Machine Controller MP900 Series

260IF DeviceNet System

USER'S MANUAL

YASKAWA

MANUAL NO. SIEZ-C887-5.2

Safety Information

The following conventions are used to indicate precautions in this manual. Failure to heed precautions provided in this manual can result in serious or possibly even fatal injury or damage to the products or to related equipment and systems.

⚠ WARNING

Indicates precautions that, if not heeded, could possibly result in loss of life or serious injury.

⚠ Caution

Indicates precautions that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.

In some situations, the precautions indicated could have serious consequences if not heeded.

Prohibited

Indicates prohibited actions that must not be performed. For example, this symbol would be used to indicate that fire is prohibited as follows: .

Mandatory

Indicates compulsory actions that must be performed. For example, this symbol would be used as follows to indicate that grounding is compulsory: .

Visual Aids

The following aids are used to indicate certain types of information for easier reference.

IMPORTANT

Indicates important information that should be memorized.

Also, indicates low-level precautions that, if not heeded, may cause an alarm to sound but will not result in the device being damaged.

INFO

Indicates additional information or information that is useful to have memorized.

TERMS

Describes technical terms that are difficult to understand, or appear in the text without an explanation being given.

CONTENTS

About This Manual

- This manual describes the DeviceNet Interface Option Module (called the 260IF Module) that is mounted to the Machine Controllers listed below to perform communications with DeviceNet™ devices.
  - MP920 Machine Controller
  - MP940 Machine Controller (built-in 260IF Module)
- The DeviceNet is a multivendor field network. DeviceNet specifications are controlled by the ODVA（Open DeviceNet Vendor Association, Inc.).

  The 260IF Module is connected to a multivendor DeviceNet system and works as either a DeviceNet Master or Slave.
- Refer to the *DeviceNet Specifications* published by the ODVA for information on the DeviceNet.
- Read this manual before creating a DeviceNet system including MP900 Series Machine Controllers and store it in a safe place for future reference.
- Refer to the following related manuals for information on the Controller.

Related Manuals

- Refer to the following related manuals as required.
- Thoroughly check the specifications, restrictions, and other conditions of the product before use.

Manual Name	Manual Number	Contents
MP900 Series Machine Controller User's Manual: Ladder Programming	SI-C887-1.2	Describes the instructions used in MP900 Series ladder logic programming.
MP900 Series Machine Controller User's Manual: Motion Programming	SI-C887-1.3	Describes the motion programming language used for MP900 Series Machine Controllers.
MP900 Series Machine Controller Software User's Manual: Programming Panel Software (for simple operation/standard operation)	SIEZ-C887-2.3 (for simple operation) (To be prepared), SIEZ-C887-2.4 (for standard operation) (To be prepared)	Describes the installation and operating procedures for the CP-717 Programming Panel software used for MP900 Series Machine Controllers.
MP920 Machine Controller User's Manual: Design and Maintenance	SIZ-C887-2.1B	Describes the design and maintenance for the MP920 Machine Controller.
MP940 Machine Controller User's Manual: Design and Maintenance	SIZ-C887-4.1	Describes the design and maintenance for the MP940 Machine Controller.

Using This Manual

■ Intended Audience

This manual is intended for the following users.

- Those responsible for estimating the 260IF Module
- Those responsible for deciding whether to apply the 260IF Module
- Those responsible for designing the 260IF Module so that it can be mounted in the control and operation panels
- Those responsible for making, inspecting, testing, adjusting, and maintaining the control and operation panels in which the 260IF Module is mounted

■ Description of Technical Terms

In this manual, the following terms are defined as follows:

- PP = Programming Panel
- PC = Programmable Logic Controller
- 260IF = The DeviceNet Option Module for use with MP900 Series Machine Controllers
- “--" in “MOV [axis1]--..." represents numeric data for axis 1.

■ Inverted Signals

In this manual, a slash (/) is placed in front of the name of any signal that is valid when low (L).

- $\overline{\text{S-ON}}$ = /S-ON
- $\overline{\text{P-CON}}$ = /P-CON

Registered Trademark

- DeviceNet is a registered trademark of ODVA (Open DeviceNet Vender Association, Inc.).

Safety Precautions

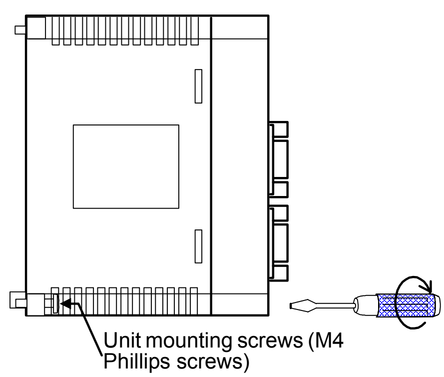
This section describes precautions that apply to correct use of devices. Before installing, operating, maintaining or inspecting devices, always read this manual and all other documents provided to ensure correct programming. Before using the equipment, familiarize yourself with equipment details, safety information, and all other precautions.

■ Installation

⚠ Caution

- Firmly tighten the Module mounting screws and terminal block mounting screws to prevent them from loosening during operation.

  Loose screws may result in a malfunction of the 260IF Module.



- Always turn OFF the power supply to the Module before installing it.
- Insert the connectors of the cables that are to be connected to the 260IF Module and secure them well.

  Incorrect insertion of the connectors may result in a malfunction of the 260IF Module.

■ Wiring

⚠ Caution

- Always connect a power supply that meets the given specifications.

  Connecting an inappropriate power supply may cause fires.
- Wiring must be performed by qualified personnel.

  Incorrect wiring may cause fires, product failure, or malfunctions.
- Do not accidentally leave foreign matter such as wire chips in the Module when wiring.

  This may cause fires, failures, and malfunctions.

Mandatory

- Always ground the FG terminal to a ground resistance 100 Ω or less.

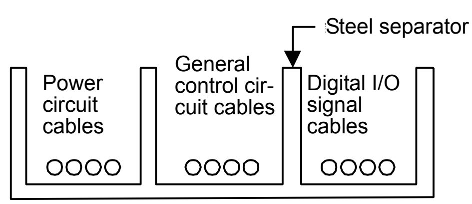
  Failure to ground the 260IF Module may result in electrical shocks or malfunctioning.

Select, separate, and lay external cables correctly.

- Consider the following items when selecting the I/O signal lines (external cables) to connect the 260IF Module to external devices.
  - Mechanical strength
  - Noise interference
  - Wiring distance
  - Signal voltage, etc.
- Separate the I/O signal lines from the power lines both inside and outside the control panel to reduce the influence of noise from the power lines.

  If the I/O signal lines and power lines are not separated properly, malfunctioning may result.

Example of Separated External Cables



■ Application

⚠ WARNING
• Do not touch any Module terminals when the system power is ON. There is a risk of electrical shock.

⚠ Caution
• Do not attempt to modify the 260IF Module programs, force outputs, switch between RUN and STOP, or performed other similar operations while the 260IF Module is operating without knowing the direct and indirect consequences of the operation. Incorrect programming or operation may damage the equipment or cause an accident.

■ Maintenance

⚠ WARNING

- Make sure that the polarity of the Module's built-in battery is correct. The battery must be installed correctly and must not be charged, disassembled, heated, thrown into fire, or short-circuited.

  Improper handling may cause the battery to explode or ignite.

Prohibited

- Do not attempt to disassemble or modify the 260IF Module in any way.

  Doing so can cause fires, product failure, or malfunctions.
- The customer must not replace any built-in fuses.

  If the customer replaces a built-in fuse, the 260IF Module may malfunction or break down. The built-in fuse must always be replaced by Yaskawa service staff.

■ General Precautions

Always note the following to ensure safe use.
• The 260IF Module was not designed or manufactured for use in devices or systems directly related to human life. Users who intend to use the product described in this manual for special purposes such as devices or systems relating to transportation, medical, space aviation, atomic power control, or underwater use must contact Yaskawa Electric Corporation beforehand. • The 260IF Module has been manufactured under strict quality control guidelines. However, if this product is to be installed in any location in which a failure of the 260IF Module involves a life and death situation or in a facility where failure may cause a serious accident, safety devices MUST be installed to minimize the likelihood of any accident. • Drawings in this manual show typical product examples that may differ somewhat from the product delivered. • This manual may change without prior notice due to product improvements and specification changes or for easier use. We will update the manual number of the manual and issue revisions when changes are made. The revision number of the revised manual appears on the back of the manual. • Contact your nearest Yaskawa sales representative or the dealer from whom you purchased the product and quote the manual number on the front page of the manual if you need to replace a manual that was lost or destroyed. • Contact your nearest Yaskawa sales representative or the dealer from whom you purchased the product to order new nameplates whenever a nameplate becomes worn or damaged. • Products modified by the customer are not covered by the Yaskawa warranty, nor does Yaskawa assume any liability for injury or damage that may result from such modifications.

1 Outline

1

This chapter describes the DeviceNet Communications Interface (called the 260IF Module), an Option Module for MP900 Machine Controllers.

1

1.1 Outline of Configuration and Functions

The DeviceNet is a multivendor field network. DeviceNet specifications are controlled by the ODVA（Open DeviceNet Vendor Association, Inc.).

The 260IF Module connects to a multivendor DeviceNet system and works as either a DeviceNet Master or Slave.

Refer to the DeviceNet specifications published by the ODVA for information on the DeviceNet.

1.1.1 System Configuration

The 260IF Module is a communications interface used to connect MP900 Machine Controllers to a DeviceNet network. Using the 260IF Module enables communications between MP900 Machine Controllers, other controllers, sensors, actuators, and other devices manufactured by other companies.

The 260IF Module can be connected to the DeviceNet as a Master or Slave.

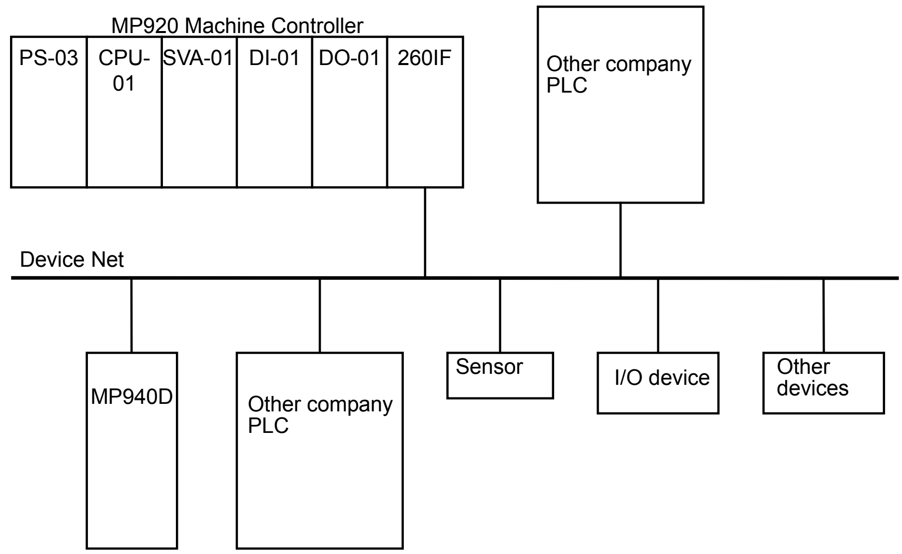


Fig 1.1 System Configuration

Master/Slave

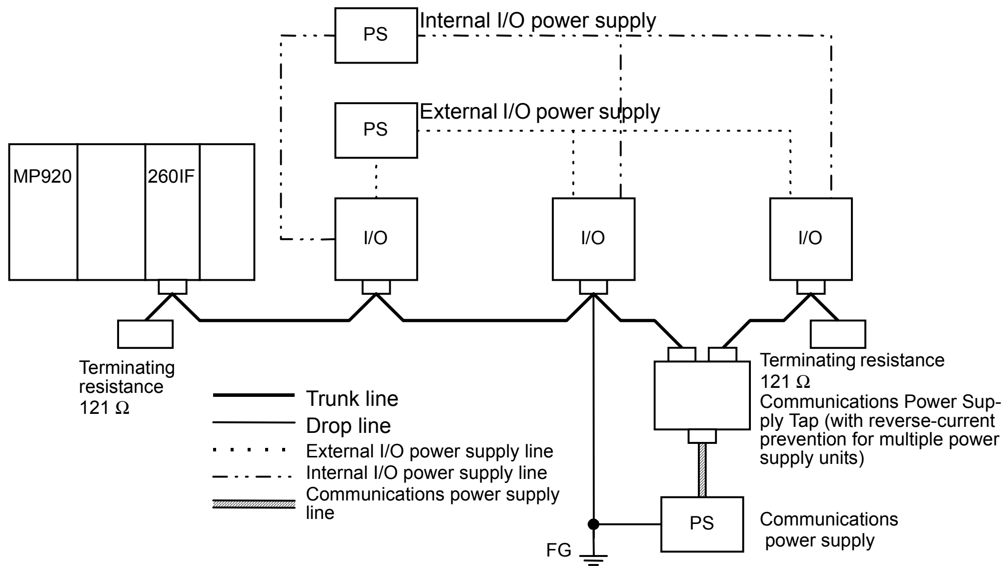
There are restrictions on the Machine Controller models that can be used as a Master or Slave.

Model	Master	Slave	260IF Module Mounting Method
MP920	OK	OK	Option slot
MP940	Not possible	OK	Built-in

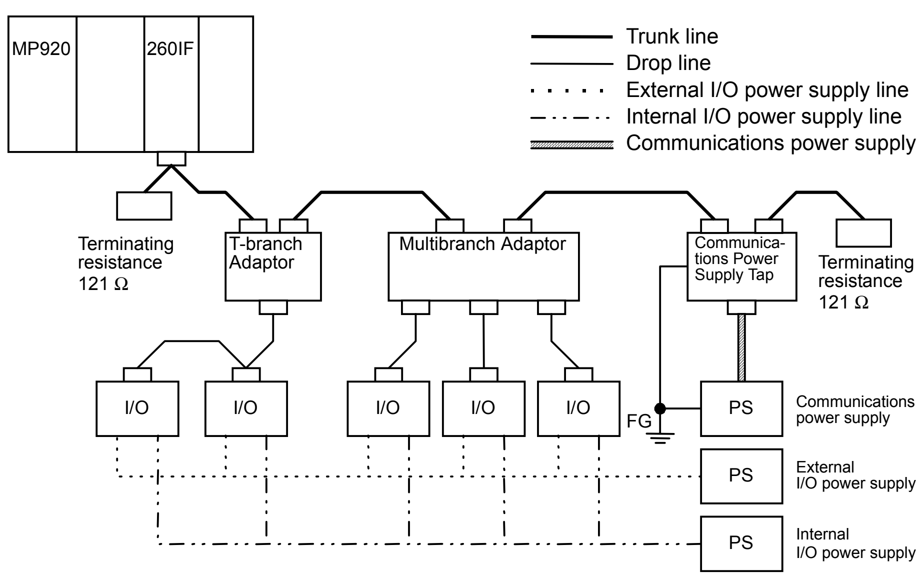
1.1.2 Master Mode

There are two connection methods for Master Modes.

■Multi-drop Connections



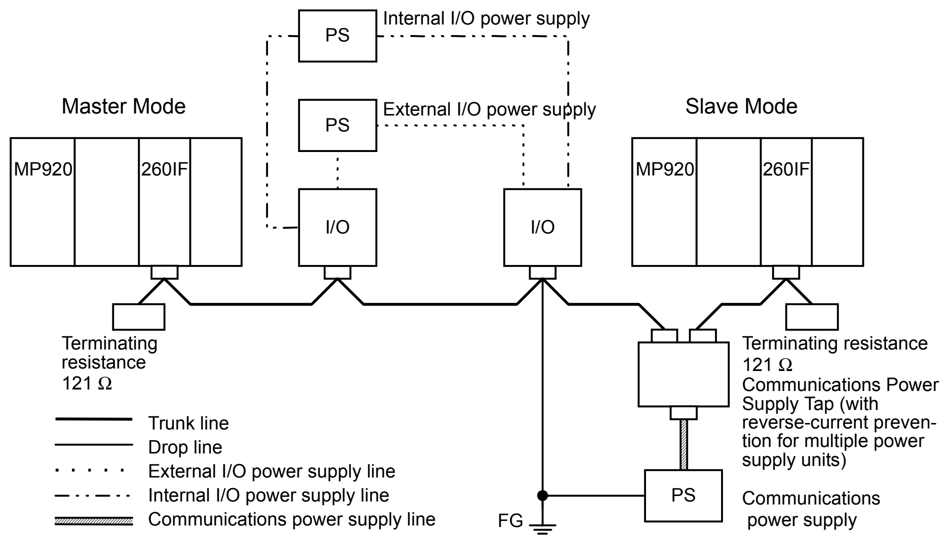
■T-branch, Multibranch, and Drop-line Branching Connections



1

1.1.3 Slave Mode

The following diagram shows the system configuration when the 260IF Module is used in Slave Mode.



1.1.4 Functional Outline

■I/O Communications

The I/O communications function uses DeviceNet I/O connections to exchange data between DeviceNet devices connected on the communications path and the MP900 Machine Controller.

The CP-717 Engineering Tool is used to allocate I/O registers in the Controller's CPU for I/O communications.

■Message Communications

The message communications function sends explicit messages that read the DeviceNet device names or serial numbers and write parameters for DeviceNet devices.

The MSG-SND function is used for message communications.

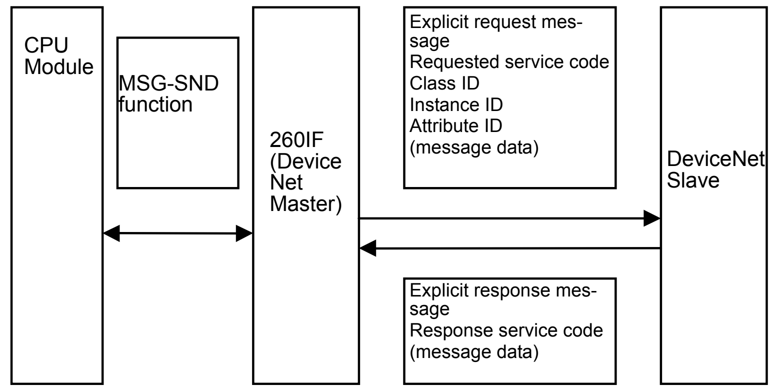


Fig 1.2 Message Communications Functions

Note: Message communications that use MSG-SND functions can be used when the 260IF Module is set as a DeviceNet Master.

2 Basic Specifications

This chapter describes the external appearance of the 260IF Module and the settings and display section specifications.

2

2.1 Specifications

The basic specifications are given for the Interface Module in the following table.

<table>
<tr><th colspan="2">Item</th><th>Specifications</th></tr>
<tr><td colspan="2">Name</td><td>260IF Module</td></tr>
<tr><td colspan="2">Model Number</td><td>JEPMC-CM230</td></tr>
<tr><td colspan="2">Circuit Number</td><td>1</td></tr>
<tr><td colspan="2">Applicable Communications Type</td><td>I/O communications
Explicit messages
(Both conform to DeviceNet.)</td></tr>
<tr><td rowspan="2">I/O Communi-cations</td><td>Max. No. of Slaves</td><td>63 nodes</td></tr>
<tr><td>Max. I/O Bytes</td><td>2048 bytes, 256 bytes/node</td></tr>
<tr><td rowspan="3">Message Communica-tions
(Master Only)</td><td>Max. No. of Nodes for Message Communications</td><td>63 nodes. Simultaneous communications possible with up to 8 nodes.</td></tr>
<tr><td>Max. Message Length</td><td>256 bytes</td></tr>
<tr><td>Function for Execution</td><td>MSG-SND</td></tr>
<tr><td colspan="2">Switches for Settings</td><td>Two rotary switches on the front: for node address
DIP switch on the front: Baud rate
Master/slave selection</td></tr>
<tr><td colspan="2">Indicators</td><td>Two LED indicators: MS and NS</td></tr>
<tr><td colspan="2">Communications Power Supply Voltage</td><td>24 VDC±10% (supplied from a special cable)</td></tr>
<tr><td colspan="2">Current Consumption</td><td>Communications power supply: 45 mA max. (supplied from the communications connector)
Internal circuit power supply (supplied from the PLC)</td></tr>
<tr><td colspan="2">Mass</td><td>100 g</td></tr>
<tr><td colspan="2">Dimensions (mm)</td><td>40 × 130 × 105 (W × H × D)</td></tr>
</table>

2.2 External Appearance

2.2.1 260IF Module

The external appearance of the 260IF Module is shown below.

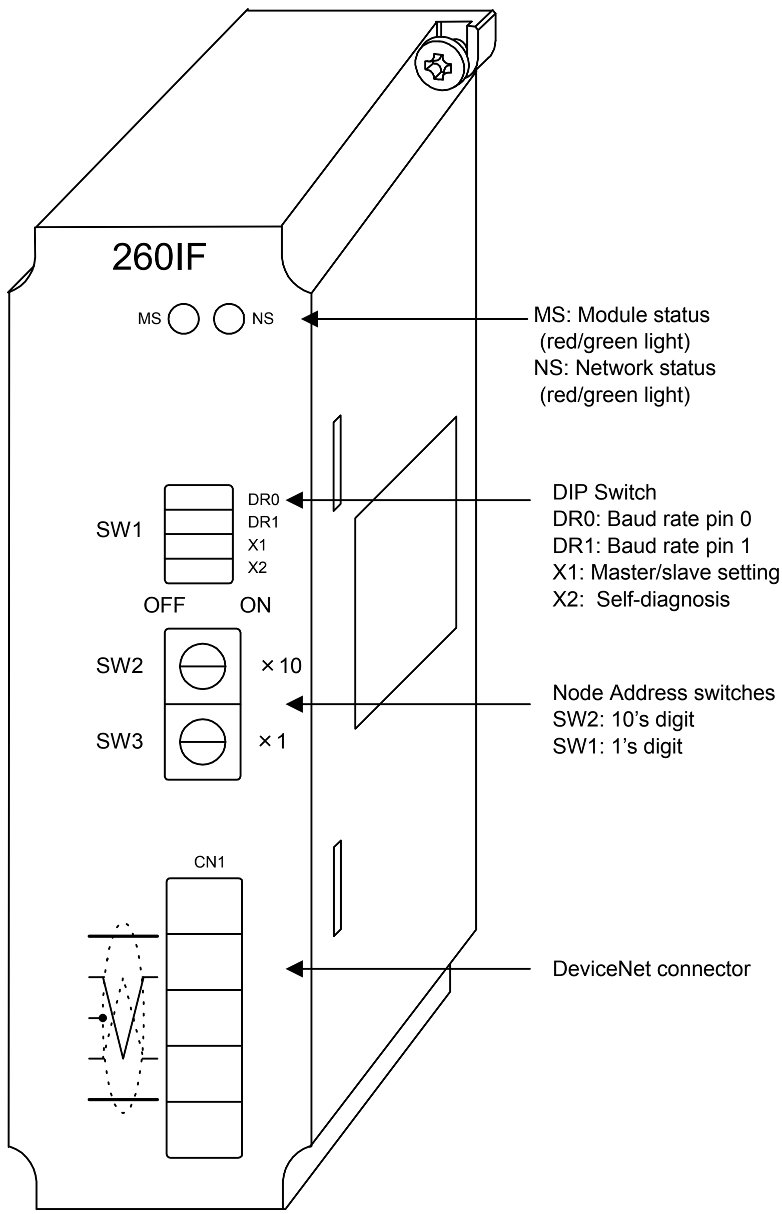


Fig 2.1 External Appearance of 260IF Module

2.3 Switch Specifications

Refer to *4.1 Basic Use of the 260IF Module* for setting details.

■ SW1

The baud rate for DeviceNet communications and Slave/Master settings are made on this DIP switch.

Table 2.1 SW1 Specifications

Pin	Meaning	Setting		
DR0	DeviceNet baud rate	DR1	DR0	
		OFF	OFF	125 kbps (default)
DR1		OFF	ON	250 kbps
		ON	OFF	500 kbps
		ON	ON	(Do not change)
X1	Slave/Master setting	OFF	Slave (default)	
		ON	Master	
X2	Not used	Always OFF		

■ SW2 and SW3

These rotary switches are used to set the DeviceNet MAC ID.

Table 2.2 SW2 and SW3 Specifications

Switch	Meaning	Setting	
*10 (SW2)	MAC ID 10's digit	0 to 6	Set a two-digit local node MAC ID (0 to 63) in decimal using two rotary switches (default: 00).
*1 (SW3)	MAC ID 1's digit	0 to 9	

2.4 LED Indicator Specifications

The LED indicator specifications for the 260IF Module are shown in the following table.

Table 2.3 LED Indicator Specifications

Indicator	Color	Status	Meaning
MS	Red/Green	Not lit Lit green Lit red	No power to the 260IF Module. Operating normally. Self-diagnostic error or WDT error.
NS	Red/green	Not lit Flashing green Lit green Flashing red Lit red	No power to the 260IF Module/offline.*1 Online but not connected. Online and connected. No-DeviceNet communications error. Communications not possible (duplicate MAC ID), bus-off error, or WDT error.*2

* 1. The 260IF Module is offline for the two seconds from the completion of the indicator test after startup through the completion of the MAC ID duplication check. The 260IF Module is online after the MAC ID duplication check at startup has been completed.

* 2. When the network power supply is OFF, the 260IF Module automatically resets as specified in the DeviceNet specifications even if a bus-off error occurs. At the same time, the NS indicator will light red for a moment and then go OFF again immediately. After power has been restored to the network, the green NS indicator will start flashing (online but not connected).

The following diagram shows the indicator test sequence that is performed immediately after the power is turned ON. Check the ON and OFF status of these indicators for any malfunctions. About 1 second is required for this test.

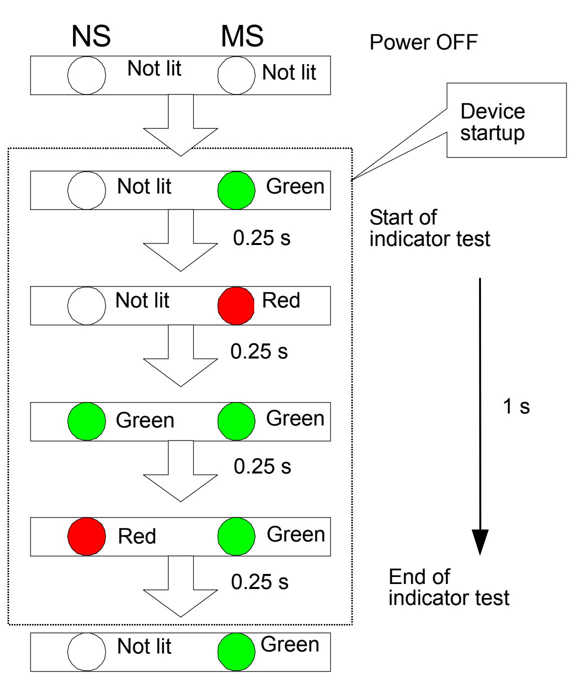


Fig 2.2 Display during Indicator Test

■ Connector Specifications

CN1 DeviceNet Connector Specifications

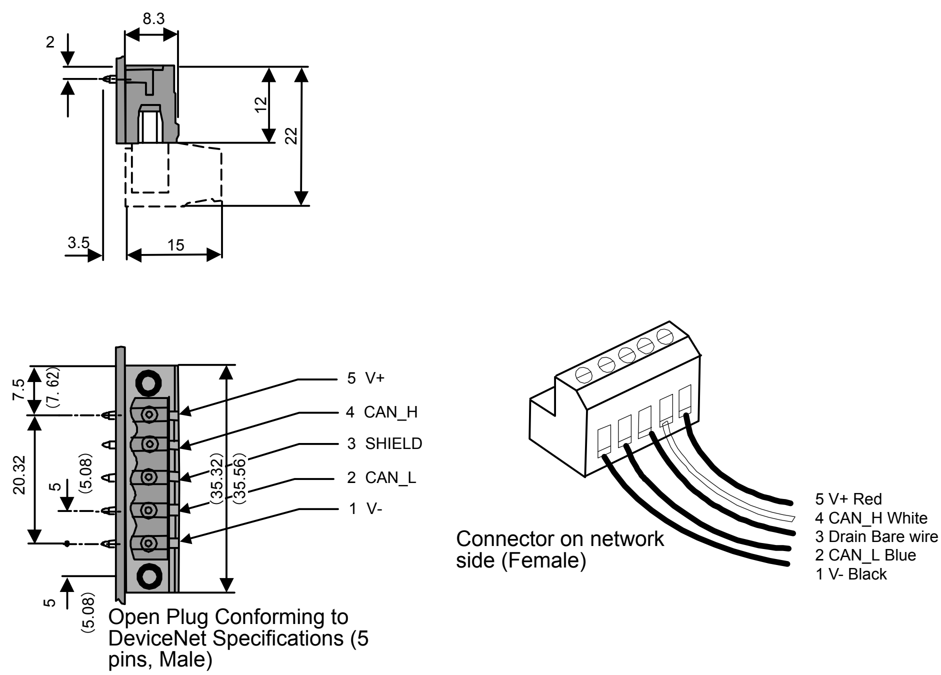


Fig 2.3 CN1 Connectors

Table 2.4 CN1 Signal Names

Pin No.	Signal	I/O
1	V −	I
2	CAN_L	I/O
3	SHIELD	_
4	CAN_H	I/O
5	V +	I

3 Network Specifications

This chapter describes the network specifications and restrictions for the 260IF Module.

3

3.1 Network Configuration

This section outlines the network configuration.

3.1.1 Basic Network Configuration

■ Connection Methods

The following diagam shows an example network connection.

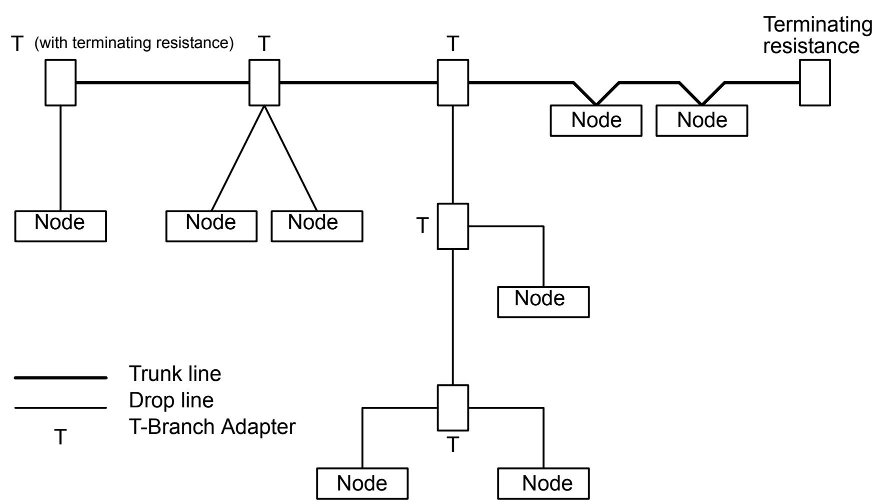


Fig 3.1 Network Connection

■ Configuration Elements

The network is configured from the following elements.

Nodes

A node is either a slave that connects to external I/O, or the Master, which manages the I/O of the slaves. There are no restrictions on the locations of the Master or Slaves. Any node in the figure above can be the Master or a Slave.

Trunk Line and Drop Lines

A cable with a terminator on each end is the trunk line. Any cable branching from the trunk line is a drop line.

Connection Methods

A node is connected using the T-branch method or multi-drop method. A T-Branch Adapter is used to connect a node with the T-branch method. A node is directly connected to the trunk line or a drop line with the multi-drop method. Both T-branch and multi-drop methods can be used together in the same network, as shown in the figure above.

Terminators

Both ends of the trunk line must connect to terminating resistance to decrease signal reflection and ensure stable network communications.

Communications Power Supply

The communications connectors of each node must be provided with communications power supply through the communications cable for DeviceNet communications. Communications power supply, internal circuit power supply, and I/O power supply must all be provided separately.

INFO

1 Use only DeviceNet cables as communications cables.

2 Always connect terminators to both ends of the trunk line.

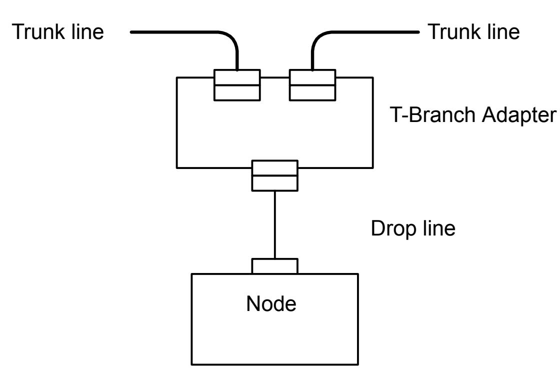
3 Do not connect lightning arresters or any devices to the network other than the 260IF Module and DeviceNet-conforming products.

3.1.2 Branching Methods

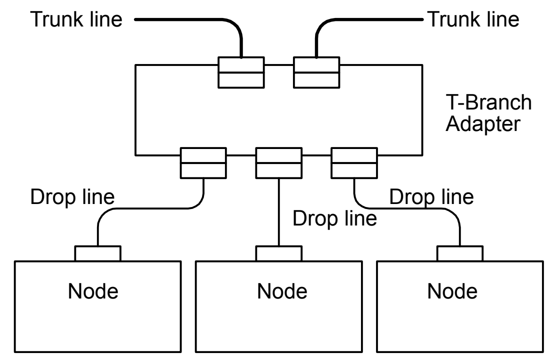
■ Branching from the Trunk Line

There are three methods that can be used to branch from the trunk line.

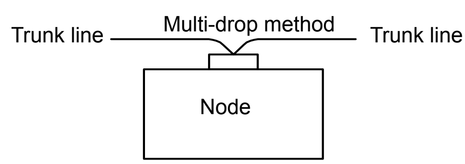
Branching to One Drop Line



Branching to Three Drop Lines



Direct Node Connection



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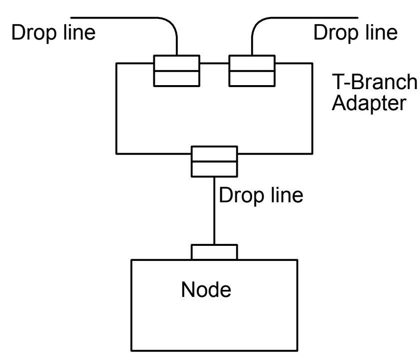
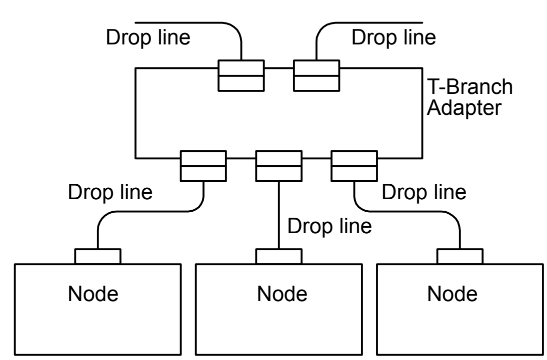
■ Branching from Drop Lines

There are three methods that can be used to branch from drop lines.

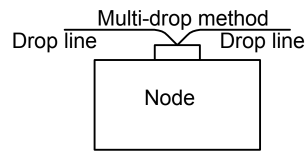
Branching to One Drop Line



Branching to Three Drop Lines



Direct Node Connection



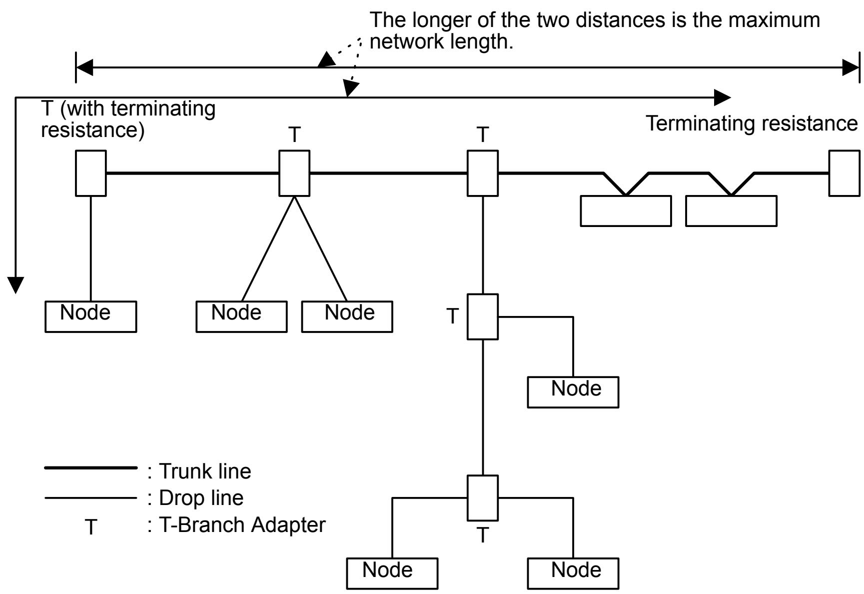
3

3

3.1.3 Network Configuration Restrictions

■ Maximum Network Length

The maximum network length is either the line length between the two nodes located farthest from each other or the line length between the terminators on the ends of the trunk line, whichever is longer.



Both thick and thin cables can be used.

The thick cables are stiff and difficult to bend but they have little signal degradation and can be used for comparatively long transmission distances.

Thin cables are supple and easy to bend but signal degradation is greater and they are not, therefore, suited to communications over long distances.

The maximum network length is determined by the type of cable, as shown in the following table.

Baud Rate (kbps)	Maximum Network Length (m)	
	Thick Cable	Thin Cable
500	100	100
250	250	100
125	500	100

Using Thick Cable and Thin Cable Together

INFO

The line connecting two nodes located farthest from each other can use both thick and thin cables provided that the length of each cable satisfies the conditions in the following table.

Baud Rate (Kbps)	Max. Network Length (m)
500	$L_{Thick} + L_{Thin} \leq 100$
250	$L_{Thick} + 2.5 \times L_{Thin} \leq 250$
125	$L_{Thick} + 5 \times L_{Thin} \leq 500$

Note: L_{Thick}: Thick cable length L_{Thin}: Thin cable length

- Drop Line Length

  The drop line length is the line length between the branch point on the trunk line to the farthest node that is located on the drop line.

  The maximum drop line length is 6 m. A drop line can be branched out into other drop lines.

3

3

■ Total Drop Line Length

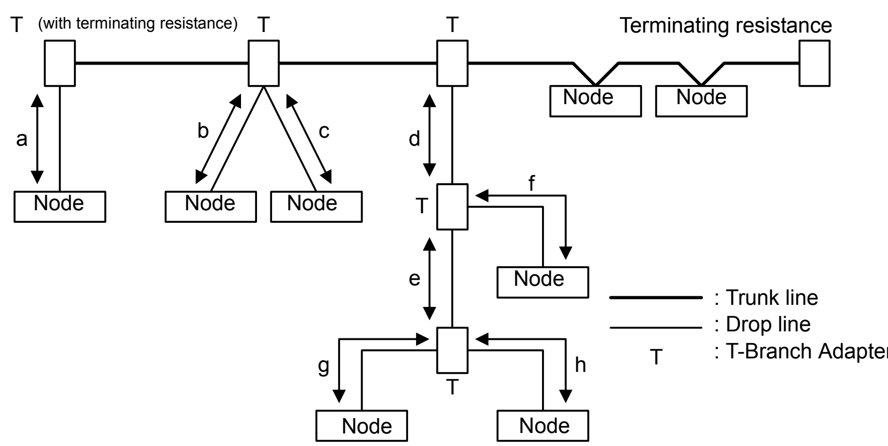
The total drop line length is the total of all drop line lengths. The total drop line length must be within the allowable range and even then, each drop line must be 6 m or less.

The allowable range of total drop line length varies with the baud rate as shown in the following table.

Baud Rate (Kbps)	Total Branch Length (m)
500	39 max.
250	78 max.
125	156 max.

• Configuration Example

The following example is for a baud rate of 500 Kbps.



The above example must satisfy the following conditions.

Drop lengths:

$a \leq 6$ m $b \leq 6$ m $c \leq 6$ m $d \leq 6$ m $d + f \leq 6$ m

$d + e + g \leq 6$ m $d + e + h \leq 6$ m

Total drop length $= a + b + c + d + e + f + g + h \leq 39$ m

4 System Startup and Setup

This chapter describes the procedures for making settings when connecting the 260IF Module to the DeviceNet.
The overall startup sequence will be described first, followed by the communications cycle calculation methods and setup from the CP-717 Engineering Tool when the 260IF Module is used.
The CP-717 Engineering Tool must be used and settings made before the I/O communications or message communications functions can be used.

4

4

4.1 Basic Use of the 260IF Module

This chapter explains the basic use of the 260IF Module in the Master Mode and Slave Mode.

When using the 260IF Module, specify which mode is to be used, Master or Slave.

4.1.1 Master Mode

If the 260IF Module is set to Master Mode, the Slave devices on the DeviceNet and the CPU Module will automatically exchange I/O data without being controlled by the program in the CPU Module.

The following diagram shows how Master Mode works.

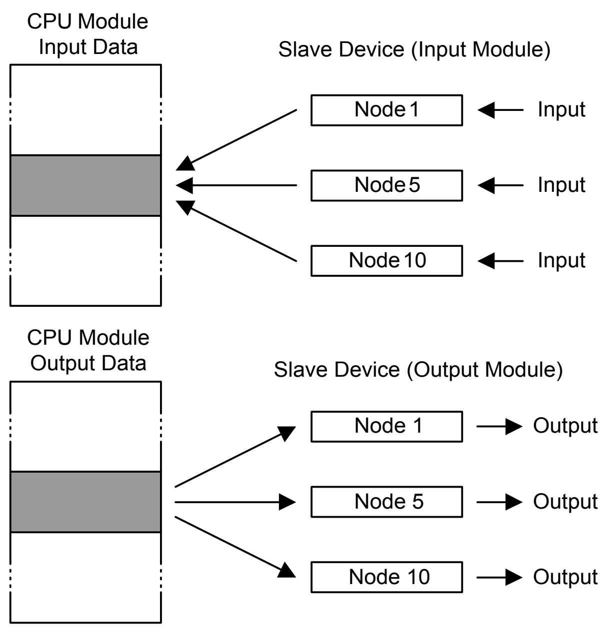


Fig 4.1 How the Master Mode Works

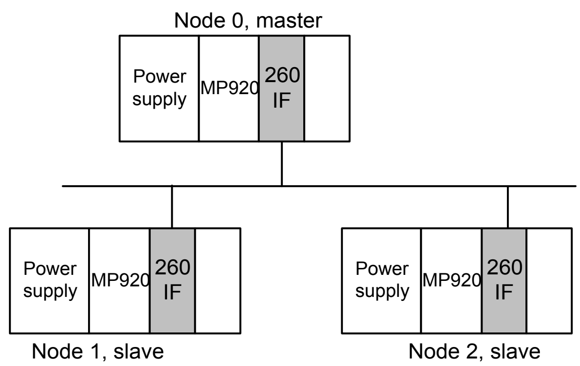
4.1.2 Slave Mode

If the 260IF Module is set to Slave Mode, the 260IF Module will automatically exchange I/O data with the Master without being controlled by the program in the CPU Module.

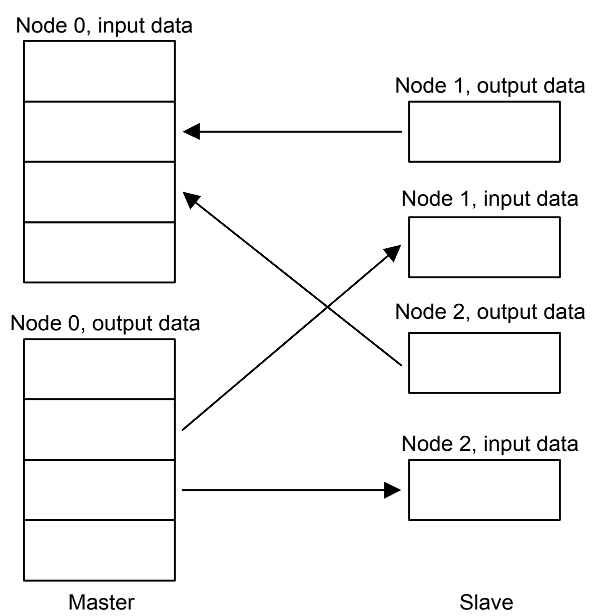
The Master can be a 260IF Module mounted on another MP920 or any other DeviceNet-conforming device.

The following diagrams show how the Slave Mode works, using the data exchange between nodes as an example.

■ System Configuration



■ I/O Data



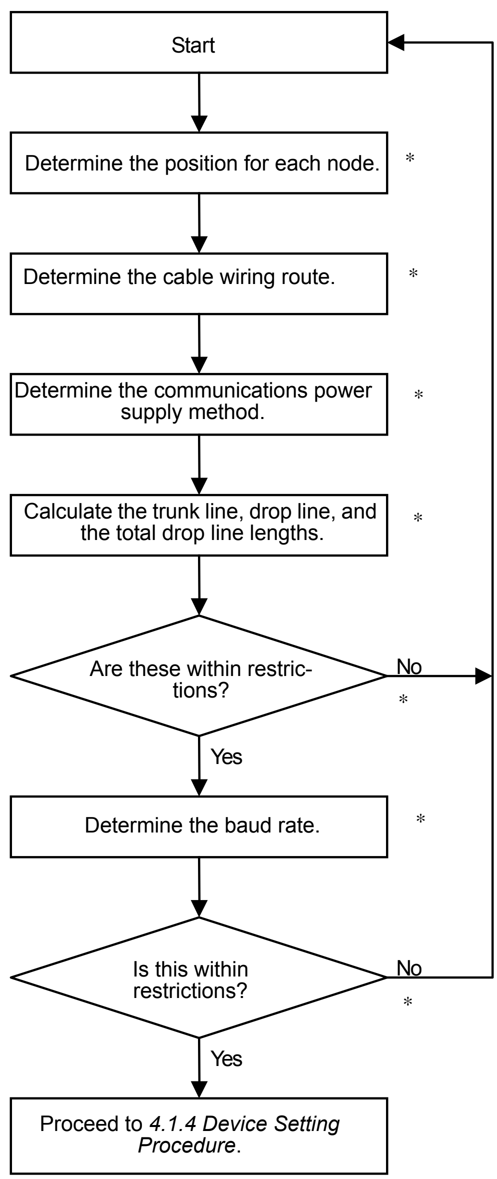
4

4

4.1.3 Basic System Design Procedure

The 260IF Module communications have restrictions on the maximum cable length and baud rate. Design the system considering the restrictions. For details on the restrictions, refer to *Chapter 3 Network Specifications*.

The following flowchart shows the basic steps in system design for 260IF Module communications.



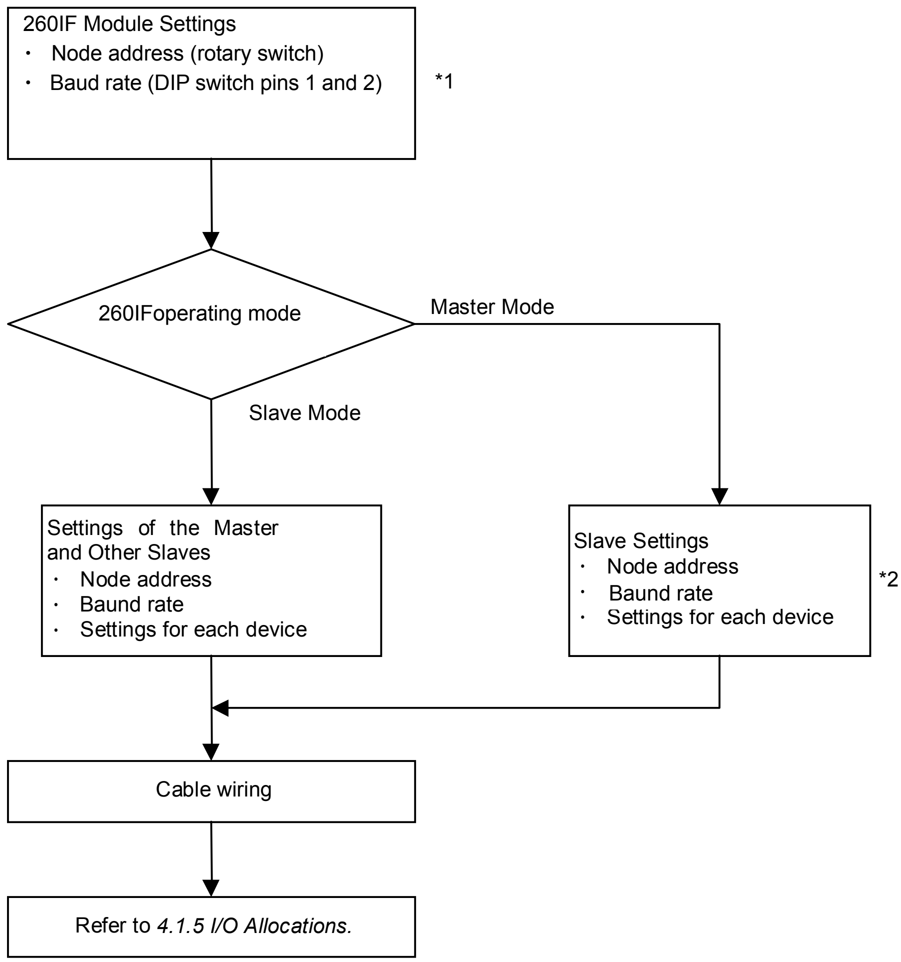
* Refer to *3.1 Network Configuration*.

4.1.4 Device Setting Procedure

Make the following settings on the 260IF Module before turning ON the power supply to the system.

- For the Master Mode
  Settings for all Slaves
- For the Slave Mode
  Settings for the Master and the other Slaves

The following flowchart shows the setting procedure.



∗ 1. Refer to *Chapter 2 Basic Specifications*.

∗ 2. Refer to the manual for each device.

INFO

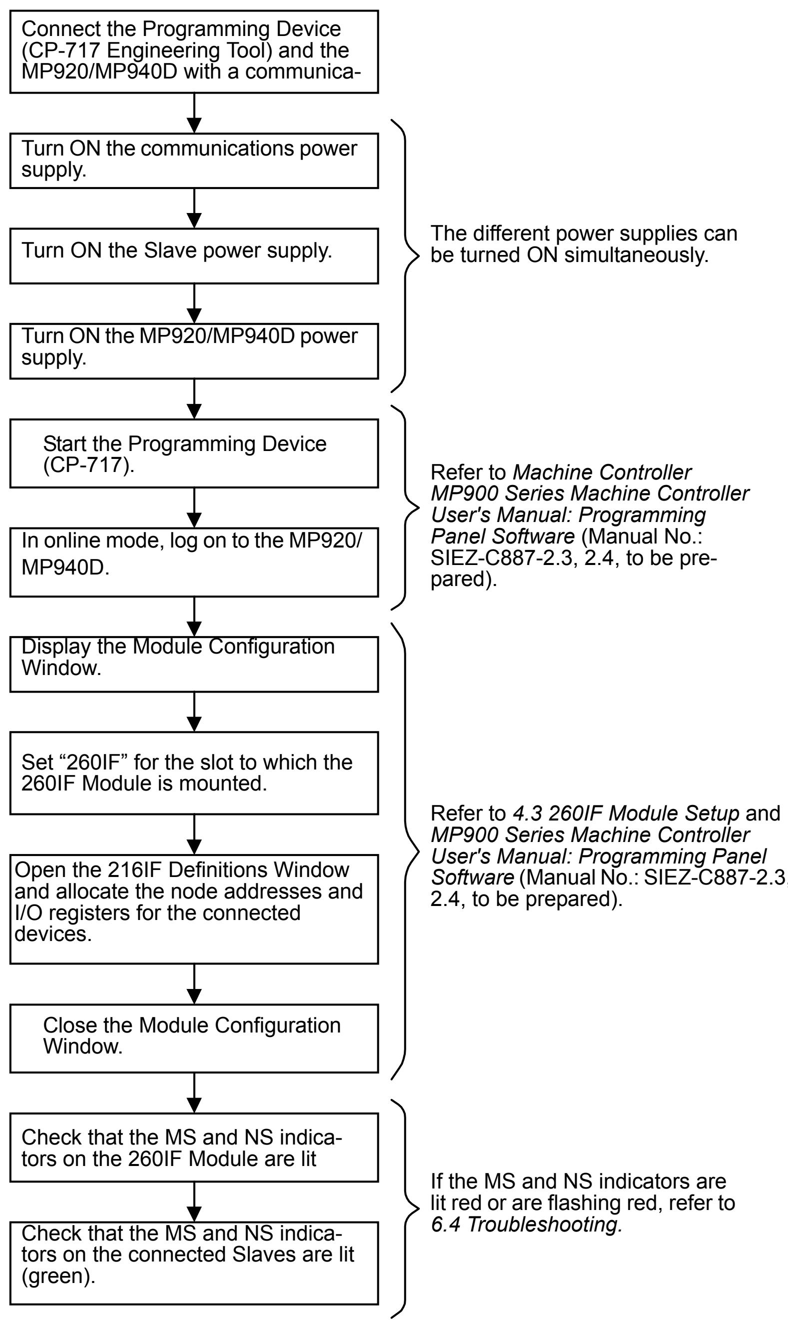
It is recommended that the Slaves be started first, and the Master last. When the Slaves are started first, they will be in waiting status, waiting for commands from or connection with the Master. When the Master is started first, an error may occur because of no responses from Slaves.

4.1.5 I/O Allocations

After selecting the device and wiring the cables, allocate I/O to start 260IF Module communications.

The following flowchart shows the basic setting procedure using the CP-717 online functions.

For details on basic CP-717 operation, refer to MP900 Series *Machine Controller User's Manual: Programming Panel Software* (Manual No.: SIEZ-C887-2.3, 2.4, to be prepared).



4.2 Calculating Communications Cycle Times

4.2.1 Communications Cycle Time

The communications cycle time is the time from when an I/O command is sent to a DeviceNet Slave on the network until the next I/O command transmission is made.

The communications cycle time must be set when the 260IF Module is used as a DeviceNet Master. This setting is not required when the 260IF Module is used as a Slave.

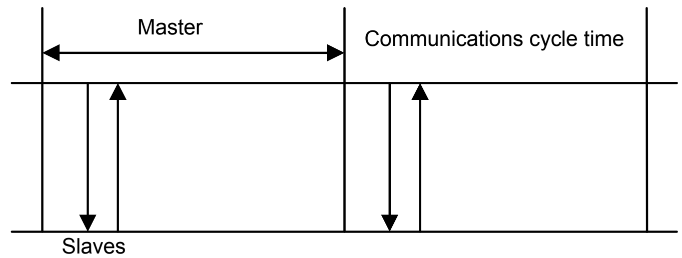


Fig 4.2 Master Communications Cycle Time

4

4.2.2 Calculating Communications Cycle Times

The communications cycle time can be found from the total of the communications times required for each Slave device.

Communications cycle time [ms] =Σ (Communications time with Slave)

The calculations for communications time with Slaves may differ from the actual communications times depending on the length of the network and the number of connections with other devices.

■ Communications Times with Slaves

The communications times with Slaves may be grouped in the following eight categories based on the number of communications bytes of the Slave. The following abbreviations are used:

No: Number of output data bytes

Ni: Number of input data bytes

TRUND (N/7): Quotient of No or Ni divided by 7. Decimal places are truncated.

MOD (N/7): Remainder when No or Ni is divided by 7.

Tb: 2 for a baud rate of 500 kbps, 4 for 250 kbps, 8 for 125 kbps.

1. Slaves with 8 bytes or less of output data

   $(94+8 \times No) \times Tb + 600[\mu s]$

2. Slaves with 8 bytes or less of input data

   $(94+8 \times Ni) \times Tb + 600[\mu s]$

3. Slaves with 8 bytes or less of both input and output data

   $[94 + 8(No + Ni)] \times Tb + 600[\mu s]$

4. Slaves with 8 bytes or more of output data

   $[111 \times TRUNC(No/7)] \times Tb$
   $+ [94 + 8 \times MOD(No/7)] \times Tb$
   $+ 300 \times [TRUNC(No/7) + 1][\mu s]$

   Note: When MOD(No/7) = 0, the 3rd line of the equation will be " + 300 × TRUNC(No/7)."

5. Slaves with 8 bytes or more of input data

   $[111 \times TRUNC(Ni/7)] \times Tb$
   $+ [94 + 8 \times MOD (Ni/7)] \times Tb$
   $+ 300 \times [TRUNC(Ni/7) + 1] [\mu s]$

   Note: When MOD(Ni/7) = 0, the 3rd line of the equation will be " + 300 × TRUNC(Ni/7)."

6. Slaves with 8 bytes or more of both input and output data

   $[111 \times TRUNC(Ni/7)] \times Tb$
   $+ [94 + 8 \times MOD(Ni/7)] \times Tb$
   $+ 300 \times [TRUNC(Ni/7) + 1]$
   $+ [111 \times TRUNC(No/7)] \times Tb$
   $+ [94 + 8 \times MOD(No/7)] \times Tb$
   $+ 300 \times [TRUNC(No/7) + 1] [\mu s]$

   Note: 1. When MOD(Ni/7) = 0, the 3rd line of the equation will be " + 300 × TRUNC(Ni/7)."

   2. When MOD(No/7) = 0, the 6th line of the equation will be " + 300 × TRUNC(No/7)."

7. Slaves with 8 bytes or less of input data and 8 bytes or more of output data

   $[47 + 8 \times Ni] \times Tb$
   $+ 300$
   $+ [111 \times TRUNC(No/7)] \times Tb$
   $+ [94 + 8 \times MOD(No/7)] \times Tb$
   $+ 300 \times [TRUNC(No/7) + 1]$

   Note: When MOD(No/7) = 0, the 5th line of the equation will be " + 300 × TRUNC(No/7)."

8. Slaves with 8 bytes or more of input data and 8 bytes or less of output data

   $[111 \times TRUNC(Ni/7)] \times Tb$
   $+ [94 + 8 \times MOD(Ni/7)] \times Tb$
   $+ 300 \times [TRUNC(Ni/7) + 1]$
   $+ [47 + 8 \times No] \times Tb$
   $+ 300$

   Note: When MOD(Ni/7) = 0, the 3rd line of the equation will be " + 300 × TRUNC(Ni/7)."

4.2.3 Precautions on Setting the Communications Cycle Time

Set a communications cycle time that allows sufficient time for a response to be returned from all Slaves. If the communications cycle time is set shorter than the I/O command transmission time, the 260IF Module will ignore the communications cycle time until I/O commands have been transmitted to all Slaves. In such cases, the set value will exceed the display for maximum value on the CP-717 communications cycle time. Adjust the setting so that the displayed maximum value does not exceed the set value.

INFO

1 If the maximum value on the communications cycle time exceeds the set value, the data in the Slaves will not be refreshed within the cycle time. Adjust the setting after calculating the communications cycle time to avoid delays in data refreshing.

2 The default setting for the communications cycle time is 0. If this setting is not changed, data will not be refreshed within the cycle time, as explained above. Always change the setting to avoid this problem.

The 260IF Module has, in addition to the I/O communications function, a message communications function.

When using message communications, the communications cycle time must be increased according to the volume of message communications data.

To calculate the appropriate communications cycle time, replace the number of output bytes (No) and the number of input bytes (Ni) in the eight equations for calculating the communications times with Slaves (*4.2.2 Calculating Communications Cycle Times*) with the message communications requirements and response data volume.

If there are multiple DeviceNet Masters in the communications network, find the sum of the times required by each Master for communications with the Slaves, and use this to set the communications cycle time.

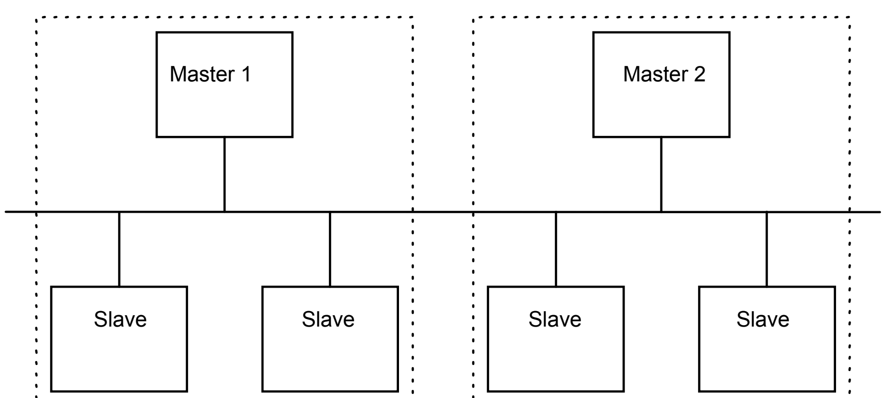


Fig 4.3 Communications Cycle Times Settings for Multiple Masters

- Communications cycle time for Master 1
  = (Σ×(time with Slave of Master 1) + (Σ(time with Slave of Master 2)
- Communications cycle time for Master 2
  = (Σ×(time with Slave of Master 1) + (Σ(time with Slave of Master 2)

4.3 260IF Module Setup

The 260IF Module is set up from the CP-717 Engineering Tool.

4.3.1 Opening the 260IF Module Configuration Window

1. Double-click the Module Configuration Definition Box for the Controller mounted to the 260IF Module to display the Module Configuration Window.

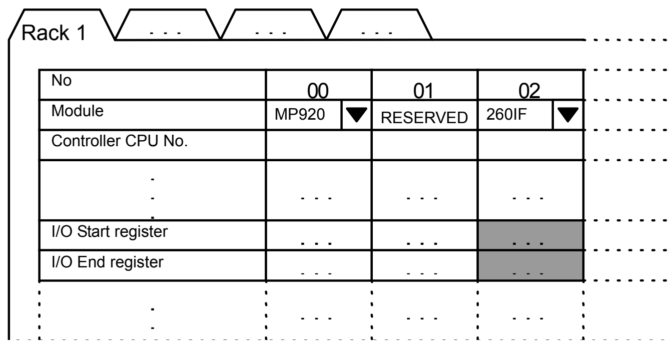


Fig 4.4 MP920 Module Configuration Window

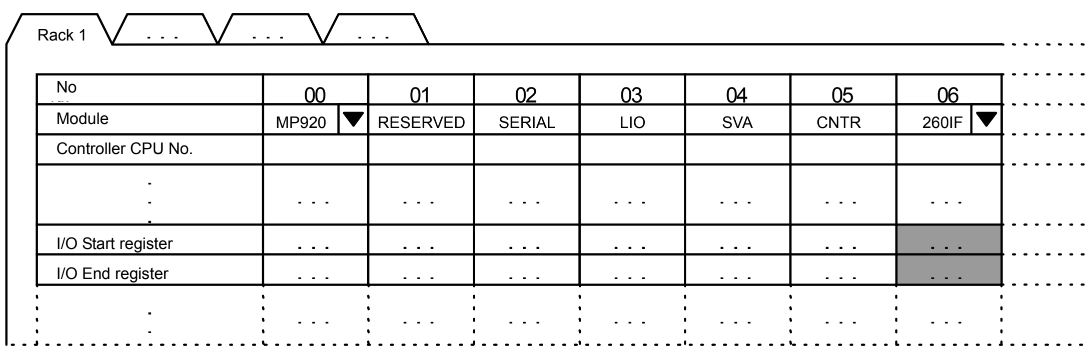


Fig 4.5 MP940 Module Configuration Window

For the MP920, set the 260IF Module for the slot in which the 260IF Module is mounted. In the above example showing the MP920 Module Configuration Window, the 260IF Module is set in slot 02.

For the MP940, the 260IF Module is always in slot 06, but 260IF Module must still be set.

The leading and end I/O register numbers must be set for the 260IF Module. Allocate I/O registers within the ranges shown in the following table.

	MP920	MP940D
Leading I/O register (Offset of leading IW/OW register)	0000 to 13FF	0000 to 07FF
End I/O register (Offset of end IW/OW register)	0000 to 13FF	0000 to 07FF

2. Double-click the slot where the 260IF Module is set and open the 260IF Definition Window.

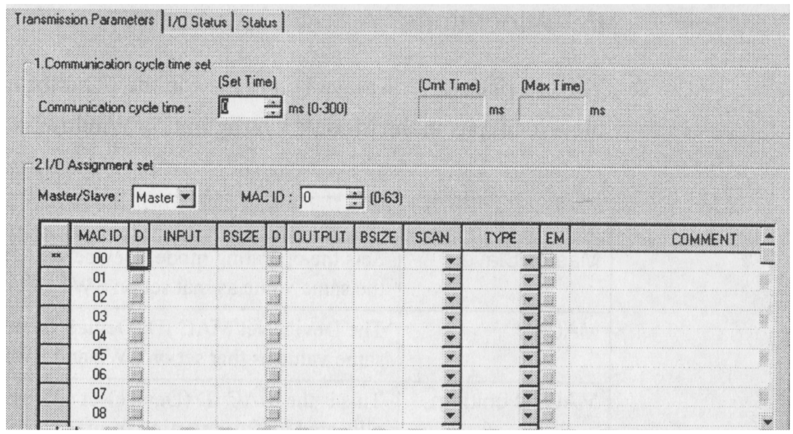
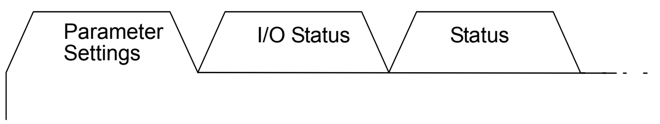


Fig 4.6 260IF Definition Window

4.3.2 Setting Methods

The 260IF Definition Window has the following three tab pages.



Tab Page	Contents
Parameter Settings	Sets the 260IF Module communications and network parameters.
I/O Status	Displays the communications status with Slaves when the 260IF Module is set to Master Mode and is online. Refer to*Chapter 6 Network Maintenance* for details.
Status	Displays the 260IF Module status when online. Refer to *Chapter 6 Network Maintenance* for details.

■ Parameter Settings

The following items are set in the 260IF Definition Window shown above.

Communications Cycle Time Information

Setting	Contents
Communications Cycle Time (Set Time)	Enter the communications cycle time set value when using the 260IF Module as a DeviceNet Master.
Communications Cycle Time (Current Time) display only	Displays the current value of the communications cycle during I/O communications.
Communications Cycle Time (Max. Time) display only	Displays the maximum value for the communications cycle during I/O communications.

Refer to *4.2 Calculating Communications Cycle Times*.

I/O Allocations

The asterisks (**) displayed on the left in the I/O allocations table indicate the 260IF Module allocations in the Module Configuration Window.

<table>
<tr><th>Setting</th><th colspan="3">Contents</th></tr>
<tr><td>Master/Slave</td><td colspan="3">Sets the operating mode (DeviceNet Master/Slave) for the 260IF Module. Set the same value as that set on SW1 (X1) on the 260IF Module.</td></tr>
<tr><td>MAC ID</td><td colspan="3">The DeviceNet MAC ID (DeviceNet address) for the 260IF Module. Set the same value as that set on SW2 and SW3 on the 260IF Module.</td></tr>
<tr><td>MAC ID column</td><td colspan="3">This is the MAC ID (DeviceNet address) for I/O allocations. It is automatically allocated in order starting from 00.</td></tr>
<tr><td>D</td><td colspan="3">Sets whether or not the Controller CPU will exchange I/O data with the 260IF Module. Turn ON (check) this setting if the data is not to be exchanged.</td></tr>
<tr><td>INPUT</td><td colspan="3">Sets the leading address of the input area (input register IWxxxx) for the 260IF Module input data . Specify a hexadecimal address.</td></tr>
<tr><td rowspan="6">BSIZE</td><td colspan="3">Sets the size of the output area for the device (input register IWxxxx) in number of bytes. Specify a number of bytes between 1 and 256 (decimal) for each Slave.
For example, if the setting is 3 bytes from IW1100 and one byte from IW1102, the register area shown in the following diagram will be allocated.</td></tr>
<tr><td>Register No.</td><td>F……8</td><td>7……0</td></tr>
<tr><td>IW1100H</td><td></td><td></td></tr>
<tr><td>IW1101H</td><td></td><td></td></tr>
<tr><td>IW1102H</td><td></td><td></td></tr>
<tr><td>IW1103H</td><td></td><td></td></tr>
<tr><td>D</td><td colspan="3">Sets whether or not the Controller CPU will exchange I/O data with the 260IF Module. Turn ON (check) this setting if the data is not to be exchanged.</td></tr>
<tr><td>OUTPUT</td><td colspan="3">Sets the leading address of the output area (output register OWxxxx) for the 260IF Module output data. Specify a hexadecimal address.</td></tr>
<tr><td>BSIZE</td><td colspan="3">Sets the size of the output area for the device (output register OWxxxx) in number of bytes. Specify a number of bytes between 1 and 256 (decimal) for each Slave. The byte order is little-endian, the same as for input registers.</td></tr>
<tr><td>SCAN</td><td colspan="3">The data exchange cycle (SCAN) is when the Controller CPU exchanges I/O data with the 260IF Module. The Controller CPU data exchange cycle is asynchronous with the I/O communications. When set to "High," the Controller CPU will exchange I/O data during the high-speed scan of the CPU. When set to "Low," the Controller CPU will exchange I/O data during the low-speed scan of the CPU.</td></tr>
<tr><td>TYPE</td><td colspan="3">Sets the I/O communication type (TYPE) to either "Polled" or "Strobed."
Polled means settings can be made for any DeviceNet device.
Strobed means settings can be made for inputs only and for DeviceNet Slaves 8 bytes or less in size.
Refer to DeviceNet specifications for details on Polled and Strobed settings.</td></tr>
</table>

4

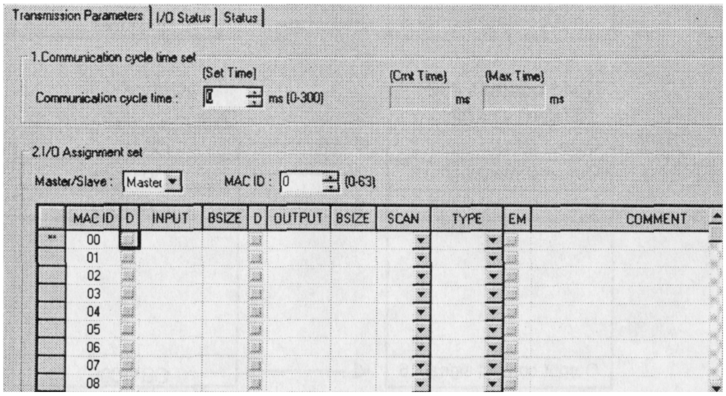
Setting	Contents
EM (Explicit Message)	EM is turned ON when the 260IF Module is set as a DeviceNet Master and only message communications are performed with Slaves. The EM allocation setting is not required when the 260IF Module is set as a DeviceNet Slave.
Comment	The name and type of the relevant device and other information can be entered as a character string of up to 32 characters.

Saving Parameters

Once the parameters have been set, select ***File*** and then ***Save*** from the menu to save the settings.

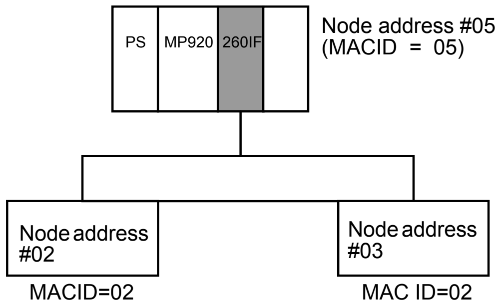
Additional Explanation of I/O Allocation Settings

1. Master/Slave
   Set the same value as that set on SW1 (X1) on the 260IF Module.
2. MAC ID
   Set the same value as that set on SW2 and SW3 on the 260IF Module.
3. Communications Cycle Time
   Enter the communications cycle time calculated in *4.2 Calculating Communications Cycle Times*.
   This setting is not required when the 260IF Module is used as a DeviceNet Slave.
4. I/O Allocations
   Allocate the I/O registers for data exchange between the Controller CPU and the 260IF Module according to the DeviceNet system configuration.



Master I/O Allocations Example

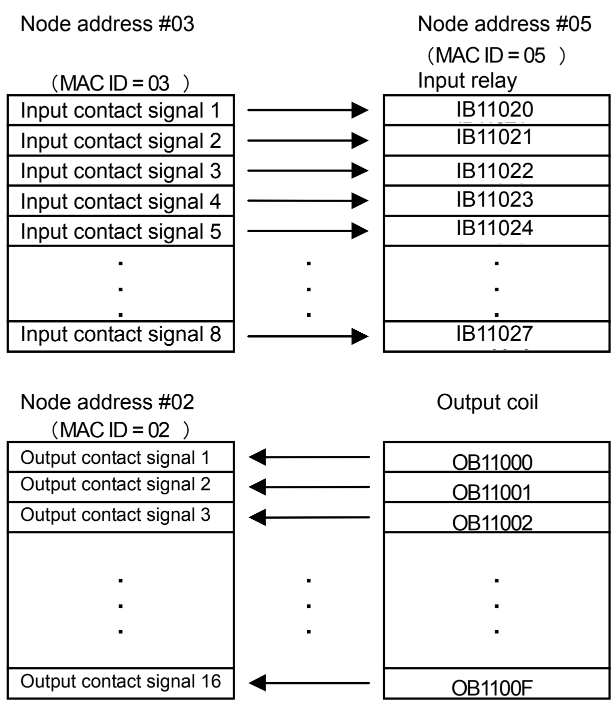
The settings in the following diagram are made when, for example, the 260IF Module is to be used as the DeviceNet Master with MAC ID = 5 and I/O data is to be exchanged between the 260IF Module and a 2-byte Output Module with MAC ID = 2 and a 1-byte Input Module with MAC ID = 3.



2. I/O Assignment set

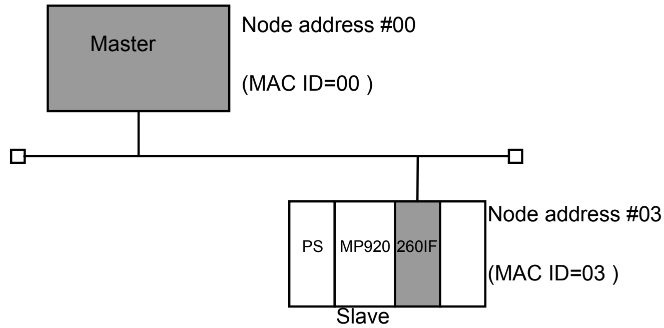
Master/Slave: Master　　MAC ID: 5

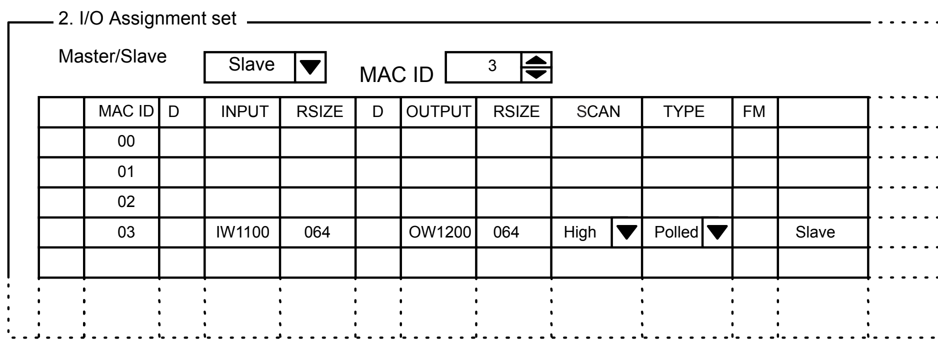
	MAC	D	INPUT	RSIZE	D	OUTPUT	RSIZE	SCAN	TYPE	FM	Comments
	01										
	02					OW1100	2	Low	Polled		
	03		IW1102	1				Low	Polled		
	04										



Slave I/O Allocation Example

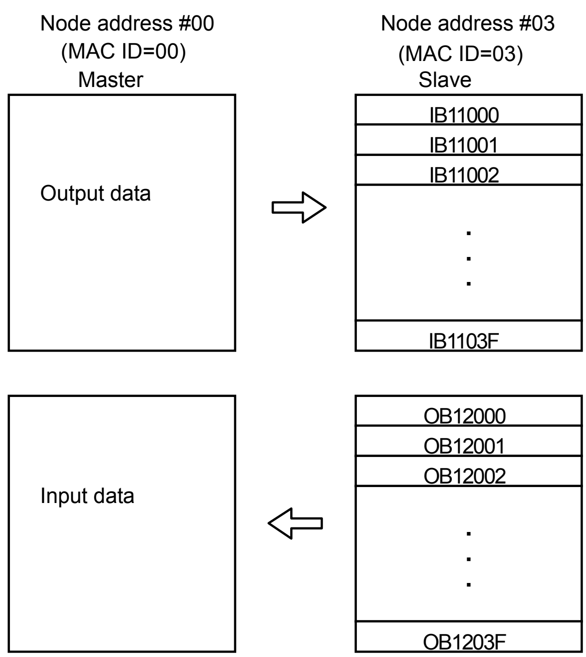
The settings shown in the following diagram are made when, for example, the 260IF Module is to be used as a DeviceNet Slave with MAC ID = 3 and input and output sizes of 64 bytes each and I/O data is to be exchanged with the DeviceNet Master.




2. I/O Assignment set

Master/Slave: Slave　MAC ID: 3

	MAC ID	D	INPUT	RSIZE	D	OUTPUT	RSIZE	SCAN	TYPE	FM	
	00										
	01										
	02										
	03		IW1100	064		OW1200	064	High	Polled		Slave



I/O Allocations using Network Configuration Information

When using the 260IF Module as a DeviceNet Master, the settings can be changed based on the I/O sizes read from the Slaves.

The network configuration information read function is used to read the I/O size from a Slave.

Refer to *6.1 Reading Network Configuration Information* for information on the setting method.

INFO

Clear all Slave I/O allocations before using the network configuration information to allocate I/O.

5 Programming

This chapter describes the system registers that monitor the I/O communications status and the functions used when performing message communications using the 260IF Module.

5

5.1 System Registers

5.1.1 System Register and Communications Errors

If a communications error occurs during I/O communications, the error status will be stored in the system registers.

(System Register)	F		3	2	1	0 (Bit No.)
SW00208	MAC ID 15	....	MAC ID 3	MAC ID 2	MAC ID 1	MAC ID 0
SW00209	MAC ID 31	....			MAC ID 17	MAC ID16
SW00210	MAC ID 47	....			MAC ID 33	MAC ID32
SW00211	MAC ID63	....			MAC ID 49	MAC ID48

0: Normal

1: Error

The system register numbers differ according to the rack and slot to which the 260IF Module is mounted. Refer to the following manuals for details.

Manual name	Manual No.
Machine Controller MP920 User's Manual: Design and Maintenance	SIEZ-C887-2.1
Machine Controller MP940 User's Manual: Design and Maintenance	SIEZ-C887-4.1

5

5.2 Message Send Function (MSG-SND)

The MSG-SND function is used to send and receive DeviceNet explicit messages. When the MSG-SND function is executed once, it will both send the request message and receive the response message.

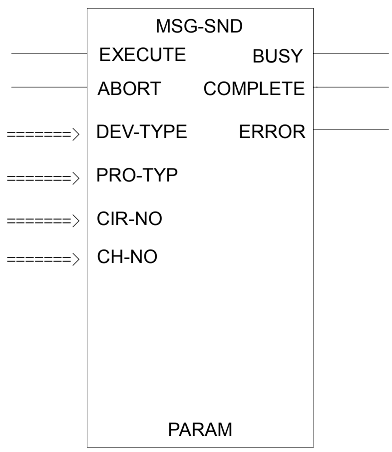
5.2.1 Before using 260IF Module Message Communications

Comply with the following conditions before using 260IF Module message communcications.

1. The 260IF Module must be set as a Master.
2. One of the following settings is required for the DeviceNet Slaves when allocating 260IF Module I/O.
   - The input or output size must be set for I/O communications.
   - The EM Check Box must be ON.
3. The MSG-SND function must be set and an application program that will create the request message is required.

5.2.2 Outline of Message Send Function

The following table shows the functions and configuration of the message send function (MSD-SND).

Function	MSG-SND			
Purpose	Sends a message to a remote node in the network specified by the communications device type. Supports multiple prototypes. Keep the EXECUTE input ON until COMPLETE or ERROR turns ON.			
Definition				
I/O definitions	No.	Name	I/O Designation *	Meaning
Inputs	1	EXECUTE	B-VAL	Message send command
	2	ABORT	B-VAL	Message send abort command
	3	DEV-TYP	I-REG	Communications device type 260IF = 11
	4	PRO-TYP	I-REG	Communications protocol 260IF = 1
	5	CIR-NO	I-REG	Circuit number
	6	CH-NO	I-REG	Communications buffer channel number
	7	PARAM	Address input	Set data leading word address (MW, DW, #W)
Outputs	1	BUSY	B-VAL	Sending message.
	2	COMPLETE	B-VAL	Message send completed.
	3	ERROR	B-VAL	Error occurred.

5.2.3 Parameter List

The parameters displayed under “PARAM” are shown in the following table.

No	IN/OUT	Content	Remarks
00	OUT	Processing result	
01	OUT	Status	
02	IN	Remote node MAC ID	
03	SYS	Reserved for system use	Reserved for system use
04	IN	Function code	
05	IN/OUT	Data address	
06	IN/OUT	Data size	
07	-	Remote node CPU #	
08	-	Coil offset	
09	-	Input relay offset	
10	-	Input register offset	
11	-	Holding register offset	
12	SYS	For system use	
13	SYS	Reserved for system use	Reserved for system use
14	SYS	Reserved for system use	Reserved for system use
15	SYS	Reserved for system use	Reserved for system use
16	SYS	Reserved for system use	Reserved for system use
17	SYS	Reserved for system use	Reserved for system use

Processing Result (PARAM00)

The processing result is output to the higher-place byte. The lower-place byte is for system analysis.

- 00xx: Processing (BUSY)
- 10xx: Processing completed (COMPLETE)
- 8xxx: Error (ERROR)

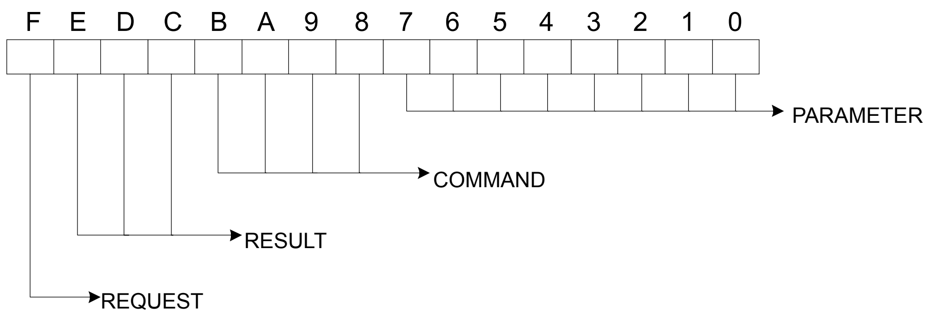
Error Classifications

Error	Content	Meaning
81xx	Function code error	An unused function code was received or an attempt was made to send an unused function code.
82xx	Address setting error	The data address, coil offset, input relay offset, input register offset, or holding register offset is out of the setting range.
83xx	Data size error	The send or receive data size setting is out of the setting range.
84xx	Circuit number setting error	The circuit number is out of the setting range.
85xx	Channel number setting error	The channel number is out of the setting range.
86xx	Node address error	The node address is out of the setting range.
88xx	Communications section error	An error response has been returned from the communications section.
89xx	Device selection error	A device that cannot be used has been selected.

Status (PARAM01)

Outputs the status of the communications section.

1. Bit allocations



2. COMMAND

Code	Abbreviation	Meaning
1	U_SEND	A general-purpose message has been sent.
2	U_REC	A general-purpose message has been received.
3	ABORT	Abort
8	M_SEND	MEMOBUS command has been sent and a response received.
9	M_REC	MEMOBUS command has been received and a response sent.
C	MR_SEND	MEMOBUS response has been sent.

3. RESULT

Code	Abbreviation	Meaning
1	SEND_OK	Normal send completed.
2	REC_OK	Normal receive completed.
3	ABORT_OK	Abort completed.
4	FMT_NG	Parameter format error
5	SEQ_NG or INIT_NG	Command sequence error or no token received. Not connected to the communications system.
6	RESET_NG or O_RING_NG	Reset status Out of ring. Did not receive token even after token reception time expired.
7	REC_NG	Data receive error (error detected in lower-level program)

4. PARAMETER

When RESULT = 4 (FMT_NG), the error codes shown in the following table will be output. When RESULT ≠ 4, the node address of the remote node will be output.

Table 5.1 Error Codes

Code	Error Content
00	No error
01	Outside node address range
02	MEMOBUS response receive monitor time error
03	No. of retries setting error
04	Cyclic area setting error
05	Message signal CPU number error
06	Message signal register number error
07	Message signal word number error

5. REQUEST

1 = Request

2 = Receive completed report

Remote Node MAC ID (PARAM02)

0 to 63: Set the remote node MAC ID for message communications.

Function Code (PARAM04)

Set “3” for the 260IF Module.

Note: In earlier versions, "3" meant “read the contents of the holding register.” For the 260IF Module, however, “3” does not have this meaning.

Data Address (PARAM05)

Set the address of the M register where the contents of the explicit request message will be written. The received explicit response messages will also be stored at the register address set here.

Data Size (PARAM06)

Set the data size (number of bytes) of the explicit request message.

When an explicit response message is received, the data size (number of bytes) of the response message will be stored.

Remote Node CPU # (PARAM07)

Not used. Set to "0."

Coil Offset (PARAM08)

Not used.

Input Relay Offset (PARAM09)

Not used.

Input Register Offset (PARAM10)

Not used.

Holding Register Offset (PARAM11)

Not used.

For System Use (PARAM12)

The channel number being used will be held.

Always set to 0000 Hex from the user program during the first scan when the power is turned ON. After that, do not change the setting from the user program because this parameter is used by the system.

5.2.4 Inputs

EXECUTE (Execute Send Command)

When this command is ON, the message will be sent.

This status must be held until COMPLETE (processing completed) or ERROR (error) turns ON.

ABORT (Send Abort Command)

Aborts the message send. When this command is input, it has priority over EXECUTE (execute send command).

DEV-TYPE (Communications Device Type)

Designates the type of communications device. The setting is 11 for the 260IF Module.

PRO-TYPE (Communications Protocol)

Designates the communications protocol. The setting is 1 for the 260IF Module.

Note: In earlier versions, 1 meant MEMOBUS protocol, but 1 does not have this meaning for the 260IF Module.

CIR-NO (Circuit Number)

Designates the circuit number. Enter the circuit number set in the Module Configuration Window.

CH-NO (Channel Number)

Designates the channel number for the communications section. The same channel number cannot be used more than once for the same circuit. The setting can be between 1 and 8.

PARAM (Setting Data Leading Word Address)

Designates the leading word address of the setting data.

Refer to*5.2.6 Explicit Request Message* for information on settings data.

5.2.5 Outputs

BUSY (Processing)

Indicates the Unit is busy processing. Keep EXECUTE ON as long as BUSY is ON.

COMPLETE (Processing completed)

Turns ON for once scan when processing has been completed normally.

ERROR (Error)

Turns ON for one scan only when an error has occurred.

Refer to PARAM00 and PARAM01 to determine the cause of the error.

5.2.6 Explicit Request Message

■ Explicit Request Message Format

An explicit request message is written in the following format to the area designated in *Data Address (PARAM05) in 5.2.3 Parameter List*.

(Word address offsets)
00000: Request service code (Higher-place byte is reserved for system use and lower-place byte is the request service code)
00001: Class ID
00002: Instance ID
00003: Attribute ID
00004: (Message data for write)
:
:

Request service codes include read (0Eh) and write (10h).

For a read request service code, set *Data Size (PARAM06)* in *5.2.3 Parameter List* to 8.

For a write request service code, set *Data Size (PARAM06)* in *5.2.3 Parameter List* to 8 + (write data size). Set the number of bytes for the write data size.

INFO

Refer to DeviceNet specifications for details on service codes.
The request service codes, class ID, instance ID, and attribute ID are specific to the DeviceNet device. Contact your DeviceNet device manufacturer for information.

■ Example of Explicit Request Message to Read Vendor ID

If “1000” is designated for *Data Address (PARAM05)* in *5.2.3 Parameter List*, the data will be written in the following format.

(Word address offsets)
MW01000: 000E Hex (Get_Attribute_Single service code)
MW01001: 0001 Hex (Class ID)
MW01002: 0001 Hex (Instance ID)
MW01003: 0001 Hex (Attribute ID)

5.2.7 Explicit Response Messages

■ Explicit Response Message Format

The Explicit response message is written in the following format to the area designated in *Data Address (PARAM05)* in *5.2.3 Parameter List*.

(Word address offsets)
00000: Response service code (Higher-place byte is reserved for system use and lower-place byte is the response service code)
00001 : Response message data
:
:

■ Example of Explicit Request Message to Read Vendor ID

If “1000” is designated for *Data Address (PARAM05)* in *5.2.3 Parameter List*, the data will be written in the following format.

(Word address offsets)
MW01000: 018E Hex (Higher-place byte is reserved for system use and lower-place byte 8E Hex is the response service code)
MW01001 : 0002C Hex (Vendor ID)

Here, 4 (including two bytes of response service code) will be written to *Data Size (PARAM05)* in *5.2.3 Parameter List*.

6 Network Maintenance

This chapter describes how to maintain a 260IF Module using the CP-717 Engineering Tool. When the CP-717 is used, information can be read about other devices connected to the DeviceNet in addition to the status of the 260IF Module.

6.1 Reading Network Configuration Information

6.1.1 Outline

The network configuration information can be read when the 260IF Module is set as the DeviceNet Master. This function detects what types of DeviceNet devices are connected to the communications circuit. The information found by this function includes the vendor ID, device type, product type, and I/O sizes.

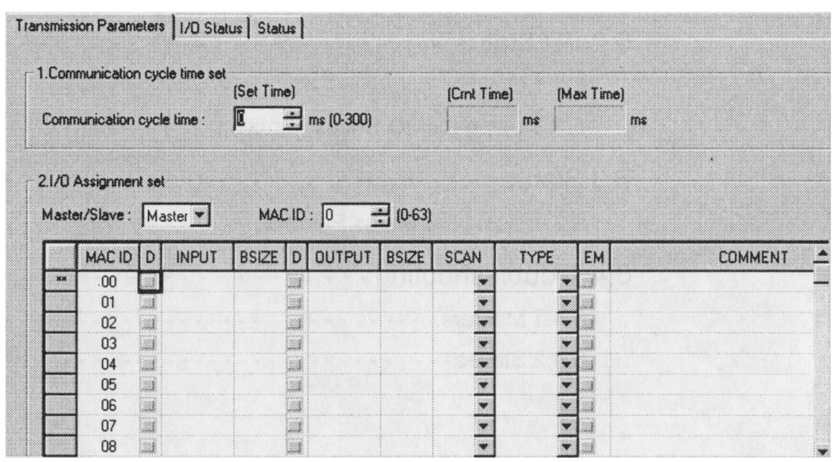
The I/O sizes read from the DeviceNet device can be used in the I/O allocation settings.

6.1.2 Using the Network Configuration Information Read Function

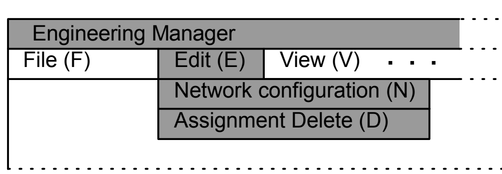
The network configuration information read function can be used when all Slave allocations in *I/O Allocations* in *4.3.2 Setting Methods* have been cleared.

The network configuration information read is performed with the following procedure.

1. Display the Module Configuration Window on the CP-717.
2. Double-click the slot to which the 260IF Module is set and open the 260IF Definition Window.



3. Select the ***Transmission Parameters*** Tab in the 260IF Definition Window and then select ***Edit*** and then ***Network configuration*** from the menu bar.



4. The Network Configuration Window will be displayed.

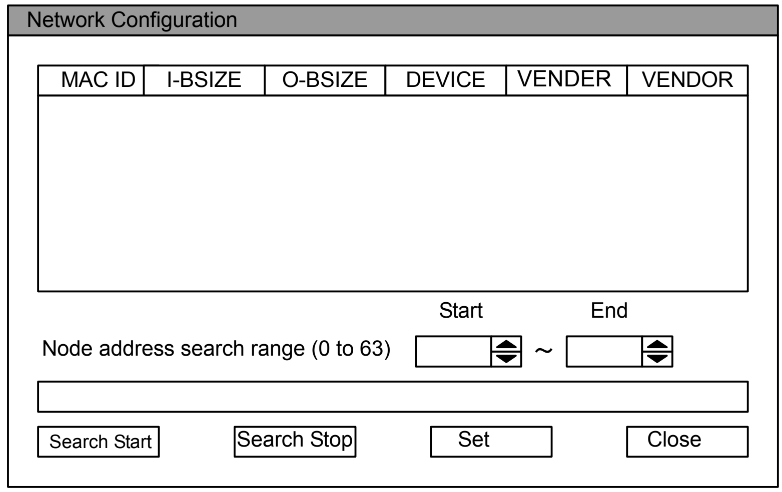


Table 6.1 Search Items

Search Item	Contents
MAC ID	The MAC ID on the DeviceNet (DeviceNet address).
I-BSIZE	The input data size (in bytes) from the relevant device.
O-BSIZE	The output data size (in bytes) to the relevant device.
DEVICE	The device type in decimal. The value will be 12 for the 260IF Module (communications adapter). Refer to DeviceNet specifications for details on device types.
VENDER	The vendor ID. The value will be 44 for the 260IF Module.
PRODUCT	The product code.

Table 6.2 Setting and Operation Items

Setting or Operation Item	Contents
Node Address Search Range (0 to 63)	The node address (MAC ID) range to be searched for.
Search Start	Starts the search for devices connected to the network.
Search Stop	Stops the search.
Set	Makes I/O allocations based on the search results.
Close	Closes the Network Configuration Window.

5. Set the leading and end addresses for the DeviceNet devices for which information is to be read and click the **Search Start** Button. To stop the search, click the ***Search Stop*** Button.

6. Click the ***Set*** Button to use the I/O sizes found during the search for the I/O Allocation Settings.

7. Click the ***Close*** Button to exit the Network Configuration Window.

IMPORTANT

■ Precautions on Reading Network Configuration Information

- Use the network configuration information read function when no I/O communications are being performed.

  This function can be used during I/O communications but communications may be affected.
- Use this function for Slaves for which no I/O allocations have been made.
- Up to 4 seconds may be required for each Slave when network configuration information is read. It is recommended that the address range setting is limited to the required addresses only.

6.2 I/O Status

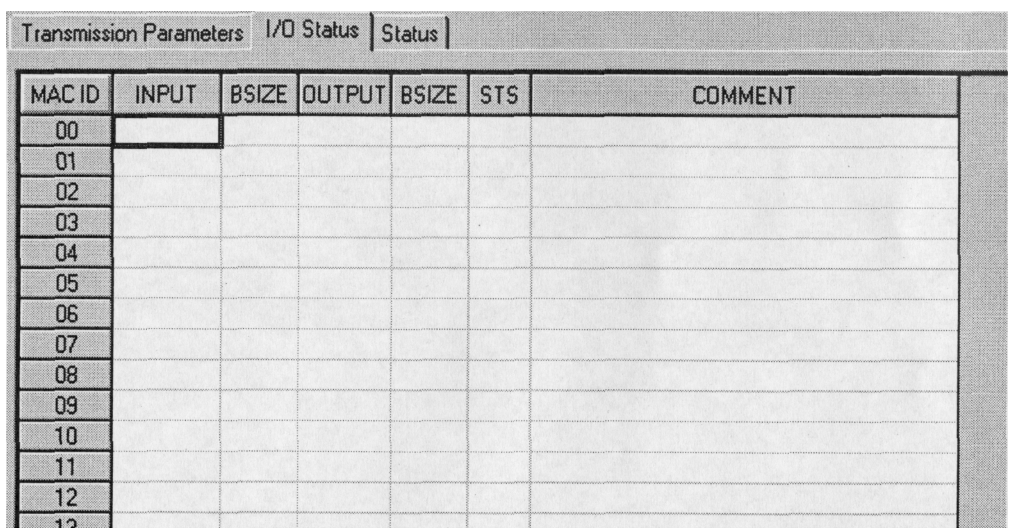
6.2.1 Outline

When the 260IF Module is set as a DeviceNet Master, the I/O status function reports in online the status of communications with the DeviceNet Slaves set in the I/O allocations for the I/O communications function.

6.2.2 Using the I/O Status Function

The I/O status is displayed using the following procedure.

1. Display the Module Configuration Window on the CP-717.
2. Double-click the slot to which the 260IF Module is set and open the 260IF Definition Window.
3. Select the ***I/O Status*** Tab in the 260IF Definition Window.



<table>
<tr><th>Display Item</th><th colspan="2">Contents</th></tr>
<tr><td>MAC ID</td><td colspan="2">The DeviceNet MAC ID (DeviceNet address).</td></tr>
<tr><td>INPUT</td><td colspan="2">The leading address of the input area allocated to the device (input register IWxxxx).</td></tr>
<tr><td>BSIZE</td><td colspan="2">The size in bytes of the input area allocated to the device (input register IWxxxx).</td></tr>
<tr><td>OUTPUT</td><td colspan="2">The leading address of the output area allocated to the device (output register OWxxxx).</td></tr>
<tr><td>BSIZE</td><td colspan="2">The size in bytes of the output area allocated to the device (output register OWxxxx).</td></tr>
<tr><td rowspan="8">STS</td><td colspan="2">The I/O status code. The I/O status display contents are shown below.</td></tr>
<tr><th>Code</th><th>Meaning</th></tr>
<tr><td>0000H</td><td>Communications not performed.</td></tr>
<tr><td>8000H</td><td>I/O communications normal.</td></tr>
<tr><td>4048H</td><td>I/O communications error. Communications stopped.</td></tr>
<tr><td>404DH</td><td>I/O communications error. Actual Slave I/O sizes different from setting.</td></tr>
<tr><td>404EH</td><td>I/O communications error. No response from Slave.</td></tr>
<tr><td>4056H</td><td>I/O communications error. Slave in idle status.</td></tr>
<tr><td>Comment</td><td colspan="2">The comment set for each device type under I/O Allocations is displayed.</td></tr>
</table>

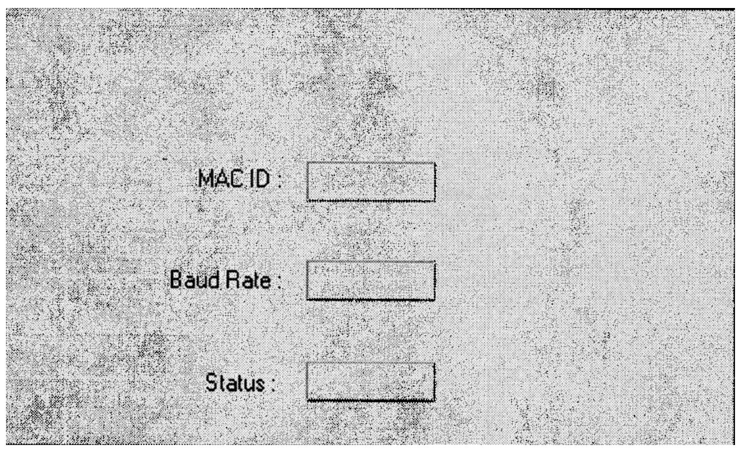
6.3 Status

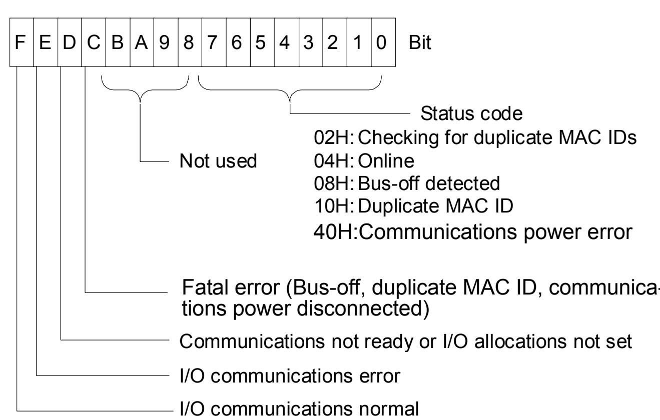
The status function reports, in online, the 260IF Module DeviceNet address, baud rate setting, and communications status.

6.3.1 Using the Status Function

The status is displayed using the following procedure.

1. Display the Module Configuration Window on the CP-717.
2. Double-click the slot to which the 260IF Module is set and open the 260IF Module Configuration Window.
3. Select the ***Status*** Tab in the 260IF Definition Window to display the Status Window.



<table>
<tr><th>Display Item</th><th>Contents</th></tr>
<tr><td>MAC ID</td><td>The MAC ID (DeviceNet address) set for the 260IF Module.</td></tr>
<tr><td>Baud Rate</td><td>The baud rate set for the 260IF Module.</td></tr>
<tr><td>Status</td><td>The 260IF Module status code. The contents of the display are shown in the following diagram.


</td></tr>
</table>

6.4 Troubleshooting

When the 260IF Module detects an error during DeviceNet communications, it reports the error via the LED indicators, I/O status function, and status function. The following table gives probable causes and possible solutions.

6.4.1 Masters

The following table gives the status of indicators and status functions for normal operation when the 260IF Module is set as a Master.

LED	Status	I/O Status
MS lit green NS lit green	8004	8000

The following table gives possible solutions for errors that occur when the 260IF Module is set as a Master.

Table 6.3 Troubleshooting the Master

Problem	Locations to Check			Probable Cause	Possible Solution
	Indicators	Status	I/O Status		
No DeviceNet communications	MS not lit NS not lit	-	-	No power to the 260IF Module.	Check the rack or system bus cable connection to the 260IF Module.
	MS lit red NS not lit	-	-	Hardware malfunction	Replace the 260IF Module.
	MS lit red NS lit red	-	-	Hardware malfunction	Replace the 260IF Module.
	MS lit green NS lit res	1010	0000	Duplicate MAC ID	1. Change the MAC ID address for the 260IF Module and cycle the power. 2. Change the MAC ID addresses for other DeviceNet devices and cycle the power to the 260IF Module.
		1008	-	Bus-off	1. Check the wiring and connections for DeviceNet cables and connectors. 2. Check the power supply voltage and connection for communications power supply. 3. Check the communications power supply voltage for each DeviceNet connector on the 260IF Module (11 to 24 V). 4. Check the baud rate for each DeviceNet device in the network. 5. Check the terminator (121 Ω) and connection status. 6. Check the length of the network. 7. Replace the 260IF Module. Then either cycle the power for the 260IF Module or disconnect and re-insert the DeviceNet connectors.

Table 6.4 Troubleshooting the Master (Cont'd)

Problem	Locations to Check			Probable Cause	Possible Solution
	Indicator	Status	I/O Status		
No DeviceNet communications (cont'd)	MS lit green NS not lit	1040	-	Communications power supply error	1. Check the wiring and connections for DeviceNet cables and connectors. 2. Check the power supply voltage and connection for communications power supply. 3. Check the communications power supply voltage for each DeviceNet connector on the 260IF Module (11 to 24V).
		0002	0000		1. Check the wiring and connections for DeviceNet cables and connectors. 2. Check the baud rate for each DeviceNet device in the network. 3. Check the terminator (121 Ω) and connection status. 4. Check the operation status of DeviceNet devices on the network. 5. Replace the 260IF Module.
	MS lit green NS flashing green	2004	0000	Connection not established with DeviceNet device	Set the I/O allocations.
	MS lit green NS flashing red	4004	404D	I/O sizes of each DeviceNet device are different from setting.	1. Change the I/O sizes for the I/O allocations. 2. Change the I/O sizes for the DeviceNet device.
		4004	404E	No response from DeviceNet device.	1. Check the wiring and connections for DeviceNet cables and connectors. 2. Check the baud rate for each DeviceNet device in the network. 3. Check the power supply status of DeviceNet devices on the network.
		4004	4056	DeviceNet device is idle.	Remove the cause of the idle status of the DeviceNet device.
Communications are occurring but the maximum communications cycle time exceeds the setting.	MS lit green NS lit green	8004	8000	Too much traffic on DeviceNet. The communications cycle time setting is too low for the I/O command send time.	Set a longer communications cycle time.

6

Table 6.5 Troubleshooting the Master (Cont'd)

Problem	Locations to Check			Probable Cause	Possible Solution
	Indicator	Status	I/O Status		
Communications are occurring but the receive data refresh is delayed.	MS lit green NS lit green	8004	8000	Too much traffic on DeviceNet. The communications cycle time setting is too low for the I/O response receive time. The processing load for data exchange with the PLC is too large.	1. Set a longer communications cycle time. 2. Reduce the baud rate. 3. Increase the setting of the CPU scan time for the I/O allocation SCAN setting.
MSG-SND function terminated due to error. (during DeviceNet communications)	MS lit green NS lit green	8004	8000	Parameter setting error	Check that the MSG-SND function parameter settings are correct. • Data address • Data size
	MS lit green NS flashing green	2004	-	EM allocations not made.	Set the EM allocation under *I/O Allocations*.
	MS lit green NS lit red	4004	40XX	I/O communications error	Remove the cause of the I/O communications error.
MSG-SND function remains BUSY and does not end.	MS lit green NS lit green	8004	8000	MSG-SND function parameter setting error	Check that the MSG-SND function parameter settings are correct. • Remote station number
				Too much traffic on DeviceNet (Cannot send Explicit request message.)	1. Set longer communications cycle time. 2. For multi-Master configuration, increase the communications cycle time for other Master.

6

6.4.2 Slaves

The followinng tabel gives the status of indicators and status functions for normal operation when the 260IF Module is set as a Slave.

LED	Status	I/O Status
MS lit green NS lit green	8004	8003 (Polled) 8005 (Strobed)

The following table gives probable causes and possible solutions for when the 260IF Module is set as a Slave.

Table 6.6 Troubleshooting Slaves

Problem	Locations to Check			Probable Cause	Possible Solution
	Indicator	Status	I/O Status		
No DeviceNet communications	MS not lit NS not lit	-	-	No power supply to 260IF Module	Check the rack or system bus cable connection to the 260IF Module.
	MS lit red NS not lit	-	-	Hardware malfunction	Replace the 260IF Module.
	MS lit red NS lit red	-	-	Hardware malfunction	Replace the 260IF Module.
	MS lit green NS lit red	1010	0000	Duplicate MAC ID	1. Change the MAC ID address for the 260IF Module and cycle the power. 2. Change the MAC ID addresses for other DeviceNet devices and cycle the power to the 260IF Module.
	MS lit green NS lit red	1008	-	Bus-off	1. Check the wiring and connections for DeviceNet cables and connectors. 2. Check the power supply voltage and connection for communications power supply. 3. Check the communications power supply voltage for each DeviceNet connector on the 260IF Module (11 to 24 V). 4. Check the baud rate for each DeviceNet device in the network. 5. Check the terminator (121 Ω) and connection status. 6. Check the length of the network. 7. Replace the 260IF Module. Then either cycle the power for the 260IF Module or disconnect and re-insert the DeviceNet connectors.

Table 6.7 Troubleshooting Slaves (Cont'd)

Problem	Locations to Check			Probable Cause	Possible Solution
	Indicator	Status	I/O Status		
No DeviceNet communications (cont'd)	MS lit green NS not lit	1040	-	• Communications power supply error • DeviceNet network error	1. Check the wiring and connections for DeviceNet cables and connectors. 2. Check the power supply voltage and connection for communications power supply. 3. Check the communications power supply voltage for each DeviceNet connector on the 260IF Module (11 to 24 V). 4. Check the terminator (121 Ω) and connection status.
	MS lit red NS not lit	0002	0000	DeviceNet network error	1. Check the wiring and connections for DeviceNet cables and connectors. 2. Check the baud rate for each device. 3. Check the terminator (121 Ω) and connection status. 4. Check the operation status of the DeviceNet Master. 5. Replace the 260IF Module.
	MS lit green NS flashing green	2004	0000	Connection not established with DeviceNet device	1. Check the DeviceNet Master scan list settings. 2. Check the wiring and connections for DeviceNet cables and connectors. 3. Check the baud rate for each device. 4. Check the operation status of the DeviceNet Master.
				DeviceNet I/O size different from setting	1. Change the I/O sizes for the I/O allocations. 2. Change the I/O sizes for the DeviceNet Master.
	MS lit green NS flashing green	4004	4000	No response from DeviceNet Master	1. Check the wiring and connections for DeviceNet cables and connectors. 2. Check the baud rate for each device. 3. Check the terminator (121 Ω) and connection status. 4. Check the operation status of the DeviceNet Master. 5. Check the power supply voltage and connection for communications power supply. 6. Check the communications power supply voltage for each DeviceNet connector on the 260IF Module (11 to 24 V).

Table 6.8 Troubleshooting Slaves (Cont'd)

Problem	Locations to Check			Probable Cause	Possible Solution
	Indicator	Status	I/O Status		
No DeviceNet communications (cont'd)	MS lit green NS flashing red	4004	4000	No response from DeviceNet Master	1. Check the wiring and connections for DeviceNet cables and connectors. 2. Check the baud rate for each device. 3. Check the terminator (121 Ω) and connection status. 4. Check the operation status of the DeviceNet Master. 5. Check the power supply voltage and connection for communications power supply. 6. Check the communications power supply voltage for each DeviceNet connector on the 260IF Module (11 to 24V).
	MS lit green NS flashing red	0000	0004	The switch MAC ID setting is different from the MAC ID setting under the I/O allocations.	1. Change the MAC ID setting under the I/O allocations. 2. Change the switch MAC ID setting and cycle the power.
	MS lit green NS lit green	0000	0004	The switch MAC ID setting is different from the MAC ID setting under the I/O allocations.	1. Change the MAC ID setting under the I/O allocations. 2. Change the switch MAC ID setting and cycle the power.
Communications are occurring but the receive data is not being refreshed.	MS lit green NS lit green	8004	8003	DeviceNet Master is in idle status.	Remove the cause of the idle status of the DeviceNet Master.
Communications are occurring but the receive data refresh is delayed.	MS lit green NS lit green	8004	8003	Too much traffic on DeviceNet. The communications cycle time setting is too low for the I/O response receive time. The processing load for data exchange with the PLC is too large.	1. Increase communications cycle time for the DeviceNet Master. 2. Reduce the baud rate. 3. Increase the CPU scan time for the I/O allocation SCAN setting.

6

7 Wiring

This chapter explains the how to wire the communications power supply, calculation methods for power supply positioning, and network grounding methods.

7

7.1 Wiring Communications Power Supply

This section describes wiring methods for communications power supply and calculation methods for power supply positioning.

7.1.1 Basic Precautions

- The communications power supply to the network must be 24 VDC.
- The communications power supply must have a sufficient margin in the capacity.
- Connect the communications power supply to the trunk line.
- If many nodes are provided with power from a single power supply, locate the power supply as close as possible to the middle of the trunk line.
- The allowable current flow in a thick cable is 8 A and that in a thin cable is 3 A.
- The power supply capacity for a drop line varies with the drop line length. The longer a drop line is, the lower the maximum current capacity of the drop line will be regardless of the thickness of the drop line. Obtain the allowable current (I) of the drop line (i.e., the allowable current consumption of the drop line and devices connected to it) from the following equation.

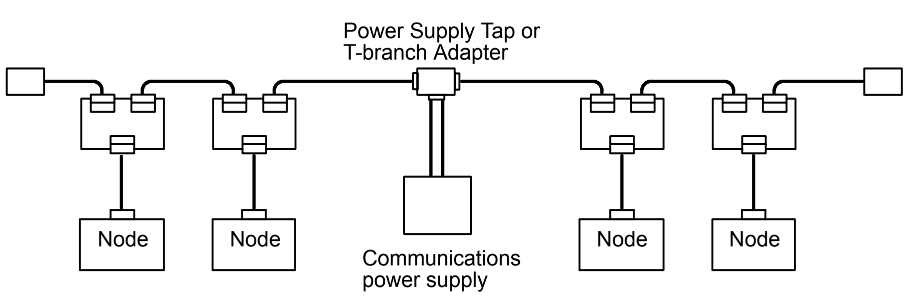
  $I = 4.57/L$ I: Allowable current (A)
  L: Drop line length (m)
- If only the communications power supply is turned OFF while the network is operating, errors may occur in the nodes that are communicating at that time.

7.1.2 Wiring Power Supply

The following diagrams show two layouts for power supply wiring.

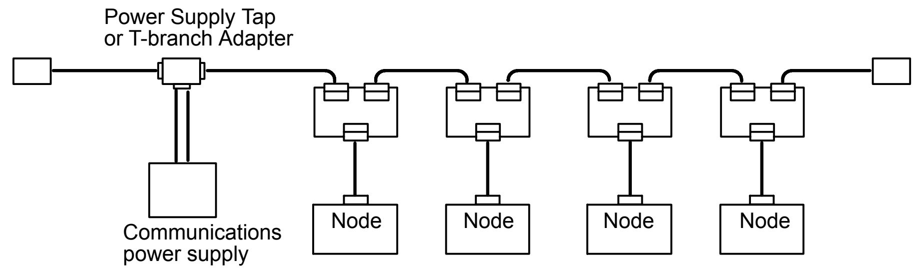
7

■ Nodes on Both Sides of the Power Supply



Note: The "Nodes on Both Sides of the Power Supply" method is recommended if a single power supply is connected to many nodes.

■ Nodes on One Side of the Power Supply



7.1.3 Methods for Deciding the Power Supply Positioning

■ Values to be Calculated

The power supply capacity required by each node and the voltage drop depending on the length of the cable will determine whether or not the correct current can be supplied to each node.

Calculate the following values.

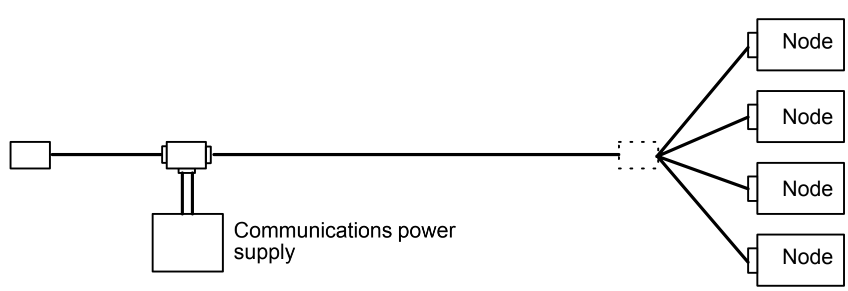
- The current capacity required for each node.
- The distance from the power supply.

■ Power Supply Calculation Method

There are two methods for calculating the power supply for the trunk line.

Simple Calculation from the Graph

The simple calculation from the graph is based on the worst configuration, with maximum voltage drop, as shown in the following diagram. The network will operate normally, therefore, if the conditions are met for a calculation from the graph.



Calculation from the Formula

The voltage drop is calculated from the transmission cable resistance and current consumption.

The conditions may be met through the results of calculation from the fomula even if the power supply specifications are not met through simple calculation from the graph. The network will operate normally if conditions are met for either the calculation from the formula or the simple calculation from the graph.

Make sure that each drop line meets the conditional expression for the length and current capacity of the drop line, as outlined in item 6 of *7.1.1 Basic Precautions*.

INFO

1 Have separate communications and internal circuit power supplies whenever possible.

2 If the same power supply must be used for both communications and internal circuit power supplies, the method of simple calculation from the graph cannot be used. Always use the calculation from the formula method.

■ Simple Calculation from the Graph

Simple Calculation

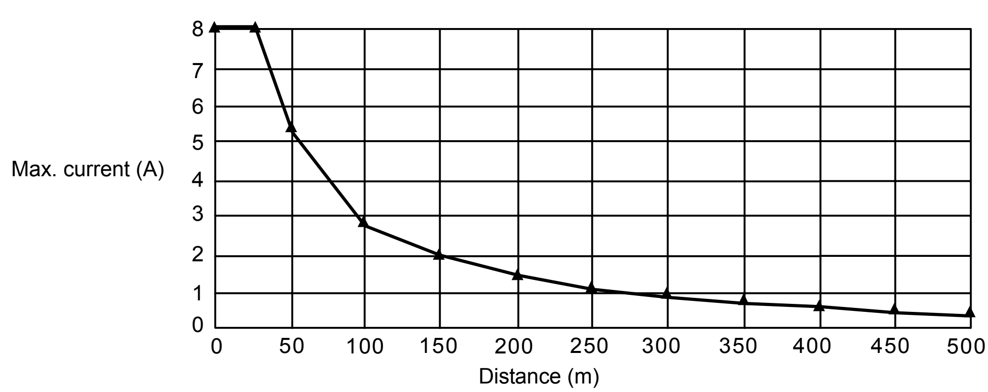
The voltage in the communications power supply section of each node must be 11 VDC or higher. The communications will become unstable if the voltage is lower than 11 VDC.

Voltage drop will occur when current flows through the transmission cable. This voltage drop will increase the longer the transmission cable and the larger the current.

The following table shows the maximum current for each cable to allow sufficient voltage to be supplied to the communications power supply section even if voltage drop occurs.

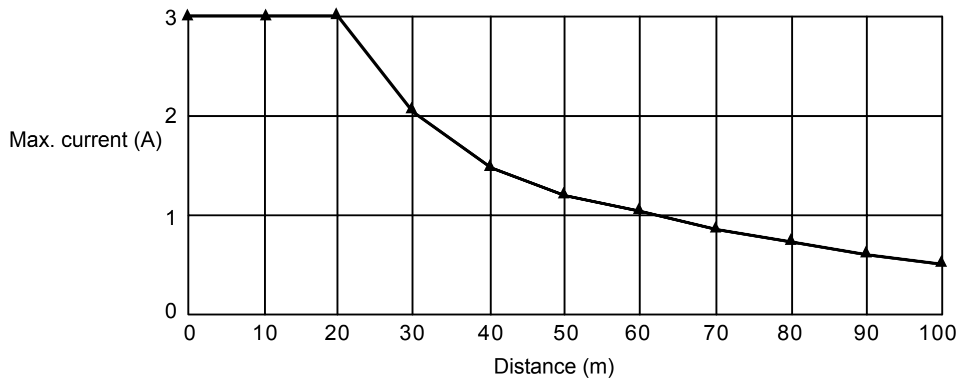
- For thick cables

Distance (m)	0	25	50	100	150	200	250	300	350	400	450	500
Max. current (A)	8.00	8.00	5.42	2.93	2.01	1.53	1.23	1.03	0.89	0.78	0.69	0.63



- For thin cables

Distance (m)	0	10	20	30	40	50	60	70	80	90	100
Max. current (A)	3.00	3.00	3.00	2.06	1.57	1.26	1.06	0.91	0.80	0.71	0.64



Confirmation Method

The following confirmation must be performed for each node connected in one direction from the power supply. If nodes are connected to both sides of the power supply, always check each direction separately. Also, be sure to refer to the appropriate graph. The relevant graph differs depending on whether thick or thin cables are used for the trunk line.

1. Calculate the total current consumption (A) for all nodes connected in one direction from the power supply.
2. Refer to the graph and determine the maximum current flowing to the cable (B), based on the type of cable and the distance from the power supply to the end of the trunk line.
3. If the total current consumption (A) calculated in step 1 is less than the maximum current (B) found in step 2, i.e., if A ≤ B, then the power supply specifications are met for all nodes in that direction.
4. If nodes are located on both sides of the power supply, repeat the confirmation process using steps 1 to 3 for the nodes in the other direction.

Countermeasures

7

Consider the following countermeasures if the total current consumption (A) calculated in step 1 is greater than the maximum current (B) found from the graph in step 2, i.e., if A > B.

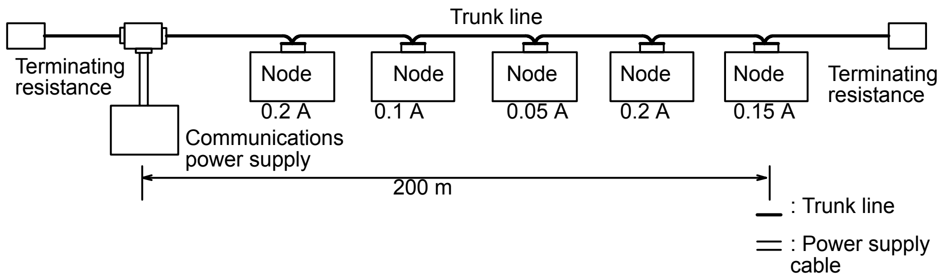
- Change the configuration so that the power supply is positioned in the middle of the network and nodes are located on both sides of the power supply.
- If the nodes are already on both sides of the power supply, move the power supply towards the nodes with the greater power supply requirements.
- If thin cables are being used, replace with thick cables.

If A > B even after all of these countermeasures have been tried, verify using the formula, using the actual node positions.

◀EXAMPLE▶

Example 1: Power Supply Positioned at One End of the Network

The following diagram shows the layout when the power supply is positioned at one end of the network and a thick cable with a total length of 200 m is used.

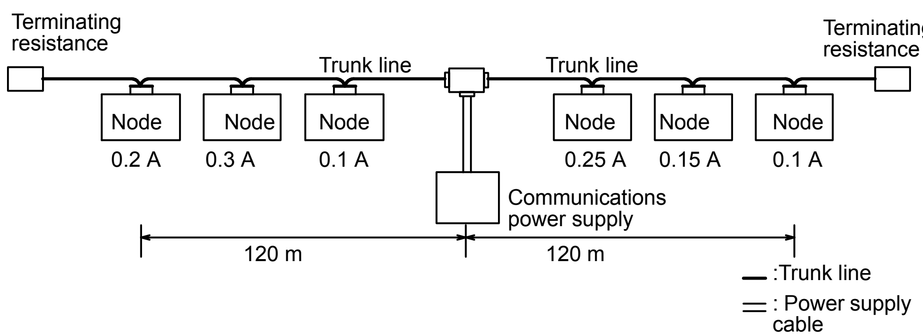


- Total length of power supply = 200 m
- Total current consumption = 0.2 A + 0.1 A + 0.05 A + 0.2 A + 0.15 A = 0.7 A
- Max. current according to the graph = 1.53 A

The total current consumption < maximum current. Therefore, communications power can be supplied to all nodes.

◀EXAMPLE▶

Example 2: Power Supply Positioned in the Middle of the Network



The following diagram shows the layout when the power supply is positioned in the middle of the network and a thick cable with a total length of 200 m is used.

- Total power supply length on the left side = Total power supply length on the right side=120 m
- Total current consumption on the left side = 0.2 A + 0.3 A + 0.1 A = 0.6 A
- Total current consumption on the right side = 0.25 A + 0.15 A + 0.1 A = 0.5 A
- Max. current on the left side according to the graph = Approx. 2.5 A
- Max. current on the right side according to the graph = Approx. 2.5 A

The total current consumption on the left side < maximum current on the left side and the total current consumption on the right side < maximum current on the right side. Therefore, communications power can be supplied to all nodes.

■ Calculation from the Formula

If the conditions cannot be met with simple calculation from the graph method, use the more detailed method of calculation from the formula.

Formula

1. For separate communications and internal circuit power supplies

Find the distance between the power supply and each node and the current consumption for each node in the communications section. If the following conditional expression is met, the power supply specifications for each node are met.

Conditional expression: Σ (Ln × Rc + Nt × 0.005) × In ≤ 4.65 V

- Ln: Distance between power supply and node (not including the length of the drop line)
- Rc: Max. cable resistance (0.015 Ω /m for thick cables, 0.069 Ω/m for thin cables)
- Nt: Number of Adapters between each node and the power supply
- In: Required current consumption for each node’s communications section
- 0.005 Ω = Adapter contact resistance

Make sure that the maximum current capacity for the cable is not exceeded (8 A for thick cables, 3 A for thin cables).

2. Shared Communications and Internal Circuit Power Supplies

Wherever possible, avoid using the same power supply for both communications and internal circuit power because the allowable voltage ranges for communications and the internal circuit power supplies differ, as shown below.

- Allowable voltage range for communications power supply:
  11 to 25 VDC
- Allowable voltage range for internal circuit power supply:
  24 VDC +10%/ –15%

Find the distance between each node and the power supply and the total current consumption for the communications and intenal circuit power supply sections of each node.

If the following conditional expression is met, the power supply specifications for each node are met.

Conditional expression: Σ [(Ln × Rc + Nt × 0.005) × In] ≤ 0.65 V

- Ln: Distance between power supply and node (not including the length of the drop line)
- Rc: Max. cable resistance (0.015 Ω /m for thick cables, 0.069 Ω/m for thin cables)
- Nt: Number of Adapters between each node and the power supply
- In: Required current consumption for each node’s communications and internal circuit sections
- 0.005 Ω = Adapter contact resistance

Make sure that the maximum current capacity for the cable is not exceeded (8 A for thick cables, 3 A for thin cables).

Countermeasures

If the conditional expression is not met, consider using one of the following countermeasures.

- Move the nodes with greater current consumption closer to the power supply.
- Change the configuration so that the power supply is positioned in the middle of the network and nodes are located on both sides of the power supply.
- If the nodes are already on both sides of the power supply, move the power supply towards the nodes with the greater power supply capacity requirements.
- If thin cables are being used, replace with thick cables.

7

7.2 Grounding the Network

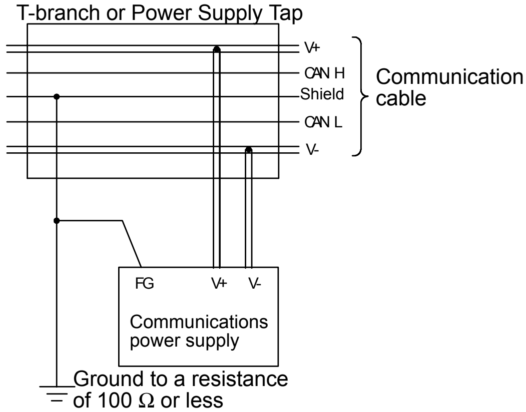
This section explains how to ground the network.

7.2.1 Grounding Methods

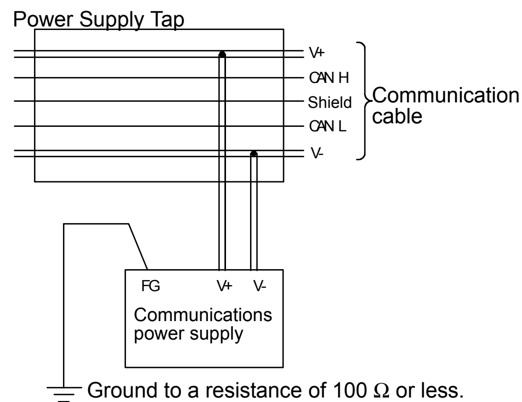
■ 260IF Communications

To avoid creating a ground loop, ground the network at one point only for 260IF Module communications. Position the ground as close to the center of the network as possible.

As shown in the following diagram, connect the cable shield wire to the ground terminal (FG) on the power supply. Ground to a resistance of 100 Ω or less.



Cable Grounded at Power Supply (one place only)



Cable Not Grounded at Power Supply

■ Using Multiple Power Supplies

When using multiple power supplies for communications, connect the shield wire to the power supply ground near the center of the network only. Do not connect the shield wire at any other power supplies.

Use Power Supply Taps when connecting multiple communications power supplies to a network.

Power supplies are not counted as nodes.

INFO

1 Always ground to a resistance of 100 Ω or less.

2 Ground the power supply separately from the servodrives and inverters.

3 Do not connect the shield wire to multiple points on the network. Connect it to one point only.

A External Appearances

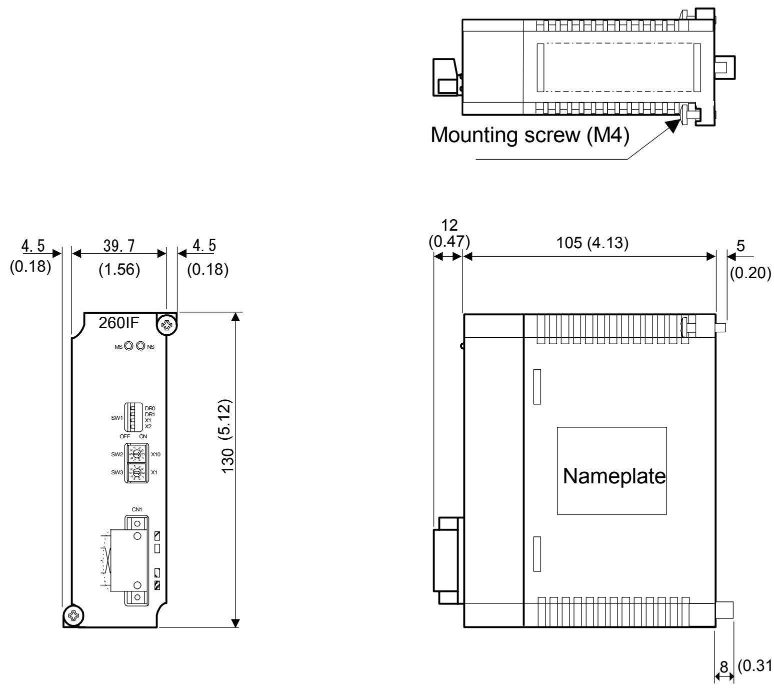
This appendix shows the external appearance of the 260IF Module and the MP940D Module.

A

A.1 260IF Module

Description: 260IF Module

Model number: JEPMC-CM230

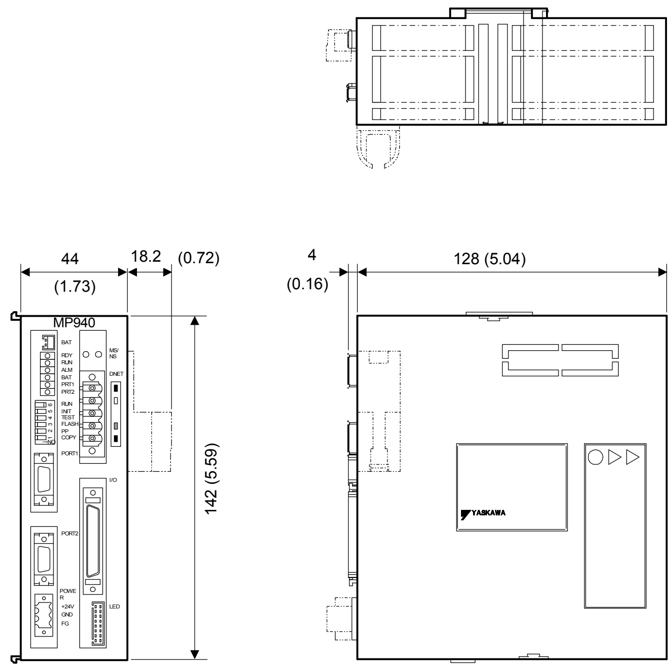


Dimensions in mm (inch)

A.2 MP940D Module

Description: MP940D

Model number: JEPMC-MC410



Dimensions in mm (inch)

B Sample Programs

This appendix provides sample programs for 260IF Module.

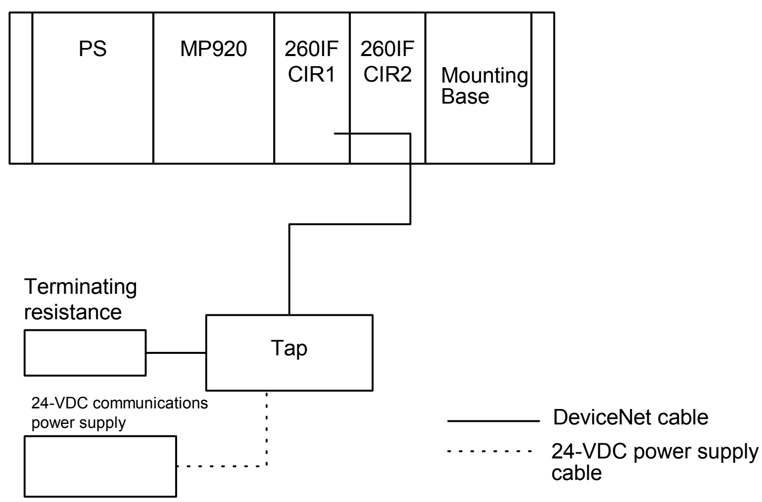
B.1 Sample Program No. 1

■ 260IF Module I/O Communications Example

This section describes the settings for actual I/O communications between 260IF Modules.

Configuration

The following diagram shows the system configuration for DeviceNet communications.

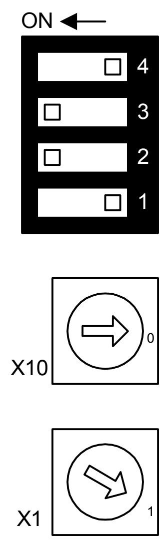
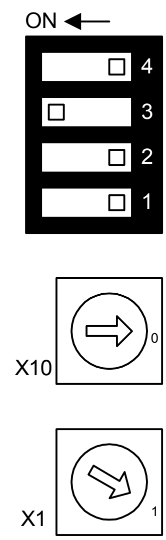


One 260IF Module is set as the 260IF Module CIR1 Master, one is set as a 260IF Module CIR2 Slave and I/O communications are performed. Message communications are also performed between the two 260IF Modules.

■ Startup Procedure

The procedure for setting DeviceNet communications is shown below.

1. Make the DIP switch and rotary switch settings shown in the following table.

260IF CIR1	260IF CIR2
	
Baud rate: 500 kbps Mode setting: Master MAC ID: 1	Baud rate: 500 kbps Mode setting: Slave MAC ID: 2

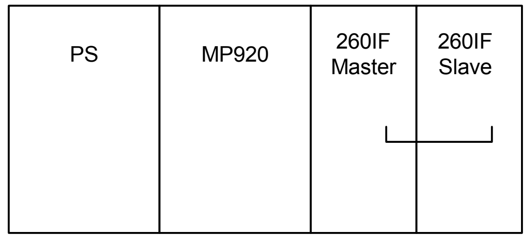
2. The Module configuration definition settings are shown in the following table.

Rack 1 | . . . | . . . | . . .

No.	00	01	02	03	04	05
Module	MP920 ▼	RESERVED	260IF	260IF	DO-01	DI-01
Controller CPU No.	—	—	01	01	01	01
Cir No.	—	—	01	01	01	01
⋮	. . .	. . .	. . .	. . .	. . .	. . .
I/O Start register	. . .	. . .	0000	0400	0800	0804
I/O End register	. . .	. . .	03FF	07FF	0803	0807
⋮	. . .	. . .	. . .	. . .	. . .	. . .

- 260IF CIR1

  Make the setings shown in the following diagram to use the 260IF Module as the DeviceNet Master with MAC ID = 1 and to exchange I/O data with a 2-byte 260IF Module with MAC ID = 2.



1. Communications cycle time set

Communications cycle time: 50 ms (0 to 300) Current Time: ms Max. Time: ms

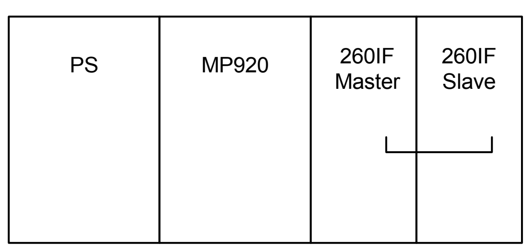
2. I/O Assignment set

Master/Slave: MAC ID : 1

	MAC ID	D	INPUT	BSIZE	D	OUTPUT	BSIZE	SCAN	TYPE	EM	Comment
	00										
**	01										
	02		IW000	2		OW200	2	High	Polled		
	03										
	. . .										
	. . .										

- 260IF CIR2

  Make the settings shown in the following diagram to use the 260IF Module as a DeviceNet Slave unit with MAC ID = 2 and 2-byte I/O size and to exchange data with a DeviceNet Master, also with a 2-byte data size.



1. Communications cycle time set

Communications cycle time: 0 ms (0 to 300)   Current Time: ms   Max. Time: ms

2. I/O Assignment set

Master/Slave: Slave   MAC ID : 2

	MAC ID	D	INPUT	BSIZE	D	OUTPUT	BSIZE	SCAN	TYPE	EM	Comment
	00										
	01										
	02		IW400	2		OW600	2	High	Polled		
	03										
	. . .										
	. . .										

3. Save the Module configuration definitions.
4. Reset the MP920 or cycle the power.
5. Create and execute a ladder program for MSG-SND.

IMPORTANT

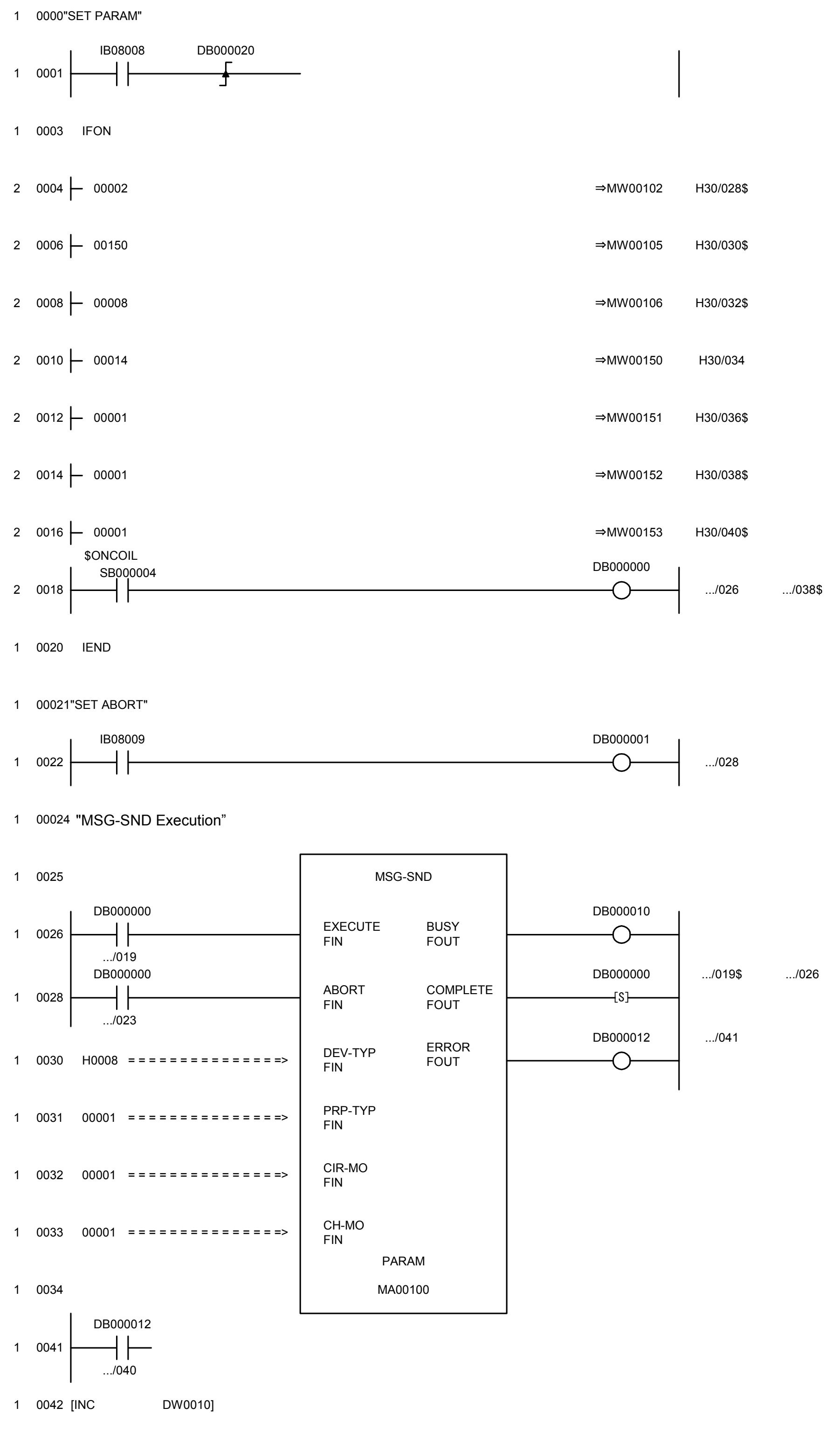
1 I/O communications will be performed if steps 1 to 4 are executed.

2 I/O communications and message communications will be performed if steps 1 to 5 are executed.

B

■ Ladder Program

The ladder program for DeviceNet message communications is shown below.



IMPORTANT

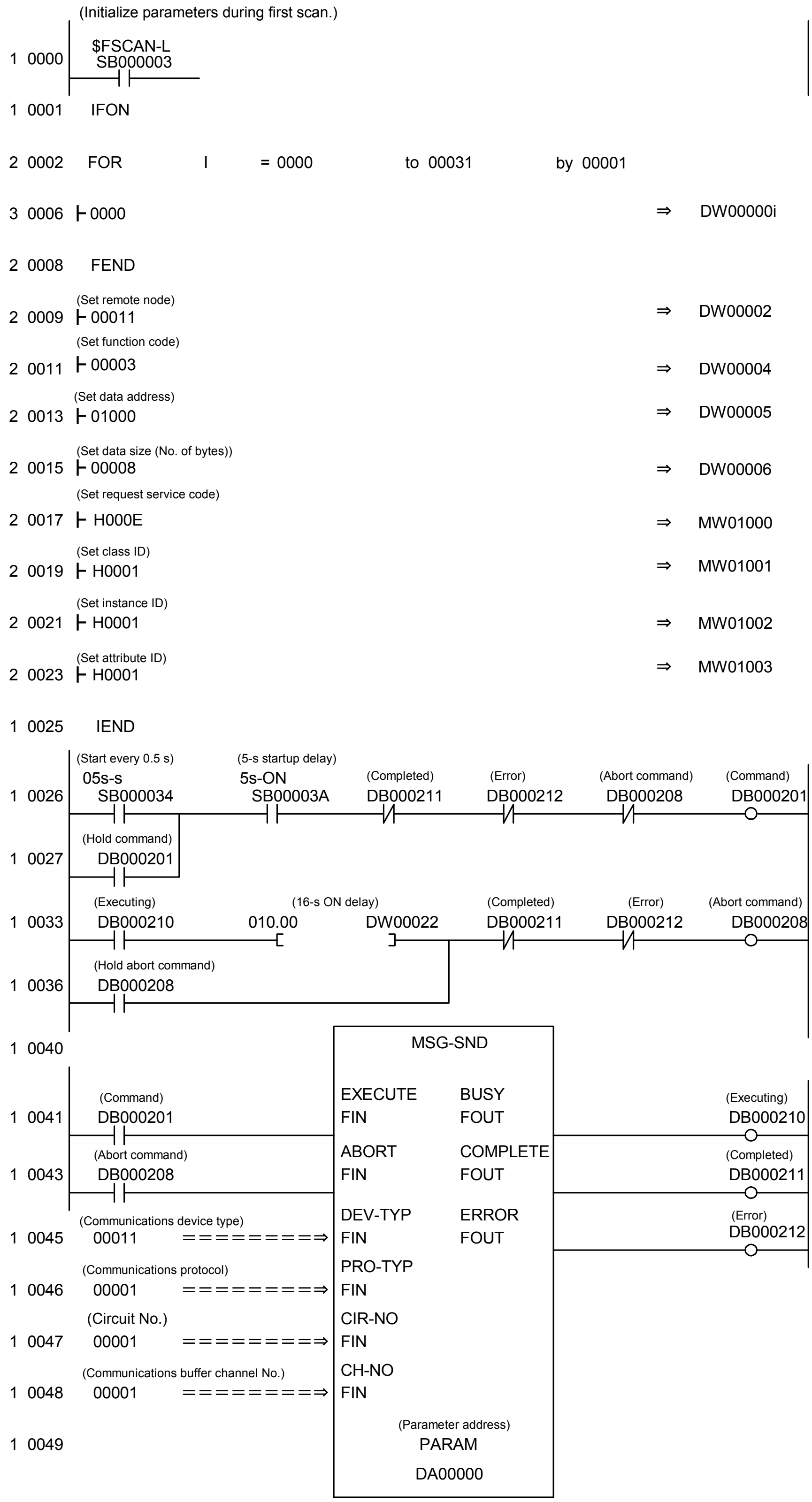
DeviceNet Message Function Precautions

Write the response data for normal ends to the same area as the input parameters.

When COMPLETE has turned ON, EXECUTE must be turned OFF otherwise an error will occur.

B.2 Sample Program No. 2

A sample program for 260IF Module explicit messages is shown below.



```
1 0056 | DB000211
       |----| |------
1 0057    IFON
                          (Normal response)
2 0058 ├ MW01000       =  H018E

2 0060    IFON
                          (Pass counter)
3 0061    INC             DW00024
                 (Receive data size (No. of bytes) converted to No. of words)
3 0062 ├ DW00006        + 00001                                  ⇒  DW00017

3 0065 ├ DW00017        ÷ 00002                                  ⇒  DW00018
         (Hold receive data)
3 0068    COPYW           MW01000  ⇒ MW01010   W = DW00018
       (Set data size (No. of bytes))
3 0071 ├ 00008                                                   ⇒  DW00006
       (Set request service code)
3 0073 ├ H000E                                                   ⇒  MW01000
       (Set class ID)
3 0075 ├ H0001                                                   ⇒  MW01001
       (Set instance ID)
3 0077 ├ H0001                                                   ⇒  MW01002
       (Set attribute ID)
3 0079 ├ H0001                                                   ⇒  MW01003

3 0081    ELSE
          (Error response counter)
3 0082    INC             DW00025

3 0083 ├ DW00006        + 00001                                  ⇒  DW00017

3 0086 ├ DW00017        ÷ 00002                                  ⇒  DW00018

3 0089    COPYW           MW01000  ⇒ MW01010   W = DW00018

3 0092 ├ 00008                                                   ⇒  DW00006

3 0094 ├ H000E                                                   ⇒  MW01000

3 0096 ├ H0001                                                   ⇒  MW01001

3 0098 ├ H0001                                                   ⇒  MW01002

3 0100 ├ H0001                                                   ⇒  MW01003

2 0102    IEND

1 0103    IEND

1 0104 | DB000212
       |----| |------
1 0105    IFON
                        (Error counter)
2 0106    INC           DW00026
         (Store processing result)
2 0107 ├ DW00000                                                 ⇒  DW00027
         (Store status)
2 0109 ├ DW00001                                                 ⇒  DW00028

1 0111    IEND

0 0112    DEND
```

Machine Controller MP900 Series

260IF DeviceNet System

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