



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

A compact robot that is easy to use yet

High-performance tabletop robot available at an amazingly low price



1

Positioning repeatability of ± 0.02 mm
An encoder eliminates the possibility of mis-stepping

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 mis-stepping.

2

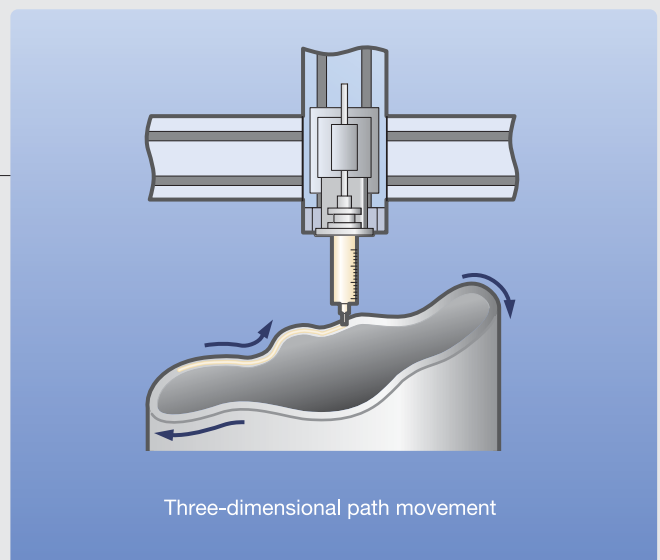
Built-in XSEL controller

High path accuracy and constant speed

The TT utilizes the high path accuracy and constant speed of the XSEL controller. Additionally, it provides the same extensive functions and commands as the XSEL 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.



1

highly functional

TABLE TOP **TT**



3

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

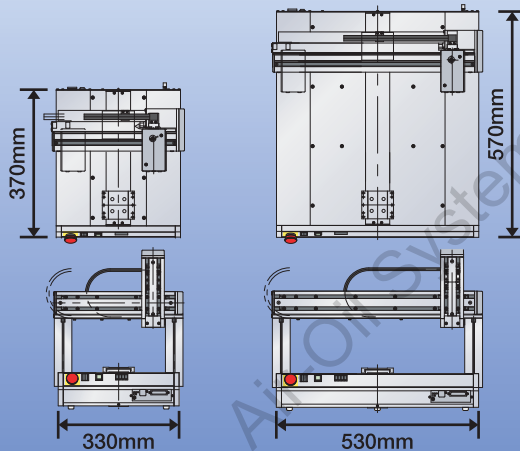


Cantilever type

4

Select one of two operating ranges

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



2020 Type

4040 Type

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.

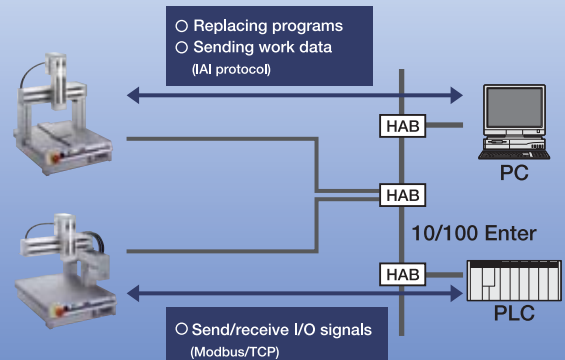
The TT is available in a 2-axis specification and a 3-axis specification. The 3-axis specification comes standard with a Z-axis brake, which prevents the slider from falling when the power is off.

5

Supporting field networks (optional)

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

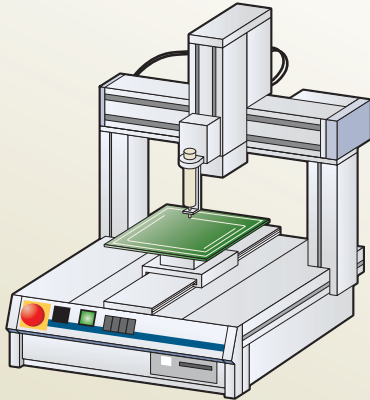
The TT can be connected to a common field network such as DeviceNet, CC-Link, ProfiBus and Ethernet for the transmission and acquisition of position changes, production results and other data.



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.

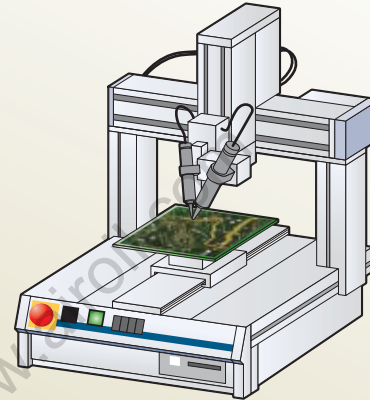


Applications

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.

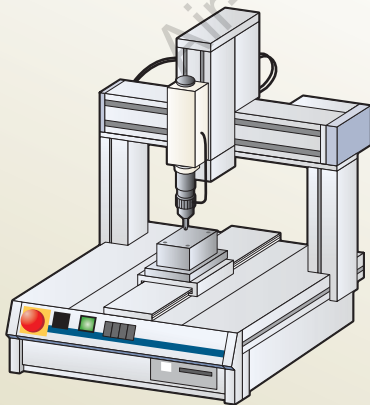


Applications

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.

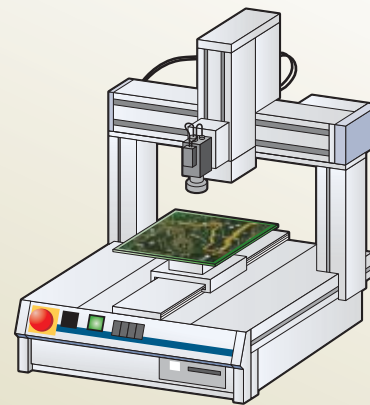


Applications

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 push button 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

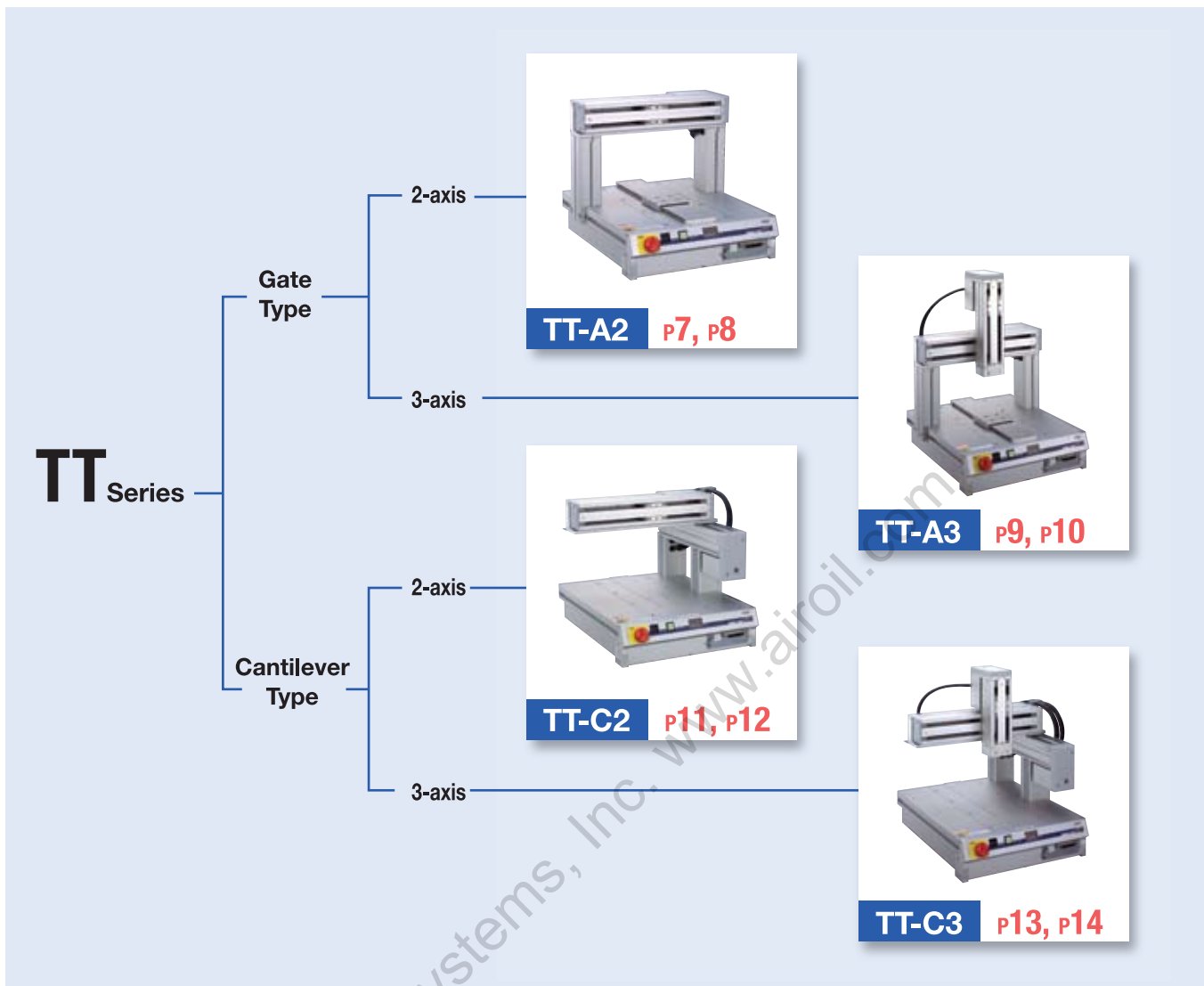


Table of Specifications

| 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 | |
| | | | 400 | 100 | | | | | | TT-A3-I-2020-10B | | |
| | | 400 | 200 | 50 | | | | | | TT-A3-I-4040-05B | P10 | |
| | | | 400 | 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 |
| | | | 400 | 100 | | | | | | | TT-C3-I-2020-10B | |
| | | 400 | 200 | 50 | | | | | | | TT-C3-I-4040-05B | P14 |
| | | | 400 | 100 | | | | | | | TT-C3-I-4040-10B | |

Model

TT - A3 - I - 2020 - 05B - DV
 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" can be specified for 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.

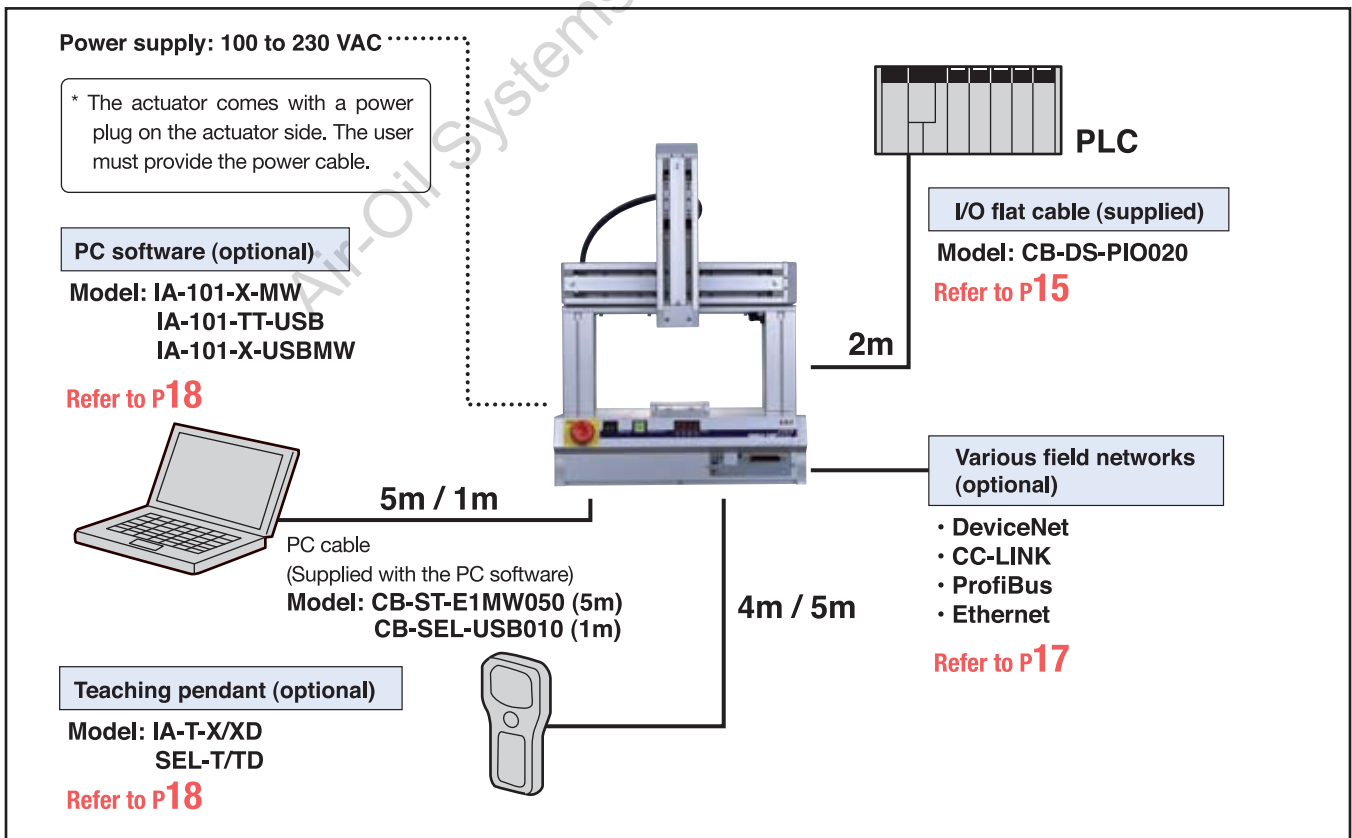
- 05B** 50mm
10B 100mm

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 Gate, 2-axis Stroke X-axis: 200 mm / Y-axis: 200 mm Load capacity 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-□ | X-axis | Incremental | Pulse motor | 6 | 200 | 1-300 | 10 |
| | Y-axis | | | 6 | 200 | 1-300 | 5 |

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

Options

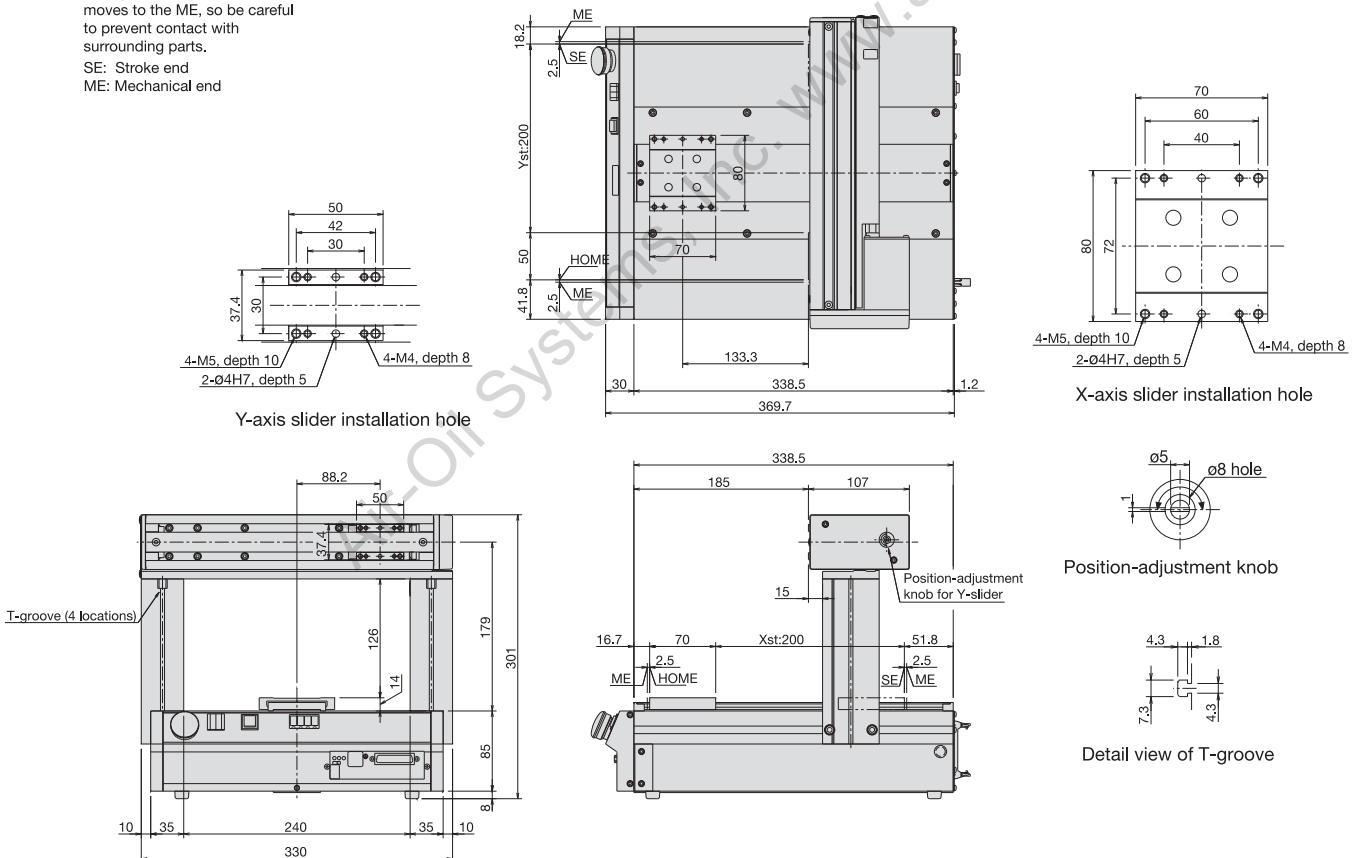
| Name | Model |
|------------------------------------|-------|
| DeviceNet connection specification | DV |
| CC-Link connection specification | CC |
| ProfiBus connection specification | PR |
| Ethernet connection specification | ET |
| Actuator bracket specification | FT |

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 | 14.8kg |

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



Applicable Controller Specifications

| Applicable Controller | Maximum number of controlled axes | Compatible encoder type | Program operation | Power-supply voltage | Page |
|-----------------------|-----------------------------------|-------------------------|-------------------|----------------------|------|
| Built-in | 2 axes | Incremental | Program | AC100V AC200V | >P15 |



(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-□ | X-axis | Incremental | Pulse motor | 6 | 400 | 1-300 | 10 |
| | Y-axis | | | 6 | 400 | 1-300 | 5 |

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

Options

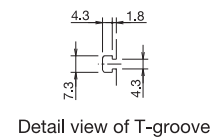
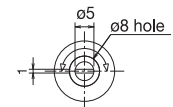
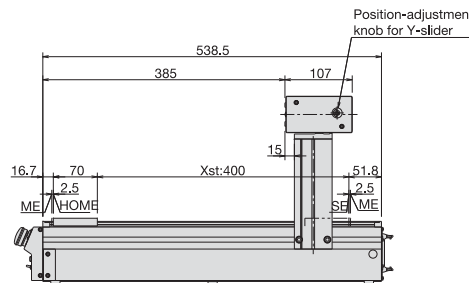
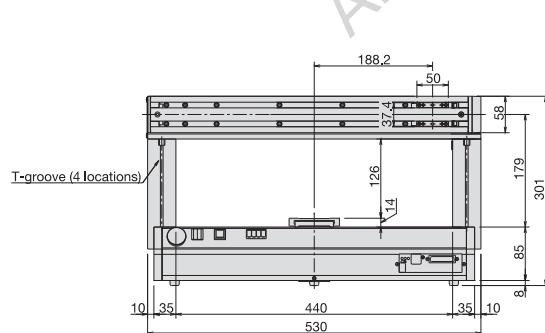
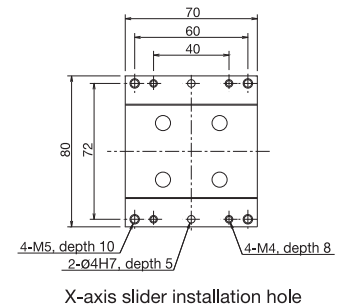
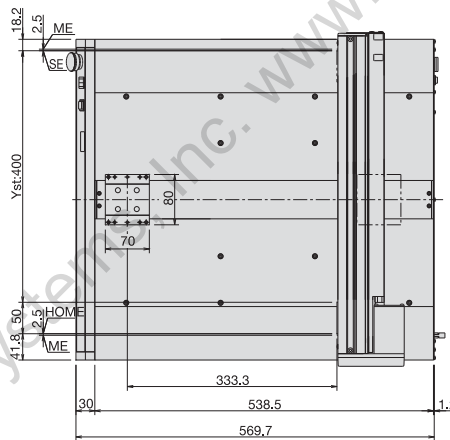
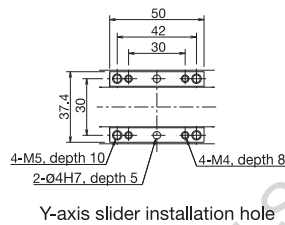
| Name | Model |
|------------------------------------|-------|
| DeviceNet connection specification | DV |
| CC-Link connection specification | CC |
| ProfiBus connection specification | PR |
| Ethernet connection specification | ET |
| Actuator bracket specification | FT |

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 | 33kg |

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



Applicable Controller Specifications

| Applicable Controller | Maximum number of controlled axes | Compatible encoder type | Program operation | Power-supply voltage | Page |
|-----------------------|-----------------------------------|-------------------------|-------------------|----------------------|------|
| Built-in | 2 axes | Incremental | Program | AC100V AC200V | >P15 |



(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 Gate, 3-axis Stroke X-axis: 200 mm / Y-axis: 200 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 - 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-□-□ | 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 |

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

Options

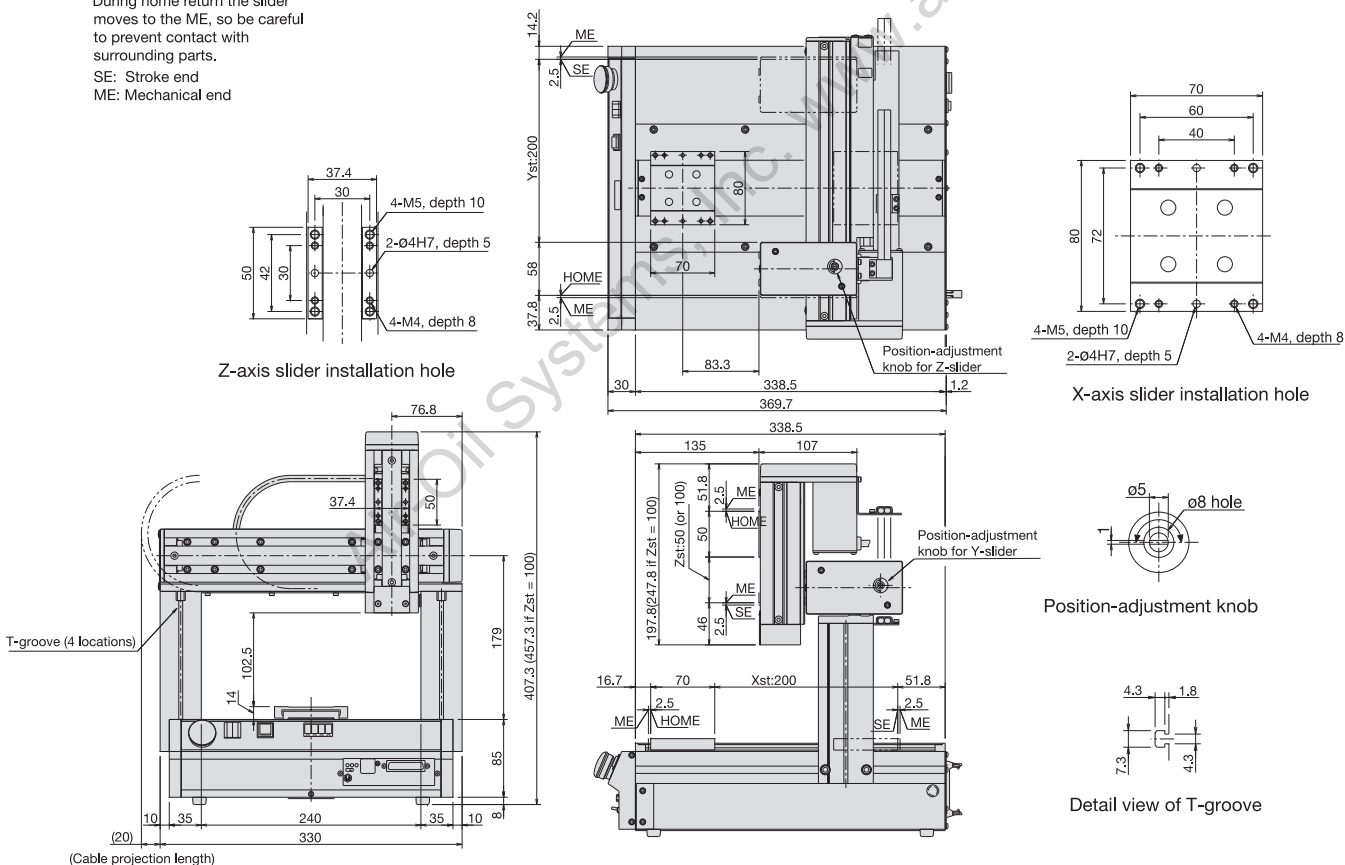
| Name | Model |
|------------------------------------|-------|
| DeviceNet connection specification | DV |
| CC-Link connection specification | CC |
| ProfiBus connection specification | PR |
| Ethernet connection specification | ET |
| Actuator bracket specification | FT |

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



Applicable Controller Specifications

| Applicable Controller | Maximum number of controlled axes | Compatible encoder type | Program operation | Power-supply voltage | Page |
|-----------------------|-----------------------------------|-------------------------|-------------------|----------------------|------|
| Built-in | 3 axes | Incremental | Program | AC100V AC200V | >P15 |



(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-□-□ | 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 |

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

Options

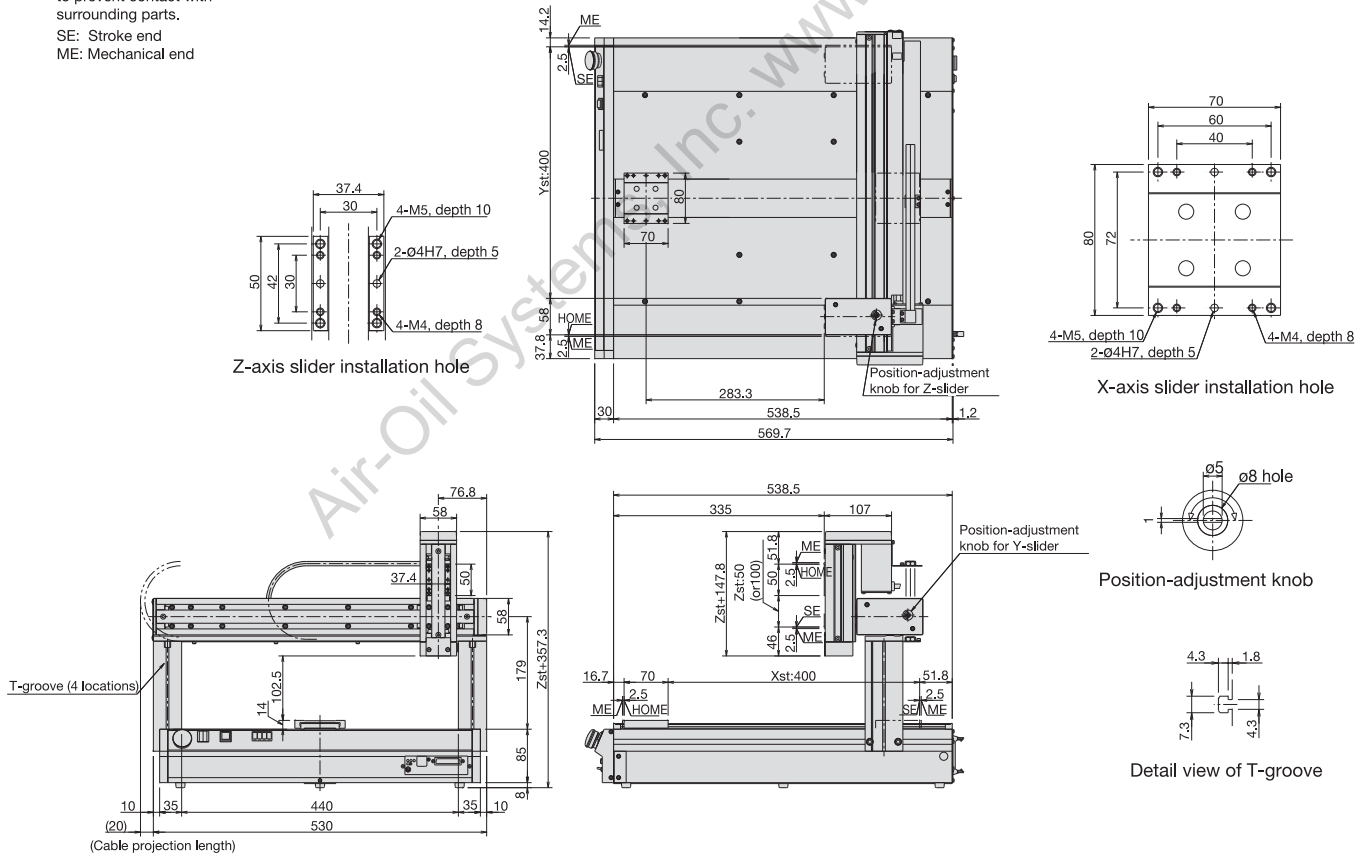
| Name | Model |
|------------------------------------|-------|
| DeviceNet connection specification | DV |
| CC-Link connection specification | CC |
| ProfiBus connection specification | PR |
| Ethernet connection specification | ET |
| Actuator bracket specification | FT |

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



Applicable Controller Specifications

| Applicable Controller | Maximum number of controlled axes | Compatible encoder type | Program operation | Power-supply voltage | Page |
|-----------------------|-----------------------------------|-------------------------|-------------------|----------------------|------|
| Built-in | 3 axes | Incremental | Program | AC100V AC200V | >P15 |



(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 Cantilever 2-axis Stroke X-axis: 200 mm / Y-axis: 200 mm Load capacity 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-□ | X-axis | Incremental | Pulse motor | 6 | 200 | 1-300 | - |
| | Y-axis | | | 6 | 200 | 1-300 | 4 |

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

Options

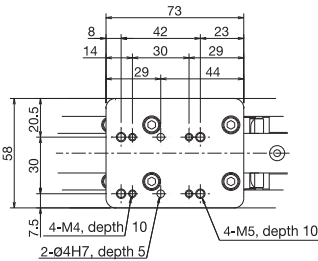
| Name | Model |
|------------------------------------|-------|
| DeviceNet connection specification | DV |
| CC-Link connection specification | CC |
| ProfiBus connection specification | PR |
| Ethernet connection specification | ET |
| Actuator bracket specification | FT |

Common Specifications

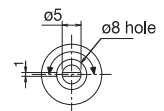
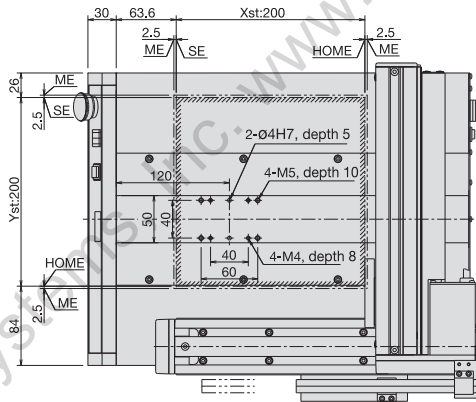
| | |
|--------------------------------|--|
| Drive system | Ball screw (ø10mm, rolled C10) |
| Positioning repeatability | ±0.02mm |
| Backlash (Note 2) | 0.1mm or less |
| Guide | Direct-coupled endless cycling type |
| Allowable load moment (Note 3) | Ma : 6.5N · m Mb : 9.3N · m Mc : 16.4N · m |
| Ambient temperature/humidity | 5 to 40°C, 85%RH max. (non-condensing) |
| Actuator weight | 16.3kg |

Dimensions

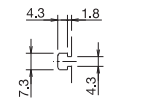
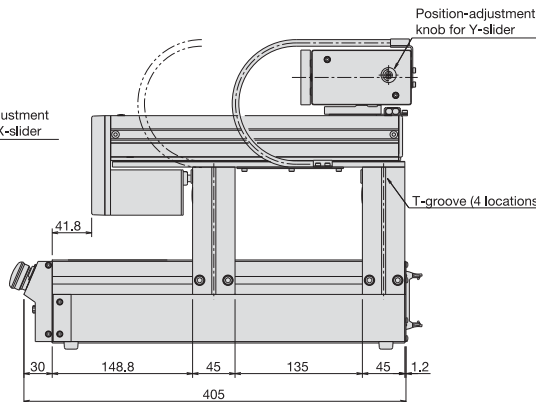
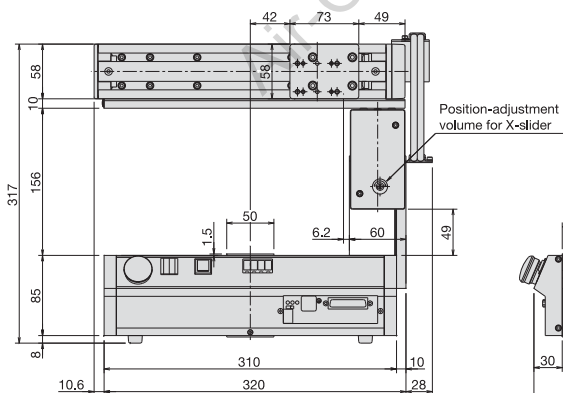
* During home return the slider moves to the ME, so be careful to prevent contact with surrounding parts.
SE: Stroke end
ME: Mechanical end



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 | Program operation | Power-supply voltage | Page |
|-----------------------|-----------------------------------|-------------------------|-------------------|----------------------|------|
| Built-in | 2 axes | Incremental | Program | AC100V AC200V | >P15 |



(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 Cantilever 2-axis Stroke X-axis: 400 mm / Y-axis: 400 mm Load capacity 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-□ | X-axis | Incremental | Pulse motor | 6 | 400 | 1-300 | - |
| | Y-axis | | | 6 | 400 | 1-300 | 4 |

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

Options

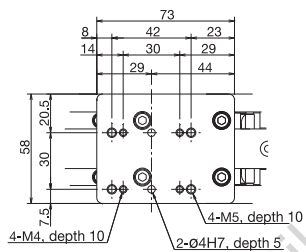
| Name | Model |
|------------------------------------|-------|
| DeviceNet connection specification | DV |
| CC-Link connection specification | CC |
| ProfiBus connection specification | PR |
| Ethernet connection specification | ET |
| Actuator bracket specification | FT |

Common Specifications

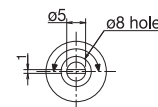
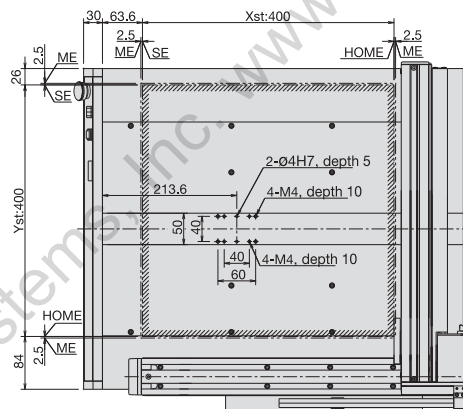
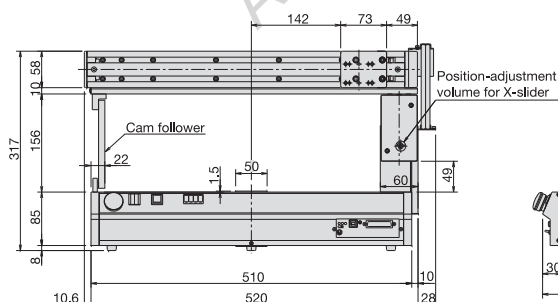
| | |
|--------------------------------|--|
| Drive system | Ball screw (ø10mm, rolled C10) |
| Positioning repeatability | ±0.02mm |
| Backlash (Note 2) | 0.1mm or less |
| Guide | Direct-coupled endless cycling type |
| Allowable load moment (Note 3) | Ma : 6.5N • m Mb : 9.3N • m Mc : 16.4N • m |
| Ambient temperature/humidity | 5 to 40°C, 85%RH max. (non-condensing) |
| Actuator weight | 35kg |

Dimensions

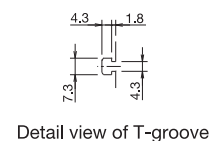
* During home return the slider moves to the ME, so be careful to prevent contact with surrounding parts.
SE: Stroke end
ME: Mechanical end



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 | Program operation | Power-supply voltage | Page |
|-----------------------|-----------------------------------|-------------------------|-------------------|----------------------|------|
| Built-in | 2 axes | Incremental | Program | AC100V AC200V | >P15 |



(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 Cantilever, 3-axis Stroke X-axis:200 mm / Y-axis:200 mm / Z-axis: 50mm / 100mm Load capacity 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-□-□ | 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 |

* □ and □ 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 |

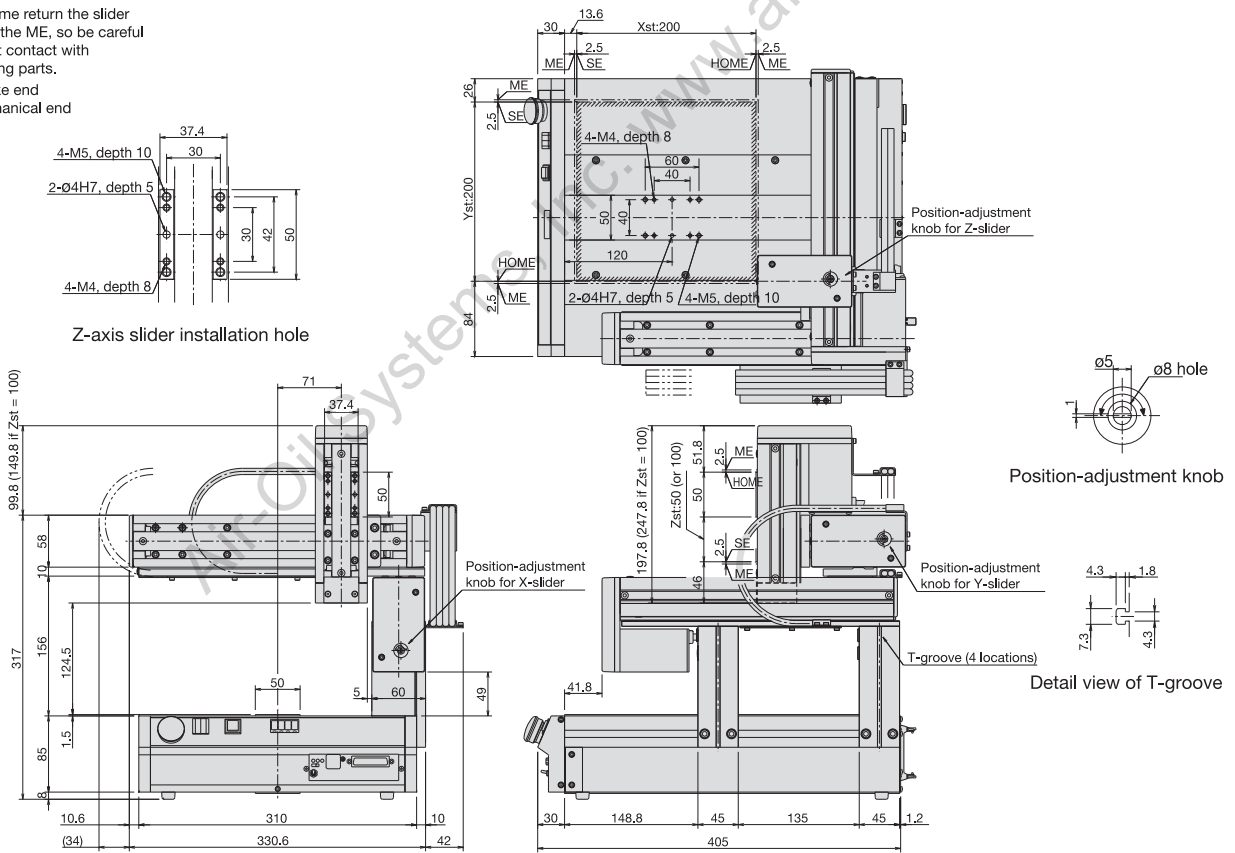
Common Specifications

| | |
|--------------------------------|--|
| 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 | 18kg |

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



Applicable Controller Specifications

| Applicable Controller | Maximum number of controlled axes | Compatible encoder type | Program operation | Power-supply voltage | Page |
|-----------------------|-----------------------------------|-------------------------|-------------------|----------------------|------|
| Built-in | 3 axes | Incremental | Program operation | AC100V AC200V | >P15 |



(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 Cantilever, 3-axis Stroke X-axis:400 mm / Y-axis:400 mm / Z-axis: 50mm / 100mm Load capacity 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-□-□ | 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 |

* □ and □ 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 |

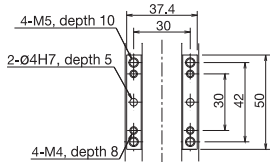
Common Specifications

| | |
|--------------------------------|--|
| 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 | 37kg |

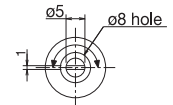
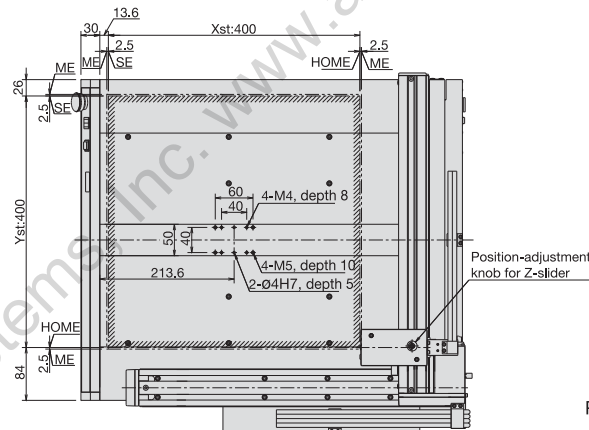
Dimensions

* During home return the slider moves to the ME, so be careful to prevent contact with surrounding parts.

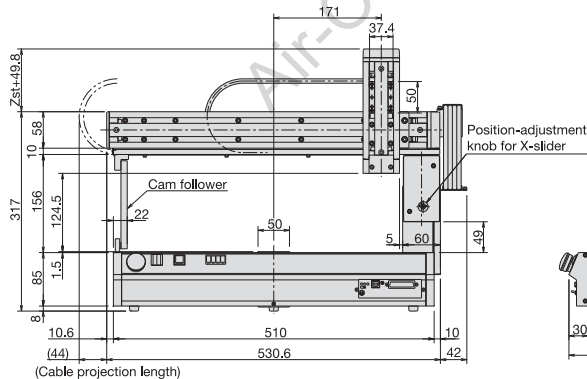
SE: Stroke end
 ME: Mechanical end



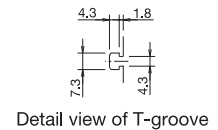
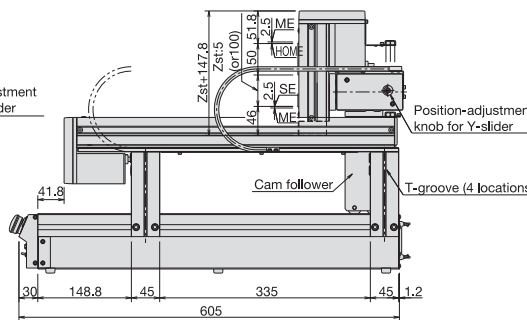
Z-axis slider installation hole



Position-adjustment knob



(Cable projection length)



Detail view of T-groove

Applicable Controller Specifications

| Applicable Controller | Maximum number of controlled axes | Compatible encoder type | Program operation | Power-supply voltage | Page |
|-----------------------|-----------------------------------|-------------------------|-------------------|----------------------|------|
| Built-in | 3 axes | Incremental | Program | AC100V AC200V | >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 length of 5,000 mm. (Refer to page 19 for the load moment.)

Controller Specifications & I/O Assignments

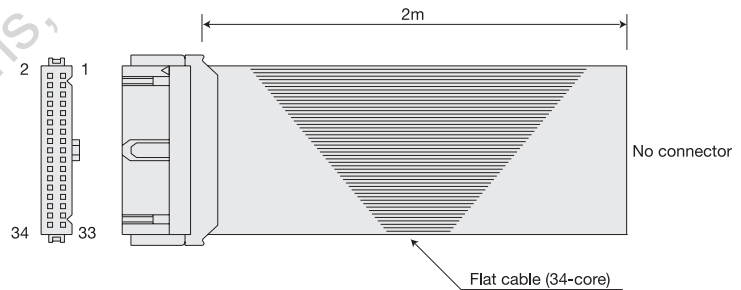
Controller Specifications

| 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

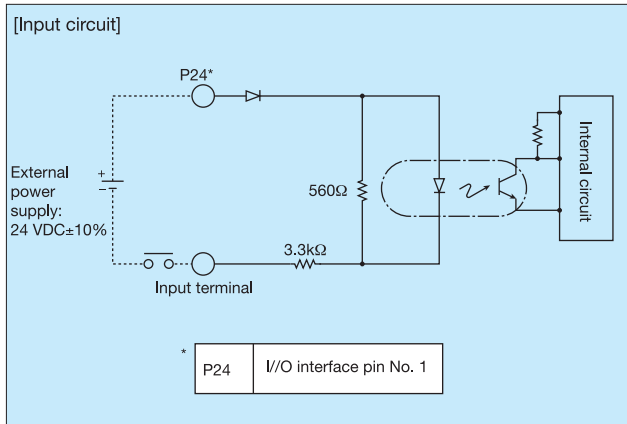


| No. | Color | Wire | No. | Color | Wire |
|-----|----------|--------------------------------|-----|----------|--------------------------------|
| 1 | Brown 1 | Flat cable, pressure-welded | 18 | Gray 2 | Flat cable, pressure-welded |
| 2 | Red 1 | | 19 | White 2 | |
| 3 | Orange 1 | | 20 | Black 2 | |
| 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

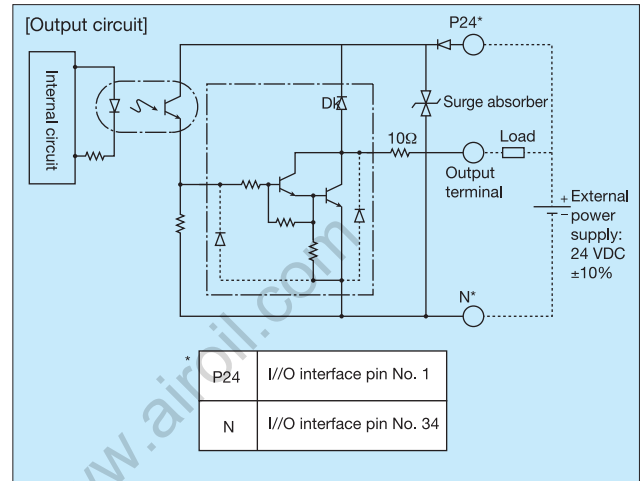
Input Part: External input specification (NPN specification)

| Item | Specification |
|--------------------------------|--|
| Input power supply | 24 VDC $\pm 10\%$ -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) |



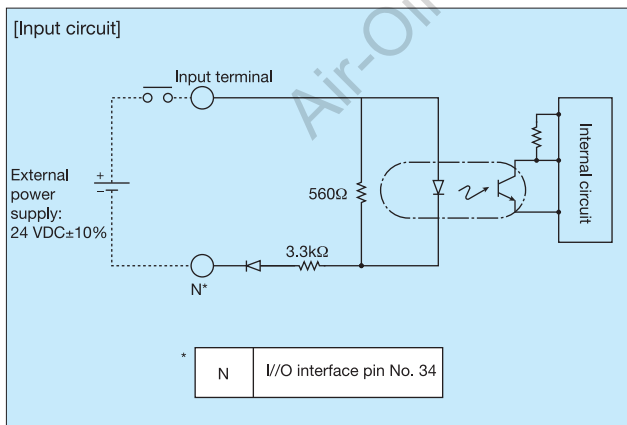
Output Part: External output specification (NPN specification)

| Item | Specification |
|--------------------------------|---|
| Load voltage | 24 VDC |
| 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 |



Input Part: External input specification (PNP specification)

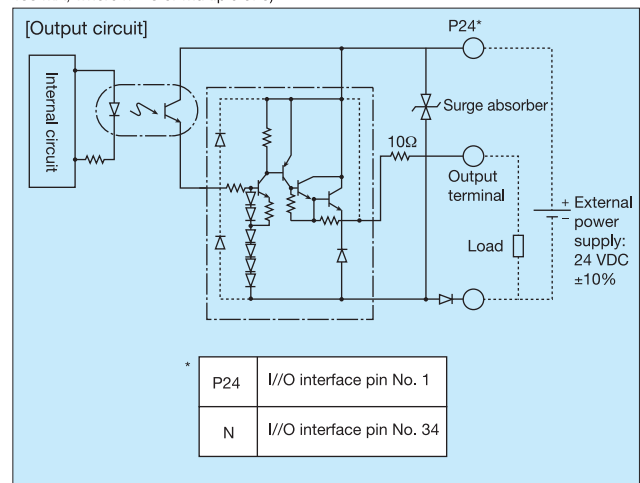
| Item | Specification |
|--------------------------------|--|
| Input power supply | 24 VDC $\pm 10\%$ |
| Input current | 7 mA/circuit |
| ON/OFF voltages | ON voltage---8 VDC max., OFF voltage---19 VDC min. |
| Insulation method | Photocoupler insulation |
| Equipment connected externally | [1] No-voltage 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) |



Output Part: External output specification (PNP specification)

| Item | Specification |
|--------------------------------|---|
| Load voltage | 24 VDC |
| 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)



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 | 500 / 250 / 125 Kbps |
| 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/93.75/187.5K/93.75K/19.2K/9.6K |
| 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 |

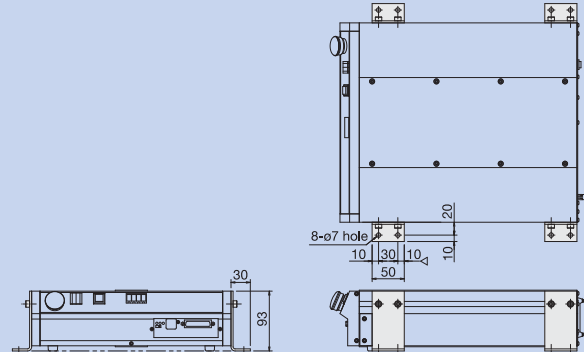
Actuator Bracket (A set of 4 pieces; supplied with bolts/nuts for installation to actuator)

Model

TT-FT



Dimensions



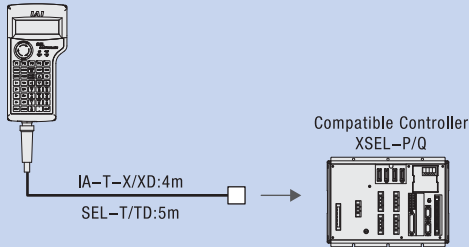
Features

This is a teaching device that provides information on functions such as programs, position input, running tests, and monitoring.

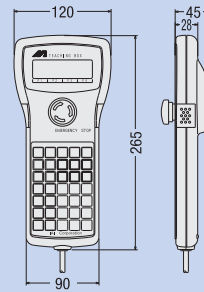
Model

| Model | Description |
|---------|---------------------------------------|
| IA-T-X | Standard Type |
| IA-T-XD | Deadman Switch Type |
| SEL-T | Standard Type |
| SEL-TD | ANSI Compatible Type (Deadman Switch) |

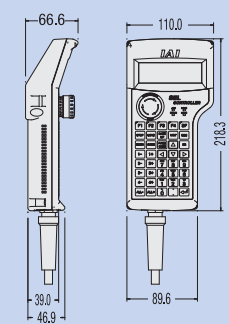
Configuration



IA-T-X/XD



SE-T/TD



| Model | IA-T-X/XD | SEL-T/TD |
|----------------------------------|--|--------------------------|
| Ambient Operating Temp./Humidity | 0°C~40°C Below 85%RH | |
| Protective Structure | Not subject to corrosive gases or significant powder dust. | IP54 |
| Weight | Approx. 650g | Approx. 400g (ex. Cable) |
| Cable Length | 4m | 5m |
| Display | 20 Characters x 4 Lines (LCD) | |

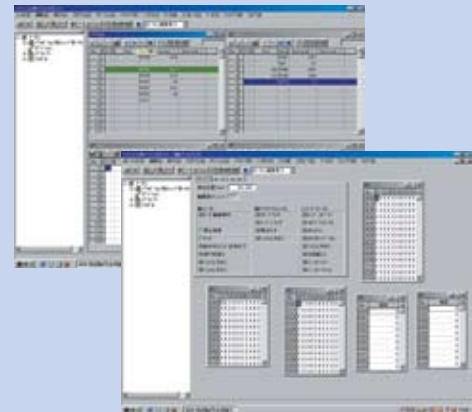
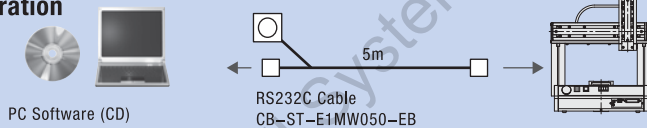
PC Software (for Windows PCs only)

Features

A startup support software program offering program/position input function, test operation function, monitoring function, and more. The functions needed for debugging have been enhanced to help reduce the startup time

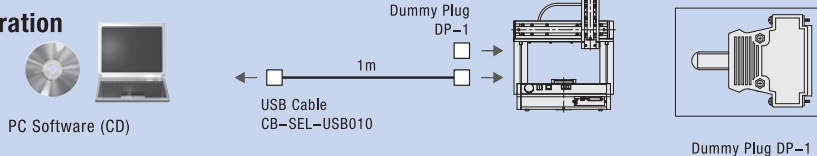
Model IA-101-X-MW (RS232C Cable Included)

Configuration



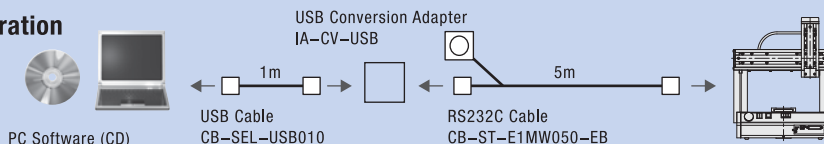
Model IA-101-TT-USB (USB Cable Included)

Configuration



Model IA-101-X-USBMW (USB Conversion adapter + Cable Included)

Configuration



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.

$$\text{Duty (\%)} = \frac{\text{Acceleration / Deceleration time}}{\text{Motion time + Inactivity}} \times 100$$

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

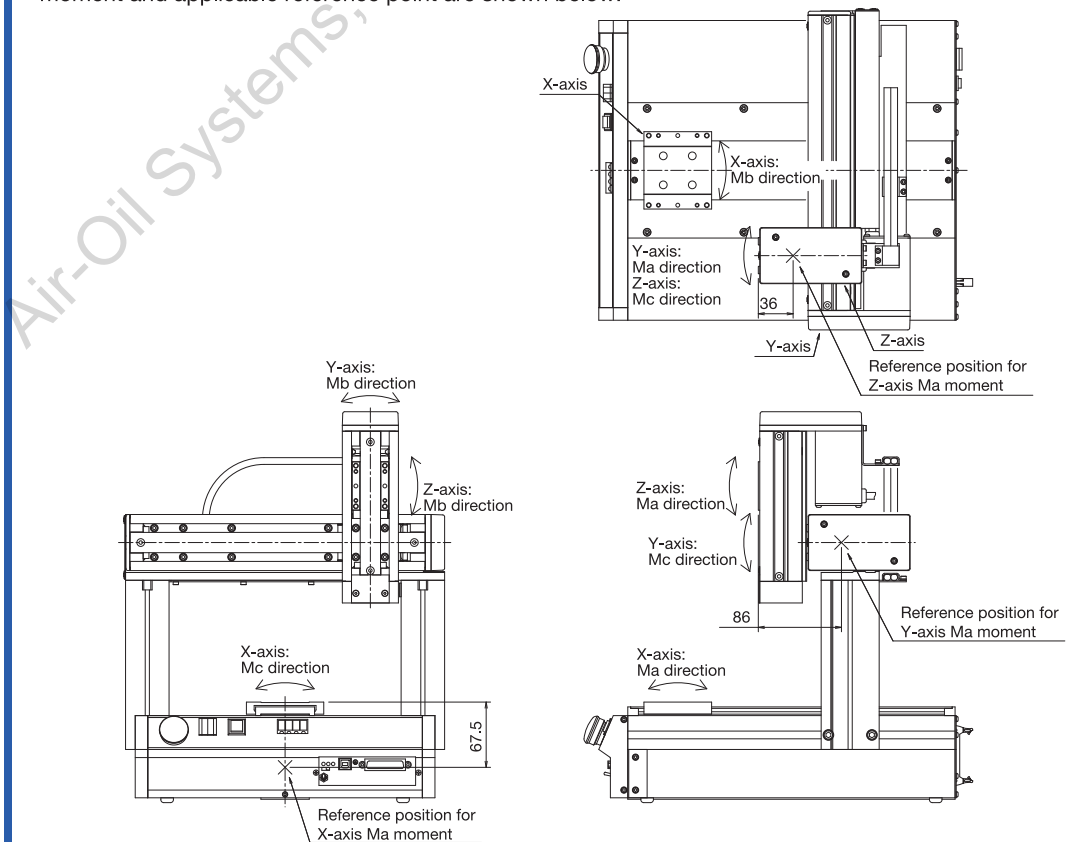
The home is located on the motor side on the actuator for standard specification, or on the counter-motor side of the actuator in the reversed-home specification.

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:



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 | Cmd | Operand 1 | Operand 2 |
|-----|---|---|---|-----|------|-----------|-----------|
| 1 | | | | | HOME | 100 | |
| 2 | | | | | HOME | 11 | |
| 3 | | | | | YEL | 200 | |
| 4 | | | | | WTON | 1 | |
| 5 | | | | | MOYL | 1 | |
| 6 | | | | | BTON | 301 | |
| 7 | | | | | WTON | 2 | |
| 8 | | | | | BTOF | 301 | |
| 9 | | | | | MOYL | 2 | |
| 10 | | | | | BTON | 302 | |

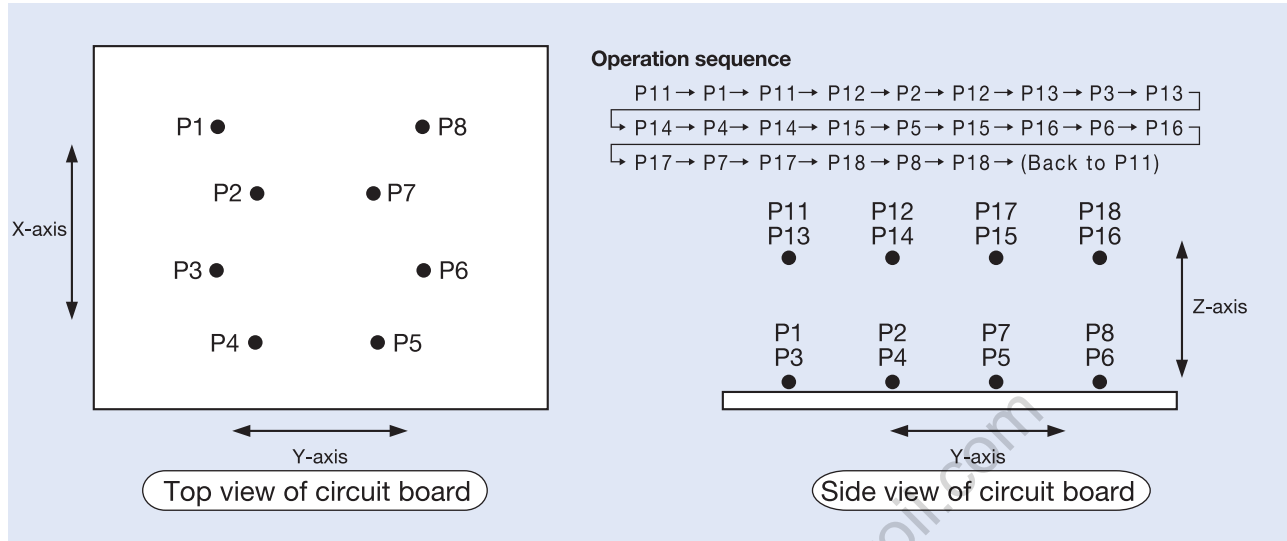
● Position data

| 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

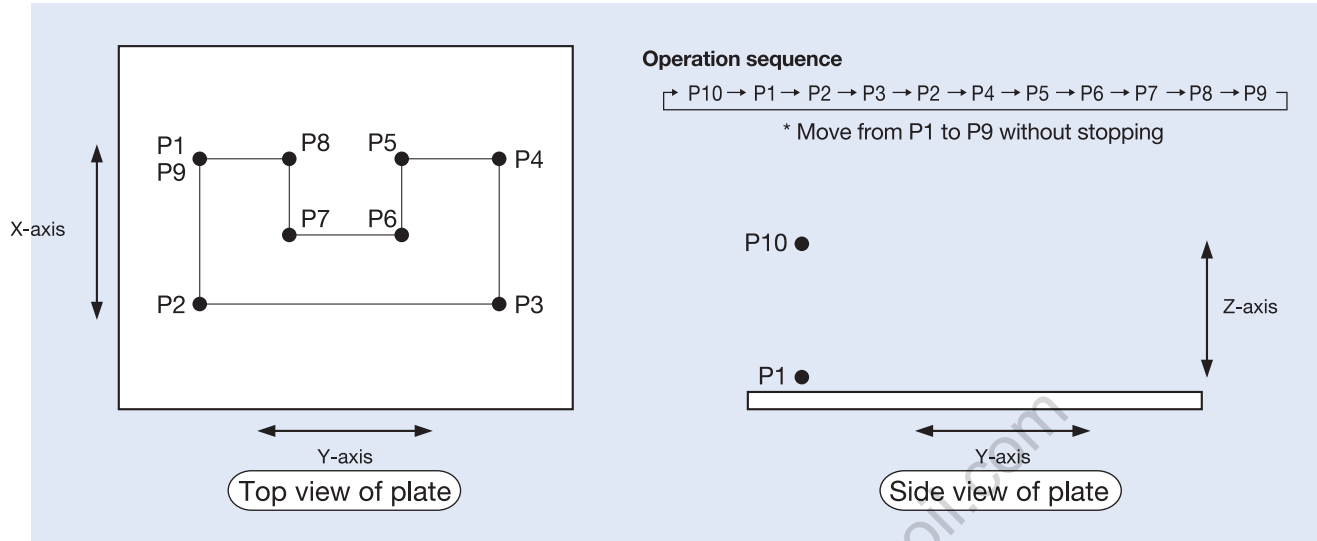
| Step | Extension condition | Input condition | Command | Operand 1 | Operand 2 | Output condition | Comment |
|-------|---------------------|-----------------|---------|-----------|-----------|------------------|---|
| 1 | | | HOME | 100 | | | Bring only the Z-axis to home |
| 2 | | | HOME | 11 | | | 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 |
| <hr/> | | | | | | | |
| 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 |



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