



**ELECTRIC  
ACTUATORS**

**NEW**

# Economy series

**ES/EC**

Stepper / Servo Driver Controller

**TSC/TLC**



For details, visit THK at [www.thk.com](http://www.thk.com)

\* Product information is updated regularly on the THK website.

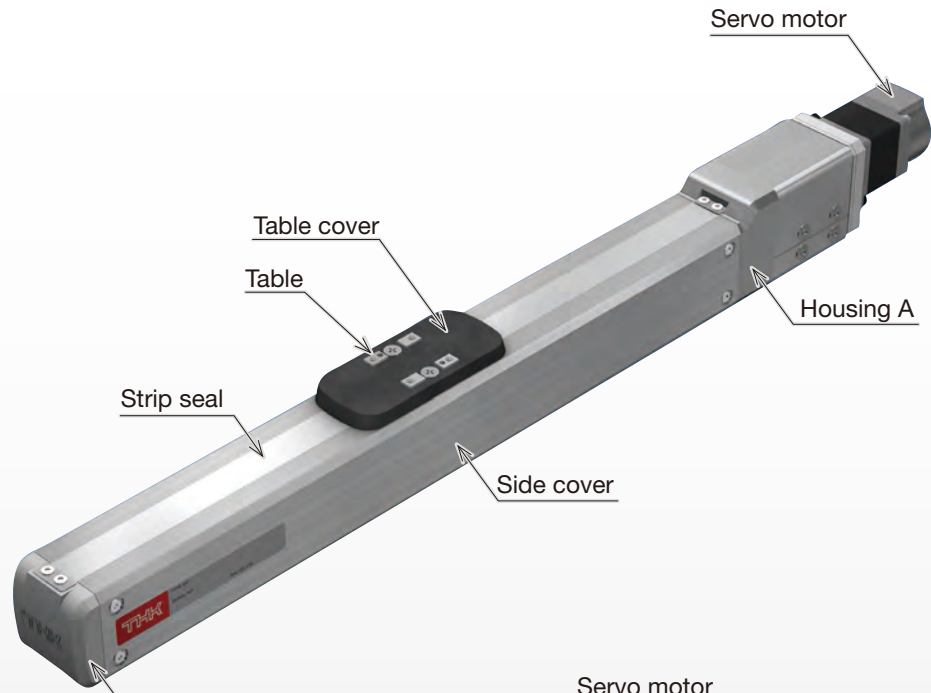
**THK CO., LTD.**  
TOKYO, JAPAN

CATALOG No.372-11E

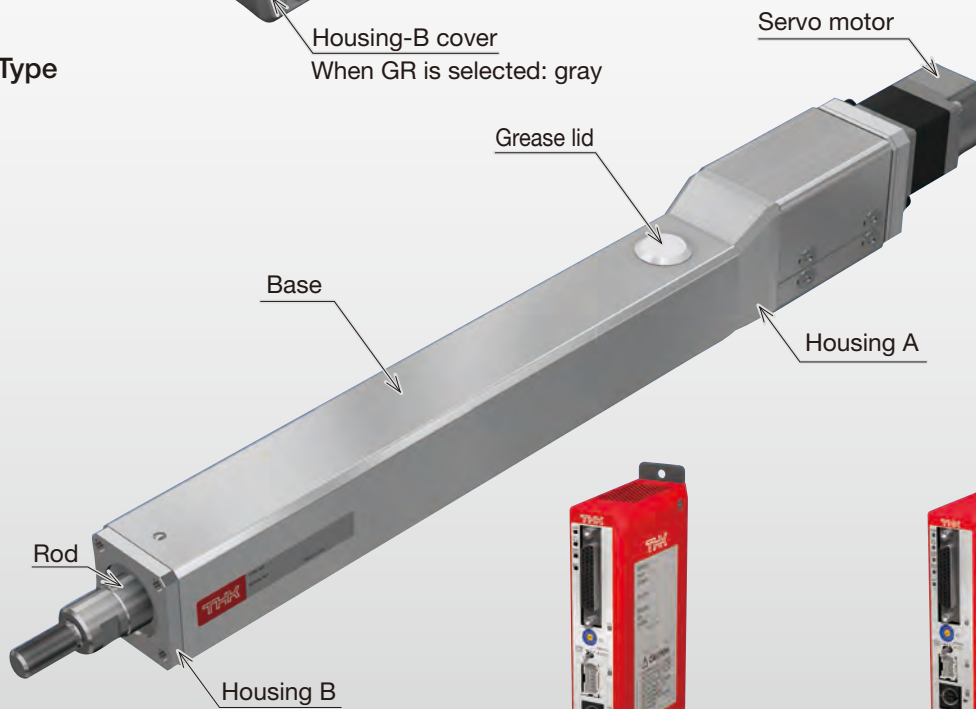
Electrical Actuator  
Economy series  
ES/EC

# Lightweight, Compact

Slider Type  
ES



Cylinder Type  
EC



Housing-B cover  
When GR is selected: gray



Stepper driver controller  
TSC



Servo driver controller  
TLC

## Features

### Compact and reliable

By incorporating an LM Guide within its rectilinear guide, the ES provides both compactness and reliability.

### Reasonably priced

The use of LM Guides reduces the number of components required, making the ES available at a reasonable cost.

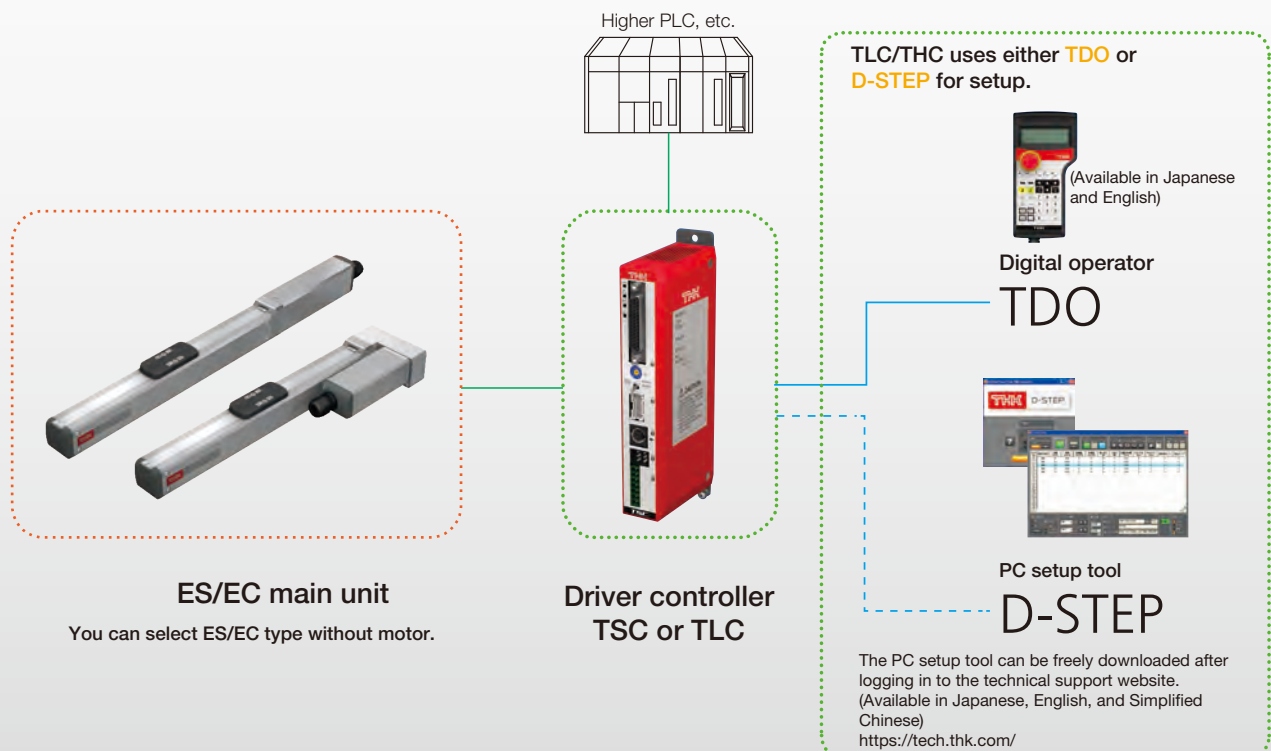
### Long-term maintenance-free operation

The ES incorporates the model SRS LM Guide, equipped with caged ball, as well as Lubricator QZ, for optimal ball-screw lubrication. The combined effect provides for long-term maintenance-free operation.

### Predictable running life

The running life of the LM Guide and ball screw can be calculated based on usage conditions. Contact THK for details.

## System



## Lineup List (Stepper driver controller TSC Specification)

Model	Ball screw lead [mm]	Stroke [mm]	Motor type	Maximum load capacity <sup>*1 *2</sup> [kg]	
				Horizontal mount	Vertical mount
ES3	6	50 to 300	Stepper motor □28	1	0.5
ES4	6	50 to 400	Stepper motor □35	9	4
	12			7.5	1.5
ES5	6	50 to 500	Stepper motor □42	10	5
	12			6	2
ES6	6	50 to 600	Stepper motor □42	10	5
	12			6	2
ES3R	6	50 to 300	Stepper motor □28	1	0.5
ES4R	6	50 to 400	Stepper motor □35	4	1.5
	12			2	1
ES5R	6	50 to 500	Stepper motor □42	8	2
	12			6	1
ES6R	6	50 to 600	Stepper motor □42	8	2
	12			6	1
EC3	6	50 to 200	Stepper motor □35	15	6
EC4	6	50 to 300	Stepper motor □42	40	12
	12			25	4.5
EC3R	6	50 to 200	Stepper motor □35	15	3
EC4R	6	50 to 300	Stepper motor □42	40	6
	12			15	4
EC3H	6	50 to 200	Stepper motor □35	15	6
EC4H	6	50 to 300	Stepper motor □42	40	12
	12			25	4.5

\*1 This specification shows the values when combining with stepper driver controller TSC.

\*2 Load capacity and maximum speed vary dependent on usage conditions. For details, see "Speed and Load Capacity".

\*3 Horizontal: 460, Vertical: 450

## Lineup List (Servo driver controller TLC Specification)

Model	Ball screw lead [mm]	Stroke [mm]	Rated speed <sup>*1</sup> [mm/s]	Motor rated output [W]	Maximum load capacity <sup>*2</sup> [kg]	
					Horizontal mount	Vertical mount
ES5	6	50 to 500	300	50	10	5
	12		600		6	2
ES6	6	50 to 600	300	50	10	5
	12		600		6	2
EC4	6	50 to 300	300	50	14	6
	12		600		7	3
ES5R	6	50 to 500	300	50	8	2
	12		600		6	1
ES6R	6	50 to 600	300	50	8	2
	12		600		6	1
EC4R	6	50 to 300	300	50	14	6
	12		600		7	3
EC4H	6	50 to 300	300	50	14	6
	12		600		7	3

\*1 At rated motor speed (3,000min<sup>-1</sup>).

\*2 Based on load capacity at rated speed with 0.3G acceleration and deceleration rate.

\*3 Maximum speed is dependent on motor speed of 3,000 min<sup>-1</sup> and, if applicable, permissible rotation speed of ball screw.

Maximum speed for each stroke <sup>*1 *2</sup> [mm/s]												
Stroke [mm]												
50	100	150	200	250	300	350	400	450	500	550	600	
300												
250												
500												
300												
500												
300										270	230	
500												460
300												
250												
Horizontal: 500, Vertical: 440												
Horizontal: 300, Vertical: 250												
500												
250												230
Horizontal: 500, Vertical: 450												★3
187												
Horizontal: 250, Vertical: 240				230	170							
450					340							
187												
250				230	170							
Horizontal: 400, Vertical: 370					340							
187												
Horizontal: 250, Vertical: 240				230	170							
450					340							

Maximum speed for each stroke <sup>*3</sup> [mm/s]												
Stroke [mm]												
50	100	150	200	250	300	350	400	450	500	550	600	
300												
600												
300										270	230	
600										540	460	
300				230	170							
600				460	340							
300												
600												
300										270	230	
600										540	460	
300				230	170							
600				460	340							
300				230	170							
600				460	340							

# Model Configuration



ES/EC (with motor)

Model	Ball screw lead	Stroke	Design symbol	Control device	Option	Motor size / motor rated output	Motor cable orientation	Homing method	Cable type and length
ES5R	06	0150	B	TL	MR-GR	M05	L	D00	F3
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ES3	06: 6mm	0050: 50mm	B	TS: Stepper driver controller TSC TL: Servo driver controller TLC	No symbol: ES: Red cover : EC: None MR: Motor right wrap <sup>*1</sup> ML: Motor left wrap <sup>*1</sup> GR: Change the cover color to gray <sup>*2</sup> SB: With slider base <sup>*2</sup> CB: With cylinder base <sup>*3</sup> FL: With flange <sup>*3 *4</sup> LB: With link ball <sup>*3 *4</sup> □ <sub>1</sub> □ <sub>2</sub> : Sensor <sup>*2</sup>	28P: Stepper motor □28 35P: Stepper motor □35 42P: Stepper motor □42 28PB: Stepper motor □28 with brake 35PB: Stepper motor □35 with brake 42PB: Stepper motor □42 with brake M05 : 50W M05B: 50W with brake	No symbol: When selecting TSC R: Right U: Up L: Left D: Down	D00: Motor side R00: Reverse motor side	No symbol: None S3: Standard 3m S5: Standard 5m SA: Standard 10m* F3: Standard 3m F5: Standard 5m FA: Standard 10m H3: High flex 3m H5: High flex 5m HA: High flex 10m

R represents motor wrap, and H represents with linear bush.

For ES3, ES3R, EC3, EC3R and EC3H, only ball screw lead 6 is applicable.

\*1 Valid only when ES□R or EC□R is selected in model (1).  
\*2 Valid only when ES is selected in model (1).  
\*3 Valid only when EC is selected in model (1).  
\*4 If you select EC□H for model (1), "FL" and "LB" cannot be selected.

Maximum stroke differs depending on models.  
ES3: 300mm  
ES4: 400mm  
ES5: 500mm  
ES6: 600mm  
EC3: 200mm  
EC4: 300mm

Change the cover color to gray  
You can change the color of ES housing cover to gray.  
No symbol: red      When GR is selected: gray

If the GR is not included in the model configuration, cover will be red.

Specify the option symbol by writing in the order of description from left adding "-".

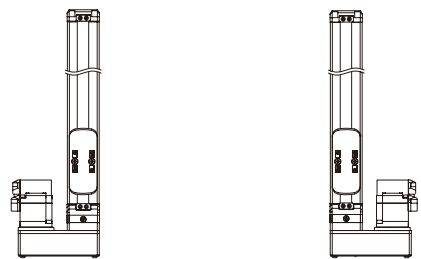
Indicates the type and length of attached cables. Cables you can select differ depending on controllers.  
TSC: "S3", "S5", "SA"  
TLC: "F3", "F5", "FA", "H3", "H5", "HA"  
\* For control device (5) TSC, when using a 10m actuator cable, insert a noise filter to the TSC power supply. Recommended noise filter is "RSAN-2003 (TDK-Lambda Corporation)".

ES  
If you select "MR" as an option, "R", "U" and "D" cannot be selected.  
If you select "ML" as an option, "L", "U" and "D" cannot be selected.  
EC  
If you select "MR" as an option, "R" cannot be selected.  
If you select "ML" as an option, "L" cannot be selected.

Motors you can select differ depending on models.  
ES3: "28P", "28PB"      EC3: "35P", "35PB"  
ES4: "35P", "35PB"      EC4: "42P", "42PB"  
ES5: "42P", "42PB"      "M05", "M05B"  
ES6: "42P", "42PB"      "M05", "M05B"

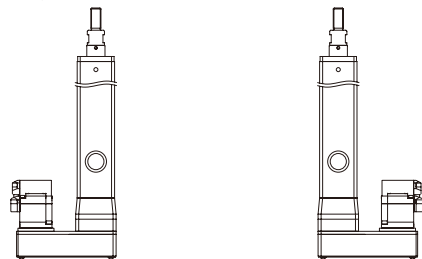
## Motor wrap direction

Slider type ES



Option symbol ML: Motor left wrap      Option symbol MR: Motor right wrap

Cylinder type EC



Option symbol ML: Motor left wrap      Option symbol MR: Motor right wrap

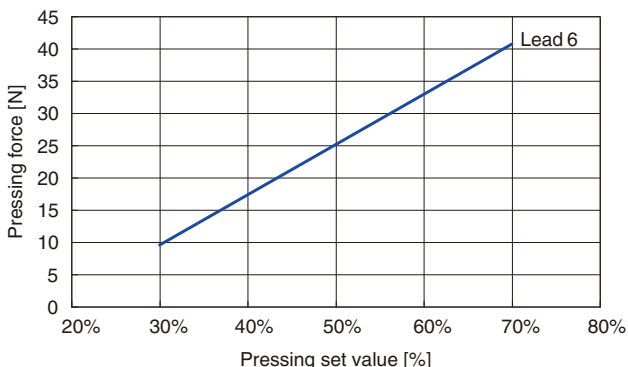
## Pages for detailed description

(6) Options		
GR: Change the cover color to gray		P. 49
SB: With slider base		P. 50
CB: With cylinder base		P. 54
FL: With flange		P. 54
LB: With link ball		P. 54
□ <sub>1</sub> □ <sub>2</sub> : Sensor		P. 53

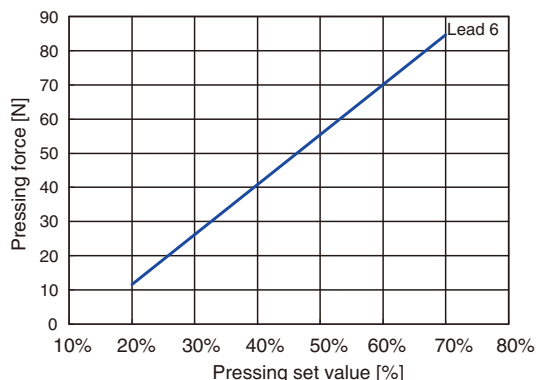
## Pressing Force and Pressing Set Value: Relationship Diagram

Pressing force may vary depending on the pressing set value. For the mounting method, see .

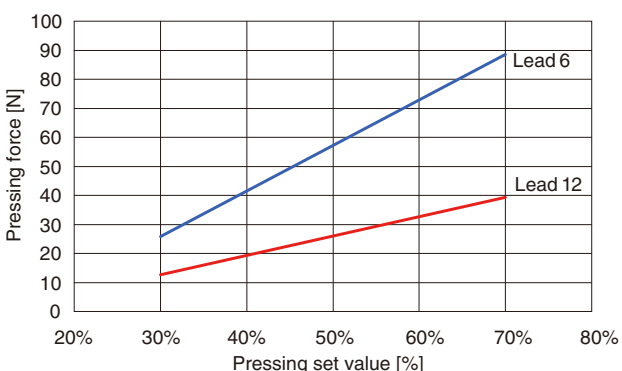
■ ES3/ES3R (TSC)



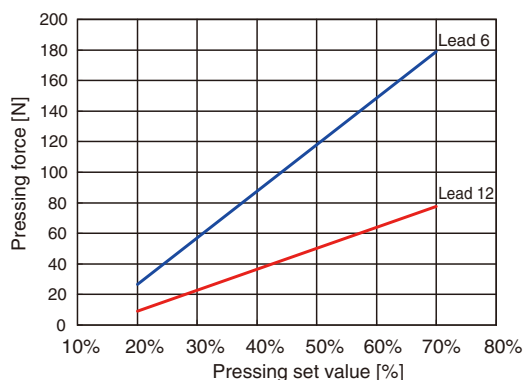
■ EC3/EC3R (TSC)



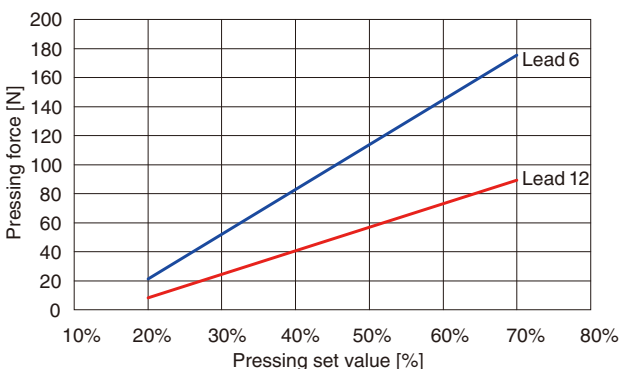
■ ES4/ES4R (TSC)



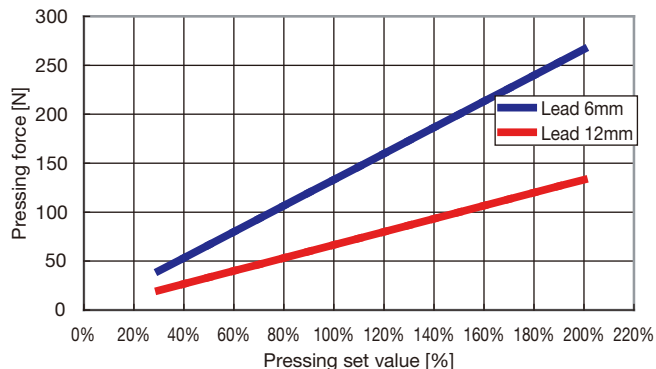
■ EC4/EC4R (TSC)



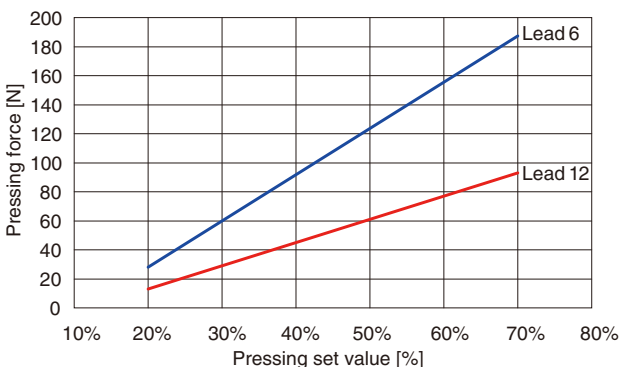
■ ES5/ES5R (TSC)



■ ES5,6/ES5,6R/EC4/EC4R/EC4H (TLC)



■ ES6/ES6R (TSC)



Model	ES5,6/EC4 (For both direct coupling and motor wrap)	
	Lead[mm]	Pressing set maximum thrust[N]
Lead[mm]	6	12
Pressing set maximum thrust[N]	266	133

### Precautions

- (1) Pressing set value 100 [%] represents the value at the time of the rated motor torque.
- (2) For ES/EC direct coupling, up to 200% can be set as pressing set value. Continuous operation, however, cannot be possible. For continuous operation, use the effective load rating of 70% as a guide line.
- (3) Since this thrust is a theoretical value calculated using the calculation formula, it may differ from the actual value.
- (4) This diagram shows theoretical values for operation in horizontal orientation. When you use this product with a vertical orientation, the following precautions are required:  
When pressing in the vertical orientation, or in the same direction as the gravitation, the force equal to Payload x Gravitation is added.  
When pressing in the vertical orientation, or in the opposite direction from the gravitation, the force equal to Payload x Gravitation is reduced.

# ES3 Slider type TSC specification Direct motor coupling



## Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device Type	Option	Motor size	Homing method	Cable length
ES3	06	0150	B	TS	GR-SB	28P	D00	S3
<b>ES3</b>	<b>06</b> : 6mm	<b>0050</b> : 50mm to <b>0300</b> : 300mm	<b>B</b>	<b>TS</b> : TSC	<b>No symbol</b> : None <b>GR</b> : Change the cover color to gray <b>SB</b> : With slider base <b>□<sub>1</sub>□<sub>2</sub></b> : Sensors	<b>28P</b> : □28 <b>28PB</b> : □28 with brake	<b>D00</b> : Motor side <b>R00</b> : Reverse motor side	<b>No symbol</b> : None <b>S3</b> : Standard 3m <b>S5</b> : Standard 5m <b>SA*</b> : Standard 10m

\* To select SA, insert a noise filter to the TSC power supply. Recommended noise filter is "RSAN-2003 (TDK-Lambda Corporation)".

## Basic Specifications

Control device type		TSC	
Motor size		□28	
Ball screw lead [mm]		6	
Maximum load Weight [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G
		Vertical mount	0.2G
Running life *1 [km]		5000	
Positioning repeatability [mm]		±0.020	
Lost motion [mm]		0.1	
Static permissible moment *2 [N·m]		M <sub>A</sub> : 6.0, M <sub>B</sub> : 7.5, M <sub>C</sub> : 5.9	

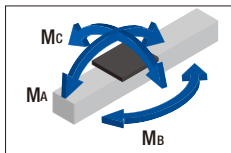
\*1 Service life is based on below conditions.

Conditions: Horizontal or vertical, under the maximum load capacity, overhang length A=6mm, B and C=0mm, 0.3G for horizontal, 0.2G for vertical, stroke 50mm

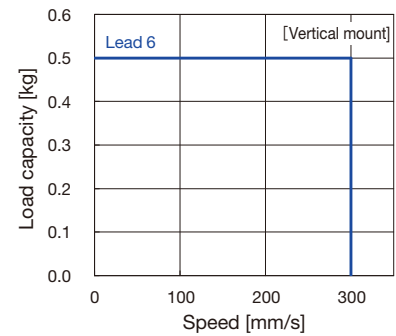
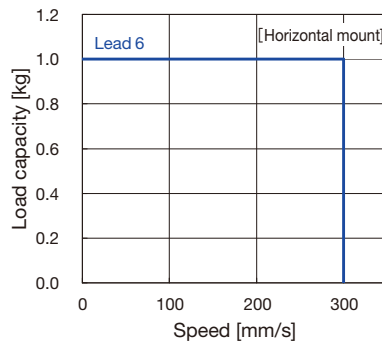
\*2 Static maximum permissible moment when unit is stationary.

Applied point of moment load for M<sub>A</sub> and M<sub>C</sub> are the top face of the table, and that for M<sub>B</sub> is the center of the table.

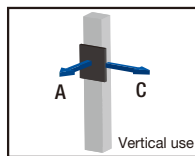
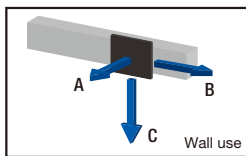
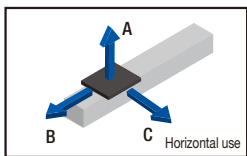
### Static Permissible Moment



## Speed and Load Capacity: Relationship Diagram



## Permissible Overhang Length \*



Horizontal mount [mm]					Wall mount [mm]					Vertical mount [mm]			
Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	C
6	0.5	200	200	200	6	0.5	200	200	200	6	0.3	200	200
	1	200	160	200		1	170	150	200		0.5	200	200

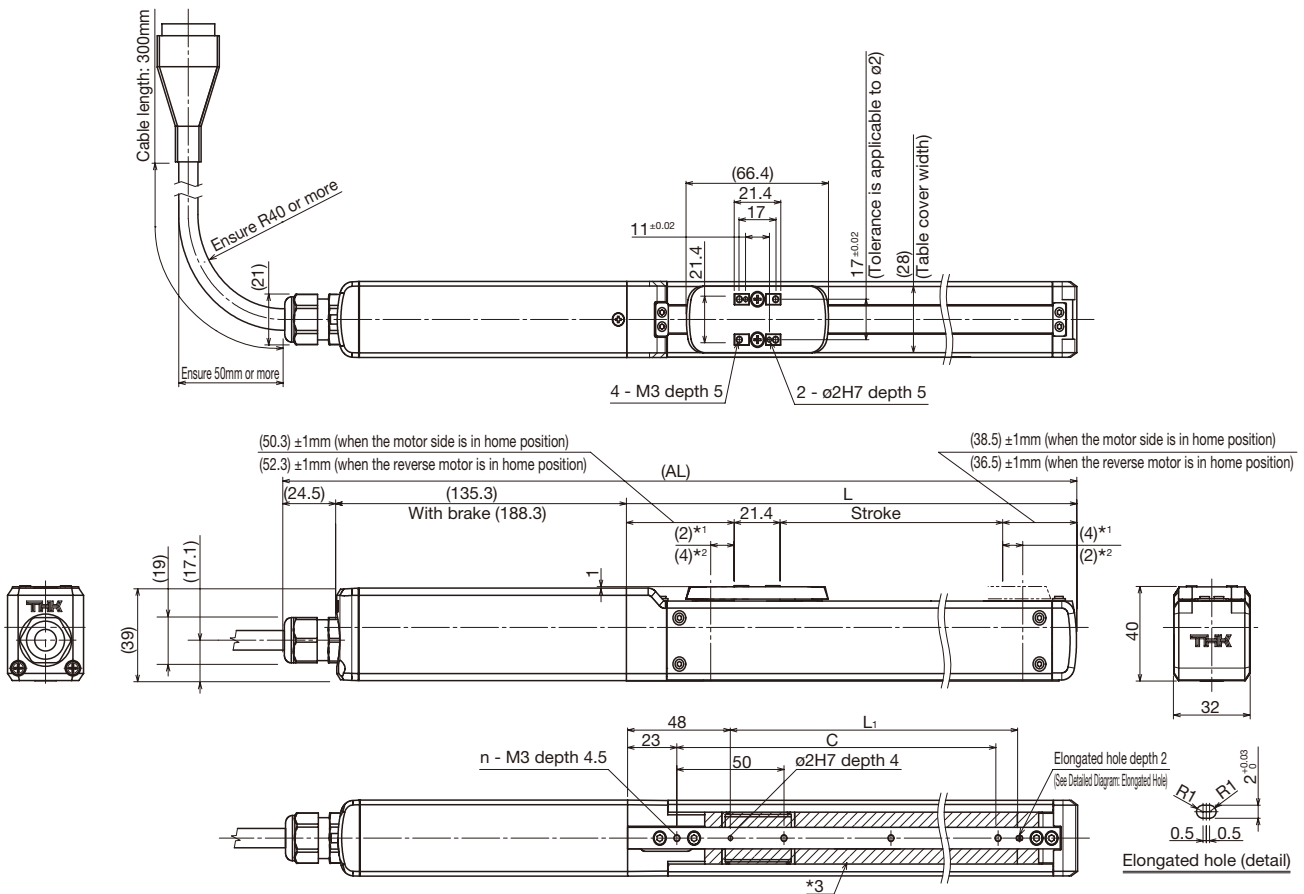
\* Distance from the center of the top face of the table to the load center of gravity position under the following conditions: 5,000km running life, single-direction load, 0.3G horizontal, 0.2G vertical, 150mm stroke.



# ES3 + TSC



## Dimensions



- \*1 Stroke to the mechanical stopper when the motor side is in home position.
- \*2 Stroke to the mechanical stopper when the reverse motor side is in home position.
- \*3 represents the opening parts.

Stroke [mm] (Stroke between mechanical stoppers)		50 (56)	100 (106)	150 (156)	200 (206)	250 (256)	300 (306)
Maximum speed <sup>*1</sup> <sup>*2</sup> [mm/s]	Ball screw lead: 6mm	300					
Dimensions [mm]	AL <sup>*3</sup>	320 (373)	370 (423)	420 (473)	470 (523)	520 (573)	570 (623)
	L	160.2	210.2	260.2	310.2	360.2	410.2
	L <sub>1</sub>	85	135	185	235	285	335
	C	100	150	200	250	300	350
Mounting hole count	n	3	4	5	6	7	8
Weight <sup>*3</sup> [kg]		1 (1.3)	1 (1.4)	1.1 (1.4)	1.1 (1.5)	1.3 (1.5)	1.3 (1.6)

\*1 Load capacity and maximum speed vary dependent on usage conditions. For details, see "Speed and Load Capacity".

\*2 The maximum speed is the value restricted by the permissible rotational speed of the ball screw.

\*3 Values when a brake is installed are shown in parentheses.

# ES3R

Slider type TSC specification Motor wrap



## Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device Type	Option	Motor size	Homing method	Cable length
ES3R	06	0150	B	TS	MR-GR	28P	D00	S3
ES3R	06: 6mm	0050: 50mm to 0300: 300mm	B	TS: TSC	MR: Motor right wrap ML: Motor left wrap GR: Change the cover color to gray SB: With slider base □ <sub>1</sub> □ <sub>2</sub> : Sensors	28P: □28 28PB: □28 with brake	D00: Motor side R00: Reverse motor side	No symbol: None S3: Standard 3m S5: Standard 5m SA*: Standard 10m

\* To select SA, insert a noise filter to the TSC power supply. Recommended noise filter is "RSAN-2003 (TDK-Lambda Corporation)".

## Basic Specifications

Control device type		TSC	
Motor size		□28	
Ball screw lead [mm]		6	
Maximum load Weight [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G
		Vertical mount	0.2G
Running life *1 [km]		5000	
Positioning repeatability [mm]		±0.020	
Lost motion [mm]		0.1	
Static permissible moment *2 [N·m]		M <sub>A</sub> : 6.0, M <sub>B</sub> : 7.5, M <sub>C</sub> : 5.9	

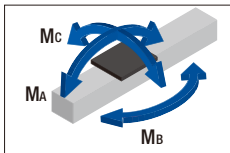
\*1 Running life is based on below conditions.

Conditions: Horizontal or vertical, under the maximum load capacity, overhang length A=6mm, B and C=0mm, 0.3G for horizontal, 0.2G for vertical, stroke 50mm

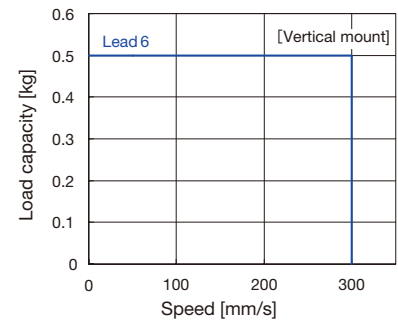
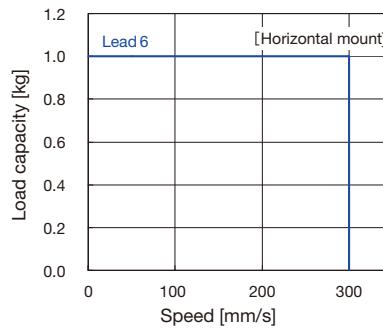
\*2 Static maximum permissible moment when unit is stationary.

Applied point of moment load for M<sub>A</sub> and M<sub>C</sub> are the top face of the table, and that for M<sub>B</sub> is the center of the table.

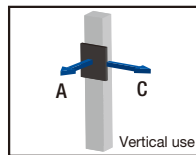
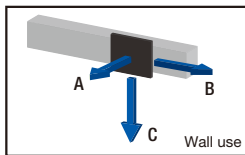
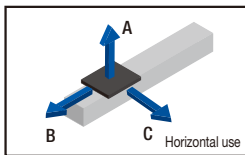
Static Permissible Moment



## Speed and Load Capacity: Relationship Diagram



## Permissible Overhang Length \*



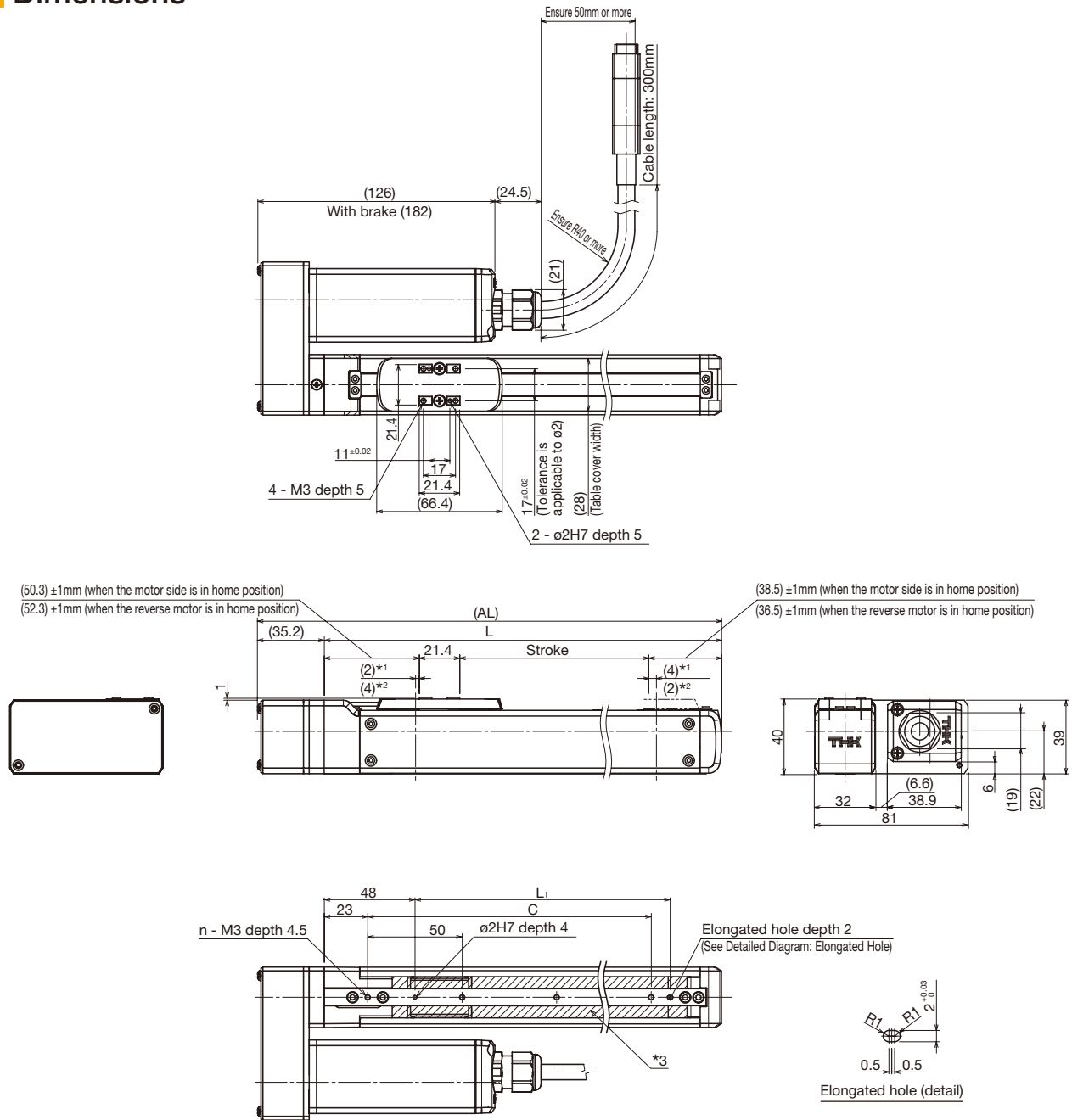
Horizontal mount [mm]					Wall mount [mm]					Vertical mount [mm]			
Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	C
6	0.5	200	200	200	6	0.5	200	200	200	6	0.3	200	200
	1	200	160	200		1	170	150	200		0.5	200	200

\* Distance from the center of the top face of the table to the load center of gravity position under the following conditions: 5,000km running life, single-direction load, 0.3G horizontal, 0.2G vertical, 150mm stroke.

# ES3R + TSC



## Dimensions



\*1 Stroke to the mechanical stopper when the motor side is in home position.  
 \*2 Stroke to the mechanical stopper when the reverse motor side is in home position.  
 \*3 represents the opening parts.

Stroke [mm] (Stroke between mechanical stoppers)		50 (56)	100 (106)	150 (156)	200 (206)	250 (256)	300 (306)
Maximum speed <sup>*1</sup> <sup>*2</sup> [mm/s]	Ball screw lead: 6mm	300					
Dimensions [mm]	AL	195.4	245.4	295.4	345.4	395.4	445.4
	L	160.2	210.2	260.2	310.2	360.2	410.2
	L <sub>1</sub>	85	135	185	235	285	335
Mounting hole count	n	3	4	5	6	7	8
Weight <sup>*3</sup> [kg]		1 (1.3)	1.1 (1.3)	1.1 (1.4)	1.2 (1.5)	1.3 (1.5)	1.3 (1.6)

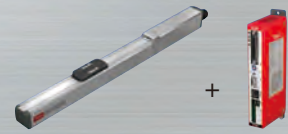
\*1 Load capacity and maximum speed vary dependent on usage conditions. For details, see "Speed and Load Capacity".

\*2 The maximum speed is the value restricted by the permissible rotational speed of the ball screw.

\*3 Values when a brake is installed are shown in parentheses.

# ES4

Slider type TSC specification Direct motor coupling



## Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device Type	Option	Motor size	Homing method	Cable length
ES4	06	0150	B	TS	GR-SB	35P	D00	S3
ES4	06: 6mm 12: 12mm	0050: 50mm to 0400: 400mm	B	TS: TSC	No symbol: None GR: Change the cover color to gray SB: With slider base □ <sub>1</sub> □ <sub>2</sub> : Sensors	35P: □35 35PB: □35 with brake	D00: Motor side R00: Reverse motor side	No symbol: None S3 : Standard 3m S5 : Standard 5m SA*: Standard 10m

\* To select SA, insert a noise filter to the TSC power supply.  
Recommended noise filter is "RSAN-2003 (TDK-Lambda Corporation)".

## Basic Specifications

Control device type		TSC	
Motor size		□35	
Ball screw lead [mm]		6	12
Maximum load Weight [kg]	Acceleration and deceleration rate	Horizontal mount	Vertical mount
		0.3G	0.2G
		9	7.5
		4	1.5
Running life *1 [km]		5000	
Positioning repeatability [mm]		±0.020	
Lost motion [mm]		0.1	
Static permissible moment ** [N·m]		M <sub>A</sub> : 9.3, M <sub>B</sub> : 13.5, M <sub>C</sub> : 17.7	

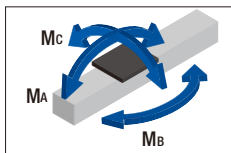
\*1 Running life is based on below conditions.

Conditions: Horizontal or vertical, under the maximum load capacity, overhang length A=6mm, B and C=0mm, 0.3G for horizontal, 0.2G for vertical, stroke 50mm

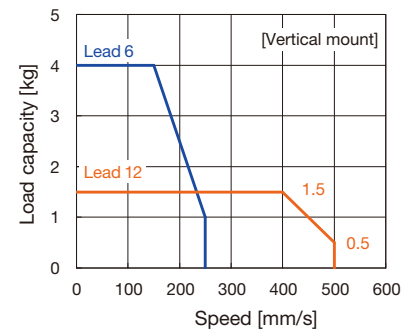
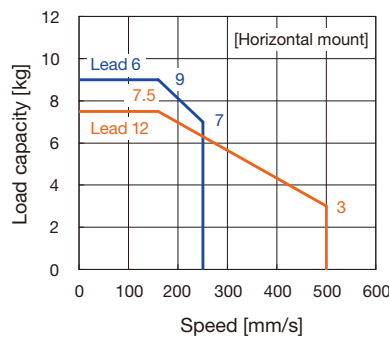
\*\* Static maximum permissible moment when unit is stationary.

Applied point of moment load for M<sub>A</sub> and M<sub>C</sub> are the top face of the table, and that for M<sub>B</sub> is the center of the table.

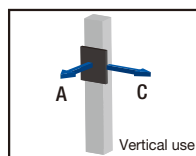
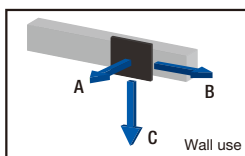
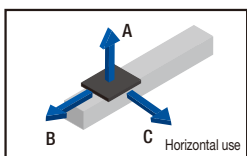
Static Permissible Moment



## Speed and Load Capacity: Relationship Diagram



## Permissible Overhang Length \*



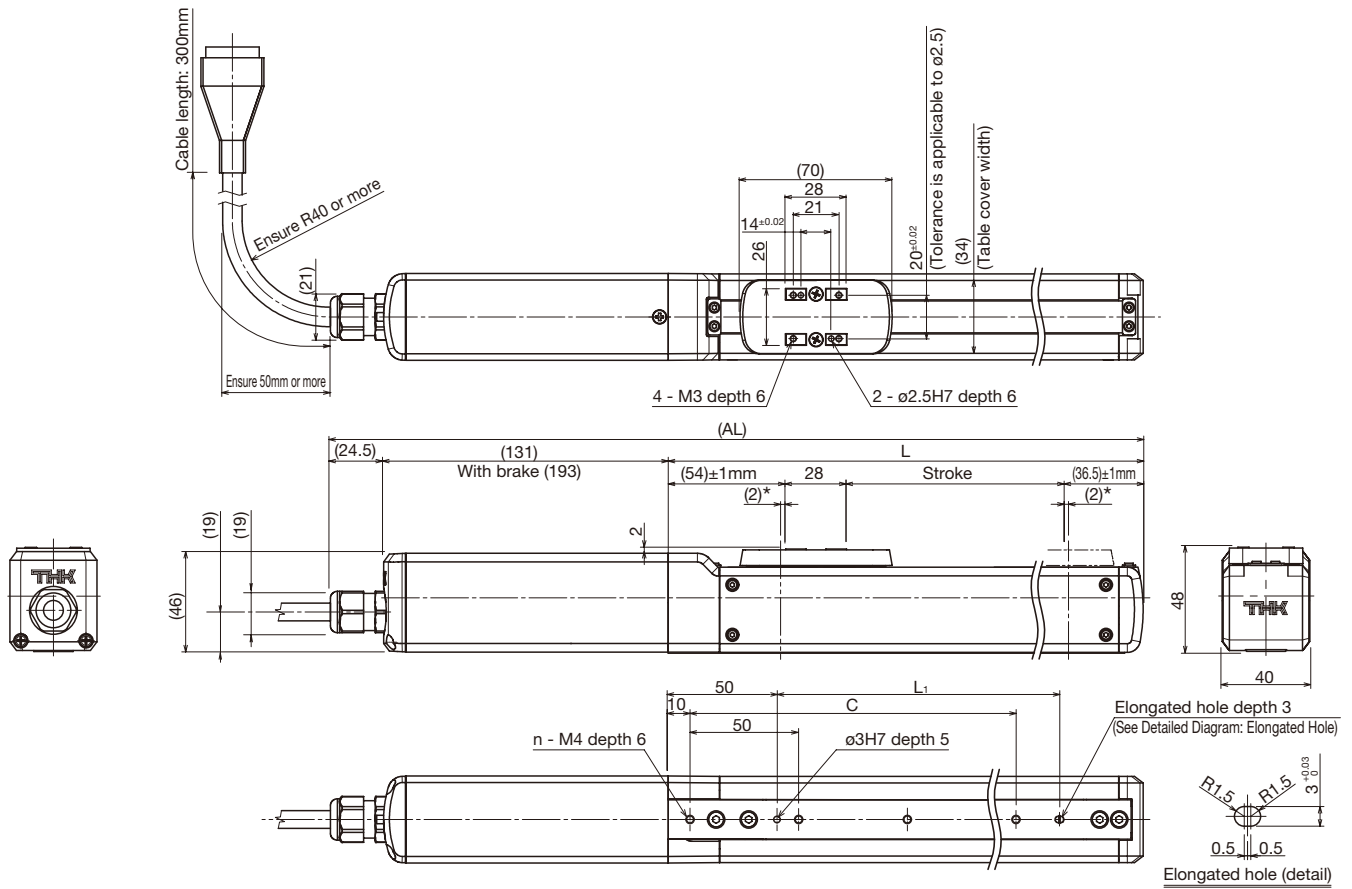
Horizontal mount [mm]					Wall mount [mm]					Vertical mount [mm]			
Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	C
6	4.5	300	50	100	6	4.5	60	30	300	6	2	100	110
	9	160	20	40		9	10	5	70		4	30	40
12	3.8	260	60	100	12	3.8	70	40	220	12	0.8	260	300
	7.5	110	20	40		7.5	10	10	50		1.5	130	150

\* Distance from the center of the top face of the table to the load center of gravity position under the following conditions: 5,000km running life, single-direction load, 0.3G horizontal, 0.2G vertical, 150mm stroke.

# ES4 + TSC



## Dimensions



\* Stroke up to mechanical stopper.

Stroke [mm] (Stroke between mechanical stoppers)	50 (54)	100 (104)	150 (154)	200 (204)	250 (254)	300 (304)	350 (354)	400 (404)	
Maximum speed <sup>*1 *2</sup> [mm/s]	Ball screw lead: 6mm	250							
	Ball screw lead: 12mm	500							
Dimensions [mm]	AL <sup>*3</sup>	324 (386)	374 (436)	424 (486)	474 (536)	524 (586)	574 (636)	624 (686)	674 (736)
	L	168.5	218.5	268.5	318.5	368.5	418.5	468.5	518.5
	L <sub>1</sub>	80	130	180	230	280	330	380	430
	C	100	150	200	250	300	350	400	450
Mounting hole count	n	3	4	5	6	7	8	9	10
Weight <sup>*3</sup> [kg]	1.5 (1.9)	1.6 (2.1)	1.7 (2.2)	1.8 (2.3)	1.9 (2.4)	2 (2.5)	2.1 (2.6)	2.2 (2.7)	

\*1 Load capacity and maximum speed vary dependent on usage conditions. For details, see "Speed and Load Capacity".

\*2 The maximum speed is the value restricted by the permissible rotational speed of the ball screw.

\*3 Values when a brake is installed are shown in parentheses.

# ES4R

Slider type TSC specification Motor wrap



## Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device Type	Option	Motor size	Homing method	Cable length
ES4R	06	0150	B	TS	MR-GR	35P	D00	S3
<b>ES4R</b>	06: 6mm 12: 12mm	0050: 50mm to 0400: 400mm	<b>B</b>	<b>TS</b> : TSC	<b>MR</b> : Motor right wrap <b>ML</b> : Motor left wrap <b>GR</b> : Change the cover color to gray <b>SB</b> : With slider base <input type="checkbox"/> 1 <input type="checkbox"/> 2: Sensors	<b>35P</b> : <input type="checkbox"/> 35 <b>35PB</b> : <input type="checkbox"/> 35 with brake	<b>D00</b> : Motor side <b>R00</b> : Reverse motor side	<b>No symbol</b> : None <b>S3</b> : Standard 3m <b>S5</b> : Standard 5m <b>SA*</b> : Standard 10m

\* To select SA, insert a noise filter to the TSC power supply. Recommended noise filter is "RSAN-2003 (TDK-Lambda Corporation)".

## Basic Specifications

Control device type		TSC	
Motor size		<input type="checkbox"/> 35	
Ball screw lead [mm]		6	12
Maximum load Weight [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G
	Vertical mount	0.2G	
Running life *1 [km]		5000	
Positioning repeatability [mm]		±0.020	
Lost motion [mm]		0.1	
Static permissible moment *2 [N·m]		M <sub>A</sub> : 9.3, M <sub>B</sub> : 13.5, M <sub>C</sub> : 17.7	

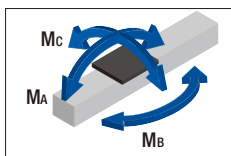
\*1 Running life is based on below conditions.

Conditions: Horizontal or vertical, under the maximum load capacity, overhang length A=6mm, B and C=0mm, 0.3G for horizontal, 0.2G for vertical, stroke 50mm

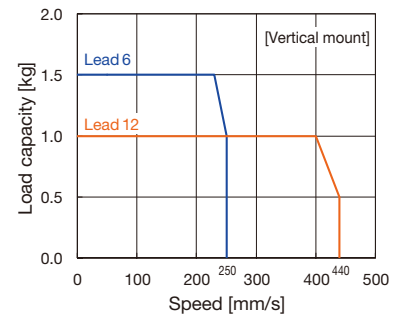
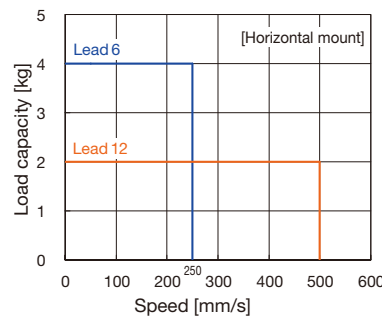
\*2 Static maximum permissible moment when unit is stationary.

Applied point of moment load for M<sub>A</sub> and M<sub>C</sub> are the top face of the table, and that for M<sub>B</sub> is the center of the table.

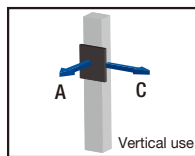
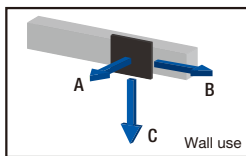
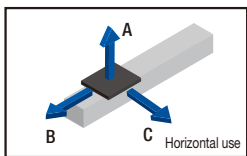
Static Permissible Moment



## Speed and Load Capacity: Relationship Diagram



## Permissible Overhang Length \*



Horizontal mount [mm]				
Ball screw lead [mm]	Load mass [kg]	A	B	C
6	2	300	120	240
	4	300	50	110
12	1	300	240	300
	2	300	120	200

Wall mount [mm]				
Ball screw lead [mm]	Load mass [kg]	A	B	C
6	2	210	110	300
	4	80	40	300
12	1	300	260	300
	2	170	110	300

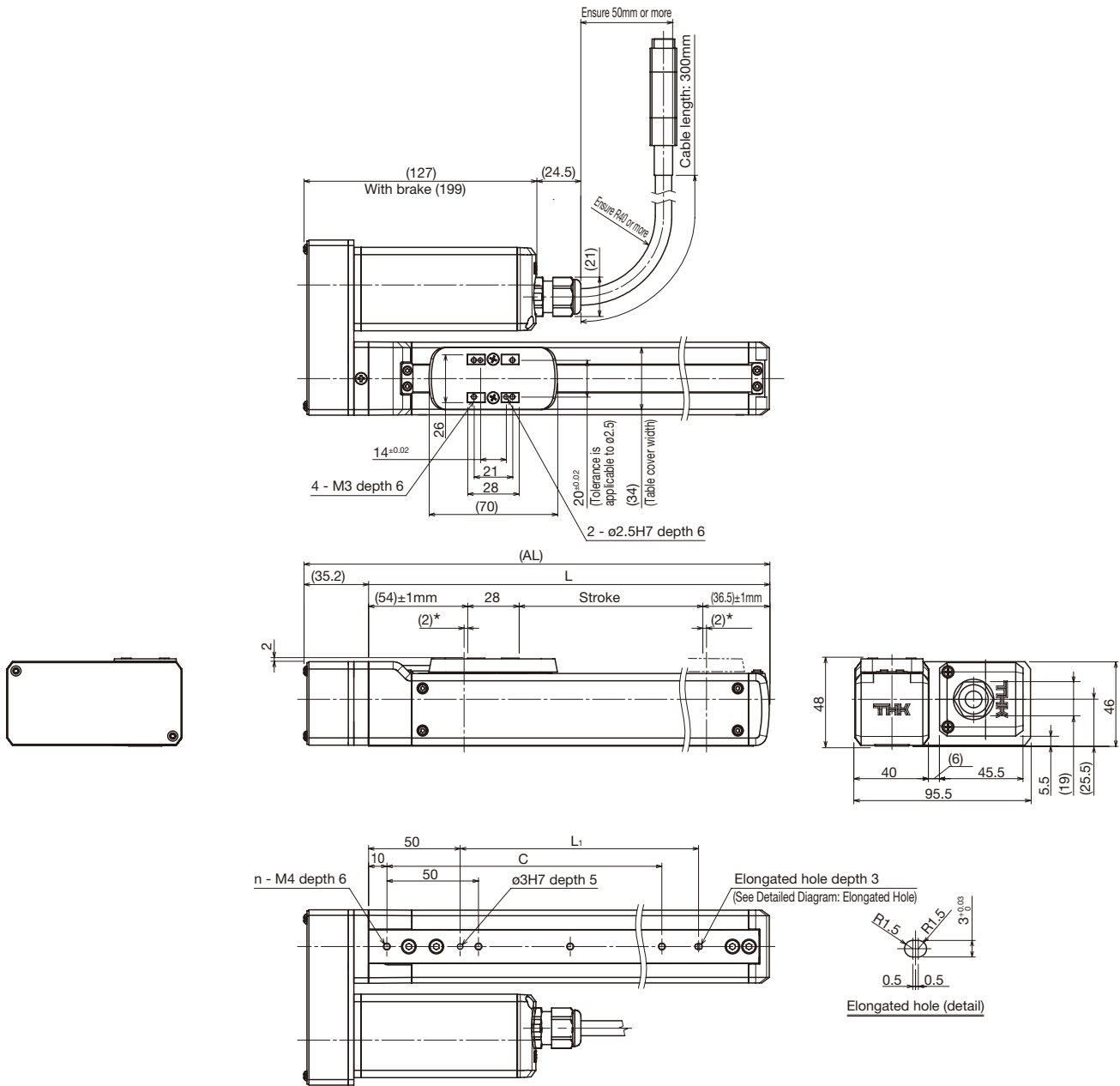
Vertical mount [mm]			
Ball screw lead [mm]	Load mass [kg]	A	C
6	0.8	280	300
	1.5	140	160
12	0.5	300	300
	1	210	240

\* Distance from the center of the top face of the table to the load center of gravity position under the following conditions: 5,000km running life, single-direction load, 0.3G horizontal, 0.2G vertical, 150mm stroke.

# ES4R + TSC



## Dimensions



\* Stroke up to mechanical stopper.

Stroke [mm] (Stroke between mechanical stoppers)	50 (54)	100 (104)	150 (154)	200 (204)	250 (254)	300 (304)	350 (354)	400 (404)	
Maximum speed <sup>*1 *2</sup> [mm/s]	Ball screw lead: 6mm	250							
	Ball screw lead: 12mm	Horizontal: 500, Vertical: 440							
Dimensions [mm]	AL	203.7	253.7	303.7	353.7	403.7	453.7	503.7	553.7
	L	168.5	218.5	268.5	318.5	368.5	418.5	468.5	518.5
	L <sub>1</sub>	80	130	180	230	280	330	380	430
Mounting hole count	n	3	4	5	6	7	8	9	10
Weight <sup>*3</sup> [kg]		1.6 (2)	1.7 (2.1)	1.8 (2.2)	1.9 (2.3)	2 (2.4)	2.1 (2.5)	2.2 (2.6)	2.3 (2.7)

\*1 Load capacity and maximum speed vary dependent on usage conditions. For details, see "Speed and Load Capacity".

\*2 The maximum speed is the value restricted by the permissible rotational speed of the ball screw.

\*3 Values when a brake is installed are shown in parentheses.

# ES5 Slider type TSC specification Direct motor coupling



## Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device Type	Option	Motor size	Homing method	Cable length
ES5	06	0150	B	TS	GR-SB	42P	D00	S3
ES5	06: 6mm 12: 12mm	0050: 50mm to 0500: 500mm	B	TS: TSC	No symbol: None GR: Change the cover color to gray SB: With slider base □ <sub>1</sub> □ <sub>2</sub> : Sensors	42P: □42 42PB: □42 with brake	D00: Motor side R00: Reverse motor side	No symbol: None S3 : Standard 3m S5 : Standard 5m SA*: Standard 10m

\* To select SA, insert a noise filter to the TSC power supply.  
Recommended noise filter is "RSAN-2003 (TDK-Lambda Corporation)".

## Basic Specifications

Control device type		TSC	
Motor size		□42	
Ball screw lead [mm]		6	12
Maximum load Weight [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G
		Vertical mount	0.2G
		10	6
		5	2
Running life *1 [km]		5000	
Positioning repeatability [mm]		±0.020	
Lost motion [mm]		0.1	
Static permissible moment *2 [N·m]		M <sub>A</sub> : 10.5, M <sub>B</sub> : 22, M <sub>C</sub> : 22.1	

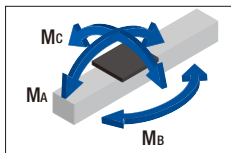
\*1 Running life is based on below conditions.

Conditions: Horizontal or vertical, under the maximum load capacity, overhang length A=10mm, B and C=0mm, 0.3G for horizontal, 0.2G for vertical, stroke 50mm

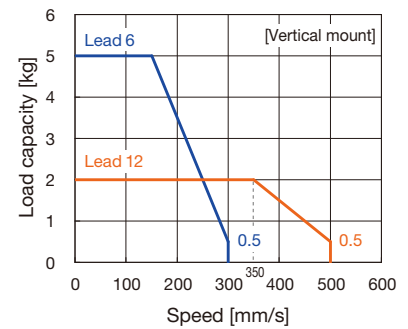
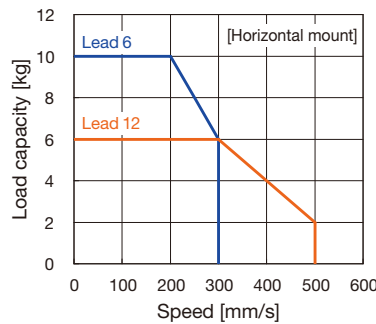
\*2 Static maximum permissible moment when unit is stationary.

Applied point of moment load for M<sub>A</sub> and M<sub>C</sub> are the top face of the table, and that for M<sub>B</sub> is the center of the table.

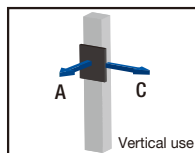
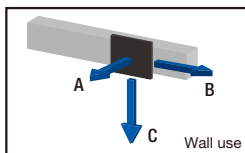
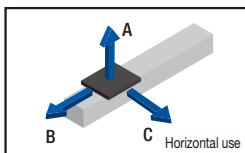
### Static Permissible Moment



## Speed and Load Capacity: Relationship Diagram



## Permissible Overhang Length \*



Horizontal mount		[mm]		
Ball screw lead [mm]	Load mass [kg]	A	B	C
6	5	400	90	200
	10	270	40	90
12	3	400	160	280
	6	320	70	130

Wall mount		[mm]		
Ball screw lead [mm]	Load mass [kg]	A	B	C
6	5	160	70	400
	10	50	20	220
12	3	260	130	400
	6	100	50	250

Vertical mount		[mm]	
Ball screw lead [mm]	Load mass [kg]	A	C
6	2.5	160	160
	5	70	70
12	1	400	400
	2	200	200

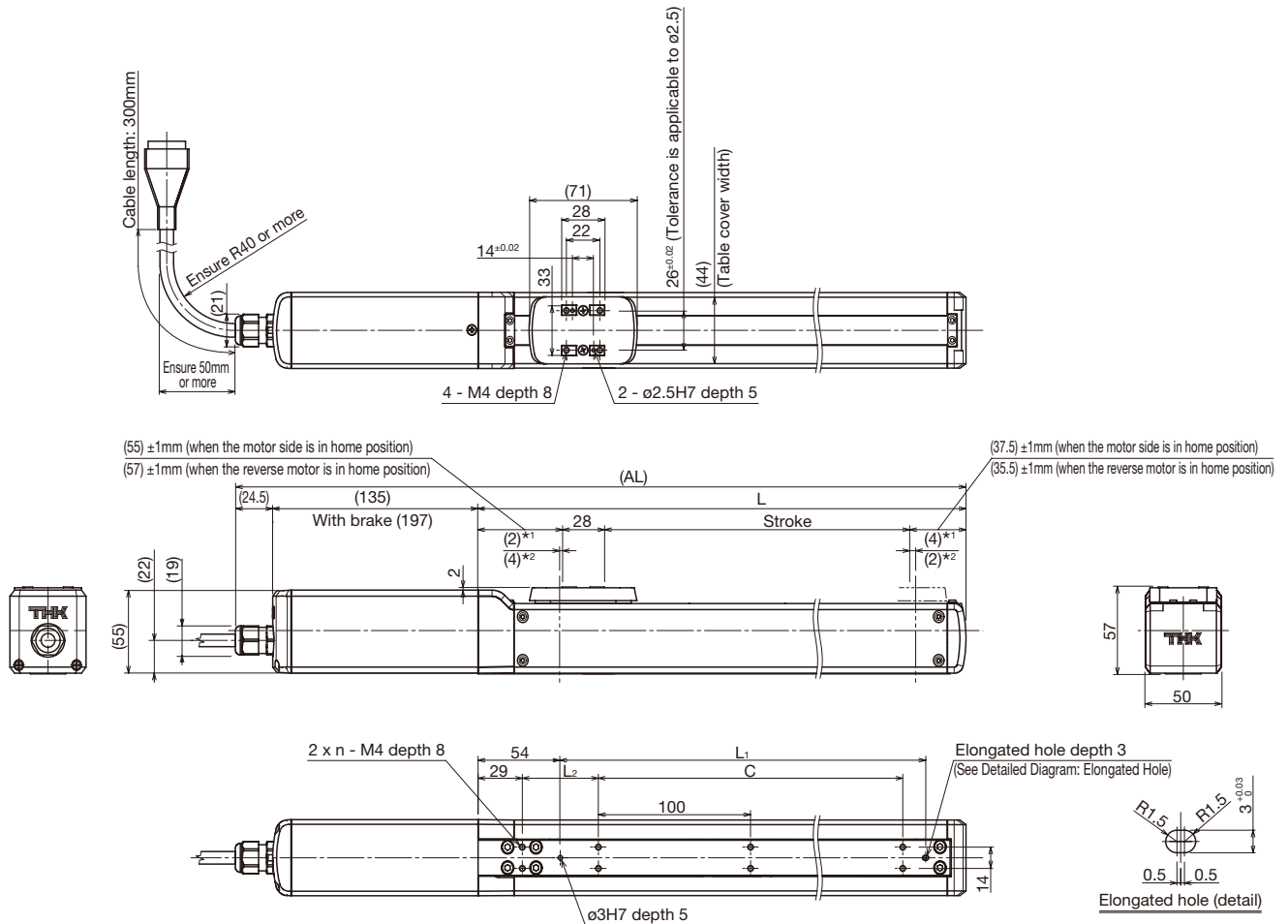
\* Distance from the center of the top face of the table to the load center of gravity position under the following conditions: 5,000km running life, single-direction load, 0.3G horizontal, 0.2G vertical, 150mm stroke.



# ES5 + TSC



## Dimensions



\*1 Stroke to the mechanical stopper when the motor side is in home position.  
 \*2 Stroke to the mechanical stopper when the reverse motor side is in home position.

Stroke [mm] (Stroke between mechanical stoppers)		50 (56)	100 (106)	150 (156)	200 (206)	250 (256)	300 (306)	350 (356)	400 (406)	450 (456)	500 (506)
Maximum speed [mm/s]	Ball screw lead: 6mm	300									
	Ball screw lead: 12mm	500									
Dimensions [mm]	AL*3	330 (392)	380 (442)	430 (492)	480 (542)	530 (592)	580 (642)	630 (692)	680 (742)	730 (792)	780 (842)
	L	170.5	220.5	270.5	320.5	370.5	420.5	470.5	520.5	570.5	620.5
	L1	90	140	190	240	290	340	390	440	490	540
	L2	100	50	100	50	100	50	100	50	100	50
	C	0	100	100	200	200	300	300	400	400	500
Mounting hole count	n	2	3	3	4	4	5	5	6	6	7
Weight *3 [kg]		2.1 (2.6)	2.2 (2.7)	2.3 (2.8)	2.5 (3)	2.6 (3.1)	2.8 (3.2)	2.9 (3.4)	3 (3.5)	3.2 (3.7)	3.3 (3.8)

\*1 Load capacity and maximum speed vary dependent on usage conditions. For details, see "Speed and Load Capacity".

\*2 The maximum speed is the value restricted by the permissible rotational speed of the ball screw.

\*3 Values when a brake is installed are shown in parentheses.

# ES5R Slider type TSC specification Motor wrap



## Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device Type	Option	Motor size	Homing method	Cable length
ES5R	06	0150	B	TS	MR-GR	42P	D00	S3
<b>ES5R</b>	06: 6mm 12: 12mm	0050: 50mm to 0500: 500mm	<b>B</b>	<b>TS</b> : TSC	<b>MR</b> : Motor right wrap <b>ML</b> : Motor left wrap <b>GR</b> : Change the cover color to gray <b>SB</b> : With slider base <input type="checkbox"/> 1 <input type="checkbox"/> 2: Sensors	<b>42P</b> : <input type="checkbox"/> 42 <b>42PB</b> : <input type="checkbox"/> 42 with brake	<b>D00</b> : Motor side <b>R00</b> : Reverse motor side	<b>No symbol</b> : None <b>S3</b> : Standard 3m <b>S5</b> : Standard 5m <b>SA*</b> : Standard 10m

\* To select SA, insert a noise filter to the TSC power supply. Recommended noise filter is "RSAN-2003 (TDK-Lambda Corporation)".

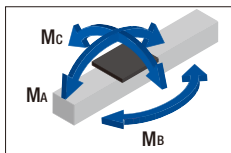
## Basic Specifications

Control device type		TSC	
Motor size		<input type="checkbox"/> 42	
Ball screw lead [mm]		6	12
Maximum load Weight [kg]	Acceleration and deceleration rate	0.3G	8
	Horizontal mount	0.2G	2
	Vertical mount	0.2G	1
Running life *1 [km]		5000	
Positioning repeatability [mm]		±0.020	
Lost motion [mm]		0.1	
Static permissible moment ** [N·m]		Ma: 10.5, Mb: 22, Mc: 22.1	

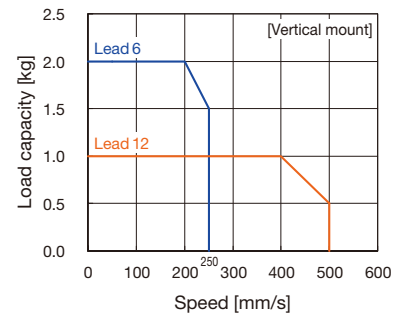
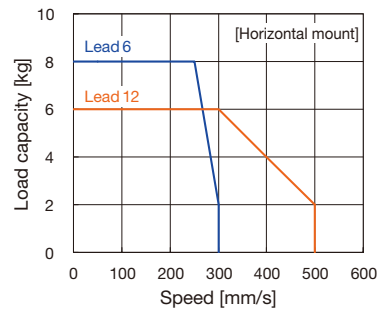
\*1 Running life is based on below conditions.  
Conditions: Horizontal or vertical, under the maximum load capacity, overhang length A=10mm, B and C=0mm, 0.3G for horizontal, 0.2G for vertical, stroke 50mm

\*2 Static maximum permissible moment when unit is stationary.  
Applied point of moment load for Ma and Mc are the top face of the table, and that for Mb is the center of the table.

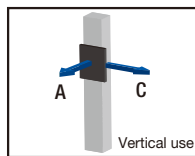
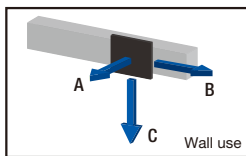
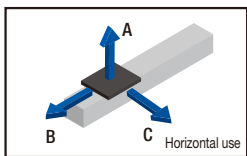
### Static Permissible Moment



## Speed and Load Capacity: Relationship Diagram



## Permissible Overhang Length \*



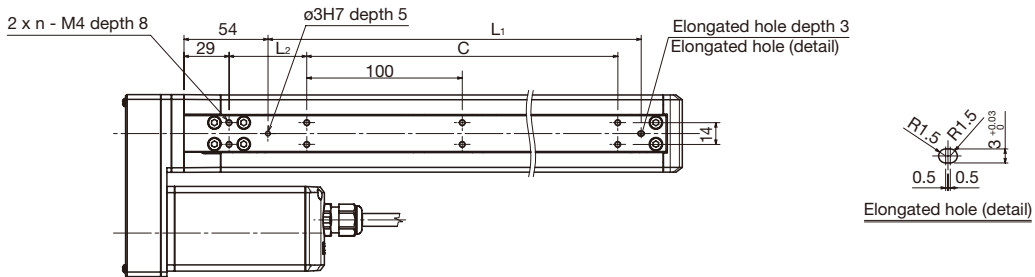
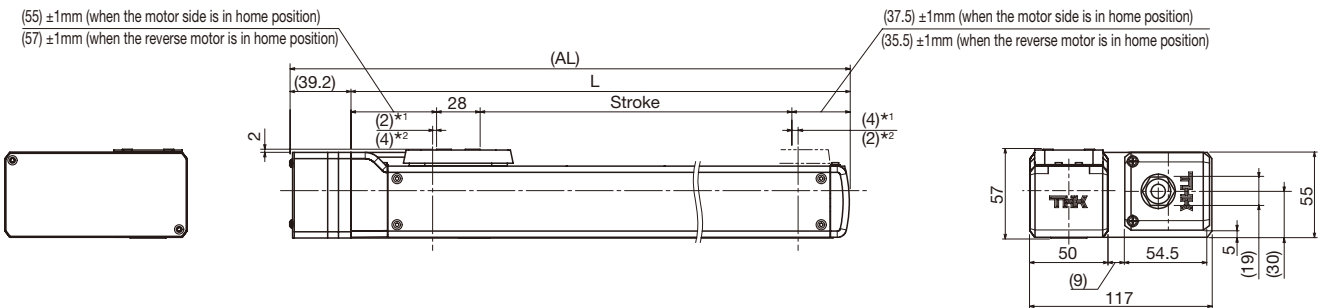
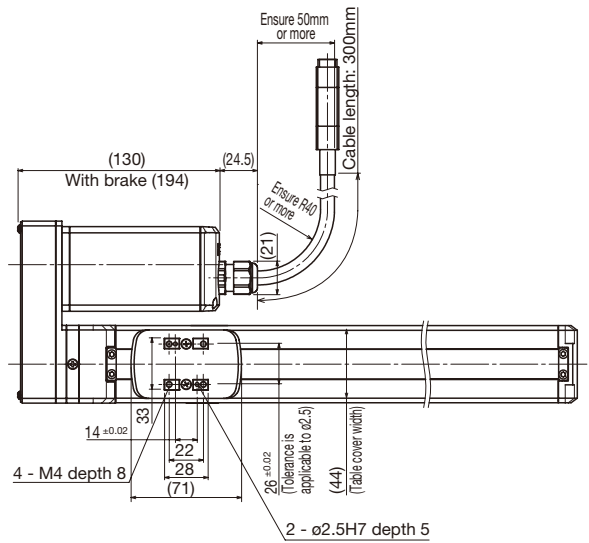
Horizontal mount [mm]					Wall mount [mm]					Vertical mount [mm]			
Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	C
6	4	400	110	260	6	4	220	90	400	6	1	400	400
	8	340	50	120		8	80	30	320		2	210	210
12	3	400	160	280	12	3	260	130	400	12	0.5	400	400
	6	320	70	130		6	100	50	250		1	400	400

\* Distance from the center of the top face of the table to the load center of gravity position under the following conditions: 5,000km running life, single-direction load, 0.3G horizontal, 0.2G vertical, 150mm stroke.

# ES5R + TSC



## Dimensions



\*1 Stroke to the mechanical stopper when the motor side is in home position.  
 \*2 Stroke to the mechanical stopper when the reverse motor side is in home position.

Stroke [mm] (Stroke between mechanical stoppers)		50 (56)	100 (106)	150 (156)	200 (206)	250 (256)	300 (306)	350 (356)	400 (406)	450 (456)	500 (506)
Maximum speed *1 *2 [mm/s]	Ball screw lead: 6mm	Horizontal: 300, Vertical: 250									
	Ball screw lead: 12mm	500									
Dimensions [mm]	AL	209.7	259.7	309.7	359.7	409.7	459.7	509.7	559.7	609.7	659.7
	L	170.5	220.5	270.5	320.5	370.5	420.5	470.5	520.5	570.5	620.5
	L <sub>1</sub>	90	140	190	240	290	340	390	440	490	540
	L <sub>2</sub>	100	50	100	50	100	50	100	50	100	50
Mounting hole count	C	0	100	100	200	200	300	300	400	400	500
	n	2	3	3	4	4	5	5	6	6	7
Weight *3 [kg]		2.2 (2.8)	2.3 (2.9)	2.4 (3)	2.6 (3.2)	2.7 (3.3)	2.8 (3.5)	3 (3.6)	3.1 (3.8)	3.3 (3.9)	3.4 (4)

\*1 Load capacity and maximum speed vary dependent on usage conditions. For details, see "Speed and Load Capacity".

\*2 The maximum speed is the value restricted by the permissible rotational speed of the ball screw.

\*3 Values when a brake is installed are shown in parentheses.

# ES6

Slider type TSC specification Direct motor coupling



## Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device Type	Option	Motor size	Homing method	Cable length
ES6	06	0150	B	TS	GR-SB	42P	D00	S3
ES6	06: 6mm 12: 12mm	0050: 50mm to 0600: 600mm	B	TS: TSC	No symbol: None GR: Change the cover color to gray SB: With slider base □ <sub>1</sub> □ <sub>2</sub> : Sensors	42P: □42 42PB: □42 with brake	D00: Motor side R00: Reverse motor side	No symbol: None S3 : Standard 3m S5 : Standard 5m SA*: Standard 10m

\* To select SA, insert a noise filter to the TSC power supply. Recommended noise filter is \*RSAN-2003 (TDK-Lambda Corporation).

## Basic Specifications

Control device type		TSC	
Motor size		□42	
Ball screw lead [mm]		6	12
Maximum load Weight [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G
		Vertical mount	0.2G
		10	6
		5	2
Running life *1 [km]		5000	
Positioning repeatability [mm]		±0.020	
Lost motion [mm]		0.1	
Static permissible moment ** [N·m]		Ma: 10.5, Mb: 22, Mc: 22.1	

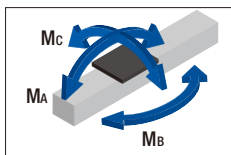
\*1 Running life is based on below conditions.

Conditions: Horizontal or vertical, under the maximum load capacity, overhang length A=10mm, B and C=0mm, 0.3G for horizontal, 0.2G for vertical, stroke 50mm

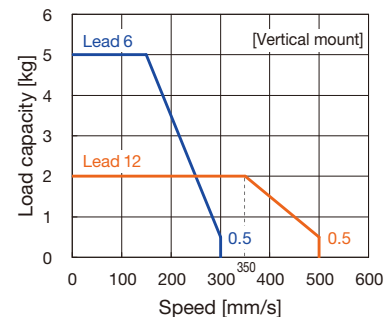
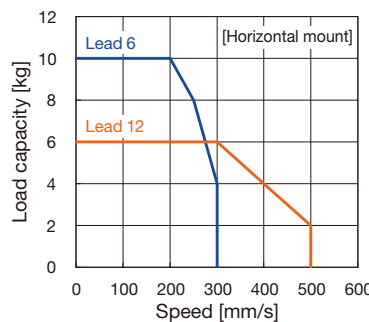
\*2 Static maximum permissible moment when unit is stationary.

Applied point of moment load for Ma and Mc are the top face of the table, and that for Mb is the center of the table.

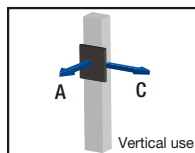
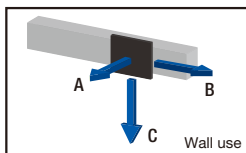
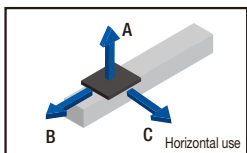
Static Permissible Moment



## Speed and Load Capacity: Relationship Diagram



## Permissible Overhang Length \*



Ball screw lead [mm]	Load mass [kg]	Horizontal mount [mm]		
		A	B	C
6	5	500	90	200
	10	260	40	90
12	3	500	160	280
	6	320	70	130

Ball screw lead [mm]	Load mass [kg]	Wall mount [mm]		
		A	B	C
6	5	160	70	500
	10	40	20	210
12	3	250	130	500
	6	90	50	240

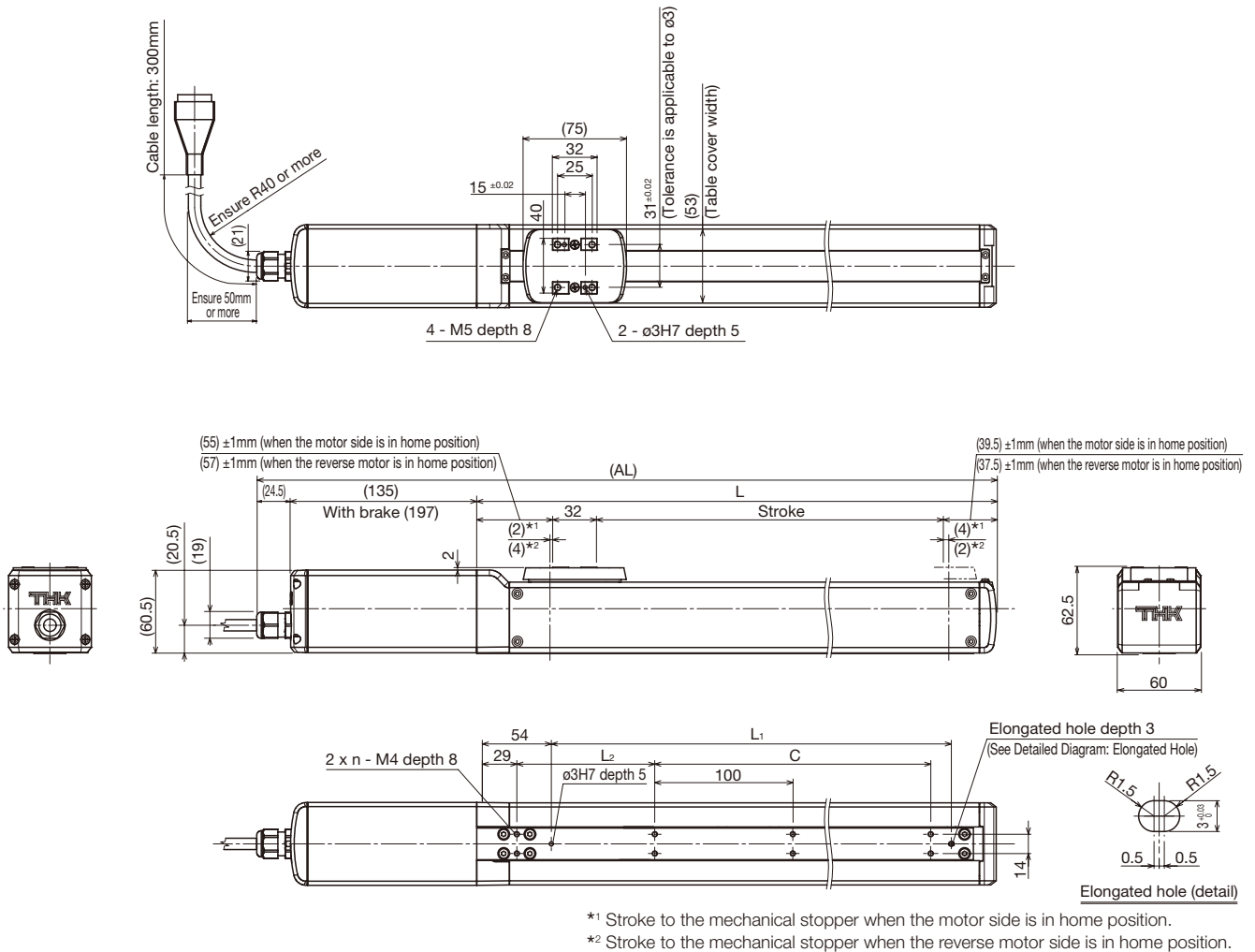
Ball screw lead [mm]	Load mass [kg]	Vertical mount [mm]	
		A	C
6	2.5	160	160
	5	60	60
12	1	420	420
	2	190	190

\* Distance from the center of the top face of the table to the load center of gravity position under the following conditions: 5,000km running life, single-direction load, 0.3G horizontal, 0.2G vertical, 150mm stroke.

# ES6 + TSC



## Dimensions



Stroke [mm] (Stroke between mechanical stoppers)	50 (56)	100 (106)	150 (156)	200 (206)	250 (256)	300 (306)	350 (356)	400 (406)	450 (456)	500 (506)	550 (556)	600 (606)	
Maximum speed <sup>*1 *2</sup> [mm/s]	Ball screw lead: 6mm										270	230	
	Ball screw lead: 12mm										460		
Dimensions [mm]	AL <sup>*3</sup>	336 (398)	386 (448)	436 (498)	486 (548)	536 (598)	586 (648)	636 (698)	686 (748)	736 (798)	786 (848)	836 (898)	886 (948)
	L	176.5	226.5	276.5	326.5	376.5	426.5	476.5	526.5	576.5	626.5	676.5	726.5
	L <sub>1</sub>	90	140	190	240	290	340	390	440	490	540	590	640
	L <sub>2</sub>	100	50	100	50	100	50	100	50	100	50	100	50
Mounting hole count	n	2	3	3	4	4	5	5	6	6	7	7	8
Weight <sup>*3</sup> [kg]		2.4 (2.9)	2.6 (3)	2.7 (3.2)	2.8 (3.3)	3 (3.5)	3.1 (3.6)	3.3 (3.8)	3.4 (3.9)	3.5 (4)	3.7 (4.2)	3.8 (4.3)	4 (4.5)

<sup>\*1</sup> Load capacity and maximum speed vary dependent on usage conditions. For details, see "Speed and Load Capacity".

<sup>\*2</sup> The maximum speed is the value restricted by the permissible rotational speed of the ball screw.

<sup>\*3</sup> Values when a brake is installed are shown in parentheses.



# ES6R Slider type TSC specification Motor wrap

## Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device Type	Option	Motor size	Homing method	Cable length
ES6R	06	0150	B	TS	MR-GR	42P	D00	S3
<b>ES6R</b>	06: 6mm 12: 12mm	0050: 50mm to 0600: 600mm	<b>B</b>	<b>TS</b> : TSC	<b>MR</b> : Motor right wrap <b>ML</b> : Motor left wrap <b>GR</b> : Change the cover color to gray <b>SB</b> : With slider base <input type="checkbox"/> <sub>1</sub> <input type="checkbox"/> <sub>2</sub> : Sensors	<b>42P</b> : <input type="checkbox"/> 42 <b>42PB</b> : <input type="checkbox"/> 42 with brake	<b>D00</b> : Motor side <b>R00</b> : Reverse motor side	<b>No symbol</b> : None <b>S3</b> : Standard 3m <b>S5</b> : Standard 5m <b>SA*</b> : Standard 10m

\* To select SA, insert a noise filter to the TSC power supply. Recommended noise filter is \*RSAN-2003 (TDK-Lambda Corporation).

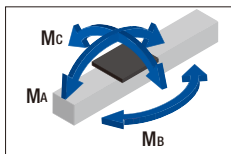
## Basic Specifications

Control device type		TSC	
Motor size		<input type="checkbox"/> 42	
Ball screw lead [mm]		6	12
Maximum load Weight [kg]	Acceleration and deceleration rate	Horizontal mount 0.3G	8
		Vertical mount 0.2G	6
Running life *1 [km]		5000	
Positioning repeatability [mm]		±0.020	
Lost motion [mm]		0.1	
Static permissible moment *2 [N·m]		Ma: 10.5, Ms: 22, Mc: 22.1	

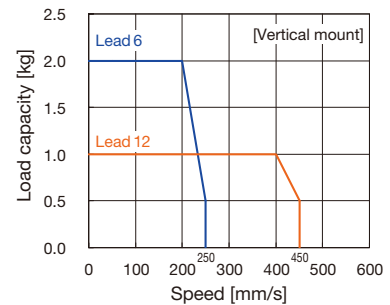
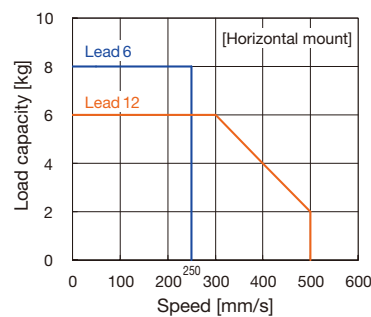
\*1 Running life is based on below conditions.  
Conditions: Horizontal or vertical, under the maximum load capacity, overhang length A=10mm, B and C=0mm, 0.3G for horizontal, 0.2G for vertical, stroke 50mm

\*2 Static maximum permissible moment when unit is stationary. Applied point of moment load for Ma and Mc are the top face of the table, and that for Ms is the center of the table.

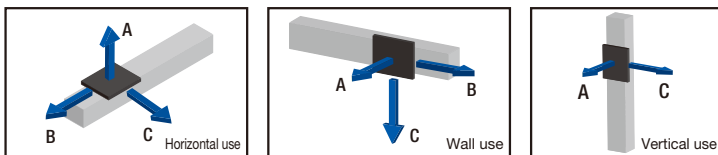
### Static Permissible Moment



## Speed and Load Capacity: Relationship Diagram



## Permissible Overhang Length \*



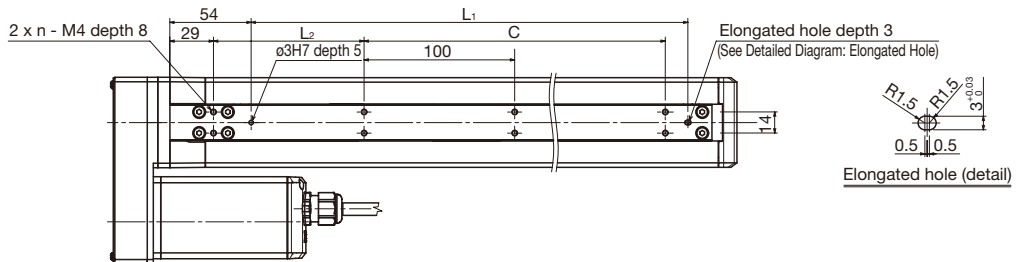
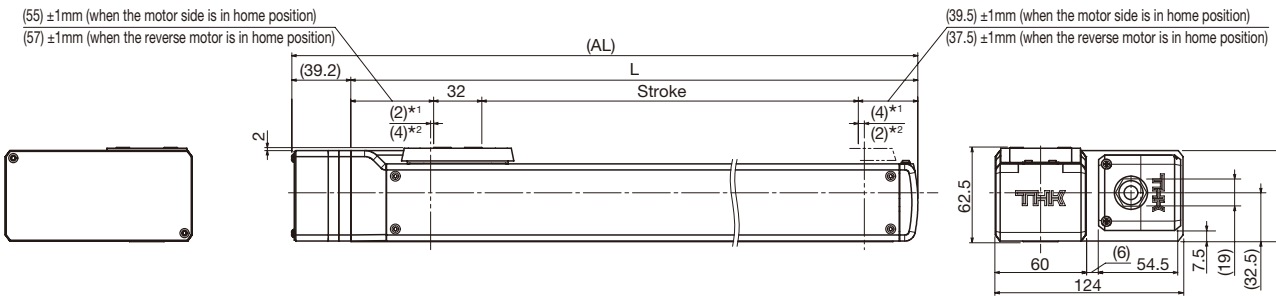
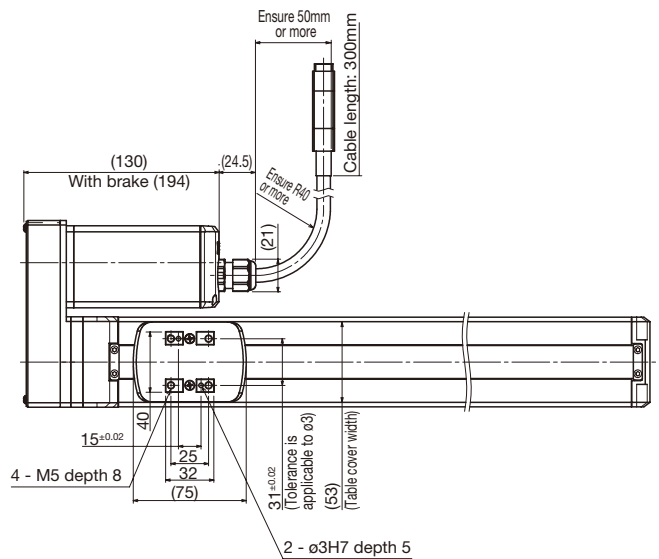
Horizontal mount [mm]					Wall mount [mm]					Vertical mount [mm]			
Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	C
6	4	500	110	260	6	4	210	90	500	6	1	450	450
	8	340	50	120		8	70	30	300		2	210	210
12	3	500	160	280	12	3	250	130	500	12	0.5	500	500
	6	320	70	130		6	90	50	240		1	420	420

\* Distance from the center of the top face of the table to the load center of gravity position under the following conditions: 5,000km running life, single-direction load, 0.3G horizontal, 0.2G vertical, 150mm stroke.

# ES6R + TSC



## Dimensions



\*1 Stroke to the mechanical stopper when the motor side is in home position.  
 \*2 Stroke to the mechanical stopper when the reverse motor side is in home position.

Stroke [mm] (Stroke between mechanical stoppers)		50 (56)	100 (106)	150 (156)	200 (206)	250 (256)	300 (306)	350 (356)	400 (406)	450 (456)	500 (506)	550 (556)	600 (606)
Maximum speed [mm/s]	Ball screw lead: 6mm	250											
	Ball screw lead: 12mm	Horizontal: 500, Vertical: 450											
Dimensions [mm]	AL	215.7	265.7	315.7	365.7	415.7	465.7	515.7	565.7	615.7	665.7	715.7	765.7
	L	176.5	226.5	276.5	326.5	376.5	426.5	476.5	526.5	576.5	626.5	676.5	726.5
	L <sub>1</sub>	90	140	190	240	290	340	390	440	490	540	590	640
	L <sub>2</sub>	100	50	100	50	100	50	100	50	100	50	100	50
	C	0	100	100	200	200	300	300	400	400	500	500	600
Mounting hole count	n	2	3	3	4	4	5	5	6	6	7	7	8
Weight *3 [kg]		2.5 (3.1)	2.7 (3.3)	2.8 (3.4)	2.9 (3.5)	3.1 (3.7)	3.2 (3.8)	3.4 (4)	3.5 (4.1)	3.7 (4.3)	3.8 (4.4)	4 (4.6)	4.1 (4.7)

\*1 Load capacity and maximum speed vary dependent on usage conditions. For details, see "Speed and Load Capacity".

\*2 The maximum speed is the value restricted by the permissible rotational speed of the ball screw.

\*3 Values when a brake is installed are shown in parentheses.

\*4 Horizontal: 460, Vertical: 450

# EC3 Cylinder type TSC specification Direct motor coupling



## Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device Type	Option	Motor size	Homing method	Cable length
EC3	06	0150	B	TS	GR-FL-LB	35P	D00	S3
EC3	06: 6mm	0050: 50mm to 0200: 200mm	B	TS: TSC	No symbol: None GR: Change the cover color to gray CB: With cylinder base FL : With flange LB : With link ball	35P: □35 35PB: □35 with brake	D00: Motor side R00: Reverse motor side	No symbol: None S3 : Standard 3m S5 : Standard 5m SA*: Standard 10m

\* To select SA, insert a noise filter to the TSC power supply. Recommended noise filter is "RSAN-2003 (TDK-Lambda Corporation)".

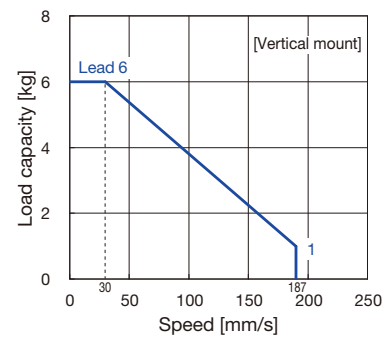
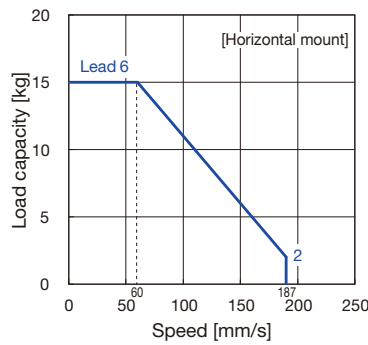
## Basic Specifications

Control device type		TSC	
Motor size		□35	
Ball screw lead [mm]		6	
Maximum load Weight*1 [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G
		Vertical mount	0.2G
Running life*2 [km]		5000	
Positioning repeatability [mm]		±0.020	
Lost motion [mm]		0.1	
Rod non-rotational accuracy [°]		±1.5	

\*1 With EC, only an axial load is permissible; do not apply any other type of load to the rod using an LM Guide. Take into account the sliding resistance of LM Guide when making selection.

\*2 Running life is based on below conditions.  
Conditions: Under the maximum load capacity (with LM guide), maximum speed, 0.3G for horizontal, 0.2G for vertical

## Speed and Load Capacity: Relationship Diagram

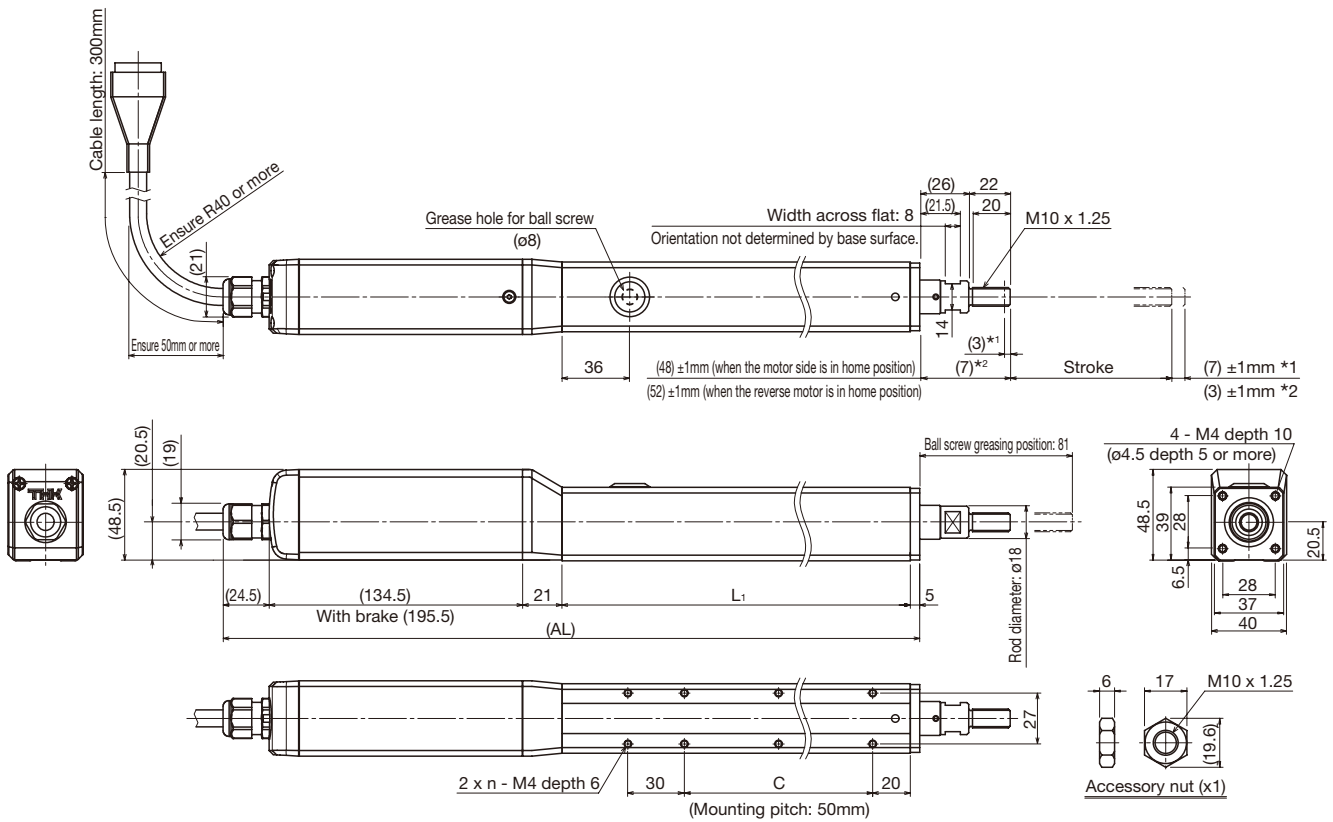




EC3 + TSC



Dimensions



\*1 Stroke to the mechanical stopper when the motor side is in home position.  
 \*2 Stroke to the mechanical stopper when the reverse motor side is in home position.

Stroke [mm] (Stroke between mechanical stoppers)		50 (60)	100 (110)	150 (160)	200 (210)
Maximum speed *1*2 [mm/s]	Ball screw lead: 6mm	187			
Dimensions [mm]	AL *3	320 (381)	370 (431)	420 (481)	470 (531)
	L <sub>1</sub>	135	185	235	285
	C	50	100	150	200
Mounting hole count	n	3	4	5	6
Weight *3 [kg]		1.4 (1.8)	1.6 (2)	1.8 (2.2)	2 (2.4)

\*1 Load capacity and maximum speed vary dependent on usage conditions. For details, see "Speed and Load Capacity".

\*2 The maximum speed is the value restricted by the permissible rotational speed of the ball screw.

\*3 Values when a brake is installed are shown in parentheses.

# EC3R Cylinder type TSC specification Motor wrap



## Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device Type	Option	Motor size	Homing method	Cable length
EC3R	06	0150	B	TS	MR-GR-FL-LB /	35P	D00	S3
EC3R	06: 6mm	0050: 50mm to 0200: 200mm	B	TS: TSC	MR: Motor right wrap ML: Motor left wrap GR: Change the cover color to gray CB: With cylinder base FL: With flange LB: With link ball	35P: □35 35PB: □35 with brake	D00: Motor side R00: Reverse motor side	No symbol: None S3: Standard 3m S5: Standard 5m SA*: Standard 10m

\* To select SA, insert a noise filter to the TSC power supply. Recommended noise filter is "RSAN-2003 (TDK-Lambda Corporation)".

## Basic Specifications

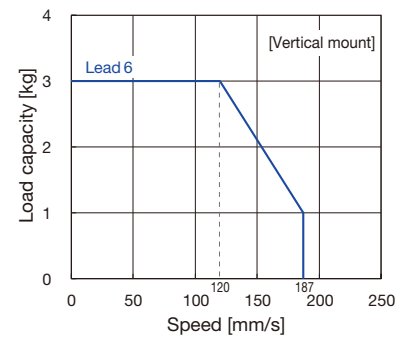
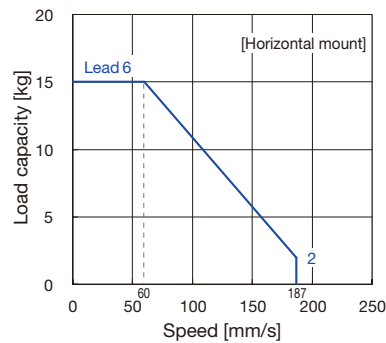
Control device type		TSC	
Motor size		□35	
Ball screw lead [mm]		6	
Maximum load Weight*1 [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G
		Vertical mount	0.2G
Running life*2 [km]		5000	
Positioning repeatability [mm]		±0.020	
Lost motion [mm]		0.1	
Rod non-rotational accuracy [°]		±1.5	

\*1 With EC, only an axial load is permissible; do not apply any other type of load to the rod using an LM Guide. Take into account the sliding resistance of LM Guide when making selection.

\*2 Running life is based on below conditions.

Conditions: Under the maximum load capacity (with LM guide), maximum speed, 0.3G for horizontal, 0.2G for vertical

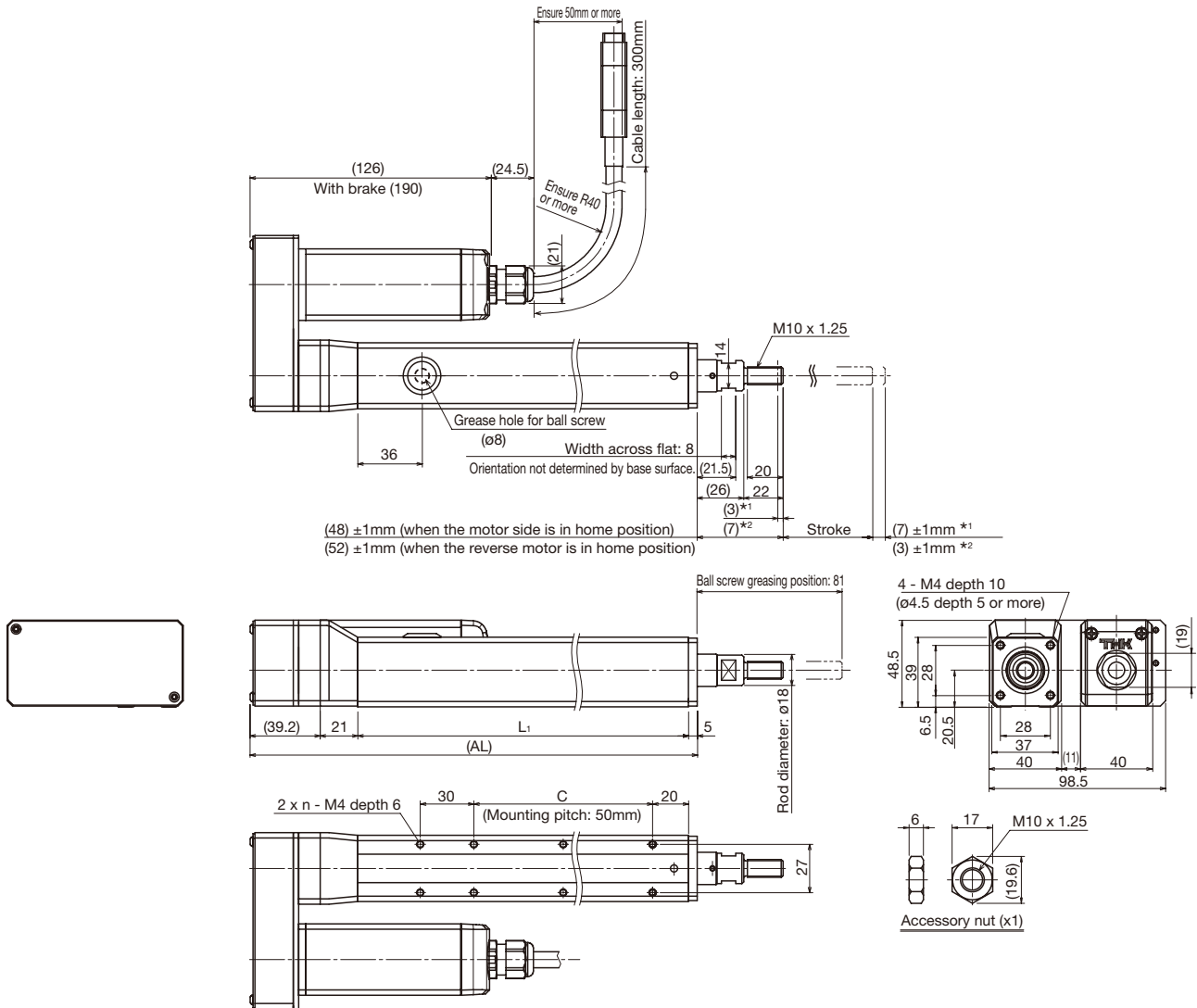
## Speed and Load Capacity: Relationship Diagram



# EC3R + TSC



## Dimensions



\*1 Stroke to the mechanical stopper when the motor side is in home position.

\*2 Stroke to the mechanical stopper when the reverse motor side is in home position.

Stroke [mm] (Stroke between mechanical stoppers)		50 (60)	100 (110)	150 (160)	200 (210)
Maximum speed *1*2 [mm/s]	Ball screw lead: 6mm	187			
Dimensions [mm]	AL	200.2	250.2	300.2	350.2
	L <sub>1</sub>	135	185	235	285
	C	50	100	150	200
Mounting hole count	n	3	4	5	6
Weight *3 [kg]		1.4 (1.8)	1.6 (2.0)	1.8 (2.2)	2 (2.4)

\*1 Load capacity and maximum speed vary dependent on usage conditions. For details, see "Speed and Load Capacity".

\*2 The maximum speed is the value restricted by the permissible rotational speed of the ball screw.

\*3 Values when a brake is installed are shown in parentheses.

# EC3H

Cylinder type TSC specification Direct motor coupling/with linear bush



## Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device Type	Option	Motor size	Homing method	Cable length
EC3H	06	0150	B	TS	GR-CB	35P	D00	S3
<b>EC3H</b>	<b>06</b> : 6mm	<b>0050</b> : 50mm to <b>0200</b> : 200mm	<b>B</b>	<b>TS</b> : TSC	<b>No symbol</b> : None <b>GR</b> : Change the cover color to gray <b>CB</b> : With cylinder base	<b>35P</b> : □35 <b>35PB</b> : □35 with brake	<b>D00</b> : Motor side <b>R00</b> : Reverse motor side	<b>No symbol</b> : None <b>S3</b> : Standard 3m <b>S5</b> : Standard 5m <b>SA*</b> : Standard 10m

\* To select SA, insert a noise filter to the TSC power supply. Recommended noise filter is "RSAN-2003 (TDK-Lambda Corporation)".

## Basic Specifications

Control device type		TSC	
Motor size		□35	
Ball screw lead [mm]		6	
Maximum load Weight <sup>*1*2</sup> [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G
		Vertical mount	0.2G
Running life <sup>*2*3</sup> [km]		5000	
Positioning repeatability [mm]		±0.020	
Lost motion [mm]		0.1	
Rod non-rotational accuracy [°]		±0.05	

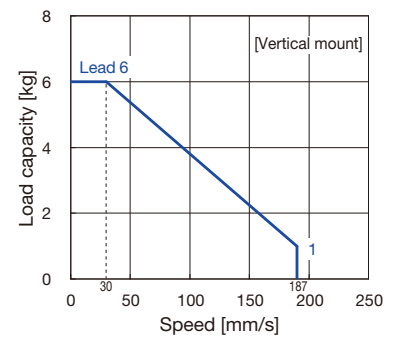
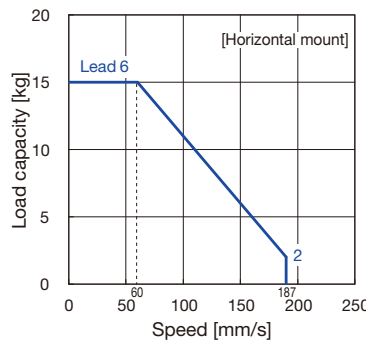
\*1 With EC, only an axial load is permissible; do not apply any other type of load to the rod using an LM Guide. Take into account the sliding resistance of LM Guide when making selection.

\*2 Load capacity and running life may vary without an LM guide. For details, see "End Load and Running Life".

\*3 Running life is based on below conditions.

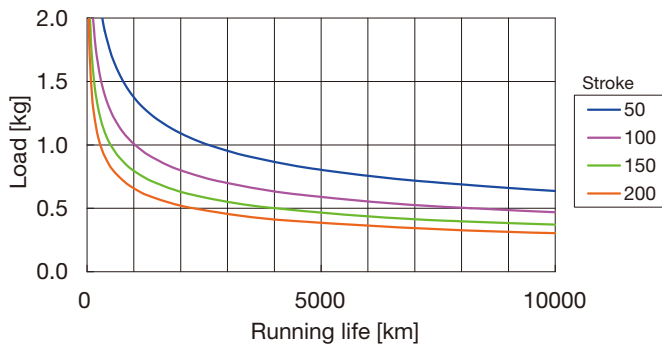
Conditions: Under the maximum load capacity (with LM guide), maximum speed, 0.3G for horizontal, 0.2G for vertical

## Speed and Load Capacity: Relationship Diagram



## Reference End Load and Running Life

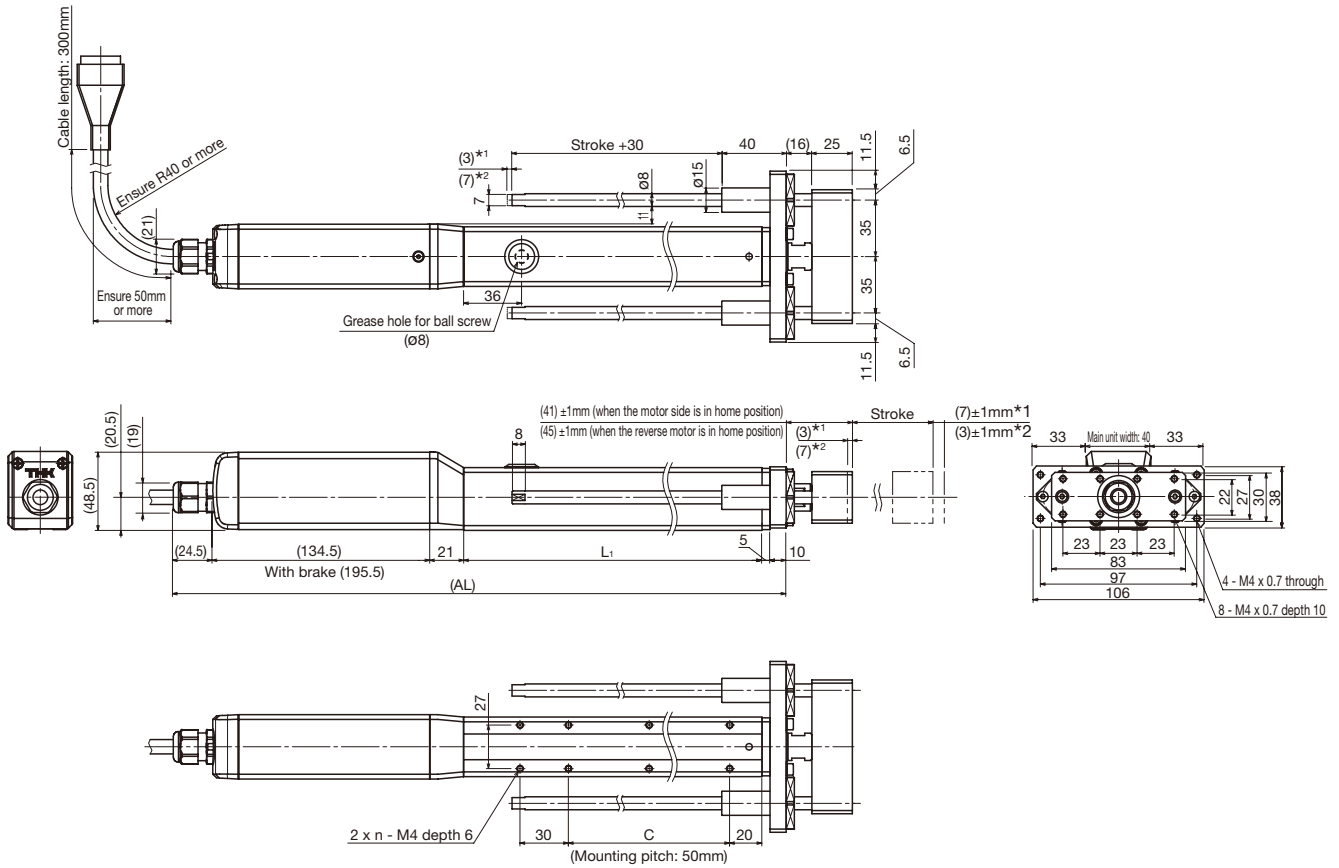
Running life varies when a load is applied to the end of the unit without using an LM Guide, as shown below.



# EC3H + TSC



## Dimensions



\*1 Stroke to the mechanical stopper when the motor side is in home position.

\*2 Stroke to the mechanical stopper when the reverse motor side is in home position.

Stroke [mm] (Stroke between mechanical stoppers)		50 (60)	100 (110)	150 (160)	200 (210)
Maximum speed *1*2 [mm/s]	Ball screw lead: 6mm	187			
Dimensions [mm]	AL*3	330 (391)	380 (441)	430 (491)	480 (541)
	L <sub>1</sub>	135	185	235	285
	C	50	100	150	200
Mounting hole count	n	3	4	5	6
Weight *3 [kg]		1.7 (2.1)	1.9 (2.4)	2.2 (2.6)	2.4 (2.9)

\*1 Load capacity and maximum speed vary dependent on usage conditions. For details, see "Speed and Load Capacity".

\*2 The maximum speed is the value restricted by the permissible rotational speed of the ball screw.

\*3 Values when a brake is installed are shown in parentheses.

# EC4 Cylinder type TSC specification Direct motor coupling



## Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device Type	Option	Motor size	Homing method	Cable length
EC4	06	0150	B	TS	GR-FL-LB	42P	D00	S3
EC4	06: 6mm 12: 12mm	0050: 50mm to 0300: 300mm	B	TS: TSC	No symbol: None GR: Change the cover color to gray CB: With cylinder base FL : With flange LB : With link ball	42P: □42 42PB: □42 with brake	D00: Motor side R00: Reverse motor side	No symbol: None S3 : Standard 3m S5 : Standard 5m SA*: Standard 10m

\* To select SA, insert a noise filter to the TSC power supply. Recommended noise filter is "RSAN-2003 (TDK-Lambda Corporation)".

## Basic Specifications

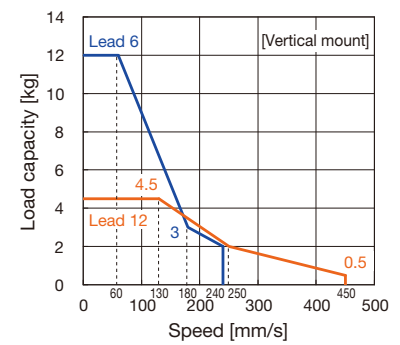
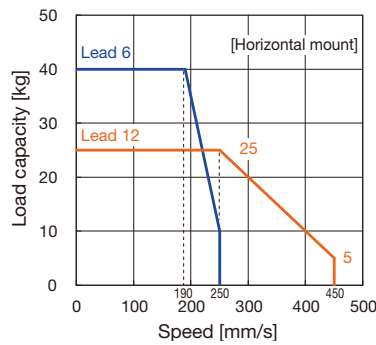
Control device type		TSC	
Motor size		□42	
Ball screw lead [mm]		6	12
Maximum load Weight*1 [kg]	Acceleration and deceleration rate	Horizontal mount	Vertical mount
		0.3G	0.2G
		40	25
		12	4.5
Running life*2 [km]		5000	
Positioning repeatability [mm]		±0.020	
Lost motion [mm]		0.1	
Rod non-rotational accuracy [°]		±1.5	

\*1 With EC, only an axial load is permissible; do not apply any other type of load to the rod using an LM Guide. Take into account the sliding resistance of LM Guide when making selection.

\*2 Running life is based on below conditions.

Conditions: Under the maximum load capacity (with LM guide), maximum speed, 0.3G for horizontal, 0.2G for vertical

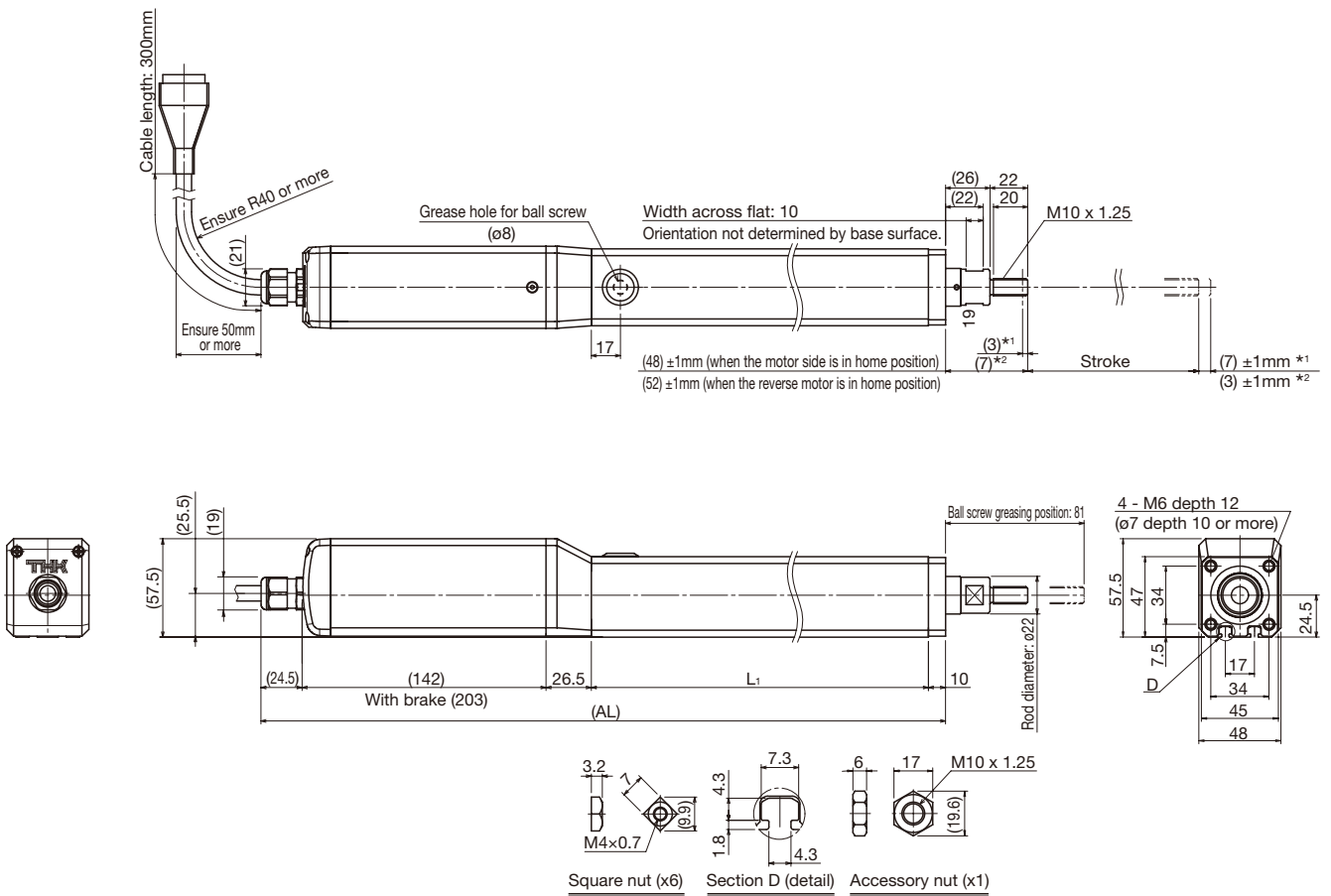
## Speed and Load Capacity: Relationship Diagram



# EC4 + TSC



## Dimensions



\*1 Stroke to the mechanical stopper when the motor side is in home position.

\*2 Stroke to the mechanical stopper when the reverse motor side is in home position.

Stroke [mm] (Stroke between mechanical stoppers)		50 (60)	100 (110)	150 (160)	200 (210)	250 (260)	300 (310)
Maximum speed <sup>*1 *2</sup> [mm/s]	Ball screw lead: 6mm	Horizontal: 250, Vertical: 240				230	170
	Ball screw lead: 12mm	450					340
Dimensions [mm]	AL <sup>*3</sup>	350 (411)	400 (461)	450 (511)	500 (561)	550 (611)	600 (661)
	L <sub>1</sub> <sup>*4</sup>	147	197	247	297	347	397
Weight <sup>*3</sup> [kg]		2.3 (2.9)	2.6 (3.2)	3 (3.5)	3.3 (3.8)	3.6 (4.2)	4 (4.5)

\*1 Load capacity and maximum speed vary dependent on usage conditions. For details, see "Speed and Load Capacity".

\*2 The maximum speed is the value restricted by the permissible rotational speed of the ball screw.

\*3 Values when a brake is installed are shown in parentheses.

\*4 The dimension of the T slot corresponds to L<sub>1</sub>.

# EC4R Cylinder type TSC specification Motor wrap



## Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device Type	Option	Motor size	Homing method	Cable length
EC4R	06	0150	B	TS	MR-GR-FL-LB /	42P	D00	S3
<b>EC4R</b>	06: 6mm 12: 12mm	0050: 50mm to 0300: 300mm	<b>B</b>	<b>TS</b> : TSC	<b>MR</b> : Motor right wrap <b>ML</b> : Motor left wrap <b>GR</b> : Change the cover color to gray <b>CB</b> : With cylinder base <b>FL</b> : With flange <b>LB</b> : With link ball	<b>42P</b> : □42 <b>42PB</b> : □42 with brake	<b>D00</b> : Motor side <b>R00</b> : Reverse motor side	<b>No symbol</b> : None <b>S3</b> : Standard 3m <b>S5</b> : Standard 5m <b>SA*</b> : Standard 10m

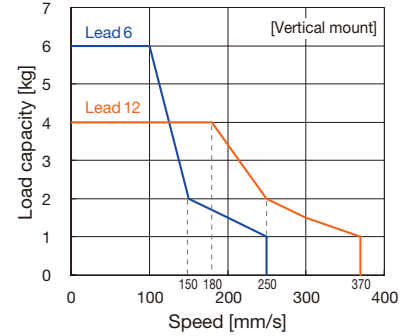
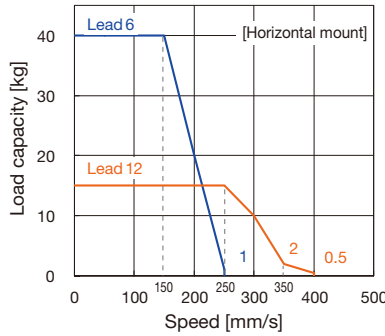
\* To select SA, insert a noise filter to the TSC power supply. Recommended noise filter is "RSAN-2003 (TDK-Lambda Corporation)".

## Basic Specifications

Control device type		TSC	
Motor size		□42	
Ball screw lead [mm]		6	12
Maximum load Weight*1 [kg]	Acceleration and deceleration rate	Horizontal mount	Vertical mount
		0.3G	0.2G
		40	15
		6	4.0
Running life*2 [km]		5000	
Positioning repeatability [mm]		±0.020	
Lost motion [mm]		0.1	
Rod non-rotational accuracy [°]		±1.5	

\*1 With EC, only an axial load is permissible. With EC, only an axial load is permissible; do not apply any other type of load to the rod using an LM Guide. Take into account the sliding resistance of LM Guide when making selection.  
\*2 Running life is based on below conditions. Conditions: Under the maximum load capacity (with LM guide), maximum speed, 0.3G for horizontal, 0.2G for vertical

## Speed and Load Capacity: Relationship Diagram

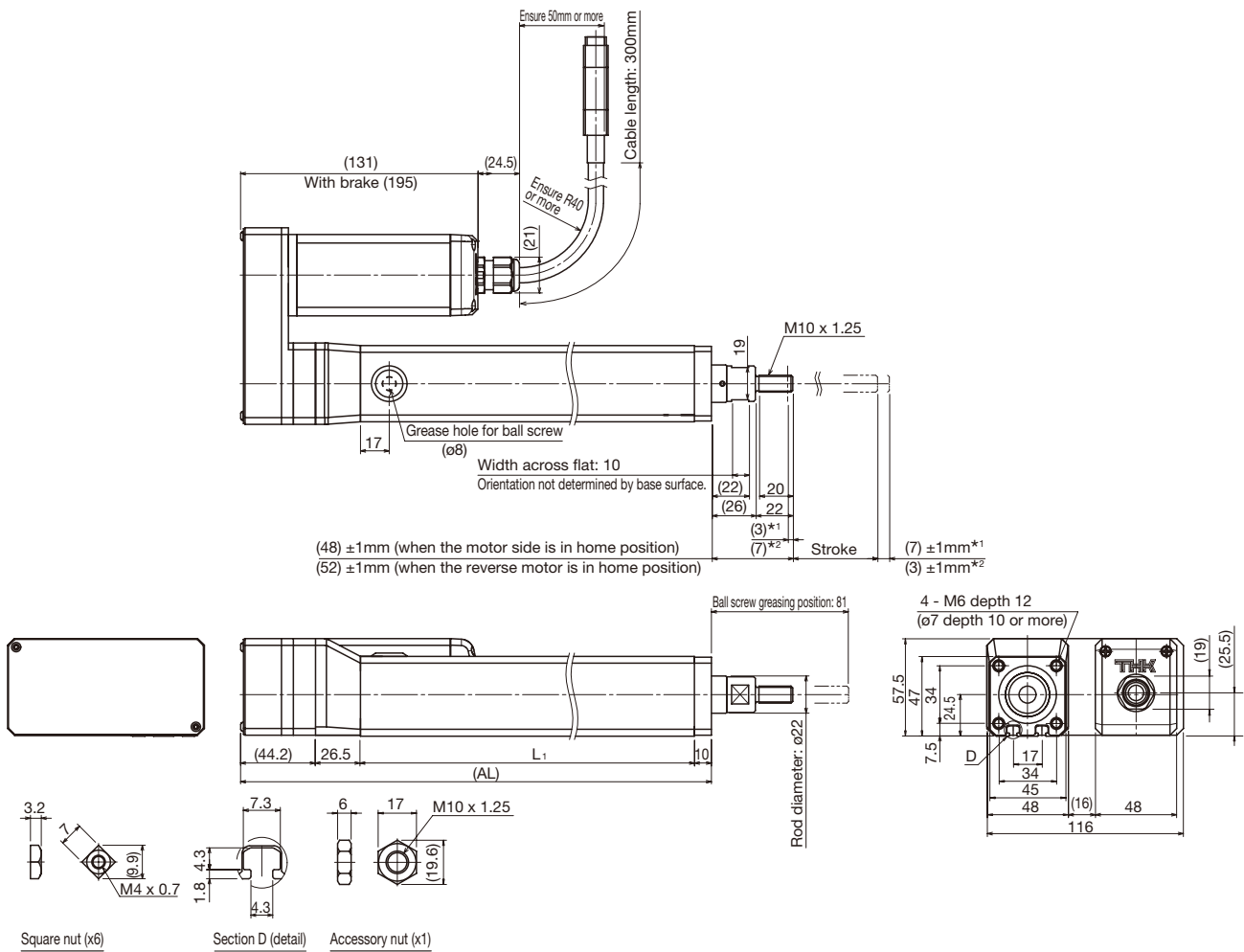




# EC4R + TSC



## Dimensions



\*<sup>1</sup> Stroke to the mechanical stopper when the motor side is in home position.

\*<sup>2</sup> Stroke to the mechanical stopper when the reverse motor side is in home position.

Stroke [mm] (Stroke between mechanical stoppers)		50 (60)	100 (110)	150 (160)	200 (210)	250 (260)	300 (310)
Maximum speed * <sup>1</sup> * <sup>2</sup> [mm/s]	Ball screw lead: 6mm	250				230	170
	Ball screw lead: 12mm	Horizontal: 400, Vertical: 370					340
Dimensions [mm]	AL	227.7	277.7	327.7	377.7	427.7	477.7
	L <sub>1</sub> * <sup>3</sup>	147	197	247	297	347	397
Weight * <sup>4</sup> [kg]		2.3 (2.9)	2.6 (3.2)	2.9 (3.6)	3.3 (3.9)	3.6 (4.2)	3.9 (4.5)

\*<sup>1</sup> Load capacity and maximum speed vary dependent on usage conditions. For details, see "Speed and Load Capacity".

\*<sup>2</sup> The maximum speed is the value restricted by the permissible rotational speed of the ball screw.

\*<sup>3</sup> The dimension of the T slot corresponds to L<sub>1</sub>.

\*<sup>4</sup> Values when a brake is installed are shown in parentheses.

# EC4H

Cylinder type TSC specification Direct motor coupling/with linear bush



## Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device Type	Option	Motor size	Homing method	Cable length
EC4H	06	0150	B	TS	GR-CB	42P	D00	S3
EC4H	06: 6mm 12: 12mm	0050: 50mm to 0300: 300mm	B	TS: TSC	No symbol: None GR: Change the cover color to gray CB: With cylinder base	42P: □42 42PB: □42 with brake	D00: Motor side R00: Reverse motor side	No symbol: None S3 : Standard 3m S5 : Standard 5m SA*: Standard 10m

\* To select SA, insert a noise filter to the TSC power supply. Recommended noise filter is "RSAN-2003 (TDK-Lambda Corporation)".

## Basic Specifications

Control device type		TSC	
Motor size		□42	
Ball screw lead [mm]		6	12
Maximum load Weight <sup>*1*2</sup> [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G
		Vertical mount	0.2G
Running life <sup>*2*3</sup> [km]		5000	
Positioning repeatability [mm]		±0.020	
Lost motion [mm]		0.1	
Rod non-rotational accuracy [°]		±0.05	

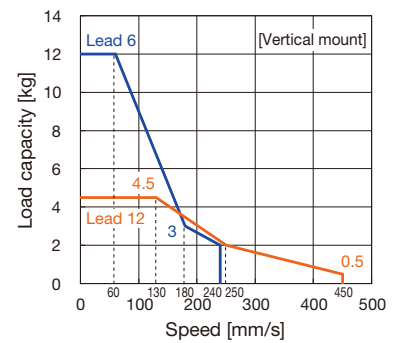
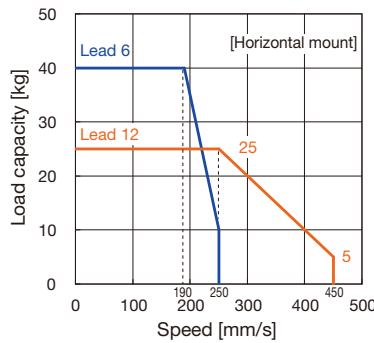
\*1 With EC, only an axial load is permissible; do not apply any other type of load to the rod using an LM Guide. Take into account the sliding resistance of LM Guide when making selection.

\*2 Load capacity and running life may vary without an LM guide. For details, see "End Load and Running Life".

\*3 Running life is based on below conditions.

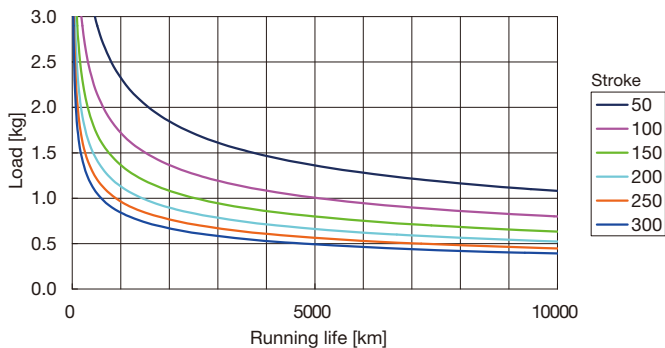
Conditions: Under the maximum load capacity (with LM guide), maximum speed, 0.3G for horizontal, 0.2G for vertical

## Speed and Load Capacity: Relationship Diagram



## Reference End Load and Running Life

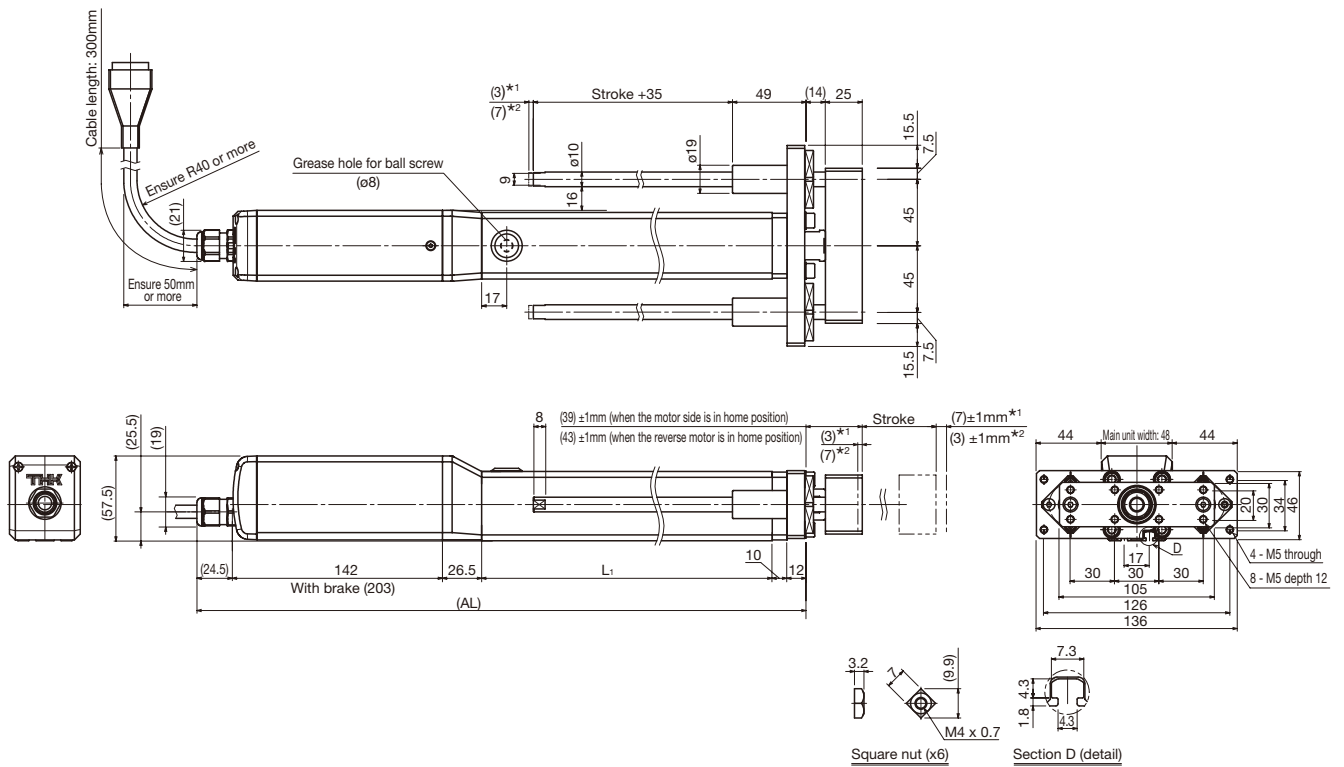
Running life varies when a load is applied to the end of the unit without using an LM Guide, as shown below.



# EC4H + TSC



## Dimensions



\*1 Stroke to the mechanical stopper when the motor side is in home position.

\*2 Stroke to the mechanical stopper when the reverse motor side is in home position.

Stroke [mm] (Stroke between mechanical stoppers)		50 (60)	100 (110)	150 (160)	200 (210)	250 (260)	300 (310)
Maximum speed <sup>*1 *2</sup> [mm/s]	Ball screw lead: 6mm	Horizontal: 250, Vertical: 240				230	170
	Ball screw lead: 12mm	450					340
Dimensions [mm]	AL <sup>*3</sup>	362 (423)	412 (473)	462 (523)	512 (573)	562 (623)	612 (673)
	L1 <sup>*4</sup>	147	197	247	297	347	397
Weight <sup>*3</sup> [kg]		2.8 (3.4)	3.1 (3.8)	3.5 (4.1)	3.9 (4.5)	4.2 (4.8)	4.6 (5.2)

\*1 Load capacity and maximum speed vary dependent on usage conditions. For details, see "Speed and Load Capacity".

\*2 The maximum speed is the value restricted by the permissible rotational speed of the ball screw.

\*3 Values when a brake is installed are shown in parentheses.

\*4 The dimension of the T slot corresponds to L1.

# ES5 Slider type TLC specification Direct motor coupling, 50W



## Model Configuration

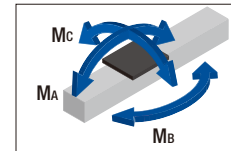
Model	Ball screw lead	Stroke	Design symbol	Control device type	Option	Motor rated output	Motor cable orientation	Homing method	Cable type and length
ES5	06	0150	B	TL	GR-SB	M05	R	D00	F3
ES5	06: 6mm 12: 12mm	0050: 50mm to 0500: 500mm	B	TL: TLC	No symbol: None GR: Change the cover color to gray SB: With slider base □ <sub>1</sub> □ <sub>2</sub> : Sensor	M05 : 50W M05B: 50W with brake	R: Right U: Up L: Left D: Down	D00: Motor side R00: Reverse motor side	F3: Standard 3m F5: Standard 5m FA: Standard 10m H3: High flex 3m H5: High flex 5m HA: High flex 10m

Note: If the GR is not included in the model configuration, cover will be red.

## Basic Specifications

Control device type				TLC	
Motor rated output [W]				50	
Ball screw lead [mm]				6	12
Rated speed *1 [mm/s]				300	600
Maximum load capacity *2 [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G	10	6
		Vertical mount	0.3G	5	2
Rated thrust *3 [N]				134	67
Maximum thrust *4 [N]				293	147
Electromagnetic brake retention [N]				268	134
Running life *5 [km]				5000	
Static permissible moment *6 [N·m]				M <sub>A</sub> : 10.5, M <sub>B</sub> : 22, M <sub>C</sub> : 22.1	
Positioning repeatability [mm]				±0.020	
Lost motion [mm]				0.1	

Static permissible moment



\*1 At rated motor speed (3,000 min<sup>-1</sup>).

\*2 At rated speed.

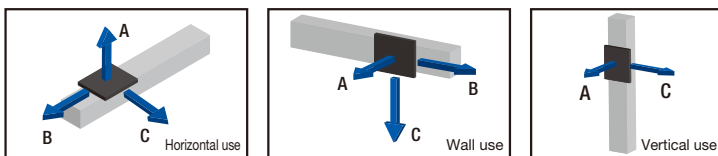
\*3 At rated motor torque.

\*4 Dependent on maximum peak torque and permissible load.

\*5 Conditions: horizontal or vertical, 0.3G; under maximum load capacity; overhang length A: 10mm, B and C: 0mm; stroke: 50mm.

\*6 Static maximum permissible moment when unit is stationary. Applied point of moment load for M<sub>A</sub> and M<sub>C</sub> are the top face of the table, and that for M<sub>B</sub> is the center of the table.

## Permissible Overhang Length\*



Horizontal mount [mm]					Wall mount [mm]					Vertical mount [mm]				
Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	C	
6	5	400	90	200	6	5	160	70	400	6	2.5	160	160	
	10	270	40	90		10	50	20	220		5	70	70	
12	3	400	160	280	12	3	260	130	400	12	1	400	400	
	6	320	70	130		6	100	50	250		2	200	200	

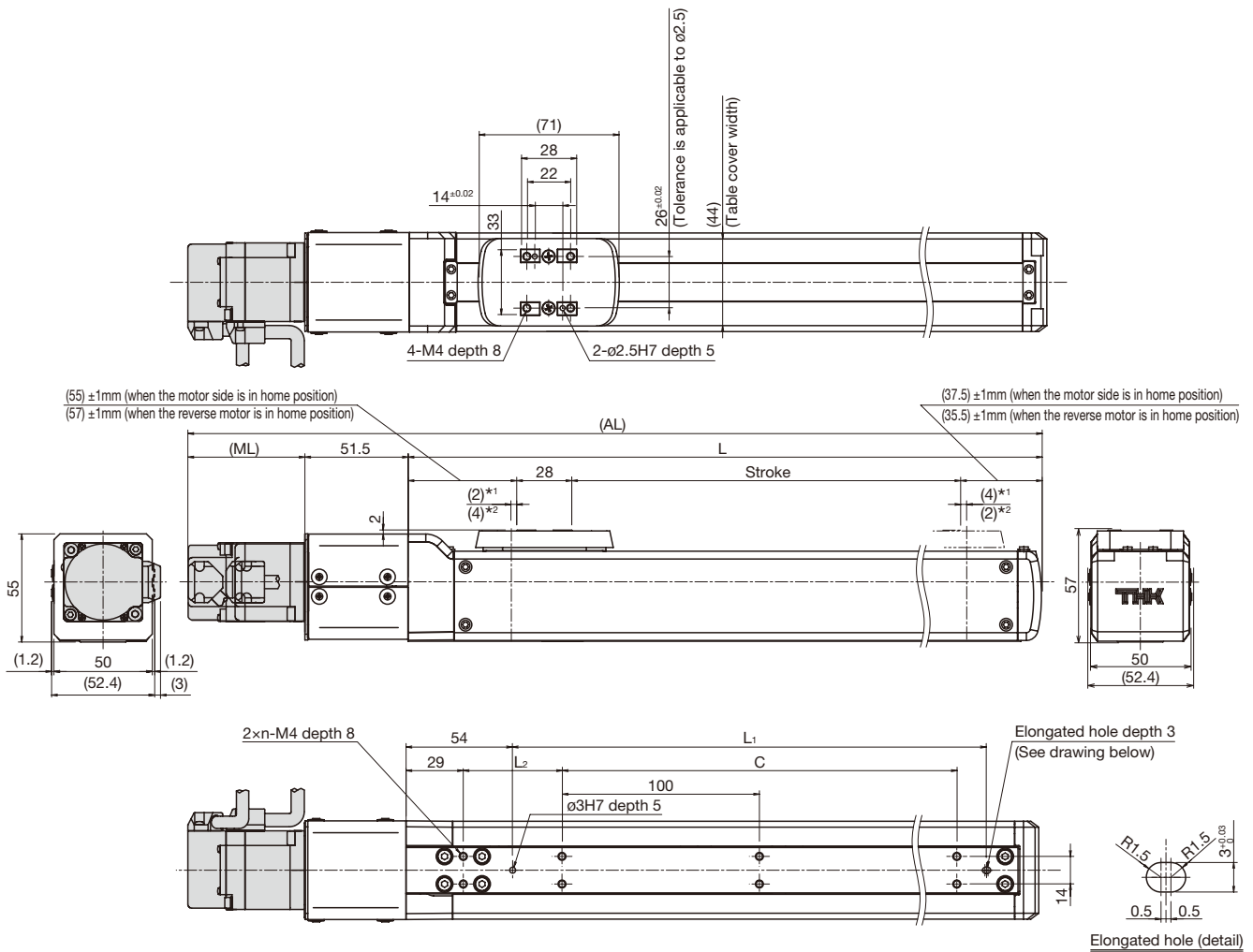
\* Distance from the center of the top face of the table to the load center of gravity position under the following conditions: 5,000km running life, single-direction load, 0.3G horizontal or vertical, 150mm stroke.

ES5 + TLC



Motor rated output  
**50W**

Dimensions



\*1 Stroke to the mechanical stopper when the motor side is in home position.  
\*2 Stroke to the mechanical stopper when the reverse motor side is in home position.

Stroke [mm] (Stroke between mechanical stoppers)		50 (56)	100 (106)	150 (156)	200 (206)	250 (256)	300 (306)	350 (356)	400 (406)	450 (456)	500 (506)
Maximum speed *1 [mm/s]	Ball screw lead: 6mm	300									
	Ball screw lead: 12mm	600									
Dimensions [mm]	AL *2	281.5 (317.1)	331.5 (367.1)	381.5 (417.1)	431.5 (467.1)	481.5 (517.1)	531.5 (567.1)	581.5 (617.1)	631.5 (667.1)	681.5 (717.1)	731.5 (767.1)
	ML *2	59.5 (95.1)									
	L	170.5	220.5	270.5	320.5	370.5	420.5	470.5	520.5	570.5	620.5
	L <sub>1</sub>	90	140	190	240	290	340	390	440	490	540
	L <sub>2</sub>	100	50	100	50	100	50	100	50	100	50
Mounting hole count	C	0	100	100	200	200	300	300	400	400	500
	n	2	3	3	4	4	5	5	6	6	7
Weight *2 [kg]		2.0 (2.2)	2.1 (2.3)	2.2 (2.4)	2.4 (2.6)	2.5 (2.7)	2.7 (2.9)	2.8 (3.0)	2.9 (3.1)	3.1 (3.3)	3.2 (3.4)

\*1 Dependent on ball screw's permissible rotation speed.  
\*2 Values when brake is installed are shown in parentheses.



# ES5R Slider type TLC specification Motor wrap, 50W

## Model Configuration

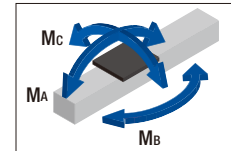
Model	Ball screw lead	Stroke	Design symbol	Control device type	Option	Motor rated output	Motor cable orientation	Homing method	Cable type and length
ES5R	06	0150	B	TL	MR-GR	M05	L	D00	F3
<b>ES5R</b>	<b>06:</b> 6mm <b>12:</b> 12mm	<b>0050:</b> 50mm to <b>0500:</b> 500mm	<b>B</b>	<b>TL:</b> TLC	<b>MR:</b> Motor right wrap <b>ML:</b> Motor left wrap <b>GR:</b> Change the cover color to gray <b>SB:</b> With slider base <b>□<sub>1</sub>□<sub>2</sub>:</b> Sensor	<b>M05:</b> 50W <b>M05B:</b> 50W with brake	<b>R:</b> Right <b>L:</b> Left	<b>D00:</b> Motor side <b>R00:</b> Reverse motor side	<b>F3:</b> Standard 3m <b>F5:</b> Standard 5m <b>FA:</b> Standard 10m <b>H3:</b> High flex 3m <b>H5:</b> High flex 5m <b>HA:</b> High flex 10m

Note: If the GR is not included in the model configuration, cover will be red.

## Basic Specifications

Control device type				TLC	
Motor rated output [W]				50	
Ball screw lead [mm]				6	12
Rated speed * <sup>1</sup> [mm/s]				300	600
Maximum load capacity * <sup>2</sup> [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G	8	6
		Vertical mount	0.3G	2	1
Rated thrust * <sup>3</sup> [N]				134	67
Maximum thrust * <sup>4</sup> [N]				134	67
Electromagnetic brake retention [N]				268	134
Running life * <sup>5</sup> [km]				5000	
Static permissible moment * <sup>6</sup> [N-m]				M <sub>A</sub> : 10.5, M <sub>B</sub> : 22, M <sub>C</sub> : 22.1	
Positioning repeatability [mm]				±0.020	
Lost motion [mm]				0.1	

Static permissible moment



\*<sup>1</sup> At rated motor speed (3,000 min<sup>-1</sup>).

\*<sup>2</sup> At rated speed.

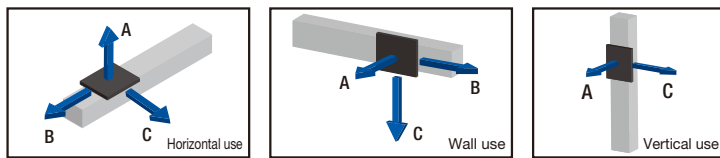
\*<sup>3</sup> At rated motor torque.

\*<sup>4</sup> Dependent on maximum peak torque and permissible load.

\*<sup>5</sup> Conditions: horizontal or vertical, 0.3G; under maximum load capacity; overhang length A: 10mm, B and C: 0mm; stroke: 50mm.

\*<sup>6</sup> Static maximum permissible moment when unit is stationary. Applied point of moment load for M<sub>A</sub> and M<sub>C</sub> are the top face of the table, and that for M<sub>B</sub> is the center of the table.

## Permissible Overhang Length\*



Horizontal mount [mm]					Wall mount [mm]					Vertical mount [mm]				
Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	C	
6	4	400	110	260	6	4	220	90	400	6	1	400	400	
	8	340	50	120		8	80	30	320		2	210	210	
12	3	400	160	280	12	3	260	130	400	12	0.5	400	400	
	6	320	70	130		6	100	50	250		1	400	400	

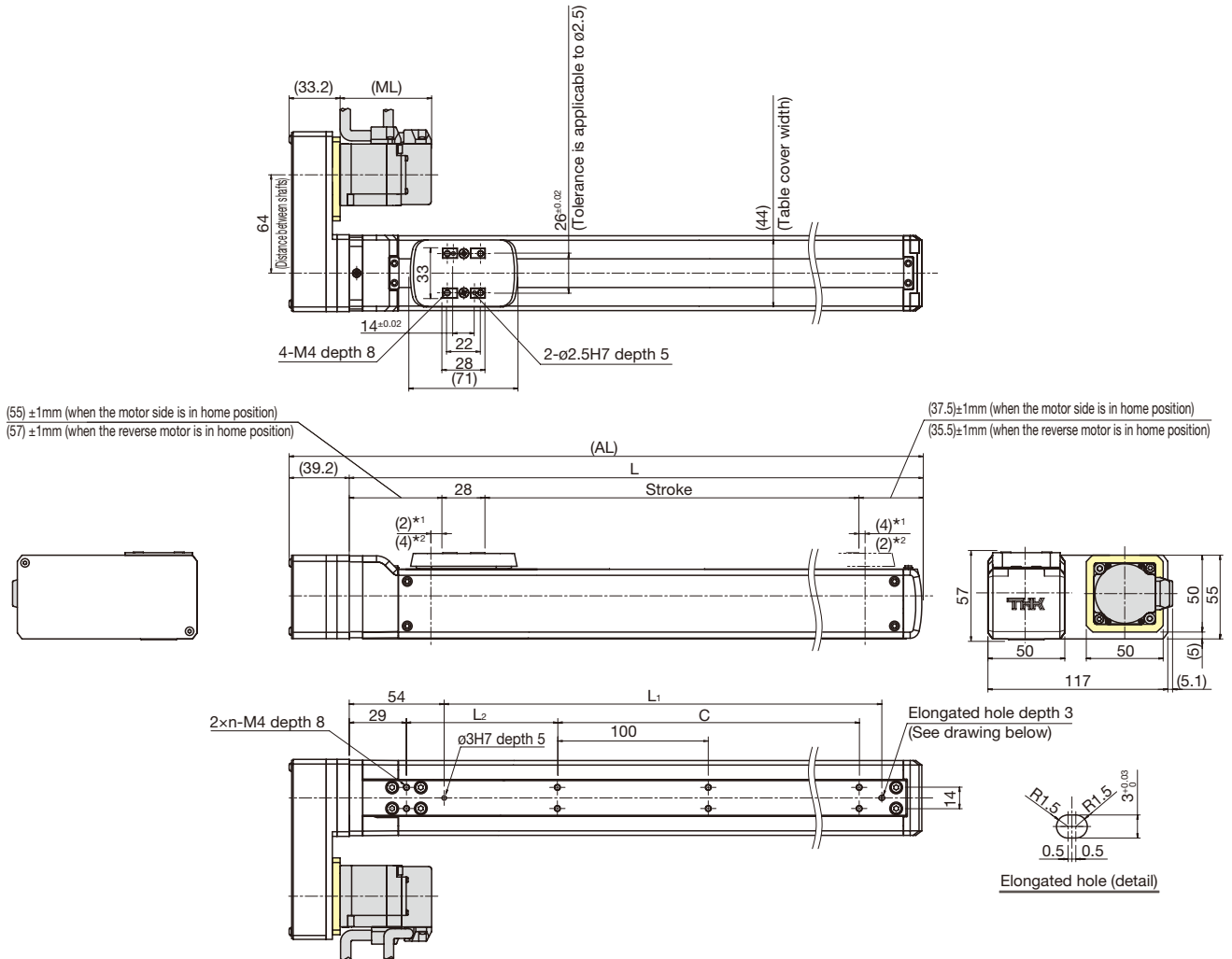
\* Distance from the center of the top face of the table to the load center of gravity position under the following conditions: 5,000km running life, single-direction load, 0.3G horizontal or vertical, 150mm stroke.

# ES5R + TLC



Motor rated output  
**50W**

## Dimensions



\*1 Stroke to the mechanical stopper when the motor side is in home position.  
\*2 Stroke to the mechanical stopper when the reverse motor side is in home position.

Stroke [mm] (Stroke between mechanical stoppers)		50 (56)	100 (106)	150 (156)	200 (206)	250 (256)	300 (306)	350 (356)	400 (406)	450 (456)	500 (506)
Maximum speed *1 [mm/s]	Ball screw lead: 6mm	300									
	Ball screw lead: 12mm	600									
Dimensions [mm]	AL	209.7	259.7	309.7	359.7	409.7	459.7	509.7	559.7	609.7	659.7
	ML *2	59.5 (95.1)									
	L	170.5	220.5	270.5	320.5	370.5	420.5	470.5	520.5	570.5	620.5
	L <sub>1</sub>	90	140	190	240	290	340	390	440	490	540
	L <sub>2</sub>	100	50	100	50	100	50	100	50	100	50
Mounting hole count	C	0	100	100	200	200	300	300	400	400	500
	n	2	3	3	4	4	5	5	6	6	7
Weight *2 [kg]		2.0 (2.2)	2.1 (2.3)	2.2 (2.4)	2.4 (2.6)	2.5 (2.7)	2.6 (2.8)	2.8 (3.0)	2.9 (3.1)	3.1 (3.3)	3.2 (3.4)

\*1 Dependent on ball screw's permissible rotation speed.

\*2 Values when brake is installed are shown in parentheses.

# ES6 Slider type TLC specification Direct motor coupling, 50W



## Model Configuration

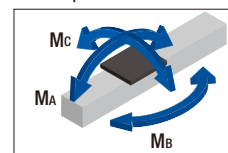
Model	Ball screw lead	Stroke	Design symbol	Control device type	Option	Motor rated output	Motor cable orientation	Homing method	Cable type and length
ES6	06	0150	B	TL	GR-SB	M05	R	D00	F3
ES6	06: 6mm 12: 12mm	0050: 50mm to 0600: 600mm	B	TL: TLC	No symbol: Red cover GR: Change the cover color to gray SB: With slider base □ <sub>1</sub> □ <sub>2</sub> : Sensor	M05 : 50W M05B: 50W with brake	R: Right U: Up L: Left D: Down	D00: Motor side R00: Reverse motor side	F3: Standard 3m F5: Standard 5m FA: Standard 10m H3: High flex 3m H5: High flex 5m HA: High flex 10m

Note: If the GR is not included in the model configuration, cover will be red.

## Basic Specifications

Control device type				TLC	
Motor rated output [W]				50	
Ball screw lead [mm]				6	12
Rated speed *1 [mm/s]				300	600
Maximum load capacity *2 [kg]	Acceleration and deceleration rate	Horizontal mount		10	6
		Vertical mount		5	2
Rated thrust *3 [N]				134	67
Maximum thrust *4 [N]				293	147
Electromagnetic brake retention [N]				268	134
Running life *5 [km]				5000	
Static permissible moment *6 [N·m]				M <sub>A</sub> : 10.5, M <sub>B</sub> : 22, M <sub>C</sub> : 22.1	
Positioning repeatability [mm]				±0.020	
Lost motion [mm]				0.1	

Static permissible moment



\*1 At rated motor speed (3,000 min<sup>-1</sup>).

\*2 At rated speed.

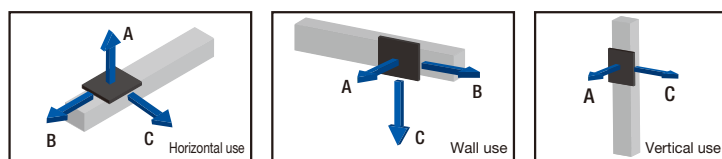
\*3 At rated motor torque.

\*4 Dependent on maximum peak torque and permissible load.

\*5 Conditions: horizontal or vertical, 0.3G; under maximum load capacity; overhang length A: 10mm, B and C: 0mm; stroke: 50mm.

\*6 Static maximum permissible moment when unit is stationary. Applied point of moment load for M<sub>A</sub> and M<sub>C</sub> are the top face of the table, and that for M<sub>B</sub> is the center of the table.

## Permissible Overhang Length\*



Horizontal mount [mm]					Wall mount [mm]					Vertical mount [mm]				
Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	C	
6	5	500	90	200	6	5	160	70	500	6	2.5	160	160	
	10	260	40	90		10	40	20	210		5	60	60	
12	3	500	160	280	12	3	250	130	500	12	1	420	420	
	6	320	70	130		6	90	50	240		2	190	190	

\* Distance from the center of the top face of the table to the load center of gravity position under the following conditions: 5,000km running life, single-direction load, 0.3G horizontal or vertical, 150mm stroke.

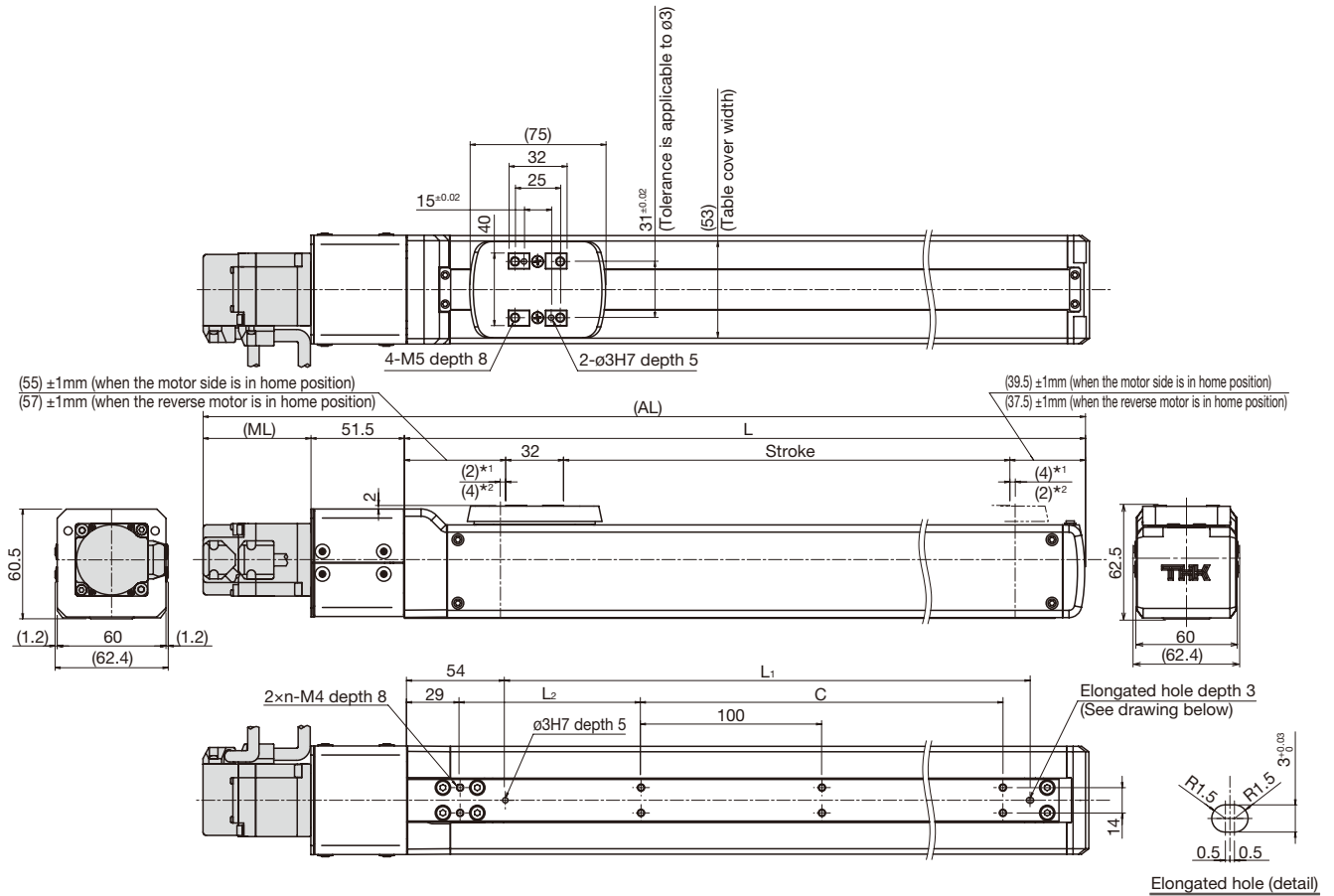


ES6 + TLC



Motor rated output  
**50W**

Dimensions



\*1 Stroke to the mechanical stopper when the motor side is in home position.  
\*2 Stroke to the mechanical stopper when the reverse motor side is in home position.

Stroke [mm] (Stroke between mechanical stoppers)		50 (56)	100 (106)	150 (156)	200 (206)	250 (256)	300 (306)	350 (356)	400 (406)	450 (456)	500 (506)	550 (556)	600 (606)	
Maximum speed *1 [mm/s]	Ball screw lead: 6mm											300	270	230
	Ball screw lead: 12mm											600	540	460
Dimensions [mm]	AL *2	287.5 (323.1)	337.5 (373.1)	387.5 (423.1)	437.5 (473.1)	487.5 (523.1)	537.5 (573.1)	587.5 (623.1)	637.5 (673.1)	687.5 (723.1)	737.5 (773.1)	787.5 (823.1)	837.5 (873.1)	
	ML *2	59.5 (95.1)												
	L	176.5	226.5	276.5	326.5	376.5	426.5	476.5	526.5	576.5	626.5	676.5	726.5	
	L <sub>1</sub>	90	140	190	240	290	340	390	440	490	540	590	640	
	L <sub>2</sub>	100	50	100	50	100	50	100	50	100	50	100	50	
Mounting hole count	n	2	3	3	4	4	5	5	6	6	7	7	8	
Weight *2 [kg]		2.3 (2.5)	2.5 (2.7)	2.6 (2.8)	2.7 (2.9)	2.9 (3.1)	3.0 (3.2)	3.2 (3.4)	3.3 (3.5)	3.5 (3.7)	3.6 (3.8)	3.8 (4.0)	3.9 (4.1)	

\*1 Dependent on ball screw's permissible rotation speed.

\*2 Values when brake is installed are shown in parentheses.



# ES6R Slider type TLC specification Motor wrap, 50W

## Model Configuration

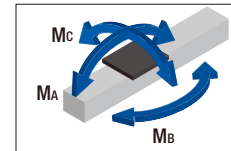
Model	Ball screw lead	Stroke	Design symbol	Control device type	Option	Motor rated output	Motor cable orientation	Homing method	Cable type and length
ES6R	06	0150	B	TL	MR-GR	M05	L	D00	F3
	06: 6mm 12: 12mm	0050: 50mm to 0600: 600mm	B	TL: TLC	MR: Motor right wrap ML: Motor left wrap GR: Change the cover color to gray SB: With slider base <input type="checkbox"/> <sub>1</sub> <input type="checkbox"/> <sub>2</sub> : Sensor	M05 : 50W M05B: 50W with brake	R: Right L: Left	D00: Motor side R00: Reverse motor side	F3: Standard 3m F5: Standard 5m F10: Standard 10m H3: High flex 3m H5: High flex 5m H10: High flex 10m

Note: If the GR is not included in the model configuration, cover will be red.

## Basic Specifications

Control device type				TLC	
Motor rated output [W]				50	
Ball screw lead [mm]				6	12
Rated speed * <sup>1</sup> [mm/s]				300	600
Maximum load capacity * <sup>2</sup> [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G	8	6
		Vertical mount	0.3G	2	1
Rated thrust * <sup>3</sup> [N]				134	67
Maximum thrust * <sup>4</sup> [N]				134	67
Electromagnetic brake retention [N]				268	134
Running life * <sup>5</sup> [km]				5000	
Static permissible moment * <sup>6</sup> [N·m]				M <sub>A</sub> : 10.5, M <sub>B</sub> : 22, M <sub>C</sub> : 22.1	
Positioning repeatability [mm]				±0.020	
Lost motion [mm]				0.1	

Static permissible moment



\*<sup>1</sup> At rated motor speed (3,000 min<sup>-1</sup>).

\*<sup>2</sup> At rated speed.

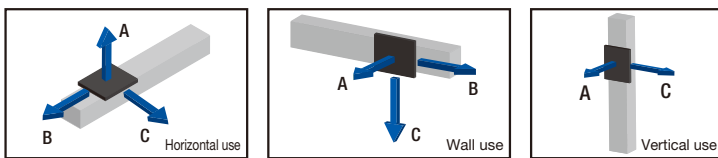
\*<sup>3</sup> At rated motor torque.

\*<sup>4</sup> Dependent on maximum peak torque and permissible load.

\*<sup>5</sup> Conditions: horizontal or vertical, 0.3G; under maximum load capacity; overhang length A: 10mm, B and C: 0mm; stroke: 50mm.

\*<sup>6</sup> Static maximum permissible moment when unit is stationary. Applied point of moment load for M<sub>A</sub> and M<sub>C</sub> are the top face of the table, and that for M<sub>B</sub> is the center of the table.

## Permissible Overhang Length\*



Horizontal mount [mm]					Wall mount [mm]					Vertical mount [mm]			
Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	B	C	Ball screw lead [mm]	Load mass [kg]	A	C
6	4	500	110	260	6	4	210	90	500	6	1	450	450
	8	340	50	120		8	70	30	360		2	210	210
12	3	500	160	280	12	3	250	130	500	12	0.5	500	500
	6	320	70	130		6	90	50	240		1	420	420

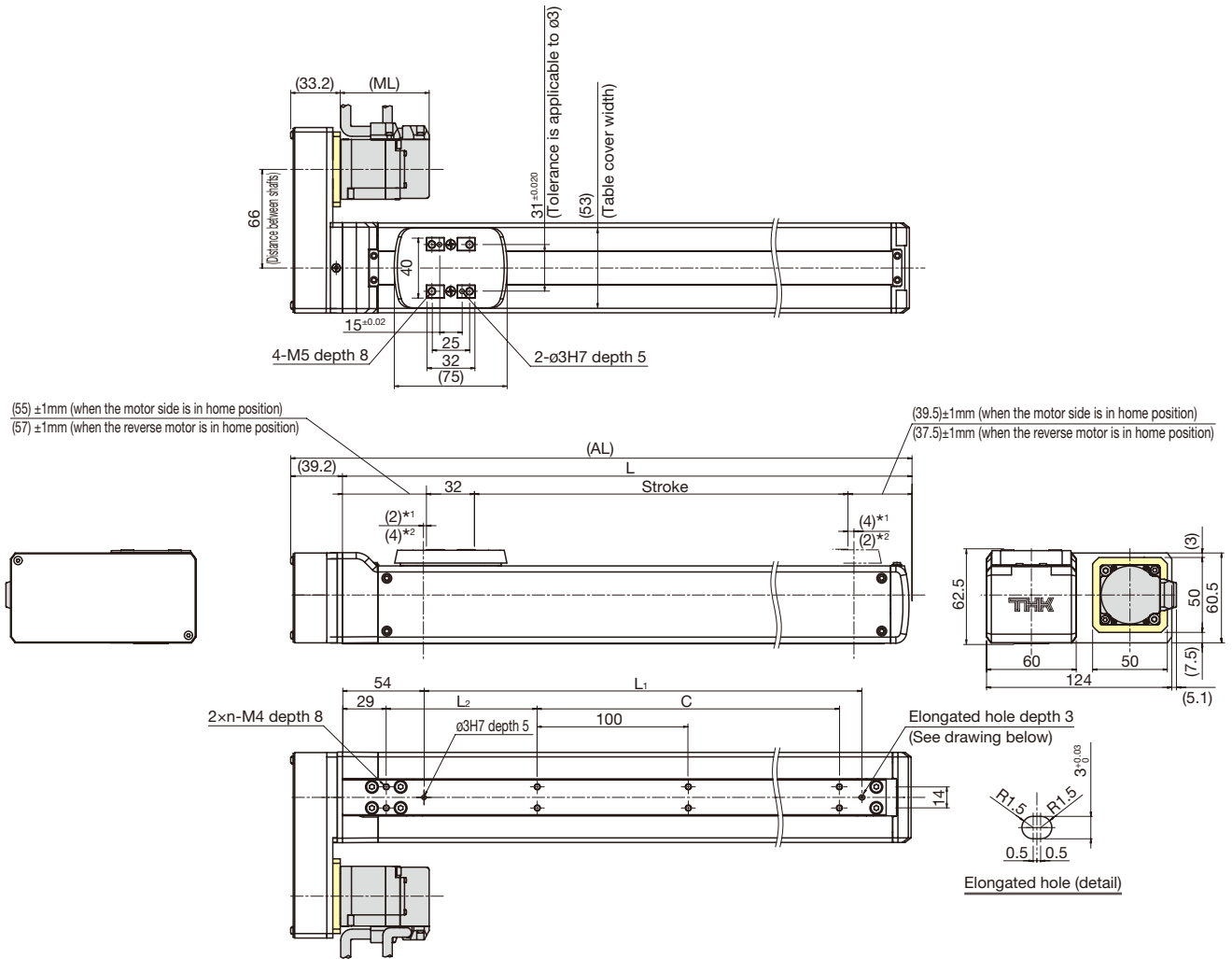
\* Distance from the center of the top face of the table to the load center of gravity position under the following conditions: 5,000km running life, single-direction load, 0.3G horizontal or vertical, 150mm stroke.

ES6R + TLC



Motor rated output  
**50W**

Dimensions



\*1 Stroke to the mechanical stopper when the motor side is in home position.  
\*2 Stroke to the mechanical stopper when the reverse motor side is in home position.

Stroke [mm] (Stroke between mechanical stoppers)		50 (56)	100 (106)	150 (156)	200 (206)	250 (256)	300 (306)	350 (356)	400 (406)	450 (456)	500 (506)	550 (556)	600 (606)
Maximum speed *1 [mm/s]	Ball screw lead: 6mm	300										270	230
	Ball screw lead: 12mm	600										540	460
Dimensions [mm]	AL	215.7	265.7	315.7	365.7	415.7	465.7	515.7	565.7	615.7	665.7	715.7	765.7
	ML *2	59.5 (95.1)											
	L	176.5	226.5	276.5	326.5	376.5	426.5	476.5	526.5	576.5	626.5	676.5	726.5
	L <sub>1</sub>	90	140	190	240	290	340	390	440	490	540	590	640
	L <sub>2</sub>	100	50	100	50	100	50	100	50	100	50	100	50
Mounting hole count	n	2	3	3	4	4	5	5	6	6	7	7	8
Weight *2 [kg]		2.3 (2.5)	2.4 (2.6)	2.6 (2.8)	2.7 (2.9)	2.8 (3.0)	3.0 (3.2)	3.1 (3.3)	3.3 (3.5)	3.4 (3.6)	3.6 (3.8)	3.7 (3.9)	3.8 (4.0)

\*1 Dependent on ball screw's permissible rotation speed.

\*2 Values when brake is installed are shown in parentheses.

# EC4 Cylinder type TLC specification Direct motor coupling



## Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device type	Option	Motor rated output	Motor cable orientation	Homing method	Cable type and length
EC4	06	0150	B	TL	FL-LB	M05	R	D00	F3
<b>EC4</b>	<b>06</b> : 6mm <b>12</b> : 12mm	<b>0050</b> : 50mm to <b>0300</b> : 300mm	<b>B</b>	<b>TL</b> : TLC	<b>No symbol</b> : None <b>CB</b> : With cylinder base <b>FL</b> : With flange <b>LB</b> : With link ball	<b>M05</b> : 50W <b>M05B</b> : 50W with brake	<b>R</b> : Right <b>U</b> : Up <b>L</b> : Left <b>D</b> : Down	<b>D00</b> : Motor side <b>R00</b> : Reverse motor side	<b>F3</b> : Standard 3m <b>F5</b> : Standard 5m <b>FA</b> : Standard 10m <b>H3</b> : High flex 3m <b>H5</b> : High flex 5m <b>HA</b> : High flex 10m

## Basic Specifications

Control device type				TLC	
Motor rated output [W]				50	
Ball screw lead [mm]				6	12
Rated speed *1 [mm/s]				300	600
Maximum load capacity *2 [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G	14	7
		Vertical mount	0.3G	6	3
Rated thrust *3 [N]				134	67
Maximum thrust *4 [N]				293	147
Electromagnetic brake retention [N]				268	134
Running life *5 [km]				5000	
Positioning repeatability [mm]				±0.020	
Lost motion [mm]				0.1	
Rod non-rotational accuracy [°]				±1.5	

\*1 At rated motor speed (3,000 min<sup>-1</sup>).

\*2 At rated speed.

With EC, only an axial load is permissible; do not apply any other type of load to the rod using an LM Guide. Take into account the sliding resistance of LM Guide when making selection.

\*3 At rated motor torque.

\*4 Dependent on maximum peak torque and permissible load.

\*5 Service life is based on below conditions.

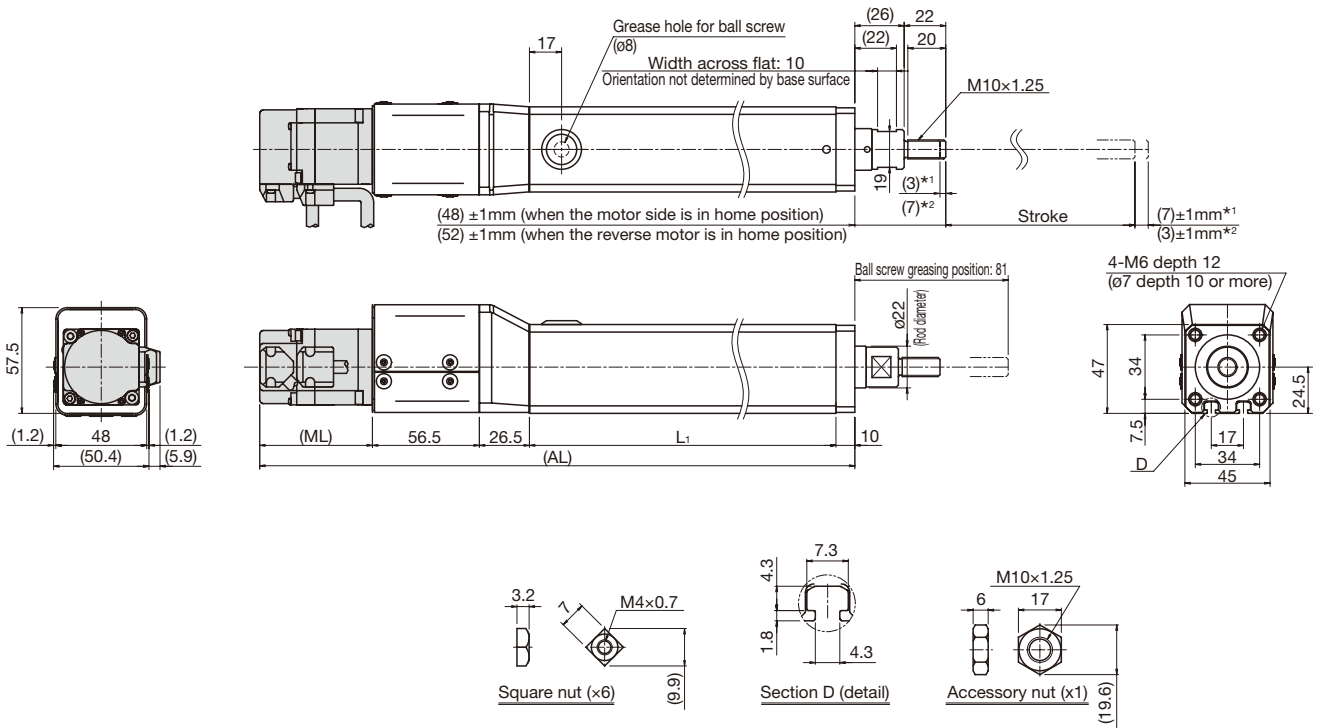
Conditions: Under maximum load capacity (with LM guide), maximum speed, 0.3G horizontal or vertical

# EC4 + TLC



Motor rated output  
**50W**

## Dimensions



\*1 Stroke to the mechanical stopper when the motor side is in home position.  
\*2 Stroke to the mechanical stopper when the reverse motor side is in home position.

Stroke [mm] (Stroke between mechanical stoppers)		50 (60)	100 (110)	150 (160)	200 (210)	250 (260)	300 (310)
Maximum speed *1 [mm/s]	Ball screw lead: 6mm			300		230	170
	Ball screw lead: 12mm			600		460	340
Dimensions [mm]	AL *2	299.5 (335.1)	349.5 (385.1)	399.5 (435.1)	449.5 (485.1)	499.5 (535.1)	549.5 (585.1)
	ML *2	59.5 (95.1)					
	L1 *3	147	197	247	297	347	397
Weight *2 [kg]		2.0 (2.2)	2.4 (2.6)	2.7 (2.9)	3.0 (3.2)	3.3 (3.5)	3.7 (3.9)

\*1 Dependent on ball screw's permissible rotation speed.

\*2 Values when brake is installed are shown in parentheses.

\*3 T slot milling in the range of L1.

# EC4R

## Cylinder type TLC specification Motor wrap



### Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device type	Option	Motor rated output	Motor cable orientation	Homing method	Cable type and length
EC4R	06	0150	B	TL	MR-FL-LB	M05	R	D00	F3
<b>EC4R</b>	<b>06</b> : 6mm <b>12</b> : 12mm	<b>0050</b> : 50mm to <b>0300</b> : 300mm	<b>B</b>	<b>TL</b> : TLC	<b>MR</b> : Motor right wrap <b>ML</b> : Motor left wrap <b>CB</b> : With cylinder base <b>FL</b> : With flange <b>LB</b> : With link ball	<b>M05</b> : 50W <b>M05B</b> : 50W with brake	<b>R</b> : Right <b>U</b> : Up <b>L</b> : Left <b>D</b> : Down	<b>D00</b> : Motor side <b>R00</b> : Reverse motor side	<b>F3</b> : Standard 3m <b>F5</b> : Standard 5m <b>F10</b> : Standard 10m <b>H3</b> : High flex 3m <b>H5</b> : High flex 5m <b>H10</b> : High flex 10m

### Basic Specifications

Control device type				TLC	
Motor rated output [W]				50	
Ball screw lead [mm]				6	12
Rated speed *1 [mm/s]				300	600
Maximum load capacity *2 [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G	14	7
		Vertical mount	0.3G	6	3
Rated thrust *3 [N]				134	67
Maximum thrust *4 [N]				134	67
Electromagnetic brake retention [N]				268	134
Running life *5 [km]				5000	
Positioning repeatability [mm]				±0.020	
Lost motion [mm]				0.1	
Rod non-rotational accuracy [°]				±1.5	

\*1 At rated motor speed (3,000 min<sup>-1</sup>).

\*2 At rated speed.

With EC, only an axial load is permissible; do not apply any other type of load to the rod using an LM Guide. Take into account the sliding resistance of LM Guide when making selection.

\*3 At rated motor torque.

\*4 Dependent on maximum peak torque and permissible load.

\*5 Service life is based on below conditions.

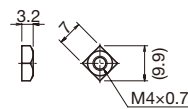
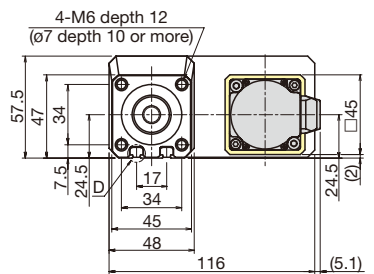
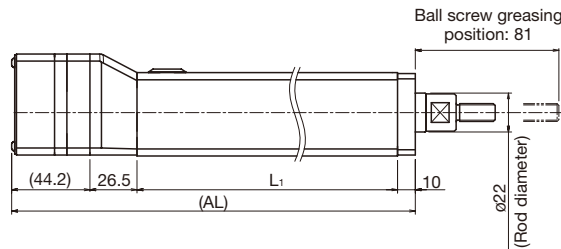
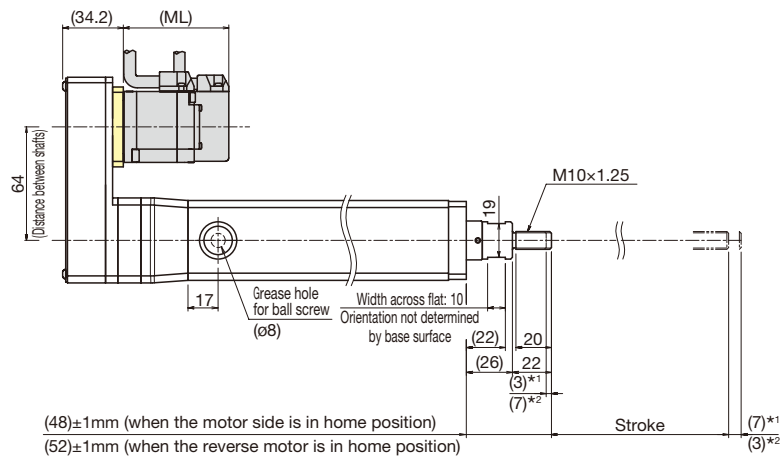
Conditions: Under maximum load capacity (with LM guide), maximum speed, 0.3G horizontal or vertical

# EC4R + TLC

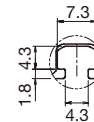


Motor rated output  
**50W**

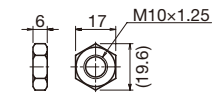
## Dimensions



Square nut (x6)



Section D (detail)



Accessory nut (x1)

\*1 Stroke to the mechanical stopper when the motor side is in home position.

\*2 Stroke to the mechanical stopper when the reverse motor side is in home position.

Stroke [mm] (Stroke between mechanical stoppers)		50 (60)	100 (110)	150 (160)	200 (210)	250 (260)	300 (310)
Maximum speed *1 [mm/s]	Ball screw lead: 6mm			300		230	170
	Ball screw lead: 12mm			600		460	340
Dimensions [mm]	AL	227.7	277.7	327.7	377.7	427.7	477.7
	ML *2	59.5 (95.1)					
	L1 *3	147	197	247	297	347	397
Weight *2 [kg]		2.1 (2.3)	2.4 (2.6)	2.7 (2.9)	3.0 (3.2)	3.4 (3.6)	3.7 (3.9)

\*1 Dependent on ball screw's permissible rotation speed.

\*2 Values when brake is installed are shown in parentheses.

\*3 T slot milling in the range of L1.

# EC4H

Cylinder type TLC specification Direct motor coupling/with linear bush



## Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device type	Option	Motor rated output	Motor cable orientation	Homing method	Cable type and length
EC4H	06	0150	B	TL	CB	M05	R	D00	F3
<b>EC4H</b>	<b>06:</b> 6mm <b>12:</b> 12mm	<b>0050:</b> 50mm to <b>0300:</b> 300mm	<b>B</b>	<b>TL:</b> TLC	<b>No symbol:</b> None <b>CB:</b> With cylinder base	<b>M05 :</b> 50W <b>M05B:</b> 50W with brake	<b>R:</b> Right <b>U:</b> Up <b>L:</b> Left <b>D:</b> Down	<b>D00:</b> Motor side <b>R00:</b> Reverse motor side	<b>F3:</b> Standard 3m <b>F5:</b> Standard 5m <b>FA:</b> Standard 10m <b>H3:</b> High flex 3m <b>H5:</b> High flex 5m <b>HA:</b> High flex 10m

## Basic Specifications

Control device type				TLC	
Motor rated output [W]				50	
Ball screw lead [mm]				6	12
Rated speed *1 [mm/s]				300	600
Maximum load capacity *2 [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G	14	7
		Vertical mount	0.3G	6	3
Rated thrust *3 [N]				134	67
Maximum thrust *4 [N]				293	147
Electromagnetic brake retention [N]				268	134
Running life *5 [km]				5000	
Positioning repeatability [mm]				±0.020	
Lost motion [mm]				0.1	
Rod non-rotational accuracy [°]				±0.05	

\*1 At rated motor speed (3,000 min<sup>-1</sup>).

\*2 At rated speed.

With EC, only an axial load is permissible; do not apply any other type of load to the rod using an LM Guide. Take into account the sliding resistance of LM Guide when making selection.

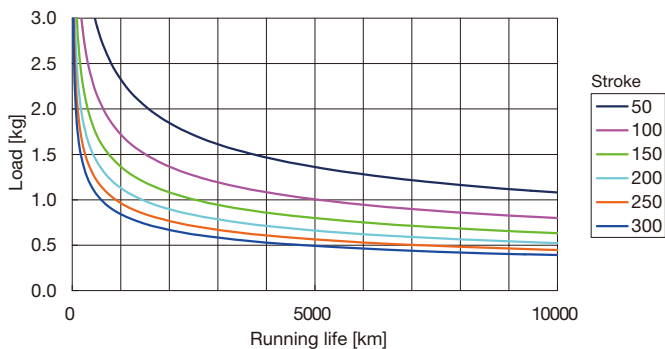
\*3 At rated motor torque.

\*4 Dependent on maximum peak torque and permissible load.

\*5 Load capacity and running life may vary without an LM guide. For details, see "End Load and Running Life".

## Reference End Load and Running Life

Running life varies when a load is applied to the end of the unit without using an LM Guide, as shown below.



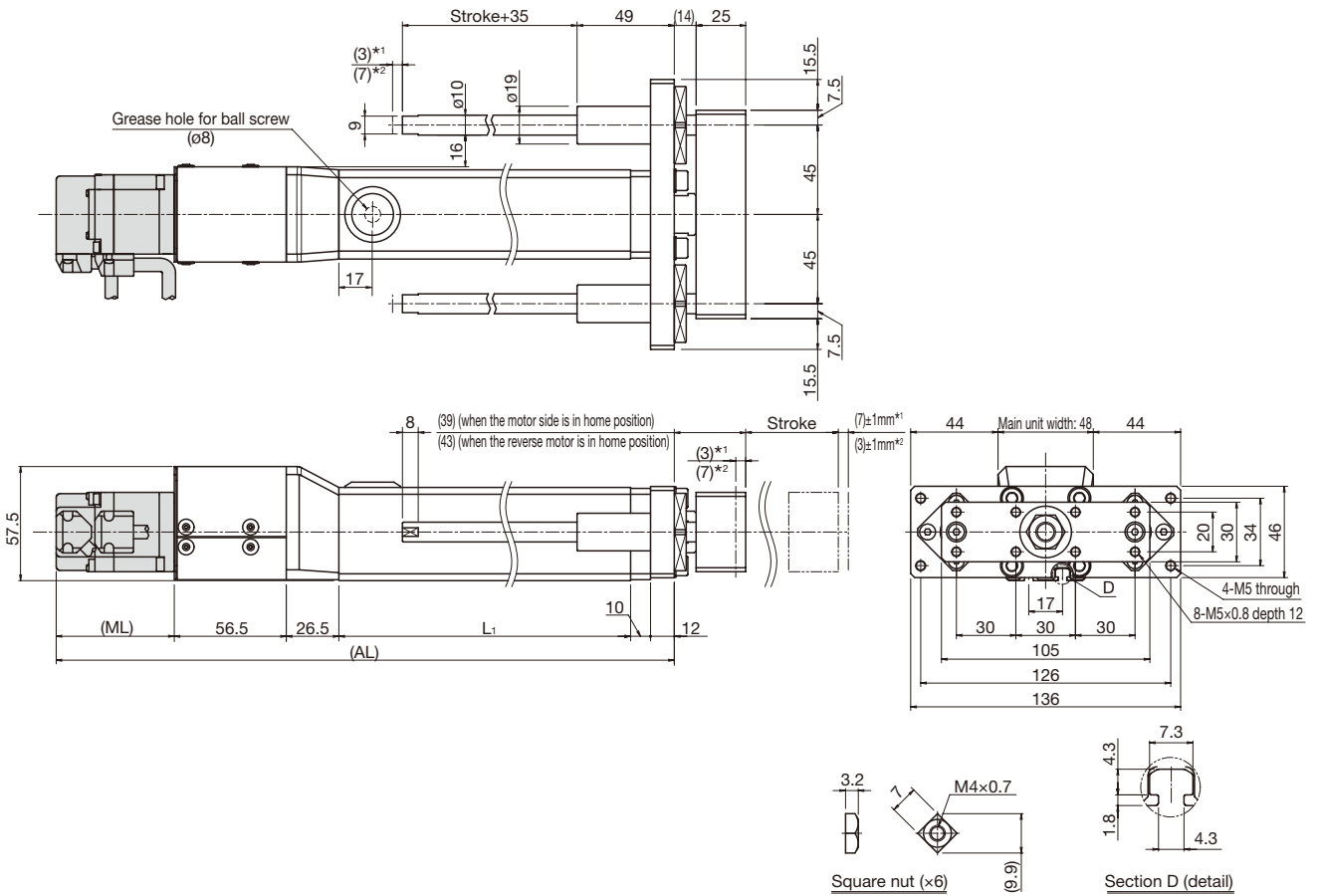


# EC4H + TLC



Motor rated output  
**50W**

## Dimensions



\*1 Stroke to the mechanical stopper when the motor side is in home position.

\*2 Stroke to the mechanical stopper when the reverse motor side is in home position.

Stroke [mm] (Stroke between mechanical stoppers)		50 (60)	100 (110)	150 (160)	200 (210)	250 (260)	300 (310)
Maximum speed *1 [mm/s]	Ball screw lead: 6mm	300				230	170
	Ball screw lead: 12mm	600				460	340
Dimensions [mm]	AL *2	311.5 (347.1)	361.5 (397.1)	411.5 (447.1)	461.5 (497.1)	511.5 (547.1)	561.5 (597.1)
	ML *2	59.5 (95.1)					
	L1 *3	147	197	247	297	347	397
Weight *2 [kg]		2.6 (2.8)	3.0 (3.2)	3.3 (3.5)	3.7 (3.9)	4.0 (4.2)	4.4 (4.6)

\*1 Dependent on ball screw's permissible rotation speed.

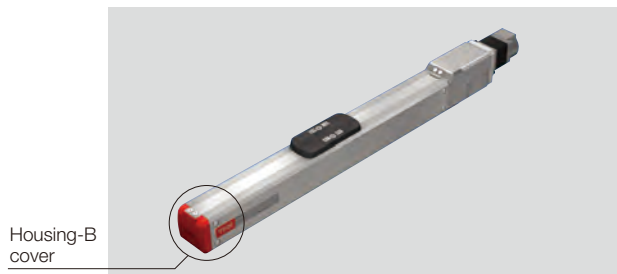
\*2 Values when brake is installed are shown in parentheses.

\*3 T slot milling in the range of L1.

## ES Option

### GR: Change the cover color to gray

As an option for ES, the cover color can be changed from red to gray.



No symbol: red cover



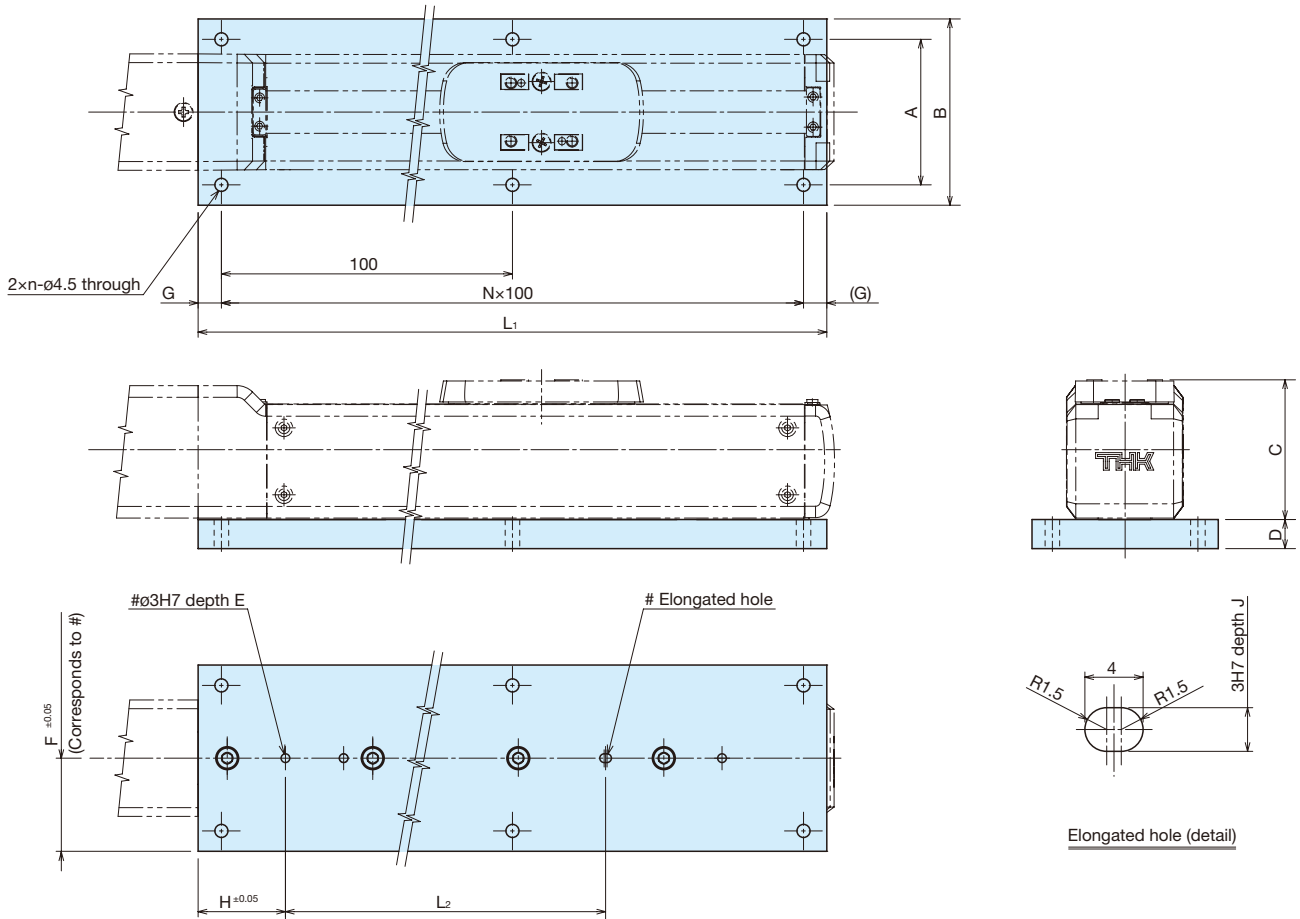
When GR is selected: gray cover

If the GR is not included in the model configuration, cover will be red.

ES Option

SB: Slider base (direct coupled type)

THK provides a slider base for installing the ES main unit from the top face.  
 \* Included with unit



Unit: mm

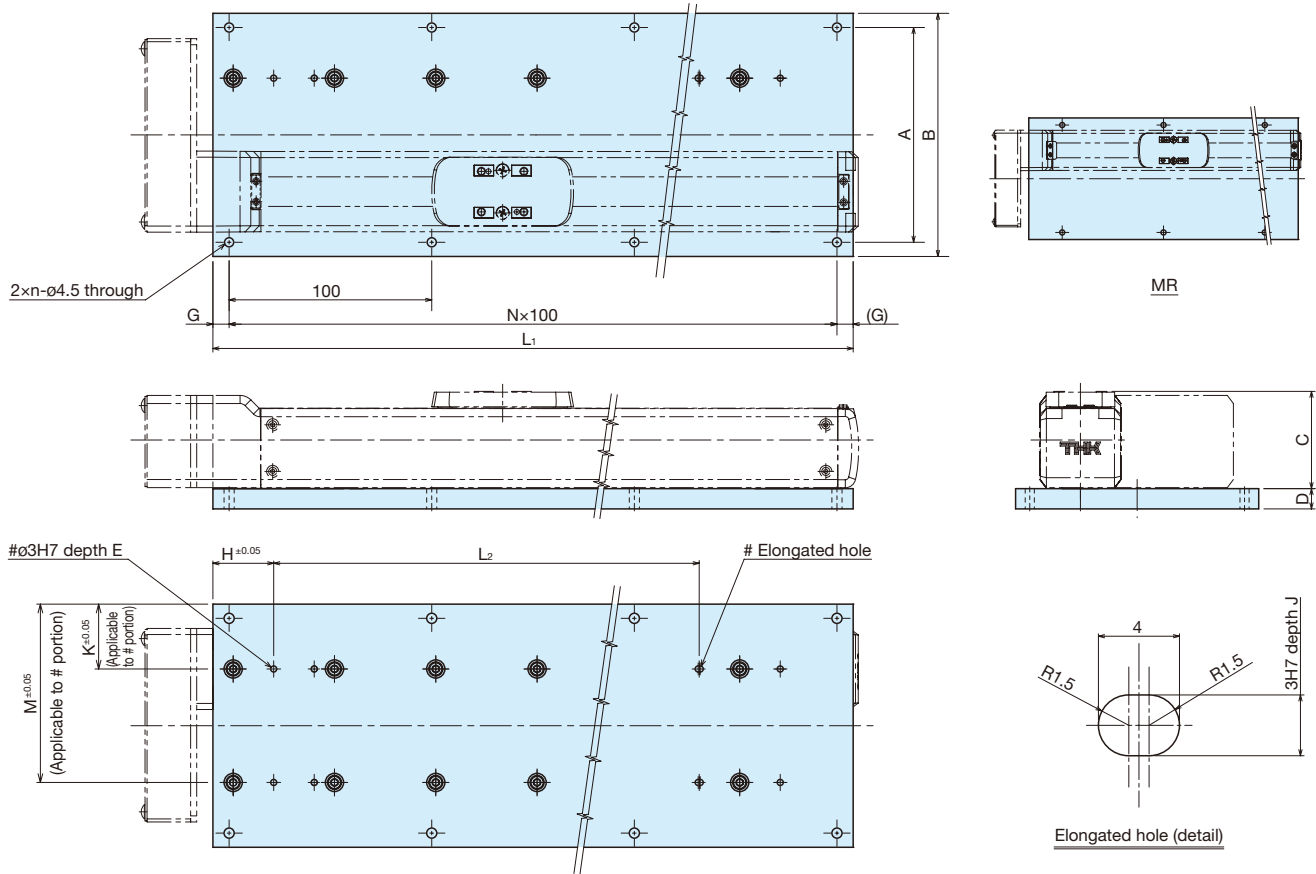
Model	A	B	C	D	E	F	H	J
ES3	42	56	40	8	8	28	40	8
ES4	50	64	48	10	10	32	30	10
ES5	70	84	57	10	10	42	45	10
ES6	70	84	62.5	10	10	42	45	10

Stroke	50	100	150	200	250	300	350	400	450	500	550	600
ES3	L <sub>1</sub> [mm]	156	206	256	306	356	406	-	-	-	-	-
	L <sub>2</sub> [mm]	70	120	170	220	270	320	-	-	-	-	-
	n	2	2	3	3	4	4	-	-	-	-	-
	N	1	1	2	2	3	3	-	-	-	-	-
	G [mm]	28	53	28	53	28	53	-	-	-	-	-
ES4	L <sub>1</sub> [mm]	166	216	266	316	366	416	466	516	-	-	-
	L <sub>2</sub> [mm]	60	110	160	210	260	310	360	410	-	-	-
	n	2	3	3	4	4	5	5	6	-	-	-
	N	1	2	2	3	3	4	4	5	-	-	-
	G [mm]	33	8	33	8	33	8	33	8	-	-	-
ES5	L <sub>1</sub> [mm]	174	224	274	324	374	424	474	524	574	624	-
	L <sub>2</sub> [mm]	70	120	170	220	270	320	370	420	470	520	-
	n	2	3	3	4	4	5	5	6	6	7	-
	N	1	2	2	3	3	4	4	5	5	6	-
	G [mm]	37	12	37	12	37	12	37	12	37	12	-
ES6	L <sub>1</sub> [mm]	174	224	274	324	374	424	474	524	574	624	674
	L <sub>2</sub> [mm]	70	120	170	220	270	320	370	420	470	520	570
	n	2	3	3	4	4	5	5	6	6	7	8
	N	1	2	2	3	3	4	4	5	5	6	7
	G [mm]	37	12	37	12	37	12	37	12	37	12	37

ES Option

SB: Slider base (motor wrap type)

THK provides a slider base for installing the ES main unit from the top face.  
 \* Included with unit



Unit: mm

Model	A	B	C	D	E	H	J	K	M
ES3	92	106	40	8	8	40	8	28	78
ES4	106	120	48	10	10	30	10	32	88
ES5	136	150	57	10	10	45	10	42	108
ES6	136	150	62.5	10	10	45	10	42	108

Stroke	50	100	150	200	250	300	350	400	450	500	550	600
ES3	L1 [mm]	156	206	256	306	356	406	-	-	-	-	-
	L2 [mm]	70	120	170	220	270	320	-	-	-	-	-
	n	2	2	3	3	4	4	-	-	-	-	-
	N	1	1	2	2	3	3	-	-	-	-	-
	G [mm]	28	53	28	53	28	53	-	-	-	-	-
ES4	L1 [mm]	166	216	266	316	366	416	466	516	-	-	-
	L2 [mm]	60	110	160	210	260	310	360	410	-	-	-
	n	2	3	3	4	4	5	5	6	-	-	-
	N	1	2	2	3	3	4	4	5	-	-	-
	G [mm]	33	8	33	8	33	8	33	8	-	-	-
ES5	L1 [mm]	174	224	274	324	374	424	474	524	574	624	-
	L2 [mm]	70	120	170	220	270	320	370	420	470	520	-
	n	2	3	3	4	4	5	5	6	6	7	-
	N	1	2	2	3	3	4	4	5	5	6	-
	G [mm]	37	12	37	12	37	12	37	12	37	12	-
ES6	L1 [mm]	174	224	274	324	374	424	474	524	574	624	674
	L2 [mm]	70	120	170	220	270	320	370	420	470	520	570
	n	2	3	3	4	4	5	5	6	6	7	8
	N	1	2	2	3	3	4	4	5	5	6	7
	G [mm]	37	12	37	12	37	12	37	12	37	12	37

## □<sub>1</sub>□<sub>2</sub>: Sensors

ES units can be equipped with optional proximity sensors and photo sensors. Sensor-equipped models also feature a dedicated sensor rail. The following precautions apply to sensor-equipped ES units.

1. The customer should provide a sensor dog; a sensor dog cannot be installed onto the actuator main unit.
2. When ordered, the sensor is included with the unit.
3. When motor wrap is selected, a sensor cannot be mounted on the same side as the wrap direction of the motor.
4. When an optional sensor is used, the home position may differ from that indicated in this brochure.
5. If proximity sensors are placed too close to each other, they may not work properly. In this case, the customer must provide sensors with variant frequencies. (For specifications, contact each manufacturer.)

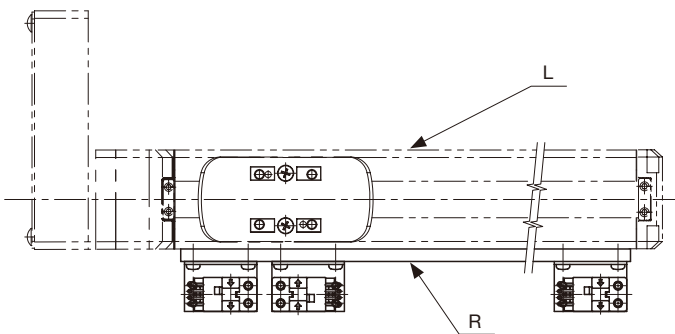
Description	Type	Accessory	Symbol	
			□ <sub>1</sub>	□ <sub>2</sub>
With sensor rail	–	–	L/R	1
Photo Sensor * [x3]	EE-SX674 (OMRON Corporation)	Mounting screw, nuts, sensor rail (x1), mounting plates (x3), connectors (EE-1001, x3)	L/R	6
Sensor N.O. contact [x1] N.C. contact points [x2]	GX-F12A (Panasonic Industrial Devices SUNX Co., Ltd.) GX-F12B (Panasonic Industrial Devices SUNX Co., Ltd.)	Mounting screws, nuts, sensor rail	L/R	J
Sensor N.O. contact [x1] (PNP output) N.C. contact points [x2] (PNP output)	GX-F12A-P (Panasonic Industrial Devices SUNX Co., Ltd.) GX-F12B-P (Panasonic Industrial Devices SUNX Co., Ltd.)	Mounting screws, nuts, sensor rail	L/R	M

N.O. contact: Normally open contact point

N.C. contact: Normally closed contact point

\* The photo sensors can be switched between ON when lit and ON when unlit.

Example: When a photo sensor is selected with motor wrap



Option: Sensor symbols

Symbol	
□ <sub>1</sub>	□ <sub>2</sub>
R	6

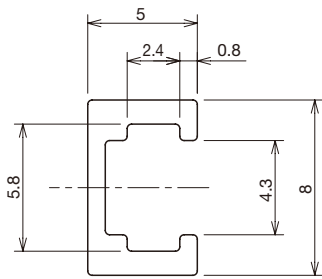
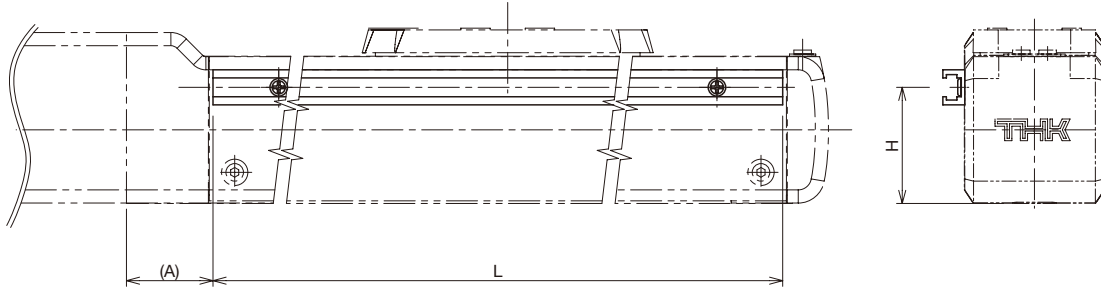
\* □<sub>1</sub> represents the mounting position for sensor rail and sensor.

□<sub>2</sub> represents the type of sensors.

\* □<sub>1</sub> on the same side as the wrap direction of the motor cannot be selected. L cannot be selected.

□<sub>1</sub>□<sub>2</sub>: Sensor

Symbol 1: Sensor rail

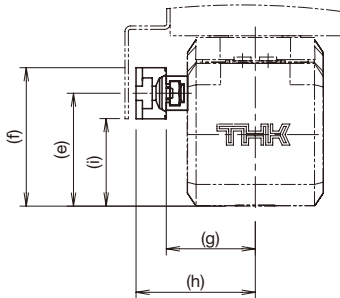


Sensor rail (detail)

Unit: mm

Model	H	A	L
ES3	26.5	19.8	Stroke +78
ES4	31.5	26.5	
ES5	38.1	27	
ES6	43.6	30	

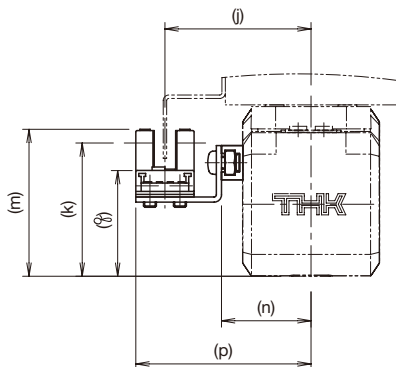
Symbols J, M: Proximity sensor GX-F12\* (Panasonic Industrial Devices SUNX Co., Ltd.)



Unit: mm

Model	e	f	g	h	i
ES3	26.5	32.5	20.9	28	20.5
ES4	31.5	37.5	24.8	31.9	25.5
ES5	38.1	44.1	29.8	36.9	32.1
ES6	43.6	49.6	34.8	41.9	37.6

Symbol 6: Photo sensor EE-SX674 (OMRON Corporation)



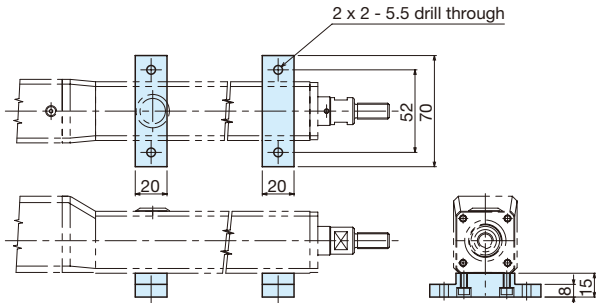
Unit: mm

Model	j	k	m	n	p	q
ES3	31.4	28.6	31.8	20.9	38.4	22.2
ES4	35.3	33.6	36.8	24.8	42.3	27.2
ES5	40.3	40.2	43.4	29.8	47.3	33.8
ES6	45.3	45.7	48.9	34.8	52.3	39.3

EC Option

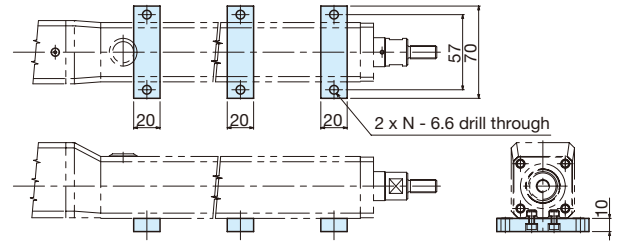
CB: Cylinder Base

EC3



\* Included with unit

EC4

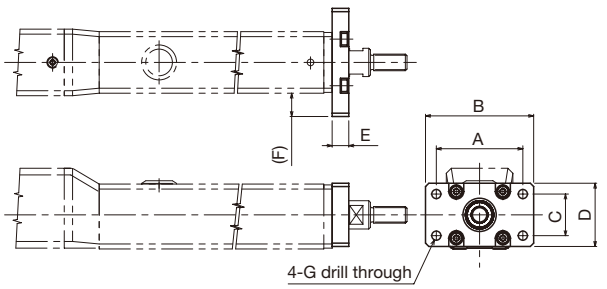


\* Included with unit

Stroke	50	100	150	200	250	300
N	2	2	2	2	3	3

FL: Flange

EC3/4, EC3R/4R

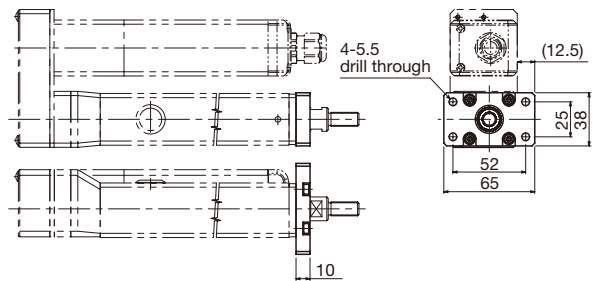


Unit: mm

Model	A	B	C	D	E	F	G
EC3/EC3R	52	65	25	38	10	14	5.5
EC4/EC4R	60	75	34	46	12	15	6.6

\* Included with unit

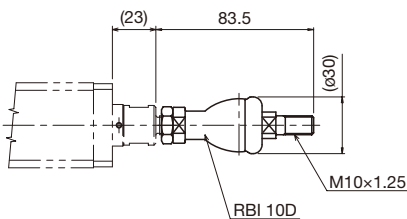
EC3R (When ST=50)



\* Included with unit

LB: Link Ball

EC3/4



\* Included with unit

## Stepper driver controller

# TSC

For single axis / Position type



## Features

Ready to use by simplified setup.

## Simple Operation

Use PC setup tool D-STEP or digital operator TDO to access many useful functions.

## Functions

- Selectable function modes  
(64-position, external unit input instruction, 256-position, 512-position, Solenoid mode 1, and Solenoid mode 2)
- Step data count: Up to 512 (depending on function mode)
- Alarm history: Up to 50 (including power ON history)
- Switching between Auto/Manual, brake release switch
- Selectable control methods (positioning or pressing)

## Changes on the new version (design symbol B)

TSC is now updated to a new version that specified with “B” in design symbol.

Differences from conventional version, design symbol “A” are shown below.

- Behavior at Servo-On

	Design symbol A	Design symbol B
Motion	Moves several millimeters	Standstill

- Compatibility

Driver controller TSC, and actuator cable does not have compatibility between A and B.

\* To use a 10m actuator cable, insert a noise filter to the TSC power supply.



## Model Configuration

● Stepper driver controller \*Separate order required.

Model	Current	Design symbol	Type	Combined Actuator	Combined actuator ball screw lead	Home position	Brake
TSC	015	B	MOD	ES6	06	D	B
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TSC	015: 1.5A	B	MOD: Mode switching type	ES3	06: 6mm	D: Motor side	No symbol: Without brake
				ES4	12: 12mm	R: Reverse motor side	B: With brake
				ES5			
				ES6			
				ES3R			
				ES4R			
				ES5R			
				ES6R			
				EC3* <sup>1</sup>			
				EC4* <sup>1</sup>			
				EC3R			
				EC4R			

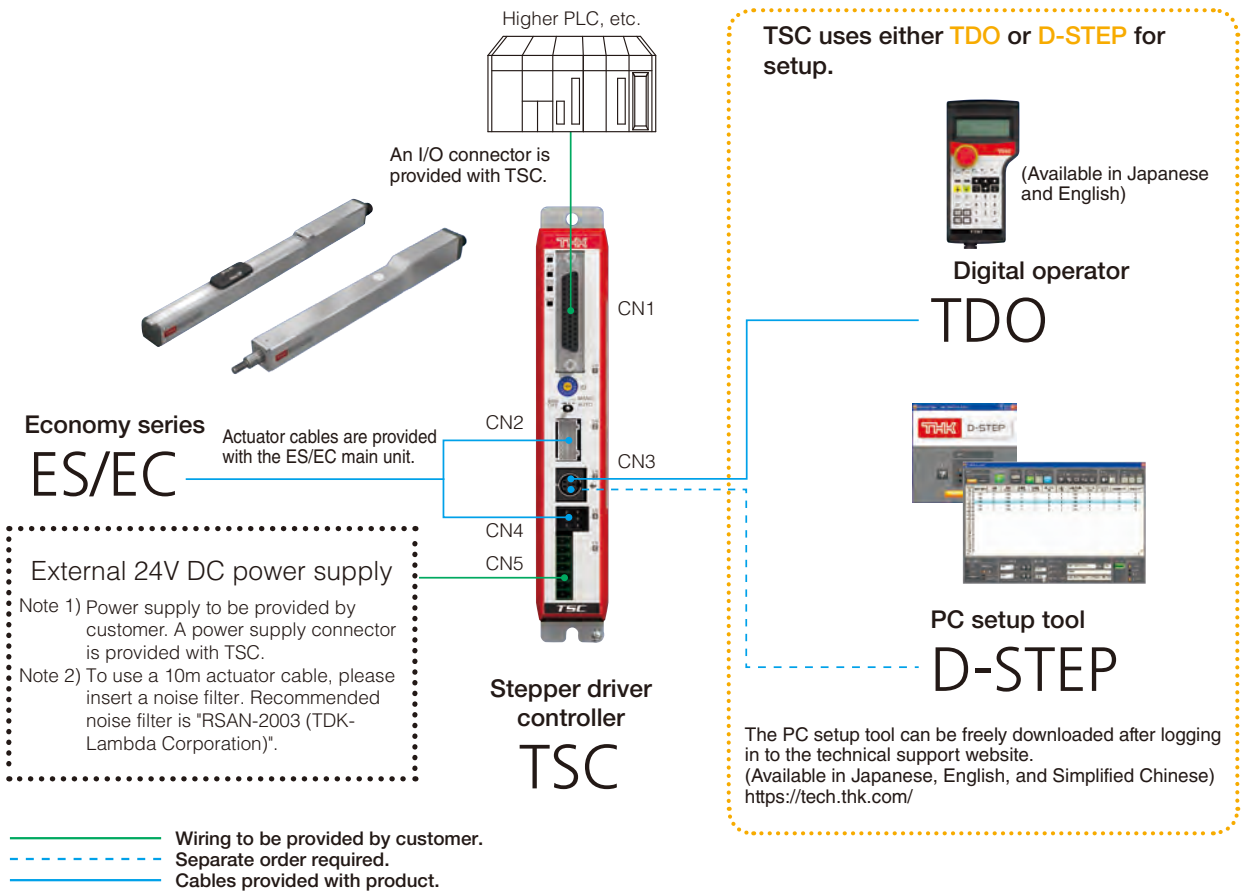
\*<sup>1</sup> Select "EC3" for EC3H and "EC4" for EC4H.

## Basic Specifications

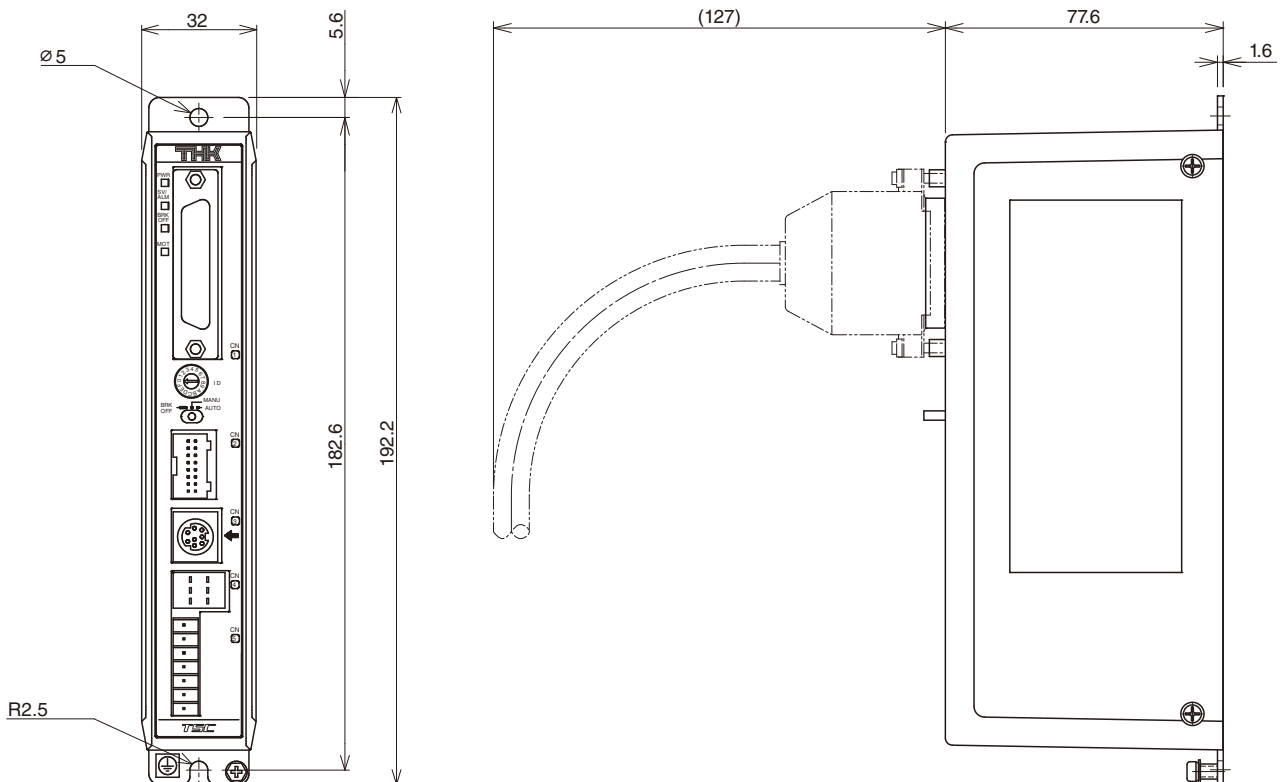
Basic Specifications	Input power supply	24V DC ±10% (Up to 2.5A)					
Control	Control axis	Single axis					
	Motor type	Stepper motor (□28mm, □35mm, □42mm)					
	Control method	Feedback control (Semi-closed loop)					
	Position detection method	Incremental					
	Acceleration/deceleration method	Trapezoid acceleration					
Program	Function mode	64-position	External unit input	256-position	512-position	Solenoid mode 1	Solenoid mode 2
	Step data count	64 points	64 points	256 points	512 points	7 points	3 points
	Data input/output method	PC setup tool D-STEP or Digital operator TDO					
Input/output	Dedicated input/output	Input point	16 points (Start, Return to home position, Pause, Reset, Servo ON, Specify step number, etc.)*				
		Output point	16 points (Return to home position completed, In position, Servo ready, Alarm, Battery alarm, etc.)*				
	Input/output power supply	24V DC ±10% (This should be prepared by yourself.)					
Communication	Serial communication	Connected device	PC setup tool D-STEP or Digital operator TDO				
		Communication method	RS-485				
		Port count	Mini DIN × 1				
Usage conditions	Usage conditions	0 to 40°C (No freezing)/-20 to 85°C (No freezing)					
	Operating humidity/Storage humidity	90% RH or below (No condensation)					
	Ambient condition	Indoor (Free from direct sunlight, corrosive gas, flammable gas, oil mist, dust, water, oil and chemicals)					
General specifications	Protective function	Overload, overvoltage, excessive position deviation, software limit over error, etc.					
	Accessories	Power supply connector × 1 I/O connector × 1					
	Options (sold separately)	Digital operator TDO (Cable length 5 m) I/O cable 3m, 5m, 7m, and 10m PC communication cable (Mini DIN ↔ USB)					
	Outer dimensions	32mm (W) × 192.2mm (H) × 77.6mm (D)					
	Weight	300g or less					

\* Varies depending on function mode.

System Configuration

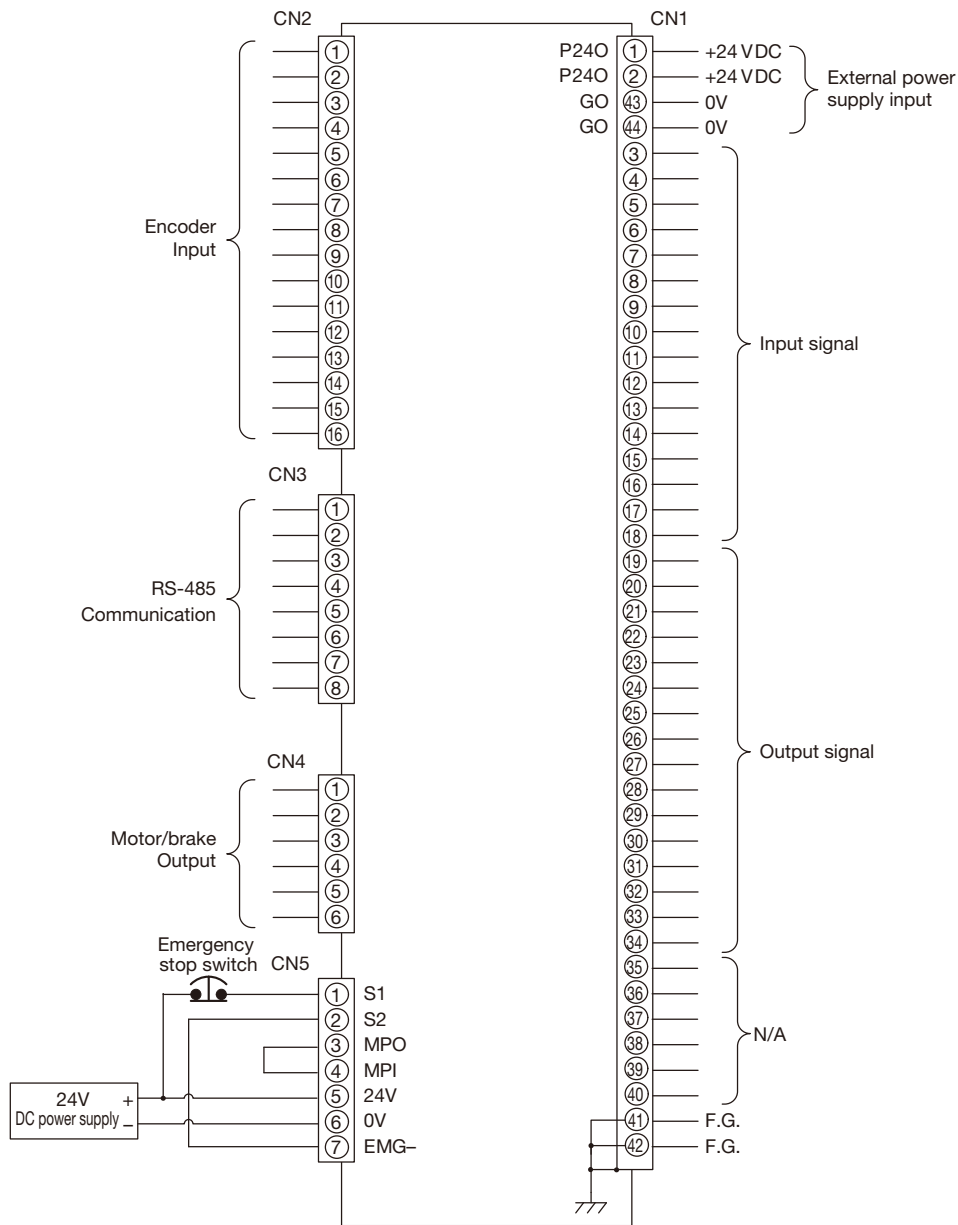


Dimensional Drawing of Controller



\* For details of the dimensional drawing, please contact THK.

# TSC Pin Assignment

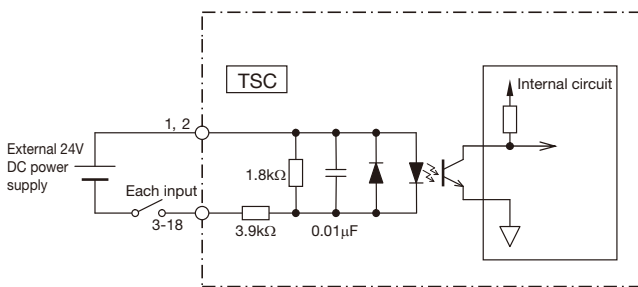


\* For attached I/O connector pin numbers, see P.48.

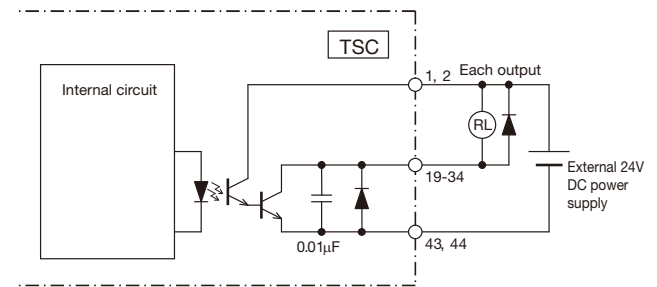
\* Customer provides 24V DC power supply for input/output circuitry.

## Input/Output Circuitry for TSC (CN1)

Input circuit



Output circuit



## TSC Function Modes

TSC provides six modes to support various requirements and purposes.

Function mode		Overview	Step data count	Pressing operation
Multi-point positioning	0: 64-position	Multi-point positioning operation with 64 points With area output, with P area output	64	○
	1: External unit input instruction	Multi-point positioning operation with 64 points I/O-based external unit instruction mode Without area output, with P area output	64	–
	2: 256-position	Multi-point positioning operation with 256 points Without area output, with P area output	256	○
	3: 512-position	Multi-point positioning operation with 512 points Without area output, without P area output	512	○
Electromagnetic valve	4: Solenoid mode 1	Multi-point positioning operation with 7 points Direct move command input With area output, with P area output	7	○
	5: Solenoid mode 2	Multi-point positioning operation with 3 points Direct move command input With position sensor auto-switch output, area output and P area output	3	–

## TSC Pin Assignment by Function Mode

I/O	CN1 pin number	Signal name						
		Function mode 0 64-position	Function mode 1 External unit input	Function mode 2 256-position	Function mode 3 512-position	Function mode 4 Solenoid mode 1	Function mode 5 Solenoid mode 2	
Input	3	PI 0	PI 0	PI 0	PI 0	ST 0	ST 0	
	4	PI 1	PI 1	PI 1	PI 1	ST 1	ST 1	
	5	PI 2	PI 2	PI 2	PI 2	ST 2	ST 2	
	6	PI 3	PI 3	PI 3	PI 3	ST 3	–	
	7	PI 4	PI 4	PI 4	PI 4	ST 4	–	
	8	PI 5	PI 5	PI 5	PI 5	ST 5	–	
	9	–	MODE	PI 6	PI 6	ST 6	–	
	10	–	JOG/INCHING	PI 7	PI 7	–	–	
	11	–	JOG P	–	PI 8	–	–	
	12	BKRL	JOG N	BKRL	BKRL	BKRL	BKRL	
	13	STRT	STRT/PWRT	STRT	STRT	–	–	
	14	MANU	MANU	MANU	MANU	MANU	MANU	
	15	HOME	HOME	HOME	HOME	HOME	HOME	
	16	PAUSE	PAUSE	PAUSE	PAUSE	PAUSE	PAUSE	
	17	REST	REST	REST	REST	REST	REST	
	18	SV-ON	SV-ON	SV-ON	SV-ON	SV-ON	SV-ON	
	Output	19	PO 0	PO 0	PO 0	PO 0	PE 0	LS 0
		20	PO 1	PO 1	PO 1	PO 1	PE 1	LS 1
21		PO 2	PO 2	PO 2	PO 2	PE 2	LS 2	
22		PO 3	PO 3	PO 3	PO 3	PE 3	–	
23		PO 4	PO 4	PO 4	PO 4	PE 4	–	
24		PO 5	PO 5	PO 5	PO 5	PE 5	–	
25		MOVE	MOVE	PO 6	PO 6	PE 6	–	
26		AREA	MODES	PO 7	PO 7	AREA	AREA	
27		P AREA	P AREA	P AREA	PO 8	P AREA	P AREA	
28		MANU S	MANU S	MANU S	MANU S	MANU S	MANU S	
29		HEND	HEND	HEND	HEND	HEND	HEND	
30		INPS	INPS	INPS	INPS	INPS	–	
31		LOAD/TRQS	WEND	LOAD/TRQS	LOAD/TRQS	LOAD/TRQS	–	
32		SVRDY	SVRDY	SVRDY	SVRDY	SVRDY	SVRDY	
33		EMGS	EMGS	EMGS	EMGS	EMGS	EMGS	
34		ALM	ALM	ALM	ALM	ALM	ALM	

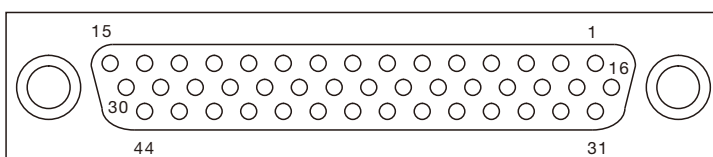
## Input Signal Functions

Input		
Signal name	Description	Remarks
MANU	Operation mode	Switches AUTO/MANUAL from I/O. MANUAL when signal is on, and AUTO when it is off.
STRT	Start	Start signal of program step. Program starts when signal is on.
PI0 to PI8	Instruction position number	Input for specifying position numbers. Specifies programs at each signal level. Selects a program step and starts a program with "STRT" signal.
PAUSE	Pause	Temporarily interrupts the operation. PAUSE input status when signal is off. (N.C. connection specification)
HOME	Return to home position	Starts the return to home position operation. Returning to home position is started when signal is on. It stops when it is off.
SV-ON	Servo on	Turns the servo ON and OFF. Servo ON when signal is on, and servo OFF when signal is off.
REST	Alarm reset	Resets alarm. Resets remaining travel distance during pause. Resets when it is on.
BKRL	Brake release	Forcibly releases brake. Releases brake when it is on.
MODE	External unit input instruction mode	Enters the instruction mode when signal is on. Instruction mode when signal is on.
PWRT	Current position write with external unit input instruction	During the instruction mode, the position is written when this signal is greater than 20ms with the position for writing specified.
JOG/INCHING	Manual operation switch with external unit input instruction	Switching of manual operation during the instruction mode. Selects inching operation when it is on, and jog operation when it is off.
JOG P	Moving direction + with external unit input instruction	Operating direction and operation start signal during the instruction mode. Moves in + direction to the soft limit when signal is on. Decelerates and stops when it is off while moving.
JOG N	Moving direction - with external unit input instruction	Operating direction and operation start signal during the instruction mode. Moves in - direction to the soft limit when signal is on. Decelerates and stops when it is off while moving.
ST0 to 6	Cylinder type START	Program start signal for position numbers from ST0 to ST6. Can select either Level or Edge for signal using parameter 13 "move" command. Note that when more than two positions are on at the same time, the lowest-number signal takes precedence.

## Output Signal Functions

Output		
Signal name	Description	Remarks
MANU S	Operation mode status	Operation mode status outputs (AUTO/MANUAL). MANUAL when signal is on, AUTO when off.
PO0 to PO8	End position number	Outputs the position number arrived after positioning is completed (binary outputs).
MOVE	Moving	Outputs signal during motor operation.
INPS	Positioning completed	Outputs when motor comes within the positioning completed width.
SVRDY	Operation preparations completed	Outputs signal when servo is on.
ALM	Alarm	Alarm output signal.
MODES	External unit input instruction mode status	Output signal for judging instruction mode or regular operation mode. Instruction mode when signal is on. Regular operation mode when it is off.
WEND	Writing completed	Signal is off after switching to the regular mode, and it is on for 30ms when writing of the PWRT signal is completed.
HEND	Return to home position completed	Outputs signal when returning to home position is completed.
AREA	Upper/lower area limit	On when the current position of actuator is within a range specified by the parameter.
P AREA	Position area	On when the current position of actuator is within a range specified by the program step.
EMGS	Emergency stop status	Outputs judgment for input of emergency stop. On during normal operation, and off when emergency stop circuit is shut off.
LOAD	Load output judgment status	On when a directive torque exceeds the threshold over a certain period within a judgment range.
TRQS	Torque level status	On when the load threshold is reached while moving. Off while the load remains under the threshold.
PE0 to PE6	Cylinder type arrival completed output	Signal generated after operation for position number is completed.
LS0 to LS2	Cylinder type position detection output	Outputs when the current position comes within the positioning width for each of the three points.

## I/O Connector Pin Numbers

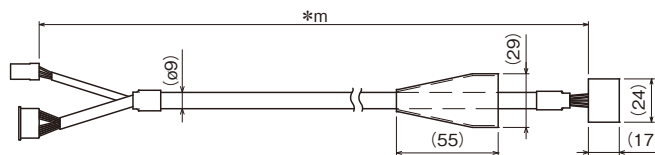


\* Controller connector port view

## Actuator Cable

TSC actuator cable: CBL-TSC-AC-\* \*-B (Standard)

\* \* indicates cable length: 03 (3m), 05 (5m), or 10 (10m).



\* To use a 10m actuator cable, insert a noise filter to the TSC power supply.  
Recommended noise filter is "RSAN-2003 (TDK-Lambda Corporation)".

## Low-capacity servo driver controller

# TLC

For single axis / position type



## Features

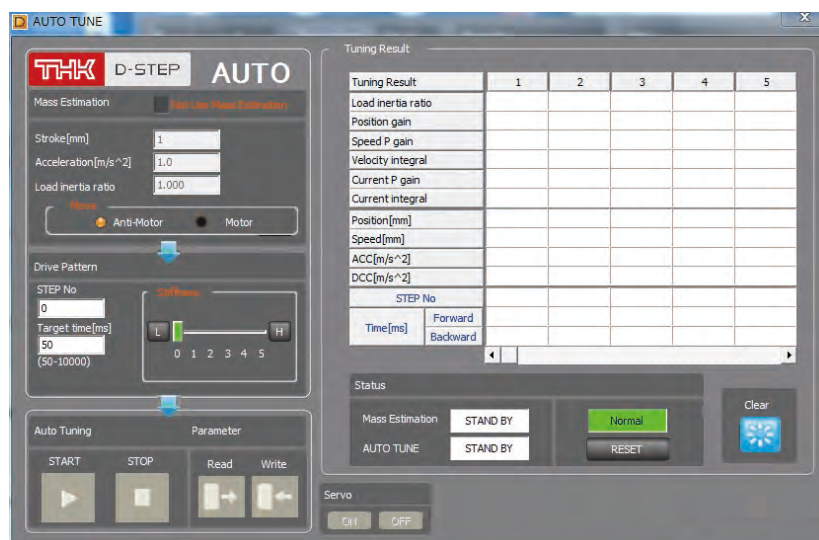
Ready to use, simplified setup.

## Simple Operation

Use PC setup tool D-STEP or digital operator TDO to access many useful functions.

## Functions

- Selectable function modes  
(64-position, external unit input instruction, 256-position, 512-position, Solenoid mode 1, and Solenoid mode 2)
- Step data count: Up to 512 (depending on function mode)
- Alarm history: Up to 50 (including power ON history)
- Switching between Auto/Manual, brake release switch
- Selectable control methods (positioning or pressing)
- Absolute supported
- Auto-tuning functionality built-in



## Combined Control Device Model Configuration (TLC)

Control device model	Capacity	Power supply voltage	Type	Encoder type	Actuator model	Lead	Home position	Brake	Stroke
TLC	005	024DC	MOD	A	ES6	06	D	B	0050
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
TLC	005: 50W	024DC: 24VDC	MOD: Mode switching type	A: Absolute	Direct coupling ES5 ES6 EC4*	06: 6mm 12: 12mm	D: Motor side R: Reverse motor side	No symbol: Without brake B: With brake	Enter the stroke of the actuator model (6) Example) 0050: 50mm
					Motor wrap ES5R ES6R EC4R				

\* Select "EC4" for EC4H.

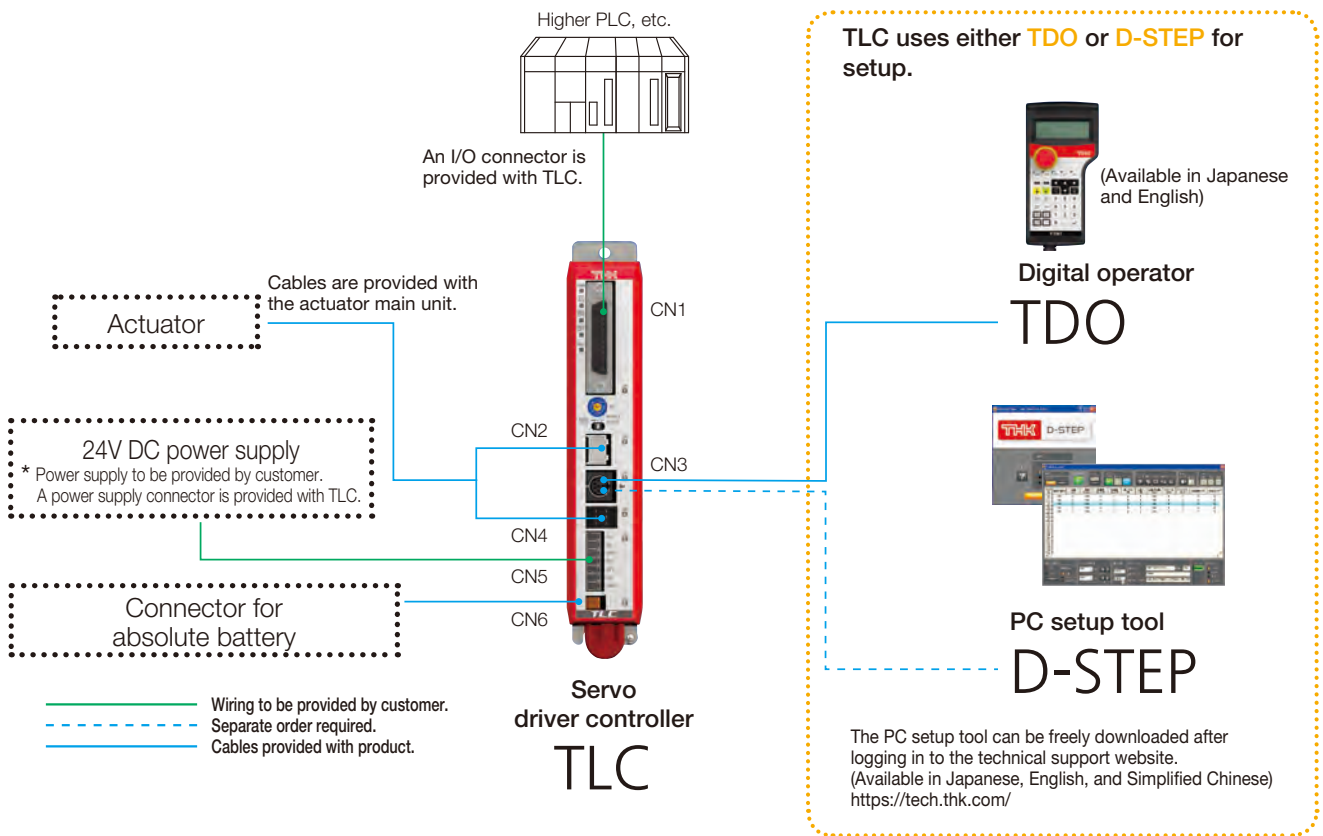
## TLC Specifications

Type of machine	Model	TLC					
	Capacity	50W					
Input power supply	Main circuit	24VDC±10%					
	Control circuit						
	Power supply [A]	Rated 6A (Max 16A)					
Control	Control axis	Single axis					
	Motor	AC servo motor					
	Control	Feedback control (Semi-closed loop)					
	Position detection	Absolute					
	Acceleration/deceleration	Trapezoid acceleration, S-shape acceleration					
Program	Function mode	64-position	External unit input	256-position	512-position	Solenoid mode 1	Solenoid mode 2
	Step data count	64 points	64 points	256 points	512 points	7 points	3 points
	Data input/output	PC setup tool D-STEP or Digital operator TDO					
Input/output	Dedicated input/output	Input points	16 points (Start, Return to home position, Pause, Reset, Servo ON, Specify step number, etc.) *				
		Output points	16 points (Return to home position completed, In position, Servo ready, Alarm, Battery alarm, etc.) *				
	Input/output power supply	24VDC ±10% (This should be prepared by yourself.)					
Communication	Serial communication	Device	Digital operator or PC software				
		Method	RS-485				
		Ports	Mini DIN × 1				
Usage conditions	Operating/storage temperature	0 to 40°C (No freezing) / -20 to 85°C (No freezing)					
	Operating/storage humidity	90% RH or below (No condensation)					
	Ambient condition	Indoor (Free from direct sunlight, corrosive gas, flammable gas, oil mist, dust, water, oil and chemicals)					
General specifications	Protective function	Overload, overvoltage, excessive position deviation, software limit over error, etc.					
	Accessories	Power supply connector × 1 I/O connector × 1					
	Options (sold separately)	Digital operator TDO (Cable length 5m) I/O cable 3m, 5m, 7m, and 10m Communication cable (Mini DIN↔USB)					
	Outer dimensions [mm]	36.4mm (W)×199.2mm (H)×112.6mm (D)					
	Weight (not including battery)	0.4kg or less					

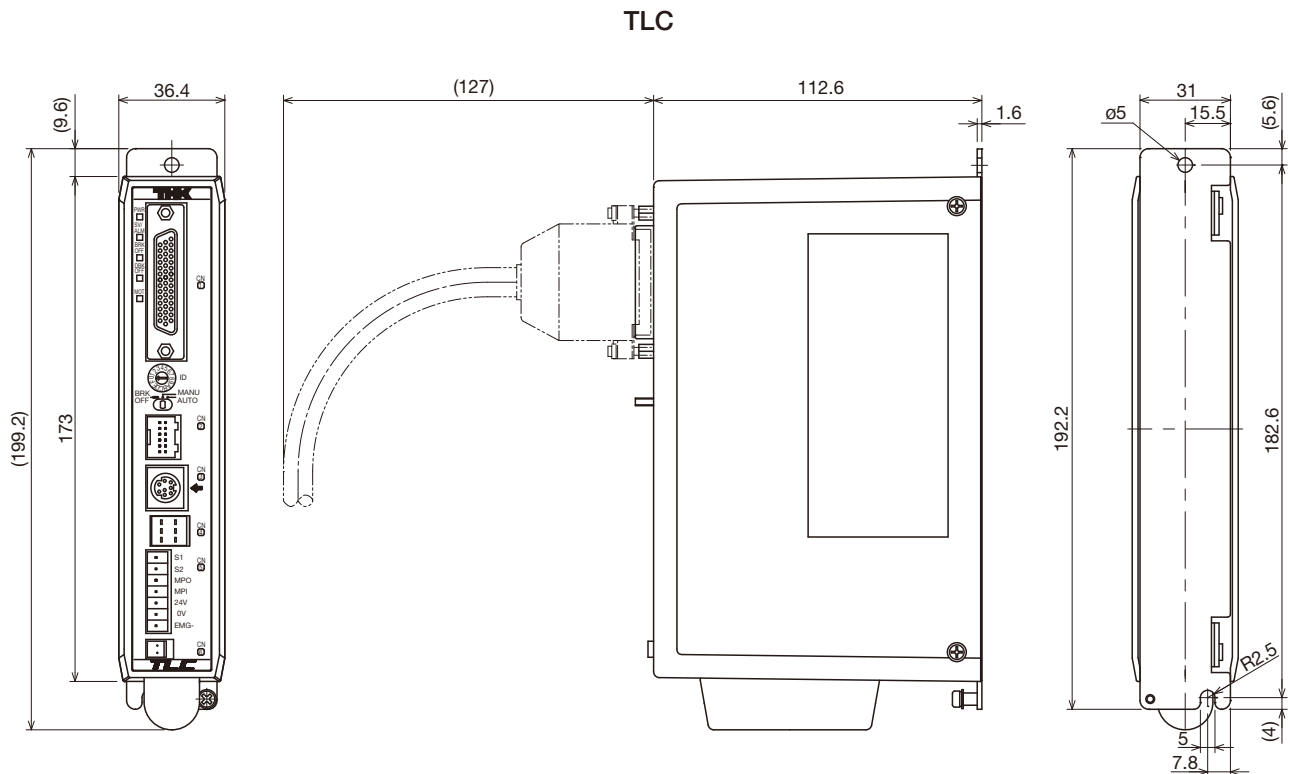
\* Varies depending on function mode.



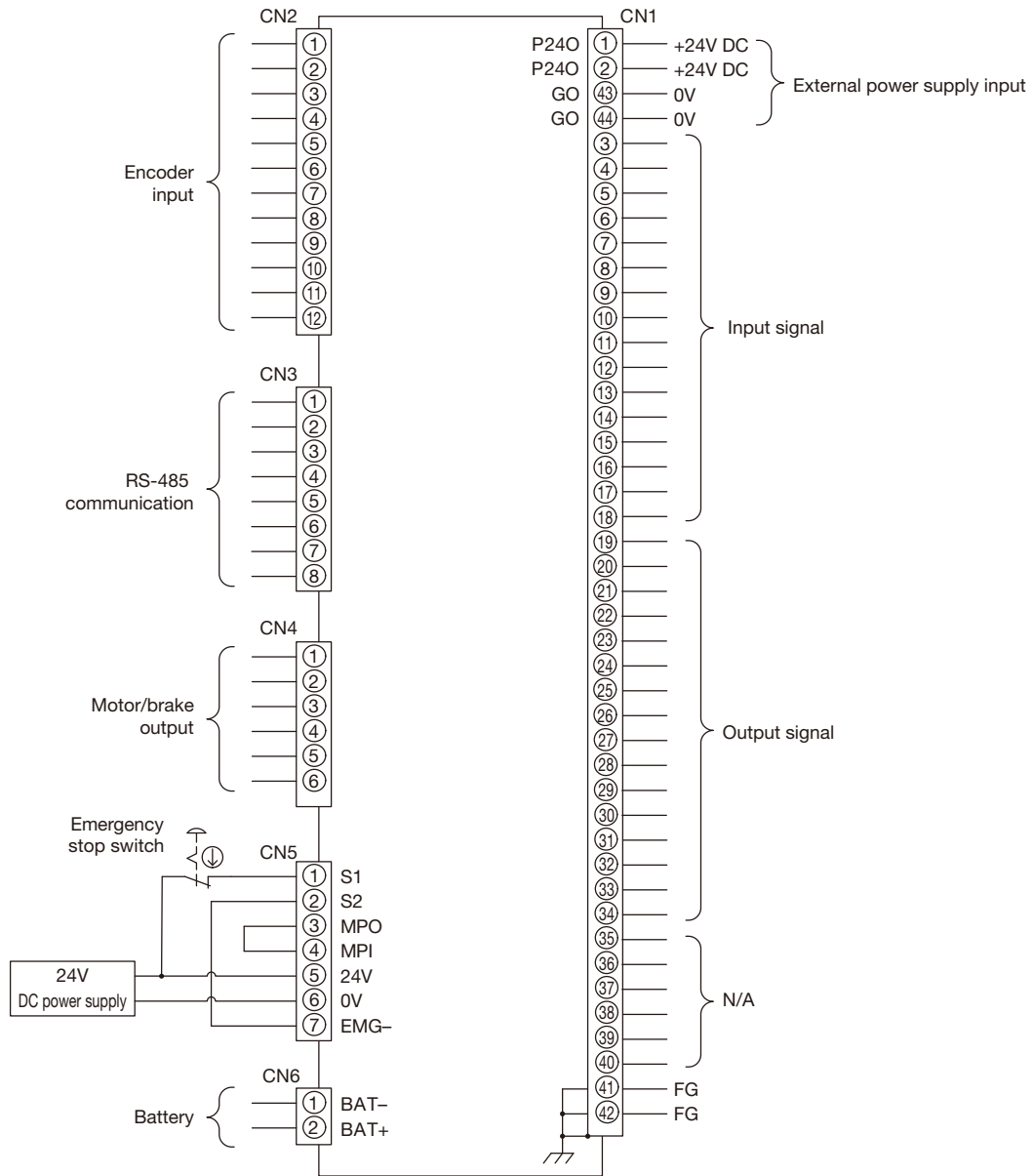
### System Configuration



### Dimensional Drawing of Controller



TLC Pin Assignment

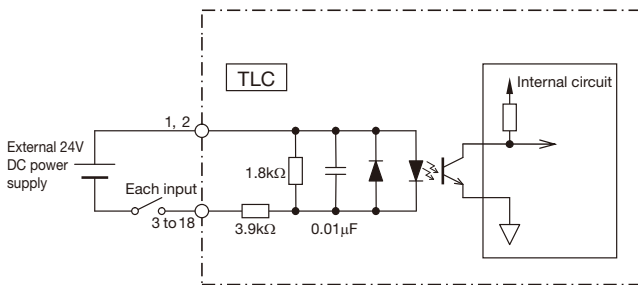


\* For attached I/O connector pin numbers, see P.55.

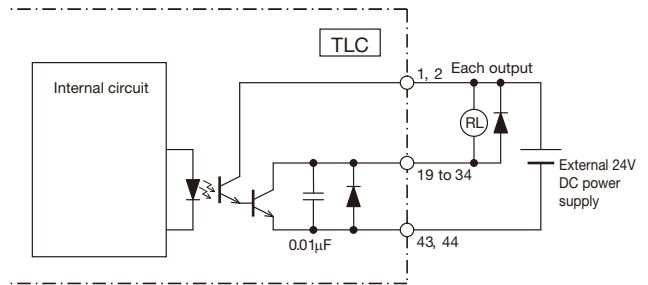
\* Customer provides 24V DC power supply for input/output circuitry.

Input/Output Circuitry for TLC (CN1)

Input circuit



Output circuit



## TLC Function Modes

TLC provides six modes to support various requirements and purposes.

Function mode		Overview	Step data count	Pressing operation
Multi-point positioning	0: 64-position	Multi-point positioning operation with 64 points With area output, with P area output	64	○
	1: External unit input instruction	Multi-point positioning operation with 64 points I/O-based external unit instruction mode Without area output, with P area output	64	–
	2: 256-position	Multi-point positioning operation with 256 points Without area output, with P area output	256	○
	3: 512-position	Multi-point positioning operation with 512 points Without area output, without P area output	512	○
Electromagnetic valve	4: Solenoid mode 1	Multi-point positioning operation with 7 points Direct move command input With area output, with P area output	7	○
	5: Solenoid mode 2	Multi-point positioning operation with 3 points Direct move command input With position sensor auto-switch output, area output and P area output	3	–

## TLC Pin Assignment by Function Mode

I/O	CN1 pin number	Signal name						
		Function mode 0	Function mode 1	Function mode 2	Function mode 3	Function mode 4	Function mode 5	
		64-position	External unit input	256-position	512-position	Solenoid mode 1	Solenoid mode 2	
Input	3	PI 0	PI 0	PI 0	PI 0	ST 0	ST 0	
	4	PI 1	PI 1	PI 1	PI 1	ST 1	ST 1	
	5	PI 2	PI 2	PI 2	PI 2	ST 2	ST 2	
	6	PI 3	PI 3	PI 3	PI 3	ST 3	–	
	7	PI 4	PI 4	PI 4	PI 4	ST 4	–	
	8	PI 5	PI 5	PI 5	PI 5	ST 5	–	
	9	–	MODE	PI 6	PI 6	ST 6	–	
	10	–	JOG/INCHING	PI 7	PI 7	–	–	
	11	–	JOG P	–	PI 8	–	–	
	12	BKRL	JOG N	BKRL	BKRL	BKRL	BKRL	
	13	STRT	STRT/PWRT	STRT	STRT	–	–	
	14	MANU	MANU	MANU	MANU	MANU	MANU	
	15	HOME	HOME	HOME	HOME	HOME	HOME	
	16	PAUSE	PAUSE	PAUSE	PAUSE	PAUSE	PAUSE	
	17	REST	REST	REST	REST	REST	REST	
	18	SV-ON	SV-ON	SV-ON	SV-ON	SV-ON	SV-ON	
	Output	19	PO 0	PO 0	PO 0	PO 0	PE 0	LS 0
		20	PO 1	PO 1	PO 1	PO 1	PE 1	LS 1
21		PO 2	PO 2	PO 2	PO 2	PE 2	LS 2	
22		PO 3	PO 3	PO 3	PO 3	PE 3	–	
23		PO 4	PO 4	PO 4	PO 4	PE 4	–	
24		PO 5	PO 5	PO 5	PO 5	PE 5	–	
25		MOVE	MOVE	PO 6	PO 6	PE 6	–	
26		AREA	MODES	PO 7	PO 7	AREA	AREA	
27		P AREA	P AREA	P AREA	PO 8	P AREA	P AREA	
28		MANU S	MANU S	MANU S	MANU S	MANU S	MANU S	
29		HEND	HEND	HEND	HEND	HEND	HEND	
30		INPS	INPS	INPS	INPS	INPS	–	
31		LOAD/TRQS	WEND	LOAD/TRQS	LOAD/TRQS	LOAD/TRQS	–	
32		SVRDY	SVRDY	SVRDY	SVRDY	SVRDY	SVRDY	
33		BALM	BALM	BALM	BALM	BALM	BALM	
34		ALM	ALM	ALM	ALM	ALM	ALM	

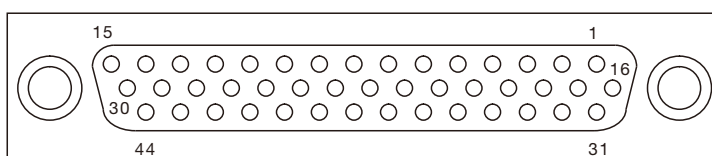
## Input Signal Functions

Input		
Signal name	Description	Remarks
MANU	Operation mode	Switches AUTO/MANUAL from I/O. MANUAL when signal is on, and AUTO when it is off.
STRT	Start	Start signal of program step. Program starts when signal is on.
PI0 to PI8	Instruction position number	Input for specifying position numbers. Specifies programs at each signal level. Selects a program step and starts a program with "STRT" signal.
PAUSE	Pause	Temporarily interrupts the operation. PAUSE input status when signal is off. (N.C. connection specification)
HOME	Return to home position	Starts the return to home position operation. Returning to home position is started when signal is on. It stops when it is off.
SV-ON	Servo on	Turns the servo ON and OFF. Servo ON when signal is on, and servo OFF when signal is off.
REST	Alarm reset	Resets alarm. Resets remaining travel distance during pause. Resets when it is on.
BKRL	Brake release	Forcibly releases brake. Releases brake when it is on.
MODE	External unit input instruction mode	Enters the instruction mode when signal is on. Instruction mode when signal is on.
PWRT	Current position write with external unit input instruction	During the instruction mode, the position is written when this signal is greater than 20ms with the position for writing specified.
JOG/INCHING	Manual operation switch with external unit input instruction	Switching of manual operation during the instruction mode. Selects inching operation when it is on, and jog operation when it is off.
JOG P	Moving direction + with external unit input instruction	Operating direction and operation start signal during the instruction mode. Moves in + direction to the soft limit when signal is on. Decelerates and stops when it is off while moving.
JOG N	Moving direction - with external unit input instruction	Operating direction and operation start signal during the instruction mode. Moves in - direction to the soft limit when signal is on. Decelerates and stops when it is off while moving.
ST0 to 6	Cylinder type START	Program start signal for position numbers from ST0 to ST6. Can select either Level or Edge for signal using parameter 13 "move" command. Note that when more than two positions are on at the same time, the lowest-number signal takes precedence.

## Output Signal Functions

Output		
Signal name	Description	Remarks
MANU S	Operation mode status	Operation mode status outputs (AUTO/MANUAL). MANUAL when signal is on, AUTO when off.
PO0 to PO8	End position number	Outputs the position number arrived after positioning is completed (binary outputs).
MOVE	Moving	Outputs signal during motor operation.
INPS	Positioning completed	Outputs when motor comes within the positioning completed width.
SVRDY	Operation preparations completed	Outputs signal when servo is on.
ALM	Alarm	Alarm output signal.
MODES	External unit input instruction mode status	Output signal for judging instruction mode or regular operation mode. Instruction mode when signal is on. Regular operation mode when it is off.
WEND	Writing completed	Signal is off after switching to the regular mode, and it is on for 30ms when writing of the PWRT signal is completed.
HEND	Return to home position completed	Outputs signal when returning to home position is completed.
AREA	Upper/lower area limit	On when the current position of actuator is within a range specified by the parameter.
P AREA	Position area	On when the current position of actuator is within a range specified by the program step.
BALM	Voltage reduction in battery	Off when the battery voltage decreases.
LOAD	Load output judgment status	On when a directive torque exceeds the threshold over a certain period within a judgment range.
TRQS	Torque level status	On when the load threshold is reached while moving. Off while the load remains under the threshold.
PE0 to PE6	Cylinder type arrival completed output	Signal generated after operation for positioning is completed.
LS0 to LS2	Cylinder type position detection output	Outputs when the current position comes within the positioning width for each of the three points.

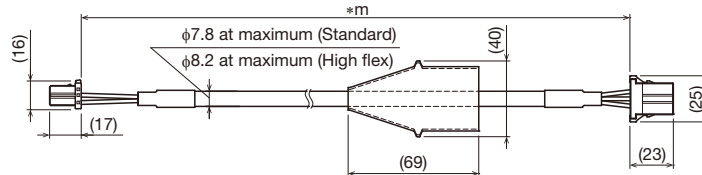
## I/O Connector Pin Numbers



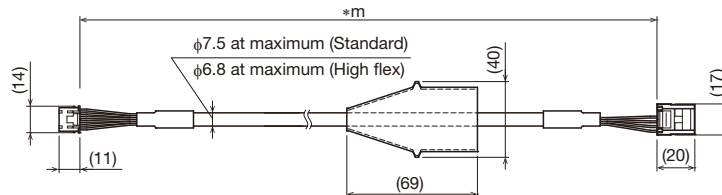
\* Controller connector port view

## Actuator Cable

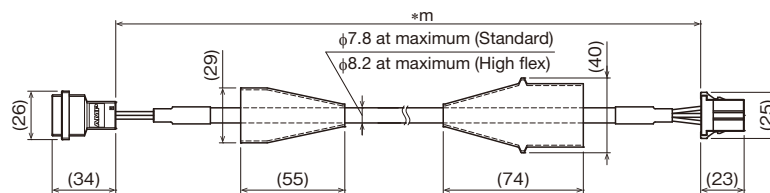
Motor brake cable for TLC: CBL-TLC-ACP-\*\* F (Standard)  
 CBL-TLC-ACP-\*\* R (High flex)  
 \*\* indicates cable length: 03 (3m), 05 (5m), or 10 (10m)



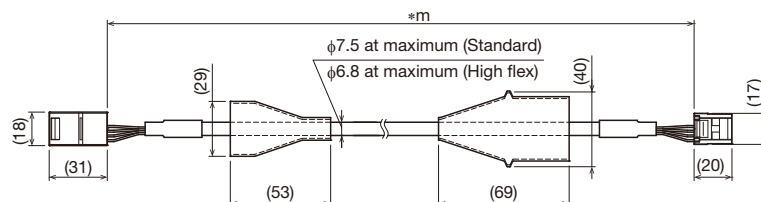
Encoder cable for TLC: CBL-TLC-ACS-\*\* F (Standard)  
 CBL-TLC-ACS-\*\* R (High flex)  
 \*\* indicates cable length: 03 (3m), 05 (5m), or 10 (10m)



Motor brake extension cable for TLC/THC: CBL-ACP-EXT01-\*\* F (Standard)  
 CBL-ACP-EXT01-\*\* R (High flex)  
 \*\* indicates cable length: 01 (1m), 03 (3m), or 05 (5m)



Extension encoder cable for TLC: CBL-ACS-EXT01-\*\* F (Standard)  
 CBL-ACS-EXT01-\*\* R (High flex)  
 \*\* indicates cable length: 01 (1m), 03 (3m), or 05 (5m)



Note 1) For use involving moving elements, select high flex type. The recommended bending radius at the core of cable is R95 or greater.  
 (For use involving other than moving elements, R50 or greater is recommended.)  
 Note 2) When using the TLC servo driver controller, motor brake cable and encoder cable should be no longer than 11m.  
 Up to two extension cables can be connected.

## Option

### Lithium ion battery (for maintenance)

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ER6V C4 (Toshiba Home Appliances Corporation)

- This is required for the absolute system.
- When replacing the battery, order the above.

Network Unit / Branch Unit

# TNU/TJU



Multiple-axis connection fieldbus compatible

## Less Wiring Required

Connecting to a PLC through a fieldbus network requires less wiring than an I/O cable connection. In addition, the network unit and each driver controller can be connected with a single dedicated cable.



## Up to 16 Axes Can Be Connected

Up to 16 axes of mixed THK driver controllers (TSC, TLC, and THC) can be connected using one TNU and TJU (branch unit) in combination.

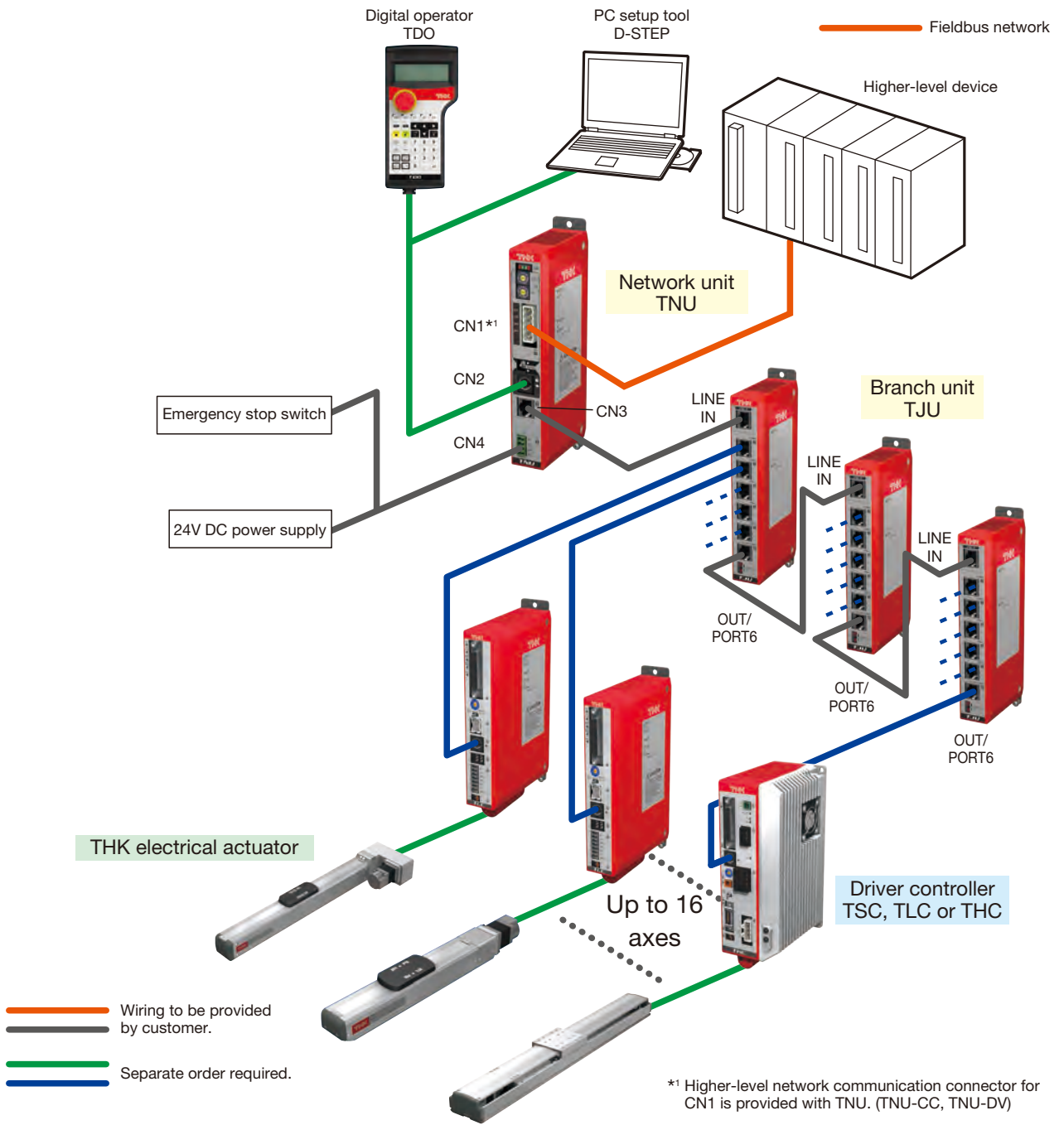
## Direct Numerical Control Supported (Version 1.2 or later)

Position, speed, and acceleration commands can be made directly from the PLC. As well, information such as the current position can be monitored.

\* TSC is supported with Version 1.22, TLC/THC with Version 1.07 or later.

\* For TNU-EC support, contact THK.

System Configuration





## Model Configuration

### ● Network unit

Model	Network type
TNU	CC
(1)	(2)
TNU	CC:CC-Link
	DV:DeviceNet
	EC:EtherCAT
	EP:EtherNet/IP

### ● Branch unit

Model
TJU
(1)
TJU

### ● TACnet cable (between TJU and driver controller)

Model	Type	Cable length
CBL	NW	01
(1)	(2)	(3)
CBL	NW	01:1m
		03:3m

Use an industrial Ethernet cable between TNU and TJU, and between TJUs.

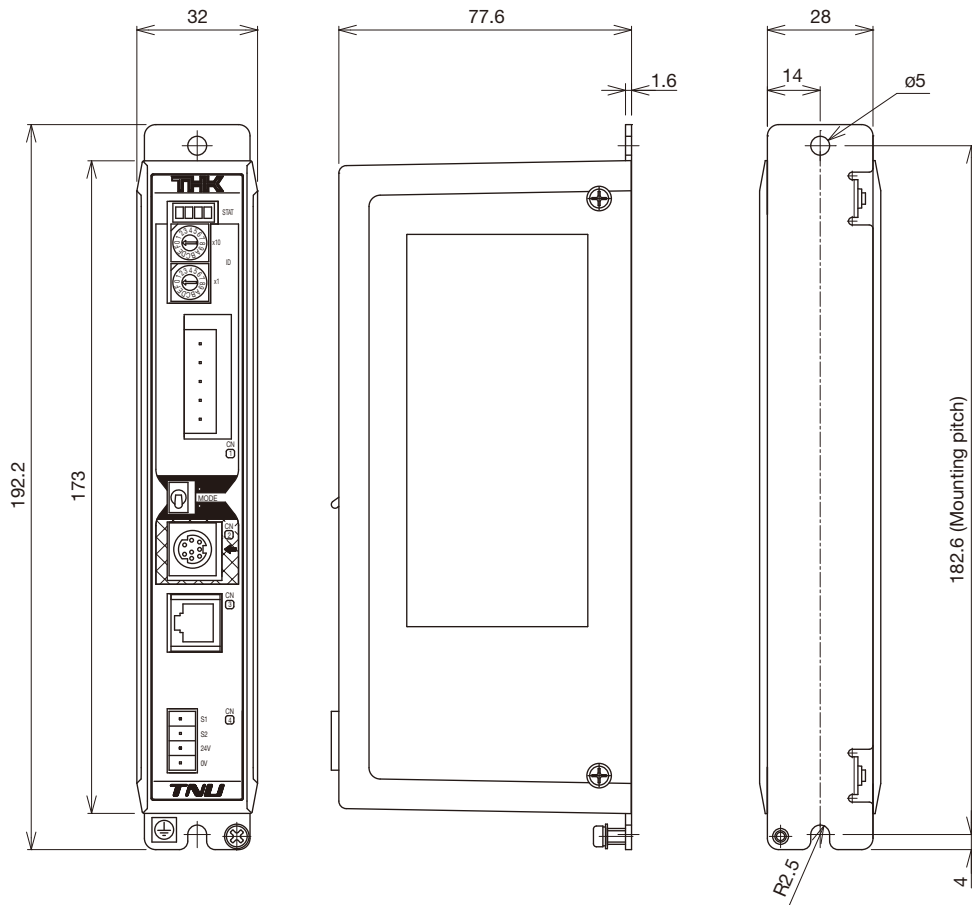
## Specifications

Model		TNU-CC		TNU-DV	TNU-EC	TNU-EP
Fieldbus	Communication standard	CC-Link Ver1.10	CC-Link Ver2.00	DeviceNet	EtherCAT	EtherNet/IP
	Communication speed	10Mbps/5Mbps/2.5Mbps/625kbps/156kbps		500kbps/250kbps/125kbps	100M	10M/100M
	Number of occupied stations	Remote device stations 4 stations	Remote device stations 1 station, 2 stations, 3 stations, 4 stations	Number of occupied nodes: 1 Number of occupied channels*: input 128 CH output 128 CH	—	—
Applicable controller		TSC/TLC/THC				
THK network	Transmission channel type	RS-485				
	Communication speed [bps]	38.4k/57.6k/115.2k				
	Communication method	Half duplex				
	Maximum trunk length [m]	20				
	Maximum number of connectable axes	16				
Input power supply		24V DC ±10%, up to 0.3A				
Operating/storage temperature		0 to 55°C (No freezing)/-20 to 85°C (No freezing)				
Ambient condition		Indoor (Free from direct sunlight, corrosive gas, flammable gas, oil mist)				
Protective function		Higher-level network communication error, communication error, system error				
Weight [g]		240(TJU:220)				

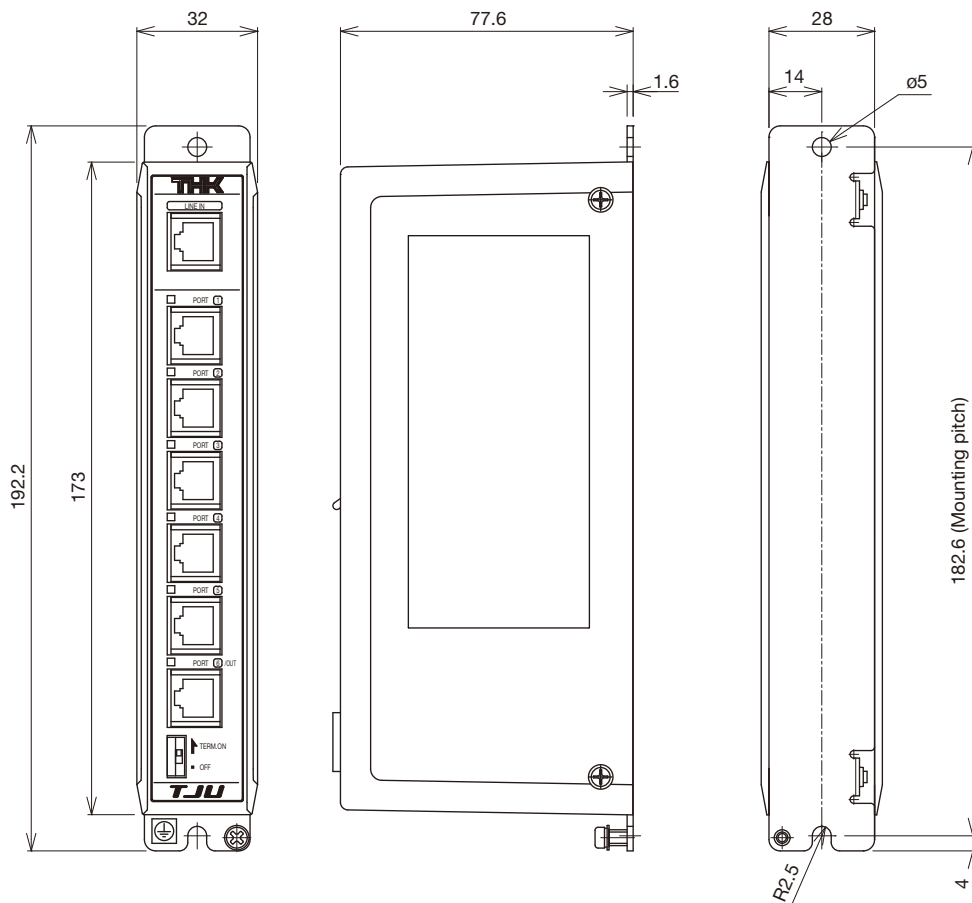
\* The number of occupied channel numbers is fixed. If using master devices with 128 or fewer input occupied channels or 128 or fewer output occupied channels, contact THK.

## Dimensions

## ● TNU



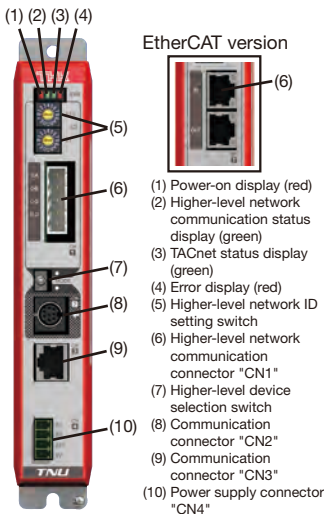
## ● TJU



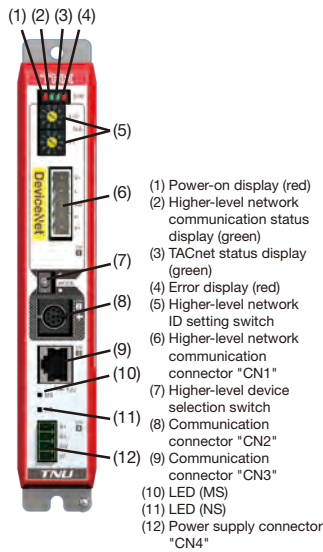
The Outer dimensions and mounting dimensions of TNU and TJU are the same.

Components

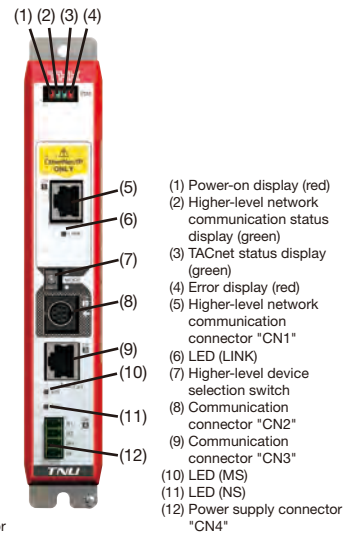
- TNU-CC
- TNU-EC



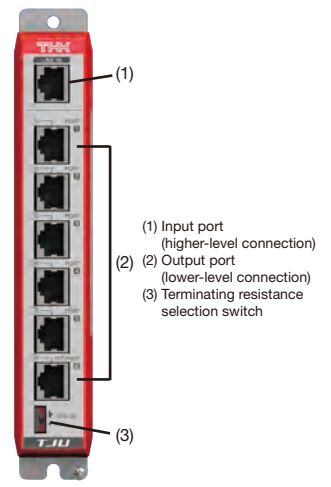
- TNU-DV



- TNU-EP

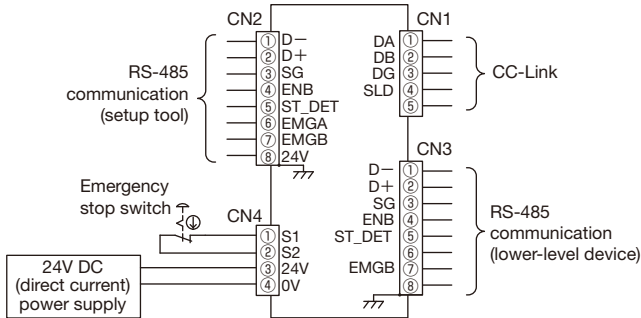


- TJU

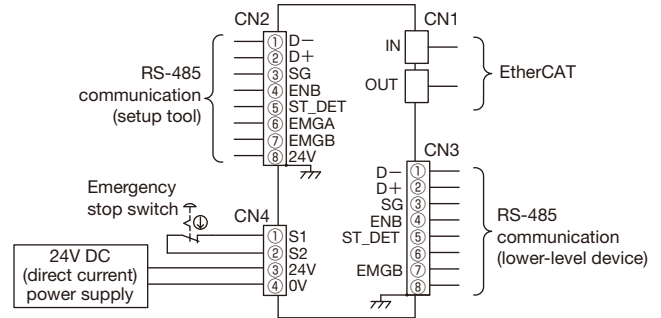


External Device Connection (TNU)

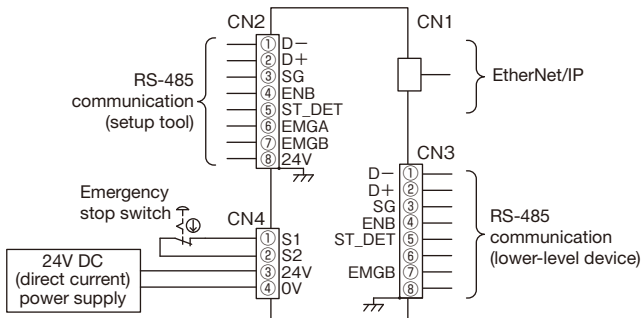
- CC-Link



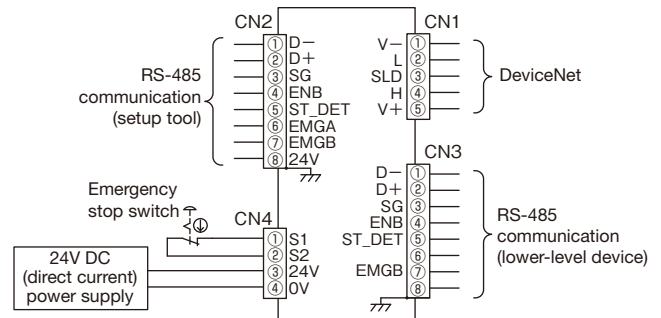
- EtherCAT



- EtherNet/IP



- DeviceNet



Note: The emergency stop terminals (CN4-S1 and S2) are not used for power shutdown of TNU, but used for an emergency stop of the lower-level device (THK driver controller).

## TDO Digital operator (separate order required)



### Features

Simple, quick operations and settings of TSC, TLC and THC are possible without using a PC.

### Simple Operation

Key sheet with a straightforward design,  
LC with backlight (20 digits × 4 lines).

### Functions

- Checking and editing step data and parameters
- Operation of actuator  
(Return to home position, Jog operation, Inching operation, Program execution, Servo ON/OFF, Electromagnetic brake ON/OFF)
- Monitor (I/O, Current position, Position command, Current command, Version display)
- Alarm (History display, Clear history, Interrupt display on occurrence, Alarm reset)
- Settings (Backlight luminance, LCD contrast, Beep tone, Automatic turn off of backlight)
- Enable switch (3 positions) - Protection structure IP54 (excluding cable connectors) - Display language (Japanese/English)

Outer dimensions: 110mm (W) × 218.3mm (H) × 66.6mm (D) (excluding crests)

Main unit weight: 400g (excluding cables) Cable length: 5m

\* TLC/THC is supported with Version 1.03 or later.

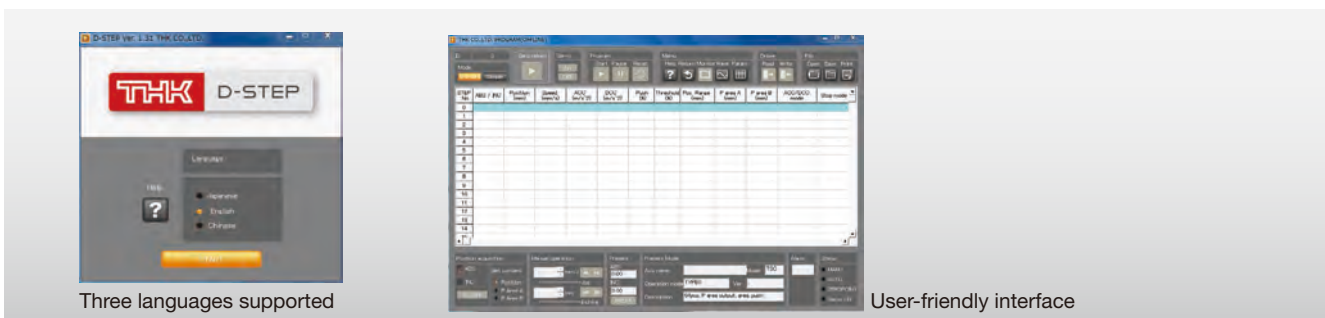
\* TNU is supported with Version 1.10 or later.

### Model Configuration

Model	Type
TDO	N
(1)	(2)
TDO	N: Category 2*1 compliant type

\*1 ISO 13849-1

## D-STEP PC setup tool



Three languages supported

User-friendly interface

### Features

Supports multifunctional TSC/TLC/THC with user-friendly interface.

### Simple Operation

Operations and settings of TSC, TLC and THC are possible using a PC.

Equipped with functions useful for maintenance, such as backing up data or logging operating states.

### Functions

- Checking, editing, backing up, or offline-editing of step data
- Checking, editing, backing up, or offline-editing of parameters
- Operations of actuator (Return to home position, Jog operation, Inching operation, Program execution, Servo ON/OFF)
- Monitor (I/O, Current position, Position command, Current command) - Logging (Speed and current waveform display)
- Alarm (History display, Clear history, Alarm reset) - Display language (Japanese/English/Simplified Chinese)

Supported OS: Windows XP/Windows Vista/Windows 7

D-STEP can be freely downloaded from the THK technical support website (<https://tech.thk.com/>).

\* TLC/THC/TNU is supported with Version 1.10 or later.

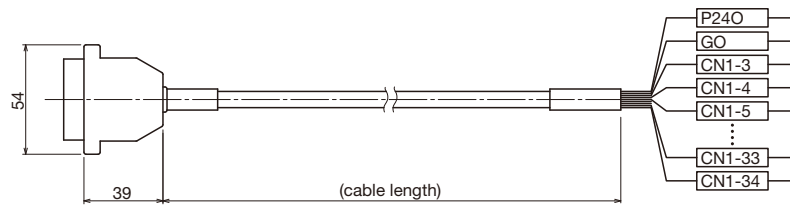
## Cable

I/O cable: CBL-CON-IO-\*\* (optional)

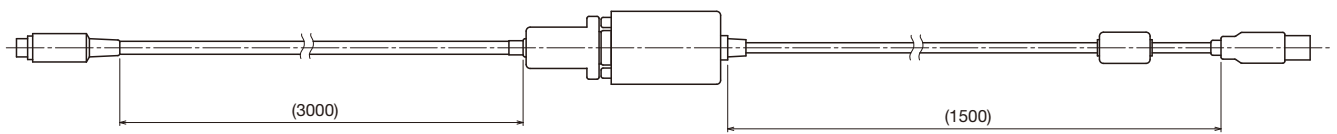
\*\* indicates cable length: 03 (3m), 05 (5m), or 10 (10m).

Cables are used for TSC/TLC/THC.

\* Cables are shipped with the discrete wire side terminals unprocessed.



PC communications cable: CBL-COM-03 (optional)





# Precautions on Use

## ● Application

- This product cannot be applied to any equipment or system that may be used under a life-threatening condition.
- When you consider using this product for special applications such as equipment/system for mobile vehicles, medical uses, aerospace, atomic energy and power plants, make sure to contact THK for applicability beforehand.

## ● Safety Precautions

- Before operation, please read thoroughly and obey "Manipulating industrial robots – Safety" (JIS B8433) and "Ordinance on Industrial Safety and Health" (Ministry of Health, Labor and Welfare).
- Read the manual carefully, understand the contents well, and strictly observe the safety precautions.
- Before performing installation, adjustment, checking, or services regarding the main actuator unit, controller and the relevant connected equipment, make sure to remove all power plugs from the outlet and apply locking or safety plugs so that nobody else can turn on the power. Also display a signboard showing that the work is ongoing at a prominent place.
- Do not touch the moving part of the actuator while it is energized. In addition, do not enter the operating area of the actuator while the product is operating or in the ready state.
- If two or more people are involved in the operation, confirm the procedures such as a sequence, signs and anomalies in advance, and appoint another person for monitoring the operation.
- Do not unnecessarily disassemble this product. Doing so may allow foreign materials to enter or deterioration of precision. Also this will cause the risk of electric shock from the controller.
- Take care not to drop or strike this product. Doing so may cause injury or damage the unit. If the product is dropped or impacted, functionality may be reduced even if there is no surface damage.
- Operation of the actuator over the permissible rotational speed may cause damage or an accident. Please keep the rotational speed within THK specifications.
- Prevent foreign material, such as dust or cutting chips, from entering the product. This could cause damage to ball recirculation components and loss of functionality.
- When planning to use the product in an environment where a coolant could penetrate the unit, contact THK.
- When there is any risk that the slider may collide with the stoppers attached to both ends of operable range, install some shock absorbing mechanism such as a shock absorber. The stoppers are not designed to absorb the impact generated by the collision of the slider. When the slider collides with a stopper during operation, it may cause damage or an accident.

## ● Environment

- An indoor location and ambient temperatures from 0 to 40°C, and humidity of 80%RH or below (no freezing or condensation).


Wrong environment can cause failures of the actuator and driver. The best place to use the product is as follows:

- A place free from corrosive gas and flammable gas.
- A place where vibration or impact is not transmitted to the unit.
- A place free from electrically conductive powder (such as iron powder), dust, oil mist, cutting fluid, moisture, salt, and organic solvent.
- A place free from direct sunlight and radiant heat.
- A place free from strong electric and magnetic fields.

- A place that is easily accessible for service and cleaning purposes.
  - When using the product in locations exposed to constant vibrations or in special environments such as vacuum or abnormally high or low temperatures, contact THK in advance.
- **Mounting Surface**
    - The surface should be the plane that has the precision of machining or the equivalent of that. Some products specify the required flatness. When you wish to use the product with QZ in a position other than horizontal (such as wall mount and vertical posture), contact THK.
- **Lubrication**
    - In order to effectively use the actuator, lubrication is required. Insufficient lubrication may increase abrasion on the rolling part and cause early failure.
    - Do not use a mix of lubricants with different physical properties. Note that encapsulated lubricant types vary depending on products.
    - Please contact THK if using special lubricants.
    - THK recommend the greasing interval to be approximately every 100km. However, it may vary depending on the usage conditions, so THK recommends determining a greasing interval during the initial inspection.
    - If the product is to be used in a location exposed to vibrations or in a special environment such as vacuum, or abnormally high or low temperatures, or in a clean room, normal lubricants may not be used. Contact THK for details.
    - When adopting oil lubrication method, contact THK.
- **Storage**
    - When storing this actuator, enclose it in a package designated by THK and store it in a horizontal position away from abnormally high or low temperatures and high humidity.
- **Instruction Manual**
    - Instruction Manuals can be downloaded from the website (a login process may be required). THK Technical Support site <https://tech.thk.com/> "Economy series ES/EC Instruction Manual" and other contents including CAD data and PC software (D-STEP) can also be downloaded.



# Economy Series ES/EC

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