FANUC Series 30*i*-MODEL A/B
FANUC Series 31*i*-MODEL A/B
FANUC Series 32*i*-MODEL A/B
FANUC Series 35*i*-MODEL B
FANUC Power Motion *i*-MODEL A
FANUC Series 0*i*-MODEL F

PROFIBUS-DP Board
CONNECTION MANUAL

B-63993EN/04

SAFETY PRECAUTIONS

"SAFETY PRECAUTIONS" describes the safety precautions related to the use of CNC units, to ensure safe operation of machines fitted with FANUC CNC units. Read this section carefully before attempting to use any function described in this manual.
Users should also read the relevant descriptions in the Operator's Manual of the CNC to become fully familiar with the functions to be used.

<u>Contents</u>

DEFINITION OF WARNING, CAUTION, AND NOTE

This manual includes safety precautions for protecting the user and preventing damage to the machine. Precautions are classified into Warnings and Cautions according to their bearing on safety. Also, supplementary information is described as Notes. Read the Warnings, Cautions, and Notes thoroughly before attempting to use the machine.

⚠ **WARNING**
    Applied when there is a danger of the user being injured or when there is a danger of both the user being injured and the equipment being damaged if the approved procedure is not observed.

⚠ **CAUTION**
    Applied when there is a danger of the equipment being damaged, if the approved procedure is not observed.

NOTE
    The Note is used to indicate supplementary information other than Warning and Caution.

- Read this manual carefully, and store it in a safe place.

GENERAL WARNINGS AND CAUTIONS

⚠ **WARNING**

1   Before operating the machine, thoroughly check the entered data. Operating the machine with incorrectly specified data may result in the machine behaving unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

2   Never attempt to machine a workpiece without first checking the programmed value, compensation value, current position, and external signal settings. Also, never attempt to machine a workpiece without first checking the operation of the machine. Before starting a production run, ensure that the machine is operating correctly by performing a trial run using, for example, the single block, feedrate override, or machine lock function, or by operating the machine with neither a tool nor workpiece mounted. Failure to confirm the correct operation of the machine may result in the machine behaving unexpectedly, possibly causing damage to the workpiece and/or machine itself, or injury to the user.

3   Ensure that the specified feedrate is appropriate for the intended operation. Generally, for each machine, there is a maximum allowable feedrate. The appropriate feedrate varies with the intended operation. Refer to the manual provided with the machine to determine the maximum allowable feedrate. If a machine is turn at other than the correct speed, unexpected load may be applied to the machine, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

4   When using a tool compensation function, thoroughly check the direction and amount of compensation.
    Operating the machine with incorrectly specified data may result in the machine behaving unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

5   The parameters for the CNC and PMC are factory-set. Usually, there is no need to change them. When, however, there is no alternative other than to change a parameter, ensure that you fully understand the function of the parameter before making any change.
    A failure to set a parameter correctly may result in the machine behaving unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

⚠ **CAUTION**

1   Immediately after switching on the power, do not touch any of the keys on the MDI unit until the position display or alarm screen appears on the CNC unit.
    Some of the keys on the MDI panel are dedicated to maintenance or other special operations. Pressing any of these keys may place the CNC unit in other than its normal state. Starting the machine in this state may cause it to behave unexpectedly.

2   The operator's manual for the CNC describes all the basic functions of the CNC, including the optional functions. The selected optional functions vary with the machine. Some functions described in this manual may not, therefore, be supported by your machine. Check the machine specifications before using the optional functions.

> ⚠ **CAUTION**
> 3 Some machine operations and screen functions are implemented by the machine tool builder. For an explanation of their usage and related notes, refer to the manual provided by the machine tool builder.
> For example:
> - On some machines, executing a tool function causes the tool change unit to operate. When executing a tool function on such a machine, stand well clear of the tool change unit. Otherwise, there is a danger of injury to the operator.
> - Many auxiliary functions trigger physical operations, such as rotation of the spindle. Before attempting to use an auxiliary function, therefore, ensure that you are fully aware of the operation to be triggered by that function.

> **NOTE**
> Command programs, parameters, and variables are stored in nonvolatile memory in the CNC. Generally, the contents of memory are not lost by a power on/off operation. However, the contents of memory may be erased by mistake, or important data in nonvolatile memory may have to be erased upon recovering from a failure.
> To enable the restoration of data as soon as possible if such a situation arises, always make a backup of the data in advance.

GENERAL WARNINGS FOR CNC APPLICATION DEVELOPMENT

> ⚠ **WARNING**
> Be careful enough for the following warnings when you develop two or more applications or use networks.
> If you neglect them, there is a danger of the user being injured or there is a danger of both the user being injured and the equipment being damaged.
> 1 Be careful enough if you write an identical CNC data, an identical PMC data or a series of related data set by two or more above applications including network functions. Because they are executed based on each individual cycles (in other words, asynchronous cycles), there is a possibility that the data will be written in an unexpected order.
> Therefore, do NOT write above data in the following cases.
> - Applications and network functions
> - Two or more applications
> - Two or more network functions
> Data, applications and network functions of interest are listed in below.
> However, all may not be listed completely because new features will be added in the future.
> 2 Be careful enough that you must prevent PMC signals in the same byte from being written by the following two or more applications including network functions. While an application reads and writes one byte of PMC signals, other applications may write the same byte.
> 3 Be careful enough if you process a PMC signal set that is related to a CNC function by using the following two or more applications including network functions. Because they are executed based on each individual cycles (in other words, asynchronous cycles), there is a possibility that the NC may receive the PMC signal set in an unexpected order.

⚠ **WARNING**

4 Generally, when multi-byte data are read or written at once among the following two or more applications including network functions, the coherency of the read multi-byte data (in other words, reading all latest data at once) is not guaranteed. To ensure the coherency of the multi-byte data, prepare flags to notify the completion of reading or writing process that is separated from the entity of the data and make the handshaking process to access the data by using the flags.

Data List Table

Category	Data
General data for CNC	Parameter, Tool compensation value and related data, Work zero offset value and related data, Workpiece coordinate system shift value and related data, Macro variable, P-CODE variable, Program and related data, Tool management function data, Tool life management data, Error compensation related data , Overtravel check (Interference check) related data , Software operator's panel related data
PMC data	PMC signal, PMC parameter
Data for Laser, Punch press or Wire cut	Tool data for punch press and related data, Safety zone data and related data, Laser cutting condition data and related data, Laser oscillator setting data and related data, Wire consumption compensation data, Guide position compensation data, Workpiece leveling data
Other data	Parameters for Data Server, Parameters for network setting

List Table of Applications and Network Functions

Category	Functions
Applications	PMC Ladder, Macro Executor, C Language Executor, FANUC PICTURE, FOCAS2
Network functions	FL-net, EtherNet/IP, PROFINET, Modbus/TCP, PROFIBUS-DP, DeviceNet, CC-Link

5 CNC has functions that read or write PMC signals in other than the G/F address. Be careful enough if the above mentioned applications and network read or write PMC signals used by these functions. When reading or writing the same PMC signal, applications or CNC functions may work in an unexpected manner.
For the relevant CNC functions, refer to "LIST OF FUNCTIONS USING PMC SIGNALS OTHER THAN G/F ADDRESS " in Appendix in the CONNECTION MANUAL (FUNCTION) of the relevant CNC.

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IV. CONNECTION

V. MAINTENANCE

I. GENERAL

1 GENERAL

This chapter explains the organization of this manual and how to read this manual.

1.1 ORGANIZATION

This manual consists of the following parts:

SAFETY PRECAUTIONS
Describes the precautions which must be observed when any of the functions explained in this manual is used.
I. GENERAL
This part describes the chapter organization, applicable models, and related manuals.
II. COMMON
Describes the common instructions for using the PROFIBUS-DP functions.
III. SETTING
Describes the setting and maintenance required for enabling PROFIBUS-DP communication.
IV. CONNECTION
Describes how to connect devices to enable PROFIBUS-DP communication, as well as related precautions.
V. MAINTENANCE
Describes PROFIBUS-DP board drawing numbers and the meanings of LED indications

1.2 APPLICABLE MODELS

The models covered by this manual are as follows. The abbreviations listed below may be used to refer to the corresponding models.

Model name	Abbreviation			
FANUC Series 30*i*-MODEL A	Series 30*i*-A	Series 30*i*/31*i*/32*i*-A		Series 30*i*/31*i*/32*i*-A/B, 35*i*-B, PM *i*-A
FANUC Series 31*i*-MODEL A	Series 31*i*-A			
FANUC Series 31*i*-MODEL A5				
FANUC Series 32*i*-MODEL A	Series 32*i*-A			
FANUC Series 30*i*-MODEL B	Series 30*i*-B	Series 30*i*/31*i*/32*i*-B	Series 30*i*/31*i*/32*i*/35*i*-B or 30*i*/31*i*/32*i*/35*i*-B	
FANUC Series 31*i*-MODEL B	Series 31*i*-B			
FANUC Series 31*i*-MODEL B5				
FANUC Series 32*i*-MODEL B	Series 32*i*-B			
FANUC Series 35*i*-MODEL B	Series 35*i*-B	Series 35*i*-B		
FANUC Power Motion *i*-MODEL A	Power Motion *i*-A	Power Motion *i*-A	PM *i*-A	
FANUC Series 0*i*-MODEL F	Series 0*i*-F	Series 0*i*-F	Series 0*i*-F	0*i*-F

1.3 RELATED MANUALS

The related manuals are shown below.
See also the following manuals together with this manual. This manual is indicated by an asterisk(*).

Manual name	Specification number	
Related to Series 30*i*/31*i*/32*i*-A		
DESCRIPTIONS	B-63942EN	

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Manual name	Specification number	
CONNECTION MANUAL (HARDWARE)	B-63943EN	
CONNECTION MANUAL (FUNCTION)	B-63943EN-1	
OPERATOR'S MANUAL (Common to Lathe System/Machining Center System)	B-63944EN	
OPERATOR'S MANUAL (For Lathe System)	B-63944EN-1	
OPERATOR'S MANUAL (For Machining Center System)	B-63944EN-2	
MAINTENANCE MANUAL	B-63945EN	
PARAMETER MANUAL	B-65950EN	
Related to Series 30*i*/31*i*/32*i*-B		
DESCRIPTIONS	B-64482EN	
CONNECTION MANUAL (HARDWARE)	B-64483EN	
CONNECTION MANUAL (FUNCTION)	B-64483EN-1	
OPERATOR'S MANUAL (Common to Lathe System/Machining Center System)	B-64484EN	
OPERATOR'S MANUAL (For Lathe System)	B-64484EN-1	
OPERATOR'S MANUAL (For Machining Center System)	B-64484EN-2	
MAINTENANCE MANUAL	B-64485EN	
PARAMETER MANUAL	B-64490EN	
Related to Series 35*i*-B		
DESCRIPTIONS	B-64522EN	
CONNECTION MANUAL (HARDWARE)	B-64523EN	
CONNECTION MANUAL (FUNCTION)	B-64523EN-1	
OPERATOR'S MANUAL	B-64524EN	
MAINTENANCE MANUAL	B-64525EN	
PARAMETER MANUAL	B-64530EN	
Related to Power Motion *i*-A		
DESCRIPTIONS	B-64572EN	
CONNECTION MANUAL (HARDWARE)	B-64573EN	
CONNECTION MANUAL (FUNCTION)	B-64573EN-1	
OPERATOR'S MANUAL	B-64574EN	
MAINTENANCE MANUAL	B-64575EN	
PARAMETER MANUAL	B-64580EN	
Related to Series 0*i*-F		
DESCRIPTIONS	B-64602EN	
CONNECTION MANUAL (HARDWARE)	B-64603EN	
CONNECTION MANUAL (FUNCTION)	B-64603EN-1	
CONNECTION MANUAL (FUNCTION) (For Series 0*i*-PF)	B-64623EN	
OPERATOR'S MANUAL (Common to Lathe System/Machining Center System)	B-64604EN	
OPERATOR'S MANUAL (For Series 0*i*-PF)	B-64624EN	
OPERATOR'S MANUAL (For Lathe System)	B-64604EN-1	
OPERATOR'S MANUAL (For Machining Center System)	B-64604EN-2	
MAINTENANCE MANUAL	B-64605EN	
PARAMETER MANUAL	B-64610EN	
PARAMETER MANUAL (For Series 0*i*-PF)	B-64630EN	
PMC		
PMC PROGRAMMING MANUAL (For Series 30*i*/31*i*/32*i*-A)	B-63983EN	
PMC PROGRAMMING MANUAL (For Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A, Series 0*i*-F)	B-64513EN	
Network		
PROFIBUS-DP Board CONNECTION MANUAL	B-63993EN	*
Industrial Ethernet CONNECTION MANUAL	B-64013EN	
Fast Ethernet / Fast Data Server OPERATOR'S MANUAL	B-64014EN	
DeviceNet Board CONNECTION MANUAL	B-64043EN	
FL-net Board CONNECTION MANUAL	B-64163EN	
CC-Link Board CONNECTION MANUAL	B-64463EN	

Manual name	Specification number	
Dual Check Safety		
Dual Check Safety CONNECTION MANUAL (For Series 30i/31i/32i- A)	B-64003EN	
Dual Check Safety CONNECTION MANUAL (For Series 30i/31i/32i/35i-B, Power Motion i-A, Series 0i-F)	B-64483EN-2	
PC Tool		
CNC SETTING TOOL OPERATOR'S MANUAL	B-64174EN	

II. COMMON

1　　OVERVIEW OF PROFIBUS-DP FUNCTIONS

The CNC supports the master and slave functions of PROFIBUS-DP functions.

> ⚠ **WARNING**
> To use the PROFIBUS-DP functions, fully understand the instructions described
> in this manual before making the setting. If you make the setting without fully
> understanding them, the machine may behave unexpectedly when started,
> possibly causing damage to the tool, machine, and/or workpiece, or injury to the
> user.
> After making the communication setting for the first time or changing any
> communication setting, conduct communication tests thoroughly.

> ⚠ **CAUTION**
> 1　If connecting to communication devices made by other companies, thoroughly
> 　　read the manuals supplied with the communication devices made by the other
> 　　companies and sufficiently conduct connection tests beforehand.
> 2　Be sure to read through this part, "COMMON".

> **NOTE**
> 1　The PROFIBUS-DP functions cannot be used simultaneously with the DeviceNet
> 　　functions or CC-Link functions.
> 2　In this manual, a DI represents a signal input to the CNC and a DO represents a
> 　　signal output from the CNC, unless otherwise specified.
> 　　The directions of data are shown below:
> 　　- DI:　　　　Communication destination device → CNC
> 　　- DO:　　　　Communication destination device ← CNC
> 　　For communication between CNCs, for example, for communication between
> 　　CNC1 and CNC2, the directions of data are shown below:
> 　　- CNC1(DO) → CNC2(DI)
> 　　- CNC1(DI) ← CNC2(DO)
> 3　In this manual, for each screen example, the corresponding screen of Series
> 　　30i/31i/32i-A is given. The basic contents are the same as for Series
> 　　30i/31i/32i/35i-B, Power Motion i-A and Series 0i-F but detailed layout might be
> 　　different.

Overview of the master function

The PROFIBUS-DP master function is outlined below.
The PROFIBUS-DP master function supports DPV0 functions (cyclic I/O transport) of class 1.

Overview of the Master Function

Master functions	Range of valid master station numbers	0 to 125
	Range of valid slave station numbers for which communication can be performed	0 to 125
	Maximum number of slave stations for which communication is enabled	48
	Maximum number of slots that can be set	128 (Total number of slots of all slave stations)
	Maximum DI/DO data size per slave station	244 bytes (Total of DI/DO)
	Maximum user parameter data size per slave station	201 bytes
	Maximum diagnose data size per slave station	244 bytes

Overview of the slave function

The PROFIBUS-DP slave function is outlined below.

Overview of the Slave Function

Slave functions	Range of valid master station numbers	0 to 125
	Maximum DI/DO data size per slave station	244 bytes (Total of DI/DO)

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2 SETTING COMMUNICATION FUNCTIONS

This chapter contains the information necessary for setting the PROFIBUS-DP function.

2.1 DI/DO DATA AND STATUS DATA

As communication parameters, in addition to the setting items depending on the communication specification of the PROFIBUS-DP functions, setting items used for allocating DI/DO data and status data (data for monitoring the communication status) to a PMC area are to be set.
This section describes the allocation of DI/DO data and status data to a PMC area.

> ⚠ **WARNING**
> Before allocating DI/DO data and status data to a PMC area, fully understand the instructions written in "GENERAL WARNINGS FOR CNC APPLICATION DEVELOPMENT" in "SAFETY PRECAUTIONS" at the beginning of this manual, and in this section.
> Allocate the PMC area so that multiple communication functions do not write it.
> Immediately after setting all communication parameters including those for allocation to the PMC area, make sure that DI/DO data and status data operate correctly in the status in which safety is ensured before starting operation.
> If operation is started without checking the above, the machine may behave unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

> **NOTE**
> For the PROFIBUS-DP master function, setting items "DGN ADDR" and "INDICATION ADDRESS" correspond to the status data.

2.1.1 Allocating PMC Areas

To allocate a PMC area in the setting screen of each communication function, specify it as follows:

```
Input format)
    <Path number>:<PMC address>
```

For example, for R0500 on the second path of the PMC, input "2:R500".
If <Path number> is omitted (R500), the first path is assumed (1:R0500).
If the <:> key is not available, it can be substituted with the </> key or the <EOB> key. ":" is optional.
To clear "<Path number>:<PMC address>" previously set, input " " (blank). ("---" will be displayed). In this case, it is assumed that no PMC area is used.

> ⚠ **CAUTION**
> 1 In the PMC area, the R, X, and Y areas, and E area in volatile memory are all set to 0 immediately after power-on.
> 2 The E area in the PMC area is normally allocated to volatile memory. However, it can also be used as nonvolatile memory by setting the option.
> When the area is used as nonvolatile memory, the contents of the area are retained even after the power is turned off. So, special attention should be paid not to cause an unpredictable operation when the power is turned on next time.

2.1.2   Creating a Ladder Program
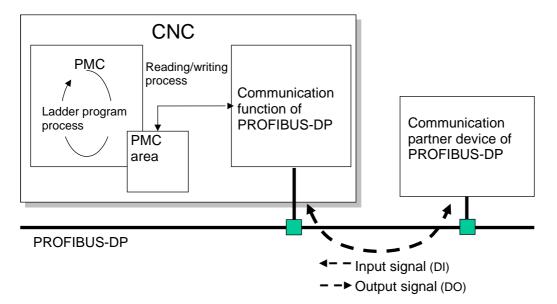
DI/DO data and status data allocated to a PMC area are processed by a ladder program.
The following provides notes on creating a ladder program required to construct a safety system.

⚠ **CAUTION**
1   The time after the power is turned on until communication is actually started may
    vary depending on the system configuration of the CNC and the state of the
    communication partner device.
    If it is necessary to strictly determine whether communication starts, it is not
    sufficient to determine it with time and status data only. Determine it with a
    method such as checking with actual DI data.
2   Create a ladder program in such a way that the system will be operated safely
    even if a communication error occurs.

Input signal (DI) and output signal (DO)

An output signal from the CNC is written by the ladder program into the PMC data area. The
reading/writing process of a communication function reads the signal and sends it to the PROFIBUS-DP
network. An input signal also flows a similar route in the opposite direction.
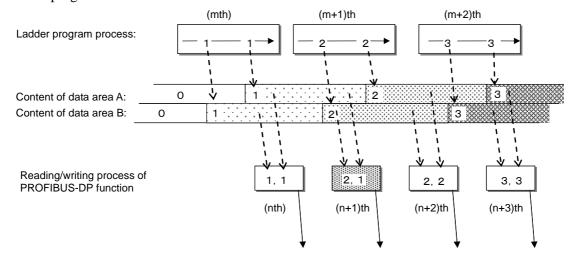
Input signal (DI) and output signal (DO)

Ladder program process and reading/writing process by a communication function

Processing by the ladder program and the reading/writing process by a communication function operate
asynchronously with one another.
Processing by the ladder program can operate independently of reading/writing process by a
communication function, so the ladder program can be repeatedly executed at high-speed.

The following figure shows a time chart of the internal operation of the CNC with signals output from the ladder program.

Time chart

The upper part of the figure indicates that processing by the ladder program is performed periodically and writing to data area A or data area B is performed in the ladder program.

The middle part indicates how data area A and data area B in the PMC are updated in this case. There are differences in the timing in which data is written to data area A or data area B even in the same execution cycle of the ladder program, so data area A and data area B are not updated at the same time.

The lower part indicates that the reading/writing process by communication functions is cyclically made to read data in data area A and data area B. Since data area A and data area B are not updated at the same time, for example, in the case of (n+1)th refreshing, the data written by one execution of the ladder program cannot be read as one set.

Conversely, when input signals from communication partner devices are processed in the ladder program, the data written by one execution of writing may not be read by one execution of the ladder program.

> ⚠ **CAUTION**
> Reading/writing process by a communication function is made asynchronously
> with the execution of the ladder program. Therefore, keep the following in mind
> when creating a ladder program.
> <1> When an input signal from the communication function to be written in the
>   specified PMC address is read from two points in the ladder program, even
>   if the ladder program can be executed in one cycle, there is no guarantee
>   that the same value can be read.
> <2> When the ladder program writes an output signal to the communication
>   partner device in the specified PMC address, the signal may be transferred
>   to the communication partner device before the ladder program is
>   completely executed.

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> **NOTE**
> 1 The DI/DO data refresh time (reading/writing process cycle) of the
>   PROFIBUS-DP master function can be checked using "REFRESH TIME" on the
>   COMMUNICATION STATUS screen.
> 2 The DI/DO data refresh time (reading/writing process cycle) of the
>   PROFIBUS-DP slave function is 8 msec.

Concurrency of data

When DI data or DO data is handled with the ladder program, the concurrency of long data (4-byte data) and word data (2-byte data) is guaranteed (there are no data segmentation) under the corresponding constraints.

> ⚠ **CAUTION**
> If the following constraints are not satisfied, the concurrency of long data or word data is not guaranteed.

Concurrency of long data (4-byte data)

To guarantee the concurrency of data, satisfy the following two conditions.

<1> In the ladder program, the following commands are used in units of four bytes.
MOVD, MOVN, XMOVB, SETND, XCHGD, DSCHB, TBLRD, TBLWD, DSEQD, DSNED, DSGTD, DSLTD, DSGED, DSLED, DMAXD, DMIND, EQD, NED, GTD, LTD, GED, LED, RNGD, COMPB, EOR, AND, OR, NOT, EORD, ANDD, ORD, NOTD, SHLD, SHRD, ROLD, RORD, BSETD, BRSTD, BTSTD, BPOSD, BCNTD, CODB, DCNVB, DECB, TBCDD, FBCDD, ADDB, SUBB, MULB, DIVB, NUMEB, ADDSD, SUBSD, MULSD, DIVSD, MODSD, INCSD, DECSD, ABSSD, NEGSD

<2> When DI data or DO data is assigned at the setting screen of a communication function, the value of items "ADDRESS" and "SIZE" are aligned with 4-byte boundaries.
Example) ADDRESS/SIZE   1:R0000/4, 1:R0004/8, 1:R0008/12, 1:E0000/16

Concurrency of word data (2-byte data)

To guarantee the concurrency of data, satisfy the following two conditions.
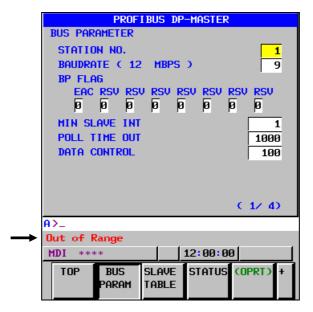
<1> In the ladder program, the following commands are used in units of two bytes.
MOVW, MOVN, XMOVB, SETNW, XCHGW, DSCHB, TBLRW, TBLWW, DSEQW, DSNEW, DSGTW, DSLTW, DSGEW, DSLEW, DMAXW, DMINW, EQW, NEW, GTW, LTW, GEW, LEW, RNGW, COMPB, EOR, AND, OR, NOT, EORW, ANDW, ORW, NOTW, SHLW, SHRW, ROLW, RORW, BSETW, BRSTW, BTSTW, BPOSW, BCNTW, CODB, DCNVB, DECB, TBCDW, FBCDW, ADDB, SUBB, MULB, DIVB, NUMEB, ADDSW, SUBSW, MULSW, DIVSW, MODSW, INCSW, DECSW, ABSSW, NEGSW

<2> When DI data or DO data is assigned to at the setting screen of a communication function, the value of items "ADDRESS" and "SIZE" are aligned with 2-byte boundaries.
Example) ADDRESS/SIZE   1:R0000/2, 2:R0002/4, 3:R0004/6, 1:E0002/8

Concurrency of byte data (1-byte data)

There are no special constraints. The concurrency is always guaranteed in 1-byte data.

2.2   ERROR MESSAGES THAT MAY OCCUR DURING COMMUNICATION PARAMETER SETTING

This section describes the common error messages that may occur while communication parameters are being set on the setting screen of each communication function.

Error message	Meaning and corrective action
Communication Software is not found	Check the following items: - Make sure that the communication software is installed. - Make sure that the PROFIBUS master board is mounted. - Make sure that the PROFIBUS slave board is mounted.
PROFIBUS Master Board not found	Check whether the PROFIBUS master board is mounted.
PROFIBUS Slave Board not found	Check whether the PROFIBUS slave board is mounted.
Software Version Error	The version of the communication software does not match. Check the software version.
Out of Range	The value of the numerical parameter is out of range.
Wrong Character(s)	A wrong character is used in the character parameter.
Format Error	The IP address input does not match the input format.
too many figures	In the numerical parameter input, the numerical value has too many digits.
Data was rejected	An invalid parameter is set for the master function. Check the following items: - Make sure that the station number of another slave is not used when inputting a slave station number. - Make sure that the maximum number of slots is not exceeded when inserting a slot. - Make sure that the number of slots is not 0 when deleting a slot.
Reading from SRAM failed	The SRAM may be destroyed.
Writing into SRAM failed	The SRAM may be destroyed.
Error(xxxx)	Another error. Report on the displayed message.

2.3 BACKING UP AND RESTORING COMMUNICATION PARAMETERS

After the completion of communication parameter setting, communication parameters can be backed up as a batch, and previously backed up communication parameters can be restored as a batch.
As the input/output device to which to back up communication parameters and from which to restore them, the memory card or USB memory can be used. To select an input/output device, use parameter No. 20. For details of this parameter, see Section 3.1, "PARAMETERS RELATED TO DATA INPUT/OUTPUT".

> ⚠ **WARNING**
> When [RESTORE] is executed for communication parameters, the communication parameters including the allocation of a PMC area to each communication function are all restored. When [ALL RESTORE] is executed for communication parameters, the communication parameters valid for embedded, Ethernet, Fast Ethernet/Fast Data Server, PROFIBUS-DP master/slave, DeviceNet master/slave, FL-net, CC-Link remote device, EtherNet/IP Scanner/Adapter, Modbus/TCP Server, and PROFINET IO Controller/IO Device are all restored. When the unsolicited messaging function is enabled, the allocation of macro variables is also restored.
> For this reason, immediately after executing [RESTORE] or [ALL RESTORE] for communication parameters, fully understand instructions written in "GENERAL WARNINGS FOR CNC APPLICATION DEVELOPMENT" in "SAFETY PRECAUTIONS" at the beginning of this manual, Section 2.1, "DI/DO DATA AND STATUS DATA", and carefully check the setting of the communication parameters of the relevant communication functions before starting operation.
> For any communication function for which any PMC area or macro variable is allocated, make sure that DI/DO data, status data, and macro variable operate correctly before starting operation.
> If operation is started without checking the above, the machine may behave unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

> ⚠ **CAUTION**
> While an external input/output device such as the memory card or USB memory is being accessed, do not turn the power to the CNC off or remove the external input/output device. Doing so may damage the external input/output device.

> **NOTE**
> 1 A backup or restore operation for communication parameters can only be performed in the MDI mode, EDIT mode, or emergency stop state.
> 2 It is not possible to backup and restore the communication parameters by using devices other than the memory card and the USB memory.
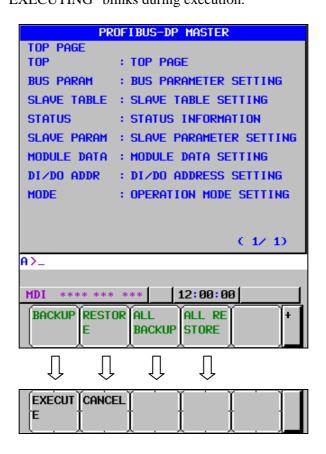>   With Series 30i/31i/32i-A, the USB memory cannot be used.

Procedure

1 Press function key ![SYSTEM] .

2 Soft key [PROFI MASTER] or [PROFI SLAVE] appears. When the soft key does not appear, press the continue key.

3   When press soft key [PROFI MASTER], and then soft key [TOP]. The "MASTER TOP screen" appears.
    When press soft key [PROFI SLAVE], and then soft key [SETTING]. The "SLAVE FUNCTION SETTING screen" appears.
4   Press soft key [(OPRT)], and then soft key [+]. The soft keys [BACKUP], [RESTORE], [ALL BACKUP], and [ALL RESTORE] for backing up or restoring settings appear.
5   Press the soft key [BACKUP], [RESTORE], [ALL BACKUP], or [ALL RESTORE]. The soft keys [EXECUTE] and [CANCEL] appear.
6   Enter the name of a file to be backed up or restored in the key-in buffer, and press the soft key [EXECUTE]. The operation selected at the above step is executed.
    The character string "EXECUTING" blinks during execution.

```
            PROFIBUS-DP MASTER
TOP PAGE
TOP          : TOP PAGE
BUS PARAM    : BUS PARAMETER SETTING
SLAVE TABLE  : SLAVE TABLE SETTING
STATUS       : STATUS INFORMATION
SLAVE PARAM  : SLAVE PARAMETER SETTING
MODULE DATA  : MODULE DATA SETTING
DI/DO ADDR   : DI/DO ADDRESS SETTING
MODE         : OPERATION MODE SETTING


                              ( 1/ 1)

A>_


MDI  **** *** ***    12:00:00

BACKUP RESTOR ALL    ALL RE          +
       E      BACKUP STORE
```

⇩ ⇩ ⇩ ⇩

```
EXECUT CANCEL
E
```

Operation

BACKUP

The communication parameters for PROFIBUS-DP master functions or PROFIBUS-DP slave functions are saved from the SRAM of the CNC main unit to the input/output device.
If a file name is specified in the key-in buffer, the specified file name is used. If no file name is specified, the appropriate one of the following standard file names is used.

Standard file name	Communication function saved
PROFIMST.MEM	PROFIBUS-DP master function
PROFISLV.MEM	PROFIBUS-DP slave function

RESTORE

The communication parameters for PROFIBUS-DP master functions or PROFIBUS-DP slave functions are read from the input/output device and saved to the SRAM of the CNC main unit.
If a file name is specified in the key-in buffer, the specified file name is used. If no file name is specified, the appropriate one of the above-mentioned standard file names is used.

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ALL BACKUP

All valid communication parameters for embedded Ethernet, Fast Ethernet/Fast Data Server, PROFIBUS-DP master/slave, DeviceNet master/slave, FL-net, CC-Link remote device, EtherNet/IP Scanner/Adapter, Modbus/TCP Server, and PROFINET IO Controller/IO Device are saved from the SRAM of the CNC main unit to the input/output device.

If a file name is specified in the key-in buffer, the specified file name is used. If no file name is specified, the file name "NETWORK.MEM" is used.

ALL RESTORE

All valid communication parameters for embedded Ethernet, Fast Ethernet/Fast Data Server, PROFIBUS-DP master/slave, DeviceNet master/slave, FL-net, CC-Link remote device, EtherNet/IP Scanner/Adapter, Modbus/TCP Server, and PROFINET IO Controller/IO Device are read from the input/output device and saved to the SRAM of the CNC main unit.

However, if a communication function related to a valid communication parameter is disabled in the CNC, that parameter is not saved to the SRAM.

If a file name is specified in the key-in buffer, the specified file name is read from the memory card. If no file name is specified, the file name "NETWORK.MEM" is used.

> **NOTE**
> When communication parameters are restored, an alarm condition occurs that requires power-off.

2.4 PROTECTION OF COMMUNICATION PARAMETER SETTING

The input and operation of the following screen setting items of the PROFIBUS-DP functions can be prohibited.

	Screen	Operation item
Master functions	TOP screen	[ALL INIT]
	BUS PARAMETER screen	[INITIALIZE]
	SLAVE TABLE screen	[ENABLE]/[DISABLE], [REFRESH], [AUTO (NO.)], [AUTO (ADDR)], [DELETE]
	SLAVE PARAMETER screen	[INITIALIZE]
	MODULE DATA screen	[SHIFT]
	DI/DO ADDRESS screen	[INSERT], [DELETE], [AUTO (SIZE)], [AUTO (ADDR)]
	OPERATION MODE screen	[OPERATE], [CLEAR], [STOP], [OFFLINE], [INITIALIZE]
Slave functions	SETTING screen	[INITIALIZE]

To set this function, use parameter bit 3 of parameter No. 10339. For details of this parameter, see Section 3.2, "PARAMETER RELATED TO SETTING PROTECTION".

3 RELATED NC PARAMETERS

This chapter lists the common NC parameters related to PROFIBUS-DP functions.

3.1 PARAMETERS RELATED TO DATA INPUT/OUTPUT

0020	I/O CHANNEL : Input/output device selection, or interface number for a foreground input/output device

[Input type] Setting input
[Data byte] Byte
[Valid data range] 4: Selects the memory card as the input/output device.
17: Selects the USB memory as the input/output device.
It is not possible to backup and restore the communication parameters by using other devices.

> **NOTE**
> In case of Series 30*i*/31*i*/32*i*-A, the memory card is used regardless for this NC parameter.

3.2 PARAMETER RELATED TO SETTING PROTECTION

	#7	#6	#5	#4	#3	#2	#1	#0
10339					PRP			

[Input type] Parameter input
[Data byte] Bit

#3 PRP The parameter input and operation of the PROFIBUS-DP master/slave functions are:
0: Not prohibited.
1: Prohibited.

> **NOTE**
> 1 When this parameter is set, the power must be turned off before operation is continued.
> 2 When the PROFIBUS-DP function application software is the followings, this parameter is applied. When the application software is earlier than edition 16, the parameter is not applied.
> - For Series 30*i*/31*i*/32*i*-A/B, Series 35*i*-B, and Power Motion *i*-A: Series 655B, edition 16 or later
> - For Series 0*i*-F: Series 655L, edition 16 or later
> 3 When this parameter is set to 1, and a parameter is input or operated, the warning "Error(PROT)" or "Invalid Operation" is displayed.

3.3   PARAMETERS RELATED TO PMC

	#7	#6	#5	#4	#3	#2	#1	#0
11937	P24	P23	P22	P21	P14	P13	P12	P11
11938	P44	P43	P42	P41	P34	P33	P32	P31
11939					P54	P53	P52	P51

> **NOTE**
> 1   When these parameters are set, the power must be turned off before operation is continued.
> 2   For Series 30*i*/31*i*/32*i*-A, PMC X/Y areas cannot be allocated.
> 3   For Series 0*i*-F, the path of PMC is from the first PMC to the 3rd PMC.

[Input type] Parameter input

[Data byte] Bit

When the following bits are "1", the X/Y areas of the PMC corresponding to the specified bit become available in communication functions. Two or more bits can be specified at the same time.

Parameter		Addresses usable in communication functions
P11	No.11937#0	X0 to127/Y0 to 127 in the first PMC
P12	No.11937#1	X200 to 327/Y200 to 327 in the first PMC
P13	No.11937#2	X400 to 527/Y400 to 527 in the first PMC
P14	No.11937#3	X600 to 727/Y600 to 727 in the first PMC
P21	No.11937#4	X0 to 127/Y0 to 127 in the 2nd PMC
P22	No.11937#5	X200 to 327/Y200 to 327 in the 2nd PMC
P23	No.11937#6	X400 to 527/Y400 to 527 in the 2nd PMC
P24	No.11937#7	X600 to 727/Y600 to 727 in the 2nd PMC
P31	No.11938#0	X0 to 127/Y0 to 127 in the 3rd PMC
P32	No.11938#1	X200 to 327/Y200 to 327 in the 3rd PMC
P33	No.11938#2	X400 to 527/Y400 to 527 in the 3rd PMC
P34	No.11938#3	X600 to 727/Y600 to 727 in the 3rd PMC
P41	No.11938#4	X0 to 127/Y0 to 127 in the 4th PMC
P42	No.11938#5	X200 to 327/Y200 to 327 in the 4th PMC
P43	No.11938#6	X400 to 527/Y400 to 527 in the 4th PMC
P44	No.11938#7	X600 to 727/Y600 to 727 in the 4th PMC
P51	No.11939#0	X0 to 127/Y0 to 127 in the 5th PMC
P52	No.11939#1	X200 to 327/Y200 to 327 in the 5th PMC
P53	No.11939#2	X400 to 527/Y400 to 527 in the 5th PMC
P54	No.11939#3	X600 to 727/Y600 to 727 in the 5th PMC

> **NOTE**
> 1   Any communication function cannot be allocated to an X or Y area allocated to I/O Link or I/O Link *i*.
> 2   When using I/O Link *i*, allocate a communication function to X and Y areas that are not used by any I/O device of I/O Link *i* and set these parameters for these areas.

NOTE

3 When the default setting is made for I/O Link, that is, when all of parameters Nos. 11910 to 11912 are set to 0, I/O Link is allocated to the X0 to X127/Y0 to Y127, X200 to X327/Y200 to Y327, and X400 to X527/Y400 to Y527 areas of the 1st path PMC. In this case, for the 1st PMC, a communication function can be allocated to the X600 to X727/Y600 to Y727 areas.

When using I/O Link with other than the default setting, allocate a communication function to an area to which no I/O Link channel is allocated. Then, set these parameters to the area to which the communication function is allocated.

Example)

    Setting for allocating channel 1 of I/O Link to the X0 to X127/Y0 to Y127 areas for the 1st path PMC and allocating DI/DO of a communication function to the X200 to X327/Y200 to Y327 areas

    No.11910=100, No.11911=0, No.11912=0, No.11937#1=1

III. SETTING

1 PROFIBUS-DP MASTER FUNCTIONS

This chapter describes the PROFIBUS-DP master functions.

> **NOTE**
> The PROFIBUS Setting Tool is provided as a personal computer tool related to the PROFIBUS-DP master function.
> (product name :CNC Setting Tool, drawing number: A08B-9510-J540)
> This tool enables PROFIBUS-DP master function parameters to be created on a PC.
> The setting of the PROFIBUS-DP master function is generally complicated, so it is recommended to purchase a copy of this tool.

1.1 MASTER FUNCTION SETTING

To use the master function, set the bus parameters, slave parameters, and PMC area allocation.
Bus parameters and slave parameters are used for PROFIBUS-DP communication. Set the slave parameters, and allocation of diagnostic data to the PMC area for each slave, and allocation of DI/DO data to the PMC area for each slave (or each slot).
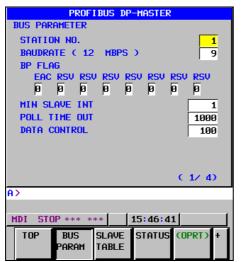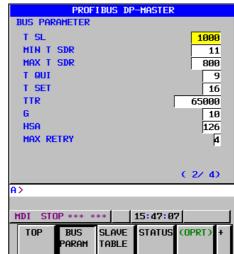
Procedure

1   Press function key [◇ SYSTEM].

2   Soft key [PROFI MASTER] appears. (When there are no soft keys, press the continue key.)
3   Press soft key [PROFI MASTER] to display the PROFIBUS DP-MASTER screen.
4   Press soft keys [BUS PARAM], [SLAVE TABLE], [SLAVE PARAM], [MODULE DATA], and [DI/DO ADDR] and then enter the parameters for the setting items of all setting screens that appear. The following describes how to set the parameters.

BUS PARAMETER screen
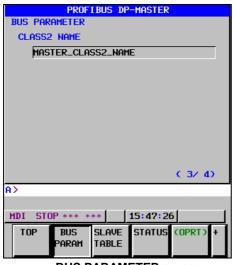
Procedure

1   Press soft key [BUS PARAM] to display the BUS PARAMETER screen.

2   On the BUS PARAMETER screen, page keys [↑ PAGE] [PAGE ↓] can be used to switch between pages.

3   Move the cursor to the item to set and then enter the parameter.
   - Set each parameter as described in the Setting item later.
   - Press soft keys [(OPRT)] then [INITIALIZE] to initialize the remaining bus parameters in conformity with BAUDRATE.
   - For MASTER USER DATA, only a specified size of data can be input.
   - CLASS2 NAME is a parameter that is input by connected class 2. It does not need to be input from this screen.

BUS PARAMETER screen

BUS PARAMETER screen
(CLASS2 NAME)

BUS PARAMETER screen
(MASTER USER DATA)

Setting item

Item	Description
STATION NO.	Station number of this master device Fieldbus Data Link Address
BAUDRATE	Transfer rate (0 : 9.6Kbps, 1 : 19.2Kbps, 2 : 93.75Kbps, 3 : 187.5Kbps, 4 : 500Kbps, 6 : 1.5Mbps, 7 : 3Mbps, 8 : 6Mbps, 9 : 12Mbps)
BP FLAG	User Interface Flag Bit 7 :(EAC)Error Action Flag 0 : Does not change the operation mode if an error occurs. 1 : Changes the operation mode from Operate mode to the Clear mode if an error occurs. Bits 6 to 0 (RSV) are reserved (to be set to 0).
MIN SLAVE INT	Minimum slave interval for between two slave poll cycles (Unit: 100 μs)
POLL TIME OUT	Poll Timeout for the master-master communication Maximum wait time after the issue of a request for communication between master stations until a response is received. (Unit: 1 ms)
DATA CONTROL	Data Control Time Time until the data transfer list is updated at least once. (Unit: 10 ms)

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Item	Description
T SL	Slot Time Maximum time from token frame transmission until the first character of a response frame is read. (Unit: Bit time)
MIN T SDR	Minimum Station Delay Time of Responders Minimum elapsed time from the last bit of send or receive data to the first bit of the next send or receive data. (Unit: Bit time)
MAX T SDR	Maximum Station Delay Time of Responders Maximum elapsed time from the last bit of send or receive data to the first bit of the next send or receive data. (Unit: Bit time)
T QUI	Transmitter fall/Repeater switch Time Wait time after data transmission until the receiver can be operated again. (Unit: Bit time)
T SET	Setup Time Time after the occurrence of an event until the execution of the corresponding action is started. (Unit: Bit time)
T TR	Target Rotation Time Estimated time required for a PROFIBUS token to make one rotation. (Unit: Bit time)
G	Gap Update Factor Number of tokens that rotate during a gap maintenance period.
HSA	Highest Station Address Maximum node number that is set for a PROFIBUS network to be connected to.
MAX RETRY	Maximum Number of retries
CLASS2 NAME	Master Class2 Name Name of the Master (class2) that created the bus parameters. **Note)** This is a parameter set by a master station (class 2).
MASTER USER DATA	Master User Data User data area for bus parameters This is not used by the current FANUC CNCs. Set LENGTH of MASTER USER DATA to 0.

Remarks) Explanation of terms used in the above table

Bit time   : Time (sec) required to send one bit of data at a specified transfer rate. This is equivalent to the reciprocal of a transfer rate (bps).

Gap maintenance period : Period during which the list for managing the address of the connected Master is updated. (Unit: Bit time)

Operation mode   : Operation mode of a PROFIBUS-DP master function.

  Offline   : Mode that disables communication with all nodes

  Stop   : Mode that enables communication with the Master

  Clear   : Mode in which the output to the Slave is set to 0

  Operate   : Mode that enables DI/DO communication with Slaves

Data transfer list   : List with a 16-byte area. This list is held in the Master so that each bit indicates whether data transfer to and from each of the nodes of station numbers 0 to 125 has been performed (1) or not (0) (bits 6 and 7 of the 16th byte are not used). It can be read by a master station of class 2.

Bus Parameter Settings Corresponding to Each Transfer Rate

Bus parameter	Setting					
(1) STATION NO.	0 to 125					
(2) BAUDRATE(Kbps)	≤187.5	500	1500	3000	6000	12000
(3) BP FLAG	0	0	0	0	0	0
(4) MIN SLAVE INT	1	1	1	1	1	1
(5) POLL TIME OUT	1000	1000	1000	1000	1000	1000
(6) DATA CONTROL	100	100	100	100	100	100
(7) T SL	100	200	300	400	600	1000
(8) MIN T SDR	11	11	11	11	11	11

Bus parameter	Setting					
(9) MAX T SDR	60	100	150	250	450	800
(10)T QUI	0	0	0	3	6	9
(11)T SET	1	1	1	4	8	16
(12)TTR	65000	65000	65000	65000	65000	65000
(13)G	10	10	10	10	10	10
(14)HSA	126	126	126	126	126	126
(15)MAX RETRY	1	1	1	2	3	4
(16)CLASS2 NAME	This parameter need not be set.					
(17)MASTER USER DATA	0	0	0	0	0	0

Viewing this table for parameter setting:

First, determine the value of BAUDRATE. Then, set the other parameters according to the set baud rate.
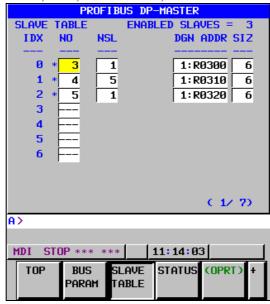

NOTE

For multiple master communication, satisfy the following conditions:
- The value set for STATION NO. for a master station is not used as another master station number.
- The same values are set for bus parameters (2) and (7) to (15) for all master stations.
- When a larger value is set for T SET, T SL is larger than T ID1.
  (T ID1 = 33 + 2 + 2 × T SET + T QUI)

SLAVE TABLE screen

Procedure

1 Press soft key [SLAVE TABLE] to display the SLAVE TABLE screen.

2 On the SLAVE TABLE screen, page keys [↑PAGE] [PAGE↓] can be used to switch between pages.

3 Move the cursor to the item to set and then enter the parameter.
   - Set the parameters for NO, NSL, DGN ADDR, and SIZ for each index.

SLAVE TABLE screen

4   Press soft key [(OPRT)] as needed and then use the following soft keys.
     [ENABLE] :
          Enables the slave station on which the cursor is placed. "*" appears to the left of the station
          number (NO) of the slave stations for which communication is enabled.

     [DISABLE] :
          Disables the slave station on which the cursor is placed.

     [REFRESH] :
          Sorts slave stations in ascending order of slave number.
          The lines on which a station number is not displayed are occupied by the following data.

     [AUTO (NO.)] :
          Pressing soft key [AUTO(NO.)] after entering the number of stations sets contiguous station
          numbers for IDX of the station numbers of the slave station on which the cursor is placed and
          later stations.

     [AUTO (ADDR)] :
          When pressing soft key [AUTO (ADDR)] after setting the diagnostic data size of each slave
          DGN SIZ and entering the number of stations, PMC addresses DGN ADDR for diagnostic data
          of the valid slave station numbers of the slave station on which the cursor is placed and later
          stations are assigned contiguously by the number of entered stations. When the slave station
          number or diagnostic data size is not determined, assignment is stopped at that point.

     [DELETE] :
          Pressing soft key [DELETE] after entering the number of stations disables the slave station on
          which the cursor is placed and later stations by the number of stations and initializes them.

Display item

Item	Description
IDX	Index number Index numbers for 48 stations are provided.
SLAVES	Number of slave stations for which communication is enabled.

Setting item

Item		Description
NO		Set a slave number. For the slave stations for which communication is enabled, "*" appears to the left of this parameter. This parameter is set by soft keys [ENABLE] and [DISABLE].
		Setting range : 0 to 125
NSL		Set the number of slots in which I/O modules are placed. For the explanation of slots, see "Slot" below.
		Setting range : 1 to 128 (NOTE)
DGN ADDR		Set the start address of diagnostic data. For details on diagnostic data, see "Diagnostic data" later.
		Setting range : R or E area of PMC (WARNING)
	SIZ	Set the size of diagnostic data.
		Setting range : 0 to 244 (bytes)

> ⚠ **WARNING**
>   Before allocating the PMC area, be sure to read Section 2.1, "DI/DO DATA AND
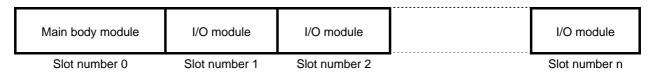>   STATUS DATA" in Part II, "COMMON".

> **NOTE**
> The number of slots that can be set by this master function is 128 in all of slave devices. For example, a maximum of 32 slave devices consisting of four modules can be connected.
> However, even for a slave device consisting of multiple modules, assignment for each slot is not required. Assignment for each slot is required only when a PMC address is assigned for each module DI/DO.
> Treat even a slave device consisting of multiple modules as a slave device consisting of one module when assigning the same DI/DO to these modules and set NSL=1.

Slot

When an I/O device consisting of multiple I/O modules is used as a slave station, a location in which an I/O module is placed is called a slot.

Main body module	I/O module	I/O module		I/O module
Slot number 0	Slot number 1	Slot number 2		Slot number n

In the figure above, NSL (number of slots) is n+1.
Modules of some input/output devices do not input or output data. However, such a module is counted as a slot.

Diagnostic data

Diagnostic data consists of standard diagnostic data (first six bytes) and extended diagnostic data (seventh or later bytes). Some slave stations use extended diagnostic data. Therefore, the size of diagnostic data needs to be determined as described in the GSD file and manual for each slave station.
The first six bytes of standard diagnostic data have the following meanings.
Standard diagnostic data can also be checked using the COMMUNICATION STATUS screen described later.
For details, see the PROFIBUS-DP specification.
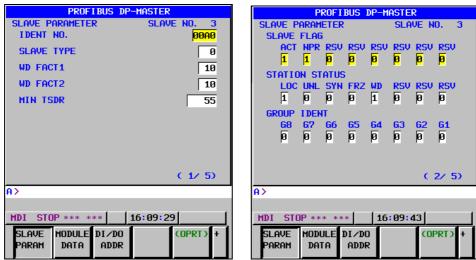
Standard diagnostic data

| Item	Description
STATION STATUS 1 (Size: 1 byte)	The state of a Slave is indicated. Bit 7: Diag.Master_Lock 　　This bit indicates that the parameters of the Slave are set by another Master. When the value of MASTER_ADDRESS is neither 255 nor the address of the Master, this bit is set by the Master. Bit 6: Diag.Prm_Fault 　　This bit is set by the Slave when the parameter data contains an error. Bit 5: Diag.Invalid_Slave_Response 　　This bit is set by the Master when incorrect data is received from the Slave. Bit 4: Diag.Not_Supported 　　This bit is set by the Slave when the Slave receives an instruction that is not supported by the Slave. Bit 3: Diag.Ext_Diag 　　This bit is set by the Slave if extended diagnose data is available at the Slave. The Master of FANUC CNCs can reference up to 238 bytes of the extended diagnose data. Bit 2: Diag.Cfg_Fault 　　This bit is set by the Slave when the configuration data differs from the data held by the DP-Slave. Bit 1: Diag.Station_Not_Ready 　　This bit is set by the Slave when the Slave is not ready for data transfer. Bit 0: Diag.Station_Non_Existent 　　This bit is set by the Slave when communication with the Slave is impossible.
STATION STATUS 2 (Size: 1 byte)	The state of a Slave is indicated. Bit 7: Diag.Deactivated 　　This bit is set by the Master when communication with the Slave is disabled during slave parameter setting. Bit 6: Reserved (undefined) Bit 5: Diag.Sync_Mode 　　This bit is set by the Slave when the Sync control command is received. Bit 4: Diag.Freeze_Mode 　　This bit is set by the Slave when the Freeze control command is received. Bit 3: Diag.WD_On 　　This bit is set by the Slave when the disconnection detection function is operating. Bit 2: Reserved (set to 1 at all times) Bit 1: Diag.Stat_Diag 　　If this bit is set by the Slave, the Master reads the diagnose data until this bit is reset. Bit 0: Diag.Prm_Req 　　This bit is set by the Slave when the parameters of the Slave need to be set again. The setting of this bit is held until the parameters are set again.
STATION STATUS 3 (Size: 1 byte)	The state of a Slave is indicated. Bit 7: Diag.Ext_Diag_Overflow 　　This bit is set by the Master when there is much diagnostic data that cannot be stored in extended diagnostic data to be set on the slave table screen. This Master of FANUC CNCs can reference up to 238 bytes of the extended diagnose data. Bits 6 to 0: Reserved
MASTER ADDRESS (Size: 1 byte)	This station number of the Master that set the parameter of the Slave is set (when this master device set the parameter, the station number of the maser is set). If the parameters are not set by the Master, 255 is set.
IDENT NUMBER (Size: 2 bytes)	The identification number of a Slave is set.

SLAVE PARAMETER screen

Procedure
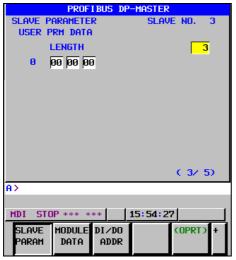
1   Press soft key [SLAVE PARAM] to display the SLAVE PARAMETER screen.

2   On the SLAVE PARAMETER screen for each slave, page keys [↑ PAGE] [PAGE ↓] can be used to switch between pages.

3   Move the cursor to the item to set and then enter the parameter.
-       Set each parameter as described in the Setting item later.
-       For USER PARAM DATA and SLAVE USER DATA, enter only the specified size of data.
-       The CONFIG DATA values are indicated according to the module data entered on the MODULE DATA screen shown later.
         It does not need to be set on this screen.

SLAVE PARAMETER screen

SLAVE PARAMETER screen
(USER PRM DATA)

SLAVE PARAMETER screen
(SLAVE USER DATA)

SLAVE PARAMETER screen
(CONFIG DATA)

4   Use the following soft keys as needed.
     [PREVI SLAVE], [NEXT SLAVE] :
          Moves to the next or previous slave station. Pressing soft key [PREVI SLAVE] or [NEXT
          SLAVE] after entering a station number moves to the specified station number.

     [INITIALIZE] :
          Performs initialization according to the FANUC CNC slave station.

Display item

Item	Description
SLAVE NO.	Station number of the partner slave device The value entered on the slave table screen is indicated.

Setting item

Item	Description
IDENT NO.	Identification number of a slave station Specify the identification number of a slave station to connect to.
SLAVE TYPE	Manufacturer-specified type indication for a slave station
WD FACT1, WD FACT2	Factor used to determine the time for broken wire detection $10 \times WD\_FACT1 \times WD\_FACT2$ (Unit: ms)
MIN TSDR	Minimum time that elapses a response to the master station (this master device) is returned (Unit: Bit time)
SLAVE FLAG	Flag for setting communication with a slave Bit 7: ACT(ACTIVE) 0: Does not perform communication with a slave station 1: Performs communication with a slave station Bit 6: NPR(NEW PRM) 0: Does not send new parameter data to a slave station 1: Sends new parameter data to a slave station Bits 5 to 0 (RSV) are reserved (to be set to 0).

Item	Description
STATION STATUS	Flag for setting the operation condition of a slave Bit 7: LOC (LOCK REQ) Bit 6: UNL (UNLOCK REQ) 　　When LOC = 1 and UNL = 0, slave station parameters cannot be changed by 　　master station. 　　When LOC = 0 and UNL = 1, slave station parameters can be changed by 　　master station. Bit 5: SYN (SYNC REQ) 　　Be sure set 0. Bit 4: FRZ (FREEZE REQ) 　　Be sure set 0. Bit 3: WD (WD REQ) 　　When WD = 1, broken wire detection is performed. Bits 2 to 0 (RSV) are reserved (to be set to 0).
GROUP　IDENT	Specify groups for the DDLM_Global_Control command. Up to eight groups can be specified because each bit represents a group.
USER　PARAM　DATA	User parameter data. This data is specified by a manufacturer.
SLAVE　USER　DATA	Slave user data. This data is specified by a manufacturer.
CONFIG DATA	Configuration data The data is automatically calculated from MODULE DATA specified for each slot.

Remarks) Explanation of terms used in the above table

Broken wire detection : This function check whether data exchange is performed normally between a master station and a slave station. An error occurs when the broken wire time calculated with WD FACT1 and WD FACT2 elapses without receiving a data exchange request from the master station.

Bit time : Time (sec) required to send one bit of data at a specified transfer rate. This is equivalent to the reciprocal of a transfer rate (bps).
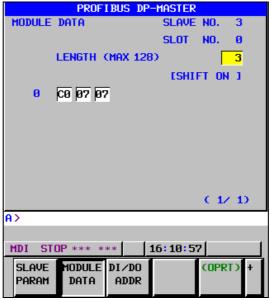

NOTE
　Slave parameters must be set as described in the GSD file that comes with each slave device.

MODULE DATA screen

Procedure

1　Press soft key [MODULE DATA] to display the MODULE DATA screen.

2　On the module data screen for each slot, page keys ⬆PAGE ⬇PAGE can be used to switch between slots.

3　Set the size for LENGTH and then enter data.

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MODULE DATA screen

4   Press soft key [(OPRT)] as needed and then use the following soft keys.
     [PREVI SLAVE], [NEXT.SLAVE] :
          Pressing soft key [PREVI SLAVE] moves the cursor to the first slot of the previous slave
          station. Pressing [NEXT SLAVE] moves the cursor to the first slot of the next slave station.
          Pressing soft key [PREVI SLAVE] or [NEXT SLAVE] after entering a station number moves
          the cursor to the first slot of the specified station number.

     [PREVI SLOT], [NEXT SLOT] :
          Pressing soft key [PREVI SLOT] moves to the previous slot. Pressing soft key [NEXT SLOT]
          moves to the next slot. Pressing soft key [PREVI SLOT] or [NEXT SLOT] after entering a slot
          number moves to the specified slot.

     [SHIFT] :
          Pressing soft key [SHIFT] switches the value between ON and OFF. Normally select ON.

Display item

Item	Description
SLAVE NO	Station number of a slave station
SLOT NO	Slot number
MAX	The maximum allowable MODULE LENGTH is indicated. The total size that can be set within the same slave station is 128 bytes.

Setting item

Item	Description
MODULE LENGTH	Set the data length of the keyword "Module" in the GSD file.
	Setting range : 0 to 128 (bytes) **NOTE)** The total size that can be set within the same slave station is also 128 bytes.
MODULE DATA	Set the data (HEX data) of the keyword Module in the GSD file.
SHIFT	Soft key [SHIFT] switches between ON and OFF. ON : Newly reserves the area with a size of the specified MODULE LENGTH. Normally select this option. OFF : Does not newly reserves the area with a size of the specified MODULE LENGTH. (NOTE)

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Example of setting module data

Example)

The following shows an example of setting a slave device (station number 3) consisting of four modules.

[Placement of modules]

Main body module (NO I/O)	I/O module (TYPE A)	I/O module (TYPE B)	I/O module (TYPE A)
Slot number 0	Slot number 1	Slot number 2	Slot number 3

[Types of modules]

- Main body module: No input/output
- I/O module (TYPE A) : Input 1 byte/Output 1 byte
- I/O module (TYPE B) : Only output 1 byte

The keyword "Module" in the GSD file is assumed to be described as follows.

```
        :
        :
Module = " NO I/O " 0x00
EndModule
Module = " TYPE A" 0x10, 0x20
EndModule
Module = " TYPE B " 0x20
EndModule
        :
        :
```

Contents of the GSD file

In the example above, the settings of the module data screens are as follows.

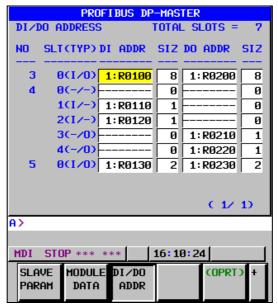| SLAVE NO/ SLOT NO	Setting value
SLAVE NO. = 3 SLOT NO. = 0	MODULE LENGTH = 1 MODULE = 00
SLAVE NO. = 3 SLOT NO. = 1	MODULE LENGTH = 2 MODULE = 10 20
SLAVE NO. = 3 SLOT NO. = 2	MODULE LENGTH = 1 MODULE = 20
SLAVE NO. = 3 SLOT NO. = 3	MODULE LENGTH = 2 MODULE = 10 20

> **NOTE**
> Since modules that can be set are listed in the GSD file, select and set an appropriate one from "Module" keywords based on the module to use.

DI/DO ADDRESS screen

Procedure

1 Press soft key [DI/DO ADDR] to display the DI/DO ADDRESS screen.

2 Page keys [↑PAGE] [PAGE↓] can be used to switch between pages.

3 Make sure the SLT (TYP) value for each slot is correct.

4 Set the DI/DO addresses (DI ADDR and DO ADDR) and the sizes (DI SIZ and DO SIZ) for each slot.

```
           PROFIBUS DP-MASTER
 DI/DO ADDRESS        TOTAL SLOTS =   7

 NO   SLT(TYP) DI ADDR  SIZ DO ADDR   SIZ
 ---  -------- -------- --- --------  ---

  3    0(I/O) 1:R0100    8  1:R0200    8
  4    0(-/-) --------   0  --------   0
       1(I/-) 1:R0110    1  --------   0
       2(I/-) 1:R0120    1  --------   0
       3(-/O) --------   0  1:R0210    1
       4(-/O) --------   0  1:R0220    1
  5    0(I/O) 1:R0130    2  1:R0230    2


                          ( 1/ 1)

 A>


 MDI  STOP *** ***  │  16:10:24  │
  SLAVE  MODULE DI/DO           (OPRT) +
  PARAM   DATA  ADDR
```

DI/DO ADDRESS screen

5   Press soft key [(OPRT)] as needed and then use the following soft keys.
     [PREVI SLAVE], [NEXT SLAVE] :
          Pressing soft key [PREVI SLAVE] moves the cursor to the first slot of the previous slave
          station. Pressing [NEXT SLAVE] moves the cursor to the first slot of the next slave station.
          Pressing soft key [PREVI SLAVE] or [NEXT SLAVE] after entering a station number moves
          the cursor to the first slot of the specified station number.

     [INSERT] :
          Adds a new slot before the slot number on which the cursor is placed.

     [DELETE] :
          Deletes the slot on which the cursor placed and moves up the following slots.

     [AUTO (SIZE)] :
          Automatically sets the DI/DO size "DI SIZ, DO SIZ" for the slots following the cursor based
          on the module data. The settings are made only for the slots in the same slave.

     [AUTO (ADDR)] :
          When pressing soft key [AUTO (ADDR)] after setting the DI/DO address of the slots on which
          the cursor is placed, this soft key assigns the addresses (DI ADDR and DO ADDR) of the
          following slots based on the specified address and size. These settings are valid only within the
          same slave station.

Display item

Item	Description
NO	Station number of a slave station

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Item	Description

SLT(TYP)	The slot number and the type of the specified module is indicated.
	The status of the module is displayed based on the module data set on the module data screen.
	Check the SLT (TYP) indication is one of the following normal states (a) to (e).
	When the indication is (f) or (g), set correct module data again.
	(a) "- - -" : No module
	        (Same as when MODULE LENGTH = 0)
	(b) "I / -" : Input module
	(c) "- / O" : Output module
	(d) "I / O" : Input/output module
	(e) "- / -" : Module without input/output
	        (Same as when MODULE LENGTH = 1 and MODULE = 00)
	(f) "OVR" : DI SIZE + DO SIZE exceeds 244 bytes.
	(g) "ERR" : The data assigned to "MODULE =" does not adhere to the PROFIBUS-DP specification.

TOTAL SLOTS	Total number of slots including those for all slaves currently set (up to 128)

Setting item

Item	Description
DI ADDR DO ADDR	Set the first addresses of DI and DO.
	Setting range: R, E, or X PMC area (for DI only), Y PMC area (for DO only) (WARNING) To allocate PMC X/Y addresses, it is also necessary to set parameters Nos. 11937 to 11939. For details of these NC parameters, see Section 3.3, "PARAMETERS RELATED TO PMC" in Part II, "COMMON".
DI SIZ DO SIZ	Set the sizes of DI data and DO data.
	Setting range : 0 to 244 (bytes) (CAUTION) The maximum DI/DO transfer size per slave station is 244 bytes in all of DI/DO.

> ⚠ **WARNING**
> Before allocating the PMC area, be sure to read Section 2.1, "DI/DO DATA AND STATUS DATA" in Part II, "COMMON".
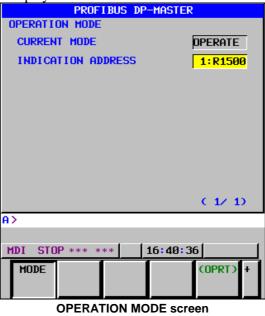
> ⚠ **CAUTION**
> When the slave consists of multiple slots, be sure to place the cursor on the first slot and press soft key [AUTO (SIZE)] to automatically set the DI/DO size for the slots. When the DI/DO size is set manually, the DI/DO data cannot be updated correctly unless the DI/DO size calculated using the module data in the GSD file is set.

OPERATION MODE screen

Procedure

1   Press soft key [MODE] to display the OPERATION MODE screen.

OPERATION MODE screen

2   To select the STOP mode, CLEAR mode, or OPERATE mode defined in the PROFIBUS-DP specification, as operation mode, press soft key [STOP], [CLEAR], or [OPERATE], respectively.

> **NOTE**
>   The setting order must be [OPERATE] → [CLEAR] → [STOP] or [STOP] → [CLEAR] → [OPERATE].

3   To post the current operation mode to a PMC address, set INDICATION ADDRESS.

The following describes each mode and the identification values used when giving notification to a PMC address.

Description of each mode and identification values

Item	Description	Identification value
OFFLINE	In this mode, communication with all nodes is disabled.	0x00
STOP	In this mode, communication with another master station (such as class 2 station) is enabled. Communication with a slave station is disabled.	0x40
CLEAR	In this mode, output (DO) is cleared for all slave stations for which communication is enabled.	0x80
OPEARTE	In this mode, DI/DO communication is being performed for all slave stations for which communication is enabled.	0xC0

4   Press soft key [(OPRT)] as needed and then use the following soft keys.
    [INITIALIZE] :
        Disables notification to a PMC address.
        In this case, "-----" appears in the INDICATION ADDRESS field.
        (The notification is disabled during initial setup.)

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Display item

Item	Description
CURRENT MODE	The current operation mode is indicated.

Setting item

Item	Description
INDICATION ADDRESS	Set the start address of a mode indication address. (The size is one byte.)
	Setting range : R or E area of PMC (WARNING)

> ⚠ **WARNING**
> Before allocating the PMC area, be sure to read Section 2.1, "DI/DO DATA AND STATUS DATA" in Part II, "COMMON".

> **NOTE**
> Keep the following in mind about operation modes.
> (1) If the power is turned on when there are one or more active slave stations, the OPERATE mode is automatically selected during startup, where an active slave station represents the slave station for which communication is enabled on the slave parameter screen and Active and New_Prm of SLAVE FLAG on the slave parameter screen are set to 1.
> (2) Otherwise, that is, if the power is turned on when there are no active slave stations, the STOP mode is automatically selected during startup.
> (3) A FANUC master station cannot be switched to the OFFLINE mode manually.
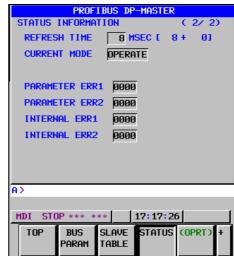> When the OFFLINE mode is selected immediately after power-up, check the communication settings again.
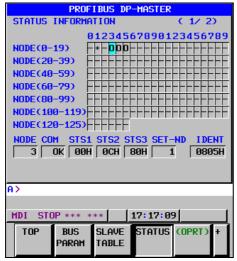
1.2   MAINTENANCE OF THE MASTER FUNCTION

The COMMUNICATION STATUS screen of the master function is displayed.

Procedure

1   Press function key [⎇ SYSTEM].

2   Soft key [PROFI MASTER] is displayed.   (If the soft key is not displayed, press the continuous menu key.)

3   Pressing soft key [PROFI MASTER] displays the PROFIBUS DP-MASTER SETTING screen.

4   Press soft key [STATUS] to display the COMMUNICATION STATUS screen.

5   Page keys [↑ PAGE] [PAGE ↓] can be used to switch between pages.

COMMUNICATION STATUS screen - 1

COMMUNICATION STATUS screen - 2

Display item of COMMUNICATION STATUS screen - 1

Item	Description
List of NODE(0-19) through NODE(120-125)	The communication status of each node is indicated. One of the following indications is provided: O : Communication being performed normally E : Communication error - : Not set * : Local device (master station) By moving the cursor to a node, detail information about the node can be displayed at the bottom of this screen.
NODE	The number of the node where the cursor is placed is indicated.
COM	The status of the node where the cursor is placed is indicated. One of the following indications is provided: OK : Communication being performed normally ERR : Communication error --- : Not set or the local device (master station)
STS1 STS2 STS3 SET-ND IDENT	The standard diagnostic data (6 bytes) of the node where the cursor is placed is indicated. For standard diagnostic data, see "Diagnostic data" in "SLAVE TABLE screen".

To move to a desired node number without using the cursor keys, press soft key [(OPRT)] then (desired node number) then soft key [NODE SELECT].

Display item of COMMUNICATION STATUS screen - 2

Item	Description
REFRESH TIME	DI/DO data refresh time (msec). (NOTE)
CURRENT MODE	The current operation mode is indicated.

Item	Description
PARAMETER ERR1	An error number related to parameter setting is indicated. 0000 : Normal (In this case, "PARAMETER ERR2" is not used.) 0001 : On the DI/DO ADDRESS screen, the total of DI/DO sizes within one slave station is greater than 244 bytes. However, the DI/DO size of an invalid DI/DO address "--------" is treated as 0 byte. 0002 : No module is set within one slave station. 0003 : The amount of slave parameter data within one slave station is greater than the maximum allowable size. 0004 : Invalid module data is set for a slot. In this case, "PARAMETER ERR2" indicates the following: - Higher byte → Number of the slave station - Lower byte → Number of the slot When multiple slots are used, the smallest slave number and slot number are indicated. 0005 : The total of DI/DO sizes calculated from the module data within one slave station is greater than 244 bytes. 0006 : Reserved. 0007 : The DI/DO size set on the DI/DO ADDRESS screen is not equal to the DI/DO size calculated from the module data. In this case, "PARAMETER ERR2" indicates the following: - Higher byte → Number of the slave station - Lower byte → Number of the slot When multiple slots are used, the smallest slave number and slot number are indicated. When this error occurs, press soft key [AUTO (SIZE)] on the DI/DO ADDRESS screen. The correct DI/DO size is set by this operation. 0008 : The local station number and another master station number are the same. 0009 : A problem with a PROFIBUS cable is detected. There may be a problem with PROFIBUS cable connection. See Chapter 1, "CONNECTING THE PROFIBUS FUNCTIONS" in Part IV, "CONNECTION". 000A : An unavailable DI/DO data area is set on the DI/DO ADDRESS screen. In this case, "PARAMETER ERR2" indicates the following: - Higher byte → Number of the slave station - Lower byte → Number of the slot When multiple slots are used, the smallest slave number and slot number are indicated. When this error occurs, check parameters Nos. 11937 to 11939 or the PMC memory type. 000B : An unavailable diagnostic data area is set on the SLAVE TABLE screen. When this error occurs, check the PMC memory type. 000C : A value unavailable for INDICATION ADDRESS is set on the OPERATION MODE screen. When this error occurs, check the PMC memory type.
PARAMETER ERR2	The number of the slave where an error occurred is indicated. (If an error has occurred with multiple slaves, the smallest slave number is indicated.)
INTERNAL ERR1 INTERNAL ERR2	An internal error that occurred between the CNC and PROFIBUS-DP master board is indicated. It is likely that there may be a problem in PROFIBUS cable connection. See Chapter 1, " CONNECTING THE PROFIBUS FUNCTIONS", of Part IV, "CONNECTION".

> **NOTE**
>   DI/DO data refresh time means a period of time required to refresh the DI/DO
>   data for all slave stations assigned to PMC addresses by address assignment.
>   -   Refresh time does not include ladder program processing time.
>   -   The time of response starting with transmission of DO data from the master
>   station and ending with reception of DI data looped back from the slave
>   station needs to be considered to be two times greater than the refresh time
>   at best.

1.3 GSD FILE FOR THE MASTER FUNCTION

The GSD file for the master station of the FANUC CNC is shown below.

GSD file for the master function

```
#Profibus_DP
GSD_Revision        = 2
Vendor_Name         = "FANUC"
Model_Name          = "FANUC CNC"
Revision            = "3.0"
Ident_Number        = 0x00CB
Protocol_Ident      = 0
Station_Type        = 1
FMS_supp            = 0
Hardware_Release    = "Release 1.0"
Software_Release    = "Release 8.0"
9.6_supp            = 1
19.2_supp           = 1
93.75_supp          = 1
187.5_supp          = 1
500_supp            = 1
1.5M_supp           = 1
3M_supp             = 1
6M_supp             = 1
12M_supp            = 1
MaxTsdr_9.6         = 60
MaxTsdr_19.2        = 60
MaxTsdr_93.75       = 60
MaxTsdr_187.5       = 60
MaxTsdr_500         = 100
MaxTsdr_1.5M        = 150
MaxTsdr_3M          = 250
MaxTsdr_6M          = 450
MaxTsdr_12M         = 800
Redundancy          = 0
Repeater_Ctrl_Sig   = 2
24V_Pins            = 0
;

; Master specific parameters
;
Download_supp       = 1
Upload_supp         = 1
```

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```
Act_Para_Brct_supp   = 0
Act_Param_supp       = 0
Max_MPS_Length       = 65532
Max_Lsdu_MS          = 244
Max_Lsdu_MM          = 244
Min_Poll_Timeout     = 100
;
Trdy_9.6             = 10
Trdy_19.2            = 10
Trdy_93.75           = 10
Trdy_187.5           = 10
Trdy_500             = 10
Trdy_1.5M            = 10
Trdy_3M              = 10
Trdy_6M              = 10
Trdy_12M             = 10
;
Tqui_9.6             = 0
Tqui_19.2            = 0
Tqui_93.75           = 0
Tqui_187.5           = 0
Tqui_500             = 0
Tqui_1.5M            = 0
Tqui_3M              = 3
Tqui_6M              = 6
Tqui_12M             = 9
;
Tset_9.6             = 1
Tset_19.2            = 1
Tset_93.75           = 1
Tset_187.5           = 1
Tset_500             = 1
Tset_1.5M            = 1
Tset_3M              = 4
Tset_6M              = 8
Tset_12M             = 16
;

LAS_Len              = 32
;
Tsdi_9.6             = 70
Tsdi_19.2            = 70
Tsdi_93.75           = 70
Tsdi_187.5           = 70
Tsdi_500             = 150
Tsdi_1.5M            = 200
Tsdi_3M              = 250
Tsdi_6M              = 450
Tsdi_12M             = 800
;
Max_Slaves_supp      = 48
;
```

1.4 RESTRICTION TO THE QUANTITY OF CONNECTABLE I/O MODULES

The number of I/O modules connectable to one slave is limited by the slave parameter length according to the expression stated below.

Slave parameter length   = 26   + [9 + USER PRM DATA length]$^{Note)}$
                                  + [2 + CONFIG DATA length]$^{Note)}$
                                  + SLAVE USER DATA length ≤ 240 (bytes)
 Note)   If a value enclosed in brackets [ ] is an odd number, 1 is added to the value.

The data length of each parameter (USER PRM DATA, CONFIG DATA, and SLAVE USER DATA) can be checked on the SLAVE PARAMETER screen belonging to the MASTER FUNCTION SETTING screen.

• Examples of calculation
Example 1)
    Assuming USER PRM DATA length = 157, CONFIG DATA length = 46, and SLAVE USER DATA length = 0:
    26 + [9 + 157] + [2 + 46] + 0 = 240   → Setting is possible.
Example 2)
    Assuming USER PRM DATA length = 158, CONFIG DATA length = 47, and SLAVE USER DATA length = 0:
    26 + [9 + 158 (+ 1)] + [2 + 47 (+ 1)] + 0 = 244   → Setting is impossible.

NOTE
1   If the slave parameter length exceeds 240 bytes, the following error number appear on the COMMUNICATION STATUS screen.
        PARAMETER ERR 1:   0003
        PARAMETER ERR 2:   00XX
        ("XX" represents the lowest slave number where the error was detected.)
2   The quantity of I/O modules connectable to a slave may become smaller than the number specified for the slave (number stated in the GSD file or the corresponding manual) depending on the slave parameter length restriction mentioned above.
3   Using the PROFIBUS Setting Tool (A08B-9510-J540) causes this check to be made automatically.

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1.5   DI/DO SIZE CHECK

When the CNC starts, it is checked that the DI/DO size set on the DI/DO ADDRESS screen is equal to the DI/DO size calculated from the module data.
For details of module data, see "MODULE DATA screen" in Section 1.1, "MASTER FUNCTION SETTING".
When these size values are not the same as a result of this check, the operation mode is changed to OFFLINE and DI/DO communication does not start.

Related NC parameters

	#7	#6	#5	#4	#3	#2	#1	#0
11931		PMS						

[Input type] Parameter input
[Data type] Bit

#6   PMS For the PROFIBUS-DP master function, whether the DI/DO size set on the DI/DO ADDRESS screen is equal to the DI/DO size calculated from the module data is:
0:    Checked.
1:    Not checked.

NOTE
1   When this parameter is set, the power must be turned off before operation is continued.
2   When the PROFIBUS-DP function application software is the followings, edition 13 or later, this parameter is applied. When the application software is earlier than edition 13, this check is not made.
   ● For Series 30*i*/31*i*/32*i*-A/B, Series 35*i*-B, and Power Motion *i*-A: Series 655B, edition 13 or later
   ● For Series 0*i*-F: Series 655L, edition 13 or later
3   Setting this parameter to "0" is recommended.
   When this parameter is set to "1", DI/DO communication starts even with an invalid setting, and it may not be able to be made correctly according to the condition.
4   When the DI/DO size values are not the same, detailed information is displayed for PARAMETER ERR1 and PARAMETER ERR2 on COMMUNICATION STATUS screen -2.

1.6 CHECK FOR A PROBLEM WITH PROFIBUS CABLES

When the CNC starts, any problem with PROFIBUS cables and duplicate master station numbers are checked.
The PROFIBUS cables are checked for a problem also during DI/DO communication.
The time interval for checking the PROFIBUS cables for a problem during DI/DO communication can be set.

When a problem is detected, the following processing is performed:
1   The operation mode is changed to OFFLINE.
2   When DI/DO communication is in progress, the DI data of each slave station is cleared.
3   When DI/DO communication is in progress, diagnostic data Diag.Station_Non_Existent (bit 0 of STATION STATUS 1) is set for each slave station.

Related NC parameters

	#7	#6	#5	#4	#3	#2	#1	#0
10339						PMD		

[Input type] Parameter input
[Data type] Bit

#2 PMD For the PROFIBUS-DP master function, any problem with PROFIBUS cables and duplicate master station numbers are:
0:   Not checked.
1:   Checked.

10409	Time interval to detect a problem with cables for PROFIBUS-DP master

[Input type] Parameter input
[Data type] Word
[Unit of data] 100 msec
[Valid data range] 0 to 32767
Specifies the time interval for checking the PROFIBUS cables for a problem during DI/DO communication.
When 0 is set for this parameter, the time interval is assumed to be 10 seconds. When a negative value is set, the cables are not checked for a problem during DI/DO communication.

> **NOTE**
> 1   When this parameter is set, the power must be turned off before operation is continued.
> 2   When the PROFIBUS-DP function application software is the followings, these parameters are applied. When the application software is earlier than edition 14, this check is not made.
>   ● For Series 30i/31i/32i-A/B, Series 35i-B, and Power Motion i-A: Series 655B, edition 14 or later
>   ● For Series 0i-F: Series 655L, edition 14 or later
> 3   When a problem is detected, detailed information is displayed for PARAMETER ERR1 and PARAMETER ERR2 on COMMUNICATION STATUS screen -2.

2   PROFIBUS-DP SLAVE FUNCTIONS

This chapter describes the PROFIBUS-DP slave functions.

2.1   SLAVE FUNCTION SETTING

To use the slave function, set a station number and PMC area allocation.
The method of setting each parameter is described below.

> ⚠ **CAUTION**
> Note that when the series and edition of the PROFIBUS-DP function application
> software are edition 06 or earlier of series 655B, slave status data is always
> posted to PMC address "R9094" regardless of the valid PMC memory type. For
> the PMC memory type, refer to the following manuals:
> - For Series 30i/31i/32i-A: PMC PROGRAMMING MANUAL (B-63983EN)
> - For Series 30i/31i/32i/35i-B, Power Motion i-A, Series 0i-F:
>   PMC PROGRAMMING MANUAL (B-64513EN)

> **NOTE**
> When a slave station manufactured by FANUC is to be used, the parameters
> depending on the FANUC-manufactured slave station must be set with the
> master station.   Depending on the master station, the GSD file for the slave
> station may be necessary.
> - When the GSD file is needed
>   Contact the sales staff of FANUC.
> - When the GSD file is not needed
>   Make a setting according to Section 2.4, "SETTING SLAVE PARAMETERS
>   TO USE A SLAVE STATION MANUFACTURED BY FANUC".
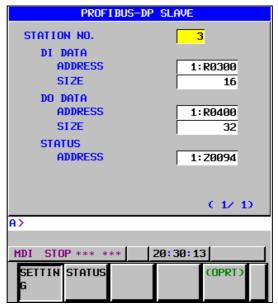
Procedure

1   Press function key [SYSTEM].
2   Soft key [PROFI SLAVE] appears. (When there are no soft keys, press the continue key.)
3   Press soft key [PROFI SLAVE] to display the PROFIBUS DP-SLAVE screen.
4   Press soft key [SETTING] to display the SLAVE FUNCTION SETTING screen.
5   Move the cursor to an item to be set, then enter a desired parameter value.
    -   To initialize all setting parameters, press soft keys [(OPRT)] then [INITIALIZE].

```
           PROFIBUS-DP SLAVE

  STATION NO.              3

     DI DATA
        ADDRESS         1:R0300
        SIZE                 16
     DO DATA
        ADDRESS         1:R0400
        SIZE                 32
     STATUS
        ADDRESS         1:Z0094



                             ( 1/ 1)

A >


  MDI  STOP *** ***  |  20:30:13 |

  SETTIN STATUS              (OPRT)
  G
```

SLAVE FUNCTION SETTING screen

Setting item

Item	Description
STATION NO.	Station number of this slave device
	Setting range : 0 to 125
DI / DO DATA ADDRESS	Set the start addresses of DI data and DO data.
	Setting range : R, E, or X PMC area (for DI only), Y PMC area (for DO only) (WARNING) To allocate PMC X/Y addresses, it is also necessary to set parameters Nos. 11937 to 11939. For details of these NC parameters, see Section 3.3, "PARAMETERS RELATED TO PMC" in Part II, "COMMON".
DI / DO DATA SIZE	Set the sizes of DI data and DO data.
	Setting range : 0 to 244 (bytes) (The total of DI/DO sizes must not exceed 244 bytes.)
STATUS ADDRESS	Set the address which Status is copied to. The details of the status are explained in "STATUS" below. The address in the PMC system area that corresponds to the valid PMC memory type, R9094 or Z0094, is set as the initial value. When you input " " (SP), the above initial value is also set.
	R or E area of PMC (WARNING, NOTE)

⚠ **WARNING**
   Before allocating the PMC area, be sure to read Section 2.1, "DI/DO DATA AND STATUS DATA" in Part II, "COMMON".

NOTE
   The STATUS ADDRESS value cannot be changed in the following cases:
   - Setting item "STATUS ADDRESS" is not displayed.
   - The series and edition of the PROFIBUS-DP function application software are edition 06 or earlier of series 655B.

STATUS

The details of the Status Address are shown below.
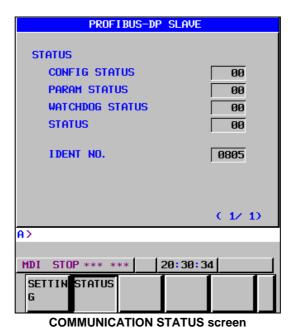To monitor communication status with a ladder program, use the status described below.

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Item	Description
STATUS (Size : 1 byte)	Bit 7 : Set when a PROFIBUS-DP slave board is absent. Bit 6 : Set when communication is the following state. 　　　　- The state when communication was not established even once. 　　　　- The initial state after communication was disconnected. Bit 5 : A DI/DO data area or status address set on the "SLAVE FUNCTION SETTING screen" is not available. 　　　　When this bit is set, check parameters Nos. 11937 to 11939 or the PMC memory type. Bit 4 : Not used Bit 3 : Set when the problem of impossibility in restoring the PROFIBUS-DP slave board is detected. Bit 2 : Set when a disconnection is detected after communication is once established. Bit 1 : Set when a slave parameter (parameter data or configuration data) is invalid. Bit 0 : Set when a slave parameter (parameter data or configuration data) is invalid.

2.2   MAINTENANCE OF THE SLAVE FUNCTION

The COMMUNICATION STATUS screen of the slave function is displayed.

Procedure

1   Press function key ⬦SYSTEM.

2   Soft key [PROFI SLAVE] is displayed.   (If the soft key is not displayed, press the continuous menu key.)

3   Pressing soft key [PROFI SLAVE] displays the PROFIBUS DP-SLAVE SETTING screen.

4   Press soft key [STATUS] to display the COMMUNICATION STATUS screen.

COMMUNICATION STATUS screen

Display item

Item	Description
CONFIG STATUS	The status of configuration data is indicated. (Hexadecimal) FF : Initial state 00 : Configuration data is valid. F0 : A slave parameter (parameter data or configuration data) is invalid. 01 : The length of configuration data is invalid. 02 : Configuration data includes errors. (Supplement) 　If a disconnection is detected, "F0" is initially set then the status returns to the initial state "FF" about 20 seconds later.
PARAM STATUS	The status of parameter data is indicated. (Hexadecimal) FF : Initial state 00 : Parameter data is valid. F0 : A slave parameter (parameter data or configuration data) is invalid. (Supplement) 　If a disconnection is detected, "F0" is initially set then the status returns to the initial state "FF" about 20 seconds later.
WATCHDOG STATUS	The status of the communication link with the master station is indicated. (Hexadecimal) FF : Initial state 00 : Communication being performed normally 01 : Disconnected (Supplement) 　If communication is not established even once, "FF" (initial state) remains to be set.　When a disconnection is detected after communication is once established, "01" is set. 　When a disconnection is repaired to return to normal communication state, "00" is set again.
STATUS	The value copied to the Status Address is indicated. (Hexadecimal) Refer to "STATUS" of Section 2.1, "SLAVE FUNCTION SETTING" for the details of Status.
IDENT NO.	Identification number of a CNC slave station manufactured by FANUC (Hexadecimal)

2.3 GSD FILE FOR THE SLAVE FUNCTION

The GSD file for the slave station of the FANUC CNC is shown below.

GSD file for the slave function

```
#Profibus_DP
Vendor_Name        = "FANUC"
Model_Name         = "FANUC CNC-2"
Revision           = "2.0"
Ident_Number       = 0x0805
Protocol_Ident     = 0
Station_Type       = 0
FMS_supp           = 0
Hardware_Release   = "Release 1.0"
Software_Release   = "Release 3.0"
9.6_supp           = 1
19.2_supp          = 1
93.75_supp         = 1
187.5_supp         = 1
```

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```
500_supp              = 1
1.5M_supp             = 1
3M_supp               = 1
6M_supp               = 1
12M_supp              = 1
MaxTsdr_9.6           = 60
MaxTsdr_19.2          = 60
MaxTsdr_93.75         = 60
MaxTsdr_187.5         = 60
MaxTsdr_500           = 100
MaxTsdr_1.5M          = 150
MaxTsdr_3M            = 250
MaxTsdr_6M            = 450
MaxTsdr_12M           = 800
Redundancy            = 0
Repeater_Ctrl_Sig     = 2
24V_Pins              = 0
;
; Slave specific parameters
;
Freeze_Mode_supp      = 0
Sync_Mode_supp        = 0
Auto_Baud_supp        = 1
Set_Slave_Add_supp    = 0
User_Prm_Data_Len     = 0
Min_Slave_Intervall   = 1
Modular_Station       = 1
Max_Module            = 1
Max_Input_Len         = 244
Max_Output_Len        = 244
Max_Data_Len          = 244
;
Module   = "32 Byte Out, 32 Byte In" 0xC0,0x1F,0x1F
EndModule
Module   = "28 Byte Out, 28 Byte In" 0xC0,0x1B,0x1B
EndModule
Module   = "24 Byte Out, 24 Byte In" 0xC0,0x17,0x17
EndModule
Module   = "20 Byte Out, 20 Byte In" 0xC0,0x13,0x13
EndModule
Module   = "16 Byte Out, 16 Byte In" 0xC0,0x0F,0x0F
EndModule
Module   = "12 Byte Out, 12 Byte In" 0xC0,0x0B,0x0B
EndModule
Module   = " 8 Byte Out,   8 Byte In" 0xC0,0x07,0x07
EndModule
Module   = " 4 Byte Out,   4 Byte In" 0xC0,0x03,0x03
EndModule
Module   = " 2 Byte Out,   2 Byte In" 0xC0,0x01,0x01
EndModule
Module   = "32 Byte Out,   1 Byte In" 0xC0,0x1F,0x00
EndModule
Module   = " 1 Byte Out, 32 Byte In" 0xC0,0x00,0x1F
EndModule
;
```

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> **NOTE**
> A slave station manufactured by FANUC allows the DI size and DO size to be freely changed as long as the total of DI/DO sizes is within 244 bytes.   When setting a DI size and DO size other than the above, see "Explanation of configuration data" in Section 2.4, "SETTING SLAVE PARAMETERS TO USE A SLAVE STATION MANUFACTURED BY FANUC".

2.4   SETTING SLAVE PARAMETERS TO USE A SLAVE STATION MANUFACTURED BY FANUC

The slave parameters to be set by the master station when a slave station manufactured by FANUC is used are described below.   For the meanings of the parameters, refer to the manual for the master station or see "SLAVE PARAMETER screen" in Section 1.1, "MASTER FUNCTION SETTING".

Setting item

Item	Setting
IDENT NO.	0805 (Hex)
SLAVE FLAG	C0 (Hex)
SLAVE TYPE	0 (Hex)
STATION STATUS	88 (Hex)
	(Note) The SYNC function and FREEZE function are not supported by a slave station manufactured by FANUC.
WD FACT1, 2	Arbitrary
	Set an appropriate value that matches the desired time for disconnection detection.
MIN TSDR	Arbitrary
	Set "0B" (Hex) usually.
GROUP IDENT	0 (Hex)
	(Note) GROUP IDENT is valid with a slave station that supports the SYNC function and the FREEZE function.
USER PRM DATA	Not used (Data length: 0)
CONFIG DATA	Data length : Depends on the input/output size. Data : Depends on the input/output size.
	(Note) See "Explanation of configuration data".
SLAVE USER DATA	Not used (Data length: 0)

Explanation of configuration data

> **NOTE**
> "Input" and "output" used in the text below represent input and output,
> respectively, as viewed from the master station. "DI" and "DO" represent input
> and output, respectively, as viewed from a slave station manufactured by
> FANUC.
> The maximum allowable total of DI/DO sizes that can be transferred by a slave
> station manufactured by FANUC is 244 bytes.

To specify configuration data (hereinafter referred to as CONFIG DATA) when using a slave station manufactured by FANUC, in general, set a "value for specifying the type of input/output" at the start of data then set "input/output size".
As a "value for specifying the type of input/output", set one of the following in hexadecimal:
(a) When both input and output are used (input/output size > 0): "C0"
(b) When output only is used (input size = 0, output size > 0): "80"
(c) When input only is used (input size > 0, output size = 0): "40"

For example, the format for using (a) (when both input and output are used) is:
    Data length: 3
    Data: "C0" "output size - 1" "input size - 1"
The maximum allowable value of each of "input size - 1" and "output size - 1" is "3F" according to the PROFIBUS-DP specifications. So, the format above is for an input size of 64 bytes or less and an output size of 64 bytes or less.
When an input size of 65 bytes or more and an output size of 65 bytes or more are used, the format above is to be repeated as follows:
    Data length: Multiple of 3
    Data: Repetition of "C0" "output size - 1" "input size - 1"
The rule above applies also when output only is used or input only is used as described below.
(b)   When output only is used
      Data length: Multiple of 2
      Data: Repetition of "80" "output size - 1"
(c)   When input only is used
      Data length: Multiple of 2
      Data: Repetition of "40" "input size - 1"

All formats of CONFIG DATA are listed below.

In the text below, XX = "output size - 1", and YY = "input size - 1". (XX and YY are hexadecimal values.)

(a)   Formats for using both input and output
      <1> Input size = 1 to 64, and output size = 1 to 64
          Data length: 3
          Data: C0   XX   YY
      <2> Input size = 65 to 128, and output size = 65 to 128
          (However, DI SIZE + DO SIZE ≤ 244 must be satisfied.)
          Data length: 6
          Data: C0   3F   3F   C0   XX   YY
      <3> Input size = 1 to 64, and output size = 65 to 128
          Data length: 5
          Data: C0   3F   YY   80   XX

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<4> Input size = 1 to 64, and output size = 129 to 192
(However, DI SIZE + DO SIZE ≤ 244 must be satisfied.)
Data length: 7
Data: C0   3F   YY   80   3F   80   XX

<5> Input size = 1 to 64, and output size = 193 to 244
(However, DI SIZE + DO SIZE ≤ 244 must be satisfied.)
Data length: 9
Data: C0   3F   YY   80   3F   80   3F   80   XX

<6> Input size = 65 to 128, and output size = 1 to 64
Data length: 5
Data: C0   XX   3F   40   YY

<7> Input size = 129 to 192, and output size = 1 to 64
(However, DI SIZE + DO SIZE ≤ 244 must be satisfied.)
Data length: 7
Data: C0   XX   3F   40   3F   40   YY

<8> Input size = 193 to 244, and output size = 1 to 64
(However, DI SIZE + DO SIZE ≤ 244 must be satisfied.)
Data length: 9
Data: C0   XX   3F   40   3F   40   3F   40   YY

<9> Input size = 65 to 128, and output size = 129 to 192
(However, DI SIZE + DO SIZE ≤ 244 must be satisfied.)
Data length: 8
Data: C0   3F   3F   C0   3F   YY   80   XX

<10>Input size = 129 to 192, and output size = 65 to 128
(However, DI SIZE + DO SIZE ≤ 244 must be satisfied.)
Data length: 8
Data: C0   3F   3F   C0   XX   3F   40   YY

(b) Formats for using output only
<1> Input size = 0, and output size = 1 to 64
Data length: 2
Data: 80   XX

<2> Input size = 0, and output size = 65 to 128
Data length: 4
Data: 80   3F   80   XX

<3> Input size = 0, and output size = 129 to 192
Data length: 6
Data: 80   3F   80   3F   80   XX

<4> Input size = 0, and output size = 193 to 244
Data length: 8
Data: 80   3F   80   3F   80   3F   80   3F   80   XX

(c) Formats for using input only
<1> Input size = 1 to 64, and output size = 0
Data length: 2
Data: 40   YY

<2> Input size = 65 to 128, and output size = 0
Data length: 4
Data: 40   3F   40   YY

<3> Input size = 129 to 192, and output size = 0
Data length: 6
Data: 40   3F   40   3F   40   YY

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<4> Input size = 193 to 244, and output size = 0
Data length: 8
Data: 40   3F   40   3F   40   3F   40   YY

Examples of setting CONFIG DATA with the master station are provided below for reference information.

(a)   Example of setting CONFIG DATA when both input and output are used

Input/output sizes of master station	DI/DO sizes to be set with slave station manufactured by FANUC	CONFIG DATA to be set with master station (Equivalent to "Module" of GSD file)
(a)-<1> Input/output size = 64 / 64	DI/DO SIZE = 64 / 64	Data length: 3 Data: C0 3F 3F
(a)-<2> Input/output size = 122 / 122	DI/DO SIZE = 122 / 122	Data length: 6 Data: C0 3F 3F C0 39 39
(a)-<3> Input/output size = 64 / 128	DI/DO SIZE = 128 / 64	Data length: 5 Data: C0 3F 3F 80 3F
(a)-<4> Input/output size = 1 / 192	DI/DO SIZE = 192 / 1	Data length: 7 Data: C0 3F 00 80 3F 80 3F
(a)-<5> Input/output size = 1 / 243	DI/DO SIZE = 243 / 1	Data length: 9 Data: C0 3F 00 80 3F 80 3F 80 32
(a)-<6> Input/output size = 128 / 64	DI/DO SIZE = 64 / 128	Data length: 5 Data: C0 3F 3F 40 3F
(a)-<7> Input/output size = 192 / 1	DI/DO SIZE = 1 / 192	Data length: 7 Data: C0 00 3F 40 3F 40 3F
(a)-<8> Input/output size = 243 / 1	DI/DO SIZE = 1 / 243	Data length: 9 Data: C0 00 3F 40 3F 40 3F 40 32
(a)-<9> Input/output size = 65 / 129	DI/DO SIZE = 129 / 65	Data length: 8 Data: C0 3F 3F C0 3F 00 80 00
(a)-<10> Input/output size = 129 / 65	DI/DO SIZE = 65 / 129	Data length: 8 Data: C0 3F 3F C0 00 3F 40 00

(b)   Example of setting CONFIG DATA when output only is used

Input/output sizes of master station	DI/DO sizes to be set with slave station manufactured by FANUC	CONFIG DATA to be set with master station (Equivalent to "Module" of GSD file)
(b)-<1> Input/output size = 0 / 64	DI/DO SIZE = 64 / 0	Data length: 2 Data: 80 3F
(b)-<2> Input/output size = 0 / 128	DI/DO SIZE = 128 / 0	Data length: 4 Data: 80 3F 80 3F
(b)-<3> Input/output size = 0 / 192	DI/DO SIZE = 192 / 0	Data length: 6 Data: 80 3F 80 3F 80 3F
(b)-<4> Input/output size = 0 / 244	DI/DO SIZE = 244 / 0	Data length: 8 Data: 80 3F 80 3F 80 3F 80 33

(c)   Example of setting CONFIG DATA when input only is used

Input/output sizes of master station	DI/DO sizes to be set with slave station manufactured by FANUC	CONFIG DATA to be set with master station (Equivalent to "Module" of GSD file)
(c)-<1> Input/output size = 64 / 0	DI/DO SIZE = 0 / 64	Data length: 2 Data: 40 3F
(c)-<2> Input/output size = 128 / 0	DI/DO SIZE = 0 / 128	Data length: 4 Data: 40 3F 40 3F
(c)-<3> Input/output size = 192 / 0	DI/DO SIZE = 0 / 192	Data length: 6 Data: 40 3F 40 3F 40 3F

Input/output sizes of master station	DI/DO sizes to be set with slave station manufactured by FANUC	CONFIG DATA to be set with master station (Equivalent to "Module" of GSD file)
(c)-<4> Input/output size = 244 / 0	DI/DO SIZE = 0 / 244	Data length: 8 Data: 40 3F 40 3F 40 3F 40 33

IV. CONNECTION

1   CONNECTING THE PROFIBUS FUNCTIONS

This chapter provides an explanation of how to connect the PROFIBUS-DP.

> ⚠ **CAUTION**
> Isolating the PROFIBUS cables from noise sources.
> The PROFIBUS cables are of the group C classification.
> Refer to the descriptions of anti-noise measures in the "Connection Manual
> (Hardware)" for the CNC main unit for explanations about how to isolate the
> PROFIBUS cables from cables in groups A and B.

> **NOTE**
> If no PROFIBUS communication can be established even when the PROFIBUS
> parameters are set, make sure that:
> 1 The PROFIBUS cable is created and grounded correctly as described in this
>   chapter.
> 2 The terminating resisters of the PROFIBUS cable are effective only at both
>   ends.
> 3 Each end of the PROFIBUS cable is connected to a PROFIBUS unit (master
>   or slave unit), and the power to the units is turned on.
> 4 Each PROFIBUS unit (master or slave unit) has a unique master or slave
>   number. For explanations about how to set master and slave numbers, refer
>   to the applicable PROFIBUS unit operator's manual.

1.1   PROFIBUS CABLE AND TRANSFER RATE

PROFIBUS communication uses shielded twisted-pair cable.
The cable must satisfy the requirements listed below.

Item	Rating
Characteristic impedance	150 Ω (f < 2 MHz)
Capacitance	< 30 nF/Km
Resistance	< 110 Ω/Km
Wire gauge	> 0.64 mm
Conductor cross-sectional area	> 0.34 mm^2

Recommended cable
    SINEC L2 Bus cable 6XV1 830-0AH10,
    manufactured by SIEMENS

The maximum allowable bus cable length varies depending on the transfer rate for which the cable is used.
Determine the length from the following table.

Baud rate (kbps)	9.6 to 93.75	187.5	500	1500	3000 to 12000
Maximum allowable overall cable length (m)	1200	1000	400	200	100

1.2   CONNECTOR

Nine-pin D-Sub female connector (on the cable side)

1	PE		
2		6	VP
3	RxD/TxD (+)	7	
4		8	RxD/TxD (-)
5	CNTR-P	9	

PE   :   Shielding
RxD/TxD (+) :   Transmission/reception data (+)
CNTR-P   :   Not used (repeater control)
DGND   :   Signal ground
VP   :   Not used (+5V output)
RxD/TxD (-) :   Transmission/reception data (-)

> ⚠ **CAUTION**
> The VP and CNTR-P pins are used for controlling a repeater. Do not connect
> these pins to anything unless a repeater is used. Otherwise, damage to the
> device is likely. If you want to use these pins, consult with FANUC beforehand.
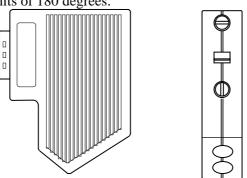
You can use the following cable-end connector to perform wiring and terminate the cable easily.

Cable-end connector:
  SUBCON-PLUS-PROFIB, manufactured by Phoenix Contact, or equivalent
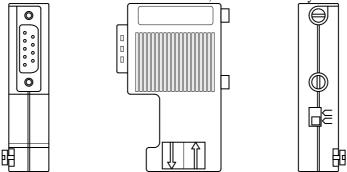
For cable-end connector manufactured by Phoenix Contact, the direction from which a cable is drawn can be changed in units of 180 degrees.

Outside Dimensions of the SUBCON-PLUS-PROFIB Connector

Cable-end connector:
  S7 SINEC L2 bus connector 6ES7 972-0BA11-0XA0, manufactured by Siemens, or equivalent
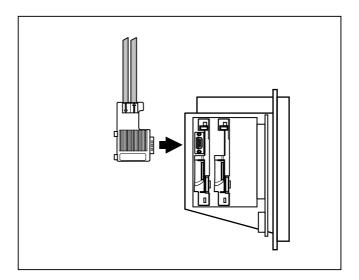
Outside Dimensions of the S7 SINEC L2 Bus Connector

NOTE
When the bus connector 6ES7 972-0BA11-0XA0 is used with the LCD-mounted type unit, the cable must be drawn upward as shown below. When using this connector, note the direction of cable. If the cable needs to be drawn downward, use the connector manufactured by Phoenix Contact
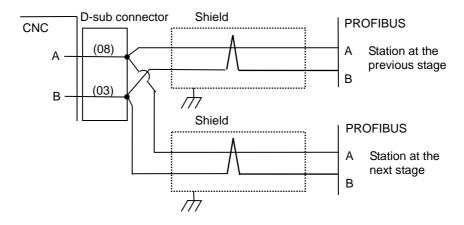
NOTE
The outside dimensions of the connectors are subject to change without notice.

1.3   CABLE CONNECTION

The following figure shows the cable connection.

NOTE
When assembling the cable with the connector, follow the instructions written in the manual supplied with the connector.
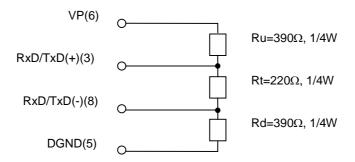
Shielding treatment

Clamp both the cable drawn from the station at the previous stage and that leading to the station at the next stage on the CNC side.
For an explanation of how to treat the cable at each station, refer to the respective manuals for the stations.
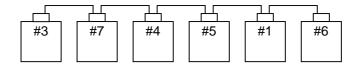
1.4 TERMINATING RESISTOR

Each end of the bus cable must be terminated with a resistor as shown below.

VP(6)

Ru=390Ω, 1/4W

RxD/TxD(+)(3)

Rt=220Ω, 1/4W

RxD/TxD(-)(8)

Rd=390Ω, 1/4W

DGND(5)

Since the connector manufactured by Phoenix Contact or Siemens include the terminators above, the switch on the connector can be used to enable or disable the terminators. In a configuration as shown below, turn on the switches of the connectors for stations #3 and #6.

To supply power to the terminating resistors, the power to the unit at each end of the cable must be turned on at all times during communication. (In the example shown below, the power to units #3 and #6 must be turned on at all times during communication.)

| #3 | #7 | #4 | #5 | #1 | #6 |
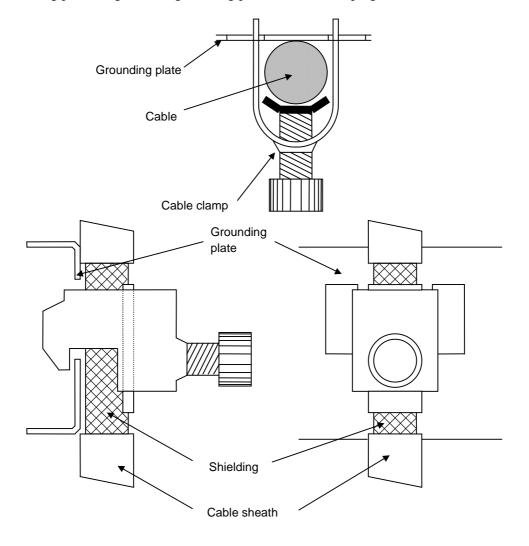
1.5   CABLE SHIELDING

Clamp the PROFIBUS bus cable as shown in the following diagram.
The clamping method shown below has two purposes: Cable fastening and shielding. It is very important
to clamp the cable to maintain stable system operation; do not forget to clamp the cable.
As shown below, remove part of the cable sheath to expose the shielding conductor, and clamp the
exposed shielding portion against the grounding plate with the clamping fixture.

2   INSTALLATION

This chapter provides information required to install the PROFIBUS-DP board.

2.1   SPECIFICATION

Order specification

Name	Specification		Remarks
PROFIBUS-DP Master Board	A02B-0303-J311	Series 30*i*/31*i*/32*i*-A	Master function only
	A02B-0323-J311	Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A	
	A02B-0338-J311	Series 0*i* –F	
PROFIBUS-DP Slave Board	A02B-0303-J313	Series 30*i*/31*i*/32*i*-A	Slave function only
	A02B-0323-J313	Series 30*i*/31*i*/32*i*/35*i*-B, Power Motion *i*-A	
	A02B-0338-J313	Series 0*i*-F	

> **NOTE**
> When using the board, it is necessary to adhere to the installation condition (the environmental condition in the cabinet) of the CNC control unit in which the board is installed.

The table below indicates the power supply capacities and heating values of the PROFIBUS-DP boards. For the values of the main CNC unit and optional units, refer to the connection manual of the CNC.
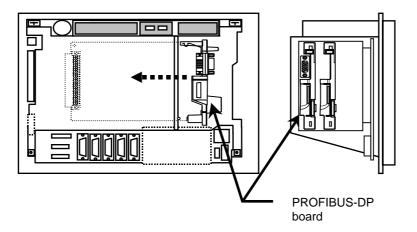
Name	Power supply capacity	Heating value
PROFIBUS-DP Master Board	0.2A	5W
PROFIBUS-DP Slave Board	0.1A	2W

2.2   MOUNTING

This section provides information on mounting of the PROFIBUS-DP board.
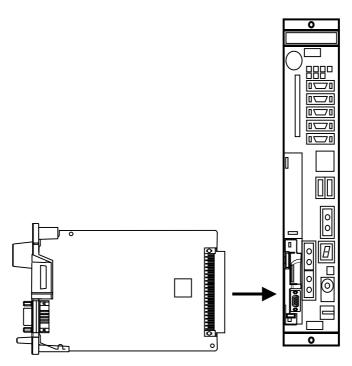
2.2.1   Mounting into the LCD-mounted Type Unit

The optional board is mounted into an option slot of the control unit. Each of the PROFIBUS-DP Master board and PROFIBUS-DP Slave board occupies one slot. No restriction is imposed on an option slot mounting position to be used.

PROFIBUS-DP
board
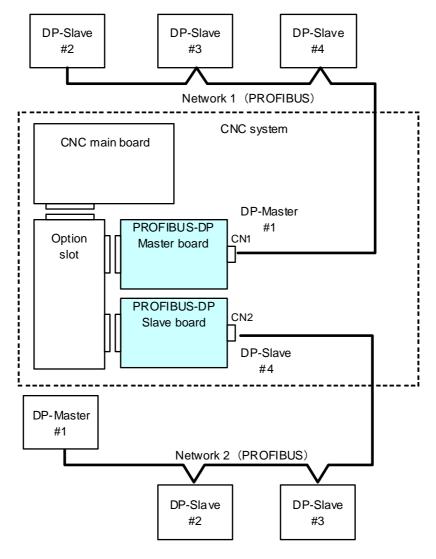
2.2.2   Mounting into the Stand-alone Type Unit

The optional board is mounted into an option slot of the control unit. Each of the PROFIBUS-DP Master board and PROFIBUS-DP Slave board occupies one slot. No restriction is imposed on an option slot mounting position to be used.

2.3   COMPLETE CONNECTION DIAGRAM

The overall connections of the PROFIBUS-DP system are outlined below. For connections that are not shown in the figure below, refer to the "Connection Manual (Hardware)" of the CNC main unit.

Network 1 and network 2 are independent of each other.

V. MAINTENANCE
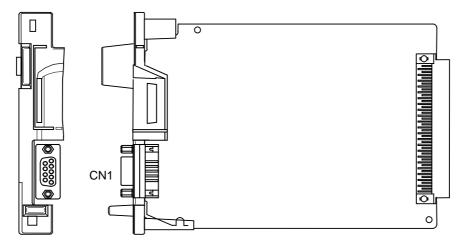
1   HARDWARE
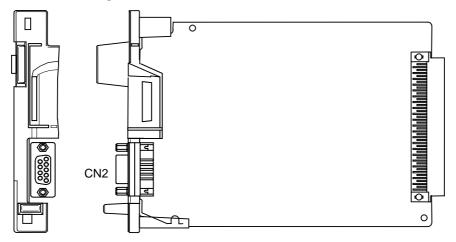
This chapter provides maintenance information on the hardware of the PROFIBUS-DP board.

1.1   COMPONENT LAYOUT

[PROFIBUS-DP Master board]

CN1

[PROFIBUS-DP Slave board]

CN2
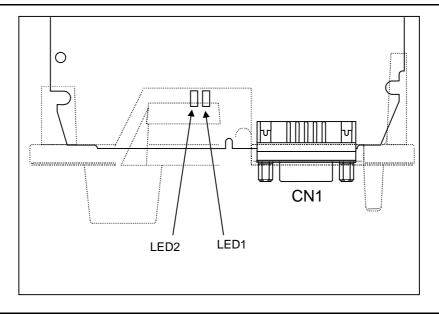
Name	Specification	Remarks
PROFIBUS-DP Master Board	A20B-8101-0050	Master function only
PROFIBUS-DP Slave Board	A20B-8101-0100	Slave function only

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1.2 LED INDICATORS AND THEIR MEANINGS

1.2.1 LED Indications on the PROFIBUS-DP Master Board
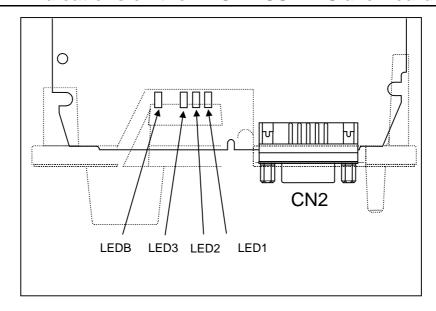
CN1

LED2   LED1

> **NOTE**
>   The face plate is indicated by the broken line.

Name	Color	Description
LED1	Green	Indicates whether the CPU of this board has been activated. Lit if the CPU has been released from the reset state and activated. The LED does not go on when the power is turned on.
LED2	Green	Indicates whether normal communication is performed. Lit if normal communication is performed. Not lit if communication is not performed. The LED does not go on when the power is turned on.

1.2.2 LED Indications on the PROFIBUS-DP Slave Board

LEDB   LED3   LED2   LED1

> **NOTE**
> The face plate is indicated by the broken line.

Name	Color	Description
LED1	Green	Indicates whether the CPU of this board has been activated. Lit if the CPU has been released from the reset state and activated. The LED does not go on when the power is turned on.
LED2	Green	Indicates that communication has started. Lit: Communication has started. This LED is off when the power is turned on or in the following cases: - Parameter data and configuration data are not received. - Invalid parameter data or configuration data is received.
LED3	Green	Indicates whether normal communication is performed. Lit if normal communication is performed. Not lit if communication is not performed. The LED does not go on when the power is turned on.
LEDB	Red	Indicates that a RAM parity alarm is issued on the board. Lit: A RAM parity alarm is issued. This LED is off when the power is turned on. Once the LED goes on, the LED is not turned off until the power is turned off.

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REVISION RECORD

Edition	Date	Contents
04	Sep., 2015	• Applied to Series 0*i*-F • Correction of errors
03	Mar., 2014	• Addition of warnings to "Safety Precautions" • Applied to Power Motion *i*-A • Addition of Part II, "COMMON" • Correction of errors
02	Oct., 2010	• Applied to Series 30*i*/31*i*/32*i*/35*i*-B • Correction of errors
01	Jan., 2009	Changing of manual name and specification number New: FANUC Series 30*i*/300*i*/300*i*s, 31*i*/310*i*/310*i*s, 32*i*/320*i*/320*i*s-MODEL A (PROFIBUS-DP Board) CONNECTION MANUAL (B-63993EN) Old: FANUC PROFIBUS-DP Board For FANUC Series 30*i*/300*i*, 31*i*/310*i*, 32*i*/320*i*-MODEL A OPERATOR'S MANUAL (B-63994EN)

B-63993EN/04

B-63993EN/04.01