11 PLC Protocol

last modified by Joey

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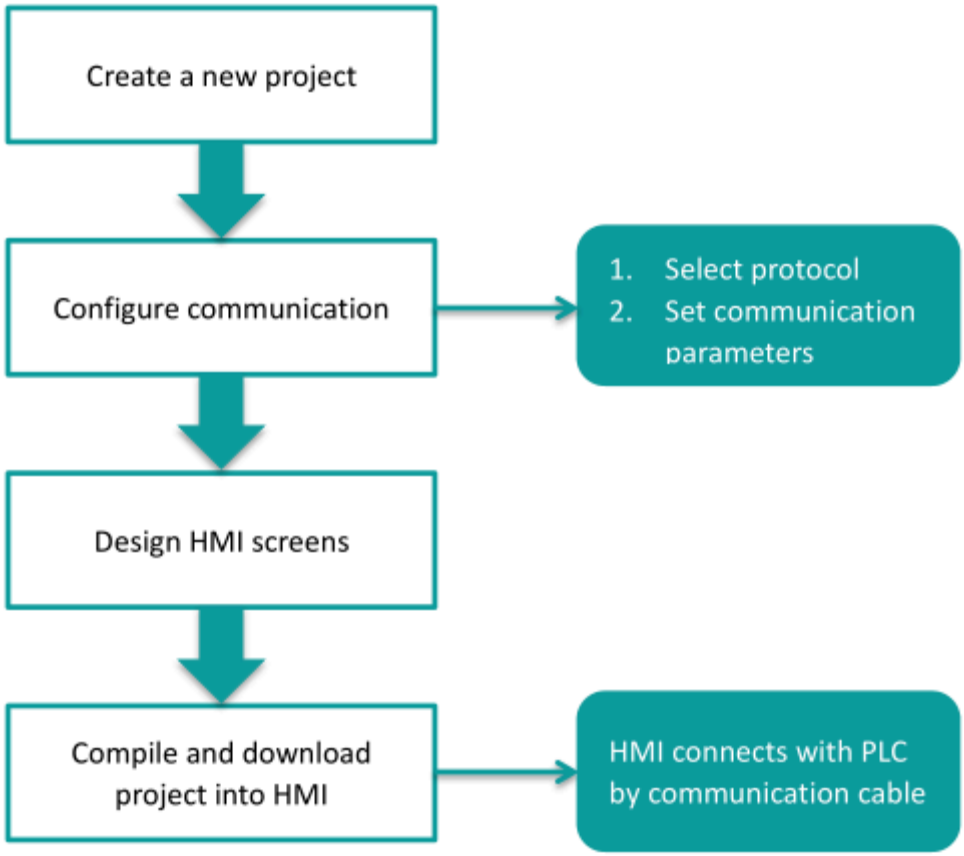
Introduction

This chapter contains information on configuring the communication between device and HMI.

General Procedure

During configuring communication in PIStudio. The following components and conditions is indeed at least.

- One PI HMI
- One connected controller (for example PLC)
- One Cable Wiring



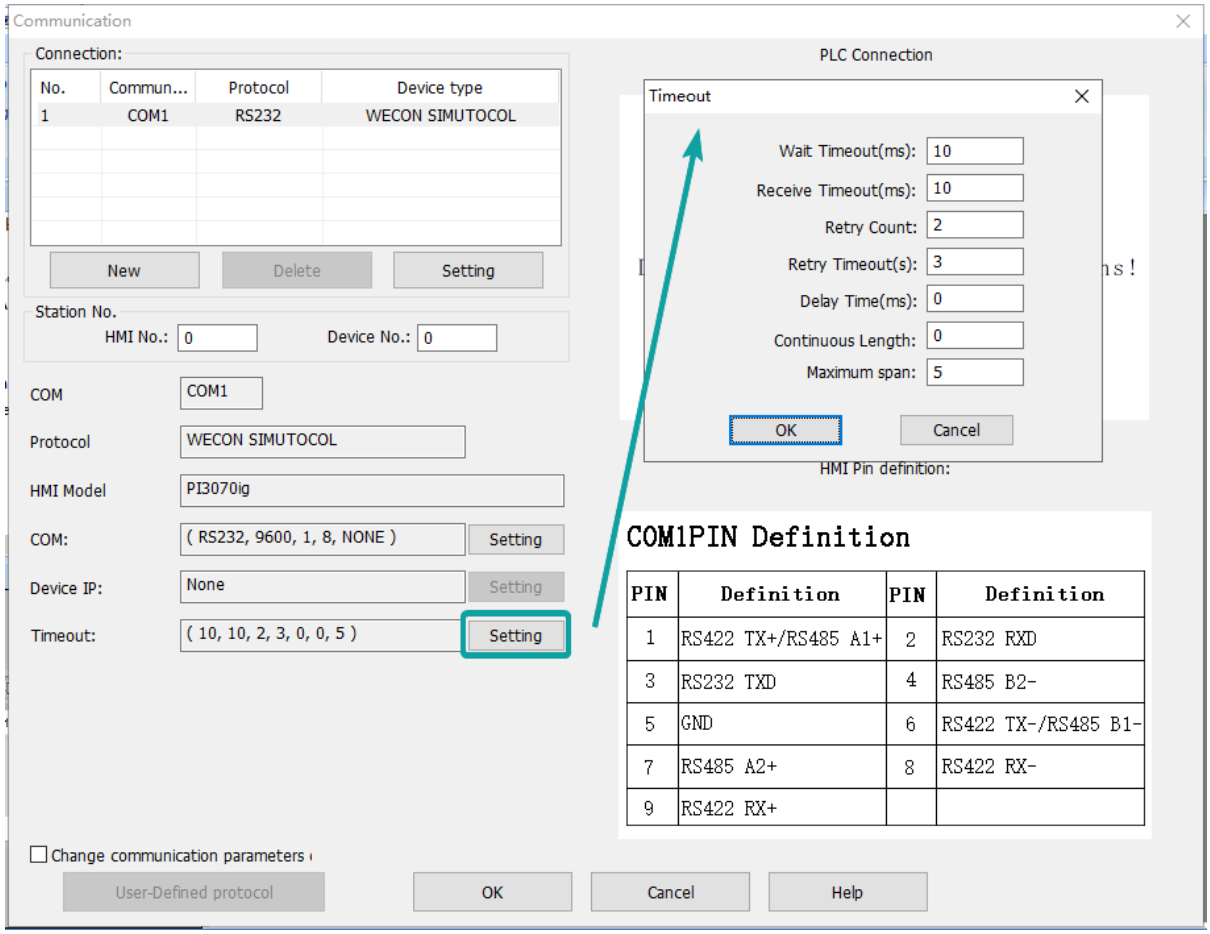
User need to select controller protocol and set communication parameters in HMI project. Please note to set same communication parameter between controller and HMI project. After finishing project, user could download HMI project into HMI and connect HMI with controller by Cable Wiring. Thena simple automation system would be established.

Protocol Selection & Communication Parameters

For example, controller is WECON LX3V series PLC and HMI is PI8070. Please set communication protocol, and set communication parameters in the [Communication].

Timeout

The follwoing are description for the timeout settings from [Communication].



Wait Timeout(ms): The time HMI waits for a response from the PLC.

Receive Timeout(ms): The longest waiting interval between the HMI receiving two characters.

Retry Count: The number of retries when there is no response in the communication between HMI and PLC.

Retry Timeout(s): The PLC will not be accessed during the Retry Timeout period when there is no response in the communication between HMI and PLC.

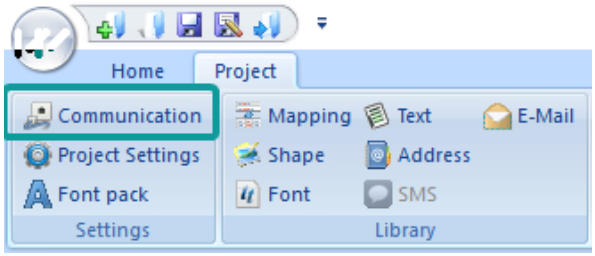
Delay Time(ms): The speed at which the HMI communicates with the device.

Continuous Length: Default value 0 means the maximum length specified by each protocol. Addresses dealt by Maximum Span settings, its read length for single time, if the Continouous Length is 1, which means it will read/write the every register one by one. If the length of Maximum Span is greater than or equal to the Continuous Length, the continuous read/write will be performed in groups according to Continuous Length.

Maximum Span: Set the interval for reading PLC addresses. If there exists two same register type addresses, their interval is less than the set value of Maximum Span, then they will be integrated into a continuous address, otherwise it will be divide into two independent addresses.

Operating Procedure

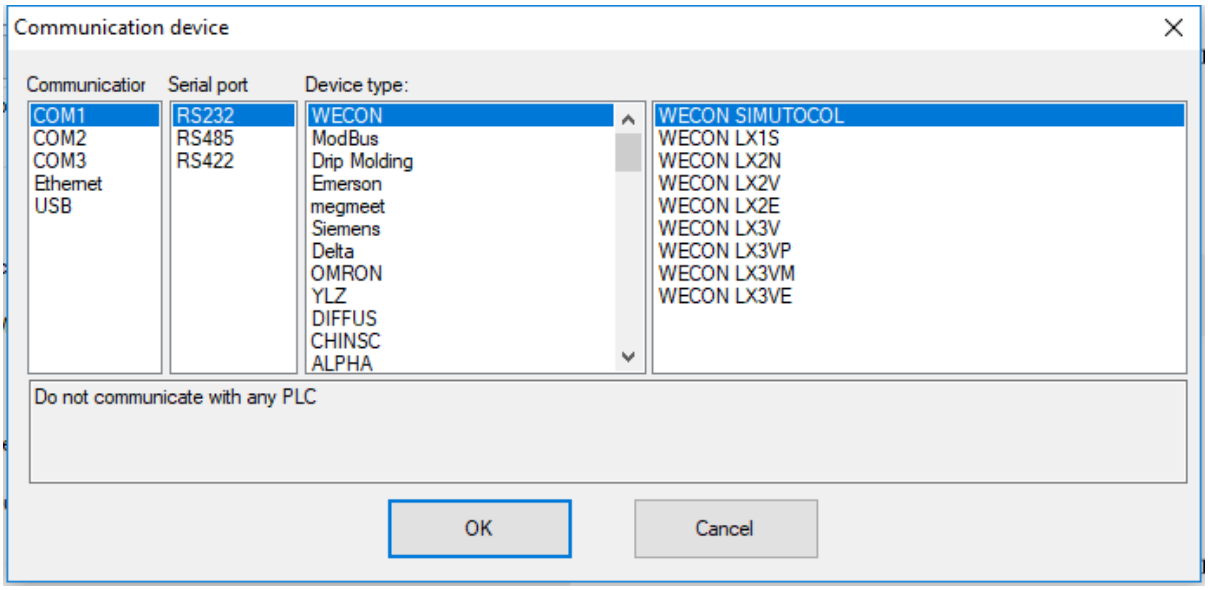
1) After creating the [Quick_Start] project,select the [Project]->[Communication].



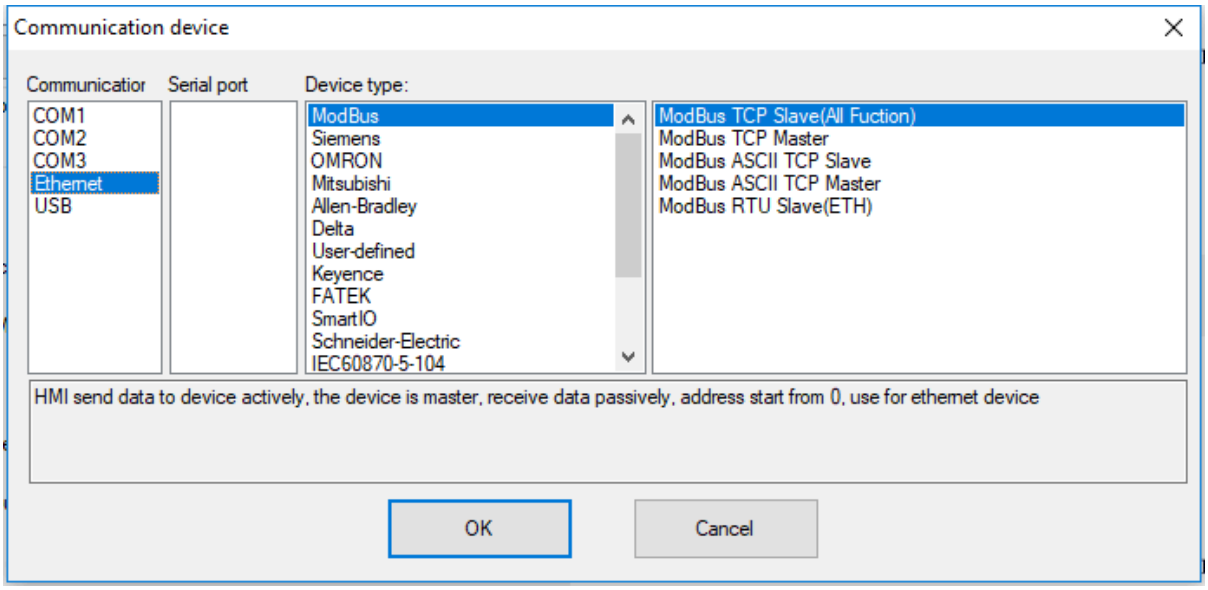
2) Click “Setting” to open protocol setting windows.

3) Select communication protocol, users could select serial port, Ethernet port, CAN port or USB.

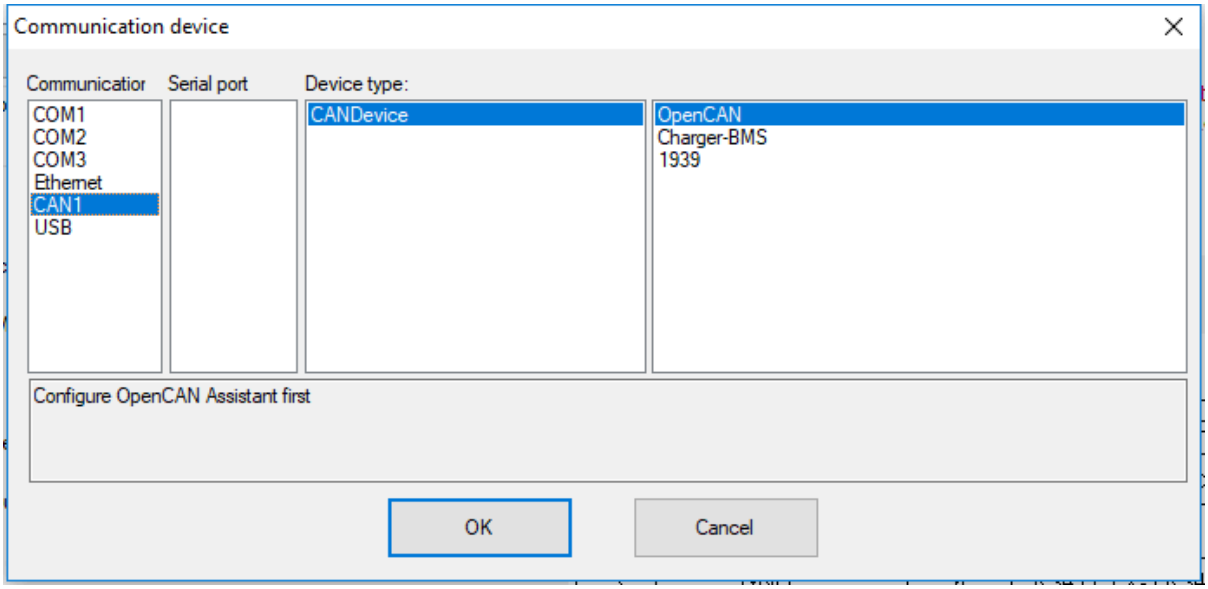
- Serial port:



- Ethernet port:



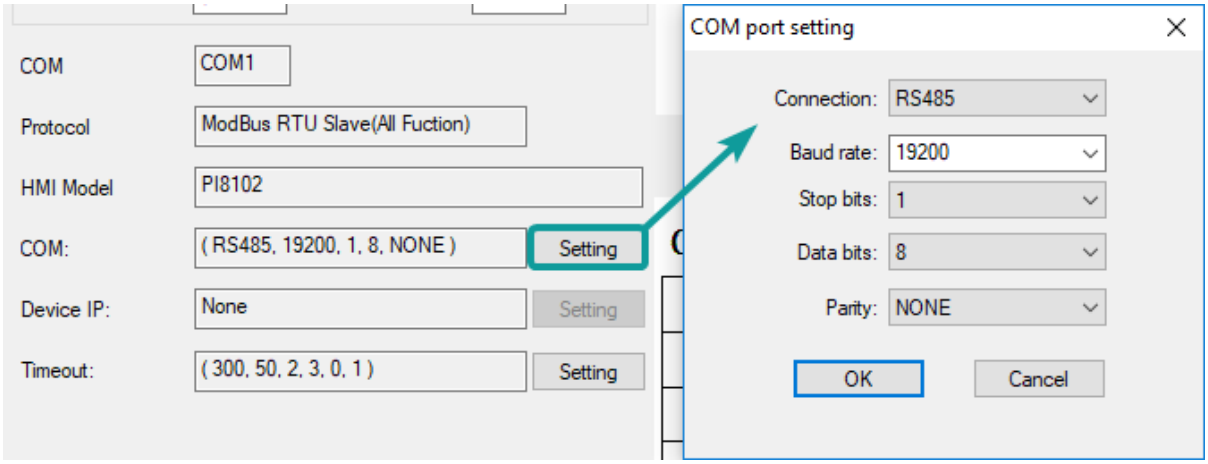
- CAN port (In COM1):



- USB port:

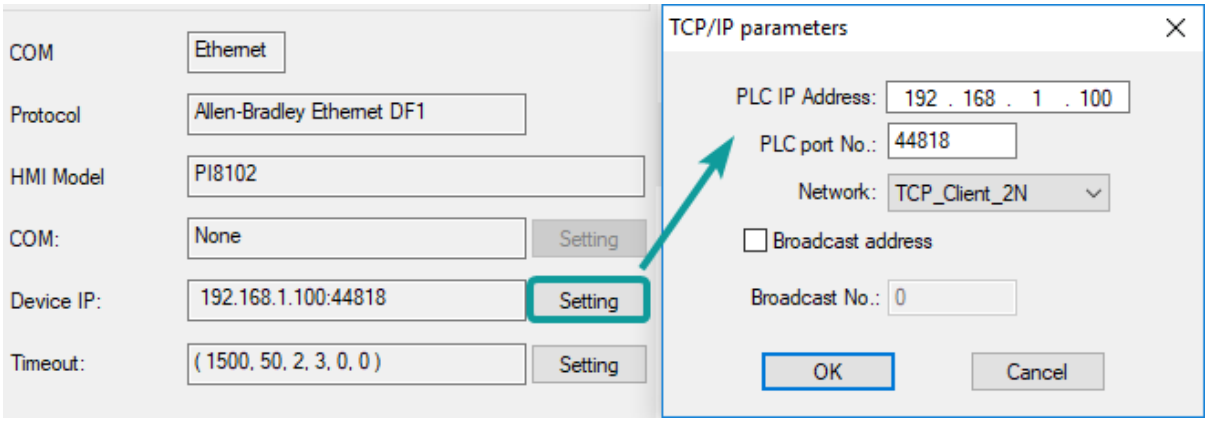
4) About parameters for communication, PLC default communication parameters have been written to PIStudio, the user can adjust them according to the actual situation.

- Serial port:



- Ethernet port

Please note, during using Ethernet port, please set HMI IP in [Project Setting], the detailed, please refer to [Project Setting] chapter.



5) Click [OK] button to save settings and close the dialog;

Allen-Bradley

FreeTag Ethernet/IP (CompactLogix)

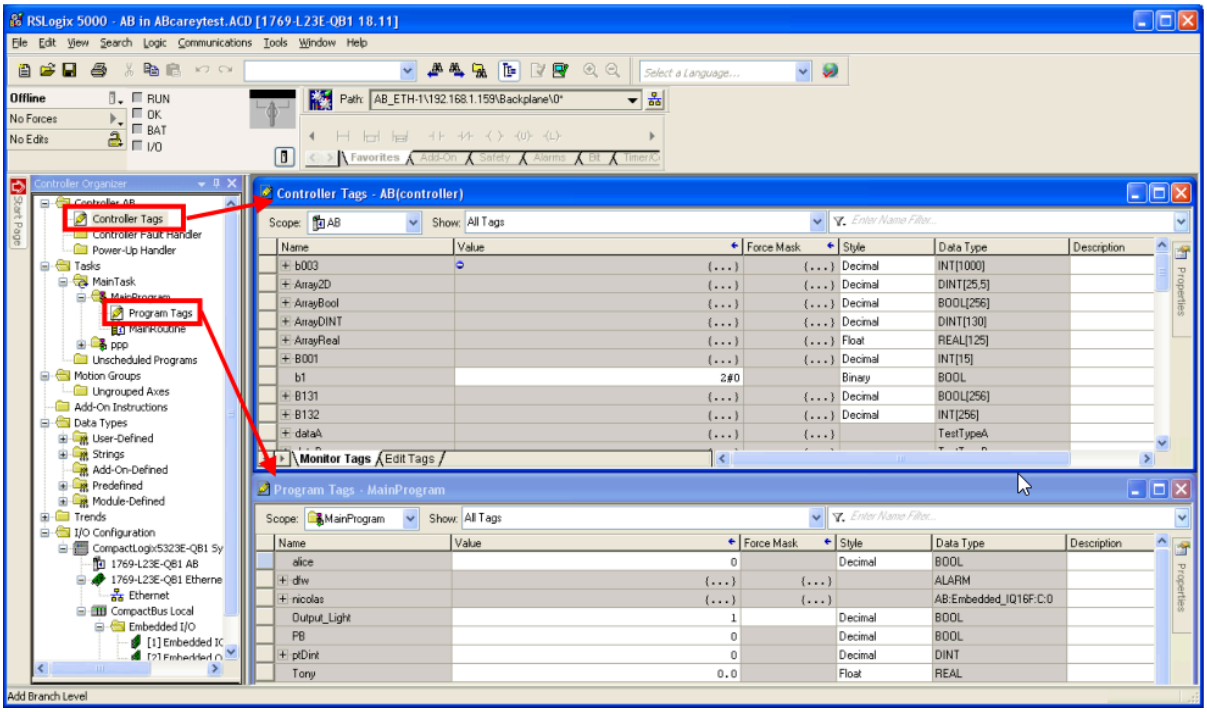
Allen-Brandly CompactLogix

HMI Settings

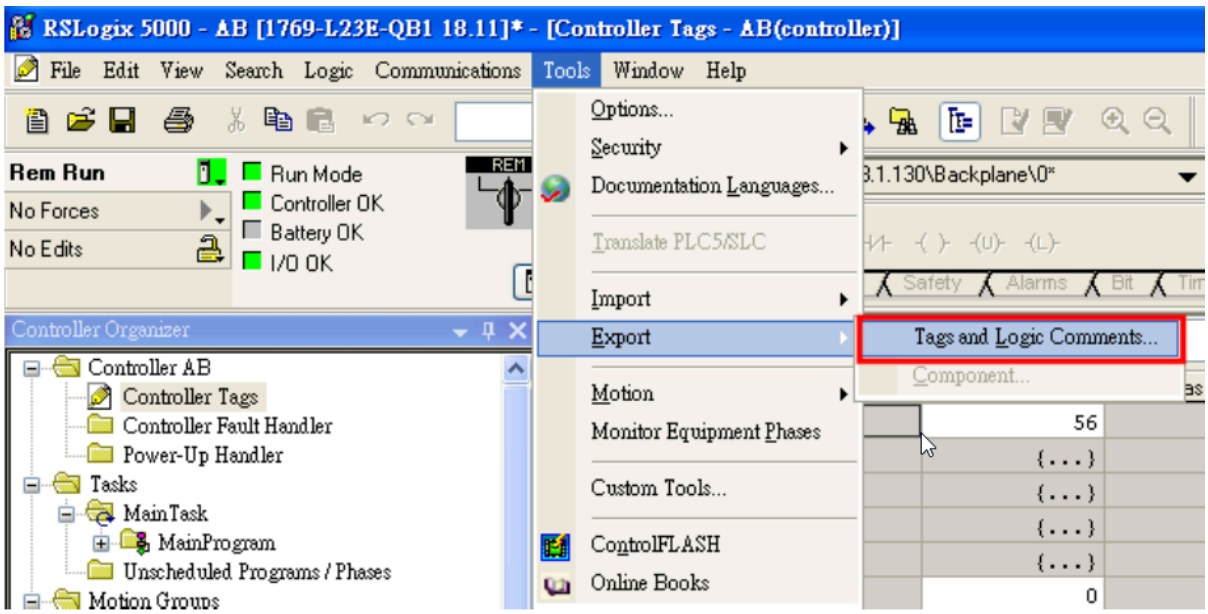
Items	Settings	Note
Protocol	Allen-Brandley FreeTag Ethernet/IP (CompactLogix)	
Connection	Ethernet	
Port No.	44818	

PLC Setting

1) Create new tags

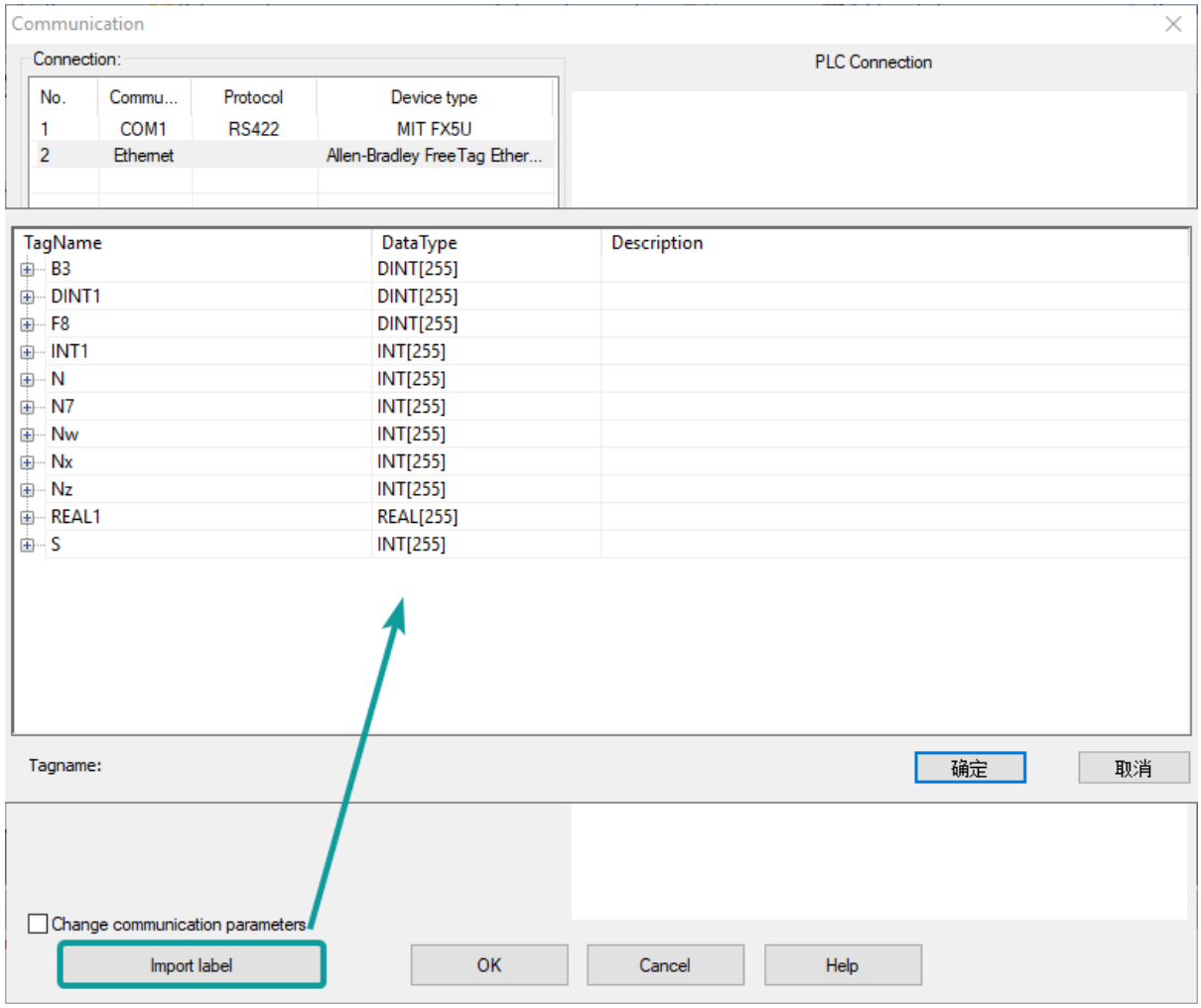


2) Export tags to CSV file. ([Tools] » [Export] » [Tags and Logic Comments])



3) Import labels, please open [Communication] window and click [Import label];

4) Select csv file, all tags will be displayed as belows;



#Note:

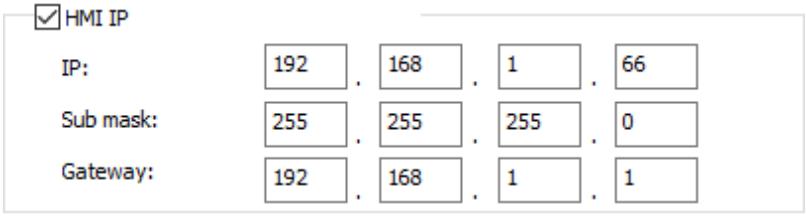
Because in different region, the separation symbol is different, we suggest you check this before you want to import your tags. To open csv file as text format.

A	B	C	D	E	F	G	H	I	J	K	L	M	N
TYPE	SCOPE	NAME	DESCRIPTI	DATATYPE	SPECIFIER	ATTRIBUTES							
TAG		Local:1:C		AB:Embedded_Discre		(ExternalAccess := Read/Write)							
TAG		Local:1:I		AB:Embedded_Discre		(ExternalAccess := Read/Write)							
TAG		Local:1:O		AB:Embedded_Discre		(ExternalAccess := Read/Write)							
TAG		B3		DINT[255]		(RADIX := Decimal, Constant := false, ExternalAccess := Read/Write)							
TAG		DINT1		DINT[255]		(RADIX := Decimal, Constant := false, ExternalAccess := Read/Write)							
TAG		F8		DINT[255]		(RADIX := Decimal, Constant := false, ExternalAccess := Read/Write)							
TAG		INT1		INT[255]		(RADIX := Decimal, Constant := false, ExternalAccess := Read/Write)							
TAG		N		INT[255]		(RADIX := Decimal, Constant := false, ExternalAccess := Read/Write)							
TAG		N7		INT[255]		(RADIX := Decimal, Constant := false, ExternalAccess := Read/Write)							
TAG		Nw		INT[255]		(RADIX := Decimal, Constant := false, ExternalAccess := Read/Write)							
TAG		Nx		INT[255]		(RADIX := Decimal, Constant := false, ExternalAccess := Read/Write)							
TAG		Nz		INT[255]		(RADIX := Decimal, Constant := false, ExternalAccess := Read/Write)							
TAG		REAL1		REAL[255]		(RADIX := Float, Constant := false, ExternalAccess := Read/Write)							
TAG		S		INT[255]		(RADIX := Decimal, Constant := false, ExternalAccess := Read/Write)							

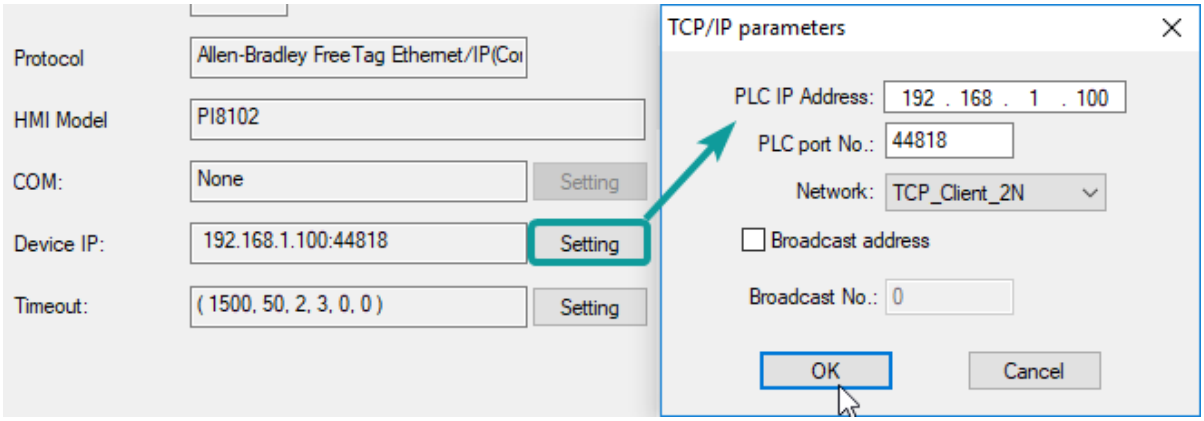
The directory of changing system settings: [Control Panel] -> [Date, Time, Language,and Regional Options] -> [Change the format of numbers, dates, and times]->[Customize]-> [List separator]. Please select [,] and export CSV file after setting.

Communication settings in HMI

1) Enable HMI Ethernet in [Project Settings];



2) Set PLC IP in [Device IP] settings;



Cable Wiring

MicroLogix

MicroLogix 1000/1100/1200/1400/1500; SLC 5/03 5/04 5/05 PLC-5

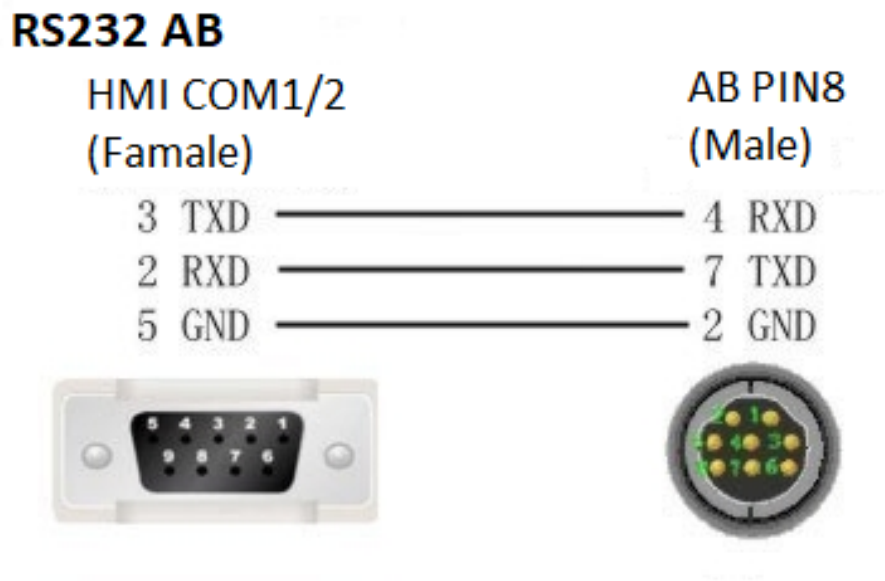
HMI Settings

Item	Settings	Note
Protocol	Allen-Bradlley MicroLogix	
Connection	RS232	
Baud rate	19200	
Data bit	8	
Parity	None	
Stop bit	1	
PLC station No.	1	

Address List

Type	Device registers	Format	Range	Note
Bit	I	I d.d	0.0~255.15	
	O	O d.d	0.0~255.15	
	B	B nnhh.dd	0.0~ffff.15	nn: block number (hex)
	S	S d.d	0.0~255.15	
	N	N nnhh.dd	0.0~ffff.15	nn: block number (hex)
Word	S	S d	0~255	
	TS	TS nnhh	0~ffff	nn: block number (hex)
	TP	TP nnhh	0~ffff	
	CS	CS nnhh	0~ffff	
	CP	CP nnhh	0~ffff	
	N	N nnhh	0~ffff	
	C	C nnhh	0~ffff	
	T	T nnhh	0~ffff	
	R	R nnhh	0~ffff	

Cable Wiring



AB PLC address edit

The operational address is determined by the connection of Allen-Bradley PLC to HMI. For extension modules or other special conditions, refer to allen-Bradley PLC instruction manual. The following is an example of allen-bradley MicroLogix1200.

Bit address I: The address ranges from 0.0 to 255.15. The value of the data before the decimal point ranges from 0 to 255 (decimal). The value from 0 to 15 after the decimal point is the sub address (decimal).

Bit address B: The address ranges from 000.0 to fff.15. The first f from left to right represents the block number (hexadecimal); The second and third f from left to right represent the word address (hexadecimal). The value 0 to 15 after the decimal point reprensents the sub address (decimal).

Word address S: The word address ranges from 0 to 255 (decimal).

Word address TS: The address ranges from 000.0 to ffff. The first and second f from left to right represents the block number (hexadecimal); The third and fourth f from left to right represent the word address (hexadecimal).

#Note: Register address TP, CS, CP, N, F and TS address edit tare he same. D indicates decimal, and F indicates hexadecimal. Different PLC models may support different registers. See the following table.

PLC bit address type	**Address format**
I	dd.dd
O	dd.dd
B	fff.dd
S	dd.dd
N	ffff.dd
PLC word address type	**Address format**
S	ddd
TS	ffff
TP	ffff
CS	ffff
CP	ffff
N	ffff
F	ffff

Barcode Scanner

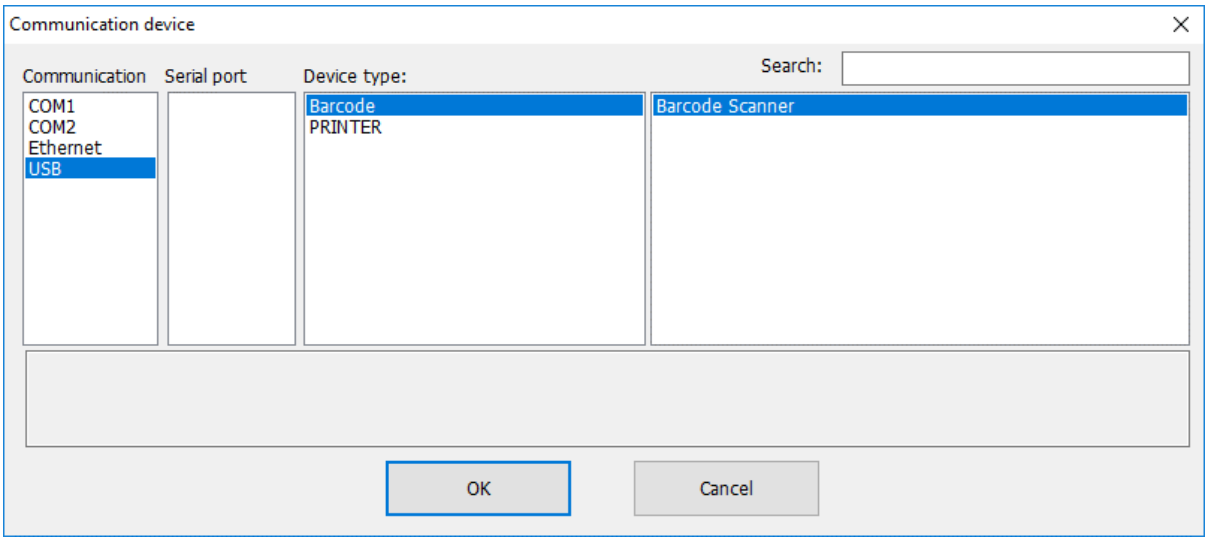
Supported: DELI 14880 barcode scanner

HMI Setting

Items	Settings	Note
Protocol	Barcode Scanner	
Connection	USB	

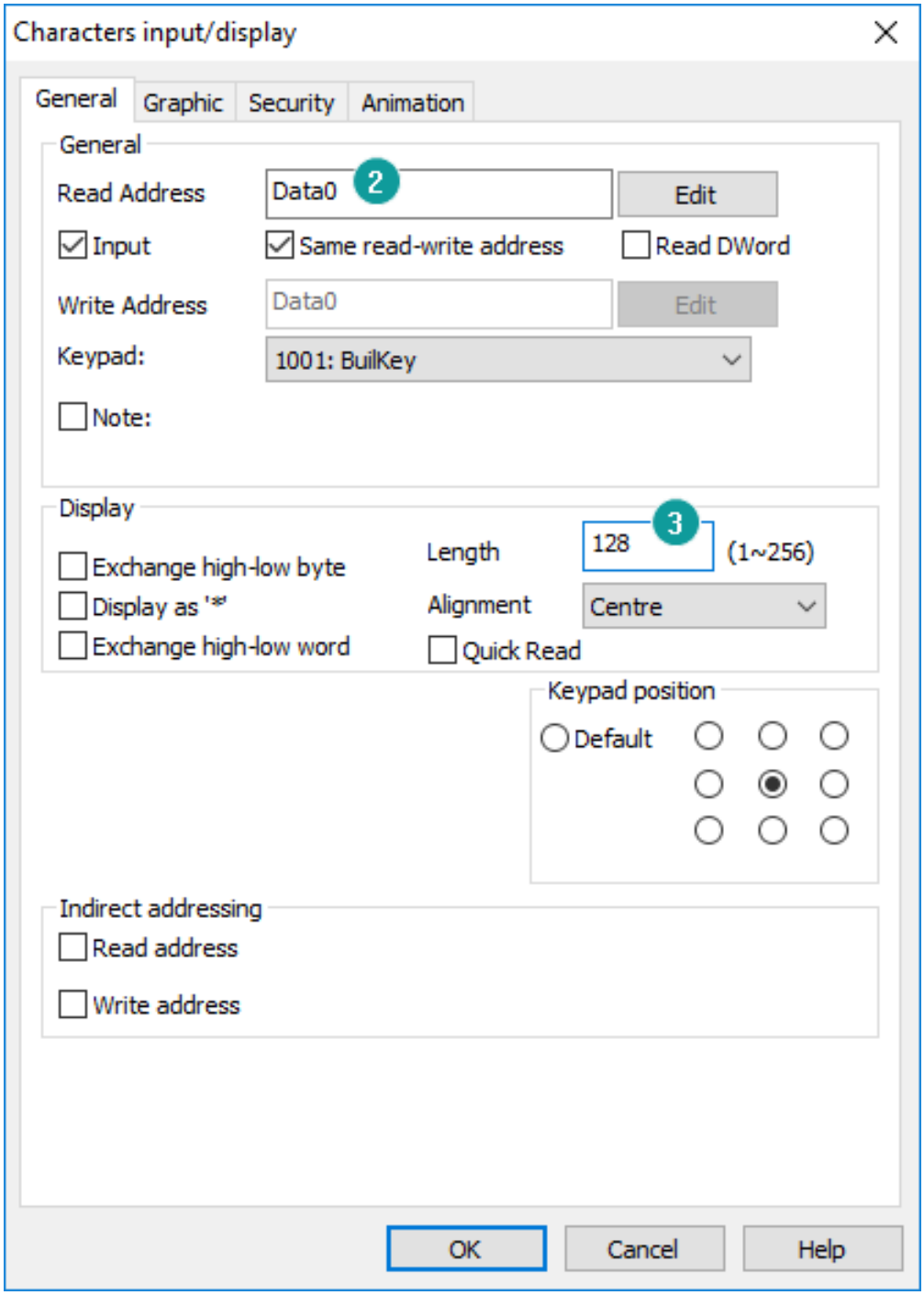
Operating Procedures

1) Select [Barcode Scanner];



2) Set address for receiving;

3) Set correct length;



#Note:

1) The protocol uploads the information acquired by the USB scanner to the HMI;

2) The acquired information is displayed in string mode, so it is necessary to use [characters input/display] object;

3) Recommended model: DELI 14880 barcode scanner;

Hitachi EHV Series (Ethernet)

Supported series: Hitachi EHV series

HMI Settings

Items	Settings	Note
Protocol	Hitachi EHV series	
Connection	Ethernet	
Port No.	3004~3007	

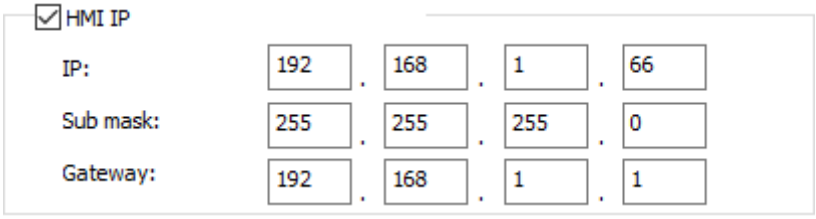
Address List

Type	Register	Range	Format	Note
Bit	T	0 - 2545	T DDDD	
	M	0 - 7FFF.f (Hex)	M HHHH.h	
	X	0 – FFFF.f (Hex)	X H1H2H3H4.h	H1H2H3H4 Module main number H1: Remote number H2: Unit number H3: Slot number H4: Word number of Module H Sub number of Module For example:X21.3 Slot number 2 Word number of module is 1 Bit number of module is 3 Remote number and unit number are 0
	Y	0 – FFFF.f (Hex)	Y H1H2H3H4.h	
	R	0 – FF.f (Hex)	R HH.h	
	L	0 - 73FF.f (Hex)	L HHHH.h	
Word	WM	0 - 7FFF (Hex)	WM HHHH	
	WX	0 – FFFF (Hex)	WX H1H2H3H4	H1H2H3H4 Module main number H1: Remote number H2: Unit number H3: Slot number H4: Word number of module For example:WX21 Word number of module is 1 Slot number is 2 Remote number and unit number are 0
	WY	0 – FFFF (Hex)	WY H1H2H3H4	

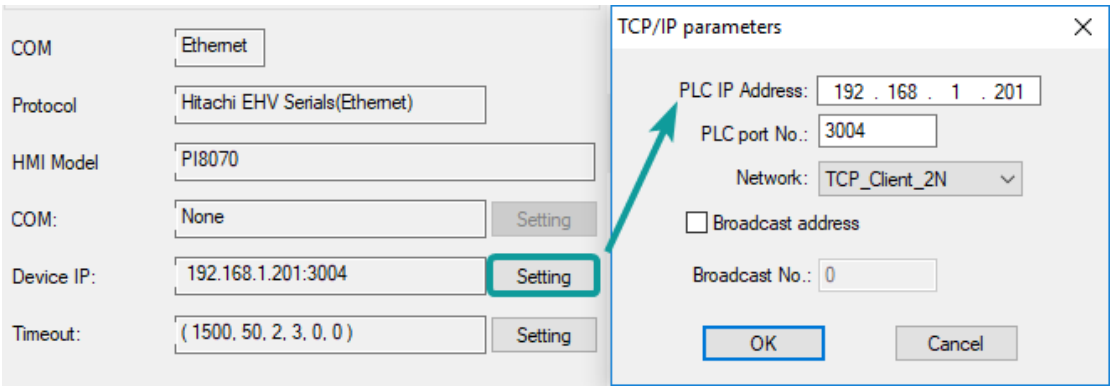
WR	0 – FFFF (Hex)	WR HHHH
WL	0 - 73FF (Hex)	WL HHHH
TC	0 - 2559	TC DDDD

Communication settings in HMI

1) Enable HMI Ethernet in [Project Settings];

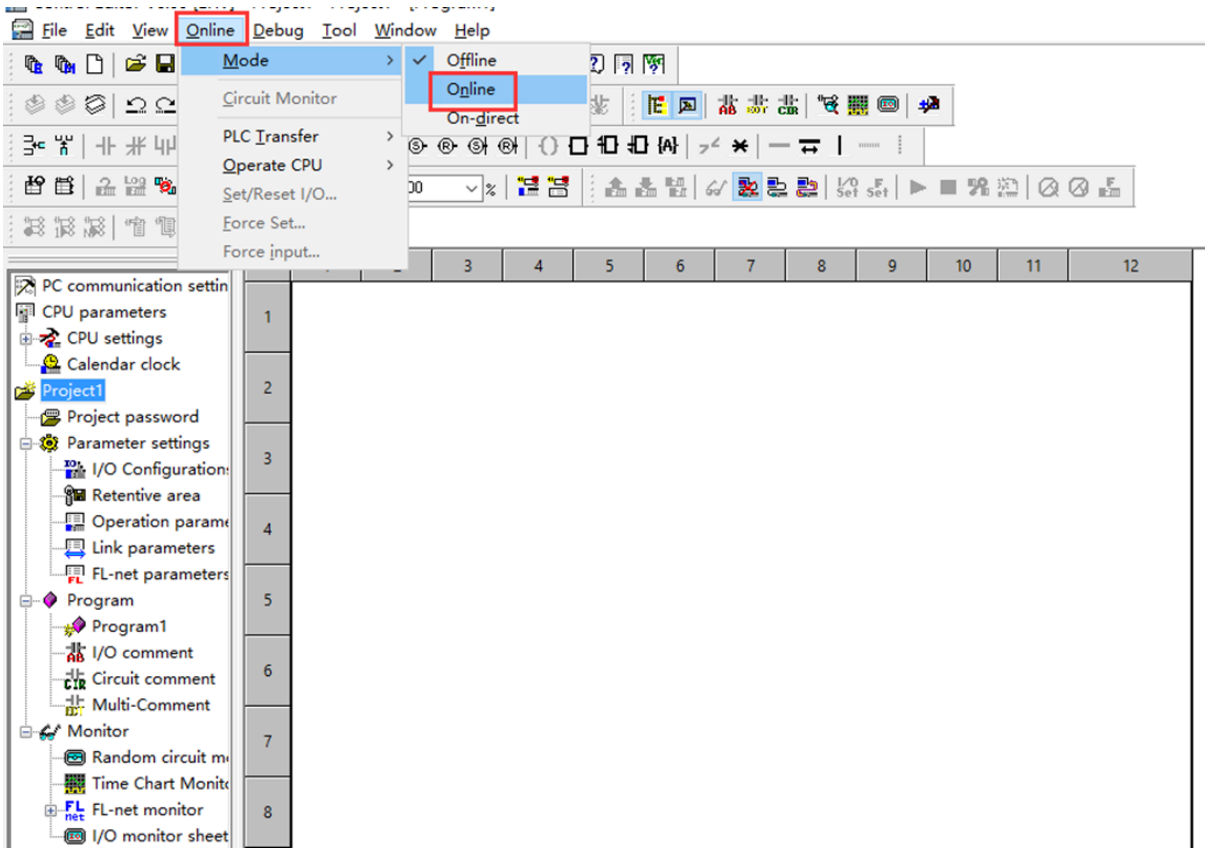


2) Set PLC IP in [Device IP] settings;

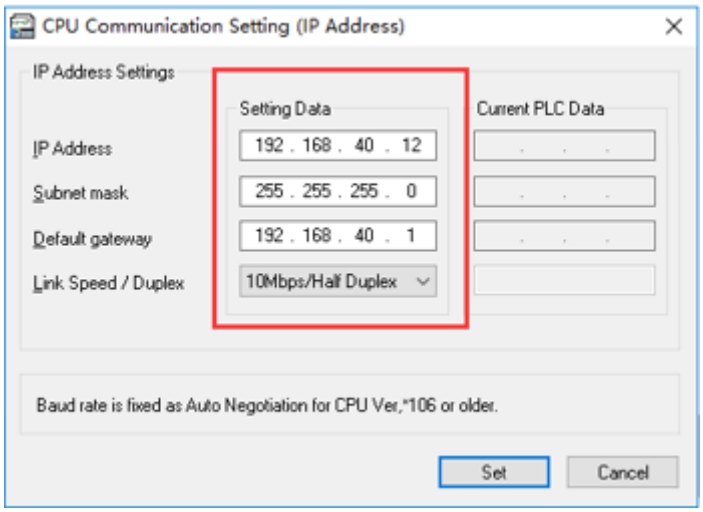


PLC Configuration

1) Connect with PLC, select[Online mode];



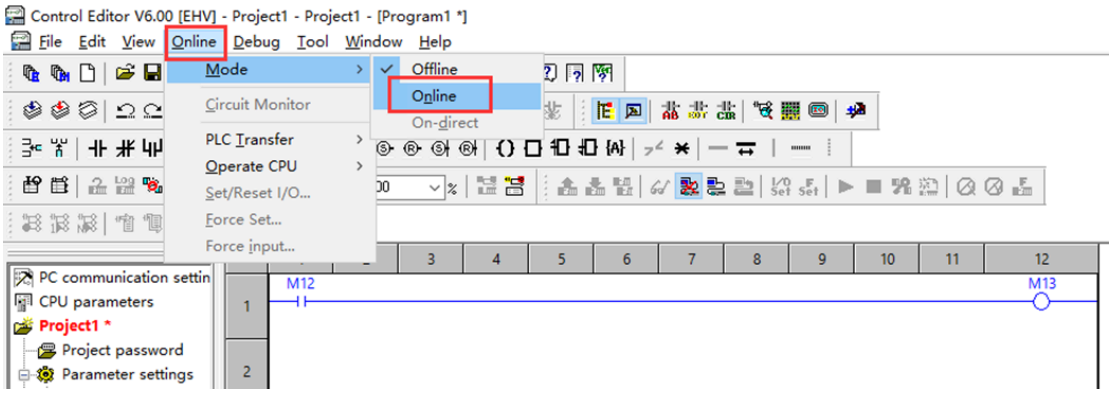
2) Set IP address, it is the same LAN parameters with HMI;



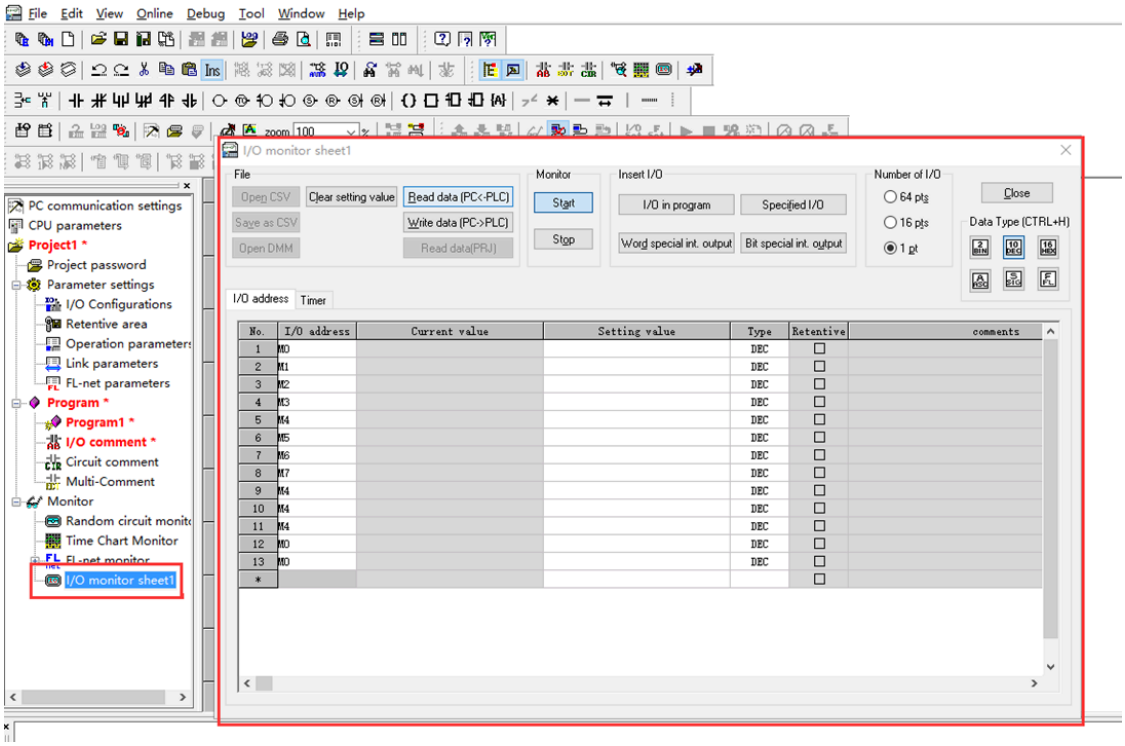
3) Save PLC communication parameter, and restart PLC

PLC Monitor Mode

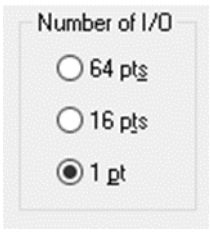
1) Connect with PLC and choose to “online” mode



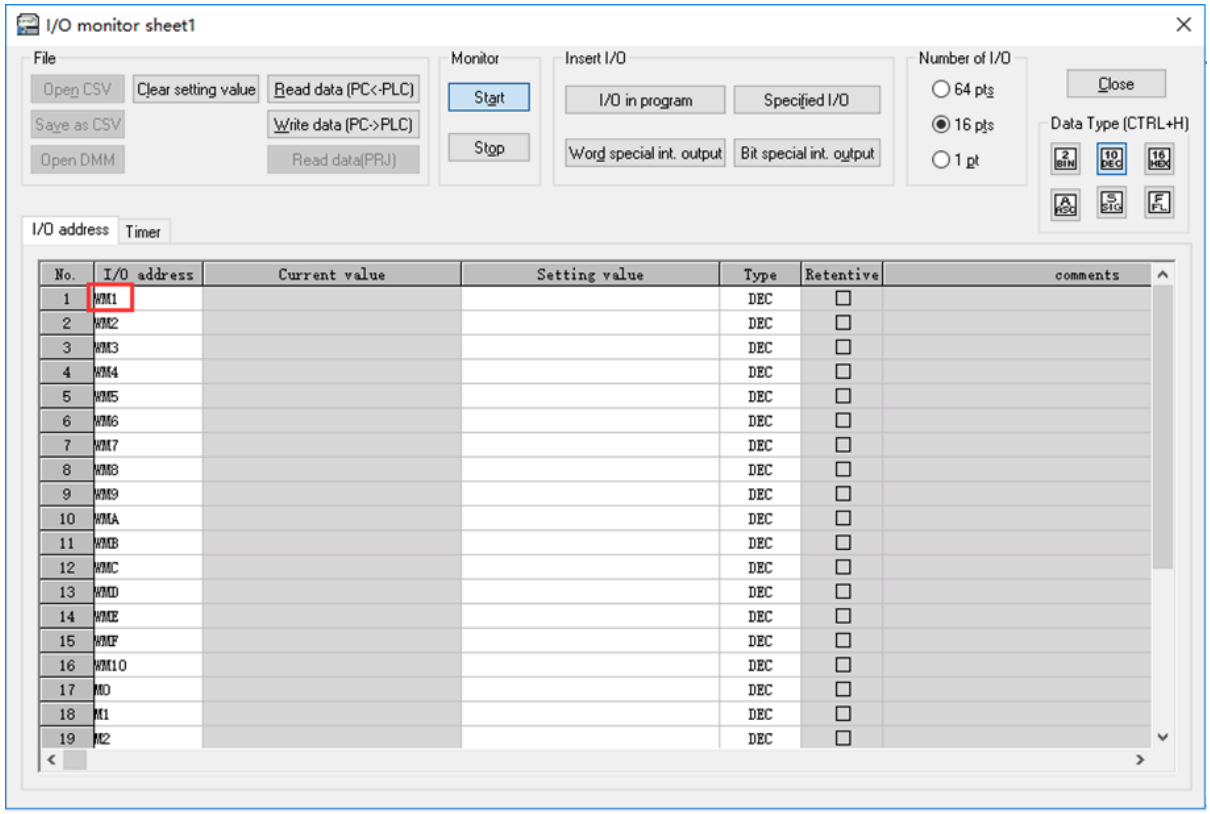
2) Open I/O monitor sheet1

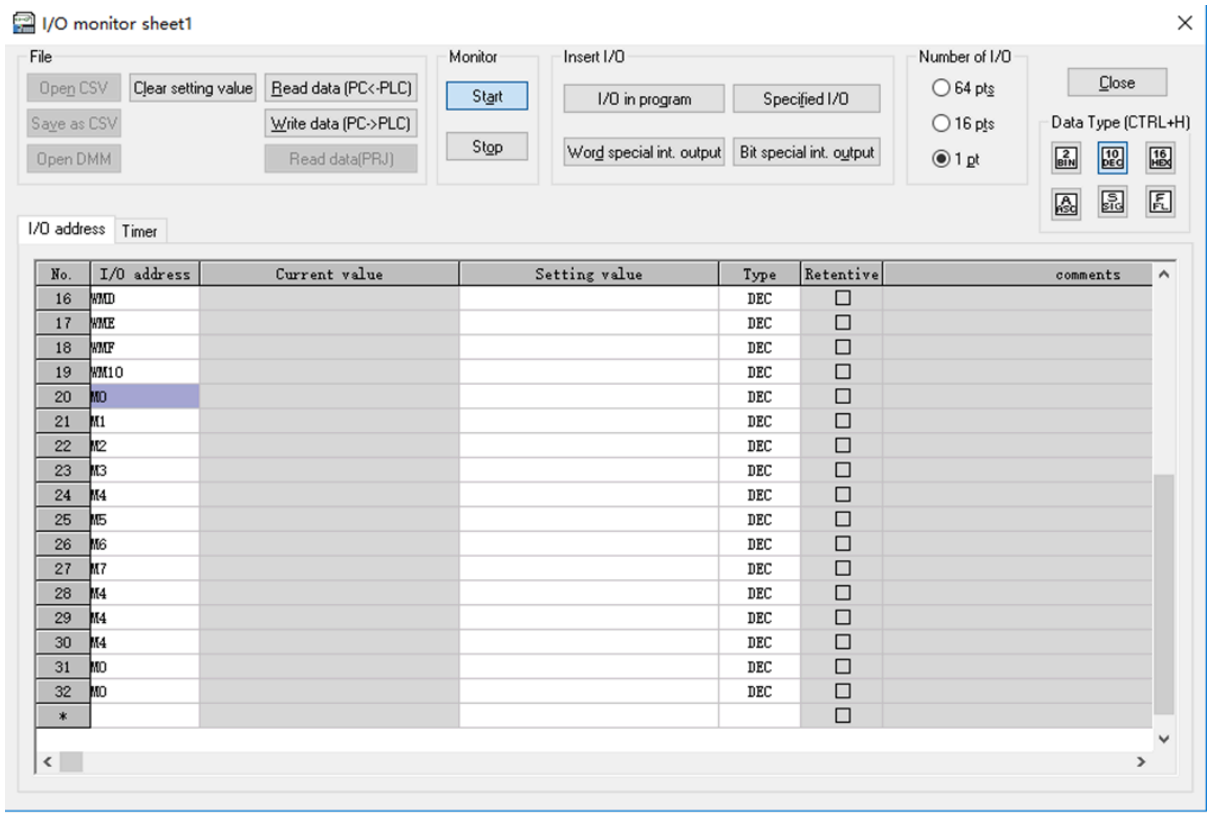


3) During monitoring bit address,1 pts should be selected; during monitoring word address, 16 pts should be selected



4) Enter the register address, click OK to view the value of the register.


I/O monitor sheet1
File
Open CSV
Clear setting value
Read data (PC<-PLC)
Save as CSV
Write data (PC->PLC)
Open DMM
Read data(PRJ)
Monitor
Start
Stop
Insert I/O
I/O in program
Specified I/O
Word special int. output
Bit special int. output
Number of I/O
64 pts
16 pts
1 pt
Close
Data Type (CTRL+H)
I/O address
Timer
No.
I/O address
Current value
Setting value
Type
Retentive
comments
1 WM1
2 WM2
3 WM3
4 WM4
5 WM5
6 WM6
7 WM7
8 WM8
9 WM9
10 WMA
11 WMB
12 WMC
13 WMD
14 WME
15 WMF
16 WM10
17 M0
18 M1
19 M2
DEC


I/O monitor sheet1
File
Open CSV
Clear setting value
Read data (PC<-PLC)
Save as CSV
Write data (PC->PLC)
Open DMM
Read data(PRJ)
Monitor
Start
Stop
Insert I/O
I/O in program
Specified I/O
Word special int. output
Bit special int. output
Number of I/O
64 pts
16 pts
1 pt
Close
Data Type (CTRL+H)
I/O address
Timer
No.
I/O address
Current value
Setting value
Type
Retentive
comments
16 WMD
17 WME
18 WMF
19 WM10
20 M0
21 M1
22 M2
23 M3
24 M4
25 M5
26 M6
27 M7
28 M4
29 M4
30 M4
31 M0
32 M0
DEC

#Note:

1) Both word registers and bit registers support even continuous read/write functions;

2) The range of registers is based on the specific PLC type;

Cable Wiring

IEC60870-5 104 Client

HMI Setting

Settings	
Protocol	IEC60870-5 104 Client
Connection	Ethernet
Port	2404
No.	

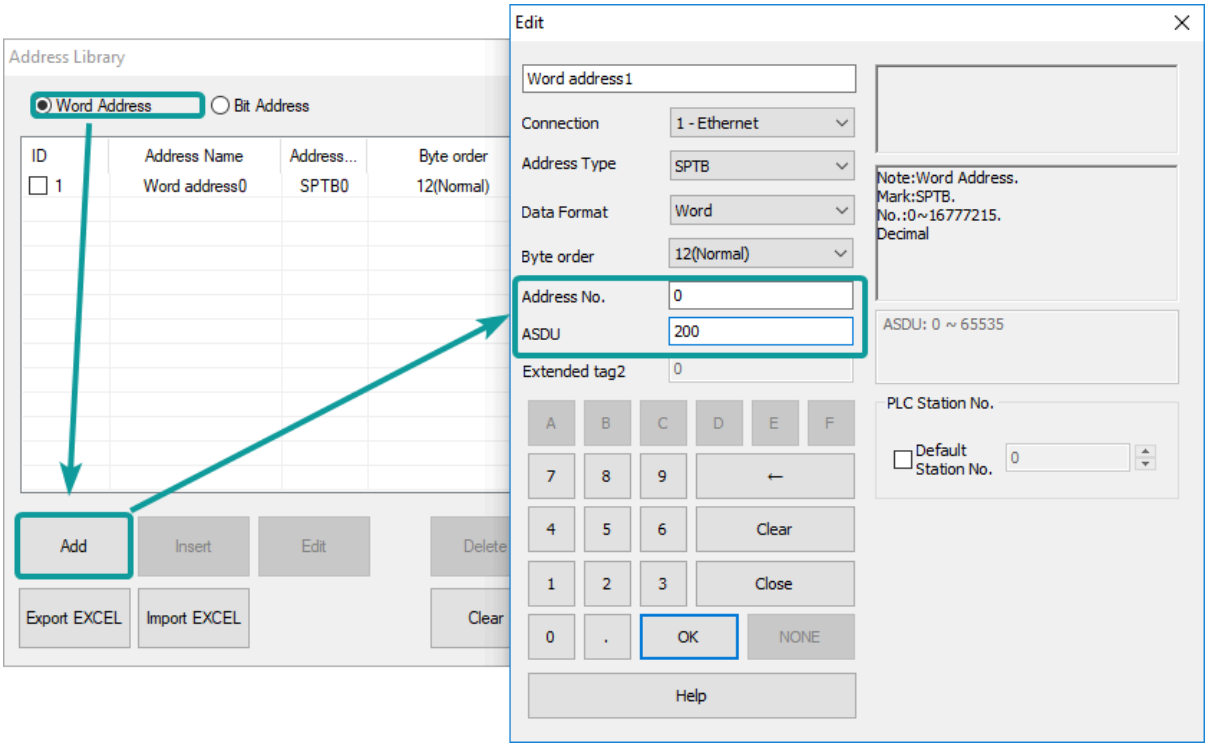
Address List

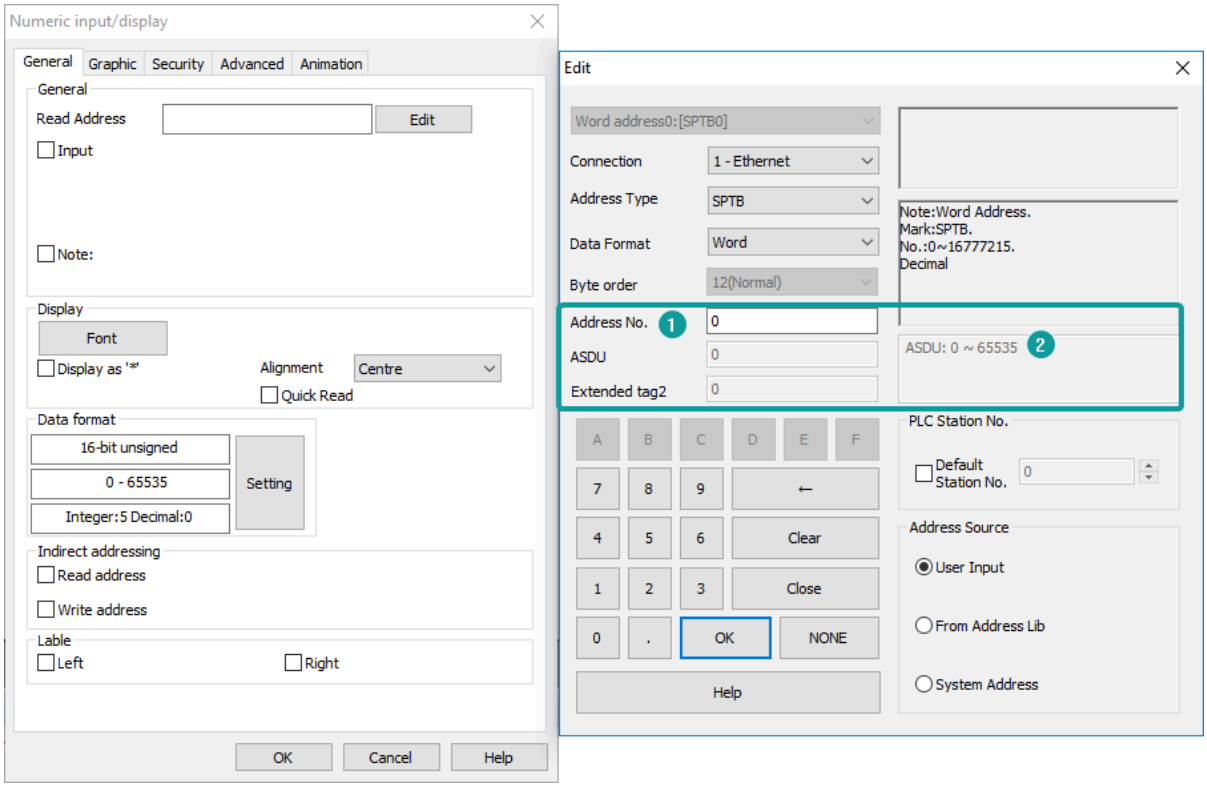
Type	Register
Bit	SPTB
	SCNA
	DPTB
	DCNA
	METF
	SENC
	SENA
	MENA
	METD
Word	SPTB
	SCNA
	DPTB
	DCNA
	SENA
	MENA
	METD
	INRO
	TIMESYN
	TIMEZ
	NTP
Double word	METF

SENC

Address Configuration

The address registers of the IEC60870-5-104 protocol are SPTB, SCNA, DPTB, DCNA, METF, and SENC. The protocol needs to be added with an extension tag "ASDU", which could only be added in the [Address Identification Library], other places are not editable, that is, the read address in the object or script is not editable.



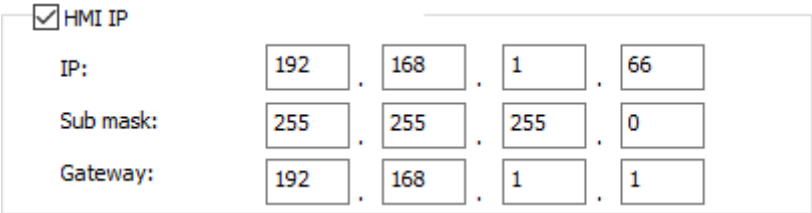


1) Extended tag name

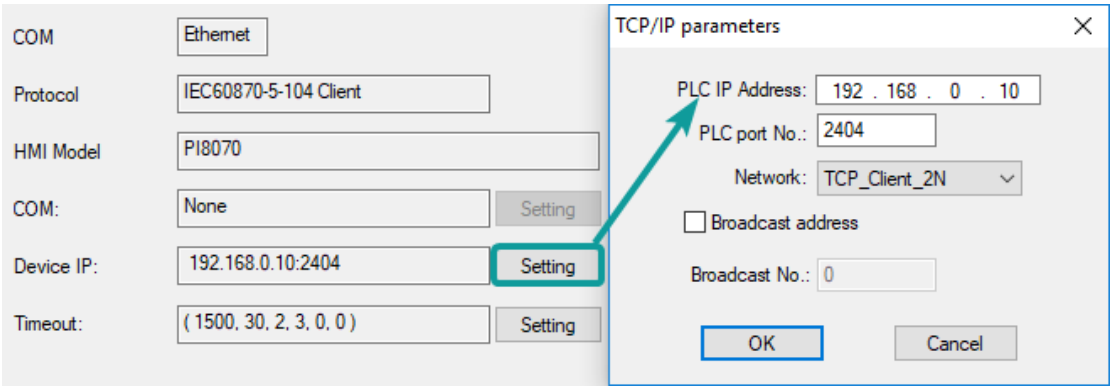
2) Address range for the extended tag.

Communication Settings

1) Enable HMI Ethernet in [Project Settings];



2) Set PLC IP in [Device IP] settings;



Cable Wiring

LG XGK FEnet Ethernet

Supported Series: LS XGT series XGK CPU with XGL-EFMT Ethernet module

HMI Settings

Items	Settings	Note
Protocol	LG XGK FEnet(Ethernet)	
Connection	Ethernet	
Port No.	2004	

Address List

Type	Register	Range	Format	Note
Word	P	0~2047	P d	
	M	0~2047	M d	
	K	0~2047	K d	
	F	0~2047	F d	
	T	0~2047	T d	
	C	0~2047	C d	
	Z	0~127	Z d	
	S	0~127	S d	
	L	0~11263	L d	
	N	0~21503	N d	
	D	0~32767	D d	
	R	0~32767	R d	
	ZR	0~65535	ZR d	
	UxDD	0~6331	UxDD nndd	nn: 0~63, dd: 0~31

#Note:

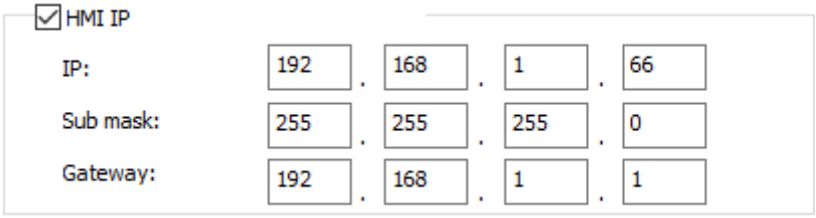
1) In addition to the "UxDD" register, the others correspond to the PLC register one by one. UxDD corresponds to U in the PLC;

2) The [UxDD] register, defined in the PLC is Ux.dd, x represents the block, and dd represents 0-31 of each block. There are 64 blocks in the PLC;

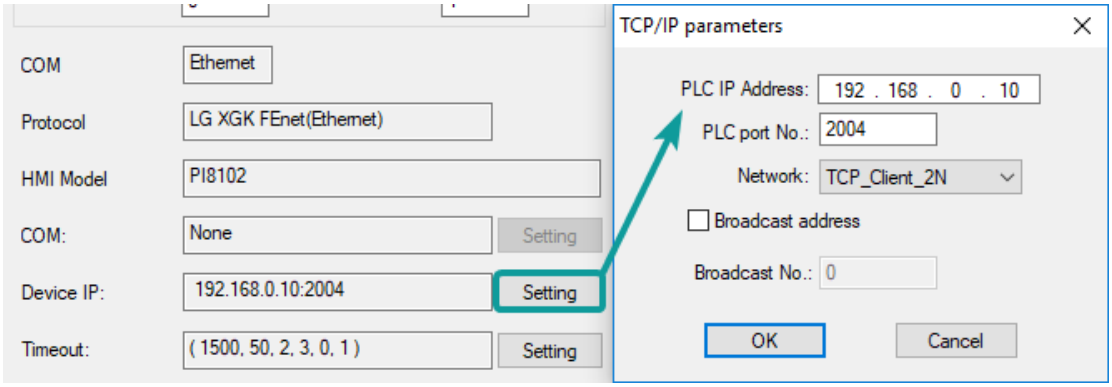
3) All bit registers are in the form of bits in word, and the range is the same as the word register;

Communication settings in HMI

1) Enable HMI Ethernet in [Project Settings];



2) Set PLC IP in [Device IP] settings;



Cable Wiring

Mitsubishi

FX1S, 1N, 2N Series

Supported Series: Mitsubishi FX1S, FX1N, FX2N series

HMI Settings

Item	Settings	Note
Protocol	Mitsubishi FX1S/FX1N/FX2N	
Connection	RS422/RS485/RS232	
Baud rate	9600~115200	
Data bit	7/8	
Parity	EVEN/Odd/None	
Stop bit	1/2	
PLC station No.	1~255	

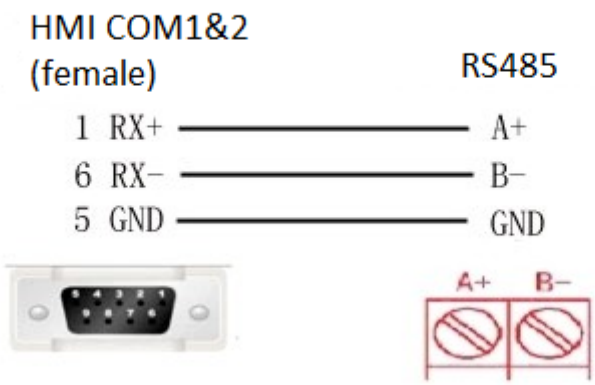
Address List

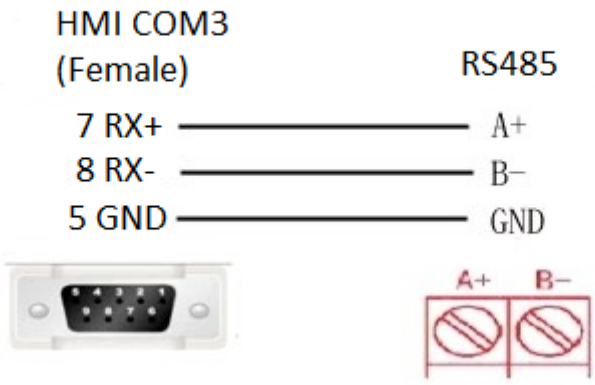
Type	Device registers	HMI registers	Format	Range	Note
Bit	X	X	Xo	0~303237	
	Y	Y	Y o	0~303237	
	M	M	M d	0~99999	
	T	T	T d	0~99999	
	C	C	C d	0~99999	
	S	S	S d	0~99999	
	SM	SM	SM d	8000~9999	
Word	X	X	Xo	0~303237	

Y	Y	Y o	0~303237
M	M	M d	0~99999
T	T	T d	0~99999
C	C	C d	0~199
D	D	D d	0~7999
S	S	S d	0~99999
SD	SD	SD d	8000~9999

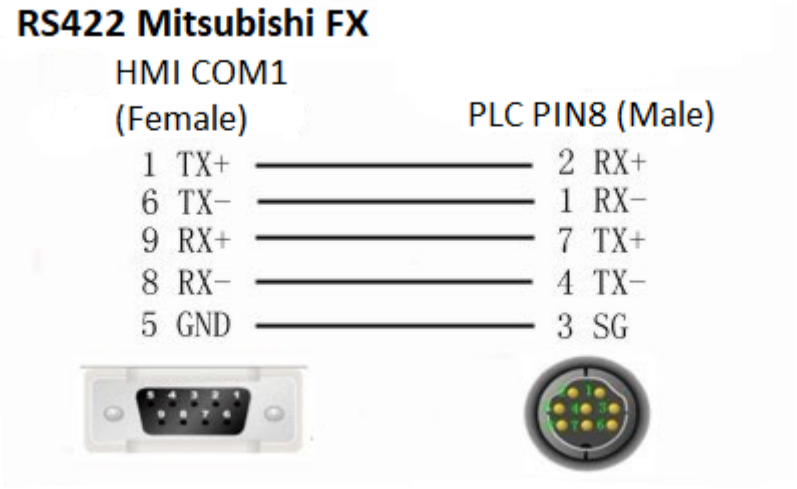
Cable Wiring

1) RS485





2)RS422



#Note:

COM3 only available in PI8000/PI9000 series.

FX5U Ethernet

Mitsubishi FX5U series PLC

HMI Settings

Items	Settings	Note
Protocol	Mitsubishi FX5U	
Connection	Ethernet	
Port No.	5002	Must be the same as the PLC setting
PLC station No.	0	

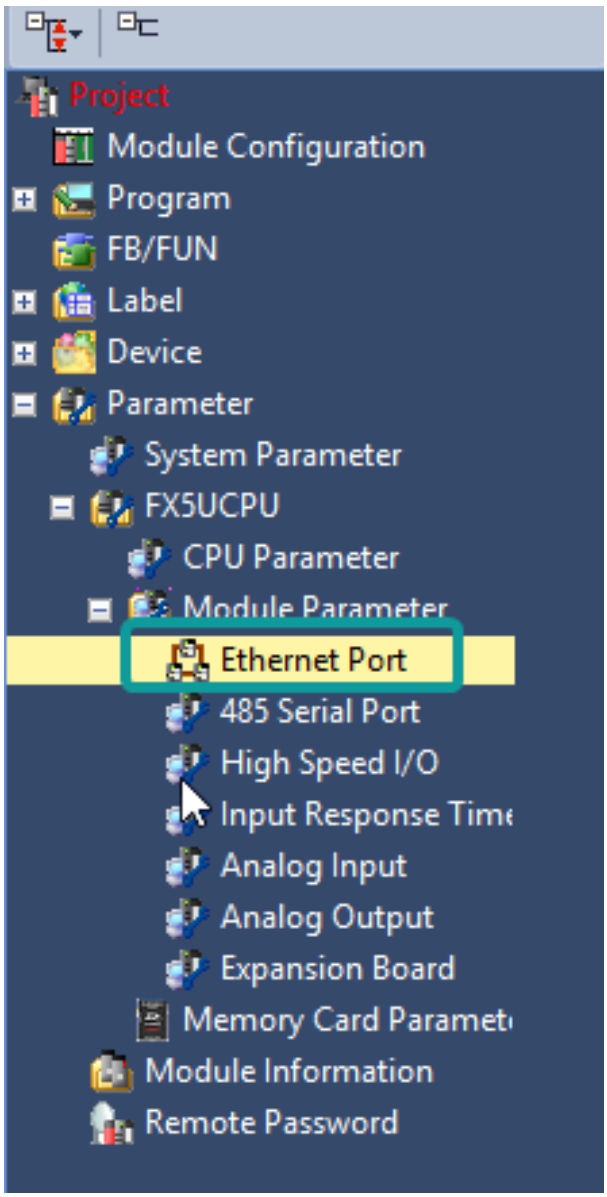
Address List

Type	Device registers	HMI registers	Format	Range	Note
Bit	X	X	X o	0~303237	
	Y	Y	Y o	0~303237	
	M	M	M d	0~99999	
	B	B	B h	0~7FFF	
	F	F	F d	0~32767	
	SB	SB	SB h	0~7FFF	
	TS	TS	TS d	0~1023	
	TC	TC	TC d	0~1023	
	STS	STS	STS d	0~1023	
	STC	STC	STS d	0~1023	
	CS	CS	CS d	0~1023	
	CC	CC	CC d	0~1023	
	SM	SM	SM d	0~9999	
	L	L	L d	0~32767	
	S	S	S d	0~4095	
Word	W	W	W h	0~3FF	
	TN	TN	TN d	0~1023	

STN	STN	STN d	0~1023
CN	CN	CN d	0~1023
R	R	R d	0~32767
SW	SW	SW h	0~7FFF
Z	Z	Z d	0~23
D	D	D d	0~7999
SD	SD	SD d	0~11999

PLC Settings (GX Works 3)

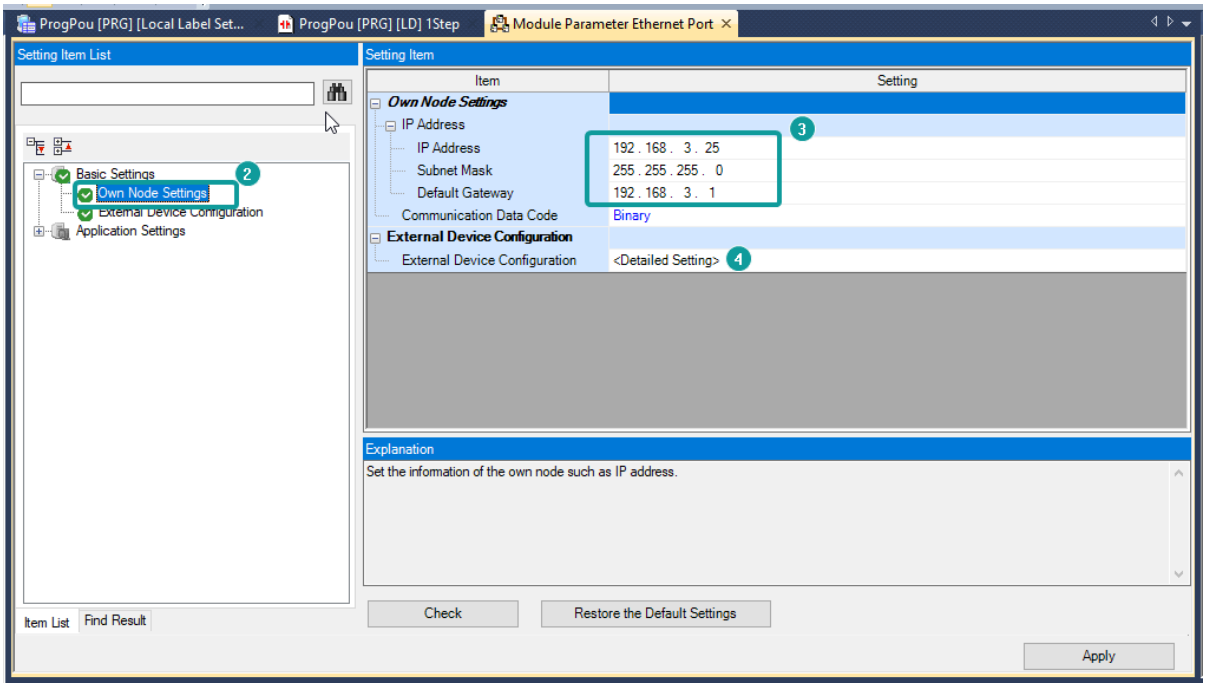
1) Find the [Ethernet port] in the navigation area.



2) Select [Own Node Settings] in the [Setting Item List];

3) Set [IP Address], [Subnet Mask], [Default Gateway];

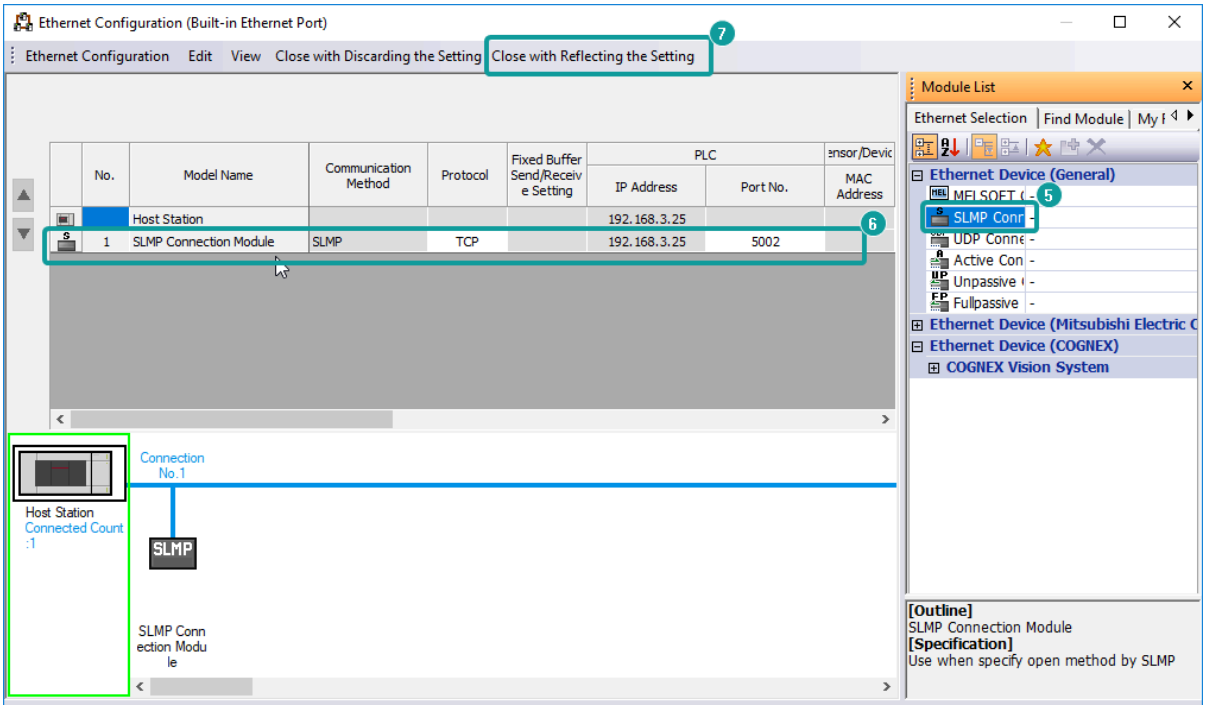
4) Click [Detailed Settings] into [Ethernet Configuration (Built-in Ethernet Port)] windows;



5) Select [SLMP Connection Module] and add into host station as below picture shows;

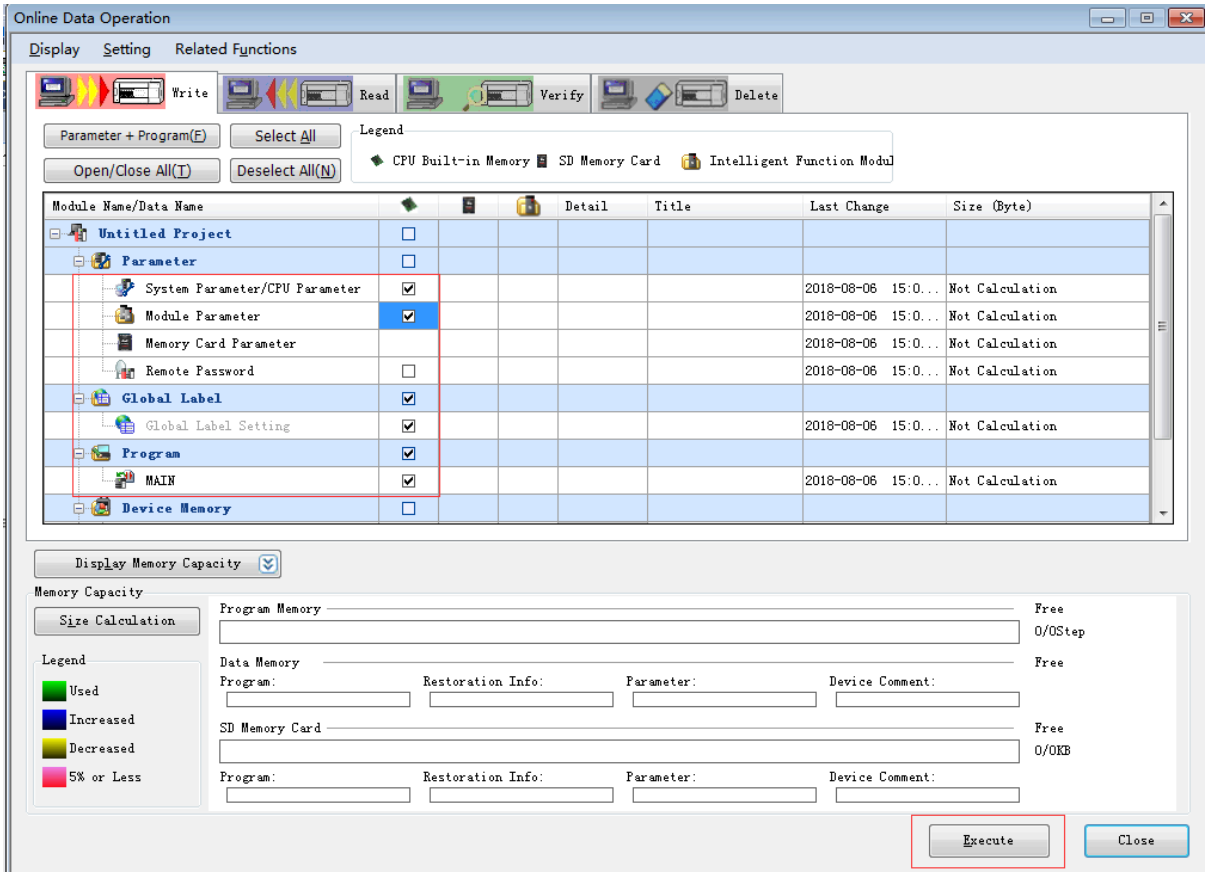
6) Set Port number as 5002 (this is necessary settings);

7) Click [Close with Reflecting the Setting] to save and close window;



8) Click [Apply] to completed Etherenet settings;

9) Switch to the [On line data operation] interface as below, check the item and click [Execute] to download.



Cable Wiring

FX5U Serial Port

Mitsubishi FX5U series PLC

HMI Settings

Item	Settings	Note
Protocol	Mitsubishi FX5U	
Connection	RS422/RS485	
Baud rate	9600	
Data bit	7	
Parity	Odd	

Stop bit	1	
PLC station No.	1~255	Need to be the same as PLC settings

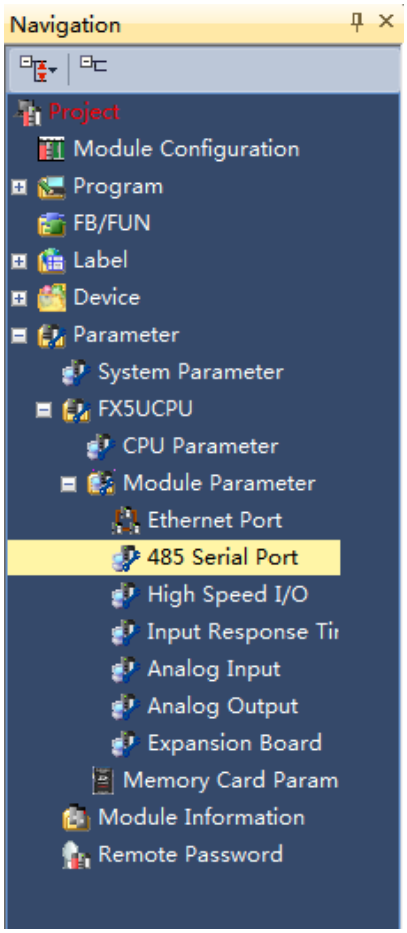
Address List

Type	Device registers	HMI registers	Format	Range	Note
Bit	X	X	X o	0~303237	
	Y	Y	Y o	0~303237	
	M	M	M d	0~99999	
	B	B	B h	0~7FFF	
	F	F	F d	0~32767	
	SB	SB	SB h	0~7FFF	
	TS	TS	TS d	0~1023	
	TC	TC	TC d	0~1023	
	STS	STS	STS d	0~1023	
	STC	STC	STS d	0~1023	
	CS	CS	CS d	0~1023	
	CC	CC	CC d	0~1023	
	SM	SM	SM d	0~9999	
	L	L	L d	0~32767	
	S	S	S d	0~4095	
Word	W	W	W h	0~3FF	
	TN	TN	TN d	0~1023	
	STN	STN	STN d	0~1023	
	CN	CN	CN d	0~1023	
	R	R	R d	0~32767	
	SW	SW	SW h	0~7FFF	
	Z	Z	Z d	0~23	
	D	D	D d	0~7999	
	SD	SD	SD d	0~11999	

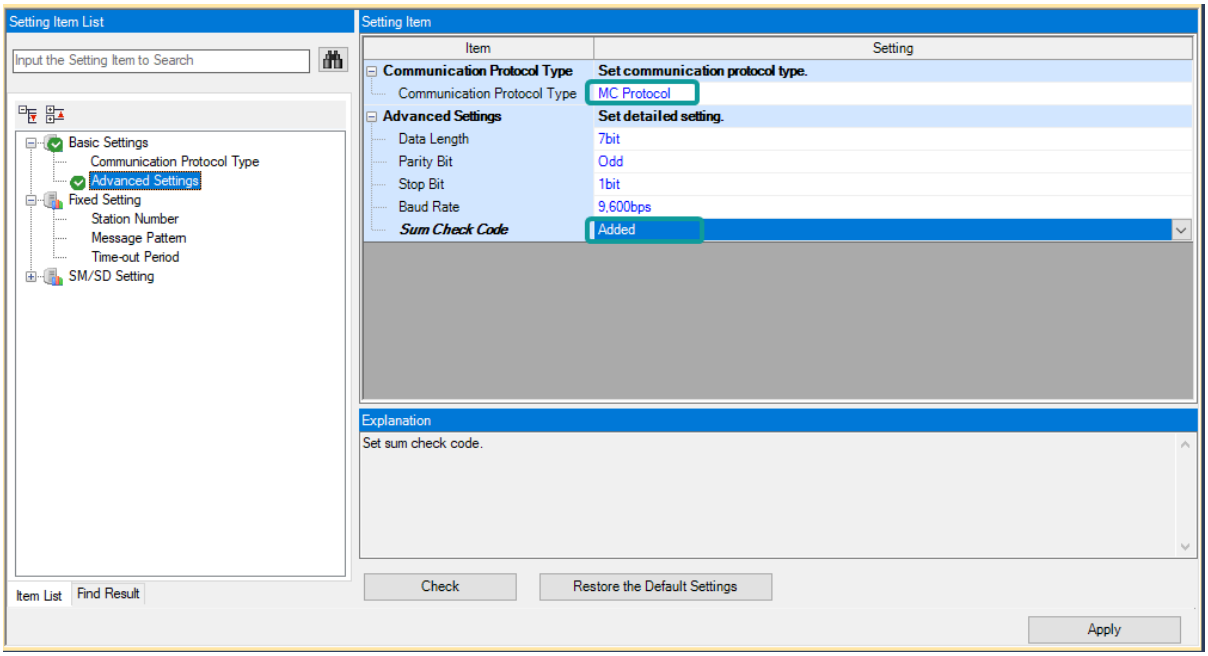
PLC Settings (GX Works 3)

1) Create a blank FX5U project

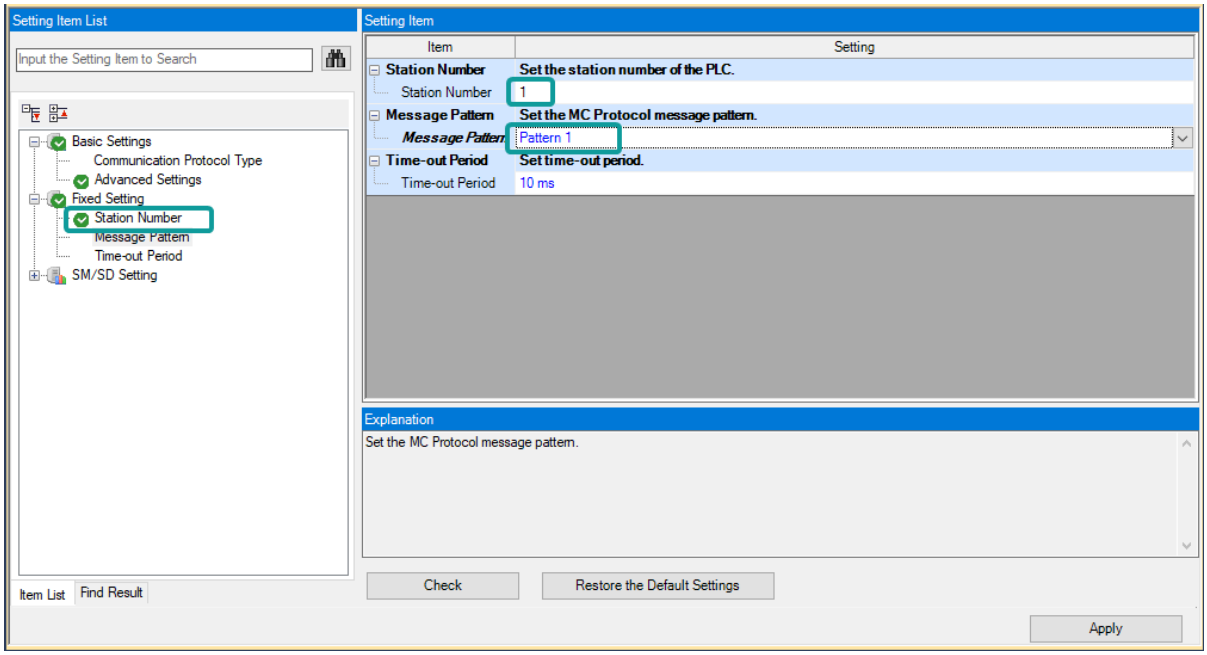
2) Find the 485 serial port module in the system navigation bar and double click to enter the settings.



3) Select protocol in the setting item, and set parameters.

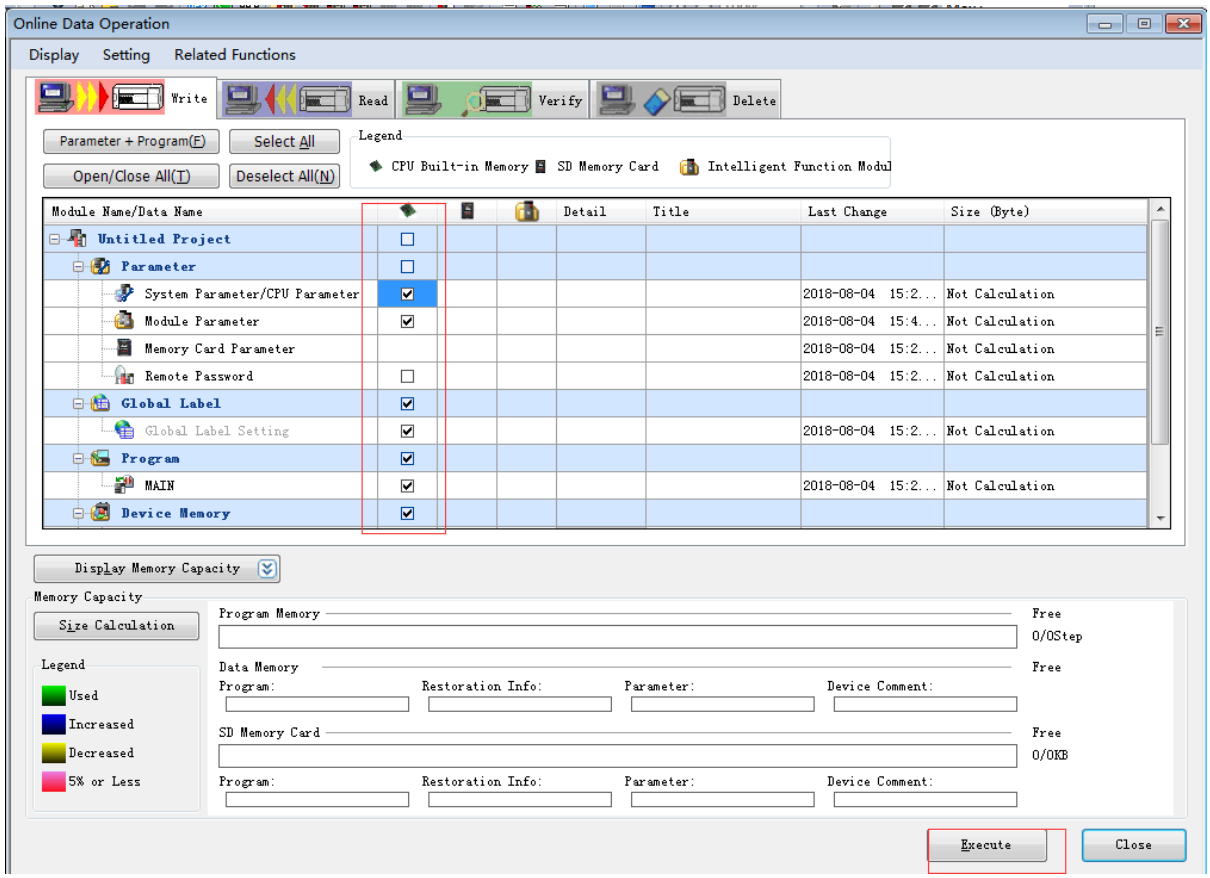


4) Set station number, and [Message Pattern] (Pattern 1 or Pattern 4)



5) Click the [Apply] button to finish the setting.

6) Click download and select the items as below, then click [execute] to download the configuration to PLC.

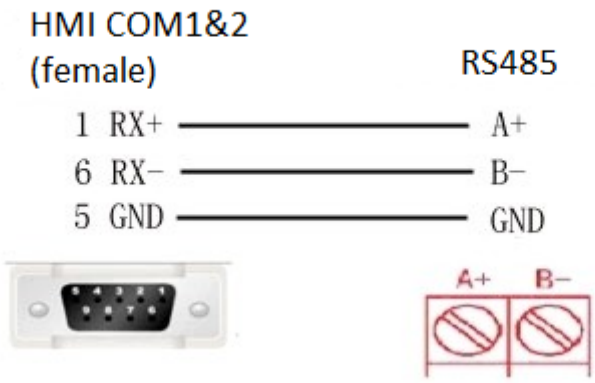


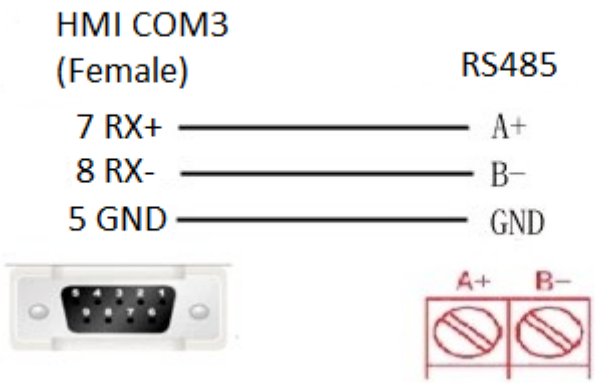
7) As soon as download is completed, connect PLC with serial port, then configure it in the [Specify Connection Destination Connection].

8) Done.

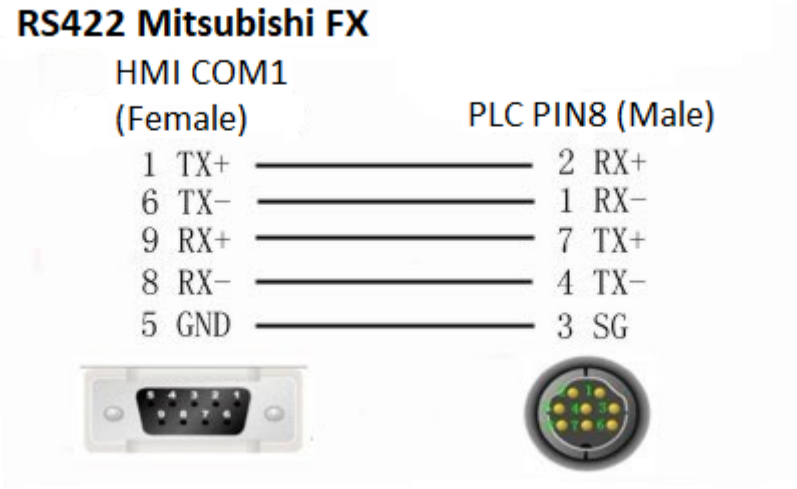
Cable Wiring

1) RS485





2) RS422



#Note:

COM3 only available in PI8000/PI9000 series.

L02 MELSEC (Ethernet)

Mitsubishi Q series CPU built-in Ethernet port.

HMI Settings

Items	Settings	Note
Protocol	MIT L02 CPU MELSEC	
Connection	Ethernet	
Port No.	1025	Must be the same as the PLC setting
PLC station No.	0	Must be the same as the PLC setting

Address List

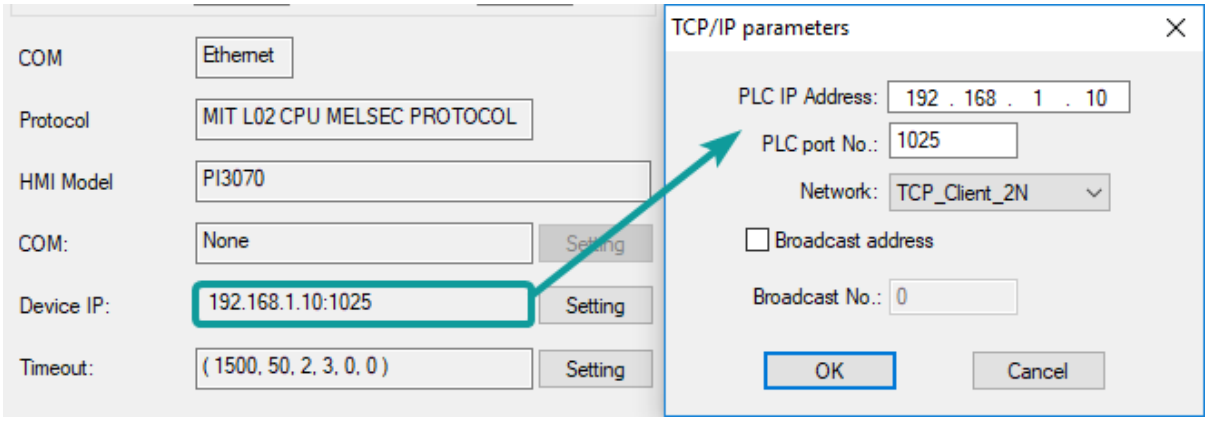
Type	Device registers	HMI registers	Format	Range	Note
Bit	X	X	X h	0~FFFF	
Bit	Y	Y	Y h	0~FFFF	
Bit	M	M	M d	0~9999	
Bit	L	L	L d	0~9999	
Bit	F	F	F d	0~9999	
Bit	B	B	B h	0~FFFF	
Bit	V	V	V d	0~2047	
Bit	TC	TC	TC d	0~9999	
Bit	SS	SS	SS d	0~9999	
Bit	SC	SC	SC d	0~9999	
Bit	CS	CS	CS d	0~9999	
Bit	CC	CC	CC d	0~9999	
Bit	SB	SB	SB h	0~FFFF	
Bit	SM	SM	SM d	0~2047	
Bit	STS	STS	STS d	0~1023	
Bit	S	S	S d	0~9999	
Bit	DX	DX	DX h	0~FFFF	

Bit	DY	DY	DY h	0~FFFF
Bit	TS	TS	TS d	0~9999
Bit	Dbit	Dbit	Dbit d.d	0~99999.0~15
Word	W	W	W h	0~FFFF
Word	TN	TN	TN d	0~99999
Word	SN	SN	SN d	0~99999
Word	CN	CN	CN d	0~99999
Word	R	R	R d	0~99999
Word	SW	SW	SW h	0~FFFF
Word	Z	Z	Z d	0~99999
Word	ZR	ZR	ZR h	0~FFFF
Word	D	D	D d	0~99999

Communication Settings

1) Enable HMI Ethernet in [Project Settings];

2) Set PLC IP in [Device IP] settings;

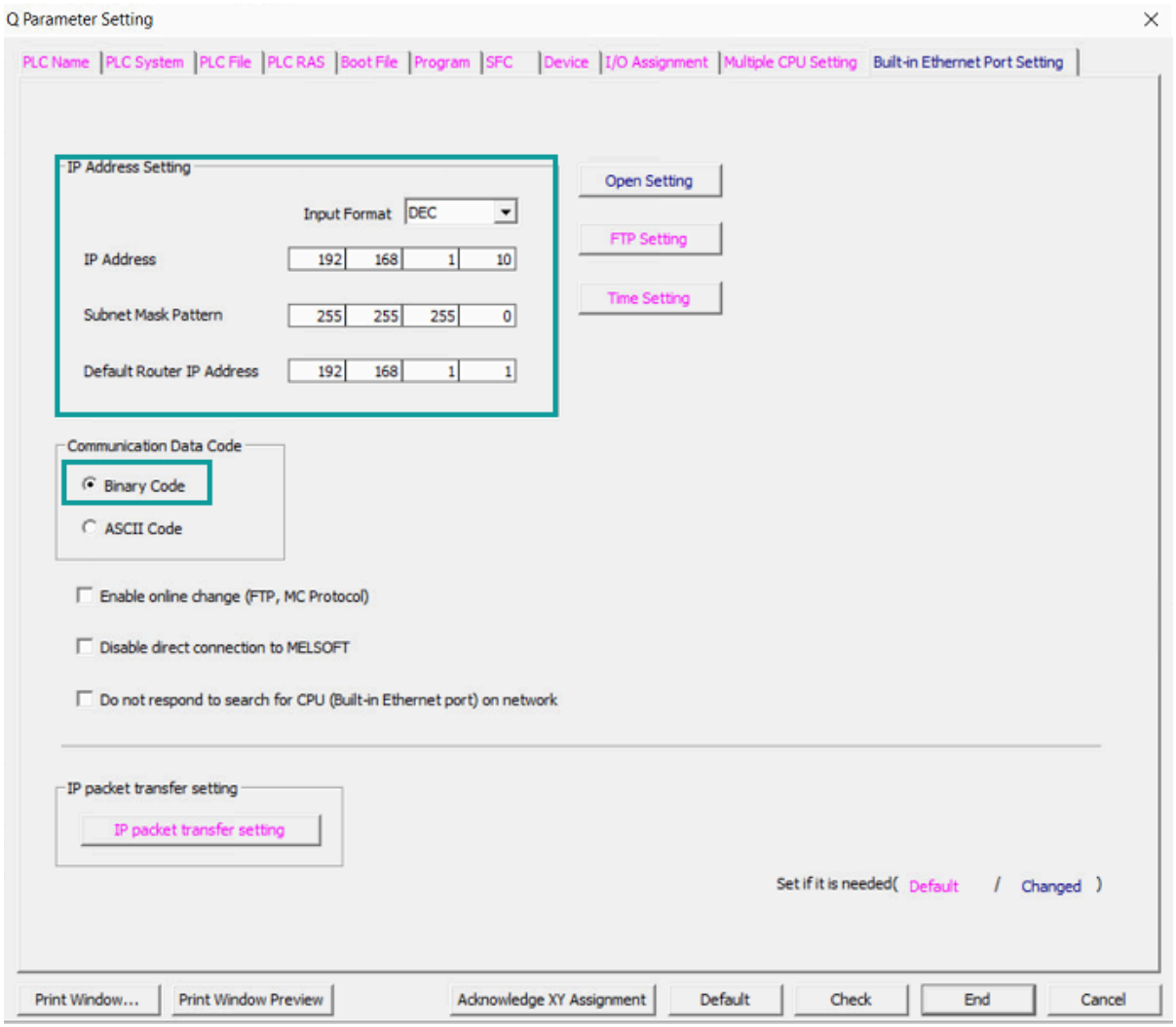


PLC Settings (GX Works2)

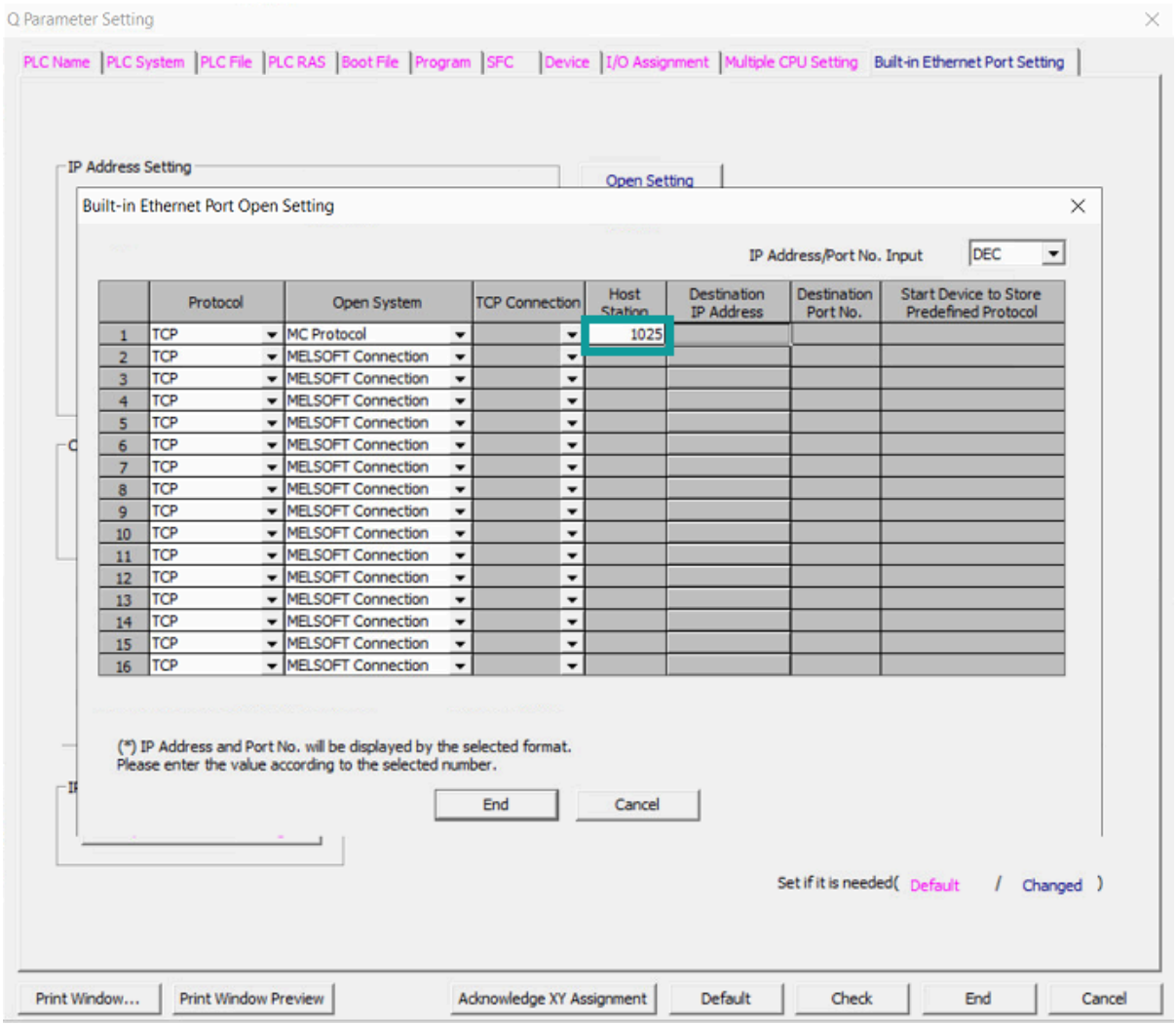
1) Create a project

2) Set PLC IP, subnet mask and gateway;

3) Select [Binary Code] as communication data code;



4) Set PLC port number, for example 1025



5) Save settings;

6) Download project into PLC device;

7) Restart PLC device;

Cable Wiring

QJ71E71 MELSEC

Mitsubishi QJ71E71 Ethernet communication module;

HMI Settings

Items	Settings	Note
Protocol	MIT QJ71E71 MELSEC	
Connection	Ethernet	
Port No.	1025	Must be the same as the PLC setting
PLC station No.	0	Must be the same as the PLC setting

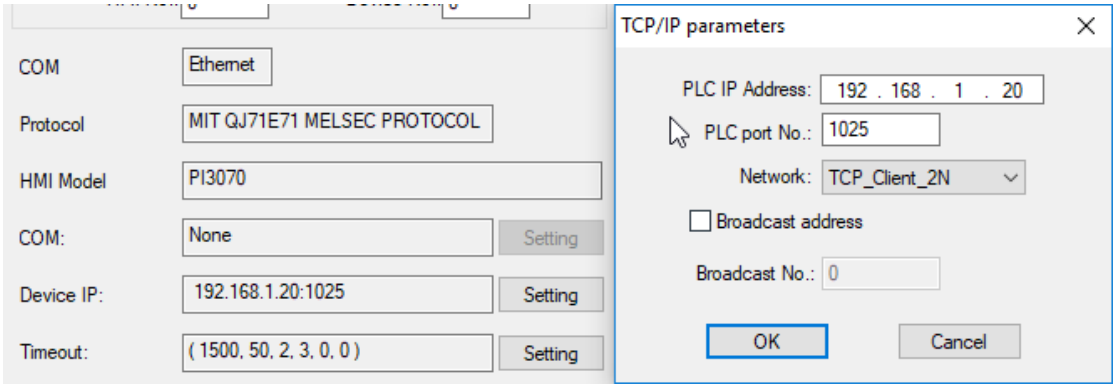
Address List

Type	Device registers	HMI registers	Format	Range	Note
Bit	X	X	X h	0~1FFF	
	Y	Y	Y h	0~1FFF	
	M	M	M d	0~99999	
	L	L	L d	0~8191	
	F	F	F d	0~2047	
	B	B	B h	0~1FFF	
	V	V	V d	0~2047	
	TS	TS	TS d	0~2047	
	TC	TC	TC d	0~2047	
	SS	SS	SS d	0~2047	
	SC	SC	SC d	0~2047	
	CS	CS	CS d	0~1023	
	CC	CC	CC d	0~1023	
	SB	SB	SB h	0~7FF	
	S	S	S d	0~8191	
	DX	DX	DX h	0~1FFF	
	DY	DY	DY h	0~1FFF	
	SM	SM	SM d	8000~9999	
Word	SD	SD	SD d	0~2047	
	D	D	D d	0~12287	
	W	W	W h	0~1FFF	
	TN	TN	TN d	0~2047	
	SN	SN	SN d	0~2047	
	CN	CN	CN d	0~1023	
	R	R	R d	0~32767	
	SW	SW	SW h	0~7FF	
	Z	Z	Z d	0~15	
	ZR	ZR	ZR h	0~FE7FF	

HMI Communication Settings

1) Enable HMI Ethernet in [Project Settings];

2) Set PLC IP in [Device IP] settings;



PLC Settings(GX Works2)

1) Click [Ethernet/CC IE/MELSECNET];

2) Please select [Ethernet] as network type;

3) Set station I/O number according to situation (For example, 0000 means that the module is connected to PLC CPU in first order);

4) Select [Online] as Mode;

5) Click [Operation setting] to set IP;

6) Select [Binary Code] as [Communication Data Code];

7) Set protocol: TCP;

8) Set [unpassive] in [Open system];

9) Set [receive] in [Fixed buffer];

10) Set [procedure Exist] in [Fixed buffer communication];

11) Disable [Pairing open];

12) Set [No confirm] in [Existence confirmation];

13) Host station port number: 1025;

14) Save settings;

15) Download project into PLC and restart it

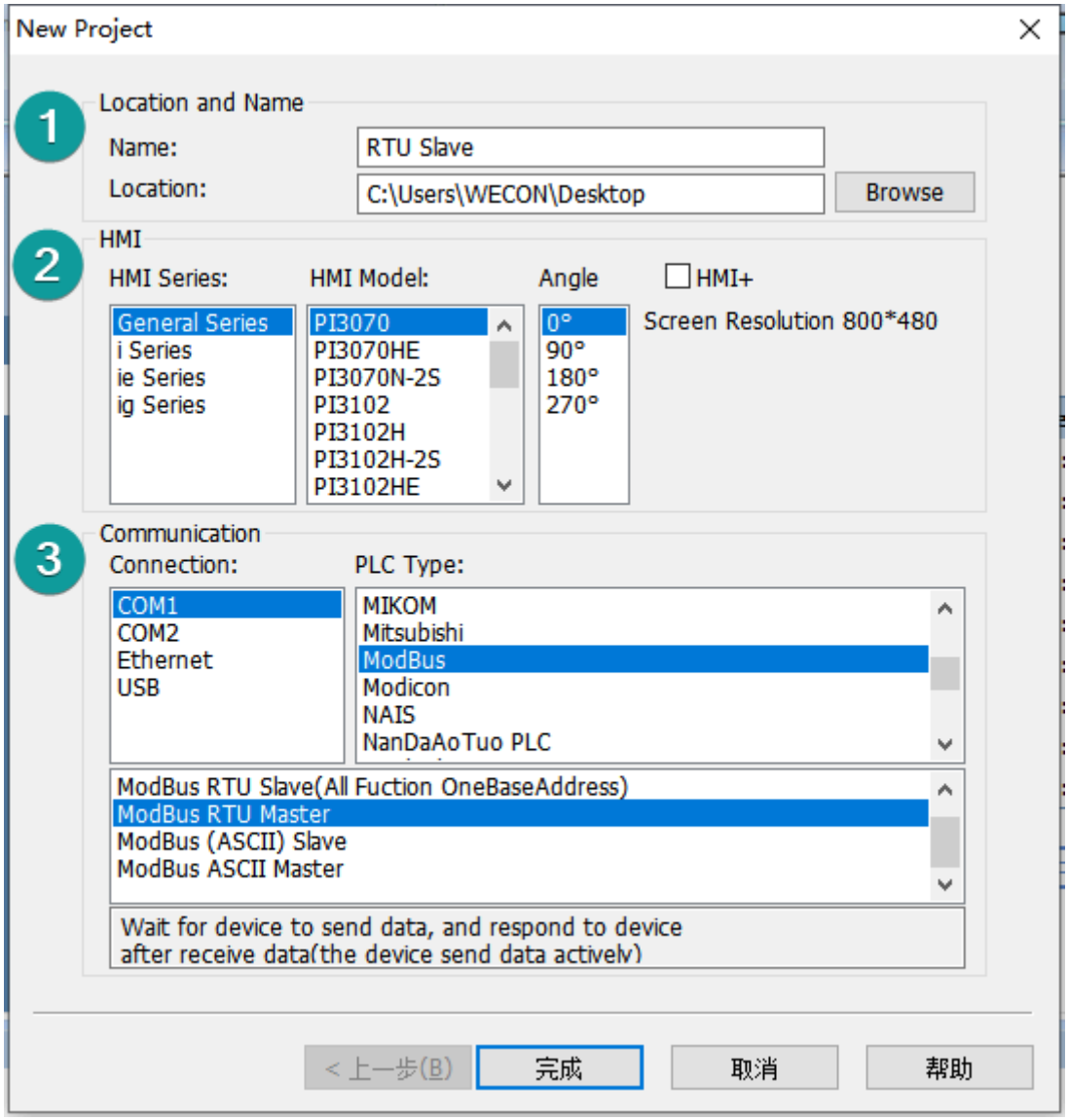
Cable Wiring

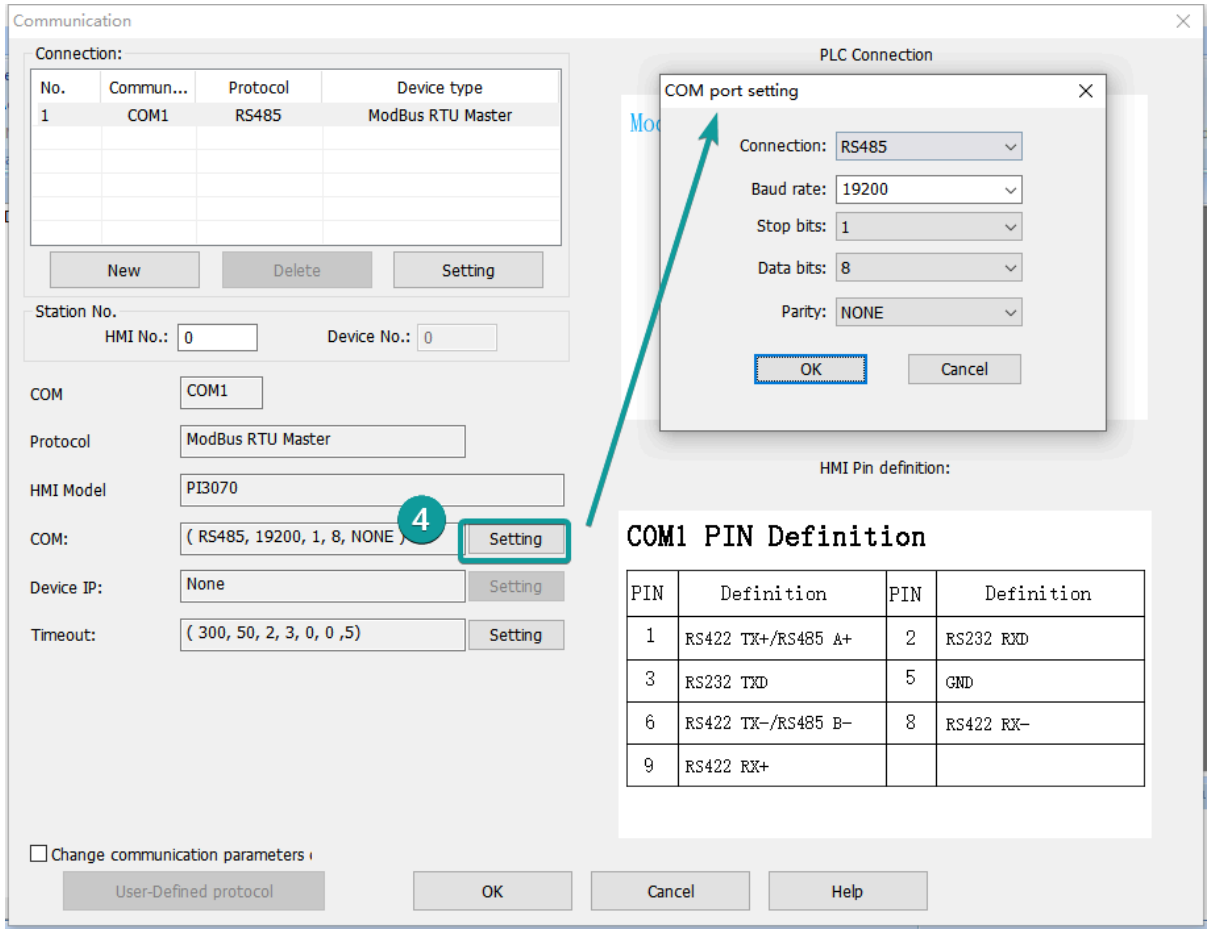
MODBUS

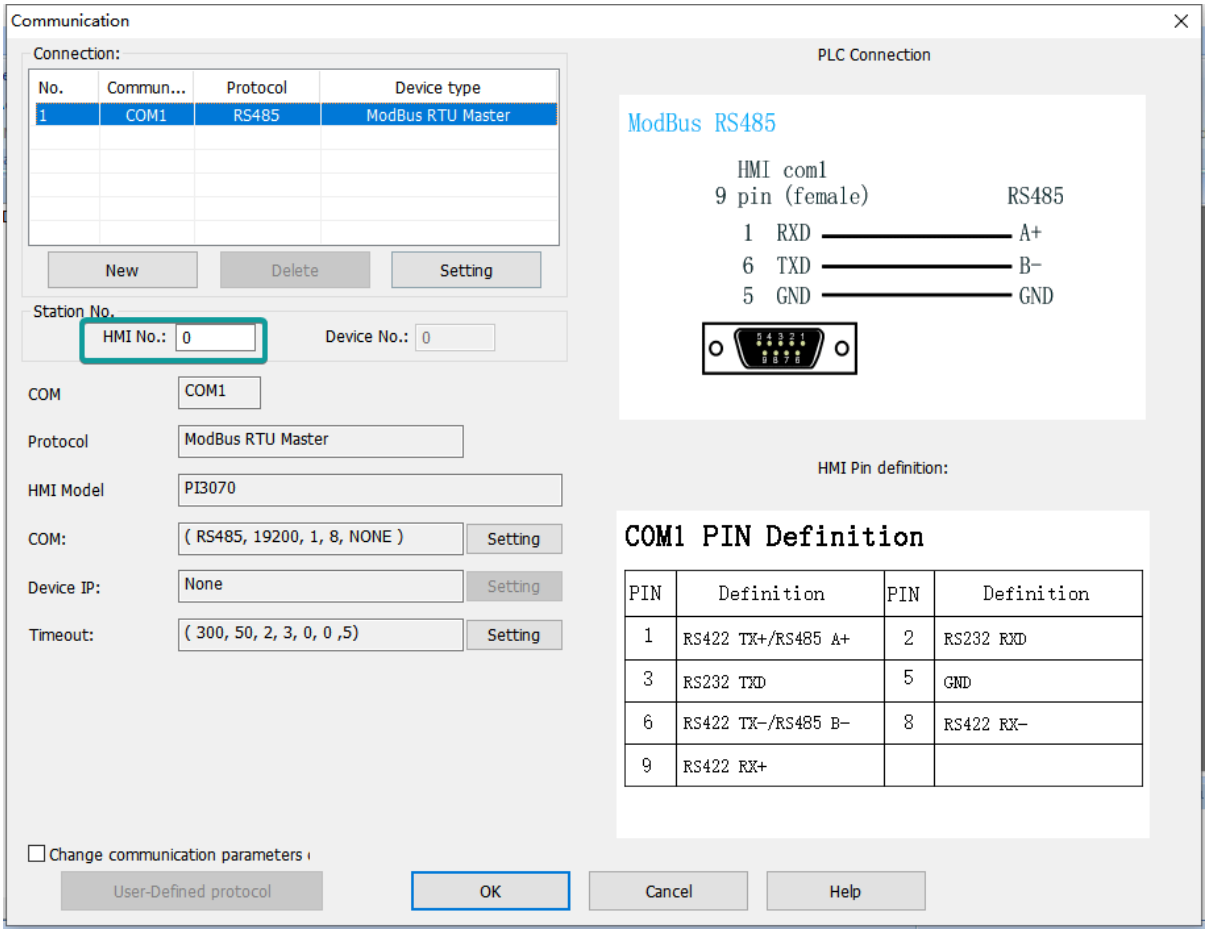
MODBUS RTU Master

Supported Series: MODBUS RTU CONTROLLER

HMI works as MODBUS SLAVE connecting with MASTER




Communication
Connection:
No.
Commun...
Protocol
Device type
1
COM1
RS485
ModBus RTU Master
New
Delete
Setting
Station No.
HMI No.:
0
Device No.:
0
COM
COM1
Protocol
ModBus RTU Master
HMI Model
PI3070
COM:
(RS485, 19200, 1, 8, NONE)
Setting
Device IP:
None
Setting
Timeout:
(300, 50, 2, 3, 0, 0 ,5)
Setting
4
Change communication parameters
User-Defined protocol
OK
Cancel
Help
PLC Connection
COM port setting
Connection:
RS485
Baud rate:
19200
Stop bits:
1
Data bits:
8
Parity:
NONE
OK
Cancel
HMI Pin definition:
COM1 PIN Definition
PIN
Definition
PIN
Definition
1
RS422 TX+/RS485 A+
2
RS232 RXD
3
RS232 TXD
5
GND
6
RS422 TX-/RS485 B-
8
RS422 RX-
9
RS422 RX+



HMI Settings

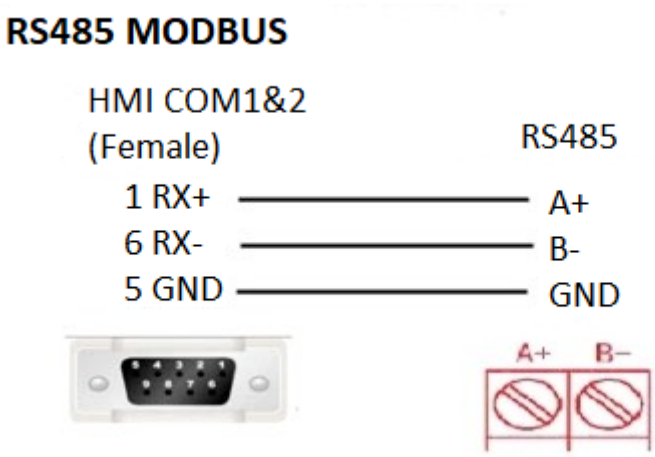
Items	Settings	Note
Protocol	MODBUS RTU Master	
Connection	RS485/RS232	
Baud rate	2400~187500	
Data bit	8	
Parity	Even/ Odd/ None	
Stop bit	1/2	
Station No.	0~255	

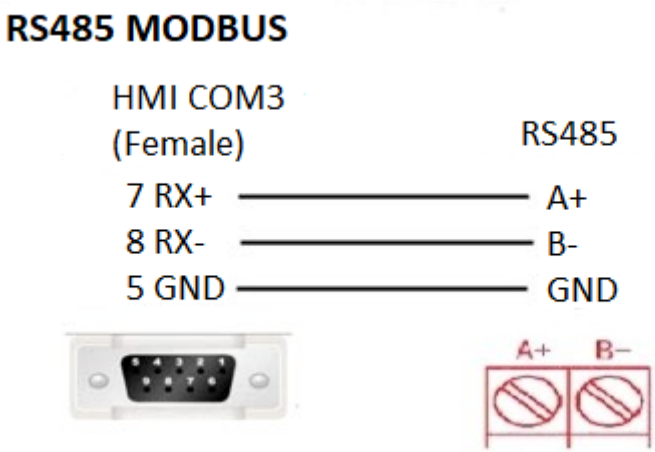
Address List

Type	HMI address	MODBUS code	Range
Bit	HDX3000.0~HDX3499.15	0	0~7999
Word	HDW3500~HDW7999	4	0~4499

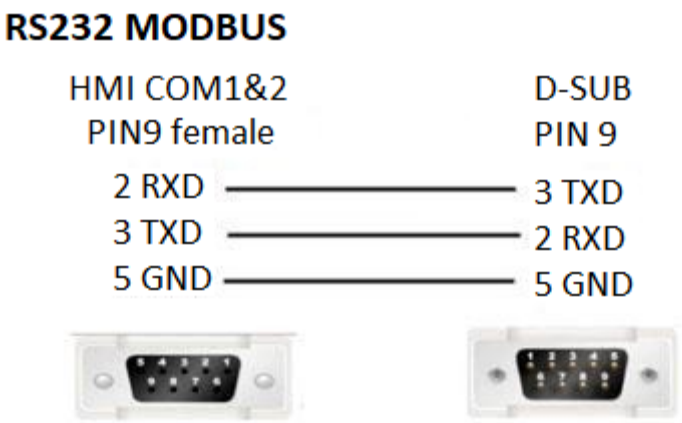
Cable Wiring

1) RS485





2) RS232



#Note:

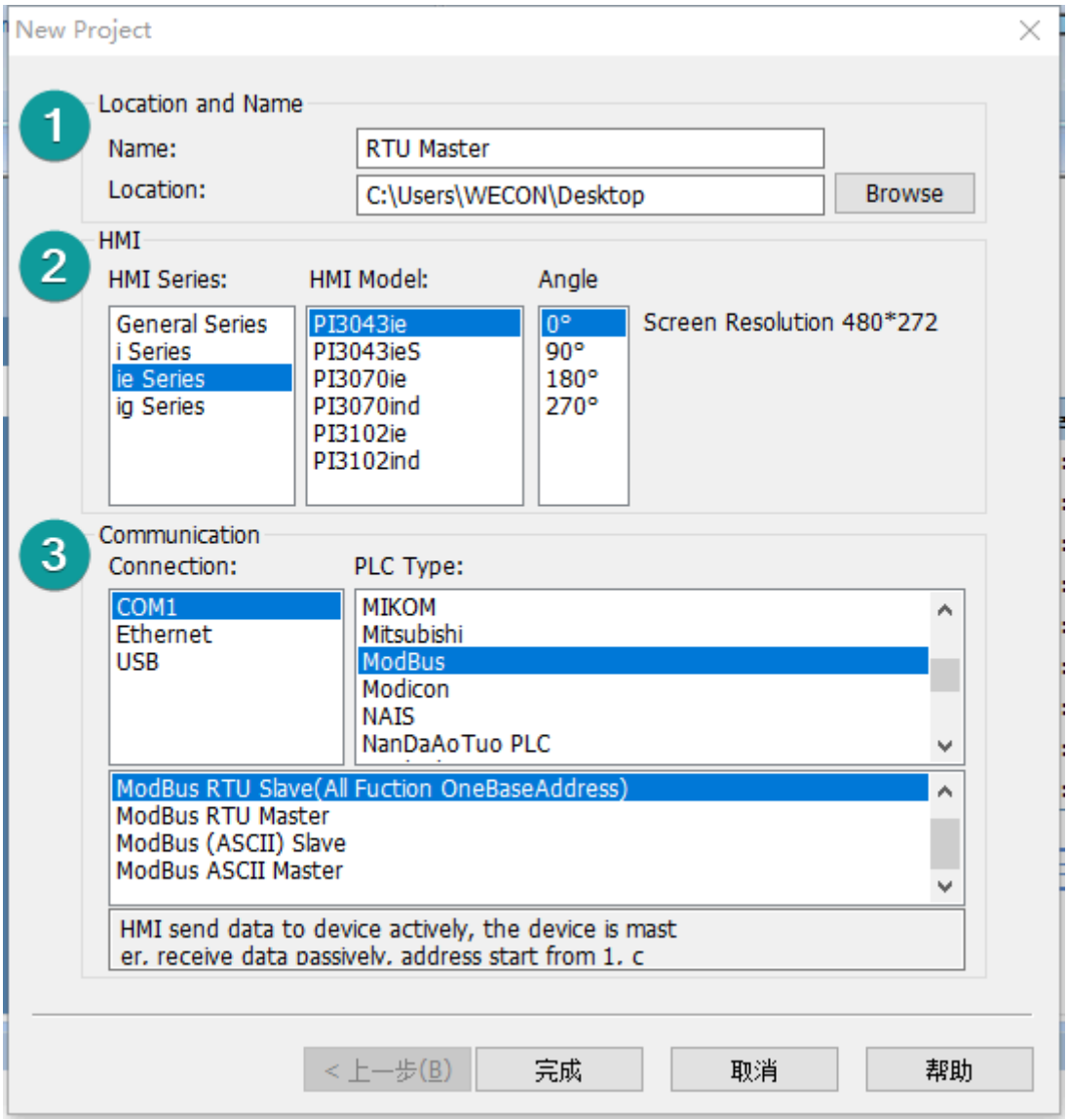
COM3 only available in PI8000/PI9000 series.

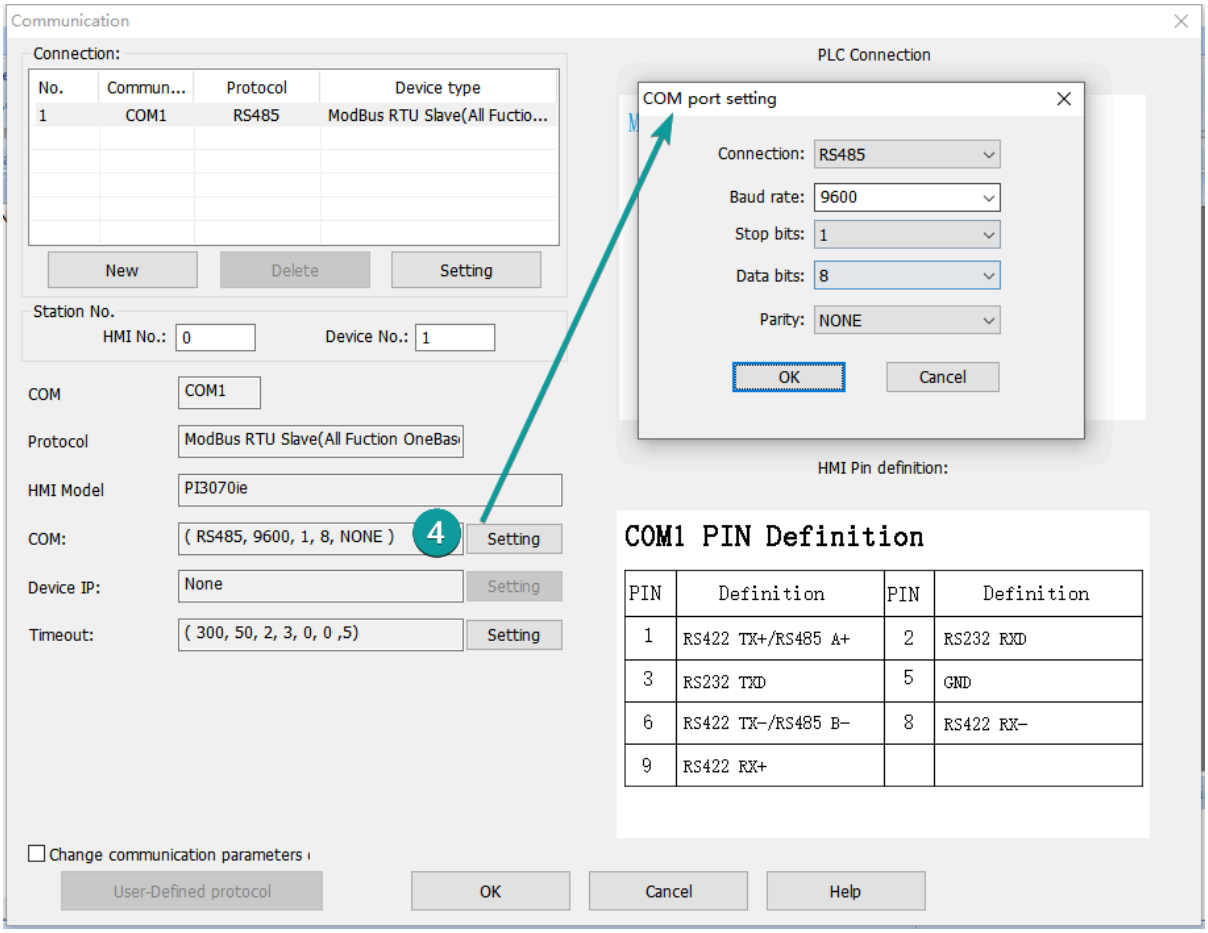
MODBUS RTU Slave (All function)/(All function OneBaseAddress)

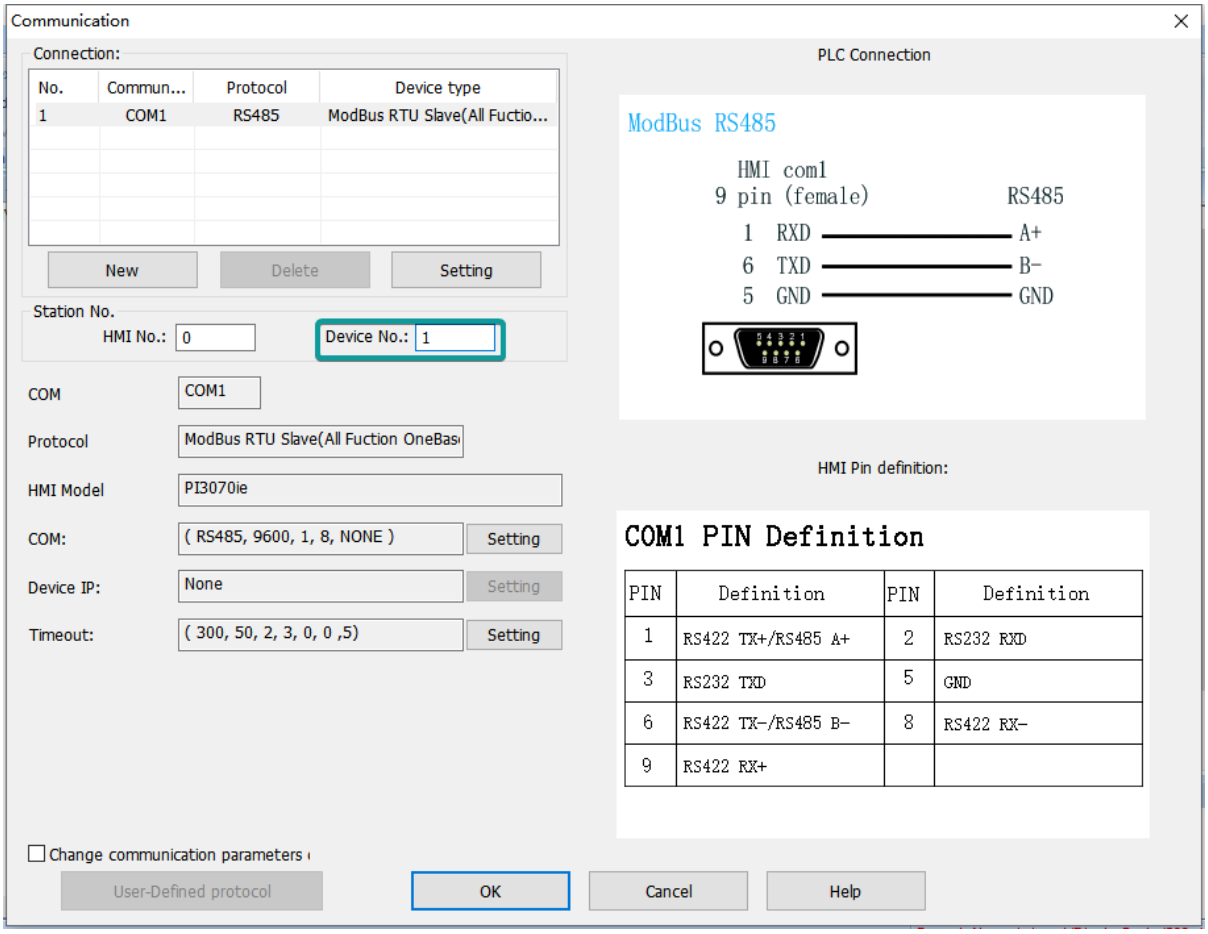
Supported Series: MODBUS RTU CONTROLLER

HMI works as MODBUS MASTER connecting with SLAVE.

The addresses in [All function] start from 0, while the addresses in [All function OneBaseAddress] start from 1 (offset 1).




Communication
Connection:
No.
Commun...
Protocol
Device type
1
COM1
RS485
ModBus RTU Slave(All Fuctio...
New
Delete
Setting
Station No.
HMI No.:
0
Device No.:
1
COM
COM1
Protocol
ModBus RTU Slave(All Fuction OneBas
HMI Model
PI3070ie
COM:
(RS485, 9600, 1, 8, NONE)
4
Setting
Device IP:
None
Setting
Timeout:
(300, 50, 2, 3, 0, 0 ,5)
Setting
Change communication parameters
User-Defined protocol
OK
Cancel
Help
PLC Connection
COM port setting
Connection:
RS485
Baud rate:
9600
Stop bits:
1
Data bits:
8
Parity:
NONE
OK
Cancel
HMI Pin definition:
COM1 PIN Definition
PIN
Definition
PIN
Definition
1
RS422 TX+/RS485 A+
2
RS232 RXD
3
RS232 TXD
5
GND
6
RS422 TX-/RS485 B-
8
RS422 RX-
9
RS422 RX+



HMI Settings

Items	Settings	Note
Protocol	MODBUS RTU Slave (All function)/(All function OneBaseAddress)	
Connection	RS485/RS232	
Baud rate	2400~187500	
Data bit	8	
Parity	Even/ Odd/ None	
Stop bit	1/2	
PLC station No.	0~255	

Address List

Type	Address Type	Function code & Description
Word	3	04 (read input register: read current binary value in one or more input registers)
		06 (write single register: write a binary value to a holding register)
		10 (write values to multiple addresses)
	4	03 (read holding register: read current binary value in one or more holding registers)

		06 (write single register: write a binary value to a holding register)
		10 (write values to multiple addresses)
	W6	03 (read holding register: read current binary value in one or more holding registers)
		06 (write single register: write a binary value to a holding register)
		10 (write values to multiple addresses)
	W16	03 (read holding register: read current binary value in one or more holding registers)
		10 (write values to multiple addresses)
Bit	0	01 (Read coil state)
		05 (Force a single coil to force the on/off state of a logic coil)
		0F (Write multiple bits, ie write continuously)
	1	02 (Read the input state)
		05 (Force a single coil to force the on/off state of a logic coil)
		0F (Write multiple bits)
	W5	01 (Read coil state to obtain the current state of a set of logic coils)
		05 (Force a single coil to force the on/off state of a logic coil)
		0F (Write multiple bits)
	W15	01 (Read coil state to obtain the current state of a set of logic coils)
		0F (Write multiple bits)

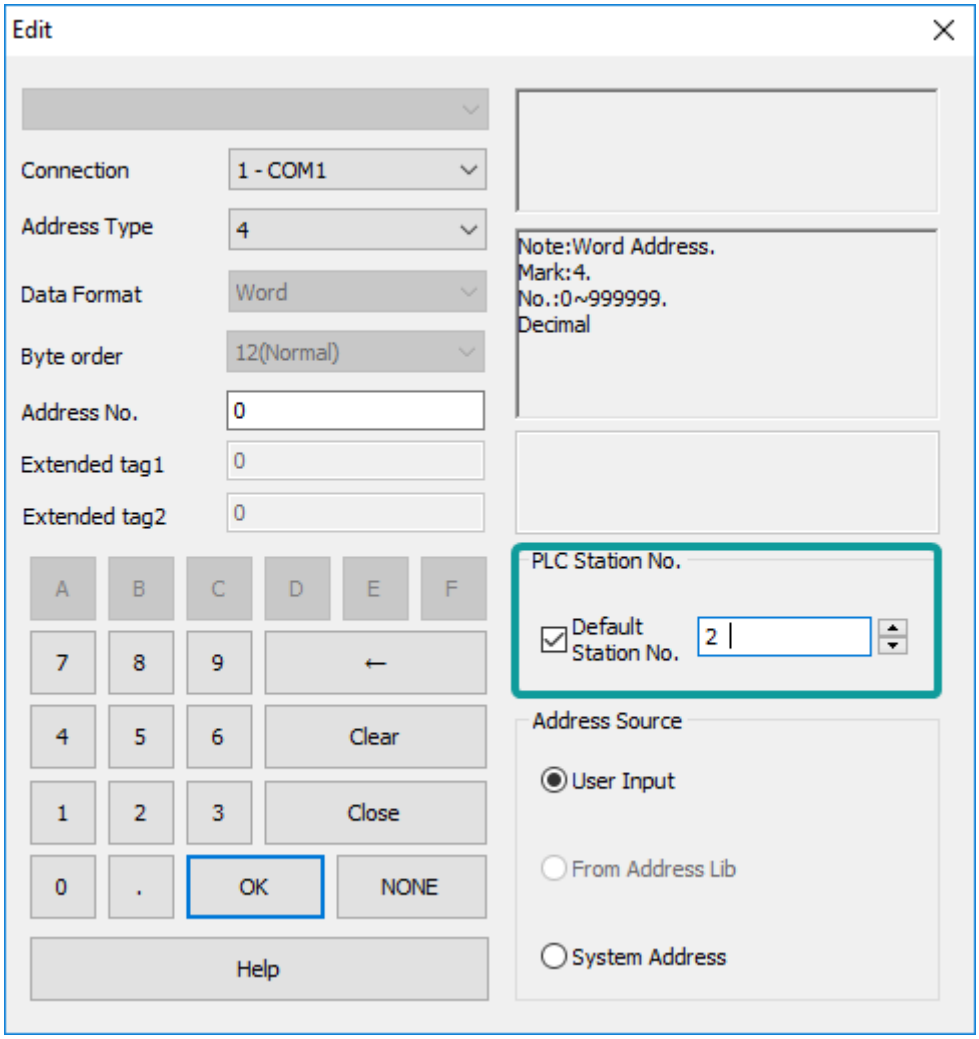
#Note:

Modbus can also support getting bit from the word, which could access the address such as 100.1 and other formats.

The function codes sent out are the same as those that read and write words.

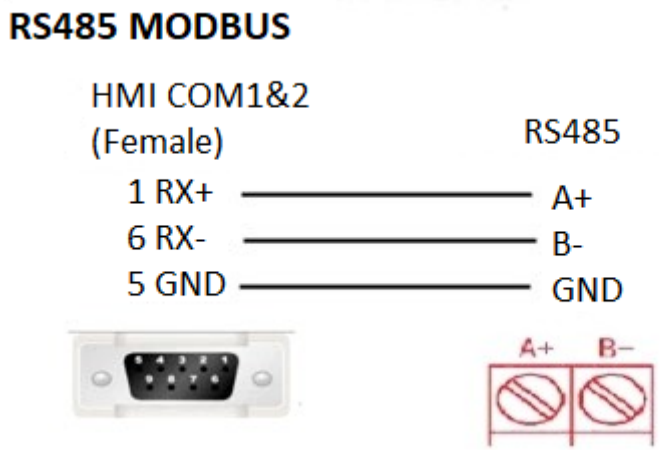
Station number for more than one slaves

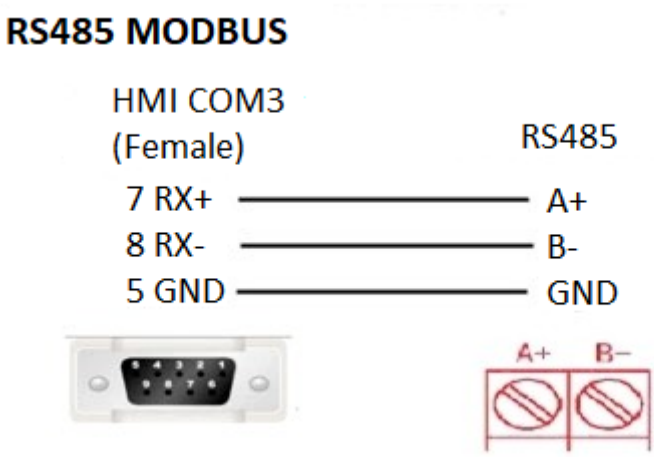
If there are more than one slaves connected to HMI, please set slave station number during editing address, as below shows.



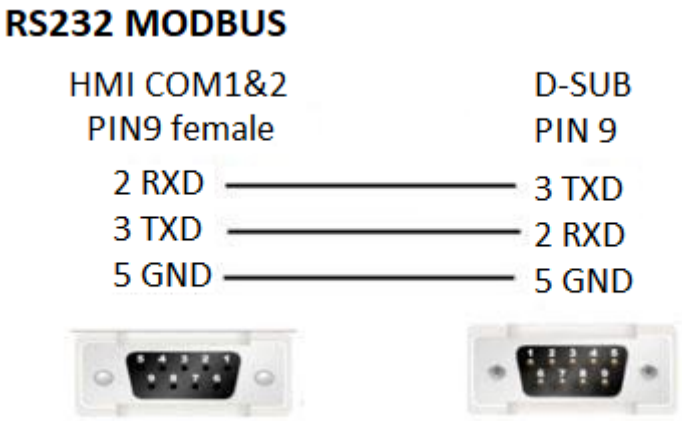
Cable Wiring

1) RS485





2) RS232



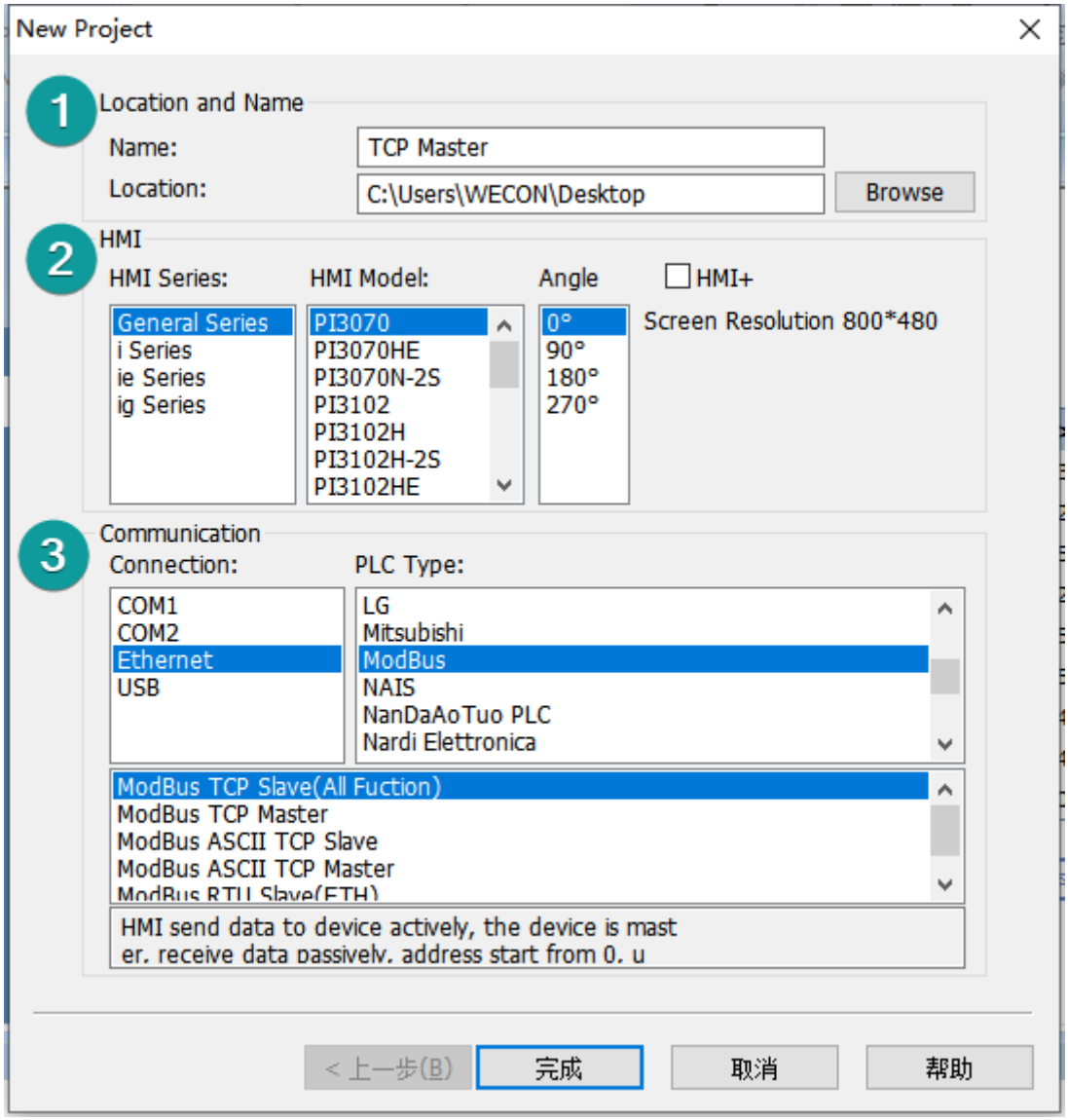
#Note:

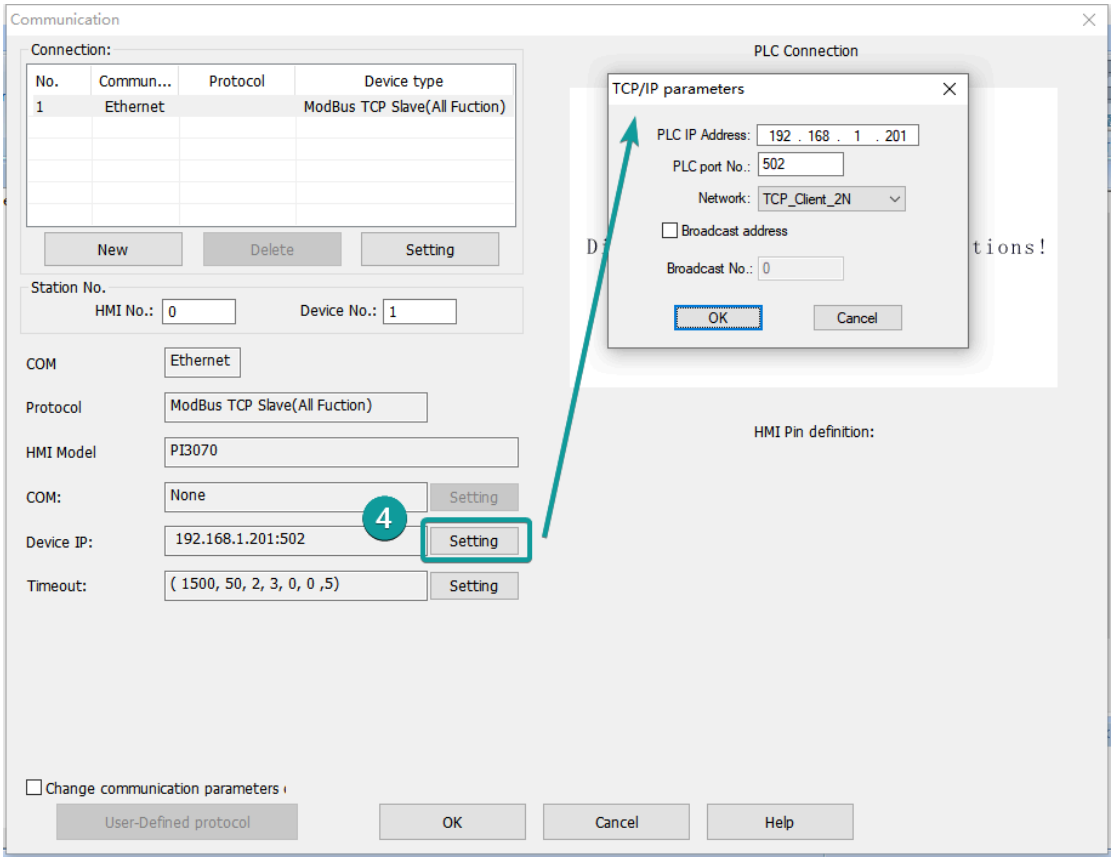
COM3 only available in PI8000/PI9000 series.

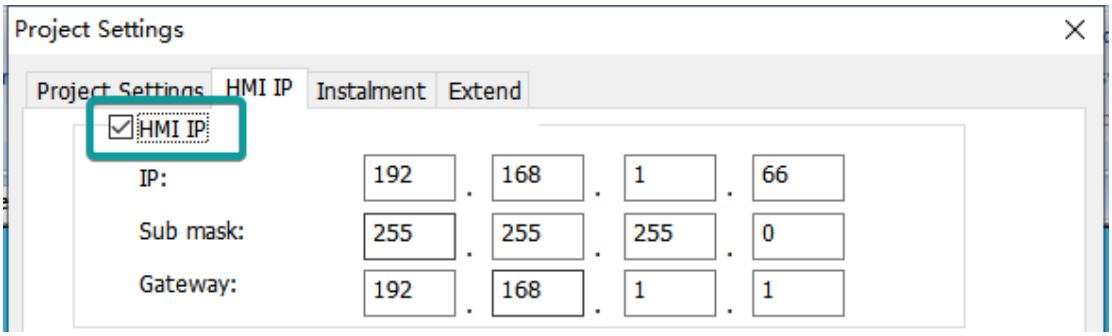
MODBUS TCP Slave (All function)

Supported series: MODBUS TCP controller

HMI works as MODBUS TCP MASTER connecting with TCP SLAVE


New Project
1
Location and Name
Name:
TCP Master
Location:
C:\Users\WECON\Desktop
Browse
2
HMI
HMI Series:
HMI Model:
Angle
HMI+
General Series
i Series
ie Series
ig Series
PI3070
PI3070HE
PI3070N-2S
PI3102
PI3102H
PI3102H-2S
PI3102HE
0°
90°
180°
270°
Screen Resolution 800*480
3
Communication
Connection:
PLC Type:
COM1
COM2
Ethernet
USB
LG
Mitsubishi
ModBus
NAIS
NanDaAoTuo PLC
Nardi Elettronica
ModBus TCP Slave(All Fuction)
ModBus TCP Master
ModBus ASCII TCP Slave
ModBus ASCII TCP Master
HMI send data to device actively, the device is mast
er. receive data passively. address start from 0. u
< 上一步(B)
完成
取消
帮助





HMI Setting

Items	Settings	Note
Protocol	MODBUS TCP Slave (All function)	
Connection	Ethernet	
Port No.	502	
PLC station No.	1	

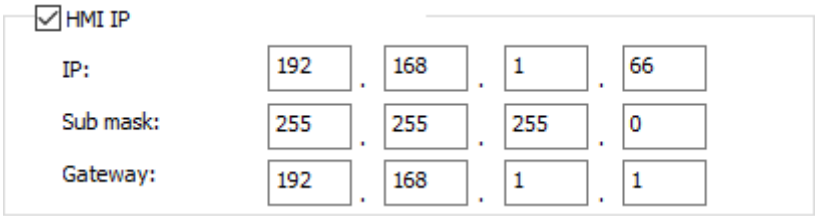
Address List

Type	Register	Function code & Description
Word	3	04 (read input register: read current binary value in one or more input registers)

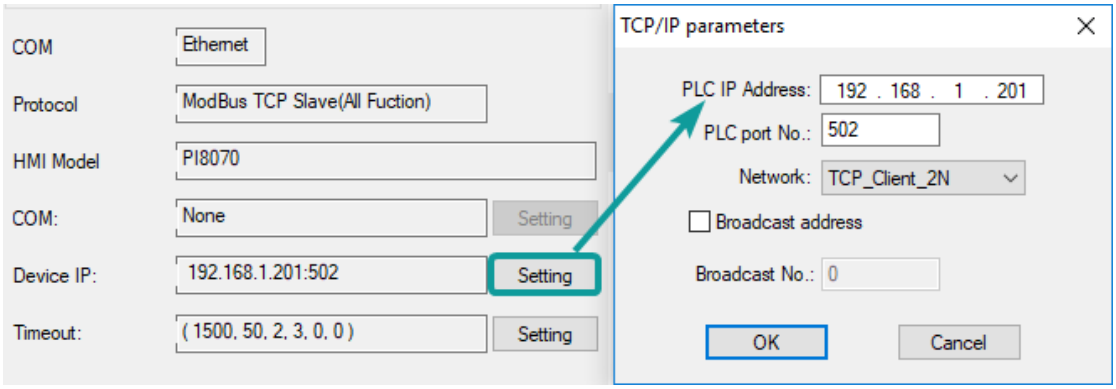
		06 (write single register: write a binary value to a holding register)
		10 (write values to multiple addresses)
	4	03 (read holding register: read current binary value in one or more holding registers)
		06 (write single register: write a binary value to a holding register)
		10 (write values to multiple addresses)
	W6	03 (read holding register: read current binary value in one or more holding registers)
		06 (write single register: write a binary value to a holding register)
		10 (write values to multiple addresses)
	W16	03 (read holding register: read current binary value in one or more holding registers)
		10 (write values to multiple addresses)
Bit	0	01 (Read coil state)
		05 (Force a single coil to force the on/off state of a logic coil)
		0F (Write multiple bits, ie write continuously)
	1	02 (Read the input state)
		05 (Force a single coil to force the on/off state of a logic coil)
		0F (Write multiple bits)
	W5	01 (Read coil state to obtain the current state of a set of logic coils)
		05 (Force a single coil to force the on/off state of a logic coil)
		0F (Write multiple bits)
	W15	01 (Read coil state to obtain the current state of a set of logic coils)
		0F (Write multiple bits)

Communication Settings

1) Enable HMI Ethernet in [Project Settings];



2) Set PLC IP in [Device IP] settings;



Cable Wiring

Omron

EC55

Supported device: EC55 temperature instrument

HMI Settings

Items	Settings	Note
Protocol	Omron EC55	
Connection	RS485 (9600, 2, 7, EVEN)	
Port No.	None	
PLC station No.	0	

Address List

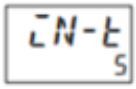
Type	Register	Device range	HMI range	Function
Double word	C0	0-13 (Hex)	0-19	Set read only parameter for area 0
	C1	0-4D(Hex)	0-77	Set Read/Write parameter for area 0
	C3	0-CD(Hex)	0-205	Set Read/Write parameter for area 1
Word	80	0-13(Hex)	0-19	Set read only parameter in area 0
	81	0-4D(Hex)	0-77	Set Read/Write parameter in area 0

83	0-CD(Hex)	0-205	Set Read/Write parameter in area 1
CP	-	0-6	Read controller intrinsic property
CS	-	0-2	Read controller states
CA	-	0-17	Action command

Device Settings

1) Omron E5CC PLC configuration

After entering the Communication Settings menu, please set the parameters to the default values for the following table. Press the cycle key of the instrument to enter the next setting.

1	**Press the Key for at least 3 seconds in the Operation Level.** The No. 1 display will flash when the keys are pressed for 1 s or longer. The display will change from the Operation Level to the Initial Setting Level.	Operation Level
2	**Press the Key for less than 1 second in the Initial Setting Level.** The display will change from the Initial Setting Level to the Communications Setting Level.	Initial Setting Level  Input Type Communications Setting Level Protocol Setting

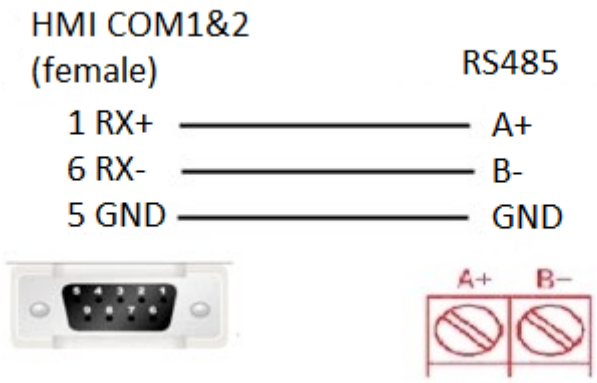
2) According to PLC configuration and communication port configuration information of the HMI, provide the corresponding steps and configuration screenshots. This configuration needs to communicate properly with the above PLC configuration. The project settings are as follows

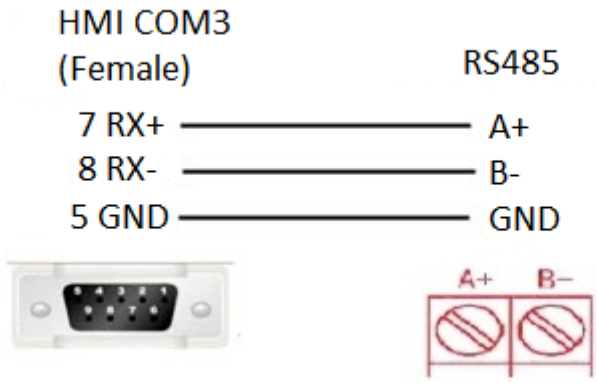
Item	Display	Set values	Settings	Default
Protocol setting	PSEL	CWF Mod	CompoWay/F/Modbus	CWF
Communications Unit No.	U-No	0 to 99	0 to 99	1
Communications baud rate	bPS	9.6/19.2/38.4/57.6 (Kbps)	9.6/19.2/38. 4/57.6 (kbps)	9.6
Communications data length	LEN	7 or 8 bits	7 or 8 bits	7
Stop bits	Sbit	1 or 2 bits	1 or 2 bits	2
Communications parity	PRTY	NONE EVEN odd	None, Even, Odd	EVEN
Send data wait time	SdWt	0 to 99	0 to 99 (ms)	20

#Note:

The communication settings for HMI should be consistent with this setting.

Cable Wiring





#Note:

1) COM3 only available in PI8000/PI9000 series.

2) CA address could not support continuous writing `function;`

3) Because of CP address intrinsic property: read control intrinsic property, so please place the character input part in use. Set address with CP0 and character length 10, used to display controller type. And place a number input part, set address with CP5 (cache size). Do not place other CP type address without CP0 in screen, otherwise CP type address is invalid

4) When set value into read & write address, it is necessary to switch the temperature instrument meter to the corresponding interface according to the menu of the instrument where the address locates, so that the value could be written, otherwise, the value could not be written; When the communication write setting of the instrument is turned off, the writing function is invalid. Writing function could be opened by using the 00 address of the CA register, which write 01 value.

5) When continuous writing of a value to a read-write address, please make sure all continuous writing address could be written. Otherwise, if one of these addresses could not be written, then all continuous writing commands will fail.

6) Because of the mechanism problem, this protocol could not support CompoWay/F function that is read-write function of variables in protocol document.

7) When using double-word address, set the data format to 32 bits, otherwise the read/write function is unable.

8) Please set the communication delay time of 10ms in setting, to avoid that the instrument may not be able to communicate in a short time due to too fast data access and too much connection requests.

9) Because of the particularity of the instrument, it is necessary to write the value of the address in the menu interface corresponding to the address, and to enter the menu where the address locates, so that the value could be written.

EtherNet/IP NX series

Supported series: Omron NX/NJ series

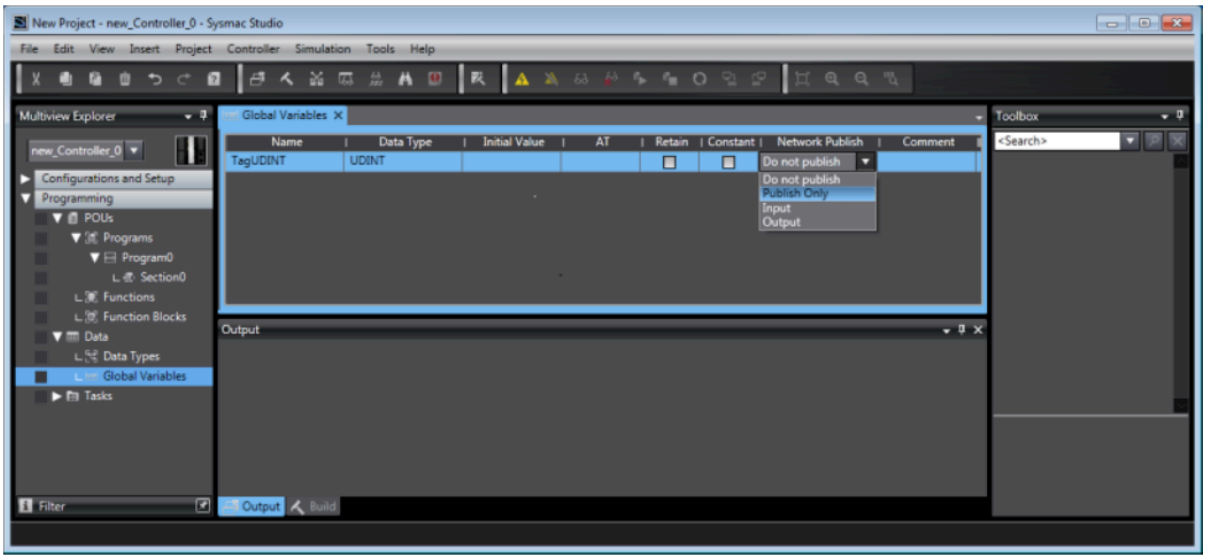
HMI Setting

Items	Settings	Note
Protocol	Omron NX Ethernet/IP	
Connection	Ethernet	
Port No.	44818	
PLC station No.	1	

Instruction

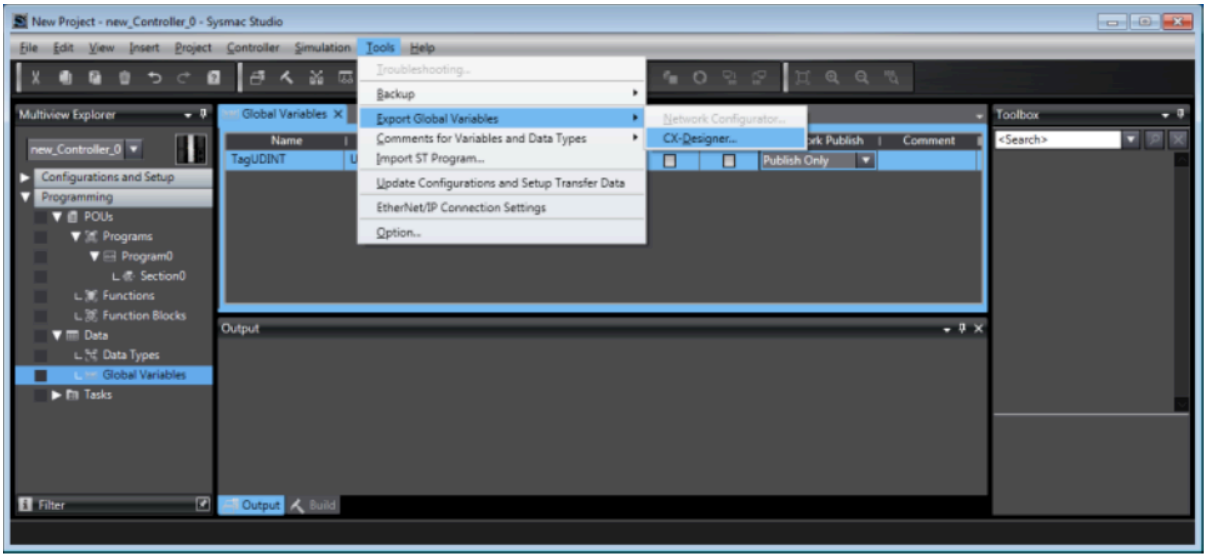
1) In Sysmac Studio, please select [Publish Only] for [Network Publish] when setting address tag.

2) When [Do not publish] is selected for a tag, different import methods may lead to different results. When import tags by [Get Tags from Device], the tag will be eliminated. If [Import tags] is selected, the tags will be imported, but the communication will not succeed.



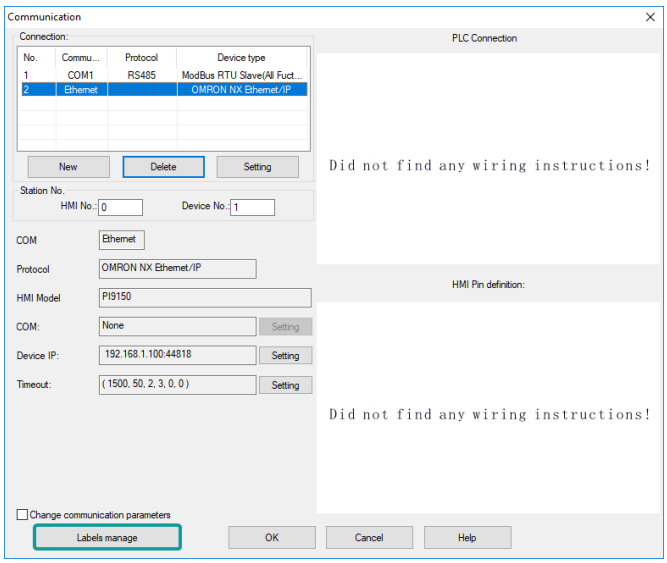
Export labels from Sysmac Studio

1) Launch Sysmac Studio, under Global Variables create the address labels, and thenselect [Tools] -> [Export Global Variables];

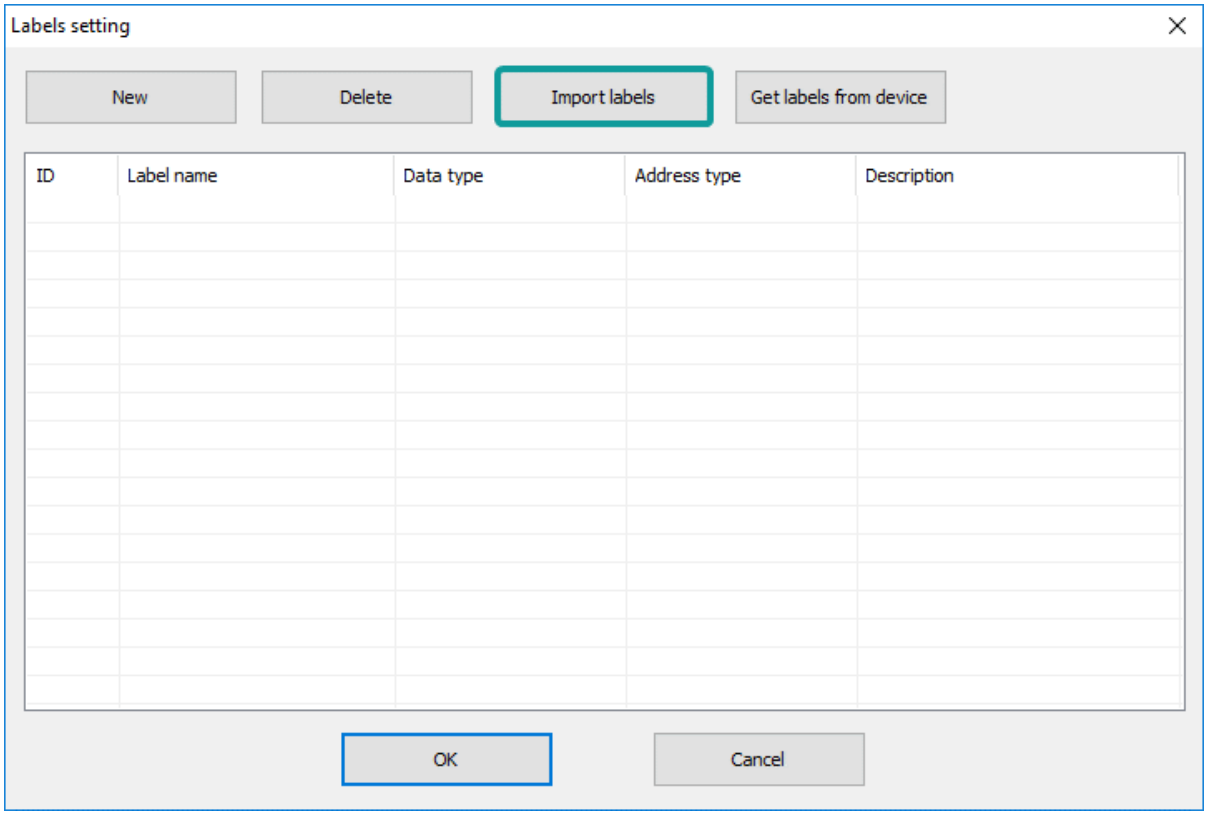


2) Launch PIStudio, in [Communication] Settings add Omron NX Ethernet/IP protocol;

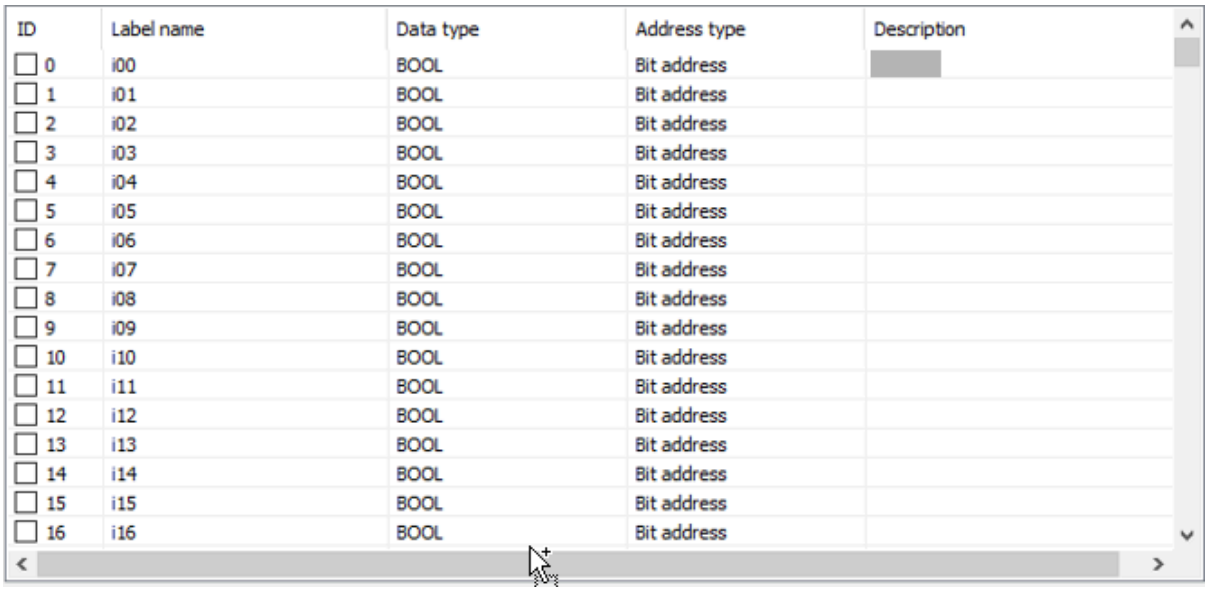
3) Click [Label manage];



4) Click [Import labels] and then select the file exported in step 1;

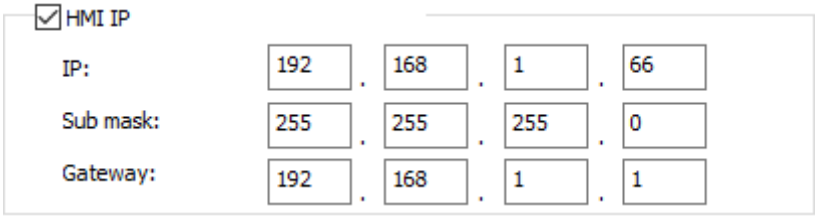


5) The Import Status field shows the result, click [OK] to finish importing address labels;

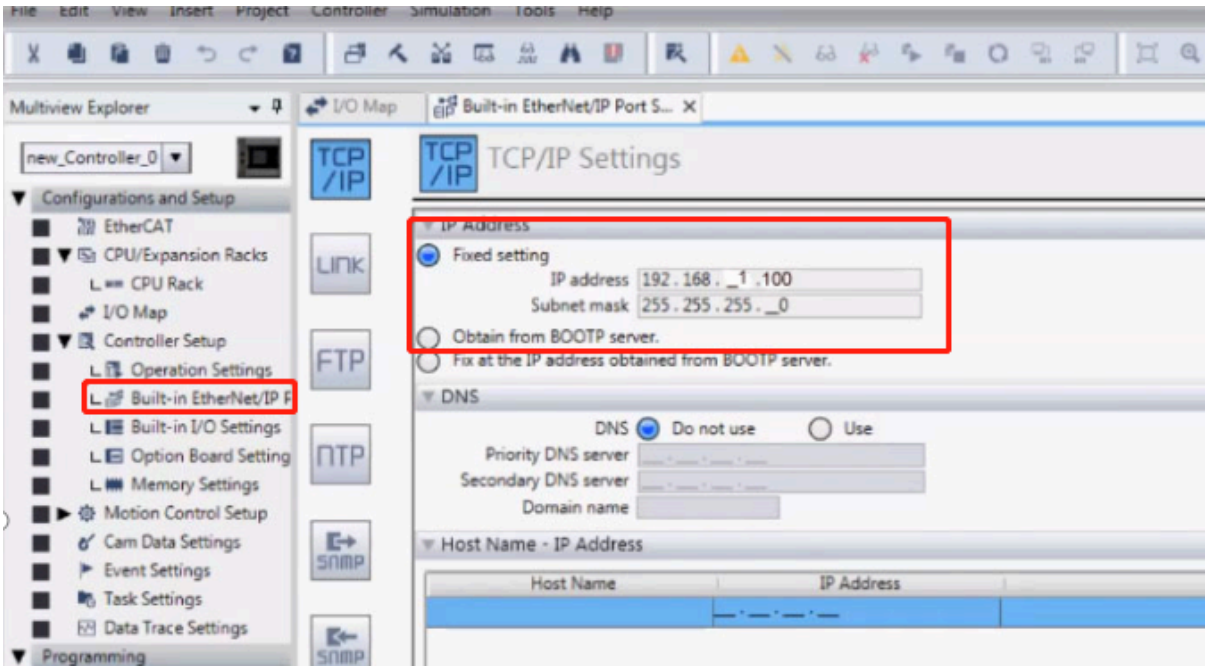


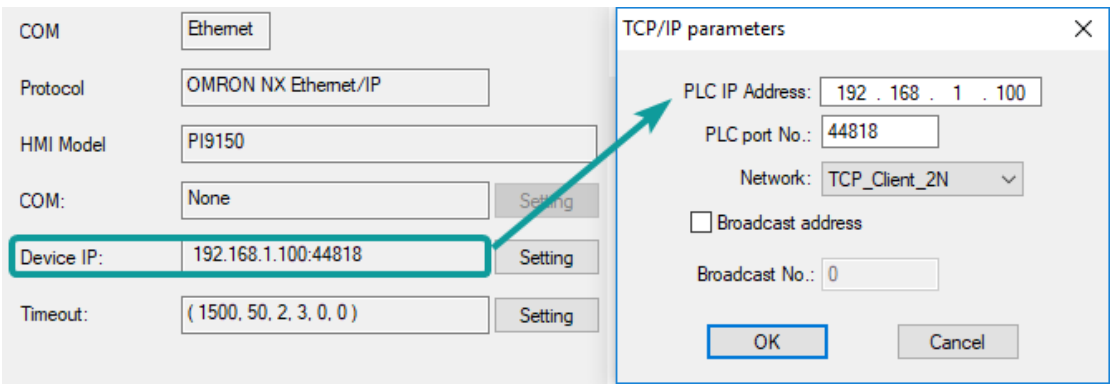
Communication Settings

1) Enable HMI Ethernet in [Project Settings];



2) Set PLC IP in [Device IP] settings;





Cable Wiring

OpenCAN

OpenCan is based on CAN2.0 standard; OpenCAN protocols that could be configured autonomously to accept and send frames.

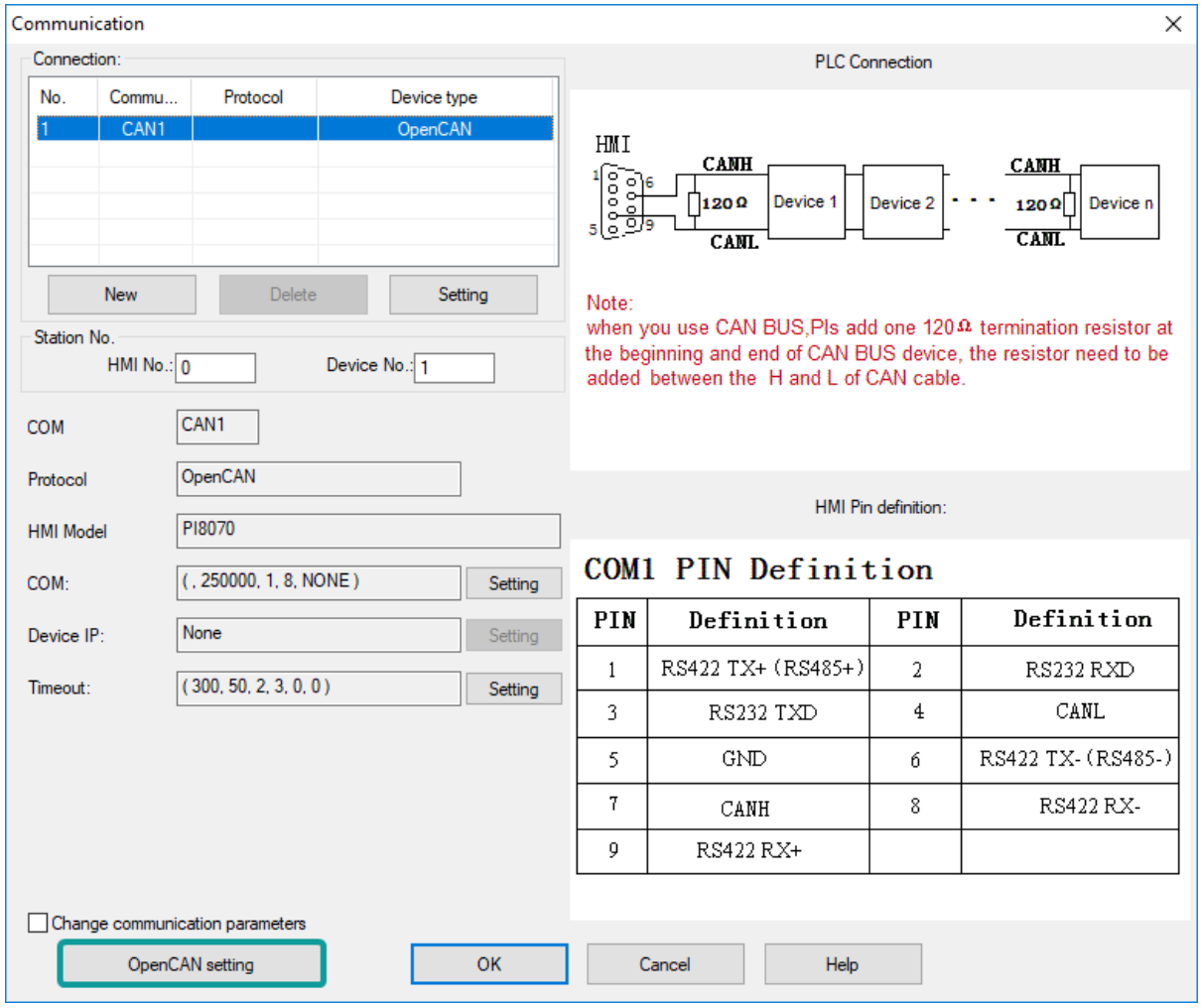
This protocol is only available in PI8000 series HMI.

HMI Settings

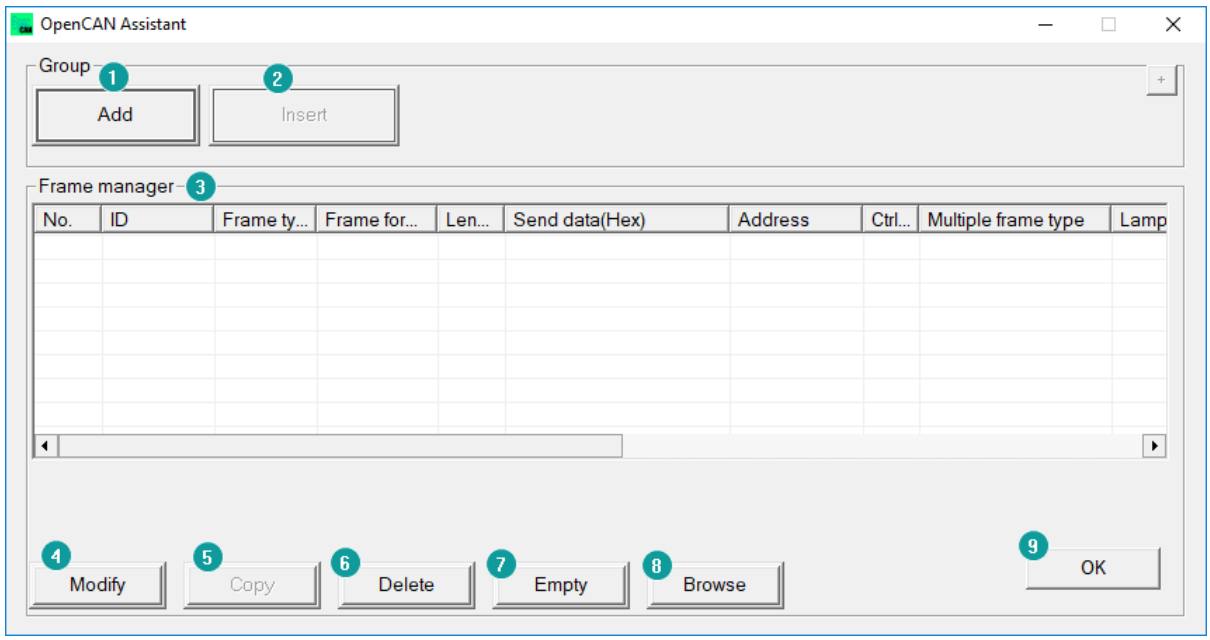
Items	Settings	Note
Protocol	OPENCAN	
Connection	CAN port	
Baud rate	250000	

CAN frame setting in HMI

1) Click [OpenCAN setting] button in communication setting window;

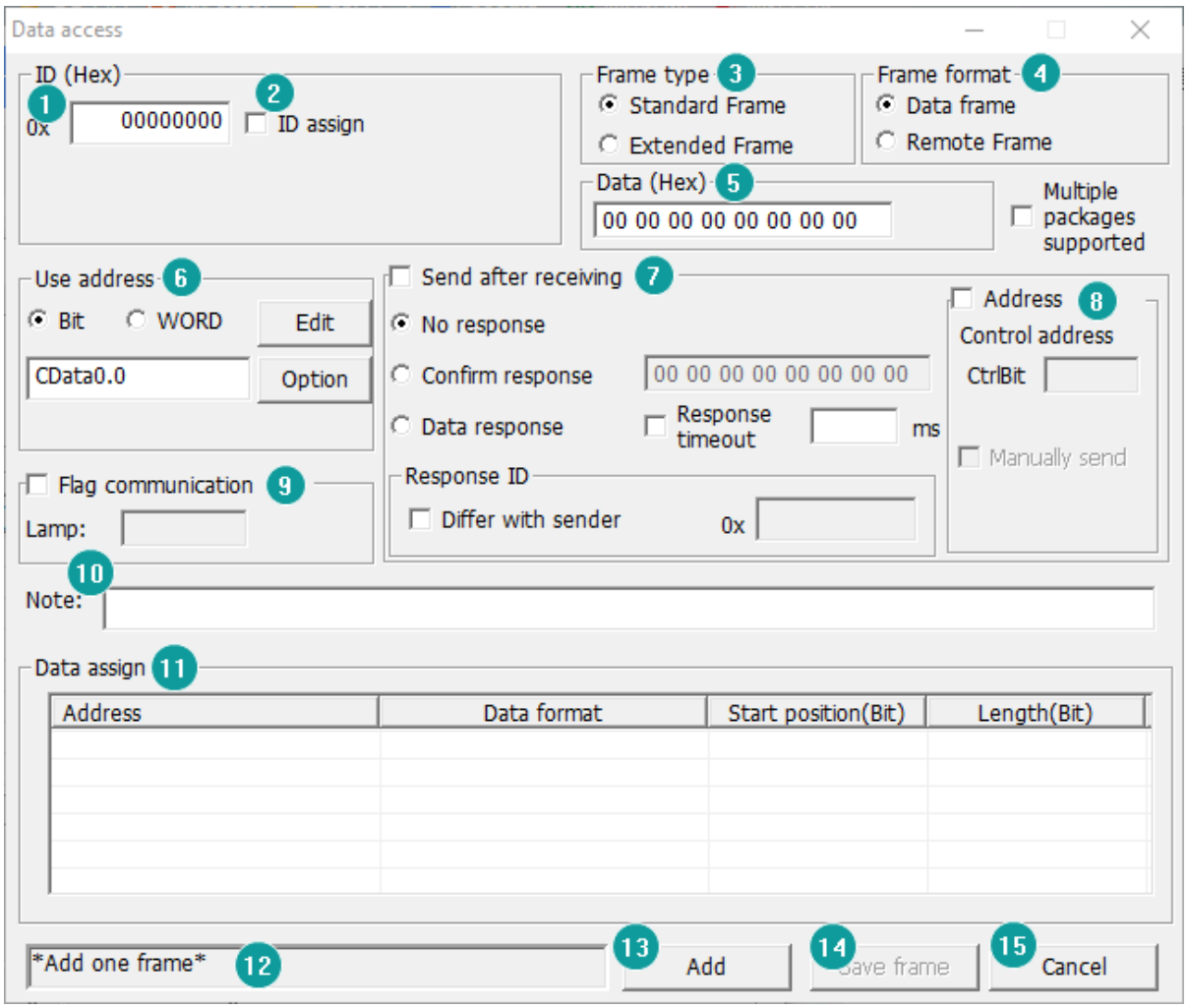


2) Click [Add] to create a new frame;



No	Items	Description
1	Add	add a frame related to register address
2	Insert	Select the position where you want to insert a frame, and click [Insert frame] to add a new frame in front of the current frame position
3	Frame manager	This list shows some of the main parameters for each frame that the user adds
4	Modify	Modify the frames in frame management
5	Copy	Copy one frame to another
6	Delete	Remove the selected frames from the list by modifying the frames in frame management. If no frames are selected in the list, the first frame is deleted.
7	Empty	All frames in the list are cleared
8	Browse	Displays configuration files in XML format in IE
9	OK	Complete the configuration of the frame and exit

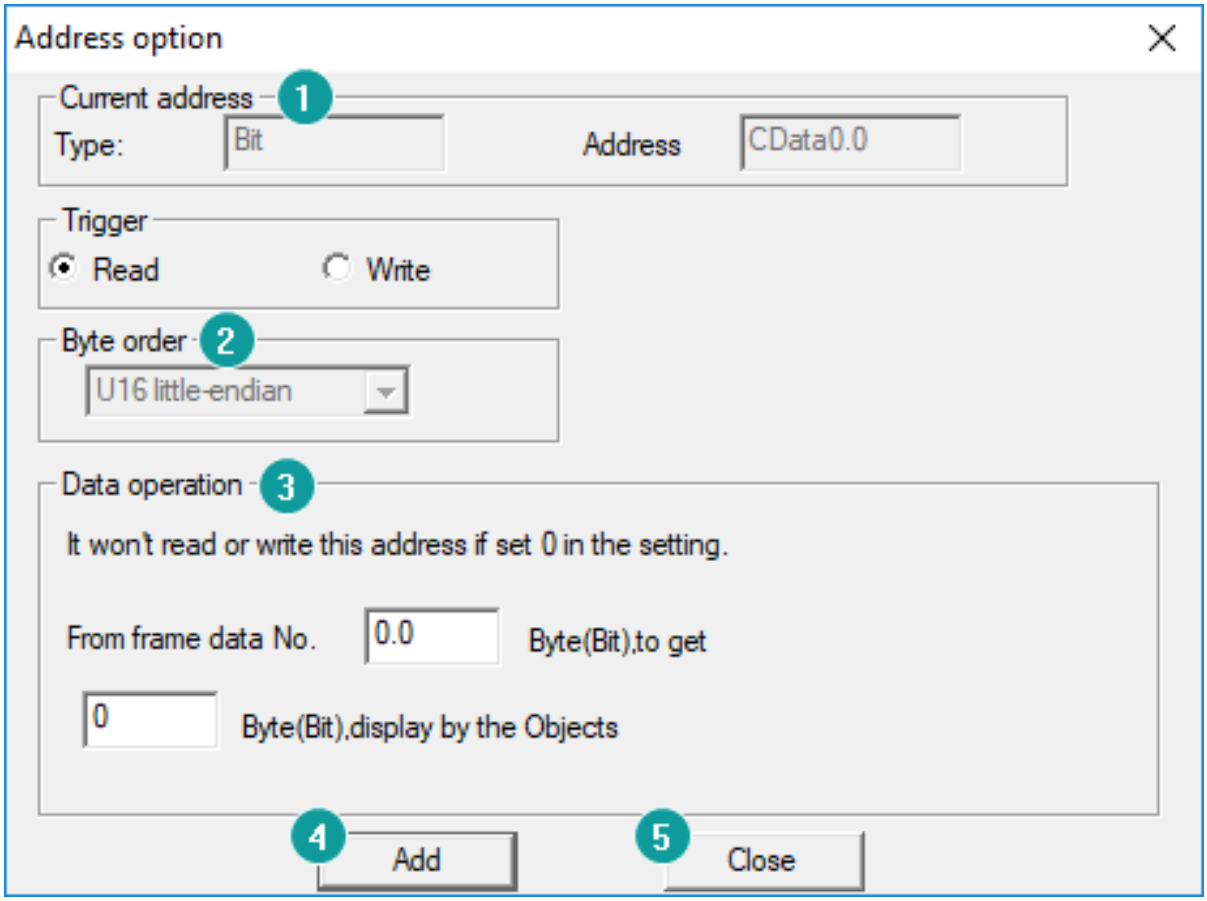
3) Set CANBUS frame in setting windows



No	Items	Description
1	ID	Set the ID of a can frame in hexadecimal format;
2	ID assign	split the ID by PF, PS, and SA;
3	Frame type	Select Standard frame or Extended Frame;
4	Frame format	Select between data frame and remote Frame;
5	Data	Set the data part of CAN frame, with two Numbers representing a hexadecimal number and Spaces spaced; Maximum support of 8 bytes is defined according to CAN message;
6	Use address	Set the register address related to the CAN frame, which corresponds to the register address set on the main state one by one. The data obtained from the address is assigned continuously; **Edit:** Set a bit or word address by its format; **Option:** Set address options related to frame, enter “register address option” interface, specifically browse the following “register address option” interface;
7	Data interactive configuration	There are two interactive modes of the touch screen. One is that the touch screen actively sends frames, and the device receives and processes and feeds back. The other, on the contrary, passively receives frames from the device for processing and feedback; Send after receiving: if this item is selected, the interaction of the touch screen will act as a passive party, and the touch screen will receive the CAN frame first and send feedback. Unchecked items interact in the opposite way; Feedback mode: feedback mode includes no response, confirm response and data response; No response: the device or touch screen will not receive feedback; Confirm response: the device or the touch screen will receive feedback with confirmation, which could be used to compare the data parts. If this function is used, the 20 addresses before and after this address should not be used. All addresses of cata10-cata30 could not be used with the reply confirmation function of cata20; Data response: the device or touch screen will receive feedback with data, and the data to be separated from the feedback frame should be set to store in the register address; response ID: if the address wants to receive data on a frame with a different

		ID, set this, check "different from sender", and enter a different ID in the following input box. Without this setting, the screen will receive and process a frame with the same ID as the sender; Response timeout: sets whether the response frame timeout;
8	Control address	If ticked, enable sending when the value of the corresponding control bit number (address) is non-0. Control bit: CtrlBit register range 0~255, if the control bit is ON, can instruction will run normally. Otherwise, it doesn't run; Manually send: a manually send tick indicates only one send;
9	Flag configuration	Communication control for each frame. Display OFF when communication is normal, and ON when communication is abnormal;
10	Note	Fill the text to explain the meaning of the frame;
11	Data assign	Preview the display in this table based on the address and the corresponding number of digits;
12	Current operation display	Display the description of current operation;
13	Add	Add a new frame;
14	Save frame	Save the configured frame format;
15	Cancel	Cancel the frame configuration;

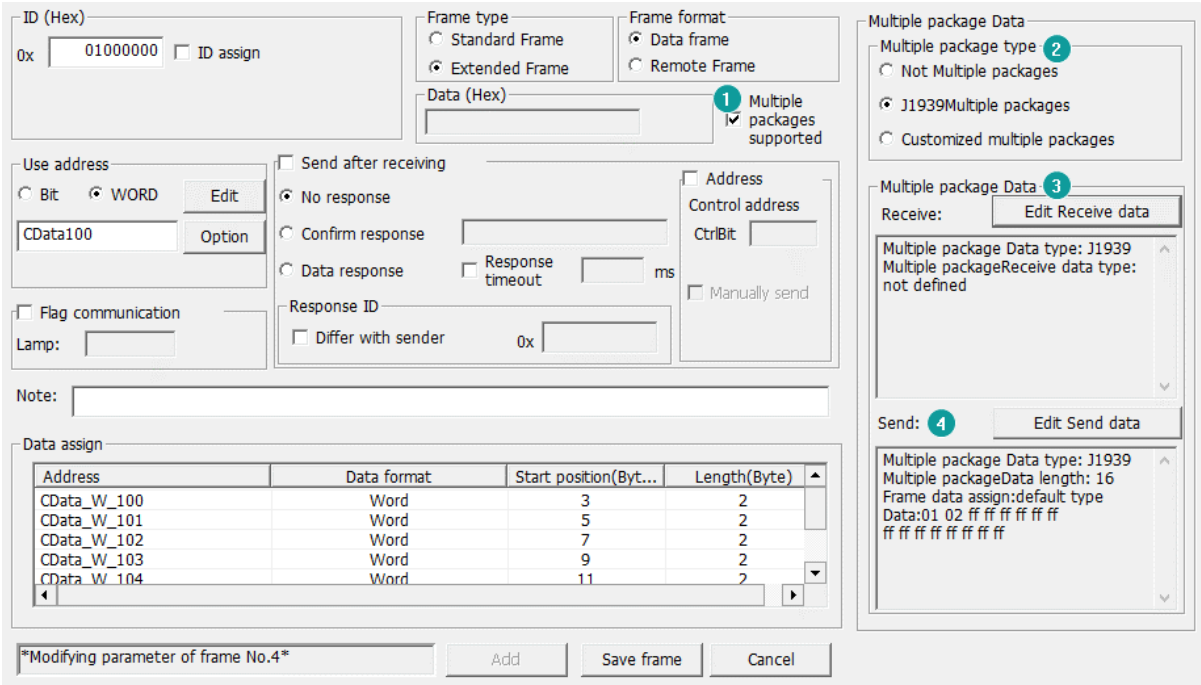
4) Set CAN address (Read or write operation);



No.	Item	Description
1	Current address	Displays the register type and register address set by the user in the data access interface
2	Trigger	Two operations, "read" and "write," are based on on-screen registers If "read" is selected, the register address is reading device data in a manner of sending frames set by the user in a loop. If "write" is selected, the screen data of the register address will be written into the device. The writing mode is that the user makes a write operation on the screen, which will trigger the sending of a frame set by the user.
3	Data operation	The read and write operations in the trigger conditions are set accordingly. If the trigger condition is a read operation, this section needs to set the position and length of the data to be obtained at the current address in the frame. If the trigger condition is a writing operation, there are two situations: • If the "add writing data to the frame" option is not selected, the frame set by the user will be sent

		directly when the user writes on the screen. • Select the "add the written data to the frame" option, and when the user writes on the screen, the program will insert the data in the frame set by the user and send the written data to the frame set by the user according to the data insertion position and length set by the user.
	Position and length input format	If the register type is a bit address, the decimal point is required to represent the bits in the byte. For example, 1.1 represents the first bit of the first byte of 8 bytes in the data frame, and the length is in bits, and so on. If the register type is word address, the integer only needs to represent the byte, such as 1, which represents the first byte of 8-byte data in the data frame, and the unit of length is byte, and so on.
4	Add	Add current configuration
5	Close	Close the configuration window to exit

Multiple Packages Settings



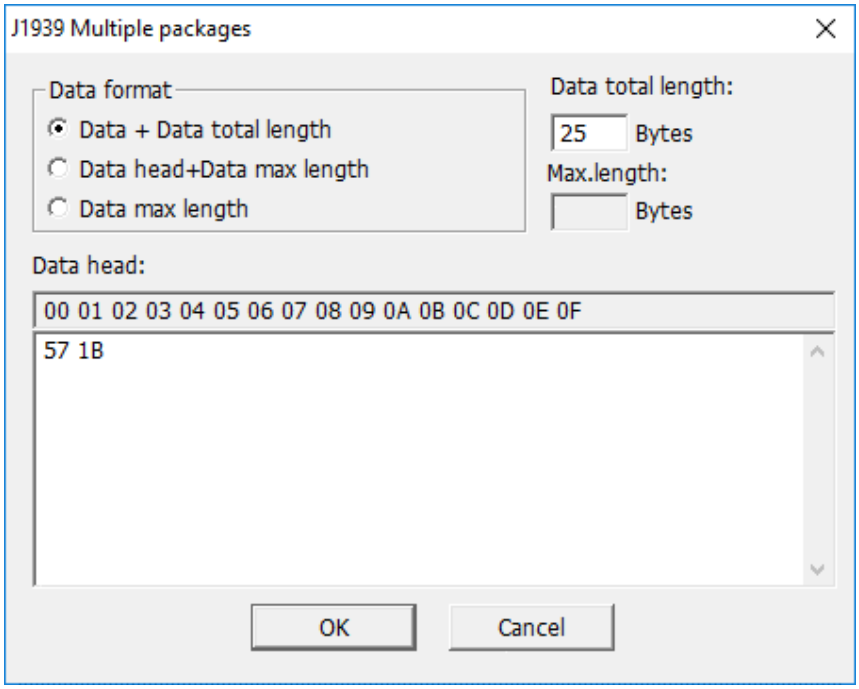
1) Check [Multiple packages supported] to open [Multiple package data] window, as below show.

2) Select Multiple package type

- Not Multiple packages
- J1939 Multiple packages
- Customized Multiple packages

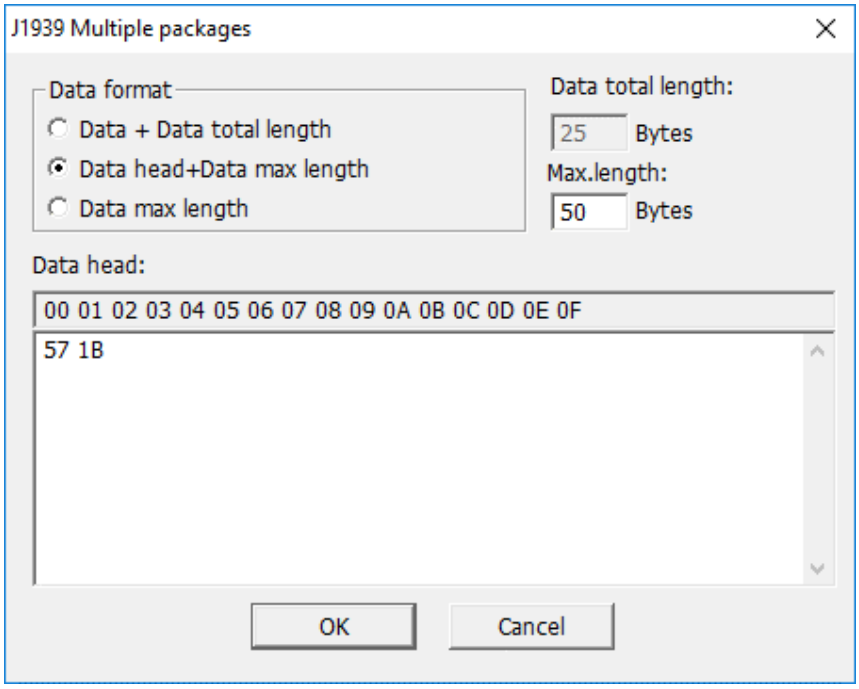
3) Click [Edit Receive data] for [Receive] settings

- Start code+ Total length (J1939)



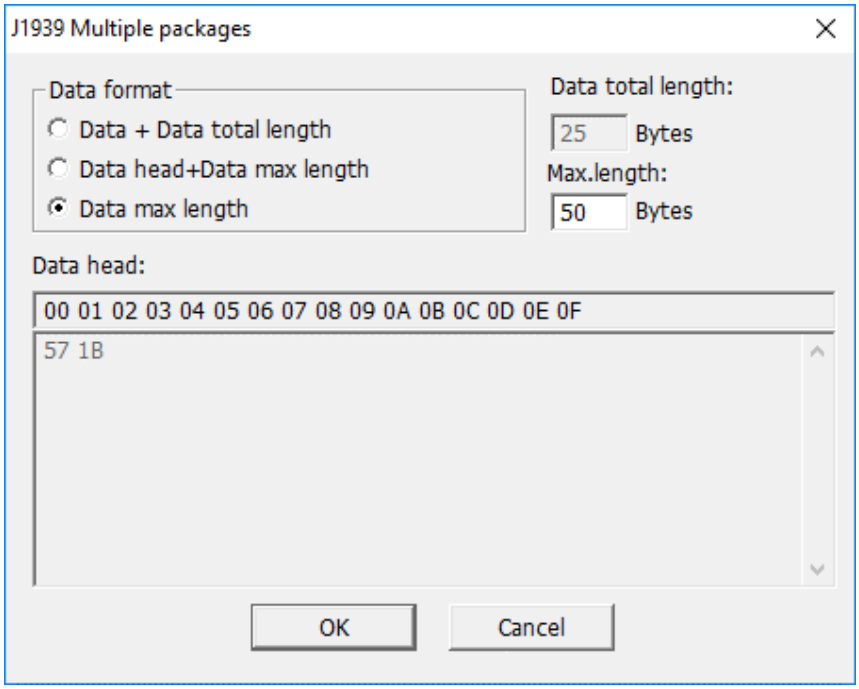
As set above set, J1939 command is received by the HMI, only when its length is 25 bytes, and the start code is 0x57, 0x1B;

- Start code + Data max length (J1939)



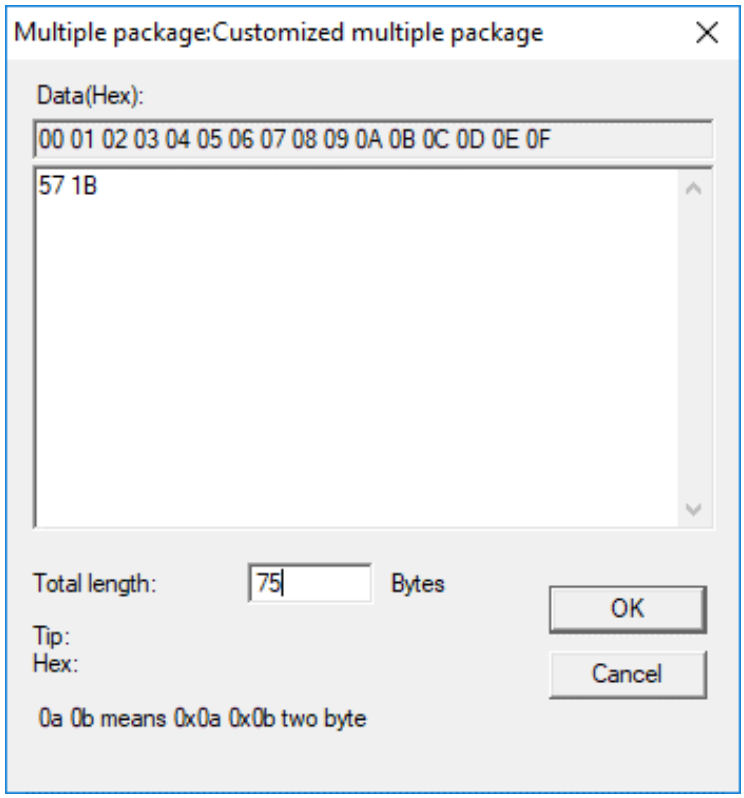
As set above set, J1939 command is received by the HMI, only when its length less than 50 bytes, and the start code is 0x57, 0x1B;

- Data max length (J1939)



As set above set, J1939 command is received by the HMI, only when its length less than 50 bytes.

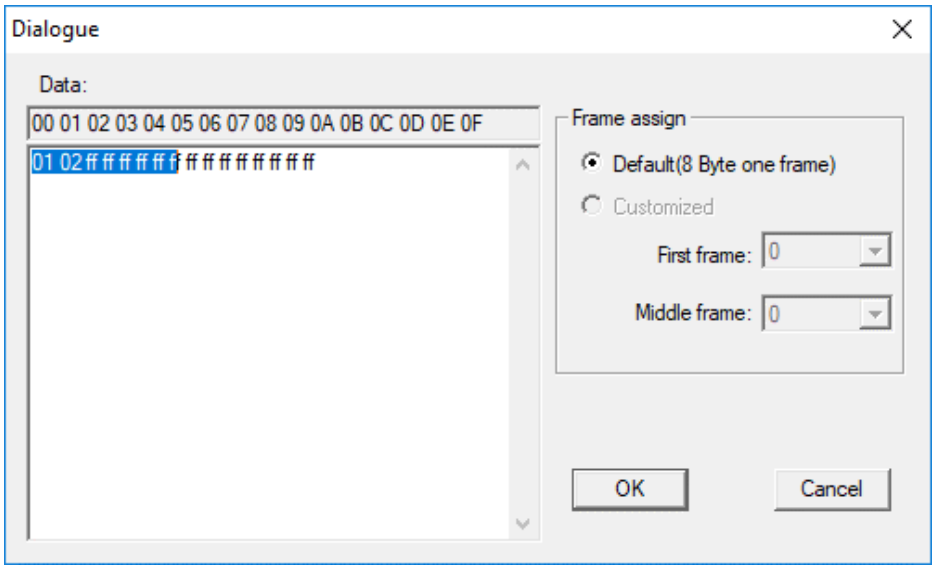
- Customized multiple package



As set above, It is received by the HMI, when the first frame starts with 0X57 0X1B, and the sum of the data lengths of multiple frames is equal to 79 bytes.

4) Click [Edit Send data] for [Send] setting

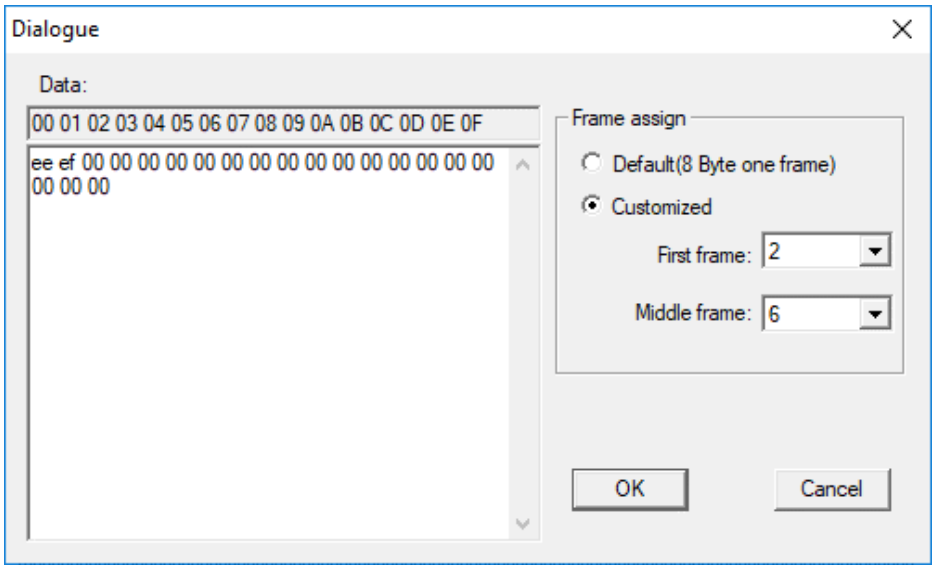
- J1939



[Data] is all data to be sent.

Since the frame of the J1939 frame contains the number of the data packet, so the data sent is: the first byte (number) + 7 bytes of data. If it is less than 7 bytes, it is sent in the actual number of bytes.

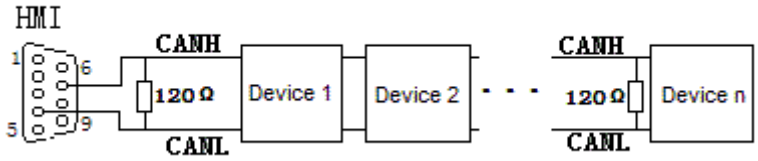
- Customized multiple package



[Data] is all data to be sent.

As set above, fist frame length is 2 bytes, and others are sent with 6 bytes for every frame, if the last frame is less than 6 bytes, send according to the actual length.

Cable Wiring



#Note:

The address interval between each frame need to be more than a word address;

SHIMADEN

FP23

Supported series: SHIMADEN FP23 series

HMI Setting

Items	Settings	Note
Protocol	SHIMADEN FP23 series	
Connection	RS485 (9600, 1, 7, EVEN)	
Port No.	None	
PLC station No.	0	

Address List

Device address	HMI register	Address range	Type
0040-0043(HEX)	FP040	100064-200067	Read only
0100-010B(HEX)	FP100	100256-200267	Read only
0110-0142(HEX)	FP110	100272-200322	Read only
0182-0252(HEX)	FP182	100386-200594	Write only
0280-0281(HEX)	FP280	100640-200641	Read only
0300-030B(HEX)	FP300	100768-200779	Read and write
0380-039F(HEX)	FP380	100896-200927	Read and write
0400-04D7(HEX)	FP400	101024-201239	Read and write
0500-05B0(HEX)	FP500	101280-201456	Read and write
0600-0670(HEX)	FP600	101536-201814	Read and write
0720-0738(HEX)	FP720	101824-201848	Read and write
0800-083F(HEX)	FP800	102048-202111	Read and write
0900-0952(HEX)	FP900	102304-202386	Read and write
	Ctrl	0-2	

#Note:

1) The upper 2 bits of the address of the HMI register are taken as the sub address, and the real address is the last four bits (for example, if the address is 100256, then 10 is the sub address as 1, and 0256 is the real address);

2) The address range in the table is only divided by the start and end addresses, and some of the addresses in the range have no corresponding address in FP23;

3) The Ctrl register is used to store the control group number and BCC check mode.

Ctrl Register Description

1) The Ctrl register is a special register that does not communicate with the temperature controller. User needs to assign value in the screen according to the settings as in the temperature controller.

2) Ctrl0 indicates the setting of the control character, the valid values are 1, 2, 3 respectively, and the corresponding control group is: STX_ETX_CR , STX_ETX_CR LF and @_:_CR .

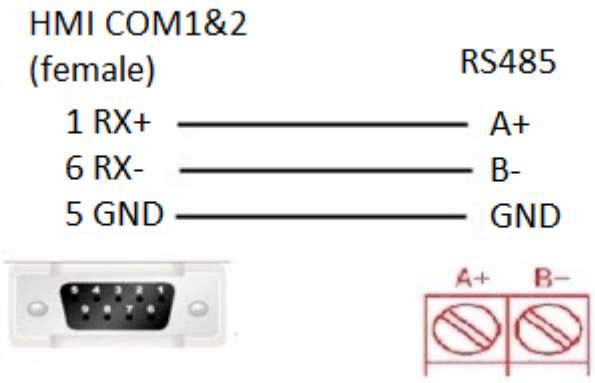
3) Ctrl1 indicates the BCC block check mode. The valid value range is 1-4. The corresponding check mode is: 1.ADD, 2.ADD_two's cmp, 3.XOR, 4.None;

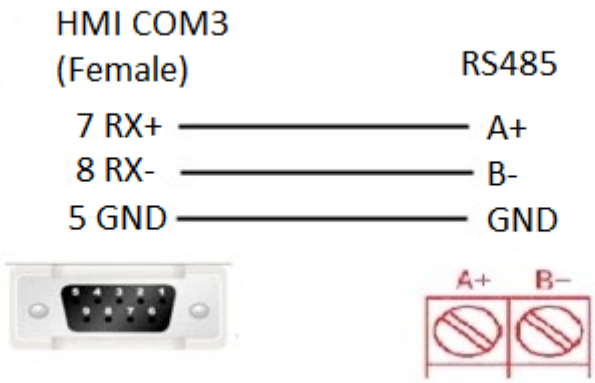
4) Ctrl3 reserved

#Note:

After reloading the HMI project or restarting the HMI, HMI will reset the value of ctrl0 and ctrl1 as 1, so user need to set these two values to make it the same as it in the temperature controller, then communication will be normal.

Cable Wiring





#Note:

COM3 only available in PI8000/PI9000 series.

SR90

Supported series: SHIMADEN SR90 series

HMI Setting

Items	Settings	Note

Protocol	SHIMADEN SR90 protocol
Connection	RS485 (1200, 1, 7, EVEN)
Port No.	None
PLC station No.	0

Address List

Device address	HMI register	Address range	Type
0040-0043 (HEX)	SR040	100064-100067	Read only
0100-010A(HEX)	SR0100	100256-100266	Read only
0182-018C(HEX)	SR0182	100386-100396	Write only
0300-04FE(HEX)	SR0300	100768-101278	Write/read
0500-050B(HEX)	SR0500	101280-101291	Write/read
0590-0611(HEX)	SR0590	101424-101553	Write/read
0701-0709(HEX)	SR0701	101793-101801	Write/read
	Ctrl	0-2	--

#Note:

1) The upper 2 bits of the address of HMIs are taken as the sub address, and the real address is the last four bits (for example, if the address is 100256, then 10 is the sub address as 1, and 0256 is the real address);

2) The address range in the table is only divided by the start and end addresses, and some of the addresses in the range have no corresponding address in SR90;

3) The Ctrl register is used to store the control group number and BCC check mode. See how to use it below;

Ctrl Register Description

1) The Ctrl register is a special register that does not communicate with the temperature controller. User needs to assign value in the screen according to the settings as in the temperature controller.

2) Ctrl0 indicates the setting of the control character, the valid values are 1, 2, 3 respectively, and the corresponding control group is: STX_ETX_CR , STX_ETX_CR LF and @_:_CR .

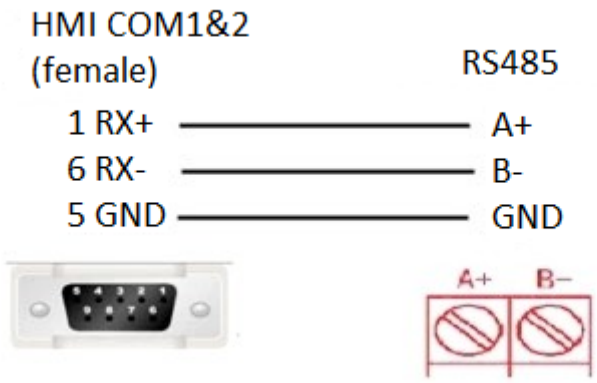
3) Ctrl1 indicates the BCC block check mode. The valid value range is 1-4. The corresponding check mode is: 1.ADD, 2.ADD_two's cmp, 3.XOR, 4.None;

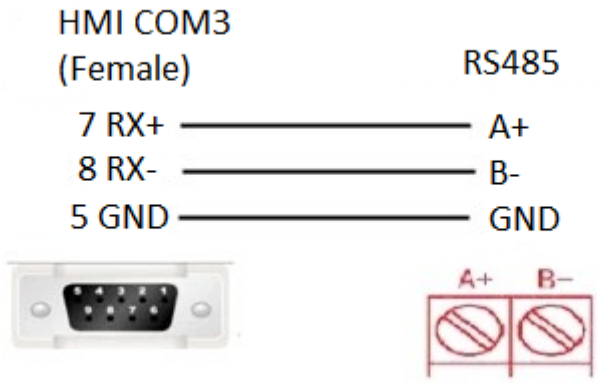
4) Ctrl3 reserved

#Note:

After reloading the HMI project or restarting the HMI, HMI will reset the value of ctrl0 and ctrl1 as 1, so user need to set these two values to make it the same as it in the temperature controller, then communication will be normal.

Cable Wiring





#Note:

COM3 only available in PI8000/PI9000 series.

MR13 series(standard protocol)

Supported series: SHIMADEN MR13 series

HMI Setting

Items	Settings	Note
Protocol	SHIMADEN standard protocol	
Connection	RS485 (1200, 1, 7, EVEN)	
Port No.	None	
PLC station No.	0	

Address List

Device address	HMI register	Address range	Type
0100-010B(HEX)	MR100	100256-300267	Read only
0111-0126(HEX)	MR111	100273-300294	Read only
0184-0192(HEX)	MR184	100388-300402	Write only
0280-0282(HEX)	MR280	100640-300642	Read only
0300-030B(HEX)	MR300	100768-300779	Read/write
0314-0317(HEX)	MR314	100788-300791	Read/write

031A(HEX)	MR31A	100794-300794	Read/write
0320-0321(HEX)	MR320	100800-300801	Read/write
0400-0504(HEX)	MR400	101024-301284	Read/write
0506(HEX)	MR506	101286-301286	Read/write
0510-0514(HEX)	MR510	101296-301300	Read/write
0516-0524(HEX)	MR516	101302-301316	Read/write
0526(HEX)	MR526	101318-301318	Read/write
0580-08C3(HEX)	MR580	101408-302243	Read/write
--	Ctrl	0-2	--

#Note:

1) The upper 2 bits of the address of the HMI register are taken as the sub address, and the real address is the last four bits (for example, if the address is 100256, then 10 is the sub address as 1, and 0256 is the real address);

2) The address range in the table is only divided by the start and end addresses, and some of the addresses in the range have no corresponding address in MR13;

3) The Ctrl register is used to store the control group number and BCC check mode.

Ctrl Register Description

1) The Ctrl register is a special register that does not communicate with the temperature controller. User needs to assign value in the screen according to the settings as in the temperature controller.

2) Ctrl0 indicates the setting of the control character, the valid values are 1, 2, 3 respectively, and the corresponding control group is: STX_ETX_CR, STX_ETX_CR LF and @_:_CR .

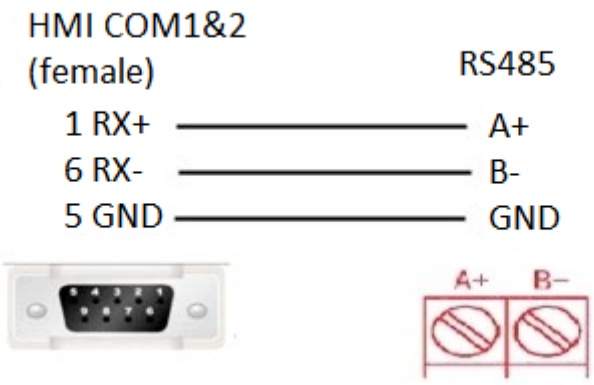
3) Ctrl1 indicates the BCC block check mode. The valid value range is 1-4. The corresponding check mode is: 1.ADD, 2.ADD_two's cmp, 3.XOR, 4.None;

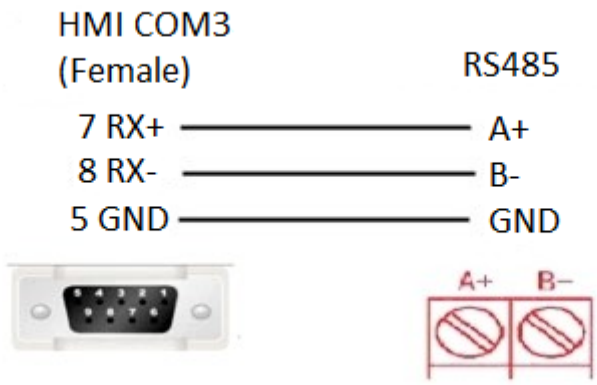
4) Ctrl3 reserved

#Note:

After reloading project or restarting the HMI, HMI will reset the value of ctrl0 and ctrl1 as 1, so user need to set these two values to make it the same as it in the temperature controller, then communication will be normal.

Cable Wiring





#Note:

COM3 only available in PI8000/PI9000 series.

Siemens

S7-200 Smart Ethernet

Supported Series: Siemens S7-200 SMART Series Ethernet Module.

Website: http://www.siemens.com/entry/cc/en/

HMI Setting

Items	Settings	Note
Protocol	Simens S7-200 Smart Ethernet	
Connection	Ethernet	
Port No.	102	
PLC station No.	2	

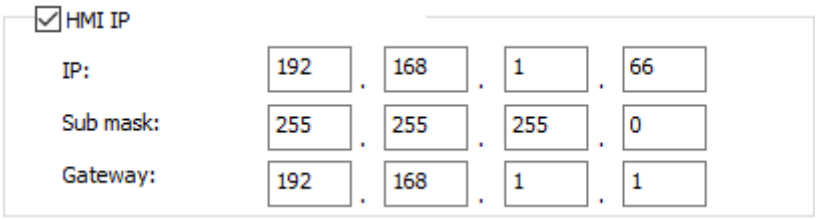
Address List

Type	Device register	HMI register	Format	Range	Note
Bit	I	I	I ddddd.o	0.0~99999.7	
	Q	Q	Q ddddd.o	0.0~99999.7	
	V	VWbit	VWbit ddddd.o	0.0~99999.7	
	V	V	V ddddd.o	0.0~99999.7	
	M	M	M ddddd.o	0.0~99999.7	
	SM	SM	ddddd.o	0.0~99999.7	
	S	S	ddddd.o	0.0~99999.7	Read only
	T	T	ddddd	0~99999	Timer state, read only
	C	C	ddddd	0~99999	Counter state, read only
Word	I	IW	IW ddddd	0~99999	
	Q	QW	QW ddddd	0~99999	
	AI	AIW	AIW ddddd	0~99999	
	AQ	VB	VB ddddd	0~99999	

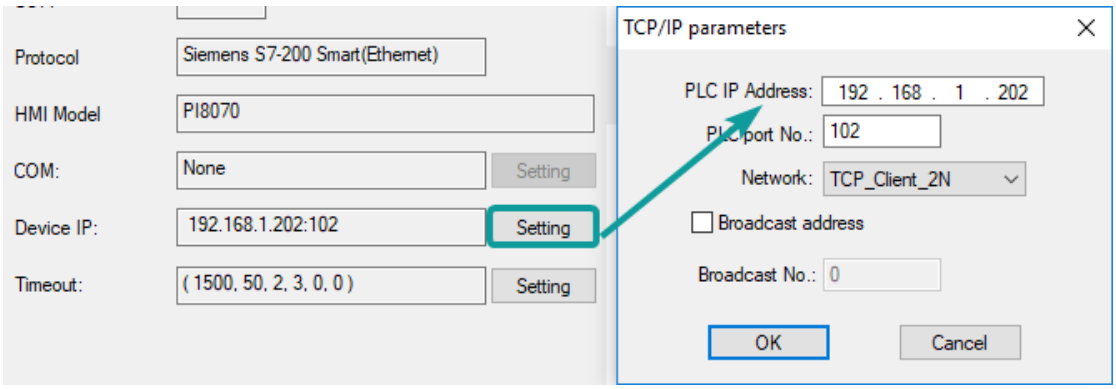
V	VW	VW ddddd	0~99998	VW0=VB (0~1) VW2=VB (2~3) Address value is a multiple of 2
V	VD	VD ddddd	0~99998	VD0=VB (0~3) VD2=VB (4~7) Address value is a multiple of 4
M	MB	MB ddddd	0~99999	
M	MW	MW ddddd	0~99999	MW0=MB(0~1) MW2=MB(2~3) Address value is a multiple of 2
M	MD	MD ddddd	0~99999	MD0=MB(0~3) MD4=MB(4~7) Address value is a multiple of 4
T	TW	TW ddddd	0~99999	Value of timer
C	CW	CW ddddd	0~99999	Value of counter
W	SW	SW ddddd	0~99999	

Communication Settings

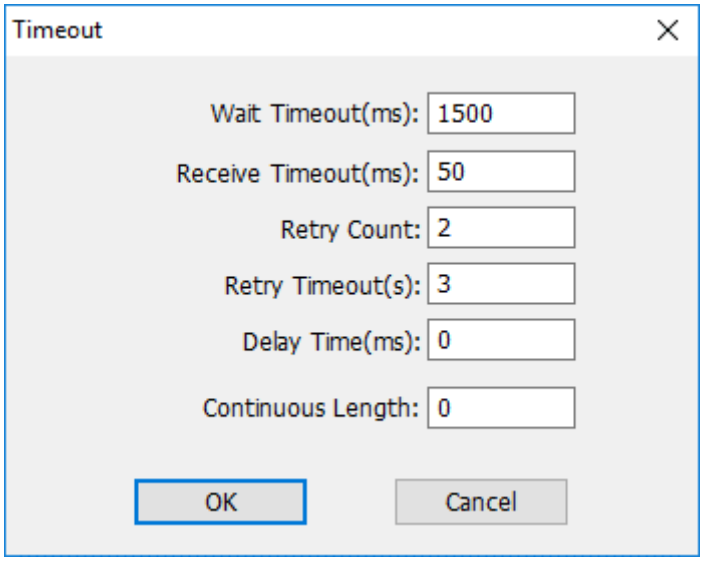
1) Enable HMI Ethernet in [Project Settings];



2) Set PLC IP in [Device IP] settings;



- PLC IP Address: PLC IP
- PLC pot No.: 102(fixed)
- Network:TCP_Client_2N(fixed)



- Wait timeout: depend on actual network situation (more than 1500 ms)

Cable Wiring

S7-300 Ethernet

Supported Series: Siemens S7-300 series PLC

HMI Setting

Items	Settings	Note
Protocol	Simens S7-300 Ethernet	
Connection	Ethernet	
Port No.	102	
PLC station No.	2	Need to be same as the PLC setting

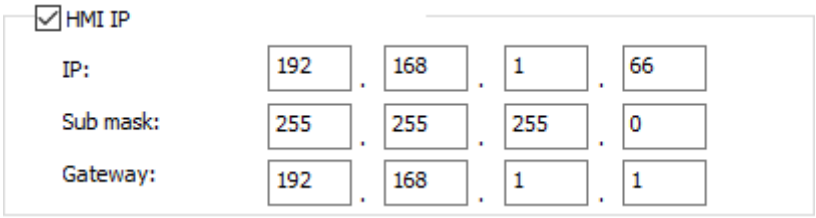
Address List

Type	Device register	HMI register	Format	Range	Note
Bit	I	I	I ddddd.o	0.0~99999.7	
	Q	Q	Q ddddd.o	0.0~99999.7	
	M	M	M ddddd.o	0.0~99999.7	
	DB0.DB~DB99.DB	DBxDBD	DBxDB nndddd.o	0.0~99999999.7	nn: block number; dddd: address;
Word	I	IW	IW ddddd	0~99999	

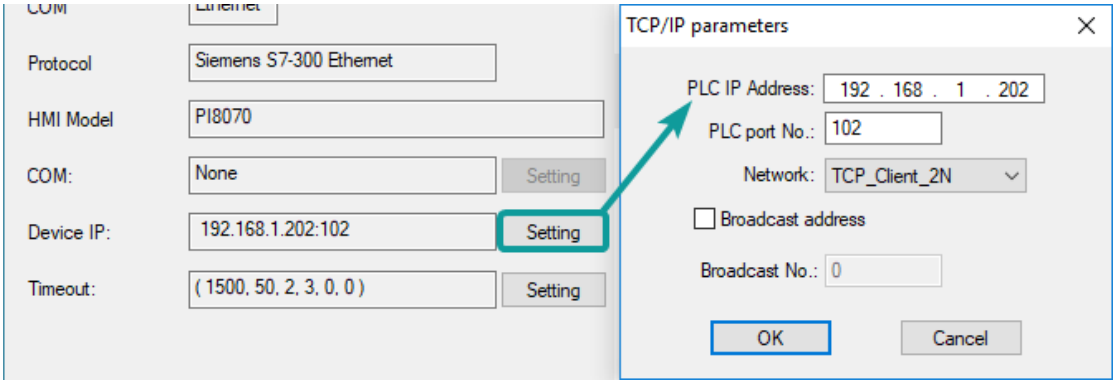
Q	QW	QW ddddd	0~99999	
M	MB	MB ddddd	0~99999	
	MW	MW ddddd	0~99999	MW0=MB(0~1) MW2=MB(2~3) Address value is a multiple of 2
	MD	MD ddddd	0~99999	MD0=MB(0~3) MD4=MB(4~7) Address value is a multiple of 4
DB0.DB~DB99.DB	DBxDBB	DBxDBB nndddd	0~99999999	nn: block number; dddd: address
	DBxDBW	DBxDBW nndddd	0~99999999	
	DBxDBD	DBxDBD nndddd	0~99999999	

Communication Settings

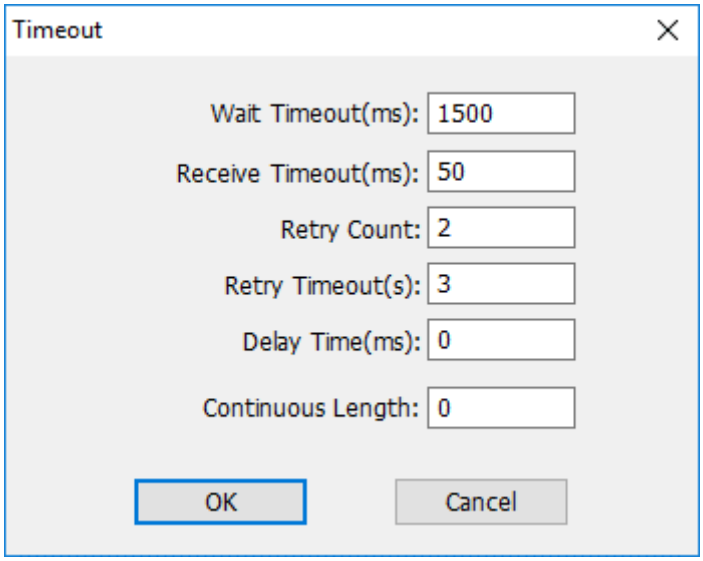
1) Enable HMI Ethernet in [Project Settings];



2) Set PLC IP in [Device IP] settings;



- PLC IP Address: PLC IP
- PLC pot No.: 102(fixed)
- Network:TCP_Client_2N(fixed)



- Wait timeout: depend on actual network situation (more than 1500 ms)

Cable Wiring

S7-1200 Ethernet

Supported Series: Siemens S7-1200

HMI Setting

Items	Settings	Note
Protocol	Siemens S7-1200	
Connection	Ethernet	
Port No.	102	
PLC station No.	2	

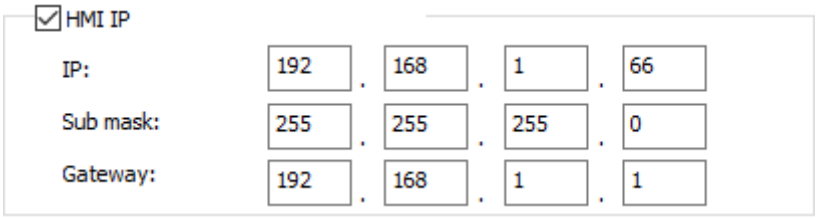
Address List

Type	Device register	HMI register	Format	Range	Note
Bit	I	I	M d.o	d:0--9999 o:0-7	
	Q	Q	Q d.o	d:0--9999 o:0-7	
	M	M	M d.o	d:0--9999	

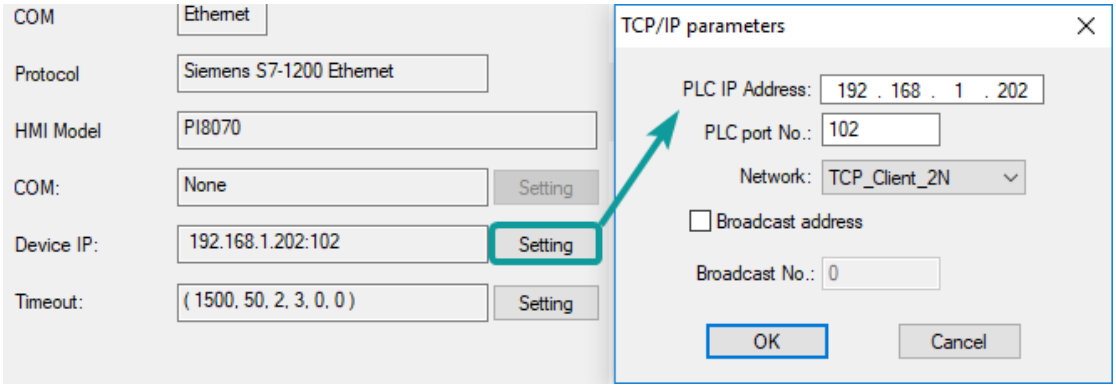
				o:0-7	
	DB0.DB-DB99.DB	DBxDB	DBxDBnndddd.o	nn:0-9999,	nn:DB No.
				dddd:0-9999,	dddd:address value
				o:0-7	o: digit address
Word	M	MB	MB d	d:0-99999	
	M	MW	MW d	d:0-99999	MW0=MB(0~1)
					MW2=MB(2~3)
					Address value is a multiple of 2
	M	MD	MD d	d:0-99999	MD0=MB(0~3)
					MD4=MB(4~7)
					Address value is a multiple of 4
	I	IW	IW d	d:0-99999	
	Q	QW	QW d	d:0-99999	
	DB0.DB-DB99.DB	DBxDBB	DBxDBBnndddd	nn:0-9999	nn:DB No.
				dddd:0-9999	dddd:address value
	DB0.DB-DB99.DB	DBxDBW	DBxDBWnndddd	nn:0-9999	nn:DB No.
				dddd:0-9999	dddd:address value
					Address value is a multiple of 2
	DB0.DB-DB99.DB	DBxDBD	DBxDBDnndddd	nn:0-9999	nn:DB No.
				dddd:0-9999	dddd:address value
					Address value is a multiple of 4

Communication Settings

1) Enable HMI Ethernet in [Project Settings];



2) Set PLC IP in [Device IP] settings;



#Note:

1) The S7-1200 supports simultaneous connection of three devices, so the driver supports simultaneous access to PLC by three touch screens.

2) HMI access PLC, use S7 protocol, access PLC TSAP 02.01 (s7-1200 PROFINET interface only supports three connections, the default support), detailed reference to the system manual of S7-1200.

PLC Settings

1) Add BD

Please uncheck [Symbolic access only] option;

2) Address settings, using BD2 as example.

DB×DBB2xxxx, DB×DBW2xxxx, DB×DBD2xxxx for accessing data of DB2 in B1.

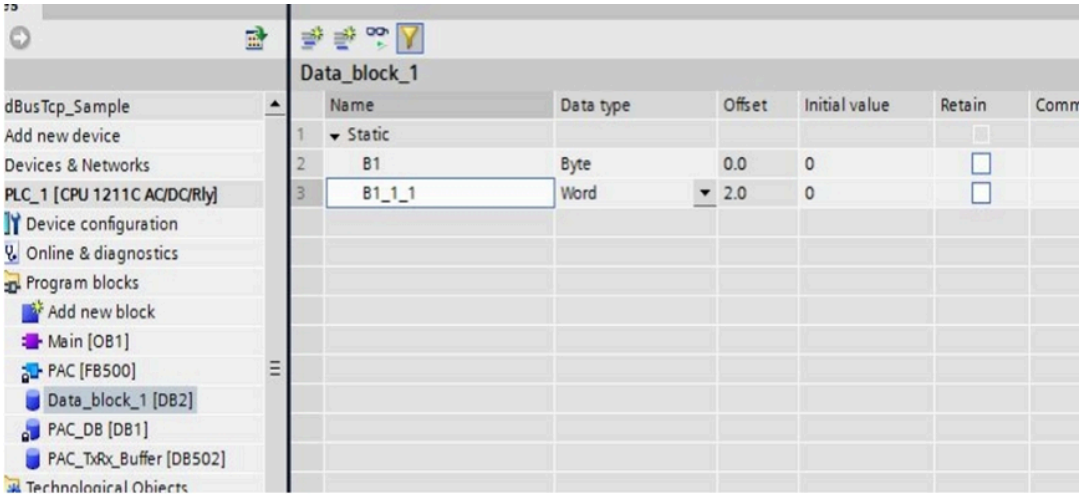
2 represent DB block number

xxxx represent address

Such as:

DBxDBB20000 = DB2.DBB0

DBxDBW20004 = DB2.DBW4

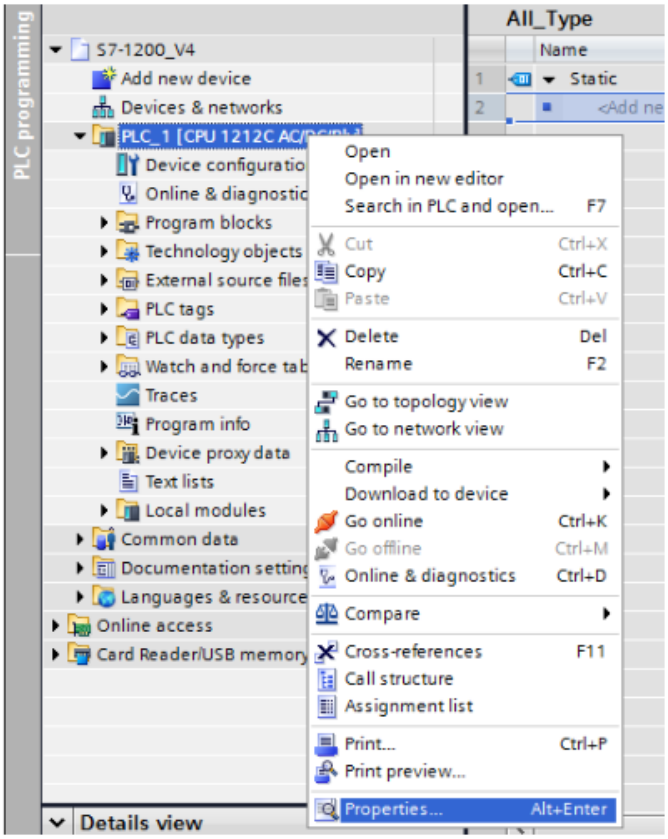


How to connect with S7-1200 Firmware V4.0

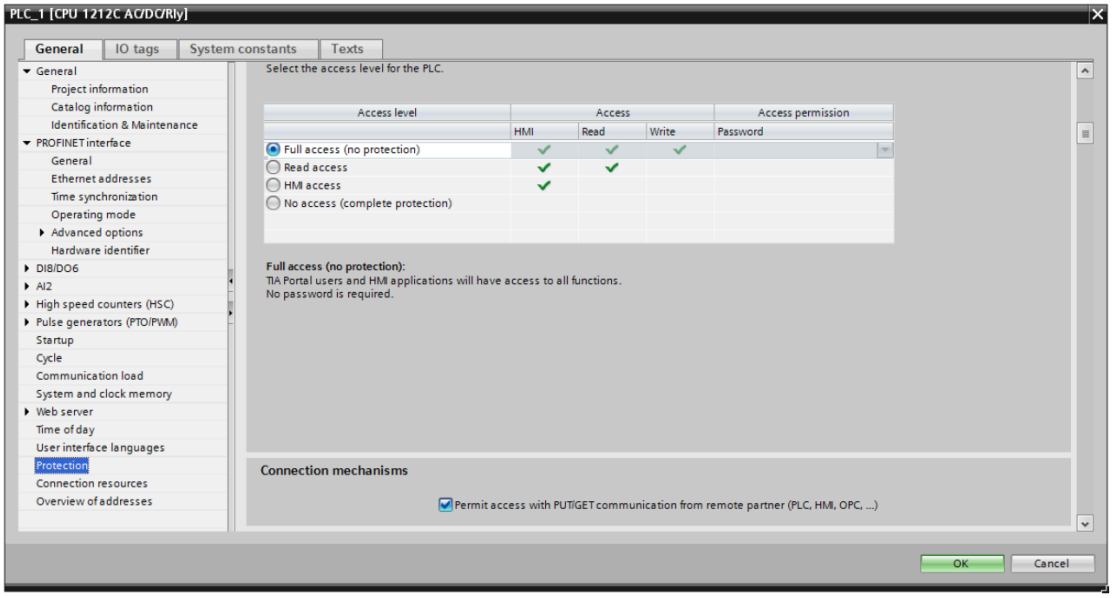
1) PLC configuration

a) Double click [device configuration] in Siemens via software

b) Double click [protection] to enter protection configuration screen



c) Check [Permit access with PUT / GET communication from remote partner (PLC, HMI, OPC, ...)]



2) DB settings

Right click [DB], select [properties]

Uncheck [optimized block access]

Cable Wiring

LOGO Ethernet

Supported Series: Siemens Logo

HMI Settings

Items	Settings	Note
Protocol	Siemens LOGO	
Connection	Ethernet	
Port No.	102	
PLC station No.	2	

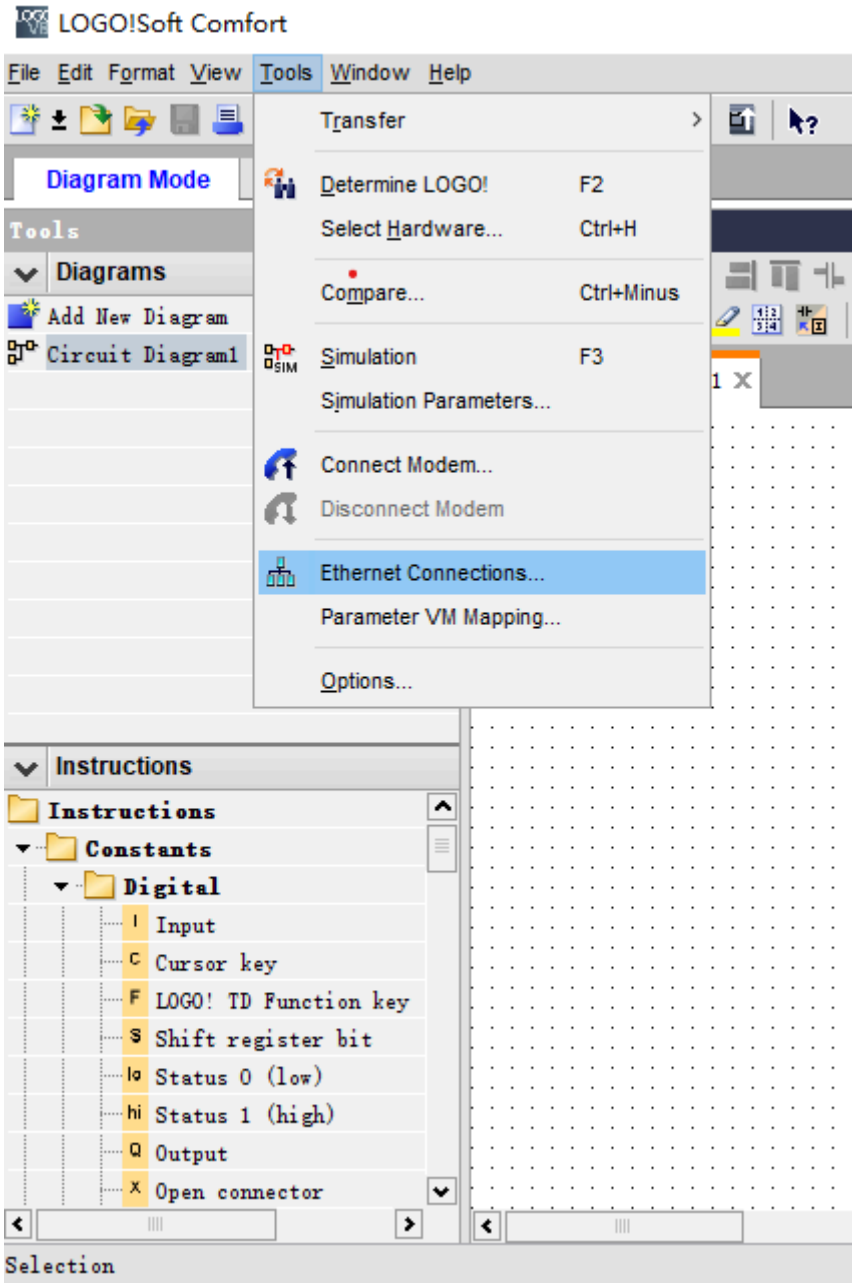
Address List

Number	Address Type	Data Type	Range	DB Address	PLC Address
1	RTC	Word	1-7	DB1.DBX984.0	0x001ec0
2	VB	Byte	0-1469	DB1.DBX0.0	0x000000

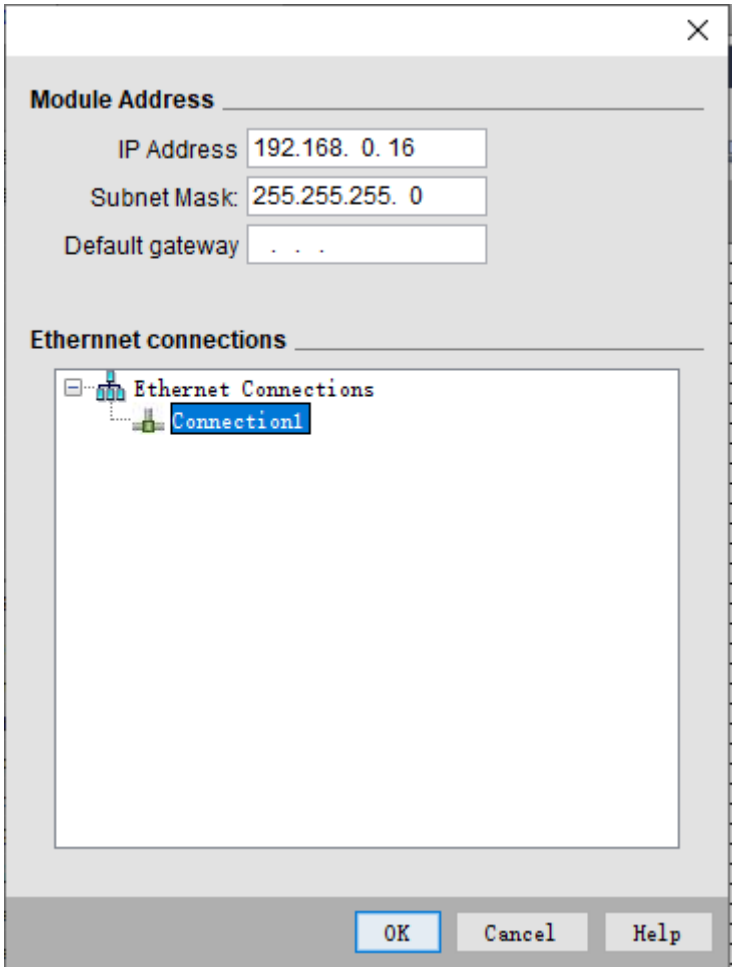
3	VD	Double Word	0-1466	DB1.DBX0.0	0x000000
4	VW	Word	0-1468	DB1.DBX0.0	0x000000
5	NAQ	Word	1-32	DB1.DBX1406.0	0x002bf0
6	NAI	Word	1-64	DB1.DBX1262.0	0x002770
7	AM	Word	1-64	DB1.DBX1118.0	0x0022f0
8	AQ	Word	1-16	DB1.DBX1072.0	0x002180
9	AI	Word	1-16	DB1.DBX1032.0	0x002040
10	I	Bit	1-64	DB1.DBX1024.0	0x002000
11	Q	Bit	1-64	DB1.DBX1064.0	0x002140
12	M	Bit	1-112	DB1.DBX1104.0	0x002280
13	NI	Bit	1-128	DB1.DBX1246.0	0x0026f0
14	NQ	Bit	1-128	DB1.DBX1390.0	0x002b70
15	V	Bit	0-14697	DB1.DBX0.0	0x000000

PLC Settings in LOGO Software:

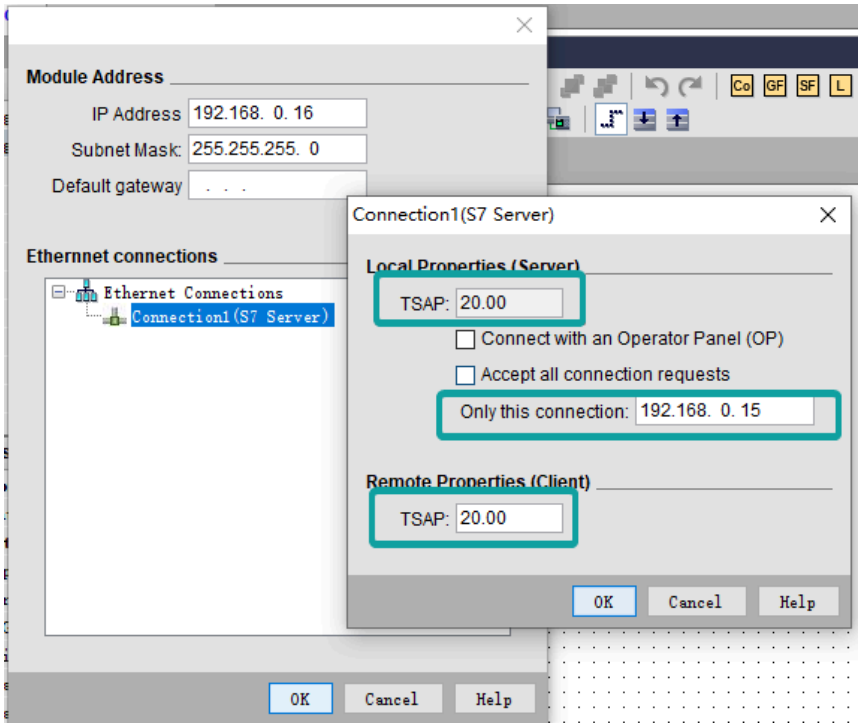
1) Click [Tools]--[Ethernet Connections],shown as below.



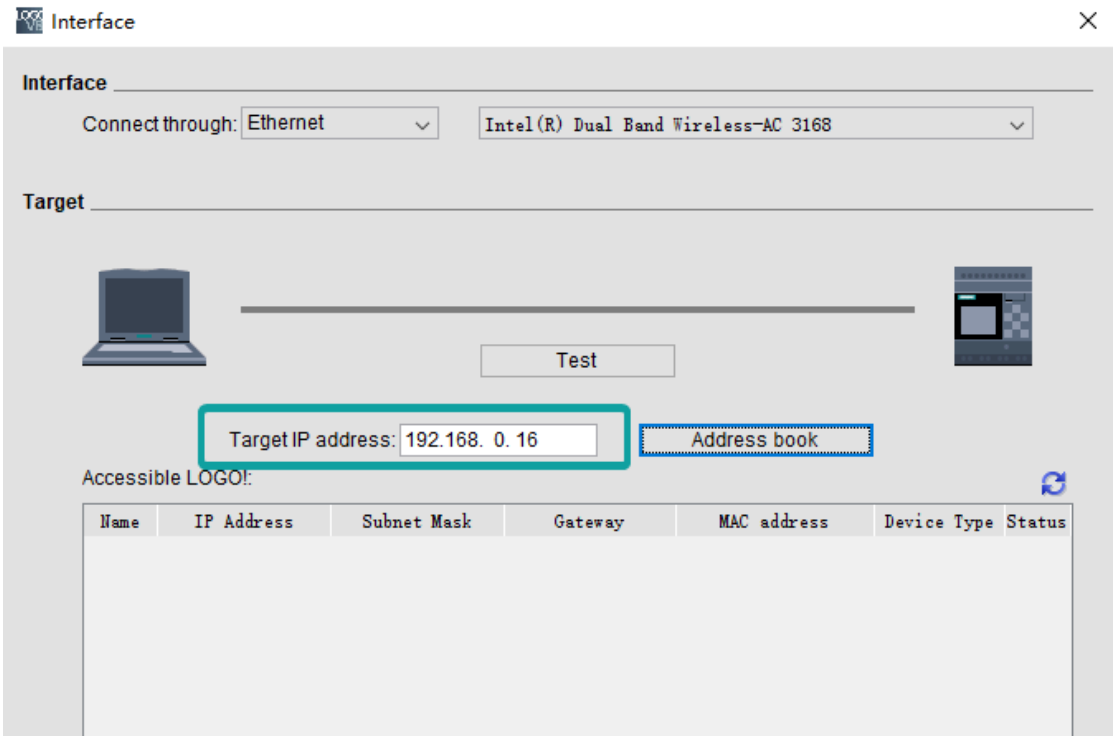
2) Set Ethernet connection parameter. IP, Subnet Mask, shown as below.

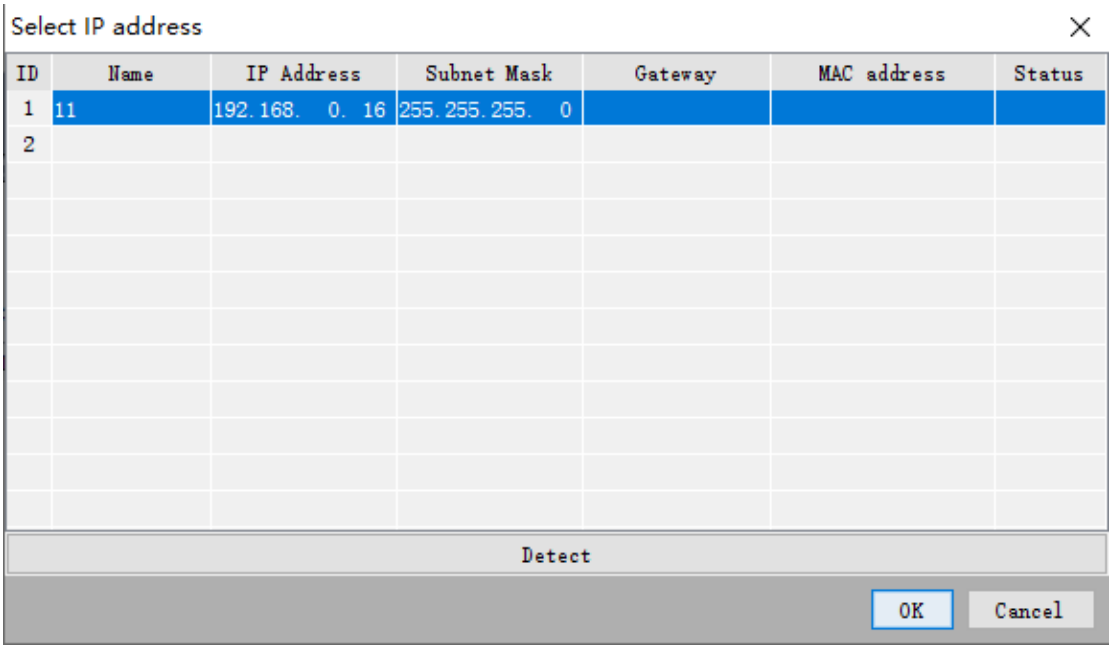


3) **TSAP set**:The value set by local TSAP is the remote TSAP set in HMI. PLC's remote TSAP is the opposite,shown as below.



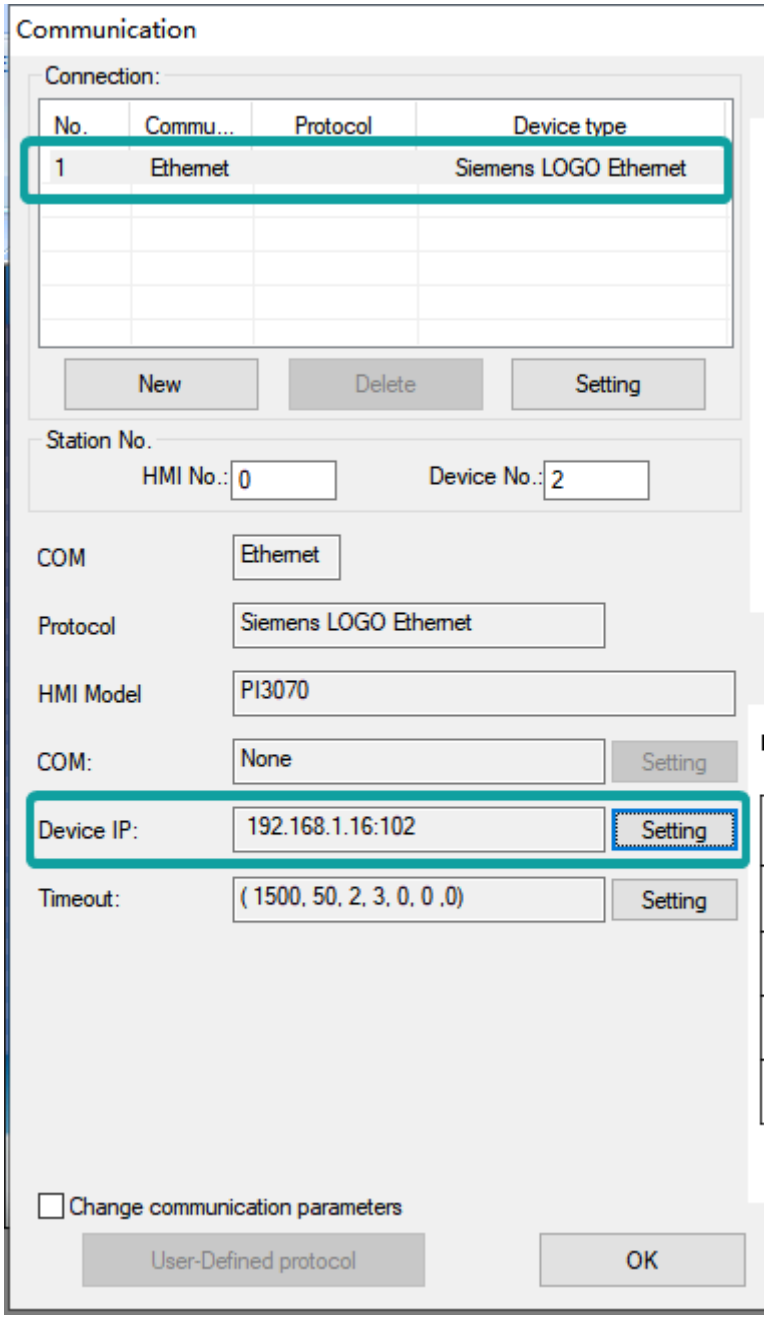
4) **Download Project**: Click "Address book" to add the IP address to be downloaded (fi."Detect" to check whether the IP address can be detected. Then click “ok”, and the system will prompt that PLC will be "STOP" mode. Click “YES” to start download.



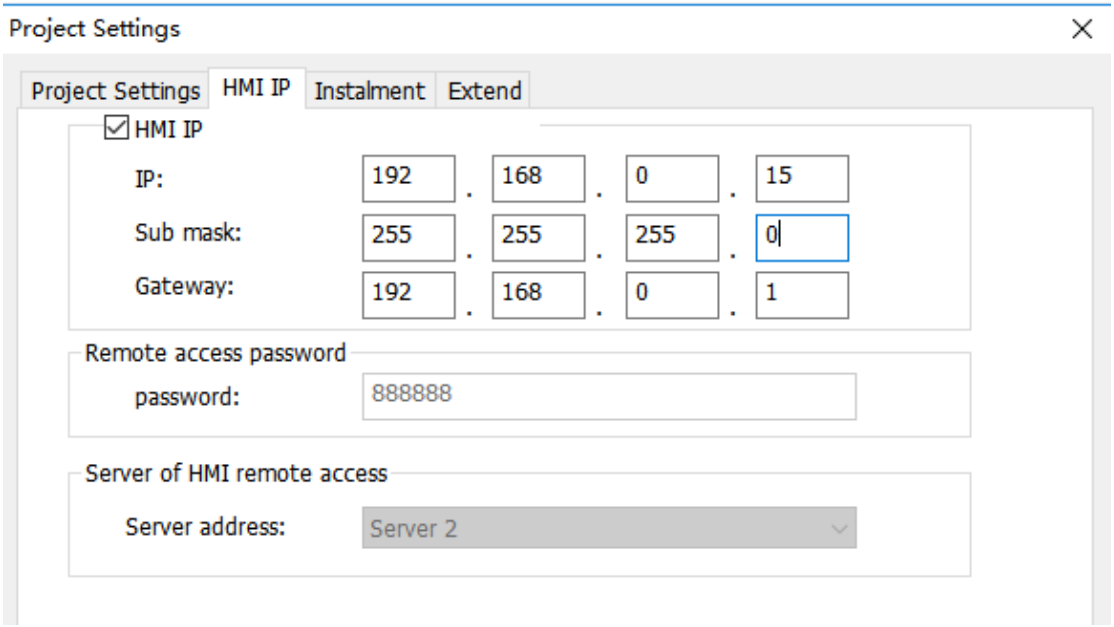


HMI Communication Settings

1)Set PLC IP in [Device IP] settings;



2)Enable HMI Ethernet in [Project Settings];



3)TSAP setting

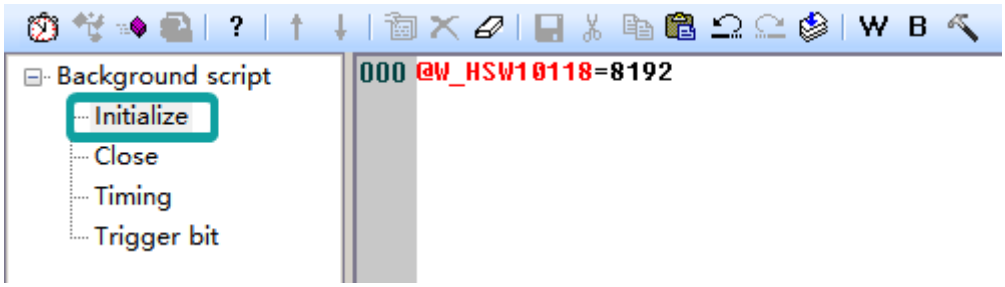
Regarding the setting of PLC TSAP, HMI provides system special address for setting, it is recommended to run in HMI script initialization, write PLC TSAP to corresponding system special register.

HSW10118 = local TSAP of HMI, this is remote TSAP of PLC.

HSW10119 = Remote TSAP of HMI, this is local TSAP of PLC.

#Note:

1) The data of TSAP is hexadecimal format. For example: the remote TSAP configured in the PLC is set to 20.00, then HSW10118 should be set to 0x2000, that is, HSW10118 = 8192.



2) AI word address and Ibit address are read-only and cannot be written on HMI.

3) VW address should be even number.such as VW0, VW2, VW4...

4) VD address it takes two VW addresses.such as VD0,VD4,VD8...

5) Written value of RTC cannot exceed 255.

Cable Wiring

S7-XXX Ethernet

Supported Series: Siemens S7-1200 and S7-1500

HMI Setting

Items	Settings	Note
Protocol	Siemens S7-XXX	
Connection	Ethernet	
Port No.	102	
PLC station No.	1 (for S7-1500)/ 2 (for S7-1200)	

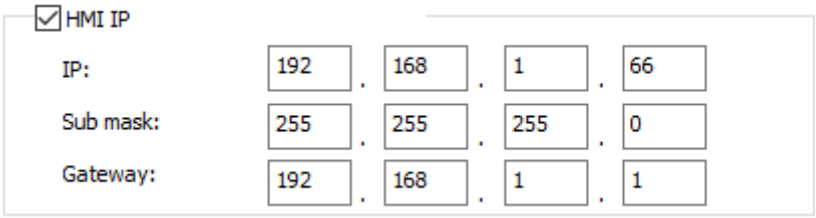
Address List

Type	Device register	HMI register	Format	Range	Note
Bit	I	I	M d.o	d:0--9999 o:0-7	
	Q	Q	Q d.o	d:0--9999 o:0-7	
	M	M	M d.o	d:0--9999 o:0-7	
	DB0.DB-DB99.DB	DBxDB	DBxDBnndddd.o	nn:0-9999, dddd:0-9999, o:0-7	nn:DB No. dddd:address value o: digit address
Word	M	MB	MB d	d:0-99999	
	M	MW	MW d	d:0-99999	MW0=MB(0~1) MW2=MB(2~3) Address value is a multiple of 2
	M	MD	MD d	d:0-99999	MD0=MB(0~3) MD4=MB(4~7) Address value is a multiple of 4
	I	IW	IW d	d:0-99999	
	Q	QW	QW d	d:0-99999	
	DB0.DB-DB99.DB	DBxDBB	DBxDBBnndddd	nn:0-9999 dddd:0-9999	nn:DB No. dddd:address value

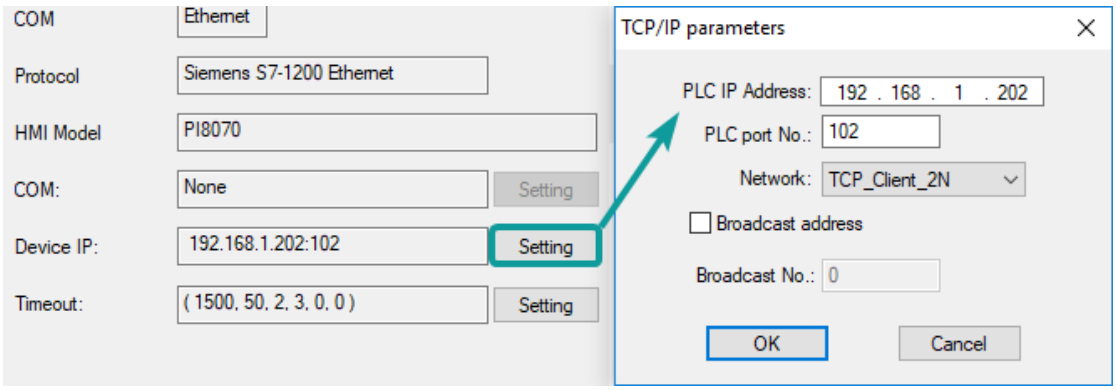
DB0.DB-DB99.DB	DBxDBW	DBxDBWnndddd	nn:0-9999 dddd:0-9999	nn:DB No. dddd:address value Address value is a multiple of 2
DB0.DB-DB99.DB	DBxDBD	DBxDBDnndddd	nn:0-9999 dddd:0-9999	nn:DB No. dddd:address value Address value is a multiple of 4

Communication Settings

1) Enable HMI Ethernet in [Project Settings];



2) Set PLC IP in [Device IP] settings;



#Note:

1) The S7-1200 supports simultaneous connection of three devices, so the driver supports simultaneous access to PLC by three touch screens.

2) HMI access PLC, use S7 protocol, access PLC TSAP 02.01 (s7-1200 PROFINET interface only supports three connections, the default support), detailed reference to the system manual of S7-1200.

Cable Wiring

User Defined Protocol

If the device does not support MODBUS standard, and the protocol is not list in PIStudio, then user can define the protocol by following instruction to realize simply communication functions like sending and receiving commands.

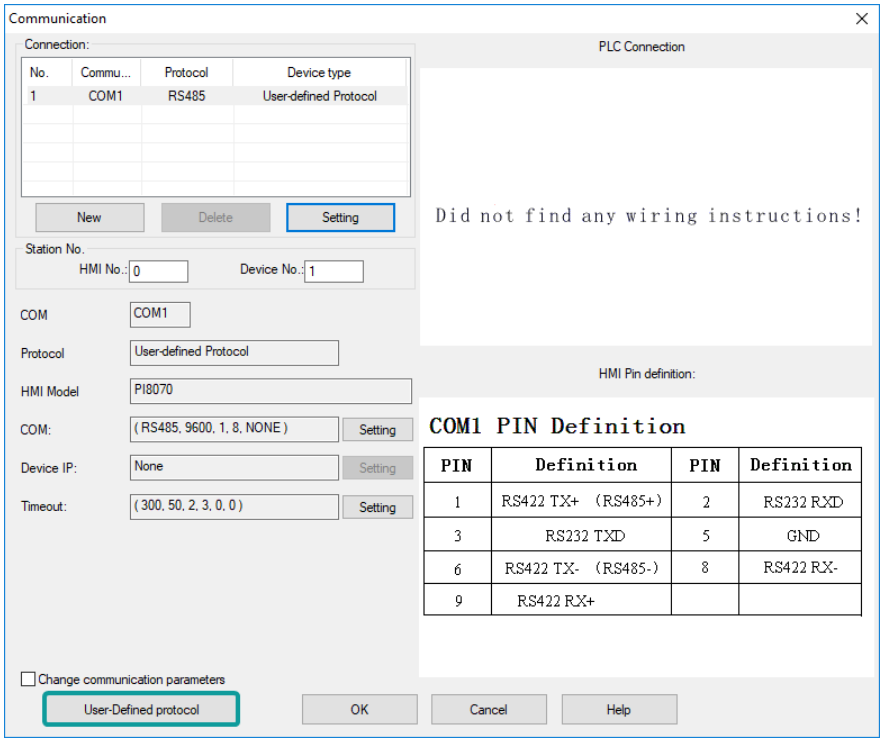
HMI Settings

Items	Settings	Note
Protocol	User defined protocol	
Connection	RS485/RS232	
Baud rate	2400~187500	
Stop bits	1/ 2	
Data bits	7/ 8	
Parity	None/ Even/ ODD	

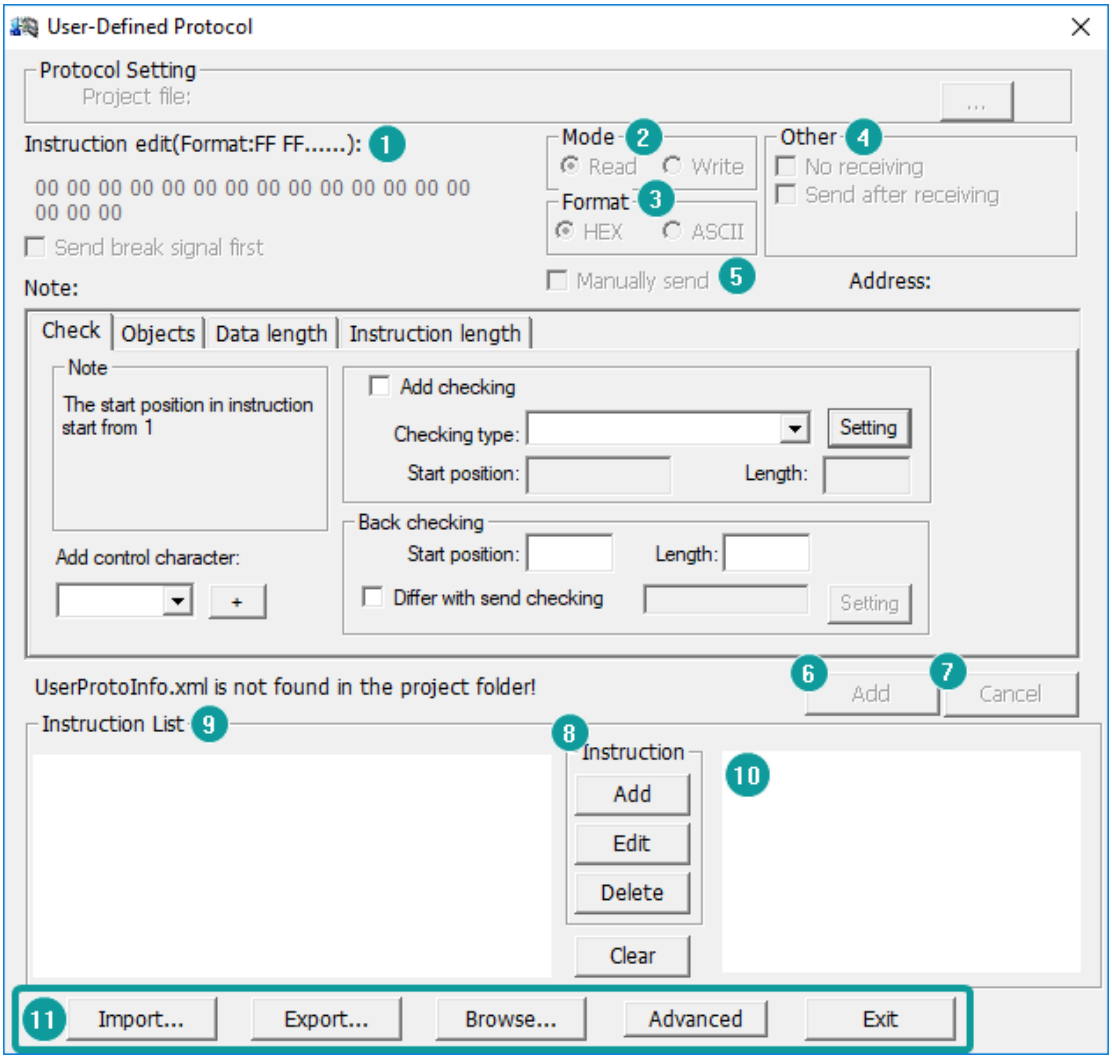
Operating Procedures

1) Select [User defined protocol];

2) Click [User defined protocol] button to open setting window as below;



3) Configure user defined command;

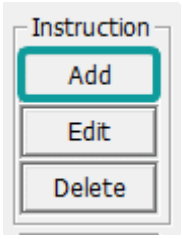


No	Item	Description
1	Instruction edit	The required command.
2	Mode	Write to address or read from the address.
3	Format	Encode format: HEX or ASCII.
4	Other	**No receiving:** HMI does not respond to the receiving command. **Send after receiving:** HMI responds to the receiving command.
5	Manually send	Respond once after trigger the address. Address: set the trigger address.
6	Add	Save this setting.
7	Cancel	Cancel current settings.
8	Add	Add a new command.
	Edit	Edit the selected command.
	Delete	Delete the selected command.
	Clear	Clear all the commands.
9	Instruction list	Display all current commands.

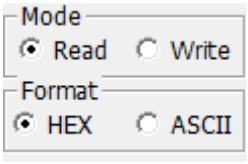
10	Address List	Display all the addresses added.
11	Import	Import the command files to the instruction list.
	Export	Export current command settings to local storage.
	Browse	Browse local command files.
	Advanced	Combine two commands.
	Exit	Complete editing and exit setting.

Operating Procedures

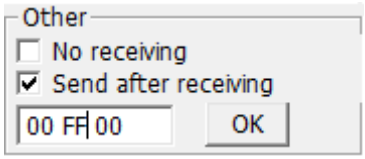
1) Click [Add] to create a new command, as below shows;



2) Select mode, [Read] or [Write], and then select Format, there are two options [Hex] and [ASCII]. As below shows;



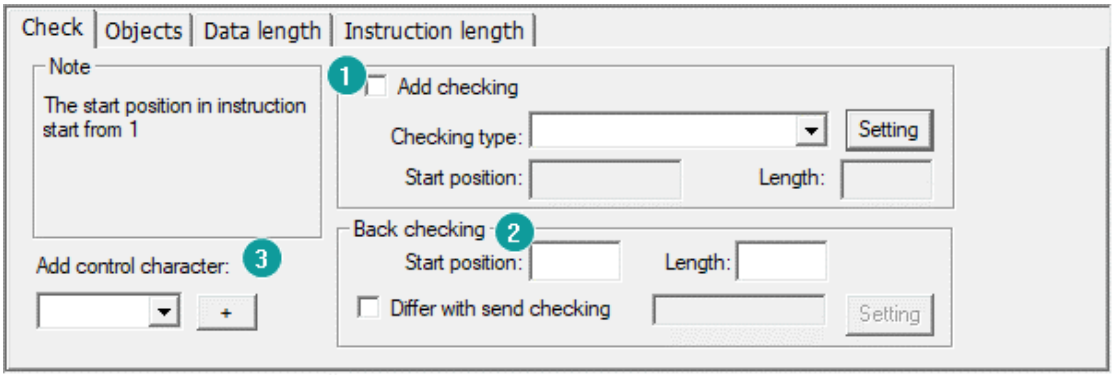
3) Other settings: [No receiving] means HMI only sends command, and it would not process the reply command which from device. [Send after receiving] means HMI will be receiving the command which from device firstly, and then sending the command to device. From example, when HMI receiving [00 FF 00] firstly and then send command, as below shows



4) Check [Manually send], and then please set the address for trigging, the setting range is 1~10, and please put Bit switch in project screen for it, and [OneCtrlBit] register is for [Manually send].

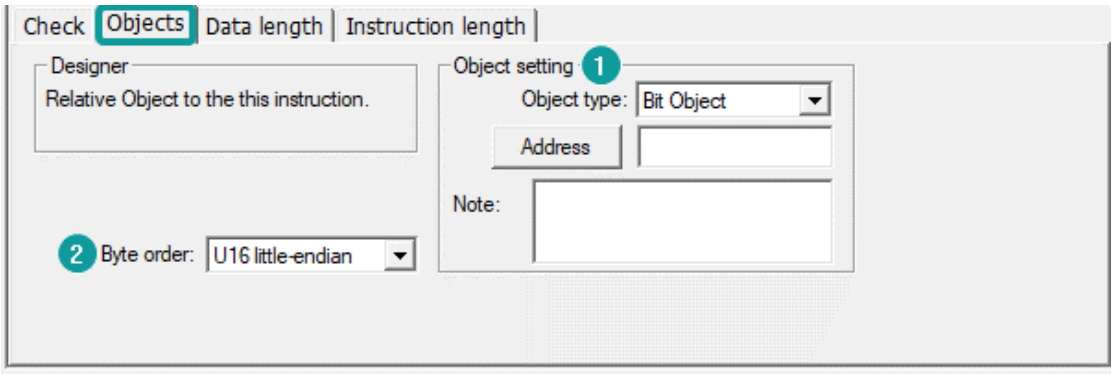
5) Instruction edit, when the data format is HEX, please use two numbers to represent one 16-bit number. ASCII format using characters to input;

6) Check settings;



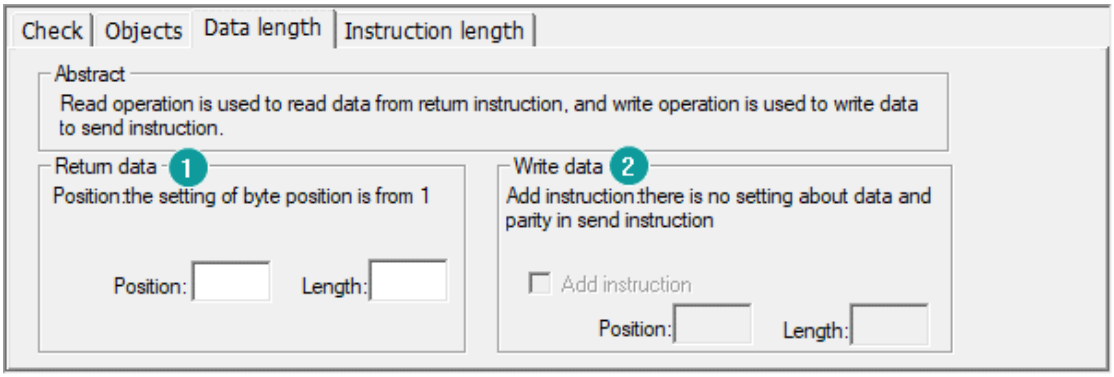
No	Items	Description
1	Add checking	Add checking command when receiving the data.
2	Back checking	Add control character in ASCII format.
	Differ with send check	Set return checking.
3	Add control character	Start position: select the start position of the data which need to check. Length: The data length need to be checked.

7) Object settings;



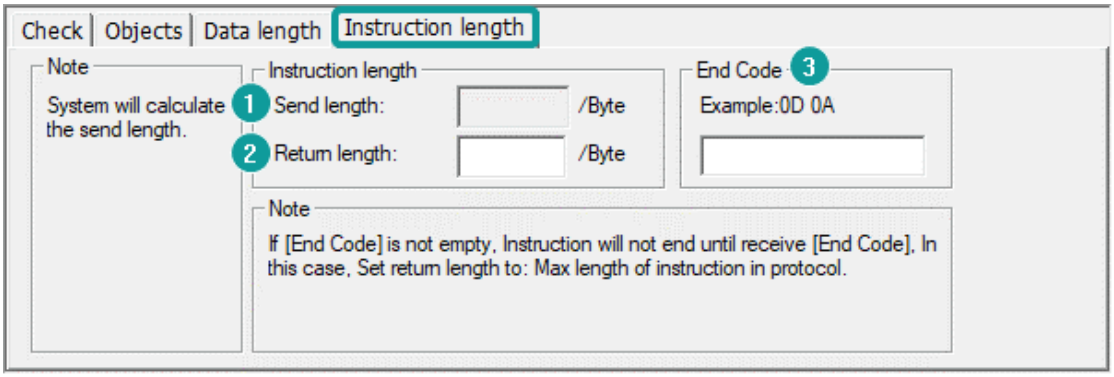
No	Items	Description
1	Object settings	Object type: bit or word address; Address: the triggering address; Note: description to object;
2	Byte order	The numerical display order;

8) Data length settings;



No	Item	Description
1	Return data	Position: the start position of the return data. Length: the return data length.
2	Write data	Position: the start position of the write data. Length: the write data length.

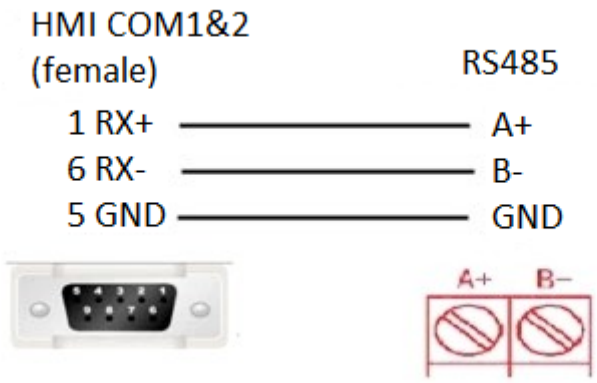
9) Instruction length settings

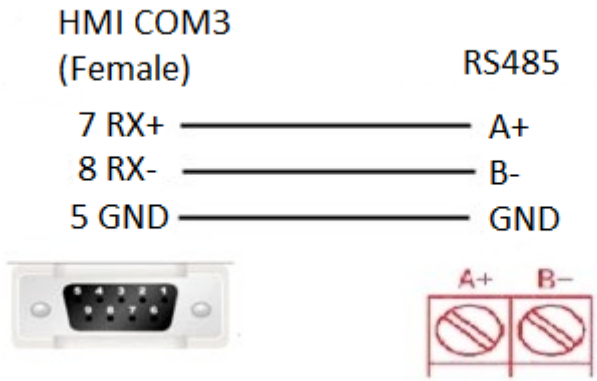


No	Item	Description
1	Send length	The instruction data will only send designated data length.
2	Return length	The responds data length.
3	End code	Instruction will not be terminated until receiving [End code];

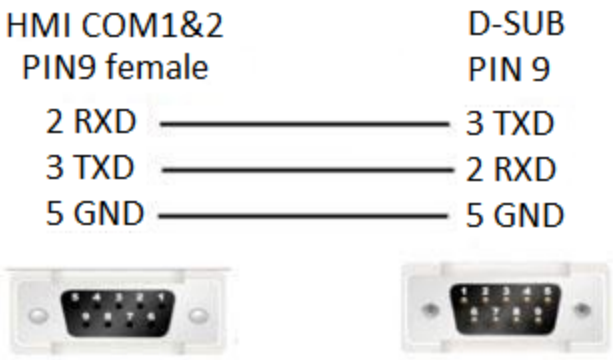
Cable Wiring

1)RS485





2)RS232



#Note:

COM3 only available in PI8000/PI9000 series.

WECON PLC LX2V/ LX2E/ LX3V/LX3VP/LX3VE/ LX3VM

Supported series: WECON LX2V/ LX2E/ LX3V/LX3VP/LX3VE/LX3VM

HMI Settings

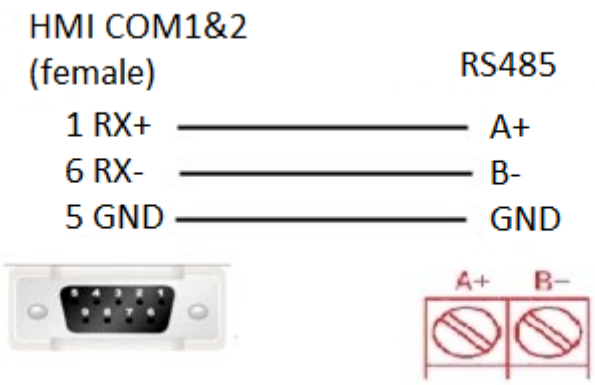
Item	Settings	Note
Protocol	WECON LX2V/ LX2E/ LX3V/LX3VP/ LX3VE/LX3VM	
Connection	RS422/RS485	
Baud rate	9600	
Data bit	7	
Parity	EVEN	
Stop bit	1	
PLC station No.	1	

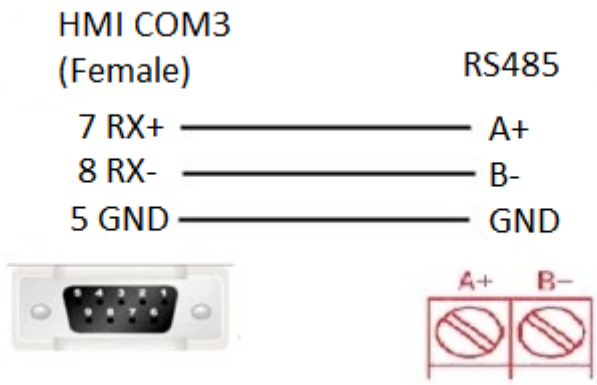
Address List

Type	Device registers	HMI registers	Format	Range	Note
Bit	X	X	Xo	0~303237	
	Y	Y	Y o	0~303237	
	M	M	M d	0~99999	
	T	T	T d	0~99999	
	C	C	C d	0~99999	
	S	S	S d	0~99999	
Word	X	X	Xo	0~303237	
	Y	Y	Y o	0~303237	
	M	M	M d	0~99999	
	T	T	T d	0~99999	
	C	C	C d	0~199	
	D	D	D d	0~7999	
	S	S	S d	0~99999	
	SD	SD	SD d	8000~9999	

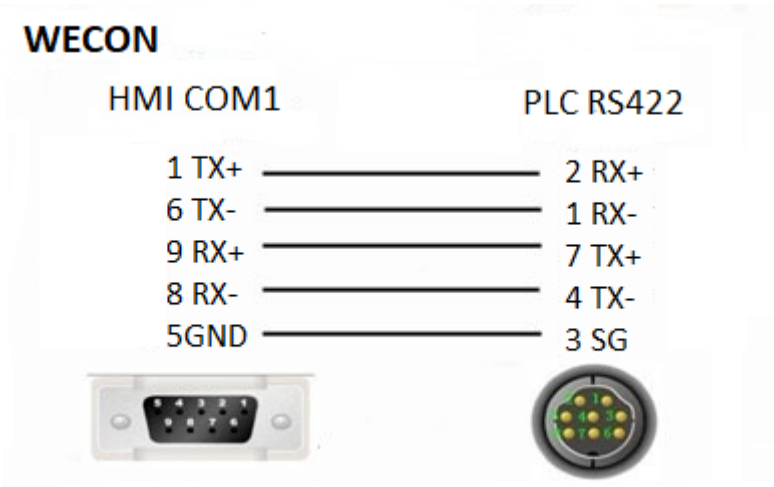
Cable Wiring

1)RS485





2)RS422



#Note:

1. HMI COM3 is available in PI8000 series and COM3 is in COM2(hardware PIN 7 and PIN 8) .

2. If PLC <= 20 points,such as LX3V-1208/LX3V-0806 PLC,PLC RS485A and RS485B mean PLC COM2 RS485+ and RS485- .PLC COM2 can support modbus. Please refer to PLC COM2 setting manual.

https://drive.google.com/drive/folders/13rgso7oUlatZQN_SNEcJCcN4toEdDPoP?usp=sharing

Printer

TSPL label printer

I. Introduction

TSPL label printer protocol supports following models.

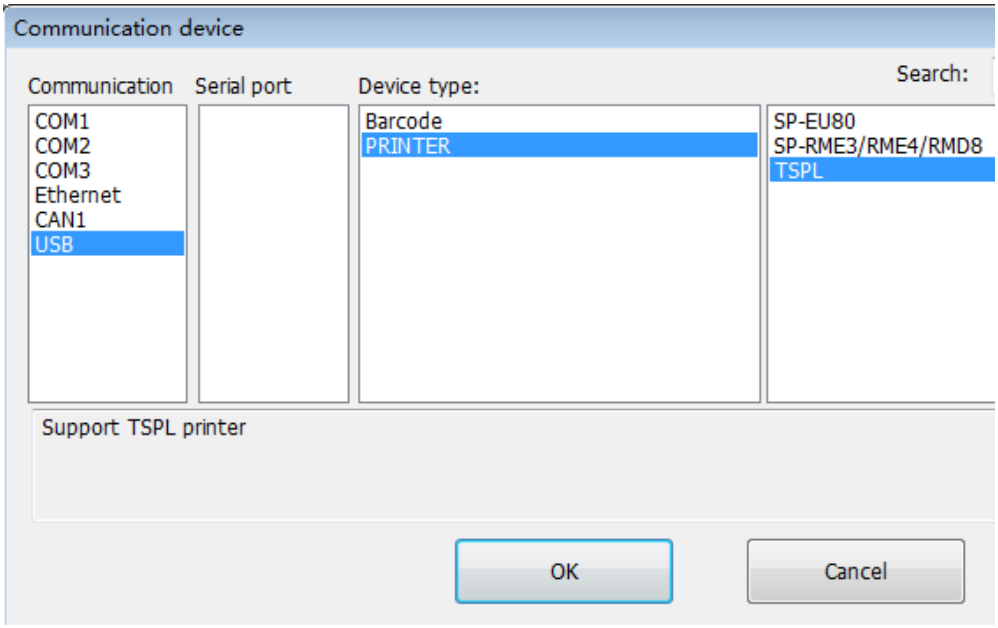
SPRT TL21: https://www.sprinter.com.cn/show-60-62-1.html

DL-888D: https://www.deliworld.com/product/detail/7624

II. Setting Step

1) Select the protocol

Create a new project, select the TSPL label printer protocol as shown below.



2) Set parameters

The connection between the TSPL label printer and the HMI is via the USB-A interface, no need to configure serial port parameters.

3)Printer register

Register	System	Range	Function
TSPL_SP	decimal	0 - 1	Set the paper size
TSPL_PT	decimal	0 - 1999	Print text
TSPL_PQ	decimal	0 - 999	Print QR code
TSPL_PB	decimal	0 - 999	Print barcode
TSPL_PR	decimal	0 - 1	Print offset
TSPL_PN	decimal	0 - 0	Trigger printing
TSPL_PS	decimal	0 - 0	Print status

1.Set paper size:

TSPL_SP0: width of paper, unit: mm.

TSPL_SP1: height of paper, unit: mm.

2.Print text:

TSPL_PT can print up to 20 texts. TSPL_PT0-TSPL_PT99 is the first text; TSPL_PT100-TSPL_PT199 is the second text; ... TSPL_PT1000-TSPL_PT1999 is the 20th text.

Detailed parameter settings of each text is shown as below table.for example,first text,TSPL_PT0-TSPL_PT99.

Register	Function	Description
TSPL_PT0	X coordinate	Unit: dot
TSPL_PT1	Ycoordinate	Unit: dot
TSPL_PT2	Rotation angle	0: 0 degrees 1: 90 degrees

		2: 180 degrees
		3: 270 degrees
TSPL_PT3	Size	Range: 0-3
TSPL_PT4 - TSPL_PT99	QR code content(text content)	Use character input device to configure

By analogy, we can know the text information configuration of the 2nd to 20th QR codes

3.Print QR code:

TSPL_PQ can print up to 10 QR codes. TSPL_PQ0-TSPL_PQ99 is the first QR code; TSPL_PQ100-TSPL_PQ199 is the second QR code; ...., TSPL_PQ900-TSPL_PQ999 is the tenth QR code.

Specific parameter description of each item: for example, the first QR code, TSPL_PQ0-TSPL_PQ99:

Register	**Function**	**Description**
TSPL_PQ0	X coordinate	Unit: dot
TSPL_PQ1	Ycoordinate	Unit: dot
TSPL_PQ2	Rotation angle	0: 0 degrees
		1: 90 degrees
		2: 180 degrees
		3: 270 degrees
TSPL_PQ3	Size	Range: 0-5
TSPL_PQ4 - TSPL_PQ99	QR code content	Use character input device to configure

By analogy, we can know the text information configuration of the 2nd to 20th QR codes.

4.Print bar code:

TSPL_PB can print up to 10 barcodes. TSPL_PB0-TSPL_PB99 is the first bar code; TSPL_PB100-TSPL_PB199 is the second bar code; ..., TSPL_PB900-TSPL_PB999 is the tenth bar code.

Specific parameter description of each item: for example, the first barcode, TSPL_PB0-TSPL_PB99:

Register	**Function**	**Description**
TSPL_PB0	X coordinate	Unit: dot
TSPL_PB1	Ycoordinate	Unit: dot
TSPL_PB2	Rotation angle	0: 0 degrees
		1: 90 degrees
		2: 180 degrees
		3: 270 degrees
TSPL_PB3	height	Unit: dot
TSPL_PB4	width	Range:0-2
TSPL_PB5- TSPL_PB99	Bar code content	Use character input device to configure

By analogy, we can know the text information configuration of the 2nd to 20th bar codes.

5.Print offset:

TSPL_PR0: X coordinate offset, unit: mm;

TSPL_PR1: Y coordinate offset, unit: mm.

6.Trigger printing:

TSPL_PN0 = 1: trigger the printer to start printing.

7.Printing status:

TSPL_PS0 = 1: The printing is normal.

TSPL_PS0 = 1: The printing is abnormal.

4)Print picture

For the function of printing pictures, please refer to the configuration of [Printer object].

5)Conversion between dot and mm

Dot is the meaning of pixels. For the conversion between dot and mm, please refer to the printer manual or consult the customer service of the corresponding printer manufacturer. For example, SPRT TL21: 8 dots / mm, that is, 1mm = 8 dot.

EpsonTM series

HMI Settings

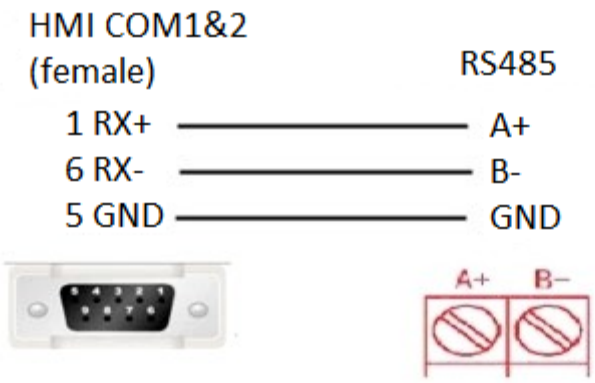
Item	Settings	Note
Protocol	EPSON-TM-T82II/TM-XXX	
Connection	RS232	
Baud rate	9600~115200	
Data bit	8	
Parity	None	
Stop bit	1	
PLC station No.	1	

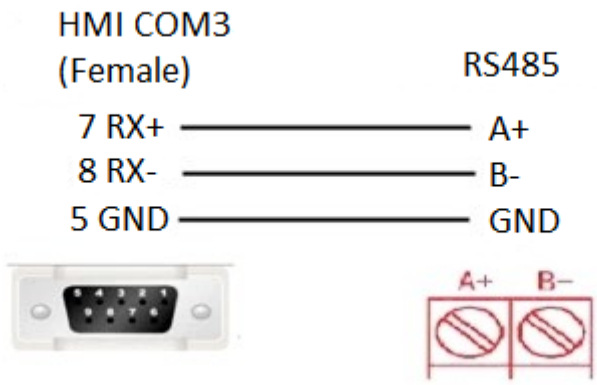
Each printer protocol has default parameter. These parameters could be configured by addresses. Error parameters may cause print failure.

Printer Settings

Address	Desc
HSW10603	Print
HSW10604	Dot M
HSW10605	Print
HSW10606	Print
HSW10607	Pape
HSW10608	Align

Cable Wiring





#Note:

COM3 only available in PI8000/PI9000 series.