# HYOSUNG

# MODBUS Slave

# MODBUS Serial Slave Driver

Supported version TOP Design Studio V1.0 or higher

## CONTENTS

We would like to thank our customers for using M2I's "Touch Operation Panel (M2I TOP) Series". Read this manual and familiarize yourself with the connection method and procedures of the "TOP and external device".

# 1. System configuration

This driver is the "Serial Slave Driver" among the "MODBUS Protocol" of "HYOSUNG".

Depending on the external device (MODBUS Slave Protocol supported), you may set the "command code", "protocol frame format" etc., of the driver separately. In this case, set the detailed settings according to the external device side based on the communication method.

The system configuration with an external device supported by this driver is as follows:

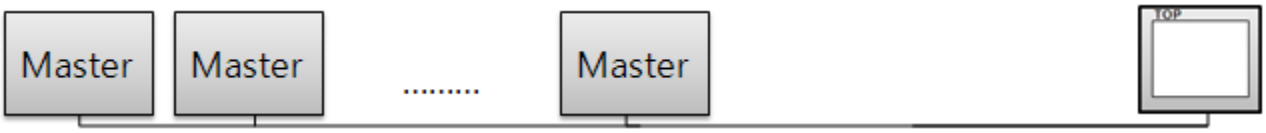
| Series | CPU | Link I/F | Communication method | System setting | Cable |
|---|---|---|---|---|---|
| HYOSUNG MODBUS Slave Device | | | RS-232C | 3. TOP communication setting<br>4. External device setting | 5. Cable table |
| | | | RS-422 (4 wire) | | |
| | | | RS-485 (2 wire) | | |

■ Connectable configuration

• 1:1 connection (one MASTER and one TOP) connection

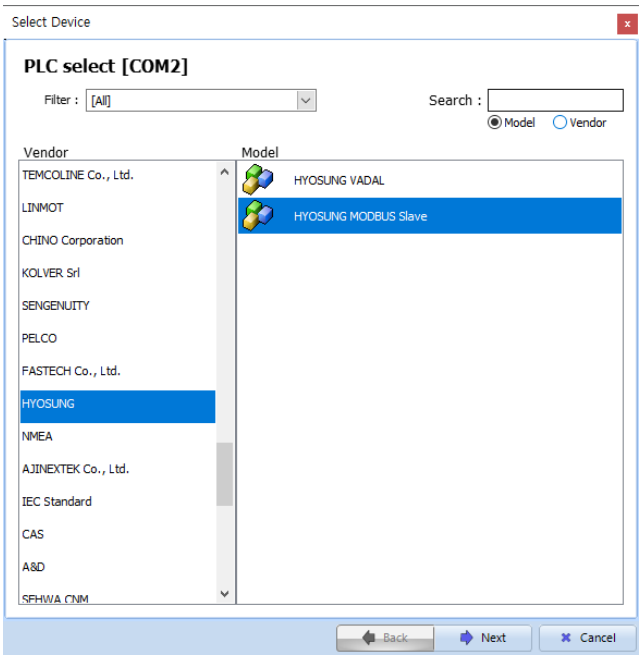

• 1:N connection (one MASTER and multiple TOPs) connection

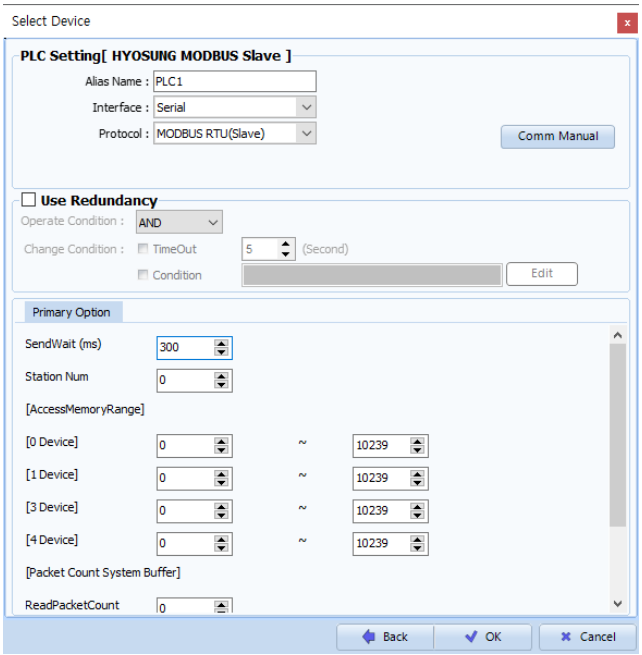

• 1 : N connection (multiple Masters and 1 TOP) connection



# 2. External device selection

■ Select a TOP model and a port, and then select an external device.




| Settings | | Contents |
|---|---|---|
| TOP | Model | Check the TOP display and process to select the touch model. |
| External device | Vendor | Select the vendor of the external device to be connected to TOP.<br>Select "HYOSUNG". |
| | PLC | Select an external device to connect to TOP. |

| Model | Interface | Protocol |
|---|---|---|
| HYOSUNG MODBUS Slave | Serial | Set Users |

| Supported Protocol | |
|---|---|
| MODBUS RTU | MODBUS ASCII |

Please check the system configuration in Chapter 1 to see if the external device you want to connect is a model whose system can be configured.

# 3. TOP communication setting

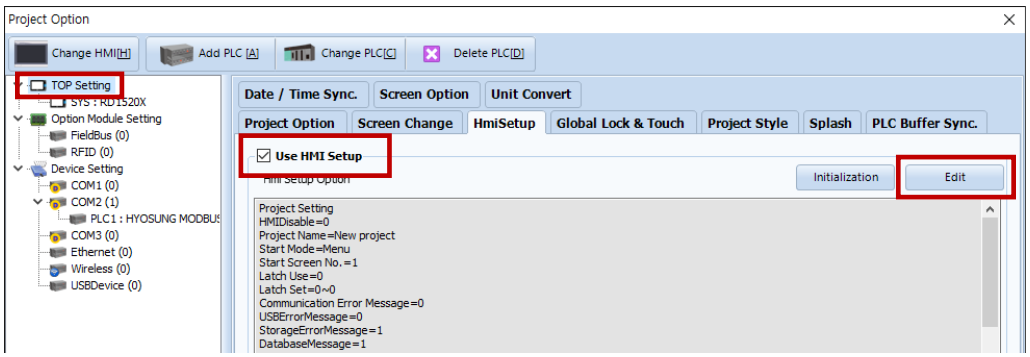
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

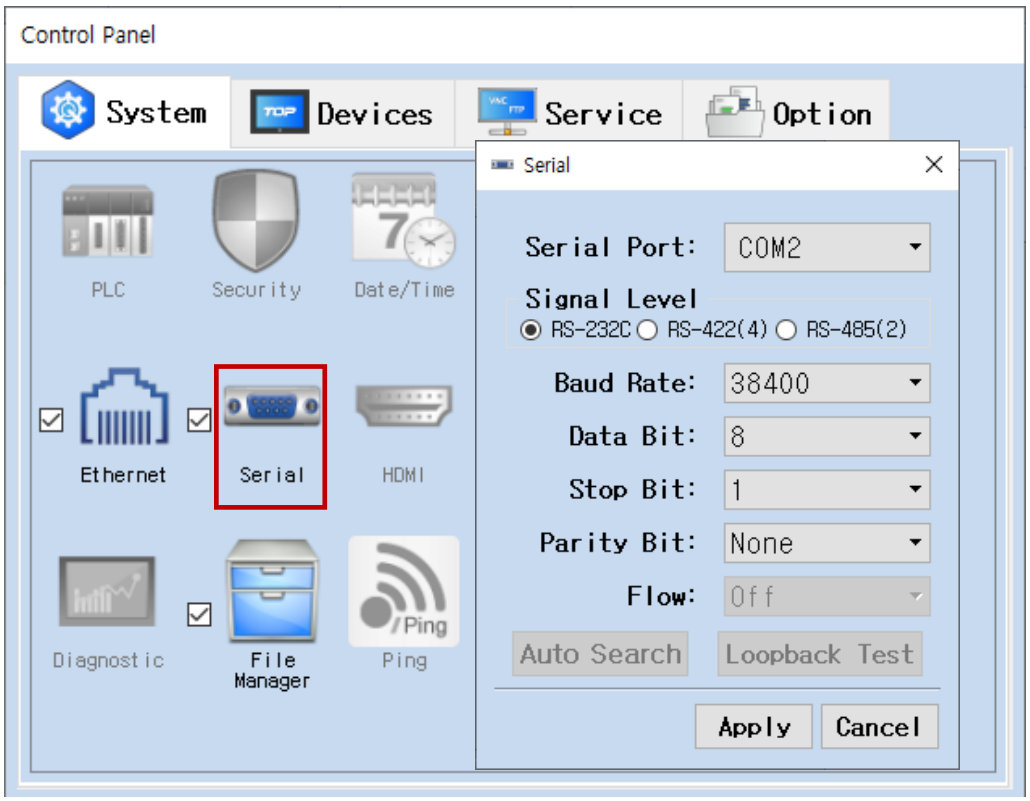
## 3.1 Communication setting in TOP Design Studio

### (1) Communication interface setting

■ [Project> Project property> TOP Settings] → [Project Options > "HMI Setting Use" Check > Edit > Serial]

– Set the TOP communication interface in TOP Design Studio.




| Items | TOP | External device | Remarks |
|---|---|---|---|
| Signal Level (port) | RS-232C<br>RS-422/485 | RS-232C<br>RS-422/485 | |
| Baud Rate | 38400 | | |
| Data Bit | 8 | | |
| Stop Bit | 1 | | |
| Parity Bit | None. | | |

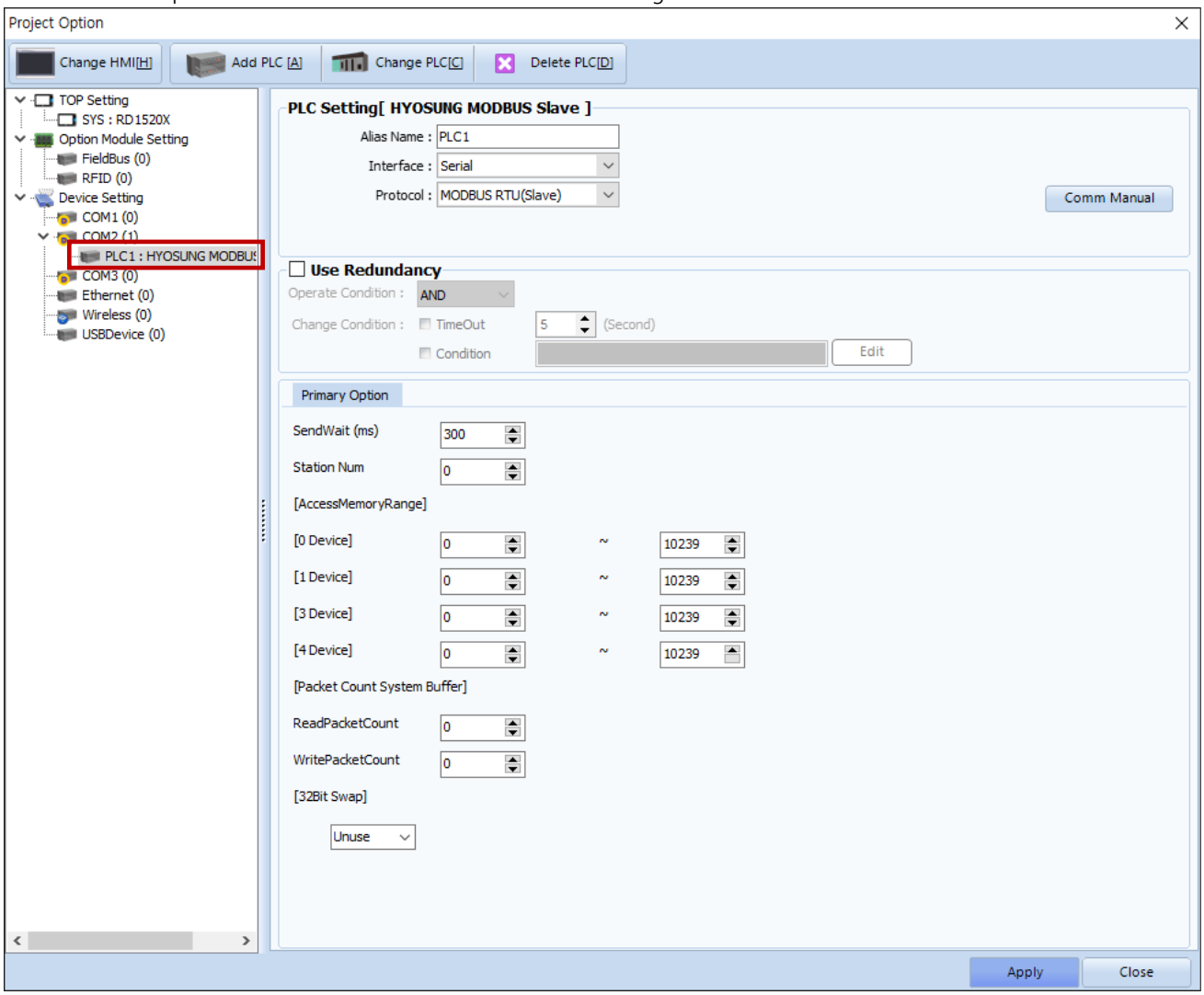
* The above settings are examples recommended by the company.

| Items | Description |
|---|---|
| Signal Level | Select the serial communication method between the TOP and an external device. |
| Baud Rate | Select the serial communication speed between the TOP and an external device. |
| Data Bit | Select the serial communication data bit between the TOP and an external device. |
| Stop Bit | Select the serial communication stop bit between the TOP and an external device. |
| Parity Bit | Select the serial communication parity bit check method between the TOP and an external device. |

### (2) Communication option setting

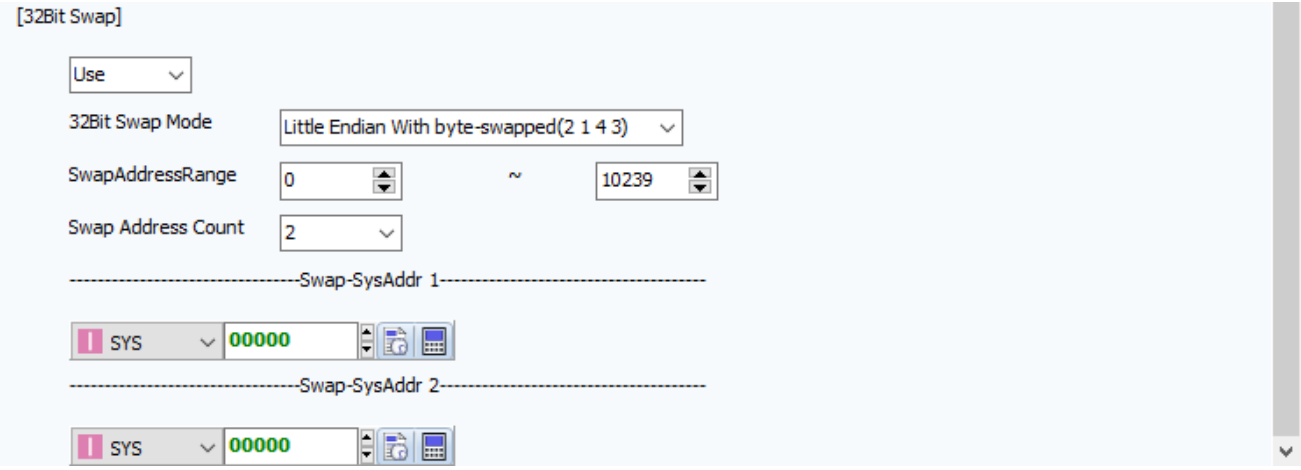
■ [Project > Project property> PLC setting > COM > "PLC1 : MODBUS Slave]

– Set the options of the MODBUS Serial Slave driver in TOP Design Studio.




| Items | Settings | Remarks |
|---|---|---|
| Interface | Select "Serial". | Refer to "2. External device selection". |
| Protocol | Select the communication protocol between the TOP and an external device. | |
| TimeOut (ms) | Set the time for the TOP to wait for a response from an external device. | |
| SendWait (ms) | Set the waiting time between TOP's receiving a response from an external device and sending the next command request. | |
| Station Num | Set the TOP (Slave) prefix. | |
| AccessMemoryRange | | |
| 0 Devie | 0 Device ADDRESS Range Setting | |
| 1 Devie | 1 Device ADDRESS Range Setting | |
| 3 Devie | 3 Device ADDRESS Range Setting | |
| 4 Devie | 4 Device ADDRESS Range Setting | |
| PacketCountSystemBuffer | | |
| ReadPacketCount | ReadPacket Count | |
| WritePacketCount | WritPacket Count | |
| [32BIT SWAP ] | Not used, used | |

[32BIT SWAP] Changing Unuse to Use will activate the options below.




- 32 BIT SWAP MODE

  Big Endian Format(4 3 2 1)

  Big Endian With byte-swapped(3 4 1 2)

  Little Endian Format(1 2 3 4)

  Little Endian With byte-swapped(2 1 4 3)

  Put the 4 forms of data on the master and the default value is Little Endian With byte-swapped (2 1 4 3).

- SwapAddressRange

  The swap sytembuffer range. If you don't intend to use it

  use 1 to 0

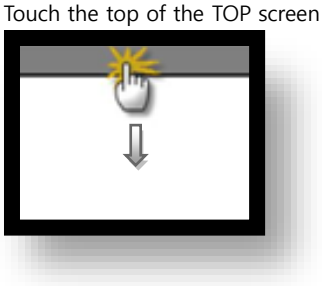
- SwapAddressCount

  You can choose individually, and not scope. Choose from 1-9.

## 3.2. Communication setting in TOP

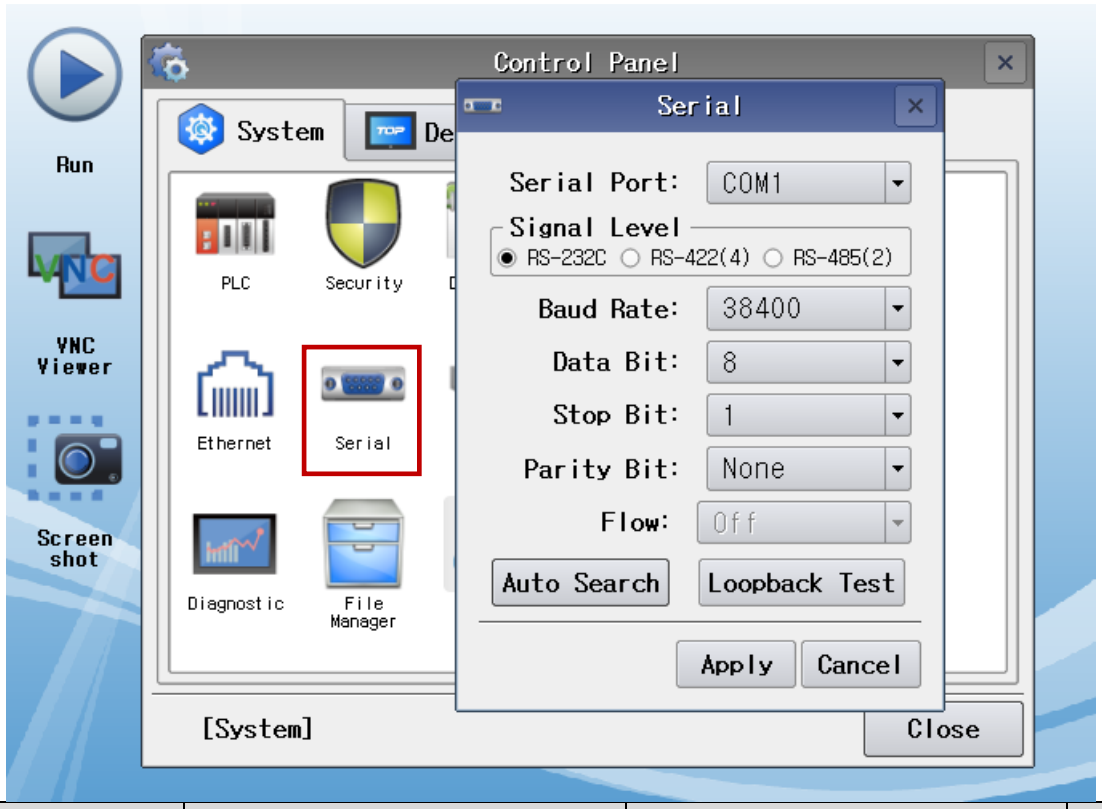
*** This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.**

■ Touch the top of the TOP screen and drag it down. Touch "EXIT" in the pop-up window to go to the main screen.



### (1) Communication interface setting

■ [Main Scree > Control Panel> Serial]



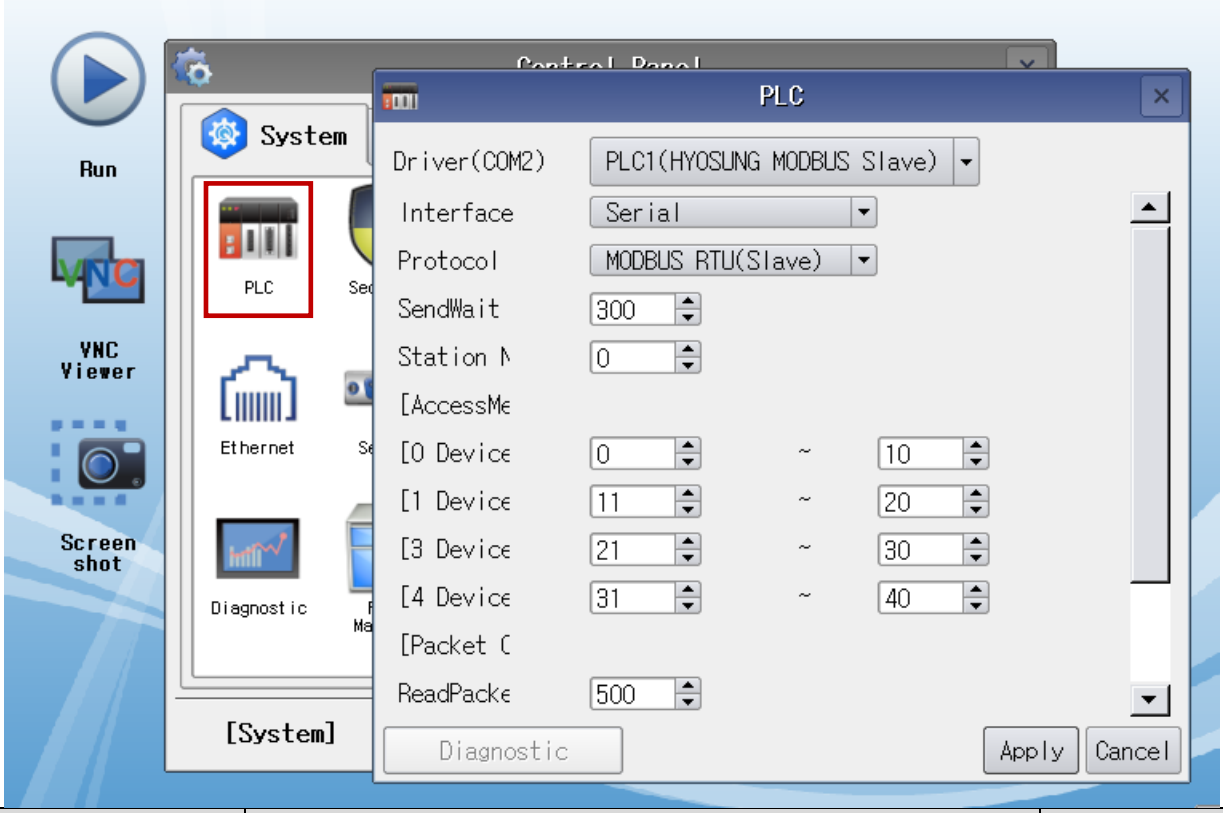

| Items | TOP | External device | Remarks |
|---|---|---|---|
| Signal Level (port) | RS-232C<br>RS-422/485 | RS-232C<br>RS-422/485 | |
| Baud Rate | 38400 | | |
| Data Bit | 8 | | |
| Stop Bit | 1 | | |
| Parity Bit | None. | | |

* The above settings are setting examples recommended by the company.

| Items | Description |
|---|---|
| Signal Level | Select the serial communication method between the TOP and an external device. |
| Baud Rate | Select the serial communication speed between the TOP and an external device. |
| Data Bit | Select the serial communication data bit between the TOP and an external device. |
| Stop Bit | Select the serial communication stop bit between the TOP and an external device. |
| Parity Bit | Select the serial communication parity bit check method between the TOP and an external device. |

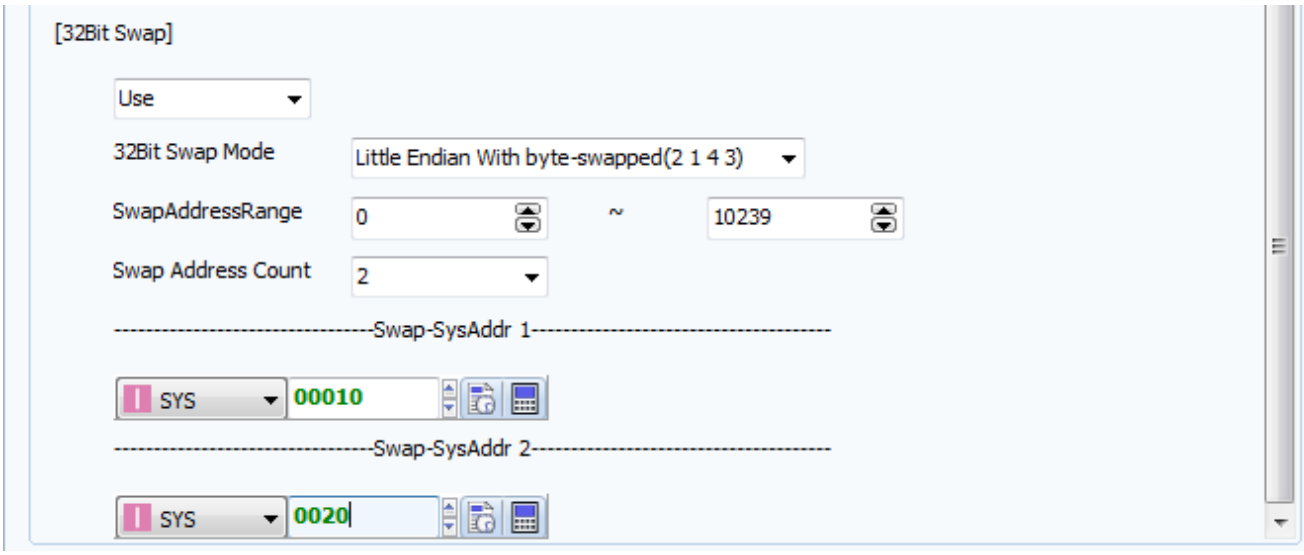
### (2) Communication option setting

■ [Main Screen > Control Panel > PLC]




| Items | Settings | Remarks |
|---|---|---|
| Interface | Select "Serial". | Refer to "2. External device selection". |
| Protocol | Select the communication protocol between the TOP and an external device. | |
| TimeOut (ms) | Set the time for the TOP to wait for a response from an external device. | |
| SendWait (ms) | Set the waiting time between TOP's receiving a response from an external device and sending the next command request. | |
| Station Num | Set the TOP (Slave) prefix. | |
| AccessMemoryRange | | |
| 0 Devie | 0 Device ADDRESS Range Setting | |
| 1 Devie | 1 Device ADDRESS Range Setting | |
| 3 Devie | 3 Device ADDRESS Range Setting | |
| 4 Devie | 4 Device ADDRESS Range Setting | |
| PacketCountSystemBuffer | | |
| ReadPacketCount | ReadPacket Count | |
| WritePacketCount | WritPacket Count | |
| [32BIT SWAP ] | Not used, used | |

[32BIT SWAP] Changing Unuse to Use will activate the options below.




- 32 BIT SWAP MODE

  Big Endian Format(4 3 2 1)

  Big Endian With byte-swapped(3 4 1 2)

  Little Endian Format(1 2 3 4)

  Little Endian With byte-swapped(2 1 4 3)

  Put the 4 forms of data on the master and the default value is Little Endian With byte-swapped (2 1 4 3).

- SwapAddressRange

  The swap sytembuffer range. If you don't intend to use it

  use 1 to 0

- SwapAddressCount

  You can choose individually, and not scope. Choose from 1-9.

## 3.3 Communication diagnostics

■ Check the interface setting status between the TOP and an external device.

- Touch the top of the TOP screen and drag it down. Touch "EXIT" in the pop-up window to go to the main screen.
- From [Control panel> Serial], confirm that the COM port settings you want to use are the same as the external device

■ Diagnosis of whether the port communication is normal or not

- Touch "Communication diagnostics" in [Control Panel > PLC].
- The Diagnostics dialog box pops up on the screen and determines the diagnostic status.

| | |
|---|---|
| **OK** | **Communication setting normal** |
| **Time Out Error** | **Communication setting abnormal**<br>- Check the cable, TOP, and external device setting status. **(Reference: Communication diagnostics sheet)** |

■ Communication diagnostics sheet

- If there is a problem with the communication connection with an external terminal, please check the settings in the sheet below.

| Items | Contents | | Check | | Remarks |
|---|---|---|---|---|---|
| System configuration | How to connect the system | | OK | NG | 1. System configuration |
| | Connection cable name | | OK | NG | |
| TOP | Version information | | OK | NG | 2. External device selection<br>3. Communication setting |
| | Port in use | | OK | NG | |
| | Driver name | | OK | NG | |
| | Other detailed settings | | OK | NG | |
| | Relative prefix | Project setting | OK | NG | |
| | | Communication diagnostics | OK | NG | |
| | Serial Parameter | Transmission Speed | OK | NG | |
| | | Data Bit | OK | NG | |
| | | Stop Bit | OK | NG | |
| | | Parity Bit | OK | NG | |
| External device | CPU name | | OK | NG | 4. External device setting |
| | Communication port name (module name) | | OK | NG | |
| | Protocol (mode) | | OK | NG | |
| | Setup Prefix | | OK | NG | |
| | Other detailed settings | | OK | NG | |
| | Serial Parameter | Transmission Speed | OK | NG | |
| | | Data Bit | OK | NG | |
| | | Stop Bit | OK | NG | |
| | | Parity Bit | OK | NG | |
| | Check address range | | OK | NG | 6. Supported addresses<br>(For details, please refer to the PLC vendor's manual.) |

# 4. External device setting

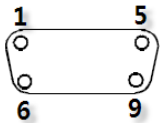
Refer to the user manual of the external device to set "HYOSUNG MODBUS Serial Slave Driver" in the external device I/F.

- Take caution when selecting RTU/ASCII mode in Protocol Frame format.
- Check the contents of the address map on the external device side and use the communication address according to its contents.

# 5. Cable table

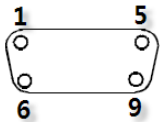
This chapter introduces a cable diagram for normal communication between the TOP and the corresponding device.
(The cable diagrams described in this section may differ from the external device vendor's recommendations.)

■ **RS-232C** (1:1 connection)

| COM | | | Cable connection | PLC | |
|---|---|---|---|---|---|
| Pin arrangement*Note 1) | Signal name | Pin number | | Signal name | |
|  Based on communication cable connector front, D-SUB 9 Pin male (male, convex) | CD | 1 | | | |
| | RD | 2 | | SD | |
| | SD | 3 | | RD | |
| | DTR | 4 | | DTR | |
| | SG | 5 | | SG | |
| | DSR | 6 | | DSR | |
| | RTS | 7 | | RTS | |
| | CTS | 8 | | CTS | |
| | | 9 | | | |

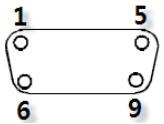
*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.

■ **RS-422** (1:1 connection)

| COM | | | Cable connection | PLC | |
|---|---|---|---|---|---|
| Pin arrangement*Note 1) | Signal name | Pin number | | Signal name | |
|  Based on communication cable connector front, D-SUB 9 Pin male (male, convex) | RDA(+) | 1 | | SDA(+) | |
| | | 2 | | SDB(-) | |
| | | 3 | | RDA(+) | |
| | RDB(-) | 4 | | RDB(-) | |
| | SG | 5 | | SG | |
| | SDA(+) | 6 | | | |
| | | 7 | | | |
| | | 8 | | | |
| | SDB(-) | 9 | | | |

*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.

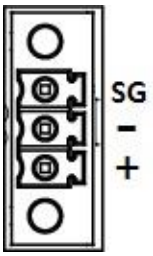
■ **RS-485** (1:1 connection)

| COM | | | Cable connection | PLC | |
|---|---|---|---|---|---|
| Pin arrangement*Note 1) | Signal name | Pin number | | Signal name | |
|  Based on communication cable connector front, D-SUB 9 Pin male (male, convex) | RDA(+) | 1 | | SDA(+) | |
| | | 2 | | SDB(-) | |
| | | 3 | | RDA(+) | |
| | RDB(-) | 4 | | RDB(-) | |
| | SG | 5 | | SG | |
| | SDA(+) | 6 | | | |
| | | 7 | | | |
| | | 8 | | | |
| | SDB(-) | 9 | | | |

*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.

☞ Continued on next page.

■ **RS-485** (1:1 connection)

| COM3 | | Cable connection | PLC | |
|---|---|---|---|---|
| Pin arrangement | Signal name | | Signal name | |
|  | + | | SDA(+) | |
| | - | | SDB(-) | |
| | SG | | RDA(+) | |
| | | | RDB(-) | |
| | | | SG | |

■ **RS-422** (1:N connection) – Refer to 1:1 connection to connect in the following way.

| TOP | Cable connection and signal direction | PLC | Cable connection and signal direction | PLC |
|---|---|---|---|---|
| Signal name | | Signal name | | Signal name |
| RDA(+) | | SDA(+) | | SDA(+) |
| RDB(-) | | SDB(-) | | SDB(-) |
| SDA(+) | | RDA(+) | | RDA(+) |
| SDB(-) | | RDB(-) | | RDB(-) |
| SG | | SG | | SG |

■ **RS-485** (1:N/N:1 connection) – Refer to 1:1 connection to connect in the following way.

| TOP | Cable connection and signal direction | PLC | Cable connection and signal direction | PLC |
|---|---|---|---|---|
| Signal name | | Signal name | | Signal name |
| RDA(+) | | SDA(+) | | SDA(+) |
| RDB(-) | | SDB(-) | | SDB(-) |
| SDA(+) | | RDA(+) | | RDA(+) |
| SDB(-) | | RDB(-) | | RDB(-) |
| SG | | SG | | SG |

# 6. Supported addresses

The devices available in TOP are as follows:

The device range (address) may differ depending on the CPU module series/type. The TOP series supports the maximum address range used by the external device series. Please refer to each CPU module user manual and be take caution to not deviate from the address range supported by the device you want to use.

| | Bit Address | Word Address | 32 bits | Remarks |
|---|---|---|---|---|
| Coil | 00000.00 – 10239.15 | 00000 – 10239 | L/H | |
| Discrete Input | 00000.00 – 10239.15 | 00000 – 10239 | | *Note 1) |
| Input Register | 00000.00 – 10239.15 | 00000 – 10239 | | *Note 1) |
| Holding Register | 00000.00 – 10239.15 | 00000 – 10239 | | |

***Note 1)** Cannot be written (Read-only)

Maximum SYSTEM BUFFER is 10239

■ "HYOSUNG MODBUS Slave Driver" Support Command (Function) Table

| Descriptions | Code | Descriptions | Code | Descriptions | Code |
|---|---|---|---|---|---|
| Read Coils | **01** | Diagnostics (Homing) | **08** | Write File Record (Homing) | **15** |
| Read Discrete Inputs | **02** | Get Comm Event Counter (Homing) | **0B** | Mask Write Register (Homing) | **16** |
| Read Holding Registers | **03** | Get Comm Event Log (Homing) | **0C** | Read/Write Multiple registers (Homing) | **17** |
| Read Input Registers | **04** | Write Multiple Coils | **0F** | Read FIFO Queue (Homing) | **18** |
| Write Single Coil | **05** | Write Multiple registers | **10** | Encapsulated I/F Transport (Homing) | **2B** |
| Write Single Register | **06** | Report Slave ID (Homing) | **11** | | |
| Read Exception Status (Homing) | **07** | Read File Record (Homing) | **14** | | |