INSTRUCTION MANUAL

COMMUNICATION CONVERTER FOR PROFIBUS **IFP-100**

No.IFP11E3 2012.01

Preface

Thank you for purchasing our IFP-100, Communication Converter for PROFIBUS. This manual contains instructions for the mounting, functions, operations and notes for operating the IFP-100. To ensure safe and correct use, thoroughly read and understand this manual before using this instrument. To prevent accidents arising from the misuse of this unit, please ensure the operator receives this manual.

Notes

- This instrument should be used in accordance with the specifications described in the manual. If it is not used according to the specifications, it may malfunction or cause a fire.
- Be sure to follow the warnings, cautions and notices. If they are not observed, serious injury or malfunction may occur.
- Specifications and the contents of this instruction manual are subject to change without notice.
- Care has been taken to ensure that the contents of this instruction manual are correct, but if there are any doubts, mistakes or questions, please inform our sales department.
- This instrument is designed to be installed on a DIN rail within a control panel. If it is not, measures must be taken to ensure that power terminals or other high voltage sections cannot be touched.
- Any unauthorized transfer or copying of this document, in part or in whole, is prohibited.
- Shinko Technos CO., LTD. is not liable for any damage or secondary damage(s) incurred as a result of using this product, including any indirect damages.

Safety Precautions (Be sure to read these precautions before using our products.)

The safety precautions are classified into two categories: “Warning” and “Caution”.
Depending on the circumstances, procedures indicated by ⚠ Caution may cause serious results, so be sure to follow the directions for correct usage.

⚠ Warning Procedures which may lead to dangerous conditions and cause death or serious injury, if not carried out properly.

⚠ Caution Procedures which may lead to dangerous conditions and cause superficial to medium injury or physical damage or may degrade or damage the product, if not carried out properly.

⚠ Warning

- To prevent an electric shock or fire, only Shinko or other qualified service personnel may handle the inner assembly.
- To prevent an electric shock, fire or damage to the instrument, parts replacement may only be undertaken by Shinko or other qualified service personnel.

⚠ Safety Precautions

- To ensure safe and correct use, thoroughly read and understand this manual before using this instrument.
- This instrument is intended to be used for industrial machinery, machine tools and measuring equipment. Verify correct usage after purpose-of-use consultation with our agency or main office. (Never use this instrument for medical purposes with which human lives are involved.)
- External protection devices such as protection equipment against excessive temperature rise, etc. must be installed, as malfunction of this product could result in serious damage to the system or injury to personnel. Also proper periodic maintenance is required.
- This instrument must be used under the conditions and environment described in this manual. Shinko Technos Co., Ltd. does not accept liability for any injury, loss of life or damage occurring due to the instrument being used under conditions not otherwise stated in this manual.

Caution with respect to Export Trade Control Ordinance

To avoid this instrument from being used as a component in, or as being utilized in the manufacture of weapons of mass destruction (i.e. military applications, military equipment, etc.), please investigate the end users and the final use of this instrument.

In the case of resale, ensure that this instrument is not illegally exported.

1. Installation Precautions

⚠ Caution

This unit is intended to be used under the following environmental conditions (IEC61010-1):
Overvoltage category Ⅱ, Pollution degree 2
Ensure the mounting location corresponds to the following conditions:

- A minimum of dust, and an absence of corrosive gases
- No flammable, explosive gases
- No mechanical vibrations or shocks
- No exposure to direct sunlight, an ambient temperature of 0 to 50℃ (32 to 122℉) that does not change rapidly, and no icing
- An ambient non-condensing humidity of 35 to 85%RH
- No large capacity electromagnetic switches or cables through which large current flows
- No water, oil or chemicals or where the vapors of these substances can come into direct contact with the unit
- When this unit is installed inside a control panel, the ambient temperature of the unit - not the ambient temperature of the control panel - must be kept to under 50℃. Otherwise the life of electronic parts (especially electrolytic capacitors) of the unit will be shortened.

Note: Avoid setting this unit directly on or near flammable material even though the case of this unit is made of flame-resistant resin.

2. Wiring Precautions

⚠ Caution

- Do not leave wire remnants in the unit as they may cause a fire or a malfunction.
- Insert the connecting cable into the designated connector securely to prevent malfunction.
- Connect the wire for the AC power source to its designated terminals as described in this instruction manual. The IFP-100 will be damaged if the AC power source wire is connected to incorrect terminals.
- When wiring terminals of the IFP-100 at the terminal block, use correct ferrules with an insulation sleeve fitting for the terminal screw.
- Tighten the terminal screw using the specified torque. If excessive force is applied to the screw when tightening, the screw or case may be damaged.
- For a 24V AC/DC power source, do not confuse polarity when using direct current (DC).
- This unit does not have a built-in power switch, circuit breaker or fuse. Therefore, it is necessary to install them near the instrument.
  (Recommended fuse: Time-lag fuse, rated voltage 250V AC, rated current 2A)

3. Operation and Maintenance Precautions

⚠ Warning

- Do not touch live terminals. This may cause an electric shock or problems in operation.
- Turn the power supply to the instrument OFF before retightening the terminal or cleaning. Working on or touching the terminal with the power switched ON may result in severe injury or death due to Electric Shock.
- Use a soft, dry cloth when cleaning the unit.
  (Alcohol based substances may tarnish or deface the unit.)
- As the display section is vulnerable, do not strike or scratch it with a hard object or put pressure on it.

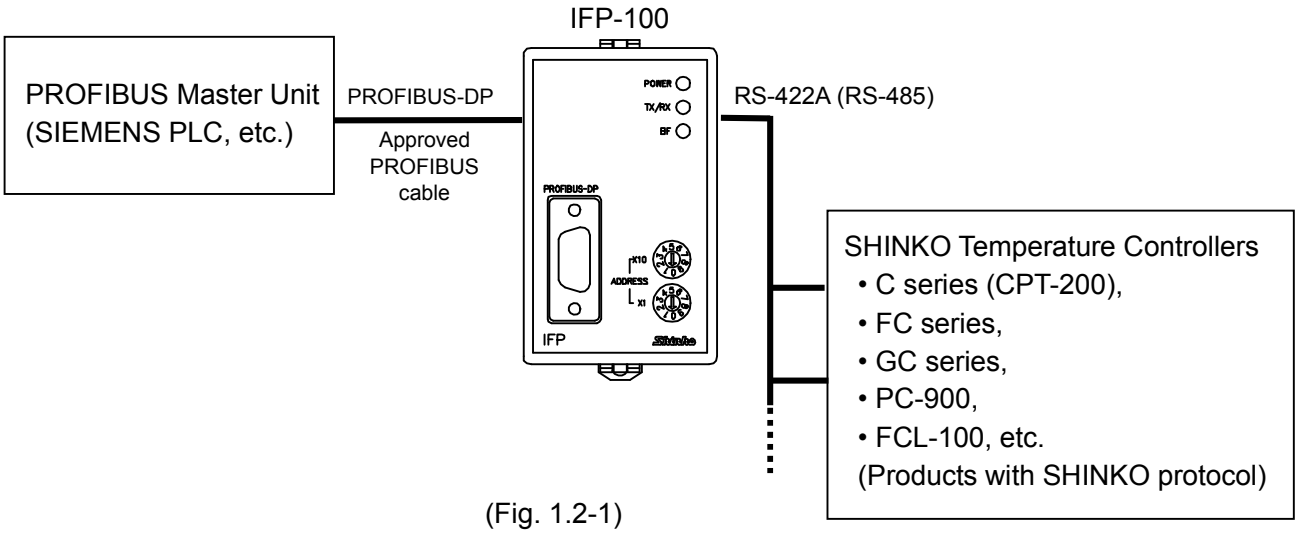
1. Overview

1.1 Overview of the IFP-100

IFP-100 is a communication converter, which is connected to the PROFIBUS master unit (SIEMENS PLC, etc.) as a PROFIBUS-DP slave unit to exchange data.

A maximum of 31 units of Shinko temperature controllers (for C series, 16 units of CPT-200) with SHINKO protocol can be connected to the IFP-100.

1.2 System Configuration



(Fig. 1.2-1)

• About GSD File

When using the IFP-100 as a PROFIBUS-DP slave, register the parameters to the master unit by using the GSD file in which the functions, data format, etc. are defined.

Please download the GSD file from the Shinko website.

http://www.shinko-technos.co.jp/e/ ⟶ Download ⟶ To download Software

2. Model

2.1 Model

IFP-100: Communication converter for PROFIBUS.

2.2 How to Read the Model Label

⚠ Warning

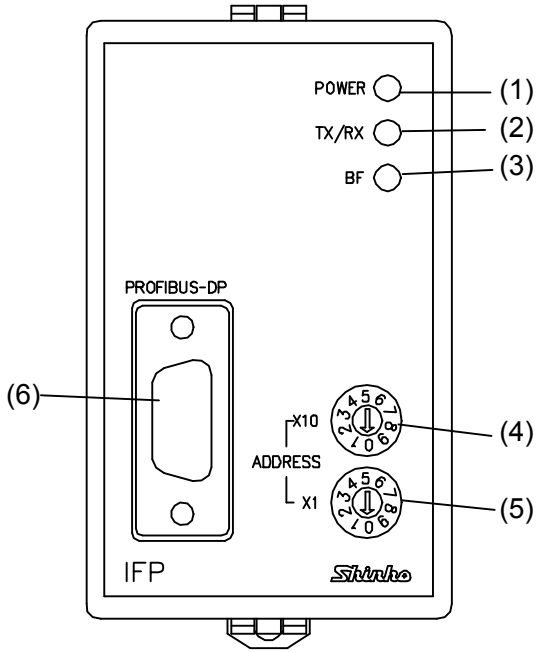
Turn the power supply to the instrument OFF before checking the model label.
Working on or touching the terminal with the power switched on may result in severe injury or death due to Electric Shock.

Model labels are attached to the case and inner assembly.

[Example]

IFP-100	Model: IFP-100
No. x x x x x x	Serial number (indicated only on the inner assembly.)

3. Name and Functions of the Sections



(Fig. 3-1)

(1) POWER indicator
While the power is turned on, the green indicator lights up.

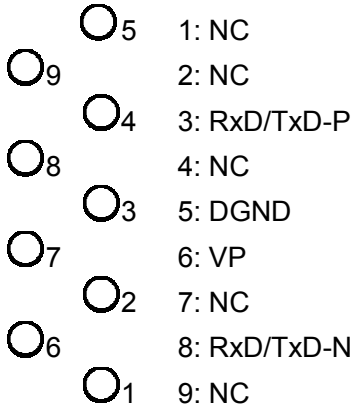
(2) TX/RX indicator
During communication between the IFP-100 and controllers, the yellow indicator flashes.

(3) BF indicator
If PROFIBUS errors occur, the red indicator lights up.

(4) Rotary switch for PROFIBUS address setting (x10)
Sets IFP-100's own address (the 2nd digit).

(5) Rotary switch for PROFIBUS address setting (x1)
Sets IFP-100's own address (the 1st digit).

(6) PROFIBUS-DP
D-sub 9-pin connector
Refer to (Fig. 3-2).



(Fig. 3-2)

4. Mounting

4.1 Site Selection

⚠ Caution

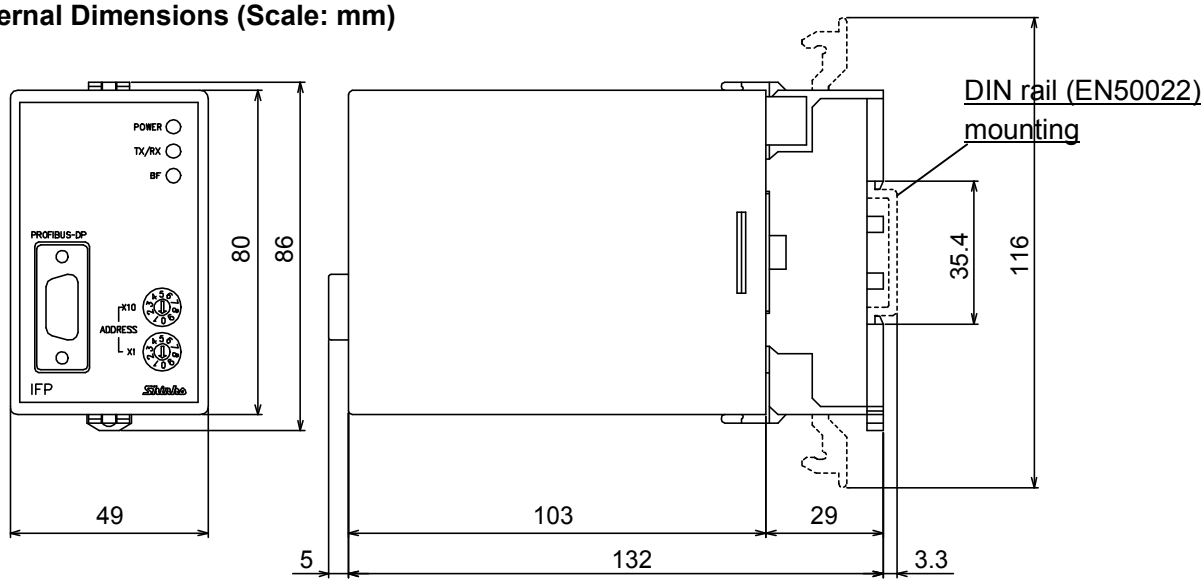
Use within the following temperature and humidity ranges.
Temperature: 0 to 50℃(32 to 122℉) (No icing), Humidity: 35 to 85%RH (Non-condensing)
If IFP-100 is mounted within a control panel, the ambient temperature of the unit - not the ambient temperature of the control panel - must be kept to under 50℃, otherwise the life of electronic parts (especially electrolytic capacitors) of the unit will be shortened.

This instrument is intended to be used under the following environmental conditions (IEC61010-1): Overvoltage category Ⅱ, Pollution degree 2

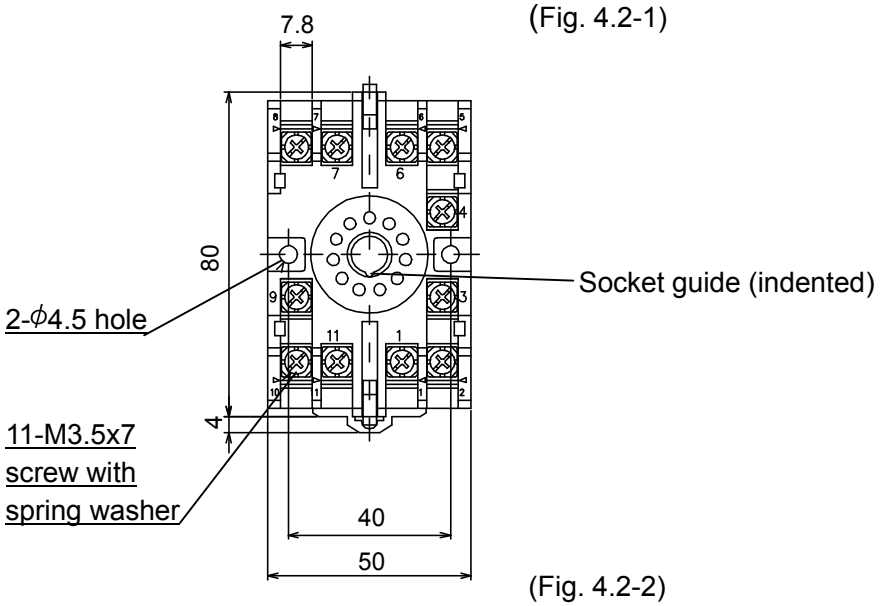
Ensure the mounting location corresponds to the following conditions:

- A minimum of dust, and an absence of corrosive gases
- No flammable, explosive gases
- No mechanical vibrations or shocks
- No exposure to direct sunlight, an ambient temperature of 0 to 50℃ (32 to 122℉) that does not change rapidly
- An ambient non-condensing humidity of 35 to 85%RH
- No large capacity electromagnetic switches or cables through which large current is flowing
- No water, oil or chemicals or where the vapors of these substances can come into direct contact with the unit

4.2 External Dimensions (Scale: mm)



(Fig. 4.2-1)



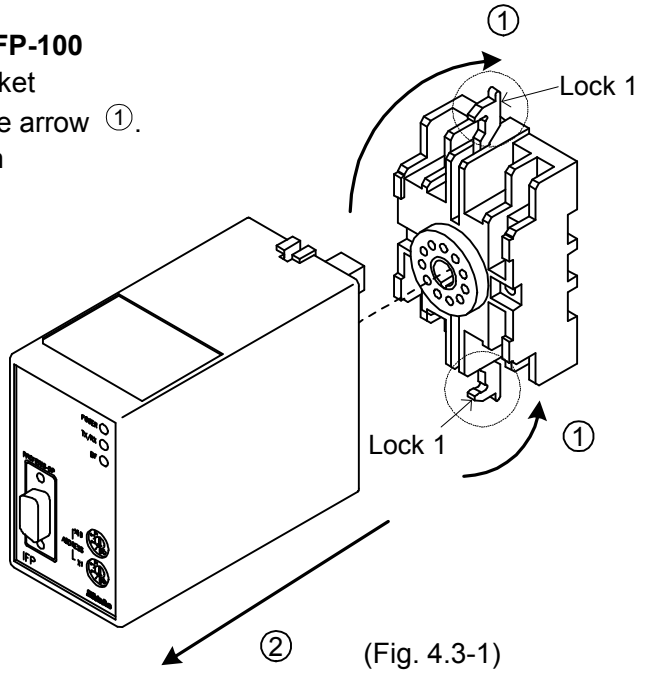
(Fig. 4.2-2)

4.3 Mounting the Round Socket

When shipped, the IFP-100 is attached to the Round socket.
Remove the Round socket.

(1) How to remove the Round socket from the IFP-100

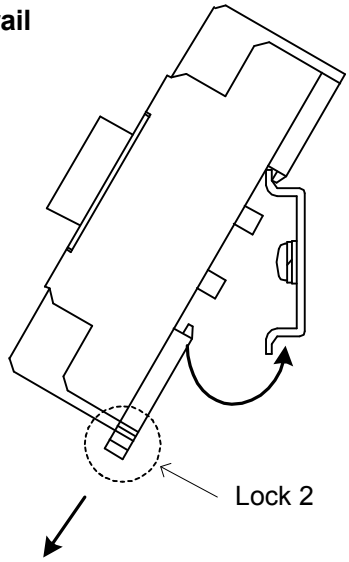
Unlock Lock 1 at the top and bottom of the socket by moving them in the direction indicated by the arrow ①.
If unlocked, pull out the IFP-100 in the direction indicated by the arrow ②.
See (Fig. 4.3-1).



(Fig. 4.3-1)

(2) How to mount the Round socket to the DIN rail

Fit the socket upper side into the DIN rail first, then fit the lower side into the DIN rail.
See (Fig. 4.3-2).
The Round socket will be completely locked to the DIN rail with a clicking sound.



(Fig. 4.3-2)

How to remove the Round socket from the DIN rail:

By using a flat bladed screwdriver, pull down Lock 2 at the bottom of the socket, and pull the socket up.

When mounting the Round socket to the control panel, make sure the Socket guide (indented) aligned downward.

Drill 2 holes of ϕ 4.5mm at 40mm pitch on the control panel, and mount the Round socket by tightening with screws and nuts (M4 x 20).

5. Wiring

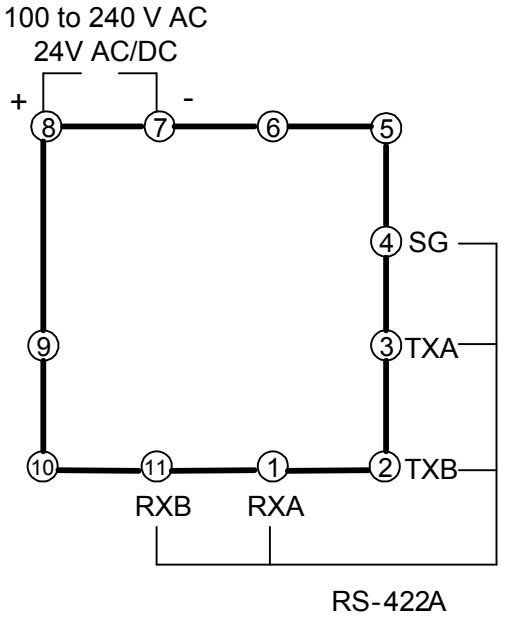
⚠ Warning

Turn the power supply to the instrument OFF before wiring or checking.
Working on or touching the terminal with the power switched on may result in severe injury or death due to Electric Shock.

⚠ Caution

- Do not leave wire remnants in the unit as they may cause a fire or a malfunction.
- Insert the connecting cable into the designated connector securely to prevent malfunction.
- Connect the wire for the AC power source to its designated terminals as described in this instruction manual. The IFP-100 will be damaged if the AC power source wire is connected to incorrect terminals.
- When wiring terminals of the IFP-100 at the terminal block, use correct ferrules with an insulation sleeve fitting for the terminal screw.
- Tighten the terminal screw using the specified torque. If excessive force is applied to the screw when tightening, the screw or case may be damaged.
- For a 24V AC/DC power source, do not confuse polarity when using direct current (DC).
- This unit does not have a built-in power switch, circuit breaker or fuse. Therefore, it is necessary to install them near the instrument.
  (Recommended fuse: Time-lag fuse, rated voltage 250V AC, rated current 2A).

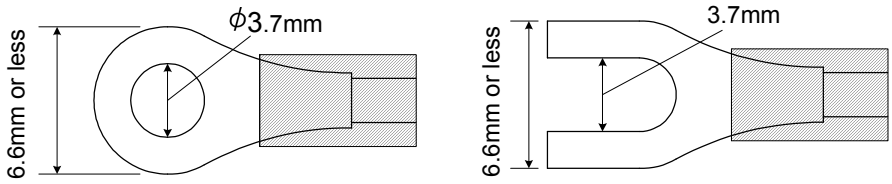
5.1 Terminal Arrangement



(Fig. 5.1-1)

• **Solderless Terminal**

Use a solderless terminal with an insulation sleeve in which the M3.5 screw fits as shown below. The tightening torque is 0.7N•m to 1.0N•m.



(Fig. 5.1-2)

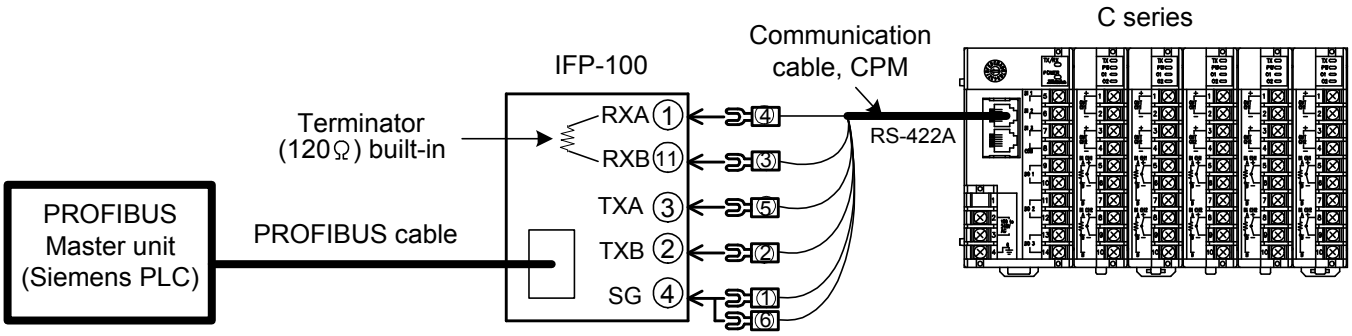
Solderless terminal	Manufacturer	Model	Tightening Torque
Y type	Nichifu Terminal Industries CO., LTD.	1.25Y-3.5	0.7N•m Max. 1.0N•m
	Japan Solderless Terminal MFG CO., LTD.	V1.25-YS3A	
Ring type	Nichifu Terminal Industries CO., LTD.	1.25-3.5	
	Japan Solderless Terminal MFG CO., LTD.	V1.25-M3	

5.2 Wiring Examples

⚠ Notice

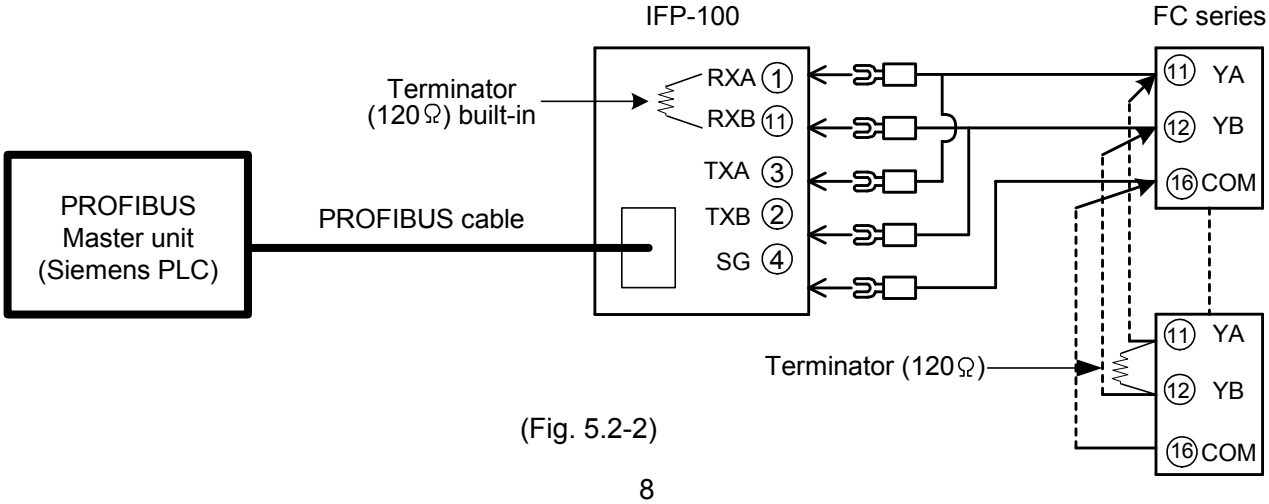
- Be sure to use a qualified PROFIBUS cable to connect PROFIBUS master unit and IFP-100.
- Use the communication cable CPM to connect IFP-100 and C series.
- Connect terminators to both ends of the unit.
- Use a thick wire (1.25 to 2.0mm^2) as a ground wire.

[Connecting PROFIBUS master unit, IFP-100 and 1 block of C series]



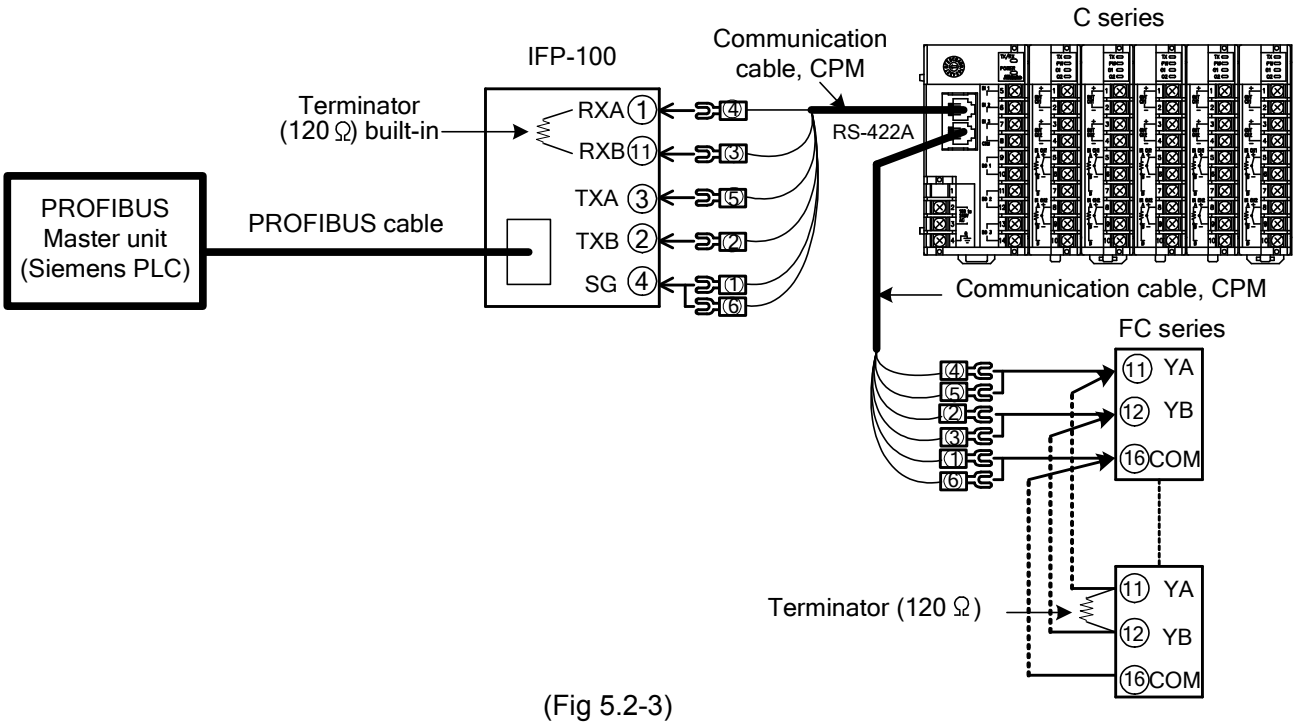
(Fig. 5.2-1)

[Connecting PROFIBUS master unit, IFP-100 and multiple FC series]



(Fig. 5.2-2)

[Connecting PROFIBUS master unit, IFP-100, 1 block of C series and multiple FC series]



(Fig 5.2-3)

Use a qualified PROFIBUS cable to connect IFP-100 and PROFIBUS master unit.

[Connecting Communication cable CPM and IFP-100]

(Table 5.2-1)

Communication cable CPM	IFP-100
Terminal 4 →	Terminal 1 (RXA)
Terminal 3 →	Terminal 11 (RXB)
Terminal 5 →	Terminal 3 (TXA)
Terminal 2 →	Terminal 2 (TXB)
Terminals 1, 6 →	Terminal 4 (SG)

[Connecting Communication cable CPM and SHINKO controller]

(Table 5.2-2)

Communication cable CPM	SHINKO controller
Terminals 4, 5 →	(YA) terminal
Terminals 2, 3 →	(YB) terminal
Terminals 1, 6 →	(COM) terminal

Use Communication cable CPP to connect (multi-drop) multiple blocks of C series.

6. Setup

⚠ Warning

Turn the power supply to the instrument OFF before wiring or checking.
Working on or touching the terminal with the power switched on may result in severe injury or death due to Electric Shock.

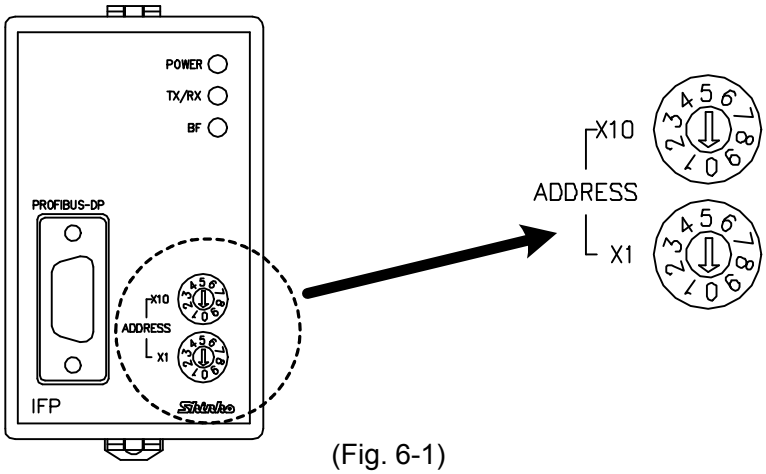
⚠ Notice

Be sure to set a PROFIBUS address of IFP-100 before the power supply to the unit is turned ON.

Set up the Rotary switches.

Using a small flat bladed screwdriver, set a PROFIBUS address of IFP-100.
Setting range: 0 to 99

A maximum of 127 units are connectable for PROFIBUS, however, up to 99 can be set for the IFP-100 address.



(Fig. 6-1)

7. Data Configuration

When using the IFP-100 as a PROFIBUS-DP slave, register the parameters to the master unit by using the GSD file in which the functions, data format, etc. are defined.

7.1 Data Type

Fixed length code: 1 or 20-item of data length can be set.

For the FC series, etc., set 1-data length.
For the C series, set 20-data length.
When the FC series, etc. and C series are used together, set 20-data length.

7.2 Data Structure

Data type: Fixed length code
There are 2 buffers:

- Output buffer: Outputs the data from the PROFIBUS master unit to the IFP-100.
- Input buffer: Inputs the data from the IFP-100 to the PROFIBUS master unit.

When configuring the output buffer and input buffer using the Hardware configuration, configure the output buffer first. If the input buffer is configured first, the PROFIBUS communication cannot be performed, and the BF indicator lights up.

Data structure of Fixed length code (Output buffer, Input buffer) is shown on the next page.

[Output buffer]

Data structure when the amount of data is 1.

1 byte	Information
1 byte	Address
1 byte	Sub address
1 byte	Command type
2 bytes	Data item
2 bytes	Data

Data structure when the amount of data is 20.

1 byte	Information
1 byte	Address
1 byte	Sub address
1 byte	Command type
2 bytes	Data item
2 bytes	Data 1
2 bytes	Data 2
2 bytes	Data 3
2 bytes	Data 4
2 bytes	Data 5
2 bytes	Data 6
2 bytes	Data 7
2 bytes	Data 8
2 bytes	Data 9
2 bytes	Data 10
2 bytes	Data 11
2 bytes	Data 12
2 bytes	Data 13
2 bytes	Data 14
2 bytes	Data 15
2 bytes	Data 16
2 bytes	Data 17
2 bytes	Data 18
2 bytes	Data 19
2 bytes	Data 20

Information:

b7	b6	b5	b4	b3	b2	b1	b0
Command flag	0	Amount of data (01H to 32H)					

Address: Numbers by which the PROFIBUS master discerns each slave.
Instrument number 0 to 94 and Global address 95.
ASCII codes (20H to 7FH) are used by adding 20H to instrument numbers 0 to 95 (00H to 5FH).
95 (7FH) is called Global address, which is used when the same command is sent to all the slaves connected. However, the response is not returned.

Sub address: 20H fixed

Command type: Code to discern Reading command or Setting command.
22H/20H: Reading command
52H/50H: Setting command

Data item: Data classification of the command object.
(Refer to the Communication command of the controller connected to the IFP-100.)

Data: Setting value, binary

[Input buffer]

Data structure when the amount of data is 1.

1 byte	Information
1 byte	Address
1 byte	Sub address
1 byte	Command type
2 bytes	Data item
2 bytes	Data

Data structure when the amount of data is 20.

1 byte	Information
1 byte	Address
1 byte	Sub address
1 byte	Command type
2 bytes	Data item
2 bytes	Data 1
2 bytes	Data 2
2 bytes	Data 3
2 bytes	Data 4
2 bytes	Data 5
2 bytes	Data 6
2 bytes	Data 7
2 bytes	Data 8
2 bytes	Data 9
2 bytes	Data 10
2 bytes	Data 11
2 bytes	Data 12
2 bytes	Data 13
2 bytes	Data 14
2 bytes	Data 15
2 bytes	Data 16
2 bytes	Data 17
2 bytes	Data 18
2 bytes	Data 19
2 bytes	Data 20

Information:

b7	b6	b5	b4	b3	b2	b1	b0
Response flag	0	0	0	Error code			

Address: The origin of the response.
The same code as the received command is used for the response.

Sub address: 20H fixed

Command type: Code to discern Reading command or Setting command.
22H/20H: Reading command
52H/50H: Setting command

Data item: Data classification of the command object.
(Refer to the Communication command of the controller connected to the IFP-100.)

Data: Reading value, binary

Error code: Represents an error type.

Error code	Contents
0H	No error (Acknowledgement)
1H	Non-existent command
2H	Incorrect designation of pattern, step
3H	Setting value outside of the range
4H	Status unable to be set (during AT)
5H	During the setting mode by keypad operation
6H	No response
7H	Amount of data outside of the range
8H	Any other error

7.3 Data Setting Procedures

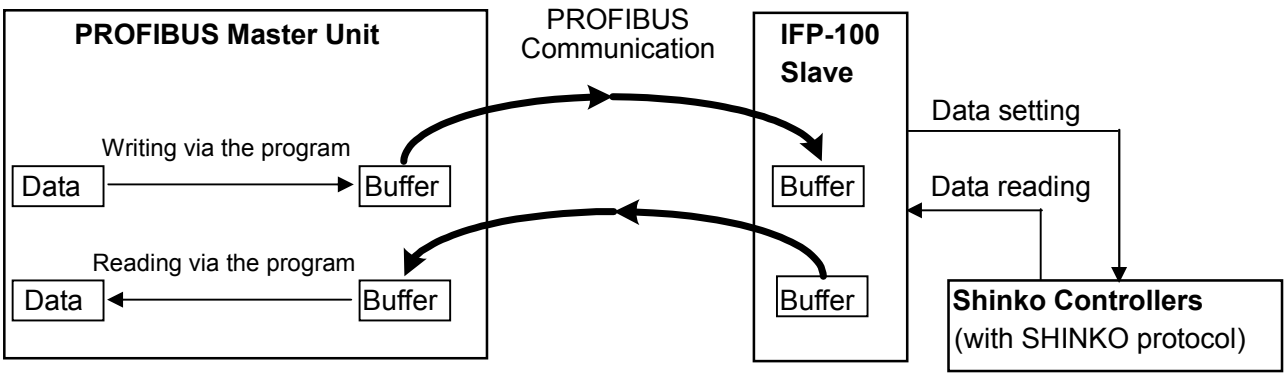
(1) Confirm that Command flag = 0 and Response flag = 0.
(2) Set the address, sub address, command type and data item (Output buffer).
(3) Set the setting value to the data section (Output buffer).
(4) Set the amount of data (Output buffer).
(5) Set the command flag to 1.
(6) Wait until the Response flag becomes 1.
(7) Confirm that the error code is 0, which means normal setting (Input buffer).
(8) Set the command flag to 0.
(9) The procedure is complete after response flag becomes 0.

7.4 Data Reading Procedures

(1) Confirm that Command flag = 0 and Response flag = 0.
(2) Set the address, sub address, command type and data item (Output buffer).
(3) Set the amount of data (Output buffer).
(4) Set the command flag to 1.
(5) Wait until the Response flag becomes 1.
(6) Confirm that the error code is 0, then read data from the data section (Input buffer).
(7) Set the command flag to 0.
(8) The procedure is complete after response flag becomes 0.

7.5 Data Flow

Data flow of setting value and reading value is shown in (Fig. 7.5-1).

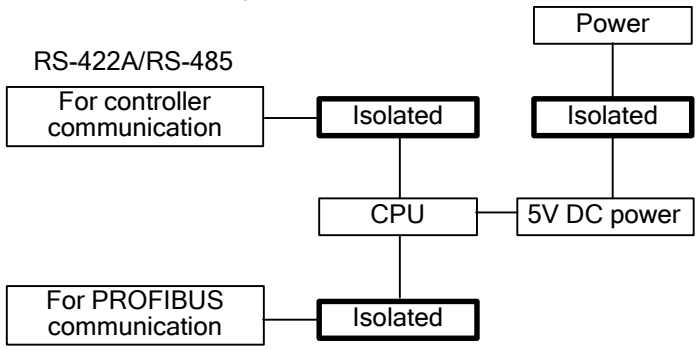


(Fig. 7.5-1)

8. Specifications

Model Communication converter for PROFIBUS
Name IFP-100
Supply voltage 100 to 240V AC, 50/60Hz
24V AC/DC, 50/60Hz
Allowable voltage fluctuation range 100 to 240V AC: 85 to 264V AC
24V AC/DC: 20 to 28V AC/DC
External dimensions 49 x 80 x 132mm (W x H x D) (including Round socket)
Mounting DIN rail mounting
Case Flame-resistant resin, Black
Indicators
While the power is turned on, the green LED (POWER) lights up.
During communication between IFP-100 and controllers, the yellow LED (TX/RX) flashes.
When PROFIBUS is in error, the red LED (BF) lights up.
Setting PROFIBUS address setting by the Rotary switch
Setting range: 0 to 99
Communication functions
Communication between the IFP-100 and PROFIBUS master unit
Communication line: PROFIBUS-DP (RS-485)
Communication speed: 9.6kbps, 19.2kbps, 93.75kbps, 187.5kbps, 500kbps,
1.5Mbps, 3Mbps, 6Mbps, 12Mbps (Automatically selected)
The lowest communication speed of the instrument connected to the same PROFIBUS communication line is automatically selected as the default.
Communication between the IFP-100 and Shinko controllers
Communication line: RS-422A (RS-485)
Communication speed: 19.2kbps fixed
Data format: Stop bit: 1
Data length: 7
Parity: Even
Stop bit: 1

Circuit insulation configuration



(Fig. 8.1-1)

Insulation resistance
10MΩ or more, at 500V DC
Between power terminal and controller's communication terminal
Between power terminal and PROFIBUS communication terminal

Dielectric strength	Between power terminal and terminal No. 4 (SG) ----- 1.5kV AC for 1 minute
Power consumption	Approx. 5VA
Ambient temperature	0 to 50℃ (32 to 122℉)
Weight	Approx. 200g
Accessories	Instruction manual: 1 copy

9. Troubleshooting

If any malfunction occurs, refer to the following items after checking that power is being supplied to the PROFIBUS master unit, IFP-100 and Shinko controllers.

⚠ Warning

Turn the power supply to the instrument OFF before wiring or checking.
Working on or touching the terminal with the power switched on may result in severe injury or death due to Electric Shock.

● **Problem: Communication Failure**

Presumed Cause	Solution
• The communication cable is disconnected or imperfect contact between the cable and terminal.	• Change the cables, or tighten the screw of the terminal securely.
• The PROFIBUS address of IFP-100 is not set.	• Set the address. (See Section “6. Setup”.)
• The wiring of communication cable is not correct.	• Check that wiring is correct. (See Section “5. Wiring”.)
• The terminators are not connected to both ends of unit.	• Connect terminators. (See Section “5. Wiring”.)

• For all other malfunctions, please contact our main office or dealers.

********* Inquiry *********

For any inquiries about this unit, please contact our agency or the vendor where you purchased the unit after checking the following.

[Example]

- Model ---------- IFP-100
- Serial number ---------- No. xxxxxx

In addition to the above, please let us know the details of the malfunction, or discrepancy, and the operating conditions.

SHINKO TECHNOS CO.,LTD.

OVERSEAS DIVISION

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