# M2I Corporation

# TOP Master

# Serial Driver

Supported version TOP Design Studio V1.0 or higher

## CONTENTS

We want to thank our customers who use the Touch Operation Panel.

# 1. System configuration

The system configuration of TOP and external devices is as follows:

| Series | CPU | Link I/F | Communication method | System setting | Cable |
|---|---|---|---|---|---|
| All devices supporting TOP Slave | | Serial port | RS–232C<br>RS-422 (4wire)<br>RS-485 (2wire) | 3. TOP communication setting<br>4. External device setting | 5. Cable table |

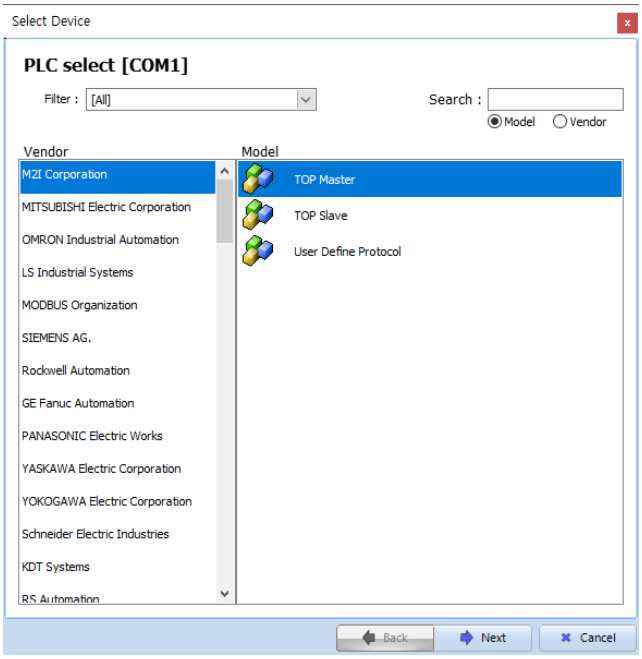
■ Connectable configuration

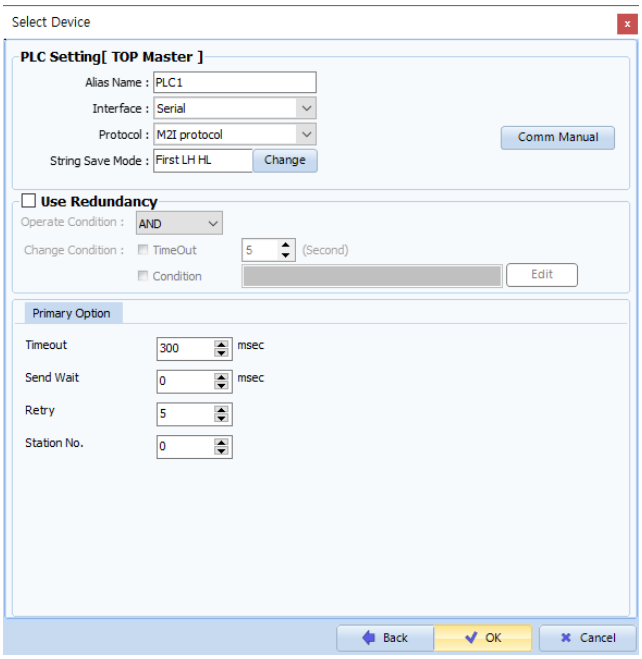
・1:1 connection

・1:N connection

# 2. External device selection

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




| Settings | | Contents |
|---|---|---|
| TOP | Model | Select the TOP model. |
| External device | Vendor | Select the vendor of the external device to be connected to the TOP.<br>Select "M2I Corporation". |
| | PLC | Select the external device to be connected to the TOP. |

| Model | Interface | Protocol |
|---|---|---|
| TOP Master | Serial | M2I Protocol |

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

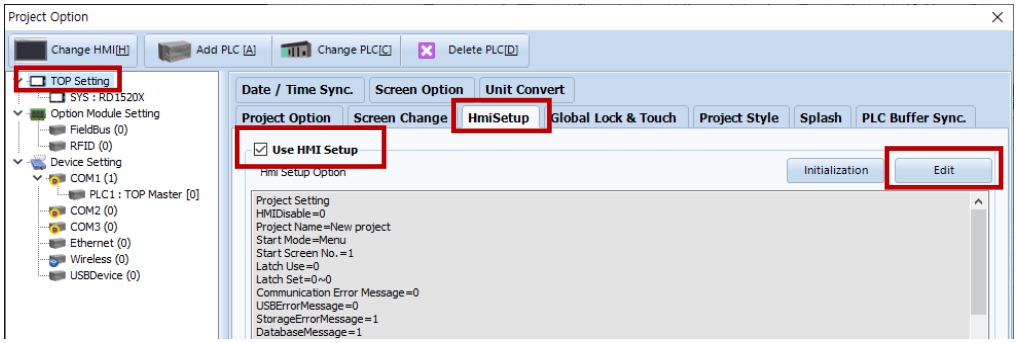
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

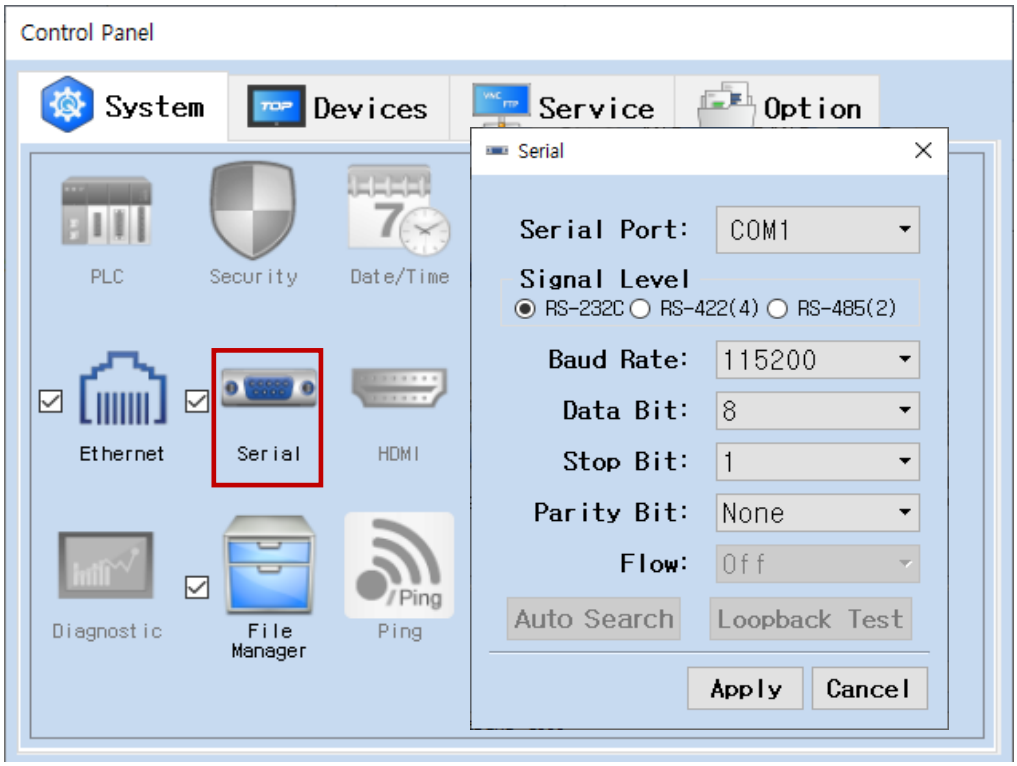
## 3.1 Communication setting in TOP Design Studio

### (1) Communication interface setting

■ [Project] → [Property] → [TOP Setting] → [HMI Setup] → [Use HMI Setup Check] → [Edit] → [Serial]

– Set the TOP communication interface in TOP Design Studio.




| Items | TOP | External device | Remarks |
|---|---|---|---|
| Signal Level | RS-232C / RS-422 / RS-485 | RS-232C / RS-422 / RS-485 | |
| Baud Rate | 115200 | | |
| Data Bit | 8 | | |
| Stop Bit | 1 | | |
| Parity Bit | None. | | |

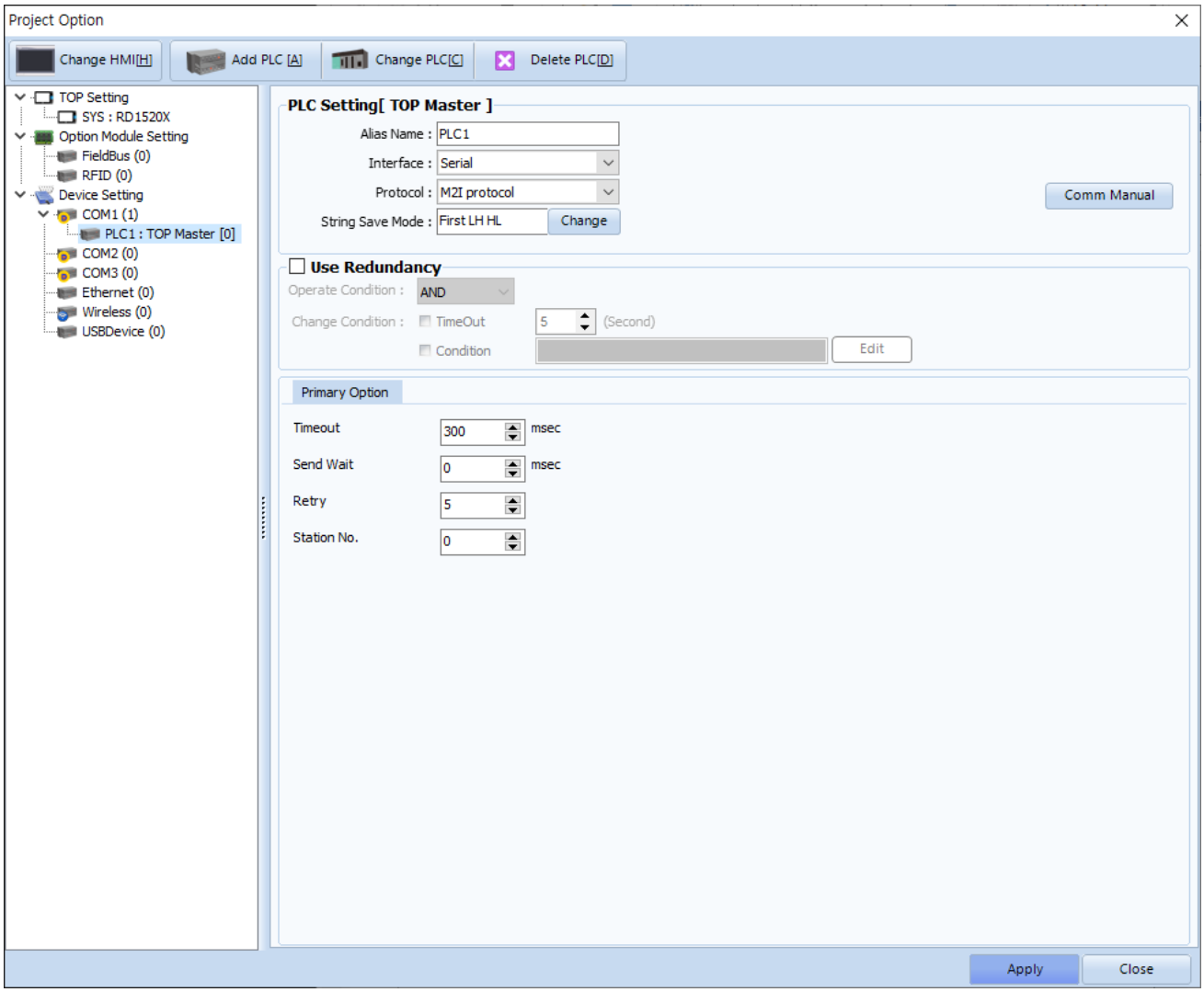
* The above settings are examples recommended by the company.

| Items | Description |
|---|---|
| Signal Level | Select the serial communication method between the TOP and an external device. (COM3 supports only RS-485.) |
| 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 > COM1 > PLC1: TOP Master]

– Set the options of the communication driver option in TOP Design Studio.

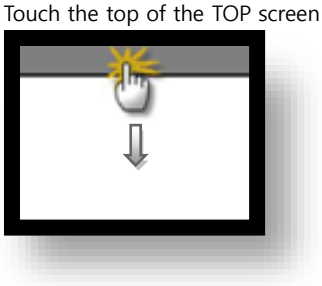



| Items | Settings | Remarks |
|---|---|---|
| Interface | Select “Serial”. | Refer to “2. External device selection”. |
| Protocol | Select the communication protocol between the TOP and an external device. | |
| String Save Mode | Set the byte order of data when entering the string data. | |
| TimeOut (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. | |
| Retry | Set the number of request retries when the data request result is no response/negative response. | |
| Station No. | Enter the prefix of an external device. | |

## 3.2. Communication setting in TOP

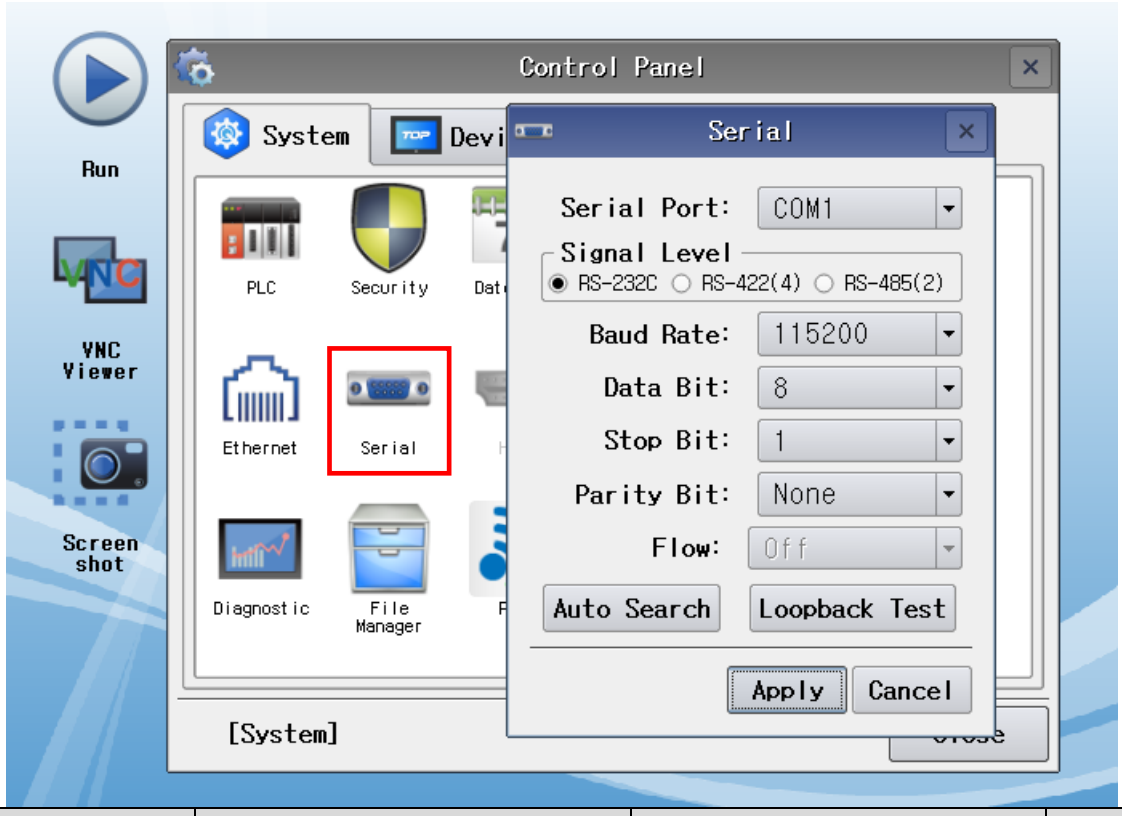
*** This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.**

■ 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

■ [Control Panel] → [Serial]



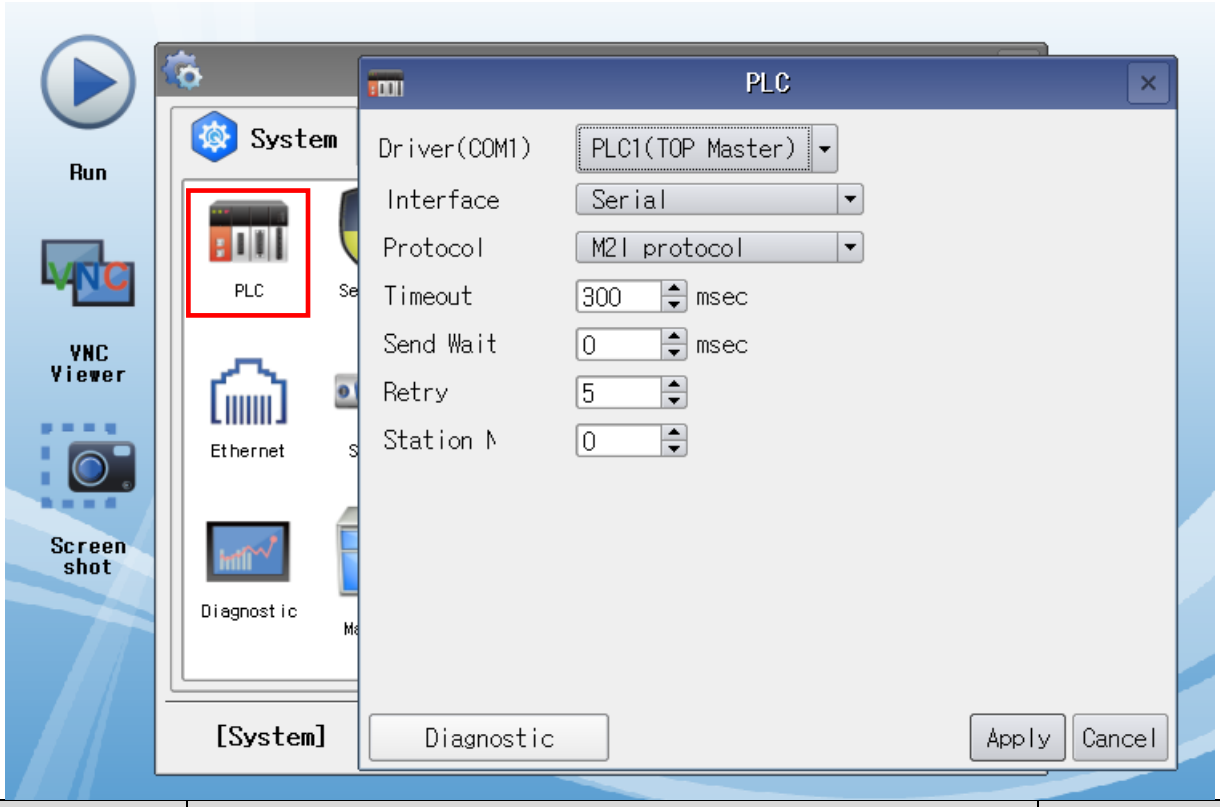

| Items | TOP | External device | Remarks |
|---|---|---|---|
| Signal Level | RS-232C / RS-422 / RS-485 | RS-232C / RS-422 / RS-485 | |
| Baud Rate | 115200 | | |
| Data Bit | 8 | | |
| Stop Bit | 1 | | |
| Parity Bit | None. | | |

* 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. (COM3 supports only RS-485.) |
| 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

■ [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. | |
| String Save Mode | Set the byte order of data when entering the string data. | |
| 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. | |
| Retry | Set the number of request retries when the data request result is no response/negative response. | |
| Station No. | Enter the prefix of an external device. | |

## 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.
- Check that the settings of the connected ports in [Control Panel] → [Serial] are the same as the settings of the external device.

■ Diagnosis of whether the port communication is normal or not

- Touch "Communication diagnostics" in [Control Panel] → [PLC].
- Check whether communication is connected or not.

| | |
|---|---|
| **Communication diagnostics succeeded** | **Communication setting normal** |
| **Error message** | **Communication setting abnormal**<br>- Check the cable, TOP, and external device settings. (Refer to 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.

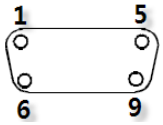
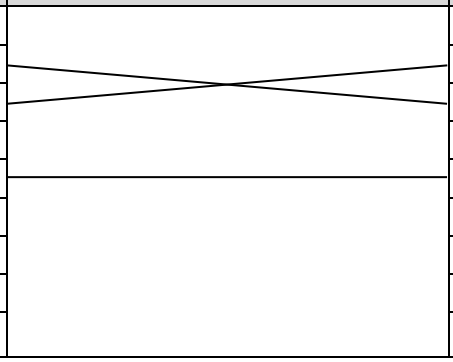
| Items | Contents | | Check | | Remarks |
|---|---|---|---|---|---|
| System configuration | How to connect the system | | OK | NG | 1. System configuration |
| | Cable | | OK | NG | |
| TOP | Version | | OK | NG | 2. External device selection<br>3. Communication setting |
| | Communication port | | OK | NG | |
| | Communication driver and protocol | | 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 | | OK | NG | |
| | Communication port | | OK | NG | |
| | Protocol | | 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 | 5. Supported addresses<br>(For details, please refer to the PLC vendor's manual.) |

# 4. External device setting

Refer to the vendor's user manual to identically configure the communication settings of the external device to that of the TOP.

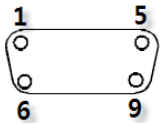
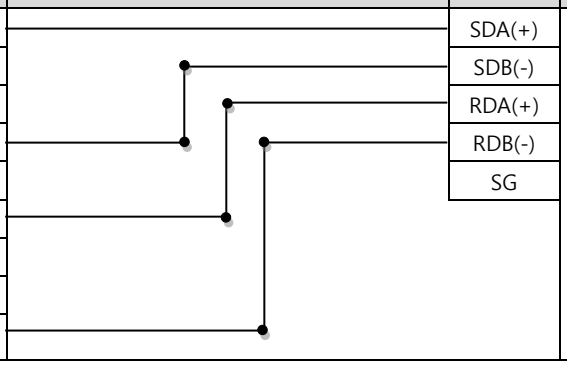
# 5. Cable table

■ **RS-232C** (1:1 connection)

| COM1 / COM2 | | | Cable connection | External device | |
|---|---|---|---|---|---|
| Pin arrangement*Note 1) | Signal name | Pin number | | Signal name | Pin arrangement |
|  Based on communication cable connector front, D-SUB 9 Pin male (male, convex) | | |  | | |
| | RD | 2 | | RD | |
| | SD | 3 | | SD | |
| | | | | | |
| | SG | 5 | | SG | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

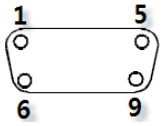
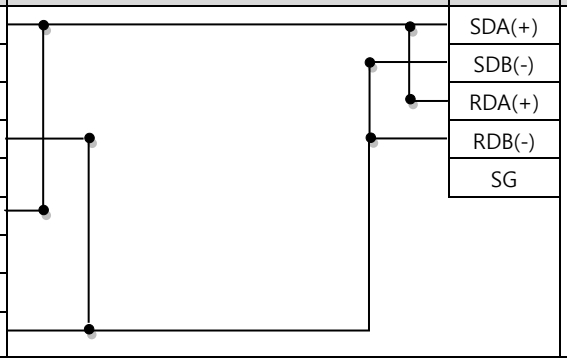
*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.

■ **RS-422** (1:1 connection)

| COM1 / COM2 | | | Cable connection | External device | |
|---|---|---|---|---|---|
| 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 | | | |

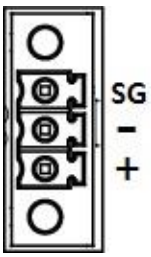
*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.

■ **RS-485** (1:1 connection)

| COM1 / COM2 | | | Cable connection | External device | |
|---|---|---|---|---|---|
| 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)

| COM3 | | Cable connection | External device | |
|---|---|---|---|---|
| Pin arrangement | Signal name | | Signal name | |
|   | + | | + | |
| | - | | - | |
| | SG | | SG | |

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

| TOP | Cable connection and signal direction | External device | Cable connection and signal direction | External device |
|---|---|---|---|---|
| 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 connection) – Refer to 1:1 connection to connect in the following way.

| TOP | Cable connection and signal direction | External device | Cable connection and signal direction | External device |
|---|---|---|---|---|
| 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:

| Address | Bit | Word |
|---|---|---|
| D | D0000.00 ~ D9999.15 | D0000 ~ D9999 |

# Appendix. M2I Protocol

This chapter describes the M2I protocol.

There are two types of M2I protocol commands: READ/WRITE, which use ASCII code.

| | Frame | Contents | Direction |
|---|---|---|---|
| Read | Read request | System buffer request to read data. | Master → Slave |
| | Read response | Response to read request | Master ← Slave |
| Write | Write request | Request to write data on system buffer | Master → Slave |
| | Write response | Response to write request | Master ← Slave |

## 1. Read request

| | Size (Byte) | ASCII | HEX | Contents |
|---|---|---|---|---|
| Start code | 1 | ENQ | 0x05 | Start code of requested frame |
| Prefix | 2 | 01 (Dec) | 0x3031 | SLAVE device prefix |
| Command | 1 | R | 0x52 | Read data command |
| Address | 4 | 0100 (Dec) | 0x3031, 0x3030 | System buffer address of SLAVE device |
| Quantity | 2 | 0x10 (Hex) | 0x3130 | Amount of data |
| End code | 1 | EOT | 0x04 | Code that denotes the end of a frame |
| BCC | 2 | 0xD9 (Hex) | 0x4439 | The last byte of the summed value from prefix to end code |

The example in the table above depicts a read request frame of 16 word data from system buffer number 100.

## 2. Read request

| | Size (Byte) | ASCII | HEX | Contents |
|---|---|---|---|---|
| Start code | 1 | ACK | 0x06 | Start code of response frame |
| Prefix | 2 | 01 (Dec) | 0x30, 0x31 | Device prefix |
| Command | 1 | R | 0x52 | Read data command |
| Data | 4 x n | 0x1234 (Hex)<br>0x5678 (Hex)<br>…<br>0xFFFF (Hex) | 0x3132, 0x3334<br>0x3536, 0x3738<br>…<br>0x4646, 0x4646 | Data |
| End code | 1 | EOT | 0x04 | Code that denotes the end of a frame |
| BCC | 2 | 0xB7 (Hex) | 0x4237 | The last byte of the summed value from prefix to end code |

The example in the table above depicts a response frame of n data from the system buffer address that received the read request.

## 3. Write request

| | Size (Byte) | ASCII | HEX | Contents |
|---|---|---|---|---|
| Start code | 1 | ENQ | 0x05 | Start code of requested frame |
| Prefix | 2 | 01 (Dec) | 0x3031 | SLAVE device prefix |
| Command | 1 | W | 0x57 | Data write command |
| Address | 4 | 0100 (Dec) | 0x3031, 0x3030 | System buffer address of SLAVE device |
| Quantity | 2 | 0x01 (Hex) | 0x3031 | Amount of data |
| Data | 4 x n | 0x1234 (Hex) | 0x3132, 0x3334 | Data |
| End code | 1 | EOT | 0x04 | Code that denotes the end of a frame |
| BCC | 2 | 0xAB (Hex) | 0x4439 | The last byte of the summed value from prefix to end code |

The example in the table above depicts a frame that requests writing the data 1234 onto 1 address from system buffer 100.

## 4. Write request

| | Size (Byte) | ASCII | HEX | Contents |
|---|---|---|---|---|
| Start code | 1 | ACK | 0x06 | Start code of response frame |
| Prefix | 2 | 01 (Dec) | 0x30, 0x31 | Device prefix |
| Command | 1 | W | 0x57 | Data write command |
| End code | 1 | EOT | 0x04 | Code that denotes the end of a frame |
| BCC | 2 | 0xBC (Hex) | 0x4243 | The last byte of the summed value from prefix to end code |

## 5. BCC error response

| | Size (Byte) | ASCII | HEX | Contents |
|---|---|---|---|---|
| Start code | 1 | NAK | 0x15 | Start code of negative response frame |
| Prefix | 2 | 01 (Dec) | 0x30, 0x31 | Device prefix |
| Command | 1 | 2 | 0x32 | BCC error |
| End code | 1 | EOT | 0x04 | Code that denotes the end of a frame |
| BCC | 2 | 0xAC (Hex) | 0x4143 | The last byte of the summed value from prefix to end code |