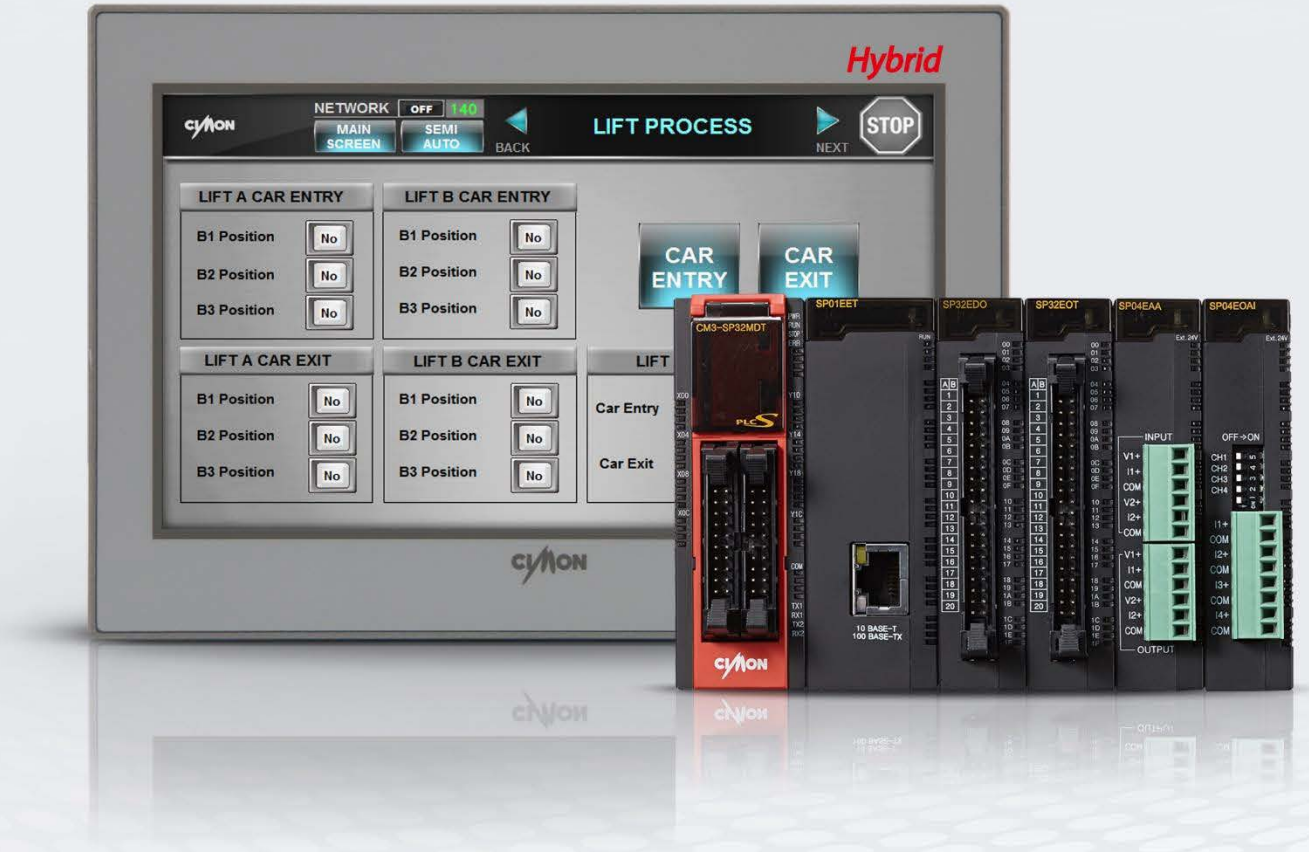
CIMON
Total Solution for Industrial Automation

User's Manual for CM-HP07CD

CIMON Hybrid Xpanel



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6. Example of Hybrid Xpanel Project 7. Maintenance Work and Repair
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Before using this product, please read this manual carefully and pay full attention to safety in order to handle the product correctly.
Store this manual in a noticeable place so that it can be read whenever necessary.

Before You Start

This manual contains important information on the use and operation of this device. Please read all the information carefully for optimal performance and to prevent any damage or misuse of the device.

Safety symbols are classified into two categories, "WARNING" and "CAUTION".

Warning This symbol describes situations that could cause major or fatal injury to the user.

Caution This symbol describes situations that may cause minor injury or damage to the device.

SAFETY SYMBOLS USED IN THIS PRODUCT MEANS:

This symbol warns the user of potential hazards.

This symbol warns the user of uninsulated voltage within the unit that can cause dangerous electric shock.

Keep this manual nearby the user operating devices so it can be easily checked.

CIMON Inc. is not responsible of any damage or loss caused by not following the user's manual.

A-class equipment (Broadcasting communication equipment for business)

This product has passed the testing for electromagnetic waves for business use, and has not been designed or manufactured to be used as a household item; users are advised as such.

Precautions for design (⚠Warning)

Please install a safety circuit to protect entire control system in case of an unexpected power shut-down and product malfunction. Such anomalies may severely compromise the integrity of the overall system.

External to the product, please install circuits and switches to safeguard the system from mechanical damages (ex. Emergency stop, upper/lower limit switches, forward/reverse direction interlocking circuits, etc.)

Do not draw up graphic object that can be hazard to both operator and device. In the case the product is damaged while output signal remained ON or OFF, fatal accident may cause. Design an emergency stop switch outside of the product so it can be stopped when the accident occurred.

Do not use this product as alarm devices such as operator's injury, damage of device or stop of production.

Design the system able to be hand-operated when the product is break down.

Do not use this product as a control unit asking high stability and reliability on systems such as airplane control device, aerospace device, centralized data processing device, nuclear control system, medical life support system, etc.

In case the product is used in transportation such as trains, vehicle, vessels, or warning devices for disasters and crimes, various safety devices, and medical devices except support system, you are required to design backup or failure provision system to securing reliability and stability.

Even the screen does not light because of the lifespan in LCD backlight is over, the product is still operating. When the operator touches a panel in this situation, the action could cause device's malfunction. Do not use product's graphic object as a controlling safety devices such as emergency stop switches.

Precautions for mounting (⚠Caution)

Use this product in the intended environment given in this manual. Using it in any conditions outside of the specifications could result in electric shock, fire, malfunction, or damage to or deterioration of the product.

Connect all cable connectors tightly in the product. Loosely or incorrectly connected cables may result in failure of inputs and outputs.

Power supply in product should be turned off before mounting. Not doing so could cause an electric shock or damage on device.

Do not install the product in high temperature out of allowance. Failure to do so could cause damage on device or reduce product life.

Do not convey direct vibration into product. Failure to do so could cause electric shock, fire or malfunctions.

Make sure that metallic debris do not enter the product. Failure to do so may cause fire, equipment damage or malfunctions.

Use low noise power between power supply and grounding. Make the power cable as short as possible to reduce noise.

Connect a surge observer to prevent electricity surge.

Precautions for wiring (⚠Warning)

Make sure to check if the device's power and external power supply is turned off before wiring. Failure to do so may cause electric shock or damage on the device.

Make sure to fasten all of power cables before turning on the power of product after wiring work. Failure to do so may cause electric shock.

Precautions for wiring (⚠Caution)

Make sure to check device's regular voltage and sequence of terminals. Failure to do so may cause fire, electric shock and malfunctions.

Make sure to tighten the screw with standard torques (0.5~0.6Nm). Loose connections may cause short, fire or malfunctions.

In grounding the FG ground terminals, be sure to conduct the product at least D type (Class 3) grounding. Not doing so could result in electric shock or malfunctions.

When wiring, make sure that wiring debris do not enter the module. Failure to do so may cause fire, equipment damage or malfunctions.

Wire the power cable as short as possible to lower the noise.

Precautions for test run and repair (⚠Warning)

Do not touch the terminals when the power is ON. Doing so could cause an electric shock or malfunctions.

When cleaning or tightening the screw, turn off the power of product and all other systems. Failure to do so could cause an electric shock or malfunctions.

The product uses lithium battery for operating RTC. Do not exchange the battery directly. Doing so may cause explosion danger. If need in situation, make contact with the product supplier.

Precautions for test run and repair (⚠Caution)

Do not dissociate the PCB from the product casing or make any modifications to the device. Doing so may cause fire, electric shock or malfunction.

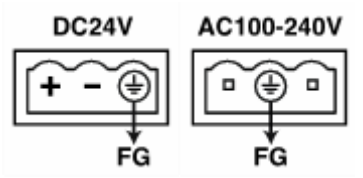
When mounting or separating the product, make sure to turn off power to product and all other external devices. Failure to do so could cause an electric shock or malfunctions.

Use radio or cellphone devices at least 30cm away from the Product. Not doing so could result in malfunction.

Precautions for Grounding (⚠Warning)

When you connect product's SG (Signal Ground) and other device's SG, make sure that short circuit is prevented.

The FG terminal is located in the input power connector of product. Connect a ground wire in ⏚ marked of connector.

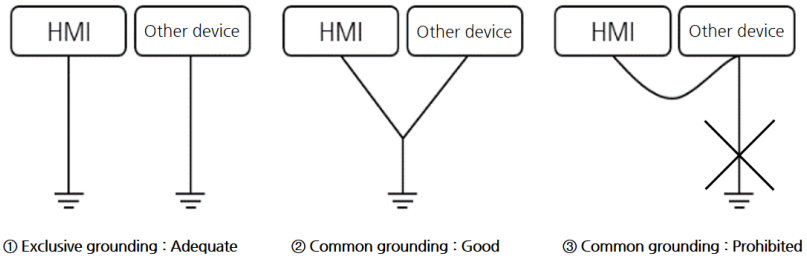


Make sure to separate from other device when grounding WG terminal.

Connect the FG terminal on the power supply to an exclusive ground. When supplying power to the product, be sure to separate the input, output and power cables.

If exclusive grounding is not possible, use a common grounding point. Use grounding resistance of your country's applicable standard for the grounding point.

Do not use common grounding as third method illustrated below, since it can lead to electric shock or device breakdown.



If the device does not function properly when grounded, disconnect the ground wire from the FG terminal.

Precautions for Disposal (⚠Caution)

When the product is disposed of, it should be done so according to your country's regulations for similar types of industrial waste.

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1 Introduction

This manual guides the reader through installation, functions, safety use and operation of Hybrid Xpanel. This manual needs to be read and understood before attempting to install or use the device. Store this manual in a noticeable place so that you can take it and read it whenever necessary. CIMON Inc. is not responsible of any damage or loss caused by not following the user's manual.

Contents of this manual is as below.

- Chapter 1 introduces the kinds, structures and characteristics of each units of the product.
- Chapter 2 explains the feature and installation of the product.
- Chapter 3 explains the general and performance specifications of the product.
- Chapter 4 explains the structure of constitution of the HMI Part that included in the product. Also provides installation path of software Xpanel Designer, which needs for running the device and ways to downloading projects.
- Chapter 5 explains the structure of constitution of the PLC Part that included in the product. Also provides setup ways inside of software CICON.
- Chapter 6 guides the user through programming example of the product.
- Chapter 7 explains repair and maintenance methods, and troubleshoot.

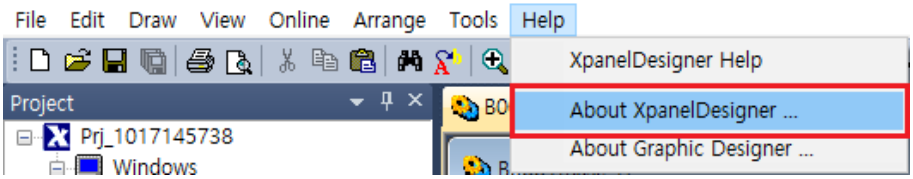
In order to run the device properly, the following specifications are required.

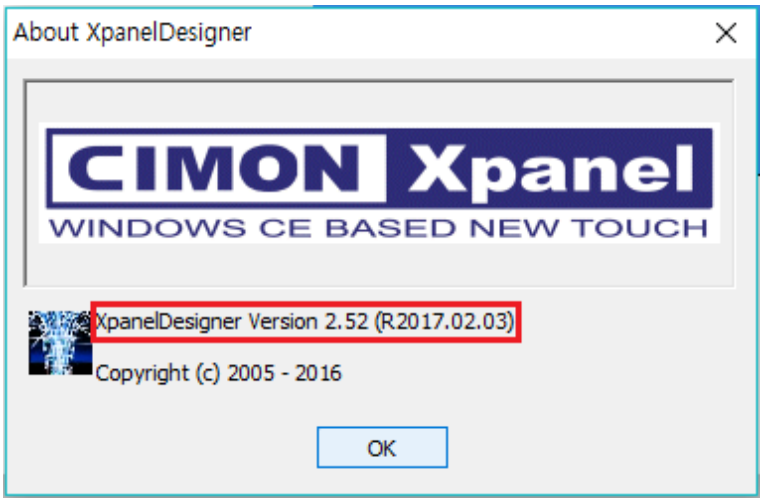
Product	Version
XPanel Designer (Software)	V2.52 or above is recommended
CICON (Software)	V6.20 or above is recommended
PLC CPU	V6.14 or above is recommended (PLC-S F/W)

Below is an instruction on how to check the latest version of the software and CPU.

(1) Xpanel Designer

Run the Xpanel Designer and click the [Help] - [About XpanelDesigner] located in the upper right side of a menu bar. You can check the version of software in the dialog box.

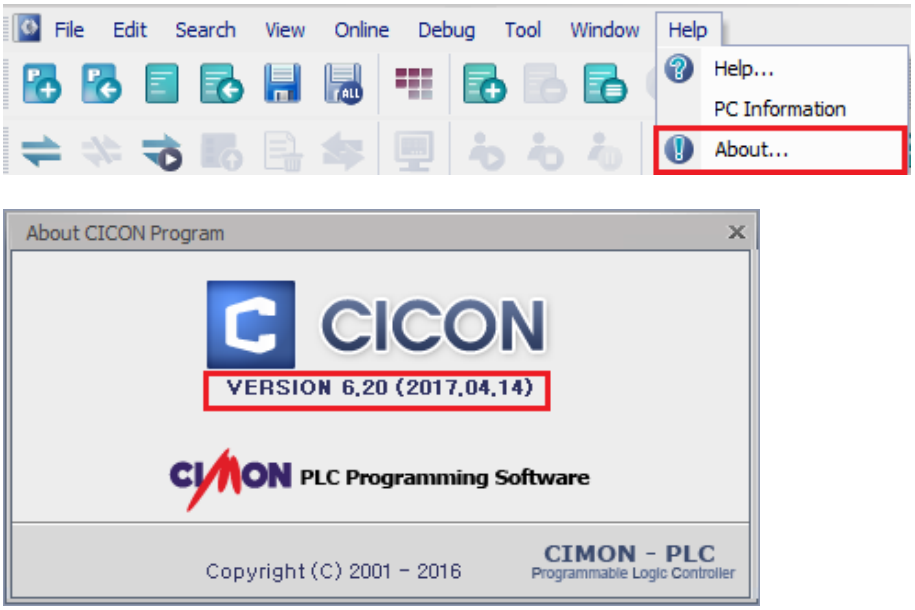




[Figure 1] Route to check Xpanel Designer version

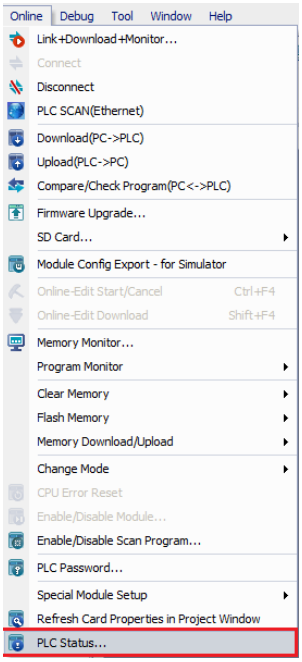
(2) CICON

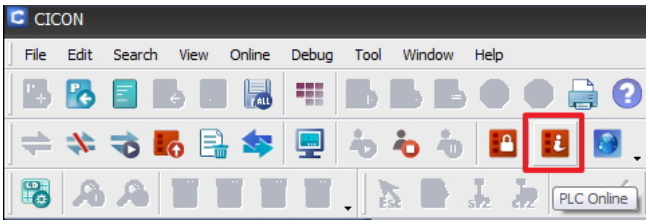
Run the CICON and click the [Help] - [About CICON information] located in the upper right side of a menu bar. You can check the version of software in the dialog box.

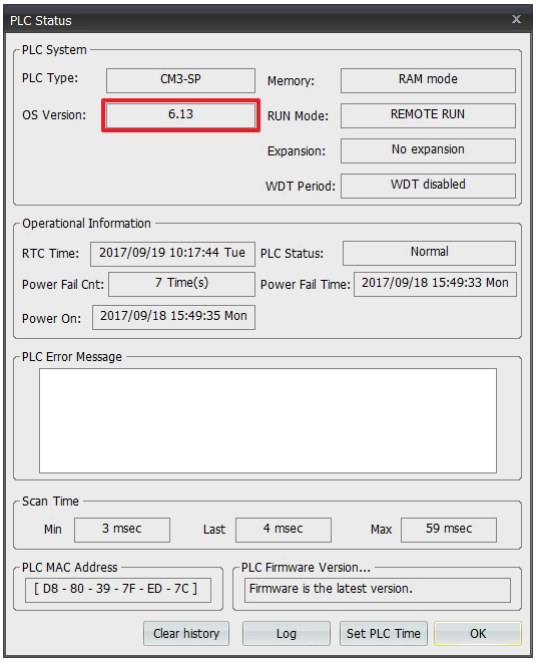


[Figure 2] Route to check CICON version

Run the CICON and make a connection with PLC. Click the [Online] - [About PLC information] or the icon below. You can check the version of CPU firmware in the dialog box.







[Figure 3] Route to check PLC-S CPU firmware

1.1 Outline of the Product

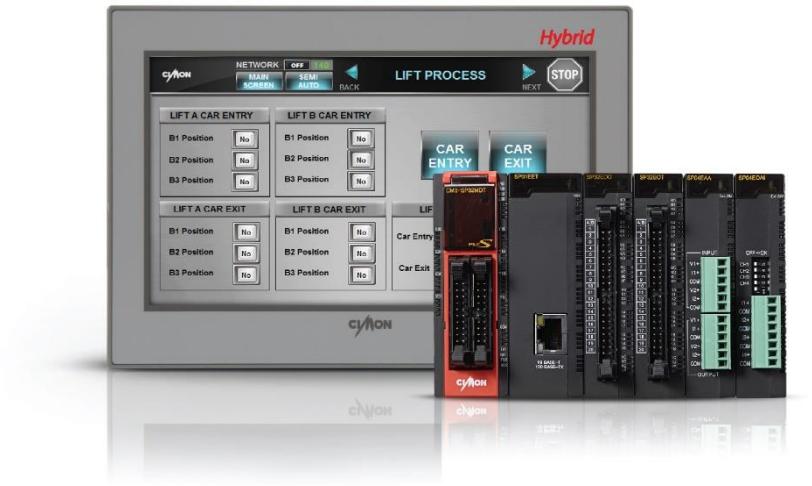
Hybrid Xpanel is composed of HMI based on windows CE and hardware PLC. You can use two devices in one, HMI and PLC.

HMI offers various color expressions through TFT LCD (65535 colors) and fine information display feature through WVGA (Resolution 800 x 480).

PLC provides DI 8points and DO 8 points of relay type, and it has a function to communicate with external master system through the serial communication. You are able to choose RS232C or RS485 according to the type of model.

You can add option modules on the product. As listed in 1.3.2, total 3 option modules are available for Hybrid Xpanel. If you need to expand more function modules, PLC-S expansion modules can be mounted on the option module, up to 2 modules.

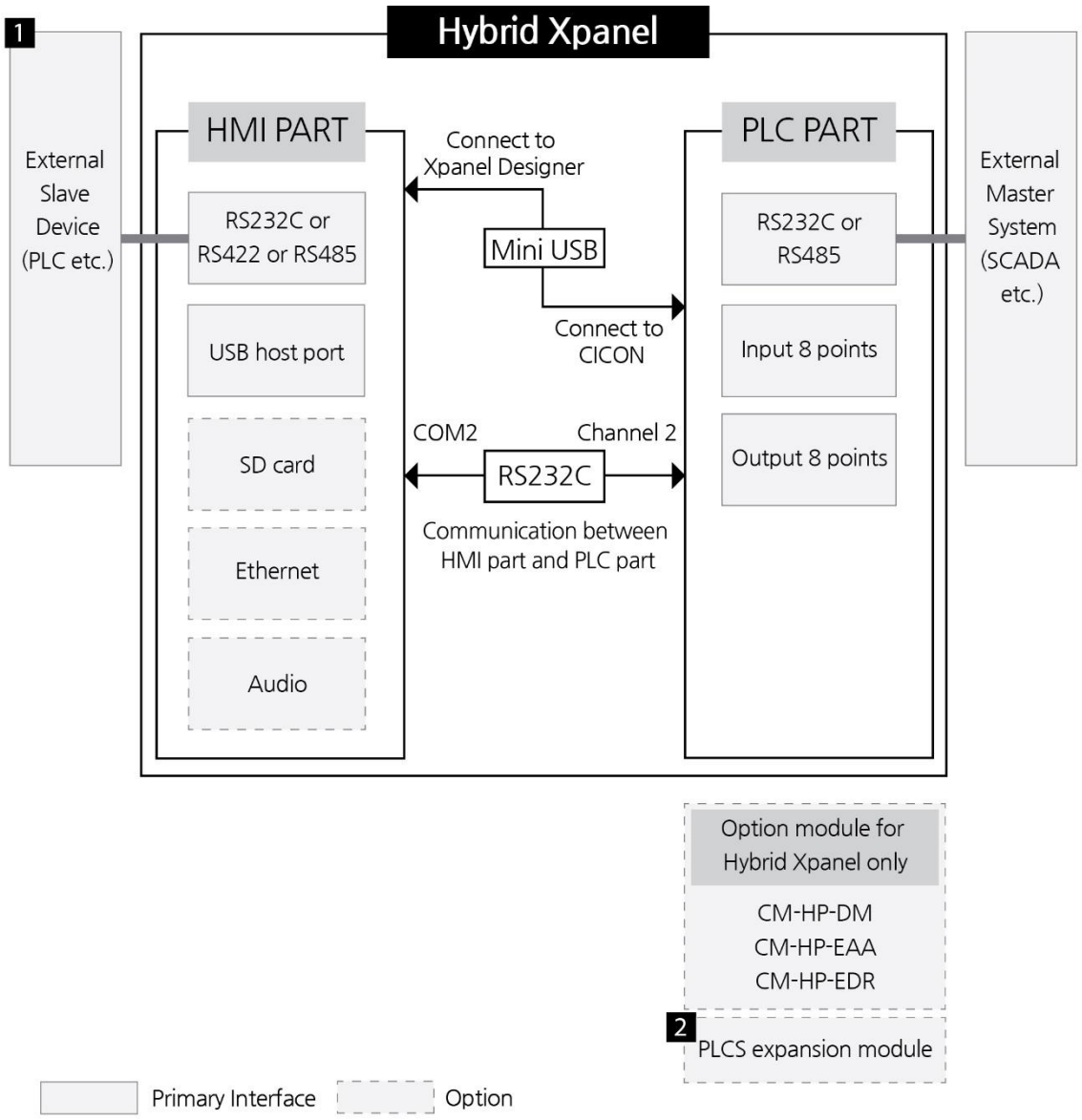
(*)Please refer to the 1.3 to get information about models and options.



〈Summary〉

- Available to use both HMI and PLC as one product
- Embedded PLC which has DI 8points and DO 8 points of relay type
- Provides MODBUS/RTU Slave communication functions
- Capability to 65535 color-expressions and fine information display with TFT LCD in WVGA (Resolution 800 x 480)
- Available to add PLC-S up to 2 modules after mounting CM-HP-EAA, CM-HP-EDR and CM-HP-DM as option
- Fully compatible with PLC-S expansion modules

1.2 Internal Structure of Hybrid Xpanel



1 Connection with master system is available when using MODBUS slave and data server functions at Xpanel Designer.

To get information about two functions, please refer to the [Help] of Xpanel Designer, which can be download from [Customer Service] - [Download center] in CIMON website (www.cimon.com).

2 PLCS can be expanded up to 2 after mounting an option module on Hybrid Xpanel.

[Figure 4] Internal structure of product

1.3 Line-up for Hybrid Xpanel

1.3.1 Desktop

Model	HMI Part	PLC Part	Standard of Power
CM-HP07CD-DNR	HP07	CPU + RS232C	DC 24V
CM-HP07CD-ANR	HP07	CPU + RS232C	AC 100 - 240V
CM-HP07CD-DNS	HP07	CPU + RS485	DC 24V
CM-HP07CD-ANS	HP07	CPU + RS485	AC 100 - 240V
CM-HP07CD-DER	HP07 + LAN	CPU + RS232C	DC 24V
CM-HP07CD-AER	HP07 + LAN	CPU + RS232C	AC 100 - 240V
CM-HP07CD-DES	HP07 + LAN	CPU + RS485	DC 24V
CM-HP07CD-AES	HP07 + LAN	CPU + RS485	AC 100 - 240V

1.3.2 Option (PLC Part)

Model	Specification
CM-HP-DM	HP07 DUMMY, for expansion of PLC-S modules
CM-HP-EAA	Analog module for HP07 (AI 2 channels, AO 2 Channels) (0 - 5V, 1 - 5V, 0 - 10V, -10 -10V, 0-20mA, 4 - 20mA)
CM-HP-EDR	Digital module for HP07 (DI 7 points, DO 5 points - Relay type)

(*)Please refer to the [PLC-S AD DA Module] in CICON [Help] to get information about EAA module.

1.4 Compatibility of PLC-S Modules

Hybrid Xpanel is compatible with all of PLC-S, which can be expanded up to 2 modules upon after an option module is mounted. Expandable PLC-S modules are listed below.

1.4.1 Digital I/O

Model	Type	Standard
CM3-SP32EDO	DI-32	DI 32 points, DC 24V
CM3-SP32EOT	DO-32	DO 32 points, DC 24V TR (Sink)
CM3-SP32EOC	DO-32	DO 32 points, DC 24V TR (Source)
CM3-SP32EOR	DO-16	DO 16 points, Relay output
CM3-SP32EDT	DI-16 / DO-16	DI 16 points, DO 16 points, TR (Sink)

1.4.2 Analog I/O & Temperature Measuring Module

Model	Type	Specification
CM3-SP04EAO	AI-4	AI 4 channels (0 - 5V, 1 - 5V, 0 - 10V, -10 -10V, 0 - 20mA, 4 - 20mA)
CM3-SP04EAA	AIO-4	AI 2 channels / AO 2 channels (0 - 5V, 1 - 5V, 0 - 10V, -10 -10V, 0-20mA, 4 - 20mA)
CM3-SP04EOAI	AO-4	AO 4 channels current output (4-20mA)
CM3-SP04EAOAV		AO 4 channels voltage output (-10 -10V, 0 - 10V)
CM3-SP04ERO	Temperature measuring	4 points RTD (PT100, JPT100, PT1000, NI1000)
CM3-SP04ETO		4 points TC (K, J, E, T, B, R, S, N)

1.4.3 Communication module

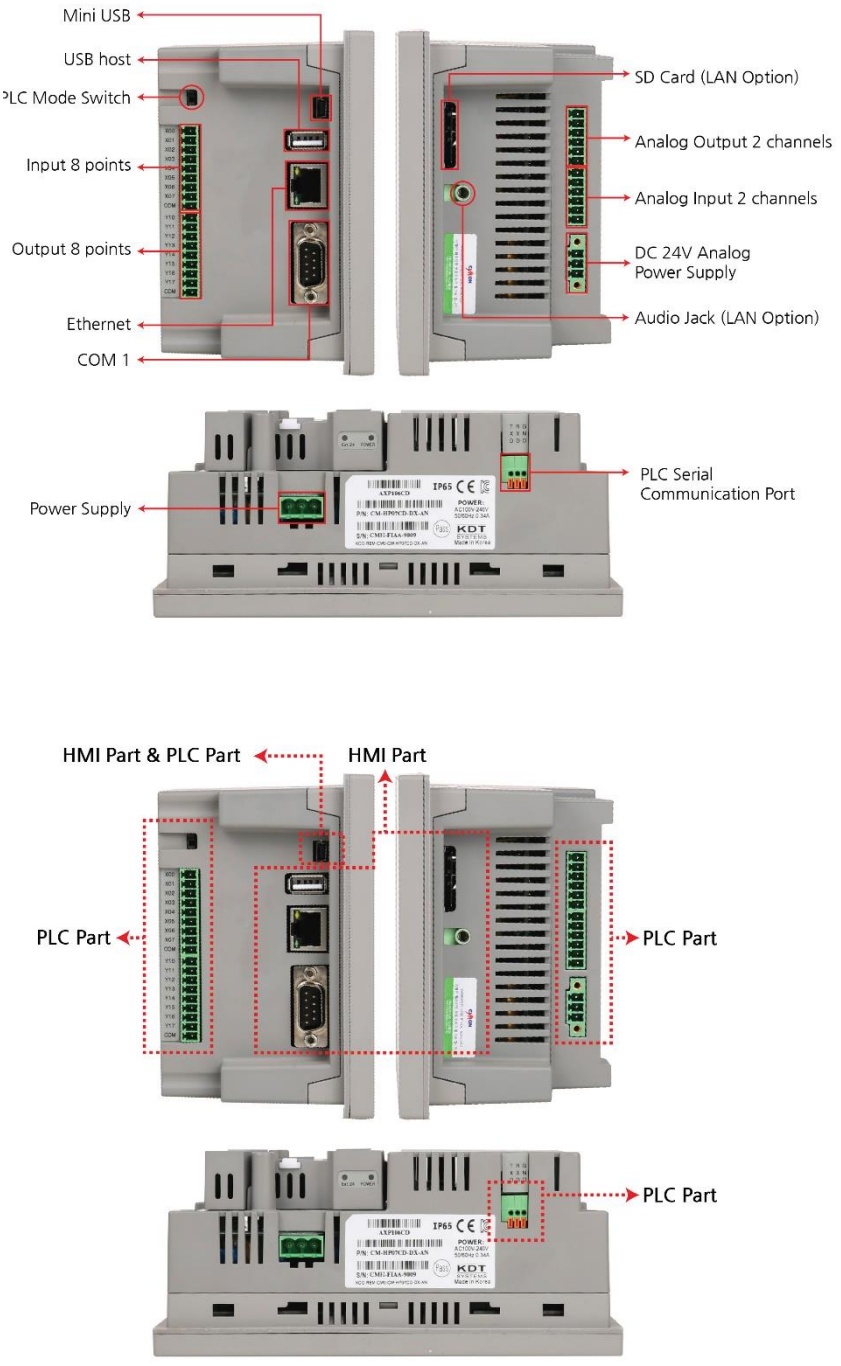
Model	Type	Protocol
CM3-SP02ERS	RS232C 1 channel, RS422/RS485 1 channel	CICON, CIMON HMI, MODBUS/RTU Slave & Master, Protocol program
CM3-SP02ERR	RS232C 2 channels	CICON, CIMON HMI, MODBUS/RTU Slave & Master, Protocol program
CM3-SP02EET	Ethernet (10BaseT, 100BaseTX)	CICON, CIMON HMI, MODBUS/RTU Slave & Master, Protocol program, DHCP

1.4.4 Accessories

Model	Classification	Note
CM0-TM32M	Terminal block	Can be used with following modules:. CM3-SP32EDO CM3-SP32EOT CM3-SP32EOC
CM0-SCB10E	1.0M cable	
CM0-SCB15E	1.5M cable	
CM0-SCB20E	2.0M cable	
CM0-SCB30E	3.0M cable	

2 Hybrid Xpanel Installation

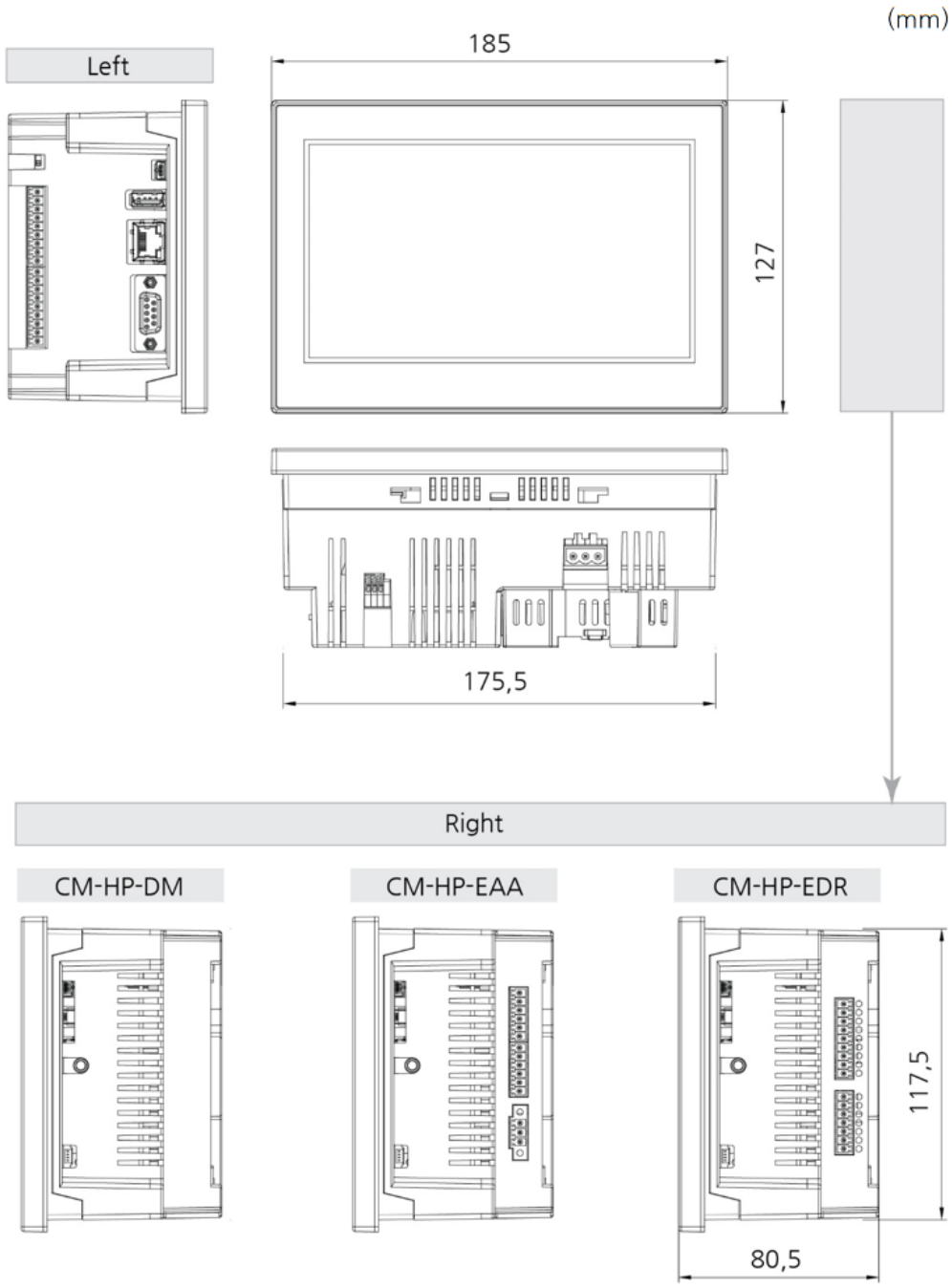
2.1 Appearance of Hybrid Xpanel



*The picture above is a main unit combined with CM-HP-EAA.
*Mini USB is used for HMI part and PLC part in common.

[Figure 5] Appearance of product

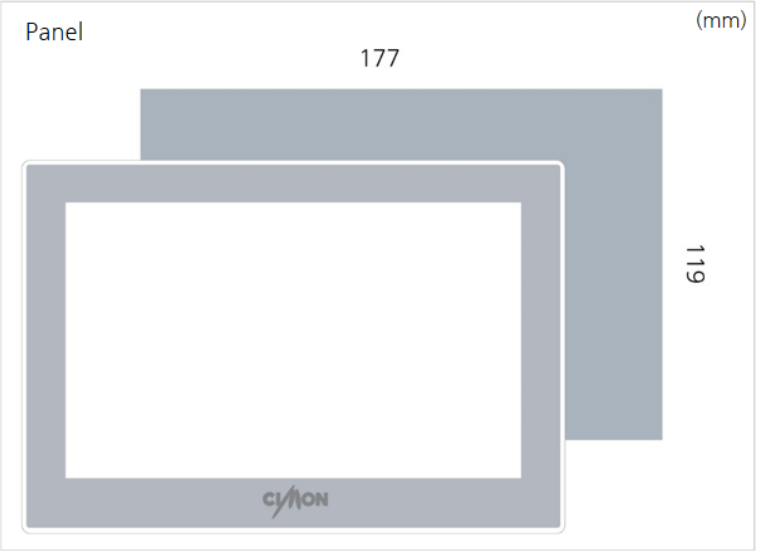
2.2 Dimensions of Hybrid Xpanel



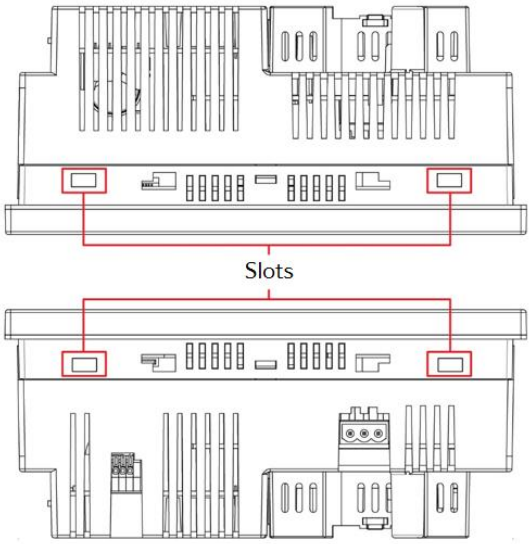
[Figure 6] Dimension of product

2.3 Installation of Hybrid Xpanel

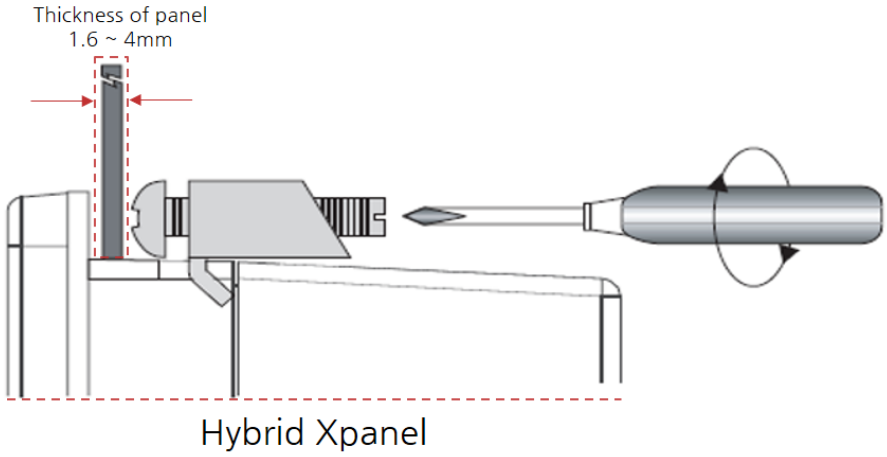
Refer to the figure below for cutting size and thickness of the panel and insert Hybrid Xpanel from front side.



Insert the installation fasteners into the insertion slots, at the top-and-bottom of unit which are marked in the figure below.



Make sure to pull the fastener back until it hook the rear of the attachment hole. Use a screwdriver to tighten each fastener screw and secure the Hybrid Xpanel in place. Be sure to install the product using screws which are enclosed in.



[Figure 7] Installation of product

3 Specification

3.1 General Specification

<table>
<tr><th>Items</th><th colspan="6">Specification</th><th>Standards</th></tr>
<tr><td>Operating Temperature</td><td colspan="6">-10 ~ 55 ℃ (14 ~ 131℉)</td><td></td></tr>
<tr><td>Preserving Temperature</td><td colspan="6">-25 ~ 70 ℃ (-13 ~ 158℉)</td><td></td></tr>
<tr><td>Operating Humidity</td><td colspan="6">Relative Humidity 10 ~ 95%, No condensation</td><td></td></tr>
<tr><td>Preserving Humidity</td><td colspan="6">Relative Humidity 10 ~ 95%, No condensation</td><td></td></tr>
<tr><td rowspan="4">Vibration Resistance</td><td rowspan="2">Frequency (pps)</td><td colspan="2">Continuous Vibration</td><td colspan="2">Intermittent Vibration</td><td rowspan="2">Count</td><td rowspan="4">IEC61131-2</td></tr>
<tr><td>Acceleration (㎪)</td><td>Amplitude (mm)</td><td>Acceleration (㎪)</td><td>Amplitude (mm)</td></tr>
<tr><td>5 ≤ f < 9
9 ≤ f ≤150pps</td><td>-</td><td>1.75</td><td>-</td><td>3.5</td><td rowspan="2">10 times for each direction X, Y, Z</td></tr>
<tr><td>9 ≤ f ≤150pps</td><td>4.9 {0.5G}</td><td>-</td><td>9.8 {1G}</td><td>-</td></tr>
<tr><td>Shock Endurance</td><td colspan="6">• Maximum shock acceleration: 147 ㎪ (15G)
• Duration time: 11ms
• Pulse wave : a sine half-wave pulse (3 times for each direction ±X, ±Y, ±Z, total on 3 times)</td><td>IEC61131-2</td></tr>
<tr><td rowspan="6">Noise Immunity</td><td>Square wave impulse noise</td><td colspan="5">±2kV, For 10 consecutive minutes</td><td>CIMON Internal Test Standard</td></tr>
<tr><td>Electrostatic Discharge Immunity</td><td colspan="5">Voltage: ±4kV(Discharge by contact), ±8kV(Air Discharge)</td><td>IEC61131-2
IEC61000-4-2</td></tr>
<tr><td>Radiated EMF Noise</td><td colspan="5">80~1000MHz, 10V/m</td><td>IEC61131-2
IEC61000-4-3</td></tr>
<tr><td rowspan="3">FAST transient burst Noise</td><td colspan="3">Power Supply</td><td colspan="2">±2kV</td><td rowspan="3">IEC61131-2
IEC61000-4-4</td></tr>
<tr><td colspan="3">Digital / Analog input output (AC)</td><td colspan="2">±2kV</td></tr>
<tr><td colspan="3">Digital / Analog input output (DC)</td><td colspan="2">±1kV</td></tr>
<tr><td>Ambient Conditions</td><td colspan="6">Avoid corrosive gas and excessive dust</td><td></td></tr>
<tr><td>Operating Altitude</td><td colspan="6">≤ 2000m</td><td>IEC61131-2</td></tr>
<tr><td>Pollution Level</td><td colspan="6">≤ 2</td><td>IEC61131-2</td></tr>
<tr><td>Cooling System</td><td colspan="6">Air natural cooling</td><td></td></tr>
</table>

3.2 Performance Specification

3.2.1 HMI Part

Model	HP07CD-AER HP07CD-DER	HP07CD-ANR HP07CD-DNR	HP07CD-AES HP07CD-DES	HP07CD-ANS HP07CD-DNS
LCD Size	7 inches			
LCD Type	TFT Color			
Color	65,536 colors			
Resolution	WVGA 800x480			
Backlight	LED			
Luminance	400cd/m2			
Touch Panel	Resistive 4 wire			
Memory	128MByte DDR2			
Storage Space	128MByte SLC NAND Flash			
SD Card	1 SD slot	None	1 SD slot	None
COM1(HMI)	RS232C/RS422/RS485			
COM2(HMI)	RS232C (Internal)			
Channel 1(PLC)	RS232C		RS485	
Channel 2(PLC)	RS232C (Internal)			
Ethernet	10/100 BaseT	None	10/100 BaseT	None
USB Host	1 port			
Tool Port	1 USB device			
Audio	1 port	None	1 port	None
Voltage	-A: AC100-240V / -D: DC24V			
Power Consumption	9.6W			
OS	Windows CE 6.0			
Dimension (mm)	185 x 127 x 80.5			
Panel Cut (mm)	177 x 119			

※ The power consumption as shown in table above is measured in CIMON HMI&PLC standards, and it can be different according to the project file downloaded and the I/O used.

3.2.2 PLC Part

Items		Descriptions	Note
Power		DC 12 - 24V / 10W (Expanded by fully in 2 modules)	
Program Control		Repetitive Operation, Time Driven Interrupt, Stored Program	
Method for Controlling Input Output		Indirect method, Direct method by Instruction	
Program Language		LD(Ladder Diagram), IL(Instruction List), SFC (Sequential Function Chart), FBD(Function Block Diagram)	
Data Processing		32bit	
Number of Instruction	Number of sequence	55	
	Number of Application instruction	389	
Execution Processing Speed (Basic Instruction)		200 ns/Step	
Program Memory		10K Step	
Number of I/O Point		384 Points	
Run mode		Run, Stop, Remote Run, Remote Stop	
Data preservation against power failure		Setting data and conservation (Latch) in K device	
Count of Program Block		127	
Blocks of Program (max 127)	Scan	4 types of scan programs including standard scan program (Subroutine, Hot / Cold initialization, Periodic interrupts)	
	Periodic Interrupts	Able to register for scan program form up to 16 (Minimum period: 10ms)	
	Special Configuration	4 types of special programs including PID program (High-speed Counter, Positioning control, Input module filtering, etc.)	
	Comm.	4 types of programs including User protocol program (MODBUS/RTU Master, High PLC Link, etc.)	
	Etc.	SFC Program, FBD (Function Block Diagram)	
Auto diagnoses		Monitoring delay of processing, problems of memory, I/O, Battery, Power error	
Restarting		Hot Restart, Reboot	

Items		Descriptions	Note
Expansion		CM-HP-EAA/CM-HP-EDR/CM-HP-DM module + 2 PLC-S modules	
Data Memory	X	1024 points (X0000 - X063F)	BIT
	Y	1024 points (Y0000 - Y063F)	BIT
	M	8192 points (M0000 - M511F)	BIT
	L	4096 points (L0000 - L255F)	BIT
	K	4096 points (K0000 - K255F)	BIT
	F	2048 points (F0000 - F127F)	BIT
	T	512 points (T0000 - T0511)	BIT
	C	512 points (C0000 - C0511)	BIT
	S	100 states x 100 set (00.00 - 99.99)	
	D	10000 words (D0000 - D9999)	WORD
	Z	1024 words (Call Stack : Z0000 - Z0063, Z1000 - Z1063)	WORD
	R	16 points (Index)	
High-speed Counter		20Kpps, 2 phase 2 channels. (10kpps when operating 2 channels together)	
PID		32 channels, Auto-tuning	
RTC		Operated by internal battery (CR2032 Backup)	
Communication Channel		USB (CICON programming)	
		Option: RS232C 1 channel or RS485 1 channel	
Etc.		Floating point arithmetic, Modification in Run status, etc.	

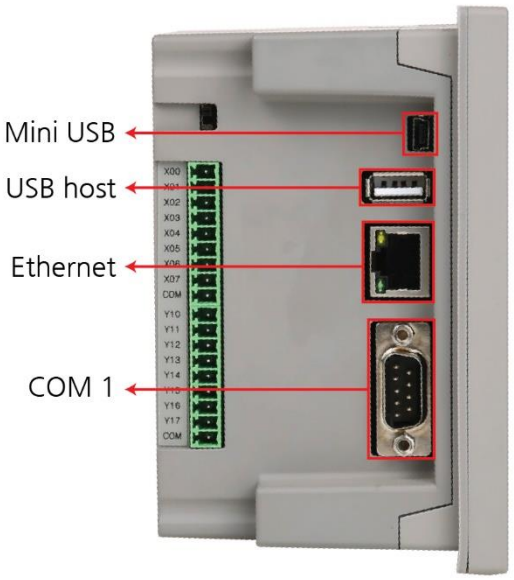
4 Detail Functions in HMI Part

This section explains about interfaces of HMI Part, install direction of Xpanel Designer and ways to download projects for operating HMI.

4.1 External Interfaces of HMI Part

The communication interfaces in HMI Part are used to connect with other external devices. Hybrid Xpanel provides a RS232C, RS422 and RS485 serial port for communication with external devices, a COM2 port for communication with internal PLC Part, and an Ethernet port for Ethernet communication. Mini USB is used for both HMI Part and PLC Part for programming.

⚠ You can't connect CICON and Xpanel Designer using mini USB simultaneously.



[Figure 8] Communication interfaces for HMI Part

4.1.1 COM1 for RS232C, RS422 and RS485

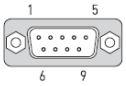
COM1 port of Hybrid Xpanel supports serial communication standards listed in [Table 1] with a single 9-pin D-Sub connector.

Standard	Description
RS232C	This standard supports 1:1 serial communication. It is able to extend communication cable up to 15M depending on the transmission speed.
RS422	This standard supports 1:N serial communication. By using current loop signal system, it shows better noise characteristic than RS232C. It is able to extend communication cable up to 1KM depending on the transmission speed.
RS485	This standard supports N:N or 1:N serial communication. By using identical signal system as RS422, it shows good noise characteristic as well. It is able to extend communication cable up to 1KM depending on the transmission speed. .

[Table 1] RS232C / RS422 / RS485 comparison

⚠ Please note that you cannot use RS232C to RS422 and RS485 converter (USB) with Hybrid Xpanel.

⚠ You can use only one of three types of serial communication listed in [Table 2] according to communication settings.

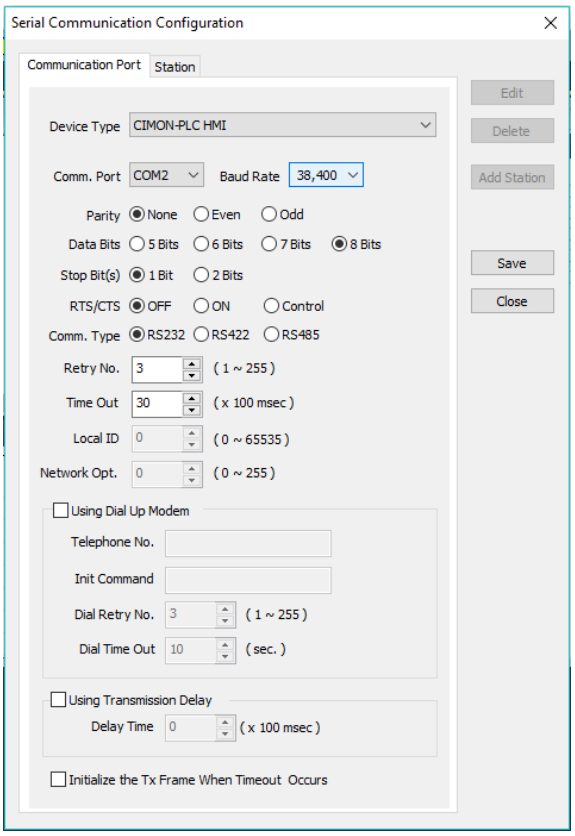
Connector	Contact No	Name	Details	RS232C	RS422	RS485
	1	SDA	Send data A		O	O
	2	RD	Receive data	O		
	3	TD	Send data	O		
	4	RDA	Receive data A		O	O
	5	SG	Signal Ground	O	O	O
	6	SDB	Send data B		O	
	7	RTS	Request Sending			
	8	CTS	Complete sending			
	9	RDB	Receive data B		O	

[Table 2] Pin descriptions of COM1

(*)Please refer to the 5.3 to get information about setup method to communication between Hybrid Xpanel and other external devices.

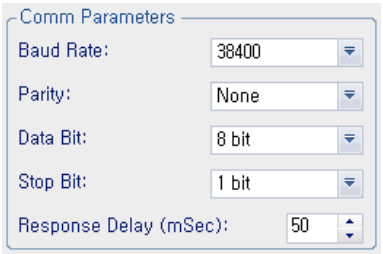
4.1.2 COM2 for Communicating Embedded PLC

Inside of Hybrid Xpanel, HMI Part and PLC Part are internally connected with a COM2 port. Go to [Tools] - [I/O Device] and set as below to communicate with embedded PLC.



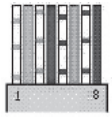
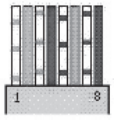
⚠ If communication settings are different between Hybrid Xpanel and embedded PLC, communication will not be possible. The settings shown in above figure only can be lead to successful communication.

⚠ When you make a CICON project through Hybrid Xpanel, communication parameters are automatically set as figure below. Users cannot change any of these settings.

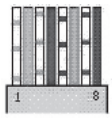
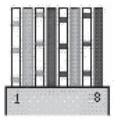


4.1.3 Ethernet

The Ethernet port is used in communication between Hybrid Xpanel and other external device. It meets standard 10BaseT and 100BaseTX.

Cable	No	Color	Color	No	Port
	1	Orange/White	Orange/White	1	
	2	Orange/White	Orange	2	
	3	Green/White	Green/white	3	
	4	Blue	Blue	4	
	5	Blue/White	Blue/White	5	
	6	Green	Green	6	
	7	Brown/White	Brown/White	7	
	8	Brown	Brown	8	

[Table 3] RJ45 - Direct cable (Host ↔ Hub)

Cable	No	Color	Color	No	Port
	1	Orange/White	Green/White	1	
	2	Orange	Green	2	
	3	Green/White	Orange/White	3	
	4	Blue	Blue	4	
	5	Blue/White	Blue/White	5	
	6	Green	Orange	6	
	7	Brown/White	Brown/White	7	
	8	Brown	Brown	8	

[Table 4] RJ45 - Cross cable (Host ↔ Host)

4.1.4 SD Card

When using a SD card, you can download project which are generated in Xpanel Designer or CICON to the Hybrid Xpanel. Also you can upload application program inside of the Hybrid Xpanel to PC.

The interface supports speed class 10, with SDHC that provides capacity up to 32GB.

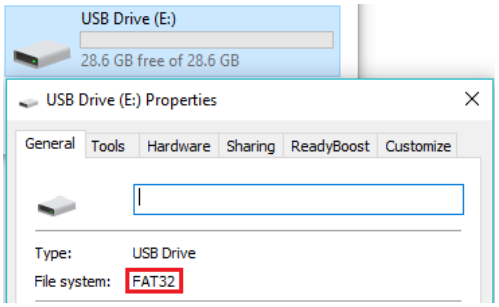
SD Card	Specification
Standard of Capacity	SD, SDHC (Supports up to 32GB)
File System	FAT 12, 16(SD), FAT 32 (SDHC)
Speed Class	Supports up to Class 10

4.1.5 USB Host

When using a USB memory stick, you can download project which was programmed in Xpanel Designer or CICON to the Hybrid Xpanel. Also you can upload application program inside of the Hybrid Xpanel. You can use a generic mouse or keyboard through this interface.

⚠ Please note that you cannot use RS232C to RS422 and RS485 converter USB with Hybrid Xpanel.

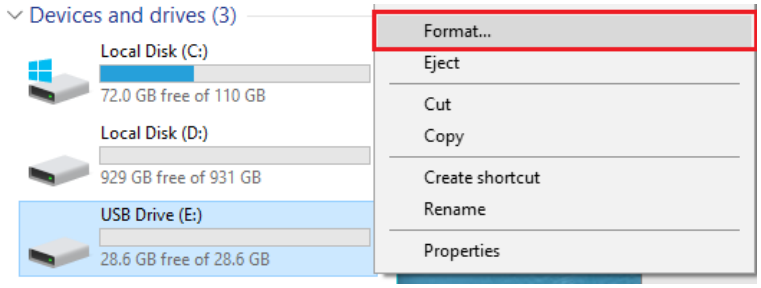
⚠ Make sure to set USB as FAT32 file format so that Hybrid Xpanel can recognize normally. Check if the type of USB file system is set as FAT32 file format.



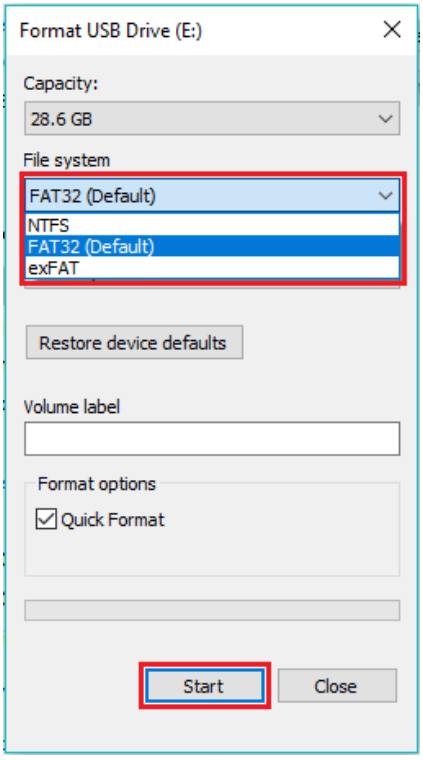
⚠ You should format the USB for configuring file system. Make sure you backed up important files stored in the USB.

Follow the direction to configure the USB format as FAT32.

1) Connect the USB to PC. Right-click on USB drive and select [Format].



2) Configure the File system as FAT32 (Default) and start formatting the USB.



4.2 Installing Xpanel Designer

Xpanel Designer is a software that draws up project for operating by Hybrid Xpanel. You can free-download any version you want in CIMON website (http://www.cimon.com/eng/). You can get information about detail functions of Xpanel Designer from software's manual which can be found in same direction.

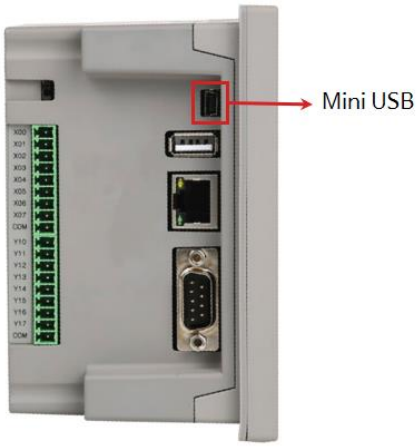
4.3 Project Download

Here are ways to run the project by Hybrid Xpanel, which is programmed in Xpanel Designer. You can choose on mini USB, Ethernet and removable disks. Each way is described below.

Download by USB

- **Location of mini USB port**

Mini USB port is located next to the USB port, as shown in the figure.



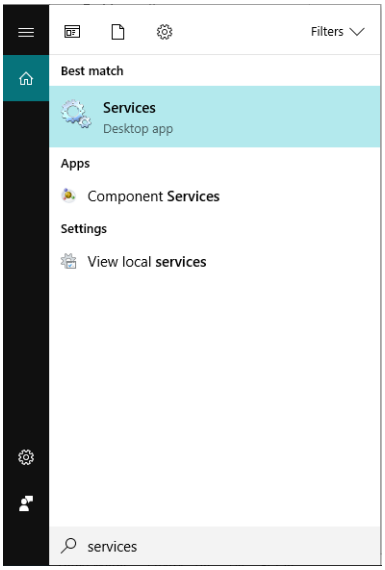
- **Install ActiveSync (Window XP OS)**

ActiveSync provides for the transfer of data between PC and various mobile devices, which are running at Windows CE. You can free-download ActiveSync in Microsoft website (https://www.microsoft.com/en-us).

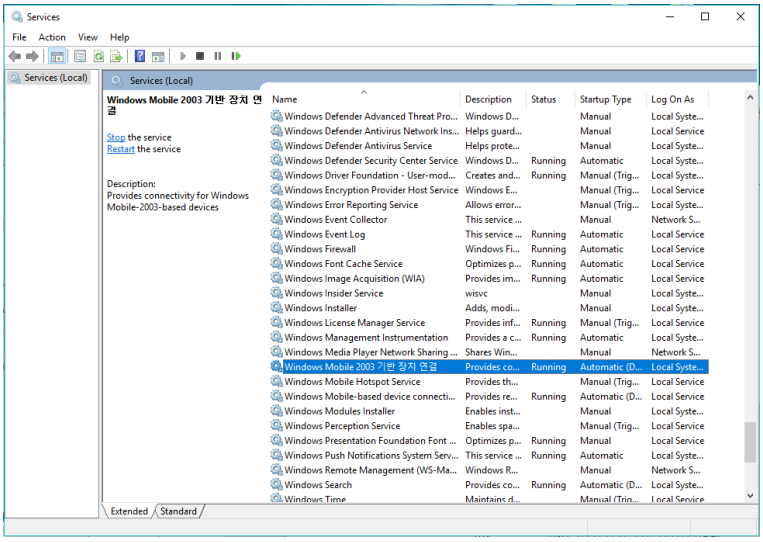
- **Install Windows Mobile Device Center (Windows 7, 8, 10 OS)**

Download Windows Mobile Device Center in Microsoft website. Sometimes the program does not operate correctly in Windows 10 OS. In this case, perform the following procedure.

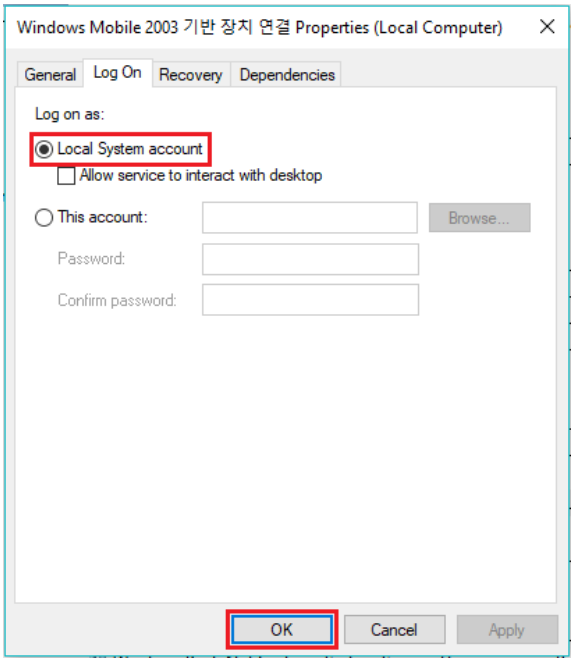
1) Start application [Services] inside of Windows.



2) Select [Windows Mobile - 2003 - based devices] inside of [Services].



3) Select [Log on as: Local system account] in [Log On] tab.



4) Click [OK] and reboot the system. After restart the PC, the program operates normally.

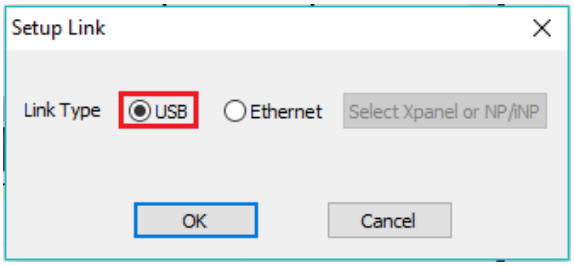
- **Install driver software for Hybrid Xpanel**

The driver software is automatically downloaded when you connect PC and Hybrid Xpanel using mini USB.

- **Setup for Xpanel Designer**

1) Run Xpanel Designer and retrieve a project to download.

2) Go to [Online] - [Setup Link] and choose [USB].



3) Go to [Online] - [Download to Xpanel] for download the project.

⚠ Please note that only one Hybrid Xpanel can be connected to a PC at a time, even the PC has two or more unused USB ports.

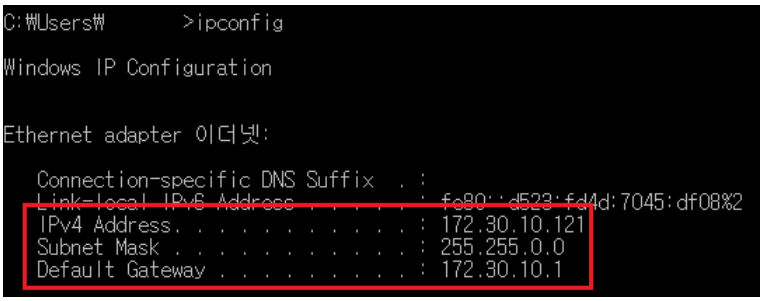
⚠ The project does not operate correctly if version is different between the application program in Hybrid Xpanel and the Xpanel Designer by which the project files were built. When you download a project from a different version of Xpanel Designer, you can see the message to upgrade application in Xpanel storage. Proceed application update to both versions are identical.

Download by Ethernet

- **Checking IP address of PC**

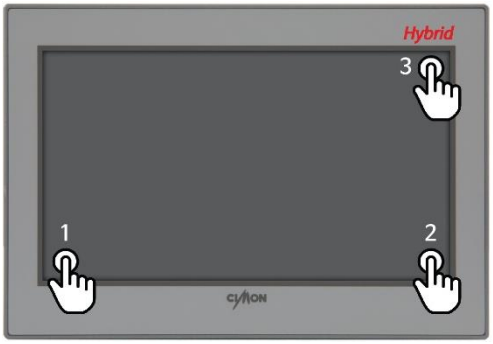
1) Go to [Window] - [Run] and enter 'cmd' on the input screen.

2) Enter 'ipconfig' on the command screen to check the PC's Ethernet setup which Xpanel Designer is installed.

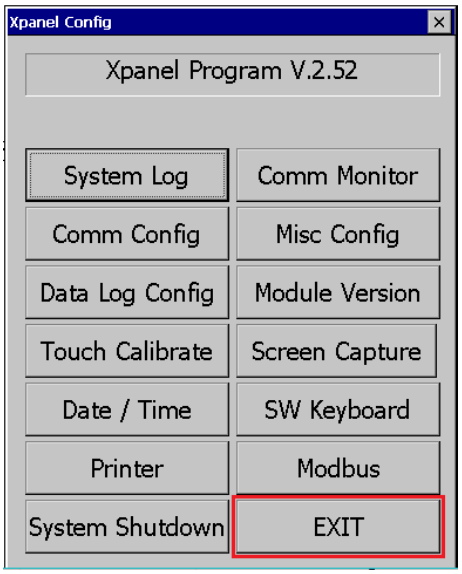


- **Checking IP address of Hybrid Xpanel**

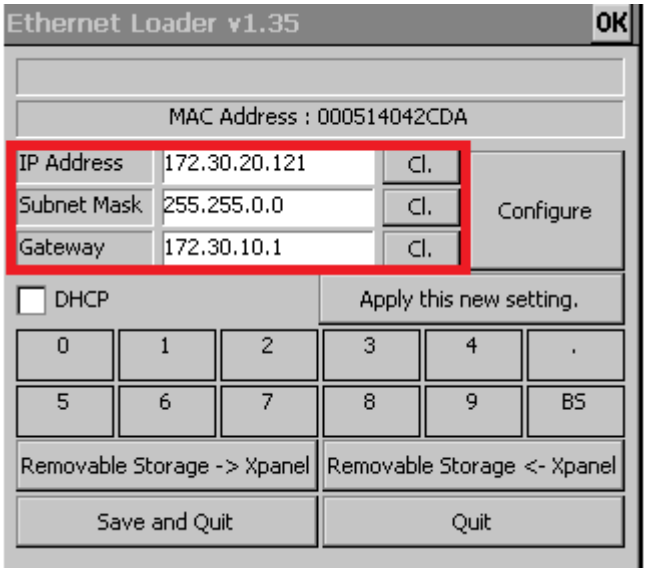
3) Click as numbered sequence. Xpanel Config dialog box appears.



4) Select [Exit].



5) Configure IP address of Hybrid Xpanel.



⚠ Subnet mask and gateway should be configured matched to those of PC.

⚠ When subnet mask is 255.255.0.0, IP address should be set as 172.30.XXX.XXX. Duplicate addresses are not allowed.

⚠ XXX is a number in range of 0~255.

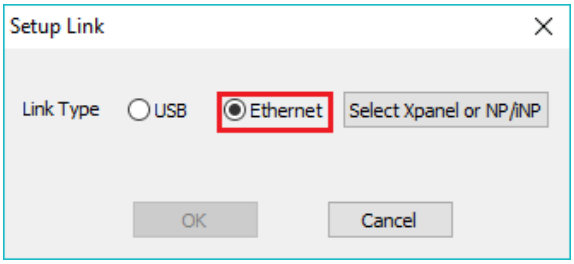
6) Select [Apply this new setting] to take effect and to save changes. A system reboot is required for changes to apply.

7) Select X button if you want to modify the setting. Select [OK] if you want to go on configuration. In this case, Hybrid Xpanel should restart.

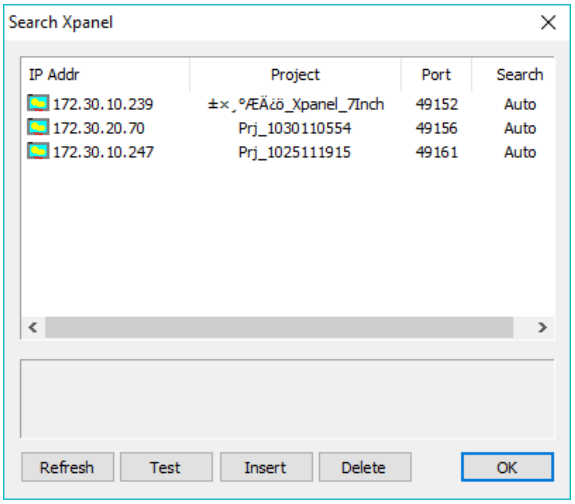
- **Setting for Xpanel Designer**

1) Run Xpanel Designer and retrieve a project to download.

2) Go to [Online] - [Setup Link].



3) Choose [Ethernet] for connect method and click [Select Xpanel or NP/iNP]. Searched Xpanel appears on the list.



4) Select the Xpanel to download a project. You can see information of the selected Xpanel on a pop-up box.

5) Go to [Online] - [Download to Xpanel] for download the project.

⚠ The project does not operate correctly if version is different between the application program in Hybrid Xpanel and the the Xpanel Designer by which the project files were built. When you download a project from a different version of Xpanel Designer, you can see the message to upgrade application in Xpanel storage. Proceed application update to both versions are identical.

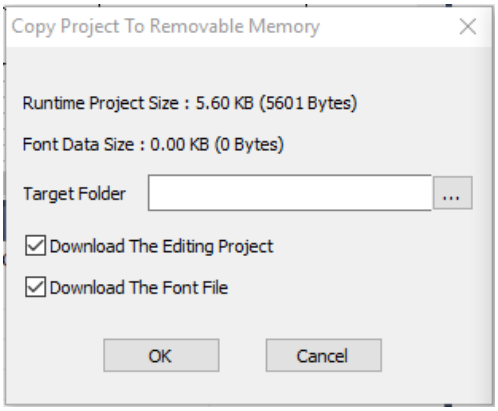
Download by Removable Disks

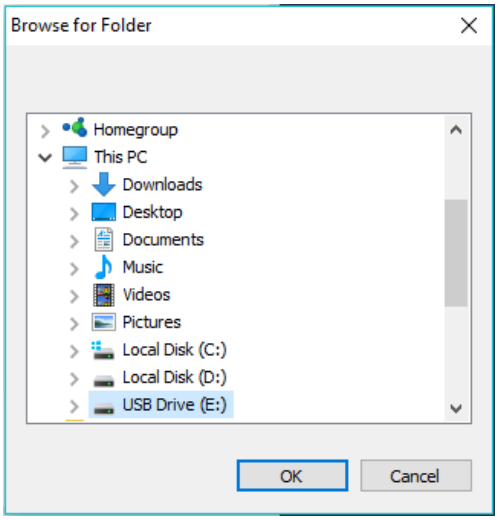
- **Download the project from Hybrid Xpanel to removable disk**

1) Connect a removable disk on the PC and run Xpanel Designer.

2) Go to [Online] - [Copy project to removable memory], and input or select the path where you want to save the project. If you want to download the data for upload at once, select [Download the Editing project].

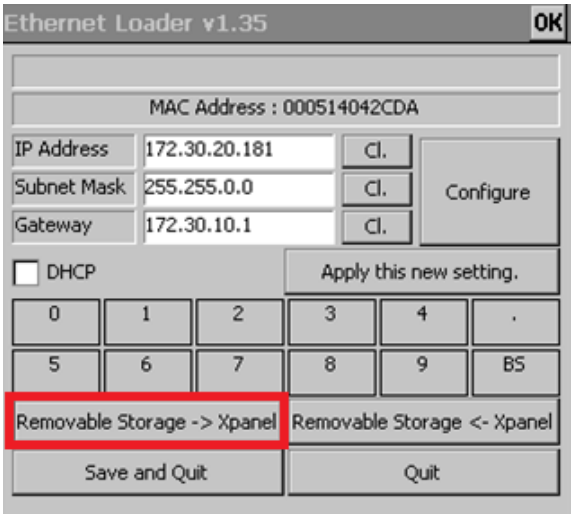
⚠ Make sure to specify the disk's path when you save the project.



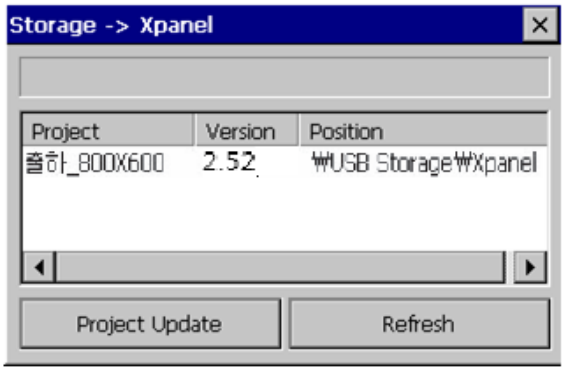


- **Update the project from removable disk to Hybrid Xpanel**

1) Connect the removable disk which downloaded project to Hybrid Xpanel. Select [Removable Storage → Xpanel] in the Ethernet Loader dialog box.



2) Select [Refresh] and you can see projects able to update which are saved in removable disk.



3) Click a project to update on the list and select [Project Update].

⚠ When you select [Project Update], the project and application program inside of the Hybrid Xpanel are being update after delete at first.

⚠ [Project Update] button is deactivated when procedure starts and activated when the task is over after All file update : OK message appears.

⚠ Do not touch the panel during update is going on. It could cause incorrect operation.

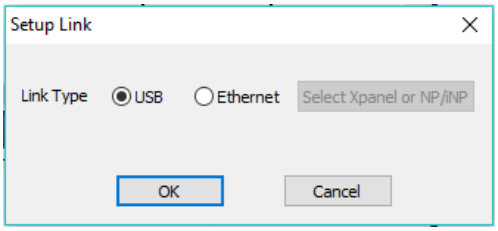
4.4 Project Upload

Here are ways to open the project in Xpanel Designer, which is stored in Hybrid Xpanel. You can choose on Xpanel Designer, USB and SD card. Each way is described below.

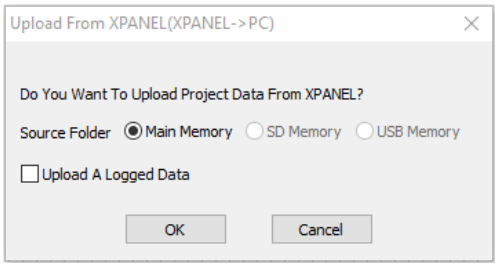
Upload by Xpanel Designer

1) Go to [Online] - [Upload from Xpanel] located in the upper right side of a menu bar.

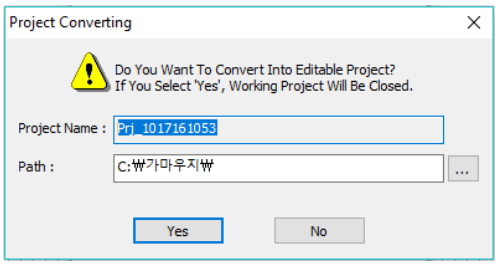
2) Choose a connect method.



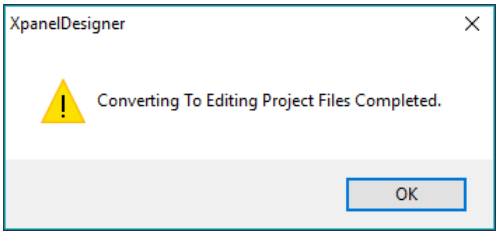
3) Select a path of the project to upload from Hybrid Xpanel. If you want to upload logged data together, check [Upload A Logged Data].



4) Specify the path where you want to save the project file.

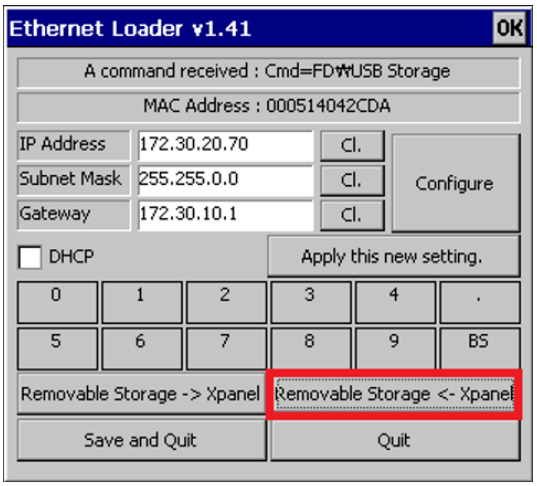


5) A message appears when the conversion is completed. Select [OK] and check the project file is opened.

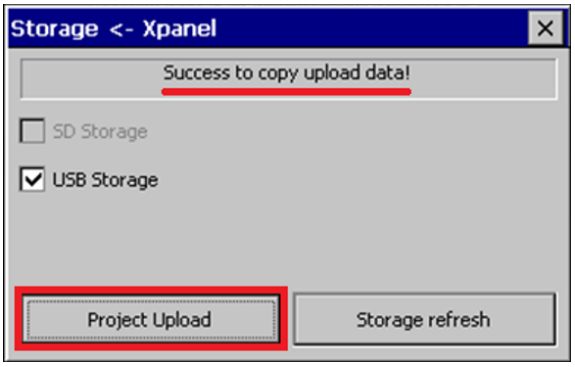


Upload by USB or SD Card

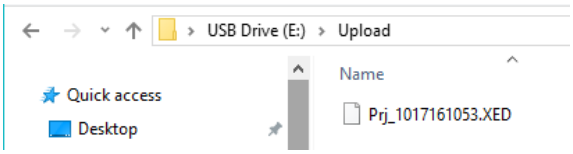
1) Connect USB or SD card on Hybrid Xpanel and Select [Removable Storage ← Xpanel] in Ethernet Loader dialog box.



2) You can see the check box what you connected to device. A Success message appears when you select [Project Upload] and upload is completed.

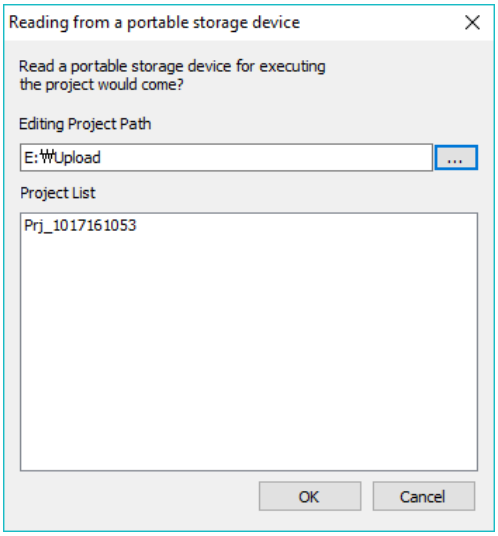


3) Hybrid Xpanel project file is copied to Upload folder located in USB or SD card.

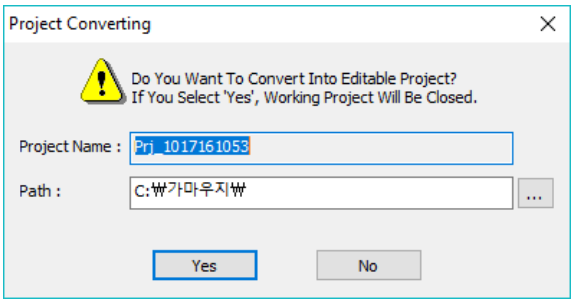


4) Connect USB or SD card on the PC. Go to [Online] - [Upload from Storage] in Xpanel Designer.

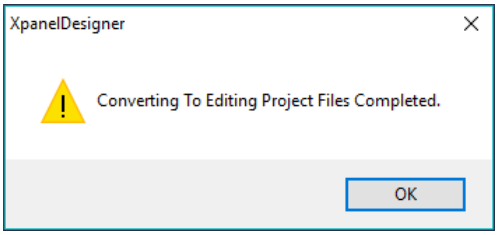
5) Specify the path of copied project file. Project file located in Hybrid Xpanel appears on the list.



6) Specify the path to save. Select [OK] to convert editable project.



7) A message appears when convert is completed. Click [OK] to open the converted project file.



5 Detail Functions in PLC Part

This section explains about interfaces of PLC Part and functions of PLC CPU embedded in Hybrid Xpanel. Also you can get information about communication settings which is needed for operating PLC.

5.1 External Interfaces of PLC Part

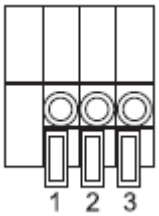
As shown in [Figure 9], there is a serial communication port which is provided by PLC Part. Through this interface, RS232C or RS485 is supported depending on the model.

⚠ Only one standard between RS232C and RS485 is installed on the PLC Part. The model number describes the actual type of standard installed. To know the serial communication standard product is supporting, please check your ordering information.
ex) CM-HP07CD-AE**R** supports RS232C and CM-HP07CD-AE**S** supports RS485.
The name of model ends as **R** supports RS232C and as **S** supports RS485.

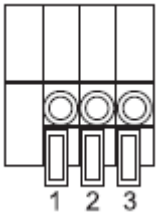
A serial communication port of PLC locates on the bottom side of the product.

[Figure 9] Serial communication port of PLC

Pin descriptions of channel 1 are shown as [Table 5] and [Table 6].

Connector	Contact No	Name	Details	Port
	1	TD	Receive data	Channel 1
	2	RD	Send data	
	3	SG	Signal Ground	

[Table 5] Pin description of RS232C

Connector	Contact No	Name	Details	Port
	1	SDA	Send/Receive line A	Channel 1
	2	SDB	Send/Receive line B	
	3	SG	Signal Ground	

[Table 6] Pin description of RS485

5.2 Embedded PLC

CICON is a software that programs the PLC CPU embedded in Hybrid Xpanel. You can free-download a recent version in CIMON website (http://www.cimon.com/eng/). Also you can get information about detail functions of CICON from [Help] inside of the software.

5.2.1 Features of CPU Module

PLC CPU embedded in Hybrid Xpanel is designed with 32-bit microprocessor. The basic instruction processing speed, as a performance parameter, reaches to 200nsec/step. Also, 2 channels of high-speed (20Kpps) counter is equipped which enables the input of 2 phase 2/4 multiplication. And software PID control is available up to 32 loops.

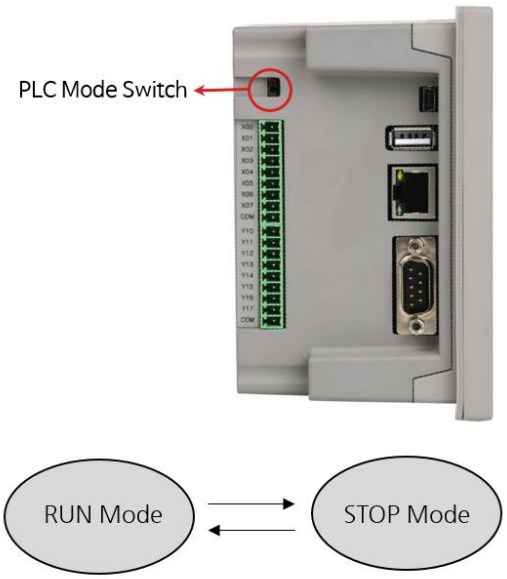
Through communication interface of RS232C or RS485, it is possible to communicate with external host system. Also, various communication protocols are available. 10K steps of program memory is available for scan programs.

Self-diagnosis function verifies the cause of error easily. Details of the error are displayed on [PLC status] of CICON. In addition, there are advanced control functions as following table.

Functions	Descriptions
Auto-identification for expansion module	Identifies the expanded module automatically and monitors on CICON.
Clock	Reads the time from RTC module and stores the value at F device.
I/O reservation	Checks if the exact card was mounted in assigned slot. Reserves to writing a program without configuring I/O, when expanding or exchanging is needed.
Modification of program during Run status	Modifies the program during Run status.

5.2.2 Operation Modes of PLC

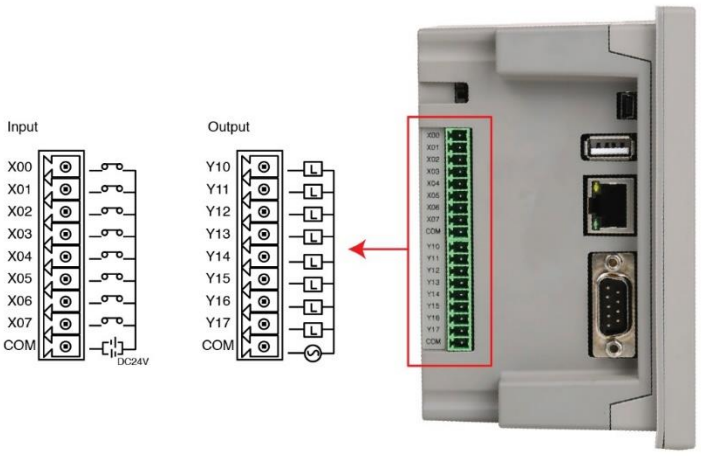
[Figure 9] indicates transferring of PLC CPU operation mode. The operation mode can be controlled in CICON. The position of the switch determines the default operation mode at power ON.



[Figure 10] Transferring of PLC mode

5.2.3 External Wiring Diagram

Before wiring Hybrid Xpanel with the external power supply, please check the connection diagram described in [Figure 11].



[Figure 11] Wiring diagram of PLC I/O

5.3 Connecting PLC and Program download

The scan program files of PLC Part can be downloaded by USB. The installation method of USB driver and how to download projects from CICON are described below.

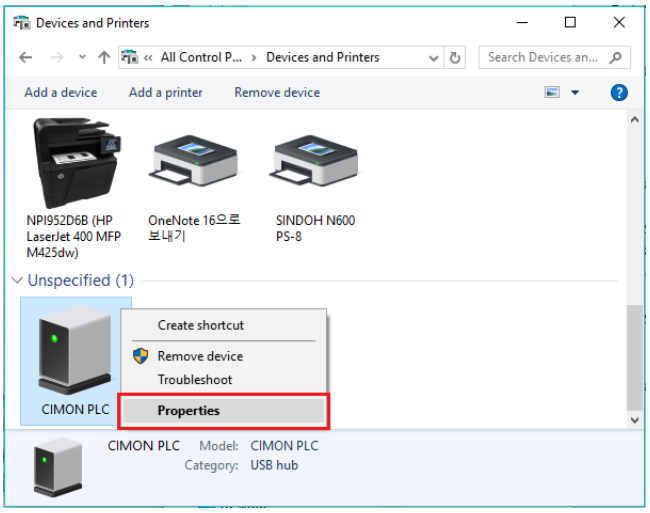
Installing USB Driver

※ If you already installed USB driver for PLC in your PC, you may skip this step.

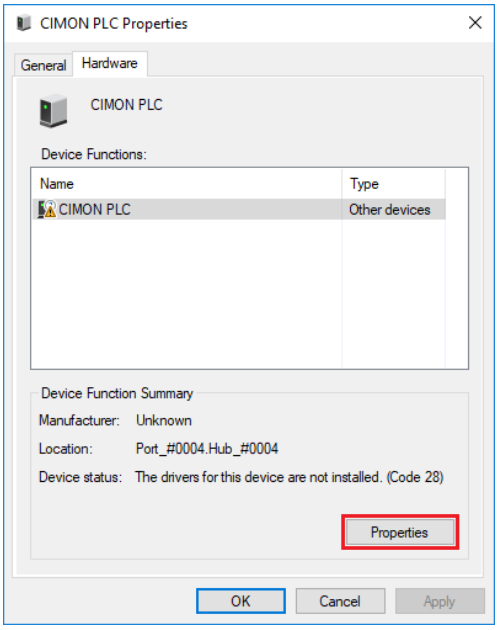
1) Install a recent version of CICON from the website refer to the 5.2.

2) Connect Hybrid Xpanel and PC through using mini USB. Mini USB port is located next to the USB port, as shown in the figure.

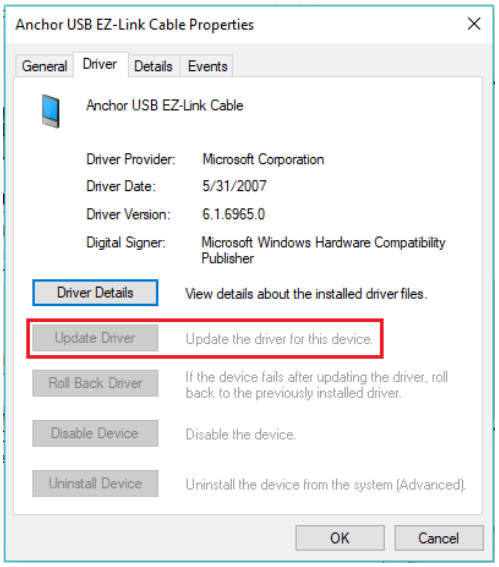
3) Rightclick the CIMON PLC appeared on [Control Panel] - [Devices and Printers] - [Unspecified] category.



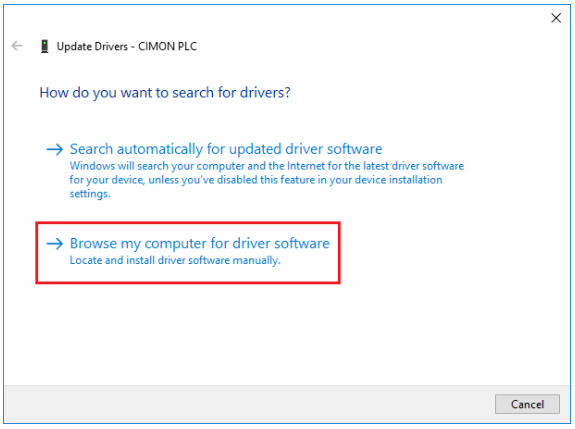
4) Select [Properties] and go to [Hardware] - [Properties].



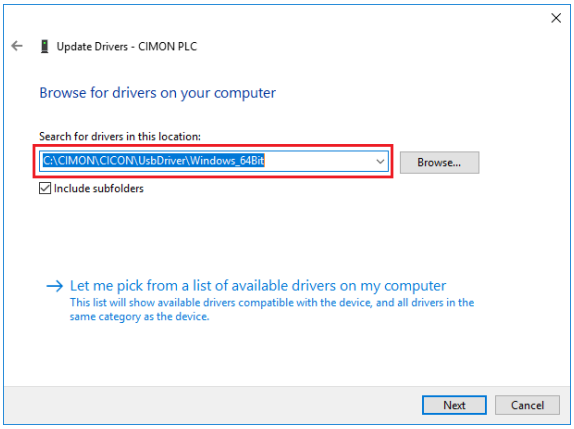
5) Go to [Driver] tab and select [Update Driver].



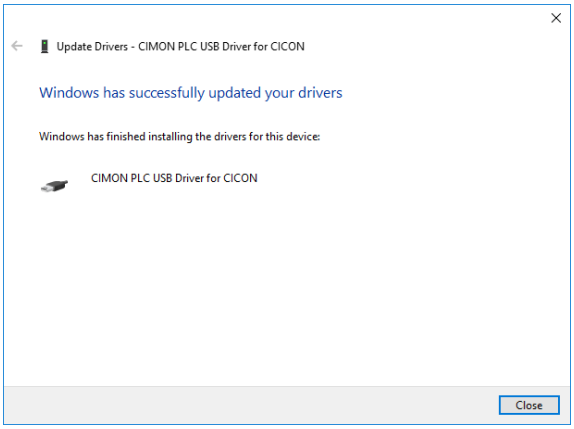
6) Select [Search a Driver Software in PC] in driver software update dialog box.



7) Select [UsbDriver] folder in where CICON is installed. Set identically as your OS and Bit.



8) The update complete dialog box appears when installation is complete.

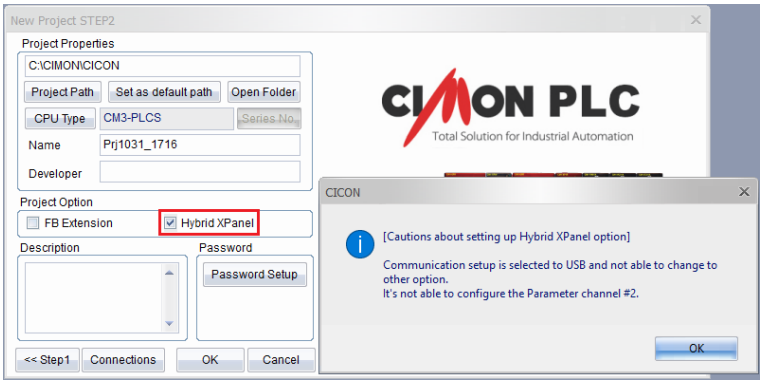


⚠ When the driver is not installed correctly, please refer to the [Help] in CICON.

Connecting with PLC Part and project download

1) Run CICON and select PLC-S to generate a project for PLC Part.

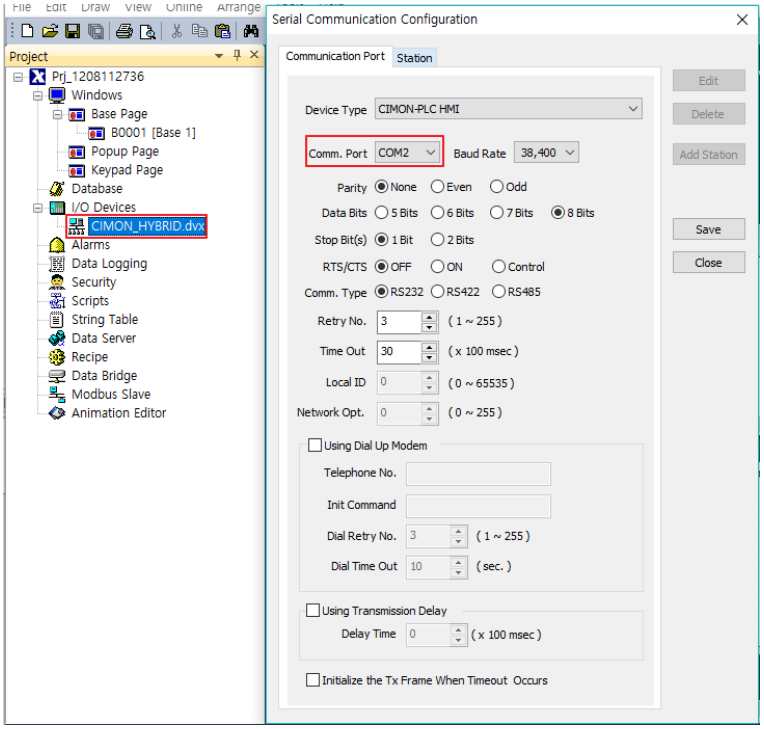
2) In step 2, check Hybrid Xpanel box and confirm the notice. Select [OK] to go on.



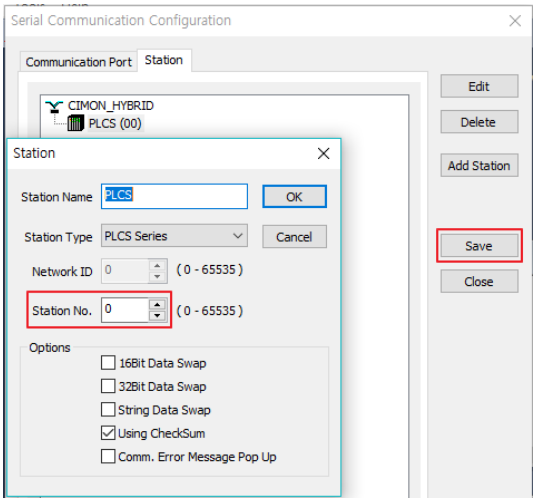
3) The communication port (channel 2) of PLC Part is internally wired to that of HMI Part (COM2), and the communication settings are automatically configured by CICON. You don't need to configure the communication parameters.

4) Further programming works of PLC Part are same as that of standard PLC-S. You can refer to [Help] in CICON for these items.

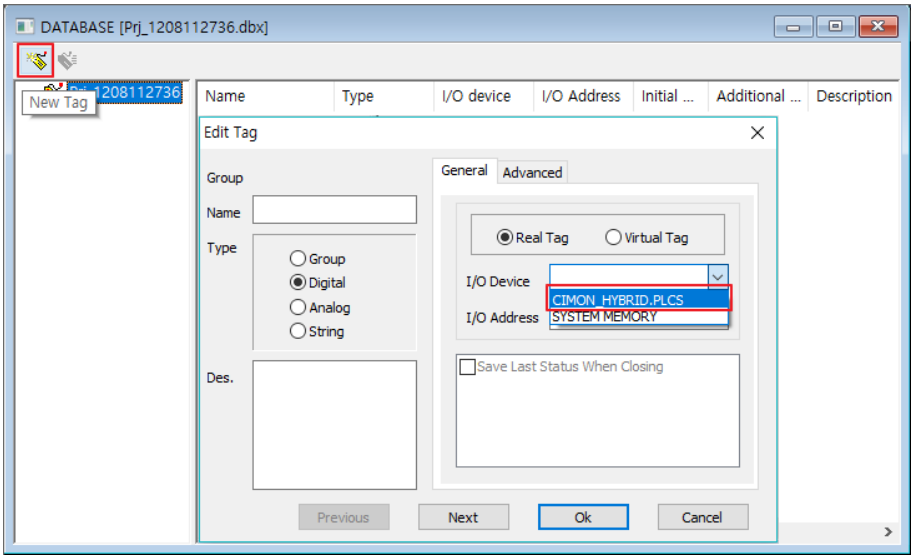
5) For more understanding, the communication settings of HMI Part are described as below. When a new project is created in XPanel Designer, the PLC Part is registered as default I/O device automatically, as shown in the figure below. Please note that COM2 port is assigned to the PLC Part. Also, the communication parameters of COM2 are set automatically. Do not change these parameters. Otherwise, the communication between PLC and HMI Parts may not be successful.



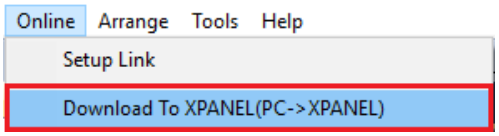
6) The XPanel Designer creates a I/O device with device name of “CIMON_HYBRID”, and registers a station of “PLCS” with station number ‘0’ automatically as shown below. Do not change those parameters.



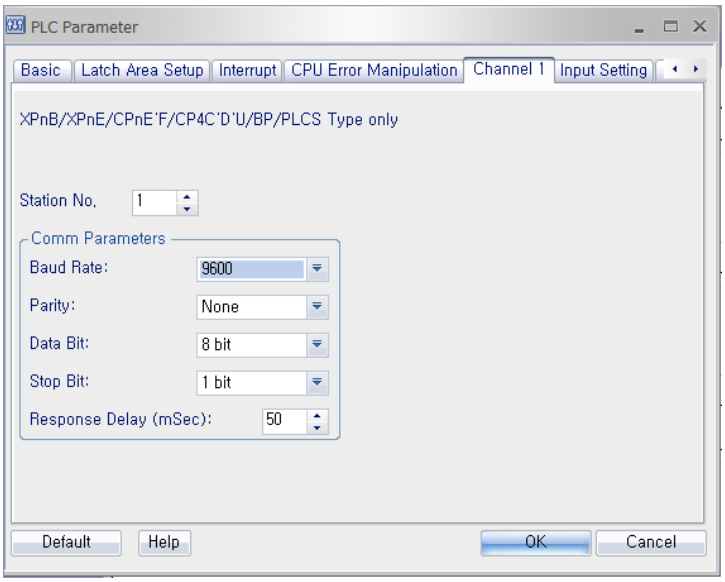
7) If you want to add a real tag in HMI Part, you have to select "CIMON_HYBRID.PLCS" in I/O Device combo-box as shown in the figure below.



8) After drawing up a project, go to [Online] - [Download to Xpanel (PC→ Xpanel)] to download on Hybrid Xpanel.



5.4 Settings for PLC Communication Port



PLC has an external communication port of RS232C or RS485. You can configure parameters of the port in [Channel 1] tab shown in the figure above.

(1) Station Number

Each PLC has its own station number, which communicates by using this. You can specify the station number of PLC in setting above. Station number is available in range of 0 to 31, total on 32.

(2) Communication Parameters

You can configure baud rate (BPS), parity, data bit, stop bit and response delay values. Note that the station number described above and these parameters must be matched with the configuration of external master.

(3) Response Delay

A response frame will be transmitted when the PLC Part receives a frame after specified time interval. You can configure the response delay according to the performance of opposite device. The default setting is '0'.

⚠ Some external device with low microprocessor performance cannot process communication signal from Hybrid Xpanel in time. Those devices need some processing time between transmission and reception signal on communication media. To receive the frame sent from Hybrid Xpanel normally when using those devices, you should use the response delay. Usually, the range of 50 ~ 100ms is recommended.

6 Example of Hybrid Xpanel Project

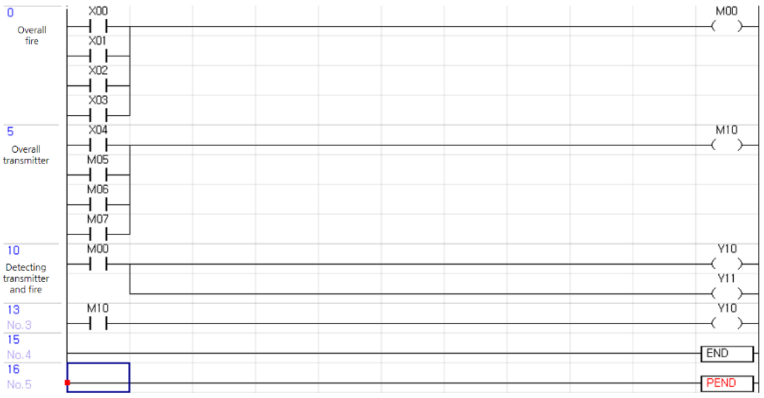
Following is an example about how to utilize Hybrid Xpanel. Firstly, draw a ladder program with CICON and download to PLC. Then draw up a program with Xpanel Designer and download to Hybrid Xpanel. After that, check if sprinkler operates when the fire occurs.

Example: Operating sprinkler when the fire occurs

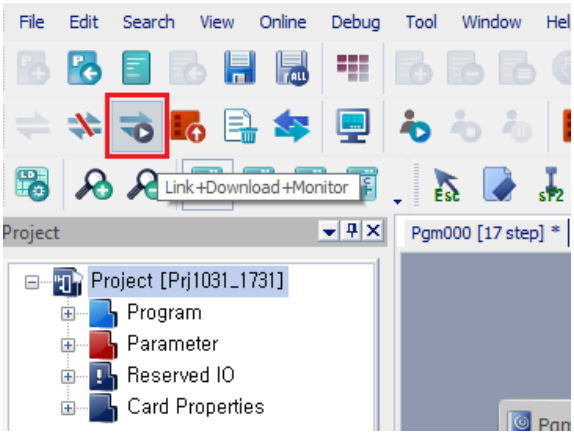
- **CICON**

1) Make a project for Hybrid Xpanel.

2) Draw a scan program as shown below.

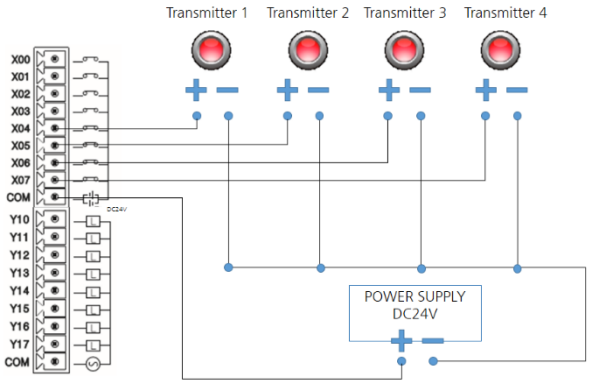


3) Connect PC and Hybrid Xpanel with USB. Download the program.



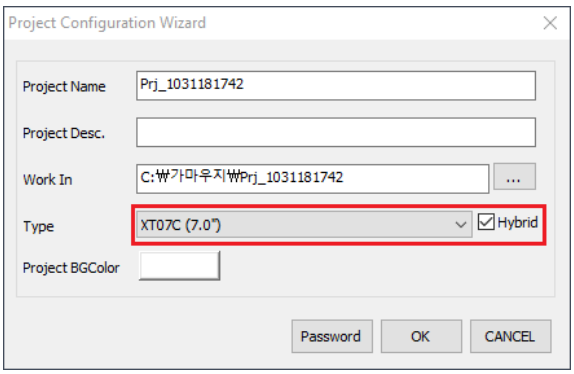
- PLC

1) Connect the fire detector to X00~X03, transmitter to X04~X07, fire alarm to Y10 and sprinkler to Y11 by reference for external connection diagram of embedded PLC.

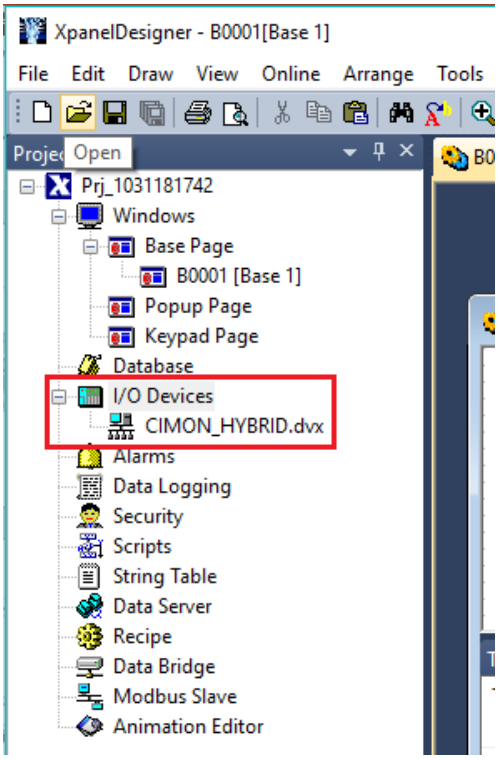


- Xpanel Designer

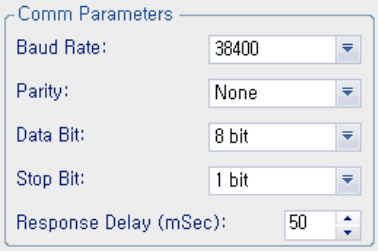
1) Select XT07C (7.0") and check the Hybrid check box.



2) CIMON_HYBRID is registered in [Tools] - [I/O Device].

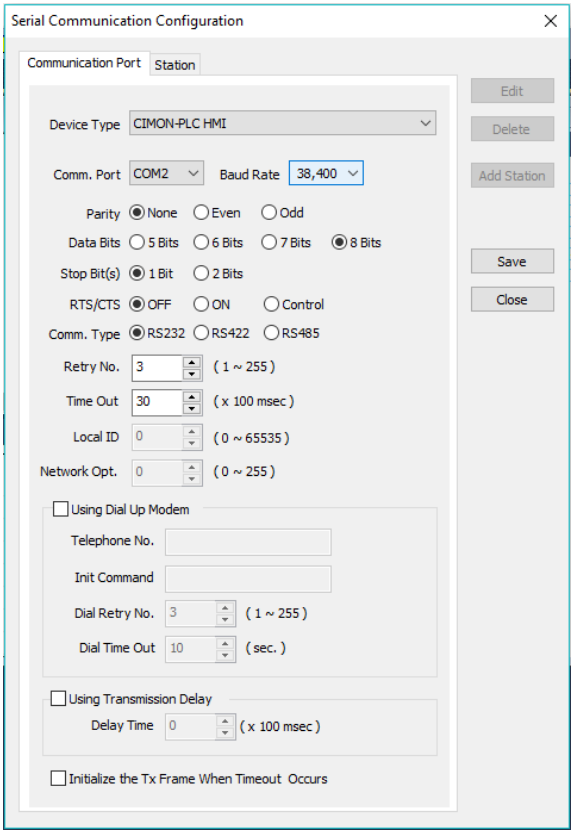


3) CIMON_HYBRID registered in I/O device is serial communication with embedded PLC. COM2 port in Hybrid Xpanel is connected with embedded PLC.



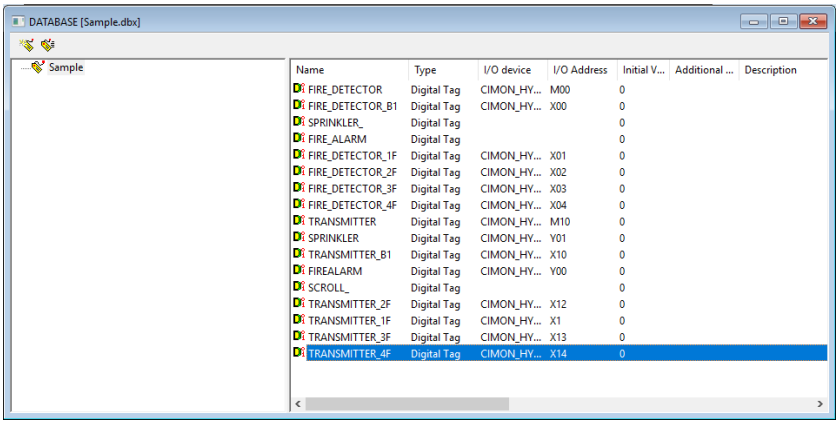
⚠ Communication setting of embedded PLC is same as above, and cannot be configured by user.

4) Configure the communication settings same as that of embedded PLC.

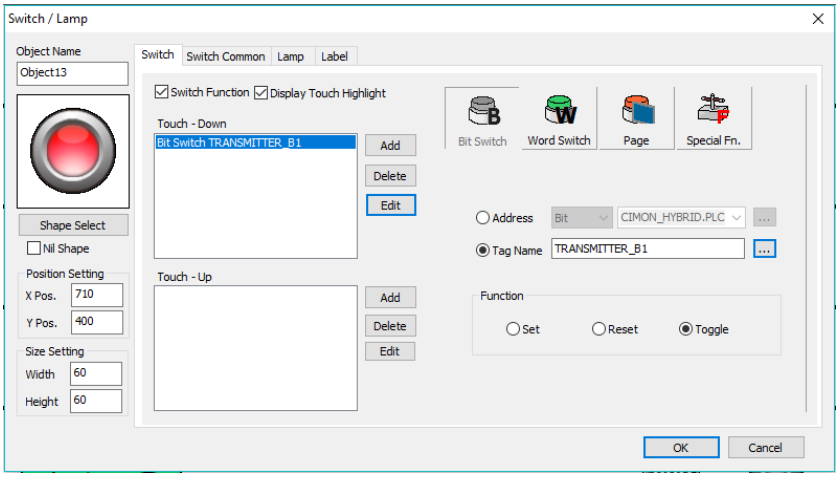


⚠ Notice that you cannot communicate with PLC if both device's communication settings are different each other. Check the setting of PLC and configure them in identical state.

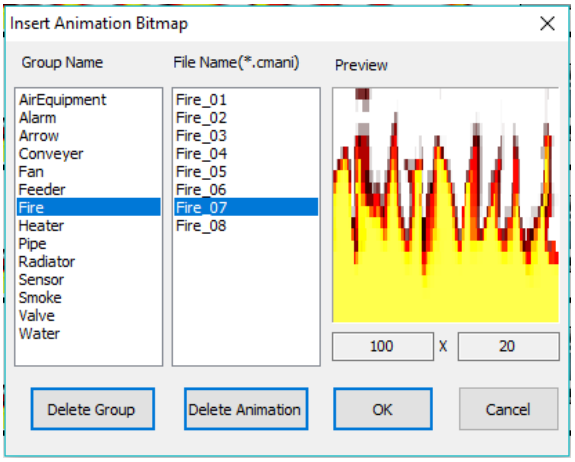
5) In the settings of [Tools] - [I/O Device], input each of name and kind of tags, I/O device, address and register them.



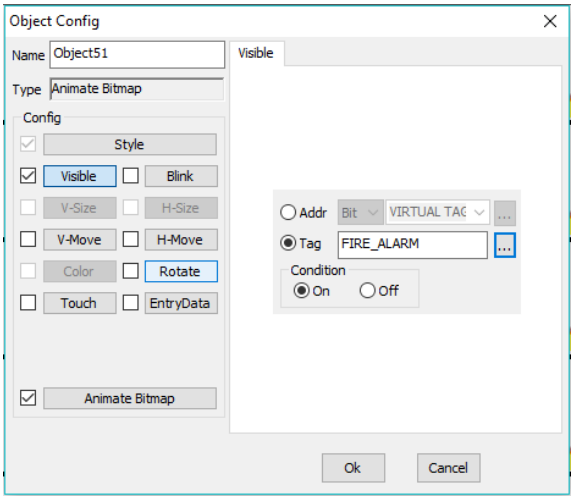
6) Go to [Draw] - [Switch Lamp], input tags and operations as below and register them.



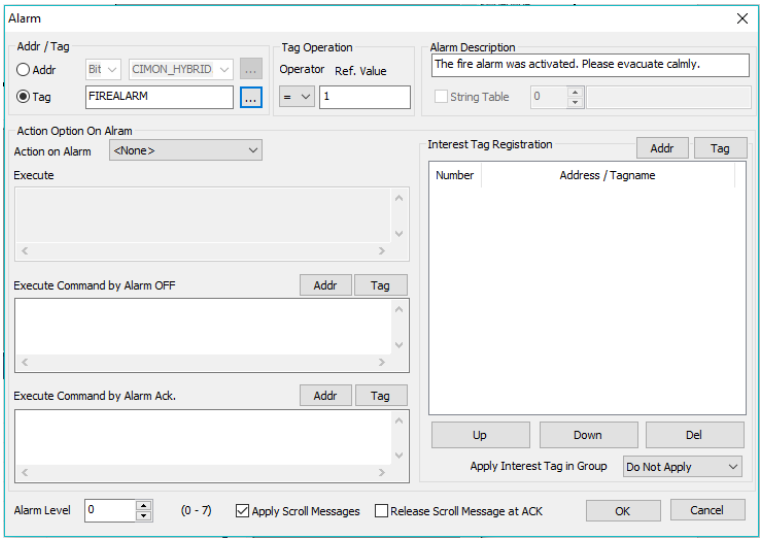
7) Go to [Edit] - [Animation Bitmap], select the animation bitmap what you want and register them.



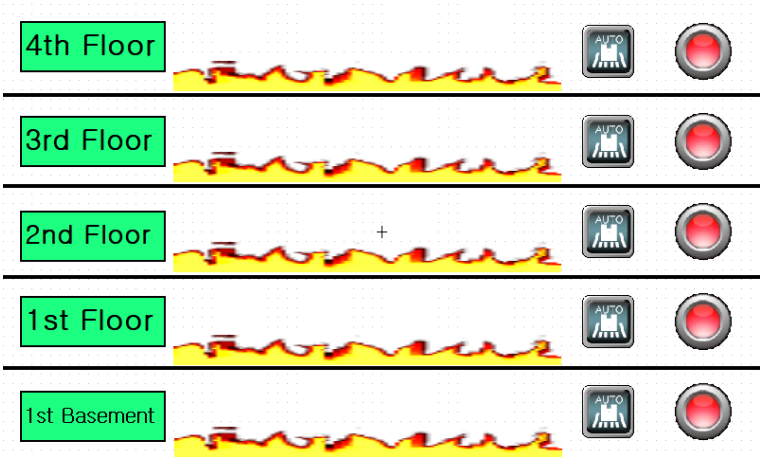
8) Select [Animation Bitmap], input tags and operations as below and register them.



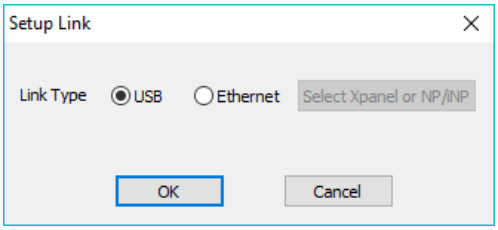
9) Go to [Tools] - [Alarm], input tags and operations as below and register them.



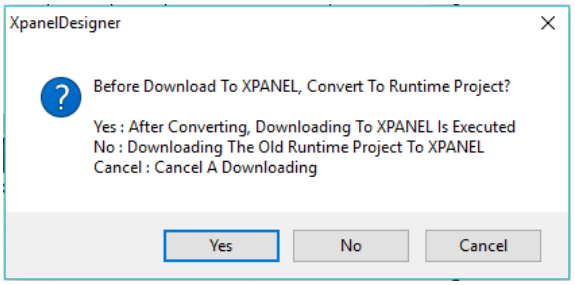
10) Draw up a page utilizing basic pictures, switch lamps and animation bitmaps as below.



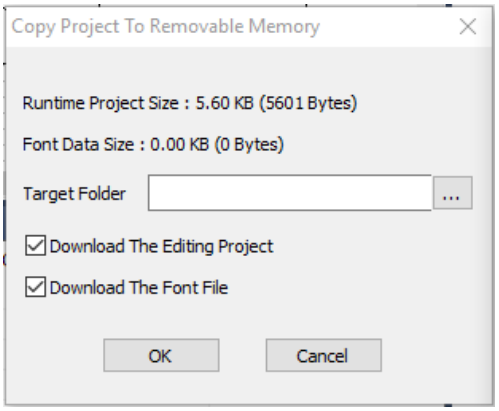
11) Select the method to connect in [Online] - [Download to Xpanel (PC → Xpanel)].



12) Select [Yes] if you don't have runtime project that is a way to convert the project. Select [No] if you have runtime project, and transmit it to Hybrid Xpanel.



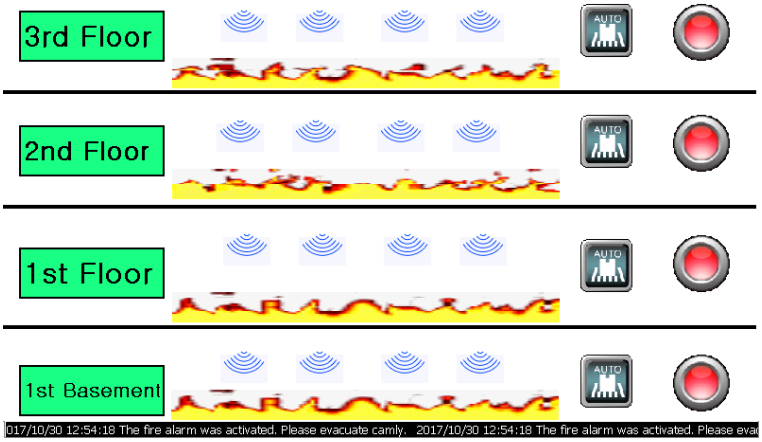
13) Select [Download editable project] if you want to download editable project together. If you want to download font file together, select [Download font file].



- Xpanel Runtime

1) When the transmitter is detected, both scroll message and fire alarms appear.

2) When the fire is detected, both scroll message and fire alarm appear and sprinklers start operating.



7 Maintenance Work and Repair

To maintain Hybrid Xpanel in best condition at all times, daily and routine checkups are essential. The environment might cause problems on terminals. These problems shorten the durability of I/O module. Therefore, it is recommended to checkup regularly to maintain its ideal performance. The following describes what is to be done in a maintenance work.

7.1 Maintenance Work

✓ Daily checkup

There are two items that should be checked daily.

(1) LED status of module

LED of module	Item to check
Power	Always lighting (Problems on besides states)
Input / Output module	Lighting when output On, lights out when output Off (Problems on besides states)

(2) Connection status of cable

Check if the cables are tightly attached to the connector of the product.

✓ Maintenance

There are items that should be checked once or twice every six months or a year. Also, it is required to do a maintenance work if there is a relocation of devices or shifts in wiring.

(1) General standard items

Item	Item to check
Operating temperature	-10 ~ 55℃ (14 ~ 131℉)
Operating humidity	10 ~ 95%
Ambient conditions	Avoid corrosive gases and dusts

(2) Power supply voltage checkup

Check if the standard has conformity by measuring AC and DC input voltage (AC 88 - 264V, DC 19.2 - 28.8V).

(3) Installation status of product

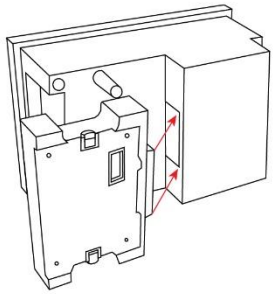
Check if the product is solidly mounted on the panel and if is debris-free.

7.2 Repair

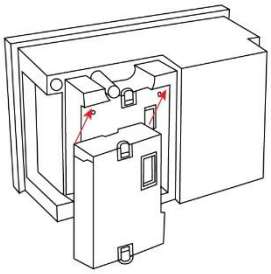
✓ Replacing a module

If a module requires replacement due to damage or failure, the following procedure should be followed.

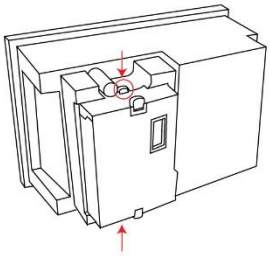
1) Turn the product power supply off.
2) Isolate the cable in connector from the product.
3) Remove the module fixed in panel and isolate from the product.
4) Mount the module again described procedure as figure below when you changed the module.



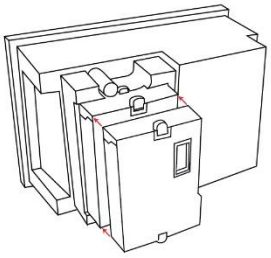
1. Mount a option module which suits to the size at the back of the main unit.



2. Attatch a PLC-S module tightly on the side of the option module.



3. To fix the PLC-S module and the option module, press extended locks of the option module until the click sound.



4. You can add on PLC-S expansion modules upon the option module up to 2.

[Figure 12] Expanding order in case of module replacement

7.3 Trouble Shooting

This section describes errors that may happen during run-time and actions to be taken.

✓ Check operating environments

See the following items before making a decision of PLC problems.

(1) Check if the power is supplied properly. The input voltage of PLC must be maintained in permissible range.

(2) Check if each module is mounted or wired properly.

(3) Please be advised that as the size of the scan program increases, response time will decrease accordingly.

✓ Cautions for operating product

(1) Operate the product in the environment which meets the general specification.

(2) Be sure not to let any foreign substances such as metallic dust or wiring debris inside the product. Such debris may cause damage in product.

(3) Do not touch the connector or remove the module when the power is supplied.

(4) Do not separate or disassemble the module.

(5) If F34 battery discharge error is ON, battery should be replaced.

(6) Do not replace the battery yourself. The product only uses CR2302 lithium battery 200mAh, and may explode if replaced incorrectly. When replacement is required, please contact CIMON service center.

(7) Even though there is no battery discharge, if life cycle is exceeded then replacement of product is recommended.

✓ Cautions for wiring

(1) Use additional cable to protect the external input signal from surge or noise, which caused by alternating current.

(2) Cables must be chosen by considering surrounding temperature and permissible current. The recommended size of cable is AWG16 ~ 28.

(3) Be sure not too close for high temperature device or not to be in constant exposure in oil. There is a danger to cause damage or malfunction by short circuit.

(4) Do not wire with a high-voltage line or a power vessel. There is a danger to cause malfunction or broken by induced lesion.

✓ Check for device failure

(1) Booting Problem

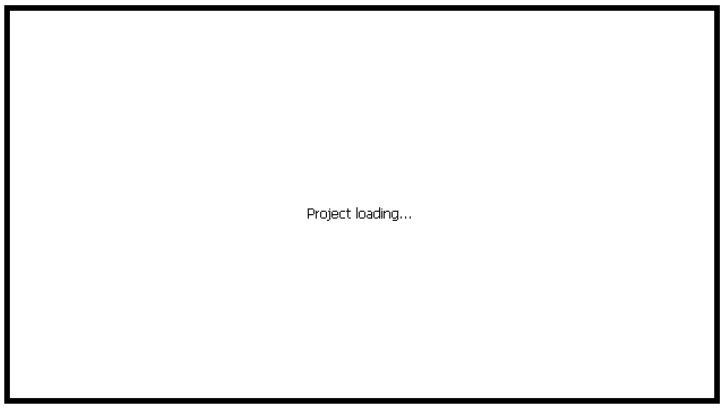
There are cases that Hybrid Xpanel cannot boot normally after power is on. Verify the power capacity or damage of external power supply. Check the contact status of power cable. If there is no problem with the power supply, please refer to the following errors to troubleshoot.

1) Freezes in Windows CE loading screen.

- The Windows OS file could have damaged.

Restart the product. If the same problem occurs, please contact ventor or CIMON service center (1899-1891).

2) The empty screen appears and stop when start Hybrid Xpanel.

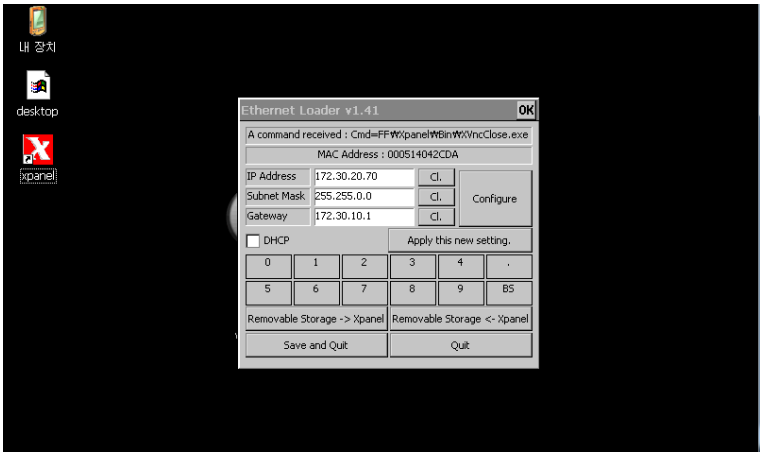


- A project file could be damaged or lost.

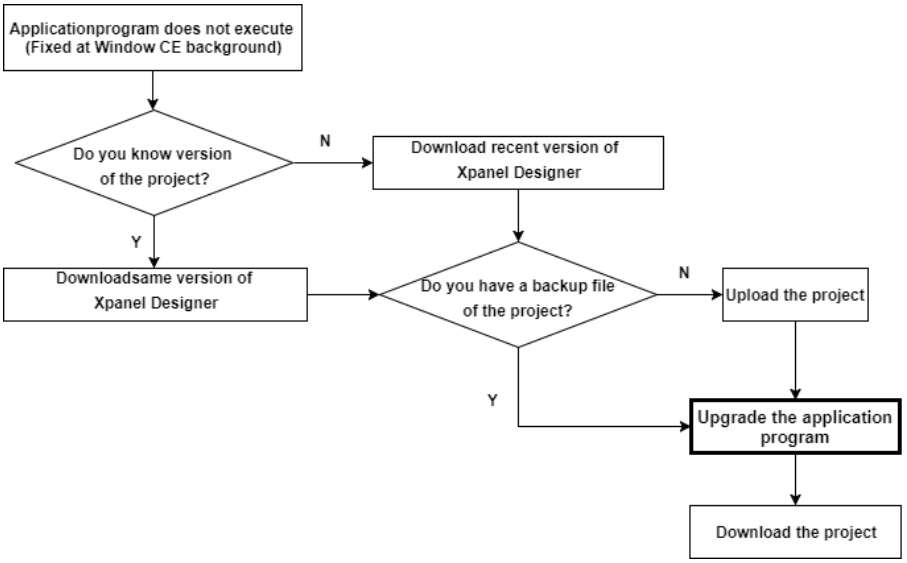
Download the same project from Xpanel Designer to Hybrid Xpanel.

(*)Please refer to the 4.3 to get information about way to project download.

3) It does not convert from Windows CE main screen to project screen automatically.



- Xpanel Designer's application program could be damaged or lost.



I. If you know the version of application program or project, download the same version of Xpanel Deisner in the CIMON website (http://www.cimon.com/eng/). Upgrade application program as below.

⚠ When there is no exist of project backup file, upgrade the application program after upload the project.

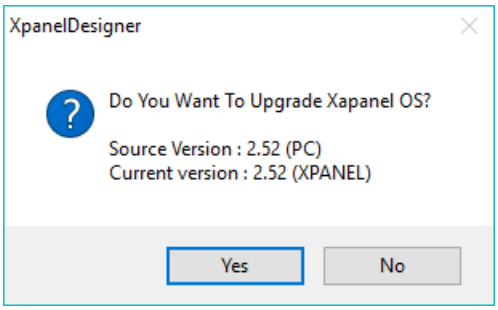
Ⅱ. If you don't know the version of application program or project, upload the project and install recent version of Xpanel Designer in the CIMON website (http://www.cimon.com/eng/). Upgrade application program as below.

(*)Please refer to the 4.4 to get information about uploading project from Xpanel Designer.

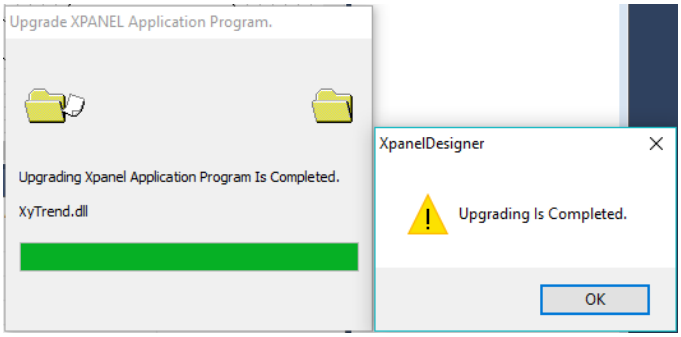
⚠ If there is difference between version of application program in Hybrid Xpanel and project, the project operates abnormally. Please upgrade the application program to make two versions identically.

a) Go to [Online] - [Upgrade Xpanel Application Program] and specify the way to connection.

b) Confirm the version to upgrade.



c) A dialog box appears when application program upgrade is completed.

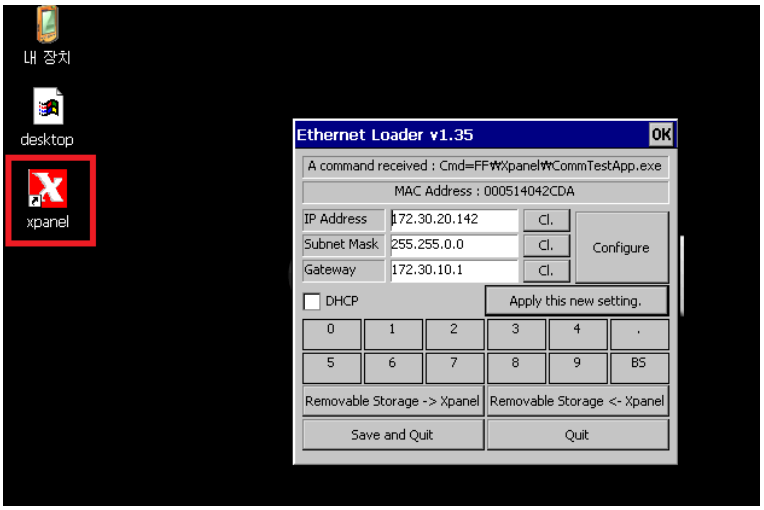


d) Download project uploaded in Xpanel Designer or project backup file on the Hybrid Xpanel.

(*)Please refer to the 4.4 to get information about uploading project from Xpanel Designer.

(*)Refer to the 4.3 to get information about downloading project on Hybrid Xpanel.

e) Check if the project screen appears normally for double-clicking [Xpanel] icon.



4) PLC is not operating.

- **Major failure could be occurred during PLC's operation.**

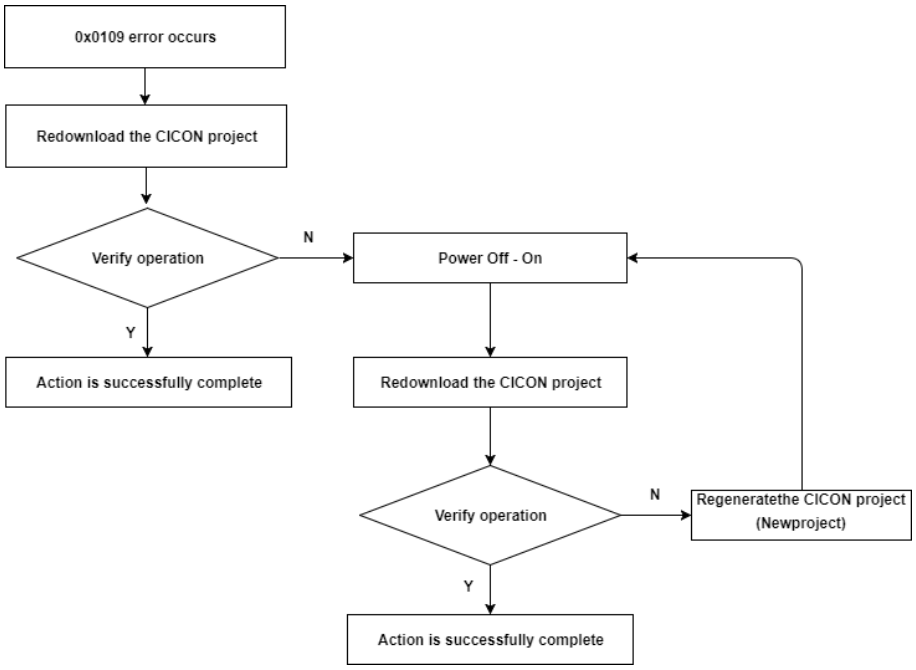
Confirm the error code in [online] - [PLC status] and eliminate the factor. Convert PLC operation status to Run.

(*)Please refer to the [Help] in CICON to get information about all kinds of error codes and countermeasures.

Followings are the error codes that could typically occur in PLC major failure. Take appropriate measures after checking abnormality of product.

I. 0x0109 Error (Error for PBT Check Sum)

This error may occur when a CICON project got damaged while downloading in PLC CPU. You can solve this error by following procedure.



a) Download a project and check the operation of PLC.

b) Convert the power of PLC Off to On and repeat a).

c) Write the project again and repeat a).

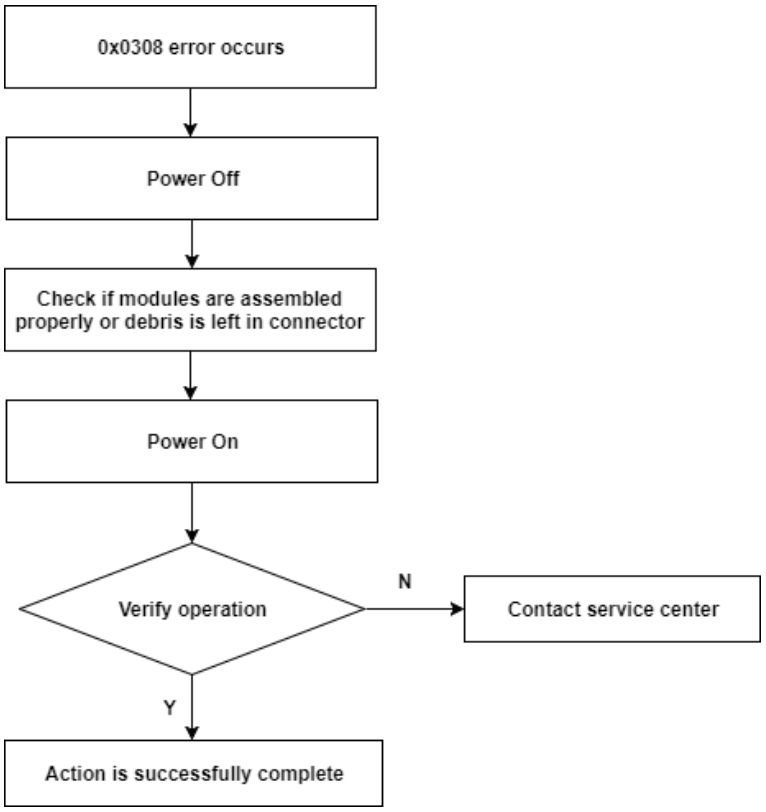
Contact CIMON service center if the solution was not completed successfully.

II. 0x0308 Error (Error for disability of communication with extended module)

This error may occur when PLC CPU failed to communicate with extended modules. If the failure occurs during operation, turn the PLC power off.

Examine the operating environment. There is a possibility of incomplete combine between product and extended module or affection of external noise.

Consider of dust into connector of extended module or damage of hardware. Check the device F0070 and replace the module or contact CIMON service center.



a) Turn the PLC CPU power off.

b) Check the assembly of modules and debris into connector or not.

c) Turn the PLC CPU power on.

d) Download a project and check the operation of PLC.

Contact CIMON service center if the solution was not completed successfully.

- **PLC Firmware upgrade could be incorrectly.**

If the power of PLC CPU was shut down during firmware upgrade through CICON, there could be damage to firmware. This can lead to failure of upgrade process. Contact CIMON service center for solution.

(2) Touch Problem

Before check about touch problem, see if protective film is removed. Protective film is only for temporary protection for product. Also, covered film is not same as protective film used in other devices such as smartphones. So it must be removed before operating the product. If there is no problem on the item, please refer to the following errors to troubleshoot.

1) There is inappropriate point responded.

The calibration might be not set appropriately. Recommendations of ways to calibrate are described below.

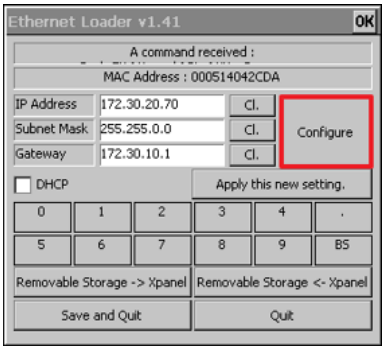
I. When the problem occurred in emergency situation, you can connect a mouse on USB host of Hybrid Xpanel and do touch calibration easily.

II. Setting for long-touch a screen of Hybrid Xpanel

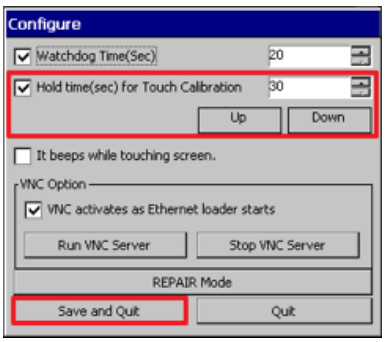
The way can be only used when preset below is applied.

Preset

a) Select [Configure] in the Ethernet loader dialog box.

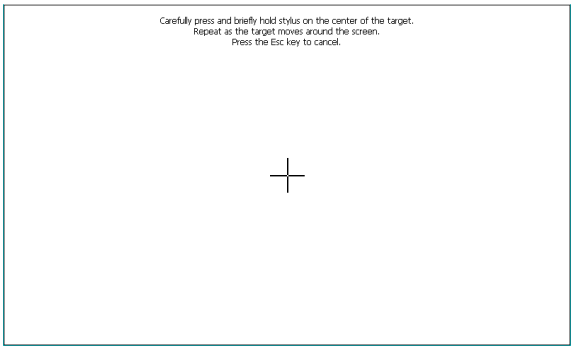


b) Check the box [Hold time for Touch Calibration] and set touch time in range of 30 seconds to 32767 seconds. Select [Save and Quit].



a) When the location is not recognized, give a long-touch to Hybrid Xpanel screen during preset time (default value is 30 seconds).

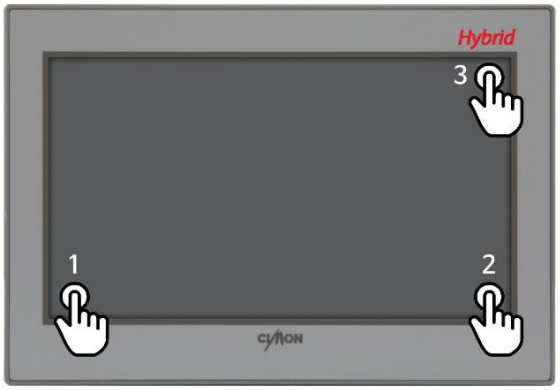
b) Click the center of cross mark according to introduction.



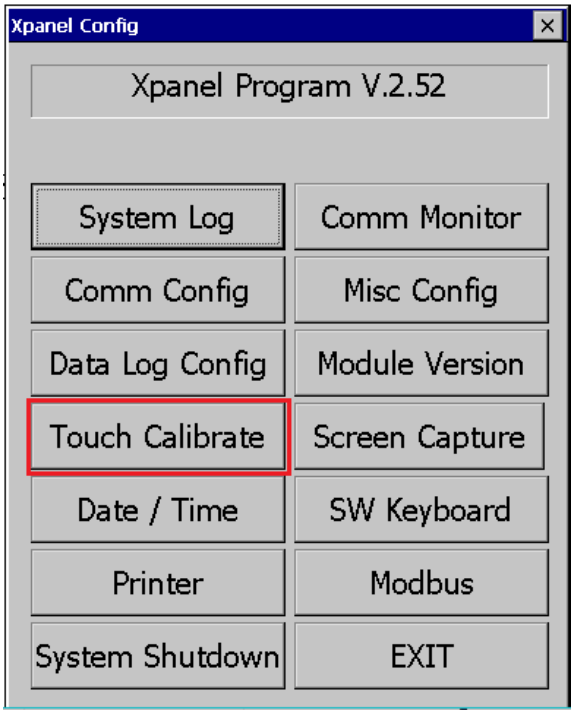
c) Confirm the touch statement after complete the calibration.

III. Setting in the Xpanel config dialog box

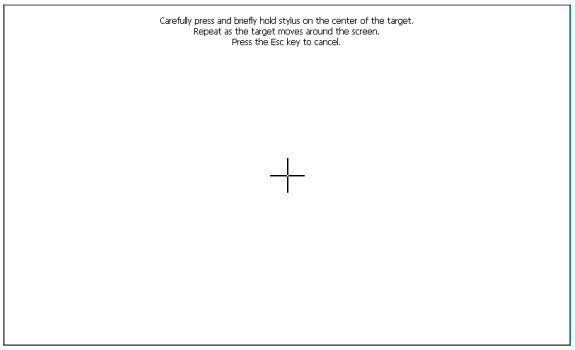
a) You can use a mouse linked by USB connecting on USB host port of Hybrid Xpanel. Click as numbered sequence and Xpanel Config dialog box appears.



b) Select [Touch Calibration].



c) Click the center of cross mark according to introduction.



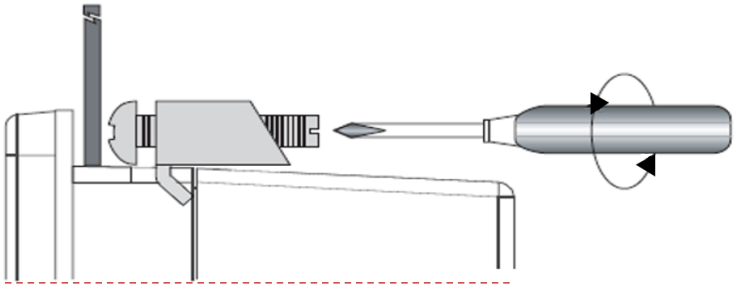
d) Confirm the touch statement after complete the calibration.

2) There is no response after screen is touched.

When the same situation occurs even if you restarted Hybrid Xpanel, contact venter or CIMON service center for product inspection.

3) Screen operates even if not touched.

The problem might occur when torque is excessively tightened.
(*)Loosen the torque refer to 2.3 and a figure below.



Hybrid Xpanel

When the same situation occurs even if you restarted Hybrid Xpanel, contact venter or CIMON service center for product inspection.

(3) Communication problem

Hybrid Xpanel is operated connecting with various external devices, hence it can be easily affected by external noise. Especially, when you use together with other companies' product, there can be a common problem because the communication specification is not coincided.

Following is the description and solution of basic communication problem. Contact CIMON service center or other companies' service center of product to know information of troubleshooting.

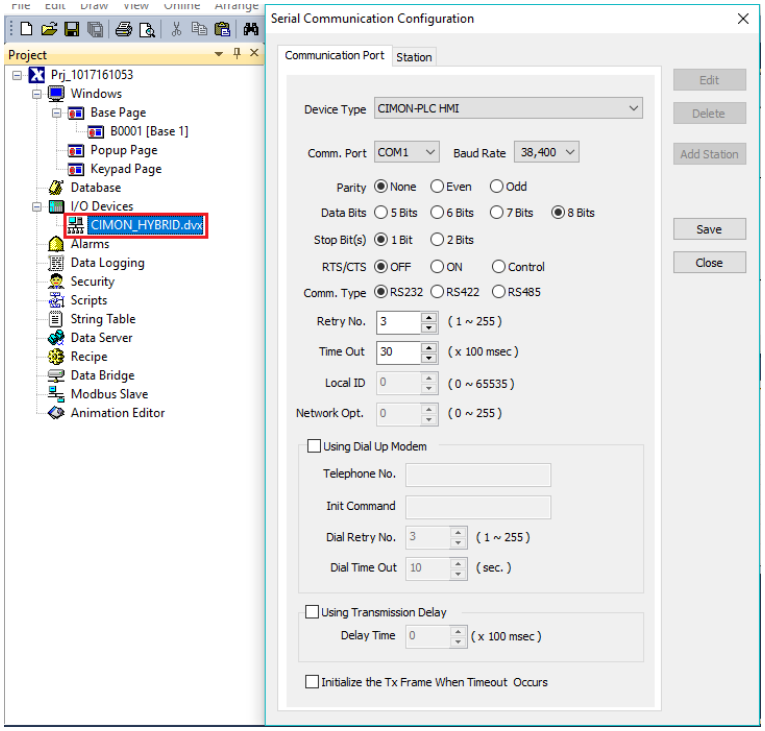
1) Serial communication is not available.

- **Cable could be damaged or outside of the standard.**

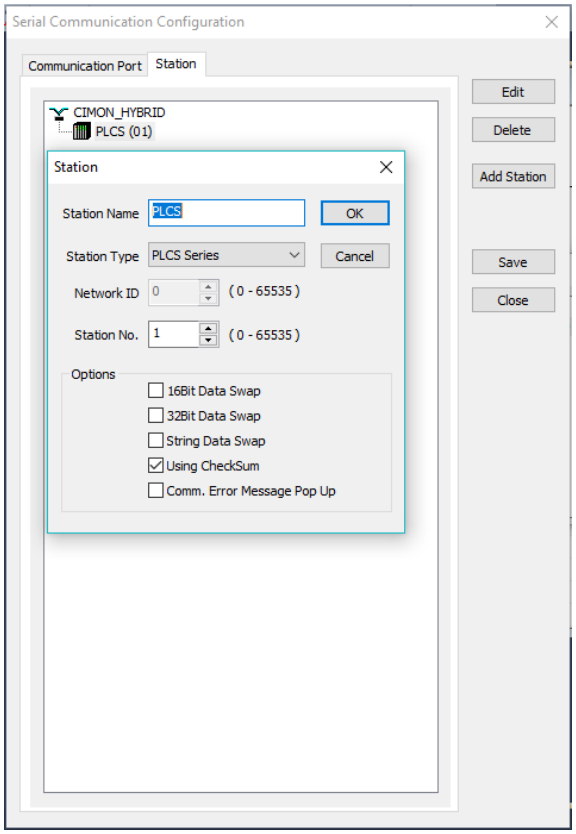
Check the connection status of cable or exchange the cable.

- **Settings for communication could be wrong.**

Run the Xpanel Designer and go to [Tools] - [I/O Device] or double-click device information. Confirm communication setting if same as external PLC.



Make sure to configure the station number of CICON and Xpanel Designer identically each other.



⚠ In the case when the communication setting is different between Hybrid Xpanel and inner PLC, communication is not possible. Check if communication settings of external PLC and configure are in identical.

2) Ethernet communication is not available.

- The Ethernet IP address could be configured incorrectly. Please refer to the communication setting.
- The Ethernet cable could be damaged or inappropriate cable is used. Replace the cable.
- The Ethernet port on Hybrid Xpanel, PC or connected device could be damaged. Please verify the condition of port.
- The firewall of the device what you want to communicate could a cause of communication problem. Confirm the firewall setting after consultation with field network security manager.

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Version History

Released Date	Version	Description
14/12/2017	V1.0	First Edition

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Date 14/12/2017 Doc. No. XP02M-001

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