

Motorized Stage

Motorized Goniometer Stage Guidance



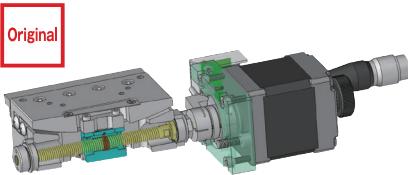
This is the arc driving stage which has center of rotation on the vertical centroid of the stage surface.

■ Usage

- Repeat positioning of minute angle in the optical pickup adjustment and inspection equipment.
- Parts posture adjusting for assembly process and mounting line.
- Available bonding camera lens and LCD panel together in production and inspection.

The focus of setting

Ball screw type



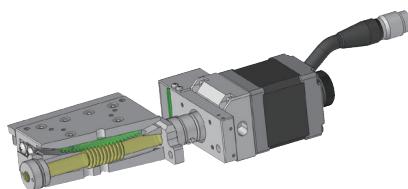
KGB/KAB Sinemotion Stage

▶ P.1-145~

High precision goniometer stage for driving minute angle repeatability.
Ball screw type is improved durability even continuing repeatability driving.

Table size	60×60mm	70×70mm
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Worm type



KG/KA/KGW/KAW

▶ P.1-149~

Our high precision goniometer stages based on cross roller guide for travel guide and worm gear mechanism.

Selectable from various sizes and work distance type.

Table size	40×40mm	50×50mm	60×60mm	70×70mm
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■ Sensor improvements

KGW and KAW series correspond to a voltage level of DC5V through 24V.

■ List of rotation centroid height

- Shows rotation centroid height for each stage surface.
- Mark of blue centroid can be integrated 2-axis.

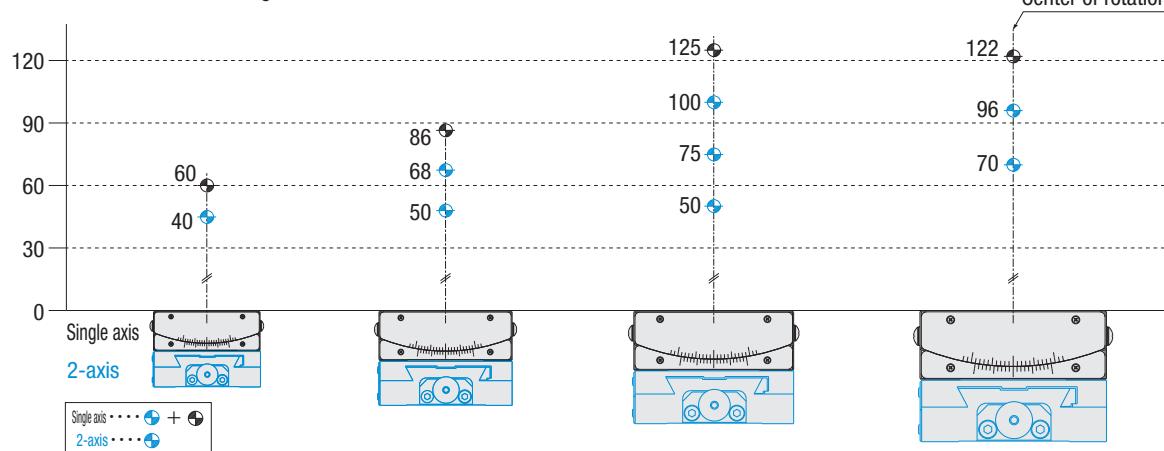


Table size	40×40	50×50	60×60	70×70
Ball screw type	-	-	○	○
Worm type	○	○	○	○

Ball bearing type sinemotion goniometer stages

High precision goniometer stages with ball bearings. This is ideal for driving a minute angle repeatability.

Features



■ High endurance

Backlash by the abrasion was concerned about by the worm gear type when continued being driven at a microangle repeatedly.
 Ball screw mechanism makes evaluation high durability.

■ Improvement acceleration and deceleration

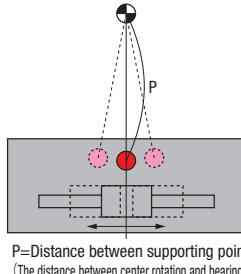
Smooth start-up and acceleration with small friction.

■ Reduction backlash

Using the preload parts may reduced backlash.

■ Travel length and isokinetic

The linear-driven will be changed to rotation-moving by using the internal bearing.
 Ball screw traveling length will not be the same as stage travel angle due to linear-moving converts to rotation-moving.
 It is different resolution per pulse at the center and end.
 Rotation speed will not be constant even with the send of pulse signal at the constant speed.



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

■ Travel range calculation formula

* The formula based on the stroke center.

(1) Travel angle = $\text{Arcsin}(\text{Input pulse} \times X) / P$ (2) Input pulse = $P \times \text{sin}(\text{Traveling angle}) / X$

■ Terms

Definition	Value	Unit
Distance between supporting points P'	76	mm
Ball screw lead	1	mm
Motor basic step angle	0.72	°
Ball screw travel length per pulse X	0.002	mm

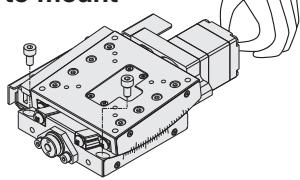
*Distance between supporting points depending on the stage.

■ Basic Specification

Model	Motor basic step angle	Distance between supporting points P
KGB06050	0.72°	55mm
KGB06075	0.72°	80mm
KGB06100	0.72°	105mm
KGB06125	0.72°	130mm
KGB07070	0.72°	76mm
KGB07096	0.72°	102mm
KGB07122	0.72°	128mm

For use correctly

▽ How to mount



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

▽ 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.
 Pay attention. [Approximate flatness: 10µm Within]

▽ Position of stage mounting

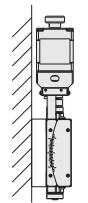
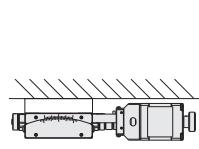
All products SPEC shows must be shown flat setting condition.
 Pay attention to mount such as up side down, vertical on the side and horizontal on the side.
 Load capacity and accuracy might be changed by the positioning.
 Please feel free to ask us for more information.

▽ Each positioning characteristics

Travel guide [Feeding method]	Inverted and reversed	Side horizontal	Side vertical use
Crossed roller [Ball screw]	○	○	△
Crossed roller [Worm gear]	○	○	△

○ means usable, however load and moment is limited.

△ Load and moment is limited, it may not lose characteristics in some usage or models.



Run-out accuracy of the center of rotation/Height of the center of rotation

Our cross roller goniometer stages are providing high-precision machining.

▽ Run-out accuracy of the center of rotation

Put the true sphere on the level of the center of rotation, and define the true sphere run-out as run-out accuracy of the center of rotation.

▽ Height of the center of rotation

Height of the center of rotation is between upper side of stage and center of roundness.

Motorized Stage

New

Motorized goniometer
Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball
Screw

Worm
Gear

□40

□50

□60

□70

□80

□100

□120

Other

Ball Screw Type Sinemotion Goniometer Stages □60:KGB06/KAB06

■ 1-axis
KGB06075AL (KGB06 series)



■ 2-axis
KAB06075AL (KAB06 series)



**Freely
customize
the motor**

※ Can be used for KGB
See page P.009

Original

RoHS

■ High precision goniometer stages with ball bearings. This is ideal for driving a minute angle repeatability.

■ Configuration 2-axis
Combination of 1-axis stage that is different center of rotation.



Cable P.1-207~
Electrical specification P.1-143~

1 Axis	
G	1-axis
A	2-axis
2 Height of center rotation (W.D.)	
050	50mm
075	75mm
100	100mm
125	125mm

3 Sensor logic	
Code	Specification
L	L position
R	Opposite hand

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)	—

* 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 details of cable.

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

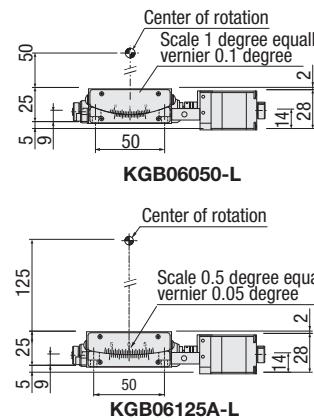
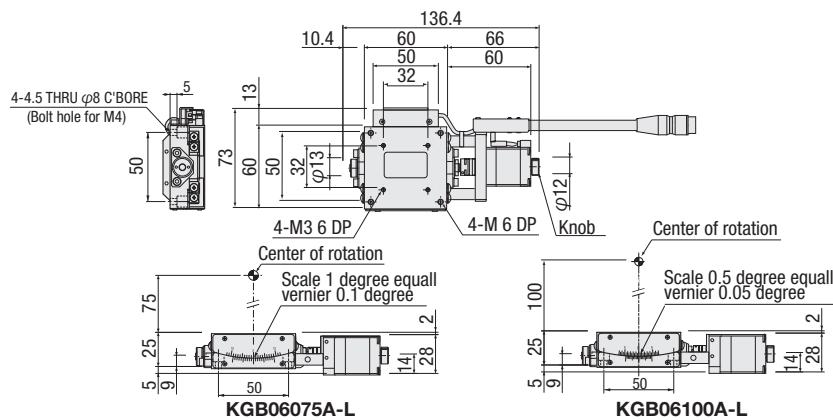
SPEC													
Number of axes		1-axis				2-axis							
Model		KGB06050-L	KGB06075-L	KGB06100-L	KGB06125-L	KAB06050-L	KAB06075-L						
(Opposite hand)													
KGB06050-R													
Travel length Upper/Lower axis		±8.5°	±5.5°	±5°	±4°	±8.5° /±5.5°	±5.5° /±5°						
Table size													
60×60mm													
Travel mechanism		Ball screw φ6 lead 1											
Guide		Crossed roller guide											
Main materials-Finishing													
Aluminum—Black almite finishing													
Weight		0.5kg				1.0kg							
25±0.2mm													
Height of stage		50±0.4mm				50±0.4mm							
Height of center rotation		50±0.2mm	75±0.2mm	100±0.2mm	125±0.2mm	50±0.4mm	75±0.4mm						
Runout accuracy of center rotation		Within 0.01mm				—							
Accuracy specification	Resolution (Pulse)*		Upper at the full		±0.0021°		±0.0014°						
	Lower at the full		±0.0014°		±0.0011°		±0.0009°						
Accuracy specification	MAX speed**		Upper		31.5° /sec [15kHz]		21° /sec						
	Lower		21° /sec [15kHz]		16.5° /sec		16.5° /sec						
Repeatability positioning accuracy													
±0.001°													
Load capacity													
5kgf [49N]													
Moment stiffness													
Pitch 0.30/yaw 0.10/roll 0.11 ["/N · cm]													
Lost motion													
Within 0.003°													
Back Rush Within 0.003°													
Within 0.003°													
Limit sensor													
Installed													
Origin sensor													
Installed													
Slit origin sensor													
—													
Provided screw (Hexagon-headed bolt)													
4 of M4—10													

* See page 1-169 if you require exact calculations. □1-140 if you require exact calculations.

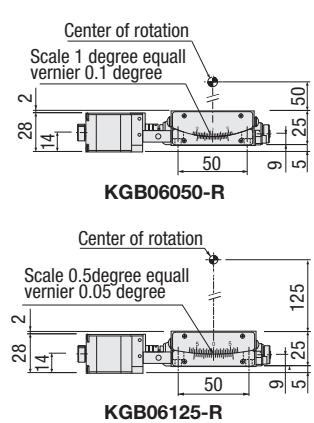
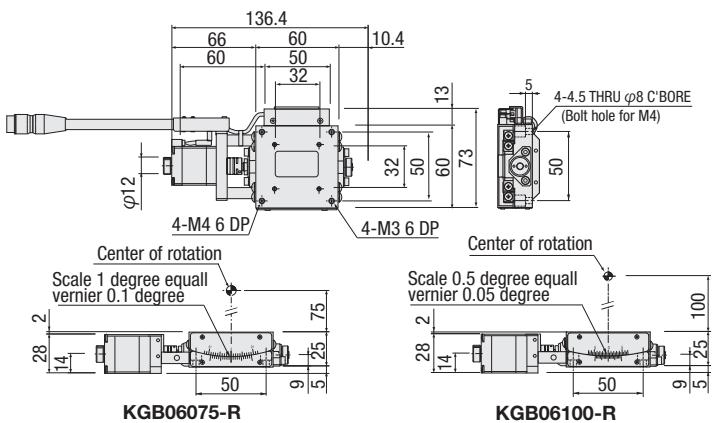
**The MAX speed becomes the theory speed at the time of the 15kHz drive for the traveling pulse of the full stroke.

Dimensional outline awings (1-axis)

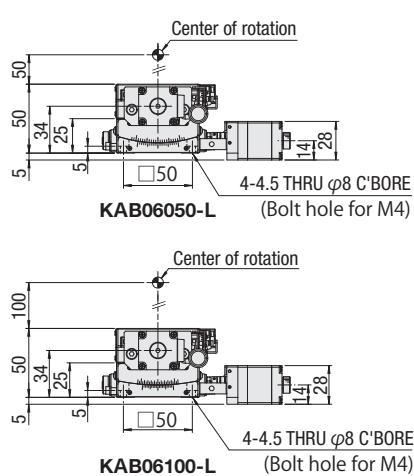
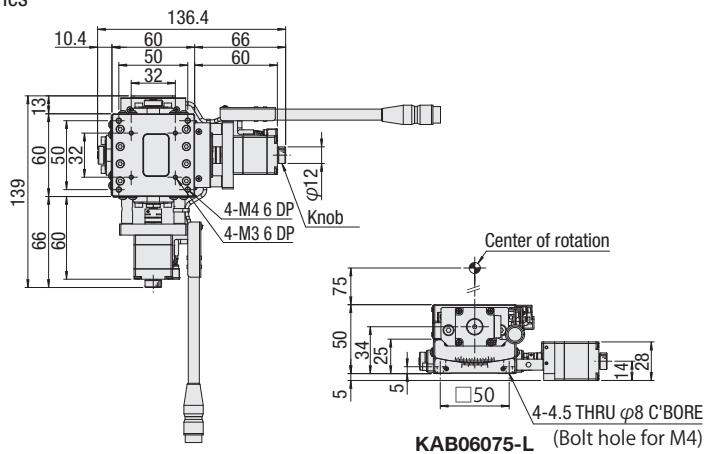
KGB06-L series



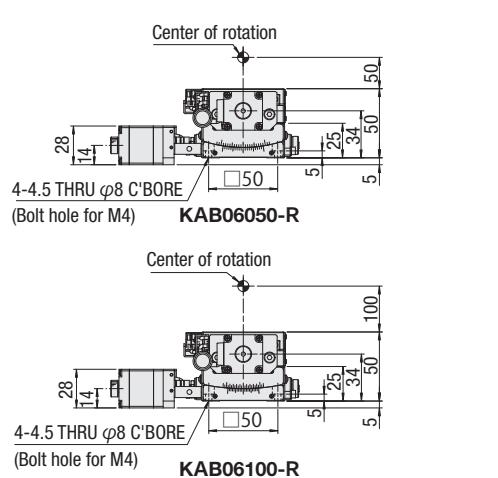
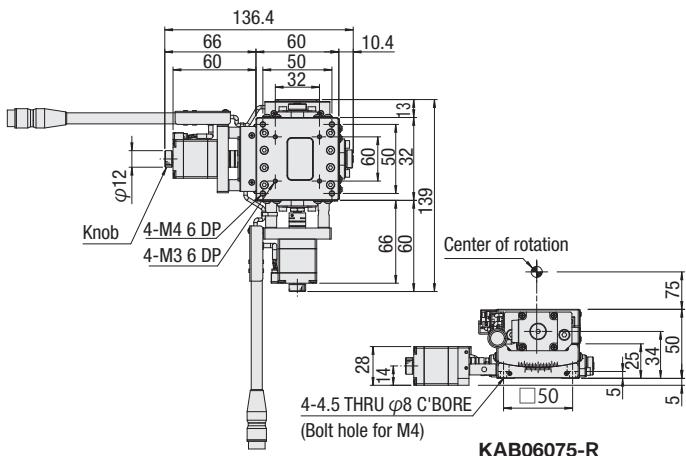
KGB06-R series (Opposite hand)



KAB06-L series



KAB06-R series (Opposite hand)



New
Stage
Motorized goniometer

X
XY
Z
Horizontal Z
XYZ
Goniometer
Rotary
Unit
Controller

Ball
Screw

Worm
Gear

□40
□50
□60
□70
□80
□100
□120
Other

Motorized Stage

Electrical Specification • Option : KGB06/KAB06

New
Stage

Motorized goniometer

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

□40

□50

□60

□70

□80

□100

□120

Other

1

143

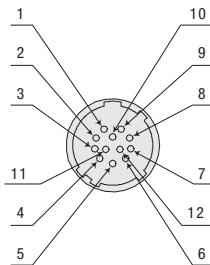
Electrical specification

Model	KGB06050-L	KGB06075-L	KGB06100-L	KGB06125-L	KAB06050-L	KAB06075-L	KAB06100-L
Opposite hand	KGB06050-R	KGB06075-R	KGB06100-R	KGB06125-R	KAB06050-R	KAB06075-R	KAB06100-R
Motor (*1)	Type	5 phase stepping motor 0.75A/Phase (Oriental Motor Co., Ltd.)					
	Model (*2)	C005C-90215P-1					
	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	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 Residual voltage 0.3V or less when the load current is 2mA					
	Output logic	On detection (light shield condition): Output transistor OFF (Non-continuity)					

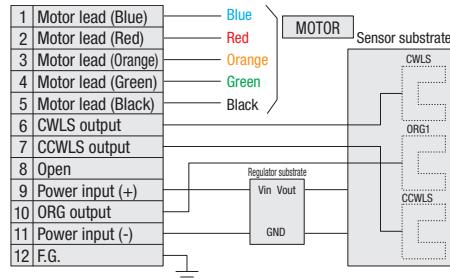
*1 See page P.1-213~ for details of single motor specification.

*2 Model is our own management model.

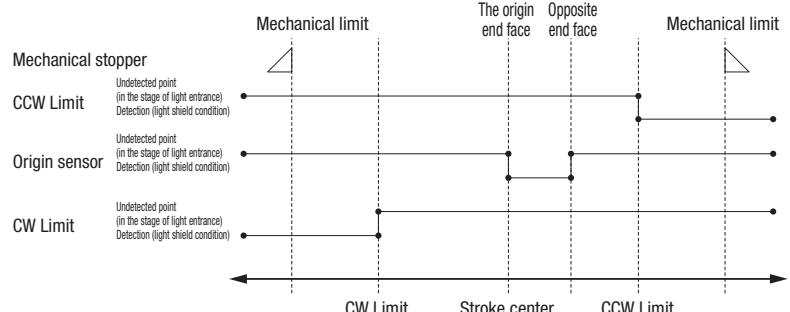
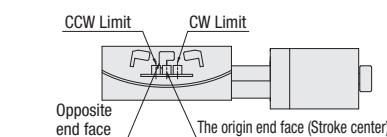
Pin allocation



Connection diagram



Timing chart



Unit [deg.]

Direction of CW

Direction of CCW

	Reference coordinate	CW Limit	The origin end face Stroke center	Opposite end face	CCW Limit
KGB06050	Return to origin	8.7	0	2.5	10.5
KGB06075	Return to origin	5.7	0	1.8	8.3
KGB06100	Return to origin	5.2	0	1.4	6.3
KGB06125	Return to origin	4.2	0	1.1	5.2

* 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.

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

Refer to ON/OFF F 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 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.

■KGB06/KAB06 recommended return to origin Return to origin sequence ▶ P.1-201~

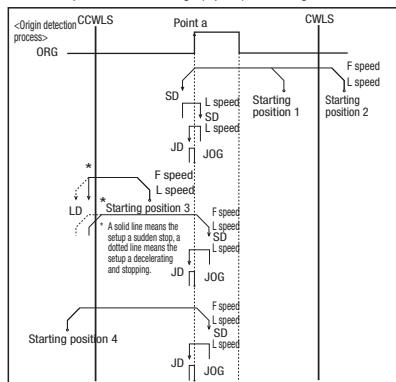
Type 3: Detect in the direction of CCW and perform detected process for CCW edge (a point) of ORG signal.

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

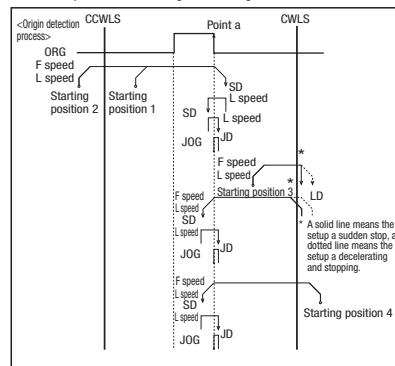
Type 9: After finished Type3, perform detected process for CCW edge of TIMING signal.

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



Motorized Stage

Ball Screw Type Sinemotion Goniometer Stage □70: KGB07/KAB07

**Motorized goniometer
Stage**

X
XY
Z
Horizontal Z
XYZ
Goniometer
Rotary
Unit
Controller

**Ball
Screw**

**Worm
Gear**

□40
□50
□60
□70
□80
□100
□120
Other



Original
RoHS

High precision goniometer stages with ball bearings.
This is ideal for driving a minute angle repeatability.

■ Configuration 2-axis
Combination of 1-axis stage that is different center of each rotation.



1 Axis

G	1-axis
A	2-axis

2 Height of center rotation (W.D.)

070	70mm
096	96mm
122	122mm

* KAB07 is available only for W.D70, 90mm.

3 Sensor logic

Type	CWLS	ORG1	CCWLS	ORG2
A	NC	NC	NC	NO
B	NO	NO	NO	
C	NC	NO	NC	

4 Sensor cover location specification

Code	Specification
L	L position
R	Opposite hand

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)	—

* 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 details of cable.

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

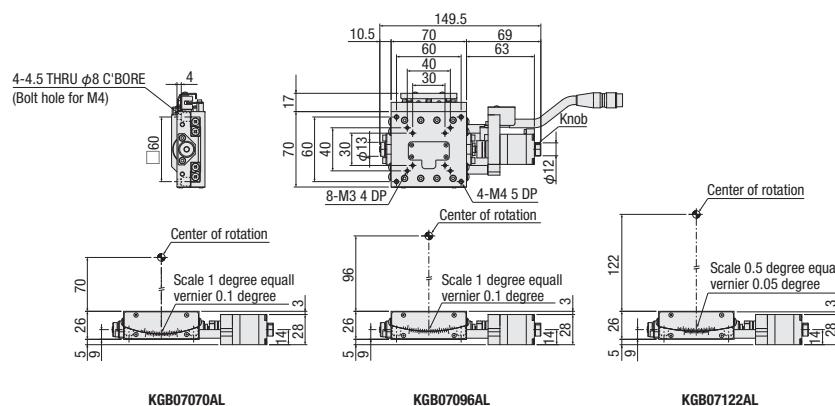
SPEC							
Number of axis		1-axis			2-axis		
Model		KGB07070AL	KGB07096AL	KGB07122AL	KAB07070AL KAB07096AL		
(Opposite hand)							
Mechanical specification							
Travel length	Upper/Lower axis	±5°	±4°	±3°	±5°/±4° ±4°/±3°		
Table size							
Travel mechanism							
Guide							
Main materials-Finishing							
Weight							
0.7kg				1.4kg			
Height of stage							
26±0.2mm							
Height of center rotation		70±0.2mm	96±0.2mm	122±0.2mm	70±0.4mm 96±0.4mm		
Runout accuracy of center rotation							
Within 0.01mm							
Accuracy specification							
Resolution (Pulse)		Upper at the full	±0.0015°	±0.0011°	±0.0009°		
		Lower at the full					
MAX speed		Upper	23°/sec [15kHz]	17°/sec [15kHz]	13°/sec [15kHz]		
		Lower					
Repeatability positioning accuracy							
Within ±0.003°							
Load capacity							
5kgf [49N]							
Moment stiffness							
Pitch 0.28/yaw 0.06/roll 0.06 ["/N · cm]							
Lost motion							
Within 0.003°							
Sensor							
Limit sensor							
Origin sensor							
Slit origin sensor							
Provided screw (Hexagon-headed bolt)							
4 of M4-8							

*See page P.1-140 if you require exact calculations.

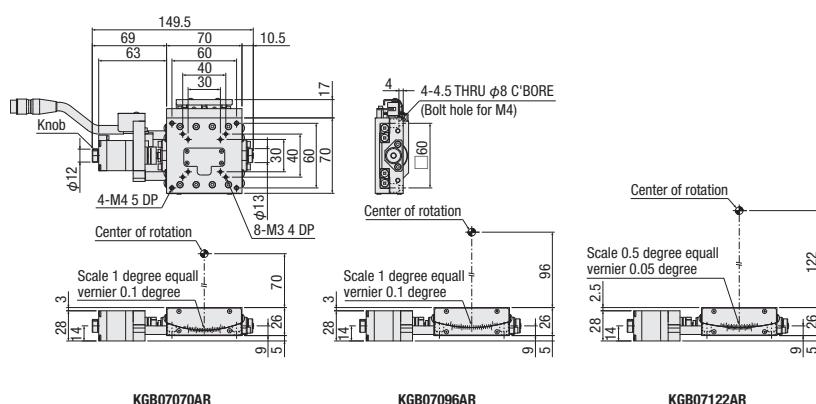
*The MAX speed becomes the theory speed at the time of the 15kHz drive for the traveling pulse of the full stroke.

Dimensional outline drawings

KGB07-L series

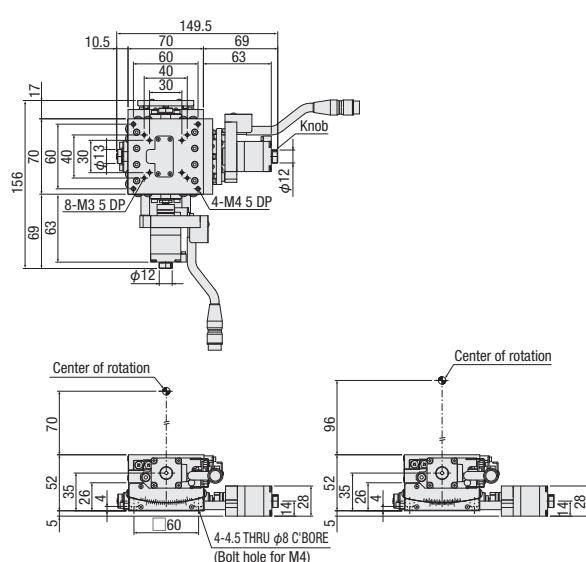


KGB07-R series

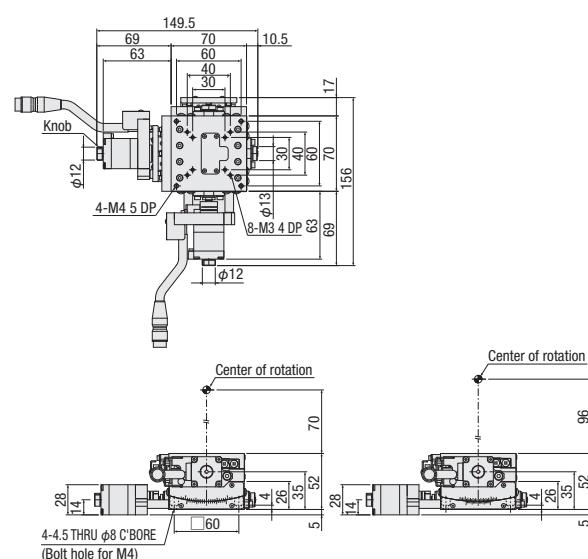


Dimensional outline drawings

KAB07-L series



KAB07-R series



Motorized goniometer
Stage

X
XY
Z
Horizontal Z
XYZ
Goniometer
Rotary
Unit
Controller

Ball Screw

Worm Gear

□40
□50
□60
□70
□80
□100
□120
Other

Motorized Stage

Electrical Specification • Option: KGB07/KAB07

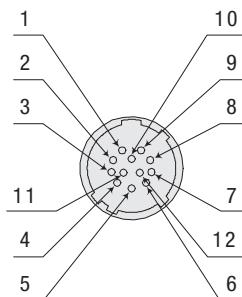
Electrical specification

Model	KGB07070AL	KGB07096AL	KGB07122AL
Opposite hand	KGB07070AR	KGB07096AR	KGB07122AR
Motor (*1)	Type Model (*2) Step angle	5 phase stepping motor C005C-90215P-1 0.72°	0.75A/Phase (Oriental Motor Co., Ltd.)
Connector	Model Applicable connector on acceptance side	HR10A-10J-12P (73) (Hirose Electric Co., Ltd.) HR10A-10P-12S (73) (Hirose Electric Co., Ltd.)	HR10A-10P-12S (73) (Hirose Electric Co., Ltd.)
Sensor	Limit sensor Origin sensor (ORG1) Slit origin sensor (ORG2)	Installed Installed Installed	
	Model	Photo microsensor: EE-SX398 (Omron Co., Ltd.)、EE-SX498 (Omron Co., Ltd.) : Limit • Origin sensor Micro Photoelectric Sensor: PM-F25 (Opposite hand PM-R25) (Panasonic Industrial Devices SUNX) : Slit origin sensor	
	Power voltage	DC5~24V ±10%	
	Consumption current	Total 100mA or less	
		EE-SX398、EE-SX498: NPN open collector output DC5~24V 16mA or less Residual voltage 0.4V or less when the load current is 16mA	
	Control output	PM-F25 (Opposite hand PM-R25) : 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	EE-SX398: On detection (light shield condition): Output transistor ON (Continuity) EE-SX498: On detection (light shield condition): Output transistor OFF (Non-continuity) PM-F25 (R25) : On detection (light shield condition) : Output transistor ON (Continuity)	

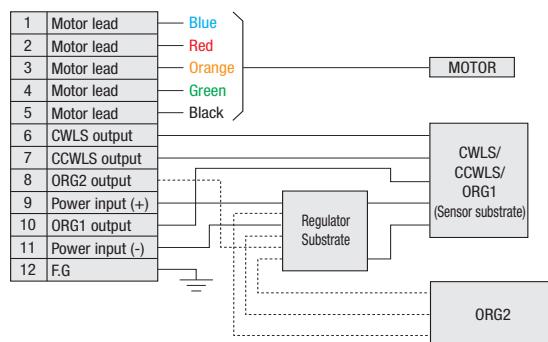
*1 See page P.1-213~ for details of single motor specification.

*2 Model is our own management model.

Pin allocation



Connection diagram



70 goniometer sensor logic

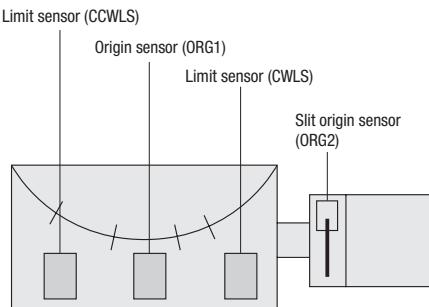
Type	CWLS	ORG1	CCWLS	ORG2
A	NC EE-SX498	NC EE-SX498	NC EE-SX498	NO
B	NO EE-SX398	NO EE-SX398	NO EE-SX398	PM-F25 (Opposite hand PM-R25)
C	NC EE-SX498	NO EE-SX398	NC EE-SX498	

*Upper: Sensor logic
Lower: Using sensor

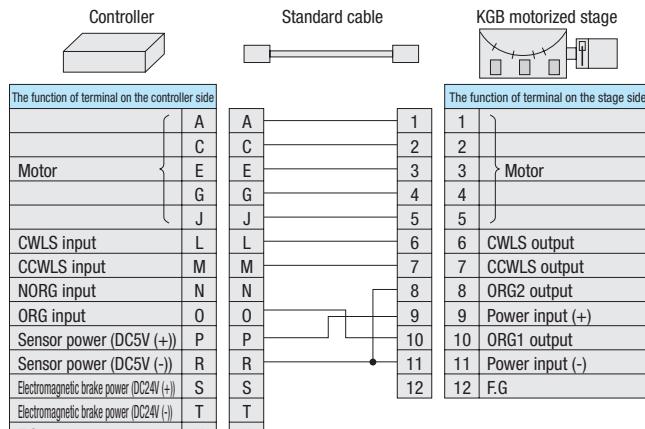
*Broken line area does not work when use standard cable

Built-in sensor

■ KGB series has built-in sensors such as below.



■ The connecting diagram that connected to our controller using standard attached cable is shown as below.



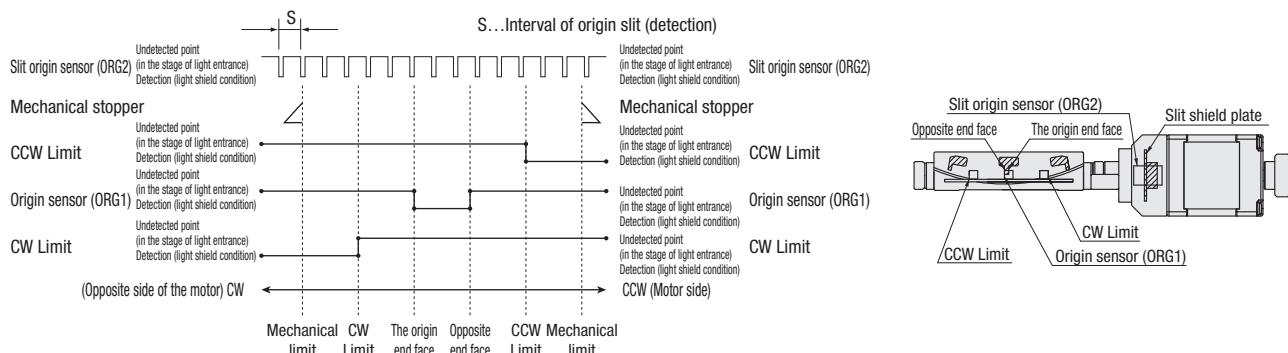
The CWLS (pin#6) and CCWLS (pin#7) on the motorized stage side are connected to CWL S (Lpin) and CCWLS (Mpin) of controller as usual. However ORG2 output (Pin#8) is connected to DC5V (-) and ORG1 output (pin#10) will be connected to ORG. In other words, the sensor of ORG2 does not work on this wire connection, only ORG1 sensor is recognized by the controller as origin signal. As a result, return to origin should be done without the slit origin sensor as same as function of motorized stages that have only three sensors (CWLS, CCWLS and ORG).

● Available the correspondence cable for a slit origin sensor (ORG2)! *See page P.1-207 for details.

This series are included four sensors as standard. In case of using four sensors with slit origin sensor (ORG2), you need the cable for four sensors. Also please note that the type is different from recommendation return to origin.

When use all of 4 sensors, please select the cable for 4 sensors from page P.1-207~.

Timing chart



Unit [deg]

	Direction of CW		Direction of CCW			
	Detection clearance of slit origin S	Reference coordinate	CW Limit	Origin	Opposite end face	CCW Limit
KGB07070A	0.8	Return to origin	5.3	0	2.1	5.3
KGB07096A	0.6	Return to origin	4.2	0	1.5	4.2
KGB07122A	0.5	Return to origin	3.2	0	1.3	3.2

* 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.

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.

■KGB07/KAB07 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.

●Select return to origin type from the followings when use the slit origin sensor (ORG2).

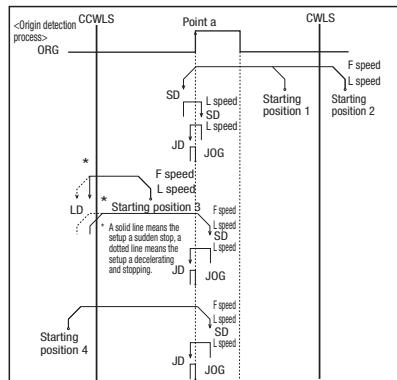
Type 1: Detect in the direction of CCW and perform detected process for CW edge (point a) of NORG signal. Next detect an edge of CCW side (point b) of ORG signal.

Type 2: Detect in the direction of CW and perform detected process for CCW edge of NORG signal. Next detect an edge of CW side (point b) of ORG signal.

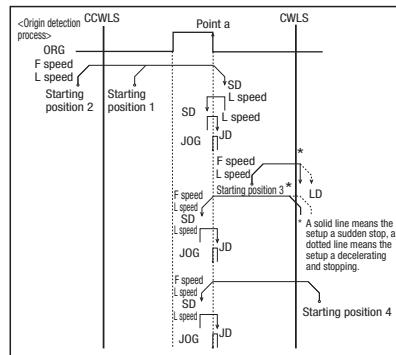
Type 7: After finished type1, perform detected process for CCW edge of TIMING signal.

Type 8: After finished type2, 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

Motorized Stage

Goniometer Stage □40 : KGW04

New

Motorized goniometer
Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball
Screw

Worm
Gear

□40

□50

□60

□70

□80

□100

□120

Other

C
025

■ 1-axis
KGW04040T-LC

KGW04040M-LC



Freely
customize
the motor

RoHS

*All image is for illustrative purposes only.

K GW04040T - L C - □

1 2 3 4 5 6 7

PA - □
6 7

● Cable P.1-207～
● Electrical specification P.C-043～

1 Axis

G	1-axis
---	--------

2 Stage size

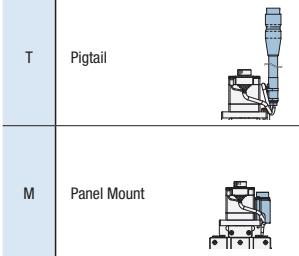
04	□40mm
----	-------

3 Height of center rotation (W.D.)

040	40mm
-----	------

060	60mm
-----	------

4 Connector specifications



5 Sensor cover location specification

Blank	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	Cable 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

6 Motor option

Code	Specification
PA	cSTEP (AR Series)
ZA	cSTEP (AZ Series)
EA	Motor 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

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

*Motor driver (amplifier)/cable combination

Selection Example

Model W.D. 40mm KGW04040 + Connector specs T:Pigtail/L position KGW04040T-L + Motor option G:High resolution KGW04040T-LG + Cable A:2m KGW04040T-LG-A → KGW04040T-LG-A

Model W.D. 60mm KGW04060 + Connector specs M:Panel Mount/Opposite hand KGW04060M-R + Motor option PA:cSTEP(AR Series) KGW04060M-RPA + Cable 3A: Driver/Cable set 3m KGW04060M-RPA-3A → KGW04060M-RPA-3A

□40

□50

□60

□70

□80

□100

□120

Other

C
025

Specification

SPEC				
Model	KGW04040T-LC	KGW04060T-LC	KGW04040M-LC	KGW04060M-LC
Opposite hand	KGW04040T-RC	KGW04060T-RC	KGW04040M-RC	KGW04060M-RC
Travel distance	±8°	±6°	±8°	±6°
Stage surface size		40×40mm		
Connector type	Pigtail		Panel Mount	
Travel mechanism (Reduction ratio)		Worm gear(1/240)		
Guide		Cross Roller Guide		
Main materials-Finishing	Aluminum - Black alumite finishing, Phosphor bronze - Black paint			
Weight	0.39kg		0.38kg	
Height of stage		20±0.2mm		
Height of center rotation	40±0.2mm	60±0.2mm	40±0.2mm	60±0.2mm
Runout accuracy of center rotation		0.01mm以内		
Resolution/Pulse		0.003(Full)		
MAX speed		15°/sec[5kHz]		
Repeatability positioning accuracy		±0.005°		
Load capacity		3kgf[29.4N]		
Moment stiffness		Pitch 1.30/Yaw 1.16/Roll 0.27["/N・cm]		
Lost motion		0.01°		
Limit sensor		Available		
Origin sensor		Available		
Slit origin sensor		—		
Provided screw (Hexagon-headed bolt)		4 of M3 - 6		

* Might be changed specification due to motors.

Resolution・MAX speed・Weight

Motor code	C		G
Type	Standard		High resolution
Motor model*3	C005C-90215P-1		PK523HPMB-C1
Step angle	0.72°		0.36°
Resolution	0.003°		0.0015°
MAX speed	15°/sec		
Weight	KGW04-T (Pigtail)		0.39kg
	KGW04-M (Panel Mount)		0.38kg

Motor code	PA	ZA	EA	UG	UA
Type	αSTEP (AR Series)	αSTEP (AZ Series)	Motor for EtherCAT	MINAS A6	J4
Motor model*3	ARM24SAK	AZM24AK	STM28W100A	MSMF5AZL1A2	HG-KR053
Resolution	0.0015°(1000P/R setting)			23 Bit encoder (8388608P/R)*1	22 Bit encoder (4194304P/R)*2
MAX speed	30°/sec			45°/sec	
Weight	KGW04-T (Pigtail)	0.43kg	0.40kg	0.64kg	0.66kg
	KGW04-M (Panel Mount)	0.42kg	0.39kg	0.63kg	0.65kg

*1 Optional encoder cable is for incremental system.

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

*3 Model is our own management model.

Motorized Stage

New

Motorized goniometer
Stage

X
XY
Z
Horizontal Z
XYZ
Goniometer
Rotary
Unit
Controller

Ball
Screw

Worm
Gear

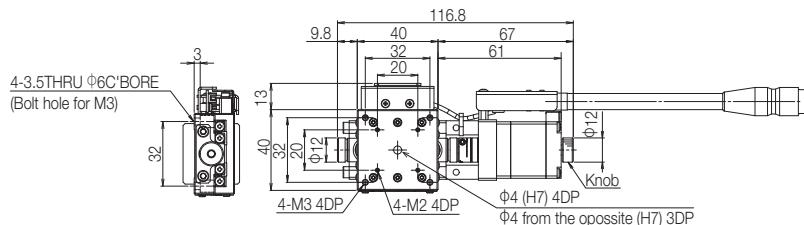
□40
□50
□60
□70
□80
□100
□120
Other

Goniometer Stage □40 : KGW04

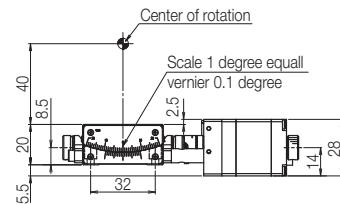
Dimensions

KGW04-L Series

Top view :KGW04□□□T-LC (Pigtail)

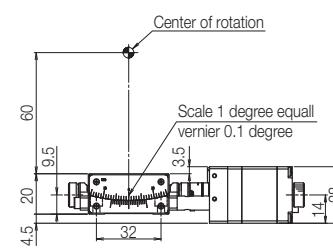
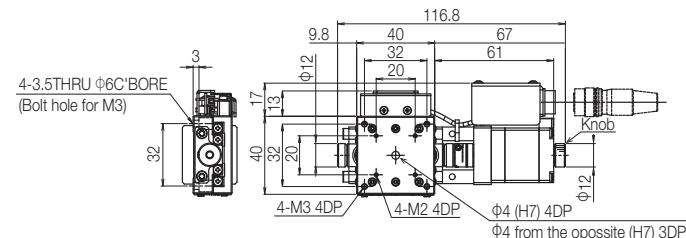


Side view :common



KGW04040T(M)-LC

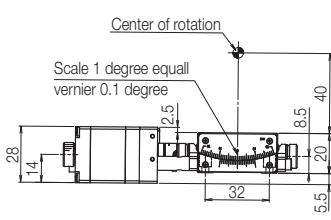
Top view :KGW04□□□M-LC (Panel Mount)



KGW04060T(M)-LC

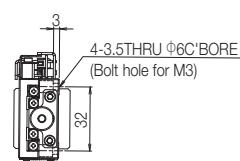
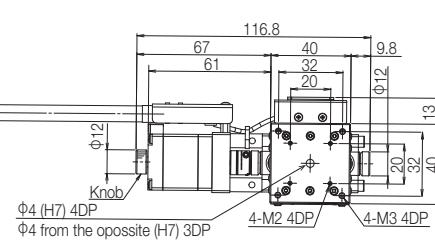
KGW04-R Series

Side view :common

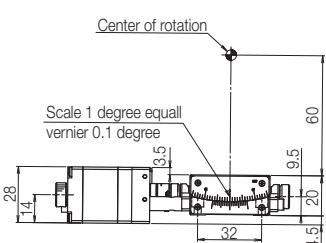
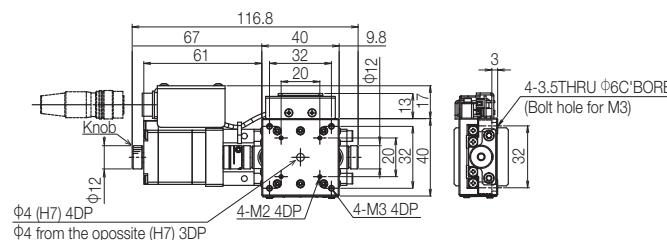


KGW04040T(M)-RC

Top view :KGW04□□□T-RC (Pigtail)



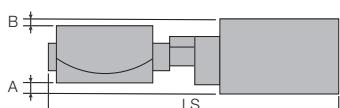
Top view :KGW04□□□M-RC (Panel Mount)



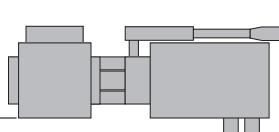
KGW04060T(M)-RC

Dimensions

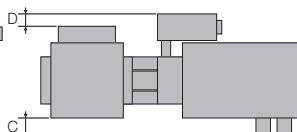
Side view



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	Motor code	Motor size	Connector type	A(mm)	B(mm)	C(mm)	D(mm)	LS(mm)
KGW04040T-□□	C + G	□28	T	5.5	2.5	—	—	116.8
KGW04060T-□□			T	4.5	3.5			
KGW04040M-□□			M	5.5	2.5			
KGW04060M-□□			M	4.5	3.5			

EA Motor for EtherCAT

Motor Model STM28W100A

Model	Motor code	Motor size	Connector type	A(mm)	B(mm)	C(mm)	D(mm)	LS(mm)
KGW04040T-L(R)EA	EA	□28	T	5.5	2.5	—	—	145.1
KGW04060T-L(R)EA			T	4.5	3.5			
KGW04040M-L(R)EA			M	5.5	2.5			
KGW04060M-L(R)EA			M	4.5	3.5			

PA αSTEP (AR Series)

Motor Model ARM24SAK

Z αSTEP (AZ Series)

Motor Model AZM24AK

Model	Motor code	Motor size	Connector type	A(mm)	B(mm)	C(mm)	D(mm)	LS(mm)
KGW04040T-L(R)PA	PA	□28	T	5.5	2.5	—	—	129.8
KGW04060T-L(R)PA			T	4.5	3.5			
KGW04040M-L(R)PA			M	5.5	2.5			
KGW04060M-L(R)PA			M	4.5	3.5			
KGW04040T-L(R)ZA	ZA	□28	T	5.5	2.5	—	—	139.3
KGW04060T-L(R)ZA			T	4.5	3.5			
KGW04040M-L(R)ZA			M	5.5	2.5			
KGW04060M-L(R)ZA			M	4.5	3.5			

UG Servo motor MINAS A6 (Panasonic)

Motor Model MSMF5AZL1A2

UA Servo motor J4 (Mitsubishi Electric corporation)

Motor Model HG-KR053

Model	Motor code	Motor size	Connector type	A(mm)	B(mm)	C(mm)	D(mm)	LS(mm)
KGW04040T-L(R)UG	UG	□38	T	10.5	7.5	12	—	169.8
KGW04060T-L(R)UG			T	9.5	8.5			
KGW04040M-L(R)UG			M	10.5	7.5			
KGW04060M-L(R)UG			M	9.5	8.5			
KGW04040T-L(R)UA	UA	□40	T	11.8	8.8	8.8	—	164.2
KGW04060T-L(R)UA			T	10.8	9.8			
KGW04040M-L(R)UA			M	11.8	8.8			
KGW04060M-L(R)UA			M	10.8	9.8			

Ball Screw

Worm Gear

□40

□50

□60

□70

□80

□100

□120

Other

C
028

Motorized Stage

New

Motorized
Stage

X

XY

Z

Horizontal
Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball
Screw

Worm
Gear

□40

□50

□60

□70

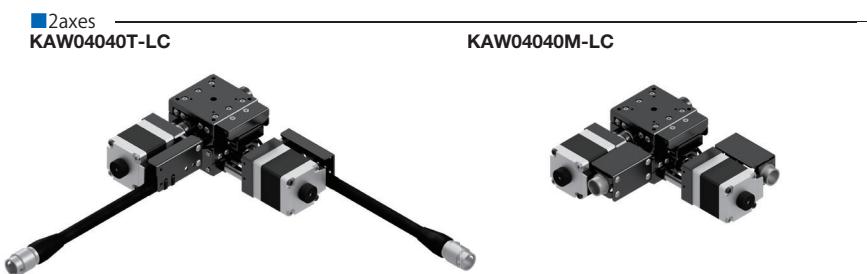
□80

□100

□120

Other

Goniometer Stage □40: KAW04 (2-axis)



RoHS

**Freely
customize
the motor**

*All image is for illustrative purposes only.

KAW04040T-L C- □

1 2 3 4 5 6 7

PA- □

● Cable P.1-207~
● Electrical specification P.C-043~

1 Axis	
A	2-axes
2 Stage size	
04	□ 40mm
3 Height of center rotation (W.D.)	
040	40mm

6 Motor option	
Code	Specification
C	Standard
G	High resolution

7 Cable option (Motor: C • G)

Code	Specification	Cable type
Blank	Cable 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

4 Connector specifications

T	Pigtail	
M	Panel Mount	

5 Sensor cover location specification

Blank	Specification
L	L position
R	Opposite hand

6 Motor option

Code	Specification
PA	cSTEP (AR Series)
ZA	cSTEP (AZ Series)
EA	Motor 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

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

*Motor driver (amplifier)/cable combination

Selection Example

Model W.D. 40mm + Connector specs T:Pigtal/L position + Motor option G:High resolution + Cable A:2m → **KAW04040T-LG-A**

Model W.D. 40mm + Connector specs M:Panel Mount/Opposite hand + Motor option PA:cSTEP(AR Series) + Cable 3A: Driver/Cable set 3m → **KAW04040M-RPA-3A**

Specification

SPEC		
Model	KAW04040T-LC	KAW04040M-LC
Opposite hand	KAW04040T-RC	KAW04040M-RC
Mechanical specification		
Travel distance Upper/Lower		$\pm 8^\circ/\pm 6^\circ$
Stage surface size		40×40mm
Connector type	Pigtail	Panel Mount
Travel mechanism (Reduction ratio)		Worm gear(1/240)
Guide		Cross Roller Guide
Main materials-Finishing	Aluminum - Black alumite finishing, Phosphor bronze - Black paint	
Weight	0.78kg	0.76kg
Dimension		
Height of stage		40±0.4mm
Height of center rotation		40±0.4mm
Runout accuracy of center rotation		—
Accuracy specification		
Resolution/Pulse	0.003°(Full)	
MAX speed	Upper	15°/sec[5kHz]
	Lower	15°/sec[5kHz]
Repeatability positioning accuracy	$\pm 0.005^\circ$	
Load capacity	2.5kgf[24.5N]	
Moment stiffness	Pitch 1.57/Yaw 2.32/Roll 1.57["/N · cm]	
Lost motion	0.01°	
Sensor		
Limit sensor	Available	
Origin sensor	Available	
Slit origin sensor	—	
Provided screw (Hexagon-headed bolt)	4 of M3 -6	

* Might be changed specification due to motors.

Resolution · MAX speed · Weight

Motor code		C	G
Type		Standard	High resolution
Motor model*3		C005C-90215P-1	PK523HPMB-C1
Step angle		0.72°	0.36°
Resolution(Full)		0.003°	0.0015°
MAX speed		15°/sec	
Weight	KAW04-T (Pigtail)	0.78kg	
	KAW04-M (Panel Mount)	0.76kg	

Motor code		PA	ZA	EA	UG	UA
Type		αSTEP (AR Series)	αSTEP (AZ Series)	Motor for EtherCAT	MINAS A6	J4
Motor model*3		ARM24SAK	AZM24AK	STM28W100A	MSMF5AZL1A2	HG-KR053
Resolution		0.0015° (1000P/R setting)			23 Bit encoder (8388608P/R)*1	22 Bit encoder (4194304P/R)*2
MAX speed		30°/sec			45°/sec	
Weight	KAW04-T (Pigtail)	0.86kg	0.80kg	1.28kg	1.32kg	
	KAW04-M (Panel Mount)	0.84kg	0.78kg	1.26kg	1.30kg	

*1 Optional encoder cable is for incremental system.

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

*3 Model is our own management model.

Motorized Stage

New

Motorized
Stage

X

XY

Z

Horizontal
Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball
Screw

Worm
Gear

□40

□50

□60

□70

□80

□100

□120

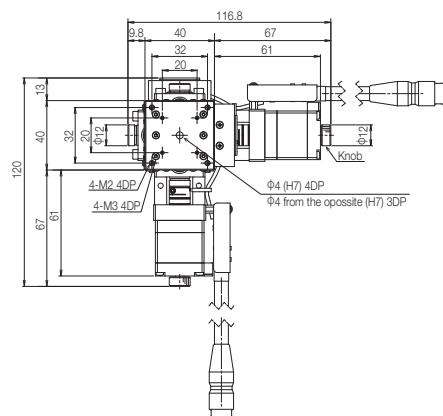
Other

Goniometer Stage □40: KAW04 (2-axis)

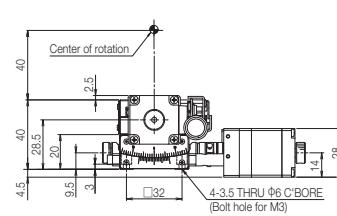
Dimensions

KAW04-L Series

Top view :KAW04040T-LC (Pigtail)

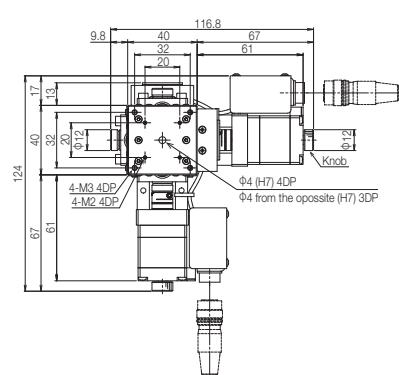


Side view :common



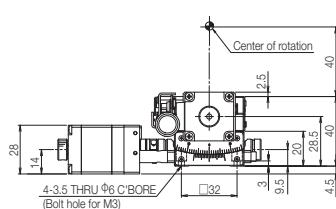
KAW04040T(M)-LC

Top view :KAW04040M-LC (Panel Mount)



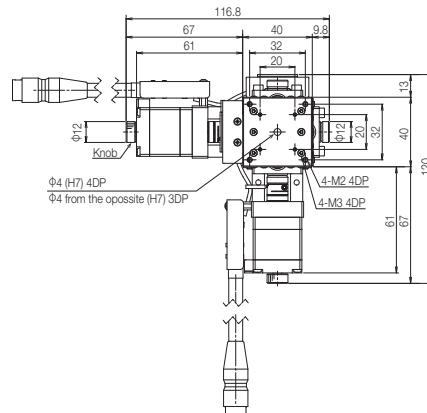
KAW04-R Series

Side view :common

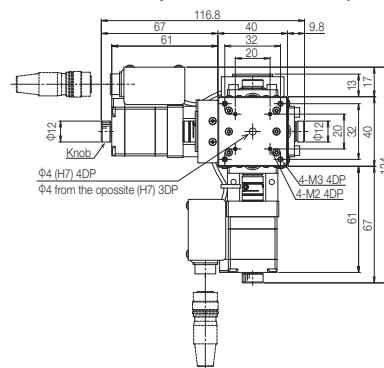


KAW04040T(M)-RC

Top view :KAW04040T-RC (Pigtail)

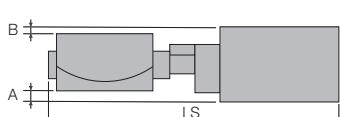


Top view :KAW04040M-RC (Panel Mount)

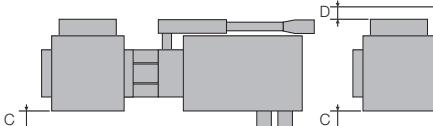


Dimensions

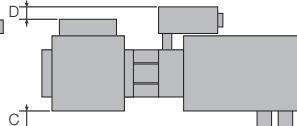
Side view



Top view :Connector :T(Pigtail)



Top view :Connector :M(Panel Mount)



C Standard motor

G High resolution

Motor Model C005C-90215P-1

Motor Model PK523HPMB-C1

Model	Motor code	Motor size	Connector type	A(mm)	B(mm)	C(mm)	D(mm)	LS(mm)	
KGW04040T-□□	C + G	□28	T	5.5	2.5	—	—	116.8	
KGW04060T-□□				4.5	3.5				
KGW04040M-□□			M	5.5	2.5	—	4		
KGW04060M-□□				4.5	3.5				

EA Motor for EtherCAT

Motor Model STM28W100A

Model	Motor code	Motor size	Connector type	A(mm)	B(mm)	C(mm)	D(mm)	LS(mm)	
KGW04040T-L(R)EA	EA	□28	T	5.5	2.5	—	—	145.1	
KGW04060T-L(R)EA				4.5	3.5				
KGW04040M-L(R)EA			M	5.5	2.5	—	—		
KGW04060M-L(R)EA				4.5	3.5				

PA αSTEP (AR Series)

Motor Model ARM24SAK

ZA αSTEP (AZ Series)

Motor Model AZM24AK

Model	Motor code	Motor size	Connector type	A(mm)	B(mm)	C(mm)	D(mm)	LS(mm)	
KGW04040T-L(R)PA	PA	□28	T	5.5	2.5	—	—	129.8	
KGW04060T-L(R)PA				4.5	3.5				
KGW04040M-L(R)PA			M	5.5	2.5	—	—		
KGW04060M-L(R)PA				4.5	3.5				
KGW04040T-L(R)ZA	ZA	□28	T	5.5	2.5	—	—	139.3	
KGW04060T-L(R)ZA				4.5	3.5				
KGW04040M-L(R)ZA			M	5.5	2.5	—	—		
KGW04060M-L(R)ZA				4.5	3.5				

UG Servo motor MINAS A6 (Panasonic)

Motor Model MSMF5AZL1A2

UA Servo motor J4 (Mitsubishi Electric corporation)

Motor Model HG-KR053

Model	Motor code	Motor size	Connector type	A(mm)	B(mm)	C(mm)	D(mm)	LS(mm)	
KGW04040T-L(R)UG	UG	□38	T	10.5	7.5	12	—	169.8	
KGW04060T-L(R)UG				9.5	8.5				
KGW04040M-L(R)UG			M	10.5	7.5	4	—		
KGW04060M-L(R)UG				9.5	8.5				
KGW04040T-L(R)UA	UA	□40	T	11.8	8.8	8.8	—	164.2	
KGW04060T-L(R)UA				10.8	9.8				
KGW04040M-L(R)UA			M	11.8	8.8	4	—		
KGW04060M-L(R)UA				10.8	9.8				

Ball Screw

Worm Gear

□40

□50

□60

□70

□80

□100

□120

Other

C
032

Motorized Stage

Goniometer Stage □60 : KGW06

New

Motorized goniometer
Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

□40

□50

□60

□70

□80

□100

□120

Other

C
033

■ 1軸
KGW06050T-LC KGW06050M-LC



Freely customize the motor

RoHS

*All image is for illustrative purposes only.

K G W 0 6 0 5 0 T - L C - □

1 2 3 4 5 6 7

PA - □
6 7

● Cable P1-207～
● Electrical specification PC-043～

1 Axis

G 1-axis

2 Stage size

06 □60mm

3 Height of center rotation (W.D.)

050 50mm

075 75mm

100 100mm

125 125mm

6 Motor option

Code	Specification
C	Standard
G	High resolution

7 Cable option (Motor : C • G)

Code	Specification	Cable type
Blank	Cable 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

4 Connector specifications

T	Pigtail	
M	Panel Mount	

6 Motor option

Code	Specification
PA	cSTEP (AR Series)
ZA	cSTEP (AZ Series)
EA	Motor 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

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

*Motor driver (amplifier)/cable combination

Selection Example

Model W.D. 50mm + Connector specs T:Pigtal/L position KGW06050T-L + Motor option G: High resolution KGW06050T-LG + Cable A:2m KGW06050T-LG-A → KGW06050T-LG-A

Model W.D. 100mm + Connector specs M: Panel Mount/Opposite hand KGW06100M-R + Motor option PA:cSTEP(AR Series) KGW06100M-RPA + Cable 3A: Driver/Cable set 3m KGW06100M-RPA-3A → KGW06100M-RPA-3A

New

Motorized goniometer
Stage

X
XY
Z
Horizontal Z
XYZ
Goniometer
Rotary
Unit
Controller

Ball
Screw

Worm
Gear

□40
□50
□60
□70
□80
□100
□120
Other

C
034

Specification

SPEC								
Model	KGW06050T-LC	KGW06075T-LC	KGW06100T-LC	KGW06125T-LC	KGW06050M-LC	KGW06075M-LC	KGW06100M-LC	KGW06125M-LC
Opposite hand	KGW06050T-RC	KGW06075T-RC	KGW06100T-RC	KGW06125T-RC	KGW06050M-RC	KGW06075M-RC	KGW06100M-RC	KGW06125M-RC
Mechanical specification	Travel distance	±10°	±8°	±6°	±5°	±10°	±8°	±6°
	Stage surface size	60×60mm			60×60mm			
	Connector type	Pigtail				Panel Mount		
	Travel mechanism (Reduction ratio)	Worm gear(1/160)	Worm gear(1/225)	Worm gear(1/292)	Worm gear(1/360)	Worm gear(1/160)	Worm gear(1/225)	Worm gear(1/292)
	Guide	Cross Roller Guide				Cross Roller Guide		
	Main materials-Finishing	Aluminum - Black alumite finishing				Aluminum - Black alumite finishing		
	Weight	0.51kg				0.5kg		
	Height of stage	25±0.2mm				25±0.2mm		
	Height of center rotation	50±0.2mm	75±0.2mm	100±0.2mm	125±0.2mm	50±0.2mm	75±0.2mm	100±0.2mm
	Runout accuracy of center rotation	0.01mm以内				0.01mm以内		
	Resolution/Pulse	0.0045°(Full)	0.0032°(Full)	0.002466°(Full)	0.002°(Full)	0.0045°(Full)	0.0032°(Full)	0.002466°(Full)
	MAX speed	22.5°/sec[5kHz]	16°/sec[5kHz]	12.5°/sec[5kHz]	10°/sec[5kHz]	22.5°/sec[5kHz]	16°/sec[5kHz]	12.5°/sec[5kHz]
	Repeatability positioning accuracy	±0.003°				±0.003°		
	Load capacity	5kgf[49N]				5kgf[49N]		
	Moment stiffness	Pitch 0.30/Yaw 0.10/Roll 0.11["/N・cm]				Pitch 0.30/Yaw 0.10/Roll 0.11["/N・cm]		
	Lost motion	0.01°以内				0.01°以内		
Sensor	Limit sensor	Available				Available		
	Origin sensor	Available				Available		
	Slit origin sensor	-				-		
	Provided screw (Hexagon-headed bolt)	4 of M4 - 10				4 of M4 - 10		

* Might be changed specification due to motors.

Resolution · MAX speed · Weight

Motor code	C	G
Type	Standard	High resolution
Motor model*3	C005C-90215P-1	PK523HPMB-C1
Step angle	0.72°	0.36°
Resolution (Full)	KGW06050	0.0045°
	KGW06075	0.0032°
	KGW06100	0.002466°
	KGW06125	0.002°
MAX speed	KGW06050	22.5°/sec
	KGW06075	16°/sec
	KGW06100	12.5°/sec
	KGW06125	10°/sec
Weight	KGW06-T (Pigtail)	0.51kg
	KGW06-M (Panel Mount)	0.50kg

Motor code	PA	ZA	EA	UG	UA		
Type	αSTEP (AR Series)	αSTEP (AZ Series)	Motor for EtherCAT	MINAS A6	J4		
Motor model*3	ARM24SAK	AZM24AK	STM28W100A	MSMF5AZL1A2	HG-KR053		
Resolution (Full)	KGW06050	0.00225° (1000P/R setting)		23 Bit encoder (8388608P/R)*1	22 Bit encoder (4194304P/R)*2		
	KGW06075	0.0016°(1000P/R setting)					
	KGW06100	0.001233°(1000P/R setting)					
	KGW06125	0.001° (1000P/R setting)					
MAX speed	KGW06050	45°/sec		67.5°/sec			
	KGW06075	32°/sec		48°/sec			
	KGW06100	25°/sec		37.5°/sec			
	KGW06125	20°/sec		30°/sec			
Weight	KGW06-T (Pigtail)	0.55kg	0.52kg	0.76kg	0.78kg		
	KGW06-M (Panel Mount)	0.54kg	0.51kg	0.75kg	0.77kg		

*1 Optional encoder cable is for incremental system.

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

*3 Model is our own management model.

Motorized Stage

New

Motorized goniometer
Stage

X
XY
Z
Horizontal Z
XYZ
Goniometer
Rotary
Unit
Controller

Ball
Screw

Worm
Gear

□40
□50
□60
□70
□80
□100
□120
Other

C

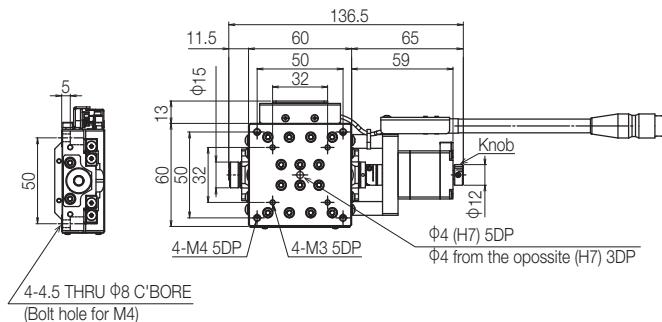
035

Goniometer Stage □60 : KGW06

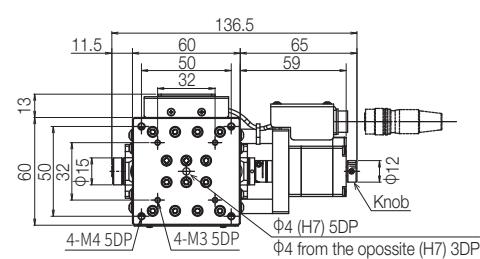
Dimensions

KGW06-L Series

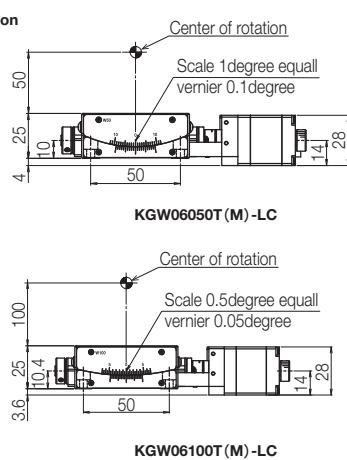
Top view :KGW06□□□T-LC (Pigtail)



Top view :KGW06□□□M-LC (Panel Mount)



Side view :common

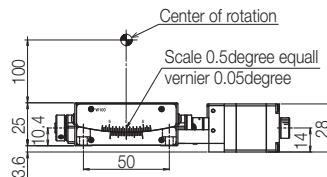


KGW06050T(M)-LC

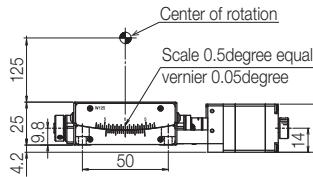
Center of rotation

KGW06075T(M)-LC

Center of rotation



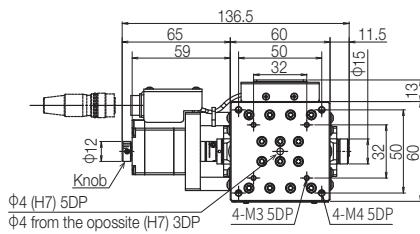
KGW06100T(M)-LC



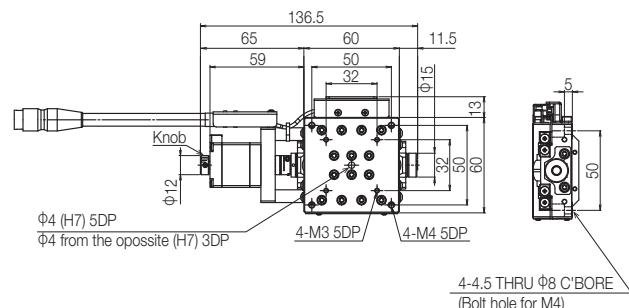
KGW06125T(M)-LC

KGW06-R Series

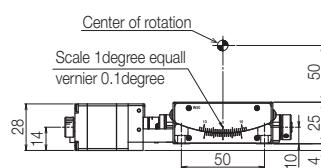
Top view :KGW06□□□M-RC (Panel Mount)



Top view :KGW06□□□T-RC (Pigtail)

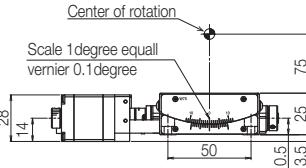


Side view :common

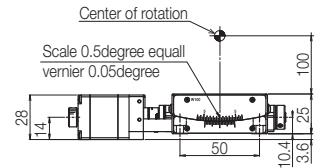


KGW06050T(M)-RC

Center of rotation

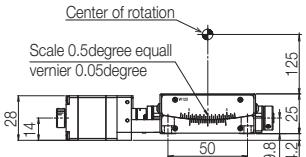


KGW06075T(M)-RC



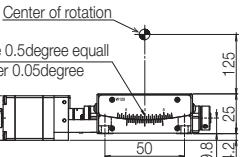
KGW06100T(M)-RC

Center of rotation



KGW06125T(M)-RC

Center of rotation



KGW06125T(M)-RC

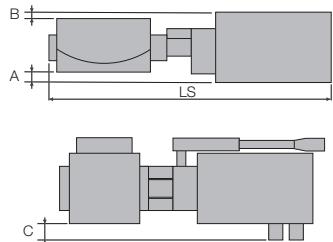
Center of rotation



Dimensions

C Standard motor

Motor Model C005C-90215P-1



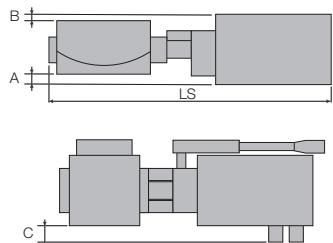
G High resolution

Motor Model PK523HPMB-C1

Model	Motor code	Motor size	Connector type	A(mm)	B(mm)	C(mm)	LS(mm)
KGW06050□-□□	C・G	□28	T・M	4.1	—	—	136.5
KGW06075□-□□				3.5			
KGW06100□-□□				3.7			
KGW06125□-□□				4.2			

EA Motor for EtherCAT

Motor Model STM28W100A



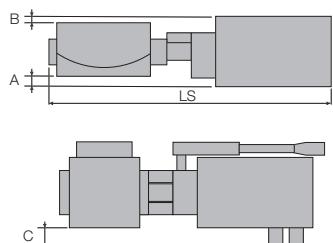
Model	Motor code	Motor size	Connector type	A(mm)	B(mm)	C(mm)	LS(mm)
KGW06050□-□EA	EA	□28	T・M	4.1	—	—	162.8
KGW06075□-□EA				3.5			
KGW06100□-□EA				3.7			
KGW06125□-□EA				4.2			

PA αSTEP (AR Series)

Motor Model ARM24SAK

ZA αSTEP (AZ Series)

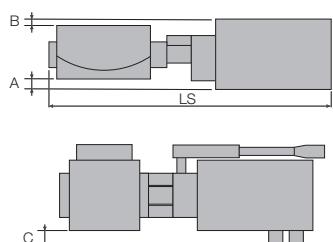
Motor Model AZM24AK



Model	Motor code	Motor size	Connector type	A(mm)	B(mm)	C(mm)	LS(mm)
KGW06050□-□PA	AR	□28	T・M	4.1	—	—	147.5
KGW06075□-□PA				3.5			
KGW06100□-□PA				3.7			
KGW06125□-□PA				4.2			
KGW06050□-□ZA	ZA	□28	T・M	4.1	—	—	157
KGW06075□-□ZA				3.5			
KGW06100□-□ZA				3.7			
KGW06125□-□ZA				4.2			

UG Servo motor MINAS A6 (Panasonic)

Motor Model MSMF5AZL1A2



UA Servo motor J4 (Mitsubishi Electric corporation)

Motor Model HG-KR053

Model	Motor code	Motor size	Connector type	A(mm)	B(mm)	C(mm)	LS(mm)
KGW06050□-□UG	UG	□38	T・M	9.1	4	2	187.5
KGW06075□-□UG				8.5	4.5		
KGW06100□-□UG				8.7	4.4		
KGW06125□-□UG				9.2	3.8		
KGW06050□-□UA	UA	□40	T・M	10.4	5.3	—	181.9
KGW06075□-□UA				9.8	5.8		
KGW06100□-□UA				10	5.7		
KGW06125□-□UA				10.5	5.1		

Motorized Stage

New

Motorized
Stage

Motorized goniometer

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball
Screw

Worm
Gear

□40

□50

□60

□70

□80

□100

□120

Other

Goniometer Stage □60: KAW06 (2-axis)

■ 2 axis
KAW06050T-LC

KAW06050M-LC



Freely
customize
the motor

RoHS

*All image is for illustrative purposes only.

KAW06050T - L C - □

1 2 3 4 5 6 7

PA - □

6 7

● Cable P.1-207～
● Electrical specification P.C-043～

1 Axis

A	2-axes
---	--------

2 Stage size

06	□60mm
----	-------

3 Height of center rotation (W.D.)

050	50mm
075	75mm
100	100mm

6 Motor option

Code	Specification
C	Standard
G	High resolution

7 Cable option (Motor: C · G)

Code	Specification	Cable type
Blank	Cable 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

4 Connector specifications

T	Pigtail	
M	Panel Mount	

6 Motor option

Code	Specification
PA	aSTEP (AR Series)
ZA	aSTEP (AZ Series)
EA	Motor 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

Code	*Combination Motor	Blank	3			5			3A			5A				
			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	—	3m	—	5m					5m
Driver (Amplifier)							Not included					Included				

*Motor driver (amplifier)/cable combination

Selection Example

Model W.D. 50mm + Connector specs T:Pigtail/L position + Motor option G:High resolution + Cable A:2m → **KAW06050T-LG-A**

Model W.D. 100mm + Connector specs M:Panel Mount/Opposite hand + Motor option PA:aSTEP(AR Series) + Cable 3A:Driver/Cable set 3m → **KAW06100M-RPA-3A**

New

Motorized goniometer

X
XY
Z
Horizontal Z
XYZ
Goniometer
Rotary
Unit
Controller

Ball Screw

Worm Gear

□40
□50
□60
□70
□80
□100
□120
Other
C
038

Specification

SPEC							
Model		KAW06050T-LC	KAW06075T-LC	KAW06100T-LC	KAW06050M-LC	KAW06075M-LC	KAW06100M-LC
Opposite hand		KAW06050T-RC	KAW06075T-RC	KAW06100T-RC	KAW06050M-RC	KAW06075M-RC	KAW06100M-RC
Travel distance Upper/Lower		±10°±8°	±8°±6°	±6°±5°	±10°±8°	±8°±6°	±6°±5°
Stage surface size		60×60mm			60×60mm		
Connector type		Pigtail			Panel Mount		
Travel mechanism (Upper Reduction ratio)	Upper	Worm gear(1/160)	Worm gear(1/225)	Worm gear(1/292)	Worm gear(1/160)	Worm gear(1/225)	Worm gear(1/292)
(Lower)	Lower	Worm gear(1/225)	Worm gear(1/292)	Worm gear(1/360)	Worm gear(1/225)	Worm gear(1/292)	Worm gear(1/360)
Guide		Cross Roller Guide			Cross Roller Guide		
Main materials-Finishing		Aluminum - Black alumite finishing			Aluminum - Black alumite finishing		
Weight		1.02kg			1.00kg		
Height of stage		50±0.4mm			50±0.4mm		
Height of center rotation		50±0.4mm	75±0.4mm	100±0.4mm	50±0.4mm	75±0.4mm	100±0.4mm
Runout accuracy of center rotation		—			—		
Resolution/Pulse	Upper	0.0045°(Full)	0.0032°(Full)	0.002466°(Full)	0.0045°(Full)	0.0032°(Full)	0.002466°(Full)
	Lower	0.0032°(Full)	0.002466°(Full)	0.002°(Full)	0.0032°(Full)	0.002466°(Full)	0.002°(Full)
MAX speed	Upper	22.5°/sec[5kHz]	16°/sec[5kHz]	12.5°/sec[5kHz]	22.5°/sec[5kHz]	16°/sec[5kHz]	12.5°/sec[5kHz]
	Lower	16°/sec[5kHz]	12.5°/sec[5kHz]	10°/sec[5kHz]	16°/sec[5kHz]	12.5°/sec[5kHz]	10°/sec[5kHz]
Repeatability positioning accuracy		±0.003°以内			±0.003°以内		
Load capacity		4.5kgf[44.1N]			4.5kgf[44.1N]		
Moment stiffness		Pitch 0.41/Yaw 0.20/Roll 0.41["/N · cm]			Pitch 0.41/Yaw 0.20/Roll 0.41["/N · cm]		
Lost motion		0.01°			0.01°		
Sensor	Limit sensor	Available			Available		
	Origin sensor	Available			Available		
	Slit origin sensor	—			—		
Provided screw (Hexagon-headed bolt)		4 of M4 - 10			4 of M4 - 10		

* Might be changed specification due to motors.

Resolution · MAX speed · Weight

Motor code		C	G
Type		Standard	
Motor model*3		C005C-90215P-1	
Step angle		0.72°	
Resolution (Upper/Lower)	KAW06050	0.0045° 0.0032°	0.00225° 0.0016°
	KAW06075	0.0032° 0.002466°	0.0016° 0.001233°
	KAW06100	0.002466° 0.002°	0.001233° 0.001°
MAX speed (Upper/Lower)	KAW06050	22.5°/sec 16°/sec	
	KAW06075	16°/sec 12.5°/sec	
	KAW06100	12.5°/sec 10°/sec	
Weight	KAW06-T (Pigtail)	1.02kg	
	KAW06-M (Panel Mount)	1.00kg	

Motor code		PA	ZA	EA	UG	UA			
Type		αSTEP (AR Series)		αSTEP (AZ Series)		Motor for EtherCAT			
Motor model*3		ARM24SAK		AZM24AK		STM28W100A			
Resolution (Upper/Lower)	KAW06050	0.00225° 0.0016°(1000P/R setting)				23 Bit encoder (8388608P/R)*1			
	KAW06075	0.0016° 0.001233° (1000P/R setting)							
	KAW06100	0.001233° 0.001° (1000P/R setting)							
MAX speed (Upper/Lower)	KAW06050	45°/sec 32°/sec				67.5°/sec 48°/sec			
	KAW06075	32°/sec 25°/sec				48°/sec 37.5°/sec			
	KAW06100	25°/sec 20°/sec				37.5°/sec 30°/sec			
Weight	KAW06-T (Pigtail)	1.10kg			1.04kg		1.52kg		
	KAW06-M (Panel Mount)	1.08kg			1.02kg		1.50kg		
*1 Optional encoder cable is for incremental system. *2 When constructing an absolute system, it is necessary to install a battery in the amplifier. *3 Model is our own management model.									

*1 Optional encoder cable is for incremental system.
*2 When constructing an absolute system, it is necessary to install a battery in the amplifier.

*3 Model is our own management model.

□40
□50
□60
□70
□80
□100
□120
Other
C
038

Motorized Stage

New

Motorized goniometer
Stage

X
XY
Z
Horizontal Z
XYZ
Goniometer
Rotary
Unit
Controller

Ball
Screw

Worm
Gear

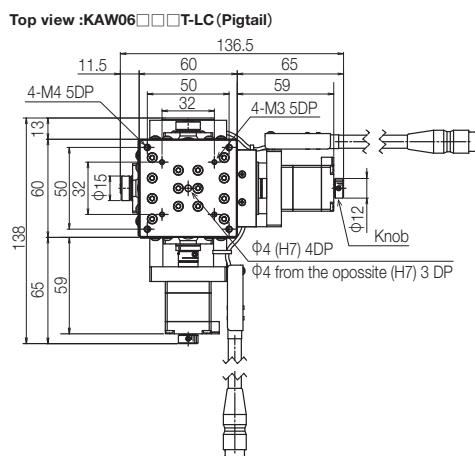
□40
□50
□60
□70
□80
□100
□120
Other

C
039

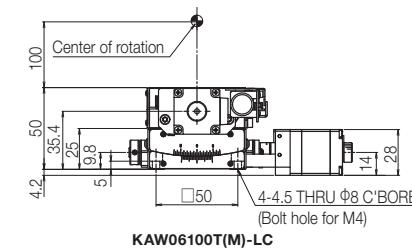
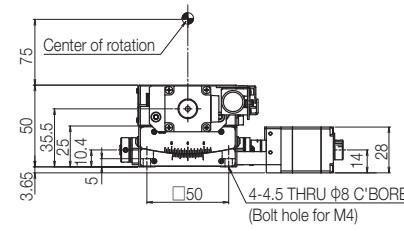
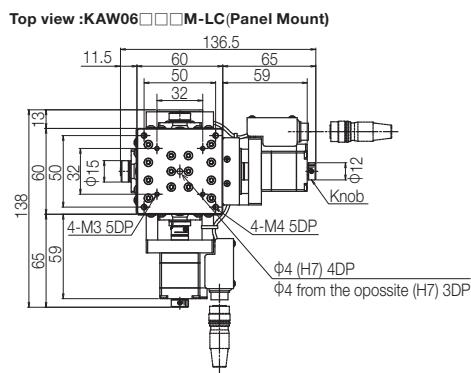
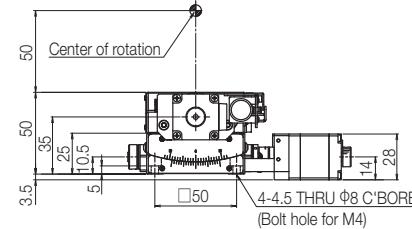
Goniometer Stage □60: KAW06 (2-axis)

Dimensions

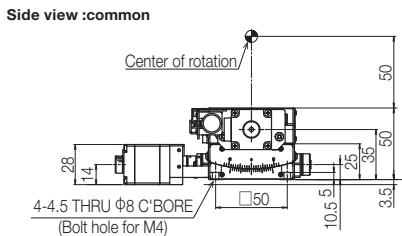
KAW06-L Series



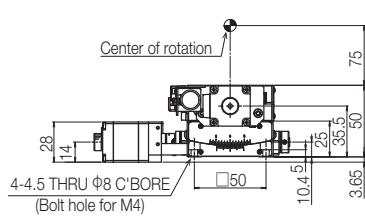
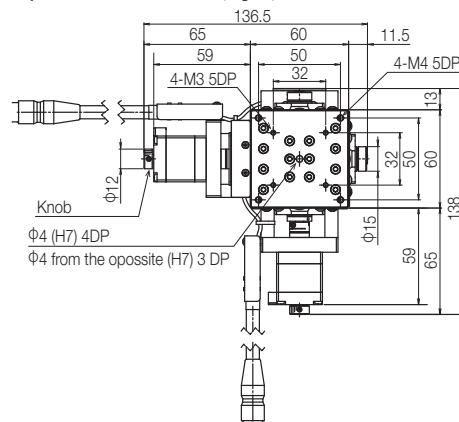
Side view :common



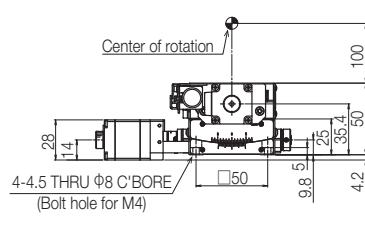
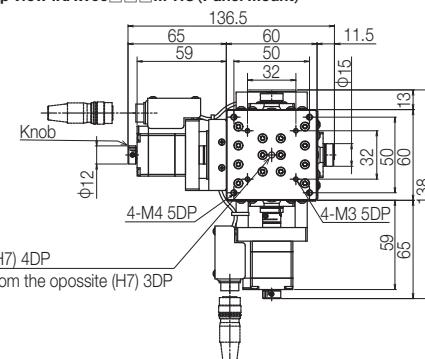
KAW06-R Series



Top view :KAW06□□□T-RC (Pigtail)



Top view :KAW06□□□M-RC (Panel Mount)

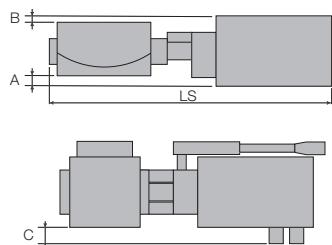


C
039

Dimensions

C Standard motor

Motor Model C005C-90215P-1



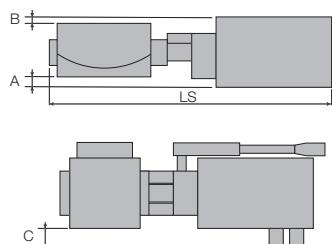
G High resolution

Motor Model PK523HPMB-C1

Model	Motor code	Motor size	Connector type	A(mm)	B(mm)	C(mm)	LS(mm)
KGW06050□-□□				4.1			
KGW06075□-□□				3.5			
KGW06100□-□□				3.7			
KGW06125□-□□				4.2			136.5

EA Motor for EtherCAT

Motor Model STM28W100A



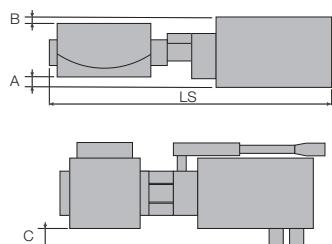
Model	Motor code	Motor size	Connector type	A(mm)	B(mm)	C(mm)	LS(mm)
KGW06050□-□EA				4.1			
KGW06075□-□EA				3.5			
KGW06100□-□EA				3.7			
KGW06125□-□EA				4.2			162.8

PA αSTEP (AR Series)

Motor Model ARM24SAK

ZA αSTEP (AZ Series)

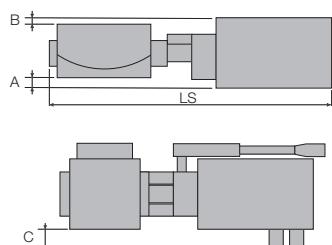
Motor Model AZM24AK



Model	Motor code	Motor size	Connector type	A(mm)	B(mm)	C(mm)	LS(mm)
KGW06050□-□PA				4.1			
KGW06075□-□PA				3.5			
KGW06100□-□PA				3.7			
KGW06125□-□PA				4.2			
KGW06050□-□ZA				4.1			
KGW06075□-□ZA				3.5			
KGW06100□-□ZA				3.7			
KGW06125□-□ZA				4.2			157

UG Servo motor MINAS A6 (Panasonic)

Motor Model MSMF5AZL1A2



UA Servo motor J4 (Mitsubishi Electric corporation)

Motor Model HG-KR053

Model	Motor code	Motor size	Connector type	A(mm)	B(mm)	C(mm)	LS(mm)
KGW06050□-□UG				9.1	4		
KGW06075□-□UG				8.5	4.5		
KGW06100□-□UG				8.7	4.4		
KGW06125□-□UG				9.2	3.8		
KGW06050□-□UA				10.4	5.3		
KGW06075□-□UA				9.8	5.8		
KGW06100□-□UA				10	5.7		
KGW06125□-□UA				10.5	5.1		181.9

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

Ball Screw

Worm Gear

- 40
- 50
- 60
- 70
- 80
- 100
- 120
- Other
- C 040

Motorized Stage

Goniometer Stage :KGW04/ KAW04/KGW06/ KAW06

New
Motorized goniometer
Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

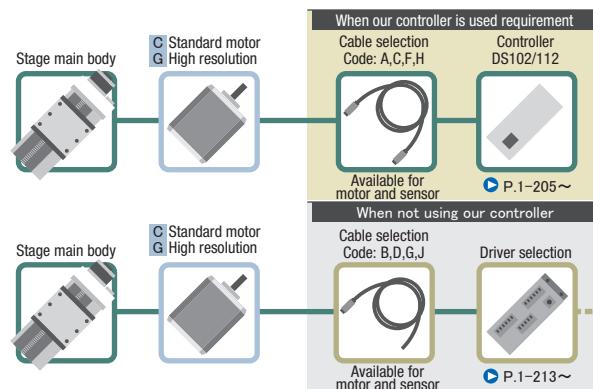
Unit

Controller

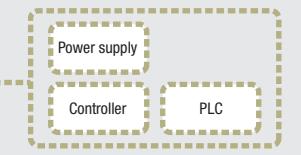
Motor option

C Standard motor
Motor model
C005C-90215P-1

G High resolution
Motor model
PK523HPMB-C1

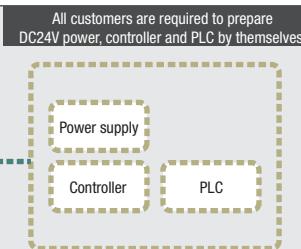
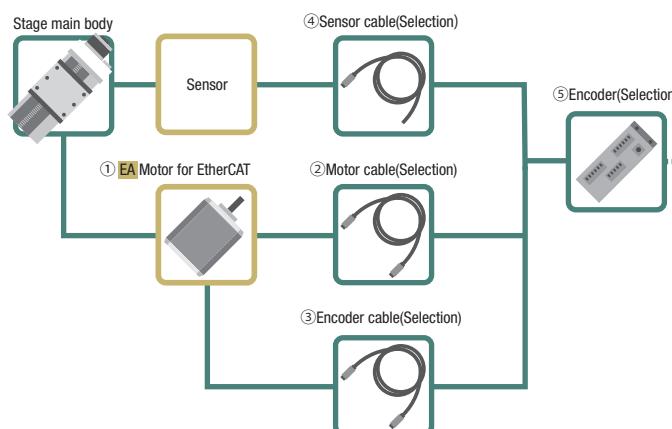


All customers are required to prepare DC24V power, controller and PLC by themselves.



Motor option

EA Motor for EtherCAT
Motor model
STM28W100A



Code	①Motor model	②Motor cable selection	③Encoder cable selection	④Sensor cable selection	④Driver 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

Ball Screw

Worm Gear

□40

□50

□60

□70

□80

□100

□120

Other

New

Motorized goniometer
Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball
Screw

Worm
Gear

□40

□50

□60

□70

□80

□100

□120

Other

C
042

Motor option

PA αSTEP (AR Series)

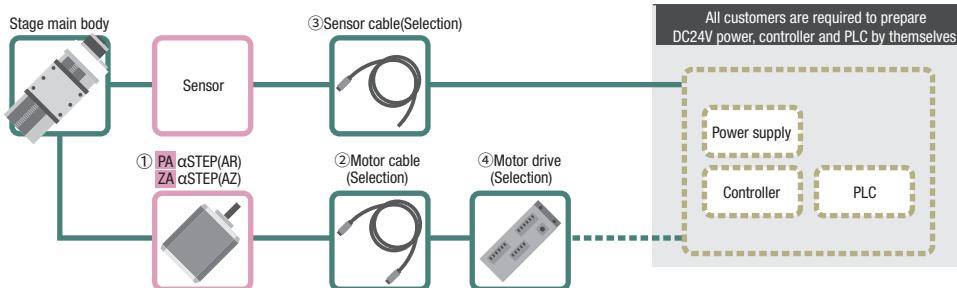
Motor model

ARM24SAK

ZA αSTEP (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

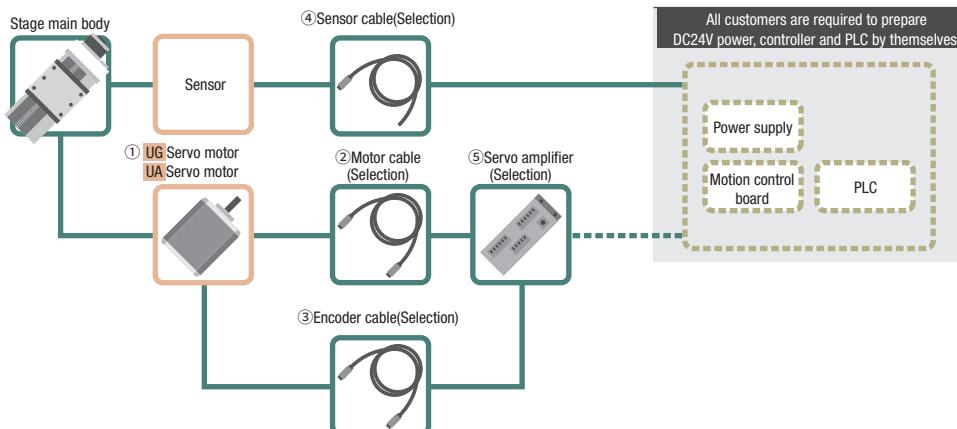
Motor model

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

Goniometer Stage :KGW04/ KAW04/KGW06/ KAW06

New
Stage

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

Motor code	C	G	PA	ZA
Model (*1)			KGW04/KGW06	
Type	5 phase stepping motor (0.75A/Phase)		αSTEP (AR Series)	αSTEP (AZ Series)
Feature	Standard	High resolution	Small step-out, incremental	Small step-out, absolute
Model (*3)	C005C-90215P-1	PK523HPMB-C1	ARM24SAK	AZM24AK
With electromagnetic brake				
Manufacturer		Oriental Motor Co., Ltd.		
Step angle	0.72°	0.36°		0.36°(1000P/R setting)
Mass	0.11kg			0.15kg
Motor size	□ size L size	□28mm 37mm	45mm	□28mm 54.5mm
Max. Holding Torque	0.048N · m	0.038N · m	0.055N · m	0.095N · m
Driver model	CVD507-K-A9		ARD-K	AZD-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:43025-1000 (MOLEX) or 1-794617-0 (TE Connectivity) Sensor:HR10A-7J-6P(73)(HRS)	Motor:DF62B-13EP-2.2C(HRS) Sensor:HR10A-7J-6P(73)(HRS)
	Panel Mount	HR10A-10R-12P(73) (Hirose Electric Co., Ltd.)	Motor:43025-1000 (MOLEX) or 1-794617-0 (TE Connectivity) Sensor:HR10A-7R-6P(73)(HRS)	Motor:DF62B-13EP-2.2C(HRS) Sensor:HR10A-7R-6P(73)(HRS)
	Receiving connector	HR10A-10P-12S(73) (Hirose Electric Co., Ltd.)	Motor:43020-1000 (MOLEX) or 1-794615-0 (TE Connectivity) Sensor:HR10A-7P-6S(73) (HRS)	Motor:DF62C-13S-2.2C(HRS) Sensor:HR10A-7P-6S(73)(HRS)
Sensor board	Limit sensor		Available	
	Origin sensor		Available	
	Slit origin sensor		—	
	Sensor model		Photo microsensor EE-SX4320 (Omron Co., Ltd.)	
	Power-supply voltage		DC5~24V±5%	
	Current consumption		Total 60mA 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) The electric specification of 2-axis Goniometer Stage (KAW) is the same.

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

(*3) Model is our own management model.

Pin allocation · Connection diagram

Motor Code	KGW Series	
C · G	Available sensor	<p>【Pin allocation (common)】</p> <p>Pigtail : HR10A-10J-12P(73) (HRS) Panel Mount : HR10A-10R-12P(73) (HRS)</p> <p>【Pin allocation (common)】</p>
PA	Motor	<p>【Receiver cable】Model:CC030VA2R2(3m)/CC050VA2R2(5m) *Flexible cable</p> <p>Driver side Connector:43025-1000(Molex) or 1-794617-0(TE Connectivity)</p> <p>Motor side Connector:43020-1000(Molex) or 1-794615-0(TE Connectivity)</p> <p>Length: 3m, 5m</p> <p>【Sensor (common)】</p> <p>【Receiver cable】Model:HR10AP-S-SB-6-□ (□ is the length) *for fixing Sensor side</p> <p>Connector (Female): HR10A-7P-6S (73) (HRS)</p> <p>ULAWM20276 AWG28 3P Black</p> <p>*The shields are connected with the connector shell.</p> <p>【Pin allocation (common)】</p> <p>Pigtail:HR10A-7J-6P(73) (HRS) Panel Mount:HR10A-7R-6P(73) (HRS)</p>
ZA	Motor	<p>【Receiver cable】Model:CC030VZ2R2(3m)/CC050VZ2R2(5m) *Flexible cable</p> <p>Driver side Connector:55100-0670(Molex)</p> <p>Motor side Connector:DF62C-13S-2.2C(HIROSE ELECTRIC)</p> <p>Driver side Connector:J11DF-06V-KX (J.S.T.MFG.)</p> <p>Length: 3m, 5m</p> <p>【Pin allocation (common)】</p> <p>Pigtail:HR10A-7J-6P(73) (HRS) Panel Mount:HR10A-7R-6P(73) (HRS)</p>

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

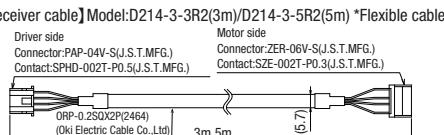
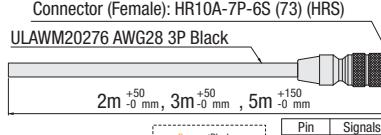
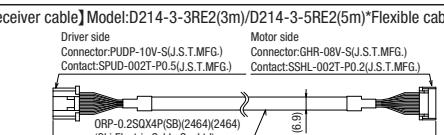
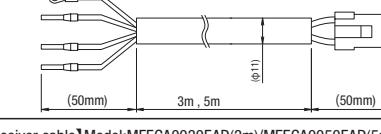
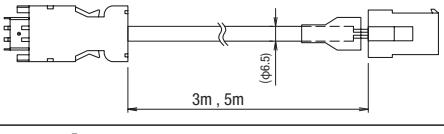
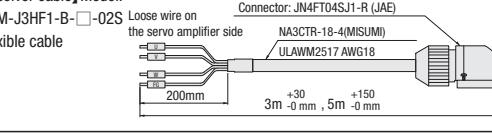
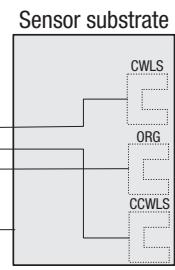
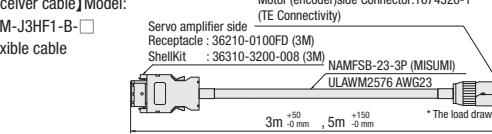
Motor code		EA	UG	UA
Model (*1)		KGW04/KGW06		
Motor Specification (*2)	Type	2 phase closed Loop stepping motor	Servo motor	Servo motor
	Feature	Small step-out ,incremental,EtherCAT	High speed	High speed
	Model (*3)	STM28W100A	MSMF5AZL1A2	HG-KR053
	With electromagnetic brake		—	
	Manufacturer	SURUGA SEIKI	Panasonic	Mitsubishi Electric corporation
	Step angle	0.36° (1000P/R setting)	Both absolute and incremental 23 bits encoder (6388608P/R) (*4)	Both absolute and incremental 22 bits encoder (4194304P/R) (*5)
	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	MA6LT05SF	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:SM06B-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:SM06B-GHS-TB (JST) Sensor:HR10A-7R-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		Available	
	Origin sensor		Available	
	Slit origin sensor		—	
	Sensor model		Photo microsensor EE-SX4320 (Omron Co., Ltd.)	
	Power-supply voltage		DC5~24V±5%	
	Current consumption		Total 60mA 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) (*2) (*3) See P.C-043

(*4) Optional encoder cable is for incremental system.

(*5) 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 	【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.
	Encoder	【Receiver cable】Model:D214-3-3RE2(3m)/D214-3-5RE2(5m)*Flexible cable 	
UG	Motor	【Receiver cable】Model:MFMCA0030EED(3m)/MFMCA0050EED(5m)*Flexible cable 	【Pin allocation】 Pigtail:HR10A-7J-6P(73) (HRS) Panel Mount:HR10A-7R-6P(73) (HRS)
	Encoder	【Receiver cable】Model:MFECA0030EAD(3m)/MFECA0050EAD(5m) *for fixing 	
UA	Motor	【Receiver cable】Model: SVPM-J3HF1-B-□-02S *Flexible cable 	Sensor substrate 
	Encoder	【Receiver cable】Model: SVEM-J3HF1-B-□ *Flexible cable 	

Motorized Stage

Goniometer Stage :KGW04/ KAW04/KGW06/ KAW06

New
Stage

Motorized goniometer

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball
Screw

Worm
Gear

□40

□50

□60

□70

□80

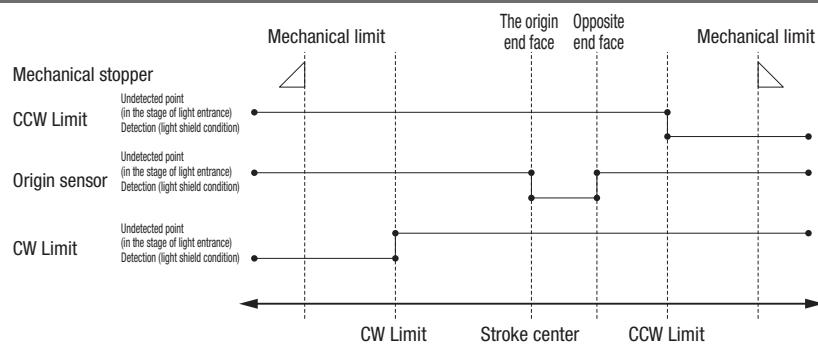
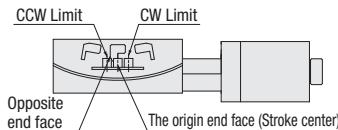
□100

□120

Other

C
045

Timing chart



Unit [deg.]	Direction of CW		Direction of CCW		
	Reference coordinate	CW Limit	The origin end face Stroke center	Opposite end face	CCW Limit
KGW04040T(M)	Return to origin	8.5	0	2.5	8.5
KGW04060T(M)	Return to origin	6.5	0	2.1	6.5
KGW06050T(M)	Return to origin	10.5	0	2.5	10.5
KGW06075T(M)	Return to origin	8.3	0	1.8	8.3
KGW06100T(M)	Return to origin	6.3	0	1.4	6.3
KGW06125T(M)	Return to origin	5.2	0	1.1	5.2

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

* 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.

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.

■KGW06/KAW06 recommended return to origin Return to origin sequence ▶ P.1-201～

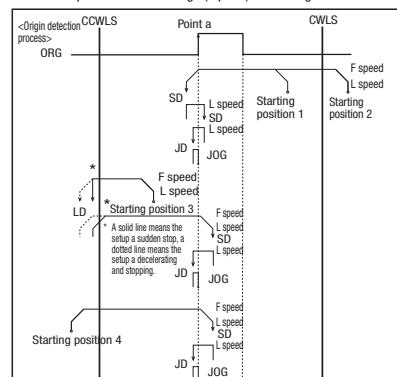
Type 3: Detect in the direction of CCW and perform detected process for CCW edge(a point) of ORG signal.

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

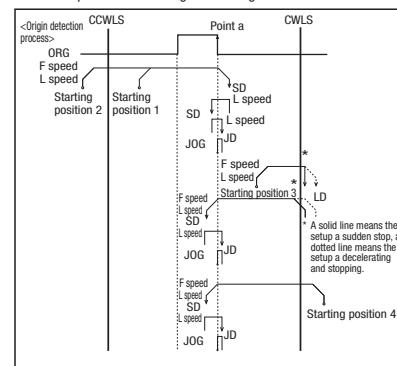
Type 9: After finished Type3, perform detected process for CCW edge of TIMING signal.

Type10: 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.



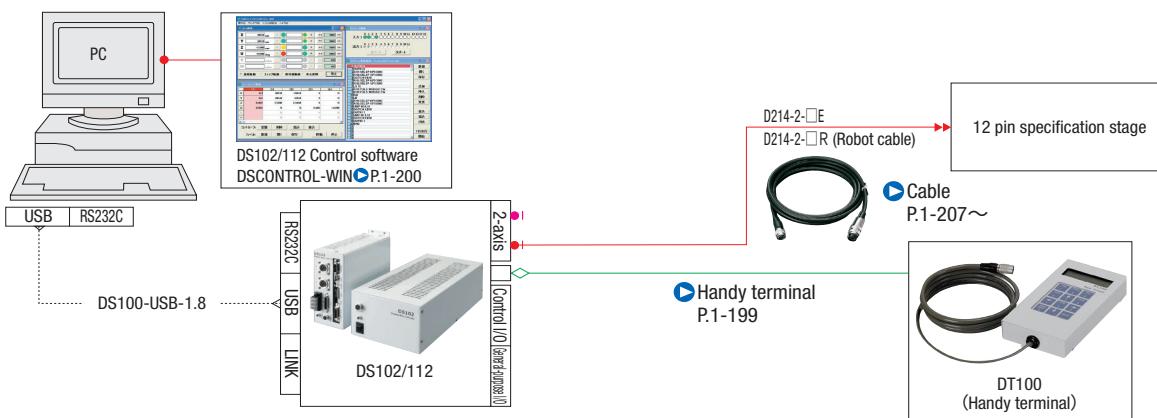
[Type4] Detect in the direction of CW and perform detected process for CW edge of ORG signal.



Connectin example

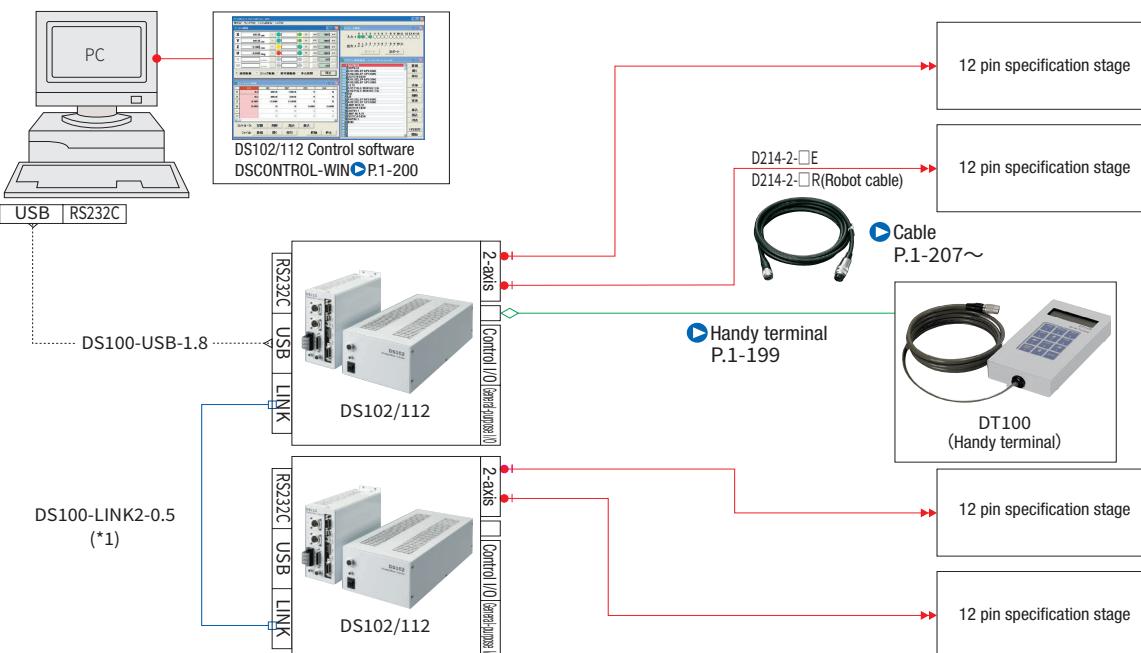
■ Connection example 1 Motorized Stage 1axis: When holding a terminal device (using control software)

*USB cable connection between PC and controller.



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

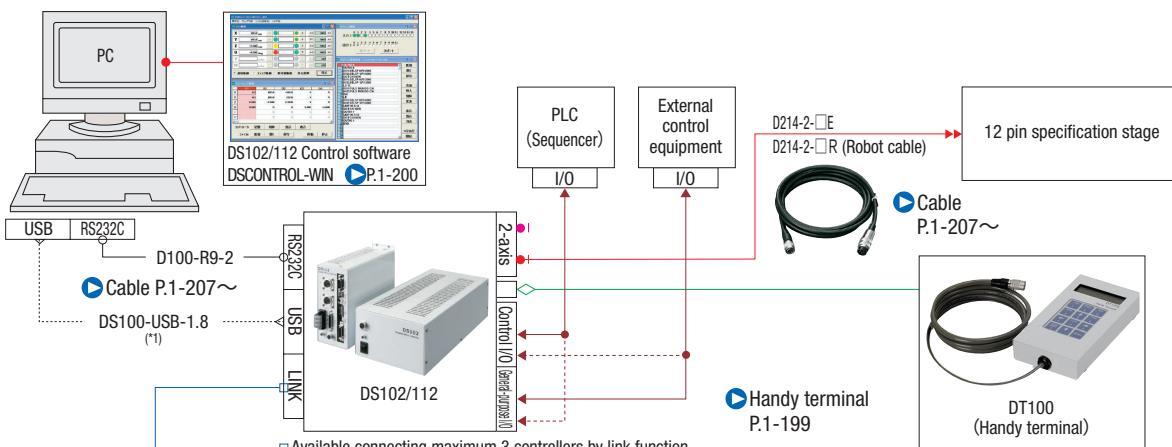
*USB cable connection between PC and controller.



(*)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

Goniometer Stage □50: KG05/KA05

Motorized goniometer
Stage

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball
Screw

Worm
Gear

□40

□50

□60

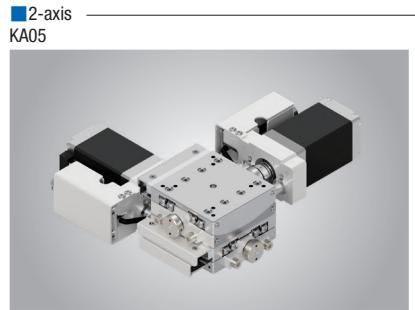
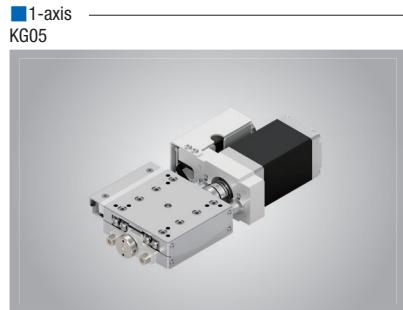
□70

□80

□100

□120

Other



RoHS

- Our high precision goniometer stages based on cross roller guide for travel guide and worm gear mechanism.
- High performance with runout accuracy of center rotation within 0.01 mm.
- Configuration 2-axis
Combination of 1-axis stage that is different center of rotation.

Model	Selection code	Option code
K G05-W050A	□ -H 5	
1	2	3 4 5

Cable P.1-207～
Electrical specification P.1-155～

1 Axis	
G	1-axis
A	2-axis
2 Height of center rotation (W.D.)	
050	50mm
068	68mm
086	86mm

*2 Unselectable 086 for 2-axis

3 Sensor cover location specification

Code	Specification
L	L position
R	Opposite hand

4 Motor option

Code	Specification
H	<input type="checkbox"/> 28 High resolution
G	<input type="checkbox"/> 42 High resolution

* There is no difference in accuracy specifications depending on the selected motor. Only the weight and external dimensions differ. For details, please check the CAD and external dimensions.

5 Cable option

Code	Specification	Cable type
Blank	2m	D214-2-2E
1	2m One end loose	D214-2-EK
2	4m	D214-2-4E
3	4m One end loose	D214-2-EK
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-RK

* One end loose position to only stage opposite side.

* 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 + Height of center rotation (W.D.) + Sensor cover location + Attached cable → KA05-W068AR-H

SPEC									
Number of axis		1-axis		2-axis					
Model (Opposite hand)		KG05-W050AL-H5	KG05-W068AL-H5	KG05-W086AL-H5	KA05-W050AL-H5				
KG05-W050AR-H5		KG05-W068AR-H5	KG05-W086AR-H5	KA05-W050AR-H5	KA05-W068AR-H5				
Travel length Upper/Lower axis		±10°	±8°	±6°	±10°/±8°				
Table size									
50×50mm									
Travel mechanism (Reduction ratio)		Worm gear (1/231) Upper	Worm gear (1/300) Lower	Worm gear (1/375)	Worm gear (1/231) Worm gear (1/300)				
Guide									
Crossed roller guide									
Main materials-Finishing									
Brass/Phosphor bronze—Nickel chrome plating									
Weight		0.63kg		1.26kg					
Height of stage		18±0.2mm		36±0.4mm					
Height of center rotation		50±0.2mm	68±0.2mm	86±0.2mm	50±0.4mm				
Runout accuracy of center rotation		Within 0.01mm		—					
Accuracy specification	Resolution/Pulse	0.001559°	0.0012°	0.00096°	0.001559°				
					0.0012°				
MAX speed	Upper	7.8°/sec [5kHz]	6°/sec [5kHz]	4.8°/sec [5kHz]	7.8°/sec [5kHz]				
					6°/sec [5kHz]				
Repeatability positioning accuracy									
Within ±0.005°									
Load capacity		3kgf [29.4N]		2.4kgf [23.5N]					
Moment stiffness		Pitch 0.42/yaw 0.16/roll 0.23 ["/N · cm]		Pitch 0.65/yaw 0.32/roll 0.65 ["/N · cm]					
Lost motion		Within 0.01°		—					
Sensor	Limit sensor		Installed						
	Origin sensor		Installed						
	Slit origin sensor		—						
Provided screw (Hexagon-headed bolt)		4 of M3-6							

※ Might be changed specification due to motors.

Motorized Stage

Electrical Specification: KG05/KA05

Motorized goniometer

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

Ball Screw

Worm Gear

□40

□50

□60

□70

□80

□100

□120

Other

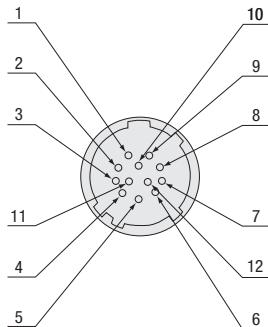
Electrical specification

Model	KG05-W050AL-G	KG05-W068AL-G	KG05-W086AL-G	
Opposite hand	KG05-W050AR-G	KG05-W068AR-G	KG05-W086AR-G	
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	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 Residual voltage 0.4V or less when the load current is 8mA		
	Output logic	On detection (light shield condition): Output transistor OFF (Non-continuity)		

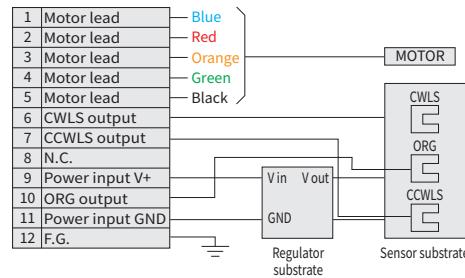
*1 See page □ P.1-213~ for details of single motor specification.

*2 Model is our own management model.

Pin allocation



Connection diagram



50 goniometer sensor logic

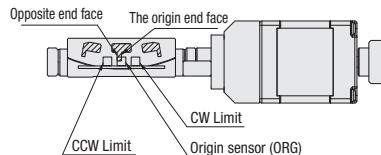
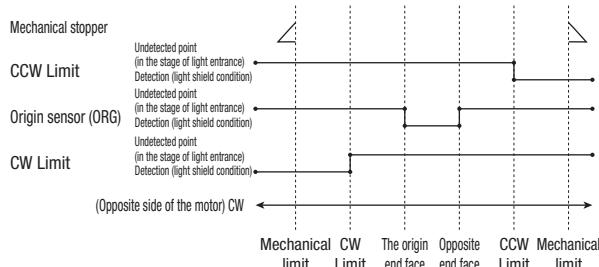
Type	CWLS	ORG	CCWLS
A	N.C. EE-SX4320	N.C. EE-SX4320	N.C. EE-SX4320

* Upper: Sensor logic

Lower: Using sensor

Note: Only 50 goniometer stage sensor logic

Timing chart



Unit [deg]	Direction of CW			Direction of CCW	
	Reference coordinate	CW Limit	Origin	Opposite end face	CCW Limit
KG05-W050A	Return to origin	10.3	0	1.9	10.3
KG05-W068A	Return to origin	8.3	0	1.5	8.3
KG05-W086A	Return to origin	6.3	0	1.2	6.3

* 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.

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.

■KG05/KA05 recommended return to origin Return to origin sequence ▶P.1-201~

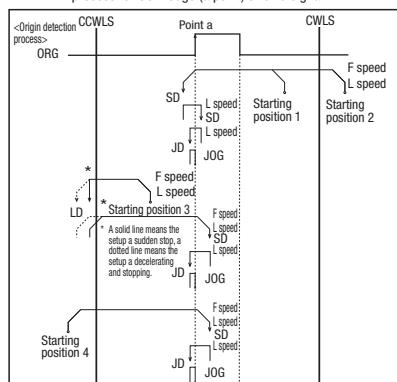
Type 3: Detect in the direction of CCW and perform detected process for CCW edge (a point) of ORG signal.

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

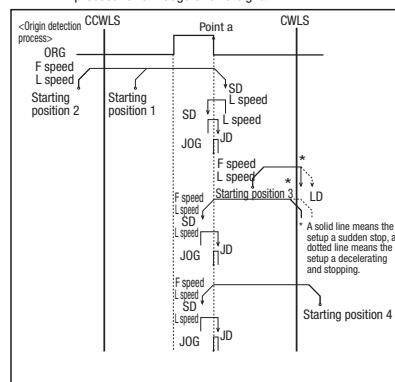
Type 9: After finished Type3, perform detected process for CCW edge of TIMING signal.

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



Motorized Stage

Goniometer Stage □70: KG07/KA07

**Motorized goniometer
Stage**

X
XY
Z
Horizontal Z
XYZ
Goniometer
Rotary
Unit
Controller

Ball
Screw

Worm
Gear

□40

□50

□60

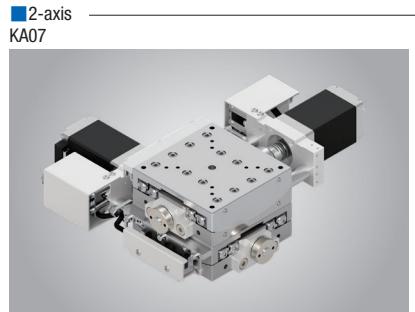
□70

□80

□100

□120

Other



RoHS

- Our high precision goniometer stages based on cross roller guide for travel guide and worm gear mechanism.
- 70*70mm has an additional sensor logic system.
- Configuration 2-axis
Combination of 1-axis stage that is different center of rotation.

Model Selection code Option code
K G07-W070 - **H** **5**

1 2 3 4 5 6

Cable P.1-207～
Electrical specification P.1-161～

1 Axis	
G	1-axis
A	2-axis
2 Height of center rotation (W.D.)	
070	70mm
096	96mm
122	122mm

* KA07 is only W.D.70 and 96mm

3 Sensor logic

Type	CWLS	ORG	CCWLS
A	N.C.	N.C.	N.C.
B	N.O.	N.O.	N.O.
C	N.C.	N.O.	N.C.

4 Sensor cover location specification

Code	Specification
L	L position
R	Opposite hand

5 Motor option

Code	Specification
H	<input type="checkbox"/> 28 High resolution
G	<input type="checkbox"/> 42 High resolution

* There is no difference in accuracy specifications depending on the selected motor. Only the weight and external dimensions differ. For details, please check the CAD and external dimensions.

6 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 details of cable.

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

Selection Example

Your spec Number of axis + Height of center rotation (W.D.) + Sensor cover location + Sensor logic + Attached cable → KA07-W096BR-H

Your spec	Number of axis
	2-axis

Height of center rotation (W.D.)
96mm

Sensor cover location
Opposite hand

Sensor logic
Absolutely N.O.

Attached cable
2m

SPEC									
Number of axis		1-axis		2-axis					
Model (Opposite hand)		KG07-W070AL-H5	KG07-W096AL-H5	KG07-W122AL-H5	KA07-W070AL-H5				
Mechanical specification		KG07-W070AR-H5	KG07-W096AR-H5	KG07-W122AR-H5	KA07-W070AR-H5				
Travel length Upper/Lower axis									
Table size		±9°	±7°	±5°	±9°/±7°				
Travel mechanism									
Upper (Reduction ratio)		Worm gear (1/235)	Worm gear (1/301)	Worm gear (1/375)	Worm gear (1/235)				
Lower					Worm gear (1/301)				
Guide									
Main materials-Finishing									
Weight									
0.82kg				1.64kg					
Height of stage									
26±0.2mm									
Height of center rotation									
70±0.2mm		96±0.2mm	122±0.2mm	70±0.4mm	96±0.4mm				
Runout accuracy of center rotation									
Within 0.01mm									
Resolution (Pulse)		0.001532°	0.001196°	0.00096°	0.001532°				
Upper at the full					0.001196°				
Lower at the full					0.00096°				
MAX speed		7.6°/sec [5kHz]	6°/sec [5kHz]	4.8°/sec [5kHz]	7.6°/sec [5kHz]				
Upper					6°/sec [5kHz]				
Lower					4.8°/sec [5kHz]				
Repeatability positioning accuracy									
Within ±0.003°									
Load capacity									
5kgf [49N]									
Moment stiffness									
Pitch 0.17/yaw 0.06/roll 0.06 ["/N · cm]									
Lost motion									
Within 0.006°									
Sensor		Installed							
Limit sensor		Installed							
Origin sensor		-							
Slit origin sensor		-							
Provided screw (Hexagon-headed bolt)									
4 of M4-8									

※ Might be changed specification due to motors.

Motorized Stage

Electrical Specification: KG07/KA07

Motorized goniometer

X

XY

Z

Horizontal Z

XYZ

Goniometer

Rotary

Unit

Controller

**Ball
Screw**

**Worm
Gear**

□40

□50

□60

□70

□80

□100

□120

Other

Electrical specification

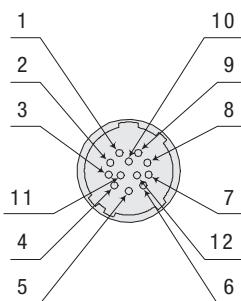
Model		KG07-W070AL-H	KG07-W096AL-H	KG07-122AL-H	KG07-W070AL-G	KG07-W096AL-G	KG07-122AL-G			
Opposite hand		KG07-W070AR-H	KG07-W096AR-H	KG07-122AR-H	KG07-W070AR-G	KG07-W096AR-G	KG07-122AR-G			
Motor (*1)	Type	5 phase stepping motor		0.75A/Phase (Oriental Motor Co., Ltd.)						
	Model (*2)	PK525HPMB-C1(□28mm)			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	Photo microsensor: EE-SX398,EE-SX498 (Omron Co., Ltd.)								
	Power voltage	DC5～24V ±10%								
	Consumption current	Total 85mA or less								
	Control output	NPN open collector output DC5V～24V 16mA or less Residual voltage 0.4V or less when the load current is 16mA								
	Output logic	EE-SX398: On detection (light shield condition): Output transistor ON (Continuity) EE-SX498: On detection (light shield condition): Output transistor OFF (Non-continuity)								

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

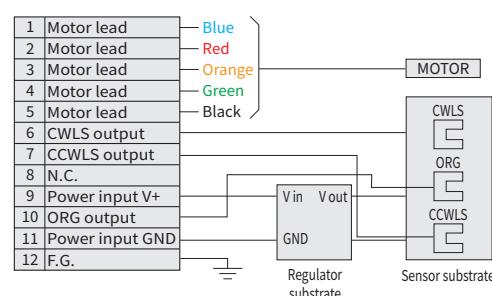
*2 Model is our own management model.

* The electric specification of the 2-axis KA07 series are the same.

Pin allocation



Connection diagram

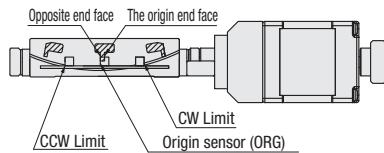
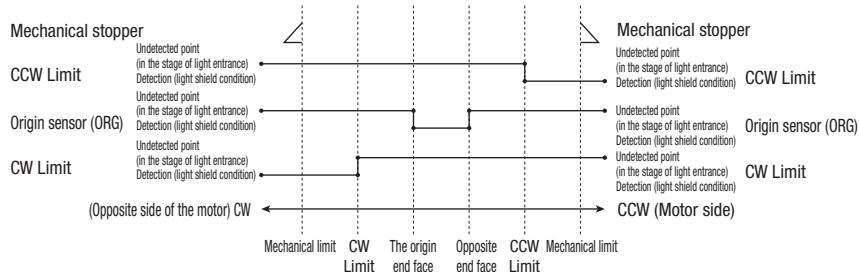


□70 goniometer sensor logic

Type	CWLS	ORG	CCWLS
A	N.C. EE-SX498	N.C. EE-SX498	N.C. EE-SX498
B	N.O. EE-SX398	N.O. EE-SX398	N.O. EE-SX398
C	N.C. EE-SX498	N.O. EE-SX398	N.C. EE-SX498

* Upper: Sensor logic
Lower: Using sensor

Timing chart



Unit [deg]	Direction of CW		Direction of CCW		
	Reference coordinate	CW Limit	Origin	Opposite end face	CCW Limit
KG07-W070A	Return to origin	9.3	0	2.1	9.3
KG07-W096A	Return to origin	7.3	0	1.6	7.3
KG07-W122A	Return to origin	5.3	0	1.3	5.3

* Return to origin means that is performed return to origin type 4 using DS102/DS112/D200 controller.

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

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.

KG07/KA07 recommended return to origin Return to origin sequence ▶ P.1-201~

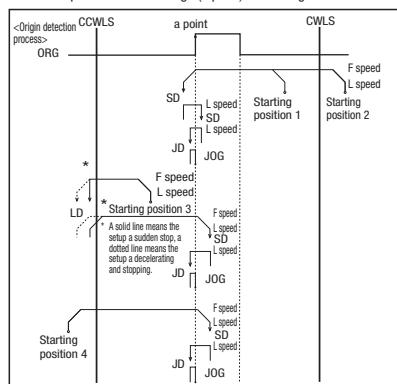
Type 3: Detect in the direction of CCW and perform detected process for CCW edge(a point) of ORG signal.

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

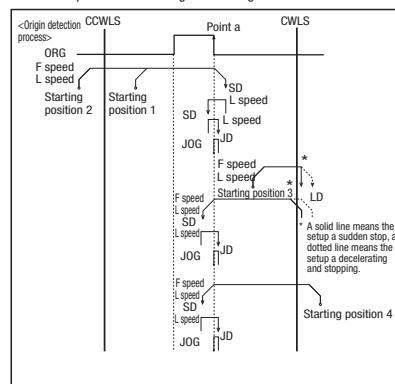
Type 9: After finished Type3, perform detected process for CCW edge of TIMING signal.

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	