

# **Ezi-SERVO<sup>®</sup>**

## **Closed Loop Stepping System**

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- Motor + Encoder + Drive + Controller + Network
- Embedded Controller
- Position Table
- Closed Loop System
- No Gain Tuning / No Hunting
- High Resolution / Fast Response
- IP65 Protection (NEMA24 Size)

**ALL**



CE

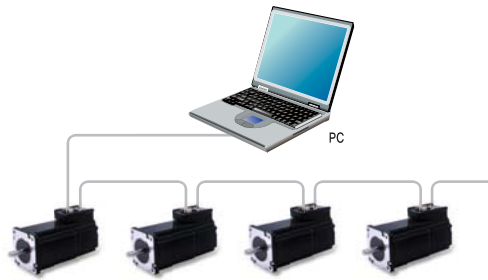


*Fast, Accurate, Smooth Motion*

# Features

## 1. Network Based Motion Control

A maximum of 16 axis can be operated from a PC through RS-485 communications. All of the Motion conditions are set through the network and saved in Flash ROM as a parameter. Motion Library(DLL) is provided for programming under Windows 2000 / XP / 7 / 8 / 10 / Vista.



## 2. Position Table Function

Position Table can be used for motion control by digital input and output signals of host controller. You can operate the motor directly by sending the position table number, start / stop, origin search and other digital input values from a PLC. The PLC can monitor the In-Position, origin search, moving / stop, servo ready and other digital output signals from a drive. A maximum of 64 positioning points can be set from PLC.

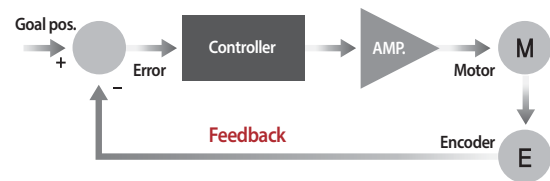


## 3. IP65 Protection

By acquiring IP65 rating, it can be used in harsh environments like water splashes or lots of dusts.(Only for Ezi-SERVO ALL-60 Series)

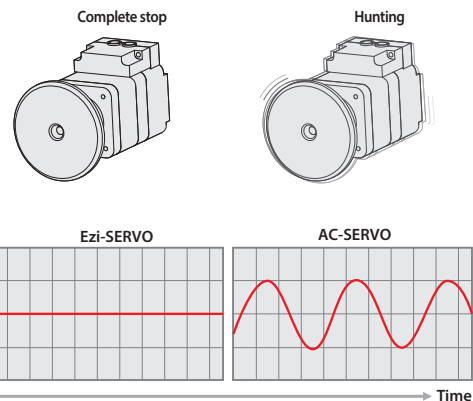
## 4. Closed Loop System

Ezi-SERVO ALL is an innovative closed loop stepping motor and controller that utilizes a high-resolution motor mounted encoder to constantly monitor the motor shaft position. The encoder feedback feature allows the Ezi-SERVO ALL to update the current motor shaft position information every 25 micro seconds. This allows the Ezi-SERVO ALL drive to compensate for the loss of position, ensuring accurate positioning. For example, due to a sudden load change, a conventional stepper motor and drive could lose a step creating a positioning error and a great deal of cost to the end user!



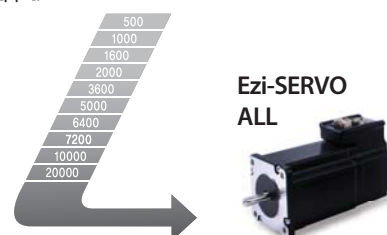
## 5. No Hunting

Traditional servo motor drives overshoot their position and try to correct by overshooting the opposite direction, especially in high gain applications. This is called null hunt and is especially prevalent in systems that the break away or static friction is significantly higher than the running friction. The cure is lowering the gain, which affects accuracy or using Ezi-SERVO ALL Motion Control System! SERVO ALL utilizes the unique characteristics of stepping motors and locks itself into the desired target position, eliminating Null Hunt. This feature is especially useful in applications such as nanotech manufacturing, semiconductor fabrication, vision systems and ink jet printing in which system oscillation and vibration could be a problem.



## 6. High Resolution

The unit of the position command can be divided precisely. (Max. 20,000[ppr])



## 7. Absolute Encoder System

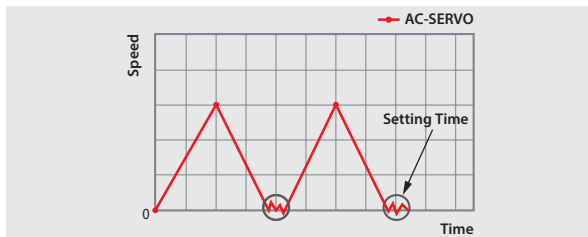
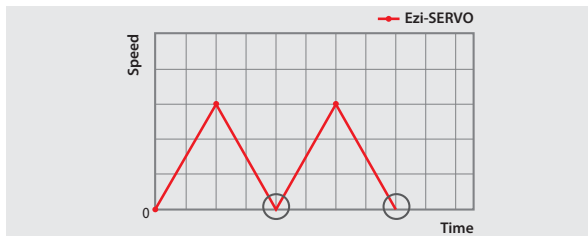
High resolution of absolute position encoder is equipped(single turn : 262,144[ppr], multi-turn : 4,096[ppr]) In addition, even power supply of drive shuts off, it enables to know the previous location and the secondary power supply for the encoder(ie : battery) is not required.

(Only for Ezi-SERVO ALL-60L-ABS)



## 8. Fast Response

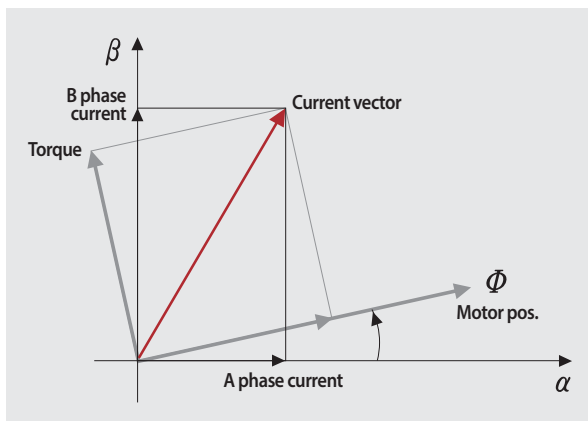
Similar to conventional stepping motors, Ezi-SERVO ALL instantly synchronizes with command pulses providing fast positional response. Ezi-SERVO ALL is the optimum choice when zero-speed stability and rapid motions within a short distance are required. Traditional servo motor systems have a natural delay between the commanding input signals and the resultant motion because of the constant monitoring of the current position, necessitating a waiting time until it settles, called settling time.



## 9. Smooth and Accurate

Ezi-SERVO ALL is a high-precision servo drive, using a high-resolution encoder with 32,000[ppr].

Unlike a conventional Microstep drive, the on-board high performance DSP(Digital Signal Processor) performs vector control and filtering, producing a smooth rotational control with minimum ripples.



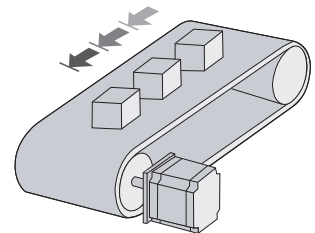
## 10. No Gain Tuning

Conventional servo systems, to ensure machine performance, smoothness, positional error and low servo noise, require the adjustment of its servo's gains as an initial crucial step. Even systems that employ autotuning require manual tweaking after the system is installed, especially if more than one axis are interdependent.

Ezi-SERVO ALL employs the best characteristics of stepper and closed loop motion controls and algorithms to eliminate the need of tedious gain tuning required for conventional closed loop servo systems.

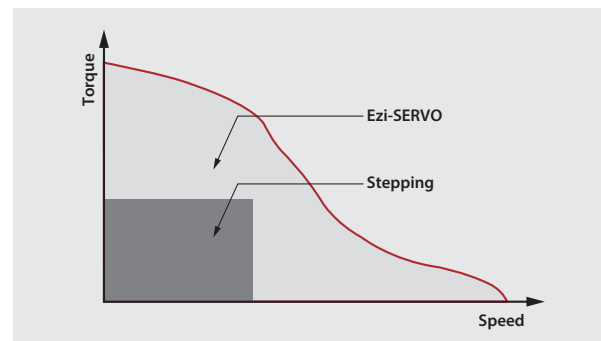
This means that Ezi-SERVO ALL is optimized for the application and ready to work right out of the box! The Ezi-SERVO ALL system employs the unique characteristics of the closed loop stepping motor control, eliminating these cumbersome steps and giving the engineer a high performance servo system without wasting setup time. Ezi-SERVO ALL is especially well suited for low stiffness loads(For example, a belt and pulley system) that sometime require conventional servo systems to inertia match with the added expense and bulk of a gearbox.

Ezi-SERVO ALL also performs exceptionally, even under heavy loads and high speeds!



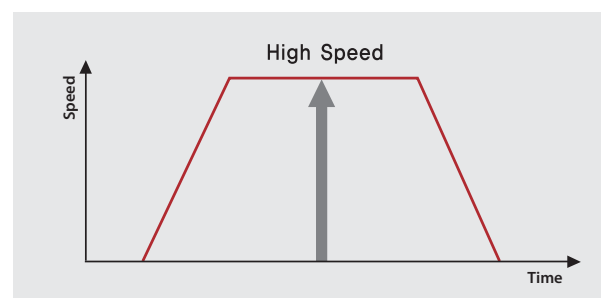
## 11. High Torque

Compared with common step motors and drives, Ezi-SERVO ALL motion control systems can maintain a high torque state over relatively long period of time. This means that Ezi-SERVO continuously operates without loss of position under 100% of the load. Unlike conventional Microstep drives, Ezi-SERVO ALL exploits continuous high-torque operation during high-speed motion due to its innovative optimum current phase control.



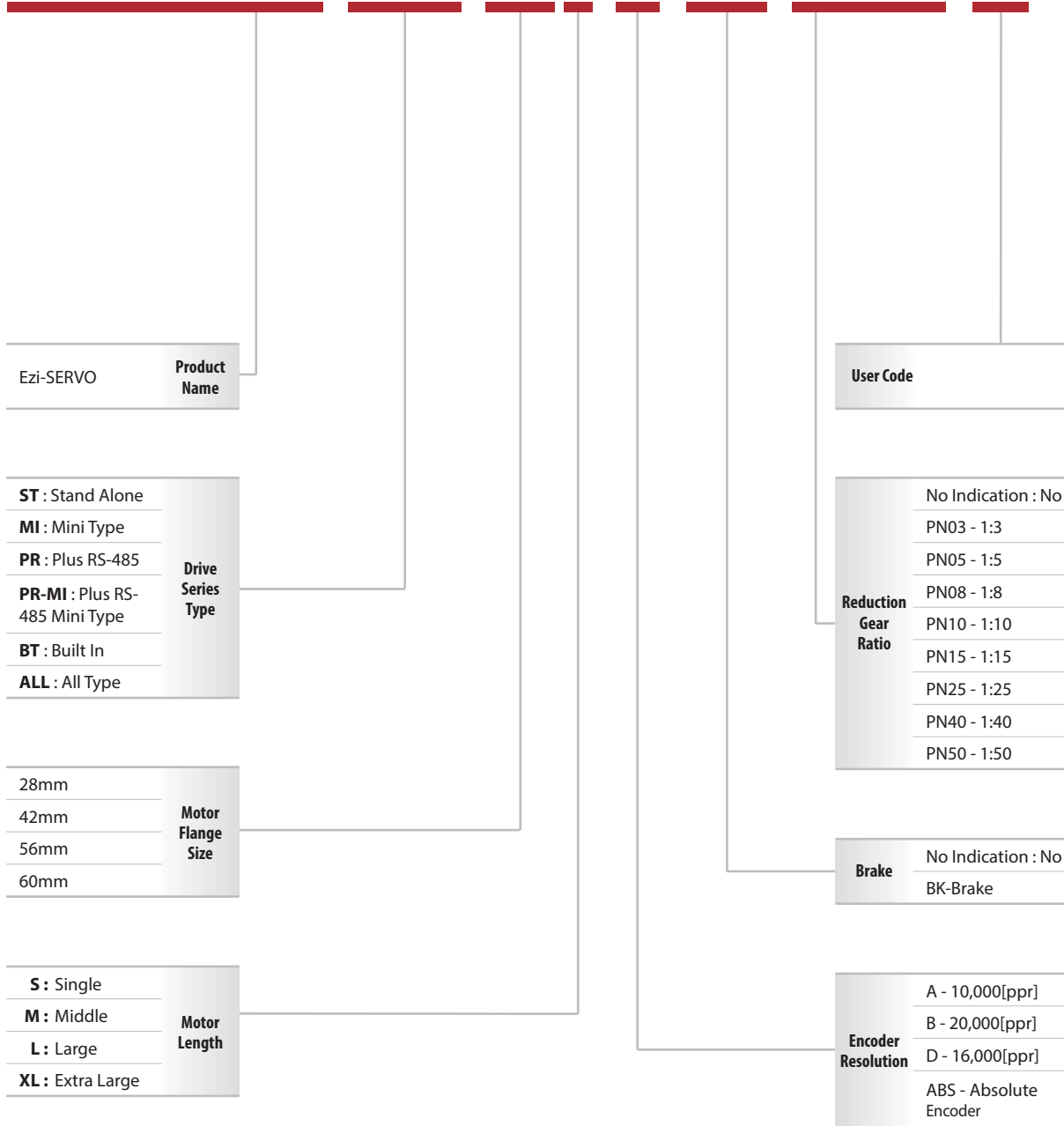
## 12. High Speed

The Ezi-SERVO ALL functions well at high speed without the loss of Synchronism or positioning error. Ezi-SERVO ALL's ability of continuous monitoring of current position enables the stepping motor to generate high-torque, even under a 100% load condition.



## Part Numbering Method

# Ezi-SERVO-ALL-56L-A-BK-PN05-□

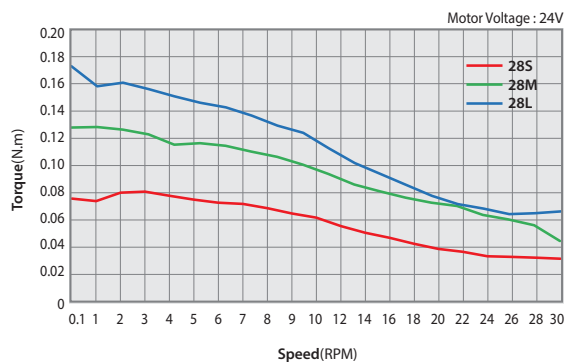


| Motor, Drive<br>Combination | UNIT No.              | MOTOR No.                             | DRIVE No. |
|-----------------------------|-----------------------|---------------------------------------|-----------|
|                             | Ezi-SERVO-ALL-28S-D   | Motor & Drive & Controller Integrated |           |
|                             | Ezi-SERVO-ALL-28M-D   |                                       |           |
|                             | Ezi-SERVO-ALL-28L-D   |                                       |           |
|                             | Ezi-SERVO-ALL-42S-A   |                                       |           |
|                             | Ezi-SERVO-ALL-42S-B   |                                       |           |
|                             | Ezi-SERVO-ALL-42M-A   |                                       |           |
|                             | Ezi-SERVO-ALL-42M-B   |                                       |           |
|                             | Ezi-SERVO-ALL-42L-A   |                                       |           |
|                             | Ezi-SERVO-ALL-42L-B   |                                       |           |
|                             | Ezi-SERVO-ALL-42XL-A  |                                       |           |
|                             | Ezi-SERVO-ALL-42XL-B  |                                       |           |
|                             | Ezi-SERVO-ALL-56S-A   |                                       |           |
|                             | Ezi-SERVO-ALL-56S-B   |                                       |           |
|                             | Ezi-SERVO-ALL-56M-A   |                                       |           |
|                             | Ezi-SERVO-ALL-56M-B   |                                       |           |
|                             | Ezi-SERVO-ALL-56L-A   |                                       |           |
|                             | Ezi-SERVO-ALL-56L-B   |                                       |           |
|                             | Ezi-SERVO-ALL-60S-A   |                                       |           |
|                             | Ezi-SERVO-ALL-60S-B   |                                       |           |
|                             | Ezi-SERVO-ALL-60M-A   |                                       |           |
|                             | Ezi-SERVO-ALL-60M-B   |                                       |           |
|                             | Ezi-SERVO-ALL-60L-A   |                                       |           |
|                             | Ezi-SERVO-ALL-60L-B   |                                       |           |
|                             | Ezi-SERVO-ALL-60L-ABS |                                       |           |

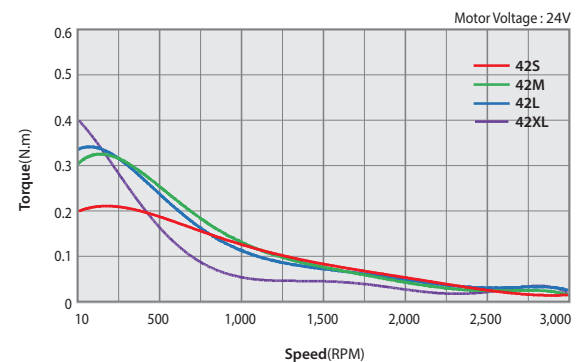
# Motor Specification Table

| Model                                                         |      | Unit              | 28                      |       |       | 42   |      |      |      | 56   |      |      | 60   |      |      |
|---------------------------------------------------------------|------|-------------------|-------------------------|-------|-------|------|------|------|------|------|------|------|------|------|------|
|                                                               |      |                   | 28S                     | 28M   | 28L   | 42S  | 42M  | 42L  | 42XL | 56S  | 56M  | 56L  | 60S  | 60M  | 60L  |
| DRIVE METHOD                                                  |      | -                 | BI-POLAR                |       |       |      |      |      |      |      |      |      |      |      |      |
| Number OF PHASES                                              |      | -                 | 2                       | 2     | 2     | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| VOLTAGE                                                       |      | VDC               | 3                       | 3     | 3     | 3.36 | 4.32 | 4.56 | 7.2  | 1.56 | 1.62 | 2.64 | 1.32 | 1.48 | 2.2  |
| CURRENT per PHASE                                             |      | A                 | 0.95                    | 0.95  | 0.95  | 1.2  | 1.2  | 1.2  | 1.2  | 3    | 3.0  | 3.0  | 4.0  | 4.0  | 4.0  |
| RESISTANCE per PHASE                                          |      | Ohm               | 3.2                     | 3.2   | 3.2   | 2.8  | 3.6  | 3.8  | 6.0  | 0.52 | 0.54 | 0.88 | 0.33 | 0.37 | 0.55 |
| INDUCTANCE per PHASE                                          |      | mH                | 2                       | 2.7   | 3.2   | 5.4  | 7.2  | 8.0  | 15.6 | 1.2  | 2    | 4    | 0.75 | 1.1  | 2.7  |
| HOLDING TORQUE                                                |      | N·m               | 0.069                   | 0.098 | 0.118 | 0.32 | 0.44 | 0.5  | 0.65 | 0.64 | 1    | 1.5  | 0.88 | 1.28 | 2.4  |
| ROTOR INERTIA                                                 |      | g·cm <sup>2</sup> | 9                       | 13    | 18    | 35   | 54   | 77   | 114  | 180  | 280  | 520  | 240  | 490  | 690  |
| WEIGHTS                                                       |      | g                 | 110                     | 140   | 200   | 250  | 280  | 350  | 500  | 500  | 720  | 1150 | 600  | 1000 | 1300 |
| LENGTH(L)                                                     |      | mm                | 32                      | 45    | 50    | 34   | 40   | 48   | 60   | 46   | 55   | 80   | 47   | 56   | 85   |
| ALLOWABLE<br>OVERHUNG LOAD<br>(DISTANCE FROM END<br>OF SHAFT) | 3mm  | N                 | 30                      | 30    | 30    | 22   | 22   | 22   | 22   | 52   | 52   | 52   | 70   | 70   | 70   |
|                                                               | 8mm  |                   | 38                      | 38    | 38    | 26   | 26   | 26   | 26   | 65   | 65   | 65   | 87   | 87   | 87   |
|                                                               | 13mm |                   | 53                      | 53    | 53    | 33   | 33   | 33   | 33   | 85   | 85   | 85   | 114  | 114  | 114  |
|                                                               | 18mm |                   | -                       | -     | -     | 46   | 46   | 46   | 46   | 123  | 123  | 123  | 165  | 165  | 165  |
| ALLOWABLE THRUST LOAD                                         |      | N                 | Lower than motor weight |       |       |      |      |      |      |      |      |      |      |      |      |
| INSULATION RESISTANCE                                         |      | Mohm              | 100 MΩ MIN.(at 500VDC)  |       |       |      |      |      |      |      |      |      |      |      |      |
| INSULATION CLASS                                              |      | -                 | CLASS B(130°C)          |       |       |      |      |      |      |      |      |      |      |      |      |
| OPERATING TEMPERATURE                                         |      | °C                | 0 to 55                 |       |       |      |      |      |      |      |      |      |      |      |      |

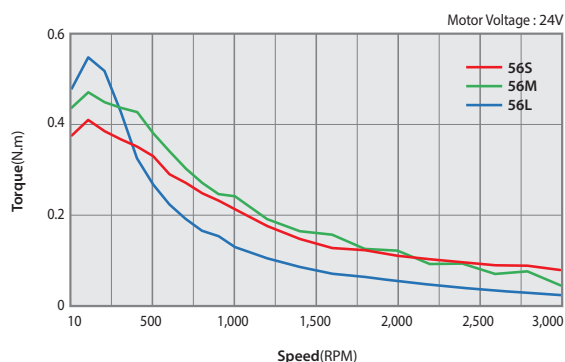
## Ezi-SERVO ALL\_ 28 Series



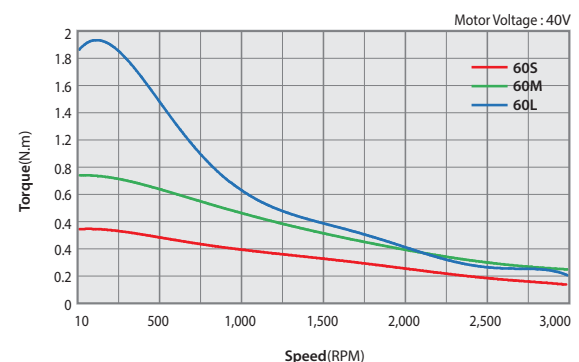
## Ezi-SERVO ALL\_ 42 Series



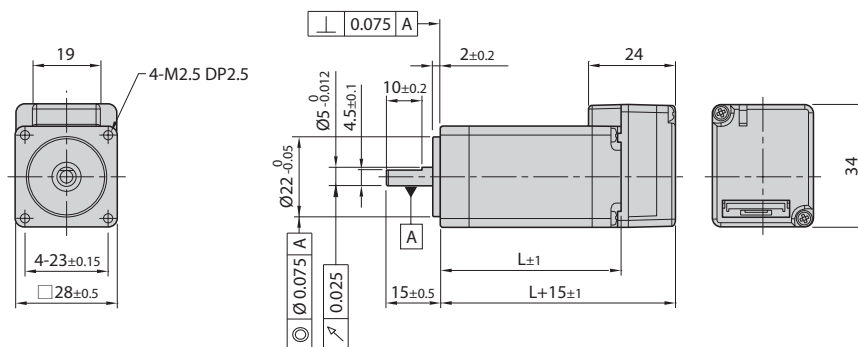
## Ezi-SERVO ALL\_ 56 Series



## Ezi-SERVO ALL\_ 60 Series

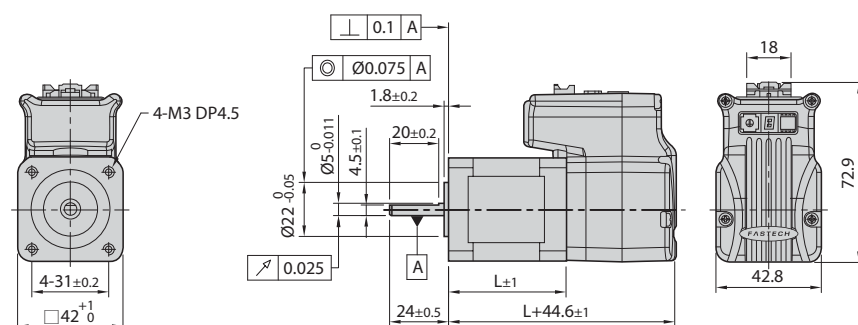


# Motor Drawing



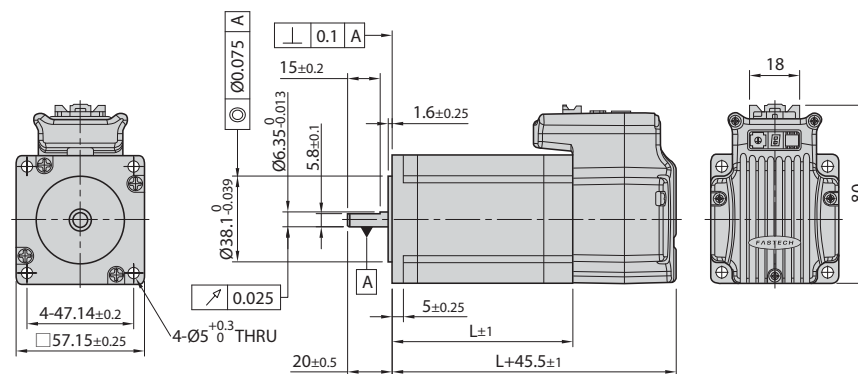
**28mm**

| Model name | Length(L) |
|------------|-----------|
| 28S        | 32        |
| 28M        | 45        |
| 20L        | 50        |



**42mm**

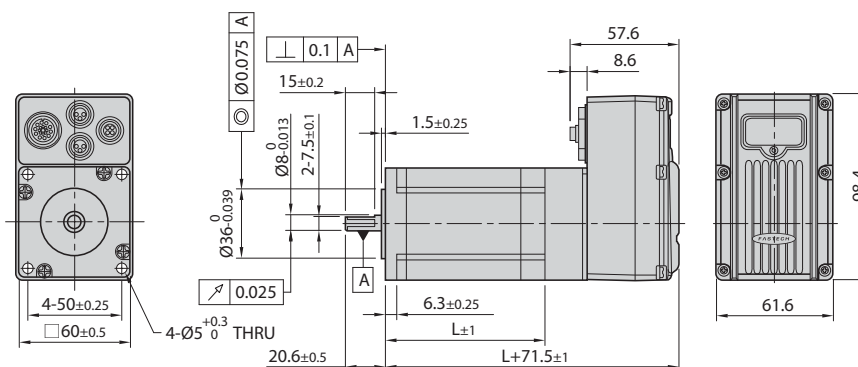
| Model name | Length(L) |
|------------|-----------|
| 42S        | 34        |
| 42M        | 40        |
| 42L        | 48        |
| 42XL       | 60        |



**56mm**

| Model name | Length(L) |
|------------|-----------|
| 56S        | 46        |
| 56M        | 55        |
| 56L        | 80        |

※ There are 2 kinds size of front shaft diameter for Ezi-SERVO-ALL-56 series as Ø6.35 and Ø8.0.



**60mm**

| Model name | Length(L) |
|------------|-----------|
| 60S        | 47        |
| 60M        | 56        |
| 60L        | 85        |

# Drive Specification

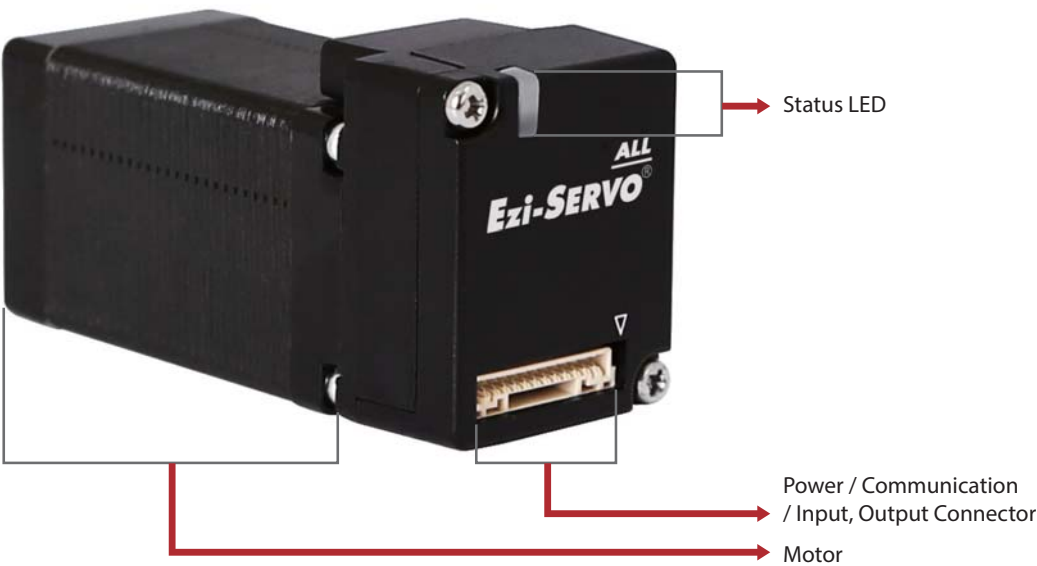
## Specifications

|                         |                              |                                                                                                                                                                                                                                                                                                                                  |
|-------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Voltage           |                              | 24VDC $\pm$ 10%                                                                                                                                                                                                                                                                                                                  |
| Control Method          |                              | Closed Loop Control with 32bit DSP                                                                                                                                                                                                                                                                                               |
| Multi Axes Drive        |                              | Maximum 16 axes through Daisy-Chain                                                                                                                                                                                                                                                                                              |
| Position Table          |                              | 64 Motion Command Steps(Speed, External start, Jump, Loop, Wait and PT finish etc.)                                                                                                                                                                                                                                              |
| Current Consumption     |                              | Max. 500mA(Except Motor Current)                                                                                                                                                                                                                                                                                                 |
| Operating Condition     | Ambient Temperature          | · In Use : 0 ~ 50°C      · In Storage : -20 ~ 70°C                                                                                                                                                                                                                                                                               |
|                         | Humidity                     | · In Use : 35 ~ 85% RH(Non-Condensing)      · In Storage : 10 ~ 90% RH(Non-Condensing)                                                                                                                                                                                                                                           |
|                         | Vib. Resist.                 | 0.5G                                                                                                                                                                                                                                                                                                                             |
| Function                | Rotation Speed               | 0 ~ 3,000[rpm]                                                                                                                                                                                                                                                                                                                   |
|                         | Resolution[ppr]              | · 10,000[ppr] Encoder model : 500 / 1,000 / 1,600 / 2,000 / 3,600 / 5,000 / 6,400 / 7,200 / 10,000<br>· 16,000[ppr] Encoder model : 500 / 1,000 / 1,600 / 2,000 / 3,600 / 5,000 / 6,400 / 7,200 / 10,000 / 16,000<br>· 20,000[ppr] Encoder model : 500 / 1,000 / 1,600 / 2,000 / 3,600 / 5,000 / 6,400 / 7,200 / 10,000 / 20,000 |
|                         | Protection                   | Over Current Error, Over Speed Error, Position Tracking Error, Over Load Error, Over Temperature Error, Over Regenerated Voltage Error, Motor Connect Error, Encoder Connect Error, Motor Voltage Error, Inposition Error, System Error, ROM Error, Position Overflow Error                                                      |
|                         | In-Position Selection        | Ezi-SERVO ALL-Common      0~15(Selectable by Parameter)                                                                                                                                                                                                                                                                          |
|                         |                              | Ezi-SERVO ALL-28 Series only      0~63(Selectable by Parameter)                                                                                                                                                                                                                                                                  |
|                         | Position Gain Selection      | Ezi-SERVO ALL- Common      0~15(Selectable by Parameter)                                                                                                                                                                                                                                                                         |
|                         |                              | Ezi-SERVO ALL-28 Series only      0~63(Selectable by Parameter)                                                                                                                                                                                                                                                                  |
|                         | Rotational Direction         | CW / CCW(Selectable by Parameter)                                                                                                                                                                                                                                                                                                |
| Input Signal            | Ezi-SERVO ALL-Common         | 3 dedicated input(LIMIT+, LIMIT-, ORIGIN), 7 programmable output(Photocoupler Input)                                                                                                                                                                                                                                             |
|                         | Ezi-SERVO ALL-28 Series only | 3 dedicated input(LIMIT+, LIMIT-, ORIGIN),<br>1 programmable output(Photocoupler Input, NPN/PNP connection support)                                                                                                                                                                                                              |
|                         | Ezi-SERVO ALL-60 Series only | 3 dedicated input(LIMIT+, LIMIT-, ORIGIN), 7 programmable output(Photocoupler Input)                                                                                                                                                                                                                                             |
|                         | Ezi-SERVO ALL-60L-ABS only   | 3 dedicated input(LIMIT+, LIMIT-, ORIGIN), 6 programmable output(Photocoupler Input)                                                                                                                                                                                                                                             |
| Output Signal           | Ezi-SERVO ALL-Common         | 1 dedicated output(Compare Out),<br>1 programmable output(Photocoupler output), Brake signal                                                                                                                                                                                                                                     |
|                         | Ezi-SERVO ALL-60 Series only | 1 dedicated output(Compare Out),<br>3 programmable output(Photocoupler output), Brake signal                                                                                                                                                                                                                                     |
|                         | Ezi-SERVO ALL-60L-ABS only   | 1 dedicated output(Compare Out),<br>6 programmable output(Photocoupler output), Brake signal                                                                                                                                                                                                                                     |
| Communication Interface |                              | The RS-485 serial communication with PC Transmission speed : 9,600 ~ 921,600[bps] (ALL28, ALL60 Series 115,200bps fixed)                                                                                                                                                                                                         |
| Position Control        |                              | Incremental mode/Absolute mode<br>Data Range : -134,217,727 to +134,217,727pulse(The range of the ALL-29 series is -2.147.483.648 to 2.147.483.647) Operating speed : Max. 3,000[rpm]                                                                                                                                            |
| Return to Origin        |                              | Origin sensor, Z phase, $\pm$ Limit sensor, Torque                                                                                                                                                                                                                                                                               |
| GUI                     | Ezi-SERVO ALL- Common        | User Interface Program within Windows                                                                                                                                                                                                                                                                                            |
|                         | Ezi-SERVO ALL-28 Series only | User Interface Program within Windows(Ver. 6.40.xx.xx)                                                                                                                                                                                                                                                                           |
| Software                |                              | Motion Library(DLL) for windows 2000 / XP / 7 / 8 / 10 / Vista                                                                                                                                                                                                                                                                   |

# Drive Specification

(Ezi-SERVO ALL-28 Series)

## Setting and Operation



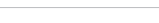
# System Operation Manual

(Ezi-SERVO ALL-28 Series)

## Status Monitor LED

### 1. Status LED

In the case Ezi-SERVO ALL 28 series products, status of LED can be checked by LED color lighting on / off and blinking.

| Status               | Function                                                                                                                                                                                 | On/Off Status                                          |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| Disable              | Green : <br>Red :      | Green light flashing,<br>Red light off                 |
| Enable               | Green : <br>Red :      | Green light flashing,<br>Red light off                 |
| Enable Communication | Green : <br>Red :      | Green light on,<br>Red light flashing                  |
| In Motion            | Green : <br>Red :      | Green<br>& Red light on                                |
| Inposition deviation | Green : <br>Red :      | Green and red light<br>alternately flashing            |
| Alarm                | Green : <br>Red :  | Red light flashing<br>repeat as may as<br>alarm number |

### 2. Protection function and status LED flash times

| Times | Protection                     | Conditions                                                                                   |
|-------|--------------------------------|----------------------------------------------------------------------------------------------|
| 1     | Over Current Error             | The current through power devices in inverter exceeds the limit value                        |
| 2     | Over Speed Error               | Motor speed exceed 3000rpm                                                                   |
| 3     | Step Out Error                 | Position values is higher than specified value in motor stop statu2 *1                       |
| 4     | Over Load Error                | The motor is continuously operated more than 5 second under a load exceeding the Max. torque |
| 5     | Over Temperature Error         | Inside temperature of drive exceeds 85°C                                                     |
| 6     | Over Regenerated Voltage Error | Back-EMF more than high limit value                                                          |
| 7     | Motor Connect Error            | The power is ON without connection of the motor cable to drive                               |
| 8     | Encoder Connect Error          | Cable connection error with Encoder Connector in drive                                       |
| 10    | Inposition Error               | After operation is finished, a position error occurs                                         |
| 11    | System Error                   | Error occurs in drive system                                                                 |
| 12    | ROM Error                      | Error occurs during tuning execution                                                         |
| 15    | Position Overflow Error        | Position error value is higher than 90° in motor stop state *1                               |

\*1 : Default value can be changed by parameter.

※Please refer to the manual

#### Alarm LED Flash(ex: Position Tracking Error)



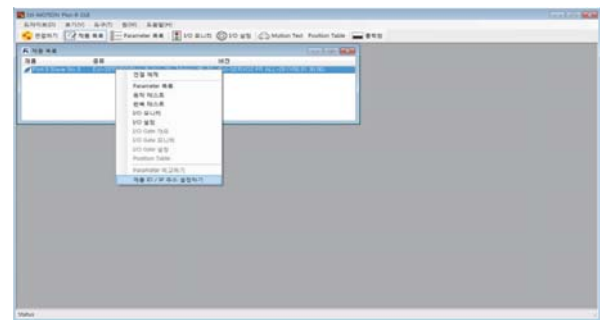
## Setting & Connector

### 1. Termination resistor setting

Terminal resistors are connected internally when 9 and 10 of product connector are connected to outside. In case of products which is connected at the end of the communication connection, set the terminal resistor.

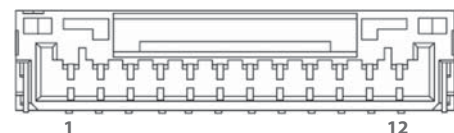
### 2. Network ID Setting

The network ID of Ezi-SERVO ALL 28 series can be set using Ezi-MOTION Plus-R GUI(Version 6.40.7.12 or later). After connecting the communication, the setting window appears by selecting the product and press the right button of the mouse.



### 3. Input/ Output access connector

| No | Fuction     | Remark                                |
|----|-------------|---------------------------------------|
| 1  | GND         | Power GND                             |
| 2  | +24V        | Power input                           |
| 3  | IO COMMON   | Input / Output Signal common terminal |
| 4  | ORIGIN      | Sensor input for Origin               |
| 5  | LIMIT+      | Sensor input for LIMIT+               |
| 6  | LIMIT-      | Sensor input for LIMIT-               |
| 7  | IN1         | User input signal(User input 0)       |
| 9  | Termination | Sensor input for LIMIT                |
| 10 | Data-(B)    | Communication signal(RS-485)          |
| 11 | Data+(A)    | Communication signal(RS-485)          |
| 12 | GND         | Power GND(Communication signal GND)   |

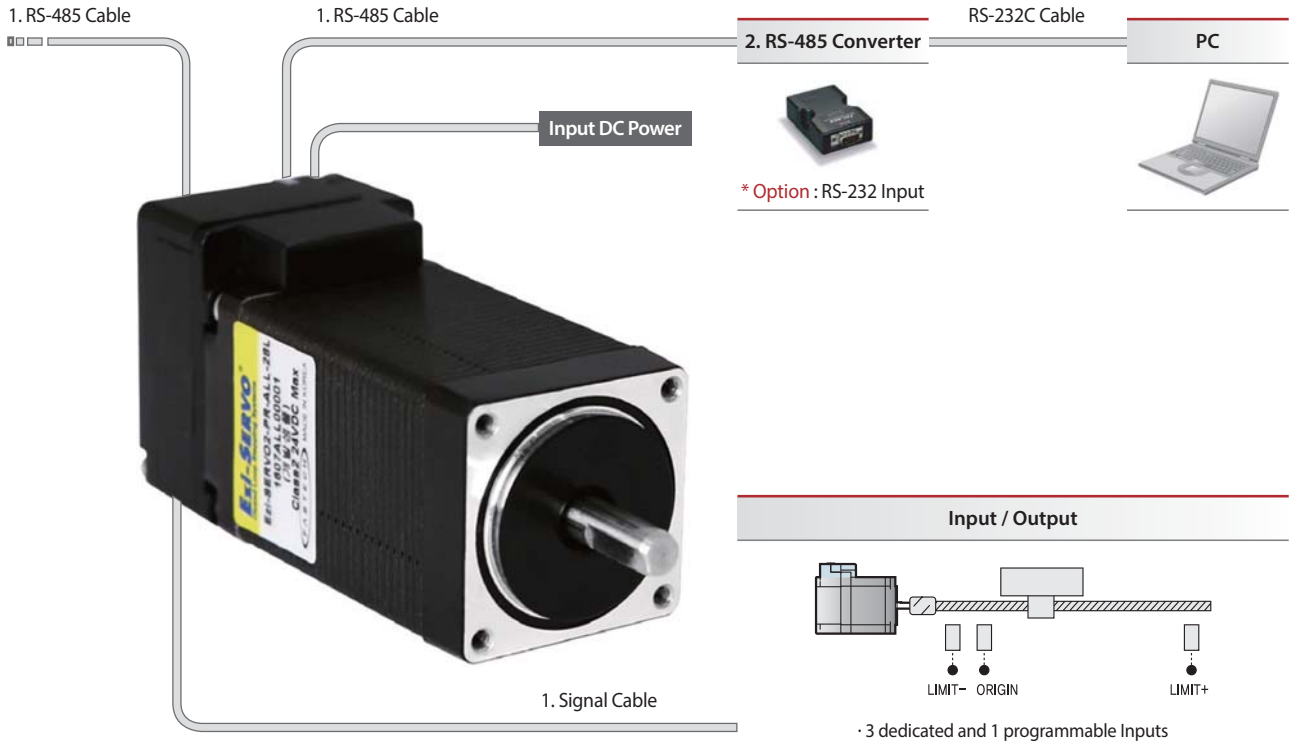


### 4. Connector for cabling

| Item     | Specification  | Maker |
|----------|----------------|-------|
| Housing  | GHR-12V-S      | JST   |
| Terminal | SSHL-002T-P0.2 |       |

# System Configuration

(Ezi-SERVO ALL-28 Series)



| Type            | Signal Cable | Power Cable | RS-485 Cable |
|-----------------|--------------|-------------|--------------|
| Standard Length | -            |             | -            |
| Max. Length     | 20m          | 2m          | 30m          |

## Cable Option

### 1. Signal Cable

Available to connect between Control System and Ezi-SERVO ALL 28 Drive.(It is provided item as standard option)

| Item        | Length[m] | Remark       |
|-------------|-----------|--------------|
| CSVA-A-OR4F | 0.4       | Normal Cable |

## Option

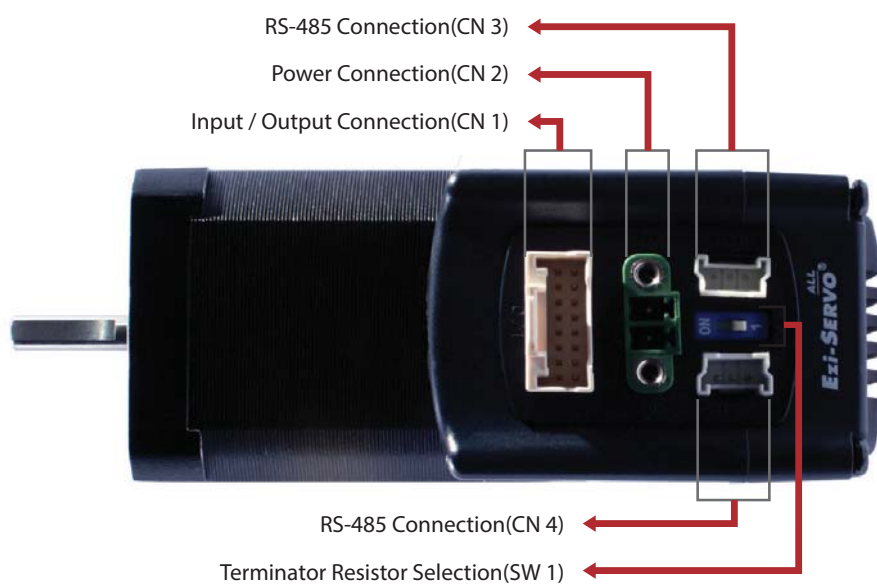
### 2. FAS-RCR(RS-232C to RS-485 Converter)

| Item           | Specification                                              |
|----------------|------------------------------------------------------------|
| Comm. Speed    | Max. 115.2Kbps                                             |
| Comm. Distance | RS-232C : Max. 15m<br>RS-485 : Max. 1.2km                  |
| Connecter      | RS-232C : DB9 Female<br>RS-485 : RJ-45                     |
| Size           | 50X75X23mm                                                 |
| Weight         | 38g                                                        |
| Power          | Self-Powered RS-232C<br>(DC5~24V external power available) |

# Drive Specification

(Ezi-SERVO ALL-42 / 56 Series)

## Setting and Operation



# System Operation Manual

(Ezi-SERVO ALL-42 / 56 Series)

## Status Monitor LED

### 1. Protection function and 7-Segment flash times

| Times | Protection                     | Conditions                                                                                   |
|-------|--------------------------------|----------------------------------------------------------------------------------------------|
| 1     | Over Current Error             | The current through power devices in inverter exceeds the limit value                        |
| 2     | Over Speed Error               | Motor speed exceed 3,000[rpm]                                                                |
| 3     | Position Tracking Error        | Position error value is higher than 90° in motor run state <sup>*1</sup>                     |
| 4     | Over Load Error                | The motor is continuously operated more than 5 second under a load exceeding the Max. torque |
| 5     | Over Temperature Error         | Inside temperature of drive exceeds 85°C                                                     |
| 6     | Over Regenerated Voltage Error | Back-EMF more than 50V                                                                       |
| 7     | Motor Connect Error            | The power is ON without connection of the motor cable to drive                               |
| 8     | Encoder Connect Error          | Cable connection error with Encoder Connector in drive                                       |
| 10    | In-Position Error              | After operation is finished, a position error occurs                                         |
| 11    | System Error                   | Error occurs in drive system                                                                 |
| 12    | ROM Error                      | Error occurs in parameter storage device(ROM)                                                |
| 15    | Position Overflow Error        | Position error value is higher than 90° in motor stop state <sup>*1</sup>                    |

<sup>\*1</sup> : Default value can be changed by parameter

※Please refer to the manual

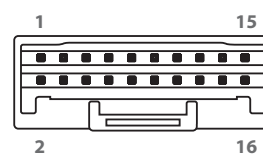
#### 7-Segment Flash(ex : Position Tracking Error)



## Connector

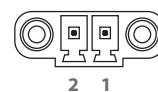
### 1. Input / Output Signal(CN 1)

| No. | Fuction       | I/O    |
|-----|---------------|--------|
| 1   | 24VDC         | Input  |
| 2   | 24VDC GND     | Input  |
| 3   | BRAKE+        | Output |
| 4   | BRAKE-        | Output |
| 5   | LIMIT+        | Input  |
| 6   | LIMIT-        | Input  |
| 7   | ORIGIN        | Input  |
| 8   | Digital IN 1  | Input  |
| 9   | Digital IN 2  | Input  |
| 10  | Digital IN 3  | Input  |
| 11  | Digital IN 4  | Input  |
| 12  | Digital IN 5  | Input  |
| 13  | Digital IN 6  | Input  |
| 14  | Digital IN 7  | Input  |
| 15  | Compare Out   | Output |
| 16  | Digital OUT 1 | Output |



### 2. Power Connection(CN 2)

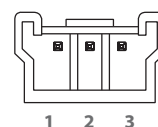
| No. | Fuction    |
|-----|------------|
| 1   | 24VDC ±10% |
| 2   | GND        |



### 3. RS-485 Communication Connector(CN 3, CN 4)

There is a converter for connecting PC.

| No. | Fuction |
|-----|---------|
| 1   | +DATA   |
| 2   | -DATA   |
| 3   | GND     |



## Cable Connector

### 1. Input / Output Signal(CN 1)

| ITEM     | Specification            | Marker |
|----------|--------------------------|--------|
| Housing  | 501646-1600              | MOLEX  |
| Terminal | 501648-1000(AWG 26 ~ 28) | MOLEX  |

### 2. Power Connection(CN 2)

| ITEM           | Specification     | Marker |
|----------------|-------------------|--------|
| Terminal Block | AKZ1550 / 2F-3.81 | PTR    |

### 3. RS-485 Communication Connector(CN 3, CN 4)

| ITEM     | Specification | Marker |
|----------|---------------|--------|
| Housing  | 33507-0300    | MOLEX  |
| Terminal | 50212-8100    | MOLEX  |

## Switch

### 1. Terminator Resistor Selection(SW 1)



Terminator Resistor Selection switch under RS-485 communication. Please set ON for Terminator Controller of Network.

### 2. Network ID Selection Switch(SW 2)

| Position | ID number | Position | ID number |
|----------|-----------|----------|-----------|
| 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        |



※ Maximum 16 axis can be connected in one network.

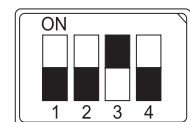
### 3. Speed and Terminator Resistor Selection Switch(SW 3)

The purpose of this is to setting the communication speed

| SW 3.1 | SW 3.2 | SW 3.3 | Baud Rate[bps]        |
|--------|--------|--------|-----------------------|
| OFF    | OFF    | OFF    | 9,600                 |
| ON     | OFF    | OFF    | 19,200                |
| OFF    | ON     | OFF    | 38,400                |
| ON     | ON     | OFF    | 57,600                |
| OFF    | OFF    | ON     | 115,200 <sup>*1</sup> |
| ON     | OFF    | ON     | 230,400               |
| OFF    | ON     | ON     | 460,800               |
| ON     | ON     | ON     | 921,600               |

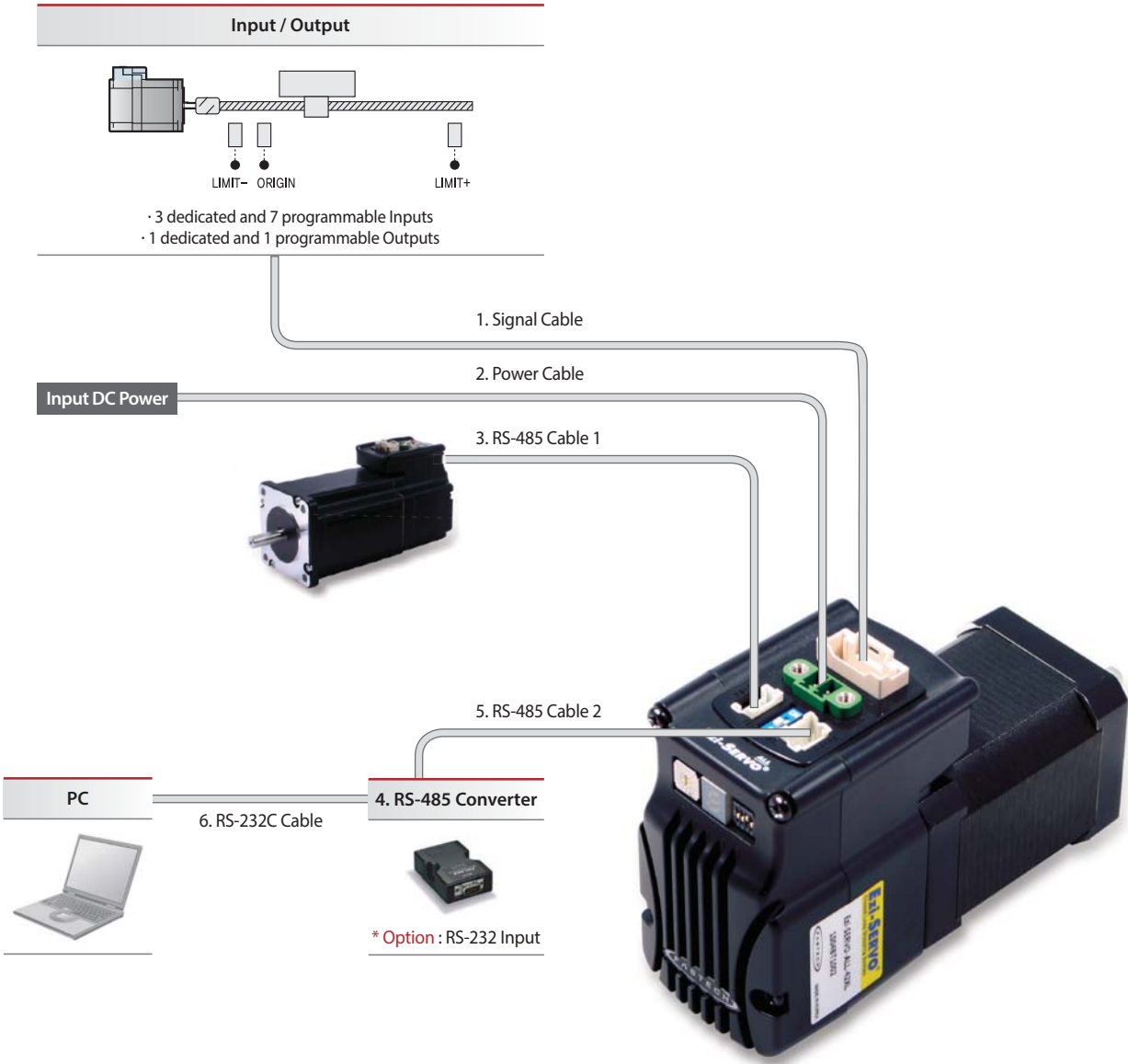
※ Possible to use common PCI Bus type RS-485 communication board for High speed communication.  
(Please contact with Distributor)

<sup>\*1</sup> : Default setting value  
If SW 3.4 is OFF, terminator resistor is disconnected.



# System Configuration

(Ezi-SERVO ALL-42 / 56 Series)



| Type            | Signal Cable | Power Cable | RS-485 Cable |
|-----------------|--------------|-------------|--------------|
| Standard Length | -            | -           | -            |
| Max. Length     | 20m          | 2m          | 30m          |

# Option

## 1. Signal Cable

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

| Model Name   | 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.

## 2. Power Cable

Available to connect between Power and Ezi-SERVO ALL.

| Model Name   | 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.

## 3. RS-485 Cable 1

| Model Name  | Length[m] | Remark       |
|-------------|-----------|--------------|
| CGNB-R-0R6F | 0.6       | Normal Cable |
| CGNB-R-001F | 1         |              |
| CGNB-R-1R5F | 1.5       |              |
| CGNB-R-002F | 2         |              |
| CGNB-R-003F | 3         |              |
| CGNB-R-005F | 5         |              |

※ Common cable to connect Ezi-SERVO ALL, Ezi-STEP ALL, Ezi-MOTIONLINK and Ezi-SERVO MINI Plus-R thru by Network.

## 4. FAS-RCR(RS-232C to RS-485 Converter)

| Item               | Specification                                    |
|--------------------|--------------------------------------------------|
| Transmission speed | Max. 115.2Kbps                                   |
| Comm. Distance     | RS-232C : Max. 15m<br>RS-485 : Max. 1.2km        |
| Connector          | RS-232C : DB9 Female<br>RS-485 : RJ-45           |
| Dimension          | 50×75×23mm                                       |
| Weight             | 38g                                              |
| Power              | Powered from PC<br>(Usable for external DC5~24V) |

## 5. RS-485 Cable 2

FAS-RCR to Ezi-SERVO ALL, FAS-RCR to Ezi-STEP ALL,  
FAS-RCR to Ezi-SERVO MINI Plus-R, FAS-RCR to Ezi-MOTIONLINK

| Model Name  | Length[m] | Remark       |
|-------------|-----------|--------------|
| CGNA-R-0R6F | 0.6       | Normal Cable |
| CGNA-R-001F | 1         |              |
| CGNA-R-1R5F | 1.5       |              |
| CGNA-R-002F | 2         |              |
| CGNA-R-003F | 3         |              |
| CGNA-R-005F | 5         |              |

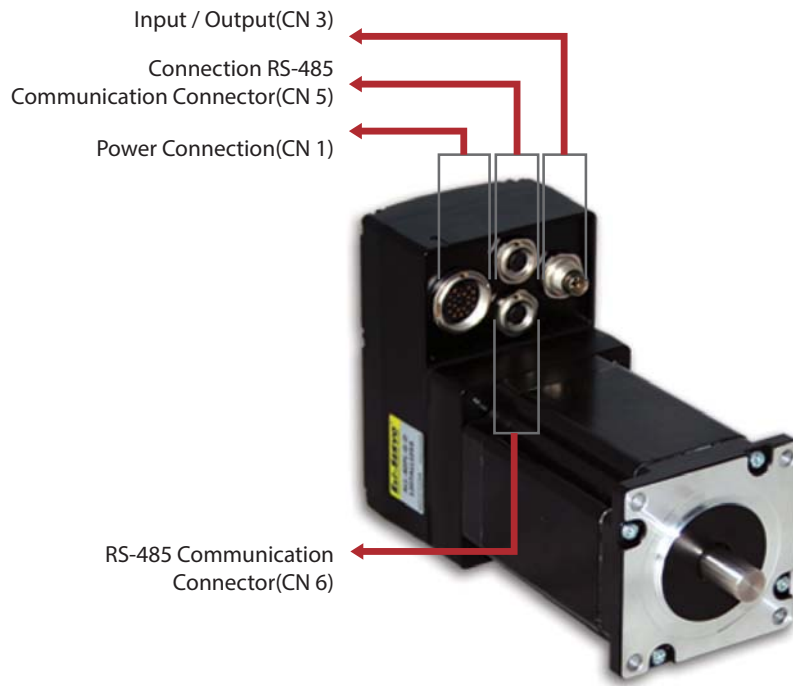
## 6. RS-232C Cable

| Model Name  | Length[m] | Remark       |
|-------------|-----------|--------------|
| CGNR-C-002F | 2         | Normal Cable |
| CGNR-C-003F | 3         |              |
| CGNR-C-005F | 5         |              |

# Drive Specification

(Ezi-SERVO ALL-60 Series)

## Setting and Operation



Ezi-SERVO ALL-60 Series



Ezi-SERVO ALL-60L-ABS

# System Operation Manual

## Status Monitor LED

### 1. Protection functions and LED flash times

| Times | Protection                     | Conditions                                                                                   |
|-------|--------------------------------|----------------------------------------------------------------------------------------------|
| 1     | Over Current Error             | The current through power devices in inverter exceeds the limit value                        |
| 2     | Over Speed Error               | Motor speed exceed 3,000[rpm]                                                                |
| 3     | Position Tracking Error        | Position error value is higher than 90° in motor run state *1                                |
| 4     | Over Load Error                | The motor is continuously operated more than 5 second under a load exceeding the Max. torque |
| 5     | Over Temperature Error         | Inside temperature of drive exceeds 85℃                                                      |
| 6     | Over Regenerated Voltage Error | Back-EMF more high 70V                                                                       |
| 7     | Motor Connect Error            | The power is ON without connection of the motor cable to drive                               |
| 8     | Encoder Connect Error          | Cable connection error with Encoder Connector in drive                                       |
| 10    | In-Position Error              | After operation is finished, a position error occurs                                         |
| 11    | System Error                   | Error occurs in drive system                                                                 |
| 12    | ROM Error                      | Error occurs in parameter storage device(ROM)                                                |
| 15    | Position Overflow Error        | Position error value is higher than 90° in motor stop state *1                               |

\*1 : The given value can be changed by parameter.

※ Please refer manual

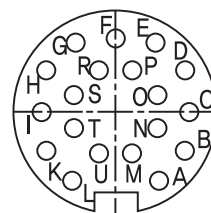
#### Alarm LED Flash(ex : Position Tracking Error)



## Connector

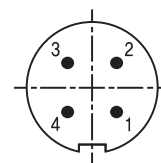
### 1. Input / Output Signal(CN 1)

| No. | Ezi-SERVO ALL-60 Series |        | Ezi-SERVO ALL-60L-ABS Series |        |
|-----|-------------------------|--------|------------------------------|--------|
|     | Function                | I/O    | Function                     | I/O    |
| A   | 24VDC                   | Input  | 24VDC                        | Input  |
| B   | 24VDC GND               | Input  | 24VDC GND                    | Input  |
| C   | LIMIT+                  | Input  | LIMIT+                       | Input  |
| D   | LIMIT-                  | Input  | LIMIT-                       | Input  |
| E   | ORIGIN                  | Input  | ORIGIN                       | Input  |
| F   | Digital IN 1            | Input  | Digital IN 1                 | Input  |
| G   | Digital IN 2            | Input  | Digital IN 2                 | Input  |
| H   | Digital IN 3            | Input  | Digital IN 3                 | Input  |
| I   | Digital IN 4            | Input  | Digital IN 4                 | Input  |
| K   | Digital IN 5            | Input  | Digital IN 5                 | Input  |
| L   | Digital IN 6            | Input  | Digital IN 6                 | Input  |
| M   | Digital IN 7            | Input  | Digital OUT 1                | Output |
| N   | Compare Out             | Output | Digital OUT 2                | Output |
| O   | Digital OUT 1           | Output | Digital OUT 3                | Output |
| P   | Digital OUT 2           | Output | Digital OUT 4                | Output |
| R   | Digital OUT 3           | Output | Digital OUT 5                | Output |
| S   | NC                      | Output | Digital OUT 6                | Output |
| T   | BRAKE+                  | Output | BRAKE+                       | Output |
| U   | BRAKE-                  | Output | BRAKE-                       | Output |



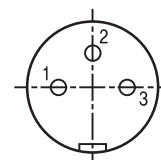
### 2. Power Connection(CN 3)

| No. | Function   |
|-----|------------|
| 1   | 24VDC ±10% |
| 2   | 24VDC ±10% |
| 3   | GND        |
| 4   | GND        |



### 3. RS-485 Communication Connector(CN 5, CN 6)

| No. | Function |
|-----|----------|
| 1   | +DATA    |
| 2   | -DATA    |
| 3   | GND      |



## Cable Connector

### 1. Input / Output Signal(CN 1)

| ITEM      | Specification | Marker |
|-----------|---------------|--------|
| Connector | 99-5461-40-19 | Binder |

### 2. Power Connection(CN 3)

| ITEM      | Specification | Marker |
|-----------|---------------|--------|
| Connector | 99-0410-00-04 | Binder |

### 3. RS-485 Communication Connector(CN 5, CN 6)

| ITEM      | Specification | Marker |
|-----------|---------------|--------|
| Connector | 99-0405-00-03 | Binder |

## Switch

### 1. Terminator Resistor Selection(SW 1)

Terminator resistor selection switch under RS-485 communication. Please set On for Terminator Controller of network.



※ In Ezi-SERVO ALL-42, Ezi-SERVO ALL-56, Ezi-SERVO ALL-60, it can be set with SW2.1 switch.

※ Ezi-SERVO ALL IP65 rating model can be set with SW1 switch.

### 2. Network ID Selection Switch(SW 1)

| Position | ID number | Position | ID number |
|----------|-----------|----------|-----------|
| 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        |



※ Maximum 16 axes can be connected in one network.

※ Ezi-SERVO ALL series IP65 rating model does not have network ID setting switch because the network ID is set by software.

### 3. Speed and Terminator Resistor Selection Switc(SW 2)

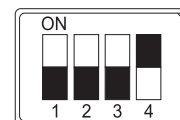
The purpose of this is to setting the communication speed and connect a terminator resistor if drive is installed at the end of network.

| SW 2.1 | SW 2.2 | SW 2.3 | SW 2.4 | Baud Rate[bps]        |
|--------|--------|--------|--------|-----------------------|
| -      | OFF    | OFF    | OFF    | 9,600                 |
| -      | ON     | OFF    | OFF    | 19,200                |
| -      | OFF    | ON     | OFF    | 38,400                |
| -      | ON     | ON     | OFF    | 57,600                |
| -      | OFF    | OFF    | ON     | 115,200 <sup>*1</sup> |
| -      | ON     | OFF    | ON     | 230,400               |
| -      | OFF    | ON     | ON     | 460,800               |
| -      | ON     | ON     | ON     | 921,600               |

※ Possible to use common PCI Bus type RS-485 communication board for High speed communication. (Please contact with Distributor)

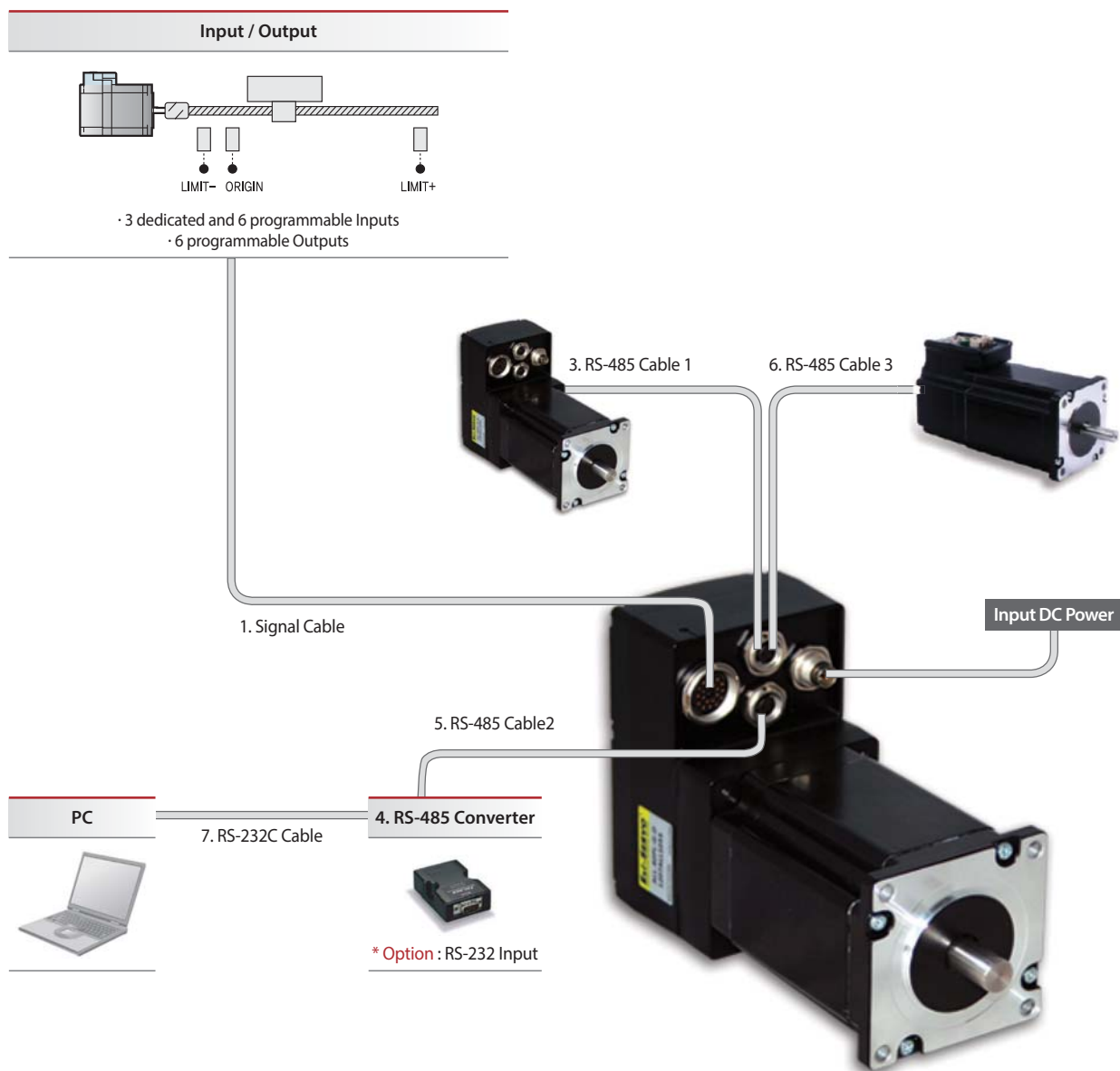
<sup>\*1</sup> : Default setting value

※ Ezi-SERVO ALL series IP65 rating model is fixed at 115,200bps.



# System Configuration

(Ezi-SERVO ALL-60 Series)



| Type            | Signal Cable | Power Cable | RS-485 Cable |
|-----------------|--------------|-------------|--------------|
| Standard Length | -            | -           | -            |
| Max. Length     | 20m          | 2m          | 30m          |

# Option

## 1. Signal Cable

Available to connect between Control System and Ezi-SERVO ALL-60.

| Model Name      | Length[m] | Remark       |
|-----------------|-----------|--------------|
| CWPA-S-□□□ F *1 | □□□       | Normal Cable |
| CWPA-S-□□□ M *1 | □□□       | Robot Cable  |
| CAPA-S-□□□ F *2 | □□□       | Normal Cable |
| CAPA-S-□□□ M *2 | □□□       | Robot Cable  |

\*1 : Ezi-SERVO ALL-60 Series

\*2 : Ezi-SERVO ALL-60L-ABS Series

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

## 2. Power Cable

Available to connect between Power and Ezi-SERVO ALL-60.

| Model Name   | Length[m] | Remark       |
|--------------|-----------|--------------|
| CWPA-P-□□□ F | □□□       | Normal Cable |
| CWPA-P-□□□ M | □□□       | Robot Cable  |

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

## 3. RS-485 Cable 1

Cable to connect Ezi-SERVO ALL-60 Series by Network.

| Model Name  | Length[m] | Remark       |
|-------------|-----------|--------------|
| CWPA-R-0R6F | 0.6       | Normal Cable |
| CWPA-R-001F | 1         |              |
| CWPA-R-1R5F | 1.5       |              |
| CWPA-R-002F | 2         |              |
| CWPA-R-003F | 3         |              |
| CWPA-R-005F | 5         |              |

| Model Name  | Length[m] | Remark      |
|-------------|-----------|-------------|
| CWPA-R-0R6M | 0.6       | Robot Cable |
| CWPA-R-001M | 1         |             |
| CWPA-R-1R5M | 1.5       |             |
| CWPA-R-002M | 2         |             |
| CWPA-R-003M | 3         |             |
| CWPA-R-005M | 5         |             |

## 4. FAS-RCR(RS-232C to RS-485 Converter)

| Item               | Specification                                    |
|--------------------|--------------------------------------------------|
| Transmission speed | Max. 115.2Kbps                                   |
| Comm. Distance     | RS-232C : Max. 15m<br>RS-485 : Max. 1.2km        |
| Connector          | RS-232C : DB9 Female<br>RS-485 : RJ-45           |
| Dimension          | 50×75×23mm                                       |
| Weight             | 38g                                              |
| Power              | Powered from PC<br>(Usable for external DC5~24V) |

## 5. RS-485 Cable 2

FAS-RCR to Ezi-SERVO ALL-60 Series

| Model Name  | Length[m] | Remark       |
|-------------|-----------|--------------|
| CWPB-R-0R6F | 0.6       | Normal Cable |
| CWPB-R-001F | 1         |              |
| CWPB-R-1R5F | 1.5       |              |
| CWPB-R-002F | 2         |              |
| CWPB-R-003F | 3         |              |
| CWPB-R-005F | 5         |              |

## 6. RS-485 Cable 3

Cable to connect Ezi-SERVO ALL-42 / 56 / 60 Series, Ezi-STEP ALL-42 / 56 Series, Ezi-SERVO PR MINI Series, Ezi-STEP Plus-R MINI Series by Network.

| Model Name  | Length[m] | Remark       |
|-------------|-----------|--------------|
| CWPC-R-0R6F | 0.6       | Normal Cable |
| CWPC-R-001F | 1         |              |
| CWPC-R-1R5F | 1.5       |              |
| CWPC-R-002F | 2         |              |
| CWPC-R-003F | 3         |              |
| CWPC-R-005F | 5         |              |

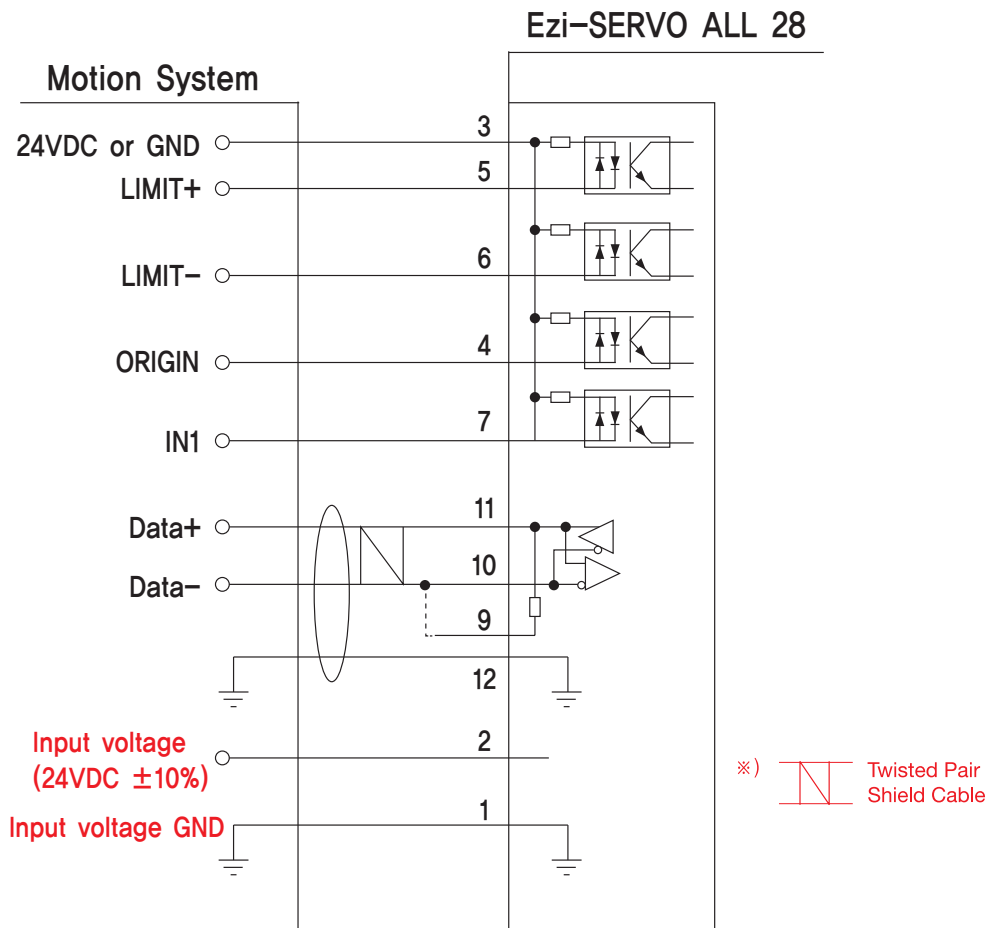
| Model Name  | Length[m] | Remark      |
|-------------|-----------|-------------|
| CWPC-R-0R6M | 0.6       | Robot Cable |
| CWPC-R-001M | 1         |             |
| CWPC-R-1R5M | 1.5       |             |
| CWPC-R-002M | 2         |             |
| CWPC-R-003M | 3         |             |
| CWPC-R-005M | 5         |             |

## 7. RS-232C Cable

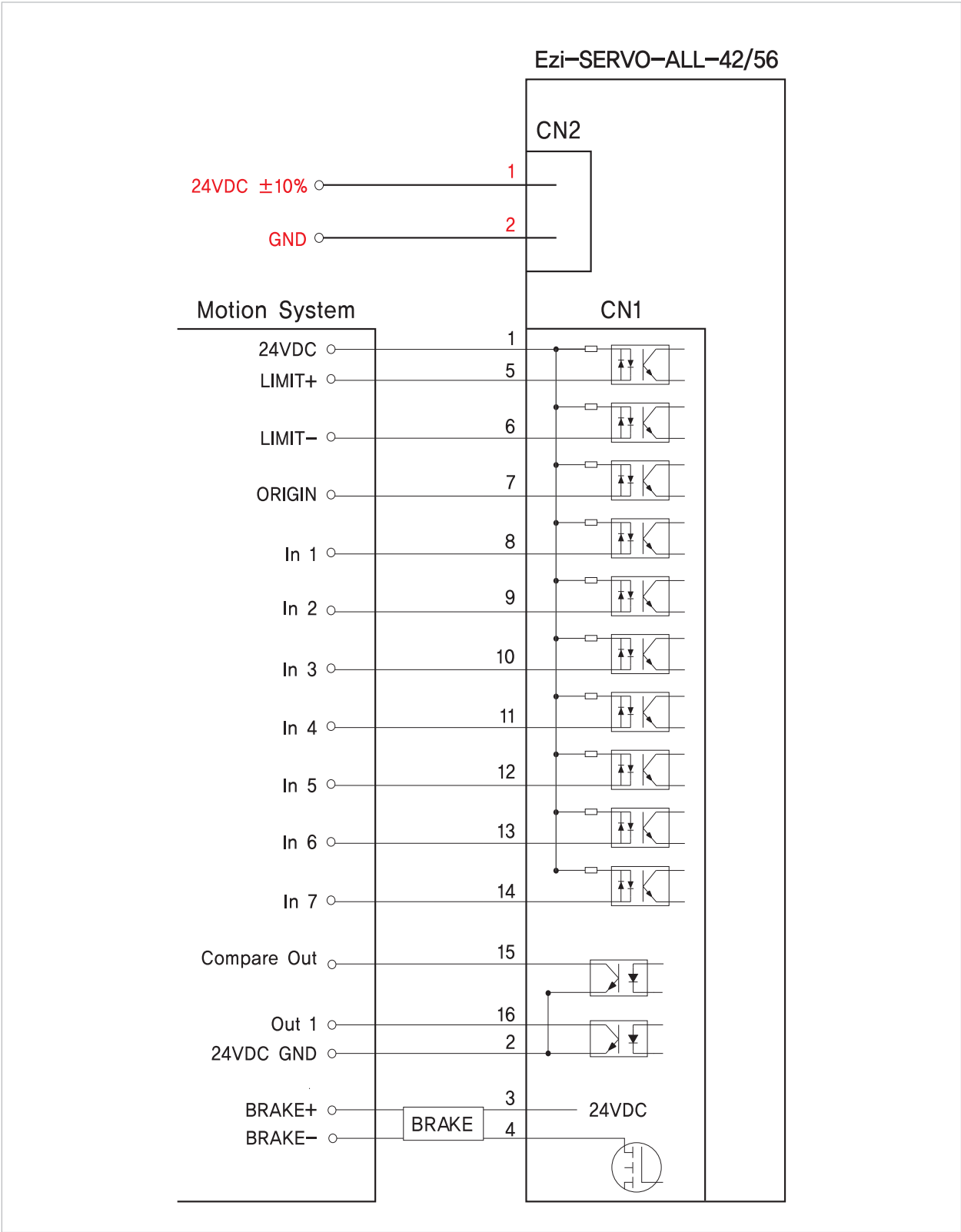
| Model Name  | Length[m] | Remark       |
|-------------|-----------|--------------|
| CGNR-C-002F | 2         | Normal Cable |
| CGNR-C-003F | 3         |              |
| CGNR-C-005F | 5         |              |

# External Wiring Diagram

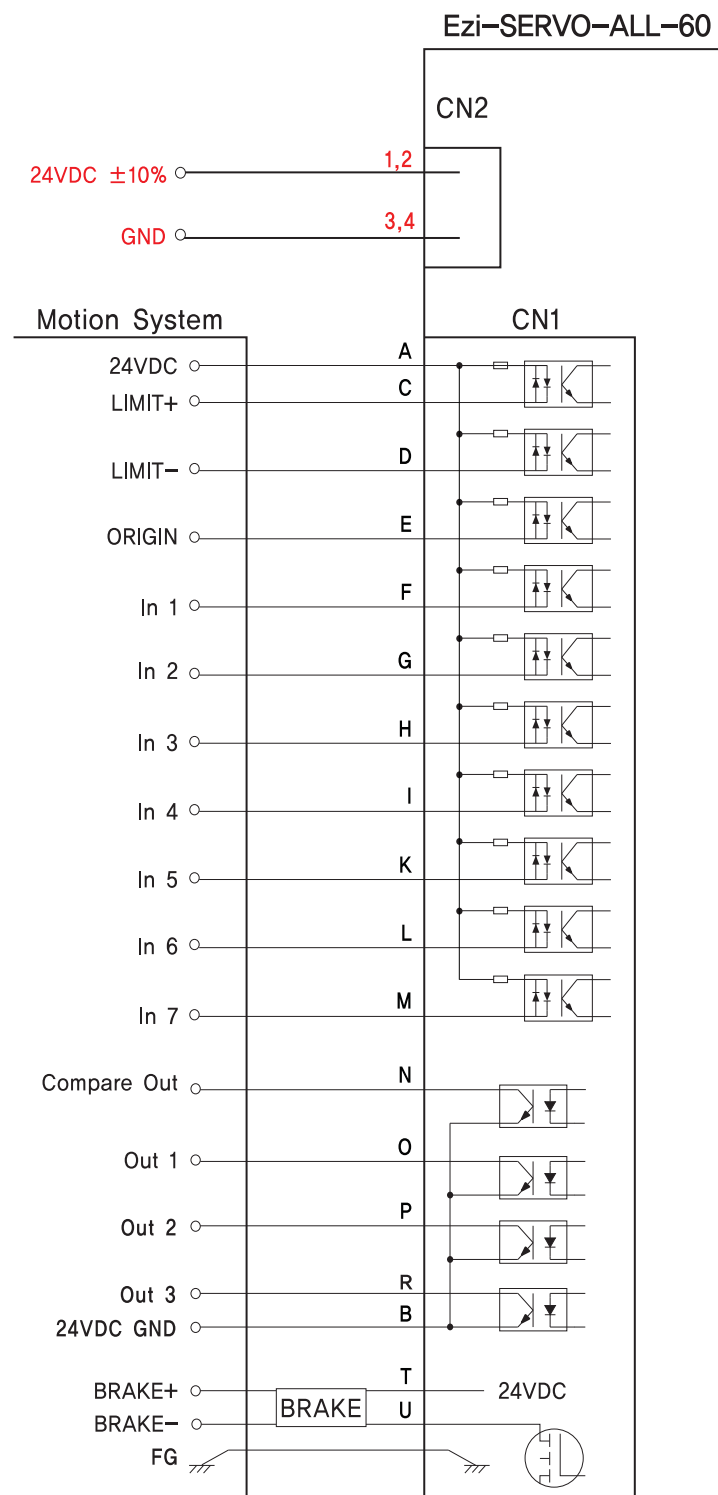
## Ezi-SERVO ALL-28 Series



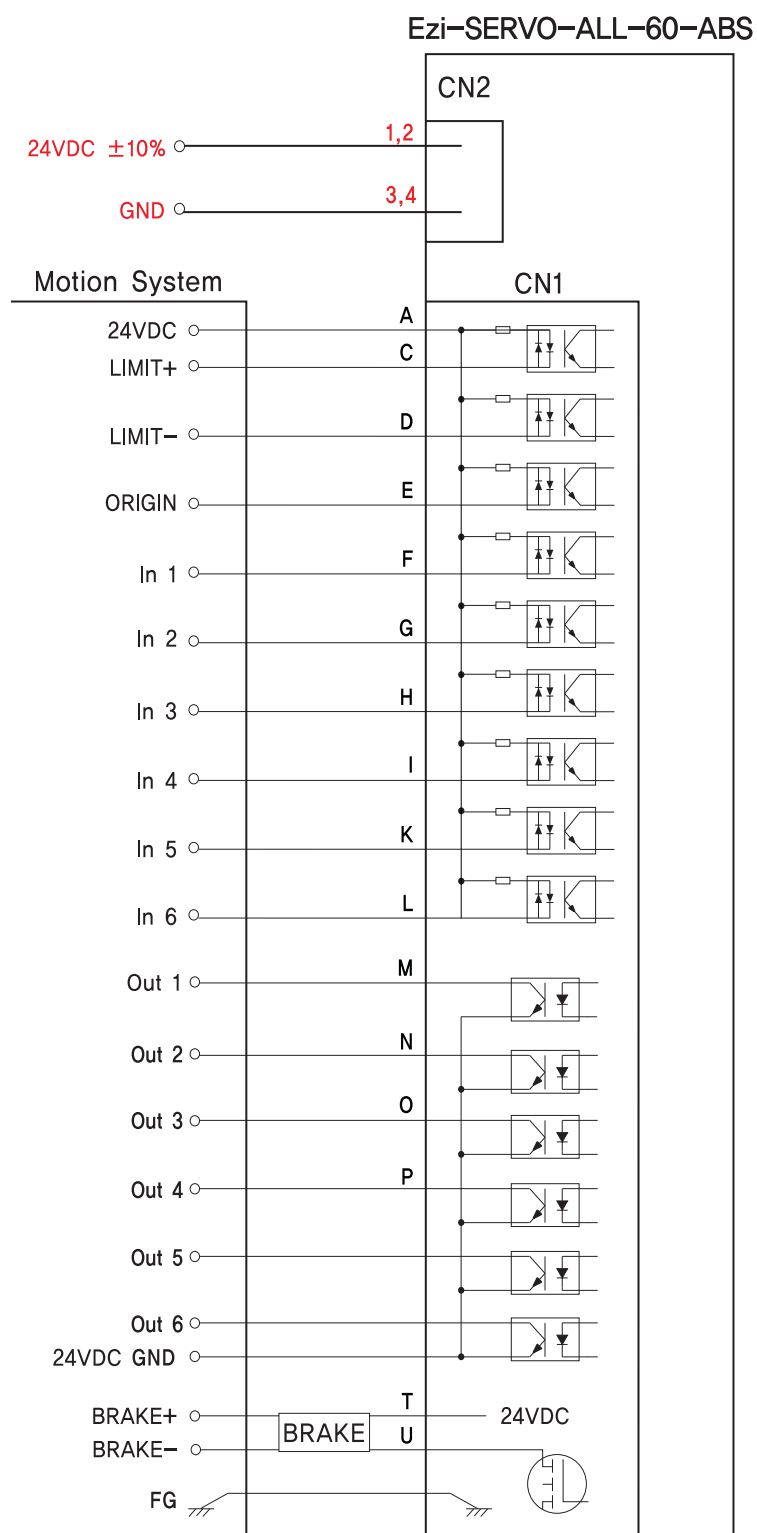
Ezi-SERVO ALL-42 Series / ALL-56 Series



## Ezi-SERVO ALL-60 Series



## Ezi-SERVO ALL-60-ABS



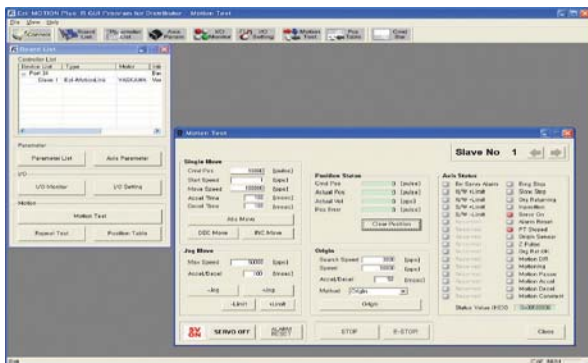
# Graphic User Interface(GUI)

## Screen Configuration

### 1. Controller Lists and Motion Test

This screen display the controller list that connected to system.

You can make a single move, jog and origin command and also the motor status is displayed.



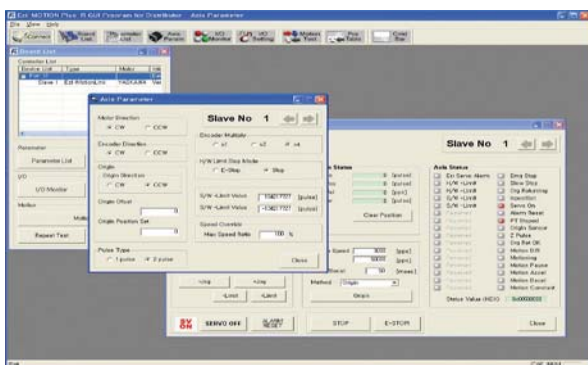
### 4. Parameter List

All of the parameters are displayed and modified on this screen.



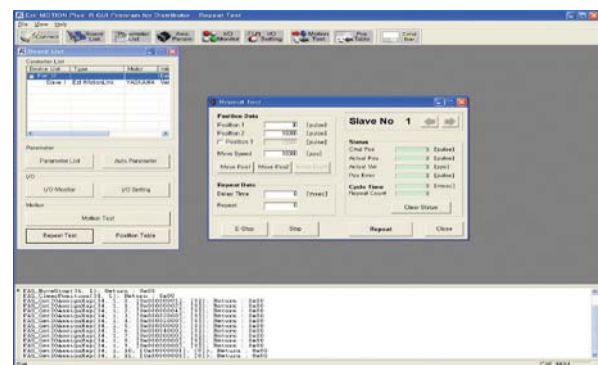
### 2. Axis Parameter Setup

You can select various parameters that frequently used.  
(ex : sensor input logic)



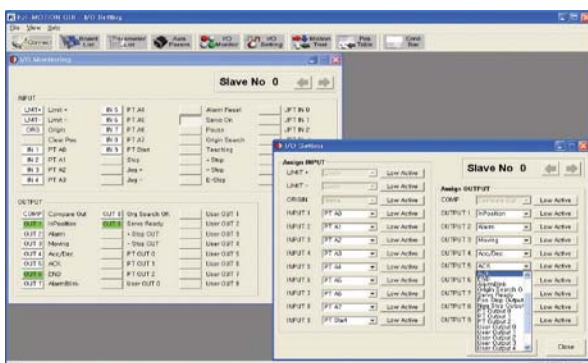
### 5. Motion Repeat and Monitor Status

Target position, speed, delay time and repeat count are selected for repeat motion test. Motion library(DLL) is also displayed on screen.



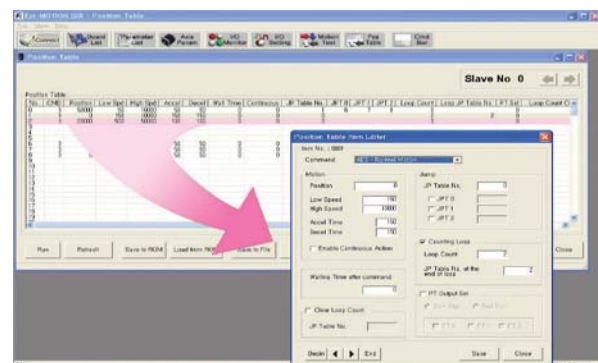
### 3. I/O Monitoring and Setting

You can select various digital input and output signals of controller.



### 6. Position Table

You can edit the position table and execute it. The position table data can be saved and loaded from Flash ROM and Windows file.







*Fast, Accurate, Smooth Motion*

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