

# **Ezi-MOTIONLINK<sup>®</sup> Plus-E**

**Network Based Motion Controller Plug-in to Servo Drives**

User Manual

Text

( Rev.01)



# Table of contents

Table of contents .....	2
1 – 1. Precautions .....	4
1 – 1. Notes on Installation .....	6
2. Specifications of the Drive .....	7
2 – 1. Characteristic Table .....	7
2 – 2. Dimensions .....	8
3. Configuration .....	9
3 – 1. Part Numbering .....	9
3 – 2. System Configuration .....	10
3 – 3. External Wiring Diagram .....	11
4. External Name and Function Setting .....	12
4 – 1. Appearance and Part name .....	12
4 – 2. Ethernet IP Display .....	12
4 – 3. Ethernet Status LED display .....	12
4 – 4. IP Address selection switch (SW1, SW2) .....	13
4 – 5. Power and I/O signal connector (CN1) .....	14
4 – 6. Ethernet connector (CN2, CN3) .....	14
4 – 7. Servo drive connection connector .....	15
5. Control I/O signal .....	16
5 – 1. Signal cabling .....	16
5 – 2. Connection Circuit .....	17
5 – 3. Input signal .....	19
5 – 4. Output signal .....	22
6. Operation .....	24
6 – 1. Servo ON operation .....	24
6 – 2. Operation mode .....	24
7. Other Operation Functions .....	26
7 – 1. Jog Operation example .....	26
7 – 2. Origin Return .....	27
7 – 3. Stop Operation .....	30
7 – 4. Trigger Pulse Output .....	30
8. Communication function .....	32
9. Parameter .....	33
9 – 1. Parameter List .....	33
9 – 2. Parameter Description .....	34
10. Protection Function .....	38
10 – 1. Type of Alarm .....	38
10 – 2. Acquiring the alarm information .....	38
10 – 3. Alarm check and Release .....	39

1 1 . Appendix .....	40
1 1 - 1 . Cable.....	40

**Manual Version : [ver01]**

Provided GUI version : 6.40.10.15 ~  
First Edition : 30<sup>th</sup> Jan. 2017

## ※ Safety Pre-caution and Note on Installation

### ※ Before Operation

- Thank you for purchasing our Ezi-MOTIONLINK Plus-E products.
- Ezi-MOTIONLINK Plus-E is a high-performance 32bit ARM chip embedded Full Digital position control stepping driving unit.
- This manual describe the handling, maintenance, repair, diagnosis and troubleshooting of Ezi-MOTIONLINK Plus-E.
- Before start operation of Ezi-MOTIONLINK Plus-E thoroughly read this manual.
- After reading this manual, keep the manual near Ezi-MOTIONLINK Plus-E, so that any user can read this manual whenever needed.

## 1 - 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-E
- 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**.

 <b>Attention</b>	If user does not properly handle the products, the user may seriously or slightly injured damages may occur in the machine.
 <b>Warning</b>	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

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

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

## ◆ Connect Cables

 <b>Attention</b>	<p><b>Keep the rated range of input Voltage for drive.</b>          Otherwise, a fire or other kinds of accidents may occur.</p> <p><b>Cable connection should be following the wiring diagram.</b>          Otherwise, a fire or malfunction of machine may occur.</p>
 <b>Warning</b>	<p><b>Before connecting cables, check if input power is off.</b>          Otherwise, an electric shock or a fire may occur.</p> <p><b>The case of this Ezi-MOTIONLINK Plus-E is installed from the ground of the internal circuit by the condenser; Please Ground the Ezi-MOTIONLINK Plus-E.</b>          Otherwise, an electric shock or a file may occur and a cause of malfunction of machine.</p>

## ◆ Operation &amp; Setting change

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

 <b>Warning</b>	<p><b>Stop to supply power to the main circuit and wait sufficient time before checking or repairing this Ezi-MOTIONLINK Plus-E.</b></p> <p>Electricity remaining in the condenser may cause of electric shock.</p> <p><b>Do not change cabling while power is being supplied.</b></p> <p>Otherwise, the user may get injured or the product and machine may get damaged.</p> <p><b>Do not reconstruct the Ezi-MOTIONLINK Plus-E..</b></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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**1 - 1 . Notes on Installation**

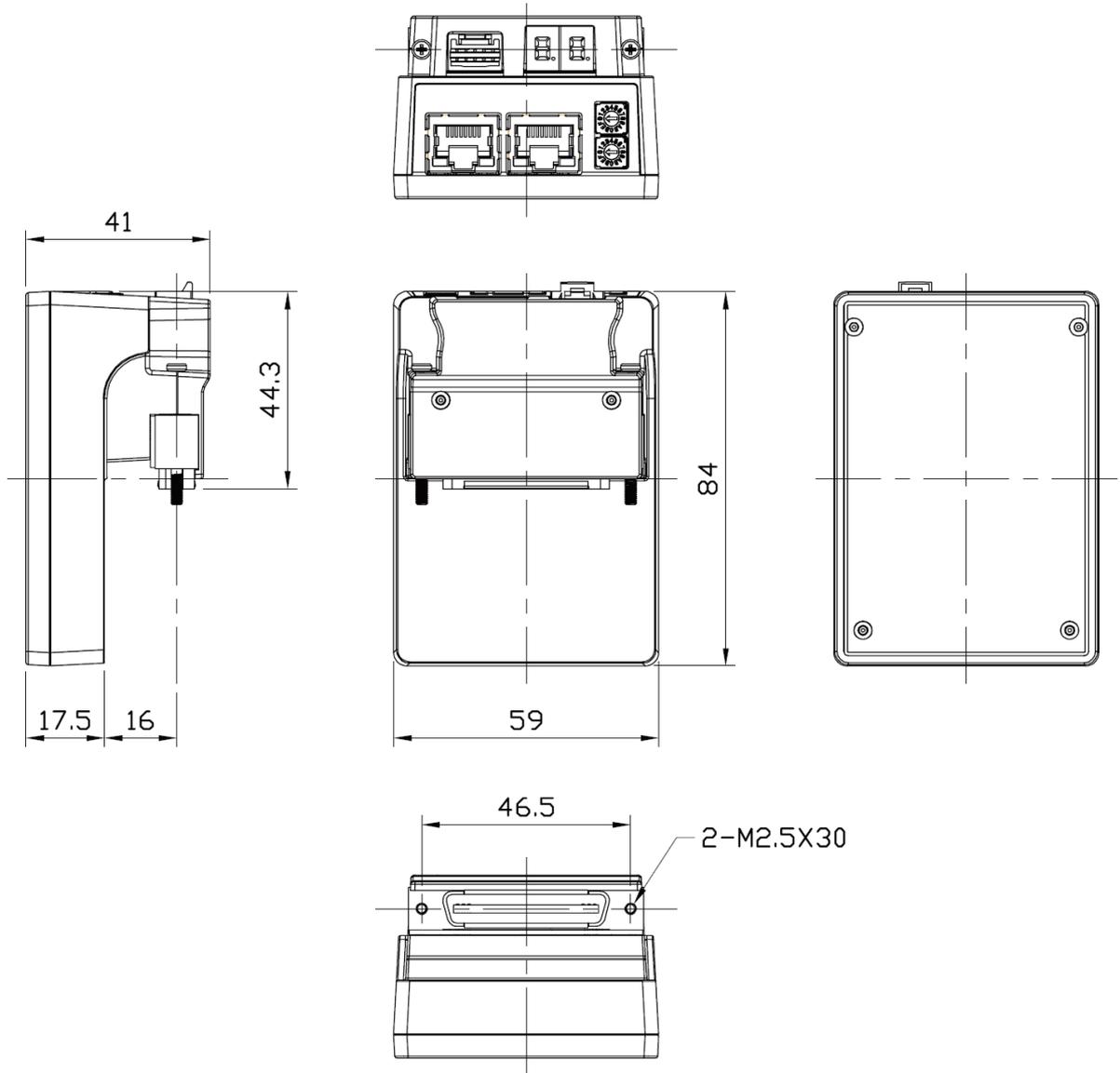
- 1) This product has been designed for indoor uses. The ambient temperature of the room should be 0°~ 55°C .
- 2) If the temperature of drive case is 50°C or higher, radiate heat outside for cooling down.
- 3) Do not install this product under direct rays or near magnetic or radioactive objects.
- 4) If more than 2 drives are installed in a line, keep the interval of 20mm or more vertically and 50mm or more horizontally at least..

## 2 . Specifications of the Drive

### 2 - 1 . Characteristic Table

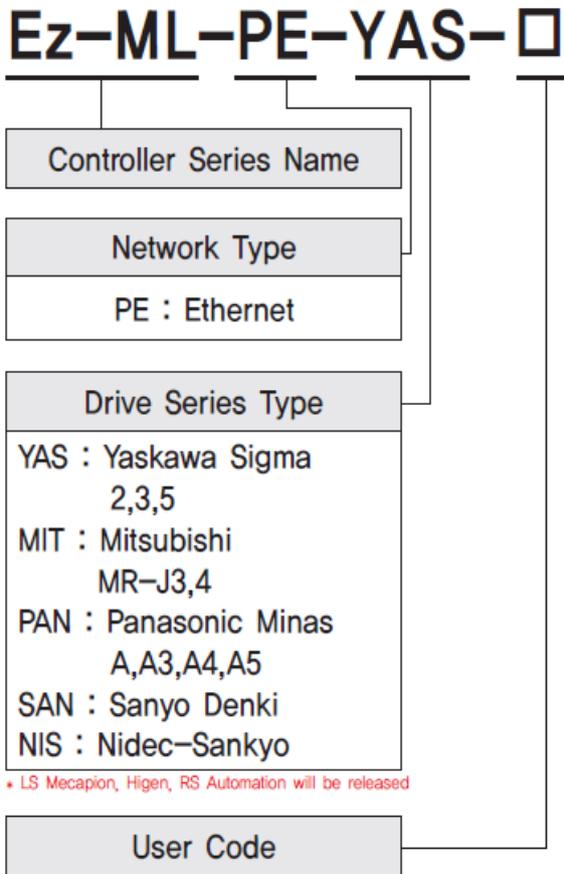
Type of Drive	Ez-ML-PE series	
Input Voltage	24VDC $\pm$ 10%	
Current consumption	최대 500mA	
Data Range	-134,217,728 ~ 134,217,727(28bit)	
Type of Acc/Dec	Symmetric / Asymmetric trapezoidal acceleration & deceleration	
Command pulse output method	2 pulse mode (CW/CCW) of 1 pulse mode (Pulse/Dir) (Selected by parameter)	
Max. Output Frequency	5MHz	
Encoder Max.Input Frequency	4MHz	
Input Signal	3 dedicated input (LIMIT+, LIMIT-, ORIGIN), 1 programmable input (photocoupler)	
Output Signal	1 dedicated output (Compare Out), 1 programmable output (photocoupler)	
Rotational Direction	CW / CCW (Selectable by parameter)	
7-Segment Display	IP address, Alarm status	
Communication Interface	Ethernet communication with PC, Dual port Ethernet switch embedded, Communication speed : 10/100bps - T/TX Full Duplex (DHCP function integrated)	
Multi axes Drive	Maximum 254 axis operating (Selectable IP : 1~255)	
Position control	Relative value movement mode / Absolute value movement mode	
Return to Origin	Origin Sensor, Z phase, $\pm$ Limit sensor	
GUI	User Interface Program within Windows	
Library	Motion Library (DLL) for windows XP/7/8/10	
Operation condition	Temp.	In Use : 0~50°C In Storage : -20~70°C
	Humidity	In Use : 35~85% (Non-condensing) In Storage : 10~90% (Non-condensing)
	Vib. Resist	0.5G

## 2 - 2 . Dimensions

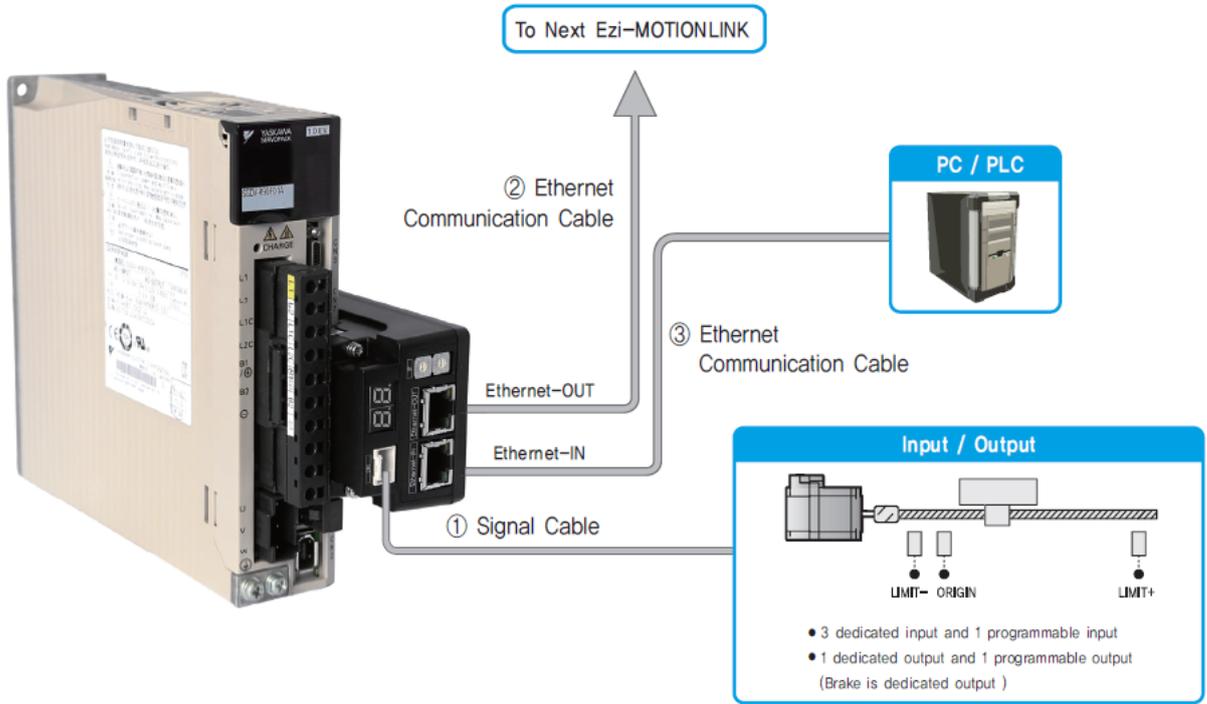
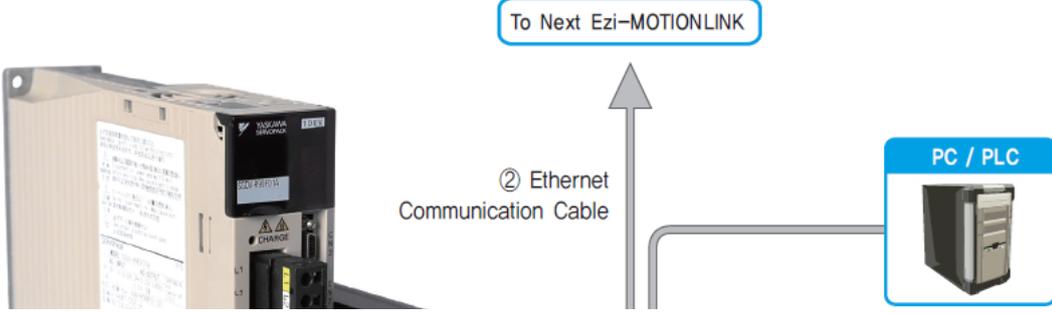


### 3 . Configuration

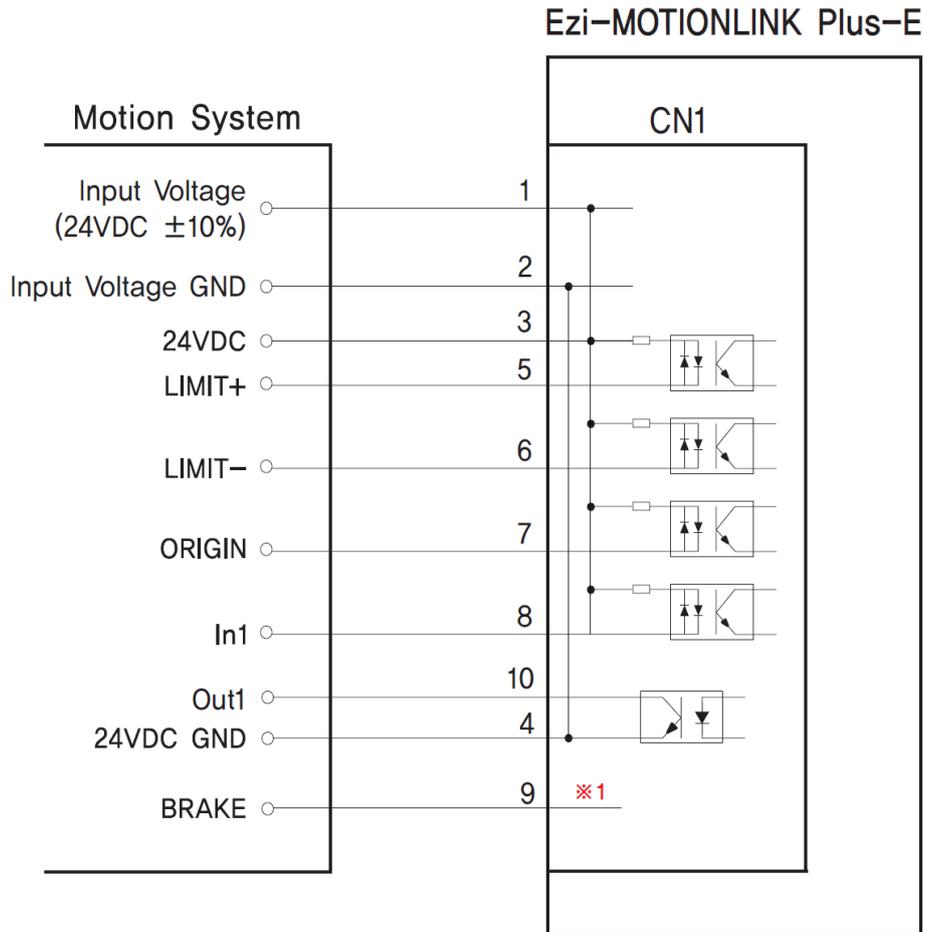
#### 3 - 1 . Part Numbering



3 -



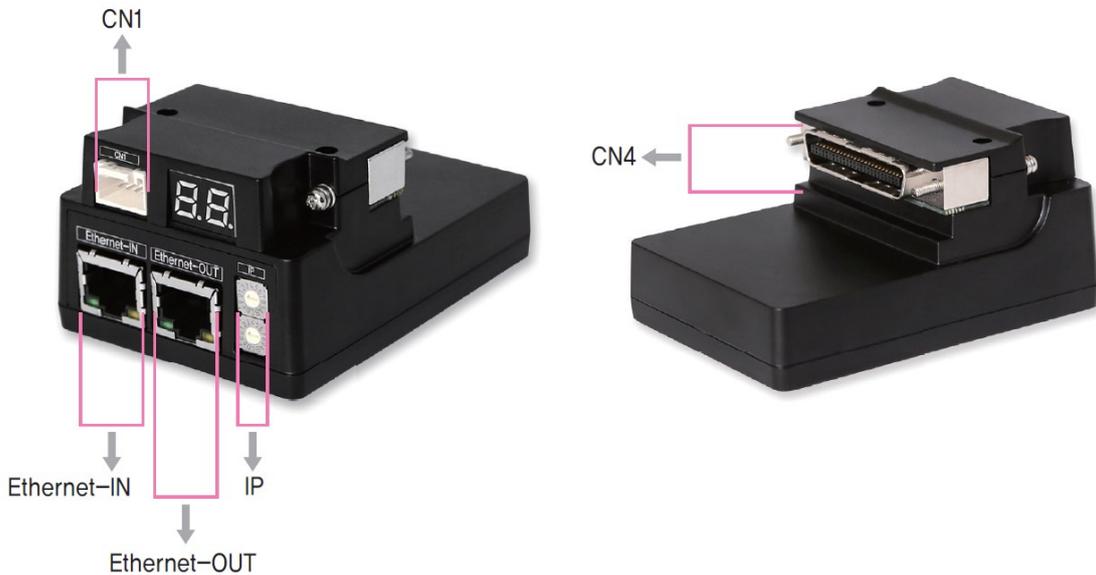
### 3 - 3 . External Wiring Diagram



※1 brake terminals of the brake servo drives Is an extension of the signal as it is.  
 Therefore Connecting to and using the brake servo is in use See the description of the drive.

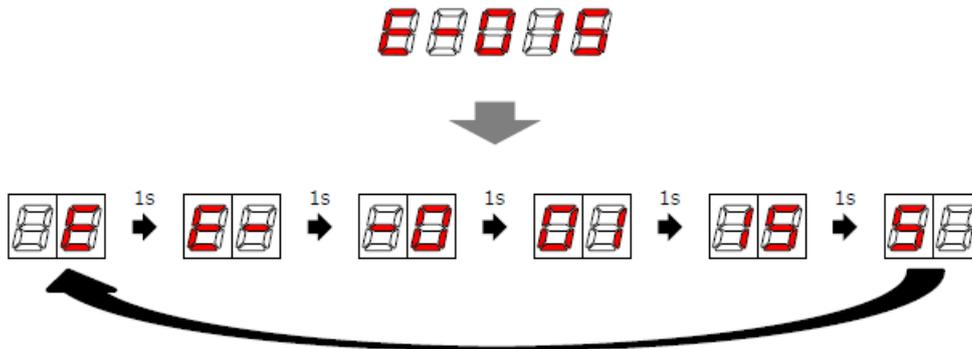
## 4 . External Name and Function Setting

### 4 - 1 . Appearance and Part name



### 4 - 2 . Ethernet IP Display

- 1) It displays the setting ID of SW1,2 (Drive ID Selection Switch)
- 2) In case of ID setting after power input status, 7-Segments are flashing and changed ID is not applied.
  - The IP must be changed when power off status.
- 3) When Alarm generating from drive, Alarm value is displayed on 7-Segment, not ID value. Alarm value is displayed on 7-Segment as 'E-000' type with one each dial. This dial is changing every one second. (ex. Display of Alarm No. 15)

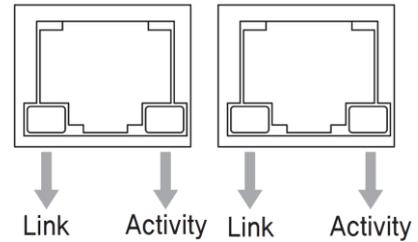


- 4) It displays the all of set ID on the drive after power input, it displays end number of IP address as hex code.  
 Ex) IP Address: 192.168.0.10  
 Firstly display 192.168.0.10 → only display 0A

### 4 - 3 . Ethernet Status LED display

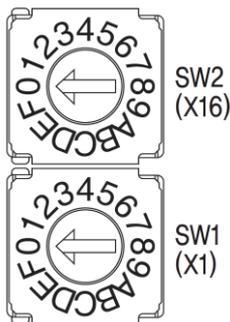
- 1) This LED indicates the Ethernet communication status. The Link LED is on the bottom left of each Ethernet connector, and the Activity LED is on the top right.

Name	Color	Status	Description
Link	Green	OFF	Link deactivated
		ON	Link activated
Activity	Yellow	OFF	Non operation
		Flickering	In operation



### 4 - 4 . IP Address selection switch (SW1, SW2)

- 1) It can be set from "1 to 254". Please set IP not to overlap.
  - "0" and "255" cannot be used for IP setting. Be sure to set it to "1 to 254"..
  - The default gateway is 192.168.0.1. When the switch is set to "1" Change Gateway. Refer to the [Manual - User Program 2-4] section for the change method. If the IP address and gateway are the same, Alarm (201 or 202) occurs.
  - It is recommended to use "2 ~ 254" for IP setting. (Default: SW1: 2, SW2: 0)
- 2) Basic set is "192.168.0.xxx", and xxx are set by switch.



Ex.) In case of SW1 : 9, and SW2 : 6

$$9 * 1 + 6 * 16 = 105$$

IP address : 192.168.0.105 (7-Segment display : 69)

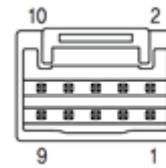
- 3) If set to switch as 255(FF), IP Address is setting automatically.  
 Because it uses DHCP, IP address is set automatically only when using router.  
 (Connect the Ethernet to Ethernet IN connector)

- When connecting directly to the controller (PC/PLC), it need to be sure to set the OP address with switch
- Set the IP address automatically only when you do not use the default IP address. If IP is set automatically, connect the user program (GUI) and save the IP address. And turn off the power and set the lasr number of IP with switch
- When the switch is set to 0, the IP setting becomes the initial (default) value.  
 In the initial state, communication is not connected.
- Basic IP Address : 192.168.0.xxx, Subnet Mask : 255.255.255.0, Gateway : 192.168.0.1

### 4 - 5 . Power and I/O signal connector (CN1)

(Connector Type : Molex 501876-1040)

No	Function	Input/Output
1	+24VDC	Input
2	24V GND	Input
3	+24VDC	Output
4	24V GND	Output
5	LIMIT+	Input
6	LIMIT-	Input
7	ORIGIN	Input
8	Digital In1	Input (Programmable)
9	Brake	Output
10	Digital Out1	Output (Programmable)

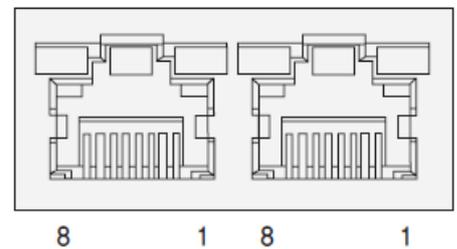


The programmable input/output pin is set by using the user program (GUI) or DLL library.

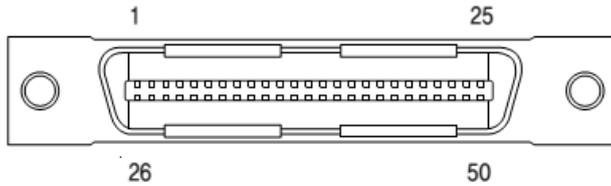
 <b>Caution</b>	<p>The signal for the brake of Pin9 is the extension of the brake signal line of the servo drive. Therefore, please refer to the description of servo drive for connecting and using the brake.</p>
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### 4 - 6 . Ethernet connector (CN2, CN3)

No	Function	No	Function
1	TD+	6	RD-
2	TD-	7	-
3	RD+	8	-
4	-	Connector Hood	F.G
5	-		



## 4 - 7 . Servo drive connection connector



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-J3,J4	Sigma2,3,5,7	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	

## 5 . Control I/O signal

### 5 - 1 . Signal cabling

All control I/O signals use connector CN1 as specified below.

1) **Input** : "Limit +", "Limit-", "Origin" signals are fixed to each unique number. For other signals such as Reset, select IN1 number and use it.

3 fixed inputs + 1 variable input = 4 inputs in total

CN1 No	Signal Name	Function
5	LIMIT+	Positive Limit sensor signal
6	LIMIT-	Negative Limit sensor signal
7	ORIGIN	Origin sensor signal
8	Digital In1	Clear Pos Soft Stop(Stop) Jog+, Jog- Alarm Reset, Servo ON Pause, Origin Search, Teaching Emergency Stop(E-Stop) User IN0

2) **Output** : 1 fixed output (1 Brake + variable output = 2 total outputs)

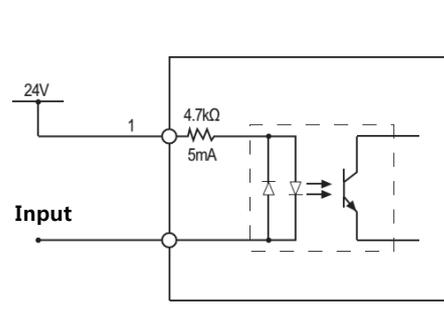
CN1 No	Signal Name	Function
9	Brake	Servo Drive Brake Signal
10	Digital OUT1	Dedicated output signal (Compare Out) InPosition, Alarm, Moving Acc/Dec OriginSearchOK ServoReady User Out0

## 5 - 2 . Connection Circuit

All drive I/O signals are insulated by a photo coupler. 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±10% (consumed current: about 5mA/circuit) should be separately prepared.

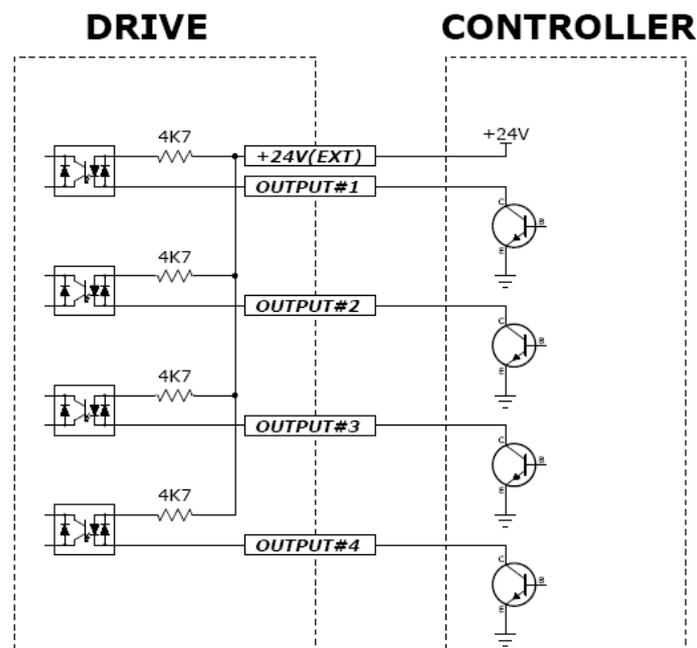


Input : CN1 - 5, 6, 7, 8

CN4 - Alarm signal, In-position signal

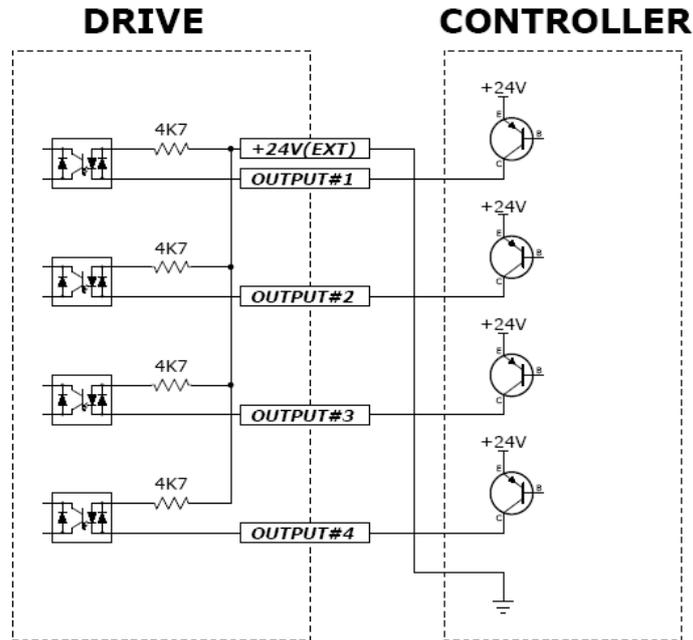
- Connect NPN type Input signal

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



● **Connect PNP type Input signal**

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

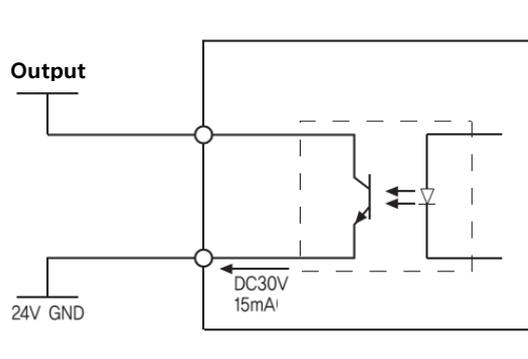


**2) Output Circuit**

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  $\leq 15mA$

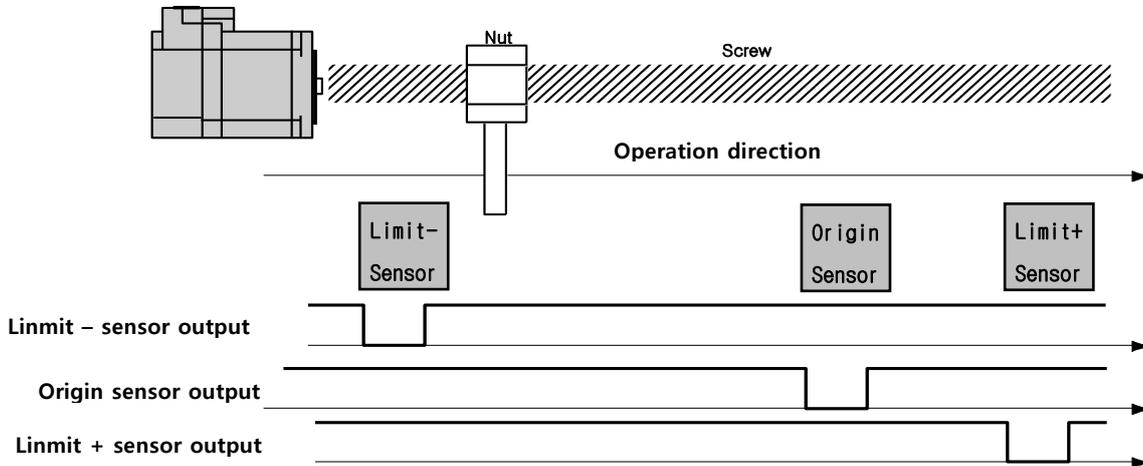


Output : CN1 – 10  
 CN4 – Servo On signal, Alarm reset signal

## 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 CN1 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

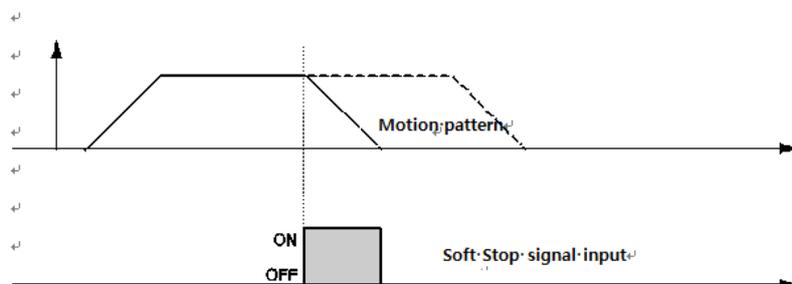
This input signal sets the command position and the actual position to 0 in relation to motion position control. The reset signal pulse scale is 10ms or more.



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

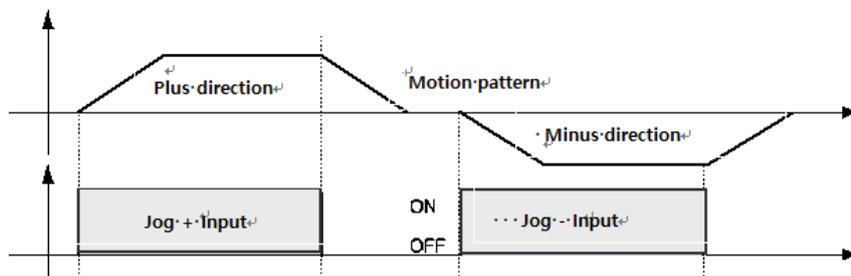
### 3) Stop input

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 soft stop signal is active in ON level and pulse scale is 10ms or more.



#### 4) Jog+ and Jog- Input

When Jog+ or Jog- signal is ON, the motor rotates clockwise or counterclockwise 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).



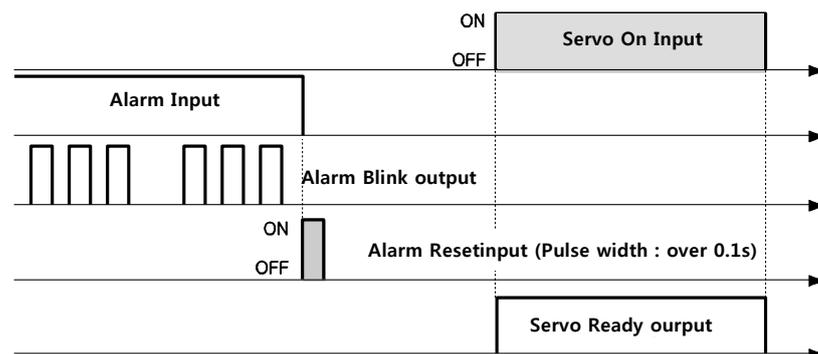
#### 5) Servo ON and Alarm Reset Input

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.

When Servo ON/OFF signal is set to OFF, the drive stops supplying the current to the motor and so the user can directly adjust the output position. When Servo ON/OFF signal is set to ON, the drive restarts to supply the current to the motor and its torque is recovered. Before operating the motor, the user must set it to ON.

When the drive is set to Servo ON, CN1 connector's <ServoReady > output signal is set to ON. Servo ON signal is **edge trigger** type and pulse scale is 10ms or more.

 <b>Caution</b>	<b>If the 'Servo ON' signal is assigned to input pin, ServoON command from GUI or DLL library will not executed.</b>
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- \*1. If 'No.0: Pulse per Revolution' in the parameter list is changed, the motor is set to Servo OFF.
- \*2. After 'ServoON' signal is assigned to input pin, it is impossible to use 'SERVO ON' button in User Program(GUI).
- \*3. After 'ServoON' is executed, the 'Command Position' value will be changed as same as 'Actual Position' value to remove 'Position Error'.

## 6) Pause Input

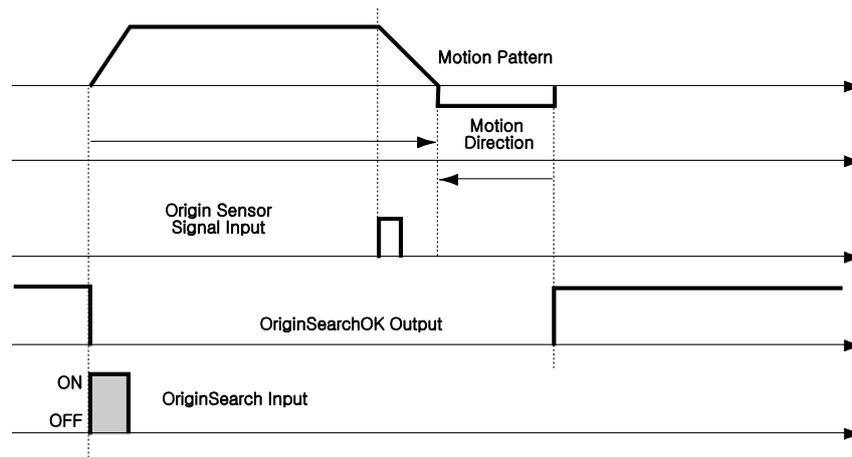
When Pause signal is set to ON, the motion in service is stopped

To start motion again, set the Pause signal to [OFF].

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

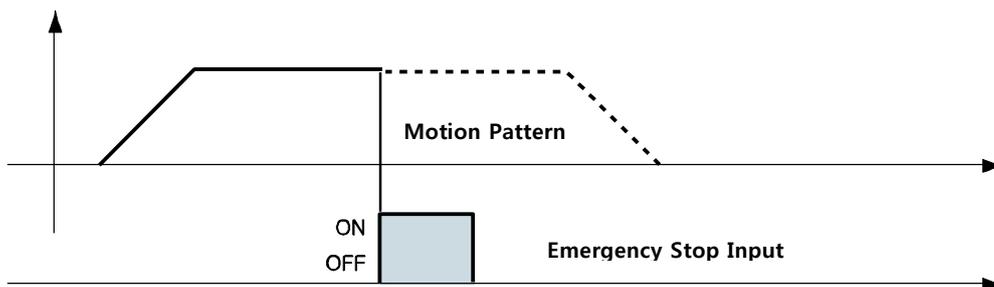
## 7) Origin Search Input

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.20:Org Method, No.17:Org Speed, No.18:Org Search Speed, No.19:Org AccDec Time, No.21:Org Dir. (For more information, refer to '1.2 Parameter'.) When the origin search command is completed, 'Origin Search OK' signal is set to ON to CN1 connector's output port.



## 8) E-Stop 입력

「Emergency stop」신호가 [ON]이 되면 현재의 모션 동작이 감속 과정 없이 즉시 정지합니다. E-Stop 신호의 인식은 ON 상태의 레벨로 인식하며, 펄스 폭은 10ms 이상이어야 합니다.



## 5 - 4 . Output signal

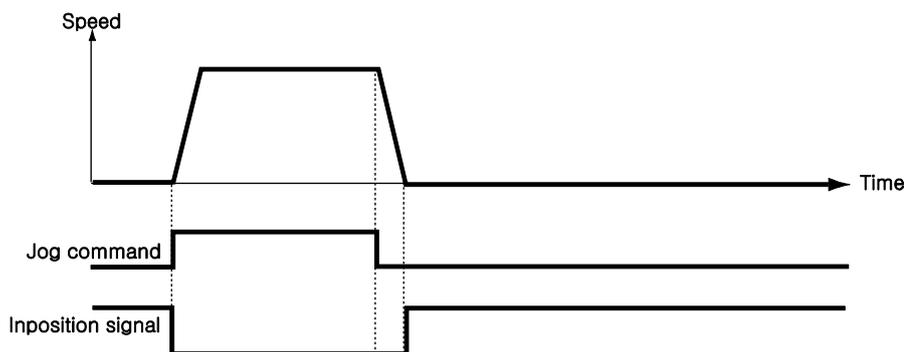
### 1) Compare Out/Trigger Pulse Output 출력

The "Trigger Pulse Output" signal is [ON] when certain conditions are met and is used when synchronized motion control with the external controller is required.

(For details, refer to '7-4.Trigger Pulse Output')

### 2) In-position output

After the motor stop in target position exactly on Servo ON status, the signal becomes [ON]. The condition of this signal depends on parameter 'Position Loop Gain' and 'Inpos Value'.

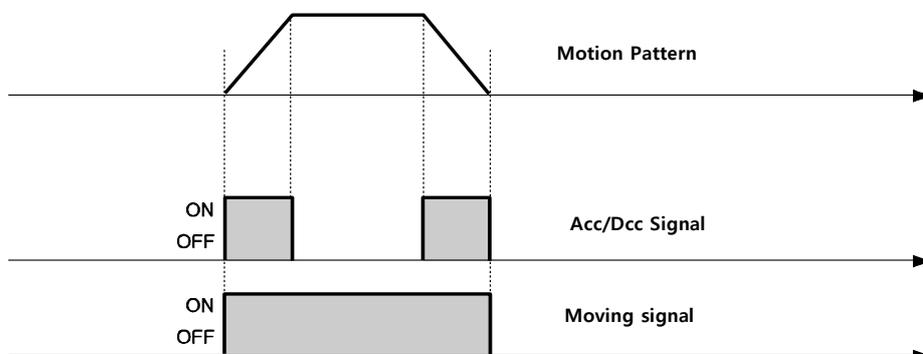


### 3) Alarm output

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 and then stops motor operation command. If overload or overcurrent occurs while the motor is operating, the drive detects it and cuts off the motor's current, In addition, alarm output is turned on and "Alarm LED" flashes to indicate the type of alarm occurrence.

### 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 - 7\) Origin Search Input](#)」.

**6) Servo Ready output**

When the drive supplies power to the motor by Servo ON signal or command and is ready to perform motion command, 'ServoReady' signal displays ON signal. Refer to 「[5.3 Input Signal - 5\) Servo On and AlarmReset Input](#)」.

**9) 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.

After Servo ON command is given, In-position is finished to the time as shown below.



T1 can be different subject to the rising time of supplying power and the motor status.



**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 two modes: communication command (DLL program) and user GUI program.

#### (1) Communication Command Mode

This drive can perform control operation such as positioning by communication command from host controller. Operation using position table is possible by communication command.

#### Position Table Operation Sequence

- 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 controller 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-MOTIONLINK Plus-E, 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 only by User Program(GUI). For more information, refer to [「User Manual – Position Table Function」](#).

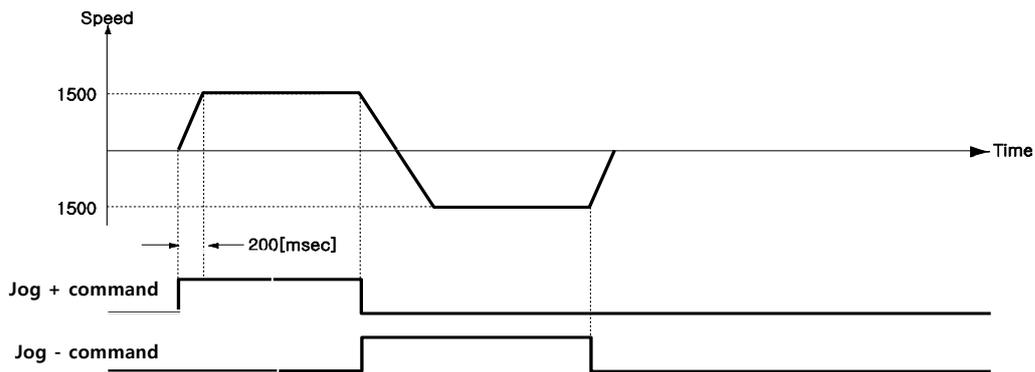
## 7 . Other Operation Functions

### 7 - 1 . Jog Operation example

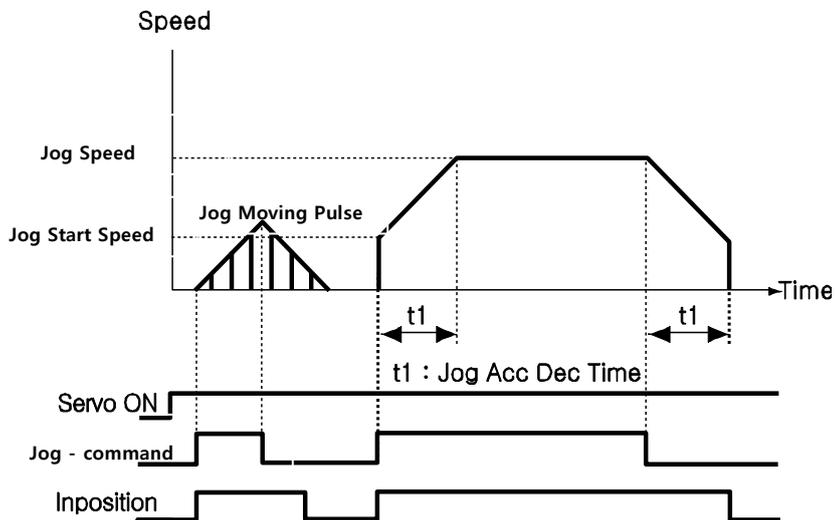
The machine executes speed control operation at the speed set by parameters according to inputting 'Jog+' and 'Jog-' signals.

[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 signals, 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.

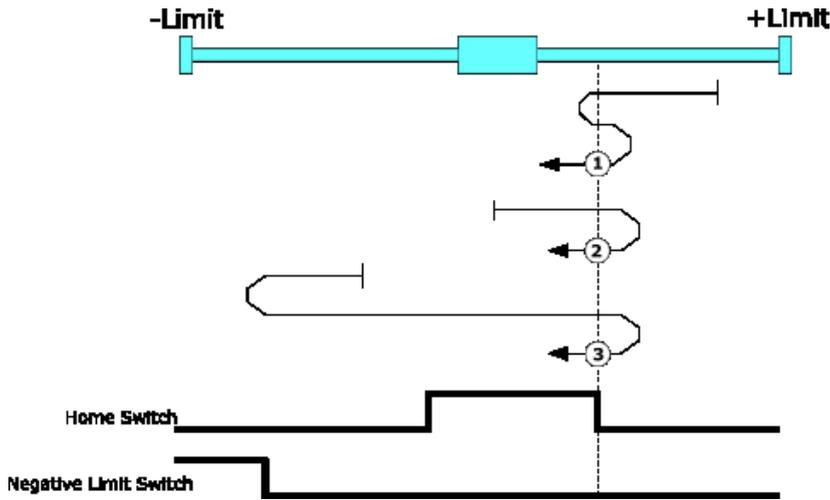
Parameter Name	Description	Range
Org Speed	Operation speed when origin return starts	1~500,000[pps]
Org Search Speed	Low-speed operation speed after origin sensor is sensed and operation start speed when origin starts.	1~50,000[pps]
Org Acc Dec Time	The time assigned to the acceleration/deceleration section when origin return starts and stops.	1~9,999[ms]
Org Method	To select how to return the origin (8 type)	0~7
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

### (1) Origin Return method setting

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

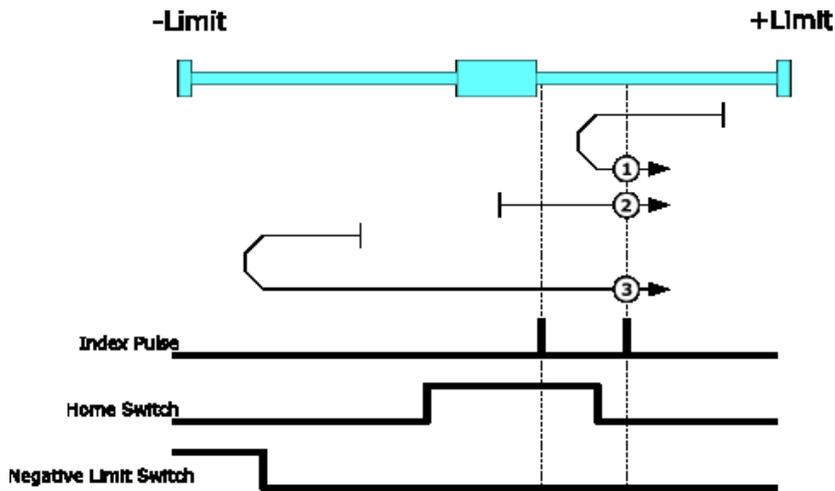
- Arrow mark is for moving direction in below picture .
- ○ is origin end position in below pic.  
(Numbers in ○ mark is indication the sensor Dog position or following example of origin direction.)
- Index Pulse is Z Phase.
- In the case of origin return by a Z-pulse , after the completion of low speed 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.)
- When limit sensor is detected, stop by the stop method set in H / W Limit Stop Method (parameter No. 12, E-STOP / Stop) and then execute the remaining homing routine.

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



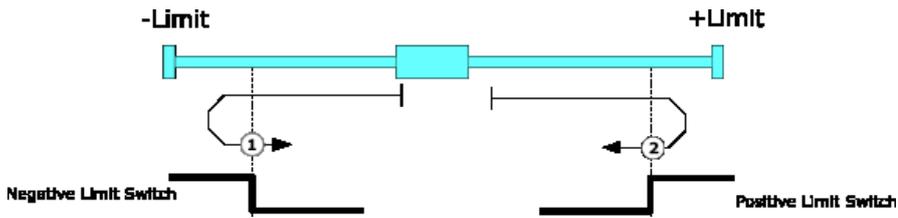
- ① : In case of position of sensor Dog is between the origin and +Limit Sensor
- ② : In case of position of sensor Dog is in the origin sensor
- ③ : In case of position of sensor Dog is between origin and -Limit Sensor

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 )

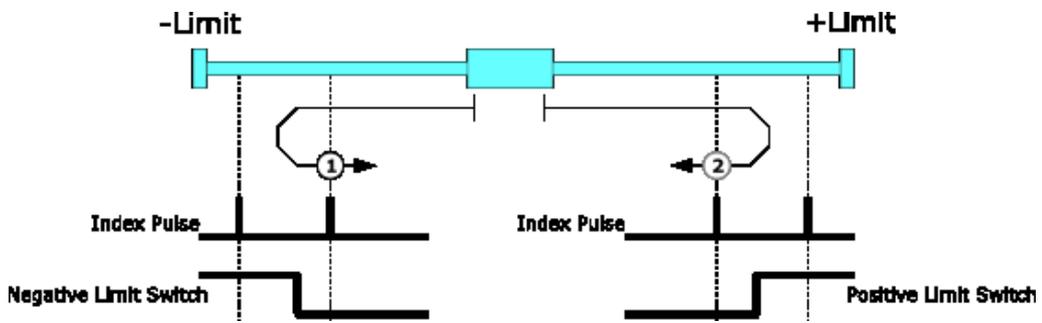


① : : In case of Org Dir is 1 (CCW)

② : In case of Org Dir is 0 (CW)

- Home search is completed at the position when Limit Sensor is off

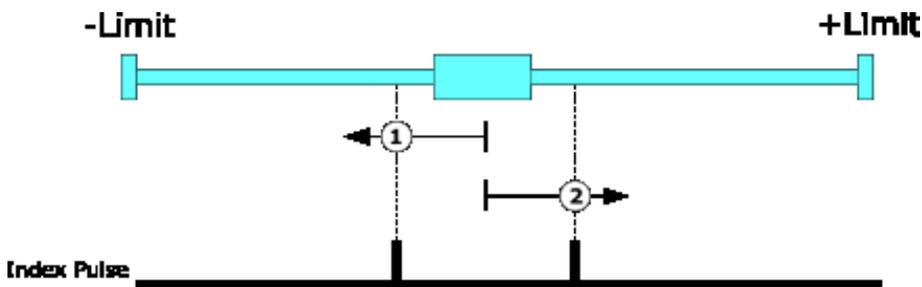
4) Z Limit Origin (In case of Org Method = 3 )



① : In case of Org Dir is 1 (CCW)

② : In case of Org Dir is 0 (CW)

5) Z Phase (Org Method = 4 인 경우)



① : Org Dir 이 1(CCW)인 경우

② : Org Dir 이 0(CW)인 경우

6) Set Origin ( In case of Org Method = 4 )

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 . 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.

**7 - 4 . 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.

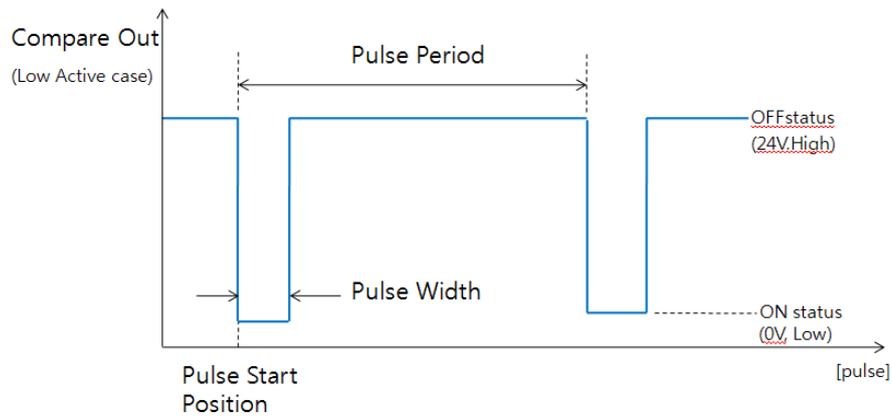
This command can be executed during the positioning command or before the positioning command also. The following table shows the setting conditions and refers to

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

Setting Item	Description	Range
Start/Stop	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]

## (2) Output signal

This output pin of CN1 connector for Trigger Pulse is fixed to 「Compare Out」 and the signal diagram is as follows.



 <b>Caution</b>	<p>The pulse is output only in bigger position area than 'pulse starts position' and is output in both motion directions.</p>
--	---

## (3) Output Status Check

By using DLL program, the user can check the trigger pulse output status. Refer to 「User Manual – Communication Function」.

## 8 . Communication function

- 1) It has embedded 2 Port Ethernet switching Hub for daisy-chain connection.
- 2) Make an UDP Protocol.
- 3) By using of UDP, two application programs can be connected to one drive, so the provided GUI and user program can be used at the same time.
- 4) Please refer to 「[3.2 System Configuration](#)」 for PC connection example
- 5) The signal contents of the RJ45 connector of the drive are as follows.

(Same as general Ethernet 10/100 Base-T)

RJ45 Pin No.	Function
1	TD+
2	TD
3	-
4	-
5	RD+
6	RD-
7	-
8	-
case	Frame GND

- 6) Basic IP Address : 192.168.0.xxx  
 Basic Gateway : 192.168.0.1  
 Basic Subnet Mask : 255.255.255.0

## 9 . Parameter

### 9 - 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	S/W Limit Plus Value	[pulse]	-134,217,728	134,217,727	134,217,727
10	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 Dir		0	1	1
19	Org OffSet	[pulse]	-134,217,728	134,217,727	0
20	Org Position Set	[pulse]	-134,217,728	134,217,727	0
21	Org Sensor Logic		0	1	0
22	Limit Sensor Dir		0	1	0
23	Pulse Type		0	1	1
24	Encoder Dir		0	1	0
25	Motion Dir		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

## 9 - 2 . Parameter Description

No.	Description	Unit	Lower Limit	Upper Limit	Default										
0	<p><b>Encoder Multiply:</b> Set the multiplication of the encoder drive input of the servo drive.</p> <table border="1"> <thead> <tr> <th>Value</th> <th>Pulse/Revolution</th> </tr> </thead> <tbody> <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> </tbody> </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	<p><b>Axis Max Speed :</b> 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. Upper Limit value has limited by Pulse per resolution value *In case of 10000 : 500,000 In case of 20000 : 1,000,000</p>	pps	1	2,500,000	500,000										
2	<p><b>Axis Start Speed :</b> When position moving commands (absolute move, incremental move) are given, this mode sets the operation start speed to [pps] unit.</p>	pps	1	35,000	1										
3	<p><b>Axis Acc Time :</b> When position moving commands (absolute move, incremental move) are given, this mode sets the acceleration section of operation start segment to [msec] unit. Possible range is different from <b>Axis Speed</b>. (Ex.1) Axis Start Speed=1, Move Speed=400000 : 1~1430 [msec] (Ex.2) Axis Start Speed=1, Move Speed=10000 : 1~350 [msec]</p>	msec	1	9,999	100										
4	<p><b>Axis Dec Time :</b> When position moving commands (absolute move, incremental move) are given, this mode sets the deceleration section of operation stop segment to [msec] unit. Possible range is different from <b>Axis Speed</b> same as 'Axis Acc Time' parameter.</p>	msec	1	9,999	100										
5	<p><b>Speed Override :</b> 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.</p>	%	1	500	100										
6	<p><b>Jog Speed :</b> When jog position moving command is given, this mode sets the motor revolution value to [pps] unit.</p>	pps	1	2,500,000	5,000										
7	<p><b>Jog Start Speed :</b> When jog position moving command is given, this mode sets the operation start speed to [pps] unit..</p>	pps	1	35,000	1										

8	<b>Jog Acc Dec Time :</b> In case of jog operation, this mode sets the time of acceleration and deceleration sections to [msec] unit.	msec	1	9,999	100
9	<b>S/W Limit Plus Value :</b> 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.	pulse	-134,217,7 28	134,217, 727	+134,217, 727
10	<b>S/W Limit Minus Value :</b> 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.	pulse	-134,217,7 28	134,217, 727	-134,217.7 28
11	<b>S/W Limit Stop Method :</b> 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. ◆ 2 : Do not use S/W Limit.		0	2	0
12	<b>H/W Limit Stop Method:</b> 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.  ● The above stop method is applied even when the limit sensor is detected during Home Search motion.		0	1	0
13	<b>Limit Sensor Logic :</b> 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	<b>Org Speed :</b> In case of origin return command, this modes sets the operation speed until the motor senses the origin sensor to [pps] unit	pps	1	500,000	5,000
15	<b>Org Search Speed :</b> 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	500,000	1,000
16	<b>Org Acc Dec Time :</b> 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	<p><b>Org Method :</b> The user can select origin return command types.</p> <ul style="list-style-type: none"> <li>◆ 0 : The motor moves up to the origin sensor spot by 'Org Speed' and then executes precise origin return at the low value of 'Org Search Speed'.</li> <li>◆ 1 : The motor moves up to the origin sensor spot by 'Org Speed' and then executes Z-pulse origin return at the low value of 'Org Search Speed'.</li> <li>◆ 2 : The motor moves up to the limit sensor spot by 'Org Speed' and then immediately stops.</li> <li>◆ 3 : The motor moves up to the limit sensor spot by 'Org Speed' and then executes Z-pulse origin return at the low value of 'Org Search Speed'.</li> <li>◆ 4 : To set origin in current mechanical position.</li> <li>◆ 5 : To execute the Z-pulse origin return at the low value of 'Org Search Speed'.</li> <li>◆ 6 : The motor moves up to the wall by 'Org Torque Ratio' and then immediately stops.</li> <li>◆ 7 : The motor moves up to the wall by 'Org Torque Ratio' and then executes Z-pulse origin return at the low value of 'Org Search Speed'.</li> </ul> <p>For more information, refer to '9.3 Origin Return'.</p> <p>※ 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.)</p>		0	5	0
18	<p><b>Org Dir :</b> In case of origin return, this mode sets the revolution direction of the motor.</p> <ul style="list-style-type: none"> <li>◆ 0 : moves the motor clockwise.</li> <li>◆ 1 : moves the motor counterclockwise.</li> </ul>		0	1	0
19	<p><b>Org Offset :</b> After origin return is completed, the motor moves additionally as this setting value and then stops. 'Command Pos/Actual Pos' is set to '0'.</p>	pulse	-134,217,7 28	134,217, 727	0
20	<p><b>Org Position Set :</b> After origin return is completed, 'Command Pos/Actual Pos' value is set to this setting value.</p>	pulse	-134,217,7 28	134,217, 727	0
21	<p><b>Org Sensor Logic :</b> Sets the origin sensor signal level so that the motor can recognize origin sensor's input to ON.</p> <ul style="list-style-type: none"> <li>◆ 0 : 0 V (low level)</li> <li>◆ 1 : 24V (high level)</li> </ul>		0	1	0

22	<p><b>Limit Sensor Dir :</b> Sets the limit sensor direction to stop the motor to the limit spot under operation.</p> <ul style="list-style-type: none"> <li>◆ 0 : When operation direction is 'CW', input the sensor signal to the Limit+ direction, and the motor will stop.</li> <li>◆ 1 : When operation direction is 'CW', input the sensor signal to the Limit- direction, and the motor will stop.</li> </ul>		0	1	0
23	<p><b>Pulse Type:</b> Set output pulse type.</p> <ul style="list-style-type: none"> <li>◆ 0 : 1 Pulse type (Pulse / Direction)</li> <li>◆ 1 : 2 Pulse type (CW / CCW)</li> </ul>		0	1	1
24	<p><b>Encoder Direction:</b> Sets the count direction of the encoder.</p> <ul style="list-style-type: none"> <li>◆ 0: CW (count increase when CW direction operating)</li> <li>◆ 1: CCW (count increase when CCW direction operating)</li> </ul>		0	1	0
25	<p><b>Motion Dir :</b> When the motor operates by position command, this mode sets the revolution direction of the motor.</p> <ul style="list-style-type: none"> <li>◆ 0 : moves the motor clockwise.</li> <li>◆ 1 : moves the motor counterclockwise.</li> </ul>		0	1	0
26	<p><b>Servo Alarmreset Logic:</b> Set the Alarm reset output level. Output time (10 [ms])</p> <ul style="list-style-type: none"> <li>◆ 0: 0V (low level, high -&gt; low -&gt; conversion for high)</li> <li>◆ 1: 24V (high level, low-&gt; high -&gt; conversion for low)</li> </ul>		0	1	0
27	<p><b>Servo On Output Logic:</b> Sets the Servo On output level.</p> <ul style="list-style-type: none"> <li>◆ 0: 0V (low level)</li> <li>◆ 1: 24V (high level)</li> </ul>		0	1	0
28	<p><b>Servo Alarm Logic:</b> Sets the alarm input level.</p> <ul style="list-style-type: none"> <li>◆ 0: 0V (low level)</li> <li>◆ 1: 24V (high level)</li> </ul>		0	1	1
29	<p><b>Servo Inposition Logic:</b> Set the Servo In-position input level</p> <ul style="list-style-type: none"> <li>◆ 0 : 0V (low level)</li> <li>◆ 1 : 24V(high lwvel)</li> </ul>		0	1	0

## 1 0 . Protection Function

### 1 0 - 1 . Type of Alarm

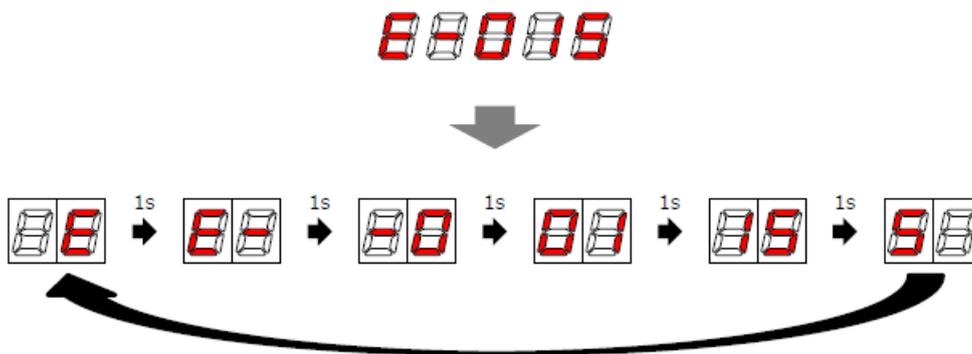
1) The alarm number is displayed on the 7-Segment.

Alarm No	Alarm Name	Description
49	Servo drive alarm	When an alarm occurs in the servo drive
201	IP setting error	IP and Gateway are the same
202	IP confliction	If you have a product with the same IP set in the connected network (Including other products)

### 1 0 - 2 . Acquiring the alarm information

If an alarm occurs, the motor will go into Servo OFF state and will stop if it is running. At the same time, the control output "Alarm" is output and the alarm number is displayed in the 7-segment for ID Display.

Ex1) Alarm 15 : 7-Segment displays when position error overflow is occurred.



## 1 0 - 3 . Alarm check and Release

If an alarm occurs, remove its cause and then release

Alarm No	Alarm Name	Description	Reset
49	Servo drive alarm	1) Checking the connected servo drive alarm.	Validity / Invalidity
201	IP setting error	1) Set the last number to IP and Gateway differently. 2) When using the default IP address, set the IP setting from 2 to 254.	Invalidity
202	IP confliction	1) IP conflicts with other drives (including other products), so check the settings of each drive (including other products).	Invalidity

# 1 1 . Appendix

## 1 1 - 1 . Cable

### ■ I/O Connection Cable

It is a cable used to connect power and input / output.

Item	Length[m]	Remark
CSPE-S-□□□F	□□□	Normal cable

### ■ Ethernet Cable

Use STP (Shielded Twisted Pair) cable (CAT5E)

Item	Length[m]	Remark
CGNR-EC-□□□F	□□□	Normal cable

□ is cable length.

The unit is 1[m] , maximum length is 100[m].

Refer to 「[3.2 Configuration](#)」

### ■ Connector for cabling

It is the connector specification to connect with Drive

Usage	ITEM	Specification	Maker
Power and I / O connection (CN1)	Housing	501646-1000	MOLEX
	Terminal	501648-1000 (AWG26~28)	MOLEX

- ※ The above connectors are the best products for Ezi-MOTIONLINK Plus-E.  
Equivalent or alternative products may be used.



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