

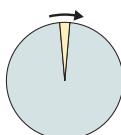
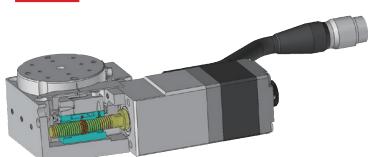
Motorized Rotary Stage Guidance



Impressive lineup of attractive products including the newest model.
Can be found the optimum stages.

Choosing an appropriate stage

Original



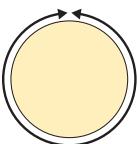
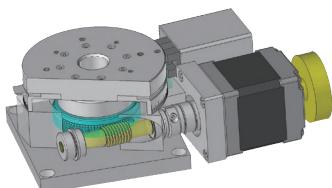
Make sure it is driven repeatedly within plus or minus 10 degree. [▶ P.1-169~](#)

Sinemotion rotary stage: KRB04/KRB06

High durability and high speed driving with ball screws.

The optimum repeatability driving of the minute angle.

Table size $\phi 40\text{mm}$ $\phi 60\text{mm}$



Make sure to use 360 degree rotated. [▶ P.1-177~](#)

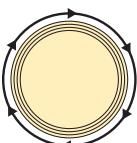
Worm gear type rotary stage: KRW04360C/KRW06360C-Z/KS402/KRE

The optimum positioning on the wide angle accuracy or continuous operation in 360 degree.

Transmission type would be suitable for rotating polarizing elements and organization cables.

KRE series: Thin type • Light weight • Low price [▶ P.1-025~](#)

Table size $\phi 40\text{mm}$ $\phi 60\text{mm}$ $\phi 75\text{mm}$ $\phi 100\text{mm}$ $\phi 180\text{mm}$



Make sure to use 360 degree high speed rotated.:KS451 [▶ P.1-189~](#)

Direct drive type

Table size $\phi 39\text{mm}$

The optimum rotation stages for use to rotate 360 degree with high speed.

High speed

Worm gear type
($\sim 40^\circ/\text{sec}$)

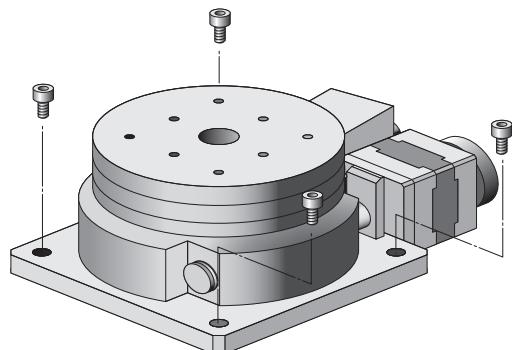
Direct drive
(72°/sec)

Ball bearing type
(102°/sec)

How to use correctly

▽Mounting

Fix corner position with supplied screw.
 * KRB04、KRB06、KRW04360、KRW06360
 KRE04360、KRE06360 are fixed in 3 position



▽About the object that mounted on upper/bottom of stage

When a stage is mounted on uneven or an object that is uneven, the stage table may deformed, and may also affeted the accuracy. [Approximate flatness: up to 10μm]

▽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 posisioning.

Load capacity or accuracy might be changed due to the mount position. Please check below table for using.
 Please feel free to ask us how to best use.

▼Each positioning characteristics

Products series	Inverted and reversed	Side horizontal	Side vertical use
Sinmotion rotation stage	○	○	○
Worm gear type rotation stage	○	○	○
Direct drive type	×	×	×
KRE04360、KRE06360	×	×	×

○ : Available under limit of load or moment

× : Not available

Center of rotation

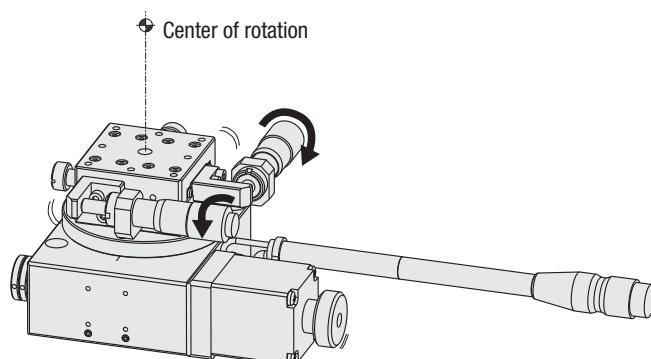
▽How to align the center of rotation

Use the full power of stages by aligned each center when mount to the other equipments.

Align the center as belows.:

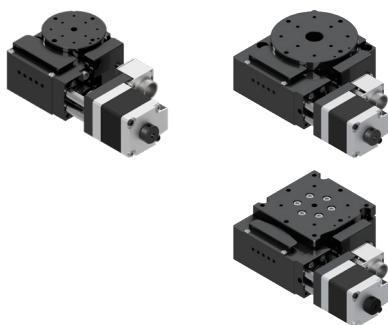
- Position the minimum point of eccentricity rotating the stage by using dial gauge, and then fix the work.
- Can be issued to fine tune the center with XY stages.

* There is no surface based on mounting.



Motorized Stage

Rotation Ball Screw Guidance



High-precision rotating stage using ball screws
Ideal for use in repeatability motion with good operation.

Sine motion rotary stage guidance

■ High durability type

Backlash by the abrasion was concerned about by the worm gear type when continued being driven at a microangle repeatedly.

We have succeeded in making travel mechanism a ball screw from a worm gear.

High durability has been achieved by adopting a sliding worm gear to a rolling ball screw for the moving mechanism.

Improved acceleration and deceleration performance

Compared to worm gears, it has less sliding resistance, enabling smooth rise and acceleration

■ Reduce the backlash

Reduce the backlash with preload mechanism.

■ Travel distance and constant speed

The linear movement of a ball screw is converted into rotational movement by bearings in the stage. (The travel distance of ball screw is not the same as the travel angle of the stage because linear movement is converted into rotational movement).

As a result, the resolution per pulse is different between the stroke center and the end.
The rotation speed is not stable even when sending pulse signals at a constant speed.

■ Equipment for calculating the travel distance

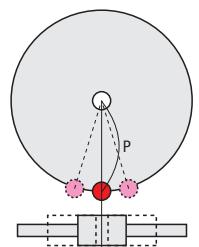
*An equation on the basis of the stroke center.

- (1) Travel angle=Arcsin((Input pulse*X)/P)
- (2) Input pulse=P*sin(travel distance)/X

■ Definition

Definition	Value	Unit
Distance between supporting points P	17	mm
Ball screw lead	1	mm
Motor basic step angle	0.72	Degree
Ball screw travel length per pulse X	0.002	mm

* Distance between supporting points are different from the stage.



P=Distance between supporting points
(The distance between center rotation and bearing)

■ Basic specification

Model	Motor basic step angle	Distance between supporting points P
KRB04017M-□C	0.72°	17mm
KRB06011M-□C	0.72°	27mm

Contact us for details of the equation.

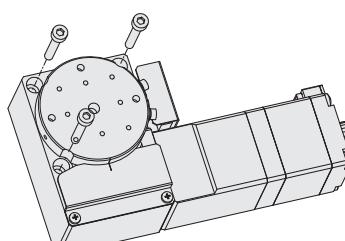
For proper operation

△ Mounting

KRB04017M/KRB06011MS : Fix 3 position with supplied screw.

KRB06011: Fix with supplied screws to 3 position of lower plate.

- KRB04017M/KRB06011MS:
Fit the hole of the upper table with the installation hole.



△ About the object that mounted on upper/bottom of stage.

When a stage is mounted on uneven or an object that is uneven, the stage table may deformed, and may also affected the accuracy.
[Approximate flatness: up to 10µm]

△ 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 refer to the posture characteristics table by product on page 1-168 to determine whether or not a product can be used.

Please feel free to ask us for more information.

Sinemotion Rotary Stage φ40/φ60: KRB04/KRB06

High-precision rotating stage using ball screws
Ideal for use in repeatability motion with good operation.



**Freely
customize
the motor**

KRB04017M □-LC □

1

2

3

3

4

4

►Cables P. 1-207 ~
►Electrical specification P1- KRB-005~

1 Stage table size

Code	size	Travel distance
04017	φ40mm	±8.5°
06011	φ60mm	60×60mm

2 Table shape

Blank	Circular
S	Square

Note: Only KRB06 is available

3 Motor option

Code	Specification
C	Standard(5 Phase stepping motor)
T	2 Phase stepping motor

3 Motor option

Code	Specification
Z	αSTEP (AZ Series)

4 Cable option(for motorless)

Code	Specification	Cable Model	2 phase cable type
Blank	Cable is not included (Standard)	—	—
A	2m	D214-2-2E	—
B	2m One end loose	D214-2-2EK	DS1-2C-2-2EK
C	4m	D214-2-4E	—
D	4m One end loose	D214-2-4EK	DS1-2C-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	DS1-2C-2-2RK
H	Robot cable 4m	D214-2-4R	—
J	Robot cable 4m one end loose	D214-2-4RK	DS1-2C-2-4RK

* One end loose position to only stage opposite side.

Note:For T-phase stepping, only one end rose (B, D, G, J) is supported.

Motor option: Accessories when ZA is selected.

Cable option code	Sensor cable model	Motor Cable model	Driver model
Blank	HR10AP-S-SB-6-2	—	—
3	HR10AP-S-SB-6-3	—	—
5	HR10AP-S-SB-6-5	—	—
3A	HR10AP-S-SB-6-3	CC030VZ2R2	AZD-K
5A	HR10AP-S-SB-6-5	CC050VZ2R2	AZD-K

4 Cable option(Motor option:ZA)

Code	Specification
Blank	Sensor cable 2m One end loose wire
3	Sensor cable 3m One end loose wire
5	Sensor cable 5m One end loose wire
3A	3A:Screwdriver (3m cable set)
5A	3A:Screwdriver (5m cable set)

* One end loose position to only stage opposite side.

*3A/5A does not include sensor cable, motor cable, and motor driver.

Specification

Model	SPEC		
	KRB04017M-LC	KRB06011M-LC	KRB06011MS-LC
Mechanical specification	Travel distance ±8.5°	±5.5°	
	Stage surface size φ40mm	φ60mm	60×60mm
	Travel mechanism (Reduction ratio) Ball screw φ6 lead 1	Combination angular ball bearing	
	Guide Main materials-Finishing	Aluminum-Black alumite processing	
	Weight 0.40kg	0.62kg	0.63kg
Accuracy specification	Resolution※ (Pulse) Full ÷0.0068°	÷0.0043°	
	MAX speed 101.5°/sec [15kHz]	63.8°/sec [15kHz]	
	Repeatability positioning accuracy 0.003°		
	Load capacity 4.0kgf [39.2N]	6.0kgf [58.8N]	
	Moment stiffness 0.52"/N・cm	0.25"/N・cm	
	Lost motion 0.003°		
	Backlash 0.01°		
	Parallelism 50μm		
Sensor	Limit sensor Available	Available	
	Origin sensor Available	—	
	Slit origin sensor —		
	Provided screw (Hexagon-headed bolt) 3 of M3-25	3 of M4-25	

* The SPEC varies depending on the motor.

*See page P.1-169 if you require exact calculations.

* The MAX speed becomes the theory speed at the time of the 15kHz drive for the traveling pulse of the full stroke.

Resolution • MAX speed • Weight

Motor code	C	T	ZA
Type	Standard	2 Phase stepping motor	αSTEP (AZ)
Motor model* 1	C005C-90215P-1	SJA28N32-0674B-01	AZM24AK
Step angle	0.72°	1.8°	0.36°※2
Resolution(Full)	KRB04017M ÷0.0068°	÷0.0169°	÷0.0034°※2
	KRB06011M ÷0.0043°	÷0.0106°	÷0.0021°※2
	KRB06011MS ÷0.0043°	÷0.0106°	÷0.0021°※2
MAX speed	KRB04017M 101.5°/sec [15kHz]	76.1°/sec [4.5kHz]	101.5°/sec [30kHz]
	KRB06011M 63.8°/sec [15kHz]	47.8°/sec [4.5kHz]	63.8°/sec [30kHz]
	KRB06011MS 63.8°/sec [15kHz]	47.8°/sec [4.5kHz]	63.8°/sec [30kHz]
Weight	KRB04017M 0.40kg	0.40kg	0.44kg
	KRB06011M 0.62kg	0.62kg	0.66kg
	KRB06011MS 0.63kg	0.63kg	0.67kg

*1 Model is our own management model.

*2 1000P/R setting

Motorized Stage

Sinemotion Rotary Stage $\phi 40/\phi 60$: KRB04/KRB06

Motorized Rotary Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

Direct Drive

$\phi 39$

$\phi 40$

$\phi 59$

$\phi 60/\square 60$

$\phi 75$

$\phi 100$

$\phi 180$

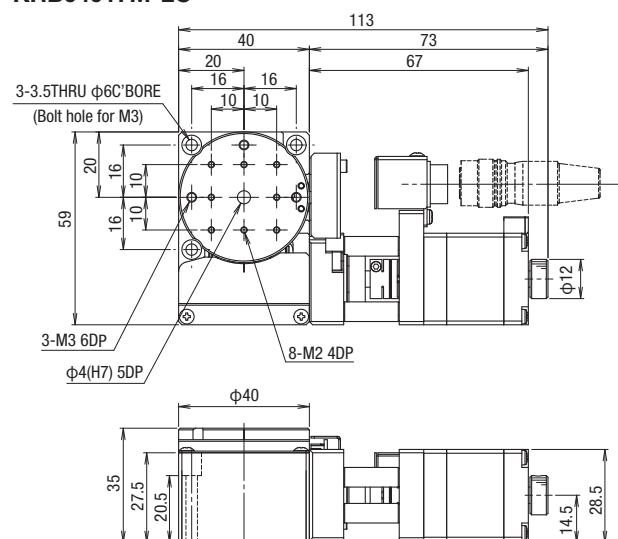
Other

1-KRB
003

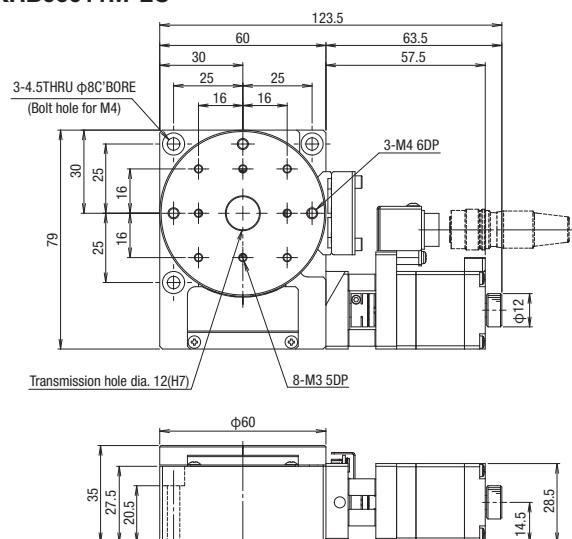
Dimensions

PART COMMUNITY CAD DATA

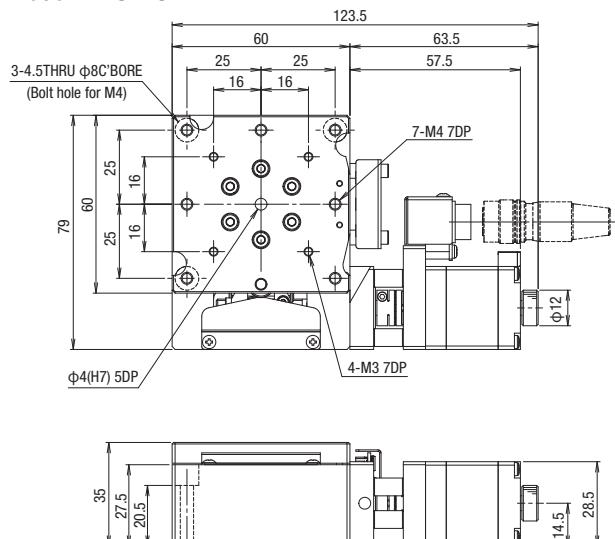
KRB04017M-LC



KRB06011M-LC



KRB06011MS-LC



C Standard motor

Motor model C005C-90215P-1

T 2 Phase stepping motor

Motor model SJA28N32-0674B-01

Model	Stage table size	Motor	Motor size	A(mm)	B(mm)	LS(mm)
KRB04017M-LC	$\phi 40$	C	<input type="checkbox"/> 28	—	—	113
KRB06011M-LC	$\phi 60$			—	—	123.5
KRB06011MS-LC	<input type="checkbox"/> 60			—	5.5	123.5
KRB04017M-LT	$\phi 40$	T	<input type="checkbox"/> 28	—	—	113
KRB06011M-LT	$\phi 60$			—	—	123.5
KRB06011MS-LT	<input type="checkbox"/> 60			—	5.5	123.5

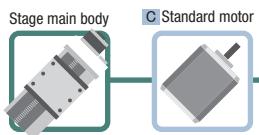
ZA aSTEP (AZ Series)

Motor model AZM24AK

Model	Stage table size	Motor	Motor size	A(mm)	B(mm)	LS(mm)
KRB04017M-LZA	$\phi 40$	ZA	<input type="checkbox"/> 28	10	—	135.5
KRB06011M-LZA	$\phi 60$			10	—	146
KRB06011MS-LZA	<input type="checkbox"/> 60			10	5.5	146

Motor option

C Standard motor
Motor model
C005C-90215P-1

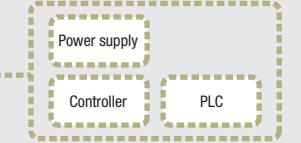


When our controller is used requirement

Cable selection
Code: A,C,F,H
Controller
DS102/112

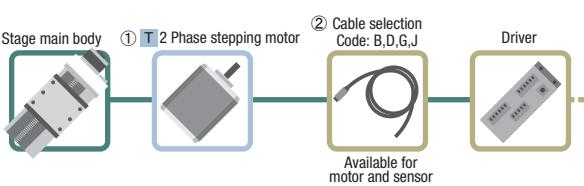
Available for
motor and sensor
When not using our controller
Cable selection
Code: B,D,G,J
Driver selection
P.1-213～
Available for
motor and sensor

All customers are required to prepare
DC24V power, controller and PLC by themselves.

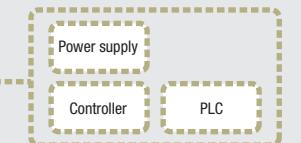


Motor option

T 2 Phase stepping motor
Motor model
SJA28N32-0674B-01



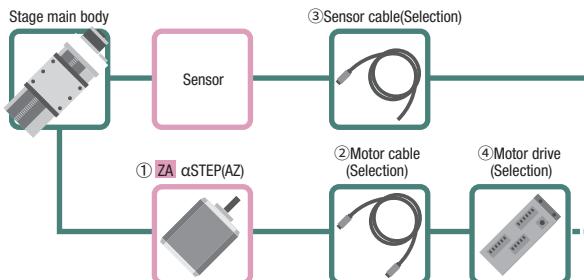
All customers are required to prepare
DC24V power, controller and PLC by themselves.



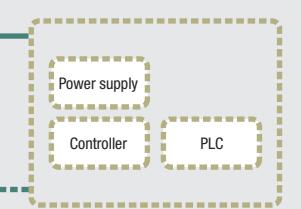
Code	Motor model	Motor + Sensor cable selection
T	SJA28N32-0674B-01	B • D : DS1-2C-2-□EK G • J : DS1-2C-2-□RK

Motor option

ZA aSTEP (AZ Series)
Motor model
AZM24AK



All customers are required to prepare
DC24V power, controller and PLC by themselves.



Code	①Motor model	②Motor cable selection	③Sensor cable selection	④Driver selection
ZA	AZM24AK	3A : CC030VZ2R2 5A : CC050VZ2R2 Blank • 3 • 5 : None	3A • 3 : HR10AP-S-SB-6-3 5A • 5 : HR10AP-S-SB-6-5 Blank : HR10AP-S-SB-6-2	3A • 5A : AZD-K Blank • 3 • 5 : None

Motorized Stage

Electrical Specification: KRB Series

Motorized Rotary Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

Direct Drive

Φ39

Φ40

Φ59

Φ60/□60

Φ75

Φ100

Φ180

Other

Motor · Electrical specification(5/2 Phase stepping motor)

Motor code	C	T
Stage model	KRB04/KRB06	
Type	5 phase stepping motor (0.75A/Phase)	2 phase stepping motor (0.67A/Phase)
Feature	Standard	-
Model ¹	C005C-90215P-1	SJA28N32-0674B-01
With electromagnetic brake	-	-
Manufacturer	Oriental Motor Co., Ltd.	SURUGA SEIKI
Step angle	0.72°	1.8°
mass	0.11kg	
Motor size	□size L size	□28mm 37mm
Maximum static torque	0.048N · m	0.059N · m
Driver model	CVD507-K-A9(Oriental Motor Co., Ltd.)	-
Driver power input	DC24V±10% 1.4A(MAX)	-
Brake power input	-	-
Connector	Panel mount Receiving connector	HR10A-10R-10P(73) (HRS) HR10A-10P-10S(73) (HRS)
Sensor board	Limit sensor Origin sensor Slit origin sensor Sensor Power-supply voltage Current consumption Control output Output logic	Available Available - Photo microsensor EE-SX4320 (Omron Co., Ltd.) DC5~24V±5% Total 60mA or less NPN open collector output DC30V 10mA or less On detection (light shield condition): Output transistor OFF (Non-continuity)

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

*2 Model is our own management model.

Pin allocation · Connection diagram

	C	Φ40	Φ60/□60
Pin allocation Connector model HR10A-10R-12P(73)(HRS)	Available for motor and sensor	<p>Connection diagram</p> <p>The diagram shows a circular pin assignment for the Φ40 stage. Pin 1 is Motor lead (Blue), 2 is Motor lead (Red), 3 is Motor lead (Orange), 4 is Motor lead (Green), 5 is Motor lead (Black), 6 is CWLs output, 7 is CCWLs output, 8 is N.C., 9 is Power input (V+), 10 is ORG output, 11 is Power input GND, and 12 is F.G. The connections include a Regulator, Sensor substrate, and 5 phase stepping motor. Power inputs Vin and Vout are connected to the Regulator, which also provides GND. The Sensor substrate connects to the CWLs and CCWLs outputs.</p>	<p>Connection diagram</p> <p>The diagram shows a circular pin assignment for the Φ60/□60 stage. Pin 1 is Motor lead (Blue), 2 is Motor lead (Red), 3 is Motor lead (Orange), 4 is Motor lead (Green), 5 is Motor lead (Black), 6 is CWLs output, 7 is CCWLs output, 8 is N.C., 9 is Power input (V+), 10 is ORG output, 11 is Power input GND, and 12 is F.G. The connections include a Regulator, Sensor substrate, and 5 phase stepping motor. Power inputs Vin and GND are connected to the Regulator, which also provides GND. The Sensor substrate connects to the CWLs and CCWLs outputs.</p>
Pin allocation Connector model HR10A-10R-10P(73)(HRS)	Available for motor and sensor	<p>Connection diagram</p> <p>The diagram shows a circular pin assignment for the T stage. Pin 1 is Motor lead B (Blue), 2 is Motor lead B (Red), 3 is Motor lead A (Green), 4 is Motor lead A (Black), 5 is Power input (V+), 6 is Power input (V-), 7 is CCWLs output, 8 is CWLs output, 9 is ORG output, and 10 is F.G. The connections include a Regulator, 2 phase stepping motor, and a Sensor substrate. Power inputs Vin and Vout are connected to the Regulator, which also provides GND. The Sensor substrate connects to the CWLs and CCWLs outputs.</p>	<p>Connection diagram</p> <p>The diagram shows a circular pin assignment for the T stage. Pin 1 is Motor lead B (Blue), 2 is Motor lead B (Red), 3 is Motor lead A (Green), 4 is Motor lead A (Black), 5 is Power input (V+), 6 is Power input (V-), 7 is CCWLs output, 8 is CWLs output, 9 is ORG output, and 10 is F.G. The connections include a Regulator, 2 phase stepping motor, and a Sensor substrate. Power inputs Vin and GND are connected to the Regulator, which also provides GND. The Sensor substrate connects to the CWLs and CCWLs outputs.</p>

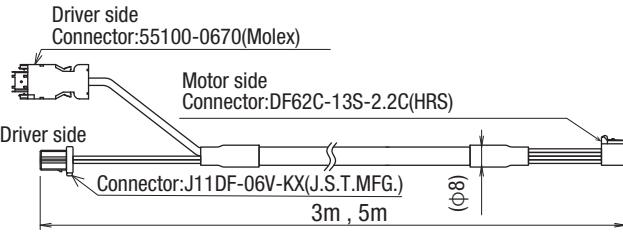
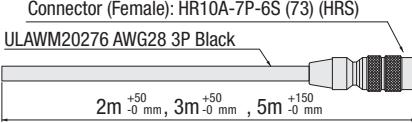
Motor • Electrical specification(αSTEP)

Motor code		ZA
Stage model		KRB04/KRB06
Motor Specification (*1)	Type	αSTEP (AZ Series)
	Feature	Small step-out, absolute
	Model*2	AZM24AK
	With electromagnetic brake	—
	Manufacturer	Oriental Motor Co., Ltd.
	Step angle	0.36°(Set to 1000P/R)
	mass	0.15kg
	Motor size	28mm
	L size	45mm
	Maximum static torque	0.095N · m
Connector	Driver model	AZD-K(Oriental Motor Co., Ltd.)
	Driver power input	DC24V±5%
	Brake power input	—
Sensor board	Panel mount	Motor: DF62B-13EP-2.2C (Hirose Electric Co., Ltd.) Sensor: HR10A-7R-6P(73) (Hirose Electric Co., Ltd.)
	Receiving connector	Motor: DF62C-13S-2.2C (Hirose Electric Co., Ltd.) Sensor: HR10A-7P-6S(73) (Hirose Electric Co., Ltd.)
Sensor board	Limit sensor	Available
	Origin sensor	Available
	Slit origin sensor	—
	Sensor	Photo microsensor EE-SX4320 (Omron Co., Ltd.)
	Power-supply voltage	DC5~24V±5%
	Current consumption	Total 60mA or less
Sensor board	Control output	NPN open collector output DC30V 10mA or less
	Output logic	On detection (light shield condition): Output transistor OFF (Non-continuity)

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

*2 Model is our own management model.

Pin allocation • Connection diagram

Motor	【Receiver cable】Model : CC030VZ2R2(3m)/CC050VZ2R2(5m) * Flexible cable															
																
ZA	【Receiver cable】Model : HR10AP-S-SB-6-□ ※□ : 2(2m)/3(3m)/5(5m) * Fixed	Φ40														
Sensor	<p>Sensor side Connector (Female): HR10A-7P-6S (73) (HRS)</p>  <p>The shields are connected with the connector shell.</p> <table border="1"> <tr> <td>Orange/Black</td> <td>Pin 1 CWLS</td> </tr> <tr> <td>Orange/Red</td> <td>2 CCWLS</td> </tr> <tr> <td>Gray/Black</td> <td>3 ORG</td> </tr> <tr> <td>Gray/Red</td> <td>4 NORG</td> </tr> <tr> <td>White/Black</td> <td>5 V+</td> </tr> <tr> <td>White/Red</td> <td>6 V-</td> </tr> <tr> <td>Shield</td> <td></td> </tr> </table>	Orange/Black	Pin 1 CWLS	Orange/Red	2 CCWLS	Gray/Black	3 ORG	Gray/Red	4 NORG	White/Black	5 V+	White/Red	6 V-	Shield		Φ60 □60
Orange/Black	Pin 1 CWLS															
Orange/Red	2 CCWLS															
Gray/Black	3 ORG															
Gray/Red	4 NORG															
White/Black	5 V+															
White/Red	6 V-															
Shield																
	【Pin allocation】Connector model : HR10A-7R-6P(73)(HRS)	Sensor substrate														
	1 CWLS output 2 CCWLS output 3 ORG output 4 N.C. 5 Power input V+ 6 Power input GND	Regulator Vin Vout GND	CWLS ORG CCWLS													
	【Pin allocation】Connector model : HR10A-7R-6P(73)(HRS)	Sensor substrate	CWLS ORG CCWLS													
	1 CWLS output 2 CCWLS output 3 ORG output 4 N.C. 5 Power input(+) 6 Power input(-)	Vin GND Regulator														

Motorized Stage

Electrical specification KRB04/ KRB06

Motorized Rotary Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

Direct Drive

Φ39

Φ40

Φ59

Φ60/□60

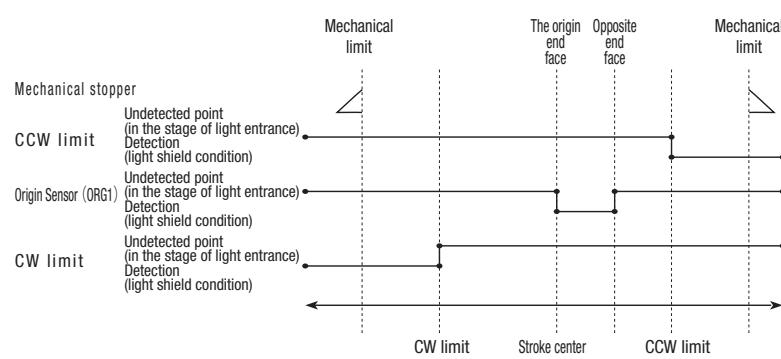
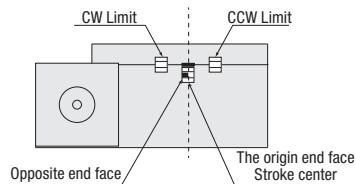
Φ75

Φ100

Φ180

Other

Timing chart



Unit [deg]	Direction of CW		Direction of CCW		
	Reference coordinate	CW Limit	The origin end face	Opposite end face	CCW Limit
KRB04017M-L	Return to origin	9.0	0	4.5	9.0
KRB06011M-L	Return to origin	6.0	0	2.5	6.0

* Return to origin means that is performed return to origin type 4 using DS102/DS112 series.(DS102/DS112 are dedicated to 5-phase motors)

* The coordinate is a basis of design value. Dimension error may occur about plus or minus 0.5 deg.

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.

Output signal logic will be different depends on your controller.

Return to origin

Suruga's motorized stages are different from the specification depending on the models. Therefore return to origin method other than recommendation may not be work correctly.

Set to the way of recommendation return origin when using our controller.

KRB04017/KRB06011 recommended return to origin Return to origin sequence P.1-201~

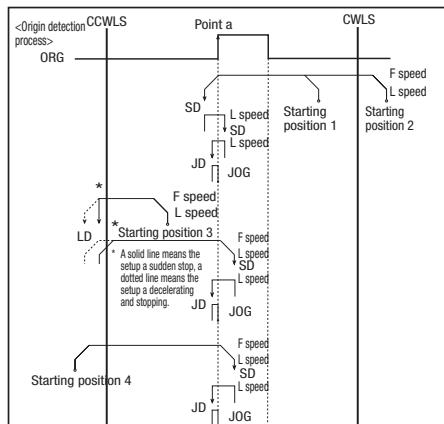
Type 3: Detect in the direction of CCW and perform detected process for CCW edge of ORG signal.

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

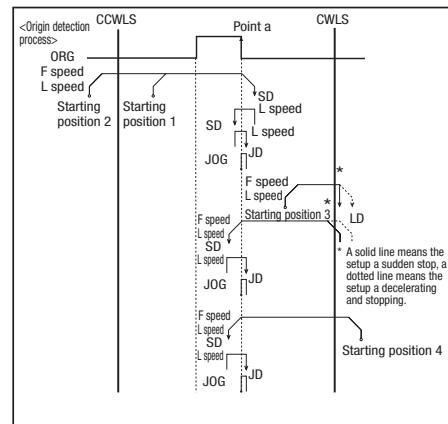
Type 9: After finished Type3, perform detected process for CCW edge of TIMING signal.

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.



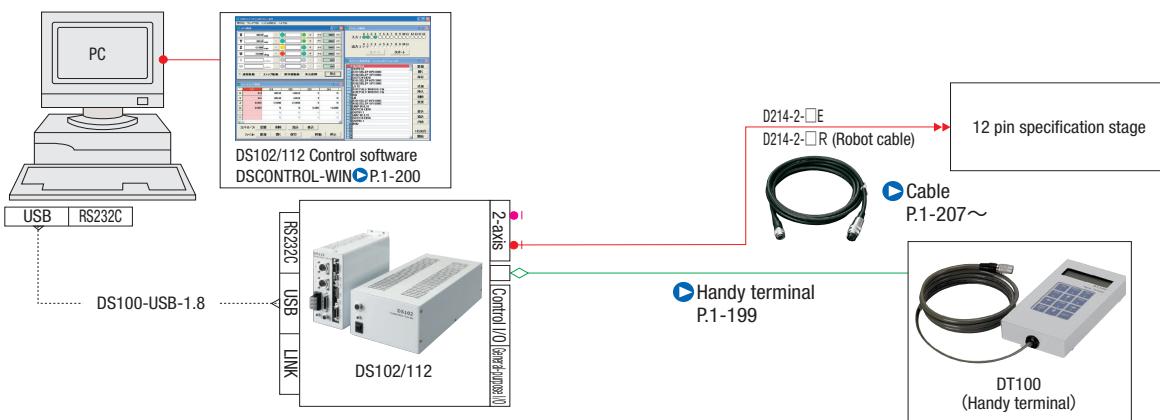
[Type4] Detect in the direction of CW and perform detected process for CW edge of ORG signal.



Connectin example

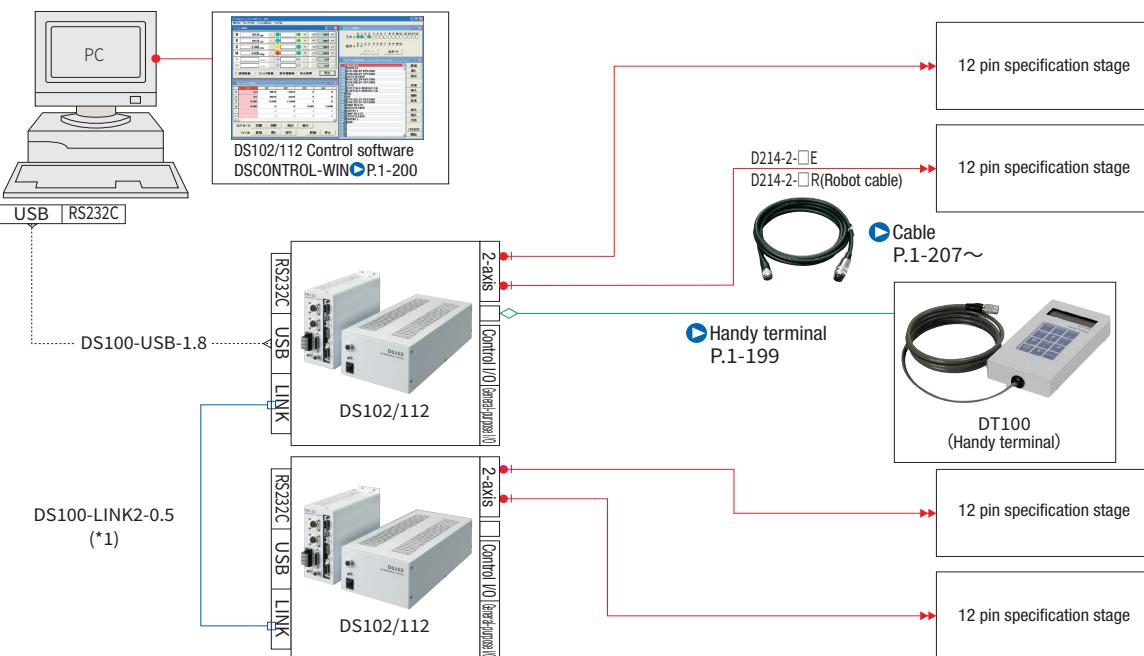
■ Connection example 1 Motorized Stage 1axis: When holding a terminal device (using control software)

*USB cable connection between PC and controller.



■ Connection example 2 Motorized Stage 4axis: When holding a terminal device (using control software)

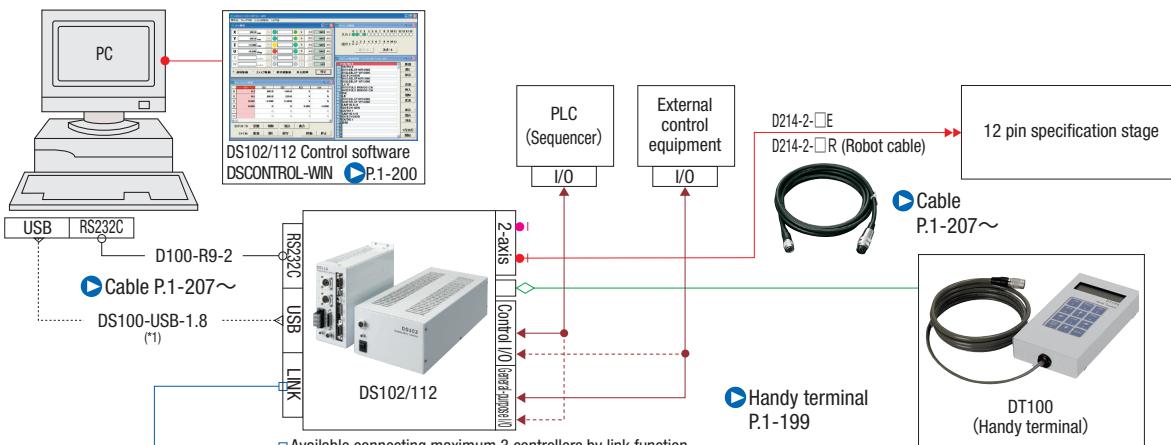
*USB cable connection between PC and controller.



(*1) It is possible to control up to 3 controllers (for a maximum of 6-axis control) with link function.

■ Connection example 3 When controlling from the PLC I/O Unit.

*USB cable connection between PC and controller.



(*1) Using the USB hub, it is controllable in a single PC to up to four link networks (24-axis).

Motorized Stage

New

Motorized Rotary Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

Direct Drive

φ39

φ40

φ59

φ60

φ75

φ100

φ180

Other

C
047

Rotary Stage φ39/φ59/□40/□60:KRW04/KRW06

KRW04360T-LC

KRW04360M-LC

KRW06360T-LC

KRW06360M-LC

KRW06360T-LC-Z

RoHS



Freely customize the motor

Vertical specifications(Z) are not included.

*All image is for illustrative purposes only.

KRW04 360 M □ - □ C - □ - □

1

2

3

4

5

6

7

Cable P.1-207～

Electrical specification P.C-055～

PA - □

1 Stage size

04	φ39mm(□40mm)
06	φ59mm(□60mm)

*Square specification size (stage surface shape) in parentheses

2 Travel distance

360	360°
-----	------

3 Connector specifications

T	Pig tail	
M	Panel mount	

4 Stage surface shape

Code	Specification
Blank	Circular
S	Square

5 Motor location specification

Code	Specification
L	L position
R	Opposite hand

6 Motor option

Code	Specification
C	Standard
G	High resolution

7 Cable option (Motor:C • G)

Code	Specification	Cable type
Blank	Calbe is not included (Standard)	—
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

8 Mounting

Code	Specification
Blank	Horizon
Z	Vertical

*Z : φ 59mm/Compatible only with Standard Motor specification

6 Motor option

Code	Specification
PA	cSTEP (AR Series)
ZA	cSTEP (AZ Series)
EA	for EtherCAT
UG	Servo motor (MINAS A6)
UA	Servo motor (J4)

7 Cable option (Motor:PA • ZA • EA • UG • UA)

Code	Specification
Blank	Sensor cable 2m One end loose wire
3	Sensor cable 3m One end loose wire
5	Sensor cable 5m One end loose wire
3A	Driver (Amplifier)/Cable set 3m
5A	Driver (Amplifier)/Cable set 5m

Driver (Amplifier) • Cable option combination

Code	Driver (Amplifier) • Cable	Blank			3			5			3A			5A		
		Motor	PA	ZA	EA	UG	UA	PA	ZA	EA	UG	UA	PA	ZA	EA	UG
Cable	Sensor	2m	3m	5m				3m		5m						
	Motor				Not included				3m		5m					
	Encoder								—	3m	—	5m				
Driver (Amplifier)													Included			
													Included			

Selection Example

Model + Connector specifications + Stage surface shape + Motor location specification + Motor option + Cable option

▷ KRW06360M-LC-B

C
047

Specification

SPEC						
Model	KRW04360T-LC	KRW04360M-LC	KRW06360T-LC	KRW06360M-LC	KRW06360T-LC-Z	KRW06360M-LC-Z
Opposite hand	KRW04360T-RC	KRW04360M-RC	KRW06360T-RC	KRW06360M-RC	KRW06360T-RC-Z	KRW06360M-RC-Z
Mechanical specification	Travel distance			360°		
	Stage size(*1)	Φ39mm (40×40mm)		Φ59mm (60×60mm)		
	Connector type	Pig tail	Panel mount	Pig tail	Panel mount	Pig tail
	Travel mechanism (Reduction ratio)	Worm gear(1/120)			Worm gear(1/180)	
	Guide			Deep groove ball bearing		
	Main materials-Finishing			Aluminum—Black almite finishing		
	Weight	0.42kg	0.39kg	0.62kg	0.59kg	0.72kg
	Resolution/Pulse		0.006°		0.004°	
	MAX speed		30°/sec		20°/sec	
Accuracy specification	Positioning accuracy			0.05°		
	Repeatability positioning accuracy			±0.01°		
	Load capacity		3kgf[29.4N]			1kgf[9.8N]
	Moment stiffness	0.74"/N・cm			0.2"/N・cm	
	Lost motion			0.05°		
	Backlash	0.1°			0.05°	
	Parallelism			50μm		
	Eccentricity			5μm		
	Runout			30μm		
Sensor	Limit sensor			—		
	Origin sensor			有		
	Slit origin sensor			—		
	Provided screw (Hexagon-headed bolt)	3 of M3—30		3 of M4—30		4 of M4—6

* Might be changed specification due to motors.

*1 The figure in parenthesis is the stage surface size when the Stage surface shape option: square (S) is selected.

Resolution · MAX speed · Weight

Motor code		C	G
Specification		Standard	High resolution
Motor model *1		C005C-90215P-1	PK523HPMB-C1
Step angle		0.72°	0.36°
Resolution/Pulse	KRW04	0.006°	0.003°
	KRW06	0.004°	0.002°
MAX speed	KRW04	30°/sec	
	KRW06	20°/sec	
Weight	KRW04360T (Pig tail)	0.42kg	
	KRW04360M (Panel mount)	0.39kg	
	KRW06360T (Pig tail)	0.62kg	
	KRW06360M (Panel mount)	0.59kg	
	KRW06360T-Z (Pig tail)	0.72kg	—
	KRW06360M-Z (Panel mount)	0.69kg	—

Motor code		PA	ZA	EA	UG	UA
Specification		αSTEP (AR)	αSTEP (AZ)	for EtherCAT	MINAS A6	J4
Motor model *1		ARM24SAK	AZM24AK	STM28W100A	MSMF5AZL1A2	HG-KR053
Resolution/Pulse	KRW04	0.003° (1000P/R setting)		23 Bit encoder (8388608P/R) ≈2	22 Bit encoder (4194304P/R) ≈3	
	KRW06	0.002° (1000P/R setting)				
MAX speed	KRW04	30°/sec		20°/sec		
	KRW06					
Weight	KRW04360T (Pig tail)	0.46kg	0.46kg	0.43kg	0.63kg	0.65kg
	KRW04360M (Panel mount)	0.43kg	0.43kg	0.40kg	0.60kg	0.62kg
	KRW06360T (Pig tail)	0.66kg	0.66kg	0.63kg	0.83kg	0.85kg
	KRW06360M (Panel mount)	0.63kg	0.63kg	0.60kg	0.80kg	0.82kg

*1 Model is our own management model.

*2 Optional encoder cable is for incremental system.

*3 When constructing an absolute system, it is necessary to install a battery in the amplifier.

Motorized Stage

New

Motorized Rotary Stage

X
XY
Z
Horizontal Z
XYZ
Goniometer
Rotary
Unit
Controller

Ball Screw
Worm Gear
Direct Drive

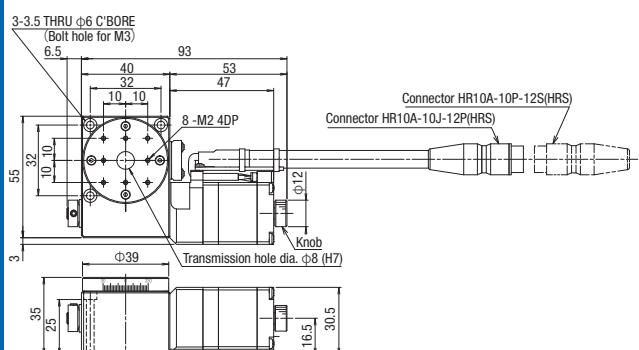
Φ39
Φ40
Φ59
Φ60
Φ75
Φ100
Φ180
Other

C
049

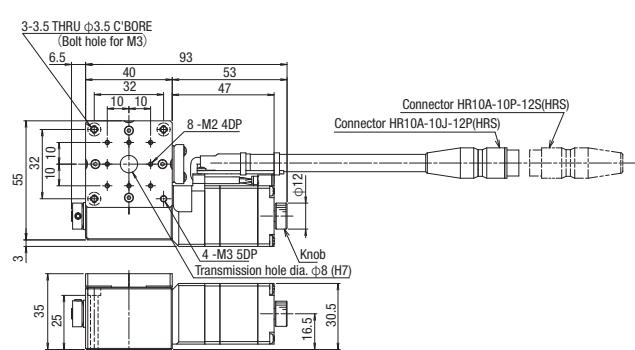
Rotary Stage $\phi 39/\phi 59/\square 40/\square 60$: KRW04/KRW06

Dimensions

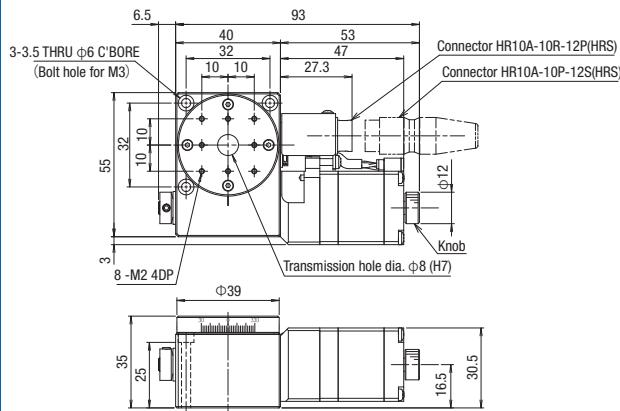
KRW04360T-LC



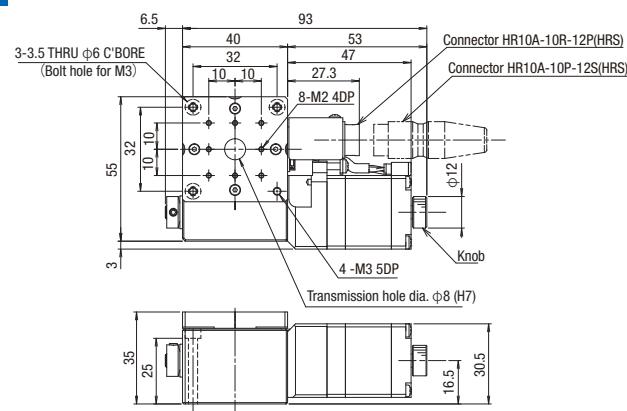
KRW04360TS-LC



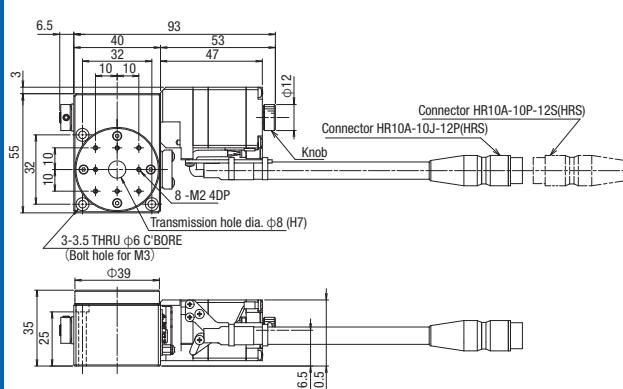
KRW04360M-LC



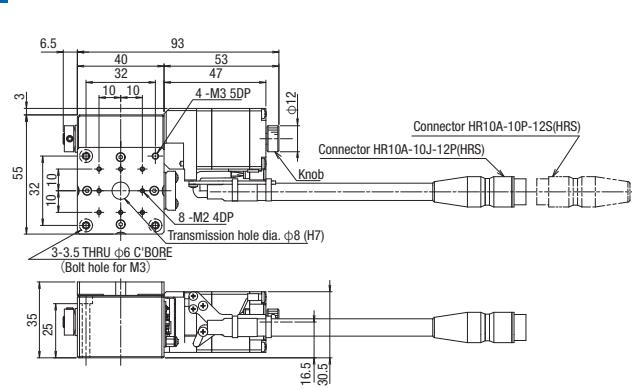
KRW04360MS-LC



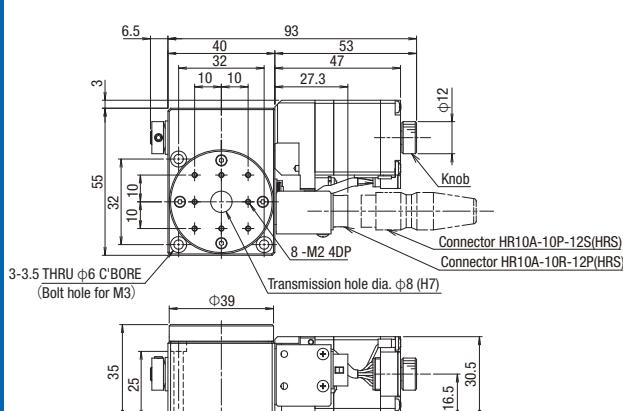
KRW04360T-RC



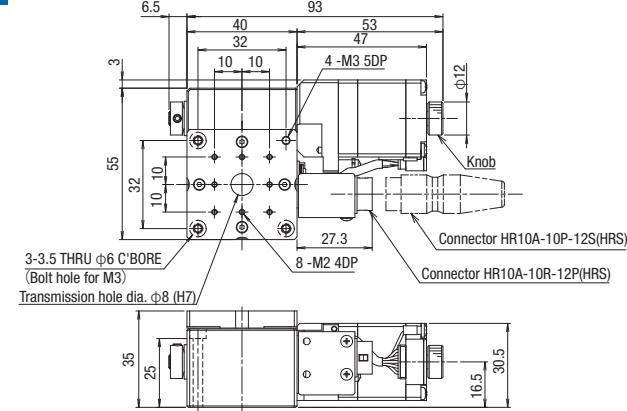
KRW04360TS-RC



KRW04360M-RC

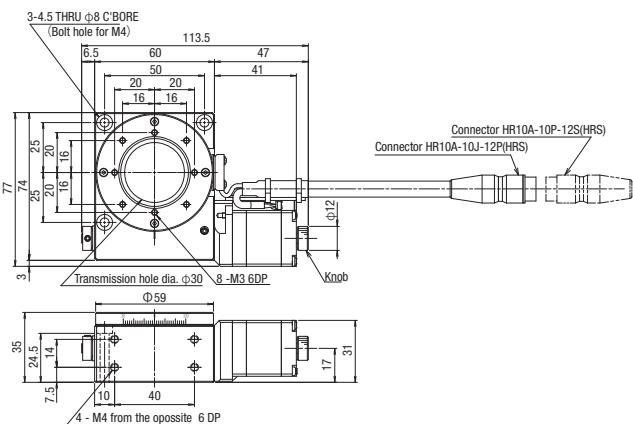


KRW04360MS-RC

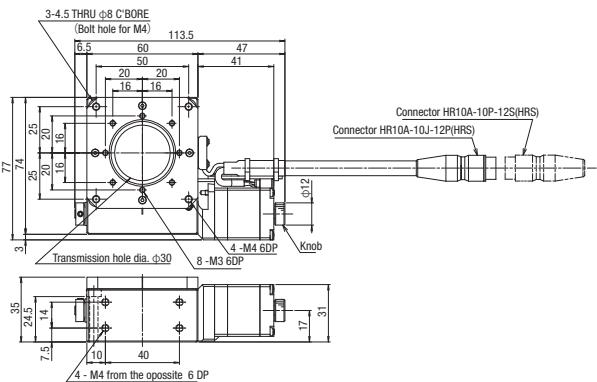


Dimensions

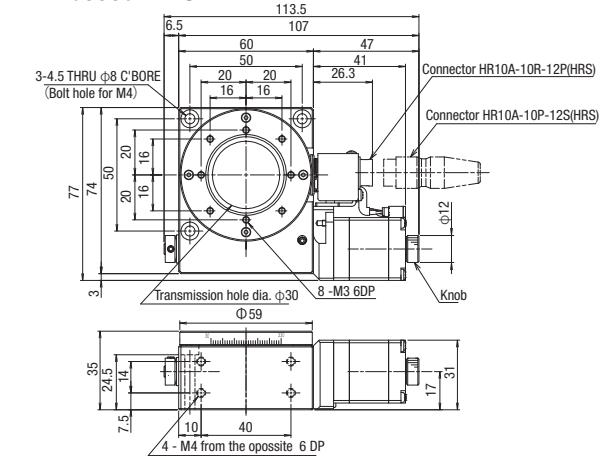
KRW06360T-LC



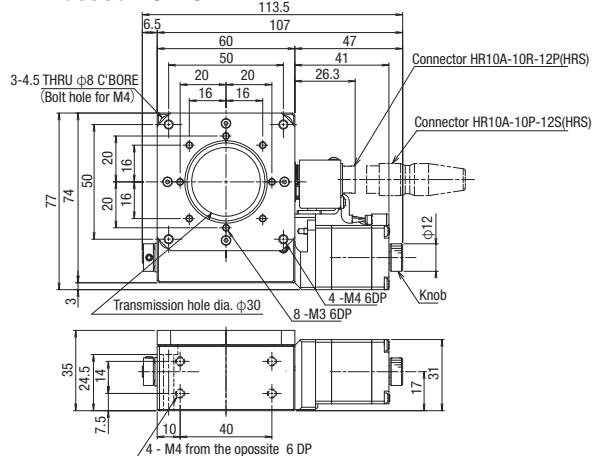
KRW06360TS-LC



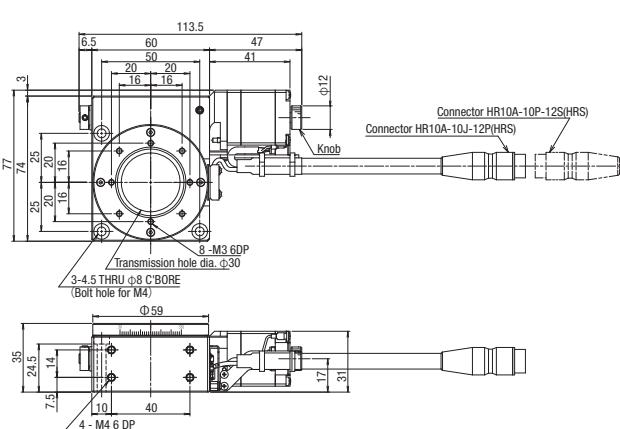
KRW06360M-LC



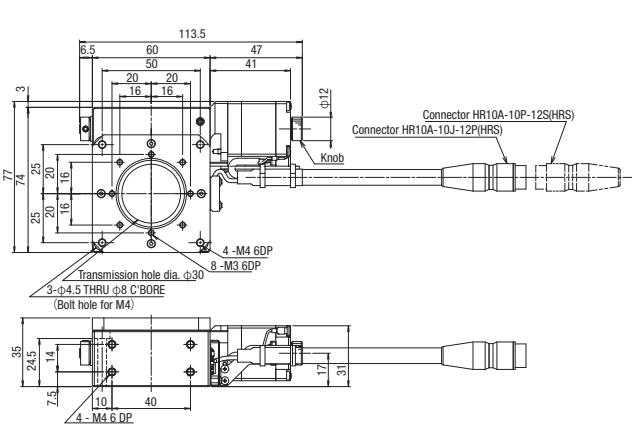
KRW06360MS-LC



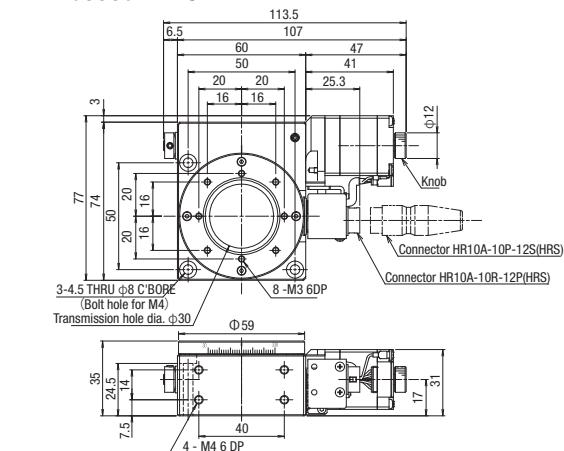
KRW06360T-RC



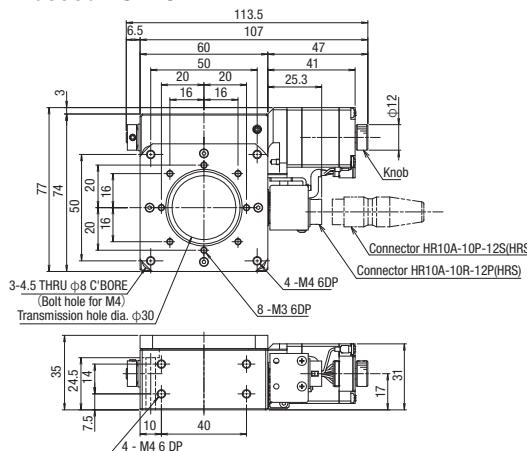
KRW06360TS-RC



KRW06360M-RC



KRW06360MS-RC



Motorized Rotary Stage

X
XY
Z
Horizontal Z
XYZ
Goniometer
Rotary
Unit
Controller

Ball Screw

Worm Gear

Direct Drive

Φ39
Φ40
Φ59
Φ60
Φ75
Φ100
Φ180
Other
C
050

Motorized Stage

New

Motorized Rotary Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

Direct Drive

Φ39

Φ40

Φ59

Φ60

Φ75

Φ100

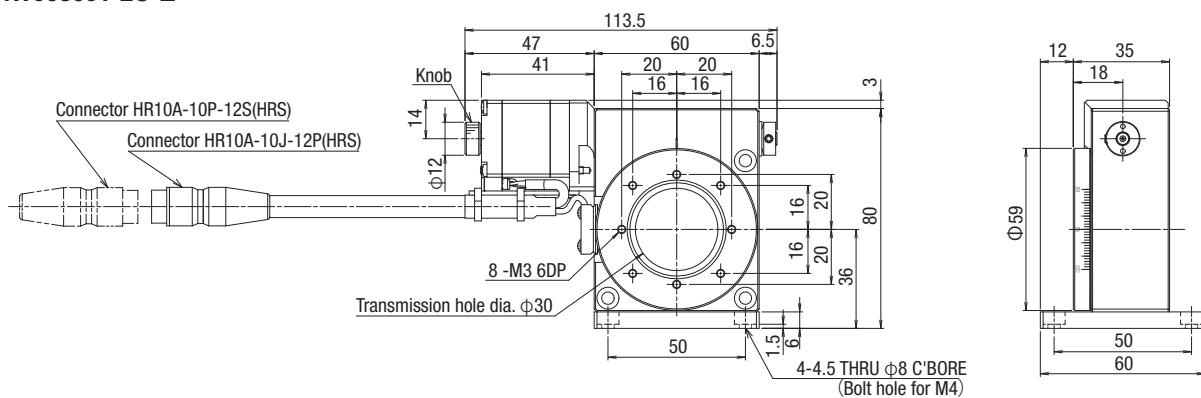
Φ180

Other

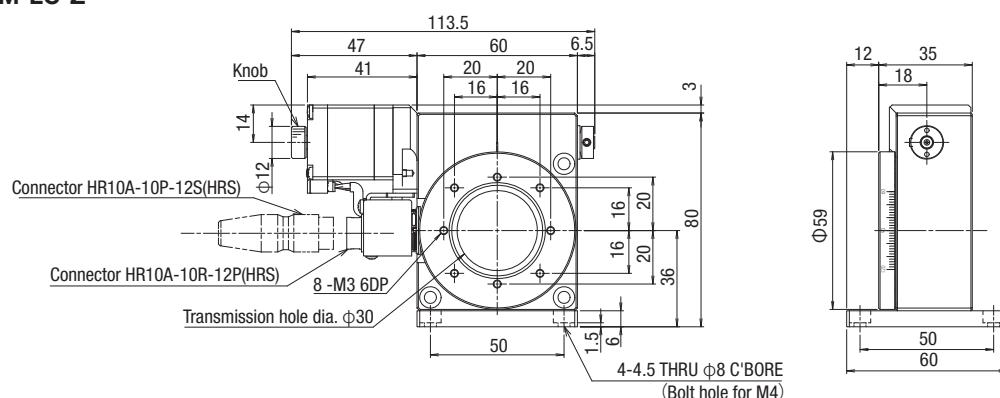
Rotary Stage φ39/φ59/□40/□60:KRW04/KRW06

Dimensions

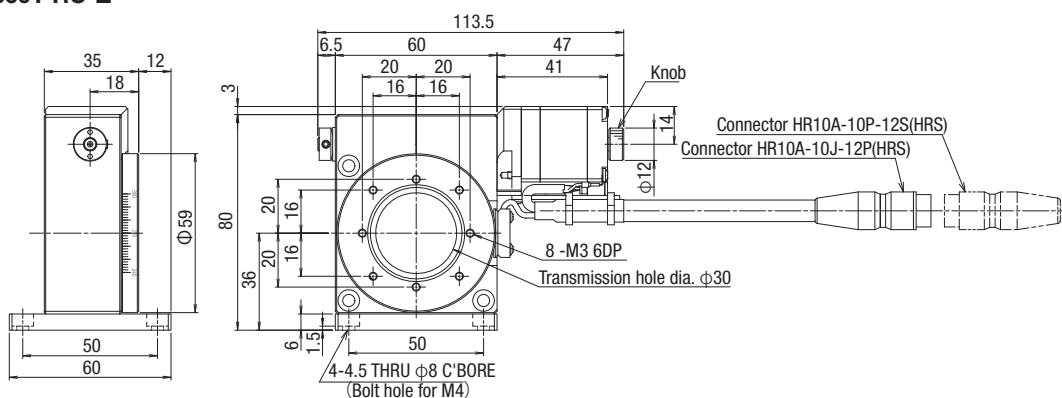
KRW06360T-LC-Z



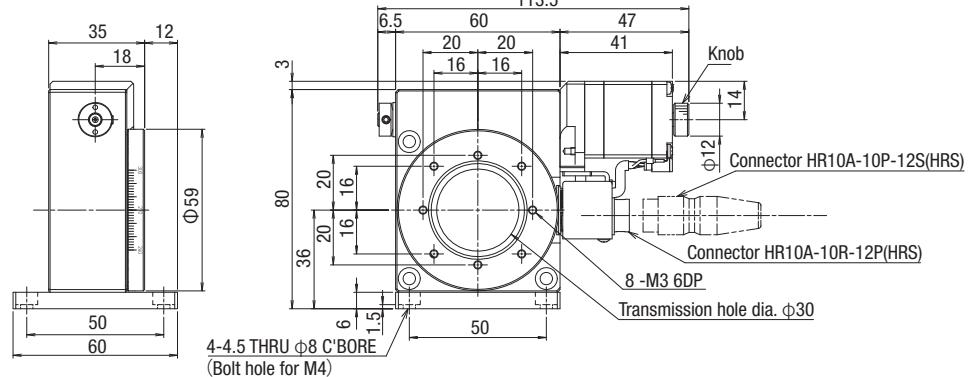
KRW06360M-LC-Z



KRW06360T-RC-Z

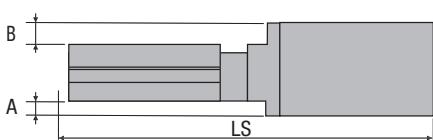


KRW06360M-RC-Z

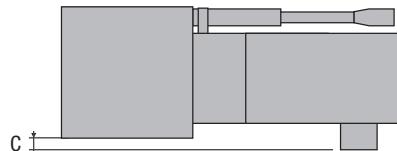


Dimensions

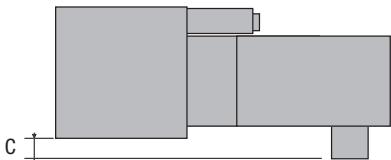
Side view



Top view :Connector :T(Pigtail)



Top view :Connector :M(Panel Mount)



C Standard motor

Motor model C005C-90215P-1

G High resolution

Motor model PK523HPMB-C1

Model	Stage size	Motor	Motor size	A(mm)	B(mm)	C(mm)	LS(mm)
KRW04360*-*C	φ39/□40	C	□28	—	—	3	99.5
KRW04360*-*G		G					
KRW06360*-*C	φ59/□60	C	□28	—	—	3	113.5
KRW06360*-*G		G					

PA αSTEP(AR Series)

Motor model ARM24SAK

ZA αSTEP(AZ Series)

Motor model AZM24AK

Model	Stage size	Motor	Motor size	A(mm)	B(mm)	C(mm)	LS(mm)
KRW04360*-*PA	φ39/□40	PA	□28	—	—	8.5	112.5
KRW04360*-*ZA		ZA				13	122
KRW06360*-*PA	φ59/□60	PA	□28	—	—	8.5	126.5
KRW06360*-*ZA		ZA				13	136

EA Motor for EtherCAT

Motor model STM28W100A

Model	Stage size	Motor	Motor size	A(mm)	B(mm)	C(mm)	LS(mm)
KRW04360*-*EA	φ39/□40	EA	□28	—	—	8.9	127.8
KRW06360*-*EA	φ59/□60						141.8

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

Direct Drive

φ39

φ40

φ59

φ60

φ75

φ100

φ180

Other

C

052

UG Servo motor MINAS A6 (Panasonic)

Motor model MSMF5AZL1A2

UA Servo motor J4 (Mitsubishi Electric corporation)

Motor model HG-KR053

Model	Stage size	Motor	Motor size	A(mm)	B(mm)	C(mm)	LS(mm)
KRW04360*-*UG	φ39/□40	UG	□38	2.5	0.5	21	154.5
KRW04360*-*UA		UA	□40	4.2	2	17.8	148.9
KRW06360*-*UG	φ59/□60	UG	□38	2	1	21	169
KRW06360*-*UA		UA	□40	3.7	2.5	17.8	163.4

Motorized Stage

New

Rotary Stage φ39/φ59/□40/□60:KRW04/KRW06

Motorized Rotary Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball
Screw

Worm
Gear

Direct
Drive

φ39

φ40

φ59

φ60

φ75

φ100

φ180

Other

Motor option

C Standard motor

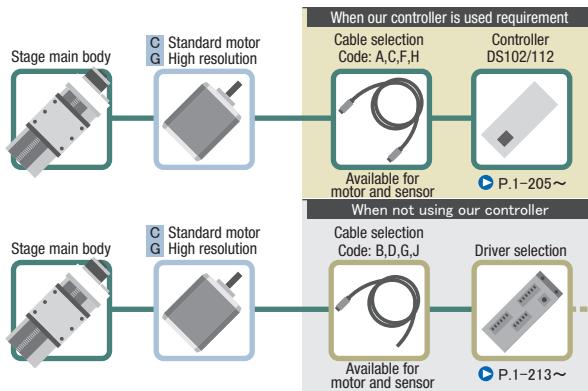
Motor model

C005C-90215P-1

G High resolution

Motor model

PK523HPMB-C1

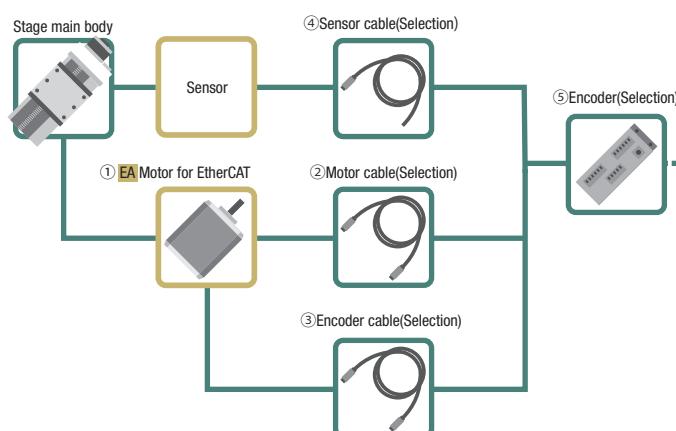


Motor option

EA Motor for EtherCAT

Motor model

STM28W100A



Code	① Motor model	② Motor cable selection	③ Encoder cable selection	④ Sensor cable selection	⑤ Driver selection
EA	STM28W100A	3A : D214-3-3R2 5A : D214-3-5R2 Blank • 3 • 5 : Not included	3A : D214-3-3RE2 5A : D214-3-5RE2 Blank • 3 • 5 : Not included	3A • 3 : HR10AP-S-SB-6-3 5A • 5 : HR10AP-S-SB-6-5 Blank : HR10AP-S-SB-6-2	3A • 5A : DS1000A-EC-28 Blank • 3 • 5 : Not included

Worm
Gear

Worm
Gear

Direct
Drive

φ39

φ40

φ59

φ60

φ75

φ100

φ180

Other

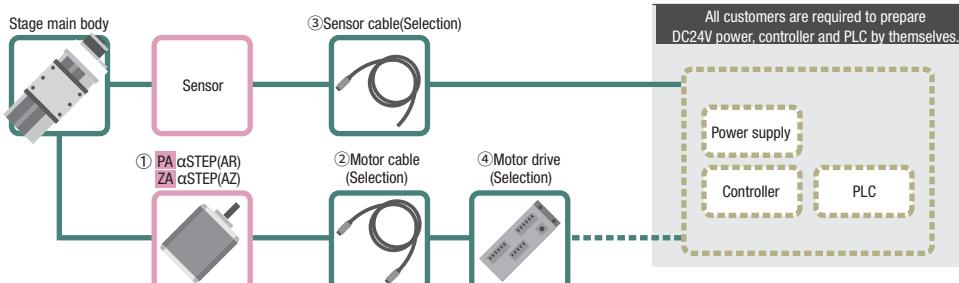
Motor option

PA cSTEP (AR Series)

Motor model
ARM24SAK

ZA cSTEP (AZ Series)

Motor model
AZM24AK



Code	①Motor model	②Motor cable selection	③Sensor cable selection	④Driver selection
PA	ARM24SAK	3A : CC030VA2R2 5A : CC050VA2R2 Blank • 3 • 5 : Not included	3A • 3 : HR10AP-S-SB-6-3 5A • 5 : HR10AP-S-SB-6-5 Blank : HR10AP-S-SB-6-2	3A • 5A : ARD-K Blank • 3 • 5 : Not included
ZA	AZM24AK	3A : CC030VZ2R2 5A : CC050VZ2R2 Blank • 3 • 5 : Not included		3A • 5A : AZD-K Blank • 3 • 5 : Not included

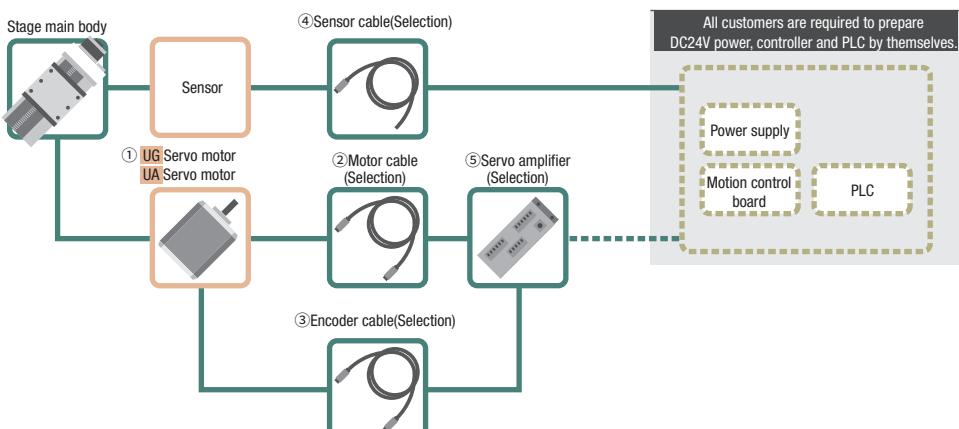
Motor option

UG Servo motor

Motor model
MSMF5AZL1A2

UA Servo motor

Motor model
HG-KR053



Code	①Motor model	②Motor cable selection	③Encoder cable selection	④Sensor cable selection	⑤AC servo amplifier selection
UG	MSMF5AZL1A2	3A : MFMCA0030EED 5A : MFMCA0050EED Blank • 3 • 5 : Not included	3A : MFECA0030EAD 5A : MFECA0050EAD Blank • 3 • 5 : Not included	3A • 3 : HR10AP-S-SB-6-3 5A • 5 : HR10AP-S-SB-6-5 Blank : HR10AP-S-SB-6-2	3A • 5A : MADLT05SF Blank • 3 • 5 : Not included
UA	HG-KR053	3A : SVPM-J3HF1-B-3-02S 5A : SVPM-J3HF1-B-5-02S Blank • 3 • 5 : Not included	3A : SVEM-J3HF1-B-3 5A : SVEM-J3HF1-B-5 Blank • 3 • 5 : Not included		3A • 5A : MR-J4-10A Blank • 3 • 5 : Not included

Motorized Stage

Electrical specification: KRW04/KRW06

New

Motorized Rotary Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball
Screw

Worm
Gear

Direct
Drive

Φ39

Φ40

Φ59

Φ60

Φ75

Φ100

Φ180

Other

C
055

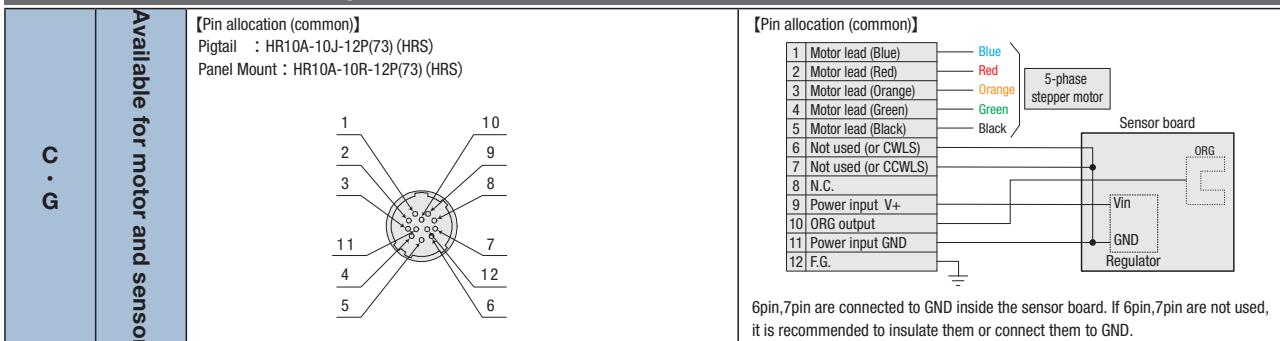
Motor · Electrical specification(5 phase stepping motor/αSTEP)

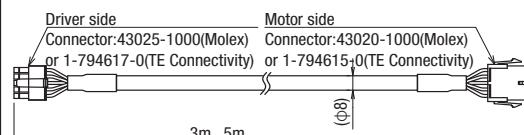
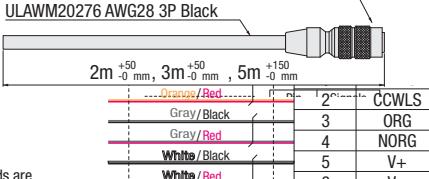
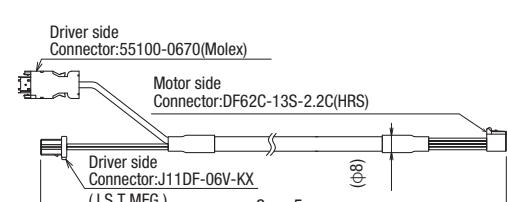
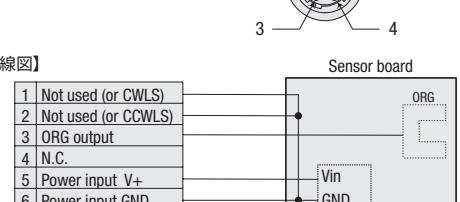
Motor code	C	G	PA	ZA
Model			KRW04/KRW06	
Motor Specification (*)	Type	5 phase stepping motor (0.75A/Phase)	αSTEP (AR Series)	αSTEP (AZ Series)
	Feature	Standard	Small step-out, incremental	Small step-out, absolute
	Model (*) ²	C005C-90215P-1	PK523HPMB-C1	ARM24SAK
	Manufacturer	Oriental Motor Co., Ltd.		
	Step angle	0.72°	0.36°	0.36°(1000P/R時)
	Mass	0.11kg	0.11kg	0.15kg
	Motor size	□size L size		□28mm
		37mm	37mm	45mm
	Max. Holding Torque	0.048N · m	0.038N · m	0.055N · m
	Driver model	CV0507-K-A9		ARD-K
Input power (Voltage · frequency)	DC24V±10% 1.4A(MAX)		DC24V±10%	DC24V±5%
	—		—	—
Connector	Pigtail	HR10A-10J-12P(73) (Hirose Electric Co., Ltd.)		Motor:DF62B-13EP-2.2C(HRS) Sensor:HR10A-7J-6P(73)(HRS)
	Panel Mount	HR10A-10R-12P(73) (Hirose Electric Co., Ltd.)		Motor:DF62B-13EP-2.2C(HRS) Sensor:HR10A-7R-6P(73)(HRS)
	Receiving connector	HR10A-10P-12S(73) (Hirose Electric Co., Ltd.)		Motor:DF62C-13S-2.2C(HRS) Sensor:HR10A-7P-6S(73)(HRS)
Sensor board	Limit sensor	—		
	Origin sensor	Available		
	Slit origin sensor	—		
	Sensor model	Photo microsensor EE-SX4320 (Omron Co., Ltd.)		
	Power-supply voltage	DC5~24V±5%		
	Current consumption	Total 35mA or less		
	Control output	NPN open collector output		DC30V 10mA or less
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.

Pin allocation · Connection diagram



Motor Code	Motor · Encoder		Sensor (common)
PA	Motor	<p>【Receiver cable】Model:CC030VA2R2(3m)/CC050VA2R2(5m) *Flexible cable</p> 	<p>【Receiver cable】Model:HR10AP-S-SB-6-□ (□ is the length) *for fixing</p> <p>Sensor side Connector (Female): HR10A-7P-6S (73) (HRS)</p>  <p>*The shields are connected with the connector shell.</p>
ZA	Motor	<p>【Receiver cable】Model:CC030VZ2R2(3m)/CC050VZ2R2(5m) *Flexible cable</p> 	<p>【Pin allocation (common)】 Pigtail:HR10A-7J-6P(73) (HRS) Panel Mount:HR10A-7R-6P(73) (HRS)</p>  <p>1pin,2pin are connected to GND inside the sensor board. If 1pin,2pin are not used, it is recommended to insulate them or connect them to GND.</p>

Motor • Electrical specification(Motor for EtherCAT/Servo motor)

Motor code		EA	UG	UA
Model			KRW04/KRW06	
Motor Specification (*)1	Type	2 phase closed Loop stepping motor	Servo motor	Servo motor
	Feature	Small step-out ,incremental,EtherCAT	High speed	High speed
	Model (*)2	STM28W100A	MSMF5AZL1A2	HG-KR053
	Manufacturer	SURUGA SEIKI	Panasonic	Mitsubishi Electric corporation
	Step angle	0.36°(1000P/R時)	Both absolute and incremental 23 bits encoder (8388608P/R) (*)3	Both absolute and incremental 22 bits encoder (4194304P/R) (*)4
	Mass	0.12kg	0.32kg	0.34kg
	Motor size	□28mm	□38mm	□40mm
	L size	59.3mm	72mm	66.4mm
Max. Holding Torque		0.085N · m	—	—
Maximum torque		—	0.48N · m	0.56N · m
Driver model		DS1000A-EC-28	MADLT05SF	MR-J4-10A
Input power (Voltage · frequency)		DC24V±10%	Three and Single phase AC200-240V 50/60Hz	Three and Single phase AC200-240V 50/60Hz
Connector	Pigtail	Motor:B06B-ZESK-D (JST) Encoder:SM08B-GHS-TB (JST) Sensor:HR10A-7J-6P(73)(HRS) Driver I/O Connector Housing:PUDP-24V-S Driver I/O Contact:SPUD-002T-P0.5;SPUD-002T-P0.5	Motor: 172167-1(TE Connectivity) Encoder: 172169-1(TE Connectivity) Sensor:HR10A-7J-6P(73)(HRS)	Motor: Manufacturer standard Encoder: Manufacturer standard Sensor:HR10A-7J-6P(73) (HRS)
	Panel Mount	Motor:B06B-ZESK-D (JST) Encoder:SM08B-GHS-TB (JST) Sensor:HR10A-7J-6P(73)(HRS) Driver I/O Connector Housing:PUDP-24V-S Driver I/O Contact:SPUD-002T-P0.5	Motor: 172167-1 (TE Connectivity) Encoder: 172169-1 (TE Connectivity) Sensor:HR10A-7R-6P(73)(HRS)	Motor: Manufacturer standard Encoder: Manufacturer standard Sensor:HR10A-7R-6P(73)(HRS)
	Receiving connector	Motor:ZER-06V-S (JST) Encoder:GHR-08V-S (JST) Sensor:HR10A-7P-6S(73)(HRS)	Motor: 172159-1 (TE Connectivity) Encoder: 172161-1 (TE Connectivity) Sensor:HR10A-7P-6S(73)(HRS)	Motor:JN4FT04SJ1-R (JST) Encoder: 1674320-1 (TE Connectivity) Sensor:HR10A-7P-6S(73)(HRS)
Sensor board	Limit sensor		—	—
	Origin sensor		Available	—
	Slit origin sensor		—	—
	Sensor model		Photo microsensor EE-SX4320 (Omron Co., Ltd.)	—
	Power-supply voltage		DC5~24V±5%	—
	Current consumption		Total 35mA or less	—
	Control output		NPN open collector output DC30V 10mA or less	—
Output logic			On detection (light shield condition): Output transistor OFF (Non-continuity)	—

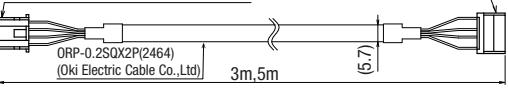
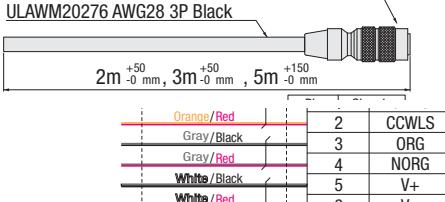
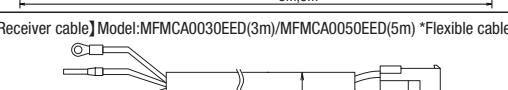
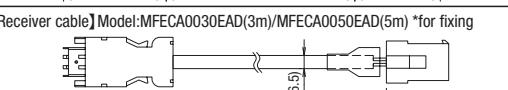
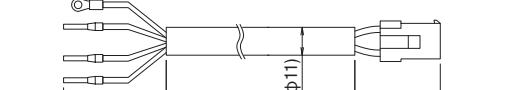
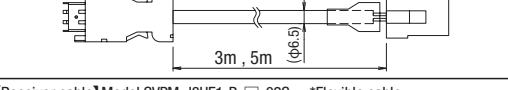
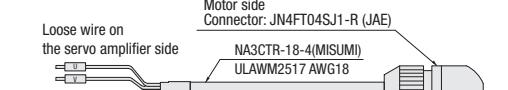
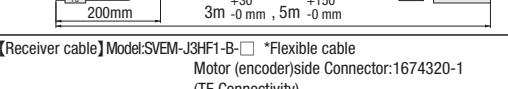
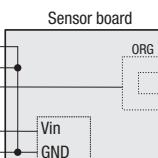
*1 See page P.1-213~ for details of single motor specification.

*2 Model is our own management model.

*3 Optional encoder cable is for incremental system.

*4 When constructing an absolute system, it is necessary to install a battery in the amplifier.

Pin allocation • Connection diagram

Motor Code	Motor • Encoder		Sensor (common)
EA	Motor	【Receiver cable】Model:D214-3-3R2(3m)/D214-3-5R2(5m) *Flexible cable Driver side Connector:PAP-04V-S(J.S.T.MFG.) Contact:SPHD-002T-P0.5(J.S.T.MFG.) Motor side Connector:ZER-06V-S(J.S.T.MFG.) Contact:SZE-002T-P0.3(J.S.T.MFG.) 	【Receiver cable】Model:HR10AP-S-SB-6-□ (□ is the length) *for fixing Sensor side Connector (Female): HR10A-7P-6S (73) (HRS)  *The shields are connected with the connector shell.
		【Receiver cable】Model:D214-3-3RE2(3m)/D214-3-5RE2(5m) *Flexible cable Driver side Connector:PUDP-10V-S(J.S.T.MFG.) Contact:SPUD-002T-P0.5(J.S.T.MFG.) Motor side Connector:GHR-08V-S(J.S.T.MFG.) Contact:SSH-002T-P0.2(J.S.T.MFG.) 	
	Encoder	【Receiver cable】Model:MFMCA0030EED(3m)/MFMCA0050EED(5m) *Flexible cable 	
		【Receiver cable】Model:MFECA0030EAD(3m)/MFECA0050EAD(5m) *for fixing 	
UG	Motor	【Receiver cable】Model:MFMCA0030EED(3m)/MFMCA0050EED(5m) *Flexible cable 	
		【Receiver cable】Model:MFECA0030EAD(3m)/MFECA0050EAD(5m) *for fixing 	
	Encoder	【Receiver cable】Model:SVPM-J3HF1-B-□-02S *Flexible cable Loose wire on the servo amplifier side Motor side Connector:JN4FT04SJ1-R (JAE) NA3CTR-18-4(MISUMI) ULAWM2517 AWG18 200mm 3m +30 -0 mm , 5m +150 -0 mm 	
		【Receiver cable】Model:SVEM-J3HF1-B-□ *Flexible cable Motor (encoder)side Connector:1674320-1 (TE Connectivity) Servo amplifier side Receptacle : 36210-0100FD (3M) ShellKit : 36310-3200-008 (3M) NAMFSB-23-3P (MISUMI) ULAWM2576 AWG23 3m +50 -0 mm , 5m +150 -0 mm * The load drawer	
UA	Motor	【Receiver cable】Model:SVPM-J3HF1-B-□-02S *Flexible cable Loose wire on the servo amplifier side Motor side Connector:JN4FT04SJ1-R (JAE) NA3CTR-18-4(MISUMI) ULAWM2517 AWG18 200mm 3m +30 -0 mm , 5m +150 -0 mm 	
		【Receiver cable】Model:SVEM-J3HF1-B-□ *Flexible cable Motor (encoder)side Connector:1674320-1 (TE Connectivity) Servo amplifier side Receptacle : 36210-0100FD (3M) ShellKit : 36310-3200-008 (3M) NAMFSB-23-3P (MISUMI) ULAWM2576 AWG23 3m +50 -0 mm , 5m +150 -0 mm * The load drawer	
	Encoder	【Connection diagram】	
		1 Not used (or CWLS) 2 Not used (or CCWLS) 3 ORG output 4 N.C. 5 Power input V+ 6 Power input GND	
		1pin,2pin are connected to GND inside the sensor board. If 1pin,2pin are not used, it is recommended to insulate them or connect them to GND.	

Motorized Stage

New

Motorized Rotary Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Electrical specification: KRW04/KRW06

Timing chart

Origin detected scale position [deg.]		
KRW04360T(M)-L	0 (The end face of the origin: CCW side edge of shield plate) 8 (Opposite end face : CW side edge of shield plate)	
KRW06360T(M)-L	0 (The end face of the origin: CCW side edge of shield plate) 8 (Opposite end face : CW side edge of shield plate)	

*Return to origin means that is performed return to origin type 4 using DS102/DS112 series. (DS102/DS112 are dedicated products for 5-phase motors.)

*The coordinate is a basis of design value. Dimension error may occur about plus or minus 0.5 deg.

Origin detected scale position [deg.]		
KRW04360T(M)-R	0 (The end face of the origin: CW side edge of shield plate) 8 (Opposite end face : CCW side edge of shield plate)	
KRW06360T(M)-R	0 (The end face of the origin: CW side edge of shield plate) 8 (Opposite end face : CCW side edge of shield plate)	

*Return to origin means that is performed return to origin type 3 using DS102/DS112 series. (DS102/DS112 are dedicated products for 5-phase motors.)

*The coordinate is a basis of design value. Dimension error may occur about plus or minus 0.5 deg.

Return to origin method

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 devided into same types. Selected wrong type may be operated incorrectly. Choose your best one whatever you need according to be recommended as below.

■KRW04360/KRW06360 recommended return to origin Return to origin sequence ▶P.1-201～

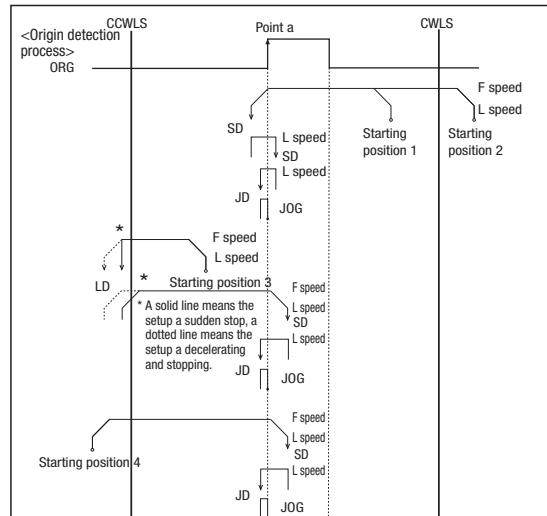
Type 3: Detect in the direction of CCW and perform detected process for CCW edge of ORG signal.

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

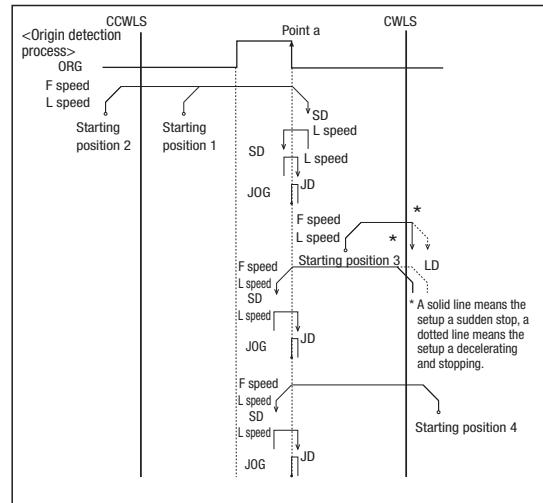
Type 9: After finished Type3, perform detected process for CCW edge of TIMING signal.

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

[Type3]



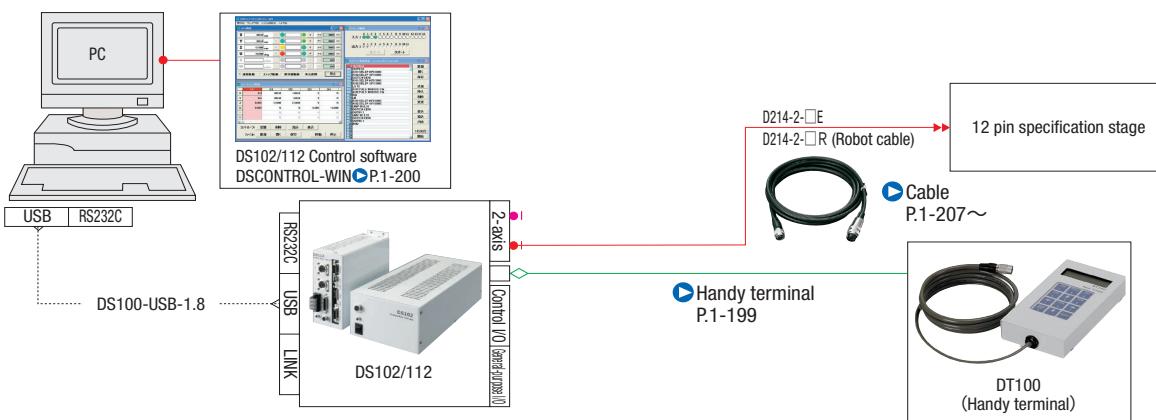
[Type4]



Connectin example

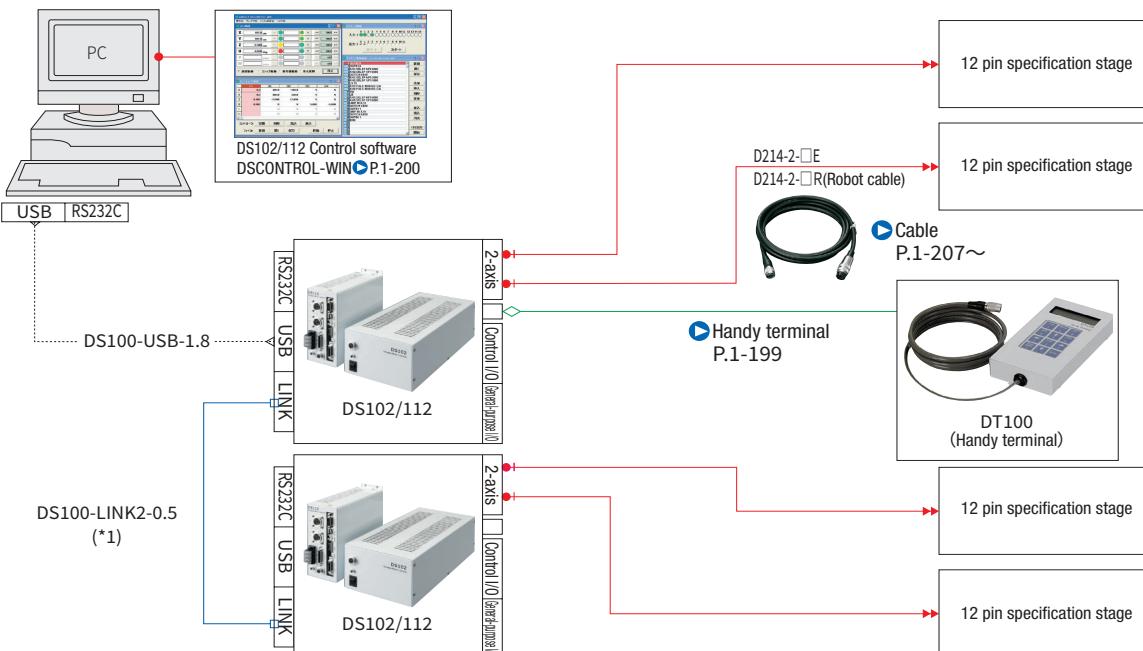
■ Connection example 1 Motorized Stage 1axis: When holding a terminal device (using control software)

*USB cable connection between PC and controller.



■ Connection example 2 Motorized Stage 4axis: When holding a terminal device (using control software)

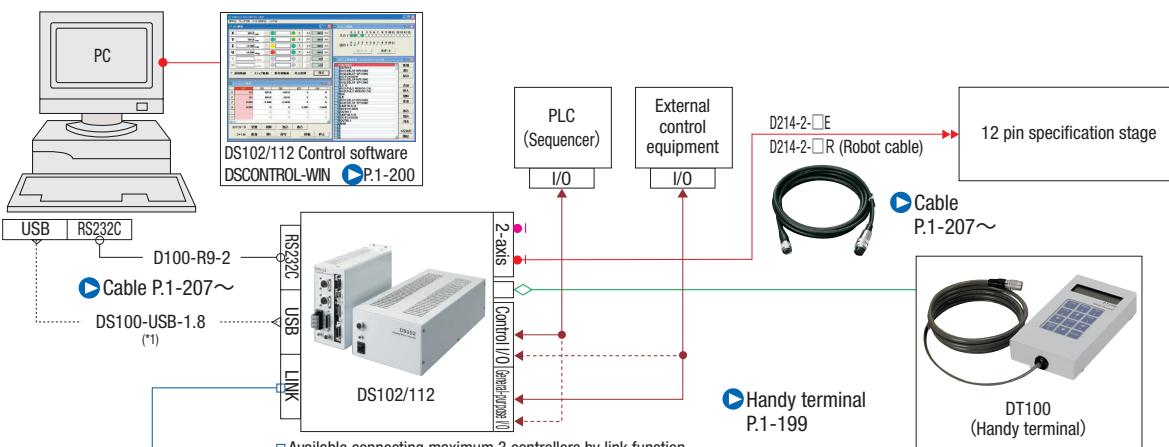
*USB cable connection between PC and controller.



(*1) It is possible to control up to 3 controllers (for a maximum of 6-axis control) with link function.

■ Connection example 3 When controlling from the PLC I/O Unit.

*USB cable connection between PC and controller.



Available connecting maximum 3 controllers by link function.

(*1) Using the USB hub, it is controllable in a single PC to up to four link networks (24-axis).

Motorized Stage

Rotary Stage: KRE04360/KRE06360



RoHS

* The photo shows an image.
The holes and the shape may differ in certain respects from the actual product.

- X
- XY
- Z
- Horizontal Z
- XYZ
- Goniometer
- Rotary**
- Unit
- Controller

Ball
Screw

Worm
Gear

Direct
Drive

φ39

φ40

φ59

φ60

φ75

φ100

φ180

Other

Model Selection code Option code
KRE04360-C

1

2

● Cable P.1-207~
● Electrical specification P.1-179~

1 Table size

04	φ39mm
06	φ60mm

2 Cable option

Code	Specification	Cable type
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)	—

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

Electrical specification ● P.1-179~

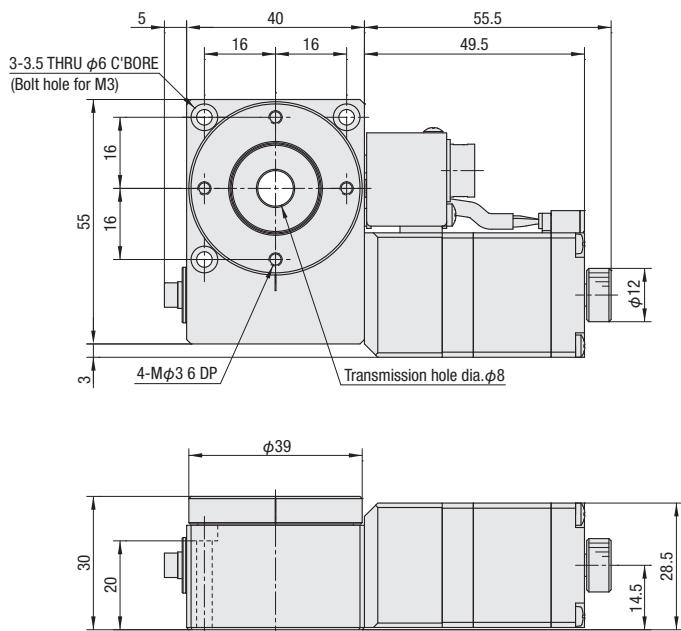
* See page ● P.1-207, 209~ for details of cable.

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

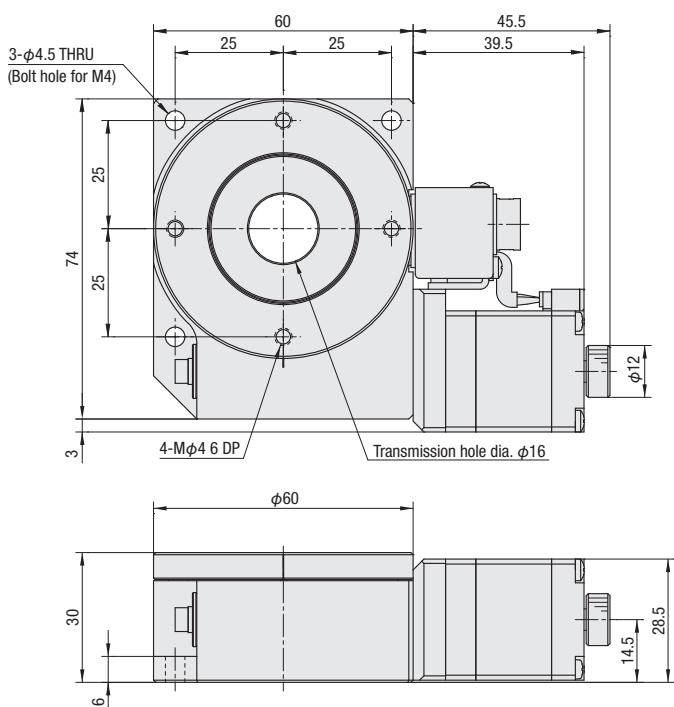
SPEC		
Model	KRE04360-C	KRE06360-C
Travel length	360°	
Table size	φ39mm	φ60mm
Travel mechanism (Reduction ratio)	Worm gear (Reduction ratio 1/90)	Worm gear (Reduction ratio 1/120)
Guide	Deep groove ball bearing	
Main materials-Finishing	Aluminum—Black almite finishing	
Weight	0.36kg	0.50kg
Resolution (Pulse)	0.008°(Full)	0.006°(Full)
MAX speed	40°/sec	30°/sec
Positioning accuracy	Within 0.1degree	
Repeatability positioning accuracy	Within ±0.05°	
Load capacity	3kgf [29.4N]	
Lost motion	Within 0.1degree	
Parallelism	Within 50μm	
Sensor	—	
Origin sensor	Installed	
Provided screw (Hexagon-headed bolt)	3 of M3—25	3 of M4—12

Dimensional outline drawings

KRE04360



KRE06360



Motorized Rotary Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball
Screw

**Worm
Gear**

Direct
Drive

φ39

φ40

φ59

φ60

φ75

φ100

φ180

Other

Motorized Stage

Electrical Specification: KRE04360/KRE06360

Motorized Rotary Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

Direct Drive

φ39

φ40

φ59

φ60

φ75

φ100

φ180

Other

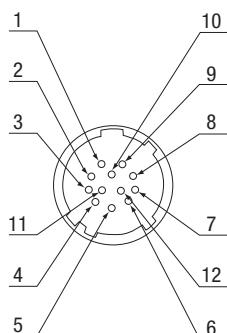
Electrical specification

	Models	KRE04360-C	KRE06360-C
Motor (*1)	Type	5 phase stepping motor	0.75A/Phase
	Maker	Oriental Motor Co., Ltd.	
	Model (*2)	C005C-90215P-1	
	Step angle	0.72°	
Connector	Model	HR10A-10R-12PC (71) (Hirose Electric Co., Ltd.)	
	Receiving connector	HR10A-10P-12S (73) (Hirose Electric Co., Ltd.)	
Sensor	Origin sensor	Photo microsensor	Installed
	Model	EE-SX4320 (Omron Co., Ltd.)	
	Power voltage	DC5~24V ±10%	
	Consumption current	Total 35mA or less	
	Control output	NPN open collector output DC5~24V 8mA or less Residual voltage 0.3V or less when the load current is 2mA	
	Output logic	On detection (light shield condition): Output transistor OFF (Non-continuity)	

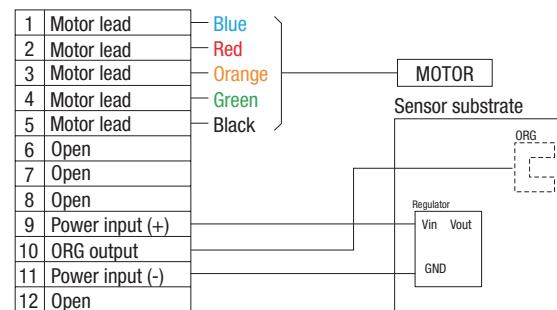
*1 See page C P.1-213~ for details of single motor specification.

*2 Model is our own management model.

Pin allocation



Connection diagram



* When use DS102/DS112 controller, setup the sensor logic as below.
• Limit sensor logic: A (N.O.)
• Origin sensor logic: B (N.C.)

Timing chart

Unit [°]

Origin detected scale position [°]

KRE04360 0 (The end face of the origin: CCW side edge of the douser.)
6 (Opposite side of the end face: CW side edge of the douser.)

KRE06360 0 (The end face of the origin: CCW side edge of the douser.)
4 (Opposite side of the end face: CW side edge of the douser.)

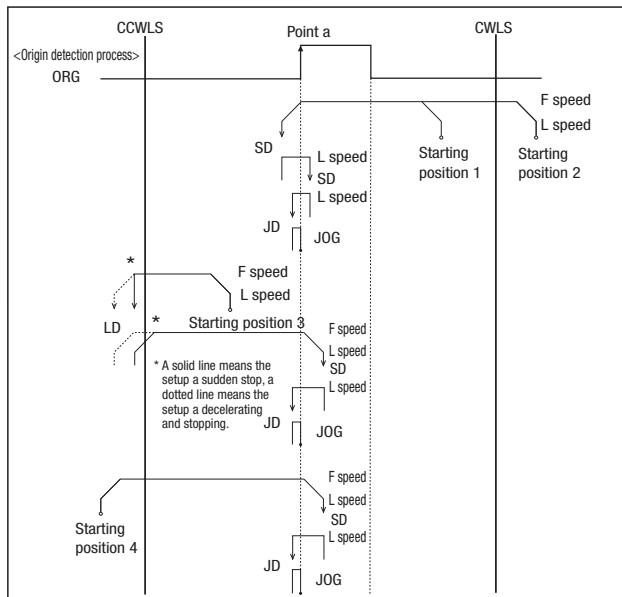
* Return to origin means that is performed return to origin type 4 using DS102/DS112 series.

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

KRE series recommendation return to origin method

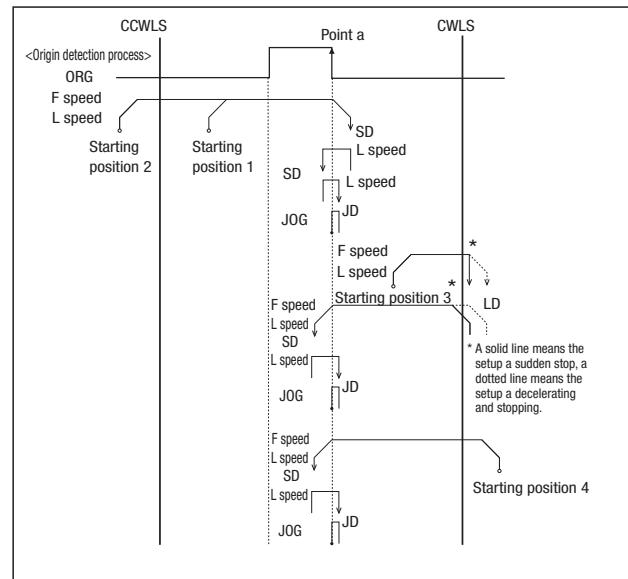
Suruga's motorized stages are different from the specification depending on the models. Therefore return to origin method other than recommendation may not be work correctly. Set to the way of recommendation return origin when using our controller.

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



[Type9] After finished Type3, perform detected process for CCW edge of TIMING signal.

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



[Typ10] After finished Type4, perform detected process for CW edge of TIMING signal.

Return to origin sequence P.1-201~

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 (Divisions)		
		Normal (Full/Half)	Micro step (1~1/250 [16 steps])	
AC100-240V	Without	DS102ANR	DS102AMS	
	With	DS102ANR-IO	DS102AMS-IO	
DC24V	Without	DS112ANR	DS112AMS	
	With	DS112ANR-IO	DS112AMS-IO	

Motorized Stage

Rotary Stage $\phi 75/\phi 100/\phi 180$: KS402

Motorized Rotary Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

Direct Drive

$\phi 39$

$\phi 40$

$\phi 59$

$\phi 60$

$\phi 75$

$\phi 100$

$\phi 180$

Other



RoHS

■ Good for accuracy positioning at wide angle and 360° continuously rotation.

■ Transmission type would be suitable for rotating polarizing elements and organization cables.

Model	Selection code	Option code
KS402-75G-		5
	1	2

○ Cable P.1-207~
○ Electrical specification P.1-183~

1 Table size	
75G	$\phi 75\text{mm}$
100C	$\phi 100\text{mm}$
180C	$\phi 180\text{mm}$

2 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

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

* See page ○ P.1-207, 209~ for details of cable.

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

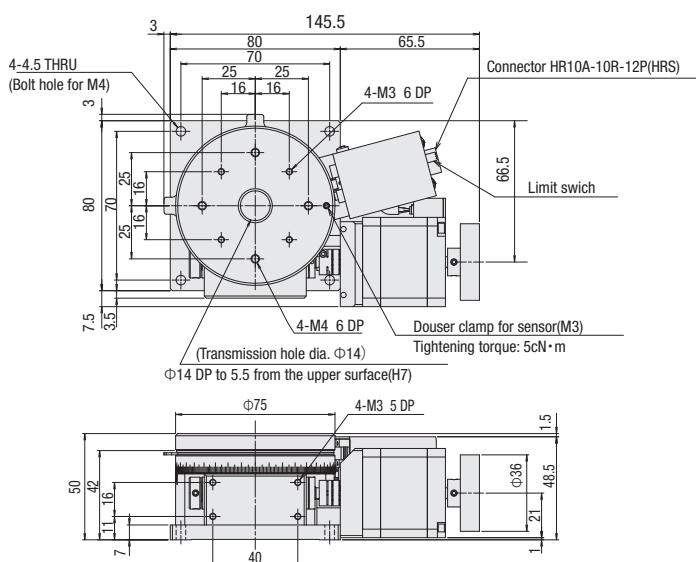
Selection Example

Your spec + Attached cable → **KS402-100C**

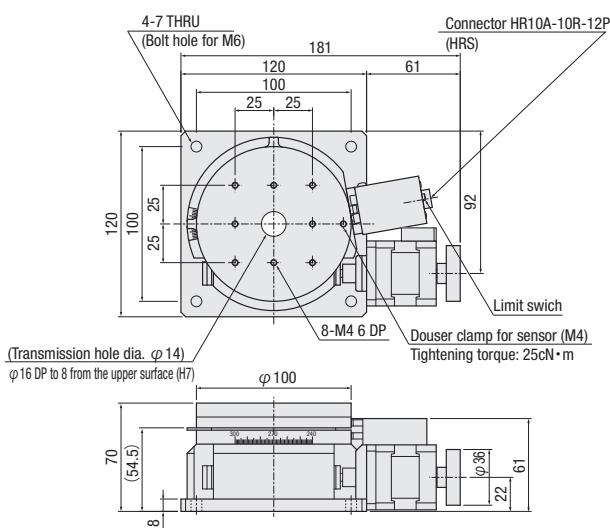
SPEC			
Model	KS402-75G-5	KS402-100C-5	KS402-180C-5
Mechanical specification			
Travel length		360°	360°
Table size	$\phi 75\text{mm}$	$\phi 100\text{mm}$	$\phi 180\text{mm}$
Travel mechanism (Reduction ratio)	Worm gear (1/144)	Worm gear (1/180)	Worm gear (1/180)
Guide	Receiving cross roller axis	Combination angular ball bearing	Combination angular ball bearing
Main materials-Finishing		Aluminum–Black almite finishing	
Weight	1.16kg	2.5kg	9.7kg
Resolution	0.0025°/Pulse (Full)	0.004°/Pulse (Full)	0.004°/Pulse (Full)
MAX speed	25°/sec [10kHz]	20°/sec [5kHz]	20°/sec [5kHz]
Positioning accuracy		0.03°	0.05°
Repeatability positioning accuracy		$\pm 0.005^\circ$	$\pm 0.005^\circ$
Load capacity	10kgf [98N]	15kgf [147N]	30kgf [294N]
Moment stiffness	0.15''/N · cm	0.07''/N · cm	0.02''/N · cm
Lost motion	0.005°	0.004°	0.01°
Backlash	0.005°	0.004°	0.01°
Parallelism		120μm	100μm
Eccentricity		5μm	
Runout		20μm	60μm
Sensor			
Limit sensor		Installed (Switch)	Installed (Switch)
Origin sensor			Installed
Proximity origin sensor		—	
Provided screw (Hexagon-headed bolt)	4 of M4–12	4 of M6–16	4 of M6–12

Dimensional outline drawings

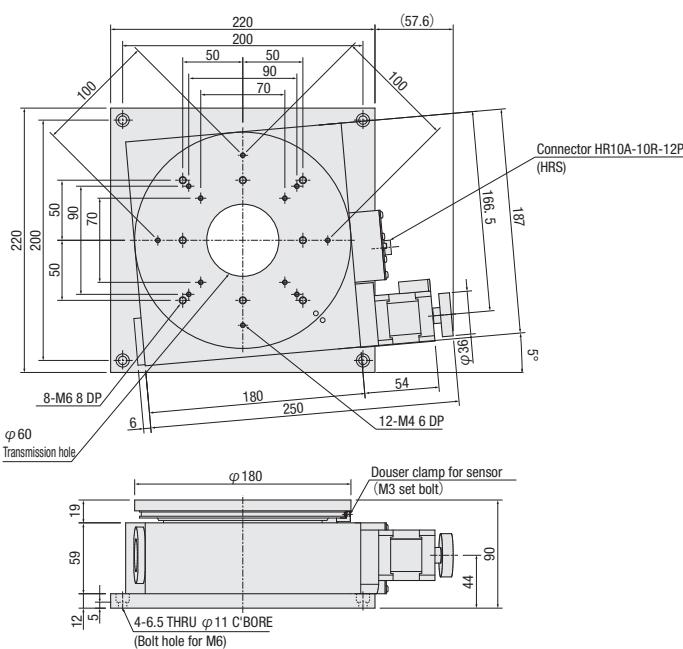
KS402-75G



KS402-100C



KS402-180C



X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

Direct Drive

$\phi 39$

$\phi 40$

$\phi 59$

$\phi 60$

$\phi 75$

$\phi 100$

$\phi 180$

Other

Motorized Stage

Electrical Specification • Option: KS402

Motorized Rotary Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

Direct Drive

φ39

φ40

φ59

φ60

φ75

φ100

φ180

Other

Electrical specification

	Models	KS402-75G	KS402-100C	KS402-180C
Motor (*1)	Type	5 phase stepping motor 0.75A/Phase (Oriental Motor Co., Ltd.)		
	Model (*2)	PK544-PMB-C18(□42mm)	PK544PB-C18(□42mm)	PK544PB(□42mm)
	Step angle	0.36°		0.72°
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 (PM-F25)	Installed (PM-F25,R25)	
	Origin sensor	Installed (PM-F25)	Installed (PM-L25)	
	Slit origin sensor	-		
	Model	Micro Photoelectric sensor PM-□25 (Panasonic Industrial Devices SUNX)		
	Power voltage	DC5～24V ±10%		
	Consumption current	Total 45mA or less (Per 1 sensor 15mA) NPN open collector output DC30V or less 50mA or less		
	Control output	Residual voltage 2V or less when the load current is 50mA Residual voltage 1V or less when the load current is 16mA		
Output logic		CWLS,CCWLS On detection (light shield condition): Output transistor OFF (Non-continuity) ORG Light on: Output transistor becomes OFF (Non-continuity)	On detection (light shield condition): Output transistor OFF (Non-continuity)	

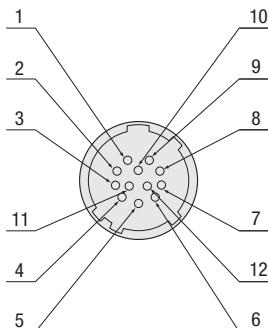
*1 See page C P.1-215~ for details of single motor specification.

*2 Model is our own management model.

○ Can be reset the limit function in KS402-75G, 100C, 180C by the switch.

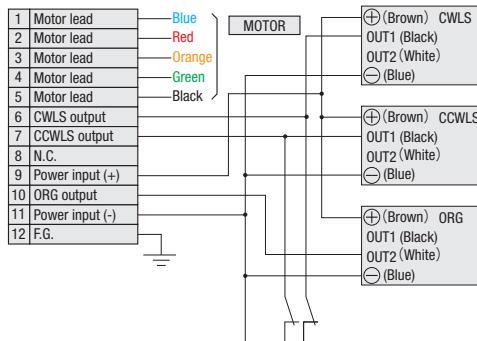
○ Can be set any traveling angle because of changeable shield plate position

Pin allocation

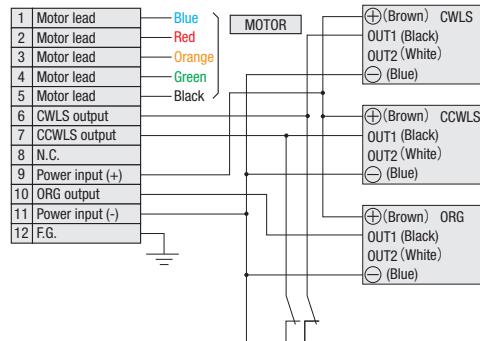


Connection diagram

KS402-75G/KS402-100C



KS402-180C



Timing chart

KS402-75G, KS402-100C, KS402-180C (Detect only KS402-180C (dark))

Origin • • Detect in scale 0 (Light on)

(Return to origin is performed type 4 of returning origin by use of DS102/DS112 controller)

CW and CCW limit • • Any changeable position

Method for return to origin

Suruga's motorized stages are different from the specification depending on the models.

Therefore return to origin method other than recommendation may not be work correctly.

Set to the way of recommendation return origin when using our controller.

■KS402 series recommended return to origin Return to origin sequence P.1-201~

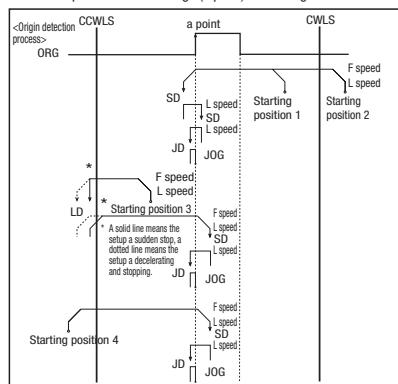
Type 3: Detect in the direction of CCW and perform detected process for CCW edge(a point) of ORG signal.

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

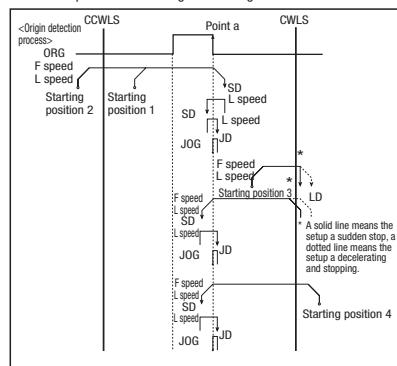
Type 9: After finished Type3, perform detected process for CCW edge of TIMING signal.

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~

DC24 type input

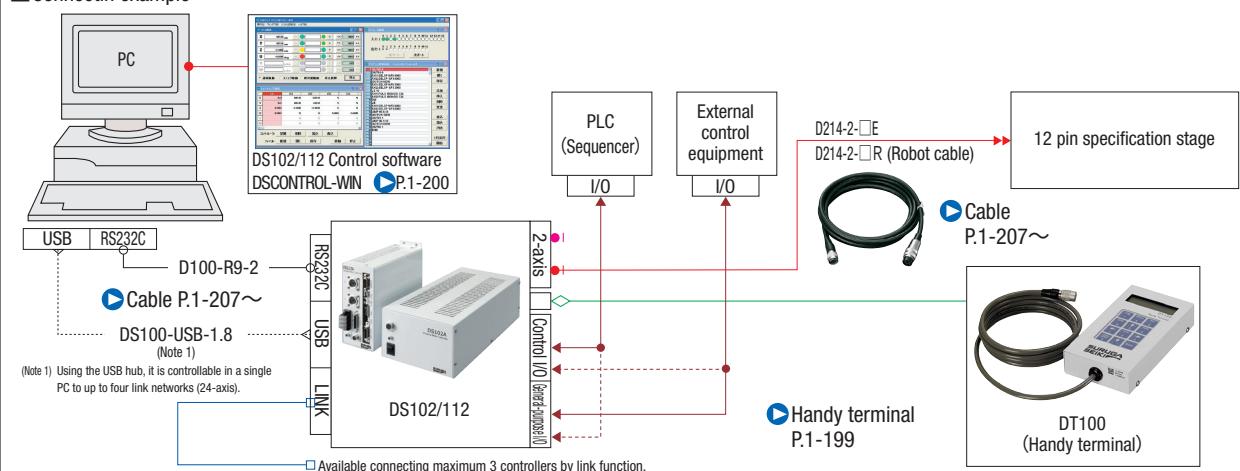
Model	CVD507-K-A9	CRD5107P
Divisions	1~1/250 (16 steps)	1~1/250 (16 steps)

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

■ Connection example



Motorized Stage

New

Motorized Rotary Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball
Screw

Worm
Gear

Direct
Drive

φ39

φ40

φ59

φ60

φ75

φ100

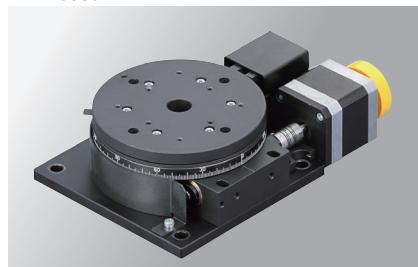
φ180

Other

1

185

KRE10360



RoHS

* This photo shows a cover position as an image.
The holes and the shape may differ in certain respects from the actual product.

Model Selection code Option code
KRE10360- 1 2

● Cable P.1-207～
● Electrical specification P.1-179～

1 Table size

10 φ100mm

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	Cable is not included (Standard)	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)	—

* The one end loose side might be on an opposite side of stage.

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

See page Page ● P.1-207, 209～ for more cable details.

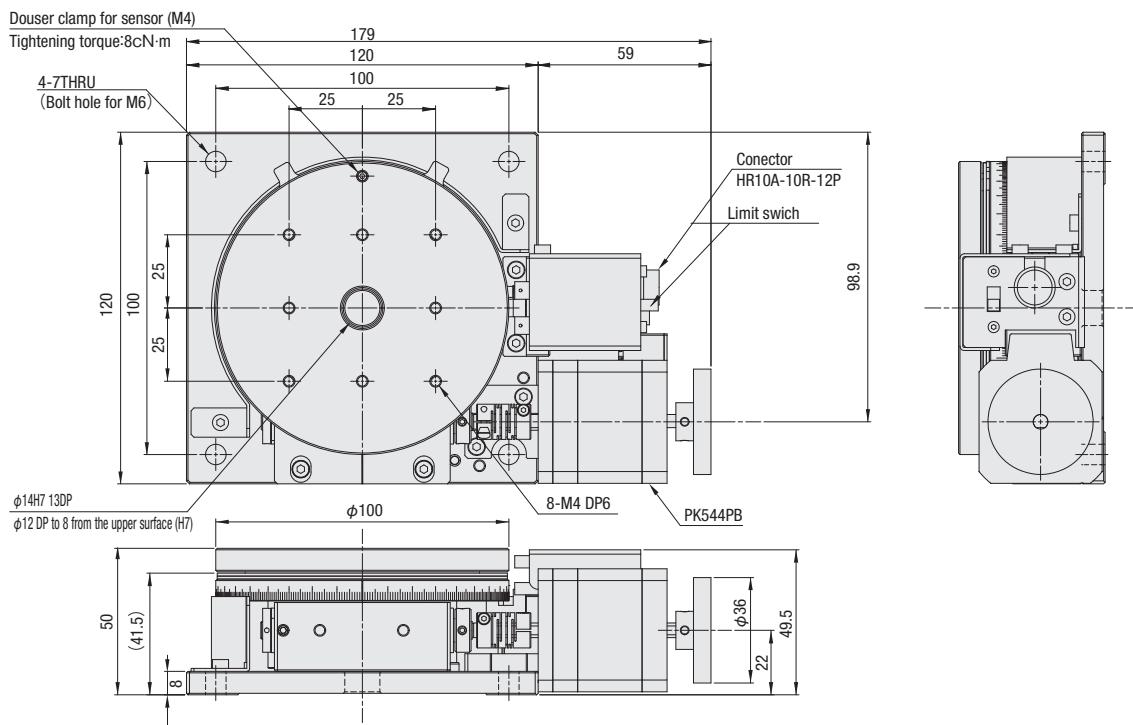
* Please select "blank, A, C, F, H" when connect with stepping motor controller(DS102/112).

SPEC

Model	KRE10360
Mechanical specification	360° φ100mm Worm gear(1/90) Deep groove ball bearing Aluminum—Al-Bronze 1.8kg
Accuracy specification	0.008°/Pulse(Full) 40°/sec[5kHz] Within 0.05° Within ±0.01° 15kgf [147N] 0.08"/N · cm Within 0.02° Within 0.02° Within 120μm Within 5μm Within 35μm 4 of M6—16
Sensor	Limit sensor Origin sensor Installed (Switch) Installed

Dimensional outline awings

KRE10360



Motorized Rotary Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball
Screw

Worm
Gear

Direct
Drive

φ39

φ40

φ59

φ60

φ75

φ100

φ180

Other

Motorized Stage

New

Motorized Rotary Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

Direct Drive

φ39

φ40

φ59

φ60

φ75

φ100

φ180

Other

Electrical Specification • Option : KRE10360

Electrical specification

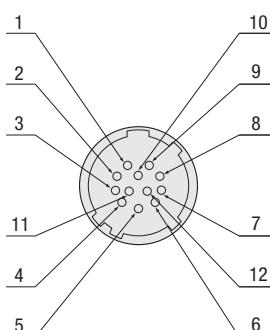
Model		KRE10360
Motor (*1)	Type	5 phase stepping motor 0.75A/Phase (Oriental Motor Co., Ltd.)
	Model (*2)	PK544PB
	Step angle	0.72°
Connector	Model	HR10A-10R-12P (73) (Hirose Electric Co., Ltd.)
	Applicable connector on acceptance side	HR10A-10P-12S (73) (Hirose Electric Co., Ltd.)
Sensor	Limit sensor	Installed (PM-R25)
	Origin sensor	Installed (PM-F25)
	Slit origin sensor	—
	Model	Micro Photoelectric Sensor PM-□25 (Panasonic Industrial Devices SUNX)
	Power voltage	DC5~24V ±10%
	Consumption current	Total 45mA or less (Per 1 sensor 15mA)
	Control output	NPN open collector output DC30V or less/50mA or less Residual voltage 2V or less when the load current is 50mA Residual voltage 1V or less when the load current is 16mA
	Output logic	CWLS,CCWLS On detection (light shield condition): Output transistor OFF (Non-continuity) ORG Light on: Output transistor becomes OFF (Non-continuity)

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

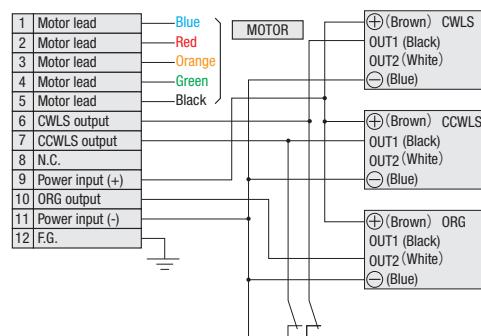
*2 Model is our own management model.

○Can be set any traveling angle because of changeable shield plate position

Pin allocation



Connection diagram



Timing chart

Origin • • • Detect in scale 0 (Light)

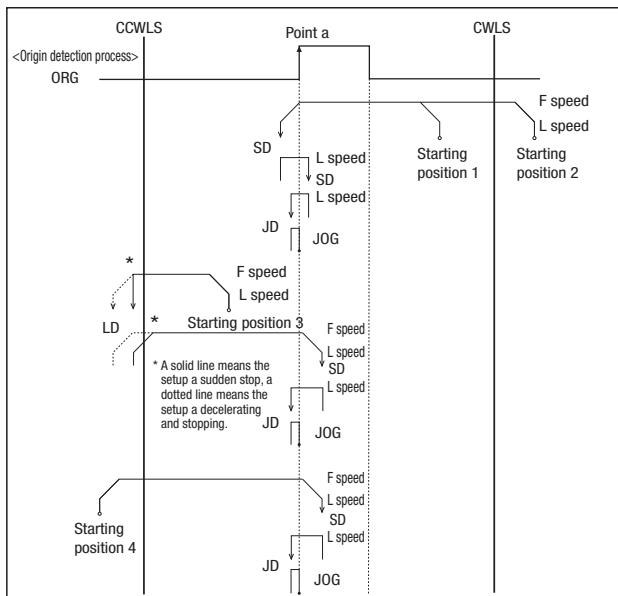
(Return to origin is performed type 4 of returning origin by use of DS102/DS112 controller)

CW and CCW limit • • Any changeable position

Method for return to origin

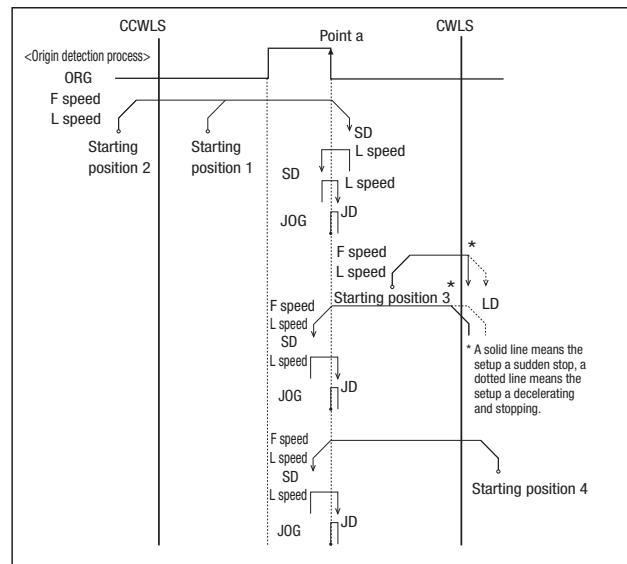
Suruga's motorized stages are different from the specification depending on the models.
Therefore return to origin method other than recommendation may not be work correctly.
Set to the way of recommendation return origin when using our controller.

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



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

【Type 4】 Detect in the direction of CW and perform detected process for CW edge of ORG 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



Motorized Stage

Rotary Stage $\phi 39$: KS451

Motorized Rotary Stage

KS451-40



RoHS

■ Good for accuracy positioning
360° continuously rotation.

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

Direct Drive

$\phi 39$

$\phi 40$

$\phi 59$

$\phi 60$

$\phi 75$

$\phi 100$

$\phi 180$

Other

Model: **KS451-40-5**
Option code: **1 2**

Cable P.1-207~
Electrical specification P.1-191~

1 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

2 Attached substrate specification

Code	Specification
Blank	Not available 24V supported substrate
V	Substrate for 24V Included K-PCBA24

※KS451: Sensor voltage 5V
Consider to use sensor amplifier substrate when you control without our controller.

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

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

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

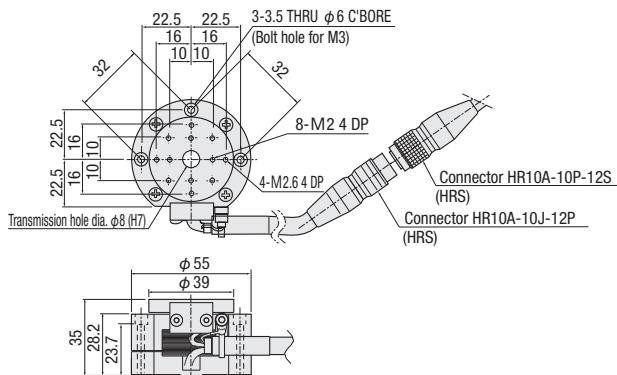
Selection Example

Your spec + Attached cable + Attached substrate specification
 $\phi 39$ mm 2m One end Loose With substrate for 24V **▷ KS451-40-1V**

		SPEC
Model		KS451-40-5
Mechanical specification	Travel length	360°
	Table size	$\phi 39$ mm
	Travel mechanism	Direct drive motor
	Guide	Ball bearing (Deep groove ball bearing)
	Main materials-Finishing	Aluminum–Black almite finishing , stainless steel
	Weight	0.3kg
Accuracy specification	Resolution	0.72°/Pulse (Full) 0.36°/Pulse (Half)
	MAX speed	72°/sec [100Hz]
	Positioning accuracy	—
	Repeatability positioning accuracy	—
	Load capacity	1.0kgf [9.8N]
	Moment stiffness	2.50"/N · cm
	Lost motion	Within 0.05°
	Backlash	—
	Parallelism	Within 100μm
	Runout	Within 50μm
Sensor	Limit sensor	—
	Origin sensor	Installed
	Proximity origin sensor	—
	Provided screw (Hexagon-headed bolt)	3 of M3–28

Dimensional outline drawings

KS451-40



Sensor amplifier substrate for 24V: K-PCBA24

Instruction Manual

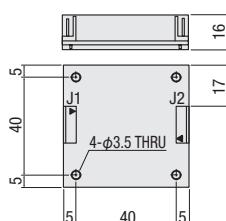
RoHS

K-PCBA is needed to drive a motorized stage with EE-SX1101 sensor when using PC or sequencer's motion control module and not using our controller. EE-SX11 sensor is operated with 5V input voltage and there is only about 1mA of output current. When using controlling equipment such as PC and sequencer, it is common to use photo coupler for sensor input-terminal and often needs about 10mA of terminal current. Therefore a motorized stage with EE-SX1101 sensor cannot be directly connected. In this case, K-PCBA is effective in being assembled as sensor amplifier so that input voltage becomes 24V and max. Output current is available up to 500mA.

K-PCBA24

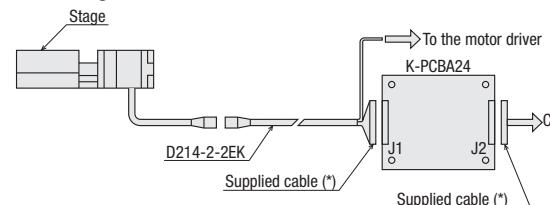


Dimensional outline drawings



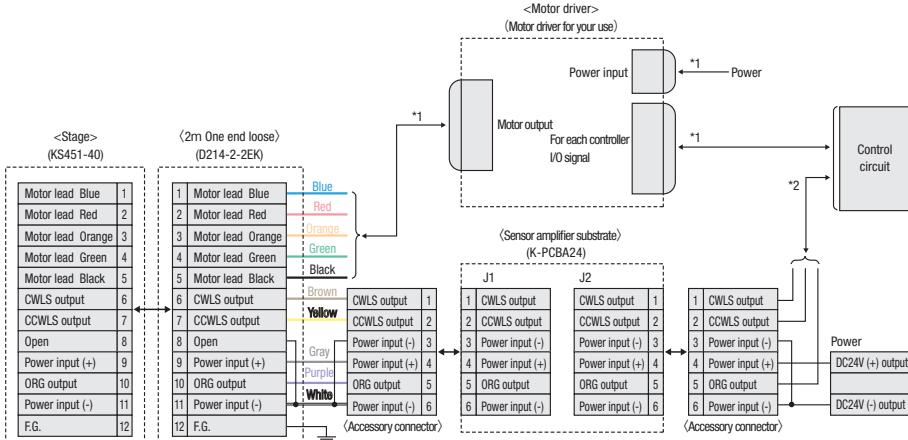
▽ mark indicates the position of connector 1 pin.

Full diagram



* Crimping connection of accessory connector needs to be done by a customer

Connection sensor amplifier and driver example



*1. When connecting, refer to operation manual of motor driver in application.

*2. When connecting, follow the control circuit in application.

Note that sensor damage

*See sensor specification for the exclude and include this substrate.

*There are stages that no need this substrate.

SPEC	
Model	K-PCBA24
Dimension	50 (W) × 50 (D) × 16 (H) mm
Connector type	171825-6 (Tyco Electronics Japan G.K.)
Compatible connector	171822-6 (Accessories)
Power voltage	DC24V ±10%
Consumption current	30mA or less
Control output	NPN open collector output DC24V 500mA or less
Specification environment	0~40°C, 20~80%RH (non-dew)
Accessories	2 of connector 171822-6 (Tyco Electronics Japan G.K.) 12 of contact terminal 170204-1 (Tyco Electronics Japan G.K.)

*Connector processing needs to be done by customer. Please use electric wire of which diameter is more than 0.2mm for wire arrangement.

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

Direct Drive

Φ39

Φ40

Φ59

Φ60

Φ75

Φ100

Φ180

Other

1

190

Motorized Stage

Electrical Specification•Option: KS451

Motorized Rotary Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

Direct Drive

φ39

φ40

φ59

φ60

φ75

φ100

φ180

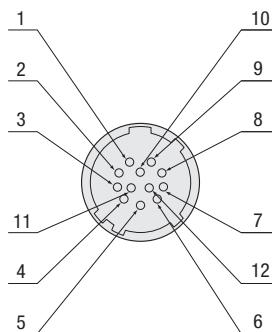
Other

Electrical specification

Model		KS451-40
Motor	Type	5 phase stepping motor 0.75A/Phase
	Model	Special specification
	Step angle	0.72°
Connector	Model	HR10A-10J-12P (73) (Hirose Electric Co., Ltd.)
	applicable connector on acceptance side	HR10A-10P-12S (73) (Hirose Electric Co., Ltd.)
Sensor	Limit sensor	—
	Origin sensor	Installed
	Slit origin sensor	—
	Model	Photo microsensor EE-SX1103 (Omron Co., Ltd.)
	Power voltage	DC5V
	Consumption current	Total 25mA or less NPN open collector output
	Control output	DC5V or less 1.2mA or less Residual voltage 0.4V or less when the load current is 0.3mA
Output logic		On detection (light shield condition): Output transistor OFF (Non-continuity)

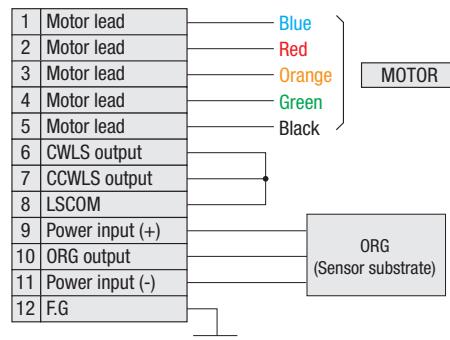
* Please use microstep when reduce the vibration or return to origin. (Driver: CVD507-K-A9/CRD5107P P.1-205~)

Pin allocation



Connection diagram

KS451-40



Timing chart

KS451-40

Range of origin detection [°]

KS451-40

0~11°

Note: The direction of CW/CCW in timing chart shows motor rotation.
Upper plate rotation in CW as below.
KS451-40: CW

Method for return to origin

Suruga's motorized stages are different from the specification depending on the models.

Therefore return to origin method other than recommendation may not be work correctly.

Set to the way of recommendation return origin when using our controller.

■KS451 recommended return to origin Return to origin sequence ▶P.1-201~

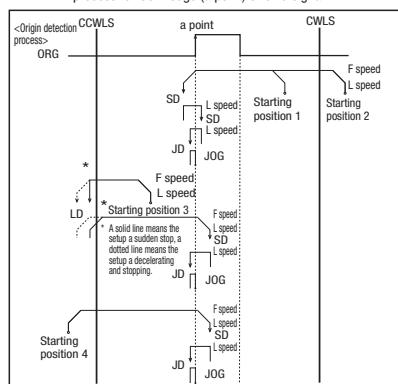
Type 3: Detect in the direction of CCW and perform detected process for CCW edge(a point) of ORG signal.

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

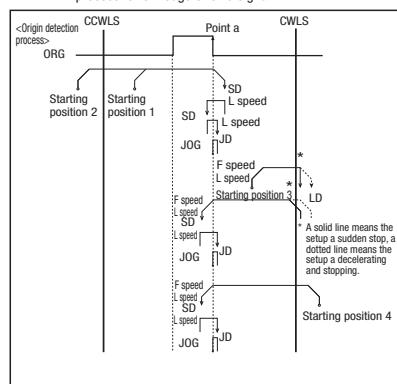
Type 9: After finished Type3, perform detected process for CCW edge of TIMING signal.

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

■ Connection example

