Electric Grippers

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.

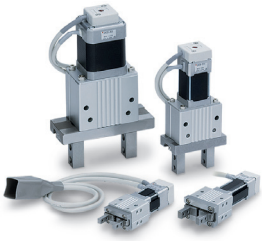
Possible to set position, speed and force. (64 points)

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.

Z Type (2 fingers)

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	—

ZJ Type (2 fingers)

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

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)

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)

Can hold round workpieces.

Series ***LEHS***

Size	Stroke/ diameter [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 ***JXC51/61***

▶**EtherCAT®/EtherNet/IP™/ PROFINET/DeviceNet™/ IO-Link/CC-Link direct input type**
Series ***JXCE□/91/P1/D1/L□/M***

▶**Programless type**
Series **LECP1**

▶**Pulse input type**
Series **LECPA**

Series *LEH*

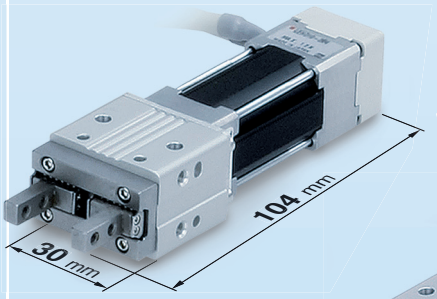
SMC

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

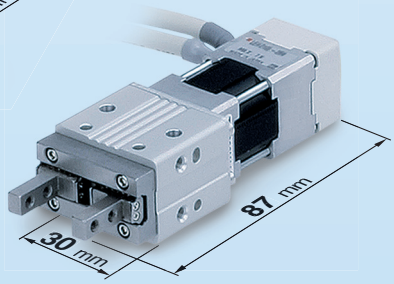
●Compact and lightweight Various gripping forces

Weight: **165** g
(LEHZ10)



Compact

Weight: **135** g
(LEHZ10L)

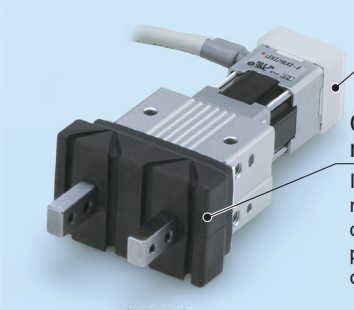


●Sealed-construction dust cover (Equivalent to IP50)

- 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

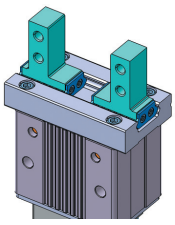


(LEHZJ)

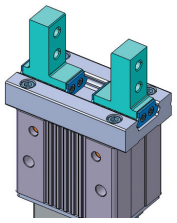
Encoder dust cover
Silicone rubber

Cover designed with no protrusions
Inward-folding design creates no protrusions when the cover is opened and closed, preventing interference with other devices' operations.

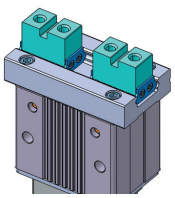
Finger options



Side tapped mounting

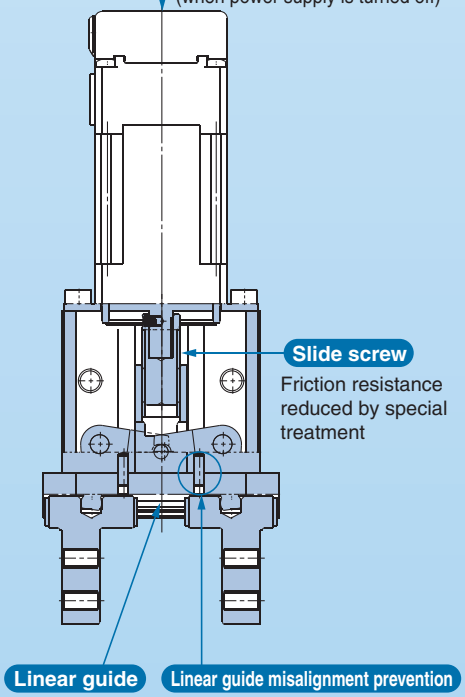


Through-hole in opening/ closing direction

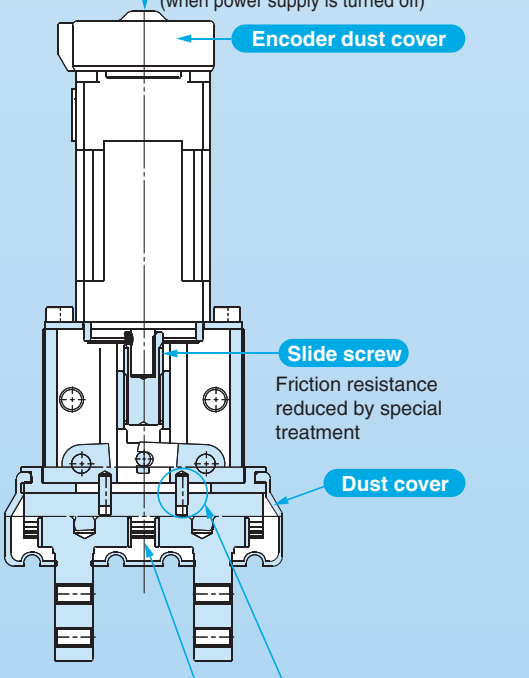


Flat fingers

Series LEHZ



Series LEHZJ



SMC

Electric Gripper 3-Finger Type

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

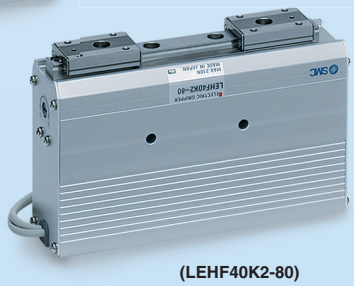
●Can hold various types of workpieces with a long stroke.

Stroke:
Max. **40** mm

(LEHF40K2-40)

Long stroke

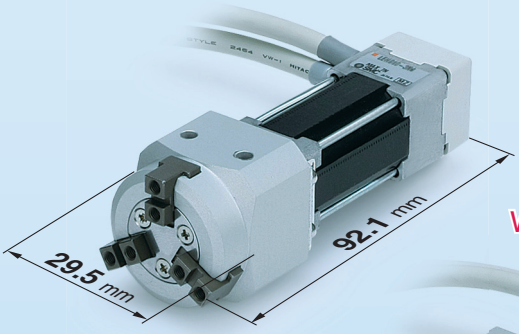
Stroke:
Max. **80** mm



(LEHF40K2-80)

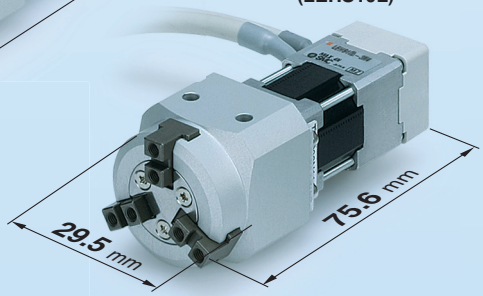
●Can hold round workpieces.

Weight: **185** g
(LEHS10)



Compact

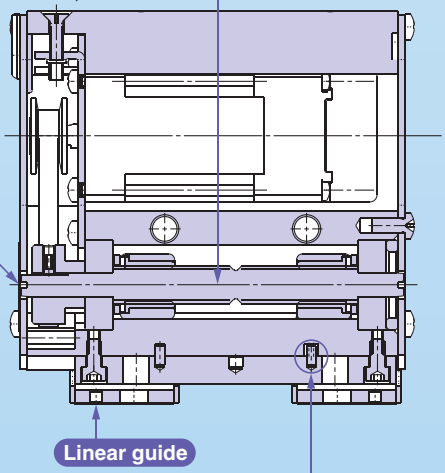
Weight: **150** g
(LEHS10L)



Series LEHF

Manual override screw/Both sides
For opening and closing the fingers (when power supply is turned off)

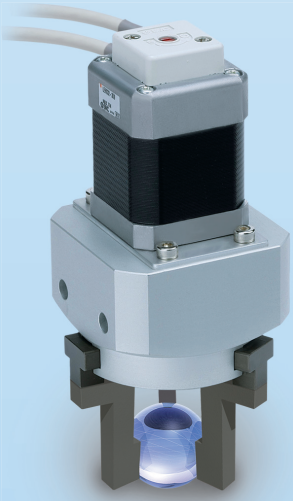
Slide screw
Friction resistance reduced by special treatment



Linear guide

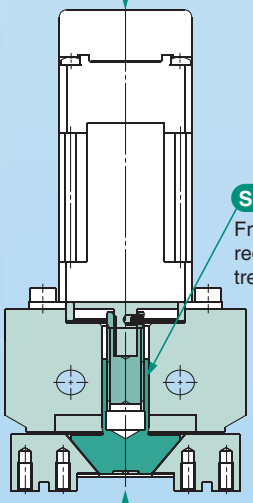
Linear guide misalignment prevention
Misalignment of the linear guide is prevented with 2 positioning pins.

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

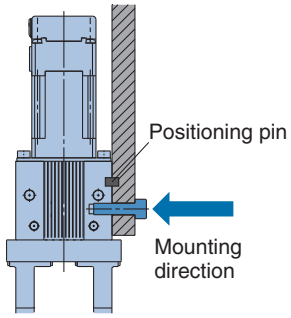


With wedge cam structure
Compact and large gripping force can be obtained through the wedge cam structure.

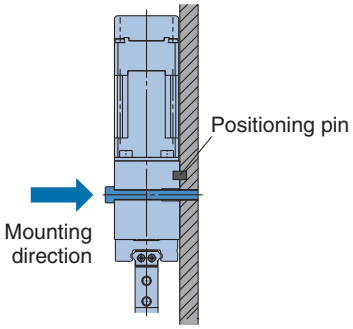
<Mounting Variations>

Series LEHZ/LEHZJ

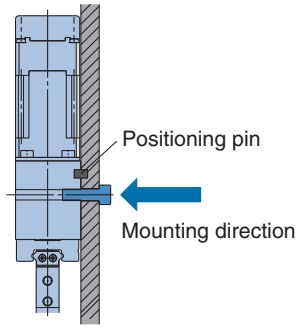
A When using the thread on the side of the body



B When using the thread on the mounting plate

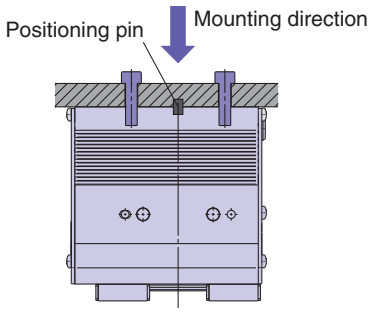


C When using the thread on the back of the body

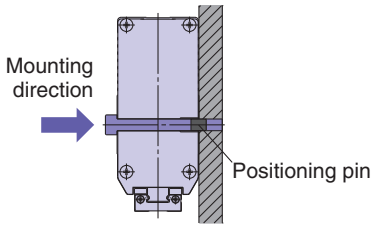


Series LEHF

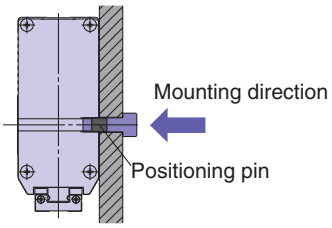
A When using the thread on the body



B When using the thread on the mounting plate

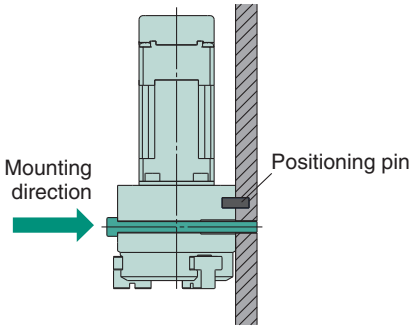


C When using the thread on the back of the body

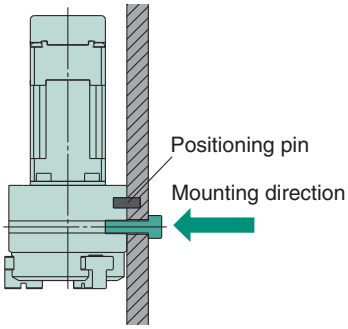


Series LEHS

A When using the thread on the mounting plate

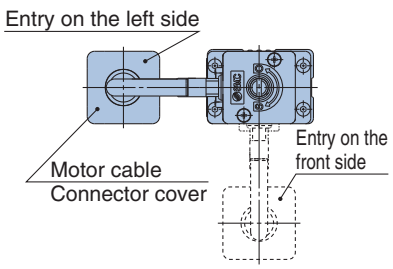


B When using the thread on the back of the body

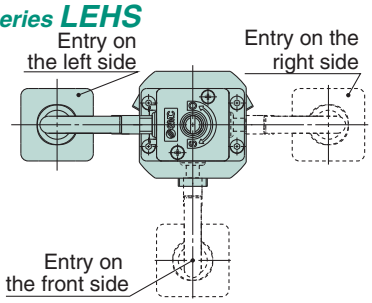


Motor cable mounting direction can be selected.

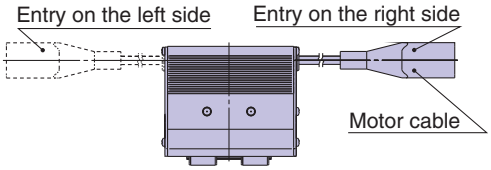
Series LEHZ/LEHZJ



Series LEHS

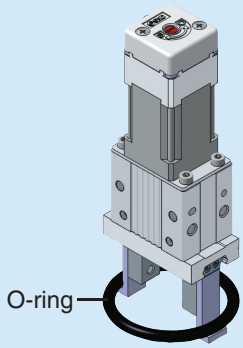


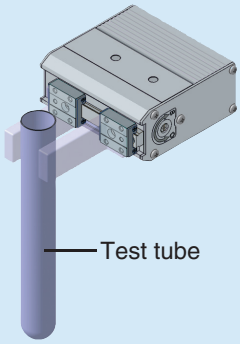
Series LEHF

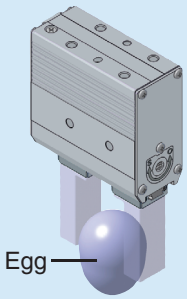


Application Examples

Gripping of components that are easily deformed or damaged

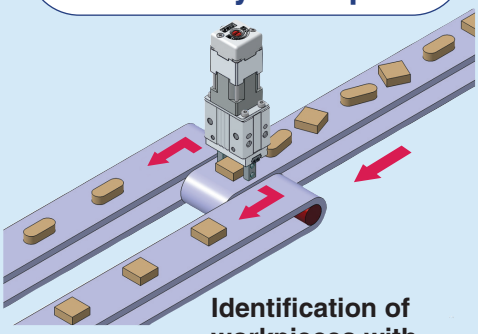






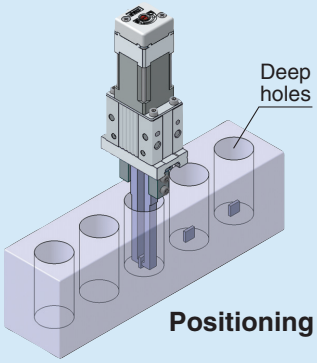
Speed and gripping force control and positioning

Alignment and selection of randomly lined parts



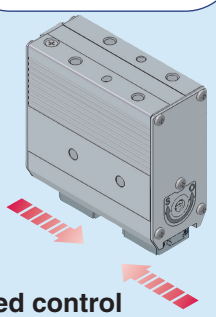
Identification of workpieces with different dimensions

Gripping in a narrow space



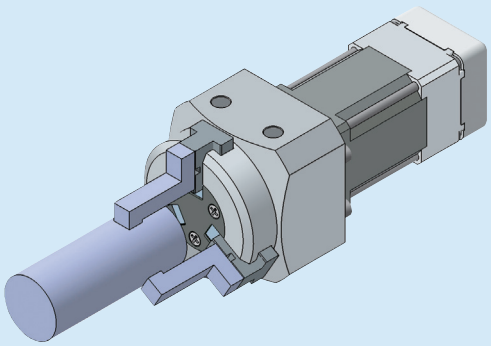
Positioning

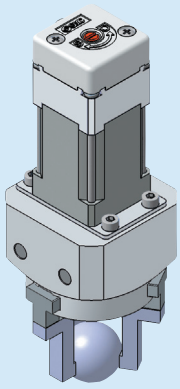
Soft touch/ High frequency

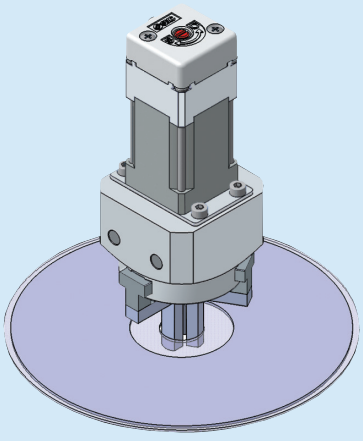


Speed control and positioning (Minimum stroke)

Gripping of cylindrical and spherical parts



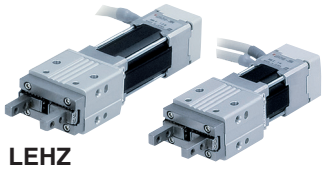




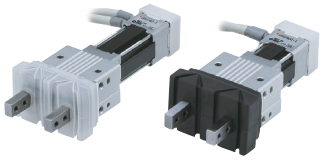
Speed and gripping force control

Series Variations

Electric Gripper 2-Finger Type *Series* LEHZ/LEHZJ/LEHF



LEHZ



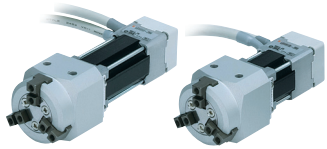
LEHZJ With dust cover

LEHF

Series	Size	Opening/closing stroke both sides [mm]	Gripping force [N]		Opening/closing speed (mm/s)	Controller /Driver series	Reference page
			Basic	Compact			
LEHZ	10	4	6 to 14	2 to 6	5 to 80	Series LECP1 Series LECPA	Page 1
	16	6		3 to 8			
	20	10	16 to 40	11 to 28	5 to 100		
	25	14					
	32	22	52 to 130	—	5 to 120		
	40	30	84 to 210	—			
LEHZJ	10	4	6 to 14	3 to 6	5 to 80		Page 15
	16	6		4 to 8			
	20	10	16 to 40	11 to 28	5 to 100		
	25	14					
LEHF	10	16 (32) Note)	3 to 7		5 to 80		Page 27
	20	24 (48) Note)	11 to 28		5 to 100		
	32	32 (64) Note)	48 to 120				
	40	40 (80) Note)	72 to 180				

Note) ( ): Long stroke

Electric Gripper 3-Finger Type *Series* LEHS

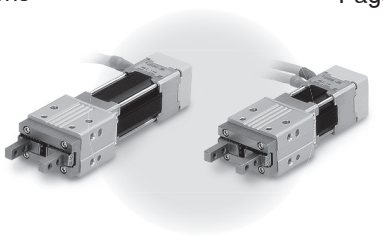


Series	Size	Opening/closing stroke both sides [mm]	Gripping force [N]		Opening/closing speed (mm/s)	Controller /Driver series	Reference page
			Basic	Compact			
LEHS	10	4	2.2 to 5.5	1.4 to 3.5	5 to 70	Series LECP1 Series LECPA	Page 40
	20	6	9 to 22	7 to 17	5 to 80		
	32	8	36 to 90	—	5 to 100		
	40	12	52 to 130	—	5 to 120		

INDEX

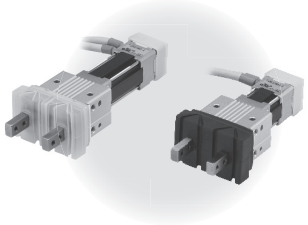
Step Motor (Servo/24 VDC)

Electric Gripper 2-Finger Type *Series LEHZ*



Step Motor (Servo/24 VDC)

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

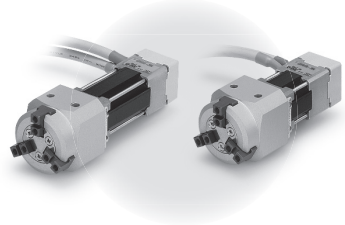


Step Motor (Servo/24 VDC)

Electric Gripper 2-Finger Type *Series LEHF*

Step Motor (Servo/24 VDC)

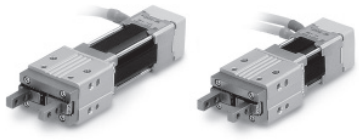
Electric Gripper 3-Finger Type *Series LEHS*



Electric Gripper 2-Finger Type Step Motor (Servo/24 VDC)

Series LEHZ

Model Selection



Selection Procedure

Step 1 Check the gripping force. → **Step 2** Check the gripping point and overhang. → **Step 3** Check the external force on fingers.

Step 1 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 10 to 20 times Note) the workpiece weight, or more.

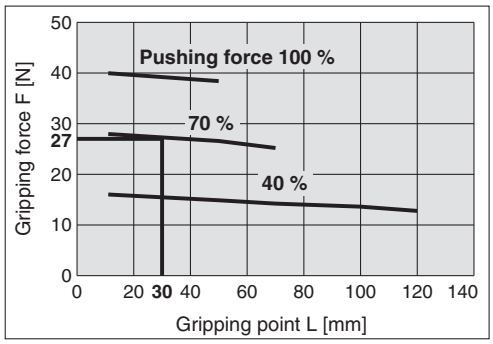
Note) For details, refer to the calculation of required gripping force.

- 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 x 20 x 9.8 m/s² ≈ 19.6 N or more

LEHZ20



Pushing force: 70 %

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

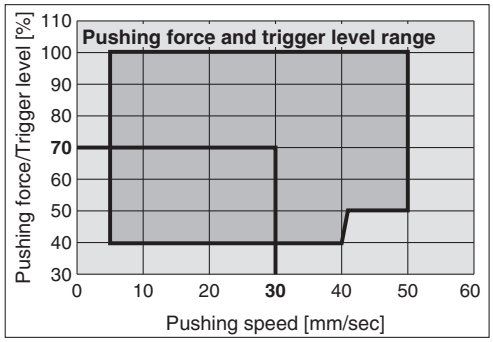
Gripping point distance: 30 mm

When the LEHZ20 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

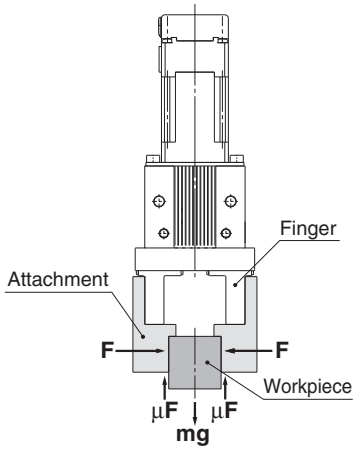
LEHZ20



- 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 m/s²)
mg: Workpiece weight [N]

the conditions under which the workpiece will not drop are

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

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

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 μ = 0.2	When μ = 0.1
$F = \dfrac{mg}{2 \times 0.2} \times 4 = 10 \times mg$	$F = \dfrac{mg}{2 \times 0.1} \times 4 = 20 \times mg$
↑ 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 μ = 0.2, for reasons of safety, select a gripping force which is at least 10 to 20 times greater than the workpiece weight, as recommended by SMC.
• If high acceleration or impact forces are encountered during motion, a further margin should be considered.

SMC

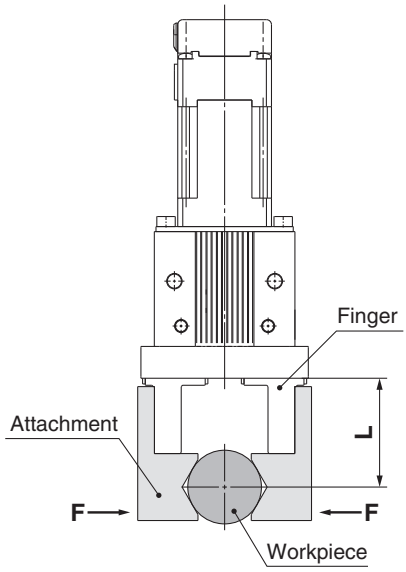
Selection Procedure

Step 1 Check the gripping force: Series LEHZ

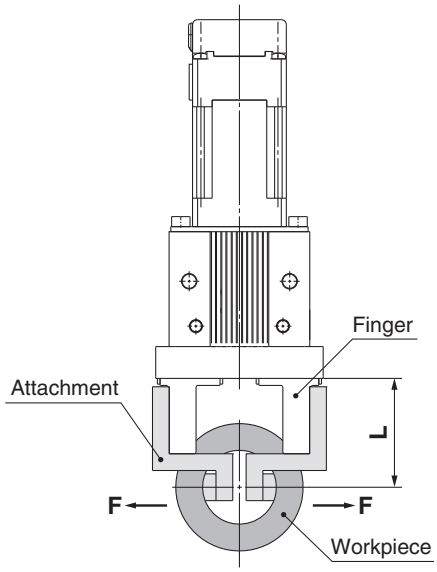
● **Indication of gripping force**
The gripping force shown in the graphs below is expressed as "F", which is the gripping force of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

● Set the workpiece gripping point "L" so that it is within the range shown in the figure below.

External Gripping State



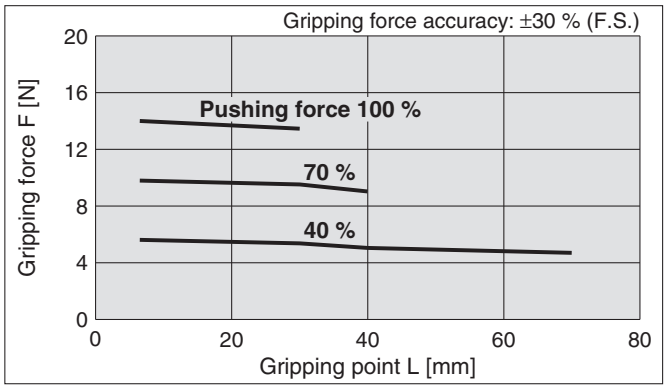
Internal Gripping State



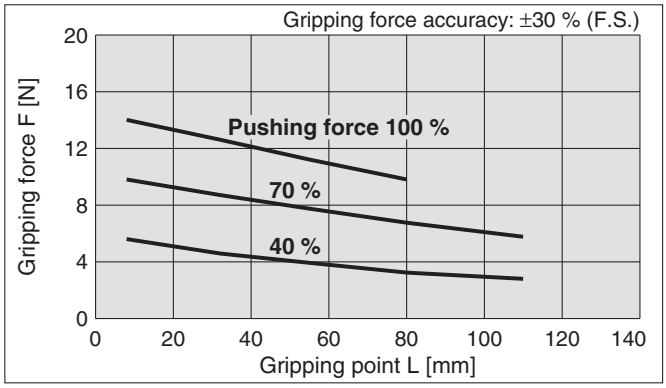
Basic

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

LEHZ10



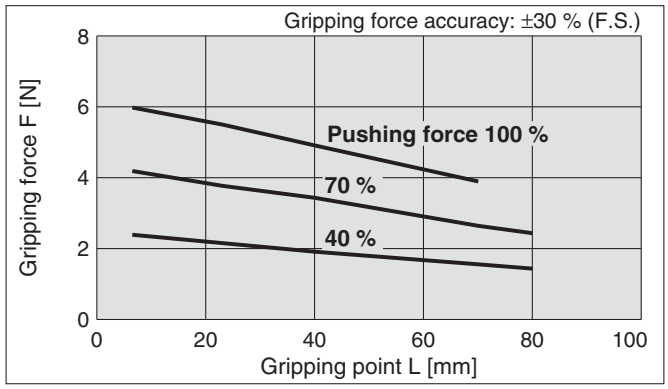
LEHZ16



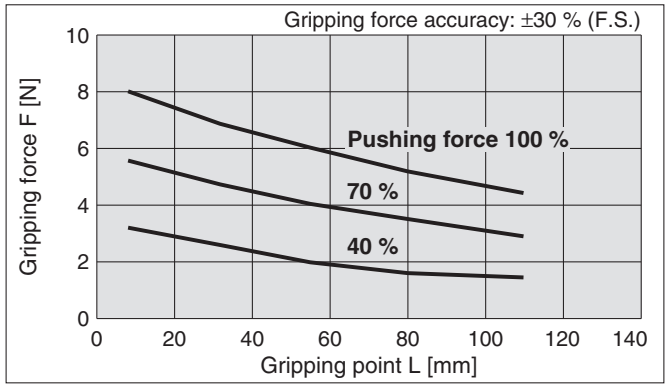
Compact

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

LEHZ10L



LEHZ16L



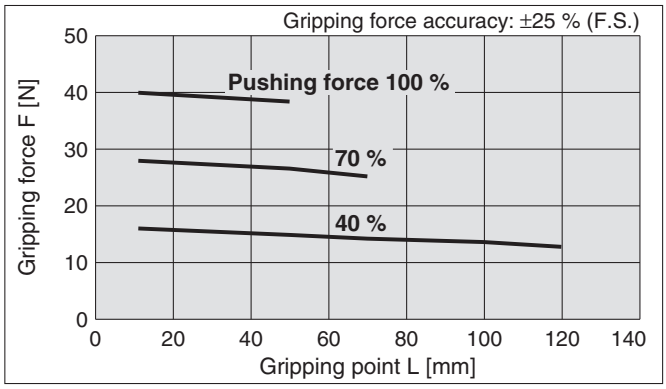
Selection Procedure

Step 1 Check the gripping force: Series LEHZ

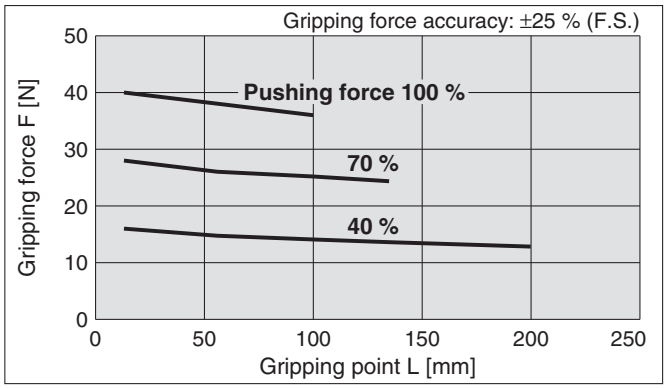
Basic

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

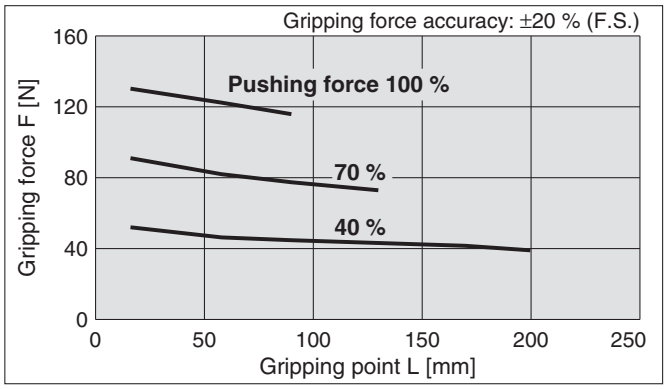
LEHZ20



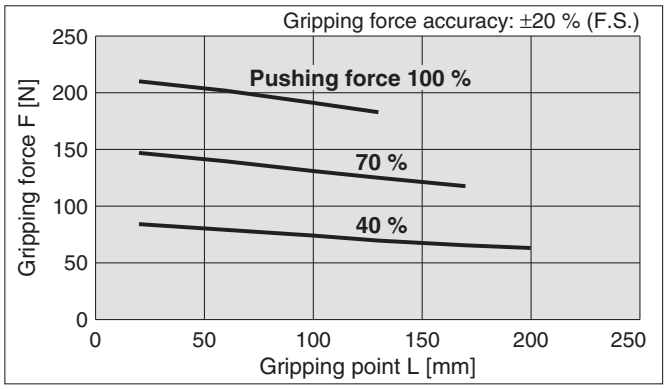
LEHZ25



LEHZ32



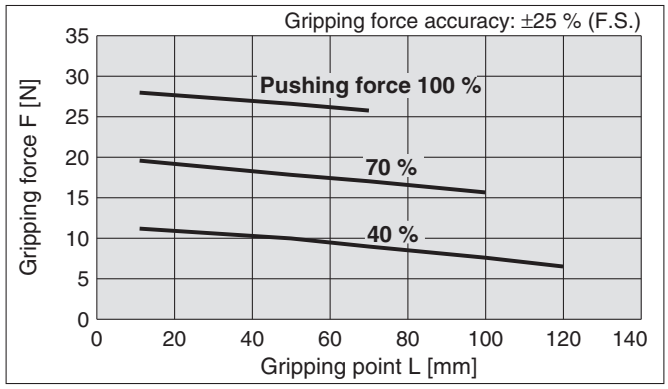
LEHZ40



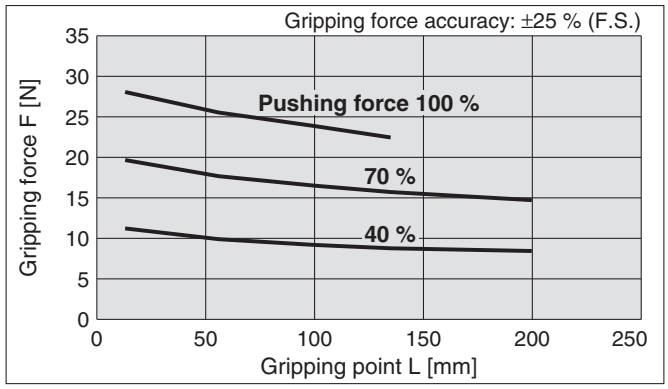
Compact

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

LEHZ20L



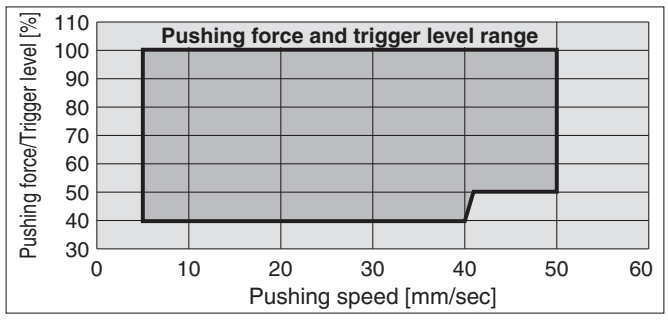
LEHZ25L



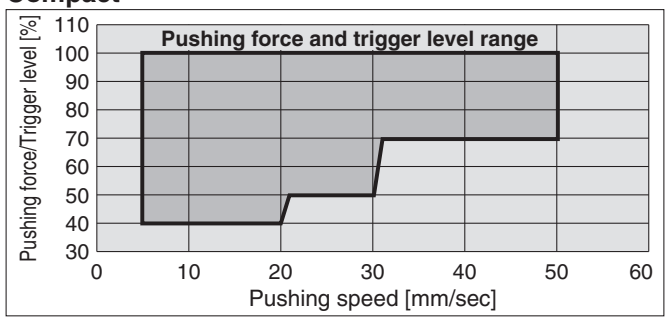
Selection of Pushing Speed

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

Basic



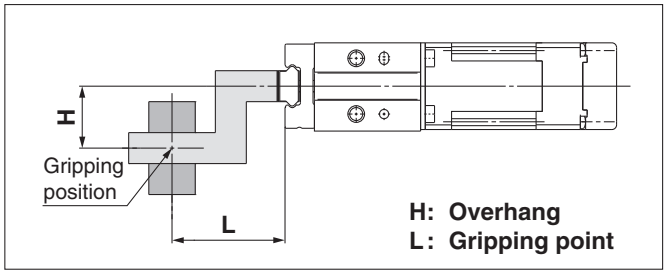
Compact



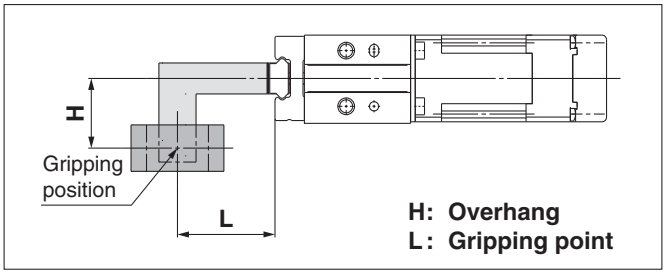
Step 2 Check the gripping point and overhang: Series LEHZ

- 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



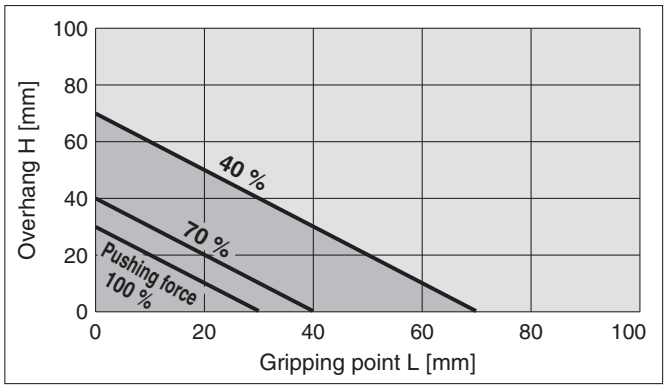
Internal Gripping State



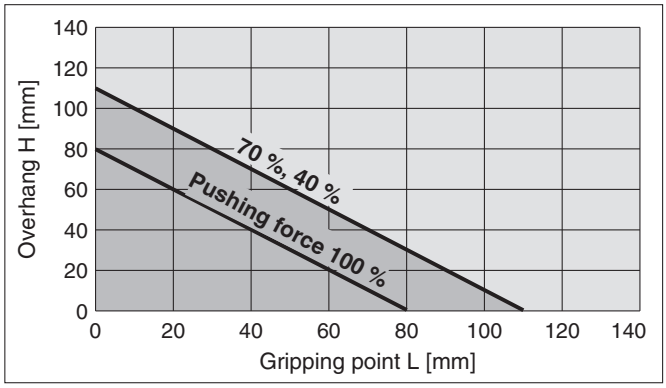
Basic

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

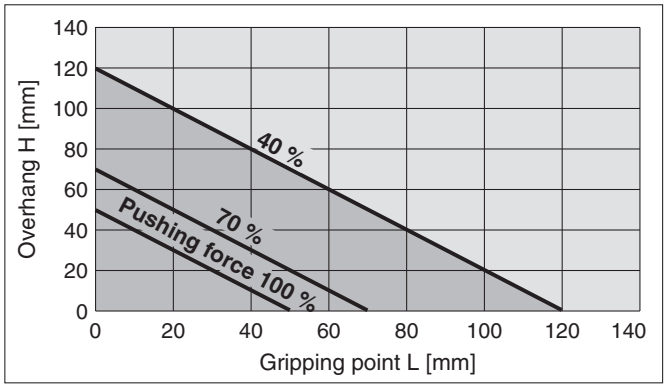
LEHZ10



LEHZ16



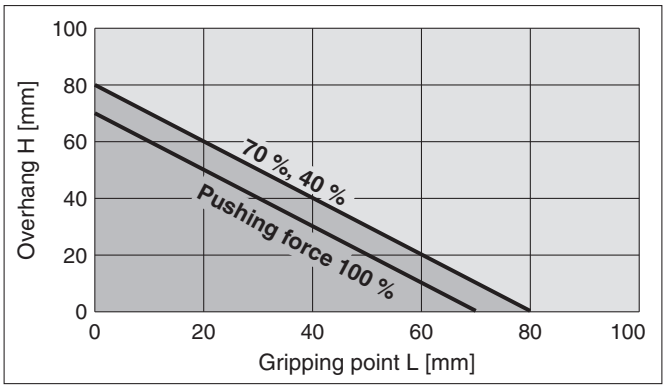
LEHZ20



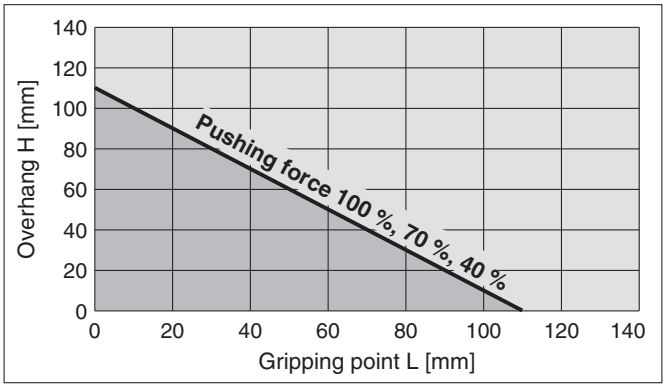
Compact

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

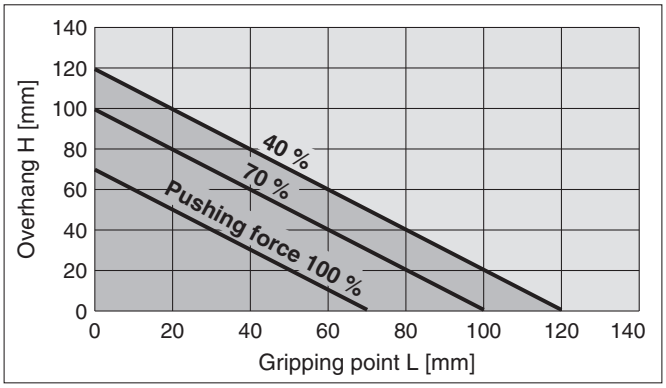
LEHZ10L



LEHZ16L



LEHZ20L



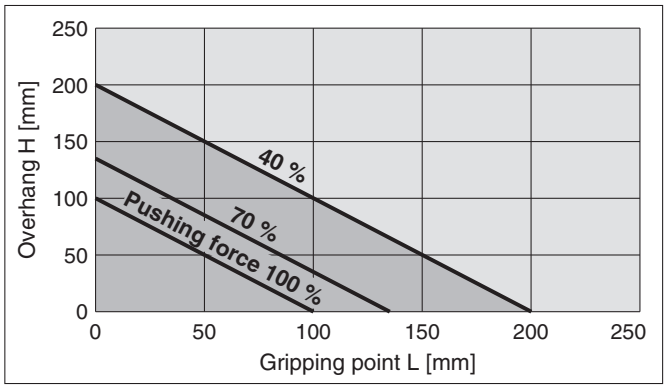
Selection Procedure

Step 2 **Check the gripping point and overhang: Series LEHZ**

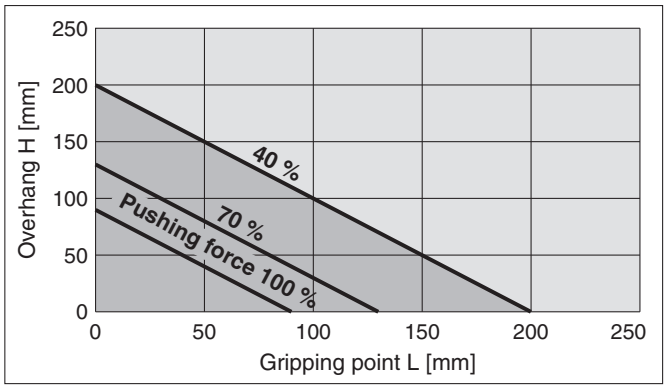
Basic

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

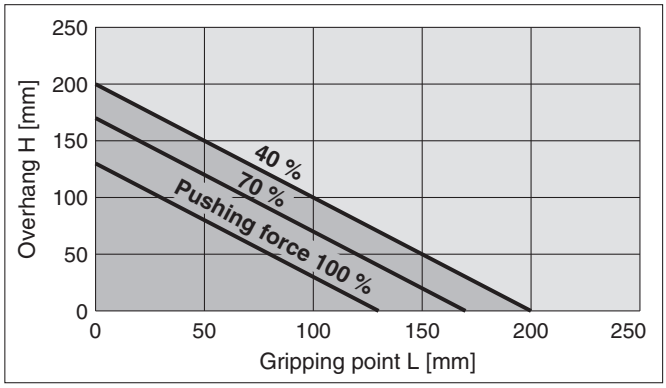
LEHZ25



LEHZ32



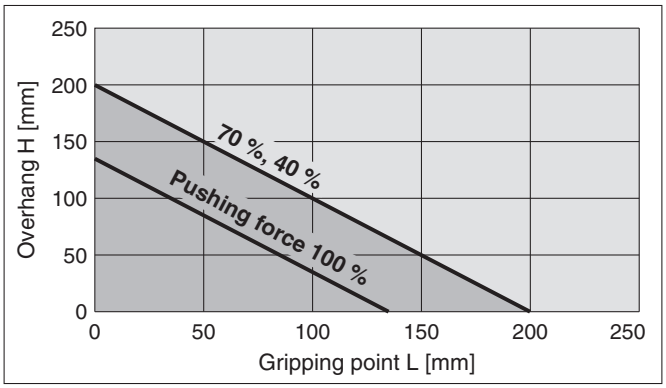
LEHZ40



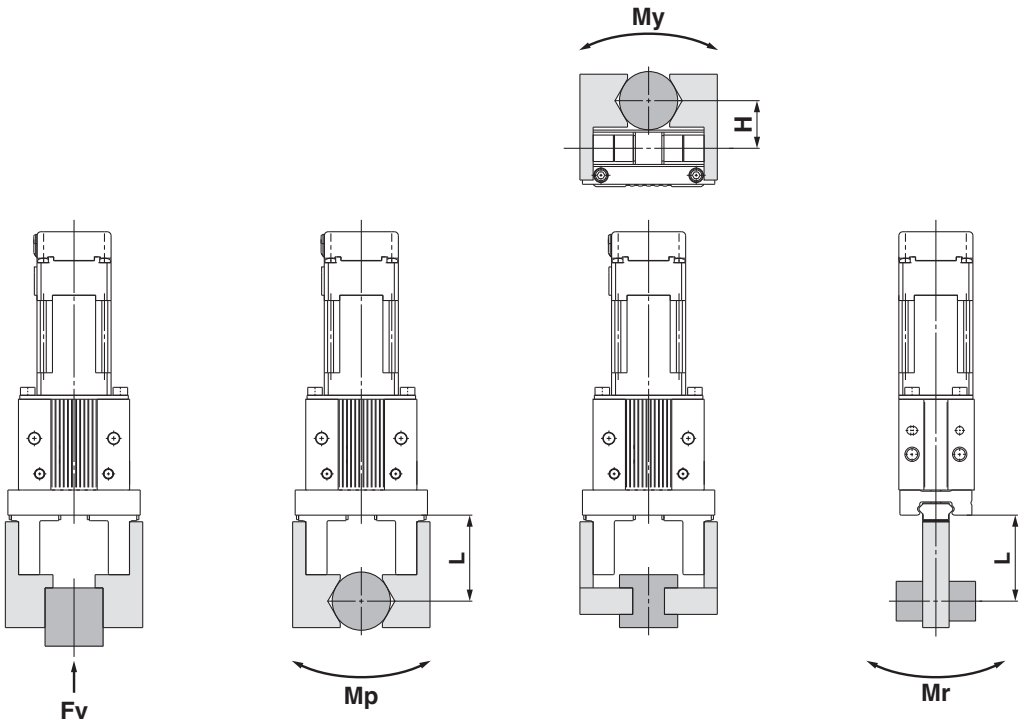
Compact

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

LEHZ25L



Step 3 Check the external force on fingers: Series LEHZ



Fv: Allowable vertical load **Mp: Pitch moment** **My: Yaw moment** **Mr: Roll moment**

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

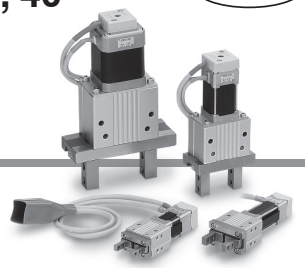
Step Motor (Servo/24 VDC)

Electric Gripper 2-Finger Type

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

∗ For details, refer to page 54.

RoHS



How to Order

LEHZ 10 ❶ K 2 – 4 ❺ ❻ – S1 ❽

Series JXC□ CD17T

Series LEC□ AP ❾ 1 ❿ ⓫

❶ Size

10
16
20
25
32
40

❷ Motor size

—	Basic
L∗1	Compact

❸ Lead

K	Basic

❹ 2-finger type

❺ Stroke [mm]

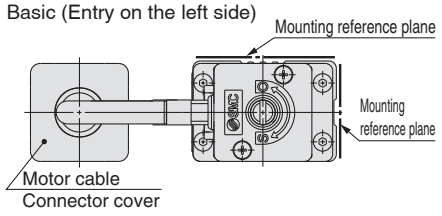
Stroke/both sides	Size
4	10
6	16
10	20
14	25
22	32
30	40

❻ Finger options

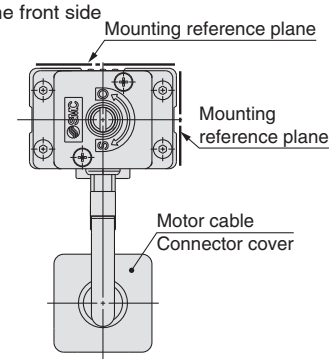
—	Basic (Tapped in open/close direction)
A	Side tapped mounting
B	Through-hole in open/close direction
C	Flat fingers

❼ Motor cable entry

— Basic (Entry on the left side)



F Entry on the front side



❽ Actuator cable type/length∗3

Standard cable [m]

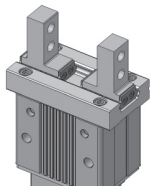
—	None
S1	1.5
S3	3
S5	5

Robotic cable [m]

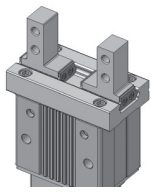
R1	1.5	RA	10∗2
R3	3	RB	15∗2
R5	5	RC	20∗2
R8	8∗2		

Finger options

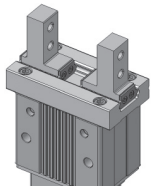
—: Basic (Tapped in open/close direction)



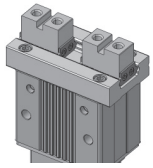
A: Side tapped mounting



B: Through-hole in open/close direction



C: Flat fingers



Series JXC□

⑨ Controller

—	Without controller
C□1□□	With controller

C D 1 7 T

Interface (Communication protocol/Input/Output)

Symbol	Type	Number of axes, Special specification: Standard	Number of axes, Special specification: With STO sub-function
5	Parallel input (NPN)	●	
6	Parallel input (PNP)	●	
E	EtherCAT	●	●
9	EtherNet/IP™	●	●
P	PROFINET	●	●
D	DeviceNet®	●	
L	IO-Link	●	●
M	CC-Link	●	

Mounting

7	Screw mounting
8∗8	DIN rail

Number of axes, Special specification

Symbol	Number of axes	Specification
1	Single axis	Standard
F	Single axis	With STO sub-function

Communication plug connector I/O cable∗9

Symbol	Type	Applicable interface
t	Without accessory	—
S	Straight type communication plug connector	DeviceNet™ CC-Link Ver 1.10
T	T-branch type communication plug connector	
1	I/O cable (1.5 m)	Parallel input (NPN) Parallel input (PNP)
3	I/O cable (3 m)	
5	I/O cable (5 m)	

Series LEC□

AP 1 □

⑨ ⑩ ⑪

⑨ Controller/Driver type∗4

—	Without controller/driver	
1N	**LECP1** (Programless type)	NPN
1P		PNP
AN	**LECPA**∗5 (Pulse input type)	NPN
AP		PNP

⑩ I/O cable length∗6

—	Without cable (Without communication plug connector)
1	1.5 m
3	3 m∗7
5	5 m∗7

⑪ Controller/Driver mounting

—	Screw mounting
D	DIN rail∗8

∗1 Size: 10, 16, 20, 25 only
∗2 Produced upon receipt of order (Robotic cable only)
∗3 The standard cable should only be used on fixed parts.
For use on moving parts, select the robotic cable.
∗4 For details on controllers/drivers and compatible motors, refer to the compatible controllers/drivers on the next page.
∗5 When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-□) separately.
∗6 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected.
∗7 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
∗8 The DIN rail is not included. It must be ordered separately.
∗9 Select "—" for anything other than DeviceNet™, CC-Link, or parallel input.
Select "—," "S," or "T" for DeviceNet™ or CC-Link.
Select "—," "1," "3," or "5" for parallel input.

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEH series and the controller series LEC/JXC.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, compliance with 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 compliance with the EMC directive for the machinery and equipment as a whole.

[UL-compliant products (For the LEC series)]

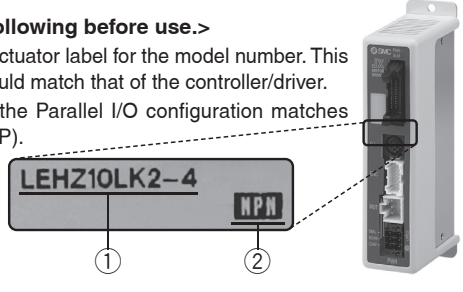
When compliance with UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.

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 the model number. This number should match that of the controller/driver.
② Check that the Parallel I/O configuration matches (NPN or PNP).

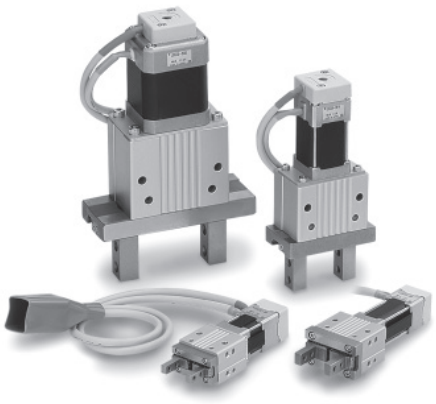


∗ Refer to the Operation Manual for using the products. Please download it via our website: https://www.smc.eu

Compatible Controllers/Drivers

Type	Step data input type	Programless type	Pulse input type
			
Series	**JXC51 JXC61**	**LECP1**	**LECPA**
Features	Parallel I/O	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)		
Max. number of step data	64 points	14 points	—
Power supply voltage	24 VDC		

Type	EtherCAT direct input type	EtherCAT direct input type with STO sub-function	EtherNet/IP™ direct input type	EtherNet/IP™ direct input type with STO sub-function	PROFINET direct input type	PROFINET direct input type with STO sub-function	DeviceNet® direct input type	IO-Link direct input type	IO-Link direct input type with STO sub-function	CC-Link direct input type
										
Series	**JXCE1**	**JXCEF**	**JXC91**	**JXC9F**	**JXCP1**	**JXCPF**	**JXCD1**	**JXCL1**	**JXCLF**	**JXCM1**
Features	EtherCAT direct input	EtherCAT direct input with STO sub-function	EtherNet/IP™ direct input	EtherNet/IP™ direct input with STO sub-function	PROFINET direct input	PROFINET direct input with STO sub-function	DeviceNet® direct input	IO-Link direct input	IO-Link direct input with STO sub-function	CC-Link direct input
Compatible motor	Step motor (Servo/24 VDC)									
Max. number of step data	64 points									
Power supply voltage	24 VDC									



Specifications

	Model		LEHZ10	LEHZ16	LEHZ20	LEHZ25	LEHZ32	LEHZ40
Actuator specifications	Opening/closing stroke (Both sides)		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] Note 1) Note 3)	Basic	6 to 14		16 to 40		52 to 130	84 to 210
		Compact	2 to 6	3 to 8	11 to 28		—	—
	Opening and closing speed/ Pushing speed [mm/s] Note 2) Note 3)		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] Note 4)		±0.05					
	Finger backlash/ both sides [mm] Note 5)		0.25 or less				0.5 or less	
	Repeatability [mm] Note 6)		±0.02					
	Positioning repeatability/one side [mm]		±0.05					
	Lost motion/one side [mm] Note 7)		0.25 or less				0.3 or less	
	Impact/Vibration resistance [m/s²] Note 8)		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	165	220	430	585	1120	1760
		Compact	135	190	365	520	—	—
Electric specifications	Motor size		□20		□28		□42	
	Motor type		Step motor (Servo/24 VDC)					
	Encoder		Incremental					
	Power supply voltage [V]		24 VDC ±10 %					
	Power Note 9)	Basic	Max. power 19		Max. power 51		Max. power 57	Max. power 61
		Compact	Max. power 14		Max. power 42		—	—

Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Positioning 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. Gripping with heavy attachment and fast pushing speed, may not reach the product specification. In this case, decrease the weight and lower the pushing speed.

Note 2) Pushing speed should be set within the range during pushing (gripping) operation. Otherwise, it may cause malfunction. The opening/closing 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.

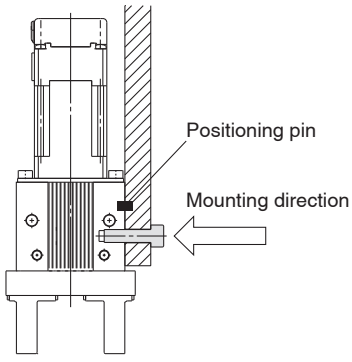
Note 7) A reference value for correcting an error in reciprocal operation which occurs during the positioning operation.

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.)

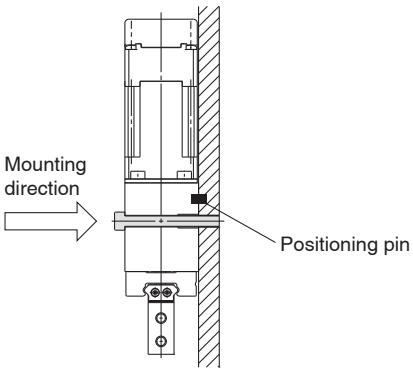
Note 9) Indicates the max. power during operation (including the controller)This value can be used for the selection of the power supply.

How to Mount

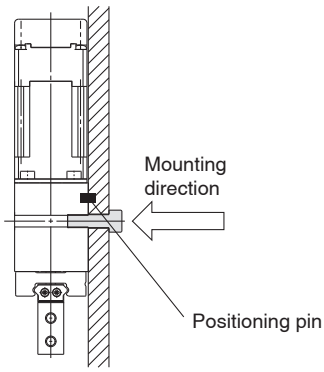
a) When using the thread on the side of the body



b) When using the thread on the mounting plate

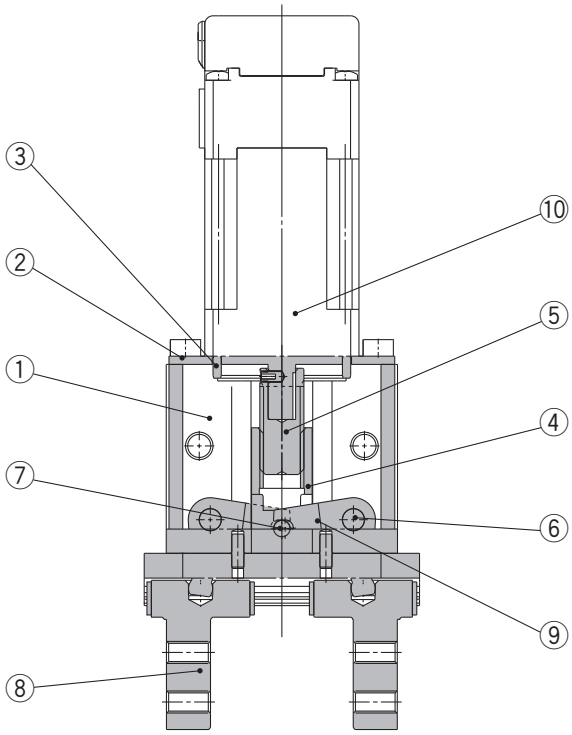


c) When using the thread on the back of the body



Construction

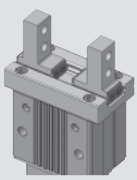
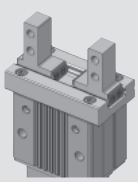
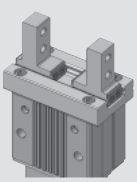
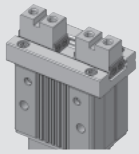
Series LEHZ



Component Parts

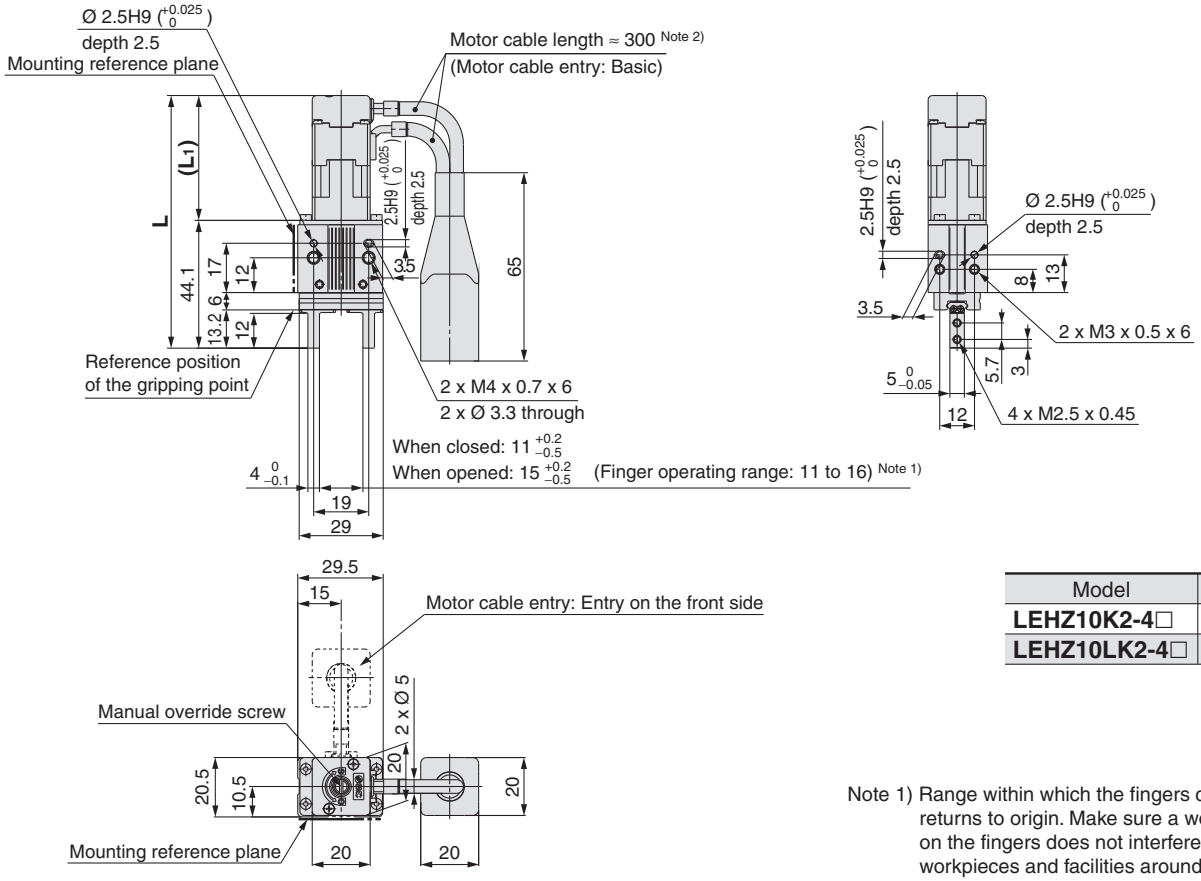
No.	Description	Material	Note
1	**Body**	Aluminium alloy	Anodised
2	**Motor plate**	Aluminium alloy	Anodised
3	**Guide ring**	Aluminium alloy	
4	**Slide nut**	Stainless steel	Heat treatment + Special treatment
5	**Slide bolt**	Stainless steel	Heat treatment + Special treatment
6	**Needle roller**	High 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

Size	Basic (—)	Side tapped mounting (**A**)	Through-hole in opening/ closing direction (**B**)	Flat fingers (**C**)
				
10	MHZ-A1002	MHZ-A1002-1	MHZ-A1002-2	MHZ-A1002-3
16	MHZ-A1602	MHZ-A1602-1	MHZ-A1602-2	MHZ-A1602-3
20	MHZ-A2002	MHZ-A2002-1	MHZ-A2002-2	MHZ-A2002-3
25	MHZ-A2502	MHZ-A2502-1	MHZ-A2502-2	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

Dimensions

LEHZ10(L)K2-4

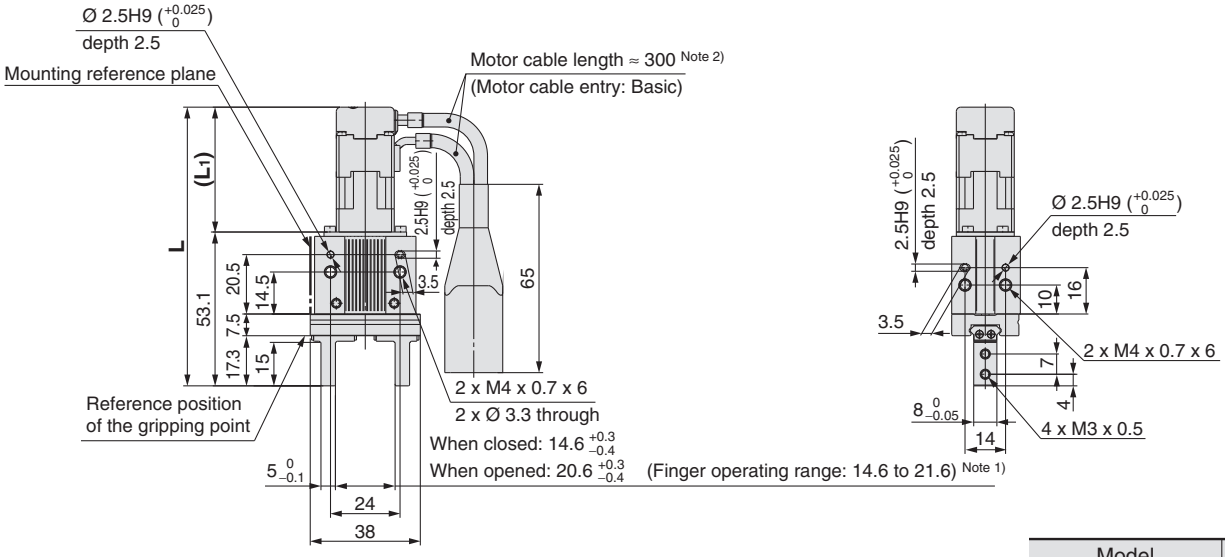


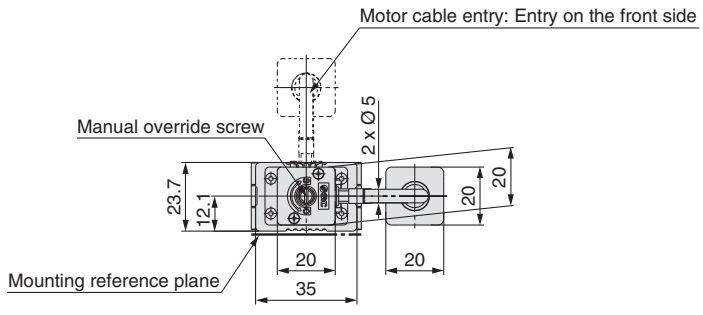
[mm]

Model	L	(L1)
LEHZ10K2-4□	103.8	(59.7)
LEHZ10LK2-4□	87.2	(43.1)

Note 1) 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.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

LEHZ16(L)K2-6





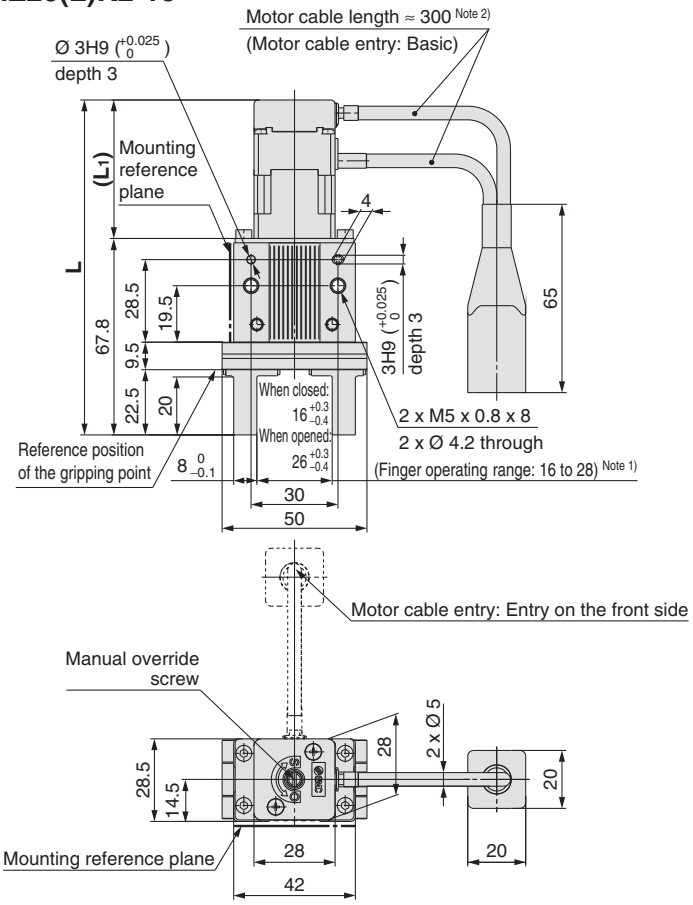
[mm]

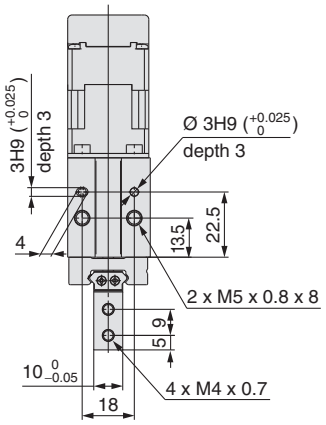
Model	L	(L1)
LEHZ16K2-6□	112.8	(59.7)
LEHZ16LK2-6□	96.2	(43.1)

Note 1) 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.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

Dimensions

LEHZ20(L)K2-10



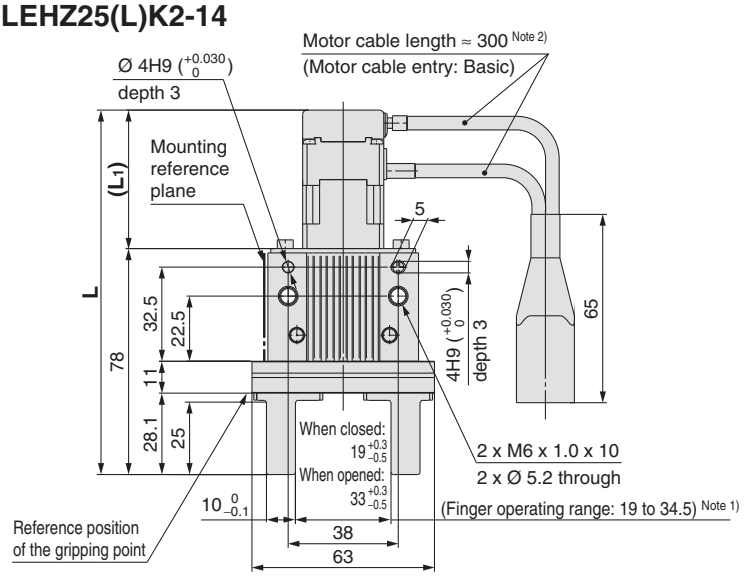


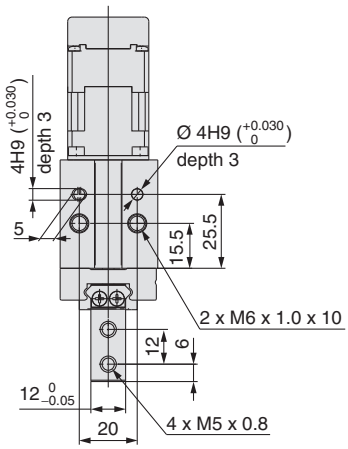
[mm]

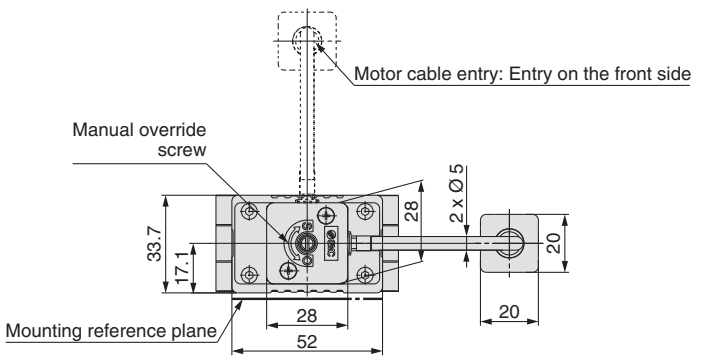
Model	L	(L1)
LEHZ20K2-10□	129.6	(61.8)
LEHZ20LK2-10□	115.6	(47.8)

Note 1) 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.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

LEHZ25(L)K2-14







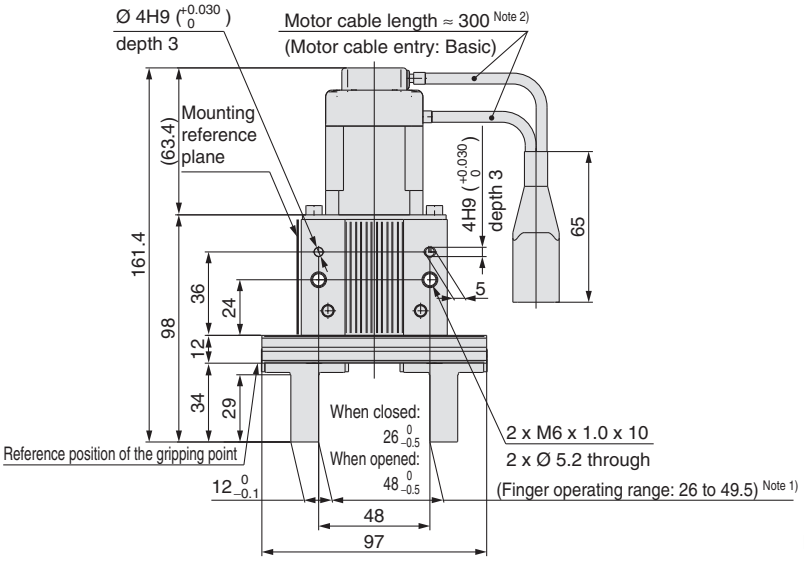
[mm]

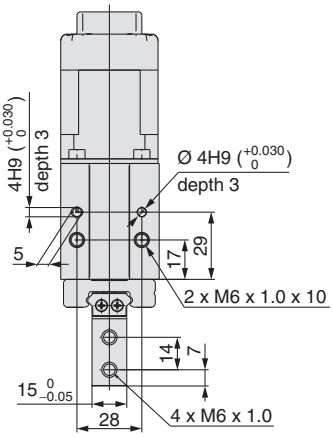
Model	L	(L1)
LEHZ25K2-14□	139.8	(61.8)
LEHZ25LK2-14□	125.8	(47.8)

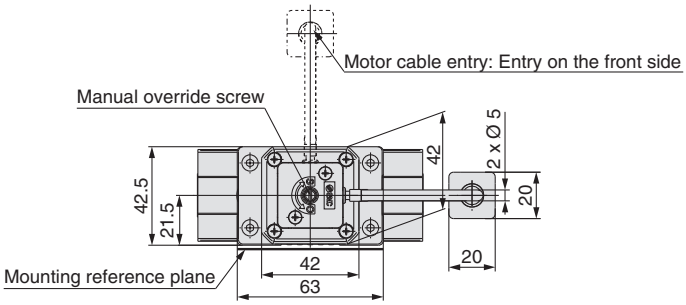
Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

Dimensions

LEHZ32K2-22

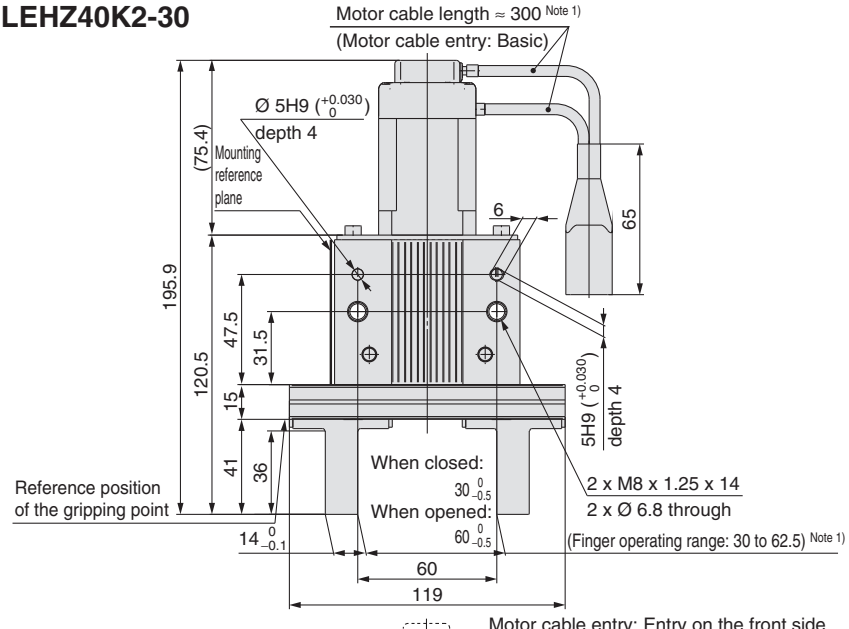


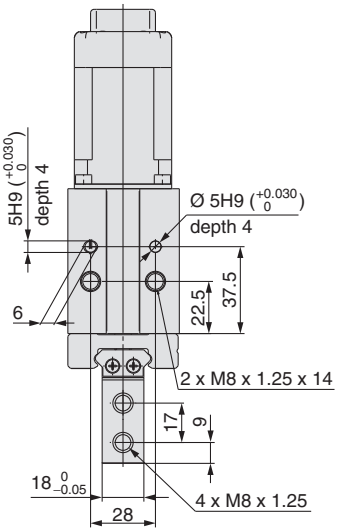


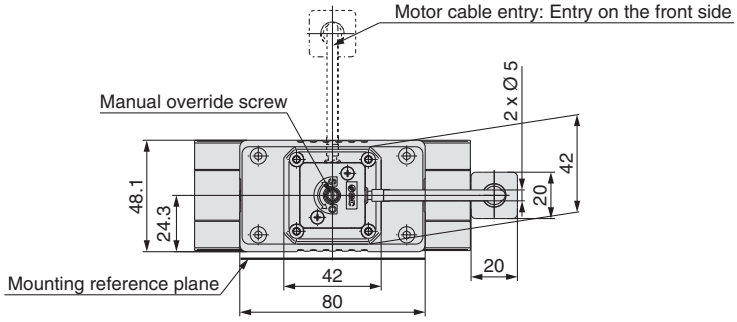


Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

LEHZ40K2-30



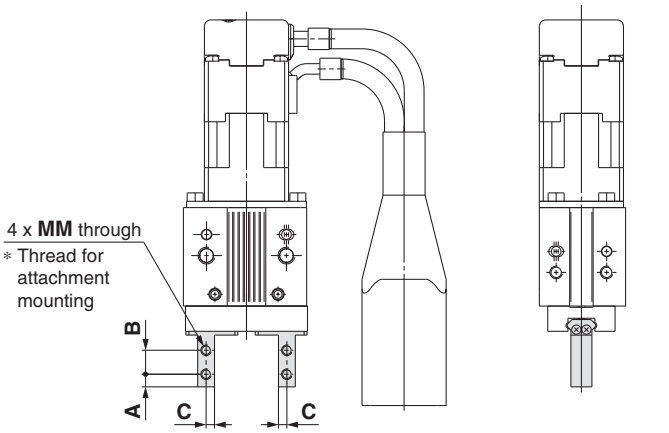




Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

Finger Options

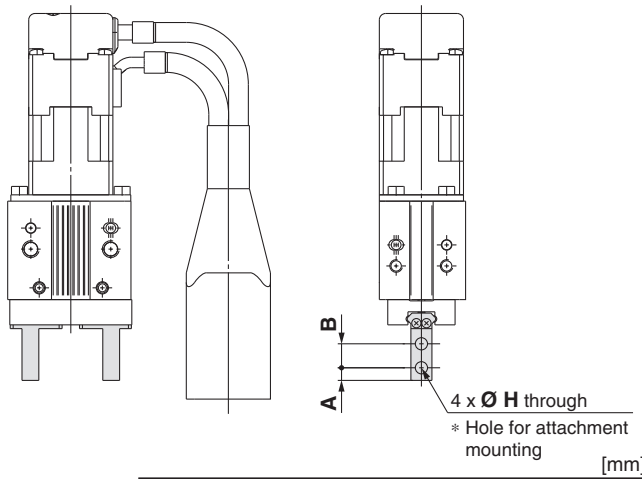
Side Tapped Mounting (A)



[mm]

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

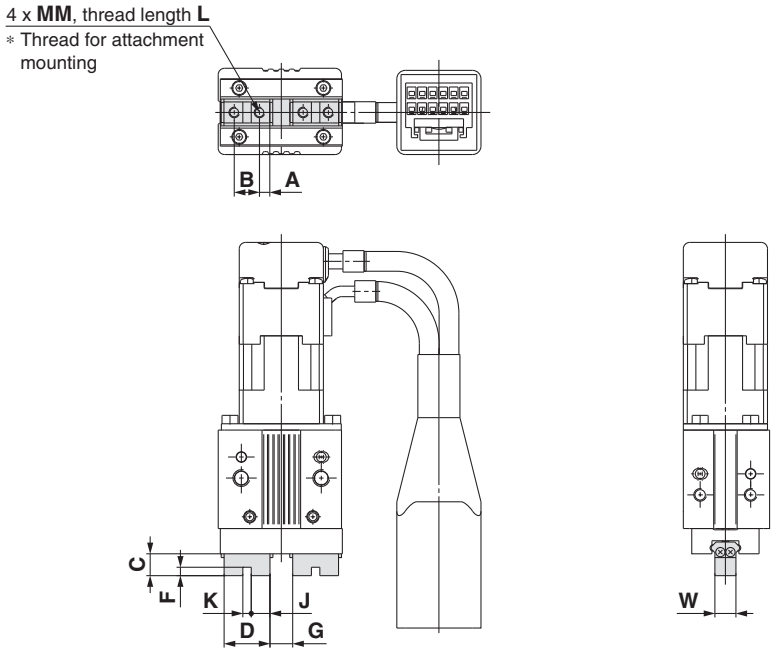
Through-hole in Opening/Closing Direction (B)



[mm]

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)



[mm]

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

Selection Procedure

Step 1 Check the gripping force. → **Step 2** Check the gripping point and overhang. → **Step 3** Check the external force on fingers.

Step 1 Check the of 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 10 to 20 times Note) the workpiece weight, or more.

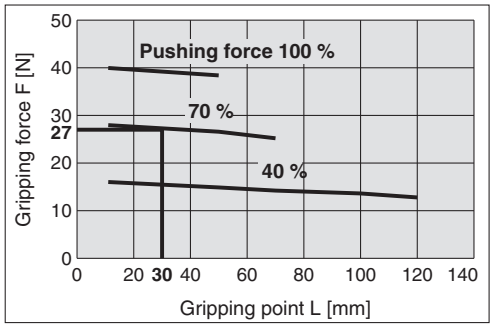
Note) For details, refer to the calculation of required gripping force.

- 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 x 20 x 9.8 m/s^2 ≈ 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.

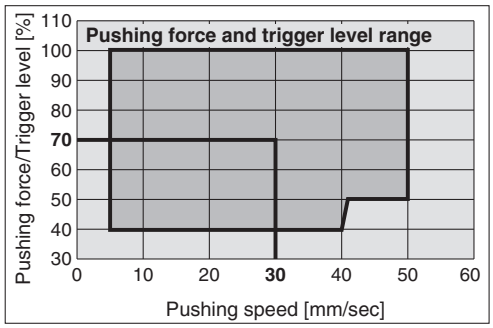
Pushing force: 70 %

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

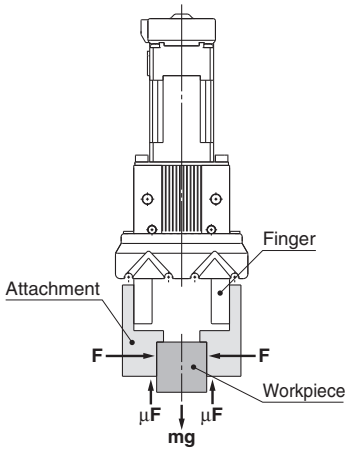
LEHZJ20



- 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/s^2)
mg: Workpiece weight (N)

the conditions under which the workpiece will not drop are

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

(2: Number of fingers)

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

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 μ = 0.2	When μ = 0.1
$F = \dfrac{mg}{2 \times 0.2} \times 4 = 10 \times mg$	$F = \dfrac{mg}{2 \times 0.1} \times 4 = 20 \times mg$
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 μ = 0.2, for reasons of safety, select a gripping force which is at least 10 to 20 times greater than the workpiece weight, as recommended by SMC.
- If high acceleration or impact forces are encountered during motion, a further margin should be considered.

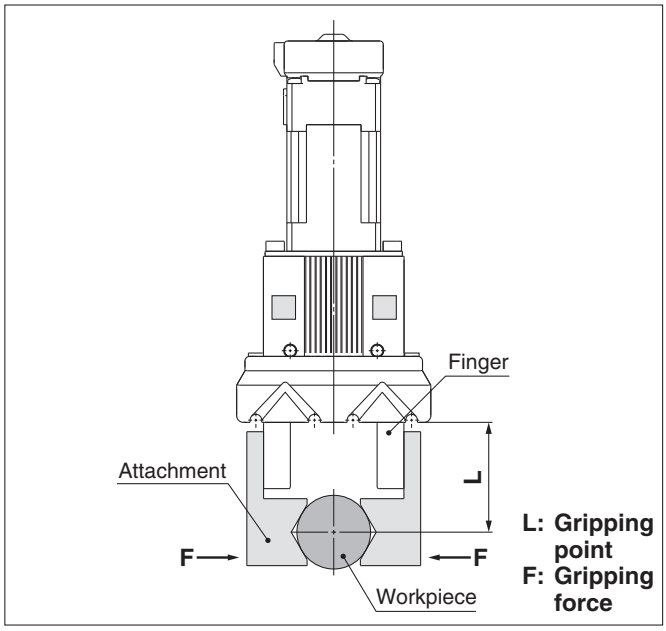
Selection Procedure

Step 1 Check the gripping force: Series LEHZJ

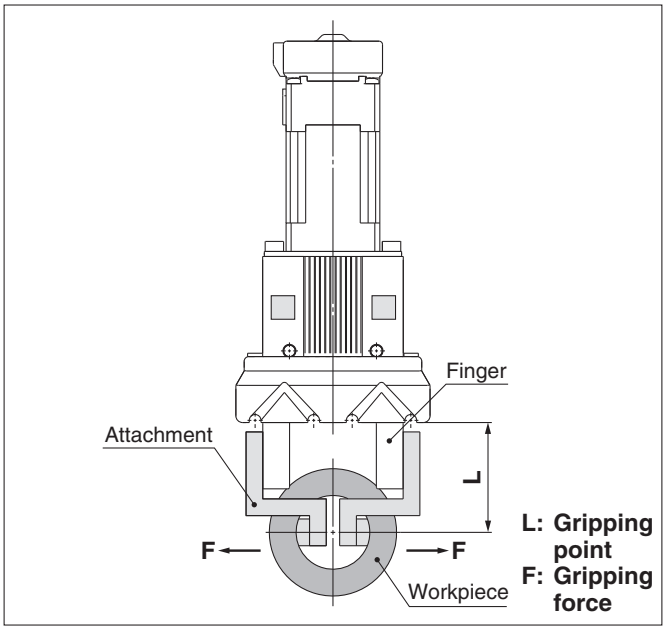
● **Indication of gripping force**
The gripping force shown in the graphs below is expressed as "F", which is the gripping force of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

● Set the workpiece gripping point "L" so that it is within the range shown in the figure below.

External Gripping State



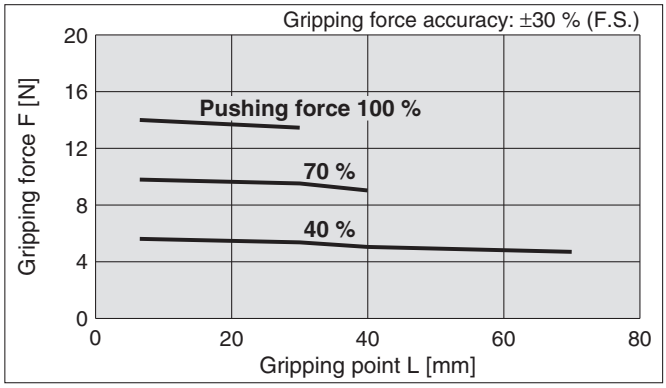
Internal Gripping State



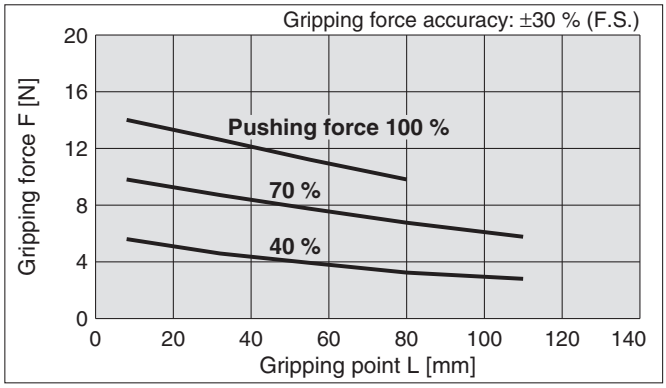
Basic

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

LEHZJ10



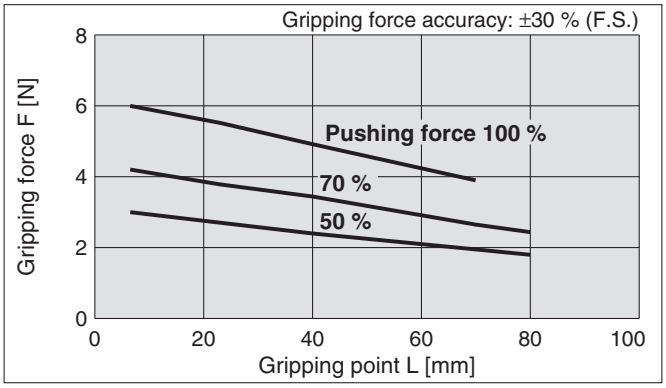
LEHZJ16



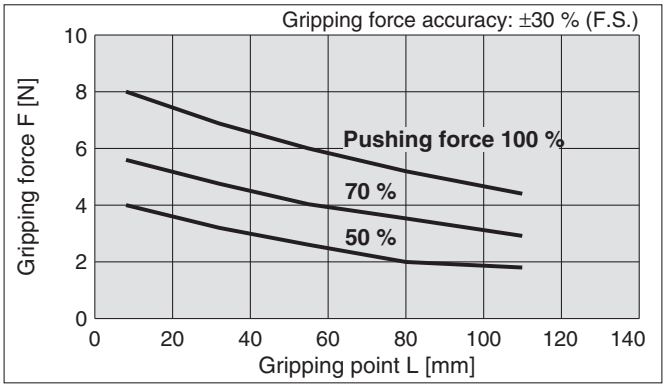
Compact

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

LEHZJ10L



LEHZJ16L



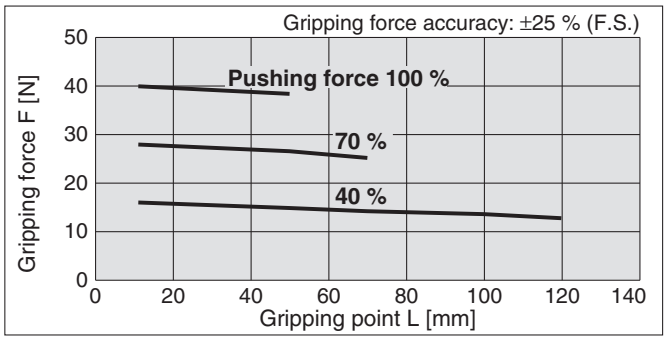
Selection Procedure

Step 1 Check the gripping force: Series LEHZJ

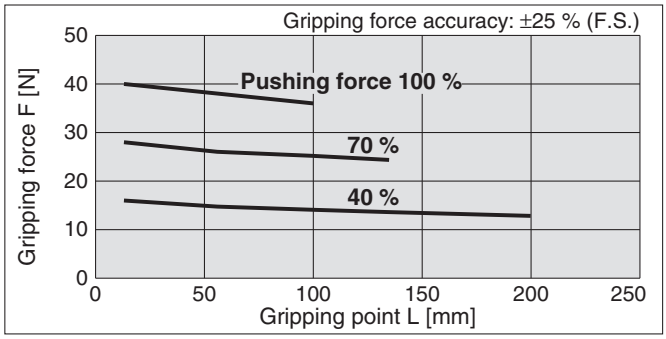
Basic

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

LEHZJ20



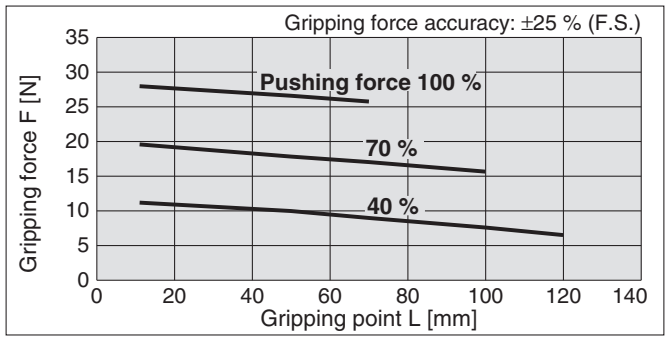
LEHZJ25



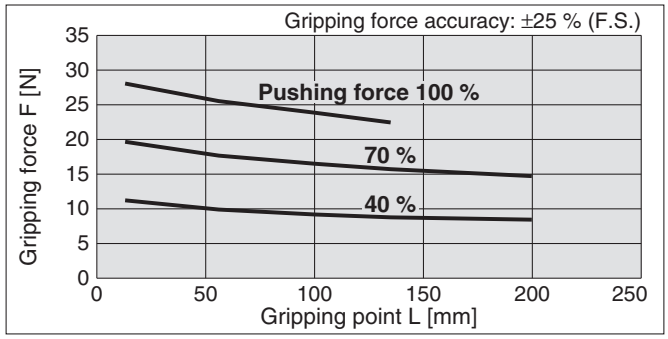
Compact

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

LEHZJ20L



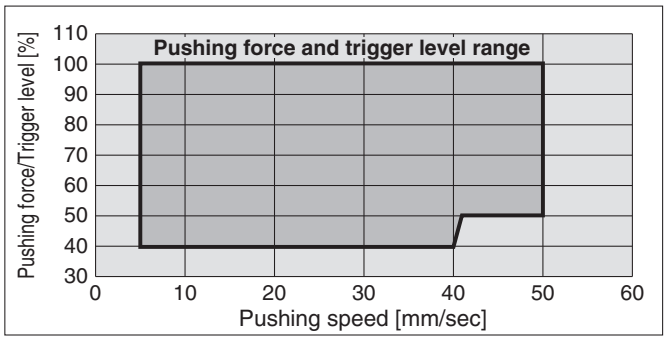
LEHZJ25L



Selection of Pushing Speed

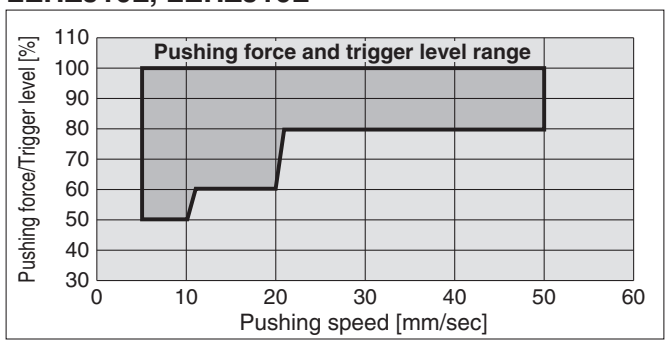
● Set the [Pushing force] and [Trigger level] within the range shown in the figure below.

Basic

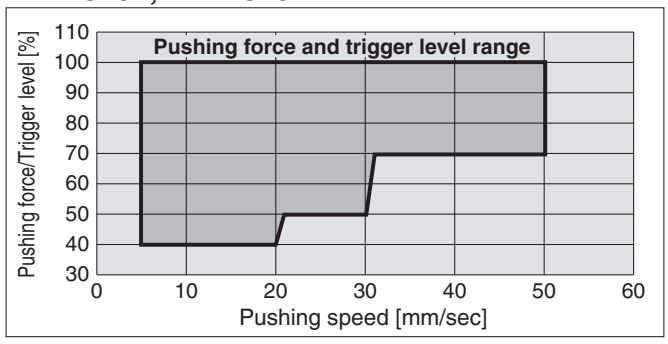


Compact

LEHZJ10L, LEHZJ16L



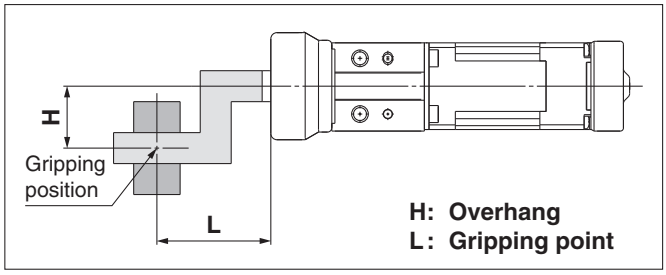
LEHZJ20L, LEHZJ25L



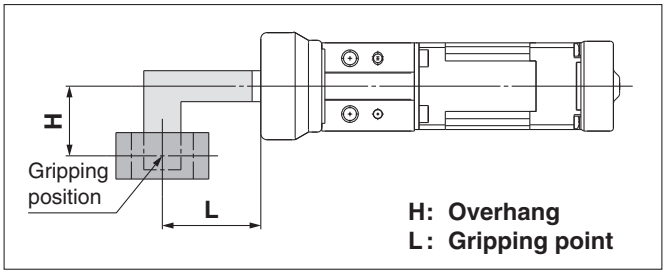
Step 2 Check the gripping point and overhang: Series LEHZJ

- 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



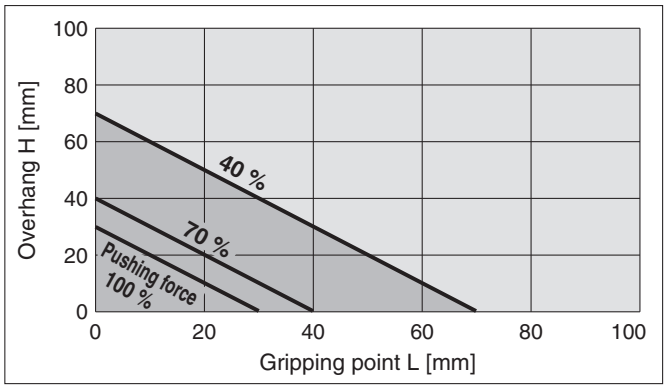
Internal Gripping State



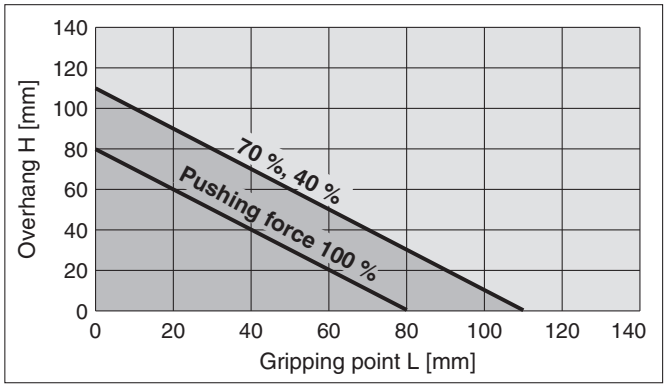
Basic

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

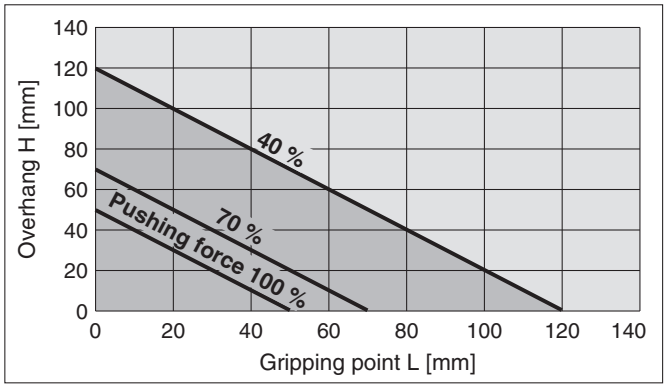
LEHZJ10



LEHZJ16



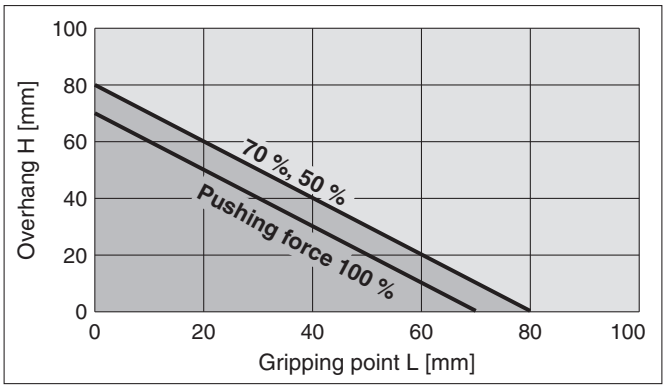
LEHZJ20



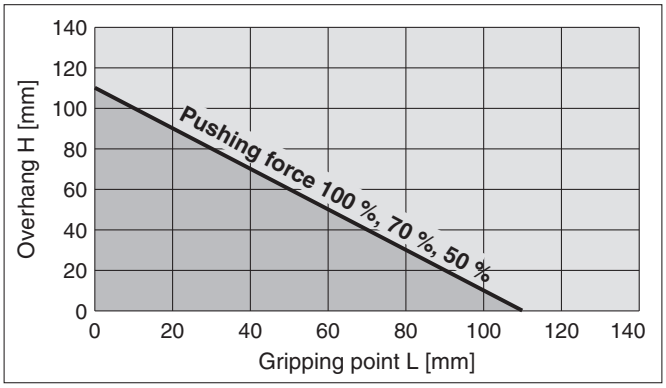
Compact

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

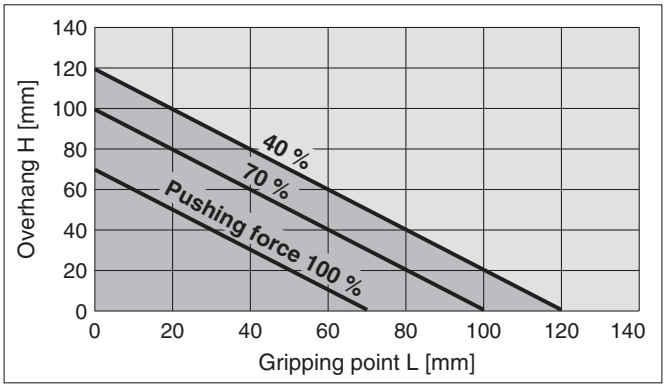
LEHZJ10L



LEHZJ16L



LEHZJ20L



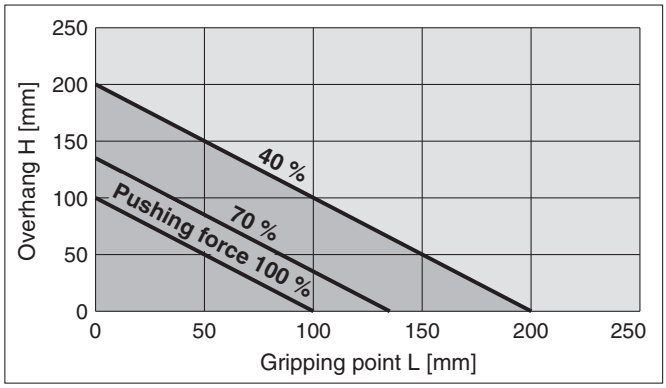
Selection Procedure

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.

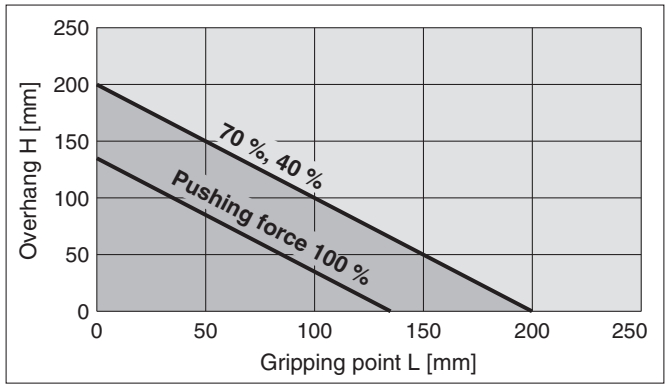
LEHZJ25



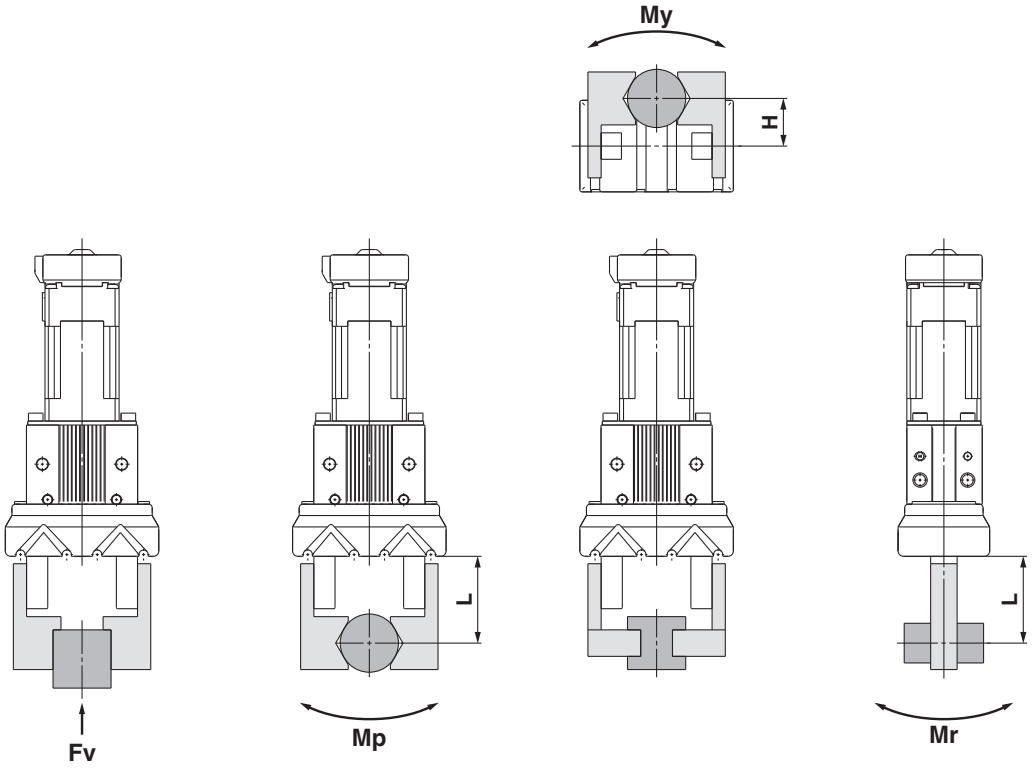
Compact

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

LEHZJ25L



Step 3 Check the external force on fingers: Series LEHZJ



Fv: Allowable vertical load **Mp: Pitch moment** **My: Yaw moment** **Mr: Roll moment**

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]
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.

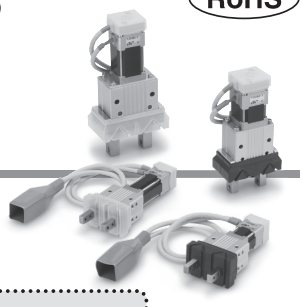
Calculation of allowable external force (when moment load is applied)	Calculation example
Allowable load F (N) $= \dfrac{\text{M (Static allowable moment) (N·m)}}{\text{L} \times 10^{-3} *}$ (∗ Constant for unit conversion)	When a static load of f = 10 N is operating, which applies pitch moment to point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

Electric Gripper 2-Finger Type With Dust Cover

Series LEHZJ LEHZJ10, 16, 20, 25

∗ For details, refer to page 54.

RoHS



How to Order

LEHZ **J** **10** **□** **K** **2** – **4** **□** **□** – **S1**

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾

Series JXC□
CD17T

Series LEC□
AP ❿ **1** ⓫ **□** ⓬

❶ Dust cover

J	With dust cover

❷ Size

10
16
20
25

❸ Motor size

—	Basic
L	Compact

❹ Lead

K	Basic

❺ 2-finger type

❻ Stroke [mm]

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

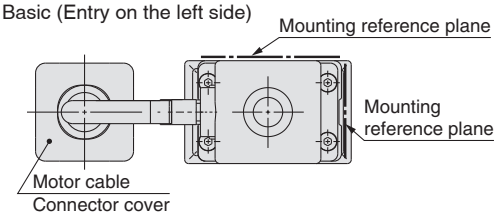
❼ Dust cover type

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

❽ Motor cable entry

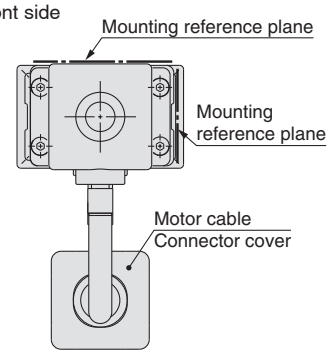
—

Basic (Entry on the left side)



F

Entry on the front side



❾ Actuator cable type/length∗2

Standard cable [m]

—	None
S1	1.5
S3	3
S5	5

Robotic cable [m]

R1	1.5	**RA**	10∗1
R3	3	**RB**	15∗1
R5	5	**RC**	20∗1
R8	8∗1		

Series JXC□

⑩Controller

—	Without controller
C□1□□	With controller

C D 1 7 T

Interface (Communication protocol/Input/Output)

Symbol	Type	Number of axes, Special specification: Standard	Number of axes, Special specification: With STO sub-function
5	Parallel input (NPN)	●	
6	Parallel input (PNP)	●	
E	EtherCAT	●	●
9	EtherNet/IP™	●	●
P	PROFINET	●	●
D	DeviceNet®	●	
L	IO-Link	●	●
M	CC-Link	●	

Mounting

7	Screw mounting
8∗8	DIN rail

Number of axes, Special specification

Symbol	Number of axes	Specification
1	Single axis	Standard
F	Single axis	With STO sub-function

Communication plug connector I/O cable∗9

Symbol	Type	Applicable interface
t	Without accessory	—
S	Straight type communication plug connector	DeviceNet™ CC-Link Ver 1.10
T	T-branch type communication plug connector	
1	I/O cable (1.5 m)	Parallel input (NPN) Parallel input (PNP)
3	I/O cable (3 m)	
5	I/O cable (5 m)	

Series LEC□

AP 1 □
⑩ ⑪ ⑫

⑩ Controller/Driver type∗3

—	Without controller/driver	
1N	**LECP1** (Programless type)	NPN
1P		PNP
AN	**LECPA**∗4 (Pulse input type)	NPN
AP		PNP

⑪ I/O cable length∗5

—	Without cable (Without communication plug connector)
1	1.5 m
3	3 m∗6
5	5 m∗6

⑫ Controller/Driver mounting

—	Screw mounting
D	DIN rail∗7

∗1 Produced upon receipt of order (Robotic cable only)
∗2 The standard cable should only be used on fixed parts.
For use on moving parts, select the robotic cable.
∗3 For details on controllers/drivers and compatible motors, refer to the compatible controllers/drivers on the next page.
∗4 When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-□) separately.
∗5 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected.
∗6 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
∗7 The DIN rail is not included. It must be ordered separately.
∗8 Select "—" for anything other than DeviceNet™, CC-Link, or parallel input.
Select "—," "S," or "T" for DeviceNet™ or CC-Link.
Select "—," "1," "3," or "5" for parallel input.

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEH series and the controller series LEC/JXC.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, compliance with 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 compliance with the EMC directive for the machinery and equipment as a whole.

[UL-compliant products (For the LEC series)]

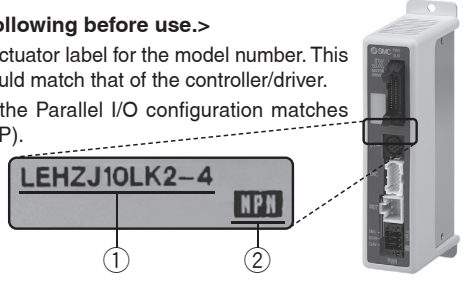
When compliance with UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.

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 the model number. This number should match that of the controller/driver.
② Check that the Parallel I/O configuration matches (NPN or PNP).



∗ Refer to the Operation Manual for using the products. Please download it via our website: https://www.smc.eu

Compatible Controllers/Drivers

Type	Step data input type	Programless type	Pulse input type
			
Series	**JXC51 JXC61**	**LECP1**	**LECPA**
Features	Parallel I/O	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)		
Max. number of step data	64 points	14 points	—
Power supply voltage	24 VDC		

Type	EtherCAT direct input type	EtherCAT direct input type with STO sub-function	EtherNet/IP™ direct input type	EtherNet/IP™ direct input type with STO sub-function	PROFINET direct input type	PROFINET direct input type with STO sub-function	DeviceNet® direct input type	IO-Link direct input type	IO-Link direct input type with STO sub-function	CC-Link direct input type
										
Series	**JXCE1**	**JXCEF**	**JXC91**	**JXC9F**	**JXCP1**	**JXCPF**	**JXCD1**	**JXCL1**	**JXCLF**	**JXCM1**
Features	EtherCAT direct input	EtherCAT direct input with STO sub-function	EtherNet/IP™ direct input	EtherNet/IP™ direct input with STO sub-function	PROFINET direct input	PROFINET direct input with STO sub-function	DeviceNet® direct input	IO-Link direct input	IO-Link direct input with STO sub-function	CC-Link direct input
Compatible motor	Step motor (Servo/24 VDC)									
Max. number of step data	64 points									
Power supply voltage	24 VDC									

Specifications

Model			LEHZJ10	LEHZJ16	LEHZJ20	LEHZJ25
Actuator specifications	Opening/closing stroke (Both sides)		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] Note 1) Note 3)	Basic	6 to 14		16 to 40	
		Compact	3 to 6	4 to 8	11 to 28	
	Opening and closing speed/Pushing speed [mm/s] Note 2) Note 3)		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)			
	Repeatability [mm] Note 4)		±0.02			
	Repeated length measurement accuracy [mm] Note 5)		±0.05			
	Finger backlash/ both sides [mm] Note 6)		0.25 or less			
	Impact/Vibration resistance [m/s²] Note 7)		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	170	230	440	610
		Compact	140	200	375	545
Electric specifications	Motor size		□20		□28	
	Motor type		Step motor (Servo/24 VDC)			
	Encoder		Incremental			
	Power supply voltage [V]		24 VDC ±10 %			
	Power Note 9)	Basic	Max. power 19		Max. power 51	
		Compact	Max. power 14		Max. power 42	

Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Positioning 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. Gripping with heavy attachment and fast pushing speed, may not reach the product specification. In this case, decrease the weight and lower the pushing speed.

Note 2) Pushing speed should be set within the range during pushing (gripping) operation. Otherwise, it may cause malfunction. The opening/closing 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) 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 5) Repeated length measurement accuracy means dispersion (value on the controller monitor) when the workpiece is repeatedly held in the same position.

Note 6) There will be no influence of backlash during pushing (gripping) operation. Make the stroke longer for the amount of backlash when opening.

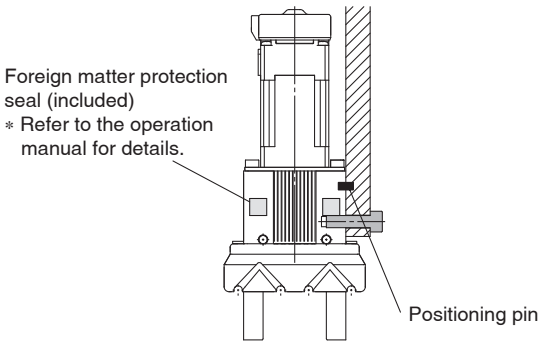
Note 7) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between 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 8) 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.

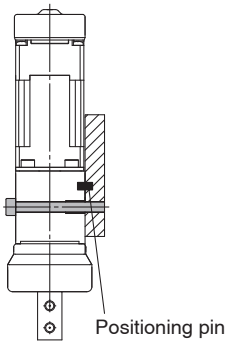
Note 9) Indicates the max. power during operation (including the controller)This value can be used for the selection of the power supply

How to Mount

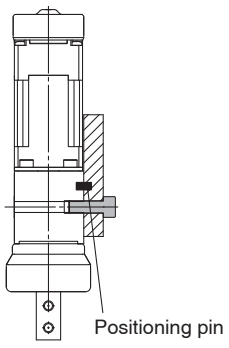
a) When using the thread on the side of the body



b) When using the thread on the mounting plate

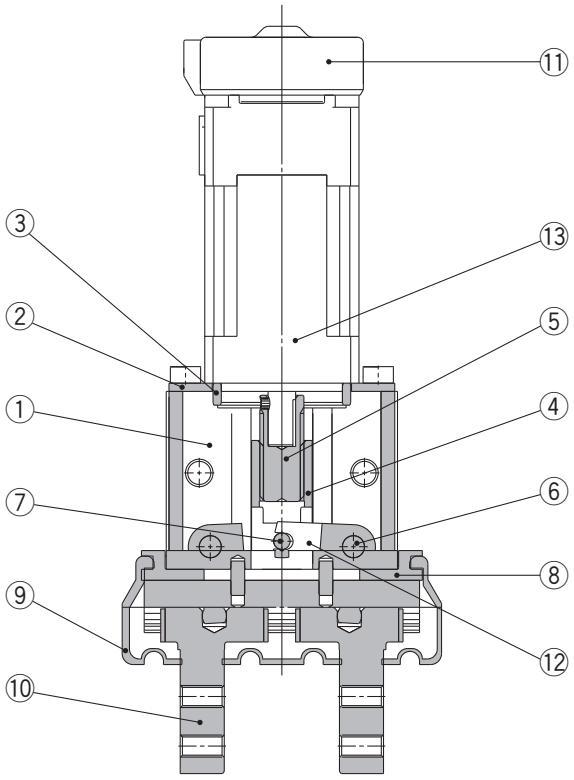


c) When using the thread on the back of the body



Construction

Series LEHZJ



Component Parts

No.	Description	Material	Note
1	**Body**	Aluminium alloy	Anodised
2	**Motor plate**	Aluminium alloy	Anodised
3	**Guide ring**	Aluminium 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**	Aluminium alloy	Anodised
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)**	—	

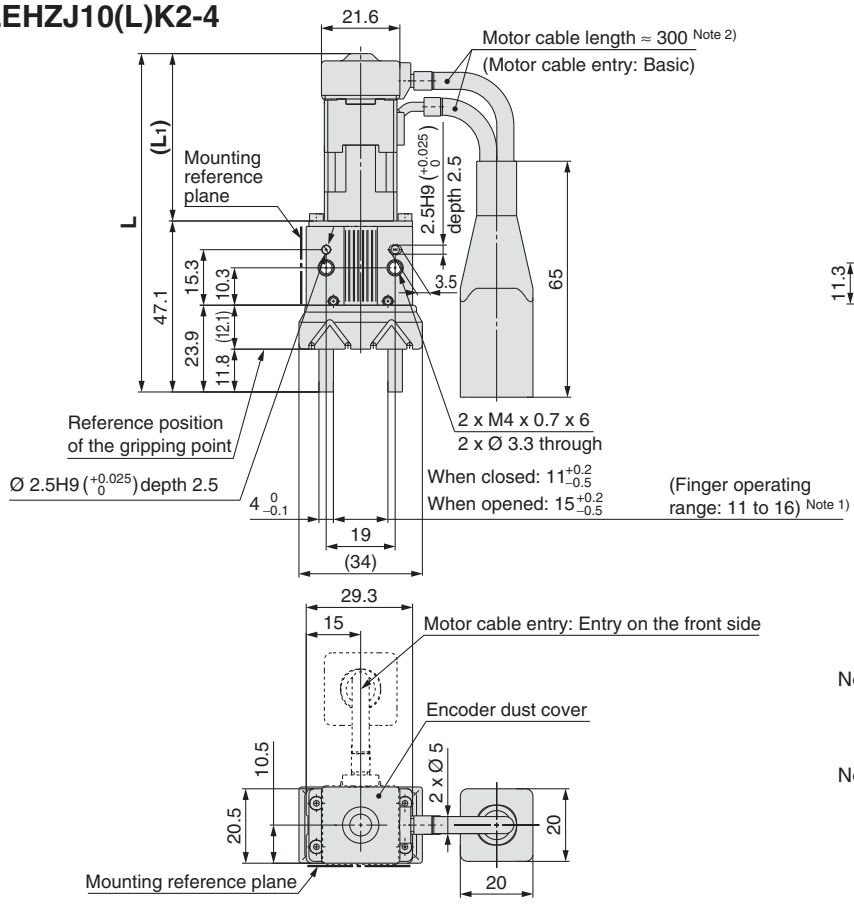
Replacement Parts

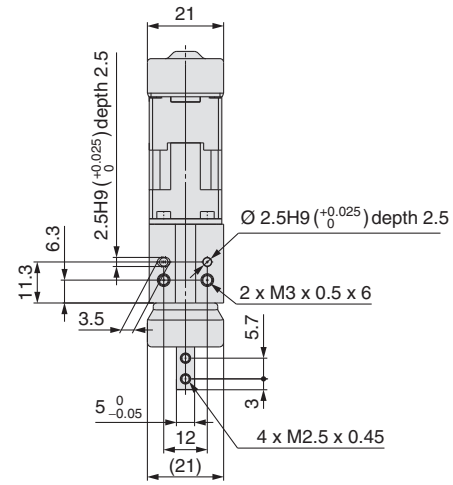
No.	Description			LEHZJ10	LEHZJ16	LEHZJ20	LEHZJ25
9	**Dust cover**	Material	CR	MHZJ2-J10	MHZJ2-J16	MHZJ2-J20	MHZJ2-J25
			FKM	MHZJ2-J10F	MHZJ2-J16F	MHZJ2-J20F	MHZJ2-J25F
			Si	MHZJ2-J10S	MHZJ2-J16S	MHZJ2-J20S	MHZJ2-J25S
10	**Finger assembly**			MHZJ-A1002	MHZJ-A1602	MHZJ-A2002	MHZJ-A2502

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

Dimensions

LEHZJ10(L)K2-4



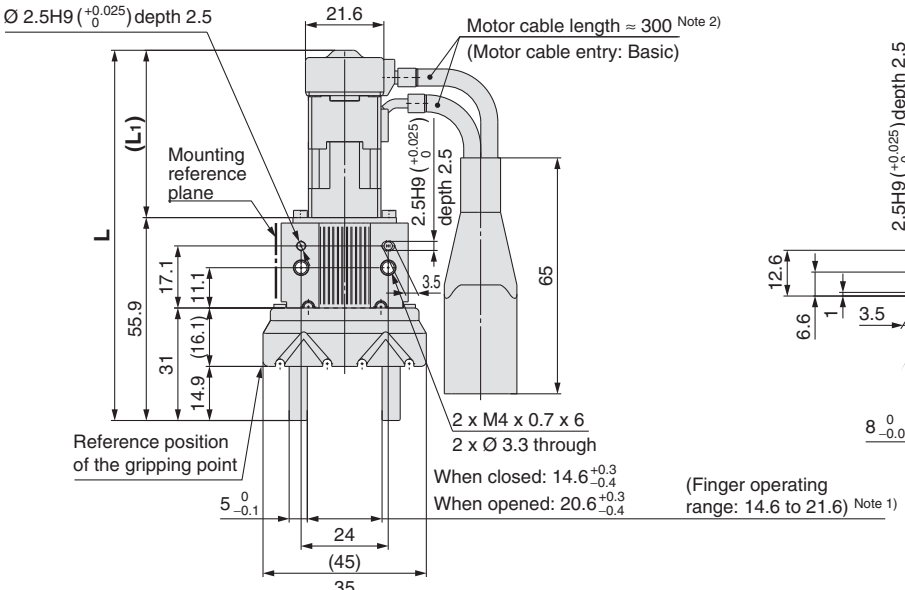


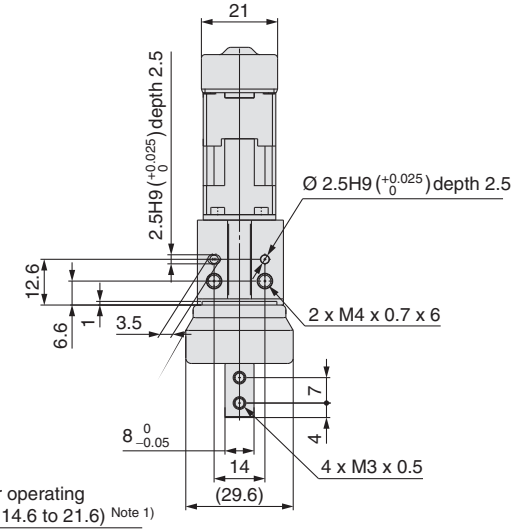
[mm]

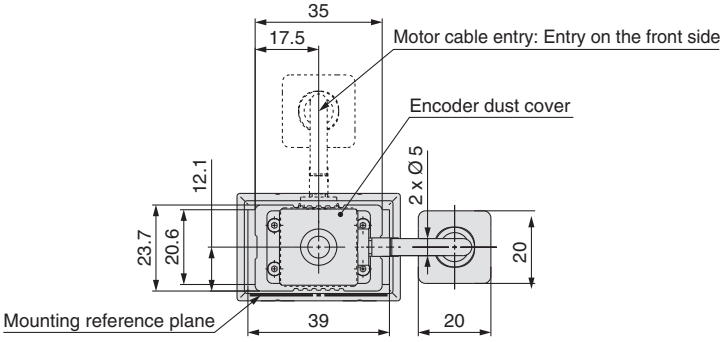
Model	L	(L1)
LEHZJ10K2-4□	109.8	(62.7)
LEHZJ10LK2-4□	93.2	(46.1)

Note 1) 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.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

LEHZJ16(L)K2-6







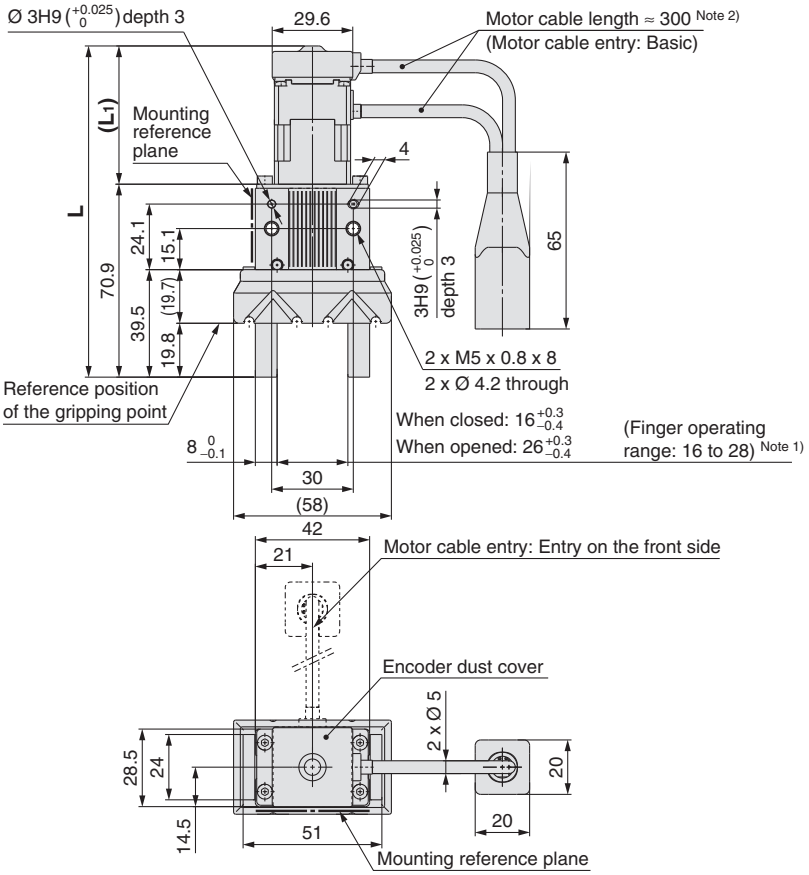
[mm]

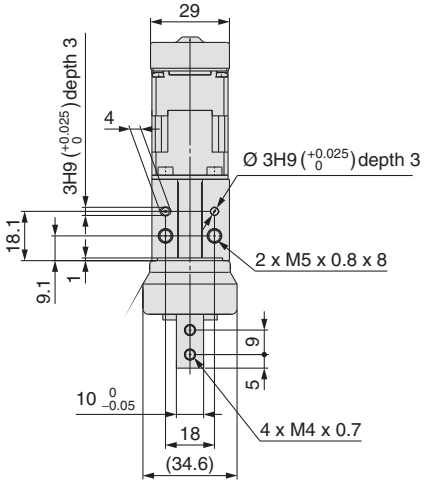
Model	L	(L1)
LEHZJ16K2-6□	118.6	(62.7)
LEHZJ16LK2-6□	102	(46.1)

Note 1) 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.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

Dimensions

LEHZJ20(L)K2-10



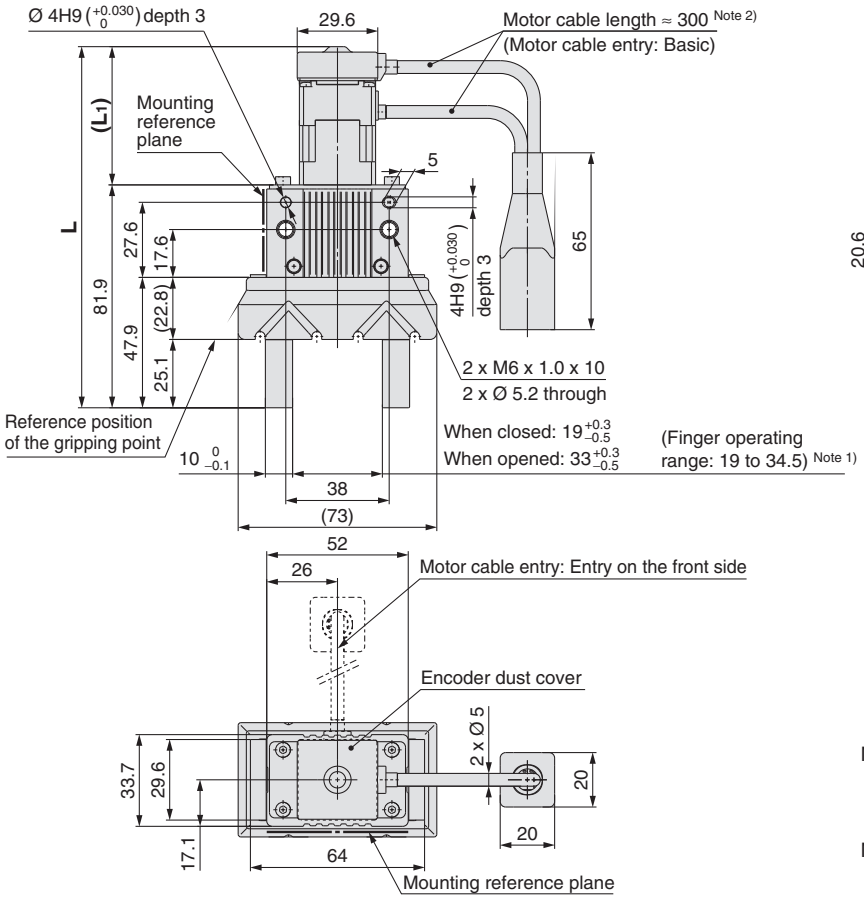


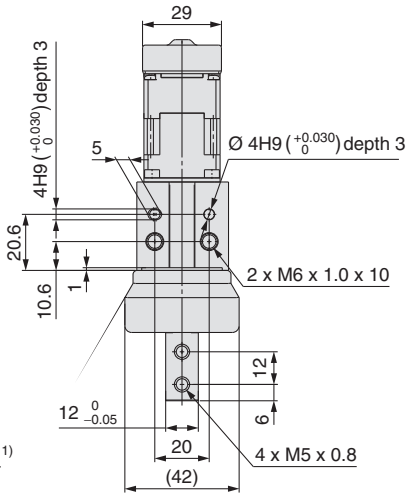
[mm]

Model	L	(L1)
LEHZJ20K2-10□	135.7	(64.8)
LEHZJ20LK2-10□	121.7	(50.8)

Note 1) 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.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

LEHZJ25(L)K2-14





[mm]

Model	L	(L1)
LEHZJ25K2-14□	146.7	(64.8)
LEHZJ25LK2-14□	132.7	(50.8)

Note 1) 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.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

Electric Gripper 2-Finger Type Step Motor (Servo/24 VDC)

Series LEHF

Model Selection

Selection Procedure

Step 1 Check the gripping force. → **Step 2** Check the gripping point and overhang. → **Step 3** Check the external force on fingers.

Step 1 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 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.

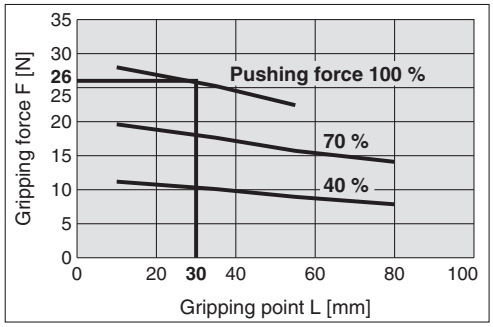
Example) When it is desired to set the gripping force at 20 times or more above the workpiece weight.

Required gripping force
= 0.1 kg x 20 x 9.8 m/s^2 ≈ 19.6 N or more

Pushing force: 100 %

Gripping point distance: 30 mm

LEHF20

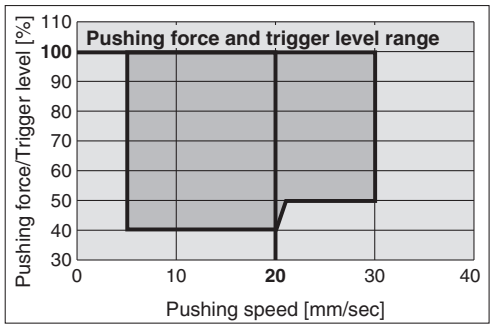


When the LEHF20 is selected.

- A gripping force of 26 N is obtained from the intersection point of gripping point distance L = 30 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 speed: 20 mm/sec

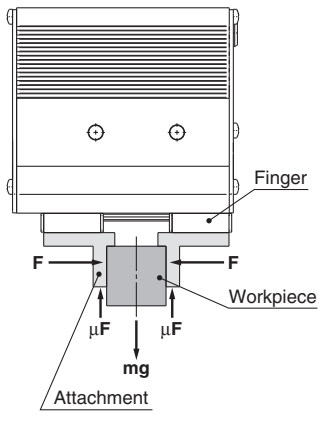
LEHF20



- 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 m/s^2)
mg: Workpiece weight [N]

the conditions under which the workpiece will not drop are

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

(2: Number of fingers)

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

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 μ = 0.2	When μ = 0.1
$F = \dfrac{mg}{2 \times 0.2} \times 4 = 10 \times mg$	$F = \dfrac{mg}{2 \times 0.1} \times 4 = 20 \times mg$
↑ 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.

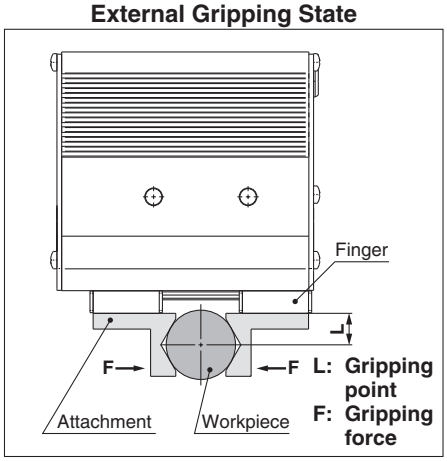
Note) • Even in cases where the coefficient of friction is greater than μ = 0.2, for reasons of safety, select a gripping force which is at least 10 to 20 times greater than the workpiece weight, as recommended by SMC.
• If high acceleration or impact forces are encountered during motion, a further margin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

Selection Procedure

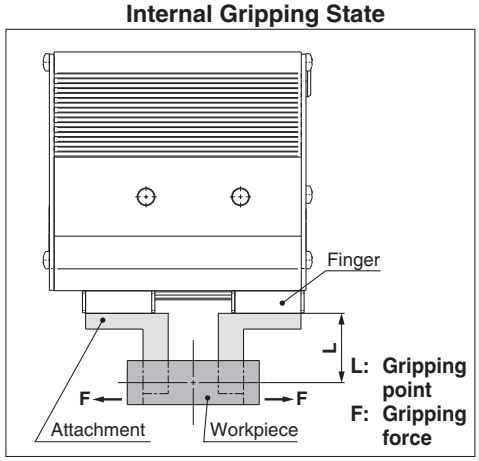
Step 1 Check the gripping force: Series LEHF

- **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.

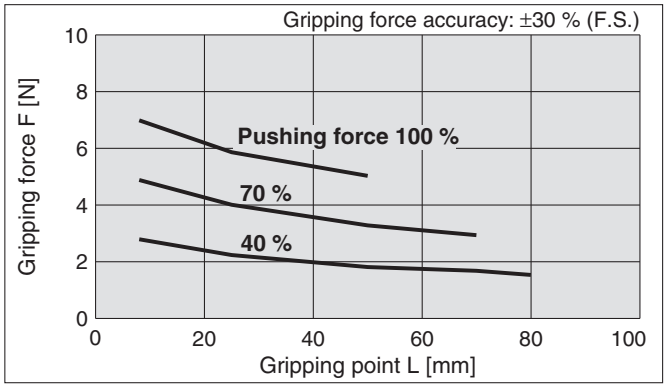
External Gripping State



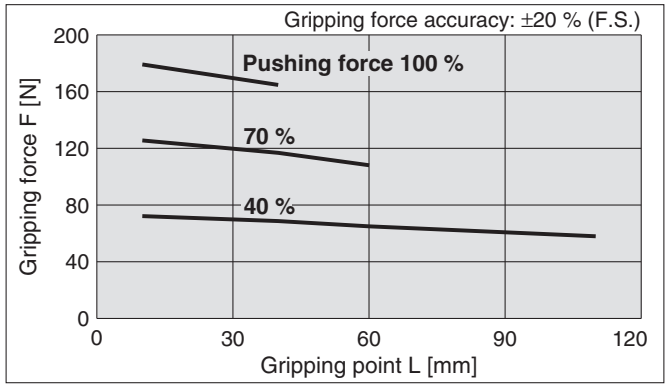
Internal Gripping State



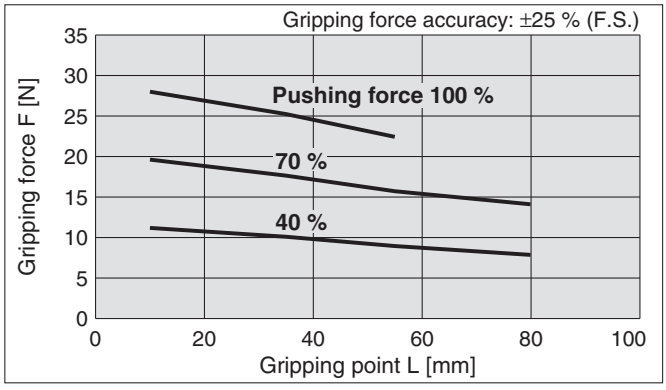
LEHF10



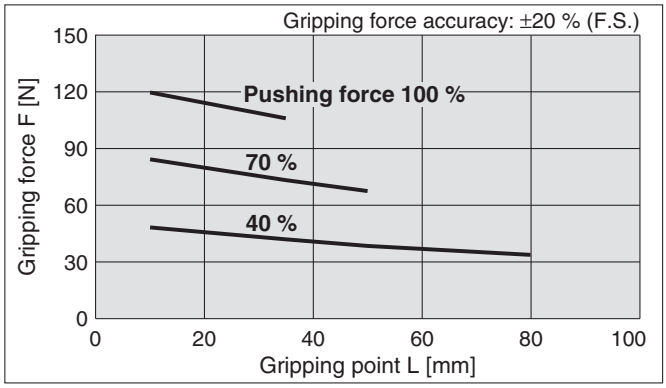
LEHF40



LEHF20

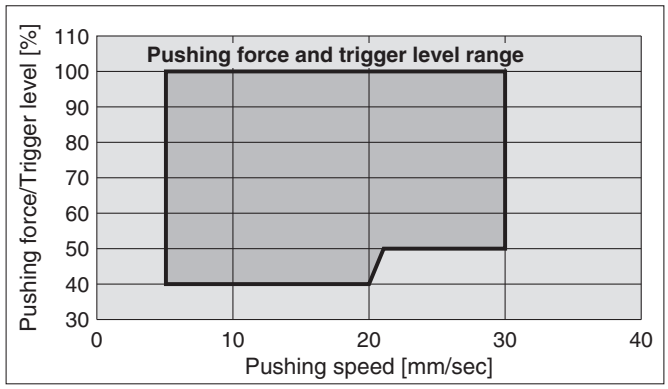


LEHF32



Selection of Pushing Speed

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



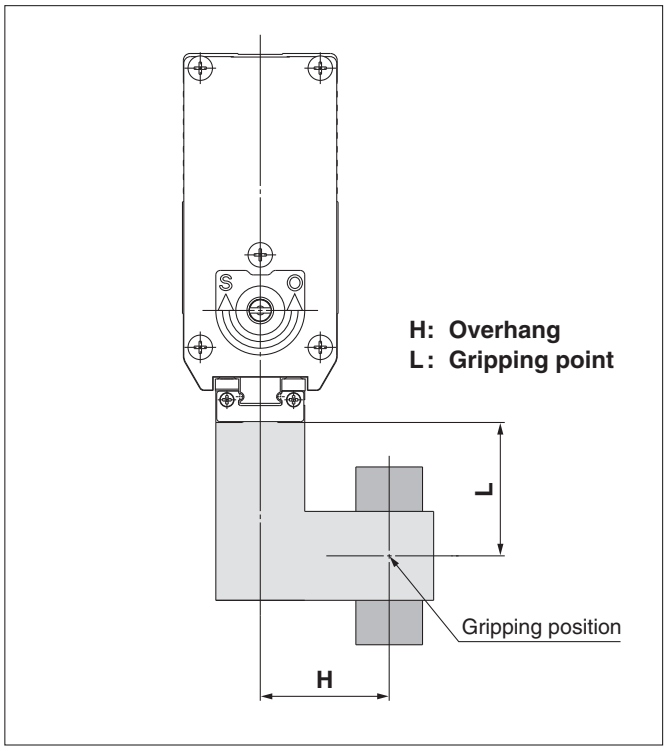
∗ Pushing force is one of the values of step data that is input into the controller.

Selection Procedure

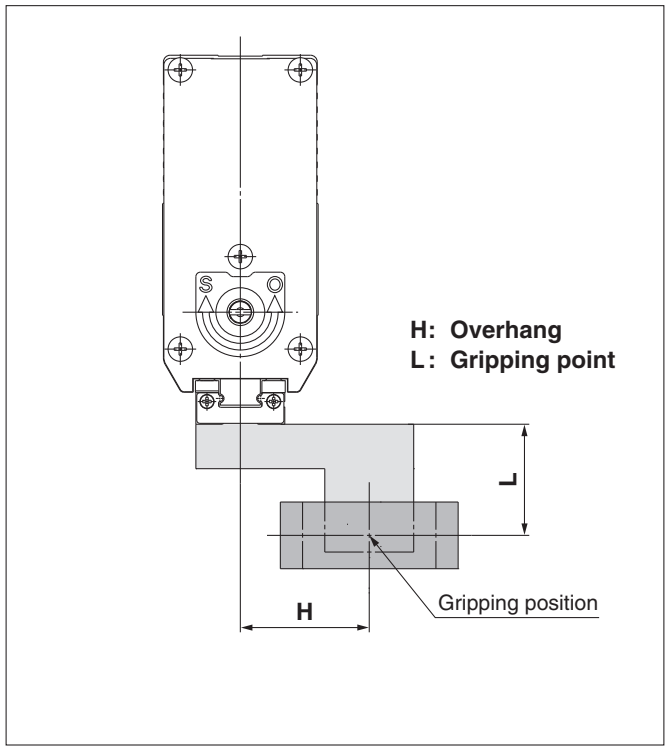
Step 2 Check the gripping point and overhang: Series LEHF

- 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.

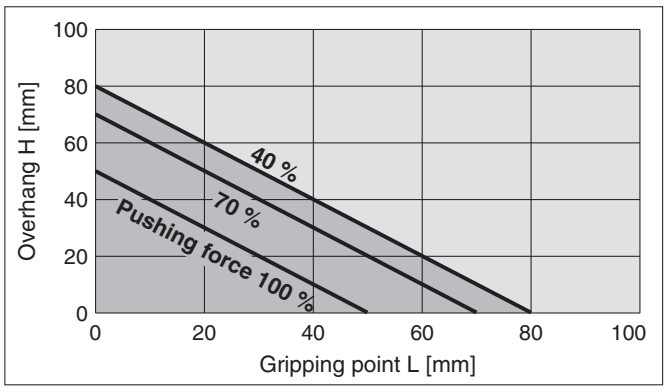
External Gripping State



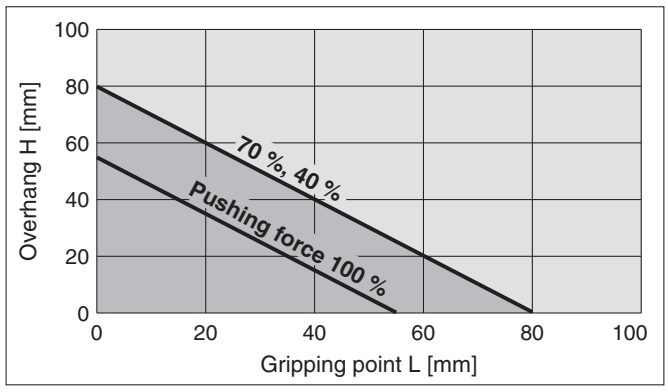
Internal Gripping State



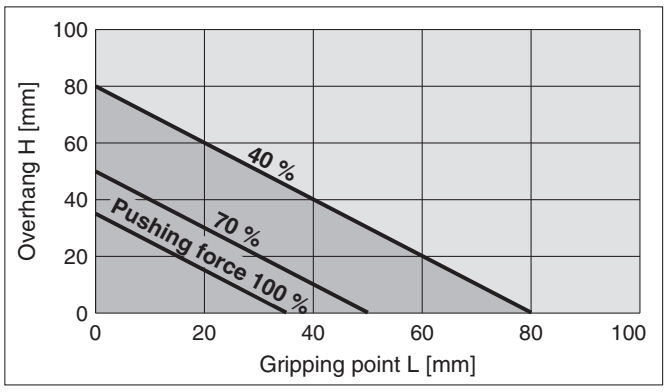
LEHF10



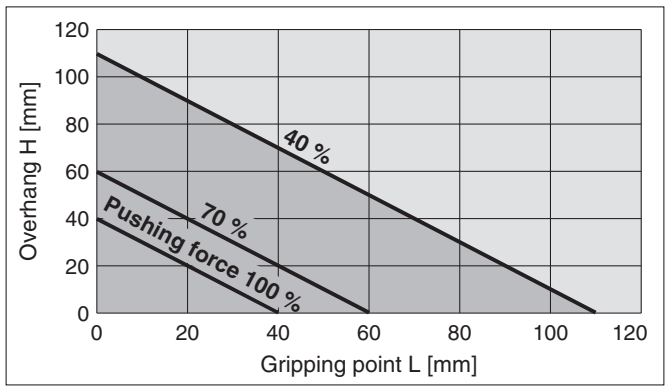
LEHF20



LEHF32

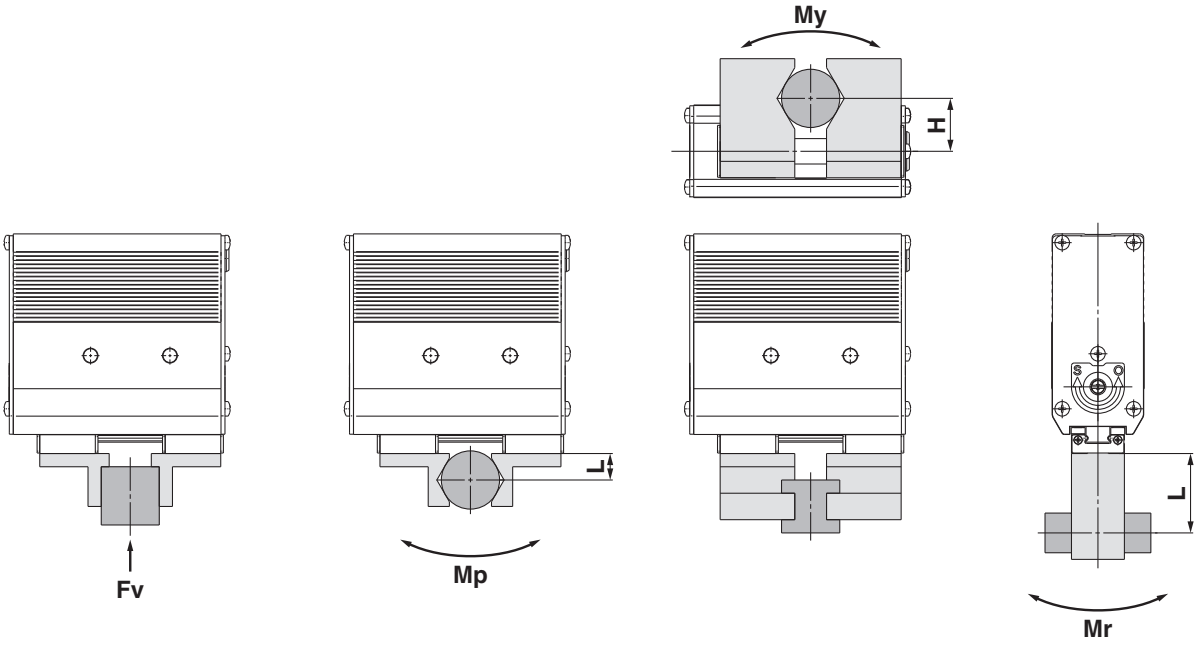


LEHF40



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

Step 3 Check the external force on fingers: Series LEHF



Fv: Allowable vertical load **Mp: Pitch moment** **My: Yaw moment** **Mr: Roll moment**

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

Step Motor (Servo/24 VDC)

Electric Gripper 2-Finger Type

Series LEHF LEHF10, 20, 32, 40

∗ For details, refer to page 54.

RoHS

How to Order

LEHF 10 K 2 – 16 ☐ – S1

❶ ❷ ❸ ❹ ❺ ❻

Series *JXC*☐ **CD17T**

Series *LEC*☐ **AP** **1** ☐

❼ ❽ ❾

❶ Size

10
20
32
40

❷ Lead

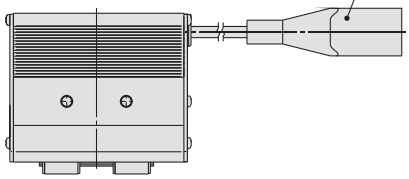
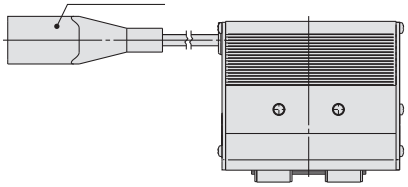
K	Basic

❸ 2-finger type

❹ Stroke [mm]

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

❺ Motor cable entry

—	Basic (Entry on the right side) Motor cable 
L	Entry on the left side Motor cable 

❻ Actuator cable type/length*2

Standard cable [m]

—	None
S1	1.5
S3	3
S5	5

Robotic cable [m]

R1	1.5	RA	10*1
R3	3	RB	15*1
R5	5	RC	20*1
R8	8*1		

Series JXC□

❼ Controller

—	Without controller
C□1□□	With controller

C D 1 7 T

Interface (Communication protocol/Input/Output)

Symbol	Type	Number of axes, Special specification: Standard	Number of axes, Special specification: With STO sub-function
5	Parallel input (NPN)	●	
6	Parallel input (PNP)	●	
E	EtherCAT	●	●
9	EtherNet/IP™	●	●
P	PROFINET	●	●
D	DeviceNet®	●	
L	IO-Link	●	●
M	CC-Link	●	

Mounting

7	Screw mounting
8∗8	DIN rail

Number of axes, Special specification

Symbol	Number of axes	Specification
1	Single axis	Standard
F	Single axis	With STO sub-function

Communication plug connector I/O cable∗9

Symbol	Type	Applicable interface
t	Without accessory	—
S	Straight type communication plug connector	DeviceNet™ CC-Link Ver 1.10
T	T-branch type communication plug connector	
1	I/O cable (1.5 m)	Parallel input (NPN) Parallel input (PNP)
3	I/O cable (3 m)	
5	I/O cable (5 m)	

Series LEC□

AP 1 □

❼ ❽ ❾

❼ Controller/Driver type∗3

—	Without controller/driver	
1N	**LECP1** (Programless type)	NPN
1P		PNP
AN	**LECPA**∗4 (Pulse input type)	NPN
AP		PNP

❽ I/O cable length∗5

—	Without cable (Without communication plug connector)
1	1.5 m
3	3 m∗6
5	5 m∗6

❾ Controller/Driver mounting

—	Screw mounting
D	DIN rail∗7

∗1 Produced upon receipt of order (Robotic cable only)
∗2 The standard cable should only be used on fixed parts.
For use on moving parts, select the robotic cable.
∗3 For details on controllers/drivers and compatible motors, refer to the compatible controllers/drivers on the next page.
∗4 When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-□) separately.
∗5 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected.
∗6 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
∗7 The DIN rail is not included. It must be ordered separately.
∗8 Select "—" for anything other than DeviceNet™, CC-Link, or parallel input.
Select "—," "S," or "T" for DeviceNet™ or CC-Link.
Select "—," "1," "3," or "5" for parallel input.

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEH series and the controller series LEC/JXC.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, compliance with 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 compliance with the EMC directive for the machinery and equipment as a whole.

[UL-compliant products (For the LEC series)]

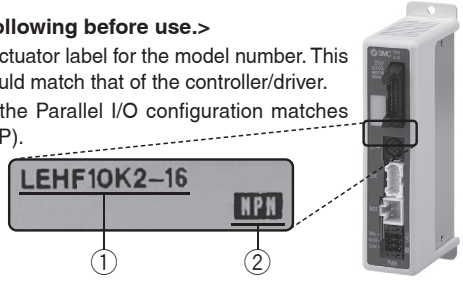
When compliance with UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.

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 the model number. This number should match that of the controller/driver.
② Check that the Parallel I/O configuration matches (NPN or PNP).



∗ Refer to the Operation Manual for using the products. Please download it via our website: https://www.smc.eu

Compatible Controllers/Drivers

Type	Step data input type	Programless type	Pulse input type
			
Series	**JXC51 JXC61**	**LECP1**	**LECPA**
Features	Parallel I/O	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)		
Max. number of step data	64 points	14 points	—
Power supply voltage	24 VDC		

Type	EtherCAT direct input type	EtherCAT direct input type with STO sub-function	EtherNet/IP™ direct input type	EtherNet/IP™ direct input type with STO sub-function	PROFINET direct input type	PROFINET direct input type with STO sub-function	DeviceNet® direct input type	IO-Link direct input type	IO-Link direct input type with STO sub-function	CC-Link direct input type
										
Series	**JXCE1**	**JXCEF**	**JXC91**	**JXC9F**	**JXCP1**	**JXCPF**	**JXCD1**	**JXCL1**	**JXCLF**	**JXCM1**
Features	EtherCAT direct input	EtherCAT direct input with STO sub-function	EtherNet/IP™ direct input	EtherNet/IP™ direct input with STO sub-function	PROFINET direct input	PROFINET direct input with STO sub-function	DeviceNet® direct input	IO-Link direct input	IO-Link direct input with STO sub-function	CC-Link direct input
Compatible motor	Step motor (Servo/24 VDC)									
Max. number of step data	64 points									
Power supply voltage	24 VDC									

Specifications

Model			LEHF10	LEHF20	LEHF32	LEHF40
Actuator specifications	Opening/closing stroke (Both sides)	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] Note 1) Note 3)		3 to 7	11 to 28	48 to 120	72 to 180
	Opening and closing speed/Pushing speed [mm/s] Note 2) Note 3)		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] Note 4)		±0.05			
	Finger backlash/both sides [mm] Note 5)		0.5 or less			
	Repeatability [mm] Note 6)		±0.05			
	Positioning repeatability/one side [mm]		±0.1			
	Lost motion/one side [mm] Note 7)		0.3 or less			
	Impact/Vibration resistance [m/s²] Note 8)		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			
	Power supply voltage [V]		24 VDC ±10 %			
	Power Note 9)		Max. power 19	Max. power 51	Max. power 57	Max. power 61

Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Positioning 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. Gripping with heavy attachment and fast pushing speed, may not reach the product specification. In this case, decrease the weight and lower the pushing speed.

Note 2) Pushing speed should be set within the range during pushing (gripping) operation. Otherwise, it may cause malfunction. The opening/closing 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.

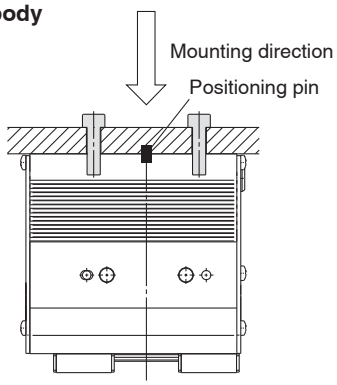
Note 7) A reference value for correcting an error in reciprocal operation which occurs during the positioning operation.

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.)

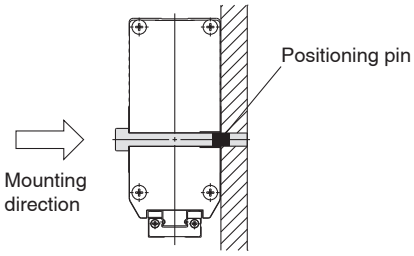
Note 9) Indicates the max. power during operation (including the controller)
This value can be used for the selection of the power supply

How to Mount

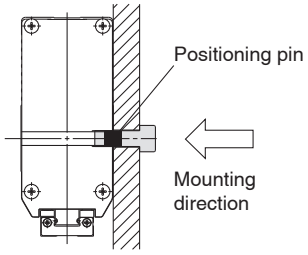
a) When using the thread on the body



b) When using the thread on the mounting plate

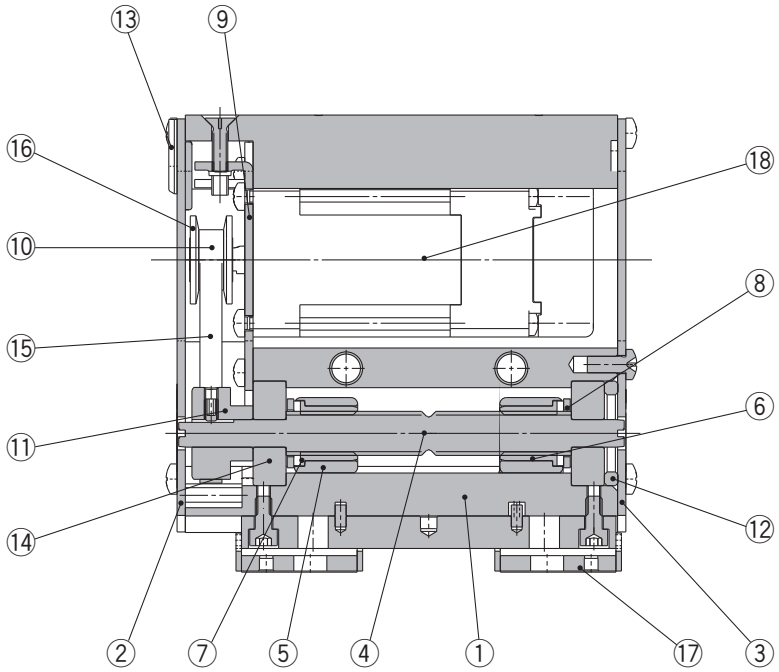


c) When using the thread on the back of the body



Construction

Series LEHF

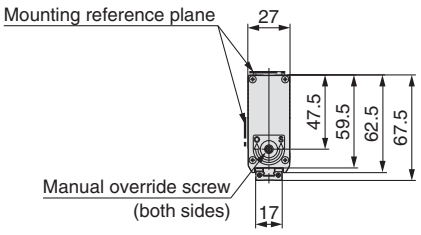


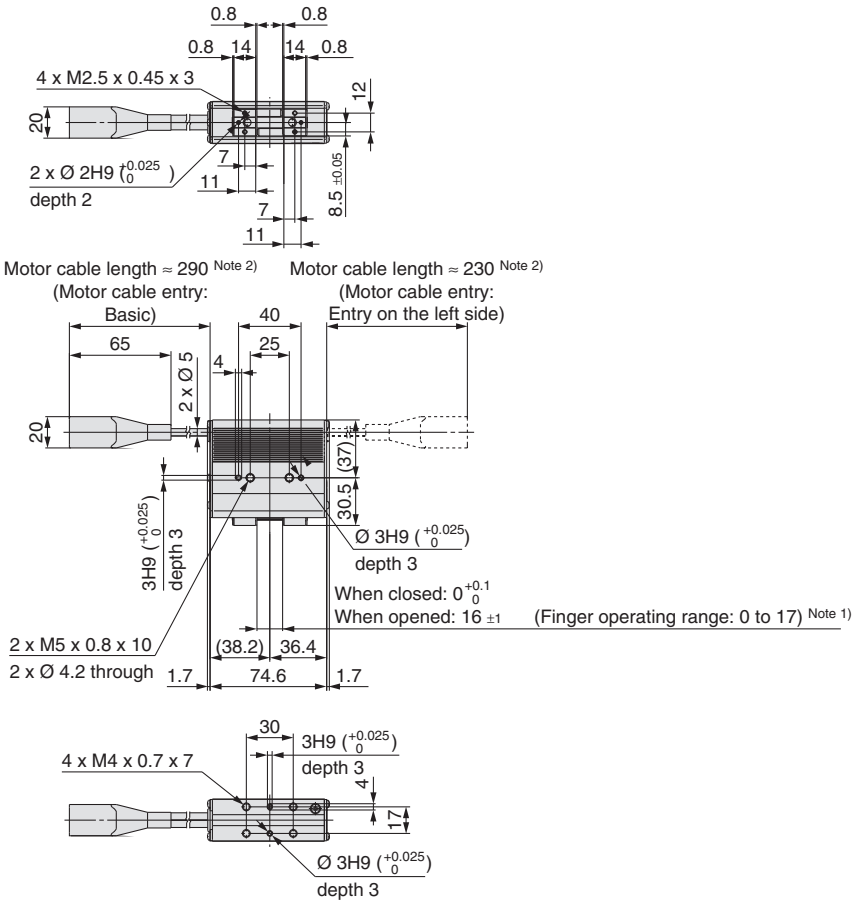
Component Parts

No.	Description	Material	Note
1	**Body**	Aluminium alloy	Anodised
2	**Side plate A**	Aluminium alloy	Anodised
3	**Side plate B**	Aluminium alloy	Anodised
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**	Aluminium alloy	
11	**Pulley B**	Aluminium alloy	
12	**Bearing stopper**	Aluminium alloy	
13	**Rubber bushing**	NBR	
14	**Bearing**	—	
15	**Belt**	—	
16	**Flange**	—	
17	**Finger assembly**	—	
18	**Step motor (Servo/24 VDC)**	—	

Dimensions

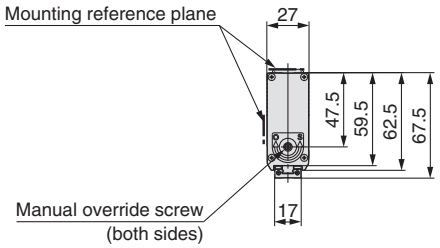
LEHF10K2-16: Basic

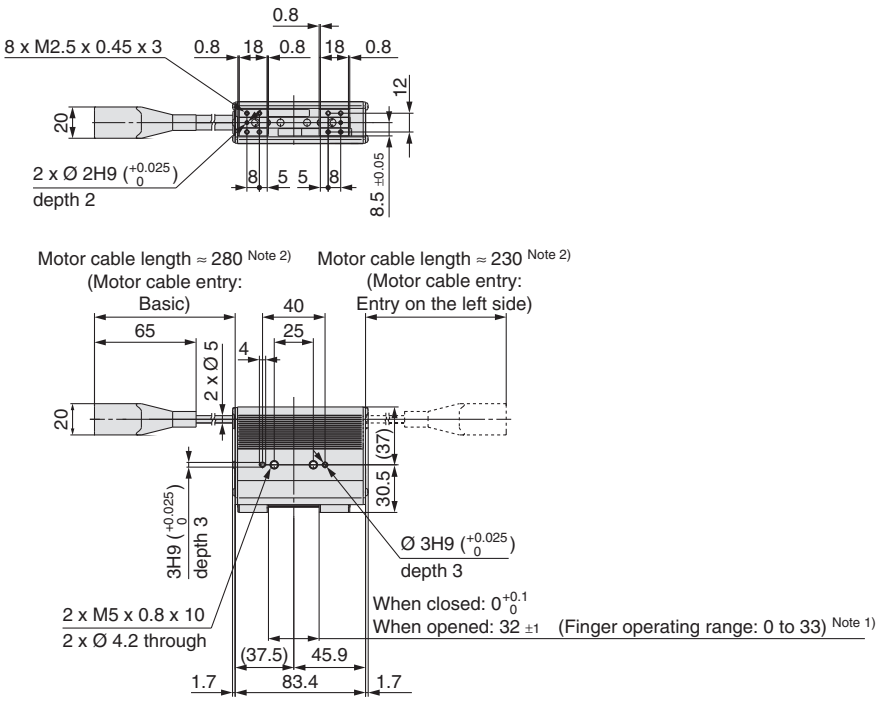


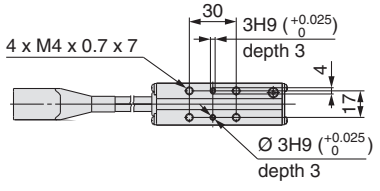


Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

LEHF10K2-32: Long Stroke



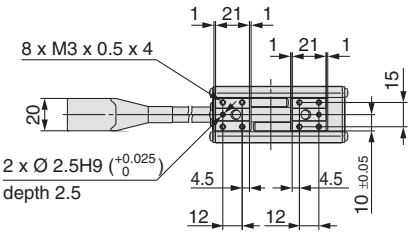


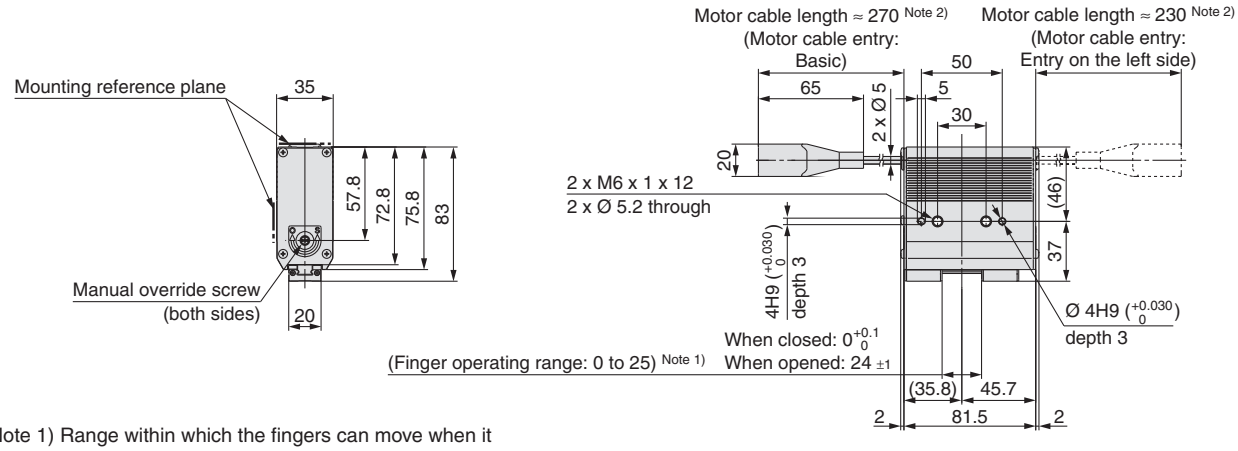


Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

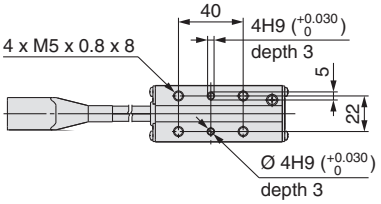
Dimensions

LEHF20K2-24: Basic

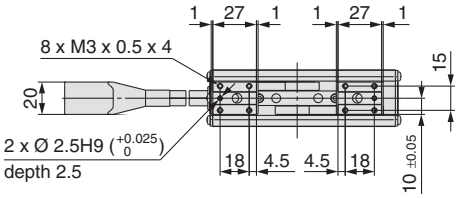


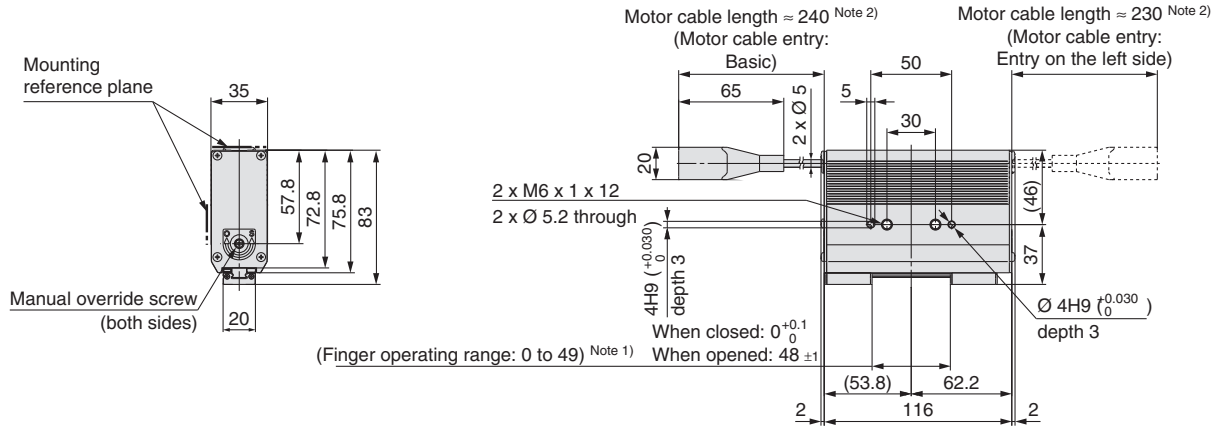


Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

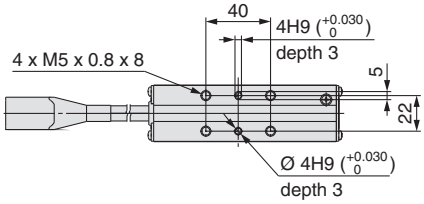


LEHF20K2-48: Long Stroke



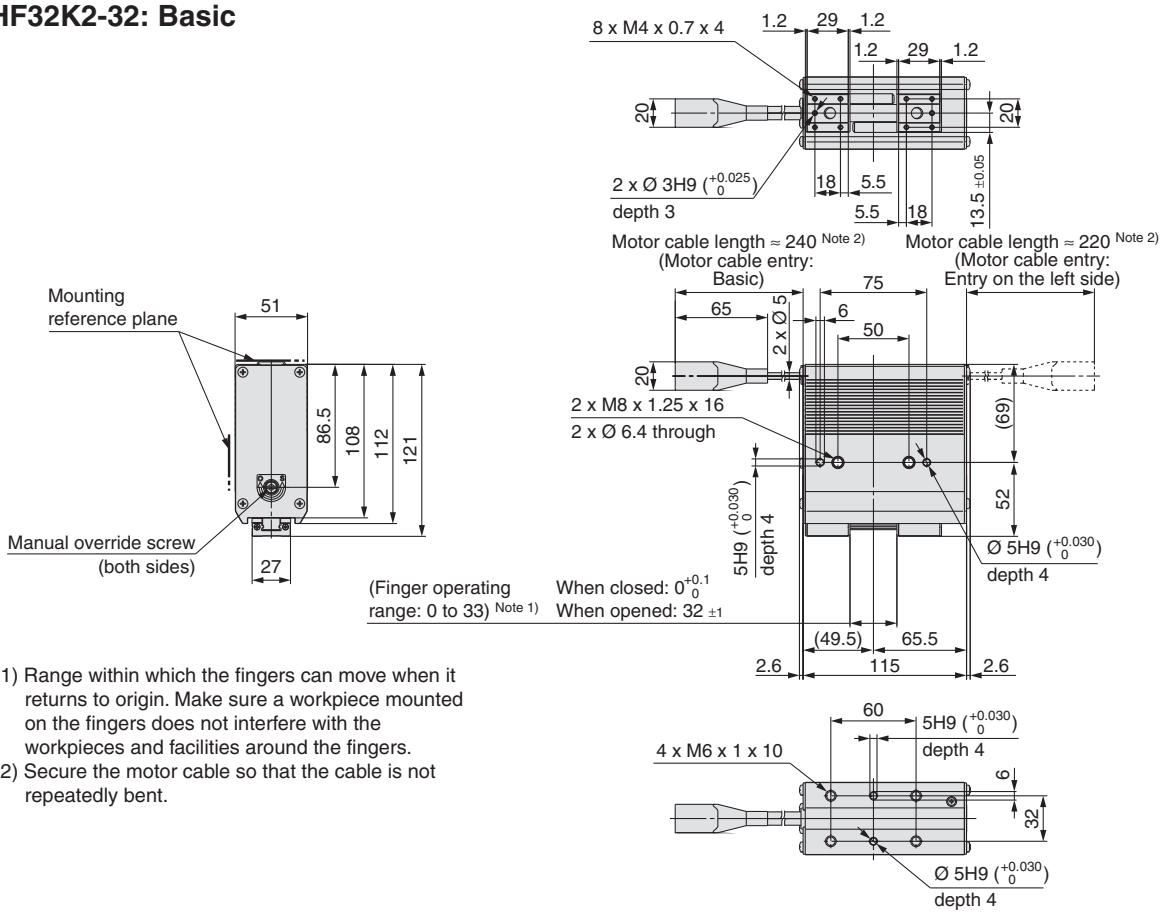


Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.



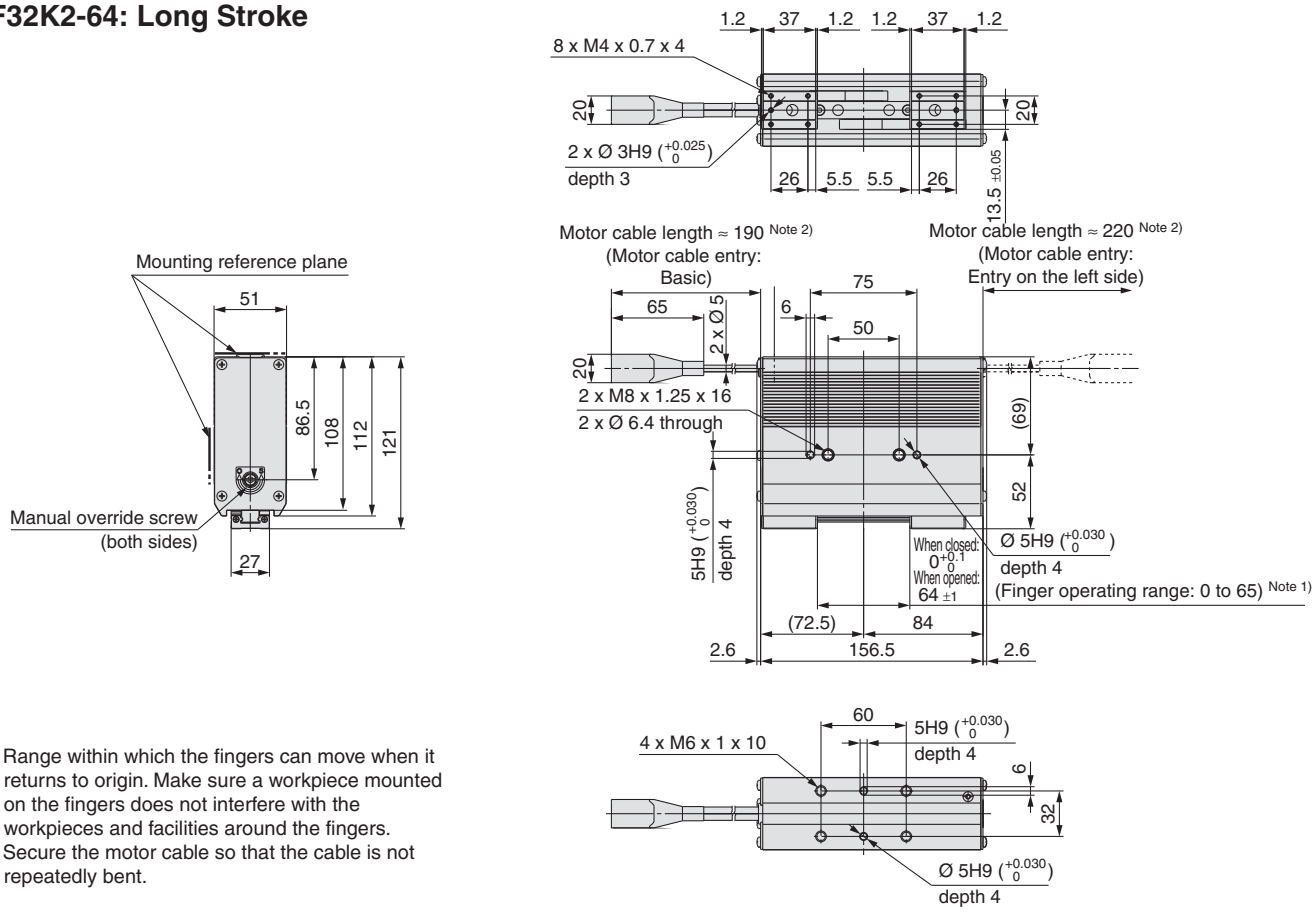
Dimensions

LEHF32K2-32: Basic



Note 1) 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.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

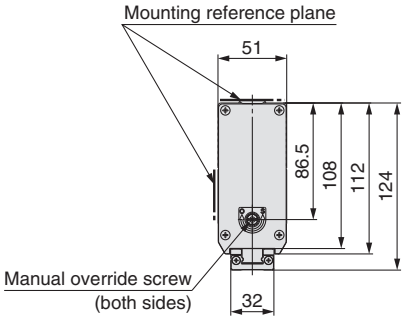
LEHF32K2-64: Long Stroke

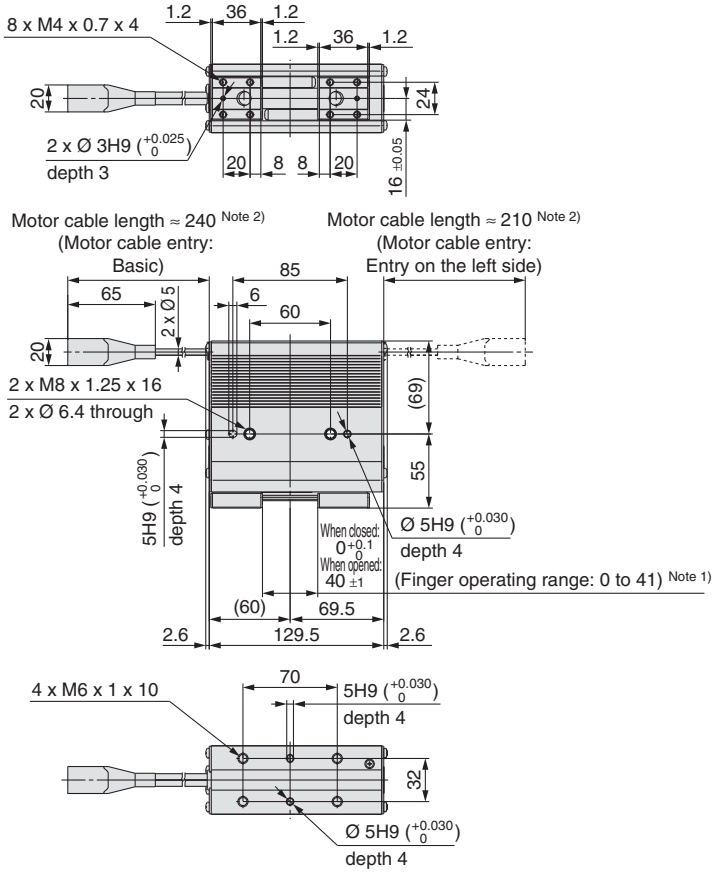


Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

Dimensions

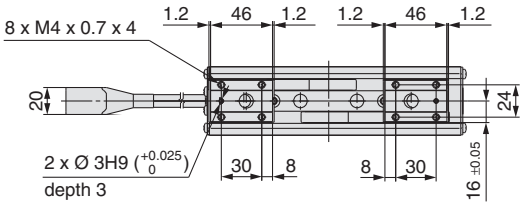
LEHF40K2-40: Basic

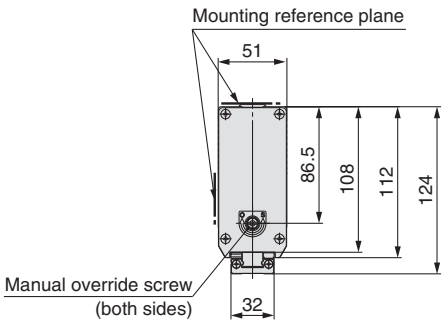


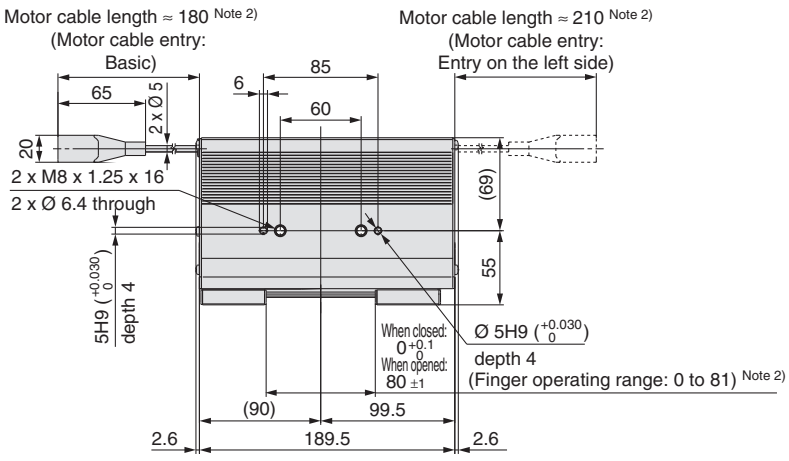


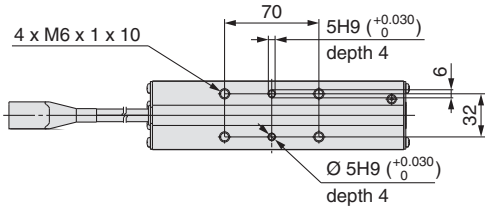
Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

LEHF40K2-80: Long Stroke



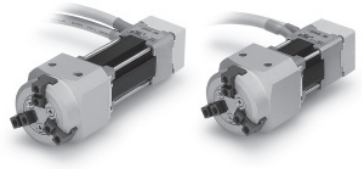






Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

Model Selection



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.

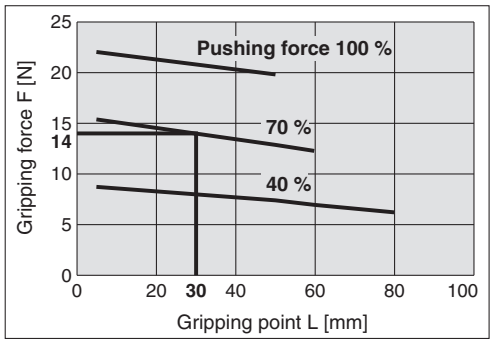
Example) When it is desired to set the gripping force at 13 times or more above the workpiece weight.

Required gripping force
= 0.1 kg x 13 x 9.8 m/s^2 ≈ 12.7 N or more

Pushing force: 70 %

Gripping point distance: 30 mm

LEHS20

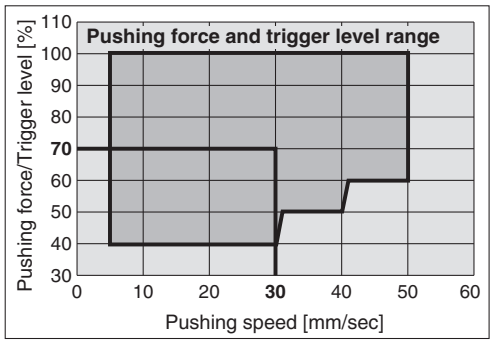


When the LEHS20 is selected.

- 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.

Pushing speed: 30 mm/sec

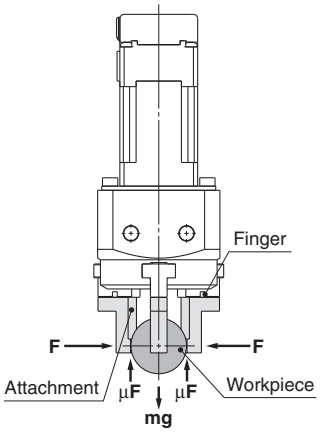
LEHS20



- 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/s^2)
mg: Workpiece weight [N]

the conditions under which the workpiece will not drop are

$$\underbrace{3}_{\text{Number of fingers}} \times \mu F > mg$$

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

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 μ = 0.2	When μ = 0.1
$F = \dfrac{mg}{3 \times 0.2} \times 4 = 6.7 \times mg$	$F = \dfrac{mg}{3 \times 0.1} \times 4 = 13.3 \times mg$
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 μ = 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.

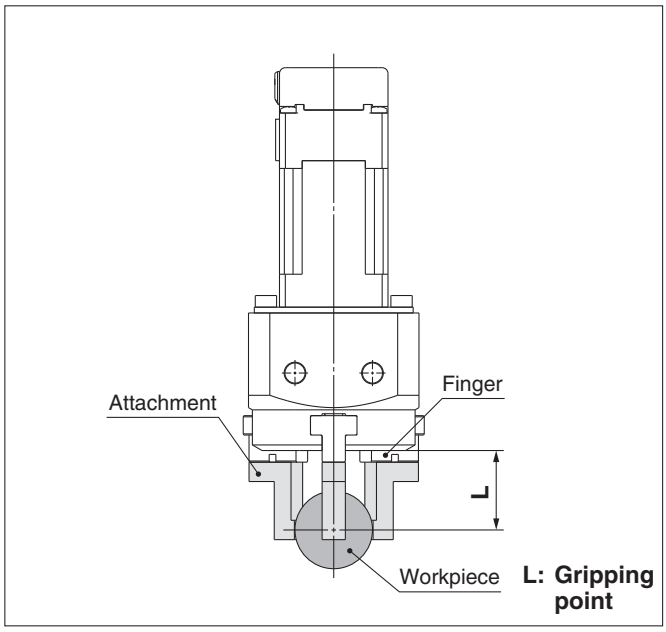
Selection Procedure

Step Check the gripping force: Series LEHS

● **Indication of gripping force**
The gripping force shown in the graphs on page 42 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.

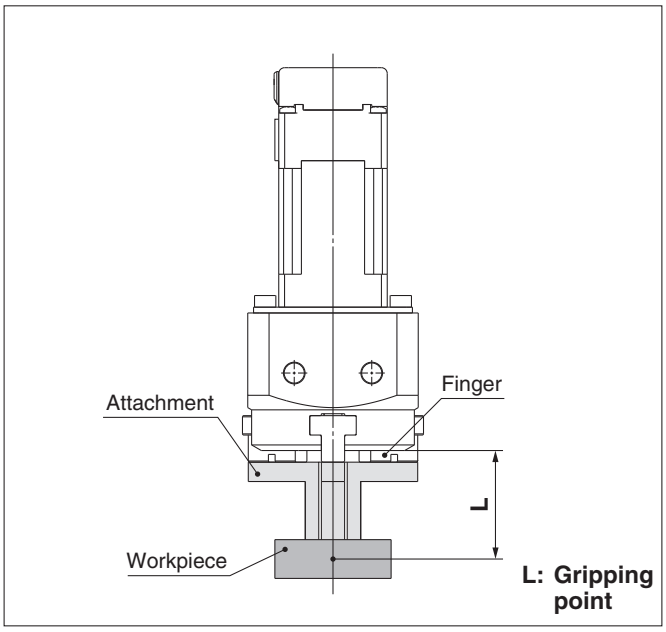
● Set the workpiece gripping point “L” so that it is within the range shown in the figure below.

External Gripping State

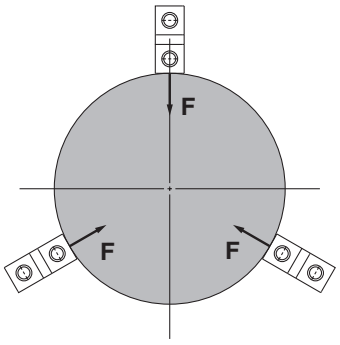


L: Gripping point

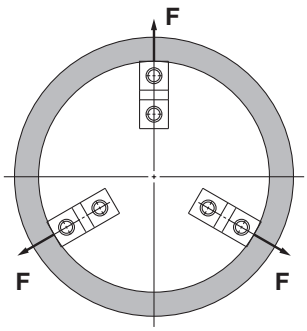
Internal Gripping State



L: Gripping point



F: Gripping force



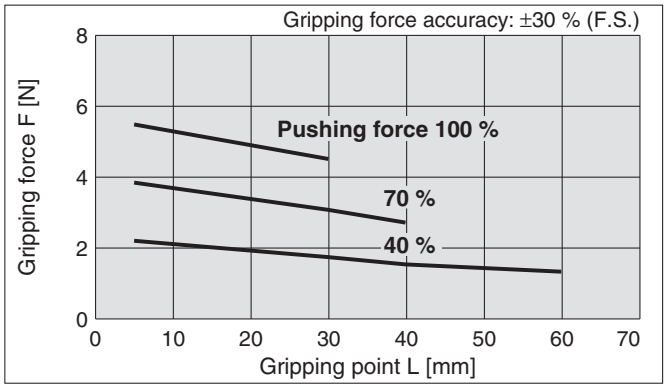
F: Gripping force

Step Check the gripping force: Series LEHS

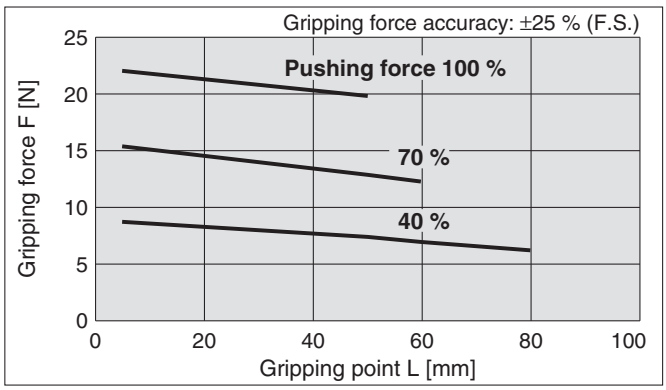
Basic

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

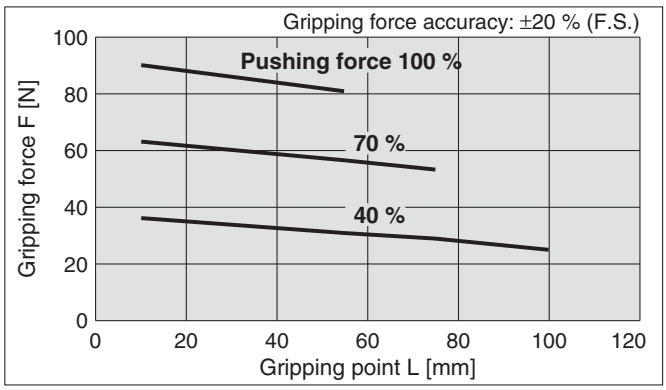
LEHS10



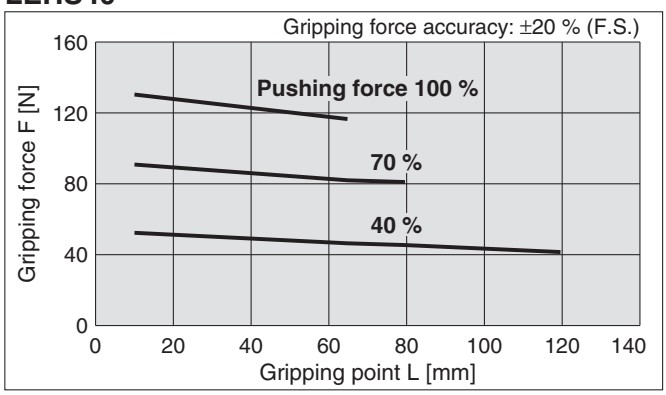
LEHS20



LEHS32



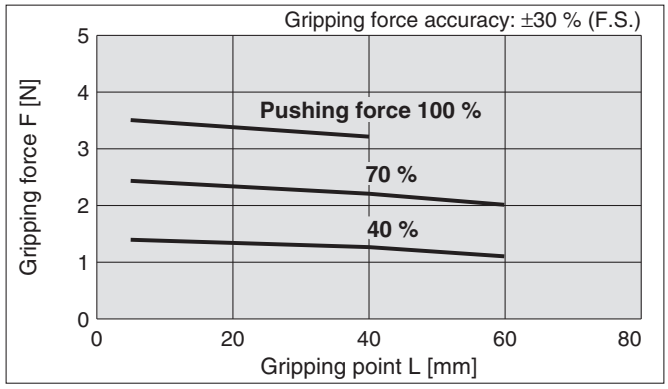
LEHS40



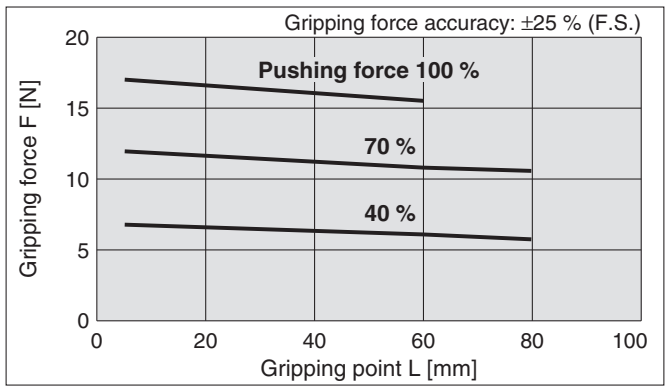
Compact

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

LEHS10L



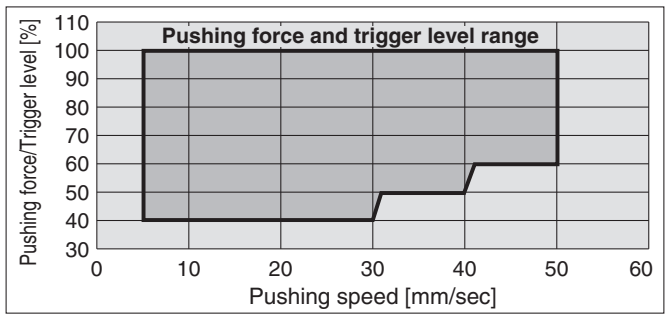
LEHS20L



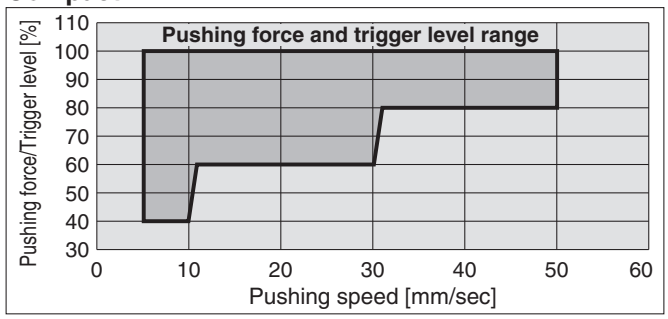
Selection of Pushing Speed

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

Basic



Compact



Step Motor (Servo/24 VDC)

Electric Gripper 3-Finger Type

Series LEHS LEHS10, 20, 32, 40

∗ For details, refer to page 54.

RoHS

How to Order

LEHS 10 ❶ K 3 ❷ – 4 ❸ ❹ – S1 ❺ ❻ ❼

Series *JXC*□ **CD17T**

Series *LEC*□ **AP** ❽ **1** ❾ ❿

❶ Size

10
20
32
40

❷ Motor size

—	Basic
L∗1	Compact

❸ Lead

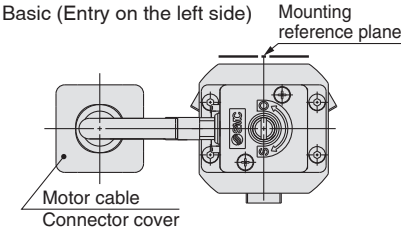
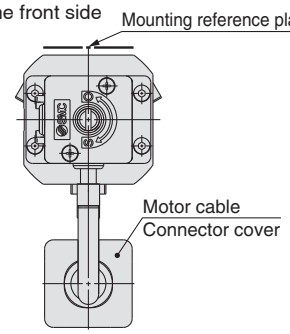
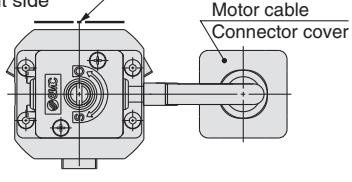
K	Basic

❹ 3-finger type

❺ Stroke [mm]

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

❻ Motor cable entry

—	Basic (Entry on the left side) 
F	Entry on the front side 
R	Entry on the right side 

❼ Actuator cable type/length∗3

Standard cable [m]

—	None
S1	1.5
S3	3
S5	5

Robotic cable [m]

R1	1.5	RA	10∗2
R3	3	RB	15∗2
R5	5	RC	20∗2
R8	8∗2		

Series JXC□

❽ Controller

—	Without controller
C□1□□	With controller

C D 1 7 T

Interface (Communication protocol/Input/Output)

Symbol	Type	Number of axes, Special specification: Standard	Number of axes, Special specification: With STO sub-function
5	Parallel input (NPN)	●	
6	Parallel input (PNP)	●	
E	EtherCAT	●	●
9	EtherNet/IP™	●	●
P	PROFINET	●	●
D	DeviceNet®	●	
L	IO-Link	●	●
M	CC-Link	●	

Mounting

7	Screw mounting
8∗8	DIN rail

Number of axes, Special specification

Symbol	Number of axes	Specification
1	Single axis	Standard
F	Single axis	With STO sub-function

Communication plug connector I/O cable∗9

Symbol	Type	Applicable interface
t	Without accessory	—
S	Straight type communication plug connector	DeviceNet™ CC-Link Ver 1.10
T	T-branch type communication plug connector	
1	I/O cable (1.5 m)	Parallel input (NPN) Parallel input (PNP)
3	I/O cable (3 m)	
5	I/O cable (5 m)	

Series LEC□

AP 1 □

❽ ❾ ❿

❽ Controller/Driver type∗4

—	Without controller/driver	
1N	**LECP1** (Programless type)	NPN
1P		PNP
AN	**LECPA**∗5 (Pulse input type)	NPN
AP		PNP

❾ I/O cable length∗6

—	Without cable (Without communication plug connector)
1	1.5 m
3	3 m∗7
5	5 m∗7

❿ Controller/Driver mounting

—	Screw mounting
D	DIN rail∗8

∗1 Size: 10, 20 only
∗2 Produced upon receipt of order (Robotic cable only)
∗3 The standard cable should only be used on fixed parts.
For use on moving parts, select the robotic cable.
∗4 For details on controllers/drivers and compatible motors, refer to the compatible controllers/drivers on the next page.
∗5 When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-□) separately.
∗6 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected.
∗7 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
∗8 The DIN rail is not included. It must be ordered separately.
∗9 Select "—" for anything other than DeviceNet™, CC-Link, or parallel input.
Select "—," "S," or "T" for DeviceNet™ or CC-Link.
Select "—," "1," "3," or "5" for parallel input.

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEH series and the controller series LEC/JXC.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, compliance with 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 compliance with the EMC directive for the machinery and equipment as a whole.

[UL-compliant products (For the LEC series)]

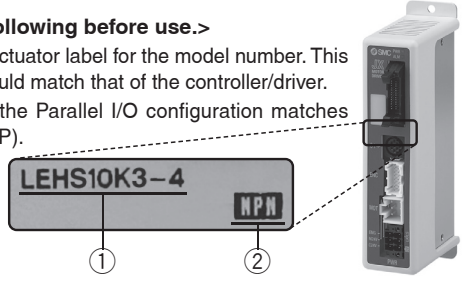
When compliance with UL is required, the electric actuator and controller/driver should be used with a UL1310 Class 2 power supply.

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 the model number. This number should match that of the controller/driver.
② Check that the Parallel I/O configuration matches (NPN or PNP).



∗ Refer to the Operation Manual for using the products. Please download it via our website: https://www.smc.eu

Compatible Controllers/Drivers

Type	Step data input type	Programless type	Pulse input type
			
Series	**JXC51 JXC61**	**LECP1**	**LECPA**
Features	Parallel I/O	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)		
Max. number of step data	64 points	14 points	—
Power supply voltage	24 VDC		

Type	EtherCAT direct input type	EtherCAT direct input type with STO sub-function	EtherNet/IP™ direct input type	EtherNet/IP™ direct input type with STO sub-function	PROFINET direct input type	PROFINET direct input type with STO sub-function	DeviceNet® direct input type	IO-Link direct input type	IO-Link direct input type with STO sub-function	CC-Link direct input type
										
Series	**JXCE1**	**JXCEF**	**JXC91**	**JXC9F**	**JXCP1**	**JXCPF**	**JXCD1**	**JXCL1**	**JXCLF**	**JXCM1**
Features	EtherCAT direct input	EtherCAT direct input with STO sub-function	EtherNet/IP™ direct input	EtherNet/IP™ direct input with STO sub-function	PROFINET direct input	PROFINET direct input with STO sub-function	DeviceNet® direct input	IO-Link direct input	IO-Link direct input with STO sub-function	CC-Link direct input
Compatible motor	Step motor (Servo/24 VDC)									
Max. number of step data	64 points									
Power supply voltage	24 VDC									

Specifications

Model			LEHS10	LEHS20	LEHS32	LEHS40
Actuator specifications	Opening/closing stroke (diameter)		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] Note 1) Note 3)	Basic	2.2 to 5.5	9 to 22	36 to 90	52 to 130
		Compact	1.4 to 3.5	7 to 17	—	—
	Opening and closing speed/ Pushing speed [mm/s] Note 2) Note 3)		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] Note 4)		±0.05			
	Finger backlash/both sides [mm] Note 5)		0.25 or less			
	Repeatability [mm] Note 6)		±0.02			
	Positioning repeatability/one side [mm]		±0.05			
	Lost motion/one side [mm] Note 7)		0.25 or less			
	Impact/Vibration resistance [m/s²] Note 8)		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	185	410	975	1265
		Compact	150	345	—	—
Electric specifications	Motor size		□20	□28	□42	
	Motor type		Step motor (Servo/24 VDC)			
	Encoder		Incremental			
	Power supply voltage [V]		24 VDC ±10 %			
	Power Note 9)	Basic	Max. power 19	Max. power 51	Max. power 57	Max. power 61
		Compact	Max. power 14	Max. power 42	—	—

Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Positioning 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. Gripping with heavy attachment and fast pushing speed, may not reach the product specification. In this case, decrease the weight and lower the pushing speed.

Note 2) Pushing speed should be set within the range during pushing (gripping) operation. Otherwise, it may cause malfunction. The opening/closing 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.

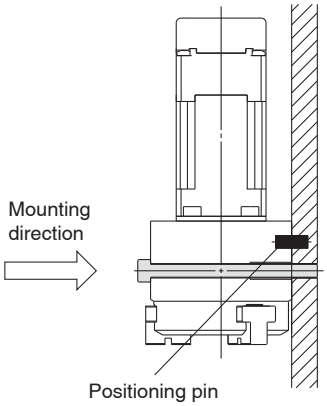
Note 7) A reference value for correcting an error in reciprocal operation which occurs during the positioning operation.

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.)

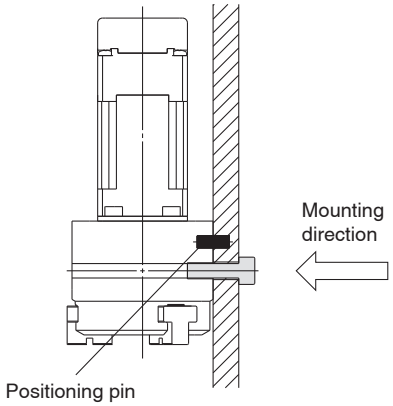
Note 9) Indicates the max. power during operation (including the controller)
This value can be used for the selection of the power supply.

How to Mount

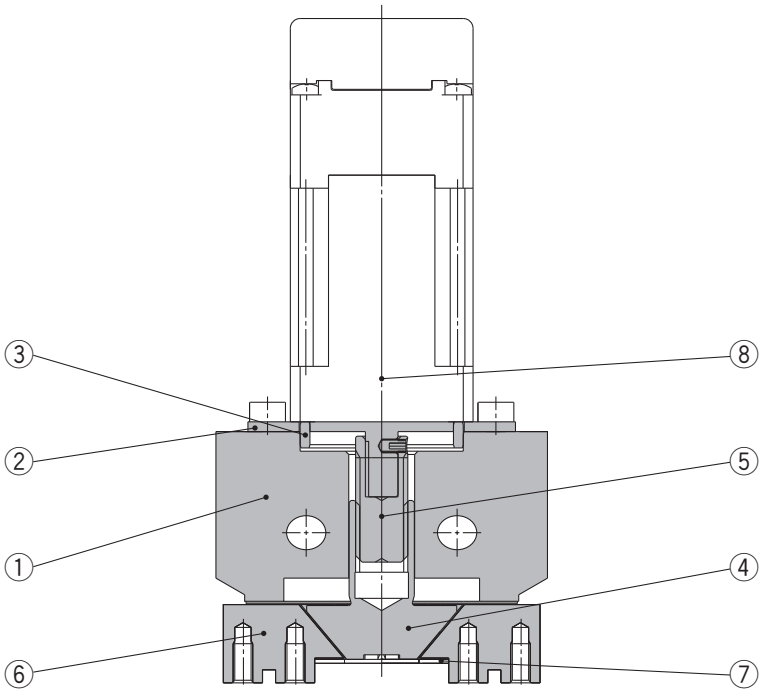
a) Mounting A type
(when using the thread on the mounting plate)



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



Construction

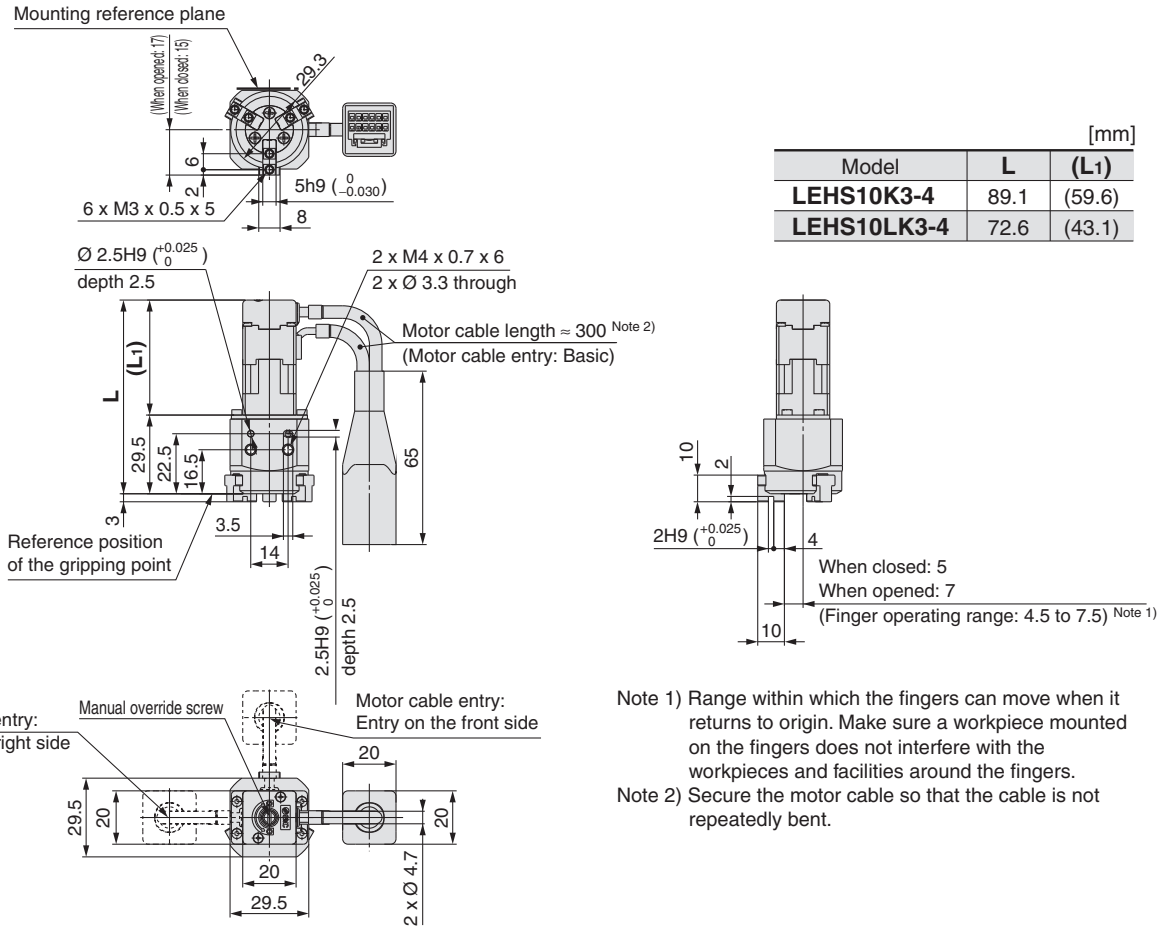


Component Parts

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

Dimensions

LEHS10(L)K3-4

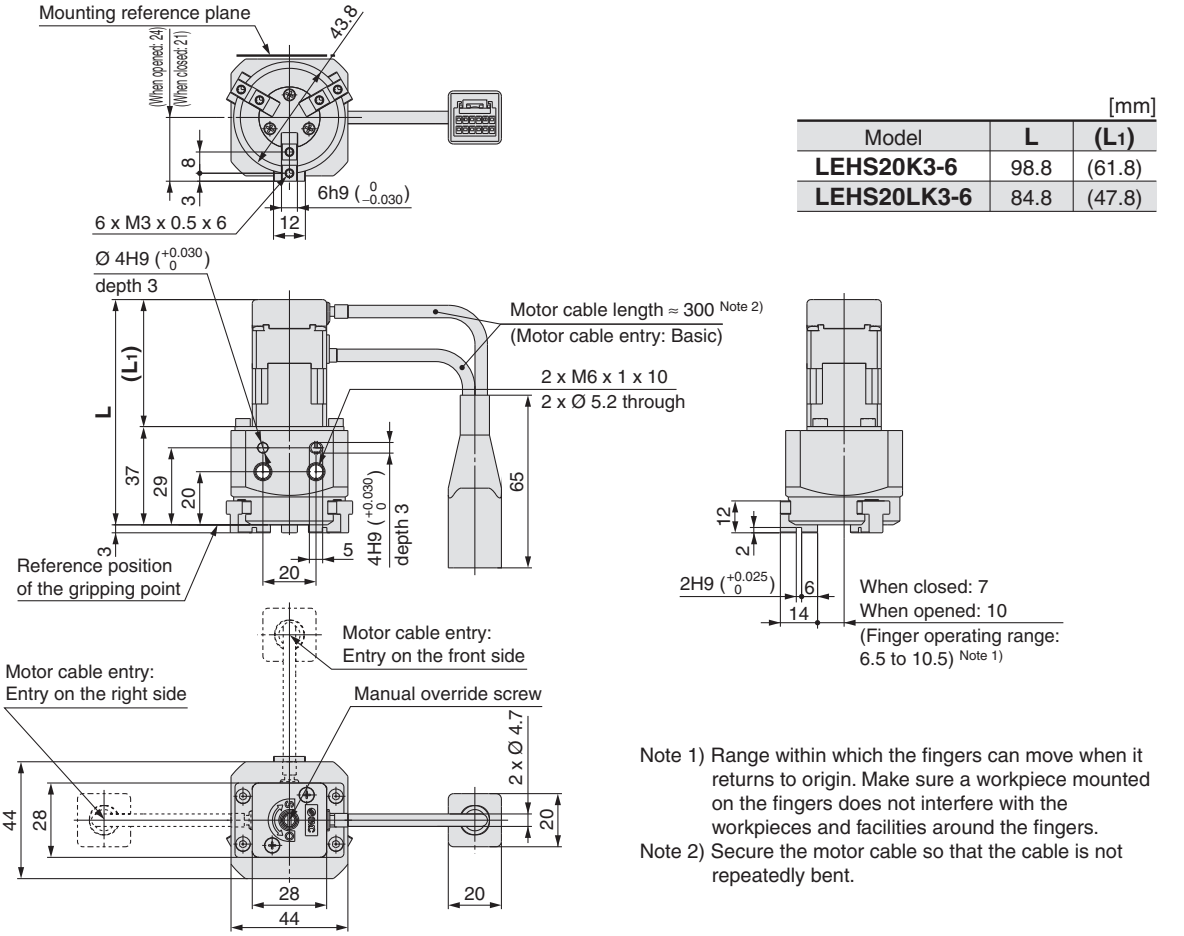


[mm]

Model	L	(L1)
LEHS10K3-4	89.1	(59.6)
LEHS10LK3-4	72.6	(43.1)

Note 1) 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.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

LEHS20(L)K3-6



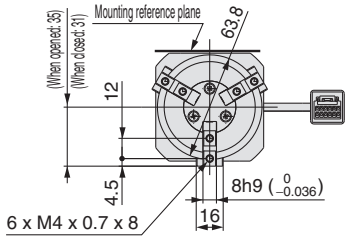
[mm]

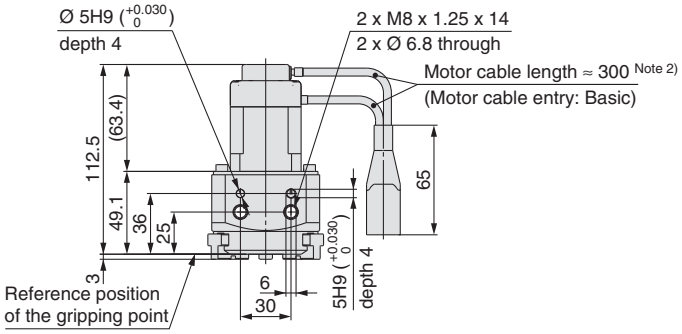
Model	L	(L1)
LEHS20K3-6	98.8	(61.8)
LEHS20LK3-6	84.8	(47.8)

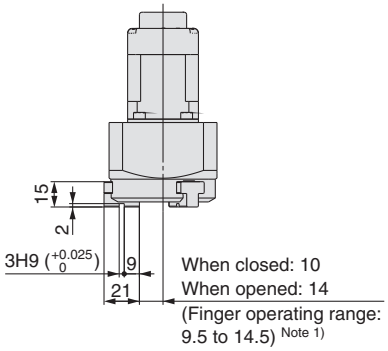
Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

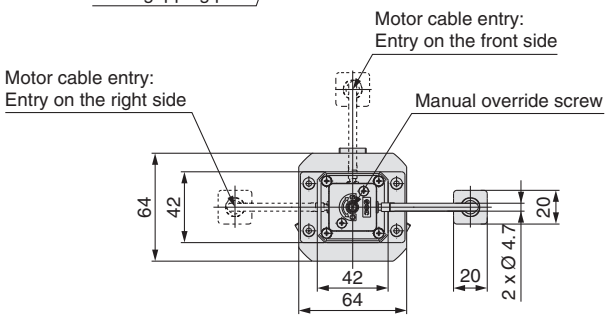
Dimensions

LEHS32K3-8



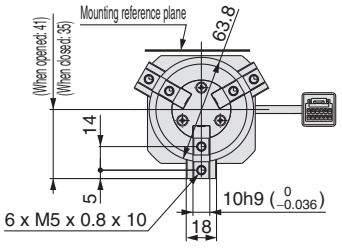


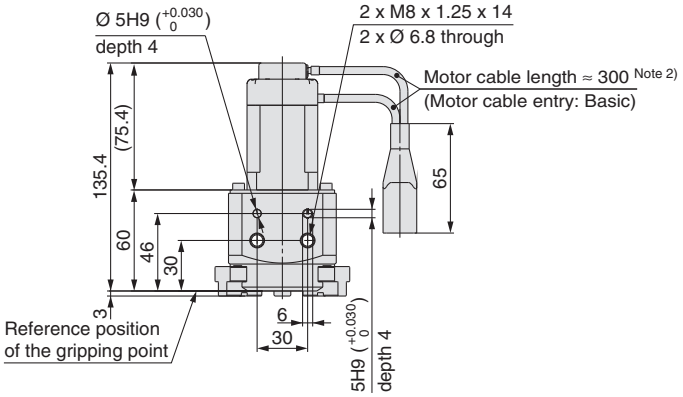


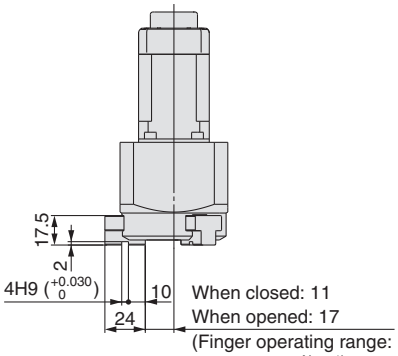


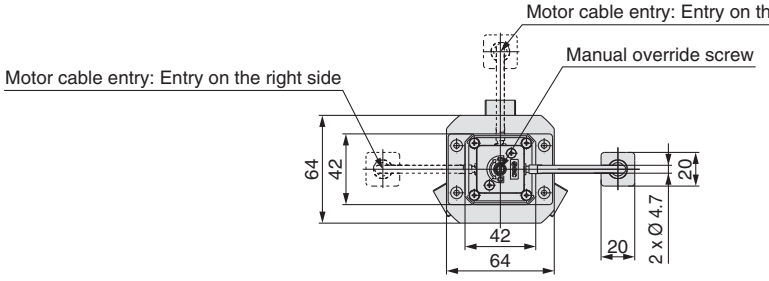
Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

LEHS40K3-12









Note 1) 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.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

Series LEH
Electric Grippers/ Specific Product Precautions 1

Be sure to read before handling. Refer to back cover for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smc.eu

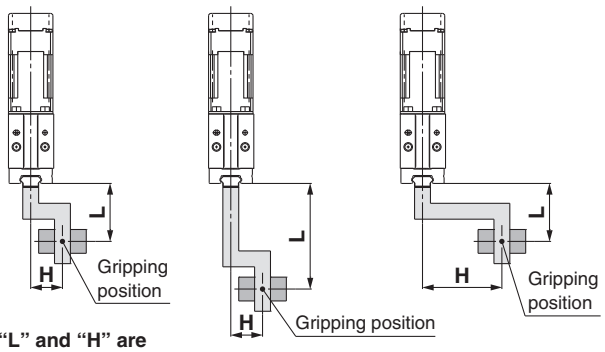
Design/Selection

⚠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



○ **"L" and "H" are appropriate.**
× **"L" is too long.**
× **"H" is too long.**

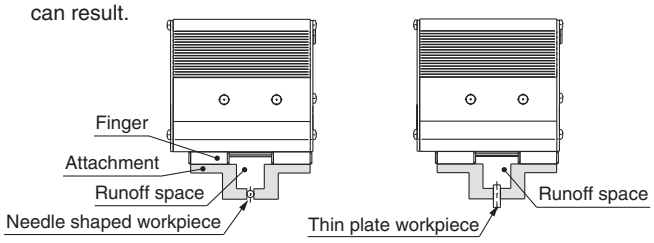
2. Design the attachment to be lightweight and short.

A long and heavy attachment will increase inertia 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.)		±20 % (F.S.)	
LEHF10		**LEHF20**		**LEHF32**	**LEHF40**
±30 % (F.S.)		±25 % (F.S.)		±20 % (F.S.)	
LEHS10(L)		**LEHS20(L)**		**LEHS32**	**LEHS40**
±30 % (F.S.)		±25 % (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 opening and closing width relative to a workpiece.

The selection of an inappropriate model will cause gripping at unexpected positions due to variable opening and closing 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, use screws with adequate length and tighten them with adequate torque 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 at the torque specified in the following table by screwing the bolt into the finger mounting female thread and hole.

<Series LEHZ>

Model	Bolt	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	Bolt	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	Bolt	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

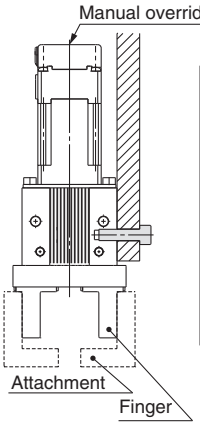
Series LEH
Electric Grippers/ Specific Product Precautions 2

Be sure to read before handling. Refer to back cover for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smc.eu

Mounting

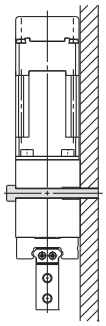
Mounting of Electric Gripper, Series LEHZ/LEHZJ

When using the thread on the side of the body



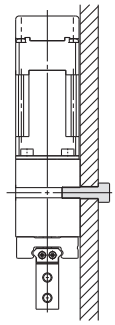
Model	Bolt	Max. tightening torque [N·m]	Max. screw-in depth L [mm]
LEHZ(J)10(L)	M3 x 0.5	0.9	6
LEHZ(J)16(L)	M4 x 0.7	1.4	6
LEHZ(J)20(L)	M5 x 0.8	3.0	8
LEHZ(J)25(L)	M6 x 1	5.0	10
LEHZ32	M6 x 1	5.0	10
LEHZ40	M8 x 1.25	12.0	14

When using the thread on the mounting plate



Model	Bolt	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

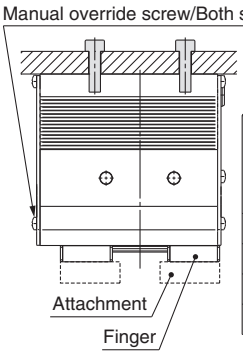
When using the thread on the back of the body



Model	Bolt	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

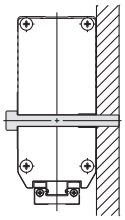
Mounting of Electric Gripper, Series LEHF

When using the thread on the body



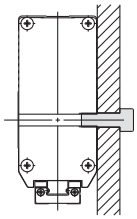
Model	Bolt	Max. tightening torque [N·m]	Max. screw-in depth L [mm]
LEHF10	M4 x 0.7	1.4	7
LEHF20	M5 x 0.8	3.0	8
LEHF32	M6 x 1	5.0	10
LEHF40	M6 x 1	5.0	10

When using the thread on the mounting plate



Model	Bolt	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

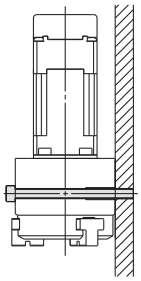
When using the thread on the back of the body



Model	Bolt	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

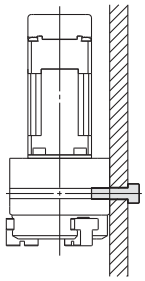
Mounting of Electric Gripper, Series LEHS

When using the thread on the mounting plate



Model	Bolt	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	Bolt	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 before handling. Refer to back cover for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smc.eu

Mounting

⚠Warning

3. Tighten the electric gripper mounting screws to the specified torque.
Tightening to a torque greater than the specified range may cause malfunction, and insufficient tightening may cause displacement.

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.

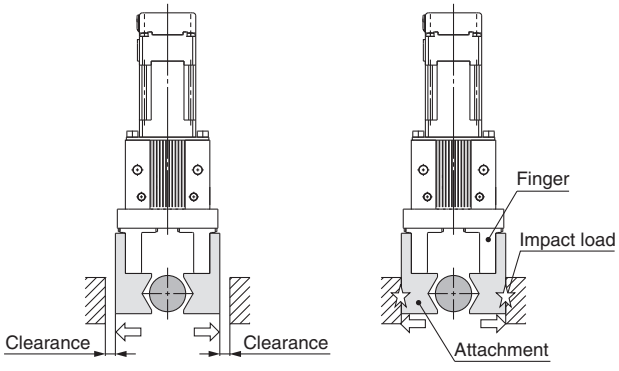
6. When a workpiece is to be removed when it is not energized, open or close the finger manually or remove the attachment beforehand.
When the product is operated with the manual override screws, check the position of the manual override screws of the product, and leave necessary space. Do not apply excessive torque to the manual override screws that could lead to damage and malfunction of the product.

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.

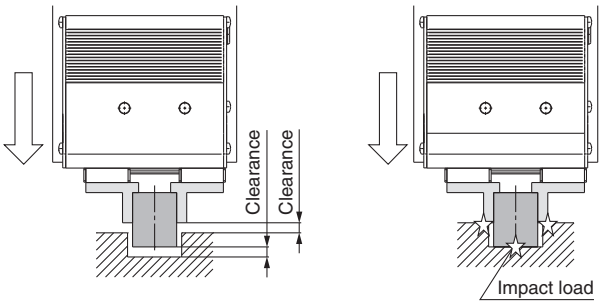
1) Stroke end when fingers are open

○ **With clearance** × **Without clearance**

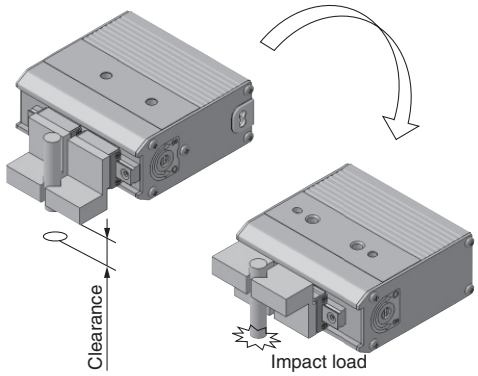


2) Stroke end when gripper is moving

○ **With clearance** × **Without clearance**

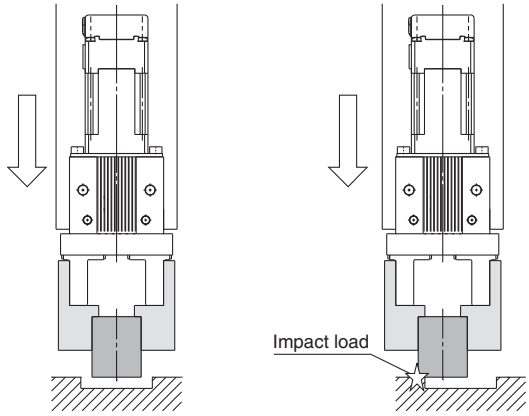


3) When turning over



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 opening/closing speed are for both fingers.
The stroke and the opening/closing 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 52.
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

Be sure to read before handling. Refer to back cover for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smc.eu

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.
c) The INP output signal is turned on when pushing in the stroke end of an electric gripper even if workpiece is not held.

<INP output signal in the controller version>

● SV1.0∗ 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.

● SV0.6∗ 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.

Label position for controller version

Position: Bottom
SV1.0∗

<Pushing force and trigger level range>

Series LEHZ

Motor size	Pushing speed [mm/sec]	Pushing force (Setting input value)
Basic	41 to 50	50 % to 100 %
	5 to 40	40 % to 100 %
Compact	31 to 50	70 % to 100 %
	21 to 30	50 % to 100 %
	5 to 20	40 % to 100 %

Series LEHZJ

Motor size	Body size	Pushing speed [mm/sec]	Pushing force (Setting input value)
Basic	10, 16	41 to 50	50 % to 100 %
	20, 25	5 to 40	40 % to 100 %
Compact	10 L, 16 L	21 to 50	80 % to 100 %
		11 to 20	60 % to 100 %
		5 to 10	50 % to 100 %
	20 L, 25 L	31 to 50	70 % to 100 %
		21 to 30	50 % to 100 %
		5 to 20	40 % to 100 %

Series LEHF

Pushing speed [mm/sec]	Pushing force (Setting input value)
21 to 30	50 % to 100 %
5 to 20	40 % to 100 %

Series LEHS

Motor size	Pushing speed [mm/sec]	Pushing force (Setting input value)
Basic	41 to 50	50 % to 100 %
	5 to 40	40 % to 100 %
Compact	31 to 50	80 % to 100 %
	11 to 30	60 % to 100 %
	5 to 10	40 % to 100 %

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

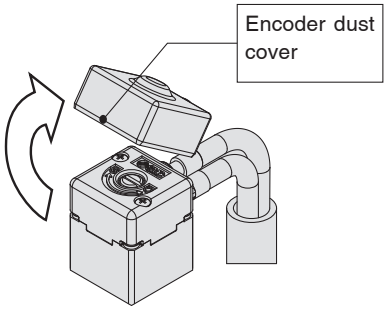
If the torque is too small when a workpiece is gripped in pushing operation, the product can have galling and become unable to release the workpiece.

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.

<series LEHZJ >

In the case of a gripper with dust covers, remove the encoder dust cover before operating the manual override.
Refit the encoder dust cover after using the manual override.



Series LEH
Electric Grippers/ Specific Product Precautions 5

Be sure to read before handling. Refer to back cover for Safety Instructions and the Operation Manual for Electric Actuator Precautions.
Please download it via our website, http://www.smc.eu

Handling

⚠Caution

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;

a) In case both of [SVRE] and [SETON] are ON before stop, [SVRE]: OFF / [SETON]: ON

b) How to restart operation

In this situation, since [SVRE] is on before stop, [SVRE] will be turned on automatically when stop is released, and operation can be restarted after that. It is not necessary to remove a workpiece beforehand because a motor magnetic pole detective operation will not occur.

c) Cautions

An alarm can take place when operation is restarted from stop. Check that [SVRE] is turned on after the release of stop and restart operation.

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

a) There will be no change in output conditions due to stop.

b) How to restart operation

In this situation, operation can be restarted after stop is released. It is not necessary to remove a workpiece beforehand because a motor magnetic pole detective operation will not occur.

c) Cautions

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.

Handling

⚠Caution

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.

c. "Err overflow" alarm
The displacement at the pushing start position exceeds the specified range.

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.

Maintenance

⚠Danger

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

There is a risk of dropping the workpiece.

⚠Caution

1. The dust cover on the gripper finger (series LEHZJ only) is a consumable item, replace the dust cover as and when it is necessary.

Otherwise, machining chips and fine particles may get into the product from the outside, leading to operation failure.

The dust cover on the gripper finger can be damaged if the finger attachment or the workpiece comes into contact with the dust cover during operation.

CE/UKCA/UL-compliance List

∗ For CE, UKCA, and UL-compliant products, refer to the tables below and the following pages.

■ Controllers

"○": Compliant "—": Not applicable

As of April 2022

Compatible motor	Series	CE UKCA	c UL us	
			Compliance	Certification No. (File No.)
Step motor (Servo/24 VDC)	JXC51/61	○	○	E480340
	JXCE1/EF			
	JXC91/9F			
	JXCP1/PF			
	JXCD1			
	JXCL1/LF			
	JXCM1			
	LECP1			E339743
	LECP2			
	LECPA			
Battery-less absolute (Step motor 24 VDC)	JXC51/61	○	○	E480340
	JXCE1/EF			
	JXC91/9F			
	JXCP1/PF			
	JXCD1			
	JXCL1/LF			
	JXCM1			
High performance (Step motor 24 VDC)	JXC5H/6H	○	○	E480340
	JXCEH			
	JXC9H			
	JXCPH			
Servo motor (24 VDC)	LECA6	○	○	E339743
Step motor (Servo/24 VDC)	JXC73	○	Not compliant	—
	JXC83			
	JXC93			
	JXC92			

Compatible motor	Series	CE UKCA	c UL us LISTED	
			Compliance	Certification No. (File No.)
AC servo motor	LECSA	○	○	E466261
	LECSB-T			
	LECSC-T			
	LECSN-T		○∗1	
	LECSS-T		○	
	LECYM		Not compliant	—
	LECYU			—

∗1 Only the "Without network card" option is UL compliant.

■ Actuators

"○": Compliant "—": Not applicable

As of April 2022

Compatible motor	Series	CE UKCA	c us	
			Compliance	Certification No. (File No.)
Step motor (Servo/24 VDC)	LEFS	○	Not applicable	—
	11-LEFS			
	25A-LEFS			
	LEFB			
	LEL			
	LEM			
	LEY			
	25A-LEY			
	LEY-X5/X7			
	LEYG			
	LES			
	LESH			
	LEPY			
	LEPS			
	LER			
	LEHZ			
	LEHZJ			
	LEHF			
	LEHS			
Battery-less absolute (Step motor 24 VDC)	LEFS	○	Not applicable	—
	LEFB			
	LEKFS			
	LEY			
	LEY-X8			
	LEYG			
	LES			
	LESH			
	LESYH			
	LER			
	LEHF			

Compatible motor	Series	CE UKCA	c us	
			Compliance	Certification No. (File No.)
High performance (Step motor 24 VDC)	LEFS	○	Not applicable	—
	LEY			
High performance battery-less absolute (Step motor 24 VDC)	LEFS	○	Not applicable	—
	LEKFS			
	LEY			
	LEG			
	LESYH			
Servo motor (24 VDC)	LEFS	○	Not applicable	—
	11-LEFS			
	25A-LEFS			
	LEFB			
	LEY			
	LEY-X5/X7			
	LEYG			
	LES			
	LESH			
AC servo motor	LEFS	○	Not applicable	—
	11-LEFS			
	25A-LEFS			
	LEKFS			
	LEFB			
	LEJS			
	JEJS100-X400			
	11-LEJS			
	25A-LEJS			
	LEJB			
	LEY25/32/63			
	LEY100			
	LEYG			
	LESYH			

∗ Actuators ordered as single units are not UL compliant.

CE/UKCA/UL-compliance List

■ Actuators (When ordered with a controller)

"○": Compliant "—": Not applicable

As of April 2022

Compatible motor	Series	JXC51/61			JXCE1			JXC91			JXCP1			JXCD1		
		CE UKCA	cULus		CE UKCA	cULus		CE UKCA	cULus		CE UKCA	cULus		CE UKCA	cULus	
			Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)
Step motor (Incremental)	LEFS	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	11-LEFS															
	25A-LEFS															
	LEFB															
	LEL															
	LEM															
	LEY															
	25A-LEY															
	LEY-X5/X7		Not applicable	—		Not applicable	—		Not applicable	—		Not applicable	—		Not applicable	—
	LEYG		○	E339743		○	E339743		○	E339743		○	E339743		○	E339743
	LES															
	LESH															
	LEPY															
	LEPS															
	LER															
	LEHZ															
	LEHZJ															
	LEHF															
	LEHS															

Compatible motor	Series	JXCL1			JXCM1			LECP1			LECP2			LECPA		
		CE UKCA	cULus		CE UKCA	cULus		CE UKCA	cULus		CE UKCA	cULus		CE UKCA	cULus	
			Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)
Step motor (Incremental)	LEFS	○	○	E339743	○	○	E339743	○	○	E339743				○	○	E339743
	11-LEFS															
	25A-LEFS															
	LEFB															
	LEL															
	LEM										○	○	E339743			
	LEY															
	25A-LEY													○	○	E339743
	LEY-X5/X7		Not applicable	—		Not applicable	—		Not applicable	—					Not applicable	—
	LEYG		○	E339743		○	E339743		○	E339743					○	E339743
	LES															
	LESH															
	LEPY															
	LEPS															
	LER															
	LEHZ															
	LEHZJ															
	LEHF															
	LEHS															

■ Actuators (When ordered with a controller)

"○": Compliant "—": Not applicable

As of April 2022

Compatible motor	Series	JXC51/61			JXCE1/EF			JXC91/9F			JXCP1/PF			JXCD1		
		CE UKCA	cULus		CE UKCA	cULus		CE UKCA	cULus		CE UKCA	cULus		CE UKCA	cULus	
			Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)
Battery-less absolute (Step motor 24 VDC)	**LEFS**	○	Not applicable	—	○	Not applicable	—	○	Not applicable	—	○	Not applicable	—	○	Not applicable	—
	LEFB															
	LEKFS															
	LEY															
	LEY-X8															
	LEYG															
	LES															
	LESH															
	LESYH															
	LER															
	LEHF															

Compatible motor	Series	JXCL1/LF			JXCM1		
		CE UKCA	cULus		CE UKCA	cULus	
			Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)
Battery-less absolute (Step motor 24 VDC)	**LEFS**	○	Not applicable	—	○	Not applicable	—
	LEFB						
	LEKFS						
	LEY						
	LEY-X8						
	LEYG						
	LES						
	LESH						
	LESYH						
	LER						
	LEHF						

CE/UKCA/UL-compliance List

■ Actuators (When ordered with a controller)

"○": Compliant "—": Not applicable As of April 2022

Compatible motor	Series	JXC5H/6H			JXCEH			JXC9H			JXCPH		
		CE UKCA	cULus		CE UKCA	cULus		CE UKCA	cULus		CE UKCA	cULus	
			Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)
High performance (Step motor 24 VDC)	LEF	○	○	E339743	○	○	E339743	○	○	E339743	○	○	E339743
	LEY												
High performance battery-less absolute (Step motor 24 VDC)	LEFS	○	Not applicable	—	○	Not applicable	—	○	Not applicable	—	○	Not applicable	—
	LEKFS												
	LEY												
	LEG												
	LESYH												

Compatible motor	Series	LECA6		
		CE UKCA	cULus	
			Compliance	Certification No. (File No.)
Servo motor (24 VDC)	LEFS	○	○	E339743
	11-LEFS			
	25A-LEFS			
	LEFB			
	LEY			
	LEY-X7		Not applicable	—
	LEYG		○	E339743
	LES			
	LESH			

Compatible motor	Series	LECSA*1			LECSB-T*1			LECSC-T*1			LECSN-T*1			LECSS-T*1		
		CE UKCA	cULus		CE UKCA	cULus		CE UKCA	cULus		CE UKCA	cULus		CE UKCA	cULus	
			Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)
AC servo motor	LEFS	○	○	E339743	○	Not applicable	—	○	Not applicable	—	○	Not applicable	—	○	○	E339743
	11-LEFS															
	25A-LEFS															
	LEKFS		Not applicable	—											Not applicable	—
	LEFB		○	E339743											○	E339743
	LEJS															
	LEJS100-X400														Not applicable	—
	11-LEJS	○	○	E339743											○	E339743
	25A-LEJS															
	LEJB															
	LEY25/32/63															
	LEY100														Not applicable	—
	LEYG	○	○	E339743											○	E339743
	LESYH		Not applicable	—											Not applicable	—

Compatible motor	Series	LECYM-V			LECYU-V		
		CE UKCA	cULus		CE UKCA	cULus	
			Compliance	Certification No. (File No.)		Compliance	Certification No. (File No.)
AC servo motor	LEFS	○	Not applicable	—	○	Not applicable	—
	11-LEFS						
	25A-LEFS						
	LEKFS						
	LEFB						
	LEJS						
	LEJS100-X400						
	11-LEJS	○	Not applicable	—	○	Not applicable	—
	25A-LEJS						
	LEJB						
	LEY25/32/63						
	LEY100						
	LEYG	○	Not applicable	—	○	Not applicable	—
	LESYH						

*1 There is a "UL Listed" mark on the AC servo motor driver body.

⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC) [1], and other safety regulations.

⚠ **Caution:**	**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
⚠ **Warning:**	**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠ **Danger:**	**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots - Safety.
etc.

⚠ Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.
The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.
1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.
1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalogue.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

⚠ Caution

1. The product is provided for use in manufacturing industries.
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first. [2] Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

2) Vacuum pads are excluded from this 1 year warranty.
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

⚠ Caution

SMC products are not intended for use as instruments for legal metrology.
Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country.
Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

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