This manual contains text, diagrams and explanations which will guide the reader in the correct installation and operation of the FXon-232ADP and should be read and understood before attempting to install or use the unit. Further information can be found in the FX SERIES PROGRAMMING MANUAL and FXon/FXon HARDWARE MANUAL.
The FX0N -232ADP type RS232C adapter (hereinafter called 232ADP) is connected to the FX0N series PC to exchange serial data with a personal computer, barcode reader, printer, and other various RS232C devices.

- Only one 232ADP unit can be connected to one base unit to the serial port provided at the left side.
- The buffer size and location are specified by an RS instruction in the PC.

**INTRODUCTION**

Transmit and/or receive RS232C device

**EXTERNAL DIMENSIONS**

- MOUNTING HOLE
- POWER LED
  Lit up by the DC 5 V power supplied from the base unit.
- RD-LED
  Lit when receiving data from the RS232C device connected to the product.
- SD-LED
  Lit when transmitting data to the RS232C device connected to the product.
- Connection cable
  Used for connection with FX0N PC.
- RS232C connector
  Used for connection between the product and RS232C device.

**TERMINAL LAYOUTS**

The connector is a 25-pin D-SUB type, and the pin configuration is as shown below.

Pins 4, 5 are not used. Short-circuited inside.

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No connection</td>
</tr>
<tr>
<td>2</td>
<td>Send data (232ADP to RS232C device)</td>
</tr>
<tr>
<td>3</td>
<td>Receive data (RS232C device to 232ADP)</td>
</tr>
<tr>
<td>4-5</td>
<td>Not used; Connected internally</td>
</tr>
<tr>
<td>6</td>
<td>Shows RS232C device is ready to receive</td>
</tr>
<tr>
<td>7</td>
<td>Signal ground</td>
</tr>
<tr>
<td>8</td>
<td>No connection</td>
</tr>
<tr>
<td>10</td>
<td>NC</td>
</tr>
<tr>
<td>11</td>
<td>SG (Signal Ground)</td>
</tr>
<tr>
<td>14</td>
<td>RS (RTS) Send request</td>
</tr>
<tr>
<td>15</td>
<td>RD (RXD) Receive data</td>
</tr>
<tr>
<td>16</td>
<td>SD (TXD) Send data</td>
</tr>
<tr>
<td>17</td>
<td>NC</td>
</tr>
<tr>
<td>18</td>
<td>ER (DTR) Send request (Data Terminal Ready)</td>
</tr>
<tr>
<td>19</td>
<td>DR (DSR) Send enable (Data Set Ready)</td>
</tr>
<tr>
<td>20</td>
<td>CS (CTS) Send enable</td>
</tr>
</tbody>
</table>

- DIN rail width: 35  Weight: approx. 0.1 kg (0.11 lbs)
  All dimensions are in mm (inch)
### 3 INSTALLATION NOTES AND USAGE

<table>
<thead>
<tr>
<th>Performance specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission standard</td>
</tr>
<tr>
<td>Isolation method</td>
</tr>
<tr>
<td>Transmission distance</td>
</tr>
<tr>
<td>Current consumption</td>
</tr>
</tbody>
</table>
| Control flags and data registers | M8121:Send wait flag  
M8122:Send flag  
M8123:Receive completion  
M8161:8 bits/16 bits changeover  
D8120:System configuration  
D8122:Remainder of send data  
D8123:Amount of received data  
D8124:Header byte  
D8125:Terminator byte |

<table>
<thead>
<tr>
<th>General specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient Temperature</td>
</tr>
<tr>
<td>Ambient Humidity</td>
</tr>
<tr>
<td>Vibration Resistance</td>
</tr>
<tr>
<td>Impact Resistance</td>
</tr>
<tr>
<td>Operating Ambience</td>
</tr>
</tbody>
</table>
For data transmission to be effective it is necessary to match the communication format between the product and the RS232C device, such as Baud rate and parity.

**Communication format** D8120 (bit mapping)

<table>
<thead>
<tr>
<th>Bit</th>
<th>Description</th>
<th>0(OF)</th>
<th>1(ON)</th>
</tr>
</thead>
<tbody>
<tr>
<td>b 0</td>
<td>Data length</td>
<td>7bit</td>
<td>8bit</td>
</tr>
<tr>
<td>b 1</td>
<td>Parity</td>
<td>(00) : None</td>
<td>(01) : Odd</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(10) : Even</td>
<td>(11) : Odd</td>
</tr>
<tr>
<td>b 2</td>
<td>Stop</td>
<td>1bit</td>
<td>2bit</td>
</tr>
<tr>
<td>b 3</td>
<td>Baud rate (bps)</td>
<td>(0011) : 300</td>
<td>(0100) : 600</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0101) : 1,200</td>
<td>(0110) : 2,400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0111) : 4,800</td>
<td>(1000) : 9,600</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1001) : 19,200</td>
<td></td>
</tr>
</tbody>
</table>

- The default value is STX (02H: changeable).
- The default value is ETX (03H: changeable).

An example of setting D8120 is shown below.

<table>
<thead>
<tr>
<th>MOV H138F D8120</th>
</tr>
</thead>
</table>

b15 H138F= 0001 0011 1000 1111 (binary)

The settings for the above program are as right.

The control line is set by b10.

- b10 = 0 : No hardware handshaking. Send and receive are controlled by software protocol.
- b10 = 1 : Hardware handshaking. Signal lines ER(DTR) and DR(DSR) are used to control send and receive of data.

The communication format is set by special data register D8120. Setting the communication format using D8120 is effective only at the time the RS instruction is driven, and therefore any change after driving is not actually accepted.

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**Table: Communication format D8120 (bit mapping)**

<table>
<thead>
<tr>
<th>Bit</th>
<th>Description</th>
<th>0(OF)</th>
<th>1(ON)</th>
</tr>
</thead>
<tbody>
<tr>
<td>b 8</td>
<td>Header</td>
<td>None</td>
<td>D8124 *1</td>
</tr>
<tr>
<td>b 9</td>
<td>Terminator</td>
<td>None</td>
<td>D8125 *2</td>
</tr>
<tr>
<td>b10</td>
<td>Control line</td>
<td>None</td>
<td>H/W</td>
</tr>
<tr>
<td>b11</td>
<td>Mode</td>
<td>Ordinary mode</td>
<td>Single line mode</td>
</tr>
<tr>
<td>b12</td>
<td></td>
<td>Not used</td>
<td>- - -</td>
</tr>
<tr>
<td>b13</td>
<td></td>
<td></td>
<td>- - -</td>
</tr>
<tr>
<td>b14</td>
<td></td>
<td></td>
<td>- - -</td>
</tr>
<tr>
<td>b15</td>
<td></td>
<td></td>
<td>- - -</td>
</tr>
</tbody>
</table>

*1 The default value is STX (02H: changeable).
*2 The default value is ETX (03H: changeable).

---

**Diagram:**

- **When sending:**
  - b10 1
  - b11 0
  - H/W: Ordinary mode
  - Send: ① SD(TXD)
  - ② ER(DTR)
  - ③ DR(DSR)

- **When receiving:**
  - b10 1
  - b11 0
  - H/W: Ordinary mode
  - Receive: ① RD(RXD)
  - ② ER(DTR)
  - ③ DR(DSR)

---

**Diagram:**

- **When sending:**
  - b10 1
  - b11 1
  - H/W: Single line mode
  - Send: ① RD(RXD)
  - ② ER(DTR)

- **When receiving:**
  - b10 1
  - b11 1
  - H/W: Single line mode
  - Receive: ① SD(TXD)
  - ② ER(DTR)
WIRING

- The connections of RS232C devices varies with each device being used. Check the specification of the device, and connect.

Connection examples:

- Terminal specification device
  - When RS232C device uses pins 6,20
    - RS232C device
    - 232ADP
  - When RS232C device uses pins 4,5
    - RS232C device
    - 232ADP

- Modem specification device
  - When RS232C device uses pins 6,20
    - RS232C device
    - 232ADP
  - When RS232C device uses pins 4,5
    - RS232C device
    - 232ADP

N/A

NOTE: The FX-ON-232ADP does not monitor the CD pin (pin 8).
**PROGRAM EXAMPLES**

- Connecting 232ADP and a printer, and printing out the data sent from the PC.

**Printer**

- Receive data

**FX0N series sequencer**

- Send data

- The communication format of the serial printer is as follows.

<table>
<thead>
<tr>
<th>Data length</th>
<th>8 bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parity</td>
<td>Even</td>
</tr>
<tr>
<td>Stop bit</td>
<td>2 bit</td>
</tr>
<tr>
<td>Baud rate</td>
<td>2400bps</td>
</tr>
</tbody>
</table>

**Sequence program**

- ● Handled by 8-bit data
- ● Setting of communication format
- ● RS Instruction drive
- ● Writing of send data
- ● Herein, "test line" is sent.
- ● Send request

**Operation**

1. Turn on the power of the PC and printer, check the printer is on line and switch the PC to RUN.
2. In this example, CR (H000D) and LF (H000A) are written at the end of the message. The printer moves down one line for each message.
3. CR: Carriage Return
4. LF: Line Feed
5. Note: It may be necessary to set the DIP switches of your printer. Check your printer manual for how to configure the serial communications.
• Connect 232ADP and a personal computer, and exchange data with the PC.

Personal computer

Send

Receive

• Send data
• Receive data

FXon series sequencer

• Receive data
• Send data

• Use the communication cable suited to the connector pin configuration of the personal computer.
  (For representative wiring see section 4.)

Preparation of software

• Use ordinary communication software (terminal emulator) or dedicated program in the personal computer.

The communication format of the PC for this example is as follows.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Data length</td>
<td>8 bit</td>
</tr>
<tr>
<td>Parity</td>
<td>Even</td>
</tr>
<tr>
<td>Stop bit</td>
<td>1 bit</td>
</tr>
<tr>
<td>Baud rate</td>
<td>2400</td>
</tr>
</tbody>
</table>

If the communication format of the software cannot be adjusted to this setting, adjust the PC and the software to be the same.
Sequence program

Power on
Turn on the power of the PC and printer, check the printer is on line and switch the PC to RUN.

X000,ON
Turn on X000, and drive RS instruction.

RS instruction drive

Data send

Every time X001 is turned on, the contents of D200 to D210 are sent to the personal computer, and "test data" is displayed.

Personal computer operation

Data send

After receiving and storing data from personal computer in D211, it is output to Y000 to Y017. When input X002 is turned on, the receive completion flag is reset.
- If data transfer does not perform correctly when using the 232ADP, check the operation using the following programs.

- Program when sending

  ![Program when sending](image)

- Program when receiving

  ![Program when receiving](image)

- If not operating normally when using these programs, eliminate the cause using the flow diagrams shown following.

- If sending and receiving using these programs is successful, it is considered that the operation failure was due to sequence program or communication protocol error.

- Set the communication format according to the external device to be used.

* Write the data to be sent to D0 to D19 before operating.
Start

Is power LED lit?
- NO
  - Check connection with the PC.
  - Check power source of PC.
- YES

Is M8063 turned on?
- NO
  - Check wiring of RS232C cable.
  - Check wiring of control line.
  - Make sure the receiving external device is normal.
  - Check the voltage level of RS232C signal (±9 V).
  - Make sure content of send data and communication format are established before driving RS instruction.
- YES

The data transfer completes
- NO
  - Send, receive error
    - There is a possibility of send crosstalk. Check the send and receive timing with the external RS232C device.
    - The receive data length may exceed the receive data area. Check the receive data length and timing of receive start.
    - Check that the program is not set so that M8122 may be always on.
- YES

No send or receive error

Only receiving fails to operate normally
- NO
- YES
  - 1

Is send wait flag M8121 turned on?
- NO
  - Check wiring of RS232C cable.
  - Check wiring of control line.
  - Make sure the receiving external device is normal.
  - Check the voltage level of RS232C signal (±9 V).
  - Make sure content of send data and communication format are established before driving RS instruction.
- YES

Is the send data remainder zero?
- NO
  - Check the timing of control line.
- YES
  - Check the wiring of RS232C cable.
  - Check the wiring of control line.
  - Match the communication format.
  - Make sure the receiving external device is normal. (CR, LF may be needed in some printers.)
  - Check the data format of sending device.
1. Is RD LED (receive) lit?
   - Yes
   - No

2. Is M8123 turned on?
   - Yes
   - No

3. All data is received?
   - Yes
   - No

4. Receive completion?
   - Yes
   - No

5. Are the contents of receive data unintelligible?
   - Yes
   - No

- Check wiring of RS232C cable.
- Make sure wiring of control line is suited to the external device.
- Make sure the external sending device is normal.
- Check the voltage level of RS232C signal.

- Check if receive data length is exceeding the data area length.
  When using terminator
  • Make sure the external sending device is sending the terminator.
  • Make sure the terminator value matches.

- Match the communication format.
- Check the timing of control line.
- Check if the send data length is not zero when driving RS instruction.
  When using header
  • Make sure the external sending device is sending the header.
  When using terminator
  • Check the timing of send, receive.

- Monitor data in hexadecimal notation (HEX).
- Check on/off of M8161.
- Confirm send data format of the sending device.

- Normal

[When M8123 is reset, the PC returns to the wait state.]
Guidelines for the safety of the user and protection of the FX0n-232ADP

- 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 FX0n-232ADP 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 FX0n-232ADP 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 example 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.