



## FX-16NP/NT INTERFACE UNIT

### USER'S GUIDE

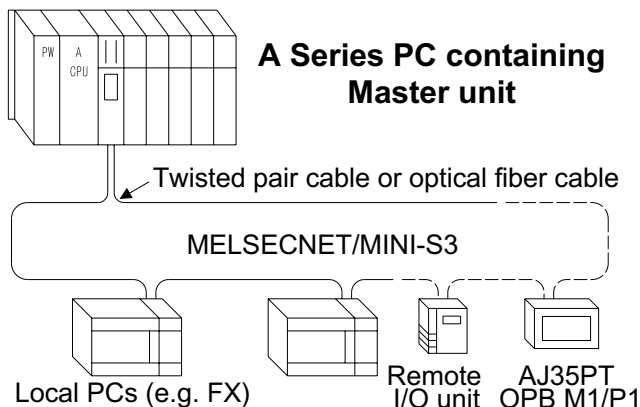
JY992D56201A

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 net work 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

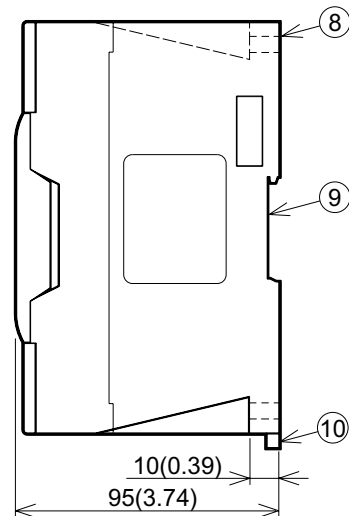
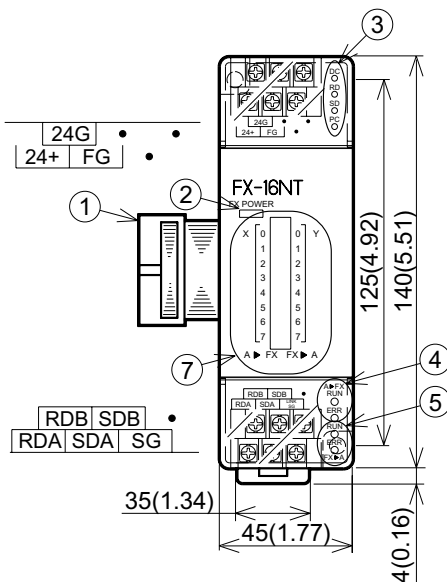
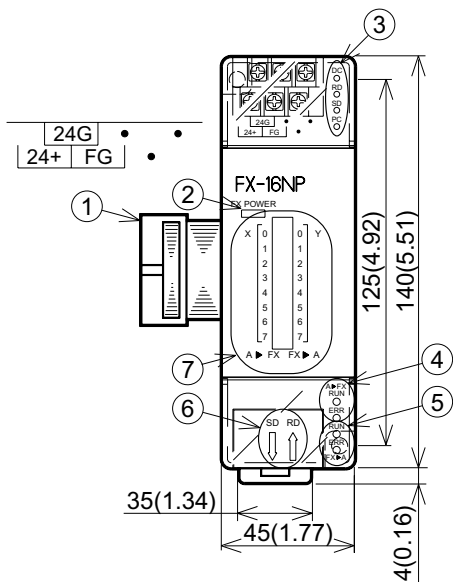
Twisted pair cable system: 100 m

## 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-  $\phi$ 5.5(0.27))
- ⑨ Groove for mounting DIN rail  
(DIN rail width: 35 (1.38))
- ⑩ Hook for mounting DIN rail

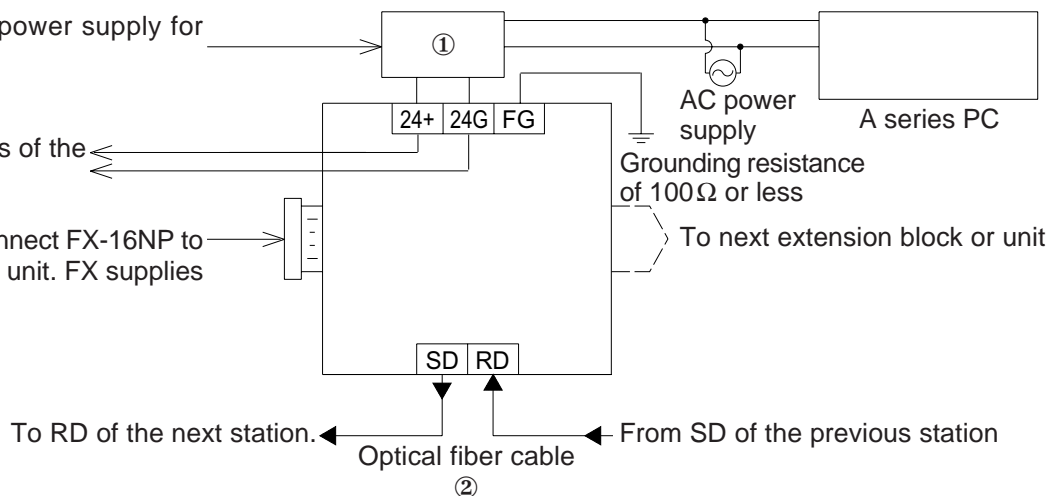
All terminal screws are M3.5 (0.14) type.

## 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.

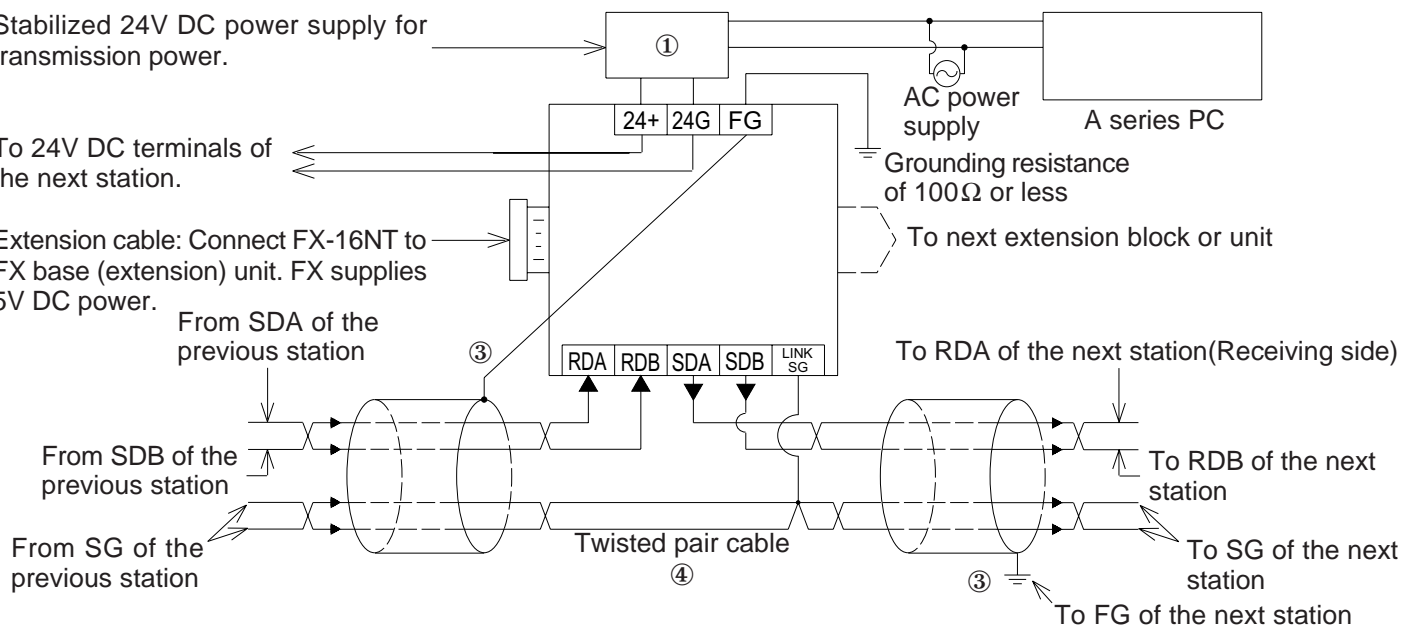


## FX-16NT

Stabilized 24V DC power supply for transmission power.

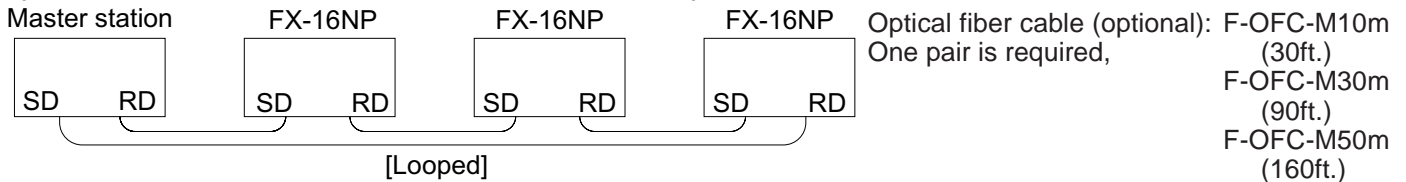
To 24V DC terminals of the next station.

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



## 2.1 Key to numbered items on Terminal Layout diagram

- ① 24V DC transmission power for the network is supplied by the stabilized power supply.
- 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.

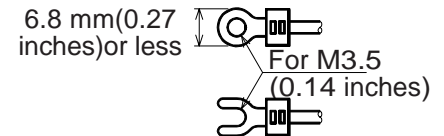


- ③ Use one-point grounding (100Ω or less ) for the shielding of twisted pair cable on the sending or receiving sides.
- ④ When using twisted pair cable, connect **[SDA]** to the **[RDA]** and **[SDB]** to the **[RDB]** of the next station, and **[RDA]** to the **[SDA]** and **[RDB]** to the **[SDB]** 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.

## 2.2 Use of crimp-style terminals

Use crimp-style terminals of the indicated dimensions.

Tightening torque: 0.5 to 0.8 N•m (5 to 8 kgf•cm). Tighten the terminals carefully to avoid any malfunctions.



# 3

## SPECIFICATIONS

### 3.1 Environmental specifications

Item	Contents
Environmental specifications (excluding dielectric withstand voltage)	Same as those for the FX,FX2C base unit
Dielectric withstand voltage	500V AC for 1 minute (between all terminals and ground)

### 3.2 Performance specifications

Item	Optical data link	Twisted pair link
Interface unit	FX-16NP	FX-16NT
Master station cable	AJ71PT32-S3, A1SJ71PT32-S3 Plastic fiber cable	AJ71PT32-S3, A1SJ71PT32-S3, A2C(J)CPU Shielded twisted pair cable
Maximum station-to-station distance	50m (160 ft.) between stations.	50m for 0.2mm <sup>2</sup> to 0.5mm <sup>2</sup> , 100m for 0.5mm <sup>2</sup> or larger. See 3.4 for more details.
Occupied stations	2 stations (8 bits for input and 8 bits for output). MELSECNET/MINI-S3 can support up to 64 stations.	
Input points	8 points (however, actually 16 points occupied in FX, FX2c): A TO FX, FX2c	
Output points	8 points (8 points occupied in FX, FX2c): FX, FX2c TO A	
No. units per FX base unit	Limited only by the I/O capacity of the base unit.	

Continued...

Continued...

Item	Contents				
LED Indicators	A to FX	RUN	Lights up when input data is received normally.	Xn4	During normal operation; Xn4, Xn6 and PC light up, SD and RD blink, and Xn5, Xn7 are off. Xn4 to Xn7 may be utilized in the sequence program. For more details on X and Y addressing see section 4.3.
		ERR	Lights up when input data is received abnormally.	Xn5	
	FX to A	RUN	Lights up when output data is transmitting normally.	Xn6	
		ERR	Lights up when output data is transmitting abnormally.	Xn7	
	SD/RD		Brinks when data is transmitted/received.		
	PC		Light up if the PC and the interface are operating normally.		
	X (n+1) 0 to X (0+1) 7		Input data		
	Ym0 to Ym7		Output data		
Reset/hold (E.C.M) switch	If a problem occurs, the last piece of data from the master is reset or held, depending on the position of this switch, at the point when communication stops.				

### 3.3 Power supply specifications

Item	Contents	Remarks
Power source for communication	24V DC +30% -35%, 0.12A (from the stabilized power supply)	The power lines for communication and the power lines for the interface are isolated from each other.
Power source for interface	5V DC 80 mA (internal power supply form FX, FX2c)	

### 3.4 Recommended specification of twisted pair cable

Item	Specifications
Cable type	Shielded twisted-wire pair cable
Number of pairs	2 pairs or more
Conductor resistance (20°C)	88.0Ω/km or less
Capacitance (1 kHz)	60 n•F/km or less
Characteristic impedance (100 kHz)	110±10Ω

### 3.5 Recommended specification of optical fiber cable

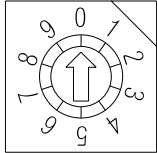
Item	Specifications
Applicable optical cable	Plastic fiber cable
Cable transmission loss	260 dB/km (853 dB/kft.)
Optical fiber outside dimensions	1 mm
Connector	1-core connector
Allowable bend radius	At least 25 mm (0.98 inches) or less

The following pre-terminated optical cables are available.

F-OFC-M10: 10 m (30ft.), F-OFC-M30: 30 m (90 ft.), F-OFC-M50: 50 m (160 ft.)

### 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.)



Enlarged view of station number rotary switch

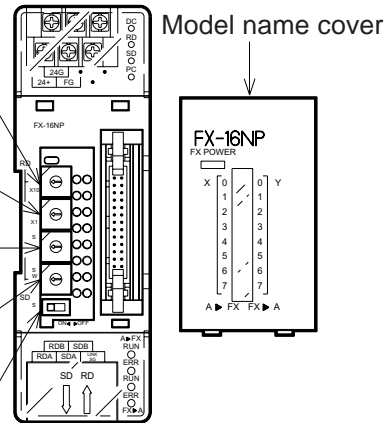
Input (A to FX, FX2C) station number setting switch SW1 (X10).

Input (A to FX, FX2C) station number setting switch SW2 (X1).

Output (FX, FX2C to A) station number setting switch SW3 (X10).

Output (FX, FX2C to A) station number setting switch SW4 (X1).

E. C. M switch SW5.



FX-16NP or FX-16NT

Location of station number setting switches.

### 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 shown in section 4.1.

E. C. M switch (SW5)	Effect
OFF	The data received just before a communication stoppage is retained.
ON	The data is not retained. All the FX-16NP or FX-16NT input points will be reset.

### 4.3 Allocation of input/output numbers (on the FX, FX2c)

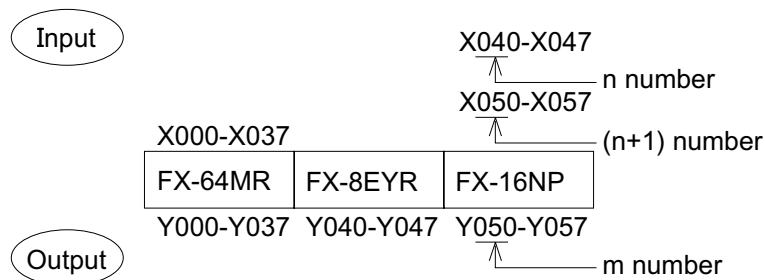
The FX-16NP/NT enables bit device data to be sent and received between the FX, FX2c and an A Series PC using 8 input points and 8 output points. For such operation, the input/output numbers should be allocated on the FX, FX2c as show below.

Communication direction	Description	Allocation of input/output numbers	I/O monitor LED
A to FX, FX2C (Input data)	The FX, FX2C will only receive the data sent by the A Series PC which corresponds to its station number.	$X(n+1)0 - X(n+1)7$	$X0 - X7$
FX, FX2C to A (Output data)	The data send by the FX, FX2C to A Series PC is identified by the station number of the FX, FX2C.	$Ym0 - Ym7$	$Y0 - Y7$
A to FX, FX2C (Status)	On when input data is received normally.	$Xn4$	RUN
	On when input data is received abnormally.	$Xn5$	ERR
FX, FX2C to A (Status)	On when output data is received normally.	$Xn6$	RUN
	On when output data is received abnormally.	$Xn7$	ERR

“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.



*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)

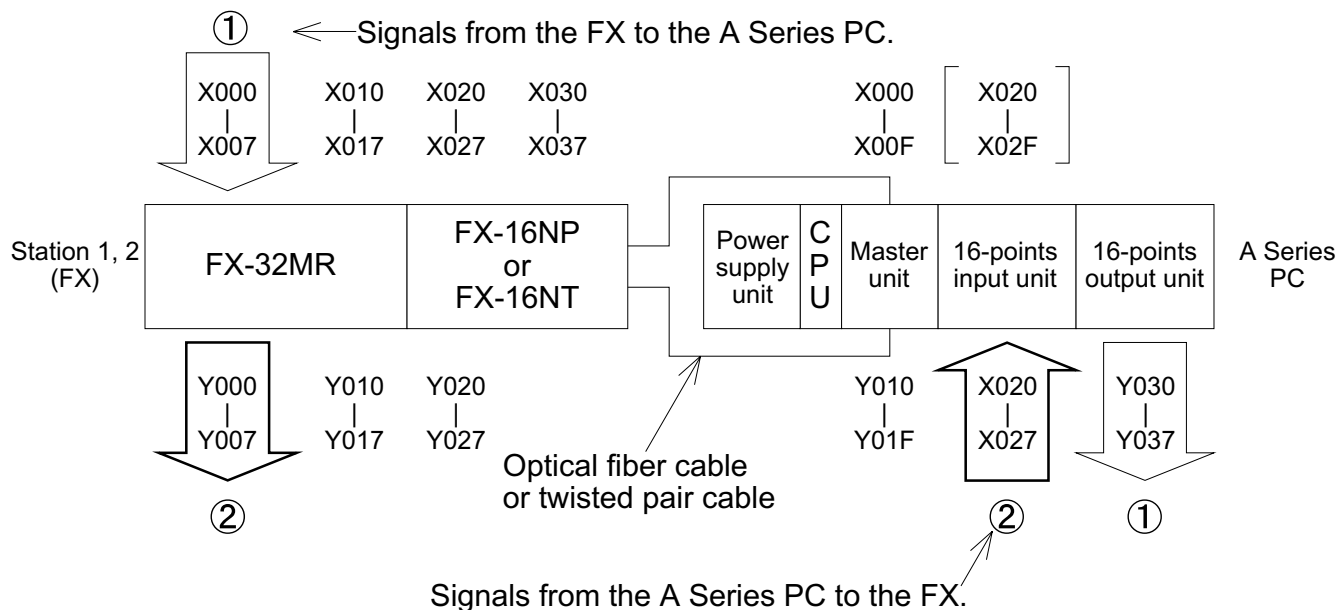
*Note: This manual is not intended to explain how to program the A Series PC to operate a network. For a detailed description of the A Series PC and A Series master unit programming, including buffer memory (BFM) assignments, please refer to the relevant A Series manuals.*

*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.

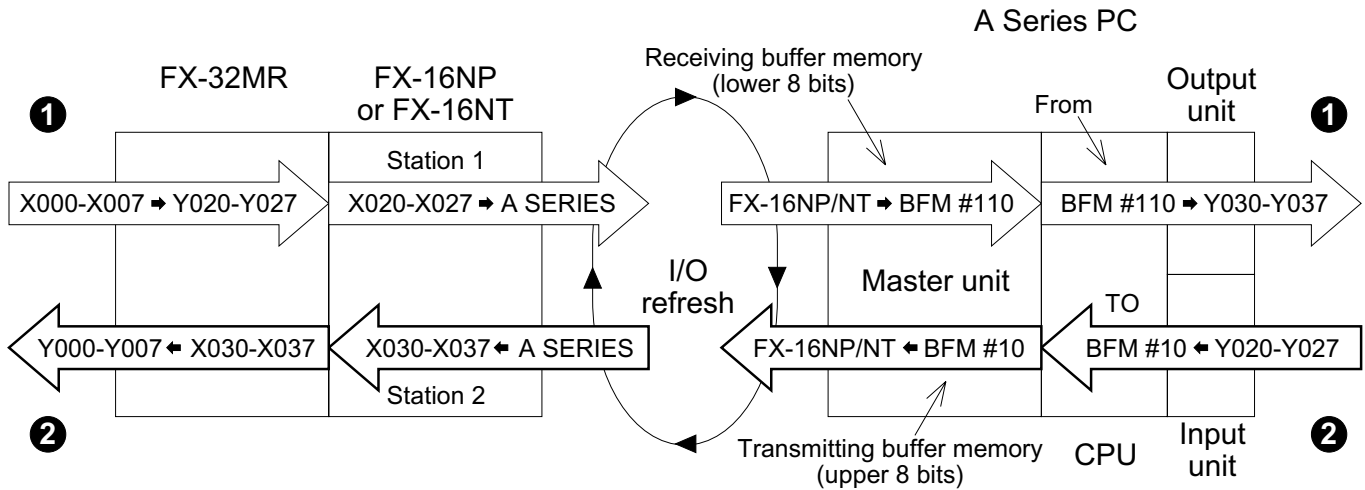
Please see the following diagrams for the system configuration and operation.

### 5.2 System configuration



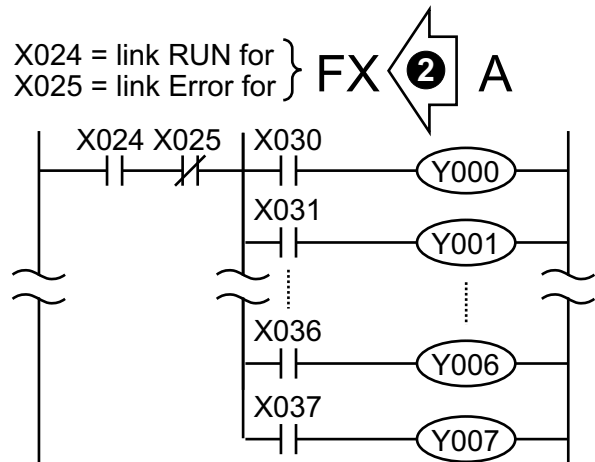
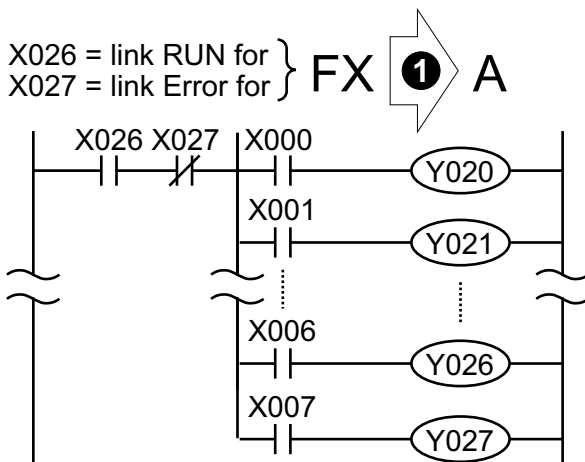


### 5.3 Flow of signals through the network



Programming is explained in the following sections.

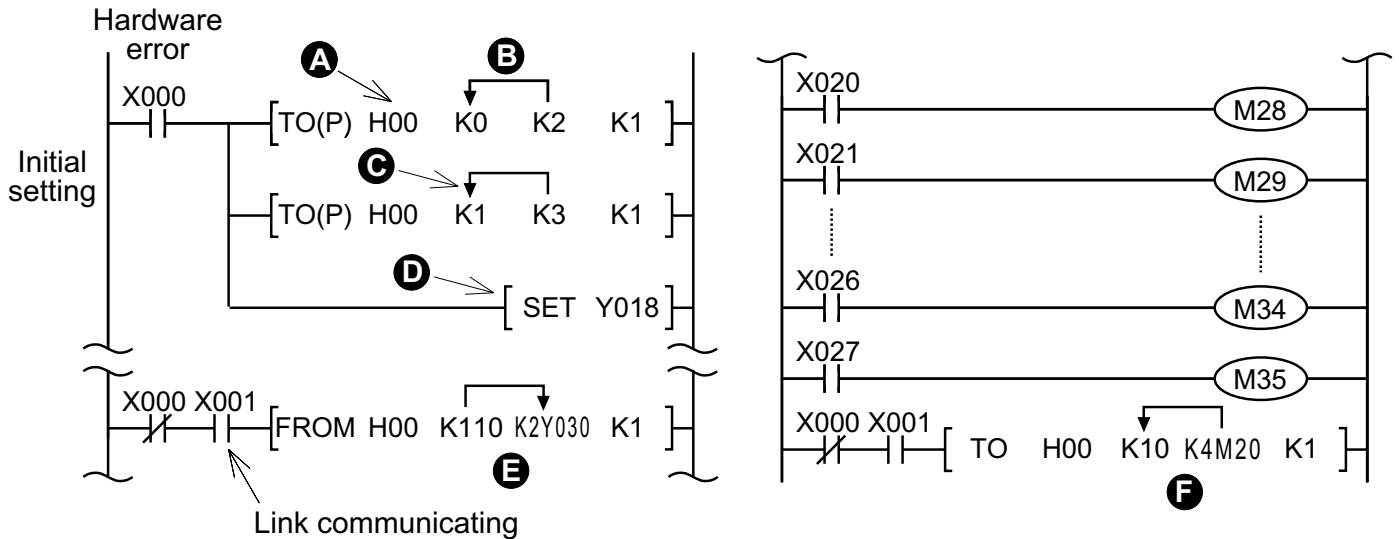
### 5.4 FX-32MR ladder program



Signals X000 through 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.

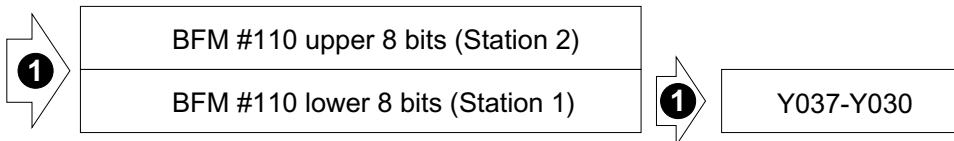
## 5.5 A Series PC ladder program



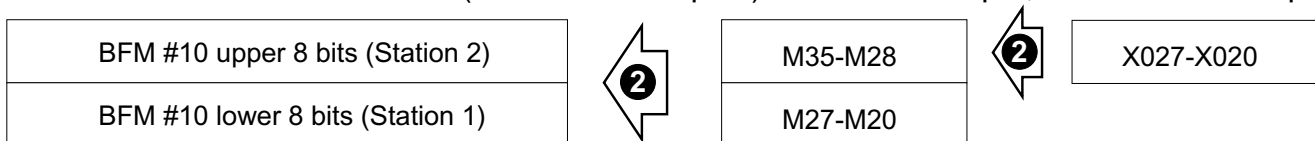
Ladder diagram for the A Series PC. Please see the next section for the explanation.

## 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**.

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

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

(2) When data can not be communicated:

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

Continued

Is the station number of the I/F block correct?	Check if the number of the I/F block is within 1 to 64 and is not already used by other blocks.	Within the range and not already used	Out of the range or already used
Does the LED indication of the I/F block match with the LED for monitoring the input/output on the master station?	Monitor and check the I/F station with the abnormal data using the monitor station switch of the master station.	Match	Mismatch
Check the program of the master station which reads the data from the master unit.	Is the address to read the data from the buffer memory correct?	Normal	Abnormal
	Check the program to transfer the data read from the buffer memory to the bit device.	Normal	Abnormal
Is the DC power source of the I/F block within the specified range?	Check if the DC LED of the I/F block is ON or OFF.	ON	OFF
Is there a misconnection of the data link cable or something similar?	Check it by reading the abnormality detection code in the buffer memory of the master station.	No abnormality found	Abnormality found

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.

Manual number: JY992D56201

Manual revision: A

Data : March 1996



**MITSUBISHI ELECTRIC CORPORATION**

HEAD OFFICE : MITSUBISHI DENKI BLDG MARUNOUCH TOKYO 100 TELEX : J24532 CABLE MELCO TOKYO  
HIMEJI WORKS : 840, CHIYODA CHO, HIMEJI, JAPAN