This manual contains text, diagrams and explanations which will guide the reader in the correct installation and operation of the FX-16NP/NT interface unit and 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 MANUAL and A SERIES MANUALS.

1 INTRODUCTION

- The FX-16NP/NT interface unit connects the FX programmable controller (or FX PC) to the MELSECNET/ MINI-S3 network as a local station, or as a remote I/O unit of an A2C CPU.
- Use the AJ71PT32-S3 or A1SJ71PT32-S3 master unit or A2C CPU as the master station. Connect the local station to the master station using twisted pair cable or optical fiber cable (A2C CPU can only use twisted pair cable).
- 8 input points and 8 output points can be transmitted on the network.
- Number of occupied stations: 2 stations (Maximum number of stations: 64)
- Number of occupied input/output points: 16 input points and 8 output points of the FX PC (24 I/O points in total)
- Maximum distance for station-to-station transmission.
  - Optical fiber cable system: 50 m
  - Twisted pair cable system: 100 m
1.1 External dimensions

Weight : Approx 0.3 kg (0.67 lbs)
Dimensions : mm (inches)
Accessory : Self-adhesive labels special block number labels.

① Extension cable
② POWER LED
③ DC, RD, SD, PC LEDs
④ A ▶ FX RUN, ERR LEDs
⑤ FX ▶ A RUN, ERR LEDs
⑥ SD, RD socket of optical fiber cable
⑦ X, Y I/O LEDs
⑧ Direct mounting hole (2-φ5.5(0.27))
⑨ Groove for mounting DIN rail
(DIN rail width: 35 (1.38))
⑩ Hook for mounting DIN rail

All terminal screws are M3.5 (0.14) type.
**FX-16NP**

Stabilized 24V DC power supply for transmission power.

To 24V DC terminals of the next station.

Extension cable: Connect FX-16NP to FX base (extension) unit. FX supplies 5V DC power.

光学配线

① 光学配线

From SD of the previous station

AC power supply

Grounding resistance of 100Ω or less

To next extension block or unit

② Extension cable: Connect FX-16NP to FX base (extension) unit. FX supplies 5V DC power.

③ Stabilized 24V DC power supply for transmission power.

To 24V DC terminals of the next station.

Extension cable: Connect FX-16NP to FX base (extension) unit. FX supplies 5V DC power.

From SDA of the previous station

From SDB of the previous station

From SG of the previous station

From RD of the previous station

To RD of the next station

Optical fiber cable

To RD of the next station

To SG of the next station

To FG of the next station

**FX-16NT**

Stabilized 24V DC power supply for transmission power.

To 24V DC terminals of the next station.

Extension cable: Connect FX-16NT to FX base (extension) unit. FX supplies 5V DC power.

AC power supply

Grounding resistance of 100Ω or less

To next extension block or unit

③ Stabilized 24V DC power supply for transmission power.

To 24V DC terminals of the next station.

Extension cable: Connect FX-16NT to FX base (extension) unit. FX supplies 5V DC power.

From SDA of the previous station

From SDB of the previous station

From SG of the previous station

From RD of the previous station

To RDA of the next station (Receiving side)

To RDB of the next station

To SG of the next station

To FG of the next station
2.1 Key to numbered items on Terminal Layout diagram

1. When using twisted pair cable, connect SDA to the RDA and SDB to the RDB of the next station, and RDA to the SDA and RDB to the SDB of the previous station. Connect all the LINK SG terminals together. Do not lay power cables or other power lines near or parallel to the transmission lines.

2. When using optical fiber cable, connect SD to the RD of the next station and RD to the SD of the previous station so that the whole link forms a loop.

2.2 Use of crimp-style terminals

Use crimp-style terminals of the indicated dimensions. Tightening torque: 0.5 to 0.8 Nm (5 to 8 kgf-cm). Tighten the terminals carefully to avoid any malfunctions.

3. SPECIFICATIONS

3.1 Environmental specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental specifications (excluding dielectric withstand voltage)</td>
<td>Same as those for the FX, FXc base unit</td>
</tr>
<tr>
<td>Dielectric withstand voltage</td>
<td>500V AC for 1 minute (between all terminals and ground)</td>
</tr>
</tbody>
</table>

3.2 Performance specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Optical data link</th>
<th>Twisted pair link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface unit</td>
<td>FX-16NP</td>
<td>FX-16NT</td>
</tr>
<tr>
<td>Master station</td>
<td>AJ71PT32-S3, A1SJ71PT32-S3</td>
<td>AJ71PT32-S3, A1SJ71PT32-S3, A2C(J)CPU</td>
</tr>
<tr>
<td>Plastic fiber cable</td>
<td>Shielded twisted pair cable</td>
<td></td>
</tr>
<tr>
<td>Maximum station-to-station distance</td>
<td>50m (160 ft.) between stations.</td>
<td>50m for 0.2mm² to 0.5mm², 100m for 0.5mm² or larger. See 3.4 for more details.</td>
</tr>
<tr>
<td>Occupied stations</td>
<td>2 stations (8 bits for input and 8 bits for output). MELSECNET/MINI-S3 can support up to 64 stations.</td>
<td></td>
</tr>
<tr>
<td>Input points</td>
<td>8 points (however, actually 16 points occupied in FX, FXcc): A TO FX, FXcc</td>
<td></td>
</tr>
<tr>
<td>Output points</td>
<td>8 points (8 points occupied in FX, FXcc): FX, FXcc TO A</td>
<td></td>
</tr>
</tbody>
</table>
| No. units per FX base unit | Limited only by the I/O capacity of the base unit. | Continued...
### 3.3 Power supply specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Contents</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power source for communication</td>
<td>24V DC +30% -35%, 0.12A (from the stabilized power supply)</td>
<td>The power lines for communication and the power lines for the interface are isolated from each other.</td>
</tr>
<tr>
<td>Power source for interface</td>
<td>5V DC 80 mA (internal power supply from FX, FX2C)</td>
<td></td>
</tr>
</tbody>
</table>

### 3.4 Recommended specification of twisted pair cable

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable type</td>
<td>Shielded twisted-wire pair cable</td>
</tr>
<tr>
<td>Number of pairs</td>
<td>2 pairs or more</td>
</tr>
<tr>
<td>Conductor resistance (20°C)</td>
<td>88.0 Ω/km or less</td>
</tr>
<tr>
<td>Capacitance (1 kHz)</td>
<td>60 nF/km or less</td>
</tr>
<tr>
<td>Characteristic impedance (100 kHz)</td>
<td>110 ±10 Ω</td>
</tr>
</tbody>
</table>

### 3.5 Recommended specification of optical fiber cable

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable optical cable</td>
<td>Plastic fiber cable</td>
</tr>
<tr>
<td>Cable transmission loss</td>
<td>260 dB/km (853 dB/kft.)</td>
</tr>
<tr>
<td>Optical fiber outside dimensions</td>
<td>1 mm</td>
</tr>
<tr>
<td>Connector</td>
<td>1-core connector</td>
</tr>
<tr>
<td>Allowable bend radius</td>
<td>At least 25 mm (0.98 inches) or less</td>
</tr>
</tbody>
</table>

The following pre-terminated optical cables are available: F-OFC-M10: 10 m (30 ft.), F-OFC-M30: 30 m (90 ft.), F-OFC-M50: 50 m (160 ft.)
4 COMMUNICATION SETTING

4.1 Setting the station number
FX, FX2C to A communication and A to FX, FX2C communication will each require a different station number. Station numbers (#01 to #64) can be set using rotary switches SW1 to SW4. (You will have to remove the model name cover to make the settings.)

Output (A to FX, FX2C) station number setting switch SW1 (×10).
Input (A to FX, FX2C) station number setting switch SW2 (×1).
Output (FX, FX2C to A) station number setting switch SW3 (×10).
Input (A to FX, FX2C) station number setting switch SW4 (×1).
E. C. M switch SW5.

4.2 E. C. M (Emergency Clear Mode) setting
When the MELSECNET/MINI-S3 master station stops signal communication (I/O refresh) and is in STOP mode, the E. C. M switch can be changed. Set it as shown below. The E. C. M switch location is show in section 4.1.

<table>
<thead>
<tr>
<th>E. C. M switch (SW5)</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>The data received just before a communication stoppage is retained.</td>
</tr>
<tr>
<td>ON</td>
<td>The data is not retained. All the FX-16NP or FX-16NT input points will be reset.</td>
</tr>
</tbody>
</table>
4.3 Allocation of input/output numbers (on the FX, FX2c)

The FX-16NP/NT enables bit device data to be sent and received between the FX, FX2c and an A Series PC using 8 input points and 8 output points. For such operation, the input/output numbers should be allocated on the FX, FX2c as shown below.

<table>
<thead>
<tr>
<th>Communication direction</th>
<th>Description</th>
<th>Allocation of input/output numbers</th>
<th>I/O monitor LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>A to FX, FX2c</td>
<td>The FX, FX2c will only receive the data sent by the A Series PC which corresponds to its station number.</td>
<td>X(n+1)0 – X(n+1)7</td>
<td>X0 – X7</td>
</tr>
<tr>
<td>FX, FX2c to A</td>
<td>The data sent by the FX, FX2c to A Series PC is identified by the station number of the FX, FX2c.</td>
<td>Ym0 – Ym7</td>
<td>Y0 – Y7</td>
</tr>
<tr>
<td>A to FX, FX2c</td>
<td>On when input data is received normally.</td>
<td>Xn4</td>
<td>RUN</td>
</tr>
<tr>
<td>FX, FX2c to A</td>
<td>On when input data is received abnormally.</td>
<td>Xn5</td>
<td>ERR</td>
</tr>
<tr>
<td>A to FX, FX2c (Status)</td>
<td>On when output data is received normally.</td>
<td>Xn6</td>
<td>RUN</td>
</tr>
<tr>
<td>FX, FX2c to A (Status)</td>
<td>On when output data is received abnormally.</td>
<td>Xn7</td>
<td>ERR</td>
</tr>
</tbody>
</table>

"n" and "m" digits vary depending on the I/O address of FX-16NP/NT.

4.4 Example of allocation

As with other extension blocks, the I/O numbers allocated to the FX, FX2c system should be continuously numbered in octal beginning from the base unit. This is shown in the diagram below.

Input:

\[ X_{000} - X_{037} \]
\[ Y_{000} - Y_{037} \]
\[ Y_{040} - Y_{047} \]
\[ X_{050} - X_{057} \]
\[ Y_{050} - Y_{057} \]

Output:

\[ X_{040} - X_{047} \]
\[ Y_{040} - Y_{047} \]
\[ Y_{050} - Y_{057} \]

Note: The input points, X40 to X43 (1st, 4 points) are not used by the link unit, but are included into the number of I/O occupied.
5.1 Example of input/output signal allocation and operation
(master unit: AJ71PT32-S3 or AISJ71PT32-S3)

Note: This manual is not intended to explain how to program the A Series PC to operate a network. For a
detailed description of the A Series PC and A Series master unit programming, including buffer
memory (BFM) assignments, please refer to the relevant A Series manuals.

Operation:
1. Input signals X000 through X007 of a FX-32MR will be output to Y030 through Y037 of an A Series PC.
2. Input signals X020 through X027 of the A Series PC will be output to Y000 through Y007 of the
FX-32MR.

Please see the following diagrams for the system configuration and operation.

5.2 System configuration

Signals from the FX to the A Series PC.

Signals from the A Series PC to the FX.
5.3 Flow of signals through the network

Signals X000 though X007 of the FX PC will be sent to the A Series PC via Y020 to Y027 of the FX-16NP/NT.

Signals X030-X037 received from the A Series PC by the FX-16NP/NT are output through Y000-Y007 of the FX.

Programming is explained in the following sections.

5.4 FX-32MR ladder program

Signals X000 though X007 of the FX PC will be sent to the A Series PC via Y020 to Y027 of the FX-16NP/NT.

Signals X030-X037 received from the A Series PC by the FX-16NP/NT are output through Y000-Y007 of the FX.
5.5 A Series PC ladder program

Ladder diagram for the A Series PC. Please see the next section for the explanation.

5.6 Key to the lettered items on the A Series PC ladder program

A. First two digits of the first input of the master station.
B. Total number of remote stations, K2, transferred to BFM #0.
C. Number of retries, K3, transferred to BFM #1.
D. Begin link communication.
E. BFM #110 : Data received from the FX PC.
F. BFM #10 : Data sent to the FX PC.

Data transfer FROM BFM #110 (data from FX inputs) to A Series output, Y030-Y037. See point E.

Data transfer TO BFM #10 (data from A Series inputs). This can then be sent to the FX-16NP/NT. See point F.
DIAGNOSTICS

(1) When RD/SD LED of the interface block does not light up:

<table>
<thead>
<tr>
<th>Check item</th>
<th>Contents</th>
<th>Normal status</th>
<th>Abnormal status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the DC power source within the specified range?</td>
<td>Check if the DC LED of the I/F block is on/off.</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Does the RD/SD LED of the I/F block blink?</td>
<td>Check for causes in the test mode or the line check mode of the master unit.</td>
<td>Blinks</td>
<td>OFF</td>
</tr>
</tbody>
</table>

(2) When data can not be communicated:

<table>
<thead>
<tr>
<th>Check item</th>
<th>Contents</th>
<th>Normal status</th>
<th>Abnormal status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the output of the I/F block changing correctly?</td>
<td>Check if the status of output LED of the I/F block matches with the output from the programmable controller.</td>
<td>Match</td>
<td>Mismatch</td>
</tr>
<tr>
<td>Is the power source on each block linked within the NET/Mini network within the specified range?</td>
<td>Check if the PC LED of the I/F block ID is ON or OFF.</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Is the input data assigned to the I/O number properly?</td>
<td>Check the I/O addressing.</td>
<td>Normal</td>
<td>Abnormal</td>
</tr>
<tr>
<td>Is the total number of substations set properly?</td>
<td>Check if the number of stations is set to take 2 stations per I/F block.</td>
<td>2 stations I/F block</td>
<td>Other than 2 stations taken.</td>
</tr>
</tbody>
</table>

If any abnormality persists even though all the above items check out normally, please contact your nearest Mitsubishi representative.
Guidelines for the safety of the user and protection of the FX-16NP, FX-16NT interface unit

- 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-16NP, FX-16NT 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-16NP, FX-16NT 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.

Effective MAR. 1996
Specifications are subject to change without notice.