THK

ELECTRIC ACTUATORS

NEW

Compact series

KRF

Stepper / Servo Driver Controller

TSC/TLC/THC

For details, visit THK at **www.thk.com**

* Product information is updated regularly on the THK website.

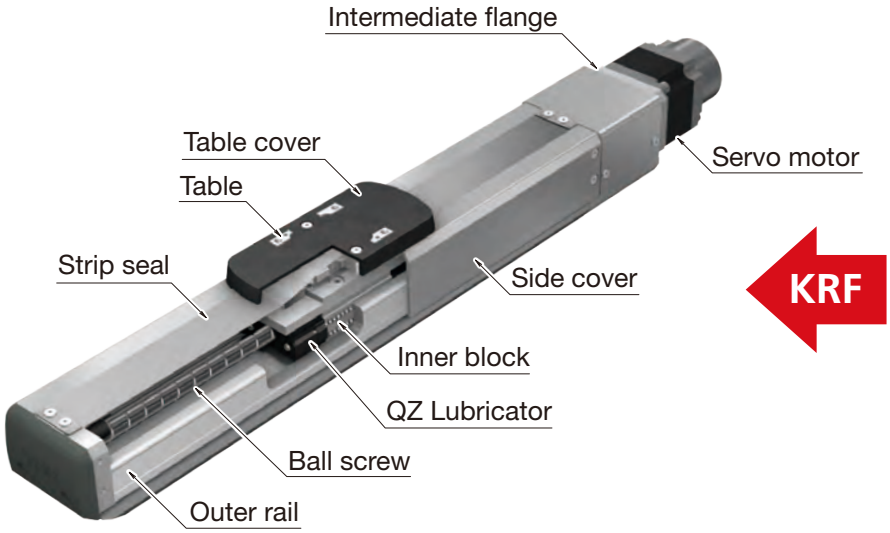
THK CO., LTD.
TOKYO, JAPAN

CATALOG No.374-11E

Compact Series

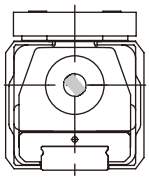
KRF

Fully enclosed actuator, designed for dedicated controller.



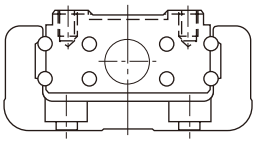
KRF

ES



Full-cover structure

KR/SKR



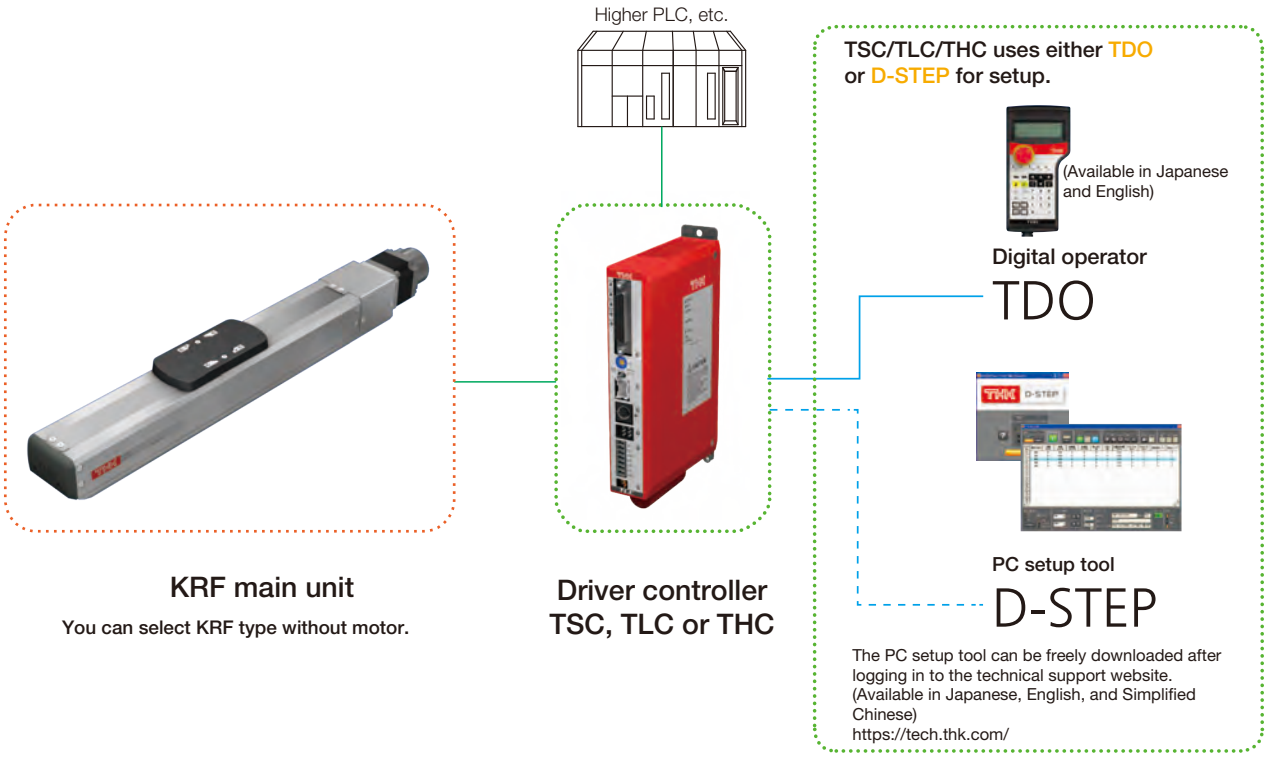
Equivalent load for four directions, with high rigidity

√ Outer rail of KR/SKR with proven history adopted
√ Single axis actuator with high moment rigidity

Supported size (guideline)

KR/SKR	20	26	33
KRF	4	5	6

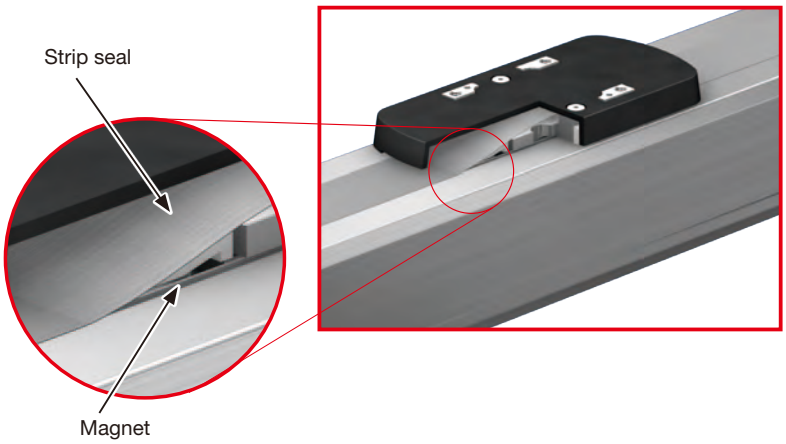
System Configuration



Features

1 Fully enclosed design

Strip seals on the side cover and upper surface using magnetic attraction method provide a fully enclosed structure.
It prevents any problems caused by entering of foreign materials from outside. As well, the top surface of the strip seal is less likely to generate dust by avoiding the contact.

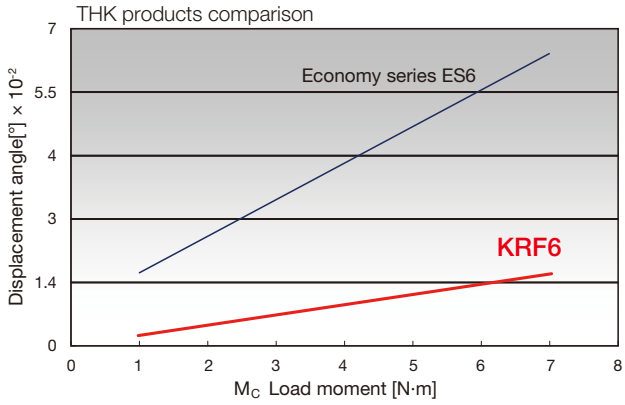


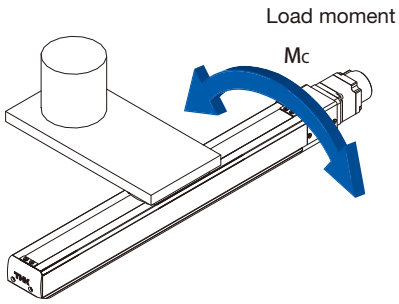
Magnetic attraction method

The magnet built in the side cover attracts the strip seal and prevents it from lifting, reducing the development of clearance.

2 High rigidity

Use of a steel outer rail with a cross-sectional U shape enables to receive larger moment.
The actuator body's high rigidity allows for a compact, space-saving design.





Layout example of cantilever configuration

3 Easy setup

Setup is easy by combining with dedicated driver controller.

Stepper driver controller
TSC

Servo Driver controller 50W
TLC

Servo Driver controller 100W
THC

Lineup List (Stepper driver controller TSC Specification)

Model	Ball screw lead [mm]	Stroke [mm]	Motor size	Maximum load capacity *1 [kg]		
				Horizontal mount	Wall mount	Vertical mount
KRF4	6	50 to 300	Stepper motor □35	6.5	6	4
KRF5	6	50 to 550	Stepper motor □42	20	14.5	7.5
	10	50 to 550		10	10	6

*1 Maximum load capacity and maximum speed vary dependent on usage conditions.
For details, see "Basic Specifications" and "Speed and Load Capacity: Relationship Diagram" of each model.

Series Specifications (Servo Driver Controller TLC/THC Specification)

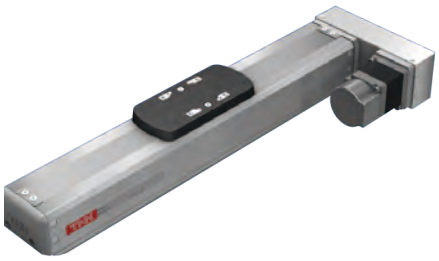
[KRF4, 5]

[KRF6]

Model	Ball screw lead [mm]	Stroke [mm]	Rated speed *2 [mm/s]	Motor capacity [W]	Used driver controller	Maximum load capacity *3 [kg]		
						Horizontal mount	Wall mount	Vertical mount
KRF4	6	50 to 300	300	50	TLC	6	5.5	4
KRF5	6	50 to 550				19	14	6
	10		500			15	12.5	3.5
KRF6	6	50 to 800	300	100	THC	35	24	10
	10		500			30	22	5

*2 At rated motor speed (3,000min^{-1}).
*3 The maximum load capacity indicates the capacity at the rated speed under 0.5 G for Horizontal mount and wall mount and 0.3 G for vertical.
*4 The maximum speed is the value restricted by the motor rotational speed (at 3,000min^{-1}) or by the permissible rotational speed of the ball screw.

	Maximum speed for each stroke *1 [mm/s]															
	Stroke															
	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
	300															
	300									250						
	500									430						



	Maximum speed for each stroke *4 [mm/s]															
	Stroke															
	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
	300															
	300									250						
	500									430						
	300										260	220	200	170	150	
	500										440	380	330	290	260	

Model Configuration

KRF (type with motor)

When combining with dedicated driver controller

Model	Ball screw lead	Stroke	Design symbol	Control device type	Option	Motor size / motor rated output
KRF6R	- 06	- 0050	A	- TH	- MR-GR	/ M10
(1)	(2)	(3)	(4)	(5)	(6)	(7)
KRF4	06: 6 mm	0050: 50 mm	A	TS: TSC	No symbol: None	35P : Stepper motor □35
KRF5	10: 10 mm	0100: 100 mm		TL: TLC	MR: Motor right wrap*	42P : Stepper motor □42
KRF6		0150: 150 mm		TH: THC	ML: Motor left wrap*	M05 : 50W
KRF4R		0200: 200 mm			MD: Motor down wrap*	M10 : 100W
KRF5R		0250: 250 mm			GR: Gray cover	28PB : Stepper motor □28 with brake
KRF6R		0300: 300 mm			SB: Slider base	35PB : Stepper motor □35 with brake
		0350: 350 mm			□1□2: Sensor	42PB : Stepper motor □42 with brake
		0400: 400 mm				M05B : 50W with brake
		0450: 450 mm				M10B : 100W with brake
		0500: 500 mm				
		0550: 550 mm				
		0600: 600 mm				
		0650: 650 mm				
		0700: 700 mm				
		0750: 750 mm				
		0800: 800 mm				

R represents motor wrap.

KRF4, and KRF4R have ball screw lead of 6mm only.

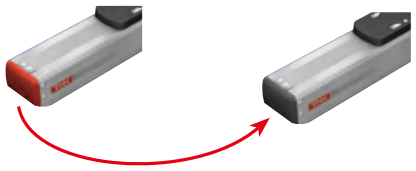
Control device you can select differ depending on models.
KRF4 : TSC, TLC
KRF5 : TSC, TLC
KRF6 : THC
KRF4R : TLC
KRF5R : TLC
KRF6R : THC
*Separate order for the control device is required.

Specify the option symbol by writing in the order of description from left adding "-".
*Valid only when KRF□R is selected in model (1).

Motors you can select differ depending on models.
KRF4 : "35P", "35PB", "M05", "M05B"
KRF5 : "42P", "42PB", "M05", "M05B"
KRF6 : "M10", "M10B"
KRF4R: "M05", "M05B"
KRF5R: "M05", "M05B"
KRF6R: "M10", "M10B"

Maximum stroke differs depending on models.
KRF4: 300mm
KRF5: 550mm
KRF6: 800mm

Change the cover color to gray
You can change the color of housing cover to gray.
Standard: red When GR is selected: gray



Sample model configuration

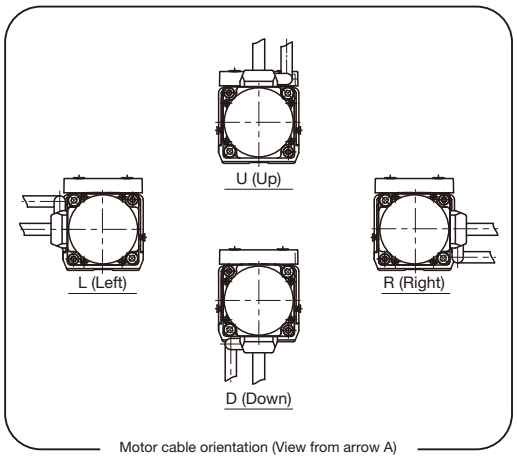
When combining with dedicated controller (TSC)	KRF4-06-0200A-TS-GR-SB-R6/35PD00S3
When combining with dedicated controller (TLC)	KRF4-06-0150A-TL-GR-SB-R6/M05BRD00F3
When combining with dedicated controller (THC)	KRF6-10-0800A-TH-GR-R6/M10RS02D1H3

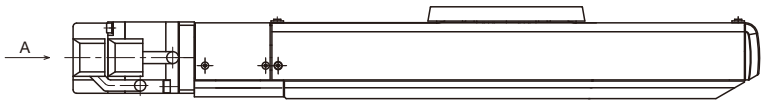
Pages for detailed description

(6) Options	SB: With slider base → P. 25
	□1□2: Sensor → P. 26
	GR: Change the cover color to gray → P. 27

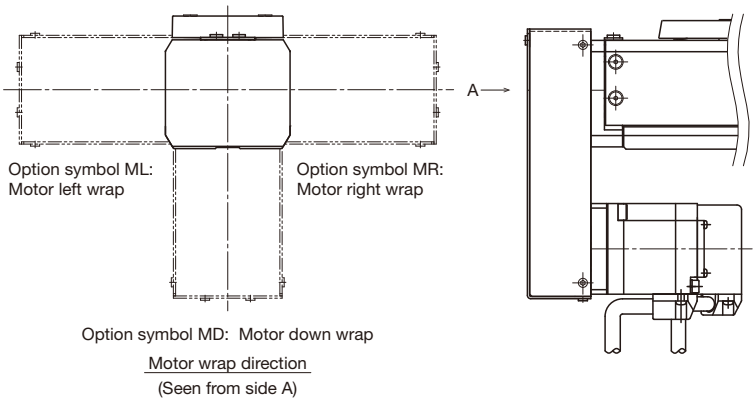
Motor cable orientation	Home position	Power supply voltage	Cable type and length
L	D00	D1	F3
(8)	(9)	(10)	(11)
No symbol : When selecting TSC	D00 : Motor side	No symbol: When selecting TSC or TLC	No symbol: None
R : Right	R00 : Reverse motor side	D1: 100 V	S3 : Standard 3 m
L : Left	S02 : Motor side	D2: 200 V	S5 : Standard 5 m
U : Up	S03 : Reverse motor side		SA : Standard 10 m
D : Down			F3 : Standard 3 m
			F5 : Standard 5 m
			FA : Standard 10 m
			H3 : High flex 3 m
			H5 : High flex 5 m
			HA: High flex 10 m
If you select "MR" as an option, "R" cannot be selected. If you select "ML" as an option, "L" cannot be selected. If you select "MD" as an option, "U" cannot be selected.	D00 and R00 are mechanical home seeking. S0 × (external sensor specification) only when selecting THC.	Only when selecting THC	Indicates the type and length of attached cables. Cables you can select differ depending on controllers. TSC : "S *" TLC : "F *", "H *" THC : "F *", "H *"

Motor cable orientation





Folded direction



KRF4 TSC specifications

Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device type	Option	Motor size	Home position	Cable type and length
KRF4 -	06	- 0150	A	- TS	- GR-SB	/ 35P	D00	S3

KRF4	06: 6 mm	0050: 50mm to 0300: 300 mm	A	TS: TSC	No symbol: None GR: Gray cover SB: Slider base □1□2: Sensor	35P : Stepper motor □35 35PB: Stepper motor □35 with brake	D00: Motor side R00 : Reverse motor side	No symbol: None S3: Standard 3 m S5: Standard 5 m SA: Standard 10 m

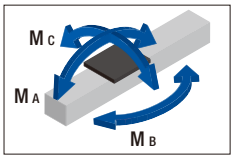
Basic Specifications

Control device type				TSC
Motor size				□35
Ball screw lead [mm]				6
Maximum load capacity [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G	6.5
		Wall mount		6
		Vertical mount	0.2G	4
Electromagnetic brake retention [N]				251
Running life *1 [km]		Horizontal/wall mount		10,000
		Vertical mount		5,000
Positioning repeatability [mm]				±0.010
Lost motion [mm]				0.1
Static permissible moment *2 [N·m]				MA: 31 MB: 21.2 MC: 52.7

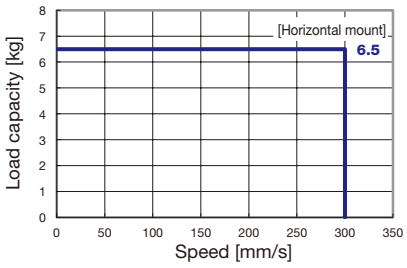
*1 The conditions for calculation are as follows:
Under maximum load capacity at permissible overhang length.
Stroke 75 mm

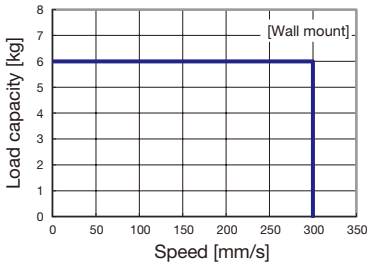
*2 Applied point of moment load for MA and MC are the top face of the table, and that for MB is the center of the table.

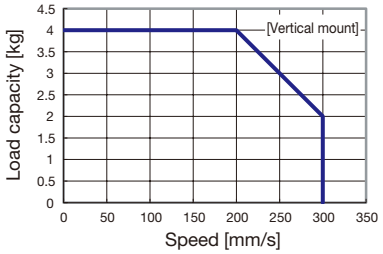
Static Permissible Moment



Speed and Load Capacity: Relationship Diagram

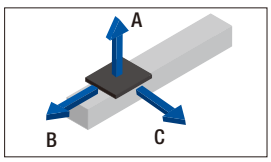




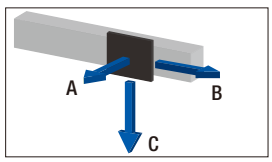


Permissible Overhang Length*

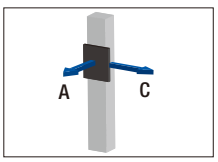
Horizontal use



Wall use



Vertical use



Horizontal mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	B	C
6	3	330	60	160
	6.5	140	20	60

Wall mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	B	C
6	3	140	50	380
	6	50	20	110

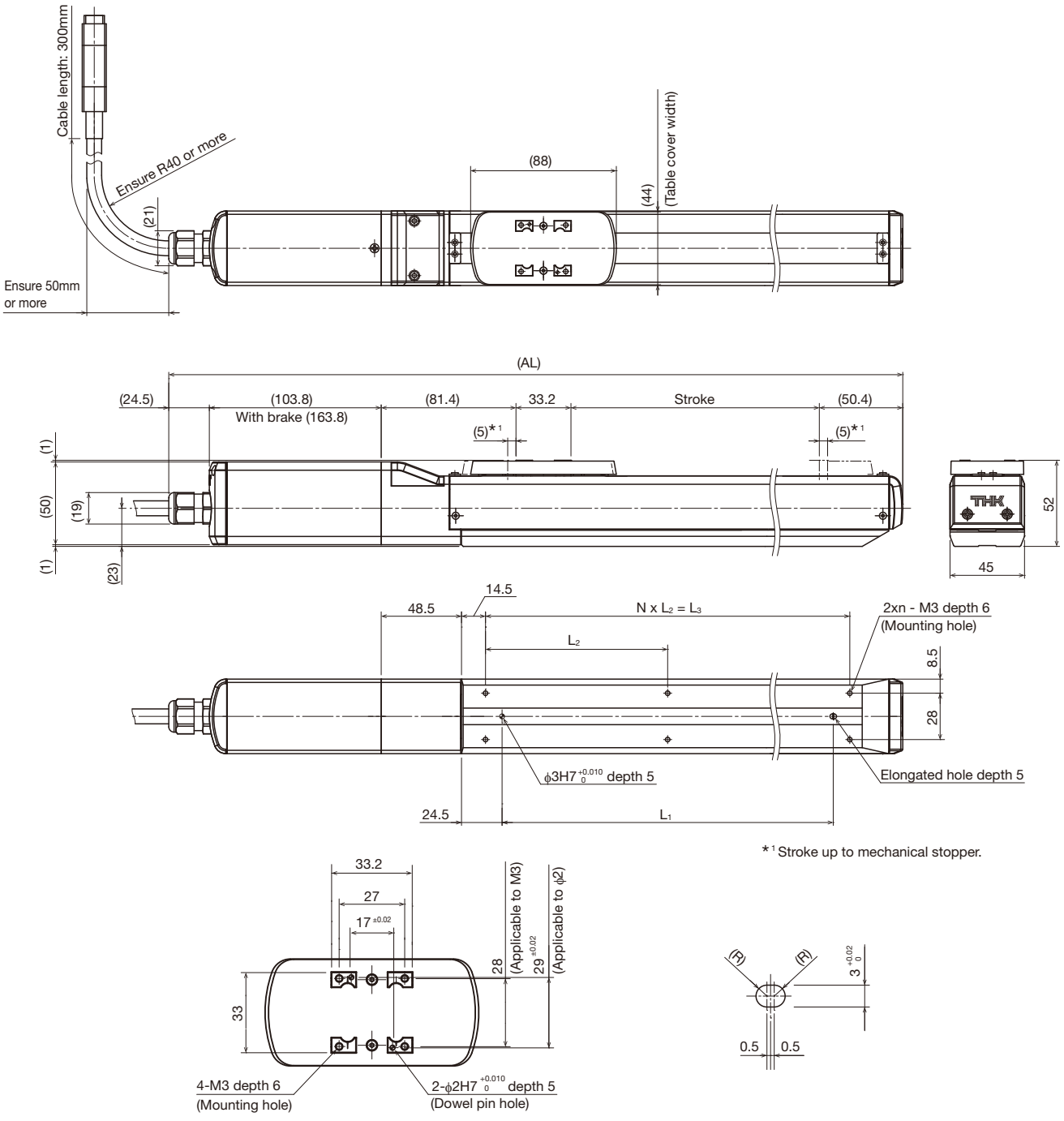
Vertical mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	C
6	2	100	100
	4	30	30

* This value is the overhang length whose running life is 10,000 km for horizontal direction/wall mount and 5,000 km for vertical direction.
A permissible value of the applied load in each direction.

KRF4 + TSC

Dimensions



*1 Stroke up to mechanical stopper.

Detailed Diagram: Table

Detailed Diagram: Elongated Hole

Stroke [mm] (Stroke between mechanical stoppers)		50 (60)	100 (110)	150 (160)	200 (210)	250 (260)	300 (310)
Maximum speed *2 *3 [mm/s]	Ball screw lead: 6 mm	300					
Dimensions [mm]	AL*4	343.3(403.3)	393.3(453.3)	443.3(503.3)	493.3(553.3)	543.3(603.3)	593.3(653.3)
	L1	100	150	200	250	300	350
	L2	120	85	110	90	105	120
	L3	120	170	220	270	315	360
Mounting pitch count	N	1	2	2	3	3	3
Mounting hole count	n	2	3	3	4	4	4
Weight *4 [kg]		1.7(2.1)	1.9(2.3)	2.1(2.5)	2.3(2.7)	2.5(3.0)	2.7(3.2)

*2 Load capacity and maximum speed vary dependent on usage conditions. For details, see “Speed and Load Capacity: Relationship Diagram”.
*3 Dependent on permissible rotational speed of ball screw.
*4 Values when a brake is installed are shown in parentheses.

KRF5 TSC specifications

Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device type	Option	Motor size	Home position	Cable type and length
KRF5 -	06 -	0150	A	- TS	- GR-SB	/ 42P	D00	S3

Model	Ball screw lead	Stroke	Design symbol	Control device type	Option	Motor size	Home position	Cable type and length
KRF5	06: 6 mm 10: 10 mm	0050: 50mm to 0550: 550 mm	A	TS: TSC	No symbol: None GR: Gray cover SB: Slider base □1□2: Sensor	42P : Stepper motor □42 42PB: Stepper motor □42 with brake	D00: Motor side R00 : Reverse motor side	No symbol: None S3: Standard 3 m S5: Standard 5 m SA: Standard 10 m

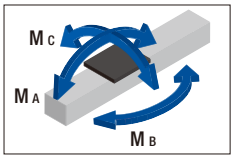
Basic Specifications

Control device type				TSC	
Motor size				□42	
Ball screw lead [mm]				6	10
Maximum load capacity [kg]	Acceleration and deceleration rate	Horizontal mount	0.3G	20	10
		Wall mount		14.5	10
		Vertical mount	0.2G	7.5	6
Electromagnetic brake retention [N]				251	151
Running life *1 [km]		Horizontal/wall mount		10,000	
		Vertical mount		5,000	
Positioning repeatability [mm]				±0.010	
Lost motion [mm]				0.1	
Static permissible moment *2 [N·m]				MA: 84 MB: 48.4 MC: 105.8	

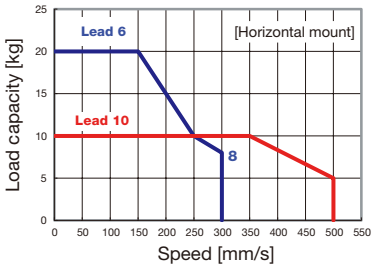
*1 The conditions for calculation are as follows:
Under maximum load capacity at permissible overhang length.
Stroke 275 mm

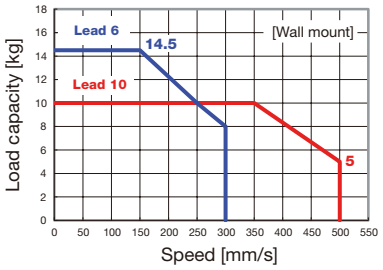
*2 Applied point of moment load for MA and MC are the top face of the table, and that for MB is the center of the table.

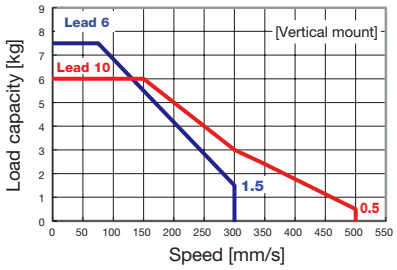
Static Permissible Moment



Speed and Load Capacity: Relationship Diagram

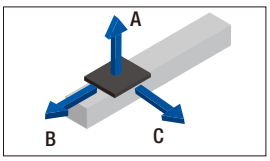




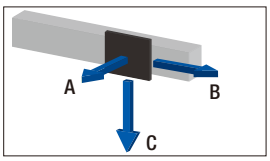


Permissible Overhang Length*

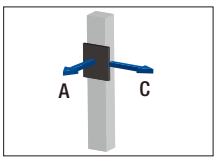
Horizontal use



Wall use



Vertical use



Horizontal mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	B	C
6	10	470	50	150
	20	210	20	60
10	5	700	110	280
	10	320	40	130

Wall mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	B	C
6	7	180	60	680
	14.5	60	20	150
10	5	250	80	700
	10	100	20	210

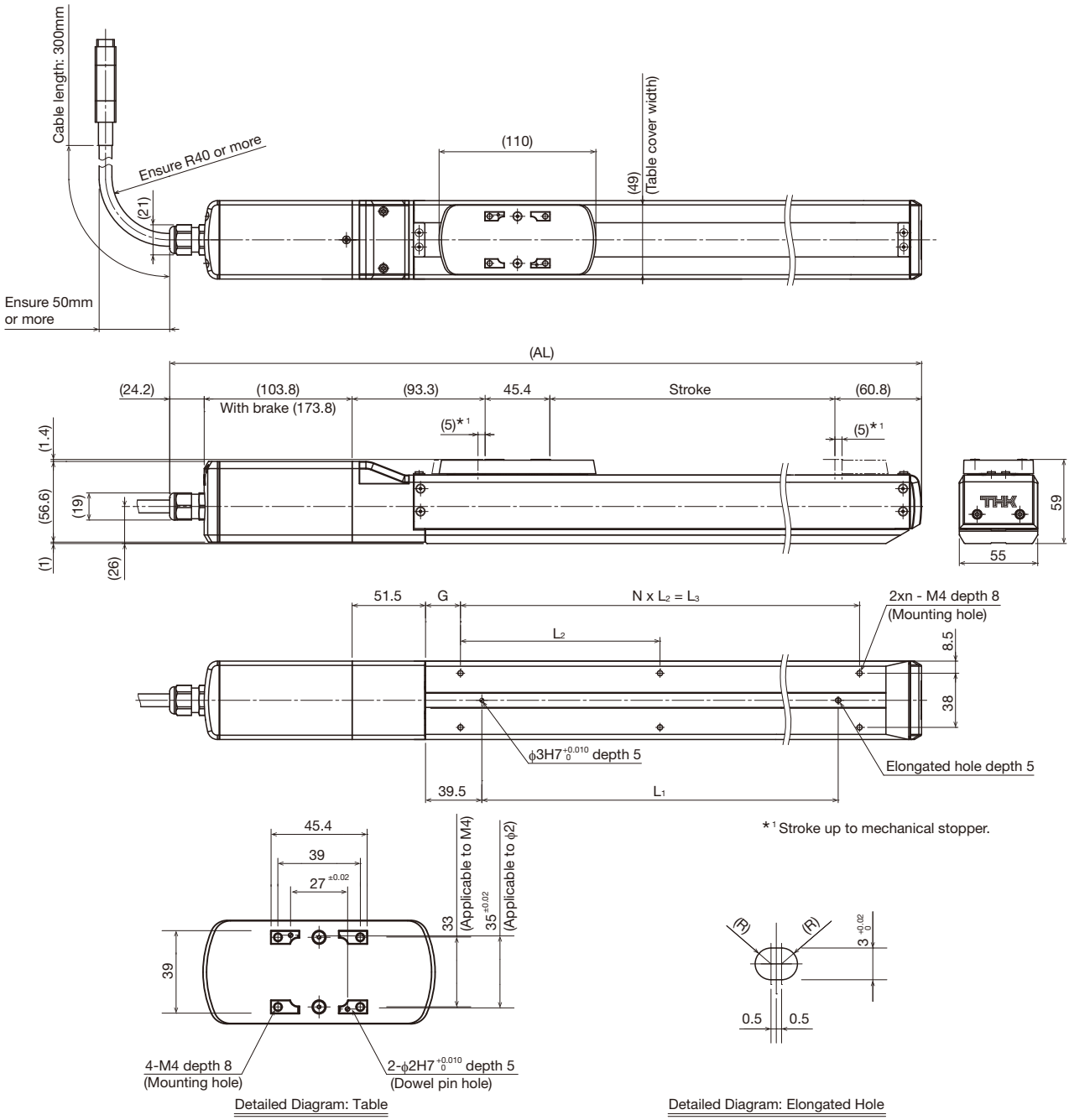
Vertical mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	C
6	3.5	160	160
	7.5	60	60
10	3	210	210
	6	90	90

* This value is the overhang length whose running life is 10,000 km for horizontal direction/wall mount and 5,000 km for vertical direction.
A permissible value of the applied load in each direction.

KRF5 + TSC

Dimensions



*1 Stroke up to mechanical stopper.

Detailed Diagram: Table

Detailed Diagram: Elongated Hole

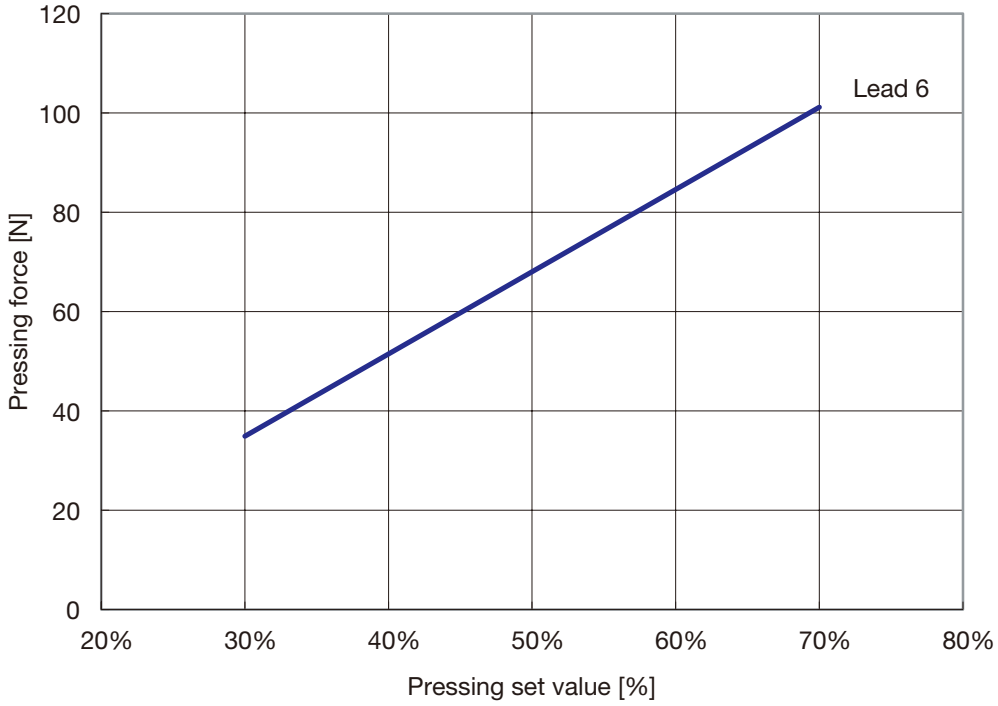
Stroke [mm] (Stroke between mechanical stoppers)		50 (60)	100 (110)	150 (160)	200 (210)	250 (260)	300 (310)	350 (360)	400 (410)	450 (460)	500 (510)	550 (560)
Maximum speed *2 *3 [mm/s]	Ball screw lead: 6 mm	300										250
	Ball screw lead: 10 mm	500										430
Dimensions [mm]	AL*4	377.5 (447.5)	427.5 (497.5)	477.5 (547.5)	527.5 (597.5)	577.5 (647.5)	627.5 (697.5)	677.5 (747.5)	727.5 (797.5)	777.5 (847.5)	827.5 (897.5)	877.5 (947.5)
	L1	100	150	200	250	300	350	400	450	500	550	600
	L2	140	100	120	140	115	130	110	120	135	120	130
	L3	140	200	240	280	345	390	440	480	540	600	650
	G	19.5	14.5	19.5	24.5	17	19.5	19.5	24.5	19.5	14.5	14.5
Mounting pitch count	N	1	2	2	2	3	3	4	4	4	5	5
Mounting hole count	n	2	3	3	3	4	4	5	5	5	6	6
Weight *4 [kg]		2.8 (3.3)	3.1 (3.6)	3.4 (3.9)	3.7 (4.2)	4.0 (4.5)	4.4 (4.8)	4.7 (5.1)	5.0 (5.4)	5.3 (5.7)	5.6 (6.1)	5.9 (6.4)

*2 Load capacity and maximum speed vary dependent on usage conditions. For details, see “Speed and Load Capacity: Relationship Diagram”.
*3 Dependent on permissible rotational speed of ball screw.
*4 Values when a brake is installed are shown in parentheses.

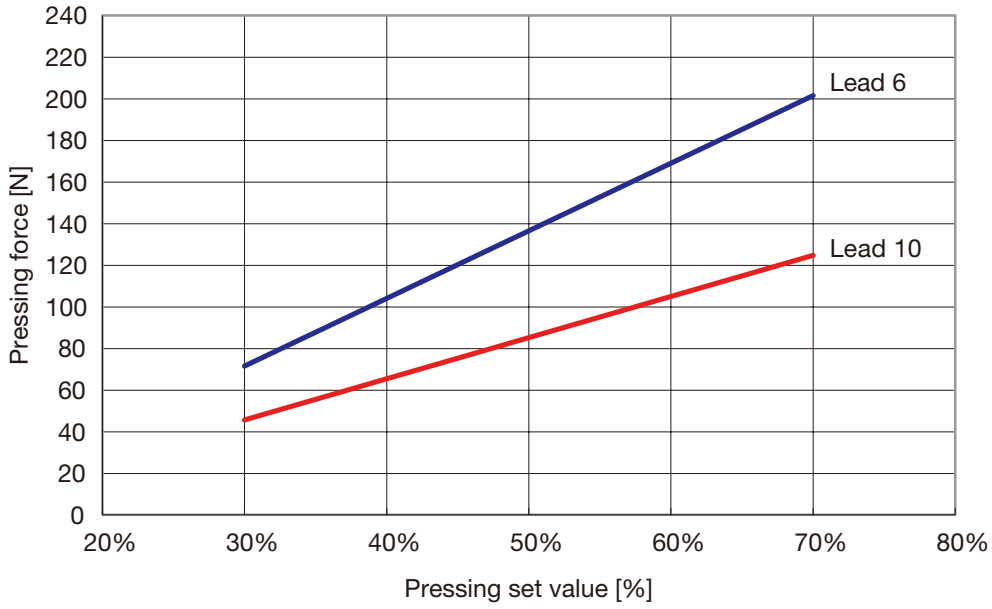
Pressing Force and Pressing Set Value for TSC specification: Relationship Diagram

Pressing force may vary depending on the pressing set value. Refer to the relationship diagram below.

■ KRF4



■ KRF5



MEMO

KRF4 TLC specifications

Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device	Option	Motor rated output	Motor cable orientation	Home position	Cable type and length
KRF4 -	06	- 0150	A	- TL	- GR-SB	/ M05	R	D00	F3

KRF4	06: 6 mm	0050: 50 mm to 0300: 300 mm	A	TL: TLC	No symbol: Red cover GR: Gray cover SB: Slider base □1□2: Sensor	M05 : 50W M05B : 50W with brake	R : Right L : Left U : Up D : Down	D00: Motor side R00 : Reverse motor side	No symbol: None F3 : Standard 3 m F5 : Standard 5 m FA : Standard 10 m H3 : High flex 3 m H5 : High flex 5 m HA: High flex 10 m

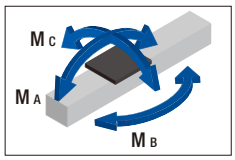
Note: If the GR is not included in the model configuration, cover will be red.

Basic Specifications

Control device type				TLC
Motor rated output [W]				50
Ball screw lead [mm]				6
Rated speed *1 [mm/s]				300
Maximum load capacity *2 [kg]	Acceleration and deceleration rate	Horizontal mount	0.5G	6
		Wall mount		5.5
		Vertical mount	0.3G	4
Rated thrust *3 [N]				133
Maximum thrust *4 [N]				241
Electromagnetic brake retention [N]				268
Running life *5 [km]		Horizontal/wall mount		10,000
		Vertical mount		5,000
Positioning repeatability [mm]				±0.010
Lost motion [mm]				0.1
Static permissible moment *6 [N·m]				MA: 31 MB: 21.2 MC: 52.7

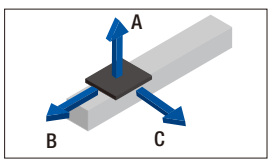
*1 At rated motor speed (3,000min^{-1}).
*2 At rated speed.
*3 At rated motor torque.
*4 Dependent on maximum peak torque and permissible load.
*5 The conditions for calculation are as follows:
Conditions: Under maximum load capacity at permissible overhang length
Stroke 75mm
*6 Applied point of moment 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

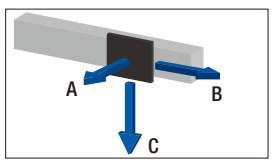


Permissible Overhang Length*

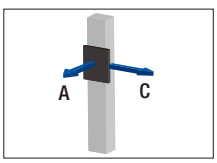
Horizontal use



Wall use



Vertical use



Horizontal mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	B	C
6	3	250	60	160
	6	110	20	60

Wall mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	B	C
6	2.5	140	60	280
	5.5	50	20	100

Vertical mount [mm]

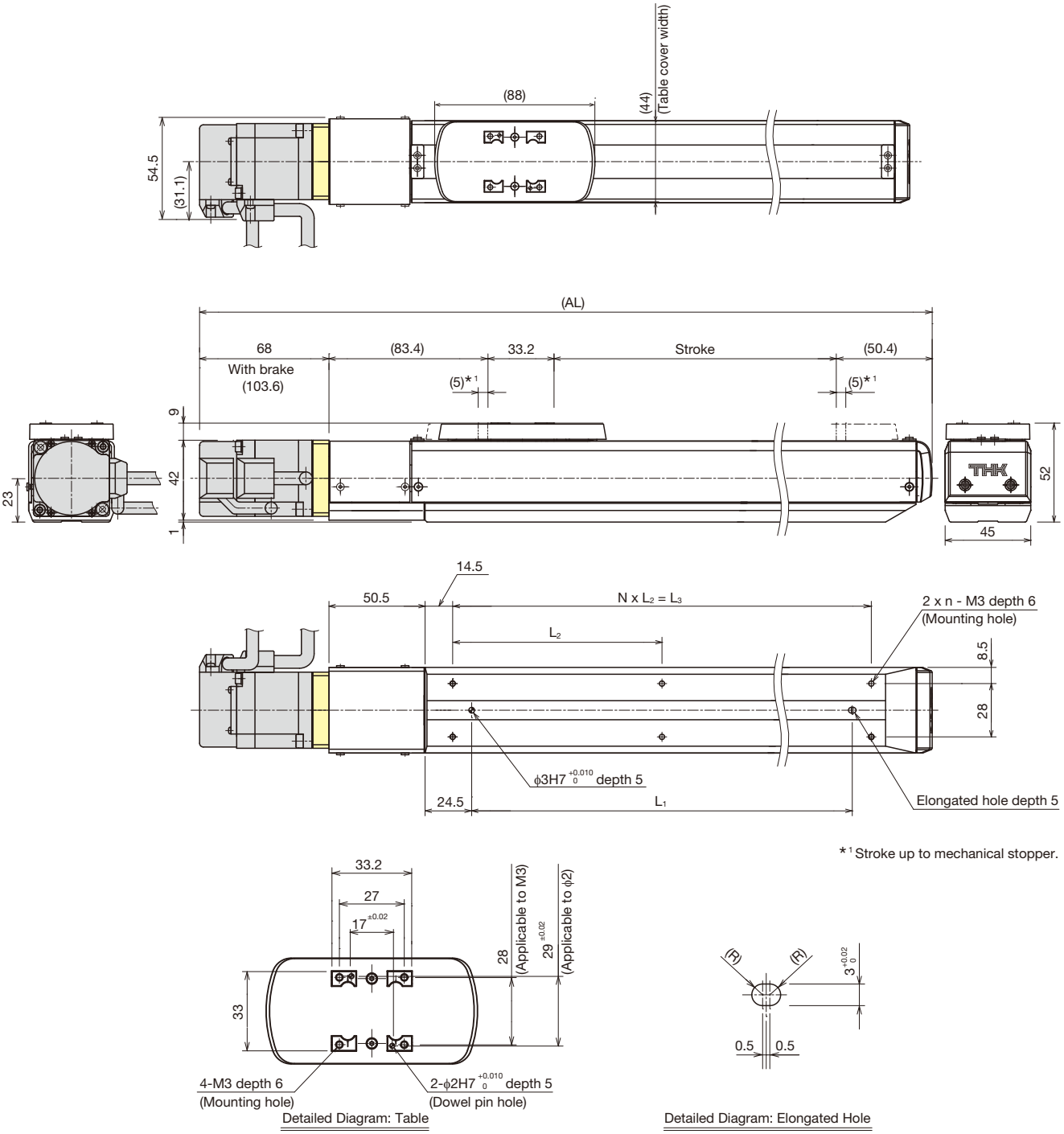
Ball screw lead [mm]	Load mass [kg]	A	C
6	2	100	100
	4	30	30

* This value is the overhang length whose running life is 10,000 km for horizontal and wall mount, and 5,000 km for vertical direction.
A permissible value of the applied load in each direction.

KRF4 + TLC

Motor rated output
50W

Dimensions



*1 Stroke up to mechanical stopper.

Stroke [mm] (Stroke between mechanical stoppers)		50 (60)	100 (110)	150 (160)	200 (210)	250 (260)	300 (310)
Maximum speed *2 [mm/s]	Ball screw lead: 6mm	300					
Dimensions [mm]	AL*3	285(320.6)	335(370.6)	385(420.6)	435(470.6)	485(520.6)	535(570.6)
	L1	100	150	200	250	300	350
	L2	120	85	110	90	105	120
	L3	120	170	220	270	315	360
Mounting pitch count	N	1	2	2	3	3	3
Mounting hole count	n	2	3	3	4	4	4
Weight *3 [kg]		1.6(1.8)	1.8(2.0)	2.0(2.2)	2.2(2.4)	2.4(2.6)	2.7(2.9)

*2 Dependent on motor speed (3,000min^{-1}) and permissible rotational speed of the ball screw.
*3 Values when a brake is installed are shown in parentheses.

KRF4R TLC specifications

Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device type	Option	Motor rated output	Motor cable orientation	Home position	Cable type and length
KRF4R -	06 -	0150	A	- TL	- ML-GR	/ M05	R	D00	F3

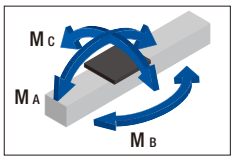
KRF4R	06: 6 mm	0050: 50 mm to 0300: 300 mm	A	TL: TLC	MR: Motor right wrap ML: Motor left wrap MD: Motor down wrap GR: Gray cover SB: Slider base □1□2: Sensor	M05 : 50W M05B : 50W with brake	R : Right L : Left U : Up D : Down	D00: Motor side R00 : Reverse motor side	No symbol: None F3 : Standard 3 m F5 : Standard 5 m FA : Standard 10 m H3 : High flex 3 m H5 : High flex 5 m HA: High flex 10 m

Basic Specifications

Control device type				TLC
Motor rated output [W]				50
Ball screw lead [mm]				6
Rated speed *1 [mm/s]				300
Maximum load capacity *2 [kg]	Acceleration and deceleration rate	Horizontal mount	0.5G	6
		Wall mount		5.5
		Vertical mount	0.3G	4
Rated thrust *3 [N]				133
Maximum thrust *4 [N]				241
Electromagnetic brake retention [N]				268
Running life *5 [km]		Horizontal/wall mount		10,000
		Vertical mount		5,000
Positioning repeatability [mm]				±0.010
Lost motion [mm]				0.1
Static permissible moment *6 [N·m]				MA: 31 MB: 21.2 MC: 52.7

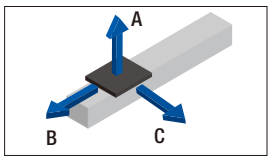
*1 Based on rated motor speed (3,000min^{-1}).
*2 At rated speed.
*3 At rated motor torque.
*4 Dependent on maximum peak torque and permissible load.
*5 The conditions for calculation are as follows:
Under maximum load capacity at permissible overhang length.
Stroke 75 mm
*6 Applied point of moment load for MA and MC are the top face of the table, and that for MB is the center of the table.

Static Permissible Moment

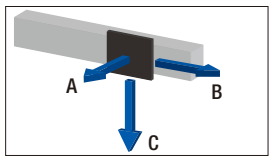


Permissible Overhang Length*

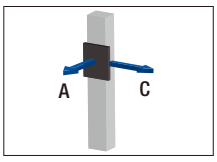
Horizontal use



Wall use



Vertical use



Horizontal mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	B	C
6	3	250	60	160
	6	110	20	60

Wall mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	B	C
6	2.5	140	60	280
	5.5	50	20	100

Vertical mount [mm]

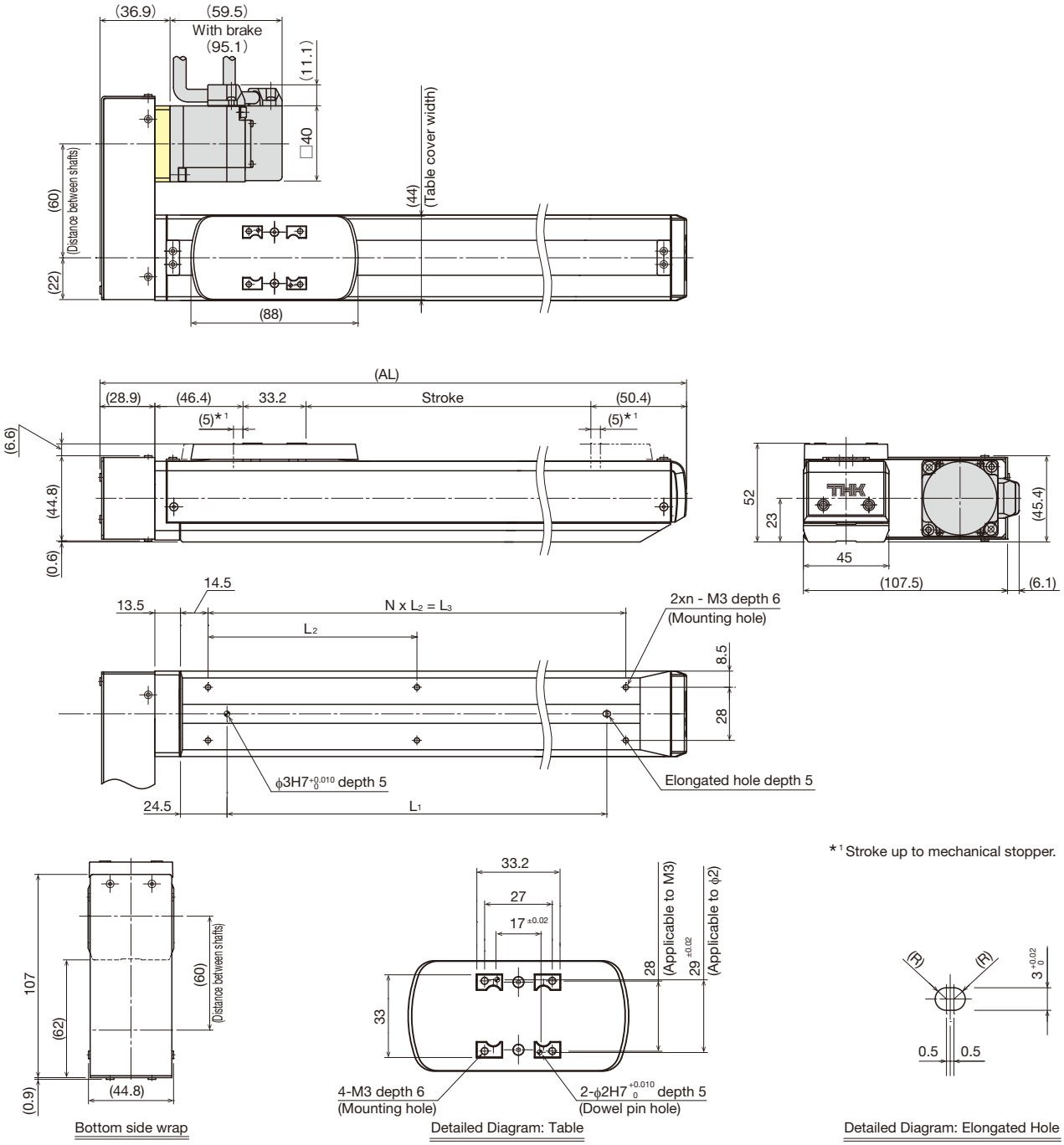
Ball screw lead [mm]	Load mass [kg]	A	C
6	2	100	100
	4	30	30

* This value is the overhang length whose running life is 10,000 km for horizontal direction/wall mount and 5,000 km for vertical direction.
A permissible value of the applied load in each direction.

KRF4R + TLC

Motor rated output **50W**

Dimensions



*1 Stroke up to mechanical stopper.

Bottom side wrap

Detailed Diagram: Table

Detailed Diagram: Elongated Hole

Stroke [mm] (Stroke between mechanical stoppers)		50 (60)	100 (110)	150 (160)	200 (210)	250 (260)	300 (310)
Maximum speed *2 [mm/s]	Ball screw lead: 6 mm	300					
Dimensions [mm]	AL	209	259	309	359	409	459
	L1	100	150	200	250	300	350
	L2	120	85	110	90	105	120
	L3	120	170	220	270	315	360
Mounting pitch count	N	1	2	2	3	3	3
Mounting hole count	n	2	3	3	4	4	4
Weight *3 [kg]		1.6(1.8)	1.8(2.0)	2.0(2.2)	2.3(2.5)	2.5(2.7)	2.7(2.9)

*2 The maximum speed is the value restricted by the motor rotational speed (at 3,000min^{-1}), or by the permissible rotational speed of the ball screw.
*3 Values when a brake is installed are shown in parentheses.

KRF5 TLC specifications

Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device	Option	Motor rated output	Motor cable orientation	Home position	Cable type and length
KRF5 -	06	- 0150	A	- TL	- GR-SB	/ M05	R	D00	F3

Model	Ball screw lead	Stroke	Design symbol	Control device	Option	Motor rated output	Motor cable orientation	Home position	Cable type and length
KRF5	06: 6 mm 10: 10 mm	0050: 50 mm to 0550: 550 mm	A	TL: TLC	No symbol: Red cover GR: Gray cover SB: Slider base □1□2: Sensor	M05 : 50W M05B : 50W with brake	R : Right L : Left U : Up D : Down	D00: Motor side R00 : Reverse motor side	No symbol: None F3 : Standard 3 m F5 : Standard 5 m FA : Standard 10 m H3 : High flex 3 m H5 : High flex 5 m HA: High flex 10 m

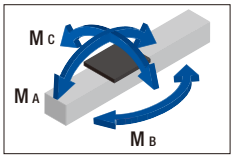
Note: If the GR is not included in the model configuration, cover will be red.

Basic Specifications

Control device type				TLC	
Motor rated output [W]				50	
Ball screw lead [mm]				6	10
Rated speed *1 [mm/s]				300	500
Maximum load capacity *2 [kg]	Acceleration and deceleration rate	Horizontal mount	0.5 G	19	15
		Wall mount		14	12.5
		Vertical mount	0.3G	6	3.5
Rated thrust *3 [N]				133	80
Maximum thrust *4 [N]				402	241
Electromagnetic brake retention [N]				268	161
Running life *5 [km]		Horizontal/wall mount		10,000	
		Vertical mount		5,000	
Positioning repeatability [mm]				±0.010	
Lost motion [mm]				0.1	
Static permissible moment *6 [N·m]				MA: 84 MB: 48.4 MC: 105.8	

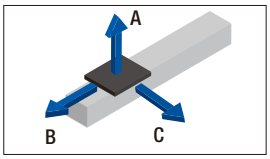
*1 At rated motor speed (3,000min-1).
*2 At rated speed.
*3 At rated motor torque.
*4 Dependent on maximum peak torque and permissible load.
*5 The conditions for calculation are as follows:
Conditions: Under maximum load capacity at permissible overhang length
Stroke 275mm
*6 Applied point of moment 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

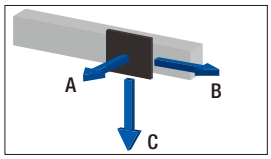


Permissible Overhang Length*

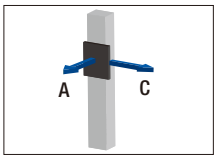
Horizontal use



Wall use



Vertical use



Horizontal mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	B	C
6	9.5	350	50	150
	19	150	20	60
10	7.5	310	70	180
	15	130	20	60

Wall mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	B	C
6	7	180	60	500
	14	60	20	130
10	6	170	70	390
	12.5	60	20	120

Vertical mount [mm]

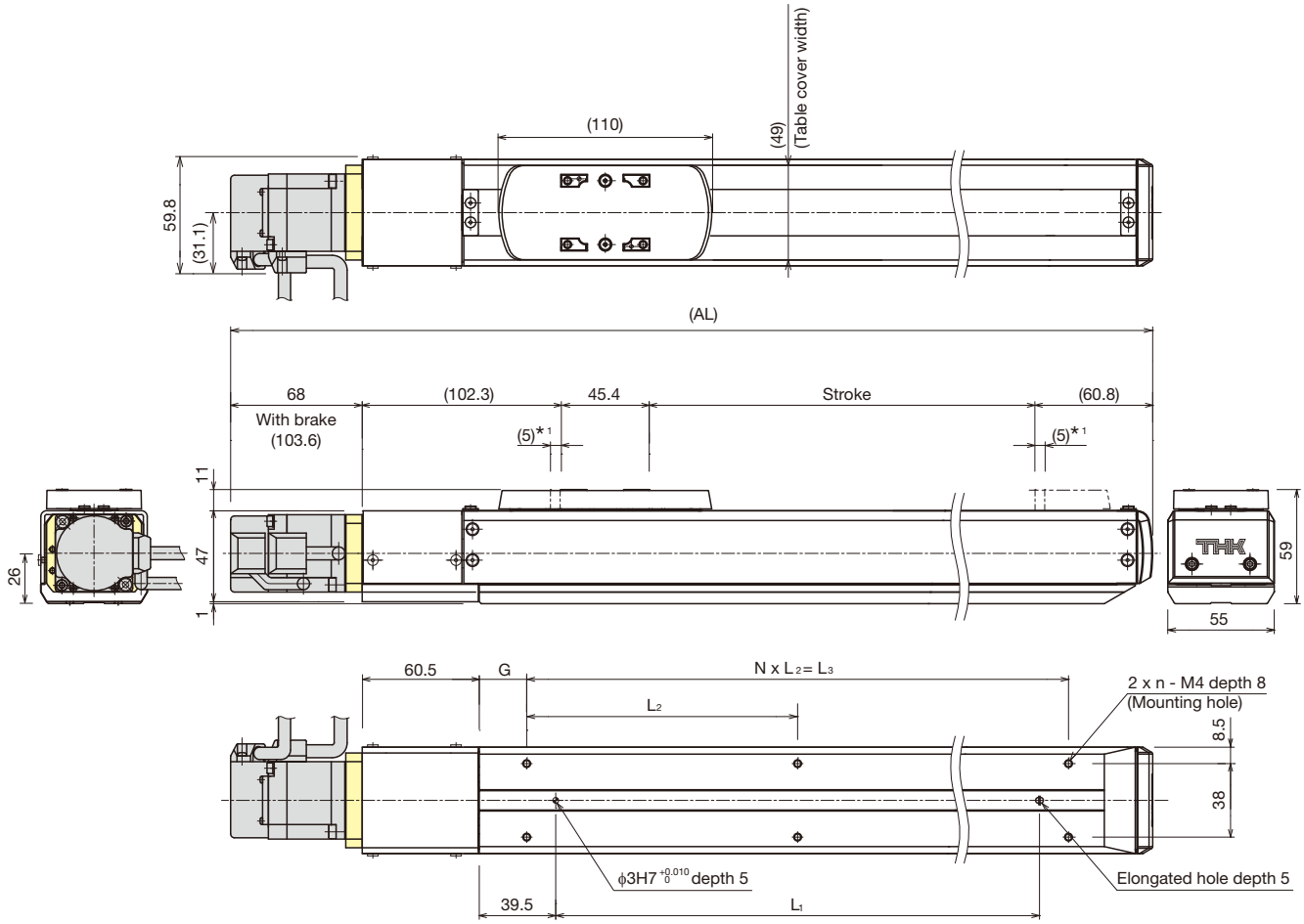
Ball screw lead [mm]	Load mass [kg]	A	C
6	3	210	210
	6	90	90
10	1.5	390	390
	3.5	180	180

* This value is the overhang length whose running life is 10,000 km for horizontal and wall mount, and 5,000 km for vertical direction.
A permissible value of the applied load in each direction.

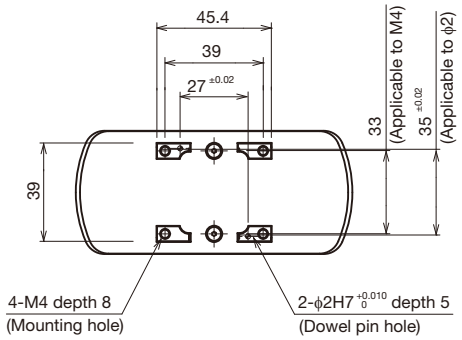
KRF5 + TLC

Motor rated output **50W**

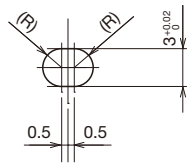
Dimensions



*1 Stroke up to mechanical stopper.



Detailed Diagram: Table



Detailed Diagram: Elongated Hole

Stroke [mm] (Stroke between mechanical stoppers)		50 (60)	100 (110)	150 (160)	200 (210)	250 (260)	300 (310)	350 (360)	400 (410)	450 (460)	500 (510)	550 (560)
Maximum speed *2 [mm/s]	Ball screw lead: 6mm	300										250
	Ball screw lead: 10mm	500										430
Dimensions [mm]	AL*3	326.5 (362.1)	376.5 (412.1)	426.5 (462.1)	476.5 (512.1)	526.5 (562.1)	576.5 (612.1)	626.5 (662.1)	676.5 (712.1)	726.5 (762.1)	776.5 (812.1)	826.5 (862.1)
	L_1	100	150	200	250	300	350	400	450	500	550	600
	L_2	140	100	120	140	115	130	110	120	135	120	130
	L_3	140	200	240	280	345	390	440	480	540	600	650
	G	19.5	14.5	19.5	24.5	17	19.5	19.5	24.5	19.5	14.5	14.5
Mounting pitch count	N	1	2	2	2	3	3	4	4	4	5	5
Mounting hole count	n	2	3	3	3	4	4	5	5	5	6	6
Weight *3 [kg]		2.6 (2.8)	2.9 (3.1)	3.2 (3.4)	3.5 (3.7)	3.8 (4.0)	4.1 (4.3)	4.4 (4.6)	4.7 (4.9)	5.0 (5.2)	5.3 (5.5)	5.6 (5.8)

*2 Dependent on motor speed (3,000min^{-1}) and permissible rotational speed of the ball screw.
*3 Values when a brake is installed are shown in parentheses.

KRF5R TLC specifications

Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device	Option	Motor rated output	Motor cable orientation	Home position	Cable type and length
KRF5R -	06	- 0150	A	- TL	- ML-GR	/ M05	R	D00	F3

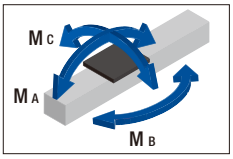
KRF5R	06: 6 mm 10: 10 mm	0050: 50mm to 0550: 550 mm	A	TL: TLC	MR: Motor right wrap ML: Motor left wrap MD: Motor down wrap GR: Gray cover SB: Slider base □1□2: Sensor	M05 : 50W M05B : 50W with brake	R : Right L : Left U : Up D : Down	D00: Motor side R00 : Reverse motor side	No symbol: None F3 : Standard 3 m F5 : Standard 5 m FA : Standard 10 m H3 : High flex 3 m H5 : High flex 5 m HA: High flex 10 m

Basic Specifications

Control device type				TLC	
Motor rated output [W]				50	
Ball screw lead [mm]				6	10
Rated speed *1 [mm/s]				300	500
Maximum load capacity *2 [kg]	Acceleration and deceleration rate	Horizontal mount	0.5 G	19	15
		Wall mount		14	12.5
		Vertical mount	0.3G	6	3.5
Rated thrust *3 [N]				133	80
Maximum thrust *4 [N]				402	241
Electromagnetic brake retention [N]				268	161
Running life *5 [km]		Horizontal/wall mount		10,000	
		Vertical mount		5,000	
Positioning repeatability [mm]				±0.010	
Lost motion [mm]				0.1	
Static permissible moment *6 [N·m]				MA: 84 MB: 48.4 MC: 105.8	

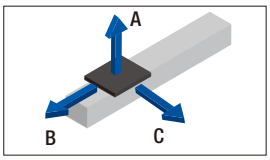
*1 Based on rated motor speed (3,000min-1).
*2 At rated speed.
*3 At rated motor torque.
*4 Dependent on maximum peak torque and permissible load.
*5 The conditions for calculation are as follows:
Under maximum load capacity at permissible overhang length.
Stroke 275 mm
*6 Applied point of moment load for MA and MC are the top face of the table, and that for MB is the center of the table.

Static Permissible Moment

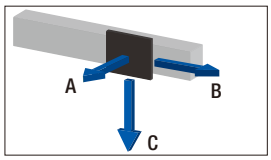


Permissible Overhang Length*

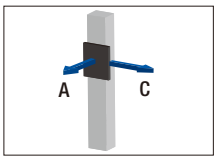
Horizontal use



Wall use



Vertical use



Horizontal mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	B	C
6	9.5	350	50	150
	19	150	20	60
10	7.5	310	70	180
	15	130	20	60

Wall mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	B	C
6	7	180	60	500
	14	60	20	130
10	6	170	70	390
	12.5	60	20	120

Vertical mount [mm]

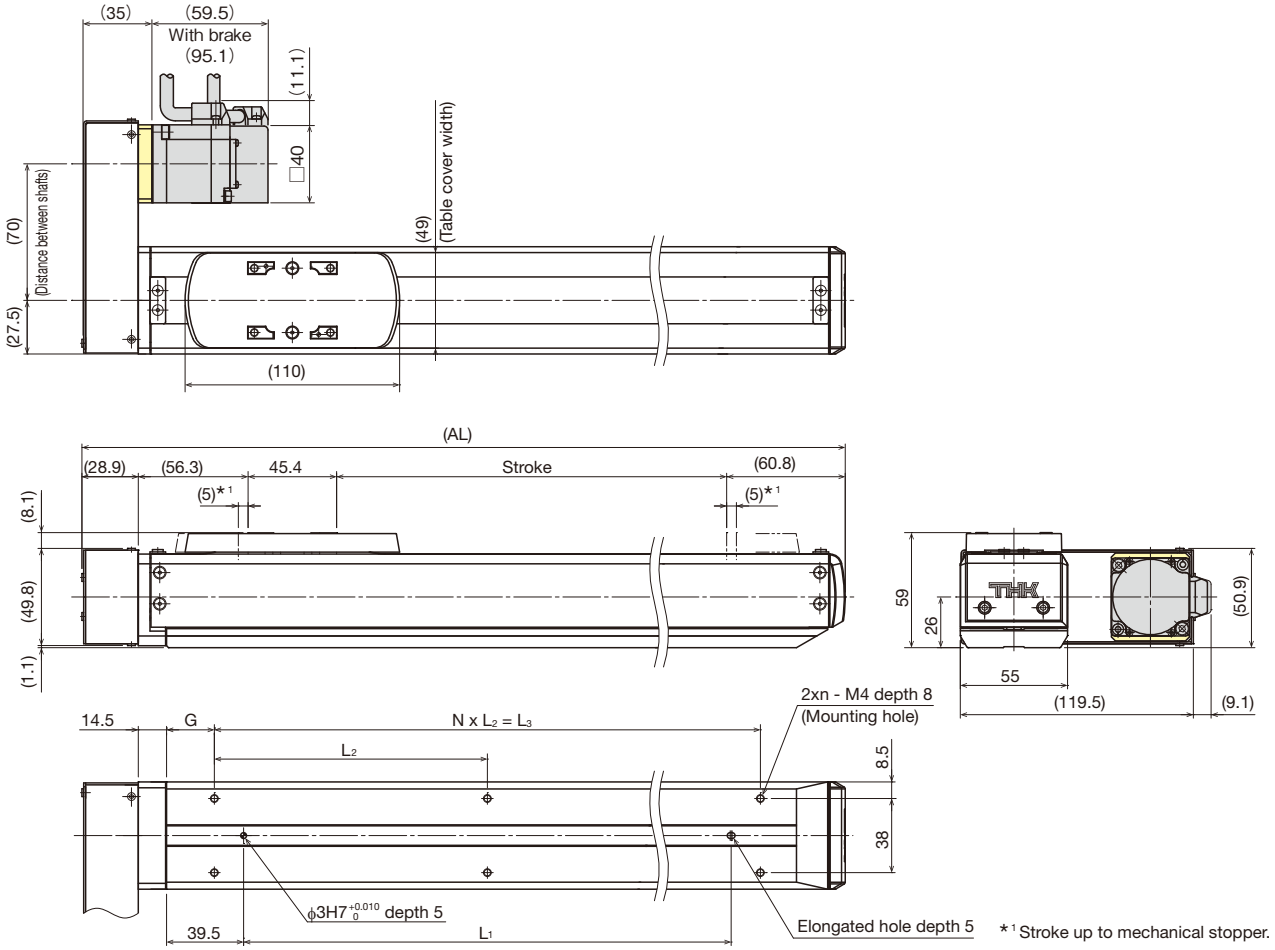
Ball screw lead [mm]	Load mass [kg]	A	C
6	3	210	210
	6	90	90
10	1.5	390	390
	3.5	180	180

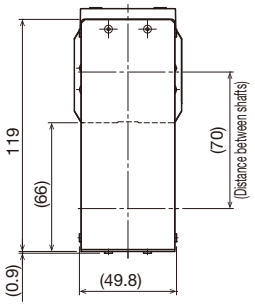
* This value is the overhang length whose running life is 10,000 km for horizontal direction/wall mount and 5,000 km for vertical direction.
A permissible value of the applied load in each direction.

KRF5R + TLC

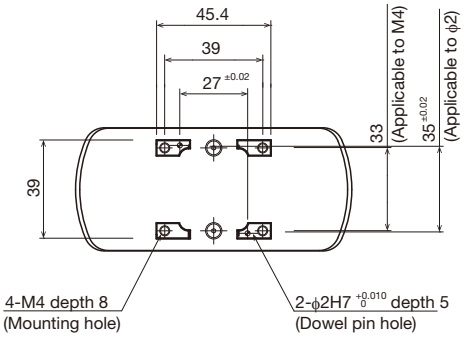
Motor rated output **50W**

Dimensions

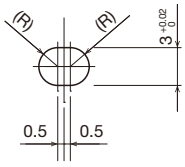




Bottom side wrap



Detailed Diagram: Table



Detailed Diagram: Elongated Hole

Stroke [mm] (Stroke between mechanical stoppers)		50 (60)	100 (110)	150 (160)	200 (210)	250 (260)	300 (310)	350 (360)	400 (410)	450 (460)	500 (510)	550 (560)
Maximum speed *2 [mm/s]	Ball screw lead: 6 mm	300										250
	Ball screw lead: 10 mm	500										430
Dimensions [mm]	AL	241.5	291.5	341.5	391.5	441.5	491.5	541.5	591.5	641.5	691.5	741.5
	L1	100	150	200	250	300	350	400	450	500	550	600
	L2	140	100	120	140	115	130	110	120	135	120	130
	L3	140	200	240	280	345	390	440	480	540	600	650
	G	19.5	14.5	19.5	24.5	17	19.5	19.5	24.5	19.5	14.5	14.5
Mounting pitch count	N	1	2	2	2	3	3	4	4	4	5	5
Mounting hole count	n	2	3	3	3	4	4	5	5	5	6	6
Weight *3 [kg]		2.5 (2.7)	2.8 (3.0)	3.1 (3.3)	3.5 (3.7)	3.8 (4.0)	4.1 (4.3)	4.4 (4.6)	4.7 (4.9)	5.0 (5.2)	5.3 (5.5)	5.6 (5.8)

*2 The maximum speed is the value restricted by the motor rotational speed (at 3,000min-1), or by the permissible rotational speed of the ball screw.
*3 Values when a brake is installed are shown in parentheses.

KRF6 THC specifications

Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device	Option	Motor rated output	Motor cable orientation	Home position	Power supply voltage	Cable type and length
KRF6 -	06	- 0150	A	- TH	- GR-SB	/ M10	R	D00	D1	F3

KRF6	06: 6 mm 10: 10 mm	0050: 50 mm to 0800: 800 mm	A	TH: THC	No symbol: Red cover GR: Gray cover SB: Slider base □1□2: Sensor	M10 : 100W M10B: 100W with brake	R : Right L : Left U: Up D: Down	D00: Motor side R00: Reverse motor side S02: Motor side S03: Reverse motor side	D1: 100 V D2: 200 V	No symbol: None F3 : Standard 3 m F5 : Standard 5 m FA : Standard 10 m H3 : High flex 3 m H5 : High flex 5 m HA: High flex 10 m

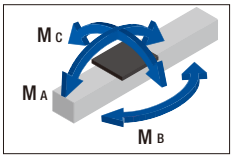
Note: If the GR is not included in the model configuration, cover will be red.

Basic Specifications

Control device type				THC	
Motor rated output [W]				100	
Ball screw lead [mm]				6	10
Rated speed *1 [mm/s]				300	500
Maximum load capacity *2 [kg]	Acceleration and deceleration rate	Horizontal mount	0.5 G	35	30
		Wall mount		24	22
		Vertical mount	0.3G	10	5
Rated thrust *3 [N]				266	160
Maximum thrust *4 [N]				796	478
Electromagnetic brake retention [N]				268	161
Running life *5 [km]		Horizontal/wall mount		10,000	
		Vertical mount		5,000	
Positioning repeatability [mm]				±0.010	
Lost motion [mm]				0.1	
Static permissible moment *6 [N·m]				MA: 166 MB: 103.8 MC: 179.5	

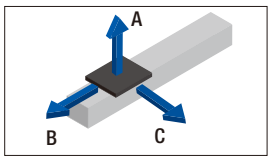
*1 At rated motor speed (3,000min^{-1}).
*2 At rated speed.
*3 At rated motor torque.
*4 Dependent on maximum peak torque and permissible load.
*5 The conditions for calculation are as follows:
Conditions: Under maximum load capacity at permissible overhang length
Stroke 275mm
*6 Applied point of moment 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

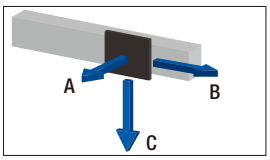


Permissible Overhang Length*

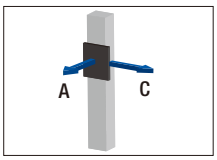
Horizontal use



Wall use



Vertical use



Horizontal mount [mm]

Ball screw Lead [mm]	Load mass [kg]	A	B	C
6	17.5	390	50	160
	35	170	10	60
10	15	320	60	170
	30	130	10	50

Wall mount [mm]

Ball screw Lead [mm]	Load mass [kg]	A	B	C
6	12	200	70	600
	24	70	20	140
10	11	200	80	460
	22	70	30	120

Vertical mount [mm]

Ball screw Lead [mm]	Load mass [kg]	A	C
6	5	240	240
	10	100	100
10	2.5	510	510
	5	230	230

* This value is the overhang length whose running life is 10,000 km for horizontal and wall mount, and 5,000 km for vertical direction.
A permissible value of the applied load in each direction.

Dimensions

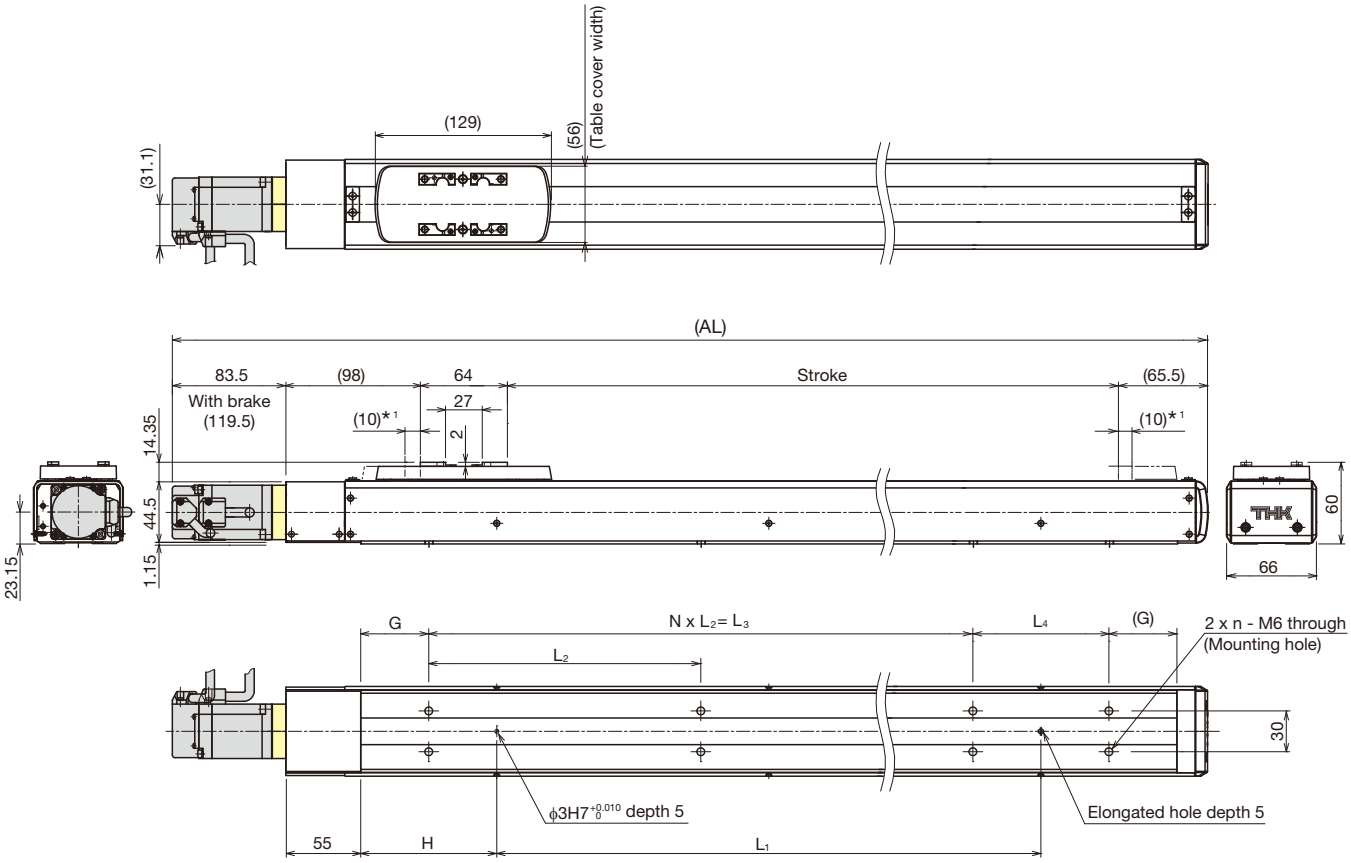
Stroke [mm] (Stroke between mechanical stoppers)		50 (70)	100 (120)	150 (170)	200 (220)	250 (270)	300 (320)	350 (370)	400 (420)
Maximum speed *2 [mm/s]	Ball screw lead: 6mm	300							
	Ball screw lead: 10mm	500							
Dimensions [mm]	AL*3	361 (396.6)	411 (446.6)	461 (496.6)	511 (546.6)	561 (596.6)	611 (646.6)	661 (696.6)	711 (746.6)
	L1	100	150	200	200	250	250	300	350
	L2	100	200	200	200	200	200	200	200
	L3	100	200	200	200	200	400	400	400
	L4	–	–	–	–	100	–	–	–
	G	50	25	50	75	50	25	50	75
	H	50	50	50	75	75	100	100	100
Mounting pitch count	N	1	1	1	1	1	2	2	2
Mounting hole count	n	2	2	2	2	3	3	3	3
Weight *3 [kg]		3.2 (3.4)	3.6 (3.8)	4.0 (4.2)	4.5 (4.7)	4.9 (5.1)	5.3 (5.5)	5.7 (5.9)	6.1 (6.3)

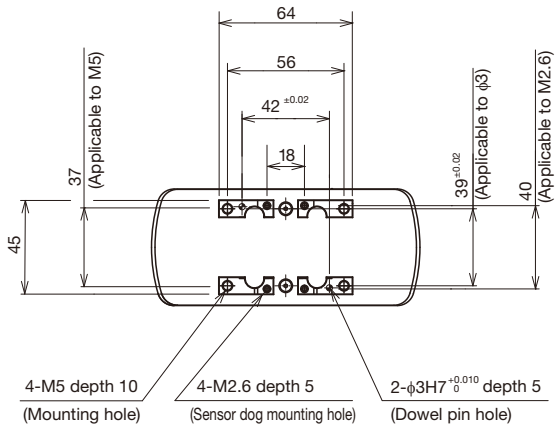
*2 Dependent on motor speed (3,000min^{-1}) and permissible rotational speed of the ball screw.
*3 Values when a brake is installed are shown in parentheses.

KRF6 + THC

Motor rated output **100W**

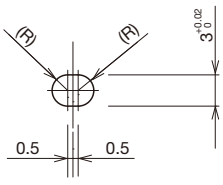
Dimensions





Detailed Diagram: Table

*1 Stroke up to mechanical stopper.



Detailed Diagram: Elongated Hole

Stroke [mm] (Stroke between mechanical stoppers)		450 (470)	500 (520)	550 (570)	600 (620)	650 (670)	700 (720)	750 (770)	800 (820)
Maximum speed *2 [mm/s]	Ball screw lead: 6mm	300			260	220	200	170	150
	Ball screw lead: 10mm	500			440	380	330	290	260
Dimensions [mm]	AL*3	761(796.6)	811(846.6)	861(896.6)	911(946.6)	961(996.6)	1011(1046.6)	1061(1096.6)	1111(1146.6)
	L1	400	450	500	550	600	650	700	750
	L2	200	200	200	200	200	200	200	200
	L3	400	600	600	600	600	800	800	800
	L4	100	–	–	–	100	–	–	–
	G	50	25	50	75	50	25	50	75
	H	100	100	100	100	100	100	100	100
Mounting pitch count	N	2	3	3	3	3	4	4	4
Mounting hole count	n	4	4	4	4	5	5	5	5
Weight *3 [kg]		6.5 (6.7)	6.9 (7.1)	7.3 (7.5)	7.7 (7.9)	8.1 (8.3)	8.5 (8.7)	8.9 (9.1)	9.3 (9.5)

*2 Dependent on motor speed (3,000min^{-1}) and permissible rotational speed of the ball screw.
*3 Values when a brake is installed are shown in parentheses.

KRF6R THC specifications

Model Configuration

Model	Ball screw lead	Stroke	Design symbol	Control device type	Option	Motor rated output	Motor cable orientation	Home position	Power supply voltage	Cable type and length
KRF6R -	06	- 0150	A	- TH	- ML-GR	/ M10	R	D00	D1	F3

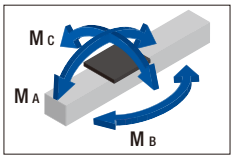
KRF6R	06: 6 mm 10: 10 mm	0050: 50 mm to 0800: 800 mm	A	TH: THC	MR: Motor right wrap ML: Motor left wrap MD: Motor down wrap GR: Gray cover SB: Slider base □1□2: Sensor	M10 : 100W M10B: 100W with brake	R : Right L : Left U : Up D : Down	D00: Motor side R00: Reverse motor side S02: Motor side S03: Reverse motor side	D1: 100 V D2: 200 V	No symbol: None F3 : Standard 3 m F5 : Standard 5 m FA : Standard 10 m H3 : High flex 3 m H5 : High flex 5 m HA: High flex 10 m

Basic Specifications

Control device type			THC	
Motor rated output [W]			100	
Ball screw lead [mm]			6	10
Rated speed *1 [mm/s]			300	500
Maximum load capacity *2 [kg]	Acceleration and deceleration rate	Horizontal mount 0.5G	35	30
		Wall mount 0.5G	24	22
		Vertical mount 0.3G	10	5
Rated thrust *3 [N]			266	160
Maximum thrust *4 [N]			796	478
Electromagnetic brake retention [N]			268	161
Running life *5 [km]	Horizontal/wall mount		10,000	
	Vertical mount		5,000	
Positioning repeatability [mm]			±0.010	
Lost motion [mm]			0.1	
Static permissible moment *6 [N·m]			MA: 166 MB: 103.8 MC: 179.5	

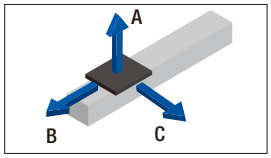
*1 Based on rated motor speed (3,000min-1).
*2 At rated speed.
*3 At rated motor torque.
*4 Dependent on maximum peak torque and permissible load.
*5 The conditions for calculation are as follows:
Under maximum load capacity at permissible overhang length.
Stroke 275 mm
*6 Applied point of moment load for MA and MC are the top face of the table, and that for MB is the center of the table.

Static Permissible Moment



Permissible Overhang Length*

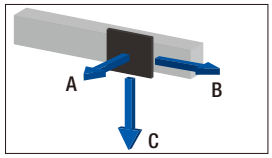
Horizontal use



Horizontal mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	B	C
6	17.5	390	50	160
	35	170	10	60
10	15	320	60	170
	30	130	10	50

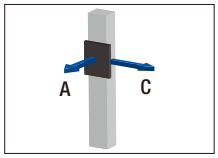
Wall use



Wall mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	B	C
6	12	200	70	600
	24	70	20	140
10	11	200	80	460
	22	70	30	120

Vertical use



Vertical mount [mm]

Ball screw lead [mm]	Load mass [kg]	A	C
6	5	240	240
	10	100	100
10	2.5	510	510
	5	230	230

* This value is the overhang length whose running life is 10,000 km for horizontal direction/wall mount and 5,000 km for vertical direction.
A permissible value of the applied load in each direction.

Dimensions

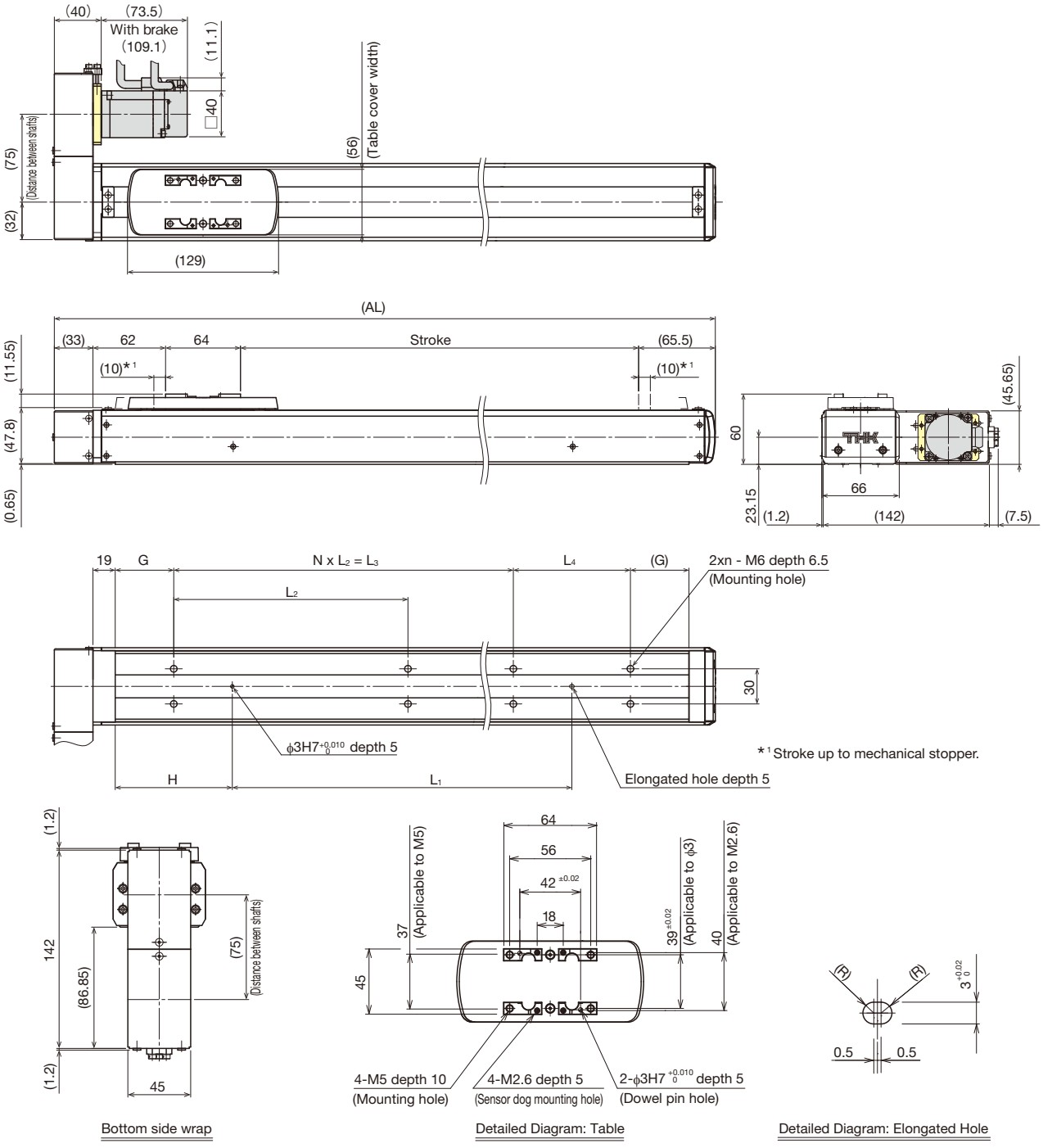
Stroke [mm] (Stroke between mechanical stoppers)		50 (70)	100 (120)	150 (170)	200 (220)	250 (270)	300 (320)	350 (370)	400 (420)
Maximum speed *2 [mm/s]	Ball screw lead: 6 mm	300							
	Ball screw lead: 10 mm	500							
Dimensions [mm]	AL	276	326	376	426	476	526	576	626
	L1	100	150	200	200	250	250	300	350
	L2	100	200	200	200	200	200	200	200
	L3	100	200	200	200	200	400	400	400
	L4	–	–	–	–	100	–	–	–
	G	50	25	50	75	50	25	50	75
	H	50	50	50	75	75	100	100	100
Mounting pitch count	N	1	1	1	1	1	2	2	2
Mounting hole count	n	2	2	2	2	3	3	3	3
Weight *3 [kg]		4.0(4.2)	4.4(4.6)	4.8(5.0)	5.2(5.4)	5.6(5.8)	6.0(6.2)	6.4(6.6)	6.8(7.0)

*2 The maximum speed is the value restricted by the motor rotational speed (at 3,000min-1), or by the permissible rotational speed of the ball screw.
*3 Values when a brake is installed are shown in parentheses.

KRF6R + THC

Motor rated output
100W

Dimensions



Bottom side wrap

Detailed Diagram: Table

Detailed Diagram: Elongated Hole

Stroke [mm] (Stroke between mechanical stoppers)		450 (470)	500 (520)	550 (570)	600 (620)	650 (670)	700 (720)	750 (770)	800 (820)
Maximum speed *2 [mm/s]	Ball screw lead: 6 mm	300			260	220	200	170	150
	Ball screw lead: 10mm	500			440	380	330	290	260
Dimensions [mm]	AL	676	726	776	826	876	926	976	1026
	L1	400	450	500	550	600	650	700	750
	L2	200	200	200	200	200	200	200	200
	L3	400	600	600	600	600	800	800	800
	L4	100	–	–	–	100	–	–	–
	G	50	25	50	75	50	25	50	75
	H	100	100	100	100	100	100	100	100
Mounting pitch count	N	2	3	3	3	3	4	4	4
Mounting hole count	n	4	4	4	4	5	5	5	5
Weight *3 [kg]		7.2(7.4)	7.7(7.9)	8.0(8.3)	8.5(8.7)	8.9(9.1)	9.3(9.5)	9.7(9.9)	10.1(10.3)

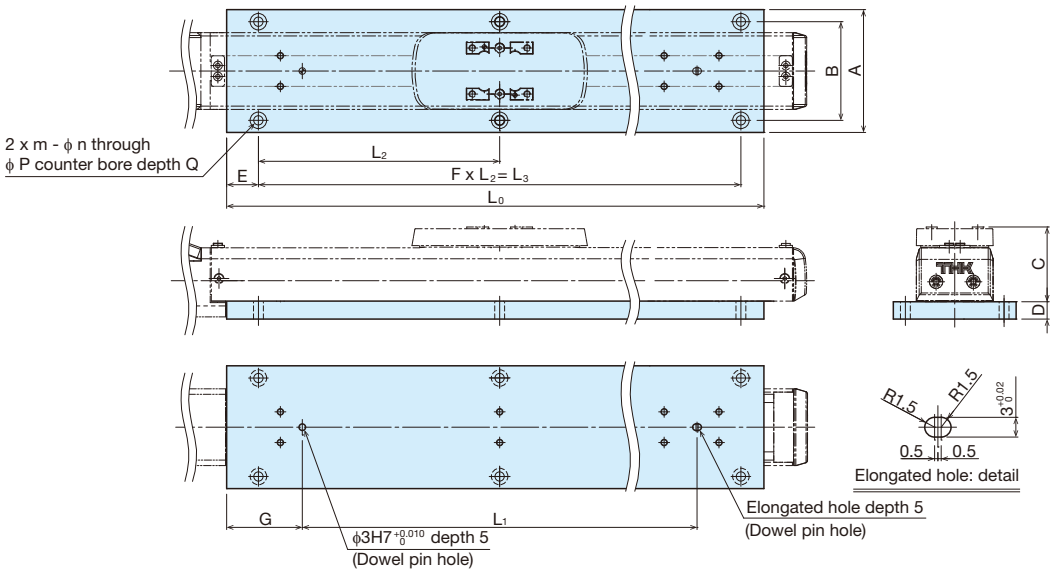
*2 The maximum speed is the value restricted by the motor rotational speed (at 3,000min-1), or by the permissible rotational speed of the ball screw.
*3 Values when a brake is installed are shown in parentheses.

Options

SB: Slider base

THK provides slider bases for installing the KRF main unit from the top face.

* The product is shipped with this optional assembled.



Unit: mm

Model	A	B	C	D
KRF4 / KRF4R	70	55	42.1	9.9
KRF5 / KRF5R	80	65	49.1	9.9
KRF6 / KRF6R	90	78	60	10

Note) When the slider base is mounted on KRF6, the height of KRF6 will be 10mm higher than the standard product due to the thickness of slider base.

Stroke		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800
KRF4 KRF4R	L_0	142	192	242	292	342	392	–	–	–	–	–	–	–	–	–	–
	L_1	100	150	200	250	300	350	–	–	–	–	–	–	–	–	–	–
	L_2	120	85	110	90	105	120	–	–	–	–	–	–	–	–	–	–
	L_3	120	170	220	270	315	360	–	–	–	–	–	–	–	–	–	–
	E	14.5						–	–	–	–	–	–	–	–	–	–
	F	1	2	2	3	3	3	–	–	–	–	–	–	–	–	–	–
	G	24.5						–	–	–	–	–	–	–	–	–	–
	m	2	3	3	4	4	4	–	–	–	–	–	–	–	–	–	–
	n	4.5						–	–	–	–	–	–	–	–	–	–
	P	8						–	–	–	–	–	–	–	–	–	–
	Q	4.4						–	–	–	–	–	–	–	–	–	–
KRF5 KRF5R	L_0	180	230	280	330	380	430	480	530	580	630	680	–	–	–	–	–
	L_1	100	150	200	250	300	350	400	450	500	550	600	–	–	–	–	–
	L_2	140	100	120	140	115	130	110	120	135	120	130	–	–	–	–	–
	L_3	140	200	240	280	345	390	440	480	540	600	650	–	–	–	–	–
	E	19.5	15	19.5	24.5	17	19.5	19.5	24.5	19.5	14.5	14.5	–	–	–	–	–
	F	1	2	2	2	3	3	4	4	4	5	5	–	–	–	–	–
	G	39.5											–	–	–	–	–
	m	2	3	3	3	4	4	5	5	5	6	6	–	–	–	–	–
	n	4.5											–	–	–	–	–
	P	8											–	–	–	–	–
	Q	4.4											–	–	–	–	–
KRF6 KRF6R	L_0	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950
	L_1	100	150	200	200	250	250	300	350	400	450	500	550	600	650	700	750
	L_2	100	200	130	150	170	140	150	160	170	140	160	170	180	150	170	180
	L_3	100	200	260	300	340	420	450	480	510	560	640	680	720	750	850	900
	E	50	25	20	25	30	15	25	35	45	45	30	35	40	50	25	25
	F	1	1	2	2	2	3	3	3	3	4	4	4	4	5	5	5
	G	50	50	50	75	75	100	100	100	100	100	100	100	100	100	100	100
	m	2	2	3	3	3	4	4	4	4	5	5	5	5	6	6	6
	n	5.5															
	P	9.5															
	Q	5.4															

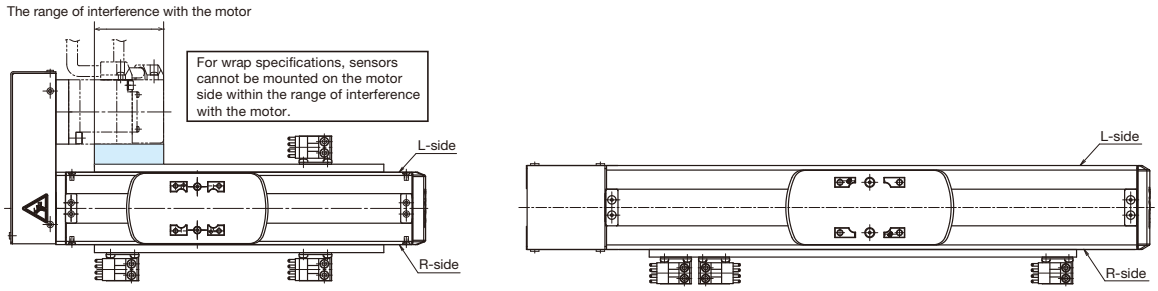
□1□2: Sensors

Optional proximity sensors and photo sensors are available for KRF. Models equipped with a sensor are also provided with a dedicated sensor rail. Please use the sensor with the following precautions (Notes 1 to 6) in mind.

Note 1) The customer should provide a sensor dog since it cannot be installed onto the actuator main unit. (Excluding KRF6)
Note 2) Sensor dog is provided with CKRF6 only.
Note 3) Sensor rails are pre-mounted, and sensors are provided with the product.
Note 4) When optional sensor is used, note the home position may differ from the position indicated by the dimension in this catalog, in considering using them.
Note 5) Proximity sensors placed too close to each other may not work properly. In such a case, please prepare a different frequency type of sensor. (For specifications, contact each manufacturer.)
Note 6) Mount the sensor/sensor rail on both sides if the stroke is not more than 100 mm.

Description	Model	Accessory	Symbol	
			□1	□2
With sensor rail	–	–	L/R	1
Photo sensor * [x 3]	EE-SX674 (OMRON Corporation)	Mounting screw, nuts, sensor rail (x 1 or 2), mounting plates (x 3), connectors (EE-1001, x 3)	L/R	6
Sensor N.O. contact [x 1] N.C. contact [x 2]	GX-F12A (Panasonic Industrial Devices SUNX Co., Ltd.) GX-F12B (Panasonic Industrial Devices SUNX Co., Ltd.)	Mounting screw, nuts, sensor rail (x 1 or 2)	L/R	J
Sensor N.O. contact [x 1] (PNP output) N.C. contact [x 2] (PNP output)	GX-F12A-P (Panasonic Industrial Devices SUNX Co., Ltd.) GX-F12B-P (Panasonic Industrial Devices SUNX Co., Ltd.)	Mounting screw, nuts, sensor rail (x 1 or 2)	L/R	M

N.O. contact: Normally open contact point
N.C. contact: Normally closed contact point
Sensors marked with a symbol "M", if combined with our controller, cannot be used as a home position sensor.
* The photo sensors can be switched between ON when lit and ON when unlit.

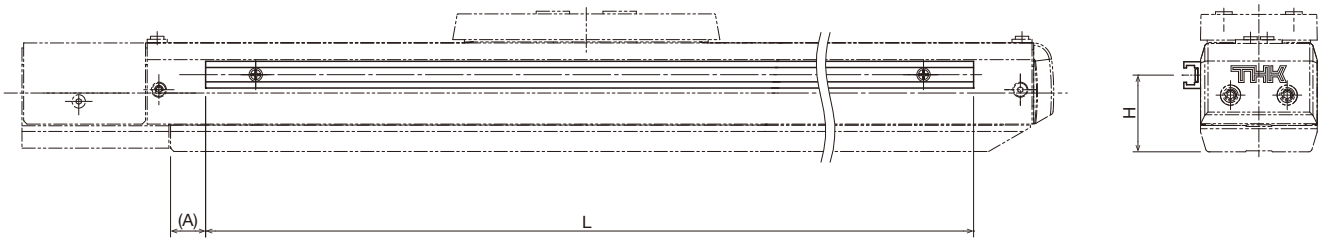


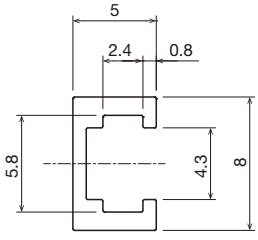
Option: Sensor symbol

Symbol	
□1	□2
R	6

* Symbol □1 represents the mounting position for sensor rail and sensor. No symbol is given for the case of stroke 100mm or shorter.
Symbol □2 represents the types of sensors.

Symbol 1: Sensor rail



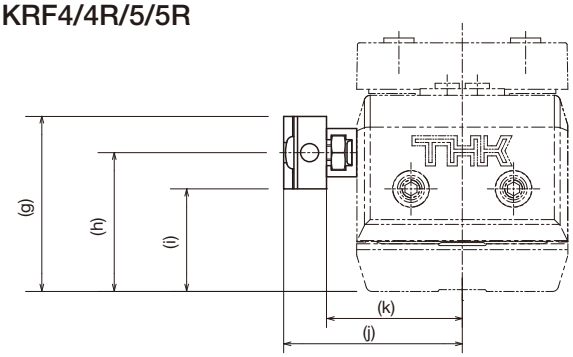


Unit: mm

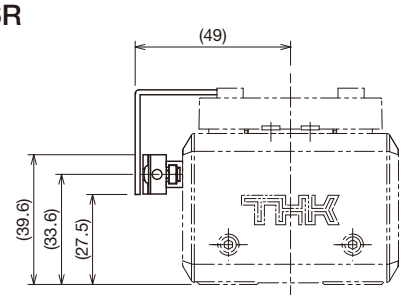
Model	H	(A)	L
KRF4/KRF4R	32.5	10.5	Stroke +80
KRF5/KRF5R	37.5	26	
KRF6/KRF6R	33.7	35	

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

KRF4/4R/5/5R



KRF6/6R



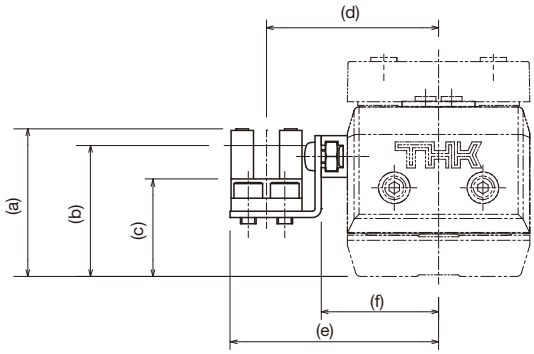
Sensor dog width: 26mm

Unit: mm

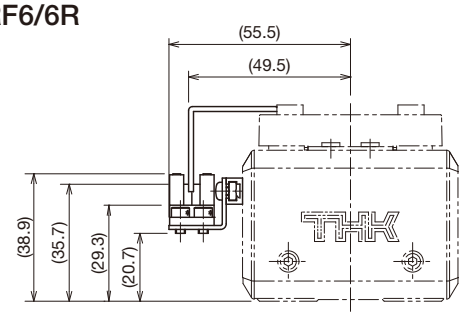
Model	g	h	i	j	k
KRF4/KRF4R	38.5	32.5	26.5	34.6	27.5
KRF5/KRF5R	43.5	37.5	31.5	39.6	32.5

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

KRF4/4R/5/5R



KRF6/6R



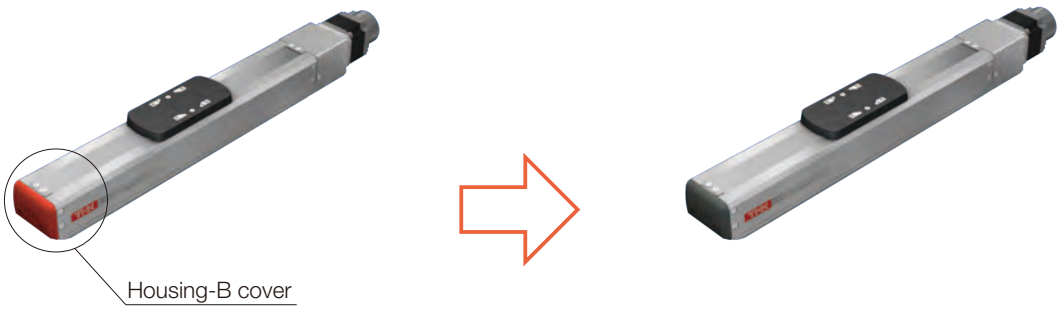
Sensor dog width: 26mm

Unit: mm

Model	a	b	c	d	e	f
KRF4/KRF4R	37.8	34.6	28.2	38	45	27.5
KRF5/KRF5R	42.8	39.6	33.2	43	50	32.5

GR: Change the cover color to gray

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



No symbol: red

When GR is selected: gray

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

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.

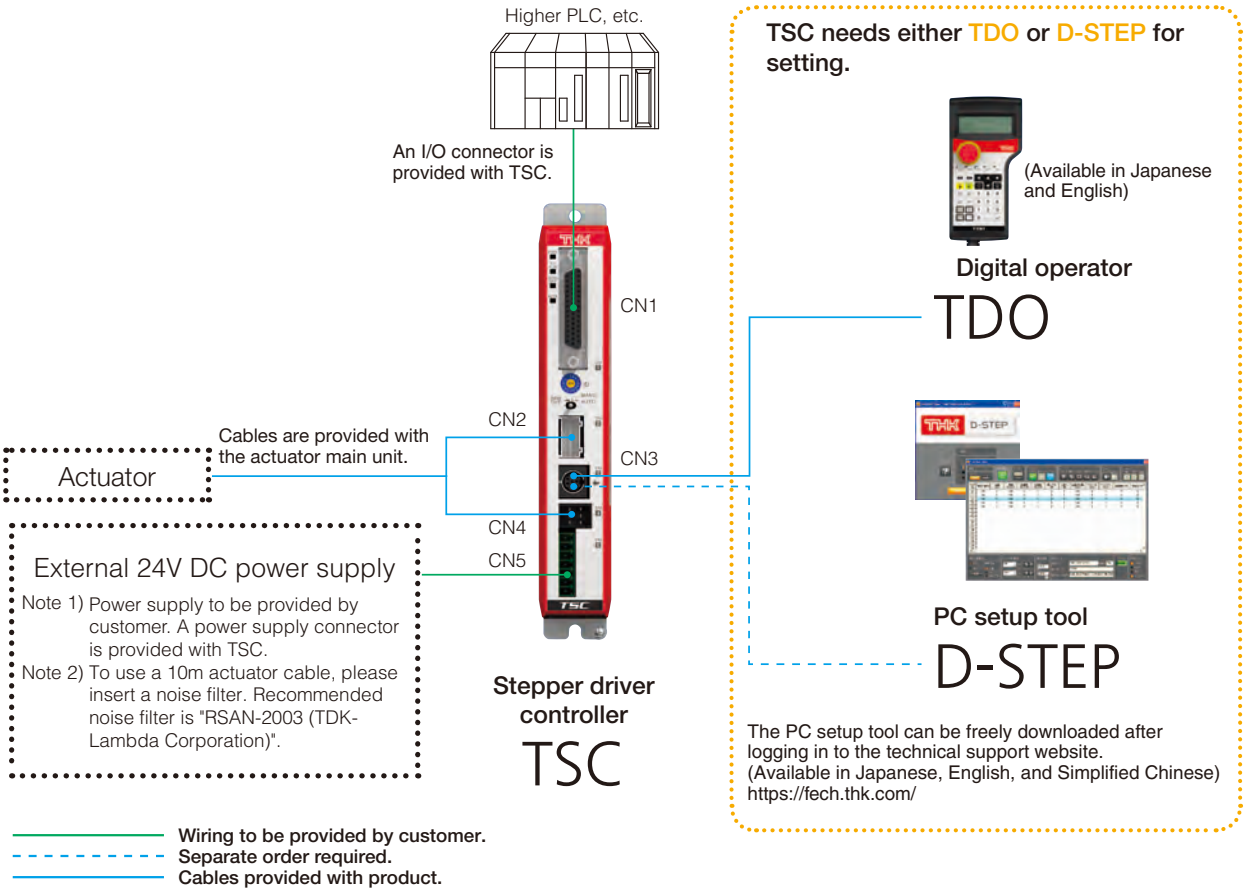
Model	Current	Design symbol	Type	Combined Actuator	Combined actuator ball screw lead	Home position	Brake
TSC –	015	B	– MOD	– KRF4	– 06	– D	– B
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TSC	015: 1.5A	B	MOD: Mode switching type	KRF4	06: 6mm	D: Motor side	No symbol: Without brake
				KRF5	10: 10mm	R: Reverse motor side	B: With brake

Basic Specifications

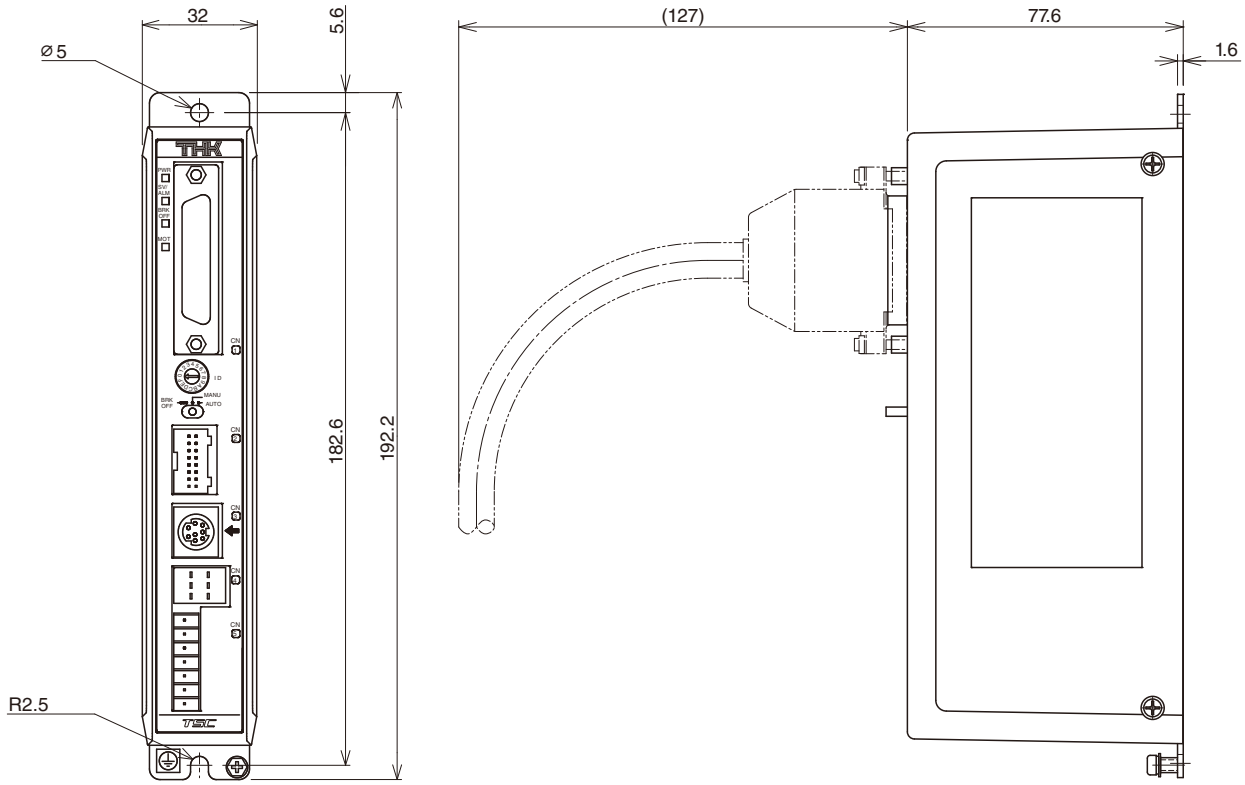
Basic Specifications								
Control	Input power supply		24V DC ±10% (Up to 2.5A)					
	Control axis		Single axis					
	Motor type		Stepper motor (□28mm, □35mm, □42mm)					
	Control method		Feedback control (Semi-closed loop)					
	Position detection method		Incremental					
	Acceleration/deceleration 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

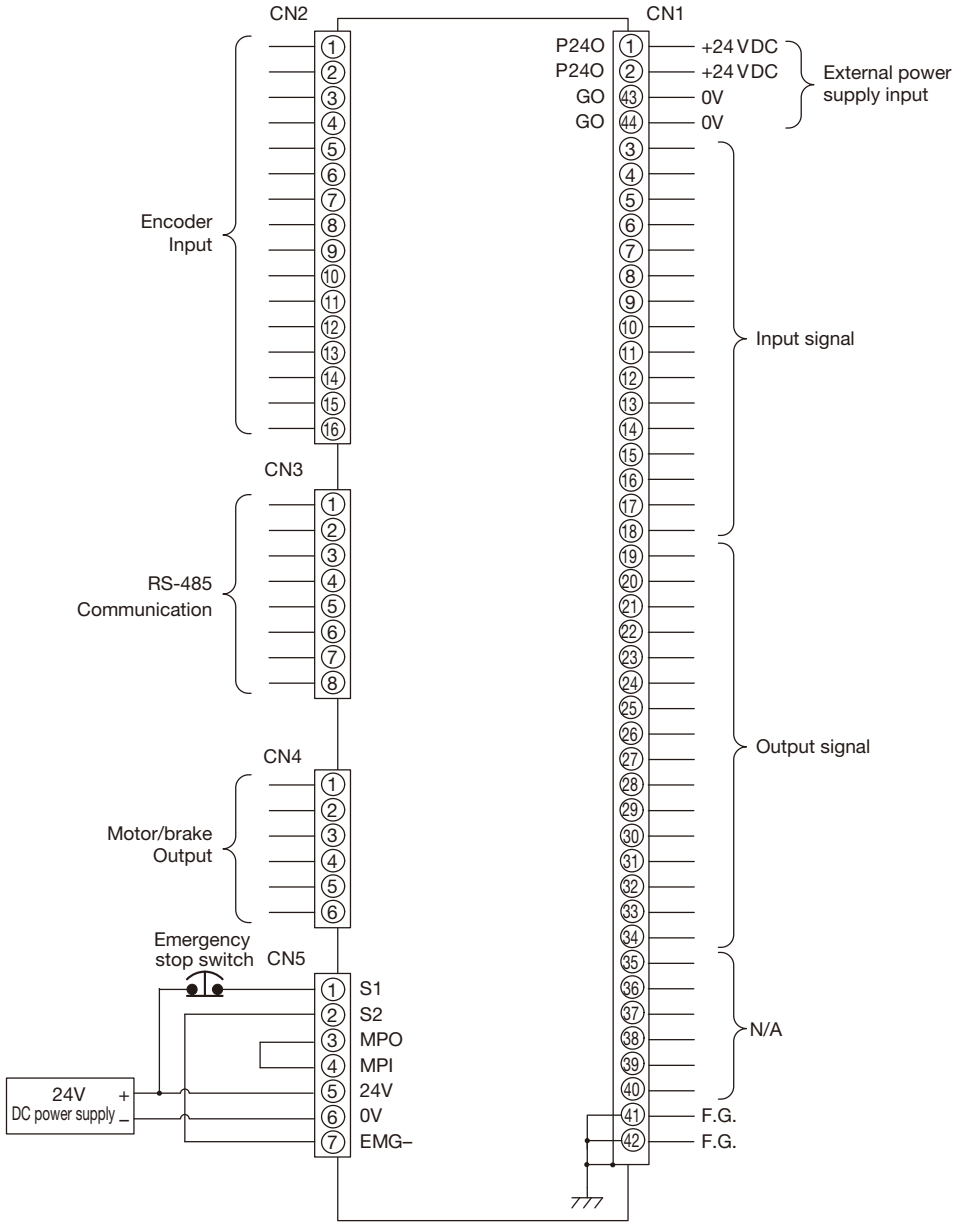


Dimensional Drawing of Controller



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

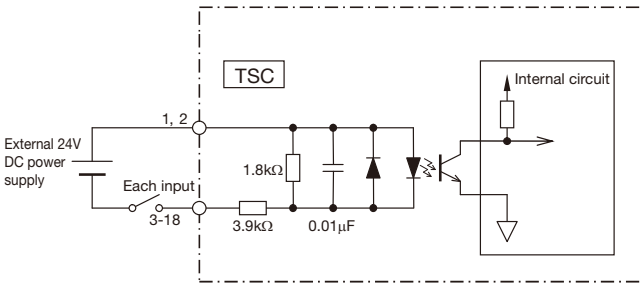
TSC Pin Assignment



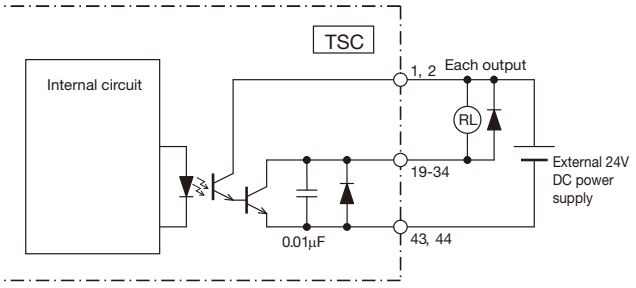
* For attached I/O connector pin numbers, see P.46.
* Customer provides 24V DC power supply for input/output circuitry.

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	–

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	EMGS	EMGS	EMGS	EMGS	EMGS	EMGS
	34	ALM	ALM	ALM	ALM	ALM	ALM

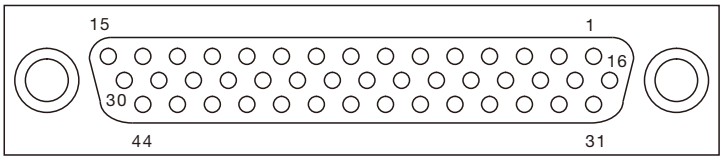
Input Signal Functions

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

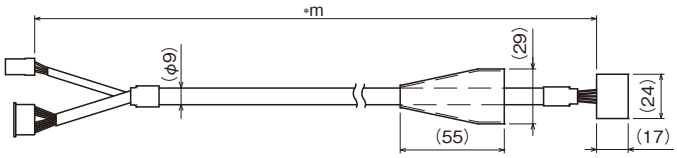


* Controller connector port view

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

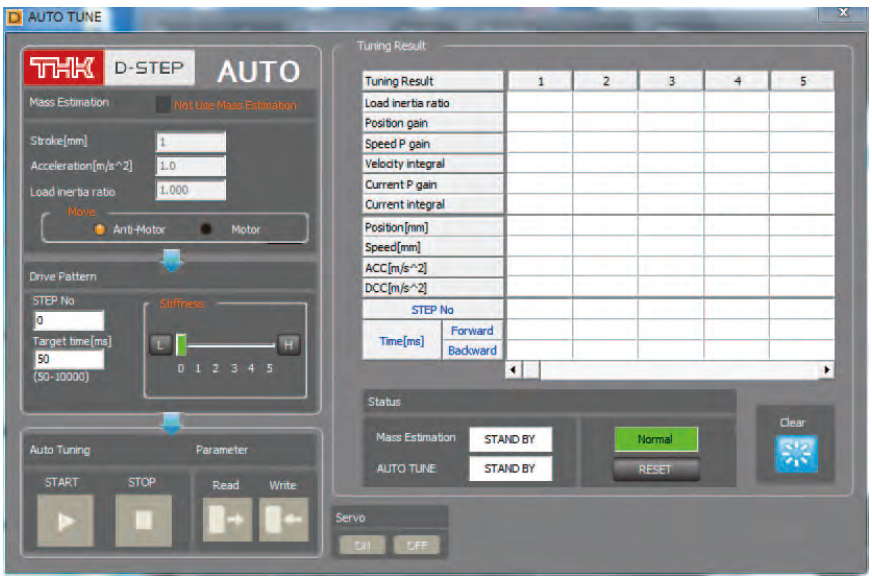
Ready to use, simplified setup.

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)
- Auto-tuning functionality built-in



Combined Control Device Model Configuration (TLC)

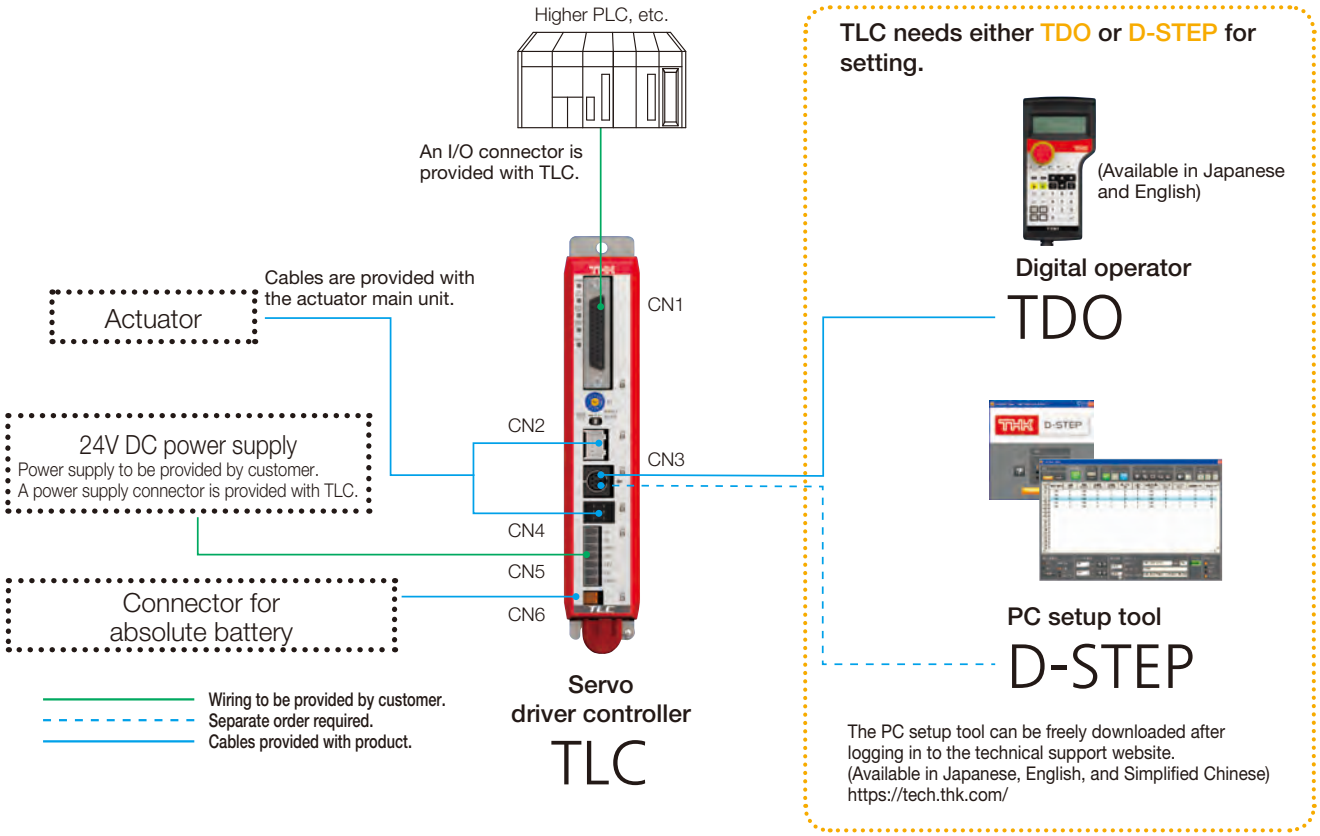
Control device model	Capacity	Power supply voltage	Type	Encoder type	Actuator model	Lead	Home position	Brake	Stroke
TLC	005	024DC	MOD	A	KRF4	06	D	B	0050
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
TLC	005: 50W	024DC: 24VDC	MOD: Mode switching type	A: Absolute	KRF4 KRF5	06: 6mm 10: 10mm	D: Motor side R: Reverse motor side	No symbol: Without brake B: With brake	Enter the stroke of the actuator model (6) Example) 0050: 50mm

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)					
	External dimensions [mm]		36.4mm (W)×199.2mm (H)×112.6mm (D)					
	Weight (not including battery)		0.4kg or less					

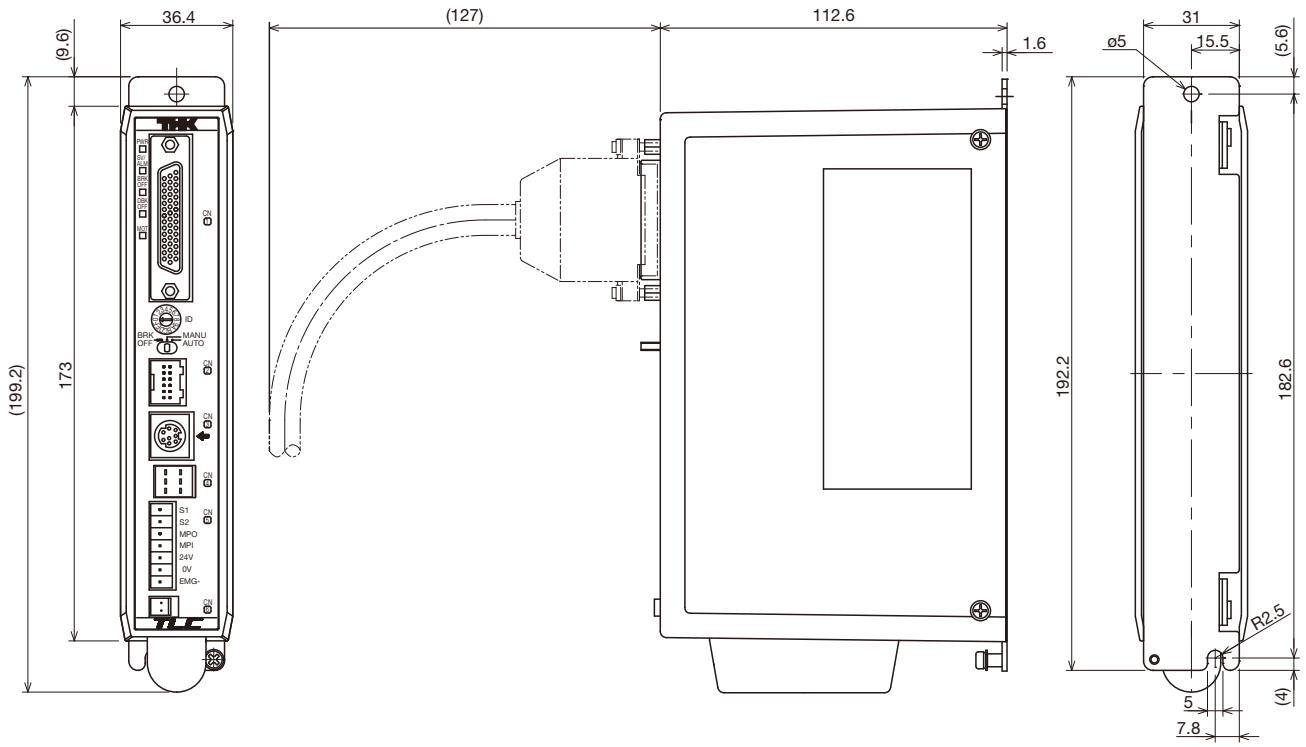
* This count varies depending on function mode.

System Configuration

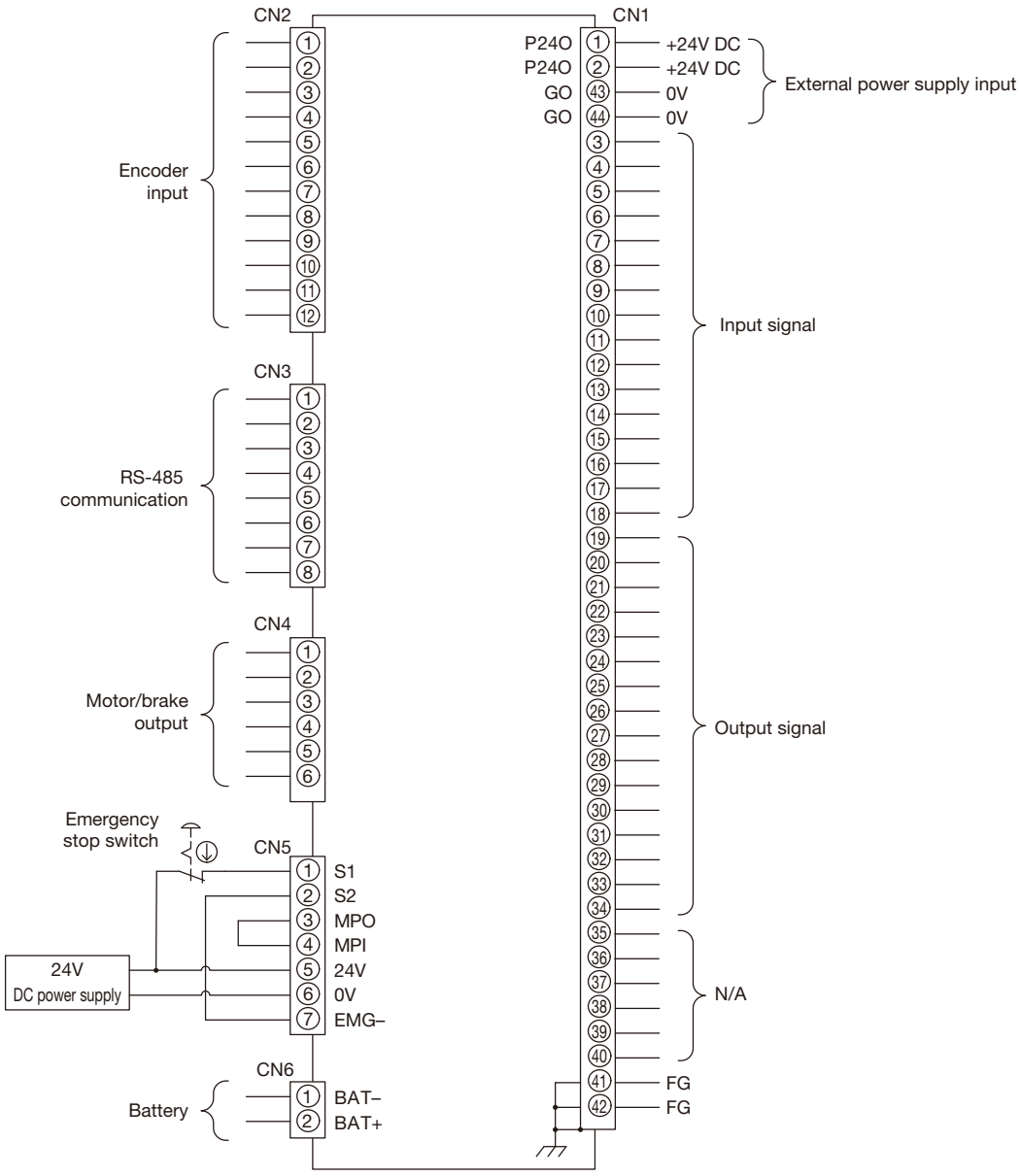


Dimensional Drawing of Controller

TLC



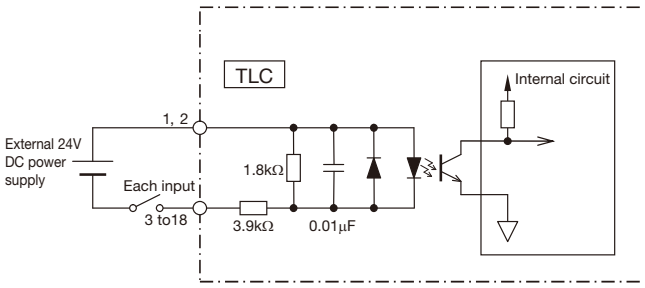
TLC Pin Assignment



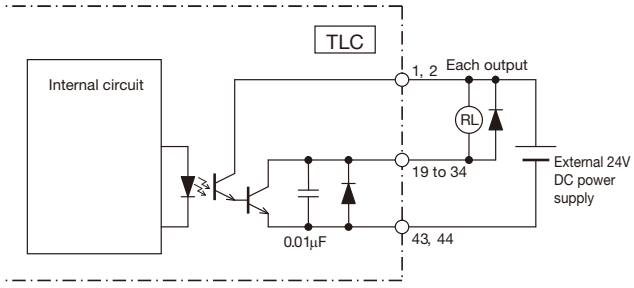
* For attached I/O connector pin numbers, see P.21.
* Customer provides 24V DC power supply for input/output circuitry.

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	–

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

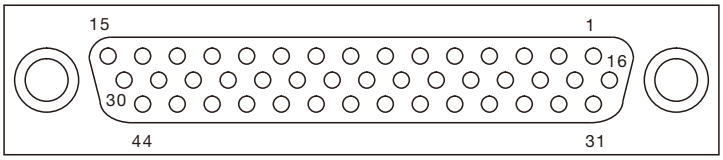
Input Signal Functions

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.

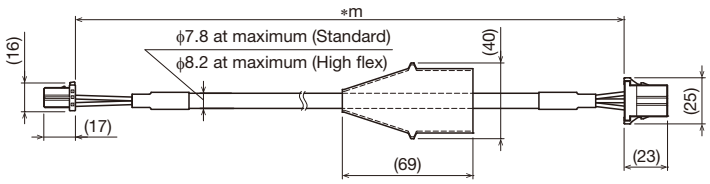
I/O Connector Pin Numbers



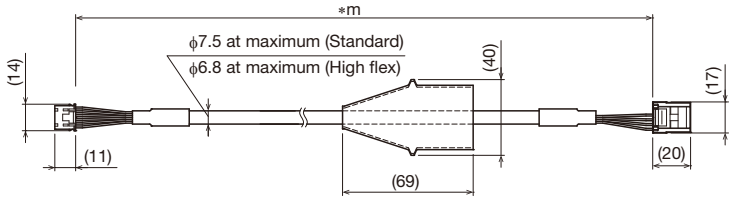
* Controller connector port view

Actuator Cable

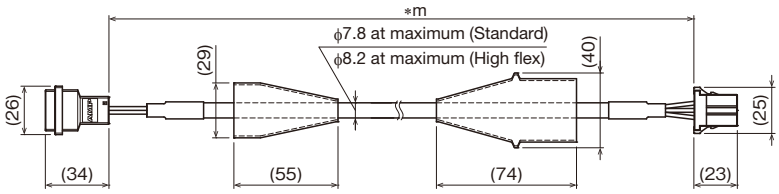
Motor brake cable for TLC: CBL-TLC-ACP-** F (Standard)
CBL-TLC-ACP-** R (High flex)
** indicates cable length: 03 (3m), 05 (5m), or 10 (10m)



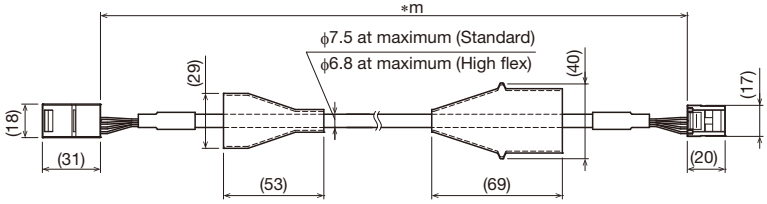
Encoder cable for TLC: CBL-TLC-ACS-** F (Standard)
CBL-TLC-ACS-** R (High flex)
** indicates cable length: 03 (3m), 05 (5m), or 10 (10m)



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)

ER6V C4 (Toshiba Home Appliances Corporation)

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

High-capacity servo driver controller

THC

For single axis / Position type

Features

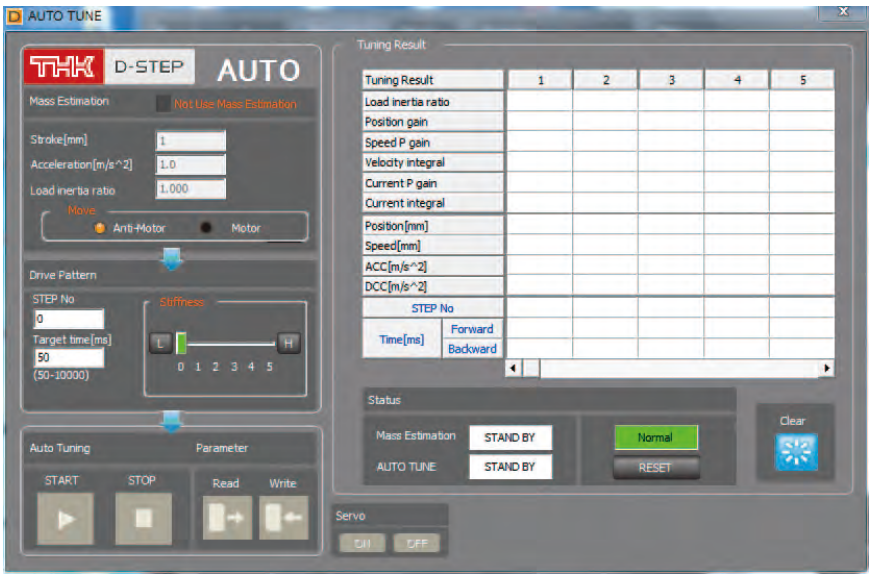
Ready to use, simplified setup.

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)
- Auto-tuning functionality built-in



Combined Control Device Model Configuration (THC)

Control device model	Capacity	Power supply voltage	Type	Encoder type	Actuator model	Lead	Home position	Brake	Stroke	Sensor
THC	- 010	- 100AC	- MOD	- A	- KRF6	- 06	- D	- B	- 0050	- 1
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
THC	010: 100W 020: 200W 040: 400W 075: 750W	100AC: 100VAC 200AC: 200VAC	MOD: Mode switching type	A: Absolute	KRF6 KRF6R Direct coupling KSF4 KSF5 KSF6 KSF8 KSF10 Motor wrap KSF4R KSF5R KSF6R KSF8R KSF10R	10: 10mm 16: 16 mm 20: 20 mm 25: 25 mm 30: 30 mm 40: 40 mm 50: 50 mm	D: Motor side R: Reverse motor side	No symbol: Without brake B: With brake	Enter the stroke of the actuator model (6) Example) 0050: 50m	No symbol: None 1: With sensor

* Select from the above also for KSF-T/U.

THC Specifications

			THC							
Type of machine	Model									
	Capacity		100V AC			200V AC				
			100W	200W	400W	100W	200W	400W	750W	
Input power supply	Main circuit		100V AC single-phase, 50/60Hz (Permissible voltage: 90 to 120V)			200V AC single-phase, 50/60Hz (Permissible voltage: 170 to 250V)				
	Control circuit		100V AC single-phase, 50/60Hz (Permissible voltage: 90 to 120V)			200V AC single-phase, 50/60Hz (Permissible voltage: 170 to 250V)				
	Power supply [kVA]		0.5	0.9	1.3	0.5	0.9	1.6	2.4	
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)							
Applicable standards	CE Marking		Low voltage directive: EN61800-5-1, EMC directive: EN61800-3							
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)							
	External dimensions [mm]		200W or lower: 58mm (W) × 208.6mm (H) × 120mm (D) 400W or higher: 67.5mm (W) × 208.6mm (H) × 120mm (D)							
	Weight (not including battery)		1.3kg or less	1.3kg or less	1.3kg or less	1.3kg or less	1.3kg or less	1.3kg or less	1.5kg or less	

* This count varies depending on function mode.

System Configuration

THC needs either TDO or D-STEP for setting.

(Available in Japanese and English)

Digital operator

TDO

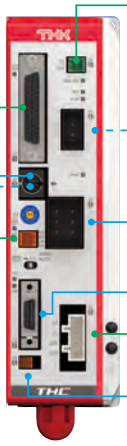
PC setup tool

D-STEP

The PC setup tool can be freely downloaded after logging in to the technical support website.
(Available in Japanese, English, and Simplified Chinese)
https://tech.thk.com/

Higher PLC, etc.

An I/O connector is provided with THC.



CN1
CN3
CN7
CN9
CN8
CN4
CN2
CN5
CN6

Connector for emergency stop

Servo driver controller

THC

Power supply connector for brake

A power supply connector for brake is provided with THC.

Regeneration resistance

Regeneration resistance may be needed when using THC. For details, see P.32.

Actuator

Cables are provided with the actuator main unit.

100V or 200V power supply

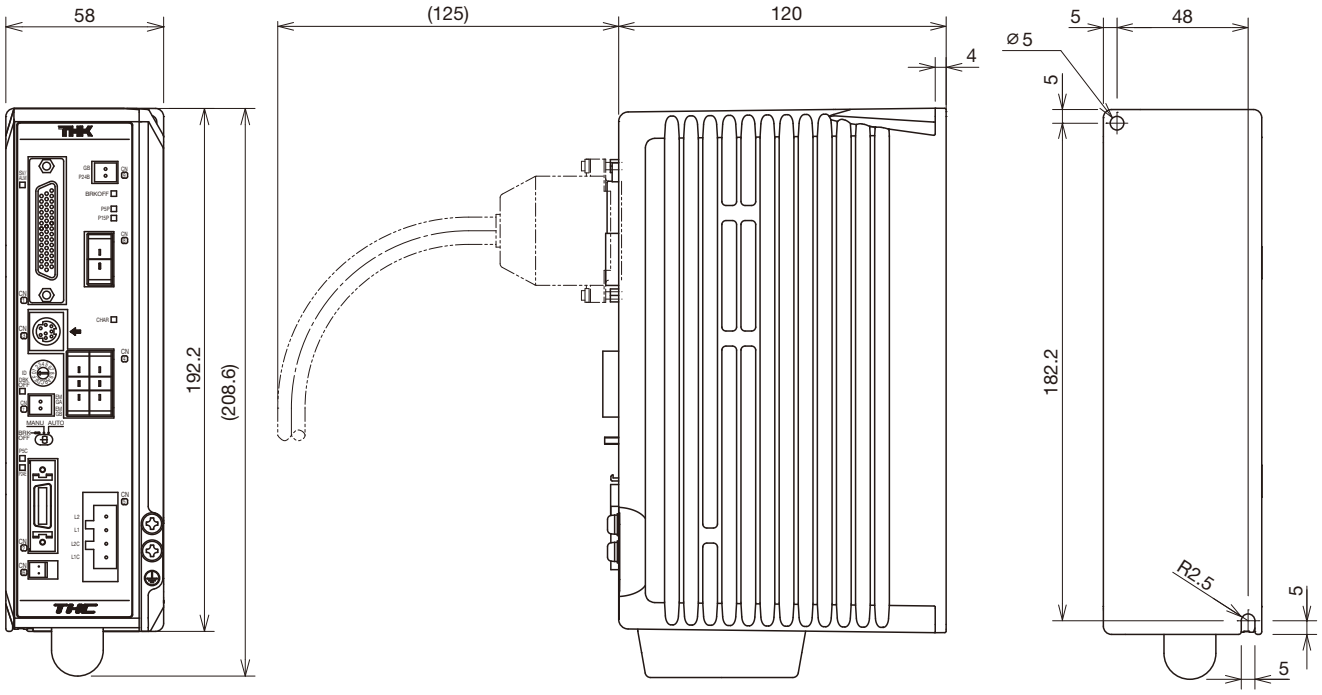
Power supply to be provided by customer.
A power supply connector is provided with THC.

Connector for absolute battery

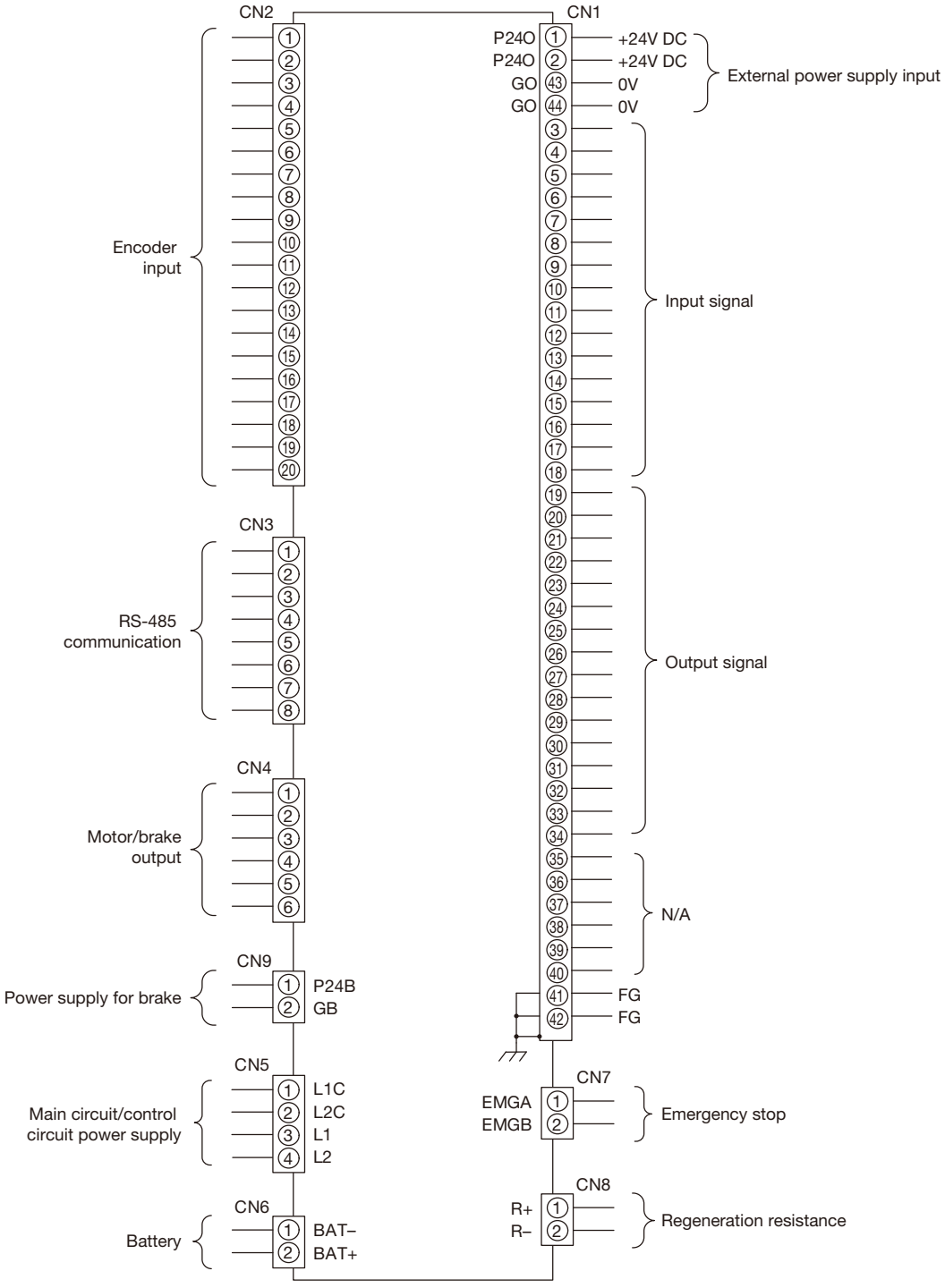
Wiring to be provided by customer.
Separate order required.
Cables provided with product.

Controller

THC (100W)



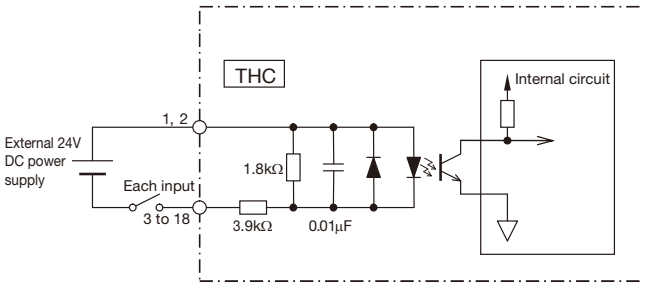
THC Pin Assignment



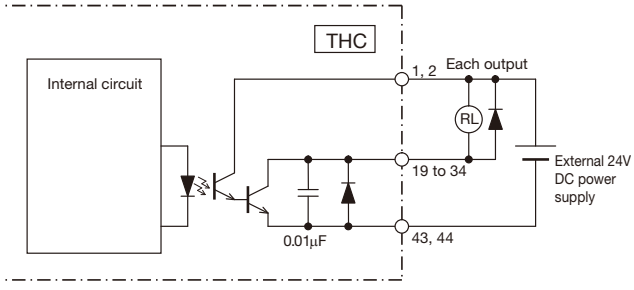
* For attached I/O connector pin numbers, see P.29.
* Customer provides 24V DC power supply for input/output circuitry.

Input/Output Circuitry for THC (CN1)

Input circuit



Output circuit



THC Function Modes

THC 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	–

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

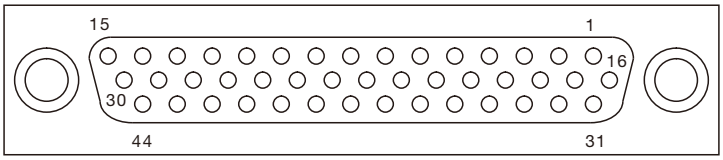
Input Signal Functions

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 - 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 - 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 - 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 - PE6	Cylinder type arrival completed output	Signal generated after operation for positioning is completed.
LS0 - LS2	Cylinder type position detection output	Outputs when the current position comes within the positioning width for each of the three points.

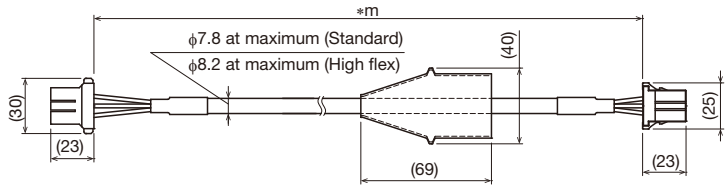
I/O Connector Pin Numbers



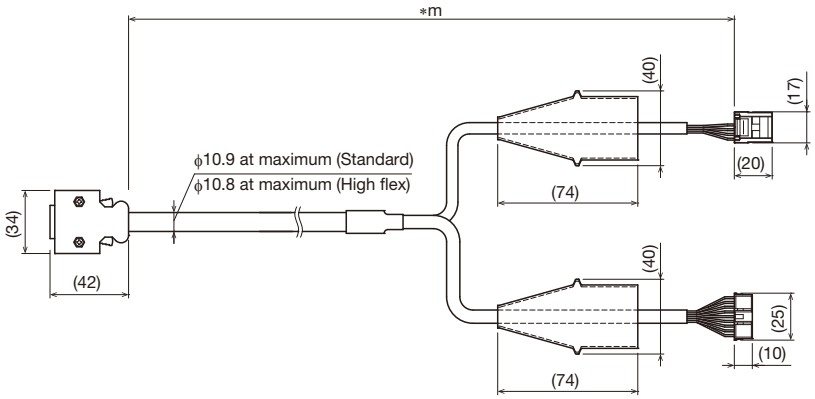
* Controller connector port view

Actuator Cable

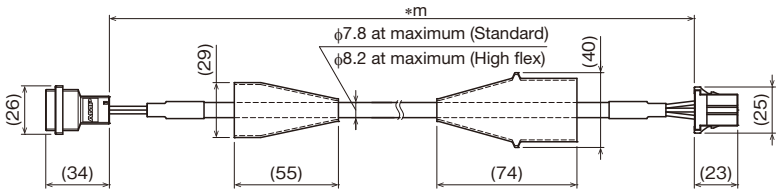
Motor brake cable for THC: CBL-THC-ACP-** F (Standard)
CBL-THC-ACP-** R (High flex)
** indicates cable length: 03 (3m), 05 (5m), or 10 (10m)



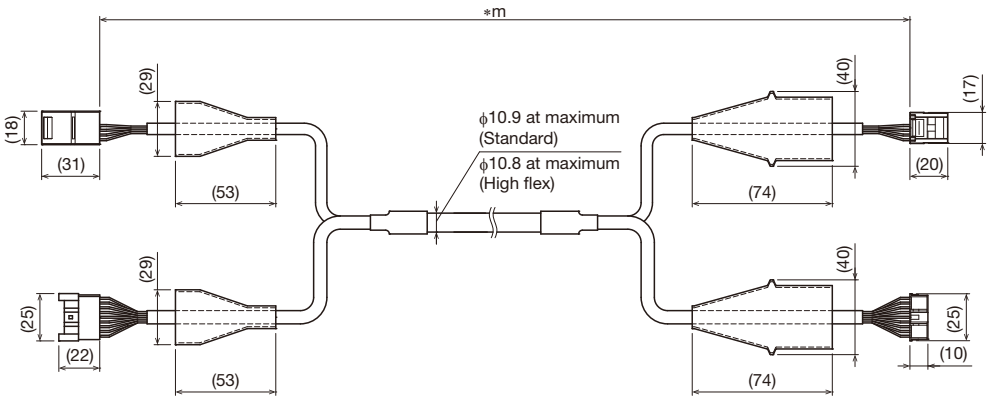
Encoder sensor cable for THC: CBL-THC-ACS-** F (Standard)
CBL-THC-ACS-** R (High flex)
** indicates cable length: 03 (3m), 05 (5m), or 10 (10m)



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)



Encoder sensor extension cable for THC: CBL-ACS-EXT02-∗∗ F (Standard)
CBL-ACS-EXT02-∗∗ 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 sensor cable should be no longer than 11m.
Up to two extension cables can be connected.
Note 3) When using the THC servo driver controller, the lengths of motor brake cable and encoder sensor cable should be no longer than 16m.
Up to two extension cables can be connected.

Option

Lithium ion battery (for maintenance)

ER6V C4 (Toshiba Home Appliances Corporation)

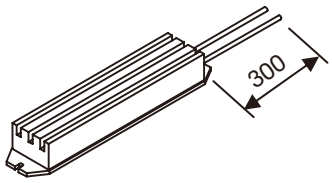
- This is required for the absolute system.
- When replacing the battery, order the above.

Optional (Regeneration Resistance)

Regeneration resistance

To make electrical actuator operate via the THC controller series, a regeneration resistance may be necessary depending on the operating conditions. The following table lists the required number of regeneration resistances just for reference. The customer should provide the required number of them.
It is recommended that you use regeneration resistances manufactured by Iwaki Musen Kenkyusho Co.,LTD.
THK supplies regeneration resistance connection cables. The customer can order them separately as necessary.

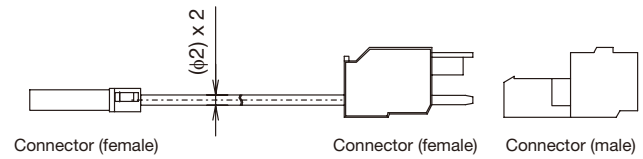
■ Regeneration resistance (Power-type cement resistor)



	Name of item	Manufacturer
A	RH150 100Ω J	Iwaki Musen Kenkyusho Co.,LTD.
B	RH150 50Ω J	

THC capacity	Orientation	
	Horizontal mount	Vertical mount
100W	A x 1	A x 1
200W	A x 1	A x 1
400W	B x 2	B x 2
750W	B x 2	B x 2

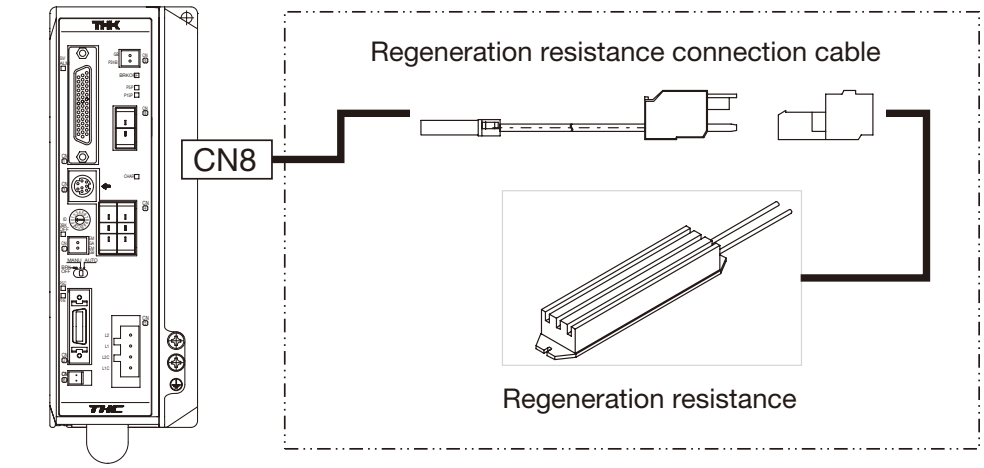
■ Regeneration resistance connection cable (CBL-REG00-01F)



* Cable insertion jig (DG010-01P-19-00AH) is provided.
(The customer does not have to provide special tools)

	Model	Length	Manufacturer
1	CBL-REG00-01F	1m	THK Co., Ltd.

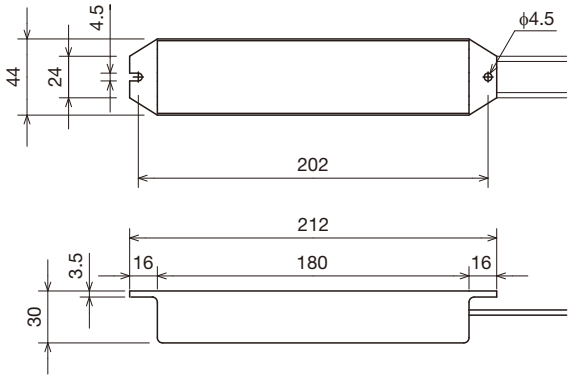
Configuration Diagram



* There is no polarity in wiring.

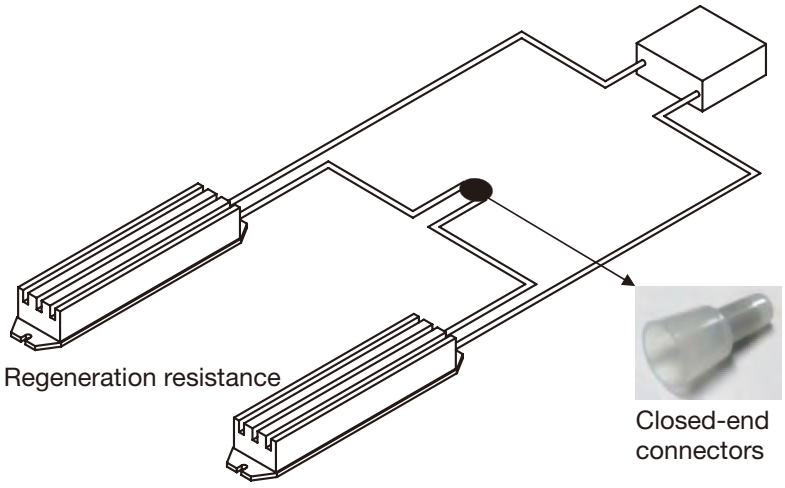
Regeneration Resistance External Drawing

RH150 (90W, 100Ω) (90W, 50Ω) common to all



Wiring Example (Using Two Regeneration Resistances)

When you use two regeneration resistances, connect them in series.



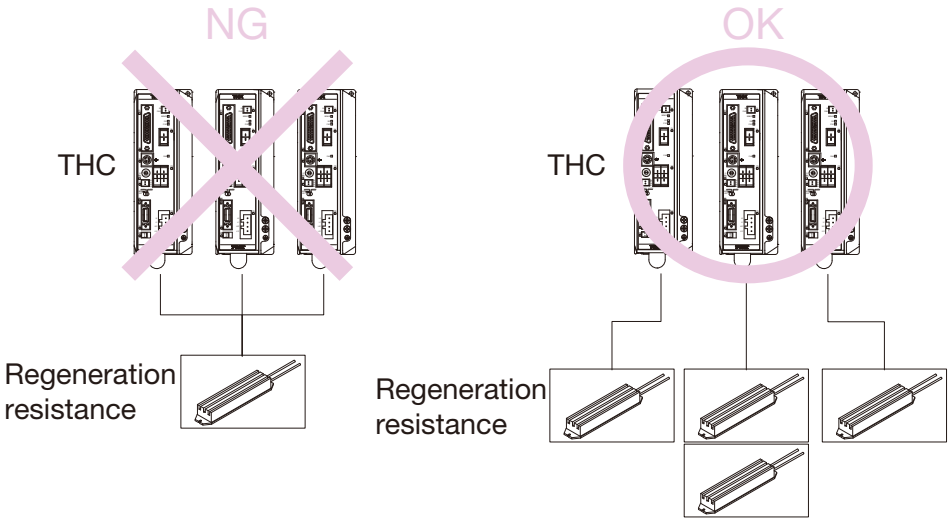
Connector (male)
8EDGKR-5.0-02P
(DEGSON)

Closed-end connectors

Wires should be connected using closed-end connectors.

Precautions on Selecting Resistance

The customer should provide the required number of regeneration resistances for each THC.



Controller Series
Network 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.

CC-Link EtherCAT EtherNet/IP DeviceNet

Up to 16 Axes Can Be Connected

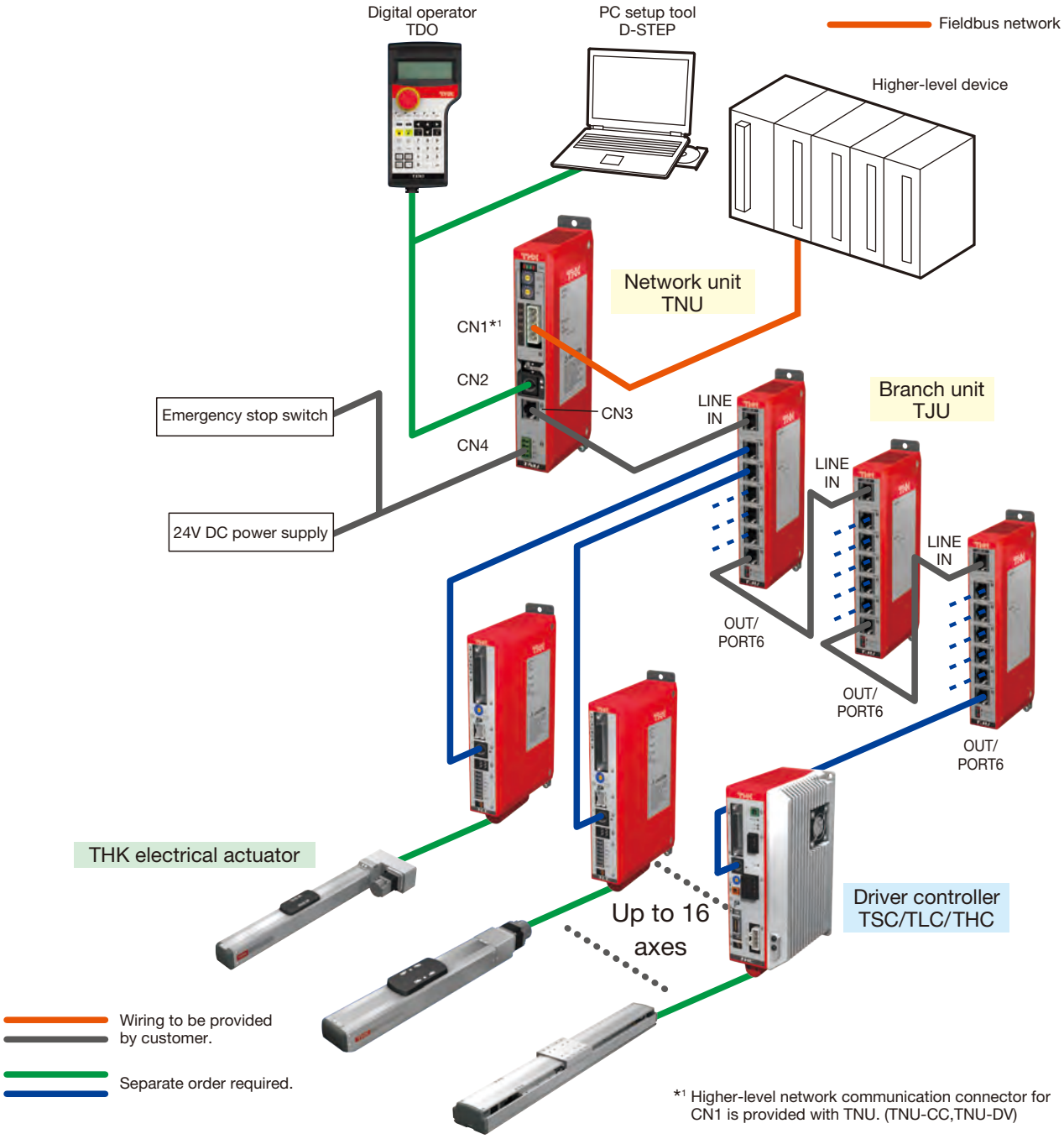
Up to 16 axes of mixed THK driver controllers (TSC, TLC, and THC) can be connected using one TNU and TJU (branch unit) in combination.

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.

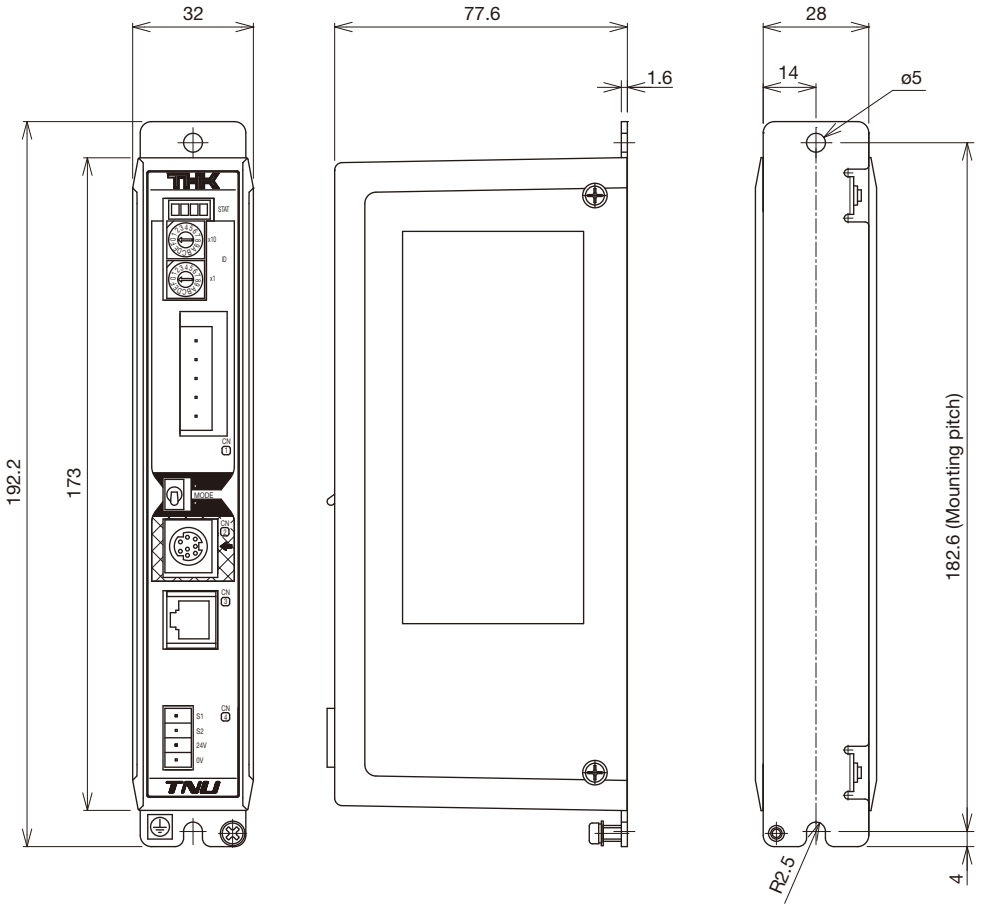
Specifications

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	Remote device stations	Number of occupied nodes: 1 Number of occupied channels*: input 128 CH output 128 CH	–	–
		4 stations	1 station, 2 stations, 3 stations, 4 stations			
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)				

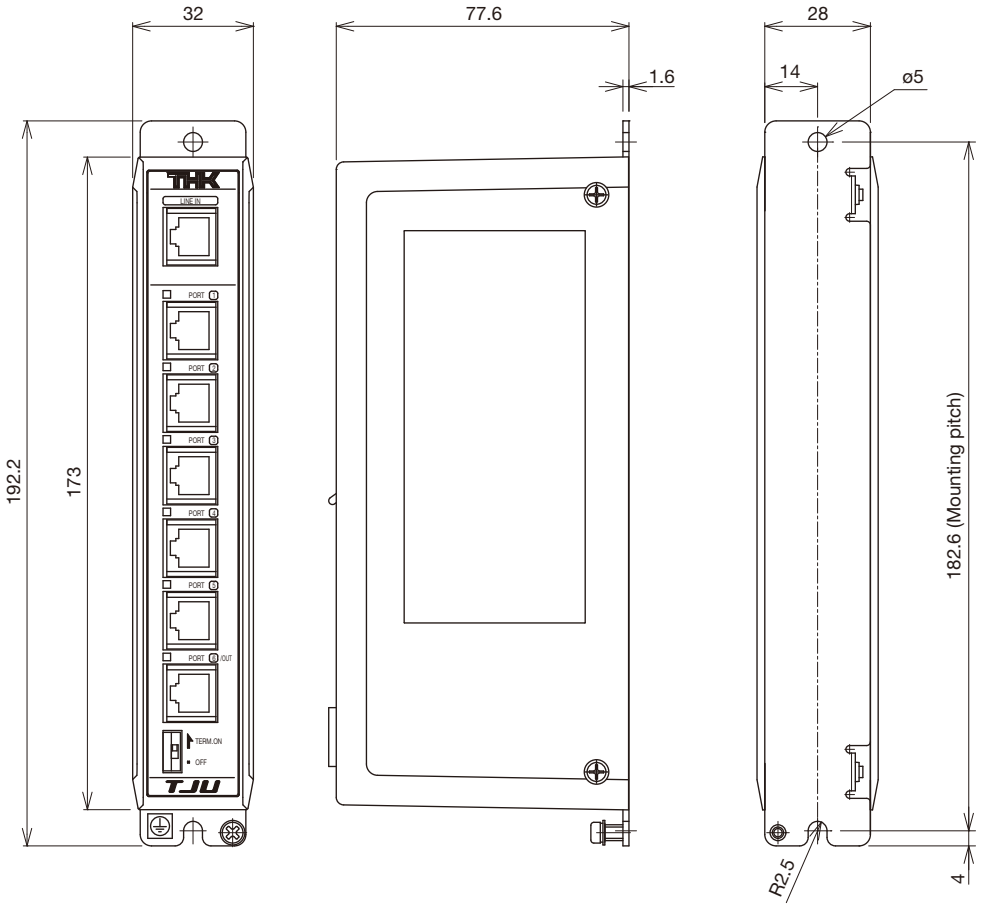
* The number of occupied channel numbers is fixed. If using master devices with 128 or fewer input occupied channels or 128 or fewer output occupied channels, contact THK.

Dimensions

● TNU



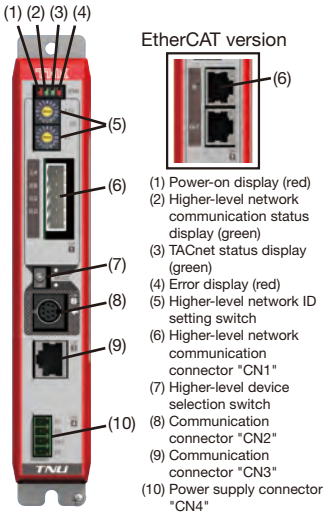
● TJU



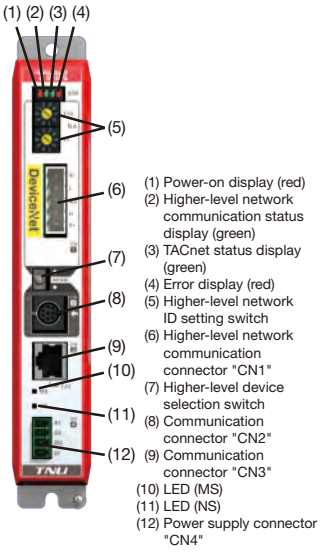
The external dimensions and mounting dimensions of TNU and TJU are the same.

Components

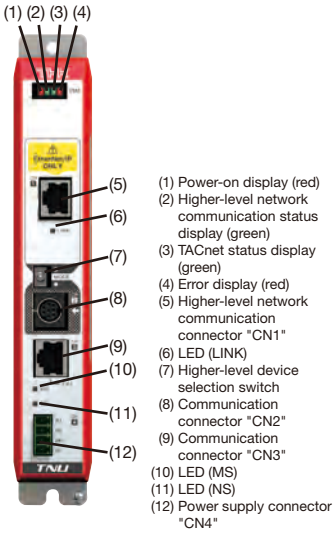
- TNU-CC
- TNU-EC



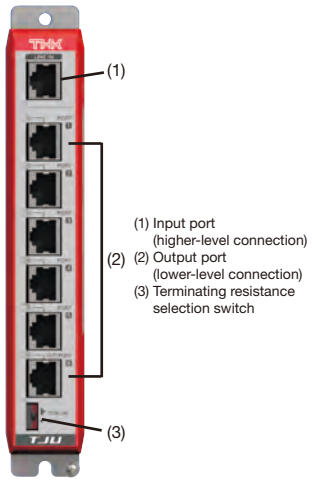
- TNU-DV



- TNU-EP

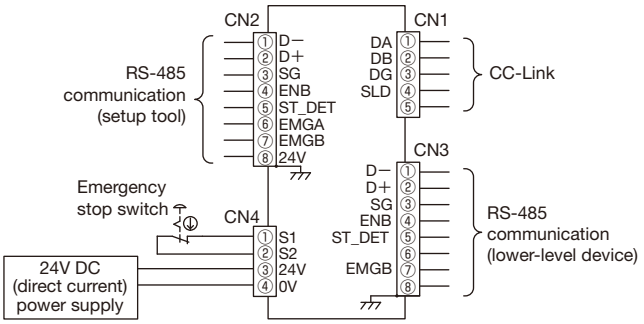


- TJU

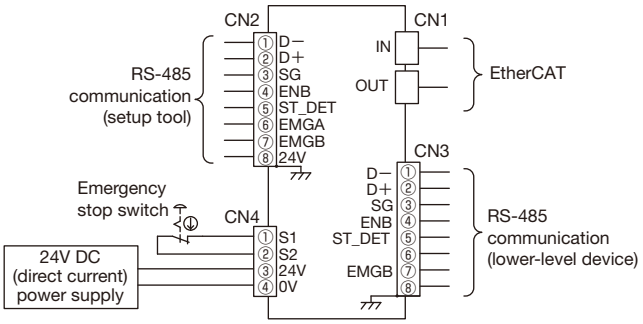


External Device Connection (TNU)

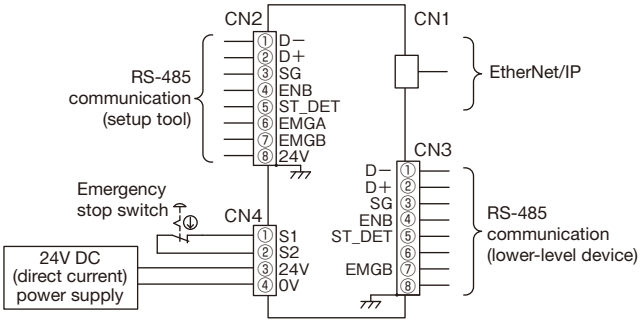
- CC-Link



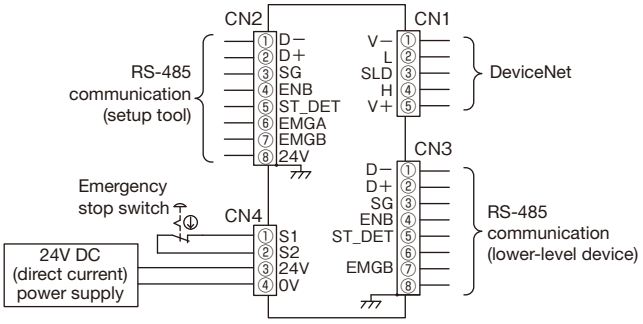
- EtherCAT



- 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).

Model Configuration

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

*1 ISO 13849-1

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.

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)

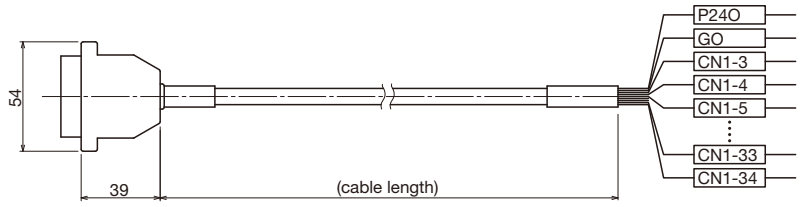
Supported OS: Windows XP/Windows Vista/Windows 7
D-STEP can be freely downloaded from the THK technical support website (https://tech.thk.com/).
* TLC/THC/TNU is supported with Version 1.10 or later.

Cable

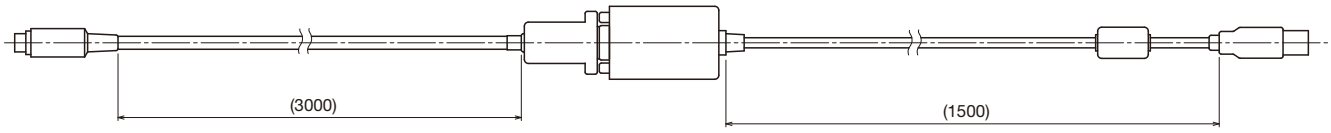
I/O cable: CBL-CON-IO-** (optional)

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

Cables are used for TSC, TLC or THC.
* Cables are shipped with the discrete wire side terminals unprocessed.



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



MEMO

Precautions on Use

Operation

- Do not unnecessarily disassemble the actuator or control device. Doing so may allow foreign objects to enter or reduce functionality.
- Do not drop or knock the actuator or control device. 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.

Environment

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

- Actuator: A place with an ambient temperature from 0 to 40°C and humidity of 80% RH or lower that will not expose the product to freezing or condensation.
- Controller: A place with an ambient temperature from 0 to 40°C and humidity of 90% RH or lower that will not expose the product to freezing or condensation.
- A place free from corrosive gas and flammable gas.
- 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 where vibration or impact is not transmitted to the unit.
- A place that is easily accessible for service and cleaning purposes.

Safety Precautions

- When the actuator is in motion or about to be in motion, do not touch any moving parts. Do not go near the actuator when it is in motion.
- Before performing installation, adjustment, checking, or services regarding and the connected peripherals, ensure that all power is disconnected. In addition, take countermeasures to prevent anyone other than the operator from turning on the power.
- If two or more people are involved in the operation, confirm the procedures such as sequences, signs, and abnormalities in advance, and appoint another person for monitoring the operation.
- 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).
- Operation of the actuator over the torque limit value leads to damage of parts or injury. Please keep the torque limit settings of parameters within THK specifications.
- Although a stopper is installed inside the product, it is intended to limit the stroke and therefore may be damaged in case of a hard collision.

Lubrication

- Thoroughly remove anti-rust oil and feed lubricant before using the product.
- In order to effectively use the actuator, lubrication is required. Insufficient lubrication may increase abrasion on the rolling part and shorten service life.
- Do not use a mix of lubricants with different physical properties.
- Please contact THK if using special lubricants.
- When adopting oil lubrication, contact THK for details.
- The greasing interval may vary depending on the usage conditions, so THK recommends determining a greasing interval during the initial inspection.

● Storage

· When storing the actuator, enclose it in a package designated by THK and store it in a horizontal orientation while avoiding high temperature, low temperature and high humidity.
· When storing control devices, avoid abnormally high or low temperatures and high humidity.

THK ELECTRIC ACTUATORS Compact Series KRF

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