Shibaura Machine

# COMPO ARM
ARM ROBOT

# BA-C SERIES

ABSOLUTE

ARM ROBOT

AGT Absolute Gauge Technologies™

Presented by: Absolute Gauge Technologies
sales@absolutegauge.com; www.absolutegauge.com,
Toronto: 416 754 3168, Montreal: 514 695 5147, Toll Free: 1 888 754 7008

Catalog BAC0018-CEC-05

# Performance

## Short cycle time
Operates at the maximum of 1000 mm/s. (Note 1)

## Servo motor
A servo motor for a compact axis to allow high-speed operation, quick acceleration and deceleration, and high payload.

## Absolute position system
No need for return-to-home routines.

## Compact controller
Uncompromised downsizing and cost reduction.

Note 1: For limited stroke and payload. Contact our sales representative for details.

## Axis features

■Resolver as a motor sensor
A brushless resolver serves as a motor sensor.
It has excellent environmental durability (against high and low temperatures, vibrations, and physical shocks).

■Compact and high power servo motor
A compact servo motor allows high-speed operation, quick acceleration and deceleration, and high payload.

■Absolute position system
No need for time-consuming return-to-home routines; equipment start-up time can be shortened.

■3 model types
Slider, table, and rod type axes are available.

## Controller features

■Compact
It is as compact as 31 (W) x 146 (H) x 89 (D) mm (excluding screw heads).

■DC24V power supply
Both the control and drive power supplies are DC24V.

■Brake release switch as standard equipment
A brake release switch is provided on the front side of the controller.

### Master controller

■Exclusive for a single axis
A controller and driver designed exclusively for a single axis.

■No programming required
Only parameter and table settings are required for execution of a desired operation.

■Torque control function as a standard feature; perfect for workpiece pushing operation
A robot can replace an air cylinder for workpiece pushing operations.

■Area entry signal output function as a standard feature
The output signal can be turned on or off while the axis is in motion.

■Acceleration and deceleration settings
Acceleration and deceleration can be set separately.

### Slave controller

■A driver for controlling multiple axes; to be used in combination with a BA-Ⅲ series product Connect to a BA-Ⅲ series product for controlling multiple axes.

## TABLE OF CONTENTS



## Easy-to-select sets

This catalog introduces sets of products including an axis, controller, and controller cable. Products can also be selected individually from corresponding pages.

# The BA-C series has the answer!

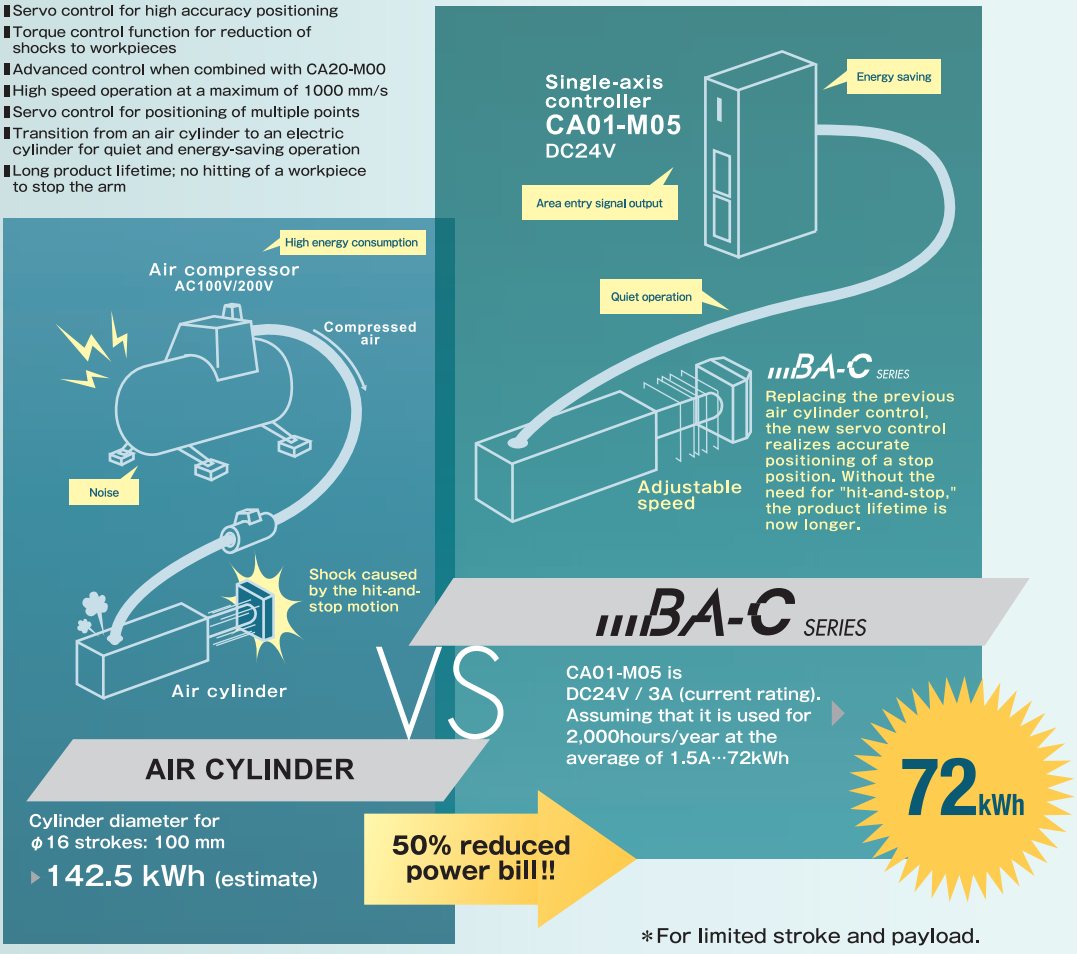
## C H E C K

- Do you want a faster and smoother operating air cylinder that can position multiple points?
- Do you want to quickly change air cylinder force?
- Do you want to control peripheral devices during robot operation?
- Do you want to save energy (by switching from an air cylinder to an electric cylinder)?
- Do you want to improve the stop position accuracy?
- Do you want to use the previous model (BA-Ⅲ) with this model?

## Performance 1

### Higher accuracy, increased energy saving, and longer lifetime than an air cylinder!

- Servo control for high accuracy positioning
- Torque control function for reduction of shocks to workpieces
- Advanced control when combined with CA20-M00
- High speed operation at a maximum of 1000 mm/s
- Servo control for positioning of multiple points
- Transition from an air cylinder to an electric cylinder for quiet and energy-saving operation
- Long product lifetime; no hitting of a workpiece to stop the arm




*For limited stroke and payload.

## Performance 2

# More features and easier-to-use

### Perfect replacement of an air cylinder

6 models from 3 types to choose from

■ Application 1
Transportation, transfer, and positioning of a workpiece

■ Advantage
From the product lineup,a model having specifications similar to those of a previous cylinder type can be selected.It allows positioning of multiple points.

■ Application 2
Workpiece (pin) insertion

■ Advantage
A BA-C series model can position an insertion point more accurately than a previous cylinder type (this allows standardization of quality).

### Introducing the new controller CA01 with brand-new features

Torque control function, area entry signal output, and individual acceleration and deceleration settings

■ Application 1
Pushing of a workpiece (torque control function)

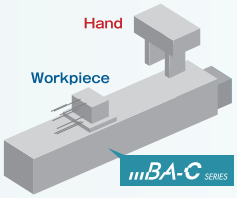
■ Advantage
Pushing force can be easily adjusted to prevent workpiece damage.
＊The master controller offers this function.

■ Application 2
Pushing and transportation of a workpiece while a robot is travelling (area entry signal output)

■ Advantage
Area entry signal output while a robot is travelling allowscontrolling of peripheral devices and hence improvement of cycle time.

### Smaller than the BA-Ⅲ series!

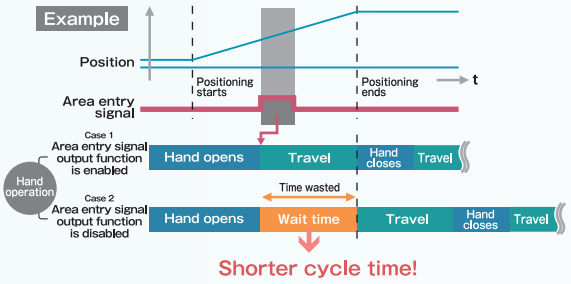
- Lower cost
- Smaller controller
- An easy-to-use DC24V controller
- Offers almost the same axis shape as the compact axis of the BA-Ⅲ series
- Can be controlled by a BA-Ⅲ product
- Improved user-friendliness with the new feature: area entry signal output




The hand grips the travelling workpiece

New What is the area entry signal output function?

An I/O signal to indicate that a slider (or a rod) has entered a specified location (area).

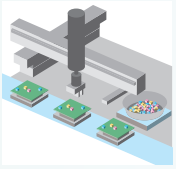



## Performance 3

# More scalable and easier to use when used in combination with BA-Ⅲ series product!

### Improved scalability when used with a BA-Ⅲ series product

Improved scalability allows axis combinations such as X-Y, Y-Z, and X-Y-Z.



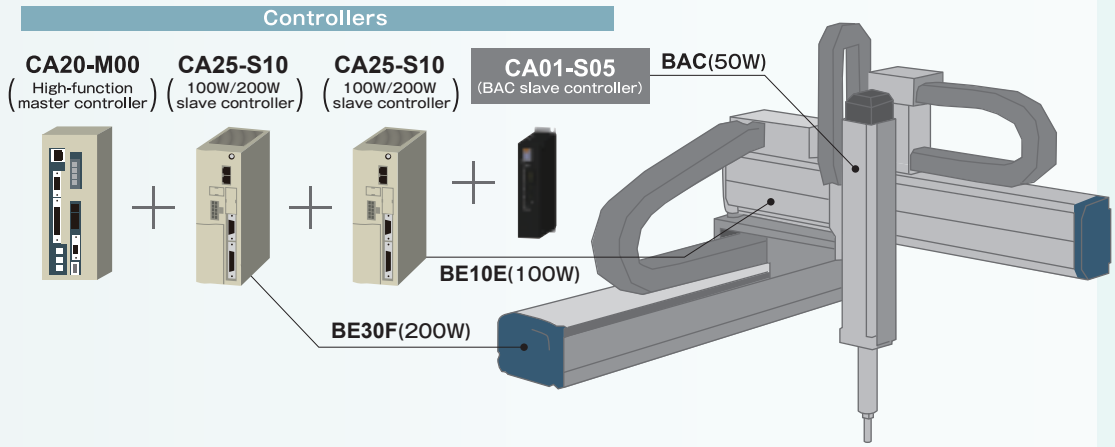
■ Application 1
An electric cylinder Z-axis (a BA-C product) can be added to a previous series X-Y-axis unit to create a 3-axis unit.

■ Advantage
Improved positioning accuracy and shorter cycle time

■ Application 2
Combination with aprevious series (BAII) product

■ Advantage
Current development environment can be used as it is.

### Example

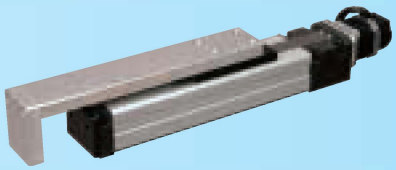


# Specifications

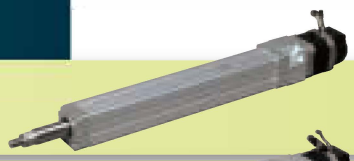
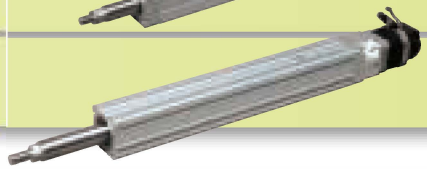
## Slider Type

| Model | Photo | Stroke (mm) |
|---|---|---|
| BAC5D |  | 50-500<br>50 to 500<br>(in 50 mm increments) |
| BAC7D |  | 50-600,<br>50 to 500<br>(in 50 mm increments)<br>700 |

## Table Type

| | | |
|---|---|---|
| BAC5D |  | 50-100<br>50 to 500<br>(in 50 mm increments) |
| BAC7D |  | 50-150<br>50 to 500<br>(in 50 mm increments) |

## Rod Type

| | | |
|---|---|---|
| BAC3D |  | 50-150<br>50 to 500<br>(in 50 mm increments) |
| BAC4D |  | 50-200<br>50 to 500<br>(in 50 mm increments) |


Lead (mm)
Maximum speed (mm/s)
Horizontal operation
Vertical operation
Maximum payload (kg)
12
800
6
400
1.5
3.0
3.0
6.0
12
800
6
400
2.0
6.0
4.0
12.0
12
800
6
400
2.5*1
1.5*2
1.0
4.5*1
3.0*2
2.5
* 1 : Stroke is 50 mm or shorter
* 2 : Stroke is from 51 mm to 100 mm
P12
12
800
6
400
2.8*2
4.5*1
1.9*3
1.5
5.6*2
s.0*1
3.8*3
3.5
* 1 : Stroke is 50 mm or shorter
* 2 : Stroke is from 51 mm to 100 mm
* 3 : Stroke is from 101 mm to 150 mm
P13
12
600
1.5
3.0
12
600
2.2
5.2
3
6
9
12
15

# Axis



COMPO ARM ROBOT

BA-C SERIES

## Slider type

**BAC — 5D — ST — M12N — 50 — 13 — M**

| Lead | Brake | Stroke | Master controller | Cable length | Axis Options |
|---|---|---|---|---|---|
| 06:6mm<br>12:12mm | N:no brake<br>B:brake installed | (※)see "Type" in below table | 0: no controller<br>1: CA01-M05 | 3:3m<br>4:4m<br>5:5m | No symbol: no option<br>M: motor cover |

## Specifications

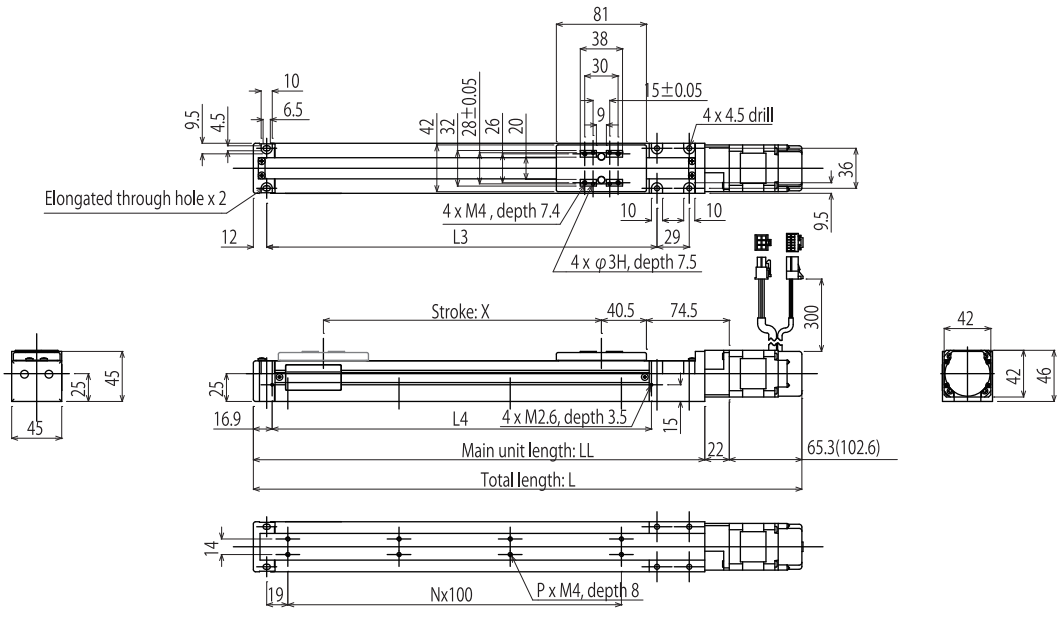
| | | | |
|---|---|---|---|
| Motor output | 0W, AC servo motor (resolver) | | |
| Drive system | Rolled ball screw (class 7 equivalent); outside diameter: 8 mm | | |
| Stroke (mm) in 50 mm increments | Internal slider | 50~450 | 500 |
| | (※)Type | 05~45 | 50 |
| Maximum speed (mm/s) | 6 mm lead | 400 | 340 |
| | 12 mm lead | 800 | 680 |
| Maximum payload (kg)<br>Acceleration/deceleration time (sec) | 6 mm lead | When used horizontally: 6.0, when used vertically: (3.0), acceleration / deceleration time: 0.1 s or longer | |
| | 12 mm lead | When used horizontally: 3.0, when used vertically: (1.5), acceleration / deceleration time: 0.2 s or longer | |
| Positioning repeatability (mm) | ± 0.02 | | |
| Resolution (mm) | Lead / 2048 | | |
| Allowable static moment (N·m) | Internal slider: MR:31, MP:12, MY:12 | | |
| Brake | Brake applied when the system is de-energized Voltage: DC24V | | |
| Master controller | CA01—M05 | | |

Note
∗Select a product with a brake if it is to be used as a vertical axis.
∗Maximum payload is the value measured when a load is placed directly above the slider.
∗The value inside the bracket for the maximum payload applies when a regenerative discharging resistor (CAR-0500) or a regenerative discharging unit (CAR-UN50) is used.
∗The acceleration / deceleration time means the time required to reach a programmed speed.

## Axis model

**BAC 5D — ST — M12N — 50 — M**

| Lead | Brake | Stroke | Axis Options |
|---|---|---|---|
| 06:6mm<br>12:12mm | N:no brake<br>B:brake installed | Refer to this page to select | No symbol: no option<br>M: motor cover |




| Stroke X (mm) | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 |
|---|---|---|---|---|---|---|---|---|---|---|
| Total length L (mm) | 293.3(330.6) | 343.3(380.6) | 393.3(430.6) | 443.3(480.6) | 493.3(530.6) | 543.3(580.6) | 593.3(630.6) | 643.3(680.6) | 693.3(730.6) | 743.3(780.6) |
| Main unit length LL (mm) | 206 | 256 | 306 | 356 | 406 | 456 | 506 | 556 | 606 | 656 |
| L3 (mm) | 151 | 201 | 251 | 301 | 351 | 401 | 451 | 501 | 551 | 601 |
| L4 (mm) | 141.6 | 191.6 | 241.6 | 291.6 | 341.6 | 391.6 | 441.6 | 491.6 | 541.6 | 591.6 |
| Number of mounting holes P | 4 | 6 | 6 | 8 | 8 | 10 | 10 | 12 | 12 | 14 |
| Intervals between mounting holes N | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 |
| Weight (kg) | 1.4(1.6) | 1.5(1.7) | 1.6(1.8) | 1.7(1.9) | 1.8(2.0) | 1.9(2.1) | 2.0(2.2) | 2.1(2.3) | 2.2(2.4) | 2.4(2.6) |

∗Figures in brackets apply to an axis with a brake. ∗ See Page 26 for an outline view of a product with a motor cover.

## Slider type

**BAC — 7D — ST — M12N — 50 — 13 — M**

| Lead | Brake | Stroke | Master controller | Cable length | Axis Options |
|---|---|---|---|---|---|
| 06:6mm<br>12:12mm | N:no brake<br>B:brake installed | (※)see "Type" in below table | 0: no controller<br>1: CA01-M05 | 3:3m<br>4:4m<br>5:5m | No symbol: no option<br>M: motor cover |

## Specifications

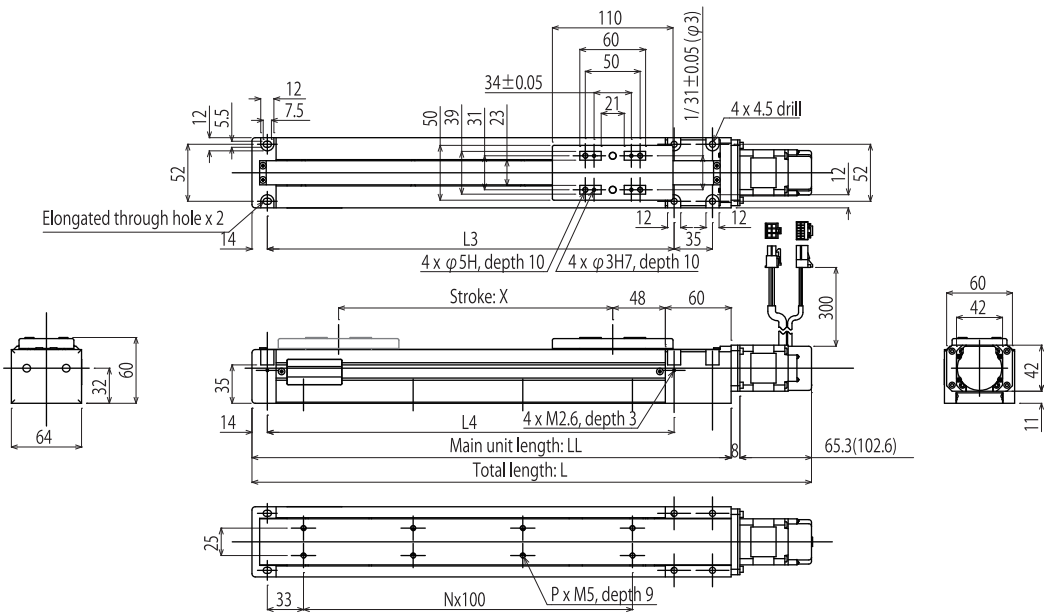
| | | | | |
|---|---|---|---|---|
| Specifications | 50W AC servo motor (resolver) | | | |
| Motor output | Rolled ball screw (class 7 equivalent); outside diameter: 12 mm | | | |
| Drive system<br>Stroke (mm) in 50 mm increments | Internal slider | 50~550 | 600 | 700 |
| | (※)Type | 05~55 | 60 | 70 |
| Maximum speed (mm/s) | 6 mm lead | 400 | 340 | 250 |
| | 12 mm lead | 800 | 680 | 500 |
| Maximum payload (kg)<br>Acceleration/deceleration time (sec) | 6 mm lead | When used horizontally: 6.0, when used vertically: (3.0), acceleration / deceleration time: 0.1 s or longer | | |
| | 12 mm lead | When used horizontally: 3.0, when used vertically: (1.5), acceleration / deceleration time: 0.2 s or longer | | |
| Positioning repeatability (mm) | ± 0.02 | | | |
| Resolution (mm) | Lead / 2048 | | | |
| Allowable static moment (N•m) | Internal slider: MR:58, MP:25.7, MY:25.7 | | | |
| Brake | Brake applied when the system is de-energized Voltage: DC24V | | | |
| Master controller | CA01−M05 | | | |

Note
∗Select a product with a brake if it is to be used as a vertical axis.
∗Maximum payload is the value measured when a load is placed directly above the slider.
∗The value inside the bracket for the maximum payload applies when a regenerative discharging resistor (CAR-0500) or a regenerative discharging unit (CAR-UN50) is used.
∗The acceleration / deceleration time means the time required to reach a programmed speed.

## Axis model

**BAC 7D — ST — M12N — 50 — M**

| Lead | Brake | Stroke | Axis Options |
|---|---|---|---|
| 06:6mm<br>12:12mm | N:no brake<br>B:brake installed | Refer to this page to select | No symbol: no option<br>M: motor cover |




| Stroke X (mm) | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 700 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total length L (mm) | 310.3(347.6) | 360.3(397.6) | 410.3(447.6) | 460.3(497.6) | 510.3(547.6) | 560.3(597.6) | 610.3(647.6) | 660.3(697.6) | 710.3(747.6) | 760.3(797.6) | 810.3(847.6) | 860.3(897.6) | 960.3(997.6) |
| Main unit length LL (mm) | 237 | 287 | 337 | 387 | 437 | 487 | 537 | 587 | 637 | 687 | 737 | 787 | 887 |
| L3 (mm) | 171 | 221 | 271 | 321 | 371 | 421 | 471 | 521 | 571 | 621 | 671 | 721 | 821 |
| L4 (mm) | 171 | 221 | 271 | 321 | 371 | 421 | 471 | 521 | 571 | 621 | 671 | 721 | 821 |
| Number of mounting holes P | 4 | 6 | 6 | 8 | 8 | 10 | 10 | 12 | 12 | 14 | 14 | 16 | 18 |
| Intervals between mounting holes N | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 | 5 | 6 | 6 | 7 | 8 |
| Weight (kg) | 2.5(2.7) | 2.7(2.9) | 2.9(3.1) | 2.9(3.1) | 3.1(3.3) | 3.3(3.5) | 3.7(3.9) | 3.9(4.1) | 4.1(4.3) | 4.3(4.5) | 4.5(4.7) | 4.7(4.9) | 5.1(5.3) |

∗Figures in brackets apply to an axis with a brake. ∗ See Page 26 for an outline view of a product with a motor cover.

## Table type

**BAC — 5D — ST — T12N — 50 — 13 — M**

| Lead | Brake | Stroke | Master controller | Cable length | Axis Options |
|---|---|---|---|---|---|
| 06:6mm<br>12:12mm | N:no brake<br>B:brake installed | (※)see "Type"<br>in below table | 0: no controller<br>1: CA01-M05 | 3:3m<br>4:4m<br>5:5m | No symbol: no option<br>M: motor cover |

## Specifications

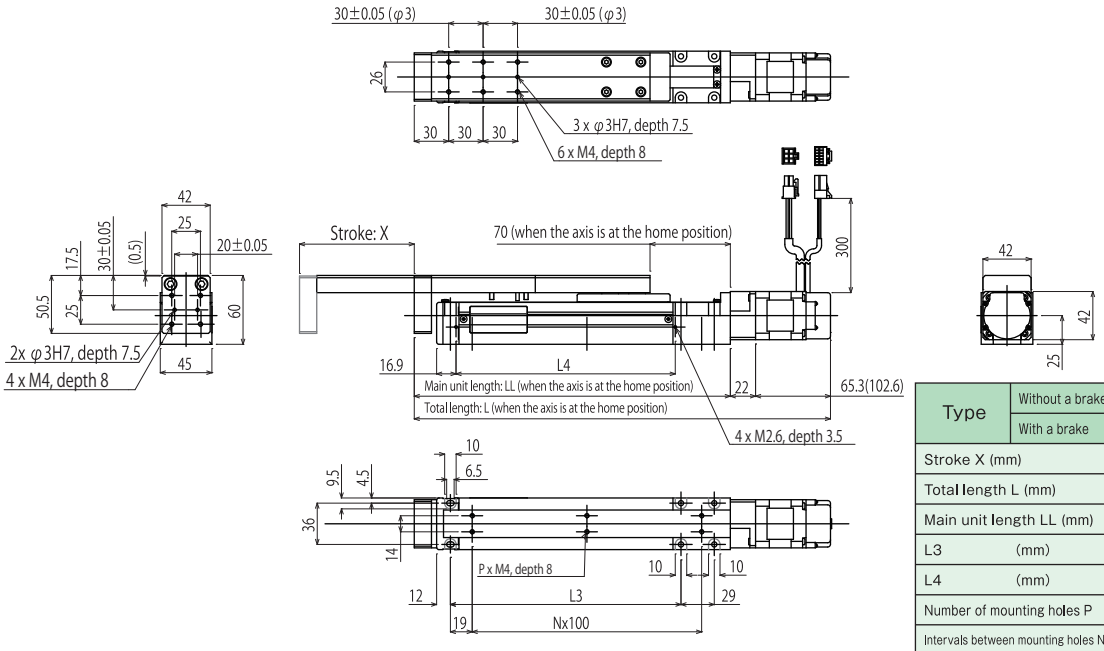
| | | | |
|---|---|---|---|
| Motor output | 50W, AC servo motor (resolver) | | |
| Drive system | Rolled ball screw (class 7 equivalent); outside diameter: 8 mm | | |
| Stroke (mm) in 50 mm increments | Table | 50 | 100 |
| | (※)Type | 05 | 10 |
| Maximum speed (mm/s) | 6 mm lead | 400 | |
| | 12 mm lead | 800 | |
| Maximum payload (kg)<br>Acceleration/deceleration time (sec) | Lead: 6 mm<br>Acceleration<br>deceleration time: 0.1 s or longer | When used horizontally: 4.5 | When used horizontally: 3.0 |
| | | when used vertically:(2.5) | |
| | Lead: 12 mm<br>Acceleration<br>deceleration time: 0.2 s or longer | When used horizontally: 2.5 | When used horizontally: 1.5 |
| | | when used vertically:(1.0) | |
| Positioning repeatability (mm) | ±0.02 | | |
| Resolution (mm) | Lead / 2048 | | |
| Allowable static moment (N･m) | Stroke: 50 mm | Table: MR: 4.4, MP: 1.9, MY: 1.9 | |
| | Stroke: 100 mm | Table: MR: 4.4, MP: 1.2, MY: 1.2 | |
| Brake | Brake applied when the system is de-energized Voltage: DC24V | | |
| Master controller | CA01−M05 | | |

Note
＊Select a product with a brake if it is to be used as a vertical axis.
＊Maximum payload is the value measured when a load is placed directly above the slider.
＊The value inside the bracket for the maximum payload applies when a regenerative discharging resistor (CAR-0500) or a regenerative discharging unit (CAR-UN50) is used.
＊The acceleration / deceleration time means the time required to reach a programmed speed.

## Axis model

**BAC 5D — ST — T12N — 50 — M**

| Lead | Brake | Stroke | Axis Options |
|---|---|---|---|
| 06:6mm<br>12:12mm | N:no brake<br>B:brake installed | Refer to this page<br>to select | No symbol: no option<br>M: motor cover |




| Type | | | |
|---|---|---|---|
| | Without a brake | BAC5D-ST-T‥N-05 | BAC5D-ST-T‥N-10 |
| | With a brake | BAC5D-ST-T‥N-05 | BAC5D-ST-T‥B-10 |
| Stroke X (mm) | | 50 | 100 |
| Total length L (mm) | | 312.8(350.1) | 362.8(400.1) |
| Main unit length LL (mm) | | 225.5 | 275.5 |
| L3 | (mm) | 151 | 201 |
| L4 | (mm) | 141.6 | 191.6 |
| Number of mounting holes P | | 4 | 6 |
| Intervals between mounting holes N | | 1 | 2 |
| Weight (kg) | | 1.7(1.9) | 1.9(2.1) |

＊Figures in brackets apply to an axis with a brake. ＊ See Page 26 for an outline view of a product with a motor cover.

## Table type

**BAC — 7D — ST — T12N — 50 — 13 — M**

| Lead | Brake | Stroke | Master controller | Cable length | Axis Options |
|---|---|---|---|---|---|
| 06:6mm<br>12:12mm | N:no brake<br>B:brake installed | (※)see "Type" in below table | 0: no controller<br>1: CA01-M05 | 3:3m<br>4:4m<br>5:5m | No symbol: no option<br>M: motor cover |

## Specifications

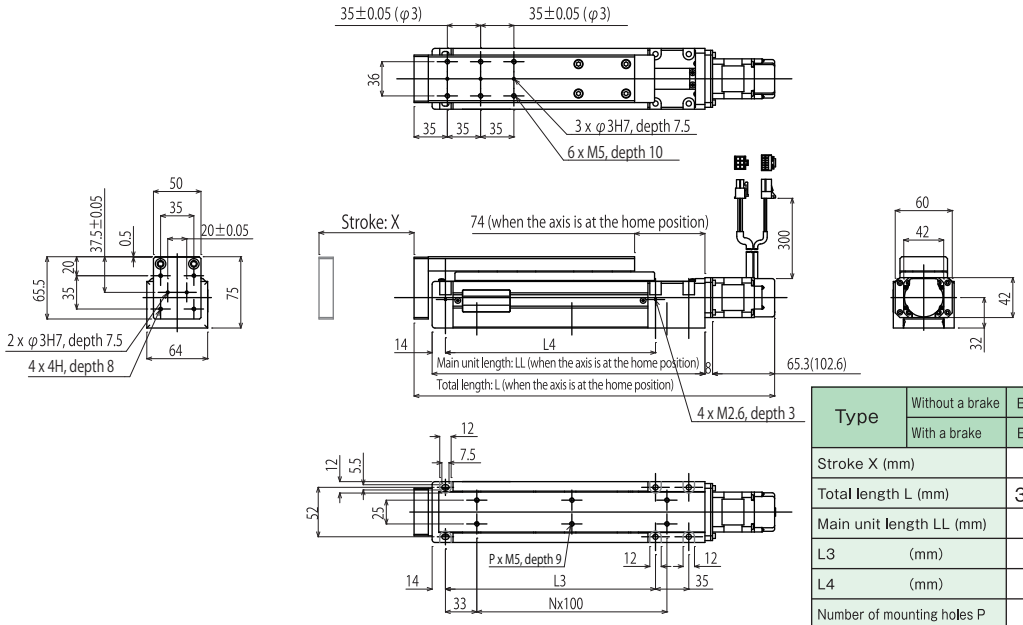
| | | | | |
|---|---|---|---|---|
| Motor output | 50W, AC servo motor (resolver) | | | |
| Drive system | Rolled ball screw (class 7 equivalent); outside diameter: 12 mm | | | |
| Stroke (mm) in 50 mm increments | Table | 50 | 100 | 150 |
| | (※)Type | 05 | 10 | 15 |
| Maximum speed (mm/s) | 6 mm lead | 400 | | |
| | 12 mm lead | 800 | | |
| Maximum payload (kg)<br>Acceleration/deceleration time (sec) | Lead: 6 mm<br>Acceleration deceleration time: 0.1 s or longer | When used horizontally: 9.0 | When used horizontally: 5.6 | When used horizontally: 3.8 |
| | | when used vertically:(3.5) | | |
| | Lead: 12 mm<br>Acceleration deceleration time: 0.2 s or longer | When used horizontally: 4.5 | When used horizontally: 2.8 | When used horizontally: 1.9 |
| | | when used vertically:(1.5) | | |
| Positioning repeatability (mm) | ±0.02 | | | |
| Resolution (mm) | Lead / 2048 | | | |
| Allowable static moment (N•m) | Stroke: 50 mm | Table: MR: 11.7, MP: 3.8, MY: 3.8 | | |
| | Stroke: 100 mm | Table: MR: 11.7, MP: 2.3, MY: 2.3 | | |
| | Stroke: 150 mm | Table: MR: 11.7, MP: 1.7, MY: 1.7 | | |
| Brake | Brake applied when the system is de-energized Voltage: DC24V | | | |
| Master controller | CA01—M05 | | | |

Note
∗Select a product with a brake if it is to be used as a vertical axis.
∗Maximum payload is the value measured when a load is placed directly above the slider.
∗The value inside the bracket for the maximum payload applies when a regenerative discharging resistor (CAR-0500) or a regenerative discharging unit (CAR-UN50) is used.
∗The acceleration / deceleration time means the time required to reach a programmed speed.

## Axis model

**BAC 7D — ST — T12N — 50 — M**

| Lead | Brake | Stroke | Axis Options |
|---|---|---|---|
| 06:6mm<br>12:12mm | N:no brake<br>B:brake installed | Refer to this page to select | No symbol: no option<br>M: motor cover |




| Type | | BAC7D-ST-T··N-05 | BAC7D-ST-T··N-10 | BAC7D-ST-T··N-15 |
|---|---|---|---|---|
| | Without a brake | | | |
| | With a brake | BAC7D-ST-T··B-05 | BAC7D-ST-T··B-10 | BAC7D-ST-T··B-15 |
| Stroke X (mm) | | 50 | 100 | 150 |
| Total length L (mm) | | 329.3(366.6) | 379.3(416.6) | 429.3(466.6) |
| Main unit length LL (mm) | | 256 | 306 | 356 |
| L3 | (mm) | 171 | 221 | 271 |
| L4 | (mm) | 171 | 221 | 271 |
| Number of mounting holes P | | 4 | 6 | 6 |
| Intervals between mounting holes N | | 1 | 2 | 2 |
| Weight (kg) | | 3.0(3.2) | 3.3(3.5) | 3.6(3.8) |

∗Figures in brackets apply to an axis with a brake. ∗ See Page 26 for an outline view of a product with a motor cover.

## Rod type

**BAC — 3D — ST — C12N — 50 — 13 — M**

| Brake | Stroke | Master controller | Cable length | Axis Options |
|---|---|---|---|---|
| N:no brake<br>B:brake installed | (※)see "Type" in below table | 0: no controller<br>1: CA01-M05 | 3:3m<br>4:4m<br>5:5m | No symbol: no option<br>M: motor cover |

### Specifications

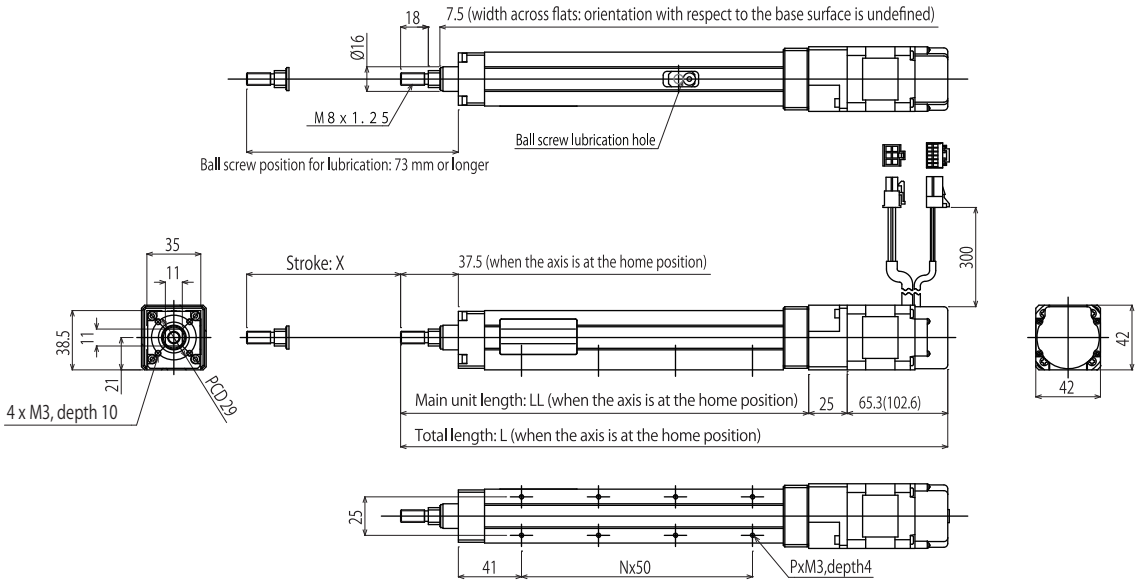
| | | |
|---|---|---|
| Motor output | 50W, AC servo motor (resolver) | |
| Drive system | Rolled ball screw (class 7 equivalent); outside diameter: 8 mm | |
| Stroke (mm) in 50 mm increments | Cylinder | 50~150 |
| | (※)Type | 05~15 |
| Maximum speed (mm/s) | 12 mm lead | 600 |
| Maximum payload (kg)<br>Acceleration/deceleration time (sec) | When used horizontally: 4.5 when used vertically:(2.5)<br>Acceleration / deceleration time: 0.15s or longer | |
| Positioning repeatability (mm) | ±0.02 | |
| Resolution (mm) | Lead / 2048 | |
| Allowable static moment (N·m) | Load moment cannot be applied to a rod | |
| Brake | Brake applied when the system is de-energized Voltage: DC24V | |
| Master controller | CA01—M05 | |

Note
*Select a product with a brake if it is to be used as a vertical axis.
*Maximum payload is the value measured when a load is placed directly above the slider.
*The value inside the bracket for the maximum payload applies when a regenerative discharging resistor (CAR-0500) or a regenerative discharging unit (CAR-UN50) is used.
*The acceleration / deceleration time means the time required to reach a programmed speed.
*Payload value for a horizontally installed system applies when an external guide mechanism is used in combination with this product.
*Load moment cannot be applied to this product. Use it in combination with an external guide mechanism.

## Axis model

**BAC 3D — ST — C12N — 50 — M**

| Brake | Stroke | Axis Options |
|---|---|---|
| N:no brake<br>B:brake installed | Refer to this page to select | No symbol: no option<br>M: motor cover |




| Stroke X (mm) | 50 | 100 | 150 |
|---|---|---|---|
| Total length L (mm) | 305.3(342.6) | 355.3(392.6) | 405.3(442.6) |
| Main unit length LL (mm) | 215 | 265 | 315 |
| Number of mounting holes P | 6 | 8 | 10 |
| Intervals between mounting holes N | 2 | 3 | 4 |
| Weight (kg) | 1.3(1.5) | 1.4(1.6) | 1.5(1.7) |

*Figures in brackets apply to an axis with a brake.
* See Page 26 for an outline view of a product with a motor cover.

## Rod type

**BAC — 4D — ST — C12N — 50 — 13 — M**

| Brake | Stroke | Master controller | Cable length | Axis Options |
|---|---|---|---|---|
| N: no brake<br>B: brake installed | (※) see "Type" in below table | 0: no controller<br>1: CA01-M05 | 3: 3m<br>4: 4m<br>5: 5m | No symbol: no option<br>M: motor cover |

## Specifications

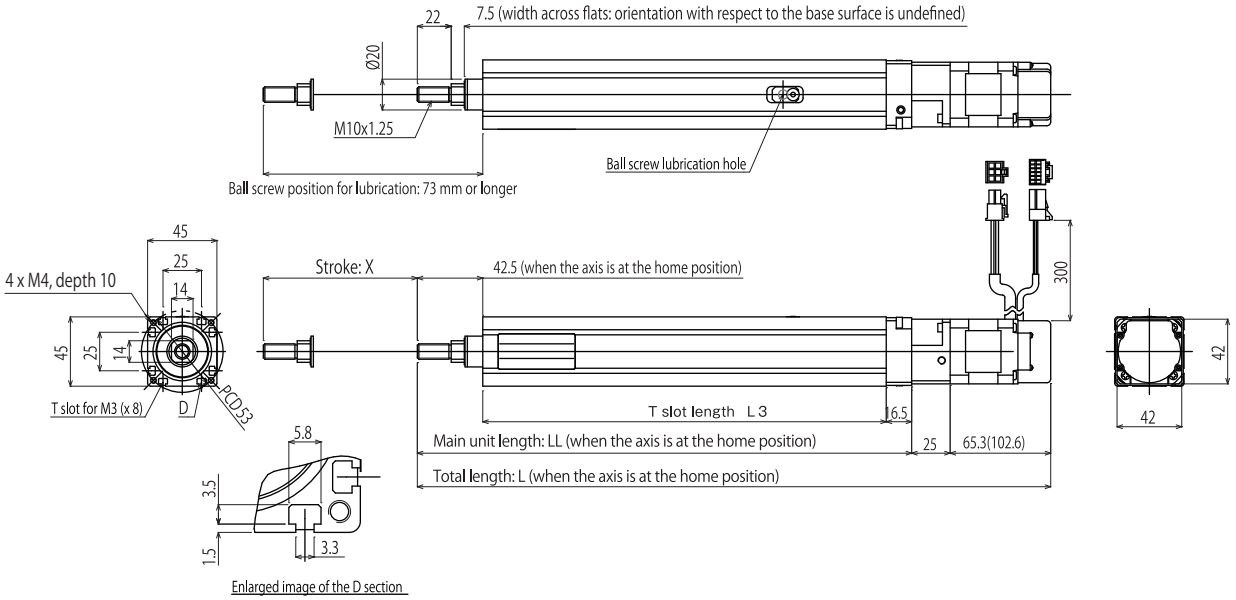
| | | |
|---|---|---|
| Motor output | 50W, AC servo motor (resolver) | |
| Drive system | Rolled ball screw (class 7 equivalent); outside diameter: 8 mm | |
| Stroke (mm) in 50 mm increments | Cylinder | 50~200 |
| | (※) Type | 05~20 |
| Maximum speed (mm/s) | 12 mm lead | 600 |
| Maximum payload (kg)<br>Acceleration/deceleration time (sec) | When used horizontally: 5.2 when used vertically:(2.2)<br>Acceleration / deceleration time: 0.15s or longer | |
| Positioning repeatability (mm) | ±0.02 | |
| Resolution (mm) | Lead / 2048 | |
| Allowable static moment (N·m) | Load moment cannot be applied to a rod | |
| Brake | Brake applied when the system is de-energized Voltage: DC24V | |
| Master controller | CA01—M05 | |

Note
*Select a product with a brake if it is to be used as a vertical axis.
*Maximum payload is the value measured when a load is placed directly above the slider.
*The value inside the bracket for the maximum payload applies when a regenerative discharging resistor (CAR-0500) or a regenerative discharging unit (CAR-UN50) is used.
*The acceleration / deceleration time means the time required to reach a programmed speed.
*Payload value for a horizontally installed system applies when an external guide mechanism is used in combination with this product.
*Load moment cannot be applied to this product. Use it in combination with an external guide mechanism.

## Axis model

**BAC 4D — ST — C12N — 50 — M**

| Brake | Stroke | Axis Options |
|---|---|---|
| N: no brake<br>B: brake installed | Refer to this page to select | No symbol: no option<br>M: motor cover |




| Stroke X (mm) | 50 | 100 | 150 | 200 |
|---|---|---|---|---|
| Total length L (mm) | 311.8(349.1) | 361.8(399.1) | 411.8(449.1) | 461.8(499.1) |
| Main unit length LL (mm) | 221.5 | 271.5 | 321.5 | 371.5 |
| T slot length L3 (mm) | 162.5 | 212.5 | 262.5 | 312.5 |
| Weight (kg) | 1.4(1.6) | 1.6(1.8) | 1.8(2.0) | 2.1(2.3) |

*Figures in brackets apply to an axis with a brake.
* See Page 26 for an outline view of a product with a motor cover.

## Control System Parts

### Controller



### Parts



### Optional Parts

# Master controller

## Main Features

- This is a single-axis controller designed exclusively for the BA-C series.
- Specify a point table using 4 input signals and turn on a start signal to start operation.
- The point table consists of 12 types of data such as coordinates, speed table number, acceleration / deceleration table number, and torque-controlled operation table number.
- Parameter setting such as gain adjustment is automatic; just input the robot type.
- Input signal can trigger jog move (coordinates can be changed using this signal).
- An LED uses 3 colors to indicate different error statuses.
- A brake release switch is now on the controller for safety reasons.

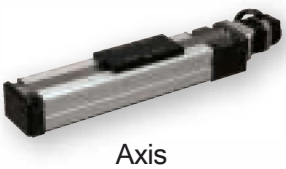
**Model**

**CA01-M05**

# System Configuration

Basic unit : Expansion unit

Master controller and a single axis



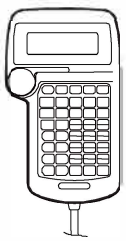
Axis

Controller cable

**Master controller CA01-M05**

Regenerative discharging resistar
CAR-0500

Regenerative discharging unit
CAR-UN50



**Teach pendant TPH-4C**

## General specifications

| | | |
|---|---|---|
| Applicable robot | | COMPO ARM BA-C Series |
| Controller model | | CA01-M05 |
| Number of axes subject to control | | 1 axis |
| Motor capacity | | 50W |
| Control method | | Semi-closed loop control |
| Teaching method | | Remote teaching,<br>Direct teaching, or MD |
| Speed setting | | 8 steps (variable) |
| Acceleration/deceleration setting | | 8 steps (variable) |
| Number of point tables | | 15 tables |
| Storage method | | EEPROM<br>(Can be rewritten 1 million times) |
| Transfer mode | | Point mode |
| Special function | | Torque control function |
| Emergency stop input | | Yes |
| Home position sensor input | | Yes |
| Regenerative function | | Yes (external regenerative resistor) |
| Dynamic brake function | | N/A |
| Mechanical brake drive output | | DC24V-0.4A or lower<br>(for a holding brake applied when the system is de-energized)<br>The brake release switch (SW1) for force-releasing of the brake |
| Protective function | Hardware error | Sensor error, drive power supply error, EEPROM error, overheating, and so on |
| | Software error | Over-speed, overload, extensive position error, and so on |
| | Warning | Drive power disconnection |
| Dimensions | | 31 (W) x 146 (H) x 89 (D) mm<br>(excluding screw heads). |

| | | |
|---|---|---|
| Status display | | Display on the status LED (LED1)<br>Normal mode (set SW2 to 0)<br>Servo is off: green (on)<br>Servo is on: green (flashing)<br>Drive power supply is off: orange (on)<br>Battery power is low: orange (flashing)<br>Power supply disconnection request is off: red (on)<br>Error: red and green (flashing) |
| System input | | 24V, 7mA, 10 points |
| System output | | 30V max, 100mA max, 8 points |
| Communication function | | RS-232C x 1 channel (9600bps)<br>for PC software SF-98D |
| Control power &WIY voltage , _ 1J | | DC24V±10% |
| Drive power StWY voltage (Note 1J | | DC24V±10% |
| Control power S4Jply | | 0.25A |
| Drive power supply | | Depends on the model of a combined axis, rating: 3A (maximum 9A) |
| Ambient conditions | Operating temperature range | 0 to 40° C |
| | Operating moisture range | 90% or lower<br>(no condensation) |
| | Storage temperature range | -10 to 65° C |
| | Storage temperature range | 90% or lower<br>(no condensation) |
| | Environment | Indoor (no direct sunlight)<br>No dirt, dust, corrosive gases, flammable gases<br>Maximum altitude of 1,000 m |
| | Noise / shock | 4.9 m/s2 or lower /<br>19.6 m/s2 or lower |
| Weight | | Approximately 0.25 kg |

Note 1: Do not use the same power supply as the control power supply and the drive power supply. Failure to follow this instruction may result in product failure.
*See page 38 for a connection example.

## Input and output specifications

| Input specifications | |
|---|---|
| Input rating | DC24V, 7mA |
| Insulation method | Photo coupler |
| Power supply | Supplied externally (DC24V) |

| Output specifications | |
|---|---|
| Output method | Transistor output (open collector) |
| Output capacitance | System output MAX 100mA / 1 point<br>*No general purpose output |

*See Pages 39 and 40 Details on System Input and Output for details on signals.
*See Page 41 for an emergency stop input and input / output connection method

## Input / output pin numbers and signal names

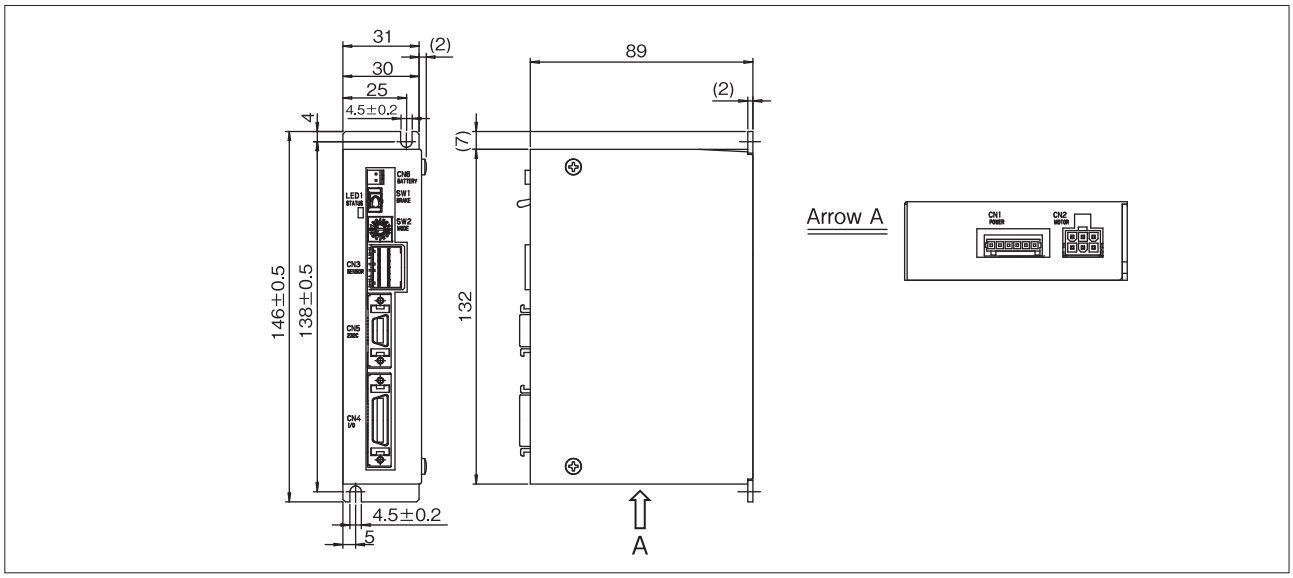
| Pin No. | Input No. | Signal | Description |
|---|---|---|---|
| 1 | - | +COM | Positive common mode |
| 2 | - | +COM | Positive common mode |
| 3 | IN1(*1) | START | Axis start |
| | | +JOG | +JOG move |
| 4 | IN2(*1) | STOP | Stop input |
| | | -JOG | -JOG move |
| 5 | IN3 | SVON | Servo ON |
| 6 | IN4 | WRITE | Write |
| 7 | IN5 | ALRST | Error reset |
| 8 | IN6 | RTSEL | Switch between operation / teaching |
| 9 | IN7 | PIN1 | Command point number |
| 10 | IN8 | PIN2 | |
| 11 | IN9 | PIN3 | |
| 12 | IN10 | PIN4 | |
| 13 | - | Emergency stop input (+) | |

| Pin No. | Input No. | Signal | Description |
|---|---|---|---|
| 14 | OUT1 | RUN | Robot in operation |
| 15 | OUT2(*2) | ERROR | Error detected |
| | | ROY/ERR | System in the READY state or an error detected |
| 16 | OUT3 | POSI | Positioning complete |
| 17 | OUT4 | AREA | Slider in designated area |
| 18 | OUT5(*3) | POUT1 | Completion point number |
| | | TQCON | Torque-controlled operation in process |
| 19 | OUT6(*3) | POUT2 | Completion point number |
| | | TQLOAD | Torque load |
| 20 | OUT7(*3) | POUT4 | Completion point number |
| | | TQLIM | Torque limit |
| 21 | OUT8(*3) | POUT8 | Completion point number |
| | | TQLOCK | Slider locked |
| 22 | - | -COM | Negative common mode |
| 23 | - | -COM | Negative common mode |
| 24 | - | N. C. | |
| 25 | - | | |
| 26 | - | Emergency stop input (-) | |

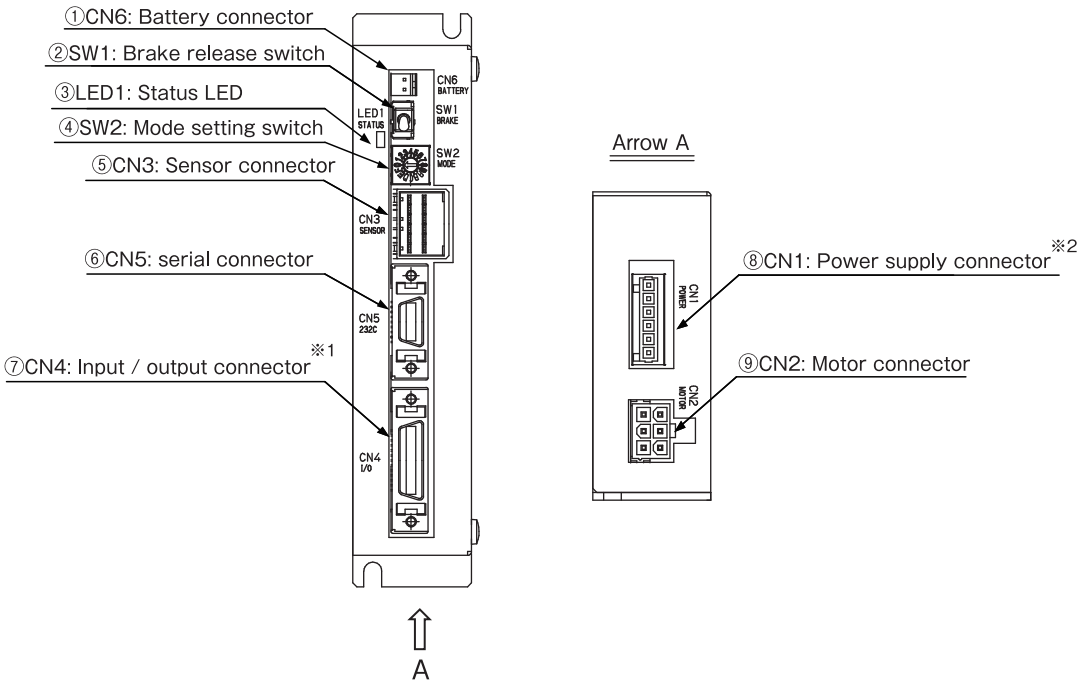
(1 *I The top line shows the signal during operation and the bottom line shows the signal during teaching.
(2*) Select one using Parameter M13.
(3*) The top line shows the signal for normal operation and teaching, and the bottom line shows the signal during torque-controlled operation.

## Dimensions

# Parts




## Parts




①CN6: Battery connector
A connector for the resolver ABS backup battery.

②SW1: Brake release switch
A momentary switch for force-releasing the brake.
The brake is released while the lever is lifted.
The brake control resumes when the lever is released.

③LED1: Status LED
It indicates the controller status using three different colors.

④SW2: Mode setting switch
A switch for making operation mode setting.

⑤CN3: Sensor connector
A motor sensor cable connector.

⑥CN5: serial connector
An RS-232C connector for connecting a teach pendant or a PC communication cable (optional).

⑦CN4: Input / output connector
A connector used for system input / output as well as emergency stop input.
A cable is connected to a sequencer to realize external robot control.

⑧CN1: Power supply connector
A connector for inputting control power and motor power.

⑨CN2: Motor connector
A motor cable connector.

＊1 It comes with a plug and a junction shell.
＊2 It comes with a plug and a connection lever.

# Slave controller

## Main features

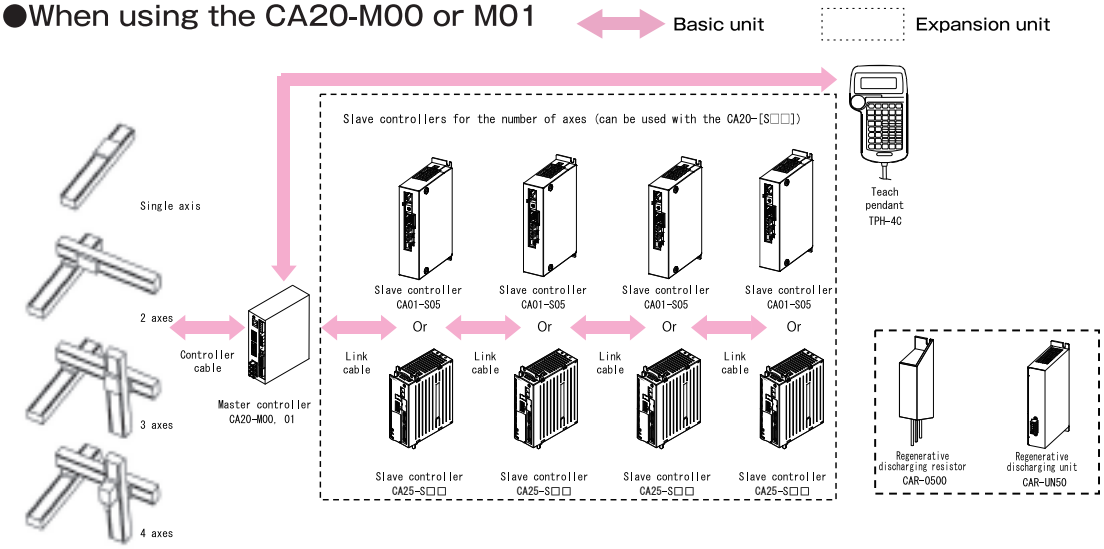
- It can be connected to a BA-III series controller.
- It can be easily added to the configuration as a cylinder for a currently used axis.

**Model**

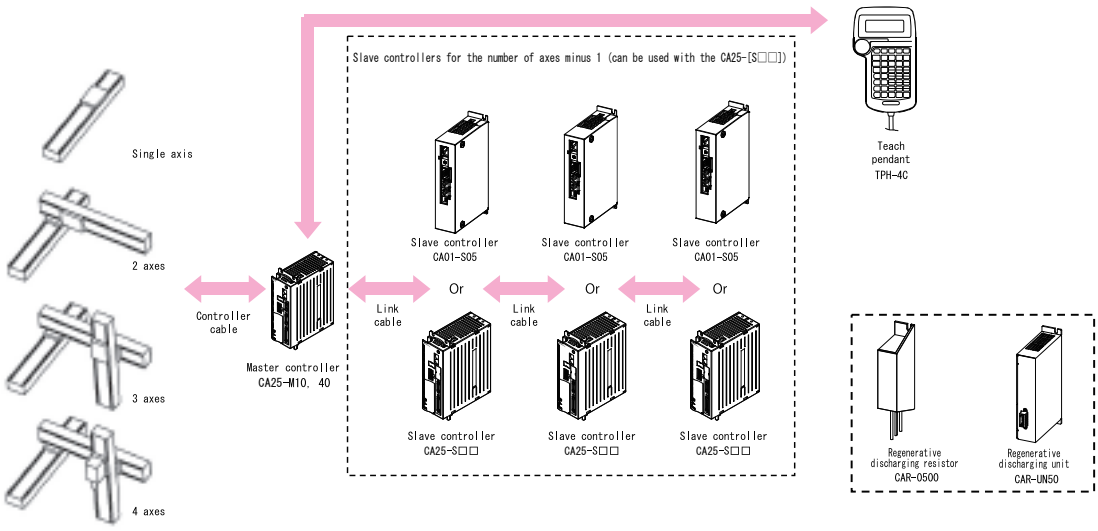
**C A 0 1 - S 0 5**

# System Configuration

●When using the CA20-M00 or M01




●When using the CA25-M10 or M40



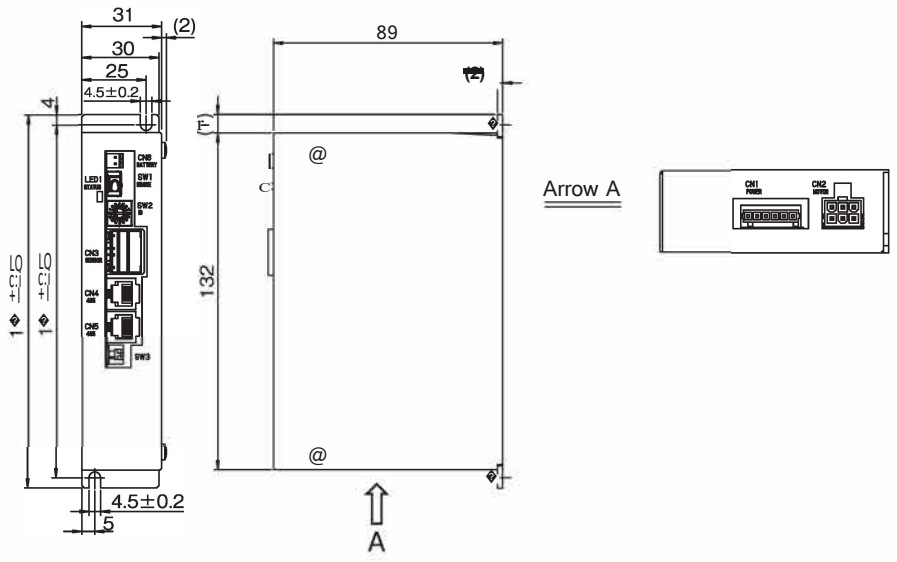
## General specifications

| | | | | | |
|---|---|---|---|---|---|
| Applicable robot | | COMPO ARM BA-C Series | Control power supply voltage (Note 1) | DC24V±10% | |
| Controller model | | CA01-S05 | Drive power supply voltage (Note 1) | DC24V±10% | |
| Numer of axes subject to control | | 1 axis (connection to the master controller required) | Control power supply | 0.25A | |
| Motor capacity | | SOW | Drive power supply | Depends on the axis model; rating; 3A (maximum 9A) | |
| Error indication | | An error lamp (front panel).<br>There will be an error indication also on the teach pendant (connected to the master controller). | Ambient conditions | Operating temperature range | 0to40' C |
| | | | | Operating moisture range | 90%or lower (no condensation) |
| Home position sensor input | | Yes | | Storage temperature range | -101085˚ C |
| Regenerative function | | Yes (external regenerative resistor) | | Storage temperature range | 90%or lower (no condensation) |
| Dynamic brake function | | Yes | | Environment | Indoor (no direct sunlight)<br>No dirt, dust, corrosive gases, flammable gases<br>Maximum altitude of 1,000 m |
| Mechanical brake drive output | | DC24V-0.4A or lower (for a holding brake applied when the system is de-energized)<br>The brake release switch (SW1) for force-releasing of the brake | | Noise / shock | 4.9 m/s2 or lower /<br>19.6 m/s2 or lower |
| Protective function | Hardware error | Sensor error. drive power supply error. non-volatile memory error. and so on | Dimensions | 31 (W) x 146 (H) x 89 (D) mm (excluding screw heads). | |
| | Software error | Over-speed. overload, extensive position error, and so on | Weight | Approximately 0.25 kg | |
| | Warning | Low battery voltage | | | |
| Dimensions | | It is normally lit in green.<br>It turns red when an error occurs. | | | |

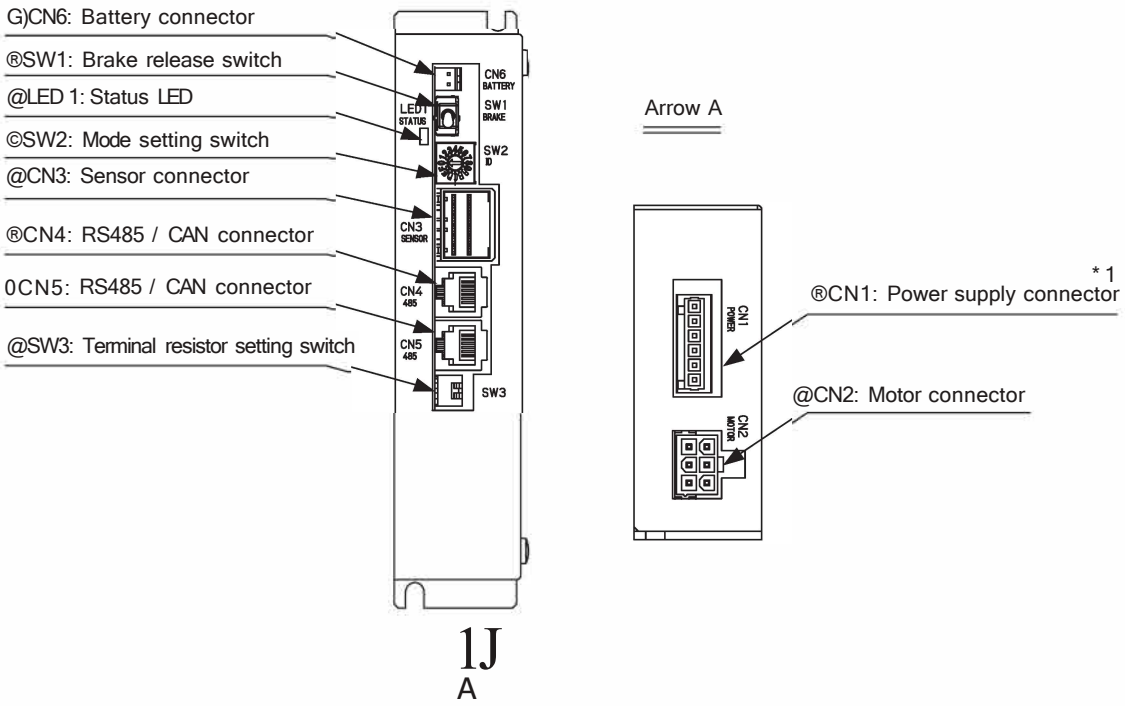
Note 1 Do not use the same power supply as the control power supply and the drive power supply. Failure to follow this instruction may result in product failure.
*See page 38 for a connection example.

## Dimensions

## Slave controller



## Parts




G)CN6: Battery connector
A connector for the resolver ABS backup battery.

(g)SW1: Brake release switch
A momentary switch for force-releasing the brake.
The brake is released while the lever is lifted.
The brake control resumes when the lever is released.

®LED1: Status LED
This LED shows the controller status. It turns green when the power turns on. It becomes red when an error occurs.

©SW2: Mode setting switch
This switch is for setting its own slave controller number when connected to the master controller for controlling multiple axes. Set it to F when updating the firmware.

®CN3: Sensor connector
A motor sensor cable connector.

®CN4: RS485 / CAN connector
A communication cable connector for connecting a slave controller (optional).

CVCNS: RS485 *I* CAN connector
A communication cable connector for connecting a slave controller (optional).

®SW3: Terminal resistor setting switch
A switch for connecting a communication terminal resistor to be connected to the slave controller (optional).

®CN 1: Power supply connector
A connector for inputting control power and motor power.

@)CN2: Motor connector
A motor cable connector.

*1 It comes with a plug and a connection lever.

# Controller Cables

**Application**

The controller cables are a set of two flexible cables that connect an axis to a controller. The set consists of a motor line and a resolver signal line.
These cables are designed exclusively for use with an axis.

**Model**

BAC − CC - M ✻✻

Controller cable

Cable length
30:3000mm
40:4000mm
50:5000mm

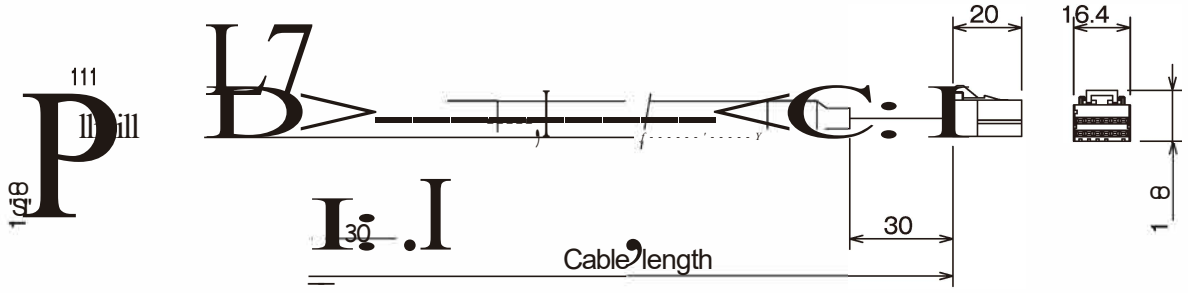
*The controller cable set consists of a motor line and a resolver signal line.
*Contact our sales representative if you need a cable longer than 5 m

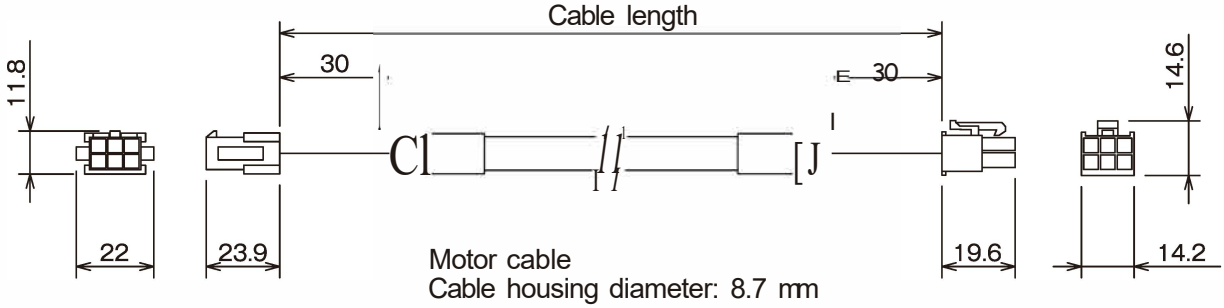
**Dimensions**

Tab housing: 1-1318115-6 (Tyco Electronics)
Tab contact: 1318112-1 (Tyco Electronics)

Resolver cable
Cable housing diameter: 8.9 mm

Receptacle housing: 1-1318118-6 (Tyco Electronics)
Receptacle contact: 1318108-1 (Tyco Electronics)




Motor cable
Cable housing diameter: 8.7 mm

Plug: 5559-06P (Molex)
Pin: 5558-PBT (Molex)

Receptacle: 6667-06R (Molex)
Pin: 5556TL (Molex)

# Table Unit

## Application

Attach this table unit to the slider of a slider type axis BAC5D or BAC7D to use it as a table type axis. This product does not include an axis.

## Model

**BACS – TU – M ****

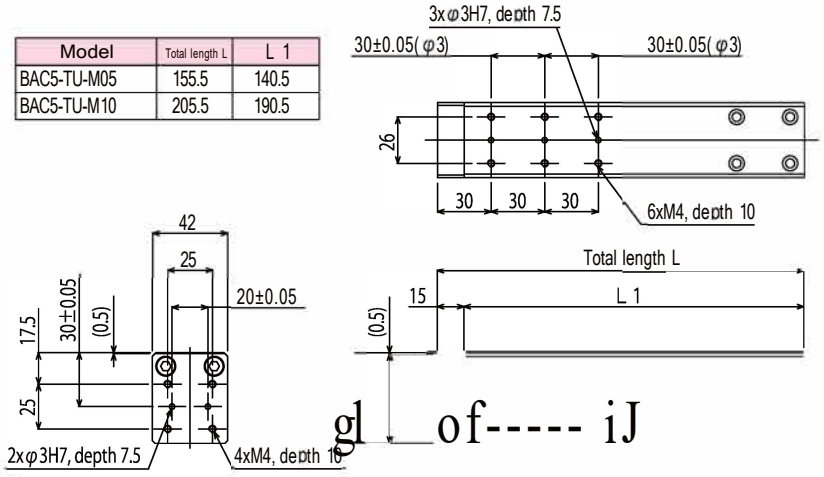
- BACS: Combined axis — 5: BAC5D-ST-M; 7: BAC7D-ST-M
- TU: Table unit
- M: Mslider
- **: Stroke — 05: 50mm; 10: 100mm; 15:150mm (Note1)

Note 1: There is no BAC5-TU-M15.
*The product comes with bolts and knock-pins. Use them when attaching the product to a slider.
*See the page describing the single axis unit specifications for table type unit specifications.

## Dimensions

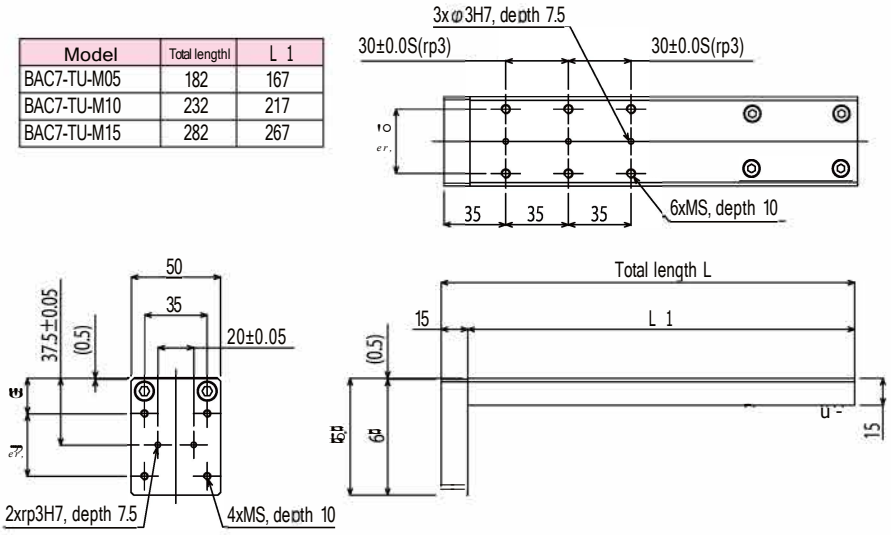
### BACS-TU-M**

| Model | Total length L | L 1 |
|---|---|---|
| BAC5-TU-M05 | 155.5 | 140.5 |
| BAC5-TU-M10 | 205.5 | 190.5 |




### BAC7-TU-M**

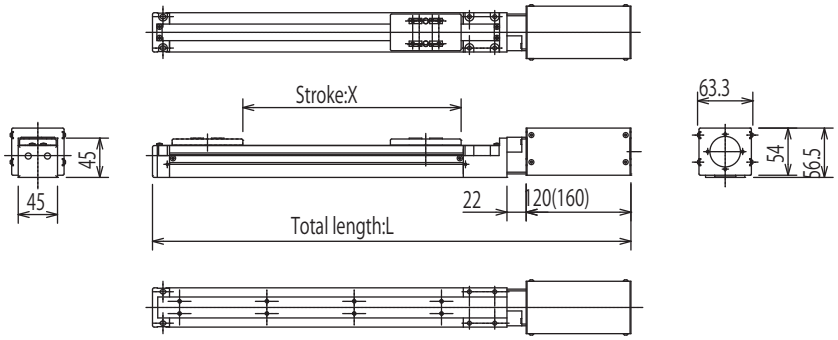
| Model | Total length | L 1 |
|---|---|---|
| BAC7-TU-M05 | 182 | 167 |
| BAC7-TU-M10 | 232 | 217 |
| BAC7-TU-M15 | 282 | 267 |



# Axis with a Motor Cover

## Dimensions

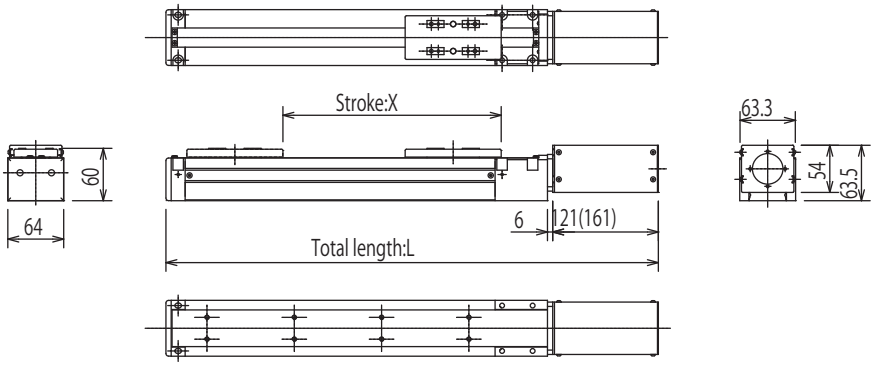
### BAC5D−ST−M＊＊＊−＊＊−M




| Stroke: X (mm) | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 |
|---|---|---|---|---|---|---|---|---|---|---|
| Total length: L (mm) | 348(388) | 398(438) | 448(488) | 498(538) | 548(588) | 598(638) | 648(688) | 698(738) | 748(788) | 798(838) |

※Figures in brackets apply to an axis with brake.

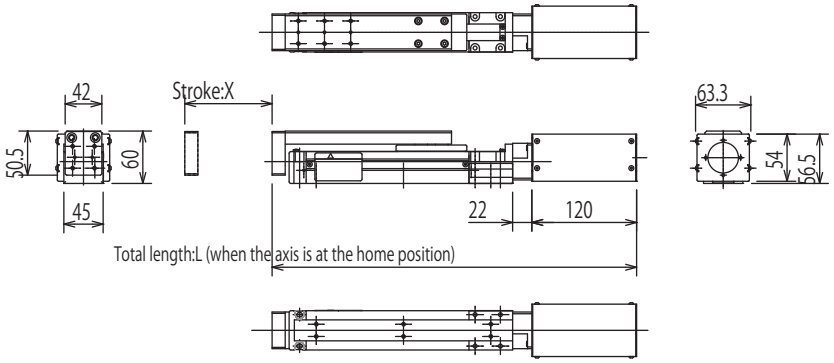
### BAC7D−ST−M＊＊＊−＊＊−M




| Stroke: X (mm) | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 700 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total length: L (mm) | 364(404) | 414(454) | 464(504) | 514(554) | 564(604) | 614(654) | 664(704) | 714(754) | 764(804) | 814(854) | 864(904) | 914(954) | 1014(1054) |

※Figures in brackets apply to an axis with brake.

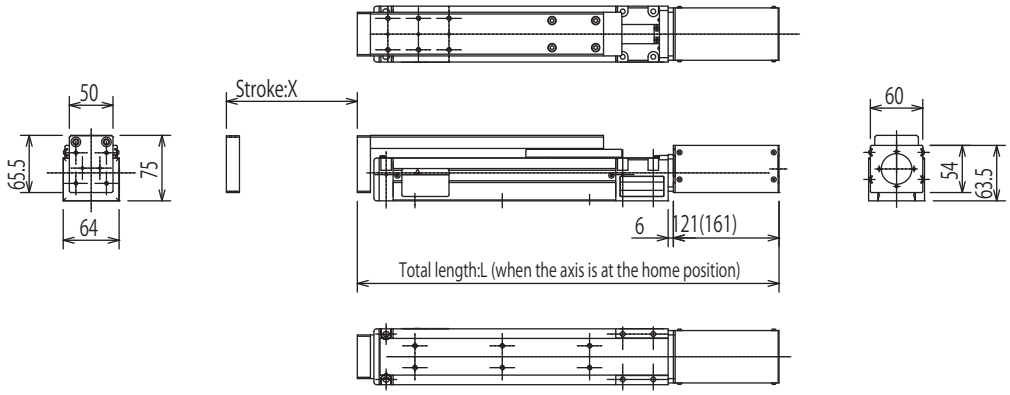
### BAC5D−ST−T＊＊＊−＊＊−M




| Stroke: X (mm) | 50 | 100 |
|---|---|---|
| Total length: L (mm) | 367.5(407.5) | 417.5(457.5) |

※Figures in brackets apply to an axis with brake.

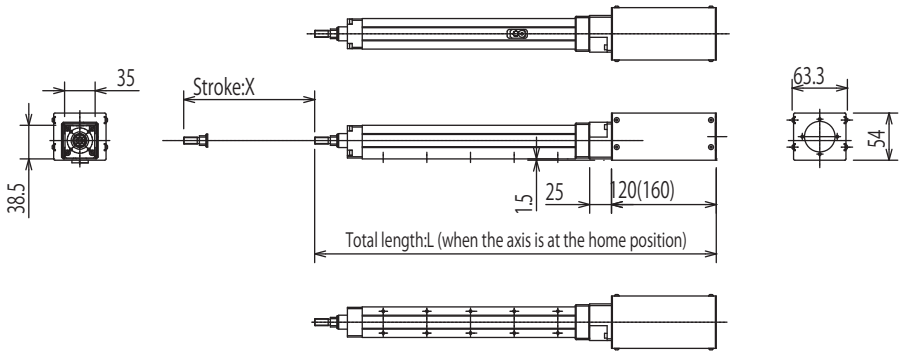
## BAC7D−ST−T＊＊＊−＊＊−M




| Stroke: X (mm) | 50 | 100 | 150 |
|---|---|---|---|
| Total length: L (mm) | 383(423) | 433(473) | 483(523) |

※Figures in brackets apply to an axis with brake.

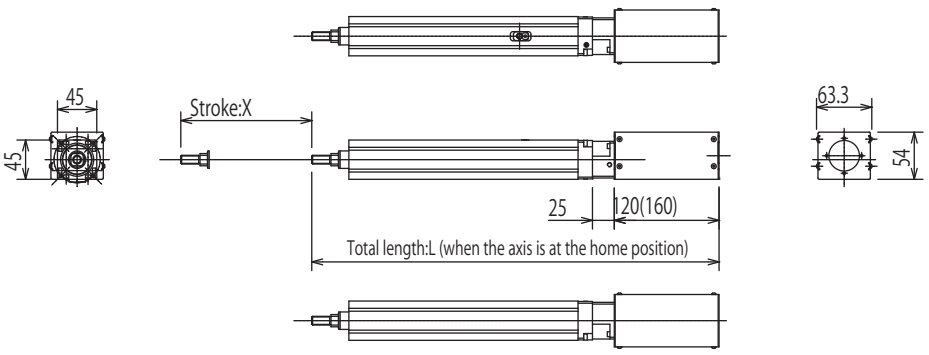
## BAC3D−ST−C12＊−＊＊−M




| Stroke: X (mm) | 50 | 100 | 150 |
|---|---|---|---|
| Total length: L (mm) | 360(400) | 410(450) | 460(500) |

※Figures in brackets apply to an axis with brake.

## BAC4D−ST−C12＊−＊＊−M




| Stroke: X (mm) | 50 | 100 | 150 | 200 |
|---|---|---|---|---|
| Total length: L (mm) | 366.5(406.5) | 416.5(456.5) | 466.5(506.5) | 516.5(556.5) |

※Figures in brackets apply to an axis with brake.

# Regenerative Resistor

## Application

The regenerative resistor absorbs energy generated during deceleration of an axis motor. Use it when the load inertia exceeds its allowable value or when a heavy load is brought down by the Z-axis in a long stroke (resulting in high power generation).
(The regenerative resistor prevents generation of an excessive voltage in the controller.)

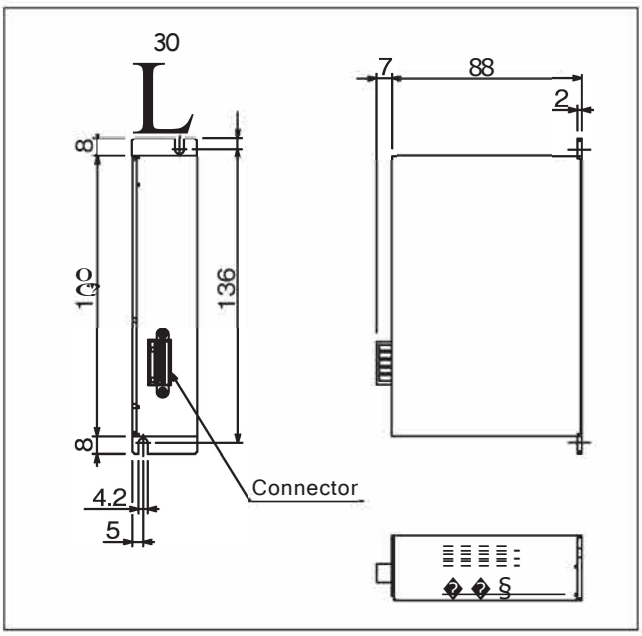
* It is available with (CAR-UN50) or without (CAR-0500) a cover.
* All discharged energy is converted into heat.
* A contact output (N.C) occurs when the resistor generates an unusual amount of heat.
*This unit supports one axis only.

## Model

**CAR-UN50 (regenerative discharging unit)**
**CAR-0500 (regenerative discharging resistor)**

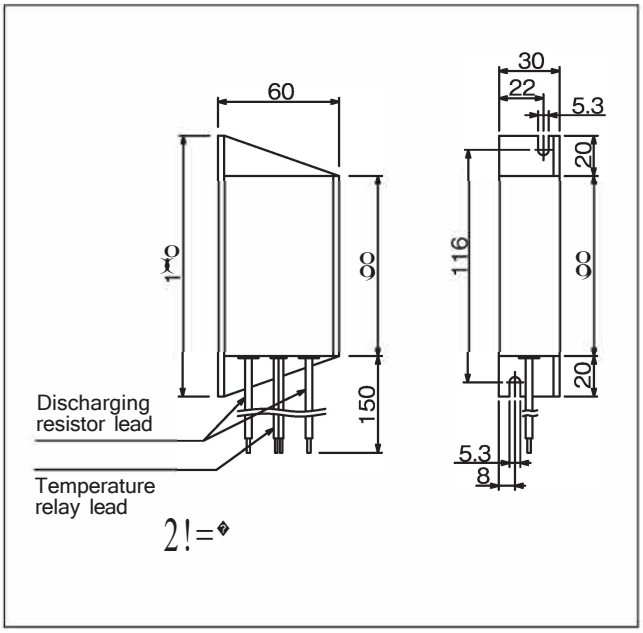
## Dimensions

**CAR-UNSO**




Accessory: connector and a connection lever

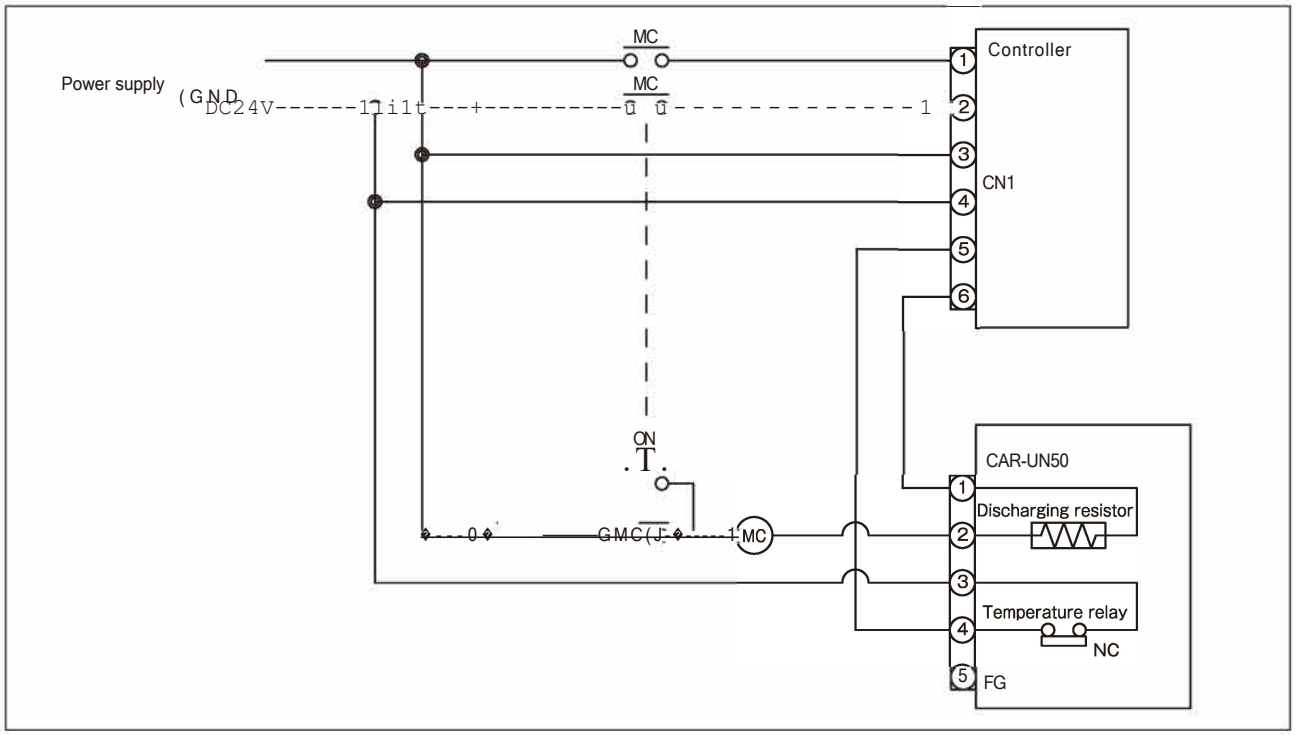
**CAR-0500**




Accessory: relay connector x 2

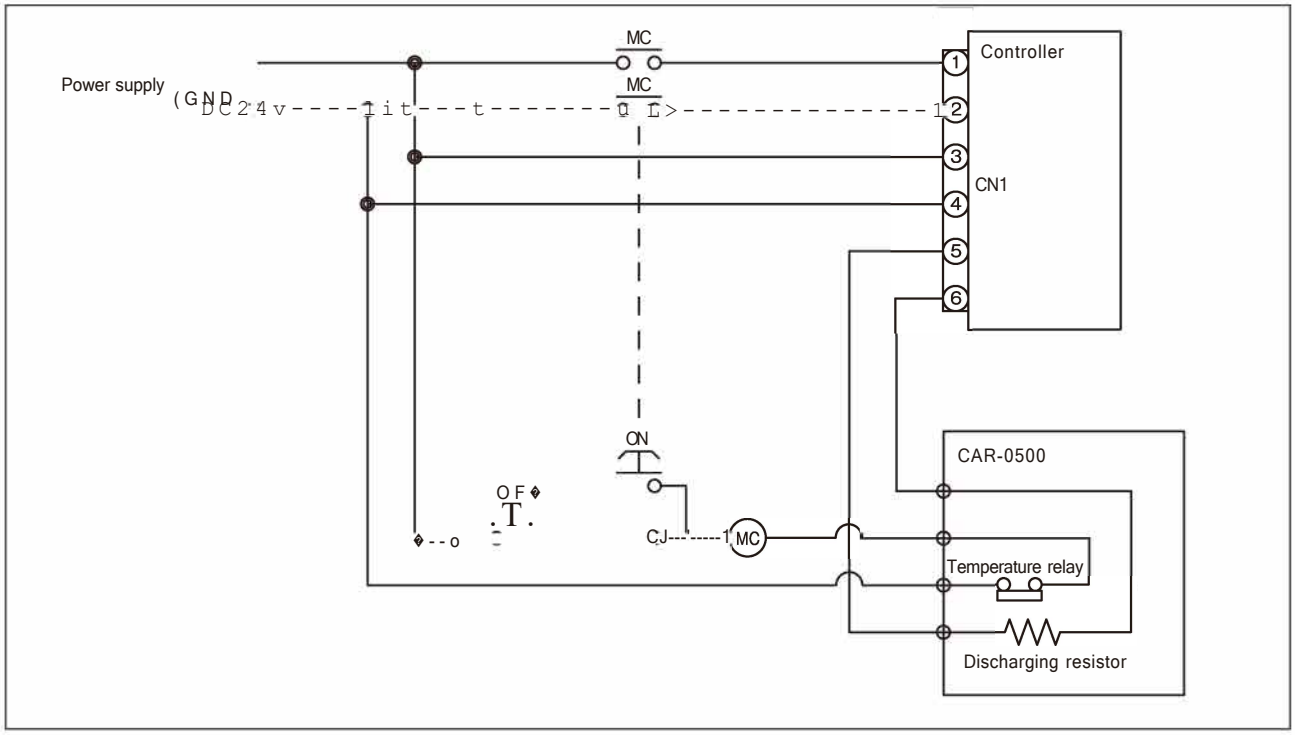
## Connection Example

# CAR-UNSO




·The CAR-UN50 has a built-in temperature relay which will be activated at 120° C.
·When this temperature relay is activated, its output becomes an open circuit.
·When including this temperature relay in the system configuration, create a sequence in which the controller drive power supply is normally off.

# CAR-0500




·The CAR-UN50 has a built-in temperature relay which will be activated at 135° C.
·When this temperature relay is activated, its output becomes an open circuit.
·When including this temperature relay in the system configuration, create a sequence in which the controller drive power supply is normally off.

# Teach Pendant

**Application**

The teach pendant connected to a controller serves as a program or parameter input device. In addition, it issues commands to find the home position, start robot operation, stop robot operation, execute jog move, and activate an emergency stop. It also shows an abnormal or error status, and can cancel it afterwards.

**Model**

TPH - 4C

＊Supports a robot version 2.25 or later.

# PC Software

**Application**

The PC software SF-98D uses a PC as a host computer and supports programming for the COMPO ARM BA-C and BA-Ⅲ series. It sends robot controller program data to or receives such data from the PC, and also edits or saves the program data. In addition, it can control monitoring of I/O and coordinates as well as execution of jog move and return-to-home operation.

**Model**

SF - 98D

＊Supports a robot version 3.0.0 or later.

## Specifications

| | | |
|---|---|---|
| Package content | | CD-ROM x 1 and Installation Manual x 1 (communication cable PCBL-31 is sold separately) |
| Required system | PC | A serial communication port (Din-sub 9-pin) and a CD-ROM drive.<br>Requires available memory of 100MB or more and available hard disk space of 15MB or more. |
| | Compatible OS | Windows7, 8, 10 |
| | Display | SVGA or higher (resolution of 800 x 600 pixels or higher) |
| | Printer | A printer that can be connected to a PC and can print out from a Windows OS. |
| | Communication cable | A communication cable that connects a PC and the controller. Use the PCBL-31. |

＊Microsoft Windows, Microsoft Windows NT, and Windows logos are registered trademarks or trademarks of Microsoft Corporation in the United States of America.

**Features**

・Its multi-window screen editor facilitates editing of a table or a parameter.
・It sends / receives table or parameter data to / from the controller. It can also save the data as a file.
・It controls axis operations such as teaching and programming.
・It can add titles or comments to tables or parameters upon print out (output to the printer) to facilitate debugging or checking.

# Communication Cable (RS-232C)

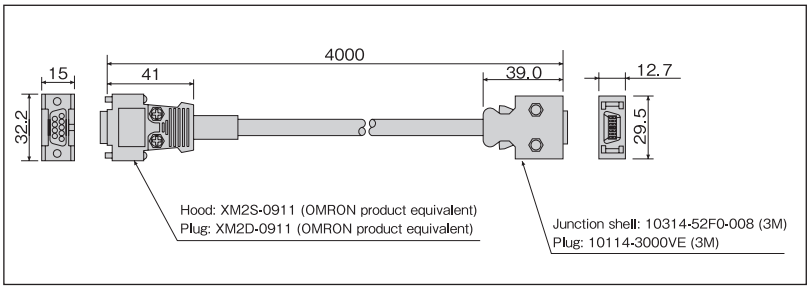
**Application**

This communication cable connects the controller to a PC (IBM / PC compatible).
Use this cable when using the PC software.

**Model**

**PCBL - 31**

**Dimensions**




# Input / Output Cable

**Application**

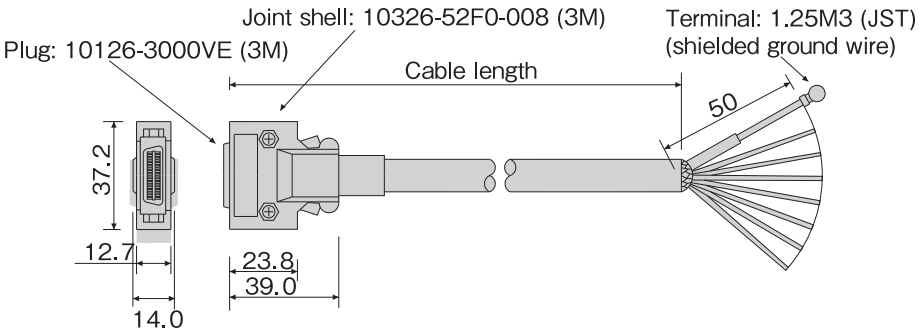
Connected to the input / output port of the master controller, it transfers signals to / from an external operation panel or control device.The plug on one of the cable ends allows direct connection to the controller.To connect to an external device, use the color on the core wire and the symbol chart as guides. Crimp the terminal in advance.

**Model**

**CA01 - IC - A 30 □**

- CA01 - IC: Input / Output Cable
- 30: Cable length (30 : 3000mm, 50 : 5000mm)
- □: Version N/A

**Dimensions**




| Model | Number of core wires | Core wire size | Cable housing diameter |
|---|---|---|---|
| CA01-IC-A □□ | 26 | 0.13sq | 9.1mm |

# Resolver ABS Backup Battery (for Maintenance Work)

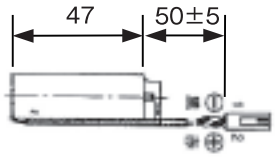
**Application**

This battery is used in the controller as a resolver (ABS) backup battery.
The master controller CA01-M05 and the slave controller CA01-S05 each comes with one.

**Model**

**CA10 - EB - 05**

## ●Lithium battery specifications

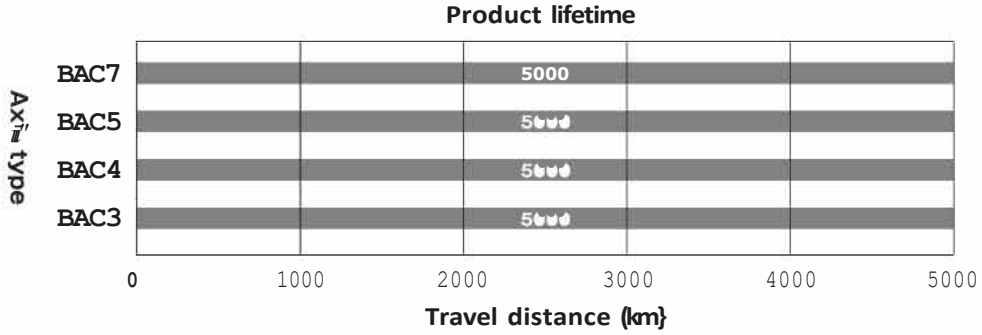
| Item | | | Detail | Note |
|---|---|---|---|---|
| Parts | | | Lithium battery | Thionyl chloride battery |
| Model | | | ER17500V C | Made by Toshiba |
| Specifications | Nominal voltage and capacity | | 3.6V, 2700mAh |   |
| | Dimensions | Battery | $\phi$17 x 47 mm (excluding the protrusion) | |
| | | Harness length | 50±5 mm (excluding the connector) | |
| | Weight | | Approximately 20g | |
| Duration of the backup function (Note 1) | | | Approximately 1 year (Note 2) | 25° C, back up current: 260 $\mu$A |

(Note 1) Cumulative time the controller is off.
(Note 2) Battery duration varies with the temperature. The figure is provided as a guide.

# Technical data

# Product Lifetime

he maximum payload and the allowable moment that appear in this catalog have been calculated based on the guide and ball screw lifetimes. The same maximum payload and the allowable moment apply to the slider, table, and rod types.






# Allowable Moment

## Allowable Moment

**The moment caused by the load on the robot axis has a great impact on the axle bearing of the slider. Therefore, follow the instructions below**

***Do not put on a load that exceeds the maximum payload**

The maximum payload value is obtained using the servo motor capacity; it changes with acceleration / deceleration time.

***Do not let the moment exceed the allowable static moment**

The allowable static moment is the moment generated when the robot is not moving. It is necessary to plan carefully the reactive force generated during workpiece insertion using a cylinder attached to the slider. Do not give a shock load to the axis.

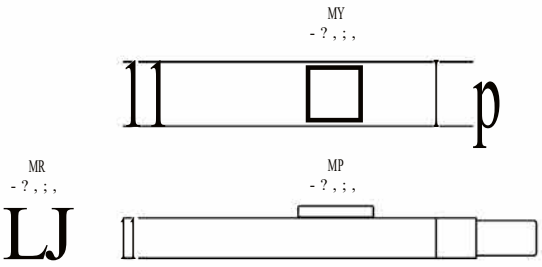
***Do not let the moment exceed the allowable dynamic moment**

The allowable dynamic moment is the moment generated due to acceleration or deceleration. It changes with the size of load, arm length, and arm direction: therefore, it needs to be calculated in each case. The chart below is provided as a guide.

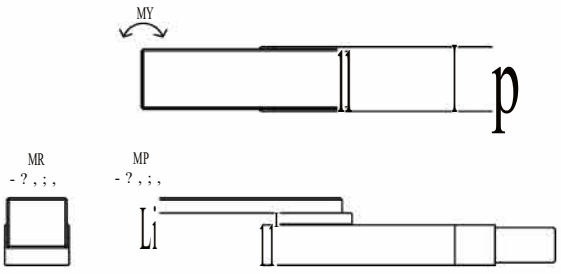
### 1. Allowable static moment

MR: rolling moment
MP: pitching moment
MY: yawing moment

*Slider type: center of the slider




* Table type: positive stroke limit at the center of the table end



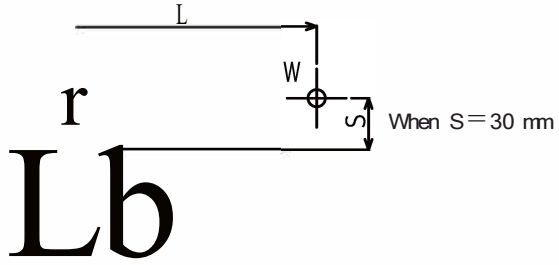

| Allowable static moment N•m | | MR | | MP | | MY | |
|---|---|---|---|---|---|---|---|
| Axis model | | BAC5D | BAC7D | BAC5D | BAC7D | BAC5D | BAC7D |
| Slider type | | 31 | 58 | **12** | 25.7 | 12 | 25.7 |
| Table type | Stroke: 50 mm | 4.4 | 11.7 | **19** | 3.8 | **19** | 3.8 |
| | Stroke: 100 mm | 4.4 | 11.7 | **12** | 2.3 | 1.2 | 2.3 |
| | Stroke: 150 mm | - | 11.7 | - | **17** | - | 1.7 |

## 2. Allowable dynamic moment

The dynamic moment of the axis has a great impact on the lifetime and performance of the product. It is therefore necessary to plan carefully the acceleration load, arm length, arm direction, arm speed, and arm stroke. This section provides the allowable dynamic moment tables. They show the relationships between the weight and allowable arm length to allow quick calculation of allowable dynamic moment. The tables show the load weight (kg) and the arm length to the center of gravity of the load (note that the values shown are not allowable moment values).

### [Allowable dynamic moment tables] BAC5, 7: slider type

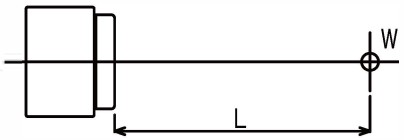
The tables show the load weight (kg) and the arm length to the center of gravity of the load (note that the values shown are not allowable moment values).




### [Horizontally mounted axis]

| | Lead | Speed | W[kg] | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BAC5D | 6 | 400 | L[mm] | 950 | 510 | 350 | 260 | 210 | 175 | 145 | 125 | 110 | 95 | 85 | 75 |
| | 12 | 800 | L[mm] | 840 | 455 | 310 | 230 | 185 | 150 | - | - | - | - | - | - |

| | Lead | Speed | W[kg] | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 11.0 | 12.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BAC7D | 6 | 400 | L[mm] | 1100 | 610 | 420 | 310 | 240 | 200 | 160 | 140 | 120 | 105 | 95 | 85 |
| | 12 | 800 | L[mm] | 995 | 530 | 355 | 265 | 210 | 175 | - | - | - | - | - | - |

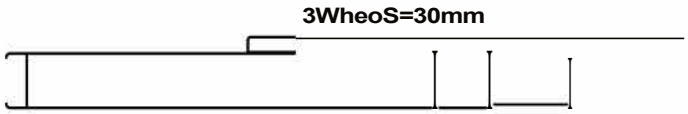



### [Horizontal mounted axis] mounted on the wall

| | Lead | Speed | W[kg] | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BAC5D | 6 | 400 | L[mm] | 1290 | 620 | 405 | 295 | 230 | 185 | 155 | 130 | 115 | 100 | 85 | 75 |
| | 12 | 800 | L[mm] | 1230 | 600 | 390 | 285 | 220 | 175 | - | - | - | - | - | - |

| | Lead | Speed | W[kg] | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 11.0 | 12.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BAC7D | 6 | 400 | L[mm] | 1440 | 705 | 460 | 335 | 260 | 215 | 180 | 150 | 130 | 115 | 100 | 90 |
| | 12 | 800 | L[mm] | 1425 | 695 | 455 | 330 | 260 | 215 | - | - | - | - | - | - |

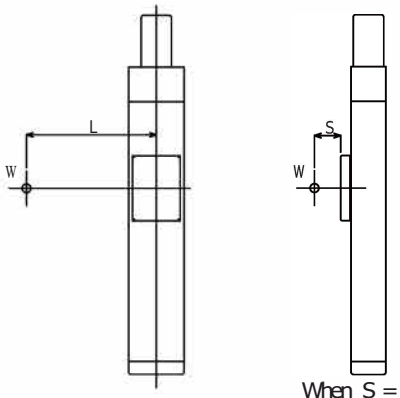
L

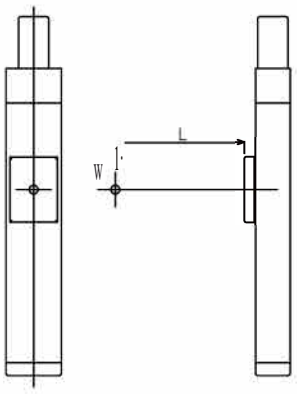



### [Vertically mounted axis]

| | Lead | Speed | W[kg] | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BAC5D | 6 | 400 | L[mm] | 650 | 380 | 260 | 200 | 165 | 135 | 115 | 100 | 90 | 80 | 70 | 60 |
| | 12 | 800 | L[mm] | 580 | 335 | 235 | 175 | 145 | 120 | - | - | - | - | - | - |

| | Lead | Speed | W[kg] | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 11.0 | 12.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BAC7D | 6 | 400 | L[mm] | 650 | 375 | 265 | 200 | 160 | 135 | 115 | 100 | 85 | 70 | 65 | 55 |
| | 12 | 800 | L[mm] | 575 | 330 | 230 | 175 | 140 | 115 | - | - | - | - | - | - |




## (Vertically mounted axis)

| | Lead | Speed | W[kg] | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
|---|---|---|---|---|---|---|---|---|---|
| BAC5D | 6 | 400 | L[mm] | 700 | 330 | 200 | 140 | 100 | 75 |
| | 12 | 800 | L[mm] | 660 | 305 | 185 | - | - | - |

| | Lead | Speed | W[kg] | 1.0 | 2.0 | 3.0 | 4.0 |
|---|---|---|---|---|---|---|---|
| BAC7D | 6 | 400 | L[mm] | 680 | 315 | 195 | 130 |
| | 12 | 800 | L[mm] | 600 | 300 | - | - |

| | Lead | Speed | W[kg] | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
|---|---|---|---|---|---|---|---|---|---|
| BAC5D | 6 | 400 | L[mm] | 730 | 360 | 230 | 170 | 130 | 105 |
| | 12 | 800 | L[mm] | 690 | 330 | 215 | - | - | - |

| | Lead | Speed | W[kg] | 1.0 | 2.0 | 3.0 | 4.0 |
|---|---|---|---|---|---|---|---|
| BAC7D | 6 | 400 | L[mm] | 630 | 340 | 220 | 160 |
| | 12 | 800 | L[mm] | 630 | 330 | - | - |



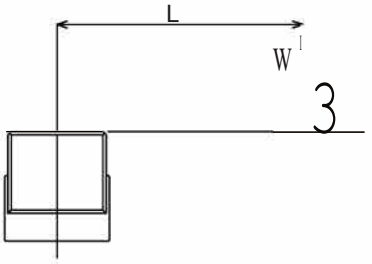
# [Allowable Moment] BACS,7 table type

The tables show the load weight (kg) and the arm length to the center of gravity of the load (note that the values shown are not allowable moment values).

## (Horizontally mounted axis)

*Stroke100mm

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
|---|---|---|---|---|---|---|---|---|
| BAC5D | 6 | 400 | L[mm] | 185 | 60 | - | - | - |
| | 12 | 800 | L[mm] | 95 | 5 | - | - | - |




S=30mm

*Stroke50mm

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BAC5D | 6 | 400 | L[mm] | 255 | 130 | 60 | 15 | - | - | - | - |
| | 12 | 800 | L[mm] | 190 | 85 | 25 | - | - | - | - | - |

*Stroke150mm

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 1.9 | 2.4 | 2.9 | 3.4 | 3.8 |
|---|---|---|---|---|---|---|---|---|---|---|
| BAC7D | 6 | 400 | L[mm] | 450 | 230 | 130 | 20 | - | - | - |
| | 12 | 800 | L[mm] | 370 | 160 | 45 | - | - | - | - |

*Stroke100mm

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 2.0 | 2.5 | 2.8 | 3.3 | 3.8 | 4.3 | 4.8 | 5.3 | 5.6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BAC7D | 6 | 400 | L[mm] | 600 | 350 | 210 | 120 | 80 | 25 | - | - | - | - | - |
| | 12 | 800 | L[mm] | 500 | 280 | 150 | 65 | 20 | - | - | - | - | - | - |

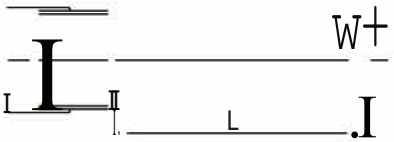
*Stroke50mm

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | 9.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BAC7D | 6 | 400 | L[mm] | 700 | 450 | 305 | 210 | 145 | 95 | 55 | 20 | - | - | - | - | - | - | - | - | - |
| | 12 | 800 | L[mm] | 540 | 340 | 220 | 140 | 85 | 45 | 15 | - | - | - | - | - | - | - | - | - | - |

## (Horizontal mounted axis] mounted on the wall

*Stroke100mm

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
|---|---|---|---|---|---|---|---|---|
| BAC5D | 6 | 400 | L[mm] | 340 | 130 | 30 | - | - |
| | 12 | 800 | L[mm] | 290 | 80 | - | - | - |




*Stroke50mm

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BAC5D | 6 | 400 | L[mm] | 420 | 210 | 100 | 40 | - | - | - | - |
| | 12 | 800 | L[mm] | 390 | 180 | 70 | 0 | - | - | - | - |

*Stroke150mm

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 1.9 | 2.5 | 3.0 | 3.5 | 3.8 |
|---|---|---|---|---|---|---|---|---|---|---|
| BAC7D | 6 | 400 | L[mm] | 950 | 500 | 310 | 160 | 70 | - | - |
| | 12 | 800 | L[mm] | 920 | 460 | 260 | - | - | - | - |

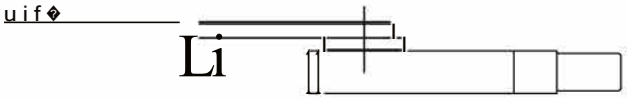
*Stroke100mm

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 2.0 | 2.5 | 2.8 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 5.6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BAC7D | 6 | 400 | L[mm] | 1060 | 600 | 370 | 230 | 170 | 90 | 40 | - | - | - | - |
| | 12 | 800 | L[mm] | 1040 | 570 | 330 | 190 | 120 | - | - | - | - | - | - |

*Stroke50mm

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | 9.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BAC7D | 6 | 400 | L[mm] | 1170 | 700 | 450 | 310 | 220 | 150 | 100 | 60 | 30 | - | - | - | - | - | - | - | - |
| | 12 | 800 | L[mm] | 1150 | 670 | 430 | 290 | 190 | 120 | 65 | 20 | - | - | - | - | - | - | - | - | - |

## [Horizontally mounted axis]




When S = 30 mm

*Stroke100mm

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
|---|---|---|---|---|---|---|---|---|
| BAC5D | 6 | 400 | L[mm] | 95 | 30 | -15 | -40 | -65 |
| | 12 | 800 | L[mm] | 60 | 5 | - | - | - |

*Stroke50mm

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BAC5D | 6 | 400 | L[mm] | 155 | 85 | 40 | 10 | -10 | -30 | -45 | -60 |
| | 12 | 800 | L[mm] | 125 | 60 | 20 | - | - | - | - | - |

*Stroke150mm

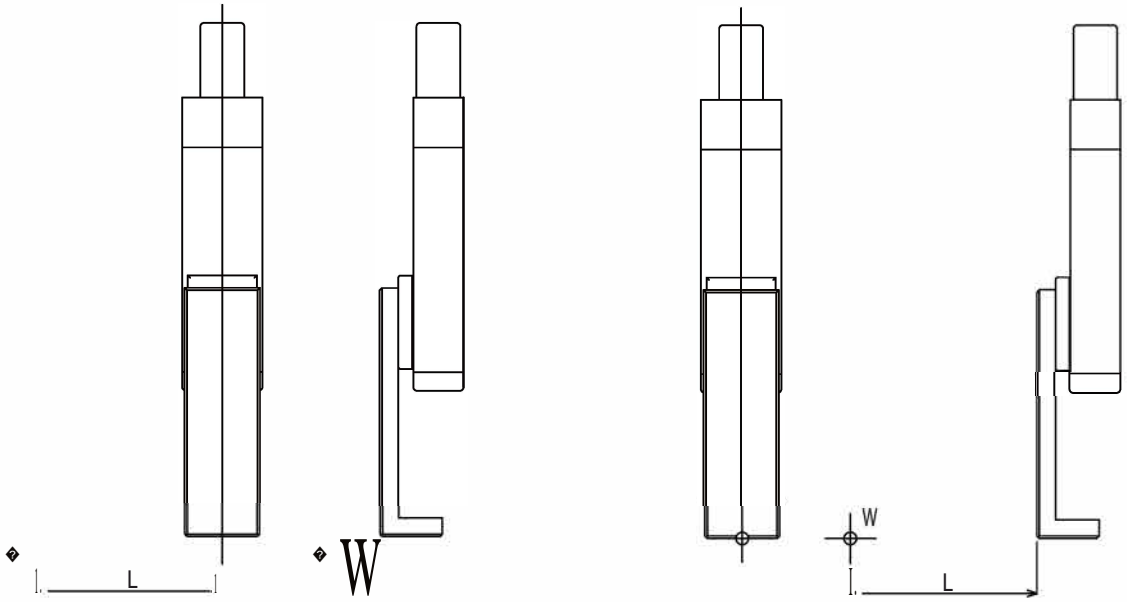
| | Lead | Speed | W[kg] | 1.0 | 1.5 | 1.9 | 2.5 | 3.0 | 3.5 | 3.8 |
|---|---|---|---|---|---|---|---|---|---|---|
| BAC7D | 6 | 400 | L[mm] | 185 | 100 | 50 | 10 | -25 | -50 | -70 |
| | 12 | 800 | L[mmJ | 130 | 55 | 15 | - | - | - | - |

*Stroke100mm

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 2.0 | 2.5 | 2.8 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 5.6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BAC7D | 6 | 400 | L[mm] | 255 | 165 | 100 | 60 | 35 | 10 | -15 | -35 | -50 | -65 | -75 |
| | 12 | 800 | L[mm] | 200 | 120 | 65 | 25 | 5 | - | - | - | - | - | - |

*Stroke50mm

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | 9.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BAC7D | 6 | 400 | L[mm] | 330 | 230 | 160 | 115 | 80 | 50 | 30 | 10 | -5 | -20 | -30 | -40 | -50 | -60 | -65 | -70 | -75 |
| | 12 | 800 | L[mm] | 270 | 180 | 120 | 80 | 50 | 25 | 5 | -10 | - | - | - | - | - | - | - | - | - |




When S = 30 mm

## [Vertically mounted axis]

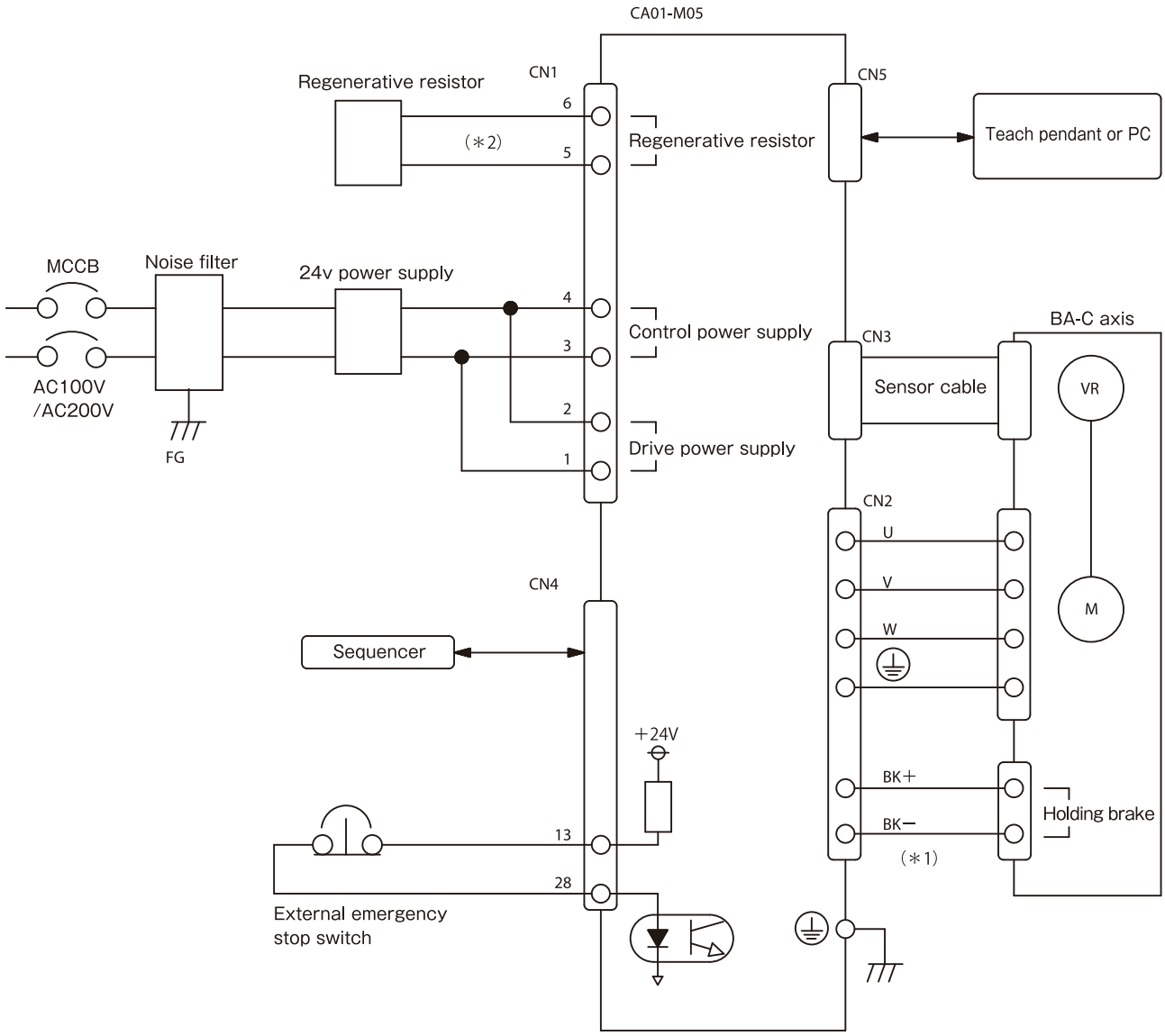
| | Lead | Speed | W[kg] | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
|---|---|---|---|---|---|---|---|---|
| BAC5D | 6 | 400 | L[mm] | 240 | 160 | 115 | 75 | 55 |
| | 12 | 800 | L[mm] | 270 | - | - | - | - |

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
|---|---|---|---|---|---|---|---|---|---|---|
| BAC7D | 6 | 400 | L[mm] | 570 | 315 | 245 | 200 | 165 | 135 | 110 |
| | 12 | 800 | L[mm] | 430 | 330 | - | - | - | - | - |

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
|---|---|---|---|---|---|---|---|---|
| BAC5D | 6 | 400 | L[mm] | 270 | 190 | 145 | 105 | 85 |
| | 12 | 800 | L[mm] | 295 | - | - | - | - |

| | Lead | Speed | W[kg] | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
|---|---|---|---|---|---|---|---|---|---|---|
| BAC7D | 6 | 400 | L[mm] | 440 | 340 | 275 | 195 | 200 | 165 | 140 |
| | 12 | 800 | L[mm] | 460 | 360 | - | - | - | - | - |

# Connection




(＊1) There is no wiring to the connector if a motor without a holding brake is used.
(＊2) This connection is required when there is a large amount of regenerative energy.

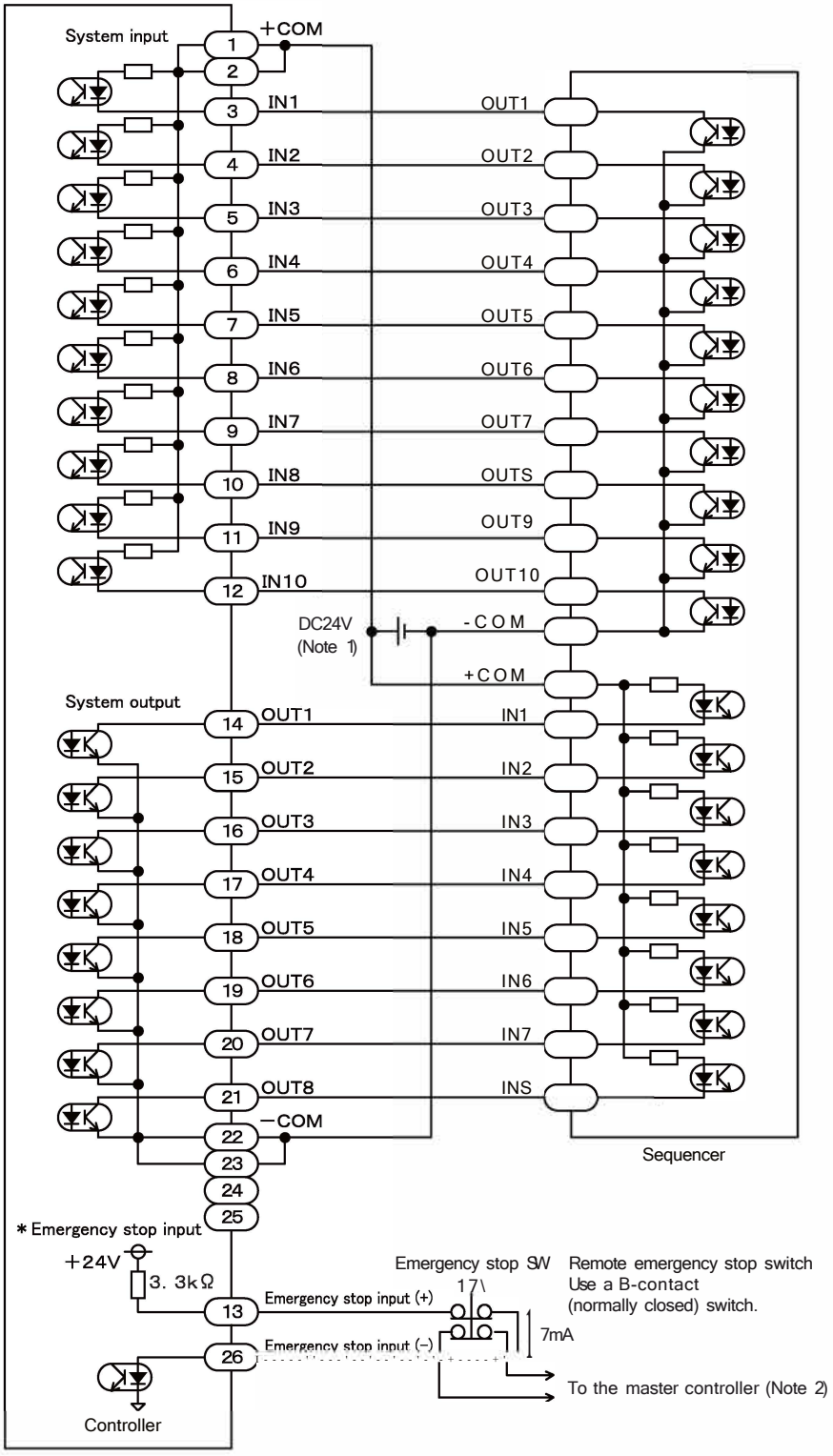
# System Input

| Input No. | Signal | Description | Note |
|---|---|---|---|
| IN1 | START | Axis start<br>An input for starting axis operation. | The signal is detected at the rising edge. |
| | +JOG | + JOG move<br>An input for starting a JOG move into the positive direction. | The robot moves when the signal is on and stops when it is off. |
| IN2 | STOP | Stop input<br>An input for terminating travel. | Signal level is detected. |
| | -JOG | - JOG move<br>An input for starting a JOG move into the negative direction. | The robot moves when the signal is on and stops when it is off. |
| IN3 | SVON | Servo ON<br>An input for enabling servo locking. | Servo locking is enabled at the rising edge.<br>The servo is released at the falling edge. |
| IN4 | WRITE | Write<br>An input for writing coordinates in the point table (T01). | |
| IN5 | ALRST | Error reset<br>An input for canceling the error state. | The signal is detected at the rising edge. |
| IN6 | RTSEL | Switch between operation / teaching<br>An input for switching between operation mode and teaching mode. | Operation mode is active when the signal is off, and teaching mode is active when it is on. |
| IN7 | PIN1 | Command point number<br>An input for specifying a point table (T01) number.<br>Turn on the start signal while signals from IN7 to IN10 are all set to ON to execute return-to-home operation. | |
| IN8 | PIN2 | | |
| IN9 | PIN4 | | |
| IN10 | PIN8 | | |

# System Output

| Output No. | Signal | Description | Note |
|---|---|---|---|
| OUT1 | RUN | Robot in operation<br>This signal turns on while the robot is in operation.<br>It also turns on during return-to-home operation and JOG move. | |
| OUT2 | ERROR | Error detected<br>This signal turns on when an error occurs. | Use Parameter M13 toselect one as the OUT 2 function. |
| | ROY/ERR | System in the READY state or an error detected<br>This signal turns on after control power is turned on and then controller initialization is complete. The signal turns off when an error occurs. | |
| OUT3 | POSI | Positioning complete<br>This signal indicates that the robot at the target position finished positioning. | The signal stays off until return-to-home operation is complete, while the robot travels, and while the servo is free. |
| OUT4 | AREA | Slider in designated area<br>A specified output logic signal is outputted while the axis slider is within the specified coordinates. | This output signal is disabled until return-to-home operation is complete. |
| **Normal operation** | | | |
| OUTS | POUT1 | Completion point number<br>After robot travel is complete, a point table number specified by IN? to IN1 O is outputted. | F (=1111) is outputted if the robot decelerates and stops due to a stop signal or if it stops due to an emergency stop signal.<br>The value O (=0000) is outputted during return-to-home operation. |
| OUT6 | POUT2 | | |
| OUT? | POUT4 | | |
| OUTS | POUTS | | |
| **TorQue-controlled operation** | | | |
| OUTS | TQCON | Torque-controlled operation in process<br>The signal turns on while torque-controlled operation is in process | |
| OUT6 | TQLOAD | Torque load<br>The signal turns on when the output torque exceeds the load output reference value for torque limit judgement time | The signal turns off if the output torque falls below the load output reference value. |
| OUT? | TQLIM | Torque limit<br>The signal turns on when torque-controlled operation continues for torque limit judgement time or longer. | The signal turns off if the output torque falls below the torque limit. |
| OUTS | TQLOCK | Slider locked<br>The signal turns on when the system detects that the slider is locked. | |

# Example of Input and Output Signal Connection




(Note 1) Do not use the same power supply as the control power supply and the drive power supply.
Failure to follow this instruction may result in product failure.

## *Emergency Stop Input

This input signal activates an emergency stop for the controller. The controller remains in the emergency stop state if the emergency stop circuit is not connected.

(Note 2) This controller does not support outputting of an emergency stop signal.
The emergency stop signal input status can be checked with the master controller.
Use a 2B-contact emergency stop switch and connect one of the switch contacts to the master controller.

# Operations

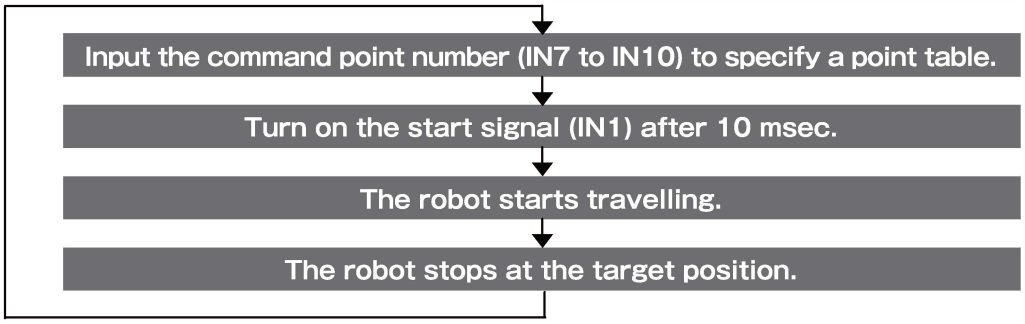
This section describes system input-based robot operation. The description applies to the robot operation and system outputs using the teach pendant and the PC software (SF-98D).

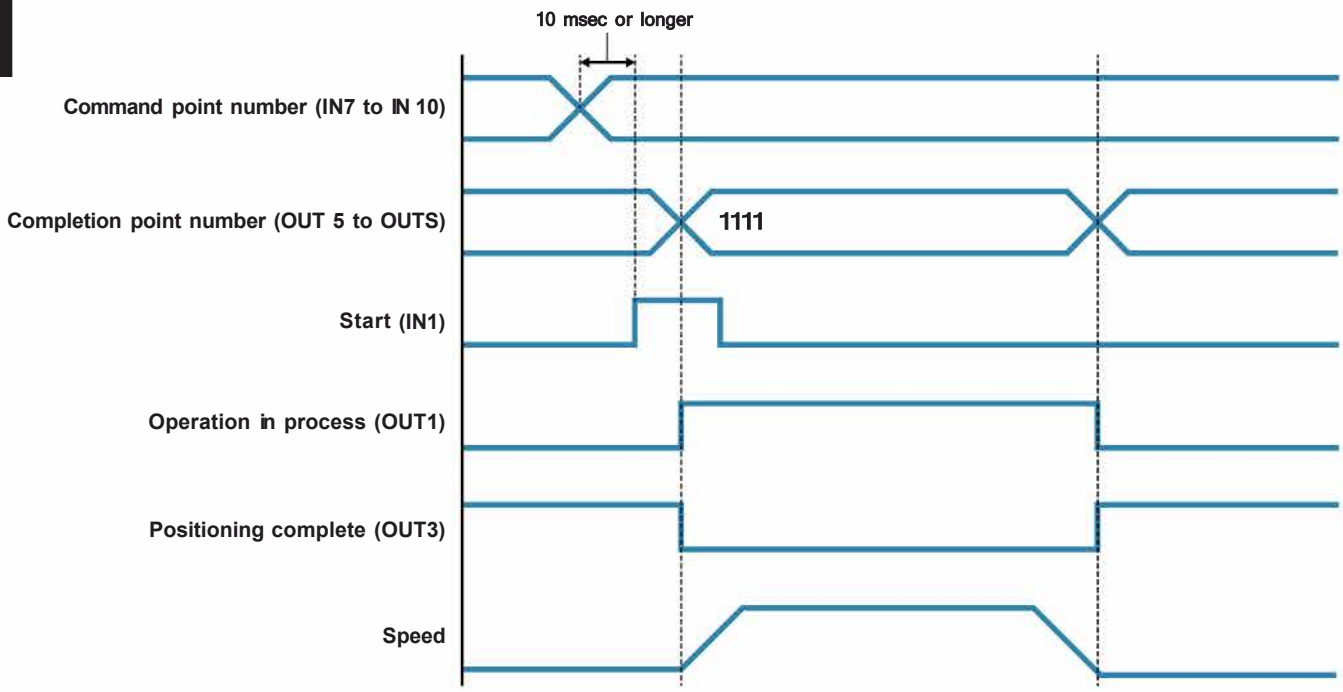
# Overview

This controller requires no programming. Only parameter and table settings are required for execution of a desired operation.
There are two types of operation: normal operation and torque-controlled operation.
In normal operation, the robot moves to the target position with no torque control.
In torque-controlled operation. the robot moves to a tentative target position with no torque control and then moves to the target position with its torque controlled in that direction. The torque-controlled operation is applied when a workpiece needs to be pushed or inserted without excessive force.

# Normal operation

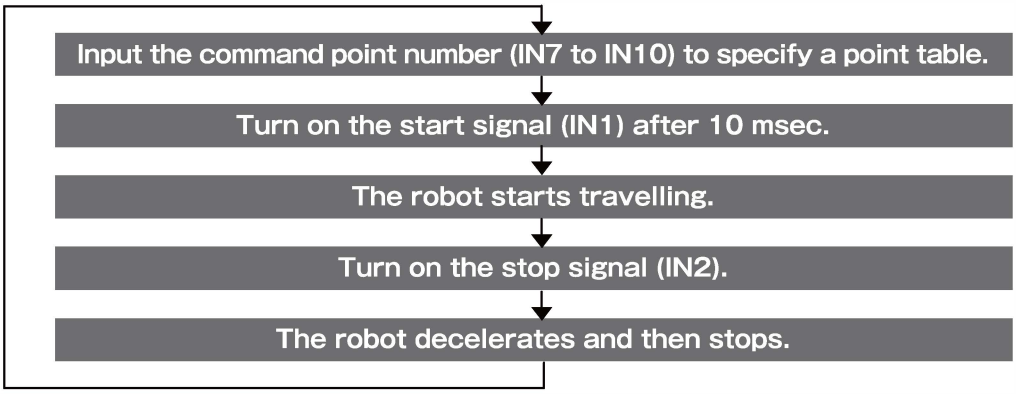
## ■When the robot stops at the target position

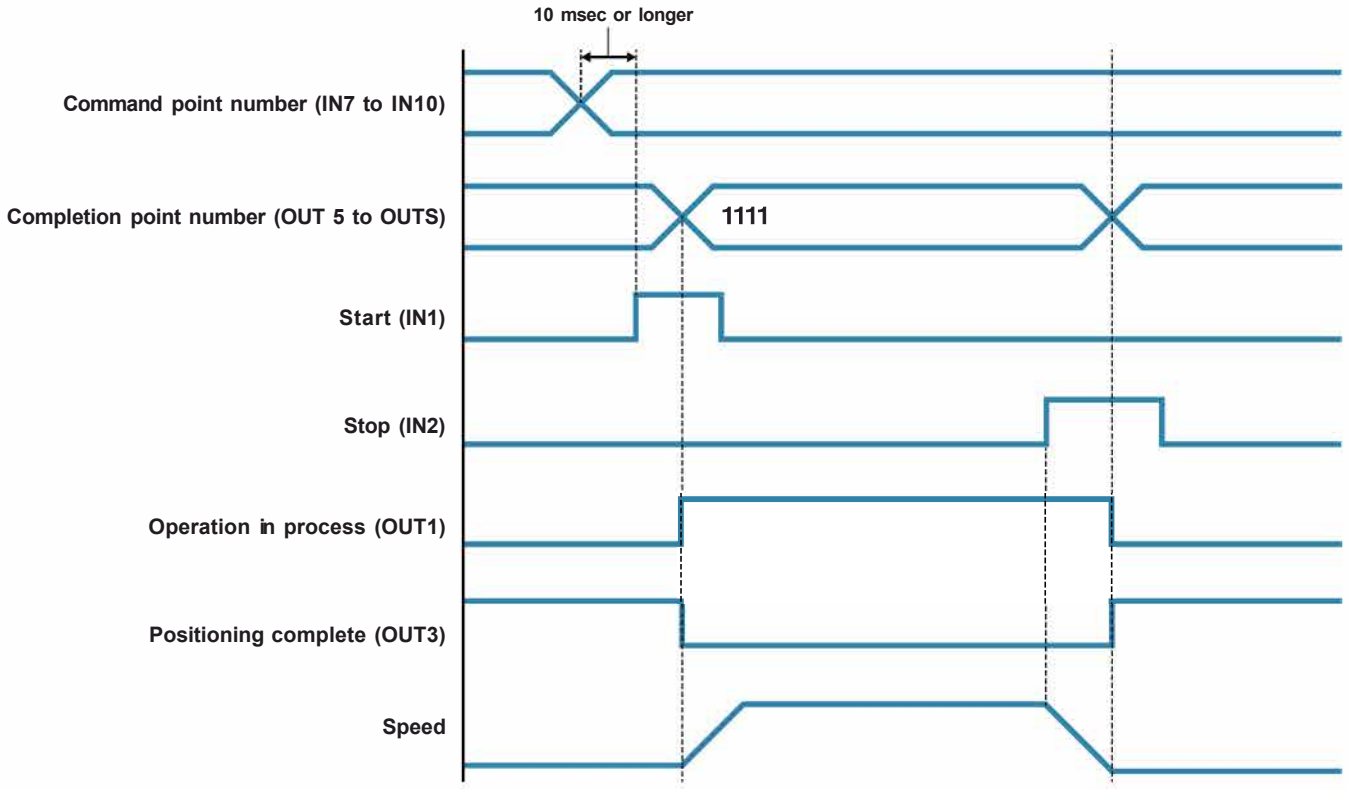


## ■When making the moving robot decelerate and stop

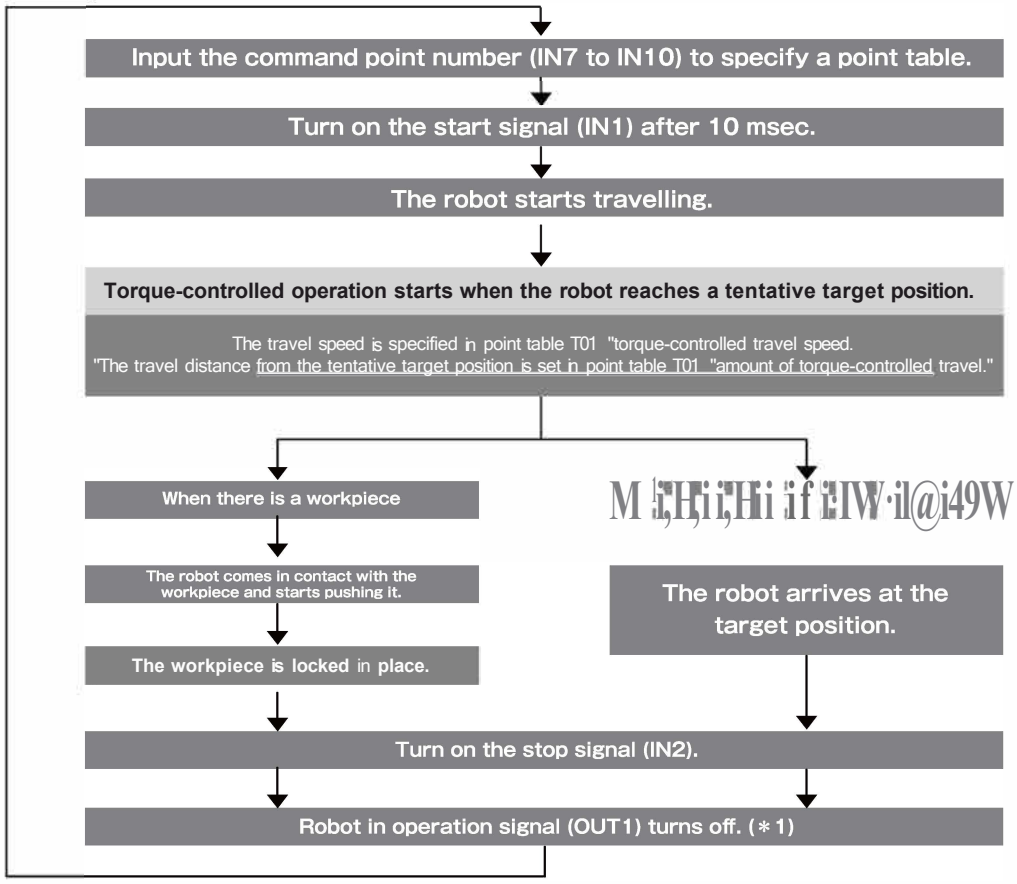
When the stop signal (IN2) is turned on while the robot is moving, the robot decelerates and then stops.



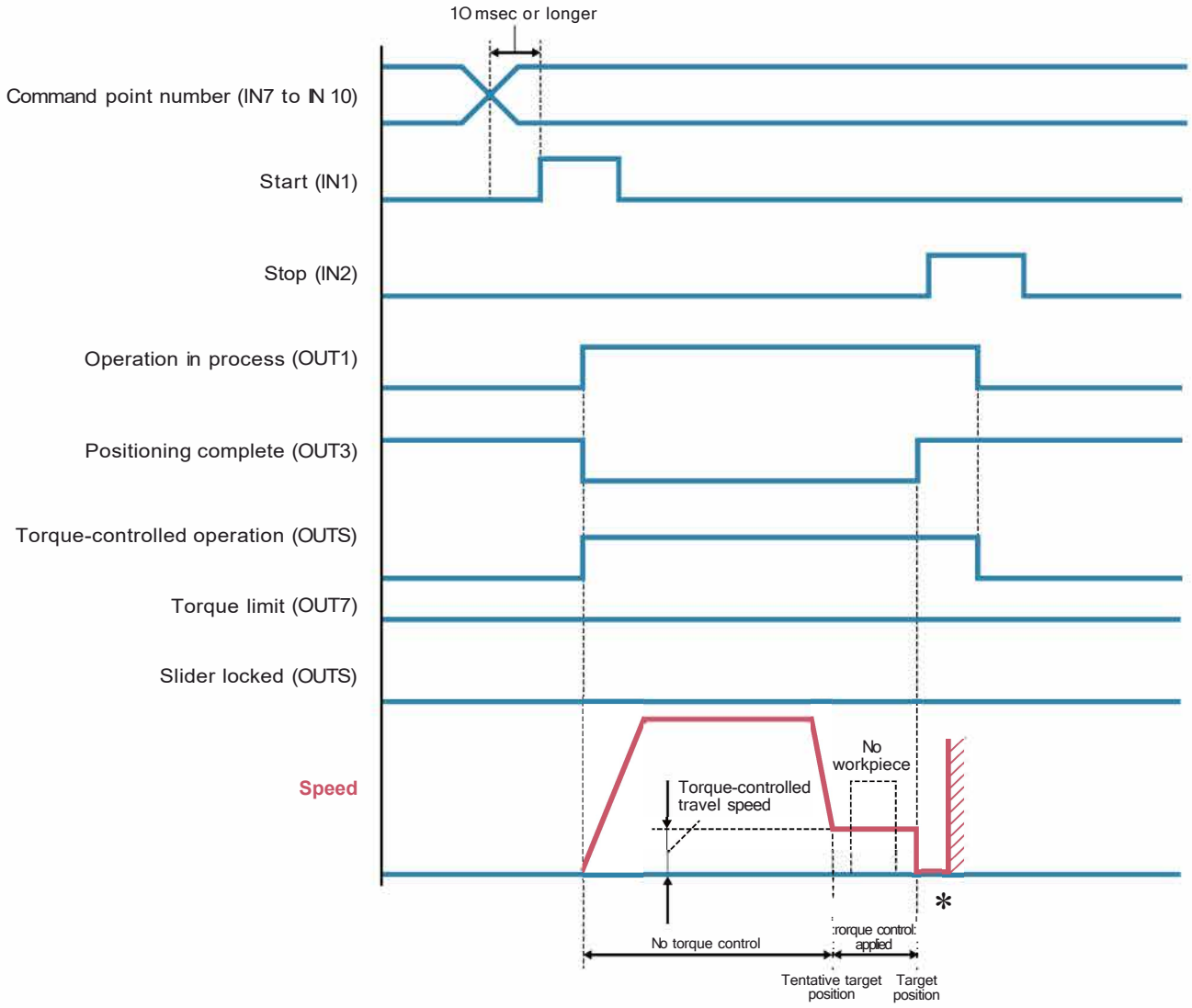
## ■Using an external signal to end torque-controlled operation

Torque-controlled operation can be terminated using the master controller. Turn on the stop (IN2) signal. Receiving the status output from a controller, the master controller determines whether or not the torque-controlled operation can end. The master controller can also use its own information in this decision making, allowing for a more flexible process. Determine whether or not a workpiece is present based on the positioning complete (OUT3). torque limit (OUT7), and slider locked (OUTS) signal status. If necessary, the area entry signal output function can also be used to determine whether or not a workpiece is present.



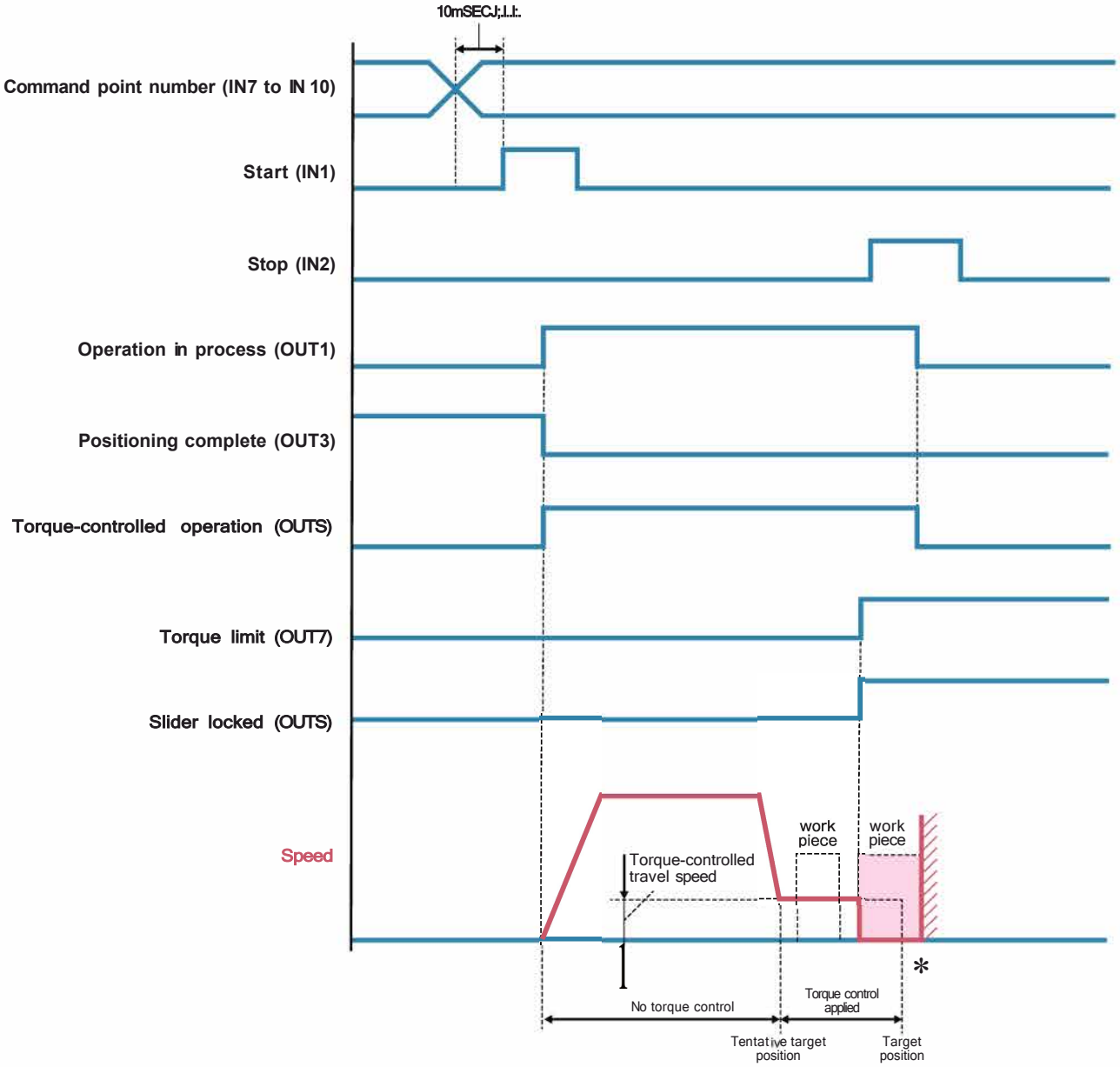

(＊ 1) When a workpiece is present, the robot position control continues with the target position as the final destination. Meanwhile, torque-controlled operation also continues. Output torque control continues until the output torque is at the same level as the torque limit or lower in order to avoid physical shock to the workpiece.

# When there is no workQiece




*In torque-controlled operation, the robot moves to a tentative target position with no torque control and then moves to the target position with its torque controlled in that direction. The torque-controlled operation is applied when a workpiece needs to be pushed or inserted without excessive force.

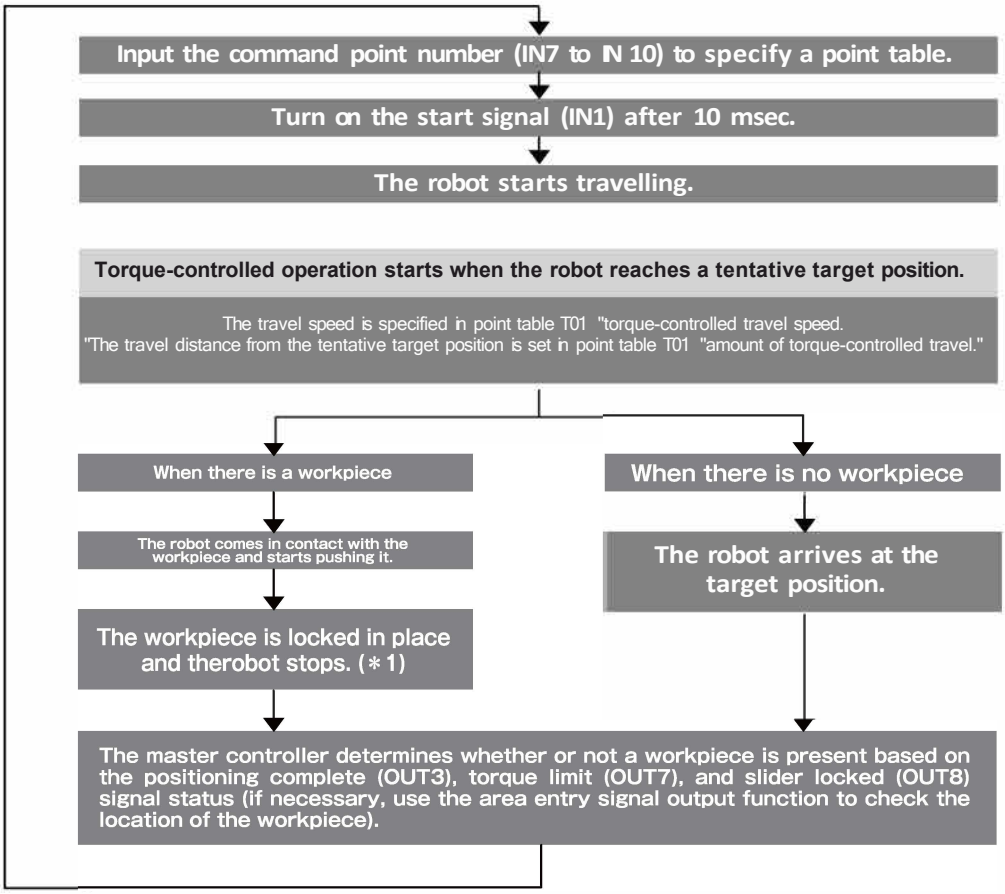
# When there is a workpiece




*In torque-controlled operation, the robot moves to a tentative target position with no torque control and then moves to the target position with its torque controlled in that direction. The torque-controlled operation is applied when a workpiece needs to be pushed or inserted without excessive force.

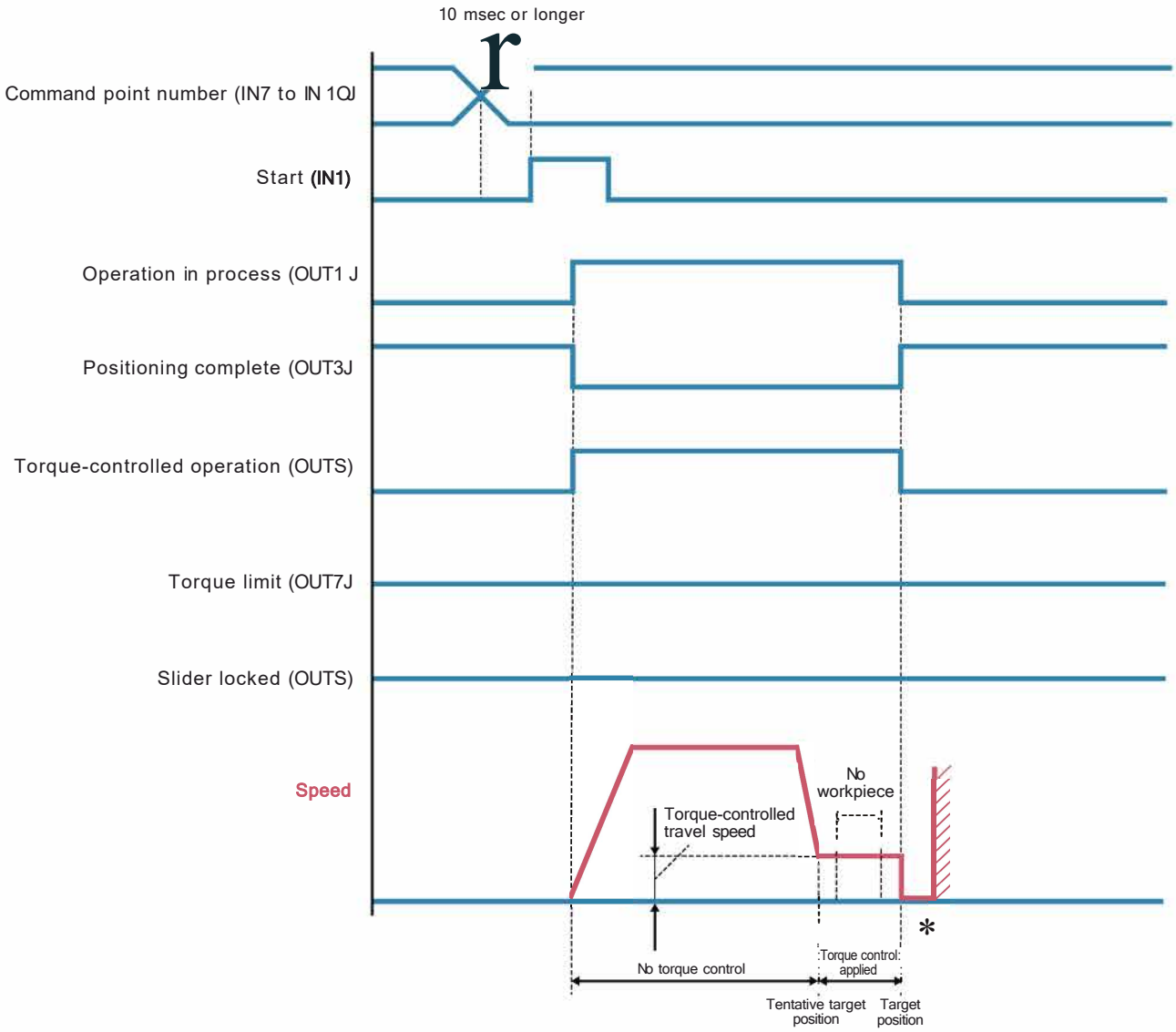
## ■Automatic termination of torque-controlled operation

A controller can terminate torque-controlled operation automatically. Turn off the robot in operation signal (OUT1) so that the master controller recognizes that the torque-controlled operation finished. Determine whether or not a workpiece is present based onthe positioning complete (OUT3), torque limit (OUT7), and slider locked (OUTS) signal status. If necessary, the area entry signal output function can also be used to determine whether or not a workpiece is present.



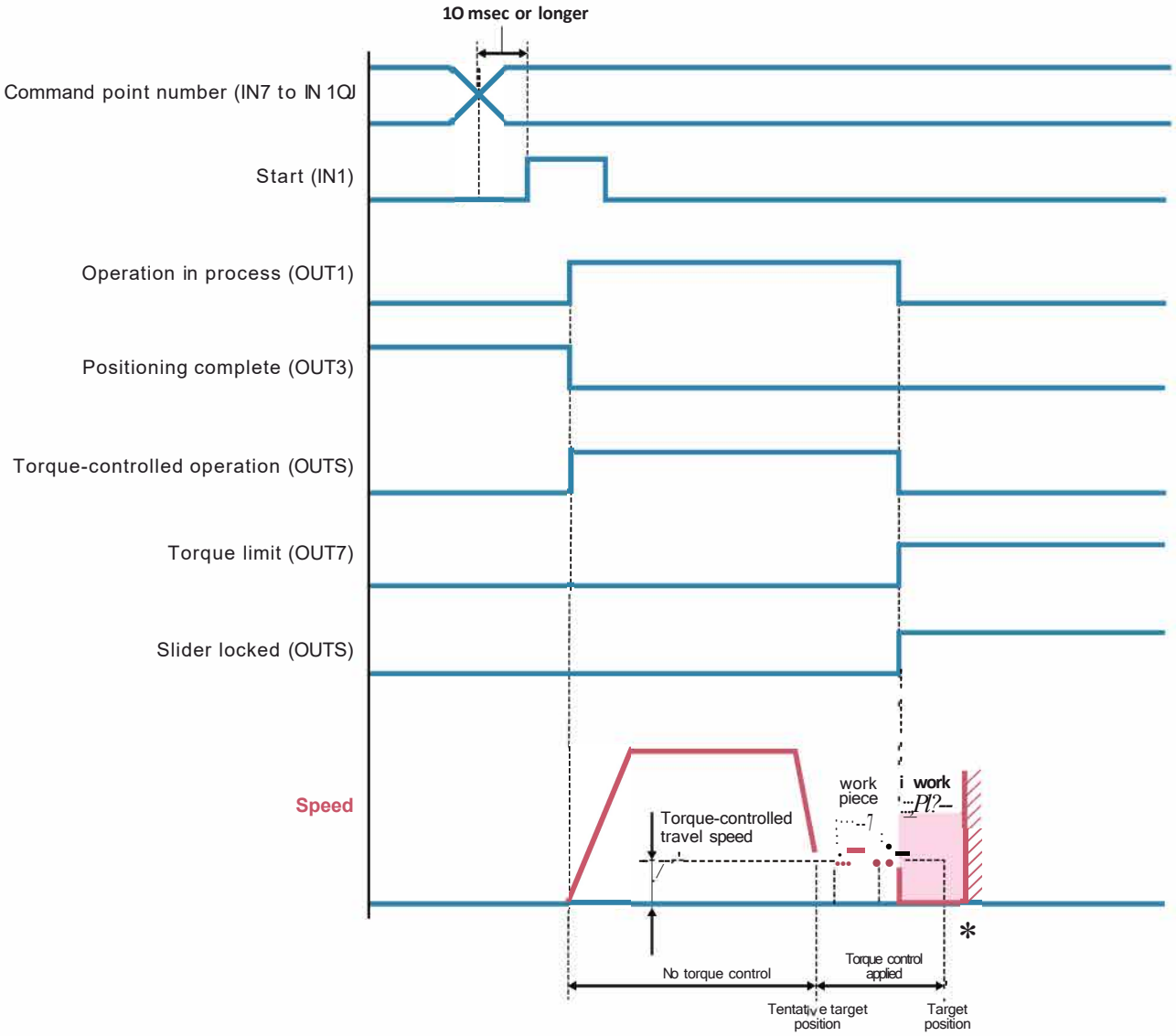

(＊ 1) The robot position control continues with the target position as the final destination.
Meanwhile, torque-controlled operation also continues.
utput torque control continues until the output torque is
at the same level as the torque limit or lower in order to avoid physical shock to the workpiece.

# When there is no workpiece




*In torque-controlled operation, the robot moves to a tentative target position with no torque control and then moves to the target position with its torque controlled in that direction. The torque-controlled operation is applied when a workpiece needs to be pushed or inserted without excessive force.

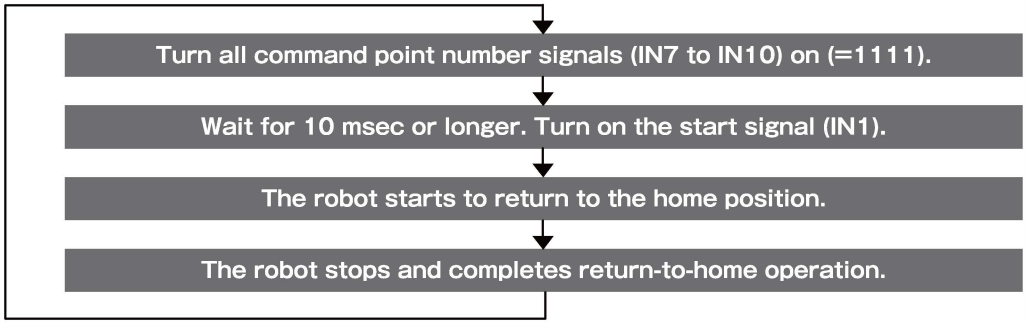
# When there is a workpiece

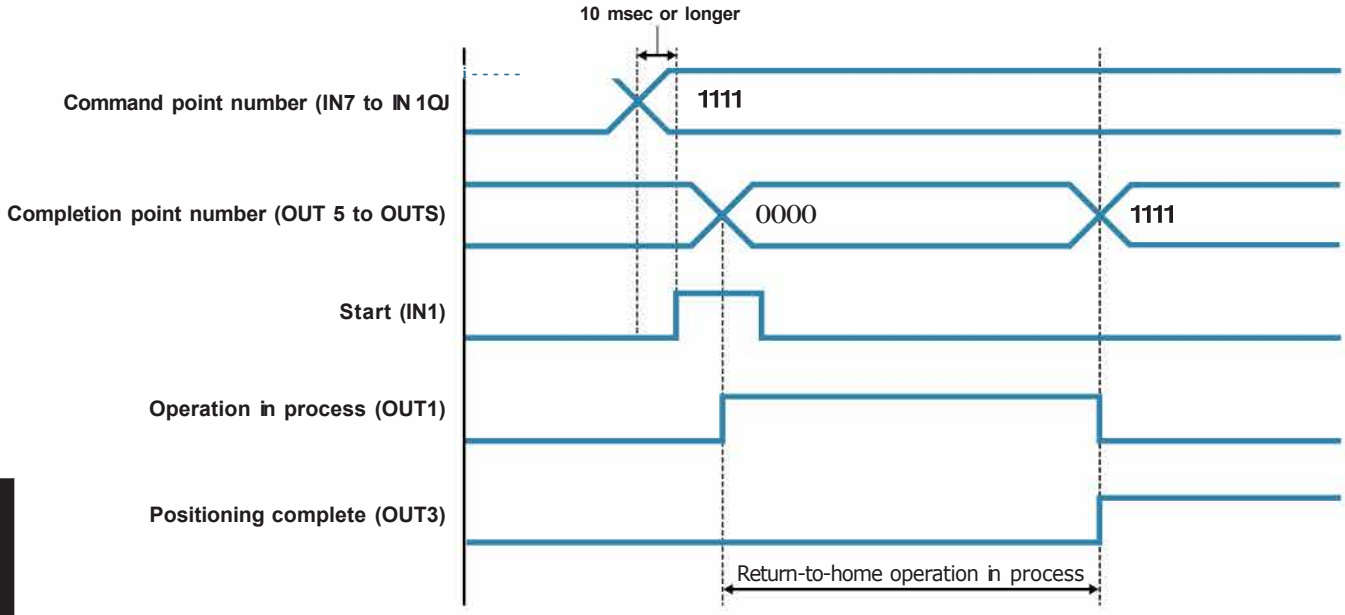



*In torque-controlled operation. the robot moves to a tentative target position with no torque control and then moves to the target position with its torque controlled in that direction. The torque-controlled operation is applied when a workpiece needs to be pushed or inserted without excessive force.

# Return-to-Home Operation

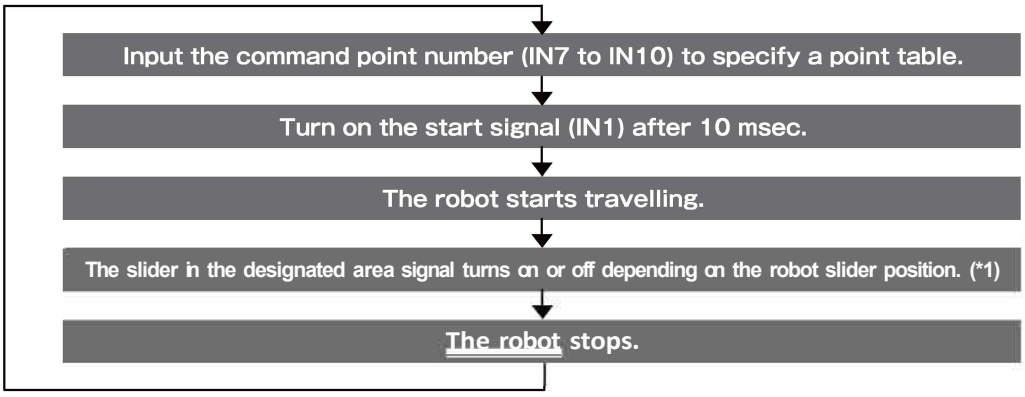
Turn all command point number signals (IN7 to IN 10) on (=1111 ) and turn on the start signal (IN 1). The robot begins to return to the home position.



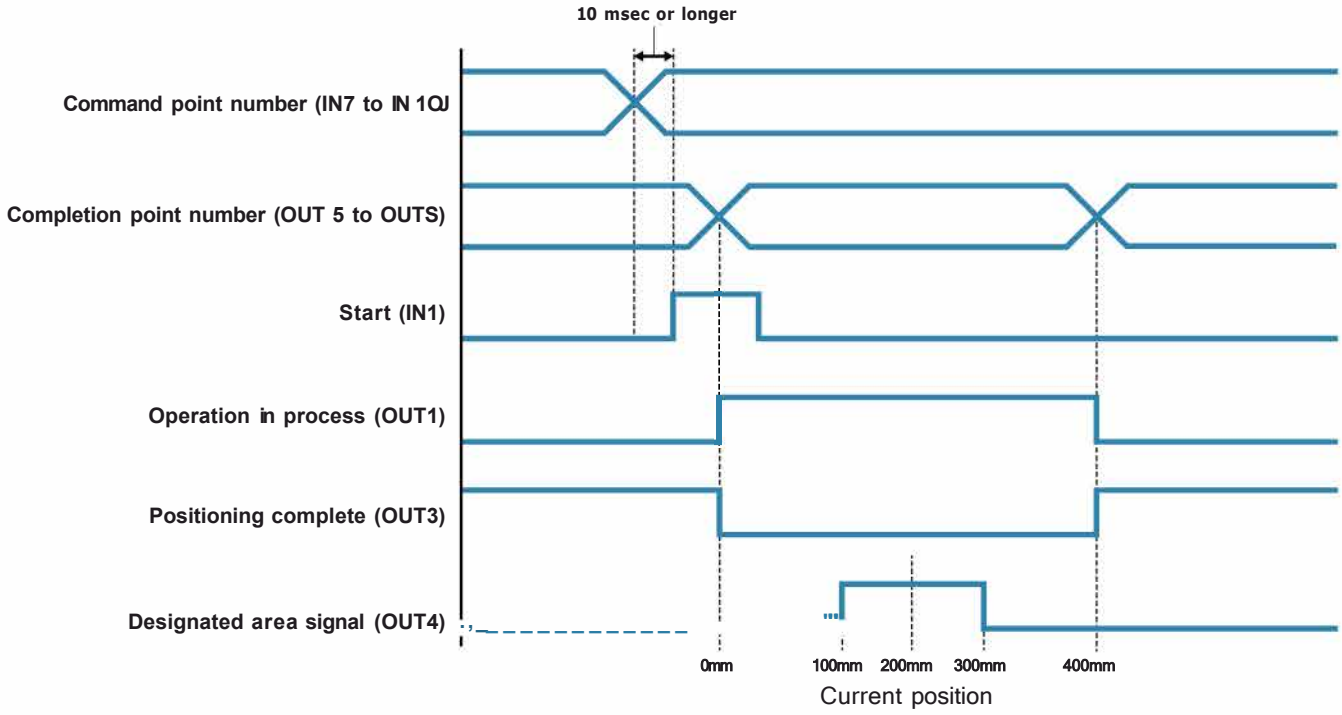
# Area Entry Signal Output

The slider in designated area signal (OUT4) changes when a robot slider enters the specified coordinates.




(* 1)The slider in designated area signal (OUT4) also turns on or off in manual operation.

**[The signal turns on when 100 x1 300]**



# Cycle Time Calculation

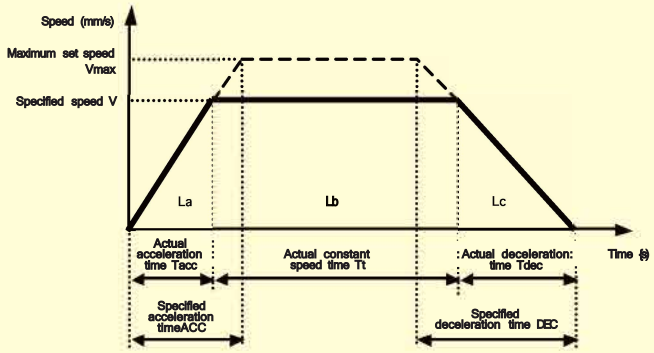
The cycle time of a robot controlled by the CA01-M05 can be obtained as described below.
The calculation result however will be slightly different from the actual value: therefore. use the result only as a guide.
There are two types of calculation: one is the case where there is a constant speed (example 1).
and the other one is the case where deceleration starts during acceleration (example 2).
Select one depending on the travel distance. specified speed, and specified acceleration / deceleration time.

G) when Travel distance (L) > $\frac{\text{specified speed [v"] x [specified acceleration time (ACC) + specified deceleration time (DEC)]}}{\text{2 x maximum set speed (Vmax)}}$ ==> example 1

@ when Travel distance (L) s $\frac{\text{specified speed [v"] x [specified acceleration time (ACC) + specified deceleration time (DEC)]}}{\text{2 x maximum set speed (Vmax)}}$ example 2

*Refer to the Relationship between Acceleration / Deceleration and Load on the next page for a rough estimate of acceleration and deceleration time.
*Refer to the specifications of the subject model for acceleration time, deceleration time, and maximum speed for the maximum payload.

## Example 1




Operating conditions
Maximum set speed: Vmax = 800 mm/s
Specified speed: V = 600 mm/s
Specified acceleration time: ACC = 0.2s
Specified deceleration time: DEC = 0.3s
Travel distance: L = 400 mm

Tacc = actual acceleration time (s)
Tdec = actual deceleration time (s)
Tt = actual constant speed time (s)
La = travel distance during acceleration (mm)
Lb = travel distance while the speed is constant (mm)
Le = travel distance during deceleration (mm)
L = travel distance (mm) = La + Lb + Le

$Tacc = \frac{V}{Vmax} \times ACC = \frac{600}{800} \times 0.2 = 0.15s$

$Tdec = \frac{V}{Vmax} \times DEC = \frac{600}{800} \times 0.3 = 0.225s$

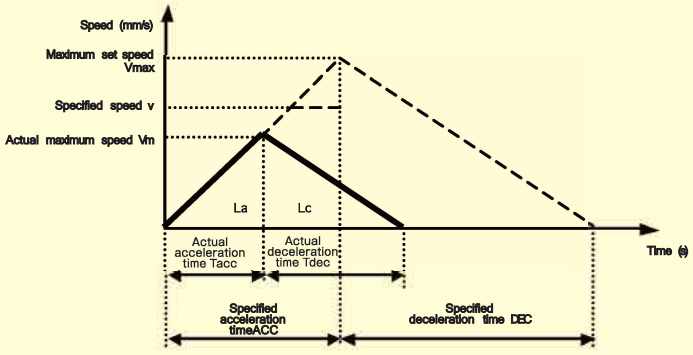
$La = \frac{L}{2} \times Tacc = \frac{L}{2} \times 600 \times 0.15 = 45mm$

$Le = \frac{1}{2} \times Tdec = \frac{1}{2} \times 600 \times 0.225 = 67.5mm$

$Tt = \frac{L-(La+Lc)}{V} = \frac{400-(45+67.5)}{600} = 0.4795$

Cycle time = actual acceleration time
+actual constant speed time
+actual deceleration time
= 0.15 + 0.479 + 0.225
= 0.854 sec

## Example 2




Operating conditions
Maximum set speed: Vmax = 800 mm/s
Specified speed: V = 600 mm/s
Specified acceleration time: ACC = 0.2s
Specified deceleration time: DEC = 0.3s
Travel distance: L = 100 mm

Taco = actual acceleration time (s)
Tdec = actual deceleration time (s)
La = travel distance during acceleration (mm)
Le = travel distance during deceleration (mm)
Vm = actual maximum speed (mm/s)
L = travel distance (mm) = La + Lb + Le

$La = L \times \frac{ACC}{ACC+DEC} = \frac{}{0.2+0.3} = 40mm$

$Lc = L \times \frac{DEC}{ACC+DEC} = \frac{}{0.2+0.3} = 60mm$

$Tacc = \sqrt{\frac{2 \times La \times ACC}{Vmax}} = \sqrt{\frac{2 \times 40 \times 0.2}{800}} = 0.141S$

$Tdec = \sqrt{\frac{2 \times Lc \times DEC}{Vmax}} = \sqrt{\frac{2 \times 60 \times 0.3}{800}} = 0.2125$

Cycle time = actual acceleration time
+ actual deceleration time
= 0.141 + 0.212
= 0.353 sec

# Relationship between Acceleration / Deceleration and Load

## Horizontal use specifications

Payload (kg)

| Type | Model | Set speed (mm/s) | Lead (mm) | Acceleration / deceleration time | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0.05sec | 0.1sec | 0.15sec | 0.2sec | 0.3sec | 0.4sec |
| Slider | BAC5D | 800 | 12 | - | 1.5 | 2.2 | 3 | 3 | 3 |
| | | 400 | 6 | 3 | 6 | 6 | 6 | 6 | 6 |
| | BAC7D | 800 | 12 | - | 3 | 4.5 | 6 | 6 | 6 |
| | | 400 | 6 | 6 | 12 | 12 | 12 | 12 | 12 |
| Table | BAC5D 50mm | 800 | 12 | - | 1.2 | 1.8 | 2.5 | 2.5 | 2.5 |
| | | 400 | 6 | 2.2 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| | BAC5D 100mm | 800 | 12 | - | 0.7 | 1.1 | 1.5 | 1.5 | 1.5 |
| | | 400 | 6 | 1.5 | 3 | 3 | 3 | 3 | 3 |
| | BAC7D 50mm | 800 | 12 | - | 2.2 | 3.3 | 4.5 | 4.5 | 4.5 |
| | | 400 | 6 | 4.5 | 9 | 9 | 9 | 9 | 9 |
| | BAC7D 100mm | 800 | 12 | - | 1.4 | 2.1 | 2.8 | 2.8 | 2.8 |
| | | 400 | 6 | 2.8 | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 |
| | BAC7D 150mm | 800 | 12 | - | 0.9 | 1.4 | 1.9 | 1.9 | 1.9 |
| | | 400 | 6 | 1.9 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| Rod | BAC3D | 600 | 12 | - | 2 | 3 | 3 | 3 | 3 |
| | BAC4D | 600 | 12 | - | 3.4 | 5.2 | 5.2 | 5.2 | 5.2 |

## Vertical use specifications

Payload (kg)

| Type | Model | Set speed (mm/s) | Lead (mm) | Acceleration / deceleration time | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0.05sec | 0.1sec | 0.15sec | 0.2sec | 0.3sec | 0.4sec |
| Slider | BAC5D | 800 | 12 | - | 0.7 | 1.3 | 1.5 | 1.5 | 1.5 |
| | | 400 | 6 | 1.5 | 3 | 3 | 3 | 3 | 3 |
| | BAC7D | 800 | 12 | - | 1 | 1.8 | 2 | 2 | 2 |
| | | 400 | 6 | 2 | 4 | 4 | 4 | 4 | 4 |
| Table | BAC5D | 800 | 12 | - | 0.5 | 0.9 | 1 | 1 | 1 |
| | | 400 | 6 | 1.2 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| | BAC7D | 800 | 12 | - | 0.7 | 1.3 | 1.5 | 1.5 | 1.5 |
| | | 400 | 6 | 1.7 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Rod | BAC3D | 600 | 12 | - | 1 | 1.5 | 1.5 | 1.5 | 1.5 |
| | BAC4D | 600 | 12 | - | 1.4 | 2.2 | 2.2 | 2.2 | 2.2 |

# [ 11,BA-C SER1Es] Product Selection Chart

**Single axis** (see product introduction pages for details and select products)

| No. | Unit | Single axis model | Amount | 2- or 3-axis model |
|---|---|---|---|---|
| 1 | Axis | BAC □D - ST - □TJ □-[IJ | | *Contact your distributorfordetails (see the other side of this sheet) |
| 2 | Controller cable | BAC - CCM - [IJ | | |
| 3 | Master cable | CA01 - □05 | | |
| 4 | Regenerative discharging unit | CAR- UN50 | | |
| 5 | Regenerative discharging resistor | CAR - 0500 | | |
| 6 | Teach pendant | TPH - 4C | | |
| 7 | PC software | SF - 98D | | |
| 8 | Communication cable (RS-232C) | PCBL - 31 | | |
| 9 | Input/ output cable | CA01 - IC - A[IJ | | |
| 10 | Resolver ABS backup battery | CA10 - EB - 05 | | |