Cleanroom precision positioning table

TC

CAT-57123

PATENT PENDING

For very clean environment…

- Most suitable for JIS Class 3 (Federal Standard 209D Class 1) cleanliness applications
- Two types selectable to meet the requirements

U-shaped track rails for achieving high rigidity
Abundant options available

TC···U

IKO

Cleanroom precision positioning table

TC

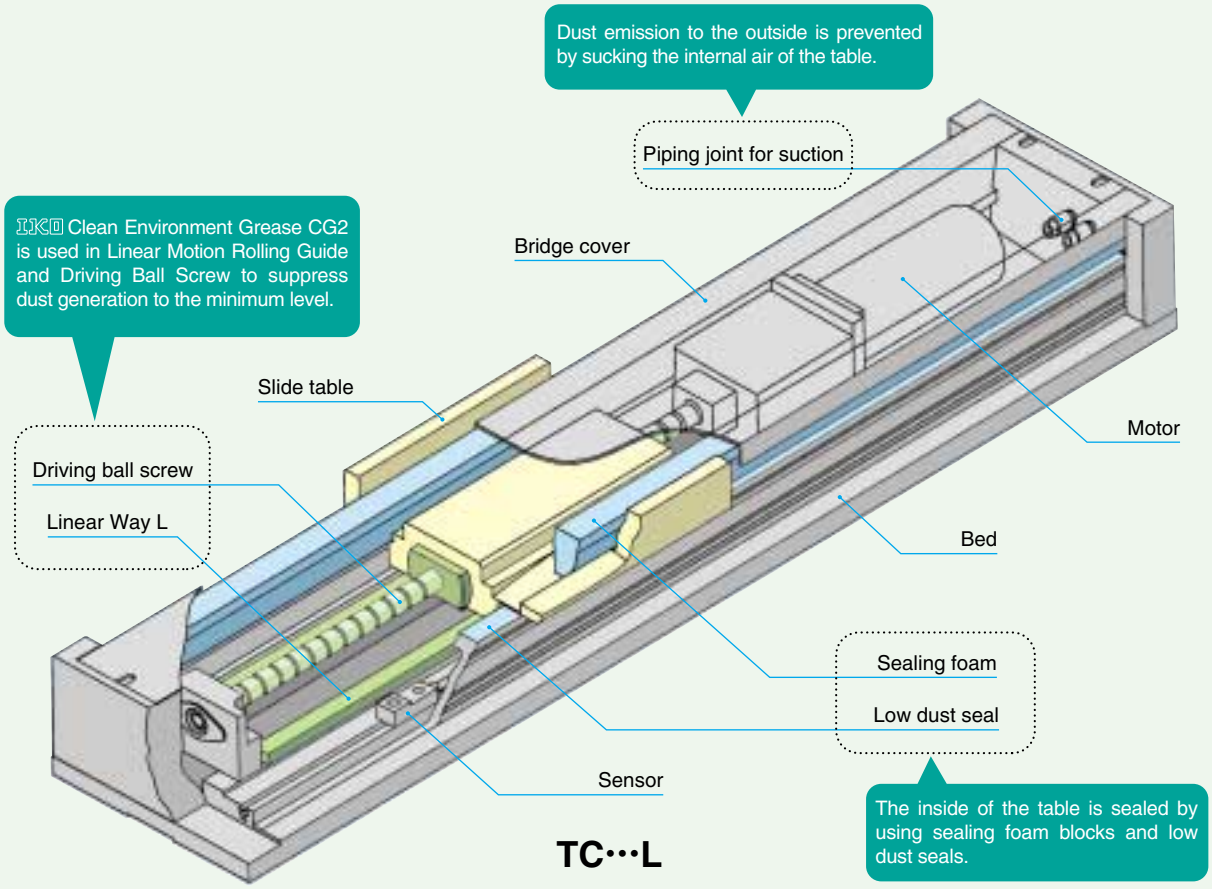
NEW!

Lightweight material and excellent corrosion resistance
Low noise level achieved by adopting a full cover structure

TC···L

IKO Cleanroom precision positioning table
TC

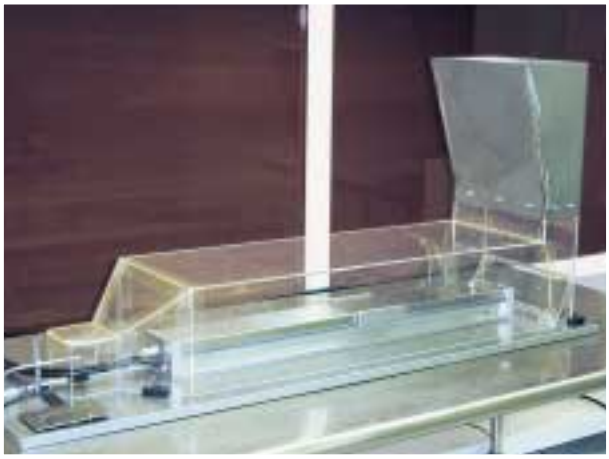
IKO Cleanroom precision positioning table TC is most suitable for use in an environment requiring high cleanliness, for example, semiconductor manufacturing equipment and liquid crystal related equipment.
Its unique high air-tightness structure seals the driving part and slide table guide part perfectly to prevent dust emission from the table to the surrounding environment.
IKO Cleanroom precision positioning table TC uses a U-shaped track rail for the slide table guide. Two types are available. One is TC-U with high rigidity having many options and the other is TC-L having a full cover structure that ensures low noise and is excellent in corrosion resistance.



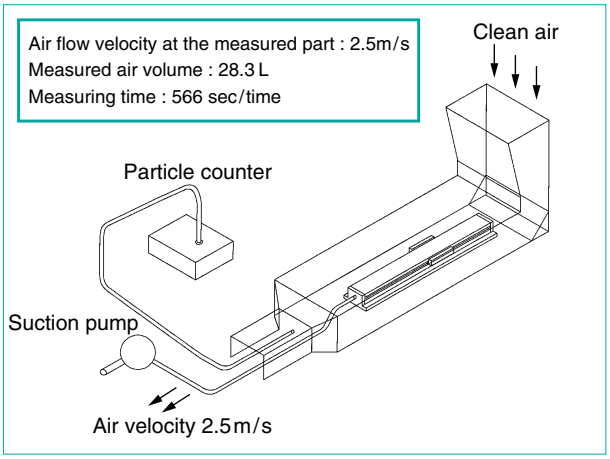
Structure of Cleanroom precision positioning table TC

Cleanliness Measurement

Cleanliness is the degree of air cleanliness represented by the size and number of floating particles per unit volume. In IKO, the cleanliness is measured by using the following method.

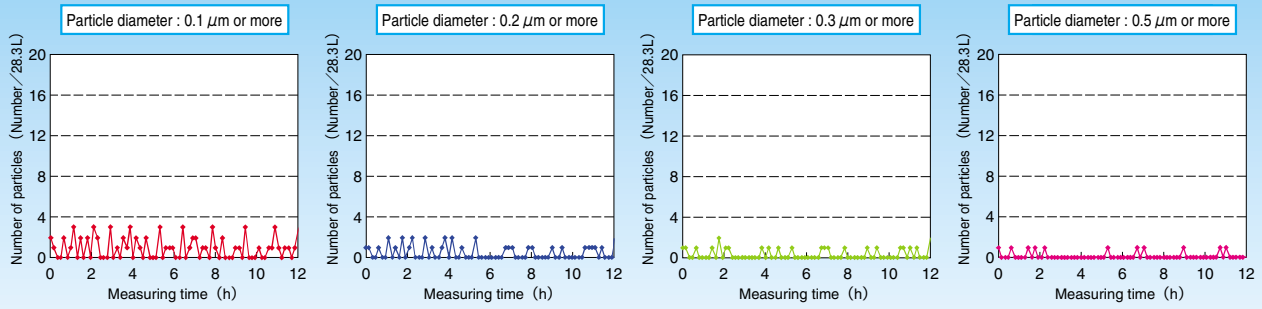


External view of test equipment



Schematic diagram of test equipment

IKO performs evaluation for each particle size range.



An example of measurement result of the number of particles (**TC60U**)

The cleanliness is evaluated according to the following table based on JIS B 9920.

Upper limit concentration of cleanliness based on the JIS Standard (Number of particles/m³)
The classifications in ( ) are for Federal Standard 209 D.

Particle diameter	Cleanliness							
	JIS Class 1	JIS Class 2	JIS Class 3 (Federal Standard 209D Class 1)	JIS Class 4 (Federal Standard 209D Class 10)	JIS Class 5 (Federal Standard 209D Class 100)	JIS Class 6 (Federal Standard 209D Class 1000)	JIS Class 7 (Federal Standard 209D Class 10 000)	JIS Class 8 (Federal Standard 209D Class 100 000)
0.1μm or more	10	100	1,000	10,000	100,000			
0.2μm or more	2	24	236	2,360	23,600			
0.3μm or more	1	10	101	1,010	10,100	101,000	1,010,000	10,100,000
0.5μm or more			35	350	3,500	35,000	350,000	3,500,000

Data of Measured Cleanliness

■ Achievement of cleanliness JIS class 3 (Federal Standard 209D Class 1) !

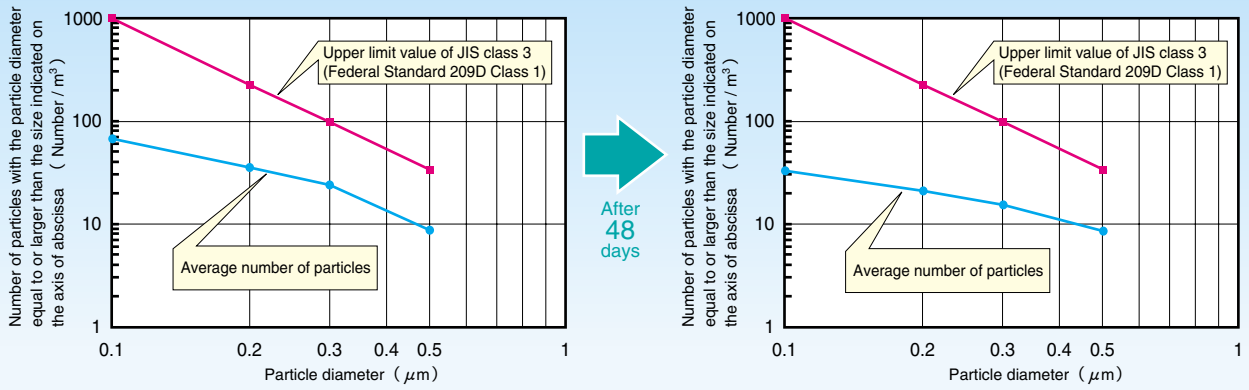
Cleanroom precision positioning table TC has achieved class 3 (Federal Standard 209D Class 1) at the cleanliness evaluation using the IKO measuring method.

<Result of cleanliness measurement>

Model	Suction amount NL / min	Stroke mm	Moving speed of slide table mm / s	Cleanliness JIS B 9920 (Cleanliness Federal Standard 209D)
TC 60U	40	500	500	3 (1)
TC 86U		650	920	3 (1)
TC120L	30	460	500	3 (1)
TC170L		480	1000	3 (1)

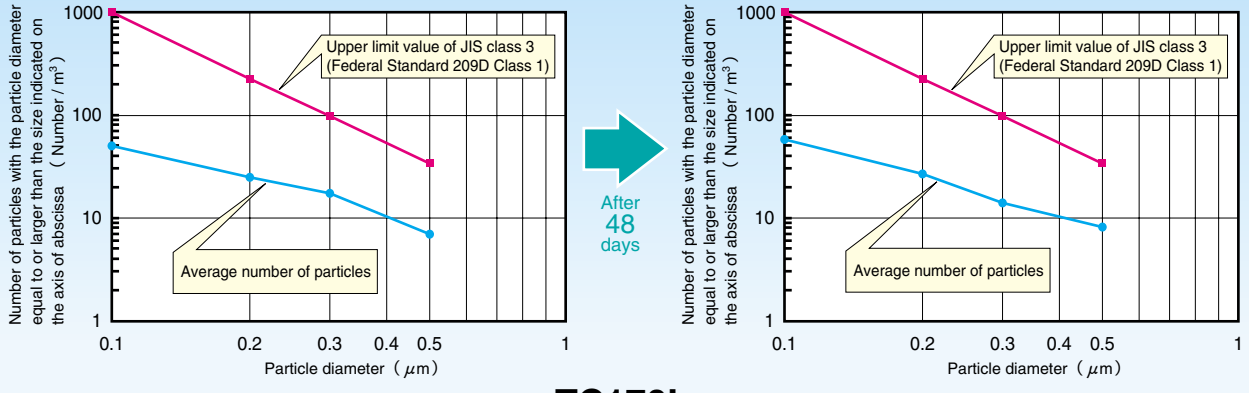
Remark: Measured data may vary depending on changes in the measuring environment.

● Measured data 1



TC86U

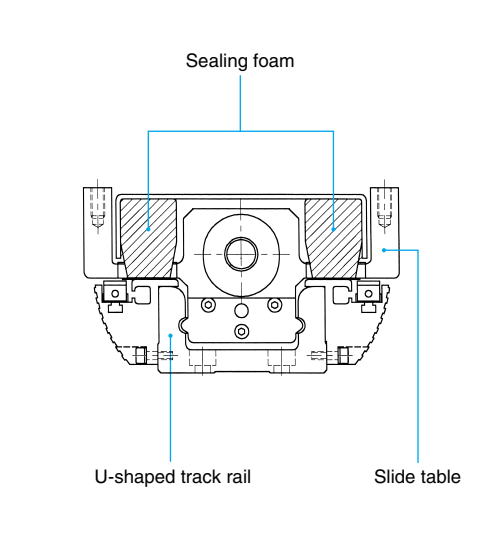
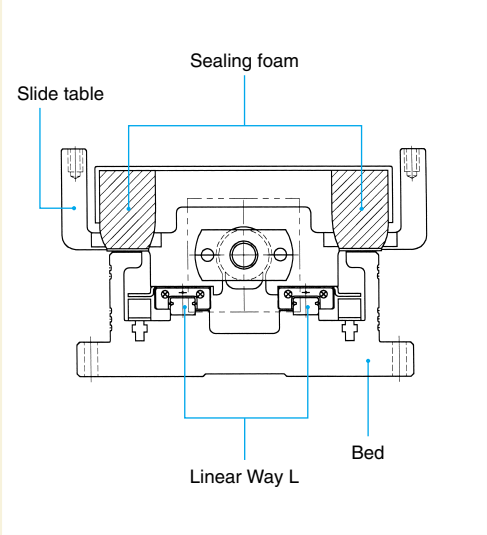
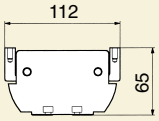
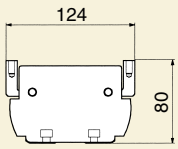
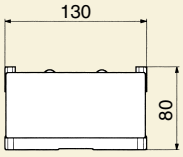
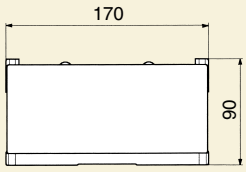
● Measured data 2



TC170L

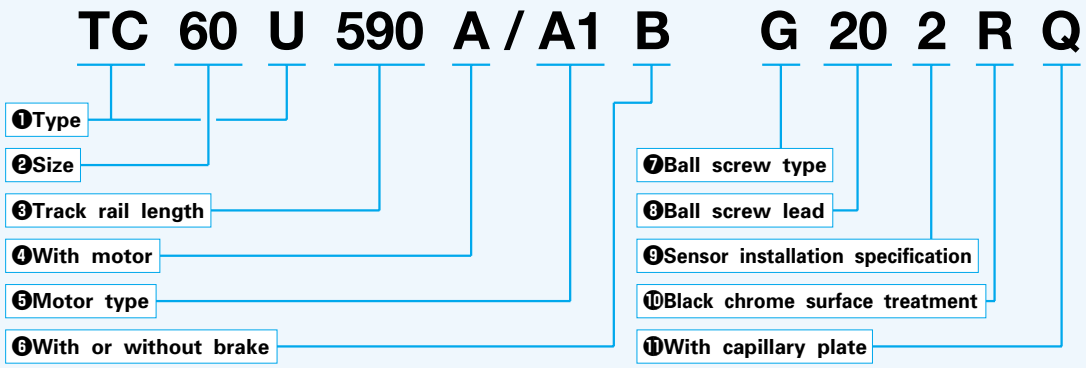
Remark: The average number of particles means the average value in a measurement on a single sample.

Characteristics of IKO Cleanroom precision positioning table

Series	TC···U	TC···L
Structure and features	 **High rigidity and high accuracy** A U-shaped steel track rail is adopted as the guide for the slide table. **Abundant selections** Ball screw leads, motor types, number of sensors, etc. can be selected. **Reduction of maintenance man-hours** Maintenance-free operation can be carried out for a long period by adopting a type with capillary plate.	 **Light weight and high corrosion resistance** The slide table and the bed are made of high-strength aluminum alloy. **Easy mounting** The bed can be mounted without removing the cover. **Full cover structure** A built-in motor reduces noise.
Sectional dimensions mm	 **TC60U**	 **TC86U**	 **TC120L**	 **TC170L**
Total length mm	306～806	506～1006	580～900	820～1420
Stroke length mm	100～600	250～750	140～460	280～880
Repeatability mm	±0.002			
Maximum speed mm / sec	1000	1000	500	1000
Maximum load mass kg	10	30	10	20

Identification Number

Example of identification number of TC···U



❶Type	TC···U : Cleanroom precision positioning table
❷Size	60 : Track rail width 60mm 86 : Track rail width 86mm
❸Track rail length	Track rail lengths shown in Table 1 can be selected. The track rail length is indicated in mm.

Table 1 Track rail length and stroke length

unit : mm

TC 60U		TC 86U	
Track rail length	Stroke length(1)	Track rail length	Stroke length(1)
290	100(85)	490	250(230)
390	200(185)	590	350(330)
490	300(285)	690	450(430)
590	400(385)	790	550(530)
690	500(485)	890	650(630)
790	600(585)	990	750(730)

Note(1) : The values in ( ) are applicable to the table with capillary plate.

❹With motor	A : with motor
❺Motor type	Specify a motor code indicated in Table 2.

Table 2 Motor type and motor code

Motor type	TC 60U	TC 86U
AC servo motor	A1、M1	A2、M2

Remark : See Motor Specification on page 12.

❻With or without brake	No symbol : without brake B : with brake If a motor with brake is required, specify "with brake" (code B).
❼Ball screw type	G : ground ball screw
❽Ball screw lead	Specify a ball screw lead shown in Table 3. The ball screw lead is indicated in mm.

Table 3 Applicable ball screw lead

Size	Ball screw lead		
	5mm	10mm	20mm
TC60U	○	○	○
TC86U	×	○	○

❾Sensor installation specification	2 : Two sensors (limit sensors) 3 : Three sensors (limit and pre-origin sensors) 9 : without sensor

The sensor code indicates the number of sensors.

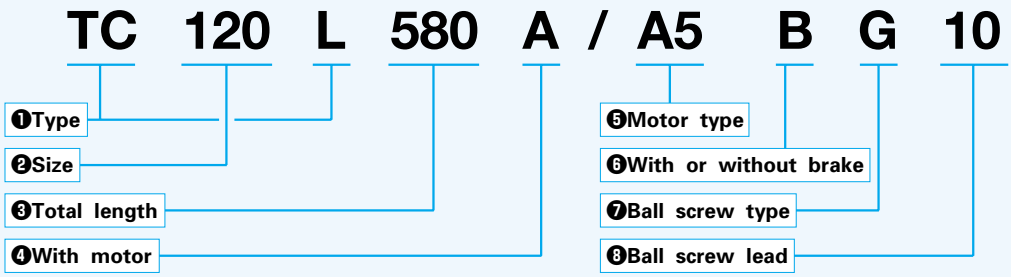
❿Black chrome surface treatment	No symbol : Black chrome surface treatment is performed on the surface of the slide table. R : black chrome surface treatment 1 L : black chrome surface treatment 2

A black permeable film is formed on the surface to increase corrosion resistance.
Black chrome surface treatment 1 : Black chrome surface treatment is performed on the surfaces of the slide table and track rail.
Black chrome surface treatment 2 : In addition to black chrome surface treatment 1, black chrome surface treatment is performed on the ball screw shaft and nut.

⓫With capillary plate	No symbol : without capillary plate Q : Table with capillary plate

The capillary plates are assembled on the end faces of the slide table and ball screw nut.
Note that the table with capillary plate has a little shorter stroke length.
The capillary plate is a lubricating part in which a large quantity of lubrication oil is impregnated in continuously porous sintered resin. Lubrication oil impregnated in the capillary plate is continuously fed to the raceways in a proper amount, when the capillary plate travels along the raceways of track rail and ball screw in uniform contact with the raceways. Re-lubrication interval can be made longer, and maintenance man-hours can be reduced. The capillary plate is effective for preventing grease dry-up at hard-to-lubricate positions.

Example of identification number of TC···L



❶Type	TC···L : Cleanroom precision positioning table
❷Size	120 : Bed width 120mm 170 : Bed width 170mm
❸Total length	Total lengths shown in Table 4 can be selected. The total length is indicated in mm.

Table 4 Total length and stroke length

unit : mm

TC120L		TC170L	
Total length	Stroke length	Total length	Stroke length
580	140	820	280
740	300	1020	480
900	460	1220	680
—	—	1420	880

❹With motor	A : with motor
❺Motor type	Specify a motor code indicated in Table 5.

Table 5 Motor type and motor code

Motor type	TC120L	TC170L
AC servo motor	A5	A2

Remark : See Motor Specification on page 12.

❻With or without brake	No symbol : without brake B : with brake If a motor with brake is required, specify "with brake" (code B).
❼Ball screw type	G : ground screw
❽Ball screw lead	Ball screw leads are shown in Table 6. The ball screw lead is indicated in mm.

Table 6 Applicable ball screw lead

Size	Ball screw lead
TC120L	10mm
TC170L	20mm

Accuracy and Maximum Speed

Accuracy of Cleanroom precision positioning table TC is shown in Table 7 and its maximum speed is shown in Table 8 and Table 9.
The maximum speeds shown in these tables are applicable when a standard motor is used. The actual maximum speeds must be determined by examining the operating pattern considering the motor type used, load conditions, etc.

Table 7 Accuracy

Size	Track rail length or total length(1) mm	Repeatability mm	Positioning accuracy mm	Parallelism in table operation B mm	Back lash mm
TC···U	290	±0.002	0.020	0.008	0.003
	390				
	490			0.010	
	590		0.025		
	690			0.012	
	790		0.030		
	890			0.014	
	990				
TC120L	580	±0.002	0.020	0.030	0.003
	740		0.030	0.040	
	900		0.045	0.050	
TC170L	820	±0.002	0.025	0.050	0.003
	1020		0.030	0.060	
	1220		0.040	0.070	
	1420		0.050	0.080	

Note(1) : For TC···U, the value indicates the track rail length. For TC···L, the value indicates the total length.

Table 8 Maximum speed of TC···U

Motor type	Size	Track rail length mm	Motor speed r/min	Maximum speed mm/s		
				Lead 5mm	Lead 10mm	Lead 20mm
AC servo motor	**TC 60U**	690 or less	3000	250	500	1000
		790	2910	243	485	970
	TC 86U	790 or less	3000	—	500	1000
		890	2760	—	460	920
		990	2180	—	363	727

Table 9 Maximum speed of TC···L

Motor type	Size	Total length mm	Motor speed r/min	Maximum speed mm/s	
				Lead 10mm	Lead 20mm
AC servo motor	**TC120L**	580	3000	500	—
		740			
		900			
	TC170L	820	3000	—	1000
		1020			
		1220	2180		727
		1420	1460		487

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Maximum Load Mass

The maximum load mass is a reference value for the maximum mass that can be mounted on a table used in a horizontal position.

Table 10 Maximum Load Mass

unit : kg

TC 60U	TC 86U	TC120L	TC170L
10	30	10	20

Table 11 Inertia of table and starting torque

Size	Track rail length or total length(1) mm	Inertia of table $J_T \times 10^{-5}$kg-m^2			Starting torque T_0 N-mm
		Lead 5mm	Lead 10mm	Lead 20mm	
TC 60U	290	0.47	0.61	1.4	0.13
	390	0.62	0.77	1.6	
	490	0.78	0.93	1.8	
	590	0.94	1.1	1.9	
	690	1.1	1.2	2.1	
	790	1.3	1.4	2.3	
TC 86U	490	—	2.3	3.9	0.21
	590	—	2.7	4.3	
	690	—	3.1	4.6	
	790	—	3.5	5.0	
	890	—	3.9	5.4	
	990	—	4.2	5.8	
TC120L	580	—	0.49	—	0.07
	740	—	0.61	—	
	900	—	0.73	—	
TC170L	820	—	—	1.6	0.15
	1020	—	—	2.0	
	1220	—	—	2.3	
	1420	—	—	2.7	

Note(1) : For TC···U, the value indicates the track rail length. For TC···L, the value indicates the total length.

Motor Specification

Table 12 shows the standard motors for Cleanroom precision positioning table TC. Motors with brake can be specified.
Table 13 shows the types of connectors used in these motors.

Table 12 Types of standard motors

Size	Motor type	With or without brake	Motor code	Model number	Remark
TC 60U	AC servo motor	Without brake	A1	SGM-01B512	Yaskawa Electric Corporation
			M1	MSM011A1A	Matsushita Electric Industrial Co., Ltd.
		With brake	A1B	SGM-01B512B	Yaskawa Electric Corporation
			M1B	MSM011A1B	Matsushita Electric Industrial Co., Ltd.
TC 86U	AC servo motor	Without brake	A2	SGM-02B512	Yaskawa Electric Corporation
			M2	MSM021A1A	Matsushita Electric Industrial Co., Ltd.
		With brake	A2B	SGM-02B512B	Yaskawa Electric Corporation
			M2B	MSM021A1B	Matsushita Electric Industrial Co., Ltd.
TC120L	AC servo motor	Without brake	A5	SGM-A5B512	Yaskawa Electric Corporation
		With brake	A5B	SGM-A5B512B	
TC170L	AC servo motor	Without brake	A2	SGM-02B512	
		With brake	A2B	SGM-02B512B	

Table 13 Types of applicable connectors

Table	Motor type	Connector type	Motor code		Type of motor-side connector		Type of opposite-side connector	
					Plug housing	Contactor	Cap housing	Contactor
TC···U	AC servo motor	Motor connector	Without brake	A···	172167-1	170360-1	172159-1	170362-1
				M···				
			With brake	A···B	172168-1		172160-1	
				M···B	172167-1 172165-1		170159-1 172157-1	
		Encoder connector	A···		172169-1	170359-1	172161-1	170361-1
			M···		172171-1		172163-1	
TC···L	AC servo motor	Motor connector	Without brake	A···	JR16RK-7P		JR16PK-7S	
			With brake	A···B				
		Encoder connector	A···		HR10A-10R-10P		HR10A-10P-10S	

Remarks 1 : The connectors for TC···U are manufactured by AMP (Tyco Electronics). The connectors for TC···L are manufactured by HIROSE.
2 : Prepare the opposite-side connector on the customer side.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Sensor specification

The sensor specifications for Cleanroom precision positioning table TC are shown in Table 14 and the specifications for sensor connectors are shown in Table 15. For TC···U, the number of sensors can be specified. If two sensors (limit sensors) or three sensors (limit and pre-origin sensors) are specified in the identification number, wirings for those sensors that are not specified will not be provided. For TC···L, three sensors (limit and pre-origin sensors) are prepared in the standard specification.

Table 14 Specifications of sensors

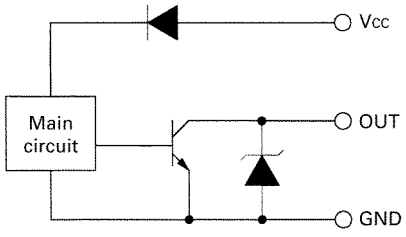
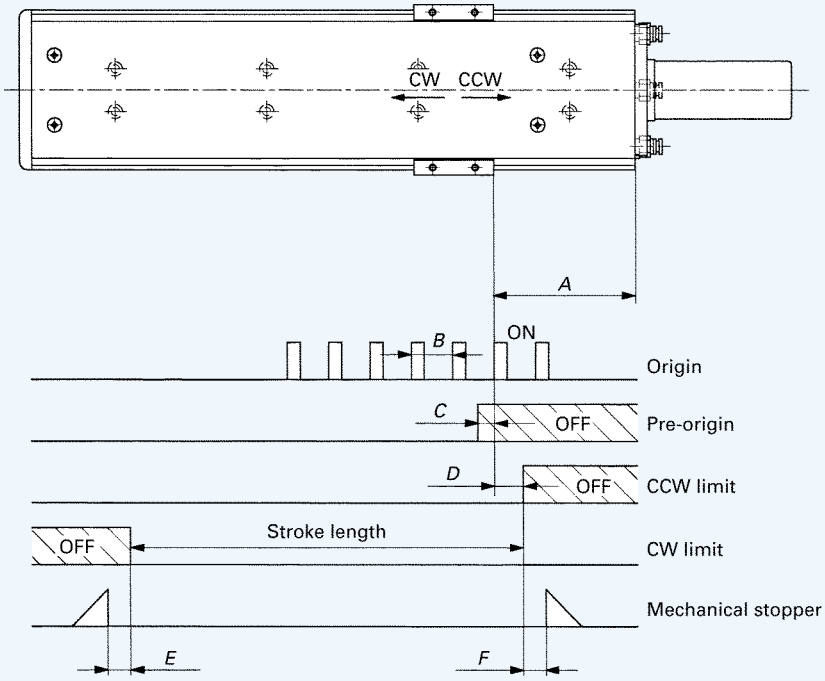
Item \ Type	Limit, pre-origin	Origin
Type	Proximity sensor	
Power supply voltage	DC12～24V ±10%	
Current consumption	15mA or less	
Output	Open collector ・Max. current : 100mA ・Applied voltage : DC30V or less ・Residual voltage : 1.0V or less at 100mA in-flow current 0.4V or less at 16mA in-flow current	
Output operation	When approaching : OFF	When approaching : ON
Operation indicator	LED (red)	
Circuit diagram		

Table 15 Specifications of connectors

Type	Sensor-side connector type	Opposite-side connector type	Specification
TC···U	Cap housing 172160-1 Contactor 170365-1	Plug housing 172168-1 Contactor 170363-1	Pin Signal name No.1 : Origin 2 : Pre-origin 3 : CW limit 4 : CCW limit 5 : Power input 6 : GND
TC···L	HR10A-10R-10S	HR10A-10P-10P	

Remark 1 : The connector for TC···U is manufactured by AMP (Tyco Electronics). The connector for TC···L is manufactured by HIROSE.
2 : Use the C or Z phase of the servomotor encoder for origin signal.
3 : Prepare the opposite-side connector on the customer side.

Table 16 Timing chart of TC···U sensors



unit : mm

Size	Ball screw lead	A	B	C	D	E	F
TC 60U	5	108	5	3	20	9.6	7
	10		10	7			
	20		20	14			
TC 86U	10	113	10	7	20	13	11
	20		20	14		12	

Remark : Also applicable to the type with capillary plate.

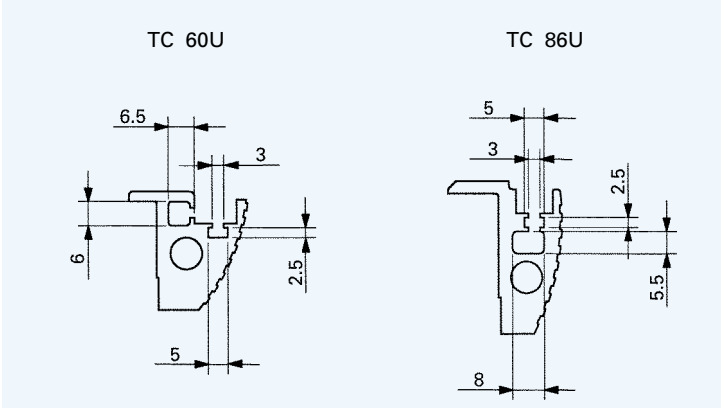
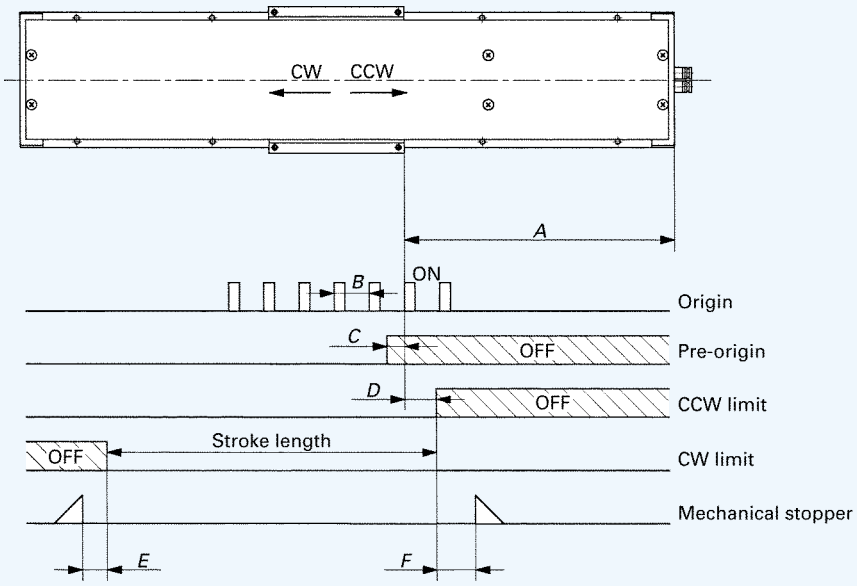


Fig. 1 Sectional shape of sensor rail

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Table 17 Timing chart of TC···L sensors



unit : mm

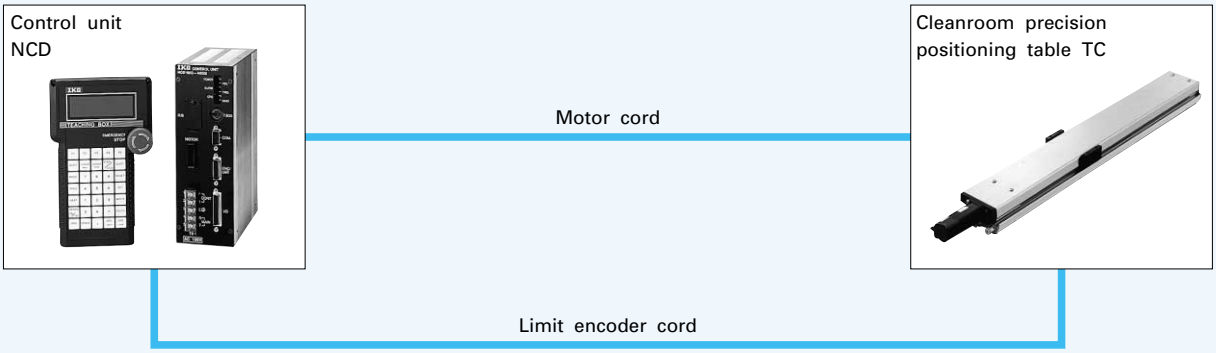
Size	*A*	*B*	*C*	*D*	*E*	*F*
TC120L	260	10	7	10	12	7
TC170L	300	20	14	10	11	7

Electric device

■System configuration

Electric devices for Cleanroom precision positioning table TC are specially designed to bring out full performance of the table. A well-balanced system can be constructed by using these devices with the table.
Tables 18 to 19 show system configurations of the table with the electric devices when a standard motor is used.

●System configuration with a control unit



●System configuration with a driver and a programmable controller

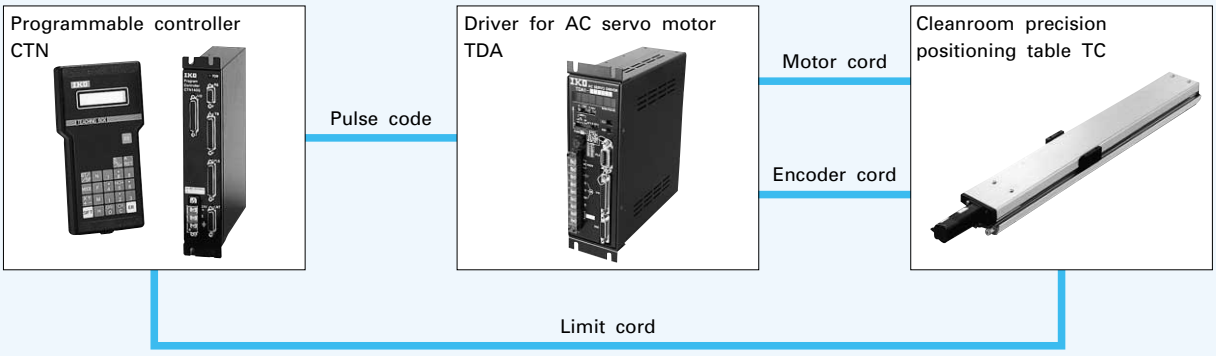


Fig. 2 System configuration

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

Table 18 System configuration of a table with AC servo motor (configuration with a control unit)

Table	With or without brake	Motor code	Control unit			
			Main body	Teaching box	Motor code	Limit/Encoder cord
TC 60U **TC 86U**	Without brake	A1、A2	NCD160G-A2006	TAE1050-TB	TAE2065-AM03 (TAE2072-AM03)	TAE2066-AEL03 (TAE2073-AEL03)
		M1、M2				TAE2067-AEL03 (TAE2074-AEL03)
	With brake	A1B、A2B	NCD160G-A2006 TAE1049-BK(1)	TAE1050-TB	TAE2070-AMB03 (TAE2077-AMB03)	TAE2066-AEL03 (TAE2073-AEL03)
		M1B、M2B			TAE2071-AMB03 (TAE2078-AMB03)	TAE2067-AEL03 (TAE2074-AEL03)
TC120L	Without brake	A5	NCD160G-A0500	TAE1050-TB	TAE20A6-AM03 (TAE20A7-AM03)	TAE20B0-AEL03 (TAE20B1-AEL03)
	With brake	A5B	NCD160G-A0500 TAE1049-BK(1)	TAE1050-TB	TAE20A8-AMB03 (TAE20A9-AMB03)	TAE20B0-AEL03 (TAE20B1-AEL03)
TC170L	Without brake	A2	NCD160G-A2006	TAE1050-TB	TAE20A6-AM03 (TAE20A7-AM03)	TAE20B0-AEL03 (TAE20B1-AEL03)
	With brake	A2B	NCD160G-A2006 TAE1049-BK(1)	TAE1050-TB	TAE20A8-AMB03 (TAE20A9-AMB03)	TAE20B0-AEL03 (TAE20B1-AEL03)

Note : This indicates the type of a brake regenerative unit. Connect it to the main body.
Remark 1 : The cord in ( ) have high bending resistance.
2 : The standard length of the cord is 3 m.
3 : If CE marking specification is required, consult IKO.

Table 19 System configuration of a table with AC servo motor (configuration with a driver and a programmable controller)

Table	With or without brake	Motor code	Type of applicable electric devices		
			Driver		
			Main body	Motor cord	Encoder cord
TC 60U	Without brake	A1	TDA1-1004	TAE2052-AM03 (TAE2036-AM03)	TAE2054-AE03 (TAE2038-AE03)
	With brake	A1B	TDA1-1004BK	TAE2053-AMB03 (TAE2037-AMB03)	
TC 86U	Without brake	A2	TDA1-2004	TAE2052-AM03 (TAE2036-AM03)	TAE2054-AE03 (TAE2038-AE03)
	With brake	A2B	TDA1-2004BK	TAE2053-AMB03 (TAE2037-AMB03)	
TC120L	Without brake	A5	TDA1-1004	TAE20A0-AM03 (TAE20A1-AM03)	TAE20A4-AE03 (TAE20A5-AE03)
	With brake	A5B	TDA1-1004BK	TAE20A2-AMB03 (TAE20A3-AMB03)	
TC170L	Without brake	A2	TDA1-2004	TAE20A0-AM03 (TAE20A1-AM03)	TAE20A4-AE03 (TAE20A5-AE03)
	With brake	A2B	TDA1-2004BK	TAE20A2-AMB03 (TAE20A3-AMB03)	

Table	Programmable controller			
	Main body	Teaching box	Pulse cord	Limit cord
TC 60U **TC 86U**	CTN120G	TAE1005-TB	TAE1022-LD03	
	CTN130G	TAE1016-TB	TAE1012-PC	TAE1042-LC03
	CTN140G	TAE1025-TB	TAE1030-PC	TAE1027-LCA03
	CTN150S	TAE1048-TB	TAE1022-LD03	
TC120L **TC170L**	CTN120G	TAE1005-TB	TAE1080-LD03	
	CTN130G	TAE1016-TB	TAE1012-PC	TAE1081-LC03
	CTN140G	TAE1025-TB	TAE1030-PC	TAE1082-LC03
	CTN150S	TAE1048-TB	TAE1080-LD03	

Remark 1 : The cord ( ) have high bending resistance.
2 : The standard length of the motor cord, encoder cord and limit cord is 3 m. The length of the pulse cord is 1.5 m.

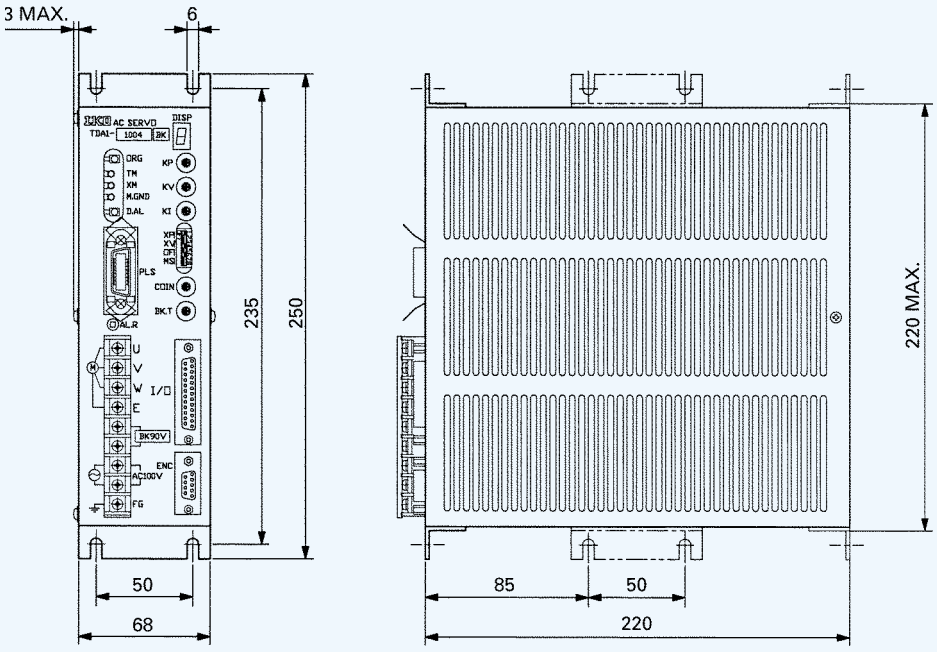
■Driver

Table 20 Main specifications of driver for AC servo motor

Item \ Type	TDA1-1004	TDA1-2004
Number of control axes	1	
Rated output of applicable motor(1)	30W、50W、100W	100W、200W
Feedback	Incremental encoder	
Command pulse input system	CW/CCW pulse or direction command/forward and reverse pulses	
Command pulse input form	Line driver or open collector (+5V level)	
Supply voltage	AC100V±10% 50/60Hz	
Current consumption	10A or less	12A or less
Ambient temperature (during operation)	0～50℃	
Ambient humidity (during operation)	35～85%RH (non-condensing)	
Mass (reference value)	2.0kg	2.2kg

Note(1) : This can be changed with the switch in the driver.

Dimensions unit : mm



Remark : The above figure shows an external view of the TDA1-1004. The dimensions are the same for this and all other models.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

NCD160G·NCD162G

1. A programmable controller and an AC servo motor driver are compactly integrated in one body.
2. Cable connections are few, so wiring work can be saved.
3. Applicable for AC servo motors ranging from 30W to 200W.
4. Speed change and torque monitoring/limitation can be made on the fly.
5. Return to origin can be made without using any sensor.
6. Command language is used for easy identification of control operations, and programming is simple.
7. I/O sequencing function is incorporated, so for a simple system no sequencer is needed.
8. RS-232C is incorporated as standard specification, so a personal computer can be used to operate the controller or to perform direct execution.
9. With check functions, connections of sensors, encoders, and external inputs and outputs, etc. can be checked readily.

Table 21 Functions and performances

Item \ Model			NCD160G-A0500 NCD162G-A0500	NCD160G-A2006 NCD162G-A2006
Control specifications	Number of control axes		1 axis	
	Applicable motor		AC servo motor 30W and 50W	AC servo motor 100W and 200W
	Feedback		Incremental encoder	
	Maximum command value		±2147483647 μm	
	Motor speed		Rated motor speed 3,000rpm, maximum motor speed 4,500rpm	
Program specifications	Input method		MDI, teaching, and PC input via RS-232C	
	Command input system		Absolute command or incremental command	
	Program capacity		12 k bytes (1,200 steps or more)	
	Number of positioning points		256 points	
	Functions		Jump, call, repetition, speed setting, acceleration/deceleration setting, timer control, I/O control, branching by input conditions, various editing functions (creation, erasing, deletion, insertion, etc.)	
Input/output specifications	Input	Number of input points	LS input : 3 points, I/O input : 23 points	
		Operation input	Start, stop, emergency stop, forward and reverse manual operations, return to origin, alarm reset, deviatjon counter reset, servo control, cut in, etc. (selective allocation to I/O input at parameter address)	
		Input system	Photo-coupler input (compatible with no-voltage contact or open collector output)	
	Output	Number of output points	I/O output : 15 points	
		Operation output	Automatic operation in progress, limit activated, emergency stop, return to origin complete, ready, alarm, positioning complete, pre-origin sensor (selective allocation to I/O output at parameter address)	
		Output system	Open collector output (30V DC, 100mA max.)	
	Power supply for input and output		DC24V 1A	
Protective functions			Over-current, over-voltage, over-load, over-speed, voltage drop, encoder error, deviation error, over-heat, CPU error, etc.	
Other main functions			RS-232C (reading, writing, direct execution, etc.), software limit, torque limitation, torque monitoring, speed change on the fly, LS logic change, various check functions, brake regenerative unit (optional)(1), etc.	

Note(1) : This regenerative unit contains a brake power supply for motor with brake (TAE1049-BK is for NCD160G, TAE1092-BK is for NCD162G)
Remark : The model code of exclusive teaching box (option) is TAE1050-TB.

Table 22 General specifications

Item \ Model	NCD160G-A0500	NCD162G-A0500 (CE Marking spec.)	NCD160G-A2006	NCD162G-A2006 (CE Marking spec.)
Main supply voltage	AC100～120V 50/60Hz	AC200～230V 50/60Hz	AC100～120V 50/60Hz	AC200～230V 50/60Hz
Control supply voltage	AC85～132V	AC175～253V	AC85～132V	AC175～253V
Continuous rated current	1.0Arms	1.0Arms	2.7Arms	2.0Arms
Maximum current consumption	6A	5.7A	12A	8.5A
Ambient temperature	0～50℃ During storage：－10～60℃			
Ambient humidity	35～85%RH (Non-condensing)			
Power failure protection	Flash memory (battery replacement not necessary)			
Weight (for reference)	Main body 1.6kg Teaching box 0.5kg			

—CE Marking specification—

- CE Marking specification models conform to the EC low voltage directive and the EC electromagnetic compatibility directive (EMC).
- As the EMC changes according to wiring and arrangement, the last check for EMC is required in the state where the model is assembled in the customer's equipment.

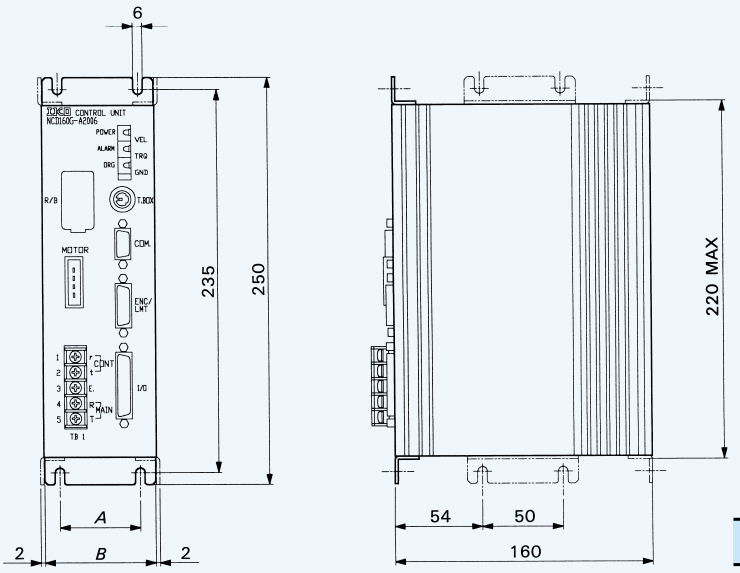
EC low voltage directive：89/392/EEC (amended by EC Directive 94/368EEC)
EC electromagnetic compatibility directive：89/336EEC (amended by EC Directive 92/31EEC)

Table 23 Connector plug (appended)

Type	Connector plug
I/O connector	High-density DSUB44 pin (with hood)

Remark：Connection cables for motor, encoder, limit, etc. are available. If required, please consult IKO.

Dimensions unit：mm



Model	A	B
NCD160G-A0500 NCD160G-A2006	50	70
NCD162G-A0500 NCD162G-A2006	60	80

Remark：The figure shows the appearance of NCD160G-A2006.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

■Programmable controller

Four types of program controllers, three types of program input type and one type of point memory type, are available. Table 24 compares the characteristics of the respective types. Select the optimal type suitable for each application.

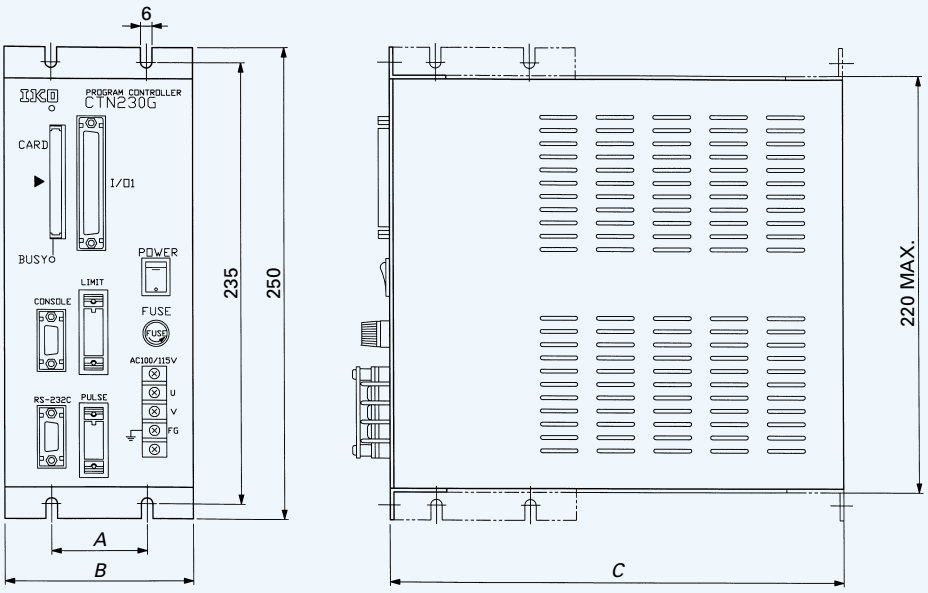
Table 24 Main specifications of programmable controller

Model		Program input type			Point memory type
		CTN120G CTN220G	**CTN130G CTN230G CTN430G**	**CTN140G CTN240G**	**CTN150S**
	Type	Standard type	High-function type	Compact type	
Appearance					
Number of control axes		1 or 2 axes	1, 2, or 4 axes	1 or 2 axes	1 axis
Supply voltage		AC90～110V	AC85～132V	DC24V±10%	DC24V±10%
Maximum output frequency		200kpps	1.5Mpps	200kpps	2.5Mpps
Pulse output system		CW/CCW pulse or direction command/forward and reverse pulses			
		Current discharge type	Line driver	Line driver	Line driver
Maximum command value		±999999 pulses	±99999999 pulses	±999999 pulses	±2147483648 pulses
Acceleration/deceleration method		Straight line	Straight line, S shaped line	Straight line	Straight line, S shaped line, cycloid
Command input system		Absolute command or incremental command			
Program capacity		1000 steps	2000 steps	1000 steps	64-point memory (not programmable)
General input and output (I/O)	Input	8 points (CTN120G) 20 points (CTN220G)	20 points	8 points (CTN140G) 20 points (CTN240G)	None
	Output	7 points (CTN120G) 12 points (CTN220G)	12 points	7 points (CTN140G) 12 points (CTN240G)	None
Linear and arc interpolation		○ (CTN220G)	○ (CTN230G、CTN430G)	×	×
	Point pass	○	×	×	×
General input and output add-ons		×	○	×	×
Memory card		○	○	×	×
RS-232C operation		○	○	○	○
Position correction of linear scale		×	○	×	×
Remarks		The program input type is so designed that programs entered by a teaching box or PC are executed in order of steps. Programming is possible with an optional teaching box or PC, or by simple teaching.			The point memory type does not come with a program function. Stored points are switched over and executed with an external device such as a sequencer or PC.
		Standard type with 100V AC power supply input. The interpolation function of CTN220G comes with a point pass function as standard specification.	High-function type with a 100V AC power supply input. High-speed output at 1.5Mpps maximum. A series of multi-axis controllers up to four-axis control.	A type to be incorporated into compact electric devices with a 24V DC power supply input.	

Remark : ○ indicates that the unit has the function. × indicates that the unit does not have the function.

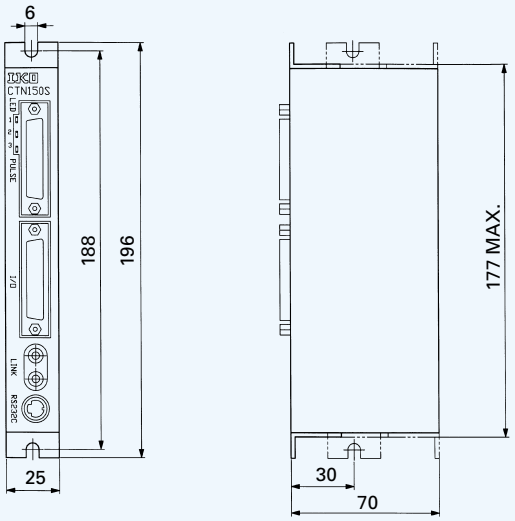
Dimensions

unit： mm



unit：mm

Model	*A*	*B*	*C*
CTN120G	50	74	221
CTN220G	50	99	221
CTN130G CNT230G	50	99	240
CNT430G	75	124	240
CNT140G CNT240G	25	49	156
CNT150S	See the figure below.		



1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

TC60U

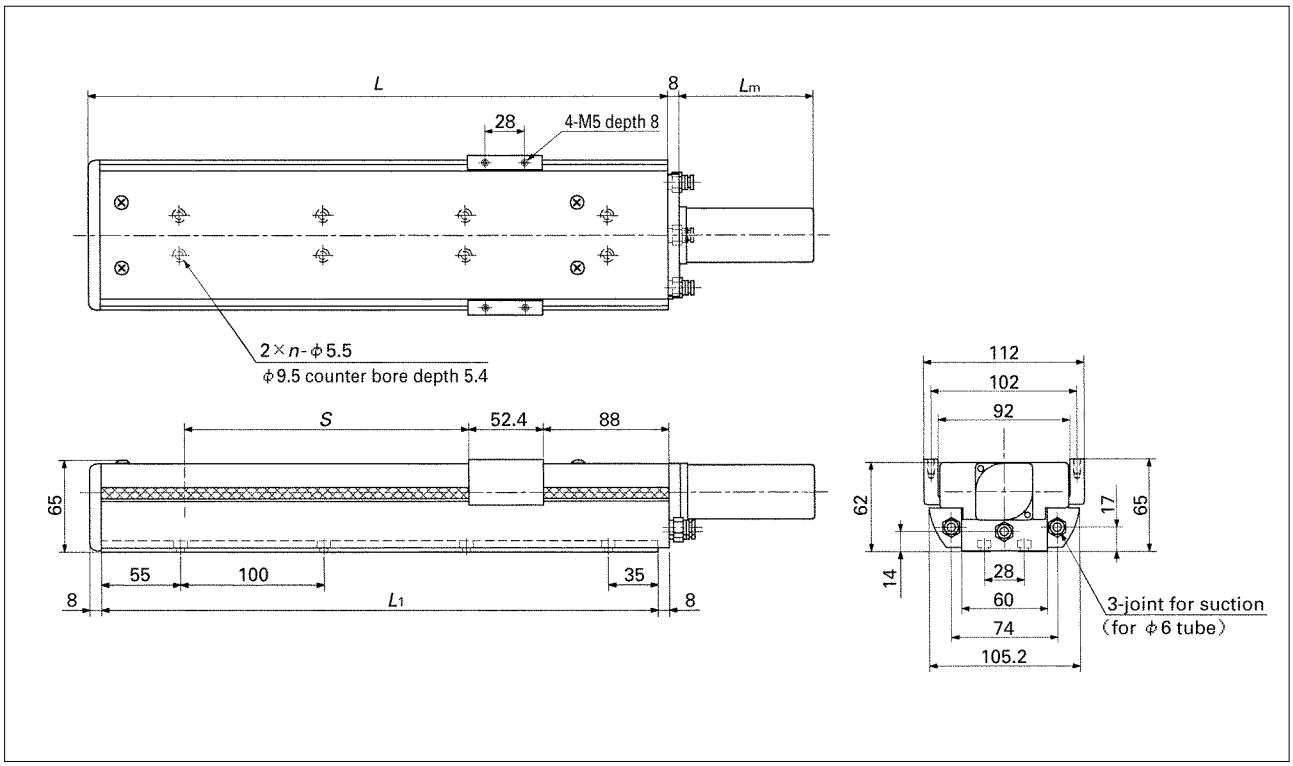


Table dimensions

unit : mm

Model number	Track rail length L_1	Total length L	n	Stroke length(1) S	Mass(2) kg
TC60U290	290	306	3	100 (85)	5.0
TC60U390	390	406	4	200 (185)	6.1
TC60U490	490	506	5	300 (285)	7.2
TC60U590	590	606	6	400 (385)	8.3
TC60U690	690	706	7	500 (485)	9.5
TC60U790	790	806	8	600 (585)	10.6

Note(1) : The values in ( ) indicate the stroke lengths of the tables with capillary plate.
(2) : Values applicable to the types without motor.

Motor length L_m

unit : mm

Motor type	AC servo motor	
Motor code	A1	M1
Without brake	94.5	103
With brake	135	135

TC86U

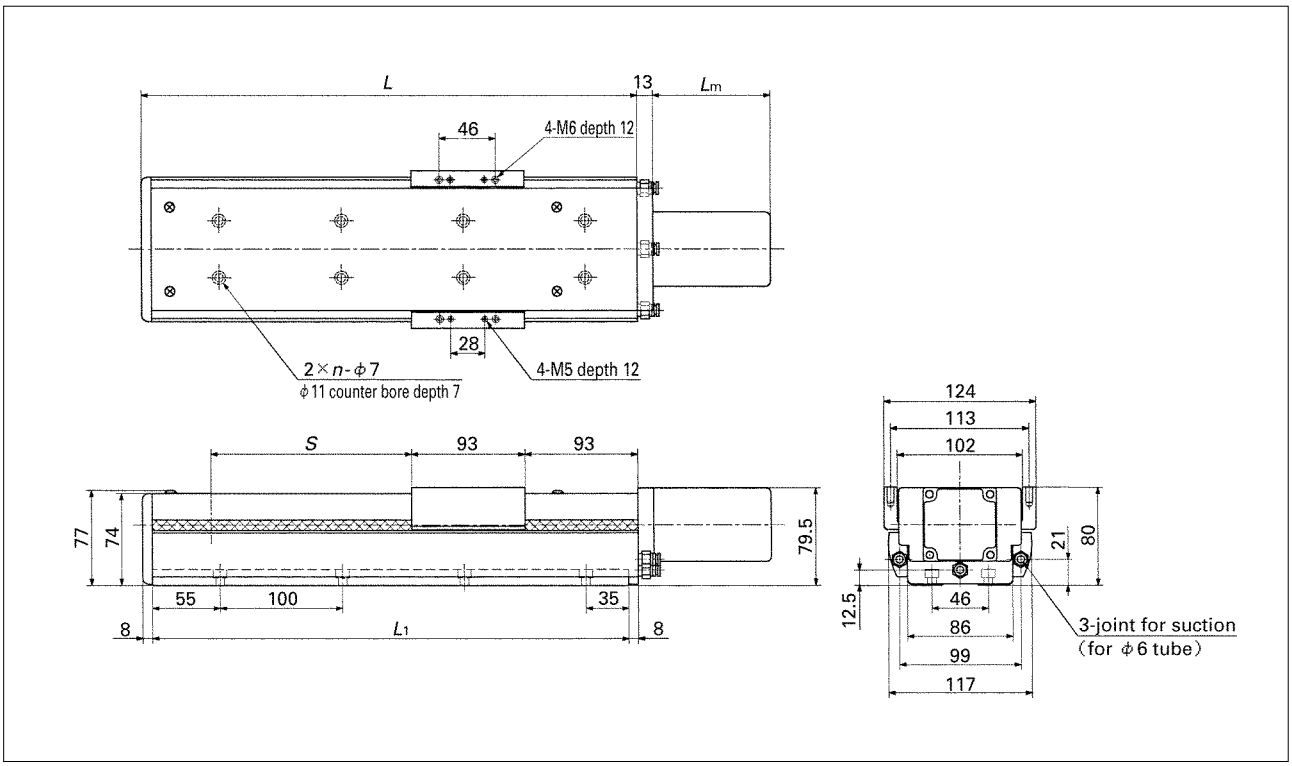


Table dimensions

unit : mm

Model number	Track rail length L_1	Total length L	n	Stroke length(1) S	Mass(2) kg
TC86U490	490	506	5	250 (230)	13.0
TC86U590	590	606	6	350 (330)	15.0
TC86U690	690	706	7	450 (430)	16.9
TC86U790	790	806	8	550 (530)	18.8
TC86U890	890	906	9	650 (630)	20.8
TC86U990	990	1006	10	750 (730)	22.7

Note(1) : The values in ( ) indicate the stroke lengths of the tables with capillary plate.
(2) : Values applicable to the types without motor.

Motor length L_m

unit : mm

Motor type	AC servo motor	
Motor code	A2	M2
Without brake	96.5	95
With brake	136	128

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

TC120L

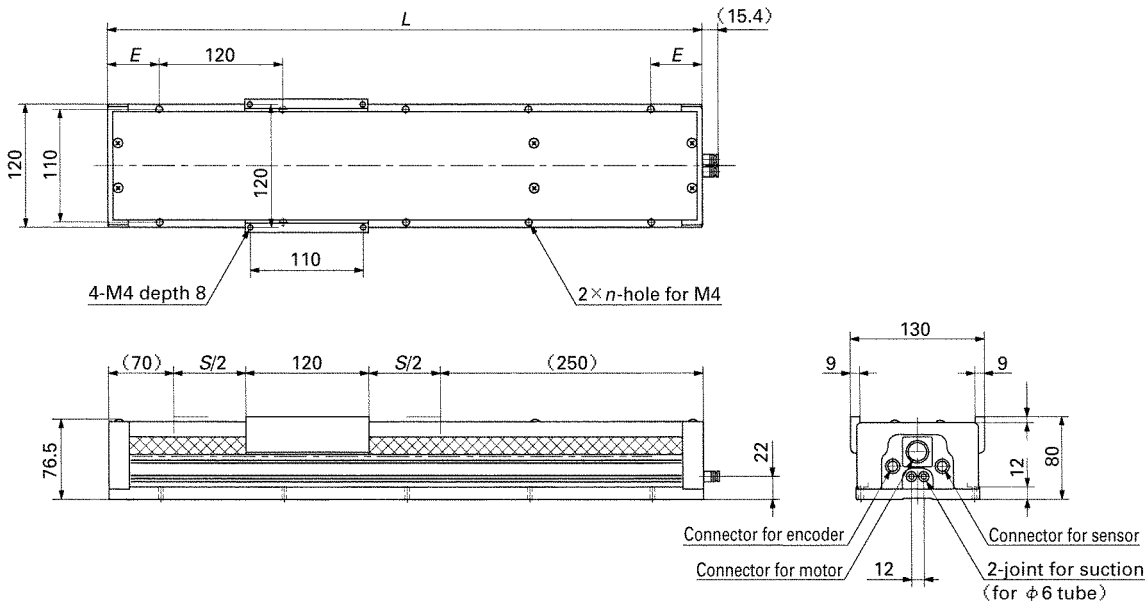


Table dimensions

unit : mm

Model number	Total length *L*	*E*	*n*	Stroke length *S*	Mass(1) kg
TC120L580	580	50	5	140	7.2 (7.5)
TC120L740	740	70	6	300	8.7 (9.0)
TC120L900	900	90	7	460	10.3 (10.6)

Note(1) : Values applicable to the tables having a motor without brake. The values in ( ) indicate those for the tables having a motor with brake.

TC170L

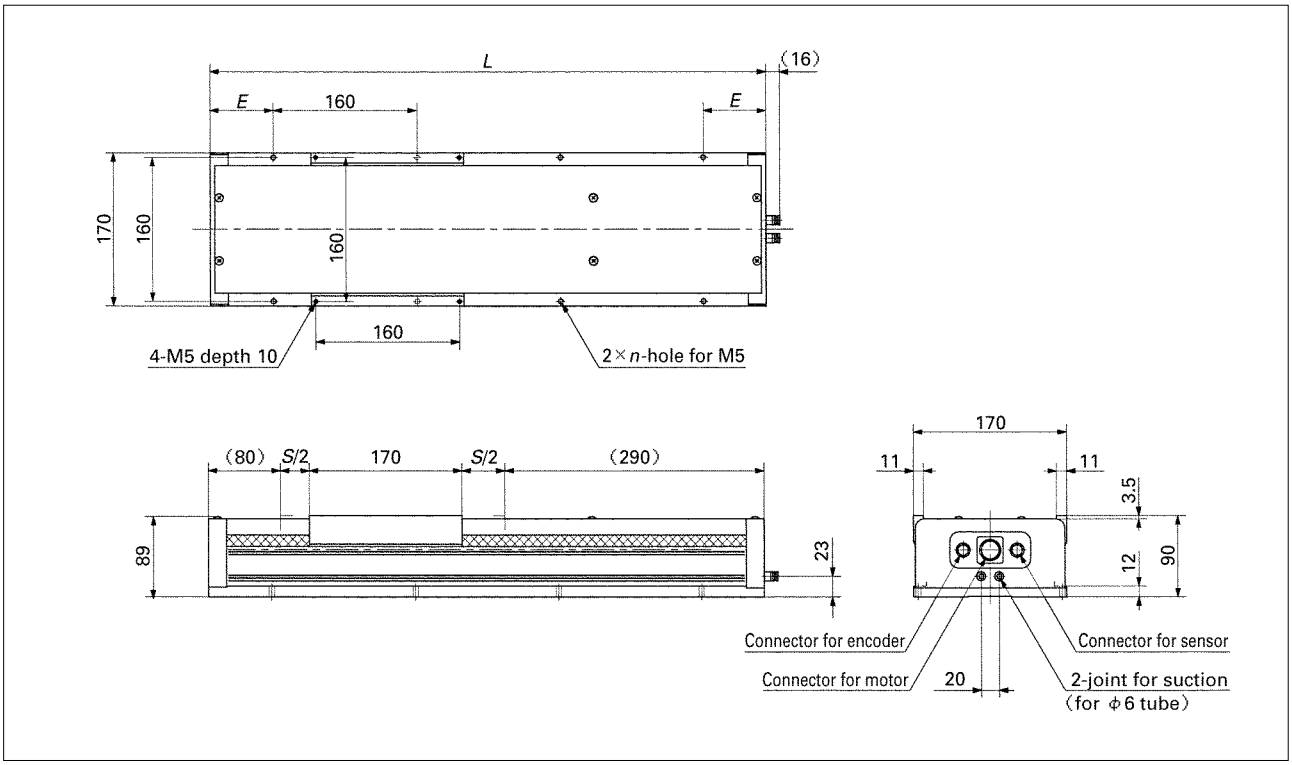


Table dimensions

unit : mm

Model number	Total length *L*	*E*	*n*	Stroke length *S*	Mass(1) kg
TC170L 820	820	90	5	280	16.6 (17.1)
TC170L1020	1020	110	6	480	19.5 (20.0)
TC170L1220	1220	50	8	680	22.4 (22.9)
TC170L1420	1420	70	9	880	25.3 (25.8)

Note(1) : Values applicable to the tables having a motor without brake. The values in ( ) indicate those for the tables having a motor with brake.

1N=0.102kgf=0.2248lbs.
1mm=0.03937inch

TC

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