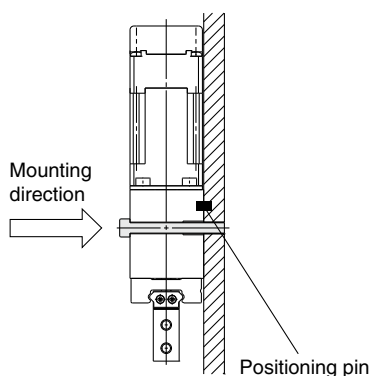
Note 10) The maximum instantaneous power consumption (including the controller) is for when the gripper is operating. This value can be used for the selection of the power supply.

How to Mount

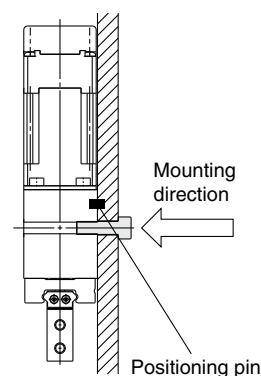
a) When using the thread on the side of the body



b) When using the thread on the mounting plate

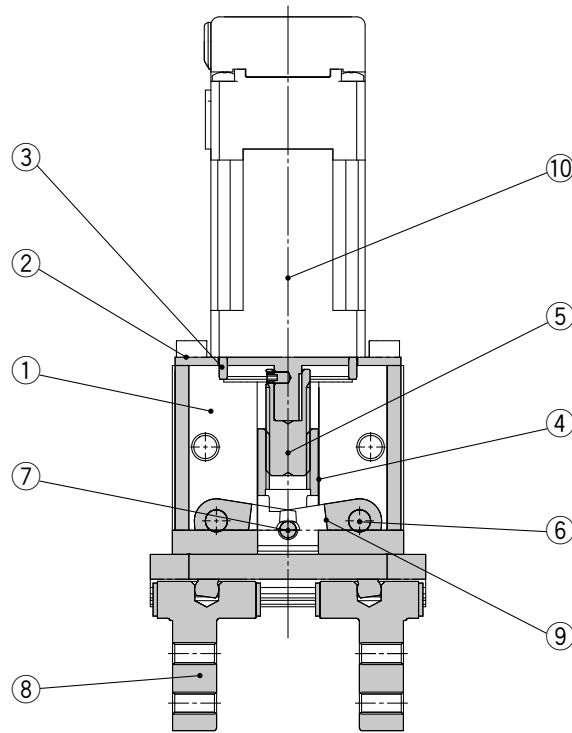


c) When using the thread on the back of the body



Construction

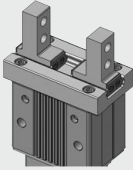
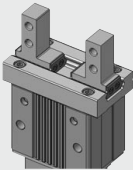
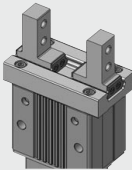
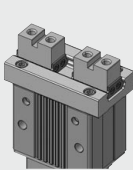
Series LEHZ



Component Parts

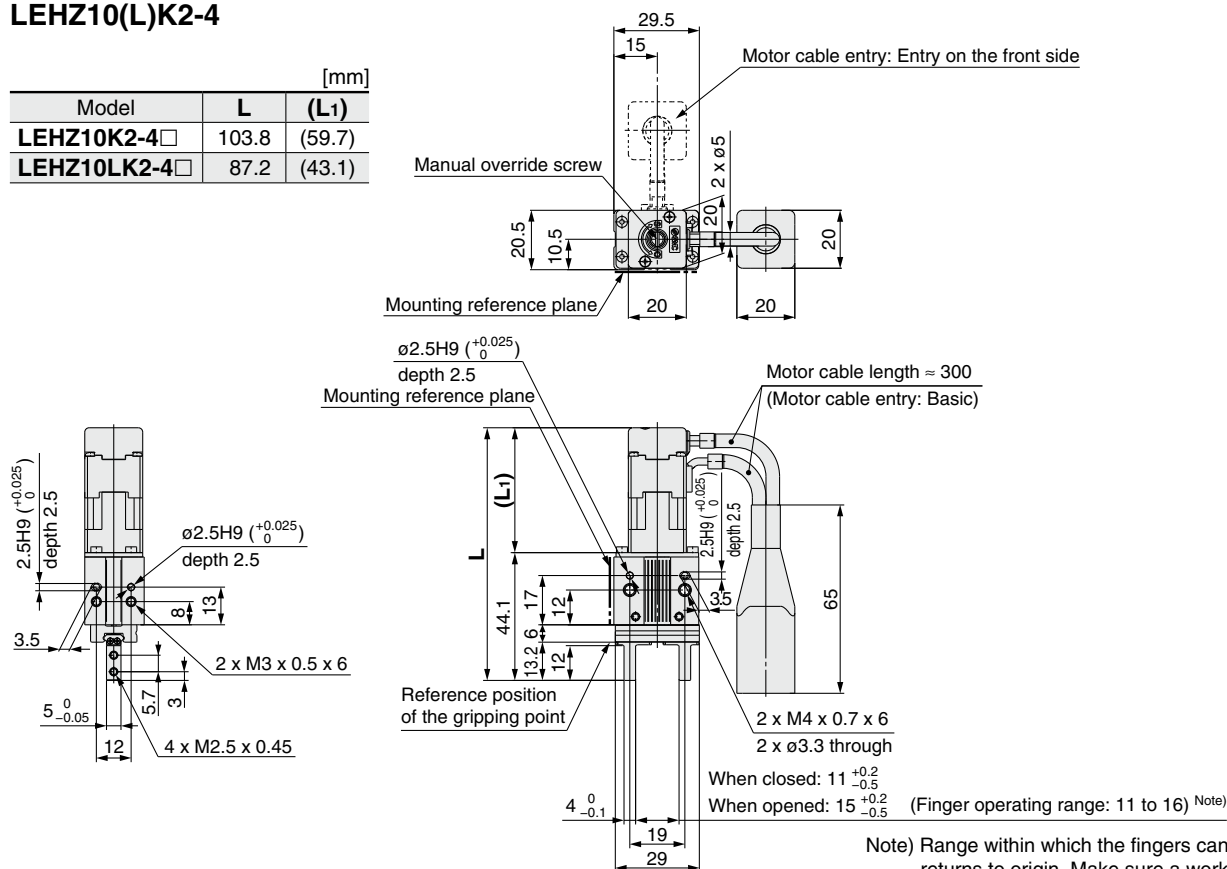
No.	Description	Material	Note
1	Body	Aluminum alloy	Anodized
2	Motor plate	Aluminum alloy	Anodized
3	Guide ring	Aluminum alloy	
4	Slide nut	Stainless steel	Heat treatment + Special treatment
5	Slide bolt	Stainless steel	Heat treatment + Special treatment
6	Needle roller	High carbon chromium bearing steel	
7	Needle roller	High carbon chromium bearing steel	
8	Finger assembly	—	
9	Lever	Special stainless steel	
10	Step motor (Servo/24 VDC)	—	

Replacement Parts ⑧ Finger Assembly

	Basic (Nil)	Side tapped mounting (A)	Through-hole in open/ close direction (B)	Flat fingers (C)
Size				
10	MHZ-AA1002	MHZ-AA1002-1	MHZ-AA1002-2	MHZ-A1002-3
16	MHZ-AA1602	MHZ-AA1602-1	MHZ-AA1602-2	MHZ-A1602-3
20	MHZ-AA2002	MHZ-AA2002-1	MHZ-AA2002-2	MHZ-A2002-3
25	MHZ-AA2502	MHZ-AA2502-1	MHZ-AA2502-2	MHZ-A2502-3
32	MHZ-A3202	MHZ-A3202-1	MHZ-A3202-2	MHZ-A3202-3
40	MHZ-A4002	MHZ-A4002-1	MHZ-A4002-2	MHZ-A4002-3

LEHZ10(L)K2-4

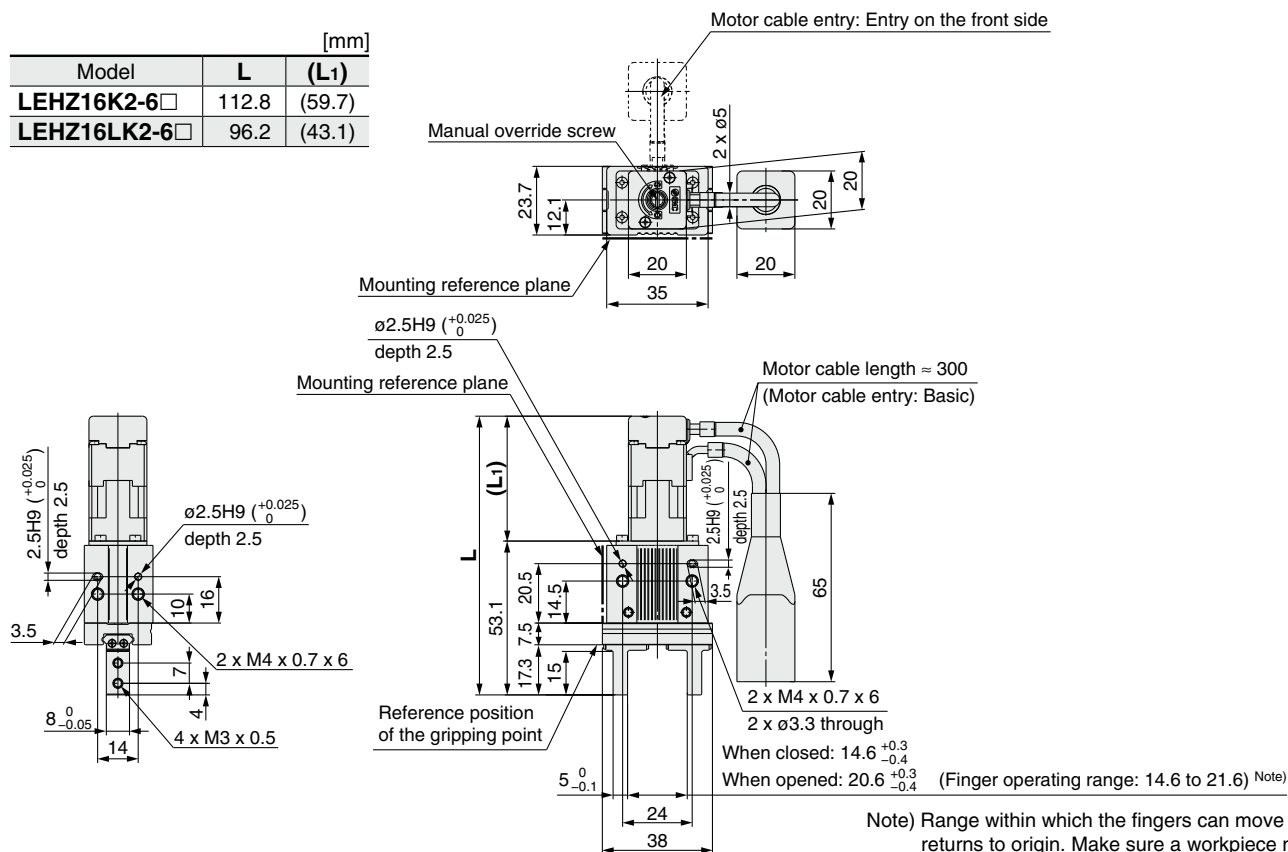
	[mm]	
Model	L	(L ₁)
LEHZ10K2-4 □	103.8	(59.7)
LEHZ10LK2-4 □	87.2	(43.1)



Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHZ16(L)K2-6

	[mm]	
Model	L	(L ₁)
LEHZ16K2-6□	112.8	(59.7)
LEHZ16LK2-6□	96.2	(43.1)

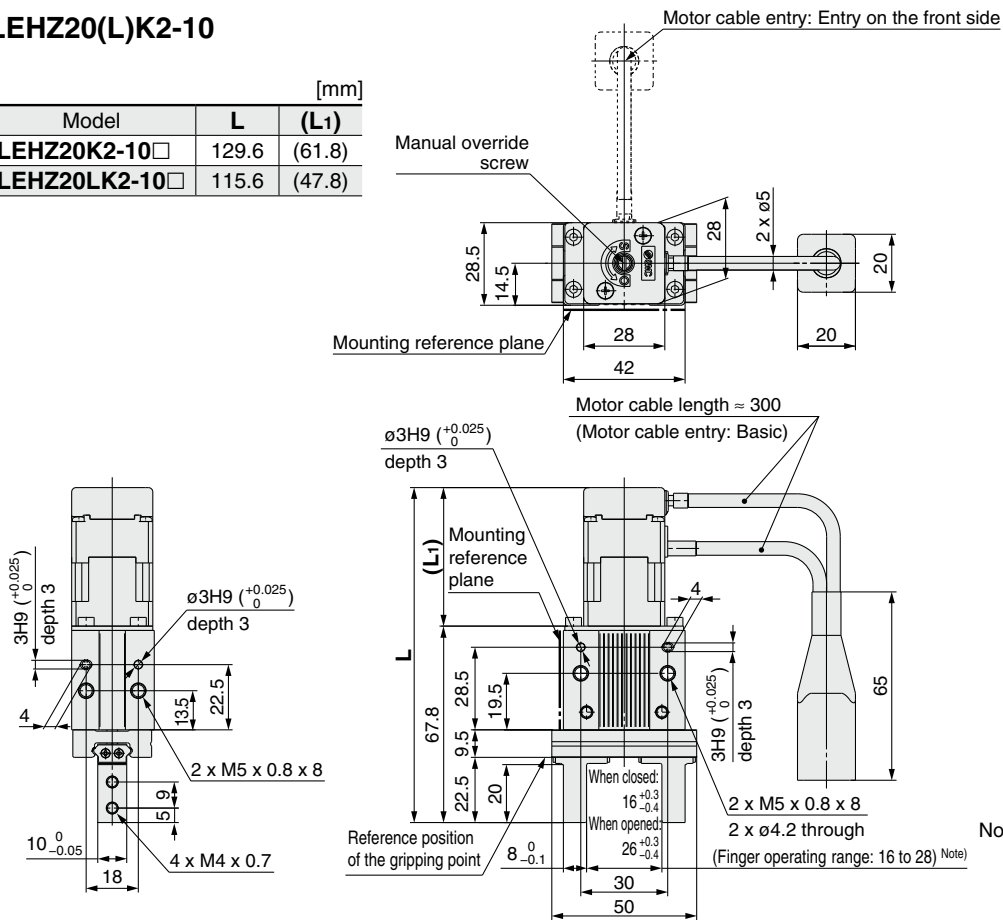


Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

Dimensions

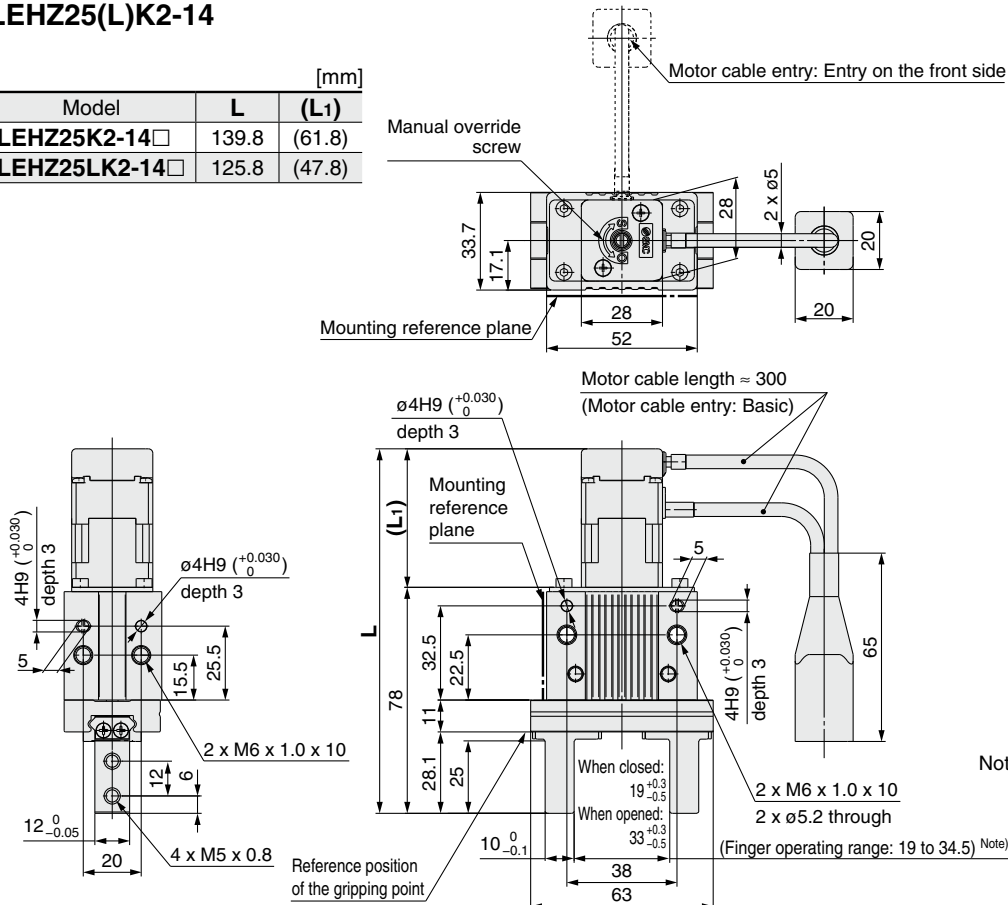
LEHZ20(L)K2-10

Model	L	(L ₁)
LEHZ20K2-10□	129.6	(61.8)
LEHZ20LK2-10□	115.6	(47.8)



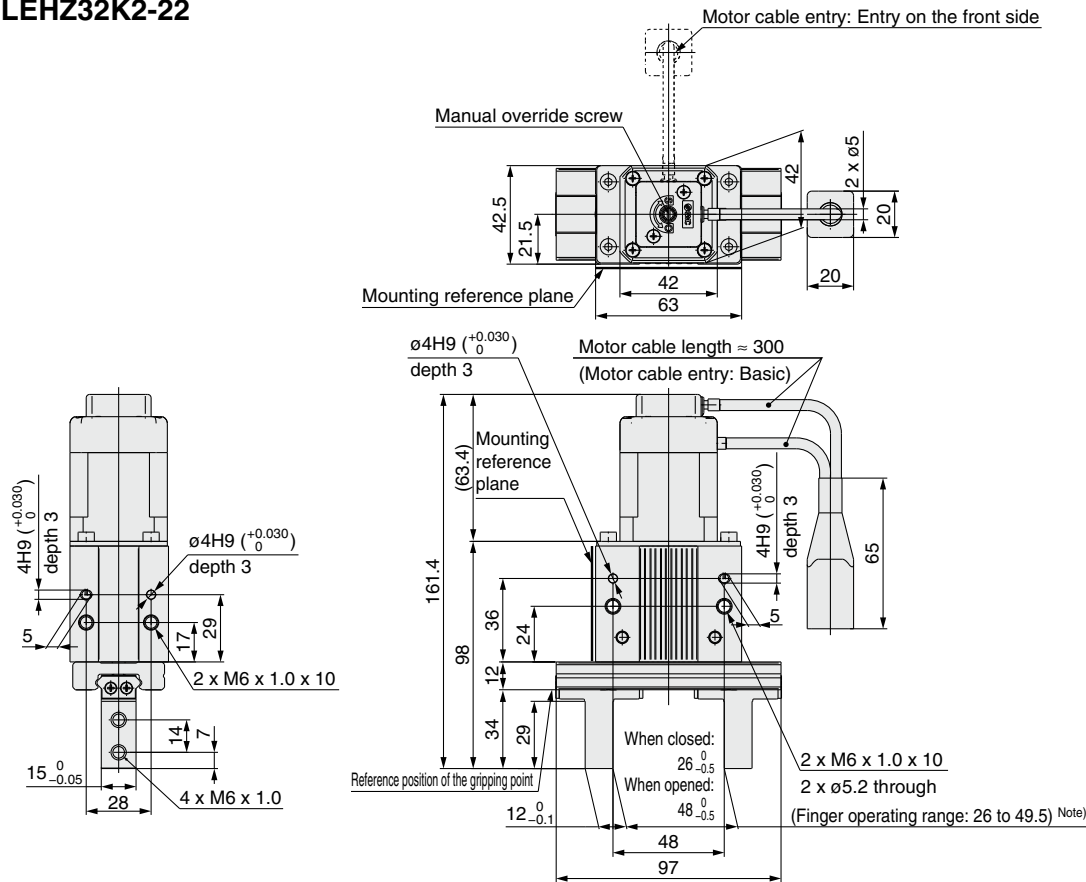
LEHZ25(L)K2-14

Model	L	(L ₁)
LEHZ25K2-14□	139.8	(61.8)
LEHZ25LK2-14□	125.8	(47.8)



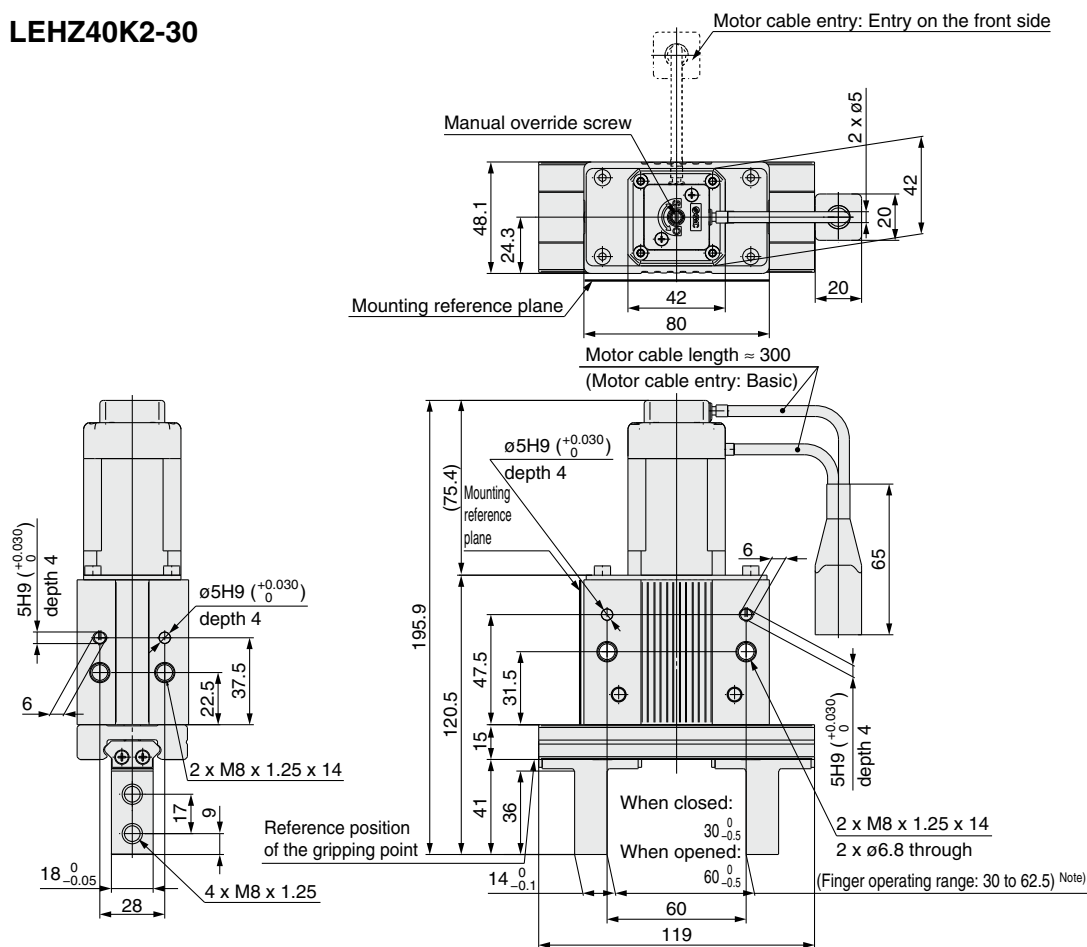
Dimensions

LEHZ32K2-22



Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHZ40K2-30

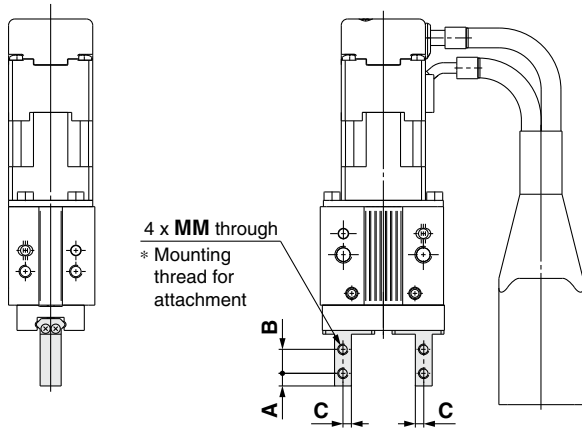


Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

Series LEHZ

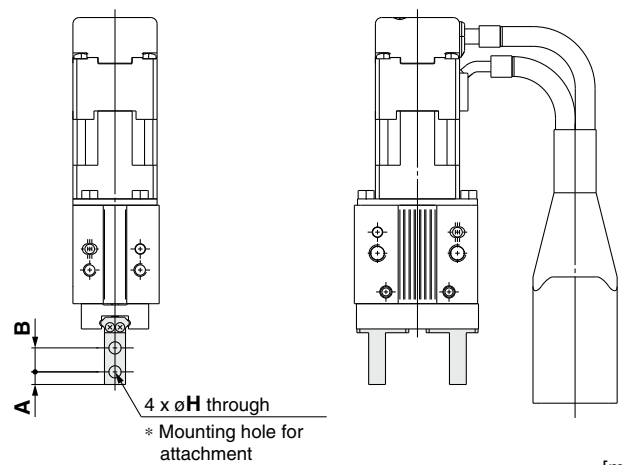
Finger Options

Side Tapped Mounting (A)



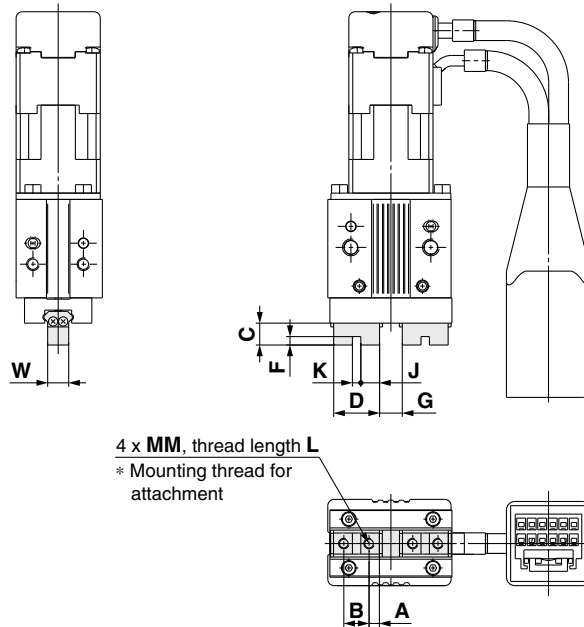
Model	A	B	C	MM
LEHZ10(L)K2-4A□	3	5.7	2	M2.5 x 0.45
LEHZ16(L)K2-6A□	4	7	2.5	M3 x 0.5
LEHZ20(L)K2-10A□	5	9	4	M4 x 0.7
LEHZ25(L)K2-14A□	6	12	5	M5 x 0.8
LEHZ32K2-22A□	7	14	6	M6 x 1
LEHZ40K2-30A□	9	17	7	M8 x 1.25

Through-hole in Open/Close Direction (B)



Model	A	B	H
LEHZ10(L)K2-4B□	3	5.7	2.9
LEHZ16(L)K2-6B□	4	7	3.4
LEHZ20(L)K2-10B□	5	9	4.5
LEHZ25(L)K2-14B□	6	12	5.5
LEHZ32K2-22B□	7	14	6.6
LEHZ40K2-30B□	9	17	9

Flat Fingers (C)



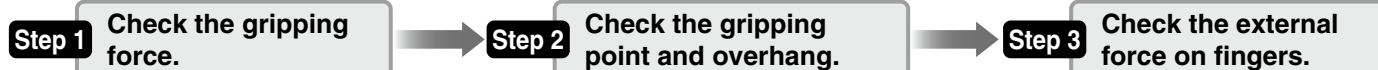
Model	A	B	C	D	F	G		J	K	MM	L	W	Weight [g]
						When opened	When closed						
LEHZ10K2-4C□	2.45	6	5.2	10.9	2	5.4 ⁰ _{-0.2}	1.4 ⁰ _{-0.2}	4.45	2H9 ^{+0.025} ₀	M2.5 x 0.45	5	5 ⁰ _{-0.05}	165
LEHZ10LK2-4C□													135
LEHZ16K2-6C□	3.05	8	8.3	14.1	2.5	7.4 ⁰ _{-0.2}	1.4 ⁰ _{-0.2}	5.8	2.5H9 ^{+0.025} ₀	M3 x 0.5	6	8 ⁰ _{-0.05}	220
LEHZ16LK2-6C□													190
LEHZ20K2-10C□	3.95	10	10.5	17.9	3	11.6 ⁰ _{-0.2}	1.6 ⁰ _{-0.2}	7.45	3H9 ^{+0.025} ₀	M4 x 0.7	8	10 ⁰ _{-0.05}	430
LEHZ20LK2-10C□													365
LEHZ25K2-14C□	4.9	12	13.1	21.8	4	16 ⁰ _{-0.2}	2 ⁰ _{-0.2}	8.9	4H9 ^{+0.030} ₀	M5 x 0.8	10	12 ⁰ _{-0.05}	575
LEHZ25LK2-14C□													510
LEHZ32K2-22C□	7.3	20	18	34.6	5	25 ⁰ _{-0.2}	3 ⁰ _{-0.2}	14.8	5H9 ^{+0.030} ₀	M6 x 1	12	15 ⁰ _{-0.05}	1145
LEHZ40K2-30C□	8.7	24	22	41.4	6	33 ⁰ _{-0.2}	3 ⁰ _{-0.2}	17.7	6H9 ^{+0.030} ₀	M8 x 1.25	16	18 ⁰ _{-0.05}	1820

Model Selection



Series LEHZJ ▶ Page 443

Selection Procedure

**Step 1** Check the gripping force.**Example**

Workpiece mass: 0.1 kg

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

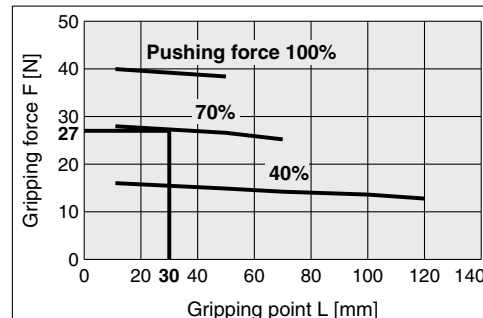
- Although conditions differ according to the workpiece shape and the coefficient of friction between the attachments and the workpiece, select a model that can provide a gripping force of 10 to 20 times ^{Note)} the workpiece weight, or more.

Note) For details, refer to the calculation of required gripping force.

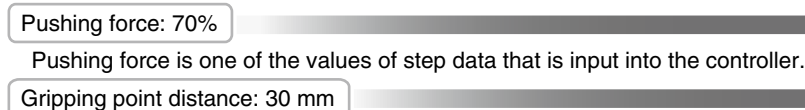
- If high acceleration or impact forces are encountered during motion, a further margin of safety should be considered.

Example) When it is desired to set the gripping force at 20 times or more above the workpiece weight.

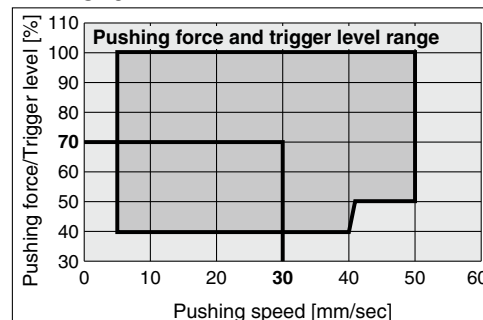
Required gripping force
= 0.1 kg × 20 × 9.8 m/s² ≈ 19.6 N or more

LEHZJ20**When the LEHZJ20 is selected.**

- A gripping force of 27 N is obtained from the intersection point of gripping point distance L = 30 mm and pushing force of 70%.
- Gripping force is 27.6 times greater than the workpiece weight, and therefore satisfies a gripping force setting value of 20 times or more.

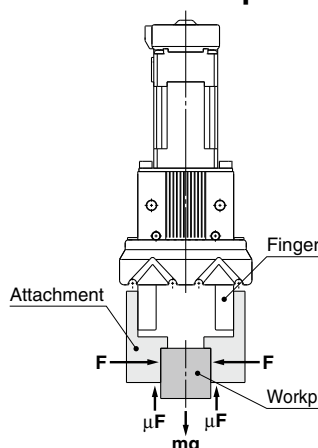


Pushing speed: 30 mm/sec

LEHZJ20

- Pushing speed is satisfied at the point where 70% of the pushing force and 30 mm/sec of the pushing speed cross.

Note) Confirm the pushing speed range from the determined pushing force [%].

Calculation of required gripping force

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/s²)
- mg: Workpiece weight (N)

the conditions under which the workpiece will not drop are
 $2 \times \mu F > mg$

Number of fingers

and therefore, $F > \frac{mg}{2 \times \mu}$

With "a" representing the 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 margin of "a" = 4, which allows for impacts that occur during normal transportation, etc.

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

<Reference> Coefficient of friction μ (depends on the operating environment, contact pressure, etc.)

Coefficient of friction μ	Attachment – Material of workpieces (guideline)
0.1	Metal (surface roughness Rz3.2 or less)
0.2	Metal
0.2 or more	Rubber, Resin, etc.

- Note) • Even in cases where the coefficient of friction is greater than $\mu = 0.2$, 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 or impact forces are encountered during motion, a further margin should be considered.

Selection Procedure

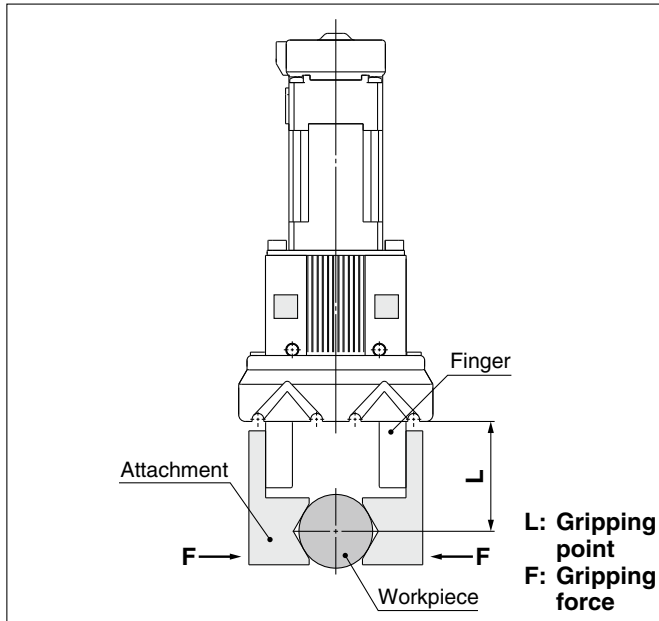
Step 1 Check the gripping force: Series LEHZJ

● Indication of gripping force

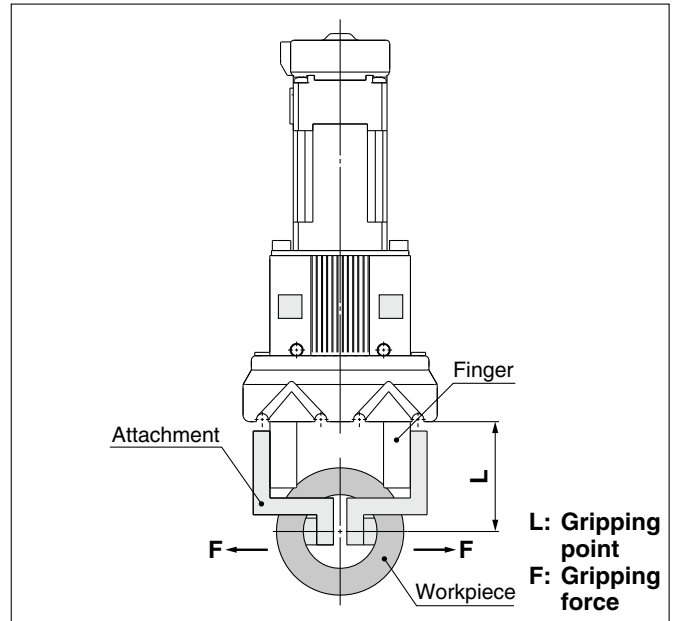
The gripping force shown in the graphs below is expressed as “F”, which is the gripping force of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

- Set the workpiece gripping point “L” so that it is within the range shown in the figure below.

External Gripping State



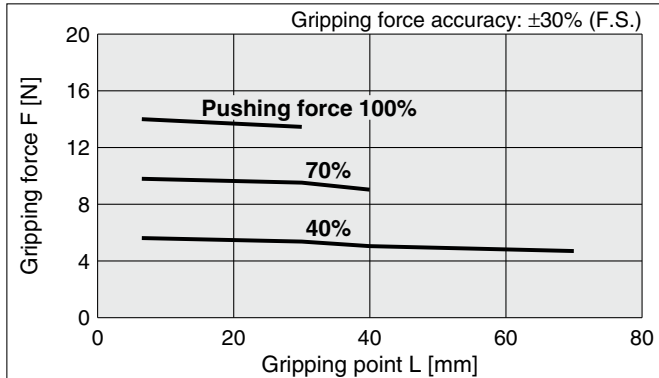
Internal Gripping State



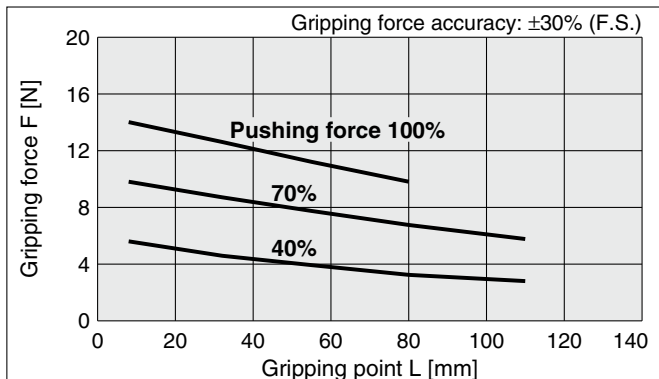
Basic

* Pushing force is one of the values of step data that is input into the controller.

LEHZJ10



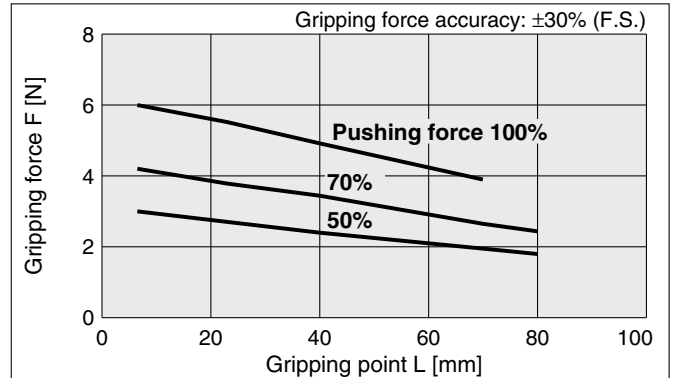
LEHZJ16



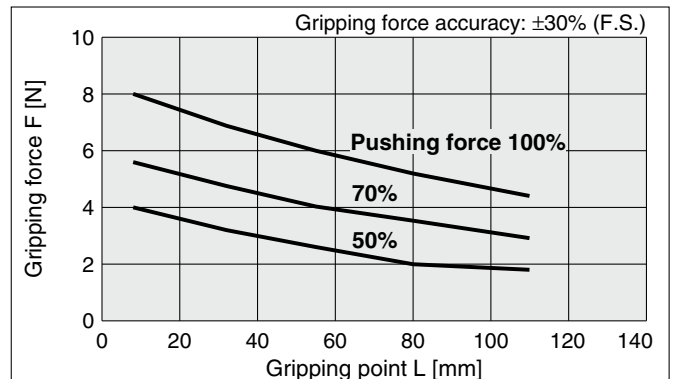
Compact

* Pushing force is one of the values of step data that is input into the controller.

LEHZJ10L



LEHZJ16L



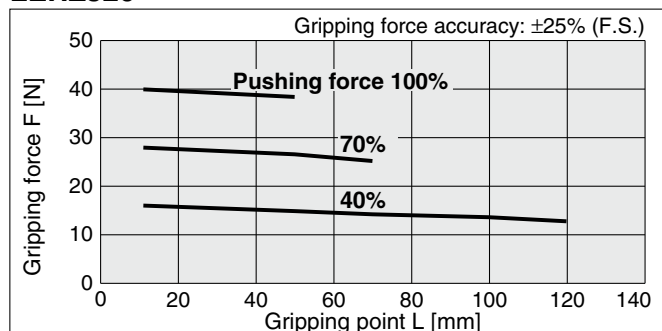
Selection Procedure

Step 1 Check the gripping force: Series LEHZJ

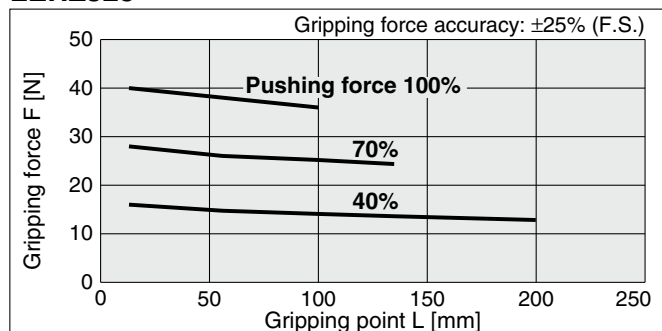
Basic

* Pushing force is one of the values of step data that is input into the controller.

LEHZJ20



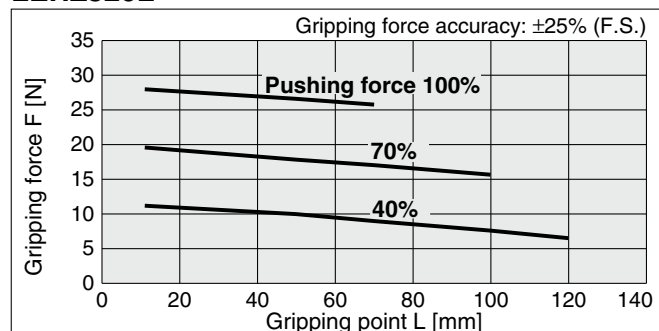
LEHZJ25



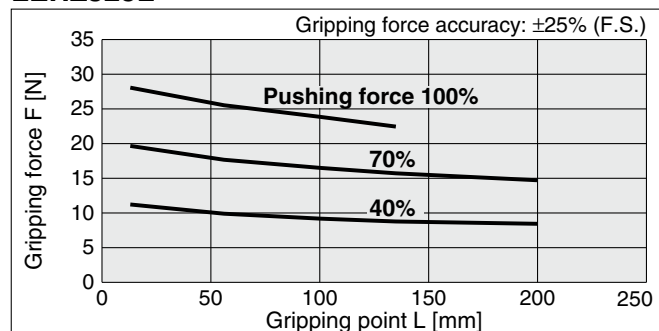
Compact

* Pushing force is one of the values of step data that is input into the controller.

LEHZJ20L



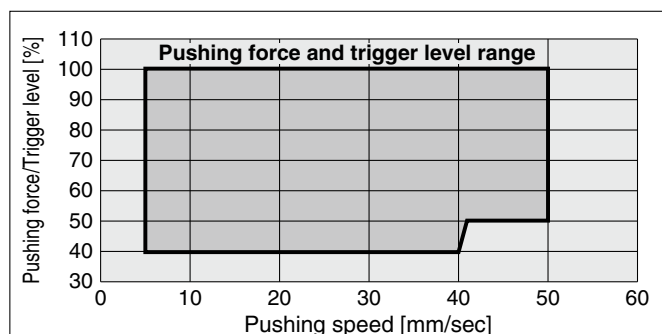
LEHZJ25L



Selection of Pushing Speed

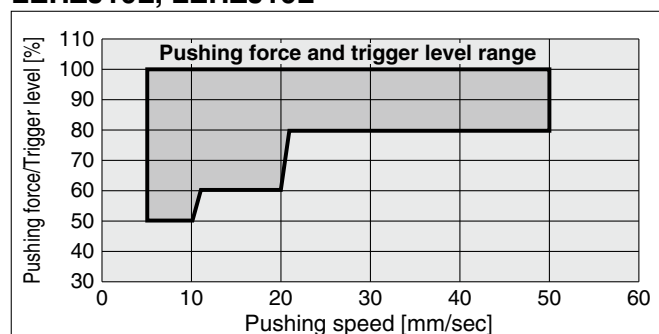
● Set the [Pushing force] and [Trigger level] within the range shown in the figure below.

Basic

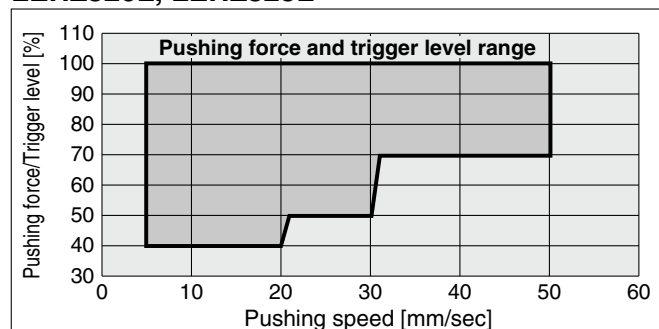


Compact

LEHZJ10L, LEHZJ16L



LEHZJ20L, LEHZJ25L

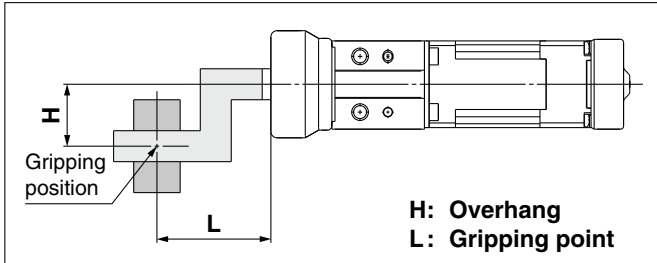


Selection Procedure

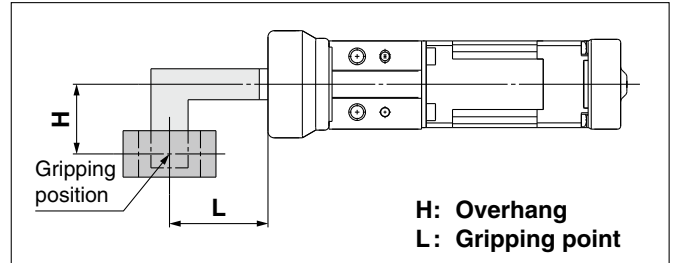
Step 2 Check the gripping point and overhang: Series LEHZJ

- Decide the gripping position of the workpiece so that the amount of overhang "H" stays within the range shown in the figure below.
- If the gripping position is out of the limit, it may shorten the life of the electric gripper.

External Gripping State



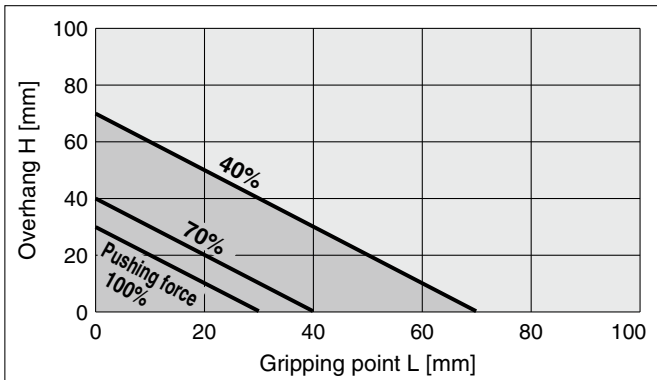
Internal Gripping State



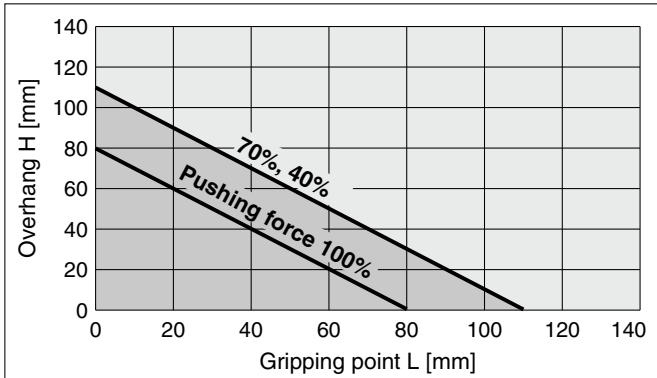
Basic

* Pushing force is one of the values of step data that is input into the controller.

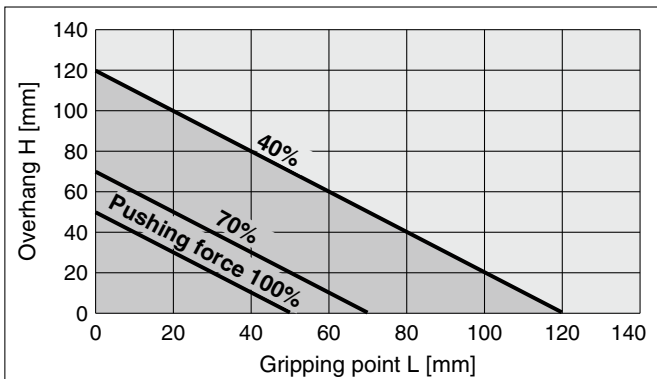
LEHZJ10



LEHZJ16



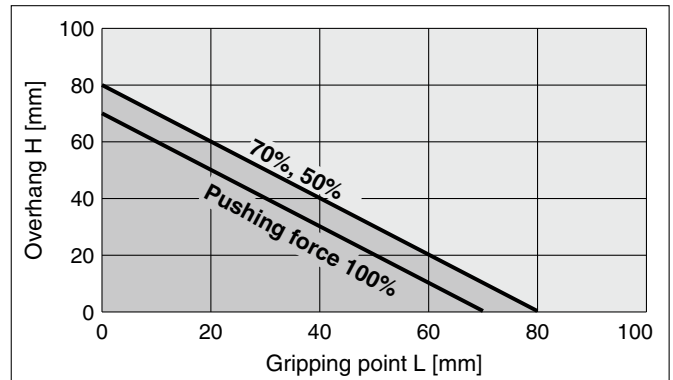
LEHZJ20



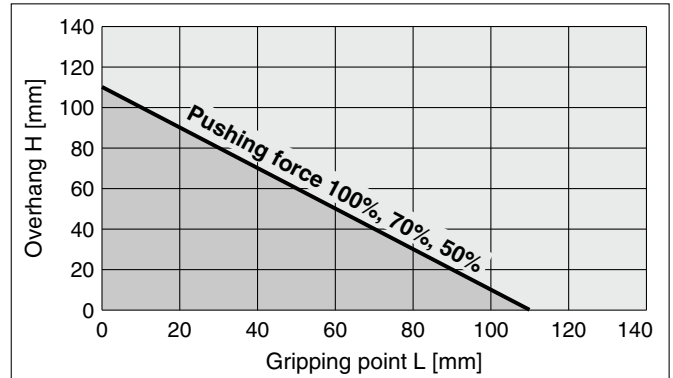
Compact

* Pushing force is one of the values of step data that is input into the controller.

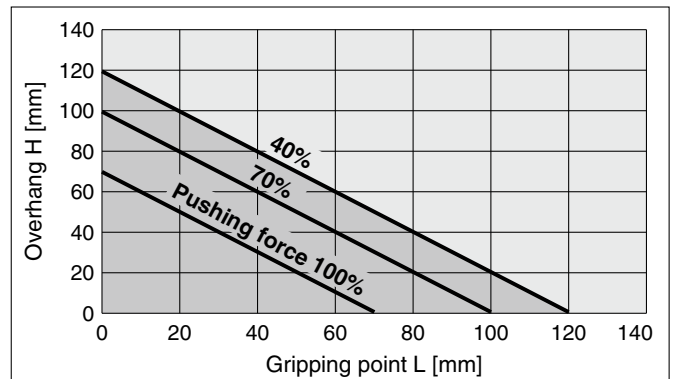
LEHZJ10L



LEHZJ16L



LEHZJ20L



Series LEHZJ

Step Motor (Servo/24 VDC)

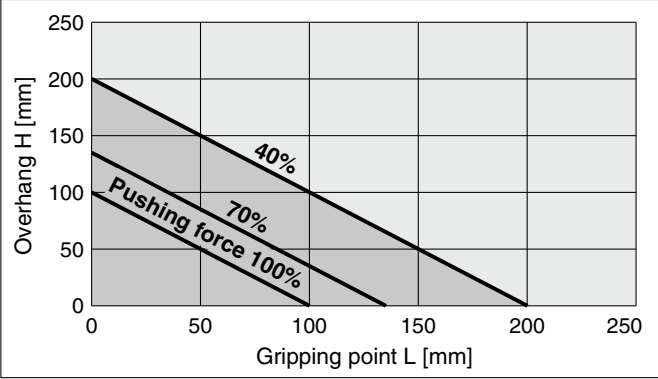
Selection Procedure

Step 2 Check the gripping point and overhang: Series LEHZJ

Basic

* Pushing force is one of the values of step data that is input into the controller.

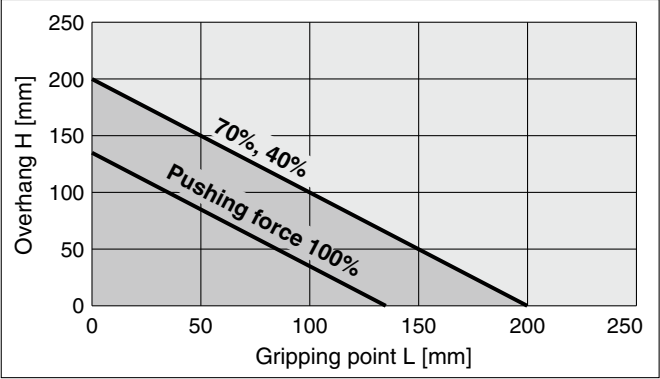
LEHZJ25



Compact

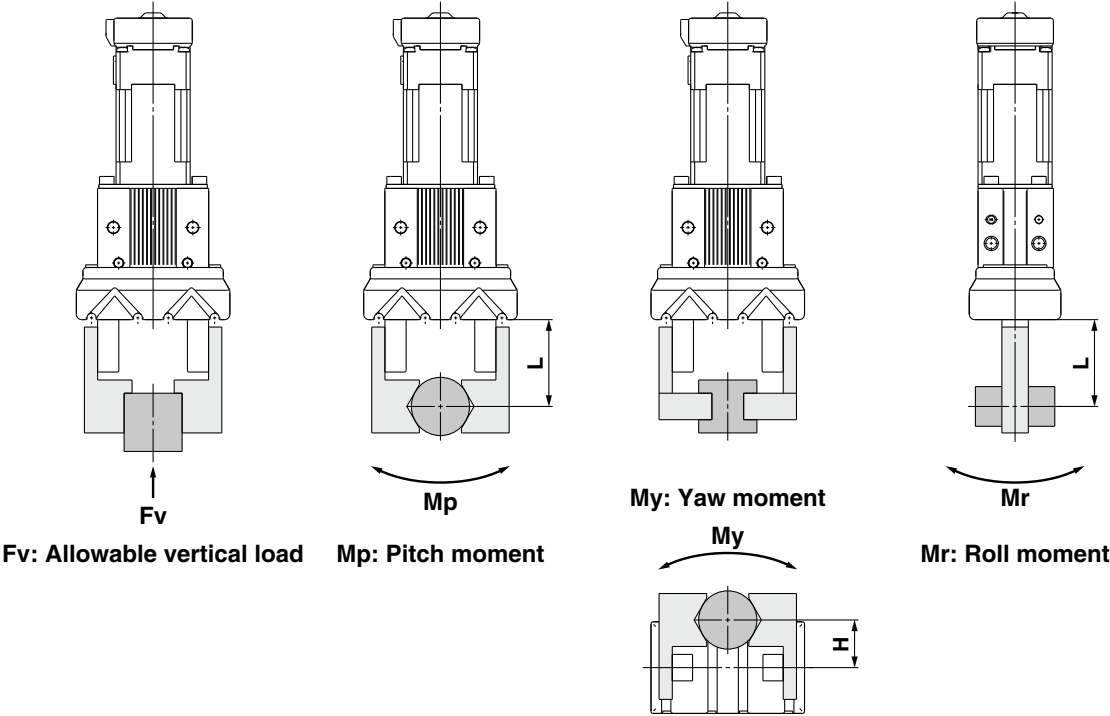
* Pushing force is one of the values of step data that is input into the controller.

LEHZJ25L



Selection Procedure

Step 3 Check the external force on fingers: Series LEHZJ



Model	Allowable vertical load Fv [N]	Static allowable moment		
		Pitch moment: Mp [N·m]	Yaw moment: My [N·m]	Roll moment: Mr [N·m]
LEHZJ10(L)K2-4	58	0.26	0.26	0.53
LEHZJ16(L)K2-6	98	0.68	0.68	1.36
LEHZJ20(L)K2-10	147	1.32	1.32	2.65
LEHZJ25(L)K2-14	255	1.94	1.94	3.88

Note) Values for load in the table indicate static values.

Calculation of allowable external force (when moment load is applied)	Calculation example
<div>Allowable load F [N] = $\frac{M \text{ (Static allowable moment) [N·m]}}{L \times 10^{-3} *}$</div> <div>(* Constant for unit conversion)</div>	<div>When a static load of $f = 10$ N is operating, which applies pitch moment to point $L = 30$ mm from the LEHZJ16K2-6 guide. Therefore, it can be used.</div> <div>Allowable load $F = \frac{0.68}{30 \times 10^{-3}}$</div> <div>$= 22.7$ [N]</div> <div>Load $f = 10$ [N] < 22.7 [N]</div>

- LEFS
- LEFB
- LEJS
- LEJB
- LEL
- LEM
- LEY
- LEYG
- LES
- LESH
- LEPY
- LEPS
- LER
- LEH
- LEY-X5
- 11-LEFS
- 11-LEJS
- 25A-
- LEC
- LECS
- LECSS-T
- LECYM
- LECYU
- Motorless
- LAT3

Electric Gripper 2-Finger Type/ With Dust Cover

Series **LEHZJ** LEHZJ10, 16, 20, 25



How to Order

LEHZ J 10 K 2 - 4 - S 1 6N 1

1 2 3 4 5 6 7 8 9 10 11 12 13

1 Dust cover

J	With dust cover
---	-----------------

2 Size

10
16
20
25

3 Motor size

Nil	Basic
L	Compact

4 Lead

K	Basic
---	-------

5 2-finger type

6 Stroke [mm]

Stroke/both sides	Size
4	10
6	16
10	20
14	25

7 Dust cover type

Nil	Chloroprene rubber (CR)
K	Fluororubber (FKM)
S	Silicone rubber (Si)

8 Motor cable entry

Nil	<p>Basic (Entry on the left side)</p>
F	<p>Entry on the front side</p>

⚠ Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEH series and the controller LEC series.

The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result, it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.

② CC-Link direct input type (LECPMJ) is not CE-compliant.

[UL-compliant products]

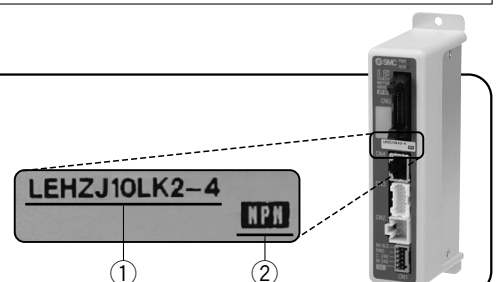
When conformity to UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.

The actuator and controller/driver are sold as a package.

Confirm that the combination of the controller/driver and the actuator is correct.

<Check the following before use.>

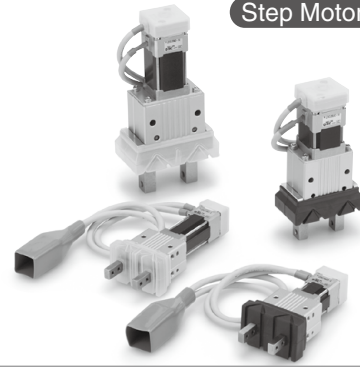
- ① Check the actuator label for model number. This matches the controller/driver.
- ② Check Parallel I/O configuration matches (NPN or PNP).



* Refer to the operation manual for using the products. Please download it via our website, <http://www.smcworld.com>

Electric Gripper 2-Finger Type/With Dust Cover **Series LEHZJ**

Step Motor (Servo/24 VDC)



9 Actuator cable type*1

Nil	Without cable
S	Standard cable
R	Robotic cable (Flexible cable)*2

*1 The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.

*2 Fix the motor cable protruding from the actuator to keep it unmovable. For details about fixing method, refer to Wiring/Cables in the Electric Actuators Precautions.

10 Actuator cable length [m]

Nil	Without cable
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only)
Refer to the specifications Note 3) on page 445.

11 Controller/Driver type*1

Nil	Without controller/driver	
6N	LECP6	NPN
6P	(Step data input type)	PNP
1N	LECP1	NPN
1P	(Programless type)	PNP
MJ	LECPMJ*2	—
	(CC-Link direct input type)	
AN	LECPA*3	NPN
AP	(Pulse input type)	PNP

*1 For details about controller/driver and compatible motor, refer to the compatible controller/driver below.

*2 Not applicable to CE.

*3 When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-□) on page 587 separately.

13 Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately.

12 I/O cable length*1, Communication plug

Nil	Without cable (Without communication plug connector)*3
1	1.5 m
3	3 m*2
5	5 m*2
S	Straight type communication plug connector*3
T	T-branch type communication plug connector*3

*1 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected. Refer to page 559 (For LECP6), page 573 (For LECP1) or page 587 (For LECPA) if I/O cable is required.

*2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.

*3 For the LECPMJ, only "Nil", "S" and "T" are selectable since I/O cable is not included.

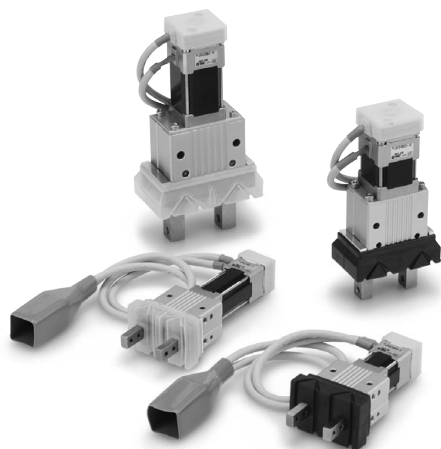
Compatible Controller/Driver

Type	Step data input type	CC-Link direct input type	Programless type	Pulse input type
Series	LECP6	LECPMJ	LECP1	LECPA
Features	Value (Step data) input Standard controller	CC-Link direct input	Capable of setting up operation (step data) without using a PC or teaching box	Operation by pulse signals
Compatible motor	Step motor (Servo/24 VDC)			
Maximum number of step data	64 points		14 points	—
Power supply voltage	24 VDC			
Reference page	Page 551	Page 591	Page 567	Page 581

Series LEHZJ

Step Motor (Servo/24 VDC)

Specifications



Model			LEHZJ10	LEHZJ16	LEHZJ20	LEHZJ25
Actuator specifications	Open and close stroke/both sides [mm]		4	6	10	14
	Lead [mm]		251/73 (3.438)	249/77 (3.234)	246/53 (4.642)	243/48 (5.063)
	Gripping force [N] <small>Note 1) Note 3)</small>	Basic	6 to 14		16 to 40	
		Compact	3 to 6	4 to 8	11 to 28	
	Open and close speed/Pushing speed [mm/s] <small>Note 2) Note 3)</small>		5 to 80/5 to 50		5 to 100/5 to 50	
	Drive method		Slide screw + Slide cam			
	Finger guide type		Linear guide (No circulation)			
	Repeated length measurement accuracy [mm] <small>Note 4)</small>		±0.05			
	Finger backlash/ one side [mm] <small>Note 5)</small>		0.25 or less			
	Repeatability [mm] <small>Note 6)</small>		±0.02			
	Positioning repeatability/one side [mm]		±0.05			
	Lost motion/one side [mm] <small>Note 7)</small>		0.25 or less			
	Impact/Vibration resistance [m/s ²] <small>Note 8)</small>		150/30			
	Max. operating frequency [C.P.M]		60			
	Operating temperature range [°C]		5 to 40			
	Operating humidity range [%RH]		90 or less (No condensation)			
Electric specifications	Weight [g]	Basic	170	230	440	610
		Compact	140	200	375	545
	Motor size		□20		□28	
	Motor type		Step motor (Servo/24 VDC)			
	Encoder		Incremental A/B phase (800 pulse/rotation)			
	Rated voltage [V]		24 VDC ±10%			
	Power consumption/ Standby power consumption when operating [W] <small>Note 9)</small>	Basic	11/7		28/15	
		Compact	8/7		22/12	
	Max. instantaneous power consumption [W] <small>Note 10)</small>	Basic	19		51	
		Compact	14		42	

Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Moving force should be 150% when releasing the workpiece. Gripping force accuracy should be ±30% (F.S.) for LEHZJ10/16 and ±25% (F.S.) for LEHZJ20/25.

Note 2) Pushing speed should be set within the range during pushing (gripping) operation. Otherwise, it may cause malfunction. The open/close speed and pushing speed are for both fingers. The speed for one finger is half this value.

Note 3) The speed and force may change depending on the cable length, load and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)

Note 4) Repeated length measurement accuracy means dispersion (value on the controller monitor) when the workpiece is repeatedly held in the same position.

Note 5) There will be no influence of backlash during pushing (gripping) operation. Make the stroke longer for the amount of backlash when opening.

Note 6) Repeatability means the variation of the gripping position (workpiece position) when the gripping operation is repeatedly performed by the same sequence for the same workpiece.

Note 7) A reference value for correcting an error in reciprocal operation which occurs during the positioning operation.

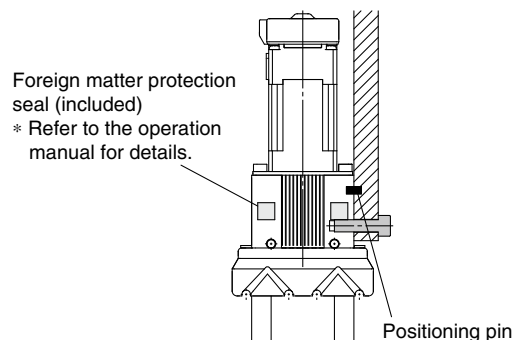
Note 8) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. Test was performed in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)

Note 9) The power consumption (including the controller) is for when the gripper is operating.
The standby power consumption when operating is for when the gripper is stopped in the set position during operation, including the energy saving mode when gripping.

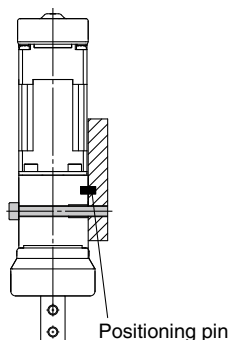
Note 10) The maximum instantaneous power consumption (including the controller) is for when the gripper is operating.
This value can be used for the selection of the power supply.

How to Mount

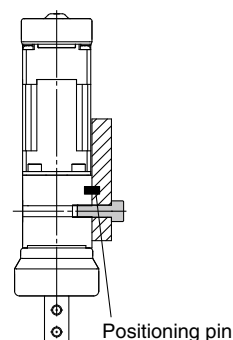
a) When using the thread on the side of the body



b) When using the thread on the mounting plate

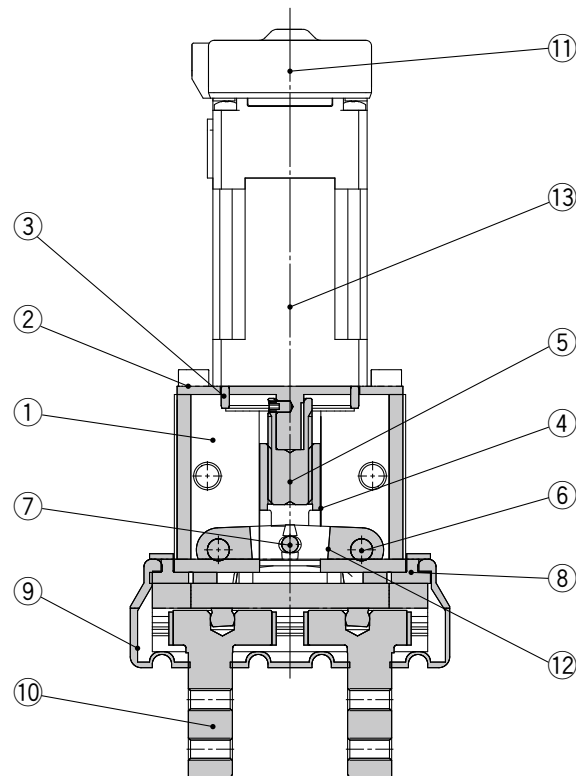


c) When using the thread on the back of the body



Construction

Series LEHZJ



Component Parts

No.	Description	Material	Note
1	Body	Aluminum alloy	Anodized
2	Motor plate	Aluminum alloy	Anodized
3	Guide ring	Aluminum alloy	
4	Slide nut	Stainless steel	Heat treatment + Special treatment
5	Slide bolt	Stainless steel	Heat treatment + Special treatment
6	Needle roller	High carbon chromium bearing steel	
7	Needle roller	High carbon chromium bearing steel	
8	Body plate	Aluminum alloy	Anodized
9	Dust cover	CR	Chloroprene rubber
		FKM	Fluororubber
		Si	Silicone rubber
10	Finger assembly	—	
11	Encoder dust cover	Si	Silicone rubber
12	Lever	Special stainless steel	
13	Step motor (Servo/24 VDC)	—	

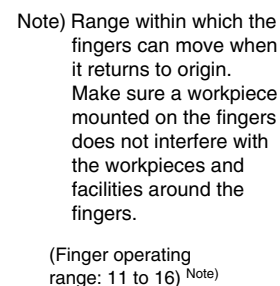
Replacement Parts

No.	Description			LEHZJ10	LEHZJ16	LEHZJ20	LEHZJ25
9	Dust cover	Material	CR	MHZJ2-J10	MHZJ2-J16	MHZJ2-J20	MHZJ2-J25
			FKM	MHZJ2-J10F	MHZJ2-J16F	MHZJ2-J20F	MHZJ2-J25F
			Si	MHZJ2-J10S	MHZJ2-J16S	MHZJ2-J20S	MHZJ2-J25S
10	Finger assembly			MHZJ-AA1002	MHZJ-AA1602	MHZJ-AA2002	MHZJ-AA2502

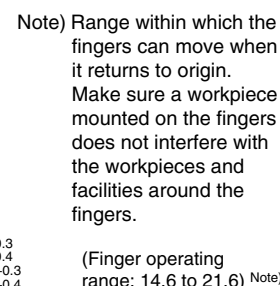
* The dust cover is a consumable part. Please replace as necessary.

LEHZJ10(L)K2-4

Model	L	(L ₁)
LEHZJ10K2-4□	109.8	(62.7)
LEHZJ10LK2-4□	93.2	(46.1)



Model	L	(L ₁)
LEHZJ16K2-6□	118.6	(62.7)
LEHZJ16LK2-6□	102	(46.1)



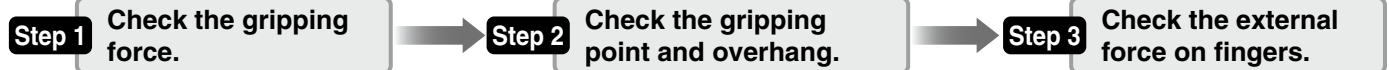
LAT:

Model Selection



Series LEHF ▶ Page 453

Selection Procedure

**Step 1** Check the gripping force.**Example**

Workpiece mass: 0.1 kg

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

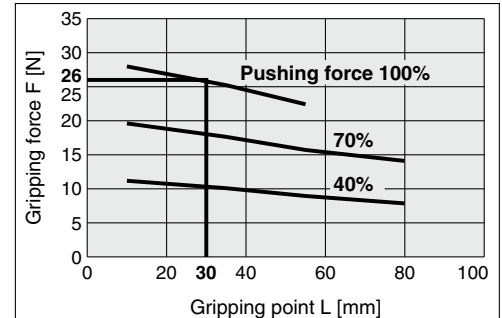
- Although conditions differ according to the workpiece shape and the coefficient of friction between the attachments and the workpiece, select a model that can provide a gripping force of 10 to 20 times ^{Note)} the workpiece weight, or more.

Note) For details, refer to the model selection illustration.

- If high acceleration 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
 $= 0.1 \text{ kg} \times 20 \times 9.8 \text{ m/s}^2 \approx 19.6 \text{ N}$ or more

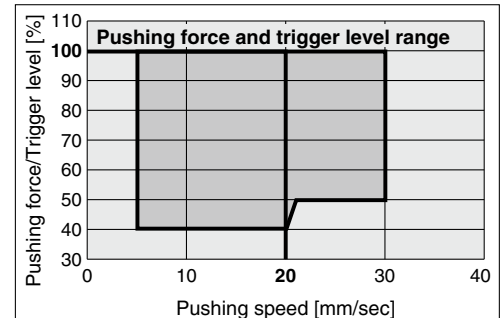
LEHF20**When the LEHF20 is selected.**

- A gripping force of 26 N is obtained from the intersection point of gripping point distance $L = 30 \text{ mm}$ and pushing force of 100%.
- Gripping force is 26.5 times greater than the workpiece weight, and therefore satisfies a gripping force setting value of 20 times or more.

Pushing force: 100%

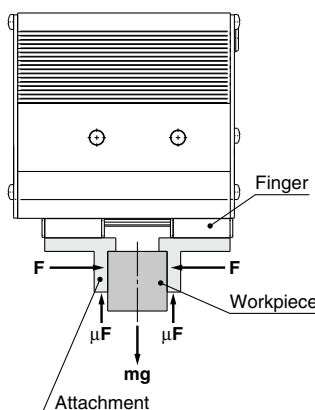
Gripping point distance: 30 mm

Pushing speed: 20 mm/sec

LEHF20

- Pushing speed is satisfied at the point where 100% of the pushing force and 20 mm/sec of the pushing speed cross.

Note) Confirm the pushing speed range from the determined pushing force [%].

Calculation of required gripping force

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 ($= 9.8 \text{ m/s}^2$)

mg: Workpiece weight (N)

the conditions under which the workpiece will not drop are
 $2 \times \mu F > mg$

Number of fingers

and therefore, $F > \frac{mg}{2 \times \mu}$

With "a" representing the 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 margin of "a" = 4, which allows for impacts that occur during normal transportation, etc.

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

<Reference> Coefficient of friction μ (depends on the operating environment, contact pressure, etc.)

Coefficient of friction μ	Attachment – Material of workpieces (guideline)
0.1	Metal (surface roughness Rz3.2 or less)
0.2	Metal
0.2 or more	Rubber, Resin, etc.

- Note) • Even in cases where the coefficient of friction is greater than $\mu = 0.2$, 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 or impact forces are encountered during motion, a further margin should be considered.

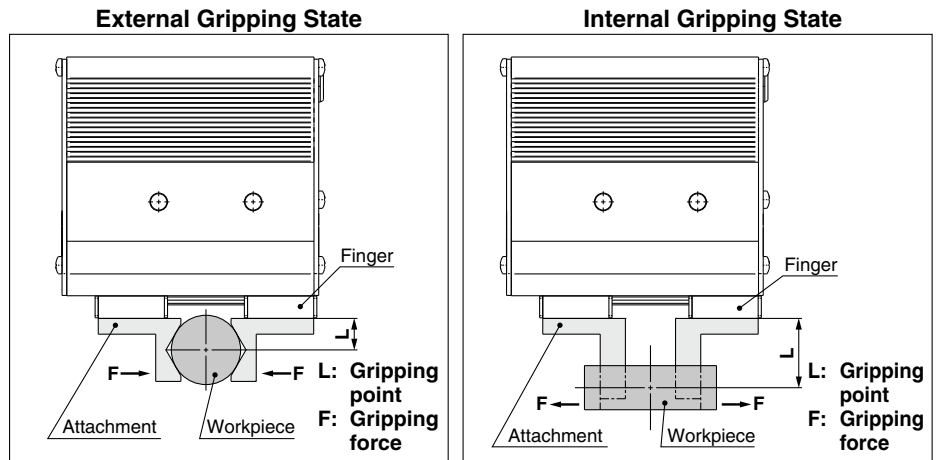
Selection Procedure

Step 1 Check the gripping force: Series LEHF

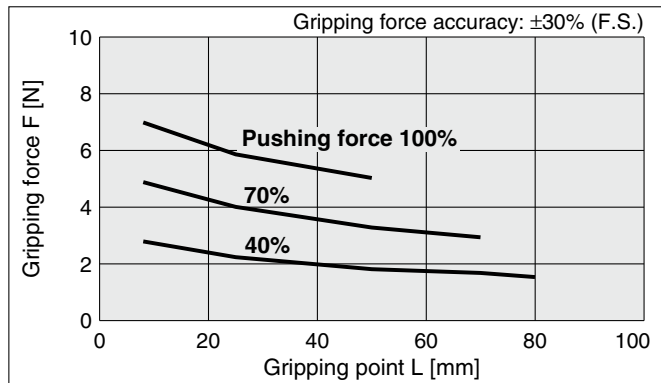
● Indication of gripping force

Gripping force shown in the graphs below is expressed as “F”, which is the gripping force of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

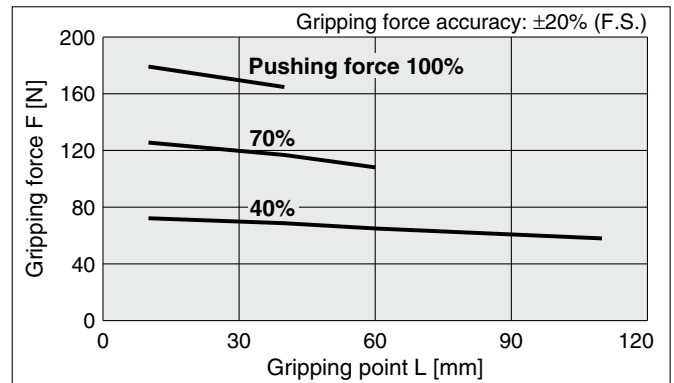
- Set the workpiece gripping point “L” so that it is within the range shown in the figure below.



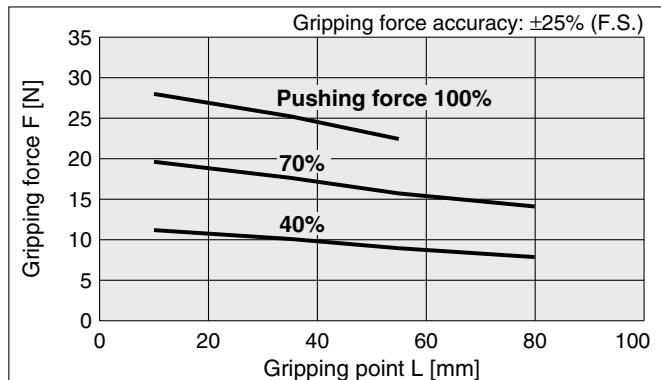
LEHF10



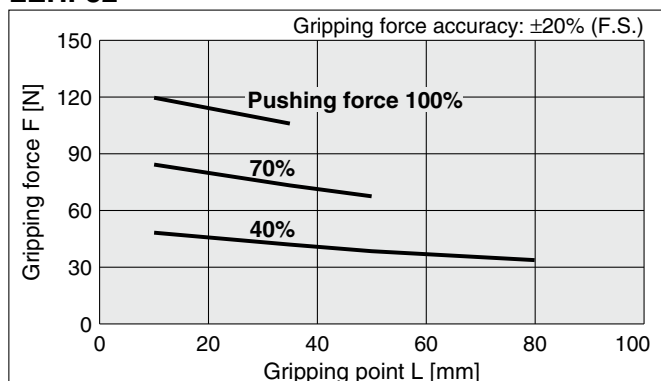
LEHF40



LEHF20

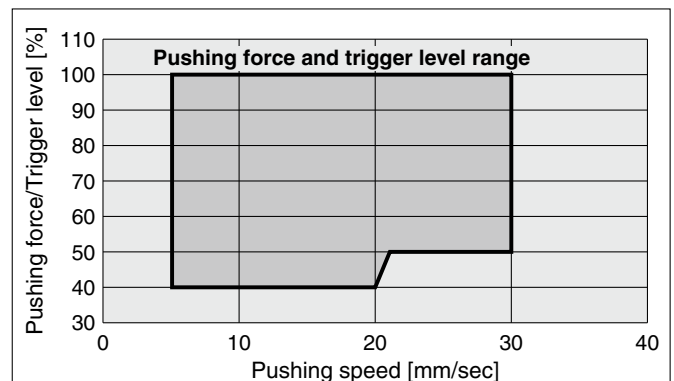


LEHF32



Selection of Pushing Speed

- Set the [Pushing force] and the [Trigger LV] within the range shown in the figure below.



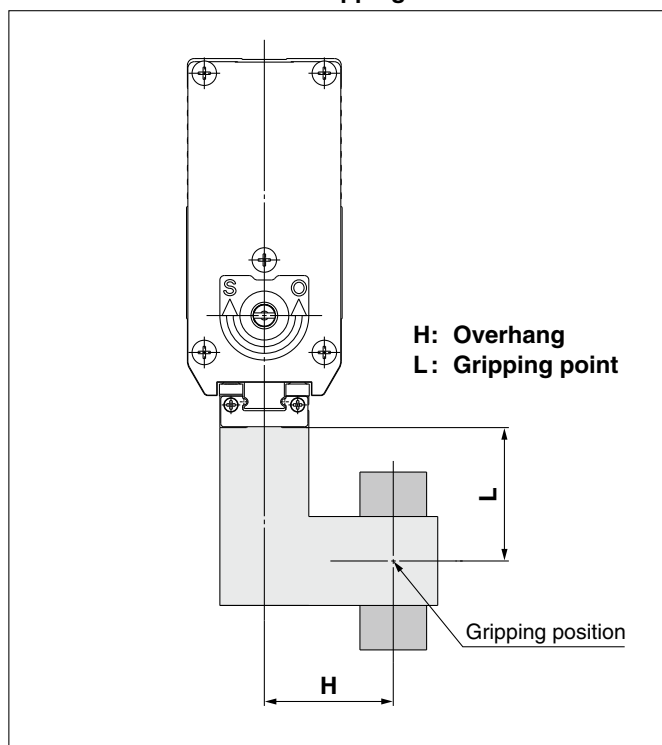
* Pushing force is one of the values of step data that is input into the controller.

Selection Procedure

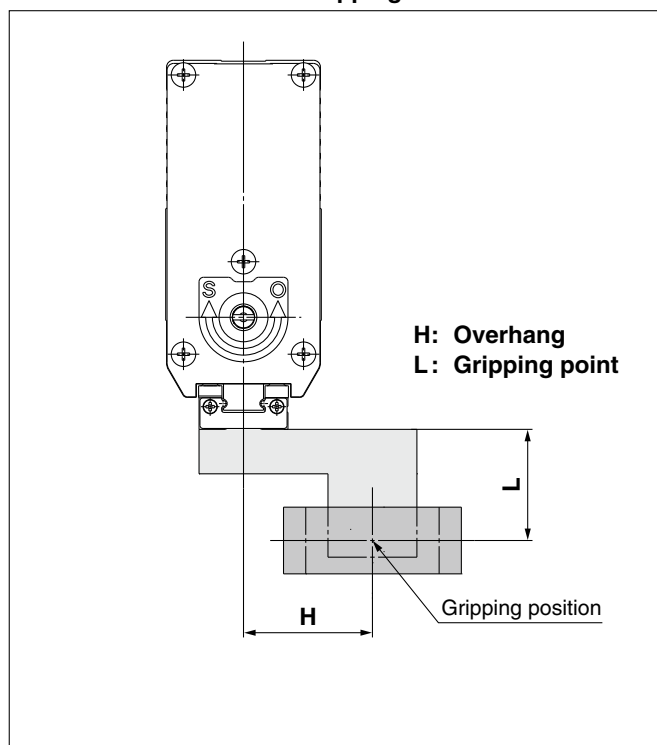
Step 2 Check the gripping point and overhang: Series LEHF

- Decide the gripping position of the workpiece so that the amount of overhang "H" stays within the range shown in the figure below.
- If the gripping position is out of the limit, it may shorten the life of the electric gripper.

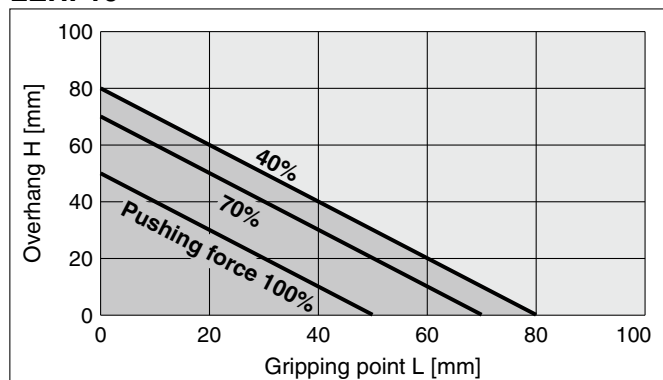
External Gripping State



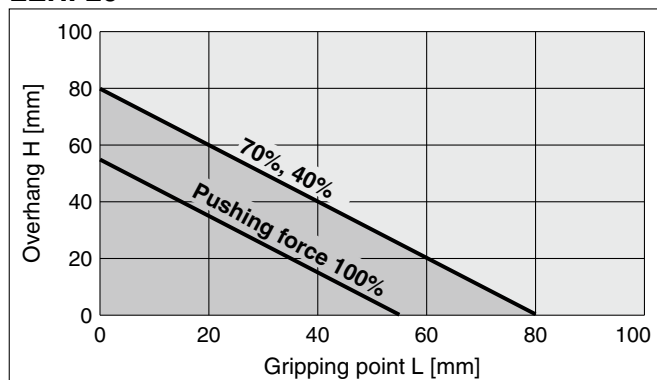
Internal Gripping State



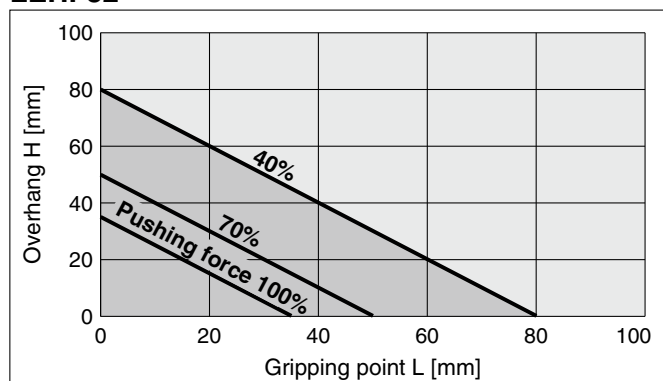
LEHF10



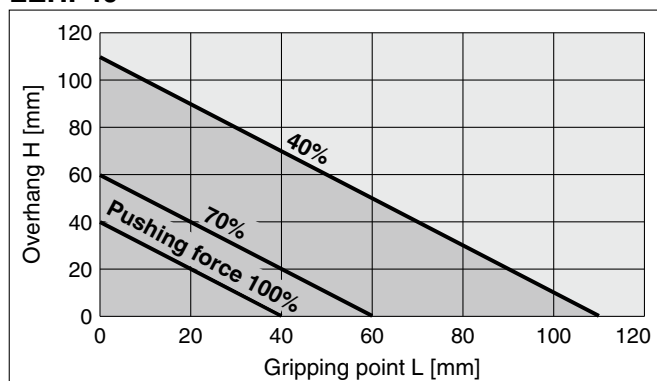
LEHF20



LEHF32



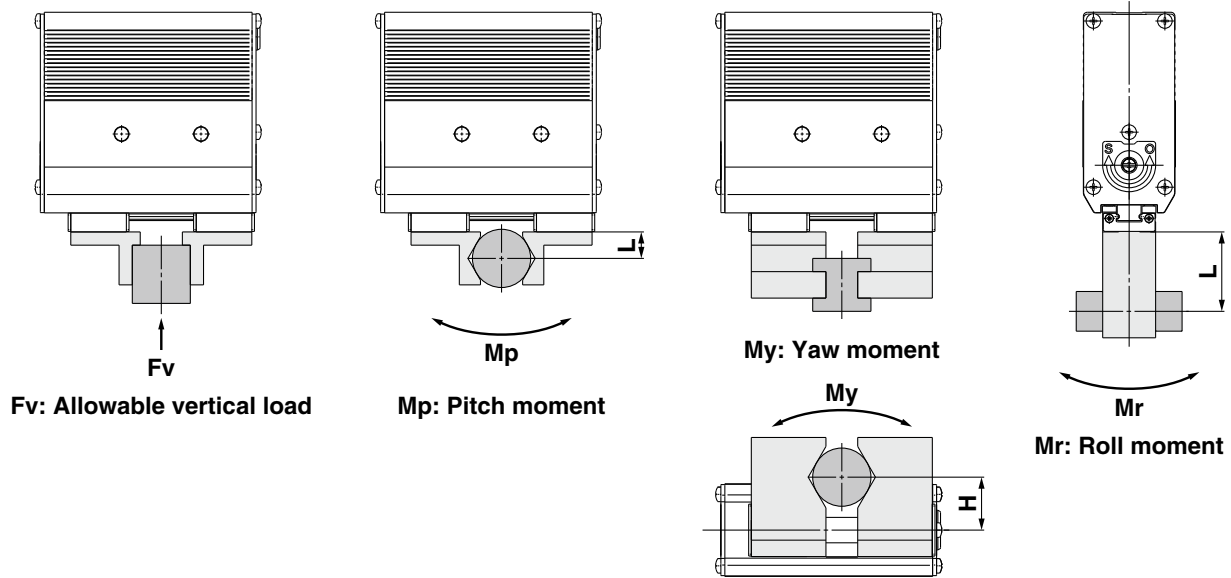
LEHF40



* Pushing force is one of the values of step data that is input into the controller.

Selection Procedure

Step 3 Check the external force on fingers: Series LEHF



H, L: Distance to the point at which the load is applied [mm]

Model	Allowable vertical load Fv [N]	Static allowable moment		
		Pitch moment: Mp [N·m]	Yaw moment: My [N·m]	Roll moment: Mr [N·m]
LEHF10K2-□	58	0.26	0.26	0.53
LEHF20K2-□	98	0.68	0.68	1.4
LEHF32K2-□	176	1.4	1.4	2.8
LEHF40K2-□	294	2	2	4

Note) Values for load in the table indicate static values.

Calculation of allowable external force (when moment load is applied)	Calculation example
$\text{Allowable load } F \text{ [N]} = \frac{M \text{ (Static allowable moment) [N·m]}}{L \times 10^{-3} *}$ <p>(* Constant for unit conversion)</p>	<p>When a static load of $f = 10 \text{ N}$ is operating, which applies pitch moment to point $L = 30 \text{ mm}$ from the LEHF20K2-□ guide. Therefore, it can be used.</p> $\text{Allowable load } F = \frac{0.68}{30 \times 10^{-3}}$ $= 22.7 \text{ [N]}$ <p>Load $f = 10 \text{ [N]} < 22.7 \text{ [N]}$</p>

Electric Gripper 2-Finger Type

Series **LEHF** LEHF10, 20, 32, 40



How to Order

LEHF **10** **K** **2** - **16** **□** - **S** **1** **6N** **1** **□**

1
2
3
4
5
6
7
8
9
10

1 Size

10
20
32
40

2 Lead

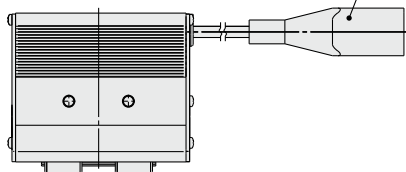
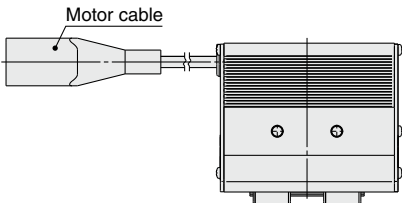
K	Basic
----------	-------

3 2-finger type

4 Stroke [mm]

Stroke/both sides		Size
Basic	Long stroke	
16	32	10
24	48	20
32	64	32
40	80	40

5 Motor cable entry

Nil	<p>Basic (Entry on the right side)</p> 
L	<p>Entry on the left side</p> 

⚠ Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEH series and the controller LEC series.

The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result, it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.

② CC-Link direct input type (LECPMJ) is not CE-compliant.

[UL-compliant products]

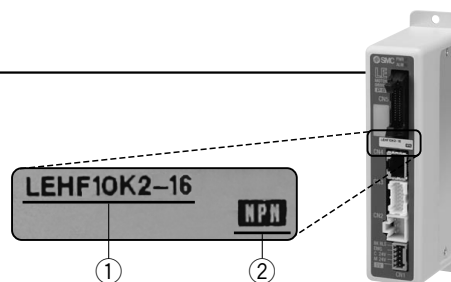
When conformity to UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.

The actuator and controller/driver are sold as a package.

Confirm that the combination of the controller/driver and the actuator is correct.

<Check the following before use.>

- ① Check the actuator label for model number. This matches the controller/driver.
- ② Check Parallel I/O configuration matches (NPN or PNP).



* Refer to the operation manual for using the products. Please download it via our website, <http://www.smcworld.com>

Electric Gripper 2-Finger Type **Series LEHF**

Step Motor (Servo/24 VDC)



6 Actuator cable type*1

Nil	Without cable
S	Standard cable
R	Robotic cable (Flexible cable)*2

*1 The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.

*2 Fix the motor cable protruding from the actuator to keep it unmovable. For details about fixing method, refer to Wiring/Cables in the Electric Actuators Precautions.

7 Actuator cable length [m]

Nil	Without cable
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only)
Refer to the specifications Note 3) on page 455.

8 Controller/Driver type*1

Nil	Without controller/driver	
6N	LECP6	NPN
6P	(Step data input type)	PNP
1N	LECP1	NPN
1P	(Programless type)	PNP
MJ	LECPMJ*2	—
	(CC-Link direct input type)	
AN	LECPA*3	NPN
AP	(Pulse input type)	PNP

*1 For details about controller/driver and compatible motor, refer to the compatible controller/driver below.

*2 Not applicable to CE.

*3 When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-□) on page 587 separately.

10 Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately.

9 I/O cable length*1, Communication plug

Nil	Without cable (Without communication plug connector)*3
1	1.5 m
3	3 m*2
5	5 m*2
S	Straight type communication plug connector*3
T	T-branch type communication plug connector*3

*1 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected. Refer to page 559 (For LECP6), page 573 (For LECP1) or page 587 (For LECPA) if I/O cable is required.

*2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.

*3 For the LECPMJ, only "Nil", "S" and "T" are selectable since I/O cable is not included.

Compatible Controller/Driver

Type	Step data input type	CC-Link direct input type	Programless type	Pulse input type
Series	LECP6	LECPMJ	LECP1	LECPA
Features	Value (Step data) input Standard controller	CC-Link direct input	Capable of setting up operation (step data) without using a PC or teaching box	Operation by pulse signals
Compatible motor	Step motor (Servo/24 VDC)			
Maximum number of step data	64 points		14 points	—
Power supply voltage	24 VDC			
Reference page	Page 551	Page 591	Page 567	Page 581

Series LEHF

Step Motor (Servo/24 VDC)



Specifications

Model			LEHF10	LEHF20	LEHF32	LEHF40
Actuator specifications	Open and close stroke/both sides [mm]	Basic	16	24	32	40
		Long stroke	32	48	64	80
	Lead [mm]		40/15 (2.667)	50/15 (3.333)	70/16 (4.375)	70/16 (4.375)
	Gripping force [N] <small>Note 1) Note 3)</small>		3 to 7	11 to 28	48 to 120	72 to 180
	Open and close speed/Pushing speed [mm/s] <small>Note 2) Note 3)</small>		5 to 80/5 to 20	5 to 100/5 to 30		
	Drive method		Slide screw + Belt			
	Finger guide type		Linear guide (No circulation)			
	Repeated length measurement accuracy [mm] <small>Note 4)</small>		±0.05			
	Finger backlash/one side [mm] <small>Note 5)</small>		0.5 or less			
	Repeatability [mm] <small>Note 6)</small>		±0.05			
	Positioning repeatability/one side [mm]		±0.1			
	Lost motion/one side [mm] <small>Note 7)</small>		0.3 or less			
	Impact/Vibration resistance [m/s ²] <small>Note 8)</small>		150/30			
	Max. operating frequency [C.P.M]		60			
	Operating temperature range [°C]		5 to 40			
	Operating humidity range [%RH]		90 or less (No condensation)			
	Weight [g]	Basic	340	610	1625	1980
		Long stroke	370	750	1970	2500
Electric specifications	Motor size		□20	□28	□42	
	Motor type		Step motor (Servo/24 VDC)			
	Encoder		Incremental A/B phase (800 pulse/rotation)			
	Rated voltage [V]		24 VDC ±10%			
	Power consumption/Standby power consumption when operating [W] <small>Note 9)</small>		11/7	28/15	34/13	36/13
	Max. instantaneous power consumption [W] <small>Note 10)</small>		19	51	57	61

Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Moving force should be 150% when releasing the workpiece. Gripping force accuracy should be ±30% (F.S.) for LEHF10, ±25% (F.S.) for LEHF20 and ±20% (F.S.) for LEHF32/40.

Note 2) Pushing speed should be set within the range during pushing (gripping) operation. Otherwise, it may cause malfunction. The open/close speed and pushing speed are for both fingers. The speed for one finger is half this value.

Note 3) The speed and force may change depending on the cable length, load and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)

Note 4) Repeated length measurement accuracy means dispersion (value on the controller monitor) when the workpiece is repeatedly held in the same position.

Note 5) There will be no influence of backlash during pushing (gripping) operation. Make the stroke longer for the amount of backlash when opening.

Note 6) Repeatability means the variation of the gripping position (workpiece position) when the gripping operation is repeatedly performed by the same sequence for the same workpiece.

Note 7) A reference value for correcting an error in reciprocal operation which occurs during the positioning operation.

Note 8) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)

Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. Test was performed in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)

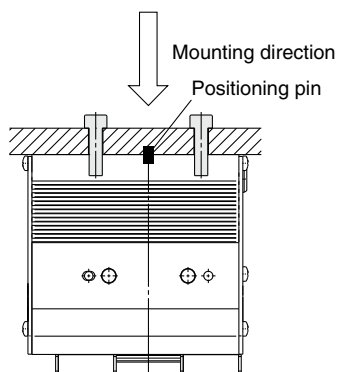
Note 9) The power consumption (including the controller) is for when the gripper is operating.

The standby power consumption when operating is for when the gripper is stopped in the set position during operation, including the energy saving mode when gripping.

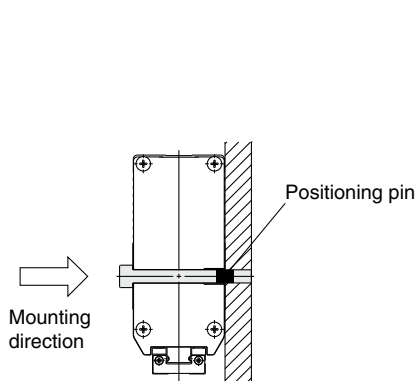
Note 10) The maximum instantaneous power consumption (including the controller) is for when the gripper is operating. This value can be used for the selection of the power supply.

How to Mount

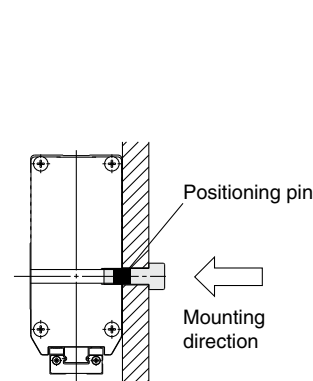
a) When using the thread on the body



b) When using the thread on the mounting plate

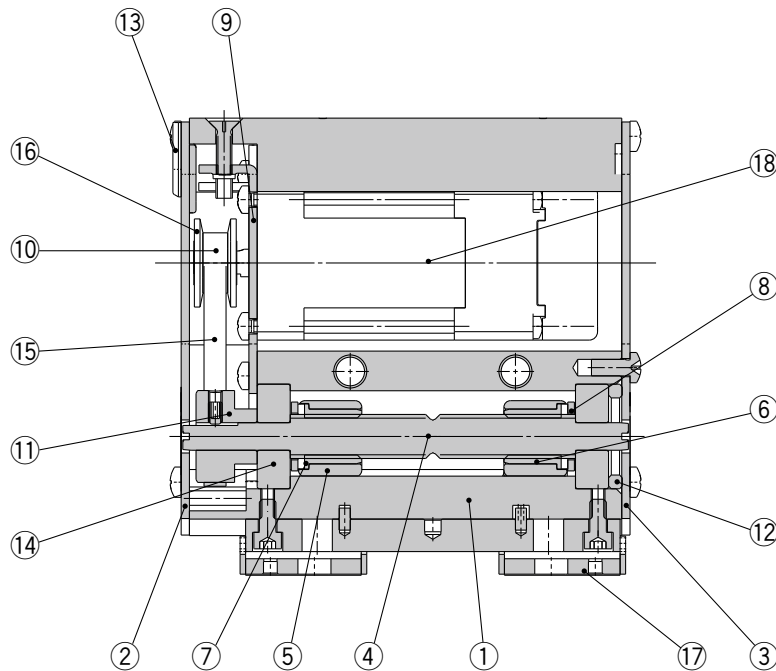


c) When using the thread on the back of the body



Construction

Series LEHF



Component Parts

No.	Description	Material	Note
1	Body	Aluminum alloy	Anodized
2	Side plate A	Aluminum alloy	Anodized
3	Side plate B	Aluminum alloy	Anodized
4	Slide shaft	Stainless steel	Heat treatment + Special treatment
5	Slide bushing	Stainless steel	
6	Slide nut	Stainless steel	Heat treatment + Special treatment
7	Slide nut	Stainless steel	Heat treatment + Special treatment
8	Fixed plate	Stainless steel	
9	Motor plate	Carbon steel	
10	Pulley A	Aluminum alloy	
11	Pulley B	Aluminum alloy	
12	Bearing stopper	Aluminum alloy	
13	Rubber bushing	NBR	
14	Bearing	—	
15	Belt	—	
16	Flange	—	
17	Finger assembly	—	
18	Step motor (Servo/24 VDC)	—	

LEFS
LEFB

LEJS
LEJB

LEL

LEM

LEY
LEYG

LES
LESH

LEPY
LEPS

LER

LEH

LEY-X5

11-LEFS

11-LEJS

25A-

LEC□

LECS□

LECSS-T

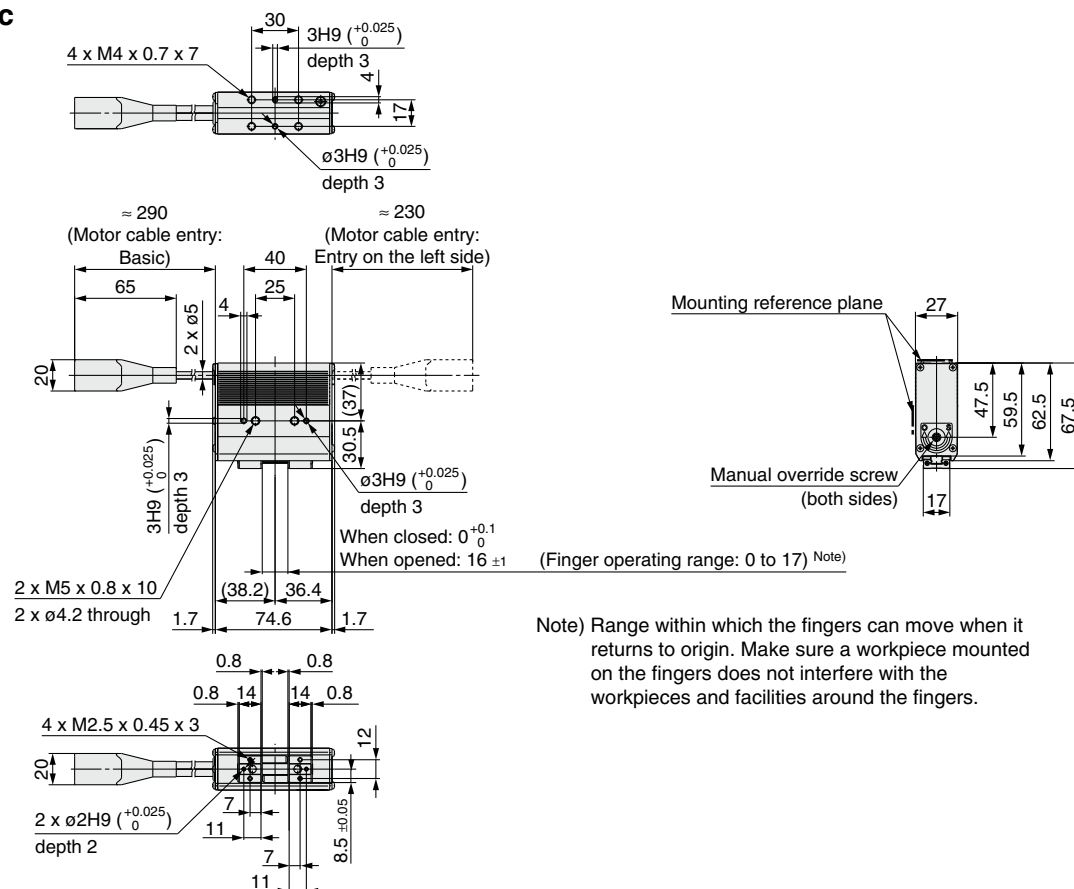
LECYM
LECYU

Motorless

LAT3

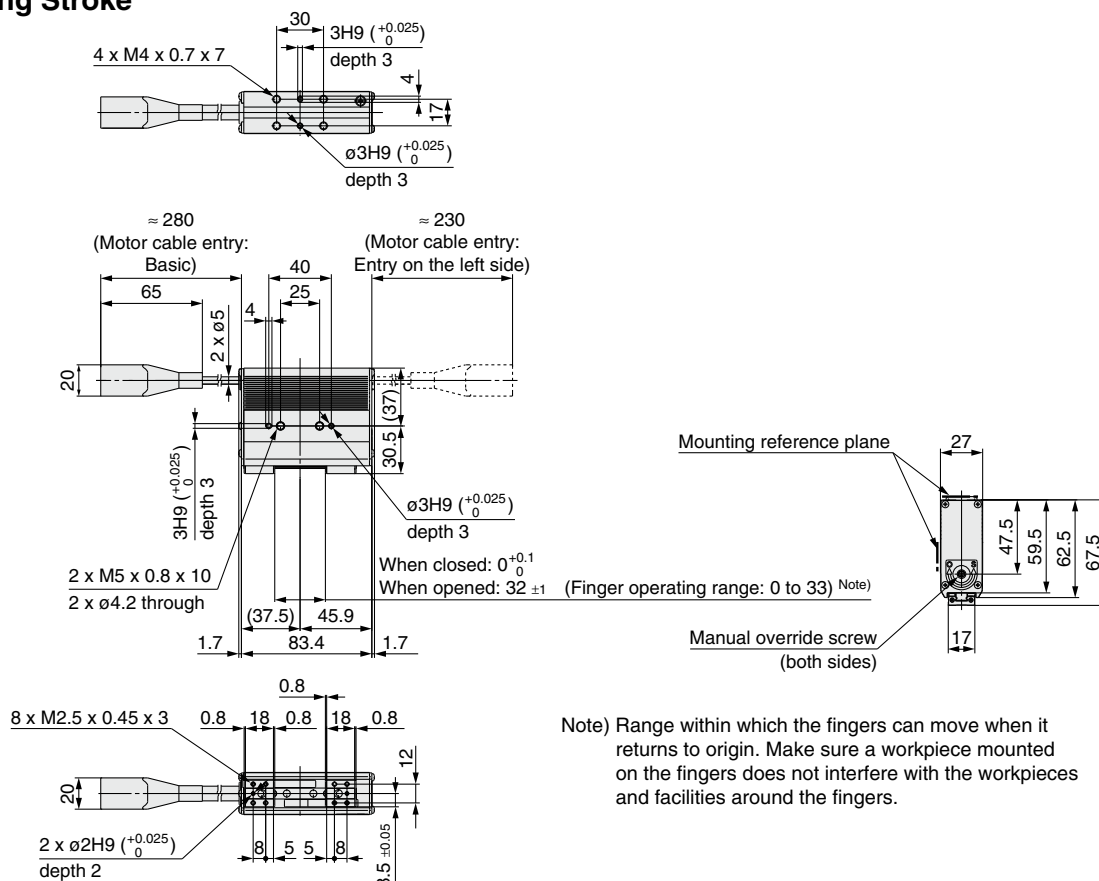
Dimensions

LEHF10K2-16: Basic



Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

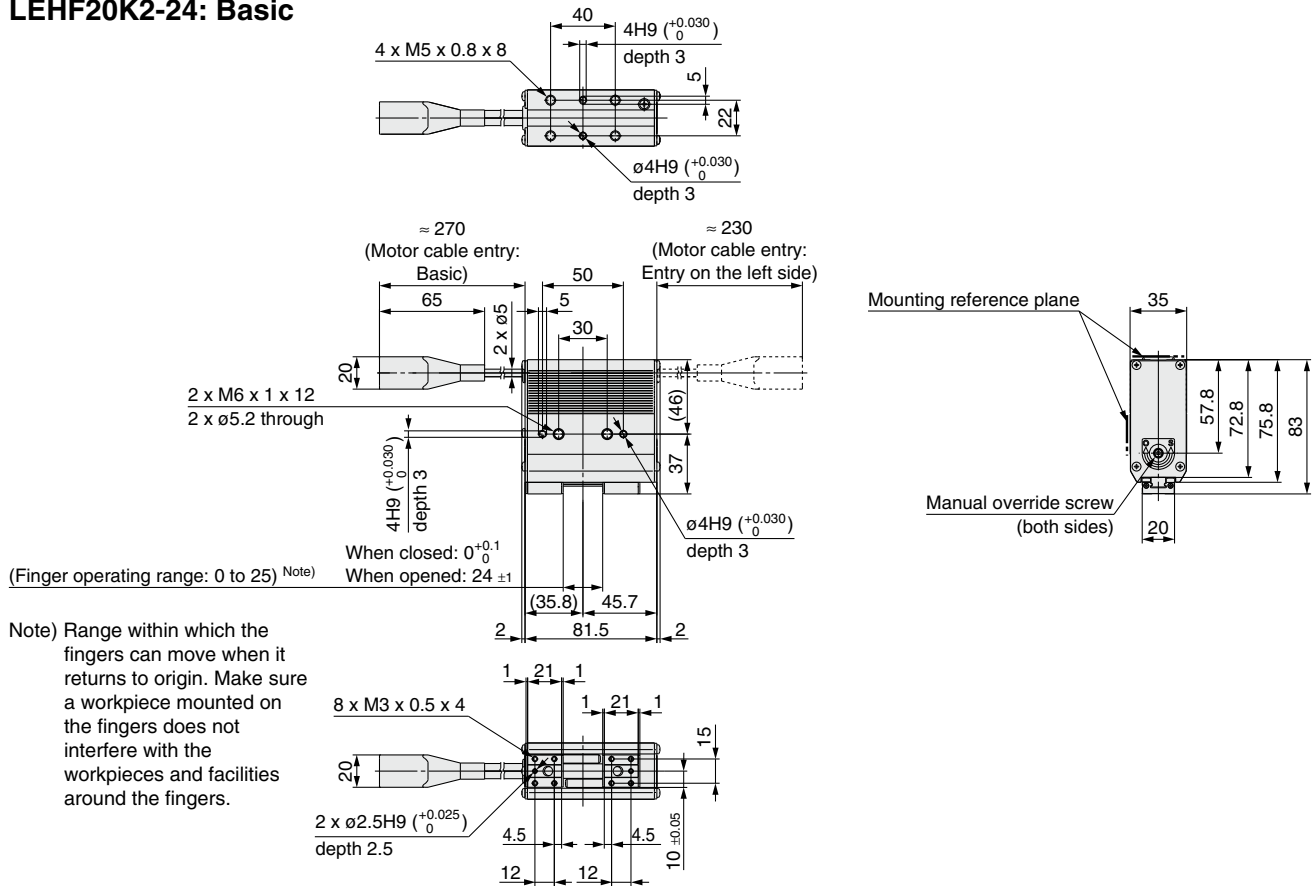
LEHF10K2-32: Long Stroke



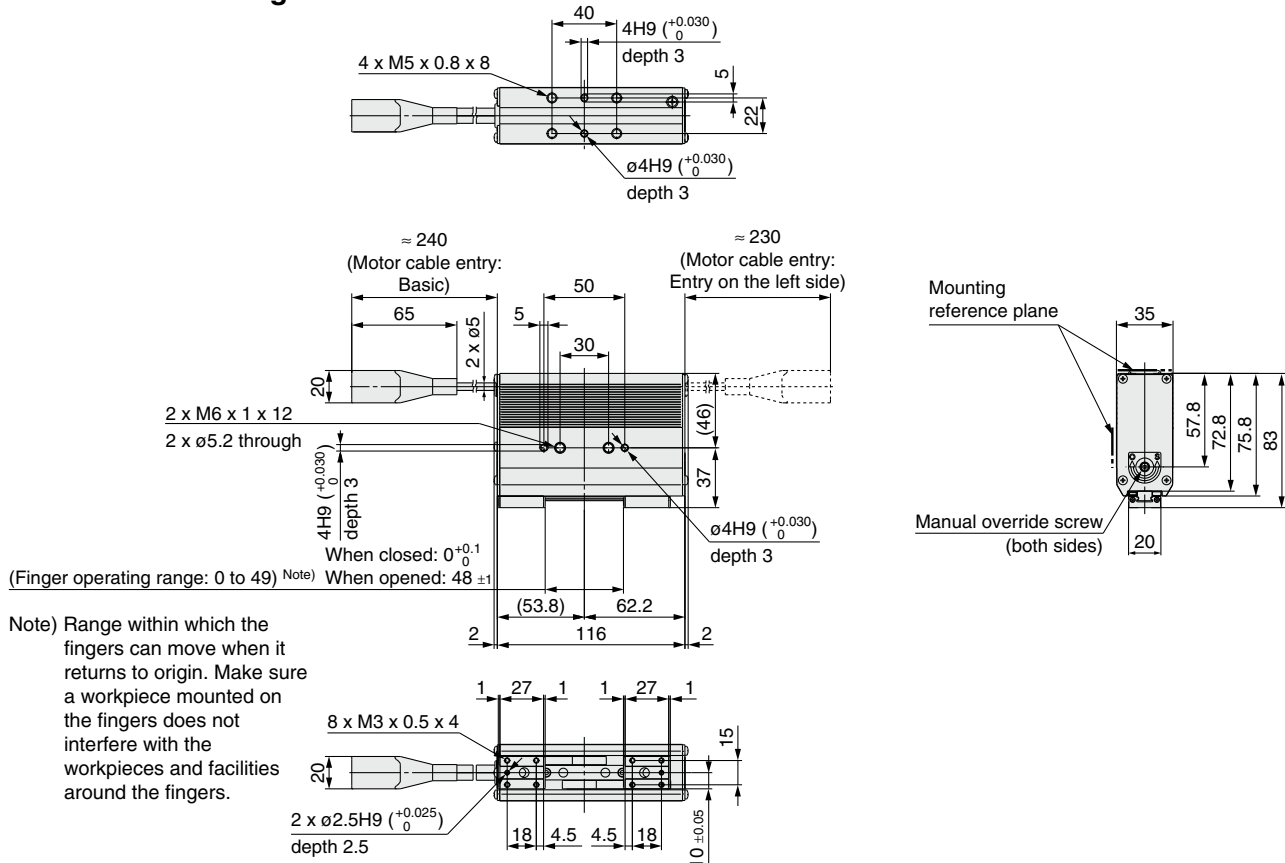
Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

Dimensions

LEHF20K2-24: Basic

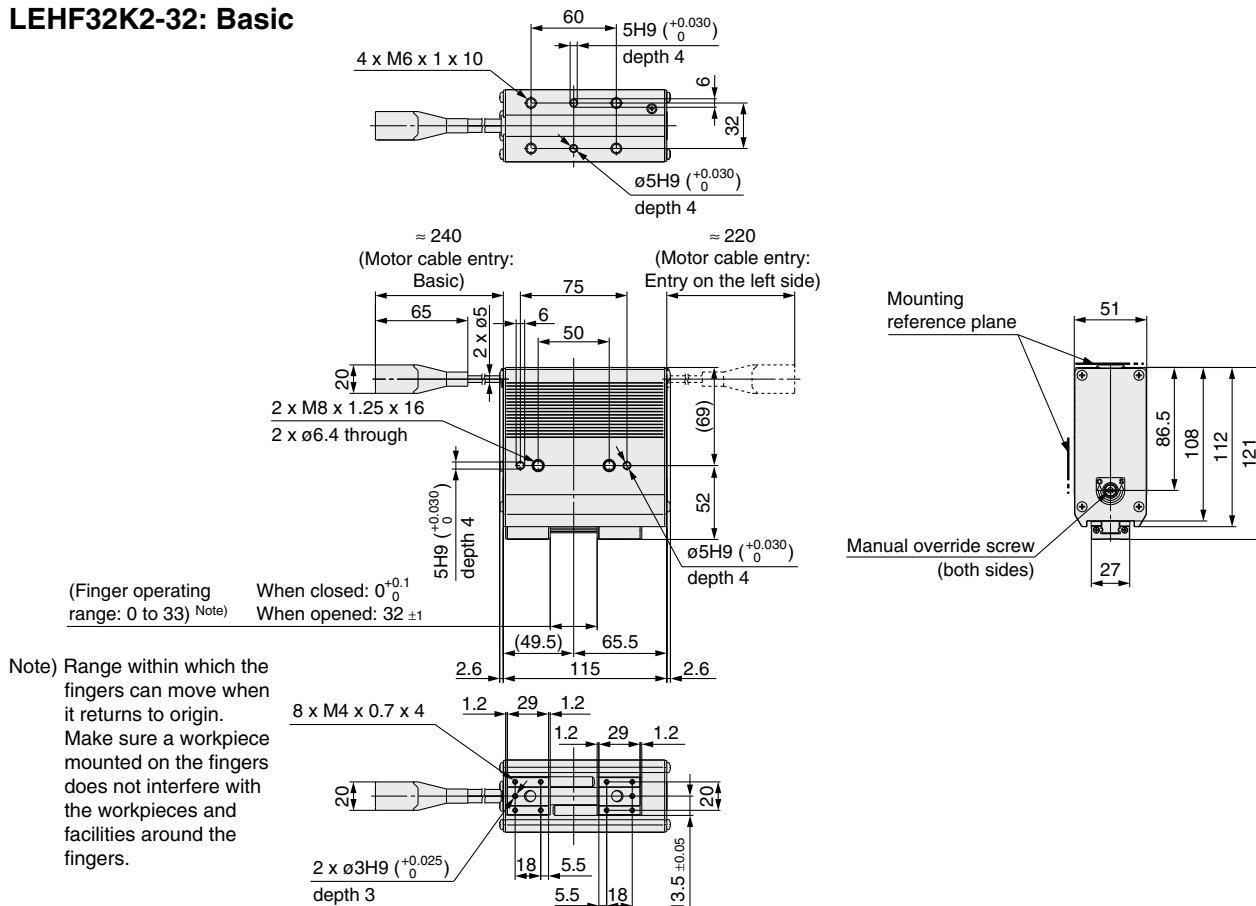


LEHF20K2-48: Long Stroke

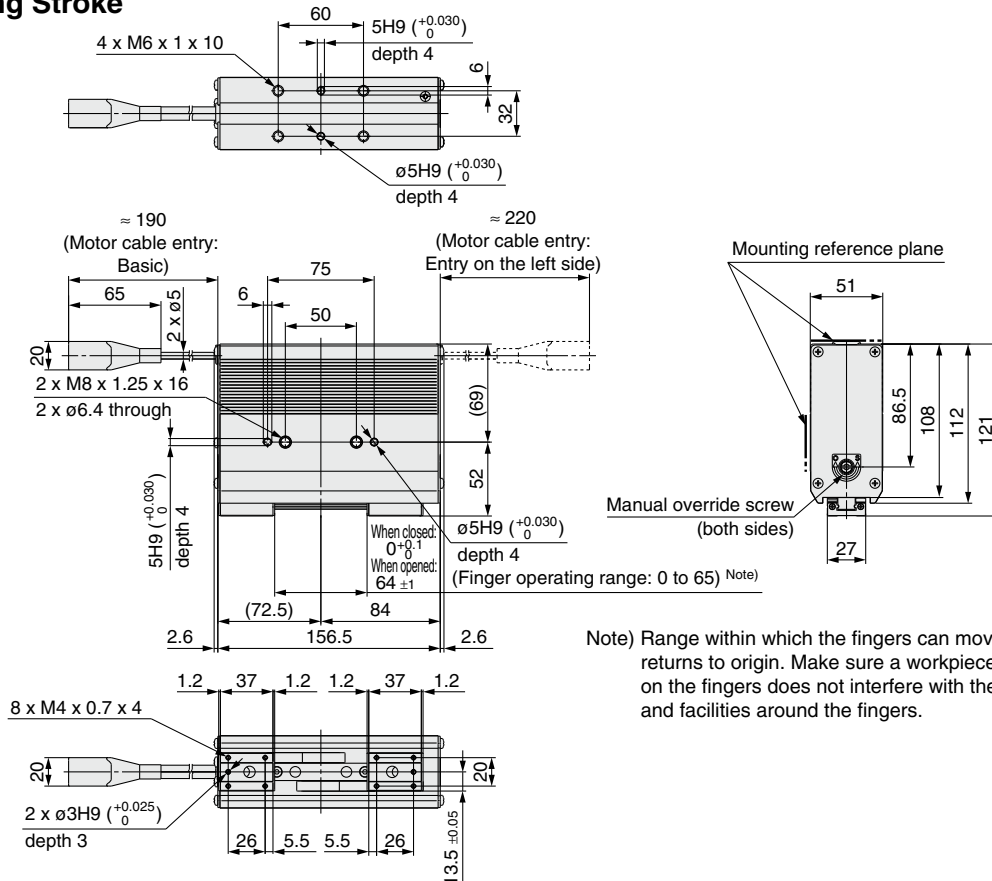


Dimensions

LEHF32K2-32: Basic

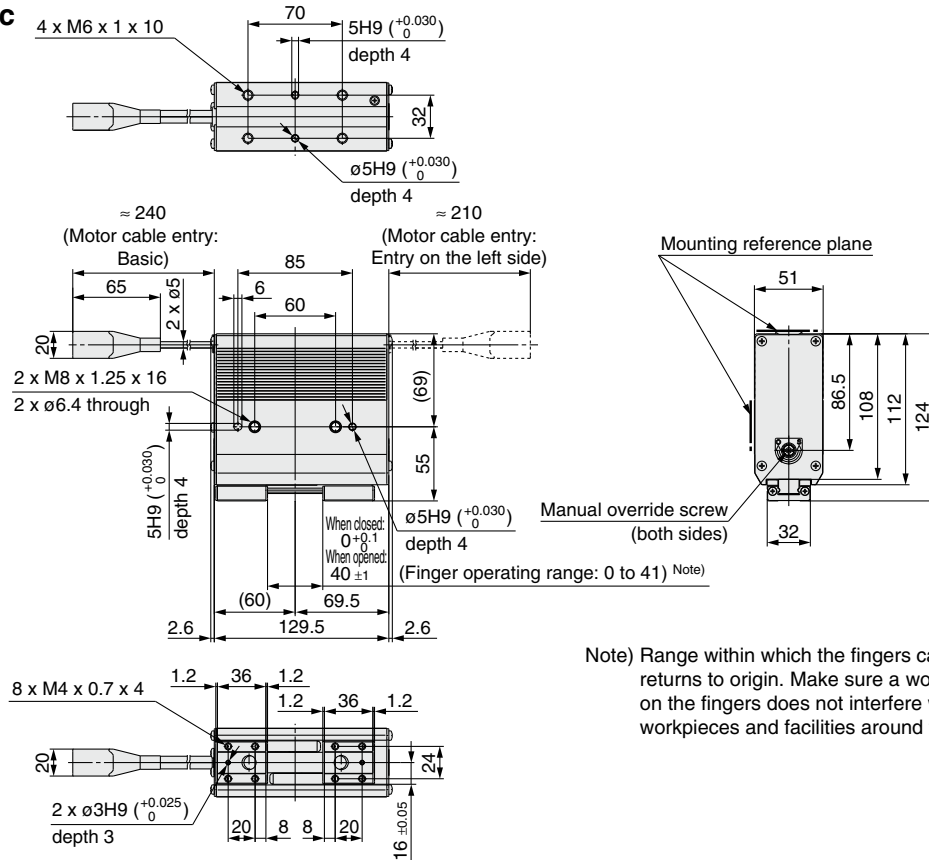


LEHF32K2-64: Long Stroke



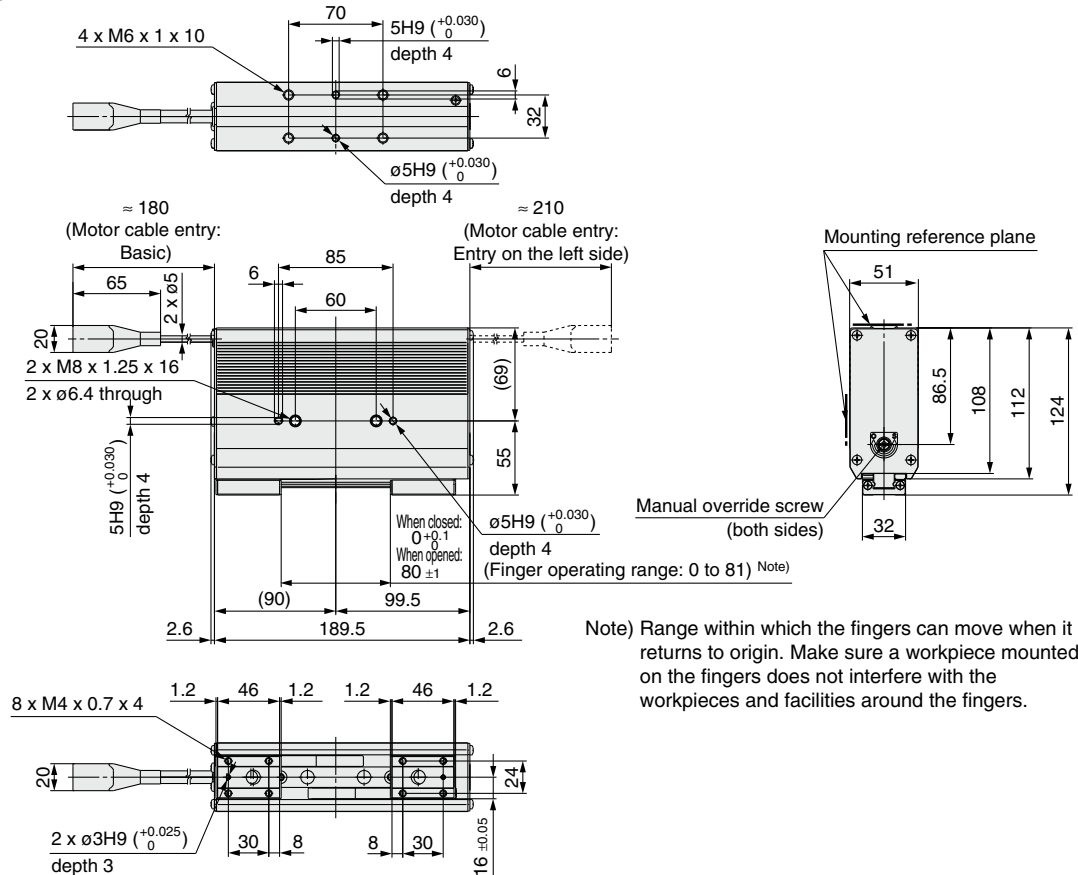
Dimensions

LEHF40K2-40: Basic



Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHF40K2-80: Long Stroke



Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

Model Selection

Series LEHS ▶ Page 465

Selection Procedure

Step Check the gripping force.

Check the conditions.

Calculate the required gripping force.

Select the model from gripping force graph.

Select the pushing speed.

Example

Workpiece mass: 0.1 kg

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

- Although conditions differ according to the workpiece shape and the coefficient of friction between the attachments and the workpiece, select a model that can provide a gripping force of 7 to 13 times ^{Note)} the workpiece weight, or more.

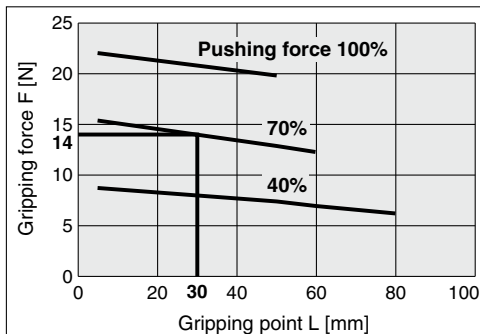
Note) For details, refer to the calculation of required gripping force.

- If high acceleration or impact forces are encountered during motion, a further margin of safety should be considered.

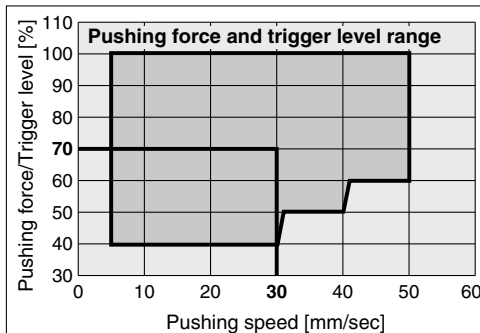
Example) When it is desired to set the gripping force at 13 times or more above the workpiece weight.

Required gripping force

$$= 0.1 \text{ kg} \times 13 \times 9.8 \text{ m/s}^2 \approx 12.7 \text{ N or more}$$

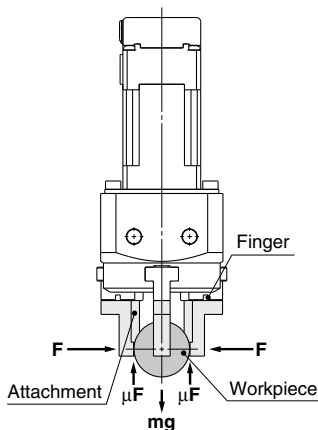
LEHS20**When the LEHS20 is selected.**

- A gripping force of 14 N is obtained from the intersection point of gripping point distance L = 30 mm and pushing force of 70%.
- Gripping force is 14 times greater than the workpiece weight, and therefore satisfies a gripping force setting value of 13 times or more.

LEHS20

- Pushing speed is satisfied at the point where 70% of the pushing force and 30 mm/sec of the pushing speed cross.

Note) Confirm the pushing speed range from the determined pushing force [%].

Calculation of required gripping force

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/s²)

mg: Workpiece weight (N)

the conditions under which the workpiece will not drop are

$$3 \times \mu F > mg$$

Number of fingers

$$\text{and therefore, } F > \frac{mg}{3 \times \mu}$$

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

$$F = \frac{mg}{3 \times \mu} \times a$$

"Gripping force at least 7 to 13 times the workpiece weight"

- The "7 to 13 times or more of the workpiece weight" recommended by SMC is calculated with a margin of "a" = 4, which allows for impacts that occur during normal transportation, etc.

When $\mu = 0.2$	When $\mu = 0.1$
$F = \frac{mg}{3 \times 0.2} \times 4 = 6.7 \times mg$	$F = \frac{mg}{3 \times 0.1} \times 4 = 13.3 \times mg$
7 x Workpiece weight	13 x Workpiece weight

<Reference> Coefficient of friction μ (depends on the operating environment, contact pressure, etc.)

Coefficient of friction μ	Attachment - Material of workpieces (guideline)
0.1	Metal (surface roughness Rz3.2 or less)
0.2	Metal
0.2 or more	Rubber, Resin, etc.

- Note) • Even in cases where the coefficient of friction is greater than $\mu = 0.2$, for reasons of safety, select a gripping force which is at least 7 to 13 times greater than the workpiece weight, as recommended by SMC.
- If high acceleration or impact forces are encountered during motion, a further margin should be considered.

Selection Procedure

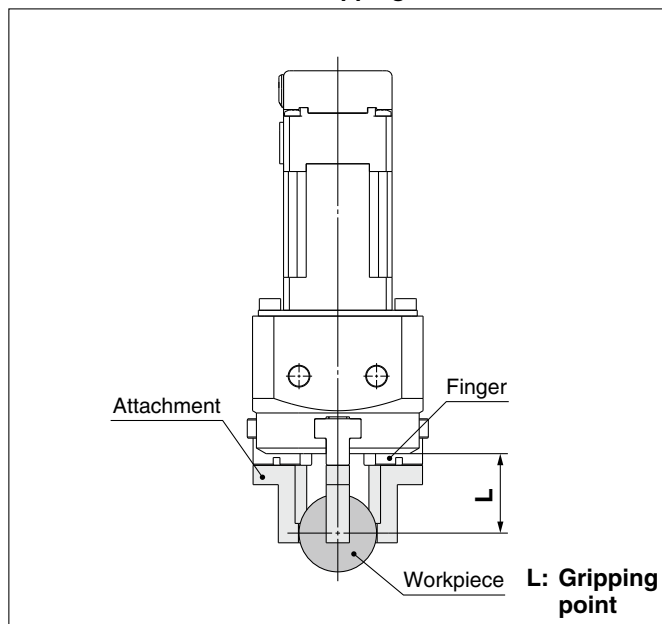
Step Check the gripping force: Series LEHS

● Indication of gripping force

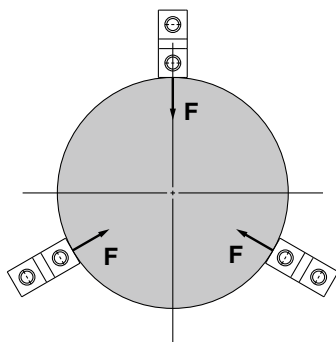
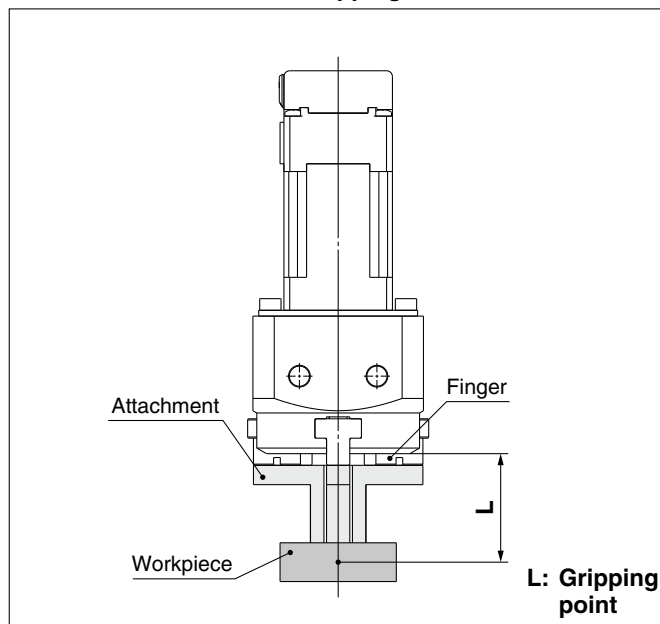
The gripping force shown in the graphs on page 464 is expressed as “F”, which is the gripping force of one finger, when three fingers and attachments are in full contact with the workpiece as shown in the figure below.

- Set the workpiece gripping point “L” so that it is within the range shown in the figure below.

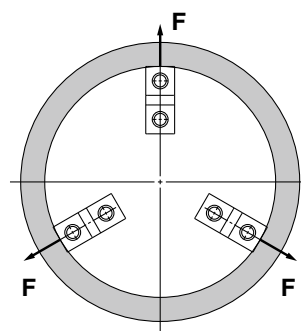
External Gripping State



Internal Gripping State



F: Gripping force



F: Gripping force

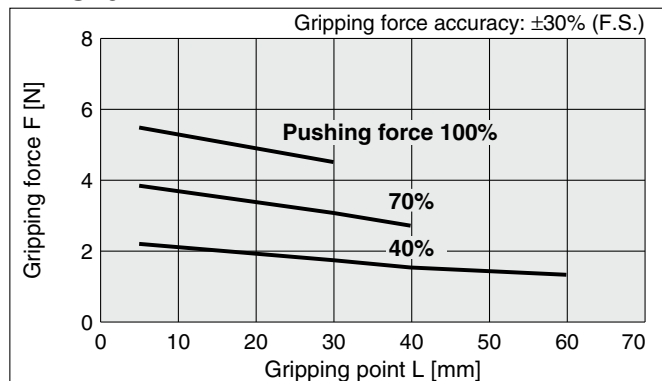
Selection Procedure

Step Check the gripping force: Series LEHS

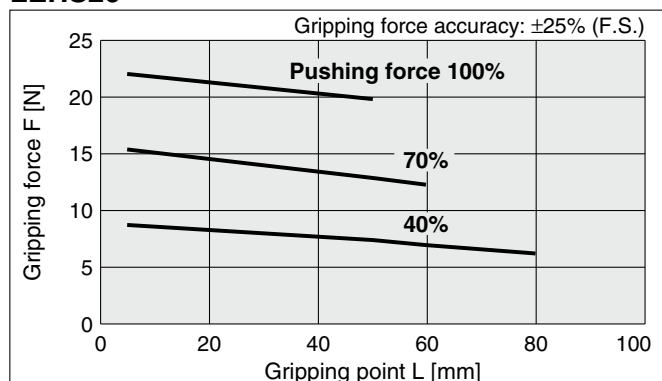
Basic

* Pushing force is one of the values of step data that is input into the controller.

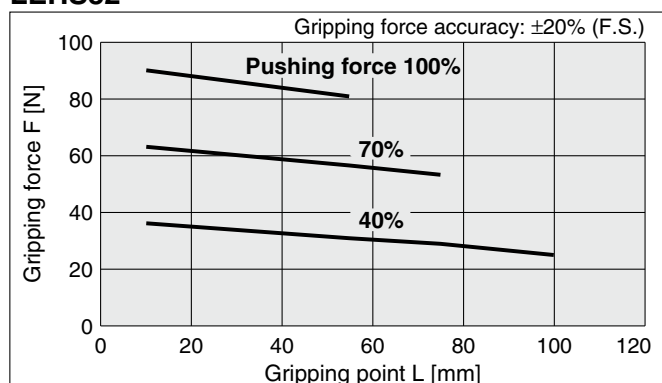
LEHS10



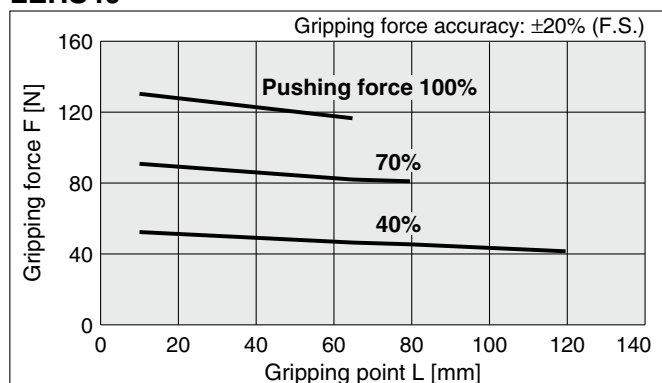
LEHS20



LEHS32



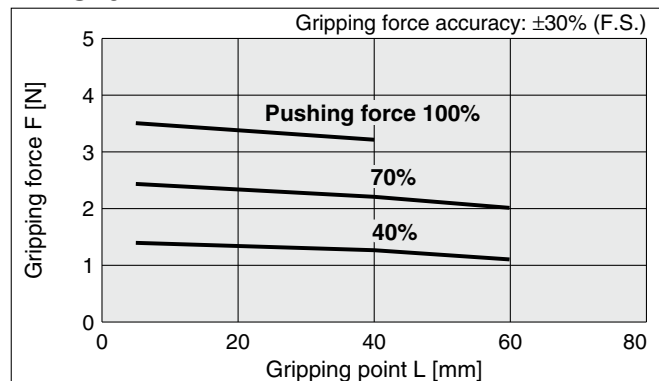
LEHS40



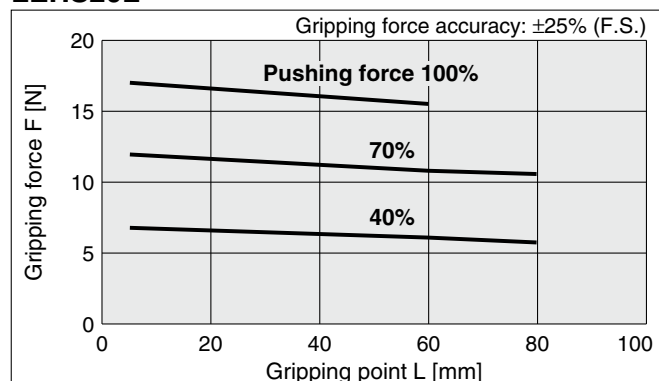
Compact

* Pushing force is one of the values of step data that is input into the controller.

LEHS10L



LEHS20L



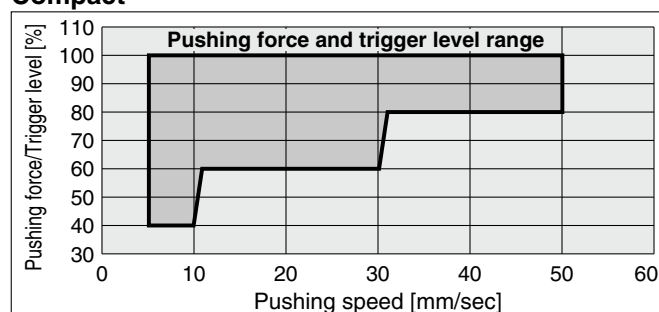
Selection of Pushing Speed

● Set the [Pushing force] and the [Trigger LV] within the range shown in the figure below.

Basic



Compact



Electric Gripper 3-Finger Type

Series **LEHS** LEHS10, 20, 32, 40

How to Order

LEHS 10 K 3 - 4 - S 1 6N 1

1 2 3 4 5 6 7 8 9 10 11

① Size

10
20
32
40

② Motor size

Nil	Basic
L (Note)	Compact

Note) Size: 10, 20 only

③ Lead

K	Basic
---	-------

④ 3-finger type

⑤ Stroke [mm]

Stroke/diameter	Size
4	10
6	20
8	32
12	40

⑥ Motor cable entry

Nil	Basic (Entry on the left side) Mounting reference plane Motor cable Connector cover
F	Entry on the front side Mounting reference plane Motor cable Connector cover
R	Entry on the right side Mounting reference plane Motor cable Connector cover

⚠ Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEH series and the controller LEC series.

The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result, it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.

② CC-Link direct input type (LECPMJ) is not CE-compliant.

[UL-compliant products]

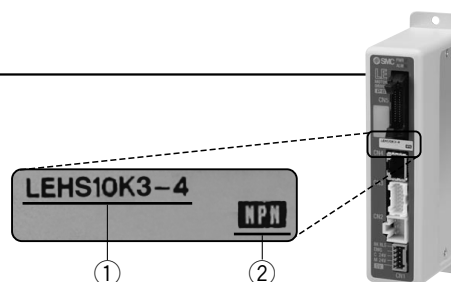
When conformity to UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.

The actuator and controller/driver are sold as a package.

Confirm that the combination of the controller/driver and the actuator is correct.

<Check the following before use.>

- ① Check the actuator label for model number. This matches the controller/driver.
- ② Check Parallel I/O configuration matches (NPN or PNP).



* Refer to the operation manual for using the products. Please download it via our website, <http://www.smcworld.com>

Electric Gripper 3-Finger Type **Series LEHS**

Step Motor (Servo/24 VDC)



7 Actuator cable type*1

Nil	Without cable
S	Standard cable
R	Robotic cable (Flexible cable)*2

*1 The standard cable should be used on fixed parts. For using on moving parts, select the robotic cable.

*2 Fix the motor cable protruding from the actuator to keep it unmovable. For details about fixing method, refer to Wiring/Cables in the Electric Actuators Precautions.

8 Actuator cable length [m]

Nil	Without cable
1	1.5
3	3
5	5
8	8*
A	10*
B	15*
C	20*

* Produced upon receipt of order (Robotic cable only)
Refer to the specifications Note 3) on page 467.

9 Controller/Driver type*1

Nil	Without controller/driver	
6N	LECP6	NPN
6P	(Step data input type)	PNP
1N	LECP1	NPN
1P	(Programless type)	PNP
MJ	LECPMJ*2	—
	(CC-Link direct input type)	
AN	LECPA*3	NPN
AP	(Pulse input type)	PNP

*1 For details about controller/driver and compatible motor, refer to the compatible controller/driver below.

*2 Not applicable to CE.

*3 When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-□) on page 587 separately.

11 Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately.

10 I/O cable length*1, Communication plug

Nil	Without cable (Without communication plug connector)*3
1	1.5 m
3	3 m*2
5	5 m*2
S	Straight type communication plug connector*3
T	T-branch type communication plug connector*3

*1 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected. Refer to page 559 (For LECP6), page 573 (For LECP1) or page 587 (For LECPA) if I/O cable is required.

*2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.

*3 For the LECPMJ, only "Nil", "S" and "T" are selectable since I/O cable is not included.

Compatible Controller/Driver

Type	Step data input type	CC-Link direct input type	Programless type	Pulse input type
Series	LECP6	LECPMJ	LECP1	LECPA
Features	Value (Step data) input Standard controller	CC-Link direct input	Capable of setting up operation (step data) without using a PC or teaching box	Operation by pulse signals
Compatible motor	Step motor (Servo/24 VDC)			
Maximum number of step data	64 points		14 points	—
Power supply voltage	24 VDC			
Reference page	Page 551	Page 591	Page 567	Page 581

Specifications



Model			LEHS10	LEHS20	LEHS32	LEHS40
Actuator specifications	Open and close stroke/diameter [mm]		4	6	8	12
	Lead [mm]		255/76 (3.355)	235/56 (4.196)	235/40 (5.875)	235/40 (5.875)
	Gripping force [N] <small>Note 1) Note 3)</small>	Basic	2.2 to 5.5	9 to 22	36 to 90	52 to 130
		Compact	1.4 to 3.5	7 to 17	—	—
	Open and close speed/ Pushing speed [mm/s] <small>Note 2) Note 3)</small>		5 to 70/ 5 to 50	5 to 80/ 5 to 50	5 to 100/ 5 to 50	5 to 120/ 5 to 50
	Drive method		Slide screw + Wedge cam			
	Repeated length measurement accuracy [mm] <small>Note 4)</small>		±0.05			
	Finger backlash/radius [mm] <small>Note 5)</small>		0.25 or less			
	Repeatability [mm] <small>Note 6)</small>		±0.02			
	Positioning repeatability/radius [mm]		±0.05			
	Lost motion/radius [mm] <small>Note 7)</small>		0.25 or less			
	Impact/Vibration resistance [m/s ²] <small>Note 8)</small>		150/30			
	Max. operating frequency [C.P.M]		60			
	Operating temperature range [°C]		5 to 40			
	Operating humidity range [%RH]		90 or less (No condensation)			
Electric specifications	Weight [g]	Basic	185	410	975	1265
		Compact	150	345	—	—
	Motor size		□20	□28	□42	
	Motor type		Step motor (Servo/24 VDC)			
	Encoder		Incremental A/B phase (800 pulse/rotation)			
	Rated voltage [V]		24 VDC ±10%			
	Power consumption/ Standby power consumption when operating [W] <small>Note 9)</small>	Basic	11/7	28/15	34/13	36/13
		Compact	8/7	22/12	—	—
	Max. instantaneous power consumption [W] <small>Note 10)</small>	Basic	19	51	57	61
		Compact	14	42	—	—

Note 1) Gripping force should be from 7 to 13 times the workpiece weight. Moving force should be 150% when releasing the workpiece. Gripping force accuracy should be ±30% (F.S.) for LEHS10, ±25% (F.S.) for LEHS20 and ±20% (F.S.) for LEHS32/40.

Note 2) Pushing speed should be set within the range during pushing (gripping) operation. Otherwise, it may cause malfunction. The open/close speed and pushing speed are for both fingers. The speed for one finger is half this value.

Note 3) The speed and force may change depending on the cable length, load and mounting conditions. Furthermore, if the cable length exceeds 5 m, then it will decrease by up to 10% for each 5 m. (At 15 m: Reduced by up to 20%)

Note 4) Repeated length measurement accuracy means dispersion (value on the controller monitor) when the workpiece is repeatedly held in the same position.

Note 5) There will be no influence of backlash during pushing (gripping) operation. Make the stroke longer for the amount of backlash when opening.

Note 6) Repeatability means the variation of the gripping position (workpiece position) when the gripping operation is repeatedly performed by the same sequence for the same workpiece.

Note 7) A reference value for correcting an error in reciprocal operation which occurs during the positioning operation.

Note 8) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)

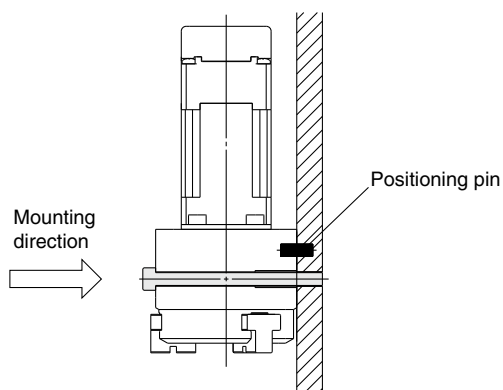
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. Test was performed in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)

Note 9) The power consumption (including the controller) is for when the gripper is operating. The standby power consumption when operating is for when the gripper is stopped in the set position during operation, including the energy saving mode when gripping.

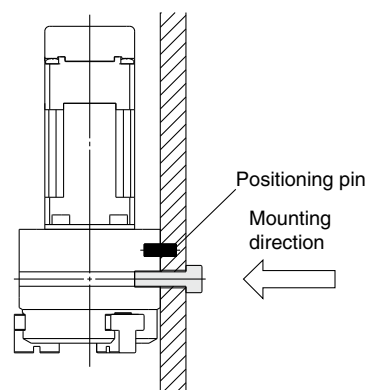
Note 10) The maximum instantaneous power consumption (including the controller) is for when the gripper is operating. This value can be used for the selection of the power supply.

How to Mount

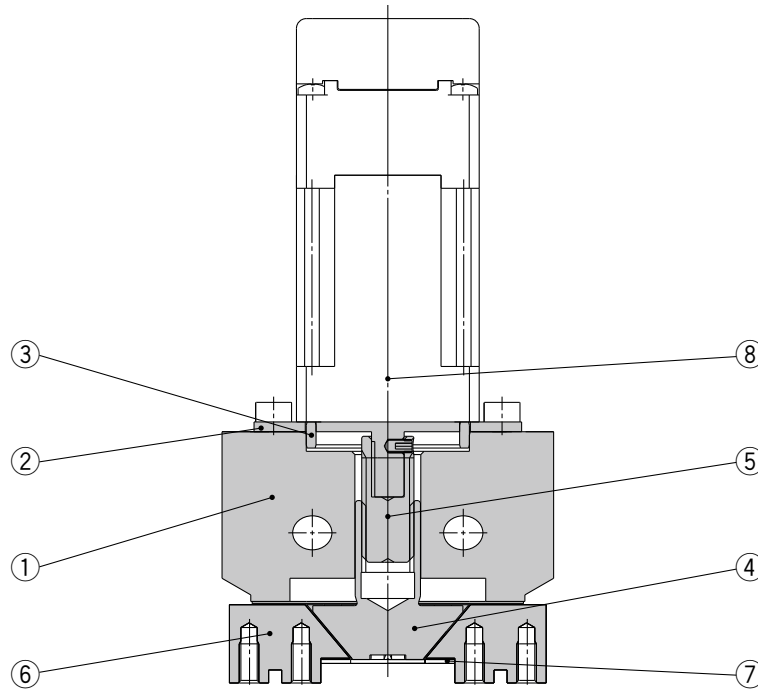
a) Mounting A type (when using the thread on the mounting plate)



b) Mounting B type (when using the thread on the back of the body)



Construction



Component Parts

No.	Description	Material	Note
1	Body	Aluminum alloy	Anodized
2	Motor plate	Aluminum alloy	Anodized
3	Guide ring	Aluminum alloy	
4	Slide cam	Stainless steel	Heat treatment + Special treatment
5	Slide bolt	Stainless steel	Heat treatment + Special treatment
6	Finger	Carbon steel	Heat treatment + Special treatment
7	End plate	Stainless steel	
8	Step motor (Servo/24 VDC)		

LEFS
LEFB

LEJS
LEJB

LEL

LEM

LEY
LEYG

LES
LESH

LEPY
LEPS

LER

LEH

LEY-X5

11-LEFS

11-LEJS

25A-

LEC□

LECS□

LECSS-T

LECYM
LECYU

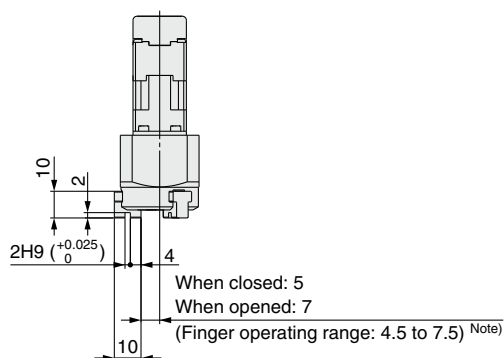
Motorless

LAT3

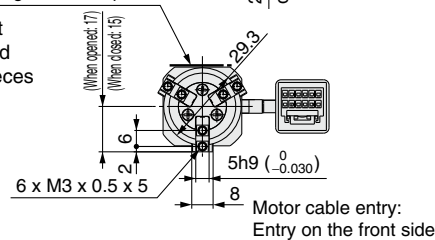
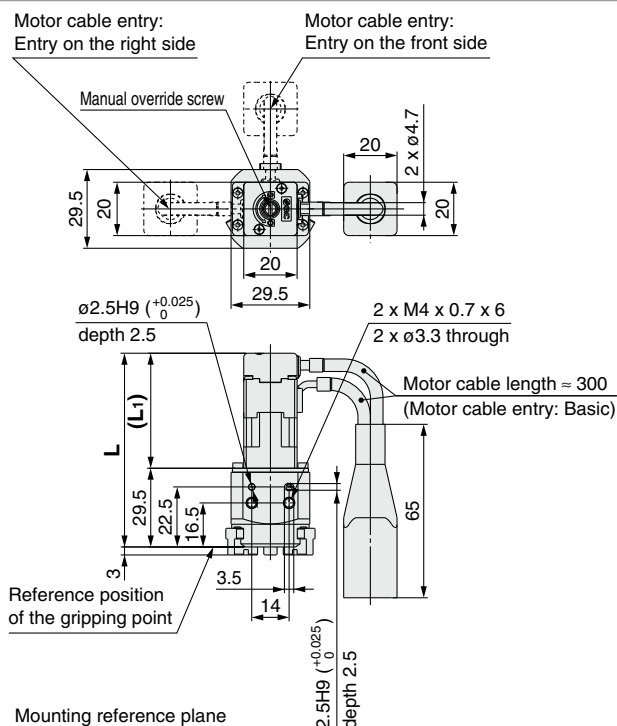
Step Motor (Servo/24 VDC)

LEHS10(L)K3-4

	[mm]	
Model	L	(L ₁)
LEHS10K3-4	89.1	(59.6)
LEHS10LK3-4	72.6	(43.1)

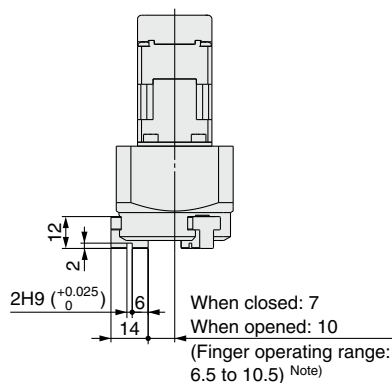


Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

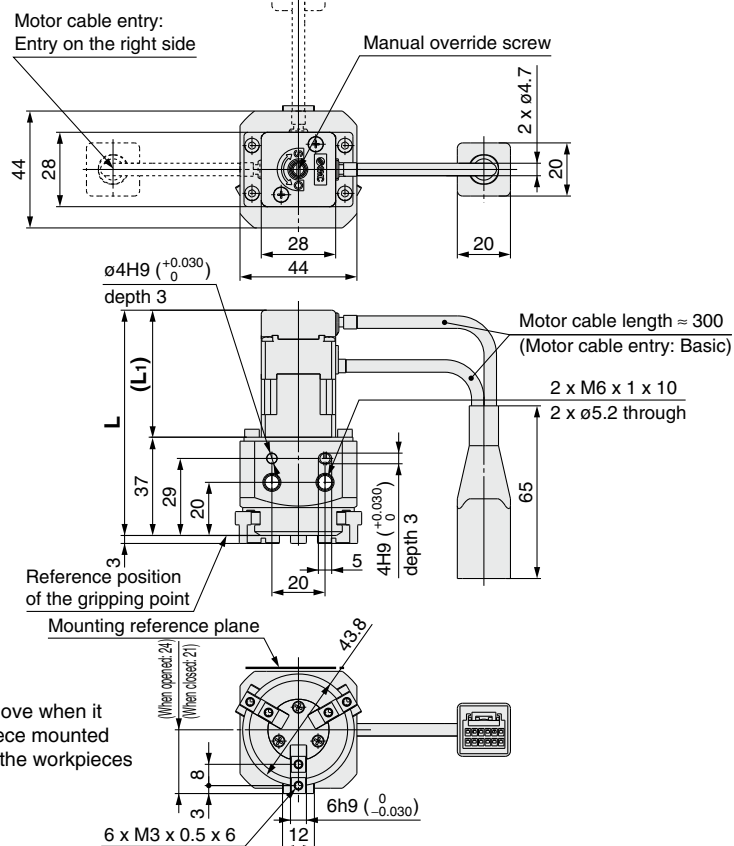


LEHS20(L)K3-6

	[mm]	
Model	L	(L ₁)
LEHS20K3-6	98.8	(61.8)
LEHS20LK3-6	84.8	(47.8)

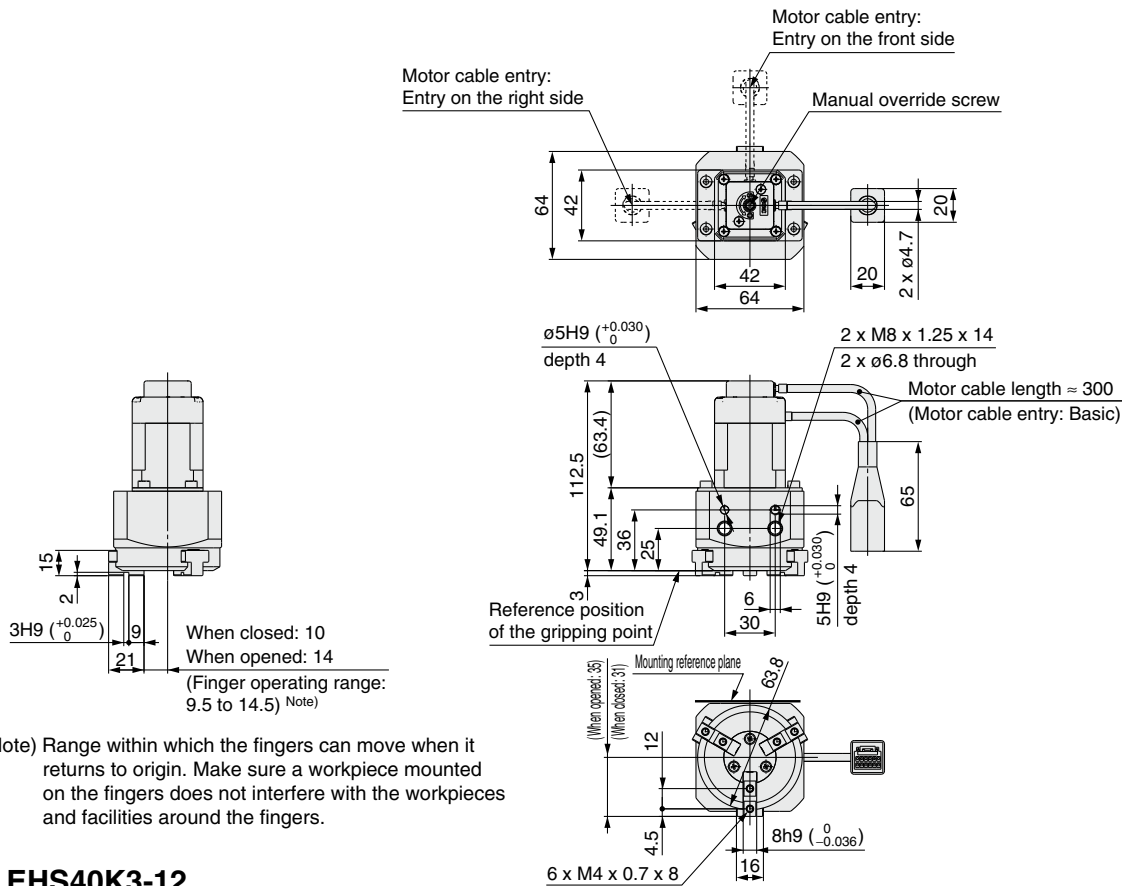


Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.



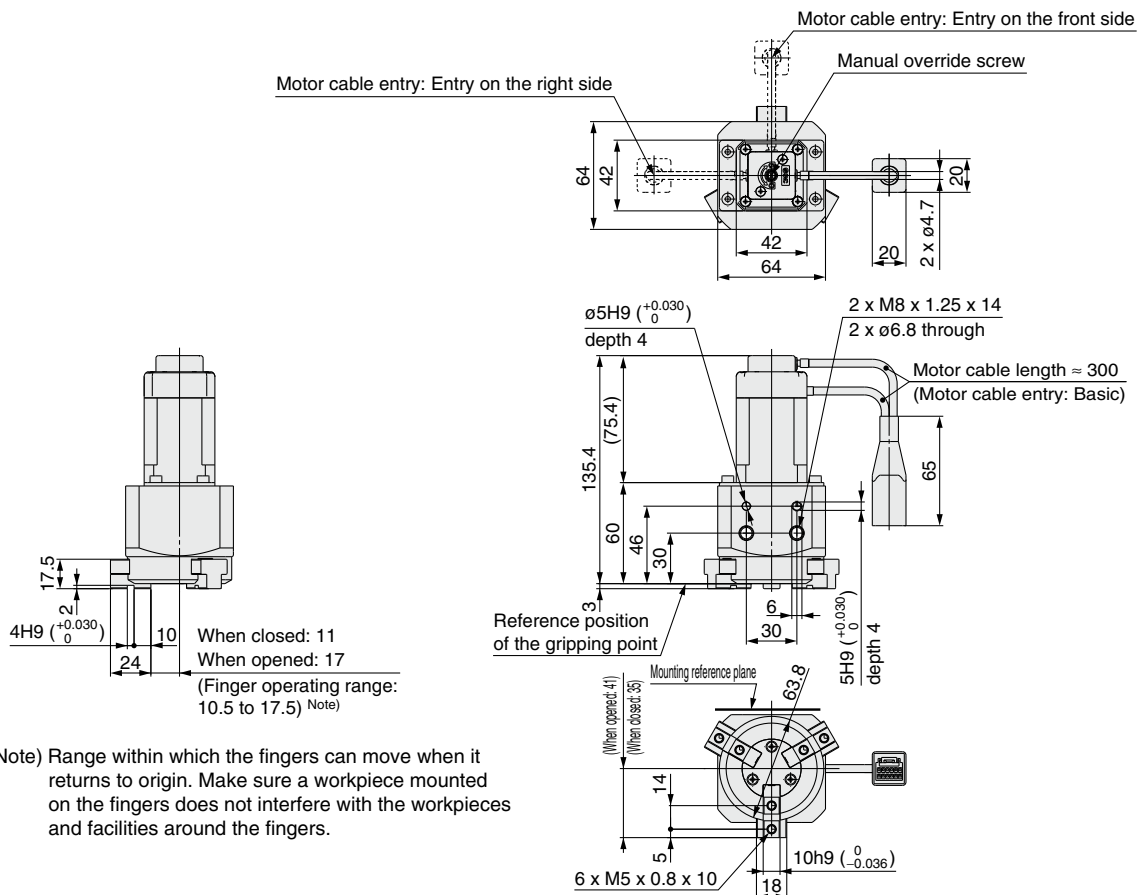
Dimensions

LEHS32K3-8



Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

LEHS40K3-12



Note) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.



Series LEH Electric Grippers/ Specific Product Precautions 1

Be sure to read this before handling. Refer to page 906 for Safety Instructions. For Electric Actuator Precautions, refer to pages 907 to 912, or "Handling Precautions for SMC Products" and the Operation Manual on SMC website, <http://www.smcworld.com>

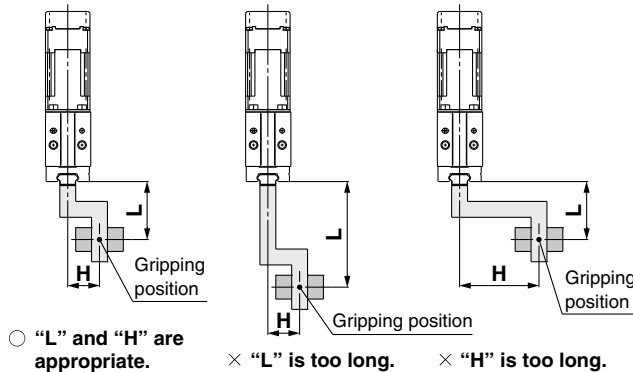
Design/Selection

Warning

1. Keep the specified gripping point.

If the specified gripping range is exceeded, excessive moment is applied to the sliding part of the finger, which may have an adverse affect on the life of the product.

L: Gripping point
H: Overhang



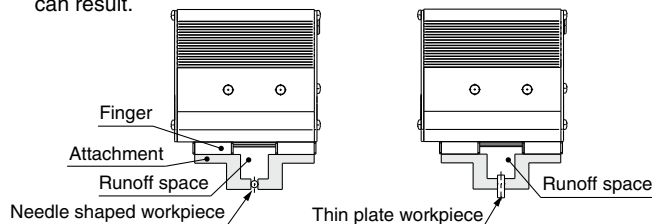
2. Design the attachment to be lightweight and short.

A long and heavy attachment will increase inertial force when the product is opened or closed, which causes play on the finger. Even if the gripping point of the attachment is within a specified range, design it to be short and lightweight as possible.

For a long or large workpiece, select a model of a larger size or use two or more grippers together.

3. Provide a runoff space for attachment when a workpiece is extremely thin or small.

Without a runoff space, the product cannot perform stable gripping, and the displacement of a workpiece or gripping failure can result.



4. Select the model that allows for gripping force in relation to the workpiece weight, as appropriate.

The selection of inappropriate model can cause dropping of a workpiece. Gripping force should be from 10 to 20 times (LEHZ, LEHF) or 7 to 13 times (LEHS) of the workpiece weight.

Gripping Force Accuracy

LEHZ(J)10(L)	LEHZ(J)16(L)	LEHZ(J)20(L)	LEHZ(J)25(L)	LEHZ32	LEHZ40
±30% (F.S.)	±25% (F.S.)	±25% (F.S.)	±25% (F.S.)	±20% (F.S.)	±20% (F.S.)
LEHF10	LEHF20	LEHF32	LEHF40		
±30% (F.S.)	±25% (F.S.)	±25% (F.S.)	±25% (F.S.)	±20% (F.S.)	±20% (F.S.)
LEHS10(L)	LEHS20(L)	LEHS32	LEHS40		
±30% (F.S.)	±25% (F.S.)	±25% (F.S.)	±25% (F.S.)	±20% (F.S.)	±20% (F.S.)

5. Do not use the product in applications where excessive external force (including vibration) or impact force is applied to it.

It may lead to breakage or galling, which causes operation failure. Do not apply impact and vibration outside of the specifications.

6. Select the model that allows for open and close width relative to a workpiece.

The selection of an inappropriate model will cause gripping at unexpected positions due to variable open and close width of the product and the diameter of a workpiece the product can handle. It is also necessary to make a larger stroke to overcome backlash created when the product will open after gripping.

Mounting

Warning

1. Do not drop or hit the gripper to avoid scratching and denting the mounting surfaces.

Even slight deformation can cause the deterioration of accuracy and operation failure.

2. When mounting the attachment, tighten the mounting screws within the specified torque range.

Tightening the screws with a higher torque than recommended may cause malfunction, whilst the tightening with a lower torque can cause the displacement of the mounting position or in extreme conditions the actuator could become detached from its mounting position.

Mounting of Attachment to Finger

The attachment should be mounted with the torque specified in the following table by screwing the screw into the finger mounting female thread and hole.

<Series LEHZ>

Model	Screw size	Max. tightening torque [N·m]
LEHZ(J)10(L)	M2.5 x 0.45	0.3
LEHZ(J)16(L)	M3 x 0.5	0.9
LEHZ(J)20(L)	M4 x 0.7	1.4
LEHZ(J)25(L)	M5 x 0.8	3.0
LEHZ32	M6 x 1	5.0
LEHZ40	M8 x 1.25	12.0

<Series LEHF>

Model	Screw size	Max. tightening torque [N·m]
LEHF10	M2.5 x 0.45	0.3
LEHF20	M3 x 0.5	0.9
LEHF32	M4 x 0.7	1.4
LEHF40	M4 x 0.7	1.4

<Series LEHS>

Model	Screw size	Max. tightening torque [N·m]
LEHS10(L)	M3 x 0.5	0.9
LEHS20(L)	M3 x 0.5	0.9
LEHS32	M4 x 0.7	1.4
LEHS40	M5 x 0.8	3.0



Series LEH

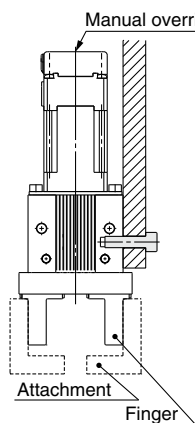
Electric Grippers/ Specific Product Precautions 2

Be sure to read this before handling. Refer to page 906 for Safety Instructions. For Electric Actuator Precautions, refer to pages 907 to 912, or "Handling Precautions for SMC Products" and the Operation Manual on SMC website, <http://www.smcworld.com>

Mounting

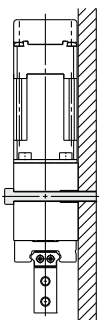
Mounting of Electric Gripper, Series LEHZ/LEHZJ

When using the thread on the side of the body



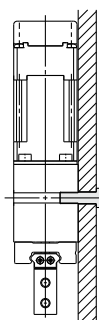
Model	Screw size	Max. tightening torque [N·m]	Max. screw-in depth L [mm]
LEHZ(J)10(L)	M3 x 0.5	0.9	6
LEHZ(J)16(L)	M4 x 0.7	1.4	6
LEHZ(J)20(L)	M5 x 0.8	3.0	8
LEHZ(J)25(L)	M6 x 1	5.0	10
LEHZ32	M6 x 1	5.0	10
LEHZ40	M8 x 1.25	12.0	14

When using the thread on the mounting plate



Model	Screw size	Max. tightening torque [N·m]
LEHZ(J)10(L)	M3 x 0.5	0.9
LEHZ(J)16(L)	M3 x 0.5	0.9
LEHZ(J)20(L)	M4 x 0.7	1.4
LEHZ(J)25(L)	M5 x 0.8	3.0
LEHZ32	M5 x 0.8	3.0
LEHZ40	M6 x 1	5.0

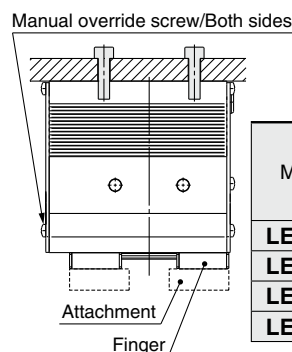
When using the thread on the back of the body



Model	Screw size	Max. tightening torque [N·m]	Max. screw-in depth L [mm]
LEHZ(J)10(L)	M4 x 0.7	1.4	6
LEHZ(J)16(L)	M4 x 0.7	1.4	6
LEHZ(J)20(L)	M5 x 0.8	3.0	8
LEHZ(J)25(L)	M6 x 1	5.0	10
LEHZ32	M6 x 1	5.0	10
LEHZ40	M8 x 1.25	12.0	14

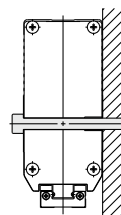
Mounting of Electric Gripper, Series LEHF

When using the thread on the body



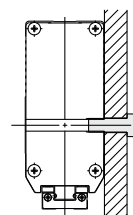
Model	Screw size	Max. tightening torque [N·m]	Max. screw-in depth L [mm]
LEHF10	M4 x 0.7	1.4	7
LEHF20	M5 x 0.8	3.0	8
LEHF32	M6 x 1	5.0	10
LEHF40	M6 x 1	5.0	10

When using the thread on the mounting plate



Model	Screw size	Max. tightening torque [N·m]
LEHF10	M4 x 0.7	1.4
LEHF20	M5 x 0.8	3.0
LEHF32	M6 x 1	5.0
LEHF40	M6 x 1	5.0

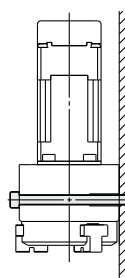
When using the thread on the back of the body



Model	Screw size	Max. tightening torque [N·m]	Max. screw-in depth L [mm]
LEHF10	M5 x 0.8	3.0	10
LEHF20	M6 x 1	5.0	12
LEHF32	M8 x 1.25	12.0	16
LEHF40	M8 x 1.25	12.0	16

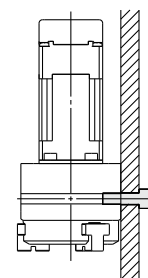
Mounting of Electric Gripper, Series LEHS

When using the thread on the mounting plate



Model	Screw size	Max. tightening torque [N·m]
LEHS10(L)	M3 x 0.5	0.9
LEHS20(L)	M5 x 0.8	3.0
LEHS32	M6 x 1	5.0
LEHS40	M6 x 1	5.0

When using the thread on the back of the body



Model	Screw size	Max. tightening torque [N·m]	Max. screw-in depth L [mm]
LEHS10(L)	M4 x 0.7	1.4	6
LEHS20(L)	M6 x 1	5.0	10
LEHS32	M8 x 1.25	12.0	14
LEHS40	M8 x 1.25	12.0	14



Series LEH Electric Grippers/ Specific Product Precautions 3

Be sure to read this before handling. Refer to page 906 for Safety Instructions. For Electric Actuator Precautions, refer to pages 907 to 912, or "Handling Precautions for SMC Products" and the Operation Manual on SMC website, <http://www.smcworld.com>

Mounting

Warning

3. When mounting the electric gripper, tighten the mounting screws within the specified torque range.

Tightening the screws with a higher torque than recommended may cause malfunction, whilst the tightening with a lower torque can cause the displacement of the mounting position or in extreme conditions the actuator could become detached from its mounting position.

4. When fixing the attachment to the finger, avoid applying excessive torque to the finger.

Play or deteriorated accuracy can result.

5. The mounting face has holes and slots for positioning. Use them for accurate positioning of the electric gripper if required.

6. When a workpiece is to be removed when it is not energized, open or close the finger manually or remove the attachment beforehand.

When it is necessary to operate the product by the manual override screws, check the position of the manual override screws of the product, and leave necessary space. Do not apply excessive torque to the manual override screws. This may lead to damage and malfunction.

7. When gripping a workpiece, keep a gap in the horizontal direction to prevent the load from concentrating on one finger, to allow for workpiece misalignment.

For the same purpose, when moving a workpiece for alignment by the product, minimize the friction resistance created by the movement of the workpiece. The finger can be displaced, play or breakage.

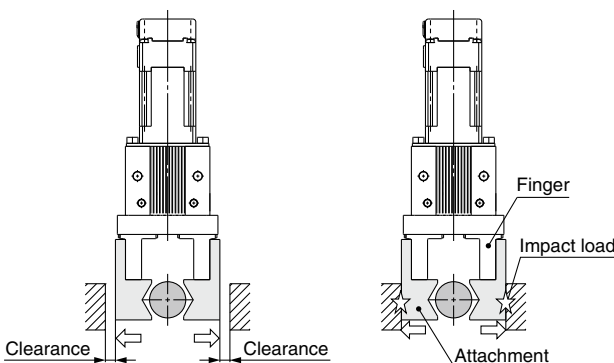
8. Perform adjustment and confirmation to ensure there is no external force applied to the finger.

If the finger is subject to repetitive lateral load or impact load, it can cause play or breakage and the lead screw can get stuck, which results in operation failure. Allow a clearance to prevent the workpiece or the attachment from hitting gripper product at the end of the stroke.

1) Stroke end when fingers are open

○ With clearance

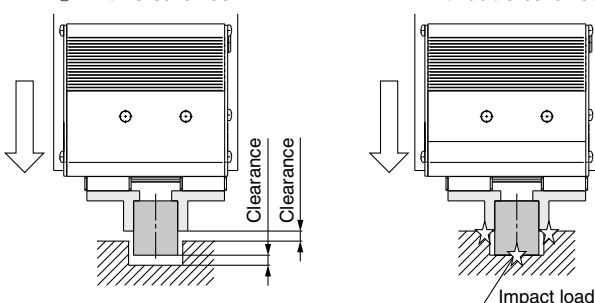
× Without clearance



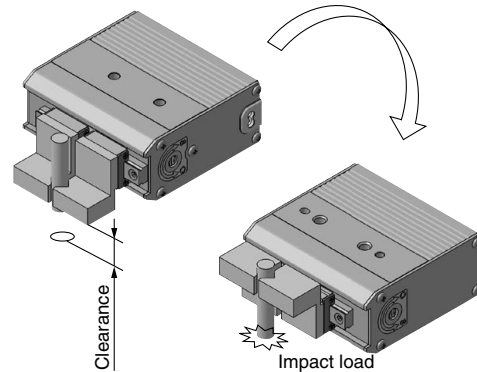
2) Stroke end when gripper is moving

○ With clearance

× Without clearance



3) When turning over

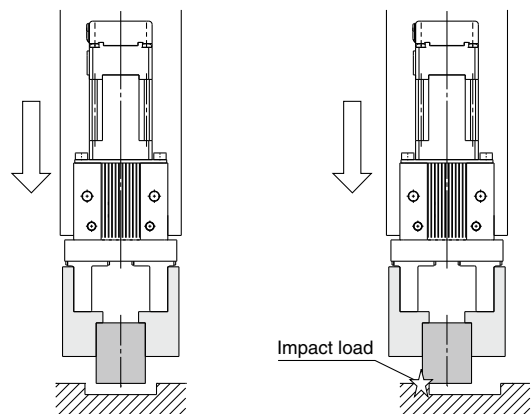


9. Adjust the gripping point so that an excessive force will not be applied to the fingers when inserting a workpiece.

In particular, during a trial run, operate the product manually or at a low speed and check that the safety is assured without impact.

○ Aligned

× Not aligned



Handling

Caution

1. The parameters of the stroke and the open/close speed are for both fingers.

The stroke and the open/close speed for one finger is half a set parameter.

2. When gripping a workpiece by the product, be sure to set to the pushing operation.

Also, do not hit the workpiece to the finger and attachment in positioning operation or in the range of positioning operation.

Otherwise, the lead screw can get caught and cause operation failure. However, if the workpiece cannot be gripped in pushing operation (such as a plastically deformed workpiece, rubber component, etc.), you can grip it in positioning operation with consideration to the elastic force of the workpiece. In this case, keep the driving speed for impact specified in item 3 on page 474.

When the operation is interrupted by a stop or temporary stop, and a pushing operation instruction is output just after operation is restarted, the operating direction will vary depending on the start position.



Series LEH

Electric Grippers/

Specific Product Precautions 4

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Handling

⚠ Caution

3. Keep the following driving speed range for pushing operation.

- LEHZ/LEHZJ: 5 to 50 mm/s
- LEHF10: 5 to 20 mm/s
- LEHF20/32/40: 5 to 30 mm/s
- LEHS: 5 to 50 mm/s

Operation at the speed outside of the range can get the lead screw caught and cause operation failure.

4. There is no backlash effect in pushing operation.

The return to origin is done by pushing operation.

The finger position can be displaced by the effect of the backlash during the positioning operation.

Take the backlash into consideration when setting the position.

5. Do not change the setting of energy saving mode.

When pushing (gripping) operation is continued, the heat generated by the motor can cause operation failure.

This is due to the self-lock mechanism in the lead screw, which makes the product keep the gripping force. To save the energy in this situation where the product is to be standby or continue to grip for extended periods of time, the product will be controlled to reduce current consumption (to 40% automatically after it has gripped a workpiece once). If there is the reduction of gripping force seen in the product after a workpiece has been gripped and deformed over certain amount of time, contact SMC separately.

6. INP output signal

1) Positioning operation

When the product comes within the set range by step data [In position], the INP output signal will turn on.

Initial value: Set to [0.50] or higher.

2) Pushing operation

When the effective force exceeds step data [Trigger LV], the INP output signal will turn on.

Use the product within the specified range of [Pushing force] and [Trigger LV].

a) To ensure that the gripper holds the workpiece with the set [Pushing force], it is recommended that the [Trigger LV] be set to the same value as the [Pushing force].

b) When the [Pushing force] and [Trigger LV] are set less than the specified range, the INP output signal will turn on from the pushing start position.

<INP output signal in the controller version>

● SV0.8 or more

Although the product automatically switches to the energy saving mode (reduced current) after pushing operation is completed, the INP output signal remains ON.

● SV0.7 or less

a. When [Trigger LV] is set to 40% (when the value is the same as the energy saving mode)

Although the product automatically switches to the energy saving mode (reduced current) after pushing operation is completed, the INP output signal remains ON.

b. When [Trigger LV] is set higher than 40%

The product is turned on after pushing operation is completed, but INP output signal will turn off when current consumption is reduced automatically in energy saving mode.

7. When releasing a workpiece, set the moving force to 150%.

If the torque is too small when a workpiece is gripped in pushing operation, the product can have galling and become unable to release the workpiece.

8. If the finger has galling due to operational setting error, etc., open and close the finger manually.

When it is necessary to operate the product by the manual override screws, check the position of the manual override screws of the product, and leave necessary space. Do not apply excessive torque to the manual override screws. This may lead to damage and malfunction.

9. Self-lock mechanism

The product keeps a gripping force due to the self-lock mechanism in the lead screw. Also, it will not operate in opposite direction even when external force is applied during gripping a workpiece.

<Type of Stops, Cautions>

1) All the power supplies to the controller are shut off.

When the power supply is turned on to restart operation, the controller will be initialized, and the product can drop a workpiece due to a motor magnetic pole detective operation. (It means that there is finger motions of partial strokes by the phase detection of motor after power supply is turned on.) Remove the workpiece before restarting operation.

2) "EMG (stop)" of the CN1 of the controller is shut off.

When using the stop switch on the teaching box;

It is not necessary to remove a workpiece beforehand because a motor magnetic pole detective operation will not occur when the power supply is turned on to restart operation. An alarm can take place when operation is restarted from stop.

3) "M24V (motor driving power supply)" of the CN1 of the controller is shut off.

It is not necessary to remove a workpiece beforehand because a motor magnetic pole detective operation will not occur when the power supply is turned on to restart operation.

An alarm can take place when stop is activated during operation or operation is restarted from stop.

10. Return to origin

1) It is recommended to set the directions of return to origin and workpiece gripping to the same direction.

If they are set opposite, there can be backlash, which worsens the measurement accuracy significantly.

2) If the direction of return to origin is set to CW (Internal gripping); If the return to origin is performed with the product only, there can be significant deviation between different actuators. Use a workpiece to set return to origin.

3) If the return to origin is performed by using a workpiece; The stroke (operation range) will be shortened. Recheck the value of step data.

4) If basic parameters (Origin offset) are used; When the return to origin is set with [Origin offset], it is necessary to change the current position of the product. Recheck the value of step data.

11. In pushing (gripping) operation, set the product to a position of at least 0.5 mm away from a workpiece. (This position is referred to as a pushing start position.)

If the product is set to the same position as a workpiece, the following alarms may be generated and operation may become unstable.

a. "Posn failed" alarm is generated.

The product cannot reach a pushing start position due to variation in the width of workpieces.

b. "Pushing ALM" alarm is generated.

The product is pushed back from a pushing start position after starting to push.

12. When mounting the product, keep a 40 mm or longer diameter for bends in the motor cable.

13. Finite orbit type guide is used in the actuator finger part. By using this, when there are inertial force which cause by movements or rotation to the actuator, steel ball will move to one side and this will cause a large resistance and degrade the accuracy. When there are inertial force which cause by movements or rotation to the actuator, operate the finger to full stroke.

Especially in long stroke type, the accuracy of finger may degrade.



Series *LEH* Electric Grippers/ Specific Product Precautions 5

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Maintenance

Warning

1. When the product is to be removed, check it has not been gripping a workpiece.

There is a risk of dropping the workpiece.