OMRON

NB-series Programmable Terminals

HOST CONNECTION MANUAL

Cat.No. **V108-E1-01**

Notice

OMRON products are manufactured for use according to proper procedures by a qualified operator and only for the purposes described in this manual.

The following conventions are used to indicate and classify precautions in this manual. Always heed the information provided with them. Failure to heed precautions can result in injury to people or damage to property.

⚠ DANGER   Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Additionally, there may be severe property damage.

⚠ WARNING Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury. Additionally, there may be severe property damage.

⚠ Caution Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

OMRON Product References

All OMRON products are capitalized in this manual. The word "Unit" is also capitalized when it refers to an OMRON product, regardless of whether or not it appears in the proper name of the product.

The abbreviation "Ch," which appears in some displays and on some OMRON products, often means "word" and is abbreviated in documentation in this sense. The abbreviation "PLC" means Programmable Controller.

The abbreviation "host" means a controller, such as an IBM PC/AT or compatible computer, that controls a PT (Programmable Terminal).

Visual Aids

The following headings appear in the left column of the manual to help you locate different types of information.

Note   Indicates information of particular interest for efficient and convenient operation of the product.

Reference   Indicates supplementary information on related topics that may be of interest to the users.

1、2、3...   1.   Indicates lists of one sort or another, such as procedures, checklists, etc.

CS1G-CPU□□-V1 Boxes in model numbers indicate variable characters.   For example: "CS1G-CPU□□-EV1" indicates the following models: CS1G-CPU42-EV1, CS1G-CPU43-EV1, CS1G- CPU44-EV1 and CS1G-CPU45-EV1.

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This section describes the connection to Panasonic PLCs.

Section 8 List for All PLCs Supported by NB Series

This section lists all PLCs supported by NB Units.

⚠ WARNING Failure to read and understand the information provided in this manual may result in personal injury or death, damage to the product, or product failure.
Please read each section in its entirety and be sure you understand the information provided in the section and related sections before attempting any of the procedures or operations given.

Related Manuals

The related manuals are as follows:

Devices and Software	Manual	Manual No.
NB series	NB series NB Designer Operation Manual	V106
	NB series Setup Manual	V107
	NB series Host Connection Manual(This manual)	V108
	NB series Startup Guide	V109
PLC	SYSMAC CP series CP1L CPU Unit Operation Manual	W462
	SYSMAC CP series CP1H/L CPU Unit Programming Manual	W451
	SYSMAC CP series CP1H CPU Unit Operation Manual	W450
	SYSMAC CP Series CP1E CPU Unit Hardware USER'S Manual	W479
	SYSMAC CP Series CP1E CPU Unit Software USER'S Manual	W480
	SYSMAC C200HX/HG/HE(-E/-ZE) Installation Guide	W302
	SYSMAC C200HX/HG/HE Operation Manual	W303
	SYSMAC C200HX/HG/HE(-ZE) Operation Manual	W322
	SYSMAC CQM1H Operation Manual	W363
	SYSMAC CPM1A Operation Manual	W317
	SYSMAC CPM2A Operation Manual	W352
	SYSMAC CPM1/CPM1A/CPM2A/CPM2C/SRM1(-V2)Programming Manual	W353
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	SYSMAC CS1 Series CS1G/H Operation Manual	W339
	SYSMAC CS/CJ Series Serial Communications Boards and Serial Communications Units Operation Manual	W336
	SYSMAC CJ Series CJ1G/H(-H) CJ1M CJ1G Operation Manual	W393
	SYSMAC CS/CJ Series Programming Manual	W394
	SYSMAC CS/CJ Series INSTRUCTIONS Reference Manual	W340
	SYSMAC CS/CJ Series Programming Consoles Operation Manual	W341
	SYSMAC CS/CJ Series Communications Commands Reference Manual	W342
	SYSMAC CJ Series CJ2 CPU Unit Hardware USER'S Manual	W472
	SYSMAC CJ Series CJ2 CPU Unit Software USER'S Manual	W473
External Tool	CX-Programmer Ver.9.□ Operation Manual	W437

Terminology

The following terminology is used in this manual.

- About the terminology

NB Unit	Indicates the main Unit of the products in the OMRON NB Series of Programmable Terminal.
NB Series	Indicates products in the OMRON NB□□ Series of Programmable Terminal. In this manual, unless otherwise specified, NB□□ Series is taken as the subject concerned.
PLC	Indicates a Programmable Controller in the OMRON CP, CS/CJ, or SYSMAC C Series of Programmable Controllers.
CP Series	Indicates the following products in the OMRON PLC Series of Programmable Controllers: CP1H, CP1L, CP1E
CS/CJ Series	Indicates the following products in the OMRON PLC Series of Programmable Controllers: CS1G, CS1H, CS1G-H, CS1H-H, CJ1G, CJ1M, CJ2M, CJ2H
C Series	Indicates the following products in the OMRON PLC Series of Programmable Controllers: C200HX(-Z), C200HG(-Z), C200HE(-Z), CQM1, CQM1H, CPM1A, CPM2A, CPM2C
Serial Communication Unit	Indicates a Serial Communication Unit for an OMRON SYSMAC CS/CJ-Series PLC.
Serial Communication Board	Indicates a Serial Communication Board for an OMRON SYSMAC CS/CJ-Series or CQM1H PLC.
Communication Board	Indicates a Communication Board for an OMRON C200HX/HG/HE (-Z) PLC.
CPU Unit	Indicates a CPU Unit in the OMRON CP, CS/CJ or SYSMAC C Series of Programmable Controllers.
NB-Designer	Indicates the OMRON NB-Designer.
Host	Indicates the PLC and other units functioning as the control devices for NB-Series Units.
PT	Indicates an OMRON Programmable Terminal.
HMI	Indicates an OMRON Programmable Terminal.

Introduction

- Intended Audience

  This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

  - Personnel in charge of introducing FA systems into production facilities.
  - Personnel in charge of designing FA systems.
  - Personnel in charge of installing and connecting FA facilities.
  - Personnel in charge of managing FA systems and facilities.

- General Precautions

  - The user must operate the product according to the performance specifications described in the operation manuals.
  - Do not use the PT touch switch input functions for applications where danger to human life or serious property damage is possible, or for emergency switch applications.
  - Before using the product under conditions which are not described in the manual or applying the product to nuclear control systems, railroad systems, aviation systems, vehicles, combustion systems, medical equipment, amusement machines, safety equipment, and other systems, machines and equipment that may have a serious influence on lives and property if used improperly, consult your OMRON representative.
  - Make sure that the ratings and performance characteristics of the product are sufficient for the systems, machines, and equipment, and be sure to provide the systems, machines, and equipment with double safety mechanisms.
  - This manual provides information for connecting and setting up an NB-Series PT. Be sure to read this manual before attempting to use the PT and keep this manual close at hand for reference during installation and operation.

Safety Precautions

● Notation Used for Safety Information

The following notation is used in this manual to provide precautions required to ensure safe usage of the product. The safety precautions that are provided are extremely important to safety. Always read and heed the information provided in all safety precautions.

The following notation is used.

⚠ **WARNING**	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally, there may be severe property damage.

Precautions for Safe Use

Indicates the points that should be practiced or avoided for safe usage of the products.

Precautions for Correct Use

Indicates the points that should be practiced or avoided in order to prevent the product from failure to function, malfunctions or negative impacts on its performance and functionality.

● Symbols

🚫	● Prohibition Indicates a general prohibition.
🚫	● Disassembling prohibition Any attempts to disassemble the product may result in electric shock or other injuries. DO NOT DISASSEMBLE!
⚠	● Note Indicates general cautionary, warning, or danger level information.

● Warning notation

⚠ **WARNING**

Do not attempt to take the product apart and do not touch the product inside while the power is being supplied. Otherwise it may result in electric shock.

Do not touch any internal parts while the power is being supplied.
Otherwise it may result in electric shock.

Always ensure that the personnel in charge confirm that installation, inspection, and maintenance were properly performed for the NB Unit.
"Personnel in charge" refers to individuals qualified and responsible for ensuring safety during machine design, installation, operation, maintenance, and disposal.

Ensure that installation and post-installation checks are performed by personnel in charge who possess a thorough understanding of the machinery to be installed.

Do not use the input functions of the touch switch, etc. of the NB Unit, in applications that involve human life, in applications that may result in serious injury, or for emergency stop switches.

Do not attempt to disassemble, repair, or modify the NB Unit. Otherwise it may cause NB Unit to lose its safety functions.

Never press more than two points on the touch panel of the NB Unit at a time. Otherwise, it may activate a switch somewhere between the two points.

Precautions for Safe Use

- When unpacking the NB Unit, check carefully for any external scratches or other damages. Also, shake the Units gently and check for any abnormal sound.
- The NB Unit must be installed in a control panel.
- The mounting panel must be between 1.6 and 4.8 mm thick. Tighten the Mounting Brackets evenly to a torque of between 0.5 and 0.6 N·m to maintain water and dust resistance. If the tightening torque exceeds the specified value, or the tightening is not even, deformation of the front panel may occur. What is more, make sure the panel is not dirty or warped and that it is strong enough to hold the Units.
- Do not let metal particles enter the Units when preparing the panel.
- Do not connect an AC power supply to the DC power terminals.
- Use a DC power with a slight voltage fluctuation and that will provide a stable output even if the input is momentarily interrupted for 10 ms.
  Rated Power Supply Voltage: DC 24 V (Allowable range DC 20.4～27.6 V)
- Do not perform a dielectric voltage test.
- Make the connection by using terminal screws crimping on a twisted-pair cable with a crimping range of 12~26 AWG, and only 6.5 mm of insulation peel of the cable needs to be peeled off. Tighten the terminal screws at a torque of between 0.3 and 0.5 N·m. Make sure the screws are properly tightened.
- To prevent malfunctions caused by noise, ground the Unit correctly.
- Do not touch the packaging part of the circuit board with your bare hands. Discharge any static electricity from your body before handling the board.
- When using the No. 6 pin of the serial communication port COM1 connector for a voltage of DC+5 V, make sure the supply equipment's current capacity is below 250 mA before using it. The DC+5V voltage output of the NB main unit is +5V±5%, and the maximum current is 250 mA.
- Turn OFF the power supply before connecting or disconnecting cables.
- Always keep the connector screws firmly tightened after the communication cable is connected.
- The maximum tensile load for cables is 30 N. Do not apply loads greater than this.
- Confirm the safety of the system before turning ON or OFF the power supply, or pressing the reset button.
- The whole system may stop depending on how the power supply is turned ON or OFF. Turn ON/OFF the power supply according to the specified procedure.
- Reset by pressing the reset button, or restart the power supply, once the DIP switch settings are changed.
- To ensure the system's safety, make sure to incorporate a program that can confirm the normal functionality of the NB Unit before running the system.
- Start actual system application only after sufficiently checking screen data, macros and the operation of the program at the host side.
- Don't press the touch panel with a force greater than 30 N.
- Do not use a screwdriver or any other tool to press the touch panel.
- Confirm the safety of the system before pressing the touch panel.

- Signals from the touch switches may not be input if the touch switches are pressed consecutively at high speed. Confirm that the PT has detected the input of a touch switch before pressing any other touch switch.
- Do not accidentally press the touch panel when the backlight is not lit or when the display does not appear. Make sure of the safety of the system before pressing the touch panel.
- To use numeric input functions safely, always make maximum and minimum limit set-tings.
- Before initializing screen data, confirm that existing data is backed up at the NB-Designer.
- When changing the password with the system menu, do not reset or turn OFF the power supply until writing is finished. Failure to save the password may cause the screen to fail to function.
- When using an equipment monitor, confirm the safety of the system before carrying out the following operations:
  - Changing monitor data.
  - Changing operation mode.
  - Forced setup/reset.
  - Changing the current value or the set value.
- Do not connect a USB connector to any device that is not applicable.
- Before connecting a USB connector to a device, make sure that the device is free of damage.
- Commercially available and the recommended USB HUB are different from the general specifications of the NB Unit. The unit may not function well in an environment subject to noise, static electricity. Therefore, when using a USB HUB, employ sufficient noise and static electricity insulation measures, or install it at a site free of noise or static electricity.
- While uploading or downloading screen data or system programs, do not perform the following operations that may corrupt the screen data or the system program:
  - Turning OFF the power supply of the NB Unit.
  - Pressing the PT's reset switch.
- Dispose of the Units and batteries according to local ordinances as they apply.

廢電池請回收

- When exporting products with lithium primary batteries containing perchlorate at 6ppb or above to or delivering them through California, USA, the following precautionary measures have to be publicized.
  Perchlorate material – applicable through special processing. Refer to http://www.dtsc.ca.gov/hazardouswaste/perchlorate.
  NB-Series products contain lithium primary batteries. When exporting products containing this kind of batteries to or delivering them through California, USA, label all the product packages as well as the appropriate delivery packages.
- Do not use benzene, paint thinner, or other volatile solvents, and do not use chemically treated cloths.
- Do not dispose the Units together with general waste at waste yards. When disposing them, follow the related local ordinances or rules.
- Customers may not replace the backlight lamp inside the NB Unit. Please contact OMRON's customer service center.

- Deterioration over time can cause the touch points to move. Calibrate the touch panel periodically.
- Water and oil resistance will be lost if the front sheet is torn or is peeling off. Do not use the Unit, if the front sheet is torn or is peeling off.
- The rubber packing will deteriorate, shrink, or harden depending on the operating environment. Inspect and replace the rubber packing periodically.
- The communication cables of the COM1 and COM2 connectors are not interchangeable. Confirm the pins of the ports before carrying out communications.
- Periodically check the installation conditions in applications where the PT is subject to contact with oil or water.

Precautions for Correct Use

- Do not install the product in any of the following locations:
  Locations subject to severe changes in temperature
  Locations subject to temperatures or humidity outside the range specified in the specifications
  Locations subject to condensation as the result of high humidity
  Locations subject to corrosive or flammable gases
  Locations subject to strong shock or vibration
  Locations outdoors subject to direct wind and rain
  Locations subject to strong ultraviolet light
  Locations subject to dust
  Locations subject to direct sunlight
  Locations subject to splashing oil or chemicals
- Take appropriate and sufficient countermeasures when installing systems in the following locations:
  Locations subject to static electricity or other forms of noise
  Locations subject to strong electric field or magnetic field
  Locations close to power supply lines
  Locations subject to possible exposure to radioactivity

Conformance to EC Directives

NB-Series Programmable Terminals are EMC compliant.

1 Concepts

OMRON products are electronic devices that are incorporated in machines and manufacturing installations. OMRON PTs conform to the related EMC Directives (see note) so that the devices and machines into which they are built can more easily conform to EMC Directives. The actual products have been through inspections and are completely in accordance with EMC directives. However, when they are built into customers' systems, whether the systems also comply with these Directives is up to the customers for further inspection.

EMC-related performance of OMRON PTs will vary depending on the configuration, wiring, and other conditions of the OMRON equipment or control panel. The customer must, therefore, perform final checks to confirm that the overall machine or device conforms to EMC standards.

Note   The applicable EMC (Electromagnetic Compatibility) standards are as follows:
EMS (Electromagnetic sensitivity): EN61131-2: 2007
EMI (Electromagnetic Interference): EN61131-2: 2007

2 Conformance to EC Directives

NB-Series Programmable Terminals are EC compliant. Heed the following precautions in order to ensure that the customer's overall machine and device conform to EC Directives.

1. The PT is intended to be installed in a control panel.
2. You must use reinforced insulation or double insulation for the DC power supply and the DC power supply must have minimal voltage fluctuations and provide a stable output even if the power supply input is interrupted for 10 ms.
3. The PTs conform to the standard EN 61131-2, but radiated emission characteristics (10m regulations) may vary depending on the configuration of the control panel used, other devices connected to the control panel, wiring, and other conditions. You must therefore confirm that the overall machine or equipment complies with EC Directives.
4. This is a class A product (Product for industry purpose). It may cause radio interference in residential areas, in which case the user may be required to take adequate measures to reduce interference.

Read and Understand this Manual

Please read and understand this manual before using the product. Please consult your OMRON representative if you have any questions or comments.

Warranty and Limitations of Liability

WARRANTY

OMRON'S EXCLUSIVE WARRANTY IS THAT THE PRODUCTS ARE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR (OR OTHER PERIOD IF SPECIFIED) FROM DATE OF SALE BY OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

IN NO EVENT SHALL THE RESPONSIBILITY OF OMRON FOR ANY ACT EXCEED THE INDIVIDUAL PRICE OF THE PRODUCT ON WHICH LIABILITY IS ASSERTED.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

Application Consideration

SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

• Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this manual.
• Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
• Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

PERFORMANCE DATA

Performance data given in this manual is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

ERRORS AND OMISSIONS

The information in this manual has been carefully checked and is believed to be accurate. however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

Section 1 Connecting to SIEMENS PLCs

This section describes the connection to SIEMENS PLCs.

1-1 Serial Port Communication

Series	CPU	Link Module	Driver
S7-200	CPU212 CPU214 CPU215 CPU216 CPU221 CPU222 CPU224 CPU226 CPU224 XP CN CPU226 XP CN	RS485 on the CPU unit	SIEMENS S7-200
S7-300	CPU312IFM CPU313 CPU313C CPU314 CPU314IFM CPU315 CPU315-2 DP CPU316 CPU316-2 DP CPU318-2	MPI port on the CPU unit	SIEMENS S7-300/400 (PC Adapter Direct)
S7-400	CPU412-1 CPU412-2 DP CPU413-1 CPU413-2 DP CPU414-1 CPU414-2 DP CPU414-3 DP CPU416-1 CPU416-2 DP CPU416-3 DP CPU417-4	MPI port on the CPU unit	

1-2 Serial Port Communication Parameters and Cable Fabrication

Series	CPU	Link Module	COMM Type	Parameter	Cable
S7-200	CPU222 CPU224 CPU226 CPU224 XP CN CPU226 XP CN	RS485 on the CPU unit	RS232	Refer to Section 1-3	Self-made cable required
			RS485	Refer to Section 1-3	Self-made cable required
S7-300	CPU312IFM CPU313 CPU313C CPU314 CPU314IFM CPU315 CPU315-2 DP CPU316 CPU316-2 DP CPU318-2	MPI port on the CPU unit	RS232 S7-300/400 (PC Adapter Direct) protocol	Refer to Section 1-3	Self-made cable required
S7-400	CPU412-1 CPU412-2 DP CPU412-3H CPU413-1 CPU413-2 DP CPU414-1 CPU414-2 DP CPU414-3 DP CPU416-1 CPU416-2 DP CPU416-3 DP CPU417-4	MPI port on the CPU unit	RS232 S7-300/400 (PC Adapter Direct) protocol	Refer to section 1-3	Self-made cable required

1-3 Serial Port Communication Parameter Setting

1-3-1 When Using SIEMENS S7-200 Communication Protocol

HMI Settings

HMI default communication parameters: 9600bps (Baud Rate)，8 (Data Bit)，1(Stop Bit)，even(Parity Check) and 0 (PLC Station No.)

Note: The maximum communication baud rate is 187.5K that is not supported by the direct online.

RS485 Communication
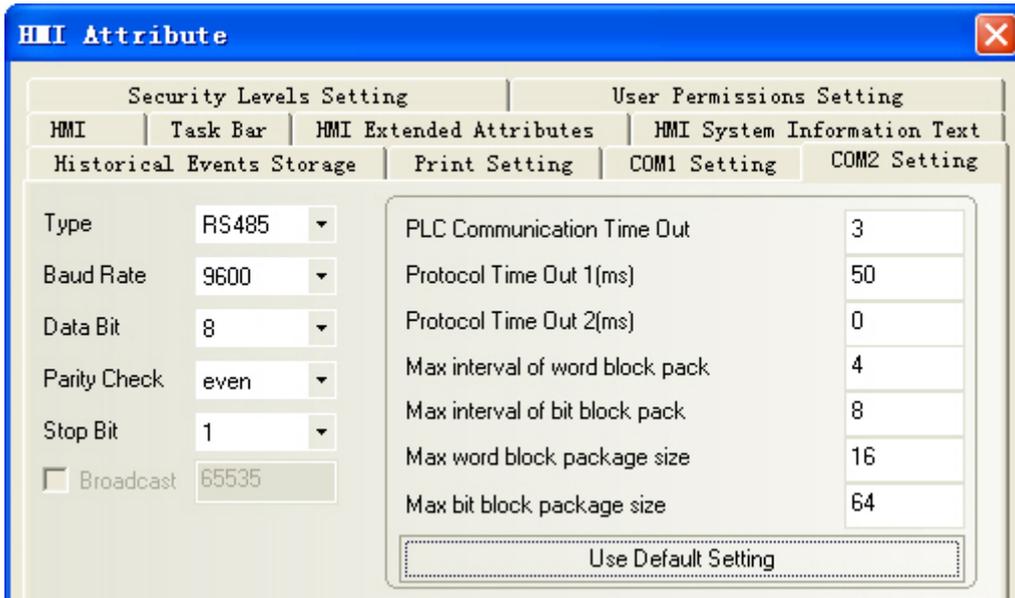
RS232 Communication
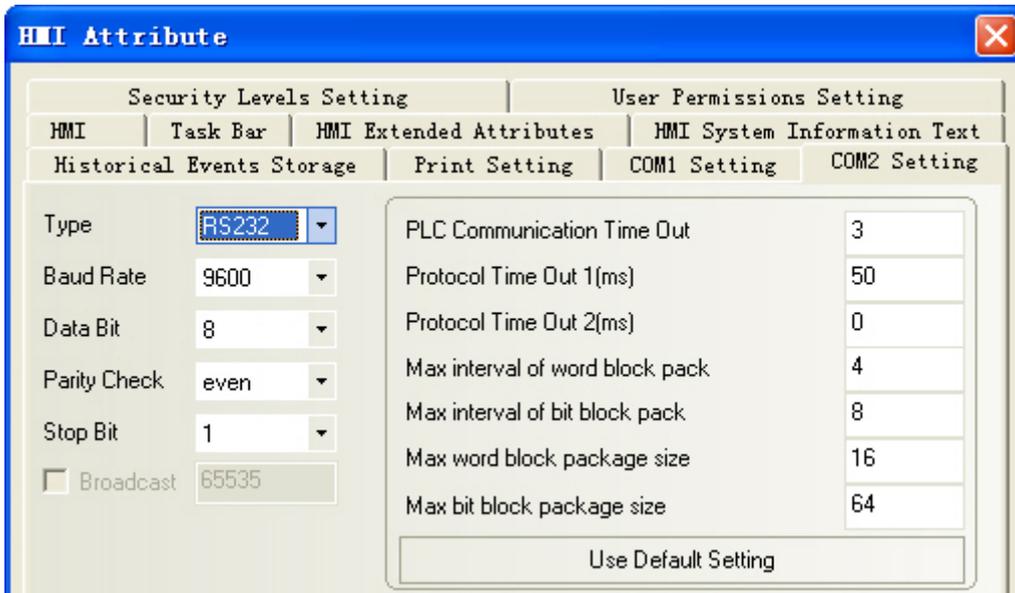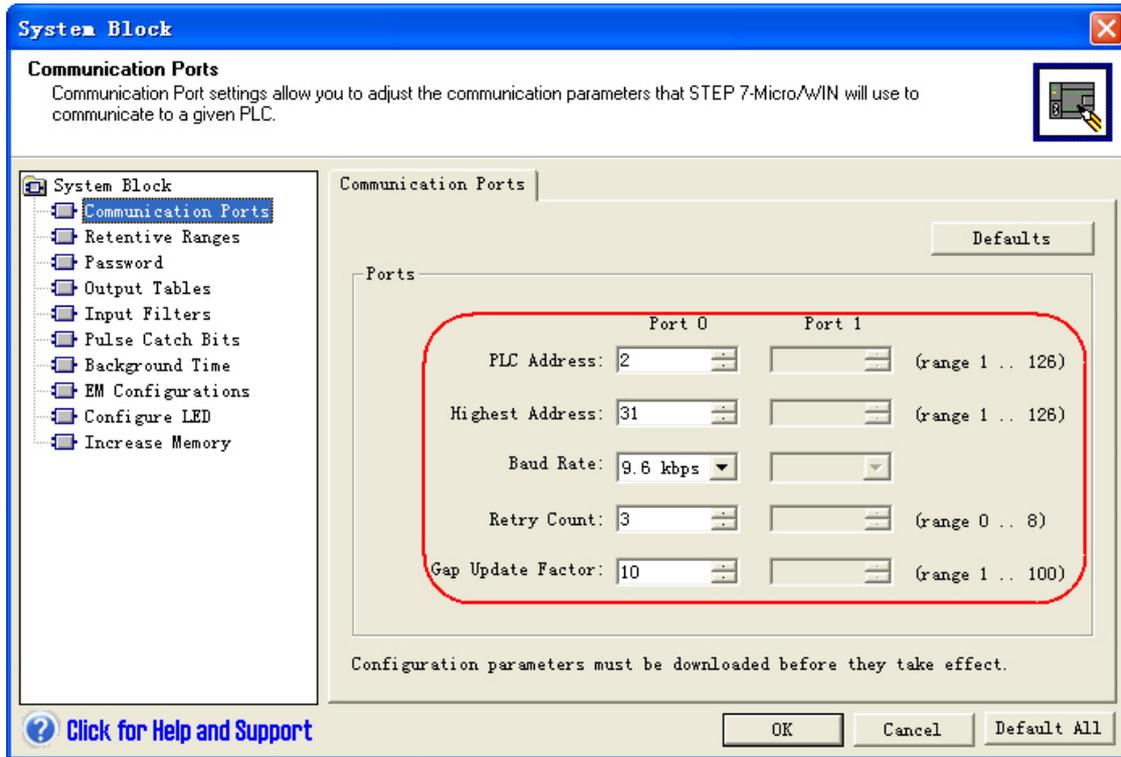
PLC Settings

1-3-2 When Using SIEMENS S7-300/400 (PC Adapter Direct)

Communication Protocol

HMI Settings

HMI default communication parameters: 19200bps(Baud Rate)，8(Data Bit)，2(Stop Bit)，odd (Parity Check) and 2 (PLC Station No.) (Multiple Station No. is not supported.)

RS232 Communication
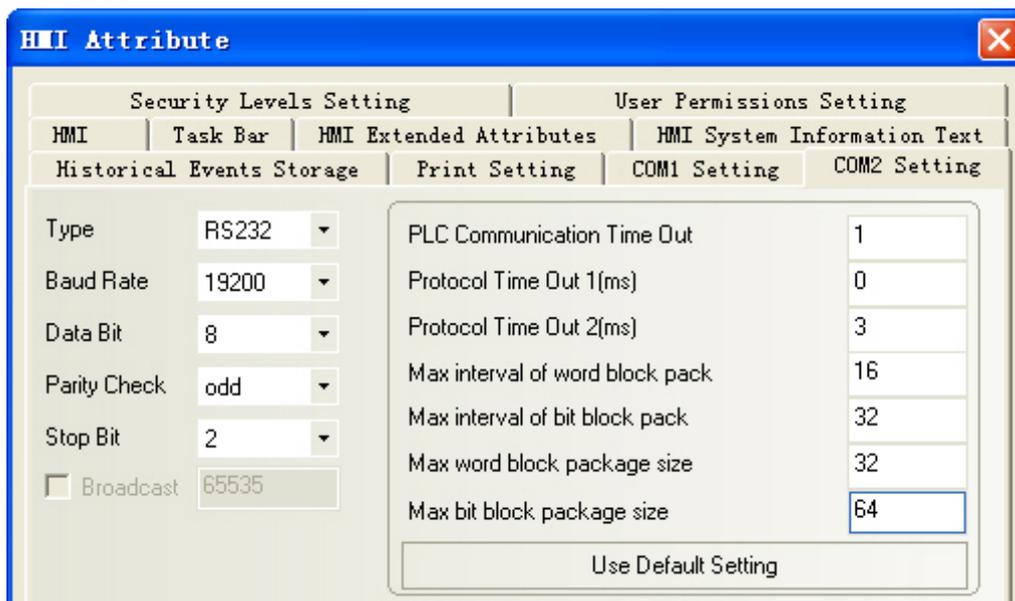
Note: 1. The PLC Station No. is not needed if the PC adapter is used, which realize one for one communication.
2. The PLC baud rate and HMI baud rate are set to 187.5Kbps and 19200bps respectively when 6ES7972-0CA1□-0XA0 adapter is used to perform communications.
3. DB blocks should be established in PLC program configuration, otherwise the relevant registers (DB.DBX, DB.DBW, DB.DBD)can not be written. The even parity should be used on the initial addresses of DBm.DBW and DBm.DBD.

PLC Settings
1. The PLC baud rate at MPI port is set to 187.5Kbps when 6ES7972-0CA1□-0XA0 adapter(HMI Adapter)is used to perform communications.
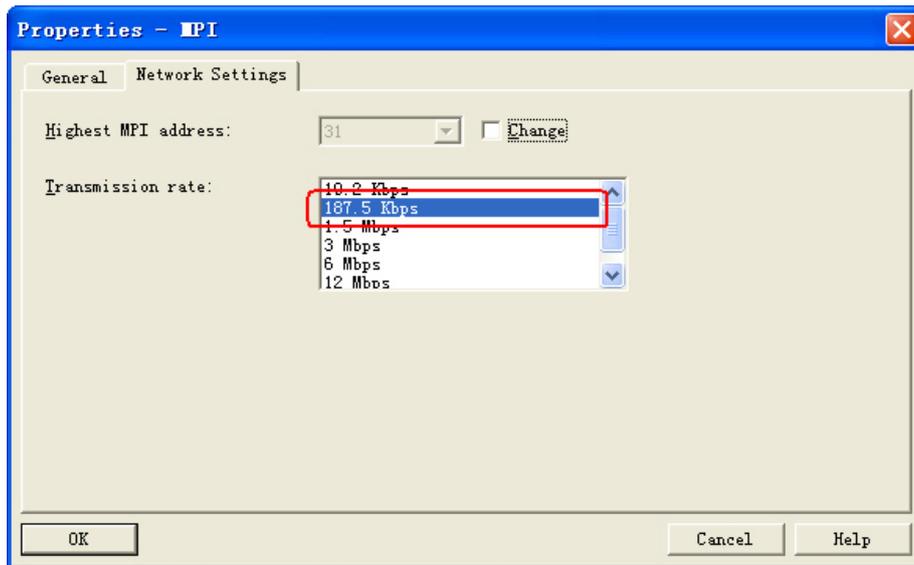
2. The MPI address must be 2.
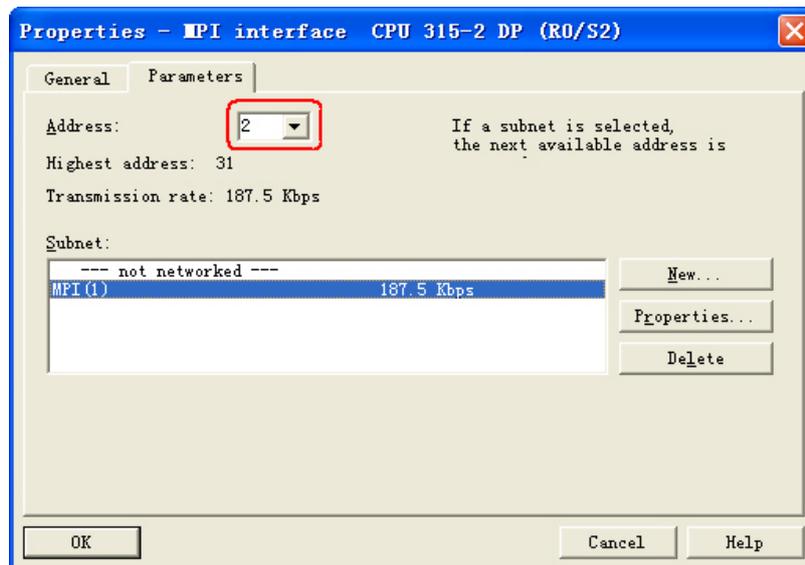
3. Download the set parameters to PLC after the setting is completed. Then open [SIMATIC Manager] menu-[Option]-[PG/PC Interface Setting], select PC Adapter (MPI) and modify the transmission rate of MPI port to be 187.5K, as shown below:
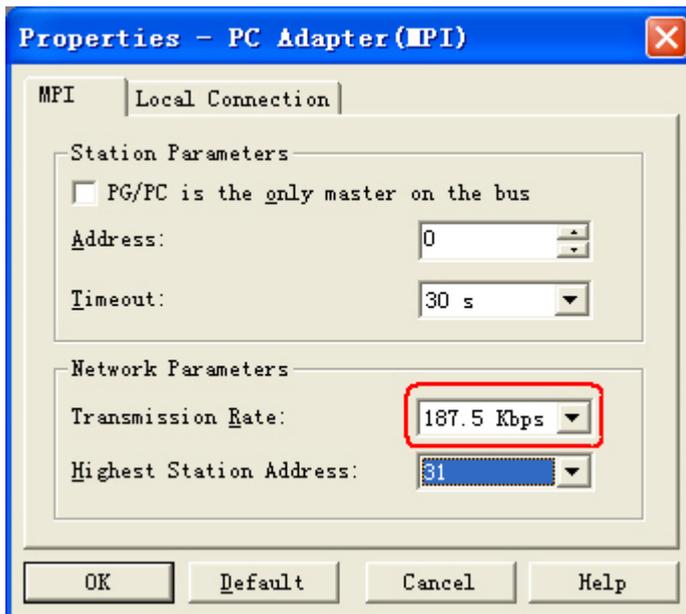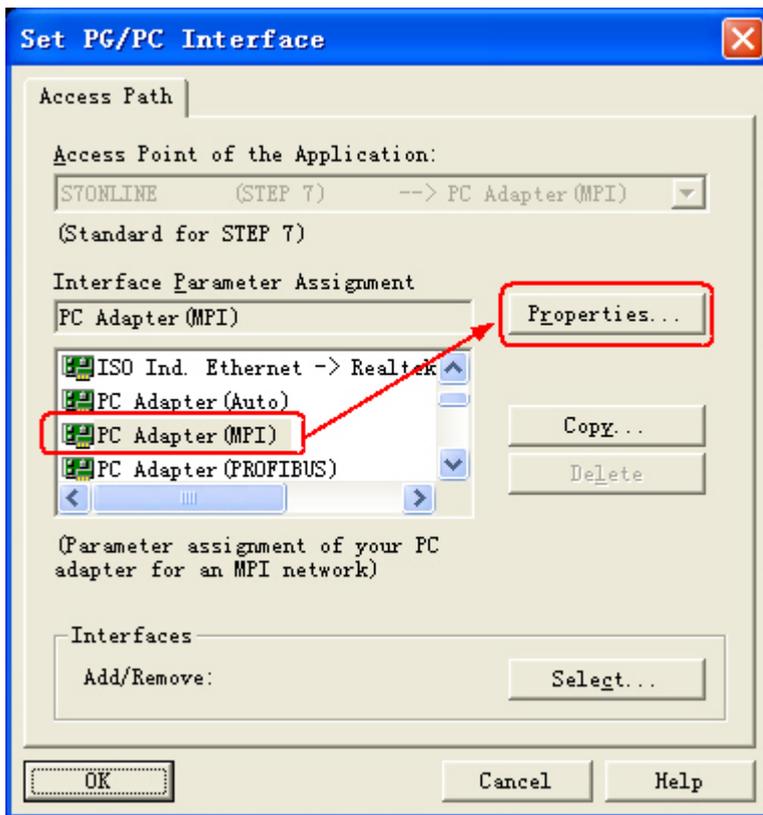
1-4 Supported Registers

1-4-1 SIEMENS S7-200

Device	Bit Address	Word Address	Format	Notes
SCR Nodes	S.B 0.0-31.7	------	DD.O	
Special Memory Bit	SM.B 0.0-549.7	------	DDD.O	
Counter Bit	Cnt 0-255	------	DDD.O	
Counter Bit	Tim 0-255	------	DDD.O	
Variable Memory Nodes	V.B 0.0-10238.7	------	DDDDD.O	
Internal Memory Bit	M.B 0.0-31.7	------	DD.O	
Discrete Output and Map Register Nodes	Q.B 0.0-15.7	------	DD.O	
Discrete Input and Map Register Nodes	I.B 0.0-15.7	------	DD.O	
Analog Output	------	AQW 0-62	DD	
Analog Input:	------	AIW 0-62	DD	
SCR (32-bit)	------	SD 0-28	DD	
SCR	------	SW 0-30	DD	
Special Memory Registers (32-bit)	------	SMD 0-546	DDD	
Special Memory Registers	------	SMW 0-548	DDD	
Internal Memory Bit (32-bit)	------	MD 0-28	DD	
Internal Memory	------	MW 0-30	DD	
Discrete Output and Map Registers (32-bit)	------	QD 0-12	DD	
Discrete Output and Map Registers	------	QW 0-14	DD	
Discrete Input and Map Registers (32-bit)	------	ID 0-12	DD	
Discrete Input and Map Registers	------	IW 0-14	DD	
Counter PV	------	Cnt 0-255	DDD	
Timer PV	------	Tim 0-255	DDD	
Variable Memory (32-bit)	------	VD 0-10236	DDDDD	
Variable Memory	------	VW 0-10238	DDDDD	

Note: The initial addresses of VW and VD must be even.

Address format description: D: decimal, O: octonary, H: hexadecimal.

1-4-2 SIEMENS S7-300/400 (PC Adapter Direct)

Device	Bit Address	Word Address	Format	Notes
External Input Nodes	I 0.0~511.7	------	DDDD.O	
External Output Nodes	Q 0.0~511.7	------	DDDD.O	
Internal Auxiliary Nodes	M 0.0~4095.7	------	DDDD.O	
Data Register Nodes	DBm.DBX 0~65535.7	------	DDDDD.O	m:10~60
Data Registers	------	DBm.DBW 0-65534	DDDDD	m:10~60
Data Registers (32-bit)	------	DBm.DBD 0-65532	DDDDD	m:10~60
Internal Registers	------	MW 0~2046	DDDD	
Internal Registers (32-bit)	------	MD 0~2044	DDDD	
External Output Registers	------	QW 0~126	DDD	
External Output Registers (32-bit)	------	QD 0~124	DDD	
External Input Registers	------	IW 0~126	DDD	
External Input Registers (32-bit)	------	ID 0~124	DDD	

Note: The initial addresses of DBm.DBW and DBm.DBD must be even.

Address format description: D: decimal, O: octonary, H: hexadecimal.

1-5 Cable Fabrication

1-5-1 When Using SIEMENS S7-200 Communication Protocol

RS232 Communication Cable

Use serial port programming cable manufactured by SIEMENS to communicate with HMI.

RS485 Communication Cable
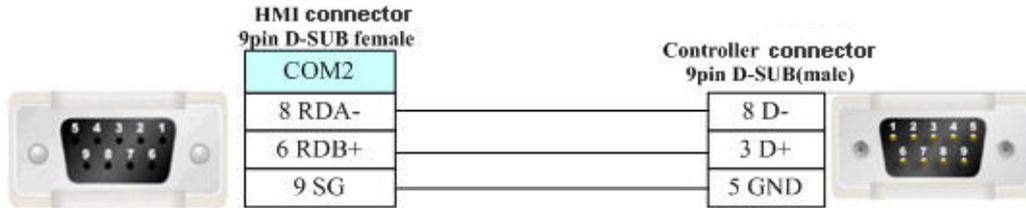
1-5-2 When Using SIEMENS S7-300/400 (PC Adapter Direct) Communication Protocol

RS232 Communication Cable

Use 6ES7972-0CA1□-0XA0 communication cables for HMI Adapter to perform communications.
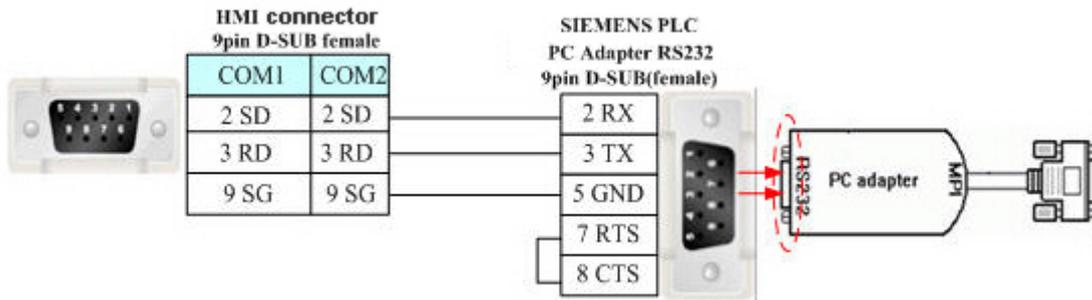
Section 2 Connecting to Mitsubishi PLCs

This section describes the connection to Mitsubishi PLCs.

2-1 Serial Port Communication

Series	CPU	Link Module	Driver
FXCPU	FX1S	RS232 on the CPU unit	Mitsubishi FX1S *2
		RS485 on the CPU unit FX□□-422-BD *3	
		FX□□-485-BD *3 FX□□-485-ADP *3	Mitsubishi FX1S *2 Mitsubishi　　　　FX-485ADP/485BD/232BD (Multi-station) *1
	FX0N FX1N FX1NC FX2N FX2NC	RS232 on the CPU unit	Mitsubishi FX0N/1N/2N/3G *2
		RS485 on the CPU unit FX□□-422-BD *3	
		FX□□-485-BD *3 FX□□-485-ADP *3	Mitsubishi FX0N/1N/2N/3G *2 Mitsubishi　　　　FX-485ADP/485BD/232BD (Multi-station) *1
		FX□□-232-BD *3	
	FX2N-10GM FX2N-20GM	RS232 on the CPU unit	Mitsubishi FX2N_10GM/20GM
		RS485 on the CPU unit	
	FX3U FX3UC	RS232 on the CPU unit	Mitsubishi FX3U *2
		RS485 on the CPU unit FX□□-422-BD *3	
		FX□□-485-BD *3 FX□□-485-ADP *3	Mitsubishi FX3U *2 Mitsubishi　　　　FX-485ADP/485BD/232BD (Multi-station) *1
		FX□□-232-BD *3	
	FX3G	RS232 on the CPU unit	Mitsubishi FX0N/1N/2N/3G *2
		RS485 on the CPU unit	
QCPU	Q00JCPU	RS232 on the CPU unit	Mitsubishi Q00J (CPU Port)
		QJ71C24 QJ71C24-R2 QJ71C24N QJ71C24N-R2 QJ71C24N-R4	Mitsubishi Q_QnA (Link Port)
	Q00CPU Q01CPU	RS232 on the CPU unit	Mitsubishi Q_QnA (Link Port)
		QJ71C24 QJ71C24-R2 QJ71C24N QJ71C24N-R2 QJ71C24N-R4	
	Q02CPU Q02HCPU Q12HCPU Q25HCPU	RS232 on the CPU unit	Mitsubishi Q Series (CPU Port)
		QJ71C24 QJ71C24-R2 QJ71C24N QJ71C24N-R2 QJ71C24N-R4	Mitsubishi Q_QnA (Link Port)
	Q06HCPU	RS232 on the CPU unit	Mitsubishi Q06H

Note: 1. *1 This protocol supports Multiple Station No..

2. *2 This protocol doesn't support Multiple Station No..

3. *3 □□ is the module type applicable to this PLC.

2-2 Serial Port Communication Parameters and Cable Fabrication

Series	CPU	Link Module	COMM Type	Parameter	Cable
FXCPU	FX1S	RS232 on the CPU unit	RS232	Refer to Section 2-3	Self-made cable required
		RS485 on the CPU unit FX□□ -422-BD	RS422	Refer to Section 2-3	Self-made cable required
		FX□□-485-BD FX□□-485-ADP	RS422	Refer to Section 2-3	Self-made cable required
	FX0N FX1N FX1NC FX2N FX2NC	RS232 on the CPU unit	RS232	Refer to Section 2-3	Self-made cable required
		RS485 on the CPU unit FX□□ -422-BD	RS422	Refer to Section 2-3	Self-made cable required
		FX□□-485-BD FX□□-485-ADP	RS422	Refer to Section 2-3	Self-made cable required
		FX□□-232-BD	RS232	Refer to Section 2-3	Self-made cable required
	FX2N-10GM FX2N-20GM	RS232 on the CPU unit	RS232	Refer to Section 2-3	Self-made cable required
		RS485 on the CPU unit	RS422	Refer to Section 2-3	Self-made cable required
	FX3G	RS232 on the CPU unit	RS232	Refer to Section 2-3	Self-made cable required
		RS485 on the CPU unit	RS422	Refer to Section 2-3	Self-made cable required
	FX3UC FX3U	RS232 on the CPU unit	RS232	Refer to Section 2-3	Self-made cable required
		RS485 on the CPU unit FX□□-422-BD	RS422	Refer to Section 2-3	Self-made cable required
		FX□□-485-BD FX□□-485-ADP	RS422	Refer to Section 2-3	Self-made cable required
		FX□□-232-BD	RS232	Refer to Section 2-3	Self-made cable required
Melsec Q	Q00JCPU	RS232 on the CPU unit	RS232	Refer to Section 2-3	Self-made cable required
	Q00CPU Q01CPU	RS232 on the CPU unit	RS232	Refer to Section 2-3	Self-made cable required

	Q00JCPU Q00CPU Q01CPU Q02CPU Q02HCPU Q12HCPU Q25HCPU	QJ71C24 QJ71C24-R2 QJ71C24N QJ71C24N-R2	RS232	Refer to Section 2-3	Self-made cable required
		QJ71C24 QJ71C24N QJ71C24N-R4	RS422	Refer to Section 2-3	Self-made cable required
	Q02CPU Q02HCPU Q12HCPU Q25HCPU	RS232 on the CPU unit	RS232	Refer to Section 2-3	Self-made cable required
	Q06HCPU	RS232 on the CPU unit	RS232	Refer to Section 2-3	Self-made cable required

2-3 Serial Port Communication Parameter Setting

2-3-1 When Using Mitsubishi FX1S, Mitsubishi FX0N/1N/2N/3G and Mitsubishi FX3U Communication Protocols

HMI Settings

HMI default communication parameters: 9600bps (Baud Rate), 7 (Data Bit), even (Parity Check), 1 (Stop Bit) and 0 (PLC Station No.)

The PLC Communication Time Out, Max interval of word (bit) block pack, Max word block package size on the right vary with PLC protocols. Generally the defaults are selected.

RS422 Communication

RS232 Communication
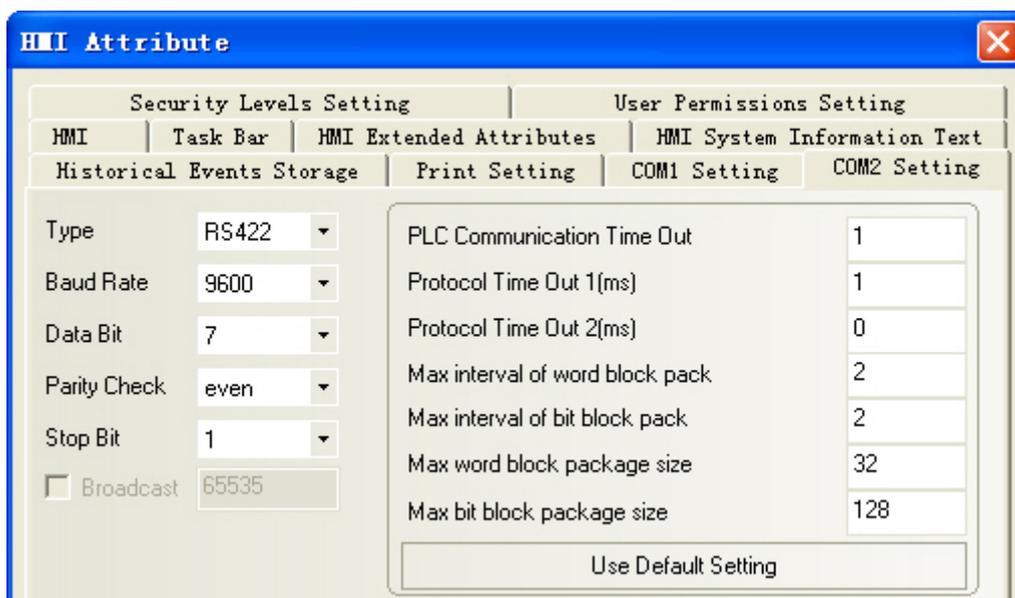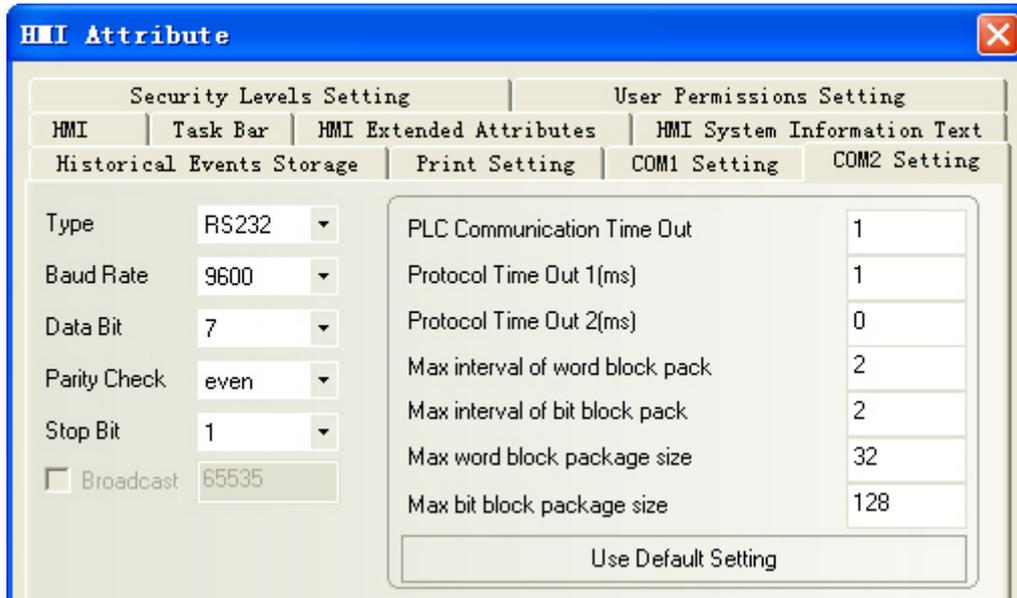
PLC Settings

The PLC setting is as shown below when **Mitsubishi FX1S, Mitsubishi FX0N/1N/2N/3G** and **Mitsubishi FX3U** communication protocols are used:

Click the [Default] button to make settings without checking the [Communication Setting]:
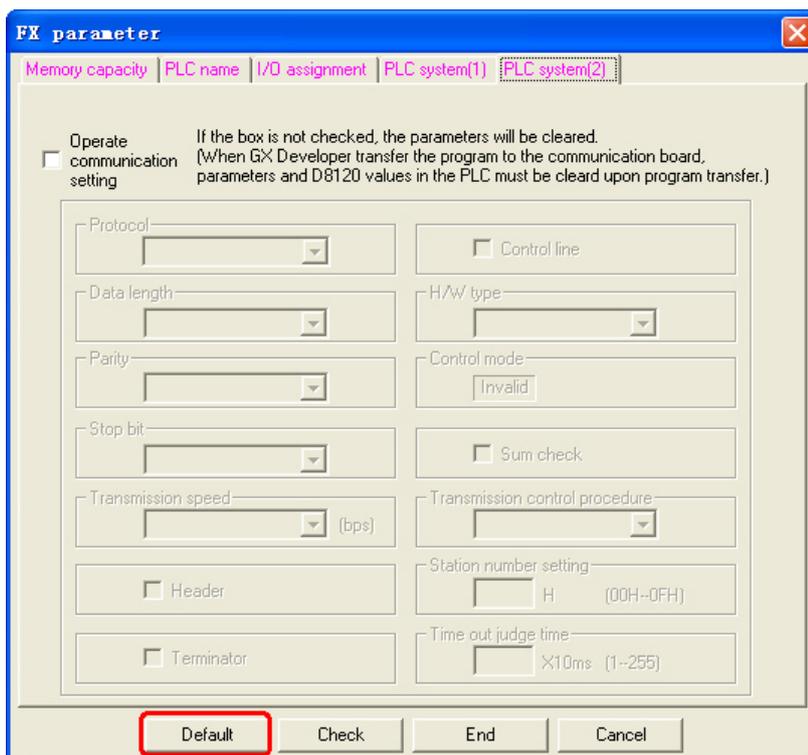
Note: 1. The communication protocols such as Mitsubishi FX1S, Mitsubishi FX0N/1N/2N/3G and Mitsubishi FX3U etc. can be selected according to PLC model if the Station No. is not used when the communication is realized through the communication function expansion board.
2. Make sure the value of communication format D8120 is 0 when the communication is realized through the communication function expansion board.

2-3-2 When Using Mitsubishi FX-485ADP/485BD/232BD (Multi-station) Communication Protocols

HMI Settings

HMI default communication parameters: 19200bps (Baud Rate), 7(Data Bit), even (Parity Check), 2 (Stop Bit) and 0 (PLC Station No.)

Note: The protocols are only applicable to PLCs communicating through communication function expansion board and support Multiple Station No. and Baud Rate settings.

RS422 Communication

RS232 Communication

PLC Settings

The PLC setting is as shown below when **FX-485ADP/485BD/232BD (Multi-station)** communication protocols are used:

Double-click the [PLC Parameter] under [Project Data List] in GX Developer software:

Open the [FX Parameter] dialog box:

1. FX1S/FX1N/FX2N/3G Series PLC
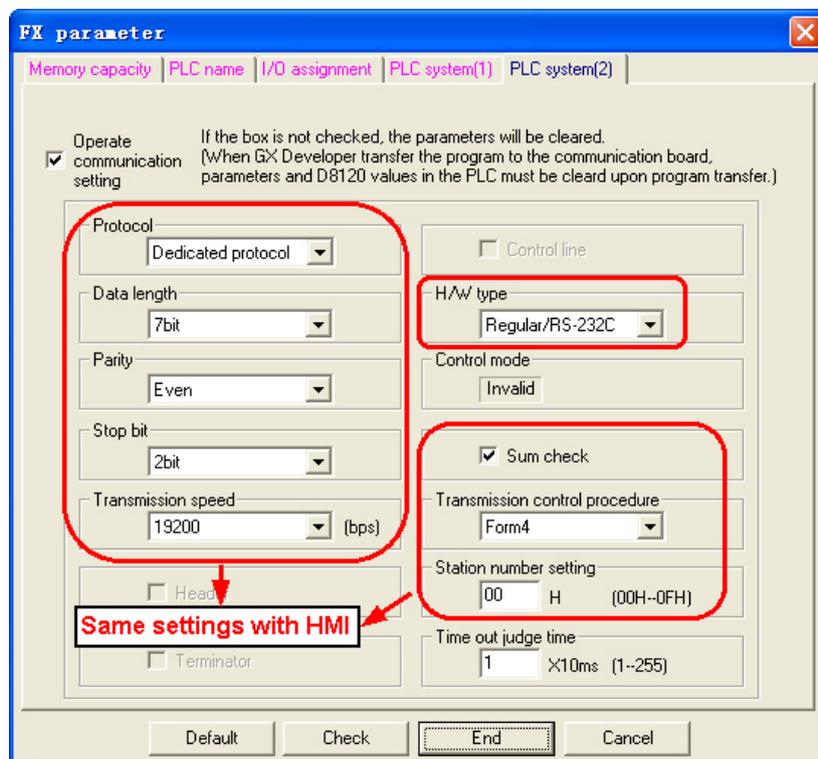
Check the [Operate communication setting] option.

Note: 1. FX0N Series PLCs do not support the [FX Parameter] operation, but the communication parameters can be set through writing values to the special data registers D8120, D8121and D8129.

2. The [Dedicated Protocol] must be selected and the [Sum Check] must be checked with [Form4] selected for the Transmission Control Sequence.

3. The [H/W Type] is "Regular/RS-232C" and "RS-485" when FX□□-232-BD and FX□□-485-BD/FX□□-485-ADP communication are used respectively.

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2. FX3U/3UC Series PLC
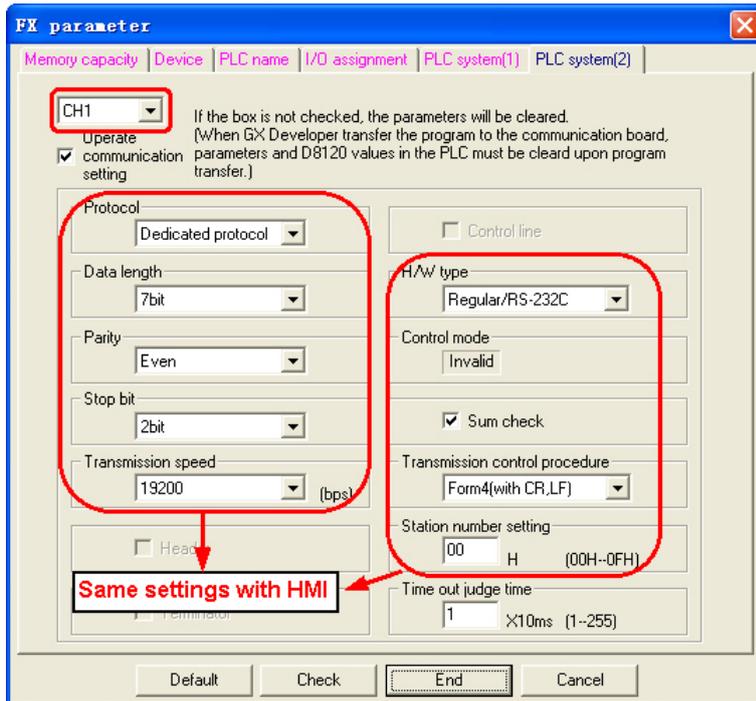
Check the [Operate communication setting] option.

Note: 1. The [CH1] should be selected for FX3U/3UC Series PLC.

2. The [Dedicated Protocol] must be selected and the [Sum Check] must be checked with [Form4] selected for the Transmission Control Sequence.

3. The [H/W Type] is "Regular/RS-232C" and "RS-485" when FX☐☐-232-BD and FX☐☐-485-BD/FX☐☐-485-ADP communication are used respectively.

Aside from using [FX Parameter], the user can use the special data register D8120 in PLC to set the communication parameters for PLC.

Special Data Registers	Descriptions
D8120	Communication format
D8121	Station No. setting
D8129	Data network out-time counting
Applicable to FX3U/3UC and other FX Series PLCs using CH1	

For example:

If the PLC communication parameters are: 9600bps (Baud Rate), 7 (Data Bit), even (Parity Check), 2 (Stop Bit), 1(PLC Station No.), RS485 (Communication Method) and 1 (PLC Communication Time Out), then
D8120=0xE08E,

D8121=1,

and D8129=1.

Note: The settings will be valid when the PLC is turned OFF and then back ON again after the D8120 setting is modified.

2-3-3 When Using FX2N-10GM/20GM Communication Protocol

HMI Settings

HMI default communication parameters: 9600bps (Baud Rate), 8 (Data Bit), even (Parity Check), 1 (Stop Bit) and 0 (PLC Station No.)

RS232 Communication

RS422 Communication

2-3-4 When Using Mitsubishi Q00J (CPU Port) Communication Protocol

HMI Settings

HMI default communication parameters: 115200bps (Baud Rate), 8 (Data Bit), odd (Parity Check), 1 (Stop Bit) and 0 (PLC Station No.) (Multiple Station No. is not supported.)

RS232 Communication
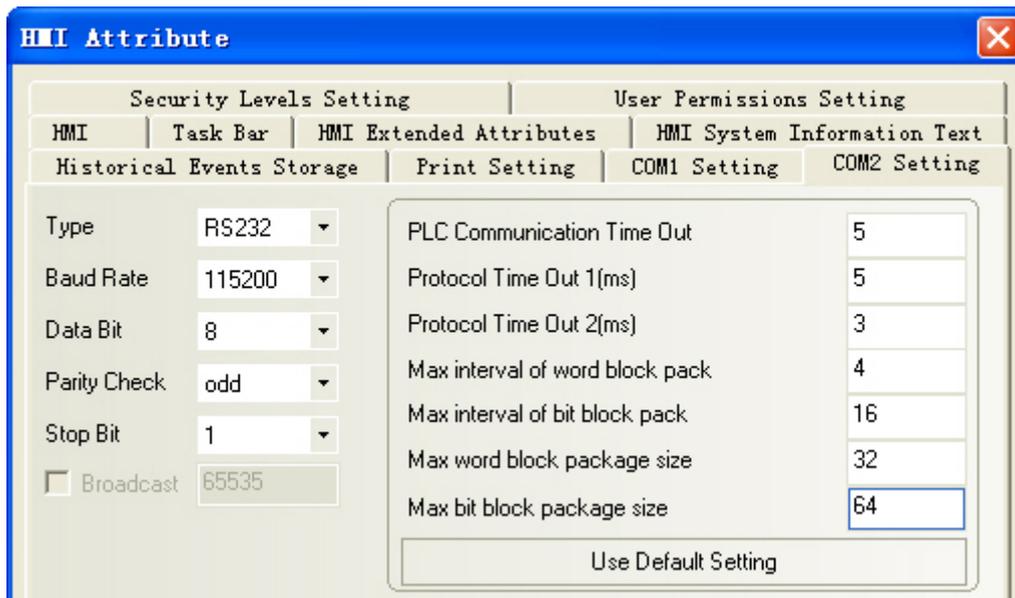
Note: There is no need to set PLC baud rate that will automatically vary with the baud rate set by HMI.

2-3-5 When Using Mitsubishi Q series (CPU Port) Communication Protocol

HMI Settings

HMI default communication parameters: 115200bps (Baud Rate), 8 (Data Bit), odd (Parity Check), 1 (Stop Bit) and 0 (PLC Station No.) (Multiple Station No. is not supported.)

RS232 Communication
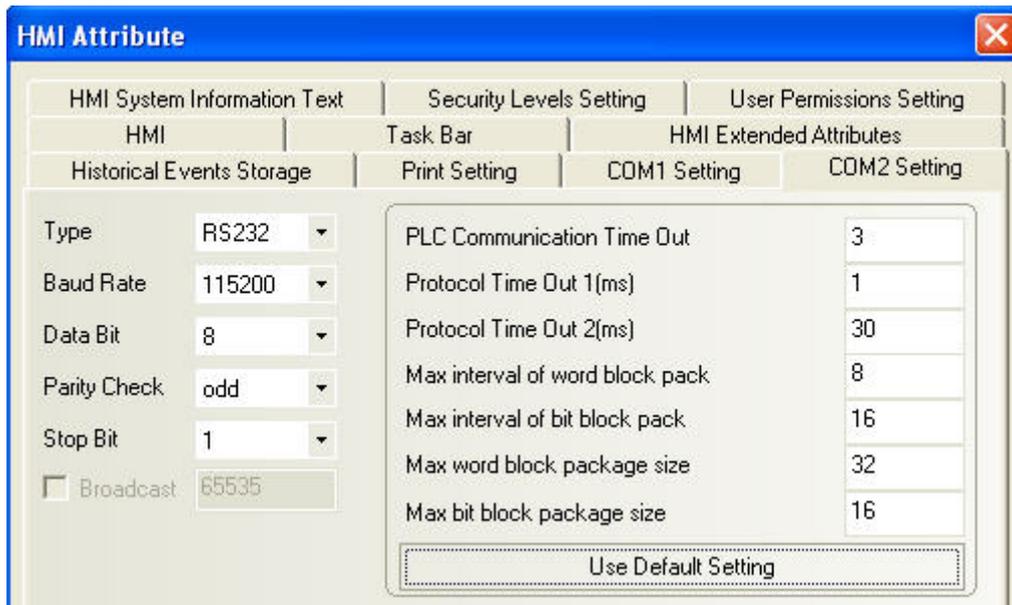
Note: There is no need to set PLC baud rate that will automatically vary with the baud rate set by HMI.

2-3-6 When Using Mitsubishi Q06H Communication Protocol

HMI Settings

HMI default communication parameters: 115200bps (Baud Rate), 8 (Data Bit), odd (Parity Check), 1 (Stop Bit) and 0 (PLC Station No.) (Multiple Station No. is not supported.)

RS232 Communication
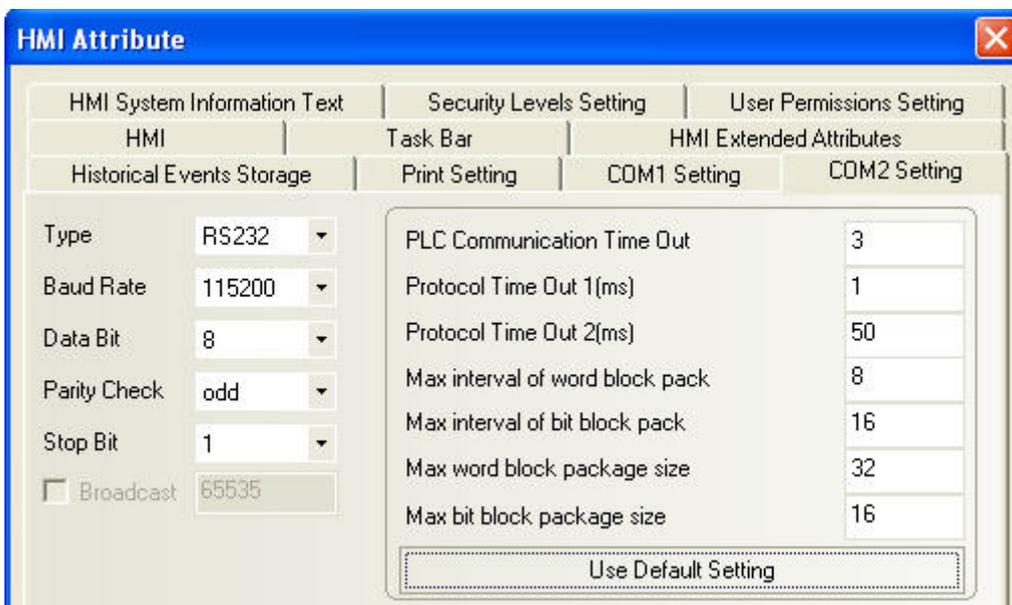
Note: There is no need to set PLC baud rate that will automatically vary with the baud rate set by HMI.

2-3-7 When Using Mitsubishi Q_QnA (Link Port) Communication Protocol

HMI Settings

HMI default communication parameters: 9600bps (Baud Rate), 8 (Data Bit), odd (Parity Check), 1 (Stop Bit) and 0 (PLC Station No.)

RS232 Communication

RS422 Communication

PLC Settings

The PLC settings is as shown below when **Mitsubishi Q_QnA (Link Port) or Mitsubishi Melsec Q** communication protocols are used:

1. Communication through CPU Port
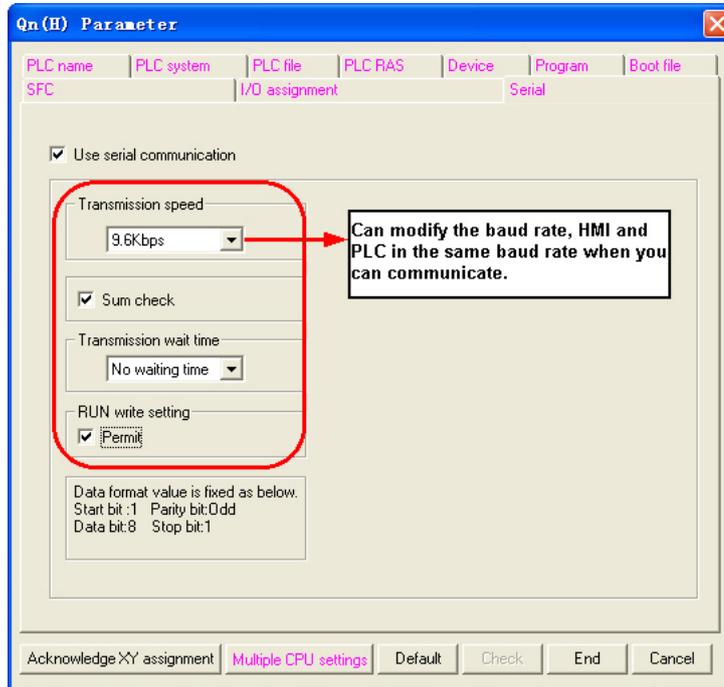
2. Communication through C24 Serial Port Communication Module

a. Open [Parameter] on Project Data List and double-click [PLC parameter], and select [I/O assignment] after the [Qn (H) Parameter] dialog box is opened.
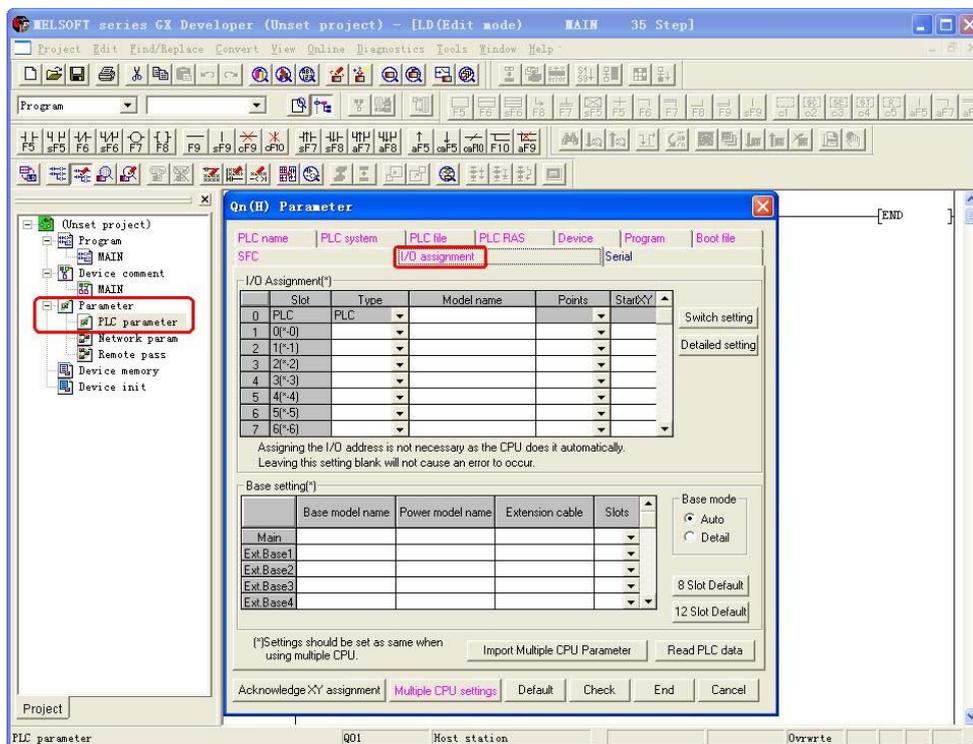
b. Click the [Type] dropdown list to select the [Intelli.] option.
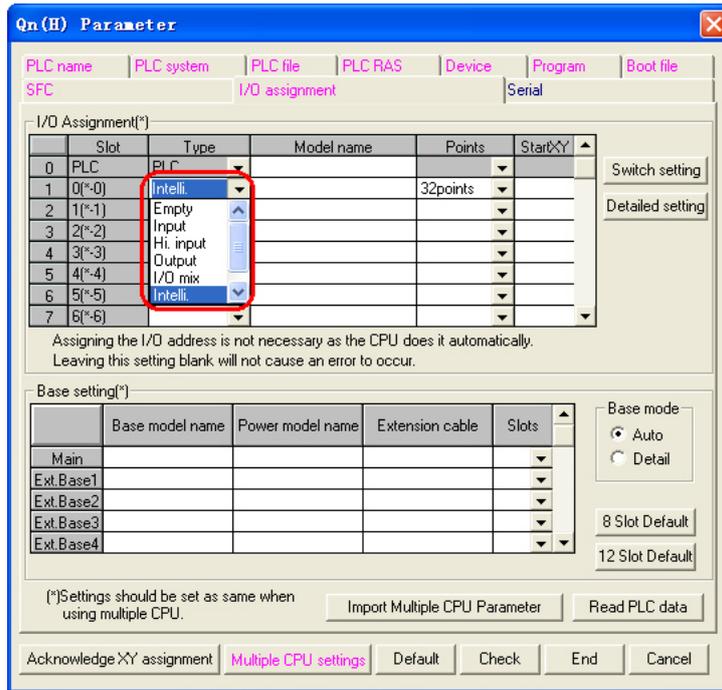
c. Click the [Switch setting] button and make settings as shown below:
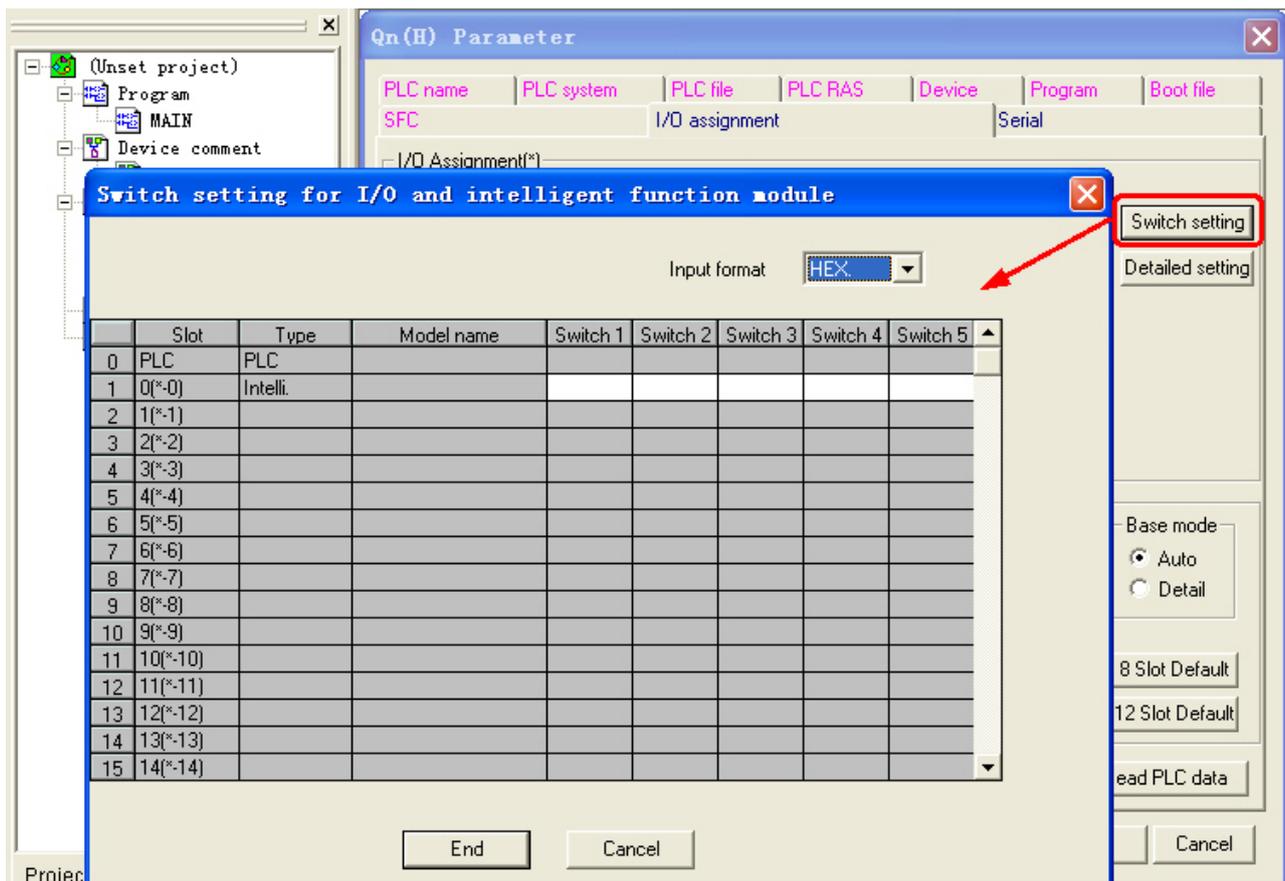
The attribute descriptions of Switch1, Switch2, Switch3, Switch4 and Switch5 are as shown below:

Switch	Content				[Example]
Switch 1	CH1:Baud rate , transmission setting Bit 15 8 7 0 [Baud rate][transmission setting]				0BEEH 115Kbps 8bit 1bit Even

Switch 1 details:

bps	Settings
4800	04H
9600	05H
19200	07H
38400	09H
57600	0AH
115200	0BH

Bit	Content	OFF	ON
0	Action set	Independent	Linked
1	Data bit	7	8
2	Parity check bit	Reserved	Served
3	Parity check	Odd	Even
4	Stop bit	1	2
5	Sum check	Reserved	Served
6	RUN write	disable	enable
7	Set to change	disable	enable

Switch	Content		[Example]
Switch 2	CH1:Communication protocol	MC protocol Form 5 Binary code	0005H
Switch 3	CH2:Baud rate, transmission setting (The same with the switch 1)		0BEEH
Switch 4	CH2:Communication protocol	MC protocol Form 5 Binary code	0005H
Switch 5	Set the station number	0~31	000H

Setting Example:

The Switch3, Switch4 and Switch5 can be set as shown below if the CH2 RS422 communication parameters and Station No. are set to 19200/8/Odd/1 and 0 respectively:

Setting Switch	Setting Value	Setup Description
Switch 3	07E6	19200/8/With/Odd/1
Switch 4	0005	Mode = Form 5
Switch 5	0000	Station No. = 0

Switch setting for I/O and intelligent function module

Input format HEX.

	Slot	Type	Model name	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5
0	PLC	PLC						
1	0(*-0)	Intelli.				07E6	0005	0000
2	1(*-1)							
3	2(*-2)							
4	3(*-3)							
5	4(*-4)							
6	5(*-5)							
7	6(*-6)							
8	7(*-7)							
9	8(*-8)							
10	9(*-9)							
11	10(*-10)							
12	11(*-11)							
13	12(*-12)							
14	13(*-13)							
15	14(*-14)							

End   Cancel
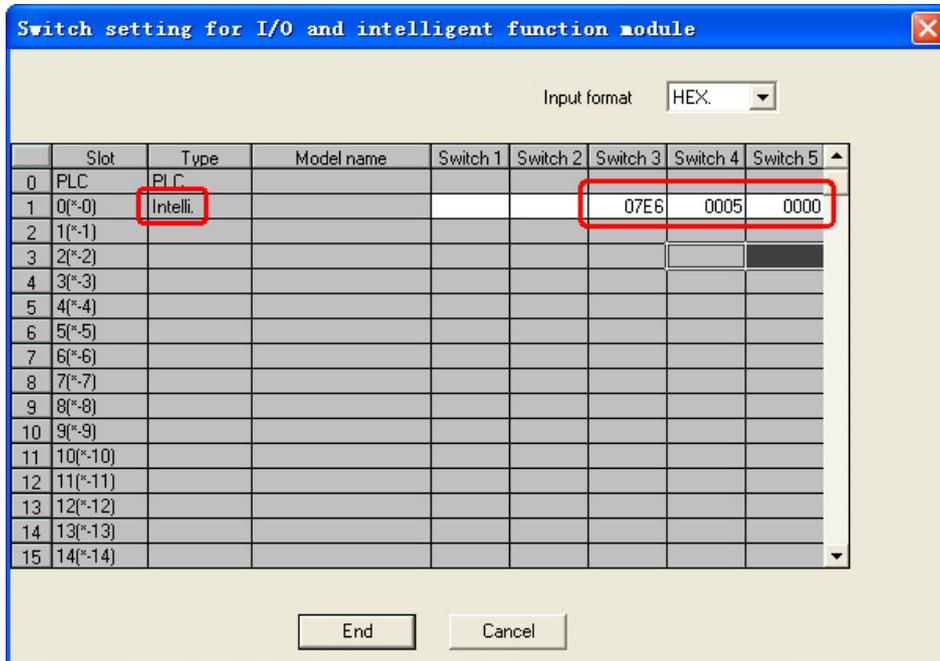
The Switch1, Switch2 and Switch5 can be set as shown below if the CH1 RS232 communication parameters and Station No. are set to 19200/8/Odd/1 and 0 respectively:

Setting Switch	Setting Value	Setup Description
Switch 1	07E6	19200/8/With/Odd/1
Switch 2	0005	Mode = Form 5
Switch 5	0000	Station No. = 0

The difference between **Mitsubishi Q_QnA (Link Port)** protocol and **Mitsubishi Melsec Q** protocol:

1. Mitsubishi Q_QnA (Link Port) protocol features fast communication speed while RS232 communication of module is not supported.

2. Mitsubishi Melsec Q protocol features support for RS232 and RS485 communications of module while the communication speed is slower.

2-4 Supported Registers

FX1S

Device	Bit Address	Word Address	Format	Notes
Input Relay	X 00-17	------	OO	
Output Relay	Y 00-15	------	OO	
Internal Relay	M 000-511	------	DDD	
Timer Contact	T 00-63	------	DD	
Counter Contact	C 00-31	------	DD	
Data Contact	D 000.0-255.F	------	DDD.H	
State	S 000-127	------	DDD	
Timer Value	------	T 00-63	DD	
Counter Value	------	C 00-31	DD	
Data Register	------	D 000-255	DDD	
Special Data Register	------	SD 8000-8255	DDDD	
Counter Value	------	C_dword 235-255	DDD	32 bit device

FX1N/FX1NC

Device	Bit Address	Word Address	Format	Notes
Input Relay	X 000-177	------	OOO	
Output Relay	Y 000-177	------	OOO	
Internal Relay	M 0000-1535	------	DDDD	
Timer Contact	T 000-255	------	DDD	
Counter Contact	C 000-199	------	DDD	
Special Internal Relay	SM 8000-8255	------	DDDD	

Device	Bit Address	Word Address	Format	Notes
State	S 000-999	------	DDD	
Timer Value	------	T 000-255	DDD	
Counter Value	------	C 000-199	DDD	
Data Register	------	D 0000-7999	DDDD	
Special Data Register	------	SD 8000-8255	DDDD	
Counter Value	------	C_dword 200-255	DDD	32 bit device

FX2N/FX2NC

Device	Bit Address	Word Address	Format	Notes
Input Relay	X 000-377	------	OOO	
Output Relay	Y 000-377	------	OOO	
Internal Relay	M 0000-3071	------	DDDD	
Timer Contact	T 000-255	------	DDD	
Counter Contact	C 000-199	------	DDD	
Special Internal Relay	SM 8000-8255	------	DDDD	
State	S 000-999	------	DDD	
Timer Value	------	T 000-255	DDD	
Counter Value	------	C 000-199	DDD	
Data Register	------	D 0000-7999	DDDD	
Special Data Register	------	SD 8000-8255	DDDD	
Counter Value	------	C_dword 200-255	DDD	32 bit device

FX2N-10GM/20GM

Device	Bit Address	Word Address	Format	Notes
Input Relay	X 00-67	------	OO	*1
Output Relay	Y 00-67	------	OO	*1
Internal Relay	M 000-511	------	DDD	*1
Special Internal Relay	SM9000-9175	------	DDDD	*1
Data Register	------	D 000-3999	DDDD	*2
Special Data Register	------	SD 9000-9599	DDDD	*2
Special Data Register	------	FD 4000-6999	DDDD	*2

*1 does not support batch transmission while *2 supports batch transmission.

FX3UC

Device	Bit Address	Word Address	Format	Notes
Input Relay	X000-377	------	OOO	
Output Relay	Y000-377	------	OOO	
Timer Contact	T_bit 000-511	------	DDD	
Counter Contact	C_bit 000-199	------	DDD	

Device	Bit Address	Word Address	Format	Notes
Data Contact	D_bit0.0-7999.F	------	DDDD.H	
State	S0000-4095	------	DDDD	
Internal Relay	M0000-7679	------	DDDD	
Special Internal Relay	SM8000-8511	------	DDDD	
Timer Value	------	T000-511	DDD	
Counter Value	------	C000-199	DDD	
Data Register	------	D0000-7999	DDDD	
Extension Register	------	R0000-32767	DDDDD	
Special Data Register	------	SD8000-8511	DDDD	
Counter Value	------	C_dword200-255	DDD	32 bit device

Q00JCPU

Device	Bit Address	Word Address	Format	Notes
Counter Coil	CC0-1023		DDDD	
Counter Contact	CS0-1023		DDDD	
Timer Coil	TC0-2047		DDDD	
Timer Contact	TS0-2047		DDDD	
Special Link Relay	SB000-7FF	------	HHH	
Link Relay	B0000-1FFF	------	HHHH	
Step Relay	S0000-1FFF	------	HHHH	
Edge Relay	V0000-2047	------	DDDD	
Annunciator	F0000-2047	------	DDDD	
Latch Relay	L0000-8191	------	DDDD	
Special Internal Relay	SM0000-2047	------	DDDD	
Internal Relay	M0000-8191	------	DDDD	
Output Relay	Y0000-1FFF	------	HHHH	
Input Relay	X0000-1FFF	------	HHHH	
File Register	------	R000-32767	DDDDD	
Special Link Register		SW0-3FF	HHH	
Link Register	------	W000-7FF	HHH	
Special Data Register	------	SD0-2047	DDDD	
Data Register	------	D0-12287	DDDDD	
Counter Value	------	CN0-1023	DDDD	
Retentive Timer Value	------	SN0-2047	DDDD	
Timer Value	------	TN0-2047	DDDD	

Q00CPU/Q01CPU/Q02HCPU/Q06HCPU/Q12HCPU/Q25HCPU

Device	Bit Address	Word Address	Format	Notes
Special Link Relay	SB 00000- 7FFF	------	HHHH	

Link Relay	B 00000- 7FFF	------	HHHH	
Edge relay	V 00000-32767	------	DDDDD	
Annunciator	F 00000-32767	------	DDDDD	
Latch relay	L 00000-32767	------	DDDDD	
Special Internal Relay	SM 0000-2047	------	DDDD	
Internal Relay	M 00000-32767	------	DDDDD	
Output Relay	Y 0000-1FFF	------	HHHH	
Input Relay	X 0000-1FFF	------	HHHH	
Link Register	------	W 00000- 291F	HHHHH	
Timer Value	------	TN 00000-23087	DDDDD	
Counter Value	------	CN 00000-23087	DDDDD	
File Register	------	R 00000-32767	DDDDD	
Retentive Timer Value	------	SN 0-23087	DDDDD	
Special Link Register	------	SW 0000- 7FF	HHHH	
File Register (Block switching is not necessary)	------	ZR 00000-65535	DDDDD	
Data Register	------	D 00000-25983	DDDDD	
Special Data Register	------	SD 0000-2047	DDDD	

Q02CPU

Device	Bit Address	Word Address	Format	Notes
Special Link Relay	SB000-7FF	------	HHH	
Link Relay	B0000-1FFF	------	HHHH	
Edge Relay	V0000-2047	------	DDDD	
Annunciator	F0000-2047	------	DDDD	
Latch Relay	L0000-8191	------	DDDD	
Special Internal Relay	SM0000-2047	------	DDDD	
Internal Relay	M0000-8191	------	DDDD	
Output Relay	Y0000-1FFF	------	HHHH	
Input Relay	X0000-1FFF	------	HHHH	
Link Register	------	W0000-1FFF	HHHH	
Timer Value	------	TN0000-2047	DDDD	
Counter Value	------	CN0000-1023	DDDD	
File Register	------	R00000-32767	DDDDD	
Special Link Register	------	SW000-7FF	HHH	
Data Register	------	D00000-12287	DDDDD	
Special Data Register	------	SD0000-2047	DDDD	

Note: Address format description: D: decimal, O: octonary, H: hexadecimal.

2-5 Cable Fabrication

2-5-1 FX Series RS232 Communication Cable

RS232 Communication Cable for CPU Port

 Please perform communication through FX Series serial port programming cable.

FX□□-232-BD Communication Cable

HMI connector 9pin D-SUB female		Controller connector 9pin D-SUB (male)
COM1	COM2	
3 RD	3 RD	3 TXD
2 SD	2 SD	2 RXD
9 SG	9 SG	5 GND
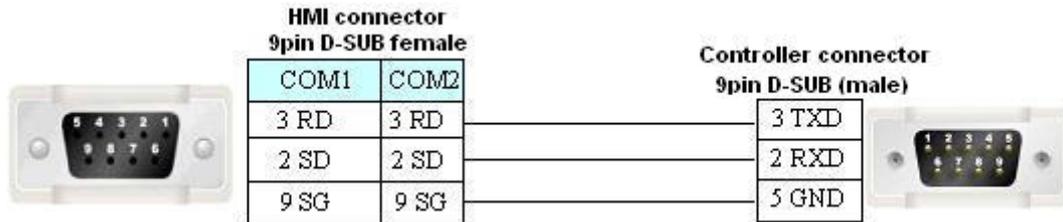
2-5-2 FX Series RS485/422 Communication Cable

1. Communication Cable for CPU Port/FX□□-422-BD Communication Cable

HMI connector 9pin D-SUB female	Controller connector 8pin Mini DIN(male)
COM2	
8 RDA-	4Tx-
6 RDB+	7Tx+
9 SG	3GND
7 SDA-	1Rx-
1 SDB+	2Rx+
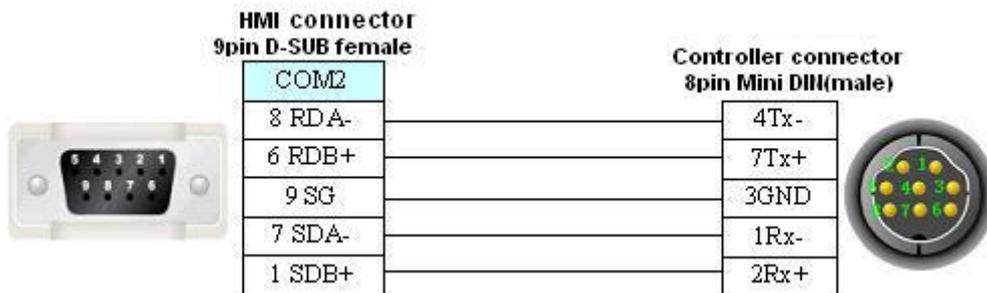
2. FX□□-485-BD Communication Cable

HMI connector 9pin D-SUB female	Controller RS422 connector
COM2	
8 RDA-	SDB
6 RDB+	SDA
9 SG	SG
7 SDA-	RDB
1 SDB+	RDA
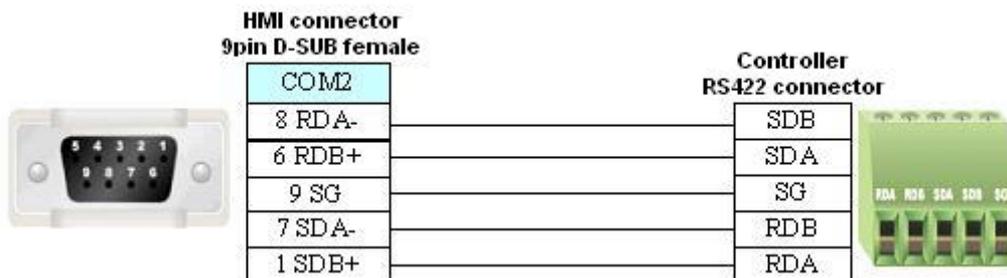
2-5-3 Q Series RS232 Communication Cable

Communication Cable for CPU Port

RS232 communication cable for C24 communication module
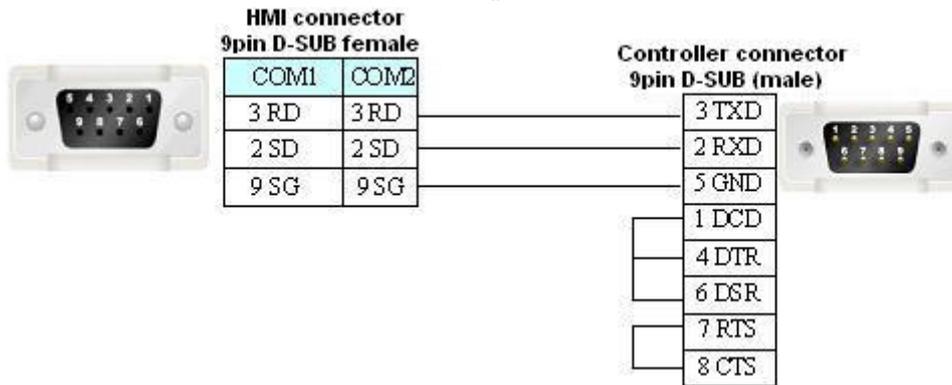
2-5-4 Q-Series RS485/422 Communication Cable

RS422 Communication Cable for C24 Communication Module
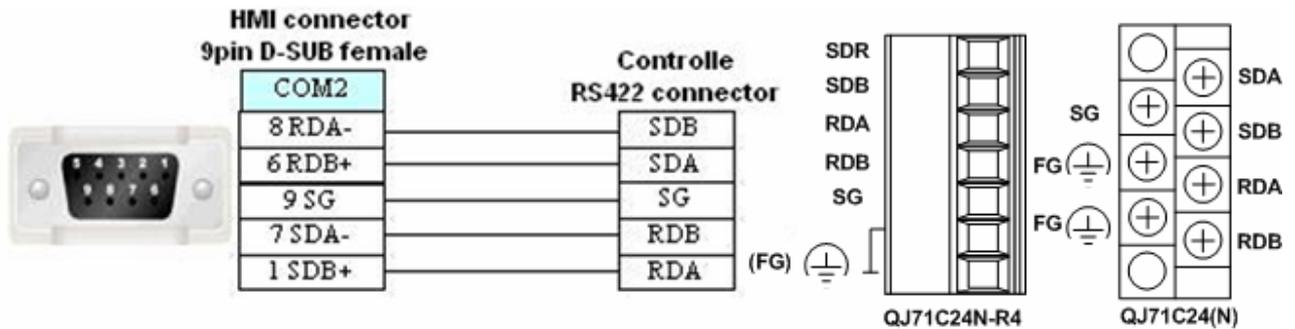
Section 3 Connecting to Schneider PLCs

This section describes the connection to Schneider PLCs.

3-1 Serial Port Communication

Series	CPU	Link Module	Driver
Micro	TSX3705001 TSX 37 05 028DR1 TSX 37 08 056DR1 TSX 37 10 128DT1 TSX 37 10 128DR1 TSX 37 10 128DTK1 TSX 37 10 164DTK1 TSX 37 10 028AR1 TSX 37 10 028DR1 TSX 37 21 101 TSX 37 22 101 TSX 37 21 001 TSX 37 22 001	TER port on the CPU	Schneider Modicon Uni-TelWay Modbus RTU
Premium	TSX P57 103M TSX P57 153M TSX P57 203M TSX P57 253M TSX P57 303M TSX P57 353M TSX P57 453M	TER port on the CPU	
Nano	TSX 07 3L □□□□28 TSX 07 30 10□□□□ TSX 07 31 16□□□□ TSX 07 31 24□□□□ TSX 07 32 □□□□28 TSX 07 33 □□□□28	Programming port on CPU	
Twido	TWD LCAA 10DRF TWD LCAA 16DRF TWD LCAA 24DRF TWD LMDA 20DTK TWD LMDA 20DUK TWD LMDA 20DRT TWD LMDA 40DTK TWD LMDA 40DUK	RS485 on the CPU unit	Schneider Twido Modbus RTU

3-2 Communication Parameters and Cable Fabrication

Series	CPU	Link Module	Driver	COMM Type	Parameter	Cable
Modicon TSX	TSX3705001 TSX3705001 TSX 37 05 028DR1 TSX 37 08 056DR1 TSX 37 10 128DT1 TSX 37 10 128DR1 TSX 37 10 128DTK1 TSX 37 10 164DTK1 TSX 37 10 028AR1 TSX 37 10 028DR1 TSX 37 21 101 TSX 37 22 101 TSX 37 21 001 TSX 37 22 001	RS485 on the CPU unit	Schneider Modicon Uni-TelWay	RS232	Refer to Section 3-3	Self-made cable required
				RS485	Refer to Section 3-3	Self-made cable required
	TSX3705001 TSX3705001 TSX 37 05 028DR1 TSX 37 08 056DR1 TSX 37 10 128DT1 TSX 37 10 128DR1 TSX 37 10 128DTK1 TSX 37 10 164DTK1 TSX 37 10 028AR1 TSX 37 10 028DR1 TSX 37 21 101 TSX 37 22 101 TSX 37 21 001 TSX 37 22 001	RS485 on the CPU unit	Modbus RTU	RS232	Refer to Section 3-3	Self-made cable required
				RS485	Refer to Section 3-3	Self-made cable required
Twido	TWD LCAA 10DRF TWD LCAA 16DRF TWD LCAA 24DRF TWD LMDA 20DTK TWD LMDA 20DUK TWD LMDA 20DRT TWD LMDA 40DTK TWD LMDA 40DUK	RS485 on the CPU unit		RS232	Refer to Section 3-3	Self-made cable required
				RS485	Refer to Section 3-3	Self-made cable required

3-3 Communication Parameter Setting

HMI Settings

When Using Schneider Modicon Uni-TelWay Protocol

HMI default communication parameters: 9600bps (Baud Rate), 8 (Data Bit), odd (Parity Check), 1 (Stop Bit) and 4 (PLC Station No.)

RS232 Communication

RS485 Communication

When Using Modbus RTU Protocol

HMI default communication parameters: 9600bps (Baud Rate), 8 (Data Bit), even (Parity Check), 1 (Stop Bit) and 1 (PLC Station No.)

RS232 Communication

RS485 Communication

PLC Settings

PL7 Software Setting

1. Open "Programs" menu - Select [XWAY Driver Manager] from Modicon Telemecanique:

2. Select [UNITELWAY Driver]→[Configuration]→[Edit] in the popup window and modify relevant communication parameters:
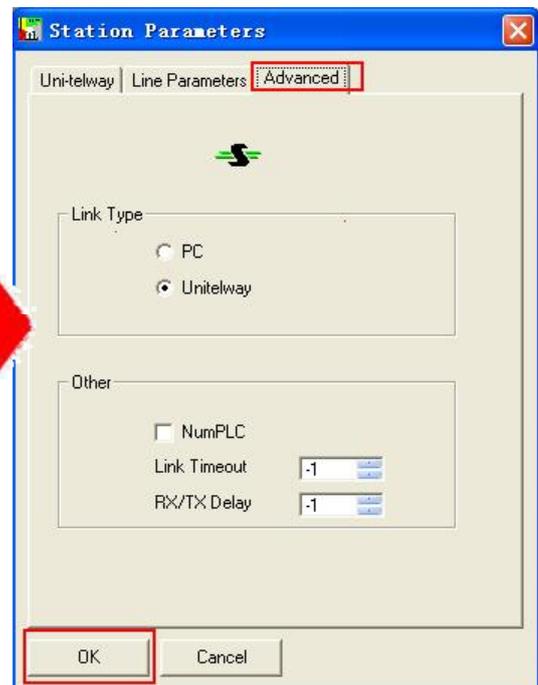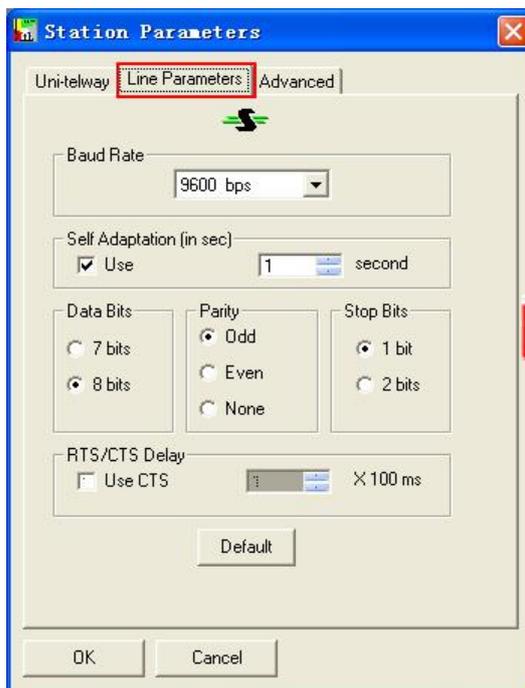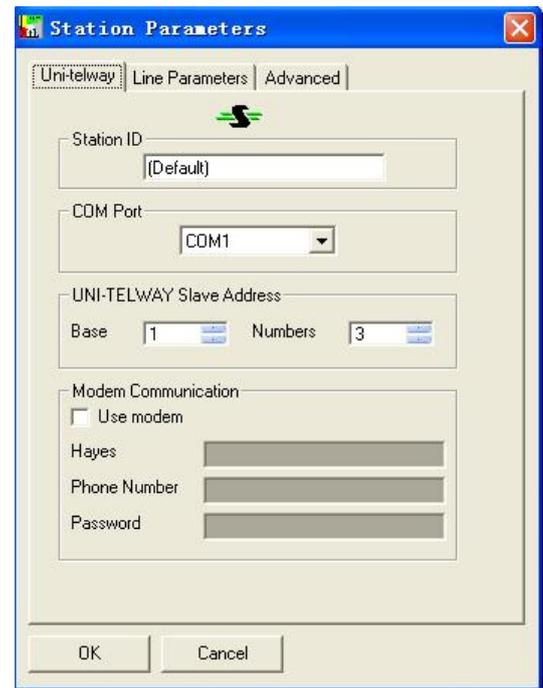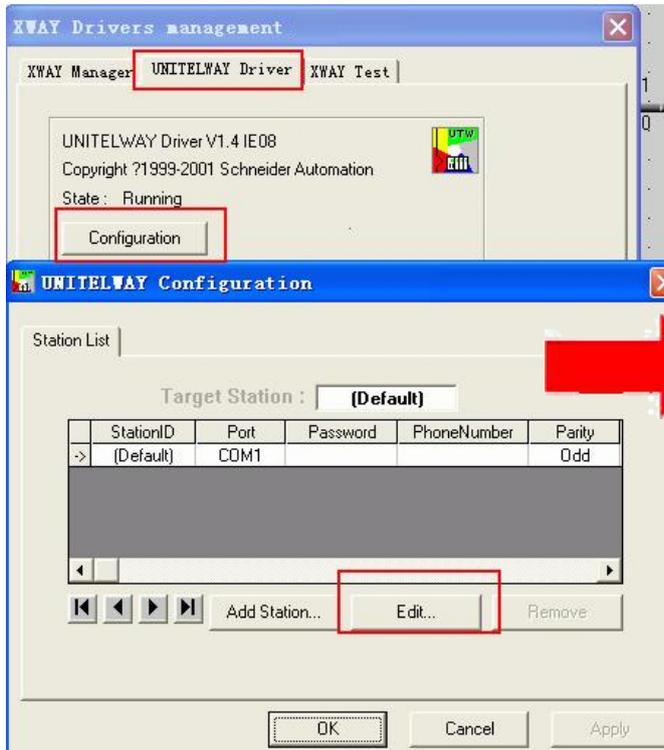
3. The following prompt information will appear after the [OK] button is clicked:

4. Click [XWAY Test]→[Connect] and the Connected prompt information will appear when the connection is successful.
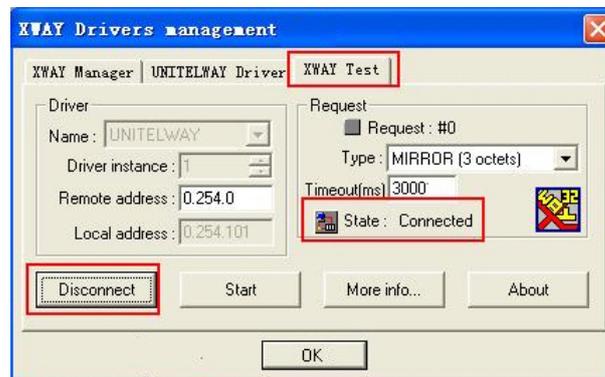
5. Open PL7 Software→New→Click [Hardware Configuration] in [STATION]→Double-click [comm] in popup
window.
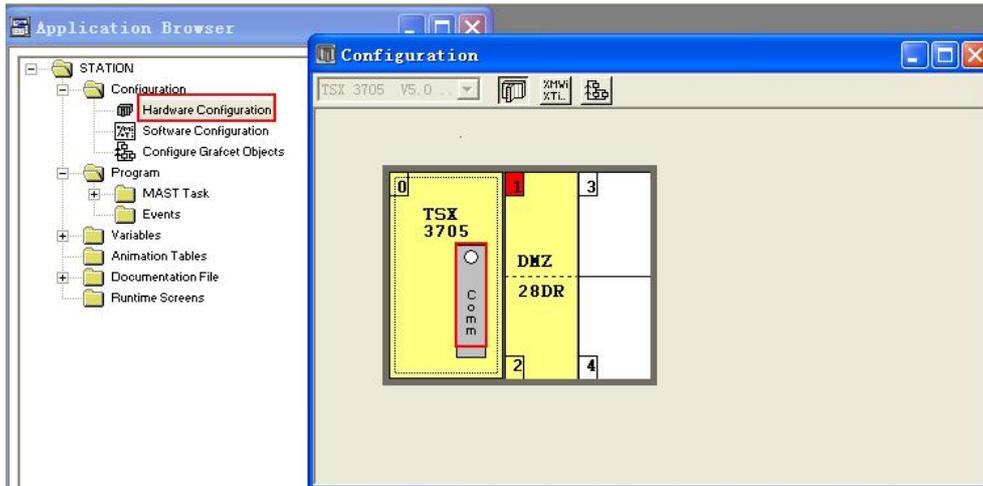
The settings are as shown below if **Schneider Modicon Uni-TelWay Protocol** is used:
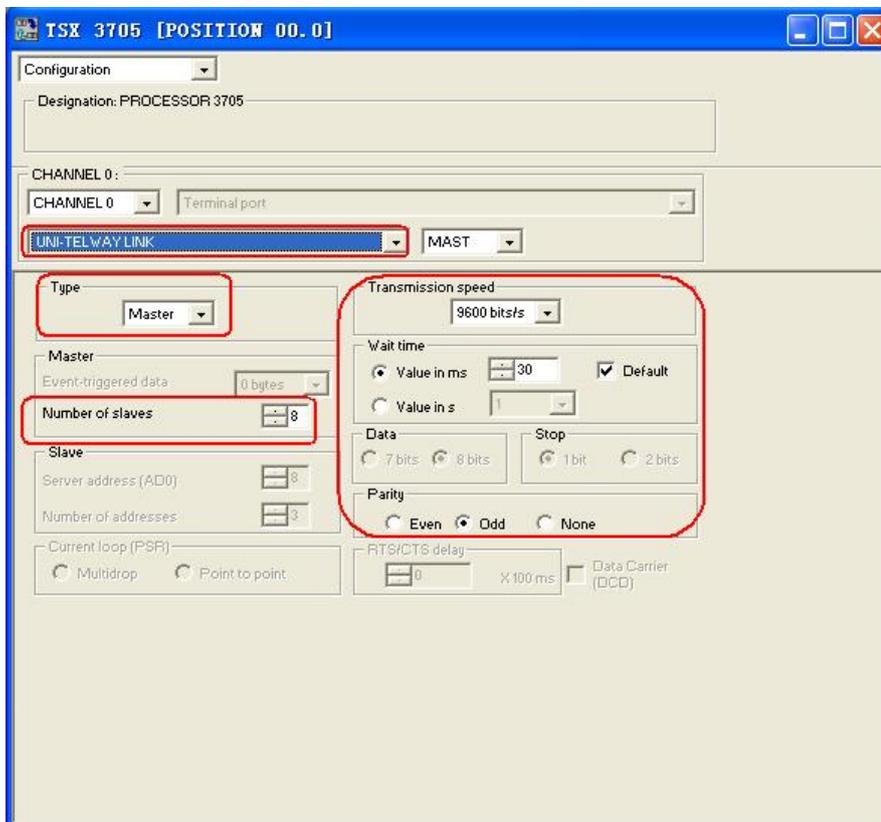
The settings are shown as below if **Modbus RTU Protocol** is used:
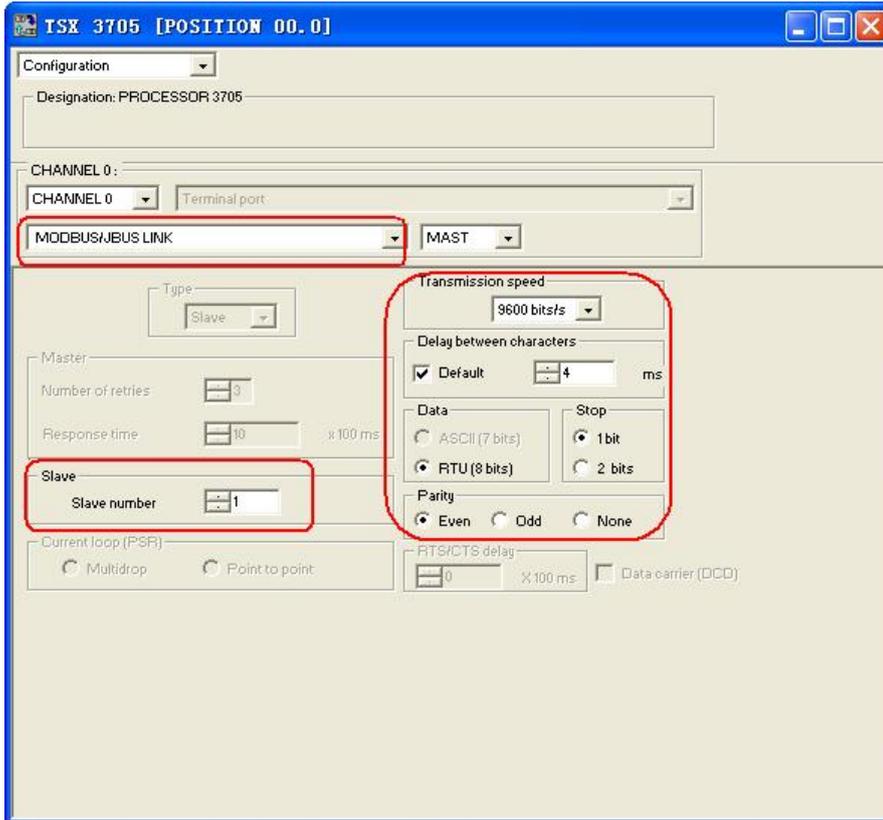
6. Download the project to PLC after the settings are completed.

When Using Schneider Twido Modbus RTU Protocol
HMI Settings
HMI default communication parameters: 19200bps (Baud Rate), 8 (Data Bit), none (Parity Check), 1 (Stop Bit) and 1 (PLC Station No.)
RS485 Communication

RS232 Communication
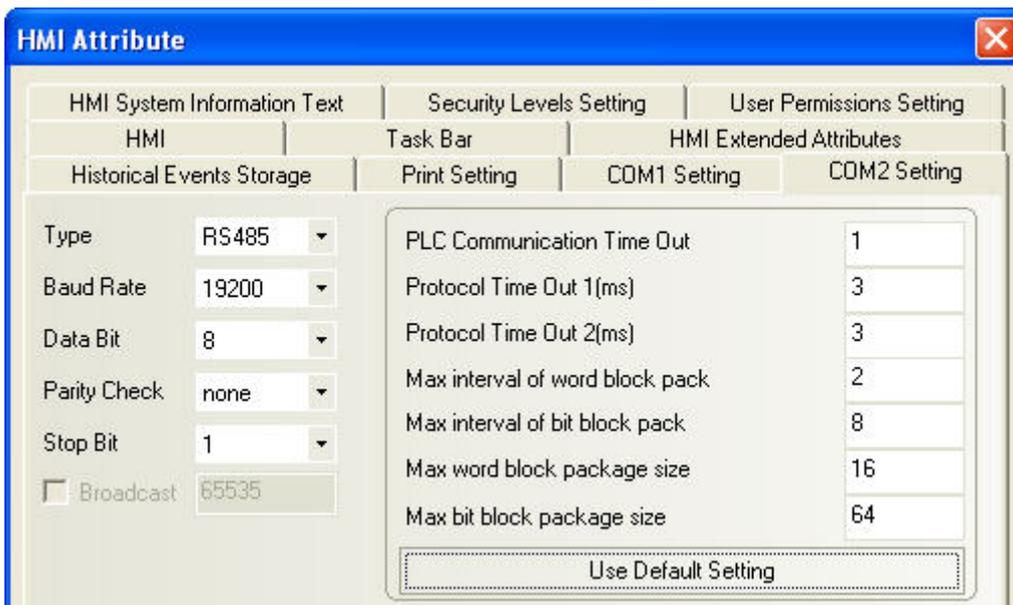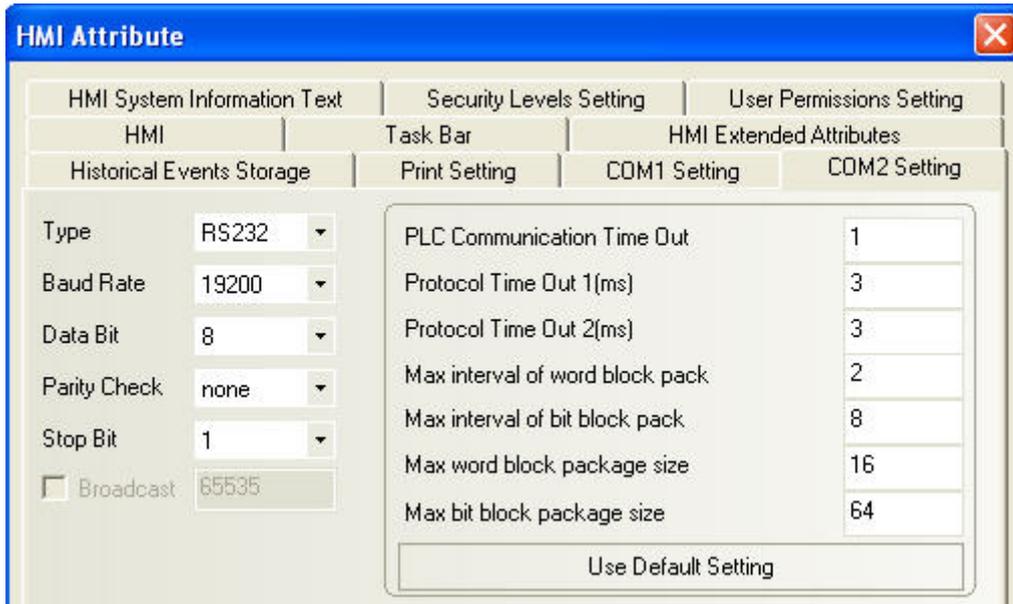
PLC Settings

Note: The memory addresses of Twido are under dynamic management, which may lead to
communication failure when address link is available. It is recommended the user to add one
statement after PLC program. Only after the user has made the correct settings of the words or
bits, referring to the following PLC Settings, PLC can communicate with the HMI device.

1. Controller Communications Setup
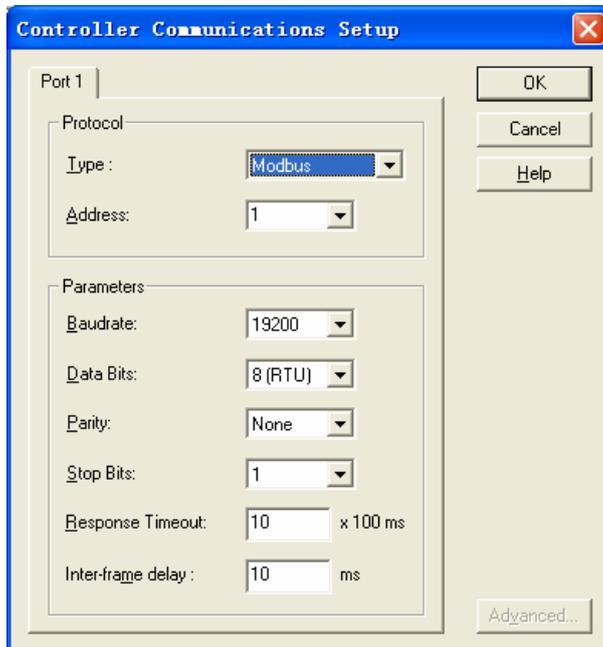
2. Extend the range of word memory address and change the [Auto] option in the [Assigned] column for the
internal word to a larger value through the [Controller]→[Used Memory]→[Edit] and download it to the PLC.
It is assumed that the "Auto" is set to 3000 as shown below, all addresses before %MW3000 can perform the
data swap.

Memory Report

Number of preallocated objects:

	Type	Maximum	Allocated	Configured
Constants	%KW	256	0	Auto
Counters	%C	128	0	Auto
Drums	%DR	4	0	Auto
Fast counters	%FC	3	0	Auto
LIFO/FIFO Registers	%R	4	0	Auto
Memory Words	%MW	3000	0	3000
PLS/PWM	%PLS/%PWM	0	0	Auto
Shift Bit Registers	%SBR	8	0	Auto
Schedule Blocks		16	0	Auto
Step Counters	%SC	8	0	Auto
Timers	%TM	64	0	Auto
Very Fast Counters	%VFC	1	0	Auto

KW also includes %KD and %KF, and %MW also includes %MD and %M.

More info...

OK   Cancel   Appli(A)   Help

3. Extend the range of open bit address and drive the coil with a maximum address through the programming. It is assumed that a %M127 coil is driven as shown below, all addresses before %M127 can perform the data swap.

3-4 Supported Registers

Modicon TSX

Device	Bit Address	Word Address	Format	Notes
System Internal Nodes	S00000-32767	------	DDDDD	
Internal Auxiliary Nodes	M00000-32767	------	DDDDD	
Data Register Bit Nodes	MW.B0000-9999.F	------	DDDD.H	
Data Registers	------	MW0000-7999	DDDD	
Data Registers (32-bit)	------	MD0000-7999	DDDD	

Twido

Device	Bit Address	Word Address	Format	Notes
Internal Auxiliary Nodes	0X 1-9999	------	DDDD	
	1X 1-9999	------	DDDD	
	------	3X 1-9999	DDDD	
Data Registers	------	4X 1-9999	DDDD	

Note: The registers M and MW in TWIDO software correspond to 0X and 4X of HMI respectively. The address
offset of HMI and PLC is 1.
Do not use 1X and 3X of HMI for there are no registers in TWIDO software corresponding to them.
The HMI address must be "PLC address + 1". For example: The M0 in PLC corresponds to 0X1 of HMI.
Address format description: D: decimal, O: octonary, H: hexadecimal.

3-5 Cable Fabrication

When Using Schneider Modicon Uni-TelWay Protocol
RS232 Communication Cable
Use serial port programming cable manufactured by Schneider directly to communicate with HMI.
Note: Direct the middle cable knob to position 2 and add a RS232 cable directly between the HMI and
programming cable.
RS485 Communication Cable
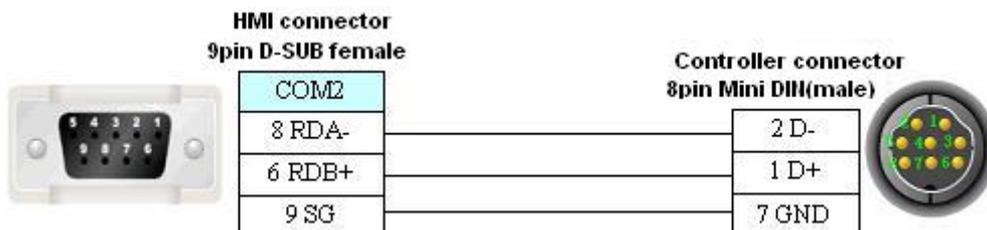
When Using Modicon modbus Protocol

RS232 Communication Cable

Use serial port programming cable manufactured by Schneider directly to communicate with HMI.

Note: Direct the middle cable knob to position 3.

RS485 Communication Cable
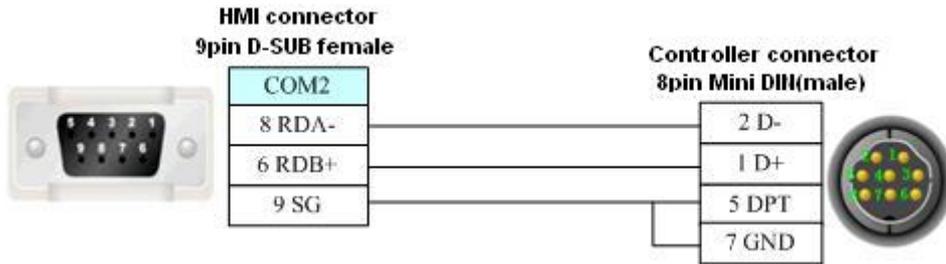
When Using Schneider Twido Modbus RTU Protocol

RS232 Communication Cable

Use serial port communication cable manufactured by Schneider directly to communicate with HMI.

RS485 Communication Cable
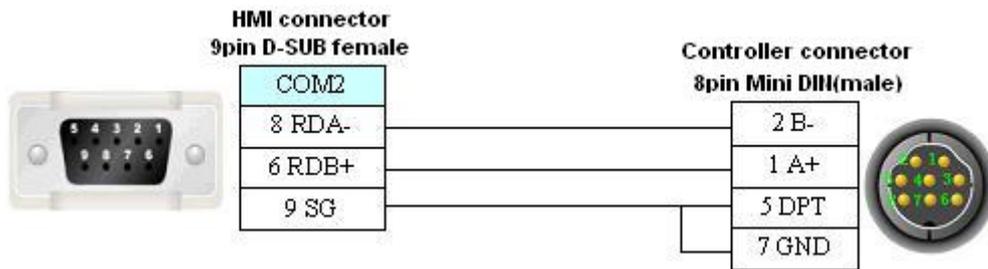
Section 4 Modbus Connection

This section describes the connection on Modbus protocol.

4-1 Serial Port Communication

Series	CPU	Link Module	Driver
Modbus RTU	Modbus Compatible External Device	RS232 on the CPU unit	Modbus RTU
		RS485 on the CPU unit	
Modbus RTU Extend		RS232 on the CPU unit	Modbus RTU Extend
		RS485 on the CPU unit	
Modbus RTU Slave		RS232 on the CPU unit	Modbus RTU Slave
		RS485 on the CPU unit	
Modbus ASCII		RS232 on the CPU unit	Modbus ASCII
		RS485 on the CPU unit	

4-2 Communication Parameters and Cable Fabrication

Series	CPU	Link Module	COMM Type	Parameter	Cable
Modbus RTU	Modbus Compatible External Device	RS232 on the CPU unit	RS232	Refer to Section 4-3	Self-made cable required
		RS485 on the CPU unit	RS422	Refer to Section 4-3	Self-made cable required
Modbus RTU Extend		RS232 on the CPU unit	RS232	Refer to Section 4-3	Self-made cable required
		RS485 on the CPU unit	RS422	Refer to Section 4-3	Self-made cable required
Modbus RTU Slave		RS232 on the CPU unit	RS232	Refer to Section 4-3	Self-made cable required
		RS485 on the CPU unit	RS422	Refer to Section 4-3	Self-made cable required
Modbus ASCII		RS232 on the CPU unit	RS232	Refer to Section 4-3	Self-made cable required
		RS485 on the CPU unit	RS422	Refer to Section 4-3	Self-made cable required

4-3 Communication Parameter Setting

HMI Settings

When Using Modbus RTU Protocol

HMI default communication parameters: 9600bps (Baud Rate), 8 (Data Bit), even (Parity Check), 1 (Stop Bit) and 1 (PLC Station No.)
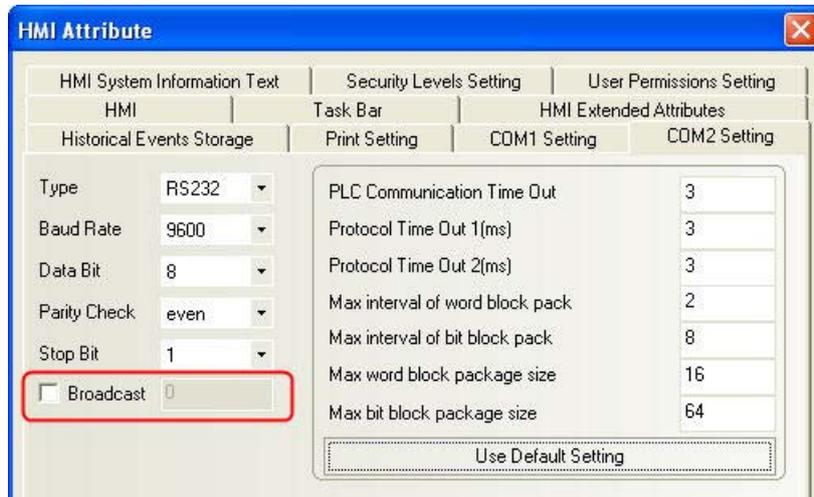
Note

1. Modbus RTU protocol supports broadcast station number, but the broadcast function only supports the write operation only i.e. the broadcast function can't be used for the components with read attribute.
2. The broadcast function has two usage methods:
   A. For the components with write-only attribute (Bit State Setting component and "Toggle" excluded) and the Multiple State Setting components("Add value", "Sub value", "JOG++" and "JOG--" excluded)
   B. Use Macro instruction in the Macro programming to perform the write operation for the address of the Broadcast Station No..

When Using Modbus RTU Extend Protocol

HMI default communication parameters: 9600bps (Baud Rate), 8 (Data Bit), even (Parity Check), 1 (Stop Bit) and 1 (PLC Station No.)
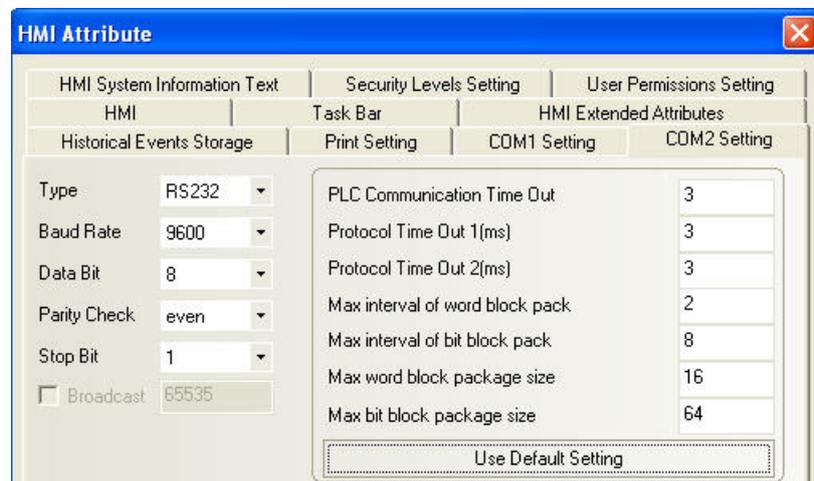
When Using Modbus RTU Slave Protocol

HMI default communication parameters: 9600bps (Baud Rate), 8 (Data Bit), even (Parity Check), 1 (Stop Bit) and 1 (PLC Station No.)
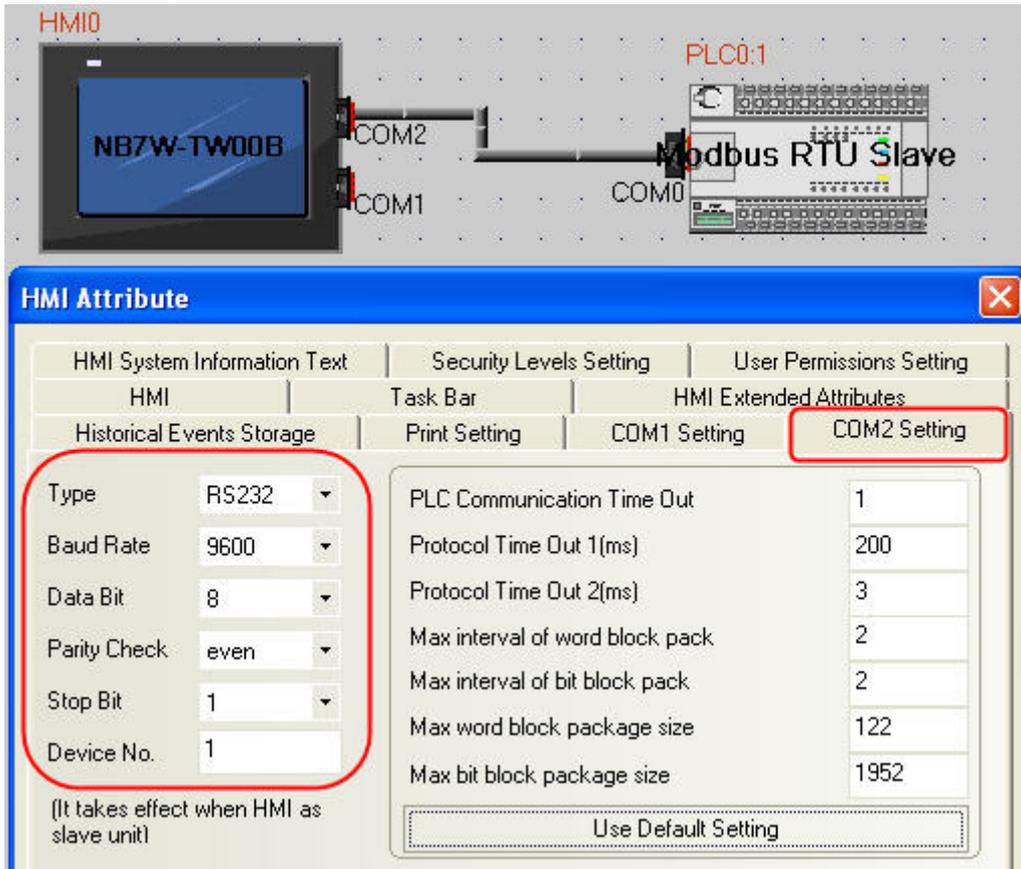
When Using MODBUS ASCII Protocol

HMI default communication parameters: 9600bps (Baud Rate), 8 (Data Bit), even (Parity Check), 1 (Stop Bit) and 1 (PLC Station No.)
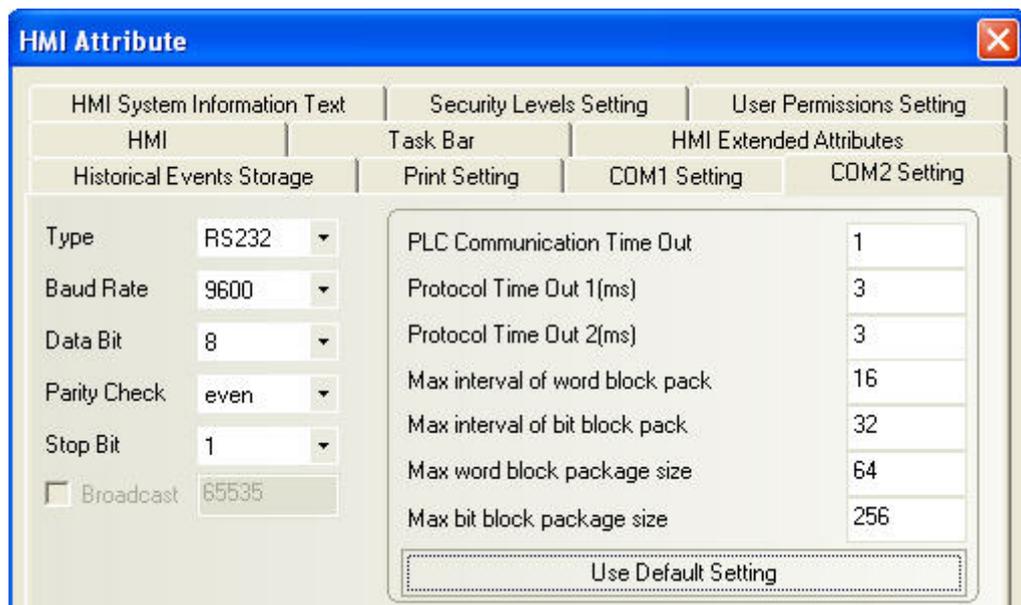
4-4 Supported Registers

Modbus RTU

Device	Bit Address	Word Address	Format	Notes
System Internal/External Output Nodes	0X 1-65535	------	DDDDD	
System Internal/External Input Nodes	1X 1-65535	------	DDDDD	
Analog Input Data Registers	------	3X 1-65535	DDDDD	
Data Registers	------	4X 1-65535	DDDDD	

Modbus RTU Extend

Device	Bit Address	Word Address	Format	Notes
System Internal/External Output Nodes	0X 1-65535	------	DDDDD	
System Internal/External Input Nodes	1X 1-65535	------	DDDDD	
Analog Input Data Nodes	3X_bit 1.00-65535.15	------	DDDDD.DD	
Data Nodes	4X_bit 1.00-65535.15	------	DDDDD.DD	
4X Single Write Data Nodes	6X_bit 1.00-65535.15	------	DDDDD.DD	
Analog Input Data Registers	------	3X 1-65535	DDDDD	
Data Registers	------	4X 1-65535	DDDDD	
Data Registers	------	5X 1-65535	DDDDD	
4X Single Write	------	6X 1-65535	DDDDD	

Note: The bytes in 5X are displayed in reverse order.

Modbus RTU Slave

Device	Bit Address	Word Address	Format	Notes
System Internal/External Output Nodes	LB 0-9999	------	DDDDD	Mapping to 0x 1~9999
Data Registers	------	LW 0-65535	DDDDD	Mapping to 4x 1~9999

Modbus ASCII

Device	Bit Address	Word Address	Format	Notes
System Internal/External Output Nodes	0X 1-65535	------	DDDDD	
System Internal/External Input Nodes	1X 1-65535	------	DDDDD	
Analog Input Data Registers	------	3X 1-65535	DDDDD	
Data Registers	------	4X 1-65535	DDDDD	

Note: Address format description: D: decimal, O: octonary, H: hexadecimal.

4-5 Cable Fabrication

RS232 Communication Cable
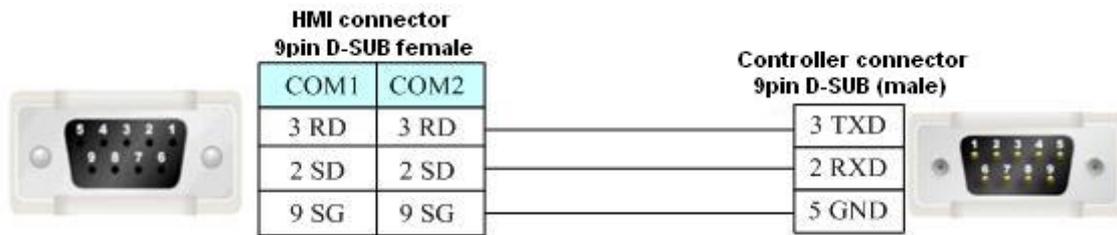
4-6 Example of NB as Modbus Slave

System description: Use CP1E-N30D□-□ (30-point I/O type) as Modbus master and 2 NB Units as Modbus slave to perform the communication.

◆ PLC Setting

CP1E-N30D□-□ should connect to CP1W-CIF11 module functioning as RS485 communication port.

Use CX-Programmer to configure the peripheral port.

Make the communication settings as follows: 9600, 8, 1, Even and Modbus-RTU simple master.
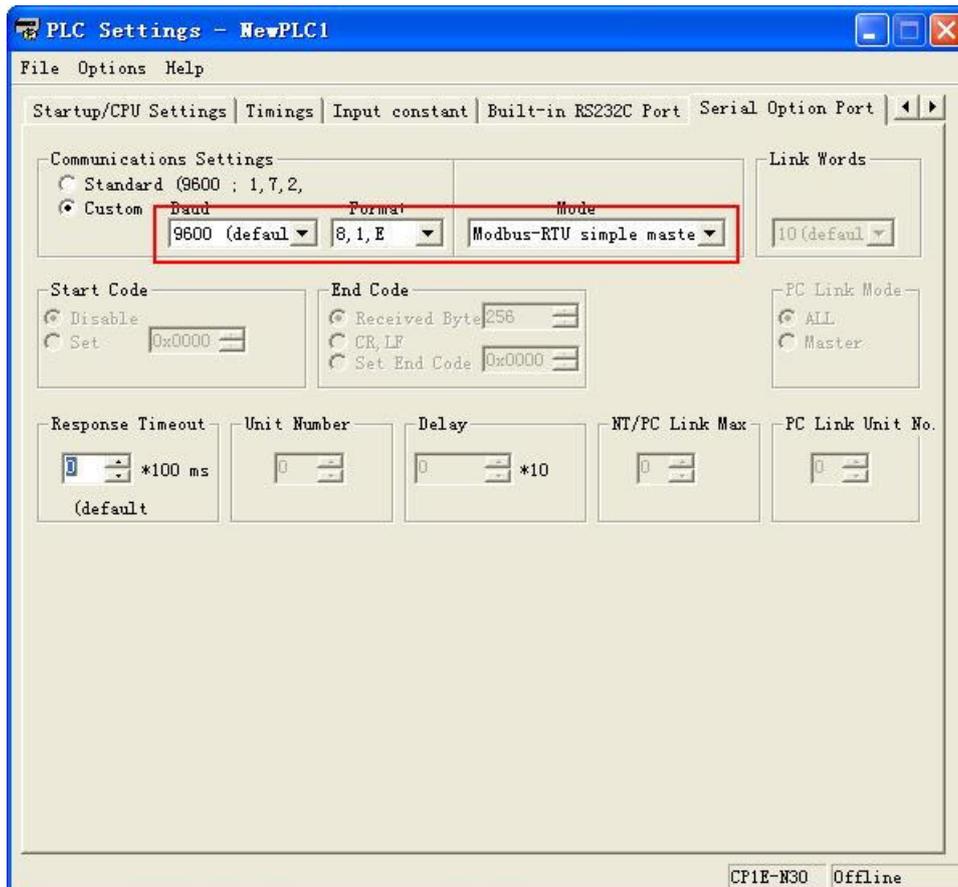
◆ NB Unit Setting

We take one NB7W-TW00B and NB5Q-TW00B respectively as example with the system configuration as shown below:
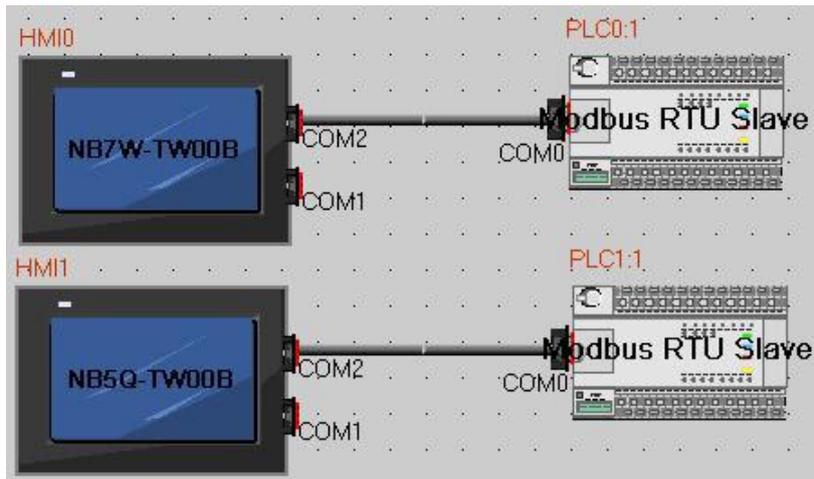
NB7W-TW00B communication settings: 9600 (Baud Rate), 8 (Data Bit), 1 (Stop Bit), Even (Parity Check) and 1 (Slave No.), as shown below:

NB5Q-TW00B communication settings: 9600 (Baud Rate), 8 (Data Bit), 1 (Stop Bit), Even (Parity Check) and 2 (Slave No.)
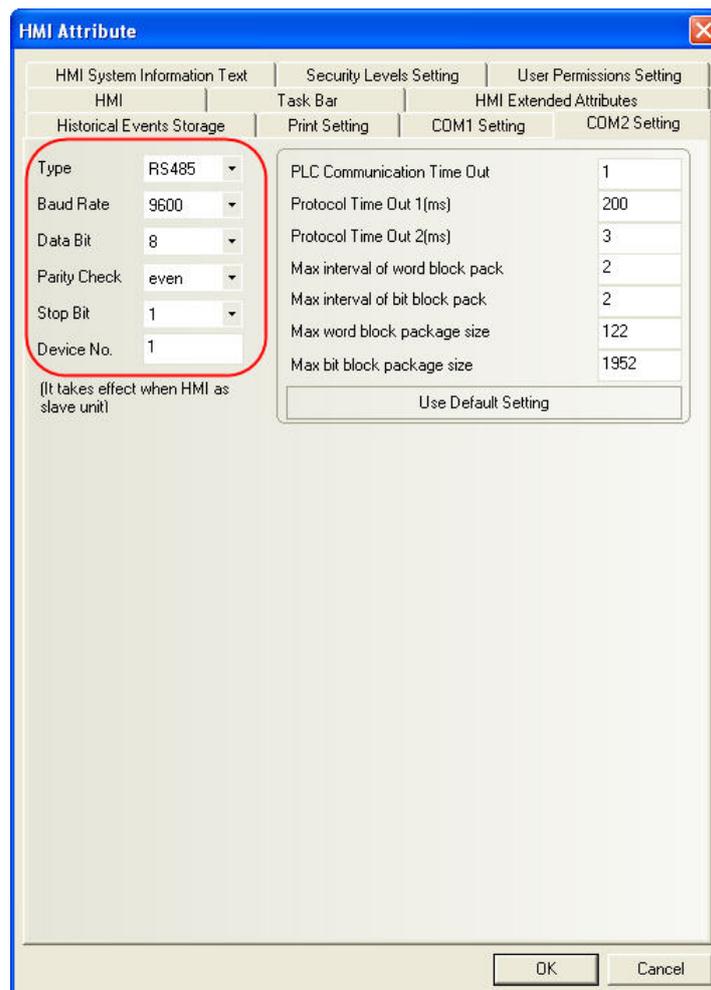
◆ Cable Fabrication

NB7W-TW00B COM2 (female)
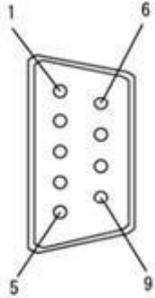
OMRON PLC side CP1W-CIF11

Signal	Pin No.
SDB+	1
SD(TXD)	2
RD(RXD)	3
Terminal 1	4
Terminal 2	5
RDB+	6
SDA−	7
RDA−	8
GND	9
FG	Connector shell

Pin No.	Signal
1	RDA−
2	RDB+
3	SDA−
4	SDB+
5	FG

Shield
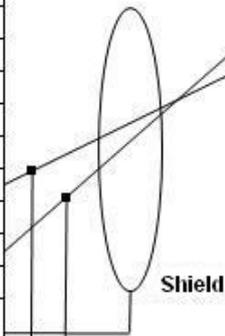
NB5Q-TW00B COM2(female)
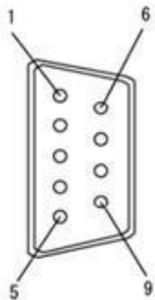
Signal	Pin No.
SDB+	1
SD(TXD)	2
RD(RXD)	3
Terminal 1	4
Terminal 2	5
RDB+	6
SDA−	7
RDA−	8
GND	9
FG	Connector shell

Shield
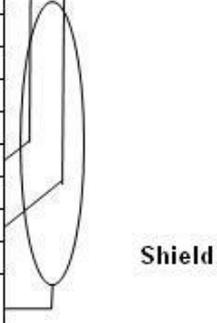
Section 5 Connecting to Delta PLCs

This section describes the connection to Delta PLCs.

5-1 Serial Port Communication

Series	CPU	Link Module	Driver
DVP	DVP-XXES/EX/SS DVP-XXSA/SX/SC DVP-XXEH/EH2/SV	RS232 on the CPU unit	Delta DVP
		RS485 on port	

5-2 Communication Parameters and Cable Fabrication

Series	CPU	Link Module	COMM Type	Parameter	Cable
DVP	DVP-XXES/EX/SS DVP-XXSA/SX/SC DVP-XXEH/EH2/SV	RS232 on the CPU unit	RS232	Refer to Section 5-3	Self-made cable required
		RS485 on port	RS485	Refer to Section 5-3	Self-made cable required

5-3 Communication Parameter Setting

HMI Settings

HMI default communication parameters: 9600bps (Baud Rate), 7 (Data Bit), even (Parity Check), 1 (Stop Bit) and 1(PLC Station No.)

RS232 Communication
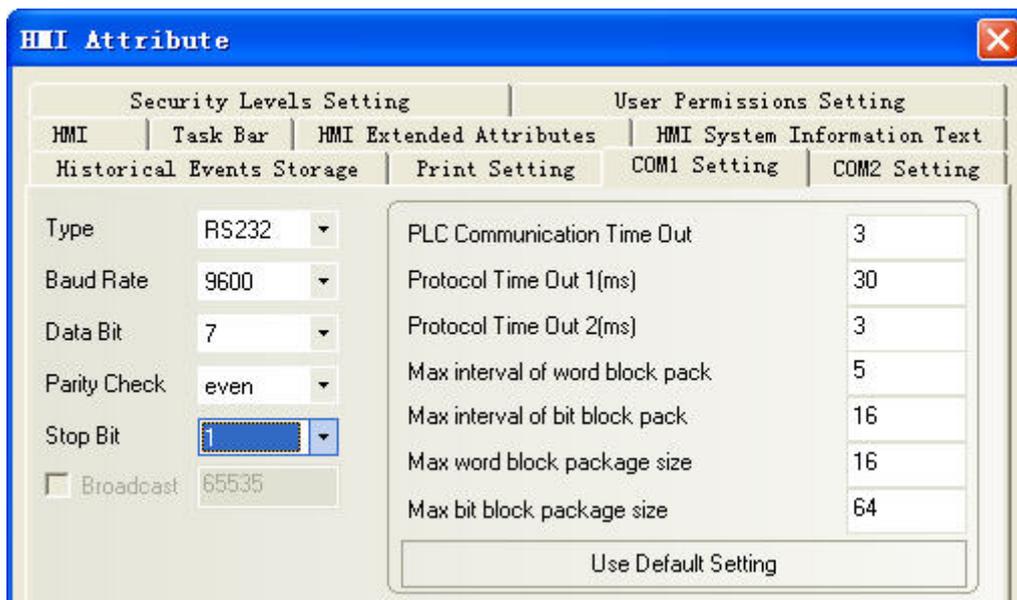
RS485 Communication
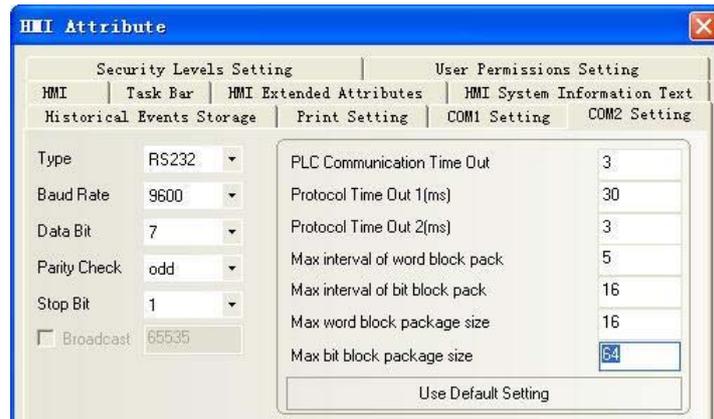
Note: The communication parameters should be set through modification of D1120 value when RS485 communication is used.

PLC Settings

1. You can check the different values of D1120 corresponding to the different baud rates in the "RS-485 Protocol Setting (D1120)" dialog box through selecting the "RS-485 Protocol Setting (D1120)" from the "Auxiliary Editing" menu in the "Help" menu in the Wpl207 software.
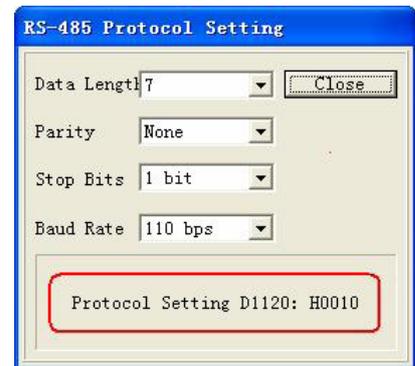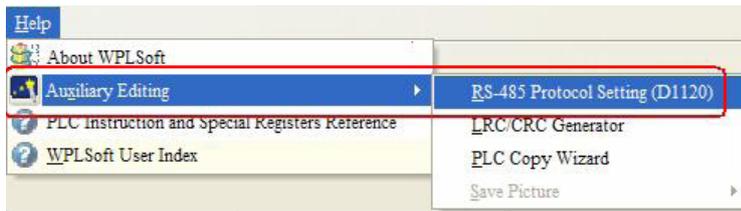
2. Monitor and modify the value of D1120 after PLC is connected to Wpl207.

For example: If the communication parameters are 110bps (Baud Rate), 7 (Data Length), None (Parity) and 1 bit (Stop Bits), then D1120=H0010 (Protocol Setting).

5-4 Supported Registers

Device	Bit Address	Word Address	Format	Notes
External Input Nodes	X0-23417	------	OOOOO	
External Output Nodes	Y0-23417	------	OOOOO	
Internal Auxiliary Nodes	M0-9999	------	DDDD	
Sequence Control Nodes	S0-9999	------	DDDD	
Timer Nodes	T0-9999	------	DDDD	
Counter Nodes	C0-9999	------	DDDD	
Timer Buffers	------	TV0-9999	DDDD	
Counter Buffers	------	CV0-127	DDD	

Counter Buffers (double-word, 32-bit)	------	CV2 232-255	DDD	
Data Registers	------	D0-9999	DDDD	

Note: Address format description: D: decimal, O: octonary, H: hexadecimal.

5-5 Cable Fabrication

RS232 Communication Cable
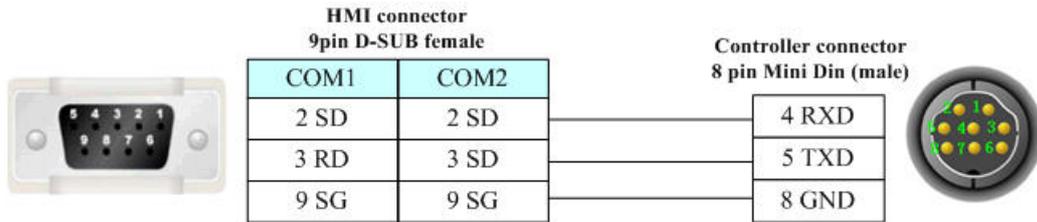
RS485 Communication Cable
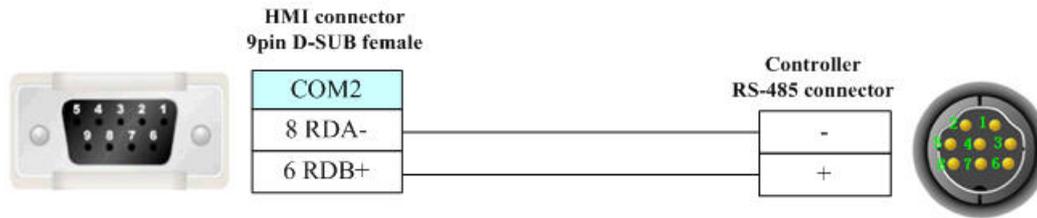
Section 6 Connecting to LG PLCs

This section describes the connection to LG PLCs

6-1 Serial Port Communication

Series	Type	CPU	Link Module	Driver
Master-K	K120S	K7M-DR10UE K7M-DR20U K7M-DT30U K7M-DT40U K7M-DT60U	Port1 on CPU unit Port2 on CPU unit	LS Master-K CPU Direct LS Master-K Cnet LS Master-K Modbus RTU
	K200S	K3P-07AS	RS232 on the CPU unit	
XGT	XGB	XBC-DN64H XBC-DR32H	RS232 on the CPU unit	LS XGT CPU Direct
			Built-in RS-232C/RS-485	LS XGT Cnet

The differences between LS Master-K CPU Direct, LS Master-K Cnet and LS Master-K Modbus RTU protocols are as shown below:

Communication Protocol	PLC Settings	Supported Communication Methods	Multiple Station No.	Supported Baud Rate (bps)
LS Master-K Cnet	Tweak the pin 2 (up) of DIP switch to ON and pin 1 (low) of DIP switch to OFF	RS-232/RS-485	Supported	9600/19200/38400
LS Master-K MODBUS RTU	Tweak the pin 2 (up) of DIP switch to ON and pin 1 (low) of DIP switch to OFF	RS-232/RS-485	Supported	9600/19200/38400
LS Master-K CPU Direct	Pin 1 and pin 2 remain OFF	RS-232	Not supported	38400

6-2 Communication Parameters and Cable Fabrication

Series	CPU	Link Module	COMM Type	Parameter	Cable
K120S	K7M-DR10UE	Port1 on CPU unit	RS232	Refer to Section 6-3	Self-made cable required
		Port2 on CPU unit	RS485	Refer to Section 6-3	Self-made cable required
	K7M-DR20U	Port1 on CPU unit	RS232	Refer to Section 6-3	Self-made cable required
		Port2 on CPU unit	RS485	Refer to Section 6-3	Self-made cable required
K200S	K3P-07AS	RS232 on the CPU unit	RS232	Refer to Section 6-3	Self-made cable required
XGB	XBC-DN64H XBC-DR32H	RS232 on the CPU unit	RS232	Refer to Section 6-3	Self-made cable required
		Built-in RS-232C	RS232	Refer to Section 6-3	Self-made cable required
		Built-in RS-485	RS485	Refer to Section 6-3	Self-made cable required

6-3 Communication Parameter Setting

HMI Settings

When Using LS Master-K Cnet Protocol

HMI default communication parameters: 38400bps (Baud Rate), 8 (Data Bit), none (Parity Check), 1 (Stop Bit) and 1(PLC Station No.)

RS232 Communication

RS485 Communication

When Using LS Master-K CPU Direct Protocol

HMI default communication parameters: 38400bps (Baud Rate), 8 (Data Bit), none (Parity Check), 1 (Stop Bit) and 1 (PLC Station No.)

RS232 Communication

Note: LS Master-K CPU Direct protocol only supports communication speed of 38400bps.

When Using LS Master-K Modbus RTU Protocol

HMI default communication parameters: 38400bps (Baud Rate), 8 (Data Bit), none (Parity Check), 1 (Stop Bit) and 1 (PLC Station No.)

RS232 Communication
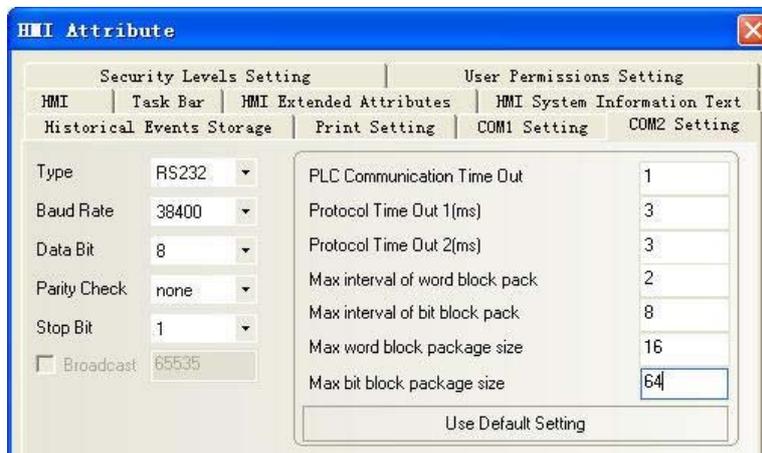
When Using LS XGT CPU Direct Protocol

HMI default communication parameters: 115200bps (Baud Rate), 8 (Data Bit), none (Parity Check), 1 (Stop Bit) and 0 (PLC Station No.)

RS232 Communication
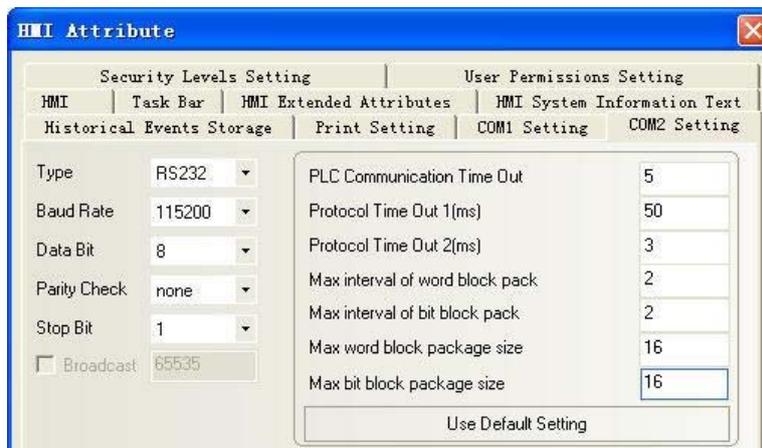
Note: LS XGT CPU Direct protocol only supports communication speed of 115200bps and the Multiple Station No. is not supported.

When Using LS XGT Cnet Protocol

HMI default communication parameters: 9600bps (Baud Rate), 8 (Data Bit), none (Parity Check), 1 (Stop Bit) and 0 (PLC Station No.)

RS232 Communication

RS485 Communication
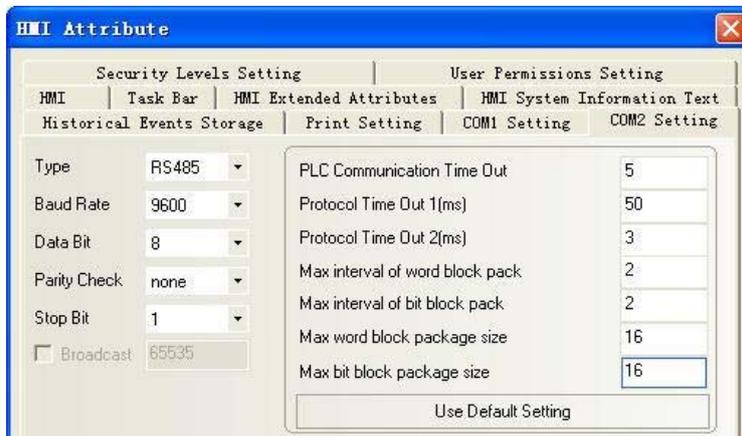
PLC Settings

When Using LS Master-K Cnet Protocol

The software settings are as shown below (Please pay attention to the settings on the right selection area.):
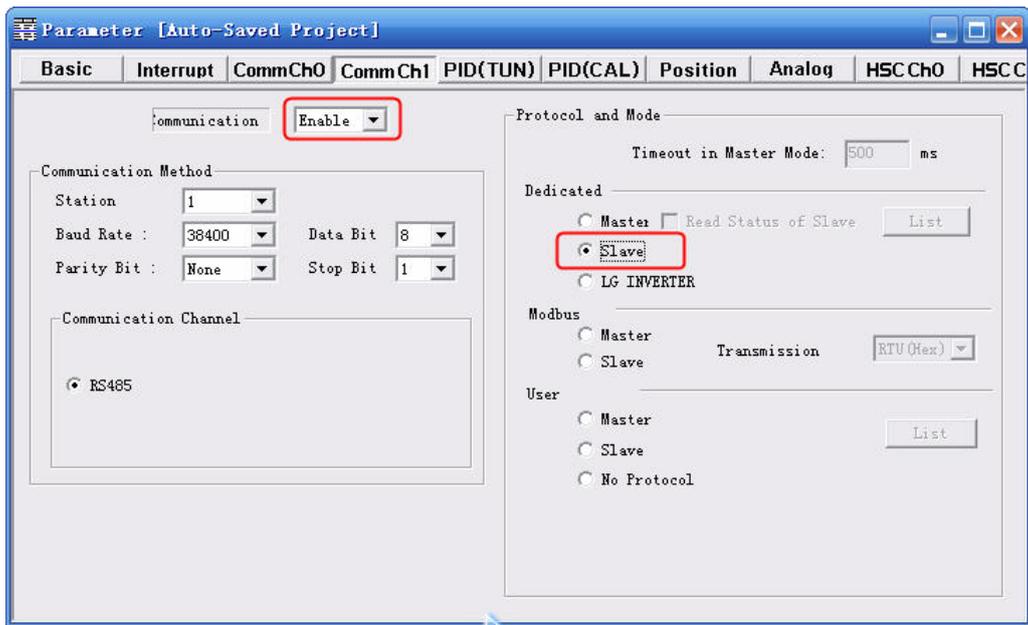
When Using LS Master-K Modbus RTU Protocol

The software settings are as shown below (Please pay attention to the settings on the right selection area.):
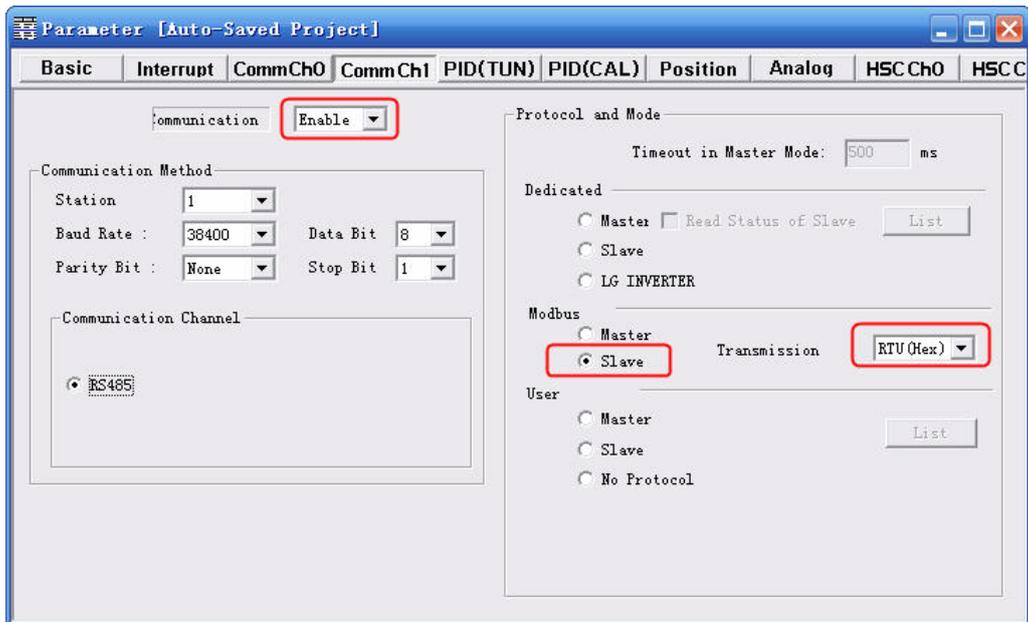
The "Cannot Change PLC Mode" will appear when [Connect+Write+Run+Monitor Start] is clicked, then manual control is needed and download operation is available only when the RUN light is OFF. After the download operation is completed, the RUN light should maintain ON.

When Using LS XGT Cnet Protocol

1. Set the communication parameters through the [Tools]—[Network Manager] menu option.
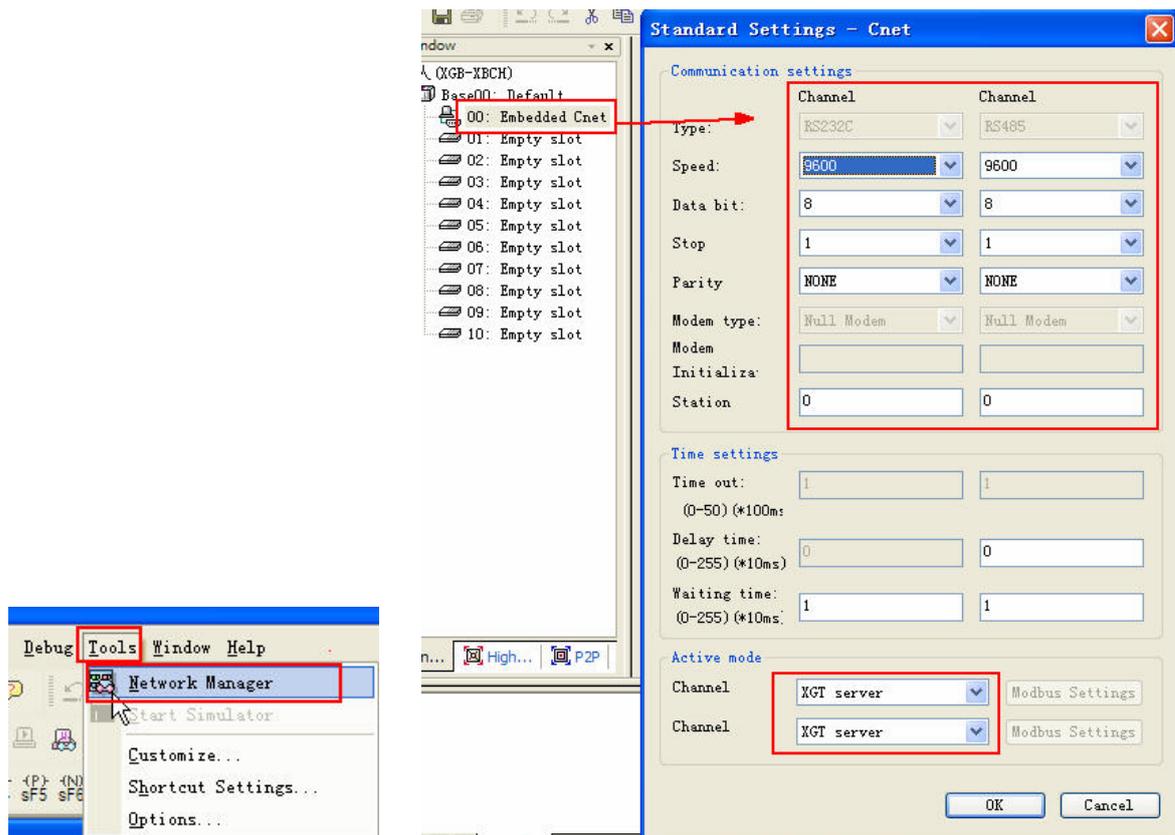
2. PLC must operate in [OPR] mode, which can be set on PLC.

6-4 Supported Registers

K120S K7M-DR10UE

Device	Bit Address	Word Address	Format	Notes
I/O Relay	P 0.0-63.f	------	DD.H	
Auxiliary Relay	M 0.0-191.f	------	DDD.H	
Link Relay	L 0.0-63.f	------	DD.H	
Keep Relay	K 0.0-31.f	------	DD.H	
Special Relay	F 0.0-31.f		DD.H	
Timer	------	T 0-255	DDD	
Counter	------	C 0-255	DDD	
Data Register		D 0-4999	DDDD	

Note: For bit registers, if the address in PLC is F01, then the address in HMI should be set to F0.1; and if the address in PLC is F2A, then the address in HMI should be set to F2.A, and the others can be deduced according to this rule.

LS XGT Cnet

Device	Bit Address	Word Address	Format
File Relay	R_bit 0.0-10239.F		DDDDD.H
Data Relay	D_bit 0.0-10239.F		DDDDD.H
Communication Relay	N_bit 0.0-5119.F		DDDD.H
Link Relay	L_bit 0.0-2047.F		DDDD.H
Index Relay	Z_bit 0.0-127.F	------	DDD.H
Counter Contact Relay	C_bit 0-1023	------	DDDD
Timer Contact Relay	T_bit 0-1023	------	DDDD
Special Relay	F_bit 0.0-1023.F	------	DDDD.H
Keep Relay	K_bit 0.0-4095.F	------	DDDD.H
Auxiliary Relay	M_bit 0.0-1023.F	------	DDDD.H
I/O Relay	P_bit 0.0-1023.F	------	DDDD.H
File Register	------	R_word 0-10239	DDDDD
Data Register	------	D_ word 0-10239	DDDDD
Communication Register	------	N_ word 0-5119	DDDD
Link Register	------	L_ word 0-2047	DDDD
Step Control Register		S_ word 0-127	DDD
Index Register		Z_ word 0-127	DDD
Counter	------	C_ word 0-1023	DDDD
Timer	------	T_ word 0-1023	DDDD
Special Register	------	F_ word 0-1023	DDDD
Keep Register	------	K_ word 0-4095	DDDD
Auxiliary Register	------	M_ word 0-1023	DDDD
I/O Register	------	P_ word 0-1023	DDDD

Note: T_bit and C_bit registers do not support batch transmission.

Address format description: D: decimal, O: octonary, H: hexadecimal.

LS XGT CPU Direct

Device	Bit Address	Word Address	Format
File Relay	R_bit 0.0-10239.F	------	DDDDD.H
Data Relay	D_bit 0.0-10239.F	------	DDDDD.H
Communication Relay	N_bit 0.0-5119.F	------	DDDD.H
Link Relay	L_bit 0.0-2047.F	------	DDDD.H
Index Relay	Z_bit 0.0-127.F	------	DDD.H

	ZR_bit 0.0-10239.F	------	DDDDD.H
Counter Contact Relay	C_bit 0-1023	------	DDDD
Timer Contact Relay	T_bit 0-1023	------	DDDD
Special Relay	F_bit 0.0-1023.F	------	DDDD.H
Keep Relay	K_bit 0.0-4095.F	------	DDDD.H
Auxiliary Relay	M_bit 0.0-1023.F	------	DDDD.H
I/O Relay	P_bit 0.0-1023.F	------	DDDD.H
File Register	------	R 0-10239	DDDDD
Data Register	------	D 0-10239	DDDDD
Communication Register	------	N 0-5119	DDDD
Link Register	------	L 0-2047	DDDD
Step Control Register	------	S 0-127	DDD
Index Register	------	Z 0-127	DDD
	------	ZR 0-10239	DDDDD
Counter Set Value	------	C_ SV 0-1023	DDDD
Timer Set Value	------	T_ SV 0-1023	DDDD
Counter Current Value	------	C_ CV 0-1023	DDDD
Timer Current Value	------	T_ CV 0-1023	DDDD
Special Register	------	F 0-1023	DDDD
Keep Register	------	K 0-4095	DDDD
Auxiliary Register	------	M 0-1023	DDDD
I/O Register	------	P 0-1023	DDDD

Note: Address format description: D: decimal, O: octonary, H: hexadecimal.

6-5 Cable Fabrication

When Using LS Master-K Cnet/LS Master-K Modbus RTU Protocol

RS232 Communication Cable

RS485 Communication Cable

When Using LS Master-K CPU Direct Protocol

RS232 Communication Cable

HMI connector
9pin D-SUB female

COM1	COM2
3 RD	3 RD
2 SD	2 SD
9 SG	9 SG

Controller connector
9 pin D-SUB (male)

4 RX
7 TX
5 GND

When Using LS XGT CPU Direct Protocol

RS232 Communication Cable

HMI connector
9pin D-SUB female

COM1	COM2
3 RD	3 RD
2 SD	2 SD
9 SG	9 SG

Controller connector
6 pin Mini Din (male)

6 TX
2 RX
3 GND
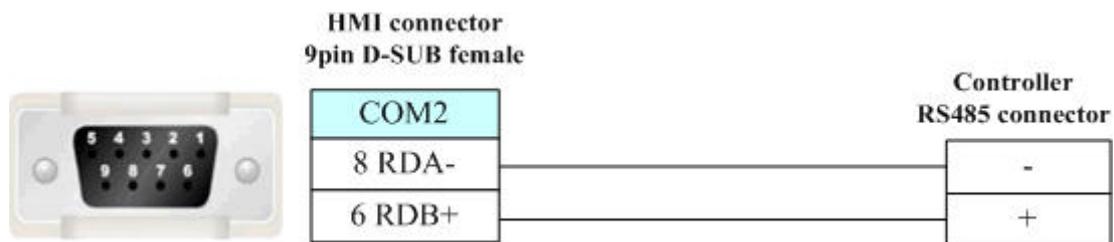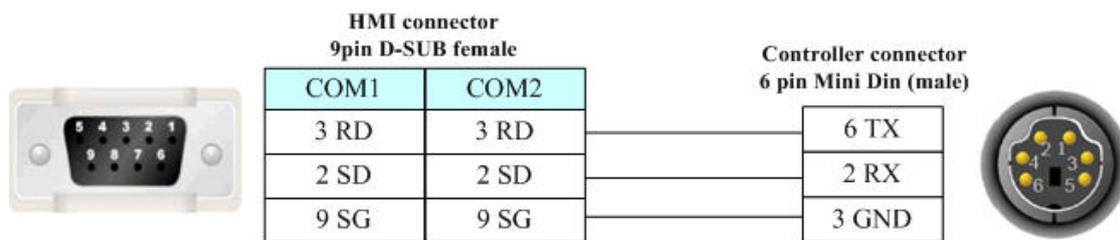
When Using LS XGT Cnet Protocol

RS232 Programming Cable
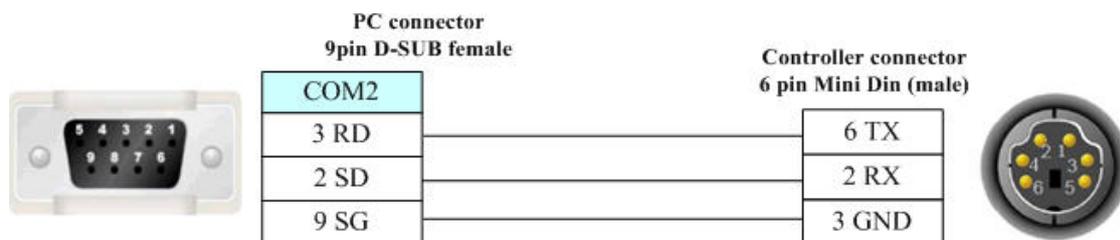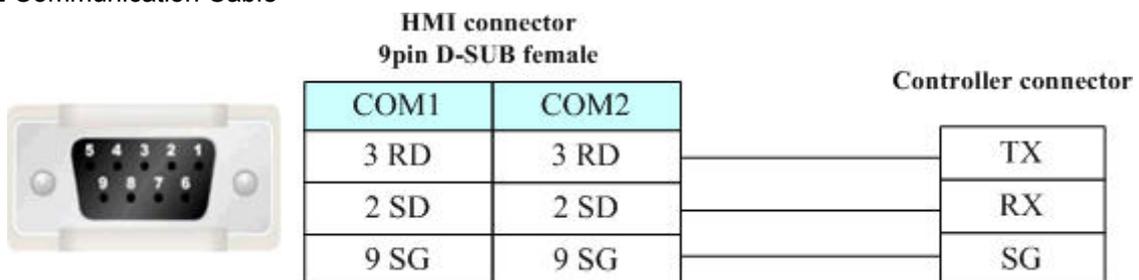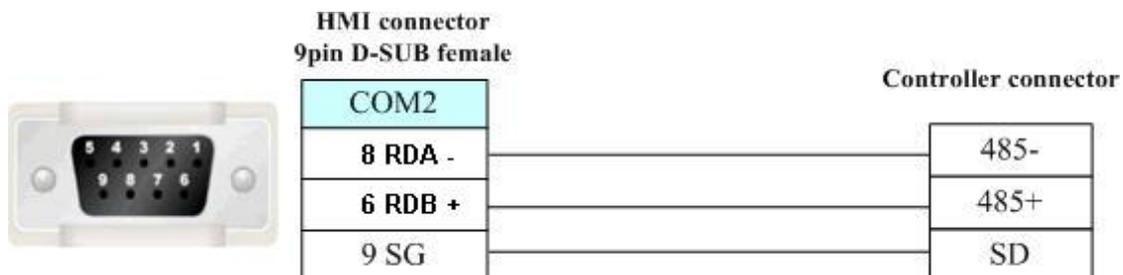
PC connector
9pin D-SUB female

COM2
3 RD
2 SD
9 SG

Controller connector
6 pin Mini Din (male)

6 TX
2 RX
3 GND

RS232 Communication Cable

HMI connector
9pin D-SUB female

COM1	COM2
3 RD	3 RD
2 SD	2 SD
9 SG	9 SG

Controller connector

TX
RX
SG

RS485 Communication Cable

HMI connector
9pin D-SUB female

COM2
8 RDA -
6 RDB +
9 SG

Controller connector

485-
485+
SD

Section 7 Connecting to Panasonic PLCs

This section describes the connection to Panasonic PLCs.

7-1 Serial Port Communication

Series	CPU	Link Module	Driver
FP	FP	Tool port on the Control unit	Panasonic FP
		AFPG801	
		AFPG802	
		AFPG803	
		AFPG806	
	FP0 FP1 FP-M	Tool port on the Control unit	
		RS232C port on the Control unit	
	FP2 FP2SH	Tool port on the Control unit	
		RS232C port on the Control unit	
		AFP2462	
		AFP2465+(AFP2803,AFP2804, FP2805)	
	FP3	Tool port on the Control unit	
		AFP3462	
	FP-e	Tool port on the Control unit	
		AFPE224300	
		AFPE224302	
		AFPE224305	
		AFPE214322	
		AFPE214325	
	FP10SH FP10S	Tool port on the Control unit	
		RS232C port on the Control unit	
		AFP3462	
	FP-X	RS232C port on the Control unit	

7-2 Communication Parameters and Cable Fabrication

Series	CPU	Link Module	COMM Type	Parameter	Cable
FP	FP	Tool port on the Control unit	RS232C	Refer to Section 7-3	Self-made cable required
		AFPG801			Self-made cable required
		AFPG802			
		AFPG806			
		AFPG803	RS485	Refer to	Self-made cable

		AFPG806		Section 7-3	required
	FP0	Tool port on the Control unit	RS232C	Refer to Section 7-3	Self-made cable required
		RS232C port on the Control unit			Self-made cable required
	FP1 FP-M	Tool port on the Control unit	RS232C	Refer to Section 7-3	Self-made cable required
		RS232C port on the Control unit			Self-made cable required
	FP2 FP2SH	Tool port on the Control unit	RS232C	Refer to Section 7-3	Self-made cable required
		RS232C port on the Control unit			Self-made cable required
		AFP2462			
		AFP2465 AFP2803			
		AFP2465 AFP2804	RS422	Refer to Section 7-3	Self-made cable required
		AFP2465 AFP2805	RS485	Refer to Section 7-3	Self-made cable required
	FP3	Tool port on the Control unit	RS232C	Refer to Section 7-3	Self-made cable required
		AFP3462			Self-made cable required
		AFP3463	RS422	Refer to section 7-3	Self-made cable required
	FP-e	Tool port on the Control unit	RS232C	Refer to Section 7-3	Self-made cable required
		AFPE224300	RS232C		Self-made cable required
		AFPE214325			
		AFPE224305			
		AFPE224302	RS485	Refer to Section 7-3	Self-made cable required
		AFPE214322			
	FP10SH FP10S	Tool port on the Control unit	RS232C	Refer to Section 7-3	Self-made cable required
		RS232C port on the Control unit			Self-made cable required
		AFP3462			
	FP-X	RS232C port on the Control unit	RS232C	Refer to Section 7-3	Self-made cable required

Note: 1. Only FP0 (C10CRM/C10CRS/C14CRM/C14CRS/C16T/C16CP/C32CT/C32CP) has RS232C communication port.

2. Only FP1 (C24/C40/C56/C72) has RS232C communication port.

3. Only FP1 (C20R/C20T/C32T) has RS232C communication port.

4. AFP245 is the combination of multi-communication of FP2/FP2SH. AFP2803, AFP2084 and AFP2085 are the communication modules connecting to AFP2465.

7-3 Communication Parameter Setting

HMI Settings

HMI default communication parameters: 9600bps (Baud Rate), 8 (Data Bit), odd (Parity Check), 1 (Stop Bit) and 1 (PLC Station No.)

RS232 Communication

RS485 Communication

RS422 Communication

PLC Settings

Please refer to relevant instruction manual of communication device on parameter settings.

7-4 Supported Registers

FP0-C16

Device	Bit Address	Word Address	Format	Notes
External Output Nodes	Y0.0-12.F	------	DD.H	
External Input Nodes	X0.0-12.F	------	DD.H	
Timer Nodes	T0-99	------	DD	
Counter Nodes	C100-143	------	DDD	
Internal Auxiliary Nodes	R0.0-62.F R900.0-903.F	------	DD.H DDD.H	
Setting Value Registers for Timer/Counter	------	SV0-143	DDD	
Actual Value Registers for Timer/Counter	------	EV0-143	DDD	
Data Registers	------	DT0-1659	DDDD	

FPX

Device	Bit Address	Word Address	Format	Notes
External Input Nodes	X0.0~109.F	------	DDD.H	
External Output Nodes	Y0.0~109.F	------	DDD.H	
Timers	T0~1007	------	DDDD	
Counters	C1008~1023	------	DDDD	
Link Nodes	L0.0~127.F	------	DDD.H	
Internal Nodes	R0.0~255.F R900.0~911.F	------	DDD.H	
Actual Value Registers for Timer/Counter	------	EV0~1023	DDDD	
Setting Value Register for Timer/Counter	------	SV0~1023	DDDD	
Data Registers	------	DT0~32764	DDDDD	

Note: 1. For X registers, if the address in PLC is X01,then the address in HMI should be set to X0.1; and if the address in PLC is X1F, then the address in HMI should be set to X1.F and Y, R registers can be deduced according to this rule.

2. The address range of EV register in HMI can be set to 32767 (max.), while the protocol only supports 9999 (max.).

3. Address format description: D: decimal, O: octonary, H: hexadecimal.

7-5 Cable Fabrication

RS232 Communication Cable

Tool port：
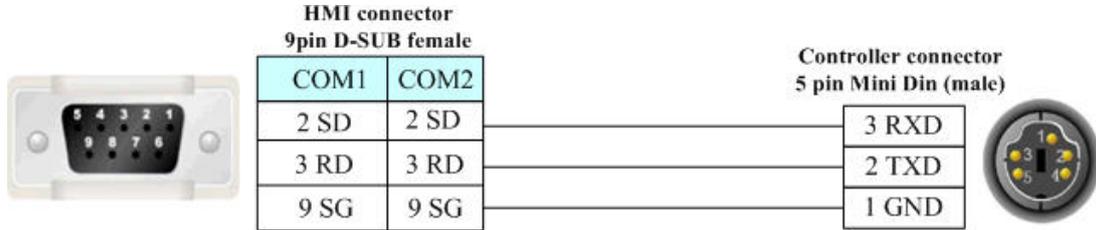
CPU port:
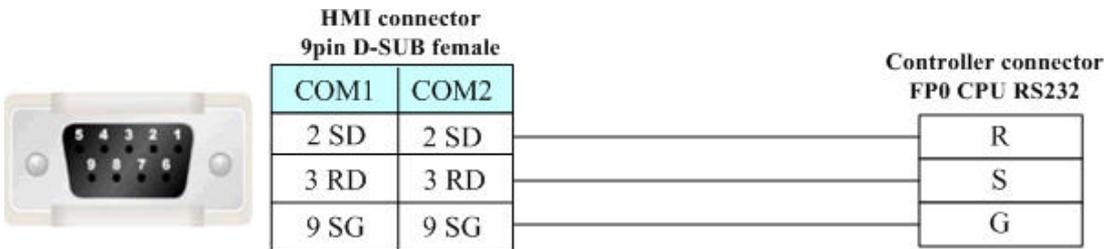
Module port:
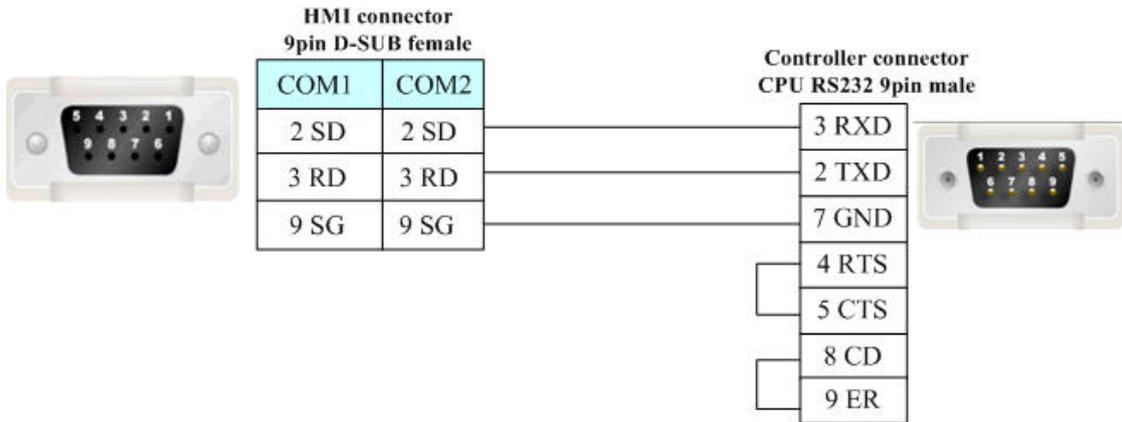
RS485 Communication Cable
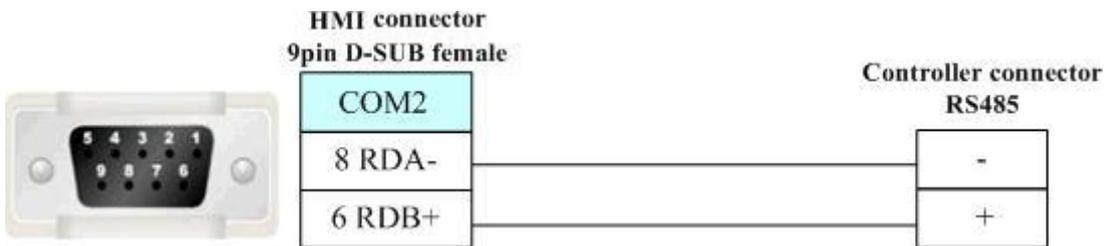
RS422 Communication Cable

FP3 RS422 programming port:

HMI connector 9pin D-SUB female COM2		Controller connector 15 pin D-SUB male
8 RDA-	——	9 TXDA
6 RDB+	——	2 TXDB
9 SG	——	7 GND
7 SDA-	——	10 RXDA
1 SDB+	——	3 RXDB
		4 RTA+
		5 CTS+
		11 RTS-
		12 CTS-
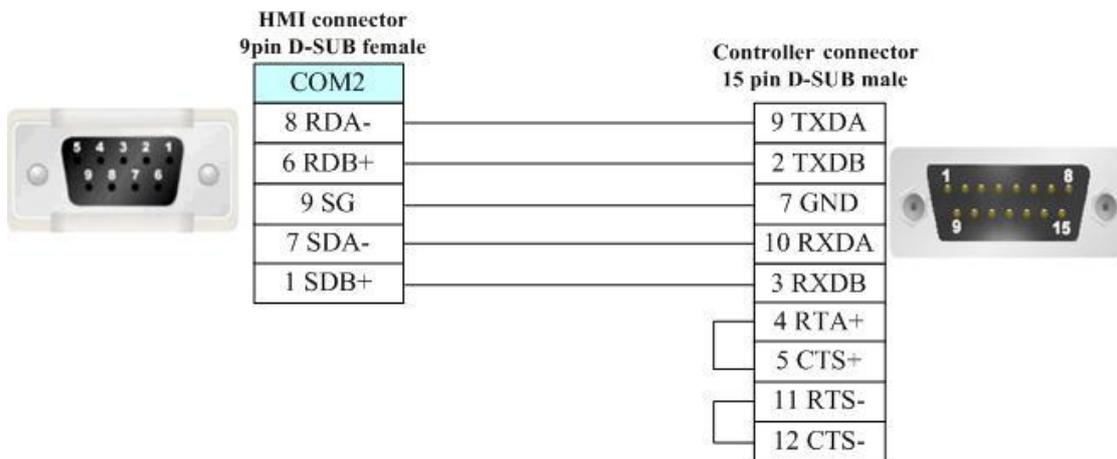
RS422 communication port for other modules:
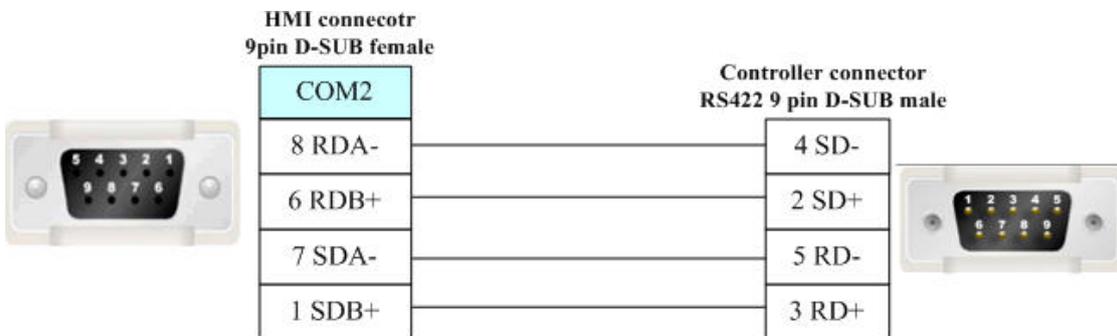
HMI connecotr 9pin D-SUB female COM2		Controller connector RS422 9 pin D-SUB male
8 RDA-	——	4 SD-
6 RDB+	——	2 SD+
7 SDA-	——	5 RD-
1 SDB+	——	3 RD+

Section 8 List for All PLCs Supported by NB Series

This section lists all PLCs supported by NB Units.

8-1 Lists for Supported PLC

Names Displayed in NB-Designer	PLC Models	PLC Manufacturers
Delta DVP	DVP-xxES/EX/SS	Delta
	DVP-xxSA/SX/SC	
	DVP-xxEH/EH2/SV	
LS Master-K Cnet	K120s	LG
	K200s	
LS Master-K CPU Direct	K120s	
	K200s	
LS Master-K Modbus RTU	K120s	
	K200s	
LS XGT CPU Direct	XGT	
	XGB	
LS XGT Cnet	XBC-DN64H	
	XBC-DR32H	
Mitsubishi FX0N/1N/2N/3G	FX0N	Mitsubishi
	FX1N	
	FX2N	
	FX3G	
	FX1NC	
	FX2NC	
Mitsubishi FX1S	FX1S	
Mitsubishi FX2N-10GM/20GM	FX2N_10GM	
	FX2N_20GM	
Mitsubishi FX3U	FX3U	
	FX3UC	
Mitsubishi FX-485ADP/485BD/232BD (Multi-station)	FX-485ADP/485BD/232BD	
Mitsubishi Q Series (CPU Port)	Q02 CPU	
	Q02H CPU	
	Q12H CPU	
	Q25H CPU	

Names Displayed in NB-Designer	PLC Models	PLC Manufacturers
Mitsubishi Q_QnA (Link Port)	Q00 CPU	Mitsubishi
	Q01 CPU	
	QJ71C24 module	
	QJ71C24-R2 module	
	QJ71C24N module	
	QJ71C24N-R2 module	
	QJ71C24N-R4 module	
Mitsubishi Q00J (CPU Port)	Q00J	
Mitsubishi Q06H	Q06H CPU	Mitsubishi
Modbus ASCII	Modbus Compatible External Device	Modbus
Modbus RTU	Modbus Compatible External Device	
Modbus RTU Extend	Modbus Compatible External Device	
Modbus RTU Slave	Modbus Compatible External Device	
Omron C Series	C200Hα	Omron
	CQM1H	
	CPM1*/2*	
Omron CJ_CS Series	CS1*/CJ1*/CJ2*	
Omron CP1H/L/E	CP1H/L/E	
Panasonic FP	FP0/FP1/FP2/FP3	Panasonic
	FP2SH	
	FP10SH/FP10S	
	FP-M	
	FP-e	
	FP-X	
Schneider Modicon Uni-TelWay	Micro Series	Schneider
	Premium Series	
	Nano Series	

Names Displayed in NB-Designer	PLC Models	PLC Manufacturers
Schneider Twido Modbus RTU	TWD LCAA 10DRF	Schneider
	TWD LCAA 16DRF	
	TWD LCAA 24DRF	
	TWD LMDA 20DTK	
	TWD LMDA 20DUK	
	TWD LMDA 20DRT	
	TWD LMDA 40DTK	
	TWD LMDA 40DUK	
Siemens S7-200	CPU212/214/215/216	Siemens
	CPU221/222/224/226	
	CPU224 XP CN	
	CPU226 XP CN	
SIEMENS S7-300/400 (PC Adapter Direct)	CPU312IFM/CPU313/CPU313C	
	CPU314IFM/CPU314	
	CPU315/CPU315-2 DP	
	CPU316/CPU316-2 DP	
	CPU318-2	
	CPU412-1/CPU412-2 DP	
	CPU413-1/CPU413-2 DP	
	CPU414-1/CPU414-2 DP/CPU414-3 DP	
	CPU416-1/CPU416-2 DP/CPU416-3 DP	
	CPU417-4	