

# BONGSHIN LOADCELL Co., Ltd.

## Digital Indicator BS Series

### Serial Driver

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Supported version    TOP Design Studio    V1.4.8.17 or higher



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

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Select a TOP model and an external device.

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Describes how to set the TOP communication.

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### **4. External device setting** [Page 10](#)

Describes how to set up communication for external devices.

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Refer to this section to check the addresses which can communicate with an external device.

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# 1. System configuration

The system configuration of TOP and "BONGSHIN LOADCELL Digital Indicator BS Series" is as follows.

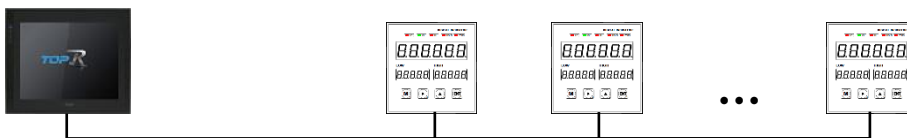
| Series            | Model   | Communication method  | System setting   | Cable                          |
|-------------------|---|-----------------------|--|--------------------------------|
| Digital Indicator | BS-7220<br>BS-7300<br>BS-7300XL<br>BS-5200<br>BS-5205<br>BS-3520<br>BS-105<br>BS-205<br>BS-270<br>BS-32 | RS-232C<br>RS-422/485 | <a href="#">3. TOP communication setting</a><br><a href="#">4. External device setting</a> | <a href="#">5. Cable table</a> |

## ■ Connectable configuration

- 1 : 1 (RS-232C/422/485)



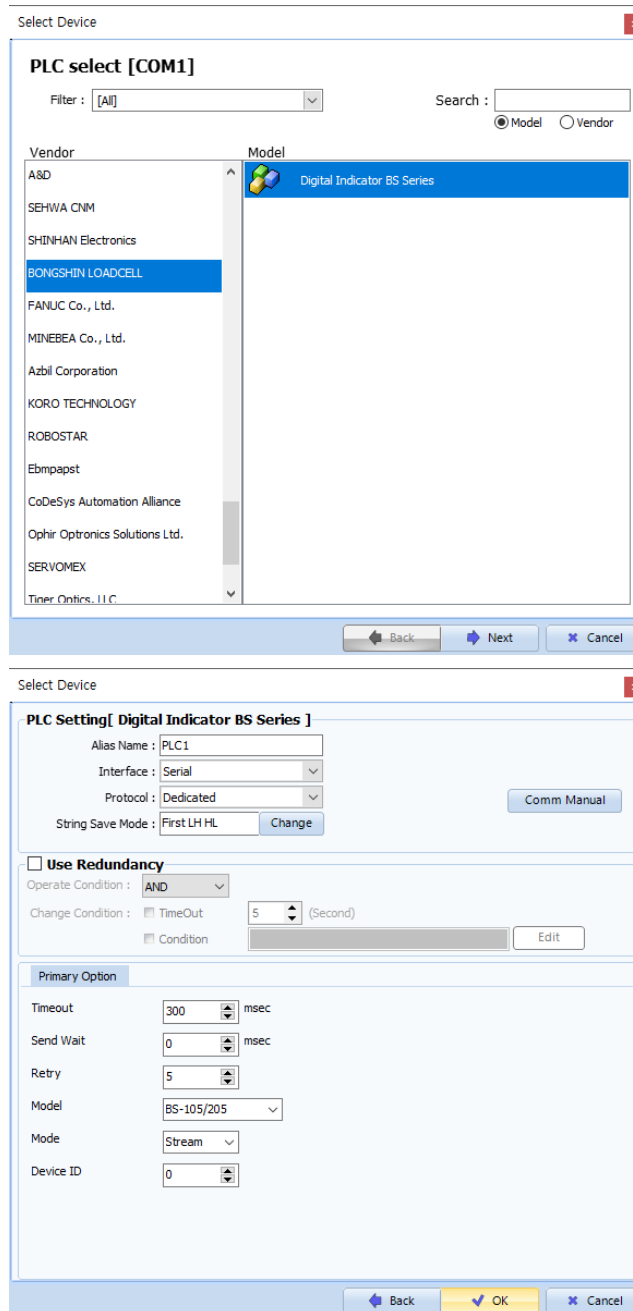
- 1 : N (RS-422/485)



※ In Stream mode, only 1:1 communication is possible.

## 2. External device selection

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



| Settings                    |           | Contents   |       |           |          |                             |        |
|-----------------------------|-----------|--|-------|-----------|----------|-----------------------------|--------|
| TOP                         | Model     | Check the display and process of TOP to select the touch model.  |       |           |          |                             |        |
| External device             | Vendor    | Select the vendor of the external device to be connected to TOP.<br>Select <b>BONGSHIN LOADCELL</b> .  |       |           |          |                             |        |
|                             | PLC       | Select an external device to connect to TOP. <table border="1" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th>Model</th> <th>Interface</th> <th>Protocol</th> </tr> </thead> <tbody> <tr> <td>Digital Indicator BS Series</td> <td>Serial</td> <td>Dedicated</td> </tr> </tbody> </table> <p>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.</p> | Model | Interface | Protocol | Digital Indicator BS Series | Serial |
| Model                       | Interface | Protocol   |       |           |          |                             |        |
| Digital Indicator BS Series | Serial    | Dedicated  |       |           |          |                             |        |

### 3. TOP communication setting

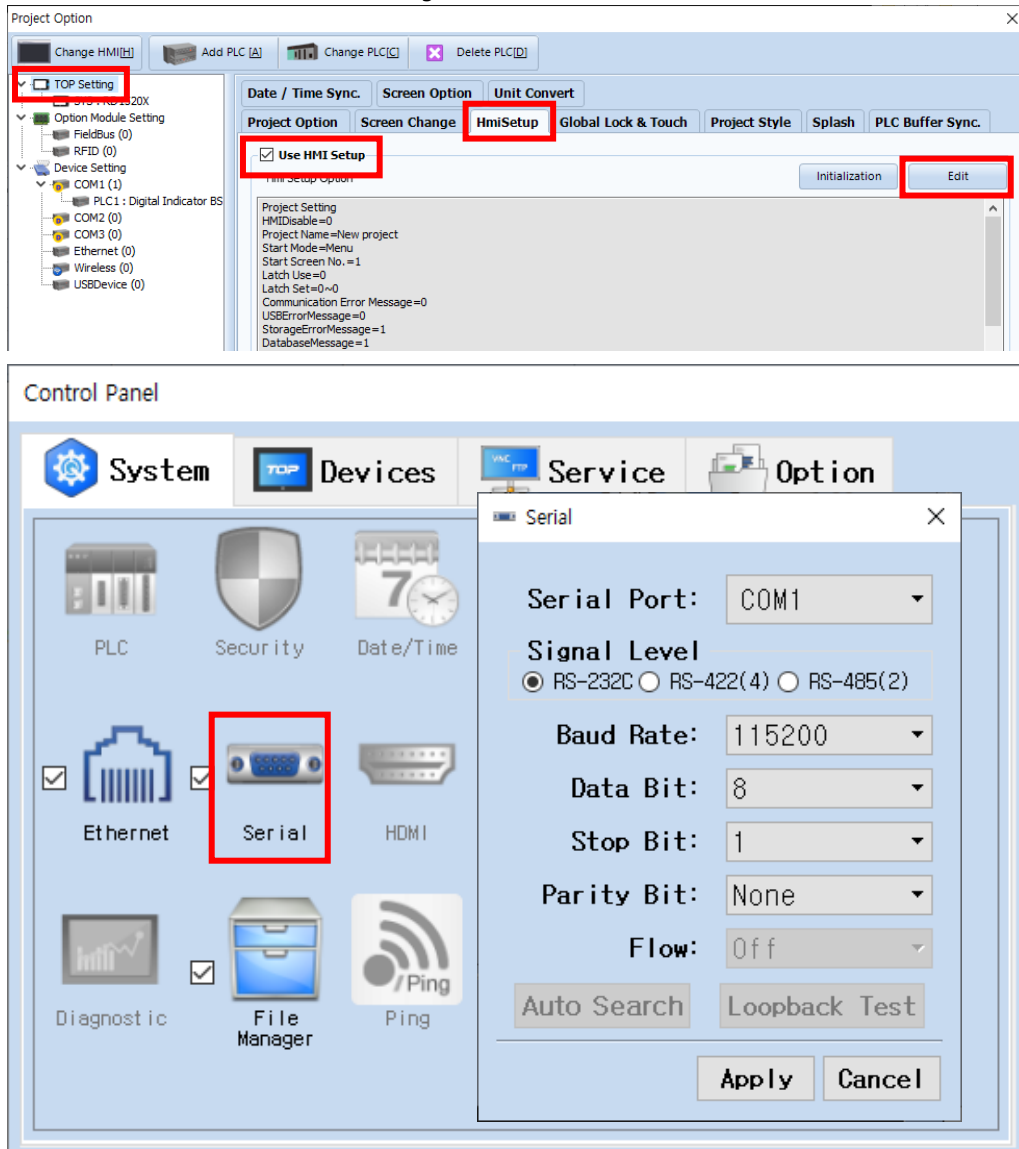
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

#### 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 (port) | RS-232C / RS-422 / RS-485 | RS-232C / RS-422 / RS-485 |         |
| Baud Rate           | 115200                    |                           |         |
| Data Bit            | 8                         |                           |         |
| Stop Bit            | 1                         |                           |         |
| Parity Bit          | None.                     |                           |         |

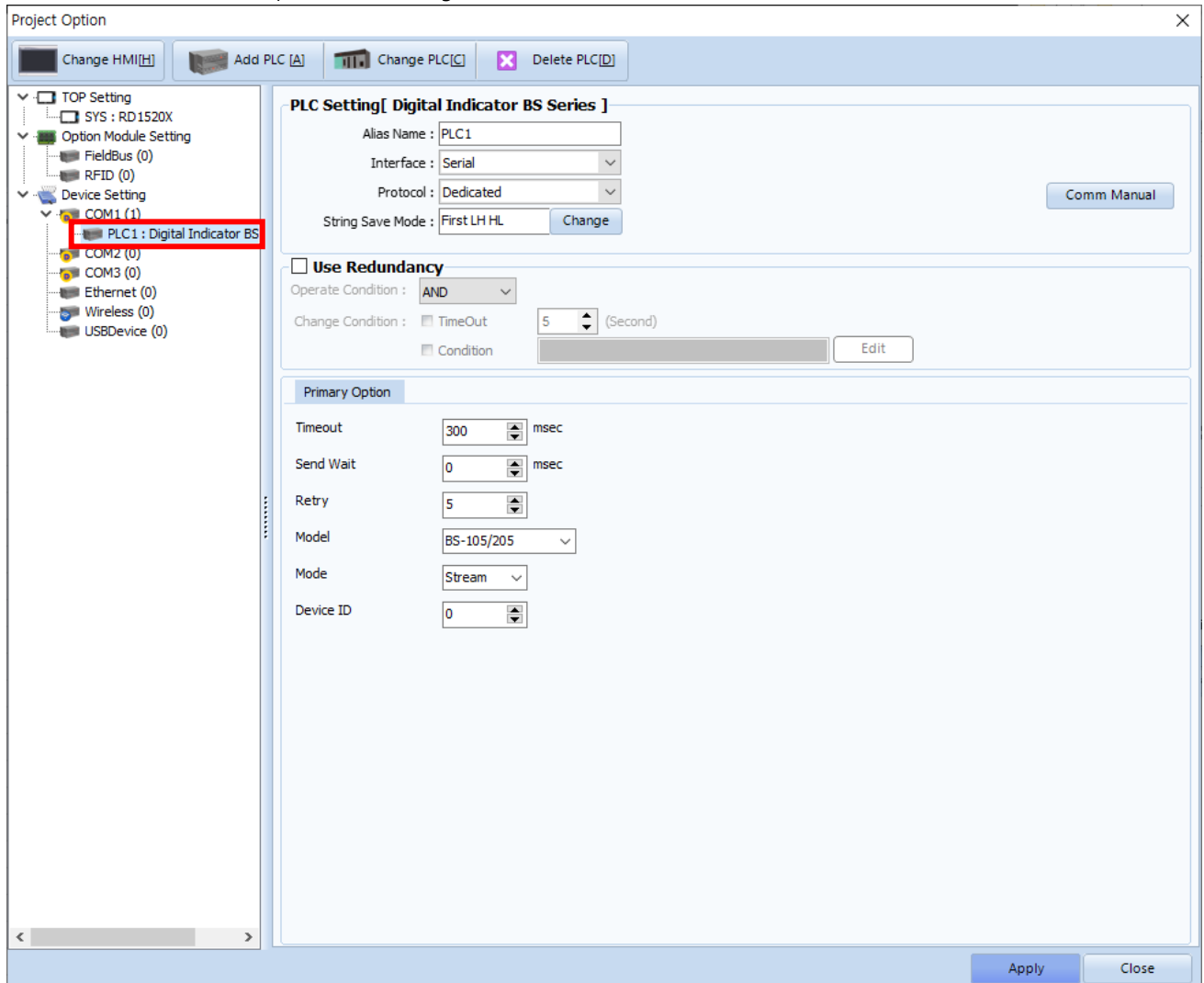
\* The above settings are examples recommended by the company.

| Items        | Description   |
|--------------|---|
| Signal Level | Select the serial communication method between the TOP and an external device.                  |
| 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] → [Property] → [PLC Settings > COM > PLC1: Digital Indicator BS Series]

Set the communication options in TOP Design Studio.



| Items         | Settings   | Remarks  |
|---------------|--|--|
| Interface     | Select "Serial".   | <a href="#">Refer to "2. External device selection".</a> |
| 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 |  |
| Retry         | Set the number of retries in case of communication failure.  |  |
| Model         | Select the model of the external device.   |  |
| Mode          | Select the communication method of the external device.  | *Note 1)   |
| Device ID     | Enter the equipment number of the external device.   |  |

\*Note 1) Stream: Select when the indicator data output setting is "Always send".

Command: Select when the indicator data output setting is "Transfer when data is requested".

### 3.2. Communication setting in TOP

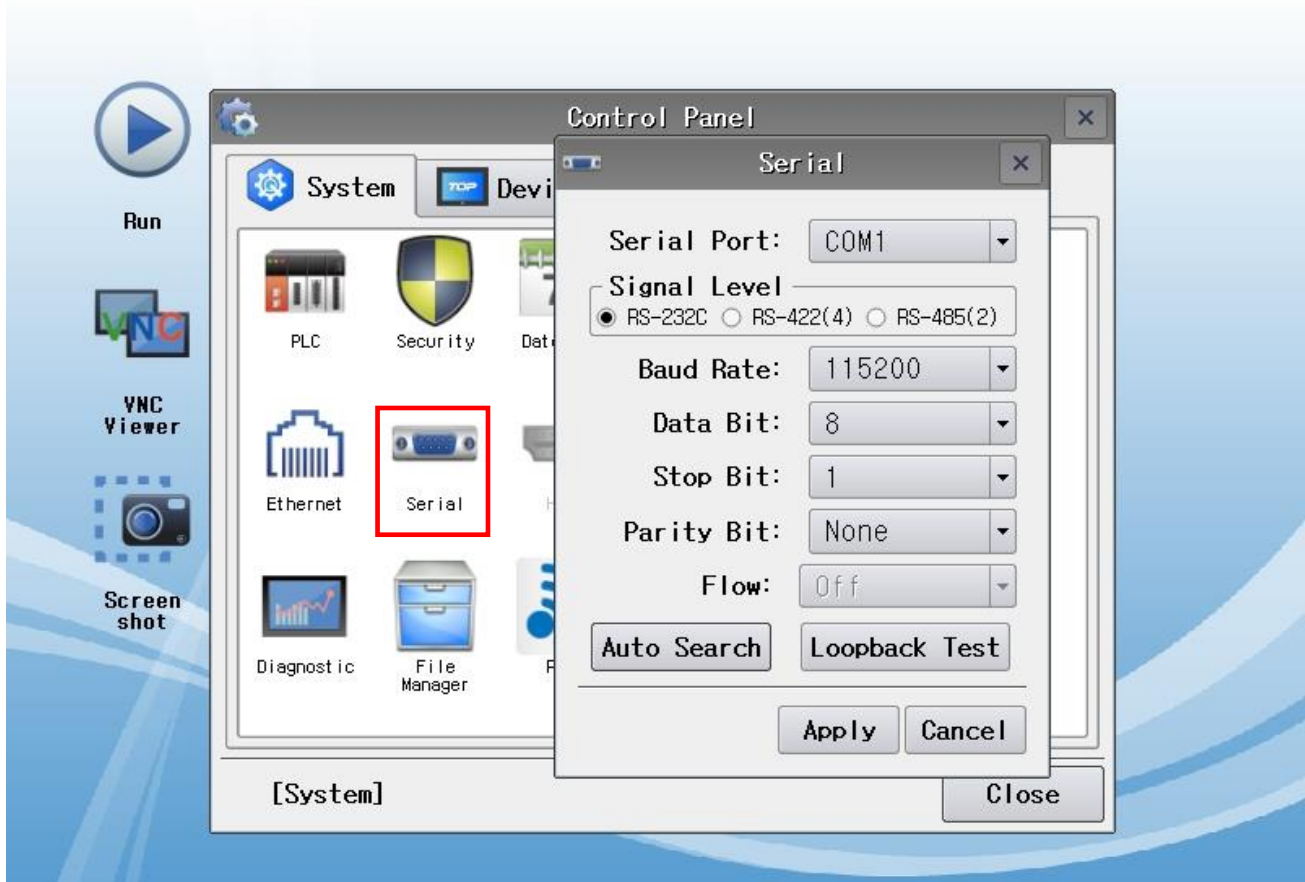
\* This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.

- 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]



TOPRX - TOPRX0800S

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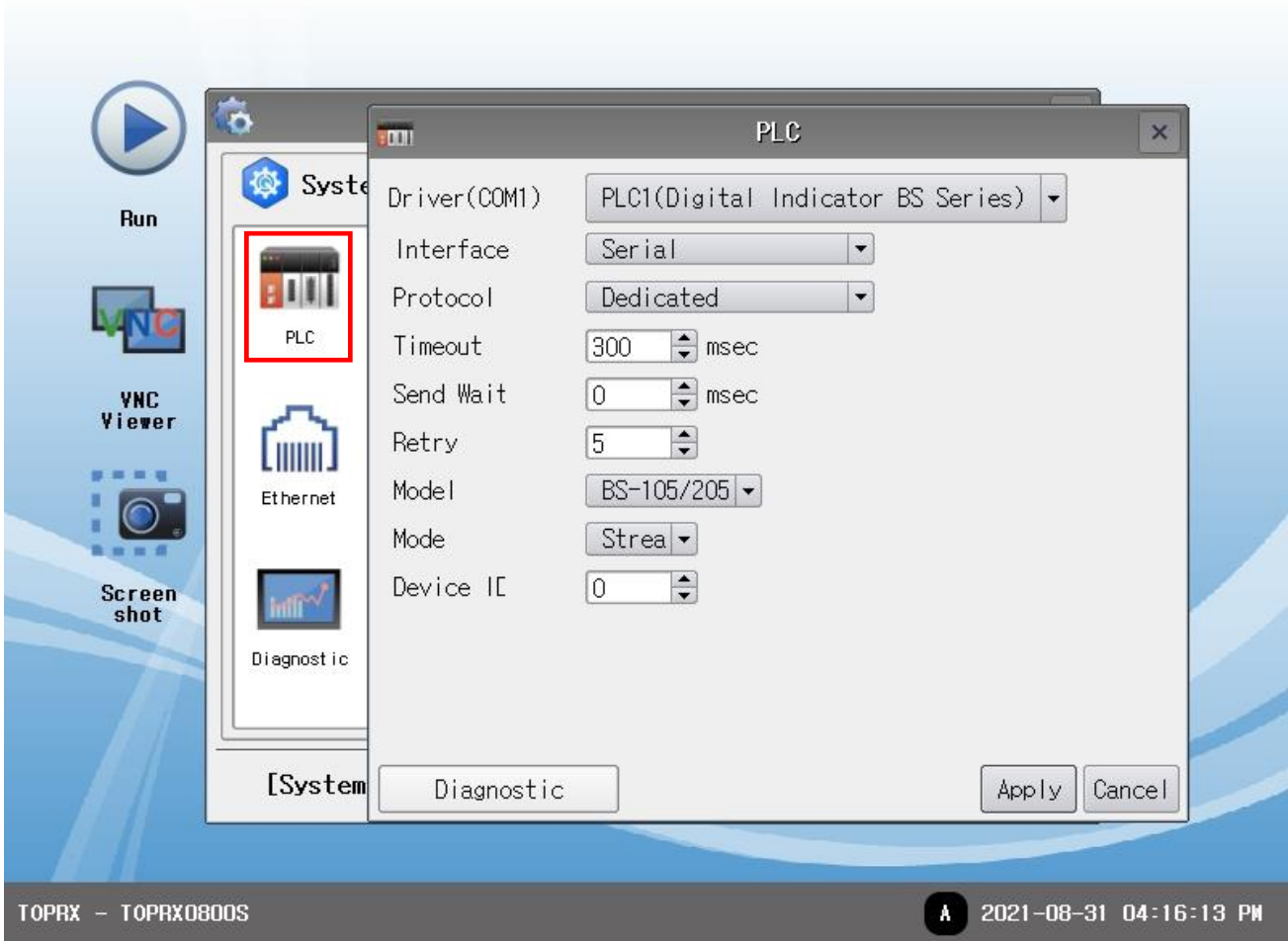
| Items               | TOP                       | External device           | Remarks |
|---------------------|---------------------------|---------------------------|---------|
| Signal Level (port) | RS-232C / RS-422 / RS-485 | RS-232C / RS-422 / RS-485 |         |
| Baud Rate           | 115200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

\* The above settings are 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

■ [Control Panel] → [PLC]



| Items         | Settings   | Remarks  |
|---------------|--|--|
| Interface     | Select "Serial".   | <a href="#">Refer to "2. External device selection".</a> |
| 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 |  |
| Retry         | Set the number of retries in case of communication failure.  |  |
| Model         | Select the model of the external device.   |  |
| Mode          | Select the communication method of the external device.  | *Note 1)   |
| Device ID     | Enter the equipment number of the external device.   |  |

\*Note 1) Stream: Select when the indicator data output setting is "Always send".  
 Command: Select when the indicator data output setting is "Transfer when data is requested".

### 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 if the COM port settings you want to use in [Control Panel > Serial] are the same as those of the external device.
  
- Diagnosis of whether the port communication is normal or not
  - Touch "Communication diagnostics" in [Control Panel > PLC ].

|                       |  |
|-----------------------|--|
| <b>OK</b>             | <b>Communication setting normal</b>  |
| <b>Time Out Error</b> | <b>Communication setting abnormal</b><br>- Check the communication settings of the communication cable, TOP and external device. |

■ 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 | <a href="#">1. System configuration</a>   |    |
|                      | Connection cable name                 | OK                        | NG |   |    |
| TOP                  | Version information                   | OK                        | NG | <a href="#">2. External device selection</a><br><a href="#">3. Communication setting</a>          |    |
|                      | 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 | <a href="#">4. External device setting</a>  |    |
|                      | 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 | <a href="#">6. Supported addresses</a><br>(For details, please refer to the PLC vendor's manual.) |    |



## 4. External device setting

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Set the RS-232C/422/485 interface by referring to the manual of the external device.

The setting method differs depending on the model. Please refer to the manual provided by BONGSHIN LOADCELL Co., Ltd. for setting.

Transmission mode<sup>\*Note 1</sup>: Select 1 of "Always Send" (Stream mode) or "Send when data is requested" (Command mode).

Transmission Speed: 115200 bps

Data Bit: 8

Stop Bit: 1

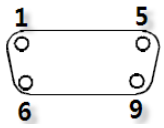
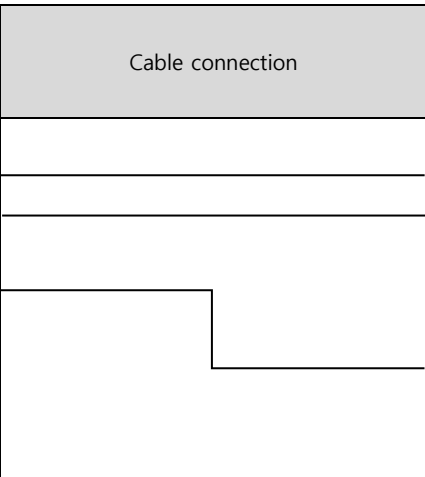
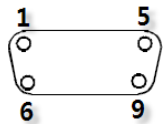
Parity Bit: None

<sup>\*Note 1</sup> If there is no setting item, set TOP to Stream mode.

## 5. Cable table

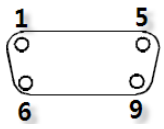
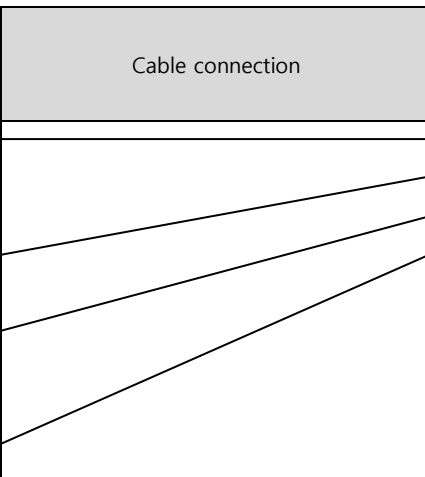
We introduce the cable diagram for normal communication between TOP and the corresponding device. The cable table below may differ depending on the indicator model. For details, refer to the manual provided by BONGSHIN LOADCELL Co., Ltd.

### ■ RS-232C (1:1 connection)

| TOP  |             |            | Cable connection   | External device |  |
|--|-------------|------------|--|-----------------|--|
| Pin arrangement* <b>Note 1</b>   | Signal name | Pin number |  | Signal name     | Pin arrangement* <b>Note 1</b>   |
|  <p>Based on communication cable connector front, D-SUB 9 Pin male (male, convex)</p> | CD          | 1          |  |                 |  <p>Based on communication cable connector front, D-SUB 9 Pin male (male, convex)</p> |
|  | RD          | 2          |  | TXD             |  |
|  | SD          | 3          |  | RXD             |  |
|  | DTR         | 4          |  |                 |  |
|  | SG          | 5          |  | GND             |  |
|  | DSR         | 6          |  |                 |  |
|  | RTS         | 7          |  |                 |  |
|  | CTS         | 8          |  |                 |  |
|  |             | 9          |  |                 |  |

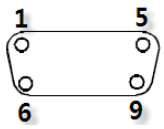
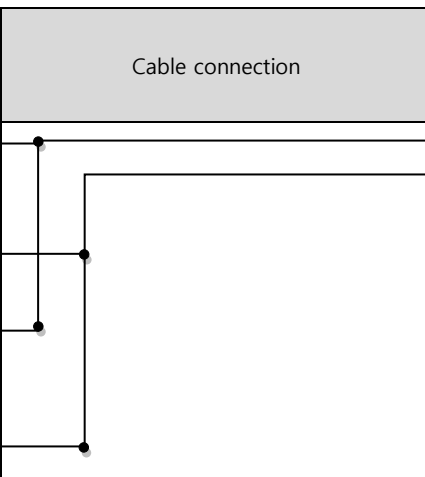
\***Note 1**) The pin arrangement is as seen from the connecting side of the cable connection connector.

### ■ RS-422 (1:1 connection)

| TOP  |             |            | Cable connection  | External device |  |
|--|-------------|------------|---|-----------------|--|
| Pin arrangement* <b>Note 1</b>   | Signal name | Pin number |   | Signal name     |  |
|  <p>Based on communication cable connector front, D-SUB 9 Pin male (male, convex)</p> | RDA(+)      | 1          |  | TXD+            |  |
|  |             | 2          |   | TXD-            |  |
|  |             | 3          |   | RXD+            |  |
|  | RDB(-)      | 4          |   | RXD-            |  |
|  | SG          | 5          |   |                 |  |
|  | SDA(+)      | 6          |   |                 |  |
|  |             | 7          |   |                 |  |
|  |             | 8          |   |                 |  |
|  | SDB(-)      | 9          |   |                 |  |

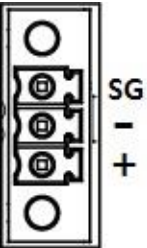

\***Note 1**) The pin arrangement is as seen from the connecting side of the cable connection connector.

### ■ RS-485 (1:1 connection)

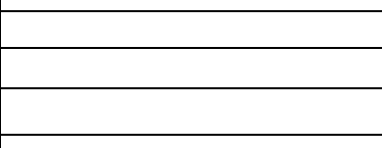
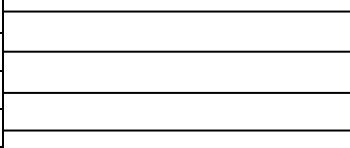
| TOP  |             |            | Cable connection   | External device |  |
|--|-------------|------------|--|-----------------|--|
| Pin arrangement* <b>Note 1</b>   | Signal name | Pin number |  | Signal name     |  |
|  <p>Based on communication cable connector front, D-SUB 9 Pin male (male, convex)</p> | RDA(+)      | 1          |  | TRX+            |  |
|  |             | 2          |  | TRX-            |  |
|  |             | 3          |  |                 |  |
|  | RDB(-)      | 4          |  |                 |  |
|  | SG          | 5          |  |                 |  |
|  | SDA(+)      | 6          |  |                 |  |
|  |             | 7          |  |                 |  |
|  |             | 8          |  |                 |  |
|  | SDB(-)      | 9          |  |                 |  |

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

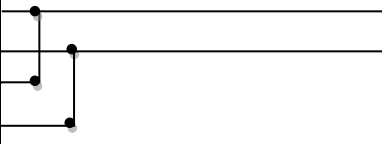
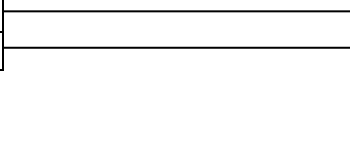
■ RS-485 (1:1 connection)

| TOP   |             | Cable connection   | External device |  |
|---|-------------|--|-----------------|--|
| Pin arrangement   | Signal name |  | Signal name     |  |
|  | +           |  | TRX+            |  |
|   | -           |  | TRX-            |  |
|   | 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(+)      |  | TXD+            |  | TXD+            |
| RDB(-)      |   | TXD-            |  | TXD-            |
| SDA(+)      |   | RXD+            |  | RXD+            |
| SDB(-)      |   | RXD-            |  | RXD-            |

■ 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(+)      |  | TRX+            |  | TRX+            |
| RDB(-)      |   | TRX-            |  | TRX-            |
| SDA(+)      |   |                 |  |                 |
| SDB(-)      |   |                 |  |                 |

## 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.

### ■ BS-7220/7300/7300XL

| Address | Data               | Bit             | Word   | Size   | Read/Write | Remarks  |
|---------|--------------------|-----------------|--------|--------|------------|----------|
| D       | Weight             | D0.00~D0.31     | D0~D0  | 32 bit |            |          |
| STATUS  | Measurement status | STATUS0~STATUS2 | STATUS | 16 bit |            | *Note 1) |

\*Note 1) Measurement status when each bit is ON.

| Bit  | Status   |
|------|----------|
| 0    | Stable   |
| 1    | Unstable |
| 2    | Peak     |
| 3~15 | Reserved |

### ■ BS-205/105

| Address  | Data     | Bit         | Word     | Size   | Read/Write | Remarks  |
|----------|----------|-------------|----------|--------|------------|----------|
| D        | Weight   | D0.00~D0.31 | D0~D0    | 32 bit | Read       |          |
| HOLD_ON  | Hold on  | HOLD_ON     | HOLD_ON  | -      | Write      | *Note 1) |
| HOLD_OFF | Hold off | HOLD_FF     | HOLD_OFF | -      | Write      | *Note 2) |

\*Note 1) Address for sending commands to perform special functions.

\*Note 2) Available only in Command mode.

### ■ BS-5200/5205

| Address | Data               | Bit               | Word   | Size      | Read/Write | Remarks  |
|---------|--------------------|-------------------|--------|-----------|------------|----------|
| D       | Weight             | D0.00 ~ D0.31     | D0~D0  | 32 bit    | Read       |          |
| STATUS  | Measurement status | STATUS0 ~ STATUS2 | STATUS | 16 bit    | Read       | *Note 1) |
| GS/NT   | Measurement status | GS/NT0 ~ GS/NT1   | GS/NT  | 16 bit    | Read       | *Note 2) |
| UNIT    | Unit               | -                 | UNIT   | 2 letters | Read       | *Note 3) |

\*Note 1) Measurement status when each bit is ON.

| Bit  | Status    |
|------|-----------|
| 0    | Stable    |
| 1    | Unstable  |
| 2    | Over load |
| 3~15 | Reserved  |

\*Note 2) Measurement status when each bit is ON.

| Bit  | Status       |
|------|--------------|
| 0    | Gross weight |
| 1    | Net weight   |
| 2~15 | Reserved     |

\*Note 3) String data

■ BS-3520

| Address  | Data             | Bit               | Word     | Size   | Read/Write | Remarks  |
|----------|------------------|-------------------|----------|--------|------------|----------|
| D        | Weight           | D0.00 ~ D0.31     | D0~D0    | 32 bit | Read       |          |
| STATUS   | Judgment         | STATUS0 ~ STATUS2 | STATUS   | 16 bit | Read       | *Note 1) |
| LO       | Low Limit Value  | -                 | LO       | 32 bit | Read/Write | *Note 2) |
| HI       | High Limit Value | -                 | HI       | 32 bit | Read/Write |          |
| RY1      | RY1              | -                 | RY1      | 32 bit | Read/Write |          |
| RY2      | RY2              | -                 | RY2      | 32 bit | Read/Write |          |
| RY3      | RY3              | -                 | RY3      | 32 bit | Read/Write |          |
| ZERO     | Zero action      | ZERO              | ZERO     | -      | Write      | *Note 3) |
| HOLD_ON  | Hold on          | HOLD_ON           | HOLD_ON  | -      | Write      | *Note 4) |
| HOLD_OFF | Hold off         | HOLD_OFF          | HOLD_OFF | -      | Write      |          |

\*Note 1) Judgment when each bit is ON.

| Bit  | Status  |
|------|---|
| 0    | L: RY1(LO) Relay action                                 |
| 1    | O: RY2(OK) Relay action                                 |
| 2    | H: RY3(HI) Relay action                                 |
| 3    | A: RY1(LO), RY2(OK) Relay action                        |
| 4    | B: RY2(OK), RY3(HI) Relay action                        |
| 5    | C: RY1(LO), RY3(HI) Relay action                        |
| 6    | F: RY1(LO), RY2(OK), RY3(HI) Relay action               |
| 7    | N: RY1(LO), RY2(OK), RY3(HI) Relay OFF or No relay mode |
| 8~15 | Reserved  |

\*Note 2) Float-type data

\*Note 3) Address for sending commands to perform special functions.

\*Note 4) Available only in Command mode.

■ BS-270/32

| Address | Data               | Bit               | Word   | Size      | Read/Write | Remarks  |
|---------|--------------------|-------------------|--------|-----------|------------|----------|
| D       | Weight             | D0.00 ~ D0.31     | D0~D0  | 32 bit    | Read       |          |
| STATUS  | Measurement status | STATUS0 ~ STATUS2 | STATUS | 16 bit    | Read       | *Note 1) |
| GS/NT   | Measurement status | GS/NT0 ~ GS/NT1   | GS/NT  | 16 bit    | Read       | *Note 2) |
| UNIT    | Unit               | -                 | UNIT   | 2 letters | Read       | *Note 3) |

\*Note 1) Measurement status when each bit is ON.

| Bit  | Status    |
|------|-----------|
| 0    | Stable    |
| 1    | Unstable  |
| 2    | Over load |
| 3~15 | Reserved  |

\*Note 2) Measurement status when each bit is ON.

| Bit  | Status       |
|------|--------------|
| 0    | Gross weight |
| 1    | Net weight   |
| 2~15 | Reserved     |

\*Note 3) String data.

※ Method to send commands to perform special functions

Addresses for sending special function performance commands are write-only and can be used by registering the object's action to turn on or off bits of that address, or to enter any value.

Ex) Send a hold setting command by pressing a square object.

1. After registering the square object, set "Condition" in "Effects and Actions" to [Event > Touch Down].
2. Set the Action to [Bit > HOLD\_ON Address Input > ON].  
(Set the maximum number of runs to 1, set the cycle, and set the delay to zero.)
3. Send the hold setting command to the indicator by pressing the square object in TOP.

