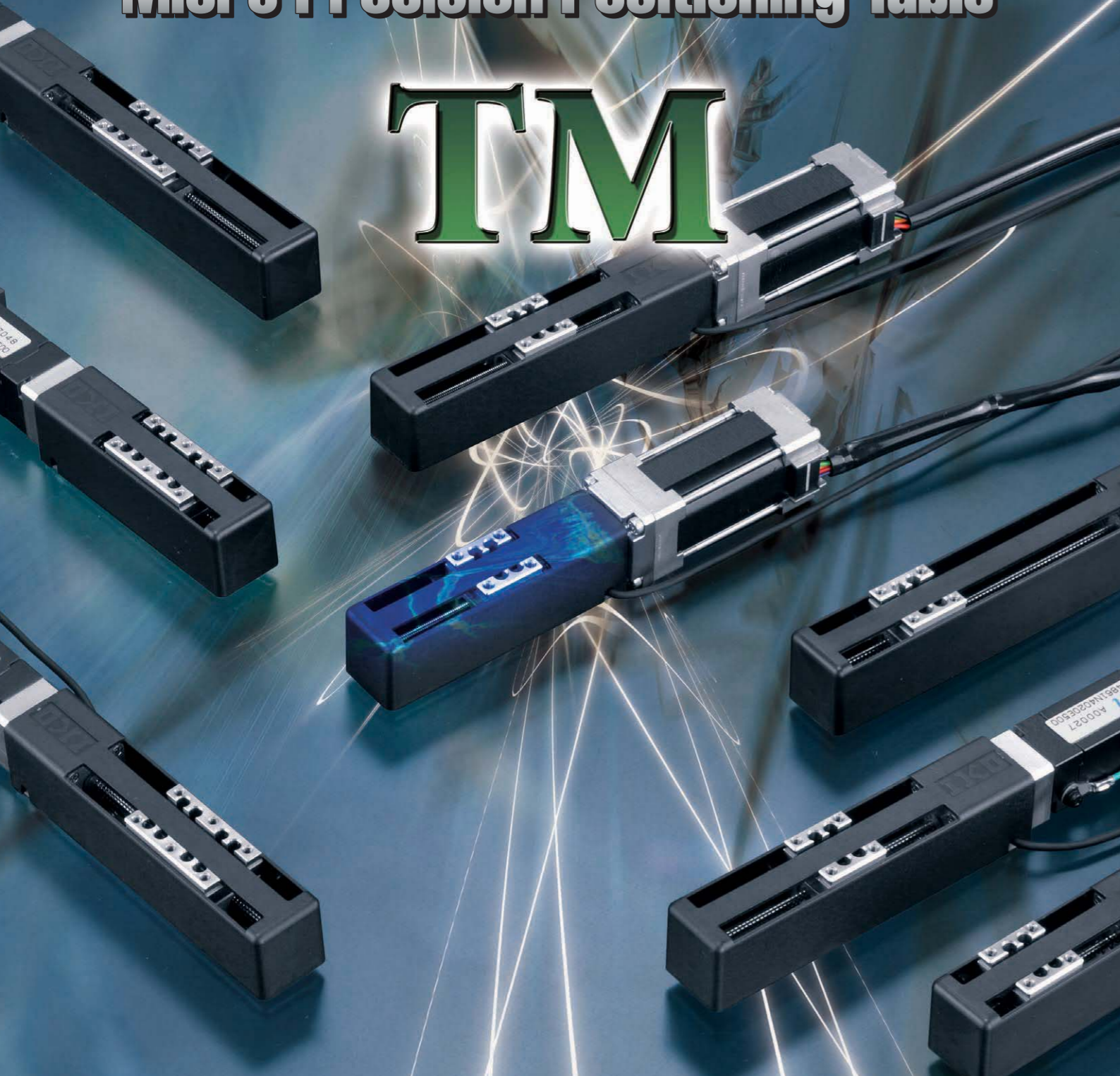


PATENT PENDING

IKO

Micro Precision Positioning Table

T.M.



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IKO Website
<http://www.ikont.co.jp/eg/>

CAT-57177

IKO Micro Precision Positioning Table

TM

IKO Micro Precision Positioning Table TM is an extremely compact precision positioning table comprising IKO Micro Linear Way L of a track rail width of 2 mm, which has a reputation in a micro device field and a precision-ground ball screw of 2 mm in diameter. Micro Linear Way L, ball screw, and other steel parts are made of stainless steel and highly corrosion resistant. This positioning table can satisfy the highest precision requirement that cannot be satisfied by conventional small positioning tables in addition to device downsizing and space saving requirements

The lowest height 20mm driven by precision ball screw

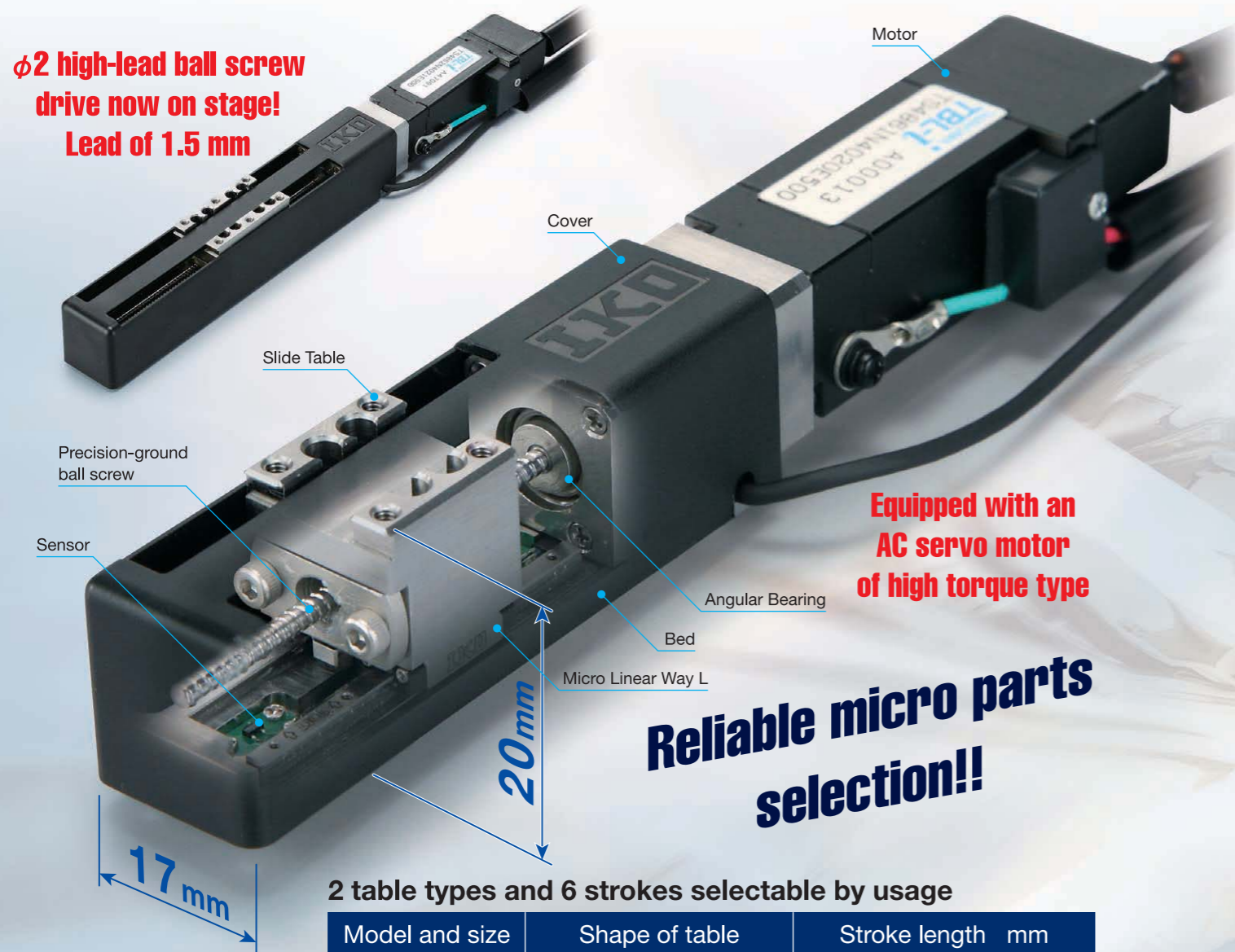
IKO Micro Precision Positioning Table TM

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Micro Linear L, ball screw, and other steel parts are made of stainless steel and highly corrosion resistant.

This positioning table can satisfy the highest precision requirement that cannot be satisfied by conventional small positioning tables in addition to device downsizing and space saving requirements.

Structure of Micro Precision Positioning Table TM



2 table types and 6 strokes selectable by usage

Model and size	Shape of table	Stroke length mm		
TM15	Standard model	20	40	60
TM15G	Long stroke model	10	30	50

Features of Micro Precision Positioning Table TM

1 Very compact positioning table of 20mm high (sectional) and 17mm wide driven by a ground ball screw

IKO Micro Linear Way L of a rail width of 2mm for the table guide and a miniature ball screw of a screw diameter of 2mm for the driving mechanism are used. The ground ball screw has the lowest sectional height that cannot be accomplished ever, and realizes smooth and stable sliding motion, high running accuracy, small backlash and high positioning accuracy by excellent following capability.



2 Adoption of new designing φ2 high-lead ball screw Maximum table speed of 150 mm/s

A maximum table speed faster by two times or more than that of our conventional products without reducing the positioning accuracy thanks to a combination of new designing high-lead ball screws and high-torque AC servo motors.

Item	Motor type	AC servo motor	
		NEW New product	Conventional product
Motor revolutions rpm		6000	4000
Maximum speed mm/s	Lead 0.5mm	50	33
	Lead 1.0mm	100	67
	Lead 1.5mm	150	-

3 Two types of slide table shapes selectable by usage

Two types of slide table shapes are available: Standard and Long tables. The long table is equipped with two parallel sets of micro linear ways L containing two slide units, resulting in high rigidity against the moment and complex loads.

4 AC servo motor and stepper motor selectable

AC servo motors and stepper motors of standard and high-torque types are available. You can select them by usage.

5 Optional super-miniature sensors (can be built in)

Micro Precision Positioning Table TM can contain Origin, Pre-origin, CW and CCW sensors without changing external dimensions.

Applications in wide range

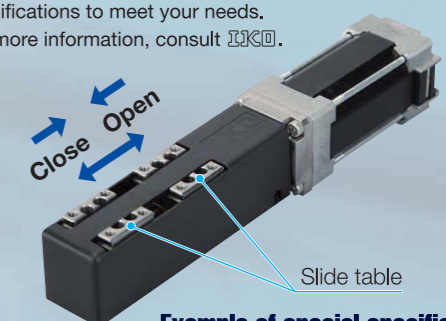
Micro Precision Positioning Table TM is best suited to increase the accuracy of a positioning mechanism of a super-miniature device since it realizes high-precision positioning although it is very small. Moreover, Micro Precision Positioning Table TM uses stainless steel parts and can also be used in places where oil and grease cannot be used.

- Measuring apparatus •Electronic part assembling equipment •Robots
- Bio-related equipment •Medical equipment
- Watch assembling machines •Wire coiling machine, etc.

Best suited for positioning mechanism of super-miniature device

IKO Meets Any Positioning Table Request of Yours

IKO can prepare any table specifications such as switching table specifications, slide screw specifications, and stainless-steel cover specifications to meet your needs. For more information, consult **IKO**.



Example of special specification: Switching table specification

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

Identification Number

Example of identification number

TM **15** **G** - **50** **A** / **T001** **05** **1**

① ② ③ ④ ⑤ / ⑥ ⑦ ⑧

① Type	TM : Micro Precision positioning table TM
② Size	15 : Table width 15 mm
③ Shape of slide table	Non-symbol : Standard table G : Long table
④ Stroke length	Stroke length can be selected from Table 1.

Table 1 Type of slide table and stroke length

Type of slide table	Stroke length mm
Standard table	20, 40, 60
Long table	10, 30, 50

⑤ Motor	A : With motor
⑥ Motor type	T001 : AC servo motor (Standard type) T003 : Stepper motor (2 phases) T002 : Stepper motor (5 phases) T004 : AC Servo motor (Higher torque type)

In case T004, ball screw lead 0.5mm cannot be specified.
For details of motor specifications, see pages 7 to 8. In case of using non-standard motor, consult .

⑦ Ball screw lead	05 : Lead 0.5mm 10 : Lead 1mm 15 : Lead 1.5mm
-------------------	---

In case 0.5mm of ball screw lead, motor type T004 cannot be specified.
When slide-screw is required, consult .

⑧ Sensor specification, direction of wiring	0 : Without sensor 1 : With sensor (on the right as viewed from the side opposite the motor) 2 : With sensor (on the left as viewed from the side opposite the motor)
---	---

In case "without sensor" is selected, adding a sensor afterward is not possible.
In case "with sensor" is selected, motor cord locates at the same side of sensor cord.

Remark : Table cover is made of resin. If a stainless steel table cover is required, consult .

Characteristics

Table 2.1 Specification for standard table

Item	Model code	TM15-20			TM15-40			TM15-60		
		mm	mm	mm	mm	mm	mm	mm	mm	mm
Stroke length	mm	20			40			60		
Ball screw lead	mm	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5
Positioning accuracy	mm	0.015								
Repeatability	mm	±0.001	±0.002		±0.001	±0.002		±0.001	±0.002	
Table inertia	$J_T \times 10^{-6} \text{kg} \cdot \text{m}^2$	0.00013	0.00016	0.00022	0.00016	0.00019	0.00024	0.00018	0.00021	0.00026
Starting torque T_0	N · m	0.005								
Allowable load ⁽¹⁾	N	15								

Note⁽¹⁾ This is a maximum load applicable without causing problems with functionality or performance.

Table 2.2 Specification for long table

Item	Model code	TM15G-10			TM15G-30			TM15G-50		
		mm	mm	mm	mm	mm	mm	mm	mm	mm
Stroke length	mm	10			30			50		
Ball screw lead	mm	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5
Positioning accuracy	mm	0.015								
Repeatability	mm	±0.001	±0.002		±0.001	±0.002		±0.001	±0.002	
Table inertia	$J_T \times 10^{-6} \text{kg} \cdot \text{m}^2$	0.00014	0.00019	0.00028	0.00016	0.00021	0.00030	0.00018	0.00023	0.00032
Starting torque T_0	N · m	0.005								
Allowable load ⁽¹⁾	N	15								

Note⁽¹⁾ This is a maximum load applicable without causing problems with functionality or performance.

Table 3 Maximum speed

Item	Motor type	AC servo motor		Stepper motor	
		r/min	mm/s	r/min	mm/s
Motor speed	r/min	6000		1800	
Maximum speed	mm/s	Lead 0.5mm	50 ⁽¹⁾	15	
		Lead 1mm	100 ⁽²⁾	30	
		Lead 1.5mm	150 ⁽²⁾	45	

Note⁽¹⁾ The value is applicable for AC servo motor of T001.

⁽²⁾ The value is applicable for AC servo motor of T004.

Remark : The values of the maximum speed are applicable when the standard motor is used. The actual maximum operation speed must be determined by examining the operating pattern for the motor used, load conditions, etc.

Sensor Specification

Table 4 Sensor Specification

Item	Specification
Type	Magnetic sensor
Power supply voltage	DC12V~24V ±10%
Current consumption ⁽¹⁾	65 mA or less
Output ⁽²⁾	Open collector
	<ul style="list-style-type: none"> Maximum input current : 12 mA or less Applied voltage : DC30V or less Residual voltage : 1.7 V or less for 12 mA of input current 1.1 V or less for 4 mA of input current
Output operation	Limit and pre-origin
	Origin
Operation indicator	LED (green) : Power
	LED (yellow) : CW limit sensor
Circuit diagram	LED (red) : Origin sensor
	Pre-origin sensor
	CCW limit sensor

Note⁽¹⁾ This is the current consumption of the entire system including the sensor amplifier.

⁽²⁾ This is the output per circuit.

Table 5 Specifications of Connector

Pin No.	Signal name	Body side	Other end ^(*)
1	Origin	Housing 43020-0600	Housing 43025-0600
2	Pre-origin		
3	CW limit		
4	CCW limit	Terminal Contactor 43031-0010	Terminal Contactor 43030-0007
5	Power input		
6	GND		

Note⁽¹⁾ Other end connector shall be prepared by customer.
When pulse/limit cord shown in system configuration on page 5 is used, connection side connector is not necessary.

Remark : Manufacture of connector: Molex.

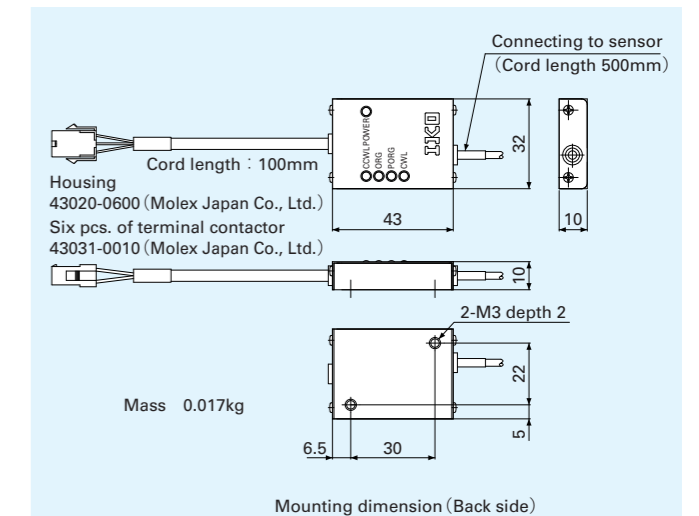


Fig. 1 Outside dimensions of sensor amplifier

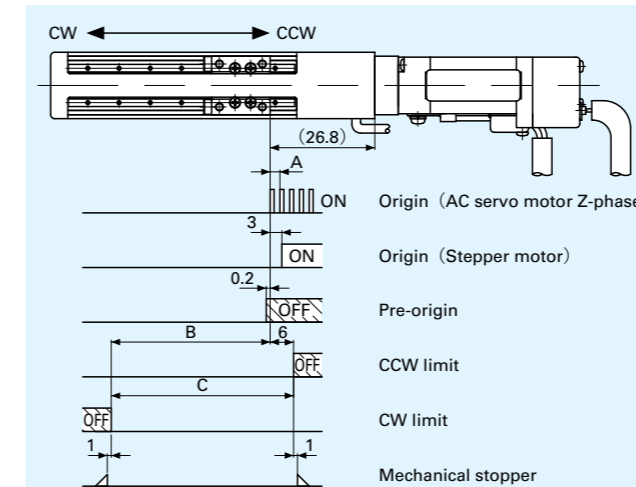


Fig. 2 Sensor timing chart

Remark : Dimension C shows the span between limit sensors.

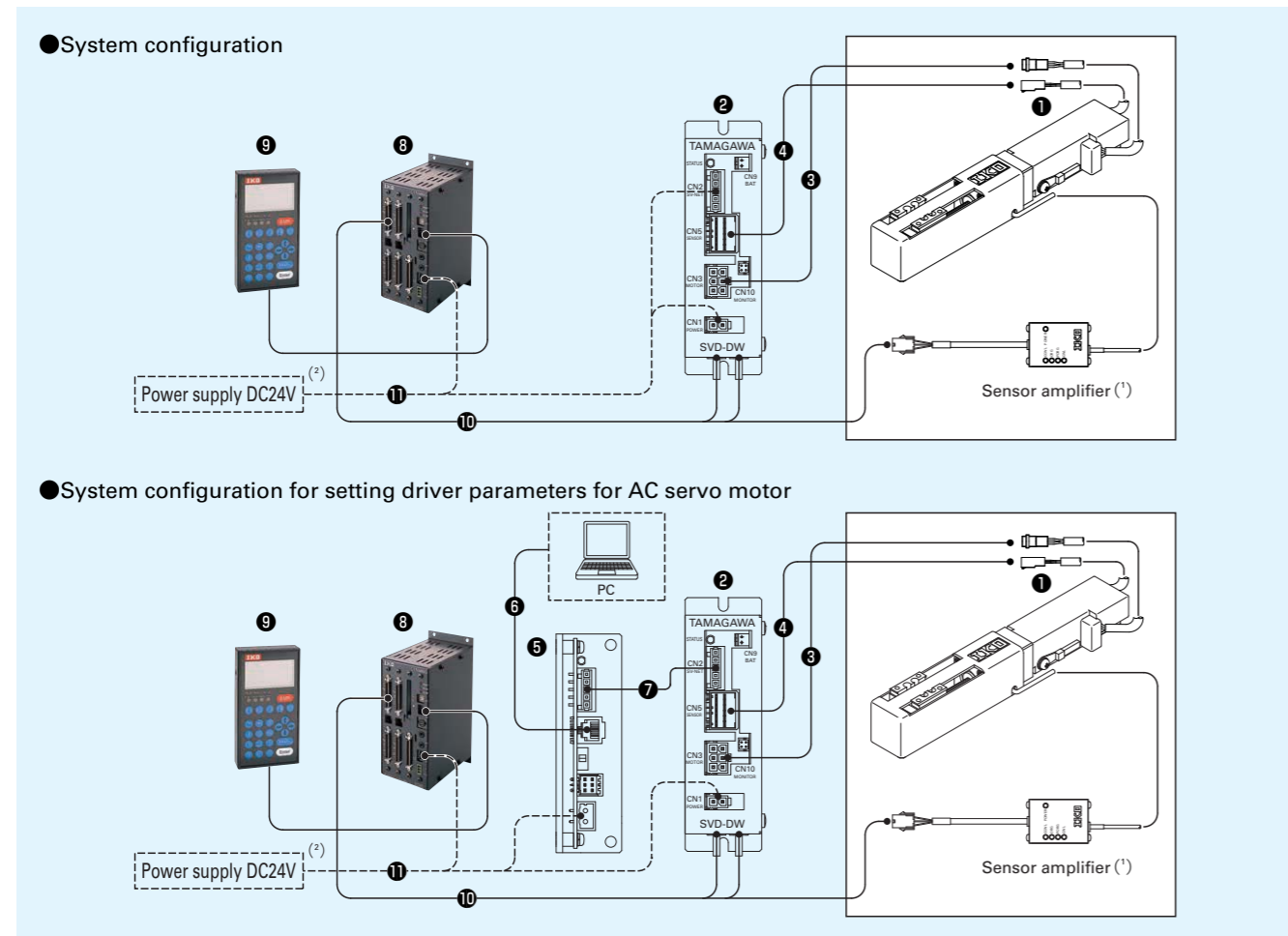
unit : mm	
Ball screw lead	A
0.5	0.25
1	0.5

Model code	unit : mm	
	B	C (Ref.)
TM15 -20	16	22
TM15 -40	36	42
TM15 -60	56	62
TM15G-10	4.5	10.5
TM15G-30	24.5	30.5
TM15G-50	44.5	50.5

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

System Configuration

Micro Precision Positioning Table TM uses a specific driver. A typical system configuration is shown below. For specifications of the driver, see "Specifications of Motor and Driver" (on Page 8 to Page 13). For ordering, use the format shown below.



No.	Name	Model code		
①	Motor code	T001 [AC servo motor]	T002 [Stepper motor(Five phases)]	T003 [Stepper motor(Two phases)]
②	Driver	TA8410N7318E936	TD-5M13-L	eTD-24A
③	Motor cord	EU9614N□0	TAE20S6-SM0□ (TAE20S7-SN0□)	TAE20S8-SM0□ (TAE20S9-SN0□)
④	Resolver cord	EU9615N□0	—	—
⑤	Communication unit ^(?)	TA8433N1	—	—
⑥	RS-232C cord ^(?)	EU6517N2	—	—
⑦	SV-NET cord ^(?)	EU9610N20□0	—	—
⑧	Program controller	CTN480G		
⑨	Teaching box	TAE10M5-TB		
⑩	Pulse limit cord ^(*)	TAE10U5-LD0□ (TAE10U6-LD0□)	TAE10U7-LD0□ (TAE10U8-LD0□)	TAE10U9-LD0□ (TAE10V0-LD0□)
⑪	Power supply cord	Prepared by customer ^(*)		

- Note⁽¹⁾ If you specify "Without sensor," no sensor amplifier will be delivered.
⁽²⁾ Power supply DC24V shall be prepared by customer.
^(?) This is required for parameter setting. See "Driver parameter setting" (on Page 12). For specifications of the communication unit, see "Specifications of communication unit for the AC servo motor T001" (on Page 7).
^(*) The customer should prepare a pulse limit cord when using any other programmable controller than CNT480G.
^(*) Connectors are attached to the driver and the communication unit. See "Specifications of Motor and Driver" on Page 5 to Page 10.
^(*) Connect the power supply cord directly.
- Remarks : 1. Pulse limit cord in (), along with motor cord and resolver cord have high bending resistance.
 2. The lengths of motor cord and resolver cord can be specified by increments of 1m up to 3m maximum in □ at the end of supplemental code. (Example of 3m: EU9614N30) The lengths of limit cord of pulse limit cord can be specified by increments of 1m up to 3m maximum in □ at the end of supplemental code. (Example of 3m: TAE10U5-LD03) If you wish to use one 3m or longer, consult IKO.
 3. The lengths of SV-NET cord can be specified by increments of 1m up to 3m maximum in □ at the end of supplemental code. (Example of 3m: EU9610N2030) If you wish to use one 3m or longer, consult IKO.
 4. The length of pulse cord of pulse limit cord is 1.5m.

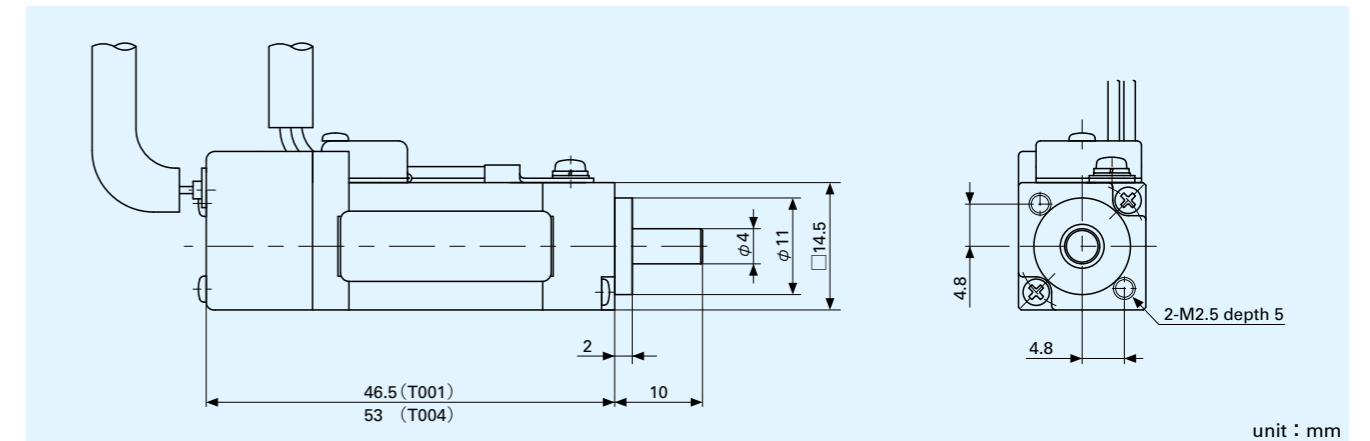
●Driver parameter setting

Parameters of the driver for the AC servo motor must always be set before use. The communication unit, the RS-232C cord, and the SV-NET cord are required for parameter setting. These items must be ordered separately. Please consult IKO for the setting software.

These can be shared for multiple drivers. Order them according customer's system requirements.

Specifications of Motor and Driver

AC Servo Motor and Driver by Tamagawa Seiki Co., Ltd. (RoHS compliance)



Specifications of Motor

Motor code	Model	Power supply V	Rated output W	Rated torque N·m	Instantaneous peak torque N·m	Rated rotation speed r/min	Motor inertia J/M ×10 ⁻⁴ kg·m ²	Resolver specification pulse/rev	Mass kg
T001	TS4861N4020E500	24	4	0.0095	0.0285	4000	0.00064	2048	0.05
T004	TS4862N4021E500	24	6.6	0.0159	0.0477	4000	0.00096	2048	0.06

Remark : Motor torque decreases when the number of revolution exceeds 4000r/min.

Specifications of motor wiring and connector

Motor code T001				Motor side	Connection side ⁽¹⁾
Pin No.	Code	Description	Sheath color of lead wire		
A1	U	Motor U-phase	Red	Tab housing 178964-3	Receptacle housing 178289-3
A2	V	Motor V-phase	White		
A3	W	Motor W-phase	Black		
B1	E	Frame ground	Green	Tab contact 175287-2	Receptacle contact 175218-2
B2	—	—	—		
B3	—	—	—		

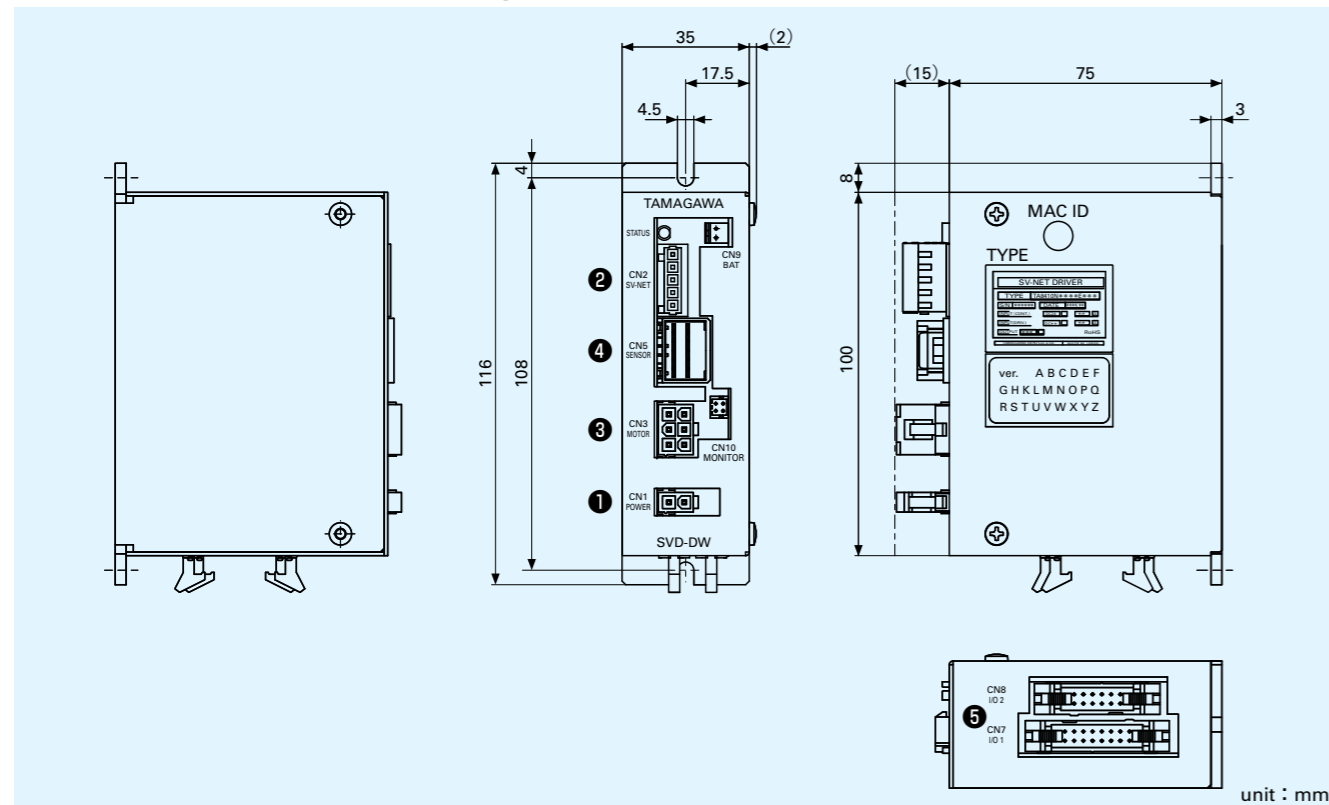
Note⁽¹⁾ Connection side connector shall be prepared by customer.
 Remark : Manufacture of connector: Tyco Electronics.

Specifications of resolver wiring and connector

Motor code T001				Motor side	Connection side ⁽¹⁾
Pin No.	Code	Description	Sheath color of lead wire		
A1	S2	Signal output	Yellow	Tab housing 1-1318115-6	Receptacle housing 1-1318118-6
A2	S1	Signal output	Red		
A3	R1	Excitation signal	White		
B1	S4	Signal output	Blue	Tab contact 1318112-1	Receptacle contact 1318108-1
B2	S3	Signal output	Black		
B3	R2	Excitation signal	Orange		

Note⁽¹⁾ Connection side connector shall be prepared by customer.
 Remark : Manufacture of connector: Tyco Electronics.

Functions and dimensions of components of driver for AC servo motor T001 and T004



No.	Name	Function
①	CN1	Driving power supply connector
②	CN2	SV-NET connector
③	CN3	Motor connector
④	CN5	Sensor connector
⑤	CN7	I/O connector
⑥	CN8	I/O connector

Specifications of driver for AC servo motor T001 and T004

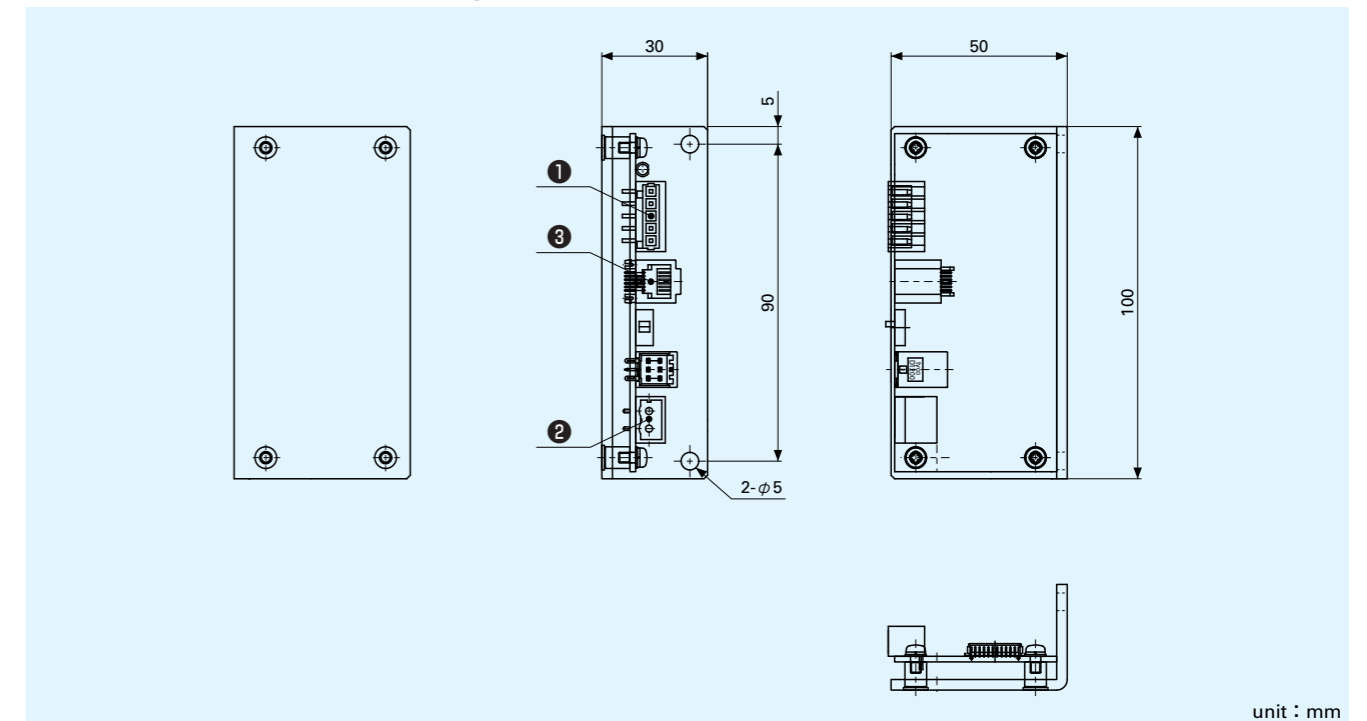
Driver type	TA8410N7318E936	TA8410N7318E951
Motor code	T001	T004
Rated output of motor	4W	6.6W
Feedback	Brushless resolver	
Type of command pulse input	CW/CCW signal, pulse signal, rotation direction signal	
System of command pulse input	Line driver, Open corrector	
Main circuit power voltage	DC24V ±10%	
Control circuit power supply	DC24V ±10%	
Continuous output current Arms	0.68	1.00
Maximum output current Arms	1.92	2.875
Ambient temperature in operation	0~40°C	
Ambient temperature in storage	-10~85°C (No freezing)	
Ambient humidity (use and storage)	Less than 90% RH (No condensation)	
Mass (kg)	0.3	

Remark : DC24V power supply shall be prepared by customer.

Accessories of driver for AC servo motor T001 and T004

Name	Description	Model	Manufactures
CN1	Driving power supply connector	Receptacle housing 5557-02R	Molex
		Terminal 5556TL	
CN2	Control power supply connector	Connector plug 734-105	WAGO
CN7	I/O connector	Socket HIF3BA-16D-2.54R	Hirose Electric
CN8	I/O connector	Socket HIF3BA-14D-2.54R	
CN10	Analog monitor connector	Socket DF-4DS-2C	
		Contact DF11-2428SC	

Functions and dimensions of components of communication unit for AC servo motor T001 and T004



No.	Name	Function
①	CN1	Communication connector
②	CN2	Power supply connector
③	CN3	Connector

Remark : Use the communication unit to set driver parameters. See "System configuration" (on Page 11) for a system configuration for parameter setting.

Specifications of communication unit for AC servo motor T001 and T004

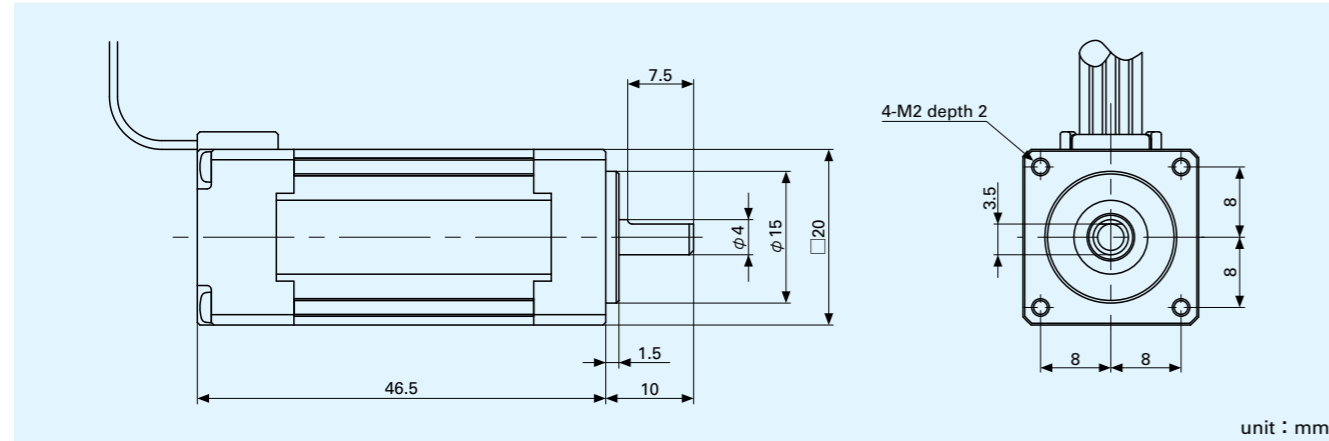
Communication unit model	TA8433N1	
Input power voltage	DC24V ±10%	
	(Unit consumption current 0.1A)	
Control power supply output voltage	DC24V ±10%	
Communication specification	PC side	RS-232C cable
	Driver side	SV-NET cord
Operating temperature range	0~40°C	
Humidity in operation	Less than 90% RH(No condensation)	
Mass kg	0.2	

Remark : DC24V power supply shall be prepared by customer.

Accessories of communication unit for AC servo motor T001 and T004

Name	Description	Model	Manufactures
CN1	Communication connector	Connector plug 734-105	WAGO
CN2	Power supply connector	Connector plug 231-102/026-000	

Stepper Motor and Driver by Tamagawa Seiki Co., Ltd. (RoHS compliance)



Specifications of Motor

Motor code	Model	Step angle degree	Maximum holding torque N · m	Current A-phase	Rotor Inertia JM ×10 ⁻⁴ kg · m ²	Mass (Ref.) kg
T002	TS3682N2	0.72	0.024	0.35	0.004	0.085
T003	TS3692N2	1.80	0.024	0.35	0.004	0.085

Specifications of motor wiring and connector

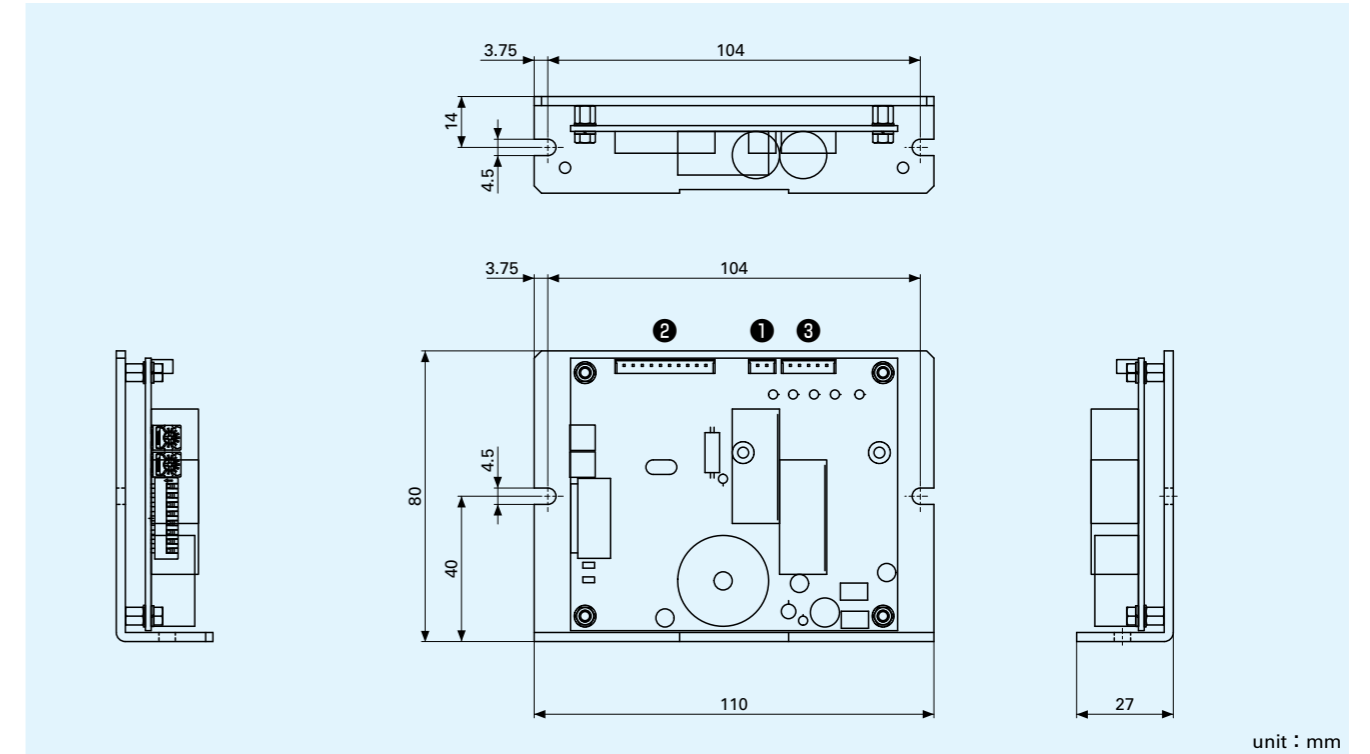
Motor code T002		Motor code T003		Motor side	Connection side ⁽¹⁾
Pin No.	Sheath color of lead wire	Pin No.	Sheath color of lead wire		
1	Blue	1	Black	Housing 43025-0600	Housing 43020-0600
2	Red	2	No-use		
3	Orange	3	Blue		
4	Green	4	Red		
5	Black	5	Orange	Terminal contactor 43030-0007	Terminal contactor 43031-0007
6	No-use	6	Green		

Note⁽¹⁾ Other end connector shall be prepared by customer.

When pulse/limit cord shown in system configuration on page 5 is used, connection side connector is not necessary.

Remark : Manufacture of connector: Molex.

Functions and dimensions of components of driver for Stepper motor T002



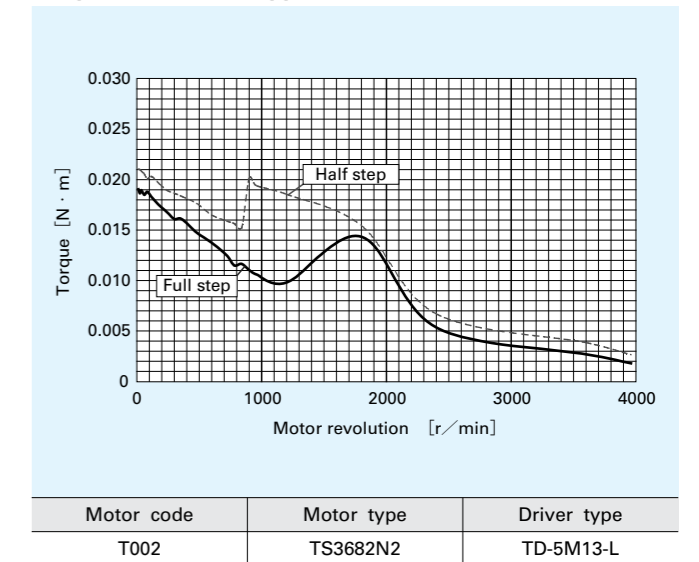
No.	Name	Function
①	CN1 Power supply connector	Connects a power supply.
②	CN2 I/O connector	Connects a pulse cord.
③	CN3 Motor connector	Connects a motor cord.

Specification of driver for stepper motor T002

Driver type	TD-5M13-L
Applicable motor code	T002
Excitation type	Micro step 500 divisions maximum
Input	Photo coupler input, input resistance 220Ω
Input type	CW/CCW signal Pulse/Rotational direction signal
Power supply	DC15~35V 2.5A
Ambient temperature in operation	0~40°C (No freezing)
Ambient humidity in operation	Less than 85% RH (No condensation)
Mass kg	0.17

Remarks : DC24V power supply is recommended. This shall be prepared by customer.

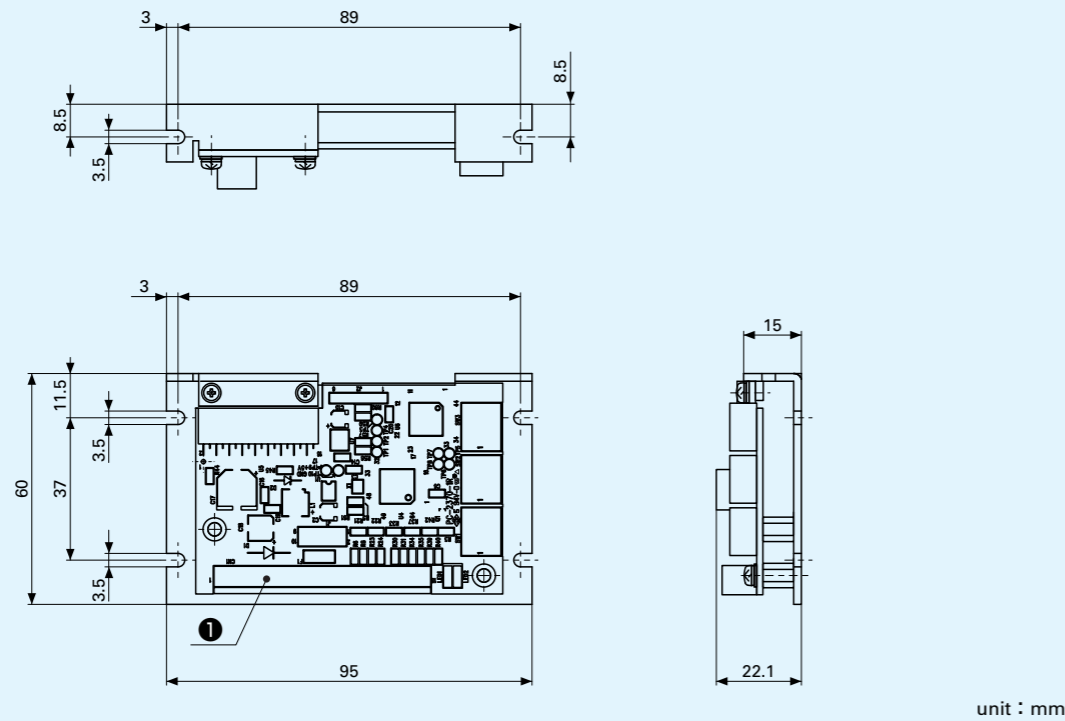
Torque charts of stepper motor T002



Torque charts of stepper motor T002

Name	Housing	Type	Contact	Manufacture
CN1 Power supply connector	EHR-2	BEH-001T-P0.6		Japan Solderless Terminal
CN2 Control signal connector	EHR-10			
CN3 Driving power supply connector	EHR-5			

Functions and dimensions of components of driver for stepper motor T003



unit : mm

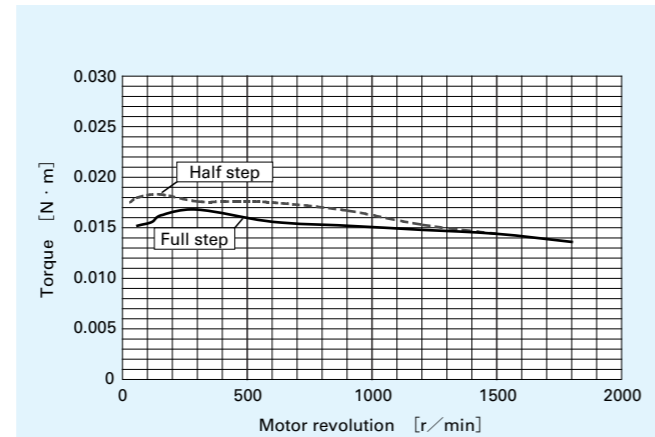
No.	Name	Function
1	Interface connector	Connects power supply, pulse cord, and motor cord.

Specification of driver for stepper motor T003

Driver type	eTD-24A
Applicable motor code	T003
Excitation type	Micro step 500 divisions maximum
Input	Photo coupler input, Input resistance 220Ω
Input type	CW/CCW signal Pulse/Rotational direction signal
Power supply	DC24V±10% 3A
Ambient temperature in operation	0~40°C (No freezing)
Ambient humidity in operation	Less than 85% RH (No condensation)
Mass kg	0.06

Remarks : DC24V power supply shall be prepared by customer.

Torque charts of stepper motor T003



Motor code	Motor type	Driver type
T003	TS3692N2	eTD-24A

Cautions in Use

- ◆ Micro Precision Positioning Table TM is a precision device. Therefore, handle it with great care and do not apply any excessive load or strong impact on it.
- ◆ Make sure that the mounting base is free from dirt and foreign objects.
- ◆ The linear motion rolling guide and ball screws assembled in Micro Precision Positioning Table TM are lubricated with grease. So take extreme care not to allow dirt or any foreign matters enter into the unit.
- ◆ The best way to lubricate Micro Precision Positioning Table TM varies by operating conditions. In general, wipe off the old grease every 6 months and apply new grease. A special-purpose re-greasing tool (a miniature grease injector) is available. If you require one, please consult .
- ◆ Micro Precision Positioning Table TM makes use of a resin table cover. Therefore do not clean it with degreasing organic solvent, white kerosene or something similar.
- ◆ Micro Precision Positioning Table TM is machined, assembled and adjusted with high accuracy. Accordingly never disassemble or remodel it in any case.
- ◆ The wiring in the motor, sensor and other electrical installations is very thin cabling. Therefore guard sufficiently against wire breaks due to hooking, pulling or other inadvertent action.

○ The appearance, specifications and other details of the products are subject to change without prior notice for improvement.

Duration and scope of warranty

The period of warranty for the precision positioning table and related electrical devices is set at one year after delivery. If a failure occurs while the product is correctly being used and the failure is clearly attributable to its manufacture, the product will be repaired at no cost within the warranty period. However, disposables are outside the scope of warranty. Furthermore, our guarantee covers the acquired product itself. Any damages, direct or indirect, damages, occurring from failures or use of this product, are outside the scope of this warranty.

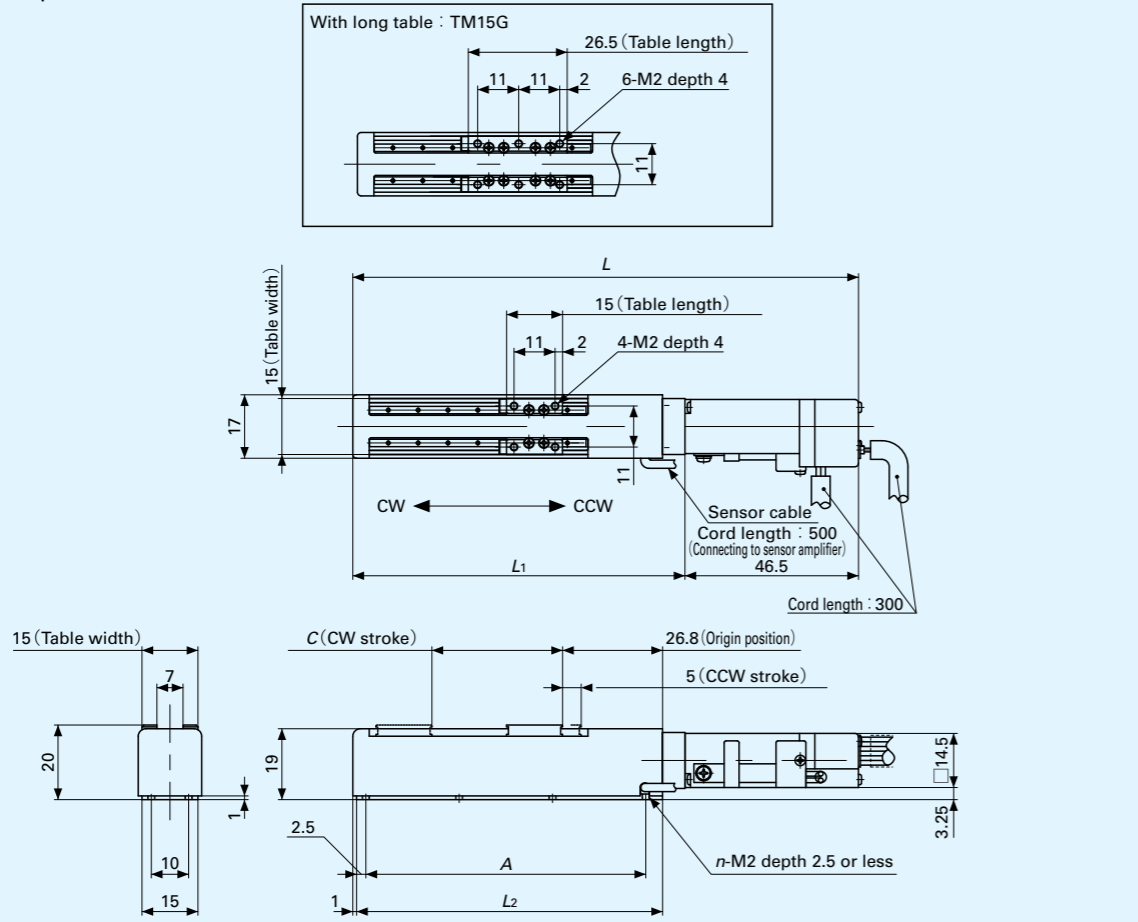
A warranty here means the guarantee of the precision positioning table itself as a single unit. It shall be a fare-paying services if field service is required.

When the trouble is not obviously judged by our product deficiency as a result of our investigation, customer shall be responsible for the repair cost. Secondary damage that occurs on the product breakdown or use is out of our warranty.

When disposing of the products, treat them as ordinary industrial waste.

TM15

AC Servo Motor Specification: T001



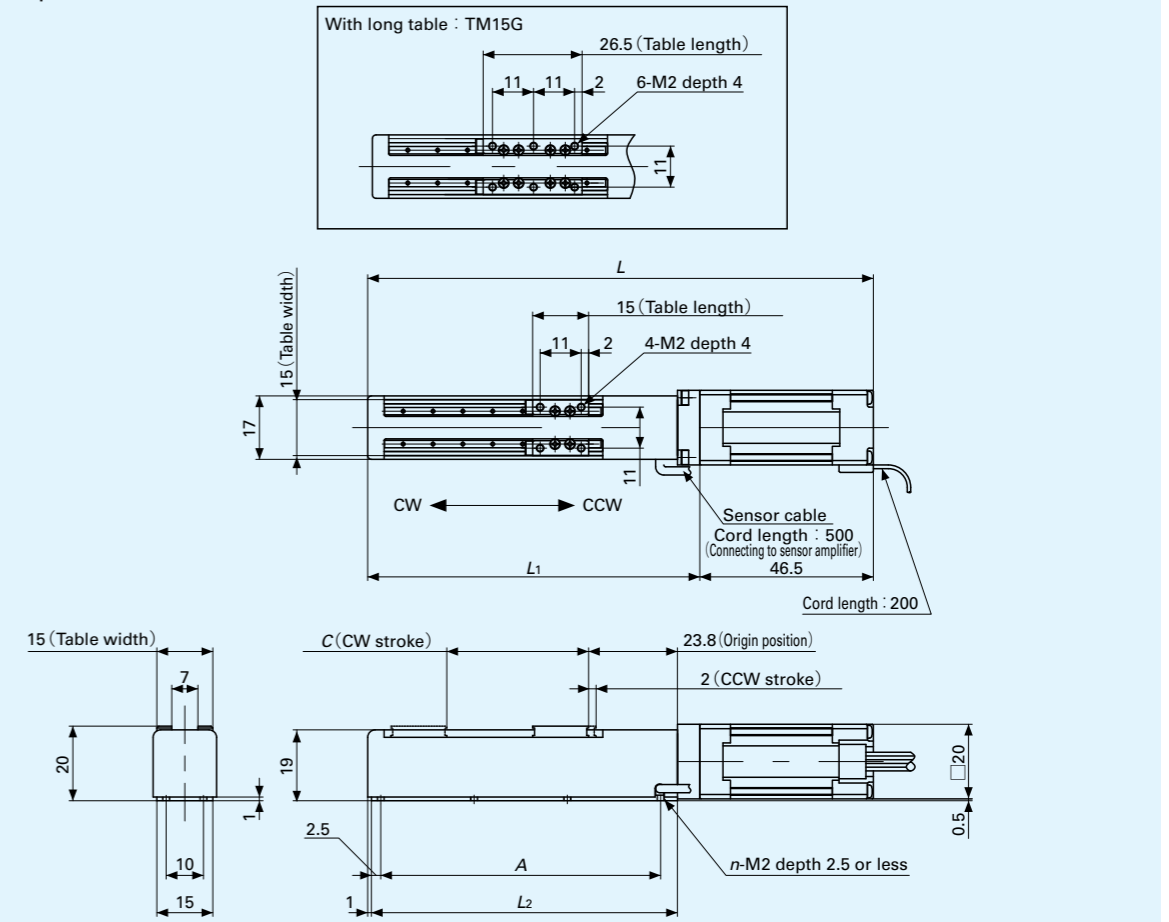
unit : mm

Model code	Stroke dimension		Table dimension					Mass (Ref.) kg
	Stroke length	CW stroke C	Overall length L	L ₁	L ₂	Mounting holes		
						A (Number of hall X pitch)	n	
TM15 -20	20	15	115.5	69	62	50 (2×25)	6	0.15
TM15 -40	40	35	135.5	89	82	75 (3×25)	8	0.16
TM15 -60	60	55	155.5	109	102	96 (4×24)	10	0.17
TM15G-10	10	5	115.5	69	62	50 (2×25)	6	0.16
TM15G-30	30	25	135.5	89	82	75 (3×25)	8	0.17
TM15G-50	50	45	155.5	109	102	96 (4×24)	10	0.18

Remark : Table cover is made of resin. If a stainless steel table cover is required, consult .

TM15

Stepper Motor Specification: T002, T003



unit : mm

Model code	Stroke dimension		Table dimension					Mass (Ref.) kg
	Stroke length	CW stroke C	Overall length L	L ₁	L ₂	Mounting holes		
						A (Number of hall X pitch)	n	
TM15 -20	20	18	115.5	69	62	50 (2×25)	6	0.18
TM15 -40	40	38	135.5	89	82	75 (3×25)	8	0.19
TM15 -60	60	58	155.5	109	102	96 (4×24)	10	0.20
TM15G-10	10	8	115.5	69	62	50 (2×25)	6	0.19
TM15G-30	30	28	135.5	89	82	75 (3×25)	8	0.20
TM15G-50	50	48	155.5	109	102	96 (4×24)	10	0.21

Remark : Table cover is made of resin. If a stainless steel table cover is required, consult .

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Recognizing that conservation of the global environment is the top-priority challenge for the world's population, **IKO** will conduct its activities with consideration of the environment as a corporate social responsibility, reduce its negative impact on the environment, and help foster a rich global environment.

**ISO 9001 & 14001 Quality system
registration certificate**

