Ezi-STEP® ALL

Step Motors with Integrated Drive and Controller

User Manual
Text

(Rev.01.01.03)

FASTECH

- Table of Contents -

Manual Version : [ver01.01.03]

Supported Firmware version : 6.4.043.11~

Supported GUI version : 6.16.0.585 ~

Fisrt Edition   : Oct 02, 2008

Revised Edition : Mar 31, 2011

1. Safety Precautions

※ Before getting started ※

- Thank you for purchasing Ezi-STEP of FASTECH, which is a full digital position control servo system with a 32bit high performance DSP.
- This manual describes handling, maintenance, repair, diagnosis, and troubleshooting of Ezi- STEP.
- Before operating Ezi- STEP, read this manual through.

◆ General Precautions

☞ Contents of this manual are subject to change without prior notice for functional improvement, change of specifications, or user's better understanding.

Thoroughly Read the manual provided with the purchased Ezi- STEP.

☞ When the manual is damaged or lost, contact a FASTECH agent or the address on the last page of the manual.

☞ FASTECH is not responsible for a product breakdown due to user's dismantling the product, and such a breakdown is not covered by the warranty.

◆ Put the safety first

☞ Before installing, operating, and repairing the product, thoroughly read the manual and fully understand contents. Before operating the product, understand the mechanical characteristics of the product and related safety information and precautions.

☞ After reading the manual, keep the manual near the product so that any user can read the manual whenever needed.

☞ This manual divides safety precautions into 「Warning」 and 「Caution」.

⚠ **Caution**	If the user does improperly handle the product, the user may get seriously or slightly injured and damages may occur in the machine only.

⚠ **Warning**	If the user does improperly handle the product, a dangerous situation like an electric shock may occur resulting in death or serious injuries.

☞ Although the item mentioned is only ⚠ **Caution** , a serious result may be caused depending on the situation. Necessarily follow safety precautions.

◆ The Status of the Product

⚠ **Caution**	☞ Check if the product is damaged or any component is omitted. 　When an abnormal product is installed and operated, the user may get injured.

◆ Install

⚠ **Caution**	☞ Carefully move the product. 　Dropping the product on the ground or the user's foot may cause an injury. ☞ Use non-flammable materials like metals in the place where the product is to be installed. 　Otherwise, a fire may occur. ☞ When installing several drives in a sealed place, install a cooling fan to keep the ambient temperature of the drive at 50℃ or lower. 　Otherwise, a fire or other kinds of accidents may occur due to overheating.

◆ Connecting Cables

⚠ **Warning**	☞ Before connecting cables, check if input power is off. 　Otherwise, an electric shock or a fire may occur. ☞ The case of the drive is insulated from the ground of the internal circuit by the condenser. Necessarily ground the driver. 　Otherwise, an electric shock or a fire may occur.

◆ Change of operation and setting

⚠ **Caution**	☞ All parameters of the drive were accordingly set at the factory. To change these parameters, read the manual first. 　Otherwise, the machine may be damaged or out of order.

◆ Repair and Check

⚠ **Warning**	☞ Stop supplying power to the main circuit, wait for a while, and then check or repair the drive. 　Electricity remaining in the condenser may cause any danger like an electric shock. ☞ Do not change cabling while power is being supplied. 　Otherwise, the user may get injured or the drive may get damaged. ☞ Do not remodel the drive. 　Otherwise, the user may receive an electric shock or the drive may get damaged. The damaged product is not covered by the warranty.

Notes on Installation

1) This product has been designed for indoor uses. The ambient temperature of the room should be 0℃~55℃.
2) If the temperature of the case is 50℃ or higher, radiate heat outside to cool down the case.
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.

2. Specifications of the Drive

2.1 Characteristic Table

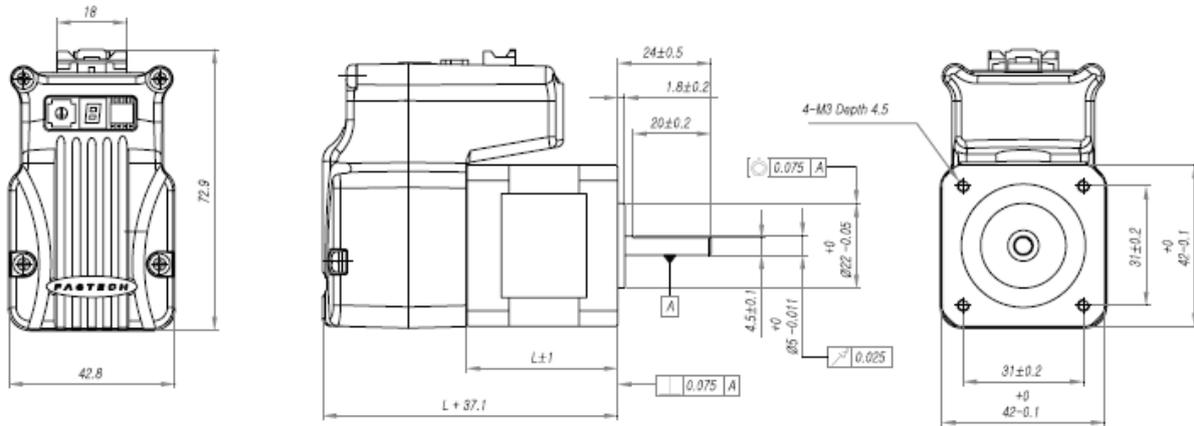|		
Input Voltage		24VDC ±10%
Control Method		PWM drive with 32bit DSP
Multi Axes Drive		Maximum 16 axes through Daisy-Chain
Position Table		64 motion command steps (Continuous, Wait, Loop, Jump and External start etc.)
Current Consumption		Max 500mA (Except motor current)
Operating Condition	Ambient Temperature	In Use : 0~50℃ In Storage : -20~70℃
	Humidity	In Use : 35~85% (Non-condensing) In Storage : 10~90% (Non-condensing)
	Vib. Resist.	0.5G
Function	Rotation Speed	0~3000rpm
	Resolution(P/R)	500, 1000, 1600, 2000, 3200, 3600, 4000, 5000, 6400, 8000, 10000, 20000, 25000, 36000, 40000, 50000 (Selectable by parameter) *Default : 10000
	Protection Functions	Over current, Over speed, Step out, Over temperature, Over regenerated voltage, Motor connect error, Motor voltage error, System error, ROM error, Input voltage error
	7-Segment	Power, Alarm, Communication ID
	STOP Current	10%~100%. (Selectable by parameter) Be setted to set value of STOP current after 0.1 second after motor stop. *Default : 50%
	Rotational Direction	CW / CCW (Selectable by parameter) Used when changing the direction of motor rotate. *Default : CW
I/O Signal	Input Signal	3 dedicated input (LIMIT+, LIMIT-, ORIGIN), 7 programmable input (Photocoupler)
	Output Signal	1 dedicated output (Compare Out), 1 programmable output (Photocoupler), Brake Signal
Communication Interface		The RS-485 serial communication with PC Transmission speed : 9,600~921,600[bps]
Position Control		Incremental mode / Absolute mode Data Range : -134,217,727 to +134,217,727[pulse], Operating speed : Max. 3000[rpm]
Return to Origin		Origin Sensor, ±Limit sensor, Z phase (By connect external encoder)
GUI		User Interface Program within Windows
Software		Motion Library (DLL) for windows 2000/XP

3. Specifications of the Motor

3.1 Ezi-STEP-ALL 42 Series

1) Specifications

M O D E L		UNIT	Ezi-STEP-ALL 42S	Ezi-STEP-ALL 42M	Ezi-STEP-ALL 42L	Ezi-STEP-ALL 42XL
DRIVE METHOD		——	BI-POLAR	BI-POLAR	BI-POLAR	BI-POLAR
NUMBER OF PHASES		——	2	2	2	2
VOLTAGE		VDC	3.36	4.32	4.56	7.2
CURRENT per PHASE		A	1.2	1.2	1.2	1.2
RESISTANCE per PHASE		Ohm	2.8	3.6	3.8	6
INDUCTANCE per PHASE		mH	2.5	7.2	8	15.6
HOLDING TORQUE		N·m	0.32	0.44	0.5	0.8
ROTOR INERTIA		g·cm²	35	54	77	114
WEIGHTS		g	220	280	350	500
LENGTH (L)		mm	33	39	47	59
ALLOWABLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	22	22	22	22
	8mm		26	26	26	26
	13mm		33	33	33	33
	18mm		46	46	46	46
ALLOWABLE THRUST LOAD		N	Lower than motor weight			
INSULATION RESISTANCE		MOhm	100min. (at 500VDC)			
INSULATION CLASS		——	CLASS B (130℃)			
OPERATING TEMPERATURE		℃	0 to 55			

2) Dimensions

3.2 Ezi-STEP-ALL 56 Series

1) Specifications

M O D E L		UNIT	Ezi-STEP-ALL 56S	Ezi-STEP-ALL 56M	Ezi-STEP-ALL 56L
DRIVE METHOD		——	BI-POLAR	BI-POLAR	BI-POLAR
NUMBER OF PHASES		——	2	2	2
VOLTAGE		VDC	1.56	1.62	2.7
CURRENT per PHASE		A	3	3	3
RESISTANCE per PHASE		Ohm	0.52	0.54	0.9
INDUCTANCE per PHASE		mH	1	2	3.8
HOLDING TORQUE		N·m	0.64	1	2
ROTOR INERTIA		g·cm²	120	200	480
WEIGHTS		g	500	700	1150
LENGTH (L)		mm	46	54	80
ALLOWABLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	52	52	52
	8mm		65	65	65
	13mm		85	85	85
	18mm		123	123	123
ALLOWABLE THRUST LOAD		N	Lower than motor weight		
INSULATION RESISTANCE		MOhm	100min. (at 500VDC)		
INSULATION CLASS		——	CLASS B (130℃)		
OPERATING TEMPERATURE		℃	0 to 55		

2) Dimensions
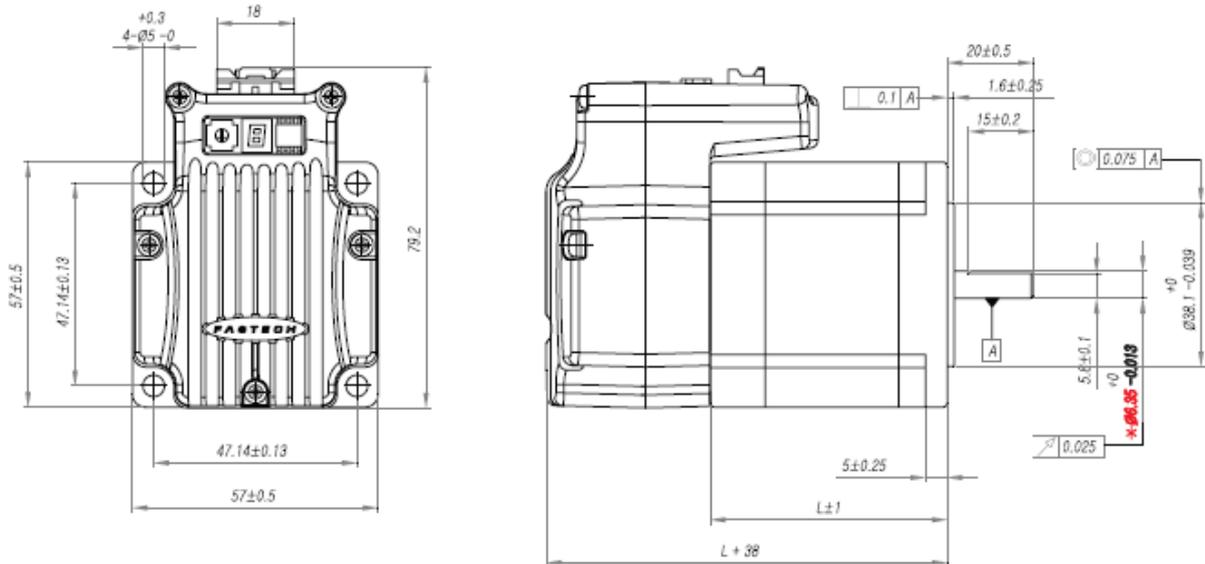
✱ : There are 2 kinds size of front shaft diameter for Ezi-STEP-ALL-56 series as Φ6.35 and Φ8.0.

### 3.3 Ezi-STEP-ALL 60 Series

1) Specifications

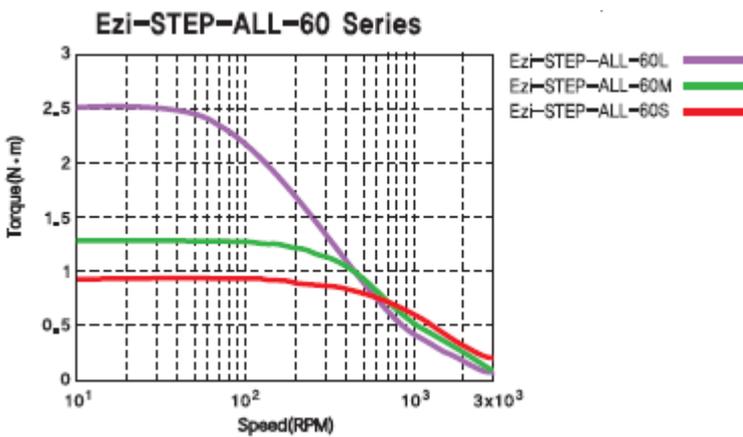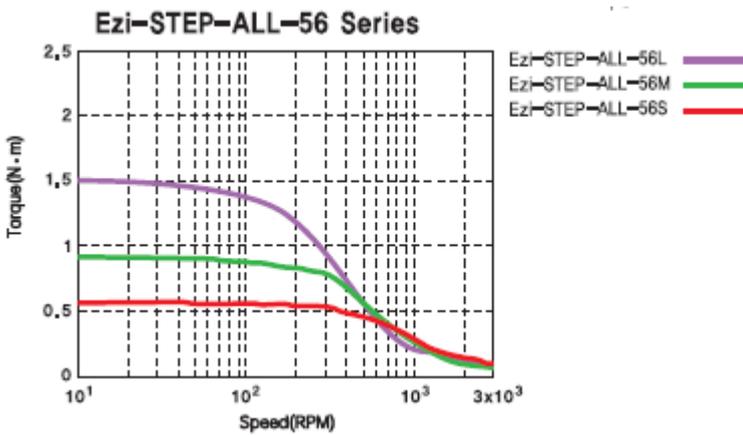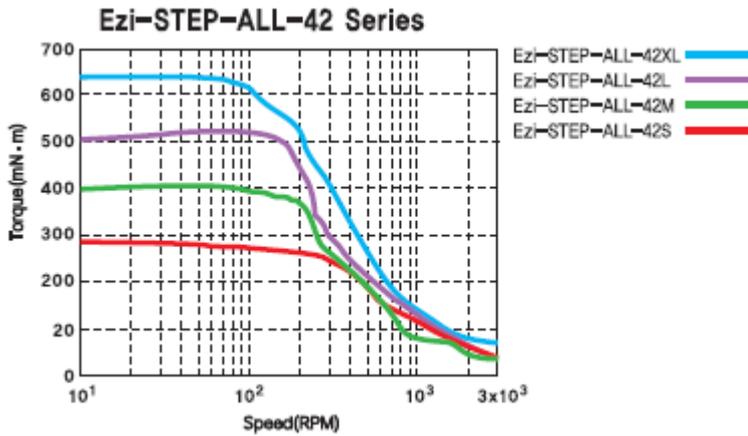| M O D E L		UNIT	Ezi-STEP-ALL 60S	Ezi-STEP-ALL 60M	Ezi-STEP-ALL 60L
DRIVE METHOD		——	BI-POLAR	BI-POLAR	BI-POLAR
NUMBER OF PHASES		——	2	2	2
VOLTAGE		VDC	1.52	1.56	2.6
CURRENT per PHASE		A	4	4	4
RESISTANCE per PHASE		Ohm	0.38	0.39	0.65
INDUCTANCE per PHASE		mH	0.64	1.2	2.4
HOLDING TORQUE		N·m	0.88	1.28	2.4
ROTOR INERTIA		g·cm²	140	320	800
WEIGHTS		g	600	900	1600
LENGTH (L)		mm	46	56	90
ALLOWABLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	70	70	70
	8mm		87	87	87
	13mm		114	114	114
	18mm		165	165	165
ALLOWABLE THRUST LOAD		N	Lower than motor weight		
INSULATION RESISTANCE		MOhm	100min. (at 500VDC)		
INSULATION CLASS		——	CLASS B (130℃)		
OPERATING TEMPERATURE		℃	0 to 55		

2) Dimensions
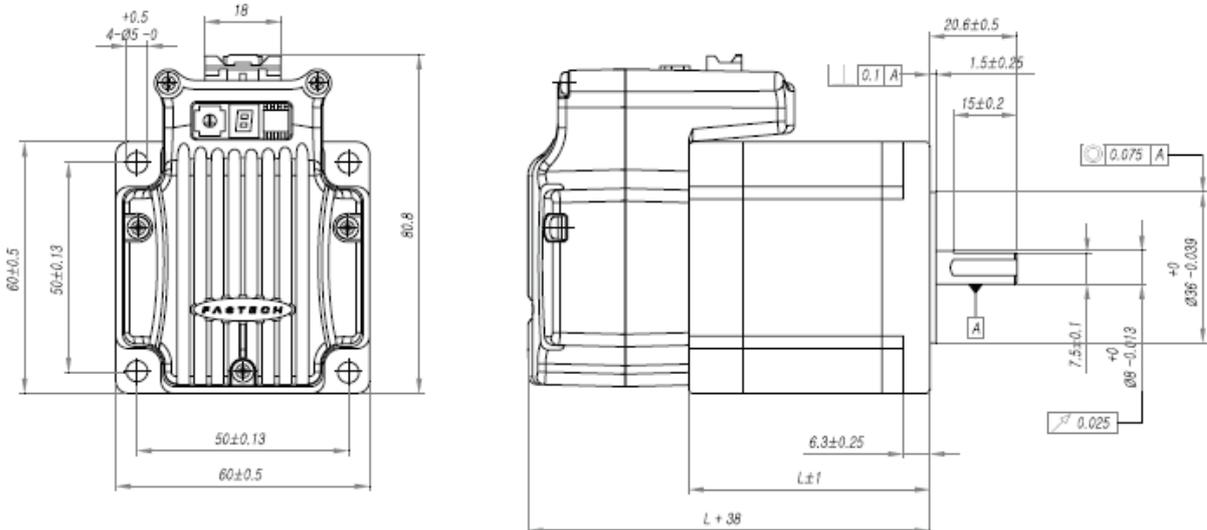
4. Characteristics of Motor Torque

Measured condition : Motor Voltage=24VDC

Motor Current=Rated Current (refer to motor specification)

Drive = Ezi-STEP-ALL

5. Configuration of the Controller

5.1 Combination of Motor and Drive

Ezi-STEP-ALL-42S-□

- Drive Series Type
- Motor Flange Size
  - 42 : 42mm
  - 56 : 56mm
  - 60 : 60mm
- Motor Length
  - S : Single
  - M : Middle
  - L : Large
  - XL: Extra Large
- User Code
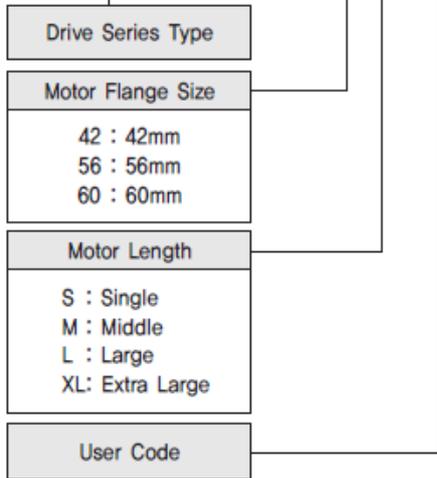
Unit Part Number
Ezi-STEP-ALL-42S
Ezi-STEP-ALL-42M
Ezi-STEP-ALL-42L
Ezi-STEP-ALL-42XL
Ezi-STEP-ALL-56S
Ezi-STEP-ALL-56M
Ezi-STEP-ALL-56L
Ezi-STEP-ALL-60S
Ezi-STEP-ALL-60M
Ezi-STEP-ALL-60L

5.2 Controller Configuration

Control Unit

Motion Controller   Network Motion Controller   PLC

① Signal Cable

Input DC Power   ② Power Cable

③ RS-485 Cable 1

⑤ RS-485 Cable 2

PC   ④ RS-485 Converter
*Option

RS-232 input

⑥ RS-232C Cable

5.3 External Wiring Diagram
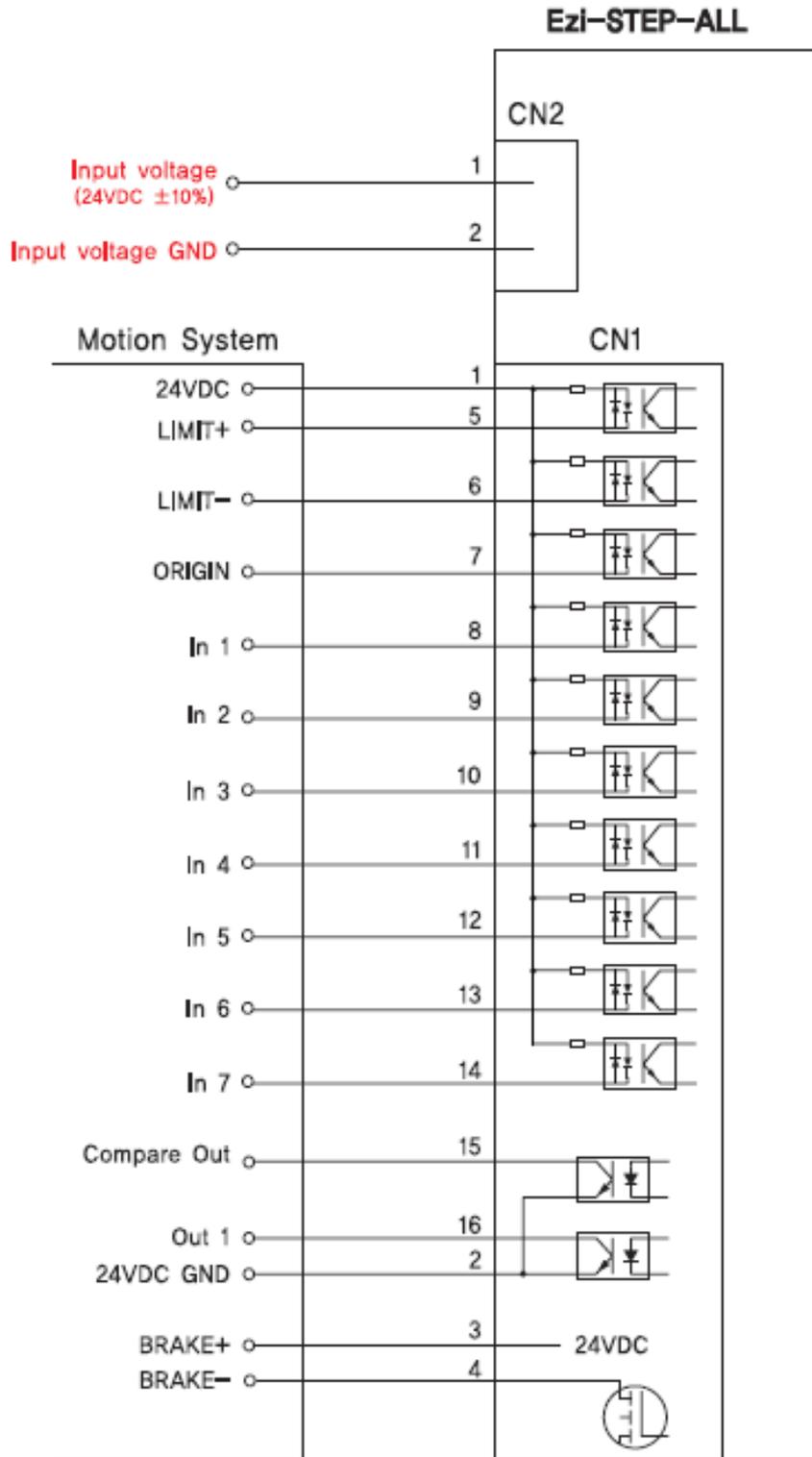
6. External Name and Function Setting

6.1 Appearance and Part Name

6.2 Terminal Resistance Select Switch(SW1)

This is used for set terminal resistance for RS-485 communication. This switch must be ON for the corresponding drive module which is connected to the end of one network segment.

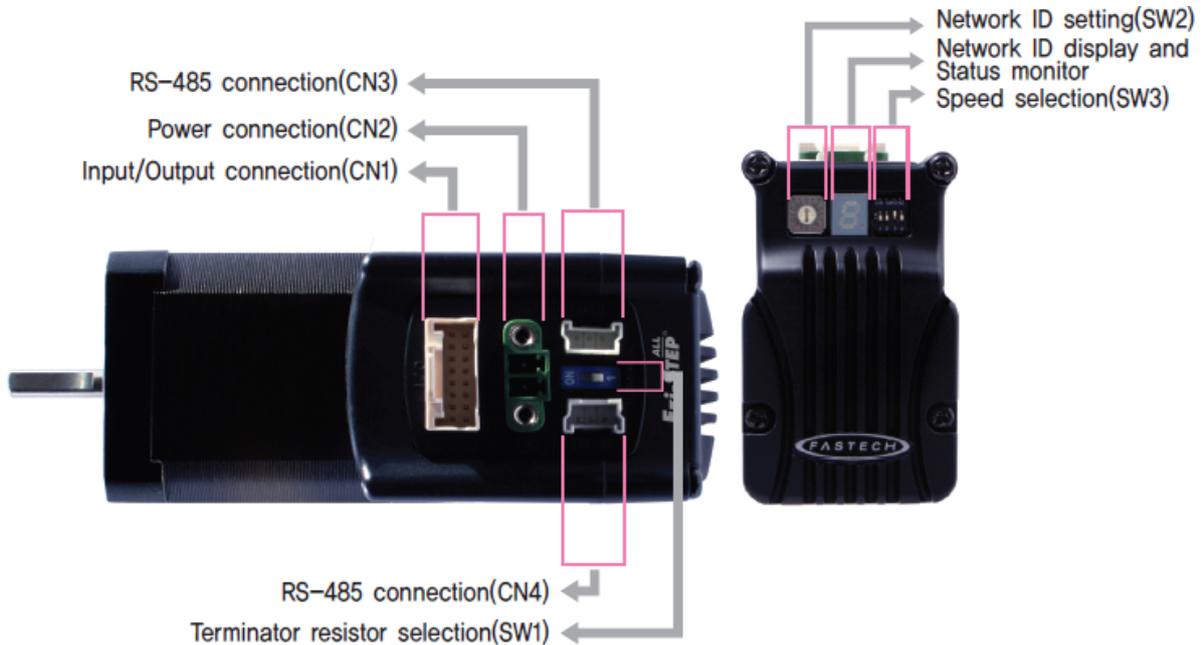## 6.3 Drive ID Select Switch(SW2)

1) When several modules are connected to one daisy chain network, this switch is to set intrinsic ID to each module.
2) The switch can set intrinsic ID to each module up to 16 numbers from 0 to F(15).

Position	ID No.	Position	ID No.
0	0	8	8
1	1	9	9
2	2	A	10
3	3	B	11
4	4	C	12
5	5	D	13
6	6	E	14
7	7	F	15

6.4 Communication Speed Select Switch(SW3)

SW3 is to set the communication speed between central controller(PC) and Drive. SW3.1~SW3.3 is to set the communication speed as follows.

⚠ Caution	The communication speed of drive modules connected to one segment must be set to the same value.

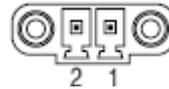| SW3.1	SW3.2	SW3.3	Baud rate [bps]
OFF	OFF	OFF	9600
ON	OFF	OFF	19200
OFF	ON	OFF	38400
ON	ON	OFF	57600
OFF	OFF	ON	115200 *1
ON	OFF	ON	230400
OFF	ON	ON	460800
ON	ON	ON	921600
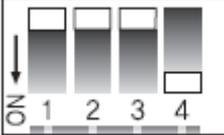
*1 : default setting value.
.

⚠ Caution	Support max. 115200[bps] when using RS-232 to RS-485 conveter

6.5 Power Connector(CN2)

Power supply connector

No.	Function
1	Power input : 24VDC ± 10%
2	Power input : GND

6.6 I/O Signal Connector(CN1)

No	Function
1	24VDC(input)
2	24VDC GND (input)
3	Brake+ (output)
4	Brale- (output)
5	+Limit Sensor (input)
6	-Limit Sensor (input)
7	Origin Sensor (input)
8	Digital IN1 (input)
9	Digital IN1 (input)
10	Digital IN1 (input)
11	Digital IN1 (input)
12	Digital IN1 (input)
13	Digital IN1 (input)
14	Digital IN1 (input)
15	Compare OUT (output)
16	Digital OUT1 (output)
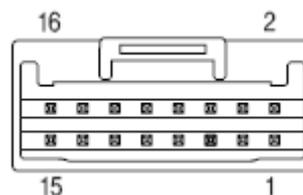
The programmable input/output pin is set by using user program(GUI) or DLL library.

⚠ Caution	Connect the Brake (current consumption is under 200[mA]) for pin 24. Refer to 7.4 Output signal for the Brake that is over 200[mA].

6.7 RS-485 Communication Connection (CN3, CN4)

No	Function
1	Data+
2	Data-
3	GND
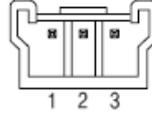
7. Control I/O Signal

7.1 Signal Cabling

All control I/O signals use connector CN1 as specified below.
1) **Input :** 「Limit+」, 「Limit-」, 「Origin」 signals are fixed to CN1 No. 5,6,7
respectively. Other signals like Reset are assigned to IN1~IN9 terminal blocks.
(3 dedicated input + 7 programmable input = total 10 input pins.)

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-, AlarmReset
11	IN4	Pause Origin Search
12	IN5	Teaching Emergency Stop(E-Stop)
13	IN6	Jump Position Table input 0 ~ Jump Position Table input 2 (JPT IN 0~ JPT IN 2)
14	IN7	Jump Position Table start (JPT Start) User input 0 ~ User input 8 (User IN 0 ~ User IN 8)

2) **Output :** 「COMP」 signal is dedicated to CN1 No.15. Other signals like
Alarm are assigned to OUT1 terminal blocks.
(1 dedicated output + 1 programmable output = total 2 output pins.)

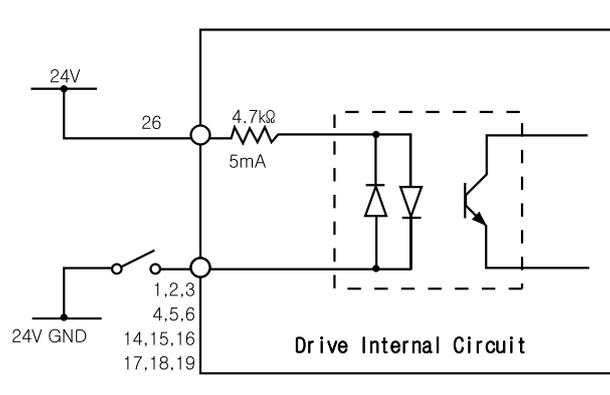| CN1 No.	Signal Name	Function
15	COMP	Specific output signal
16	OUT1	Alarm, Moving Acc/Dec ACK, END AlarmBlink OriginSearchOK ServoReady Brake Position Table output 0 ~ Position Table output 2 (PT OUT 0 ~ PT OUT 2) User Output 0 ~ User Output 8

7.2 Connection Circuit

All drive I/O signals are insulated by a photocoupler. The signals display the internal photocoupler 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.

```
        24V
              26      4.7kΩ
                      5mA
                      1,2,3
                      4,5,6
    24V GND   14,15,16        Drive Internal Circuit
              17,18,19
```
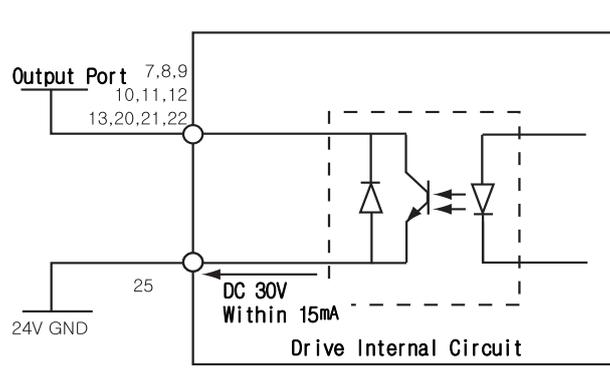
2) **Output Circuit**

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 ≤ 30V
· Electrified current ≤ 15mA

```
    Output Port  7,8,9
                 10,11,12
         13,20,21,22

              25      DC 30V
                      Within 15mA
    24V GND           Drive Internal Circuit
```

3) **Connect NPN type Output signal**

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

DRIVE   **CONTROLLER**

4K7
+24V(EXT)   +24V
OUTPUT#1

4K7
OUTPUT#2

4K7
OUTPUT#3

4K7
OUTPUT#4
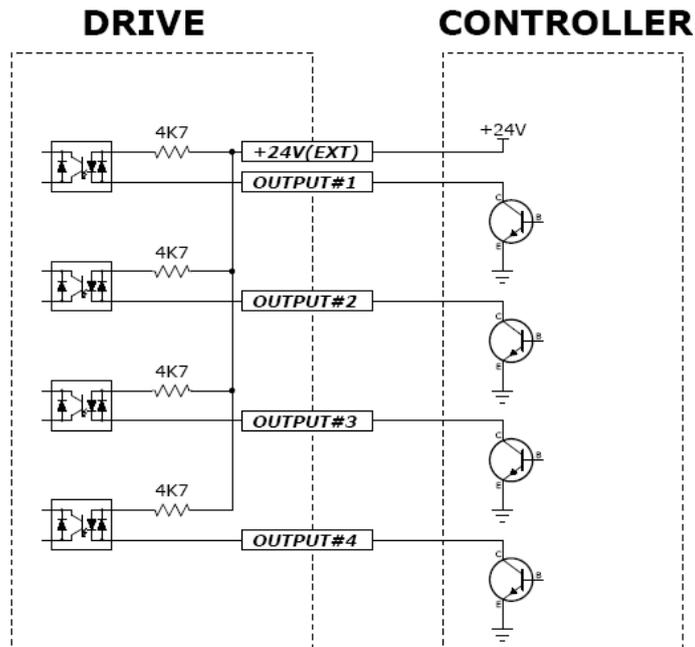
4) Connect PNP type Output signal

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

DRIVE   **CONTROLLER**

4K7
+24V(EXT)   +24V
OUTPUT#1

4K7   +24V
OUTPUT#2

4K7   +24V
OUTPUT#3

4K7   +24V
OUTPUT#4
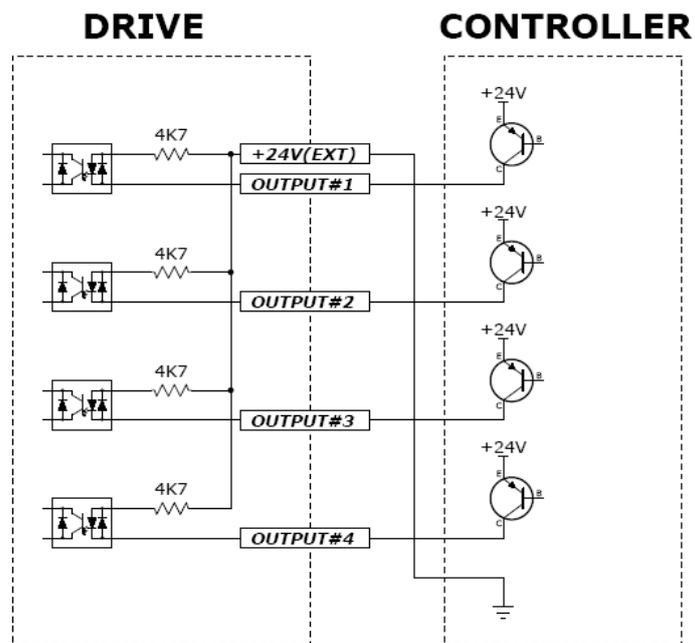
7.3 Input Signal

1) Limit Sensor and Origin Sensor

Limit sensors 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 clockwise and counterclockwise to prevent mechanical collision. Origin sensor is to set the origin of equipment.
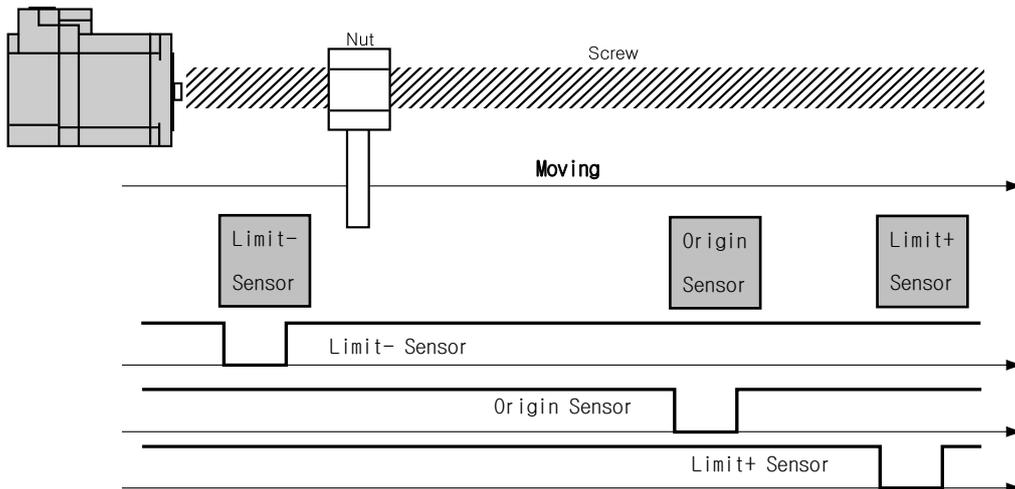
2) Clear Pos

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.

Set the position to 0 at the rising/falling edge of this
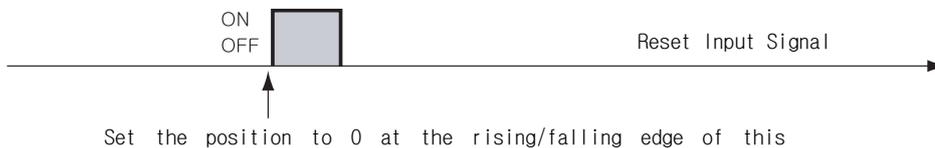
3) Position Table A0 - A7 (PT A0~A7) Input

The position table supports the machine so that its motion can be controlled by I/O signals of central controller. It can directly transmit commands such as position table number, start/stop and origin return to the machine through the PLC. Also, the user can check output signals such as completion of origin return and Servo ready through the PLC.

「Position Table A0~A7」 inputs are total 8 bits of input signal. It is used to set 64 position table numbers. There are two application methods as follows.
1) To set position table number(0~63) to be run by 'PT start' input signal.
2) To set position table number(0~63) to save current position values by 'Teaching' input signal.

By using PT A0~A7 signals, the position table address can be set from 0 to 63 with a binary number. A0 is LSB(least significant bit) and A7 is MSB(most significant bit). The following table shows how to assign position table number.

*1. Save signal cabling : If 'PT A0~A7' signal is not connected when motioning by
   'PT Start' signal, the position table number will be '0'

A7	A6	A5 ~ A3	A2	A1	A0	PT No.
0	0	0	0	0	0	0
0	0	0	0	0	1	1
0	0	0	0	1	0	2
0	0	0	0	1	1	3
... ...						
1	1	1	1	1	0	254
1	1	1	1	1	1	255

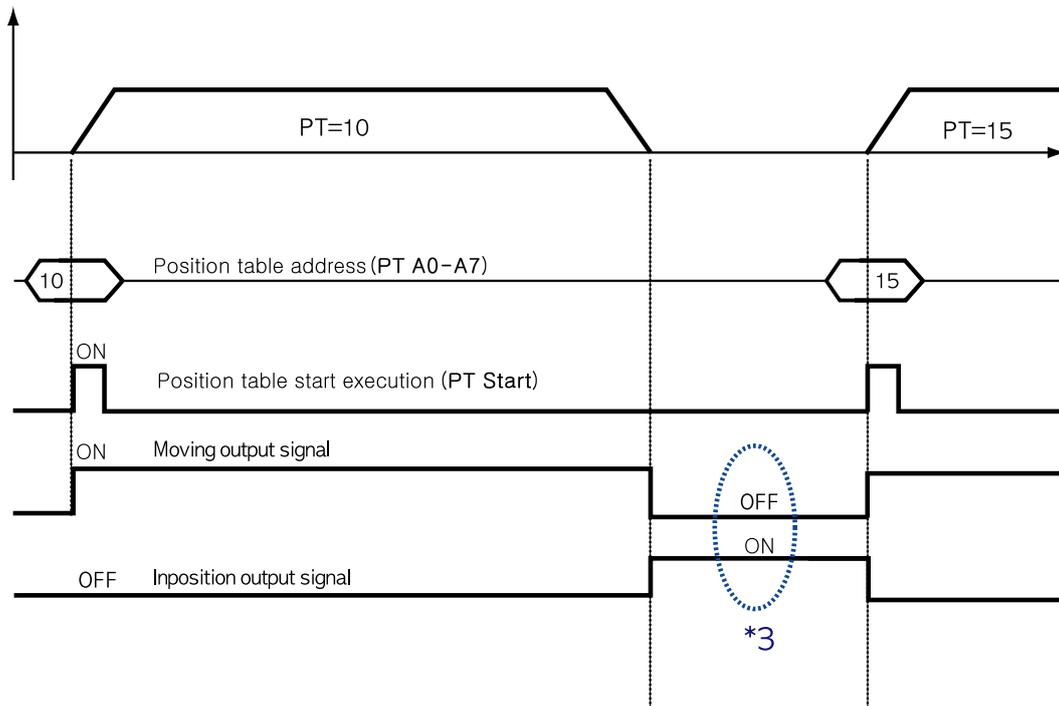## 4) Position Table Start (PT Start) Input

By using PT A0~A7 signals, set and input the running PT start number. Then the
motion pattern corresponding to the PT No. will be executed.

Following example shows that total 6 motion patterns are in order executed 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.
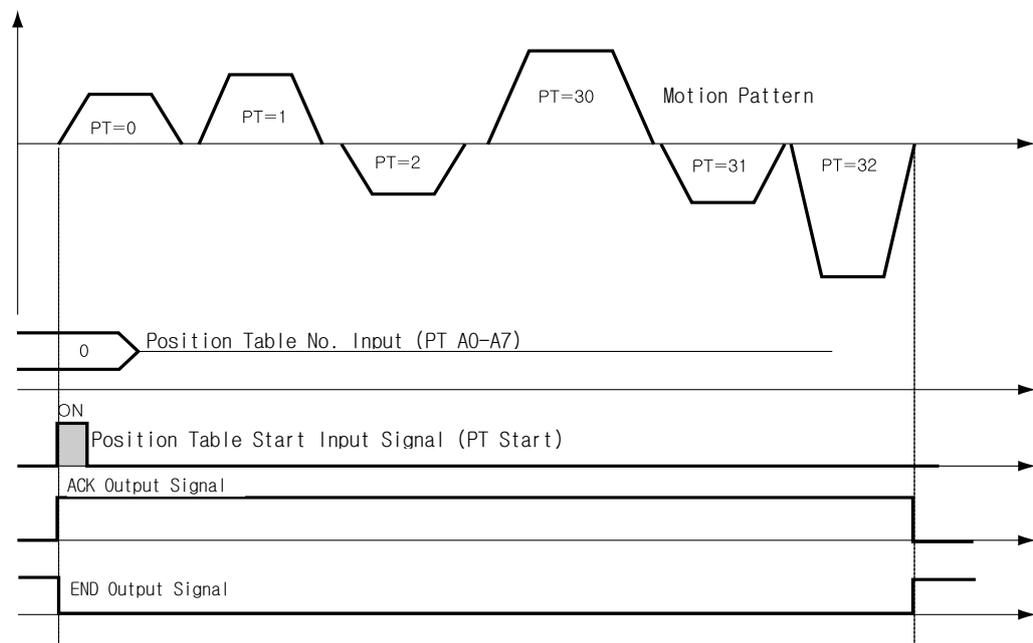
*1. Timing of signals : PT A0~A7 signals must be set before(50msec)
                        PT Start signal set to [ON].
*2. If the PT A0~A7 signals are not used and the PT Start signal set to [ON],
    the PT No. 0 will be executed.

| 10 | Position table address (PT A0-A7) | | 15 |

Position table start execution (PT Start)

Moving output signal

Inposition output signal

*3

*3. Checking the 'Moving' and 'Inposition' signals :
    Between sequencial 'PT Start' motion command signal, the checking step
    for motion status(Moving, Inposition) is needed before next motion command.

5) Soft 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.

Motion Pattern

Soft Stop Signal
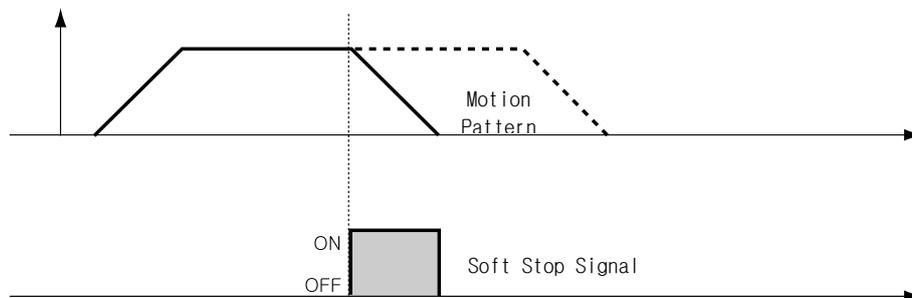
6) Jog+ and Jog- Input

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).
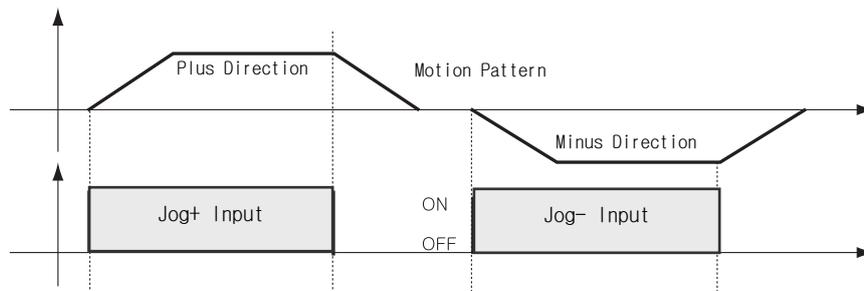
7) AlarmReset Input

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 working.

When 'STEP OFF' button click of 'Motion Test' window, the drive stops supplying the current to the motor and so the user can directly adjust the output position. When you click 'STEP 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.
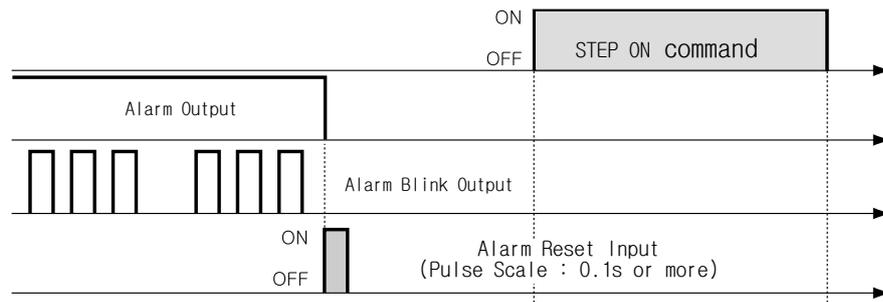
8) Pause Input

When Pause signal is set to ON, the motion in service is stopped. There are two pause signal operation modes as follows.

① Case A : When Pause signal is set to ON, the motor starts to decelerate. Pause signal becomes OFF before the motor is completely stopped. To start motion, Pause signal should be set to ON.
② Case B : When Pause signal is set to ON, the motor starts to decelerate. The signal is continuously maintained since the motor is completely stopped. To start motion, Pause signal should be set to OFF.

Pause signal pulse scale is 10ms or more.
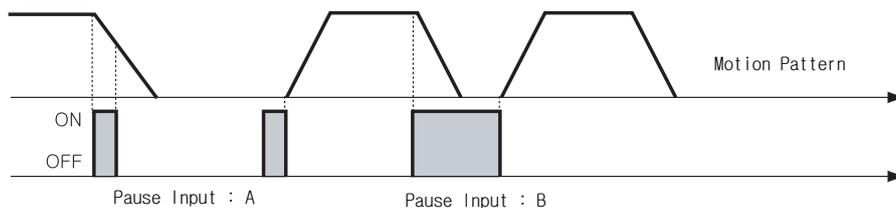
*1. This function is not applied while 'Repeat Test' of the User Program(GUI) is executing.

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.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 '12.Parameter'.) When the origin search command is ended, 'Origin Search OK' signal is set to ON to CN1 connector's output port.
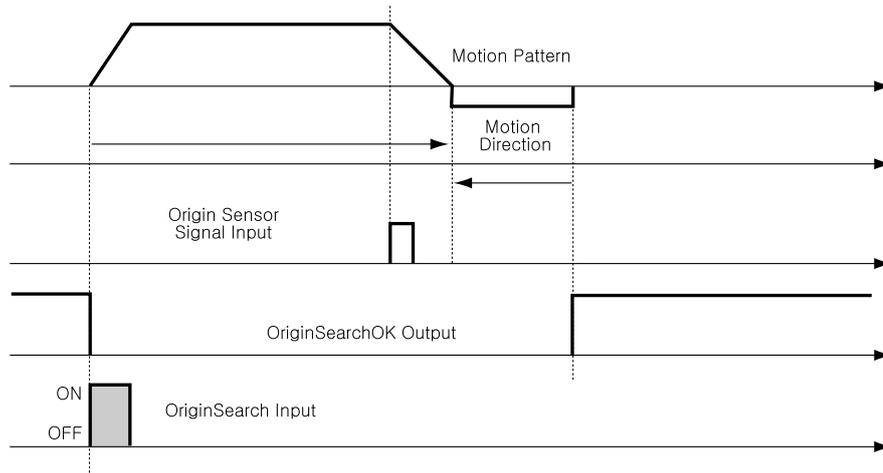
10) Teaching Input

Teaching signal functions that the position value[pulse] being working can be automatically inputted into a 'position' value of a specific position table. If it is hard to calculate the exact moving distance(position value) of specific motion mechanically, the user can measure the distance(position value) easily by using this signal.

1) By using User Program(GUI), set a command type of corresponding PT number among 4 kinds of absolute moving commands(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 save to the position value of corresponding PT. At this time, it becomes the absolute position value.
4) Teaching signal pulse scale is 10ms or more.
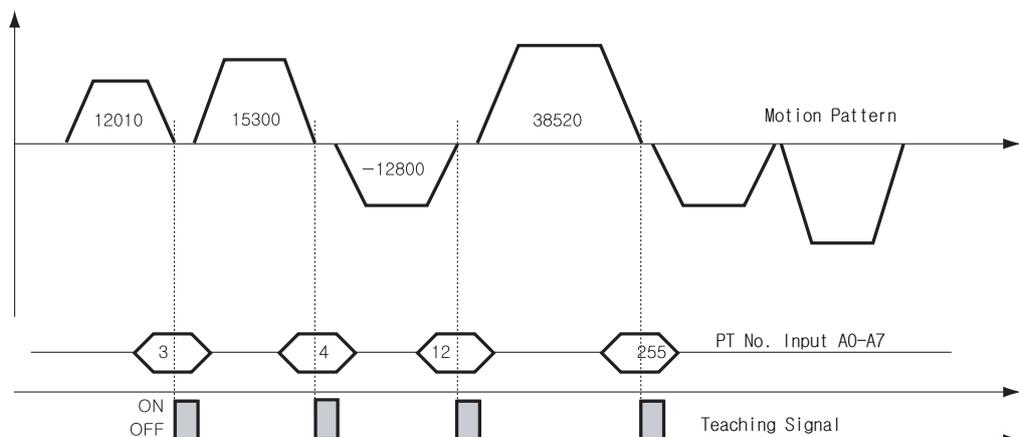
PT No.	Position Value [pulse] of Corresponding PT
3	12010
4	15300
12	-12800
255	38520

* After executing Teaching, click 'Refresh' icon, and the position value will be displayed to the position table.
* Click 'Save to ROM' icon, and the position value will be saved to the ROM area.
* Teaching signal can be used by two methods; the user assigns actual signal to the motor, or he clicks 'Teaching' icon at the 'I/O Monitoring' window of User Program(GUI).

11) E-Stop Input

When 'Emergency stop' signal is set to ON, the current motion is stopped immediately without deceleration. E-Stop signal is active in ON level and pulse scale is 10ms or more.
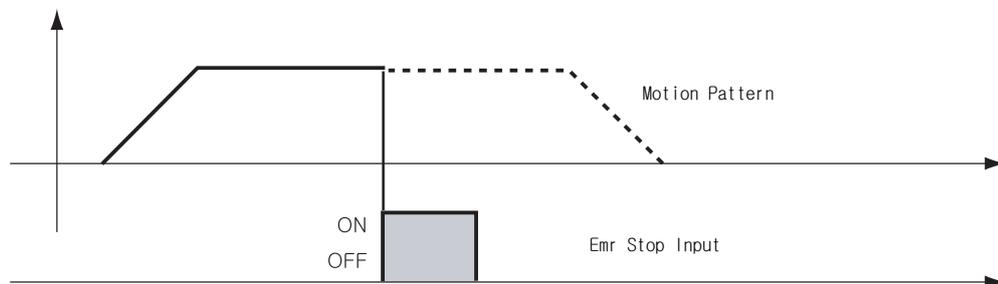
12) JPT Input0~Input2 (Jump Position Table Input) Input

To select motion pattern(position table number) to be subsequently executed according to input signal conditions.

【Example】 If PT 14 motion is operating, when there is no other input signal, next motion becomes PT 15 as shown in Figure 1). However, if 'JPT Input0~Input2' input signal is set to ON while PT 14 is executing, each corresponding position number is executed as shown in Figure 2)~4).

PT 14 Data

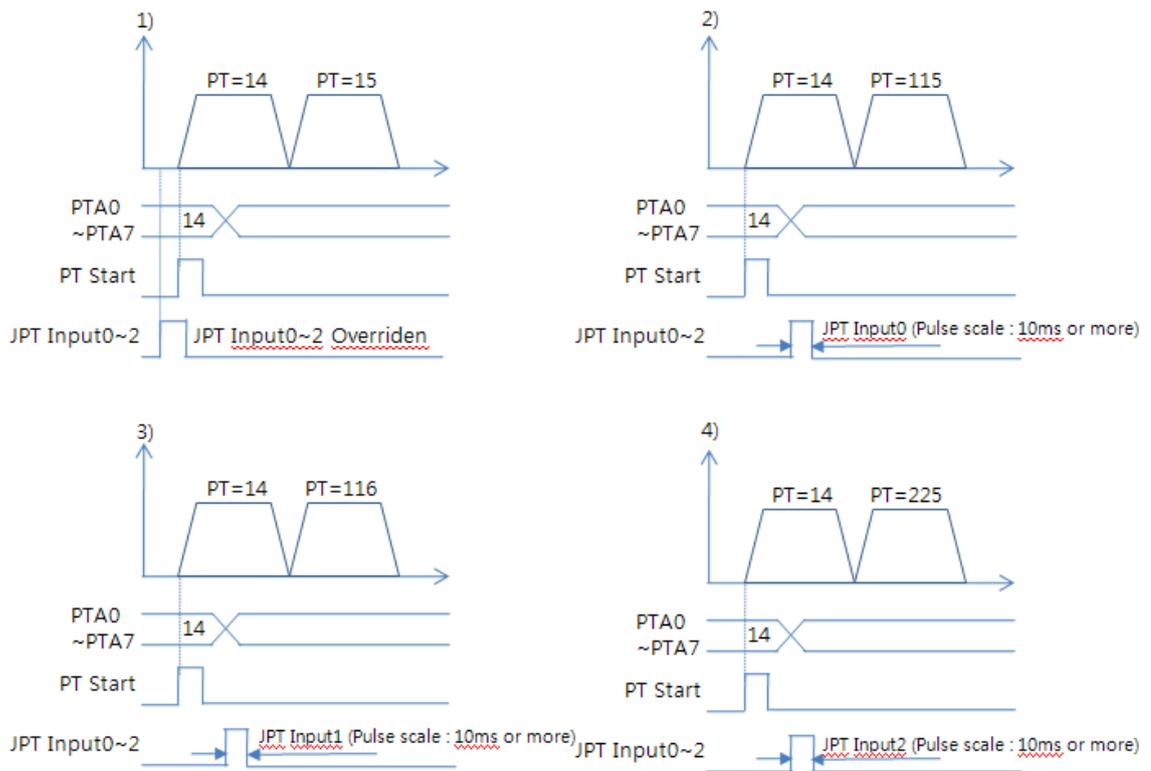| PT No.	···	JP Table No.	JPT 0	JPT 1	JPT 2
14	···	15	115	116	225

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 「13) '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
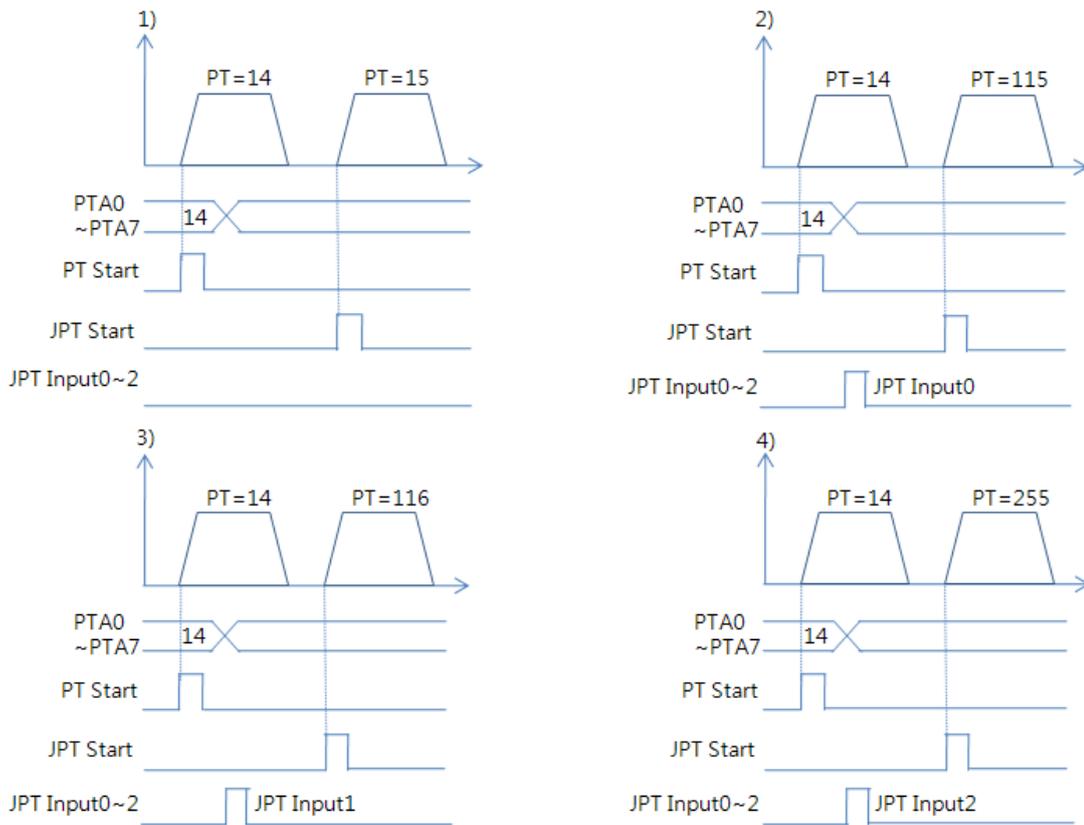
7.4 Output Signal

1) 'Compare Out' Output
'Compare out' signal is displayed when specific conditions are performed. It is fixed to CN1 connector's COMP pin. And it is available when the motor needs to be synchronously controlled by an external controller.

2) 'Alarm' & 'AlarmBlink' 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. And alarm output is set to ON and also 'AlarmBlink' flash so that the user can check abnormality type. The following table shows alarm type according to flash count.

Flash Count	Alarm Name	Condition
1	Over Current	The current through power devices in inverter exceeds the limit value
2	Over Speed	Motor speed exceed 3000rpm
3	Step Out	Abnormally motor do not followed pulsed input
5	Over Temperature	Inside temperature of drive exceeds 55℃
6	Over Regenerative voltage	Back-EMF more high limit value*1
7	Motor Connect error	The power is ON without connection of the motor cable to drive
9	Motor Voltage error	Motor voltage is out of limited value*2
11	System error	Error occurs in drive system
12	ROM error	Error occurs in parameter storage device(ROM)
14	Input voltage error	Power source voltage is out of limited value*3

*1 50V : Ezi-STEP-ALL42, Ezi-STEP-ALL56, Ezi-STEP-ALL60 model
*2 20V : Ezi-STEP-ALL42, Ezi-STEP-ALL56, Ezi-STEP-ALL60 model
*3 32V : Ezi-STEP-ALL42, Ezi-STEP-ALL56, Ezi-STEP-ALL60 model

3) 'PT ACK' and 'PT END' Output
'ACK' and 'END' signals are available only when the motion is executed by position table. When ACK signal is set to ON and END signal is set to OFF, all motion loops are finished. Then ACK signal becomes OFF and END signal becomes ON. Refer to 「Ezi-STEP ALL User Manual – 'Position Table Function' 」.

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.
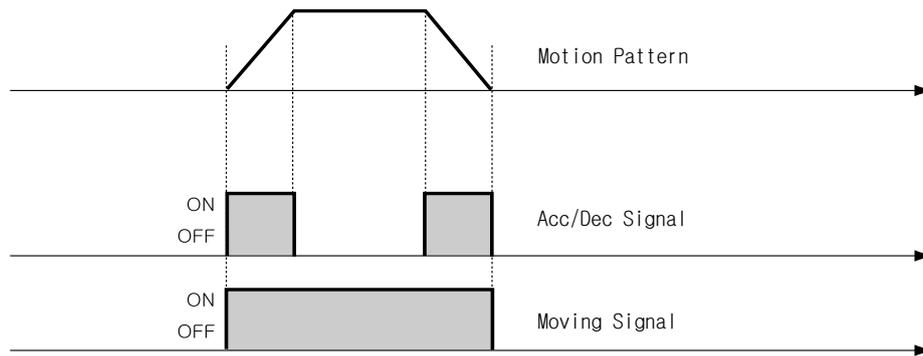
5) 'Org Search OK' Output

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 「7.3 Input Signal - 9) Origin Search Input」.

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

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. If 'Start/Stop Message Function' is not used, this signal should be set to 0 or 8. At the position set with other values, the motion operates as follows.

- If PT set items are set to '1~7', when the position starts to move, PT Output HEX value is displayed to 'PT Output 0 ~ PT Output 2'.
- If PT set items are set to '9~15', the position motion is finished and then PT Output HEX value is displayed to 'PT Output 0 ~ PT Output 2'.

For more information, refer to 「Ezi-STEP ALL User Manual – Position Table Function」.

7) 'BRAKE+' and 'BRAKE- '

This function is used for protect motor rotation in STEP ON status.

DC +24V is connect to 'BRAKE+' for brake logic and brake control signal is connect to 'BRAKE- '.

It takes some times to supply the current to the motor after STEP ON.

So the Brake signal change to release status after 200[msec] delay.

This function is optional.

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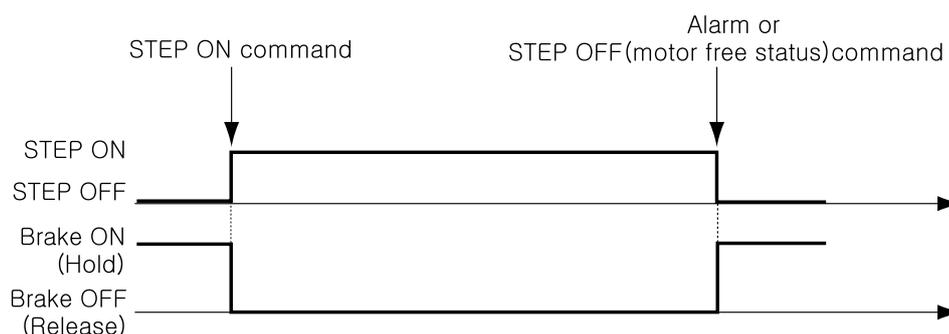
8) 'Brake' Output

This function can be used when the Brake signal is assigned to OUTPUT1 of CN1 connector. This is used for protect motor rotation in STEP ON status. The signal timing diagram between STEP ON command and Brake signal is same as 7) 'BRAKE+' and 'BRAKE- ' Output.

This signal used for the Brake that is over 200[mA]/DC24V of current consumption. Brake, Relay and diode is needed for this function and the signal connection diagram is as follows.

*1 Brake : User selected Brake
*2 Relay : under 15[mA] / DC24V
*3 Diode : 1N4004 or equivalent
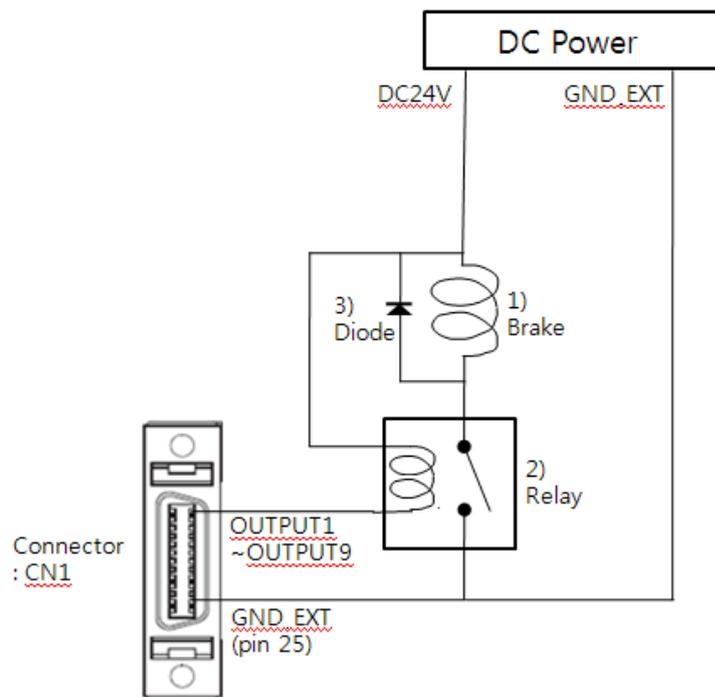
8. Operation

8.1 Power Supply Timing

Ezi-STEP ALL is supplied power through drive module to motor. Therefore, connect the drive and the motor with a cable and then supply power to the drive module. After power is supplied, the motor is basically set to STEP ON status.

8.2 STEP ON/OFF Operation

Drive is 'STEP ON' status after power is supplied.

(1)Click 「STEP OFF」 on 'Motion Test' window :

It is possible to rotate the motor to move initial position by hands. Because there's no current supplied to motor ('motor free' status).

(2)Click 「STEP ON」 on 'Motion Test' window :

The motor is prepared to normal motioning by current supply to motor.

'AlarmReset' command is used for this function through DLL program.

8.3 Operation Mode

This controller can do three control operations such as I/O command, communication command(DLL program), and User Program(GUI)

(1) I/O Command Mode

This controller can execute control operation like Incremental move by I/O command transmitted from the upper controller. The Incremental move control operation is executed by operating position table with I/O command.

(2) Communication Command Mode

This controller can execute control operation like Incremental move by command transmitted from the upper controller. The Incremental move control operation is executed by operating position table with I/O command

Position Table Operation Sequence

In case of Ezi-STEP ALL, the system can execute 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 STEP OFF, set the controller to STEP ON by communication program or STEP ON(AlarmReset) 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-STEP

ALL, 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.

Speed Control Operation

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

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

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

Parameter Name	Setting Content	Range
Axis Max Speed	Operation speed after acceleration is finished	1~500,000[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
Pulse per Revolution	Number of pulses per revolution. The range of 'Axis Max Speed' parameter is depend on this value.	0~15

Teaching Function

Teaching can be executed only by User Program(GUI). For more information, refer to 「User Manual – Position Table Function」.

9. Other Operation Functions

9.1 Position Table(PT) Operation Example

Input ‘PT A0~ PT A7’ signals to set PT number. Input ‘PT Start’ number to execute speed control operation. For more information, refer to 「User Manual - Position Table Function」.

【Position Table Setting】

PT No.	Command type	Position	Low Speed	High Speed	Accel. time	Decel. time	Wait time	Continuous Action	JP Table No.
0	3	10000	1	2500	50	300	0	1	1
1	3	1000	1	500	-	-	0	1	2
2	3	5000	1	1500	50	300	300	0	3
3	3	-2500	1	1000	300	300	0	0	-
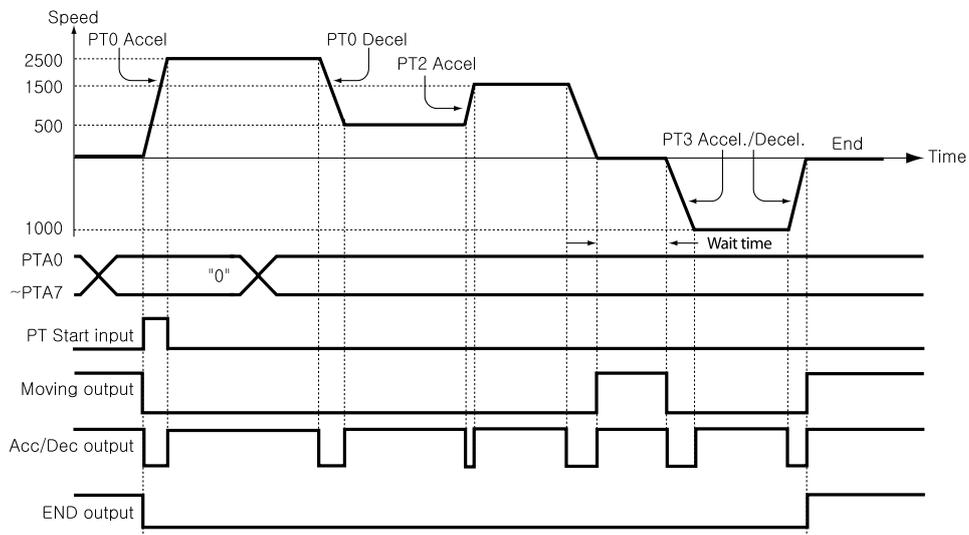
9.2 Jog Operation Example

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]

9.3 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 ca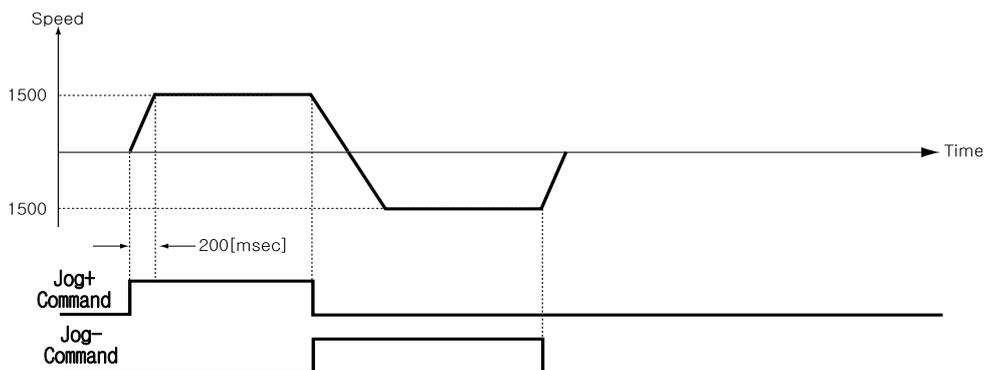n execute origin return with User Program(GUI) and DLL program. The following table shows parameter types related to origin return.

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	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	0~2
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.	-134,217,727 ~ 134,217,727
Org Position Set	After origin return is finished, 'Command Pos' value is set to this setting value.	-134,217,727 ~ 134,2177,27
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.

① Common Origin (In case of 'Org Method' = 0)
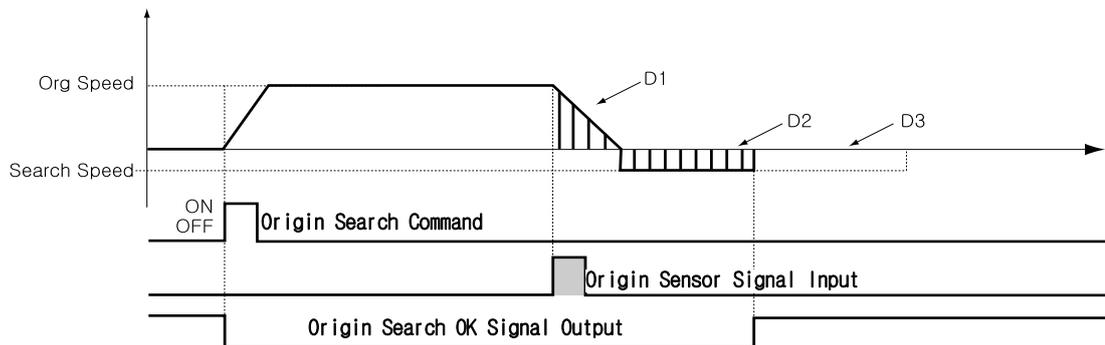
The machine moves up to the origin sensor by 'Org Speed' and 'Org Acc Dec Time' parameters and then finishes precise origin return at the low speed set to 'Org Search Speed'. The machine senses the origin sensor and moves as far as D1 and then stops. And the machine changes its moving direction and additionally moves as far as D2 and then stops. D1 and D2 are the same moving distance. If Org Offset parameter is not '0', the machine moves additionally as much as the parameter (ex: D3) and then stops. If the limit sensor is sensed while the machine is under origin return, the machine stops and reverses its moving direction and then continues to origin return operation.

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

This method can be used when external encoder is connected.
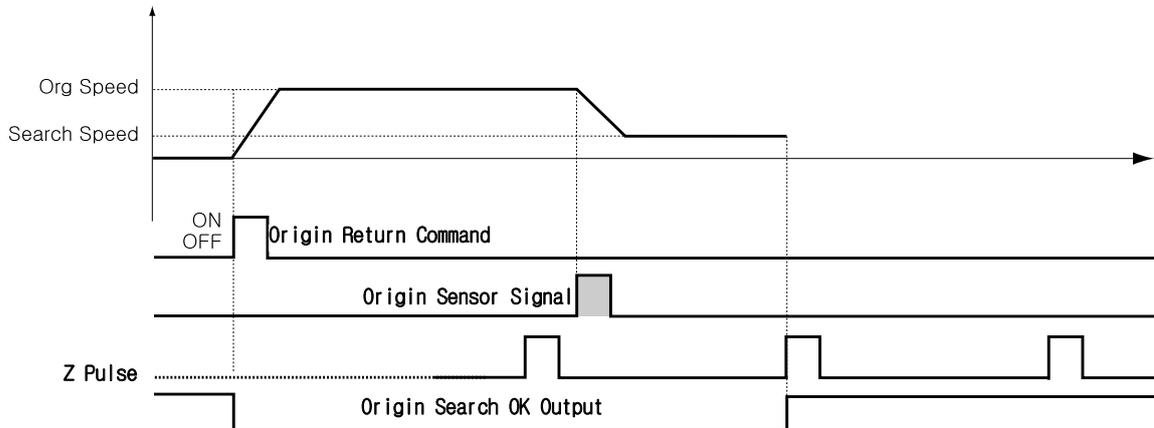
The machine moves up to the origin sensor by 'Org Speed' and 'Org Acc Dec Time' parameters and then finishes Z-pulse origin return at the low speed set to 'Org Search Speed' . That is, after the origin sensor is sensed, the machine moves slowly to the original moving direction until Z-pulse signal is sensed.

③ Limit Origin (In case of 'Org Method' = 2)
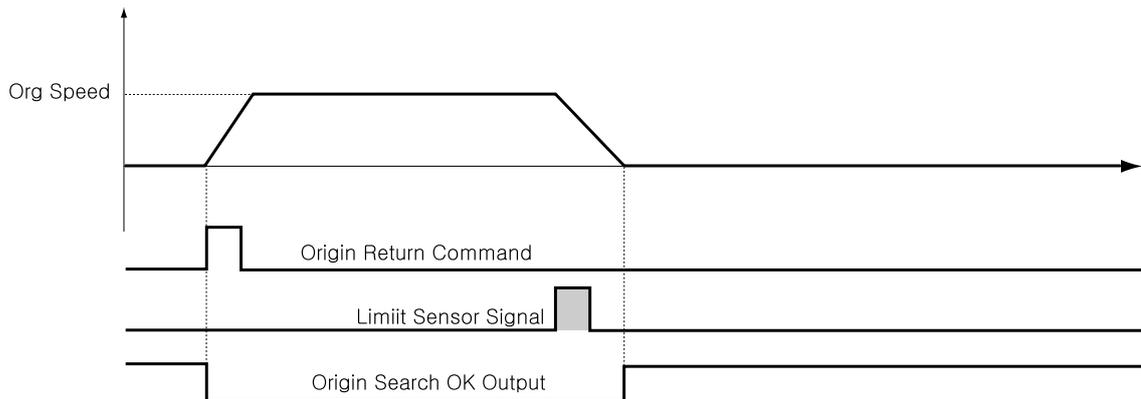
The machine moves up to the spot which the limit sensor is sensed by 'Org Speed' parameter, and stops by 'Org Acc Dec Time' value. The moving direction complies with as set in 'Org Dir' .
If there's no limit sensor on your system, you can set 'Origin' by 'S/W Limit Plus Value' and 'S/W Limit Minus Value' of parameters.

(2) Origin Return Procedure
Origin return is executed to the following procedure.
① Set parameters required to origin return.
② Start origin return operation to the rising edge of control input origin search or the communication program.

(3) Interruption of Origin Return

When the machine is under origin return, click 'Stop' or 'E-Stop' to stop the machine. In this case, the machine's origin is not edited and origin return is not finished either.

(4) Output of Origin Return Finish

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.

9.4 Stop Operating

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 motor will not 'STEP OFF' ('motor free' status). In case emergency stop, the machine stops immediately without deceleration. So, a special caution for mechanical impact is required.

10. Communication Function

In case of RS-485, up to 16 axes can be controlled by the multi-drop link(daisy chain).

⚠ Caution	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.

10.1 Connection with the PC

There are one method of connecting the drive and the PC by RS-485(serial communication). PC's RS-232C port is used. By using following communication converters according to each communication type, the user can connect the PC and the drive module. The maximum communication speed is 115200[bps] with RS-232 to RS-485 converter.

RS-485 Converter (to RS-232)

For connection with the PC, refer to 「5.2 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 have problems without power, DC 5~24V external power can connect. The signal is wired as follows.

PC Connector (DB-9 female)		Cable Connection	Converten 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	
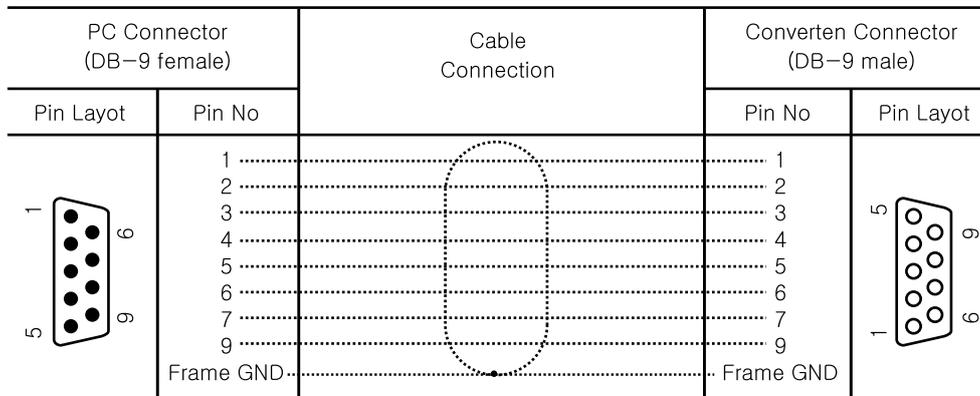
2) Cable of connecting RS-485 Converter and Drive Module(CN5 : Ezi-SERVO-PR only)

Connector Type : RJ45
Cable Type   : LAN cable, CAT5E or better (UTP or STP)

Signal Wiring : Standard Straight Wiring
               (1↔1, 2↔2, 3↔3,···, 8↔8)

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.

RJ45 Pin No.	UTP CAT5E 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	The cable length of RS-485 Converter<->Drive or Drive<->Drive must be longer than 60 cm.

3) Cable of connecting RS-485 Converter and Drive Module(CN3, CN4)
   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

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

10.2 Communication Interface Circuit
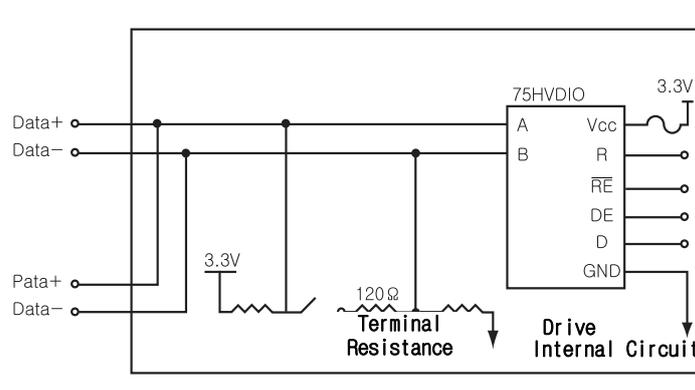
The above figure shows an I/O circuit of RS-485 communication interface signal. When communication is connected, Ezi-STEP ALL maintains the receive stand-by status. It performs sending only when it receives the signal from upper communication and then replies. For more information about communication function, refer to 「User Manual - Communication Function」 in a separate volume.

11. Protective Function

11.1 Alarm Type

When an alarm occurs while the controller is operating, a red LED among status display LEDs flash and the following protective function will be displayed according to flash count.

Flash Count	Alarm Name	Condition
1	Over Current	The current through power devices in inverter exceeds the limit value
2	Over Speed	Motor speed exceed 3000rpm
3	Step Out	Abnormally motor do not followed pulsed input
5	Over Temperature	Inside temperature of drive exceeds 55℃
6	Over Regenerative voltage	Back-EMF more high limit value*1
7	Motor Connect error	The power is ON without connection of the motor cable to drive
9	Motor Voltage error	Motor voltage is out of limited value*2
11	System error	Error occurs in drive system
12	ROM error	Error occurs in parameter storage device(ROM)
14	Input voltage error	Power source voltage is out of limited value*3

*1 50V : Ezi-STEP-ALL42, Ezi-STEP-ALL56, Ezi-STEP-ALL60 model

*2 20V : Ezi-STEP-ALL42, Ezi-STEP-ALL56, Ezi-STEP-ALL60 model

*3 32V : Ezi-STEP-ALL42, Ezi-STEP-ALL56, Ezi-STEP-ALL60 model

11.2 Acquiring Alarm Information

When an alarm occurs, the motor become STEP OFF(motor free) and then stops by free run and at the same time displays alarm message.

Also, 'AlarmBlink' signal repeats On/Off according to the timing as illustrated below. The red LED flash every 0.5 second in accordance with alarm number and wait for 2 seconds. And then red LED flash repeatedly until inputting 'AlarmReset' signal.

(Example) Alarm 3: 'AlarmBlink' display signal occurred when the Stall is occur.

11.3 Alarm Reset

If an alarm occurs, remove its cause and then release it. The alarm can be released as follows. In case of alarms of which 'Reset' column is indicated to 'Invalid', power must get downed prior to releasing the alarms.

Flash Count	Alarm Name	Description	Reset
1	Over Current	Check the mechanical status such as parameter setting, motor's short-circuit, or machine load (whether machine edge is collided), etc.	Valid
2	Over Speed	Check parameter setting, and abnormal operation of the motor.	Valid
3	Step Out	Get down the load or increase the acceleration or deceleration speed.	Valid
5	Over Temperature	Get down the ambient temperature or install a cooling fan.	Valid
6	Over Regenerative voltage	In case of high-speed operation, check if the acceleration or deceleration speed is low.	Valid
7	Motor Connect error	Check the connection status of drive and motor.	Invalid
9	Motor Voltage error	Check if power is supplied to the drive.	Invalid
11	System error	Check the green LED of CN5.	Invalid
12	ROM error	Check the green LED of CN5.	Invalid
14	Input voltage error	Check if power is supplied to the drive.	Invalid

12. Parameter

12.1 Parameter List

No.	Name	Unit	Lower Limit	Upper Limit	Default
0	Pulse per Revolution		0	15	10
1	Axis Max Speed	[pps]	1	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	9999	100
5	Speed Override	[%]	1	500	100
6	Jog Speed	[pps]	1	500,000	5,000
7	Jog Start Speed	[pps]	1	35,000	1
8	Jog Acc Dec Time	[msec]	1	9,999	100
9	Servo Alarm Logic		0	1	0
10	Servo On Logic		0	1	0
11	Servo Alarm Reset Logic		0	1	0
12	S/W Limit Plus Value	[pulse]	-134,217,727	+134,217,727	+134,217,727
13	S/W Limit Minus Value	[pulse]	-134,217,727	+134,217,727	-134,217,727
14	S/W Limit Stop Method		0	1	1
15	H/W Limit Stop Method		0	1	1
16	Limit Sensor Logic		0	1	0
17	Org Speed	[pps]	1	500,000	5,000
18	Org Search Speed	[pps]	1	500,000	1,000
19	Org Acc Dec Time	[msec]	1	9,999	50
20	Org Method		0	2	0
21	Org Dir		0	1	0
22	Org Offset	[pulse]	-134,217,727	+134,217,727	0
23	Org Position Set	[pulse]	-134,217,727	+134,217,727	0
24	Org Sensor Logic		0	1	0
25	Stop current	[%]	10	100	50
26	Motion Dir		0	1	0
27	Limit Sensor Dir		0	1	0
28	Encoder Multiply Value		0	3	0
29	(Reserved : Motor Lead)		1	50	1
30	(Reserved : Gear Ratio)		1	50	1

12.2 External Encoder Connection

When external encoder is connected to Ezi-STEP PlusR, the user have to set correct parameters for specification of encoder. But for Ezi-STEP ALL, the user can not connect external encoder.

‘No.0 (Pulse per Revolution)’ : resolution value that include the multiply value.
‘No.28 (Encoder Multiply Value)’ : encoder multiply value

12.3 Parameter Description

No.	Description	Unit	Lower Limit	Upper Limit	Default
0	**Pulse per Revolution :** Number of pulses per revolution. 	Vaule	ppr	Vaule	ppr
---	---	---	---
0	500	8	6400
1	1000	9	8000
2	1600	10	10000
3	2000	11	20000
4	3200	12	25000
5	3600	13	36000
6	4000	14	40000
7	5000	15	50000			0	15	10
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	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	35,000	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. Possible range is different from Axis Speed. (Ex.1) Axis Start Speed=1, Move Speed=400000 : 1~1430 [msec] (Ex.2) Axis Start Speed=1, Move Speed=10000 : 1~350 [msec]	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. Possible range is different from Axis Speed same as 'Axis Acc Time' parameter	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	500,000	5000
7	**Jog Start Speed :** When jog position moving command is given, this mode sets the operation start speed to [pps] unit.	pps	1	35,000	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	**Alarm Logic :** When the motor or the drive is defective and so alarm signal output is ON through CN1 connector, this mode sets the output signal level. ♦ 0 : 0 V (Active low level) ♦ 1 : 24V (Active high level)		0	1	0

10	**Run/Stop Logic:** When the motor is run, this signal output is ON through CN1 connector, this mode sets the output signal level. ♦ 0 : When motor is run, 0 V (low level) is outputted. ♦ 1 : When motor is run, 24V(high level) is outputted.		0	1	0
11	**Alarm Reset Logic :** When the motor or the drive is defective and so an alarm occurs, this mode sets the input signal level to release the alarm signal. Before releasing the alarm signal, the user must release its cause. ♦ 0 : 0 V (Active low level) ♦ 1 : 24V(Active high level)		0	1	0
12	**S/W Limit Plus Value :** When position moving commands(absolute move, incremental move, jog) are given, this move set the maximum input limit that the motor can move to the plus(+) direction with 28 bits. When this value set to '0', S/W Limit function is canceled	pulse	-134,217,727	+134,217,727	+134,217,727
13	**S/W Limit Minus Value :** When position moving commands(absolute move, incremental move, jog) are given, this move set the minimum input limit that the motor can move to the minus(-) direction with 28 bits.. When this value set to '0', S/W Limit function is canceled	pulse	-134,217,727	+134,217,727	-134,217,727
14	**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
15	**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
16	**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
17	**Org Speed :** 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
18	**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	500,000	1,000
19	**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

20	**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 value of 'Org Search Speed'. ♦ 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'. ♦ 2 : The motor moves up to the limit sensor spot by 'Org Speed' and then immediately stops. *Z-pulse mode : can used when external encoder connected For more information, refer to '9.3 Origin Return' .		0	2	0
21	**Org Dir :** In case of origin return, this mode sets the revolution direction of the motor. ♦ 0 : moves the motor clockwise. ♦ 1 : moves the motor counterclockwise.		0	1	0
22	**Org Offset :** After origin return is finished, the motor moves additionally as this setting value and then stops. 'Command Pos/Actual Pos' is set to '0'. If 'Org Method' is set to '2', this value is ignored.	pulse	-134,217,727	+134,217,727	0
23	**Org Position Set :** After origin return is finished, 'Command Pos/Actual Pos' value is set to this setting value.	pulse	-134,217,727	+134,217,727	0
24	**Org Sensor Logic :** Sets the origin sensor signal level so that the motor can recognize origin sensor's input to ON. ♦ 0 : 0 V (low level) ♦ 1 : 24V(high level)		0	1	0
25	**Stop Current :** To set the ratio value of current that supplied to the motor on Stop status. (Ex1) 50[%] : Compare to normal running status, 50% of current Is supplied to the motor when stop status.	%	10	100	50
26	**Motion Dir :** When the motor operates by position command, this mode sets the revolution direction of the motor. ♦ 0 : moves the motor clockwise. ♦ 1 : moves the motor counterclockwise. If this parameter is changed, normally 'Limit Sensor Dir' is also changed.		0	1	0
27	**Limit Sensor Dir :** Sets the limit sensor direction to stop the motor to the limit spot under operation. ♦ 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. If this parameter is changed, normally 'Motion Sensor Dir' is also changed.	pulse	0	1	0
28	**Encoder Multiply Value :** Can select if the external encoder is connected or not. ♦ 0 : No external encoder connected. ('Actual Pos/Pos Error' value display to '0') ♦ 1 : External encoder connected and the value will be Multiply by '1'.		0	3	0

	♦ 2 : External encoder connected and the value will be
	     Multiply by '2' .
	♦ 3 : External encoder connected and the value will be
	     Multiply by '4' .				

29	**Motor Lead :** ' Prepare for future use		1	50	1
30	**Gear Ratio :** ' Prepare for future use		1	50	1

Appendix

Option : RS-485 Communication

■ RS-485 Converter

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

Type	Item	Max comm. Speed [bps]	External Power
RS485 to RS232	FAS-RCR	115,200	No need (5~24VDC optional)

FAS-RCR

■ RS-232 Connection Cable for FAS-RCR

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

Item	Length	
CGNR-C-002F	2m	
CGNR-C-003F	3m	
CGNR-C-005F	5m	

For more information wiring diagram and connector, refer to 「10. Communication Function」.

■ RS-485 Connection Cable : Ezi-STEP-ALL

Universal RJ-45 (STP:CAT5 category) straight type cable is used.

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

Option : Cable

■Cable for Input/Output Signal

Available to connect between Control System and Ezi-STEP-ALL.

Item	Length[m]	Remark
CSVA-S-□□□F	□□□	Normal Cable
CSVA-S-□□□M	□□□	Robot Cable

□ is for Cable Length. The unit is 1m and Max. 20m length.

■ Cable for Power

Available to connect between Power and Ezi-STEP-ALL.

Item	Length[m]	Remark
CSVA-P-□□□F	□□□	Normal Cable
CSVA-P-□□□M	□□□	Robot Cable

□ is for Cable Length. The unit is 1m and Max. 2m length.

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● Please note that the specifications are subject to change without
notice due to product improvements.