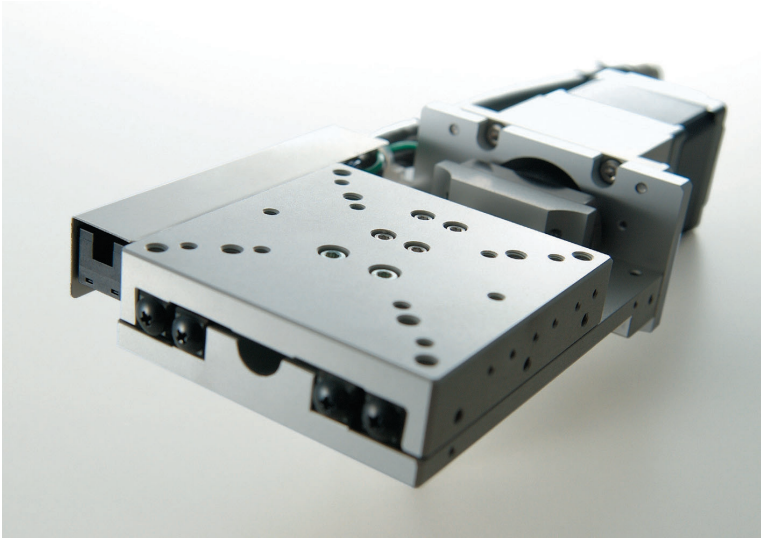


## Cross Roller Guide Guidance



It is “Light weight”  
“Compact size” and  
“High precision” Stages  
because of the aluminum  
main material.

### ■ Usage

- Automatic focusing
- Precision positioning for lens and electronic parts.

## Features of Cross roller guide

### ■ Light weight

- ◎ It is made of aluminium to weight as little as possible.

### ■ Compact

#### KXC series

- ◎ As sensor is embedded in a stage body, projection from the table surface is small.

You can use it without though to opposite hand.

#### KX series

- ◎ Not only the thin body but high precision. Available maximum 25kg load capacity.



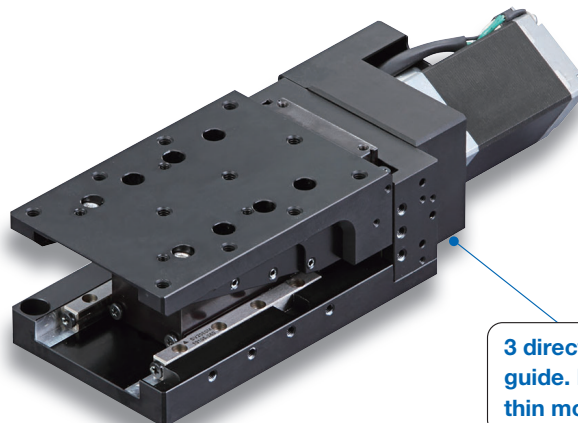
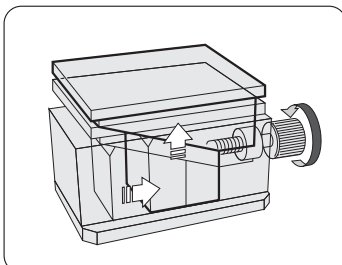
### ■ High precision

- ◎ Satisfy a high rigidity by a linear contact with V-groove and cross roller. It is ideal for fine feeding because of a little operation slip and a low friction.

## Feature of horizontal Z wedge type

Place the cross roller guide to horizontal, oblique and vertical direction, and it allows stage table to be shifted up or down with precision ball screw drive. All of the sliding part is configured in the rotational motion, drive high precision, to be effective against moment load.

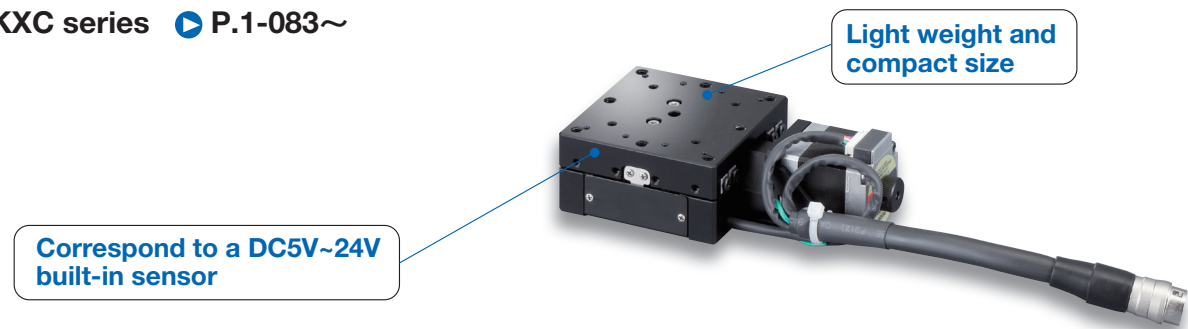
### Wedge type image



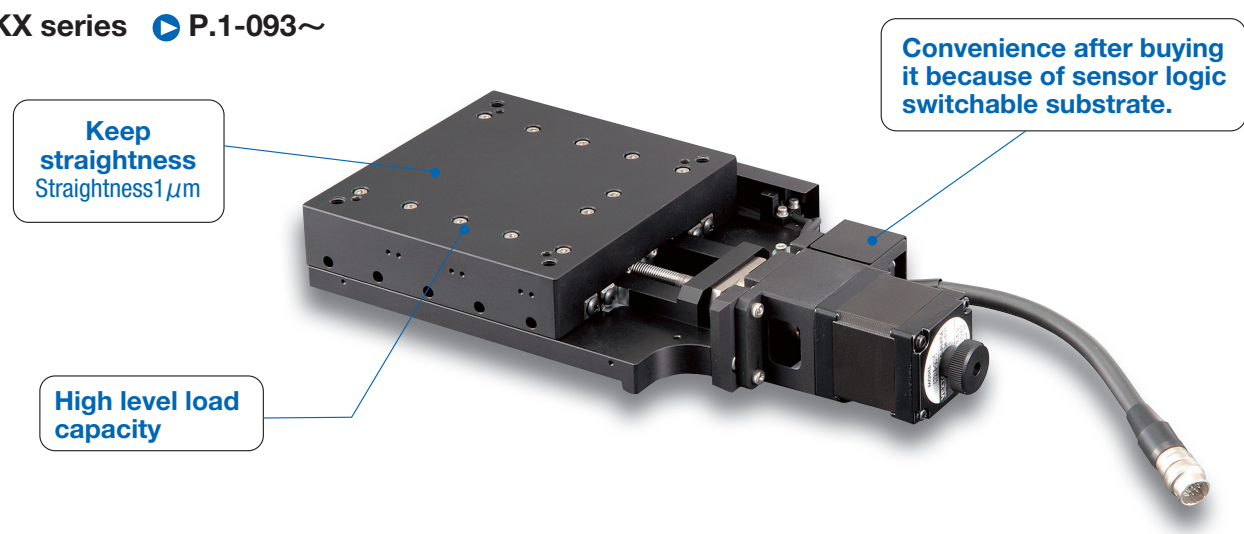
3 directions cross roller  
guide. High rigidity and  
thin model.

## High performance

**KXC series** ▶ P.1-083~



**KX series** ▶ P.1-093~



### ■ Cross roller guide stroke line-up

|      |      |      |      |      |      |      |       |
|------|------|------|------|------|------|------|-------|
| 15mm | 20mm | 25mm | 30mm | 40mm | 50mm | 70mm | 100mm |
|------|------|------|------|------|------|------|-------|

### Available various motors

Selectable high-torque, high resolution and  $\alpha$ step. \* Need to separately confirmation to use the electromagnetic brake.  
 Please see product pages for more information. \* Unselectable some parts of types.

## For use correctly

### ▽ How to mount

Stroke the upper plate to CW or CCW. Screw on bolt holes for each 2. (Total 4 screws)

### ▽ About object on the upper or lower stage.

Stage surface might be deformed and Mounting unflat object and set to the unflat place can affect to be deformed stage surface and decreasing accuracy. When a stage is mounted on uneven or an object that is uneven, the stage table may deformed, and may also affected the accuracy.

### ▽ Positioning

#### ■ Position of stage mounting

All products SPEC shows must be shown flat setting condition.

Pay attention to mount such as up side down, vertical on the side and horizontal on the side.

Load capacity and accuracy might be changed by the positioning.

Please feel free to ask us for more information.

## X-axis Cross Roller Guide: KXC04015/KXC06020

KXC04015-C



KXC04015-PA



KXC06020-C



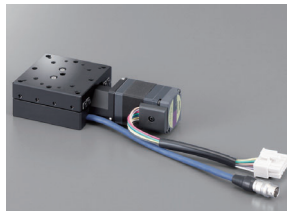
KXC06020-F



KXC06020-G



KXC06020-PA



RoHS

See page P.009

Model Selection code Option code

**KXC 04015-**

1 2 3 4

Cable P.1-207~  
Electrical specification P.1-091~

### 1 Table size

|    |      |
|----|------|
| 04 | 40mm |
| 06 | 60mm |

\* Not available 04020 and 06015

### 2 Travel length

|     |      |
|-----|------|
| 015 | 15mm |
| 020 | 20mm |

### 3 Motor option

| Code | Specification          |
|------|------------------------|
| C    | Standard               |
| F    | High-torque            |
| G    | High resolution        |
| PA   | 28 α Step (Driver set) |

\* PA can choose only cable code P. Cannot choose the blank.  
\* In case of KXC04, can be chosen only C and PA.

### 4 Cable option

| Code  | Specification                          | Cable type |
|-------|----------------------------------------|------------|
| A     | 2m                                     | D214-2-2E  |
| B     | 2m One end loose                       | D214-2-2EK |
| C     | 4m                                     | D214-2-4E  |
| D     | 4m One end loose                       | D214-2-4EK |
| E     | Only connector (Cable is not included) | —          |
| F     | Robot cable 2m                         | D214-2-2R  |
| G     | Robot cable 2m one end loose           | D214-2-2RK |
| H     | Robot cable 4m                         | D214-2-4R  |
| J     | Robot cable 4m one end loose           | D214-2-4RK |
| Blank | Cable is not included (Standard)       | —          |
| P     | Cable for α step 3m                    | —          |

\* One end loose position to only stage opposite side.  
\* If you choose the option specification, please add the difference to standard price.  
\* See page P.1-207,209~ for cable details.  
\* Please select "Code A, C, F or H" when connect with stepping motor controller(DS102/112).

| SPEC                                 |                                      |                       |                                        |                       |                                        |            |                             |                      |
|--------------------------------------|--------------------------------------|-----------------------|----------------------------------------|-----------------------|----------------------------------------|------------|-----------------------------|----------------------|
| Model                                |                                      | KXC04015-C            | KXC04015-PA                            | KXC06020-C            | KXC06020-F                             | KXC06020-G | KXC06020-PA                 |                      |
| Mechanical specification             | Travel length                        |                       | 15mm                                   |                       | 20mm                                   |            |                             |                      |
|                                      | Table size                           |                       | 40×40mm                                |                       | 60×60mm                                |            |                             |                      |
|                                      | Feed screw (Ball screw)              |                       | φ6 lead 1                              |                       | φ8 lead 1                              |            |                             |                      |
|                                      | Guide                                |                       | Crossed roller guide                   |                       |                                        |            |                             |                      |
|                                      | Main materials-Finishing             |                       | Aluminum—Black almite finishing        |                       |                                        |            |                             |                      |
| Weight                               |                                      | 0.31kg                | 0.36kg                                 | 0.44kg                | 0.54kg                                 | 0.44kg     | 0.49kg                      |                      |
| Accuracy specification               | Resolution (Pulse)                   | Full/Half             | 2μm/1μm                                | 1μm (Set to 1000P/R)  | 2μm/1μm                                |            | 1μm/0.5μm                   | 1μm (Set to 1000P/R) |
|                                      |                                      | Microstep             | 0.1μm (1/20 on resolution)             | —                     | 0.1μm (1/20 on resolution)             |            | 0.05μm (1/20 on resolution) | —                    |
|                                      | MAX speed                            |                       | 10mm/sec                               |                       | 20mm/sec                               |            |                             |                      |
|                                      | Uni-directional positioning accuracy |                       | Within 10μm                            |                       | Within 5μm                             |            |                             |                      |
|                                      | Repeatability positioning accuracy   |                       | Within ±0.5μm                          |                       | Within ±0.3μm                          |            |                             |                      |
|                                      | Load capacity                        |                       | 5.0kgf [49N]                           |                       |                                        |            |                             |                      |
|                                      | Moment stiffness                     |                       | Pitch 0.33/yaw 0.44/roll 0.37 [°/N・cm] |                       | Pitch 0.15/yaw 0.12/roll 0.07 [°/N・cm] |            |                             |                      |
|                                      | Lost motion                          |                       | Within 1μm                             |                       |                                        |            |                             |                      |
|                                      | Backlash                             |                       | Within 0.5μm                           |                       |                                        |            |                             |                      |
|                                      | Straightness                         |                       | Within 3μm                             |                       |                                        |            |                             |                      |
| Parallelism                          |                                      | Within 30μm           |                                        |                       |                                        |            |                             |                      |
| Motion parallelism                   |                                      | Within 10μm           |                                        |                       |                                        |            |                             |                      |
| Pitching/Yawing                      |                                      | Within 25°/Within 20° |                                        | Within 20°/Within 15° |                                        |            |                             |                      |
| Sensor                               | Limit sensor                         |                       | Installed                              |                       |                                        |            |                             |                      |
|                                      | Origin sensor                        |                       | Installed                              |                       |                                        |            |                             |                      |
|                                      | Slit origin sensor                   |                       | —                                      |                       |                                        |            |                             |                      |
| Provided screw (Hexagon-headed bolt) |                                      |                       | 4 of M3—16                             |                       | 4 of M4—16                             |            |                             |                      |

\* Motor code [C-F-G] not include the cable. Choose the cable from cable code table.  
\* Motor code [PA] includes the driver, motor and sensor cable.

Dimensional outline drawings



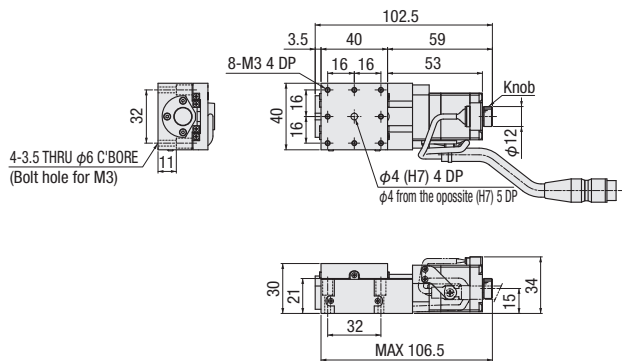
PART  
COMMUNITY

CAD  
DATA

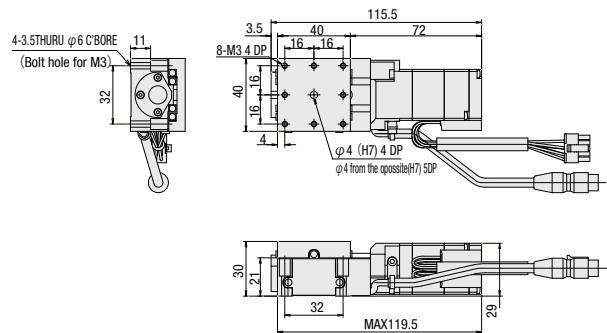
SURUGA  
SEIKI

CAD  
3D・2D

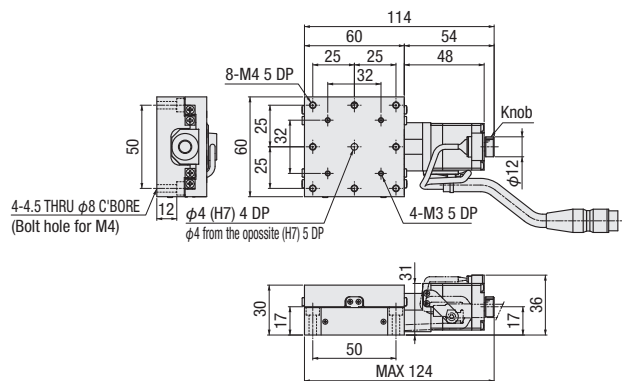
KXC04015-C



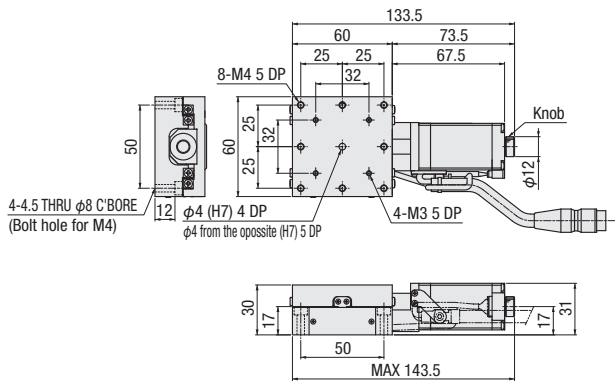
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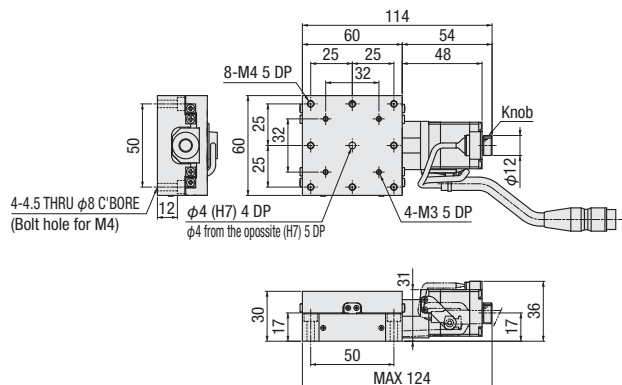
KXC06020-C



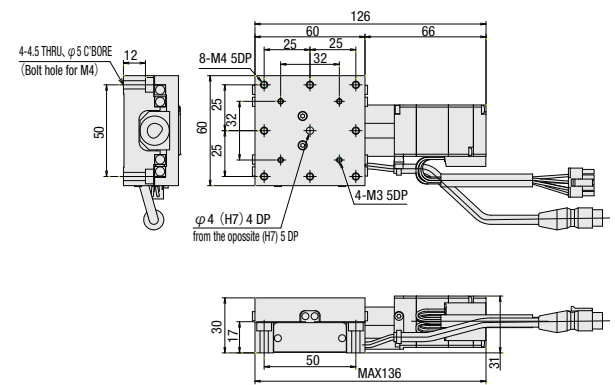
KXC06020-F



KXC06020-G



KXC06020-PA



Motorized Stage

X

XY

Z

Horizontal  
Z

XYZ

Goniometer

Rotary

Unit

Controller

Linear  
Ball

CAVE-X  
Linear ball

Cross  
Roller

Slide  
Guide

□40

□50

□60

□70

□80

□100

□120

Other

1

084

## XY-axis Cross Roller Guide: KYC04015/KYC06020

Motorized Stage

RoHS

KYC04015-C



KYC04015-PA



KYC06020-C



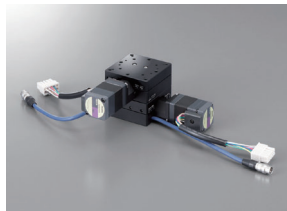
KYC06020-F



KYC06020-G



KYC06020-PA



Cable P.1-207~  
Electrical specification P.1-091~

### 1 Table size

|    |      |
|----|------|
| 04 | 40mm |
| 06 | 60mm |

\* Not available 04020 and 06015

### 2 Travel length

|     |      |
|-----|------|
| 015 | 15mm |
| 020 | 20mm |

### 3 Motor option

| Code | Specification          |
|------|------------------------|
| C    | Standard               |
| F    | High-torque            |
| G    | High resolution        |
| PA   | 28 α Step (Driver set) |

\* PA can choose only cable code P. Cannot choose the blank.

\* In case of KYC04, can be chosen only C and PA.

### 4 Cable option

| Code  | Specification                          | Cable type |
|-------|----------------------------------------|------------|
| A     | 2m                                     | D214-2-2E  |
| B     | 2m One end loose                       | D214-2-2EK |
| C     | 4m                                     | D214-2-4E  |
| D     | 4m One end loose                       | D214-2-4EK |
| E     | Only connector (Cable is not included) | —          |
| F     | Robot cable 2m                         | D214-2-2R  |
| G     | Robot cable 2m one end loose           | D214-2-2RK |
| H     | Robot cable 4m                         | D214-2-4R  |
| J     | Robot cable 4m one end loose           | D214-2-4RK |
| Blank | Cable is not included (Standard)       | —          |
| P     | Cable for α step 3m                    | —          |

\* One end loose position to only stage opposite side.

\* If you choose the option specification, please add the difference to standard price.

\* See page P.1-207, 209~ for more cable details.

\* Please select "Code A, C, F or H" when connect with stepping motor controller(DS102/112).

| SPEC                                 |                                      |            |                                 |                      |                            |            |                             |                      |
|--------------------------------------|--------------------------------------|------------|---------------------------------|----------------------|----------------------------|------------|-----------------------------|----------------------|
| Model                                |                                      | KYC04015-C | KYC04015-PA                     | KYC06020-C           | KYC06020-F                 | KYC06020-G | KYC06020-PA                 |                      |
| Mechanical specification             | Travel length                        |            | 15mm                            |                      | 20mm                       |            |                             |                      |
|                                      | Table size                           |            | 40×40mm                         |                      | 60×60mm                    |            |                             |                      |
|                                      | Feed screw (Ball screw)              |            | φ6 lead 1                       |                      | φ8 lead 1                  |            |                             |                      |
|                                      | Guide                                |            | Crossed roller guide            |                      |                            |            |                             |                      |
|                                      | Main materials-Finishing             |            | Aluminum—Black almite finishing |                      |                            |            |                             |                      |
| Accuracy specification               | Weight                               |            | 0.63kg                          | 0.73kg               | 0.90kg                     | 1.10kg     | 0.90kg                      | 1.00kg               |
|                                      | Resolution (Pulse)                   | Full/Half  | 2μm/1μm                         | 1μm (Set to 1000P/R) | 2μm/1μm                    |            | 1μm/0.5μm                   | 1μm (Set to 1000P/R) |
|                                      |                                      | Microstep  | 0.1μm (1/20 on resolution)      | —                    | 0.1μm (1/20 on resolution) |            | 0.05μm (1/20 on resolution) | —                    |
|                                      | MAX speed                            |            | 10mm/sec                        |                      | 20mm/sec                   |            |                             |                      |
|                                      | Load capacity                        |            | 4.5kgf [44.1N]                  |                      |                            |            |                             |                      |
|                                      | Perpendicularity                     |            | Within 7.5μm/Full stroke        |                      | Within 10μm/Full stroke    |            |                             |                      |
|                                      | Pitching/Yawing                      |            | Within 25″/Within 20″           |                      | Within 20″/Within 15″      |            |                             |                      |
| Sensor                               | Limit sensor                         |            | Installed                       |                      |                            |            |                             |                      |
|                                      | Origin sensor                        |            | Installed                       |                      |                            |            |                             |                      |
|                                      | Slit origin sensor                   |            | —                               |                      |                            |            |                             |                      |
| Provided screw (Hexagon-headed bolt) |                                      | 4 of M3—16 |                                 | 4 of M4—16           |                            |            |                             |                      |
| Stage accuracy specification         | Uni-directional positioning accuracy |            | Within 10μm                     |                      | Within 5μm                 |            |                             |                      |
|                                      | Repeatability positioning accuracy   |            | Within ±0.5μm                   |                      | Within ±0.3μm              |            |                             |                      |
|                                      | Lost motion                          |            | Within 1μm                      |                      |                            |            |                             |                      |
|                                      | Backlash                             |            | Within 0.5μm                    |                      |                            |            |                             |                      |
|                                      | Straightness                         |            | Within 3μm                      |                      |                            |            |                             |                      |

\* Motor code [C-F-G] not include the cable. Choose the cable from cable code table.

\* Motor code [PA] includes the driver, motor and sensor cable.





PART  
COMMUNITY

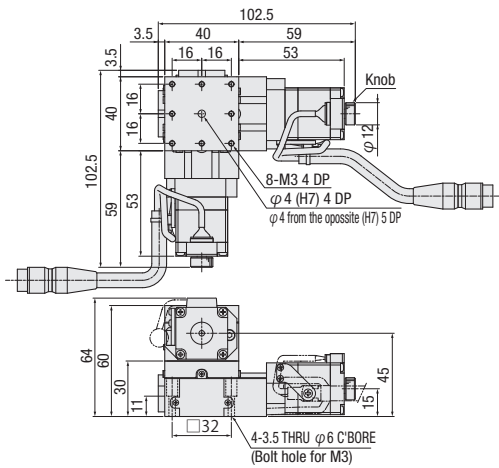
CAD  
DATA

SURUGA  
SEIKI

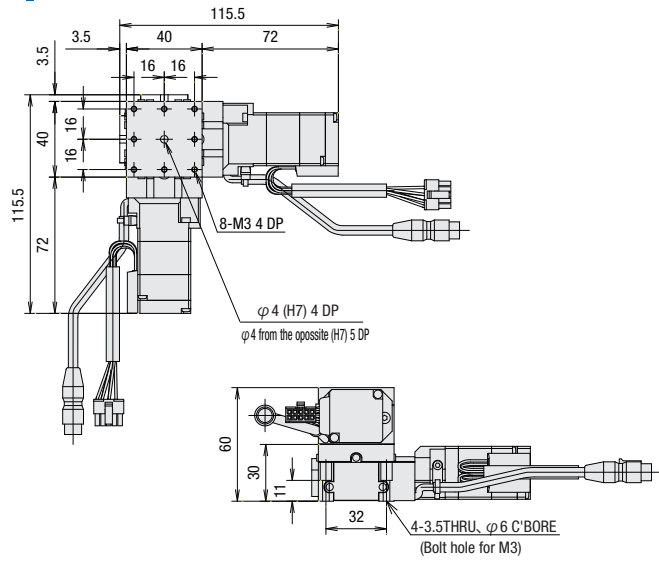
CAD  
3D·2D

## Dimensional outline drawings

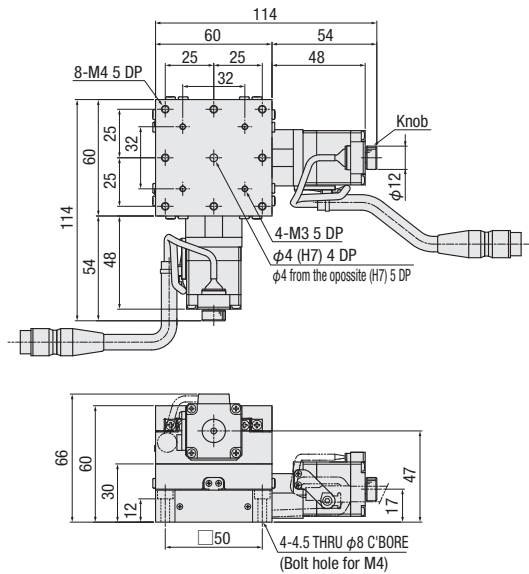
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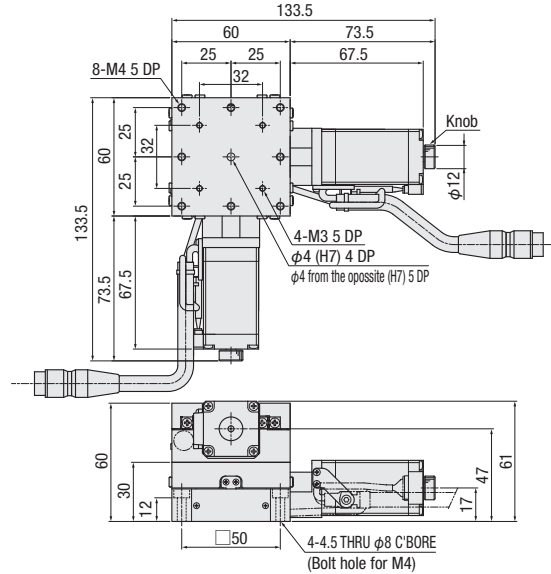
### KYC04015-PA



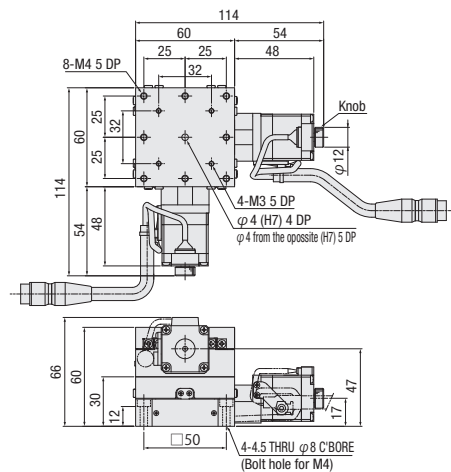
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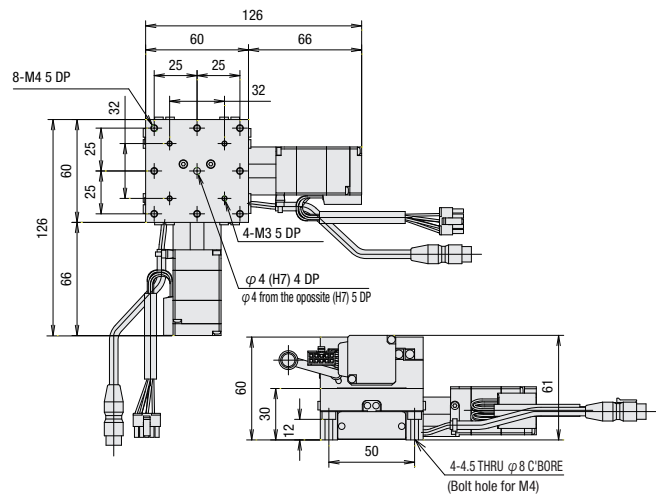
### KYC06020-F



### KYC06020-G



### KYC06020-PA



Motorized Stage

X

XY

Z

Horizontal  
Z

XYZ

Goniometer

Rotary

Unit

Controller

Linear  
Ball

CAVE-X  
Linear ball

Cross  
Roller

Slide  
Guide

□40

□50

□60

□70

□80

□100

□120

Other

1

086

## Z-axis Cross Roller Guide: KZC04015/KZC06020

RoHS

KZC04015-C



KZC04015-PA



KZC06020-C



KZC06020-F



KZC06020-G



KZC06020-PA



| Model      | Selection code                      | Option code                         |
|------------|-------------------------------------|-------------------------------------|
| <b>KZC</b> | <b>04015-</b>                       | <div><div></div><div></div></div>   |
|            | <div><div>1</div><div>2</div></div> | <div><div>3</div><div>4</div></div> |

Cable P.1-207~  
 Electrical specification P.1-091~

### 1 Table size

|    |                               |
|----|-------------------------------|
| 04 | <input type="checkbox"/> 40mm |
| 06 | <input type="checkbox"/> 60mm |

\* Not available 04020 and 06015

### 2 Travel length

|     |      |
|-----|------|
| 015 | 15mm |
| 020 | 20mm |

### 3 Motor option

| Code | Specification                                   |
|------|-------------------------------------------------|
| C    | Standard                                        |
| F    | High-torque                                     |
| G    | High resolution                                 |
| PA   | <input type="checkbox"/> 28 α Step (Driver set) |

\* PA can choose only cable code P. Cannot choose the blank.

\* In case of KZC04, can be chosen only C and PA.

### 4 Cable option

| Code  | Specification                          | Cable type |
|-------|----------------------------------------|------------|
| A     | 2m                                     | D214-2-2E  |
| B     | 2m One end loose                       | D214-2-2EK |
| C     | 4m                                     | D214-2-4E  |
| D     | 4m One end loose                       | D214-2-4EK |
| E     | Only connector (Cable is not included) | —          |
| F     | Robot cable 2m                         | D214-2-2R  |
| G     | Robot cable 2m one end loose           | D214-2-2RK |
| H     | Robot cable 4m                         | D214-2-4R  |
| J     | Robot cable 4m one end loose           | D214-2-4RK |
| Blank | Cable is not included (Standard)       | —          |
| P     | Cable for α step 3m                    | —          |

\* One end loose position to only stage opposite side.

\* If you choose the option specification, please add the difference to standard price.

\* See page P.1-207, 209~ for more cable details.

\* Please select "Code A, C, F or H" when connect with stepping motor controller(DS102/112).

| SPEC                                 |                                      |            |                                 |                      |                            |            |                             |                      |
|--------------------------------------|--------------------------------------|------------|---------------------------------|----------------------|----------------------------|------------|-----------------------------|----------------------|
| Model                                |                                      | KZC04015-C | KZC04015-PA                     | KZC06020-C           | KZC06020-F                 | KZC06020-G | KZC06020-PA                 |                      |
| Mechanical specification             | Travel length                        |            | 15mm                            |                      | 20mm                       |            |                             |                      |
|                                      | Table size                           |            | 40×40mm                         |                      | 60×60mm                    |            |                             |                      |
|                                      | Feed screw (Ball screw)              |            | φ6 lead 1                       |                      | φ8 lead 1                  |            |                             |                      |
|                                      | Guide                                |            | Crossed roller guide            |                      |                            |            |                             |                      |
|                                      | Main materials-Finishing             |            | Aluminum—Black almite finishing |                      |                            |            |                             |                      |
|                                      | Weight                               |            | 0.38kg                          | 0.43kg               | 0.80kg                     | 0.90kg     | 0.80kg                      | 0.85kg               |
| Accuracy specification               | Resolution (Pulse)                   | Full/Half  | 2μm/1μm                         | 1μm (Set to 1000P/R) | 2μm/1μm                    |            | 1μm/0.5μm                   | 1μm (Set to 1000P/R) |
|                                      |                                      | Microstep  | 0.1μm (1/20 on resolution)      | —                    | 0.1μm (1/20 on resolution) |            | 0.05μm (1/20 on resolution) | —                    |
|                                      | MAX speed                            |            | 10mm/sec                        |                      | 20mm/sec                   |            |                             |                      |
|                                      | Load capacity (Excitation)           |            | 3.0kgf [29.4N]                  |                      |                            |            |                             |                      |
|                                      | Vertical degree                      |            | Within 7.5μm/Full stroke        |                      | Within 10μm/Full stroke    |            |                             |                      |
|                                      | Pitching/Yawing                      |            | Within 25°/Within 20°           |                      | Within 20°/Within 15°      |            |                             |                      |
| Sensor                               | Limit sensor                         |            | Installed                       |                      |                            |            |                             |                      |
|                                      | Origin sensor                        |            | Installed                       |                      |                            |            |                             |                      |
|                                      | Slit origin sensor                   |            | —                               |                      |                            |            |                             |                      |
| Provided screw (Hexagon-headed bolt) |                                      |            | 4 of M3—8                       |                      | 4 of M4—10                 |            |                             |                      |
| Stage accuracy specification         | Uni-directional positioning accuracy |            | Within 10μm                     |                      | Within 5μm                 |            |                             |                      |
|                                      | Repeatability positioning accuracy   |            | Within ±0.5μm                   |                      | Within ±0.3μm              |            |                             |                      |
|                                      | Lost motion                          |            | Within 1μm                      |                      |                            |            |                             |                      |
|                                      | Backlash                             |            | Within 0.5μm                    |                      |                            |            |                             |                      |
|                                      | Straightness                         |            | Within 3μm                      |                      |                            |            |                             |                      |
|                                      |                                      |            |                                 |                      |                            |            |                             |                      |

\* Motor code [C-F-G] not include the cable. Choose the cable from cable code table.

\* Motor code [PA] includes the driver, motor and sensor cable.

Dimensional outline drawings



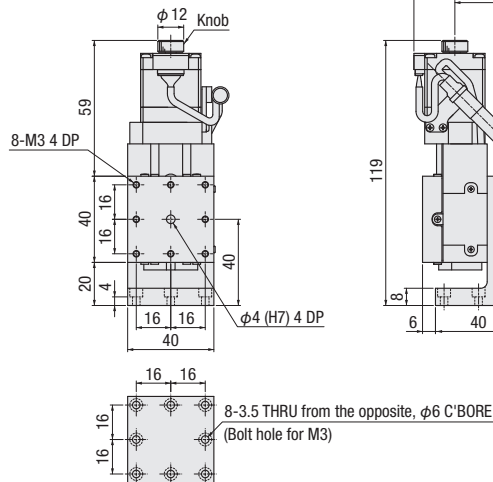
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COMMUNITY

CAD  
DATA

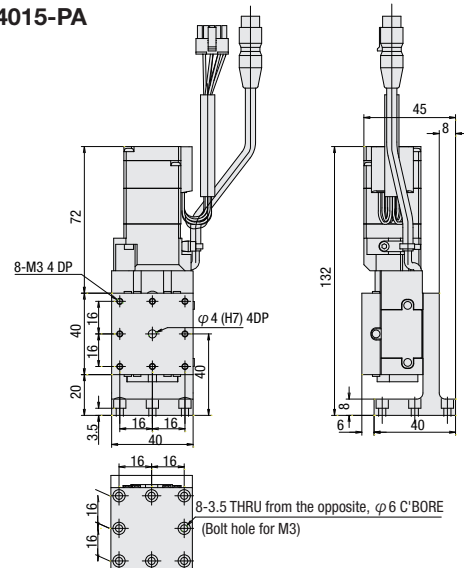
SURUGA  
SEIKI

CAD  
3D・2D

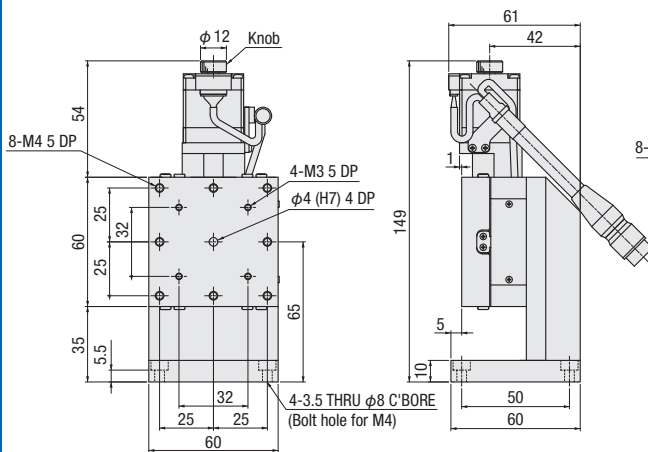
KZC04015-C



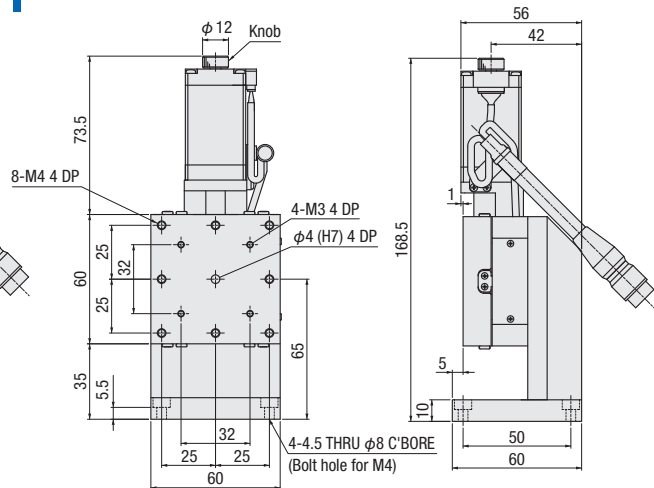
KZC04015-PA



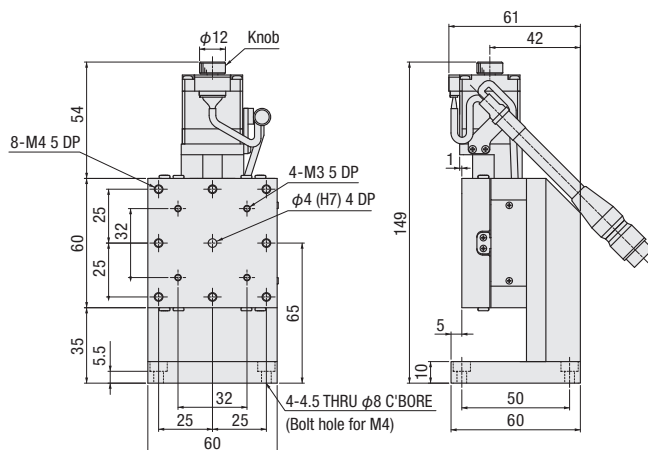
KZC06020-C



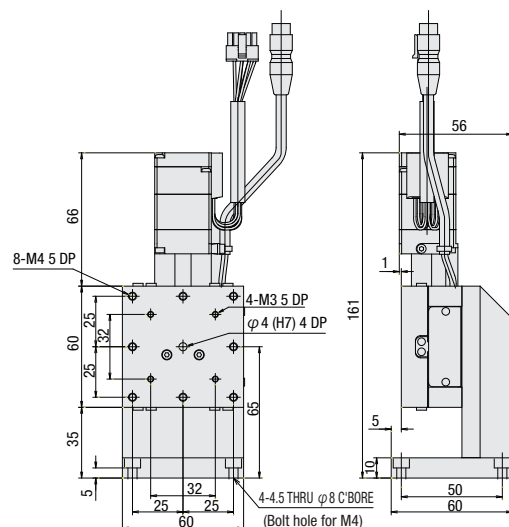
KZC06020-F



KZC06020-G



KZC06020-PA



Motorized Stage

X

XY

Z

Horizontal  
Z

XYZ

Goniometer

Rotary

Unit

Controller

Linear  
Ball

CAVE-X  
Linear ball

Cross  
Roller

Slide  
Guide

40

50

60

70

80

100

120

Other

1

088



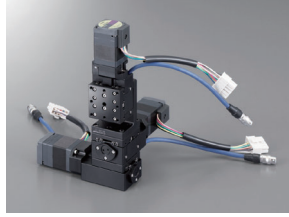
## XYZ-axis Cross Roller Guide: KWC04015/KWC06020

RoHS

KWC04015-C



KWC04015-PA



KWC06020-LC



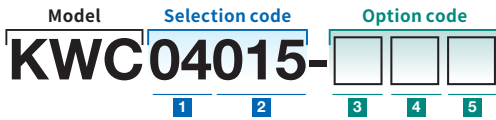
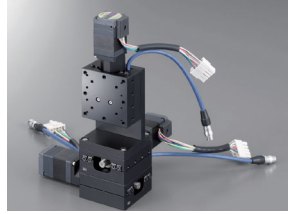
KWC06020-LF



KWC06020-LG



KWC06020-LPA



▶ Cable P.1-207~  
▶ Electrical specification P.1-091~

### 1 Table size

|    |       |
|----|-------|
| 04 | □40mm |
| 06 | □60mm |

\* Not available 04020 and 06015

### 2 Travel length

|     |      |
|-----|------|
| 015 | 15mm |
| 020 | 20mm |

### 3 Sensor cover location specification

|   |                 |
|---|-----------------|
| L | L Specification |
| R | R Opposite hand |

\* 04015 for only L position

### 4 Motor option

| Code | Specification           |
|------|-------------------------|
| C    | Standard                |
| F    | High-torque             |
| G    | High resolution         |
| PA   | □28 α Step (Driver set) |

\* PA can choose only cable code P. Cannot choose the blank.  
\* In case of KWC04, can be chosen only C and PA.

### 5 Cable option

| Code  | Specification                          | Cable type |
|-------|----------------------------------------|------------|
| A     | 2m                                     | D214-2-2E  |
| B     | 2m One end loose                       | D214-2-2EK |
| C     | 4m                                     | D214-2-4E  |
| D     | 4m One end loose                       | D214-2-4EK |
| E     | Only connector (Cable is not included) | —          |
| F     | Robot cable 2m                         | D214-2-2R  |
| G     | Robot cable 2m one end loose           | D214-2-2RK |
| H     | Robot cable 4m                         | D214-2-4R  |
| J     | Robot cable 4m one end loose           | D214-2-4RK |
| Blank | Cable is not included (Standard)       | —          |
| P     | Cable for α step 3m                    | —          |

\* One end loose position to only stage opposite side.  
\* If you choose the option specification, please add the difference to standard price.  
\* See page P.1-207,209~ for cable details.  
\* Please select "Code A, C, F or H" when connect with stepping motor controller(DS102/112).

| SPEC                                 |                                      |            |                                 |                      |                            |             |                             |                      |
|--------------------------------------|--------------------------------------|------------|---------------------------------|----------------------|----------------------------|-------------|-----------------------------|----------------------|
| Model                                |                                      | KWC04015-C | KWC04015-PA                     | KWC06020-LC          | KWC06020-LF                | KWC06020-LG | KWC06020-LPA                |                      |
| (Opposite hand)                      |                                      | —          |                                 | KWC06020-RC          | KWC06020-RF                | KWC06020-RG | KWC06020-RPA                |                      |
| Mechanical specification             | Travel length                        |            | 15mm                            |                      | 20mm                       |             |                             |                      |
|                                      | Table size                           |            | 40×40mm                         |                      | 60×60mm                    |             |                             |                      |
|                                      | Feed screw (Ball screw)              |            | φ6 lead 1                       |                      | φ8 lead 1                  |             |                             |                      |
|                                      | Guide                                |            | Crossed roller guide            |                      |                            |             |                             |                      |
|                                      | Main materials-Finishing             |            | Aluminum—Black almite finishing |                      |                            |             |                             |                      |
| Accuracy specification               | Weight                               |            | 1.03kg                          | 1.45kg               | 1.98kg                     | 2.00g       | 1.70kg                      | 1.85kg               |
|                                      | Resolution (Pulse)                   | Full/Half  | 2μm/1μm                         | 1μm (Set to 1000P/R) | 2μm/1μm                    |             | 1μm/0.5μm                   | 1μm (Set to 1000P/R) |
|                                      |                                      | Microstep  | 0.1μm (1/20 on resolution)      | —                    | 0.1μm (1/20 on resolution) |             | 0.05μm (1/20 on resolution) | —                    |
|                                      | MAX speed                            |            | 10mm/sec                        |                      | 20mm/sec                   |             |                             |                      |
|                                      | Load capacity (Excitation)           |            | 3.0kgf [29.4N]                  |                      |                            |             |                             |                      |
|                                      | Pitching/Yawing                      |            | Within 25°/Within 20°           |                      | Within 20°/Within 15°      |             |                             |                      |
| Sensor                               | Limit sensor                         |            | Installed                       |                      |                            |             |                             |                      |
|                                      | Origin sensor                        |            | Installed                       |                      |                            |             |                             |                      |
|                                      | Slit origin sensor                   |            | —                               |                      |                            |             |                             |                      |
| Provided screw (Hexagon-headed bolt) |                                      | 4 of M3—16 |                                 | 4 of M4—16           |                            |             |                             |                      |
| Single axis accuracy specification   | Uni-directional positioning accuracy |            | Within 10μm                     |                      | Within 5μm                 |             |                             |                      |
|                                      | Repeatability positioning accuracy   |            | Within ±0.5μm                   |                      | Within ±0.3μm              |             |                             |                      |
|                                      | Lost motion                          |            | Within 1μm                      |                      |                            |             |                             |                      |
|                                      | Backlash                             |            | Within 0.5μm                    |                      |                            |             |                             |                      |
|                                      | Straightness                         |            | Within 3μm                      |                      |                            |             |                             |                      |

\* Motor code [C·F·G] not include the cable. Choose the cable from cable code table.

\* Motor code [PA] includes the driver, motor and sensor cable.

Motorized Stage

X

XY

Z

Horizontal  
Z

XYZ

Goniometer

Rotary

Unit

Controller

Linear  
Ball

CAVE-X  
Linear ball

Cross  
Roller

Slide  
Guide

□40

□50

□60

□70

□80

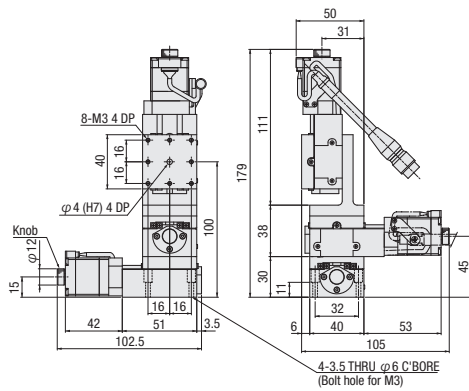
□100

□120

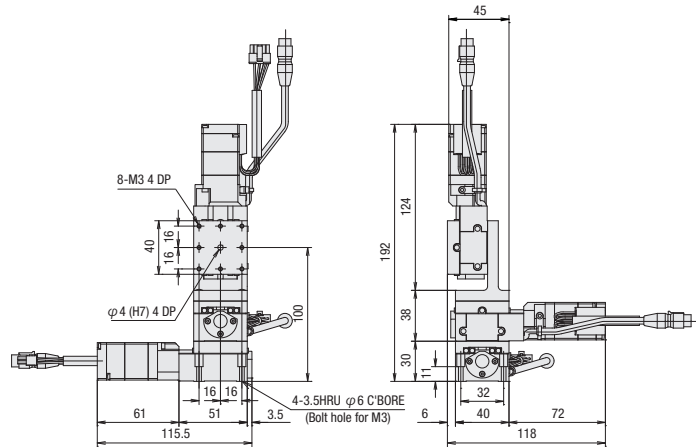
Other

Dimensional outline drawings

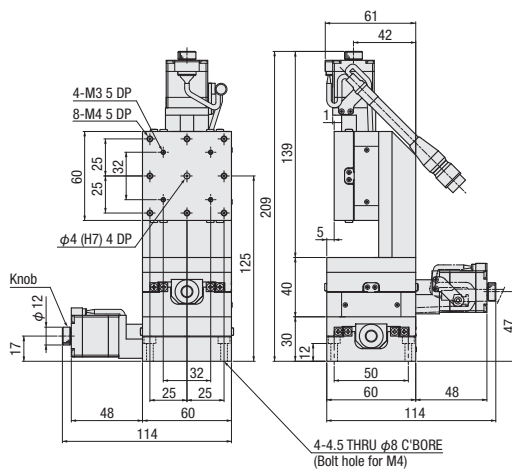
**KWC04015-C**



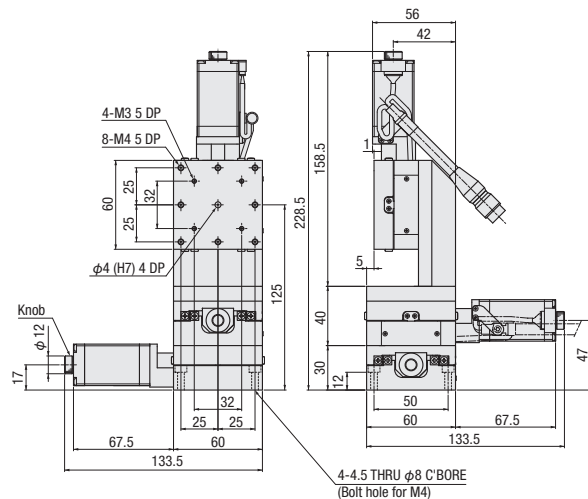
**KWC04015-PA**



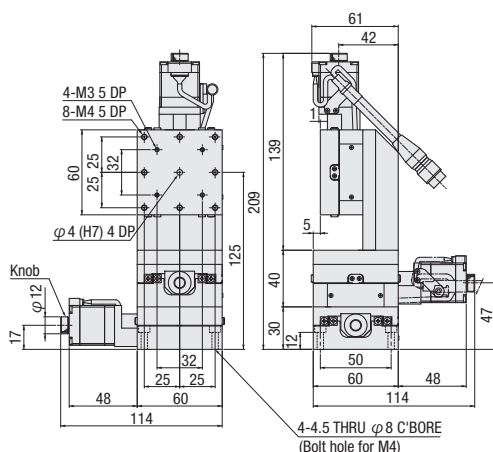
**KWC06020-LC**



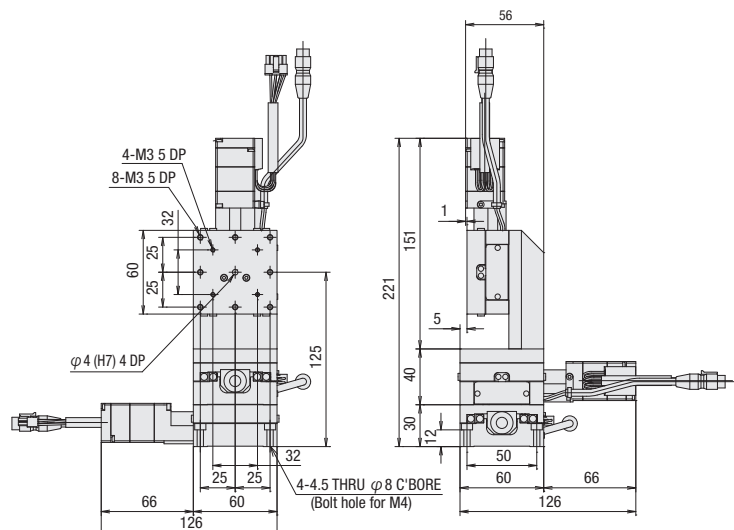
**KWC06020-LF**



**KWC06020-LG**



**KWC06020-LPA**



Motorized Stage

X

XY

Z

Horizontal  
Z

XYZ

Goniometer

Rotary

Unit

Controller

Linear  
Ball

CAVE-X  
Linear ball

Cross  
Roller

Slide  
Guide

☐ 40

☐ 50

☐ 60

☐ 70

☐ 80

☐ 100

☐ 120

Other

## Electrical Specification: KXC04015/KXC06020

### Electrical specification

|               | Models                                  | KXC04015-C                                                                                                  | KXC06020-C | KXC06020-F          | KXC06020-G           | KXC04015-PA            | KXC06020-PA |
|---------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------|------------|---------------------|----------------------|------------------------|-------------|
| Motor<br>(*1) | Type                                    | 5 phase stepping motor 0.75A/Phase                                                                          |            |                     |                      | $\alpha$ step motor    |             |
|               | Model (*2)                              | C005C-90215P-1 (□28mm)                                                                                      |            | PK525HPB-C1 (□28mm) | PK523HPMB-C1 (□28mm) | ARM24SAK (□28mm)       |             |
|               | Step angle                              | 0.72°                                                                                                       |            |                     | 0.36°                | 0.36° (Set to 1000P/R) |             |
|               | Driver type                             | ▶ P.1-205~                                                                                                  |            |                     |                      | ARD-K                  |             |
| Connector     | Model                                   | HR10A-10J-12P (73) (Hirose Electric Co., Ltd.)                                                              |            |                     |                      | HR10A-7J-6P (73)       |             |
|               | Contact type                            | —                                                                                                           |            |                     |                      | —                      |             |
|               | applicable connector on acceptance side | HR10A-10P-12S (73) (Hirose Electric Co., Ltd.)                                                              |            |                     |                      | HR10A-7P-6S (73)       |             |
|               | Compatible receiving contact            | —                                                                                                           |            |                     |                      | —                      |             |
| Sensor        | Limit sensor                            | Installed                                                                                                   |            |                     |                      |                        |             |
|               | Origin sensor                           | Installed                                                                                                   |            |                     |                      |                        |             |
|               | Slit origin sensor                      | —                                                                                                           |            |                     |                      |                        |             |
|               | Model                                   | Photo microsensor EE-SX4320 (Omron Co., Ltd.)                                                               |            |                     |                      |                        |             |
|               | Power voltage                           | DC5~24V ±10%                                                                                                |            |                     |                      |                        |             |
|               | Consumption current                     | Total 60mA or less                                                                                          |            |                     |                      |                        |             |
|               | Control output                          | NPN open collector output DC5~24V 8mA or less<br>Residual voltage 0.3V or less when the load current is 2mA |            |                     |                      |                        |             |
|               | Output logic                            | On detection (light shield condition): Output transistor OFF (Non-continuity)                               |            |                     |                      |                        |             |

\*1 See page ▶ P.1-213~ for details of single motor specification.

\*2 Model is our own management model.

### Available sensor DC5V~24V.

This stages have DC5V~24V correspondence sensor. 24V correspondence sensor amplifier substrateK-PCBA24 is not necessary.

It used to require the K-PCBA24 when the former products are driven by use of a motion control board or programmable logic controller (PLC) without our controller.

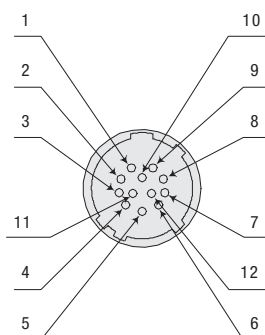
### Note

Must be wired without sensor amplifier substrate when our customer who uses the former stages KS101-15, -20 and amplifier substrates will be replaced with KXC04 and KXC06 stages.

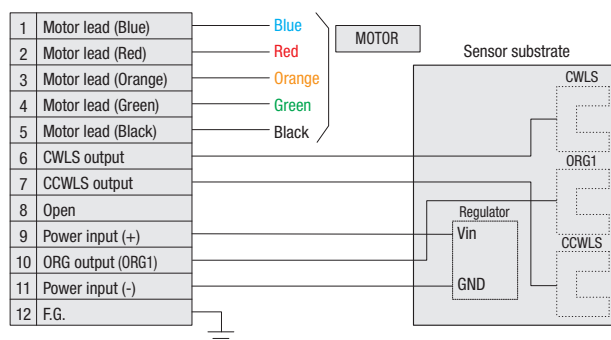
We have avariety of harness that can be jumped between input and output connector of sensor amplifier substrate for taking advantage of existing cables that using sensor amplifier substrate.

Motor code: C (Standard) • F (High-torque) • G (High resolution)

### Pin allocation (The same)

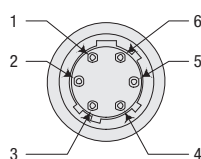


### Connection diagram (The same)

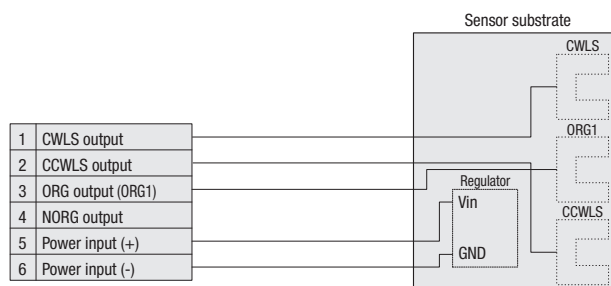


Motor code: PA ( $\alpha$  step) Motor cable model: CC030VA2R2 ▶ P.1-211

### Pin allocation (Sensor)

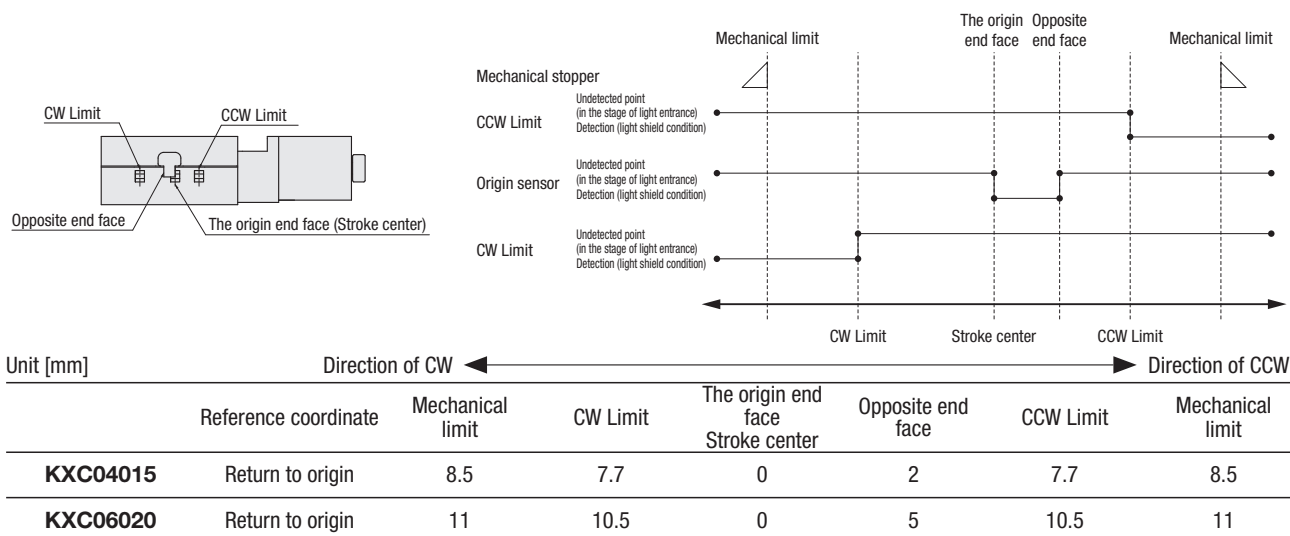


### Connection diagram (Sensor)



※Other side cable specification See page ▶ P.1-212

## Timing chart



\*Return to origin means that is performed return to origin type 4 using DS102/DS112 series.

\* The coordinate value should be on the design. Dimension error may occur about plus or minus 0.5 mm.

Note: The timing chart shows only timing of sensor, it is not for output signal logic.

Refer to ON/OFF display of output transistor that shows on electrical specifications-sensor-output logic for output signal logic.

## Method for return to origin

Suruga's motorized stages is different from the wire connection as the number of sensors depending on models.

It is necessary to choose type to suit correctly as return to origin operation is divided into same types/Selected wrong type may be operated incorrectly. Choose your best one whatever you need according to be recommended as below.

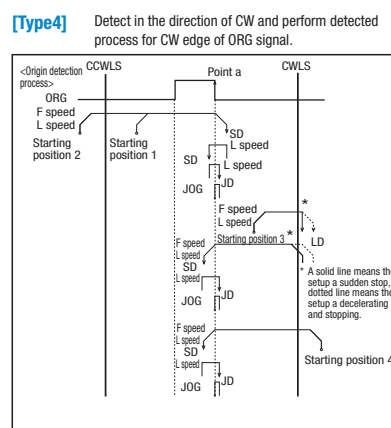
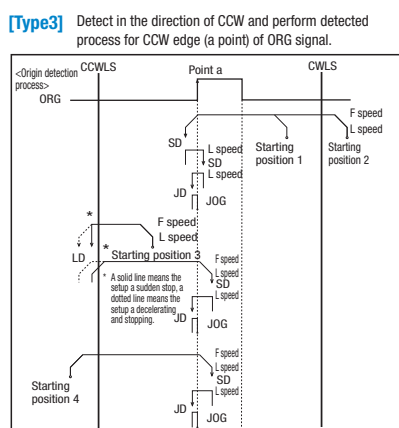
### ■ KXC04015/KXC06020 recommended return to origin Return to origin sequence P.1-201~

Type 3: Detect in the direction of CCW and perform detected process for CCW edge of ORG signal.

Type 4: Detect in the direction of CW and perform detected process for CW edge of ORG signal.

Type 9: After finished Type3, perform detected process for CCW edge of TIMING signal.

Type 10: After finished Type4, perform detected process for CW edge of TIMING signal.



## Adaptive driver

### ■ Driver P.1-205~

DC24V type input

| Model     | CVD507-K-A9        | CRD5107P           |
|-----------|--------------------|--------------------|
| Divisions | 1~1/250 (16 steps) | 1~1/250 (16 steps) |

## Adaptive stepping motor controller

### ■ Controller P.1-197~

| Input power | General-purpose input/output port | Driver type |                    |
|-------------|-----------------------------------|-------------|--------------------|
|             |                                   | Full/Half   | 1~1/250 (16 steps) |
| AC100-240V  | Without                           | DS102ANR    | DS102AMS           |
|             | With                              | DS102ANR-IO | DS102AMS-IO        |
| DC24V       | Without                           | DS112ANR    | DS112AMS           |
|             | With                              | DS112ANR-IO | DS112AMS-IO        |



DS112/102

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Linear Ball

CAVE-X Linear ball

Cross Roller

Slide Guide

40

50

60

70

80

100

120

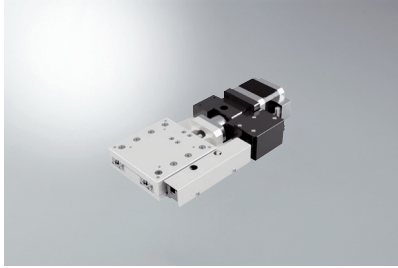
Other

1

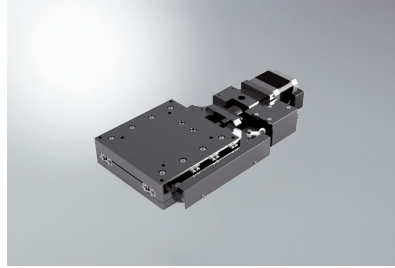
092

## Thin Type X-axis Cross Roller Guide: KX0725/KX0830/KX1040/KX1250

KX0725-LG



KX1040-LG



RoHS

Motorized Stage

X

XY

Z

Horizontal  
Z

XYZ

Goniometer

Rotary

Unit

Controller

Model Selection code Option code  
**K X0725-LG 5**  
1 2 3 4 5

Cable P.1-207~  
Electrical specification P.1-099~

### 1 Axis

|   |        |
|---|--------|
| X | X-axis |
|---|--------|

### 2 Table size

|    |                                |
|----|--------------------------------|
| 07 | <input type="checkbox"/> 70mm  |
| 08 | <input type="checkbox"/> 80mm  |
| 10 | <input type="checkbox"/> 100mm |
| 12 | <input type="checkbox"/> 120mm |

### 3 Travel length

|    |      |
|----|------|
| 25 | 25mm |
| 30 | 30mm |
| 40 | 40mm |
| 50 | 50mm |

\* Selectable only 0725, 0830, 1040, 1250 in combination with 2 and 3.

### 4 Sensor cover location specification

|   |               |
|---|---------------|
| L | L position    |
| R | Opposite hand |

### 5 Cable option

| Code  | Specification                          | Cable type |
|-------|----------------------------------------|------------|
| Blank | 2m                                     | D214-2-2E  |
| 1     | 2m One end loose                       | D214-2-2EK |
| 2     | 4m                                     | D214-2-4E  |
| 3     | 4m One end loose                       | D214-2-4EK |
| 4     | Only connector (Cable is not included) | —          |
| 5     | Cable is not included (Standard)       | —          |
| 6     | Robot cable 2m                         | D214-2-2R  |
| 7     | Robot cable 4m                         | D214-2-4R  |
| 8     | Robot cable 4m one end loose           | D214-2-4RK |
| 9     | Robot cable 2m one end loose           | D214-2-2RK |

\* One end loose position to only stage opposite side.

\* If you choose the option specification, please add the difference to standard price.

\* See page P.1-207, 209~ for more cable details.

\* Please select "blank, 2, 6 and 7" when connect with stepping motor controller(DS102/112).

Linear  
Ball

CAVE-X  
Linear ball

Cross  
Roller

Slide  
Guide

☐ 40

☐ 50

☐ 60

☐ 70

☐ 80

☐ 100

☐ 120

Other

### SPEC

| Model                                |                                      | KX0725-LG5                             | KX0830-LG5                             | KX1040-LG5                             | KX1250-LG5                             |
|--------------------------------------|--------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| (Opposite hand)                      |                                      | KX0725-RG5                             | KX0830-RG5                             | KX1040-RG5                             | KX1250-RG5                             |
| Mechanical specification             | Travel length                        | 25mm                                   | 30mm                                   | 40mm                                   | 50mm                                   |
|                                      | Table size                           | 70×70mm                                | 80×80mm                                | 100×100mm                              | 120×120mm                              |
|                                      | Feed screw                           | Ball screwφ6 lead 1                    | Ball screwφ8 lead 1                    |                                        |                                        |
|                                      | Guide                                | Crossed roller guide                   |                                        |                                        |                                        |
|                                      | Main materials-Finishing             | Aluminum—White almite finish           | Aluminum—Black almite finishing        |                                        |                                        |
| Weight                               |                                      | 1.0kg                                  | 1.2kg                                  | 1.6kg                                  | 2.2kg                                  |
| Accuracy specification               | Resolution (Pulse)                   | Full/Half<br>Microstep                 | 1μm/0.5μm                              |                                        |                                        |
|                                      |                                      |                                        | 0.05μm (1/20 on resolution)            |                                        |                                        |
|                                      | MAX speed                            | 10mm/sec                               |                                        |                                        |                                        |
|                                      | Uni-directional positioning accuracy | Within 5μm                             |                                        |                                        |                                        |
|                                      | Repeatability positioning accuracy   | Within ±0.3μm                          |                                        |                                        |                                        |
|                                      | Load capacity                        | 10kgf [98N]                            | 15kgf [147N]                           | 20kgf [196N]                           | 25kgf [245N]                           |
|                                      | Moment stiffness                     | Pitch 0.09/yaw 0.07/roll 0.07 [°/N・cm] | Pitch 0.05/yaw 0.04/roll 0.03 [°/N・cm] | Pitch 0.04/yaw 0.04/roll 0.02 [°/N・cm] | Pitch 0.03/yaw 0.02/roll 0.02 [°/N・cm] |
|                                      | Lost motion                          | Within 1μm                             |                                        |                                        |                                        |
|                                      | Backlash                             | Within 0.5μm                           |                                        |                                        |                                        |
|                                      | Straightness                         | Within 1μm                             |                                        |                                        |                                        |
|                                      | Parallelism                          | Within 30μm                            |                                        |                                        |                                        |
|                                      | Motion parallelism                   |                                        | Within 10μm                            | Within 15μm                            |                                        |
| Pitching/Yawing                      |                                      | Within 20°/Within 15°                  |                                        |                                        |                                        |
| Sensor                               | Limit sensor                         | Installed                              |                                        |                                        |                                        |
|                                      | Origin sensor                        | Installed                              |                                        |                                        |                                        |
|                                      | Slit origin sensor                   | —                                      |                                        |                                        |                                        |
| Provided screw (Hexagon-headed bolt) |                                      | 4 of M4—8                              | 4 of M4—10                             |                                        | 4 of M6—10                             |

Dimensional outline drawings



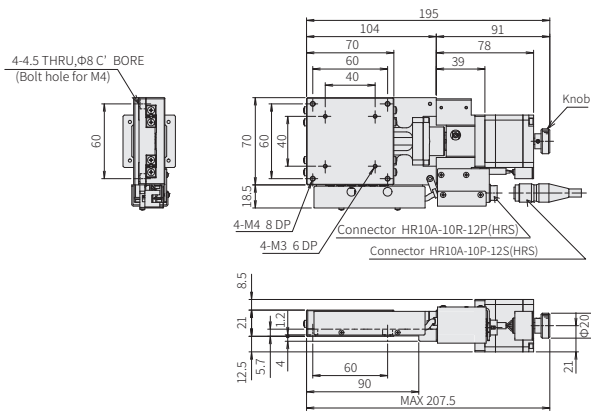
PART  
COMMUNITY

CAD  
DATA

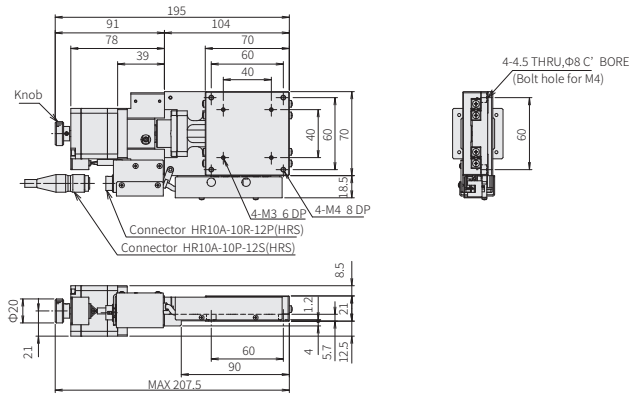
SURUGA  
SEIKI

CAD  
3D・2D

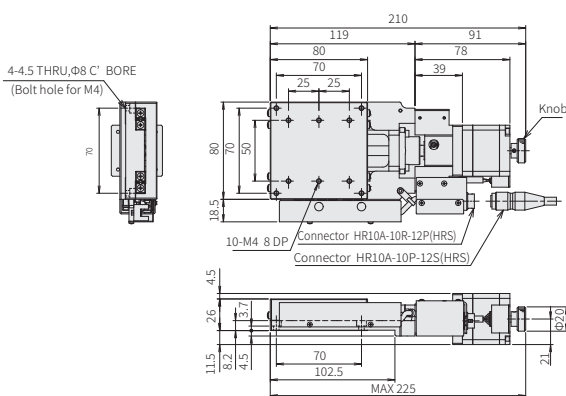
KX0725-LG



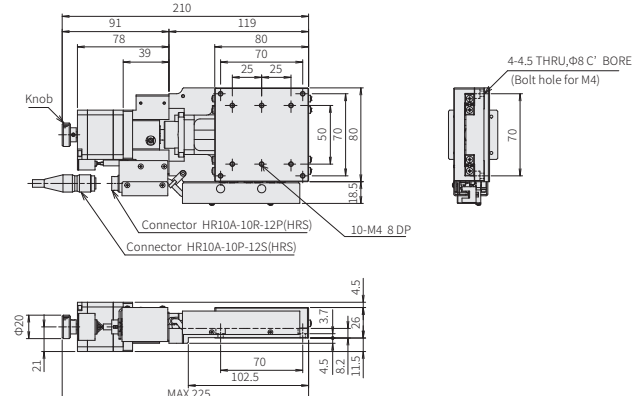
KX0725-RG



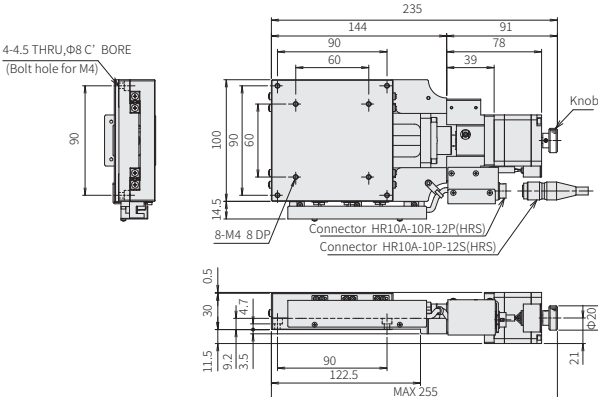
KX0830-LG



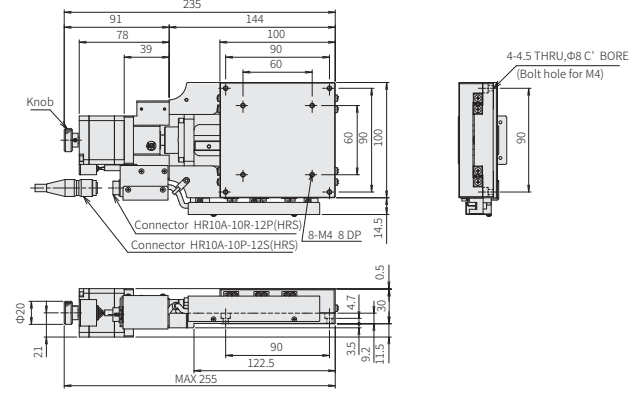
KX0830-RG



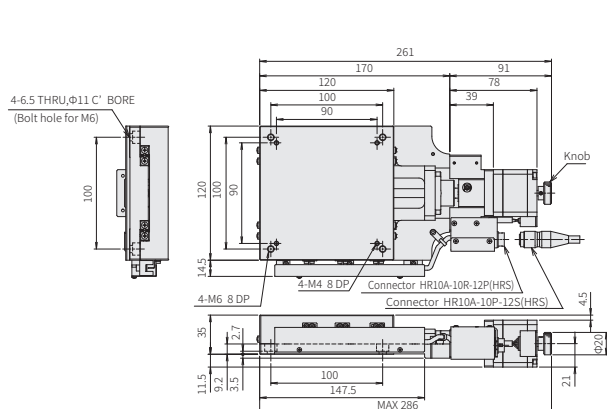
KX1040-LG



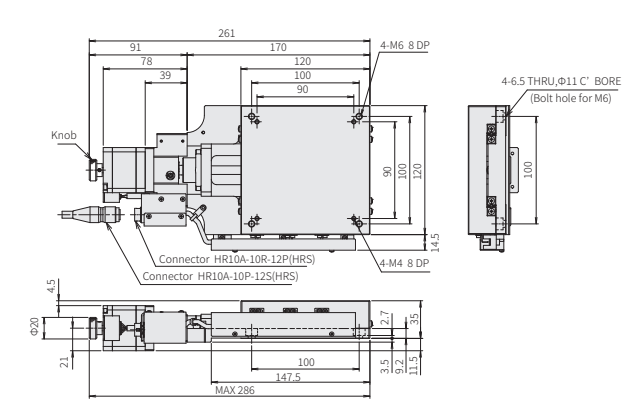
KX1040-RG



KX1250-LG



KX1250-RG



Motorized Stage

X

XY

Z

Horizontal  
Z

XYZ

Goniometer

Rotary

Unit

Controller

Linear  
Ball

CAVE-X  
Linear ball

Cross  
Roller

Slide  
Guide

☐ 40

☐ 50

☐ 60

☐ 70

☐ 80

☐ 100

☐ 120

☐ Other



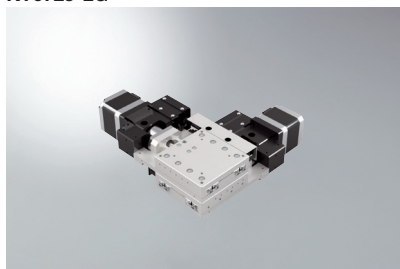
# Motorized Stage

## Thin Type XY-axis Cross Roller Guide: KY0725/KY0830/KY1040/KY1250

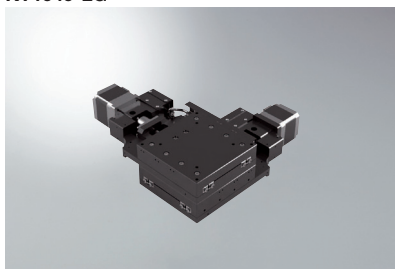
Motorized Stage

RoHS

KY0725-LG



KY1040-LG



X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Model Selection code Option code  
**K** **Y0725-LG** **5**  
1 2 3 4 5

Cable P.1-207~  
Electrical specification P.1-099~

### 1 Axis

|   |         |
|---|---------|
| Y | XY-axis |
|---|---------|

### 2 Table size

|    |                                |
|----|--------------------------------|
| 07 | <input type="checkbox"/> 70mm  |
| 08 | <input type="checkbox"/> 80mm  |
| 10 | <input type="checkbox"/> 100mm |
| 12 | <input type="checkbox"/> 120mm |

### 3 Travel length

|    |      |
|----|------|
| 25 | 25mm |
| 30 | 30mm |
| 40 | 40mm |
| 50 | 50mm |

\* Selectable only 0725, 0830, 1040, 1250 in combination with 2 and 3.

### 4 Sensor cover location specification

|   |               |
|---|---------------|
| L | L position    |
| R | Opposite hand |

### 5 Cable option

| Code  | Specification                          | Cable type |
|-------|----------------------------------------|------------|
| Blank | 2m                                     | D214-2-2E  |
| 1     | 2m One end loose                       | D214-2-2EK |
| 2     | 4m                                     | D214-2-4E  |
| 3     | 4m One end loose                       | D214-2-4EK |
| 4     | Only connector (Cable is not included) | —          |
| 5     | Cable is not included (Standard)       | —          |
| 6     | Robot cable 2m                         | D214-2-2R  |
| 7     | Robot cable 4m                         | D214-2-4R  |
| 8     | Robot cable 4m one end loose           | D214-2-4RK |
| 9     | Robot cable 2m one end loose           | D214-2-2RK |

\* One end loose position to only stage opposite side.  
\* If you choose the option specification, please add the difference to standard price.  
\* See page P.1-207, 209~ for more cable details.  
\* Please select "blank, 2, 6 and 7" when connect with stepping motor controller(DS102/112).

Linear Ball

CAVE-X  
Linear ball

Cross Roller

Slide Guide

☐ 40

☐ 50

☐ 60

☐ 70

☐ 80

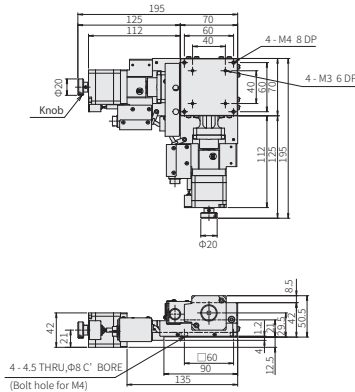
☐ 100

☐ 120

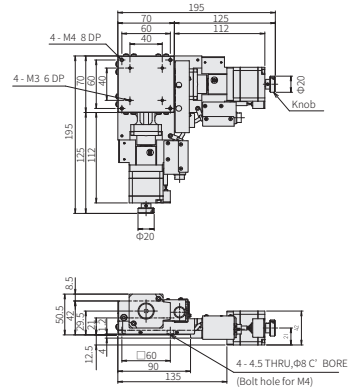
Other

Dimensional outline drawings

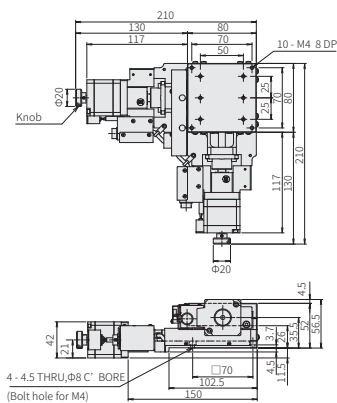
**KY0725-LG**



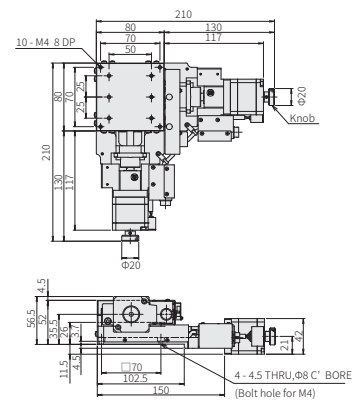
**KY0725-RG**



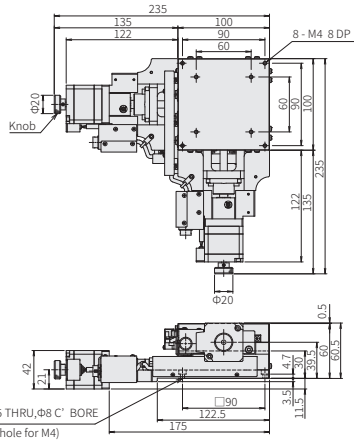
**KY0830-LG**



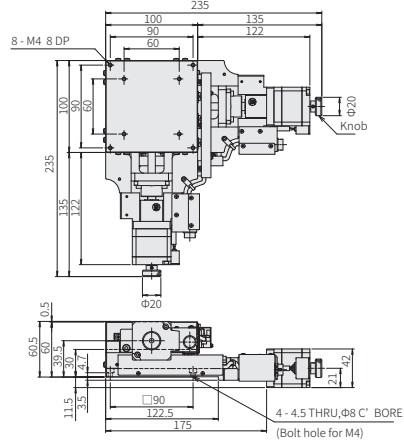
**KY0830-RG**



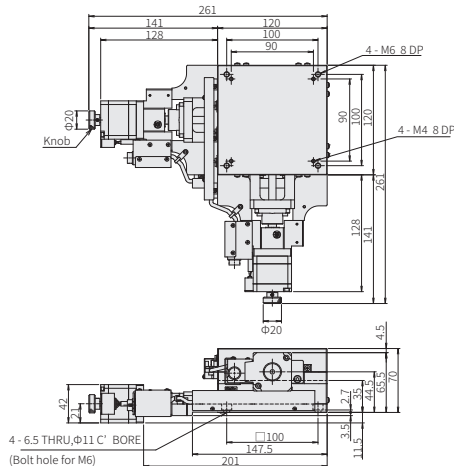
**KY1040-LG**



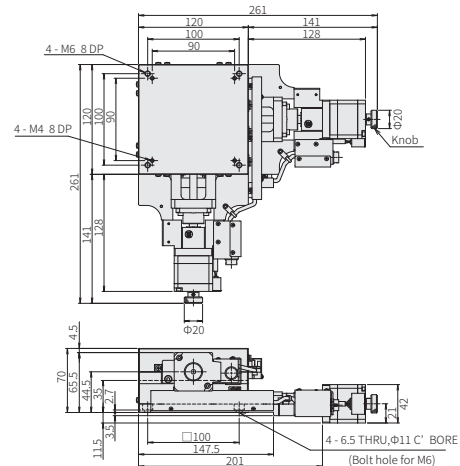
**KY1040-RG**



**KY1250-LG**



**KY1250-RG**



Motorized Stage

X

XY

Z

Horizontal  
Z

XYZ

Goniometer

Rotary

Unit

Controller

Linear  
Ball

CAVE-X  
Linear ball

Cross  
Roller

Slide  
Guide

□40

□50

□60

□70

□80

□100

□120

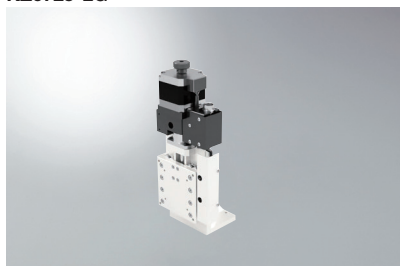
Other

## Thin Type Z-axis Cross Roller Guide: KZ0725/LG/KZ0830/KZ1040/KZ1250

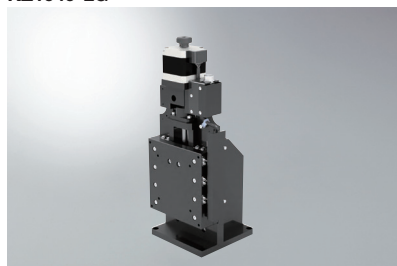
Motorized Stage

RoHS

KZ0725-LG



KZ1040-LG



X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Linear Ball

CAVE-X  
Linear ball

Cross Roller

Slide Guide

40

50

60

70

80

100

120

Other

Model Selection code Option code  
**K** **Z0725-LG** **5**

1

2

3

4

5

▶ Cable P.1-207~

▶ Electrical specification P.1-099~

### 1 Axis

Z Z-axis

### 2 Table size

|    |       |
|----|-------|
| 07 | 70mm  |
| 08 | 80mm  |
| 10 | 100mm |
| 12 | 120mm |

### 3 Travel length

|    |      |
|----|------|
| 25 | 25mm |
| 30 | 30mm |
| 40 | 40mm |
| 50 | 50mm |

\* Selectable only 0725, 0830, 1040, 1250 in combination with **2** and **3**.

### 4 Sensor cover location specification

|   |               |
|---|---------------|
| L | L position    |
| R | Opposite hand |

### 5 Cable option

| Code  | Specification                          | Cable type |
|-------|----------------------------------------|------------|
| Blank | 2m                                     | D214-2-2E  |
| 1     | 2m One end loose                       | D214-2-2EK |
| 2     | 4m                                     | D214-2-4E  |
| 3     | 4m One end loose                       | D214-2-4EK |
| 4     | Only connector (Cable is not included) | —          |
| 5     | Cable is not included (Standard)       | —          |
| 6     | Robot cable 2m                         | D214-2-2R  |
| 7     | Robot cable 4m                         | D214-2-4R  |
| 8     | Robot cable 4m one end loose           | D214-2-4RK |
| 9     | Robot cable 2m one end loose           | D214-2-2RK |

\* One end loose position to only stage opposite side.

\* If you choose the option specification, please add the difference to standard price.

\* See page P.1-207, 209~ for more cable details.

\* Please select "blank, 2, 6 and 7" when connect with stepping motor controller(DS102/112).

| SPEC                                 |                                      |                              |                                 |             |             |
|--------------------------------------|--------------------------------------|------------------------------|---------------------------------|-------------|-------------|
| Model                                |                                      | KZ0725-LG5                   | KZ0830-LG5                      | KZ1040-LG5  | KZ1250-LG5  |
| (Opposite hand)                      |                                      | KZ0725-RG5                   | KZ0830-RG5                      | KZ1040-RG5  | KZ1250-RG5  |
| Mechanical specification             | Travel length                        | 25mm                         | 30mm                            | 40mm        | 50mm        |
|                                      | Table size                           | 70×70mm                      | 80×80mm                         | 100×100mm   | 120×120mm   |
|                                      | Feed screw                           | Ball screwφ6 lead 1          | Ball screwφ8 lead 1             |             |             |
|                                      | Guide                                | Crossed roller guide         |                                 |             |             |
|                                      | Main materials-Finishing             | Aluminum—White almite finish | Aluminum—Black almite finishing |             |             |
| Accuracy specification               | Weight                               | 1.3kg                        | 1.5kg                           | 2.6kg       | 4.0kg       |
|                                      | Resolution (Pulse)                   | Full/Half<br>Microstep       | 1μm/0.5μm                       |             |             |
|                                      |                                      |                              | 0.05μm (1/20 on resolution)     |             |             |
|                                      | MAX speed                            | 10mm/sec                     |                                 |             |             |
|                                      | Load capacity (Excitation)           | 5kgf [49N]                   | 7.5kgf [73.5N]                  |             |             |
|                                      | Vertical degree                      | Within 20μm                  | Within 25μm                     | Within 30μm | Within 40μm |
|                                      | Pitching/Yawing                      | Within 20″/Within 15″        |                                 |             |             |
|                                      | Uni-directional positioning accuracy | Within 15μm                  |                                 |             |             |
|                                      | Repeatability positioning accuracy   | Within ±0.3μm                |                                 |             |             |
|                                      | Lost motion                          | Within 1μm                   |                                 |             |             |
| Straightness                         | Within 2μm                           |                              |                                 |             |             |
| Sensor                               | Limit sensor                         | Installed                    |                                 |             |             |
|                                      | Origin sensor                        | Installed                    |                                 |             |             |
|                                      | Slit origin sensor                   | -                            |                                 |             |             |
| Provided screw (Hexagon-headed bolt) |                                      | 4 of M3—12                   | 4 of M4—12                      | 4 of M4—10  | 4 of M6—12  |

Dimensional outline drawings



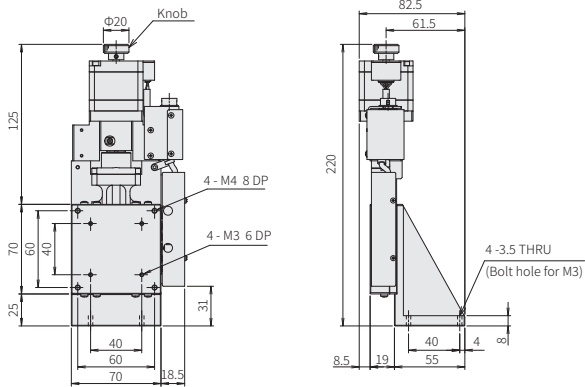
PART  
COMMUNITY

CAD  
DATA

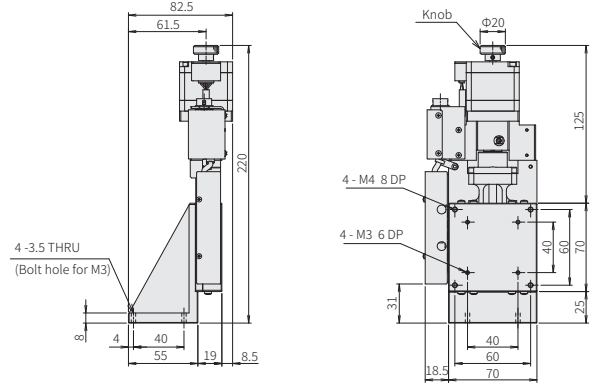
SURUGA  
SEIKI

CAD  
3D·2D

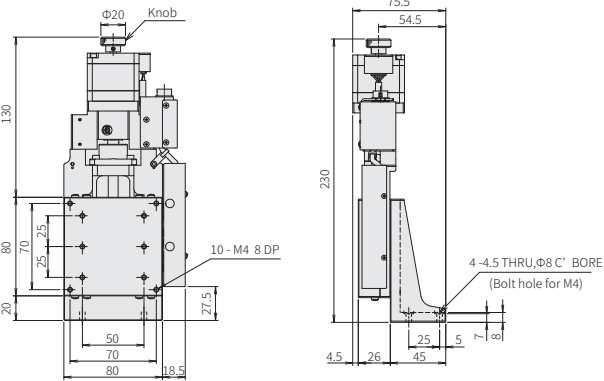
KZ0725-LG



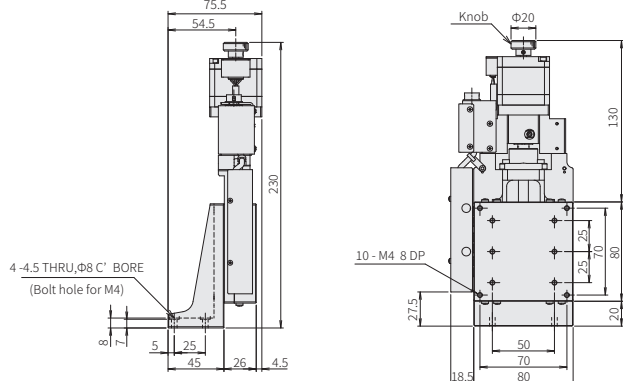
KZ0725-RG



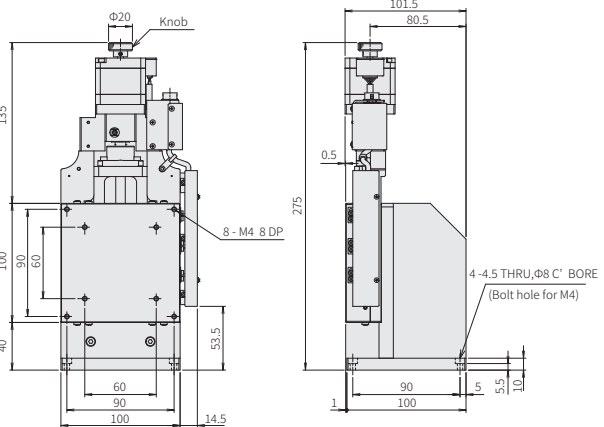
KZ0830-LG



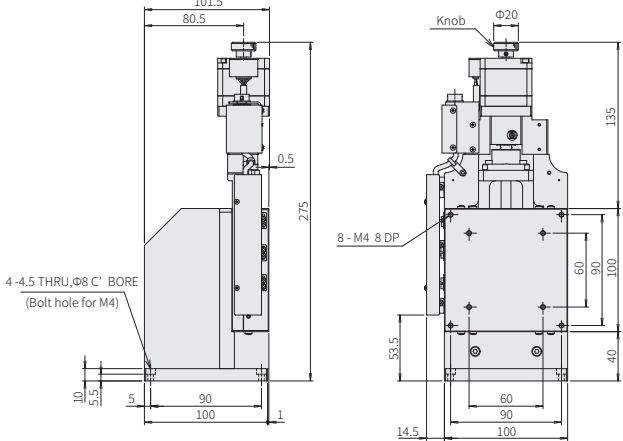
KZ0830-RG



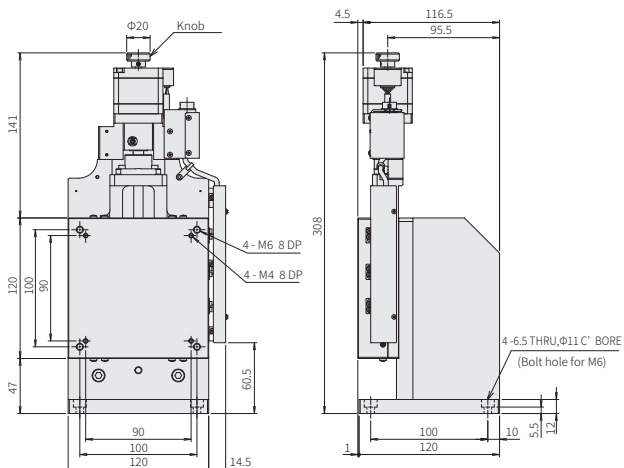
KZ1040-LG



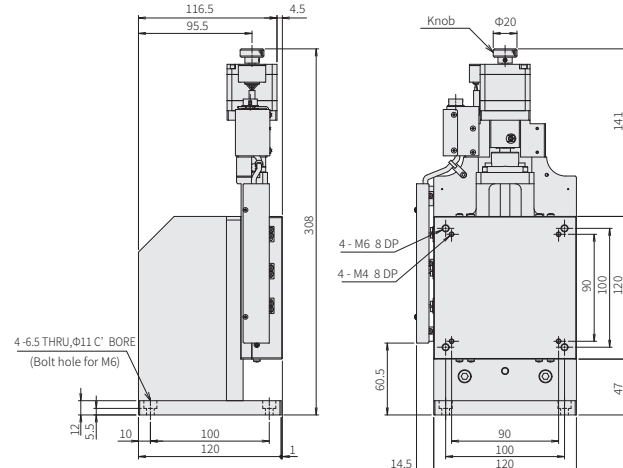
KZ1040-RG



KZ1250-LG



KZ1250-RG



Motorized Stage

X

XY

Z

Horizontal  
Z

XYZ

Goniometer

Rotary

Unit

Controller

Linear  
Ball

CAVE-X  
Linear ball

Cross  
Roller

Slide  
Guide

□40

□50

□60

□70

□80

□100

□120

Other

1  
098

## Electrical Specification: KX0725/KX0830/KX1040/KX1250

### Electrical specification

| Models    |                                         | KX0725                                                                                                                                                                         | KX0830 | KX1040 | KX1250 |
|-----------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------|--------|
| Motor(*1) | Type                                    | 5 phase stepping motor 0.75A/Phase(Oriental Motor Co., Ltd.)                                                                                                                   |        |        |        |
|           | Model (*2)                              | PK544PMB-C18(□ 42mm)                                                                                                                                                           |        |        |        |
|           | Step angle                              | 0.36°                                                                                                                                                                          |        |        |        |
| Connector | Model                                   | HR10A-10R-12P (73) (Hirose Electric Co., Ltd.)                                                                                                                                 |        |        |        |
|           | applicable connector on acceptance side | HR10A-10P-12S (73) (Hirose Electric Co., Ltd.)                                                                                                                                 |        |        |        |
| Sensor    | Limit sensor                            | Installed                                                                                                                                                                      |        |        |        |
|           | Origin sensor                           | Installed                                                                                                                                                                      |        |        |        |
|           | Slit origin sensor                      | —                                                                                                                                                                              |        |        |        |
|           | Model                                   | Micro Photoelectric Sensor PM-L25 (Panasonic Industrial Devices SUNX)                                                                                                          |        |        |        |
|           | Power voltage                           | DC5~24V ±10%                                                                                                                                                                   |        |        |        |
|           | Consumption current                     | Total 45mA or less (15mA or less per 1 sensor)                                                                                                                                 |        |        |        |
|           | Control output                          | NPN open collector output DC30V or less 50mA or less<br>Residual voltage 2V or less when the load current is 50mA<br>Residual voltage 1V or less when the load current is 16mA |        |        |        |
|           | Output logic (*)                        | On detection (light shield condition): Output transistor OFF (Non-continuity)                                                                                                  |        |        |        |

\*KX series, the origin sensor switchable output logic. (The output logic was set at the shipping)

Dip switch of logic swithing plate will be set as below.

The dip switch 1 and 2 is used for logic setting of origin sensor ORG1.

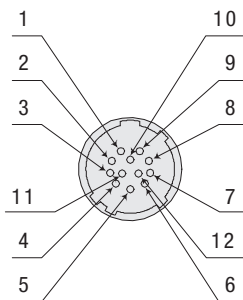
{ On detection (light shield condition): Output transistor OFF (Non-continuity): 1=ON,2=OFF  
On detection (light shield condition): Output transistor ON (Continuity): 1=OFF,2=ON

\*1 See page P.1-213~ for details of single motor specification

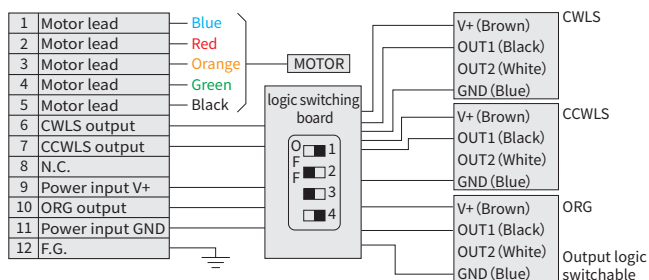
\*2 Motor model is our own management model.

\* The electric specification of XY, Z are the same.

### Pin allocation

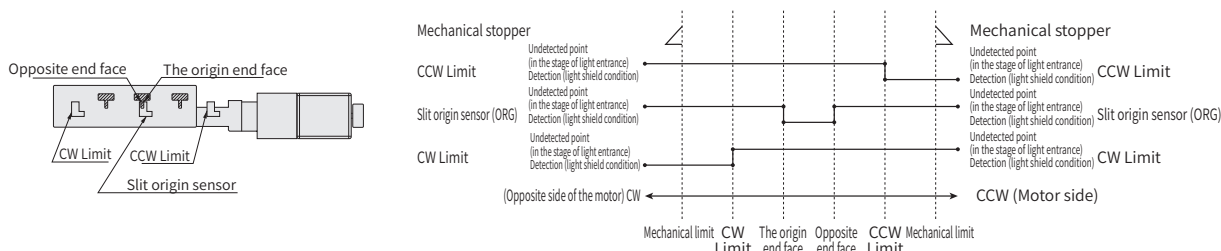


### Connection diagram



\* Dip switch number 3 and 4 are not used.

## Timing chart



| Unit [mm]     | Direction of CW | Reference coordinate | Mechanical limit | CW Limit | Origin | Opposite end face | CCW Limit | Mechanical limit | Direction of CCW |
|---------------|-----------------|----------------------|------------------|----------|--------|-------------------|-----------|------------------|------------------|
| <b>KX0725</b> |                 | Return to origin     | 15               | 13.3     | 0      | 2                 | 13.3      | 15               |                  |
| <b>KX0830</b> |                 | Return to origin     | 17.5             | 15.8     | 0      | 2                 | 15.8      | 17.5             |                  |
| <b>KX1040</b> |                 | Return to origin     | 22.5             | 20.8     | 0      | 2                 | 20.8      | 22.5             |                  |
| <b>KX1250</b> |                 | Return to origin     | 27.5             | 25.8     | 0      | 2                 | 25.8      | 27.5             |                  |

\*Return to origin means that is performed return to origin Type 4 using DS102/DS112 series.

\* The coordinate value should be on the design. Dimension error may occur about plus or minus 0.5 mm.

## Method for return to origin

Suruga's motorized stages is different from the sensor specifications depends on models. As return to origin operation is divided into types, it is necessary to choose the correct type. Selected wrong type may be operated incorrectly. Choose your best one whatever you need according to be recommended as below.

■ **KX0725/KX0830/KX1040/KX1250 recommended return to origin** ▶ **Return to origin sequence P.1-201~**

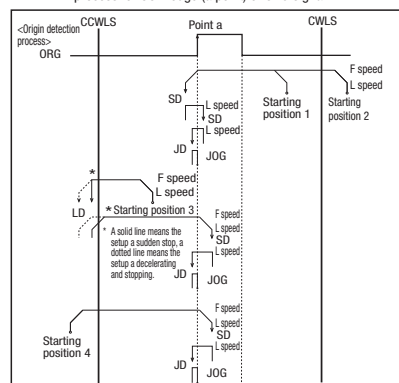
Type 3: Detect in the direction of CCW and perform detected process for CCW edge of ORG signal.

Type 4: Detect in the direction of CW and perform detected process for CW edge of ORG signal.

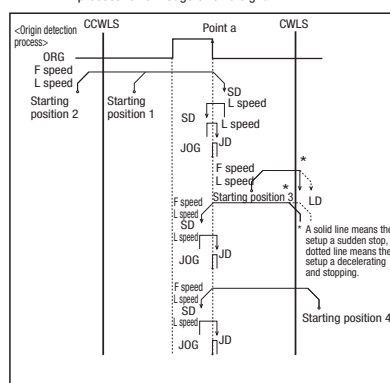
Type 9: After finished Type3, perform detected process for CCW edge of TIMING signal.

Type 10: After finished Type4, perform detected process for CW edge of TIMING signal.

**[Type3]** Detect in the direction of CCW and perform detected process for CCW edge (a point) of ORG signal.



**[Type4]** Detect in the direction of CW and perform detected process for CW edge of ORG signal.



## Adaptive driver

■ **Driver** ▶ P.1-205~

DC24V type input

| Model     | CVD507-K-A9        | CRD5107P           |
|-----------|--------------------|--------------------|
| Divisions | 1~1/250 (16 steps) | 1~1/250 (16 steps) |

## Adaptive stepping motor controller

■ **Controller** ▶ P.1-197~

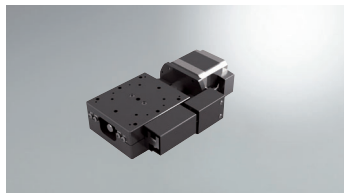
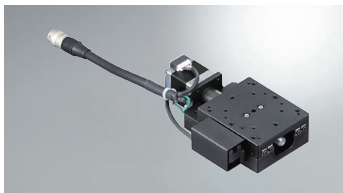
| Input power | General-purpose input/output port | Driver type |                    |
|-------------|-----------------------------------|-------------|--------------------|
|             |                                   | Full/Half   | 1~1/250 (16 steps) |
| AC100-240V  | Without                           | DS102ANR    | DS102AMS           |
|             | With                              | DS102ANR-IO | DS102AMS-IO        |
| DC24V       | Without                           | DS112ANR    | DS112AMS           |
|             | With                              | DS112ANR-IO | DS112AMS-IO        |



DS112/102



## RoHS



Model Selection code Option code

**KS** **101-30L** **□-5**

1 2 3 4 5

- ▶ Cable P.1-207~
- ▶ Electrical specification P.1-107~

|   |        |
|---|--------|
| 1 | X-axis |
|---|--------|

|    |        |
|----|--------|
| 2  | Travel |
| 30 | 30mm   |

|    |      |
|----|------|
| 30 | 30mm |
|----|------|

| Code | Specification |
|------|---------------|
| L    | L position    |
| R    | Opposite hand |

| Code | Specification |
|------|---------------|
| L    | L position    |
| R    | Opposite hand |

| Code | Specification                                  |
|------|------------------------------------------------|
| C    | Standard                                       |
| G    | High resolution                                |
| PA   | <input type="checkbox"/> 28 $\alpha$ step (DC) |
| QA   | <input type="checkbox"/> 42 $\alpha$ step (AC) |

| Code | Specification                                  |
|------|------------------------------------------------|
| C    | Standard                                       |
| G    | High resolution                                |
| PA   | <input type="checkbox"/> 28 $\alpha$ step (DC) |
| QA   | <input type="checkbox"/> 42 $\alpha$ step (AC) |

\* Must be choosen the cable from 2A~5B for PA and QA.

| Code  | Specification                          | Cable type |
|-------|----------------------------------------|------------|
| Blank | 2m                                     | D214-2-2E  |
| 1     | 2m One end loose                       | D214-2-2E  |
| 2     | 4m                                     | D214-2-4E  |
| 3     | 4m One end loose                       | D214-2-4E  |
| 4     | Only connector (Cable is not included) | —          |
| 5     | Cable is not included (Standard)       | —          |
| 6     | Robot cable 2m                         | D214-2-2R  |
| 7     | Robot cable 4m                         | D214-2-4R  |
| 8     | Robot cable 4m one end loose           | D214-2-4R  |
| 9     | Robot cable 2m one end loose           | D214-2-2R  |
| 2A    | 2m ( $\alpha$ step)                    | —          |
| 5A    | 5m ( $\alpha$ step)                    | —          |
| 2R    | Robot cable 2m ( $\alpha$ step)        | —          |
| 5R    | Robot cable 5m ( $\alpha$ step)        | —          |

| Code  | Specification                          | Cable type |
|-------|----------------------------------------|------------|
| Blank | 2m                                     | D214-2-2E  |
| 1     | 2m One end loose                       | D214-2-2E  |
| 2     | 4m                                     | D214-2-4E  |
| 3     | 4m One end loose                       | D214-2-4E  |
| 4     | Only connector (Cable is not included) | —          |
| 5     | Cable is not included (Standard)       | —          |
| 6     | Robot cable 2m                         | D214-2-2R  |
| 7     | Robot cable 4m                         | D214-2-4R  |
| 8     | Robot cable 4m one end loose           | D214-2-4R  |
| 9     | Robot cable 2m one end loose           | D214-2-2R  |
| 2A    | 2m ( $\alpha$ step)                    | —          |
| 5A    | 5m ( $\alpha$ step)                    | —          |
| 2R    | Robot cable 2m ( $\alpha$ step)        | —          |
| 5R    | Robot cable 5m ( $\alpha$ step)        | —          |

- \* One end loose position to only stage opposite side.
- \* If you choose the option specification, please add the difference to standard price.
- \* See page  P.1-207, 209~ for more cable details.
- \* Please select "blank, 2, 6 and 7" when connect with stepping motor controller(DS102/112).

| SPEC                                 |                                      |              |                                          |                             |                      |
|--------------------------------------|--------------------------------------|--------------|------------------------------------------|-----------------------------|----------------------|
| Model                                |                                      | KS101-30LC-5 | KS101-30LG-5                             | KS101-30LPA                 | KS101-30LQA          |
| (Opposite hand)                      |                                      | KS101-30RC-5 | KS101-30RG-5                             | KS101-30RPA                 | KS101-30RQA          |
| Mechanical specification             | Travel length                        |              | 30mm                                     |                             |                      |
|                                      | Table size                           |              | 60×70mm                                  |                             |                      |
|                                      | Feed screw                           |              | Ball screwφ8 lead 1                      |                             |                      |
|                                      | Guide                                |              | Crossed roller guide                     |                             |                      |
|                                      | Main materials-Finishing             |              | Aluminum—Black almite finishing          |                             |                      |
| Weight                               |                                      | 0.56kg       | 0.74kg                                   | 0.61kg                      | 0.96kg               |
| Accuracy specification               | Resolution (Pulse)                   | Full/Half    | 2μm/1μm                                  | 1μm/0.5μm                   | 1μm (Set to 1000P/R) |
|                                      |                                      | Microstep    | —                                        | 0.05μm (1/20 on resolution) | —                    |
|                                      | MAX speed                            |              | 20mm/sec                                 | 10mm/sec                    | 20mm/sec             |
|                                      | Uni-directional positioning accuracy |              | Within 5μm                               |                             |                      |
|                                      | Repeatability positioning accuracy   |              | Within ±0.3μm                            |                             |                      |
|                                      | Load capacity                        |              | 5.0kgf [49N]                             |                             |                      |
|                                      | Moment stiffness                     |              | Pitch 0.15°/yaw 0.08°/roll 0.07 [°/N・cm] |                             |                      |
|                                      | Lost motion                          |              | Within 1μm                               |                             |                      |
|                                      | Backlash                             |              | Within 0.5μm                             |                             |                      |
|                                      | Straightness                         |              | Within 3μm                               |                             |                      |
|                                      | Parallelism                          |              | Within 30μm                              |                             |                      |
|                                      | Motion parallelism                   |              | Within 10μm                              |                             |                      |
|                                      | Pitching/Yawing                      |              | Within 25°/Within 20°                    |                             |                      |
| Sensor                               | Limit sensor                         |              | Installed                                |                             |                      |
|                                      | Origin sensor                        |              | Installed                                |                             |                      |
|                                      | Slit origin sensor                   |              | —                                        |                             |                      |
| Provided screw (Hexagon-headed bolt) |                                      | 4 of M4—16   |                                          |                             |                      |

\* The price includes a driver for  $\alpha$  step. Motor cable sold separately. Please order from cable option 2A, 5A, 2R and 5R. Sensor cable attached only receiving connector. See page P.1-107~.

\* The controller for  $\alpha$  step drive is not supplied.

# Dimensional outline drawings



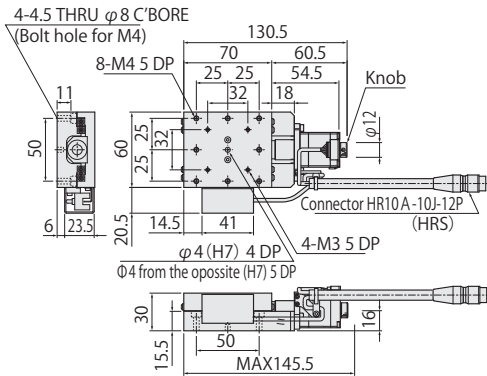
CAD COMMUNITY

CAD DATA

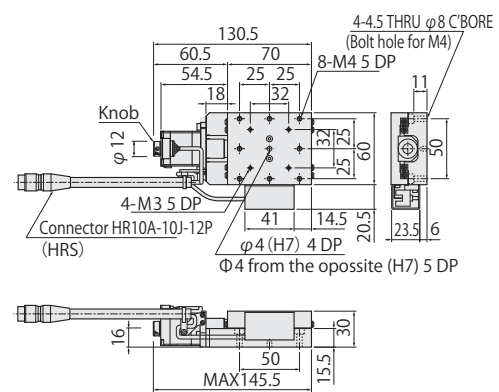
SURUGA SEIKI

CAD 3D·2D

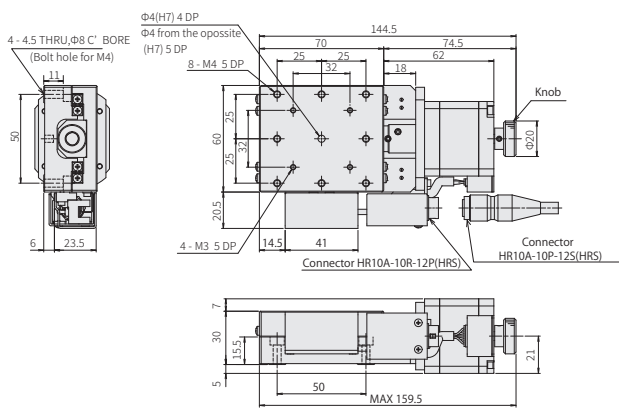
## KS101-30LC



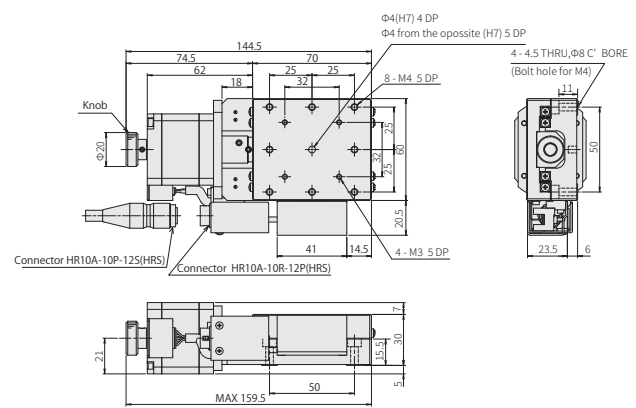
## KS101-30RC



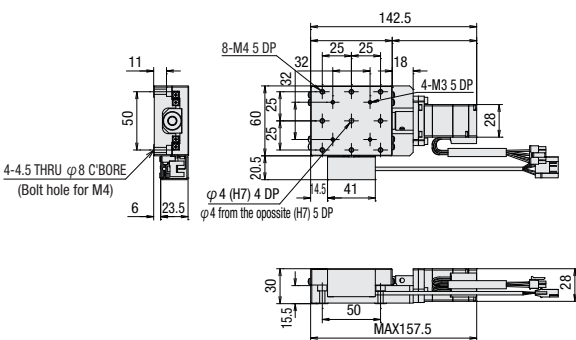
## KS101-30LG



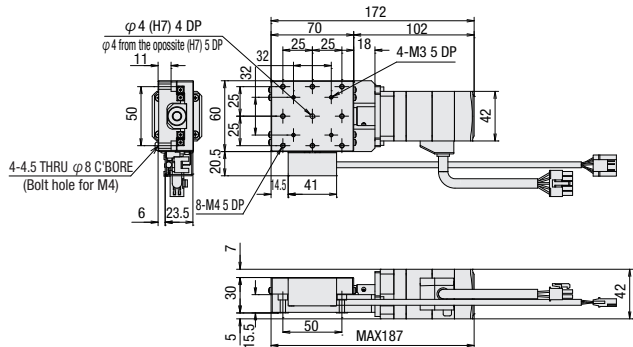
## KS101-30RG



## KS101-30LPA



## KS101-30LQA



Motorized Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Linear Ball

CAVE-X Linear ball

Cross Roller

Slide Guide

□40

□50

□60

□70

□80

□100

□120

Other

1

102

## XY-axis Cross Roller Guide: KS201-30

RoHS

KS201-30LC



KS201-30LG



KS201-30RC



KS201-30RG



Model Selection code Option code  
**KS 201-30L** **5**

● Cable P.1-207~  
 ● Electrical specification P.1-107~

### 1 Axis

|   |         |
|---|---------|
| 2 | XY-axis |
|---|---------|

### 2 Travel

|    |      |
|----|------|
| 30 | 30mm |
|----|------|

### 3 Sensor cover location specification

| Code | Specification |
|------|---------------|
| L    | L position    |
| R    | Opposite hand |

### 4 Motor option

| C | Standard        |
|---|-----------------|
| G | High resolution |

### 5 Cable option

| Code  | Specification                          | Cable type |
|-------|----------------------------------------|------------|
| Blank | 2m                                     | D214-2-2E  |
| 1     | 2m One end loose                       | D214-2-2EK |
| 2     | 4m                                     | D214-2-4E  |
| 3     | 4m One end loose                       | D214-2-4EK |
| 4     | Only connector (Cable is not included) | —          |
| 5     | Cable is not included (Standard)       | —          |
| 6     | Robot cable 2m                         | D214-2-2R  |
| 7     | Robot cable 4m                         | D214-2-4R  |
| 8     | Robot cable 4m one end loose           | D214-2-4RK |
| 9     | Robot cable 2m one end loose           | D214-2-2RK |

\* One end loose position to only stage opposite side.  
 \* If you choose the option specification, please add the difference to standard price.  
 \* See page P.1-207, 209~ for more cable details.  
 \* Please select "blank, 2, 6 and 7" when connect with stepping motor controller(DS102/112).

### SPEC

| Model                              |                                      |                     | KS201-30LC-5                    | KS201-30LG-5 |
|------------------------------------|--------------------------------------|---------------------|---------------------------------|--------------|
| (Opposite hand)                    |                                      |                     | KS201-30RC-5                    | KS201-30RG-5 |
| Mechanical specification           | Travel length                        |                     | 30mm                            |              |
|                                    | Table size                           |                     | 60×70mm                         |              |
|                                    | Feed screw                           |                     | Ball screwφ8 lead 1             |              |
|                                    | Guide                                |                     | Crossed roller guide            |              |
|                                    | Main materials-Finishing             |                     | Aluminum—Black almite finishing |              |
| Accuracy specification             | Weight                               |                     | 1.12kg                          | 1.52kg       |
|                                    | Resolution (Pulse)                   | Full/Half Microstep | 2μm/1μm                         | 1μm/0.5μm    |
|                                    | MAX speed                            |                     | 20mm/sec                        | 10mm/sec     |
|                                    | Load capacity                        |                     | 4.5kgf [44.1N]                  |              |
|                                    | Perpendicularity                     |                     | Within 15μm/Full stroke         |              |
| Sensor                             | Pitching/Yawing                      |                     | Within 25°/Within 20°           |              |
|                                    | Limit sensor                         |                     | Installed                       |              |
|                                    | Origin sensor                        |                     | Installed                       |              |
|                                    | Slit origin sensor                   |                     | —                               |              |
|                                    | Provided screw (Hexagon-headed bolt) |                     | 4 of M4—16                      |              |
| Single axis accuracy specification | Uni-directional positioning accuracy |                     | Within 5μm                      |              |
|                                    | Repeatability positioning accuracy   |                     | Within ±0.3μm                   |              |
|                                    | Lost motion                          |                     | Within 1μm                      |              |
|                                    | Backlash                             |                     | Within 0.5μm                    |              |
|                                    | Straightness                         |                     | Within 3μm                      |              |

Motorized Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Linear Ball

CAVE-X Linear ball

Cross Roller

Slide Guide

40

50

60

70

80

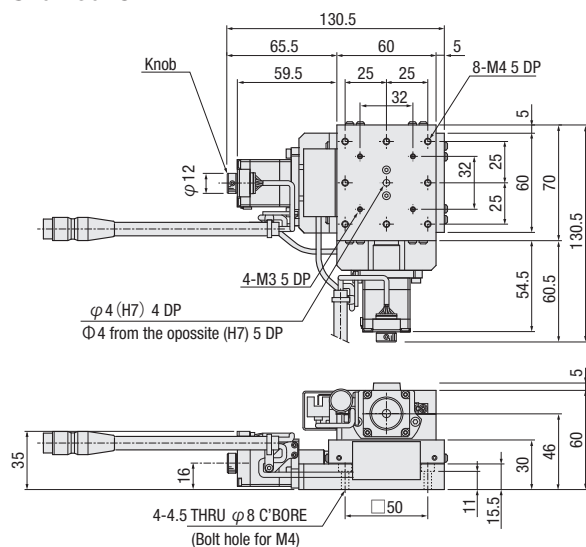
100

120

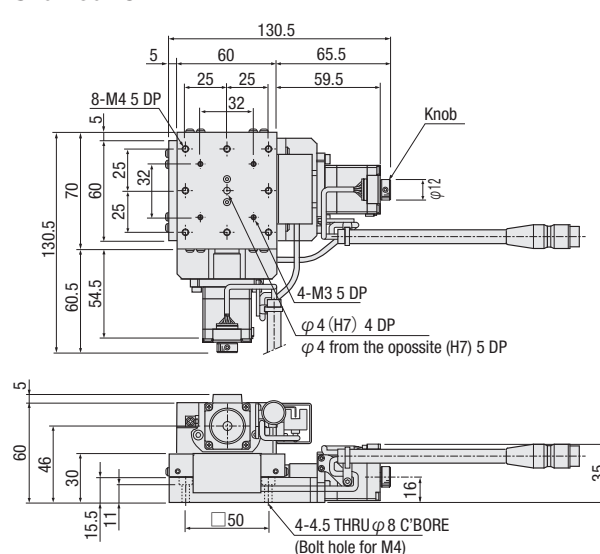
Other

Dimensional outline drawings

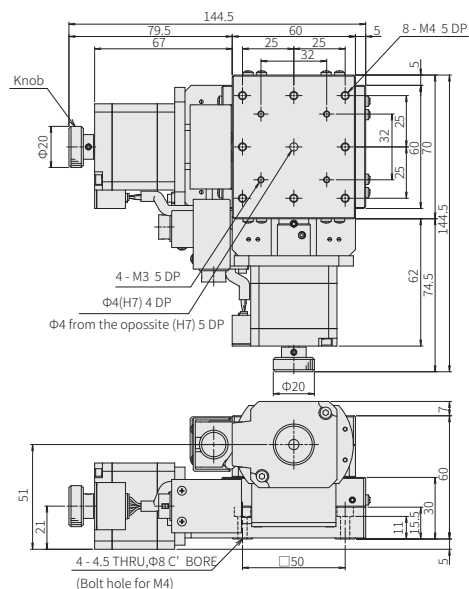
**KS201-30LC**



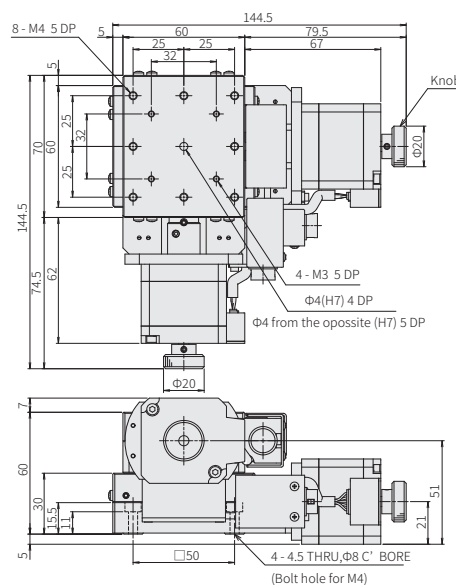
**KS201-30RC**



**KS201-30LG**



**KS201-30RG**



Motorized Stage

X

XY

Z

Horizontal  
Z

XYZ

Goniometer

Rotary

Unit

Controller

Linear  
Ball

CAVE-X  
Linear ball

Cross  
Roller

Slide  
Guide

□40

□50

□60

□70

□80

□100

□120

Other

1

104

## Z-axis Cross Roller Guide: KS301-30

RoHS

KS301-30LC



KS301-30LG



KS301-30RC



KS301-30RG



Model Selection code Option code  
**KS 301-30L**    - **5**

► Cable P.1-207~  
 ► Electrical specification P.1-107~

### 1 Axis

|   |        |
|---|--------|
| 3 | Z-axis |
|---|--------|

### 2 Travel

|    |      |
|----|------|
| 30 | 30mm |
|----|------|

### 3 Sensor cover location specification

| Code | Specification |
|------|---------------|
| L    | L position    |
| R    | Opposite hand |

### 4 Motor option

|   |                 |
|---|-----------------|
| C | Standard        |
| G | High resolution |

### 5 Cable option

| Code  | Specification                          | Cable type |
|-------|----------------------------------------|------------|
| Blank | 2m                                     | D214-2-2E  |
| 1     | 2m One end loose                       | D214-2-2EK |
| 2     | 4m                                     | D214-2-4E  |
| 3     | 4m One end loose                       | D214-2-4EK |
| 4     | Only connector (Cable is not included) | —          |
| 5     | Cable is not included (Standard)       | —          |
| 6     | Robot cable 2m                         | D214-2-2R  |
| 7     | Robot cable 4m                         | D214-2-4R  |
| 8     | Robot cable 4m one end loose           | D214-2-4RK |
| 9     | Robot cable 2m one end loose           | D214-2-2RK |

\* One end loose position to only stage opposite side.  
 \* If you choose the option specification, please add the difference to standard price.  
 \* See page P.1-207, 209~ for more cable details.  
 \* Please select "blank, 2, 6 and 7" when connect with stepping motor controller(DS102/112).

| SPEC                                 |                                      |               |                                          |
|--------------------------------------|--------------------------------------|---------------|------------------------------------------|
| Model                                | KS301-30LC-5<br>KS301-30RC-5         |               | KS301-30LG-5<br>KS301-30RG-5             |
| (Opposite hand)                      |                                      |               |                                          |
| Travel length                        | 30mm                                 |               |                                          |
| Table size                           | 60×70mm                              |               |                                          |
| Feed screw                           | Ball screwφ8 lead 1                  |               |                                          |
| Guide                                | Crossed roller guide                 |               |                                          |
| Main materials-Finishing             | Aluminum—Black almite finishing      |               |                                          |
| Weight                               | 0.89kg                               |               | 1.09kg                                   |
| Resolution (Pulse)                   | Full/Half<br>Microstep               | 2μm/1μm<br>—  | 1μm/0.5μm<br>0.05μm (1/20 on resolution) |
| MAX speed                            | 20mm/sec                             |               | 10mm/sec                                 |
| Load capacity (Excitation)           | 3.0kgf [29.4N]                       |               |                                          |
| Vertical degree                      | Within 15μm/Full stroke              |               |                                          |
| Pitching/Yawing                      | Within 25"/Within 20"                |               |                                          |
| Limit sensor                         | Installed                            |               |                                          |
| Origin sensor                        | Installed                            |               |                                          |
| Slit origin sensor                   | —                                    |               |                                          |
| Provided screw (Hexagon-headed bolt) | 4 of M4—10                           |               |                                          |
| Single axis accuracy specification   | Uni-directional positioning accuracy | Within 5μm    |                                          |
|                                      | Repeatability positioning accuracy   | Within ±0.3μm |                                          |
|                                      | Lost motion                          | Within 1μm    |                                          |
|                                      | Backlash                             | Within 0.5μm  |                                          |
|                                      | Straightness                         | Within 3μm    |                                          |

Motorized Stage

X

XY

Z

Horizontal  
Z

XYZ

Goniometer

Rotary

Unit

Controller

Linear  
Ball

CAVE-X  
Linear ball

Cross  
Roller

Slide  
Guide

40

50

60

70

80

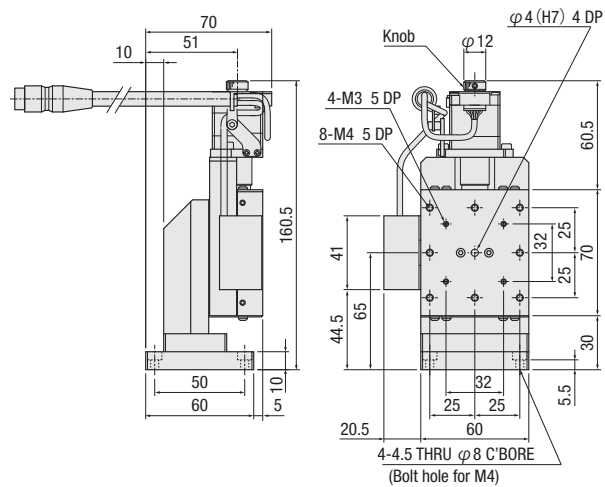
100

120

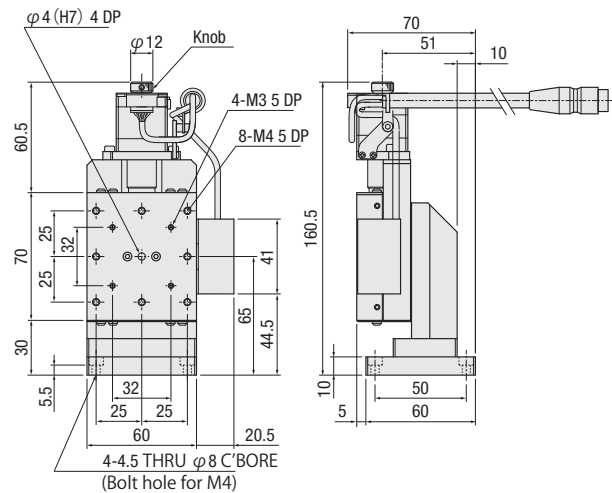
Other

Dimensional outline drawings

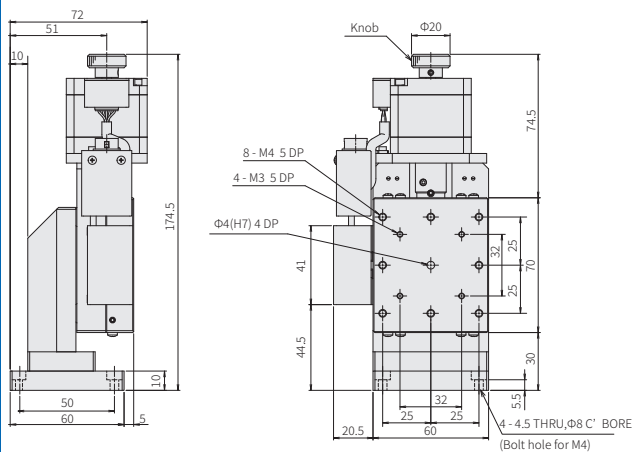
**KS301-30LC**



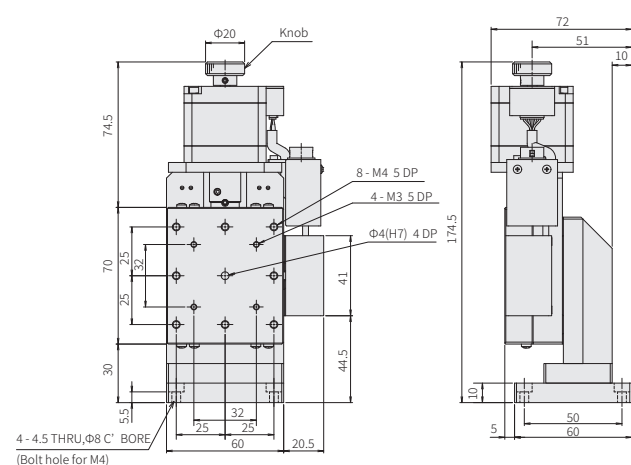
**KS301-30RC**



**KS301-30LG**



**KS301-30RG**



Motorized Stage

X

XY

Z

Horizontal  
Z

XYZ

Goniometer

Rotary

Unit

Controller

Linear  
Ball

CAVE-X  
Linear ball

Cross  
Roller

Slide  
Guide

☐ 40

☐ 50

☐ 60

☐ 70

☐ 80

☐ 100

☐ 120

Other

1

106



## Electrical Specification: KS101-30

## Electrical specification

| Models     |                                         | KS101-30LC<br>KS101-30RC                                                                                                                                                      | KS101-30LG<br>KS101-30RG | KS101-30LPA<br>KS101-30RPA              | KS101-30LQA<br>KS101-30RQA |
|------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------------------|----------------------------|
| Motor (*1) | Type                                    | 5 phase stepping motor 0.75A/Phase (Oriental Motor Co., Ltd.)                                                                                                                 |                          | α step motor (Oriental Motor Co., Ltd.) |                            |
|            | Model (*2)                              | C005C-90215P-1 (□28mm)                                                                                                                                                        | PK544PMB-C18 (□42mm)     | ARM24SAK (□28mm)                        | ARM46AC (□42mm)            |
|            | Step angle                              | 0.72°                                                                                                                                                                         | 0.36°                    | 0.36° (Set to 1000P/R)                  |                            |
|            | Driver type                             |  P.1-205～                                                                                    |                          | ARD-K                                   | ARD-A                      |
| Connector  | Model                                   | HR10A-10J-12P (73)                                                                                                                                                            | HR10A-10R-12P (73)       | 172211-6 (Tyco Electronics Japan G.K. ) |                            |
|            | applicable connector on acceptance side | HR10A-10P-12S (73) (Hirose Electric Co., Ltd.)                                                                                                                                |                          | 171822-6 (Tyco Electronics Japan G.K. ) |                            |
|            | Contact type                            | —                                                                                                                                                                             |                          | 170430-1 (Tyco Electronics Japan G.K. ) |                            |
|            | Cmpatible receiving contact             | —                                                                                                                                                                             |                          | 170205-1 (Tyco Electronics Japan G.K. ) |                            |
| Sensor     | Limit sensor                            | Installed                                                                                                                                                                     |                          |                                         |                            |
|            | Origin sensor                           | Installed                                                                                                                                                                     |                          |                                         |                            |
|            | Slit origin sensor                      | —                                                                                                                                                                             |                          |                                         |                            |
|            | Model                                   | Micro Photo Sensor PM-□25 (Panasonic Industrial Devices SUNX)                                                                                                                 |                          |                                         |                            |
|            | Power voltage                           | DC5～24V or less ±10%                                                                                                                                                          |                          |                                         |                            |
|            | Consumption current                     | Total 45mA or less (15mA or less per 1 sensor)                                                                                                                                |                          |                                         |                            |
|            | Control output                          | NPN open collector output DC30V or less50mA or less<br>Residual voltage 2V or less when the load current is 50mA<br>Residual voltage 1V or less when the load current is 16mA |                          |                                         |                            |
|            | Output logic                            | On detection (light shield condition): Output transistor OFF (Non-continuity)                                                                                                 |                          |                                         |                            |

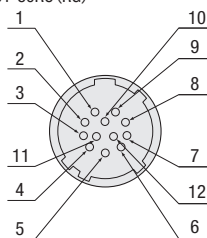
\*1 See page P.1-213~ for details of single motor specification

\*2 Model is our own management model.

\* The electric specification of XY, Z are the same.

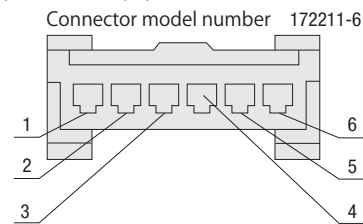
## Pin allocation

KS101-30LC (LG) /KS101-30RC (RG)



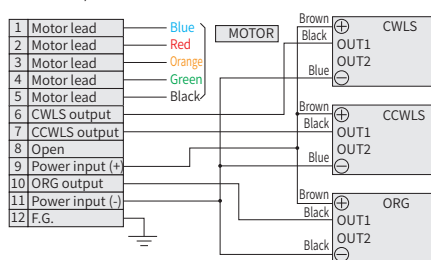
## Pin allocation (sensor)

KS101-30LPA (QA) /KS101-30RPA (QA)



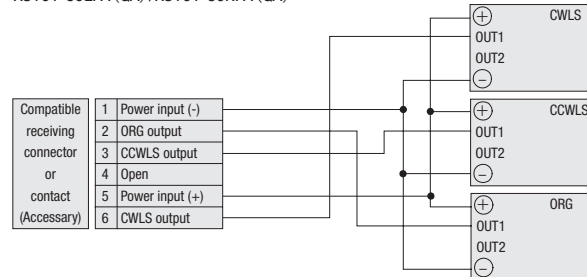
## Connection diagram

KS101-30LC (LG) /KS101-30RC (RG)

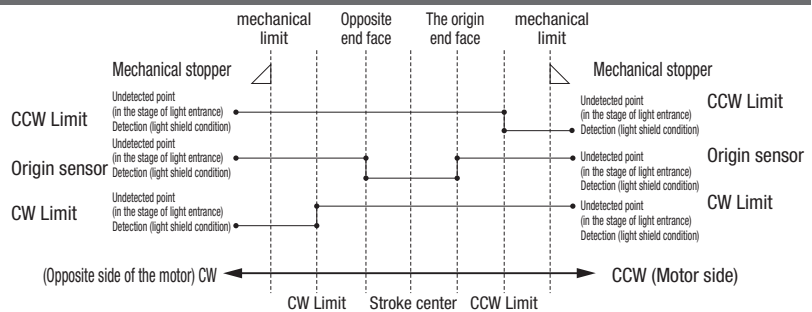
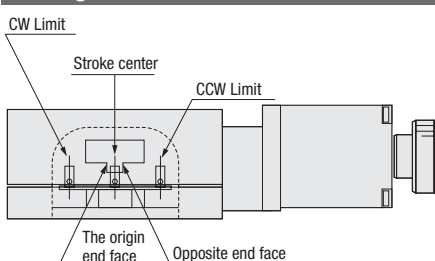


## Connection diagram (sensor)

KS101-30LPA (QA) /KS101-30RPA (QA)



## Timing chart



| Unit [mm] | Direction of CW      |                  |          | Direction of CCW  |               |                     |           |                  |
|-----------|----------------------|------------------|----------|-------------------|---------------|---------------------|-----------|------------------|
|           | Reference coordinate | Mechanical limit | CW Limit | Opposite end face | Stroke center | The origin end face | CCW Limit | Mechanical limit |
| KS101-30  | Return to origin     | 18.5             | 17.5     | 4                 | 2             | 0                   | 13.5      | 14.5             |
|           | Stroke center        | 16.5             | 15.5     | 2                 | 0             | 2                   | 15.5      | 16.5             |

\*Return to origin means that is performed return to origin Type 3 using DS102/DS112 series.

\* The coordinate value should be on the design. Dimension error may occur about plus or minus 0.5 mm.

Note: The timing chart shows only timing of sensor, it is not for output signal logic.

Refer to ON/OFF display of output transistor that shows on electrical specifications-sensor-output logic for output signal logic.

## Method for return to origin

Suruga's motorized stages is different from the sensor specifications depends on models. As return to origin operation is divided into types, it is necessary to choose the correct type. Selected wrong type may be operated uncorrectly.

Choose your best one whatever you need according to be recommended as below.

### ■KS101-30 series recommended return to origin ▶ Return to origin sequence P.1-201~

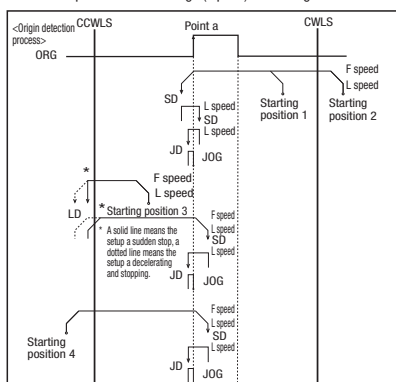
Type 3: Detect in the direction of CCW and perform detected process for CCW edge(a point) of ORG signal.

Type 4: Detect in the direction of CW and perform detected process for CW edge of ORG signal.

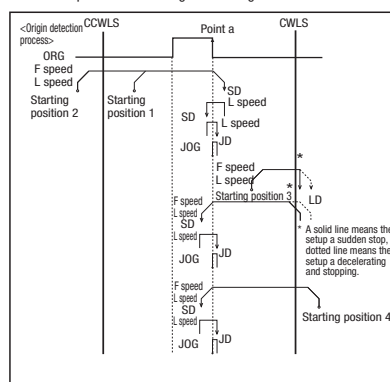
Type 9: After finished Type3, perform detected process for CCW edge of TIMING signal.

Type 10: After finished Type4, perform detected process for CW edge of TIMING signal.

**[Type3]** Detect in the direction of CCW and perform detected process for CCW edge (a point) of ORG signal.



**[Type4]** Detect in the direction of CW and perform detected process for CW edge of ORG signal.



## Adaptive driver

### ■ Driver ▶ P.1-205~

DC24V type input

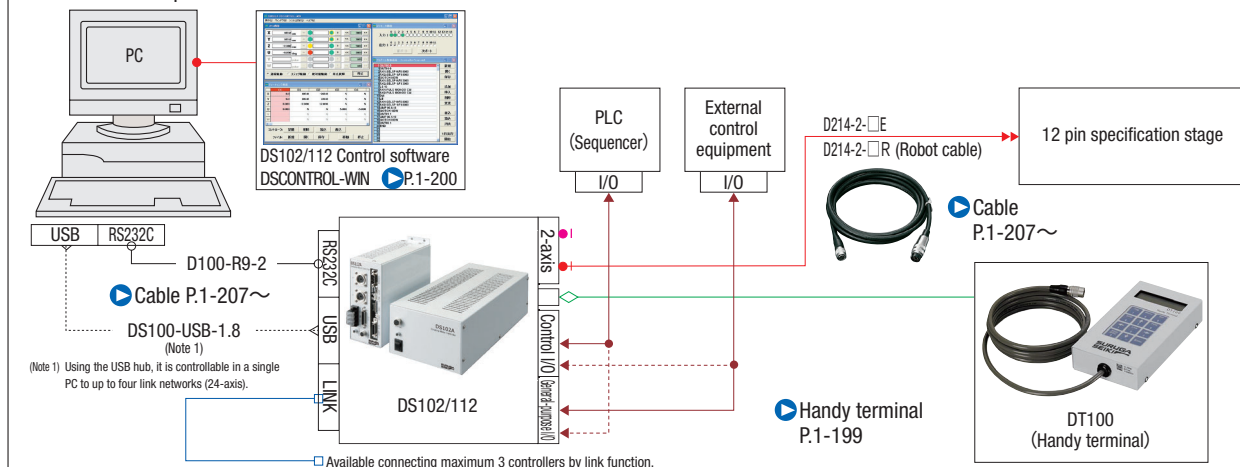
| Model     | CVD507-K-A9        | CRD5107P           |
|-----------|--------------------|--------------------|
| Divisions | 1~1/250 (16 steps) | 1~1/250 (16 steps) |

## Adaptive stepping motor controller

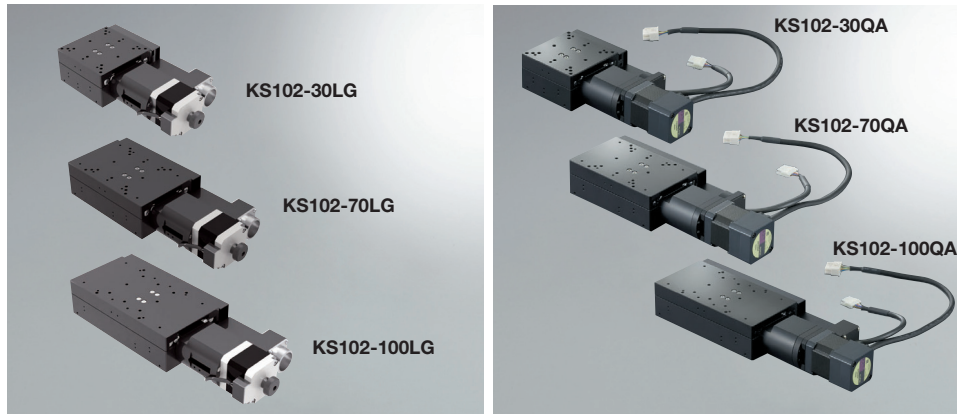
### ■ Controller ▶ P.1-197~

| Input power | General-purpose input/output port | Driver type |                    |
|-------------|-----------------------------------|-------------|--------------------|
|             |                                   | Full/Half   | 1~1/250 (16 steps) |
| AC100-240V  | Without                           | DS102ANR    | DS102AMS           |
|             | With                              | DS102ANR-IO | DS102AMS-IO        |
| DC24V       | Without                           | DS112ANR    | DS112AMS           |
|             | With                              | DS112ANR-IO | DS112AMS-IO        |

### ■ Connectin example



## X-axis Cross Roller Guide: KS102



RoHS

\* This is for illustrative purpose.

| Model           | Selection code | Option code |
|-----------------|----------------|-------------|
| <b>KS102-30</b> | <b>L G-5</b>   |             |
| 1               | 2              | 3 4 5       |

[Cable P.1-207~](#)  
[Electrical specification P.1-111~](#)

### 1 Axis

| 1 | X-axis |
|---|--------|
|---|--------|

### 2 Travel

| 30  | 30mm  |
|-----|-------|
| 70  | 70mm  |
| 100 | 100mm |

### 3 Sensor cover location specification

| Code | Specification |
|------|---------------|
| L    | L position    |
| R    | Opposite hand |

\* The sensor cover position code is blank when the  $\alpha$ -step motor is selected.

### 4 Motor option

| Code | Specification                   |
|------|---------------------------------|
| G    | Standard                        |
| QA   | $\square$ 42 $\alpha$ step (AC) |

\* Must be chosen the cable from 2A~5R for QA.

### 5 Cable option

| Code  | Specification                          | Cable type |
|-------|----------------------------------------|------------|
| Blank | 2m                                     | D214-1-2E  |
| 1     | 2m One end loose                       | D214-1-2EK |
| 2     | 4m                                     | D214-1-4E  |
| 3     | 4m One end loose                       | D214-1-4EK |
| 4     | Only connector (Cable is not included) | —          |
| 5     | Cable is not included (Standard)       | —          |
| 6     | Robot cable 2m                         | D214-1-2R  |
| 7     | Robot cable 4m                         | D214-1-4R  |
| 8     | Robot cable 4m one end loose           | D214-1-4RK |
| 9     | Robot cable 2m one end loose           | D214-1-2RK |
| 2A    | 2m ( $\alpha$ step)                    | —          |
| 5A    | 5m ( $\alpha$ step)                    | —          |
| 2R    | Robot cable 2m ( $\alpha$ step)        | —          |
| 5R    | Robot cable 5m ( $\alpha$ step)        | —          |

\* One end loose position to only stage opposite side.

\* If you choose the option specification, please add the difference to standard price.

\* See page [P.1-207, 209~](#) for more cable details.

\* Please select "blank, 2, 6 and 7" when connect with stepping motor controller(DS102/112).

| SPEC                                 |                                      |                                        |                                          |                                           |                                        |                                         |
|--------------------------------------|--------------------------------------|----------------------------------------|------------------------------------------|-------------------------------------------|----------------------------------------|-----------------------------------------|
| Model                                | KS102-30LG-5                         | KS102-70LG-5                           | KS102-100LG-5                            | KS102-30QA                                | KS102-70QA                             | KS102-100QA                             |
| (Opposite hand)                      | KS102-30RG-5                         | KS102-70RG-5                           | KS102-100RG-5                            | KS102-30RQA                               | KS102-70RQA                            | KS102-100RQA                            |
| Mechanical specification             | Travel length                        | 30mm                                   | 70mm                                     | 100mm                                     | 30mm                                   | 100mm                                   |
|                                      | Table size                           | 80×80mm                                | 80×130mm                                 | 80×160mm                                  | 80×80mm                                | 80×130mm                                |
|                                      | Feed screw                           | Ball screwφ8 lead 1                    |                                          |                                           |                                        |                                         |
|                                      | Guide                                | Crossed roller guide                   |                                          |                                           |                                        |                                         |
|                                      | Main materials-Finishing             | Aluminum-Black almite finishing        |                                          |                                           |                                        |                                         |
| Accuracy specification               | Weight                               | 1.4kg                                  | 1.8kg                                    | 2.2kg                                     | 1.6kg                                  | 2.0kg                                   |
|                                      | Resolution (Pulse)                   | Full/Half Microstep                    | 1μm/0.5μm<br>0.05μm (1/20 on resolution) |                                           | 1μm (Set to 1000P/R)<br>-              |                                         |
|                                      | MAX speed                            | 10mm/sec                               |                                          |                                           |                                        |                                         |
|                                      | Uni-directional positioning accuracy | Within 5μm                             |                                          | Within 10μm                               | Within 5μm<br>Within 10μm              |                                         |
|                                      | Repeatability positioning accuracy   | Within ±0.3μm                          |                                          |                                           |                                        |                                         |
|                                      | Load capacity                        | 20kgf [196N]                           |                                          |                                           |                                        |                                         |
|                                      | Moment stiffness                     | Pitch 0.07/yaw 0.06/roll 0.02 [°/N・cm] | Pitch 0.01/yaw 0.014/roll 0.01 [°/N・cm]  | Pitch 0.005/yaw 0.011/roll 0.008 [°/N・cm] | Pitch 0.07/yaw 0.06/roll 0.02 [°/N・cm] | Pitch 0.01/yaw 0.014/roll 0.01 [°/N・cm] |
|                                      | Lost motion                          | Within 1μm                             |                                          |                                           |                                        |                                         |
|                                      | Backlash                             | Within 0.5μm                           |                                          |                                           |                                        |                                         |
|                                      | Parallelism                          | Within 30μm                            |                                          |                                           |                                        |                                         |
|                                      | Motion parallelism                   | Within 10μm                            | Within 15μm                              |                                           | Within 10μm                            | Within 15μm                             |
|                                      | Pitching/Yawing                      | Within 25°/Within 15°                  | Within 25°/Within 20°                    |                                           | Within 25°/Within 15°                  | Within 25°/Within 20°                   |
|                                      | Sensor                               | Limit sensor                           | Installed                                |                                           |                                        |                                         |
| Origin sensor                        |                                      | Installed                              |                                          |                                           |                                        |                                         |
| Slit origin sensor                   |                                      | Installed                              |                                          |                                           |                                        |                                         |
| Provided screw (Hexagon-headed bolt) |                                      | 4 of M4—20                             |                                          |                                           |                                        |                                         |

\* The price includes a driver for  $\alpha$  step. Motor cable sold separately. Please order from cable option 2A,5A,2R and 5R. Sensor cable attached only receiving conector. See page [P.1-111~](#).

\* The controller for  $\alpha$  step drive is not supplied.



PART  
COMMUNITY

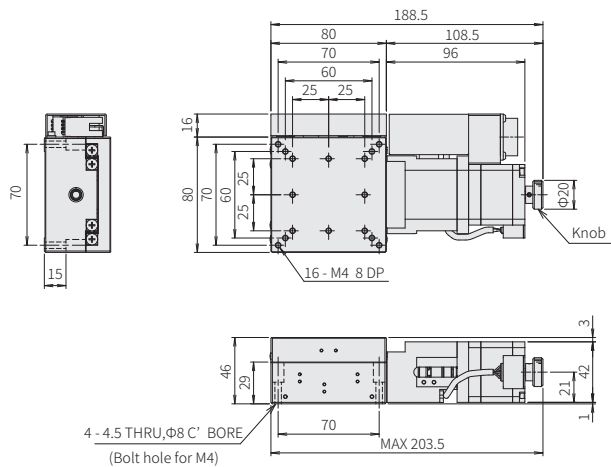
CAD  
DATA

SURUGA  
SEIKI

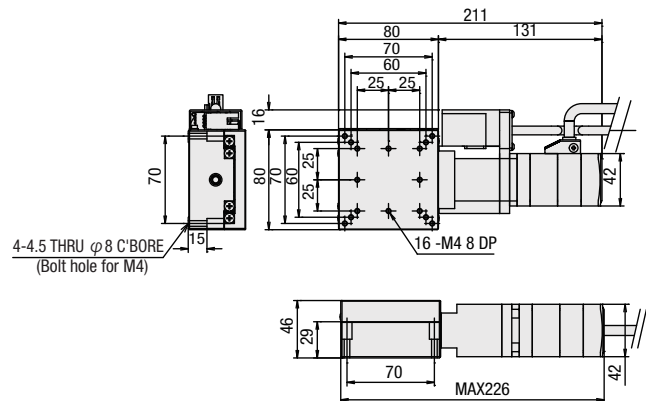
CAD  
3D・2D

## Dimensional outline drawings

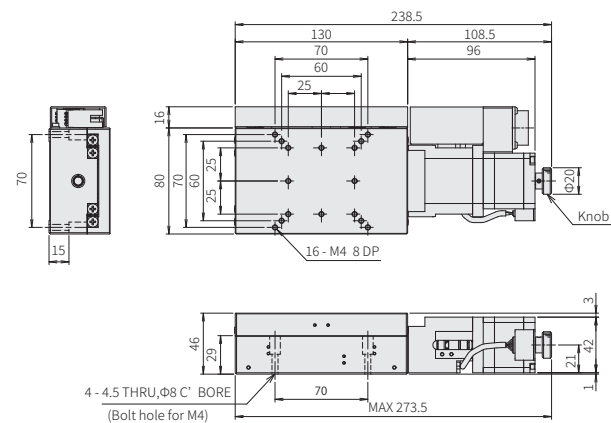
### KS102-30LG



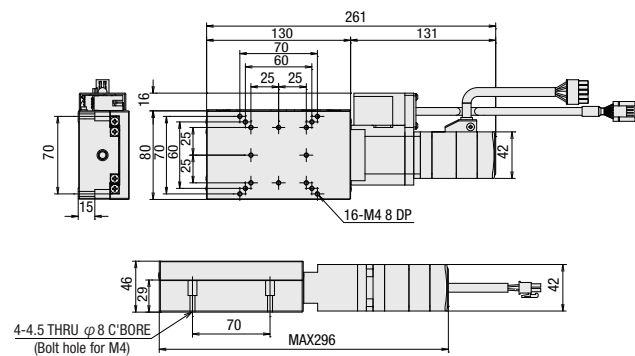
### KS102-30QA



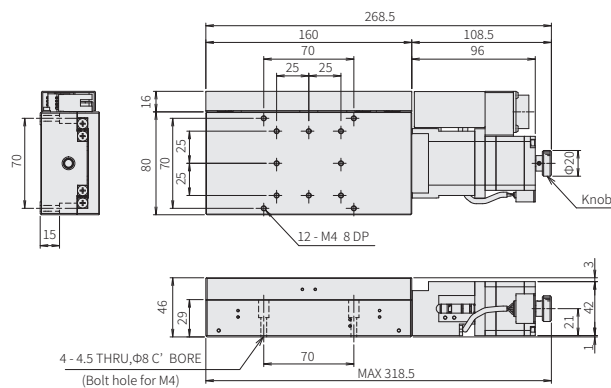
### KS102-70LG



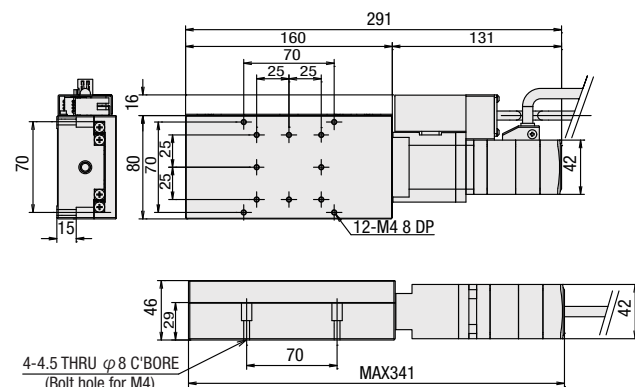
### KS102-70QA



### KS102-100LG



### KS102-100QA



Motorized Stage

X

XY

Z

Horizontal  
Z

XYZ

Goniometer

Rotary

Unit

Controller

Linear  
Ball

CAVE-X  
Linear ball

Cross  
Roller

Slide  
Guide

☐ 40

☐ 50

☐ 60

☐ 70

☒ 80

☐ 100

☐ 120

☐ Other

1

110

## Electrical Specification: KS102

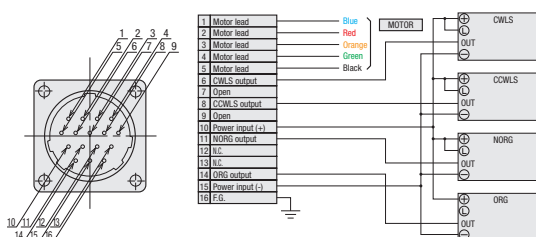
### Electrical specification

| Models       |                                               | KS102-30LG                                                                                                                                                                     | KS102-70LG | KS102-100LG | KS102-30LQA                             | KS102-70LQA | KS102-100LQA |
|--------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|-----------------------------------------|-------------|--------------|
|              |                                               | KS102-30RG                                                                                                                                                                     | KS102-70RG | KS102-100RG | KS102-30RQA                             | KS102-70RQA | KS102-100RQA |
| Motor (*1)   | Type                                          | 5 phase stepping motor 0.75A/Phase (Oriental Motor Co., Ltd.)                                                                                                                  |            |             | α step motor (Oriental Motor Co., Ltd.) |             |              |
|              | Model                                         | PK544PMB-C18 ( □ 42mm) Model is our own management model.                                                                                                                      |            |             | ARM46AC (□42mm)                         |             |              |
|              | Step angle                                    | 0.36°                                                                                                                                                                          |            |             | 0.36° (Set to 1000P/R)                  |             |              |
|              | Driver type                                   | 🔵 P.1-205～                                                                                                                                                                     |            |             | ARD-A                                   |             |              |
| Connector    | Model                                         | SRCN2A21-16P (JAE)                                                                                                                                                             |            |             | 172211-6 (Tyco Electronics Japan G.K. ) |             |              |
|              | applicable connector on acceptance side       | SRCN6A21-16S (JAE)                                                                                                                                                             |            |             | 171822-6 (Tyco Electronics Japan G.K.)  |             |              |
|              | Connector type                                | —                                                                                                                                                                              |            |             | 170430-1 (Tyco Electronics Japan G.K.)  |             |              |
|              | applicable connector on acceptance side model | —                                                                                                                                                                              |            |             | 170205-1 (Tyco Electronics Japan G.K.)  |             |              |
| Sensor       | Limit sensor                                  | Installed                                                                                                                                                                      |            |             |                                         |             |              |
|              | Proximity origin sensor                       | Installed                                                                                                                                                                      |            |             |                                         |             |              |
|              | Slit origin sensor                            | Installed                                                                                                                                                                      |            |             |                                         |             |              |
|              | Model                                         | Photo microsensor EE-SX673 (Omron Co., Ltd.)                                                                                                                                   |            |             |                                         |             |              |
|              | Power voltage                                 | DC5～24V ±10%                                                                                                                                                                   |            |             |                                         |             |              |
|              | Consumption current                           | Total 140mA or less (35mA or less per 1 sensor)                                                                                                                                |            |             |                                         |             |              |
|              | Control output                                | NPN open collector output DC5～24V 100mA or less<br>Residual voltage 0.8V or less when the load current is 100mA<br>Residual voltage 0.4V or less when the load current is 40mA |            |             |                                         |             |              |
| Output logic |                                               | On detection (light shield condition): Output transistor OFF (Non-continuity) (Only slit origin sensor is OFF when detected. (Non-continuity))                                 |            |             |                                         |             |              |

\*1 See page P.1-213~ for details of single motor specification.

### Pin allocation

### Connection diagram

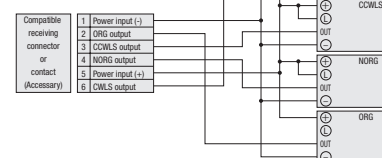
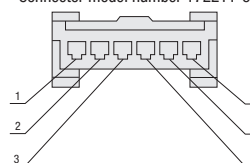


### Pin allocation (sensor)

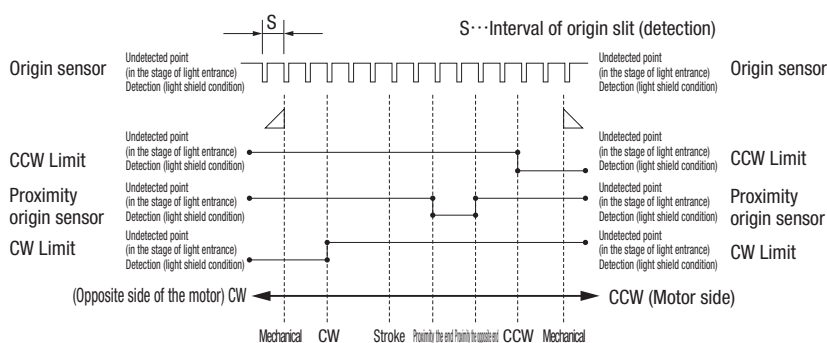
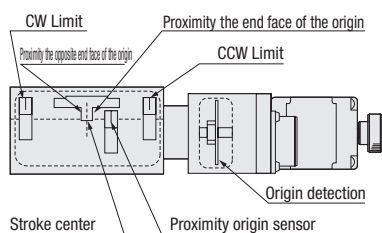
### Connection diagram (sensor)

#### KS102-□□QA

Connector model number 172211-6



### Timing chart



| Unit [mm] | Direction of CW ◀────────────────────────────────────────▶ Direction of CCW |                  |          |               |                               |                                               |           |                  |
|-----------|-----------------------------------------------------------------------------|------------------|----------|---------------|-------------------------------|-----------------------------------------------|-----------|------------------|
|           | Reference coordinate                                                        | Mechanical limit | CW Limit | Stroke center | The proximity origin end face | Proximity the opposite end face of the origin | CCW Limit | Mechanical limit |
| KS102-30  | Return to origin                                                            | —                | 23       | 7             | 0                             | 6                                             | 9         | —                |
|           | Stroke center                                                               | —                | 16       | 0             | 7                             | 13                                            | 16        | —                |
| KS102-70  | Return to origin                                                            | —                | 63       | 27            | 0                             | 6                                             | 9         | —                |
|           | Stroke center                                                               | —                | 36       | 0             | 27                            | 33                                            | 36        | —                |
| KS102-100 | Return to origin                                                            | —                | 93       | 42            | 0                             | 6                                             | 9         | —                |
|           | Stroke center                                                               | —                | 51       | 0             | 42                            | 48                                            | 51        | —                |

The same

Interval of origin slit (detection) S=1

\* Return to origin means that is performed return to origin type 1 using DS102/DS112 series.

\* Origin becomes any position till the origin sensor is detected shielded disk slit of the origin side after through the proximity end face.

\* The coordinate value should be on the design. Dimension error may occur about plus or minus 0.5 mm.

Note: The timing chart shows only timing of sensor, it is not for output signal logic. Refer to ON/OFF display of output transistor that shows on electrical specifications-sensor-output logic for output signal logic.

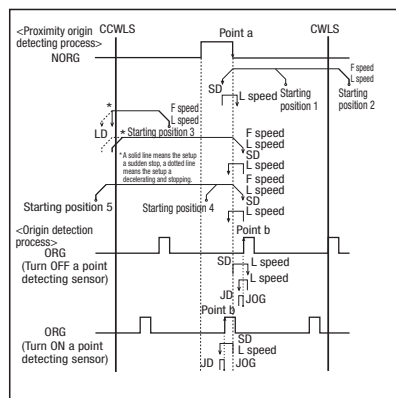
## Method for return to origin

Suruga's motorized stages is different from the sensor specifications depends on models. As return to origin operation is divided into types, it is necessary to choose the correct type. Selected wrong type may be operated uncorrectly. Choose your best one whatever you need according to be recommended as below.

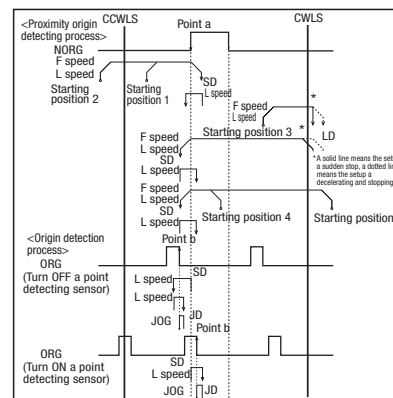
### KS102 recommended return to origin Return to origin sequence P.1-201~

Type1:Detect in the direction of CCW and perform detected process for CW edge(point a) of NORG signal.Next detect an edge of CCW side(point b) of ORG signal.  
Type2:Detect in the direction of CW and perform detected process for CCW edge of NORG signal.Next detect on edge of CW side (point b) of ORG signal.  
Type7:After finished type1, perform detected process for CCW edge of TIMING signal.  
Type8:After finished type2, perform detected process for CW edge of TIMING signal.

**[Type1]** Detect in the direction of CCW and perform detected process for CW edge(point a) of NORG signal.  
Next detect an edge of CCW side(point b) of ORG signal.



**[Type2]** Detect in the direction of CW and perform detected process for CCW edge(point a) of NORG signal.  
Next detect on edge of CW side (point b) of ORG signal.



## Adaptive driver

### Driver P.1-205~

DC24V type input

| Model     | CVD507-K-A9        | CRD5107P           |
|-----------|--------------------|--------------------|
| Divisions | 1~1/250 (16 steps) | 1~1/250 (16 steps) |

## Adaptive stepping motor controller

### Controller P.1-197~

| Input power | General-purpose input/output port | Driver type |                    |
|-------------|-----------------------------------|-------------|--------------------|
|             |                                   | Full/Half   | 1~1/250 (16 steps) |
| AC100-240V  | Without                           | DS102ANR    | DS102AMS           |
|             | With                              | DS102ANR-IO | DS102AMS-IO        |
| DC24V       | Without                           | DS112ANR    | DS112AMS           |
|             | With                              | DS112ANR-IO | DS112AMS-IO        |

### Connectin example

