GB

IAI
Quality and Innovation

TT

TABLETOP ROBOT

High accuracy	± 0.02 mm
Types	Gate / Cantilever
Numbers of axes	2 axes / 3 axes
Work envelope	200 X 200 400 X 400
Number of positioning points	3000 points

www.intelligentactuator.de

A compact robot that is easy to use yet

High-performance tabletop robot available at an amazingly low price

Cross-sectional view of TT base

1 Positioning repeatability of 0.02 mm An encoder eliminates the possibility of misstepping

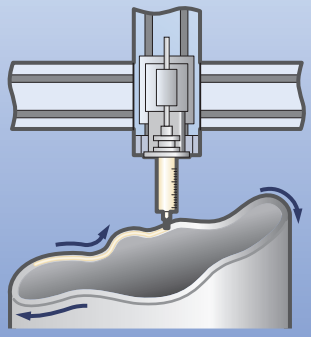
Adoption of a rigid base, ball screw and servo control motor

The TT employs a rigid base made of aluminum extruded material. It also uses a high-accuracy ball screw and a servo control motor to allow precision and eliminate misstepping.

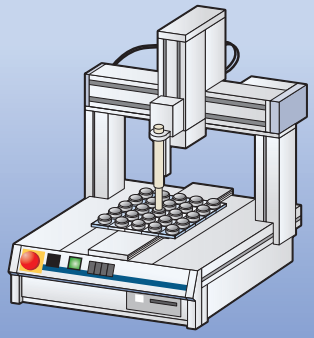
2 Built-in X-SEL controller

High path accuracy and constant speed

The TT utilizes the high path accuracy and constant speed of the X-SEL controller. Additionally, it provides the same extensive functions and commands as the X-SEL controller. With the 3-axis specification, the TT lets you perform three-dimensional arc interpolation and path movement. You can also use the TT together with a teaching pendant, PC software or other tools.
A maximum of 64 programs can be stored, and up to 16 programs can be run simultaneously. Up to 3,000 positions can be registered.



Three-dimensional path movement



Adjustable push function for switch testing

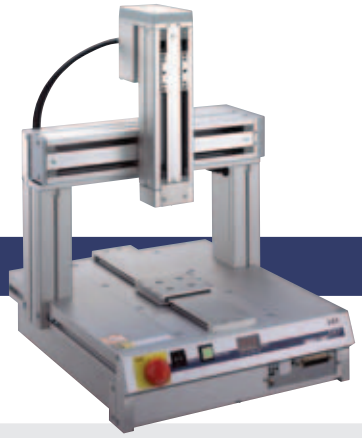
3 PUSH Motion - Operation is possible

For test with push motion and press-fitting

The PUSH Motion-Operation available with RC series is also available with Tabletop. As with RC series, forces can be changed freely and it can be used for variety of application like test for pushing switch and press fitting of works.

highly functional

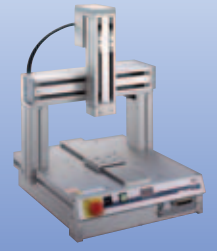
TABLE TOP TT



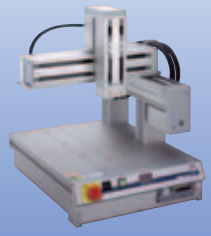
4 Gate type or cantilever type

The gate type for high rigidity or the cantilever type for a savings in workspace

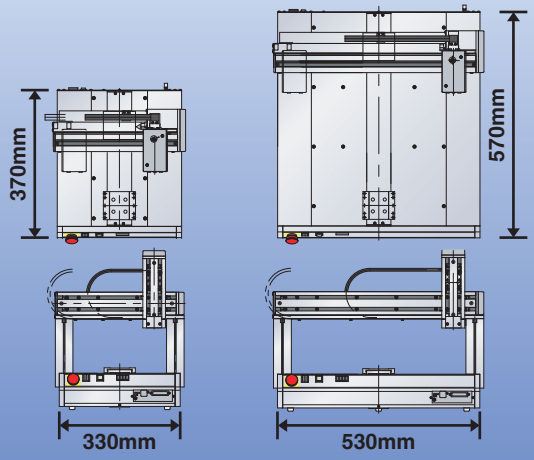
The gate type has its Y-axis fixed, so it withstands unbalanced loads well and is suitable in applications where the Z-axis receives a heavy load, as well as applications where a large portion of the load overhangs the slider.
The cantilever type provides a wide, open work surface, so it is ideal when your equipment will be handling larger loads or loads with an irregular shape in a fixed condition.



Gate type



Cantilever type



5 Select one of two operating ranges

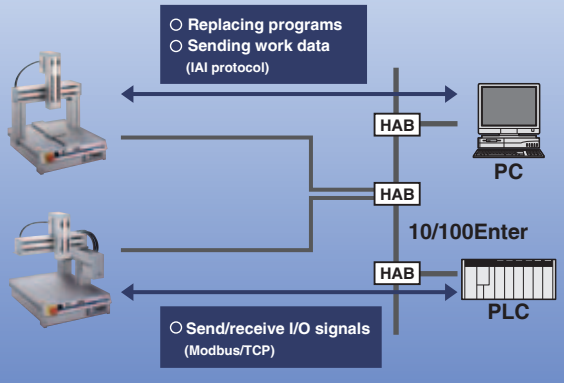
2020 type (200 mm) or 4040 type (400 mm)

In addition to offering two model types (gate type and cantilever type), the TT also provides two selectable operating ranges. Choose 200 mm x 200 mm (2020 type) or 400 mm x 400 mm (4040 type) as the operating range (X-axis/ Y-axis) of the actuator. Whether your equipment is handling small loads or large loads, you can select an appropriate model to operate in the appropriate range.
The TT is available in a 2-axis specification and a 3-axis specification. The 3-axis specification comes standard with a Z-axis brake, which prevents the slider from falling when the power is off.

6 Supporting field networks (optional)

Configured to support DeviceNet, CC-Link, ProfiBus and Ethernet

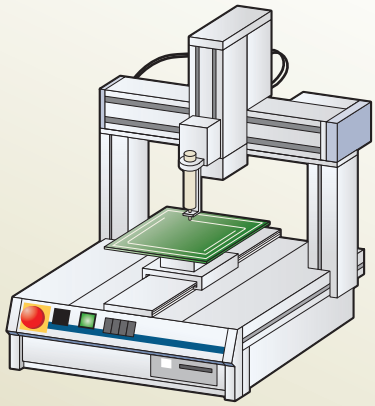
The TT can be connected to a common field network such as DeviceNet, CC-Link, ProfiBus and Ethernet for the transmission and acquisition of position changes, production results and other data.



Examples of Application

Coating

The TT's high-performance interpolation function makes it an ideal actuator for coating targets having a two- or three-dimensional shape.

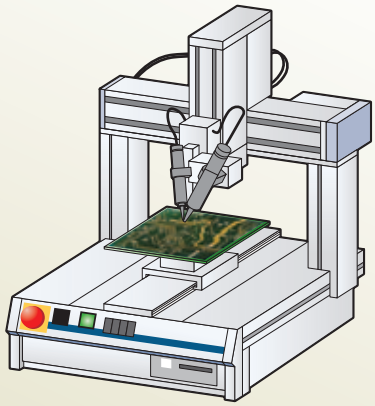


Applications

Applying silicone to circuit boards, adhesive to speakers, sealant to fuel cells, etc.

Soldering

With its 3000-point positioning capability, the TT can easily apply solder to circuit boards, etc.

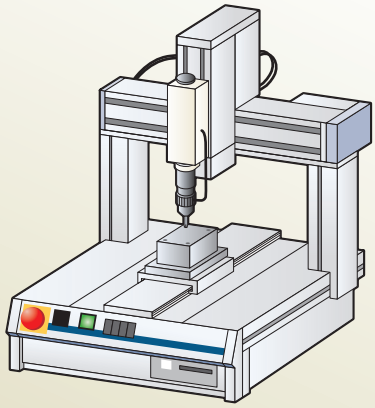


Applications

Soldering electronic components.

Driving screws

The push-motion function of the Z-axis can be used to hold a screwdriver against the load to tighten screws.

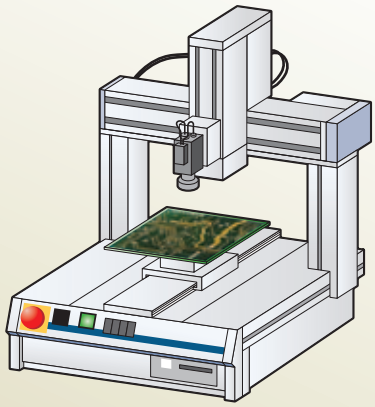


Applications

Tightening screws into electronic components and automotive parts.

Circuit board inspection

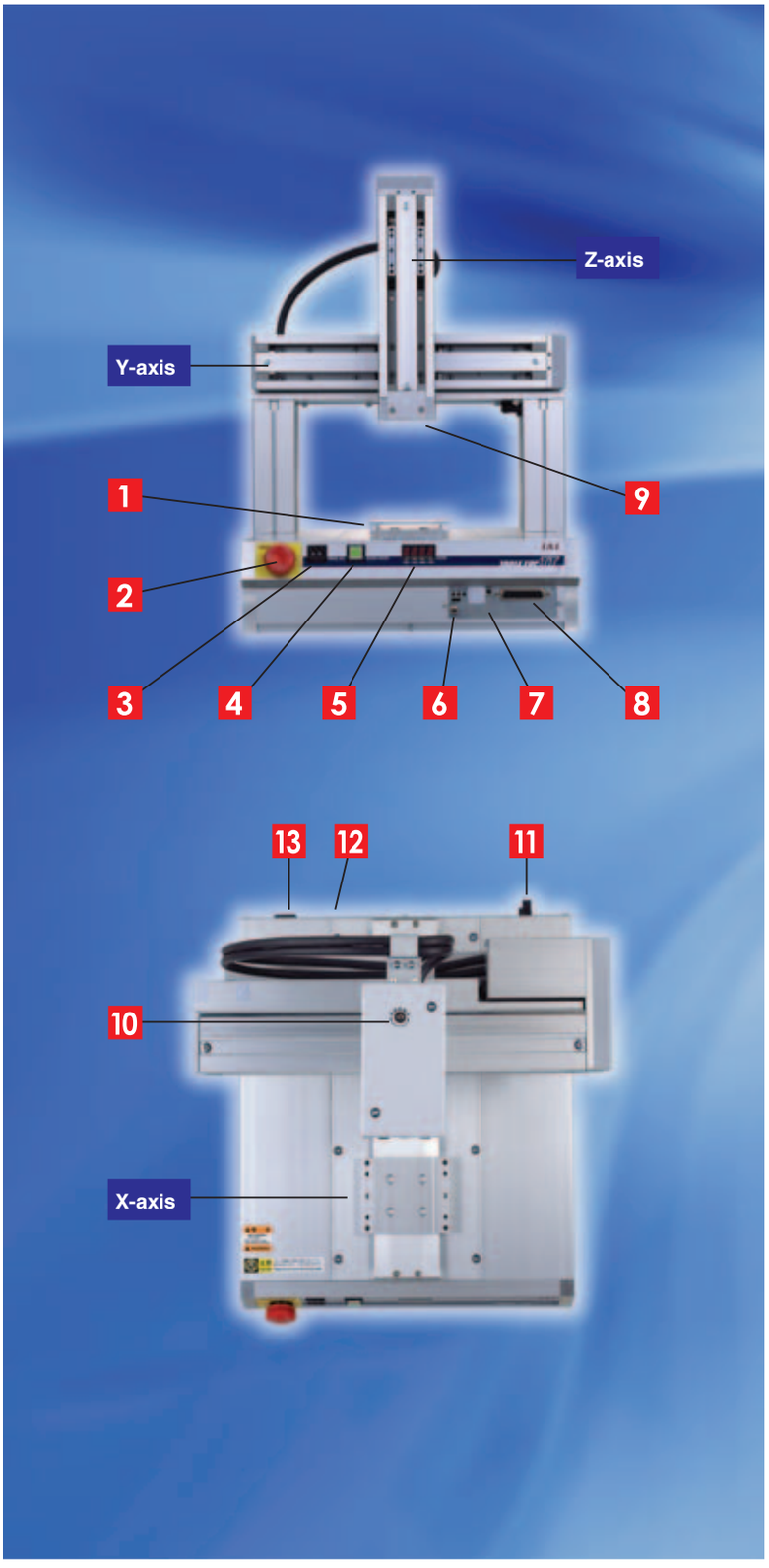
You can attach an image sensor to the Z-axis to inspect circuit boards and components.



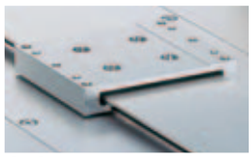
Applications

Checking circuit boards for mounting defects, inspecting processed parts.

Name of Each Part



1 X-axis slider opening
The X-axis slider opening has a step that prevents the entry of foreign matter.



2 Emergency stop switch
A lock switch used to stop all actuator operations.

3 Digital program-selector switch
A digital switch used to select the program you want to run.

4 Function switch
A pushbutton switch that can be used to start/pause a program.

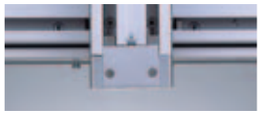
5 Panel window
A 4-digit, 7-segment LED that displays the program number of the current program, error codes, etc.

6 Brake-release switch
A switch to forcibly release the Z-axis brake.

7 Network connector socket (optional)
A socket that accepts a field network connector.
(Refer to page 17.)

8 Teaching connector
A D-sub, 25-pin connector that accepts a teaching -pendant cable or PC cable.

9 Z-axis brake
A brake that prevents the slider from falling when the servo or power is switched off.



10 Position-adjustment Knob
Used to fine-tune the slider position when the servo is off (One knob is provided on each of the X-, Y- and Z-axes.)

11 I/O connector
A 34-pin flat connector used for communicating with external equipment. (Refer to page 15.)

12 Power switch

13 Power connector
(A power plug is supplied with the actuator.)

Lineup

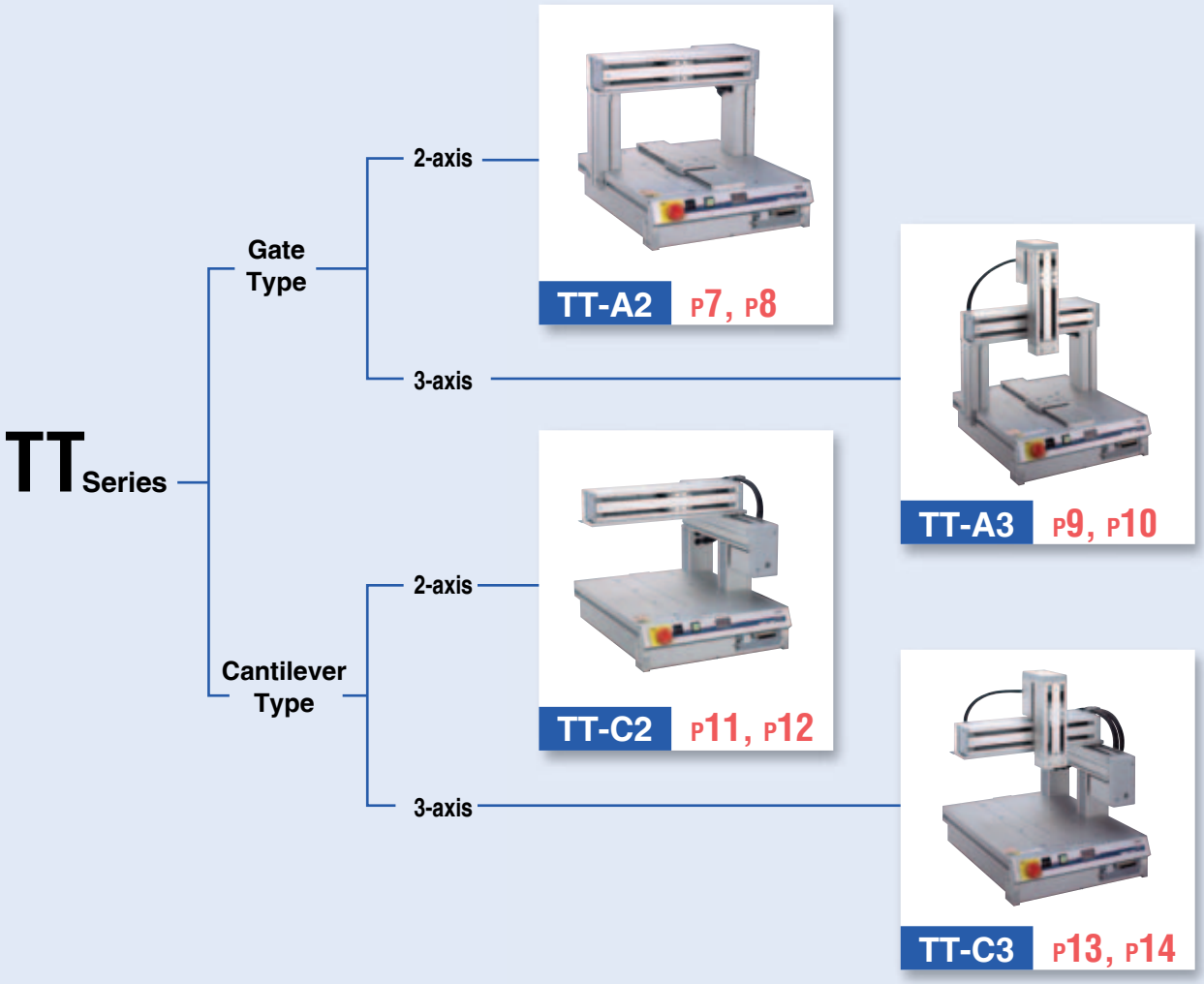


Table of Specifications

Type		Stroke (mm)			Maximum speed (mm/sec)	Load capacity (kg)			Positioning repeatability (mm)	Model	Page
		X-axis	Y-axis	Z-axis		X-axis	Y-axis	Z-axis			
Gate Type	2-axis	200	200	–	300	10	5	–	±0.02	TT-A2-I-2020	P7
		400	400	–						TT-A2-I-4040	P8
	3-axis	200	200	50		10	–	2		TT-A3-I-2020-05B	P9
				100						TT-A3-I-2020-10B	
		400	400	50						TT-A3-I-4040-05B	P10
				100						TT-A3-I-4040-10B	
Cantilever Type	2-axis	200	200	–		–	4	–		TT-C2-I-2020	P11
		400	400	–						TT-C2-I-4040	P12
	3-axis	200	200	50		–	–	2		TT-C3-I-2020-05B	P13
				100						TT-C3-I-2020-10B	
		400	400	50						TT-C3-I-4040-05B	P14
				100						TT-C3-I-4040-10B	

Model

TT - A3 - I - 2020 - 05B - PR
1 2 3 4 5 6

1 Series	2 Type	3 Encoder type	4 XY stroke (mm)	5 Z stroke (mm)	6 Option
TT	A2 A3	I	2020 4040	A3: 05B 10B	DV CC PR ET FT P
	C2 C3			C3: 05B 10B	

1 Series
Name of the series

2 Type
Shape and number of component axes

A2	Gate, 2 axes	A3	Gate, 3 axes
C2	Cantilever, 2 axes	C3	Cantilever, 3 axes

3 Encoder type
Type of encoder installed in the actuator

Only "Incremental" is available with the tabletop type.

I	Incremental:	Since the slider position data is erased once the power is turned off, home return will be required the next time the power is turned on.

4 XY stroke
X- and Y-axis stroke

(The X-axis stroke is the same as the Y-axis stroke.)

2020	200mm
4040	400mm

5 Z stroke
Z-axis stroke

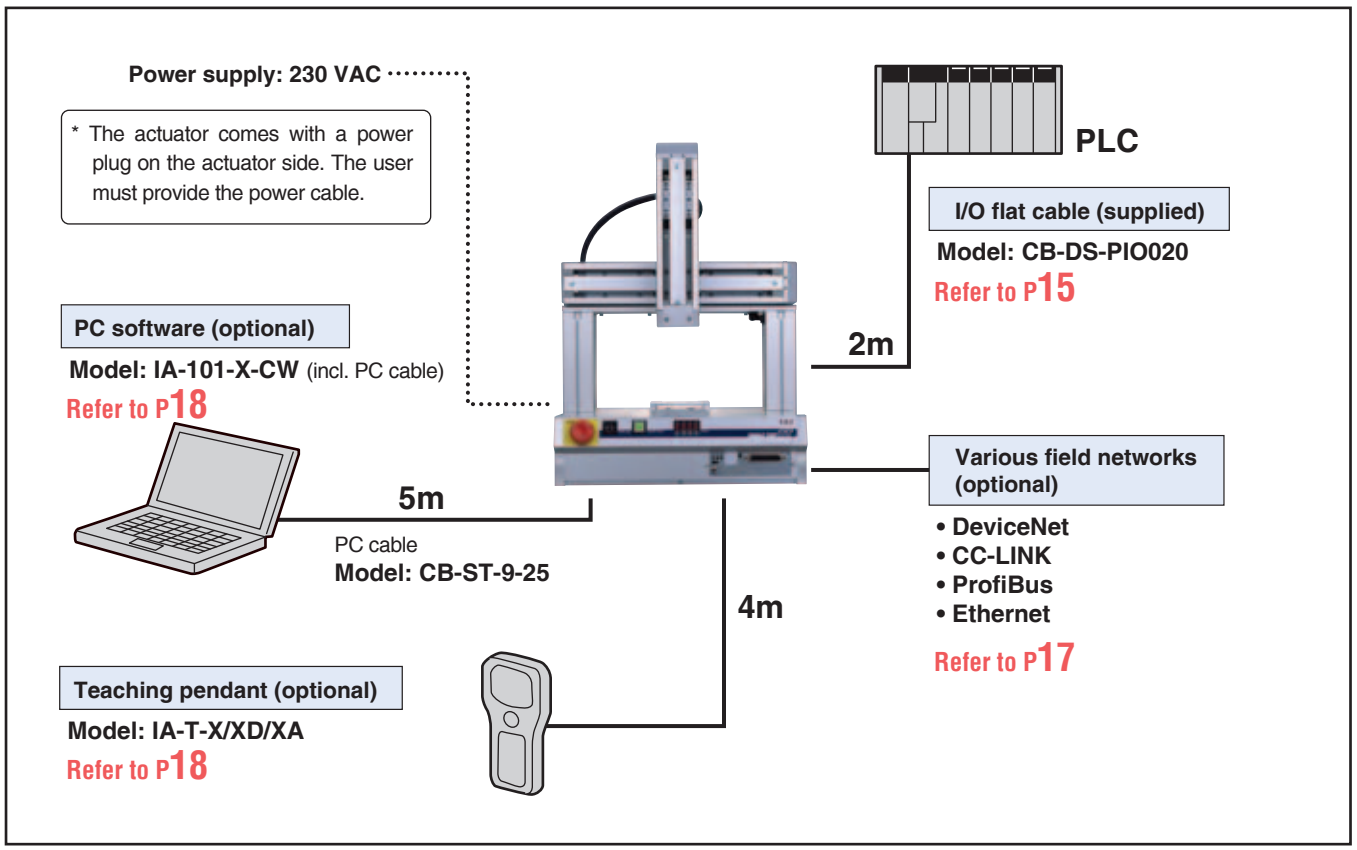
* Since the Z-axis comes standard with a brake, "B" is added after the number indicating the stroke.

05B	50mm
10B	100mm

6 Option
Specify the options you want included in the actuator:

DV	DeviceNet connection specification	PR	ProfiBus connection specification
CC	CC-Link connection specification	ET	Ethernet connection specification
FT	Actuator bracket specification	P	External I/O PNP specification

System Configuration



TT-A2-2020

Tabletop Robot/ Gate 2-axis specification
XY-axes: 200 mm

Type	Stroke	Load capacity
Gate, 2-axis	X-axis: 200 mm / Y-axis: 200 mm	X-axis:10kg / Y-axis:5kg

■ Model specification items — Series — Type — Encoder type — XY-axis stroke — Option

(Example) TT - A2 - I - 2020 - DV

Model / Specifications

Model	Axis configuration	Encoder type	Motor type	Lead (mm)	Stroke (mm)	Speed (mm/sec)	Load capacity (kg) (Note 1)
TT-A2-I-2020-①	X-axis	Incremental	Pulse motor	6	200	1-300	10
	Y-axis			6	200	1-300	5

* ① in the model number shown above indicates the applicable option(s).

Options

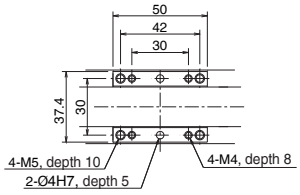
Name	Model
DeviceNet connection specification	DV
CC-Link connection specification	CC
ProfiBus connection specification	PR
Ethernet connection specification	ET
Actuator bracket specification	FT

Common Specifications

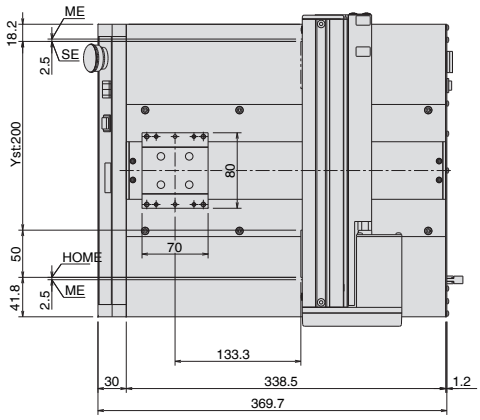
Drive system	Ball screw (Ø10mm, rolled C10)
Positioning repeatability	±0.02mm
Backlash (Note 2)	0.1mm or less
Guide	Direct-coupled endless cycling type
Allowable load moment (Note 3)	Ma : 6.5N • m Mb : 9.3N • m Mc : 16.4N • m
Ambient temperature/humidity	5 to 40°C, 85%RH max. (non-condensing)
Actuator weight	14.8 kg

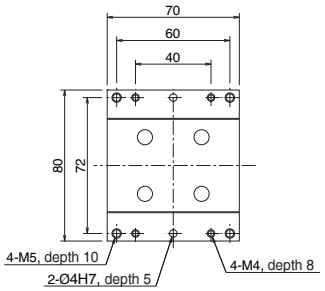
Dimensions

* During home return the slider moves to the ME, so be careful to prevent contact with surrounding parts.
SE: Stroke end
ME: Mechanical end

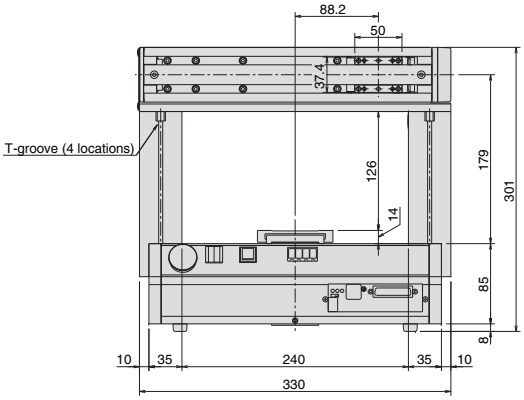


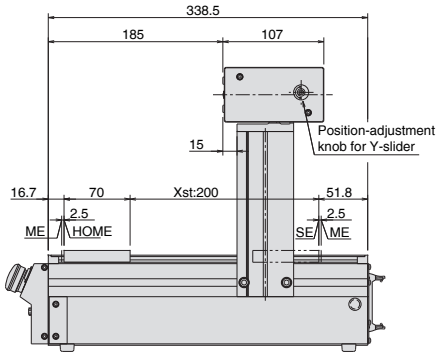
Y-axis slider installation hole

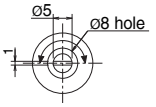




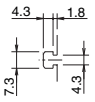
X-axis slider installation hole







Position-adjustment knob



Detail view of T-groove

Applicable Controller Specifications

Applicable Controller	Maximum number of controlled axes	Compatible encoder type	Programs	Power-supply voltage	Page
Built-in	2 axes	Incremental	64	230V	→P15

Caution

(Note 1) The load capacity is based on operation at an acceleration of 0.3 G.
(Note 2) Applicable to each axis of X or Y.
(Note 3) The load moment is a per-axis value based on a travel life of 5,000 km. (Refer to page 19 for the load moment.)

TT-A2-4040

Tabletop Robot/ Gate 2-axis specification
XY-axes: 400 mm

Type: Gate, 2-axis | Stroke: X-axis: 400 mm / Y-axis: 400 mm | Load capacity: X-axis: 10kg / Y-axis: 5kg

■ Model specification items — Series | Type | Encoder type | XY-axis stroke | Option

(Example) TT - A2 - I - 4040 - DV

Model / Specifications

Model	Axis configuration	Encoder type	Motor type	Lead (mm)	Stroke (mm)	Speed (mm/sec)	Load capacity (kg) (Note 1)
TT-A2-I-4040-①	X-axis	Incremental	Pulse motor	6	400	1-300	10
	Y-axis			6	400	1-300	5

* ① in the model number shown above indicates the applicable option(s).

Options

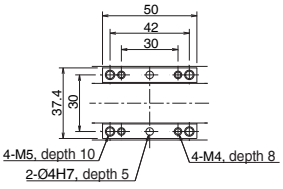
Name	Model
DeviceNet connection specification	DV
CC-Link connection specification	CC
ProfiBus connection specification	PR
Ethernet connection specification	ET
Actuator bracket specification	FT

Common Specifications

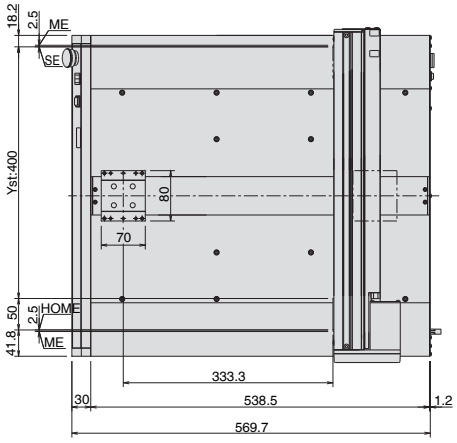
Drive system	Ball screw (Ø10mm, rolled C10)
Positioning repeatability	±0.02mm
Backlash (Note 2)	0.1mm or less
Guide	Direct-coupled endless cycling type
Allowable load moment (Note 3)	Ma : 6.5N • m Mb : 9.3N • m Mc : 16.4N • m
Ambient temperature/humidity	5 to 40°C, 85%RH max. (non-condensing)
Actuator weight	33 kg

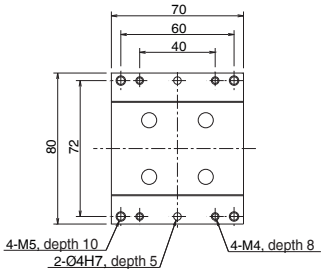
Dimensions

* During home return the slider moves to the ME, so be careful to prevent contact with surrounding parts.
SE: Stroke end
ME: Mechanical end

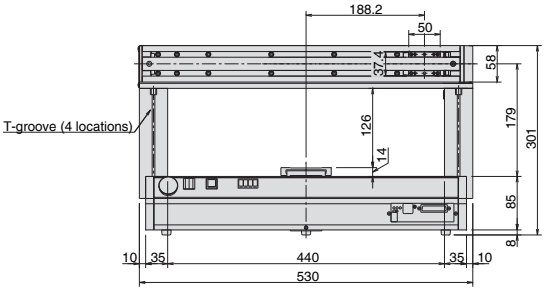


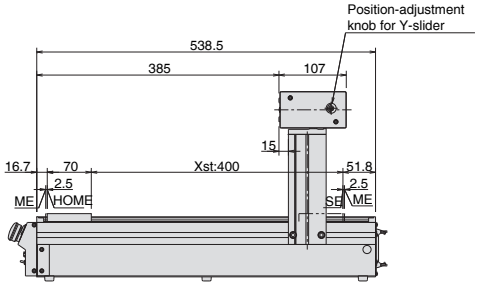
Y-axis slider installation hole

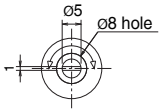




X-axis slider installation hole







Position-adjustment knob

Detail view of T-groove

Applicable Controller Specifications

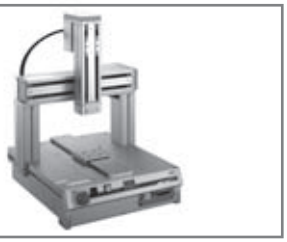
Applicable Controller	Maximum number of controlled axes	Compatible encoder type	Programs	Power-supply voltage	Page
Built-in	2 axes	Incremental	64	230V	→P15

Caution

(Note 1) The load capacity is based on operation at an acceleration of 0.3 G.
(Note 2) Applicable to each axis of X or Y.
(Note 3) The load moment is a per-axis value based on a travel life of 5,000 km. (Refer to page 19 for the load moment.)

TT-A3-2020

Tabletop Robot/ Gate 3-axis specification
XY-axes: 200 mm Z-axis: 50mm / 100mm



Type	Stroke	Load capacity
Gate, 3-axis	X-axis: 200 mm / Y-axis: 200 mm / Z-axis: 50mm / 100mm	X-axis: 10kg / Z-axis: 2kg

■ Model specification items — Series — Type — Encoder type — XY-axis stroke — Z-axis stroke — Option

(Example) TT - A3 - I - 2020 - 05B - DV

Model / Specifications

Model	Axis configuration	Encoder type	Motor type	Lead (mm)	Stroke (mm)	Speed (mm/sec)	Load capacity (kg) (Note 1)
TT-A3-I-2020-①-②	X-axis	Incremental	Pulse motor	6	200	1-300	10
	Y-axis			6	200	1-300	–
	Z-axis			6	50/100	1-300 (Note 2)	2

* ① and ② in the model number shown above indicate the Z-axis stroke and applicable option(s), respectively.

Options

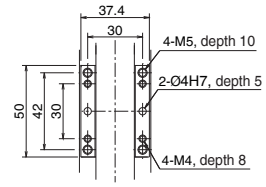
Name	Model
DeviceNet connection specification	DV
CC-Link connection specification	CC
ProfiBus connection specification	PR
Ethernet connection specification	ET
Actuator bracket specification	FT

Common Specifications

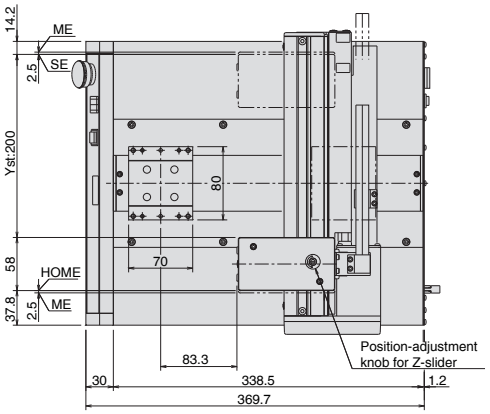
Drive system	Ball screw (Ø10mm, rolled C10)
Positioning repeatability	±0.02mm
Backlash (Note 3)	0.1mm or less
Guide	Direct-coupled endless cycling type
Allowable load moment (Note 4)	Ma : 6.5N • m Mb : 9.3N • m Mc : 16.4N • m
Ambient temperature/humidity	5 to 40°C, 85%RH max. (non-condensing)
Actuator weight	16.5kg

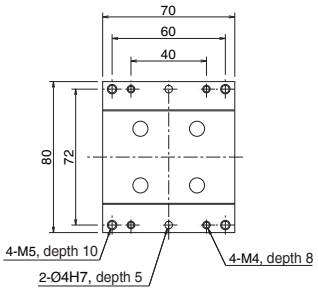
Dimensions

* During home return the slider moves to the ME, so be careful to prevent contact with surrounding parts.
SE: Stroke end
ME: Mechanical end

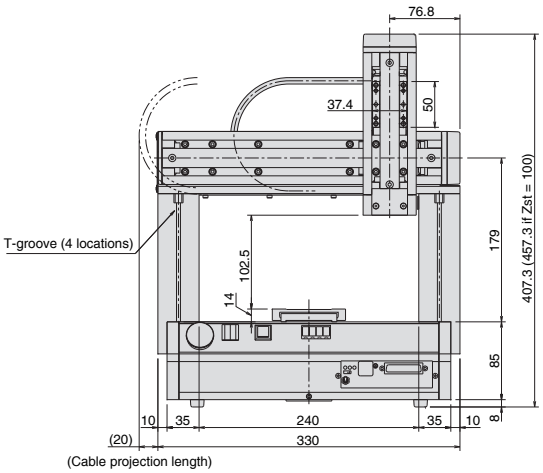


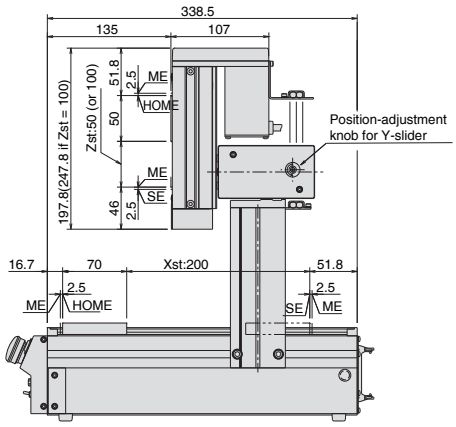
Z-axis slider installation hole

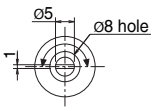




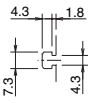
X-axis slider installation hole







Position-adjustment knob



Detail view of T-groove

Applicable Controller Specifications

Applicable Controller	Maximum number of controlled axes	Compatible encoder type	Programs	Power-supply voltage	Page
Built-in	3 axes	Incremental	64	230V	→P15

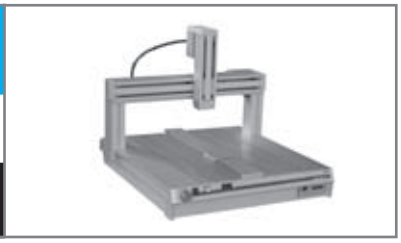
Caution

(Note 1) The load capacity is based on operation at an acceleration of 0.3 G.
(Note 2) If the stroke is 50, the maximum speed will be capped at 280 mm/sec due to the shorter travel distance.
(Note 3) Value for each of the X, Y and Z axes
(Note 4) The load moment is a per-axis value based on a travel life of 5,000 km. (Refer to page 19 for the load moment.)

TT-A3-4040

Tabletop Robot/ Gate 3-axis specification
XY-axes: 400 mm Z-axis: 50mm / 100mm

Type: Gate, 3-axis | Stroke: X-axis: 400 mm / Y-axis: 400 mm / Z-axis: 50mm / 100mm | Load capacity: X-axis: 10kg / Z-axis: 2kg



■ Model specification items — Series — Type — Encoder type — XY-axis stroke — Z-axis stroke — Option

(Example) TT - A3 - I - 4040 - 05B - DV

Model / Specifications

Model	Axis configuration	Encoder type	Motor type	Lead (mm)	Stroke (mm)	Speed (mm/sec)	Load capacity (kg) (Note 1)
TT-A3-I-4040-①-②	X-axis	Incremental	Pulse motor	6	400	1-300	10
	Y-axis			6	400	1-300	–
	Z-axis			6	50/100	1-300 (Note 2)	2

* ① and ② in the model number shown above indicate the Z-axis stroke and applicable option(s), respectively.

Options

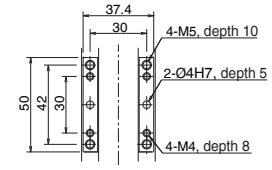
Name	Model
DeviceNet connection specification	DV
CC-Link connection specification	CC
ProfiBus connection specification	PR
Ethernet connection specification	ET
Actuator bracket specification	FT

Common Specifications

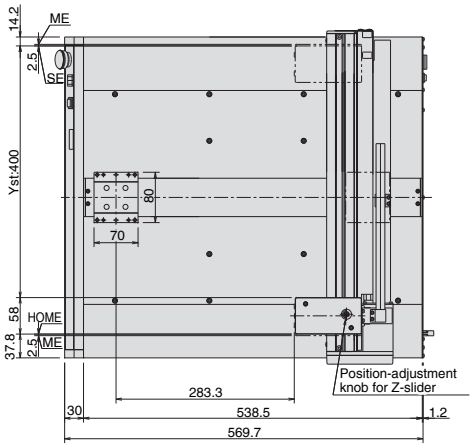
Drive system	Ball screw (Ø10mm, rolled C10)
Positioning repeatability	±0.02mm
Backlash (Note 3)	0.1mm or less
Guide	Direct-coupled endless cycling type
Allowable load moment (Note 4)	Ma : 6.5N • m Mb : 9.3N • m Mc : 16.4N • m
Ambient temperature/humidity	5 to 40°C, 85%RH max. (non-condensing)
Actuator weight	35kg

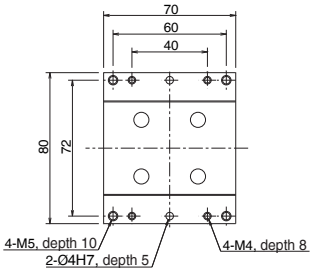
Dimensions

* During home return the slider moves to the ME, so be careful to prevent contact with surrounding parts.
SE: Stroke end
ME: Mechanical end

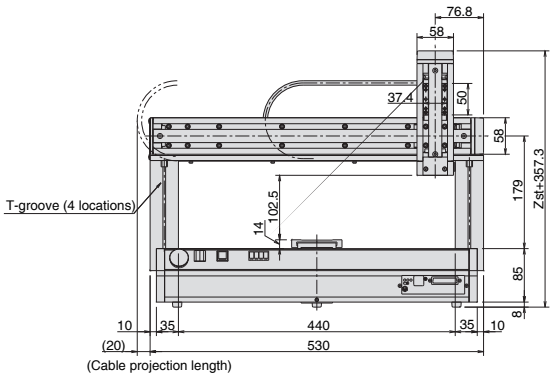


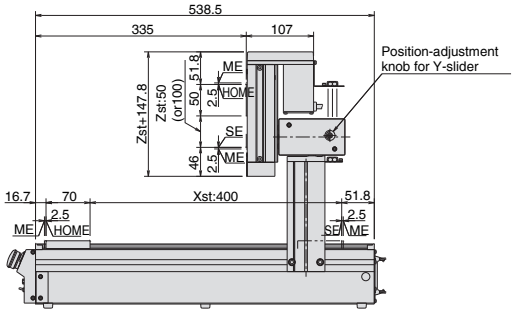
Z-axis slider installation hole

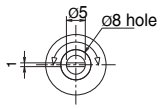




X-axis slider installation hole







Position-adjustment knob

Detail view of T-groove

Applicable Controller Specifications

Applicable Controller	Maximum number of controlled axes	Compatible encoder type	Programs	Power-supply voltage	Page
Built-in	3 axes	Incremental	64	230V	→P15

Caution

(Note 1) The load capacity is based on operation at an acceleration of 0.3 G.
(Note 2) If the stroke is 50, the maximum speed will be capped at 280 mm/sec due to the shorter travel distance.
(Note 3) Value for each of the X, Y and Z axes
(Note 4) The load moment is a per-axis value based on a travel life of 5,000 km. (Refer to page 19 for the load moment.)

TT-C2-2020

Tabletop Robot/ Cantilever 2-axis specification
XY-axes: 200 mm

Type	Stroke	Load capacity
Cantilever 2-axis	X-axis: 200 mm / Y-axis: 200 mm	Y-axis: 4kg

■ Model specification items — Series — Type — Encoder type — XY-axis stroke — Option

(Example) TT - C2 - I - 2020 - DV

Model / Specifications

Model	Axis configuration	Encoder type	Motor type	Lead (mm)	Stroke (mm)	Speed (mm/sec)	Load capacity (kg) (Note 1)
TT-C2-I-2020-①	X-axis	Incremental	Pulse motor	6	200	1-300	–
	Y-axis			6	200	1-300	4

* ① in the model number shown above indicates the applicable option(s).

Options

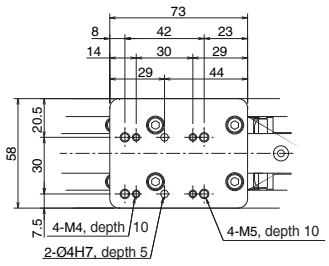
Name	Model
DeviceNet connection specification	DV
CC-Link connection specification	CC
ProfiBus connection specification	PR
Ethernet connection specification	ET
Actuator bracket specification	FT

Common Specifications

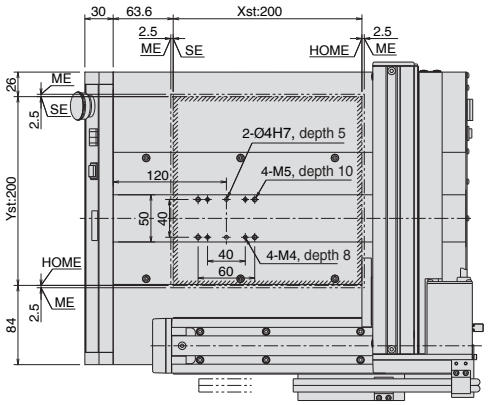
Drive system	Ball screw (Ø10mm, rolled C10)
Positioning repeatability	±0.02mm
Backlash (Note 2)	0.1mm or less
Guide	Direct-coupled endless cycling type
Allowable load moment (Note 3)	Ma : 6.5N • m Mb : 9.3N • m Mc : 16.4N • m
Ambient temperature/humidity	5 to 40°C, 85%RH max. (non-condensing)
Actuator weight	16.3 kg

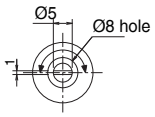
Dimensions

* During home return the slider moves to the ME, so be careful to prevent contact with surrounding parts.
SE: Stroke end
ME: Mechanical end

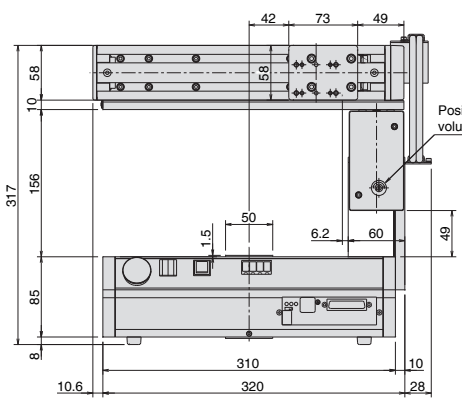


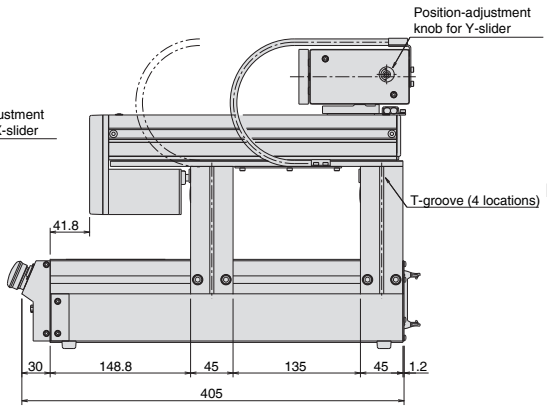
Y-axis slider installation hole

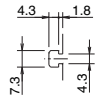




Position-adjustment knob







Detail view of T-groove

Applicable Controller Specifications

Applicable Controller	Maximum number of controlled axes	Compatible encoder type	Programs	Power-supply voltage	Page
Built-in	2 axes	Incremental	64	230V	→P15

Caution

(Note 1) The load capacity is based on operation at an acceleration of 0.2 G.
(Note 2) Applicable to each axis of X or Y.
(Note 3) The load moment is a per-axis value based on a travel life of 5,000 km. (Refer to page 19 for the load moment.)

TT-C2-4040

Tabletop Robot/ Cantilever 2-axis specification
XY-axes: 400 mm

Type	Stroke	Load capacity
Cantilever 2-axis	X-axis: 400 mm / Y-axis: 400 mm	Y-axis: 4kg

■ Model specification items — Series — Type — Encoder type — XY-axis stroke — Option

(Example) TT - C2 - I - 4040 - DV

Model / Specifications

Model	Axis configuration	Encoder type	Motor type	Lead (mm)	Stroke (mm)	Speed (mm/sec)	Load capacity (kg) (Note 1)
TT-C2-I-4040-①	X-axis	Incremental	Pulse motor	6	400	1-300	–
	Y-axis			6	400	1-300	4

* ① in the model number shown above indicates the applicable option(s).

Options

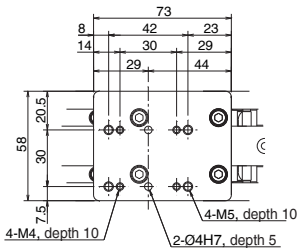
Name	Model
DeviceNet connection specification	DV
CC-Link connection specification	CC
ProfiBus connection specification	PR
Ethernet connection specification	ET
Actuator bracket specification	FT

Common Specifications

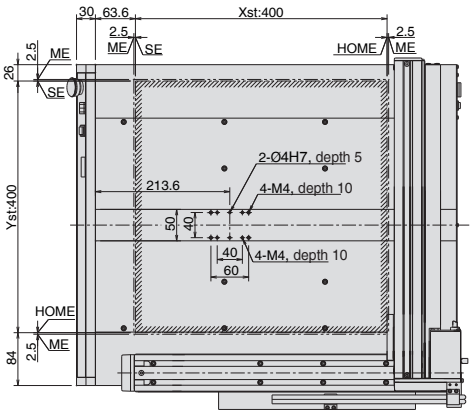
Drive system	Ball screw (Ø10mm, rolled C10)
Positioning repeatability	±0.02mm
Backlash (Note 2)	0.1mm or less
Guide	Direct-coupled endless cycling type
Allowable load moment (Note 3)	Ma : 6.5N • m Mb : 9.3N • m Mc : 16.4N • m
Ambient temperature/humidity	5 to 40°C, 85%RH max. (non-condensing)
Actuator weight	35kg

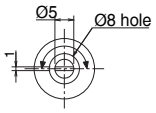
Dimensions

* During home return the slider moves to the ME, so be careful to prevent contact with surrounding parts.
SE: Stroke end
ME: Mechanical end

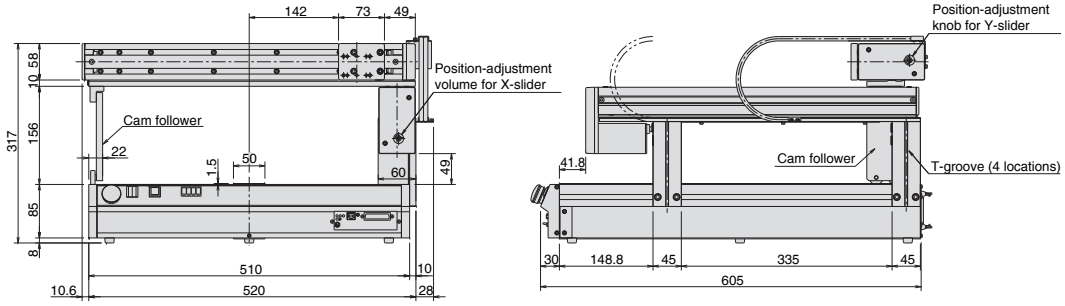


Y-axis slider installation hole





Position-adjustment knob



Detail view of T-groove

Applicable Controller Specifications

Applicable Controller	Maximum number of controlled axes	Compatible encoder type	Programs	Power-supply voltage	Page
Built-in	2 axes	Incremental	64	230V	→P15

Caution

(Note 1) The load capacity is based on operation at an acceleration of 0.2 G.
(Note 2) Applicable to each axis of X or Y.
(Note 3) The load moment is a per-axis value based on a travel life of 5,000 km. (Refer to page 19 for the load moment.)

TT-C3-2020

Tabletop Robot/ Cantilever 3-axis specification
XY-axes: 200 mm Z-axis: 50mm / 100mm

Type	Stroke	Load capacity
Cantilever, 3-axis	X-axis:200 mm / Y-axis:200 mm / Z-axis: 50mm / 100mm	Z-axis: 2kg

■ Model specification items — Series — Type — Encoder type — XY-axis stroke — Z-axis stroke — Option

(Example) TT - C3 - I - 2020 - 05B - DV

Model / Specifications

Model	Axis configuration	Encoder type	Motor type	Lead (mm)	Stroke (mm)	Speed (mm/sec)	Load capacity (kg) (Note 1)
TT-C3-I-2020-①-②	X-axis	Incremental	Pulse motor	6	200	1-300	–
	Y-axis			6	200	1-300	–
	Z-axis			6	50/100	1-300 (Note 2)	2

* ① and ② in the model number shown above indicate the Z-axis stroke and applicable option(s), respectively.

Options

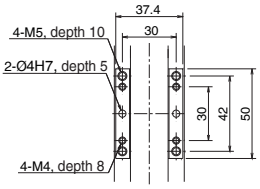
Name	Model
DeviceNet connection specification	DV
CC-Link connection specification	CC
ProfiBus connection specification	PR
Ethernet connection specification	ET
Actuator bracket specification	FT

Common Specifications

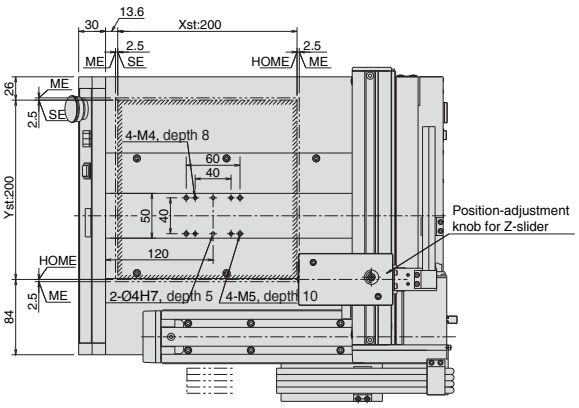
Drive system	Ball screw (Ø10mm, rolled C10)
Positioning repeatability	±0.02mm
Backlash (Note 3)	0.1mm or less
Guide	Direct-coupled endless cycling type
Allowable load moment (Note 4)	Ma : 6.5N • m Mb : 9.3N • m Mc : 16.4N • m
Ambient temperature/humidity	5 to 40°C, 85%RH max. (non-condensing)
Actuator weight	18 kg

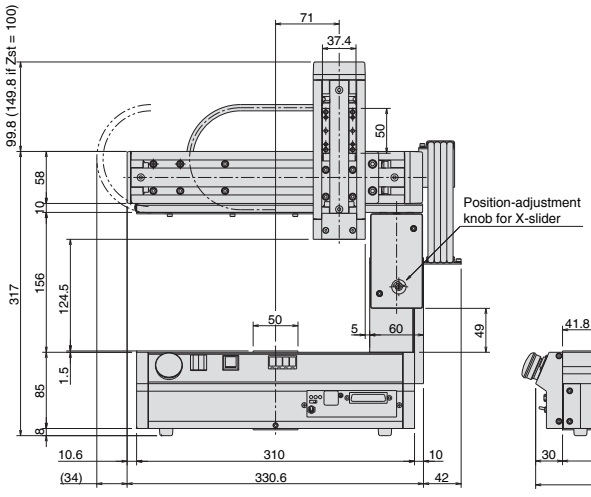
Dimensions

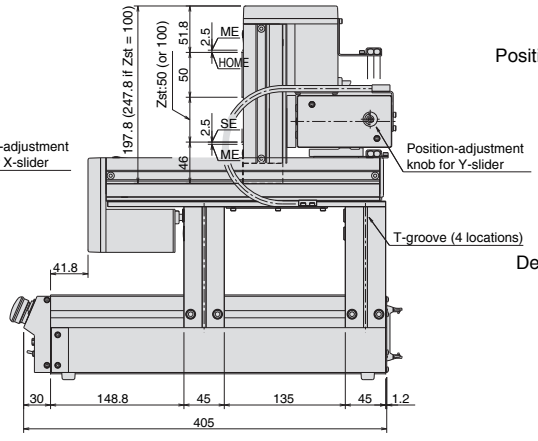
* During home return the slider moves to the ME, so be careful to prevent contact with surrounding parts.
SE: Stroke end
ME: Mechanical end

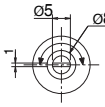


Z-axis slider installation hole









Position-adjustment knob

Detail view of T-groove

Applicable Controller Specifications

Applicable Controller	Maximum number of controlled axes	Compatible encoder type	Programs	Power-supply voltage	Page
Built-in	3 axes	Incremental	64	230V	→P15

Caution

(Note 1) The load capacity is based on operation at an acceleration of 0.2 G.
(Note 2) If the stroke is 50, the maximum speed will be capped at 280 mm/sec due to the shorter travel distance.
(Note 3) Value for each of the X, Y and Z axes
(Note 4) The load moment is a per-axis value based on a travel life of 5,000 km. (Refer to page 19 for the load moment.)

TT-C3-4040

Tabletop Robot/ Cantilever 3-axis specification
XY-axes: 400 mm Z-axis: 50mm / 100mm

Type	Stroke	Load capacity
Cantilever, 3-axis	X-axis:400 mm / Y-axis:400 mm / Z-axis: 50mm / 100mm	Z-axis: 2kg

■ Model specification items — Series — Type — Encoder type — XY-axis stroke — Z-axis stroke — Option

(Example) TT - C3 - I - 4040 - 05B - DV

Model / Specifications

Model	Axis configuration	Encoder type	Motor type	Lead (mm)	Stroke (mm)	Speed (mm/sec)	Load capacity (kg) (Note 1)
TT-C3-I-4040-①-②	X-axis	Incremental	Pulse motor	6	400	1-300	–
	Y-axis			6	400	1-300	–
	Z-axis			6	50/100	1-300 (Note 2)	2

* ① and ② in the model number shown above indicate the Z-axis stroke and applicable option(s), respectively.

Options

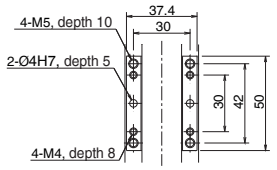
Name	Model
DeviceNet connection specification	DV
CC-Link connection specification	CC
ProfiBus connection specification	PR
Ethernet connection specification	ET
Actuator bracket specification	FT

Common Specifications

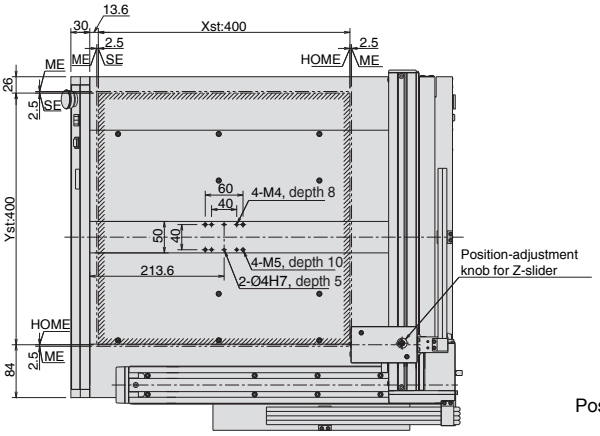
Drive system	Ball screw (Ø10mm, rolled C10)
Positioning repeatability	±0.02mm
Backlash (Note 3)	0.1mm or less
Guide	Direct-coupled endless cycling type
Allowable load moment (Note 4)	Ma : 6.5N • m Mb : 9.3N • m Mc : 16.4N • m
Ambient temperature/humidity	5 to 40°C, 85%RH max. (non-condensing)
Actuator weight	37 kg

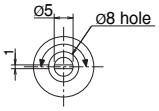
Dimensions

* During home return the slider moves to the ME, so be careful to prevent contact with surrounding parts.
SE: Stroke end
ME: Mechanical end

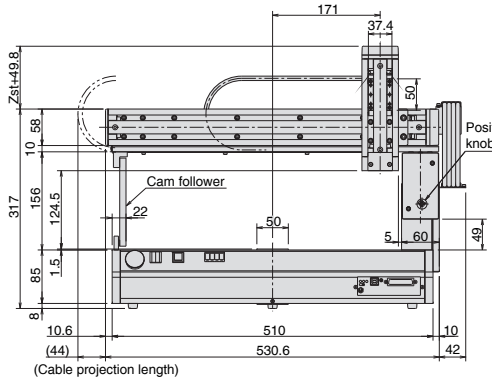


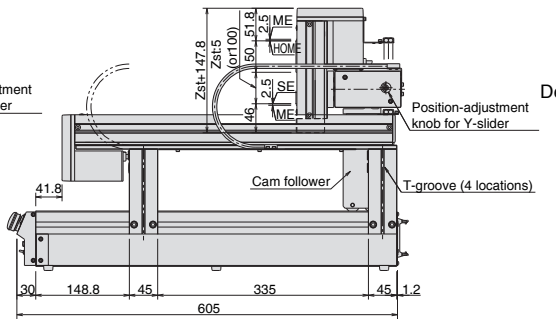
Z-axis slider installation hole

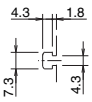




Position-adjustment knob







Detail view of T-groove

Applicable Controller Specifications

Applicable Controller	Maximum number of controlled axes	Compatible encoder type	Programs	Power-supply voltage	Page
Built-in	3 axes	Incremental	64	230V	→P15

Caution

(Note 1) The load capacity is based on operation at an acceleration of 0.2 G.
(Note 2) If the stroke is 50, the maximum speed will be capped at 280 mm/sec due to the shorter travel distance.
(Note 3) Value for each of the X, Y and Z axes
(Note 4) The load moment is a per-axis value based on a travel life of 5,000 km. (Refer to page 19 for the load moment.)

Controller Specifications & I/O Assignments

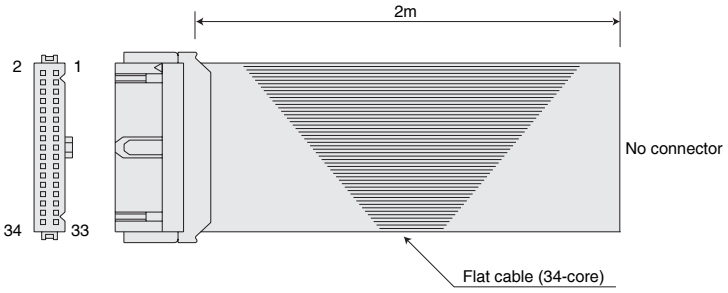
Controller Specifications

Item	Gate type		Cantilever type	
	2-axis specification	3-axis specification	2-axis specification	3-axis specification
Motor type	Pulse motor (servo control)			
Position detection method	Incremental encoder			
Power-supply voltage	100 to 115 VAC, 200 to 230 VAC, single-phase, ±10%			
Power-supply frequency	50Hz / 60Hz			
Power-supply capacity	Rated power output: 151.2 W --- Maximum instantaneous output (2 times)			
Speed setting	1 to 300 mm/sec			
Acceleration setting	0.01 to 0.3 G			
Programming language	Super SEL language			
Number of programs (programs that can be run simultaneously)	64 programs (16 programs)			
Number of program steps	6000 steps (total)			
Number of positions	3000 positions (total)			
Program start	Dedicated digital switch + Dedicated start switch			
Data-storage device	FLASH ROM			
Data-input device	Teaching pendant (model: IA-T-X) PC software (model: IA-101-X-MW)			
Numbers of I/O (input/output) points	16 input points / 16 output points (insulated DIO)			
I/O connector	34-pin, flat			
Supported field buses	DeviceNet / CC-Link / ProfiBus / Ethernet			
Protection functions	Motor overcurrent, overload, motor-driver temperature check, overload check, encoder open detection, etc. (Error codes are shown on the 7-segment LED on the front of the actuator.)			
Specified ambient temperature/humidity	0 to 40°C, 20 to 90% (non-condensing)			
Accessories	Power connector, I/O flat cable			

I/O Signal Table

Pin No.	Classification	Port No.	
1	24V	-	Connected to 24V I/O power supply
2	Input	016	General-purpose input
3		017	General-purpose input
4		018	General-purpose input
5		019	General-purpose input
6		020	General-purpose input
7		021	General-purpose input
8		022	General-purpose input
9		023	General-purpose input
10		024	General-purpose input
11		025	General-purpose input
12		026	General-purpose input
13		027	General-purpose input
14		028	General-purpose input
15		029	General-purpose input
16		030	General-purpose input
17		031	General-purpose input
18	Output	316	General-purpose output
19		317	General-purpose output
20		318	General-purpose output
21		319	General-purpose output
22		320	General-purpose output
23		321	General-purpose output
24		322	General-purpose output
25		323	General-purpose output
26		324	General-purpose output
27		325	General-purpose output
28		326	General-purpose output
29		327	General-purpose output
30		328	General-purpose output
31		329	General-purpose output
32		330	General-purpose output
33		331	General-purpose output
34	0V	-	Connected to 0V I/O power supply

I/O flat cable (accessory), model: CB-DS-PIO020



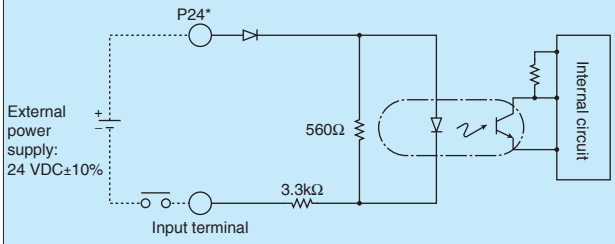
No.	Color	Wire	No.	Color	Wire
1	Brown 1	Flat cable, pressure-welded	18	Gray 2	Flat cable, pressure-welded
2	Red 1		19	White 2	
3	Orange 1		20	Black 2	
4	Yellow 1		21	Brown-3	
5	Green 1		22	Red 3	
6	Blue 1		23	Orange 3	
7	Purple 1		24	Yellow 3	
8	Gray 1		25	Green 3	
9	White 1		26	Blue 3	
10	Black 1		27	Purple 3	
11	Brown-2		28	Gray 3	
12	Red 2		29	White 3	
13	Orange 2		30	Black 3	
14	Yellow 2		31	Brown-4	
15	Green 2		32	Red 4	
16	Blue 2		33	Orange 4	
17	Purple 2		34	Yellow 4	

I/O Wiring Diagram

Input Part: External input specification (NPN specification)

Item	Specification
Input power supply	24 VDC +10%-15%
Input current	7 mA/circuit
ON/OFF voltages	ON voltage---16.0 VDC min., OFF voltage---5.0 VDC max.
Insulation method	Photocoupler insulation
Equipment connected externally	[1] No-voltage contact (with a minimum load of approx. 5 VDC/1 mA) [2] Photoelectric proximity sensor (NPN type) [3] Sequencer transistor output (open-collector type) [4] Sequencer contact output (with a minimum load of approx. 5 VDC/1 mA)

[Input circuit]

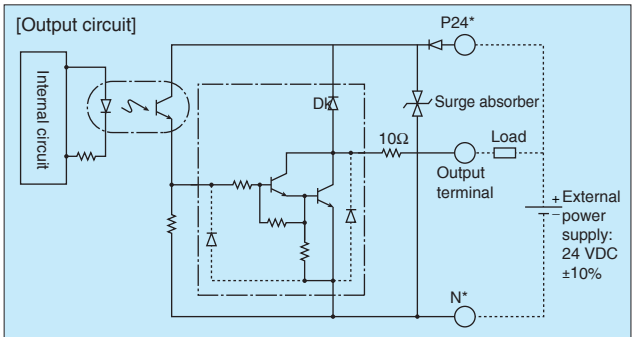


*		
	P24	I/O interface pin No. 1

Output Part: External output specification (NPN specification)

Item	Specification	
Load voltage	24 VDC	TD62084 (or equivalent)
Maximum load current	100 mA/point 400 mA, peak (full current)	
Leak current	0.1 mA/point max.	
Insulation method	Photocoupler insulation	
Equipment connected externally	[1] Miniature relay, [2] Sequencer input unit	

[Output circuit]

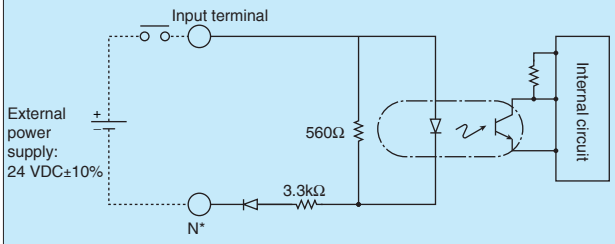


*		
	P24	I/O interface pin No. 1
	N	I/O interface pin No. 34

Input Part: External input specification (PNP specification)

Item	Specification
Input power supply	24 VDC ±10%
Input current	7 mA/circuit
ON/OFF voltages	ON voltage---8 VDC max., OFF voltage---19 VDC min.
Insulation method	Photocoupler insulation
Equipment connected externally	[1] No-voltage contact (with a minimum load of approx. 5 VDC/1 mA) [2] Photoelectric proximity sensor (PNP type) [3] Sequencer transistor output (open-collector type) [4] Sequencer contact output (with a minimum load of approx. 5 VDC/1 mA)

[Input circuit]



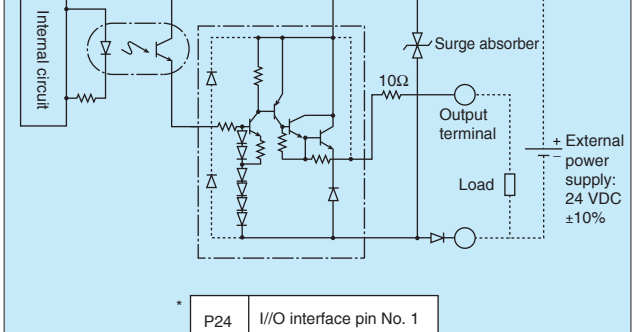
*		
	N	I/O interface pin No. 34

Output Part: External output specification (PNP specification)

Item	Specification	
Load voltage	24 VDC	TD62784 (or equivalent)
Maximum load current	100 mA/point 400 mA/8 ports (see note)	
Leak current	0.1 mA/point max.	
Insulation method	Photocoupler insulation	
Equipment connected externally	[1] Miniature relay, [2] Sequencer input unit	

Note) 400 mA is the maximum total load current for eight ports from output port No. 300. (Maximum total load current for output port No. 300+n through No. 300+n+7 = 400 mA; where n = 0 or multiple of 8)

[Output circuit]



*		
	P24	I/O interface pin No. 1
	N	I/O interface pin No. 34

Options

DeviceNet Connection Specification

Model

(Actuator model)**-DV**

Item	Specification
Numbers of input/output points	Maximum 256 input points / Maximum 256 output points
Communication standard	An interface module certified under DeviceNet 2.0 is used.
Communication speed	500K / 250K / 125Kbps
Number of occupied node	1 node
Connector type (controller end)	MSTBA2.5/5-G-5.08-AUM by Phoenix Contact (*1)

*1 Cable-end connector: SMSTB2.5/5-ST-5.08AU by Phoenix Contact (standard accessory)

CC-Link Connection Specification

Model

(Actuator model)**-CC**

Item	Specification
Numbers of input/output points	Maximum 256 input points / Maximum 256 output points
Communication standard	CC-Link, Ver. 1.10 (certified)
Communication speed	10M / 5M / 2.5M / 625K / 156Kbps
Station type	Remote device station
Number of occupied stations	1 to 3 stations (selectable)
Connector type (controller end)	MSTBA2.5/5-G-5.08-AUM by Phoenix Contact (*1)

*1 Cable-end connector: SMSTB2.5/5-ST-5.08AU by Phoenix Contact (standard accessory)

ProfiBus Connection Specification

Model

(Actuator model)**-PR**

Item	Specification
Numbers of input/output points	Maximum 256 input points / Maximum 256 output points
Communication standard	An interface module certified under ProfiBus-DP1.10 is used.
Communication speed	12M/1.5M/500K/187.5K/93.75K/19.2K/9.6Kbps
Address of occupied node	1 address (1 to 99; settable using the rotary switch on the board)
Connector type (controller end)	D-sub, 9-pin connector

Ethernet Connection Specification

Model

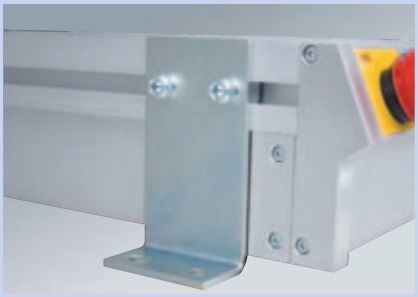
(Actuator model)**-ET**

Item	Specification
Network specification	10BASE-T / 100BASE-T (auto negotiation)
Communication standard	IEEE 802.3
Communication speed	10M/100Mbps
Connector	RJ-45
Cable	Category 5 UTP twisted cable

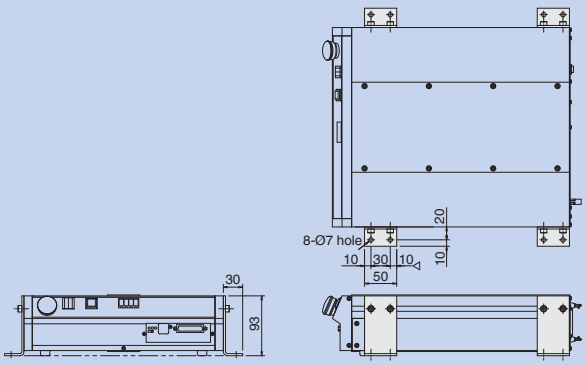
Actuator Bracket (A set of 4 pieces; supplied with bolts/nuts for installation to actuator)

Model

TT-FT



Dimensions



Teaching Pendant

Model

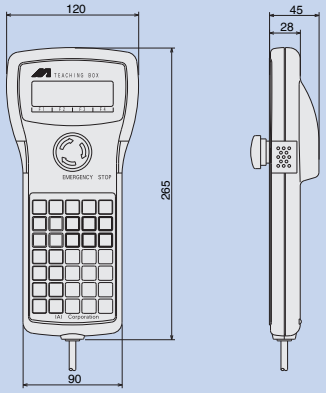
IA-T-X (standard) **IA-T-XD** (with deadman switch)

- A teaching device equipped with program/position input, test operation, monitoring and other functions.
- The interactive unit realizes easy operation.
- A deadman switch specification offering added safety is also available.

Item	Specification
Operating temperature, humidity	Temperature: 0 to 40°C, humidity: 85%RH max)
Operating environment	Not subject to corrosive gases or significant powder dust
Weight	Approx. 650 g
Cable length	4m
Display	LCD with 20 characters x 4 lines

Note
* Ver. 1.14 and older cannot be used with the TT Series.

Dimensions



Teaching Pendant Conforming to ANSI Standard/CE Mark (for general-purpose actuators only)

Model

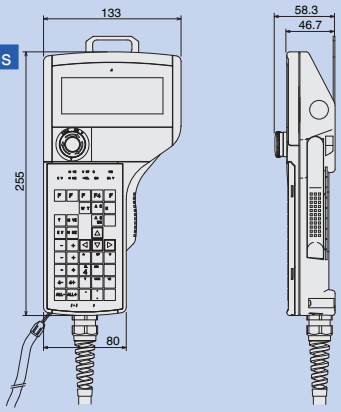
IA-T-XA

A teaching device with a 3-position enable switch conforming to the ANSI Standard and CE Mark.
The large LCD screen and interactive operation guidance allow even a beginner to safely and easily teach a robot.

Item	Specification
Specified ambient temperature, humidity	Temperature: 0 to 40°C, humidity: 30 to 85%RH (non-condensing)
Protection class	IP54 (excluding cable connectors)
Weight	600 g max. (excluding cables)
Cable length	5m
Display	LCD with 32 characters x 8 lines

Note
* Ver. 1.04 and older cannot be used with the TT Series.

Dimensions



PC Software (for Windows PCs only)

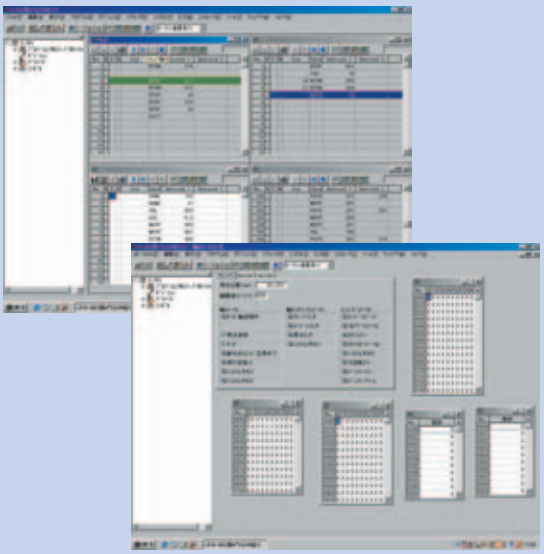
Model

IA-101-X-CW (PC version) * Please consult IAI for DOS version.

Note: From version 4.0.0.0 software is compatible to TT Series.
* Ver. 3.0.1.0 and older cannot be used with the TT Series.

A startup support software equipped with program/position input, test operation, monitoring and other functions. The functions needed for debugging have been enhanced significantly, thus reducing the startup time.

- The software runs on Windows 95, 98, NT, 2000, ME and XP.
- PC cable, 5 m (Model: CB-ST-9-25); with emergency-stop box as option (Model: CB-ST-E1MW050)

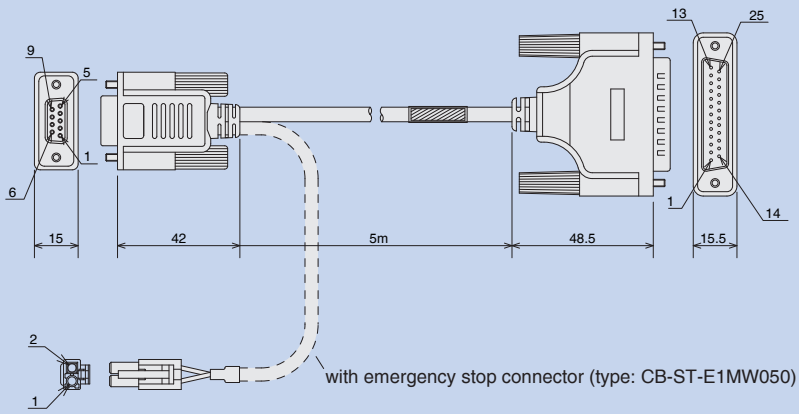


Content

PC connector cable (type: CB-ST-9-25)

Note
To order spare PC cables for maintenance purposes, please specify "CB-ST-9-25." When ordering the PC cable together with the emergency-stop box, specify "CB-ST-E1MW050."

Dimensions



with emergency stop connector (type: CB-ST-E1MW050)

Notes

Notes on Catalog Specifications

Speed

"Speed" refers to the set speed at which the actuator slider is moved.
The slider accelerates from a stationary state. Once the set speed is reached, the slider will move at that speed until immediately before the target position (specified position), where the slider will decelerate to a stop.

Acceleration /deceleration

"Acceleration" refers to the rate of change of speed from a stationary state until the set speed is reached.
"Deceleration" refers to the rate of change of speed from the set speed until the slider stops.
Acceleration and deceleration are set in "G" (0.3 G = 2940 mm/sec^2).

Duty

IAI recommends that our actuators to be used at a duty of 50% or less as a guideline in view of the relationship of service life and accuracy.

$$\text{Duty (\%)} = \frac{\text{Motion time}}{\text{Motion time + Inactivity time}} \text{ X100}$$

Positioning repeatability

"Positioning repeatability" refers to the positioning accuracy when the actuator is repeatedly moved to a pre-stored position. It is different from "absolute positioning accuracy."

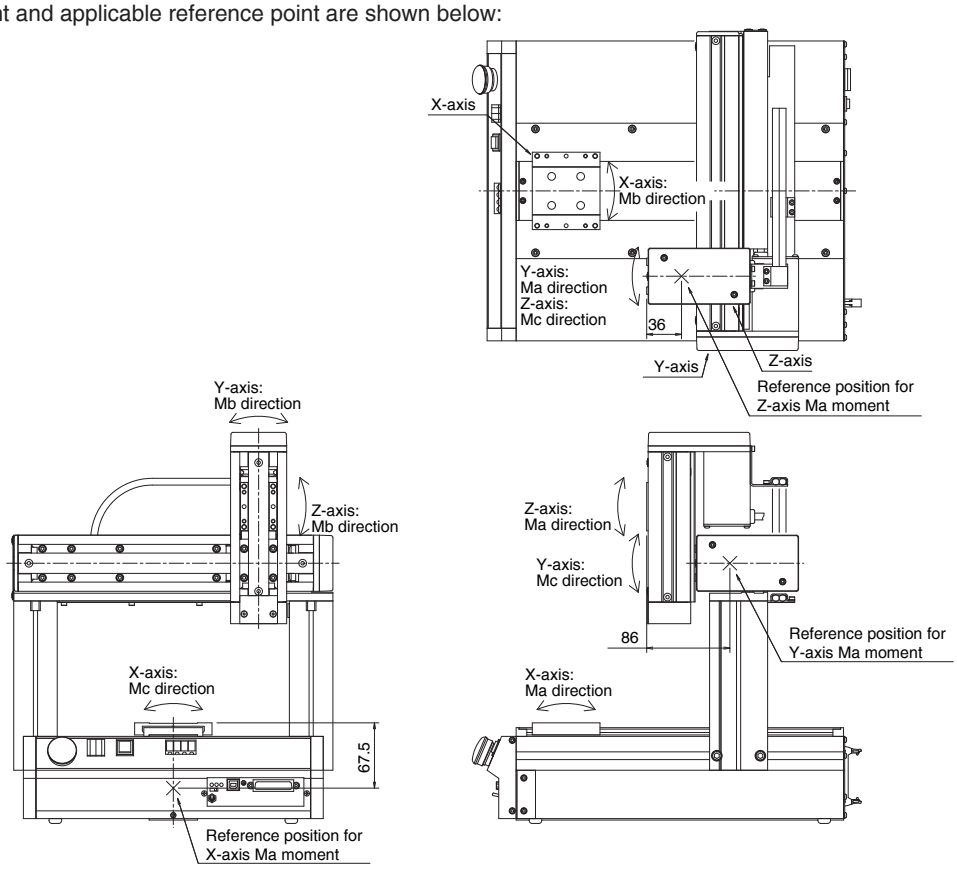
Home

The home is located on the motor side on the actuator for standard specification, or on the counter-motor side of the actuator in the reversed-home specification.
During home return the slider moves until it contacts the mechanical end, and then it reverses its direction. Be careful to prevent contact with surrounding parts.

Allowable load moment

(Ma, Mb, Mc)

The load moment is calculated by assuming a travel life of 5,000 km. Note that if the specified moment value is exceeded, the service life of the guide will be reduced. The direction of each moment and applicable reference point are shown below:



PUSH Motion - Operation

The push force used during push-motion operation can be changed freely by changing the controllers current-limit value. Please confirm the required push force from the graphs below.

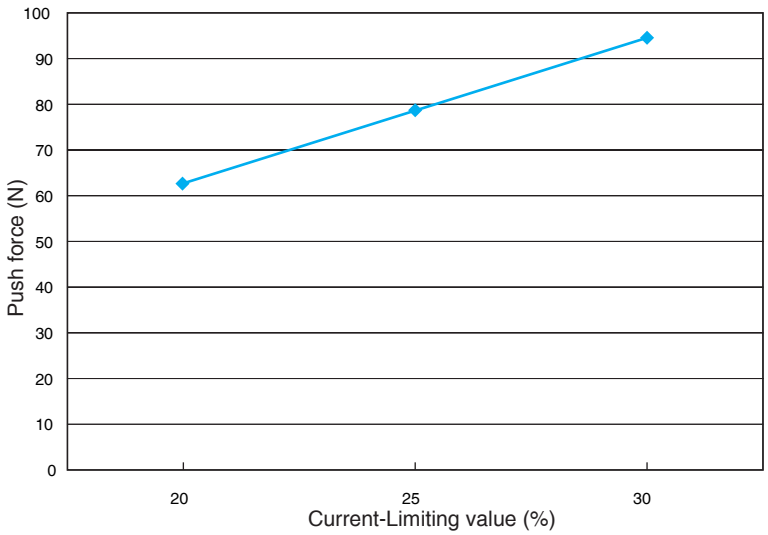
Please pay attention in using PUSH Motion-Operation:

1. A PUSH command only moves a single axis. Two axes or more can not be operated with PUSH command.

2. The force against axis during PUSH Motion-Operation should be less than 80% of the moments for each axis described in this catalogue

3. If Z axis is used for PUSH Motion-Operation, please use Gate Type. If cantilever type is used for Z axis PUSH Motion-Operation, please take the moments of X and Y axis into consideration.

Tabletop Correlation Diagrams of Push Force and Current-Limiting Value



Programming

Super SEL Language

Super SEL is one of the simplest of many robot languages available today.

Super SEL has single-handedly resolved the age-old challenge of "embodying advanced controls using simple language."

Super SEL employs the step method in which all steps are executed one by one from the top. Since commands are input in the order of operations, even a beginner can easily create a program.

Programming in Super SEL involves two types of data: the "program data" used for executing axis movement commands, external communication commands and various other commands; and the "position data" consisting of the record of positions to which each axis will be moved.

Up to 6000 steps of program data can be input, and these command steps can be divided into a maximum of 64 individual programs.

Up to 3000 positions can be registered, with each position consisting of data corresponding to three axes.

To move each axis, simply include a movement command in the program data and specify the number corresponding to the desired position data. The axis will then move to the position registered under the specified position data number.

● **Program data**

No.	B	E	N	Cnd	Cmnd	Operand 1	Operand 2
1					HOME	100	
2					HOME	11	
3					VEL	200	
4					WTON	1	
5					MOVL	1	
6					BTON	301	
7					WTON	2	
8					BTOF	301	
9					MOVL	2	
10					BTON	302	

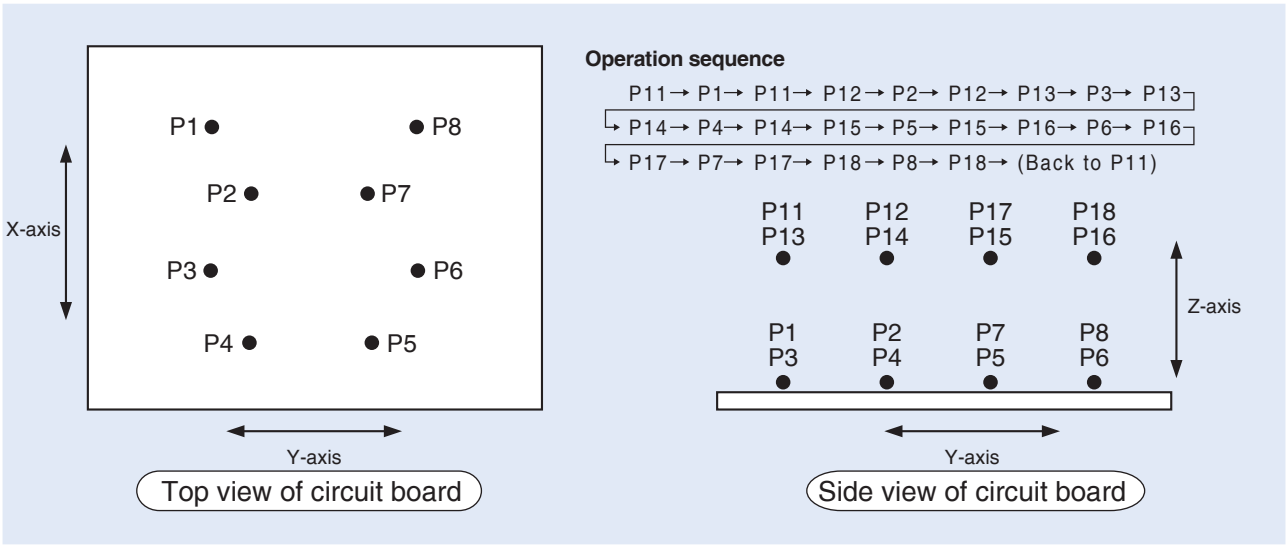
● **Position data**

No.	Axis1	Axis2	Axis3	V
1	10.000	150.000	50.000	
2	20.000	140.000	50.000	
3	30.000	150.000	50.000	
4	40.000	140.000	50.000	
5	40.000	110.000	50.000	
6	30.000	100.000	50.000	

Sample Program 1 Soldering

Operation Overview

Register solder positions as position data and move the soldering head (attached to the Z-axis) using a program to the registered positions sequentially.



Position data

	X-axis	Y-axis	Z-axis
P1	10	150	50
P2	20	140	50
P3	30	150	50
P4	40	140	50
P5	40	110	50
P6	30	100	50
P7	20	110	50
P8	10	100	50

	X-axis	Y-axis	Z-axis
P11	10	150	0
P12	20	140	0
P13	30	150	0
P14	40	140	0
P15	40	110	0
P16	30	100	0
P17	20	110	0
P18	10	100	0

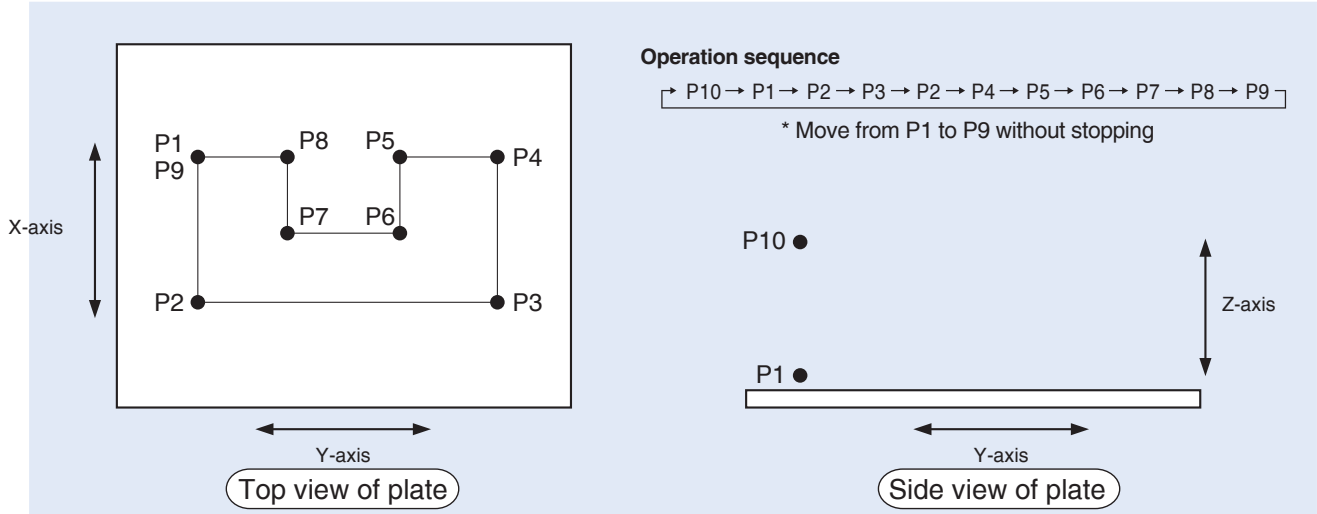
Program

Step	Extension condition	Input condition	Command	Operand 1	Operand 2	Output condition	Comment
1			HOME	100			Bring only the Z-axis to home
2			HOME	11			Bring the X- and Y-axes to home
3			VEL	100			Set the speed to 100 mm/sec.
4			ACC	0.3			Set the acceleration to 0.3 G
5			TAG	1			Destination of GOTO 1 in step 32
6			WTON	16			Stop until start button input 16 turns on
7			MOVP	11			Move to above position 1 (= position 11)
8			MOVP	1			Move (descend) to position 1
9			TIMW	3			Stop for 3 seconds
10			MOVP	11			Move (ascend) to position 11
11			MOVP	12			Move to above position 2 (= position 12)
12			MOVP	2			Move (descend) to position 2
13			TIMW	3			Stop for 3 seconds
14			MOVP	12			Move (ascend) to position 12
28			MOVP	18			Move to above position 8 (= position 18)
29			MOVP	8			Move (descend) to position 8
30			TIMW	3			Stop for 3 seconds
31			MOVP	18			Move (ascend) to above position 18
32			GOTO	1			Jump to TAG 1
33							
34							

Sample Program 2 Coating

Operation Overview

Apply sealant to a plate along the path illustrated below.
The actuator moves continuously, without stopping, from position 1 to position 9 based on the movement path.



Position data

	X-axis	Y-axis	Z-axis
P1	10	150	50
P2	40	150	50
P3	40	70	50
P4	10	70	50
P5	10	90	50
P6	20	90	50
P7	20	130	50
P8	10	130	50
P9	10	150	50
P10	10	150	0

Program

Step	Extension condition	Input condition	Command	Operand 1	Operand 2	Output condition	Comment
1			HOME	100			Bring only the Z-axis to home
2			HOME	11			Bring the X- and Y-axes to home
3			VEL	100			Set the speed to 100 mm/sec.
4			ACC	0.3			Set the acceleration to 0.3 G
5			TAG	1			Destination of GOTO 1 in step 11
6			WTON	16			Stop until start button input 16 turns on
7			MOVP	10			Move to above position 1 (= position 10)
8			MOVP	1			Move (descend) to position 1
9			PATH	2	9		Move continuously from position 1 being the point of origin, to position 9
10			MOVP	10			Move to above position 1 (= position 10)
11			GOTO	1			Jump to TAG 1

TT Series
Catalogue No. 0206-E

The information contained in this catalog is subject to change without notice for the pupose of product inprovement

ISO 9001

Providing quality products since 1986

IAI
Quality and Innovation

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