

Ezi-MOTIONLINK[®] Plus-R

Network based Motion Controller Plug-in to Servo Drives

User Manual

Text

(Rev.04)



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1 . Precautions

◆ General Precautions

- Contents of this manual are subject to change without prior notice for functional improvements, change of specifications or user's better understanding. Thoroughly read is the manual which is provided with purchased Ezi-MOTIONLINK Plus-R
- In case of manual is damaged or lost, please contact with FASTECH's agent or our company at the address on the last page of this manual.
- FASTECH is not responsible for a product breakdown due to user's dismantling for the product, and such a breakdown is not guaranteed by the warranty.


◆ Safety Precaution

- Before installation, operation, repairing the products, thoroughly read the manual and fully understand the contents. Before operating the products, please understand the mechanical characteristics of this products and related safety information and precautions.
- This manual divides safety precautions into **Attention** and **Warning**.



 Attention	If user does not properly handle the products, the user may seriously or slightly injured damages may occur in the machine.
 Warning	If user does not properly handle the products, a dangerous situation (such as an electric shock) may occur resulting in deaths or serious injuries.

- Although precaution is only a **Attention**, a serious result could be caused depending on the situation. Follow safety precaution.



◆ Check the Product

 Attention	<p>Check whether the Product is damaged or parts are missing. Otherwise, the machine may get damaged or the user may get injured.</p>
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◆ Setting

 Attention	<p>Please carry the Ezi-MOTIONLINK Plus-R carefully. Otherwise, the product may get damaged or user's foot may get injured by dropping the product.</p> <p>Use non-flammable materials such as metal in the place where the Ezi-MOTIONLINK Plus-R is to be installed. Otherwise, a fire may occur.</p> <p>When installing several Ezi-MOTIONLINK Plus-R in is sealed place, install a cooling fan to keep the ambient temperature of the product as 50°C or lower. Otherwise, a fire or other kinds of accidents may occur due to overheating.</p>
 Warning	<p>The process of installation, Connection, Operation, Checking and Repairing should be done by qualified person. Otherwise, a fire or other kinds of accidents may occur.</p>


◆ Connect Cables

 Attention	<p>Keep the rated range of input Voltage for drive. Otherwise, a fire or other kinds of accidents may occur.</p> <p>Cable connection should be following the wiring diagram. Otherwise, a fire or malfunction of machine may occur.</p>
 Warning	<p>Before connecting cables, check if input power is off. Otherwise, an electric shock or a fire may occur.</p>

◆ Operation & Setting change

 <p>Attention</p>	<p>If a protection function (Alarm) occurs, firstly remove its cause and then release (Alarm reset) the protection function.</p> <p>If you operate continuously without removing its cause, the machine may get damaged or the user may get injured.</p> <p>Make all input signals to OFF before supply input voltage to Ezi-MOTIONLINK Plus-R. drive.</p> <p>The machine may get damaged or the user may get injured by motor operation.</p> <p>All parameter values are set by default factory setting value. Change this value after reading this manual thoroughly.</p> <p>Otherwise, the machine may get damaged or other kinds of accidents may occur.</p>
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◆ Check and Repair

 <p>Warning</p>	<p>Stop to supply power to the main circuit and wait sufficient time before checking or repairing this Ezi-MOTIONLINK Plus-R.</p> <p>Electricity remaining in the condenser may cause of electric shock.</p> <p>Do not change cabling while power is being supplied.</p> <p>Otherwise, the user may get injured or the product and machine may get damaged.</p> <p>Do not reconstruct the Ezi-MOTIONLINK Plus-R.</p> <p>Otherwise, an electric shock may occur or the product and machine get damaged. And the reconstructed product cannot get after service.</p>
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2 . Specifications of the Drive

2 - 1 . Characteristic Table

Input Voltage		24VDC ± 10%
Control Method		Control with ARM based 32bit MCU
Multi Axes Drive		Maximum 16 axes through Daisy-Chain
Position Control		Incremental mode / Absolute mode Data range: -134,217,728 to +134,217,727 pulse ^{*1}
Type of Acc/Dec		Symmetric / Asymmetric trapezoidal acceleration & deceleration, S-Shape acceleration & deceleration ^{*2}
Command pulse output method		2 pulse mode (CW/CCW) of 1 pulse mode (Pulse/Dir) (Selected by parameter)
Max. Output Frequency		5MHz
Encoder Max.Input Frequency		4MHz
Input Signal		3 dedicated input (LIMIT+, LIMIT-, ORIGIN), 5 programmable input (photocoupler)
Output Signal		1 dedicated output (Compare Out), 3 programmable output (photocoupler), Brake
Rotational Direction		CW / CCW (Selectable by parameter)
LED Display		Power, Alarm, In-Position, Servo-On/Off, ±Limit Sensor, Origin sensor
Communication Interface		RS-485 Serial communication with PC Communication speed : 9,600~921,600[bps]
Return to Origin		Origin Sensor, Z phase, ±Limit sensor
Positon Table		It is possible to design 256 of Motion Step. (Speed, External start, Jump, Loop, Wait and PT finish etc.)
GUI		User Interface Program within Windows
Library		Motion Library (DLL) for windows 7/8/10
Current Consumption		Maximum 500mA
Operating condition	Ambient Temperature	In Use : 0~50℃ In Storage : -20~70℃
	Humidity	In Use : 35~85%RH (Non-condensing) In Storage : 10~90%RH (Non-condensing)
	Viv. Resist	0.5G

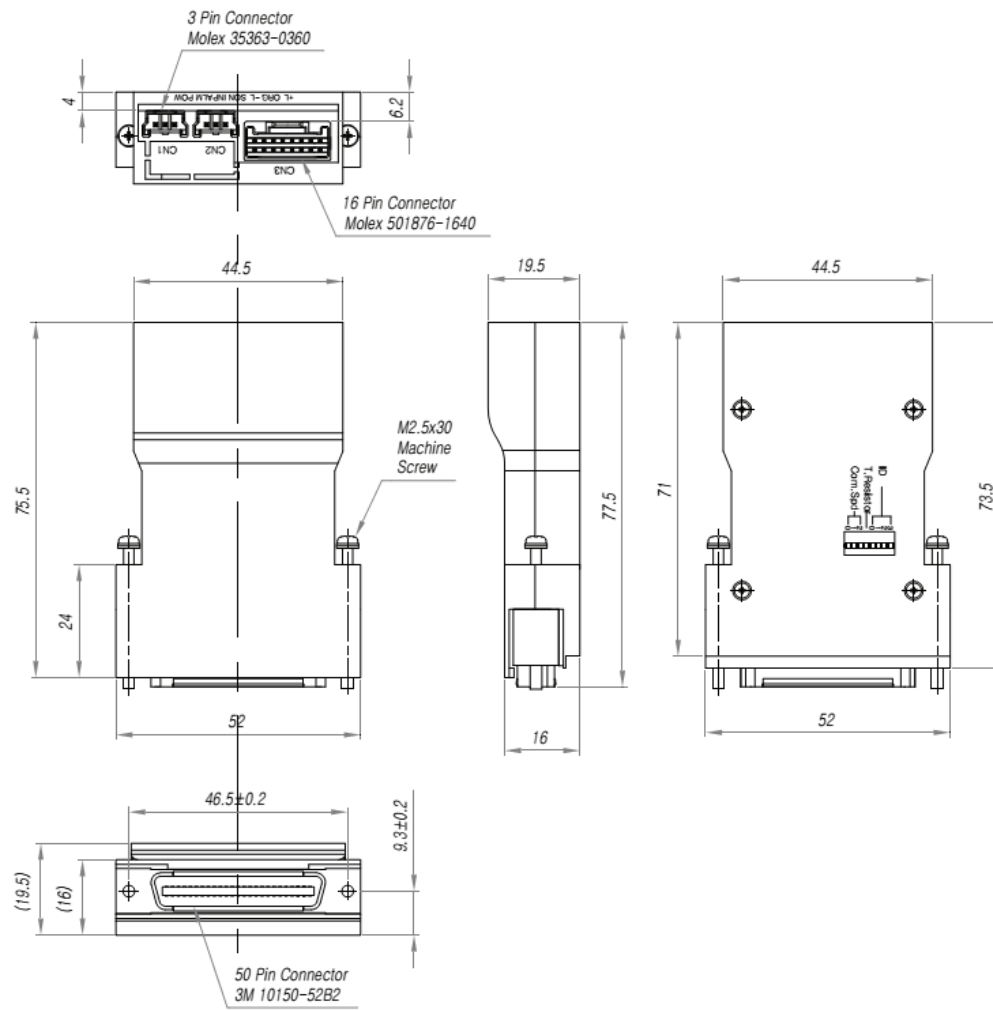
^{*1} Position range differs from the product version, listed as below.

V06.03.04x.xx : -134,217,728 ~ 134,217,727

V06.03.05x.xx : - 2,147,483,648 ~ 2,147,483,647

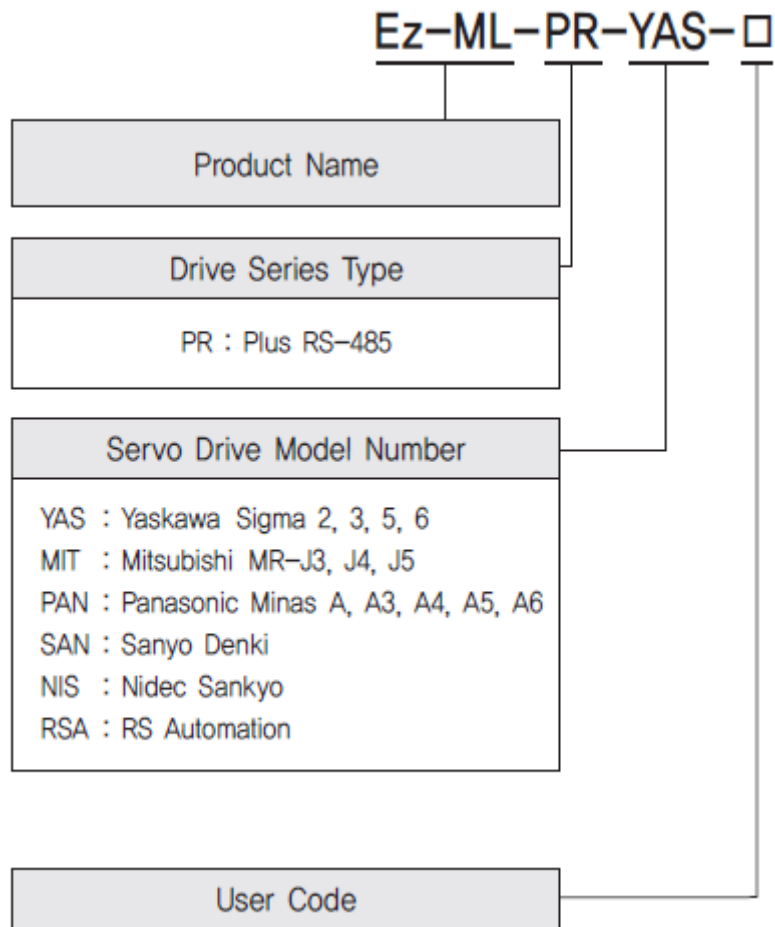
^{*2} It can be used from V06.03.0xx.28 and above.

2 - 2 . Dimensions

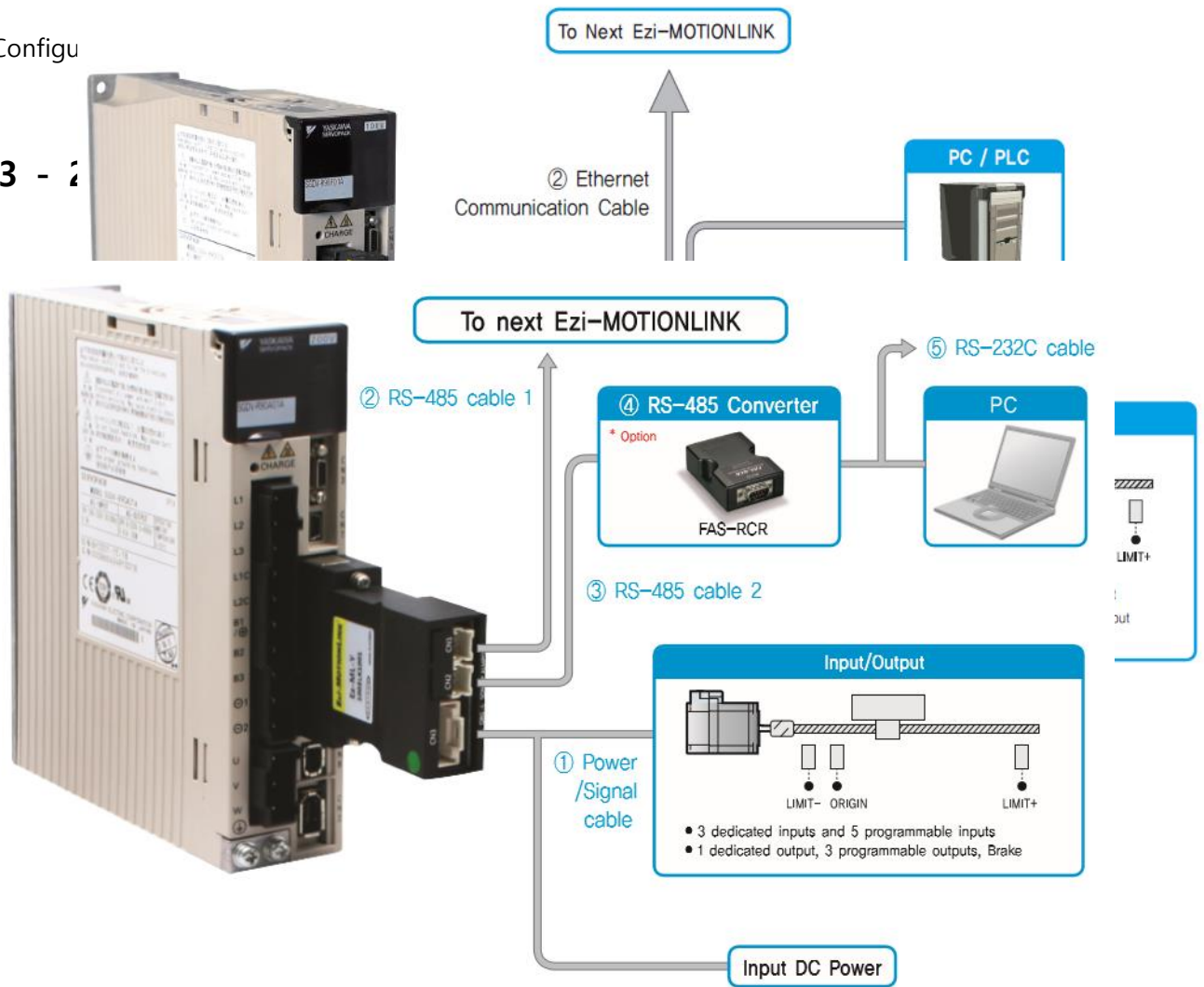


3 . Configuration

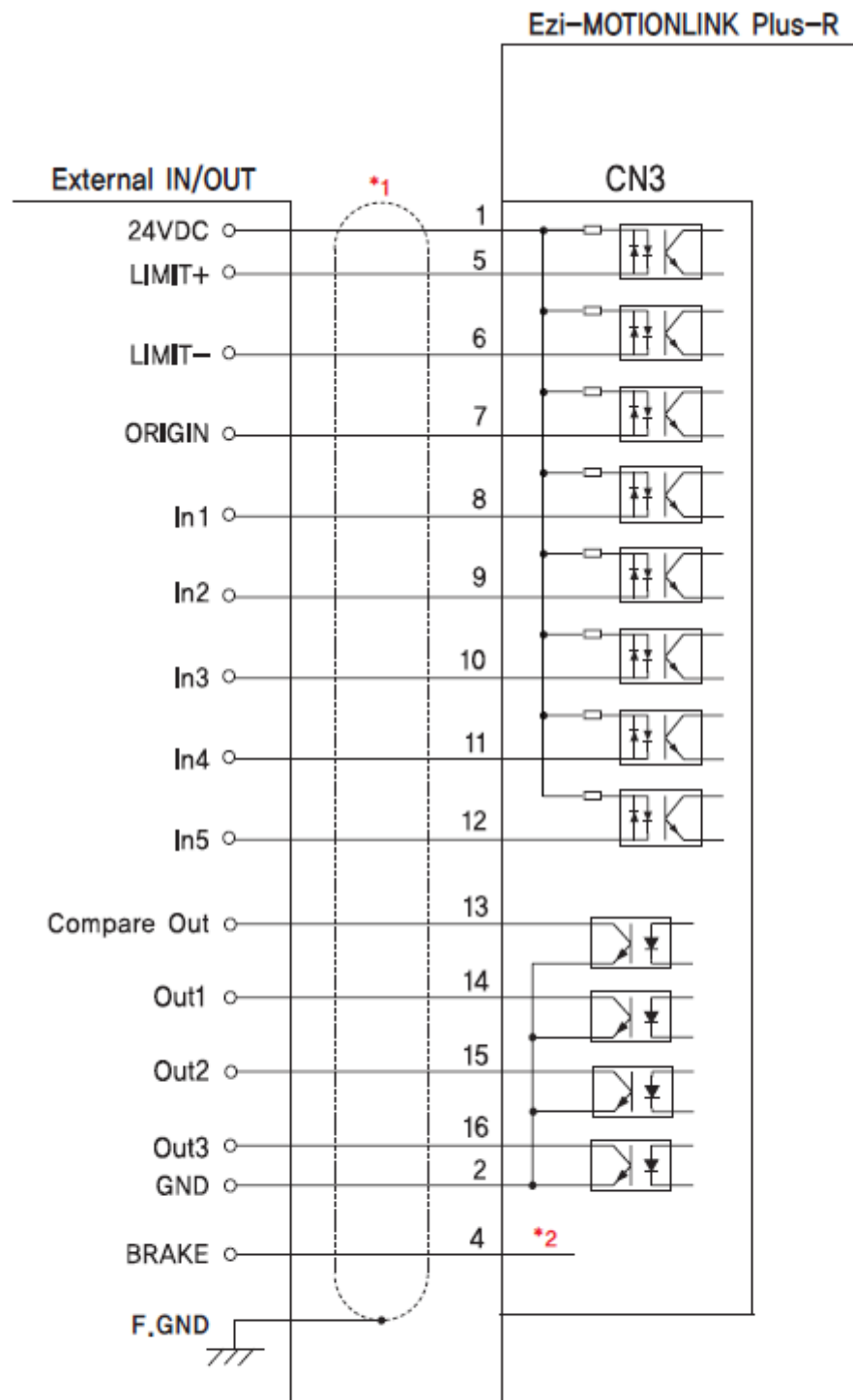
3 - 1 . Part Numbering



3 - 2

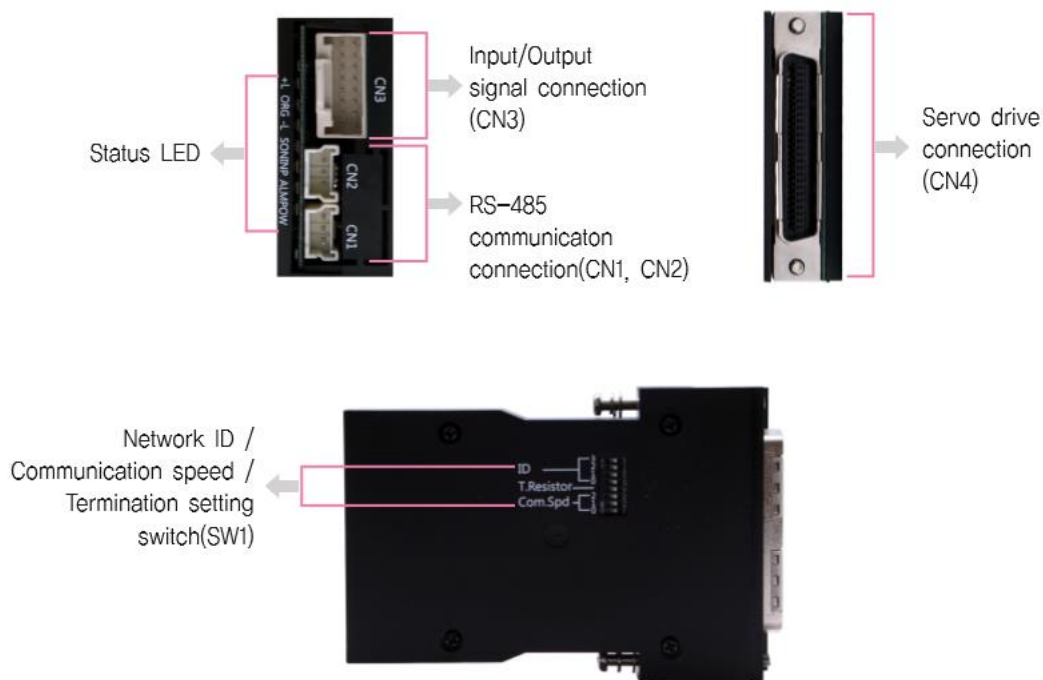


3 - 3 . External Wiring Diagram



4 . External Name and Function Setting

4 - 1 . Appearance and Part name



4 - 2 . Status LED Display

Indication	Color	Function	ON/OFF Condition
POW	Green	Power input indication	LED is turned ON when power is applied
ALM	Red	Alarm indication	Lights when alarm occurs at Servo Drives
INP	Yellow	Complete positioning motion	Lights when position deviation is within In-Position value which set as parameter of Servo Drive after completion of position command pulse input.
SON	Orange	Servo On/Off indication	Servo On: Lights On, Servo Off: Lights Off
-L	Green	Indicate -Limit sensor detection	Lights when -Limit sensor is detected
ORG	Green	Indicate Origin sensor detection	Lights when Origin sensor is detected
+L	Green	Indicate +Limit sensor detection	Lights when +Limit sensor is detected

4 - 3 . Network ID Selection Switch(SW1.5~8)

- 1) If multiple modules are connected to a single daisy chain network, this switch is used to set each module's network ID.
- 2) Up to 16 ID numbers are available.

SW1.8	SW1.7	SW1.6	SW1.5	ID
OFF	OFF	OFF	OFF	0
OFF	OFF	OFF	ON	1
OFF	OFF	ON	OFF	2
OFF	OFF	ON	ON	3
OFF	ON	OFF	OFF	4
OFF	ON	OFF	ON	5
OFF	ON	ON	OFF	6
OFF	ON	ON	ON	7
ON	OFF	OFF	OFF	8
ON	OFF	OFF	ON	9
ON	OFF	ON	OFF	10
ON	OFF	ON	ON	11
ON	ON	OFF	OFF	12
ON	ON	OFF	ON	13
ON	ON	ON	OFF	14
ON	ON	ON	ON	15

4 - 4 . Communication Speed Switch(SW1.1~3)

SW1.1~3 changes RS-485 communication speed

SW1.1~3 use as setting Baud-Rate as below

SW1.3	SW1.2	SW1.1	Baud rate [bps]
OFF	OFF	OFF	9,600
OFF	OFF	ON	19,200
OFF	ON	OFF	38,400
OFF	ON	ON	57,600
ON	OFF	OFF	115,200 ^{*1}
ON	OFF	ON	230,400
ON	ON	OFF	460,800
ON	ON	ON	921,600

***1 : Default Setting**

For high-speed communication, it is possible to use commercial PCI Bus type RS-485 communication board



Caution

Communication speed of drive modules connected to same segment should be same.



Caution

If you are using RS-232 to RS-485 converter, communication speed is limited, up to 115,200[bps]

4 - 5 . Communication Terminating Resistor Switch (SW1.4)

If a drive module is connected to the end of network segment, the module needs to decide whether it will be using terminating resistor. SW1.4 determines whether to use terminating resistor.

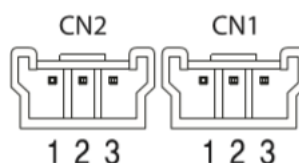
Use terminating resistor when SW1.4 is on

Don't use terminating resistor when SW1.4 is off

4 - 6 . RS-485 Communication Connector (CN1, CN2)

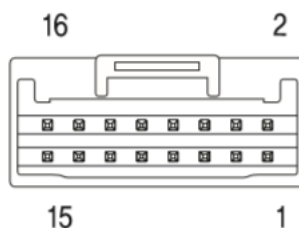
CN1 and CN2 are RS-485 communication connector

NO.	Function
1	Data+
2	Data-
3	GND

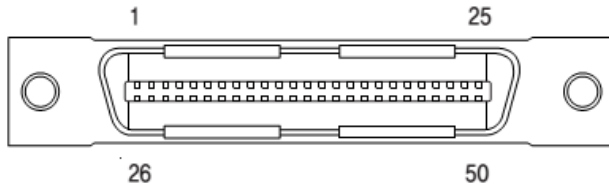


4 - 7 . I/O and Power Connector (CN3)

NO.	Function	I/O
1	24VDC	Input
2	GND	Input
3	F.GND	-----
4	BRAKE	출력
5	LIMIT+	Input
6	LIMIT-	Input
7	ORIGIN	Input
8	Digital In1	Input
9	Digital In2	Input
10	Digital In3	Input
11	Digital In4	Input
12	Digital In5	Input
13	Compare Out	Output
14	Digital Out1	Output
15	Digital Out2	Output
16	Digital Out3	Output



4 - 8 . Servo drive connection connector(CN4)



The pin map of the connector (CN4) connected to the servo driver differs depending on the servo driver used and the pin map is as follows. (Since it is plug-in to the servo driver to be used, it is necessary to confirm the servo drive and I / O mapping.)

Mitsubishi	YASKAWA	SANYO	PANASONIC	Function	Remark
MR-J4,J4	Sigma2,3,5	Q-series	Minas-A,A3,A4,A5		
10	7	26	3	CW+	
11	8	27	4	CW-	
35	11	28	5	CCW+	
36	12	29	6	CCW-	
4	33	3	21	A+	
5	34	4	22	A-	
6	35	5	48	B+	
7	36	6	49	B-	
8	19	7	23	Z+	
9	20	8	24	Z-	
48	31	43	37	SV_ALM	
24	25	39	39	SV_INP	
15	40	37	29	SV_SON	
19	44	36	31	SV_RST	
43	42		8	LSP	24V GND connect
44	43		9	LSN	24V GND connect
42				EMG	24V GND connect
34,28	1	12,23,47,48	13,25	S-GND	
20,21	47	49,50	7	DIO 24V	
46,47	26,28,32	24,25	10,36,38,15	DIO GND	
23	27	46	11	BRAKE	

- If brake output of servo drive does not match the connector number above, **please change brake output so it matches the connector number above.**
- Ezi-MOTIONLINK Plus-R RSS/PAN is connected to both **general/high** speed pulse input terminals as shown in the table above.
Therefore, set the parameters for the type of position command pulse in the servo

drive before use.

For details on setting, refer to the servo drive manual.

For PAN (PANASONIC), only the product version V6.03.x4.xx or higher is connected to the general/high-speed pulse input terminal (in version V6.03.x4.xx, x4 is the hardware version)

5 . Control I/O signal

5 - 1 . Signal cabling

All control I/O signals use connector CN3 as specified below.

1) **Input** : "Limit +", "Limit-", "Origin" signals are fixed to each unique number.

For other signals such as Reset, select IN1~IN5 number and use it.

CN1 No	Signal Name	Function
5	LIMIT+	Positive Limit sensor signal
6	LIMIT-	Negative Limit sensor signal
7	ORIGIN	Origin sensor signal
8	IN1	Clear Pos Position Table A0 ~ Position Table A7 (PT A0~PT A7)
9	IN2	Position Table start execution (PT Start) Soft Stop(Stop)
10	IN3	Jog+, Jog- Alarm Reset, Servo ON
11	IN4	Pause, Origin Search, Teaching Emergency Stop(E-Stop)
12	IN5	Jump Position Table input 0 ~ Jump Position Table input 2 (JPT IN 0~ JPT IN 2) Jump Position Table start (JPT Start) User input 0 ~ User input 4 (User IN 0 ~ User IN 4)

2) **Output** : "COMP" signal is fixed to a unique number.

For other signals such as Inposition, select OUT1~OUT3 and use it.

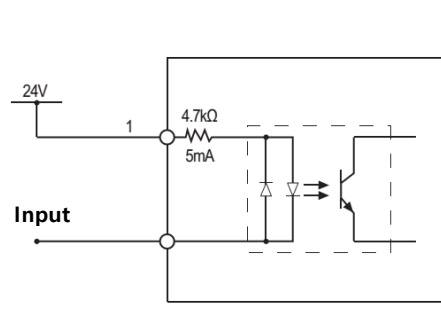
CN1 No	Signal Name	Function
13	COMP	Dedicated output signal(Compare out)
14	OUT1	InPosition, Alarm, Moving Acc/Dec
15	OUT2	ACK, END OriginSearchOK Position Table output 0 ~ Position Table output 2 (PT OUT 0 ~ PT OUT 2)
16	OUT3	User Output 0 ~ User Output 2

5 - 2 . Connection Circuit

All drive I/O signals are insulated by a photocoupler. The signals display the internal photo coupler status - [ON: Conduction] and [OFF: Non- Conduction], not the signal voltage level.

1) Input Circuit

Input circuit power of $DC24V \pm 10\%$ (consumed current: about 5mA/circuit) should be separately prepared.

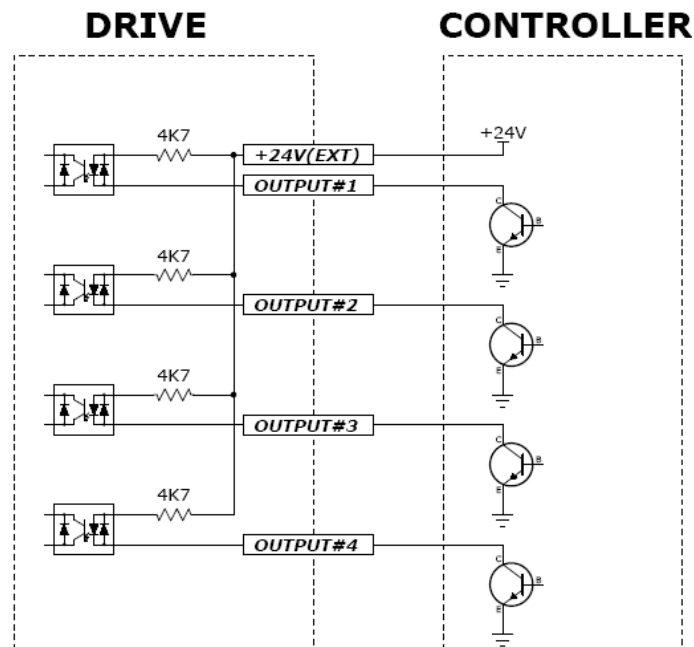


Input : CN3 - 5, 6, 7, 8, 9, 10, 11, 12

CN4 - Alarm signal, In-position signal

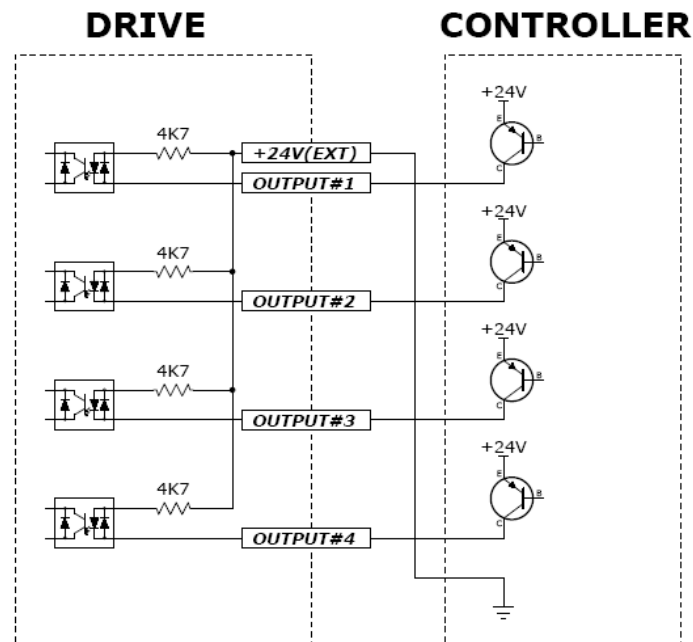
● Connect NPN type Input signal

Connect the '+24V external' pin of drive to '+24V' of Controller.



● Connect PNP type Input signal

Connect the '+24V external' pin of drive to 'GND' of Controller.

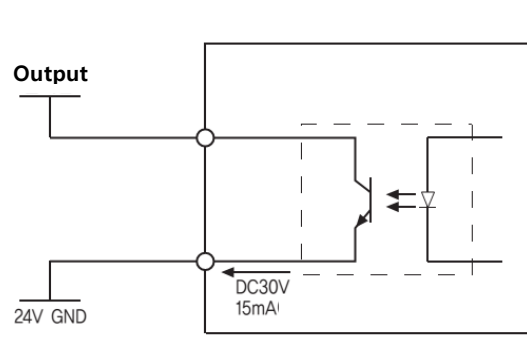


2) Output Circuit

Output circuit power should be separately prepared. This may share input circuit power. In this case, working power capacity should add output power capacity to input power capacity.

Applied voltage and power capacity in the control output port are as follows.

- Applied voltage $\leq 30V$
- Electrified current $\leq 15mA$



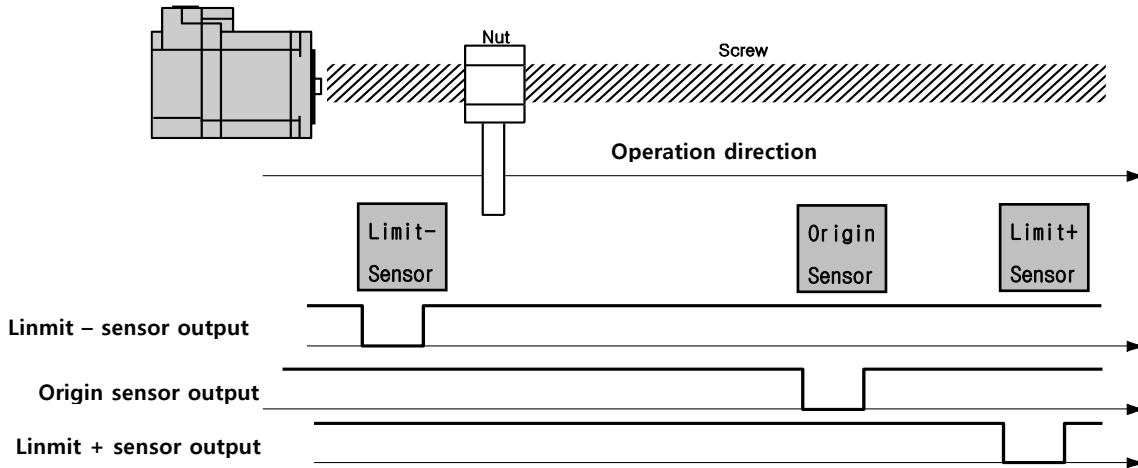
Output : CN3 – 13, 14, 15, 16

CN4 – Servo On signal, Alarm reset signal

5 - 3 . Input signal

1) Limit sensor and Origin sensor

Limit sensor and origin sensor are assigned to LIMIT+, LIMIT- , and ORIGIN pin in the CN3 connector respectively. LIMIT+ and LIMIT- sensors are used to limit the motion of each axis to prevent mechanical collision. Origin sensor is to set the origin of equipment



2) Clear Pos

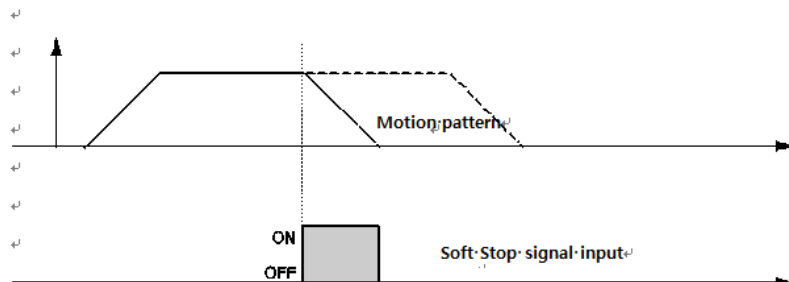
This input signal sets the command position and the actual position to 0 in relation to motion position control. The reset signal pulse scale is 10ms or more.



Position value is to be "0" from the rising/falling edge of this signal

3) Stop input

(Soft)Stop input signal is to stop motion patterns under operation. The deceleration condition until they stop complies with the deceleration time value and the start speed value set previously. The stop signal is active in ON level and pulse scale is 10ms or more.

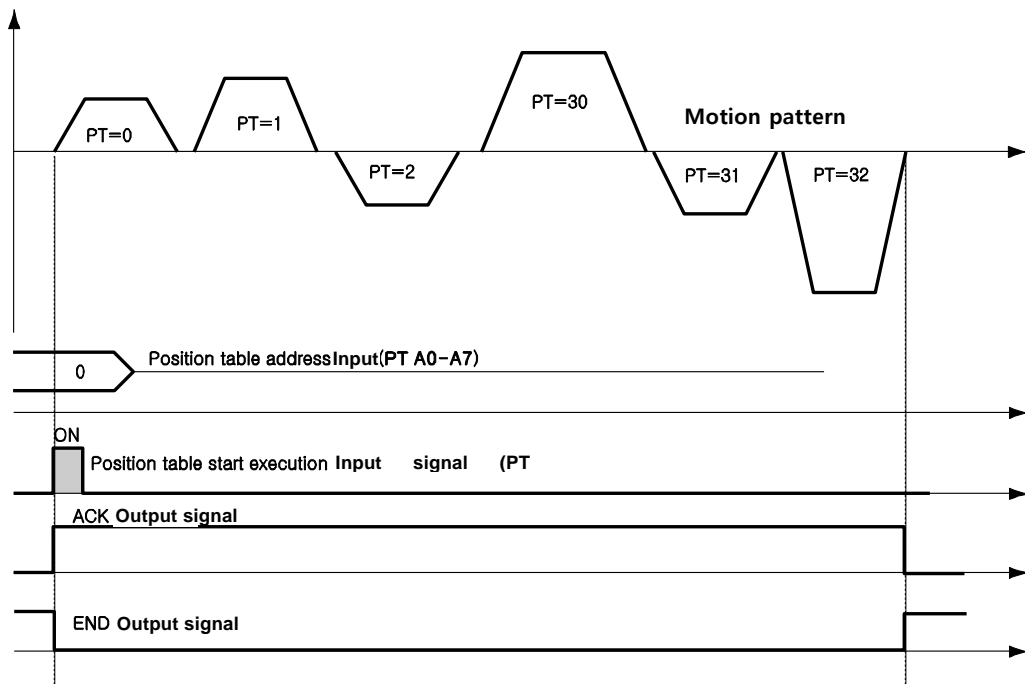


4) Position Table start (PT Start) Input

If set and input the running start number at the same time by using PT A0~A7 signals, the motion pattern corresponds to the PT No. will be executed.

Following example shows that total 6 motion patterns are in order to execute from No.0 to No.32 and then stopped.

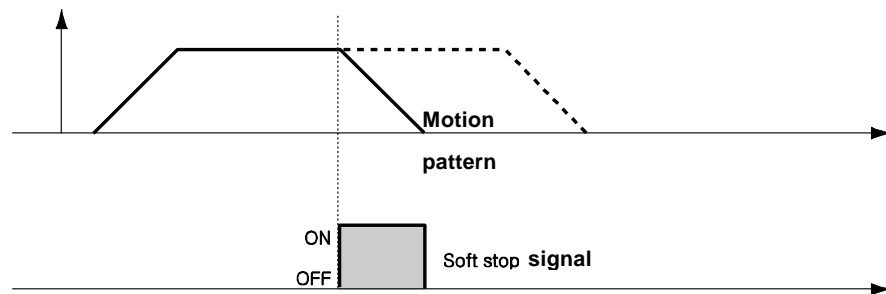
- 1) All of PT A0~A7 is set to '0' and PT number is set to '0'.
- 2) Set PT Start signal to [ON], and PT No.0 motion pattern will be executed.
- 3) When the motion pattern is started by PT, ACK signal and END signal are displayed to [ON] at CN1 output port as illustrated below. The signal is kept until one motion pattern loop is stopped. After all motions are stopped, the output signal level is set to [OFF].
- 4) PT Start signal is **edge trigger** type and pulse scale is 10ms or more.



- *1. Order of signal : 'PT A0~A7' signals must be set over 50[msec] before 'PT Start' signal to be [ON].
- *2. Save signal cabling : If it starts 'PT Start' without designating 'PT A0~A7' signals, Start PT number set to be '0'.
- *3. In case of using 'PT Start' command sequentially, Before executing the next 'PT Start' command check motion status('Moving' signal and 'Inpositon' signal).

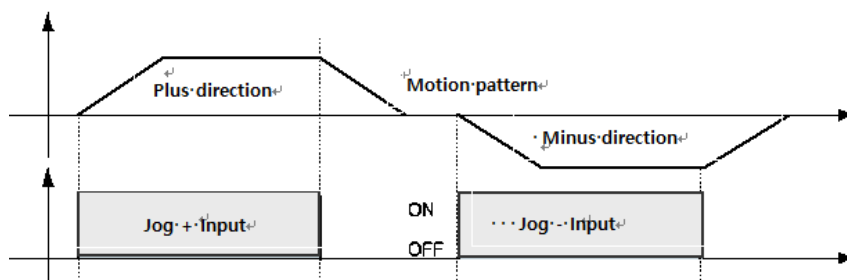
5) Stop Input

Stop(Soft) input signal is to stop motion patterns under operation. The deceleration condition until stop follows deceleration time value and start speed value which is set existing. Stop signal is recognized as ON status level, pulse width must be over 10ms.



6) Jog+ and Jog- Input

When Jog+ or Jog- signal is ON, the motor rotates CW or CCW until it reaches the hardware limit or the software limit. Jog motion pattern is subject to jog related parameters (No.7: start speed, No.6: speed, No.8: Acc Dec time).



7) Servo ON and Alarm Reset Input

When the protective function of drive executes, alarm output is released. When 「AlarmReset」 input is set to ON, alarm output and alarm blink output are released. Before releasing alarm output, the user must remove any cause of alarm operating.



Caution

If the 'Servo ON' signal is assigned to input pin, ServoON command from GUI or DLL library will not executed.

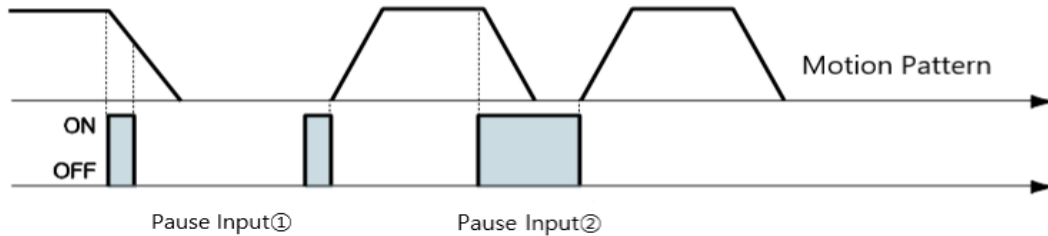
- *1. After 'ServoON' signal is assigned to input signal, it is impossible to use 'SERVO ON' button in User Program(GUI). DLL program's 'FAS_ServoEnable' command also does not work.
- *2. After 'Servo ON' is executed, the 'Command Position' value will be changed as same as 'Actual Position' value.

8) Pause Input

When 「Pause」 signal is set to ON, the motion in service stops. Pause signal works in 2 ways.

- ① Pause signal is [ON] and deceleration starts. Before motor completely stops, pause signal turns [OFF]. To start the motion again, pause signal should be turned [ON].
- ② Pause signal is [ON] and deceleration starts. Even after motor completely stops, pause signal is still [ON]. To start the motion again, pause signal should be turned [OFF].

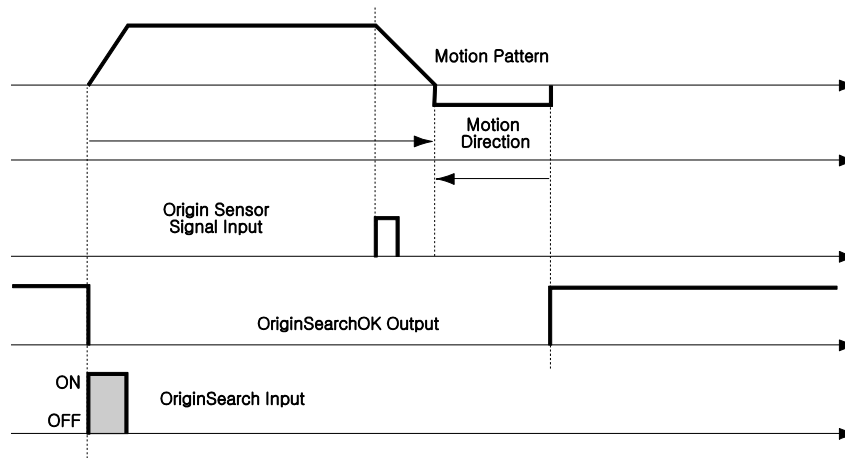
The pulse width of the pause signal is 10ms or more.



*1. It is not applied while 'Repeat Test' of GUI is operating.

9) Origin Search Input

When 「Origin Search」 signal is set to [ON] (10ms or more), it starts to search the origin position according to selected conditions. The conditions are subject to parameters such as No.17:Org Method, No.14:Org Speed, No.15:Org Search Speed, No.16:Org AccDec Time, No.28:Org Dir. (For more information, refer to '[10 Parameter](#)').

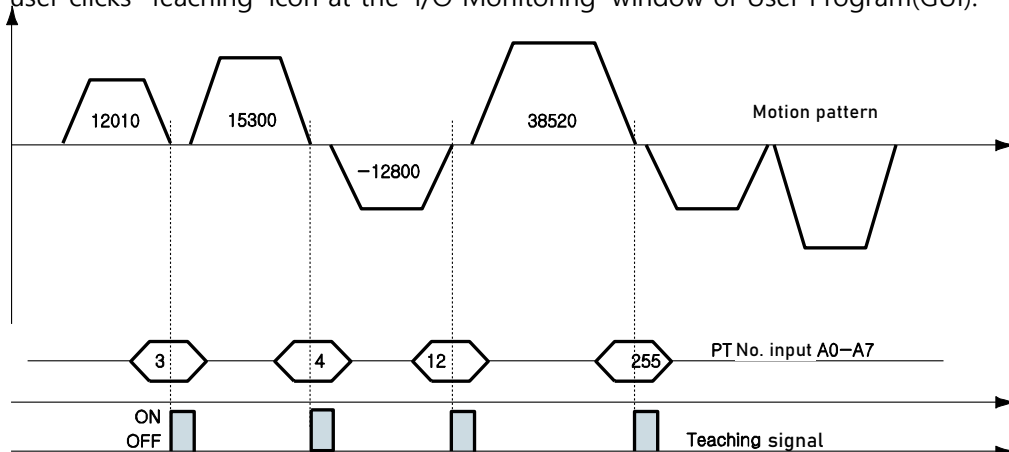


10) Teaching Input

「Teaching」 signal functions that the position value [pulse] being working can be automatically inputted into a 「position」 value of a specific position table. This is a function to easily measure and specify the position when it is difficult to mechanically obtain the exact actual moving position (position value) of a specific motion.

- 1) By using User Program(GUI), set a 'Command' type of corresponding PT number among '**absolute position value moving command(Absolute Move)**'.
- 2) By using input signal (PT A0~A7), select corresponding PT number.
- 3) When Teaching signal is set to [ON], the position value [pulse] is saved to the position value of corresponding PT. At this time, it becomes the absolute position value.
- 4) Pulse width of Teaching signal is over 10ms.

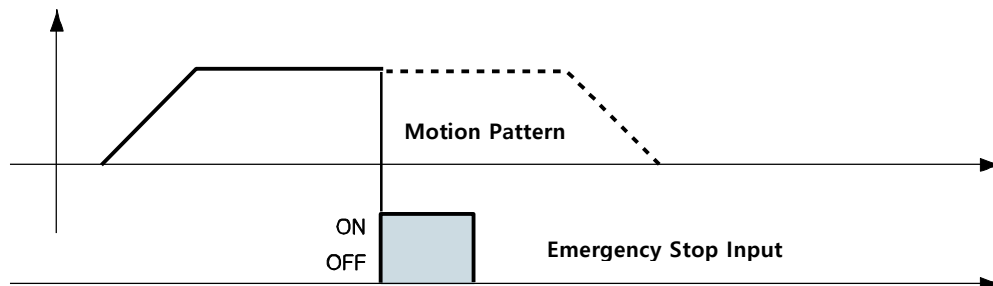
- *1. After executing Teaching, click 'Refresh' icon on Teaching Dialog window to display written position value on position table.
- *2. Click 'Save to ROM' icon to save written position value in the ROM area.
- *3. Teaching signal can be used by two methods; the user assigns actual signal to the motor, or the user clicks 'Teaching' icon at the 'I/O Monitoring' window of User Program(GUI).



PT No.	Position Value of Corresponding PT [pulse]
3	12010
4	15300
12	-12800
255	38520

11) E-Stop Input

When 「Emergency stop」 signal is [ON], motion in service stops immediately without deceleration. E-Stop signal is recognized as [ON] level, and pulse width should be 10ms or more.

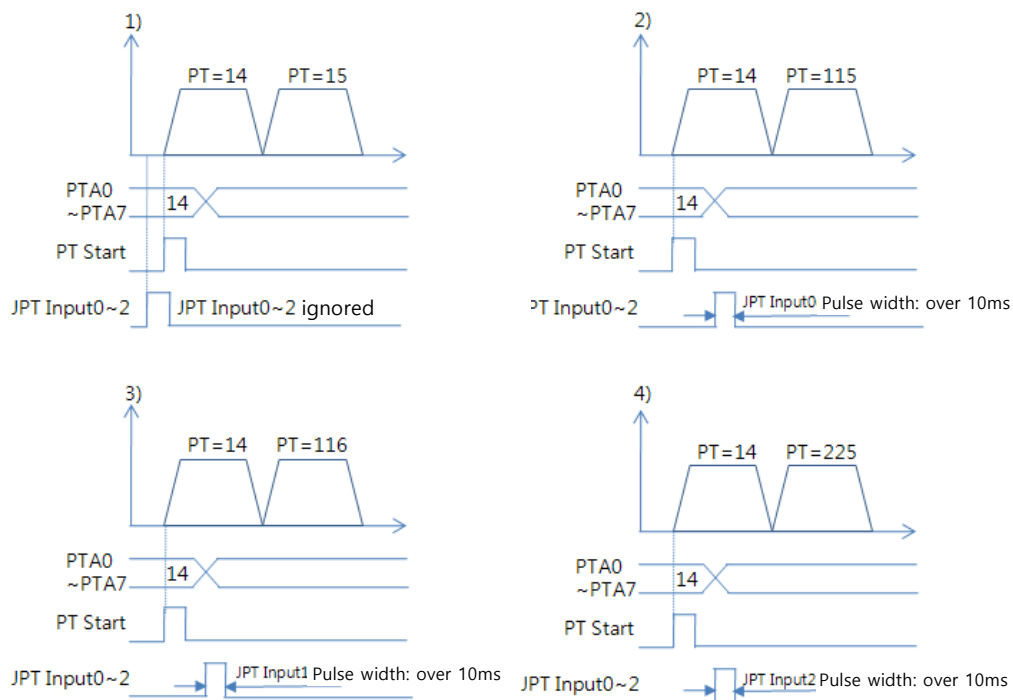


12) JPT Input0~Input2 (Jump Position Table Input) Input

This function selects the motion pattern (position table number) to be executed next according to the condition of the input signal.

【Example】 If there is no other input signal when PT 14 motion is running, the next motion PT15 like 1) will be executed. However, if the input signal of 「JPT Input 0 to Input 2」 becomes [ON] while PT No. 14 is in operation, the designated position numbers are executed as shown in 2) to 4).

PT 14 Data					
PT No.	...	JP Table No.	JPT 0	JPT 1	JPT 2
14	...	15	115	116	225



13) JPT(Jump Position Table) Start Input

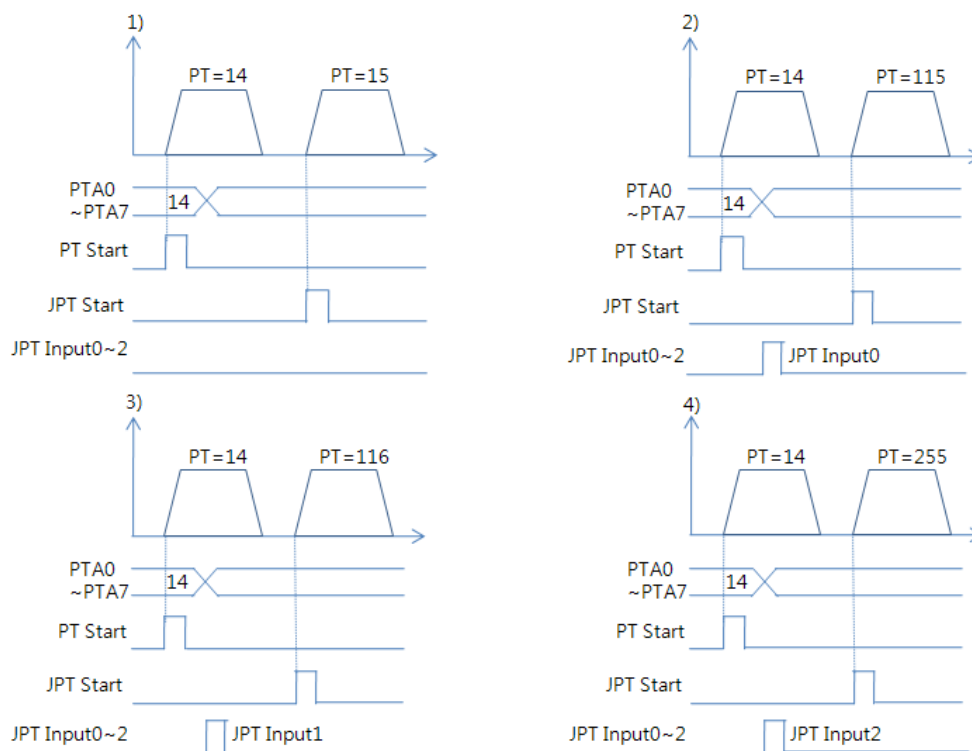
To select motion pattern (position table number) to be subsequently executed according to input signal conditions. The difference from Paragraph 12), 「JPT Input0~Input2 Input」, is:

- 1) PT number to be jumped must be composed to 10XXX;
- 2) Next motion is not executed until 'JPT Start' is set to [ON]. If 'Wait Time' value of PT data is more than '0', the time lapses additionally and then next motion is executed.

【Example】

PT 14 Data

PT No.	...	Wait Time	JP Table No	JPT 0	JPT 1	JPT 2
14	...	500	10015	10115	10116	10255



5 - 4 . Output signal

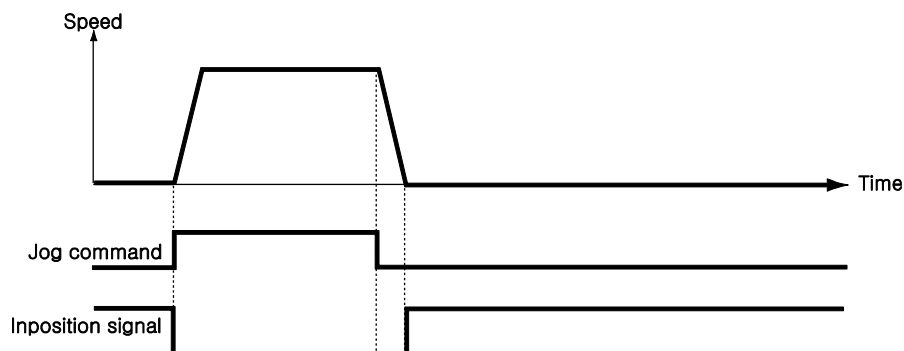
1) Compare Out/Trigger Pulse Output

The "Trigger Pulse Output" signal is [ON] when certain conditions are met and is fixed at 「COMP」 (Compare Out) pin of CN3 connector. This is used when synchronized motion control with the external controller is required.

(For details, refer to '7-3.Trigger Pulse Output')

2) In-position output

After the motor stop in target position exactly on Servo ON status, the signal becomes [ON]. The signal is generated by Inposition of connected servo drive.

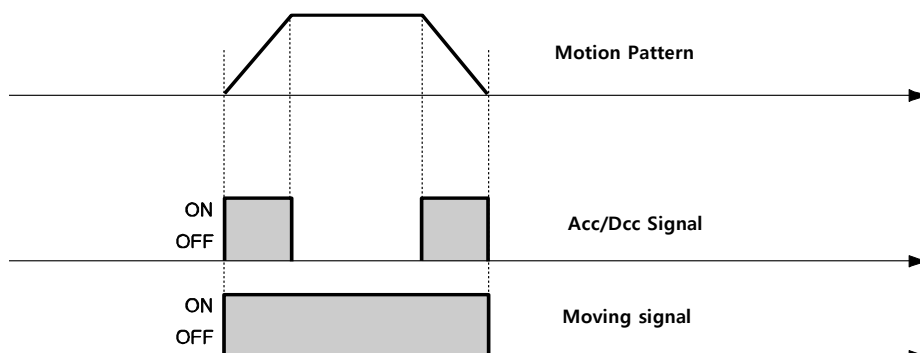


3) Alarm output

When the motor operates normally, alarm output becomes OFF. When the protective function operates, alarm output becomes ON. The upper controller being used by the user detects this alarm signal and then stops motor operation command. When the alarm of connected servo drive has occurred, alarm is outputted.

4) Moving and Acc/Dec output

As shown below, the position starts to move by motion command, and Moving signal becomes ON and Acc/Dec signal becomes ON in the acceleration and deceleration section only.



* Moving signal is not related to actual position. The signal becomes to [OFF] Just after the 'position command' is finished.

5) Org Search OK output

When the origin return motion is executed by origin search command, 'Origin Search OK' signal is set to OFF. When the origin return motion is normally finished by the origin sensor, 'Origin Search OK' is set to ON. Refer to [「5.3 Input Signal - 8\) Origin Search Input」](#).

6) PT(Position Table) Output 0~2 Output

It is control output used for 「Start/Stop Message Function」. When these items are set, this signal enables the user to check if corresponding PT motion starts or stops through control output signal(PT Output 0~2). If 「Start/Stop Message Function」 is not used, "PT Set" item of position table should be set to 0~8. At the position set with other values, the motion operates as follows.

- In case that PT Set items are set to '1~7', if the position starts to move, 'PT set' setting value is outputted as 「PT Output 0~PT Output 2」, the value of PT Output Hex is outputted.
- In case that PT Set items are set to '9~15', after completed the position movement, 'PT set' setting value is outputted as 「PT Output 0~PT Output 2」, the value of PT Output Hex is outputted.

For more information, refer to [「Ezi-MOTIONLINK Plus-R User Manual - Position Table Function」](#).

6) BRAKE output

The BRAKE output of CN3 is an extension of the BRAKE control signal of the connected servo drive.

6 . Operation

6 - 1 . Servo ON operation

After power is supplied, set the drive module to Servo ON as follows.

- ① Click 'Servo ON' button at the User Program (GUI).
- ② Give the drive a command through DLL library.
- ③ Assign 'Servo ON' to control input pin, and supply the drive with signal through the pin.



Caution

If the 'Servo ON' signal is assigned to input pin, Servo ON command from GUI or DLL library will not executed.

6 - 2 . Operation mode

Control operation is possible in 3 modes: communication command (DLL program), user GUI program and I/O command.

(1) I/O Command Mode

This drive can perform control operation such as positioning by I/O command from host controller. It is also executed by starting the position table with commands by the I/O signal.

(2) Communication Command Mode

This drive can perform control operation such as positioning by communication command from host controller. Also, start the machine using the position table during the communication command.

Position Table Operation Sequence

It is can executed continuous operation by position table at the I/O command mode.

- ① By using PT A0 ~ PT A7 input signal or DLL program, set PT number to be operated.
- ② In case of Servo OFF, set the drive to Servo ON by communication program or Servo ON control input.
- ③ Start to operate by rising edge of PT Start input signal or communication program.

Stopping Continuous Operation of Position Table

When the motor is executing continuous operation of position table with Ezi-SERVOII Plus-E, it can stop executing position table by following methods.

- ① To use DLL program or control input signal corresponding to 「Stop」 and 「E-Stop」. In this case, operation is completely finished and is not connected to next operation.
- ② The user can click 「Pause」 at User Program(GUI) to temporarily stop operating. In this case, click 「Pause」 again, and remaining operation will be executed again.

Position control Operation

To operate the motor by parameters set by User Program(GUI) or DLL program. (This is not connected with PT operation.)

Once position control operation is started, PT operation command is overridden. Likewise, while PT operation is executing, position control operation command is overridden.

The followings show parameters applied to position control operation. All position table item values are overridden.

Parameter Name	Setting Content	Range
Axis Max Speed	Operation speed after acceleration is finished	1~2,500,000[pps]
Axis Start Speed	Operation start speed before acceleration starts	1~35,000[pps]
Axis Acc Time	Required time until the motor reaches the axis max speed from stop status	1~9,999[ms]
Axis Dec Time	Required time until the motor reaches from the axis max speed to the stop status	1~9,999[ms]
Motion Dir	To select motion direction (CW or CCW)	0~1

Teaching Function

Teaching can be executed by User Program(GUI) and control input signal.

For more information, refer to [「User manual – Position Table Function」](#).

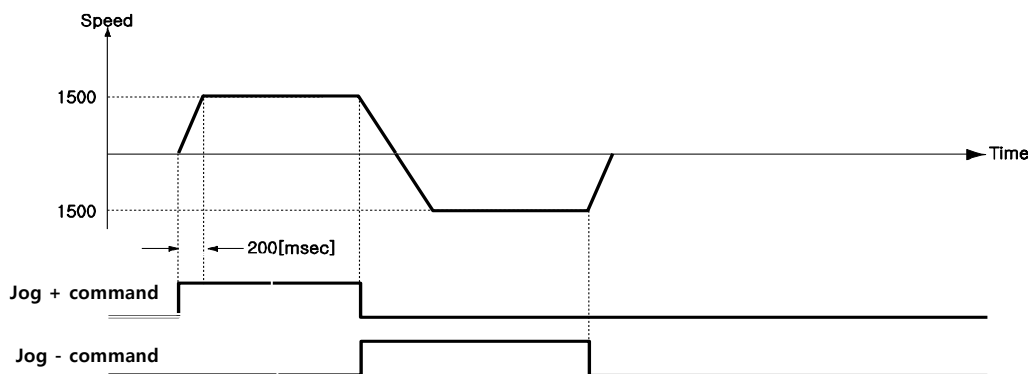
7 . Other Operation Functions

7 - 1 . Jog Operation example

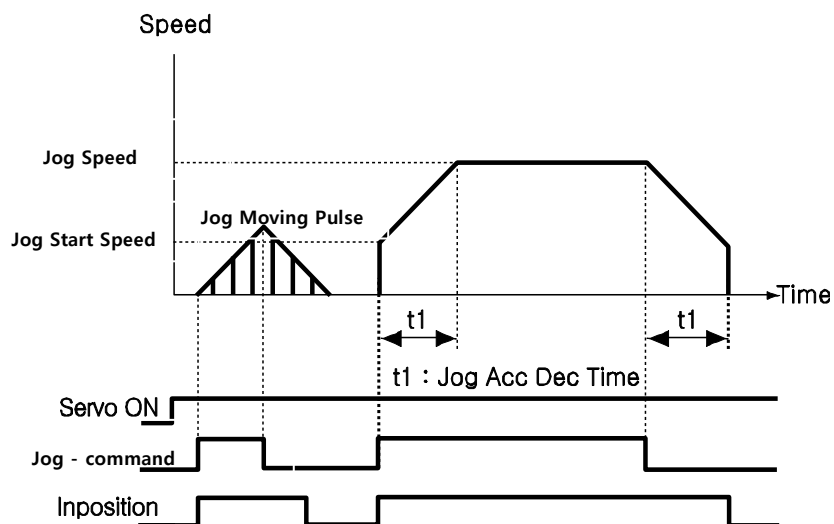
The machine executes speed control operation at the speed set by parameters according to inputting 'Jog+' and 'Jog-' signals.

【Parameter Setting】

No.	Parameter Name	Setting Value	Unit
6	Jog Speed	1500	[pps]
7	Jog Start Speed	100	[pps]
8	Jog Acc Dec Time	200	[msec]



Also, when any value except 0 is set to the 'Jog Start Speed' parameter, the relation between jog command and in-position is indicating as below diagram.



7 - 2 . Origin Return

If the machine is operated by I/O command mode, the motor can execute origin return by inputting 'Origin Search' signal. Also, the motor can execute origin return with User Program(GUI) and DLL program.

The following table shows parameter types related to origin return.

Parameter Name	Description	Range
Org Speed	Operation speed when origin return starts	1~2,500,000[pps]
Org Search Speed	Low-speed operation speed after origin sensor is sensed and operation start speed when origin starts.	1~2,500,000[pps]
Org Acc Dec Time	The time assigned to the acceleration/deceleration section when origin return starts and stops.	1~9,999[ms]
Org Method	To select how to return the origin (6 type)	0~5
Org Dir	To select operation direction(CW or CCW)	0~1
Org Offset	After origin return is finished, the motor moves additionally as this setting value and then stops.	-134,217,728 ~ 134,217,727
Org Position Set	After origin return is finished, 'Command Pos' value is set to this setting value.	-134,217,728~ 134,217,727
Org Sensor Logic	To set the origin sensor signal level.	0~1

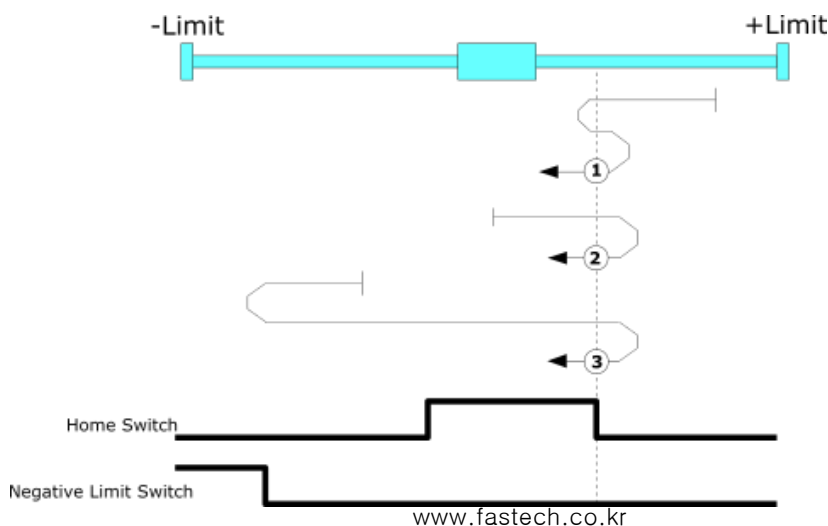
- The range of Org Offset and Org Position Set differs from the product version, listed as below.
V06.03.04x.xx : -134,217,728 ~134,217,727
V06.03.05x.xx : - 2,147,483,648 ~ 2,147,483,647

(1) Origin Return method setting

To execute origin return, 'Org Method' parameter should be set as follows.

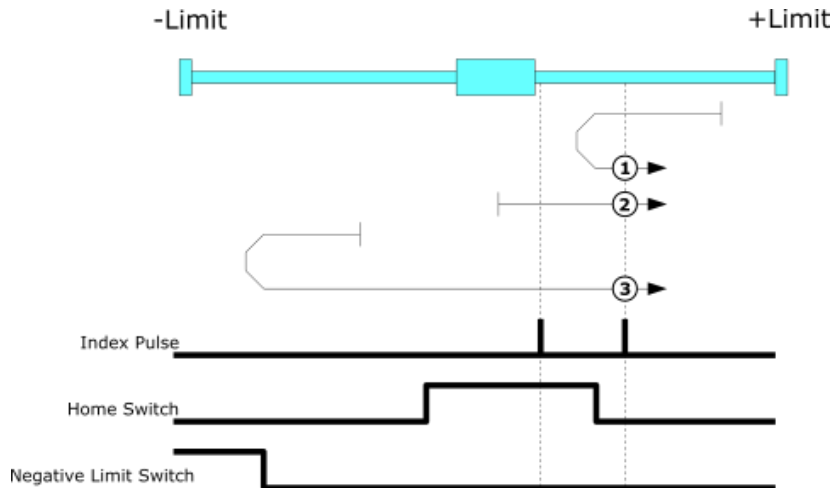
- Arrow mark is for moving direction in below picture.
- is origin end position in below pic.
(Numbers in ○ mark is indication the sensor Dog position or following example of origin direction.
- Index Pulse is Z Phase.

1) Origin (In case of Org Method = 0)



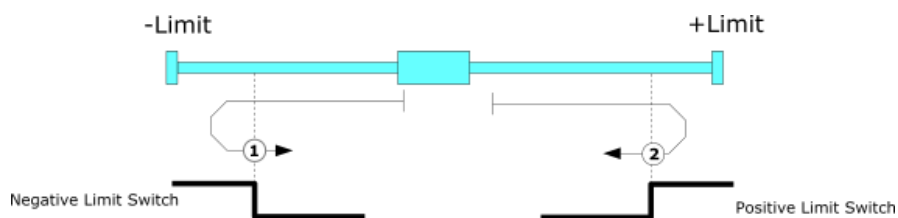
- ① : In case of position of sensor Dog is between the origin and +Limit Sensor
- ② : In case of position of sensor Dog is in the origin sensor
- ③ : In case of position of sensor Dog is between origin and -Limit Sensor

2) Z Origin (In case of Org Method = 1)



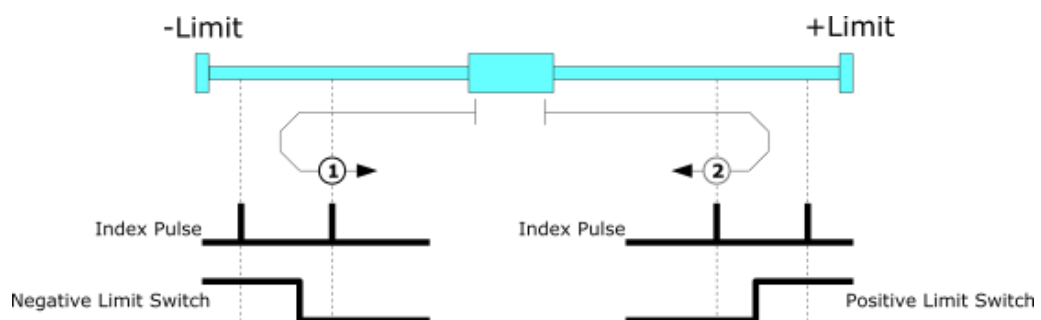
- ① : In case of position of sensor Dog is between the origin and +Limit Sensor
- ② : In case of position of sensor Dog is in the origin sensor
- ③ : In case of position of sensor Dog is between origin and -Limit Sensor

3) Limit Origin (In case of Org Method = 2)



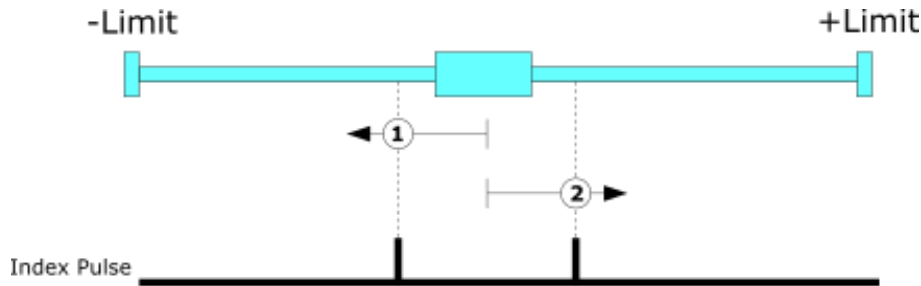
- ① : In case of Org Dir is 1 (CCW)
- ② : In case of Org Dir is 0 (CW)

4) Z Limit Origin (In case of Org Method = 3)



- ① : In case of Org Dir is 1 (CCW)
- ② : In case of Org Dir is 0 (CW)

5) Z Phase (In case of Org Method = 4)



- ① : In case of Org Dir is 1 (CCW)
- ② : In case of Org Dir is 0 (CW)

6) Set Origin (In case of Org Method = 5)

It designates current mechanics position as origin irrespective sensor.

(2) Origin return procedure

Origin return is executed according to the following procedure.

- ① Set parameters required to origin return.
- ② If the Servo is OFF, (reset an alarm when it occurs) input a control input Servo ON command or send a communication program so that the Servo can be ON.
- ③ Start origin return operation to the rising edge of control input origin search or the communication program.

(3) Stop of Origin return

It stops according to 'Stop' or 'E-Stop' command during home return operation. In this case, the machine zero point is not updated and the zero-point return is canceled.

(4) Origin return finish output

The completion of origin return operation can be decided with related bit values of either 'Origin Search OK' of control output or 'Axis Status' of communication program.

7 - 3 . Trigger Pulse Output

This function is used when the output signal becomes ON periodically in specific condition.

(1) Control Method

This function is working with RS-485 communication (DLL library) method only.

This command can be executed during the positioning command or before the positioning command also. The following table shows the setting conditions and refers to

「User Manual – Communication Function」.

Setting Item	Description	Range
Start/Stop Command	Setting start/stop of pulse output.	0~1
Pulse Start Position	Setting the start position of first pulse output.	-134,217,727 ~ 134,217,727
Pulse Period	Setting the pulse period. (0 : pulse output only 1 time in Pulse start position. 1~ : pulse output repeatedly depends on setting.)	0~134,217,727 [pulse]
Pulse Width	Setting the pulse width.	1~1000[ms]

- Pulse Start Position and Pulse Period differ from the product version, listed as below.
V06.03.04x.xx : -134,217,728 ~ 134,217,727(Pulse Start Position), 0 ~ 134,217,727(Pulse Period)
V06.03.05x.xx : -2,147,483,648 ~ 2,147,483,647(Pulse Start Position), 0 ~ 2,147,483,647(Pulse Period)

- Trigger output can be output normally when the pulse period is 2[ms] or more(include pulse width).

Pulse period[ms] =

Pulse period[pulse] / moving velocity[pps]*1000(unit converter constant [s]->[ms]) + Pulse width[ms]

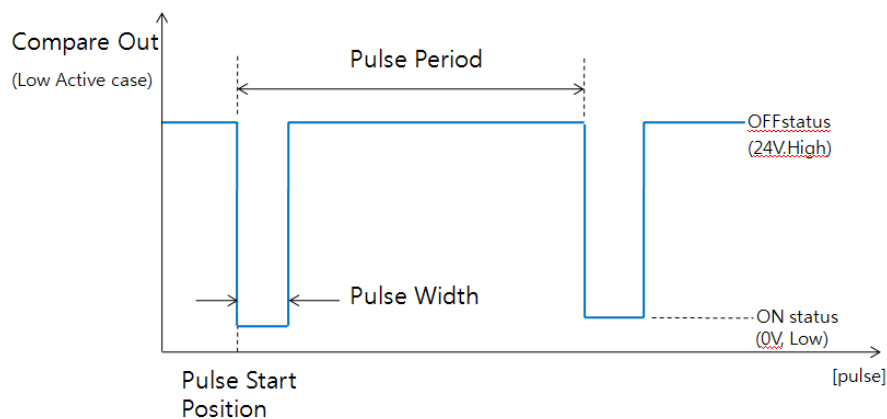
ex) Pulse period : 100[pulse], Moving velocity: 10,000[pps], Pulse width : 1[ms]

$$\begin{aligned}\text{Pulse period[ms]} &= 100/10000 * 1000 + 1 \\ &= 11\end{aligned}$$

- In case that Start/End is not set as '0', if moving command having target position be transferred, trigger output is operated.
- After trigger output, if command having no target position as like Jog command, Start/End set as '0' automatically.

(2) Output signal

This output pin of CN3 connector for Trigger Pulse is fixed to 「Compare Out」 and the signal diagram is as follows.





The pulse is output only in bigger position area than 'pulse starts position 'and is output in both motion directions.

(3) Output Status Check

By using DLL program, the user can check the trigger pulse output status.


Refer to [「User Manual – Communication Function」](#).

7 - 4 . Stop Operation

By using two methods of control input and communication program command, the user can input stop and emergency stop commands. Even though the emergency stop command is inputted, the Servo will be not OFF. In case emergency stop, the machine stops immediately without deceleration. So, a special caution for mechanical impact is required.

8 . Communication function

Up to 16 axes can be controlled by Daisy Chain using RS-485 communication.

 Caution	<p>If Windows goes to the stand-by mode, serial communication is basically disconnected. So, after recovering from the stand-by mode, the user should connect communication again. This content is equally applied to the library provided with the product.</p>
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8 - 1 . Connection with the PC

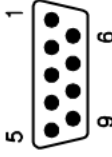
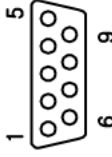
There is one method of connecting between the drive and the PC by RS-485(serial communication). PC's RS-232C port can be used. By using following communication converters according to each communication type, the user can connect the PC and the drive module.



For connection with the PC, refer to [「3-2 Controller Configuration」](#)


1) Cable of Connecting RS232 Port (to PC) and Converter (RS232 ↔ RS-485)

Normally Power does not need to be supplied to the converter module. But when the communication has problems without power, DC 5~24V external power can be connected. The signal is wired as follows.

PC Connector (DB-9 female)		Cable Connection	Converter Connector (DB-9 male)	
Pin Layot	Pin No		Pin No	Pin Layot
	1	1	
	2	.....	2
	3	.....	3
	4	.....	4
	5	.....	5
	6	.....	6
	7	.....	7
	9	.....	9
	Frame GND	Frame GND	

2) Cable of connecting RS-485 Converter and Drive Module

RJ45 Pin No.	UTP CAT5 cable	Function
1	White/Orange	GND
2	Orange	GND
3	White/Green	Data+
4	Blue	GND
5	White/Blue	GND
6	Green	Data-
7	White/Brown	GND
8	Brown	GND
case		Frame GND


 Caution	This connector's fixing pins are connected to Frame GND through PCB's mount hall. Please use STP CAT5E cable in this case.
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3) Cable of connecting RS-485 Converter and Ezi-MOTIONLINK Plus-R(CN1, CN2) : Ezi-MOTIONLINK Plus-R, Ezi-SERVO Plus-R MINI, Ezi-SERVO ALL

Signal Wiring : Standard Straight Wiring (1↔1, 2↔2, 3↔3)

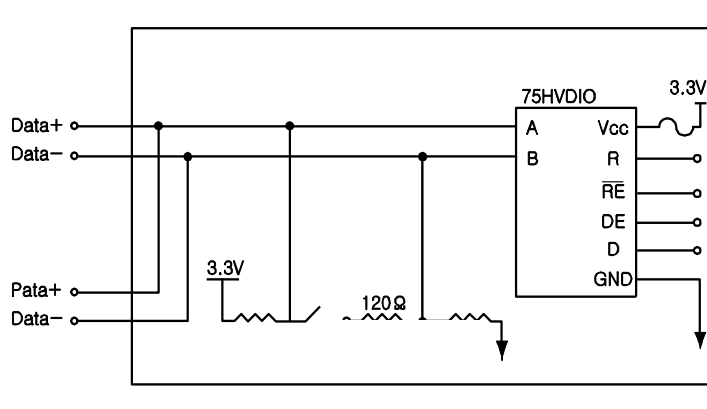
If multi-axis connection is required at one segment, up to 16 drive modules can be connected by the daisy-chain method. The pin signal content is as follows.

Pin No.	Function
1	Data+
2	Data-
3	GND

 Caution	The cable length of RS-485 Converter <-> Drive or Drive <-> Drive must be longer than 60cm.
--	--

 Caution	Signal cable 'Data+' and 'Data-' are differential type signals. These two signal cables must be twisted.
--	--

8 - 2 . Communication Interface Circuit



The above figure shows an I/O circuit of RS-485 communication interface signal. When communication is connected, Ezi-MOTIONLINK Plus-R maintains to receive stand-by status. For more information about communication function, refer to 「[User Manual – Communication Function](#)」 in a separate volume.

9 . Protective function

If an alarm occurs on servo drive, the motor will go into Servo OFF state and will stop automatically.

Also, Alarm LED(red) will be turned on.

1 0 . Parameter

1 0 - 1 . Parameter List

No.	Name	Unit	Lower Limit	Upper Limit	Default
0	Encoder Multiply		0	3	3
1	Axis Max Speed	[pps]	1	2,500,000	500,000
2	Axis Start Speed	[pps]	1	35,000	1
3	Axis Acc Time	[msec]	1	9,999	100
4	Axis Dec Time	[msec]	1	9,999	100
5	Speed Override	[%]	1	500	100
6	Jog Speed	[pps]	1	2,500,000	5,000
7	Jog Start Speed	[pps]	1	35,000	1
8	Jog Acc Dec Time	[msec]	1	9,999	100
9*1	S/W Limit Plus Value	[pulse]	-134,217,728	134,217,727	134,217,727
10*1	S/W Limit Minus Value	[pulse]	-134,217,728	134,217,727	-134,217,728
11	S/W Limit Stop Method		0	2	2
12	H/W Limit Stop Method		0	1	0
13	Limit Sensor Logic		0	1	0
14	Org Speed	[pps]	1	500,000	5,000
15	Org Search Speed	[pps]	1	50,000	1,000
16	Org Acc Dec Time	[msec]	1	9,999	50
17	Org Method		0	7	0
18	Org Direction		0	1	1
19*1	Org OffSet	[pulse]	-134,217,728	134,217,727	0
20*1	Org Position Set	[pulse]	-134,217,728	134,217,727	0
21	Org Sensor Logic		0	1	0
22	Limit Sensor Direction		0	1	0
23	Pulse Type		0	1	1
24	Encoder Direction		0	1	0
25	Motion Direction		0	1	0
26	Servo Alarmreset Logic		0	1	0
27	Servo On Output Logic		0	1	0
28	Servo Alarm Logic		0	1	1
29	Servo Inposition Logic		0	1	0
30*2	Servo Alarmreset On Time	msec	10	1000	10
31*2	Use Motion Queue		0	1	0
32*2	Motion Profile		0	1	0
33*2	Origin Search OK Flag Off		0	3	0

*1 The parameter range differs from the product version, listed as below.

V06.03.04x.xx : -134,217,728 ~134,217,727

V06.03.05x.xx : - 2,147,483,648 ~ 2,147,483,647

*2 The parameter is available from the product version V06.03.0xx.28 and above.

1 0 - 2 . Parameter Description

No.	Description	Unit	Lower Limit	Upper Limit	Default										
0	Encoder Multiply: Set the multiplication of the encoder drive input of the servo drive. <table><tr><th>Value</th><th>Pulse/Revolution</th></tr><tr><td>0</td><td>Not used</td></tr><tr><td>1</td><td>*1</td></tr><tr><td>2</td><td>*2</td></tr><tr><td>3</td><td>*4</td></tr></table>	Value	Pulse/Revolution	0	Not used	1	*1	2	*2	3	*4		0	3	3
Value	Pulse/Revolution														
0	Not used														
1	*1														
2	*2														
3	*4														
1	Axis Max Speed : When position moving commands (absolute move, incremental move) are given, this mode sets the maximum speed which the motor can operate. So, the motor cannot be operated faster than this value in any case. This value is set to [pps] unit.	pps	1	2,500,000	500,000										
2	Axis Start Speed : When position moving commands (absolute move, incremental move) are given, this mode sets the operation start speed to [pps] unit.	pps	1	2,500,000	1										
3	Axis Acc Time : When position moving commands (absolute move, incremental move) are given, this mode sets the acceleration section of operation start segment to [msec] unit.	msec	1	9,999	100										
4	Axis Dec Time : When position moving commands (absolute move, incremental move) are given, this mode sets the deceleration section of operation stop segment to [msec] unit.	msec	1	9,999	100										
5	Speed Override : When position moving commands (absolute move, incremental move) are given, the operation speed is subject to the ratio set to 'Move Speed'. (Ex) If current move speed is 10,000 and speed override is 200, actual motion speed is set to 20,000.	%	1	500	100										
6	Jog Speed : When jog position moving command is given, this mode sets the motor revolution value to [pps] unit.	pps	1	2,500,000	5,000										

7	Jog Start Speed : When jog position moving command is given, this mode sets the operation start speed to [pps] unit.	pps	1	2,500,000	1
8	Jog Acc Dec Time : In case of jog operation, this mode sets the time of acceleration and deceleration sections to [msec] unit.	msec	1	9,999	100
9	S/W Limit Plus Value : When position moving commands (absolute move, incremental move, Jog) are given, this mode set the maximum input limit value that the motor can move to the plus (+) direction with 28 bits. In case of Limit Origin command, it realizes as Origin when reaching this value. If this value is set to '0', S/W Limit function is cleared.	pulse	-134,217,728	+134,217,727	+134,217,727
10	S/W Limit Minus Value : When position moving commands (absolute move, incremental move, jog) are given, this mode set the minimum input limit that the motor can move to the minus (-) direction with 28 bits. In case of Limit Origin command, it realizes as Origin when reaching this value. If this value is set to '0', S/W Limit function is cleared.	pulse	-134,217,728	+134,217,727	-134,217,728
11	S/W Limit Stop Method : Sets how to stop the motor by SW Limit Plus/Minus Value', not stop motion by the limit sensor. ◆ 0 : stops the motor immediately by emergency stop mode. ◆ 1 : stops the motor gradually by soft stop mode.		0	1	1
12	H/W Limit Stop Method : In case of stop motion by the limit sensor, this mode sets how to stop the motor. ◆ 0 : stops the motor immediately by emergency stop mode. ◆ 1 : stops the motor gradually by soft stop mode.		0	1	1
13	Limit Sensor Logic : Sets the signal level so that the motor can recognize limit sensor's input to ON. ◆ 0 : 0 V (Active low level) ◆ 1 : 24V(Active high level)		0	1	0
14	Org Speed : In case of origin return command, this mode sets the operation speed until the motor senses the origin sensor to [pps] unit.	pps	1	2,500,000	5,000
15	Org Search Speed : In case of origin return command, the low operation speed for precise origin return after the motor senses the origin sensor is set to [pps] unit by this mode.	pps	1	2,500,000	1,000

16	Org Acc Dec Time : In case of origin return command, the acceleration/deceleration section time of the operation start/stop segment is set to [msec] unit by this mode.	msec	1	9,999	50
17	Org Method : The user can select origin return command types. ◆ 0 : The motor moves up to the origin sensor spot by 'Org Speed' and then executes precise origin return at the low speed of 'Org Search Speed'. ◆ 1 : The motor moves up to the origin sensor spot by 'Org Speed' and then executes Z-pulse origin return in the opposite direction of origin sensor as the low speed of 'Org Search Speed'. ◆ 2 : The motor moves up to the limit sensor sensing spot by 'Org Speed' and then moves to the opposite direction which was sensed limit sensor as the low speed of 'Org Search Speed'. When the limit sensor is OFF, the origin return is completed. ◆ 3 : The motor moves up to the limit sensor sensing spot by 'Org Speed' and then moves to the opposite direction which was sensed limit sensor as the low speed of 'Org Search Speed'. And executes Z-pulse origin return. ◆ 4 : It executes Z-pulse origin return to Org Dir direction by the low speed of 'Org Search Speed' value. ◆ 5 : To set origin in current position. For more information, refer to ' 7-2 Origin Return '. ※ In the case of origin return by a Z-pulse, after the completion of low speed origin return in 'Org Search Speed' value, Z-pulse origin return (fixed rate) is done twice to complete the return to origin with 10[pps] speed. (Fixed speed) (It is method for precise return to Z-pulse origin.)		0	5	0
18	Org Dir : In case of origin return, this mode sets the revolution direction of the motor. ◆ 0 : moves the motor CW. ◆ 1 : moves the motor CCW.		0	1	0
19	Org Offset : After origin return is completed, the motor moves additionally as this setting value and then stops. 'Command Pos/Actual Pos' is set to '0'.	pulse	-134,217,727 (-2,147,483,648)	+134,217,727 (2,147,483,647)	0
20	Org Position Set : After origin return is completed, 'Command Pos/Actual Pos' value is set to this setting value.	pulse	-134,217,727 (-2,147,483,648)	+134,217,727 (2,147,483,647)	0
21	Org Sensor Logic : To set the origin sensor signal level so that the motor can recognize the origin sensor's input to ON. ◆ 0 : 0 V (low level)		0	1	0

	◆ 1 : 24V (high level)				
22	Limit Sensor Dir : Sets the limit sensor direction to stop the motor to the limit spot under operation. In nomal system, set same as parameter '28'. ◆ 0 : When operation direction is 'CW', input the sensor signal to the Limit+ direction, and the motor will stop. ◆ 1 : When operation direction is 'CW', input the sensor signal to the Limit- direction, and the motor will stop.		0	1	0
23	Pulse Type: Set output pulse type. ◆ 0 : 1 Pulse type (Pulse / Direction) ◆ 1 : 2 Pulse type (CW / CCW)		0	1	1
24	Encoder Direction: Set the count direction of the encoder. ◆ 0: CW (count increase when CW direction operating) ◆ 1: CCW (count increase when CCW direction operating)		0	1	0
25	Motion Dir : When the motor operates by position command, this mode sets the revolution direction of the motor. ◆ 0 : moves the motor CW. ◆ 1 : moves the motor CCW.		0	1	0
26	Servo Alarmreset Logic : Set the Alarm reset output level. Output time (10 [ms]) ◆ 0: 0V (low level, high -> low -> conversion for high) ◆ 1: 24V (high level, low-> high -> conversion for low)		0	1	0
27	Servo On Output Logic : Set the Servo On output level. ◆ 0: 0V (low level) ◆ 1: 24V (high level)		0	1	1
28	Servo Alarm Logic: Set the alarm input level. ◆ 0: 0V (low level) ◆ 1: 24V (high level)		0	1	1
29	Servo Inposition Logic: Set the Servo In-position input level ◆ 0 : 0V (low level) ◆ 1 : 24V (high level)		0	1	0
30	Servo Alarmreset On Time Set the time of Alarm Reset signal. ※ Set the time according to the servo drive currently in use.	msec	10	1,000	10

31	Use Motion Queue: If another move command is received before the move command is completed, the current move command is executed and the next move command is executed. ◆ 0 : Using Motion Queue function ◆ 1 : No using Motion Queue function (Return error (0x85) if another move is made during the move) ※ Move commands are only available for Incremental / Absolute commands. If more than one command is received, only one is executed and the other commands return an error.		0	1	0
32	Motion Profile: It is the parameter setting Motion acceleration/deceleration Profile. ◆ 0 : Trapezoid ◆ 1 : S-curve ※ If the acceleration time and deceleration time are different when it is set to S-curve, the deceleration time is set the same as the acceleration time.		0	1	0
33	Org Ret OK Flag Off Option Set the condition that the [Org Ret OK] flag of Axis Status becomes off. ◆ 0 : When Origin search is stopped while the [Org Ret OK] flag of Axis Status is On. ◆ 1 : Same as 0 ◆ 2 : When Drive Alarm (Axis Status Err Servo Alarm flag On) occurs (including No. 0) ◆ 3 : Drive Alarm (Axis Status Err Servo Alarm flag On) or Servo off command executed (including No. 0)		0	3	0

- The range of parameter 9, 10, 19, 20 differs from the product version, listed as below..
 V06.03.04x.xx : -134,217,728 ~134,217,727
 V06.03.05x.xx : - 2,147,483,648 ~ 2,147,483,647
- Parameter 30, 31, 32,33 are available from the product version V06.03.0xx.28 and above.

1 1 . Appendix

1 1 - 1 . Connector for cabling

Usage	ITEM	Specification	Maker
Power and I / O connection (CN3)	Housing	501646-1600	MOLEX
	Terminal	501648-1000 (AWG26~28)	MOLEX
RS-485 (CN1, CN2)	Housing	35507-0300	MOLEX
	Terminal	50212-8100 (AWG26~28)	MOLEX

1 1 - 2 . Option : RS-485 Communication

■ RS485 Converter : Common

Available to communicate between the PC and the drive. One module per multi-drop link is required.


Type	Item	Max comm. Speed [bps]	External Power
RS-485	FAS-RCR	115,200	No need (5~24VDC optional)



FAS-RCR

■ RS232 Connection Cable for FAS-RCR : Common

Universal DB-9 male-female type cable is used.

Item	Length	
CGNR-C-1R8F	1.8m	
CGNR-C-003F	3m	
CGNR-C-005F	5m	

For more information wiring diagram and connector, refer to 「[8. Communication Function](#)」.

■ RS-485 Connection Cable : Ezi-MOTIONLINK Plus-R / Ezi-SERVO Plus-R MINI / EZI-SERVO ALL42/ Ezi-SERVO ALL56

Item	Length
CGNA-R-0R6F	60cm
CGNA-R-001F	100cm
CGNA-R-1R5F	150cm
CGNA-R-002F	200cm
CGNA-R-003F	300cm
CGNA-R-005F	500cm

For cabling position, refer to 「8-1.(3)」 of 「8. Communication Function」

■ I/O Connection Cable

These are cables for connecting Ezi-MOTIONLINK Plus-R Drive and External I/O.

Item	Length
CSVN-S-001F	1m
CSVN-S-002F	2m
CSVN-S-005F	5m

Maximum Length is 20m.



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