EMX-100

4-axis Ethernet-based Motion Controller

User's Manual

Manual Rev.: 1.0

Revision Date: Apr. 17, 2019

Part No: 50-1Z257-1010

Leading **EDGE COMPUTING**

Revision History

Revision	Release Date	Description of Change(s)
1.0	Apr. 17, 2019	Initial Release

Preface

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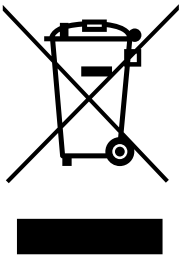
Environmental Responsibility



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Battery Labels (for products with battery)

California Proposition 65 Warning

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Trademarks

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Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.

NOTE: Additional information, aids, and tips that help users perform tasks.

Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.

Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1 Introduction

ADLINK's EMX-100 motion controller, based on Ethernet connection, provides a significantly more compact PC system with simplified motor wiring via standard TCP/IP communication protocol, eliminating the need to install a controller board at the main station or extra real-time OS, making it particularly suitable for small machine PC controller use in limited space.

The EMX-100 supports 4-axis pulse wave I/O for servo or step motor encoder use. Each axis supports positive limit input, negative limit input, and zero point usage for motion control. Built-in 32-point industrial-grade isolated input and 14-point industrial-grade isolated output and 2 sets of command or encoder position comparison trigger dedicated output.

The EMX-100 library is compatible with ADLINK's standard APS motion control library interface and offers the same high affinity parameter settings, motor testing and system verification software as MotionCreatorPro 2™, supporting all motion control libraries. For users who are already familiar with ADLINK's motion control products, there is no need to relearn, because the EMX-100 has a consistent programming approach. For users new to ADLINK's motion control products, the learning curve is significantly shortened, thanks to the intuitive nature of the APS library.

1.1 Features

- Libraries and utilities for Windows 7/10
- Expansion deployment up to 100 meters via Ethernet
- Support for standard C++, C#, VB.NET
- 2-axis position Compare and Trigger output
- Includes MotionCreator Pro 2 Windows-based application development software
- 16 axes of step and direction pulse output for controlling stepping or servomotor
- Digital input and output signals 37500Vrms isolated
- Plug and play provides easy setup and maintainance

1.2 Specifications

General Specifications	
Dimensions	215 (l) x 164 (w) x 39 (h) mm
Weight	1030kg ±10g
Installation method	4 x screw lock
Power module input voltage	24 VDC ±10%
Power consumption	11.48W
Overvoltage protection	⩾ 28V
Overcurrent protection	⩾ 1.25A
IP rating	IP20
Operating temperature	0°C to 50°C
Storage temperature	-20°C to 80°C
Humidity	80% RH
Heat dissipation	Natural air cooling
Compliance	CE/FCC/RoHs

Internet Control	
Physical level	10/100M Ethernet
Communication level	Standard TCP/IP, Intranet communication only
Approximate level	Uses APS library provided by ADLINK
Support topology	Based on star topology through switch or hub
Motion Control Switch	
Support axis/module	4
Support motor type	Supports whole servo or step motor drive by pulse wave I/O
Max. axes supported	16
Position control range	-2,147,483,648 to +2,147,483,647 pulse units
Max. pulse output rate	a4Mpps (Hz)

Controller pulse output format	Differential OUT/DIR, CW/CCW and 2x, 4x AB phase
Encoder pulse input format	Differential CW/CCW and 1x, 2x, 4x AB phase
Max. encoder input frequency	4Mhz (under 4 x AB phase)
Motion Control Function	
Motion track	T/S curve
Point-to-point	Arbitrary axis
Linear interpolation	1 set of 2 axes (max. one set)
Jog operation	Arbitrary axis
Speed control	Arbitrary axis
Return to zero mode	Single instruction auto-completion, with origin ORG, limit EL and encoder EZ signal
Dedicated Motion I/O	
Digital output	Servo ON/Alarm Reset/Deviation Counter Clear
Digital input	Servo alarm/in place/servo ready/return to zero/ negative and positive limit signal/ emergency stop
Universal Digital Input Signal	
Digital input channels	32
Digital input	W/ optical isolation Sink & Source with DICOM
Digital input voltage	24VDC ±10%
General Purpose Digital Output Signal	
Digital output channels	14
Digital output	Dry contact with optical isolation and flywheel diode protection
Max. digital output current	40mA
Location Comparison and Triggering	
Supported types	Single or continuous trigger, with the encoder of the first two axes
Continuous trigger mode	Equal pulse interval

Channels	2
Trigger pulse bandwidth	64µs/256µs/1000µs via software
Continuous trigger max. frequency	500Hz
Software	
Operating software	MotionCreatorPro 2
Support library	APS library DLL form
OS	Windows 7/Windows 10 32/64-bit
API function response	Class function minimum parameter command 2ms, feedback function less than 1ms, state update is 2ms

1.3 Software Support

OS/Programming Library

The EMX-100 supports Windows 7/10 64/32-bit OS and provides DLL files for easy application development by users.

MotionCreatorPro 2

MotionCreatorPro 2™ is a user interface exclusively developed for ADLINK motion control products in a standard Windows environment. It provides easy card and axis parameter setup, and a Setup Wizard guides users through hardware installation and wiring as well as single-axis manipulation in minutes. MotionCreatorPro 2™ not only effectively reduces development time but also enables concurrent validation of overall mechanism and electric design with all single axis and interpolation motion operation pages.

For more information, please see the ADLINK document MotionCreatorPro 2 User's Manual.

1.4 Mechanical Drawings

NOTE: All dimensions shown are in millimeters (mm) unless otherwise stated.

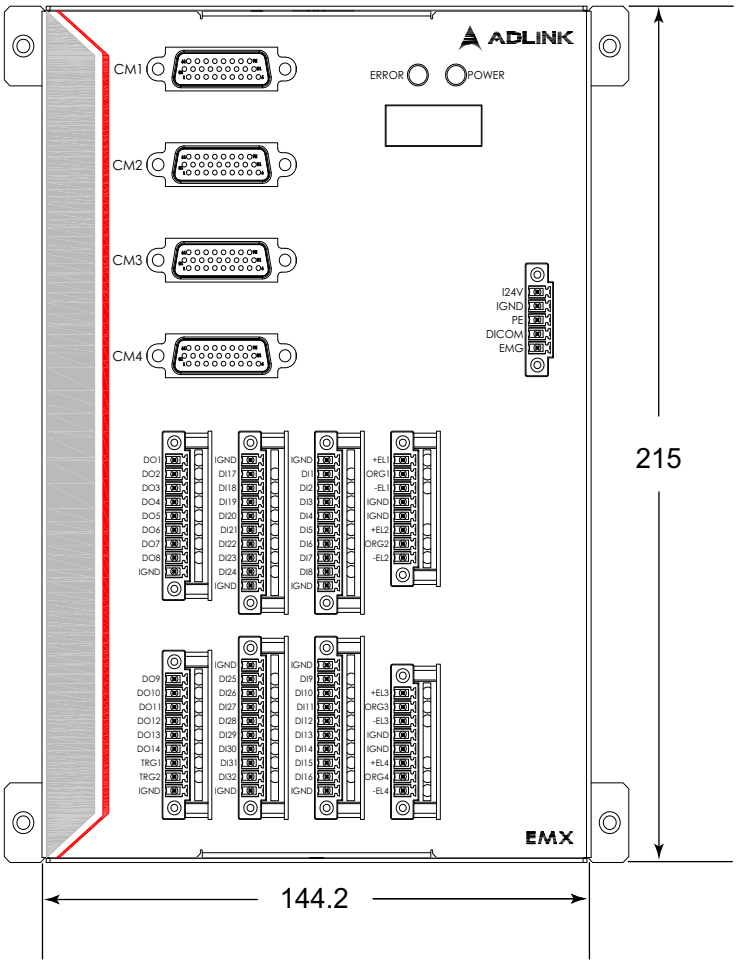


Figure 1-1: Front View

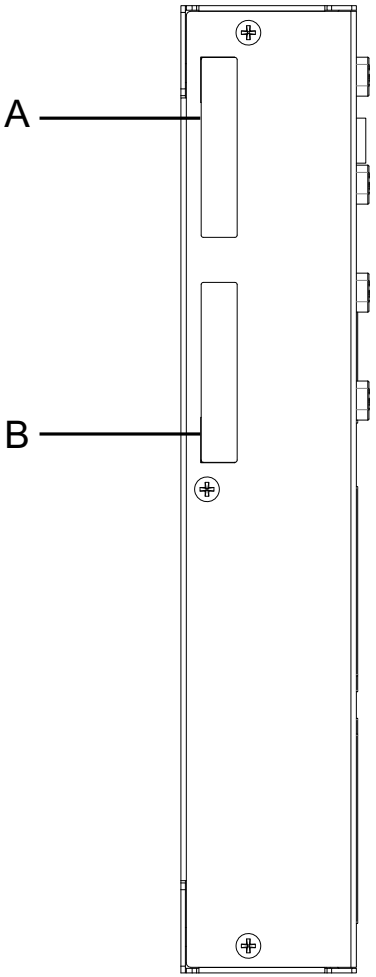


Figure 1-2: (Left) Side View

A	Barcode label
B	MAC address label

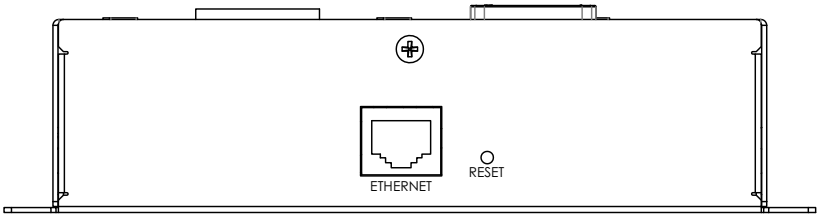


Figure 1-3: Top View (incl. RJ-45 connector and device Reset button)

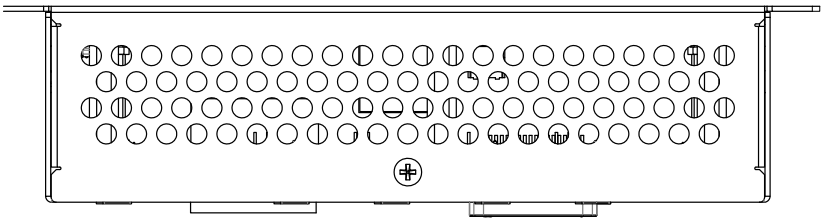
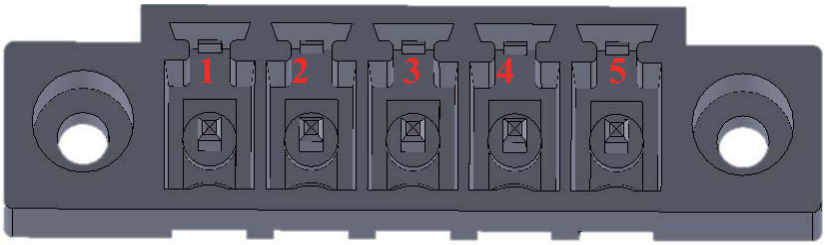


Figure 1-4: Underside View

1.5 Power Connectors

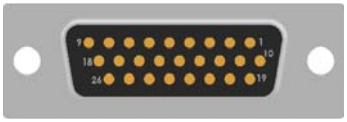
The main power supply connectors from which the external supply controller 24VDC power is supplied. In addition to the power input, the DICOM contact provides a choice of digital input point types, such as Source or Sink. The emergency stop input signal in motion control is also accessed from this connector. The PE point should be grounded. It should be noted that the PE and digital I/O's IGND location need to be separated, as do the PE and the 24VDC power supply GRND.

Pin	Name	I/O	Function	Pin	Name	I/O	Function
1	I24V	P	24VDC power supply	4	DICOM	I	General input common
2	IGND	P	External power ground	5	EMG	I	Device emergency stop
3	PE		Ground				



1.6 Motor Drive Connector CM1 to CM4

A D-SUB connector for the motor driver. The EMX-100 provides a series of cables of different lengths that can interface with commonly used servo drives. Generally, the servo driver terminal is the popular SCSI-50pin connecter. If no pin-to-pin matched cable is provided, the open cable can be used.



Pin	Name	I/O	Function	Pin	Name	I/O	Function
1	SVON	O	Servo on	14	IGND	P	Isolation Ground
2	INP	I	In position	15	IGND	P	Isolation Ground
3	DCC	O	Deviation counter clear	16	EB-	I	Encoder B-phase(-)
4	RDY	I	Servo ready	17	EB+	I	Encoder B-phase(+)
5	OUT-	O	Pulse signal(-)	18	IGND	P	Isolation Ground
6	OUT+	O	Pulse signal(+)	19	EMG	O	Emergency stop
7	EA-	I	Encoder A-phase(-)	20	IGND	P	Isolation Ground

Pin	Name	I/O	Function	Pin	Name	I/O	Function
8	EA+	I	Encoder A-phase(+)	21	IGND	P	Isolation Ground
9	N/A			22	N/A		
10	RST	O	Alarm reset	23	DIR-	O	Direction signal(-)
11	ALM	I	Servo alarm	24	DIR+	O	Direction signal(+)
12	I24V	P	I/O power supply +24V	25	EZ-	I	Encoder Z-phase(-)
13	IGND	P	Isolation ground	26	EZ+	I	Encoder Z-phase(+)

1.7 Dedicated Motion I/O Connector

A quick-release Phoenix connector for the origin switch and limit switch on the motion control platform.

Pin	Name	I/O	Function	Pin	Name	I/O	Function
1	+EL1	I	Axis 1 Positive Limit Switch	5	IGND	P	Isolation Ground
2	ORG1	I	Axis 1 Origin Switch	6	+EL2	I	Axis 2 Positive Limit Switch
3	-EL1	I	Axis 1 Negative Limit Switch	7	ORG2	I	Axis 2 Origin Switch
4	IGND	P	Isolation Ground	8	-EL2	I	Axis 2 Negative Limit Switch

Pin	Name	I/O	Function	Pin	Name	I/O	Function
1	+EL3	I	Axis 3 Positive Limit Switch	5	IGND	P	Isolation Ground
2	ORG3	I	Axis 3 Origin Switch	6	+EL4	I	Axis 4 Positive Limit Switch

Pin	Name	I/O	Function	Pin	Name	I/O	Function
3	-EL3	I	Axis 3 Negative Limit Switch	7	ORG4	I	Axis 4 Origin Switch
4	IGND	P	Isolation Ground	8	-EL4	I	Axis 4 Negative Limit Switch

1.8 General Input Connector

Another quick-release Phoenix connector for use with digital input points on the equipment platform, generally connecting sensors such as proximity or photoelectric switches.

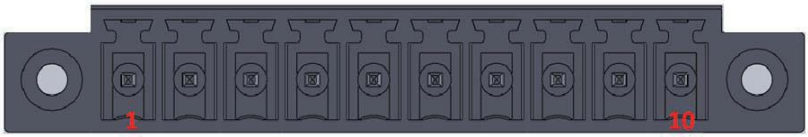
Pin	Name	I/O	Function	Pin	Name	I/O	Function
1	IGND	P	Isolation Ground	6	DI5	I	Digital input
2	DI1	I	Digital input	7	DI6	I	Digital input
3	DI2	I	Digital input	8	DI7	I	Digital input
4	DI3	I	Digital input	9	DI8	I	Digital input
5	DI4	I	Digital input	10	IGND	P	Isolation Ground

Pin	Name	I/O	Function	Pin	Name	I/O	Function
1	IGND	P	Isolation Ground	6	DI13	I	Digital input
2	DI9	I	Digital input	7	DI14	I	Digital input
3	DI10	I	Digital input	8	DI15	I	Digital input
4	DI11	I	Digital input	9	DI16	I	Digital input

Pin	Name	I/O	Function	Pin	Name	I/O	Function
5	DI12	I	Digital input	10	IGND	P	Isolation Ground

Pin	Name	I/O	Function	Pin	Name	I/O	Function
1	IGND	P	Isolation Ground	6	DI21	I	Digital input
2	DI17	I	Digital input	7	DI22	I	Digital input
3	DI18	I	Digital input	8	DI23	I	Digital input
4	DI19	I	Digital input	9	DI24	I	Digital input
5	DI20	I	Digital input	10	IGND	P	Isolation Ground

Pin	Name	I/O	Function	Pin	Name	I/O	Function
1	IGND	P	Isolation Ground	6	DI29	I	Digital input
2	DI25	I	Digital input	7	DI30	I	Digital input
3	DI26	I	Digital input	8	DI31	I	Digital input
4	DI27	I	Digital input	9	DI32	I	Digital input
5	DI28	I	Digital input	10	IGND	P	Isolation Ground

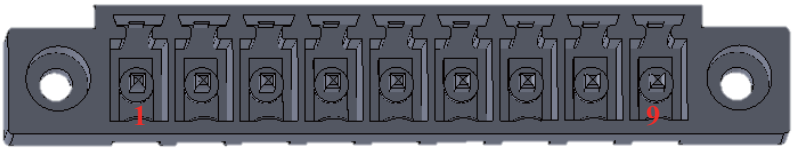


1.9 General Digital Output Connector

Another quick-release Phoenix connector for use with digital output points on the equipment platform, which can be used to control valve or relay.

Pin	Name	I/O	Function	Pin	Name	I/O	Function
1	DO9	O	Digital Output	6	DO14	O	Digital Output
2	DO10	O	Digital Output	7	TRG1	O	Axis 1 compare trigger output
3	DO11	O	Digital Output	8	TRG2	O	Axis 2 compare trigger output
4	DO12	O	Digital Output	9	IGND	P	Isolation Ground
5	DO13	O	Digital Output				

Pin	Name	I/O	Function	Pin	Name	I/O	Function
1	DO1	O	Digital Output	6	DO6	O	Digital Output
2	DO2	O	Digital Output	7	DO7	O	Digital Output
3	DO3	O	Digital Output	8	DO8	O	Digital Output
4	DO4	O	Digital Output	9	IGND	P	Isolation Ground
5	DO5	O	Digital Output				



1.10 Reset Button

The reset button, located next to the network interface, resets the IP and axis parameters to factory values.

Since the EMX-100 will restart during the reset process, close the application software on the PC side, or unplug the network cable, and wait until the Error indicator lights before resetting.

Once the Error indicator is lit:

1. Press and hold the Reset button for 5 seconds. when Error indicator extinguishes, the EMX-100 has begun to restart.
2. Press and hold the Reset button for 14 seconds until the Error indicator extinguishes and release. The EMX-100 sets the IP to the default (192.168.0.1), parameter settings for each axis also return to default values, and the controller is automatically restarted. Wait for 14 seconds until the Error indicator lights, indicating that reset is complete.

1.11 Status LEDs

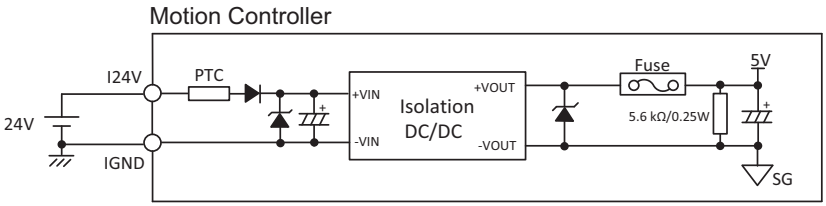
Two LED indicators on the front panel show device status as follows.

LED	Color	Status
Power	Red	Power on
Error	Yellow	Cable signal interrupted or emergency stop executed

The Error indicator is also used in software updates. Please refer to the Appendix for more details.

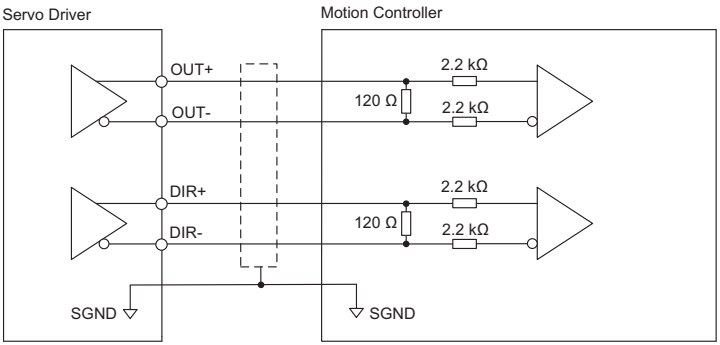
1.12 Power I/F Circuit

Located inside the power input point of the power connector. the circuit contains an isolated power converter and overvoltage, overcurrent, and reverse protection. A fuse (3.15A/250V) is also available for replacement in the overcurrent section.



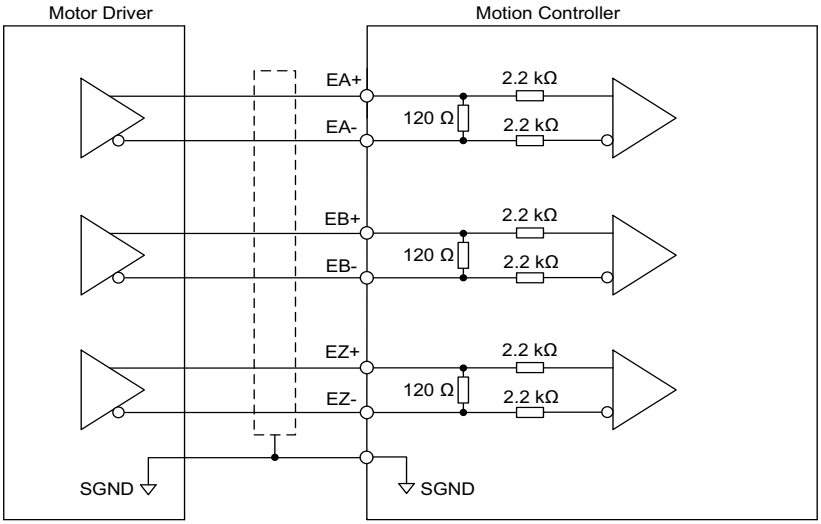
1.13 Pulse Output I/F Circuit

The following figure shows the internal circuit of the pulse wave output interface, a differential output mode that can resist common mode noise (Single-ended mode is not supported). Signal quality is greatly improved over single-ended mode, and is suitable for high-speed motor control. Most currently used motor drives support differential mode, already an industry standard.



1.14 Encoder Pulse Input I/F Circuit

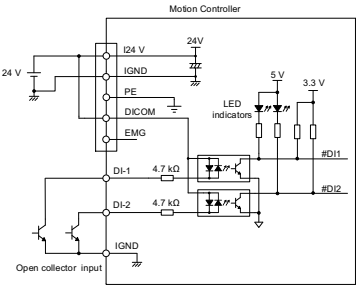
At the internal circuit of the pulse input interface, a differential input mode that can resist common mode noise (Single-ended mode is not supported). The signal quality is greatly improved compared with the single-ended mode, and it is suitable for high-speed and high-precision position control. Most encoders on the market support this mode.



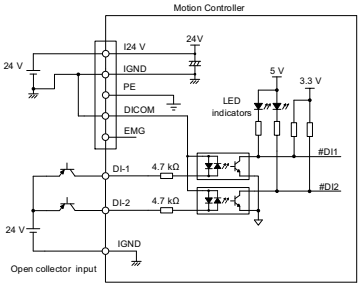
1.15 Digital Input I/F Circuit

As shown, the internal circuit of the digital input interface can be selected by grounding DICOM or connecting 24VDC. If grounded, the external device to be docked is Sink. If connected to 24VDC, the external device to be docked is Source. Whether it is a general-purpose digital input interface or an origin limit interface, DICOM is used to select the supported device type, which cannot be set individually. The device could be a proximity switch or a photoelectric switch. From the interface circuit, all input points are optically isolated, which helps to resist noise and provide internal circuit protection of the controller.

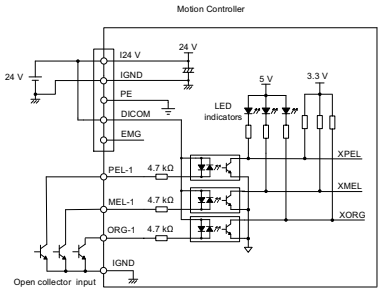
SOURCE



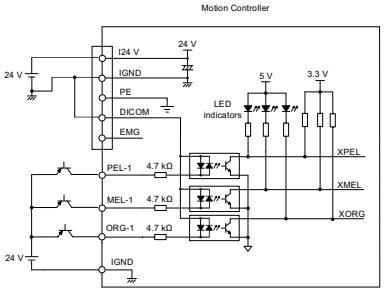
SINK



SOURCE



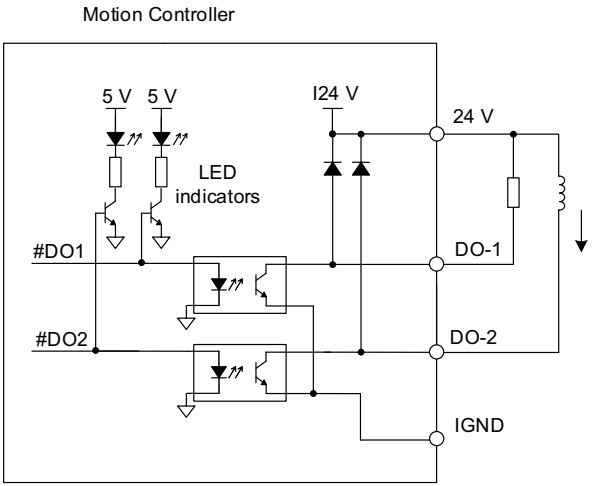
SINK



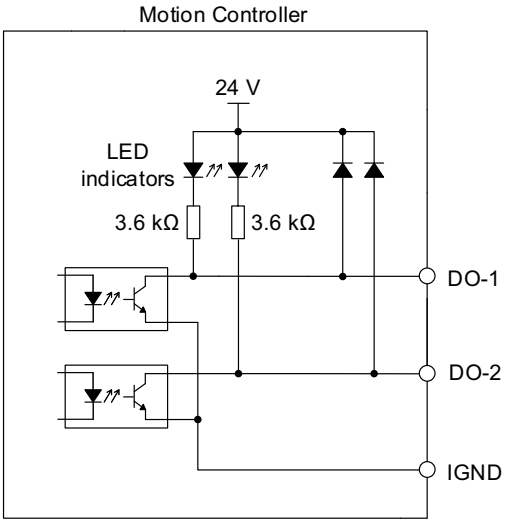
1.16 Digital Output I/F Circuit

The following shows the internal circuit of the digital output interface, which indicates the connection for inductive and resistive load devices, which can, because of the built-in flywheel diode, for inductive loads, eliminate back electromotive force during digital switch closing. The internal circuit is only available for connected source type devices.

DO Connection Configuration

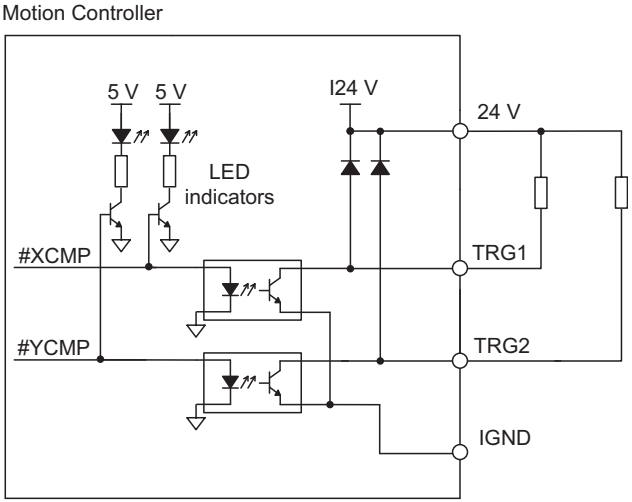


The following shows connection of the motor drive. For example, because the interface on EMX-100 is sink type, the servo drive side must be source type.



1.17 Position Comparison and Trigger Output I/F Circuit

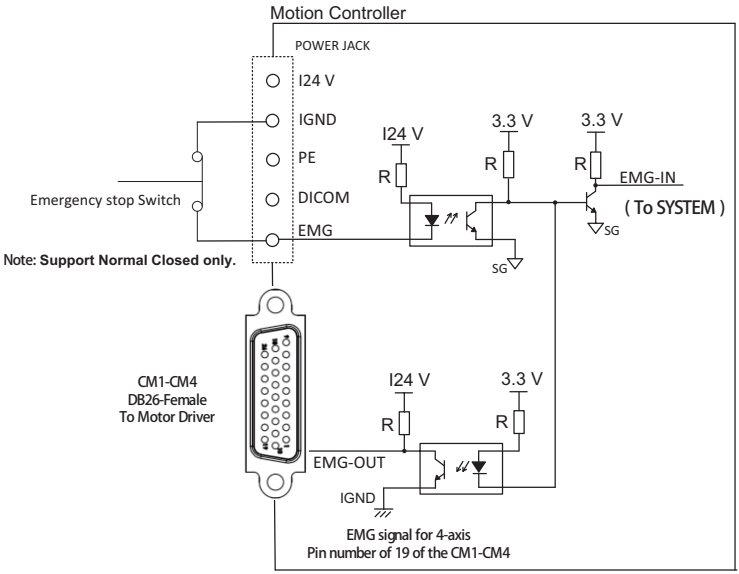
The internal circuit of the trigger output and the digital output interface is generally used where the control process needs to be accurately matched with the motor position, for example, triggering an industrial camera image capture. When the motion axis reaches a certain position without stopping and capturing an image, this can be utilized. Triggering the signal completes the motion capture. This output signal can also be continuously triggered by the function of the continuous position comparison of the controller. It is suitable where there is more than one position to be triggered during the motion. This contact is also equipped with a flywheel diode and can also be connected to an inductive load such as a relay. Note that, in the following, 24V refers to I24V.)



1.18 Emergency Stop Input I/F Circuit

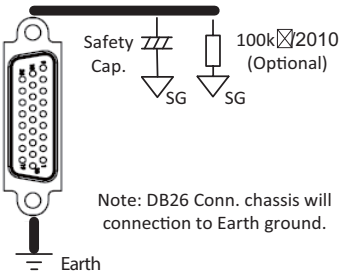
The emergency stop input interface circuit, as shown, is normal closed type. When the circuit is open, the controller detects the emergency stop input signal, and terminates pulse output of all

control motors and sends an emergency stop signal to the motor drive end, because this signal is interlocked with the EMG on the motor connector CM1 to CM4. When the emergency stop input signal of the controller is valid, the controller sends an emergency stop signal to the servo motor via the direct circuit. The input point of the servo motor end must be sink type. This contact defaults to an open circuit. To enable, it must be grounded, otherwise the controller will be treated as an exception and the Error indicator will light.

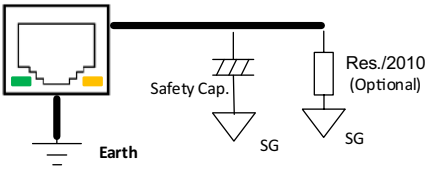


1.19 Power Input and Grounding I/F Circuit

As shown, the different grounding points of the controller are provided mainly for power supply safety considerations and to prevent electromagnetic or other interference.



Ethernet Grounding

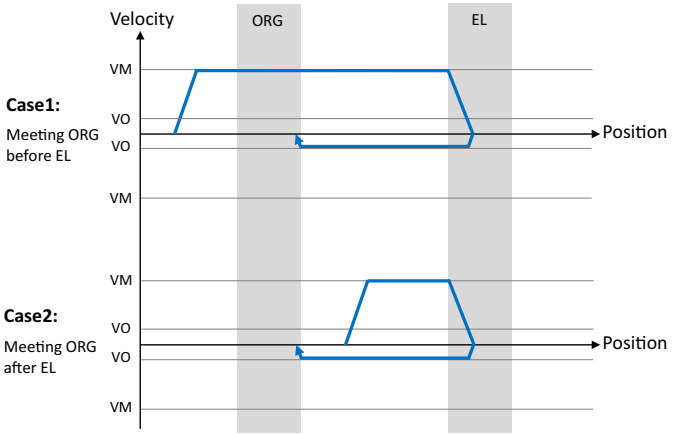


Note: RJ45 Conn. chassis conect to Earth ground.

1.20 Home Return Mode

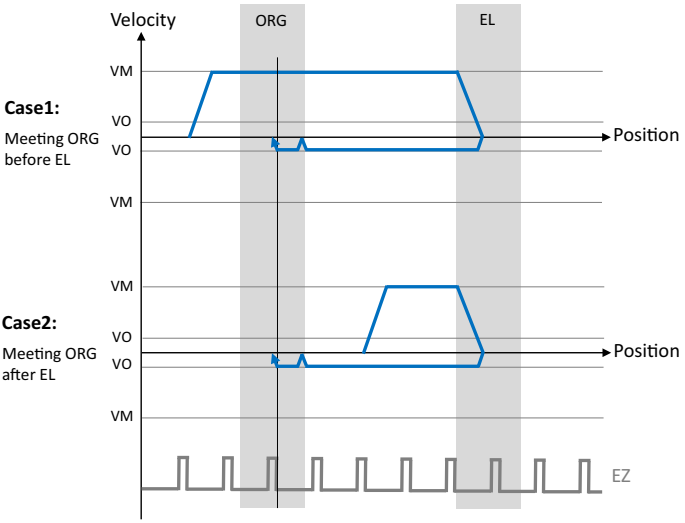
EMX-100 provides three homing modes, each executed automatically with no need for additional process controls. Each mode can run with the Z-phase (EZ) search function, generally enabled when using servo motor, and disabled when using stepper motor.

Mode 1: Using ORG & EL

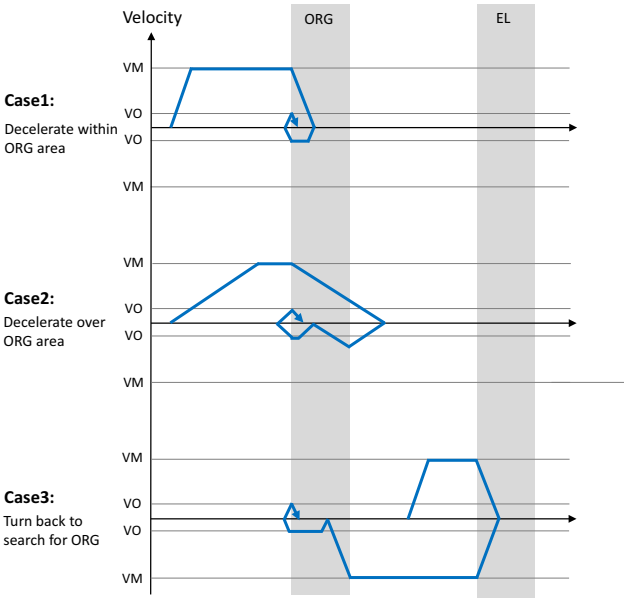


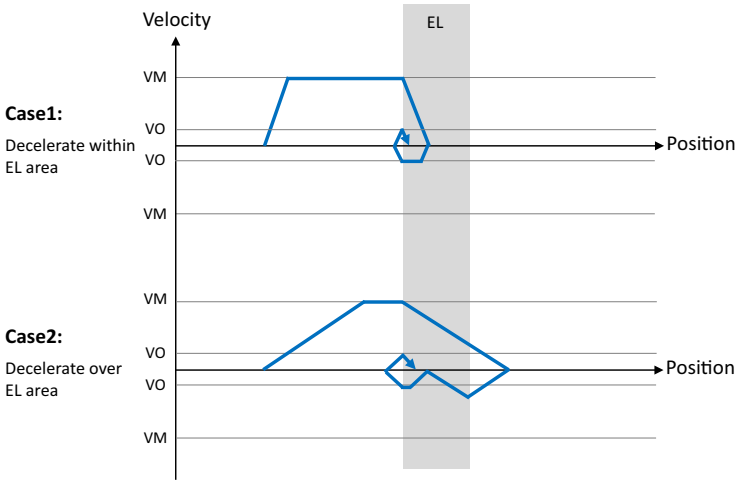
* Home return process:

Go forward to EL direction --> through ORG --> meeting EL and decelerate to stop --> reverse with low speed to search for ORG --> Find ORG and decelerate to stop



Mode 2: Using ORG or EL only

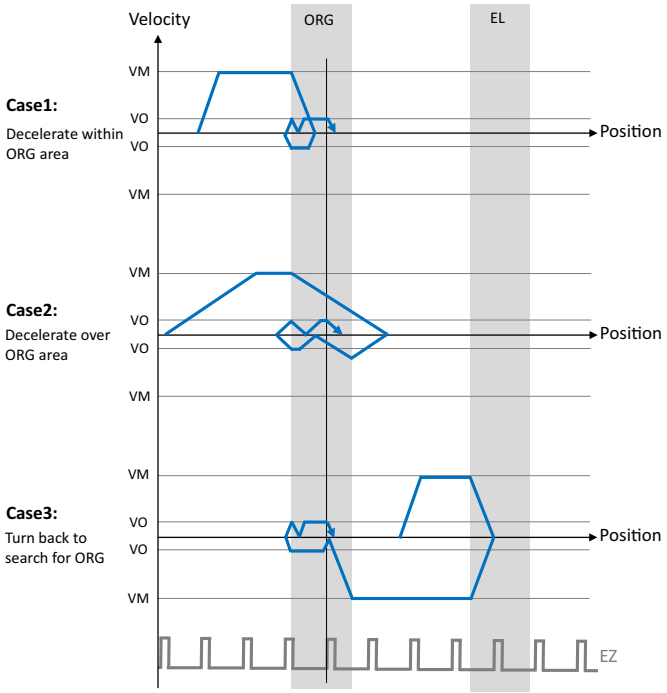


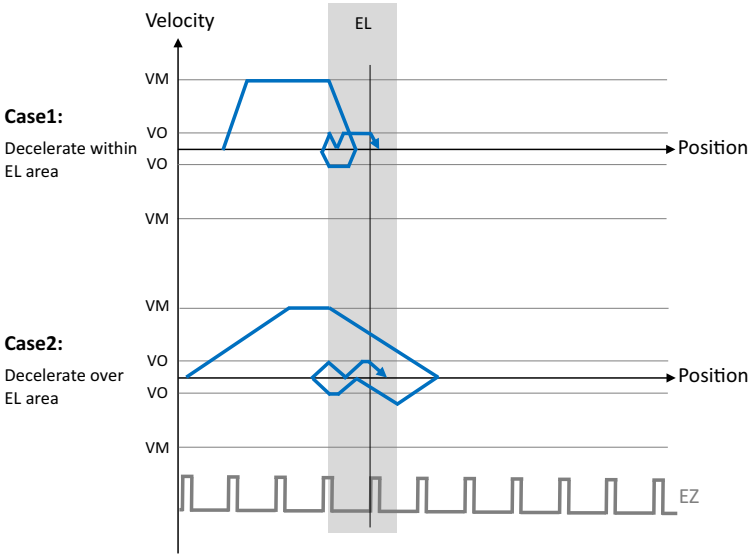


* Home return process:

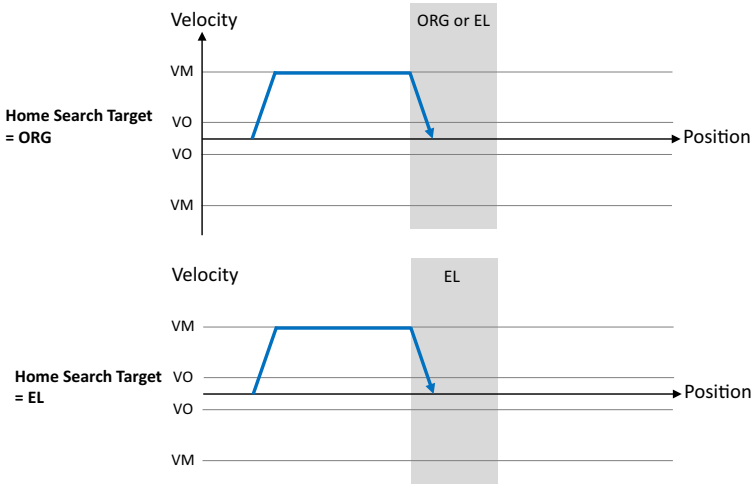
Go forward to ORG/EL direction --> meeting ORG/EL and decelerate to stop --> reverse with low speed to search for ORG/EL --> Find ORG/EL and decelerate to stop

* Use ORG or EL (EZ enable)





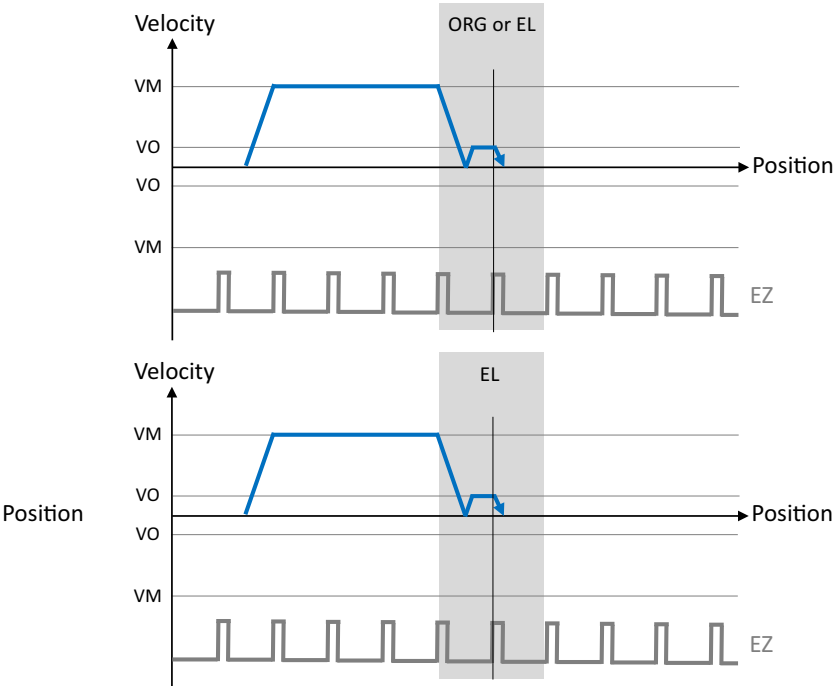
Mode 3: Using ORG or EL only



* Home return process:

Go forward to ORG/EL direction --> meeting ORG/EL and decelerate to stop

* Use ORG or EL (EZ enable)



2 Getting Started

2.1 Unpacking Checklist

The package includes the following items:

- EMX-100
- Connectors:

5-pin Phoenix	Power
8-pin Phoenix x2	Dedicated I/O)
9-pin Phoenix x2	general DO
10-pin Phoenix x4	General DI

If any of these items are missing or damaged, contact your dealer.

Save the shipping materials and carton to ship or store the product in the future.

2.2 Hardware Installation

Install the EMX-100 on the distribution box via the four corner screw holes. Connect through isolated on-site internet, rated at or above CAT5e.

2.3 Software Installation

Download the corresponding SDK from ADLINK's website: http:// www.adlinktech.com

For IP settings, pleaseplease see “Controller IP Settings” on page 29..

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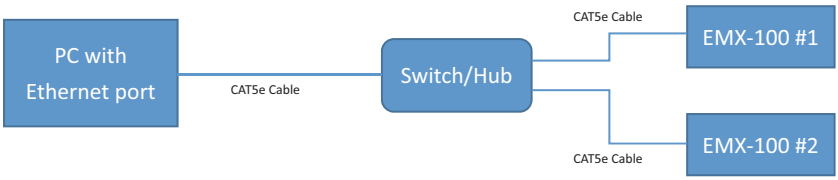
Appendix A: Controller IP Settings

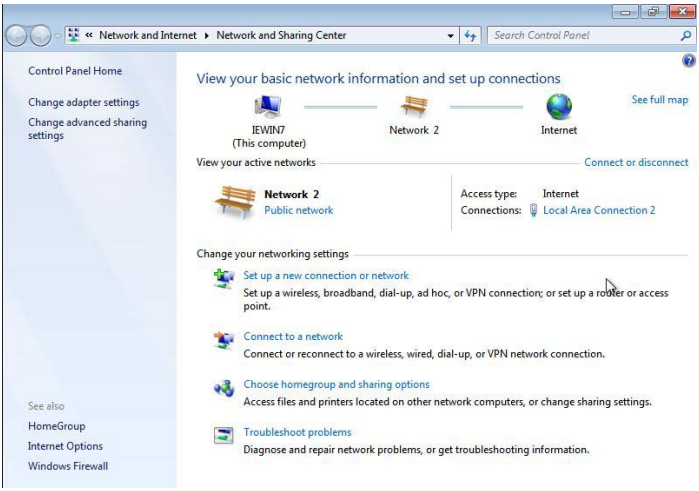
A.1 Connection Example: Two EMX-100 units connected to a single Ethernet port

Up to four sets can be connected, this example connects two

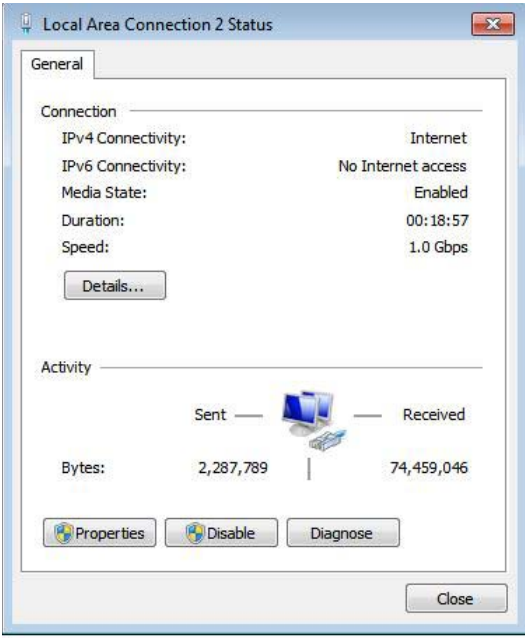


A.1.1 Check/set the PC Network Interface

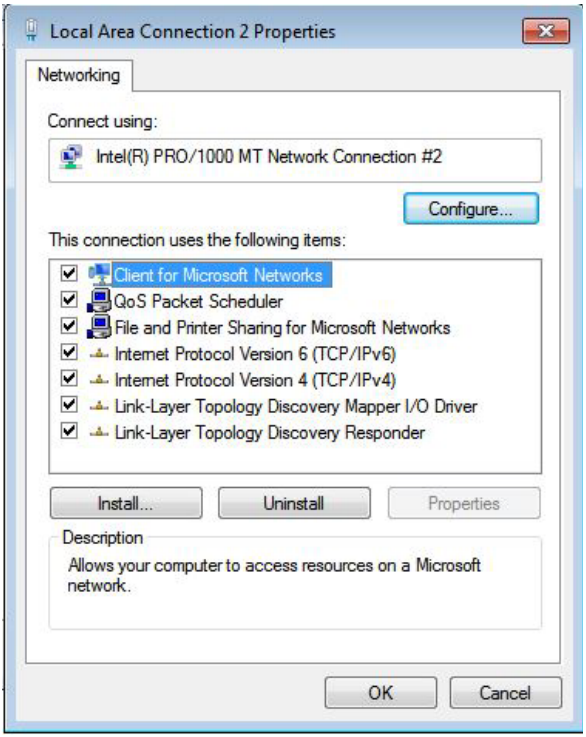
1. Open Network and Sharing



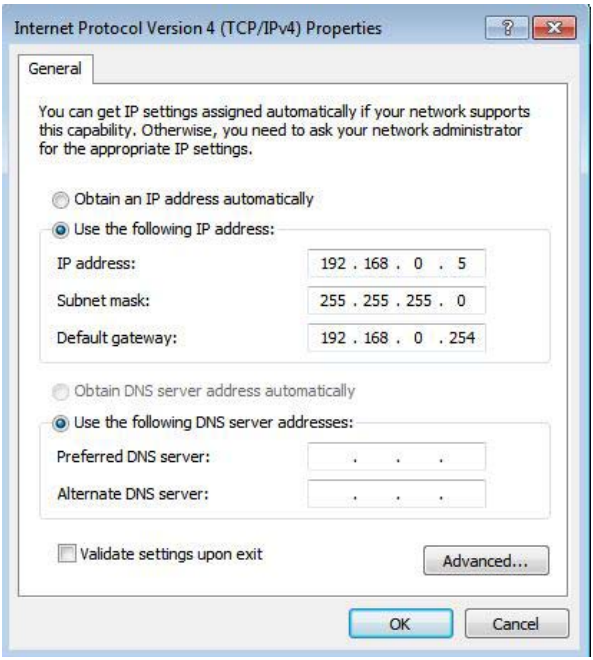
2. Select Area Connection and then the Properties in the window



3. Select Internet Protocol Version 4 (TCP/IP V4) in the content window and select content.

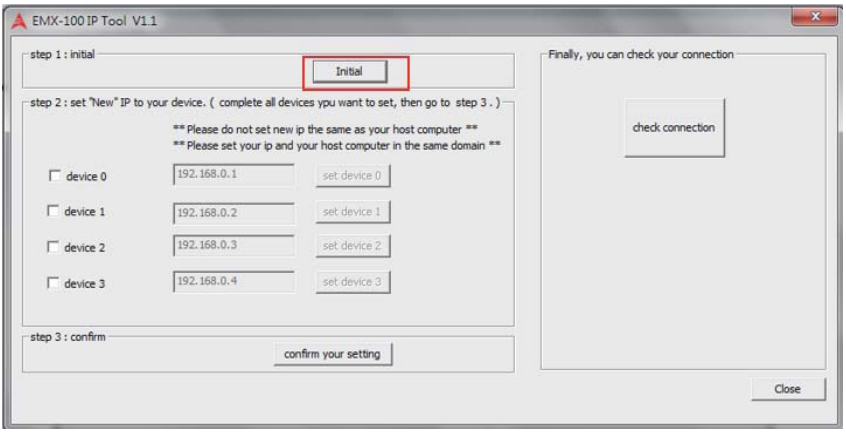


4. Cancel the Automatic IP setting and use the displayed IP address (limited to 5 to 253, the gateway is fixed to 254)

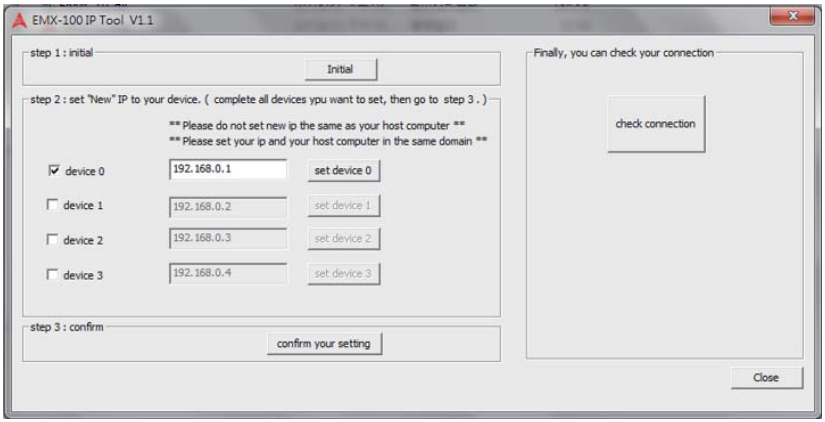


A.1.2 Open Set IP Tool and Select Initial

The system will prompt to perform Reset after clicking initial button, resetting IP to default address 192.168.0.1 for first connection. If it has been reset or confirmed as the default IP, ignore the message. The Error light extinguishes once initialization is complete.



1. Since the IP of each EMX-100 is the same at the beginning (after reset), connect one device at a time to change IP.
2. Connect the first device and select Device 0, enter the IP (default value is 192.168.0.1), and select set device 0. The Completed dialog appears and the Error indicator lights, indicating that setting is complete.
3. Unplug the first device, connect the second device, select device 1, enter the IP (default value is 192.168.0.2), and select set device 1.
4. After the Complete notice appears, after around 14 seconds, the Error LED re-lights, indicating that Reset is complete.

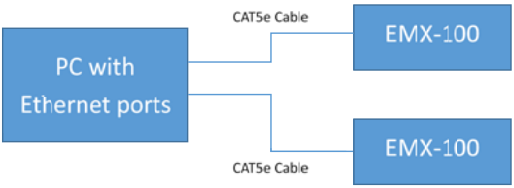


5. After setting the IP for both EMX-100 units, connect both to the network cable and select confirm your setting to modify the system INI configuration file. During the process, the Error light will extinguish. The OK dialog box appears indicating setting is complete. After the Error light extinguishes, select Check Connection to ensure connection is successful. If OK is displayed, connection is complete.

A.2 Connection Example: One EMX-100 connected to each of two Ethernet ports

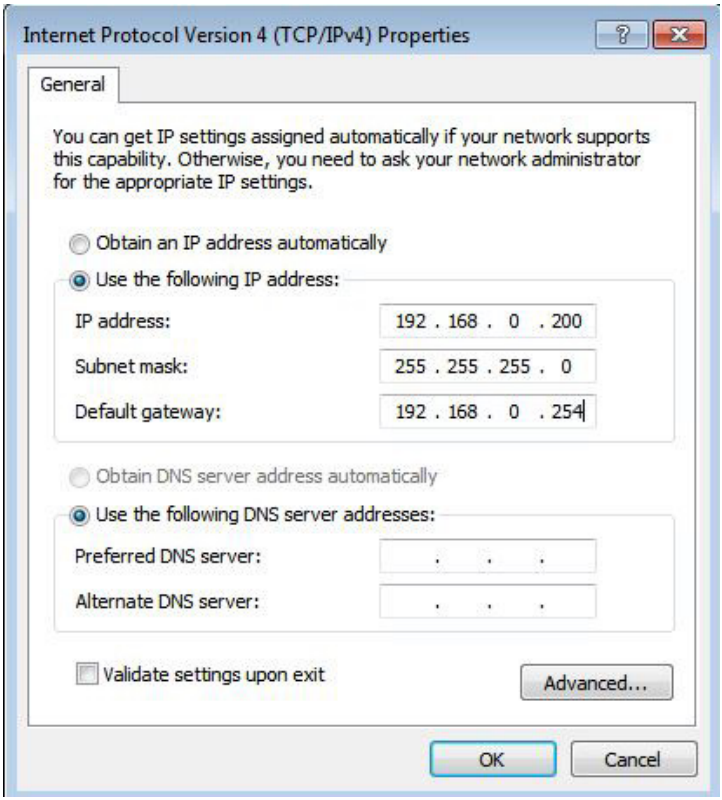
(Before using Example 2, please consult the Setting method of Example 1, on which it is based)

Note that, while the host may have more than 4 Ethernet ports, the maximum number of EMX-100 supported by one PC is always 4.

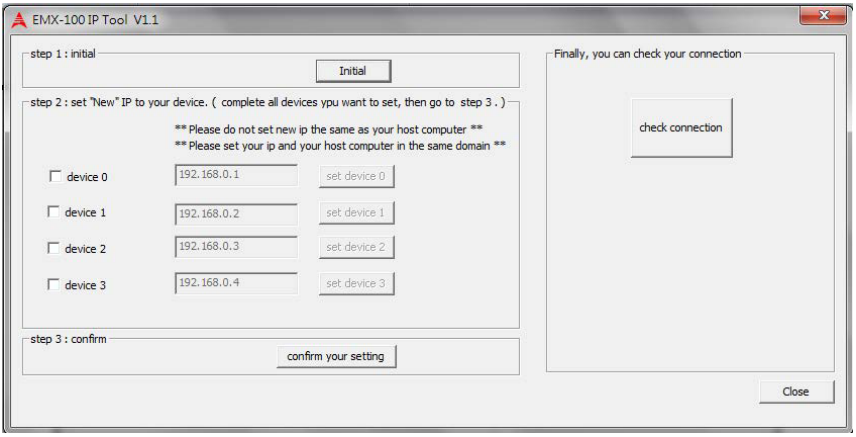


Unlike Example 1, when using two Ethernet ports, the different network ports must be set on different network segments, for example, one at 192.168.0.5 and the other at 192.168.5.200.

1. Using the Set IP Tool, as in Example 1, select device 0 to complete the first network port and the first EMX-100 settings. Once setting is complete, remove the EMX-100 from the first network port.
2. Connect the second EMX-100 to the second network port. The IP address of the network port is set to 192.168.0.200 (do not conflict with the IP address of the first network port)

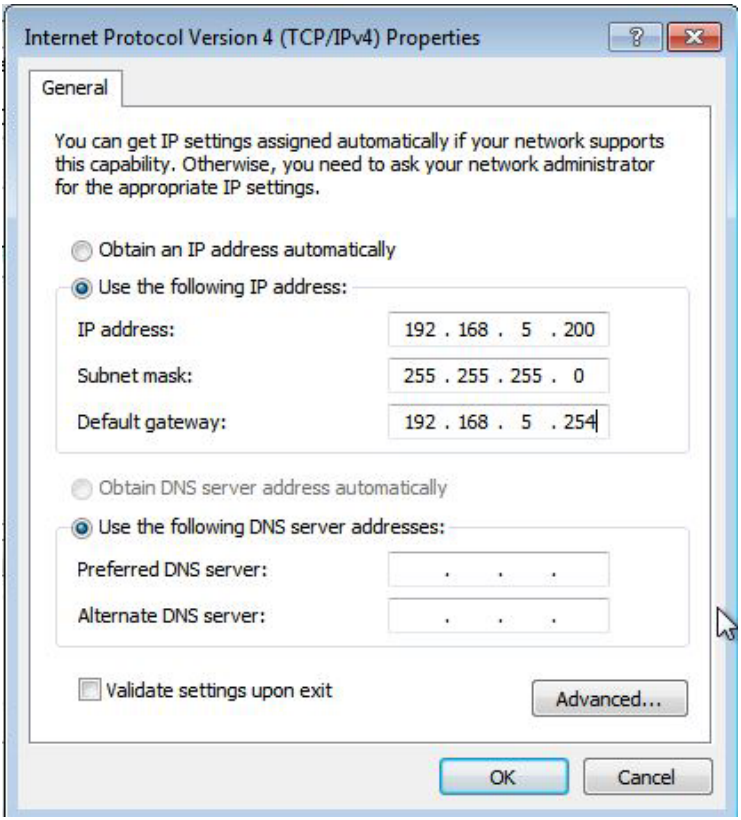


3. Select device1 to set IP 192.168.5.1, select set device1. After about 14 seconds, the Error indicator lights and setting is complete.



Since the IP address of the second network port is 192.168.0.200, this network segment is different from device1. The next operation of the Setup IP tool must not find device 1, so returning to the second network port must be done manually.

4. Open IP Settings for the second network port and set manually as shown



5. After the second network port is set, connect the first EMX-100 to the first network port. At this time, the second EMX-100 is also connected to the second network port. Confirm your setting. After OK, select check connection again, and setting is complete.

A.3 Troubleshooting

If it is confirmed that network configuration is correct and message err = 8 is repeatedly received, check the EMX-100 indicator. If flashing yellow, close the program and restart the EMX-100. After 20 seconds following power-on, redo settings.

A.4 Updating Firmware

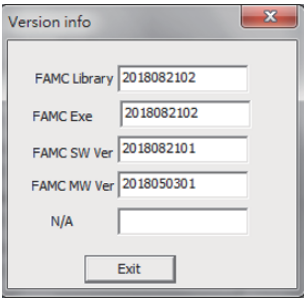
1. Execute **sw_update.exe** (the Error indicator lights)

2. Select Update Firmware. The Error light extinguishes twice for about 2 seconds, and the Please Wait message appears

.

3. After holding **confirming** for about 5 seconds, the Error indicator lights and Updating message appears. When the Error indicator is extinguished again, update begins.

4. After about 16 seconds, the Error indicator lights again to indicate that update is complete. Select OK to finish. (If you do not press OK in time, an Error is reported, select OK to re-light)
5. Select Get Version and the Version display appears. FAMC SW Ver is this version.



Important Safety Instructions

For user safety, please read and follow all instructions, Warnings, Cautions, and Notes marked in this manual and on the associated device before handling/operating the device, to avoid injury or damage.

S'il vous plaît prêter attention stricte à tous les avertissements et mises en garde figurant sur l'appareil , pour éviter des blessures ou des dommages.

- Read these safety instructions carefully
- Keep the User's Manual for future reference
- Read the Specifications section of this manual for detailed information on the recommended operating environment
- The device can be operated at an ambient temperature of 50ºC
- When installing/mounting or uninstalling/removing device; or when removal of a chassis cover is required for user servicing (See "Getting Started" on page 33.):
  - Turn off power and unplug any power cords/cables
  - Reinstall all chassis covers before restoring power
- To avoid electrical shock and/or damage to device:
  - Keep device away from water or liquid sources
  - Keep device away from high heat or humidity
  - Keep device properly ventilated (do not block or cover ventilation openings)
  - Always use recommended voltage and power source settings
  - Always install and operate device near an easily accessible electrical outlet
  - Secure the power cord (do not place any object on/over the power cord)
  - Only install/attach and operate device on stable surfaces and/or recommended mountings
- If the device will not be used for long periods of time, turn off and unplug from its power source

- Never attempt to repair the device, which should only be serviced by qualified technical personnel using suitable tools
- A Lithium-type battery may be provided for uninterrupted backup or emergency power.

Risk of explosion if battery is replaced with one of an incorrect type; please dispose of used batteries appropriately.
Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.

- The device must be serviced by authorized technicians when:
  - The power cord or plug is damaged
  - Liquid has entered the device interior
  - The device has been exposed to high humidity and/or moisture
  - The device is not functioning or does not function according to the User's Manual
  - The device has been dropped and/or damaged and/or shows obvious signs of breakage
- Disconnect the power supply cord before loosening the thumbscrews and always fasten the thumbscrews with a screwdriver before starting the system up
- It is recommended that the device be installed only in a server room or computer room where access is:
  - Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefor, and any precautions required
  - Only afforded by the use of a tool or lock and key, or other means of security, and controlled by the authority responsible for the location

	**BURN HAZARD** Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching. ***RISQUE DE BRÛLURES*** *Ne touchez pas cette surface, cela pourrait entraîner des blessures.* *Pour éviter tout danger, laissez la surface refroidir avant de la toucher.*

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Getting Service

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