Ezi-SERVO®

Closed Loop Stepping System

- Closed Loop System
- Absolute Encoder
- Embedded Controller
- Position Table
- IP65 Rating
- No Gain Tuning / No Hunting
- High Resolution / Fast Response
- Motor + Encoder + Drive + Controller + Network

ABS ALL

* Ezi-SERVO-ABS-ALL-60L-AWN Model

FASTECH

* Ezi-SERVO-ABS-ALL-60L-AWI Model

* Ezi-SERVO-ABS-ALL-60L-AWN Model

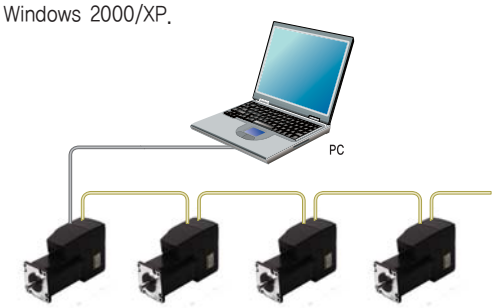
FASTECH

Ezi-SERVO® ABS ALL

Closed Loop Stepping System

1 Network Based Motion Control

A maximum of 24 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.

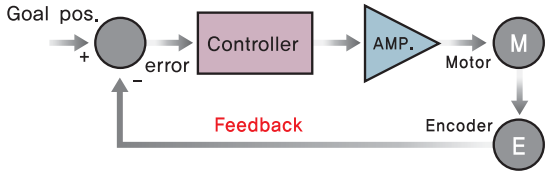


2 Position Table Function

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 Closed Loop System

Ezi-SERVO® 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® to update the current motor shaft position information every 25 micro seconds. This allows the Ezi-SERVO® drive to compensate for the loss of position, ensuring accurate positioning. For example, due to a sudden load change, a conventional step-per motor and drive could lose a step creating a positioning error and a great deal of cost to the end user!



4 Absolute Encoder System

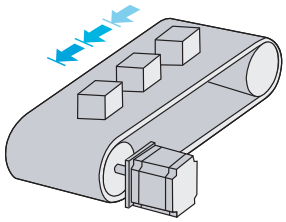
High resolution of absolute position encoder is equipped (single turn-262,144/rev, multi turn-4096 rev) In addition, even power supply of driver shuts off, it enables to know the previous location and the secondary power supply for the encoder (ie : battery) is not required.

5 IP65 Certification

By acquiring IP65 rating, it can be used in harsh environments like water splashes or lots of dusts.

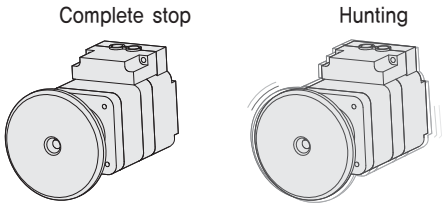
6 No Gain Tuning

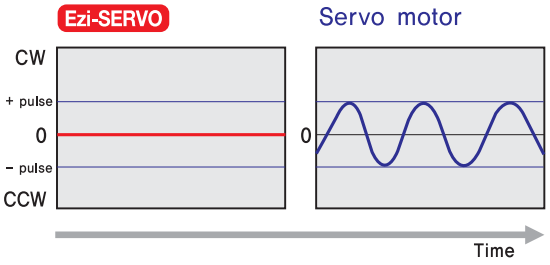
Conventional servo systems, to ensure machine performance, smoothness, positional error and low servo noise, require the adjustment of its servo' s gains as an initial crucial step. Even systems that employ auto-tuning require manual tweaking after the system is installed, especially if more that one axis are interdependent. Ezi-SERVO® 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® is optimized for the application and ready to work right out of the box! The Ezi-SERVO® 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® is especially well suited for low stiffness loads (for example, a belt and pulley system) that some-time require conventional servo systems to inertia match with the added expense and bulk of a gearbox. Ezi-SERVO® also performs exceptionally, even under heavy loads and high speeds!



7 No Hunting

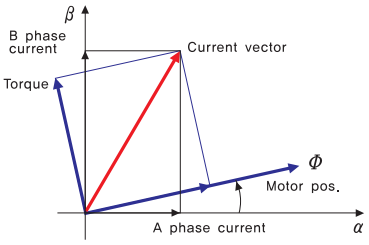
Traditional servo motor drives overshoot their position and try to correct by overshooting the opposite direction, especially in high gain applications. This is called null hunt and is especially prevalent in systems that the break away or static friction is significantly higher than the running friction. The cure is lowering the gain, which affects accuracy or using Ezi-SERVO® Motion Control System! Ezi-SERVO® 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.





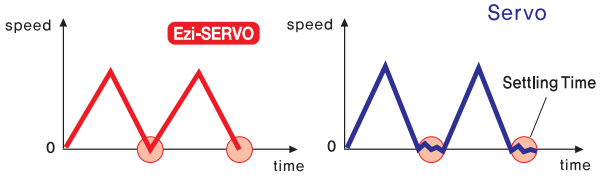
8 Smooth and Accurate

Ezi-SERVO® is a high-precision servo drive, using a high-resolution encoder with 32,000 pulses/revolution.
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.



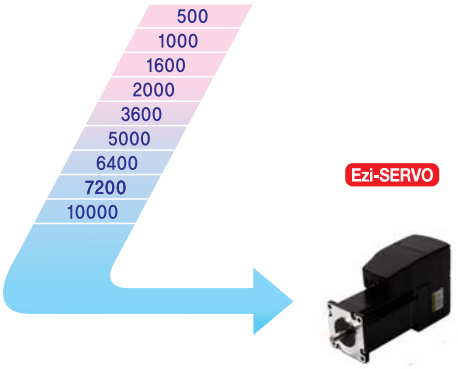
9 Fast Response

Similar to conventional stepping motors, Ezi-SERVO® instantly synchronizes with command pulses providing fast positional response. Ezi-SERVO® 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 in a waiting time until it settles, called settling time.



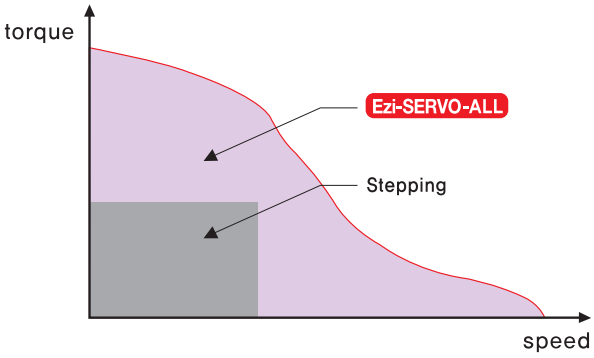
10 High Resolution

The unit of the position command can be divided precisely. (Max. 20,000 pulses/revolution)



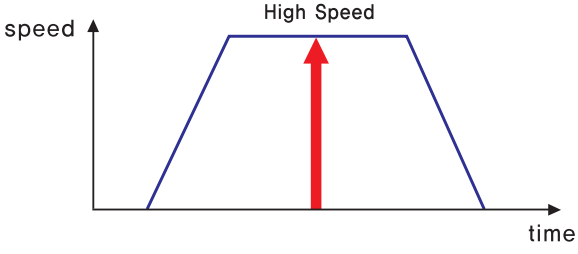
11 High Torque

Compared with common step motors and drives, Ezi-SERVO® 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® exploits continuous high-torque operation during high-speed motion due to its innovative optimum current phase control.



12 High Speed

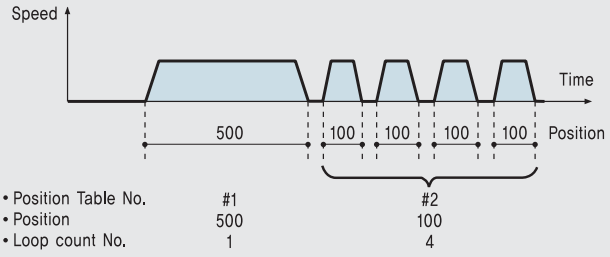
The Ezi-SERVO® functions well at high speed without the loss of Synchronism or positioning error. Ezi-SERVO®' s ability of continuous monitoring of current position enables the stepping motor to generate high-torque, even under a 100% load condition.



● Features of Motion Controller

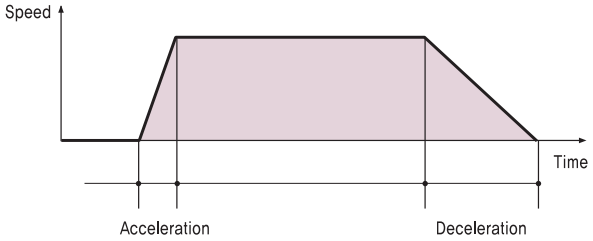
1. Loop Count

This function allows positioning repeatedly according to the Loop Count Number.



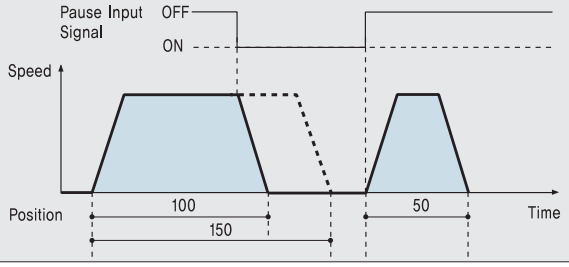
2. Acceleration/Deceleration

For quick acceleration and gradual deceleration, you can set each acceleration and deceleration time separately.



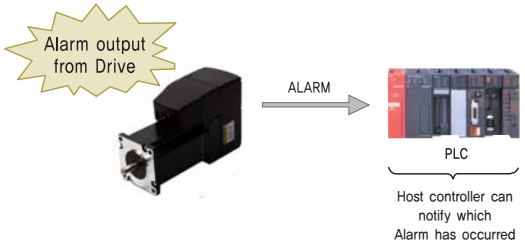
3. Pause

You can pause the motion upon the input of an external signal. When Pause signal change to OFF, the motor will restart to original target position.



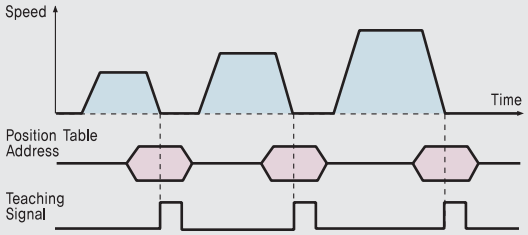
4. Alarm

The number of 7-Segment flashing time indicates which Alarm has occurred.



5. Teaching

Teaching signal is used to memorize current Position data into the selected Position Table item.

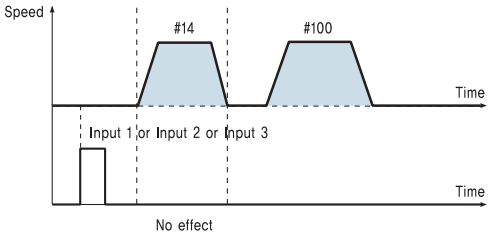


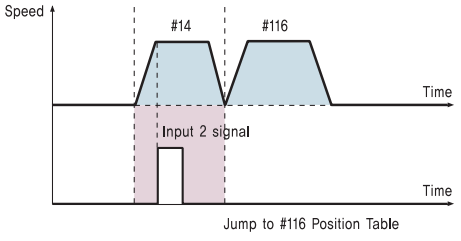
6. Jump

Within one Position Table, you can select various Position Table numbers that you want to jump.
With three external input signal during movement, the next jump Position Table number can be select.

◆ Position Table #14

Position	– – –	Next	– – –	Input 1	Input 2	Input 3	– – –
10000		100		115	116	117	





● Part Numbering

Ezi-SERVO-ABS-ALL-60L-AWN-□

Closed Loop Stepping System Name (absolute encoder)	
Drive Type	ALL : All in one ST : Stand alone
Motor Flange Size	60 : 60mm
Motor Length	S : Single M : Middle L : Large
Encoder	A : 30 bits resolution
Option	W : IP 65 B : Nothing
Connector Type	N : Normal I : Industrial
User code	

● Combination List of Ezi-SERVO ALL

Part Number
Ezi-SERVO-ABS-ALL-60L-AWN
Ezi-SERVO-ABS-ALL-60L-AWI

● Advantages over Open-loop Control Stepping Drive

1. Reliable positioning without loss of synchronism.
2. Holding stable position and automatically recovering to the original position even after experiencing positioning error due to external forces, such as mechanical vibration or vertical positional holding.
3. Ezi-SERVO® utilizes 100% of the full range of rated motor torque, contrary to a conventional open-loop stepping driver that can use up to 50% of the rated motor torque due to the loss of synchronism.
4. Capability to operate at high speed due to load-dependant current control, open-loop stepper drivers use a constant current control at all speed ranges without considering load variations.

● Advantages over Servo Motor Controller

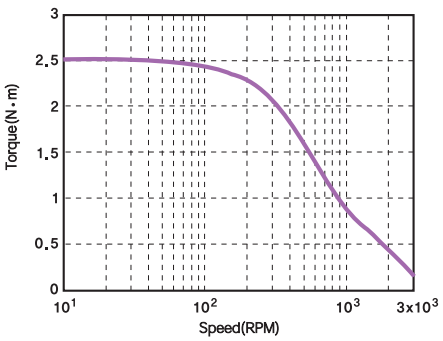
1. No gain tuning (Automatic adjustment of gain in response to a load change.)
2. Maintains the stable holding position without oscillation after completing positioning.
3. Fast positioning due to the independent control by on-board DSP.
4. Continuous operation during rapid short-stroke movement due to instantaneous positioning.

● Specifications

Input Voltage		24VDC ±10%
Control Method		Closed loop control with 32bit DSP
Encoder		Absolute type, No Battery Backup type
Multi Axes Drive		Maximum 24 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
	Water & Dust Preef	IP65
Function	Rotation Speed	0~3000rpm
	Resolution(P/R)	10,000/Rev. Encoder model : 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 20,000/Rev. Encoder model : 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 20,000
	Protection Functions	Over current, Over speed, Position tracking error, Over load, Over temperature, Over regenerated voltage, Motor connect error, Encoder connect error, Motor voltage error, In-Position error, System error, ROM error, Position overflow error
	In-Position Selection	0~15 (Selectable by parameter)
	Position Gain Selection	0~15 (Selectable by parameter)
	Rotational Direction	CW / CCW (Selectable by parameter)
I/O Signal	Input Signal	3 dedicated input (LIMIT+, LIMIT-, ORIGIN), 6 programmable input (Photocoupler)
	Output Signal	6 programmable output (Photocoupler), Brake signal
Communication Interface		The RS-485 serial communication with PC Transmission speed : 115.200bps
Position Control		Incremental mode / Absolute mode Data Range : -134,217,727 to +134,217,727pulse, Operating speed : Max. 3,000rpm
Return to Origin		Origin Sensor, ±Limit sensor, Torque Origin, Set Origin
GUI		User Interface Program within Windows
Software		Motion Library (DLL) for windows 2000/XP

● Torque Characteristics

Ezi-SERVO-ABS-ALL-60L Series



※Measured Condition

Motor Voltage = 40VDC

Motor Current = Rated Current (Refer to Motor Specification)

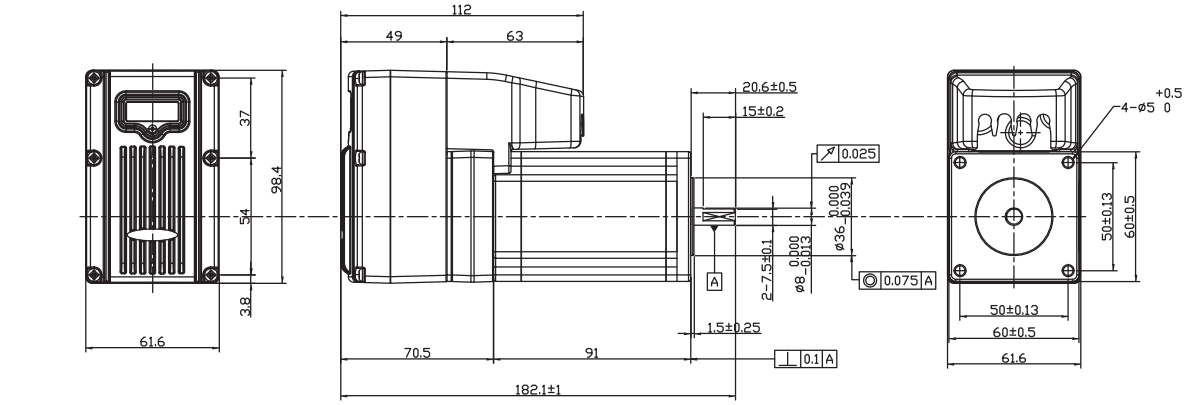
Drive = Ezi-SERVO-ABS-ALL

● Motor Specifications

M O D E L		UNIT	Ezi-SERVO-ABS-ALL-60L Series
DRIVE METHOD		----	BI-POLAR
NUMBER OF PHASES		----	2
VOLTAGE		VDC	2.6
CURRENT per PHASE		A	4
RESISTANCE per PHASE		Ohm	0.65
INDUCTANCE per PHASE		mH	2.4
HOLDING TORQUE		N · m	2.4
ROTOR INERTIA		g · ㎠	800
WEIGHTS		g	1600
LENGTH (L)		mm	90
ALLOWABLE OVERHUNG LOAD (DISTANCE FROM END OF SHAFT)	3mm	N	70
	8mm		87
	13mm		114
	18mm		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

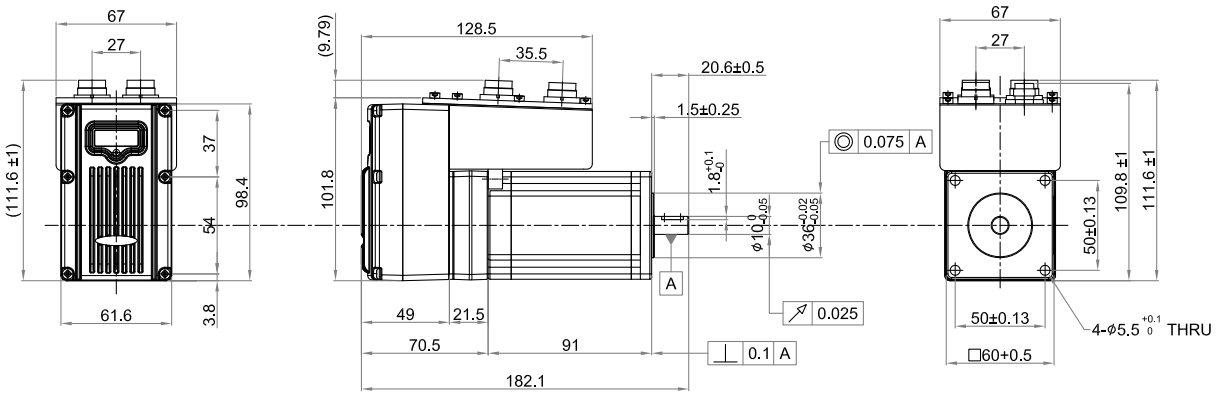
● Motor Dimension [mm]

◆ Normal model



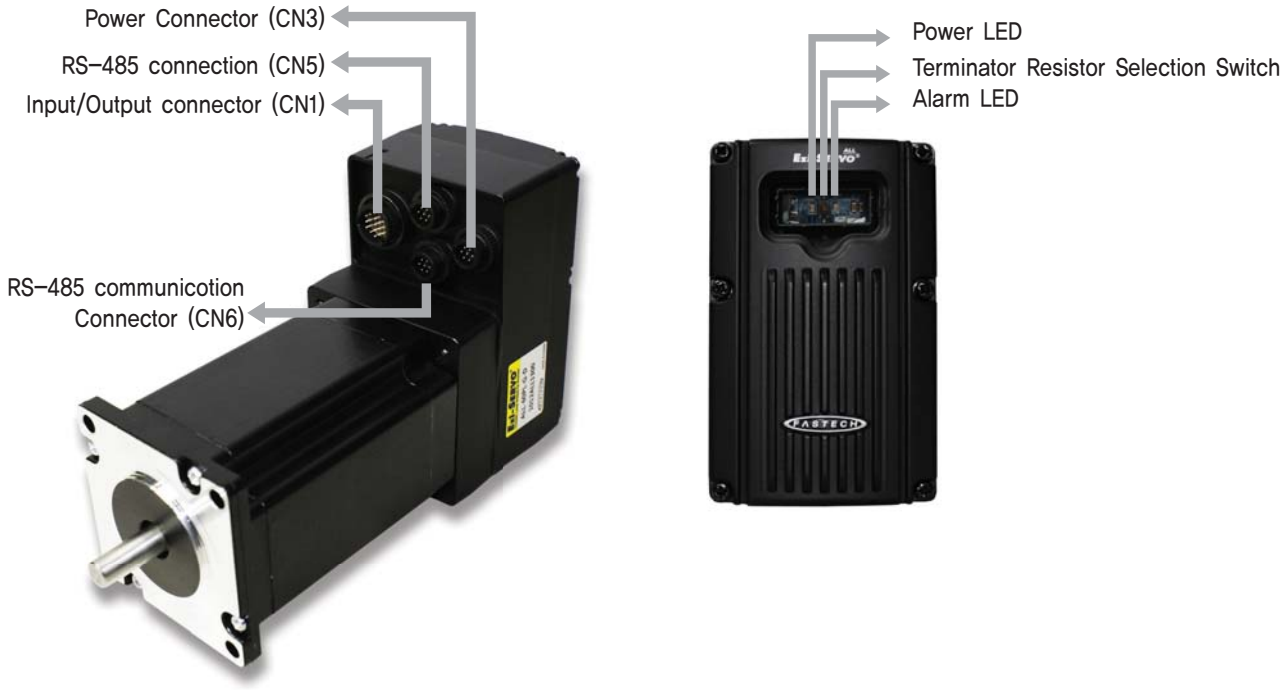
*Front Shaft is Ø8.0

◆ Industrial model



*Front Shaft is Ø10.0

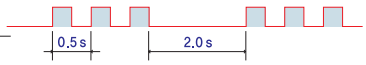
● Setting and Operating *Normal model*



◆ Protection function and LED flash times

When Alarm occurs, can recognize main reason of alarming thru by LED flash times.

Times	Protection	Conditions
1	Over current	The current through power devices in inverter exceeds the limit value
2	Over speed	Motor speed exceed 3,000rpm
3	Position tracking error	Position error value is higher than 90° in motor run state*1
4	Over load	The motor is continuously operated more than 5 second under a load exceeding the max. torque
5	Over temperature	Inside temperature of drive exceeds 55℃
6	Over regenerativedvoltage	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
9	Motor voltage error	Motor voltage is less than 20V
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)
14	Input voltage error	Power wource voltage is out of limited value
15	Position overflow error	Position error value is higher than 90° in motor stop state*1
16	PT position error	position error value is higher than limit*1 after PT motioning



Alarm LED flash
(ex : Position tracking error)

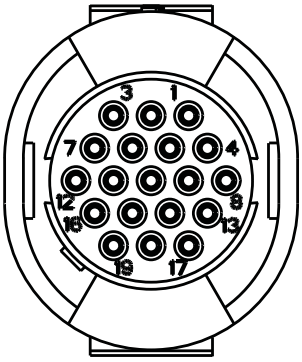
*1 : Limit value can be change by parameter (refer to manual)

1. Terminator resistor selection(SW1)

Terminator resistor selection switch under RS-485 communication. Please set ON for Terminator Controller of Network.

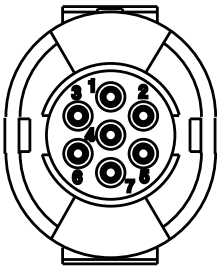
2. Input/Output connector(CN1)

No.	Function	I/O
1	24VDC_EXT	Output
2	GND_EXT	Input
3	DIgital IN1 (Limits +)	Input
4	DIgital IN2 (Limits −)	Input
5	DIgital IN3 (Origin)	Input
6	DIgital IN4	Input
7	DIgital IN5	Input
8	DIgital IN6	Input
9	DIgital IN7	Input
10	DIgital IN8	Input
11	DIgital IN9	Input
12	DIgital OUT1	Output
13	DIgital OUT2	Output
14	DIgital OUT3	Output
15	DIgital OUT4	Output
16	DIgital OUT5	Output
17	DIgital OUT6	Output
18	BRAKE+	Output
19	BRAKE−	Output



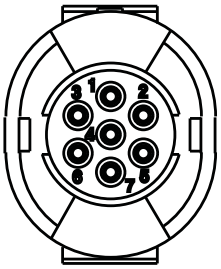
3. Power connector(CN3)

No.	Function
1	GND
2	GND
3	GND
4	F.GND
5	24VDC
6	24VDC
7	24VDC



4. RS-485 Communication Connector(CN5, CN6)

No.	Function
1	GND
2	24VDC*1
3	NC
4	Shield
5	GND
6	−DATA
7	+DATA



*1 Power supply for teach pendant

◆ Connector for Cabling

These connectors are serviced together with Ezi-SERVO-ABS-ALL except when purchasing option cables.

CN1 : Input/Output Connector

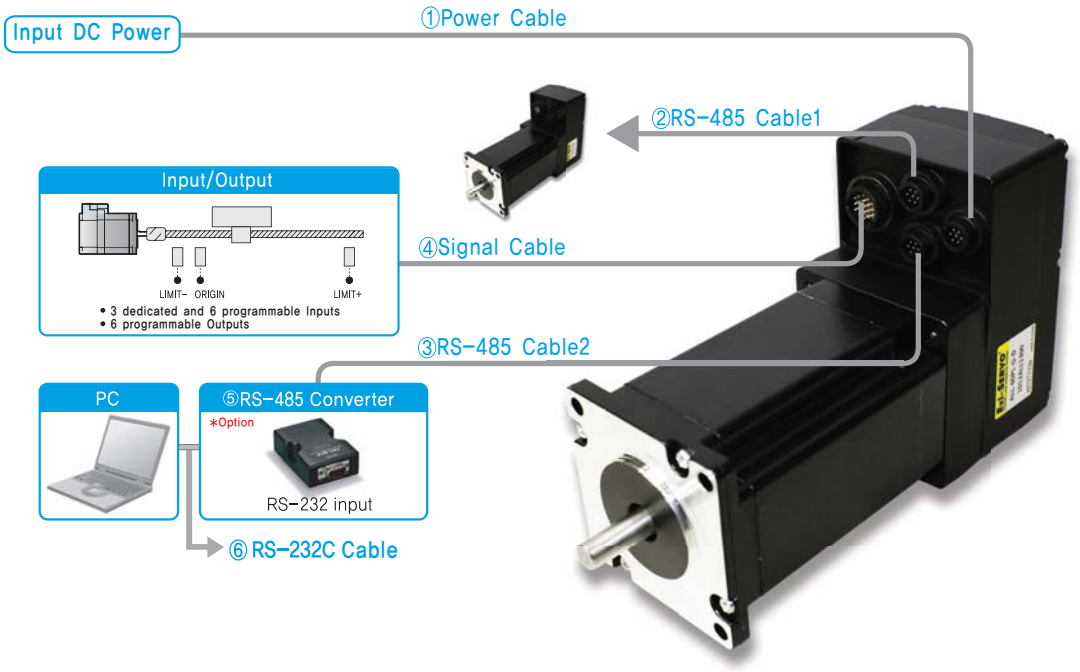
Item	Specification	Maker
Connector	1445782-1	Tyco
Strain Relief	1604204-1	Tyco

CN5, CN6 : Motor connector

Item	Specification	Maker
Connector	1445642-1	Tyco
Strain Relief	1604111-1	Tyco

CN3 : Power Connector

Item	Specification	Maker
Connector	1445642-1	Tyco
Strain Relief	1604111-1	Tyco



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

1. Option Cable

Available cables for Ezi-SERVO-ABS-ALL(Normal model) series

Item : **CN60-C-□□□M-□□**

- Cable Series
- Usage
  - C : Communication
  - P : Power
  - S : Signal
- Motor Length
  - 3 digit number, unit is m.
- Cable type
  - M : Robot
  - F : Normal
  - A : Oilproof
- User Code

①Power Cable

Connector Specification	No.	Cable wire color and number	Function	Connector Specification
Connector Maker : Tyco Item : 1445642-1	1 2 3	Black 1	N24	
	4	Green + Yellow	F. GND	
Strain Relief Maker : Tyco Item : 1604111-1	5 6 7	Black 2	P24	

Cable Type	Maker	Model	Item
Nomal			
Robot	SAB BROCKSKES	S776	103776-0405
Oilproof		S200	07740305

②RS-485 Cable for motor and motor

There are two kinds of communication cables. The cables that connects the motor and the motor and the motor and the cable connecting the converter.

Connector Specification	No.	Cable wire color and number	Function	Connector No.	Connector Specification
Connector Maker : Tyco Item : 1445642-1	1			1	Connector Maker : Tyco Item : 1445642-1
	2			2	
	3			3	
	4			4	
Strain Relief Maker : Tyco Item : 1604111-1	5		GND	5	Strain Relief Maker : Tyco Item : 1604111-1
	6		-Data	6	
	7		+Data	7	

④Signal cable

Connector Specification	No.	Cable wire color and number	Function	Connector Specification
Connector Maker : Tyco Item : 1445782-1	1~17		24VDC Digital IN Digatal OUT	
Strain Relief Maker : Tyco Item : 1604204-1	18	Red	Brake+	
	19	Orange	Brake-	

Cable Type	Maker	Model	Item
Normal	Teayoung Elec	2464	2464-22

2. Option

⑤FAS-RCR (Communication Converter)

The devices converts Computer's RS-232C Port Signal to RS-485 signal.

Item	Specification
Comm. Speed	Max. 115.2Kbps
Comm. Distance	RS-232C : Max. 15m RS-485 : Max. 1.2km
Connector Type	RS-232C : DB9 Female RS-485 : RJ-45
Dimension	50X75X23mm
Weight	38g
Power	Powered from PC (Usable for external DC5~24V)

• Cable for FAS-RCR

③RS-485 Cable

Available to connect Ezi-SERVO-ABS-ALL and FAS-RCR converter

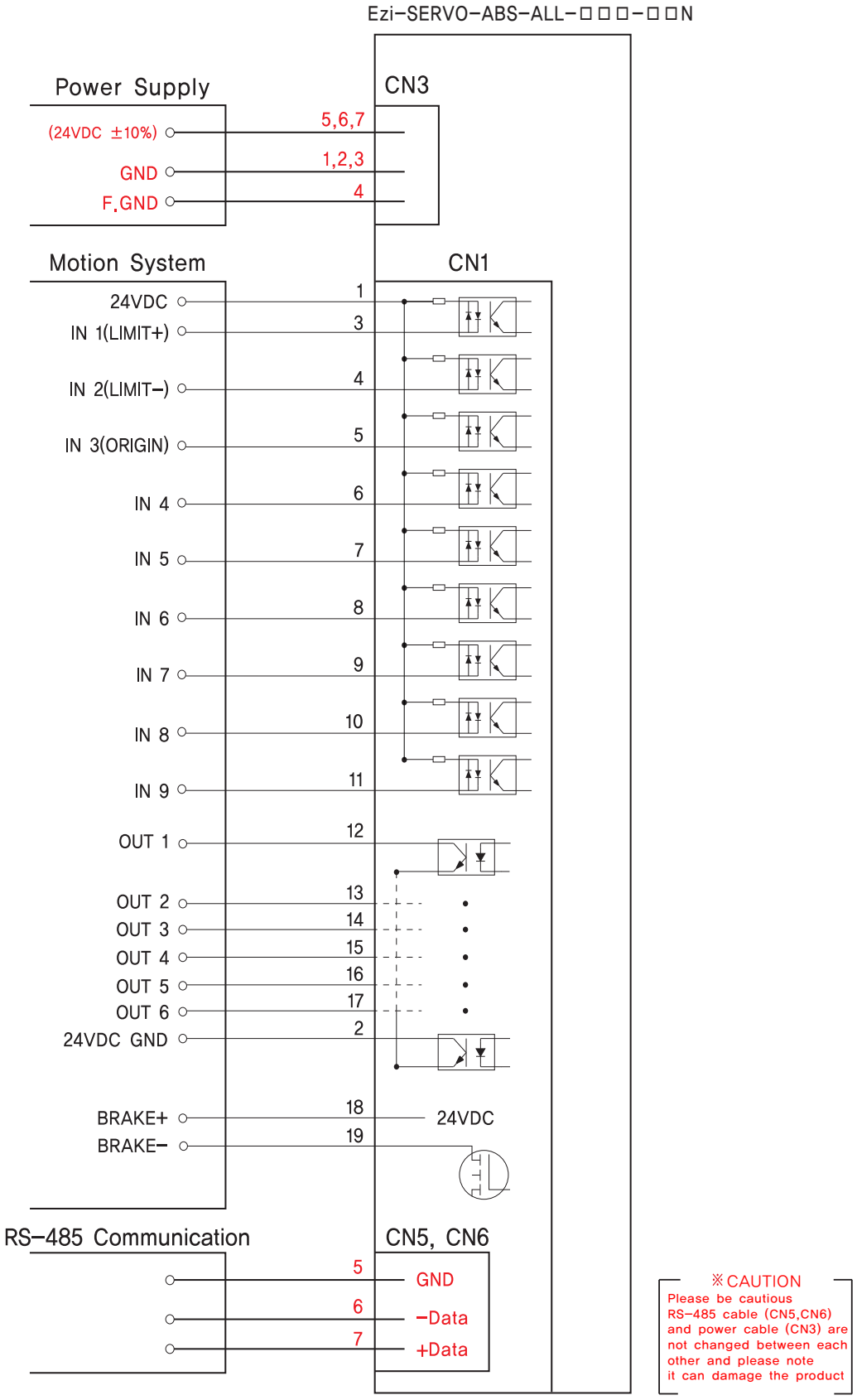
Item	Length[m]	Remark
CGNR-A-OR06F	0.6	Nomal Cable
CGNR-A-001F	1	
CGNR-A-IR5F	1.5	
CGNR-A-002F	2	
CGNR-A-003F	3	
CGNR-A-005F	5	

⑥RS-232C Cable

Available to connect PC and FAS-RCR. Normal RS-232C standard cable can be used

Item	Length[m]	Remark
CGNR-C-002F	2	Nomal Cable
CGNR-C-003F	3	
CGNR-C-005F	5	

● External Wiring Diagram *Normal model*

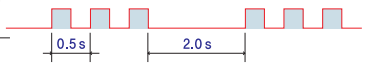


※CAUTION
Please be cautious RS-485 cable (CN5,CN6) and power cable (CN3) are not changed between each other and please note it can damage the product

◆ Protection function and LED flash times

When Alarm occurs, can recognize main reason of alarming thru by LED flash times.

Times	Protection	Conditions
1	Over current	The current through power devices in inverter exceeds the limit value
2	Over speed	Motor speed exceed 3,000rpm
3	Position tracking error	Position error value is higher than 90° in motor run state*1
4	Over load	The motor is continuously operated more than 5 second under a load exceeding the max. torque
5	Over temperature	Inside temperature of drive exceeds 55℃
6	Over regenerativted voltage	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
9	Motor voltage error	Motor voltage is less than 20V
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)
14	Input voltage error	Power wource voltage is out of limited value
16	PT position error	position error value is higher than limit*1 after PT motioning



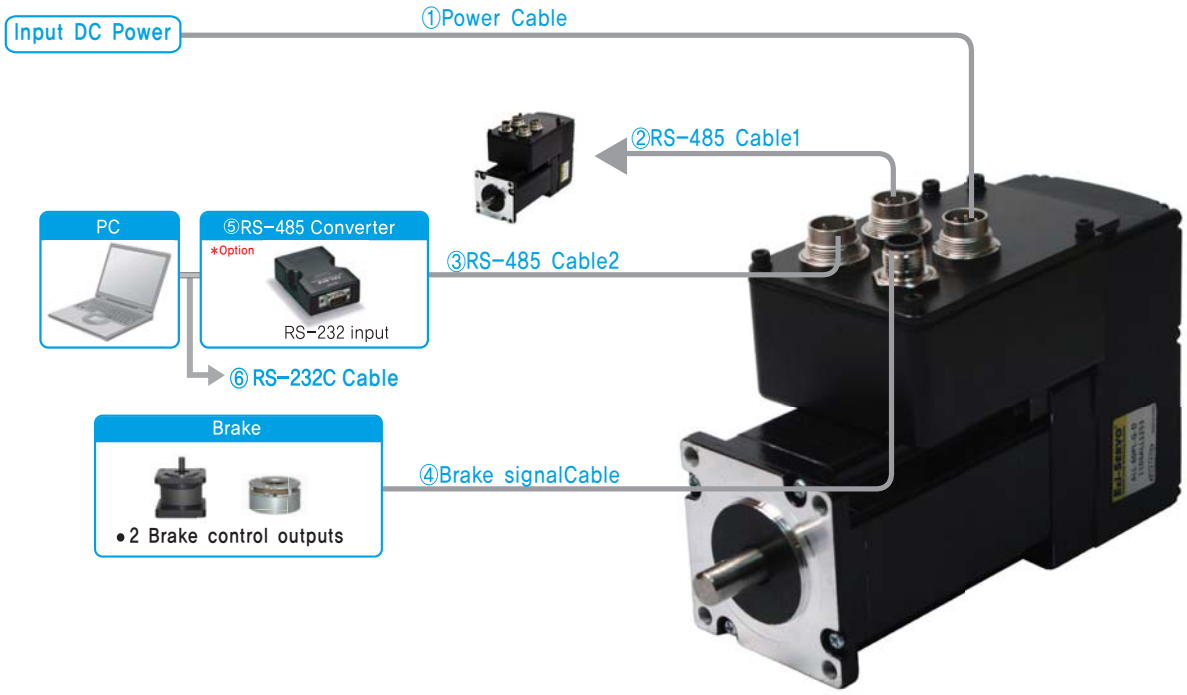
Alarm LED flash
(ex : Position tracking error)

*1 : Limit value canbe change by parameter (refer to manual)

1. Terminator resistor selection(SW1)

Terminator resistor selection switch under RS-485 communication. Please set ON for Terminator Controller of Network.

● System configuration [Default] *Industrial model*



Type	Brake signal cable	Power cable	RS-485 Cable
Standard Length	–	–	–
Max. Length	1m	2m	30m

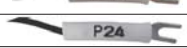
1. Cable

Available cables for Ezi-SERVO-ABS-ALL(Industrial model) series

Item : CI60-C-□□□MA-□□

- **Cable Series**
- **Usage**
  - C1 : motor (communt:cation)
  - C2 : converter (communication)
  - P : Power
  - S : Signal
- **Motor Length**
  - 3 digit number, unit is m.
- **Cable type**
  - M : Robot
  - F : Normal
  - A : Oilproof
- **User Code**

①Power Cable

Connector		Cable wire color and number	Function	Connector Specification
Specification	No.			
 **Connector** Maker : Binder Item : 99-5606-75-04	1 2	Black 1	N24	
	3	Green + Yellow	F. GND	
	4	Black 3	P24	

Cable Type	Maker	Model	Item
Nomal			
Robot	SAB BROCKSKES	S776	103776-0405
Oilproof		S200	07740305

②,③RS-485 Cable

There are two kinds of communication cables. The cables that connects the motor and the motor and the motor and the cable connecting the terminal(BD-CON-A) that is different. In case of cables connects to Terminal, please fill in the letters O as user code.

②Cable for motor and motor

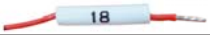
Connector		Cable wire color and number	Function	Connector Specification
Specification	No.			
Connector Maker : Binder Item : 99-5606-75-04	1 2	Black 1	N24	**Connector** Maker : Binder Item : 99-5606-75-04
	3	Green + Yellow	F. GND	
	4	Black 3	P24	

③Cable for motor and cable connecting the converter(FAS-RCR)

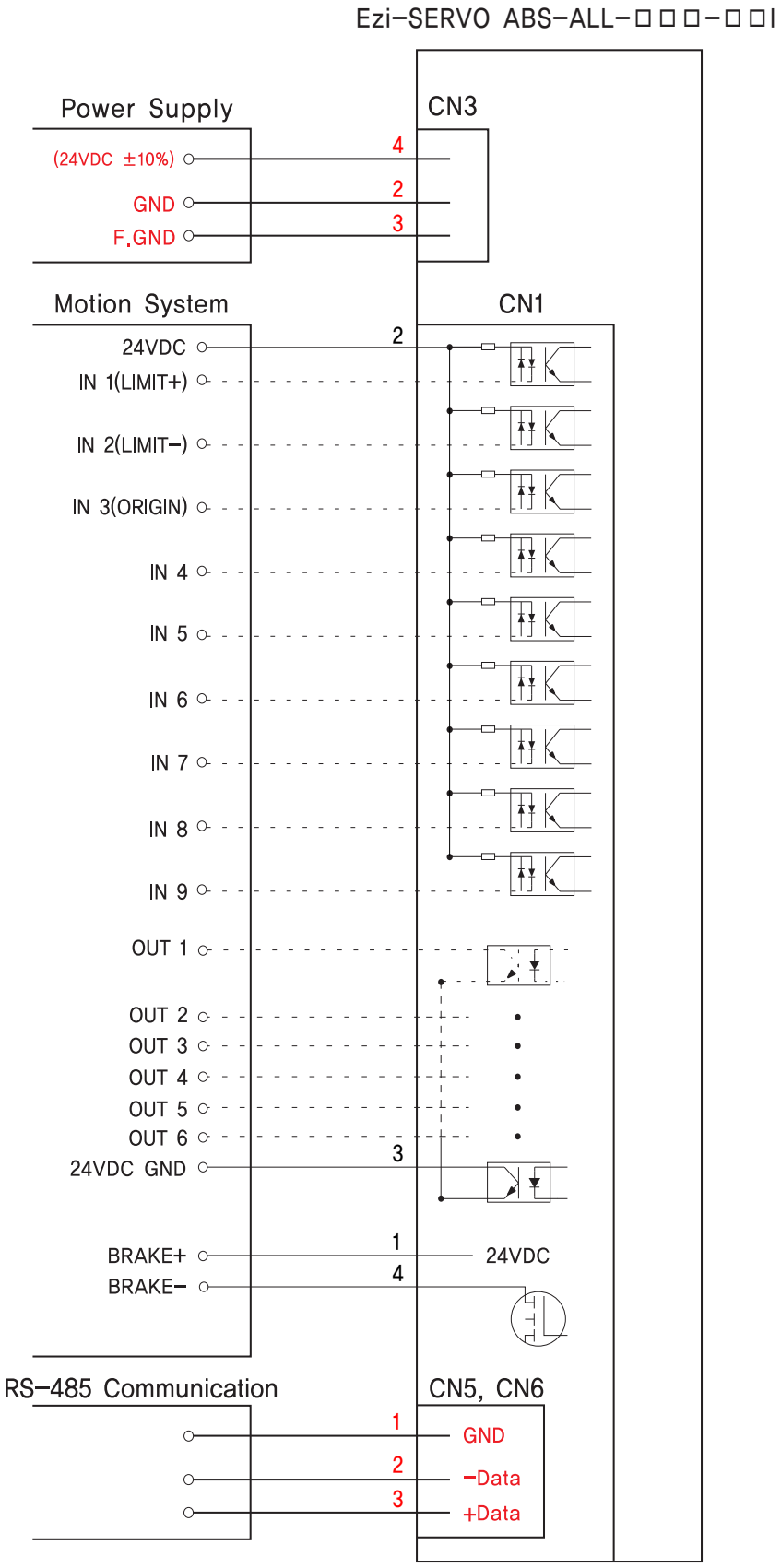
Connector		Cable wire color and number	Function	Connector Specification	
Specification	No.			No.	Specification
Connector Maker : Binder Item : 99-5606-75-04	1	Brown	GND	1, 2, 4, 5, 7, 8	**Connector** Type : RJ45
	2	Yellow	-Data	2	
	3	Green	+Data	3	

Cable Type	Maker	Model	Item
Nomal			
Robot	SAB BROCKSKES	SD787 CTP	37870325
Oilproof		SD200 CTP	07890325

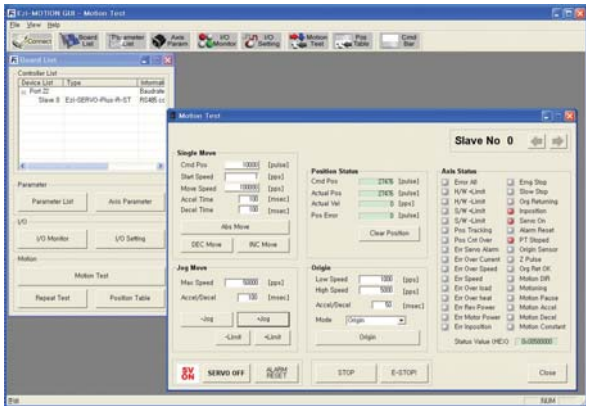
④Singnal (Brake control)cable

Connector		Cable wire color and number	Function	Connector Specification
Specification	No.			
Connector Maker : Qport Item : MI2S-H33-Volo/0LN	1	Brown	Brake+	
	4	Black	Brake-	

Cable Type	Maker	Model	Item
Normal	Teayoung Elec	2464	2464-22

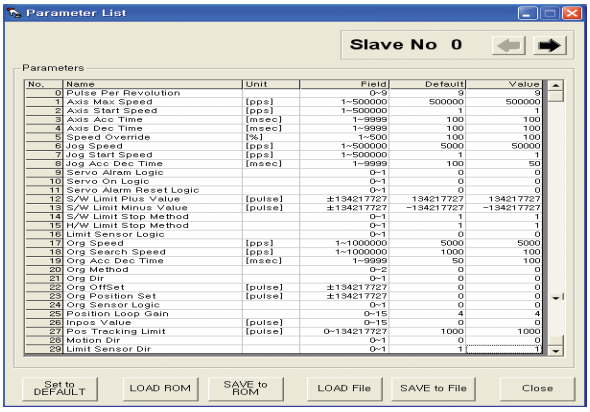

Ezi-SERVO ABS-ALL-□□□-□□I
Power Supply
(24VDC ±10%)
GND
F.GND
CN3
4
2
3
Motion System
CN1
24VDC
IN 1(LIMIT+)
IN 2(LIMIT-)
IN 3(ORIGIN)
IN 4
IN 5
IN 6
IN 7
IN 8
IN 9
OUT 1
OUT 2
OUT 3
OUT 4
OUT 5
OUT 6
24VDC GND
2
3
BRAKE+
BRAKE-
1
4
24VDC
RS-485 Communication
CN5, CN6
1
2
3
GND
-Data
+Data

● GUI(Graphic User Interface) Screenshot



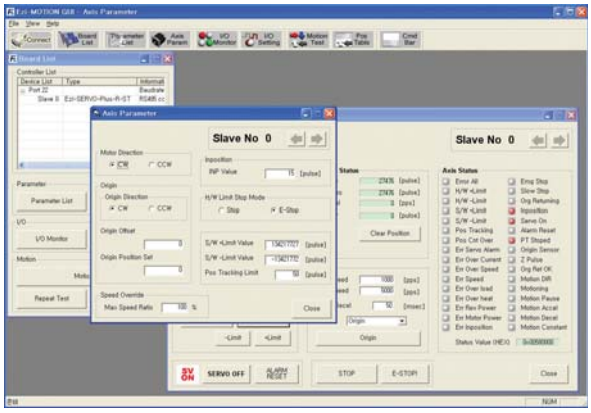
◆ Controller Lists and Motion Test

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.



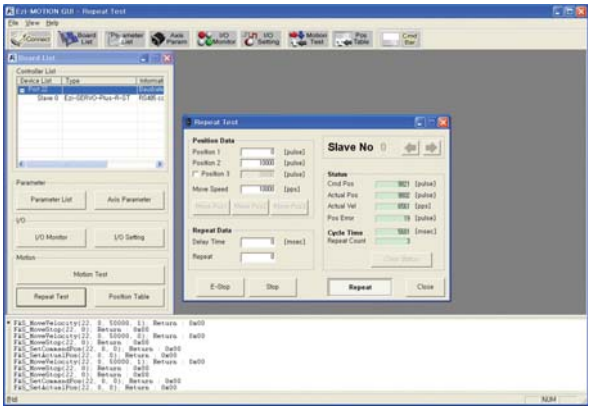
◆ Parameter List

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



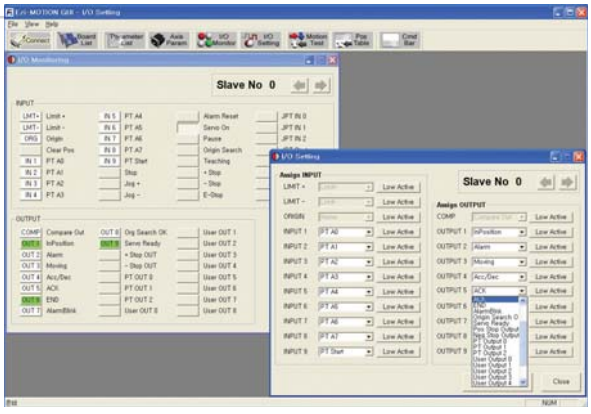
◆ Axis Parameter Setup

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



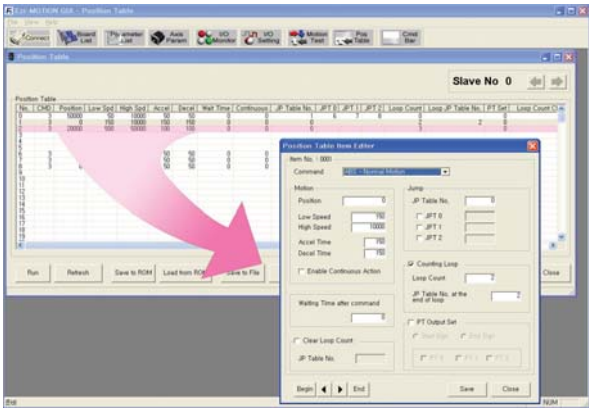
◆ Motion Repeat and Monitor Status

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



◆ I/O Monitoring and Setting

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



◆ 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.

MEMO

FASTECH Ezi-SERVO ABS ALL

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