This manual contains text, diagrams and explanations which will guide the reader in the correct installation and operation of the FX-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 FX SERIES HARDWARE MANUAL.
The FX-232ADP type RS232C adapter (hereinafter called 232ADP) is connected to the FX(V3.07 or later), FX 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.

- This product cannot be combined with special adapters such as FX-8AV, FX-40AP/AW, or the like.

## TERMINAL LAYOUTS

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

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Frame ground</td>
</tr>
<tr>
<td>2</td>
<td>Send data (232ADP to RS232C device)</td>
</tr>
<tr>
<td>3</td>
<td>Receive data (RS232 device to 232ADP)</td>
</tr>
<tr>
<td>4 • 5</td>
<td>Not used</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>On when carrier is detected for data reception</td>
</tr>
<tr>
<td>20</td>
<td>Signal requesting preparation for data sending to RS232C device</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Transmission standard</th>
<th>Conforming to RS232C, 25pin D-SUB, connector used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolation method</td>
<td>Photo coupler isolation</td>
</tr>
<tr>
<td>Transmission distance</td>
<td>15m or less (shielded cable recommended)</td>
</tr>
<tr>
<td>Current consumption</td>
<td>DC 5V 200mA form base unit</td>
</tr>
</tbody>
</table>

| Related flag          | M8121: Send wait flag                           |
| and data registers    | M8122: Send flag                               |
|                       | M8123: Receive completion                      |
|                       | M8124: Carrier detection                       |
|                       | M8161: 8 bits/16 bits changeover               |
|                       | D8120: Communication format                    |
|                       | D8122: Remainder of send data                  |
|                       | D8123: Number of received data                 |
|                       | D8124: Header byte                             |
|                       | D8125: Terminator byte                         |

### General specification

| General specifications (excluding following) | Same as those for FX or FX2C base unit          |
| Dielectric withstand voltage                | 500V AC 1min                                    |
| Insulation resistance                       | 500V DC, 1M Ω by Megger unit                    |
|                                         | Between 25-pin D-SUB and base unit              |
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 (OFF)</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>b 2</td>
<td></td>
<td>(11): Even</td>
<td></td>
</tr>
<tr>
<td>b 3</td>
<td>Step</td>
<td>1bit</td>
<td>2bit</td>
</tr>
<tr>
<td>b 4</td>
<td>Baud rate</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>

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

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 if changed after driving, it is not actually accepted.

An example of setting D8120 is shown below.

M8002  MOV H138F, D8120

H138F= 0001 0011 1000 1111 (binary)

The settings for the above program are as right.

The control line is set by b12.

b12=0 : No hardware hand shaking. Send and receive are controlled by software protocol.
b12=1 : Hardware hand shaking. Signal lines ER (DTR) and DR (DSR) are used to control send and receive of data.

When sending:

- b12=1: @SD (TXD)
- b11=1: @ER (DTR)
- b11=0: @DR (DSR)

When receiving:

- b12=1: @RD (RXD)
- b11=1: @ER (DTR)
- b11=0: @DR (DSR)
When RS232C device uses pins 6,20

When RS232C device uses pins 4,5

RS232C device

FX-232 ADP

FX-232 ADP

FX-232 ADP

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

Connection examples

Terminal specification device

Modem specification device

When RS232C device uses pins 6,20

When RS232C device uses pins 4,5

RS232C device

FX-232 ADP

FX-232 ADP

FX-232 ADP

1 1 1 1

2 2 2 2

3 3 3 3

4 6 6 6

5 5 5 5

7 7 7 7

23 23 23 23

1 1 1 1

2 2 2 2

3 3 3 3

4 4 4 4

5 5 5 5

6 6 6 6

7 7 7 7

8 8 8 8

23 23 23 23
Connecting 232ADP and a printer, and printing out the data sent from the PC.

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>1 bit</td>
</tr>
<tr>
<td>Baud rate</td>
<td>2400bps</td>
</tr>
</tbody>
</table>

Sequencer program

<table>
<thead>
<tr>
<th>Operation</th>
<th>Power on</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Turn on the power of the PC and printer, check the printer is on line and switch the PC to RUN.</td>
</tr>
<tr>
<td>X000,ON</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operation</th>
<th>RS instruction drive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Turn on X000, and drive RS instruction.</td>
</tr>
<tr>
<td>X000,ON</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operation</th>
<th>Data send</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Every time X001 is turned on, the contents of D200 to D210 are sent to the printer, and &quot;test line&quot; is printed.</td>
</tr>
<tr>
<td>X000,ON</td>
<td></td>
</tr>
</tbody>
</table>

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. CR: Carriage Return LF: Line Feed

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

FX,FX2N series PC

• 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.

<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>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.
Power on

X000,ON

RS instruction drive

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

Turn on X000, and drive RS instruction.

Data send

X001,ON

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

After receiving and storing data from personal computer in D500, it is output to Y000 to Y017. When input X002 is turned on, the receive completion flag is reset.

Personal computer operation

Operation

Sequence program

Handed by 8-bit data ①
Setting of communication format ②
RS instruction drive ③
Writing of send data ④
Herein, "test line" is sent.
Send request ⑤
Output of receive data ⑥
Receive completion reset ⑦
● If data transfer does not perform correctly when using the 232ADP, check the operation using the following programs.

Program when sending

M8002  [ MOV H**** D8120 ]
M8000  [ RS D0 K20 D100 K0 ]
M8013  [ PLS M0 ]
M0     [ SET M8122 ]
       [ END ]

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

Program when receiving

M8002  [ MOV H**** D8120 ]
M8000  [ RS D0 K20 D100 K0 ]
M8000  [ RST M8123 ]
       [ END ]

● 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.

● Program when receiving

M8002  [ MOV H**** D8120 ]
M8000  [ RS D0 K20 D100 K0 ]
M8000  [ RST M8123 ]
       [ END ]

\* Set the communication format according to the external device to be used.

\* Header and terminator are not attached.

Receive completion reset
Start

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

Is VRRD, VRSC instruction used?
- NO: NO
- YES: Eliminate VRRD, VRSC instruction and reset power source.

Are M8070, M8071 turned on?
- NO: NO
- YES: Reset M8070, M8071, and reset power source.

Is M8063 turned on?
- NO: No send or receive error
- YES: Send, receive error

The data transfer completes once:
- NO: 
  - Check the timing of control line.
  - Check the wiring of RS232C cable.
  - Check the wiring of control line.
  - Make sure content of send data and communication format are established before driving RS instruction.
- YES: 
  - Match the communication format.
  - Check the wiring of control line.
  - Check the start timing of send, receive.

No send or receive error:
- NO: 
  - Check wiring of control line.
  - Check timing of send, receive.
  - Change RS instruction from OFF to ON.
  - Make sure the received data length matches with the receive data area length.
- YES: 
  - Check wiring of RS232C cable.
  - Check the 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.

Is send wait flag M8121 turned on?
- NO: 
  - Check that the program is not set so that M8122 may be always on.
- YES: 
  - Check wiring of control line.
  - Check timing of send, receive.
  - Change RS instruction from OFF to ON.
  - Make sure the received data length matches with the receive data area length.

Is SD LED (send) lit up momentarily?
- 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.

Note: Only one of the following devices can be connected to the communications port on the left of the PC: FX-8AV, FX2-40AW, FX2-40AP, FX-232ADP, FX-485ADP.
1. Is RD LED (receive) lit?
   - No
     - Is M8123 turned on?
       - No, receive completion
       - Yes
         - All data is received?
           - Yes
             - 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.
           - NO
             - Monitor data in hexadecimal notation (HEX).
             - Check on/off of M8161.
             - Confirm send data format of the sending device.
         - NO
           - 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.
     - 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.

2. Are the contents of receive data unintelligible?
   - Yes
     - Monitor data in hexadecimal notation (HEX).
   - NO
     - Normal

[When M8123 is reset, the PC returns to the wait state.]
Guidelines for the safety of the user and protection of the FX-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 FX-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 FX-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 to your specific application.