This manual contains text, diagrams and explanations which will guide the reader in the correct installation and operation of the FX2n-232IF RS232C Interface Block. It should be read and understood before attempting to install or use the unit. Further information can be found in the FX PROGRAMMING MANUAL, FX series hardware manuals.

In doubt about any stage during the installation of the FX2n-232IF RS232C Interface Block always consult a professional electrical engineer who is qualified and trained to the local and national standards.

1. INTRODUCTION

The RS232C interface block FX2n-232IF (hereinafter referred to as “232IF”) is connected to the FX2n/FX3U/FX3UC series PLC to realize full duplex serial data communication with another RS232C PLC. However, the capacity of the 5V DC power supplied from the programmable controller is limited. The current consumption of the 5V DC power in the 232IF is 40 mA. Make sure that the total current consumption of the 5V DC power supply including other special blocks is equivalent to or less than 0.8 A.

2. SPECIFICATIONS

2.1 External Dimensions and Part Names

Dimensions:mm(inches) Weight: Approx. 0.3 kg

<table>
<thead>
<tr>
<th>Accessory/special block No.</th>
<th>label</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN rail clip</td>
<td></td>
</tr>
<tr>
<td>DIN rail groove (35(1.38&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

2.2 Connector Pin Layout

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal name</th>
<th>Meaning</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CD</td>
<td>Carrier detection</td>
<td>This signal indicates only status</td>
</tr>
<tr>
<td>2</td>
<td>RD(TXD)</td>
<td>Receive data</td>
<td>Receive data (RS232C device to 232IF)</td>
</tr>
<tr>
<td>3</td>
<td>SD(TXD)</td>
<td>Send data</td>
<td>Send data (232IF to RS232C device)</td>
</tr>
<tr>
<td>4</td>
<td>ER(DTR)</td>
<td>Data terminal ready</td>
<td>ON when Send/Receive enable is ON</td>
</tr>
<tr>
<td>5</td>
<td>SG</td>
<td>Signal ground</td>
<td>Signal ground</td>
</tr>
<tr>
<td>6</td>
<td>DR(CTS)</td>
<td>Set data ready</td>
<td>This signal indicates only status</td>
</tr>
<tr>
<td>7</td>
<td>RS(RTS)</td>
<td>Request to send</td>
<td>ON when Send Now command is ON</td>
</tr>
<tr>
<td>8</td>
<td>CS(CS)</td>
<td>Clear to send</td>
<td>ON when RS232C device is ready to receive</td>
</tr>
<tr>
<td>9</td>
<td>CR(IRQ)</td>
<td>Calling indication</td>
<td>This signal indicates only status</td>
</tr>
</tbody>
</table>

*1 Up to 7 special function blocks can be connected to the FX2n-32MT-LT (-2) PLC

2.3 System Configuration

To connect this block to the FX2n PLC series PLC, the FX2n-CNIF is required.

2.4 Power Supply Wiring

Handling the crimp-style terminal

3. WIRING AND CONNECTION

3.1 Connection with the programmable controller

The 232IF can be connected to the FX2n/FX3U/FX3UC FX2n programmable controller or connected on the right side of another extension block. A number is assigned to each special unit block counting from the one nearest the main unit in the way of No.0, No.1. . . No.7. Up to 8 FX2n-232IF units can be connected to the FX2n/FX3U/FX3UC series PLC. Up to 4 FX2n-232IF units can be connected to the FX3U/FX3UC series PLC. The capacity of the 5V DC power supplied from the programmable controller is limited. The current consumption of the 5V DC power in the 232IF is 40 mA. Make sure that the total current consumption of the 5V DC power supply including other special blocks is equivalent to or less than that available.

*1 Up to 7 units can be connected to an FX3U-32MT-LT (-2) PLC

3.2 Power Supply Wiring

Handling the crimp-style terminal

3.3 Connection Example

The signal wiring of the RS232C equipment varies depending on the RS232C specifications connected. Check the specifications of the RS232C equipment used, then connect the signals correctly. Representative wiring examples are shown below.

1) Connection with counterpart equipment of terminal specifications when control line is not used

BPM0 communication format: b0 = b1 = 0, with control line.

2) Connection with counterpart equipment of terminal specifications when control line is used

Cross cable used, BPM0 communication format: b0 = b1 = 1, standard RS232C mode

Because the carrier to send (CS) signal pin of the 232IF itself receives the request to send (RS) signal, signal transfer is performed as if the counterpart equipment is functioning.

*1 When the CD signal is not monitored, the CD signal pin is not required to be connected. The 232IF only monitors the signal status (ON/OFF).

*2 The 232IF only monitors the signal status (ON/OFF).

3) Interlink serial cross cable used.

BPM0 communication format: b0 = b1 = 1, RS232C interlink connection mode

In the interlink connection mode, data exceeding 512 bytes (upper limit of the receive buffer in the 232IF) can be received.

*1 In this mode, the Request To Send signal (RS) functions as the receive enable signal in the 232IF. When receiving data that exceeds 512 bytes (the upper limit of the 232IF receive buffer), the 232IF sets the Request to Send signal to “OFF” and requests the counterpart equipment to suspend the data transmission. Once the data saved in the receive buffer is read by the sequence program, the remaining data can be received.

*2 The 232IF only monitors the signal status (ON/OFF).

4) Connection with counterpart equipment of modern specifications (Control line is essential)

Straight cable used, BPM0 communication format: b0 = b1 = 1, standard RS232C mode

*1 When the CD signal is not being monitored, the CD signal pin is not required to be connected. The 232IF only monitors the signal status (ON/OFF).

*2 The 232IF only monitors the signal status (ON/OFF).

*3 When the CI signal is not required, the CI signal pin is not required to be connected. The 232IF only monitors the signal status (ON/OFF).
The RS232C interface FX2n-232IF (hereinafter referred to as "232IF") is connected to the FX2n/FX2NC/FX3U/FX3UC series PLC to realize full duplex serial data communication with another RS232C professional electrical engineer who is qualified and trained to the local and national standards:

1) Two or more devices with RS232C interfaces can be connected to an FX2n/FX2NC/FX3U/FX3UC series PLC by using the RS232C special function block. Up to 8 special function block can be connected to the FX2n/FX2NC/FX3U/FX3UC series PLC. (Refer to section 2.1)

2) Connection with counterpart equipment of terminal specifications (when control line is used)

3) Connection with counterpart equipment of terminal specifications (when control line is used)

4) ASCII/HEX conversion function

The function to convert and send and a hexadecimal numeric (0 to F) saved in the send data buffer as can be received.

Full-duplex asynchronous communication between RS232C devices is specified through buffer memory (BFM). The FD/TO instruction is used for the buffer memory.

The send/receive buffer can accommodate 512 bytes (256 words). When the 232IF interlink connection mode is used, data exceeding 512 bytes (256 words) can also be received.

4) ASCII/HEX conversion function

The function to convert and send and a hexadecimal numeric (0 to F) saved in the send data buffer as can be received.

Full-duplex asynchronous communication between RS232C devices is specified through buffer memory (BFM). The FD/TO instruction is used for the buffer memory.

The send/receive buffer can accommodate 512 bytes (256 words). When the 232IF interlink connection mode is used, data exceeding 512 bytes (256 words) can also be received.

The 232IF only monitors the signal status (ON/OFF).

2) Connection with counterpart equipment of terminal specifications (when control line is used)

Because the carrier to send (CS) signal pin of the 232IF itself receives the request to send (RS) signal, signal transfer is performed as if the counterpart equipment is functioning.

1) When the CD signal is not monitored, the CD signal pin is not required to be connected. The 232IF only monitors the signal status (ON/OFF).

2) The 232IF only monitors the signal status (ON/OFF).

3) Interlink serial cross cable used.

BFM communication format: b1 = 0, b1 = 1, standard 232IF mode

In the interlink connection mode, data exceeding 512 bytes (upper limit of the receive buffer in the 232IF) can be received.

1) When the CD signal is not being monitored, the CD signal pin is not required to be connected. The 232IF only monitors the signal status (ON/OFF).

2) The 232IF only monitors the signal status (ON/OFF).

3) When the CI signal is not required, the CI signal pin is not required to be connected. The 232IF only monitors the signal status (ON/OFF).
2.2 Connector Pin Layout

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<thead>
<tr>
<th>Pin No.</th>
<th>Pin Name</th>
<th>Meaning</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CI(RI)</td>
<td>Call-in</td>
<td>This signal indicates only status</td>
</tr>
<tr>
<td>2</td>
<td>RD(RXD)</td>
<td>Receive data</td>
<td>Receive data (RS232C device to 232IF)</td>
</tr>
<tr>
<td>3</td>
<td>SD(TXD)</td>
<td>Send data</td>
<td>Send data (232IF to RS232C device)</td>
</tr>
<tr>
<td>4</td>
<td>ER(DTR)</td>
<td>Data terminal</td>
<td>ON when Send/Receive is enabled</td>
</tr>
<tr>
<td>5</td>
<td>SG(GND)</td>
<td>Signal ground</td>
<td>Signal ground</td>
</tr>
<tr>
<td>6</td>
<td>DR(DSR)</td>
<td>Data set ready</td>
<td>This signal indicates only status</td>
</tr>
<tr>
<td>7</td>
<td>RS(RTS)</td>
<td>Request to send</td>
<td>ON when Send command is ON</td>
</tr>
<tr>
<td>8</td>
<td>CS(CTS)</td>
<td>Clear to send</td>
<td>ON when Send data is ready to receive</td>
</tr>
<tr>
<td>9</td>
<td>CI(RI)</td>
<td>Calling indication</td>
<td>This signal indicates only status</td>
</tr>
</tbody>
</table>

* <> At selection of interlink connection mode

2.3 System Configuration

3. WIRING AND CONNECTION

3.1 Connection with the programmable controller

The 232IF can be connected to the FXn/FXnc/FXncx/FXnx PLC or extension block/unit. A number is assigned to each special unit/block counting from the one nearest the main unit in the way of No.0, No.1, No.2. Up to 8 FXn/FXnc/FXncx/FXnx series PLCs can be connected to the FXnc/FXncx/FXnx PLC series. Up to 4 special function block can be connected to the FXnc/FXnx PLC. (Refer to section 2.1)

Communication requires no protocol

Full-duplex asynchronous communication between RS232C devices is specified through buffer memory (BFM). The FROM/TO instruction is used for the buffer memory.

The send/receive buffer can accommodate 512 bytes/256 words. In the interlink connection mode, data exceeding 512 bytes/256 words can also be received.

ASCII/HEX conversion function

The function to convert and send a hexadecimal numeric (0 to F) saved in the send data buffer as well as the function to convert a received ASCII code into a hexadecimal numeric (0 to F) and save it to the receive buffer are provided.

*1 Up to 7 special function block can be connected to the FXnc-232IF (2) PLC

2.4 Power Supply Wiring

Handling of the crimp-style terminal

Use the crimp-style terminals of the dimensions shown on the figure on the left. Make sure that the tightening torque of the terminal is 0.5 to 0.8 Nm. Do not tighten the terminal block mounting screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

3.3 Connection Example

The signal wiring of the RS232C equipment varies depending on the RS232C specifications connected. Check the specifications of the RS232C equipment used, then connect the signals correctly. Representative wiring examples are shown below.

1) Connection with counterpart equipment of terminal specifications (when control line is not used)

Because the carrier to send (CS) signal pin of the 232IF itself receives the request to send (RS) signal, the signal transfer is performed as if the counterpart equipment is functioning.

- When the CD signal is not monitored, the CD signal pin is not required to be connected.
- The 232IF only monitors the signal status (ON/OFF).

2) Connection with counterpart equipment of terminal specifications (when control line is used)

Cross cable used, 8Fm-0 communication format: b0 = 0, b1 = 1, standard RS232C mode

Because the carrier to send (CS) signal pin of the 232IF itself receives the request to send (RS) signal, the signal transfer is performed as if the counterpart equipment is functioning.

- When the CD signal is not monitored, the CD signal pin is not required to be connected.
- The 232IF only monitors the signal status (ON/OFF).

3) Interlink serial cross cable used.

BFM communication format: b1 = 1, b1 = 1, RS232C interlink connection mode

In the interlink connection mode, data exceeding 512 bytes (upper limit of the receive buffer in the 232IF) can be received.

- In this mode, the Request to Send signal (RS) functions as the receive enable signal in the 232IF. When receiving data that exceeds 512 bytes (the upper limit of the 232IF receive buffer), the 232IF sets the Request to Send signal (RS) to "OFF" and requests the counterpart equipment to suspend the data transmission. Once the data saved in the receive buffer is read by the sequence program, the remaining data can be received.

- The 232IF only monitors the signal status (ON/OFF).

4) Connection with counterpart equipment of modem specifications (Control line is essential.)

Straight cable used, 8Fm-0 communication format: b0 = 0, b1 = 1, standard RS232C mode

- When the CD signal is not being monitored, the CD signal pin is not required to be connected.
- The 232IF only monitors the signal status (ON/OFF).

- The 232IF only monitors the signal status (ON/OFF).

- When the CI signal is not required, the CI signal pin is not required to be connected. The 232IF only monitors the signal status (ON/OFF).
4. SPECIFICATIONS

4.1 General specifications

General specifications excluding withstand voltage

- Same as those of the main unit
- 300V AC, 1 minute (between the entire external terminal and the ground terminal)

4.2 Power Supply Specifications

- Internal power supply from programmable controller: 5V DC ±10% 40mA
- External power supply: 24V ±10% 20mA

4.3 Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transmission Standard</strong></td>
<td>Conforming RS232C</td>
</tr>
<tr>
<td><strong>Transmission distance</strong></td>
<td>Max. 15m</td>
</tr>
<tr>
<td><strong>Connected the number</strong></td>
<td>9-pin type</td>
</tr>
<tr>
<td><strong>Connector</strong></td>
<td>9-pin D-SUB type</td>
</tr>
<tr>
<td><strong>Pin layout of connector</strong></td>
<td>1:CD(DCD), 2:RD(RXD), 3:SD(TXD), 4:ER(DTR), 5:SG, 6:GROUND, 7:RS(RTS), 8:CS(CTS), 9:RI(RI)</td>
</tr>
<tr>
<td><strong>Communication method</strong></td>
<td>Digital, Full-duplex asynchronous</td>
</tr>
<tr>
<td><strong>Sported baud rate</strong></td>
<td>300, 600, 1200, 2400, 4800, 9600, 19200</td>
</tr>
<tr>
<td><strong>Isolation</strong></td>
<td>≥ 1kV</td>
</tr>
<tr>
<td><strong>Number of I/O points occupied</strong></td>
<td>8 points taken from the programmable controller extension bus (can be either input or output)</td>
</tr>
<tr>
<td><strong>Applicable programmable controllers</strong></td>
<td>FX2N/FX2NC/FX3U/FX3UC series</td>
</tr>
<tr>
<td><strong>Communication with programmable controller</strong></td>
<td>PROMT instruction</td>
</tr>
</tbody>
</table>

5. DIAGNOSTICS

For error code, refer to the FX Communication User’s Manual.

1) Check the status of the POWER LED provided in the 232IF.
   - When it is lit, the drive power is correctly supplied.
   - If it is extinguished, supply the drive power correctly.
2) Check the status of the SD LED and RD LED provided in the 232IF.
   - If the RD LED is not lit while data is received or the SD LED is not lighted while data is sent, check the instruction and the wiring.
   - When the RD LED is lit while data is received or the SD LED is lit while data is sent, check the instruction and the wiring.
3) Make sure that the communication setting (BFM #0) in the 232IF is equivalent to that of the external equipment. If they are not equivalent each other, correct as required.
4) Verify the status of the data send/receive device. For example, make sure that the counter equipment is ready to receive before starting to send data to it.
5) When the terminator is not used, check whether the send data capacity is equivalent to the accept-able data capacity. Use the terminator, if the send data capacity may be changed.
6) Make sure that the external equipment is correctly operating.
7) Check whether the type of send data and the type of receive data are equivalent. If they are different, make them equivalent.

Guidelines for the safety of the user and protection of the FX2N-232IF RS232C INTERFACE BLOCK

- This manual has been written to be used by trained and competent personnel. This is defined by the European directives for machinery, low voltage and EMC.
- If in doubt at any stage during the installation of the FX2N-232IF always consult a professional electrical engineer who is qualified and trained to the local and national standards. If in doubt about the operation or use of the FX2N-232IF please consult the nearest Mitsubishi Electric distributor.
- Under no circumstances will Mitsubishi Electric be liable or responsible for any consequential damage that may arise as a result of the installation or use of this equipment.
- All examples and diagrams shown in this manual are intended only as an aid to understanding the text, not to guarantee operation. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.
- Owing to the very great variety in possible application of this equipment, you must satisfy yourself as to its suitability for your specific application.

This manual covers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

Warranty

Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the grants warranty term, Mitsubishi shall not be liable for compensation to:
(1) Damages caused by any cause found not to be the responsibility of Mitsubishi.
(2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
(3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
(4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi Electric.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

Effective August 2018
Specifications are subject to change without notice
4.3 Specifications

3) Make sure that the communication setting (BFM #0) of the 232IF is equivalent to that of the external equipment.

4) Check the status of the SF LED and the RD LED provided in the 232IF.

5) Verify the status of the data send/receive device. For example, make sure that the counterpart equipment is ready to receive before starting to send data to it.

6) Make sure that the external equipment is correctly operating.

7) Check whether the type of send data and the type of receive data are equivalent. If they are different, make them equivalent.

1) Check the status of the POWER LED provided in the 232IF.

2) Check the status of the SD LED and the RD LED provided in the 232IF.

5. DIAGNOSTICS

For error code, refer to the FX Communication User’s Manual.

1) Check the status of the POWER LED provided in the 232IF.

- If it is lit, the drive power is correctly supplied.

- If it is extinguished, supply the drive power correctly.

2) Check the status of the SD LED and the RD LED provided in the 232IF.

- If the RD LED is not lit while data is received or the SD LED is not lighted while data is sent, check the instruction and the wiring.

- When the RD LED is lit while data is received or the SD LED is lit while data is sent, the installation and the wiring are correct.

3) Make sure that the communication setting (BFM #0) of the 232IF is equivalent to that of the external equipment. If they are not equivalent each other, correct as required.

4) Verify the status of the data send/receive device. For example, make sure that the counterpart equipment is ready to receive before starting to send data to it.

5) When the terminator is not used, check whether the send data capacity is equivalent to the acceptable data capacity. Use the terminator, if the send data capacity may be changed.

6) Make sure that the external equipment is correctly operating.

7) Check whether the type of send data and the type of receive data are equivalent. If they are different, make them equivalent.
4. SPECIFICATIONS

4.1 General specifications

<table>
<thead>
<tr>
<th>General specifications excluding withstand voltage</th>
<th>Same as those of the main unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Withstand voltage</td>
<td>500V AC, 1 minute (between the entire external terminal and the ground terminal)</td>
</tr>
</tbody>
</table>

4.2 Power Supply Specifications

<table>
<thead>
<tr>
<th>Internal power supply from programmable controller</th>
<th>5V DC ±40mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>External power supply</td>
<td>24V DC ±10% 80mA</td>
</tr>
</tbody>
</table>

4.3 Specifications

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<tr>
<th>Item</th>
<th>Content</th>
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</tr>
<tr>
<td>Transmission distance</td>
<td>Max. 15m</td>
</tr>
<tr>
<td>Connected the number</td>
<td>1:1</td>
</tr>
<tr>
<td>Connector</td>
<td>9-pin D-SUB type</td>
</tr>
<tr>
<td>Pin layout of connector</td>
<td>1:CD(DCD), 2:RD(RXD), 3:SD(TXD), 4:ER(DTR), 5:SG, 6:DR(DSR), 7:TS(RTS), 8:CS(CTS), 9:CI(RI)</td>
</tr>
<tr>
<td>Indication (LED)</td>
<td>POWER, SD, RD</td>
</tr>
<tr>
<td>Communication method</td>
<td>No protocol by full-duplex asynchronous</td>
</tr>
<tr>
<td>SPORTED baud rate</td>
<td>300, 600, 1200, 2400, 4800, 9600, 19200</td>
</tr>
<tr>
<td>Isolation</td>
<td>Photo-coupler</td>
</tr>
<tr>
<td>Number of I/O points occupied</td>
<td>8 points taken from the programmable controller expansion bus (can be either input or output)</td>
</tr>
<tr>
<td>Applicable programmable controllers</td>
<td>FX2N/FX2NC/FX3U/FX3UC series</td>
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<td>PROM/TMO instruction</td>
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</table>

5. DIAGNOSTICS

For error code, refer to the FX Communication User’s Manual:

1) Check the status of the POWER LED provided in the 232IF.
   - When it is lit, the drive power is correctly supplied.
   - If it is extinguished, supply the drive power correctly.

2) Check the status of the SD LED and the RD LED provided in the 232IF.
   - If the RD LED is not lit while data is received or the SD LED is not lighted while data is sent, check the instruction and the wiring.
   - When the RD LED is lit while data is received or the SD LED is lit while data is sent, the installation and the wiring are correct.

3) Make sure that the communication setting (BFM #0) of the 232IF is equivalent to that of the external equipment. If they are not equivalent each other, correct as required.

4) Verify the status of the data send/receive device. For example, make sure that the counterpart equipment is ready to receive before starting to send data to it.

5) When the terminator is not used, check whether the send data capacity is equivalent to the acceptable data capacity. Use the terminator, if the send data capacity may be changed.

6) Make sure that the external equipment is correctly operating.

7) Check whether the type of send data and the type of receive data are equivalent. If they are different, make them equivalent.

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- Under no circumstances will Mitsubishi Electric be liable or responsible for any consequential damage that may arise as a result of the installation or use of this equipment.
- All examples and diagrams shown in this manual are intended only as an aid to understanding the text, not to guarantee operation. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.
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2. Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
3. Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
4. Replacement of using the on-site equipment, start-up test run and other tasks.

### For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi Electric.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or fallback functions in the system.
This manual contains text, diagrams and explanations which will guide the reader in the correct installation and operation of the FX2N-232IF RS232C INTERFACE BLOCK. It should be read and understood before attempting to install or use the unit. Further information can be found in the FX PROGRAMMING MANUAL, FX series hardware manuals.

In doubt at any stage during the installation of the FX2N-232IF RS232C INTERFACE Block always consult a professional electrical engineer who is qualified and trained to the local and national standards.

1. INTRODUCTION

The RS232C interface block FX2N-232IF (hereinafter referred to as "232IF") is connected to the FX2N/FX3U/FX3UC series PLC to realize full duplex serial data communication with another RS232C interface such as a personal computer, bar code reader, printer, etc.

1) Two or more devices with RS232C interfaces can be connected to an FX2N/FX3U/FX3UC series PLC by using the RS232C special function block. Up to 8 special function blocks can be connected to the FX2N/FX3U PLC. (Refer to section 2.1)

2) Communication requires no protocol

Full-duplex asynchronous communication between RS232C devices is specified through buffer memory (BFM). The FFM/TO instruction is used for the buffer memory.

3) The send/receive buffer can accommodate 512 bytes/256 words. When the 232IF interlink connection mode is used, data exceeding 512 bytes/256 words can also be received.

4) ASCII/Hex conversion function

The function to convert and send a hexadecimal numeric (0 to F) saved in the send data buffer as well as the function to convert a received ASCII code into a hexadecimal numeric (0 to F) and save it to the receive buffer are provided.

*1 Up to 7 special function blocks can be connected to the FX2NC-FX3UC-32MT-LT (-2) PLC

2. SPECIFICATIONS

2.1 External Dimensions and Part Names

<table>
<thead>
<tr>
<th>Dimensions:mm (inches)</th>
<th>Weight: Approx. 0.3 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension cable</td>
<td>Mounting hole (2-4.5)</td>
</tr>
<tr>
<td>POWER LED</td>
<td>1/8&quot; (4.5-5.18&quot;)</td>
</tr>
<tr>
<td>SD LED/SD</td>
<td>24V DC power supplied from the main unit</td>
</tr>
<tr>
<td>LED LED</td>
<td>24V DC power supplied from the external terminal</td>
</tr>
<tr>
<td>Terminal screws (M3)</td>
<td>0.12&quot;)</td>
</tr>
<tr>
<td>Next step extension connector</td>
<td>9-pin D-SUB connector</td>
</tr>
<tr>
<td>DIN rail clip</td>
<td>DIN rail groove (351.38&quot;)</td>
</tr>
</tbody>
</table>

2.2 Connector Pin Layout

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal name</th>
<th>Meaning</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CI(RI)</td>
<td>Calling indication</td>
<td>This signal indicates only status</td>
</tr>
<tr>
<td>2</td>
<td>RD(RXD)</td>
<td>Receive data</td>
<td>Receive data (RS232C device to 232IF)</td>
</tr>
<tr>
<td>3</td>
<td>SD(TXD)</td>
<td>Send data</td>
<td>Send data (232IF to RS232C device)</td>
</tr>
<tr>
<td>4</td>
<td>DR(DSR)</td>
<td>Data terminal ready</td>
<td>ON when Send/Receive is ON</td>
</tr>
<tr>
<td>5</td>
<td>SG</td>
<td>Signal ground</td>
<td>Signal ground</td>
</tr>
<tr>
<td>6</td>
<td>DR(RTS)</td>
<td>Clear to send</td>
<td>Clear to send</td>
</tr>
<tr>
<td>7</td>
<td>RS(RTS)</td>
<td>Request to send</td>
<td>When Send command is ON</td>
</tr>
<tr>
<td>8</td>
<td>CS(CTS)</td>
<td>Clear to receive</td>
<td>When 232IF is Receive enabled</td>
</tr>
<tr>
<td>9</td>
<td>CR</td>
<td>Calling indication</td>
<td>This signal indicates only status</td>
</tr>
</tbody>
</table>

* At selection of interlink connection mode

2.3 System Configuration

3. WIRING AND CONNECTION

3.1 Connection with the programmable controller

The 232IF can be connected to the FX2N/FX3U/FX3UC programmable controller or connected on the right side of another extension block/terminal. A number is assigned to each special unit/block counting from the one nearest the main unit in the way of No.0, No.1... No.7. Up to 8 FX2N/FX3U/FX3UC units can be connected to the FX2N/FX3U/FX3UC series PLC. Up to 4 FX2N-232IF units can be connected to the FX2NC series PLC. However, the capacity of the 5V DC power supplied from the programmable controller is limited. The current consumption of the 5V DC power in the 232IF is 40 mA. Make sure that the total current consumption of the 5V DC power supply including other special blocks is equivalent to or less than that available.

*1 Up to 7 units can be connected to an FX3UC-32MT-LT (-2) PLC

3.2 Power Supply Wiring

Handling of the crimp-style terminal

Use the crimp-style terminals of the dimensions shown on the figure on the left. Make sure that the tightening torque of the terminal is 0.5 to 0.8 Nm. Do not tighten the terminal block mounting screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

3.3 Connection Example

The signal wiring of the RS232C equipment varies depending on the RS232C specifications connected. Check the specifications of the RS232C equipment used, then connect the signals correctly. Representative wiring examples are shown below.

1) Connection with counterpart equipment of terminal specifications (when control line is not used)

<table>
<thead>
<tr>
<th>232IF side</th>
<th>RS232C device side</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD(TXD)</td>
<td>3</td>
</tr>
<tr>
<td>RS(RTS)</td>
<td>7</td>
</tr>
<tr>
<td>CS(CTS)</td>
<td>8</td>
</tr>
<tr>
<td>ER(DTR)</td>
<td>4</td>
</tr>
<tr>
<td>DR(DSR)</td>
<td>6</td>
</tr>
<tr>
<td>SG(GND)</td>
<td>5</td>
</tr>
</tbody>
</table>

2) Connection with counterpart equipment of RS232C terminal specifications (when control line is used)

Cross cable used, BFM 0 communication format: b0 = 0, b1 = 1, standard 232IF mode

Because the carrier to send (CS) signal pin of the 232IF itself receives the request to send (RS) signal, signal transfer is performed as if the counterpart equipment is functioning.

*1 When the CD signal is not monitored, the CD pin signal is not required to be connected.

*2 The 232IF only monitors the signal status.

3) Interlink serial cross cable used.

BFM 0 communication format: b0 = 1, b1 = 1, RS232C interlink connection mode

In the interlink connection mode, data exceeding 512 bytes (upper limit of the receive buffer in the 232IF) can be received.

*1 In this mode, the Request to Send signal (RS) functions as the receive enable signal in the 232IF. When receiving data that exceeds 512 bytes (the upper limit of the 232IF receive buffer), the 232IF sets the Request to Send signal (RS) to "OFF" and requests the counterpart equipment to suspend the data transmission. Once the data saved in the receive buffer is read by the sequence program, the remaining data can be received.

*2 The 232IF only monitors the signal status.

4) Connection with counterpart equipment of modern specifications (Control line is essential.)

Straight cable used, BFM 0 communication format: b0 = 0, b1 = 1, standard 232IF mode

When the CD signal is not being monitored, the CD signal pin is not required to be connected. The 232IF only monitors the signal status.

*1 When the CD signal is not being monitored, the CD signal pin is not required to be connected. The 232IF only monitors the signal status.

*2 When the CD pin is not connected, the 232IF only monitors the signal status.
4. SPECIFICATIONS

4.1 General specifications

4.2 Power Supply Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission Standard</td>
<td>Conforming RS232C</td>
</tr>
<tr>
<td>Transmission distance</td>
<td>Max. 1.5m</td>
</tr>
<tr>
<td>Connected the number</td>
<td>1:1</td>
</tr>
<tr>
<td>Connector</td>
<td>9-pin D-SUB type</td>
</tr>
<tr>
<td>Pin layout of connector</td>
<td>1:CD(DCD), 2:RD(RXD), 3:SD(TXD), 4:ER(DTR), 5:SG, 6:DR(DSR), 7:RS(RTS), 8:CS(CTS), 9:CI(RI)</td>
</tr>
<tr>
<td>Indication(LED)</td>
<td>POWER, SD, RD</td>
</tr>
<tr>
<td>Communication method</td>
<td>No protocol by full-duplex asynchronous</td>
</tr>
<tr>
<td>Sported baud rate</td>
<td>300, 600, 1200, 2400, 4800, 9600, 19200</td>
</tr>
<tr>
<td>Isolation</td>
<td>Photo-coupler</td>
</tr>
<tr>
<td>Number of I/O points occupied</td>
<td>8 points taken from the programmable controller extension bus (can be either input or output)</td>
</tr>
<tr>
<td>Applicable programmable controllers</td>
<td>FX2N/FX2NC/FX3U/FX3UC series</td>
</tr>
<tr>
<td>Communication with programmable controller</td>
<td>PROMTO instruction</td>
</tr>
</tbody>
</table>

4.3 Specifications

5. DIAGNOSTICS

For error code, refer to the FX Communication User's Manual.

1) Check the status of the POWER LED provided in the 232IF.
   - When it is lit, the drive power is correctly supplied.
   - If it is extinguished, supply the drive power correctly.
2) Check the status of the SD LED and the RD LED provided in the 232IF.
   - If the RD LED is not lit while data is received or the SD LED is not lighted while data is sent, check the instruction and the wiring.
   - When the RD LED is lit while data is received or the SD LED is lit while data is sent, the installation and the wiring are correct.
3) Make sure that the communication setting (BFM #0) of the 232IF is equal to that of the external equipment. If they are not equal, make them equal.
4) Verify the status of the data send/receive device. For example, make sure that the counterpart equipment is ready to receive before starting to send data to it.
5) When the terminator is not used, check whether the send data capacity is equivalent to the acceptable data capacity. Use the terminator, if the send data capacity may be changed.
6) Make sure that the external equipment is correctly operating.
7) Check whether the type of send data and the type of receive data are equivalent. If they are different, make them equivalent.

### Specifications

- **Connector**: 9-pin D-SUB type
- **Indication (LED)**: POWER, SD, RD
- **Transmission Standard**: Conforming RS232C
- **Transmission Distance**: Max. 1.5m
- **Sported Baud Rate**: 300, 600, 1200, 2400, 4800, 9600, 19200
- **Isolation**: Photo-coupler
- **Number of I/O Points Occupied**: 8 points taken from the programmable controller extension bus (can be either input or output)
- **Applicable Programmable Controllers**: FX2N/FX2NC/FX3U/FX3UC series
- **Communication with Programmable Controller**: PROMTO instruction

5. DIAGNOSTICS

For error code, refer to the FX Communication User's Manual.

1) Check the status of the POWER LED provided in the 232IF.
   - When it is lit, the drive power is correctly supplied.
   - If it is extinguished, supply the drive power correctly.
2) Check the status of the SD LED and the RD LED provided in the 232IF.
   - If the RD LED is not lit while data is received or the SD LED is not lighted while data is sent, check the instruction and the wiring.
   - When the RD LED is lit while data is received or the SD LED is lit while data is sent, the installation and the wiring are correct.
3) Make sure that the communication setting (BFM #0) of the 232IF is equal to that of the external equipment. If they are not equal, make them equal.
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