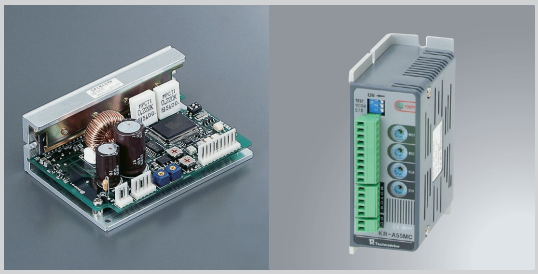
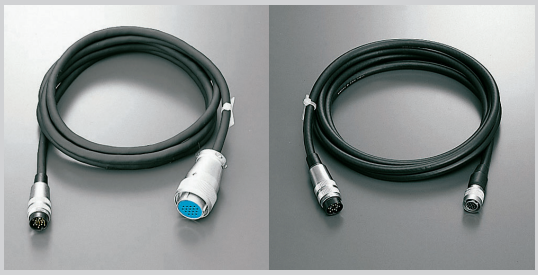
Controller Guidance

Stepping motor controller

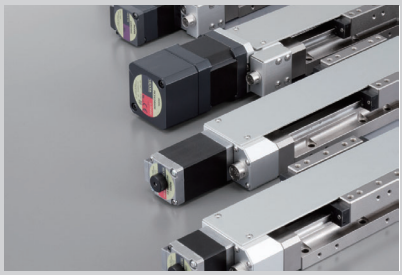
Stepping motor driver



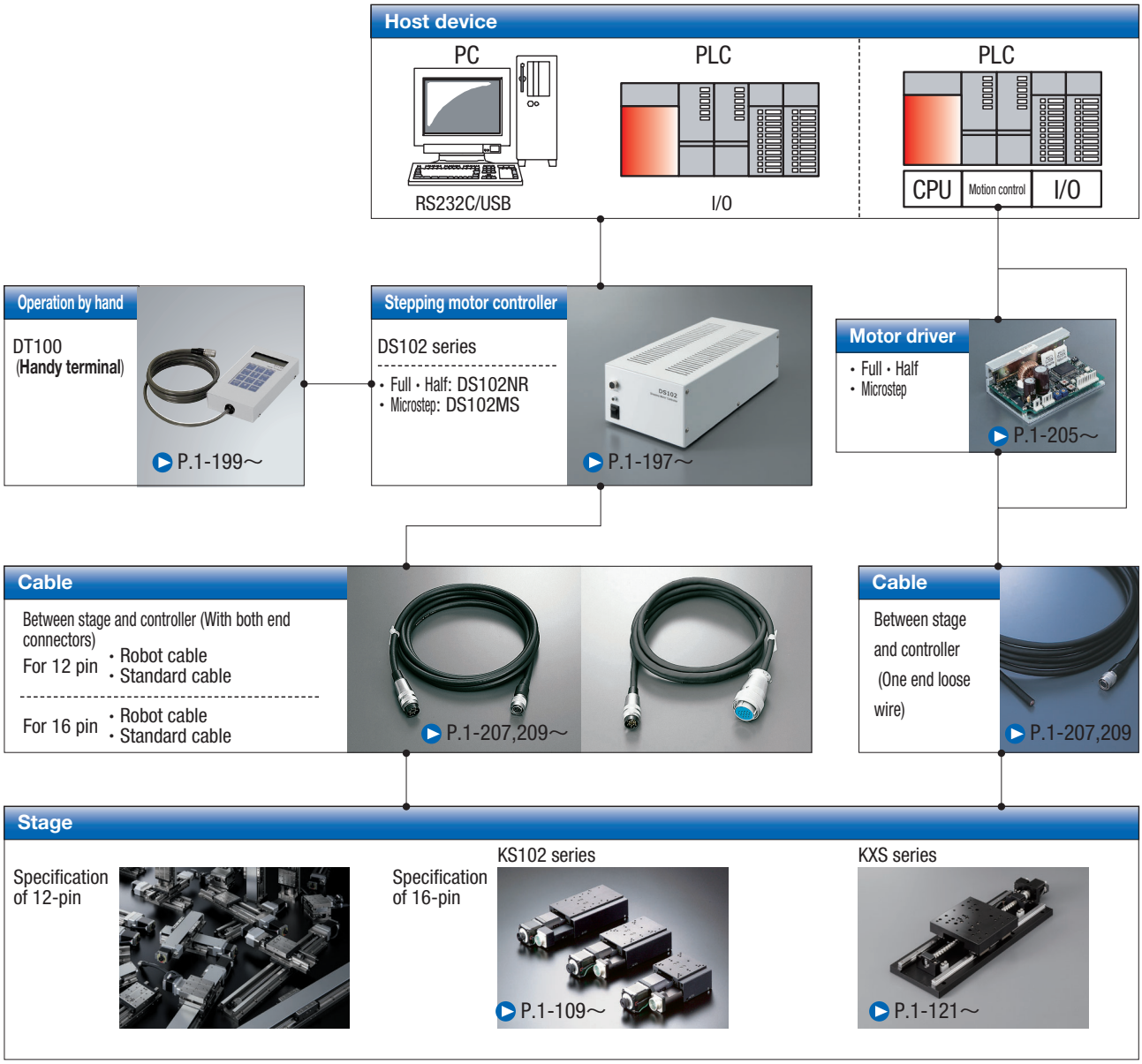
Cable



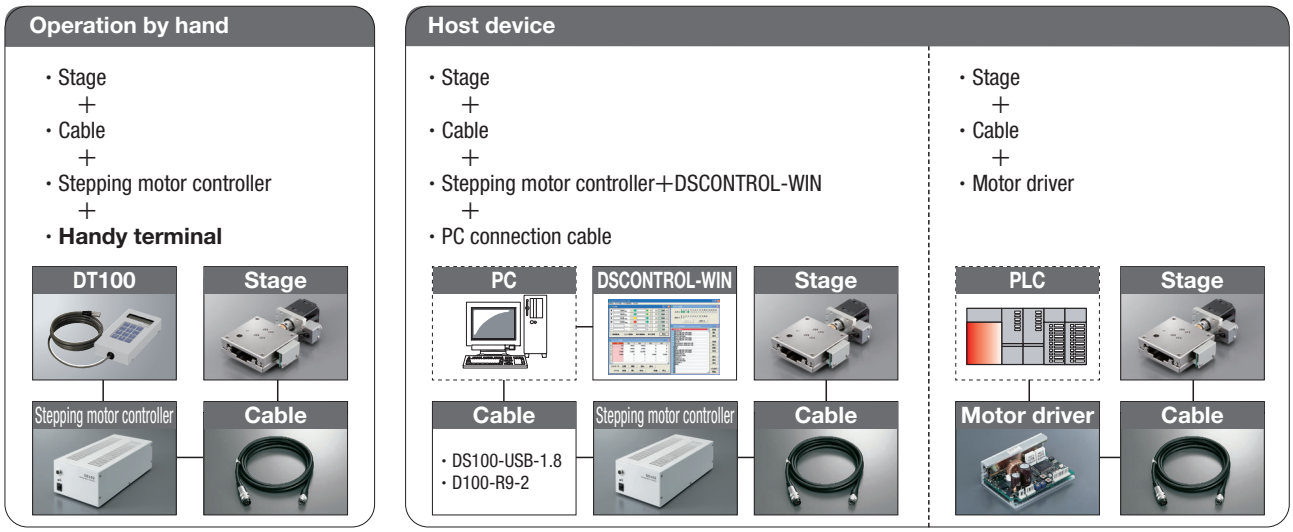
Motor list



Connection Example



Configurations



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

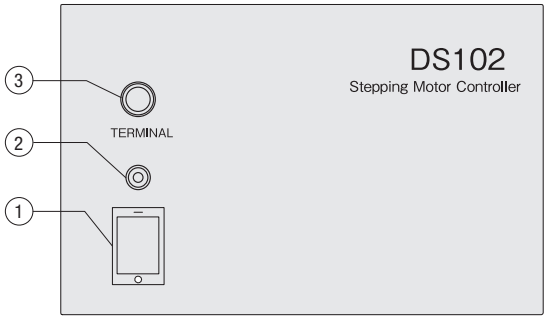
1: Please use our handy terminal DT100 and software DSCONTROL-WIN for programing and teaching set-up.
2: Control the stage with electromagnetic brake is custom-made.
3: Not available for PG series sensor voltage 24V.
4: The advance verification is required when use the program for D200series.

SPEC

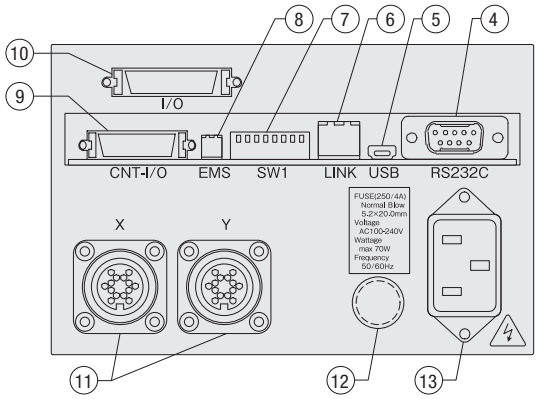
Model	DS102NR DS102MS	DS102NR-IO DS102MS-IO	DS112NR DS112MS	DS112NR-IO DS112MS-IO
Dimension	140 (W) ×300 (D) ×90 (H) mm		70 (W) ×165 (D) ×155 (H) mm	
Input power	AC100～240V±10%、50/60Hz		DC24V±10%	
Maxium power consumption	Less than 70W		Less than 2.5A	
Driver type (Divisions)	DS102NR: Normal (Full/Half) 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



Rear panel

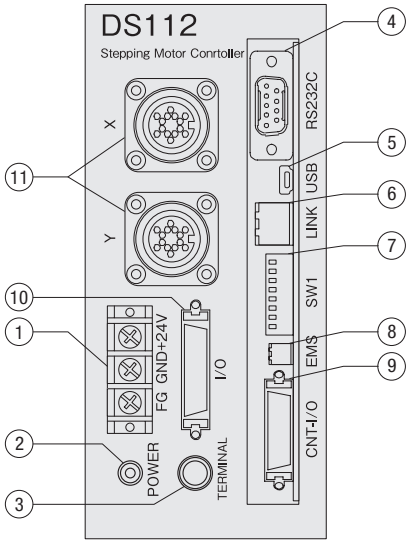


①Power switch
②POWER LED
③TERMINAL *1

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

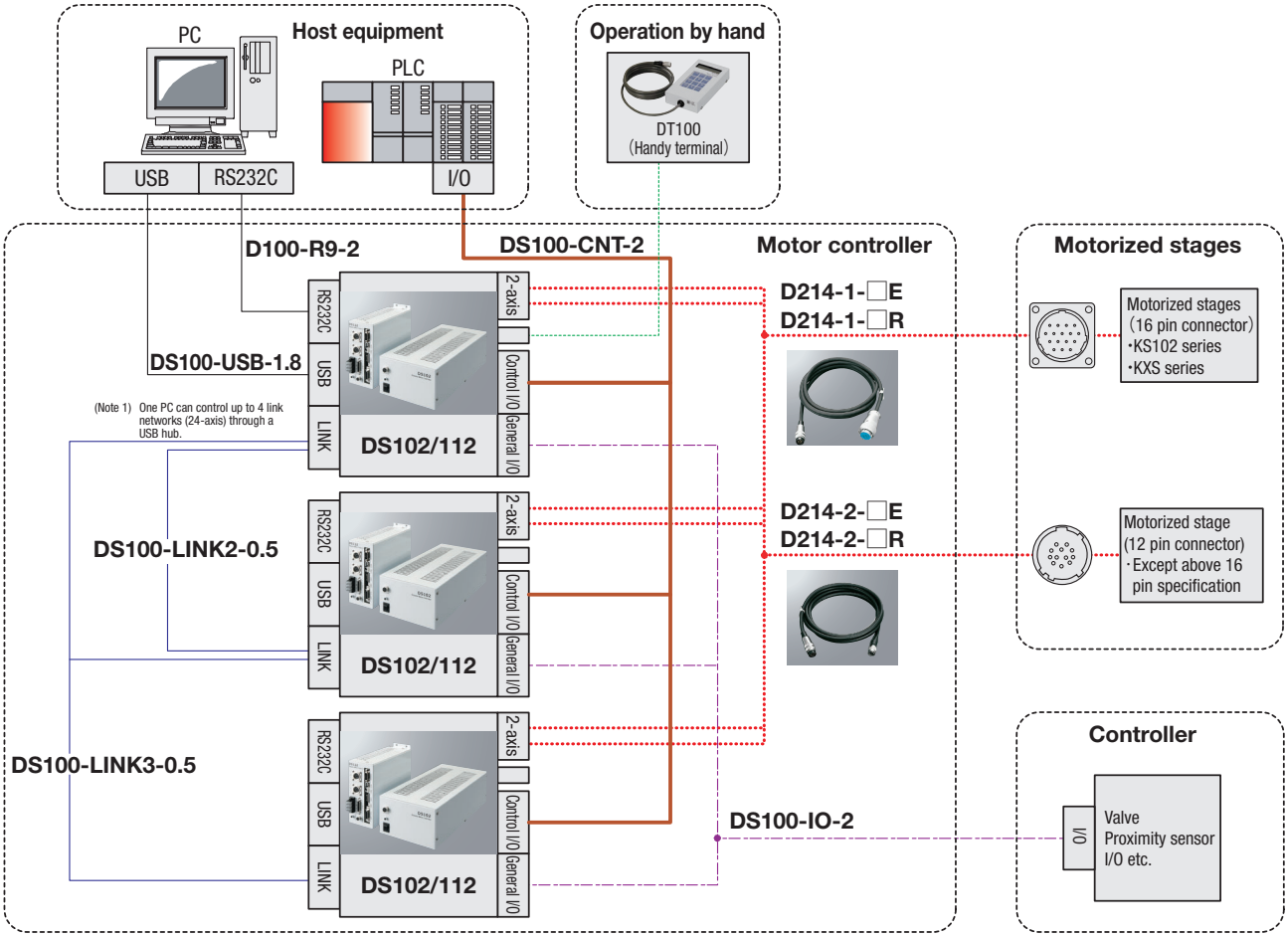
* Please refer the instruction manual about mounting from our web site.

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

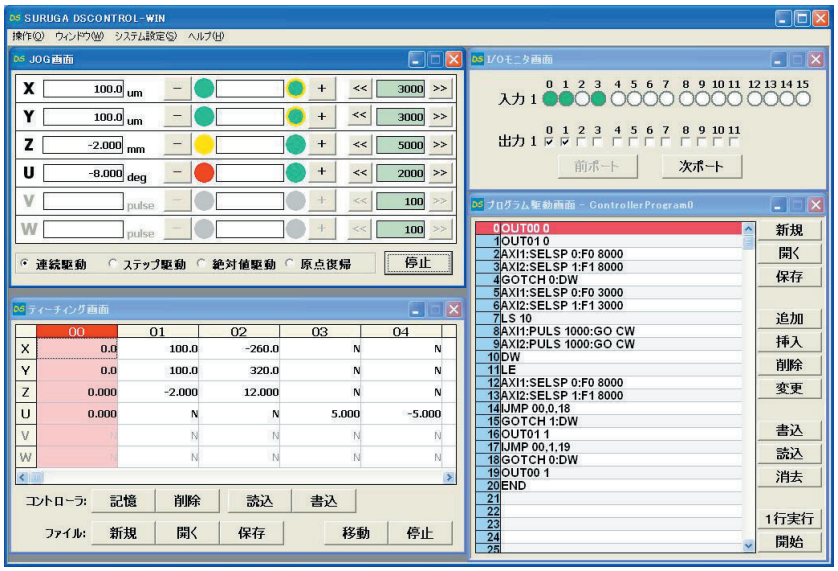
Can be operated remotely with DT100.
Can be operated continuous driving, step driving, return to origin, program execution and teaching by hand with DT100.
The display is a 16 digit × 2 line LCD.

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

Recommended origin return method	Motorized Stage sensor specification			Number or stage connector pins
	Limit	ORG	NORG	
3, 4, 9, 10	—	1	—	12
5, 6, 11, 12	2	—	—	12
3, 4, 9, 10	2	1	—	12
1, 2, 7, 8	2	1	1	16 , 12 (*)

* About stages with 12-pin specifications and NORG
Type 1, 2, 7, 8 :Select the 4 sensor cable D214-2-□□A.
Type 3, 4, 9, 10 :Select the standard cable D214-2-□□.
*Please refer to our website or catalog for electrical specifications of our stages.

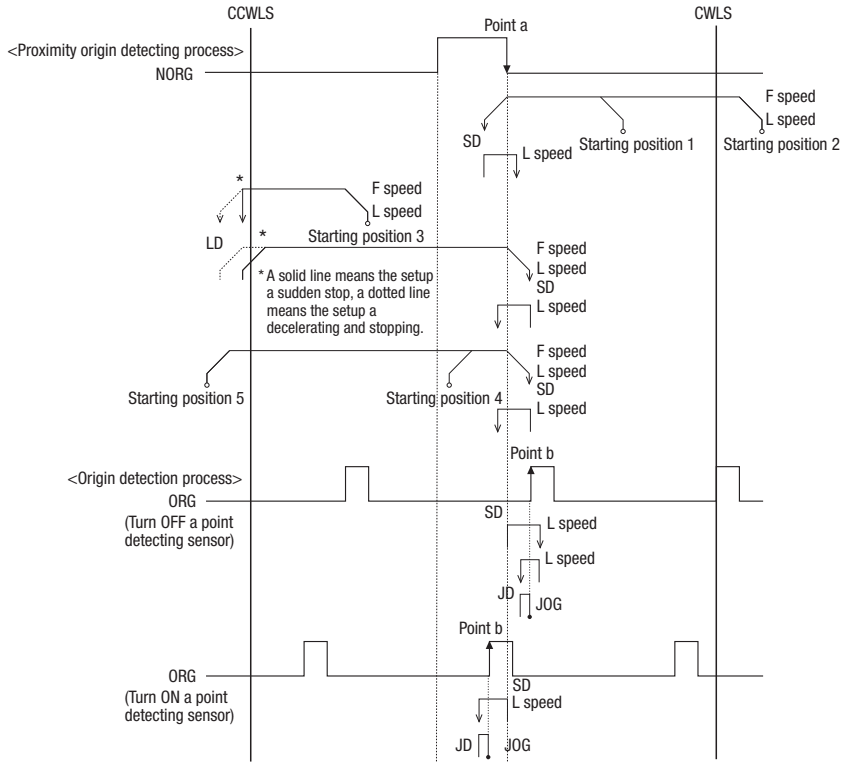
■The return to origin type list

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.

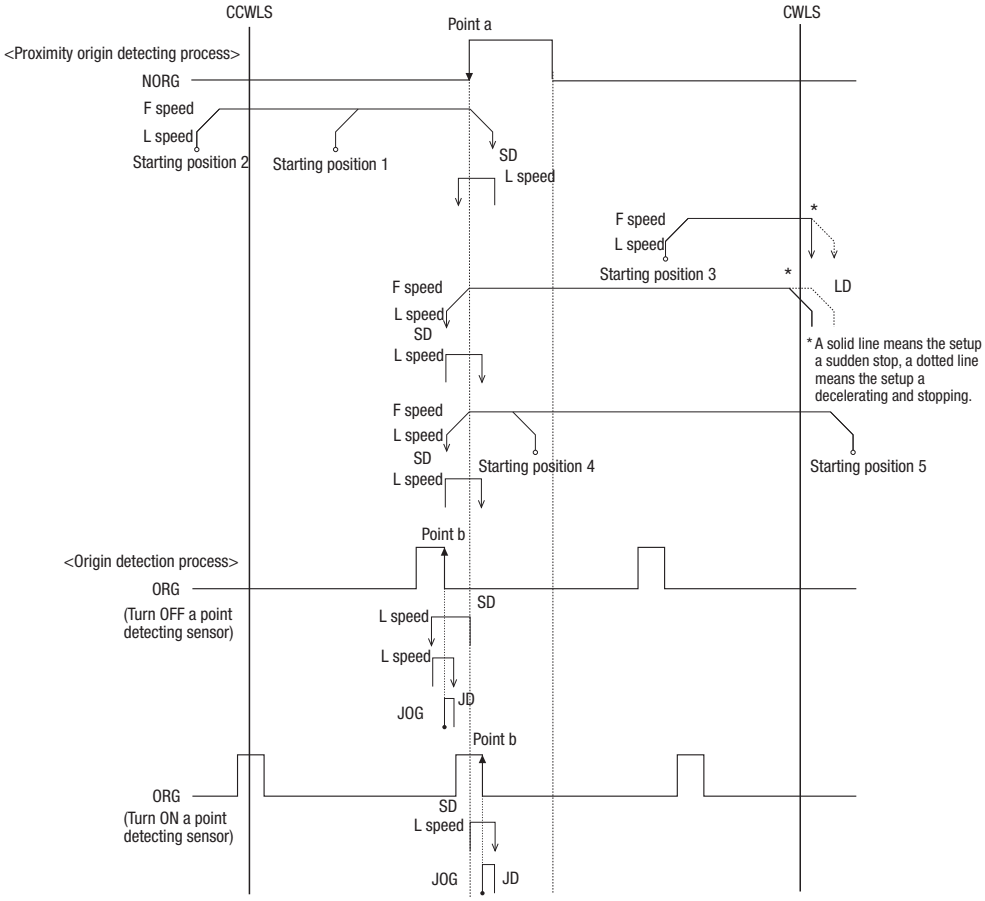
Return to origin sequence shows as below.

[Type 0] No return to origin is performed

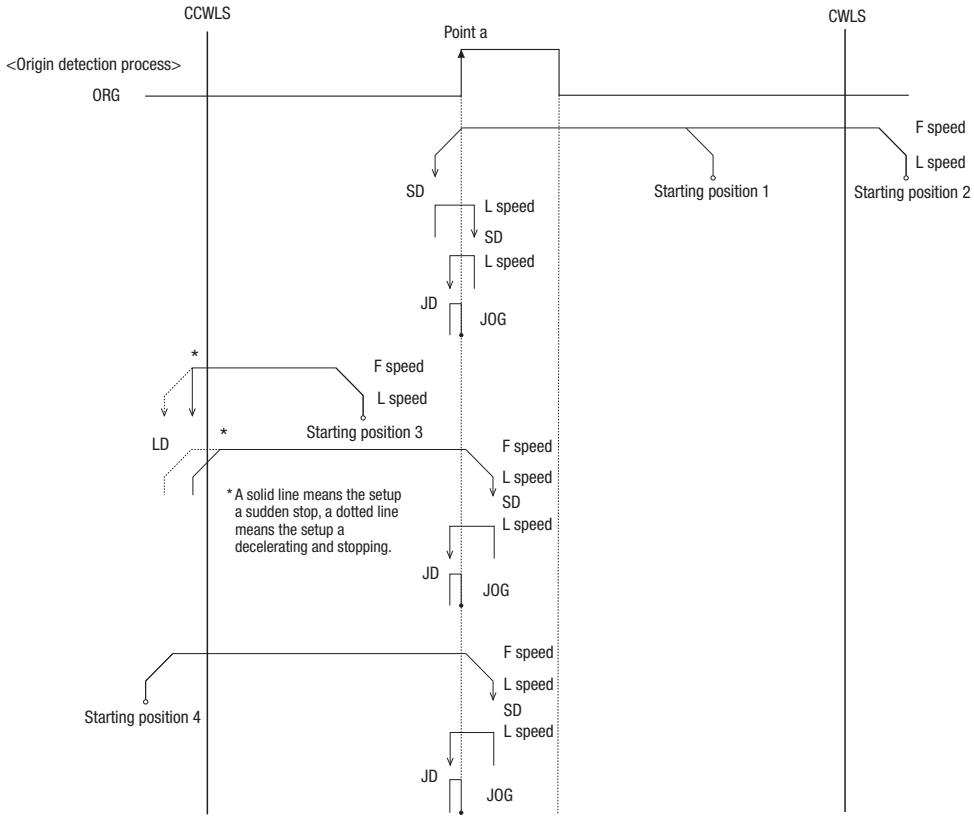
[Type 1] Detect in the direction of CCW and perform detected process for CW edge(point a) of NORG signal.



[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.

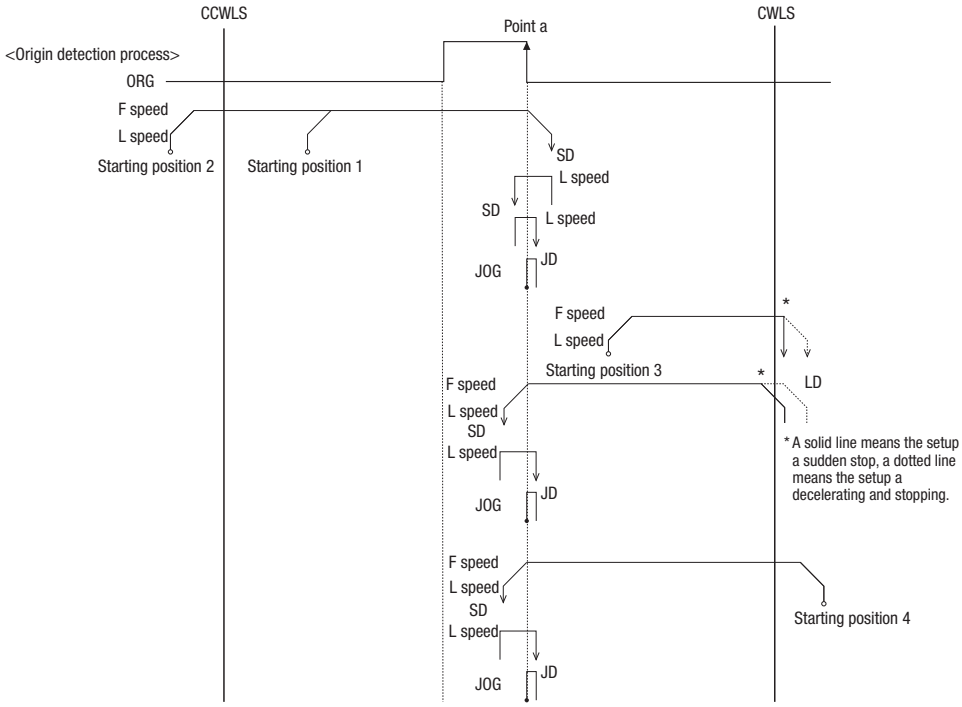


[Type 3] Detect in the direction of CCW and perform detected process for CCW edge(a point) of ORG signal.

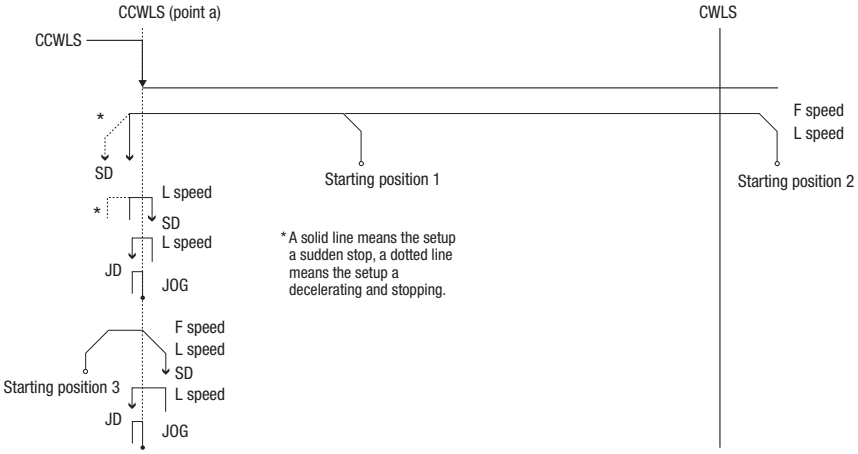


Method for Return to Origin

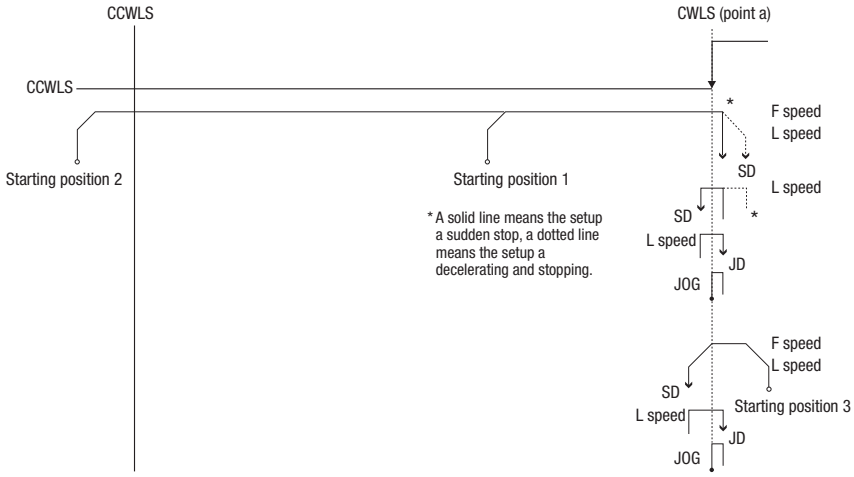
[Type 4] Detect in the direction of CW and perform detected process for CW edge of ORG signal.



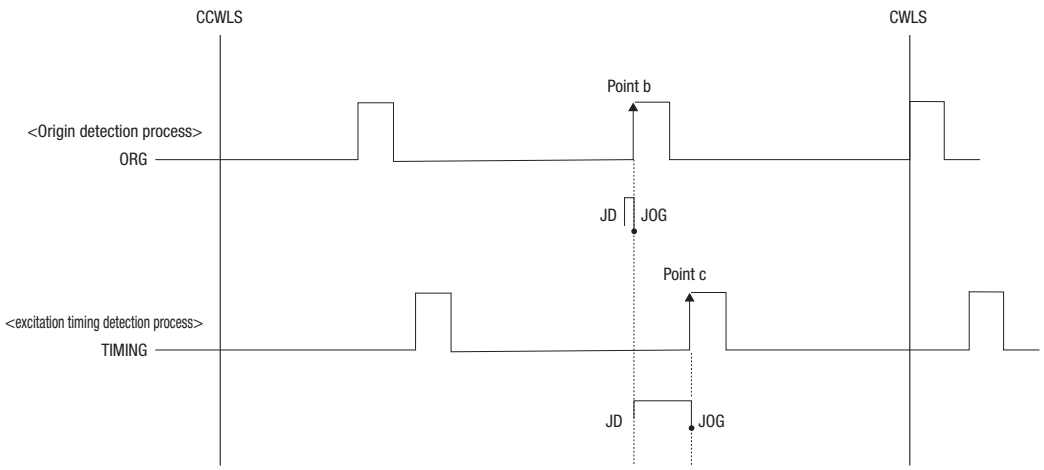
[Type 5] Detect in the direction of CCW and perform detected process for CW edge(point a) of CWLS signal.



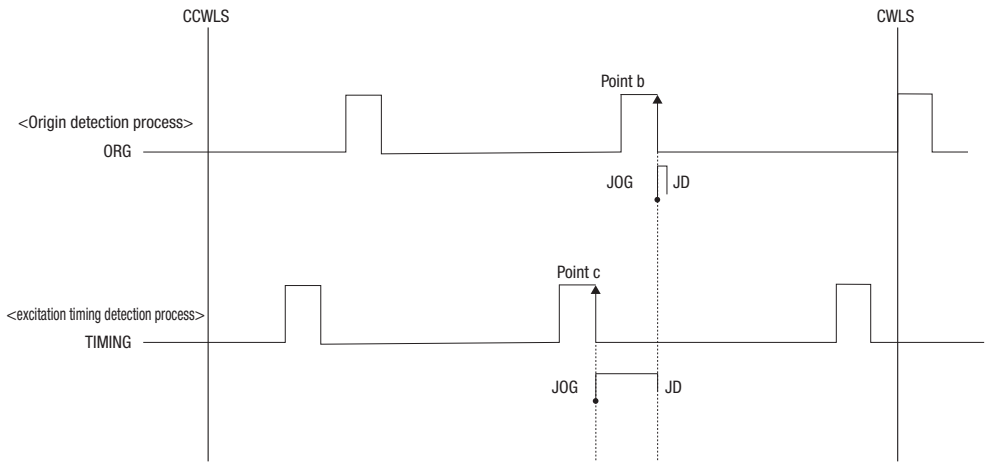
[Type 6] Detect in the direction of CW and perform detected process for CCW edge (point a) of CWLS signal.



[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

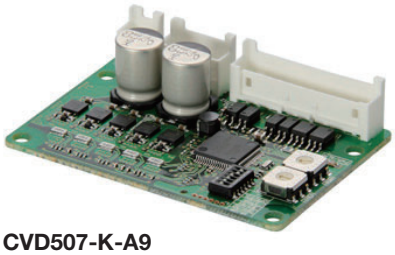
Stepping Motor Driver

Orientalmotor

When the motorized stage is driven with the motion control board and the positioning unit, we recommend following drivers.
CVD507-K-A9/CRD5107P has smooth driver function that is realized vibration reduction and low noise.

DC24V type input driver

Instruction Manual RoHS



CVD507-K-A9

*The photo shows an image.

What is smooth drive function?

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

SPEC				
Model	CVD507-K-A9	CRD5107P	DISCONTINUED SD5107P3-A22	DISCONTINUED DFC5107P
Compatible motor	C005C-90215P-1 PK523HPB-C15 PK523HPB-C17 PK523HPMB PK523HPMB-C1 PK525HPB PK525HPB-C1 PK525HPMB-C1 PK544PB PK544PB-C18 PK544PMB-C18 PK546PB Motor for KS451-40(Customized)		C005C-90215P-1 C7214-9015-1 C9582-9015-1 PK523HPB-C15 PK523HPB-C17 PK523HPMB PK523HPMB-C1 PK525HPB PK525HPB-C1 PK544PB-C18 PK546PB PKE545MC-A1 PKE566MC Motor for KS451-40(Customized)	
Input power	DC24V±10% 1.4A(Max)		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	0～50°C	0～40°C	0～40°C	
Dimension	65(W)×45(D)×21max(H)mm	65(W)×45(D)×28(H)mm	65(W)×45(D)×28(H)m	100(W)×76(D)×36max(H)mm
Weight	0.02kg	0.04kg	0.04kg	0.2kg
Input signal	Photo coupler input			

Cable for DC24V input driver

SPEC		
Model	LCS04SD5	DISCONTINUED LCS02CFK
Compatible driver	CVD507-K-A9/CRD5107P/SD5107P3-A22 (*End of sale)	DFC5107P (*End of sale)
Length	600mm	

AC100V type input driver

Instruction Manual RoHS

SPEC	
Model	DISCONTINUED RKD507-A
Compatible motor	C005C-90215P-1 C9582-9015-1 PK523HPB-C17 PK523HPMB-C1 PK525HPB-C1 PK544PMB-C18 PK546PB C7214-9015-1 PK523HPB-C15 PK523HPMB PK525HPB PK544PB-C18 Motor for KS451-40(Customized)
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°C
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

Instruction Manual RoHS

KR-A5MC

KR-A55MC

SPEC		
Model	KR-A5MC	KR-A55MC
Compatible motor	C005C-90215P-1 PK523HPB-C15 PK523HPB-C17 PK523HPMB PK523HPMB-C1 PK525HPB PK525HPB-C1 PK525HPMB-C1 PK544PB PK544PB-C18 PK544PMB-C18 PK546PB Motor for KS451-40(Customized)	
Input power	DC20V−35V	
Rated current	0.75A/Phase	
Divisions	Full/Half	1～1/250
Range of operating temperature	0～40°C	
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

Instruction Manual RoHS

KR-A535M

SPEC	
Model	KR-A535M
Compatible motor	C005C-90215P-1 PK523HPB-C15 PK523HPB-C17 PK523HPMB PK523HPMB-C1 PK525HPB PK525HPB-C1 PK525HPMB-C1 PK544PB PK544PB-C18 PK544PMB-C18 PK546PB Motor for KS451-40(Customized)
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°C
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.

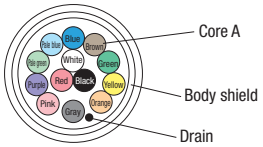
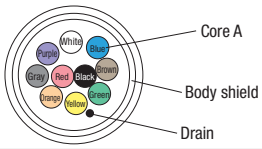
D214-1-2E

D214-2-2E

Loose wire on controller side

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

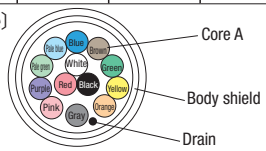
■Normal cable/minimum bending radius:R33mm

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	

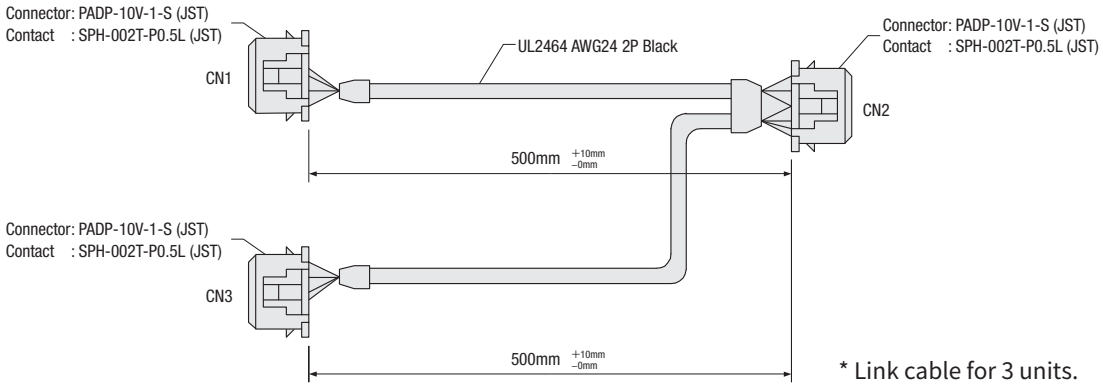
DS102/112 Dedicated cable

RoHS

●Link cable DS100-LINK□-0.5

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

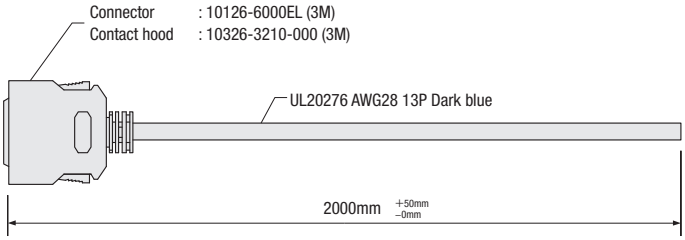
Select the cable DS100-LINK2-0.5 when will be linked two of DS102/112, and DS100-LINK3-0.5 for linking three of them.



* Link cable for 3 units.

●Control I/O cable DS100-CNT-2

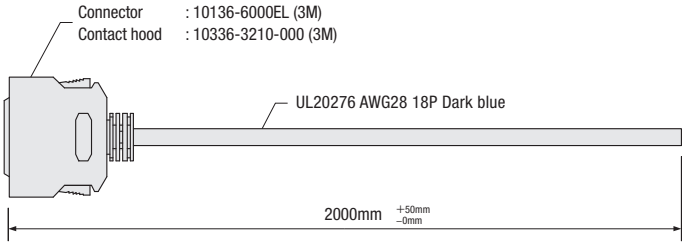
Use this cable if DS102/112 is operated I/O control in upper controller. Loose wire on one side.



* 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.

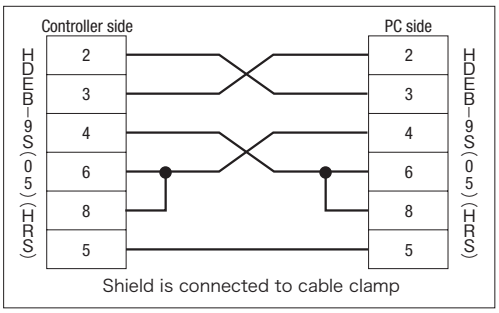
SPEC				
Model	**DS100-LINK2-0.5**	**DS100-LINK3-0.5**	**DS100-CNT-2**	**DS100-IO-2**
Cable length	0.5m	0.5m	2.0m	2.0m
Remarks	For linking 2 units	For linking 3 units	For control I/O (One end loose wire)	For general I/O (One end loose wire)

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

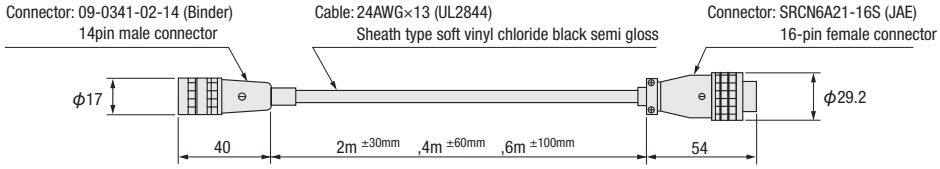


Cable Connection Diagram

■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).



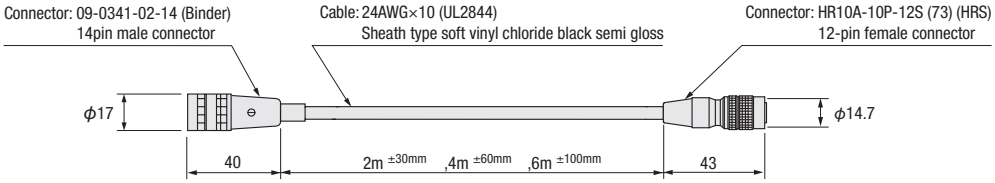
The function of terminal on the controller side			The function of terminal on the stage side
Motor lead (Blue)	A	Blue 1	Motor lead (Blue)
Motor lead (Red)	C	Red 2	Motor lead (Red)
Motor lead (Orange)	E	Orange 3	Motor lead (Orange)
Motor lead (Green)	G	Green 4	Motor lead (Green)
Motor lead (Black)	J	Black 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.

●D214-2-2E (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).



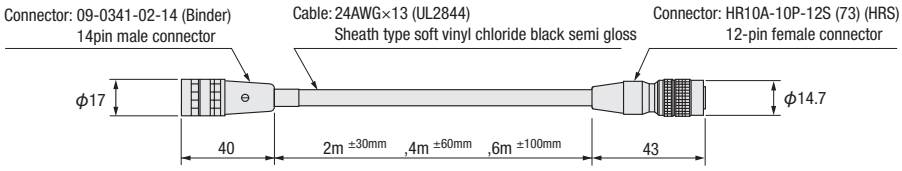
The function of terminal on the controller side			The function of terminal on the stage side
Motor lead (Blue)	A	Blue 1	Motor lead (Blue)
Motor lead (Red)	C	Red 2	Motor lead (Red)
Motor lead (Orange)	E	Orange 3	Motor lead (Orange)
Motor lead (Green)	G	Green 4	Motor lead (Green)
Motor lead (Black)	J	Black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



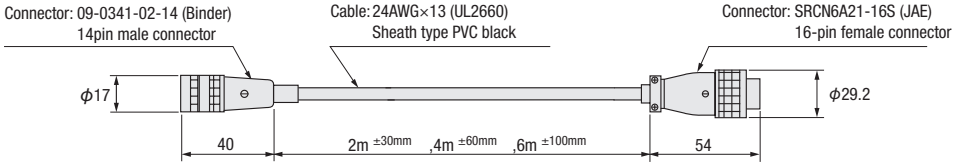
The function of terminal on the controller side			The function of terminal on the stage side
Motor lead (Blue)	A	Blue 1	Motor lead (Blue)
Motor lead (Red)	C	Red 2	Motor lead (Red)
Motor lead (Orange)	E	Orange 3	Motor lead (Orange)
Motor lead (Green)	G	Green 4	Motor lead (Green)
Motor lead (Black)	J	Black 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.

■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).



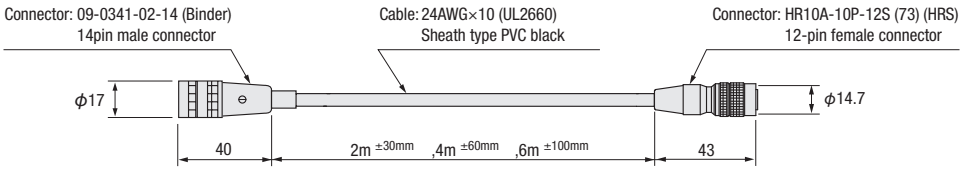
The function of terminal on the controller side				The function of terminal on the stage side
Motor lead (Blue)	A	Blue	1	Motor lead (Blue)
Motor lead (Red)	C	Red	2	Motor lead (Red)
Motor lead (Orange)	E	Orange	3	Motor lead (Orange)
Motor lead (Green)	G	Green	4	Motor lead (Green)
Motor lead (Black)	J	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).



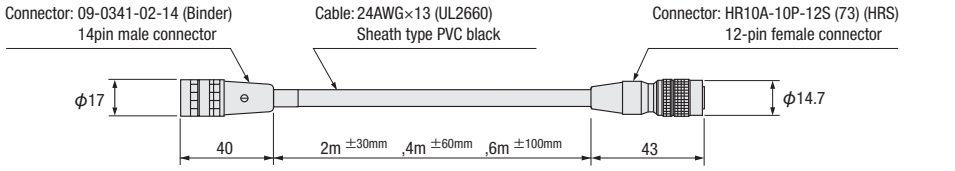
The function of terminal on the controller side				The function of terminal on the stage side
Motor lead (Blue)	A	Blue	1	Motor lead (Blue)
Motor lead (Red)	C	Red	2	Motor lead (Red)
Motor lead (Orange)	E	Orange	3	Motor lead (Orange)
Motor lead (Green)	G	Green	4	Motor lead (Green)
Motor lead (Black)	J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

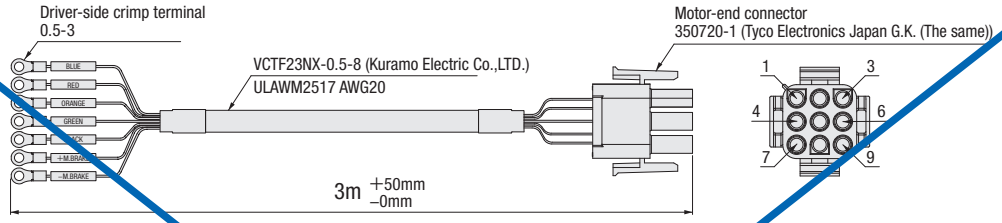


The function of terminal on the controller side				The function of terminal on the stage side
Motor lead (Blue)	A	Blue	1	Motor lead (Blue)
Motor lead (Red)	C	Red	2	Motor lead (Red)
Motor lead (Orange)	E	Orange	3	Motor lead (Orange)
Motor lead (Green)	G	Green	4	Motor lead (Green)
Motor lead (Black)	J	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

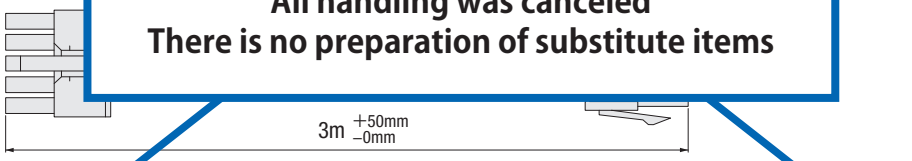


Mark		Pin	Signals
BLUE	Blue	1	Motor lead Blue
RED	Red	2	Motor lead Red
	Yellow		

Discontinued

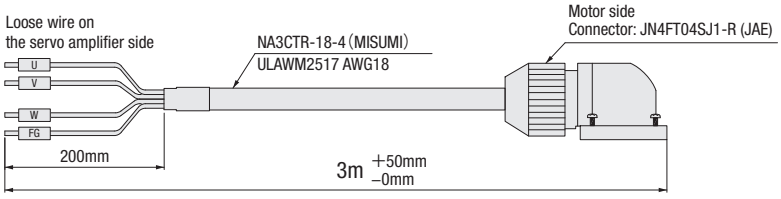
※ The product on this page
All handling was canceled
There is no preparation of substitute items

●α Step motor cab



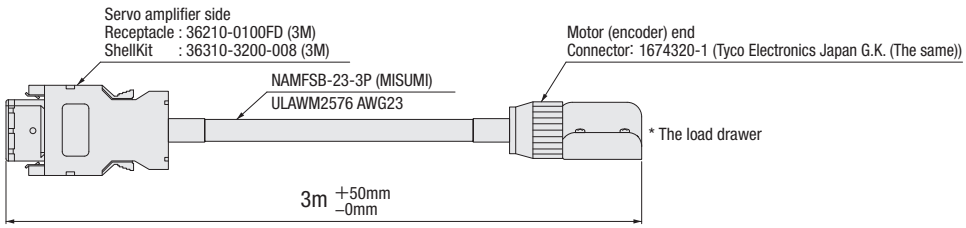
Pin		Pin
1	White	1
2	Purple	2
3	Red	3
4	Blue	4
—		—
6	Black	6
7	Brown	7
8	Green	8
9	Yellow	9
10	Shield	10

●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

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TEL.+81-3-6711-5014 FAX.+81-3-6711-5021

Optionally Supplied Cable αstep motor cable

■CC0□0VA2F2

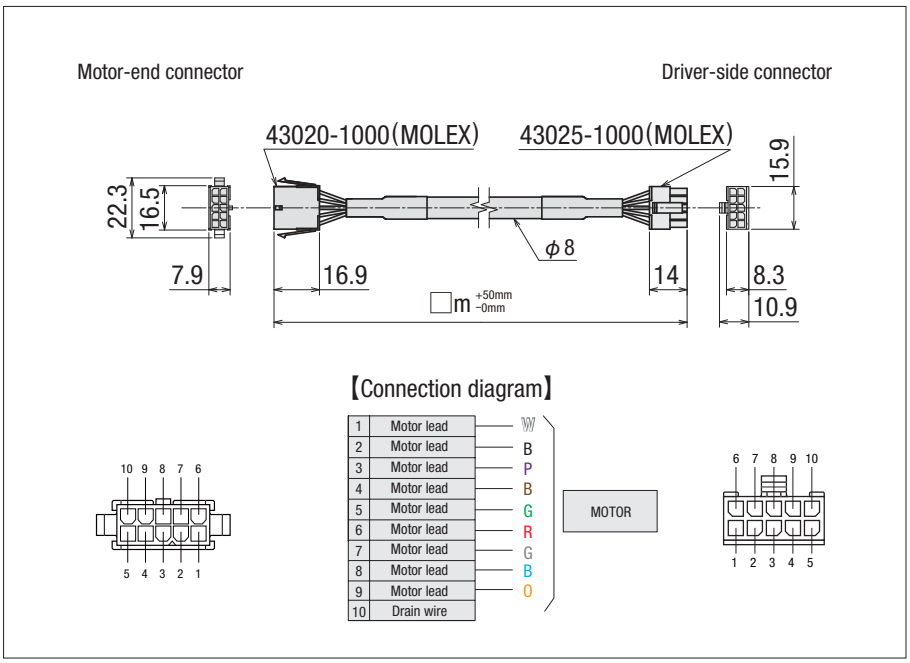
└─2 : 2m
5 : 5m

Product Model
KS101-30L (R) PA-2A
KS101-30L (R) PA-5A

■CC0□0VA2R2

└─2 : 2m
3 : 3m
5 : 5m

Product Model
KS101-30L (R) PA-2R
KS101-30L (R) PA-5R
KXC□□□□□-PAP
KXG06-□□□-PAP
KXL06□□□-□□-PA□P
PG□□□—□□□□□PAP
SXM20-T1E-D1-3
SXM26-T1E-D1-3



■CC0□0VAF

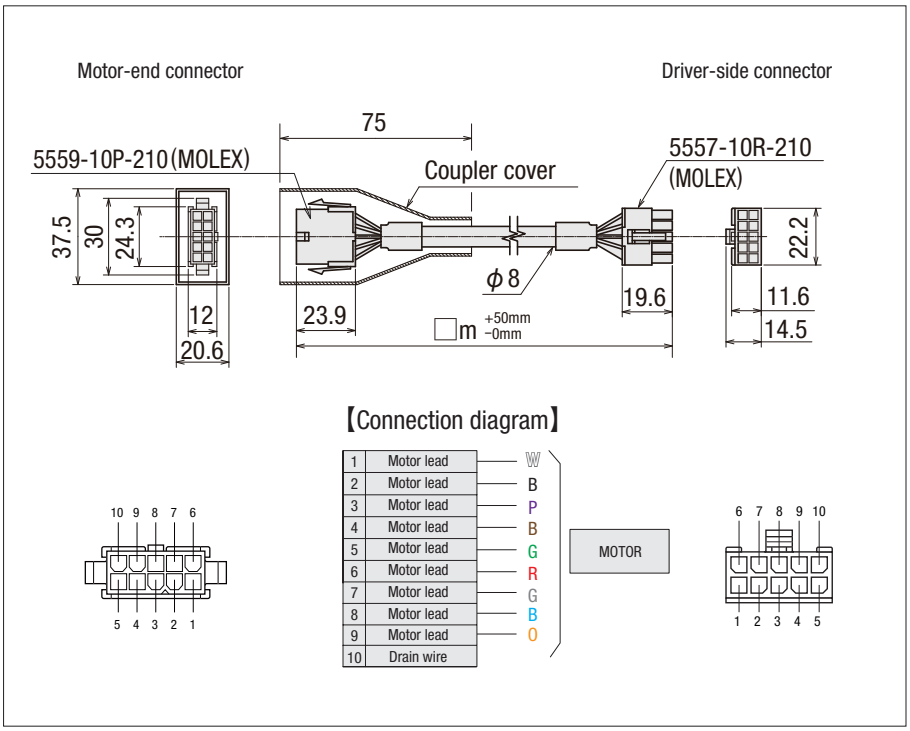
└─2 : 2m
5 : 5m

Product Model
KS101-30L (R) QA-2A
KS101-30L (R) QA-5A
KS102-□□□QA-2A
KS102-□□□QA-5A

■CC0□0VAR

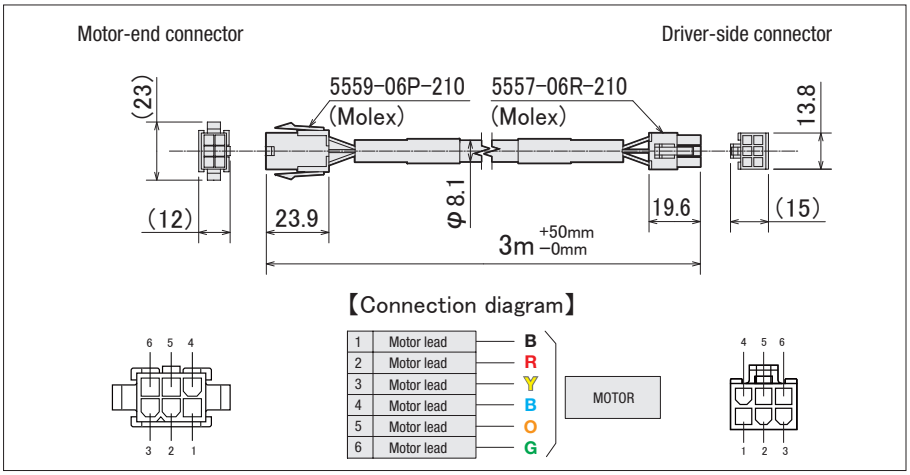
└─2 : 2m
3 : 3m
5 : 5m

Product Model
KS101-30L (R) QA-2R
KS101-30L (R) QA-5R
KS102-□□□QA-2R
KS102-□□□QA-5R
KXS18□□□—□□-QAP
SXM20-T2E-D2E-3
SXM26-T2E-D2E-3
SXM30-T2E-D2E-3
SXM30-T3E-D3E-3
SXM45-T3E-D3E-3



■CC030VPF (3m)

Product Model
SXM20-T4E-D4E-3
SXM26-T4E-D4E-3
SXM30-T5E-D5E-3
SXM45-T5E-D5E-3



URL:http://eng.surugaseiki.com/ E-mail:e-ost@suruga-g.co.jp
TEL.+81-3-6711-5014 FAX.+81-3-6711-5021

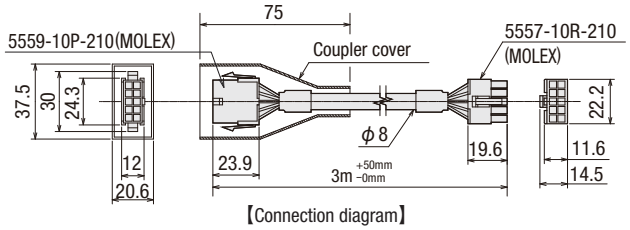
Optionally Supplied Cable With electromagnetic brake motor cable

■CC030VARB (3m)

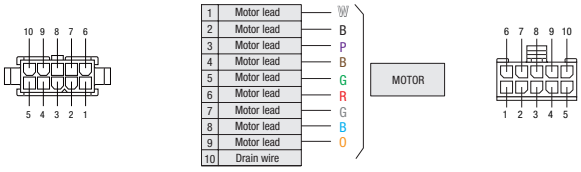
Product Model
SXM20-T2BE-D2E-3
SXM26-T2BE-D2E-3
SXM30-T2BE-D2E-3
SXM30-T3BE-D3E-3
SXM45-T3BE-D3E-3

Cable for motor

Motor-end connector Driver-side connector

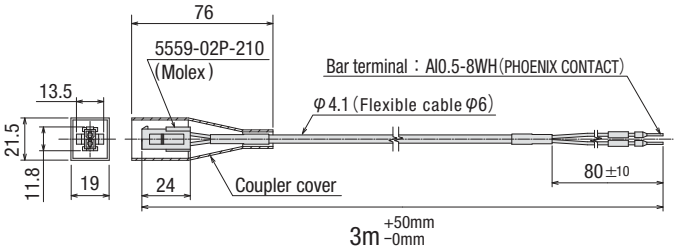


【Connection diagram】

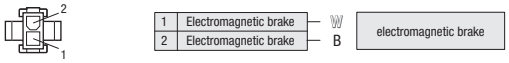


Cable for electromagnetic brake

Motor-end connector Driver-side connector



【Connection diagram】

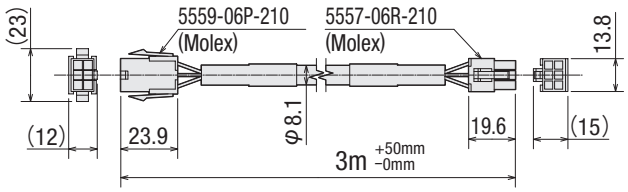


■CC030VPFB (3m)

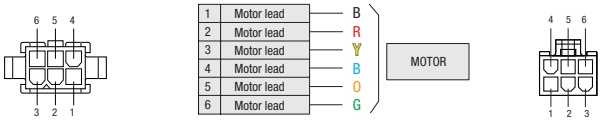
Product Model
KXG06-□□□-MAM
KXL06□□□-□□-MA□M
PG□□□—□□□□□MAM
KXS18□□□—□□-SAM
SXM20-T4BE-D6E-3
SXM26-T4BE-D6E-3
SXM30-T4BE-D6E-3
SXM30-T5BE-D7E-3
SXM45-T5BE-D7E-3

Cable for motor

Motor-end connector Driver-side connector

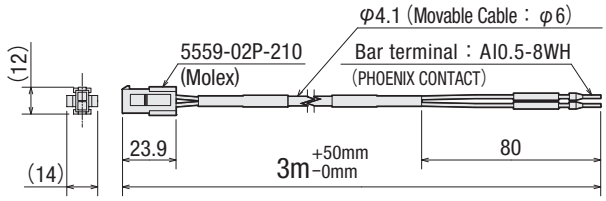


【Connection diagram】

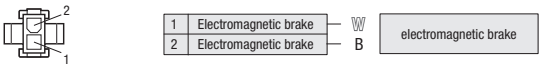


Cable for electromagnetic brake

Motor-end connector Driver-side connector

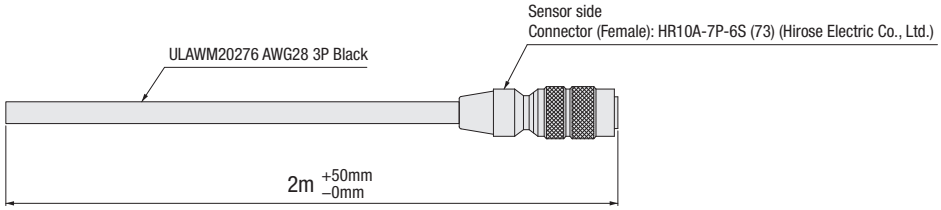


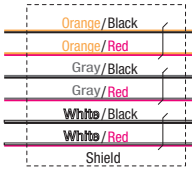
【Connection diagram】



Motorized Stage Optionally Supplied Cable (for Sensor)

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

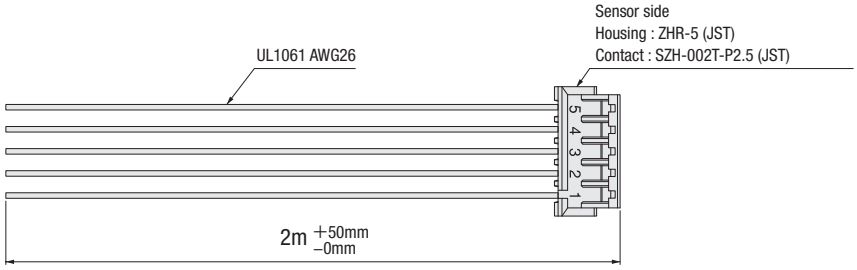


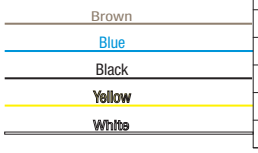


Pin	Signals
1	CWLS
2	CCWLS
3	ORG
4	NORG
5	V+
6	V–

*The shields are connected with the connector shell.

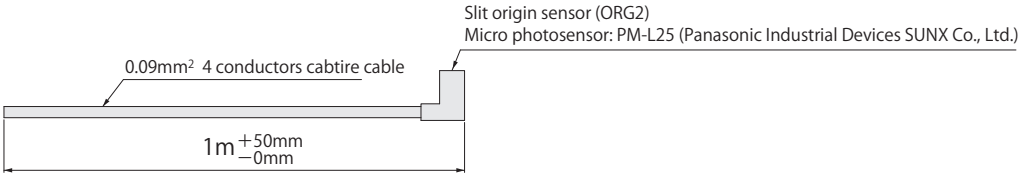
●Limit sensor cable for PG series (Fixed) PG-H-ASSY5-2000

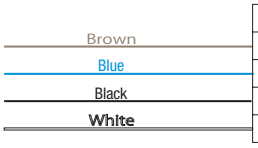




Pin	Signals
1	V+
2	V–
3	CCWLS
4	ORG1
5	CWLS

●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	C005C-90215P-1	PK523HPB-C15 PK523HPB-C17	PK523HPMB PK523HPMB-C1	PK525HPB PK525HPB-C1
Phases	5 phase			
Rated current	0.75A/Phase			
Size	□28mm	□28mm	□28mm	□28mm
Basic step angle	0.72°	0.72°	0.36°	0.72°
Max. Holding torque	0.048N・m	0.048N・m	0.038N・m	0.073N・m
Roter inertial moment	9×10^{-7}kg・m^2	9×10^{-7}kg・m^2	9×10^{-7}kg・m^2	18×10^{-7}kg・m^2
Mass	0.11kg	0.11kg	0.11kg	0.2kg
Temperature	−10°C～+50°C			
Recommended driver	CVD507-K-A9 CRD5107P			
Stage (single axis)	KXT KXG-C KXL-C KXC-C KS101-30-C KGB KGW KRB KRE04 KRE06 KRW04 KRW06	PK523HPB-C15(PG-C) PK523HPB-C17(KHE)	PK523HPMB(PG-E) PK523HPMB-C1 (KXG-G/KXL-G/KXC-G/ KGW-G/KRW-G)	PK525HPB(PG-D) PK525HPB-C1 (KXG-F/KXL-F/KXC06-F/KHC)

■No electromagnetic brake(Oriental motor)

Motor model	PK525HPMB-C1	PK544PMB-C18	PK544PB PK544PB-C18	PK546PB
Phases	5 phase			
Rated current	0.75A/Phase			
Size	□28mm	□42mm	□42mm	□42mm
Basic step angle	0.36°	0.36°	0.72°	0.72°
Max. Holding torque	0.09N・m	0.24N・m	0.24N・m	0.42N・m
Roter inertial moment	19×10^{-7}kg・m^2	60×10^{-7}kg・m^2	57×10^{-7}kg・m^2	114×10^{-7}kg・m^2
Mass	0.2kg	0.3kg	0.3kg	0.5kg
Temperature	−10°C～+50°C			
Recommended driver	CVD507-K-A9 CRD5107P			
Stage(single axis)	KXG-H/KG-H	KX-G KS101-30-G KS102-G KG-G KS402-75G	PK544PB (KS402-180C/KRE10360) PK544PB-C18 (KS332-C/KS402-100C)	KXS-J

■Motor for EtherCAT (SURUGASEIKI)

Motor model	STM28W100A
Size	□28mm
Resolution (Set to 1000P/R)	0.36°
Max. Holding torque	0.085N・m
Mass	0.12kg
Recommended driver	DS1000A-EC-28
Driver power input	DC24V±10%
Stage(single axis)	KXG-EA/KGW-EA/KRW-EA

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

Motor model	PKE545MC-A1	PKE566MC	C103A-90215PM (*1)
Phase	5 Phase		
Rated current	0.35A/Phase	0.75A/Phase	0.75A/
Size	□42mm	□60mm	□28mm
Basic step angle	0.72°		
Max. Holding torque	0.27N・m	0.96N・m	0.048N・m
Rotor inertial moment	79×10^{-7}kg・m²	430×10^{-7}kg・m²	14×10^{-7}kg・m²
Input voltage of excitation brake	DC24V±0.5 0.08A	DC24V±0.5 0.25A	DC24V±0.5 0.08A
Excitation brake static friction torque	0.13N・m	0.48N・m	0.48N・m
Mass	0.52kg	1.2kg	0.17kg
Temperature	−10°C～＋50°C		
Driver type	RKSD503M-A(C)	RKSD507M-A	—
Stage(single axis)	PG-MA KXG-MA(MB) KXL-MA	KXS-SA	KXG-MG

*1 SURUGASEIKI original motor

αstep (Oriental Motor Co., Ltd.)

Motor model	ARM24SAK	AZM24AK	ARM46AC
Size	□28mm	□28mm	□42mm
Resolution (Set to 1000P/R)	0.36°		
Max. Holding torque	0.055N・m	0.095N・m	0.3N・m
Rotor inertial moment	11×10^{-7}kg・m²	9.2×10^{-7}kg・m²	58×10^{-7}kg・m²
Mass	0.15kg	0.15kg	0.47kg
Temperature	-10°C～＋50°C		
Driver type	ARD-K	AZD-K	ARD-A
Driver power input	DC24V±10%	DC24V±5%	Single phase 100-115V 50/60Hz
Driver input current	0.9A	1.6A	2.9A
Stage(single axis)	KXC-PA KS101-30LPA(RPA) PG-PA KXG-PA KXL-PA KGW-PA/KRW-PA	KXG-ZA KGW-ZA KRW-ZA	KS101-30LQA(RQA) KS102-□LQA(RQA) KXS-QA

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

Motor model	HG-KR053	HG-KR13
Size	□40mm	
Resolution (1Rotary)	4194304p/rev	
Speed detector	22 bits encoder	
Rated rotation speed	3000r/min	
Rated output	50W	100W
Rated torque	0.16N・m	0.32N・m
Max. Torque	0.56N・m	1.10N・m
Inertial moment	0.045×10^{-4}kg・m²	0.0777×10^{-4}kg・m²
Rated current	0.9A	0.8A
Mass	0.35kg	0.56kg
Temperature	0°C～40°C	
Driver type	MR-J4-10A	
Stage(single axis)	PG-UA/KXG-UA KXL-UA/ KGW-UA/KRW-UA	KXS-WA

AC servo motor (Panasonic)

Motor model	MSMF5AZL1A2
Size	□38mm
Resolution (1Rotary)	8388608p/rev
Speed detector	23bits encoder
Rated rotation speed	3000r/min
Rated output	50W
Rated torque	0.16N・m
Max. Torque	0.48N・m
Inertial moment	0.026×10^{-4}kg・m²
Rated current	1.1A
Mass	0.32kg
Temperature	0°C～40°C
Driver type	MADLT05SF
Stage(single axis)	KXG-UG KGW-UG KRW-UG