Electric Grippers

LEH Series

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) ▶Page 432

Compact and light, various gripping forces



LEHZ Series

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) ▶Page 446

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



LEHZJ Series

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

F Type (2 fingers) ▶Page 458

Can hold various types of workpieces with a long stroke.



LEHF Series

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

( ): Long stroke

S Type (3 fingers) ▶Page 471

Can hold round workpieces.



LEHS Series

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

Step Motor (Servo/24 VDC) **Controller/Driver** ▶Page 547

▶Step data input type
LECP6 Series
- 64 points positioning
- Input using controller setting kit or teaching box



▶CC-Link direct input type
LECPMJ Series*

▶EtherCAT®/EtherNet/IP™/ PROFINET/DeviceNet™/ IO-Link direct input type
JXCE1/91/P1/D1/L1 Series

* Not applicable to CE.



▶Programless type
LECP1 Series
- 14 points positioning
- Control panel setting



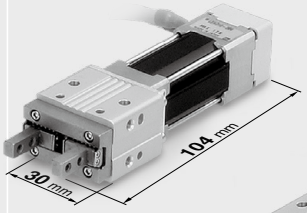
▶Pulse input type
LECPA Series



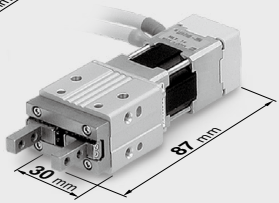
LEHZ Series/Size: 10, 16, 20, 25, 32, 40
LEHZJ Series/Size: 10, 16, 20, 25
LEHF Series/Size: 10, 20, 32, 40

●Compact and lightweight Various gripping forces

Weight: **165** g
(LEHZ10)



Compact
Weight: **135** g
(LEHZ10L)

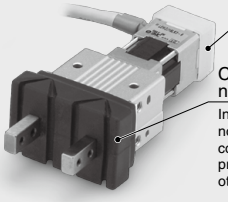


●Sealed-construction dust cover (Equivalent to IP50)

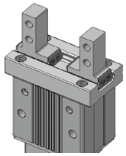
- Prevents machining chips, dust, etc., from getting inside
- Prevents spattering of grease, etc.

●3 types of cover material (Finger portion only)

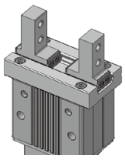
- Chloroprene rubber (black): Standard
- Fluororubber (black): Option
- Silicone rubber (white): Option



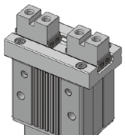
Finger options



Side tapped mounting

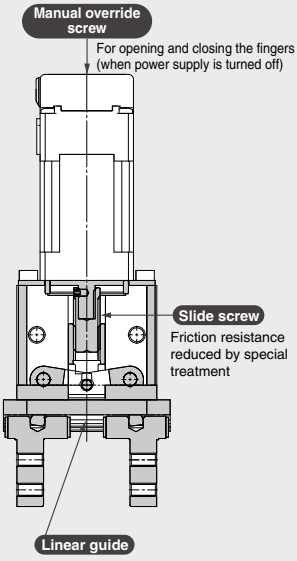


Through-hole in open/ close direction

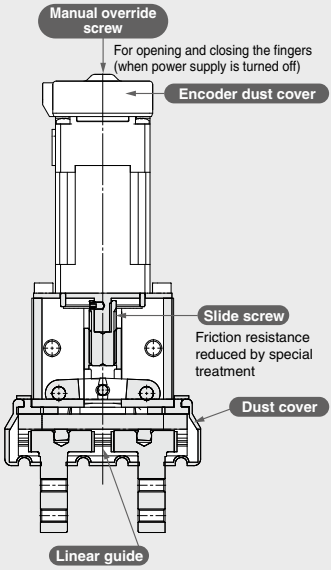


Flat fingers

LEHZ Series



LEHZJ Series



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

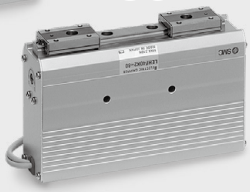
●Can hold various types of workpieces with a long stroke.

Stroke:
Max. **40** mm



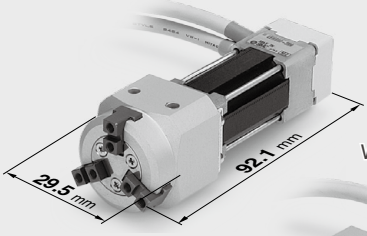
Long stroke

Stroke:
Max. **80** mm



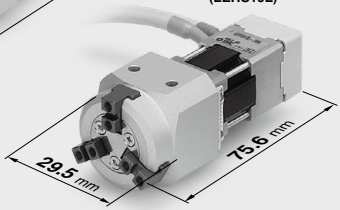
●Can hold round workpieces.

Weight: **185** g
(LEHS10)



Compact

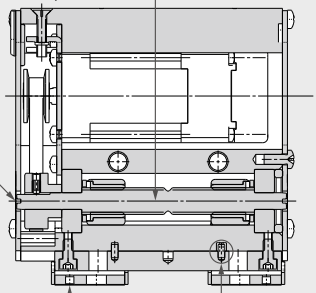
Weight: **150** g
(LEHS10L)



LEHF Series

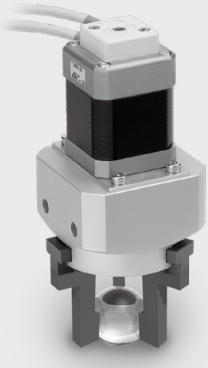
Manual override screw/Both sides
For opening and closing the fingers (when power supply is turned off)

Slide screw
Friction resistance reduced by special treatment



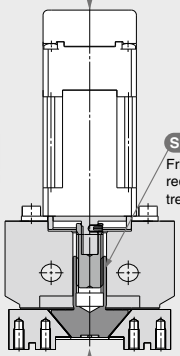
Linear guide

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



LEHS Series

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



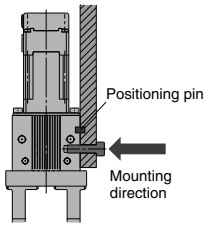
Slide screw
Friction resistance reduced by special treatment

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

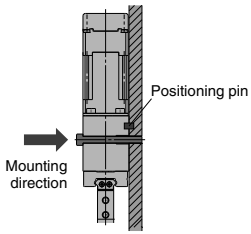
<Mounting Variations>

LEHZ/LEHZJ Series

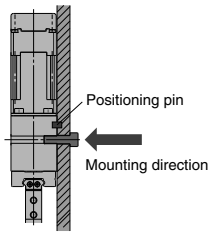
A When using the thread on the side of the body



B When using the thread on the mounting plate

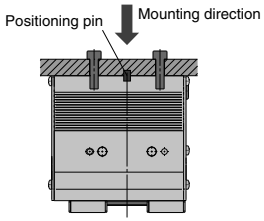


C When using the thread on the back of the body

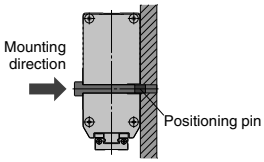


LEHF Series

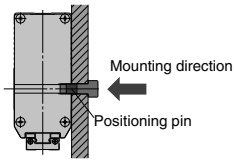
A When using the thread on the body



B When using the thread on the mounting plate

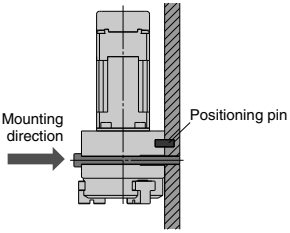


C When using the thread on the back of the body

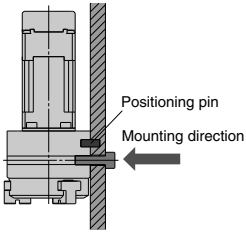


LEHS Series

A When using the thread on the mounting plate

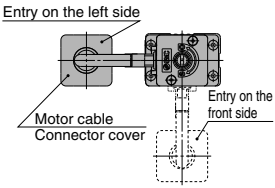


B When using the thread on the back of the body

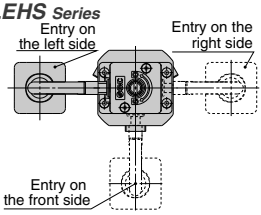


Motor cable mounting direction can be selected.

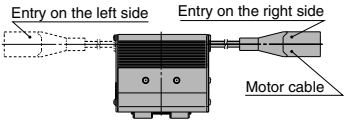
LEHZ/LEHZJ Series



LEHS Series

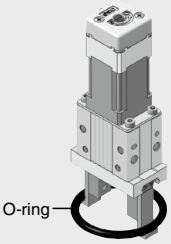


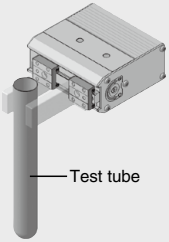
LEHF Series

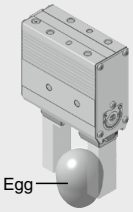


Application Examples

Gripping of components that are easily deformed or damaged

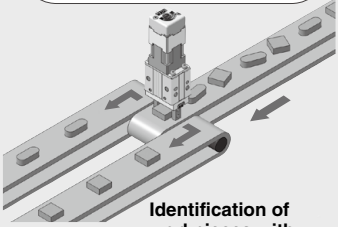






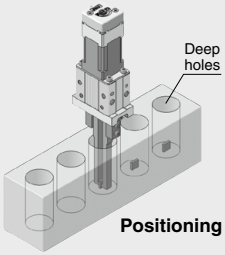
Speed and gripping force control and positioning

Alignment and selection of randomly lined parts



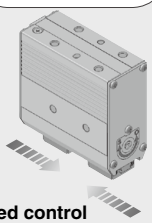
Identification of workpieces with different dimensions

Gripping in a narrow space



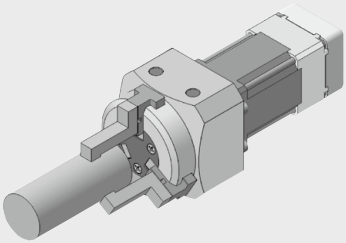
Positioning

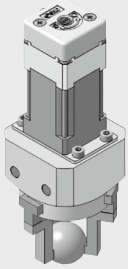
Soft touch/ High frequency

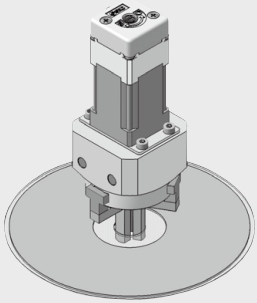


Speed control and positioning (Minimum stroke)

Gripping of cylindrical and spherical parts





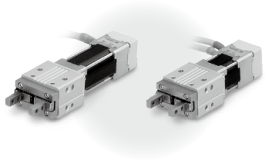


Speed and gripping force control

Step Motor (Servo/24 VDC)

Electric Gripper 2-Finger Type *LEHZ Series*

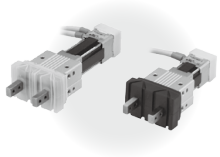
Model Selection ····· Page 432
How to Order ····· Pages 438, 439-1
Specifications ····· Page 440
Construction ····· Page 441
Dimensions ····· Page 442
Finger Options ····· Page 445



Step Motor (Servo/24 VDC)

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

Model Selection ····· Page 446
How to Order ····· Pages 452, 453-1
Specifications ····· Page 454
Construction ····· Page 455
Dimensions ····· Page 456



Step Motor (Servo/24 VDC)

Electric Gripper 2-Finger Type *LEHF Series*

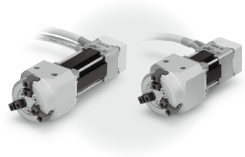
Model Selection ····· Page 458
How to Order ····· Pages 462, 463-1
Specifications ····· Page 464
Construction ····· Page 465
Dimensions ····· Page 466



Step Motor (Servo/24 VDC)

Electric Gripper 3-Finger Type *LEHS Series*

Model Selection ····· Page 471
How to Order ····· Pages 474, 475-1
Specifications ····· Page 476
Construction ····· Page 477
Dimensions ····· Page 478



Specific Product Precautions ····· Page 480

Step Motor (Servo/24 VDC) Controller

Step Data Input Type/***LECP6 Series*** ····· Page 560
  Controller Setting Kit/***LEC-W2*** ····· Page 569
  Teaching Box/***LEC-T1*** ····· Page 570
CC-Link Direct Input Type/***LECPMJ Series*** ·· Page 600
  Controller Setting Kit/***LEC-W2*** ····· Page 603-2
  Teaching Box/***LEC-T1*** ····· Page 603-3
EtherCAT®/EtherNet/IP™/PROFINET/DeviceNet™/IO-Link
  Direct Input Type/***JXCE1/91/P1/D1/L1 Series*** ····· Page 603-5
  Controller Setting Kit/***LEC-W2*** ····· Page 603-10
  Teaching Box/***LEC-T1*** ····· Page 605
Gateway Unit/***LEC-G Series*** ····· Page 572
Programless Controller/***LECP1 Series*** ····· Page 576
Step Motor Driver/***LECPA Series*** ····· Page 590
  Controller Setting Kit/***LEC-W2*** ····· Page 597
  Teaching Box/***LEC-T1*** ····· Page 598



4-Axis Step Motor Controller (Servo/24 VDC)

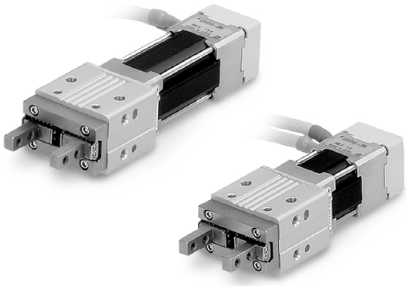
Parallel I/O/***JXC73/83 Series*** ····· Page 606-1
EtherNet/IP™ Type/***JXC93 Series*** ····· Page 606-1



Grippers

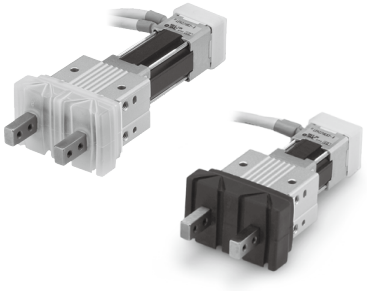
2-Finger Type *LEHZ Series*

Step Motor (Servo/24 VDC)



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

Step Motor (Servo/24 VDC)



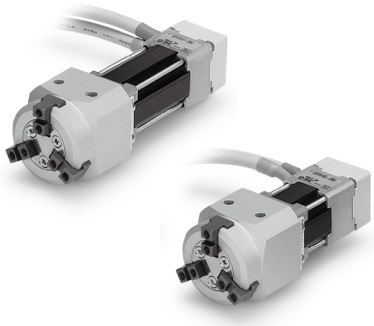
2-Finger Type *LEHF Series*

Step Motor (Servo/24 VDC)



3-Finger Type *LEHS Series*

Step Motor (Servo/24 VDC)



Step Motor (Servo/24 VDC)

Electric Gripper 2-Finger Type

LEHZ Series

Model Selection



LEHZ Series ▶ Pages 438, 439-1

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.

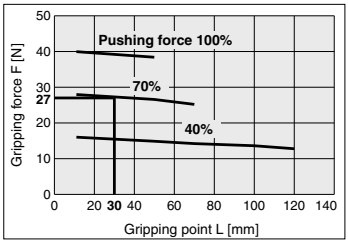
Note) For details, refer to the calculation of required gripping force.

- 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.

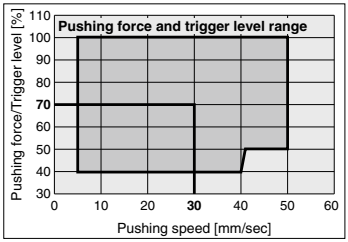
Gripping point distance: 30 mm

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

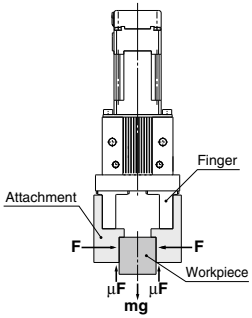
LEHZ20



- 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

$$2 \times \mu F > mg$$

(2: Number of fingers)

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

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

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

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

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

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

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

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

Note) • Even in cases where the coefficient of friction is greater than 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.

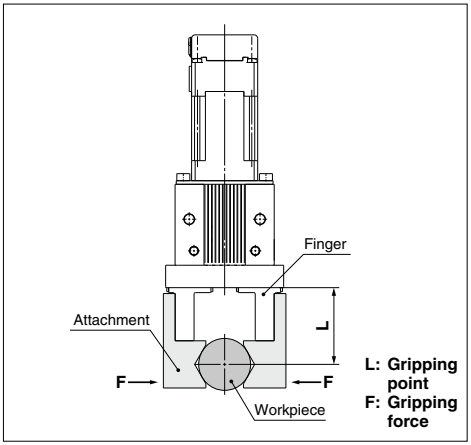
Selection Procedure

Step 1 Check the gripping force: LEHZ Series

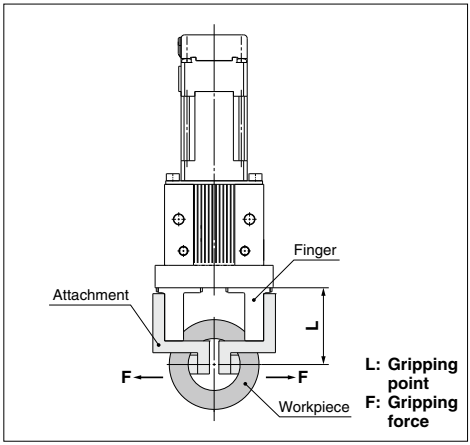
● **Indication of gripping force**
The gripping force shown in the graphs below is expressed as "F", which is the gripping force of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

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

External Gripping State



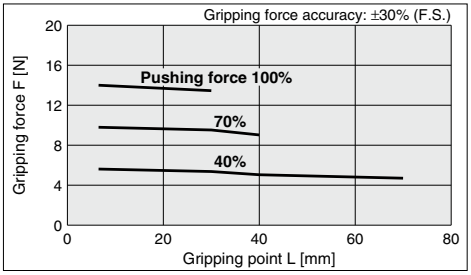
Internal Gripping State



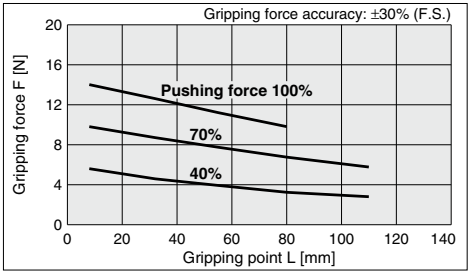
Basic

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

LEHZ10



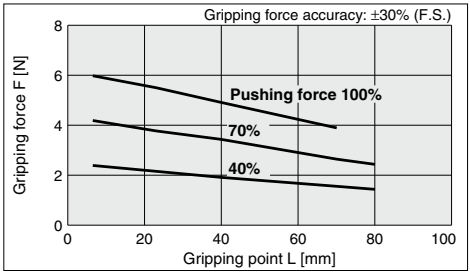
LEHZ16



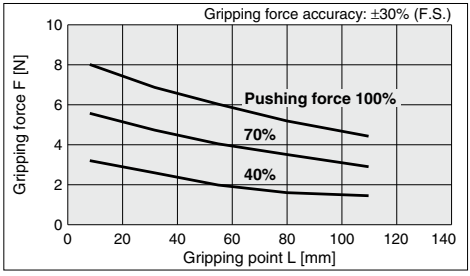
Compact

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

LEHZ10L



LEHZ16L



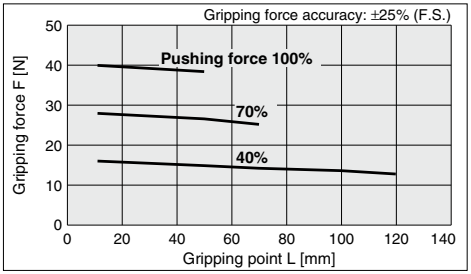
Selection Procedure

Step 1 **Check the gripping force: LEHZ Series**

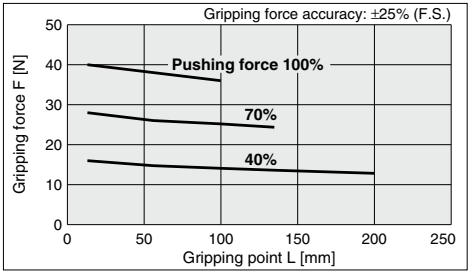
Basic

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

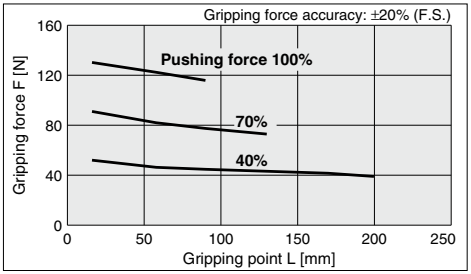
LEHZ20



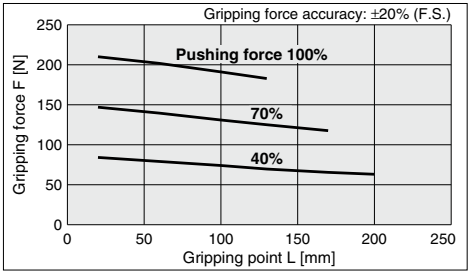
LEHZ25



LEHZ32



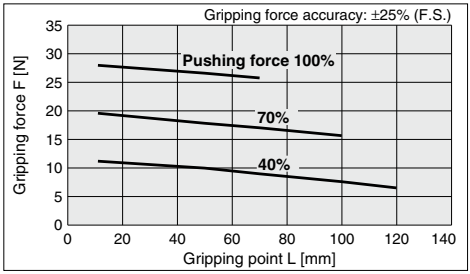
LEHZ40



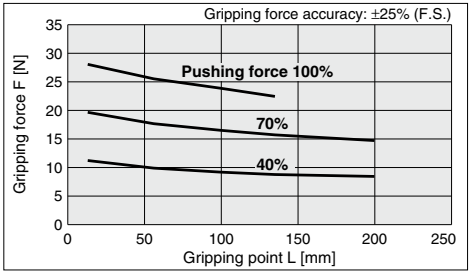
Compact

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

LEHZ20L



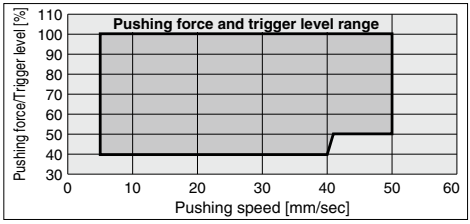
LEHZ25L



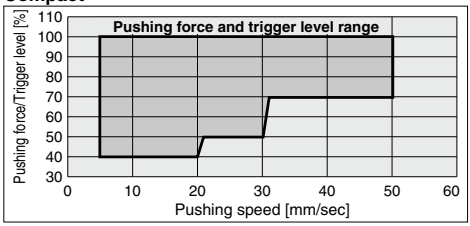
Selection of Pushing Speed

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

Basic



Compact

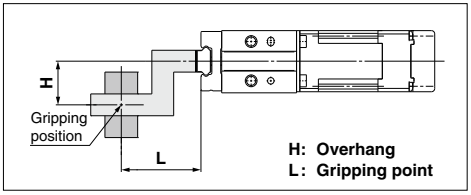


Selection Procedure

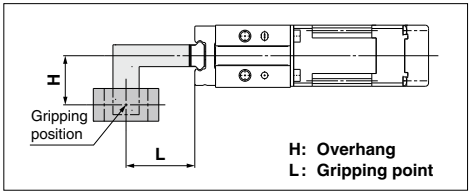
Step 2 Check the gripping point and overhang: LEHZ Series

- 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



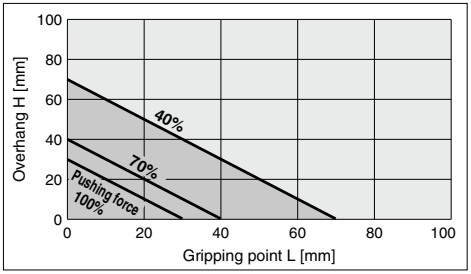
Internal Gripping State



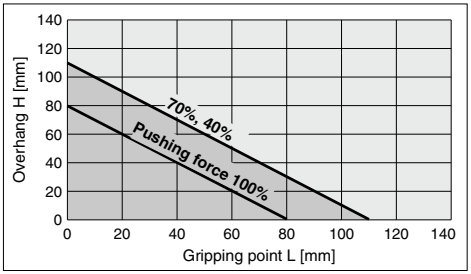
Basic

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

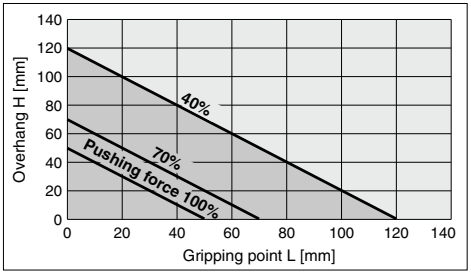
LEHZ10



LEHZ16



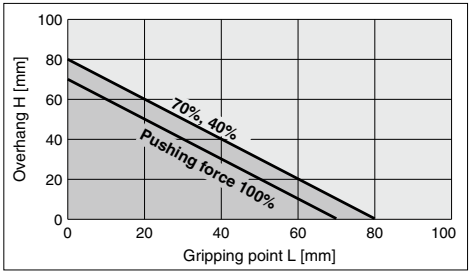
LEHZ20



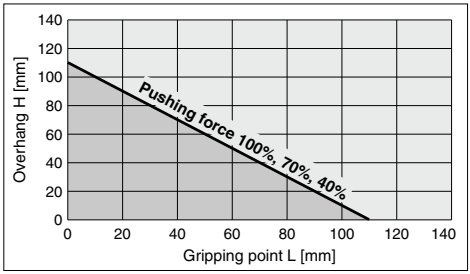
Compact

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

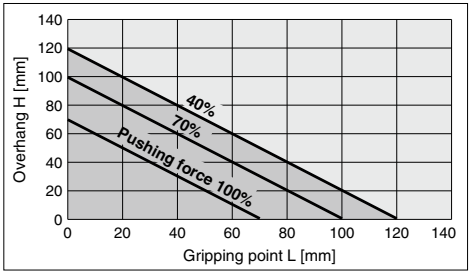
LEHZ10L



LEHZ16L



LEHZ20L



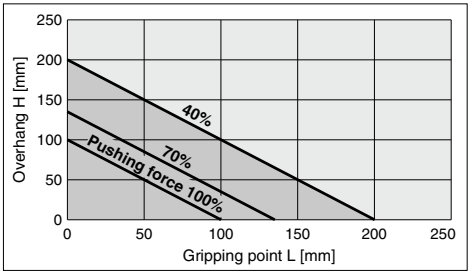
Selection Procedure

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

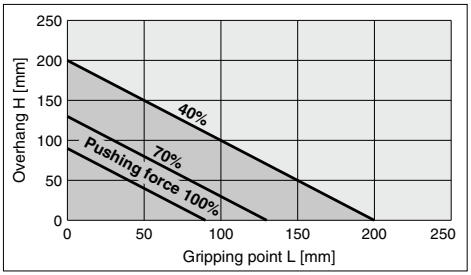
Basic

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

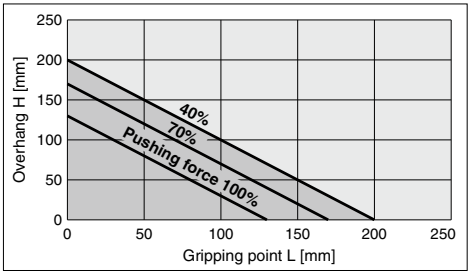
LEHZ25



LEHZ32



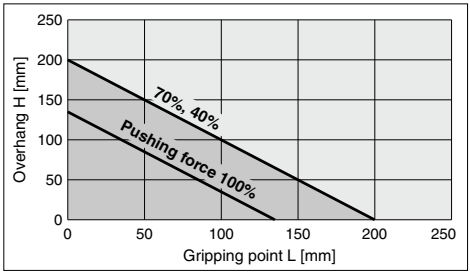
LEHZ40



Compact

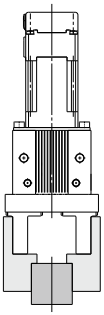
∗ Pushing force is one of the values of step data that is input into the controller.

LEHZ25L

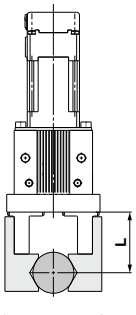


Selection Procedure

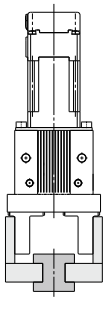
Step 3 Check the external force on fingers: LEHZ Series



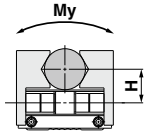
Fv: Allowable vertical load

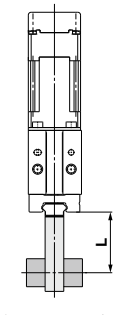


Mp: Pitch moment



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] = $\dfrac{\text{M (Static allowable moment) [N·m]}}{\text{L} \times 10^{-3}\ *}$ (* 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 LEHZ16K2-6 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]**

Step Motor (Servo/24 VDC)

Electric Gripper 2-Finger Type

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

Applicable to the LEC□ series

RoHS

Refer to page 439-1 for the communication protocols EtherCAT®, EtherNet/IP™, PROFINET, DeviceNet™, and IO-Link.

How to Order

LEHZ **10** □ **K** **2** – **4** □ □ – **S1** **6N** **1** □

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫

❶ Size

10
16
20
25
32
40

❷ Motor size

Nil	Basic
L Note)	Compact

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

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

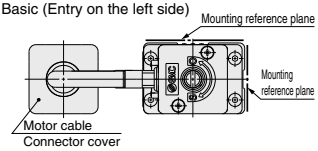
❻ Finger options

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

❼ Motor cable entry

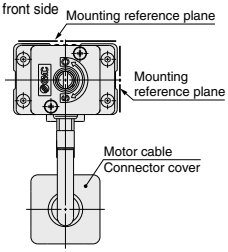
Nil

Basic (Entry on the left side)



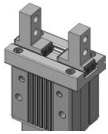
F

Entry on the front side

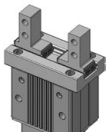


Finger options

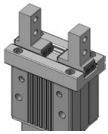
Nil: Basic (Tapped in open/close direction)



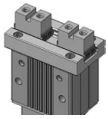
A: Side tapped mounting



B: Through-hole in open/close direction



C: Flat fingers



⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEH series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result, it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.

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

[UL-compliant products]

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

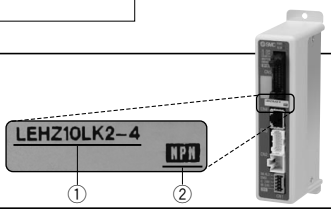
The actuator and controller/driver are sold as a package.

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

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.

② Check Parallel I/O configuration matches (NPN or PNP).



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



❽ Actuator cable type/length

Nil	Without cable
S1	Standard cable 1.5 m
S3	Standard cable 3 m
S5	Standard cable 5 m
R1	Robotic cable 1.5 m
R3	Robotic cable 3 m
R5	Robotic cable 5 m
R8	Robotic cable 8 m*1
RA	Robotic cable 10 m*1
RB	Robotic cable 15 m*1
RC	Robotic cable 20 m*1

*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.

❾ Controller/Driver type*1

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

*1 For details about controller/driver and compatible motor, refer to the compatible controller/driver below.
*2 Not applicable to CE.
*3 When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-□) on page 596 separately.

❿ I/O cable length*1, Communication plug

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

*1 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected. Refer to page 568 (For LECP6), page 582 (For LECP1) or page 596 (For LECPA) if I/O cable is required.
*2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.
*3 For the LECPMJ, only "Nil", "S" and "T" are selectable since I/O cable is not included.

⓫ Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately.

Compatible Controller/Driver

Type	**Step data input type** 	**CC-Link direct input type** 	**Programless type** 	**Pulse input type** 
Series	**LECP6**	**LECPMJ**	**LECP1**	**LECPA**
Features	Value (Step data) input Standard controller	CC-Link direct input	Capable of setting up operation (step data) without using a PC or teaching box	Operation by pulse signals
Compatible motor	Step motor (Servo/24 VDC)			
Maximum number of step data	64 points		14 points	—
Power supply voltage	24 VDC			
Reference page	Page 560	Page 600	Page 576	Page 590

Step Motor (Servo/24 VDC)

Electric Gripper 2-Finger Type

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

Applicable to the JXC□ series

CE cULus RoHS

How to Order

Refer to page 438 for the communication protocol CC-Link.

LEHZ 10 □ K 2 – 4 □ □ – R1 CD17T

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾

❶ Size

10
16
20
25
32
40

❷ Motor size

Nil	Basic
L Note)	Compact

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

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

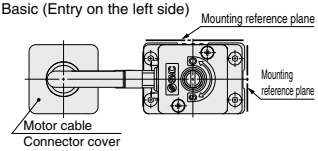
❻ Finger options

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

❼ Motor cable entry

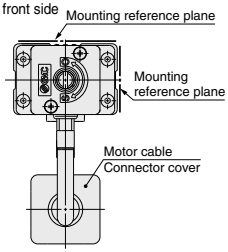
Nil

Basic (Entry on the left side)



F

Entry on the front side



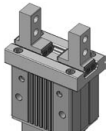
⚠Caution

[CE-compliant products]

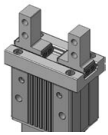
EMC compliance was tested by combining the electric actuator LE series and the JXCE1/91/P1/D1/L1 series. The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result, it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.

Finger options

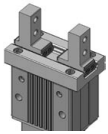
Nil: Basic (Tapped in open/close direction)



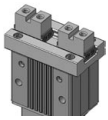
A: Side tapped mounting



B: Through-hole in open/close direction



C: Flat fingers





❽ Actuator cable type/length

Nil	Without cable
S1	Standard cable 1.5 m
S3	Standard cable 3 m
S5	Standard cable 5 m
R1	Robotic cable 1.5 m
R3	Robotic cable 3 m
R5	Robotic cable 5 m
R8	Robotic cable 8 m*1
RA	Robotic cable 10 m*1
RB	Robotic cable 15 m*1
RC	Robotic cable 20 m*1

*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.

❾ Controller

Nil	Without controller
C□1□□	With controller

C D 1 7 T

Communication protocol

E	EtherCAT®
9	EtherNet/IP™
P	PROFINET
D	DeviceNet™
L	IO-Link

For single axis

Mounting

7	Screw mounting
8*	DIN rail

* DIN rail is not included. It must be ordered separately. (Page 603-8)

Communication plug connector for DeviceNet™

Nil	Without plug connector
S	Straight type
T	T-branch type

* Select "Nil" for anything other than DeviceNet™.

Compatible Controller

Type	EtherCAT® direct input type 	EtherNet/IP™ direct input type 	PROFINET direct input type 	DeviceNet™ direct input type 	IO-Link direct input type 
Series	**JXCE1**	**JXC91**	**JXCP1**	**JXCD1**	**JXCL1**
Features	EtherCAT® direct input	EtherNet/IP™ direct input	PROFINET direct input	DeviceNet™ direct input	IO-Link direct input
Compatible motor	Step motor (Servo/24 VDC)				
Maximum number of step data	64 points				
Power supply voltage	24 VDC				
Reference page	Page 603-5				



Specifications

Model			LEHZ10	LEHZ16	LEHZ20	LEHZ25	LEHZ32	LEHZ40
Actuator specifications	Open and close stroke/both sides [mm]		4	6	10	14	22	30
	Lead [mm]		251/73 (3.438)	249/77 (3.234)	246/53 (4.642)	243/48 (5.063)	242/39 (6.205)	254/43 (5.907)
	Gripping force [N] 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		—	—
	Open and close 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/ one side [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 A/B phase (800 pulse/rotation)					
	Rated voltage [V]		24 VDC ±10%					
	Power consumption/ Standby power consumption when operating [W] Note 9)	Basic	11/7		28/15		34/13	36/13
		Compact	8/7		22/12		—	—
	Max. instantaneous power consumption [W] Note 10)	Basic	19		51		57	61
		Compact	14		42		—	—

Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Moving force should be 150% when releasing the workpiece. Gripping force accuracy should be ±30% (F.S.) for LEHZ10/16, ±25% (F.S.) for LEHZ20/25 and ±20% (F.S.) for LEHZ32/40. 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 open/close speed and pushing speed are for both fingers. The speed for one finger is half this value.

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

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

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

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

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

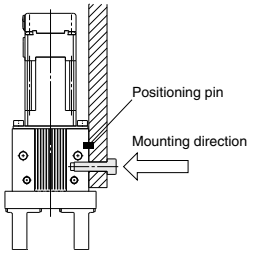
Note 8) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between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

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

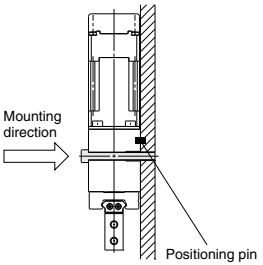
Note 10) The maximum instantaneous power consumption (including the controller) is for when the gripper is operating. This value can be used for the selection of the power supply.

How to Mount

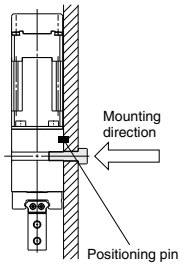
a) When using the thread on the side of the body



b) When using the thread on the mounting plate

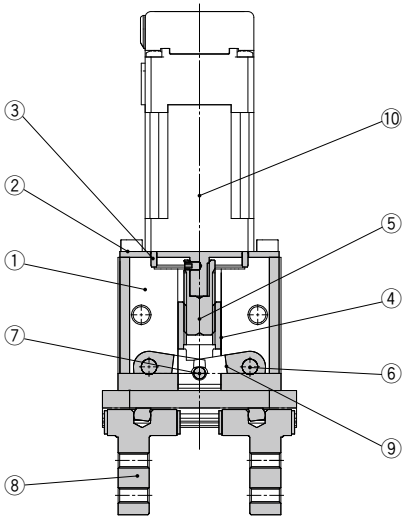


c) When using the thread on the back of the body



Construction

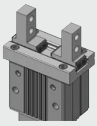
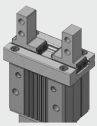
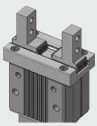
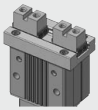
LEHZ Series



Component Parts

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

Replacement Parts ⑧ Finger Assembly

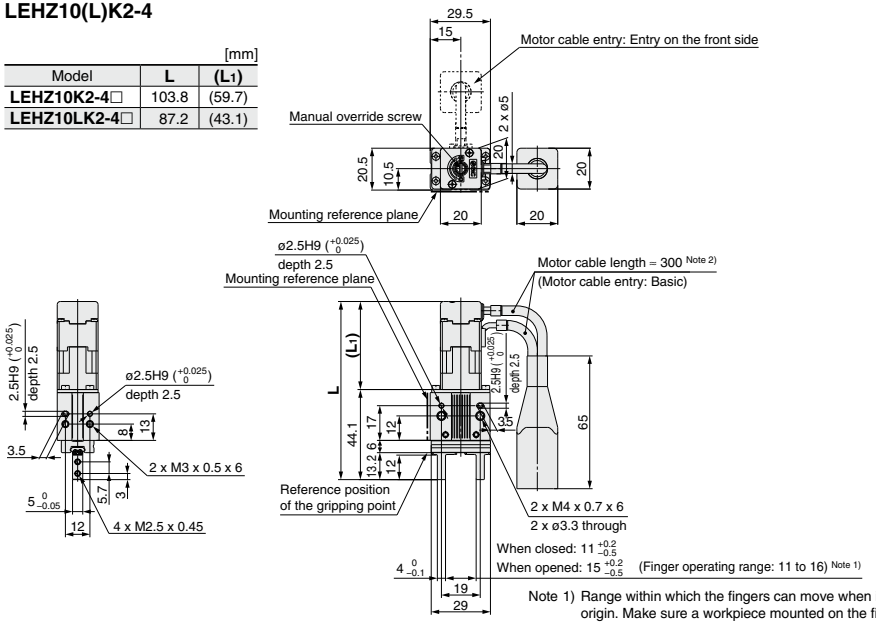
Size	Basic (**Nil**)	Side tapped mounting (**A**)	Through-hole in open/close direction (**B**)	Flat fingers (**C**)
				
10	MHZ-AA1002	MHZ-AA1002-1	MHZ-AA1002-2	MHZ-AA1002-3
16	MHZ-AA1602	MHZ-AA1602-1	MHZ-AA1602-2	MHZ-AA1602-3
20	MHZ-AA2002	MHZ-AA2002-1	MHZ-AA2002-2	MHZ-AA2002-3
25	MHZ-AA2502	MHZ-AA2502-1	MHZ-AA2502-2	MHZ-AA2502-3
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)

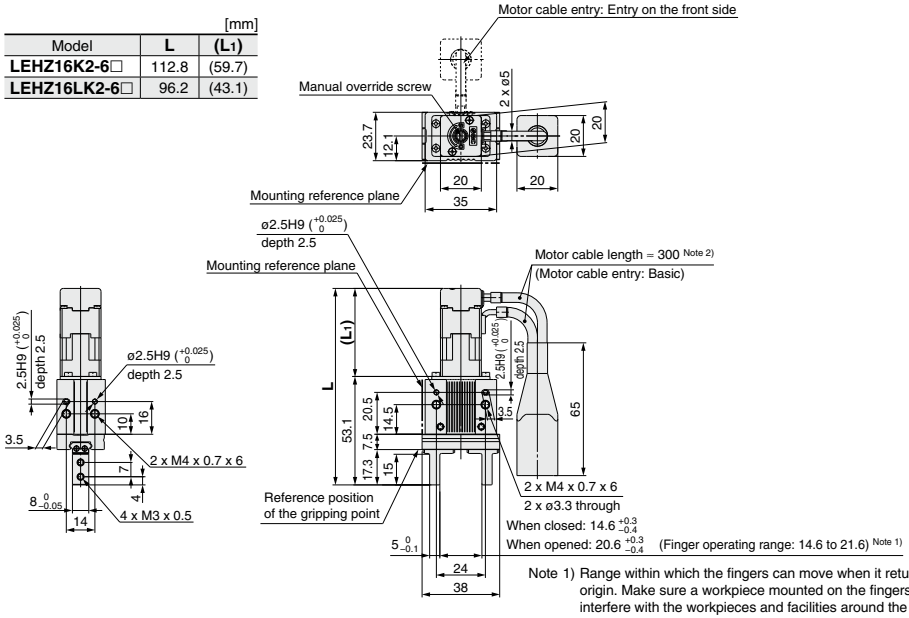


Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

LEHZ16(L)K2-6

[mm]

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



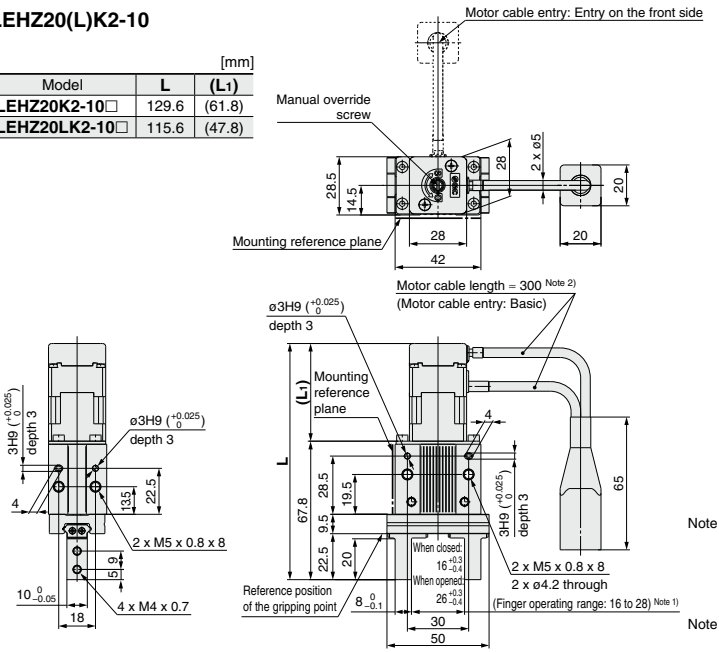
Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

Dimensions

LEHZ20(L)K2-10

[mm]

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

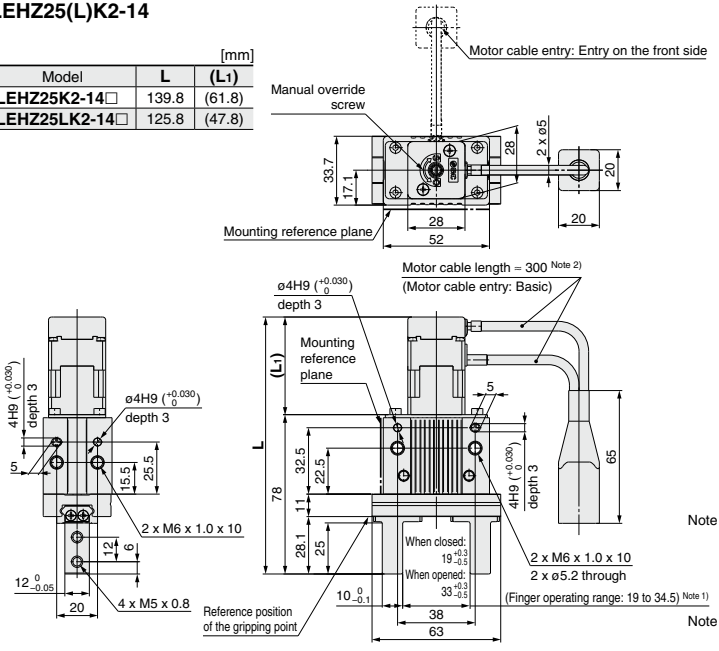


Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

LEHZ25(L)K2-14

[mm]

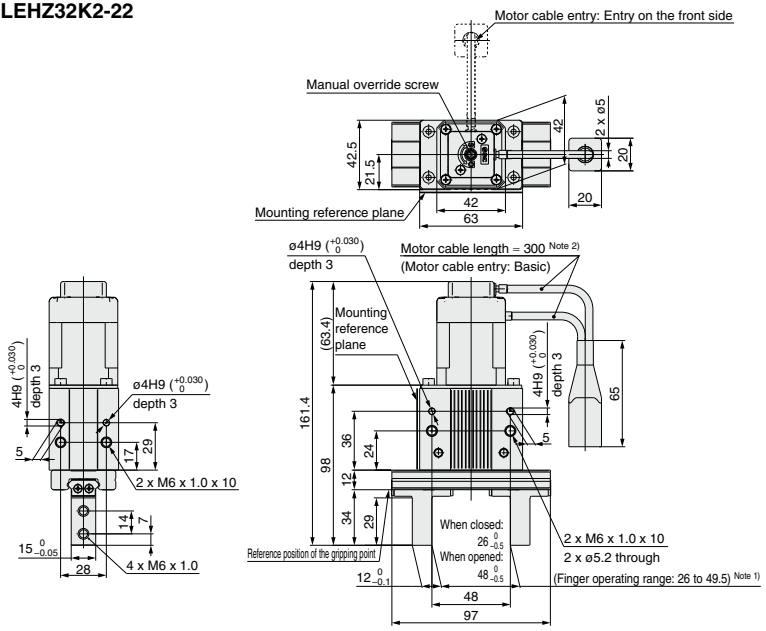
Model	L	(L1)
LEHZ25K2-14□	139.8	(61.8)
LEHZ25LK2-14□	125.8	(47.8)



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.

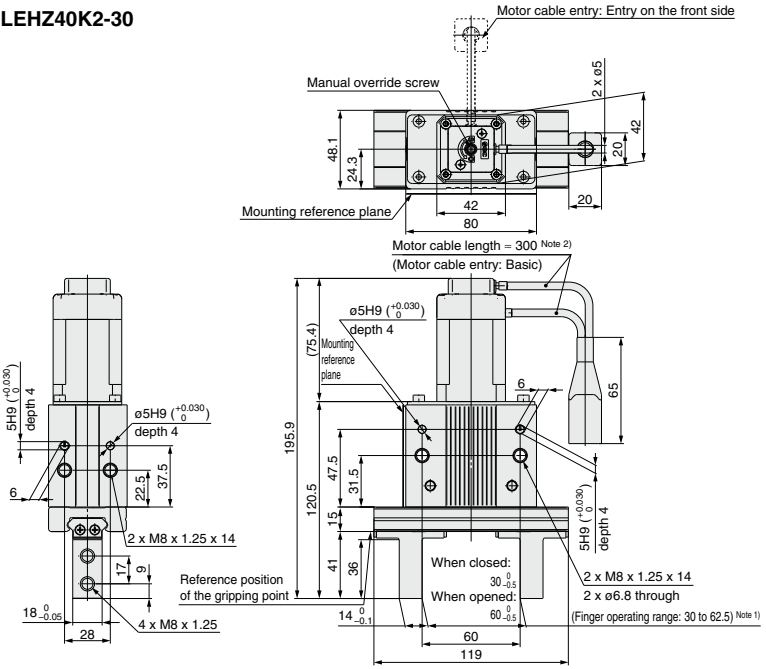
Dimensions

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.

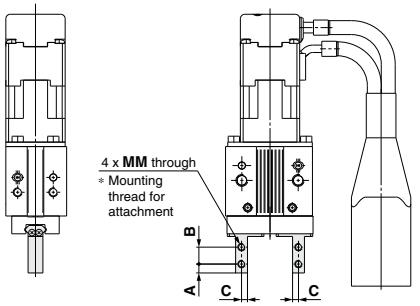
LEHZ40K2-30



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

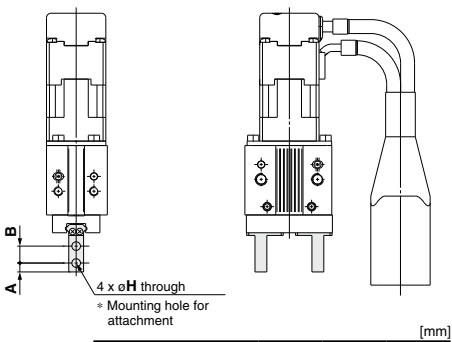
Side Tapped Mounting (A)



[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

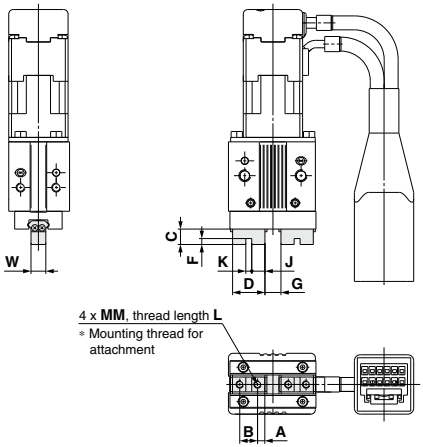
Through-hole in Open/Close Direction (B)



[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



LEHZJ Series ▶ Pages 452, 453-1

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.

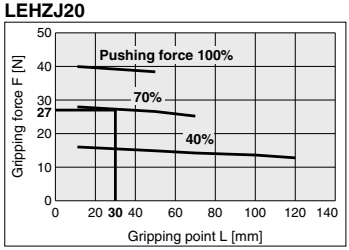
Note) For details, refer to the calculation of required gripping force.

- 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/s^2 ≈ 19.6 N or more

LEHZJ20



Pushing force: 70%

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

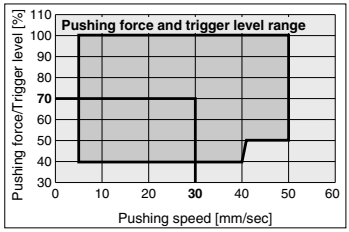
Gripping point distance: 30 mm

When the LEHZJ20 is selected.

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

Pushing speed: 30 mm/sec

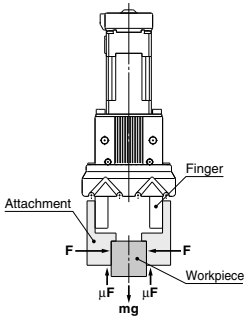
LEHZJ20



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

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

Calculation of required gripping force



When gripping a workpiece as in the figure to the left, and with the following definitions,

F: Gripping force (N)
μ: Coefficient of friction between the attachments and the workpiece
m: Workpiece mass (kg)
g: Gravitational acceleration (= 9.8 m/s^2)
mg: Workpiece weight (N)

the conditions under which the workpiece will not drop are

$$2 \times \mu F > mg$$

(2: Number of fingers)

and therefore,

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

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

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

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

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

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

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

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

Note)
- Even in cases where the coefficient of friction is greater than 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.

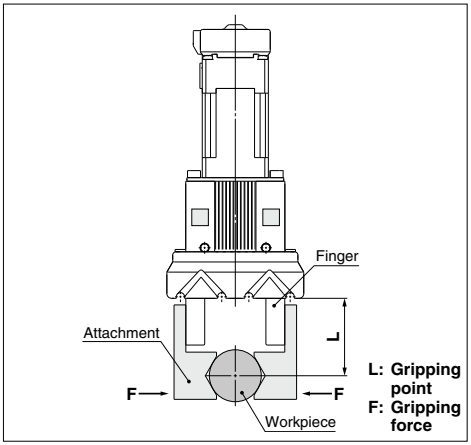
Selection Procedure

Step 1 Check the gripping force: LEHZJ Series

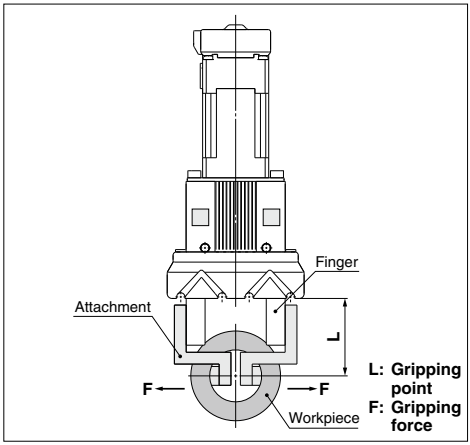
● **Indication of gripping force**
The gripping force shown in the graphs below is expressed as "F", which is the gripping force of one finger, when both fingers and attachments are in full contact with the workpiece as shown in the figure below.

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

External Gripping State



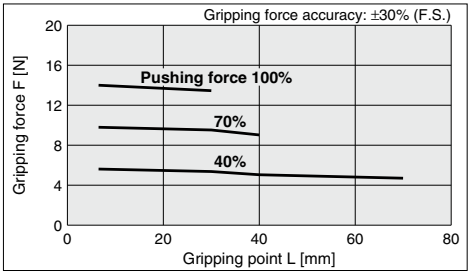
Internal Gripping State



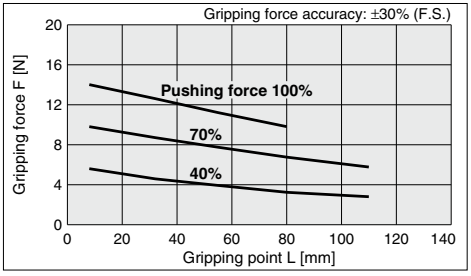
Basic

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

LEHZJ10



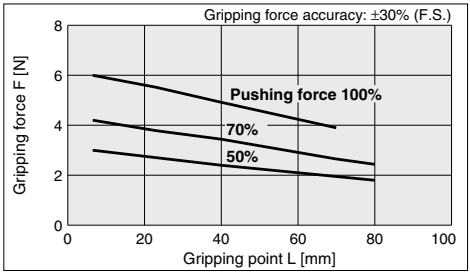
LEHZJ16



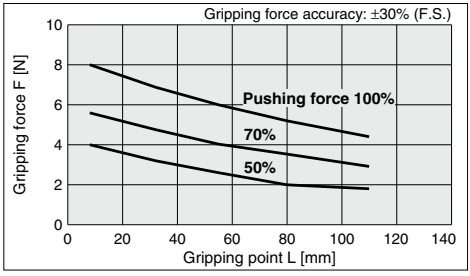
Compact

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

LEHZJ10L



LEHZJ16L



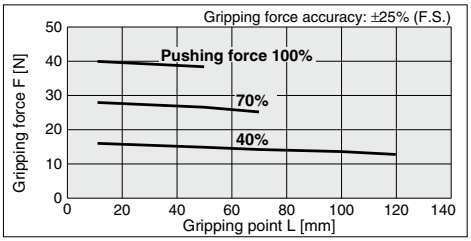
Selection Procedure

Step 1 Check the gripping force: LEHZJ Series

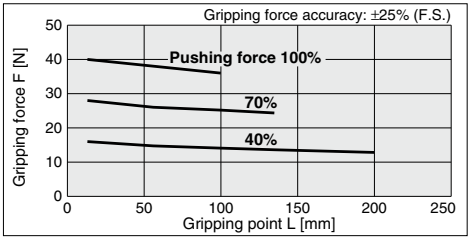
Basic

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

LEHZJ20



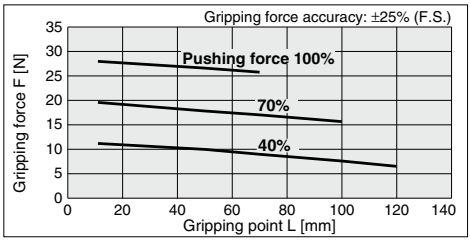
LEHZJ25



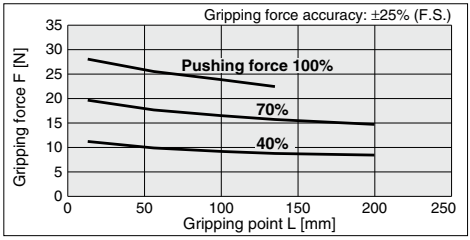
Compact

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

LEHZJ20L



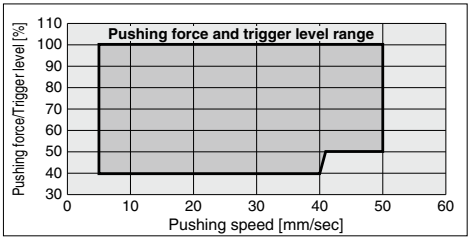
LEHZJ25L



Selection of Pushing Speed

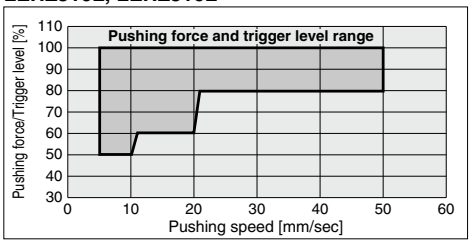
● Set the [Pushing force] and [Trigger level] within the range shown in the figure below.

Basic

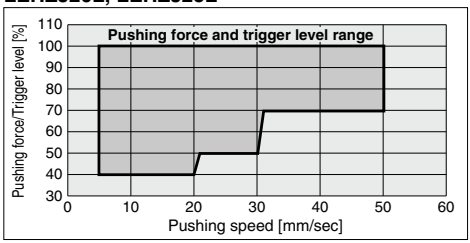


Compact

LEHZJ10L, LEHZJ16L



LEHZJ20L, LEHZJ25L

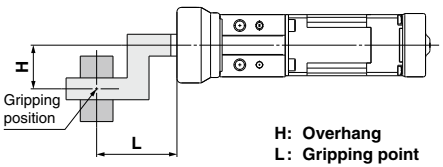


Selection Procedure

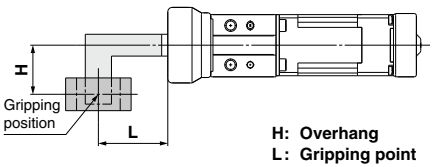
Step 2 Check the gripping point and overhang: LEHZJ Series

- 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



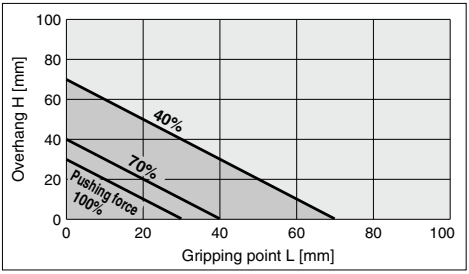
Internal Gripping State



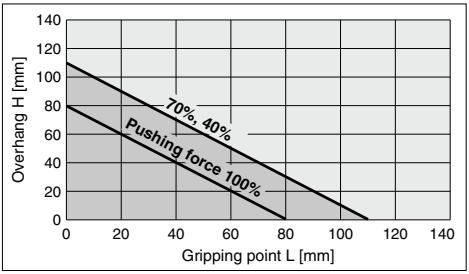
Basic

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

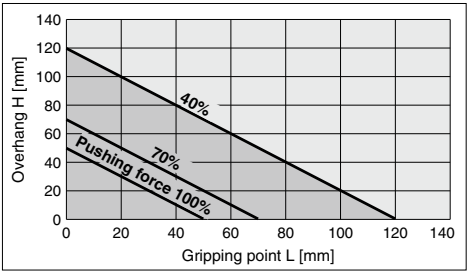
LEHZJ10



LEHZJ16



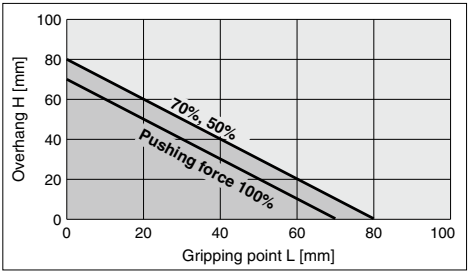
LEHZJ20



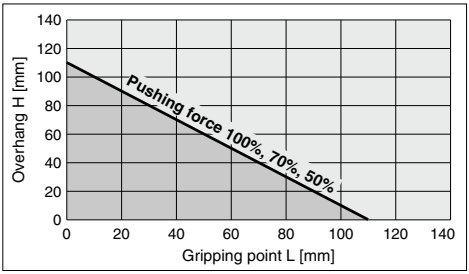
Compact

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

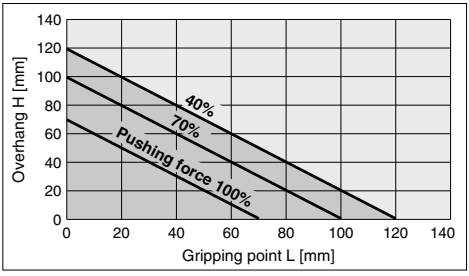
LEHZJ10L



LEHZJ16L



LEHZJ20L



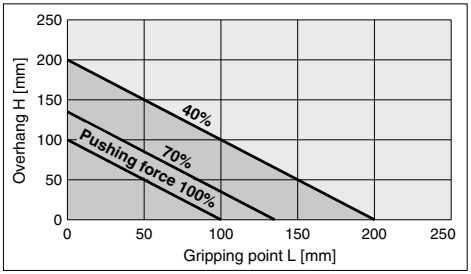
Selection Procedure

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

Basic

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

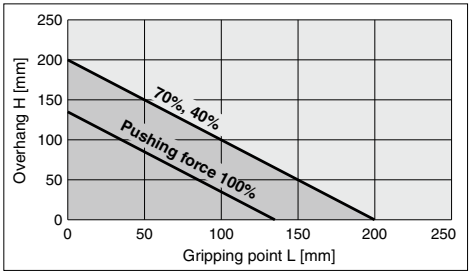
LEHZJ25



Compact

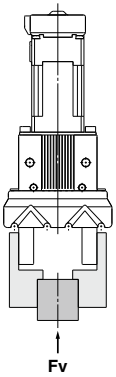
∗ Pushing force is one of the values of step data that is input into the controller.

LEHZJ25L

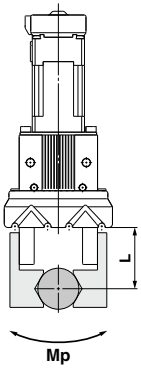


Selection Procedure

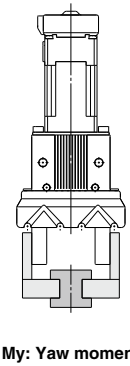
Step 3 Check the external force on fingers: LEHZJ Series

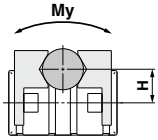


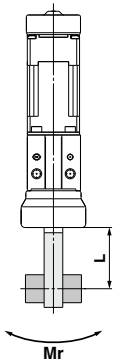
Fv: Allowable vertical load



Mp: Pitch 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] = $\frac{\text{M (Static allowable moment) [N·m]}}{\text{L} \times 10^{-3} *}$ (* 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 LEHZJ16K2-6 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/ With Dust Cover

LEHZJ Series LEHZJ10, 16, 20, 25

Applicable to the LEC□ series

Refer to page 453-1 for the communication protocols EtherCAT®, EtherNet/IP™, PROFINET, DeviceNet™, and IO-Link.

How to Order

LEHZ J 10 □ K 2 – 4 □ □ – S1 6N 1 □

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿ ⓫ ⓬

❶ Dust cover

J	With dust cover

❷ Size

10
16
20
25

❸ Motor size

Nil	Basic
L	Compact

❹ Lead

K	Basic

❺ 2-finger type

❻ Stroke [mm]

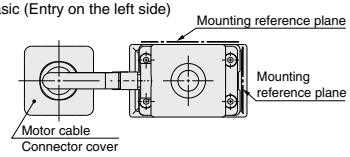
Stroke/both sides	Size
4	10
6	16
10	20
14	25

❼ Dust cover type

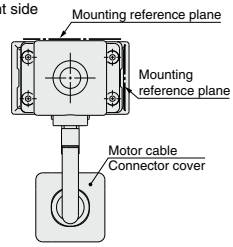
Nil	Chloroprene rubber (CR)
K	Fluororubber (FKM)
S	Silicone rubber (Si)

❽ Motor cable entry

Nil Basic (Entry on the left side)



F Entry on the front side



⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEH series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result, it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.

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

[UL-compliant products]

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

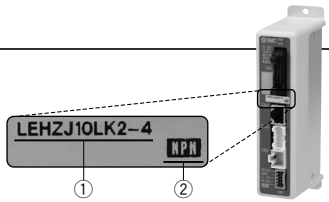
The actuator and controller/driver are sold as a package.

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

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.

② Check Parallel I/O configuration matches (NPN or PNP).



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



⑨ Actuator cable type/length

Nil	Without cable
S1	Standard cable 1.5 m
S3	Standard cable 3 m
S5	Standard cable 5 m
R1	Robotic cable 1.5 m
R3	Robotic cable 3 m
R5	Robotic cable 5 m
R8	Robotic cable 8 m*1
RA	Robotic cable 10 m*1
RB	Robotic cable 15 m*1
RC	Robotic cable 20 m*1

*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.

⑩ Controller/Driver type*1

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

*1 For details about controller/driver and compatible motor, refer to the compatible controller/driver below.
*2 Not applicable to CE.
*3 When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-□) on page 596 separately.

⑪ I/O cable length*1, Communication plug

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

*1 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected. Refer to page 568 (For LECP6), page 582 (For LECP1) or page 596 (For LECPA) if I/O cable is required.
*2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.
*3 For the LECPMJ, only "Nil", "S" and "T" are selectable since I/O cable is not included.

⑫ Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately.

Compatible Controller/Driver

Type	**Step data input type** 	**CC-Link direct input type** 	**Programless type** 	**Pulse input type** 
Series	**LECP6**	**LECPMJ**	**LECP1**	**LECPA**
Features	Value (Step data) input Standard controller	CC-Link direct input	Capable of setting up operation (step data) without using a PC or teaching box	Operation by pulse signals
Compatible motor	Step motor (Servo/24 VDC)			
Maximum number of step data	64 points		14 points	—
Power supply voltage	24 VDC			
Reference page	Page 560	Page 600	Page 576	Page 590

Step Motor (Servo/24 VDC)

Electric Gripper 2-Finger Type/ With Dust Cover

LEHZJ Series LEHZJ10, 16, 20, 25

Applicable to the JXC□ series

CE cULus RoHS

How to Order

Refer to page 452 for the communication protocol CC-Link.

LEHZ J 10 □ K 2 – 4 □ □ – R1 CD17T

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

❶ Dust cover

J	With dust cover

❷ Size

10
16
20
25

❸ Motor size

Nil	Basic
L	Compact

❹ Lead

K	Basic

❺ 2-finger type

❻ Stroke [mm]

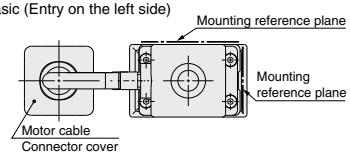
Stroke/both sides	Size
4	10
6	16
10	20
14	25

❼ Dust cover type

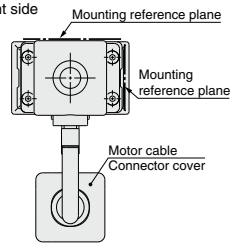
Nil	Chloroprene rubber (CR)
K	Fluororubber (FKM)
S	Silicone rubber (Si)

❽ Motor cable entry

Nil — Basic (Entry on the left side)



F — Entry on the front side



⚠Caution

[CE-compliant products]

EMC compliance was tested by combining the electric actuator LE series and the JXCE1/91/P1/D1/L1 series.

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



⑨ Actuator cable type/length

Nil	Without cable
S1	Standard cable 1.5 m
S3	Standard cable 3 m
S5	Standard cable 5 m
R1	Robotic cable 1.5 m
R3	Robotic cable 3 m
R5	Robotic cable 5 m
R8	Robotic cable 8 m*1
RA	Robotic cable 10 m*1
RB	Robotic cable 15 m*1
RC	Robotic cable 20 m*1

*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.

⑩ Controller

Nil	Without controller
C□1□□	With controller

C D 1 7 T

Communication protocol

E	EtherCAT®
9	EtherNet/IP™
P	PROFINET
D	DeviceNet™
L	IO-Link

For single axis

Communication plug connector for DeviceNet™

Nil	Without plug connector
S	Straight type
T	T-branch type

* Select "Nil" for anything other than DeviceNet™.

Mounting

7	Screw mounting
8*	DIN rail

* DIN rail is not included. It must be ordered separately. (Page 603-8)

Compatible Controller

Type	EtherCAT® direct input type 	EtherNet/IP™ direct input type 	PROFINET direct input type 	DeviceNet™ direct input type 	IO-Link direct input type 
Series	**JXCE1**	**JXC91**	**JXCP1**	**JXCD1**	**JXCL1**
Features	EtherCAT® direct input	EtherNet/IP™ direct input	PROFINET direct input	DeviceNet™ direct input	IO-Link direct input
Compatible motor	Step motor (Servo/24 VDC)				
Maximum number of step data	64 points				
Power supply voltage	24 VDC				
Reference page	Page 603-5				



Specifications

Model			LEHZJ10	LEHZJ16	LEHZJ20	LEHZJ25
Actuator specifications	Open and close stroke/both sides [mm]		4	6	10	14
	Lead [mm]		251/73 (3.438)	249/77 (3.234)	246/53 (4.642)	243/48 (5.063)
	Gripping force [N] Note 1) Note 3)	Basic	6 to 14		16 to 40	
		Compact	3 to 6	4 to 8	11 to 28	
	Open and close speed/Pushing speed [mm/s] 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)			
	Repeated length measurement accuracy [mm] Note 4)		±0.05			
	Finger backlash/ one side [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	170	230	440	610
		Compact	140	200	375	545
Electric specifications	Motor size		□20		□28	
	Motor type		Step motor (Servo/24 VDC)			
	Encoder		Incremental A/B phase (800 pulse/rotation)			
	Rated voltage [V]		24 VDC ±10%			
	Power consumption/ Standby power consumption when operating [W] Note 9)	Basic	11/7		28/15	
		Compact	8/7		22/12	
	Max. instantaneous power consumption [W] Note 10)	Basic	19		51	
		Compact	14		42	

Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Moving force should be 150% when releasing the workpiece. Gripping force accuracy should be ±30% (F.S.) for LEHZJ10/16 and ±25% (F.S.) for LEHZJ20/25. 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 open/close speed and pushing speed are for both fingers. The speed for one finger is half this value.

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

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

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

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

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

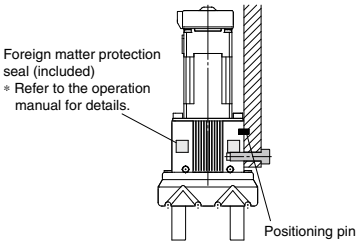
Note 8) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.) Vibration resistance: No malfunction occurred in a test ranging between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

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

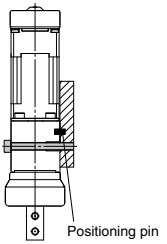
Note 10) The maximum instantaneous power consumption (including the controller) is for when the gripper is operating. This value can be used for the selection of the power supply.

How to Mount

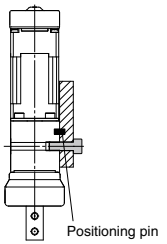
a) When using the thread on the side of the body



b) When using the thread on the mounting plate

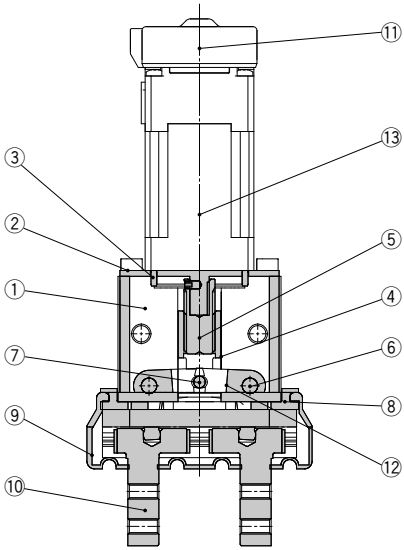


c) When using the thread on the back of the body



Construction

LEHZJ Series



Component Parts

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

Replacement Parts

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

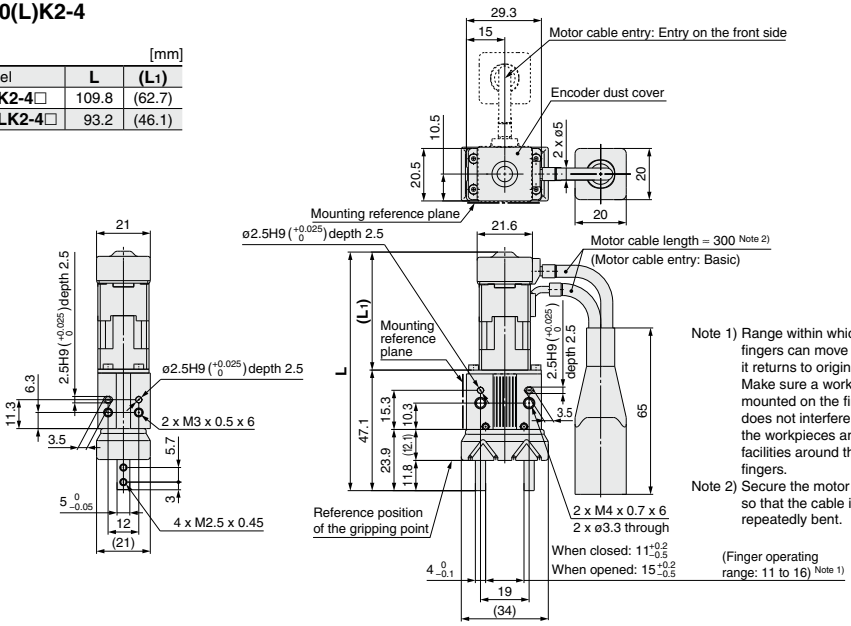
∗ The dust cover is a consumable part. Please replace as necessary.

Dimensions

LEHZJ10(L)K2-4

[mm]

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



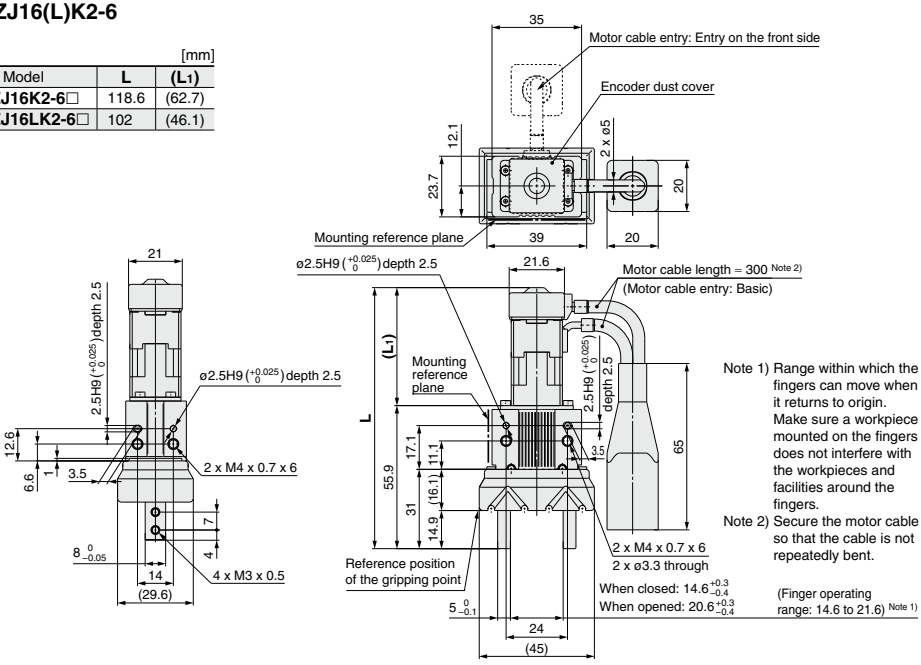
Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

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.

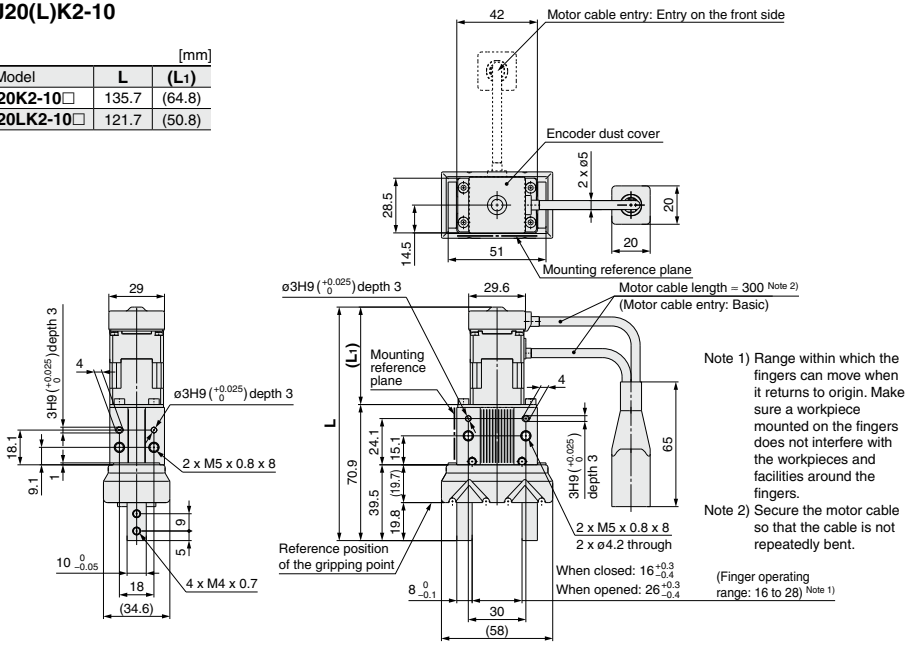
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

Dimensions

LEHZJ20(L)K2-10

[mm]

Model	L	(L_1)
LEHZJ20K2-10□	135.7	(64.8)
LEHZJ20LK2-10□	121.7	(50.8)



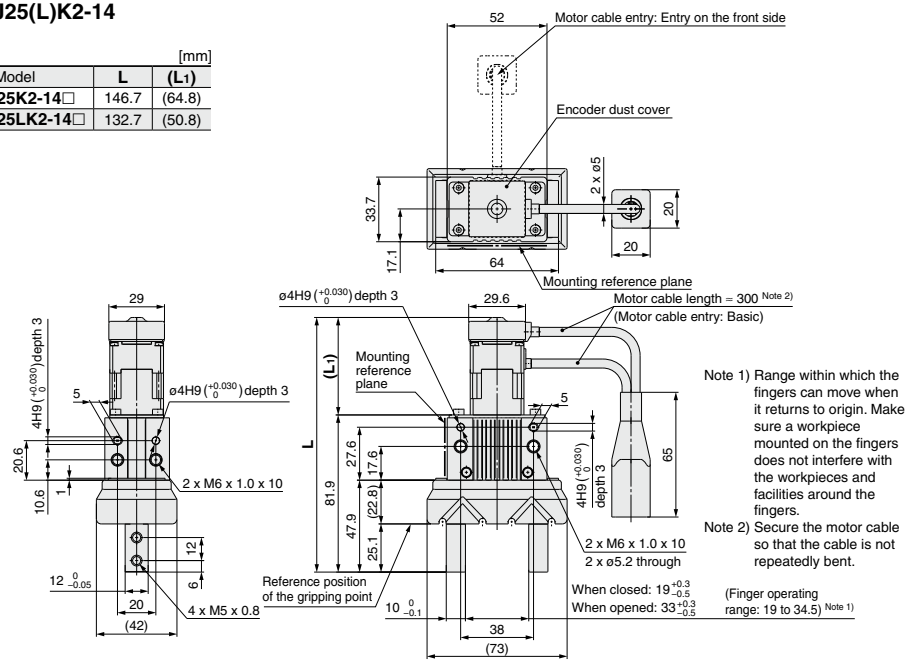
Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.

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

LEHZJ25(L)K2-14

[mm]

Model	L	(L_1)
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.

Model Selection



LEHF Series ▶ Pages 462, 463-1

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.

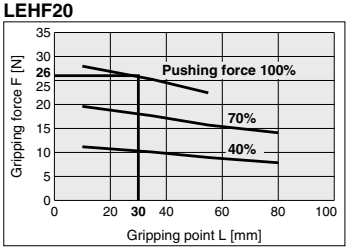
Example) When it is desired to set the gripping force at 20 times or more above the workpiece weight.

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

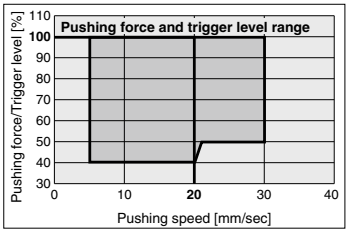


When the LEHF20 is selected.

- 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

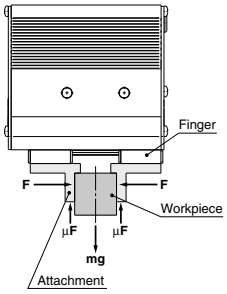
LEHF20



- 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

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

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.

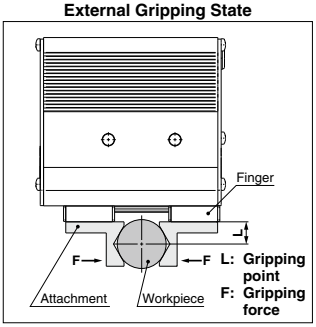
Note) • Even in cases where the coefficient of friction is greater than μ = 0.2, for reasons of safety, select a gripping force which is at least 10 to 20 times greater than the workpiece weight, as recommended by SMC.
• If high acceleration or impact forces are encountered during motion, a further margin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

Selection Procedure

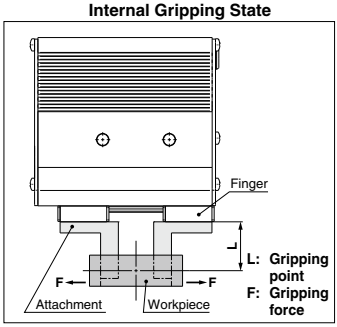
Step 1 Check the gripping force: LEHF Series

- **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.

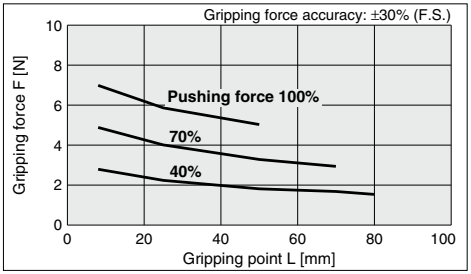
External Gripping State



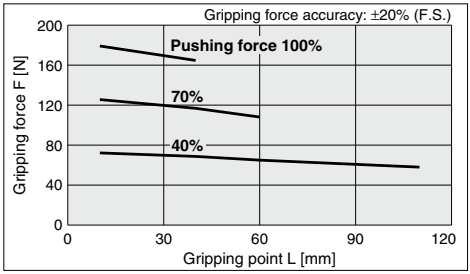
Internal Gripping State



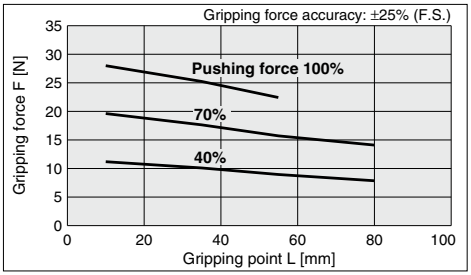
LEHF10



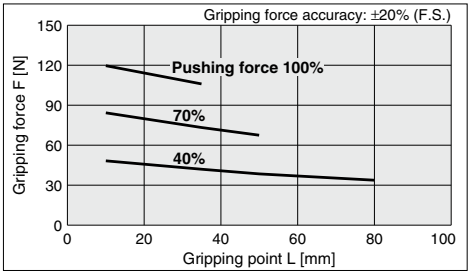
LEHF40



LEHF20

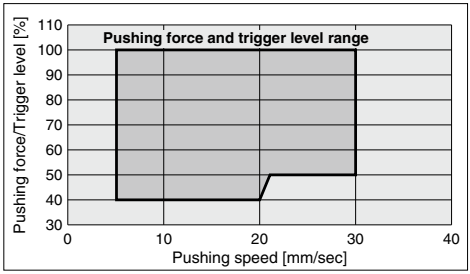


LEHF32



Selection of Pushing Speed

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



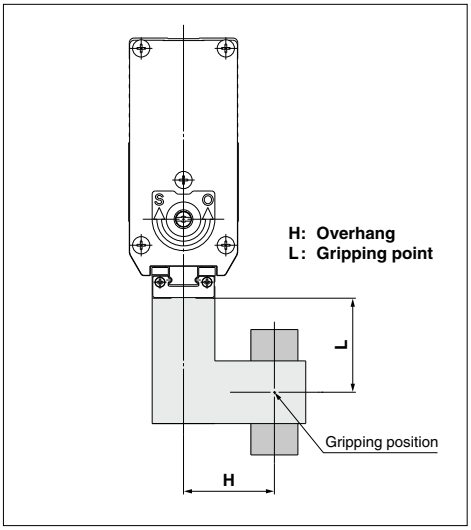
∗ Pushing force is one of the values of step data that is input into the controller.

Selection Procedure

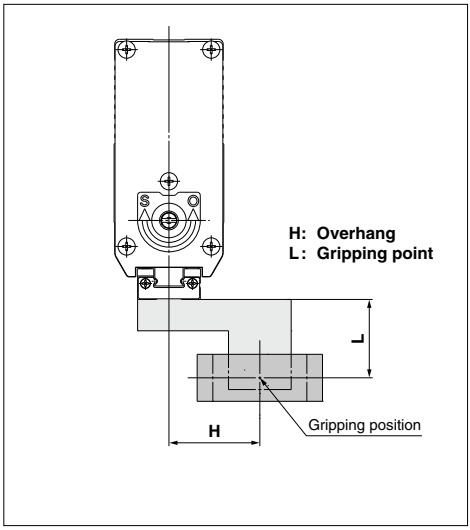
Step 2 Check the gripping point and overhang: LEHF Series

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

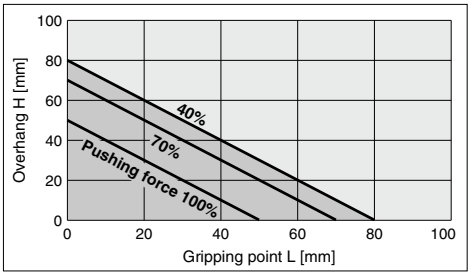
External Gripping State



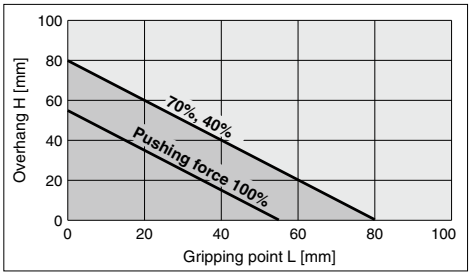
Internal Gripping State



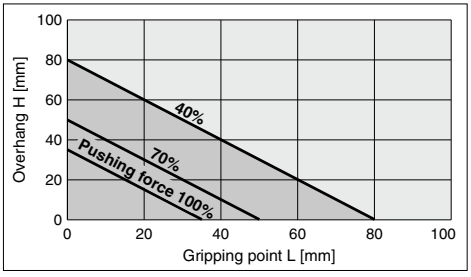
LEHF10



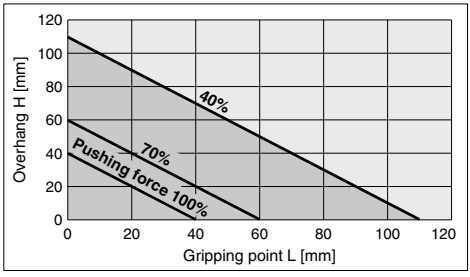
LEHF20



LEHF32



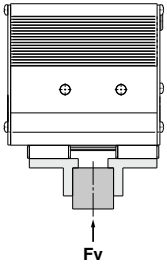
LEHF40



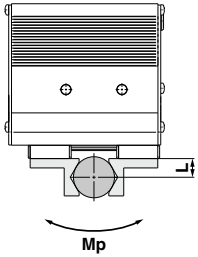
∗ Pushing force is one of the values of step data that is input into the controller.

Selection Procedure

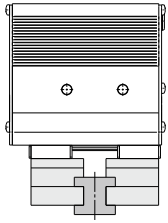
Step 3 **Check the external force on fingers: LEHF Series**



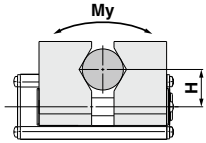
Fv: Allowable vertical load

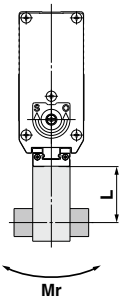


Mp: Pitch moment



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

LEHF Series LEHF10, 20, 32, 40

Applicable to the LEC□ series

Refer to page 463-1 for the communication protocols EtherCAT®, EtherNet/IP™, PROFINET, DeviceNet™, and IO-Link.

How to Order

LEHF 10 K 2 – 16 □ – S1 6N 1 □

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾

❶ Size

10
20
32
40

❷ Lead

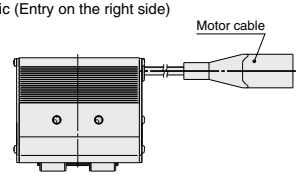
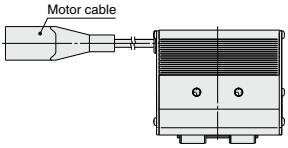
K	Basic

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

Nil	Basic (Entry on the right side) 
L	Entry on the left side 

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEH series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result, it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.

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

[UL-compliant products]

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

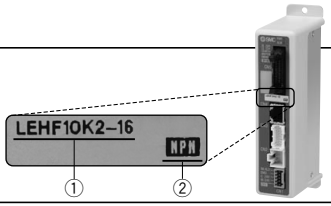
The actuator and controller/driver are sold as a package.

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

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.

② Check Parallel I/O configuration matches (NPN or PNP).



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



⑥ Actuator cable type/length

Nil	Without cable
S1	Standard cable 1.5 m
S3	Standard cable 3 m
S5	Standard cable 5 m
R1	Robotic cable 1.5 m
R3	Robotic cable 3 m
R5	Robotic cable 5 m
R8	Robotic cable 8 m*1
RA	Robotic cable 10 m*1
RB	Robotic cable 15 m*1
RC	Robotic cable 20 m*1

*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.

⑦ Controller/Driver type*1

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

*1 For details about controller/driver and compatible motor, refer to the compatible controller/driver below.
*2 Not applicable to CE.
*3 When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-□) on page 596 separately.

⑧ I/O cable length*1, Communication plug

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

*1 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected. Refer to page 568 (For LECP6), page 582 (For LECP1) or page 596 (For LECPA) if I/O cable is required.
*2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.
*3 For the LECPMJ, only "Nil", "S" and "T" are selectable since I/O cable is not included.

⑨ Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately.

Compatible Controller/Driver

Type	**Step data input type** 	**CC-Link direct input type** 	**Programless type** 	**Pulse input type** 
Series	**LECP6**	**LECPMJ**	**LECP1**	**LECPA**
Features	Value (Step data) input Standard controller	CC-Link direct input	Capable of setting up operation (step data) without using a PC or teaching box	Operation by pulse signals
Compatible motor	Step motor (Servo/24 VDC)			
Maximum number of step data	64 points		14 points	—
Power supply voltage	24 VDC			
Reference page	Page 560	Page 600	Page 576	Page 590

Step Motor (Servo/24 VDC)

Electric Gripper 2-Finger Type

LEHF Series LEHF10, 20, 32, 40

Applicable to the JXC□ series

RoHS

How to Order

Refer to page 462 for the communication protocol CC-Link.

LEHF **10** **K** **2** – **16** **□** – **R1** **CD17T**

❶ ❷ ❸ ❹ ❺ ❻ ❼

❶ Size

10
20
32
40

❷ Lead

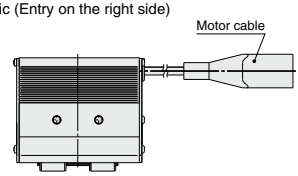
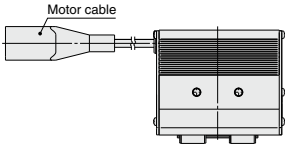
K	Basic

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

Nil	Basic (Entry on the right side) 
L	Entry on the left side 

⚠Caution

[CE-compliant products]

EMC compliance was tested by combining the electric actuator LE series and the JXCE1/91/P1/D1/L1 series.

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



❻ Actuator cable type/length

Nil	Without cable
S1	Standard cable 1.5 m
S3	Standard cable 3 m
S5	Standard cable 5 m
R1	Robotic cable 1.5 m
R3	Robotic cable 3 m
R5	Robotic cable 5 m
R8	Robotic cable 8 m*1
RA	Robotic cable 10 m*1
RB	Robotic cable 15 m*1
RC	Robotic cable 20 m*1

*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.

❼ Controller

Nil	Without controller
C□1□□	With controller

C D 1 7 T

Communication protocol

E	EtherCAT®
9	EtherNet/IP™
P	PROFINET
D	DeviceNet™
L	IO-Link

For single axis

Communication plug connector for DeviceNet™

Nil	Without plug connector
S	Straight type
T	T-branch type

* Select "Nil" for anything other than DeviceNet™.

Mounting

7	Screw mounting
8*	DIN rail

* DIN rail is not included. It must be ordered separately. (Page 603-8)

Compatible Controller

Type	EtherCAT® direct input type	EtherNet/IP™ direct input type	PROFINET direct input type	DeviceNet™ direct input type	IO-Link direct input type
					
Series	**JXCE1**	**JXC91**	**JXCP1**	**JXCD1**	**JXCL1**
Features	EtherCAT® direct input	EtherNet/IP™ direct input	PROFINET direct input	DeviceNet™ direct input	IO-Link direct input
Compatible motor	Step motor (Servo/24 VDC)				
Maximum number of step data	64 points				
Power supply voltage	24 VDC				
Reference page	Page 603-5				



Specifications

Model			LEHF10	LEHF20	LEHF32	LEHF40
Actuator specifications	Open and close stroke/both sides [mm]	Basic	16	24	32	40
		Long stroke	32	48	64	80
	Lead [mm]		40/15 (2.667)	50/15 (3.333)	70/16 (4.375)	70/16 (4.375)
	Gripping force [N] Note 1) Note 3)		3 to 7	11 to 28	48 to 120	72 to 180
	Open and close 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/one side [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 A/B phase (800 pulse/rotation)			
	Rated voltage [V]		24 VDC ±10%			
	Power consumption/Standby power consumption when operating [W] Note 9)		11/7	28/15	34/13	36/13
	Max. instantaneous power consumption [W] Note 10)		19	51	57	61

Note 1) Gripping force should be from 10 to 20 times the workpiece weight. Moving force should be 150% when releasing the workpiece. Gripping force accuracy should be ±30% (F.S.) for LEHF10, ±25% (F.S.) for LEHF20 and ±20% (F.S.) for LEHF32/40. 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 open/close speed and pushing speed are for both fingers. The speed for one finger is half this value.

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

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

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

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

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

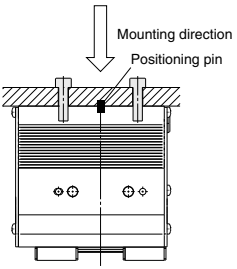
Note 8) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between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

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

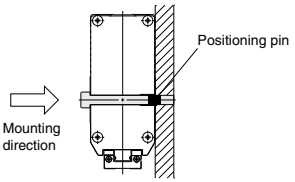
Note 10) The maximum instantaneous power consumption (including the controller) is for when the gripper is operating. This value can be used for the selection of the power supply.

How to Mount

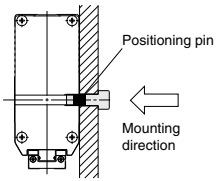
a) When using the thread on the body



b) When using the thread on the mounting plate

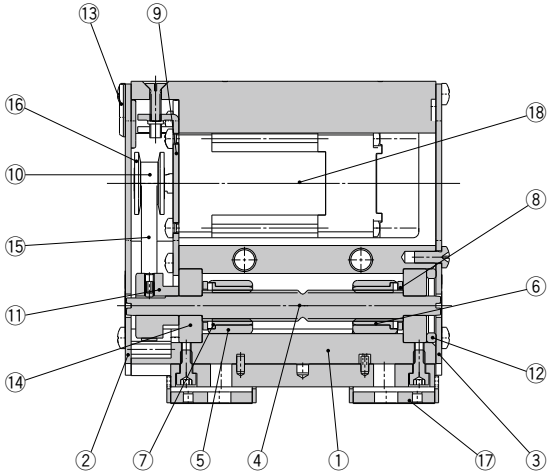


c) When using the thread on the back of the body



Construction

LEHF Series

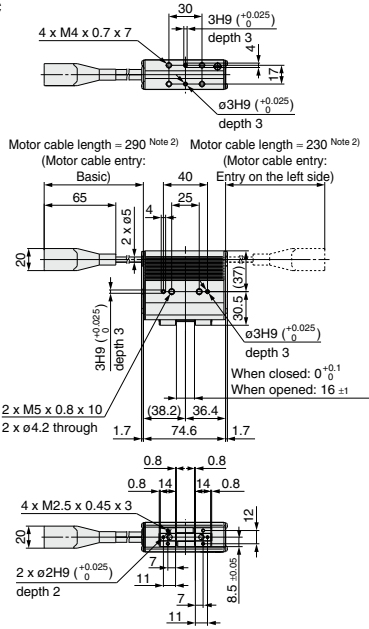


Component Parts

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

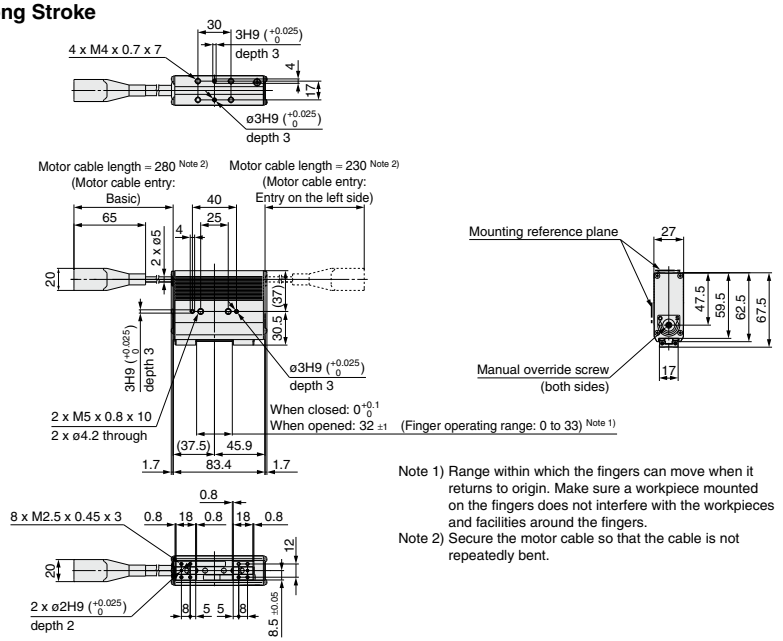
Dimensions

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.

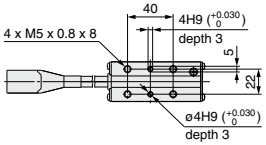
LEHF10K2-32: Long Stroke

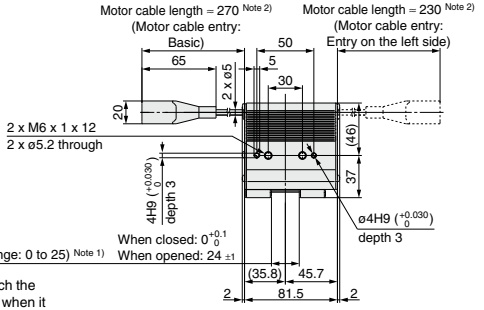


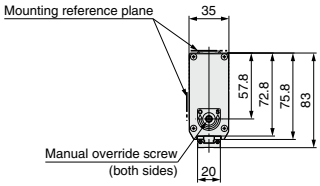
Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

Dimensions

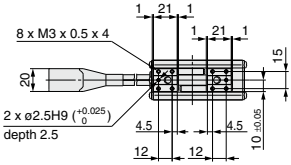
LEHF20K2-24: Basic



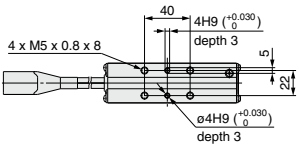


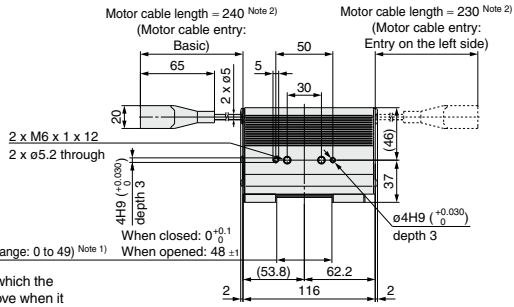


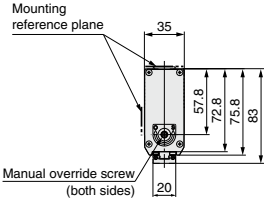
Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.



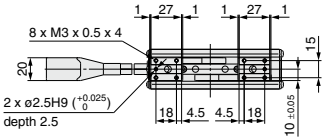
LEHF20K2-48: Long Stroke





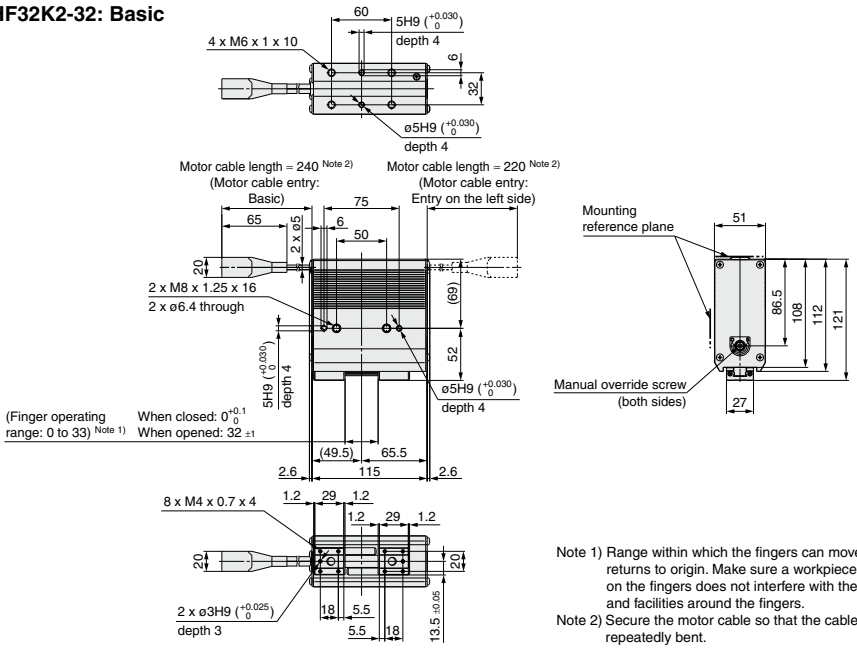


Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.



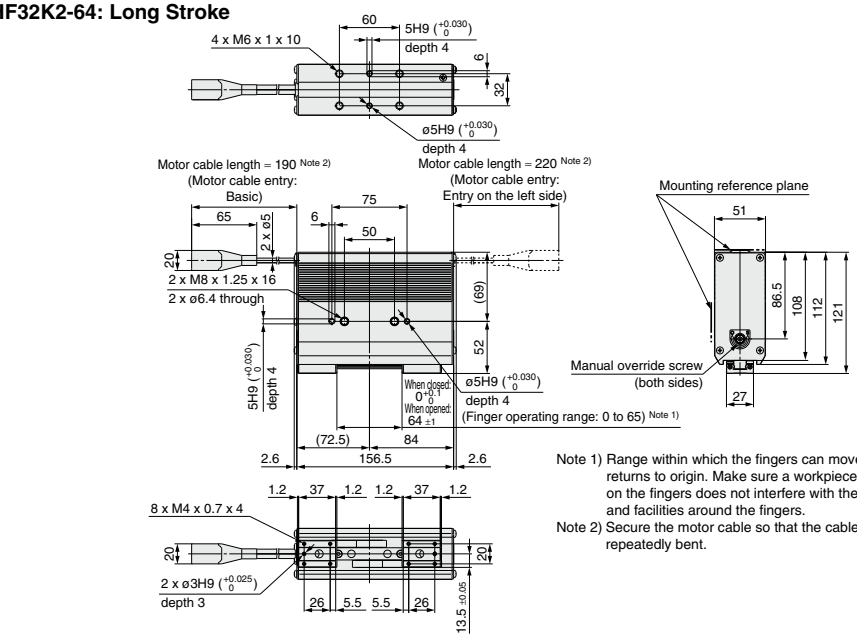
Dimensions

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.

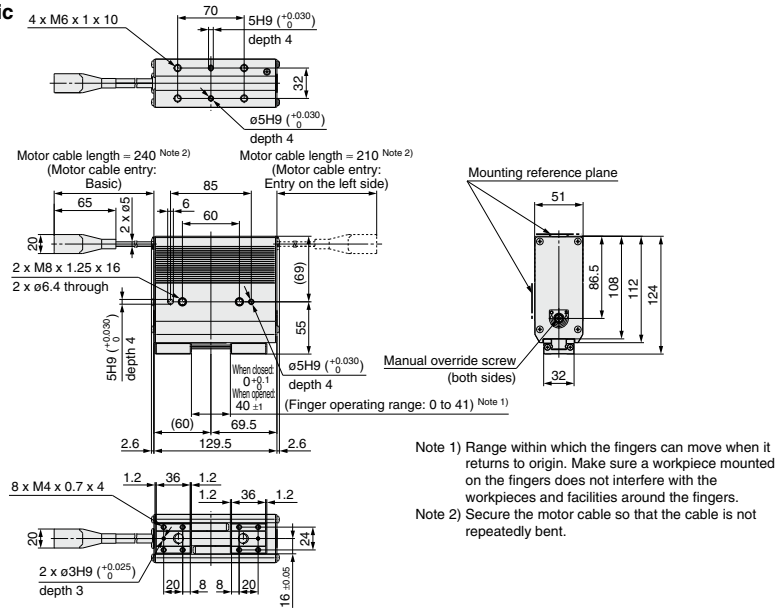
LEHF32K2-64: Long Stroke



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.

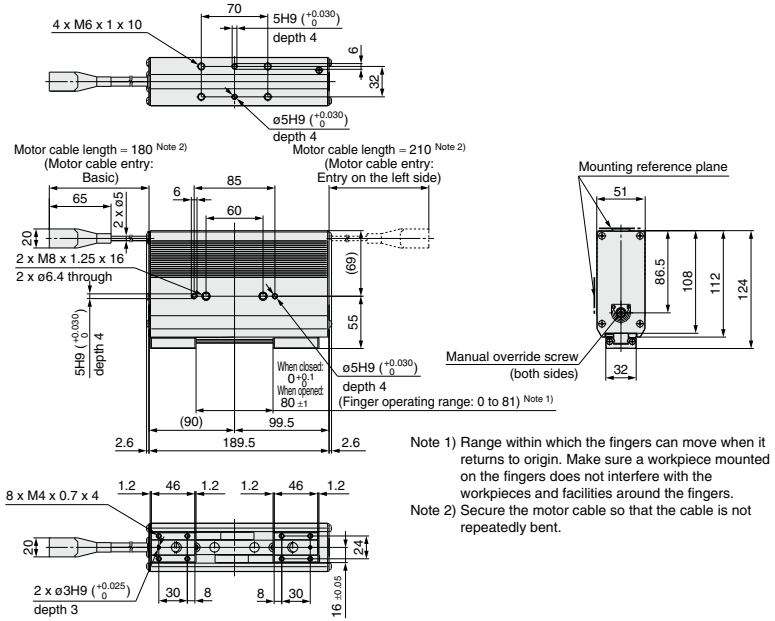
Dimensions

LEHF40K2-40: Basic



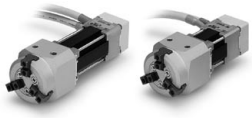
Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

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



LEHS Series ▶ Pages 474, 475-1

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.

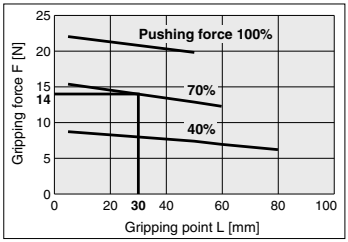
Example) When it is desired to set the gripping force at 13 times or more above the workpiece weight.

Required gripping force
= 0.1 kg x 13 x 9.8 m/s² = 12.7 N or more

Pushing force: 70%

Gripping point distance: 30 mm

LEHS20

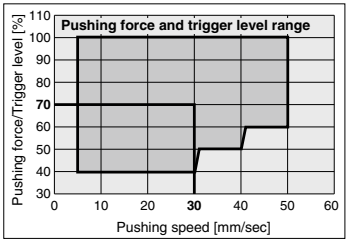


When the LEHS20 is selected.

- 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

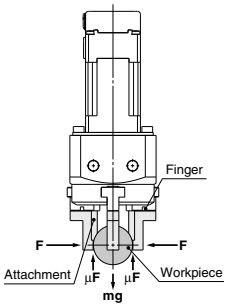
LEHS20



- 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/s²)
mg: Workpiece weight (N)

the conditions under which the workpiece will not drop are

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

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.

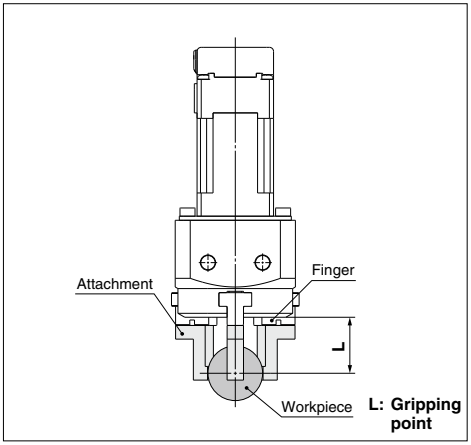
Selection Procedure

Step Check the gripping force: LEHS Series

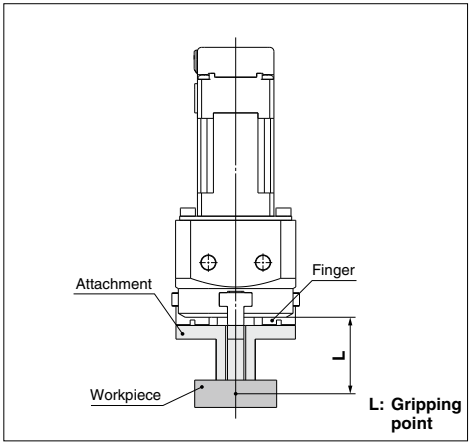
● **Indication of gripping force**
The gripping force shown in the graphs on page 473 is expressed as "F", which is the gripping force of one finger, when three fingers and attachments are in full contact with the workpiece as shown in the figure below.

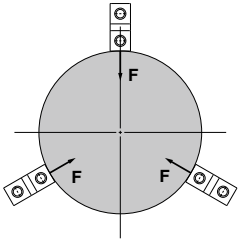
● Set the workpiece gripping point "L" so that it is within the range shown in the figure below.

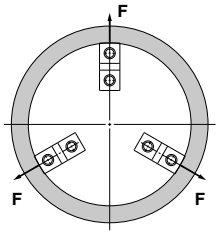
External Gripping State



Internal Gripping State







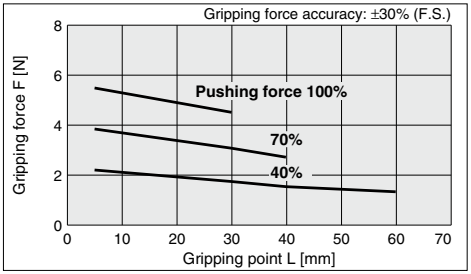
Selection Procedure

Step **Check the gripping force: LEHS Series**

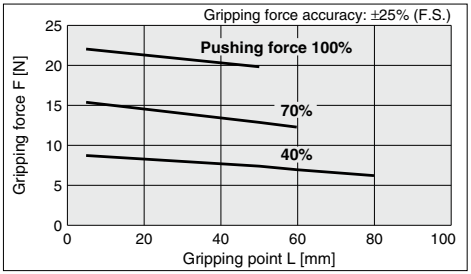
Basic

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

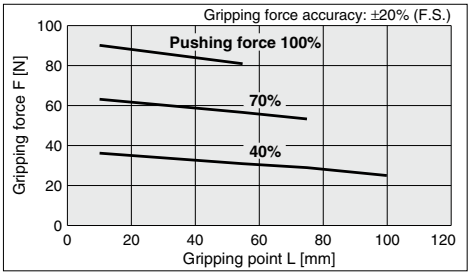
LEHS10



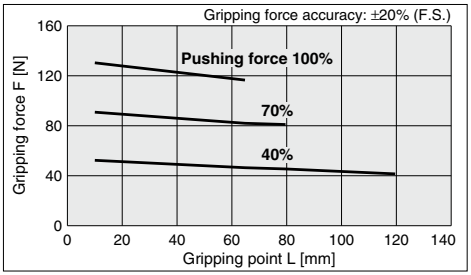
LEHS20



LEHS32



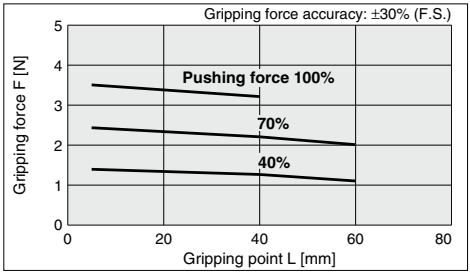
LEHS40



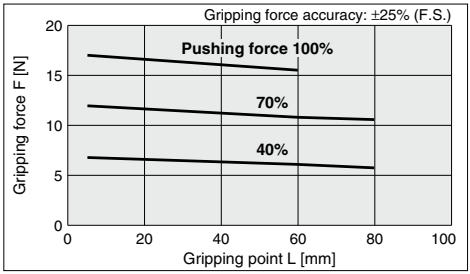
Compact

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

LEHS10L



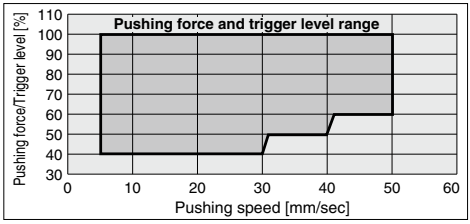
LEHS20L



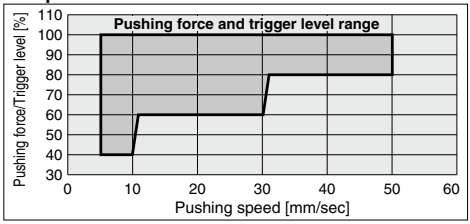
Selection of Pushing Speed

● 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

LEHS Series LEHS10, 20, 32, 40

Applicable to the LEC□ series

RoHS

Refer to page 475-1 for the communication protocols EtherCAT®, EtherNet/IP™, PROFINET, DeviceNet™, and IO-Link.

How to Order

LEHS 10 □ K 3 – 4 □ – S1 6N 1 □

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿

❶ Size

10
20
32
40

❷ Motor size

Nil	Basic
L Note)	Compact

Note) Size: 10, 20 only

❸ Lead

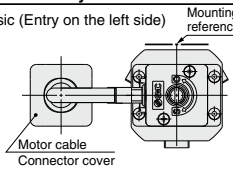
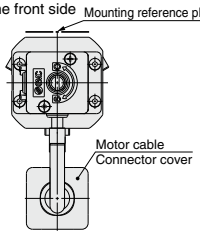
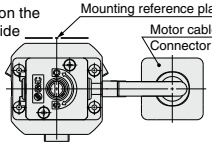
K	Basic

❹ 3-finger type

❺ Stroke [mm]

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

❻ Motor cable entry

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

⚠Caution

[CE-compliant products]

① EMC compliance was tested by combining the electric actuator LEH series and the controller LEC series.
The EMC depends on the configuration of the customer's control panel and the relationship with other electrical equipment and wiring. Therefore, conformity to the EMC directive cannot be certified for SMC components incorporated into the customer's equipment under actual operating conditions. As a result, it is necessary for the customer to verify conformity to the EMC directive for the machinery and equipment as a whole.

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

[UL-compliant products]

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

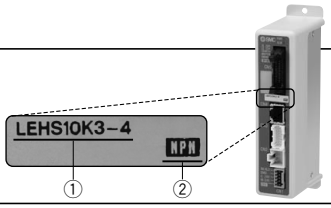
The actuator and controller/driver are sold as a package.

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

<Check the following before use.>

① Check the actuator label for model number. This matches the controller/driver.

② Check Parallel I/O configuration matches (NPN or PNP).



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

SMC



❼ Actuator cable type/length

Nil	Without cable
S1	Standard cable 1.5 m
S3	Standard cable 3 m
S5	Standard cable 5 m
R1	Robotic cable 1.5 m
R3	Robotic cable 3 m
R5	Robotic cable 5 m
R8	Robotic cable 8 m*1
RA	Robotic cable 10 m*1
RB	Robotic cable 15 m*1
RC	Robotic cable 20 m*1

*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.

❽ Controller/Driver type*1

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

*1 For details about controller/driver and compatible motor, refer to the compatible controller/driver below.
*2 Not applicable to CE.
*3 When pulse signals are open collector, order the current limiting resistor (LEC-PA-R-□) on page 596 separately.

❾ I/O cable length*1, Communication plug

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

*1 When "Without controller/driver" is selected for controller/driver types, I/O cable cannot be selected. Refer to page 568 (For LECP6), page 582 (For LECP1) or page 596 (For LECPA) if I/O cable is required.
*2 When "Pulse input type" is selected for controller/driver types, pulse input usable only with differential. Only 1.5 m cables usable with open collector.
*3 For the LECPMJ, only "Nil", "S" and "T" are selectable since I/O cable is not included.

❿ Controller/Driver mounting

Nil	Screw mounting
D	DIN rail mounting*

* DIN rail is not included. Order it separately.

Compatible Controller/Driver

Type	**Step data input type** 	**CC-Link direct input type** 	**Programless type** 	**Pulse input type** 
Series	**LECP6**	**LECPMJ**	**LECP1**	**LECPA**
Features	Value (Step data) input Standard controller	CC-Link direct input	Capable of setting up operation (step data) without using a PC or teaching box	Operation by pulse signals
Compatible motor	Step motor (Servo/24 VDC)			
Maximum number of step data	64 points		14 points	—
Power supply voltage	24 VDC			
Reference page	Page 560	Page 600	Page 576	Page 590

Step Motor (Servo/24 VDC)

Electric Gripper 3-Finger Type

LEHS Series LEHS10, 20, 32, 40

Applicable to the JXC□ series

RoHS

How to Order

Refer to page 474 for the communication protocol CC-Link.

LEHS 10 □ K 3 – 4 □ – R1 CD17T

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽

❶ Size

10
20
32
40

❷ Motor size

Nil	Basic
L Note)	Compact

Note) Size: 10, 20 only

❸ Lead

K	Basic

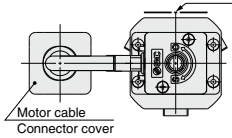
❹ 3-finger type

❺ Stroke [mm]

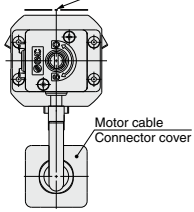
Stroke/diameter	Size
4	10
6	20
8	32
12	40

❻ Motor cable entry

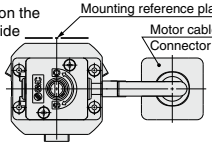
Nil — Basic (Entry on the left side)



F — Entry on the front side



R — Entry on the right side



⚠Caution

[CE-compliant products]

EMC compliance was tested by combining the electric actuator LE series and the JXCE1/91/P1/D1/L1 series.

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



❼ Actuator cable type/length

Nil	Without cable
S1	Standard cable 1.5 m
S3	Standard cable 3 m
S5	Standard cable 5 m
R1	Robotic cable 1.5 m
R3	Robotic cable 3 m
R5	Robotic cable 5 m
R8	Robotic cable 8 m*1
RA	Robotic cable 10 m*1
RB	Robotic cable 15 m*1
RC	Robotic cable 20 m*1

*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.

❽ Controller

Nil	Without controller
C□1□□	With controller

C D 1 7 T

Communication protocol

E	EtherCAT®
9	EtherNet/IP™
P	PROFINET
D	DeviceNet™
L	IO-Link

For single axis

Mounting

7	Screw mounting
8*	DIN rail

* DIN rail is not included. It must be ordered separately. (Page 603-8)

Communication plug connector for DeviceNet™

Nil	Without plug connector
S	Straight type
T	T-branch type

* Select "Nil" for anything other than DeviceNet™.

Compatible Controller

Type	EtherCAT® direct input type 	EtherNet/IP™ direct input type 	PROFINET direct input type 	DeviceNet™ direct input type 	IO-Link direct input type 
Series	**JXCE1**	**JXC91**	**JXCP1**	**JXCP1**	**JXCL1**
Features	EtherCAT® direct input	EtherNet/IP™ direct input	PROFINET direct input	DeviceNet™ direct input	IO-Link direct input
Compatible motor	Step motor (Servo/24 VDC)				
Maximum number of step data	64 points				
Power supply voltage	24 VDC				
Reference page	Page 603-5				



Specifications

	Model		LEHS10	LEHS20	LEHS32	LEHS40
Actuator specifications	Open and close stroke/diameter [mm]		4	6	8	12
	Lead [mm]		255/76 (3.355)	235/56 (4.196)	235/40 (5.875)	235/40 (5.875)
	Gripping force [N] 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	—	—
	Open and close 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/radius [mm] Note 5)		0.25 or less			
	Repeatability [mm] Note 6)		±0.02			
	Positioning repeatability/radius [mm]		±0.05			
	Lost motion/radius [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 A/B phase (800 pulse/rotation)			
	Rated voltage [V]		24 VDC ±10%			
	Power consumption/ Standby power consumption when operating [W] Note 9)	Basic	11/7	28/15	34/13	36/13
		Compact	8/7	22/12	—	—
	Max. instantaneous power consumption [W] Note 10)	Basic	19	51	57	61
		Compact	14	42	—	—

Note 1) Gripping force should be from 7 to 13 times the workpiece weight. Moving force should be 150% when releasing the workpiece. Gripping force accuracy should be ±30% (F.S.) for LEHS10, ±25% (F.S.) for LEHS20 and ±20% (F.S.) for LEHS32/40. 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 open/close speed and pushing speed are for both fingers. The speed for one finger is half this value.

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

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

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

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

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

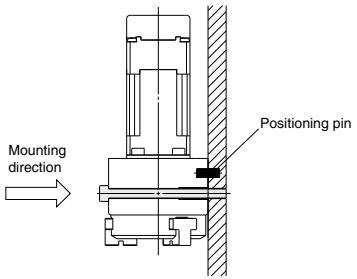
Note 8) Impact resistance: No malfunction occurred when the gripper was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (Test was performed with the gripper in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between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

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

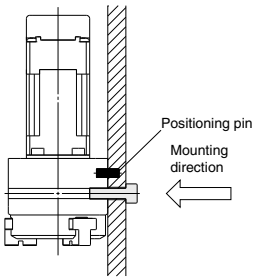
Note 10) The maximum instantaneous power consumption (including the controller) is for when the gripper is operating. This value can be used for the selection of the power supply.

How to Mount

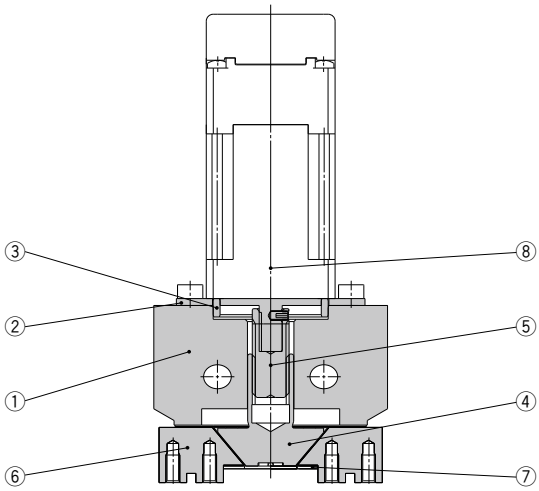
a) Mounting A type
(when using the thread on the mounting plate)



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



Construction



Component Parts

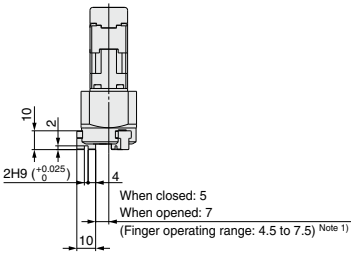
No.	Description	Material	Note
1	**Body**	Aluminum alloy	Anodized
2	**Motor plate**	Aluminum alloy	Anodized
3	**Guide ring**	Aluminum alloy	
4	**Slide cam**	Stainless steel	Heat treatment + Special treatment
5	**Slide bolt**	Stainless steel	Heat treatment + Special treatment
6	**Finger**	Carbon steel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

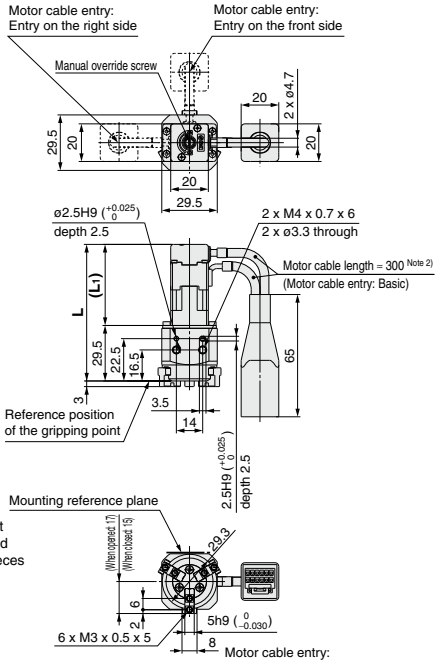
Dimensions

LEHS10(L)K3-4

[mm]

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



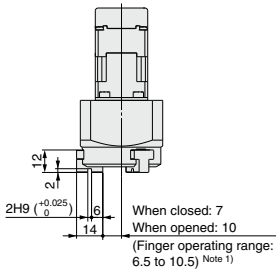


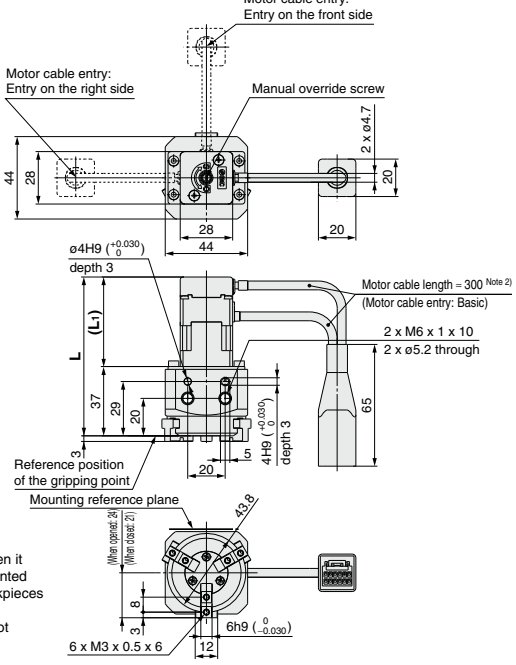
Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

LEHS20(L)K3-6

[mm]

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

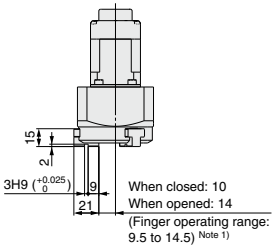


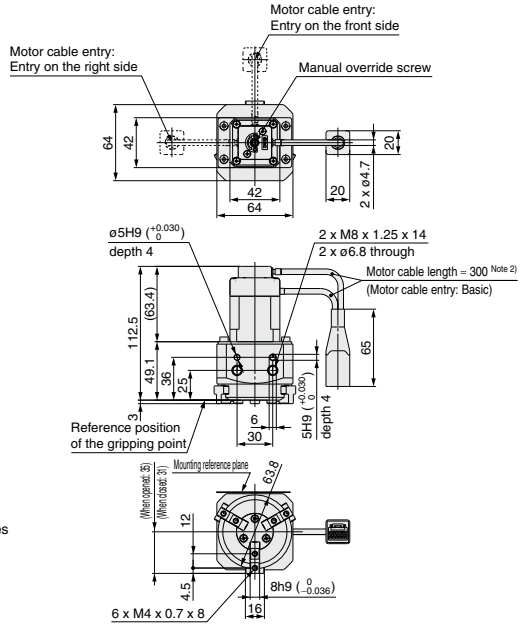


Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

Dimensions

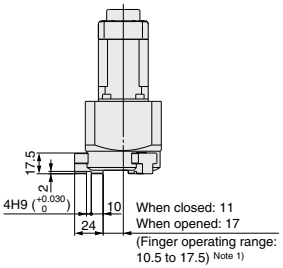
LEHS32K3-8

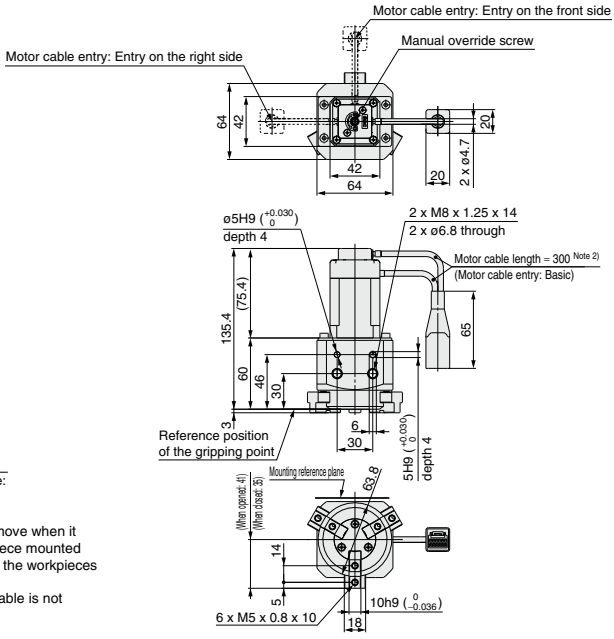




Note 1) Range within which the fingers can move when it returns to origin. Make sure a workpiece mounted on the fingers does not interfere with the workpieces and facilities around the fingers.
Note 2) Secure the motor cable so that the cable is not repeatedly bent.

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.

LEH Series
Electric Grippers/
Specific Product Precautions 1

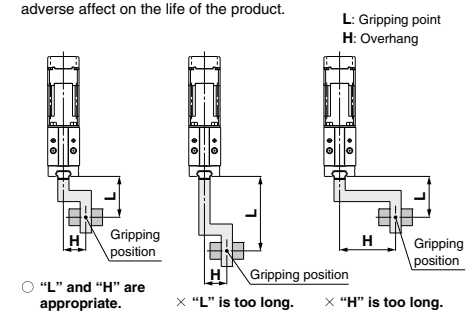
Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 8 for Electric Actuator Precautions.

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

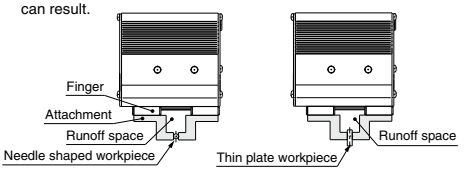
2. Design the attachment to be lightweight and short.

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

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

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

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



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

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

Gripping Force Accuracy

LEHZ(J)10(L)	LEHZ(J)16(L)	LEHZ(J)20(L)	LEHZ(J)25(L)	LEHZ32	LEHZ40
±30% (F.S.)		±25% (F.S.)		±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 open and close width relative to a workpiece.

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

Mounting

⚠Warning

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

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

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

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

Mounting of Attachment to Finger

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

<LEHZ Series>

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

<LEHF Series>

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

<LEHS Series>

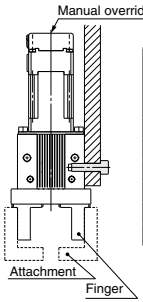
Model	Screw size	Max. tightening torque [N·m]
LEHS10(L)	M3 x 0.5	0.9
LEHS20(L)	M3 x 0.5	0.9
LEHS32	M4 x 0.7	1.4
LEHS40	M5 x 0.8	3.0

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 8 for Electric Actuator Precautions.

Mounting

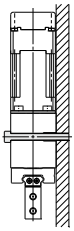
Mounting of Electric Gripper, LEHZ/LEHZJ Series

When using the thread on the side of the body



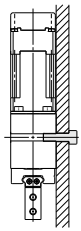
Model	Screw size	Max. tightening torque [N·m]	Max. screw-in depth L [mm]
LEHZ(J)10(L)	M3 x 0.5	0.9	6
LEHZ(J)16(L)	M4 x 0.7	1.4	6
LEHZ(J)20(L)	M5 x 0.8	3.0	8
LEHZ(J)25(L)	M6 x 1	5.0	10
LEHZ32	M6 x 1	5.0	10
LEHZ40	M8 x 1.25	12.0	14

When using the thread on the mounting plate



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

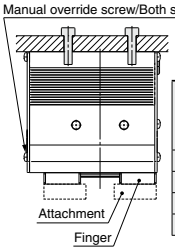
When using the thread on the back of the body



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

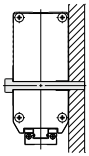
Mounting of Electric Gripper, LEHF Series

When using the thread on the body



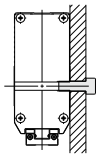
Model	Screw size	Max. tightening torque [N·m]	Max. screw-in depth L [mm]
LEHF10	M4 x 0.7	1.4	7
LEHF20	M5 x 0.8	3.0	8
LEHF32	M6 x 1	5.0	10
LEHF40	M6 x 1	5.0	10

When using the thread on the mounting plate



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

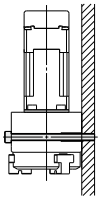
When using the thread on the back of the body



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

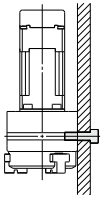
Mounting of Electric Gripper, LEHS Series

When using the thread on the mounting plate



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

When using the thread on the back of the body



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

Mounting

⚠Warning

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

4. When fixing the attachment to the finger, avoid applying excessive torque to the finger.
Play or deteriorated accuracy can result.

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

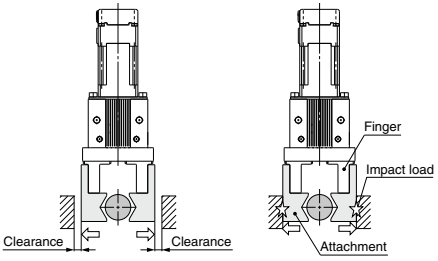
6. When a workpiece is to be removed when it is not energized, open or close the finger manually or remove the attachment beforehand.
When it is necessary to operate the product by the manual override screws, check the position of the manual override screws of the product, and leave necessary space.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

7. When gripping a workpiece, keep a gap in the horizontal direction to prevent the load from concentrating on one finger, to allow for workpiece misalignment.
For the same purpose, when moving a workpiece for alignment by the product, minimize the friction resistance created by the movement of the workpiece. The finger can be displaced, play or breakage.

8. Perform adjustment and confirmation to ensure there is no external force applied to the finger.
If the finger is subject to repetitive lateral load or impact load, it can cause play or breakage and the lead screw can get stuck, which results in operation failure. Allow a clearance to prevent the workpiece or the attachment from hitting gripper product at the end of the stroke.

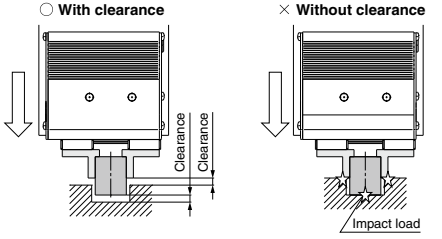
1) Stroke end when fingers are open

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

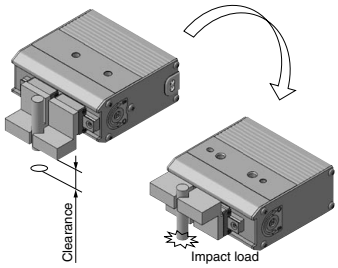


2) Stroke end when gripper is moving

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

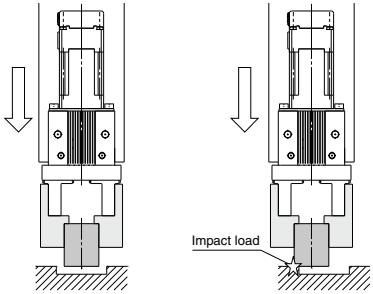


3) When turning over



9. Adjust the gripping point so that an excessive force will not be applied to the fingers when inserting a workpiece.
In particular, during a trial run, operate the product manually or at a low speed and check that the safety is assured without impact.

○ **Aligned** × **Not aligned**



Handling

⚠Caution

1. The parameters of the stroke and the open/close speed are for both fingers.
The stroke and the open/close speed for one finger is half a set parameter.

2. When gripping a workpiece by the product, be sure to set to the pushing operation.
Also, do not hit the workpiece to the finger and attachment in positioning operation or in the range of positioning operation.
Otherwise, the lead screw can get caught and cause operation failure.
However, if the workpiece cannot be gripped in pushing operation (such as a plastically deformed workpiece, rubber component, etc.), you can grip it in positioning operation with consideration to the elastic force of the workpiece. In this case, keep the driving speed for impact specified in item 3 on page 483.
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.

LEH Series
Electric Grippers/ Specific Product Precautions 4

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 8 for Electric Actuator Precautions.

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.

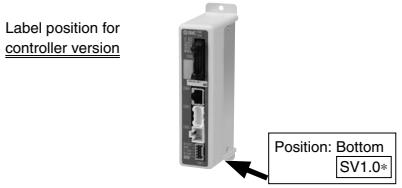
<INP output signal in the controller version>

● 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.



<Pushing force and trigger level range>

LEHZ Series

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%

LEHZJ Series

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%

LEHF Series

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

LEHS Series

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%.

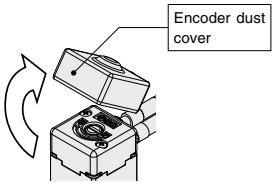
If the torque is too small when a workpiece is gripped in pushing operation, the product can have galling and become unable to release the workpiece.

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.

<LEHZJ series>

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.



LEH Series
Electric Grippers/
Specific Product Precautions 5

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 3 to 8 for Electric Actuator Precautions.

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 (LEHZJ series 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.