FANUC FAST Ethernet
FANUC FAST Data Server

For FANUC Series 0*i*-MODEL D

OPERATOR'S MANUAL

B-64414EN/01

SAFETY PRECAUTIONS

This section 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 User's Manual of the CNC to become fully familiar with the functions to be used.

Contents

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 workpiece and/or machine itself, 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 run at other than the correct speed, it may behave unexpectedly, possibly causing damage to the workpiece and/or machine itself, 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 workpiece and/or machine itself, 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 Failure to set a parameter correctly may result in the machine behaving unexpectedly, possibly causing damage to the workpiece and/or machine itself, or injury to the user.

⚠ **CAUTION**
1 Immediately after switching on the power, do not touch any of the keys on the MDI panel 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 FAST Ethernet / FAST Data Server 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 FAST Ethernet / FAST Data Server.
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.

TABLE OF CONTENTS

I. GENERAL

1 GENERAL

This part explains the organization of this manual.

Chapter 1, "GENERAL", consists of the following sections:

1.1   ORGANIZATION

This manual consists of the following parts:

SAFETY PRECAUTIONS
This section describes the precautions to be observed when reading this manual.

I. GENERAL
This part describes the chapter organization, applicable models, and related manuals.

II. SPECIFICATION
This part describes the specifications of the functions that operate on the FAST Ethernet/FAST Data Server.

III. SETTING
This part describes the method of setting.

IV. OPERATION
This part describes the method of operating the Data Server functions.

V. CONNECTION
This part describes the method of connection and provides notes.

VI. MAINTENANCE
This part provides an Ethernet board drawing number and describes the meanings of LED indications.

APPENDIX
These appendixes describe additional information such as that related to troubleshooting, the operation of the FTP client, and how to set up the FTP server.

1.2 APPLICABLE MODELS

This Operator's Manual covers the following models.
The abbreviations in the following table are sometimes used in text descriptions.

Model name	Abbreviation	
FANUC Series 0*i*-MODEL D	Series 0*i*-D	0*i*-D

1.3   RELATED MANUALS

The table below lists manuals related to this Operator's Manual.
Refer to these manuals when you use this Operator's Manual.

Related manuals of FANUC Series 0*i*-D

Manual name	Specification number
DESCRIPTIONS	B-64302EN
CONNECTION MANUAL (HARDWARE)	B-64303EN
CONNECTION MANUAL (FUNCTION)	B-64303EN-1
USER'S MANUAL (Common to Lathe System/Machining Center System)	B-64304EN
USER'S MANUAL (For Lathe System)	B-64304EN-1
USER'S MANUAL (For Machining Center System)	B-64304EN-2
MAINTENANCE MANUAL	B-64305EN
PARAMETER MANUAL	B-64310EN
START-UP MANUAL	B-64304EN-3

Related manuals of FANUC CIMPLICITY *i* CELL

Manual name	Specification number
OPERATOR'S MANUAL	B-75074EN

Related manuals of FANUC Machine Remote Diagnosis Package

Manual name	Specification number
OPERATOR'S MANUAL	B-63734EN

Related manuals of FANUC Program Transfer Tool

Manual name	Specification number
OPERATOR'S MANUAL	B-64344EN

II. SPECIFICATION

1 PREFACE

In this manual, a board that has an ATA Flash card or a Compact Flash Card (collectively called a memory card hereinafter) mounted to enable the use of the Data Server functions is referred to as a "FAST Data Server" (or simply as a "Data Server"). On the other hand, a board that does not have a memory card mounted is referred to as a "FAST Ethernet".

Board name	Usable function
FAST Data Server (or simply referred to as "Data Server")	- Data Server functions - FOCAS2/Ethernet functions - CNC screen display functions - Machine remote diagnosis functions - Unsolicited messaging function (FOCAS2/Ethernet)
FAST Ethernet	- FOCAS2/Ethernet functions - CNC screen display functions - Machine remote diagnosis functions - Unsolicited messaging function (FOCAS2/Ethernet) - FTP file transfer function

NOTE
To use the Data Server functions, the Data Server function option is required.
To use the FOCAS2/Ethernet functions, CNC screen display functions, machine remote diagnosis functions, unsolicited messaging function, and FTP file transfer function, the Ethernet function option is required.

2 DATA SERVER FUNCTIONS

The Data Server functions use a memory card built into a board for storing files and can transfer files and perform DNC operation using FTP.

A Data Server can operate on both FTP client and FTP server.

When you use a Data Server to transfer files, the Data Server operates as an FTP client and communicates with the FTP server on the host computer.

When you use the host computer to transfer files, the Data Server operates as an FTP server and communicates with the FTP client on the host computer.
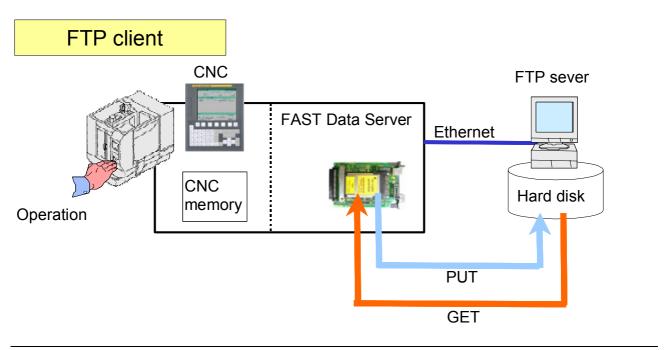
NOTE
1 When the host computer operates as an FTP server, FTP server software must be run on the host computer. When the host computer operates as an FTP client, FTP client software must be run on the host computer.
2 The Program Transfer Tool (drawing number: A08B-9510-J513 [Version 3 or later]) is available as a PC tool for transferring NC programs between the CNC and personal computer. This tool allows NC programs to be transferred between a personal computer and CNC memory or Data Server memory card through a simple operation on the personal computer side. The transfer of NC programs between a personal computer and CNC memory requires the FOCAS2/Ethernet functions, and that between a PC and Data Server memory card requires the Data Server functions.
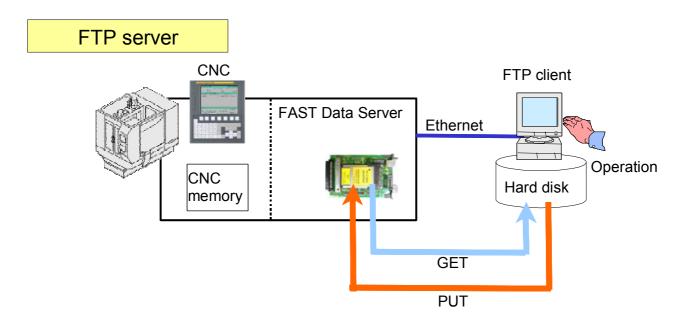
Chapter 2, "DATA SERVER FUNCTIONS", consists of the following sections:

FTP client

FTP server

2.1   DATA SERVER FILE MANAGEMENT

With the Data Server functions, you can format the built-in memory card in the CNC file management mode to manage NC programs.

CNC file management

For NC programs managed in the CNC file management mode, memory operation such as custom macro commands and M98-based subprogram calling are available. Operate the NC programs using the PROGRAM FOLDER screen in the same way as for NC programs in the CNC memory.

As a CNC external input/output device, DNC operation and M198-based subprogram calling are available. In this case, operate NC programs using the DATA SERVER FILE LIST screen.

> **NOTE**
> 1   The Data Server for the Series 0*i*-D allows editing and memory operation of NC programs stored on the memory card, so the method of managing files on the memory card differs from the file management method of conventional Data Servers. Note that, therefore, the memory card of the Series 0*i*-D is not compatible with the memory cards of Data Server models for the Series 0*i*-C .
> 2   For operation and details of the DATA SERVER FILE LIST screen, refer to Chapter 1, "OPERATING THE DATA SERVER FUNCTIONS," in Part IV, "OPERATION."

2.1.1   **File Names of CNC File Management**

A file name of CNC file management may be an arbitrary file name of up to 32 characters.

- Up to 32 characters
- Alphabetic characters (in upper and lower cases), numeric characters, and four symbols (+, -, _, and .)

NOTE
1 File names are case-sensitive.
2 Any file name or folder name cannot begin with a period (.).
3 It is impossible to assign the same name to a file and a folder.

File names and program numbers

When a file name assigned to a file consists of uppercase O and a numeric value, the file name is treated as a program number.
Values ranging from 1 to 9999 can be used.
A value beyond this range cannot be used for a file name in the program number format.

Example)
        File names that can be used as program numbers
        "O0123" Program number 123
        "O0001" Program number 1
        "O3000" Program number 3000
        "O9999" Program number 9999
        File names that cannot be used as program numbers
        "ABC"   (Does not have the format "O plus a numeric value")
        "o123"   (Does not begin with uppercase letter "O")
        "O123.4" (Uses a character other than numeric characters)

NOTE
1 When files on a Data Server are managed by program number, their program numbers always consist of "O" plus a 4-digit number. So, even if there are files managed with different file names such as "O1" and "O01" on a personal computer, their program numbers are regarded as the same when these files are transferred to the Data Server.
2 When a text file assigned an arbitrary file name other than a program number is input to the CNC memory, it is necessary to specify the program number set in the CNC memory.

2.1.2   **Files which can be Created on a Data Server**

In the initial status, the maximum number of files which can be created on a memory card on a Data Server is 2047 and the maximum file size is 512 MB. Each folder is counted as one file.

The maximum number of files and the maximum file size can be changed using NC parameter No. 930.

For details, see Section 2.3, "RELATED NC PARAMETERS," in Part III, "SETTING."

2.1.3   **Text Files and Binary Files**

You can store the following two types of files on a memory card on a Data Server: text files and binary files.

For a text file, memory operation and edit operation as well as DNC operation can be performed by selecting it as a main program.

On the other hand, memory and edit operations cannot be performed for a binary file.

If NC data other than an NC program is not handled as a binary file, it may not be able to be input or output correctly. NC data punched and stored on a memory card on a Data Server from the CNC is automatically handled as a binary file. A file to be transferred from a personal computer to a memory card on a Data Server must be specified explicitly as a binary file.

More specifically, for GET operation on a Data Server operation screen, you can use soft key [GET] or [BGET] to specify whether to handle the file as a text file or a binary file.

When the Data Server is used as an FTP server, you can execute an ASCII (text file) command or a BIN (binary file) command on your personal computer (FTP client) to specify whether to handle the file as a text file or a binary file.

NOTE
1 An NC program stored as a text file is converted to an editable file format so that the file can be edited on the CNC. For this reason, when a text file is read from the host computer to the memory card on the Data Server, then the file is transferred to the host computer, binary compatibility can no longer be maintained.
2 In the case of a text file, the file name and program name are identical. If a file having a program name different from the file name on the personal computer side is transferred as a text file, the program name is replaced by the file name. Note, however, that only when the file is transferred through an operation on the CNC side, precedence can be given to the program name by setting bit 3 (DSF) of NC parameter No. 905.

2.2   **DATA SERVER MODES**

Each Data Server mode determines the input or output destination when a Data Server is operated as a CNC external input/output device. You can select one of the following two modes.

> **NOTE**
> Data Server modes are valid only when the Data Server is operated as an external storage device of the CNC. In case of main program operation for editing and a memory operation and an M98-based subprogram call, programs on the memory card of the Data Server are selected regardless of the Data Server mode.
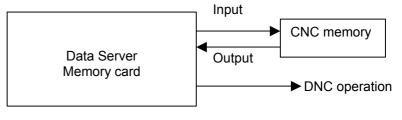
Storage mode

The memory card built into the Data Server is selected as the external input/output device.

For example, when DNC operation or M198-based subprogram calling is executed, the relevant NC program is called from the memory card built into the Data Server.

When input operation is executed for the Data Server, the relevant NC program is read from the memory card built into the Data Server.

Conversely, when NC program output operation is executed for the Data Server, the output NC program is written on the memory card built into the Data Server.

FTP mode

The host computer connected to the Data Server is selected as the external input/output device.
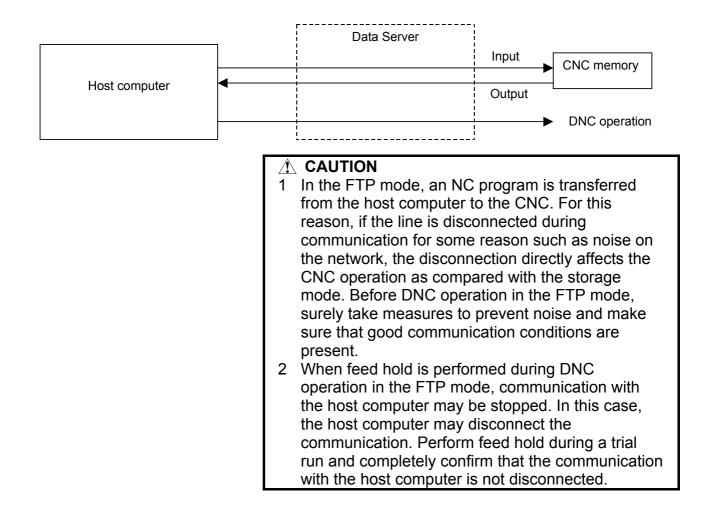
For example, when DNC operation or M198-based subprogram calling is executed, the relevant NC program is called from the host computer.

When input operation is executed for the Data Server, the relevant NC program is read from the host computer connected to the Data Server.

Conversely, when NC program output operation is executed for the Data Server, the output NC program is directly written on the host computer.

Data Server
Host computer
Input → CNC memory
Output
DNC operation

> **⚠ CAUTION**
> 1 In the FTP mode, an NC program is transferred from the host computer to the CNC. For this reason, if the line is disconnected during communication for some reason such as noise on the network, the disconnection directly affects the CNC operation as compared with the storage mode. Before DNC operation in the FTP mode, surely take measures to prevent noise and make sure that good communication conditions are present.
> 2 When feed hold is performed during DNC operation in the FTP mode, communication with the host computer may be stopped. In this case, the host computer may disconnect the communication. Perform feed hold during a trial run and completely confirm that the communication with the host computer is not disconnected.

2.3   **OPERATION FROM A DATA SERVER**

Memory operation

You can perform memory operation for an NC program on the memory card built into a Data Server in the same way as for an NC program in the CNC memory.

You can also supply an NC program simultaneously for a multipath CNC system.

> **NOTE**
> 1   When memory operation is performed, a selected program on the Data Server must be a text file. It is impossible to use a binary file for memory operation.
> 2   Memory and edit operations for the Data Server can be performed only for NC programs stored in the memory card built in the Data Server. Memory and edit operations cannot be performed directly for files on the host computer.
> 3   When memory operation is performed using a program in the Data Server memory card as the main program, a subprogram in the same folder as the main program can be called by the M98 subprogram call.

M198 subprogram operation

In the storage mode, you can perform M198 calling from the memory card built into a Data Server. In the FTP mode, you can perform M198 calling form the host computer.

On the DATA SERVER FILE LIST screen, set an M198 folder in advance. When M198 calling is specified, the set M198 folder is searched for the target subprogram.

> **NOTE**
> M198 subprogram operation cannot be performed simultaneously for two paths.

DNC operation

In the storage mode, you can perform DNC operation from the memory card built into a Data Server. In the FTP, you can perform DNC operation from the host computer.

On the DATA SERVER FILE LIST screen, set the file name for DNC operation in advance. When DNC operation starts, the set DNC operation file is called.

> **NOTE**
> DNC operation cannot be performed for the second path.

2.4   **NC PROGRAM FORMAT**

NC programs prepared on the host computer must have the following format:

```
% TITLE ;
O0001(COMMENT) ;
        .
        .
        .
M30 ;
%
```

An NC program starts with a tape start (%). In the subsequent part (leader section) until EOB (;, program start) is encountered, a comment such as a title can be inserted as necessary.

At the beginning of the program part, be sure to specify a program name, which must be either an O number (program number) or an arbitrary file name of not more than 32 characters enclosed by "<" and ">". This O number or file name must be used for management on the personal computer.

If the O number in the NC program or the program name in the arbitrary file name does not match the file name on the personal computer, the file name on the personal computer is used as the program name by default when the file is transferred from the personal computer to the Data Server.

The semicolon ";" used at the end of each block means EOB (end of block) and actually functions as LF (LF: 0A in hexadecimal), CR-LF (CR: 0D in hexadecimal), or LF-CR-CR.

The NC program must end with "M code ; tape end (%)".

For information about the NC program structure, refer to the user's manual (B-64304EN).

> ⚠ **WARNING**
> If an NC program prepared on the host computer does not use the program format specified by the CNC, executing the NC program can cause an unpredictable operation. So, special care should be taken when an NC program is prepared on the host computer.

NOTE
1   Put "%" (tape end) at the end of the file. Do not allow the program to continue beyond the tape end.
2   Do not use any characters other than the usable characters, including in comment sections. If any unusable characters - Japanese characters in particular - are used, they may be interpreted as unexpected control characters.
3   EIA codes cannot be used for a Data Server.
4   When two or more NC programs are managed with a single file on the host computer, transferring that file to the Data Server memory card as a text file results in those programs being registered as a single NC program; the transferred file is not automatically divided into separate NC programs.

2.5   **LIST FILE FORMAT**

In the LIST-GET, LIST-PUT, and LIST-DELETE functions described later, one of the following list file formats must be used:

Format 1
```
% ;
O0001(COMMENT) ;
N111 ;
N222 ;
N333 ;
   :
   :
N999 ;
%
```

Format 2
```
% ;
O0001(COMMENT) ;
N111 (PC-File) ;
N222 (PC-File) ;
N333 (PC-File) ;
   :
   :
N999 (PC-File) ;
%
```

Format 3
```
% ;
O0001(COMMENT) ;
(Dtsvr-File) ;
(Dtsvr-File) ;
(Dtsvr-File) ;
   :
   :
(Dtsvr-File) ;
%
```

Format 4
```
% ;
O0001(COMMENT) ;
(Dtsvr-File, PC-File) ;
(Dtsvr-File, PC-File) ;
(Dtsvr-File, PC-File) ;
   :
   :
(Dtsvr-File, PC-File) ;
%
```

Specifications common to all formats

<1> A list file begins with a tape start "%".

<2> In the next block, be sure to specify an O number. Assign this O number as the file name.
A comment enclosed in parentheses "(" and ")" can be inserted between the O number and EOB.

<3> In the subsequent blocks, specify files to be processed.

<4> The list file must end with "%".

Specifications of format 1

The following describes the specifications of list file format 1:

<1> This specification method applies when the file names of files to be processed have the format "Oxxxx" (where "xxxx" denotes a 4-digit number). In this case, change "O" in file name "Oxxxx" to "N" when specifying the file name. The 4-digit number can be zero-suppressed. The example shows that files O0111, O0222, O0333, and so on up to O0999 are processed sequentially.

<2> The LIST-GET service transfers "Oxxxx" files stored on the built-in hard disk of the host computer to the built-in memory card of the FAST Data Server without modifying file names "Oxxxx". The LIST-PUT service transfers "Oxxxx" files stored on the built-in memory card of the FAST Data Server to the built-in hard disk of the host computer without modifying file names "Oxxxx". The LIST-DELETE service deletes "Oxxxx" files stored on the built-in memory card of the FAST Data Server.

Specifications of format 2

The following describes the specifications of list file format 2:

<1> This specification method applies when files to be processed are named "Oxxxx" (where "xxxx" denotes a 4-digit number) on the built-in memory card of the FAST Data Server and are named arbitrary file names on the built-in hard disk of the host computer. In this case, change "O" in file name "Oxxxx" to "N" when specifying the file name on the FAST Data Server. The 4-digit number can be zero-suppressed. The example shows that files O0111, O0222, O0333, and so on up to O0999 are processed sequentially.
A file name on the built-in hard disk of the host computer can be specified by enclosing it with parentheses "(" and ")" following the corresponding "Nxxxx". The characters that can be used in file names depend on the OS of the host computer.

<2> The LIST-GET service transfers files with arbitrary file names "PC-File" stored on the built-in hard disk of the host computer to the built-in memory card of the FAST Data Server as "Oxxxx" files. The LIST-PUT service transfers "Oxxxx" files stored on the built-in memory card of the FAST Data Server to the built-in hard disk of the host computer as files with arbitrary file names "PC-File". The LIST-DELETE service deletes "Oxxxx" files stored on the built-in memory card of the FAST Data Server.

Specifications of format 3

The following describes the specifications of list file format 3:

<1> This specification method applies when the file names of files to be processed are arbitrary file names. In this case, file names on the built-in memory card of the FAST Data Server and on the built-in hard disk of the host computer are assumed to be the same. Specify an arbitrary file name enclosed with parentheses "(" and ")". Arbitrary file names are those that can be used on the Data Server side.

<2> The LIST-GET service transfers files with arbitrary file names "Dtsvr-File" stored on the built-in hard disk of the host computer to the built-in memory card of the FAST Data Server with the file names kept unchanged.

The LIST-PUT service transfers "Dtsvr-File" files stored on the built-in memory card of the FAST Data Server to the built-in hard disk of the host computer with the file names "Dtsvr-File" kept unchanged. The LIST-DELETE service deletes "Dtsvr-File" files stored on the built-in memory card of the FAST Data Server.

Specifications of format 4

The following describes the specifications of list file format 4:

<1> This specification method applies when files to be processed have arbitrary file names. In this case, file names on the built-in memory card of the FAST Data Server and file names on the built-in hard disk of the host computer are assumed to be different. Specify a file name on the built-in memory card of the FAST Data Server and a file name on the built-in hard disk of the host computer in parentheses, separated by a comma ",".

<2> The LIST-GET service transfers files with arbitrary file names "PC-File" stored on the built-in hard disk of the host computer to the built-in memory card of the FAST Data Server as "Dtsvr-File" files.

The LIST-PUT service transfers "Dtsvr-File" files stored on the built-in memory card of the FAST Data Server to files with file name "PC-File" on the built-in hard disk of the host computer.

The LIST-DELETE service deletes "Dtsvr-File" files stored on the built-in memory card of the FAST Data Server.

Limitations on file names in a list file

The following limitations apply when file names are specified in a list file:

<1> As arbitrary file names on the built-in memory card of the FAST Data Server, only the following 66 types of ASCII characters can be used and the maximum length is 32 characters:

Numeric characters 0 to 9

Lowercase letters a to z

Uppercase letters A to Z

Four symbols (+, -, _, .)

<2> The characters that can be used in arbitrary file names on the built-in hard disk of the host computer depend on the OS of the host computer.

Arbitrary file names may consist of up to 255 characters. However, the number of characters that can actually be used depends on the OS of the host computer.

Storage locations of list files

The LIST-GET, LIST-PUT, and LIST-DELETE services are useful functions for managing NC programs in groups.

The places where list files are prepared vary depending on the service to be executed.

For the LIST-GET service, NC programs to be operated on are present on the built-in hard disk of the host computer, so list files are placed also on the built-in hard disk of the host computer.

For the LIST-PUT and LIST-DELETE services, NC programs to be operated on are present on the built-in memory card of the FAST Data Server, so list files are also prepared on the built-in memory card of the FAST Data Server.

2.6   ISO CODE INPUT/OUTPUT FUNCTION

This function is intended to accomplish NC data input and output between the CNC and Data Server, as well as between a personal computer and Data Server, using the ISO code. Unlike the traditional ASCII code characters, each ISO code character has parity data appended to it. The function checks this parity data, which improves the reliability of data input and output operations.

While the most significant bit of an ASCII code character is in an OFF state, the ISO code uses the most significant bit to store parity data so that each character has an even number of ON bits.

NOTE
1   NC data may not be transferred properly between a personal computer and Data Server, depending on the FTP communication software used on the personal computer.
2   If a parity error is found in the ISO code in the comment section, it is not regarded as an error and the character in question is converted to a space.
3   If the ASCII code is selected as the input/output code, the parity check is not performed. Even if the data to be transferred is ISO code data, it is transferred as ASCII code data with the parity data in the most significant bit removed.
4   To input data to or output data from the CNC requires that a Data Server be selected as the input/output device. For information about input/output device and input/output code selection, see SETTING, Section 2.3, "RELATED NC PARAMETERS".
5   A tool (FANUC ISO Converter) is available that allows you to create and check ISO code NC data on a personal computer. For details of this tool, refer to the appendix of the "User's Manual (Common to Lathe System/Machining Center System) (B-64304EN)".

Input from the Data Server to CNC

If the ISO code is selected as the input/output code, an ISO code check is performed to verify the validity of data when the CNC receives the data from the Data Server.

If any character with invalid parity data is found, the input/output operation ends abnormally.

Target functions
<1> Program input
<2> M198 subprogram call
<3> DNC operation

NOTE
1   The CNC checks the ISO code in the received data, regardless of whether the Data Server file is a text file or binary file.
    For information about text files and binary files, see Subsection 2.1.3, "Text Files and Binary Files".
2   The CNC checks the ISO code in the received data, regardless of the Data Server mode.
    In the FTP mode, therefore, ISO code NC data needs to be prepared on the personal computer side.
    For information about the Data Server mode, see Section 2.2, "DATA SERVER MODES".

Output from the CNC to Data Server

If the ISO code is selected as the input/output code, an ISO code check is performed to verify the validity of data when the data is stored in the Data Server memory card.

If any character with invalid parity data is found, the input/output operation ends abnormally.

Target function
<1> Program output

NOTE
1   When the Data Server is in the FTP mode, data is output directly to the personal computer and the Data Server does not perform the ISO code check. In this case, perform the check on the personal computer side.
2   When more than one NC program is output simultaneously or NC parameters are output, the data is output to the Data Server as a binary file. In the case of a binary file, the Data Server does not perform the ISO code check.

File transfer from a personal computer to Data Server

If the ISO code is selected as the input/output code, an ISO code check is performed to verify the validity of data when the data received from the personal computer is stored in the Data Server memory card.

If any character with invalid parity data is found, the input/output operation ends abnormally.

Target functions
<1> GET (Data Server = FTP client)
<2> PUT (Data Server = FTP server)

> **NOTE**
> 1 It is necessary to prepare ISO code NC data on the personal computer side.
> 2 In the case of binary file transfer, the ISO code check is not performed when the data is stored in the Data Server memory card.

File transfer from the Data Server to personal computer

If the ISO code is selected as the input/output code, data is output as ISO code data from the Data Server memory card.

Target functions
<1> PUT (Data Server = FTP client)
<2> GET (Data Server = FTP server)

> **NOTE**
> 1 Perform the ISO code check on the personal computer side, as needed.
> 2 In the case of binary file transfer, the Data Server does not perform ISO code conversion.

3

FOCAS2/Ethernet FUNCTIONS

The FOCAS2/Ethernet functions can remotely control and monitor the CNC by using a personal computer. For details, refer to the manual delivered with the FOCAS2 library software.

NOTE
1 In the FOCAS2/Ethernet functions, the CNC operates as a server and waits for a communication start request from a personal computer that operates as a client.
   As communication with the personal computer starts, two sockets are used for control and monitoring from the personal computer and for file transfer.
2 The Program Transfer Tool (drawing number: A08B-9510-J513 [Version 3 or later]) is available as a PC tool for transferring NC programs between the CNC and personal computer. This tool allows NC programs to be transferred between a personal computer and CNC memory or Data Server memory card through a simple operation on the personal computer side. The transfer of NC programs between a personal computer and CNC memory requires the FOCAS2/Ethernet functions, and that between a PC and Data Server memory card requires the Data Server functions.

---

4   DNS/DHCP FUNCTIONS

If DNS/DHCP functions are used for communication setting of the Data Server functions and FOCAS2/Ethernet functions, Ethernet addresses (IP address and subnet mask) can be set at a time on the host computer to facilitate Ethernet address control.

DNS

With the DNS function, a fully qualified domain name (e.g., www.fanuc.co.jp) can be specified instead of a hard-to-remember IP address just consisting of numbers (e.g., 192.168.0.10) when a TCP/IP communication destination is to be specified.

> **NOTE**
> To use the DNS function, a personal computer having the DNS server function is additionally required. See APPENDIX D, "DNS/DHCP FUNCTION."

DHCP

With the DHCP function, Ethernet addresses (IP address and subnet mask) that need to be set on the CNC can be set on the host computer.

> **NOTE**
> To use the DHCP function, a personal computer having the DHCP server function is additionally required. See APPENDIX D, "DNS/DHCP FUNCTION."

5

MACHINE REMOTE DIAGNOSIS FUNCTIONS

With the machine remote diagnosis functions, checking of the internal CNC status, ladder program editing, and other operations can be performed as necessary by using a personal computer through a LAN. For details, refer to "Machine Remote Diagnosis Package OPERATOR'S MANUAL (B-63734EN)."

6 UNSOLICITED MESSAGING FUNCTION
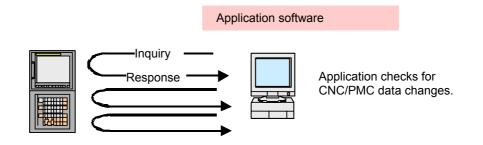
This chapter describes the unsolicited messaging function.
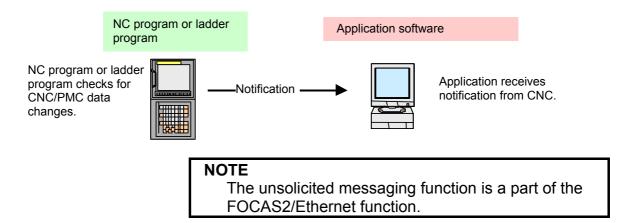
Overview of the unsolicited messaging function

An overview of the unsolicited messaging function is provided below. With the unsolicited messaging function, the CNC transmits messages (CNC/PMC data) in an unsolicited manner to application software on the personal computer according to a command from an NC program or ladder program.   By using this function, the need for application processing on the personal computer to periodically inquire about the state of the CNC can be eliminated.

When the conventional function is used

Application software

Inquiry
Response

Application checks for CNC/PMC data changes.

When the unsolicited messaging function is used

NC program or ladder program

Application software

NC program or ladder program checks for CNC/PMC data changes.

Notification

Application receives notification from CNC.

> **NOTE**
> The unsolicited messaging function is a part of the FOCAS2/Ethernet function.

Unsolicited messaging function execution procedure

The execution procedure for the unsolicited messaging function is described below.

1   Preparation on the personal compute
Create an application using the FOCAS2 function for the unsolicited messaging function and install the unsolicited message server on a personal computer.   For the method of creating an application using the FOCAS2 function for the unsolicited messaging function and the method of installing the unsolicited message server, refer to Chapter 5, "UNSOLICITED MESSAGING FUNCTION", in "FANUC Open CNC FOCAS1/FOCAS2 CNC/PMC Data Window Library Operator's Manual".

2   Preparation on the CNC
Create an NC program or ladder program for controlling unsolicited messaging.
For the method of creating an NC program or ladder program, see Appendix F.2, "EXECUTING THE UNSOLICITED MESSAGING FUNCTION."

3   Setting of the communication parameters for the unsolicited messaging function
To use the unsolicited messaging function, the following communication parameter settings are needed:
(1)   Setting for using the FOCAS2/Ethernet function
(2)   Setting of the parameters for the unsolicited messaging function
For (2), a choice can be made from two modes of setting: CNC mode for setting on the CNC screen and the PC mode for setting on the personal computer.
For the setting method of (1) and (2), see Appendix F.1, "SETTING OF THE UNSOLICITED MESSAGING FUNCTION."

4   Starting the NC program or ladder program
Start the NC program or ladder program created in step 2, "Preparation on the CNC".   At this time, no unsolicited message is transmitted to the personal computer until step 5, "Starting the unsolicited messaging function", is executed.

5   Starting the unsolicited messaging function
Execute the FOCAS2 function cnc_unsolicstart on the personal computer.   This execution places the CNC in the state (named "Ready") where a transmission request from the NC program or ladder program is awaited.   Each time a transmission request is made from the NC program or ladder program, an unsolicited message is automatically transmitted to the personal computer.

6   Ending the unsolicited messaging function
To end unsolicited message transmission, execute the FOCAS2 function cnc_unsolicstop on the personal computer.   This execution places the CNC in the state (named "Not Ready") where no unsolicited message is transmitted even when a request for transmission is made from the NC program or ladder program.

7

FTP FILE TRANSFER FUNCTION

The FTP file transfer function is operated from the CNC to transfer a file. It works as an FTP client and communicates with the FTP server on the host computer.

> **NOTE**
> 1   The FTP server software needs to be running on the host computer.
> 2   The FTP file transfer function cannot perform M198 subprogram calling or DNC operation.

III. SETTING

1 SETTING THE COMMUNICATION FUNCTION

This part describes the settings required to operate the following FAST Ethernet/FAST Data Server functions:

- Data Server functions
- FOCAS2/Ethernet functions
- CNC screen display functions

> **NOTE**
> For details of the machine remote diagnosis functions, unsolicited messaging function, and FTP file transfer function, see the relevant appendixes.

Notes on using the Data Server functions

> ⚠ **CAUTION**
> When setting the FAST Ethernet/FAST Data Server for the first time, carefully set data such as an IP address and conduct a sufficient communication test, consulting with your network administrator.
> If data such as an IP address is not set correctly, a communication failure can affect the entire network. Take sufficient care.

2

SETTING THE DATA SERVER FUNCTIONS

This chapter describes the communication setting for the Data Server functions.

Notes on using the functions for the first time

> ⚠ **CAUTION**
> 1 When using the FAST Data Server for the first time, be sure to initialize the memory card, set parameters, then turn the power off then back on. If an attempt is made to use the Data Server functions without following these steps, normal operation is not guaranteed.
> 2 Before performing FTP communication using the FAST Data Server for the first time, consult with your network administrator, carefully set a network address and other items, and conduct communication tests thoroughly. Any error in settings such as a network address setting can lead to an adverse influence such as a communication failure on the entire network.
>   In particular, IP address duplication causes an intermittent communication failure in the Data Server, which can result in a system error in the CNC. So, be very careful when making settings.
> 3 When the power to the CNC is turned off during access to the memory card, files stored on the memory card may be destroyed. So, be careful not to turn off the power to the CNC during access to the memory card.
> 4 In preparation for damage to the memory card, always take backup copies of the files stored on the memory card to the host computer.

> **NOTE**
> 1 With the Data Server functions (FTP client), a single CNC can connect only one FTP server.
> 2 With the Data Server functions (FTP server), a single CNC can connect up to five FTP clients. However, some FTP client software programs may each internally use two or more FTP clients. Note, therefore, that the number of FTP clients is not always equal to the number of applications.
> 3 The Data Server functions do not support passive mode (PASV command).

2.1 OPERATING THE DATA SERVER SETTING SCREEN

This section describes the setting screen for operating the Data Server functions.

Procedure

1 Press the function key .

2 Soft key [ETHBRD] appear. (When there is no soft keys, press the continue key.)

3 Press soft key [ETHBRD] to display the Ethernet Setting screen.

4 Press soft keys [COMMON] and [DTSVR] and then enter parameters for the items that appear.

COMMON screen (BASIC)

Press soft key [COMMON] to display the COMMON screen (BASIC).

```
ETH_BRD SETTING                    O0000 N00000
          COMMON: Setting[BOARD]
 BASIC
  MAC ADDRESS                 00E0E4000001
  IP ADDRESS                  192. 168. 0. 100
  SUBNET MASK                 255. 255. 255. 0
  ROUTER IP ADDRESS           192. 168. 0. 253



                                      1/ 2
A)_


MDI    **** *** ***      12:00:00
《 COMMON  FOCAS2   DTSVR  RMTDIAG (OPRT)  +
```

COMMON screen (BASIC)

Setting item

Item	Description
IP ADDRESS	Specify the IP address of the FAST Data Server. (Example of specification format: "192.168.0.100")
SUBNET MASK	Specify a mask address for the IP addresses of the network. (Example of specification format: "255.255.255.0")
ROUTER IP ADDRESS	Specify the IP address of the router. Specify this item when the network contains a router. (Example of specification format: "192.168.0.253")

Display item

Item	Description
MAC ADDRESS	FAST Data Server MAC address

> **NOTE**
> The second page (detail screen) of the COMMON screen is to be set when the DNS/DHCP function is used. For details, see Appendix D, "DNS/DHCP FUNCTION."

Data Server screens (CONNECT 1, CONNECT 2, CONNECT 3)

Press soft key [DTSVR] to display the Data Server screen.

By using page keys ⬆PAGE ⬇PAGE , the three host computers at connection destinations 1, 2, and 3 can be set.

```
ETH_BRD SETTING              O0000 N00000
          Data Server:Setting[BOARD]
 CONNECT1
  HOST NAME(IP ADDRESS)
         192. 168. 0. 200

  PORT NUMBER                           21
  USER NAME
         user
  PASSWORD
         ****

                                      1/ 8

 A)_


 MDI  **** *** ***    12:00:00
 ( COMMON  FOCAS2   DTSVR  RMTDIAG (OPRT) +
```

Data Server screen 1 (for connection destination 1)

```
ETH_BRD SETTING              O0000 N00000
          Data Server:Setting[BOARD]
 CONNECT1
  LOGIN FOLDER
         /ncdata




                                      2/ 8

 A)_


 MDI  **** *** ***    12:00:00
 ( COMMON  FOCAS2   DTSVR  RMTDIAG (OPRT) +
```

Data Server screen 2 (for connection destination 1)

Setting item

Item	Description
HOST NAME	Specify the IP address of the host computer. (Example of specification format: "192.168.0.200")
PORT NUMBER	Specify the port number. Usually, set 21 because the FTP communication is used.
USER NAME	Specify the name of the user to log on to the host computer using FTP. (A user name of up to 31 characters can be specified.)
PASSWORD	Specify the password for the above user name. The password must always be specified.
LOGIN FOLDER	Specify a work folder to be used when the user logs in to the host computer. (Up to 127 characters can be specified.) If no data is set, the home folder set on the host computer is used as a login folder.

Operation

Select a connection destination.

1   Press soft key [(OPRT)] to display soft key [HOST]. Then, press soft key [HOST] to display soft keys [CONECT1], [CONECT2], and [CONECT3].

HOST	CHA−EXT			INPUT

CONECT1	CONECT2	CONECT3		

2   Press one of soft keys [CONECT1], [CONECT2], and [CONECT3] according to the host computer to which you want to make a connection. The screen title of connection destination 1, 2 or 3 is displayed in reverse video. The screen title displayed in reverse video indicates the connection destination host computer.

CONECT1 ⟶ CONECT1

When connection destination 1 is selected

- 42 -

Data Server screens (FTP SERVER)

Press soft key [DTSVR] to display the Data Server screen.

By using page keys ⬆PAGE ⬇PAGE , the FTP server setting screen is displayed after the connection destination 1, 2, or 3 screen.

```
ETH_BRD SETTING                  O0000 N00000
            Data Server:Setting[BOARD]
FTP SERVER
 USER NAME
        DTSVR

 PASSWORD
        *****




                                        7/ 8

A)_

MDI   **** *** ***    12:00:00
 《COMMON  FOCAS2   DTSVR  RMTDIAG (OPRT)  +
```

Data Server screen 1 (FTP SERVER)

```
ETH_BRD SETTING                  O0000 N00000
            Data Server:Setting[BOARD]
FTP SERVER
 LOGIN FOLDER
        FTPSERVER






                                        8/ 8

A)_

MDI   **** *** ***    12:00:00
 《COMMON  FOCAS2   DTSVR  RMTDIAG (OPRT)  +
```

Data Server screen 2 (FTP SERVER)

Setting item

Item	Description
USER NAME	Specify a user name to be used when the host computer logs in to the Data Server. (A user name of up to 31 characters can be specified.)
PASSWORD	Specify the password for the above user name. The password must always be specified.
LOGIN FOLDER	Specify a work folder to be used when the host computer logs in to the Data Server. (Up to 127 characters can be specified.) If no data is set, the home folder (home directory) is used as a login folder.

Data Server MODE screen (SETTING)

Press soft key [DS MODE] to display the Data Server MODE screen (SETTING). The current mode can be checked and changed.

```
ETH_BRD SETTING                    O0000 N00000
              DataServer MODE
 SETTING
  MODE                        STORAGE MODE
  CHANNELS                               1




                                      1／ 2
A）_


MDI   **** *** ***      12:00:00
《  PING   COM STS TSK STS DS MODE (OPRT)  ＋
```

Data Server screen (SETTING)

Display item

Item	Description
CHANNELS	Displays the number of channels currently being used.
MODE	Displays the currently set Data Server mode. STORAGE MODE FTP MODE

Operation

The Data Server mode can be changed.

1   Press soft key [(OPRT)] to display soft keys [STORAGE] and [FTP].

```
《 STORAGE            FTP
```

2   To change the mode to a desired mode, press the soft key of the desired mode.

Data Server MODE screen (MAINTENANCE)

Press soft key [DS MODE] and press page keys [↑PAGE] [↓PAGE] to display maintenance information for each channel.

```
ETH_BRD SETTING                    O0000 N00000
              DataServer MODE
 MAINTENANCE
 CHANNEL  1

  EMPTY  COUNTER                       ⌐        0 ┐
  TOTAL  SIZE                          ⌐        0 ┐
  WRITE  POINTER                       ⌐        0 ┐
  READ  POINTER                        ⌐        0 ┐



                                       2/ 2
 A) _


 MDI    ****  ***  ***    12:00:00
 〈   PING    COM STS TSK STS DS MODE (OPRT)  +
```

Data Server MODE screen (MAINTENANCE)

Display item

Item	Description
CHANNEL	Interface number of the buffer used for transferring NC programs between the CNC and Data Server. For example, a channel is assigned to each path.
EMPTY COUNTER	Used for maintenance. This item indicates the number of cases where the buffer becomes empty while NC programs are being transferred from the Data Server to the CNC.
TOTAL SIZE	Used for maintenance. This item indicates the total number of bytes transferred when an NC program is transferred from the Data Server.
WRITE POINTER READ POINTER	Used for maintenance. This item indicates the buffer use status when NC programs are transferred from the Data Server to the CNC.

Data Server FORMAT screen

Press soft key [DS FMT] to display the format screen of the memory card built into the Data Server.

```
ETH_BRD SETTING                    O0000 N00000
              DataServer  FORMAT

   DEVICE  NAME                 ATA

   FORMAT  TYPE               CNC FILE
   CHECK  DISK                  ---




                                        1／ 1
A）_


MDI   ＊＊＊＊ ＊＊＊ ＊＊＊    12:00:00
（ DS  FMT                       UNSOLI   (OPRT)  +
```

Data Server FORMAT screen

Display item

Item	Description
DEVICE NAME	Indicates the storage media currently being used by the Data Server. "ATA" or "NONE" is indicated.
FORMAT TYPE	Indicates the format type of the memory card. "CNC FILE" or "---" is displayed. When "---" is displayed, check whether the memory card is mounted properly and is formatted correctly.
CHECK DISK	Indicates the check result. When no check is made : "-----" When the check result is normal : "OK" When the check result is abnormal : "NG"

Procedure (CHECK DISK)

1   Press soft key [(OPRT)] then soft key [CHKDSK].

| (| CHKDSK | | | CNC FMT | | | | |

2   Press soft key [EXEC] to check the format of the memory card
     and display the check result.

> ⚠ **CAUTION**
> If the check result is abnormal, determine the
> cause of trouble from an error message displayed
> on the ETHERNET LOG screen and back up the
> files stored on the memory card immediately.
> Then, try to reformat the memory card.

> **NOTE**
> 1 An error occurs if other Data Server functions are
>   operated when a check disk is made.
> 2 Also when a program on the memory card of the
>   Data Server is selected as a main program, the
>   check disk operation cannot be performed.

Procedure (CNC FORMAT)

1   Press soft key [(OPRT)] then soft key [CNC FMT].

| (| CHKDSK | | | CNC FMT | | | | |

2   Press soft key [EXEC] to format the memory card built into the
     FAST Data Server.

> ⚠ **CAUTION**
> 1 Do not turn off the power to the CNC when the
>   memory card is being formatted. Otherwise, the
>   memory card can be damaged.
> 2 When the memory card is formatted, all files held
>   on the memory card are erased.

> **NOTE**
> 1 An error occurs if other Data Server functions are
>   operated when the memory card is formatted.
> 2 Also when a program on the memory card of the
>   Data Server is selected as a main program, the
>   memory card cannot be formatted.

2.2 INPUT OF SPECIAL CHARACTERS

By setting bits 4 and 5 (SI1 and SI2) of NC parameter No. 13115, it is possible to input special characters and lowercase characters that are not available on the MDI keys.

Setting this NC parameter displays soft key [CHA-EXT], and pressing this soft key displays the following set of soft keys.

◁	(	)	?	*	&	+
◁	@	_	{	}	¥	+
◁	%	$	!	~	:	+
◁	"	'			ABC/abc	+

Each time you press soft key [ABC/abc], you switch from uppercase input to lowercase input or vice versa. The uppercase/lowercase input state can be checked in the key input field.

A ⟩ _ ⟷ a ⟩ _

Uppercase input   Lowercase input

2.3   **RELATED NC PARAMETERS**

The NC parameters related to the Data Server functions are described below.

	#7	#6	#5	#4	#3	#2	#1	#0
0000								TVC

[Input type]   Setting input
[Data type]   Bit path

#0   TVC   When a file is transferred from the personal computer to the Data Server, a TV check is:
0:    Not performed.
1:    Performed.

> **NOTE**
>   This parameter is valid only for text files.
>   For text files, see Subsection 2.1.3, "Text Files and Binary Files" in Part II, "SPECIFICATION."

0020	I/O CHANNEL : Input/output device selection

[Input type]   Setting input
[Data type]   Byte
[Valid data range]   5 : Selects the Data Server as the input/output device.

	#7	#6	#5	#4	#3	#2	#1	#0
0100					NCR	CRF	CTV	

[Input type]   Setting input
[Data type]   Bit
#1   CTV   When a file is transferred from the personal computer to the Data Server, character counting for the TV check in program comment parts is:
0:    Performed.
1:    Not performed.
#2   CRF   When a file is output from the Data Server to the personal computer, EOB (end of block) is:
0:    Set as specified by parameter NCR (bit 3 of parameter No. 100).
1:    Set to "CR" "LF".
#3   NCR   When a file is output from the Data Server to the personal computer, EOB (end of block) is:
0:    Set to "LF" "CR" "CR".
1:    Set to "LF".

> **NOTE**
> This parameter is valid only for text files.
> For text files, see Subsection 2.1.3, "Text Files and
> Binary Files" in Part II, "SPECIFICATION."

	#7	#6	#5	#4	#3	#2	#1	#0
0904	LCH							

[Input type]   Setting input
[Data type]   Bit

 # 7   **LCH**   In the LIST-GET service of the Data Server function, when a list file
specifies 1025 or more files:
0:   A check for duplicated file names is performed.
1:   A check for duplicated file names is not performed.

	#7	#6	#5	#4	#3	#2	#1	#0
0905					DSF		PCH	

[Input type]   Setting input
[Data type]   Bit

 # 1   **PCH**   At the start of communication of the Data Server function, FTP file
transfer function, or machine remote diagnosis function, checking for
the presence of the server using PING is:
0:   Performed.
1:   Not performed.

> **NOTE**
> Usually, set 0.
> If 1 is set not to check the presence of the server
> by using PING, it may take several tens of seconds
> to recognize an error when the server is not
> present in the network.
> For mainly security reasons, a personal computer
> may be set so that it does not respond to the PING
> command. To communicate with such a personal
> computer, set 1.

 # 3   **DSF**   When an NC program is stored on the memory card of the Data
Server:
0:   The file name takes priority.
1:   The program name in the NC program takes priority.
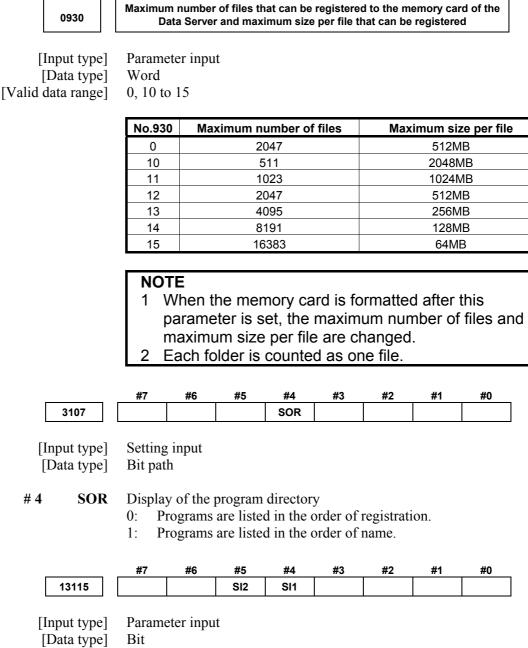
> **NOTE**
> Only when the file in the personal computer is
> registered to the memory card of the Data Server
> by operating the CNC side, this parameter is
> effective.

	#7	#6	#5	#4	#3	#2	#1	#0
0908								**ISO**

[Input type]   Setting input
[Data type]   Bit

 # 0   ISO   When the data server is selected as an I/O device, data is input or
output using:
0:   ASCII codes
1:   ISO codes

0921	**Selects the host computer 1 OS.**

0922	**Selects the host computer 2 OS.**

0923	**Selects the host computer 3 OS.**

[Input type]   Parameter input
[Data type]   Word
[Valid data range]   0 to 2
0:   Windows95/98/Me/2000/XP/Vista.
1:   UNIX, VMS.
2:   Linux.

> **NOTE**
> Some FTP server software products do not depend
> on the OS. So, even when the above parameters
> are set, it is sometimes impossible to display a list
> of files properly.

0929	**File attribute specification during FTP server operation**

[Input type]   Parameter input
[Data type]   Word
[Valid data range]   0 to 2
This parameter sets whether to give priority to the file attribute
specified in a TYPE command of FTP during operation as an FTP
server.
0:   Priority is given to the file attribute specified in a TYPE
     command from an FTP client.
1:   Text files are always assumed.
2:   Binary files are always assumed.

0930	Maximum number of files that can be registered to the memory card of the Data Server and maximum size per file that can be registered

[Input type]   Parameter input
[Data type]   Word
[Valid data range]   0, 10 to 15

No.930	Maximum number of files	Maximum size per file
0	2047	512MB
10	511	2048MB
11	1023	1024MB
12	2047	512MB
13	4095	256MB
14	8191	128MB
15	16383	64MB

NOTE
1   When the memory card is formatted after this parameter is set, the maximum number of files and maximum size per file are changed.
2   Each folder is counted as one file.

3107	#7	#6	#5	#4	#3	#2	#1	#0
				SOR				

[Input type]   Setting input
[Data type]   Bit path

 # 4   **SOR**   Display of the program directory
      0:     Programs are listed in the order of registration.
      1:     Programs are listed in the order of name.

13115	#7	#6	#5	#4	#3	#2	#1	#0
			SI2	SI1				

[Input type]   Parameter input
[Data type]   Bit

 # 4   **SI1**   Soft key input of the characters shown below is:
      0:     Disabled.
      1:     Enabled.
      < > ¥ % $! ~ : " '

 # 5   **SI2**   Soft key input of the characters shown below and switching between the uppercase and lowercase input modes by a soft key are:
      0:     Disabled.
      1:     Enabled.
      ( ) ? * & @ _

2.4   **EXAMPLE OF SETTING THE DATA SERVER FUNCTIONS**

An example of setting for operating the Data Server functions is given below. In this example of setting, one personal computer is connected to two CNCs through a Data Server.

		CNC 1	CNC 2	
IP ADDRESS		192.168.0.100	192.168.0.101	The common setting screen is used for setting.
SUBNET MASK		255.255.255.0	255.255.255.0	
ROUTER IP ADDRESS		None	None	
CONNECT 1	PORT NUMBER	21	21	The Data Server setting screen is used for setting.
	IP ADDRESS	192.168.0.200	192.168.0.200	
	USER NAME	user	user	
	PASSWORD	user	user	
	LOGIN FOLDER	None	None	
DATA SERVER MODE		Storage	Storage	The Data Server mode setting screen is used for setting.
NC Parameter NO. 20		5	5	NC parameter setting

	PC 1	
IP address	192.168.0.200	"Microsoft TCP/IP property" of the personal computer (Windows2000/WindowsXP/Vista) is used for setting.
Sub-net mask	255.255.255.0	
Default gateway	None	"User acount" of the personal computer (Windows2000/WindowsXP/Vista) is used for setting.
User name	user	
Password	user	"Internet service manager" of the personal computer (Windows2000/WindowsXP) is used for setting. Windows Vista uses "FTP Publishing Service" for setting.
Home folder	default	

3

SETTING THE FOCAS2/Ethernet FUNCTIONS

This chapter describes the setting of parameters for the FOCAS2/Ethernet functions and CNC screen display functions.

> ⚠ **CAUTION**
> Before performing communication using the
> FOCAS2/Ethernet functions for the first time,
> consult with your network administrator, carefully
> set a network address and other items, and
> conduct communication tests thoroughly. Any error
> in settings such as a network address setting can
> lead to an adverse influence such as a
> communication failure on the entire network.
> In particular, IP address duplication causes an
> intermittent communication failure in the Data
> Server, which can result in a system error in the
> CNC. So, be very careful when making settings.

Note on using the FOCAS2/Ethernet functions

> **NOTE**
> With the FOCAS2/Ethernet functions, up to 20
> FOCAS2/Ethernet clients can be connected to one
> CNC.

Note on using the CNC screen display functions

> **NOTE**
> With the CNC screen display functions, up to 1
> CNC screen display function client can be
> connected to one CNC.

3.1   **OPERATING THE FOCAS2/Ethernet SETTING SCREEN**

This section describes the setting screen for operating the FOCAS2/Ethernet functions and CNC screen display functions.

Procedure

1   Press the function key .

2   Soft key [ETHBRD] appear. (When there is no soft keys, press the continue key.)

3   Press soft key [ETHBRD] to display the Ethernet Setting screen.

4   Press soft keys [COMMON] and [FOCAS2] and then enter parameters for the items that appear.

COMMON screen (BASIC)

Press soft key [COMMON] to display the COMMON screen (BASIC).

```
ETH_BRD SETTING                    O0000 N00000
         COMMON: Setting[BOARD]
 BASIC
  MAC ADDRESS                  00E0E4000001
  IP ADDRESS                   192. 168. 0. 100
  SUBNET MASK                  255. 255. 255. 0
  ROUTER IP ADDRESS            192. 168. 0. 253




                                        1／ 2
 A ) _


 MDI   **** *** ***        12:00:00
 ( COMMON  FOCAS2   DTSVR  RMTDIAG (OPRT)  +
```

COMMON screen (BASIC)

Setting item

Item	Description
IP ADDRESS	Specify the IP address of the FAST Ethernet/ FAST Data Server. (Example of specification format: "192.168.0.100")
SUBNET MASK	Specify a mask address for the IP addresses of the network. (Example of specification format: "255.255.255.0")
ROUTER IP ADDRESS	Specify the IP address of the router. Specify this item when the network contains a router. (Example of specification format: "192.168.0.253")

Display item

Item	Description
MAC ADDRESS	FAST Ethernet/ FAST Data Server MAC address

> **NOTE**
> The second page (detail screen) of the COMMON screen is to be set when the DNS/DHCP function is used. For details, see Appendix D, "DNS/DHCP FUNCTION."

FOCAS2 screen

Press soft key [FOCAS2] to display the FOCAS2 screen.

```
ETH_BRD SETTING                      O0000 N00000
        FOCAS2/Ethernet:Setting[BOARD]
 BASIC
  PORT NUMBER (TCP)                         8193
  PORT NUMBER (UDP)                            0
  TIME INTERVAL                                0




                                          1／ 1
 A)_

 MDI    ****  ***  ***       12:00:00
 (COMMON  FOCAS2   DTSVR   RMTDIAG  (OPRT)  +
```

FOCAS2 screen

Setting item

Item	Description
PORT NUMBER (TCP)	Specifies the port No. to be used by the FOCAS2/Ethernet functions and CNC screen display functions, within a range of 5001 to 65535.
PORT NUMBER (UDP)	Set 0 when using this item for the FOCAS2/Ethernet functions and CNC screen display functions. Set this port number to communicate with the FANUC CIMPLICITY i CELL.
TIME INTERVAL	Set 0 when using this item for the FOCAS2/Ethernet functions and CNC screen display functions. Set this time interval to communicate with the FANUC CIMPLICITY i CELL.

> **NOTE**
> 1 For connection with the FANUC CIMPLICITY i CELL, make the above setting according to "FANUC CIMPLICITY i CELL OPERATOR'S MANUAL (B-75074EN)."
> 2 The unit of TIME INTERVAL is 10 ms. The allowable input range is 10 to 65535. Values less than 100 ms cannot be set.
> 3 If a smaller value is set in TIME INTERVAL, the communication load can increase to adversely affect the performance of the network.
>   Example)If 100 is set, broadcast data is transmitted at intervals of 1 second [1000 ms] (=100×10).

3.2 **RELATED NC PARAMETERS**

0020	I/O CHANNEL : Input/output device selection

[Input type]   Setting input
[Data type]   Byte
[Valid data range] 6 :   Selects the FOCAS2/Ethernet as the input/output device. This
                         parameter is required only for DNC operation, however.

	#7	#6	#5	#4	#3	#2	#1	#0
0905								**DNE**

[Input type]   Setting input
[Data type]   Bit

 # 0   DNE   During DNC operation using the FOCAS2/Ethernet functions, the
                   termination of DNC operation is:
                   0:     Waited.
                   1:     Not waited.

0924	FOCAS2/Ethernet waiting time setting

[Input type]   Parameter input
[Data type]   Word
[Unit of data]   millisecond
[Valid data range] 0 to 32767
                   When the FOCAS2/Ethernet and Data Server functions are used
                   simultaneously, this parameter sets the FOCAS2/Ethernet function
                   waiting time in milliseconds.
                   When a value of 0 is set, the functions operate with assuming that 1
                   millisecond is specified.

3.3   **EXAMPLE OF SETTING THE FOCAS2/Ethernet FUNCTIONS**

An example of setting for operating the FOCAS2/Ethernet functions is given below. In this example of setting, one personal computer is connected to two CNCs through a FOCAS2/Ethernet.

	CNC 1	CNC 2
IP ADDRESS	192.168.0.100	192.168.0.101
SUBNET MASK	255.255.255.0	255.255.255.0
ROUTER IP ADDRESS	None	None
PORT NUMBER (TCP)	8193	8193
PORT NUMBER (UDP)	0	0
TIME INTERVAL	0	0

The common setting screen is used for setting.

The FOCAS2 setting screen is used for setting.

		PC 1
IP address		192.168.0.200
Sub-net mask		255.255.255.0
Default gateway		None
CNC 1	NC IP address	192.168.0.100
	NC TCP port number	8193
CNC 2	NC IP address	192.168.0.101
	NC TCP port number	8193

"Microsoft TCP/IP property" of the personal computer (Windows 2000/XP/Vista) is used for setting.

Specify these items with the arguments of the data window library function "cnc_allclibhnd13."

4

ERROR MESSAGES DISPLAYED
DURING PARAMETER SETTING

This chapter explains the error messages that are issued when FAST Ethernet/FAST Data Server parameters are set.

```
ETH_BRD SETTING                    O0000 N00000
          COMMON: Setting[BOARD]
 BASIC
  MAC ADDRESS                    00E0E4000001
  IP ADDRESS                     192. 168. 0. 100
  SUBNET MASK                    255. 255. 255. 0
  ROUTER IP ADDRESS              192. 168. 0. 253



                                           1/ 2

A)_
Format Error
MDI   ****  ***  ***       12:00:00
 ⟨           CHA-EXT                   INPUT  +
```

Messages	Meaning and action to be taken
Communication Software is not found	Check whether the communication software is installed.
Ethernet board is not found	Check whether the Ethernet board is installed.
Software Version Error	The communication software version is illegal. Check the software version.
DATA IS OUT OF RANGE	A numeric parameter value is beyond the range.
Wrong Character(s)	An illegal character is used in a character parameter.
Format Error	Input data such as an IP address has an illegal input format.
too many figures	A value input in a numeric parameter consists of too many digits.
Data was rejected	A parameter error is found. Confirm the setting conditions described in the relevant manual.
Reading from SRAM failed	SRAM may have been destroyed.
Writing into SRAM failed	Check whether the necessary options and other items are properly set.
DHCP is available	When the DHCP client function is enabled, the parameters cannot set from the setting screen. To set the parameters, disable the DHCP client function.
Error(xxxx)	Other errors. Check the parameter settings and contact FANUC.

5

BACKING UP OR RESTORING COMMUNICATION PARAMETERS

This chapter describes how to back up the FAST Ethernet/FAST Data Server communication parameters to a memory card, as well as how to restore the parameters from the memory card.

1. Press the function key [⬦ SYSTEM].

2. Press soft key [ETHBRD] to display soft key [COMMON].
3. After pressing soft keys [COMMON] - [(OPRT)], press soft key [+]. The soft keys for backing up and restoring the communication parameters - [BACKUP], [RESTORE], [ALLBACK], and [ALL RES] - are displayed as shown below.
4. Press one of the soft keys - [BACKUP], [RESTORE], [ALLBACK], and [ALL RES]. The soft keys [EXECUTE] and [CANCEL] are displayed.
5. Input the name of the file to be backed up or restored to the key-in buffer, and press soft key [EXECUTE]. The target operation is performed.
    While the operation is in progress, "EXECUTING" blinks.

```
ETH_BRD SETTING                    O0000 N00000
         COMMON: Setting[BOARD]
 BASIC
  MAC ADDRESS                 00E0E4000001
  IP ADDRESS                  192. 168. 0. 100
  SUBNET MASK                 255. 255. 255. 0
  ROUTER IP ADDRESS           192. 168. 0. 253




                                         1╱ 2

A)_

MDI   **** *** ***    12:00:00
<[BACKUP  RESTORE ALLBACK ALL RES            ]+
```

⇩   ⇩   ⇩   ⇩

```
<[EXECUTE CANCEL                             ]
```
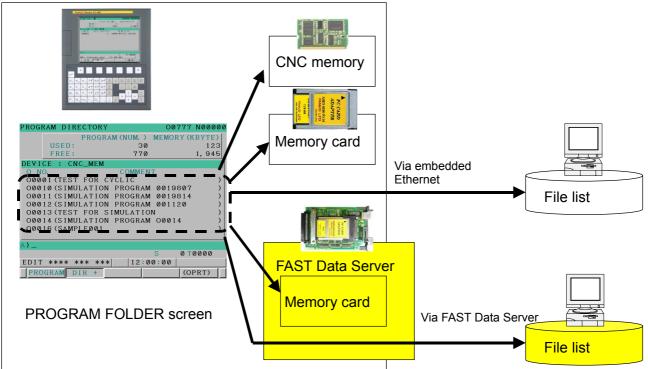
BACKUP

This saves the FAST Ethernet/FAST Data Server communication parameters, stored in the SRAM of the CNC, to a memory card.
If a file name is specified in the key-in buffer, the parameters are saved to the memory card using the specified file name. If no file name is specified, "ETHERBRD.MEM" is used.

RESTORE

This reads the FAST Ethernet/FAST Data Server communication parameters stored in a memory card and saves them to the SRAM of the CNC.
If a file name is specified in the key-in buffer, the file having the specified name is read from the memory card. If no file name is specified, "ETHERBRD.MEM" is used.

ALLBACK

This saves all the effective embedded Ethernet, FAST Ethernet/FAST Data Server, and PROFIBUS-DP master/slave communication parameters, stored in the SRAM of the CNC, to a memory card.
If a file name is specified in the key-in buffer, the parameters are saved to the memory card using the specified file name. If no file name is specified, "NETWORK.MEM" is used.

ALL RES

This reads all the effective embedded Ethernet, FAST Ethernet/FAST Data Server, and PROFIBUS-DP master/slave communication parameters, stored in a memory card, and saves them to the SRAM of the CNC.
Note that, if the communication function on the CNC side is disabled for an effective communication parameter, that parameter is not saved to the SRAM.
If a file name is specified in the key-in buffer, the file having the specified name is read from the memory card. If no file name is specified, "NETWORK.MEM" is used.

NOTE
1 The communication parameters can be backed up or restored only in the MDI mode or during an emergency stop,
2 Restoring the communication parameters causes an alarm that requests that the power be turned off.
3 For the communication parameter backup or restoration operation, a memory card is used, regardless of the external input/output device number (NC parameter No. 20).

IV. OPERATION

1

OPERATING THE DATA SERVER FUNCTIONS

This chapter describes how to operate the Data Server functions.

On the PROGRAM DIRECTORY screen, files on the CNC memory, memory card, host computer connected via the embedded Ethernet, memory card built into the FAST Data Server, or host computer connected via the FAST Data Server can be handled by selecting a device.

Series 0i-MODEL D

In this manual, the method of handling files on the memory card built into the FAST Data Server and on the host computer connected via the FAST Data Server is described.

1.1 **DEVICE CHANGE ON THE PROGRAM DIRECTORY SCREEN**

Procedure

1   Press the function key [PROG].

2   Press soft key [DIR +] to display the PROGRAM DIRECTORY screen. (When there is no soft keys, press the continue key.)

```
PROGRAM DIRECTORY                 O0777 N00000
              PROGRAM(NUM. )  MEMORY(KBYTE)
     USED:              30             123
     FREE:             770           1,945
DEVICE : CNC_MEM
 O NO.              COMMENT
 O0001(TEST FOR CYCLIC                      )
 O0010(SIMULATION PROGRAM 0019807           )
 O0011(SIMULATION PROGRAM 0019814           )
 O0012(SIMULATION PROGRAM 001120            )
 O0013(TEST FOR SIMULATION                  )
 O0014(SIMULATION PROGRAM O0014             )
 O0016(SAMPLE001                            )

A)_
                                 S      0 T0000
 EDIT  ****  ***  ***     12:00:00
  PROGRAM  DIR +                        (OPRT)
```

PROGRAM DIRECTORY screen

3   Press soft key [(OPRT)] then soft key [DEVICE] to display the soft keys for selectable devices.

```
( CNCMEM  MEMCARD M-CARD  EMB ETH
```

```
(  DTSVR  DS HOST                              +
```

4   Press soft key [DTSVR] to display the DATA SERVER FILE LIST screen, which lists the files stored in the built-in memory card of the FAST Data Server.
5   Press soft key [DS HOST] to display the DATA SERVER HOST FILE LIST screen, which lists the files stored in the host computer connected with the Data Server.

1.2   OPERATING THE DATA SERVER FILE LIST SCREEN

The DATA SERVER FILE LIST screen lets you operate the files stored in the built-in memory card of the Data Server.

```
DTSVR FILE LIST                    O0000 N00000
M198 FLD
DNC FILE
CON HOST   1  :
     USED        57,483[KBYTE]   USED FL        18
     FREE        64,744[KBYTE]   FREE FL     2,029
DEVICE : DATA_SV    ( / )
    NCDATA001          {FOLDER}                    △
    MACRO.TXT         2008/03/14  17:50:40
    O0001             2008/03/10  16:12:04
    O0003             2008/03/14  16:56:08
    O0006             2008/03/16  16:24:10
                                                  ▽
A)_
                                      S    0 T0000
EDIT **** *** ***  │  12:00:00
```

| ⟨ | BG-EDIT | SEARCH | | | MAIN P | | + |

| ⟨ | DEVICE | F INPUT | FOUTPUT | | | | + |

| ⟨ | DNC SET | M198SET | DELETE | RENAME | F CREAT | + |

| ⟨ | PUT | MPUT | LST-PUT | LST-DEL | | + |

| ⟨ | SELECT | COPY | MOVE | | REFRESH | + |

| ⟨ | | CHA-EXT | | | | + |

DATA SERVER FILE LIST screen (8.4-inch LCD)

```
DATA SERVER FILE LIST                    O0777 N00000

M198 OPE FOLDER
DNC OPE FILE

CONNECT HOST      1 :

                  USED SIZE    56,483[KBYTE]   USED FILES        18
                  FREE SIZE    64,744[KBYTE]   FREE FILES     2,029

DEVICE : DATA_SV    ( CURRENT FOLDER: / )
  NCDATA001                      <FOLDER>
  MACRO.TXT                    16[KBYTE]    2008/03/14 17:50:40
  00001                       196[KBYTE]    2008/03/10 16:12:04
  00003                        49[KBYTE]    2008/03/14 12:56:08
  00006                      1017[KBYTE]    2008/03/16 16:24:10
  00009                      2071[KBYTE]    2008/03/14 18:40:16
  00010                      9767[KBYTE]    2008/03/10 17:56:24
  00039                         2[KBYTE]    2008/03/18 16:56:12
  00040                     39063[KBYTE]    2008/03/17 08:08:58
  00198                         1[KBYTE]    2008/03/14 13:53:12
  02032                        10[KBYTE]    2008/03/12 15:43:50

                             A >_

                    EDIT **** *** ***      12:00:00

< BG     SEARCH       MAIN             DEVICE F      F                    +
  EDIT                PROGRM           CHANGE INPUT  OUTPUT


< DNC    M198   DELETE RENAME CREATE   PUT    MPUT   LIST-  LIST-         +
  SET    SET                 FOLDER                  PUT    DELETE


< SELECT COPY   MOVE          REFRES          CHARA                      +
  START                       H               EXT
```

DATA SERVER FILE LIST screen (10.4-inch LCD)

If the file list is longer than one page, you can scroll the screen by using page keys [⬆ PAGE] [PAGE ⬇].

Display item

M198 FLD (M198 OPE FOLDER)

Displays a folder (directory) for M198-based subprogram calling. This is effective when the Data Server is in the storage mode.

DNC FILE (DNC OPE FILE)

Displays a file name used when DNC operation is performed. This is effective when the Data Server is in the storage mode.

CON HOST (CONNECT HOST)

Displays the work folder and the number of the host currently connected.

USED / FREE (USED SIZE / FREE SIZE)

Displays the size used of the memory card built into the FAST Data Server and the size that is free.

USED FL / FREE FL (USED FILES / FREE FILES)

Displays the total number of folders (files) in use of the Data Server and the number of remaining free folders (files).

DEVICE

Displays the current device. If the memory card built into the FAST Data Server is selected, "DATA_SV" is indicated.

CURRENT FOLDER

Displays the current work folder in the built-in memory card of the FAST Data Server.

File list

Displays information about the files and folders in the current work folder.

> **NOTE**
> Character strings within parentheses are those that are displayed when the display unit of 10.4" is used.

Operation list

DIR +

Switches the file list information to overall display or detail display.

SEARCH

Searches for a file in the current work folder.

MAIN P (MAIN PROGRM)

Selects a file as a main program.

DEVICE (DEVICE CHANGE)

Enables a device for display on the PROGRAM DIRECTORY screen.
When selecting the memory card built into the FAST Data Server,
press soft key [DTSVR].

F INPUT

Inputs a program in the Data Server memory card to the CNC memory.
This can be performed only when the Data Server is in the storage
mode, the EDIT mode is on, and "5" is set in NC parameter No. 20.

FOUTPUT (F OUTPUT)

Outputs a program in the CNC memory to the Data Server memory
card.
This can be performed only when the Data Server is in the storage
mode, the EDIT mode is on, and "5" is set in NC parameter No. 20.

DNC SET

Specifies the file for which to perform DNC operation when the Data
Server is in the storage mode.

M198SET (M198 SET)

Specifies the folder for which to perform M198 subprogram calling
when the Data Server is in the storage mode.

DELETE

Deletes a file or folder.

RENAME

Renames a file or folder.

F CREAT (CREATE FOLDER)

Creates a sub-folder under the current work folder.

PUT

Transfers a file from the Data Server to the host computer.

MPUT

Transfers multiple files from the Data Server to the host computer.

LST-PUT (LIST-PUT)

Transfers multiple files from the Data Server to the host computer according to a list file.

LST-DEL (LIST-DELETE)

Deletes multiple files from the Data Server according to a list file.

SELECT (SELECT START)

Selects multiple files.

COPY

Copies a file within the Data Server.

MOVE

Moves a file to another folder in the Data Server.

REFRESH

Updates the display information of the PROGRAM DIRECTORY screen.

NOTE
1 The operations of soft keys [F CREAT], [DELETE], [RENAME], [COPY], and [LST-DEL] are the target operations of the memory protection key.
   This means that when the memory protection key is enabled, these operations result in a "WRITE PROTECT" error and cannot be performed.
   For information about the memory protection key, refer to the CONNECTION MANUAL (FUNCTION) (B-64303EN-1) of the CNC.
2 Character strings within parentheses are those that are displayed when the display unit of 10.4" is used.

Status display

Performing any of the operations listed below displays the status at the
lower right part of the screen during the operation.

```
EDIT  ****  ***  ***       12:00:00  OUTPUT
( F  NAME    O  SET              CANCEL    EXEC     +
```

Operation	Status
F INPUT	INPUT
F OUTPUT	OUTPUT
COPY MOVE	EDIT
SEARCH	SEARCH
PUT MPUT LST-PUT（LIST-PUT）	PUT

1.2.1   Displaying and Operating the File List

DETAIL OFF, DETAIL ON

The content of the displayed file list can be changed.
Each time you press soft key [DIR +], the list changes from DETAIL OFF to DETAIL ON or vice versa.
In the DETAIL OFF mode, file names and creation dates are displayed while, in the DETAIL ON mode, other file information such as comments and file attributes are also displayed.

> **NOTE**
> 1 For a file selected as a main program and a file being used for memory operation, no comment is displayed in detail display mode.
> 2 In the DETAIL ON mode, the comment immediately after the file name is displayed. If no comment is found, the data is displayed beginning from the top of the file.
> 3 The file attribute of a binary file is displayed as "R/B" to the right of the comment.

REFRESH

The content of the displayed file list can be refreshed.
Pressing soft key [REFRESH] refreshes the content of the displayed file list.

MOVE FOLDER

A work folder can be moved.

1   By using cursor keys [↑] [↓], select a folder to be moved.

2   Press the MDI key [INPUT].

- 75 -

CREATE FOLDER

A new folder can be created.

1   Move to the folder to create a new folder.
2   Key in a folder name.
3   Press soft key [F CREAT] ([CREATE FOLDER]).

NOTE
1   Up to six levels of folders can be created.
2   No duplicate folder name is allowed within the
    same folder.
3   Each time a folder is created, the number of
    programs that can be registered decreases by one.
4   No folder may be able to be created, depending on
    the status such as operation state or protection
    state.

DELETE FILE/FOLDER

A file or folder can be deleted.

1   By using cursor keys [↑] [↓] , select a file or folder to be
    deleted.
2   Press soft key [DELETE].
    -   Press soft key [EXEC] for execution.
    -   Press soft key [CANCEL] for cancellation.

NOTE
1   The initial folder cannot be deleted.
2   A folder can be deleted only when the folder is
    empty.
    (An empty folder means a folder that does not
    contain any folder and file.)
3   If a folder contains a folder or file that has the
    edit/display prohibition attribute set, the folder
    appears to be empty but is not actually empty. So,
    the folder cannot be deleted.
4   Files or folders may not be able to be deleted,
    depending on the status such as operation state or
    protection state.

DELETE (multiple files)

Multiple files can be deleted at a time.

1   Press soft key [SELECT] ([SELECT START]).
2   By using cursor keys [↑] [↓] , select a file to be deleted.
3   Press soft key [SELECT].
     A selected file is displayed in reverse video.
     Repeat steps 2 and 3 for files to be deleted.
4   Press soft key [DELETE].
     •   Press soft key [EXEC] for execution.
     •   Press soft key [CANCEL] for cancellation.

> **NOTE**
> 1 If a folder contains a file that has the edit/display
>   prohibition attribute set, the folder appears to be
>   empty but is not actually empty. So, the folder
>   cannot be deleted.
> 2 Up to 10 files can be selected at a time.
> 3 It is only files that can be specified in plural.
>   Specifying more than one folder at a time is not
>   allowed.
> 4 Files may not be able to be deleted, depending on
>   the status such as operation state or protection
>   state.

DELETE (specified range)

A specified range of files that have program numbers can be deleted.

1   Enter "Oxxxx, Oyyyy".
     In xxxx, enter the smallest of the program numbers to be deleted.
     In yyyy, enter the largest of the program numbers to be deleted.
3   Press soft key [DELETE].
     •   Press soft key [EXEC] for execution.
     •   Press soft key [CANCEL] for cancellation.

> **NOTE**
> 1 A deletion range can be specified only for files
>   having program numbers. Files having arbitrary file
>   names cannot be deleted with this method.
> 2 Files may not be able to be deleted, depending on
>   the status such as operation state or protection
>   state.

RENAME

A file or folder can be renamed.

1   By using cursor keys [↑] [↓], select a file or folder to be renamed.
2   Key a new file name or folder name.
3   Press soft key [RENAME].

NOTE
1 The initial folder cannot be renamed.
2 No duplicate folder name or file name is allowed within the same folder.
3 Files and folders may not be able to be renamed, depending on the status such as operation state or protection state.

COPY (within a folder)

In the Data Server, a file can be copied within the same folder.

1   Set the CNC to the EDIT mode.
2   By using cursor keys [↑] [↓], select a copy source file.
3   Key the name of a copy destination file.
4   Press soft key [COPY].

NOTE
1 Copy operation is impossible if the same file is specified as a copy source file and copy destination file.
2 Files may not be able to be copied, depending on the status such as operation state or protection state.

COPY (multiple files)

More than one file can be copied to another folder in the Data Server.

1   Set the CNC to the EDIT mode.
2   Press soft key [SELECT] ([SELECT START]).
3   By using cursor keys [↑] [↓], select a copy source file.
4   Press soft key [SELECT].
     A selected file is displayed in reverse video.
     Repeat steps 3 and 4 for files to be copied.
5   Press soft key [SEL END] ([SELECT END]).
6   Move to a copy destination folder.
7   Press soft key [COPY].

NOTE
1 Copy operation is impossible if the same folder is
   specified as a copy source folder and copy
   destination folder.
2 Up to 10 files can be selected at a time.
3 Files retain their original file names when they are
   copied to the copy destination folder. If any
   identical file name exists in the copy destination
   folder, an error occurs.
4 Files may not be able to be copied, depending on
   the status such as operation state or protection
   state.

MOVE

A file can be moved to another folder in the Data Server.

1 Set the CNC to the EDIT mode.
2 Press soft key [SELECT] ([SELECT START]).
3 By using cursor keys ⬆ ⬇ , select a copy source file.
4 Press soft key [SELECT].
  A selected file is displayed in reverse video.
5 Press soft key [SEL END] ([SELECT END]).
6 Move to a move destination folder.
7 To change the file name, key in a new file name.
  When no file name is keyed in, the original file name is used.
8 Press soft key [MOVE].

> **NOTE**
> 1 Move operation is impossible if the same folder is
> specified as a move source folder and move
> destination folder.
> 2 Files may not be able to be copied, depending on
> the status such as operation state or protection
> state.

MOVE (multiple files)

More than one file can be moved to another folder in the Data Server.

1 Set the CNC to the EDIT mode.
2 Press soft key [SELECT] ([SELECT START]).
3 By using cursor keys [↑] [↓], select a copy source file.
4 Press soft key [SELECT].
   A selected file is displayed in reverse video.
   Repeat steps 3 and 4 for files to be copied.
5 Press soft key [SEL END] ([SELECT END]).
6 Move to a move destination folder.
7 Press soft key [MOVE].

NOTE
1 Move operation is impossible if the same folder is specified as a move source folder and move destination folder.
2 Up to 10 files can be selected at a time.
3 Files retain their original file names when they are moved to the move destination folder. If any identical file name exists in the move destination folder, an error occurs.
4 Files may not be able to be copied, depending on the status such as operation state or protection state.

SEARCH

The current work folder can be searched for a file or folder. The file or folder found is displayed at the top of the file list.

1 Key in the name of the file or folder to find.
2 Press soft key [SEARCH].

LIST-DELETE

By using a list file, multiple files in the Data Server can be deleted.

1   By using cursor keys $\boxed{\uparrow}$ $\boxed{\downarrow}$, select a list file.

2   Press soft key [LST-DEL] ([LIST-DELETE]).
     •   Press soft key [EXEC] for execution.
     •   Press soft key [CANCEL] for cancellation.

When execution is selected, the files in the Data Server are deleted according to the list file.

> **NOTE**
> Files cannot sometimes be deleted depending on
> the operation status and protection status.

1.2.2   **File Transfer Operation**

Files can be transferred from the Data Server to the host computer.

> **NOTE**
> If an error occurs, check the cause of the error according to the Item, "ETHERNET LOG screen" in Section 2.1, "Ethernet LOG" in Part VI, "MAINTENANCE."

PUT

A file can be transferred from the Data Server to the host computer.

1   By using cursor keys [↑] [↓], select a file to be transferred.
2   Press soft key [PUT].
3   When a file is to be transferred to the host computer under a different file name, enter the desired transfer destination file name before pressing soft key [PUT].

PUT (multiple files)

Multiple files can be transferred from the Data Server to the host computer.

1   Press soft key [SELECT] ([SELECT START]).
2   By using cursor keys [↑] [↓], select a file to be transferred.
3   Press soft key [SELECT].
     A selected file is displayed in reverse video.
     Repeat steps 2 and 3 for files to be copied.
4   Press soft key [SEL END] ([SELECT END]).
5   Press soft key [PUT].

> **NOTE**
> 1   Files cannot be transferred with their names changed.
> 2   Up to 10 files can be selected at a time.

MPUT

Multiple files can be transferred from the Data Server to the host computer.

1   Key in the names of the files to transfer. File names can be specified using wildcards (*, ?).
    "?" represents any single character, and "*" any combination of characters.
2   Press soft key [MPUT].

> **NOTE**
> If "*" is specified, any characters specified after it are ignored.
> For example, "ABC∗DEF" is considered to be equivalent to "ABC∗".

LIST-PUT

Multiple files can be transferred from the Data Server to the host computer according to a list file.

1   By using cursor keys ⬆ ⬇, select a list file.
2   Press soft key [LST-PUT] ([LIST-PUT]).

1.2.3   Preparations for File Operation and Editing

MAIN PROGRM

A selected file can be registered as a main program.

1   Select the EDIT mode or MEM mode.
2   By using cursor keys   ⬆   ⬇   , select a file to be registered as
       a main program.
3   Press soft key [MAIN P] ([MAIN PROGRM]).

A registered main program can be executed in memory operation or
edited.

> **NOTE**
> 1   Only a text file can be selected as a main program.
> 2   When memory operation is performed using a
>   program in the Data Server memory card as the
>   main program, a subprogram in the same folder as
>   the main program can be called by the M98
>   subprogram call.
> 3   For a file selected as a main program and a file
>   being used for memory operation, no comment is
>   displayed in detail display mode.
> 4   For a file selected as a main program, other file
>   operations are disabled.
> 5   For memory operation and editing, refer to the
>   USER'S MANUAL of the CNC.
> 6   No file may be able to be selected, depending on
>   the status such as operation state or protection
>   state.

M198 SET

A folder for M198-based subprogram calling can be specified.

1   Move to the folder containing a file to be called by M198-based
    subprogram calling.
2   Press soft key [M198SET] ([M198 SET]).
3   The specified folder is displayed in "M198 FOLDER" ("M198
    OPE FOLDER").

NOTE
1   This setting is valid when the operating mode of the
    Data Server is the storage mode.
2   This setting is saved in nonvolatile memory. Even if
    the power is turned off and then back on, the last
    saved setting remains.
3   No file may be able to be selected, depending on
    the status such as operation state or protection
    state.

DNC SET

A file used for DNC operation can be selected.

1   Move to the folder containing a file to be used for DNC
    operation.
2   By using cursor keys [↑] [↓], select a file to be used for
    DNC operation.
3   Press soft key [DNC SET].
4   The specified file is displayed in "DNC FILE" ("DNC OPE
    FILE").

NOTE
1   This setting is valid when the operating mode of the
    Data Server is the storage mode.
2   This setting is deleted when the power is turned off.
3   No file may be able to be selected, depending on
    the status such as operation state or protection
    state.

1.3 OPERATING THE DATA SERVER HOST FILE LIST SCREEN

Host computer files can be operated on the DATA SERVER HOST FILE LIST screen.

```
DTSV HST FILE LIST              O0777 N00000
M198 FLD
DNC FILE
DTSV FLD │/
CON HOST │1 : HOST1      │REG NUM        36
DEVICE : DTSVR_HOST( / )
  O0006                                    △
  O0010
  O0011
  O0040
  O0044
  O0050                                    ▽
A)_
                              S    0 T0000
EDIT **** *** ***│ │12:00:00│
                   │SEARCH│

│(│DEVICE│F INPUT│FOUTPUT│          │+│

│(│DNC SET│M198SET│DELETE│RENAME│F CREAT│+│

│(│ GET │ MGET │LST-GET│        │ BGET │+│

│(│SELECT│      │      │        │REFRESH│+│

│(│     │CHA-EXT│ HOST │        │      │+│
```

DATA SERVER HOST FILE LIST screen (8.4-inch LCD)

```
DATA SERVER HOST FILE LIST                        O0777 N00000

M198 OPE FOLDER  [                                          ]
DNC OPE FILE     [                                          ]

DTSVR FOLDER     [ /                                        ]

CONNECT HOST     [ 1 : HOST1       ]          REGISTERED PROGRAM [     36 ]

DEVICE : DTSVR_HOST ( CURRENT FOLDER: / )
  O0006                                                              △
  O0010
  O0011
  O0040
  O0044
  O0050
  O0111
  O0123
  O1234
  O2032
  O7040
  O7041                                                              ▽

                                      A>_

                            EDIT **** *** ***       12:00:00


 <         SEARCH                          DEVICE  F       F                     +
                                          CHANGE  INPUT   OUTPUT
```

```
 <   DNC    M198   DELETE RENAME CREATE    GET    MGET   LIST-           BGET    +
     SET    SET                  FOLDER                  GET
```

```
 <   SELECT                REFRES          CHARA  HOST                           +
     START                 H               EXT    CHANGE
```

DATA SERVER HOST FILE LIST screen (10.4-inch LCD)

NOTE
    A file name including characters other than ASCII
    characters is not displayed correctly.

Display item

M198 FLD (M198 OPE FOLDER)

Displays a folder (directory) for M198-based subprogram calling. This is effective when the Data Server is in the FTP mode.

DNC FILE (DNC OPE FILE)

Displays a file name used when DNC operation is performed. This is effective when the Data Server is in the FTP mode.

DTSV FLD (DTSVR FOLDER)

Displays the work folder (directory) of the Data Server (memory card).

CON HOST (CONNECT HOST)

Displays the number of the host computer currently connected.

REG NUM (REGISTERED PROGRAM)

Displays the number of files stored in the host computer currently connected.

DEVICE

Displays the current device. If the host file list of the Data Server is selected, "DTSVR_HOST" is indicated.

CURRENT FOLDER

Displays the work folder in the current host computer.

File list

Displays information about the files and folders in the host computer.

> **NOTE**
> Character strings within parentheses are those that are displayed when the display unit of 10.4" is used.

Operation list

DEVICE (DEVICE CHANGE)

Enables a device for display on the PROGRAM DIRECTORY screen. When selecting the host file list of the Data Server, press soft key [DSVHST].

DNC SET

Specifies the file for which to perform DNC operation when the Data Server is in the FTP mode.

M198 SET

Specifies the folder for which to perform M198 subprogram calling when the Data Server is in the FTP mode.

DIR +

Switches the file list information to overall display or detail display.

F CREAT (CREATE FOLDER)

Creates a sub-folder under the current work folder in the host computer.

DELETE

Deletes a file or folder in the host computer.

RENAME

Renames a file or folder in the host computer.

HOST (HOST CHANGE)

Changes the connected host computer.

SEARCH

Searches for a file in the current folder in the host computer..

GET

Transfers a file from the host computer to the Data Server.

MGET

Transfers files from the host computer to the Data Server by specifying a file name with wildcards (*, ?).

BGET

Transfers a file from the host computer to the Data Server in binary format. Use this soft key to transfer a binary-format NC program or data other than an NC program such as NC parameter or tool data.

LST-GET (LIST-GET)

Transfers multiple files from the host computer to the Data Server according to a list file.

REFRESH

Updates the information displayed on the DATA SERVER HOST
FILE LIST screen.

F INPUT

Inputs a program stored in the host computer to the CNC memory.
This can be performed only when the Data Server is in the FTP mode,
the EDIT mode is on, and "5" is set in NC parameter No. 20.

FOUTPUT (F OUTPUT)

Outputs a program stored in the CNC memory to the host computer.
This can be performed only when the Data Server is in the FTP mode,
the EDIT mode is on, and "5" is set in NC parameter No. 20.

NOTE
1 The operations of soft keys [GET], [MGET],
   [BGET], and [LIST-GET] are the target operations
   of the memory protection key.
   This means that when the memory protection key
   is enabled, these operations result in a "WRITE
   PROTECT" error and cannot be performed.
   For information about the memory protection key,
   refer to the CONNECTION MANUAL (FUNCTION)
   (B-64303EN-1) of the CNC.
2 Character strings within parentheses are those that
   are displayed when the display unit of 10.4" is
   used.

Status display

Performing any of the operations listed below displays the status at the
lower right part of the screen during the operation.

```
EDIT **** *** ***        12:00:00  OUTPUT
( F NAME   O SET              CANCEL  EXEC    +
```

Operation	Status
F INPUT	INPUT
F OUTPUT	OUTPUT
SEARCH	SEARCH
GET	GET
BGET	
MGET	
LST-GET（LIST-GET）	

1.3.1   **Displaying and Operating the File List**

DETAIL OFF, DETAIL ON

The content of the displayed file list can be changed.
Each time you press soft key [DIR +], the list changes from DETAIL OFF to DETAIL ON or vice versa.
In the DETAIL OFF mode, only file names are displayed while, in the DETAIL ON mode, other file information such as file sizes and creation dates are also displayed.

> **NOTE**
> 1   The information displayed with soft key [DETAIL ON] depends on the setting of the FTP server on the host computer.
> 2   When a file operation is performed in the DETAIL ON mode, the information displayed at the right end of the screen is used as the file name. Therefore, the operation may not be performed properly, depending on the displayed content or file name. In that case, switch to the DETAIL OFF mode and perform the operation.

REFRESH

The content of the displayed file list can be refreshed.
Pressing soft key [REFRESH] refreshes the content of the displayed file list.

MOVE FOLDER

A current folder can be moved.

1   By using cursor keys $\boxed{\uparrow}$ $\boxed{\downarrow}$, select a folder to be moved.

2   Press the MDI key $\boxed{\text{INPUT}}$.

CREATE FOLDER

A new folder can be created.

1   Move to the folder to create a new folder.
2   Key in a folder name.
3   Press soft key [F CREAT] ([CREATE FOLDER]).

DELETE FILE/FOLDER

A file or folder can be deleted.

1 By using cursor keys ⬆ ⬇ , select a file or folder to be deleted.
2 Press soft key [DELETE].
   • Press soft key [EXEC] for execution.
   • Press soft key [CANCEL] for cancellation.

DELETE (multiple files)

Multiple files can be deleted at a time.

1 Press soft key [SELECT] ([SELECT START]).
2 By using cursor keys ⬆ ⬇ , select a file to be deleted.
3 Press soft key [SELECT].
   A selected file is displayed in reverse video.
   Repeat steps 2 and 3 for files to be deleted.
4 Press soft key [DELETE].
   • Press soft key [EXEC] for execution.
   • Press soft key [CANCEL] for cancellation.

> **NOTE**
> Up to 10 files can be selected at a time.

RENAME

A file or folder can be renamed.

1 By using cursor keys ⬆ ⬇ , select a file or folder to be renamed.
2 Key a new file name or folder name.
3 Press soft key [RENAME].

SEARCH

In the current work folder, a file or folder can be found. The file or folder found is displayed at the top of the file list.

1 Enter a desired file name.
2 Press soft key [SEARCH],

HOST CHANGE

The connected host computer can be changed.

1   Press soft key [HOST] ([HOST CHANGE]).
     The connected host number changes in the order $1 \rightarrow 2 \rightarrow 3 \rightarrow$
     1.

1.3.2   **File Transfer Operation**

Files can be transferred from the host computer to the Data Server.

> **NOTE**
> If an error occurs, check the cause of the error
> according to the Item, "ETHERNET LOG screen" in
> Section 2.1, "Ethernet LOG" in Part VI,
> "MAINTENANCE."

GET

A file can be transferred from the host computer to the Data Server.

1   By using cursor keys ⬆ ⬇ , select a file to be transferred.
2   Press soft key [GET].
   •   Press soft key [EXEC] for execution.
   •   Press soft key [CANCEL] for cancellation.
3   When a file is to be transferred to the Data Server under a
     different file name, enter the desired transfer destination file
     name before pressing soft key [GET].

> **NOTE**
> 1   Use this operation only for text format NC
>   programs.
> 2   Files cannot sometimes be transferred depending
>   on the operation status and protection status.

GET (multiple files)

Multiple files can be transferred from the host computer to the Data
Server.

1   Press soft key [SELECT] ([SELECT START]).
2   By using cursor keys ⬆ ⬇ , select a file to be transferred.
3   Press soft key [SELECT].
     A selected file is displayed in reverse video.
     Repeat steps 2 and 3 for files to be copied.
4   Press soft key [SEL END] ([SELECT END]).
5   Press soft key [GET].

> **NOTE**
> 1   Use this operation only for text format NC
>   programs.
> 2   Up to 10 files can be selected at a time.
> 3   Files cannot sometimes be transferred depending
>   on the operation status and protection status.

MGET

Multiple files can be transferred from the host computer to the Data Server.

1   Key in the names of the files to transfer. File names can be specified using wildcards (* and ?).
    "?" represents any single character, and "*" any combination of characters.
2   Press soft key [MGET].

> **NOTE**
> 1   Use this operation only for text format NC programs.
> 2   If "*" is specified, any characters specified after it are ignored.
>   For example, "ABC * DEF" is considered to be equivalent to "ABC * ".
> 3   Files cannot sometimes be transferred depending on the operation status and protection status.

BGET

A file can be transferred from the host computer to the Data Server.

1   By using cursor keys [↑] [↓], select a file to be transferred.
2   Press soft key [BGET].
3   When a file is to be transferred to the Data Server under a different file name, enter the desired transfer destination file name before pressing soft key [BGET].

> **NOTE**
> 1   When transferring binary format NC programs and NC data such as tool offset data, be sure to use the binary format.
> 2   An NC program transferred in binary format cannot be selected as the main program. Nor is it possible to perform memory operation.
> 3   Files cannot sometimes be transferred depending on the operation status and protection status.

BGET (multiple files)

Multiple files can be transferred from the host computer to the Data Server.

1   Press soft key [SELECT] ([SELECT START]).
2   By using cursor keys [↑] [↓], select a file to be transferred.
3   Press soft key [SELECT].
     A selected file is displayed in reverse video.
     Repeat steps 2 and 3 for files to be copied.
4   Press soft key [SEL END] ([SELECT END]).
5   Press soft key [BGET].

NOTE
1   When transferring binary format NC programs and NC data such as tool offset data, be sure to use the binary format.
2   An NC program transferred in binary format cannot be selected as the main program. Nor is it possible to perform memory operation.
3   Up to 10 files can be selected at a time.
4   Files cannot sometimes be transferred depending on the operation status and protection status.

LIST-GET

Multiple files can be transferred from the host computer to the Data Server according to a list file.

1   By using cursor keys [↑] [↓], select a list file.
2   Press soft key [LST-GET] ([LIST-GET]).

NOTE
1   Use this operation only for text format NC programs.
2   Files cannot sometimes be transferred depending on the operation status and protection status.

1.3.3   **Preparations for File Operation**

M198 SET

A folder for M198-based subprogram calling can be specified.

1   Move to the folder containing a file to be called by M198-based
     subprogram calling.
2   Press soft key [M198 SET].
3   The specified folder is displayed in "M198 FLD" ("M198 OPE
     FOLDER").

> **NOTE**
> 1 This setting is valid when the operating mode of the
>   Data Server is the FTP mode.
> 2 This setting is saved in nonvolatile memory. Even if
>   the power is turned off and then back on, the last
>   saved setting remains.
> 3 No file may be able to be selected, depending on
>   the status such as operation state or protection
>   state.

DNC SET

A file used for DNC operation can be selected.

1   Move to the folder containing a file to be used for DNC
     operation.
2   By using cursor keys [↓] [↑] , select a file to be used for
     DNC operation.
3   Press soft key [DNC SET].
4   The specified file is displayed in "DNC FILE" ("DNC OPE
     FILE").

> **NOTE**
> 1 This setting is valid when the operating mode of the
>   Data Server is the FTP mode.
> 2 This setting is deleted when the power is turned off.
> 3 No file may be able to be selected, depending on
>   the status such as operation state or protection
>   state.

1.4 M198-BASED SUBPROGRAM CALL

When the Data Server mode is the storage mode, an M198-based subprogram call can be made using an NC program in the Data Server. When the Data Server mode is the FTP mode, an M198-based subprogram call can be made using an NC program in the host computer.

> **NOTE**
> 1 An M198-based subprogram call cannot be executed simultaneously with NC program input, NC program output, and DNC operation.
> 2 In an M198-based subprogram call, no additional M198-baesd subprogram call can be made.

Subprogram call in the storage mode

Procedure

1 Check that the Data Server mode is the storage mode.
2 Check that "5" is set in input/output device parameter No. 20.
3 Set the CNC to the MEM mode.
4 Display the DATA SERVER FILE LIST screen to check that an M198 operation folder is set.
5 Automatically operate the NC program including the M198 command.

Subprogram call in the FTP mode

Procedure

1 Check that the Data Server mode is the FTP mode.
2 Check that "5" is set in input/output device parameter No. 20.
3 Set the CNC to the MEM mode.
4 Display the DATA SERVER HOST FILE LIST screen to check that an M198 operation folder is set.
5 Automatically operate the NC program including the M198 command.

1.5   DNC OPERATION

When the Data Server mode is the storage mode, DNC operation can be performed using an NC program in the Data Server.
When the Data Server mode is the FTP mode, DNC operation can be performed using an NC program in the host computer.

> **NOTE**
>   A DNC operation cannot be executed
>   simultaneously with NC program input, NC
>   program output, and M198-based subprogram call.

DNC operation in the storage mode

Procedure

1   Check that the Data Server mode is the storage mode.
2   Check that "5" is set in input/output device parameter No. 20.
3   Set the CNC to the RMT mode.
4   Display the DATA SERVER FILE LIST screen to check that a DNC operation file is set.
5   Perform a cycle start to execute DNC operation.

DNC operation in the FTP mode

Procedure

1   Check that the Data Server mode is the FTP mode.
2   Check that "5" is set in input/output device parameter No. 20.
3   Set the CNC to the RMT mode.
4   Display the DATA SERVER HOST FILE LIST screen to check that a DNC operation file is set.
5   Perform a cycle start to execute DNC operation.

1.6 NC PROGRAM INPUT

When the Data Server mode is the storage mode, programs on the Data Server can be input to CNC memory.
When the Data Server mode is the FTP mode, programs on the host computer can be input to CNC memory.

> ⚠ **CAUTION**
> If bit 2 (REP) of NC parameter No. 3201 is set to 1, when an NC program having the same file name as an NC program to be input is already present in CNC memory, the existing NC program is overwritten.

> **NOTE**
> 1   When inputting a text file assigned an arbitrary file name other than a program number to the CNC memory, be sure to specify a program number.
> 2   NC programs cannot be input simultaneously with an NC program output, M198-based subprogram call, and DNC operation.

Procedure

1   Set the CNC to the EDIT mode.
2   Press soft key [F INPUT].

```
A》_
F  NAME=                  O  NO. =
EDIT **** *** ***        12:00:00
《 F  NAME   O  SET           CANCEL   EXEC   +
```

3   Select a program on the Data Server or host computer. Place the cursor on the name of the file to be input and press soft key [F GET], or key in the name of the file to be input.
4   Press soft key [F NAME].
5   To input the file with a different file name, key in the program number and press soft key [O SET].
6   Press soft key [EXEC].
7   During transferring, "INPUT" blinks in the lower right part of the screen.

The following table summarizes what happens if the input file name [F NAME] and input program number [O SET] are omitted.

[FNAME]	[OSET]	Key input buffer	Input file name	Input program	Input program number
Not specified	Not specified	Not specified	Warning "NO PROGRAM SELECTED" is displayed, and nothing is input.		
		Other than Oxxxx	Warning "THE WRONG DATA IS USED" is displayed, and nothing is input.		
		Oxxxx	File name specified in the key input buffer (Note)	All programs in the input file	Sequential number beginning with the program number specified in the key input buffer (xxxx)
	-9999	Not affected	Warning "NO PROGRAM SELECTED" is displayed, and nothing is input.		
	Specified		Same file name as the program number set in [O SET] (Note)	All programs in the input file	Sequential number beginning with the program number set in [O SET]
Specified	Not specified	Not affected	File name set with [F NAME]	All programs in the file specified in [F NAME]	Program number used when saving
	-9999		Warning "THE WRONG DATA IS USED" is displayed, and nothing is input.		
	Specified		File name set with [F NAME]	All programs in the file specified in [F NAME]	Sequential number beginning with the program number set in [O SET]

> **NOTE**
> An input file name consists of the letter "O" followed by a four-digit number.
> For example, when a program is input with program number 1 specified, the file is input with the file name "O0001".
> When the operation is performed for the second path, the extension "P-2" is appended to the file name. In the example stated above, the file name is "O0001.P-2".

1.7   NC PROGRAM OUTPUT

When the Data Server mode is the storage mode, programs in CNC
memory can be output to the Data Server.
When the Data Server mode is the FTP mode, programs in CNC
memory can be output to the host computer.

NOTE
1   If a program has been output with an arbitrary file
    name, instead of a program number, it is
    necessary to specify the program number when
    inputting the file to the CNC memory again.
2   NC programs cannot be output simultaneously with
    an NC program input, M198-based subprogram
    call, and DNC operation.

Procedure

1   Set the CNC to the EDIT mode.
2   Press soft key [F OUTPUT].

```
A ) _
F  NAME =              O  NO. =
EDIT  ****  ***  ***  |  12:00:00  |
( F  NAME  O  SET            CANCEL  EXEC   +
```

3   Select a program on the CNC.
    Key in the number of the program to be output.
4   Press soft key [O SET].
5   To output the program with a different program name, key in the
    file name and press soft key [F NAME].
6   Press soft key [EXEC].
7   During transferring, "OUTPUT" blinks in the lower right part of
    the screen.

The following table summarizes what happens if the output file name [F NAME] and output program number [O SET] are omitted.

[FNAME]	[OSET]	Key input buffer	Output file name	Output program
Not specified	Not specified	Not specified	Currently selected main program name (Note 1, 2)	Currently selected main program (Note 1)
		Other than Oxxxx	Warning "THE WRONG DATA IS USED" is displayed, and nothing is input.	
		Oxxxx	Program name set in the key input buffer (Note 2)	Program in the CNC memory set in the key input buffer
		O-9999	ALL-PROG.TXT (Note 3)	All programs in the CNC memory
	-9999	Not affected		
	Specified		Same file name as the program number set in [O SET] (Note)	Program in the CNC memory set in [O SET]
Not specified	Not specified	Not affected	File name set with [F NAME]	Currently selected main program (Note 1)
	-9999			All programs in the CNC memory
	Specified			Program in the CNC memory set in [O SET]

NOTE
1   During background editing, the file being edited in the background is output.
2   An output file name consists of the letter "O" followed by a four-digit number.
    For example, when a program is output with program number 1 specified, it is output to the host computer with the file name "O0001".
    When the operation is performed for the second path, the extension "P-2" is appended to the file name. In the example stated above, the file name is "O0001.P-2".
3   When the operation is performed for the second path, the file name is "ALL-PROG.P-2".
4   When the Data Server is in the storage mode, "NC program output" causes an error if the Data Server memory card contains any file having the same name.

1.8   **FTP SERVER FUNCTIONS**

The FTP server functions allow communication with FTP clients on the host computer.

> **NOTE**
> 1 Up to five FTP clients can be connected to the FTP server. Some FTP client software products may attempt to internally connect the FTP server as two or more FTP clients, however. For this reason, the number of FTP clients actually connected may differ from that of FTP client applications that can be connected.
> 2 On the memory card on the Data Server, text files and binary files are distinguished from each other. You can specify text (ASCII) or binary (image) when transferring a file from the FTP client to use the file as a text or binary file.
> By using NC parameter No. 929, it is possible to determine whether to use text or binary files alone, regardless of the specification from the FTP client.
> 3 On the memory card on the Data Server, files are managed in units of 500 bytes. Therefore, when viewed from the FTP client, the file sizes in the Data Server appear to be in 500-byte units.
> 4 On the memory card on the Data Server, folder creation dates are not managed. Therefore, when viewed from the FTP client, the creation dates of all the folders in the Data Server appear to be January 1, 2000.

1.9   INPUT OF SPECIAL CHARACTERS

By setting bits 4 and 5 (SI1 and SI2) of NC parameter No. 13115, it is possible to input special characters and lowercase characters that are not available on the MDI keys.

Setting this NC parameter displays soft key [CHA-EXT], and pressing this soft key displays the following set of soft keys.

◁‖	(	)	?	*	&	+
◁‖	@	_	〈	〉	¥	+
◁‖	%	$	!	~	:	+
◁‖	"	'			ABC/abc	+

Each time you press soft key [ABC/abc], you switch from uppercase input to lowercase input or vice versa. The uppercase/lowercase input state can be checked in the key input field.

A 〉 _   ⬅➡   a 〉 _

Uppercase input   Lowercase input

Related NC parameters

	#7	#6	#5	#4	#3	#2	#1	#0
13115			SI2	SI1				

[Input type]   Parameter input
[Data type]   Bit

 # 4   **SI1**   Soft key input of the characters shown below is:
0:   Disabled.
1:   Enabled.
< > ¥ % $! ~ : " '

 # 5   **SI2**   Soft key input of the characters shown below and switching between the uppercase and lowercase input modes by a soft key are:
0:   Disabled.
1:   Enabled.
( ) ? * & @ _

V. CONNECTION

1 SETTING

This chapter provides information required to install the FAST Ethernet/FAST Data Server.

1.1   SPECIFICATIONS

This section describes the hardware specifications of the FAST Ethernet/FAST Data Server.

Name	
Ordering information	A02B-0319-J146
Board drawing number	A20B-8101-0030

NOTE
1 When using a board, observe the installation condition (environmental condition inside the cabinet) of the CNC control unit where the board is installed.
2 Even if a control unit is installed in the environment described above, the contents on the memory card may be destroyed as a result of a operation mistake or unexpected event. This tends to happen if the power is turned off while accessing the memory card. An accident can occur. So, ensure that the data on the memory card is backed up at all times.

The table below indicates the amount of heat output by the FAST Ethernet/FAST Data Server. For the amount of heat output by the main CNC unit and other optional units, refer to the CONNECTION MANUAL (HARDWARE) (B-64303EN) of the CNC.

	FAST Ethernet	FAST Data Server
Single board unit	6 W	6 W
Memory card	-	0.3 W [(Note)]
Total	6 W	6.3 W

NOTE
The amount of heat output by the memory card may vary, depending on the employment of a large-capacity card, a modification to the card specifications, and so forth.
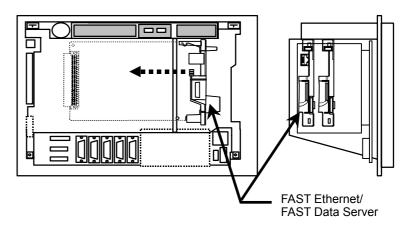
1.2 **INSTALLATION**

This section provides information relating to the installation of the FAST Ethernet and FAST Data Server.

1.2.1 **Installation on an Control Unit**
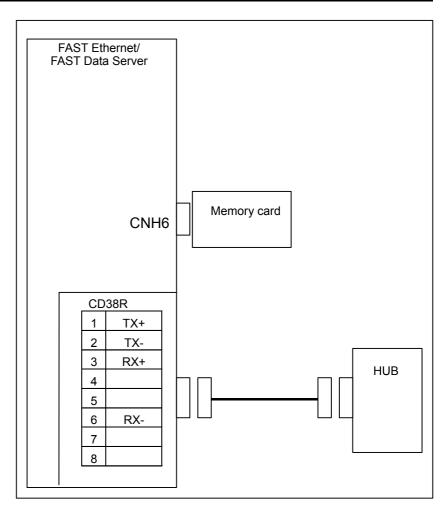
The board is installed in an optional slot of the control unit. It occupies one slot. No restriction is imposed on installation in the optional slot.

FAST Ethernet/
FAST Data Server

> **NOTE**
> 1　When using the Data Server functions, install a memory card in CNH6 before installing the board in the optional slot. While the board is installed in the optional slot, the memory card cannot be installed/removed.
> 2　Use the memory card recommended by FANUC.

1.2.2 **Total Connection Diagram**

1.2.3 Installing a Memory Card

The following shows the specifications of memory cards recommended as an external storage device of the FAST Data Server.

Specification	Capacity	Remarks
A02B-0281-K601	128MB	CompactFlash card
A02B-0213-K211	256MB	CompactFlash card
A02B-0213-K212	1GB	CompactFlash card

Generally, because of characteristics of the internal flash memory, repeatedly reading data from a CompactFlash card can degrade internal data and result in a data error.

Even if such a problem arises, the CompactFlash cards listed above have a function for restoring data automatically, so incorrect data will not be read from these cards. However, a read operation may take a time temporarily.

The delay in read time is related to memory operation performance (speed) and finish on machined surfaces. So, this should be taken into consideration when these cards are used.

For memory operation, these cards should be used with the processing time per block set to 24 ms or longer.

For DNC operation, a sufficient buffer is provided between the Data Server and the CNC, so there is no influence on machining even if the delay mentioned above is generated in read operation.
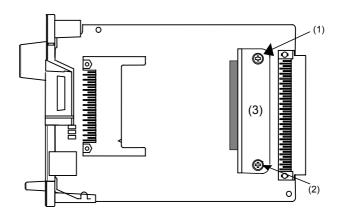
To convert the above-mentioned CompactFlash card to an ATA card, use FANUC's adapter (A02B-0236-K150).

> **NOTE**
> For latest information, refer to the Technical Report provided separately.
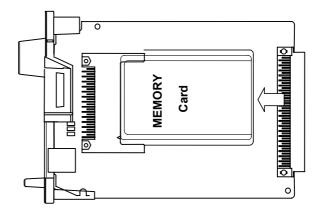
Installing a memory card
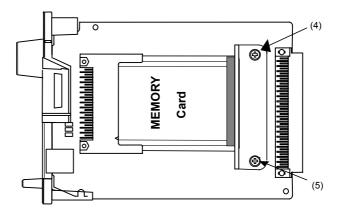
<1> Remove the screws of (1) and (2) for securing the stopper plate.

<2> Remove the stopper plate of (3), then insert the memory card into the connector.

<3> Secure the memory card with the stopper plate, then tighten the screws of (4) and (5).

2   CABLE CONNECTION

This section describes information relating to the physical Ethernet connection.
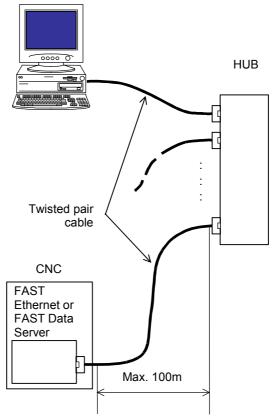
⚠ **CAUTION**
1 Before connecting or disconnecting the cable to or from the FAST Ethernet/FAST Data Server, make sure that the power to the CNC is turned off.
2 Please inquire of each manufacturer about the construction of network or the condition of using the equipment except the FAST Ethernet/FAST Data Server (HUB, transceiver, cable etc.). When configuring your network, you must take other sources of electrical noise into consideration to prevent your network from being influenced by electrical noise. Make sure that network wiring is sufficiently separated from power lines and other sources of electrical noise such as motors, and ground each of the devices as necessary. Also, a high and insufficient ground impedance may cause interference during communications. After installing the machine, conduct a communications test before you actually start operating the machine. We cannot ensure operation that is influenced by network trouble caused by a device other than the FAST Ethernet or FAST Data Server.

2.1   **CONNECTING TO Ethernet**

The FAST Ethernet or FAST Data Server is provided with a 100BASE-TX interface.
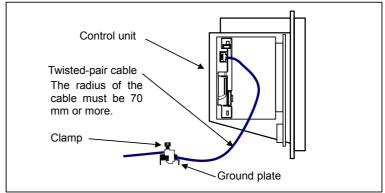
Prepare a HUB for connecting the FAST Ethernet board to the Ethernet trunk. The following shows an example of a general connection.

Some devices (HUB, transceiver, etc.) that are needed for building a network do not come in a dust-proof construction. Using such devices in an atmosphere where they are subjected to dust or oil mist will interfere with communications or damage the FAST Ethernet or FAST Data Server. Be sure to install such devices in a dust-proof cabinet.

2.2 **LEADING OUT THE Ethernet CABLE**

For this type of control unit, the cable is led out from the side of the control unit. See the outline drawing of the board for the location of the connector.

Control unit

Twisted-pair cable
The radius of the cable must be 70 mm or more.

Clamp

Ground plate

The Ethernet cable must be fastened by a cable clamp to prevent tension being applied to the modular connector (RJ-45) that connects the cable to the control unit even if the Ethernet cable is pulled directly. This clamp is also used to ground the cable shield.
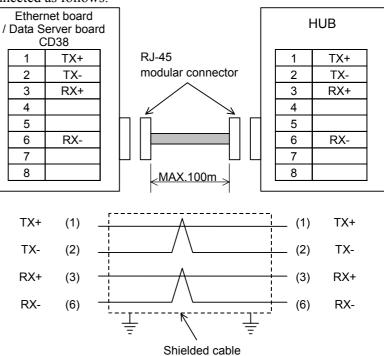
2.3   100BASE-TX CONNECTOR (CD38R) PIN ASSIGNMENTS

CD38R

Pin No.	Signal name	Description
1	TX+	Send +
2	TX-	Send -
3	RX+	Receive +
4		Not used
5		Not used
6	RX-	Receive -
7		Not used
8		Not used

2.4   **TWISTED-PAIR CABLE SPECIFICATION**
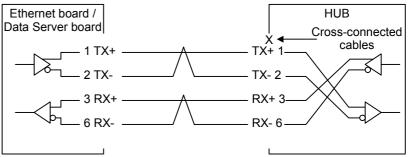
2.4.1   **Cable Connection**

The cable used for connection between the 100BASE-TX interface, CD38R, of the Ethernet board/Data Server board and the HUB is connected as follows:

Ethernet board / Data Server board CD38		RJ-45 modular connector	HUB	
1	TX+		1	TX+
2	TX-		2	TX-
3	RX+		3	RX+
4			4	
5			5	
6	RX-		6	RX-
7			7	
8		MAX.100m	8	

TX+	(1)		(1)	TX+
TX-	(2)		(2)	TX-
RX+	(3)		(3)	RX+
RX-	(6)		(6)	RX-

Shielded cable

- Keep the total cable length within 100 m.
  Do not extend the cable more than is necessary.
- The figure above shows the cable connection when cables are crossed in the HUB.
  "X" is usually indicated at the port of the HUB to signify that cables are crossed in the HUB.

- 119 -

2.4.2 **Cable Materials**

> ⚠ **CAUTION**
> Unshielded cable (UTP cable) is commercially available as 100BASE-TX twisted-pair cable: You should, however, use shielded Category 5 twisted-pair cable (STP cable) to improve the resistance to electrical noise in an FA environment.

Recommended Cables

Manufacturer	Specification	Remarks
FURUKAWA ELECTRIC CO., LTD.	DTS5087C-4P	Twisted-pair cable
NISSEI ELECTRIC CO., LTD.	F-4PFWMF	Single-conductor cable

Inquiries

Manufacturer	Contact address
FURUKAWA ELECTRIC CO., LTD. Sales Headquarters	2-6-1 Marunouchi, Chiyoda-ku. Tokyo 100-8322
	TEL: 03-3286-3126 FAX: 03-3286-3979
Remarks	
NISSEI ELECTRIC CO., LTD. Machida Branch	3F MU Bldg., 1-9-1 Minami-narise, Machida City, Tokyo 194-0045
	TEL: 0427-29-2531 FAX: 0427-29-3375
Overseas Sales Office	IWATANI International Corporation Tokyo Head Office 21-8 Nishi-shinbashi 3-chome, Minato-ku, TOKYO, 105-8458, JAPAN TEL: 03-5405-5810 FAX: 03-5405-5666 Telex: 2524256 IWATYO J
Remarks	A finished cable with connectors at both ends can be offered.

> **NOTE**
> The recommended cables cannot be connected to moving parts.

Recommended cable (for movable parts)

Manufacturer	Specification	Remarks
Oki Electric Cable Co., Ltd.	AWG26 4P TPMC-C5-F(SB)	Dedicated
Shinko Electric Industrial Co., Ltd.	FNC-118	to FANUC

Specification
- Electric characteristics:
  Conforms to EIA/TIA 568A Category 3 and Category 5.
  From the viewpoint of attenuation performance, ensure that the length to the HUB is 50 m or less.
- Structure:
  Group shielded (braided shield). A drain wire is available.
  The conductor is an AWG26 annealed copper twisted wire, with a sheath thickness of 0.8 mm and an outer diameter of 6.7 mm ±0.3 mm.
- Fire retardancy
  UL1581   VW-1
- Oil resistance
  Conforms to the FANUC internal standards (equivalent to the conventional oil-resistant electric cables).
- Flexing resistance:
  1,000,000 times or more with a bending radius of 50 mm (U-shaped flex test)
- UL style No.
  AWM 20276 (80°C/30V/VW-1)

NOTE
Be sure to use the connector TM21CP-88P(03) manufactured by HIROSE ELECTRIC CO., LTD. for this cable.

Inquiries

Manufacturer	Contact address
Oki Electric Cable Co., Ltd.	Nagano Sales Office TEL:0266-27-1597
Remarks	
Shinko Electric Industrial Co., Ltd.	Tokyo Sales Office TEL:03-3492-0073
Remarks	

Cable assembly
Oki Electric Cable Co., Ltd. can also supply the cable assembly mentioned above.
Contact Oki Electric directly to determine the specifications (length, factory test, packing, and so forth) for purchase.

2.4.3 **Connector Specification**

Use an 8-pin modular connector (RJ-45) with the twisted-pair cable for the Ethernet connection. The following connectors or equivalents must be used.

For general use	Specification	Manufacturer	Remarks
Solid wire	5-569530-3	Tyco Electronics AMP K.K..	
Solid wire	MS8-RSZT-EMC	SK KOHKI CO., LTD.	Special tools required
Twisted-pair cable	5-569552-3	Tyco Electronics AMP K.K..	
Twisted-pair cable	TM11AP-88P	HIROSE ELECTRIC CO., LTD.	Special tools required

For movable parts	Specification	Manufacturer	Remarks
For cable AWG26 4P TPMC-C5-F(SB) or FNC-118	TM21CP-88P(03)	HIROSE ELECTRIC CO., LTD.	Note

> **NOTE**
> Information about TM21CP-88P(03):
> Connector (standard product of the manufacturer)
> Drawing number: A63L-0001-0823#P
> Manufacturer: HIROSE ELECTRIC CO., LTD.
> Manufacturer type number: TM21CP-88P(03)
> Conforms to EIA/TIA 568A Category 3 and Category 5.
> For assembly with a cable, contact HIROSE ELECTRIC CO., LTD. directly.
> (From HIROSE ELECTRIC CO., LTD., "TM21CP-88P(03) Connection Procedure Manual (Technical Specification No. ATAD-E2367)" is available as a technical document.)

2.5   ELECTRICAL NOISE COUNTERMEASURES

2.5.1   Separating Signal Lines
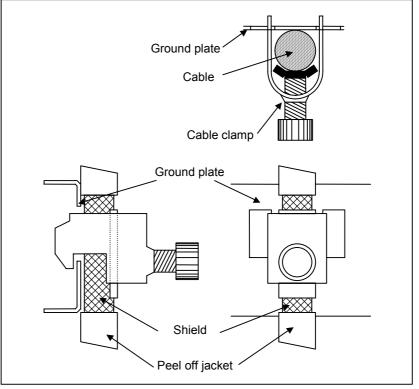
For signal line separation, refer to the description of noise protection in the Connection Manual (Hardware) (B-64303EN) of CNC. The wiring for the Ethernet cable is of group C.

2.5.2   Clamping and Shielding Cables

Clamp an Ethernet twisted pair cable according to the method described below, as with cables that need to be shielded. Clamping cables provides support and shielding and is extremely important to the safe operation of the system. Never overlook cable clamping.

Peel off part of the jacket as shown in the figure to expose the outer coating of the shield, and press this outer coating against the ground plate with the clamp fixture.
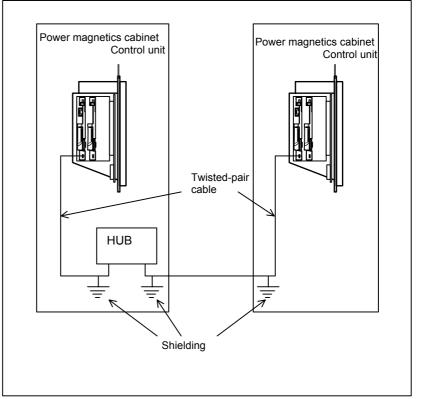
The machine manufacturer must prepare the ground plate and install it as follows:

NOTE
To ensure the safe operation of the system, clamp and shield the cables.
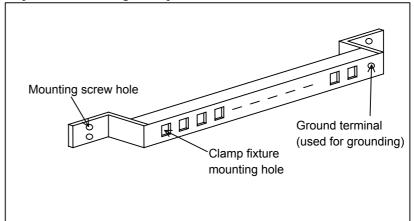
Connect the Ethernet board and HUB with a twisted-pair cable. Shield the cable with clamp fixtures.

This shielding is extremely important to the stable operation of the system. Be sure to shield the cable. Shield both ends of each cable at locations as nearest to the CNC and HUB connectors as possible. When the CNC and HUB are contained in the same power magnetics cabinet and the cable is short, shield the cable only at the HUB side.
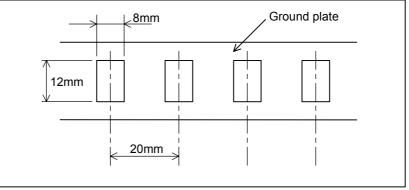
Example of shielding of transceiver cable
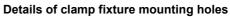
Prepare the following earth plate.
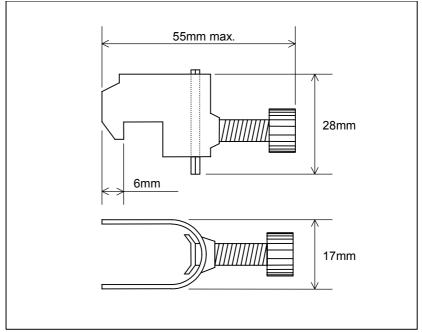
Use a nickel-plated iron plate at least 2 mm thick as the ground plate.

Details of clamp fixture mounting holes
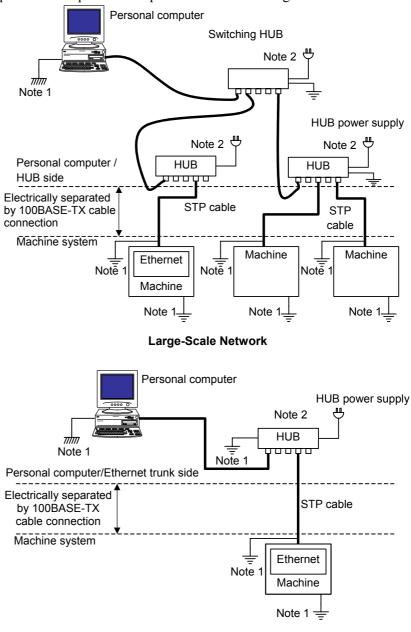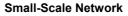
External dimensions of clamp fixture

2.5.3   Grounding the Network

Even if the grounding condition on the machine side is satisfied, the communication line can pick up noise from the machine, depending on the machine installation condition and environment, thus resulting in a communication error. To protect against such noise, the machine should be separated and insulated from the Ethernet trunk cable and personal computer. Examples of connection are given below.

Large-Scale Network

Small-Scale Network
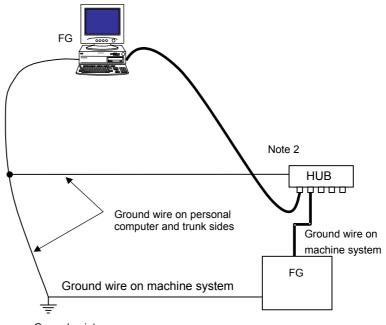
NOTE
1   The ground between PC/HUB side and machine system side must be separated. If it is impossible to separate the ground because there is only one grounding point, connect the ground cable for each system to the grounding point independently. (See figure below.)
    The resistance for grounding must be less than 100-ohm (Class D). The thickness of the ground cable is the same as the thickness of AC power cable or more. At least thickness of 5.5mm^2 is necessary.
2   Note that the number of allowable HUB -to- HUB connections depends on the type of HUB.
3   There is possibility that noise makes the obstacle of communication even if the ground is separated using the 100BASE-TX. In the case of using the FAST Ethernet/FAST Data Server under the worst environment, please separate between the PC/Trunk line side and machine system side completely using the 100BASE-FX (Optical fiber media).

Wiring on a single ground point

2.6   CHECK ITEMS AT INSTALLATION

The following table lists check items at installation.

Check item		Description	Check
Ethernet cable			
	Type	Use cables which satisfies all the following conditions:	
		1) With shielding	
		2) Twisted-pair cable	
		3) Category 5	
	Length	The cable length shall be within 100 m (50 m for a movable cable recommended by FANUC).	
	Connection	For a twisted-pair cable, the following pins shall be paired:	
		1) Pin No. 1 (TX+) – pin No. 2 (TX-)	
		2) Pin No. 3 (RX+) – pin No. 6 (RX-)	
	Separation	The Ethernet cables shall be bound separately from the following cables or covered with an electromagnetic shield:	
		1) Group A: AC power lines, power lines for motors, and others	
		2) Group B: Current DC (24 VDC) and others	
	Shielding	For a shielded cable, the part of which outer coating is peeled off and exposed shall be fixed to the ground plate with a clamp fixture.	
	Clamping	The ground plate shall be located as nearest to the CNC as possible (to make the cable between the ground plate and CNC hard to be affected by noise).	
	Connectors	Any cable connector shall not be pulled (to prevent poor contact of the connector).	
	Wiring	No cable shall be laid under a heavy object.	
	Bending radius	The bending radius shall be at least four times as long as the diameter of the cable.	
	For movable part	For a movable part, a cable for a movable part shall be used.	
CNC and cabinet			
	CNC grounding	The CNC ground (frame ground) shall be connected properly and the length of the ground wire shall be within 300 mm.	
	Ground plate	The ground plate shall be connected to the AC ground of the cabinet with wire.	
	Mounting	The Ethernet board shall be inserted in a CNC slot properly.	
HUB			
	Use conditions	The "cautions on use" of the HUB shall be observed (A terminating resistor shall be mounted properly if required).	
	Grounding	The HUB shall be grounded.	
	Cabinet	The HUB shall be installed in an enclosed cabinet.	
	Vibration	The HUB shall be installed so that it is not affected by vibration.	
	Bending radius	The bending radius shall be at least four times as long as the diameter of the cable.	

VI. MAINTENANCE

1

HARDWARE MAINTENANCE INFORMATION
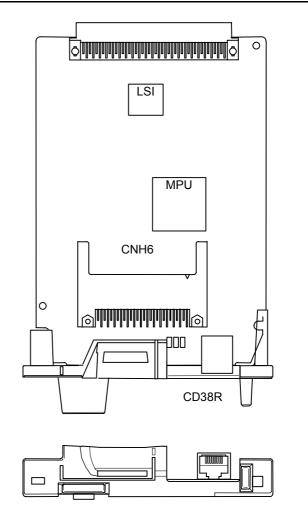
This chapter provides hardware maintenance information related to the FAST Ethernet/FAST Data Server.

1.1   **BOARD**

This section describes the maintenance information for the FAST Ethernet board / FAST Data Server board.

1.1.1   **Component Layout**
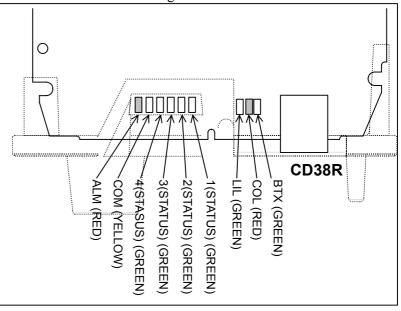
Name	PCB drawing No.	Remarks
FAST Ethernet board / FAST Data Server board	A20B-8101-0030	

1.1.2   **LED Indications and Meanings**

The board provides four green LEDs (STATUS) and one red LED
(ALARM) for status indication, and provides two green LEDs, one
red LED, and one yellow LED for communication status indication.
The figure below shows the locations of these LEDs. The table below
explains the LED lighting states.

In the following explanations, the LED lighting states are expressed as
follows:

□: Off   ■: On   ☆: Blinking   ◊: Don't care

NOTE
The face plate is indicated using dotted lines.

LED display transition for LED1, LED2, LED3, and LED4 (during power-on)

LED indication L4 L3 L2 L1	Status	Meaning
□□□□	Power-off	
■■■■	Immediately after power-on	Initial state entered immediately after power-on. If the board is stopped in this condition, the cause is one of the following: → The firmware is not stored in the Flash ROM of the CNC. → The board is defective.
■■■□	Start of board	The board has started. If the board is stopped in this condition, the board may be defective.
■■□□	Completion of firmware downloading	The firmware has been downloaded to the board. If the board is stopped in this condition, the board may be defective.
■□□□	Firmware OS started.	The firmware OS has started. If the board is stopped in this condition, the cause is one of the following: → The firmware stored in the Flash ROM of the CNC is destroyed. → The board is defective.
□■■■	Completion of firmware OS initialization	Initialization of the firmware OS is completed. If the board is stopped in this condition, the cause is one of the following: → The firmware stored in the Flash ROM of the CNC is destroyed. → The board is defective.
□■■☆	Completion of parameter reading	The Ethernet parameters have been read. If the board is stopped in this condition, the cause is one of the following: → The Ethernet option or Data Server option is not installed. → The IP address or subnet mask is not set.
□□□☆	Start completion	The board has started normally.

LED display for LED1, LED2, LED3, and LED4 (during normal operation)

LED indication L4 L3 L2 L1	Status	Meaning
□□□☆	Normal status	The board is operating normally.

LED display for BTX, LIL, COM, and ALM (during normal operation)

LED indication		Status	Meaning
BTX	■	100BASE-TX connection in progress	The communication rate is 100BASE-TX.
BTX	□	10BASE-T connection in progress	The communication rate is 10BASE-T.
LIL	■	Connected to HUB	The board is connected to the HUB.
COM	■	Transmission/ reception in progress	Data is being transmitted or received.
ALM	□	No alarm	No alarm is issued

LED display for LED1, LED2, LED3, and LED4 (when abnormality occurs)

The STATUS LEDs are turned on and off repeatedly with long on-time and short on-time.

LED indication [Long on-time] 4 3 2 1	LED indication [Short on-time] 4 3 2 1	Status	Description
■■□□	□□□■	Error on another board	A defect on another board or a problem on another board was detected.
■■□□	□□■□	Bus error	Software has a problem, or the board is defective.
■■□□	□□■■	Parity alarm	The board is defective.
■□■□	□□□□	Illegal general instruction	Software has a problem, or the board is defective.
■□■□	□□□■	Illegal slot instruction	Software has a problem, or the board is defective.
■□■□	□■□□	CPU address error	Software has a problem, or the board is defective.

> **NOTE**
> If an error occurs with the LEDs turned on and off with long on-time and short on-time in a manner not indicated above, contact FANUC.

LED display for COL, LIL, and ALM (when abnormality occurs)

LED indication	Status	Description
COL ■ COL ☆	Collision occurs. (Data collision occurs.)	The LED is on or blinks at short intervals when the Ethernet communication traffic (communication amount) is high or ambient noise is high.
LIL □	Not connected to HUB	The board is not connected to the HUB properly. The LIL LED stays off also when the power to the HUB is off. Check whether the board is connected to the HUB properly.
ALM ■	Parity error occurs.	A parity error occurred in memory on the board. The board is defective.

2

SOFTWARE MAINTENANCE INFORMATION

This chapter provides software maintenance information related to the FAST Ethernet/FAST Data Server.

2.1   **Ethernet LOG**

A log related to the FAST Ethernet/FAST Data Server is displayed.

ETHERNET LOG screen

Procedure

1   Press the function key ⌨ .

2   Press soft key [BRD LOG] ([BOARD LOG]) to display the LOG
screen for the FAST Ethernet/FAST Data Server. (If the soft key
is not found, press the continuous menu key.)

```
ETH_BRD LOG                      O0000 N00000
             ETHERNET LOG  [BOARD]
 ALL
E-0208 The FTP server is not found
                        Mar. 22 13:02:56
E-0B04 Router IP address is wrong [192
. 168. 2. 2]            Mar. 22 13:02:24




                              PAGE:  1/30
A〉_

MDI    ****  ***  ***  |  12:00:00  |
〈|  ALL   | COMMON | FOCAS2 |  DTSVR  | (OPRT) | +
```
LOG screen

The latest log information is displayed at the top of the screen. At the
right end of a log item, the occurrence date and time of the log item is
indicated. Date and time data is indicated in the format "MMM.DD
hh:mm:ss", where MMM represents a month, DD represents a day, hh
represents hours, mm represents minutes, and ss represents seconds.
The top item in the example above indicates "13:02:56 on March 22".

To clear the log information, press soft key [(OPRT)] then soft key
[CLEAR].

```
〈|       |       |       |       |  CLEAR  | |
```

By operating the LOG screen of the FAST Ethernet/FAST Data
Server, log information can be displayed for each function.
(1) Soft key [ALL]
    This soft key displays all log information related to the FAST
    Ethernet/FAST Data Server.
(2) Soft key [COMMON]
    This soft key displays log information related to the parameter
    setting and basic communication function of the FAST
    Ethernet/FAST Data Server.
(3) Soft key [FOCAS2]
    This soft key displays log information related to the
    FOCAS2/Ethernet function.
(4) Soft key [DTSVR] ([DATA SERVER])
    This soft key displays log information related to the Data Server.
(5) Soft key [RMTDIAG] ([REMOTE DIAG])
    This soft key displays log information related to the machine
    remote diagnosis functions.
(6) Soft key [UNSOLI] ([UNSOLI MSG])
    This soft key displays log information related to the unsolicited
    messaging function.
(7) Soft key [FTPTRNS] ([FTP TRANS])
    This soft key displays log information related to the FTP transfer
    function.

NOTE
The Ethernet log information is stored in volatile memory and is lost when the power to the CNC is turned off. Check the log information when an error occurs.

Error number	Log message	Meaning and action to be taken
E-0118 E-0119	Error occurred while wait for FOCAS2 pdu	A communication error occurred due to one of the following causes: → The network quality degraded, data could not be received from the personal computer with which to communicate, and the logical communication path was disconnected. → The software component on the personal computer with which to communicate forcibly disconnected the logical communication path. → The Ethernet cable was disconnected.
E-011A	All communication paths are busy	All FOCAS2/Ethernet communication paths are being used.
E-0126	No response from RMT DIAG server	The IP address of the machine remote diagnosis accepting server may be invalid or the power to the machine remote diagnosis accepting server may be off. Check whether the IP address of the machine remote diagnosis accepting server is valid and whether the power to the machine remote diagnosis accepting server is on. Alternatively, the machine remote diagnosis accepting server may not respond to the PING command to increase the security level (such as a firewall setting). Set bit 1 (PCH) of NC parameter No. 0905 to "1" and connect the server again.
E-012D	No response from router	The IP address of the router may be invalid or the power to the router may be off. Check whether the IP address of the router is valid and whether the power to the router is on.
E-0148	Cannot save parameter for Unsolicited Message	When the FOCAS2 function cnc_wrunsolicprm2 was received, the parameter for the unsolicited messaging function could not be saved for one of the following causes: → The mode of the unsolicited messaging function is not set to "PC mode". → The state of the unsolicited messaging function is not "Not Ready". → The argument "parameter-for-unsolicited-message" of the FOCAS2 function cnc_wrunsolicprm2 includes an invalid value.
E-0149	The received parameter for Unsolicited Message is wrong	When the FOCAS2 function cnc_wrunsolicprm2, cnc_rdunsolicprm2, cnc_unsolicstart, or cnc_unsolicstop was received, the argument "parameter-number-for-unsolicited-message" was found to be invalid.
E-0200	(Received message from FTP server)	A message sent from the FTP server is displayed as is. A message containing kanji, hiragana, and/or katakana characters may not be displayed correctly.
E-0202	Connection failed with FTP server	The FTP server software may not be running. Run the FTP server software. Alternatively, the setting may be made so that the FTP server cannot be connected to increase the security level (such as a firewall setting). Change the firewall setting so that the FTP server can be connected.

Error number	Log message	Meaning and action to be taken
E-0207	The router is not found	The IP address of the router may be invalid or the power to the router may be off. Check whether the IP address of the router is valid and whether the power to the router is on.
E-0208	The FTP server is not found	The IP address of the FTP server may be invalid or the power to the FTP server may be off. Check whether the IP address of the FTP server is valid and whether the power to the FTP server is on. Alternatively, the FTP server may not respond to the PING command to increase the security level (such as a firewall setting). Set bit 1 (PCH) of NC parameter No. 0905 to "1" and connect the server again.
E-020B	Cannot login into FTP server	Check the user name and password for logging in to the FTP server.
E-020C	The parameters of FTP server are wrong	Check the user name and password for logging in to the FTP server.
E-020D	Changing a work folder of host failed	Check the work folder for logging in to the FTP server.
E-0219	The DNC file is not found	Check whether the file for DNC operation is specified correctly.
E-021A	The specified file is not found	Check whether the specified file is present.
E-021B	Opening a file failed	The file could not be opened. Check the error code in parentheses.
E-0221	The specified file already exists	The specified file is already present on the memory card of the Data Server. Delete the existing file. Alternatively, change the file name.
E-0223	Writing data to the file failed	Data could not be written to the memory card of the Data Server. Check the error code in parentheses.
E-023A	The specified file is busy	The file on the memory card of the Data Server is currently used. When a file on the memory card is selected as a main program, the file is regarded as being used.
E-0252	Contents of ATA card are broken	Format the memory card of the Data Server.
E-02F0	ATA card is not found	Check whether a memory card is installed in the Data Server.
E-02F3	ATA card is not mounted	Check whether the memory card of the Data Server is destroyed and whether the memory card has been formatted.
E-041A	Frame transmission failed (TCP)	A communication error occurred due to one of the following causes: → The network quality degraded, data could not be received from the personal computer with which to communicate, and the logical communication path was disconnected. → The software component on the personal computer with which to communicate forcibly disconnected the logical communication path. → The Ethernet cable was disconnected. → Data cannot be posted to the communication destination due to a firewall setting.
E-0A02	Cannot read MAC address	The MAC address may not be written on the FAST Ethernet board or FAST Data Server board or the board may be damaged.

Error number	Log message	Meaning and action to be taken
E-0A06	Network is too busy	An excessive amount of data flows over the network. Take action such as dividing the network.
E-0B00	The own IP address is wrong	Set the IP address according to the IP address specification format.
E-0B01	The own IP address is not set	Set the IP address.
E-0B02	Subnet mask is wrong	Set the subnet mask according to the subnet mask specification format.
E-0B03	Subnet mask is not set	Set the subnet mask.
E-0B04	Router IP address is wrong	There may be a conflict between the classes of the local node and router IP addresses.
E-0B05	IP address of DNS server is wrong	There may be a conflict between the classes of the local node and DNS server IP addresses.
E-0B06	The own host name is wrong	Check the host name setting.
E-0B07	The own domain name is wrong	Check the domain name setting.
E-0B08	TCP port number is wrong	A value outside the valid setting range may be set.
E-0B09	UDP port number is wrong	A value outside the valid setting range may be set.
E-0B0B	IP address of remote FTP server is wrong	Set the IP address according to the IP address specification format.
E-0B0C	Port number of a remote FTP server is wrong	A value outside the valid setting range may be set.
E-0B0D	User name of remote FTP server is wrong	A character unavailable for a user name may be used.
E-0B0E	Password of remote FTP server is wrong	A character unavailable for a password may be used.
E-0B0F	Login folder of remote FTP srv is wrong	A character unavailable for a login folder name may be used.
E-0B10	Port number of own FTP server is wrong	A value outside the valid setting range may be set.
E-0B11	User name of own FTP server is wrong	A character unavailable for a user name may be used.
E-0B12	Password of own FTP server is wrong	A character unavailable for a password may be used.
E-0B13	Login folder of own FTP server is wrong	A character unavailable for a login folder name may be used.
E-0B14	IP address of Remote Diag is wrong	Set the IP address of the machine remote diagnosis accepting server according to the IP address specification format.
E-0B15	Port number of Remote Diag is wrong	A value outside the valid setting range may be set.
E-0B18	Cannot set because DHCP is available	To set the item, disable the DHCP client function.
E-0B27	Unsolicited Message isn't available	The software condition for using the unsolicited messaging function is not satisfied. Check that "1" is set in bit 4 (UNM) of NC parameter No. 904.
E-0B29	Mode of Unsolicited Message is wrong	In the CNC mode, the FOCAS2 function cnc_wrunsolicprm2 cannot be executed.
E-0B2A	Status of Unsolicited Message is wrong	The state of the unsolicited messaging function was other than "Not Ready", so that the parameters for the unsolicited messaging function could not be updated. The cause may be one of the following: → In a state other than "Not Ready", the FOCAS2 function cnc_wrunsolicprm2 or cnc_unsolicstart was executed. → In a state other than "Not Ready", soft key [APPLY] was pressed.

Error number	Log message	Meaning and action to be taken
E-0B2B	Cannot refresh parameter of Unsolicited Message	The parameters for the unsolicited messaging function could not be updated. The cause may be one of the following: → The problem of E-0B29 or E-0B2A occurred. → A parameter for the unsolicited messaging function includes an invalid value.
E-0B44	Invalid value exists in Transmission parameter of Unsolicited Message	The parameter for the unsolicited messaging function, TRANSMISSION NUMBER or TRANSMISSION PARAMETER (NO. 1 to NO. 3), includes an invalid value.
E-0B45	The total of Transmission size of Unsolicited Message exceeds the limitation	The sum of sizes specified by the parameters for the unsolicited messaging function, TRANSMISSION PARAMETER NO. 1 to NO. 3, exceeds the maximum specifiable number of bytes. For the maximum specifiable number of bytes, see the setting item "TRANSMISSION PARAMETER" in Appendix F.1.2, "Setting on the CNC Screen".
E-XXXX	(No message)	Internal error. Report the error number.

The meanings of the error codes that appear in E-02XX are as follows:

Error code	Meaning
2	The available space of the memory card of the Data Server is insufficient.
10	The specified folder cannot be found.
11	The allowable number of entries is exceeded.
12	Access to a folder was rejected.
14	The specified file cannot be found.
15	Access to a file was rejected.
19	An attempt was made to access a file being used.
22	The specified file name is illegal.
28	A TV check error was detected.
36	The specified file is already present.
37	The folder is not empty.
39	The specified folder is already present.
48	The available file size is exceeded.
74	An ISO code parity error was detected.

2.2   ETHERNET CONNECTION CONFIRMATION

By transmitting the PING command, the CNC can check that a connection is made with the communication destination.

PING screen (connection state confirmation)

Procedure

1   Press the function key [SYSTEM].

2   Soft key [ETHBRD] ([ETHER BOARD]) is displayed. (If the soft key is not found, press the continuous menu key.)

3   Press soft key [ETHBRD] ([ETHER BOARD]) then soft key [PING].

```
ETH_BRD SETTING                    O0000 N00000
                    PING  [BOARD]
CONNECT STATE

 PING STATE                 -------        1/ 2
A) _

MDI    **** *** ***   12:00:00
<  PING    COM STS TSK STS DS MODE (OPRT)  +
```

PING (CONNECT STATE) screen

4   Press soft key [(OPRT)] then soft key [P.FTP1] ([PING FTP1]) to send the PING command to host 1 to which the Data Server function is connected. Similarly, press soft key [P.FTP2] ([PING FTP2]) and soft key [P.FTP3] ([PING FTP3]) to send the PING command to connection hosts 2 and 3, respectively.

```
< P. FTP1  P. FTP2  P. FTP3   P. CAN  P. EXEC  +
```

5   Press soft key [(OPRT)] then soft key [P.RMT1] ([PING RMT1])
to send the PING command to inquiry destination 1 of the
machine remote diagnosis functions. Similarly, press soft key
[P.RMT2] ([PING RMT2]) to send the command to inquiry
destination 2 and soft key [P.RMT3] ([PING RMT3]) to inquiry
destination 3.

| ⟨ P. RMT1 | P. RMT2 | P. RMT3 | | CHA−EXT | + |

The results of PING execution are as follows:

```
ETH_BRD SETTING              O0000 N00000
                PING  [BOARD]
CONNECT STATE
 192. 168. 0. 251


 Response  is  received
 Response  is  received
 Response  is  received
 No  response
 No  response


 PING STATE          −−−−−−−      1/ 2
A )_


MDI    ****  ***  ***     12:00:00
⟨ P. FTP1 | P. FTP2 | P. FTP3 | P. CAN | P. EXEC | +
```

Execution results of PING

PING (SETTING) screen

Procedure

1　When sending the PING command to a desired destination, enter the destination address in HOSTNAME (IP ADDRESS) on the PING (SETTING) screen. Moreover, set a desired execution repeat value in REPEAT.

```
ETH_BRD SETTING                    O0000 N00000
              PING  [BOARD]
SETTING
 HOST NAME(IP ADDRESS)
      192. 168. 0. 251


 REPEAT                                      3




                                          2/ 2

A ) _


MDI   **** *** ***  |  12:00:00  |
⟨  PING   COM STS TSK STS DS MODE (OPRT)  +
```

PING (SETTING) screen

2　After entering a host name (IP address) and repeat value, press soft key [(OPRT)] then soft key [P.EXEC] ([PING EXEC]) to send the PING command to the specified destination.

3　To cancel the transmission of the PING command halfway, press soft key [P.CAN] ([PING CANCEL]).

```
⟨ P. FTP1  P. FTP2  P. FTP3   P. CAN  P. EXEC  +
```

- 145 -

2.3   COMMUNICATION STATE CONFIRMATION

The communication state of the FAST Ethernet/FAST Data Server
detected by hardware can be checked.

COM STATE (SEND / RECEIVE) screen

Procedure

1   Press the function key [SYSTEM].

2   Soft key [ETHBRD] ([ETHER BOARD]) is displayed. (If the
soft key is not found, press the continuous menu key.)

3   Press soft key [ETHBRD] ([ETHER BOARD]) then soft key
[COM STS] ([COM STATE]) to display the COM STATE
screen.

```
ETH_BRD SETTING                   O0000 N00000
              COM STATE [BOARD]
 COM STATE : SEND
  BAUDRATE              100Mbps / Full duplex
  SEND PACKET                            3559
  SEND RETRYOVER                            0
  COLLISION                                 0
  CARRIER SENSE LOST                        0
  NO CARRIER                                0
  FRAME LENGTH ERROR                        0


                                        1/ 2
 A)_

 MDI  **** *** ***    12:00:00
 (  PING  COM STS TSK STS MAINTE  (OPRT)  +
```
COM STATE screen 1

```
ETH_BRD SETTING              O0000 N00000
          COM STATE  [BOARD]
 COM STATE : RECEIVE
  BAUDRATE         100Mbps / Full duplex
  RECEIVE PACKET                      3638
  CRC ERROR                              0
  SHORT FRAME                            0
  LONG FRAME                             0
  ODD FRAME                              0
  OVERFLOW                               0
  PHY-LSI ERROR                          0


                                    2/ 2

A〉_


MDI  **** *** ***    12:00:00
〈  PING  ‖COM STS TSK STS MAINTE  (OPRT)  +‖
```

COM STATE screen 2

Display item

Display item	Description
BAUDRATE	Displays the communication rate and mode. Communication rate: 100 Mbps or 10 Mbps Communication mode: Full duplex or Half duplex --------: Not connected to the HUB
SEND PACKET	Displays the number of sent packets.
SEND RETRYOVER COLLISION CARRIER SENSE LOST NO CARRIER FRAME LENGTH ERROR	Displays the number of errors detected during packet sending.
RECEIVE PACKET	Displays the number of received packets.
CRC ERROR SHORT FRAME LONG FRAME ODD FRAME OVERFLOW PHY-LSI ERROR	Displays the number of errors detected during packet reception.

2.4 **COMMUNICATION SOFTWARE CONFIRMATION**

The operating status of the software of the FAST Ethernet/FAST Data Server can be checked.

TASK STATE screen

Procedure

1 Press the function key 📱.

2 Soft key [ETHBRD] ([ETHER BOARD]) is displayed. (If the soft key is not found, press the continuous menu key.)

3 Press soft key [ETHBRD] ([ETHER BOARD]) then soft key [TSK STS] ([TASK STATE]) to display the TASK STATE screen.

```
ETH_BRD SETTING                    O0000 N00000
              TASK STATE [BOARD]
COMMON               DWWDW
FOCAS2 #0            C
FOCAS2 #1            XXXXXXXXXXXXXXXXXXXX
FOCAS2 #2            XXXXXXXXXXXXXXXXXXXX
SCREEN               XX
UDP                  X
PMC                  XX
DATASERVER           WWWWW
FTP SERVER           DX0

                                    1/ 2

A〉_

MDI   **** *** ***  │ 12:00:00 │
〈  PING   COM STS TSK STS DS MODE       │ + │
```

TASK STATE screen 1

```
ETH_BRD SETTING                    O0000 N00000
              TASK STATE [BOARD]

REMOTE DIAG          DXXXXXXX
UNSOLICITED MSG      WE 0




                                          2/ 2
A〉_


MDI  **** *** ***  │ 12:00:00 │
《│  PING  │ COM STS│TSK STS│DS MODE│        │+│
```

TASK STATE screen 2

Display item

The meaning of each symbol is indicated below.

	Symbol and meaning
COMMON	W : Data being processed (1) D : Data being processed (2) E : Start of software
FOCAS2 #0	C : Waiting for connection from the host W : Data being processed (1) D : Data being processed (2) N : FOCAS2 incapable of being executed
FOCAS2 #1	W : Data being processed (1) D : Data being processed (2) X : Not executed yet
FOCAS2 #2	W : Data being processed (1) D : Data being processed (2) X : Not executed yet
SCREEN	W : Data being processed (1) D : Data being processed (2) X : Not executed yet
UDP	W : Data being processed (1) D : Data being processed (2) X : Not executed yet
PMC	W : Data being processed (1) D : Data being processed (2) X : Not executed yet
DATASERVER	W : Data being processed (1) D : Data being processed (2) X : Not executed yet
FTP SERVER	W : Data being processed (1) D : Data being processed (2) Number : Number of sockets currently connected
REMOTE DIAG	W : Data being processed (1) D : Data being processed (2) X : Not executed yet
UNSOLICITED MSG	W : Data being processed (1) D : Data being processed (2) N : Abnormal state X : Not executed yet Number : When the number is incrementing, the alive signal (UDP) is being transmitted.
FTP	W : Data being processed (1) D : Data being processed (2) X : Not executed yet

When the FOCAS2/Ethernet functions are running, you can check the operating status from:
FOCAS2#0, FOCAS2#1, and FOCAS2#2.

When the CNC screen display functions are running, you can check the operating status from:
SCREEN

When the FANUC LADDER-III functions are running, you can check the operating status from:
PMC

When the Data Server functions are running, you can check the operating status from:
DATASERVER and FTP SERVER

When the Machine Remote Diagnosis functions are running, you can check the operating status from:
REMOTE DIAG

When the Unsolicited Messaging functions are running, you can check the operating status from:
UNSOLICITED MSG

When the FTP transfer functions are running, you can check the operating status from:
FTP

APPENDIX

A TROUBLESHOOTING

This appendix describes troubleshooting related to FAST Ethernet/ FAST Data Server communication.

Appendix A, "TROUBLESHOOTING", consists of the following sections:

A.1   **CHECKING COMMUNICATION WITH A HUB**

(1) Make sure that the STP cable between the HUB and the FAST
Ethernet/FAST Data Server is connected.
(2) Make sure that cables are properly wired.
- Though communication is carried out when the cable pair at
the send and receive sides is not properly mounted,
communications errors may occur more frequently.
(3) Make sure that a HUB for 100BASE-TX is used.
- A HUB for 10BASE-T may be used to perform
communication. In this case, however, the communication
speed can decrease.
(4) Make sure that the LIL LED on the FAST Ethernet/FAST Data
Server is lit at all times.
- The LIL LED will not light if the FAST Ethernet/FAST
Data Server is not connected to the HUB or if the HUB is
not ON.
(5) Make sure that the LED (LINK indicator LED) on the connected
HUB is lit at all times.
- Some HUBs do not have a LINK indicator LED.
- The LINK indicator LED will not light if the HUB is not
connected to the FAST Ethernet/FAST Data Server or the
CNC is not ON.
(6) Make sure that a HUB for full duplex communication only is not
used.
- The FAST Ethernet/FAST Data Server automatically
detects the communication speed and communication mode
(full duplex or half duplex) by using the auto negotiation
function. In communication with a HUB that does not have
the auto negotiation function, the FAST Ethernet/FAST
Data Server recognizes the communication speed correctly
but regards the communication mode as half duplex
communication.
As a result, when an attempt is made to communicate with a
HUB for full duplex communication only that does not have
the auto negotiation function, there is a discrepancy in
communication mode, so correct communication cannot
sometimes be performed.

- For details on how to connect, see Part V "CONNECTION."

A.2   **CHECKING CONNECTION WITH THE TRUNK**

General notes are provided below. For network installation, consult with specialized vendors or manufacturers. Run cables away from noise sources.
The descriptions below are not applicable if the network is configured using only those HUBs that have Ethernet boards connected.

- When the trunk is based on 10BASE-5
  (1) Make sure that a transceiver is attached to the trunk correctly.
      - If a transceiver is attached correctly, the resistance between the trunk shield and central conductor is about 25Ω (when a terminating resistor is attached).
      - A special tool is required to attach a transceiver. (No special tool is required, depending on the manufacturer. For details, refer to the installation manual of each transceiver.)
      - Do not attach a transceiver again to a point where a transceiver was once attached. (Otherwise, the cable can be damaged.)
  (2) Make sure that transceivers are attached at proper intervals.
      - Transceivers must be attached at intervals of 2.5 m or more. It is recommended that transceivers be attached at intervals of an integral multiple of 2.5 m. Usually, marks indicating installation points are provided on the trunk cable.
  (3) Make sure that terminating resistors are attached.
      - A terminating resistor must be attached to each end of the trunk cable. (Resistance: 50Ω)
  (4) Make sure that the trunk cable is not longer than 500 m.
  (5) Make sure that the cable (transceiver cable) used for connection between a transceiver and the HUB is not longer than a specified limit.
      - Usually, the maximum allowable length of a transceiver cable is 50 m. However, the maximum allowable length of a cable with a smaller diameter may be shorter than 50 m. So, check the specifications of each cable.

- When the trunk is based on 10BASE-2
  (1) Make sure that the length of each cable is 0.5 m or more.
      - The minimum allowable distance between nodes (units) is 0.5 m.
  (2) Make sure that the trunk cable length (sum of the lengths of cables) is 185 m or less.
  (3) Make sure that terminating resistors are attached.
      - A terminating resistor must be attached to each end of the trunk cable. (Resistance: 50Ω)

A.3   **CHECKING SETTINGS**

The following describes how to check the minimum settings needed for communications.

> **NOTE**
> For details on IP addresses, subnet mask and other set values, consult with the network administrator.

- Checking settings on the FAST Ethernet/FAST Data Server
  - (1) Make sure that the MAC address of the FAST Ethernet/FAST Data Server is displayed.
    - This address is appended to each board before shipment from the factory, and is automatically displayed in the Setting screen. This address need not be set by the user.
  - (2) Make sure that the IP address is set.
  - (3) Make sure that the subnet mask is set.
  - (4) When a router is used, make sure that the router IP address is set.

- Checking settings on the personal computer
  - (1) Make sure that the IP address is set.
  - (2) Make sure that the subnet mask is set.
  - (3) When a router is used, make sure that the router IP address is set.

- For details on how to set, see Part III "SETTING."

A.4 **CHECKING COMMUNICATION**

This section describes how to check the communication status between a CNC and the other communicating partner (host computer). If communication with the CNC sometimes fails or is not possible, first make sure that the communication path is normal by the following procedure. The "ping" command is used to check communication.

In the following example, a host computer running the Windows NT4.0 is used.

- Checking the communication path
  Open the DOS window, and enter 'ping "IP address of CNC"'. If a response is returned from the CNC, the FAST Ethernet/FAST Data Server is connected to the CNC.

  (1) When a response is returned (normal connection)


  ```
  C:\WINNT\system32\cmd.exe

  C:\>ping 190.0.1.11

  Pinging 190.0.1.11 with 32 bytes of data:

  Reply from 190.0.1.11: bytes=32 time=10ms TTL=255
  Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
  Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
  Reply from 190.0.1.11: bytes=32 time<10ms TTL=255

  C:\>
  ```

  (2) When a response is not returned (abnormal connection)


  ```
  C:\WINNT\system32\cmd.exe

  C:\>ping 190.0.1.10

  Pinging 190.0.1.10 with 32 bytes of data:

  Request timed out.
  Request timed out.
  Request timed out.
  Request timed out.

  C:\>
  ```

  When a response is not returned, probable causes are either the hardware connection or a software setting, or both. Check the hardware connections and software settings again.

- 159 -

• Checking IP addresses for duplication
IP addresses can be checked for duplication by the procedure described below.
(1) Disconnect the Ethernet cable from the CNC to isolate it from the network.
(2) Execute a ping command on another personal computer as described in "• Checking the communication path."
Since the CNC is disconnected from the network, no response should be returned. If a response is returned, the IP address is in use on another unit. Therefore, the IP address cannot be used on the CNC from which the cable was disconnected.

⚠ **CAUTION**
The purpose of this check is to check for a duplicate IP address. It does not assure that the IP address is left non-duplicated because a unit having the same IP address may be turned on after the check or the same address may be set later.
When setting an IP addressing, ask the network manager about duplication.

• Checking for influence of electrical noise
The "ping" command "-t" option is used for checking for the influence of electrical noise. This option sends ping packets until "Ctrl+C" is pressed.

```
C:¥>ping -t 190.0.1.11

Pinging 190.0.1.11 with 32 bytes of data:

Reply from 190.0.1.11: bytes=32 time=10ms TTL=255
Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
Reply from 190.0.1.11: bytes=32 time<10ms TTL=255
^C^C
C:¥>_
```

1. About the influence of electrical noise from peripheral machinery (devices)

    (1) Turn the CNC is mounted ON to enable communications.

    (2) Press the EMERGENCY STOP button on the machine with the servo/spindle amplifier OFF, and issue the "ping" command from the host computer.

    (3) Count the number of lost packets (packets for which a response was not returned).
    If a lost packet occurs in this state, the machine is probably being affected by electrical influence from peripheral machines.

    Countermeasure:
    Pin-point the source of the electrical noise, and check the wiring again to prevent the influence of electrical noise.

2. About the influence of electrical noise from mounted machinery

    (1) Start up the machine in the same way as 1 above.

    (2) Cancel the emergency stop on the machine with the servo/spindle amplifier ON, and issue the "ping" command from the host computer.

    (3) Count the number of lost packets.
    If more lost packets than in 1 above are occurring, a probable cause is the influence of electrical noise on the machine itself. General probable causes are the state of the ground on the machine or on the communicating party.

    Countermeasure:
    Check the state of the ground on the machine or on the communicating party, and insulate the communications trunk with the machine.

- For the method of checking the operating status and communication status of the FAST Ethernet/FAST Data Server, see Part VI "MAINTENANCE" as well.

A.5   **TROUBLESHOOTING DATA SERVER FUNCTION PROBLEMS**

> **NOTE**
>   While some parts of the troubleshooting procedures described below contain references to free software packages that receive frequent inquiries, these are not intended to offer a guarantee that the mentioned software will work properly. FANUC will have no liability with respect to any problems arising from software running on the user's personal computer.
>   Free software should be used with the user's judgment.

A.5.1   **DNC Operation or M198-Based Subprogram Calling**

This section enumerates troubles and solutions that occurred when DNC operation or M198-based subprogram calling was performed.

A.5.1.1   **An alarm occurs when an NC program is performed long time**

Trouble)

The condition of the Data Server mode: FTP mode
The contents of the trouble:
(1) An alarm occurs in performing if the feedrate of the NC program is slow.
(2) An alarm occurs in performing if the size of the NC program is large.
(3) An alarm occurs in performing if the NC program with long execution time of one block is performed.

Cause)

The cause is that the FTP server in the host computer disconnects the communication with the FTP client (CNC) for one of the following reasons.
<1> The connecting time with the FTP client is long.
<2> The time that the FTP server cannot send the one's data is long.

The cause of trouble (1) is <1> or <2>.
The cause of trouble (2) is <1>.
The cause of trouble (3) is <1> or <2>.

Solution)

Change setting of the FTP server in the host computer.

(1) In case of IIS
Change the setting of "Connection Timeout" from 900 seconds to 86400 seconds (24 hours).

(2) In case of Serv-U
Change the setting of "Idle time-out" from 10 minutes to a blank.
Confirm that a blank is set in the setting of "Session time-out".

Supplement)
Serv-U is the FTP server software that is developed by Rhino Soft Inc.
For details, refer to http://www.Serv-U.com/.

A.5.2   **M198-Based Subprogram Calling Fails for an NC Program**

Trouble)

The contents of the trouble:
An alarm occurs if a file name of an NC program called begins with a lowercase "o".

Cause)

The cause is that a file name of an NC program called begins with a lowercase "o".
For example, "O1234" is valid as the O number format, but "o1234" is invalid.

Solution)

A file name of an NC program of the O number format must begin with a uppercase "O" , such as "O1234".

A.5.3 Operating the DATA SERVER HOST FILE LIST Screen

This section enumerates troubles and solutions that occurred when the DATA SERVER HOST FILE LIST screen was displayed.

A.5.3.1 The list of files cannot be displayed

Trouble)
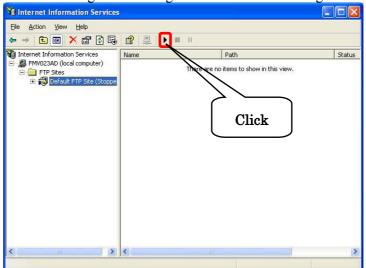
The contents of the trouble:
(1) At the first time of displaying the DATA SERVER HOST FILE LIST screen, the list of files cannot be displayed.
(2) The list of files had been displayed before, but oneday suddenly the list of files could not be displayed.

Cause)

The cause is that Data Server cannot connect the communication with the FTP server in the host computer.
<1> The FTP server software is not installed in a personal computer.
<2> The FTP server software does not run.
<3> The user name, the password or the login directory for connecting communication with the FTP server is invalid.
<4> The setting of the IP address and the subnetmask of the host computer or the setting of them of the Data Server board is invalid.
<5> The FTP communication is intercepted by the firewall function.
<6> The expiration of the user name or the password to connect with the FTP server is over.
<7> The host computer or the CNC which has the duplicate IP address is newly set up on the network.

The cause of trouble (1) is the one of <1> to <5>.
The cause of trouble (2) is the one of <5> to <7>.

Solution <1>)

Install the FTP server software in the host computer.

Solution <2>)

Get the FTP server running.
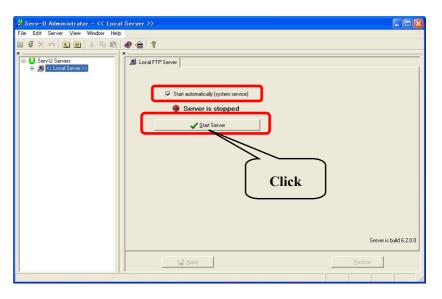
(1) In case of IIS
Click the triangle button to get the FTP server running.

(2) In case of Serv-U
Check "Start automatically (system service)" and click "Start Server" to get the FTP server running.

Solution <3>)

Confirm that the user name and the password set to Data Server are same with the user name and the password of the FTP server.
Note that the capital letter and the small letter are distinguished in the user name and the password.

Solution <4>)

Set not only the setting of the IP address and the subnetmask of the host computer but also the setting of them of Data Server correctly.

Solution <5>)

Reset the expiration of the user name and the password that can log in to the FTP server. You can stop the user name and the password from expiring by the following method.

(1) In case of IIS
Check "Password never expires".

(2) In case of Serv-U
Remove the check of "Disable account" and "Automatically".

Solution <6>)

Stop the firewall function, alternatively, set the firewall to be able to pass the FTP. A firewall may be set to the following two cases. One of them, the firewall is the software in the host computer (such as the Antivirus software and the Windows Firewall of Windows XP and so on). Another, it is the function built into the router and the layer 3 switch. Adjust it according to your system.

Solution <7>)

Check whether the IP address of the Data Server board is duplicated with the IP address of the host computer or CNC on the network. If it is duplicated, change it into the unique one.
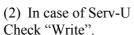
A.5.3.2   **Files cannot be transferred**

Trouble)

The contents of the trouble:
(1) Files cannot be transferred from a host computer to the mass storage medium built into Data Server board.
(2) Files cannot be transferred from the mass storage medium built into Data Server board to a host computer.

Cause)

There are the following three causes except for the cause that Data Server cannot connect the communication with the FTP server in the host computer. (See Subsection A.5.3.1 "The list of files cannot be displayed".)
<1> For GET operation or read (input) operation on the FTP mode, the specified file is not found in the folder managed by the FTP server.
<2> When an NC program is transferred by Get operation, the TV check alarm is detected.
<3> The access right for writing to the folder managed by the FTP server is not set.

The cause of trouble (1) is the one of <1> and <2>.
The cause of trouble (2) is <3>.

Solution <1>)

Store the file to be transferred in a folder managed by the FTP server. Alternatively, when GET operation and read (input) operation are performed, check whether a wrong file name is specified. In case of specifying a wrong file name, specify the correct file name.

Solution <2>)

Set "0" to bit 0 (TVC) of NC parameter No. 0000.

Solution <3>)

Add an access right to write for the folder managed by the FTP server.

(1) In case of IIS
Check "Write".

(2) In case of Serv-U
Check "Write".

A.5.4   Operating the DATA SERVER FILE LIST Screen

This section enumerates troubles and solutions that occurred when the DATA SERVER FILE LIST screen was displayed.

A.5.4.1   A program cannot be selected as a main program

Trouble)

The contents of the trouble:
(1) The NC program that is transferred from the host computer by the operation of the personal computer cannot be selected as a main program.
(2) The NC program that is transferred from the host computer by the operation of CNC (Data Server board) cannot be selected as a main program.

Cause)

The cause is that the attribute of the NC program stored in the mass storage medium built into Data Server is "the binary type".
In the DETAIL ON mode, "R/B" is displayed for a binary-type NC program.
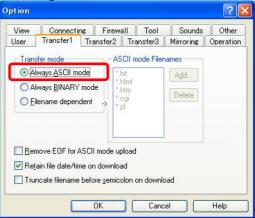
```
DTSVR  FILE  LIST                    O0777 N00000

M198 FLD
DNC FILE

CON HOST   1 : /ncdata

   USED        57, 485 [KBYTE]   USED FL        19
   FREE        64, 742 [KBYTE]   FREE FL     2, 028

DEVICE  :  DATA_SV    ( / )
  O0001                    2008/03/14  16:56:04
    (ROUGH         )         196 [KBYTE]  R/B
  O0010                    2008/03/14  16:56:24
    (CYCLE  001    )        9767 [KBYTE]



A ) _


EDIT  ****  ***  ***      12:00:00
  PROGRAM  DIR +                          (OPRT)
```

The NC program of O0001 is the binary file for the above figure.

Solution <1>)

Use the ASCII mode.
For example, in case of using FFFTP as the FTP client, set as the following.

Supplement)
FFFTP is the FTP client software.
For details, refer to http://www2.biglobe.ne.jp/~sota/.

Alternatively, set "1" to the NC parameter No.0929.

Solution <2>)

Use not soft key [BGET] but soft key [GET] of the DATA SERVER HOST FILE LIST screen.

B

EXAMPLE OF FTP SERVER SETUP

This appendix describes the method of setting up an FTP server that operates on the host computer to function as a communication destination for the Data Server functions.

Appendix B, "EXAMPLE OF FTP SERVER SETUP", consists of the following sections:

B.1　SETTING UP FTP SERVER OF Windows 2000 Professional (FOR INTERNET INFORMATION SERVICE)

Installing the Internet Information Service

1.　Set the CD-ROM of Windows 2000 Professional.

2.　Click [Install Add-On Components].

3. Select [Internet Information Services (IIS)], then click the [Details] button to display the [Internet Information Services (IIS)] dialog box. Next, check [File Transfer Protocol (FTP) Server].

4. Click the [OK] button, then return to the previous screen. Next, click [Next]. The necessary files are installed.
   The installation is completed when the following screen appears:

Setting the Internet Information Service

1. Select [Start] → [Settings] → [Control Panel].

2. Double-click [Administrative Tools].

3. Double-click [Internet Service Manager] for activation.

4. Double-click the computer name. Next, select [Default FTP Site] and right-click to display the menu. Then, select Properties.

5.   Select the [Home Directory] tab to display the [Home Directory]
property sheet. Check [Read] and [Write] in [FTP Site Directory].
In [Directory Listing Style], [MS-DOS] is selected by default.
However, it is recommended to check [UNIX]. If files are listed
in UNIX format, whether each file is accessible can be
determined.

6.   Upon completion of setting, click the [Apply] button.
In [Default FTP Site], the directory named "\Inetpub\ftproot", set
in [Local Path] above (in the drive where Windows 2000 is
installed), is assumed to be the home directory. So, directories
under this directory can be accessed.
So, with the default setting, NC programs need to be managed
under this directory.
The home directory can be changed by setting the new directory
in the [Local Path] of [FTP Site Directory].

7.   To access a directory other than the directories under the home
directory, a virtual directory needs to be set.
For details of a virtual directory, use the online help information
of Windows 2000.

Login user setting

1. Select [Start] → [Settings] → [Control Panel].

2. Double-click the icon [Users and Passwords].

3.   Click the [Add] button, then enter necessary items such as a user name.

4.   Click the [Next] button, then enter a password for the specified user name. (Unless a password is set, access to the FTP server cannot be made correctly. So, be sure to enter a password.)

5.   Click the [Next] button, then set an access right to be granted.
     The access right set here can affect the capability to read from
     and write to a file in FTP-based communication. Use care when
     setting an access right.

6.   Click the [Finish] button. The entered user name is registered,
     and the user can log in by using the user name and password.

Stopping password expiration for a login user

If the password expiration is not stopped, when the password expires, login is disabled, preventing FTP communication.
Therefore, stop the password expiration as necessary.
When a password has expired, it is necessary to set the password again.

1. Select [Start] $\rightarrow$ [Settings] $\rightarrow$ [Control Panel].

2.   Double-click the icon [Users and Passwords].

3.   Click the [Advanced] tab.

4.   Click the [Advanced] button.

5.   Double-click [Users]. A list of registered users is displayed.

6. Double-click the user name for which you want to change the password setting.
For example, double-click "dtsvr".

7. Check [Password never expires] and then click the [OK] button.
The password expiration is stopped.

B.2   SETTING UP FTP SERVER OF Windows XP Professional (FOR INTERNET INFORMATION SERVICE)

> **NOTE**
> Windows XP Home Edition does not have IIS (Internet Information Service).

Installing the Internet Information Service

1. Open [Control Panel] of Windows XP Professional.

2. Double-click [Add or Remove Programs].

3.   Double-click [Add/Remove Windows Components].

4.   Select [Internet Information Services (IIS)], then click the
[Details] button to display the [Internet Information Services
(IIS)] dialog box. Next, check [File Transfer Protocol (FTP)
Service].

5. Click the [OK] button, then return to the previous screen. Next, click [Next].

6. The dialog box above is displayed, and the necessary files are installed.
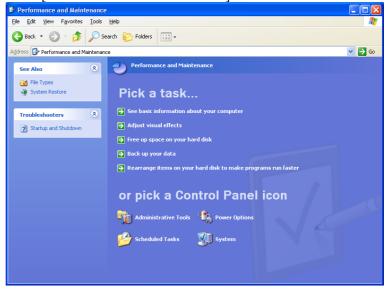
7. The installation is completed when the screen above is displayed.

Setting the Internet Information Service
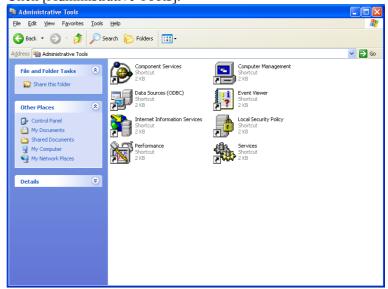
1. Open [Control Panel] of Windows XP Professional.

2. Click [Performance and Maintenance].

3.   Click [Administrative Tools].

4.   Double-click [Internet Information Services].

5. Double-click [FTP Site], right-click [Default FTP Site] to display a menu, then select Properties.

6. Select the [Home Directory] tab to display the [Home Directory] property sheet.
Check [Read] and [Write] in [FTP Site Directory]. In [Directory Listing Style], [MS-DOS] is selected by default. However, it is recommended to check [UNIX]. If files are listed in UNIX format, whether each file is accessible can be determined.

7. Then, click the [OK] button.
    In the standard [Default FTP Site], the directory \Inetput\ftproot
    (on the drive where Windows XP is installed) is the home
    directory, and only the directories under the home directory can
    be accessed.
    To use a directory other than the default directory as a home
    directory, modify the local path of [FTP Site Directory]
    mentioned in step 6 above.

8. To access a directory other than the directories under the home
    directory set in step 7 above, a virtual directory needs to be set.
    For details of a virtual directory, use information such as the
    online help information of Windows XP.

Login user setting

1. Open [Control Panel] of Windows XP Professional.

2. Double-click the icon of [User Accounts].
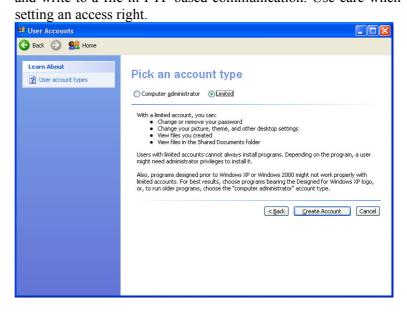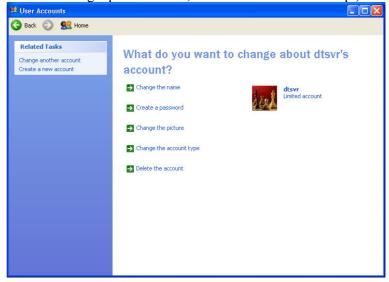
3.   Click [Create a new account], then enter a desired user name.

4.   Click the [Next] button, then set an account type.
The access right set here can affect the capability to read from and write to a file in FTP-based communication. Use care when setting an access right.

5. Click the [Create Account] button, then the creation of an account is completed.

6. For password setting, click the previously created account in [or pick an account to change]. (The FTP server cannot be accessed without setting a password. So, be sure to execute this step.)

7. Click [Create a password], then enter a password for the specified user name.

8. Click the [Create Password] button to register the entered password. By using the account registered this time, the user can log in to the FTP server.

Stopping password expiration for a login user

If the password expiration is not stopped, the Data Server will not be able to communicate with the FTP server at the time of expiring the password.
If you are necessary, stop the password expiration.
If the password is expired, it is necessary that you re-enter the password.

1. Select [Start] → [All Programs] → [Accessories] → [Command Prompt].

2. Input "net user login-user /expires:never".

3. If the above message is displayed, the password expiration is stopped.

Confirming the Firewall function of Windows XP

Because the Internet Connection Firewall function is included in the Windows XP Professional, the Data Server cannot communicate with the FTP server.
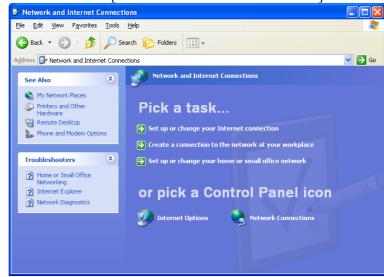
If the FTP connection cannot be established, confirm the following setting of the Internet Connection Firewall function.

NOTE

When settings are made as described below, the FTP server functions and response to PING, which have been disabled by the network security function, are enabled.

Therefore, when making the following settings, consult with your network administrator, and take special care.

In some cases, it becomes necessary to isolate the network from the outside as required.

---
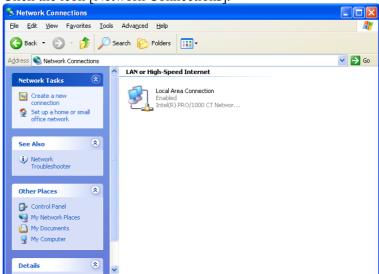
1. Open [Control Panel] of Windows XP Professional.

2. Click the icon of [Network and Internet Connections].

3. Click the icon [Network Connections].

4. Right-click the icon [Local Area Connection] to display the menu.
    Then, select Properties.

5. Select the [Advanced] tab.

6.   If [Internet Connection Firewall] is not checked, the Internet Connection Firewall function does not work. Then, the following confirmations are not necessary.

7.   If [Internet Connection Firewall] is checked, click the [Settings…] button.
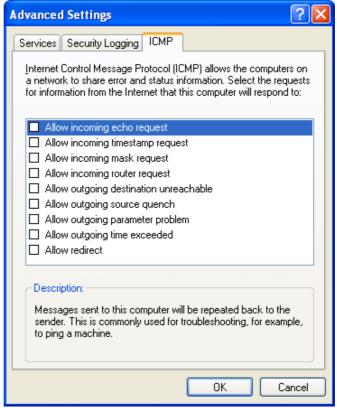
8.   If the [FTP Server] check-box is not checked, the FTP server function does not work. Check the [FTP Server] check-box.
When the [FTP Server] check-box is cheeked, the following window is displayed. Then, click the [OK] button.

9.   Select the [ICMP] tab.

10. If the [Allow incoming echo request] check-box is not checked, the Data Server function cannot find the FTP server at the start of communication.
At the start of communication of Data Server, if the message "[FTP] (IP-address) IS NOT AVAILABLE" is displayed, check this check-box.
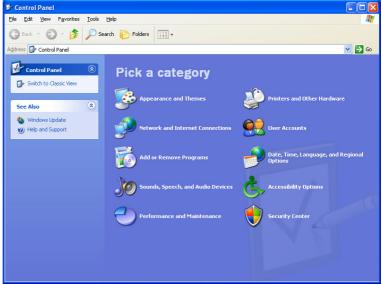
Confirming the firewall function when Windows XP (Service Pack 2) is used

When Windows XP Professional (Service Pack 2) is used, a different firewall setting procedure is used.

1. Open [Control Panel] of Windows XP Professional.

2. Double-click [Security Center] to start it.

3.   Click [Windows Firewall] displayed at the bottom.

4.   Select the [Advanced] tab.

5. Click the [Settings] button of [ICMP].

6. If [Allow incoming echo request] is not checked, check it, and click the [OK] button.
This allows a response to be made to PING from other devices.

7.   Select the [Exceptions] tab.

8.   Click the [Add Port] button, and make settings as follows:

9.   Click the [OK] button.

B.3 SETTING UP FTP SERVER OF Windows Vista (FOR INTERNET INFORMATION SERVICE)

> **NOTE**
> Windows Vista Home Basic and Windows Vista Home Premium do not have IIS (Internet Information Service).

Installing the Internet Information Service
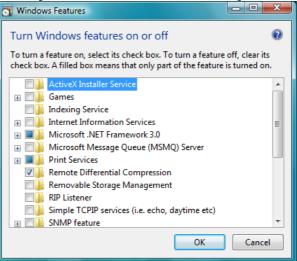
1. Open [Control Panel] of Windows Vista.

2.   Click [Programs].
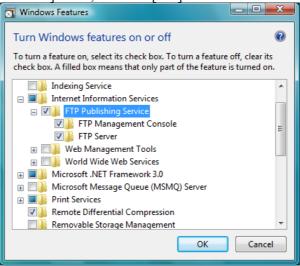
3.   Click [Turn Windows features on or off].

4. Expand [Internet Information Services], then check [FTP Management Console] and [FTP Server] in [FTP Publishing Service]. Next, click the [OK] button.
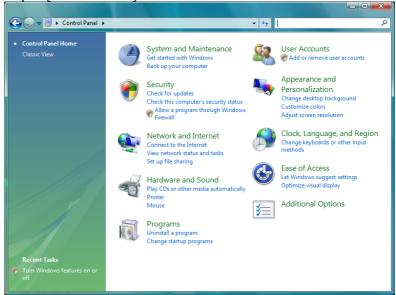
5. The dialog box below is displayed, and the necessary files are installed.
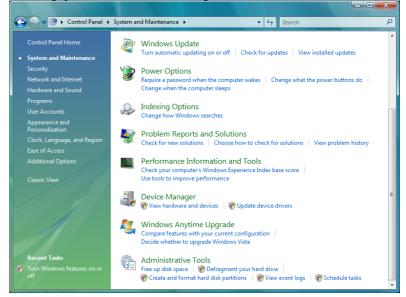
6. The installation is completed when the dialog box above and [Windows Features] dialog box are finished.

Setting the Internet Information Service
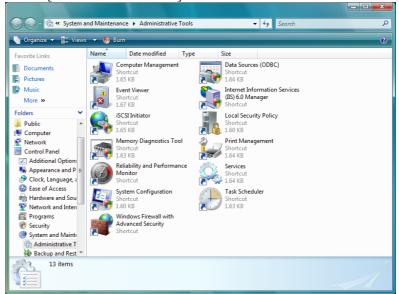
1.   Open [Control Panel] of Windows Vista.

2.   Click [System and Maintenance].

3. Click [Administrative Tools].

4. Double-click [Services] to start it.

5.   Select [FTP Publishing Service], right-click it to display a menu, then select Properties.

6.   Display the [General] property sheet.
Change [Manual] to [Automatic] in [Startup type] and click the [Start] button in [Service status], then click the [OK] button.
End [Services].

7. Return to [Administrative Tools], then Double-click [Internet Information Services (IIS) 6.0 Manager] ([IIS6 Manager]) to start it.

8. Double-click [FTP Sites], right-click [Default FTP Site] to display a menu, then select Properties.

9. Select the [Home Directory] tab to display the [Home Directory] property sheet.
    Check [Read] and [Write] in [FTP site directory]. In [Directory listing style], [MS-DOS] is selected by default. However, it is recommended to check [UNIX]. If files are listed in UNIX format, whether each file is accessible can be determined.

10. Then, click the [OK] button.
    In the standard [Default FTP Site], the directory \inetpub\ftproot (on the drive where Windows Vista is installed) is the home directory, and only the directories under the home directory can be accessed.
    To use a directory other than the default directory as a home directory, modify the local path of [FTP site directory] mentioned in step 9 above.
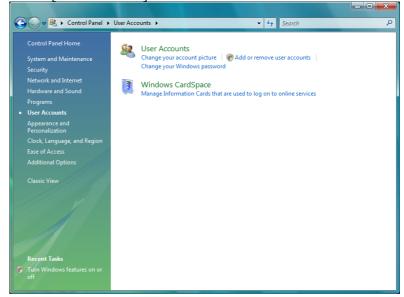
11. To access a directory other than the directories under the home directory set in step 10 above, a virtual directory needs to be set.
    For details of a virtual directory, use information such as the online help information of Windows Vista.

Login User Setting

1. Open [Control Panel] of Windows Vista.

2. Click [User Accounts].

3.   Click [Add or remove user accounts].

4.   Click [Create a new account], then enter a desired user name and
set an account type.
The access right set here can affect the right to read from and
write to a file in FTP-based communication. Use care when
setting an access right.

5. Click the [Create Account] button, then the creation of an account is completed.

6. For password setting, click the previously created account. (The FTP server cannot be accessed without setting a password. So, be sure to execute this step.)

7. Click [Create a password], then enter a password for the specified user name.

8. Click the [Create password] button to register the entered password. By using the account registered this time, the user can log in to the FTP server.

Stopping password expiration for a login user

If the password expiration is not stopped, the Data Server will not be able to communicate with the FTP server at the time of expiring the password.
If you are necessary, stop the password expiration.
If the password is expired, it is necessary that you re-enter the password.

1. Select [Start] → [All Programs] → [Accessories] → [Command Prompt], right-click it to display a menu, then select [Run as administrator].

2. Input "net   user   login-user   /expires:never".

3. If the above message is displayed, the password expiration is stopped.

Confirming the Firewall function of Windows Vista

Because the Internet Connection Firewall function is included in the Windows Vista, the Data Server may not communicate with the FTP server.

If the FTP connection cannot be established, confirm the following setting of the Internet Connection Firewall function.

NOTE

When settings are made as described below, the FTP server functions and response to PING, which have been disabled by the network security function, are enabled.

Therefore, when making the following settings, consult with your network administrator, and take special care.

In some cases, it becomes necessary to isolate the network from the outside as required.

---

1.   Open [Control Panel] of Windows Vista.

2.   Click [System and Maintenance].

3.   Click [Administrative Tools].

4. Double-click [Windows Firewall with Advanced Security] to start it.

5. Click [Inbound Rules], select [File and Printer Sharing (Echo Request - ICMPv4 - In)] from the list, right-click it to display a menu, then select Properties.
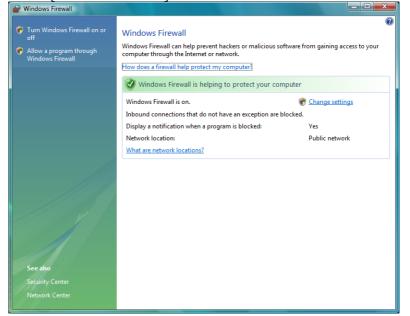
6.   Display the [General] property sheet.
      Check [Enabled] in [General], then click the [OK] button.
      End [Windows Firewall with Advanced Security].

7.   Return to [Control Panel], then click [Security].

8.   Click [Windows Firewall].

9.   Click [Change settings].

10. Select the [Exceptions] tab.
     Check [FTP Server], then click the [OK] button.

C

FTP CLIENT OPERATION

This appendix describes the method of operating an FTP client that operates on the host computer to function as a communication destination for the Data Server functions.

Appendix C, "FTP CLIENT OPERATION", consists of the following sections:

C.1 OPERATION USING THE FTP COMMAND

Login

1 Enter "ftp IP-address-of-NC or host-name" at the command prompt.
2 Enter a user name.
3 Enter a password.
4 The message, "230 User logged in, proceed." indicates that the login process has been completed successfully.

```
Command Prompt - ftp 192.168.0.1                          _ □ ✕
Microsoft(R) Windows NT(R)
(C) Copyright 1985-1996 Microsoft Corp.

F:¥>ftp 192.168.0.1
Connected to 192.168.0.1.
220 FANUC FTP server ready.
User (192.168.0.1:(none)): dtsvr
331 User name okay, need password.
Password:
230 User logged in, proceed.
ftp>
```

GET (acquiring a file from the FTP server)

1 Enter "get Data-Server-file-name".

```
ftp> get 00001.DAT
200 Command okay.
150 Opening data connection for (00001.DAT) (192.168.0.101,1036).
226 Closing data connection.
1040102 bytes received in 13.28 seconds (78.33 Kbytes/sec)
ftp>
```

MGET (acquiring files from the FTP server)

1 Enter "mget Data-Server-file-name (including a wildcard character)".

```
ftp> mget *.DAT
200 Command okay.
200 Command okay.
150 Opening data connection for (00002.DAT) (192.168.0.101,1066).
226 Closing data connection.
2080120 bytes received in 27.45 seconds (75.78 Kbytes/sec)
200 Command okay.
150 Opening data connection for (PRG7.DAT) (192.168.0.101,1067).
226 Closing data connection.
1160 bytes received in 0.13 seconds (8.92 Kbytes/sec)
ftp>
```

- 229 -

PUT (sending a file to the FTP server)

1   Enter "put host-file-name Data-Server-file-name".

```
ftp> put 00001.DAT 00001
200 Command okay.
150 Opening data connection for (00001) (192.168.0.101,1037).
226 Closing data connection.
1040102 bytes sent in 11.48 seconds (90.63 Kbytes/sec)
ftp>
```

MPUT (sending files to the FTP server)

1   Enter "mput host-file-name (including a wildcard character)."

```
ftp> mput *.DAT
200 Command okay.
150 Opening data connection for (00002.DAT) (192.168.0.101,1068).
226 Closing data connection.
2080120 bytes sent in 22.69 seconds (91.66 Kbytes/sec)
200 Command okay.
150 Opening data connection for (PRG7.DAT) (192.168.0.101,1069).
226 Closing data connection.
1160 bytes sent in 0.00 seconds (1160000.00 Kbytes/sec)
ftp>
```

DIR (acquiring a list of files of the FTP server)

1   Enter dir.

```
ftp> dir
200 Command okay.
150 Opening data connection for (LIST ) (192.168.0.101,1035).
d---------  1 owner    group             0 Feb 10 15:42 .
d---------  1 owner    group             0 Feb 10 15:42 ..
----------  1 owner    group       1040102 Feb 16 09:47 00001.DAT
----------  1 owner    group       2080120 Feb 16 09:47 00002.DAT
----------  1 owner    group         45448 Feb 24 16:57 PRAMETER
----------  1 owner    group         11092 Feb 24 17:02 TOOLOFS
----------  1 owner    group          4116 Feb 25 10:35 MACRO
----------  1 owner    group            74 Feb 16 09:47 00199.PRG
----------  1 owner    group         12292 Feb 24 17:09 PITCH
----------  1 owner    group          2740 Feb 24 17:54 WORKOFS
----------  1 owner    group           462 Feb 24 20:28 HISTORY
----------  1 owner    group          6004 Feb 24 20:31 M-CODE
----------  1 owner    group          1160 Feb 16 09:48 PRG7.DAT
226 Closing data connection.
876 bytes received in 0.17 seconds (5.15 Kbytes/sec)
ftp>
```

DEL (deleting a file from the FTP server)

1   Enter "del Data-Server-file-name".

```
ftp> del 00001.DAT
250 Requested file action okay, completed.
ftp>
```

- 230 -

TYPE (confirming the transfer type of the FTP client)

1. Enter type.
2. Whether the ascii mode or binary mode is set can be determined.

```
ftp> type
Using ascii mode to transfer files.
ftp>
```

```
ftp> type
Using binary mode to transfer files.
ftp>
```

ASCII, BIN (changing the transfer type of the FTP client)

1. Entering bin can change the mode to the binary mode.

```
ftp> bin
200 Type set to I.
ftp>
```

2. Entering ascii can change the mode to the ascii mode.

```
ftp> ascii
200 Type set to A.
ftp>
```

Logout

1   Enter bye.

```
ftp> bye
221 Service closing control connection.

F:¥>
```

C.2   SECURITY UNBLOCKING IN Windows

When an attempt is made to start FTP communication for the first time in Windows XP (Service Pack 2) or Windows Vista, the security alert shown below may appear.
If the alert appears, consult with the network administrator, and select "Unblock" as necessary.

Security alert for Windows XP（Service Pack 2）

Security alert for Windows Vista

⚠ **CAUTION**
Since selecting "Unblock" means change in settings related to network security, be sure to consult with the network administrator in advance. If "Unblock" is selected carelessly, network security can be compromised.

D

DNS/DHCP FUNCTION

This chapter describes the setting and other procedures for using the DNS client function and DHCP client function.

Appendix D, "DNS/DHCP FUNCTION", consists of the following sections:

D.1   **SETTINGS ON THE COMMUNICATION BOARD SIDE**

D.1.1   **Setting the DNS Client Function**

This section describes the setting procedure for operating DNS client function.

Procedure

1   Enable the DNS client function according to Item, "Related NC parameters" provided later.
2   Set up the DNS server on the host computer. For information about setup, see Item, "Example of DNS/DHCP setup."
3   Make a connection to the host computer where the DNS server operates (hereinafter referred to as the "DNS server") and restart the CNC, then press the function key [◇ SYSTEM].
4   Press soft key [ETHBRD] ([ETHER BOARD]), then press [COMMON] to display the COMMON (DETAIL) screen.
5   As the DNS IP address, enter the IP address of the DNS server.

This section describes the setting procedure for operating the DNS client function.

COMMON screen (DETAIL)

Press soft key [COMMON] then page keys [↑PAGE] [↓PAGE] to display the COMMON (DETAIL) screen. Set the setting items for DNS IP addresses.

```
ETH_BRD SETTING                    O0000 N00000
            COMMON: Setting[BOARD]
 DETAIL
  DNS  IP  ADDRESS  1          192. 168. 0. 251
  DNS  IP  ADDRESS  2          192. 168. 0. 252
  HOST  NAME
            CNC-1
  DOMAIN
            FACTORY


                                          2／ 2

 A)_

 MDI    ****  ***  ***      12:00:00
 〈 COMMON   FOCAS2    DTSVR  RMTDIAG (OPRT)  +
```

COMMON screen (DETAIL)

Setting item

Item	Description
DNS IP ADDRESS 1, 2	Up to two DNS server IP addresses can be set. The CNC searches for a DNS server in the order from DNS IP address 1 to 2.

D.1.2   **Setting the DHCP Client Function**

This section describes the setting procedure for operating DHCP client function.

Procedure

1   Enable the DHCP client function according Item, "Related NC parameters" provided later.
2   Set up the DHCP server on the host computer. For information about setup, see Item, "Example of DNS/DHCP setup."
3   Make a connection to the host computer where the DHCP server operates (hereinafter referred to as the "DHCP server") and restart the CNC, then press the function key ⬒.
4   Press soft key [ETHBRD] ([ETHER BOARD]), then press [COMMON] to display the COMMON screen.
5   If the DHCP client function of the CNC is enabled and a connection is made successfully with the DHCP server, the following items are set automatically from the DHCP server:
    - IP ADDRESS
    - SUBNET MASK
    - ROUTER IP ADDRESS
    - DNS IP ADDRESS
    - DOMAIN
    If an attempt to make a connection with the DHCP server fails, "DHCP ERROR" is indicated in each item.
6   Moreover, if the DNS client function is enabled at the same time and the DHCP server interacts with the DNS server (the DNS server supports dynamic DNS), enter a desired host name.

COMMON screens (BASIC, DETAIL)

Press soft key [COMMON] then page keys [↑PAGE] [PAGE↓] to display the COMMON screens (BASIC and DETAIL). If a connection is made successfully with the DHCP server and setting data is acquired, the following is displayed:

```
ETH_BRD SETTING                    O0000 N00000
            COMMON: Setting[BOARD]
 BASIC
  MAC ADDRESS                  00E0E4000001
  IP ADDRESS                   192. 168. 0. 100
  SUBNET MASK                  255. 255. 255. 0
  ROUTER IP ADDRESS            192. 168. 0. 253




                                          1/ 2
 A)_


 MDI   **** *** ***   | 12:00:00 |
 《 COMMON  FOCAS2   DTSVR  RMTDIAG (OPRT)  |+
```
When a connection with the DHCP server has been made successfully (1)

```
ETH_BRD SETTING                    O0000 N00000
            COMMON: Setting[BOARD]
 DETAIL
  DNS IP ADDRESS 1             192. 168. 0. 251
  DNS IP ADDRESS 2             192. 168. 0. 252
  HOST NAME
        CNC-1
  DOMAIN
        FACTORY


                                          2/ 2
 A)_


 MDI   **** *** ***   | 12:00:00 |
 《 COMMON  FOCAS2   DTSVR  RMTDIAG (OPRT)  |+
```
When a connection with the DHCP server has been made successfully (2)

If no host name is set, the CNC automatically sets a host name in the format "NC-<MAC address>".

```
HOST NAME
          NC-00E0E4000001
```
Example of host name automatically set

If an attempt to make a connection with the DHCP server fails, the following is displayed:

```
ETH_BRD SETTING                    O0000 N00000
            COMMON: Setting[BOARD]
 BASIC
  MAC ADDRESS                   00E0E4000001
  IP ADDRESS                    DHCP ERROR
  SUBNET MASK                   DHCP ERROR
  ROUTER IP ADDRESS             DHCP ERROR




                                          1/ 2

A)_

MDI   **** *** ***     12:00:00
《 COMMON  FOCAS2   DTSVR  RMTDIAG (OPRT) +
```
When an attempt to make a connection with the DHCP server has failed (1)

```
ETH_BRD SETTING                    O0000 N00000
            COMMON: Setting[BOARD]
 DETAIL
  DNS IP ADDRESS 1              DHCP ERROR
  DNS IP ADDRESS 2              DHCP ERROR
  HOST NAME
          CNC-1
  DOMAIN
          DHCP ERROR


                                          2/ 2

A)_

MDI   **** *** ***     12:00:00
《 COMMON  FOCAS2   DTSVR  RMTDIAG (OPRT) +
```
When an attempt to make a connection with the DHCP server has failed (2)

Check item

Item	Description
IP ADDRESS SUBNET MASK ROUTER IP ADDRESS DNS IP ADDRESS 1, 2 DOMAIN	If a connection is made successfully with the DHCP server, data acquired from the DHCP server is displayed. If an attempt to make a connection with the DHCP server fails, "DHCP ERROR" is displayed.

Setting item

Item	Description
HOST NAME	Enter a desired CNC host name. If the DHCP server interacts with the DNS server, this host name is posted to the DNS server. If no host name is set, "NC-<MAC address>" is automatically set. 　Example of host name automatically set: 　NC-00E0E4000001

Display item

Item	Description
MAC ADDRESS	FAST Ethernet/FAST Data Server MAC address

D.1.3 **Related NC Parameters**

	#7	#6	#5	#4	#3	#2	#1	#0
0904		DHC	DNS		D1E			

    [Input type]   Setting input
    [Data type]   Bit

 # 3   **D1E**   When the DHCP function is used:
    0:    Default parameters for the FOCAS2/Ethernet functions are set.

Port number (TCP)	8193
Port number (UDP)	0
Time interval	0

    1:    Default parameters for CIMPLICITY *i*CELL communication are set.

Port number (TCP)	8193
Port number (UDP)	8192
Time interval	50

> **NOTE**
> Set D1ET to 1 to make a connection with the FANUC CIMPLICITY *i* CELL and use the DHCP function and DNS function.

 # 5   **DNS**   The DNS client function is:
    0:    Not used.
    1:    Used.

 # 6   **DHC**   The DHCP client function is:
    0:    Not used.
    1:    Used.

    If any of these parameters has been modified, the power must be turned off then back on for the modification to be become effective.
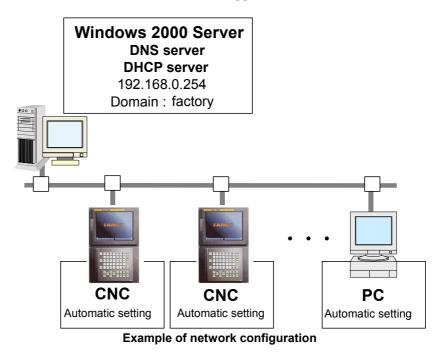
D.2   SETTING UP THE DNS/DHCP SERVER OF Windows 2000 Server

This appendix describes the method of setting up the DNS/DHCP server of Windows 2000 Server.

Example of setting a simple network

An example of setup in a network configuration that satisfies the following conditions is provided:
1. The DHCP server and DNS server are operated using the same personal computer.
2. The IP address of the DHCP server and DNS server is 192.168.0.254.
3. The DHCP server controls the IP address range 192.168.0.10 to 192.168.0.29.
4. The domain controlled by the DNS server is named "factory".
5. The same domain includes the DHCP server, DNS server, CNCs, and a PC for FOCAS1/Ethernet applications.
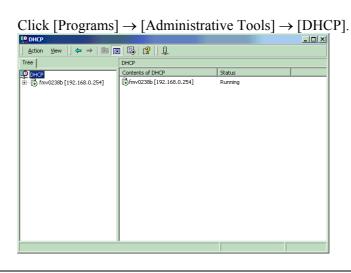
Example of network configuration

> **NOTE**
> The setting described above is just an example.
> For setup in an actual network configuration in the factory, consult with the network administrator of the factory.

D.2.1 Example of Setting Up DHCP Server of Windows 2000 Server

1. Activating the Microsoft administrative console (DHCP)

Click [Programs] → [Administrative Tools] → [DHCP].

2. Adding a scope

Click [Action] → [New Scope] to start "New Scope Wizard".

Click the [Next] button.

Enter "factory" as [Name], and enter "FACTORY" as [Description].
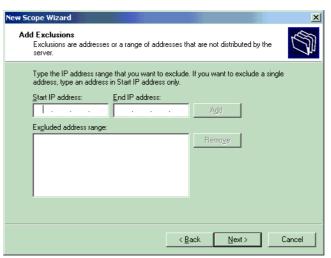
Click the [Next] button.

Enter "192.168.0.10" as [Start IP address], enter "192.168.0.29" as [End IP address], enter "24" as [Length], and enter "255.255.255.0" as [Subnet mask].

Click the [Next] button.

Click the [Next] button without entering any data.

Keep "8" days unchanged as Period, then click the [Next] button.

Keep [Yes, I want to configure these options now] selected, and click the [Next] button.

Click the [Next] button without entering any data.
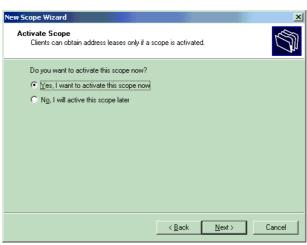
Enter "192.168.0.254" as IP Address, then click [Add].

Click the [Next] button.

Click the [Next] button without entering any data.

Keep [Yes, I want to activate this scope now] selected, and click the [Next] button.

Click [Finish].
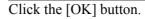
3.   Adding a scope option

Click [Scope[192.168.0.0]factory], then click [Scope Options] →
[Action] → [Configure Options].

From the available options, find and check [DNS Domain Name].
Then, enter "factory" as String value.
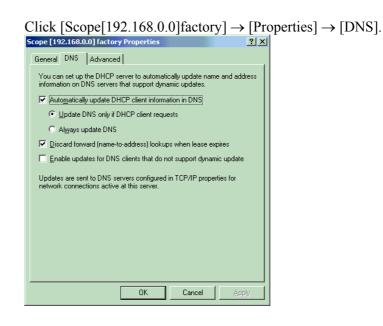
Click the [OK] button.

The following setting is made:
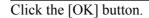
4. Enabling Dynamic DNS

Click [Scope[192.168.0.0]factory] → [Properties] → [DNS].

Check [Always update DNC] and [Enable updates for DNS clients that do not support dynamic update].

Click the [OK] button.

This completes DHCP server setting.

D.2.2   Example of Setting Up DNS Server of Windows 2000 Server

1.   Activating the Microsoft administrative console (DNS)

Click [Programs] → [Administrative Tools] → [DNS].
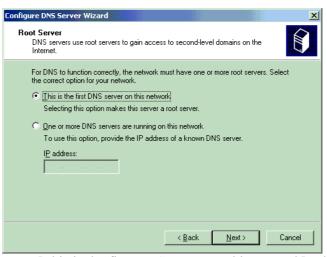
2.   DNS server configuration
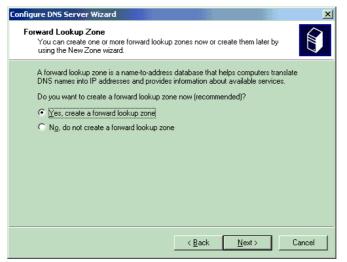
Click [Action] → [Configure the server] to start [Configure DNS Server Wizard].
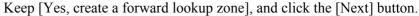
Click the [Next] button.

Keep [This is the first DNS server on this network] selected, and click the [Next] button.

Keep [Yes, create a forward lookup zone], and click the [Next] button.

Keep [Standard primary] selected, and click the [Next] button.

Enter "factory." as Name. (Do not fail to enter "." after "factory".)

Click the [Next] button.

Keep "factory.dns" unchanged, and click the [Next] button.

Keep [Yes, create a reverse lookup zone] selected, and click the [Next] button.

Keep [Standard primary] selected, and click the [Next] button.

Enter "192.168.0" as Network ID.

Click the [Next] button.

Keep "0.168.192.in-addr.arpa.dns" unchanged, and click the [Next] button.
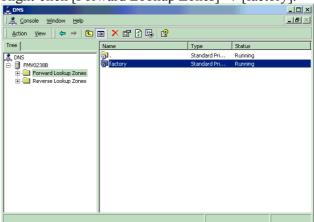
Click the [Finish] button.
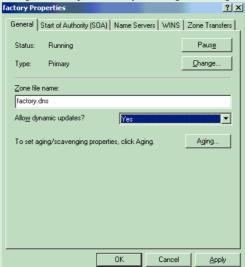
3. Enabling Dynamic DNS

Right-click [Forward Lookup Zones] → [factory].

Click [Properties].

For [Allow dynamic updates?], select [Yes].

Click the [OK] button.

This completes DNS server setting.

D.3   **EXAMPLE OF SETTING DNS/DHCP**

D.3.1   **When DNS/DHCP is Used with the Data Server**

When a connection is made with the FTP server of the host computer (hereinafter referred to as the "FTP server") by using the Data Server function, the IP address of the CNC can be set from the DHCP server by enabling the DHCP client function of the CNC.

Moreover, by enabling the DNS client function of the CNC, an FTP server can be specified with a host name instead of an IP address.

```
ETH_BRD SETTING                    O0000 N00000
            Data Server:Setting[BOARD]
 CONNECT1
  HOST NAME(IP ADDRESS)
        FTPserver-1

  PORT NUMBER                              21
  USER NAME
        user
  PASSWORD
        ****
                                       1/ 8
 A)_


 MDI   **** *** ***      12:00:00
 《 COMMON  FOCAS2   DTSVR  RMTDIAG (OPRT)  +
```

Example of specifying a connection destination with a host name
(FTPServer-1)

Setting the DNS server / DHCP server

Operating system

It is recommended to use Windows 2000 Server as the operating system.

Setting the DHCP server

In the database of the DHCP server, set the following items:
- Range of IP addresses to be managed by the DHCP server
- Subnet mask to be managed by the DHCP server
- IP address for DNS server
- Domain

The DHCP server enables the function for updating the database of the DNS server.

For DHCP server setting, see Appendix D.2.1, "Example of Setting Up DHCP Server of Windows 2000 Server."

Setting the DNS server

The DNS server allows the DHCP server to update the database of the DNS server.

For DNS server setting, see Appendix D.2.2, "Example of Setting Up DNS Server of Windows 2000 Server."

Setting the FTP server

For FTP server setting, see Appendix B, "EXAMPLE OF FTP SERVER SETUP."

Setting the CNC

Parameter

To enable the DNS function, set bit 5 (DNS) of NC parameter No. 0904 to 1.
To enable the DHCP function, set bit 6 (DHC) of NC parameter No. 0904 to 1.

D.3.2 **When DHCP is Used with the FTP Server Function of the Data Server**

The Data Server (FTP server function) can be accessed by specifying a host name from an FTP client where an FTP client operates (hereinafter referred to as an "FTP client"), using the interaction between the DHCP server and DNS server operating with Windows 2000 Server.
The DHCP client function of the CNC is enabled.

Flow of operation

When the system is initialized or the system configuration is modified
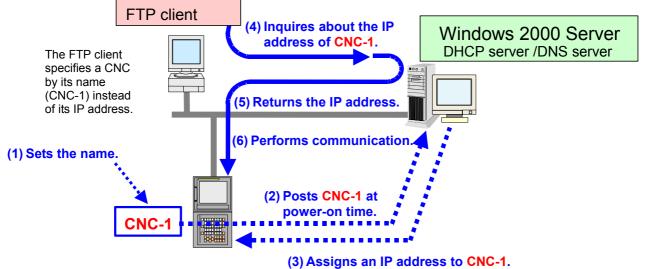
1   A host name is set on the CNC.
2   When the power is turned on, the Data Server posts the host name to the DHCP server.
3   The DHCP server assigns an IP address, and the table of correspondence between CNC host names and CNC IP addresses is updated.

When operation is performed from an FTP client

1   An FTP client inquires of the DNS server about the IP address of a CNC.
2   The FTP client acquires the IP address of the CNC.
3   The FTP client communicates with the FTP server of the CNC by using the IP address of the CNC.

FTP client

The FTP client specifies a CNC by its name (CNC-1) instead of its IP address.

(4) Inquires about the IP address of CNC-1.

Windows 2000 Server
DHCP server /DNS server

(5) Returns the IP address.

(6) Performs communication.

(1) Sets the name.

(2) Posts CNC-1 at power-on time.

CNC-1

(3) Assigns an IP address to CNC-1.

Setting the DNS server/DHCP server

Operating system

It is recommended to use Windows 2000 Server as the operating system. (The DNS server and DHCP server supporting dynamic DNS need to operate.)

Setting the DHCP server

In the database of the DHCP server, set the following items:
- Range of IP addresses to be managed by the DHCP server
- Subnet mask to be managed by the DHCP server
- IP address for DNS server
- Domain

The DHCP server enables the function for updating the database of the DNS server.

For DHCP server setting, see Appendix D.2.1, "Example of Setting Up DHCP Server of Windows 2000 Server."

Setting the DNS server

The DNS server allows the DHCP server to update the database of the DNS server.

For DNS server setting, see Appendix D.2.2, "Example of Setting Up DNS Server of Windows 2000 Server."

Setting the CNC

Parameter

To enable the DHCP function, set bit 6 (DHC) of NC parameter No. 0904 to 1.

As a host name, set a desired name. Otherwise, a name automatically set by the FAST Ethernet/FAST Data Server is used.

D.3.3 **When DHCP Function is Used with the FOCAS2/Ethernet Function**

Ethernet parameters can be set with no setting performed from the CNC, using the interaction between the DHCP server and DNS server operating with Windows 2000 Server.
The DHCP client function of the CNC is enabled.

Flow of operation

When the system is initialized or the system configuration is modified
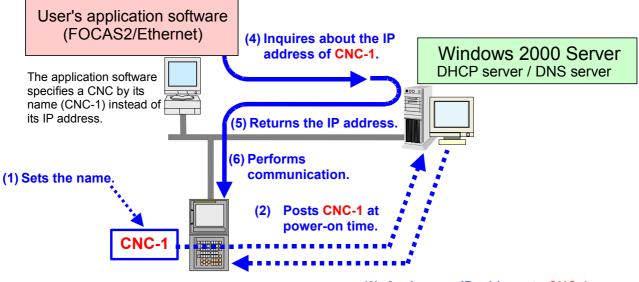
1   A host name is set on the CNC.
2   When the power is turned on, the CNC posts the host name to the DHCP server.
3   The DHCP server assigns an IP address, and the table of correspondence between CNC host names and CNC IP addresses is updated.

When FOCAS2/Ethernet application software is executed

1   The user's application inquires of the DNS server about the IP address of a CNC.
2   The user's application acquires the IP address of the CNC.
3   The user's application communicates with the CNC by using the IP address of the CNC.

User's application software
(FOCAS2/Ethernet)

The application software specifies a CNC by its name (CNC-1) instead of its IP address.

(4) Inquires about the IP address of CNC-1.

Windows 2000 Server
DHCP server / DNS server

(5) Returns the IP address.

(6) Performs communication.

(1) Sets the name.

(2)   Posts CNC-1 at power-on time.

CNC-1

(3)   Assigns an IP address to CNC-1.

Setting the DNS server/DHCP server

Operating system

It is recommended to use Windows 2000 Server as the operating system. (The DNS server and DHCP server supporting dynamic DNS need to operate.)

Setting the DHCP server

In the database of the DHCP server, set the following items:
- Range of IP addresses to be managed by the DHCP server
- Subnet mask to be managed by the DHCP server
- IP address for DNS server
- Domain

The DHCP server enables the function for updating the database of the DNS server.

For DHCP server setting, see Appendix D.2.1, "Example of Setting Up DHCP Server of Windows 2000 Server."

Setting the DNS server

The DNS server allows the DHCP server to update the database of the DNS server.

For DNS server setting, see Appendix D.2.2, "Example of Setting Up DNS Server of Windows 2000 Server."

Setting the CNC

Parameter

To enable the DHCP function, set bit 6 (DHC) of NC parameter No. 0904 to 1.

As a host name, set a desired name. Otherwise, a name automatically set by the FAST Ethernet/FAST Data Server is used.

When the DHCP function is enabled, the FOCAS2/Ethernet-related parameters are automatically set if bit 3 (D1E) of NC parameter No. 0904 is set to 0. If bit 3 (D1E) of NC parameter No. 0904 is set to 1, the parameters for *i* CELL communication are automatically set.

E

MACHINE REMOTE DIAGNOSIS
FUNCTIONS

This chapter describes the setting and operating procedures for using
the machine remote diagnosis functions.

Appendix E, "MACHINE REMOTE DIAGNOSIS FUNCTIONS",
consists of the following sections:

E.1 **SETTING THE MACHINE REMOTE DIAGNOSIS SETTING SCREEN**

This section describes how to set the parameters of the machine remote diagnosis functions.

For a general description of the machine remote diagnosis functions, refer to the "Machine Remote Diagnosis Package Operator's Manual (B-63734EN)".

Procedure

1 Press the function key [⬦ SYSTEM].

2 Soft key [ETHBRD] ([ETHER BOARD]) appear. (When there is no soft keys, press the continue key.)

3 Press soft key [ETHBRD] ([ETHER BOARD]) to display the Ethernet Setting screen.

4 Press soft keys [COMMON], [FOCAS2], and [RMTDIAG] ([REMOTE DIAG]) and then enter parameters for the items that appear.

COMMON screen (BASIC)

Press soft key [COMMON] to display the COMMON screen (BASIC).

```
ETH_BRD SETTING              O0000 N00000
          COMMON: Setting[BOARD]
 DETAIL
  DNS IP ADDRESS 1        192. 168. 0. 251
  DNS IP ADDRESS 2        192. 168. 0. 252
  HOST NAME
              CNC-1
  DOMAIN
          FACTORY


                                    2/ 2

 A）_


 MDI   **** *** ***      12:00:00
 《 COMMON  FOCAS2    DTSVR  RMTDIAG (OPRT)  +
```

COMMON screen (BASIC)

Setting item

Item	Description
IP ADDRESS	Specify the IP address of the FAST Ethernet / FAST Data Server. (Example of specification format: "192.168.0.100")
SUBNET MASK	Specify a mask address for the IP addresses of the network. (Example of specification format: "255.255.255.0")
ROUTER IP ADDRESS	Specify the IP address of the router. Specify this item when the network contains a router. (Example of specification format: "192.168.0.253")

Display item

Item	Description
MAC ADDRESS	FAST Ethernet / FAST Data Server MAC address

> **NOTE**
> The second page (detail screen) of the COMMON screen is to be set when the DNS/DHCP function is used. For details, see Appendix D "DNS/DHCP FUNCTION."

COMMON screen (DETAIL)

Press soft key [COMMON] then page keys ⬆PAGE ⬇PAGE , to display the COMMON (DETAIL) screen. Set the setting items for DNS IP addresses.

```
ETH_BRD SETTING                    O0000 N00000
         COMMON: Setting[BOARD]
 BASIC
  MAC ADDRESS                00E0E4000001
  IP ADDRESS                 192. 168. 0. 100
  SUBNET MASK                255. 255. 255. 0
  ROUTER IP ADDRESS          192. 168. 0. 253



                                      1/ 2

A}_


MDI   ****  ***  ***     12:00:00
 COMMON  FOCAS2   DTSVR  RMTDIAG  (OPRT)  +
```

COMMON screen (DETAIL)

Setting item

Item	Description
DNS IP ADDRESS 1, 2	Up to two DNS server IP addresses can be set. The CNC searches for a DNS server in the order from DNS IP address 1 to 2.

- 265 -

FOCAS2 screen

Press soft key [FOCAS2] to display the FOCAS2 screen.

```
ETH_BRD SETTING                      O0000 N00000
         FOCAS2/Ethernet:Setting[BOARD]
 BASIC
  PORT NUMBER (TCP)                         8193

  PORT NUMBER (UDP)                            0

  TIME  INTERVAL                               0




                                          1/  1

 A} _

 MDI    ****  ***  ***       12:00:00
 { COMMON  FOCAS2   DTSVR  RMTDIAG (OPRT)  +
```

FOCAS2 setting screen

Setting item

Item	Description
PORT NUMBER (TCP)	Specifies the port No. to be used by the machine remote diagnosis functions (FOCAS2/Ethernet functions), within a range of 5001 to 65535.
PORT NUMBER (UDP)	Set 0 when using this item for the machine remote diagnosis functions (FOCAS2/Ethernet functions). Set this port number to communicate with the FANUC CIMPLICITY i CELL.
TIME INTERVAL	Set 0 when using this item for the machine remote diagnosis functions (FOCAS2/Ethernet functions). Set this time interval to communicate with the FANUC CIMPLICITY i CELL.

> **NOTE**
> 1 For connection with the FANUC CIMPLICITY i CELL, make the above setting according to "FANUC CIMPLICITY i CELL OPERATOR'S MANUAL (B-75074EN)."
> 2 The unit of TIME INTERVAL is 10 ms. The allowable input range is 10 to 65535. Values less than 100 ms cannot be set.
> 3 If a smaller value is set in TIME INTERVAL, the communication load can increase to adversely affect the performance of the network.
>   Example)If 100 is set, broadcast data is transmitted at intervals of 1 second [1000 ms] (=100×10).

MACHINE REMOTE DIAG screen (COMMON)

Press soft key [RMTDIAG] ([REMOTE DIAG]) to display the
MACHINE REMOTE DIAG screen (COMMON).

```
ETH_BRD SETTING                    O0000 N00000
    MACHINE  REMOTE  DIAG:Setting[BOARD]
 COMMON
  MTB  ID                    FANUC
  MACHINE  ID               217XXX-1011XXXXX




                                           1／ 4

A ) _


 MDI    ****  ***  ***    | 12:00:00 |
 (COMMON  FOCAS2   DTSVR  RMTDIAG (OPRT)  +
```

Machine remote diagnosis screen (BASIC)

Setting item

Item	Description
MTB ID	This information is required by the machine remote diagnosis package to confirm that the diagnosis request is issued from a machine manufactured by the machine tool builder. The MTB identification information on the diagnosis accepting server of the machine remote diagnosis package can be set to accept diagnosis requests only from the machines manufactured by the machine tool builder. (Example of specification format: "FANUC")
MACHINE ID	Information required by the machine remote diagnosis package to identify the machine under diagnosis (Example of specification format: "217xxx-1011xxxxx")

- 267 -

MACHINE REMOTE DIAG screen (INQUIRY1, INQUIRY2, INQUIRY3)

Press soft key [RMTDIAG] ([REMOTE DIAG]) to display the MACHINE REMOTE DIAG screen.

By using page keys ⬆PAGE ⬇PAGE, the three host computers at inquiry destinations 1, 2, and 3 can be set.

```
ETH_BRD SETTING              O0000 N00000
    MACHINE  REMOTE  DIAG:Setting[BOARD]
 INQUIRY1
  HOST  NAME(IP  ADDRESS)
        200. 201. 202. 203


  PORT  NUMBER                       8194
  INQUIRY  NAME
        FANUC  LTD.



                                     2/ 4
A ) _

MDI   **** *** ***      12:00:00
( COMMON  FOCAS2   DTSVR  RMTDIAG  (OPRT)  +
```

MACHINE REMOTE DIAG screen when the DNS function is disabled (INQUIRY1):

```
ETH_BRD SETTING              O0000 N00000
    MACHINE  REMOTE  DIAG:Setting[BOARD]
 INQUIRY1
  HOST  NAME(IP  ADDRESS)
        RMTDIAG. FANUC. CO. JP

  PORT  NUMBER                       8194
  INQUIRY  NAME
        FANUC  LTD.



                                     2/ 4
A ) _

MDI   **** *** ***      12:00:00
( COMMON  FOCAS2   DTSVR  RMTDIAG  (OPRT)  +
```

MACHINE REMOTE DIAG screen when the DNS function is disabled (INQUIRY1):

Setting item

Item	Description
HOST NAME	Specify the IP address of the host computer (machine remote diagnosis accepting server) when the DNS function is disabled. (Example of specification format: "200.201.202.203") Specify the host name of the host computer (machine remote diagnosis accepting server) when the DNS function is enabled. (You can specify up to 63 characters.) (Example of specification format: "RMTDIAG.FANUC.CO.JP")
PORT NUMBER	Specify a port number. Usually, specify "8194" because the machine remote diagnosis functions are used.
INQUIRY NAME	Specify information for identifying the host computer (machine remote diagnosis accepting server). (You can specify up to 63 characters.) (Example of specification format: "FANUC LTD.")

E.1.1   **Related NC Parameters**

0024	Setting of communication with the PMC ladder development tool

[Input type]   Setting input
[Data type]   Word
[Valid data range]   10: The high-speed interface (Ethernet) is used for PMC online editing.

	#7	#6	#5	#4	#3	#2	#1	#0
0904			DNS					

[Input type]   Setting input
[Data type]   Bit

5   **DNS**   The DNS client function is:
0:   Not used.
1:   Used.

> **NOTE**
> To use the DNS function, set DNS IP ADDRESS 1
> and DNS IP ADDRESS 2 on the COMMON
> (DETAIL) screen.

	#7	#6	#5	#4	#3	#2	#1	#0
8706		MRD						

[Input type]   Setting input
[Data type]   Bit
6   **MRD**   Type of communication device to be used by the machine remote diagnosis functions:
0:   The FAST Ethernet/FAST Data Server is not used.
1:   The FAST Ethernet/FAST Data Server is used.

If this parameter has been modified, the power must be turned off then back on for the modification to be become effective.

E.2 **CONTROLLING THE MACHINE REMOTE DIAGNOSIS FUNCTIONS FROM THE PMC**

You can use signals from the PMC to control the start and forced termination of the machine remote diagnosis functions and post the status of the machine remote diagnosis functions and error numbers to the PMC ladder.

E.2.1 **Signals**

No.	#7	#6	#5	#4	#3	#2	#1	#0
G0141			DIAREQ	DIASTP		INQU2	INQU1	INQU0

DIAREQ   <G0141#5>
[Name]   Signal to request machine remote diagnosis
[Classification]   Input signal
[Function]   Requests the start of machine remote diagnosis.
[Operation]   When this signal is set to "1", it requests the start of machine remote diagnosis to the inquiry destination according to the signals indicating the number of the inquiry destination (INQU0 to INQU2). When the acceptance completion signal (RMTEND) or acceptance reject signal (RMTCAN) is set to "1", this signal is set to "0".

DIASTP   <G0141#4>
[Name]   Signal to request machine remote diagnosis cancellation
[Classification]   Input signal
[Function]   Requests the forced termination of machine remote diagnosis.
[Operation]   When this signal is set to "1", it requests forced termination to the machine remote diagnosis accepting server. When the completion signal for machine remote signal cancel acceptance (RMTCLS) is set to "1", this signal is set to "0".

INQU2   <G0141#2>
INQU1   <G0141#1>
INQU0   <G0141#0>
[Name]   Inquiry number select signals
[Classification]   Input signal
[Function]   Inquiry destination for which to start machine remote diagnosis
[Operation]   Select an item from the table below as an inquiry destination for which to start machine remote signal.

INQU2	INQU1	INQU0	Status
0	0	0	No selection
0	0	1	Inquiry destination 1
0	1	0	Inquiry destination 2
0	1	1	Inquiry destination 3

No.	#7	#6	#5	#4	#3	#2	#1	#0
F0082					RMTCLS			

RMTCLS   <F0082#3>
  [Name]   Completion signal for machine remote diagnosis cancel acceptance
  [Classification]   Output signal
  [Function]   Notifies that a request to cancel machine remote diagnosis has been accepted.
  [Output condition]   When machine remote diagnosis is canceled after the signal to request machine remote diagnosis cancellation (DIASTP) is set to "1", this signal is set to "1". When the signal to request machine remote diagnosis cancellation (DIASTP) is set to "0", this signal is set to "0".

No.	#7	#6	#5	#4	#3	#2	#1	#0
F0083	RMTCAN	RMTEND	DIAST5	DIAST4	DIAST3	DIAST2	DIAST1	DIAST0

RMTCAN   <F0083#7>
  [Name]   Reject signal for machine remote diagnosis acceptance
  [Classification]   Output signal
  [Function]   Notifies that a machine remote diagnosis request has been rejected.
  [Output condition]   When the signal to request machine remote diagnosis (DIAREQ) is set to "1", a request to start machine remote diagnosis is issued to the machine remote diagnosis accepting server. When the server rejects the request, this signal is set to "1". When the signal to request machine remote diagnosis (DIAREQ) is set to "0", this signal is set to "0".

RMTEND   <F0083#6>
  [Name]   Completion signal for machine remote diagnosis acceptance
  [Classification]   Output signal
  [Function]   Notifies that a machine remote diagnosis request has been accepted by the machine remote diagnosis accepting server.
  [Output condition]   When the signal to request machine remote diagnosis (DIAREQ) is set to "1", a request to start machine remote diagnosis is issued to the machine remote diagnosis accepting server. When the server accepts the request, this signal is set to "1". When the signal to request machine remote diagnosis (DIAREQ) is set to "0", this signal is set to "0".

DIAST5 <F0083#5>
DIAST4 <F0083#4>
DIAST3 <F0083#3>
DIAST2 <F0083#2>
DIAST1 <F0083#1>
DIAST0 <F0083#0>

[Name] Notification signals for the machine remote diagnosis status
[Classification] Output signal
[Function] Report the status of machine remote diagnosis.
[Output condition] The status of machine remote diagnosis is reported as listed in the following table.
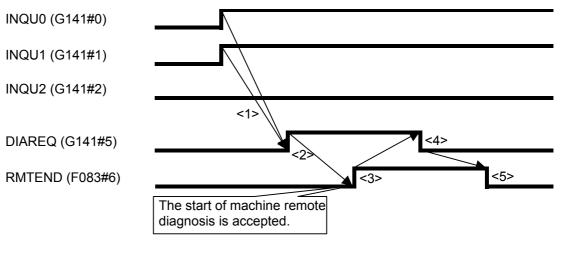
DIAST5	DIAST4	DIAST3	DIAST2	DIAST1	DIAST0	Description
0	0	0	0	0	0	No status
0	0	0	0	0	1	OPEN
0	0	0	0	1	0	OPENING
0	0	0	0	1	1	ACCEPTED
0	0	0	1	0	0	REFUSED
0	0	0	1	0	1	DIAGNOSING
0	0	0	1	1	0	DIAGNOSING
0	0	0	1	1	1	CLOSE
0	0	1	0	0	0	FORCE CLOSING
0	0	1	0	0	1	ERROR

No.	#7	#6	#5	#4	#3	#2	#1	#0
F0088	DIAER7	DIAER6	DIAER5	DIAER4	DIAER3	DIAER2	DIAER1	DIAER0

DIAER7 <F0088#7>
DIAER6 <F0088#6>
DIAER5 <F0088#5>
DIAER4 <F0088#4>
DIAER3 <F0088#3>
DIAER2 <F0088#2>
DIAER1 <F0088#1>
DIAER0 <F0088#0>

[Name] Notification signals for a machine remote diagnosis error number
[Classification] Output signal
[Function] Report an error number of machine remote diagnosis.
[Output condition] These signals indicate an error number of machine remote diagnosis. The error number is 0 to 255 in binary format.

E.2.2   **Signal Timing Charts**
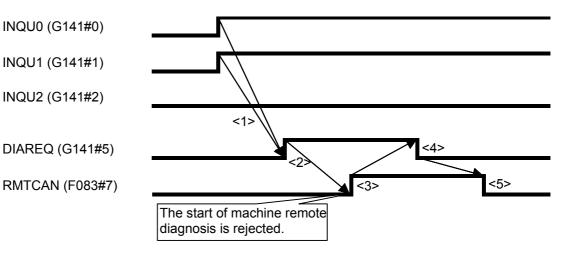
This section describes control of the start and forced termination of machine remote diagnosis according to the signals from the PMC using timing charts.

E.2.2.1   **When the start of machine remote diagnosis is accepted**
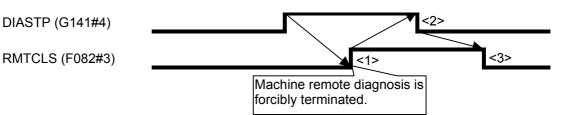
The start of machine remote diagnosis is accepted.

<1> Before the signal to request machine remote diagnosis (DIAREQ) is set to "1", an inquiry destination for which to start the remote diagnosis functions is selected using the inquiry destination number signals (INQU0, INQU1, and INQU2). In this example, "inquiry destination 3" is selected by setting INQU0 = 1, INQU1 = 1, and INQU2 = 0.

<2> The signal to request machine remote diagnosis (DIAREQ) is set to "1".

<3> When the machine remote diagnosis package accepts the request to start diagnosis, the completion signal for machine remote diagnosis acceptance (RMTEND) is set to "1".

<4> When the completion signal for machine remote diagnosis acceptance (RMTEND) is set to "1", the signal to request machine remote diagnosis (DIAREQ) is set to "0".

<5> When the signal to request machine remote diagnosis (DIAREQ) is set to "0", the completion signal for machine remote diagnosis acceptance (RMTEND) is set to "0".

E.2.2.2　　**When the start of machine remote diagnosis is rejected**

<1> Before the signal to request machine remote diagnosis (DIAREQ) is set to "1", an inquiry destination for which to start the remote diagnosis functions is selected using the inquiry destination number signals (INQU0, INQU1, and INQU2). In this example, "inquiry destination 3" is selected by setting INQU0 = 1, INQU1 = 1, and INQU2 = 0.

<2> The signal to request machine remote diagnosis (DIAREQ) is set to "1".

<3> When the machine remote diagnosis package rejects the request to start diagnosis, the reject signal for machine remote diagnosis acceptance (RMTCAN) is set to "1".

<4> When the reject signal for machine remote diagnosis acceptance (RMTCAN) is set to "1", the signal to request machine remote diagnosis (DIAREQ) is set to "0".

<5> When the signal to request machine remote diagnosis (DIAREQ) is set to "0", the reject signal for machine remote diagnosis acceptance (RMTCAN) is set to "0".

E.2.2.3 **When machine remote diagnosis is forcibly terminated**

DIASTP (G141#4)

RMTCLS (F082#3)

<1>

Machine remote diagnosis is
forcibly terminated.

<2>

<3>
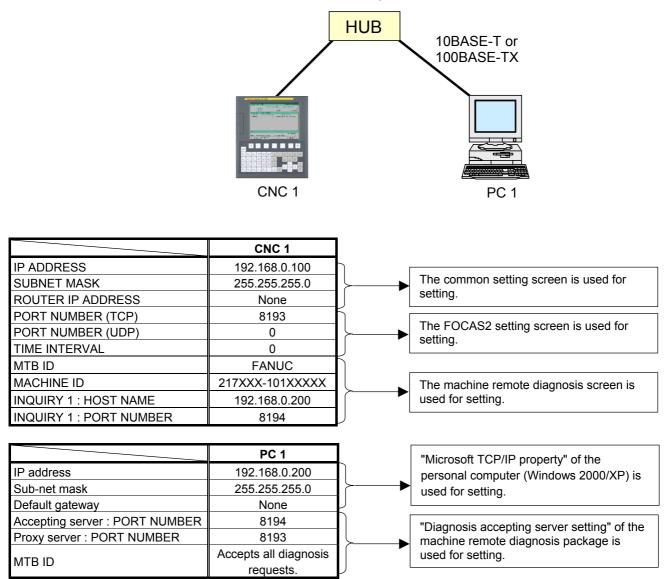
<1> When the signal to request machine remote diagnosis cancellation (DIASTP) is set to "1", machine remote diagnosis is forcibly terminated. When forcible termination is complete, the completion signal for machine remote diagnosis cancel acceptance (RMTCLS) is set to "1".

<2> When the completion signal for machine remote diagnosis cancel acceptance (RMTCLS) is set to "1", the signal to request machine remote diagnosis cancellation (DIASTP) is set to "0".

<3> When the signal to request machine remote diagnosis cancellation (DIASTP) is set to "0", the completion signal for machine remote diagnosis cancel acceptance (RMTCLS) is set to "0".

E.3   EXAMPLE OF SETTING THE MACHINE REMOTE DIAGNOSIS FUNCTIONS

An example of setting for operating the machine remote diagnosis functions is given below. In this example of setting, one personal computer functions as the machine remote diagnosis accepting server and machine remote diagnosis client and is connected to one CNC.

	CNC 1
IP ADDRESS	192.168.0.100
SUBNET MASK	255.255.255.0
ROUTER IP ADDRESS	None
PORT NUMBER (TCP)	8193
PORT NUMBER (UDP)	0
TIME INTERVAL	0
MTB ID	FANUC
MACHINE ID	217XXX-101XXXXX
INQUIRY 1 : HOST NAME	192.168.0.200
INQUIRY 1 : PORT NUMBER	8194

The common setting screen is used for setting.

The FOCAS2 setting screen is used for setting.

The machine remote diagnosis screen is used for setting.

	PC 1
IP address	192.168.0.200
Sub-net mask	255.255.255.0
Default gateway	None
Accepting server : PORT NUMBER	8194
Proxy server : PORT NUMBER	8193
MTB ID	Accepts all diagnosis requests.

"Microsoft TCP/IP property" of the personal computer (Windows 2000/XP) is used for setting.

"Diagnosis accepting server setting" of the machine remote diagnosis package is used for setting.

E.4   OPERATING THE MACHINE REMOTE DIAGNOSIS
SCREEN

Procedure

1   Press the function key [⬦ SYSTEM].

2   Soft key [RMTDGN] ([REMOTE DIAG]) appear. (When there is no soft keys, press the continue key.)

3   Press soft key [RMTDGN] ([REMOTE DIAG]) to display the machine remote diagnosis screen.

```
MACHINE  REMOTE  DIA            O0000 N00000

      ┌─────────────┐
      │     − − −    │
      ├─────────────┴─────────────────────┐
      │                                   │
      └───────────────────────────────────┘
  RMT  DIAG  STATUS     │        − − −      │
  RMT  DIAG  TIME       │         00:00:00  │
  RECEIPT  NUMBER       │                0  │
  ERROR  NUMBER         │                0  │
  AVAILABLE  DEVICE     │ Fast  Ethernet  Board│
  ERROR  MESSAGE
  ┌───────────────────────────────────────┐
  │                                       │
  └───────────────────────────────────────┘
 A )_

  MDI   ****  ***  *** │  12:00:00 │
  │RMTDGN │        │        │        │  (OPRT) │ +
```

Machine remote diagnosis screen

4   Press soft key [(OPRT)] to display available soft keys.

```
 │ OPEN   │ CLOSE  │ INQUI1 │ INQUI2 │ INQUI3 │
```

Display item

INQUIRY NUMBER

Displays the inquiry number indicating the machine remote diagnosis accepting server: "INQUIRY 1 ," "INQUIRY2," or "INQUIRY3."

INQUIRY

Displays information for identifying the machine remote diagnosis accepting server.

RMT DIAG STATUS

Displays the status of machine remote diagnosis.

RMT DIAG TIME

Displays the time from the start of machine remote diagnosis to the end of it.
At each start of diagnosis, the time is accumulated from "00:00:00."

RECEIPT NUMBER

Displays the receipt number issued by the machine remote diagnosis accepting server.

ERROR NUMBER

Displays the number of an error which occurs in operation of the machine remote diagnosis functions.

AVAILABLE DEVICE

Displays the type of communication device for which the machine remote diagnosis functions can operate.

ERROR MESSAGE

Displays the message indicating an error which occurs in operation of the machine remote diagnosis functions.

Operation list

OPEN (DIAG OPEN)

Starts machine remote diagnosis.

CLOSE (DIAG CLOSE)

Forcibly terminates machine remote diagnosis.

INQUI1 (INQUIRY1)

Selects inquiry destination 1.

INQUI2 (INQUIRY2)

Selects inquiry destination 2.

INQUI3 (INQUIRY3)

Selects inquiry destination 3.

E.4.1   **Selecting an Inquiry Destination**

Select an inquiry destination among inquiry destinations 1 to 3.

1   Press soft key [(OPRT)].
2   Press soft key [INQUI1] ([INQUIRY1]) to select inquiry
     destination 1.
3   Similarly, press soft key [INQUI2] ([INQUIRY2]) to select
     inquiry destination 2 and soft key [INQUI3] ([INQUIRY3]) to
     select inquiry destination 3.

E.4.2   **Starting Diagnosis**

Start diagnosis.

1   Press soft key [(OPRT)].
2   Press soft key [OPEN] ([DIAG OPEN]) to issue a diagnosis
     request to the machine remote diagnosis accepting server.
3   When the machine remote diagnosis accepting server accepts the
     diagnosis request, diagnosis starts.

E.4.2.1   **Diagnosis status**

Status	Description
---	No operation
OPEN	[DIAG OPEN] was pressed.
OPENING	An attempt is being made to connect the machine remote diagnosis accepting server.
ACCEPTED	The machine remote diagnosis accepting server accepted diagnosis.
REFUSED	The machine remote diagnosis accepting server rejected diagnosis.
DIAGNOSING	This message flashes in synchronization with data flowing on the communication line.
CLOSE	The machine remote diagnosis terminated diagnosis.
FORCE CLOSING	[CLOSE] ([DIAG CLOSE]) was pressed. After the completion of forced termination processing, "CLOSE" is indicated in the RMT DIAG STATUS field.
ERROR	An error occurred during machine remote diagnosis.

E.4.2.2 Error numbers and error messages

Number	Error message	Meaning and action to be taken
1	Diagnosis is busy	[OPEN] ([DIAG OPEN]) was pressed during diagnosis.
2	Router isn't alive	The IP address of the router may be invalid or the power to the router may be off. Check whether the IP address of the router is valid and whether the power to the router is on.
3	Receipt Server isn't alive	The IP address of the machine remote diagnosis accepting server may be invalid or the power to the machine remote diagnosis accepting server may be off. Check whether the IP address of the machine remote diagnosis accepting server is valid and whether the power to the machine remote diagnosis accepting server is on.
4	System error	A system error occurred. Check the log messages on the ETHERNET LOG screen and contact FANUC.
5	Invalid Inquiry number.	A value outside the valid setting range may be set for the inquiry destination. Check whether the correct inquiry destination is set.
6	Invalid IP Address	Set the IP address according to the IP address specification format.
7	Invalid PORT number	A value outside the valid setting range may be set for the port number. Check whether the correct port number is set.
8	Invalid Router IP Address	Set the IP address of the router according to the IP address specification format.
9	Socket error	A communication error occurred due to a cause as listed below. Check the network wiring and anti-noise measures. → The network quality degraded, data could not be received from the personal computer with which to communicate, and the logical communication path was disconnected. → The software component on the personal computer with which to communicate forcibly disconnected the logical communication path. → The Ethernet cable was disconnected.
11	Invalid Request	An internal error related to machine remote diagnosis occurred in the CNC. Check the log messages on the ETHERNET LOG screen and contact FANUC.
12	Invalid Packet	An unrecognizable packet was received. Check the log messages on the ETHERNET LOG screen and contact FANUC.
13	Diagnosis was already stopped	[CLOSE] ([DIAG CLOSE]) was pressed not during diagnosis.
17	Receive error	An attempt to receive data failed. See Number 9 and check the network wiring and anti-noise measures.
19	HeartBeat timeout	Communication with the machine remote diagnosis accepting server stopped. See Number 9 and check the network wiring and anti-noise measures.
20	HeartBeat error	An attempt was failed to send a heartbeat packet for machine remote diagnosis. See Number 9 and check the network wiring and anti-noise measures.
22	DNS error	An attempt was failed to connect the machine remote diagnosis accepting server using the DNS function. The IP address of the DNS server may be invalid or the power to the DNS server may be off. Check whether the IP address of the DNS server is valid and whether the power to the DNS server is on.

E.4.3 Forcibly Terminating Diagnosis

Forcibly terminate diagnosis.

1   Press soft key [(OPRT)].
2   Press soft key [CLOSE] ([DIAG CLOSE]) to forcibly terminate diagnosis.

F

UNSOLICITED MESSAGING FUNCTION

This chapter describes the setting and operating procedures for using the unsolicited messaging function.

Appendix F, "UNSOLICITED MESSAGING FUNCTION", consists of the following sections:

F.1   SETTING OF THE UNSOLICITED MESSAGING FUNCTION

This chapter describes the setting required to operate the unsolicited messaging function.

Procedure

1   Press the function key ⌖.

2   Soft key [ETHBRD] ([ETHER BOARD]) appear. (When there is no soft keys, press the continue key.)

3   Press soft key [ETHBRD] ([ETHER BOARD]) to display the Ethernet Setting screen.

4   Press soft keys [COMMON], [FOCAS2], and [UNSOLI] ([UNSOLI MSG]) and then enter parameters for the items that appear.

COMMON screen (BASIC)

Press soft key [COMMON].   The COMMON screen (BASIC) is displayed.

```
ETH_BRD SETTING                    O0000 N00000
            COMMON: Setting[BOARD]
 DETAIL
  DNS IP ADDRESS 1        │192. 168. 0. 251│
  DNS IP ADDRESS 2        │192. 168. 0. 252│
  HOST NAME
            │CNC-1                              │
  DOMAIN
            │FACTORY                            │
            │                                   │

                                        2/ 2
 A)_

 MDI    **** *** ***  │ 12:00:00 │
 │COMMON  FOCAS2  │ DTSVR │RMTDIAG│(OPRT)│ +│
```

COMMON screen (BASIC)

Settings items

Item	Description
IP ADDRESS	Specify the IP address of the Fast Ethernet.
	(Example of specification format: "192.168.0.100")
SUBNET MASK	Specify a mask address for the IP addresses of the network.
	(Example of specification format: "255.255.255.0")
ROUTER IP ADDRESS	Specify the IP address of the router.
	Specify this item when the network contains a router.
	(Example of specification format: "192.168.0.253")

Display items

Item	Description
MAC ADDRESS	Fast Ethernet MAC address

> **NOTE**
>   Set page 2 (DETAIL screen) of the COMMON
>   screen when using the DNS/DHCP function.   For
>   details, see Appendix D, "DNS/DHCP Function".

COMMON screen (DETAIL)

When using the DNS function, press soft key [COMMON] then press page key ⬆PAGE ⬇PAGE . The COMMON screen (DETAIL) is displayed. Set the DNS IP address setting items.

```
ETH_BRD SETTING              O0000 N00000
          COMMON: Setting[BOARD]
 BASIC
  MAC ADDRESS              00E0E4000001
  IP ADDRESS              192. 168. 0. 100
  SUBNET MASK             255. 255. 255. 0
  ROUTER IP ADDRESS       192. 168. 0. 253



                                   1／ 2

A)_


MDI   **** *** ***      12:00:00
⟨ COMMON  FOCAS2   DTSVR  RMTDIAG (OPRT)  +
```

COMMON screen (DETAIL)

Display items

Item	Description
DNS IP ADDRESS 1, 2	Up to two DNS IP addresses can be specified. The CNC searches for the DNS server using DNS IP addresses 1 and 2 in that order.

FOCAS2 screen

Press soft key [FOCAS2].   The FOCAS2 screen is displayed.

```
ETH_BRD SETTING                    O0000 N00000
     FOCAS2/Ethernet:Setting[BOARD]
 BASIC
  PORT NUMBER (TCP)                         8193
  PORT NUMBER (UDP)                            0
  TIME INTERVAL                                0




                                          1/  1

 A}_


 MDI   ****  ***  ***  |  12:00:00  |
 {COMMON FOCAS2   DTSVR RMTDIAG (OPRT) +
```

FOCAS2 setting screen

Setting items

Item	Description
PORT NUMBER (TCP)	Specify a port number to be used with the unsolicited messaging function (FOCAS2/Ethernet function). The valid input range is 5001 to 65535.
PORT NUMBER (UDP)	Set this item to 0 when it is used as the unsolicited messaging function (FOCAS2/Ethernet function).
TIME INTERVAL	Set this item to 0 when it is used as the unsolicited messaging function (FOCAS2/Ethernet function).

F.1.1   **Mode Selection**

This subsection describes the selection of a mode for setting the unsolicited messaging function.

Unsolicited Message screen (BASIC)

Press soft key [UNSOLI] ([UNSOLI MSG]). The Unsolicited Message screen (BASIC) is displayed.

```
ETH_BRD SETTING              O0000 N00000
 CNC Unsolicited Message:Setting[BOARD]
 BASIC
  MODE                       CNC MODE
  IP ADDRESS


  STATUS                     Not Ready



                                    1/ 3
A ) _


MDI   **** *** ***    12:00:00
( DS FMT                   UNSOLI  (OPRT)  +
```

Unsolicited Message screen 1 (BASIC)

Setting items

Item	Description
MODE	Select a mode for setting the unsolicited messaging function. For the method of selection, see "Operation" described later. • When "CNC MODE" is selected This mode enables setting on the CNC screen. In this case, setting on the personal computer is disabled. For details, see Appendix F.1.2, "Setting on the CNC Screen". • When "PC MODE" is selected This mode enables setting on the personal computer. In this case, setting on the CNC screen is disabled. For details, see Appendix F.1.2, "Setting on the Personal Computer".

> **NOTE**
> 1 The mode is set to "PC MODE" at the time of initial use.
> 2 The mode can be switched only in the "Not Ready" state.   For the "Not Ready" state, see "**Display items**" provided later.
> 3 If the mode is switched from "CNC MODE" to "PC MODE", all parameters set on the CNC screen are cleared.

Operation

The mode can be switched as described below.

1   Press soft key [(OPRT)].   Soft key [MODE] is displayed.

| (| MODE | CHA−EXT | | | | | |

2   Press soft key [MODE].   Soft keys [CNC MODE] and [PC MODE] are displayed.

| (| CNCMODE | PC MODE | | | | | |

3   Press soft key of the mode that you want to change.

Display items

Item	Description
IP ADDRESS	Displays the IP address of the personal computer currently connected. (Example of display format: "192.168.0.1")
STATUS	Displays the current state. The following five states are available: <1> Not Ready State where data is not transmitted even when a request for data transmission is made from an NC program or ladder program <2> Ready State where data is transmitted when a request for data transmission is made from an NC program or ladder program <3> Sending... State present from the acceptance of a request for data transmission from an NC program or ladder program until data transmission is completed <4> Receiving... State present from completion of data transmission until response data is received <5> Completed State present from reception of response data until response data processing is completed [Supplement] • Data transmission Means unsolicited message transmission (CNC→PC). • Response data Means a response to an unsolicited message (PC→CNC).

NOTE
1 To switch the state from "Not Ready" to "Ready", the FOCAS2 function cnc_unsolicstart needs to be executed on the personal computer.
2 To switch the state from other than "Not Ready" to "Not Ready", the FOCAS2 function cnc_unsolicstop needs to be executed on the personal computer.
3 For the timing charts of the states, see Appendix F.2, "Execution Methods".

F.1.2   **Setting on the CNC Screen**

This subsection describes the method of setting on the Unsolicited Message screen.

> **NOTE**
> 1 To enable the settings on the CNC screen and perform unsolicited messaging, the procedure below needs to be used.
>   (1) Set all setting items on the Unsolicited Message screen (CONNECT).
>   (2) Press soft key [(OPRT)] then press soft key [APPLY].
>   (3) Start unsolicited messaging (execute the FOCAS2 function cnc_unsolicstart) on the personal computer.
> 2 Setting of the setting items on the Unsolicited Message screen (CONNECT) and execution of the soft keys ([(OPRT)] then [APPLY]) are possible only in the "Not Ready" state.   For the "Not Ready" state, see "**Display items**" in Appendix F.1.1, "Mode Selection".

Unsolicited Message screen (CONNECT)

Press soft key [UNSOLI] ([UNSOLI MSG]) then open page 2 and page 3 with page keys ⬆PAGE ⬇PAGE . The Unsolicited Message screen (CONNECT) is displayed.

```
ETH_BRD SETTING              O0000 N00000
  CNC Unsolicited Message:Setting[BOARD]
 CONNECT
  HOST NAME(IP ADDRESS)

       192. 168. 0. 1


  PORT NUMBER                         8196
  RETRY COUNT                            3
  TIMEOUT                               10
  ALIVE TIME                             5
  CONTROL PARAMETER TYPE                 1
  CONTROL PARAMETER                  R1000

                                     2/ 3
 A)_


 MDI   **** *** ***     12:00:00
 《 DS FMT                   UNSOLI  (OPRT) +
```

Unsolicited Message screen 2 (CONNECT)

```
ETH_BRD SETTING              O0000 N00000
  CNC Unsolicited Message:Setting[BOARD]
 CONNECT
  TRANSMISSION NUMBER                    3
  TRANSMISSION PARAMETER
  NO.     TYPE        PMC ADDRESS    SIZE
                      MACRO NO.    NUMBER
  ___ _____    _____ _____
    1       1                R1500    100
    2       1                D1100    100
    3       3                1:100     10


                                     3/ 3
 A)_


 MDI   **** *** ***     12:00:00
 《 DS FMT                   UNSOLI  (OPRT) +
```

Unsolicited Message screen 3 (CONNECT)

Setting items

Item	Description
HOST NAME (IP ADDRESS)	When the DNS function is disabled, specify the IP address of the communication destination personal computer. (Example of specification format: "192.168.0.1") When the DNS function is enabled, specify the host name of the communication destination personal computer. (Up to 63 characters can be specified.) (Example of specification format: "UNSOLI-SRV.FACTORY")
PORT NUMBER	Specify the TCP port number and UDP port number of the communication destination personal computer. Usually, specify "8196". The valid input range is 5001 to 65535.
RETRY COUNT	Specify the number of retries to be made when there is no response to data transmitted by the communication board. The valid input range is 0 to 32767.
TIMEOUT	Specify a time-out period (in sec) from the transmission of data by the communication board until a response is made to the transmitted data. The valid input range is 1 to 32767.
ALIVE TIME	Specify the time interval (in sec) of the alive signal to be transmitted while the communication board is operating normally. Specify a value not greater than the value of TIMEOUT. The valid input range is 1 to 32767.
CONTROL PARAMETER TYPE	Specify a type of control parameter. When this parameter is set to 0, the control parameter is invalid. • When set to 1: PMC address (response notification method) • When set to 2: PMC address (simplified method) • When set to 3: Custom macro variable (simplified method)
CONTROL PARAMETER	Specify a control parameter for executing data transmission.
	When CONTROL PARAMETER TYPE is set to 1
	Specify a PMC address for control. A PMC address in the R area or E area may be specified. Two bytes starting at a specified address are allocated in the area.
	When CONTROL PARAMETER TYPE is set to 2
	Specify a PMC address for control. A PMC address in the R area or E area may be specified. Only a specified address (one byte) is allocated in the area.
	When CONTROL PARAMETER TYPE is set to 3
	Specify a custom macro variable number for control. Only a volatile common variable may be specified as a custom macro variable. Only the variable with a specified variable number is allocated in the area.
TRANSMISSION NUMBER	Specify the number of data items to be transmitted. The valid input range is 1 to 3.

Item	Description
TRANSMISSION PARAMETER (NO.1 to 3)	Specify each parameter for transmission data.
TYPE	Specify a transmission data type.　When this parameter is set to 0, the transmission parameter is invalid. • When set to 1 or 2:　PMC address • When set to 3:　Custom macro variable
PMC ADDRESS or MACRO NO.	Specify the start of a transmission data area
	When TYPE is set to 1 or 2 Specify a PMC address for transmission.
	When TYPE is set to 3 Specify a custom macro variable number for transmission.
SIZE or NUMBER	Specify the size of a transmission data area or the number of variables. The maximum specifiable number of bytes is as follows: • When TRANSMISSION NUMBER is set to 1:　2890 bytes • When TRANSMISSION NUMBER is set to 2:　2874 bytes in total • When TRANSMISSION NUMBER is set to 3:　2858 bytes in total When using custom macro variables, use a conversion rate of one variable for eight bytes.
	When TYPE is set to 1 or 2 Specify a PMC area size (bytes) for transmission.

	When TYPE is set to 3
	    Specify the number of custom macro variables for transmission.
	    When a macro variable number of 1000 or greater (system variable) is used, this parameter can be set to 1 only.

⚠ **CAUTION**
1 When setting a PMC address for control or a PMC address for transmission, observe the following:
   (1) An R address or E address can be set.
   (2) Ensure that a PMC address area for control never overlaps PMC areas used by other functions (PROFIBUS-DP).
2 When setting a macro variable for control or a macro variable for transmission, observe the following:
   (1) When a multipath CNC is used, use the following input format:
        <path-number>:<variable-number>
        When specifying variable number #100 of the second CNC path, for example, input "2:100".　When only the variable number (100) is input, the specification of the first path (1:100) is assumed for processing. When the key for ":" is unavailable, use the key for "/" or "EOB" instead.
   (2) Ensure that a macro variable for control never be doubly specified as a variable to be used for a purpose other than the unsolicited messaging function.

> **NOTE**
> 1 Two methods are available for PMC address specification in CONTROL
>   PARAMETER TYPE: response notification method and simplified method.
>   For details of the methods, see Appendix F.2, "EXECUTING THE
>   UNSOLICITED MESSAGING FUNCTION".
> 2 The valid setting ranges of custom macro variable numbers depend on the
>   selected options.   For details, refer to "User's Manual (Common to Lathe
>   System/Machining Center System) (B-64304EN)".
> 3 Ensure that the setting of TRANSMISSION NUMBER matches the settings of
>   TRANSMISSION PARAMETER (NO. 1 to NO. 3).   If TRANSMISSION
>   NUMBER is set to 3, and an invalid value is specified in any of
>   TRANSMISSION PARAMETER NO. 1 to NO. 3, for example, execution of
>   soft key [APPLY] results in an error.

Operation

The settings of all setting items on the Unsolicited Message screen
(CONNECT) can be made effective as follows:

1   Press soft key [(OPRT)].   Soft key [APPLY] is displayed.

| ⟨ | | CHA-EXT | APPLY | | | INPUT | ⟩ |

2   Press soft key [APPLY].

F.1.3   Setting on the personal computer

For setting on the personal computer, create and set an application by using the following FOCAS2 functions:

- cnc_wrunsolicprm2 Parameter setting 2 for unsolicited messaging
- cnc_unsolicstart   Start of unsolicited messaging

For details, refer to Chapter 5, "UNSOLICITED MESSAGING FUNCTION", in "FANUC Open CNC FOCAS1/FOCAS2 CNC/PMC Data Window Library Operator's Manual".

NOTE

1 To start unsolicited messaging, the FOCAS2 function cnc_wrunsolicprm2 needs to be executed first then the FOCAS2 function cnc_unsolicstart needs to be executed.

2 The FOCAS2 function cnc_wrunsolicprm2 can be executed only in the "Not Ready" state. For details of the state, see "**Display items**" in Appendix F.1.1, "Mode Selection".

3 When the FOCAS2 function cnc_wrunsolicprm2 is executed, the Unsolicited Message screen (CONNECT) displays the settings made on the personal computer.

F.2   EXECUTING THE UNSOLICITED MESSAGING FUNCTION

How to execute the unsolicited messaging function is described below.

To execute the unsolicited messaging function, three methods are available:

- Using a PMC address for control based on the response notification method in a ladder program
- Using a PMC address for control based on the simplified method in a ladder program
- Using a macro variable for control based on the simplified method in an NC program

---

NOTE
1 When a ladder program is used, the response notification method and the simplified method are available.   A major difference is that the response notification method sends RES_CODE to the ladder program in response to data transmission but the simplified method does not send a response.
   To utilize a ladder program based on logic used with the Series 16*i*, for example, use the response notification method.   When RES_CODE is unnecessary or a new ladder program is created, the simplified method can be used.
2 RES_CODE is recorded on the Ethernet log screen when a value other than 0x00 and 0x01 is detected.
3 For details of RES_CODE, refer to Chapter 5, "UNSOLICITED MESSAGING FUNCTION", in "FANUC Open CNC FOCAS1/FOCAS2 CNC/PMC Data Window Library Operator's Manual".

F.2.1 **When a PMC Address for control is Used (Response Notification Method)**

A description of using a PMC address for control in a ladder program according to the response notification method is provided below.

> **NOTE**
> A combination of a PMC address for control and a macro variable for transmission is also usable.   In this case, note that the read timing of the value of a macro variable to be transmitted cannot be identified when viewed from the ladder program.
> In the description below, a PMC address is used for both of control and transmission.

Explanation of PMC address signals for control

A detailed description of PMC address signals for control used to execute the unsolicited messaging function is provided below.   A PMC address area for control consists of 2 bytes.

The description below assumes that Rxxxx is used as a PMC address for control.

No.	#7	#6	#5	#4	#3	#2	#1	#0
Rxxxx	REQ							

REQ <Rxxxx#7>
[Name] Message transmission request signal
[Classification] Input signal
[Function] Requests transmission of an unsolicited message.
[Operation] After preparing a transmission message at a PMC address for transmission, the ladder program sets this signal to 1.   The message is then transmitted to the personal computer.

No.	#7	#6	#5	#4	#3	#2	#1	#0
Rxxxx+1	RES	COM			RES_CODE			

RES <Rxxxx+1#7>
[Name] Message response reception signal
[Classification] Output signal
[Function] Posts the reception of a response to an unsolicited message.
[Output condition] Upon reception of a message by the personal computer, a response to the message is transmitted to the CNC (communication board). When the CNC (communication board) receives the response, this signal is set to 1.   When this signal is set to 1, the ladder program reads RES_CODE then clears REQ to 0.   Next, the CNC (communication board) clears RES_CODE to 0 then sets this signal to 0.

COM	\<Rxxxx+1#6\>
[Name]	Message transmission start signal
[Classification]	Output signal
[Function]	Posts the start of transmission of an unsolicited message.
[Output condition]	When transmission of a message to the personal computer is started, this signal is set to 1. Upon completion of message transmission, this signal is set to 0.

RES_CODE	\<Rxxxx+1#0\> to \<Rxxxx+1#5\>
[Name]	Message response reception result signal
[Classification]	Output signal
[Function]	Posts the reception result of a response to an unsolicited message.
[Output condition]	The reception result of a response to a message is set. After reading this signal, the ladder program clears REQ to 0. The CNC (communication board) then clears this signal to 0.

> **NOTE**
> For details of RES_CODE, refer to Chapter 5, "UNSOLICITED MESSAGING FUNCTION", in "FANUC Open CNC FOCAS1/FOCAS2 CNC/PMC Data Window Library Operator's Manual".
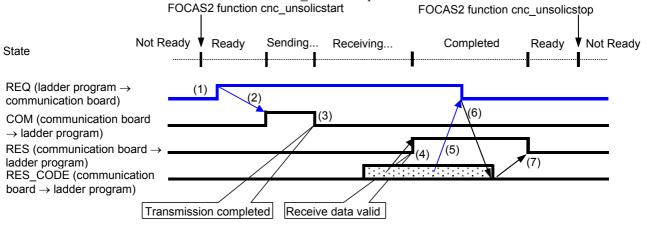
Timing chart of PMC address signals for control

The timing chart of PMC address signals for control based on the response notification method is described below.

In the example below, an unsolicited message is transmitted once after reception of the FOCAS2 function cnc_unsolicstart then the FOCAS2 function cnc_unsolicstop is received.

(1) After checking that RES is set to 0, the ladder program prepares a message then sets REQ to 1.

(2) Because of REQ set to 1, the communication board sets COM to 1 then transmits the message.

(3) Upon completion of message transmission, the communication board sets COM to 0.

(4) Upon reception of a response to the message, the communication board sets RES_CODE then sets RES to 1.

(5) Because of RES set to 1, the ladder program reads RES_CODE then sets REQ to 0.

(6) Because of REQ set to 0, the communication board clears RES_CODE to 0.

(7) The communication board sets RES to 0.

> **NOTE**
> For details of the states, see "**Display items**" in F.1.1, "Mode Selection".

F.2.2   **When a PMC Address for Control is Used (Simplified Method)**

A description of using a PMC address for control in a ladder program according to the simplified method is provided below.

> **NOTE**
>   A combination of a PMC address for control and a macro variable for transmission is also usable.   In this case, note that the read timing of the value of a macro variable to be transmitted cannot be identified when viewed from the ladder program.
>   In the description below, a PMC address is used for both of control and transmission.

Explanation of PMC address signals for control

A detailed description of PMC address signals for control used to execute the unsolicited messaging function is provided below. A PMC address area for control consists of 1 byte.

The description below assumes that Rxxxx is used as a PMC address for control.

No.	#7	#6	#5	#4	#3	#2	#1	#0
Rxxxx	REQ							

REQ	<Rxxxx#7>
[Name]	Message transmission request signal
[Classification]	Input/Output signal
[Function]	Requests transmission of an unsolicited message.
[Operation]	After preparing a transmission message at a PMC address for transmission, the ladder program sets this signal to 1. The message is then transmitted to the personal computer. Upon reception of a response to the message, the CNC (communication board) clears this signal to 0.

Timing chart of PMC address signals for control

The timing chart of PMC address signals for control based on the simplified method is described below.

In the example below, an unsolicited message is transmitted once after reception of the FOCAS2 function cnc_unsolicstart then the FOCAS2 function cnc_unsolicstop is received.

(1) After checking that REQ is set to 0, the ladder program prepares a message then sets REQ to 1.

(2) Because of REQ set to 1, the communication board transmits the message.

(3) The communication board completes message transmission processing.

(4) Upon reception of a response to the message, the communication board completes reception processing.

(5) Because of reception processing completed, the communication board sets REQ to 0.

> **NOTE**
> For details of the states, see "**Display items**" in F.1.1, "Mode Selection".

F.2.3 **When a Macro Variable for Control is Used (Simplified Method)**

A description of using a macro variable for control in an NC program according to the simplified method is provided below.

> **NOTE**
> A combination of a macro variable for control and a PMC address for transmission is also usable.   In this case, note that the read timing of the value of PMC data to be transmitted cannot be identified when viewed from the NC program.
> In the description below, a macro variable is used for both of control and transmission.

Explanation of a macro variable for control

A detailed description of a macro variable for control used to execute the unsolicited messaging function is provided below.   One macro variable for control is used.

The description below assumes that #xxxx (with no CNC path number specified) is used as a macro variable number for control.

REQ	<#xxxx>
[Name]	Message transmission request signal
[Classification]	Input/Output signal
[Function]	Requests transmission of an unsolicited message.
[Operation]	After preparing a transmission message in a macro variable for transmission, the NC program sets this signal to 1. The message is then transmitted to the personal computer. Upon reception of a response to the message, the CNC (communication board) clears this signal to 0.
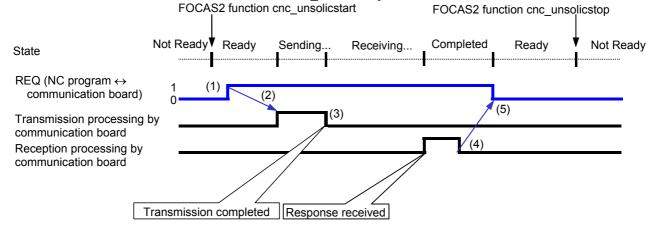
> **NOTE**
> A REQ input/output value is a real number.   So, "0" means "0.0", and "1" means "1.0".

Timing chart of a macro variable for control

The timing chart of a macro variable for control based on the simplified method is described below.

In the example below, an unsolicited message is transmitted once after reception of the FOCAS2 function cnc_unsolicstart then the FOCAS2 function cnc_unsolicstop is received.

(1) After checking that REQ is set to 0, the NC program prepares a message then sets REQ to 1.
(2) Because of REQ set to 1, the communication board transmits the message.
(3) The communication board completes message transmission processing.
(4) Upon reception of a response to the message, the communication board completes reception processing.
(5) Because of reception processing completed, the communication board sets REQ to 0.

> **NOTE**
> For details of the states, see "**Display items**" in F.1.1, "Mode Selection".

F.3   RELATED NC PARAMETERS

	#7	#6	#5	#4	#3	#2	#1	#0
0904		DHC	DNS	UNM	D1E			

[Input type]   Setting input
[Data type]   Bit

 # 3   D1E   When the DHCP function is used:
   0:   Default parameters for the FOCAS2/Ethernet functions are set.
      Port number (TCP)   8193
      Port number (UDP)   0
      Time interval   0
   1:   Default parameters for CIMPLICITY *i*CELL communication are set.
      Port number (TCP)   8193
      Port number (UDP)   8192
      Time interval   50

 # 4   UNM   The CNC Unsolicited Messaging function is:
   0:   Not used.
   1:   Used.

 # 5   DNS   The DNS client function is:
   0:   Not used.
   1:   Used.

 # 6   DHC   The DHCP client function is:
   0:   Not used.
   1:   Used.

> **NOTE**
>   If any parameter is changed, the power needs to be turned off.
>   To use the DNS function, it is necessary to set DNS IP addresses 1 and 2 in the COMMON (DETAIL) screen.

	#7	#6	#5	#4	#3	#2	#1	#0
0905				UNS				

[Input type]   Setting input
[Data type]   Bit

 # 4   UNS   In the CNC Unsolicited Messaging function, when the end of the function is requested by other than the CNC Unsolicited Messaging server currently connected:
   0:   The request for the end of the function is rejected.
   1:   The request for the end of the function is accepted.

G FTP TRANSFER FUNCTION

This chapter describes the setting and operating procedures for using the FTP transfer function.

> **NOTE**
> 1 With the FTP, the maximum number of FTP servers that can be connected per CNC is 1.
> 2 The FTP file transfer function does not support the passive mode (PASV command).
> 3 The FTP file transfer function does not work when the software option for the Data Server function is enabled.
> 4 The FTP file transfer function cannot perform M198-based subprogram calling or DNC operation.

Appendix G, "FTP TRANSFER FUNCTION", consists of the following sections:

G.1   **SETTING OF THE FTP TRANSFER FUNCTION**

This chapter describes the setting required to operate the FTP transfer function.

Procedure

1   Press the function key .

2   Soft key [ETHBRD] ([ETHER BOARD]) appear. (When there is no soft keys, press the continue key.)

3   Press soft key [ETHBRD] ([ETHER BOARD]) to display the Ethernet Setting screen.

4   Press soft keys [COMMON] and [FTPTRNS] ([FTP TRANS]) and then enter parameters for the items that appear.

COMMON screen (BASIC)

Press soft key [COMMON]. The COMMON screen (BASIC) is displayed.

```
ETH_BRD SETTING              O0000 N00000
        COMMON: Setting[BOARD]
 BASIC
  MAC ADDRESS               00E0E4000001
  IP ADDRESS                192. 168. 0. 100
  SUBNET MASK               255. 255. 255. 0
  ROUTER IP ADDRESS         192. 168. 0. 253




                                      1/ 2
 A)_


 MDI   **** *** ***    12:00:00
( COMMON  FOCAS2  FTPTRNS RMTDIAG (OPRT)  +
```

COMMON screen (BASIC)

Setting items

Item	Description
IP ADDRESS	Specify the IP address of the Fast Ethernet. (Example of specification format: "192.168.0.100")
SUBNET MASK	Specify a mask address for the IP addresses of the network. (Example of specification format: "255.255.255.0")
ROUTER IP ADDRESS	Specify the IP address of the router. Specify this item when the network contains a router. (Example of specification format: "192.168.0.253")

Display items

Item	Description
MAC ADDRESS	Fast Ethernet MAC address

> **NOTE**
> Set page 2 (DETAIL screen) of the COMMON screen when using the DNS/DHCP function. For details, see Appendix D, "DNS/DHCP Function".

COMMON screen (DETAIL)

When using the DNS function, press soft key [COMMON] then press page key [PAGE↑] [PAGE↓].   The COMMON screen (DETAIL) is displayed.   Set the DNS IP address setting items.

```
ETH_BRD SETTING                    O0000 N00000
            COMMON:  Setting[BOARD]
 DETAIL
  DNS  IP  ADDRESS  1          192. 168. 0. 251
  DNS  IP  ADDRESS  2          192. 168. 0. 252
  HOST  NAME
            CNC-1
  DOMAIN
            FACTORY


                                           2/ 2

 A} _

 MDI   ****  ***  ***        12:00:00
 ‹ COMMON  FOCAS2  FTPTRNS RMTDIAG  (OPRT)   +
```

COMMON screen (DETAIL)

Display items

Item	Description
DNS IP ADDRESS 1, 2	Up to two DNS IP addresses can be specified. The CNC searches for the DNS server using DNS IP addresses 1 and 2 in that order.

FTP transfer screen (CONNECT1, CONNECT2, CONNECT3)

1 Press soft key [FTPTRNS] ([FTP TRANS]). The FTP transfer screen is displayed.

2 Page keys [↑PAGE] [PAGE↓] can be used to make settings for the three host computers for connection destinations 1 to 3.

```
ETH_BRD SETTING            O0000 N00000
          FTP  TRANS:Setting[BOARD]
 CONNECT1
  HOST  NAME(IP  ADDRESS)
         192. 168. 0. 200

  PORT  NUMBER                        21
  USER  NAME
        user
  PASSWORD
        ****
                                    1/ 6
 A)_

 MDI   **** *** ***  | 12:00:00 |
 《 COMMON  FOCAS2  FTPTRNS RMTDIAG (OPRT)  +
```
FTP transfer screen 1

```
ETH_BRD SETTING            O0000 N00000
          FTP  TRANS:Setting[BOARD]
 CONNECT1
  LOGIN  FOLDER
        /ncdata




                                    2/ 6
 A)_

 MDI   **** *** ***  | 12:00:00 |
 《 COMMON  FOCAS2  FTPTRNS RMTDIAG (OPRT)  +
```
FTP transfer screen 2

Setting items

Item	Description
HOST NAME	Specify the IP address of the host computer. (Example of specification format: "192.168.0.200")
PORT NUMBER	Specify a port number to be used with the FTP file transfer function. An FTP session is used, so that "21" is to be specified usually.
USERNAME	Specify a user name to be used for logging in to the host computer with FTP. (Up to 31 characters can be specified.)
PASSWORD	Specify a password for the user name specified above. (Up to 31 characters can be specified.) Be sure to set a password.
LOGIN FOLDER	Specify a work folder to be used when logging in to the host computer. (Up to 127 characters can be specified.) If nothing is specified, the home folder specified in the host computer becomes the log-in folder.

Operation

Select a destination.

1   Pressing the [(OPRT)] soft key causes soft key [HOST] ([HOST SELECT]) to be displayed.   Pressing this soft key causes soft keys [CONECT1], [CONECT2], and [CONECT3] to be displayed.

| HOST | CHA-EXT | | | INPUT | |

| CONECT1 | CONECT2 | CONECT3 | | | |

2   Depending on the host computer to be connected, press soft key [CONECT 1], [CONECT 2], or [CONECT 3].   Destination 1, 2, or 3 is highlighted in the screen title field.   The computer corresponding to the highlighted destination is selected as the target computer to be connected.

CONNECT1 ⟶ CONNECT1

When destination 1 is selected

G.2   RELATED NC PARAMETERS

The NC parameters related to the FTP file transfer function are described below.

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

[Input type] Setting input
[Data type] Byte
[Valid data range] 5 : Select the FTP transfer function as the input/output device.

> **NOTE**
> Use the same number as that for the Data Server function.

	#7	#6	#5	#4	#3	#2	#1	#0
0901							EFT	

[Input type] Setting input
[Data type] Bit

#1   EFT The FTP file transfer function by the Ethernet function is:
0:   Not used.
1:   Used.

> **NOTE**
> 1 If this parameter is changed, the power needs to be turned off.
> 2 This parameter is valid only for the first path.
> 3 The FTP file transfer function is disabled when the Data Server function option is enabled.

	#7	#6	#5	#4	#3	#2	#1	#0
0905							PCH	

[Input type] Setting input
[Data type] Bit

#1   PCH At the start of communication of the Data Server function, FTP file transfer function, or machine remote diagnosis function, checking for the presence of the server using PING is:
0:   Performed.
1:   Not performed.

> **NOTE**
> Usually, set 0.
> If 1 is set not to check the presence of the server by using PING, it may take several tens of seconds to recognize an error when the server is not present in the network.
> For mainly security reasons, a personal computer may be set so that it does not respond to the PING command. To communicate with such a personal computer, set 1.

0921	Selects the host computer 1 OS.

0922	Selects the host computer 2 OS.

0923	Selects the host computer 3 OS.

[Input type]   Parameter input
[Data type]   Word
[Valid data range] 0 to 2
               0:   Windows 2000/XP/Vista.
               1:   UNIX, VMS.
               2:   Linux.

> **NOTE**
> Some FTP server software products do not depend on the OS. So, even when the above parameters are set, it is sometimes impossible to display a list of files properly.

G.3 **Example of setting the FTP file transfer function**

The following shows a setting example required for the FTP file transfer function to operate.
In this example, one personal computer is connected to two CNCs through the FTP file transfer function.
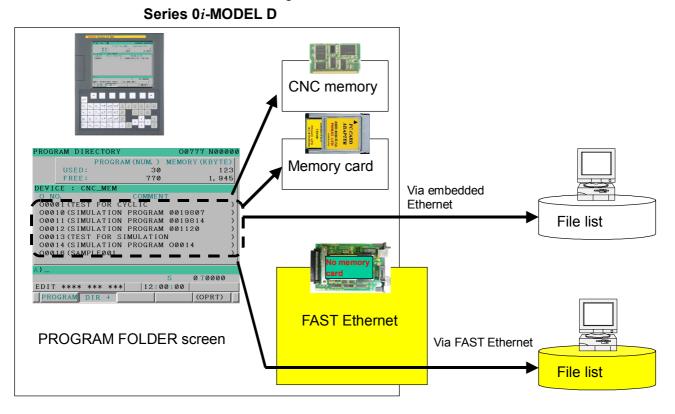
HUB

10BASE-T or 100BASE-TX

CNC 1   CNC 2   PC 1

		CNC 1	CNC 2
IP address		192.168.0.100	192.168.0.101
Subnet mask		255.255.255.0	255.255.255.0
Router IP address		None	None
Connection host 1	Port number	21	21
	IP address	192.168.0.200	192.168.0.200
	User name	user	user
	Password	user	user
	Login DIR	None	None
NC parameter No. 20		5	5

The common setting screen is used for setting.

The Ethernet parameter screen is used for setting.

NC parameter setting

	PC 1
IP address	192.168.0.200
Subnet mask	255.255.255.0
Default gateway	None
User name	user
Password	user
Login DIR	Default

"Microsoft TCP/IP property" of the personal computer (Windows 2000 / XP / Vista) is used for setting.

"User acount of the personal computer (Windows 2000 / XP / Vista) is used for setting.

"Internet service manager" of the personal computer (Windows 2000 / XP) is used for setting.
Windows Vista uses "FTP Publishing Service" for setting.

G.4   OPERATING THE FTP FILE TRANSFER FUNCTIONS

This chapter describes how to operate the Data Server functions.

The PROGRAM DIRECTORY screen allows you to manipulate files in the CNC memory, in a memory card, or on a host computer connected via an embedded Ethernet or FAST Ethernet board, by selecting a device.

Series 0*i*-MODEL D

This section describes how to manipulate files on a host computer connected via a FAST Ethernet board.

> **NOTE**
> The ISO code input/output function is also effective for the FTP file transfer function. The parameters to be set are the same as those for the Data Server functions.
> For details of the ISO code input/output function, see Section 2.6, "ISO CODE INPUT/OUTPUT FUNCTION" in Part I, "GENERAL".

G.4.1   **Device Change on the Program Directory Screen**

Procedure

1   Press the function key ⬚ .

2   Press soft key [DIR +] to display the PROGRAM DIRECTORY screen. (When there is no soft keys, press the continue key.)

```
PROGRAM DIRECTORY              O0777 N00000
            PROGRAM(NUM. )  MEMORY(KBYTE)
     USED:              30             123
     FREE:             770           1,945
DEVICE : CNC_MEM
 O NO.              COMMENT
 O0001(TEST FOR CYCLIC                      )
 O0010(SIMULATION PROGRAM 0019807           )
 O0011(SIMULATION PROGRAM 0019814           )
 O0012(SIMULATION PROGRAM 001120            )
 O0013(TEST FOR SIMULATION                  )
 O0014(SIMULATION PROGRAM O0014             )
 O0016(SAMPLE001                            )

A)_
                              S      0 T0000
EDIT **** *** ***    12:00:00
   PROGRAM  DIR +                    (OPRT)
```

PROGRAM DIRECTORY screen

3   Press soft key [(OPRT)] then soft key [DEVICE] to display the soft keys for selectable devices.

```
<CNCMEM  MEMCARD M-CARD  EMB ETH
```

```
<            FTPHOST                         +
```

4   Press soft key [FTPHOST] ([FTP HOST]) to display the FTP TRANSFER HOST FILE LIST screen, which lists the files stored on the host computer connected via FAST Ethernet.
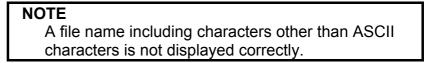
G.4.2   **FTP Transfer Host File List**

Host computer files can be operated on the FTP TRANSFER HOST FILE LIST screen.

FTP TRANSFER HOST FILE LIST screen (8.4-inch LCD)

| < | | | DELETE | RENAME | CREATE FOLDER | | | | | | + |

| < | SELECT START | | | REFRES H | | CHARA EXT | HOST CHANGE | | | + |

FTP TRANSFER HOST FILE LIST screen (10.4-inch LCD)

> **NOTE**
> A file name including characters other than ASCII characters is not displayed correctly.

If the file list is longer than one page, you can scroll the screen by using page keys ⬆PAGE ⬇PAGE .

Display item

CON HOST (CONNECT HOST)

Displays the number of the host computer currently connected.

REG NUM (REGISTERED PROGRAM)

Displays the number of files stored in the host computer currently connected.

DEVICE

Displays the current device. If the host file list of the Data Server is selected, "FTP_HOST" is indicated.

CURRENT FOLDER

Displays the work folder in the current host computer.

File list

Displays information about the files and folders in the host computer.

> **NOTE**
> Character strings within parentheses are those that are displayed when the display unit of 10.4" is used.

Operation list

DIR +

Switches the file list information to overall display or detail display.

SEARCH

Searches for a file in the current folder in the host computer..

DEVICE (EDEVICE CHANGE)

Enables a device for display on the PROGRAM DIRECTORY screen. When selecting the host file list of the Fast Ethernet board, press soft key [FTP HOST].

F INPUT

Inputs a program stored in the host computer to the CNC memory. This can be performed only when the EDIT mode is on, and "5" is set in NC parameter No. 20.

FOUTPUT (F OUTPUT)

Outputs a program stored in the CNC memory to the host computer. This can be performed only when the EDIT mode is on, and "5" is set in NC parameter No. 20.

DELETE

Deletes a file or folder in the host computer.

RENAME

Renames a file or folder in the host computer.

F CREAT (CREATE FOLDER)

Creates a sub-folder under the current work folder in the host computer.

REFRESH

Updates the information displayed on the FTP HOST FILE LIST screen of the Fast Ethernet board.

HOST (HOST CHANGE)

Changes the connected host computer.

> **NOTE**
> Character strings within parentheses are those that are displayed when the display unit of 10.4" is used.

G.4.2.1   Displaying and operating the file list

DETAIL OFF, DETAIL ON

The content of the displayed file list can be changed.
Each time you press soft key [DIR +], the list changes from DETAIL OFF to DETAIL ON or vice versa.
In the DETAIL OFF mode, only file names are displayed while, in the DETAIL ON mode, other file information such as file sizes and creation dates are also displayed.

> **NOTE**
> 1   The information displayed with soft key [DETAIL ON] depends on the setting of the FTP server on the host computer.
> 2   When a file operation is performed in the DETAIL ON mode, the information displayed at the right end of the screen is used as the file name. Therefore, the operation may not be performed properly, depending on the displayed content or file name. In that case, switch to the DETAIL OFF mode and perform the operation.

REFRESH

The content of the displayed file list can be refreshed.
Pressing soft key [REFRESH] refreshes the content of the displayed file list.

MOVE FOLDER

A current folder can be moved.

1   By using cursor keys ⬆ ⬇ , select a folder to be moved.

2   Press the MDI key ⬇INPUT .

CREATE FOLDER

A new folder can be created.

1   Move to the folder to create a new folder.
2   Key in a folder name.
3   Press soft key [F CREAT] ([CREATE FOLDER]).

DELETE FILE/FOLDER

A file or folder can be deleted.

1 By using cursor keys $\boxed{\uparrow}$ $\boxed{\downarrow}$, select a file or folder to be deleted.
2 Press soft key [DELETE].
   • Press soft key [EXEC] for execution.
   • Press soft key [CANCEL] for cancellation.

DELETE (multiple files)

Multiple files can be deleted at a time.

1 Press soft key [SELECT] ([SELECT START]).
2 By using cursor keys $\boxed{\uparrow}$ $\boxed{\downarrow}$, select a file to be deleted.
3 Press soft key [SELECT].
   A selected file is displayed in reverse video.
   Repeat steps 2 and 3 for files to be deleted.
4 Press soft key [DELETE].
   • Press soft key [EXEC] for execution.
   • Press soft key [CANCEL] for cancellation.

NOTE
1 Up to 10 files can be selected at a time.
2 It is only files that can be specified in plural. If more than one folder is specified, an error occurs when an attempt is made to delete any folder.

RENAME

A file or folder can be renamed.

1 By using cursor keys $\boxed{\uparrow}$ $\boxed{\downarrow}$, select a file or folder to be renamed.
2 Key a new file name or folder name.
3 Press soft key [RENAME].

SEARCH

In the current work folder, a file or folder can be found. The file or folder found is displayed at the top of the file list.

1 Enter a desired file name.
2 Press soft key [SEARCH],

HOST CHANGE

The connected host computer can be changed.

1   Press soft key [HOST] ([HOST CHANGE]).
     The connected host number changes in the order $1 \rightarrow 2 \rightarrow 3 \rightarrow 1$.

G.4.3   **Program Transfer Operation**

A program can be transferred between the host computer and CNC.

> **NOTE**
> 1 To input or output a program via FAST Ethernet, it
>   is necessary to set "5" in NC parameter No. 20.
> 2 If an error occurs, see the "ETHERNET LOG
>   screen" screen to identify the cause of the error.

Program input

A program on the host computer can be transferred to the CNC memory.

> ⚠ **CAUTION**
> If bit 2 (REP) of NC parameter No. 3201 is set to 1,
> when an NC program having the same file name as
> an NC program to be input is already present in
> CNC memory, the existing NC program is
> overwritten.

> **NOTE**
> The input of an NC program cannot be performed
> simultaneously with "NC program output".

1   Set the CNC to the EDIT mode.
2   Press soft key [F INPUT].

```
A〉_
F  NAME=                    O  NO. =
EDIT ✳✳✳✳  ✳✳✳  ✳✳✳ │    12:00:00
〈[F  NAME ][ O  SET ][      ][CANCEL][ EXEC  ]+│
```

3   Select a program on the host computer.
      Place the cursor on the name of the host computer file to be input
      and press soft key [F GET], or key in the name of the file to be
      input.
4   Press soft key [F NAME].
5   To input a program with a different program name, key in a
      program number and press soft key [O SET].
6   Press soft key [EXEC].
7   During transferring, "INPUT" blinks in the lower right part of the
      screen.

The following table summarizes what happens if the input file name [F NAME] and input program number [O SET] are omitted.

[FNAME]	[OSET]	Key input buffer	Input file name	Input program	Input program number
Not specified	Not specified	Not specified	Warning "NO PROGRAM SELECTED" is displayed, and nothing is input.		
		Other than Oxxxx	Warning "THE WRONG DATA IS USED" is displayed, and nothing is input.		
		Oxxxx	File name specified in the key input buffer (Note)	All programs in the input file	Sequential number beginning with the program number specified in the key input buffer (xxxx)
	-9999	Not affected	Warning "NO PROGRAM SELECTED" is displayed, and nothing is input.		
	Specified		Same file name as the program number set in [O SET] (Note)	All programs in the input file	Sequential number beginning with the program number set in [O SET]
Specified	Not specified	Not affected	File name set with [F NAME]	All programs in the file specified in [F NAME]	Program number used when saving
	-9999		Warning "THE WRONG DATA IS USED" is displayed, and nothing is input.		
	Specified		File name set with [F NAME]	All programs in the file specified in [F NAME]	Sequential number beginning with the program number set in [O SET]

NOTE
An input file name consists of the letter "O" followed by a four-digit number.
For example, when a program is input with program number 1 specified, the file is input with the file name "O0001".
When the operation is performed for the second path, the extension "P-2" is appended to the file name. In the example stated above, the file name is "O0001.P-2".

Program output

A program in the CNC memory can be transferred to the host computer.

> **NOTE**
> The output of an NC program cannot be performed simultaneously with "NC program input".

Procedure

1   Set the CNC to the EDIT mode.
2   Press soft key [F OUTPUT].

```
A ) _
F  NAME =                    O  NO. =
 EDIT  ****  ***  ***  │   12:00:00  │
 (│F  NAME │ O  SET │       │CANCEL │ EXEC  │ +
```

3   Select a program on the CNC.
     Key in the number of the program to be output.
4   Press soft key [O SET].
5   To output the program with a different program name, key in the file name and press soft key [F NAME].
6   Press soft key [EXEC].
7   During transferring, "OUTPUT" blinks in the lower right part of the screen.

The following table summarizes what happens if the output file name [F NAME] and output program number [O SET] are omitted.

[FNAME]	[OSET]	Key input buffer	Output file name	Output program
Not specified	Not specified	Not specified	Currently selected main program name (Note 1, 2)	Currently selected main program (Note 1)
		Other than Oxxxx	Warning "THE WRONG DATA IS USED" is displayed, and nothing is input.	
		Oxxxx	Program name set in the key input buffer (Note 2)	Program in the CNC memory set in the key input buffer
		O-9999	ALL-PROG.TXT (Note 3)	All programs in the CNC memory
	-9999	Not affected		
	Specified		Same file name as the program number set in [O SET] (Note)	Program in the CNC memory set in [O SET]
Not specified	Not specified	Not affected	File name set with [F NAME]	Currently selected main program (Note 1)
	-9999			All programs in the CNC memory
	Specified			Program in the CNC memory set in [O SET]

NOTE
1 During background editing, the file being edited in the background is output.
2 An output file name consists of the letter "O" followed by a four-digit number.
For example, when a program is output with program number 1 specified, it is output to the host computer with the file name "O0001".
When the operation is performed for the second path, the extension "P-2" is appended to the file name. In the example stated above, the file name is "O0001.P-2".
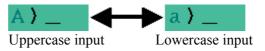3 When the operation is performed for the second path, the file name is "ALL-PROG.P-2".

G.5　　**Input of Special Characters**

By setting bits 4 and 5 (SI1 and SI2) of NC parameter No. 13115, it is possible to input special characters and lowercase characters that are not available on the MDI keys.

Setting this NC parameter displays soft key [CHA-EXT], and pressing this soft key displays the following set of soft keys.

Each time you press soft key [ABC/abc], you switch from uppercase input to lowercase input or vice versa. The uppercase/lowercase input state can be checked in the key input field.

Uppercase input　　　　　Lowercase input

Related NC parameters

	#7	#6	#5	#4	#3	#2	#1	#0
13115			SI2	SI1				

[Input type]　Parameter input
[Data type]　Bit

 # 4　　**SI1**　Soft key input of the characters shown below is:
0:　Disabled.
1:　Enabled.
< > \ % $! ~ : " '

 # 5　　**SI2**　Soft key input of the characters shown below and switching between the uppercase and lowercase input modes by a soft key are:
0:　Disabled.
1:　Enabled.
( ) ? * & @ _

INDEX

Revision Record

FANUC FAST Ethernet / FAST Data Server For FANUC Series 0*i*-MODEL D OPERATOR'S MANUAL (B-64414EN)

Edition	Date	Contents	Edition	Date	Contents
01	Jun., 2008				

FANUC Series 0*i*–MODEL D
Modbus/TCP Server function

1. Type of applied technical documents

Name	FANUC FAST Ethernet FANUC FAST Data Server For FANUC Series 0*i*–MODEL D OPERATOR'S MANUAL
Spec.No./Version	B-64414EN/01

2. Summary of change

Group	Name / Outline	New, Add, Correct, Delete	Applicable Date
Basic Function			
Optional Function	Modbus/TCP Server function is added into APPENDIX H.	Add	Immediately
Unit			
Maintenance parts			
Notice			
Correction			
Another			

				Title	FANUC Series 0*i*–MODEL D Modbus/TCP Server function		
				Draw No.	B-64414EN/01-1		
Edit	**Date**	**Design**	**Description**	**FANUC CORPORATION**		**Sheet**	1/11
	Date	2010.12.13 **Design** Y.Honda **Apprv.** N.Mutai					

H Modbus/TCP Server function

H.1 OVERVIEW

The Server function of Modbus/TCP functions is supported.

> **NOTE**
> 1 In this function, the client function of Modbus/TCP functions is not supported.
> 2 The Ethernet function (S707) is necessary to use Modbus/TCP Server function (R968).

Modbus/TCP data model

The following four kinds of data formats are defined as Modbus/TCP data model.

Table name	Object type (Data type)	Type of READ/WRITE
Discrete input	Single bit	READ only
Coils	Single bit	READ-WRITE
Input Registers	16-bit word	READ only
Holding Registers	16-bit word	READ-WRITE

> **NOTE**
> 1 In FANUC Modbus/TCP Server function, only "Holding Registers" can be used. "Discrete input", Coils", and "Input Registers" cannot be used.
> 2 "READ" means the input of data from the client, and "WRITE" means the data of output from the client.

Modbus/TCP function code

In FANUC Modbus/TCP Server function, the following function codes are supported.

Function code name	Code
Read Holding Registers	03h
Write Multiple Registers	10h
Read/Write Multiple Registers	17h

Modbus area (Holding Registers)
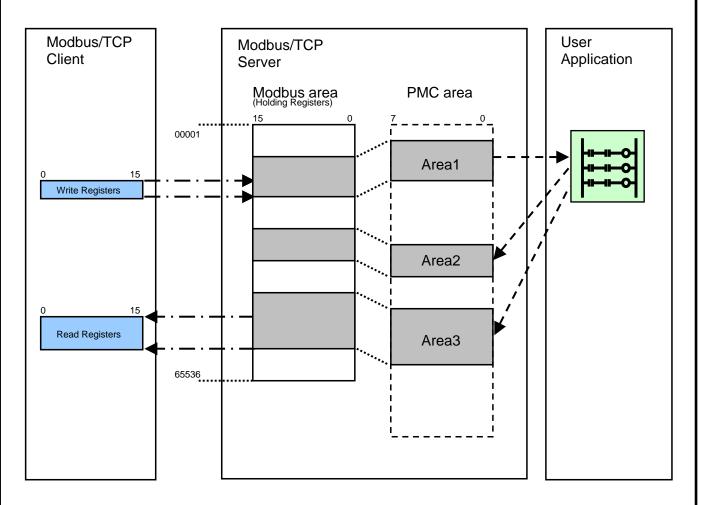
In Modbus/TCP Server function, the Modbus area (Holding Registers) of 64K words (128K bytes) is prepared.

				Title	FANUC Series 0i–MODEL D Modbus/TCP Server function
				Draw No.	B-64414EN/01-1

And the Modbus area can be allocated to the PMC area.

As a result, the data accessed from the client device to the Modbus area can be notified to the PMC area, and the user application (Ladder program etc.) can be accessed to the Modbus area through the PMC area.

This allocation can be set up to three areas.

The minimum access unit of Modbus area is "a word" and the range of the address is 1- 65536.

Specification of Modbus/TCP Server function

The specification of FANUC Modbus/TCP Server function is shown in the following.

1. "Automatic TCP connection management" is implemented. This means that user application (such as Ladder program) does not need to take care of TCP connection.

2. "Non-priority connection pool" is implemented. This means that the oldest connection is disconnected when the requests from the multiple clients are received and the connections are full, FANUC Modbus/TCP Server function can receive the requests from the maximum 10 clients at the same time. "Priority connection pool" is not implemented.

3. "Access control service" is not implemented. This means that all of device can be accessed without authorization (user name, or password).

Title	FANUC Series 0*i*–MODEL D Modbus/TCP Server function		
Draw No.	B-64414EN/01-1		
Edit	Date	Design	Description	FANUC CORPORATION	Sheet	3/11
Date	2010.12.13	Design Y.Honda	Apprv. N.Mutai			

H.2   SETTING THE Modbus/TCP SERVER FUNCTION

This chapter describes the communication setting for the Modbus/TCP Server function.

Notes on using the Modbus/TCP Server function

NOTE
1 The client of Modbus/TCP functions is not supported.
2 The number of Modbus/TCP clients that can be connected with one CNC is maximum 10 at the same time. When more than ten connections are attempted, the oldest communication is disconnected.
3 Please confirm that there is no problem as the entire system when communicating with the device of the other companies.

H.2.1   SETTING THE Modbus/TCP SERVER FUNCTION

This section describes the setting screen for operating the Modbus/TCP Server function.

Procedure

1 Press function key $\boxed{\diamondsuit}$ SYSTEM .

2 Soft key [ETHBRD] appears. (When soft key does not appear, press the continue key.)

3 Press soft key [ETHBRD] to display the Ethernet Setting screen.

4 Press soft keys [COMMON] and [ModSET], and then enter the parameters.

COMMON screen (BASIC)

Press soft key [COMMON] to display the COMMON screen (BASIC).

Title	FANUC Series 0*i*–MODEL D Modbus/TCP Server function
Draw No.	B-64414EN/01-1

Edit	Date	Design		Description			FANUC CORPORATION	Sheet	4/11
	Date	2010.12.13	Design	Y.Honda	Apprv.	N.Mutai			

```
ETH_BRD SETTING                    O0000 N00000
            COMMON: Setting[BOARD]
 BASIC
  MAC ADDRESS                    00E0E4000001
  IP ADDRESS                     192. 168. 0. 100
  SUBNET MASK                    255. 255. 255. 0
  ROUTER IP ADDRESS              192. 168. 0. 253



                                           1/ 2

A) _
                                    S     0 T0000
 MDI    **** *** ***      12:00:00
 (COMMON  FOCAS2  FTPTRNS          (OPRT)  +
```

COMMON screen (BASIC)

Setting item

Item	Description
IP ADDRESS	Specify the IP address of the Fast Ethernet. (Example of specification format "192.168.0.100")
SUBNET MASK	Specify a mask address for the IP addresses of the network. (Example of specification format "255.255.255.0")
ROUTER IP ADDRESS	Specify the IP address of the router. Specify this item when the network contains a router. (Example of specification format "192.168.0.253")

Display item
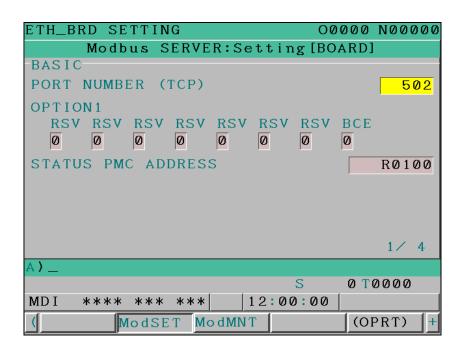
Item	Description
MAC ADDRESS	MAC address of the Fast Ethernet

Modbus SERVER screens

Press soft key [ModSET] to display the Modbus SERVER screen.

				Title	FANUC Series 0*i*–MODEL D Modbus/TCP Server function
				Draw No.	B-64414EN/01-1
Edit	Date	Design	Description	FANUC CORPORATION	Sheet	5/11
	Date	2010.12.13	Design Y.Honda Apprv. N.Mutai		

```
ETH_BRD SETTING              O0000 N00000
         Modbus SERVER:Setting[BOARD]
 BASIC
 PORT NUMBER (TCP)                     502

 OPTION1
   RSV  RSV  RSV  RSV  RSV  RSV  RSV  BCE
    0    0    0    0    0    0    0    0

 STATUS PMC ADDRESS                  R0100




                                    1/ 4
 A) _

                           S      0 T0000
 MDI   **** *** ***    12:00:00
 (            ModSET  ModMNT        (OPRT)  +
```

Modbus/TCP Server screen 1 (BASIC)

```
ETH_BRD SETTING              O0000 N00000
         Modbus SERVER:Setting[BOARD]
 AREA1
 DATA Modbus ADDRESS                     1

 DATA PMC ADDRESS                    R0124

 DATA SIZE(WORD)                       100




                                    2/ 4
 A) ^

                           S      0 T0000
 MDI   **** *** ***    12:00:00
 (            ModSET  ModMNT        (OPRT)  +
```

Modbus/TCP Server screen 2 (AREA1-3)

Setting item

Item	Description
PORT NUMBER (TCP)	Specify the port number for using Modbus/TCP Server function. The input range is from 0 to 65535. Usually, set 502. When 0 is set, the Modbus/TCP Server function is not operated.

				Title	FANUC Series 0*i*–MODEL D Modbus/TCP Server function
				Draw No.	B-64414EN/01-1
Edit	**Date**	**Design**	**Description**	**FANUC CORPORATION**	**Sheet** 6/11
	Date 2010.12.13	**Design** Y.Honda	**Apprv.** N.Mutai		

Item	Description
OPTION1	Bit 0 : BCE Byte arrangement in the Modbus area is assumed to be 0 : a little endian 1 : a big endian Bit 1 – 7 : RSV Be sure to set 0.
STATUS PMC ADDRESS	The top address in the E/R area of PMC that stores status is set. The setting range depends on an effective PMC area. This status is occupied by one byte. Specify a space (blank) when not using this status. In this case, "---" is displayed.
DATA Modbus ADDRESS	The top address in Modbus area (Holding registers) where I/O is exchanged for the Modbus/TCP client is set. The setting range is 1 – 65536.
DATA PMC ADDRESS	The top address in E/R/D area of PMC that exchanges I/O for the Modbus/TCP client is set. The setting range depends on an effective PMC area. Only the even-numbered address can be set. Specify a space (blank) when not exchanging I/O. In this case, "---" is displayed.
DATA SIZE	The data size (unit: word size) that exchanges I/O for the Modbus/TCP client is set. The setting range depends on an effective PMC area. Set 0 when not exchanging I/O.

NOTE
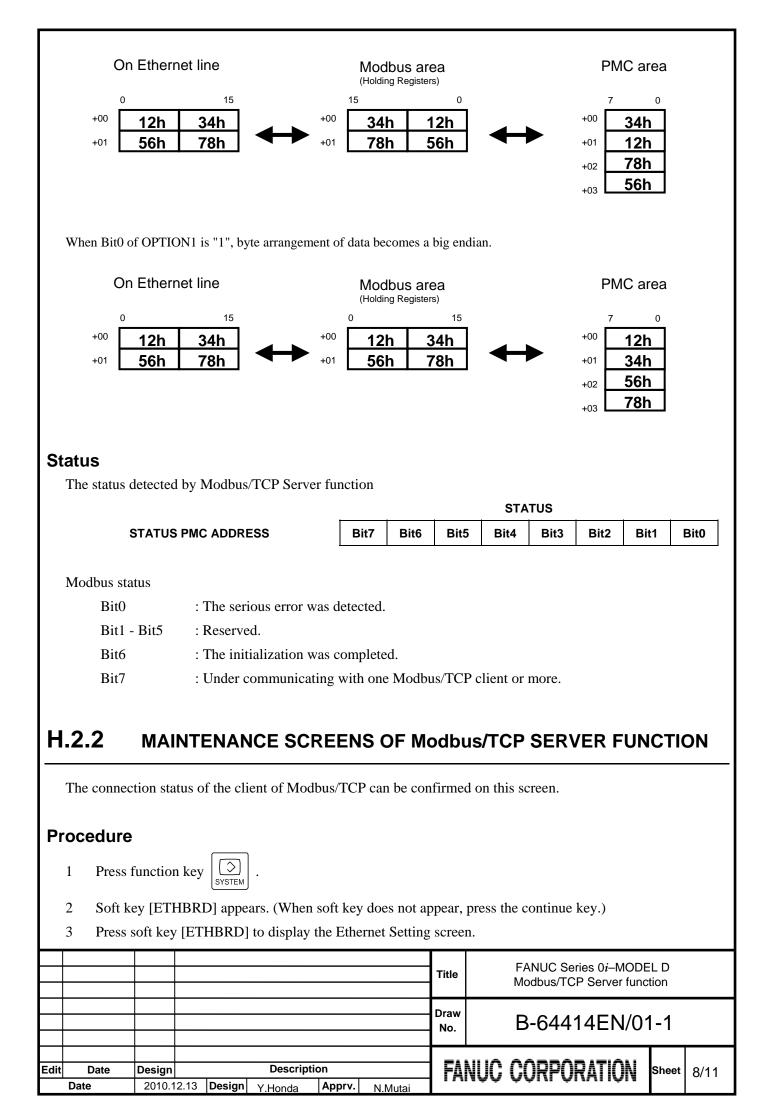
1 Be careful not to cause an overlap between an area such as the input data area of the user program and a PMC area used for other purposes.

2 This parameter is backed up and stored with Fast Ethernet.
   When backing up or storing the parameter, please execute it by the common screen of Fast Ethernet.

3 The changed parameter is effective by turning the power off and on.

4 Please set not to overlap the Modbus area in area 1-3. When the overlapping setting is done, operation is different in READ/WRITE as follows.
   In case of READ, the data in area n (n is the biggest number) is read.
   In case of WRITE, the same data as all the overlapping areas is written.

Byte arrangement of Modbus area (Holding Registers)

The byte arrangement in Modbus area is normally a little endian.

							Title	FANUC Series 0*i*–MODEL D Modbus/TCP Server function

| | | | | | | | Draw No. | B-64414EN/01-1 |

| Edit | Date | Design | | Description | | | | FANUC CORPORATION | Sheet | 7/11 |
| Date | 2010.12.13 | Design | Y.Honda | Apprv. | N.Mutai | | | | | |

On Ethernet line	Modbus area (Holding Registers)	PMC area

```
       0          15              15          0              7        0
+00  | 12h | 34h |          +00  | 34h | 12h |          +00  |  34h  |
+01  | 56h | 78h |          +01  | 78h | 56h |          +01  |  12h  |
                                                        +02  |  78h  |
                                                        +03  |  56h  |
```

When Bit0 of OPTION1 is "1", byte arrangement of data becomes a big endian.

On Ethernet line	Modbus area (Holding Registers)	PMC area

```
       0          15               0          15             7        0
+00  | 12h | 34h |          +00  | 12h | 34h |          +00  |  12h  |
+01  | 56h | 78h |          +01  | 56h | 78h |          +01  |  34h  |
                                                        +02  |  56h  |
                                                        +03  |  78h  |
```

Status

The status detected by Modbus/TCP Server function

	STATUS							
STATUS PMC ADDRESS	**Bit7**	**Bit6**	**Bit5**	**Bit4**	**Bit3**	**Bit2**	**Bit1**	**Bit0**

Modbus status

Bit0	: The serious error was detected.
Bit1 - Bit5	: Reserved.
Bit6	: The initialization was completed.
Bit7	: Under communicating with one Modbus/TCP client or more.

H.2.2   MAINTENANCE SCREENS OF Modbus/TCP SERVER FUNCTION

The connection status of the client of Modbus/TCP can be confirmed on this screen.

Procedure

1   Press function key $\boxed{\diamondsuit}$ SYSTEM .

2   Soft key [ETHBRD] appears. (When soft key does not appear, press the continue key.)

3   Press soft key [ETHBRD] to display the Ethernet Setting screen.

					Title	FANUC Series 0*i*–MODEL D Modbus/TCP Server function
					Draw No.	B-64414EN/01-1
Edit	**Date**	**Design**		**Description**		**FANUC CORPORATION**
	Date	2010.12.13	**Design** Y.Honda	**Apprv.** N.Mutai		**Sheet** 8/11

4   Press soft key [ModMNT], and then Modbus SERVER MAINTENANCE screen (CLIENT LIST) is displayed.

```
ETH_BRD SETTING               O0000 N00000
    Modbus SERVER MAINTENANCE  [BOARD]
CLIENT LIST
NO. CLIENT                        TIME
   1 192. 168. 0. 200           000:05:30
   2 192. 168. 0. 201           000:00:22
   3
   4
   5
   6
   7
   8
   9
  10
A) _
                              S      0 T0000
MDI    ****  ***  ***    12:00:00
 {          ModSET  ModMNT                 +
```

Modbus/TCP SERVER MAINTENANCE screen (CLIENT LIST)

Display item

Item	Description
CLIENT	IP address of the Modbus/TCP client communicating with this Modbus/TCP Server is displayed. (Example of display form "192.168.0.200") It is displayed in order of communicating with this Server.
TIME	The connecting time of the Modbus/TCP client communicating with this Server is displayed. The displayed time is updated automatically. The display form displays hour (hhh), minute (mm) and second (ss) in the form of "hhh:mm:ss". When the maximum value is exceeded by "999: 59:59", the maximum value is not updated from "999: 59:59".

H.2.3   LOG SCREEN OF Modbus/TCP SERVER FUNCTION

The communication log related to Modbus/TCP Server function is displayed.

LOG screen for Modbus/TCP Server function

Procedure

1   Press function key [?] MESSAGE .

					Title	FANUC Series 0*i*–MODEL D Modbus/TCP Server function
					Draw No.	B-64414EN/01-1

Edit	Date	Design	Description			FANUC CORPORATION	Sheet	9/11
	Date	2010.12.13	Design	Y.Honda	Apprv.	N.Mutai		

2   Press soft key [BRD LOG] to display the Ethernet log screen. (When soft key does not appear, press the continue key.)

3   Press soft key [Modbus], and then the information related to the Modbus/TCP Server function is displayed.

```
ETH_BRD LOG                      O0000 N00000
           ETHERNET LOG [BOARD]
 Modbus SERVER
 E-041B Frame reception failed (TCP) [2
 60]                      Dec. 09 11:22:22




                              PAGE: 1/30
 A) _

                          S     0 T0000
 MDI  **** *** ***  │ 12:00:00 │
 (│Modbus  │       │       │       │ (OPRT) │+│
```

Modbus/TCP LOG screen

The latest log information is displayed at the top of the screen. At the right end of a log item, the occurrence date and time of the log item is indicated. Date and time data is indicated in the format "MMM.DD hh:mm:ss", where MMM represents a month, DD represents a day, hh represents hour, mm represents minute, and ss represents second.

The top item in the example above indicates "11:22:22 on December 9".

To clear the log information, press soft key [(OPRT)] then soft key [CLEAR].

NOTE

The Modbus/TCP Server log information is stored in volatile memory and it is lost when the power of CNC is turned off. Check the log information when an error occurs.

			Title	FANUC Series 0*i*–MODEL D Modbus/TCP Server function
			Draw No.	B-64414EN/01-1
Edit **Date** **Design**		**Description**	**FANUC CORPORATION**	**Sheet** 10/11
Date 2010.12.13 **Design** Y.Honda **Apprv.** N.Mutai				

The following lists major log message:

Error Code	Log message	Meaning and action to be taken
E-0B47	TCP port number of Modbus/TCP Server is wrong	A value outside the valid setting range might be set.
E-0B48	Status PMC address of Modbus/TCP Server is out of range	A value outside the valid setting range might be set.
E-0B49	Data PMC address of Modbus/TCP Server is wrong	The odd address might be set.
E-0B4A	Data PMC address of Modbus/TCP Server is out of range	A value outside the valid setting range might be set.
E-0B4B	Modbus area of Modbus/TCP Server is out of range	A value outside the valid setting range might be set.
E-1001	All Modbus communication paths are busy	The communication destination (Modbus/TCP client) exceeded 10 nodes. For a new communication destination (Modbus/TCP client), the oldest connection is disconnected.
E-1003	Version number of Modbus packet is wrong	Please specify a correct version number according to the protocol of Modbus/TCP.
E-1004	Length of Modbus packet is wrong	Please specify a correct size according to the protocol of Modbus/TCP.
E-100B	Function code of Modbus packet is wrong	The specified function code might not be supported. Please refer to "1. Modbus/TCP SERVER FUNCTION" about the supported function code.
E-1015 E-1016	Data address of Modbus packet is wrong	Please specify a correct data address according to the protocol of Modbus/TCP.
E-1017 E-1018 E-1019	Data value of Modbus packet is wrong	Please specify a correct data value according to the protocol of Modbus/TCP.
E-XXXX	(No message)	Internal error Report the error number to FANUC.

Edit	Date	Design	Description				Title	FANUC Series 0*i*–MODEL D Modbus/TCP Server function
	Date	2010.12.13	Design	Y.Honda	Apprv.	N.Mutai	Draw No.	B-64414EN/01-1

FANUC CORPORATION Sheet 11/11