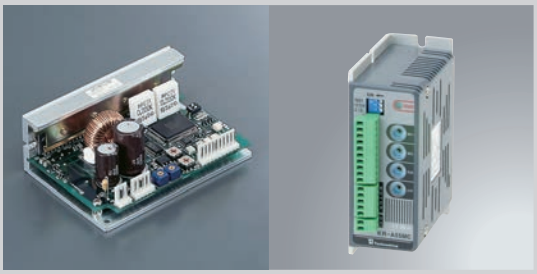
Controller Guidance

Stepping motor controller

- Stepping motor controller DS102/112 ▶ P.1-197～
- Handy terminal DT100 ▶ P.1-199～
- DS102/112 Control software DSCONTROL-WIN ▶ P.1-200～
- Method for return to origin ▶ P.1-201～
- Cable for DS102/112 ▶ P.1-208～
- Cable for external control ▶ P.1-208～

Stepping motor driver



- Stepping motor driver ▶ P.1-205～

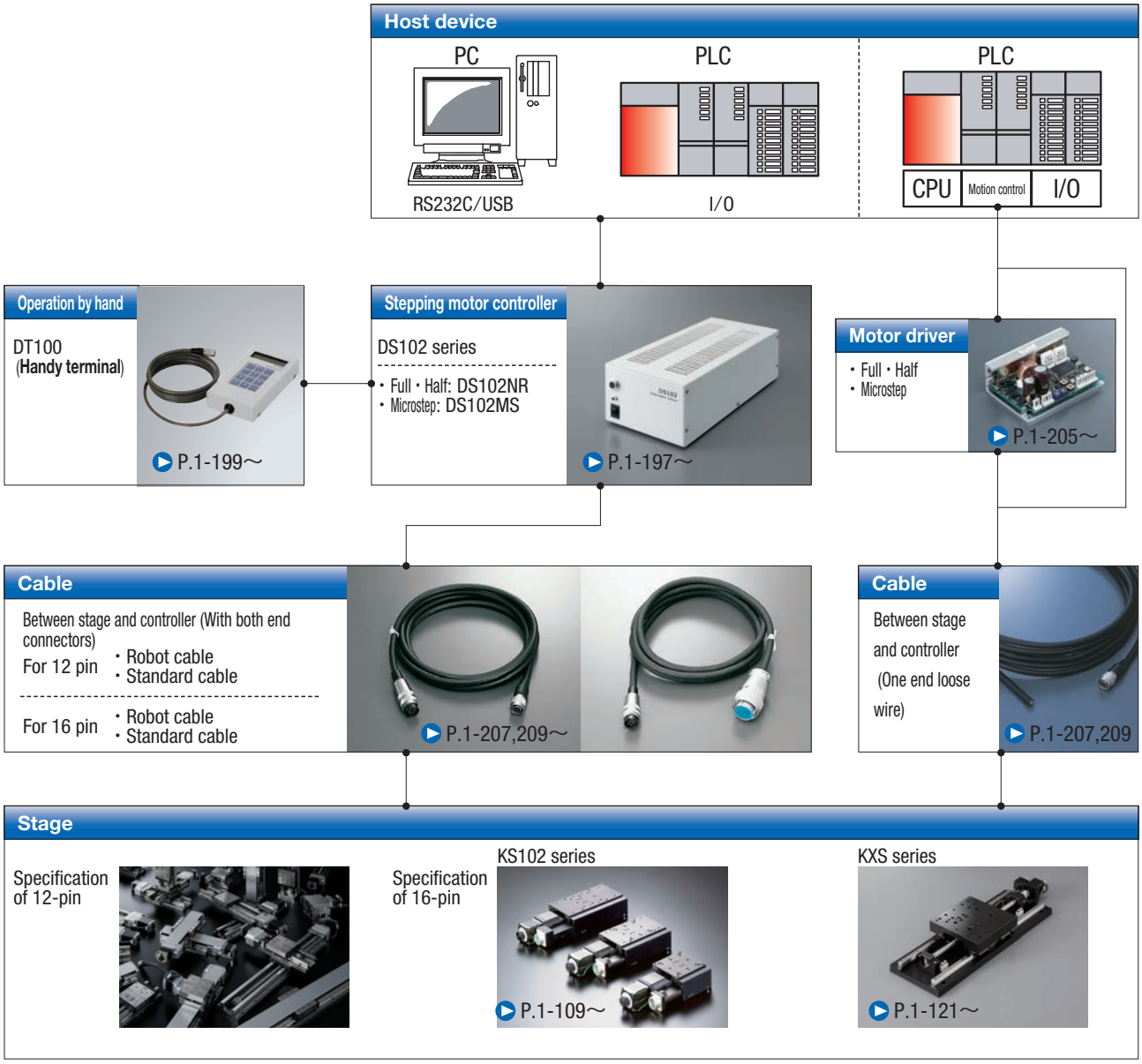
Cable

- Cable (Between stage and controller) ▶ P.1-207～
- Cable for DS102/112 ▶ P.1-208～
- Cable for external control ▶ P.1-208～
- Cable connecting diagram ▶ P.1-209～
- Motor option supplied cable ▶ P.1-211～

Motor list

- Motor list ▶ P.1-213～

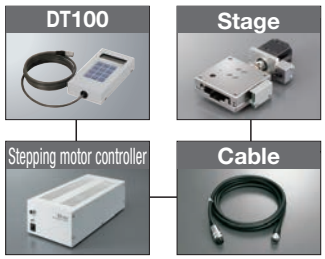
Connection Example



Configurations

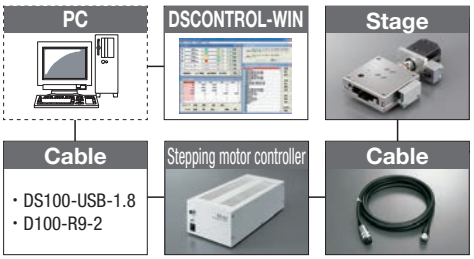
Operation by hand

- Stage
  ＋
- Cable
  ＋
- Stepping motor controller
  ＋
- **Handy terminal**

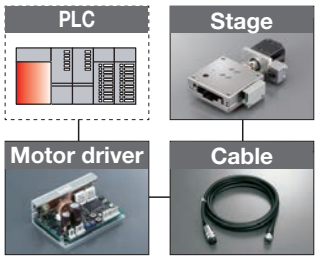


Host device

- Stage
  ＋
- Cable
  ＋
- Stepping motor controller＋DSCONTROL-WIN
  ＋
- PC connection cable



- Stage
  ＋
- Cable
  ＋
- Motor driver



Stepping Motor Controller: DS102/112 Series

Instruction Manual RoHS

DS102/112 series stepping motor controller has 2-axis driver for 5 phases stepping motor driving.

- Program and teaching function has developed positioning system without control PC.
- It is possible to control up to 6-axis with link function. Up to 24-axis can be controlled with USB Hub.
- Linear interpolatin of 2-axis.
- The standard input/output board for controlling internal equipments by using option models also available.
- Controlled command is compabitle for D200 series

DS102 series

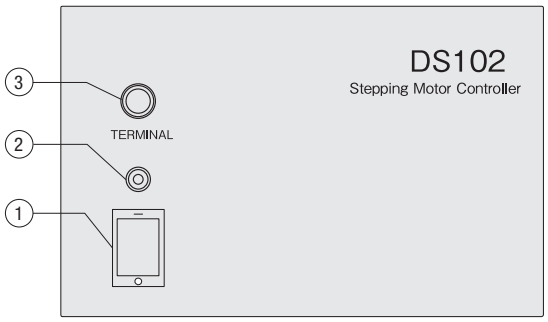
DS112 series

1: Please use our handy terminal DT100 and software DSCONTROL-WIN for programing and teaching set-up.
2: Control the stage with electromagnetic brake is custom-made.
3: Not available for PG series sensor voltage 24V.
4: The advance verification is required when use the program for D200series.

SPEC				
Model	**DS102NR DS102MS**	**DS102NR-IO DS102MS-IO**	**DS112NR DS112MS**	**DS112NR-IO DS112MS-IO**
Dimension	140 (W) ×300 (D) ×90 (H) mm		70 (W) ×165 (D) ×155 (H) mm	
Input power	AC100～240V±10%、50/60Hz		DC24V±10%	
Maxium power consumption	Less than 70W		Less than 2.5A	
Driver type (Divisions)	DS102NR: Normal (Full/Half) DS102MS: Micro step (1~1/250 [16 steps])		DS112NR: Normal (Full/Half) DS112MS: Micro step (1~1/250 [16 steps])	
Driver current rating	0.75A/Phase			
Number of controlled axis	2			
Coordinate setting range	±99,999,999pls			
Driving speed setting range	1～999,999pps			
Rate of rise speed setting range	1～9,999pps			
Addition-subtraction speed rate setting range	1～9,999ms			
Machine limit	2places for each axis to CW, CCW CW・Direction of CCW (Possible logic change)			
Detected proximity origin	1place for each axis(Possible logic change)			
Detected origin	1place for each axis(Possible logic change)			
How to detect origin	12 methods			
Sensor power	DC5V			
Home position	1place for each axis(Can be set up in effective area arbitrarily)			
External COM interface	RS232C：4,800～38,400bps【D-SUB9Pin male】 USB2.0：Full/Low Speed Only【USB mini B connector】 Control I/O: Input 9 points(24V photo coupler), output 12 points (open collector)			
Link function	RS485(Contrable max 6-axis in DG chain)			
Programing function	8 programs (100 steps/per program, Start/finish on control I/O)			
Teaching function	64 points (positioning in control I/O)			
Interpolation function	6-axis linear interpolation(between link device is easy linear interpolation			
Universal input and output	—	Input 16 points(24V photo coupler) Output 12 points(Open collector)	—	Input 16 points(24V photo coupler) Output 12 points(Open collector)
Accessories	1 power cable and CD-ROM(USB driver)			
Weight	2.2kg		1.2kg	

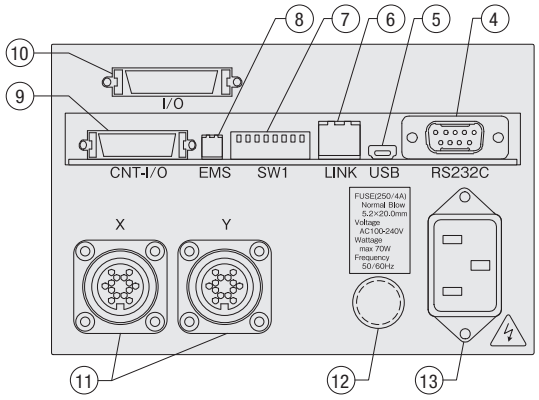
DS102 panel layout

Front panel



①Power switch
②POWER LED
③TERMINAL *1

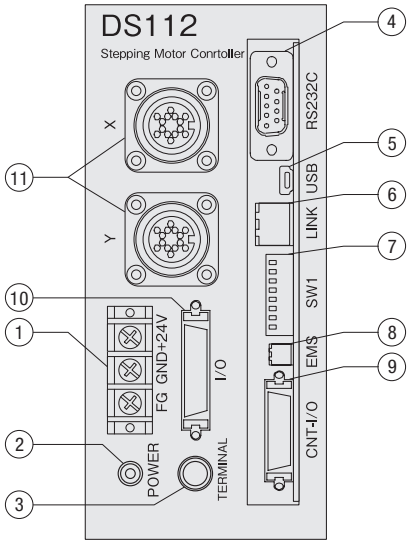
Rear panel



④RS232C *2
⑤USB connector *3
⑥LINK connector
⑦DIP switch *4
⑧EMS connector *5
⑨I/O connector for control *6
⑩General I/O connector *7
⑪Stage motor connector *8
⑫Fuse holder
⑬AC inlet

DS112 panel layout

Front panel



①Terminals for power input
②POWER LED
③TERMINAL *1
④RS232C connector *2
⑤USB connector *3
⑥LINK connector
⑦DIP switch *4
⑧EMS connector *5
⑨I/O connector for control *6
⑩General I/O connector *7
⑪Stage motor connector *8

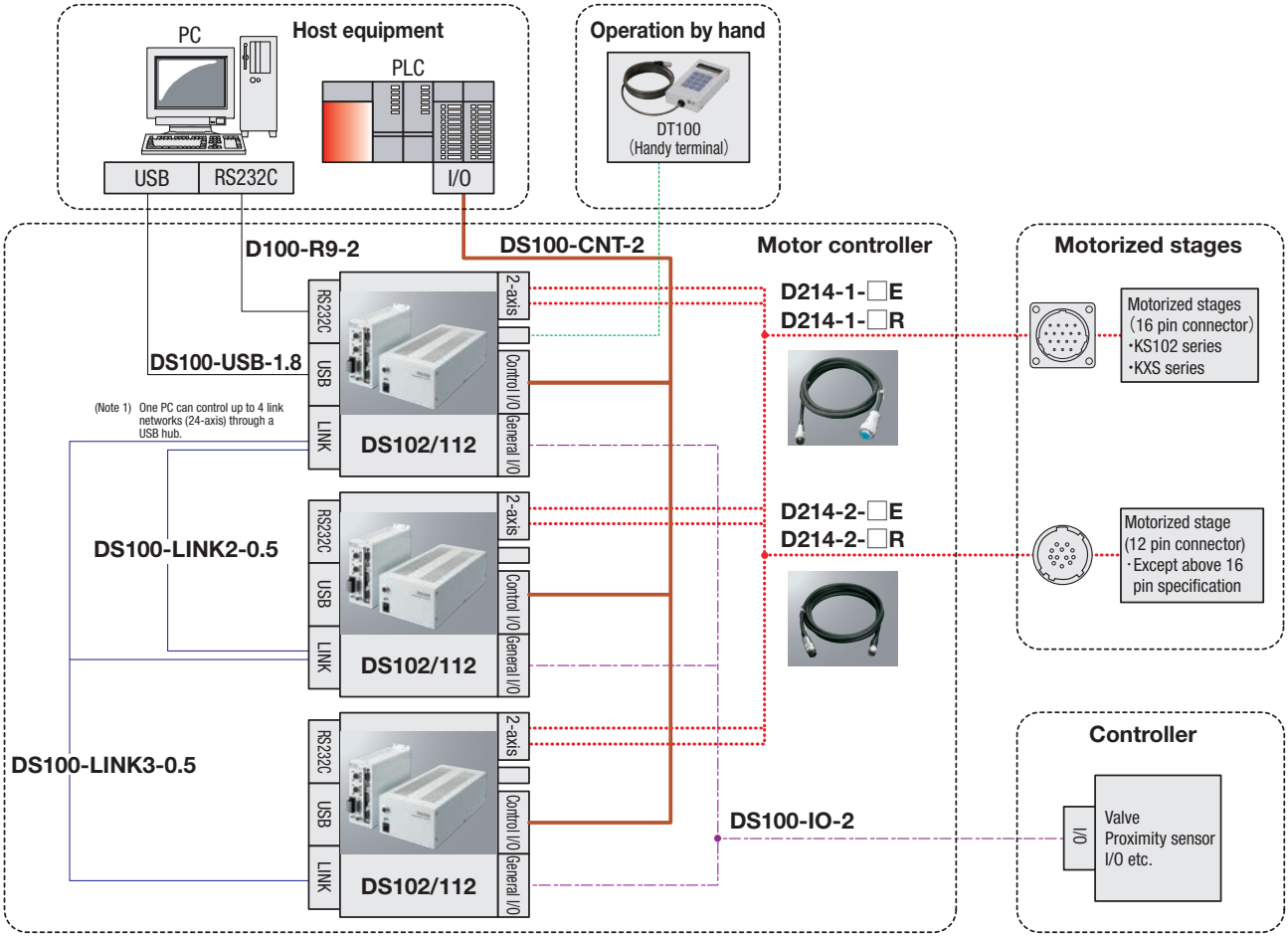
* Please refer the instruction manual about mounting from our web site.

Specifications (Applicable for DS102/112)

*1: DT100 Connector for DT100 handy terminal
*2: Dsub9P male
*3: Mini-B type
*4: RS232C baud rate(2bit), Link(2bit),
USB ID(2bit) Set a command response (1bit)
*5: Model type S02B—PASK-2(LF)(SN)(Manufactured by JST)
*6: Model type 10226-52A2PL(Manufactured by 3M)
*7: Model type 10236-0200(Manufactured by 3M)
【Only DS102□□-IO, DS112□□-IO】
*8: Model type 09-0054-00-14 (Manufactured by Binder)

Connection integration example

When use our recommendation stepping motor controller (DS102/112)



Handy Terminal: DT100

RoHS

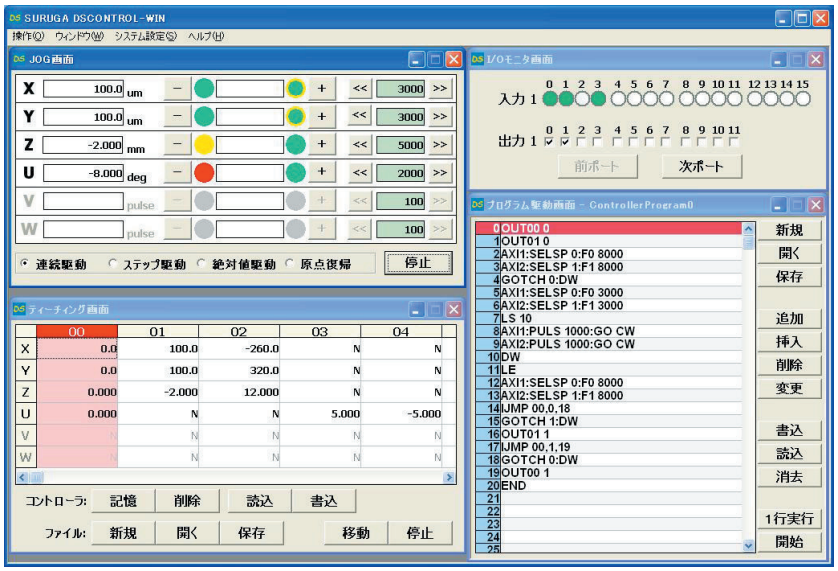
Can be operated remotely with DT100.
Can be operated continuous driving, step driving, return to origin, program execution and teaching by hand with DT100.
The display is a 16 digit × 2 line LCD.

It may not be possible to create or edit on DT100. Available only for program number selection, setting and stop.
DSCONTROL-WIN for programing is recommended.

SPEC	
Model	**DT100**
Display	LCD
Input power	DC24V (from main body)
Number of keys	12 keys
Cable length	1.5m
Dimentions	73 (W) ×130 (D) ×27 (H) mm
Weight	280g

DS102/112 Control software: DSCONTROL-WIN

DSCONTROL-WIN is the DS102/112 control software used to easily set and control the DS102/DS112 stepping motor controller connected by USB or RS232C on Microsoft Windows.Available maximum 6-axis.



*Sample display

■Main function

- ●Set the parameter for each axis.
- ●Manual driving(continuous driving, step driving, Absolute value driving, return to origin)
- ●Teaching function
- ●Edit, upload and download of internal programs.
- ●Monitoring and forced output function of general I/O port

SPEC	
Model	**DSCONTROL-WIN**
Number of controlled axis	6-axis
Applicable interface	USB/RS232C
Applicable OS	Microsoft® Windows 2000/XP/7/8/10

*This software cannot be operated plural start-up at the same time.

Stage controller sample program

Required to make a program when controll our stage controller from your PC.
Available free sample program from our web site.

http://eng.surugaseiki.com/

*Sample display

You do not need to follow our sample program.
The final control program should be organized by yourself.
No guarantee of the motion in all environment.

Method for Return to Origin

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

Recommended return to origin

Sensor	Models	Return to origin type
1	KRW04/06,KRE	3,4,9,10
2	KXL,KRB,KRB04/06(An additional specification of KXL origin sensor option becomes a return to origin type 3, 4, 9 and 10.)	5,6,11,12
3	KXG,PG*,KXC,KS101,KX*07/08/10/12,KH*,KS332*,KGB*,KG05/07,KS402,KGW,KXT,KHE	3,4,9,10
4	KXS,KS102	1,2,7,8

(*) means sensor mounted stages. Please purchase the cable for 4 sensors separately.Return to origin type becomes 1, 2, 7, and 8.

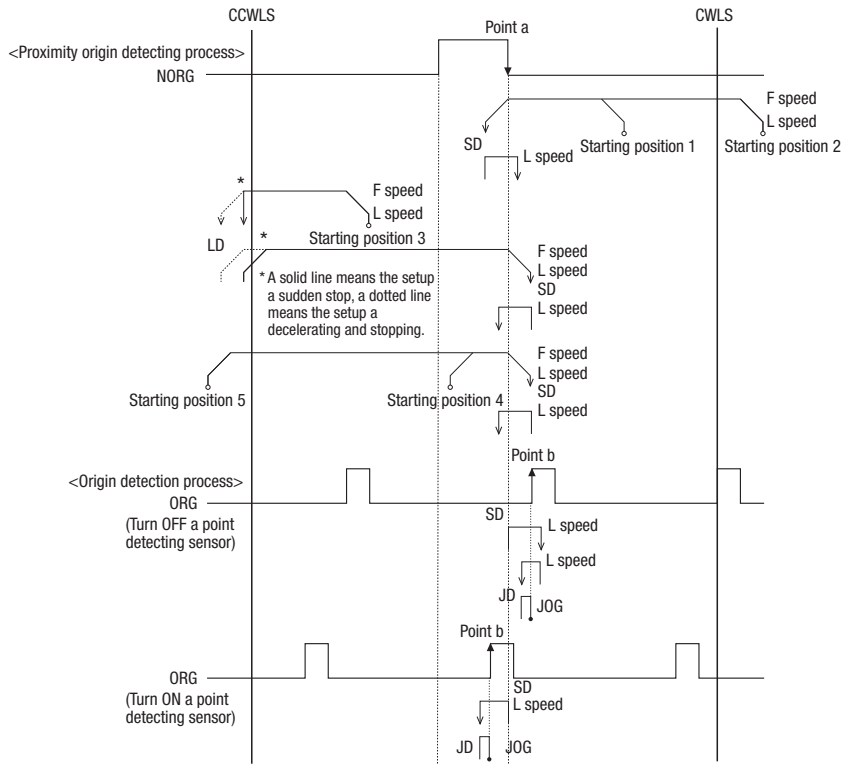
The return to origin type list

Type	Motion
Type 0	No return to origin is performed
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 on edge of CW side (point b) of ORG signal.
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 5	Detect in the direction of CCW and perform detected process for CW edge of CWLS signal.
Type 6	Detect in the direction of CW and perform detected process for CCW edge of CWLS 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.
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.
Type 11	After finished type5, perform detected process for CCW edge of TIMING signal.
Type 12	After finished type6, perform detected process for CW edge of TIMING signal.

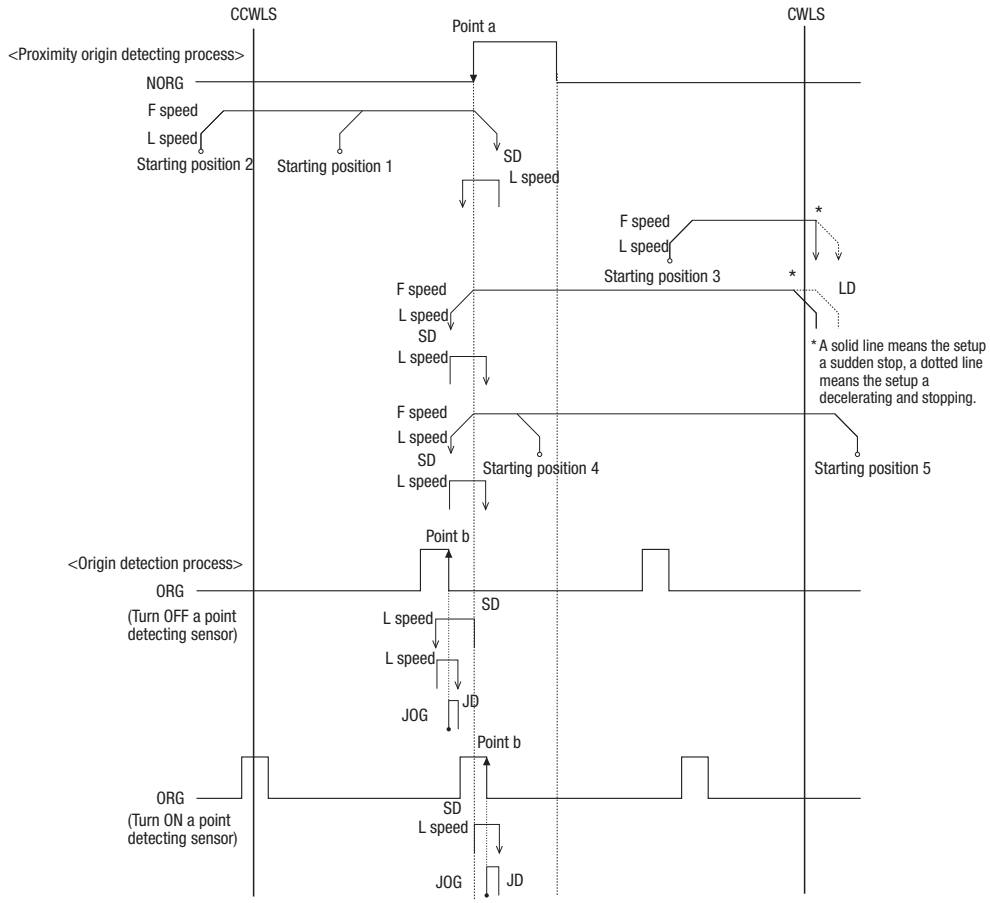
Return to origin sequence shows as below.

[Type 0] No return to origin is performed

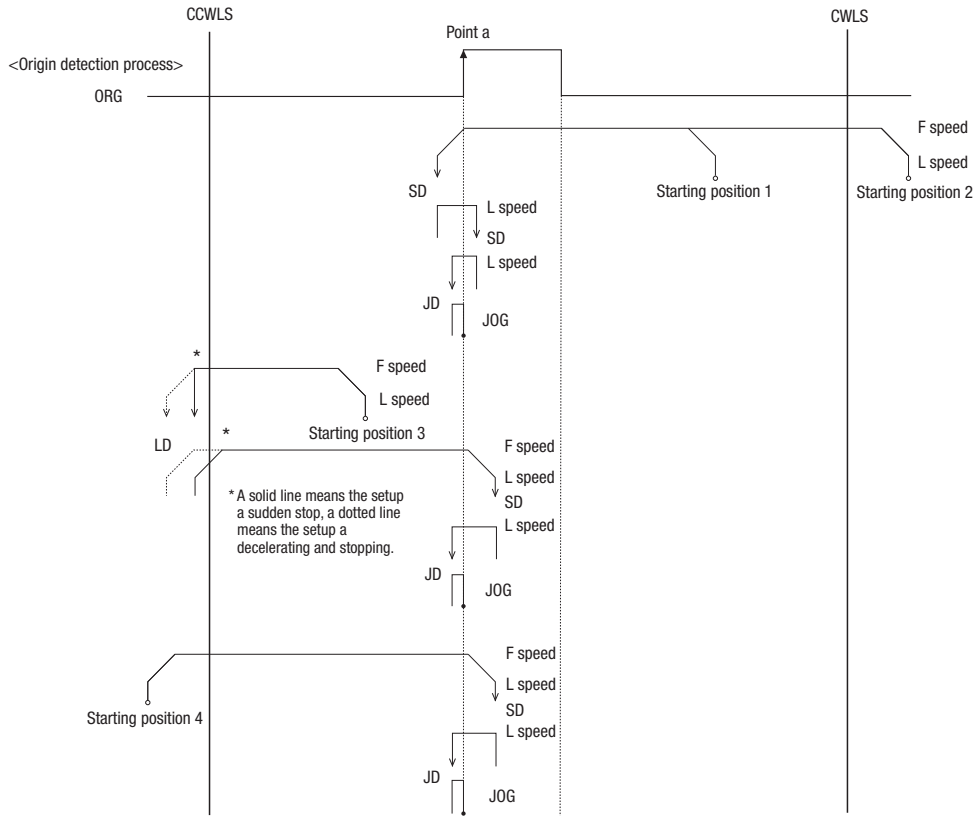
[Type 1] Detect in the direction of CCW and perform detected process for CW edge(point a) of NORG signal.



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

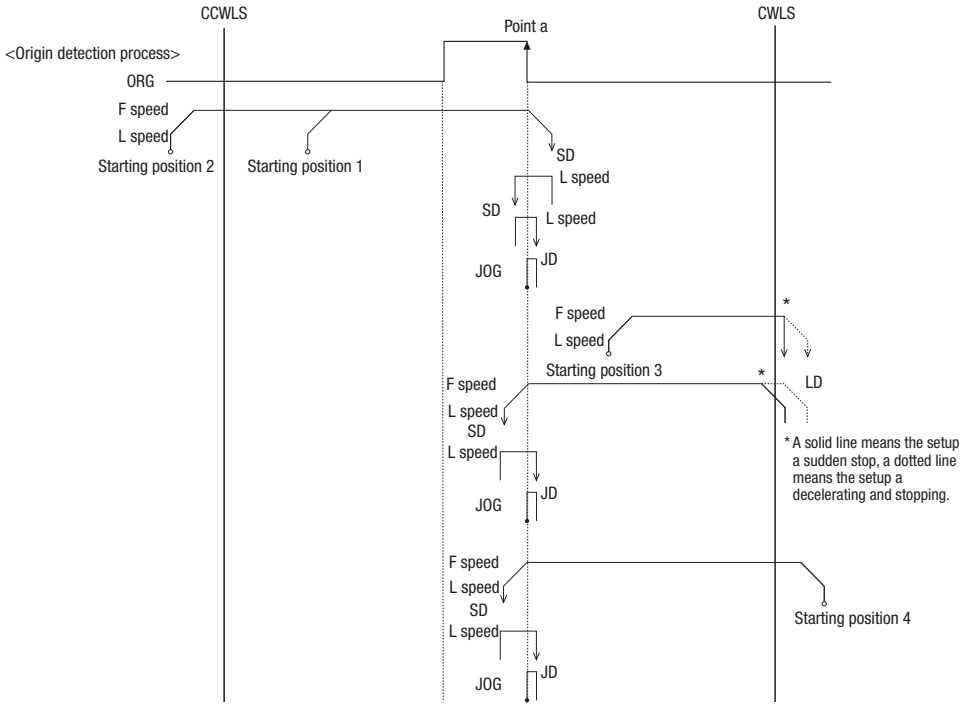


[Type 3] Detect in the direction of CCW and perform detected process for CCW edge(a point) of ORG signal.

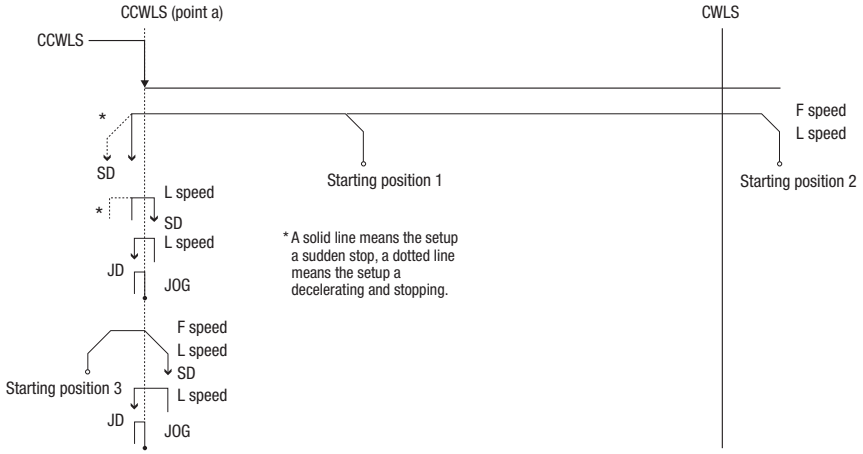


Method for Return to Origin

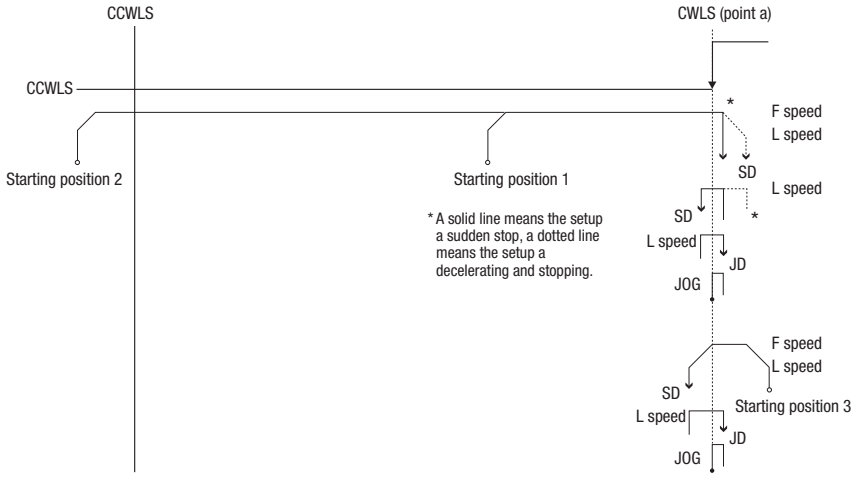
[Type 4] Detect in the direction of CW and perform detected process for CW edge of ORG signal.



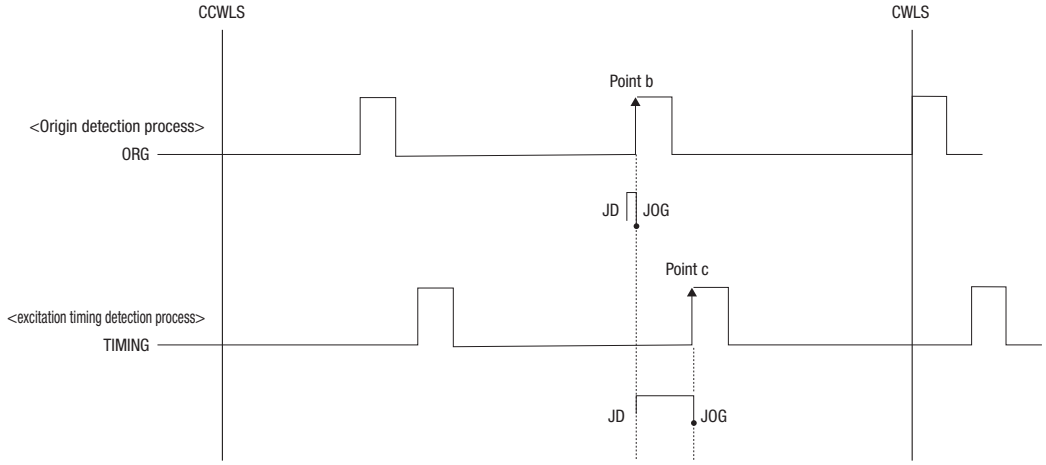
[Type 5] Detect in the direction of CCW and perform detected process for CW edge(point a) of CWLS signal.



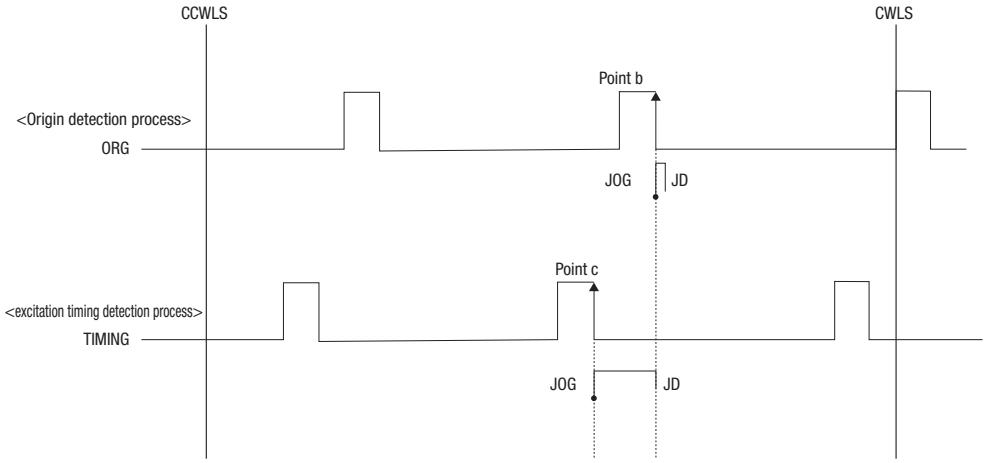
[Type 6] Detect in the direction of CW and perform detected process for CCW edge (point a) of CWLS signal.



[Type 7] After finished type1, perform detected process for CCW edge(point c) of TIMING signal.



[Type 8] After finished type2, perform detected process for CW edge(point c) of TIMING 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.

[Type 11] After finished type5, perform detected process for CCW edge of TIMING signal.

[Type 12] After finished type6, perform detected process for CW edge of TIMING signal.

In case of return to origin with TIMING signal (Type7~Type12).

When the excitation condition of stepping motor is the excitation origin by stated in driver.
TIMING output becomes ON for each 7.2degree when the motor's step angle is 0.72degree.
The AND circuit that is configured with stage origin sensor and TIMING output can be detected to improving the accuracy of the origin without motor stop position variation in the origin sensor.

○	Detection start position
●	Detection finishing position
F speed	Driving speed(setting speed)
L Speed	Start speed(setting speed)
JD (JOG)	Interval detection JOG(JD=Lspeed)
LD	Stop time of limit detectio 300msec
SD	Stop time of sensor detectio 300msec

Stepping Motor Driver

Oriental motor

When the motorized stage is driven with the motion control board and the positioning unit, we recommend following drivers.
CRD5107P has smooth driver function that is realized vibration reduction and low noise.

DC24V type input driver

Instruction Manual RoHS

DFC5107P

*The photo shows an image.

What is smooth drive function?

Micro step can be driven without changing setup in controller as necessary.

SPEC						
Model	**CRD5107P**		**SD5107P3-A22**		**DFC5107P**	
Compatible motor	PK525HPB-C15 PK525HPB-C17	C7214-9015-1 PK523HPMB	C9582-9015-1 PK523HPMB-C1	C005C-90215P PK546PB	C005C-90215P-1 PK523-HPB-C17	PK544-NB-C16 PK525HPB Motor for KS451-40(Customized)
Input power	DC24V±10% 1.4A (Max)					DC24V—36V±10% 1A (Max)
Rated current	0.75A/Phase					
Divisions	1～1/250		Full/Half			1～1/250
Range of operating temperature	0～40℃					
Dimension	65 (W) ×45 (D) ×28 (H) mm					100 (W) ×70 (D) ×36 (H) mm
Weight	0.04kg					0.2kg
Input signal	Photo coupler input					

Cable for DC24V input driver

600mm connector is crimped to a driver connector. A three-piece set of cable between driver and DC power, a motor and host controller Ready for use becayse if east insert to the driver directly.
No need a crimping work and crimping tools, also avoid a damage of the driver due to miswiring.
(The connector assembly and wiring that included DC24 type driver required the specialized crimping tools).

SPEC		
Model	**LCS04SD5**	**LCS02CFK**
Compatible driver	CRD5107P/SD5107P3-A22	DFC5107P
Length	600mm	

AC100V type input driver

Instruction Manual RoHS

SPEC						
Model	**RKD507-A**					
Compatible motor	PK525HPB-C15 PK525HPB-C17	C7214-9015-1 PK523HPMB	C9582-9015-1 PK523HPMB-C1	C005C-90215P PK546PB	C005C-90215P-1 PK523-HPB-C17	PK544-NB-C16 PK525HPB Motor for KS451-40(Special Limited)
Kinds	Standard driver					
Input power	Single phase 100V—115V ±15% 50/60Hz 1A (Max)					
Rated current	0.75A/Phase					
Divisions	1～1/250					
Range of operating temperature	0～50℃					
Dimension	45 (W) ×90 (D) ×120 (H) mm					
Weight	0.4kg					
Input signal	Photo coupler input					

Stepping Motor Driver

株式会社 テクノドライブ

This case type driver (Manufactured by Techno Drive Co.,Ltd.) can be connected easily.

DC24V type input driver

CE Instruction Manual RoHS

KR-A5MC

KR-A55MC

SPEC						
Model	**KR-A5MC**			**KR-A55MC**		
Compatible motor	PK525HPB-C15 PK525HPB-C17	C7214-9015-1 PK523HPMB	C9582-9015-1 PK523HPMB-C1	PK544-NB-C16 PK546PB	C005C-90215P PK523-HPB-C17	C005C-90215P-1 PK525HPB Motor for KS451-40(special limited)
Input power	DC20V—35V					
Rated current	0.75A/Phase					
Divisions	Full/Half			1～1/250		
Range of operating temperature	0～40℃					
Dimension	93 (W) ×45 (D) ×32 (H) mm			105 (W) ×76.5 (D) ×39.5 (H) mm		
Weight	0.13kg			0.22kg		
Input signal	Photo coupler input					

AC100V type input driver

CE Instruction Manual RoHS

KR-A535M

SPEC						
Model	**KR-A535M**					
Compatible motor	PK525HPB-C15 PK525HPB-C17	C7214-9015-1 PK523HPMB	C9582-9015-1 PK523HPMB-C1	PK544-NB-C16 PK546PB	C005C-90215P PK523-HPB-C17	C005C-90215P-1 PK525HPB Motor for KS451-40(special limited)
Type	Standard driver					
Input power	Single phase 100V—220V ±10% 50/60Hz					
Rated current	0.75A/Phase					
Divisions	1～1/250					
Range of operating temperature	0～50℃					
Dimension	42 (W) ×170 (D) ×134.3 (H) mm					
Weight	0.66kg					
Input signal	Photo coupler input					

Cable

RoHS

The connection cable between a motorized stage and a stepping motor controller. There is the standard 2m cable and following cables.

●2~6m cable(in 2m increments) ●One end loose cable(Loose wire on controller side) ●Robot cable

Selectable from the following cables when you purchase the motorized stage. Must be checked for cable type in code table on the page of each product.

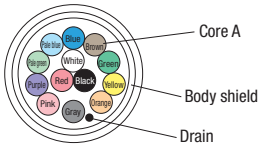
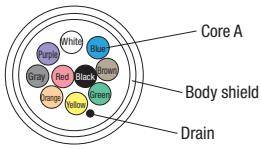
D214-1-2E

D214-2-2E

Loose wire on controller side

Choose the connector that is either end of the connection type for using DS102/112.

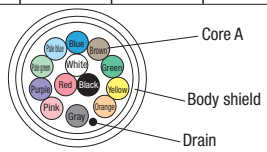
■Normal cable/minimum bending radius:R33mm

Model	D214-1-2E	D214-1-4E	D214-1-6E	D214-1-2EK	D214-1-4EK	D214-1-6EK	D214-2-2E	D214-2-4E	D214-2-6E	D214-2-2EK	D214-2-4EK	D214-2-6EK
Existence of connector	With both end connectors			One end (controller side) loose wire			With both end connectors			One end (controller side) loose wire		
Connector on controller side	09-0341-02-14 (Binder)			—			09-0341-02-14 (Binder)			—		
Stage-side connector	SRCN6A21-16S (JAE)						HR10A-10P-12S (73) (HRS)					
Cable length	2m	4m	6m	2m	4m	6m	2m	4m	6m	2m	4m	6m
Color of insulator												

■Robot cable ／Minimum bending radius:R33mm Excellent performance in bending

Model	D214-1-2R	D214-1-4R	D214-1-6R	D214-1-2RK	D214-1-4RK	D214-1-6RK	D214-2-2R	D214-2-4R	D214-2-6R	D214-2-2RK	D214-2-4RK	D214-2-6RK
Existence of connector	With both end connectors			One end (controller side) loose wire			With both end connectors			One end (controller side) loose wire		
Connector on controller side	09-0341-02-14 (Binder)			—			09-0341-02-14 (Binder)			—		
Stage-side connector	SRCN6A21-16S (JAE)						HR10A-10P-12S (73) (HRS)					
Cable length	2m	4m	6m	2m	4m	6m	2m	4m	6m	2m	4m	6m
Color of insulator												

■Cable for 4 sensors / Minimum bending radius:R33mm

Model	D214-2-2EA	D214-2-4EA	D214-2-6EA	D214-2-2EAK	D214-2-4EAK	D214-2-6EAK	D214-2-2RA	D214-2-4RA	D214-2-6RA	D214-2-2RAK	D214-2-4RAK	D214-2-6RAK
Existence of connector	With both end connectors			One end (controller side) loose wire			With both end connectors			One end (controller side) loose wire		
Connector on controller side	09-0341-02-14 (Binder)			—			09-0341-02-14 (Binder)			—		
Stage-side connector	HR10A-10P-12S (73) (HRS)						HR10A-10P-12S (73) (HRS)					
Cable length	2m	4m	6m	2m	4m	6m	2m	4m	6m	2m	4m	6m
Color of insulator	〔Standard cable〕 						〔Robot cable 〕					

■Multi-core cables common specification

Type		Standard cable	Robot cable
Conductor	Configuration	40pieces/0.08mm［24AWG］	50pieces/0.08mm［24AWG］
	Approximate external diameter	0.65mm	
Insulator	material	PVC	ETFE
	Color	Refer to the cross section	
Sheath	material	PVC	
	Color	Black	
Finishing external diameter		6.70±0.15mm	
Minimum bending radius		R33mm	

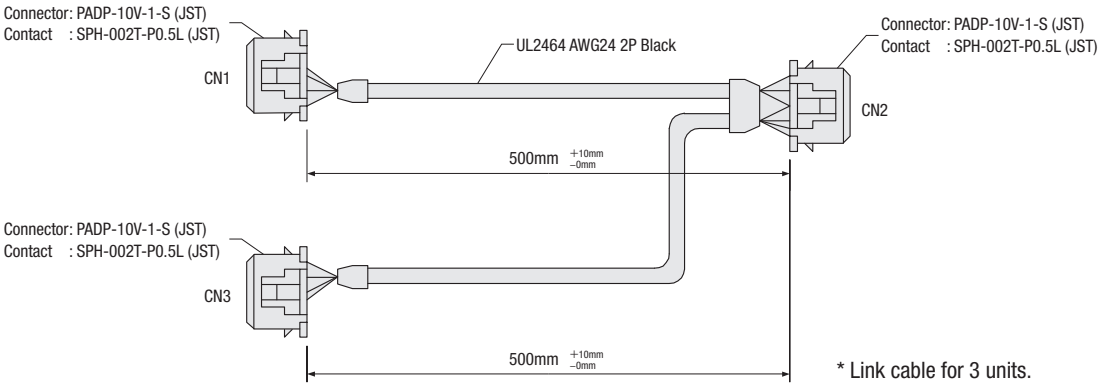
DS102/112 Dedicated cable

RoHS

●Link cable DS100-LINK□-0.5

Use for control 4 or 6-axis with linking DS102/112

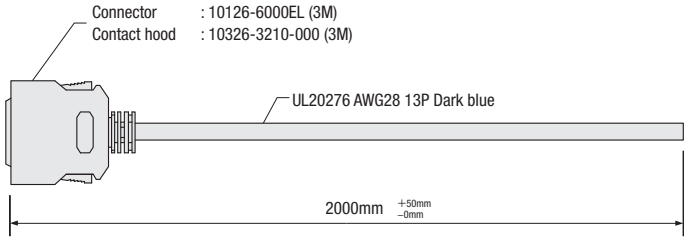
Select the cable DS100-LINK2-0.5 when will be linked two of DS102/112, and DS100-LINK3-0.5 for linking three of them.



* Link cable for 3 units.

●Control I/O cable DS100-CNT-2

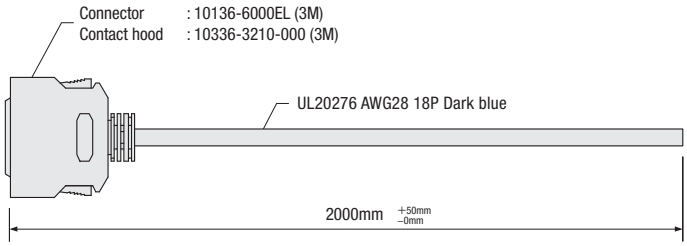
Use this cable if DS102/112 is operated I/O control in upper controller. Loose wire on one side.



* Refer the user's manual for support wiring color information.

●Universal input and output DS100-IO-2

Connect the external equipment to DS102/112 for controlling. Loose wire on one side.



* Refer the user's manual for support wiring color information.

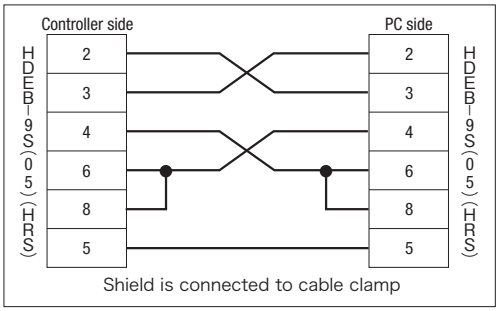
SPEC				
Model	**DS100-LINK2-0.5**	**DS100-LINK3-0.5**	**DS100-CNT-2**	**DS100-IO-2**
Cable length	0.5m	0.5m	2.0m	2.0m
Remarks	For linking 2 units	For linking 3 units	For control I/O (One end loose wire)	For general I/O (One end loose wire)

External control cable

There are cables for external control: cables for USB and RS232C.

SPEC		
Model	**DS100-USB-1.8**	**D100-R9-2**
interface	USB	RS232C
Applicable controller	DS102/DS112	DS102/DS112
PC side Connector	USB USB A terminal socket	D-sub 9P Female
Cable length	1.8m	2m

■RS232C cable: D100-R9-2

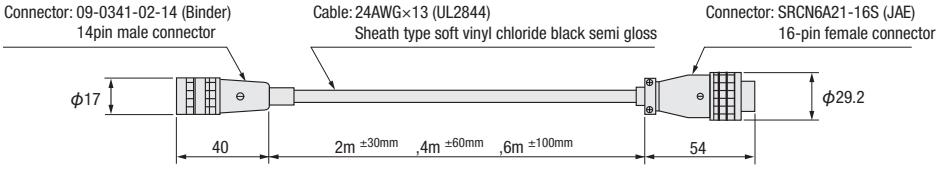


Cable Connection Diagram

Standard cable

●D214-1-2E (K) 、 D214-1-4E (K) 、 D214-1-6E (K)

* The one end loose cable (tailing K) has loose wire in side of 14 pin male connector (controller).



The function of terminal on the controller side			The function of terminal on the stage side
Motor lead (Blue)	A	1	Motor lead (Blue)
Motor lead (Red)	C	2	Motor lead (Red)
Motor lead (Orange)	E	3	Motor lead (Orange)
Motor lead (Green)	G	4	Motor lead (Green)
Motor lead (Black)	J	5	Motor lead (Black)
CWLS input	L	6	CWLS output
CCWLS input	M	7	Open
NORG input	N	8	CCWLS output
ORG input	O	9	Open
Sensor power (DC5V (+))	P	10	Sensor power (DC5V (+))
Sensor power (DC5V (-))	R	11	NORG output
–	S	12	Electromagnetic brake power (DC24V (+)) *1
–	T	13	Electromagnetic brake power (DC24V (-))
Frame ground	U	14	ORG output
		15	Sensor power (DC5V (-))
		16	Frame ground

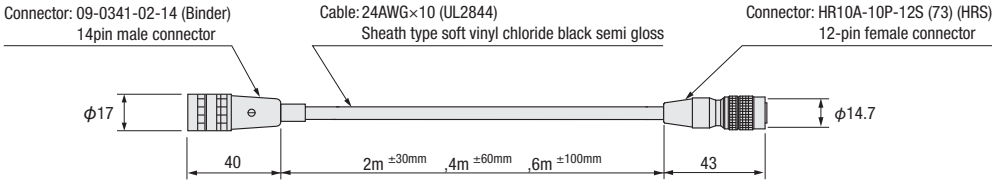
Blue, Red, Orange, Green, Black, Brown, Yellow, Pink, Purple, Gray, White, Pale green, Pale blue

The dashed line indicates the shield.

*1 The terminal is open other than the electromagnetic brake.

●D214-2-2E (K) 、 D214-2-4E (K) 、 D214-2-6E (K)

* The one end loose cable (tailing K) has loose wire in side of 14 pin male connector (controller).



The function of terminal on the controller side			The function of terminal on the stage side
Motor lead (Blue)	A	1	Motor lead (Blue)
Motor lead (Red)	C	2	Motor lead (Red)
Motor lead (Orange)	E	3	Motor lead (Orange)
Motor lead (Green)	G	4	Motor lead (Green)
Motor lead (Black)	J	5	Motor lead (Black)
CWLS input	L	6	CWLS output
CCWLS input	M	7	CCWLS output
NORG input	N	8	Sensor power (DC5V (-))
ORG input	O	9	Sensor power (DC5V (+))
Sensor power (DC5V (+))	P	10	ORG output
Sensor power (DC5V (-))	R	11	Sensor power (DC5V (-))
–	S	12	Frame ground
–	T		
Frame ground	U		

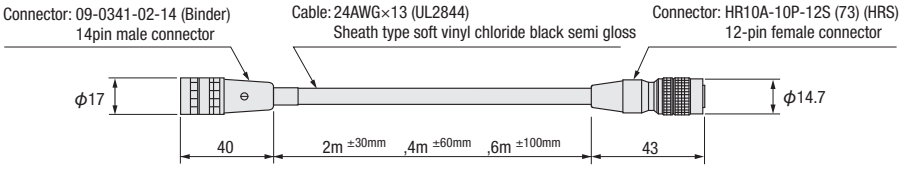
Blue, Red, Orange, Green, Black, Brown, Yellow, Purple, Gray, White

The dashed line indicates the shield.

■Cable for slit origin sensor(ORG2)(For PG,KX07/08/10/12,KH,KG05/07 series)

●D214-2-2EA (K) 、 D214-2-4EA (K) 、 D214-2-6EA (K)

* The one end loose cable (tailing K) has loose wire in side of 14 pin male connector (controller).



The function of terminal on the controller side			The function of terminal on the stage side
Motor lead (Blue)	A	1	Motor lead (Blue)
Motor lead (Red)	C	2	Motor lead (Red)
Motor lead (Orange)	E	3	Motor lead (Orange)
Motor lead (Green)	G	4	Motor lead (Green)
Motor lead (Black)	J	5	Motor lead (Black)
CWLS input	L	6	CWLS output
CCWLS input	M	7	CCWLS output
ORG1 (NORG) input	N	8	ORG2 (ORG) output
ORG2 (ORG) input	O	9	Sensor power (DC5V (+))
Sensor power (DC5V (+))	P	10	ORG1 (NORG) output
Sensor power (DC5V (-))	R	11	Sensor power (DC5V (-))
–	S	12	Frame ground
–	T		
Frame ground	U		

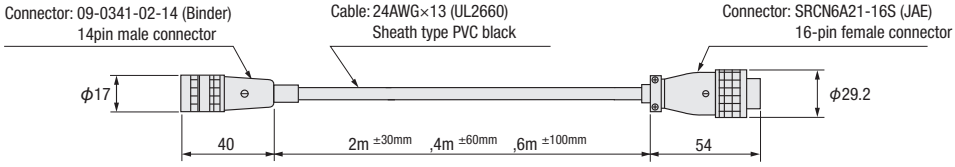
Blue, Red, Orange, Green, Black, Brown, Yellow, Purple, Gray, Pink, White, Pale green, Pale blue

The dashed line indicates the shield.

Robot cable

●D214-1-2R (K) 、 D214-1-4R (K) 、 D214-1-6R (K)

* The one end loose cable (tailing K) has loose wire in side of 14 pin male connector (controller).



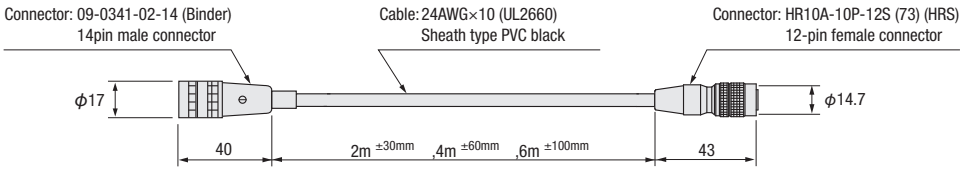
The function of terminal on the controller side			The function of terminal on the stage side
Motor lead (Blue)	A	Blue 1	Motor lead (Blue)
Motor lead (Red)	C	Red 2	Motor lead (Red)
Motor lead (Orange)	E	Orange 3	Motor lead (Orange)
Motor lead (Green)	G	Green 4	Motor lead (Green)
Motor lead (Black)	J	Black 5	Motor lead (Black)
CWLS input	L	Brown 6	CWLS output
CCWLS input	M	Yellow 7	Open
NORG input	N	Pink 8	CCWLS output
ORG input	O	Purple 9	Open
Sensor power (DC5V (+))	P	Gray 10	Sensor power (DC5V (+))
Sensor power (DC5V (-))	R	White 11	NORG output
–	S	Pale green 12	Electromagnetic brake power (DC24V (+)) *1
–	T	Pale blue 13	Electromagnetic brake power (DC24V (-))
Frame ground	U	14	ORG output
		15	Sensor power (DC5V (-))
		16	Frame ground

The dashed line indicates the shield.

*1 The terminal is open other than the electromagnetic brake.

●D214-2-2R (K) 、 D214-2-4R (K) 、 D214-2-6R (K)

* The one end loose cable (tailing K) has loose wire in side of 14 pin male connector (controller).



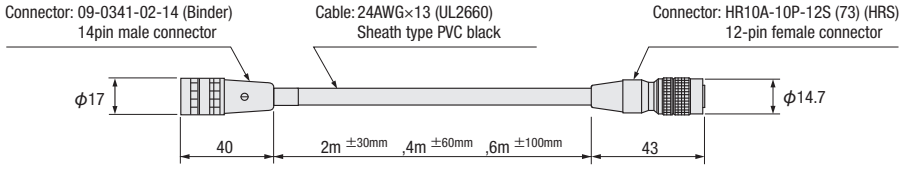
The function of terminal on the controller side			The function of terminal on the stage side
Motor lead (Blue)	A	Blue 1	Motor lead (Blue)
Motor lead (Red)	C	Red 2	Motor lead (Red)
Motor lead (Orange)	E	Orange 3	Motor lead (Orange)
Motor lead (Green)	G	Green 4	Motor lead (Green)
Motor lead (Black)	J	Brown 5	Motor lead (Black)
CWLS input	L	Yellow 6	CWLS output
CCWLS input	M	7	CCWLS output
NORG input	N	Purple 8	Sensor power (DC5V (-))
ORG input	O	Gray 9	Sensor power (DC5V (+))
Sensor power (DC5V (+))	P	White 10	ORG output
Sensor power (DC5V (-))	R	11	Sensor power (DC5V (-))
–	S	12	Frame ground
–	T		
Frame ground	U		

The dashed line indicates the shield.

■Cable for slit origin sensor(ORG2) (For PG,KX07/08/10/12,KH,KG05/07)

●D214-2-2RA (K) 、 D214-2-4RA (K) 、 D214-2-6RA (K)

* The one end loose cable (tailing K) has loose wire in side of 14 pin male connector (controller).

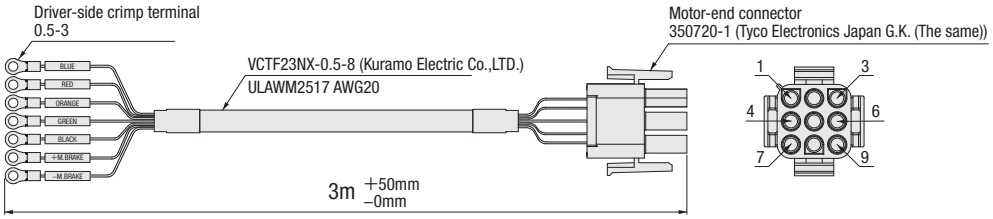


The function of terminal on the controller side			The function of terminal on the stage side
Motor lead (Blue)	A	Blue 1	Motor lead (Blue)
Motor lead (Red)	C	Red 2	Motor lead (Red)
Motor lead (Orange)	E	Orange 3	Motor lead (Orange)
Motor lead (Green)	G	Green 4	Motor lead (Green)
Motor lead (Black)	J	Black 5	Motor lead (Black)
CWLS input	L	Brown 6	CWLS output
CCWLS input	M	Yellow 7	CCWLS output
ORG1 (NORG) input	N	Purple 8	ORG2 (ORG) output
ORG2 (ORG) input	O	Gray 9	Sensor power (DC5V (+))
Sensor power (DC5V (+))	P	Pink 10	ORG1 (NORG) output
Sensor power (DC5V (-))	R	White 11	Sensor power (DC5V (-))
–	S	Pale green 12	Frame ground
–	T	Pale blue	
Frame ground	U		

The dashed line indicates the shield.

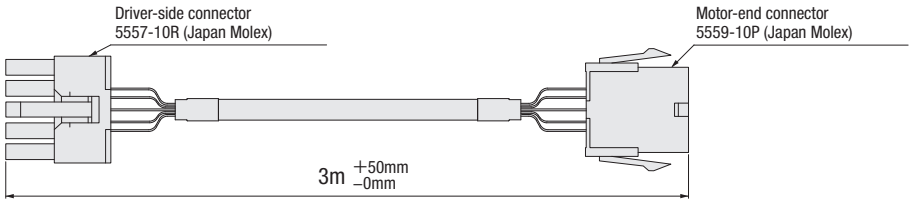
Motorized Stage Optionally Supplied Cable (for Motor)

●Motor cable with electromagnetic brake (Fixed) STPO-RK2-A-3



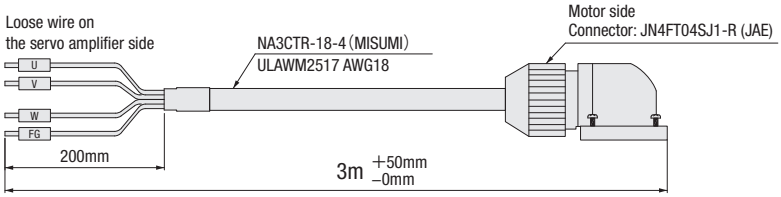
Mark		Pin	Signals
BLUE	Blue	1	Motor lead Blue
RED	Red	2	Motor lead Red
ORANGE	Yellow	3	Motor lead Orange
GREEN	Green	4	Motor lead Green
BLACK	Black	5	Motor lead Black
+M.BRAKE	Brown	8	Motor brake (+)
–M.BRAKE	White	9	Motor brake (-)

●α Step motor cable (Movable) STPO-AS1-B-3



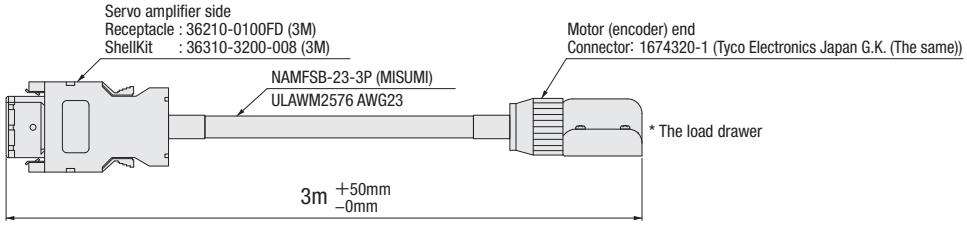
Pin		Pin
1	White	1
2	Purple	2
3	Red	3
4	Blue	4
—		—
6	Black	6
7	Brown	7
8	Green	8
9	Yellow	9
10	Shield	10

●Servo motor cable (Movable) SVPM-J3HF1-B-3-02S



Mark		Pin	Signals
FG	Green / Yellow	1	FG
U	Red	2	U Phase
V	White	3	V Phase
W	Blue	4	W Phase

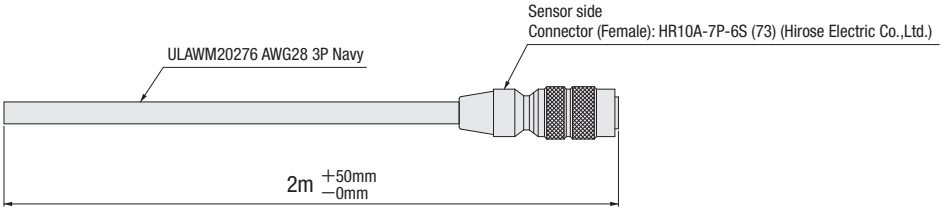
●Servo motor cable (Movable) SVEM-J3HF1-B-3



Signals	Pin		Pin	Signals
P5	1	White	3	P5
LG	2	Black	6	LG
MR	3	Red	5	MR
MRR	4	Black	4	MRR
BAT	9	Green	2	BAT
SD	Plate	Shield	9	SD

Motorized Stage Optionally Supplied Cable (for Sensor)

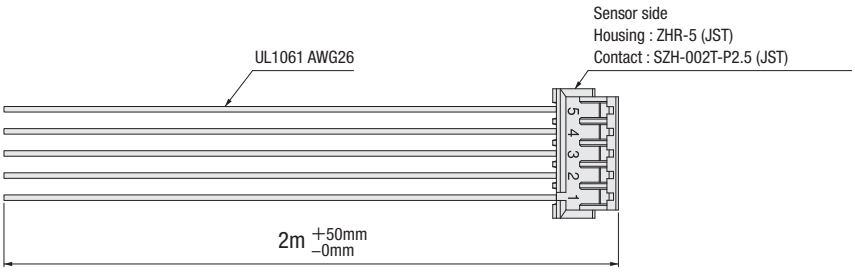
●CAVE-X/KXCSensor cable for motor option (Fixed) HR10AP-S-A-6-2

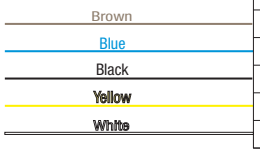


Pin	Signals
1	CWLS
2	CCWLS
3	ORG
4	NORG
5	V+
6	V−

*The shields are connected with the connector shell.

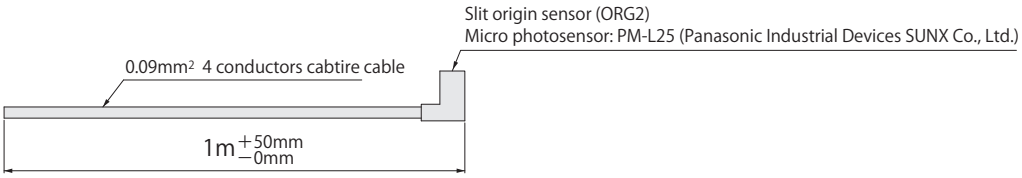
●Limit sensor cable for PG series (Fixed) PG-H-ASSY5-2000

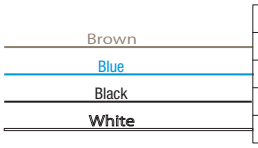




Pin	Signals
1	V+
2	V−
3	CCWLS
4	ORG1
5	CWLS

●Slit origin sensor for PG series (Micro photosensor) (Fixed) PM-L25





Signals
V+
V−
ORG2 (OUT1)
ORG2 (OUT2)

Motor option supplied cable not available to purchase separately.

See page P.1-037 for PG series motor
See page P.1-051 for CAVE-X motor
See page P.1-077 for KXL

Motor List

Motorized stages are provided with 5-lead pentagon connection stepping motor. See the table below for specifications of motor types.

No electromagnetic brake(Oriental motor)

Motor model	PK523HPB-C15	C005C-90215P-1	C005C-90215P	C7214-9015-1 C9582-9015-1	PK544-NB-C16	PK544PB
Phases	5 phase					
Rated current	0.75A/Phase					
Size	□28mm	□28mm	□28mm	□38mm	□42mm	□42mm
Basic step angle	0.72°	0.72°	0.72°	0.36°	0.72°	0.72°
Excitation maximus still torque	0.048N・m	0.048N・m	0.048N・m	0.135N・m	0.171N・m	0.24N・m
Roter inertial moment	9×10^{-7}kg・m²	9×10^{-7}kg・m²	9×10^{-7}kg・m²	35×10^{-7}kg・m²	54×10^{-7}kg・m²	57×10^{-7}kg・m²
Mass	0.11kg	0.11kg	0.11kg	0.27kg	0.27kg	0.3kg
Temperature	−10℃～+50℃					
Recommended driver	SD5107P3-A22 CRD5107P DFC5107P RKD507-A					
Stage (single axis)	PG	KS101-30	KXG KXC KGB KRB KRW KXL KGW KXT KRE04 KRE06	・C7214-9015-1 KX KS101-30MS KS102 KS402-75 ・C9582-9015-1 KG KH	KS402-100 KS402-180 KS332	KRE10360

No electromagnetic brake(Oriental motor)

Motor model	PK523HPMB…	PK525HPB…	PK546PB	PK523HPB-C17
Phases	5 phase			
Rated current	0.75A/Phase			
Size	□28mm	□28mm	□42mm	□28mm
Basic step angle	0.36°	0.72°	0.72°	0.72°
Excitation maximus still torque	0.038N・m	0.073N・m	0.42N・m	0.048N・m
Roter inertial moment	9×10^{-7}kg・m²	18×10^{-7}kg・m²	114×10^{-7}kg・m²	9×10^{-7}kg・m²
Mass	0.11kg	0.2kg	0.5kg	0.11kg
Temperature	−10℃～+50℃			
Recommended driver	SD5107P3-A22 CRD5107P DFC5107P RKD507-A			
Stage(single axis)	PG KXG KXL KXC KHC		KXS	KHE

With electromagnetic brake (Oriental Motor Co.,Ltd.)

Motor model	PKE545MC-A1	PKE566MC
Phase	5Phase	
Rated current	0.35A/Phase	0.75A/Phase
Size	□42mm	□60mm
Basic step angle	0.72°	
Max.magnetized stopping torque	0.27N・m	0.96N・m
Rotor inertial moment	79×10^{-7}kg・m^2	430×10^{-7}kg・m^2
Input voltage of excitation brake	DC24V±0.5 0.08A	DC24V±0.5 0.25A
Excitation brake static friction torque	0.13N・m	0.48N・m
Mass	0.52kg	1.2kg
Temperature	−10℃～+50℃	
Driver type (Set model)	RKSD503M-A	RKSD507M-A
Stage(single axis)	PG KXG KXL	KXS

α step motor (Oriental Motor Co.,Ltd.)

Motor model	ARM24SAK	ARM46AC
Size	□28mm	□42mm
Resolution (Set to 1000P/R)	0.36°	
Max.magnetized stopping torque	0.055N・m	0.3N・m
Rotor inertial moment	11×10^{-7}kg・m^2	58×10^{-7}kg・m^2
Input voltage of excitation brake	—	
Excitation brake static friction torque	—	
Mass	0.15kg	0.47kg
Temperature	-10℃～+50℃	
Driver type (Set model)	ARD-K (AR26SAK)	ARD-A (AR46AA)
Driver power input	DC24V±10%	Single phase100-115V 50/60Hz
Driver input current	0.9A	2.9A
Stage(single axis)	KXC KS101-30LPA(RPA) PG KXG KXL	KS101-30LQA(RQA) KS102-□LQA(RQA) KXS

AC servo motor (Mitsubishi electric co.,Ltd.)

Motor model	HF-KP053	HF-KP13
Size	□40mm	
Resolution (1Rotary)	262144p/rev	
Speed detector	18 bits encoder	
Rated rotation speed	3000r/min	
Rated output	50W	100W
Rated torque	0.16N・m	0.32N・m
Max. Torque	0.48N・m	0.95N・m
Inertial moment	0.052×10^{-4}kg・m^2	0.088×10^{-4}kg・m^2
Rated current	0.9A	0.8A
Mass	0.35kg	0.56kg
Temperature	0℃～40℃	
Driver type (Set model)	MR-J3-10A	
Stage(single axis)	PG KXL	KXS