GE Fanuc Automation

Computer Numerical Control Products

Data Server Operator's Manual

GFZ-62694EN/03 *April 2000*

Warnings, Cautions, and Notes as Used in this Publication

Warning

Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist in this equipment or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

Caution

Caution notices are used where equipment might be damaged if care is not taken.

Note

Notes merely call attention to information that is especially significant to understanding and operating the equipment.

This document is based on information available at the time of its publication. While efforts have been made to be accurate, the information contained herein does not purport to cover all details or variations in hardware or software, nor to provide for every possible contingency in connection with installation, operation, or maintenance. Features may be described herein which are not present in all hardware and software systems. GE Fanuc Automation assumes no obligation of notice to holders of this document with respect to changes subsequently made.

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SAFETY PRECAUTIONS

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

Contents

1 WARNING, CAUTION, AND NOTE

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

WARNING
Applied when there is a danger of the user being injured or when there is a damage 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.

2 GENERAL WARNINGS AND NOTES

WARNING

1. Before operating the machine, thoroughly check the entered data.
   Operating the machine with incorrect 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 perform a production run, such as actually machining a workpiece, without first checking the operation of the machine. Before starting the machine for a production run, ensure that the program command values, offsets, current position, external signals, and other settings are suitable for the operation to be performed. Also check that the machine operates 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.
3. Ensure that the specified feedrate is appropriate for the intended operation. Generally, for each machine, there is a maximum allowable feedrate. But, 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 not need to change them. When, however, there is not alternative other than to change a parameter, ensure that you fully understand the function of the parameter before making any change.
   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.

WARNING

6. 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 cause the machine to behave unexpectedly.
7. The operator's manual supplied with a CNC unit provide an overall description of the machine's functions, including any optional functions. Note that the optional functions will vary from one machine model to another. Therefore, some functions described in the manuals may not actually be available for a particular model. Check the specification of the machine if in doubt.
8. Some machine operations and screen functions may have been implemented at the request of the machine-tool builder. When using such functions, refer to the manual supplied by the machine-tool builder for details of their use and any related cautions.

NOTE

1. Command programs, parameters, and variables are stored in nonvolatile memory in the CNC unit. Usually, they are retained even if the power is turned off. Such data may be deleted inadvertently, however, or it may prove necessary to delete all data from nonvolatile memory as part of error recovery.
   To guard against the occurrence of the above, and assure quick restoration of deleted data, backup all vital data, and keep the backup copy in a safe place.

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IV. OPERATION

APPENDIX

I. GENERAL

1 OUTLINE

This manual consists of the following parts:

About this manual

SAFETY PRECAUTIONS
Notes for reading this manual is described.

I. GENERAL
Chapter organization, applicable models, and related manuals are described.

II. CONNECTION
The method of connecting each device and notes for connection are described.

III. MAINTENANCE
The drawing number of the Data Server, meaning of the LEDs, and the error messages are described.

IV. OPERATION
How to operate the Data Server functions are described.

APPENDIX
The error messages and technical terms, etc. are described.

Applicable models

This manual describes the following models. Each model may be referred to using an abbreviation, as listed below.

Product Name	Abbreviations	
FANUC Series 16-TB	16-TB	
FANUC Series 16-MB	16-MB	
FANUC Series 16-PB	16-PB	
FANUC Series 16-LB	16-LB	
FANUC Series 160-TB	160-TB	
FANUC Series 160-MB	160-MB	
FANUC Series 160-PB	160-PB	
FANUC Series 18-TB	18-TB	
FANUC Series 18-MB	18-MB	
FANUC Series 18-PB	18-PB	
FANUC Series 180-TB	180-TB	
FANUC Series 180-MB	180-MB	
FANUC Series 180-PB	180-PB	
FANUC Series 16-TC	16-TC	
FANUC Series 16-MC	16-MC	
FANUC Series 16-PC	16-PC	
FANUC Series 160-TC	160-TC	
FANUC Series 160-MC	160-MC	
FANUC Series 160-PC	160-PC	
FANUC Series 18-TC	18-TC	
FANUC Series 18-MC	18-MC	
FANUC Series 18-PC	18-PC	
FANUC Series 180-TC	180-TC	
FANUC Series 180-MC	180-MC	
FANUC Series 180-PC	180-PC	
FANUC Series 16*i*-TA	16*i*-TA	
FANUC Series 16*i*-MA	16*i*-MA	
FANUC Series 16*i*-PA	16*i*-PA	
FANUC Series 18*i*-TA	18*i*-TA	
FANUC Series 18*i*-MA	18*i*-MA	
FANUC Series 18*i*-PA	18*i*-PA	
FANUC Series 15-TB	15-TB	Series 15-B
FANUC Series 15-MB	15-MB	

Related manuals

The manuals related to each model are as follows. When reading this manual, also refer to the following manuals as required.

Related manual for Series 16/18/160/180-TB/MB

Manual Name	Specification Number
DESCRIPTIONS	B-62442E
CONNECTION MANUAL (HARDWARE)	B-62443E
CONNECTION MANUAL (FUNCTION)	B-62443E-1
OPERATOR'S MANUAL (FOR LATHE)	B-62444E
OPERATOR'S MANUAL (FOR MACHINING CENTER)	B-62454E
MAINTENANCE MANUAL	B-62445E
PARAMETER MANUAL	B-62450E

Related manual for Series 16/18/160/180-PB

Manual Name	Specification Number
DESCRIPTIONS	B-62622EN
CONNECTION MANUAL (HARDWARE)	B-62443E
CONNECTION MANUAL (FUNCTION)	B-62443E-1
CONNECTION MANUAL [Supplement for 16/18/160/180-PB]	B-62623EN
OPERATOR'S MANUAL	B-62624EN
MAINTENANCE MANUAL	B62445E
PARAMETER MANUAL	B-62450E
PARAMETER MANUAL [Supplement for 16/18/160/180-PB]	B-62630EN

Related manual for Series 16-LB

Manual Name	Specification Number
DESCRIPTIONS	B-62442
CONNECTION MANUAL (HARDWARE)	B-62443
CONNECTION MANUAL (FUNCTION)	B-62443-1
CONNECTION MANUAL [Supplement for 16-LB]	B-62593EN
OPERATOR'S MANUAL	B-62594EN
MAINTENANCE MANUAL	B62595EN
PARAMETER MANUAL	B-62450
PARAMETER MANUAL [Supplement for 16-LB]	B-62600EN

Related manual for Series 16/18/160/180-TC/MC

Manual Name	Specification Number
DESCRIPTIONS	B-62752EN
CONNECTION MANUAL (HARDWARE)	B-62753EN
CONNECTION MANUAL (FUNCTION)	B-62753EN-1
OPERATOR'S MANUAL (FOR LATHE)	B-62754EN
OPERATOR'S MANUAL (FOR MACHINING CENTER)	B-62764EN
MAINTENANCE MANUAL	B-62755EN
PARAMETER MANUAL	B-62760EN

Related manual for Series 16/18/160/180-PC

Manual Name	Specification Number
DESCRIPTIONS	B-62772EN
CONNECTION MANUAL (HARDWARE)	B-62753EN
CONNECTION MANUAL (FUNCTION)	B-62753EN-1
CONNECTION MANUAL [Supplement for 16/18/160/180-PC]	B-62773EN
OPERATOR'S MANUAL	B-62774EN
MAINTENANCE MANUAL	B62755EN
PARAMETER MANUAL	B-62760EN
PARAMETER MANUAL [Supplement for 16/18/160/180-PC]	B-62780EN

Related manual for Series 16*i* /18*i*-TA/MA

Manual Name	Specification Number
DESCRIPTIONS	B-63002EN
CONNECTION MANUAL (HARDWARE)	B-63003EN
CONNECTION MANUAL (FUNCTION)	B-63003EN-1
OPERATOR'S MANUAL (FOR LATHE)	B-63004EN
OPERATOR'S MANUAL (FOR MACHINING CENTER)	B-63014EN
MAINTENANCE MANUAL	B-63005EN
PARAMETER MANUAL	B-63010EN

Related manual for Series 16*i* /18*i*-PA

Manual Name	Specification Number
DESCRIPTIONS	B-63122EN
CONNECTION MANUAL (HARDWARE)	B-63003EN
CONNECTION MANUAL (FUNCTION)	B-63003EN-1
CONNECTION MANUAL [Supplement for 16*i*/18*i*-PA]	B-63123EN
OPERATOR'S MANUAL	B-63124EN
MAINTENANCE MANUAL	B63005EN
PARAMETER MANUAL	B-63010EN
PARAMETER MANUAL [Supplement for 16*i*/18*i*-PA]	B-63130EN

Related manual for Series 15-TB/MB

Manual Name	Specification Number
DESCRIPTIONS (FOR LATHE)	B-62072E
DESCRIPTIONS (FOR MACHINING CENTER)	B-62082E
CONNECTION MANUAL	B-62073E
CONNECTION MANUAL (BMI interface)	B-62073E-1
OPERATOR'S MANUAL (FOR LATHE, FOR PROGRAMMING)	B-62554E
OPERATOR'S MANUAL (FOR LATHE, FOR OPERATION)	B-62554E-1
OPERATOR'S MANUAL (FOR MACHINING CENTER, FOR PROGRAMMING)	B-62564E
OPERATOR'S MANUAL (FOR MACHINING CENTER, FOR OPERATION)	B-62564E-1
MAINTENANCE MANUAL	B-62075E
PARAMETER MANUAL	B-62560E

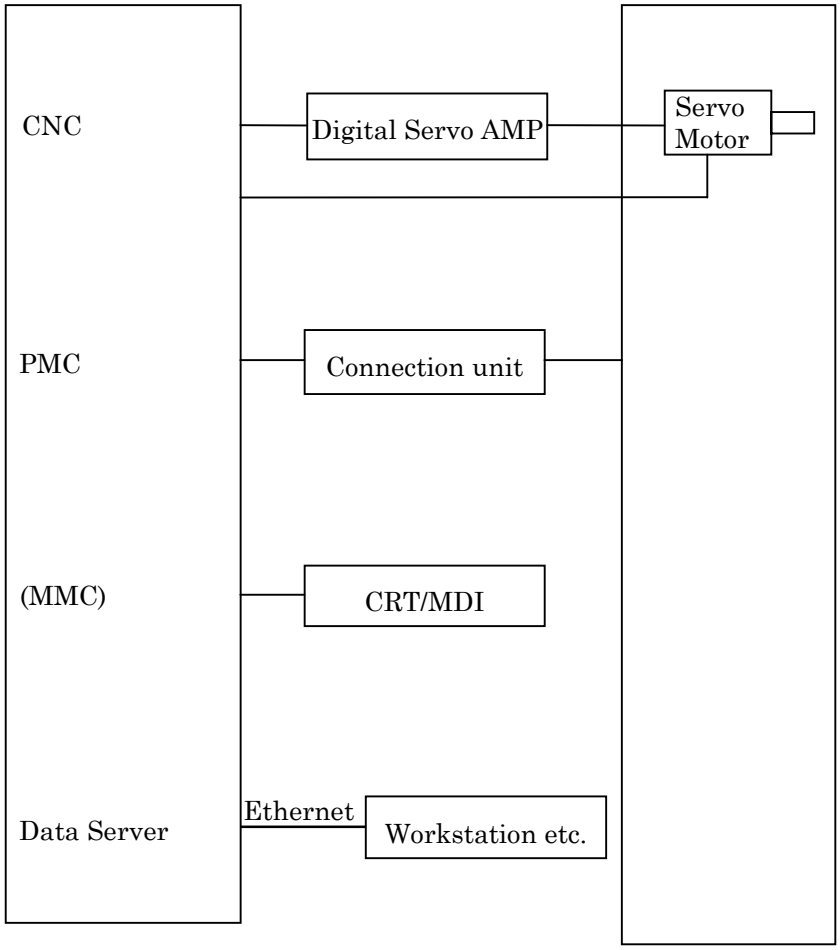
II. CONNECTION

1 FOR Series 16/18-B/C, Series 15-B

The information for connection of the Data Server interface for Series 16/18-B/C and Series 15-B is described in this chapter.

1.1 CONSTRUCTION

The construction when the Data Server board is inserted into the FANUC's CNC control system is as follows.



1.2 INSTALLATION

1.2.1 Environmental Requirements

Keep the environmental requirements of CNC control unit in which the Data Server board is installed.

Ambient temperature	At operation	5 to 50 degrees centigrade
	No operation	-20 to 60 degrees centigrade
Temperature variance	Maximum	20 degrees centigrade/hour
Humidity	Normally	10% to 75% (relative humidity)
	For short terms (within one month)	10% to 90% (relative humidity)
Vibration	At operation	0.5G or less (Note)
	No operation	1.0G or less
Atmosphere	Mount in a sealed magnetic cabinet	

CAUTION

Even if in the above environment, the data in the hard disk may be destroyed for the mistake of operation or an accident. Especially, the possibility of destruction is higher to put off the power during accessing to the hard disk.

To provide against an emergency, please backup the data in the hard disk periodically.

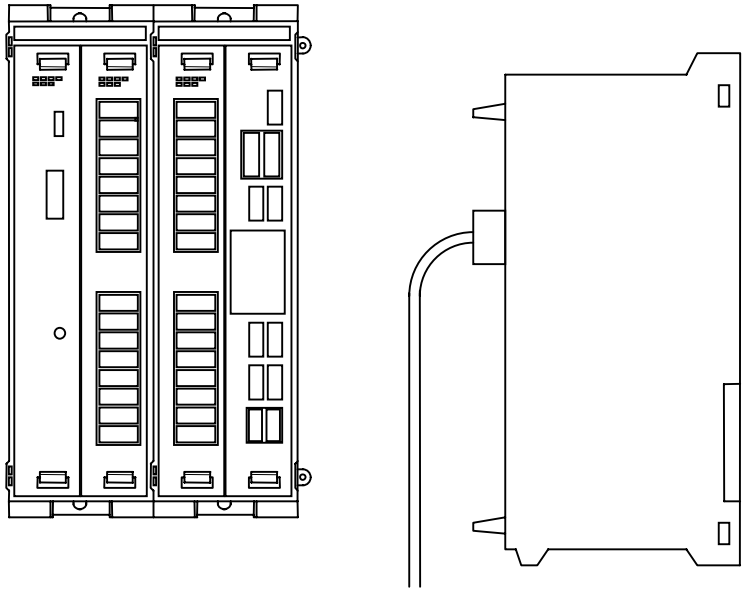
NOTE

About the vibration

The CNC control unit or internal hard disk unit may vibrate at any frequency. Please confirm not to vibrate after mounting the CNC control unit in a magnetic cabinet.

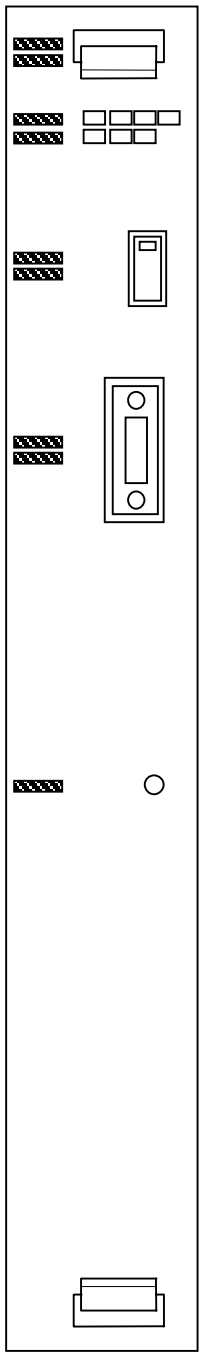
1.2.2 Cable Lead-in Diagram

The direction of leading in the cable is the front of the control unit.
The connector layout of Data Server board is shown as follows.(Left side)



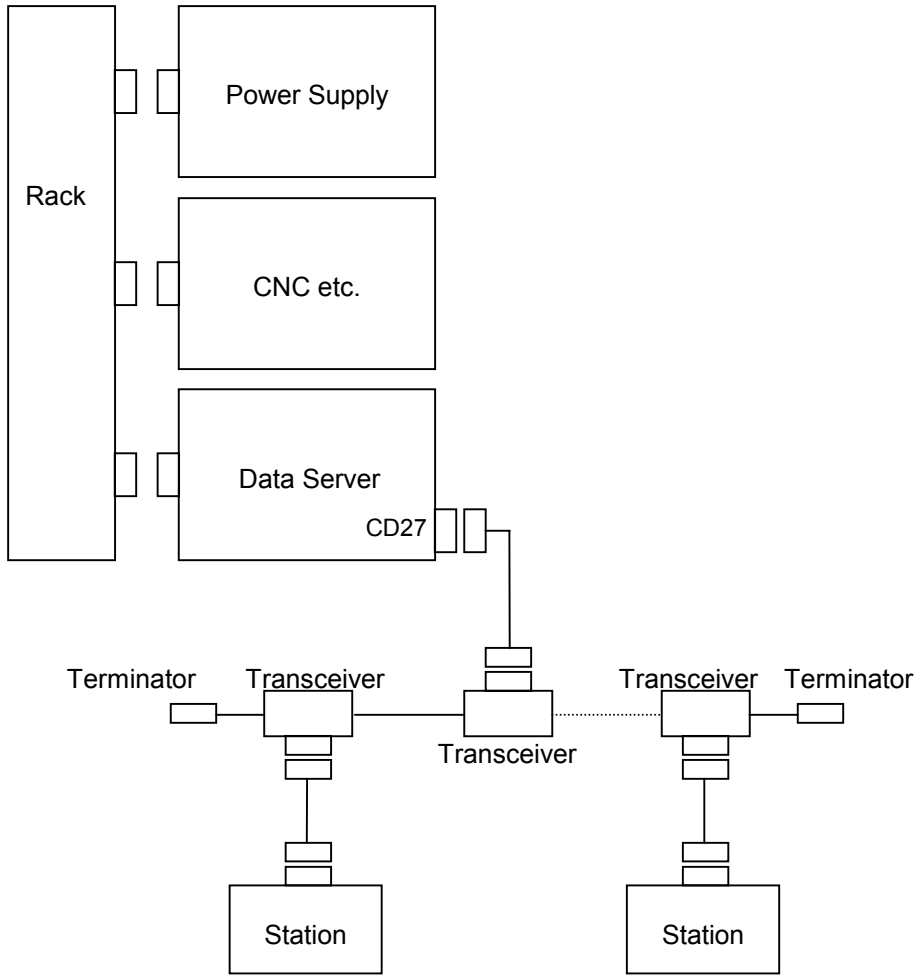
The location of the boards and the connector layout of other board may be different from the actual control unit. For actual connector layout of each board, please see the each connecting manual.

1.2.3 Connector Disposition of Data Server board



Function	Marking Upper	Marking Lower
P.C.B.Name	DATA	SERVER
LED Indicators	STATUS	ALARM
Fuse	F1	2.0A
Ethernet Interface	AUI	CD27
Internal HDD access LED		HDD

1.3 GENERAL CONNECTION DIAGRAM



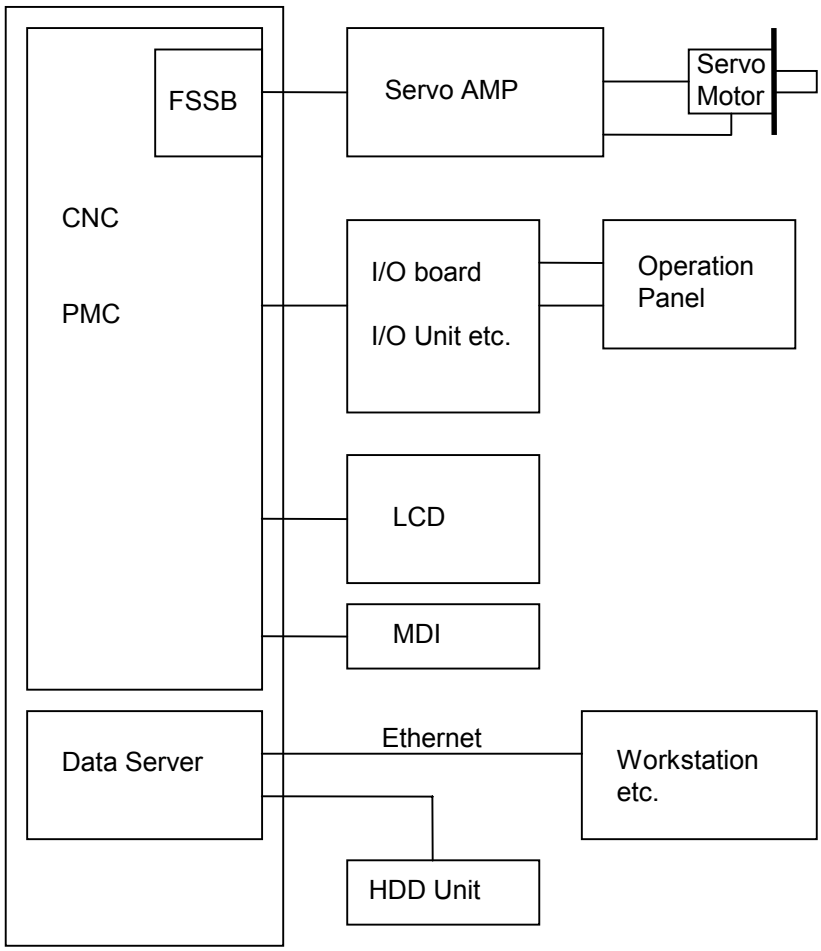
Please refer the connecting manual of CNC about the other connections.

2 FOR Series 16*i*/18*i*-A

The information for connection of the Data Server Interface board for Series 16*i*/18*i*-A is described in this chapter.

2.1 CONSTRUCTION

The construction when the Data Server board is inserted into the FANUC's CNC control system is as follows.



2.2 INSTALLATION

2.2.1 Environmental Requirements

Keep the environmental requirements of CNC control unit in which the Data Server board is installed.

Ambient Temperature	At operation	5 to 45 degrees centigrade
	No operation	-20 to 60 degrees centigrade
Temperature variance	Maximum	20 degrees centigrade/hour
Humidity	Normally	10% to 75% (relative humidity)
	For short terms (within one month)	10% to 90% (relative humidity)
Vibration	At operation	0.5G or less (Note)
	No operation	1.0G or less (Note)
Atmosphere	Mount in a sealed magnetic cabinet	

CAUTION

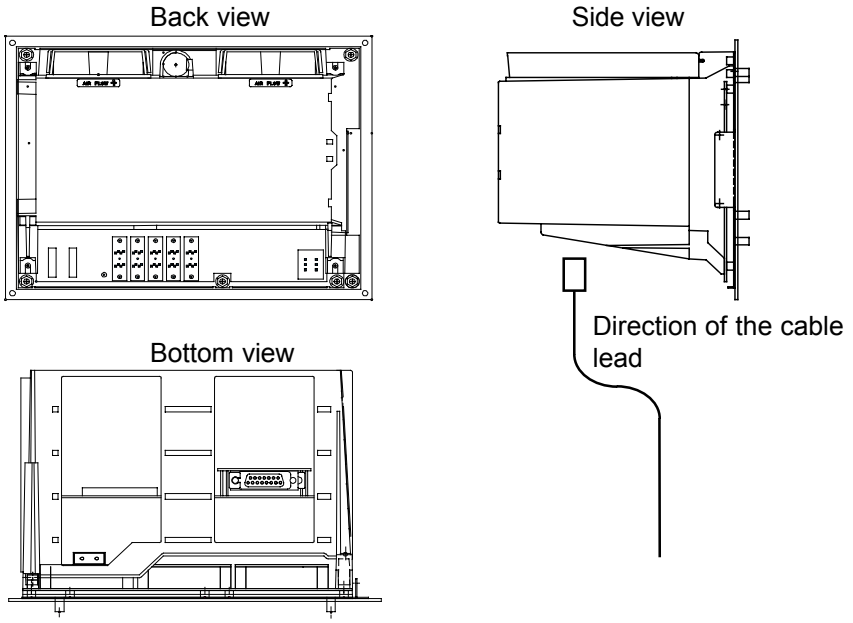
Even if in the above environment, the data in the hard disk may be destroyed for the mistake of operation or an accident. Especially, the possibility of destruction is higher to put off the power during accessing to the hard disk.
To provide against an emergency, please backup the data in the hard disk periodically.

NOTE

About the vibration
The CNC control unit or in hard disk unit may vibrate at any frequency. Please confirm not to vibrate after mounting the CNC control unit in a magnetic cabinet.

2.2.2 Cable Lead-in Diagram

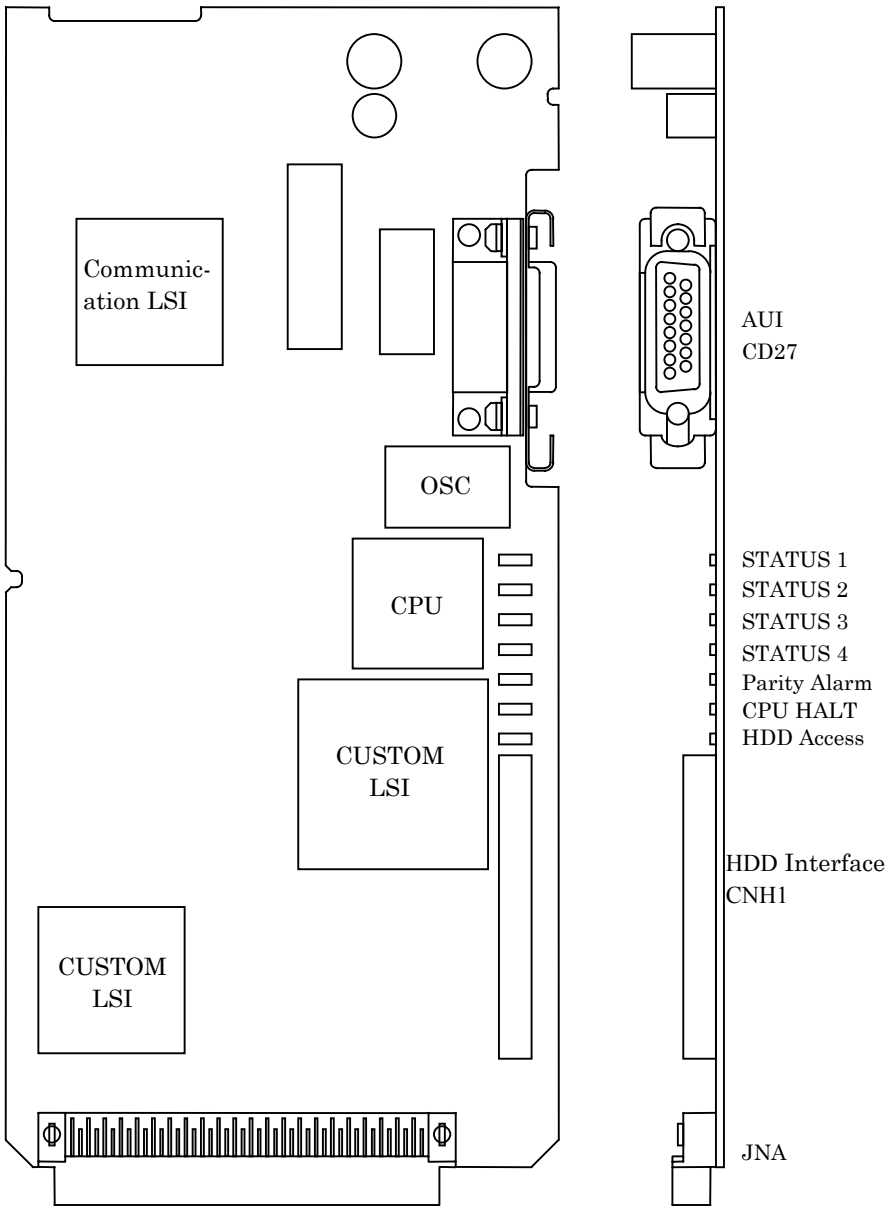
The direction of leading in the cable is the bottom of the control unit.
The 4-slot lack of Series 16*i*/18*i*-A is shown as follows and the connector layout of Data Server board is shown to next page.



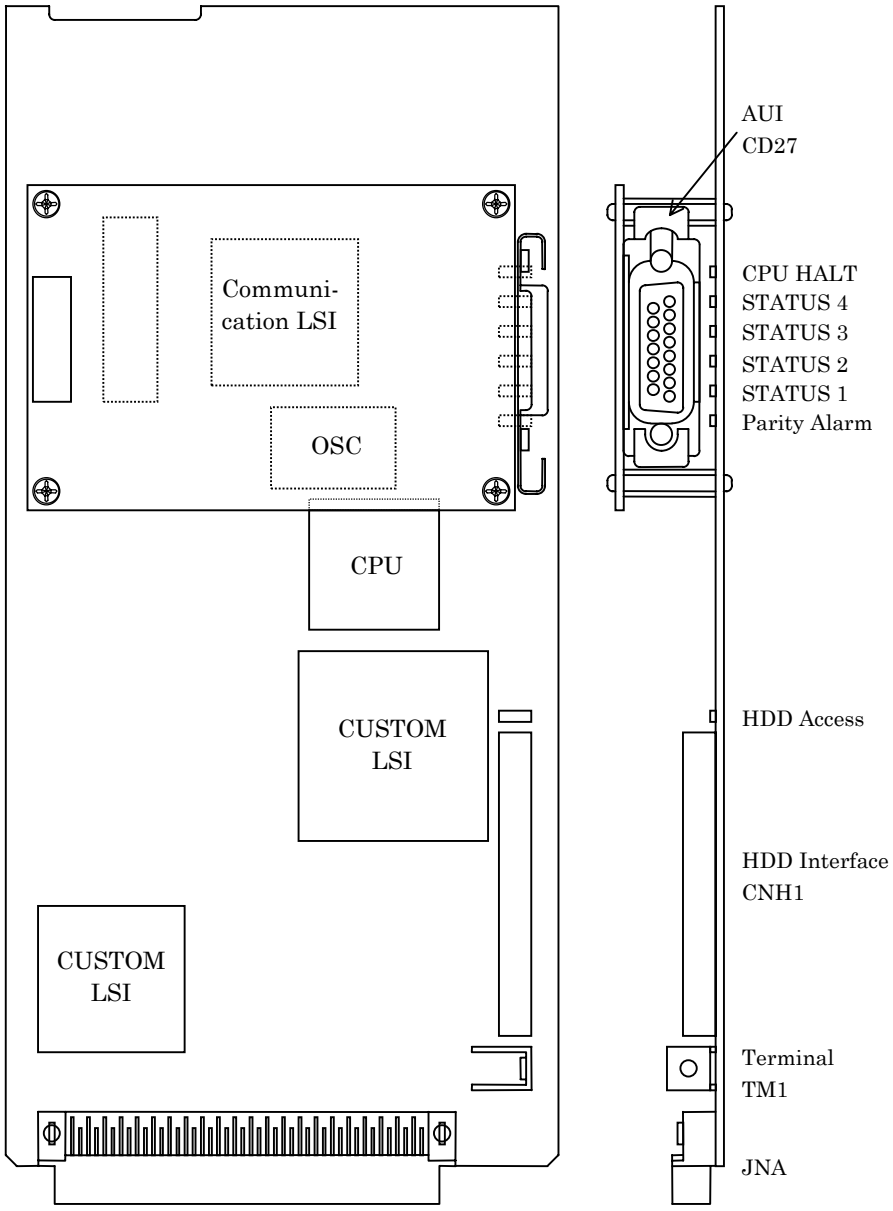
The location of the boards and the connector layout of other board may be different from the actual control unit. For actual connector layout of each board, please see the each connecting manual.

2.2.3 Connector Disposition of Data Server board

Total edition 01A only

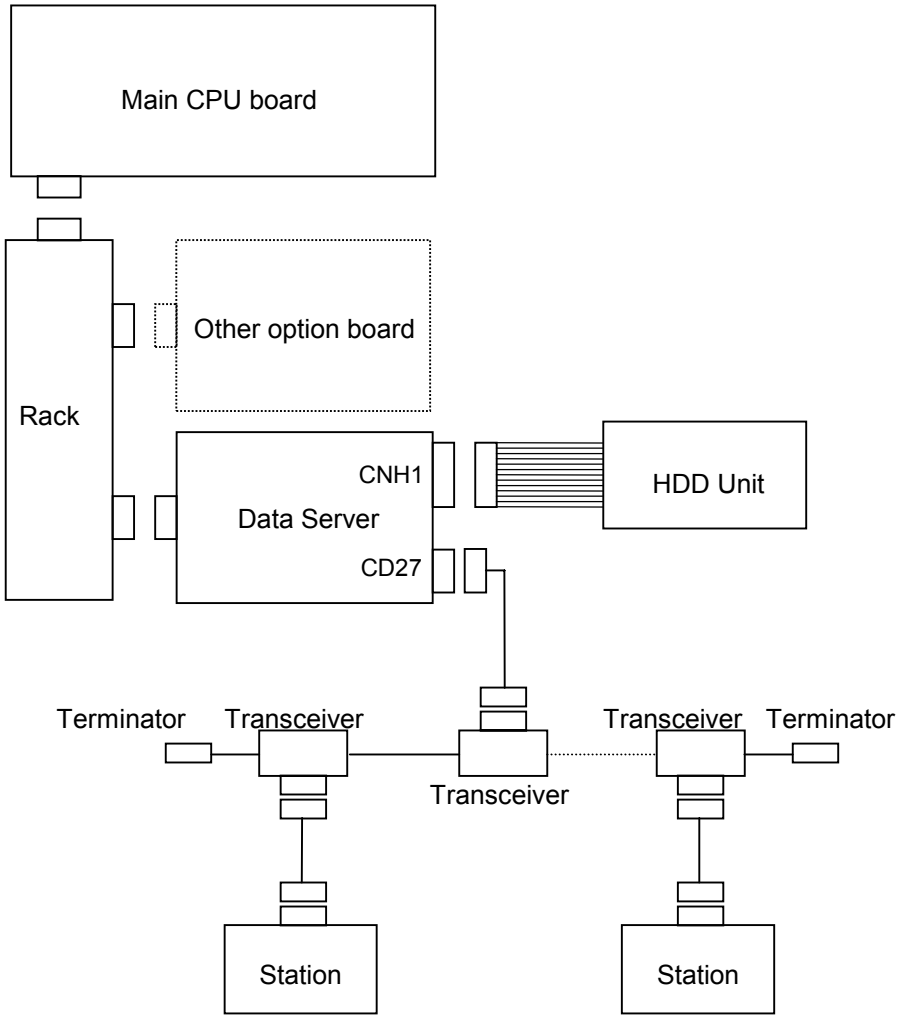


Total Edition 02B or newer



2.3 GENERAL CONNECTION DIAGRAM

2.3.1 General Connection Diagram

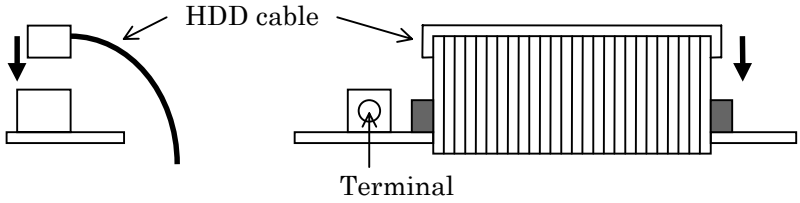


Please refer the connecting manual of CNC about the other connections.

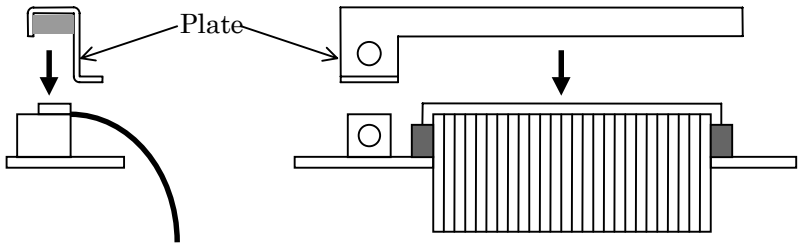
2.3.2 Connection of HDD Unit

The board of total edition 02B or newer must be assemble the plate which is to prevent slipping out of the hard disk connector.
To connect or disconnect the hard disk cable, this plate also need to be connected or disconnected.
(The board of total edition 01A has no terminal to assemble the plate.)

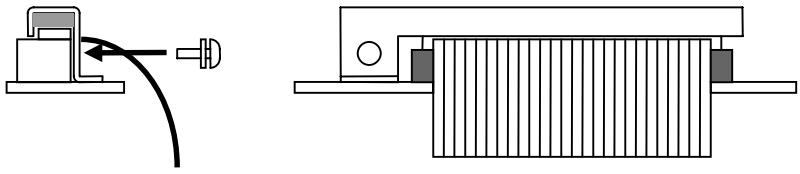
1) Connection of the cable



2) Assemble of the plate



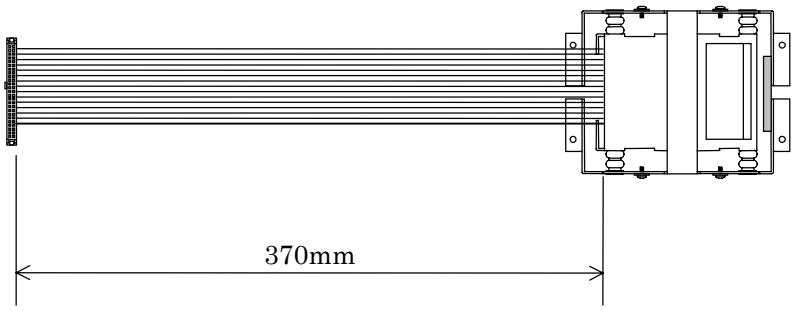
3) Fix the plate using the screw



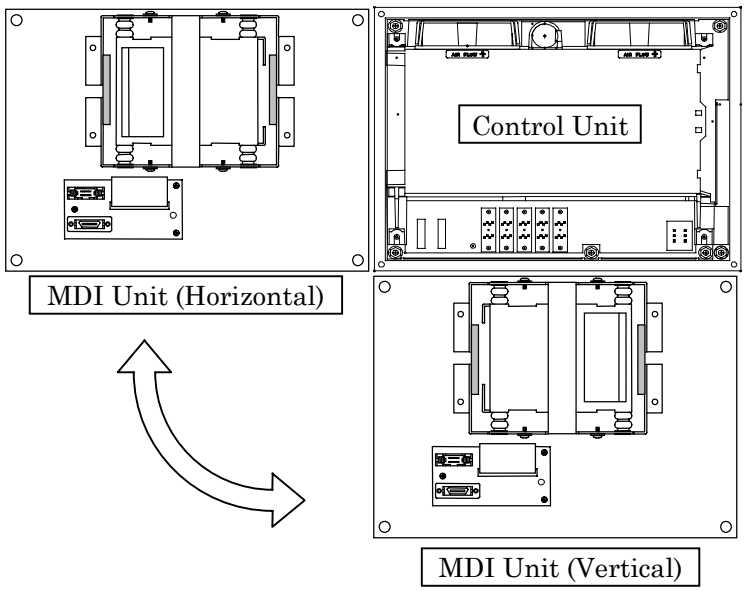
To disconnect the hard disk cable, do the reveres way of the above order.

CAUTION
Before connect or disconnect the cable to Data Server board, cut the power supply of CNC unit and confirm that the power is off.

HDD Unit is mounted on the back side of MDI unit. The length of the HDD flat cable is 370mm.



In the case of mounting the MDI unit apart from control unit, the hard disk unit is not be able to be connected. So, considering the cable length of hard disk unit, mount the MDI unit as follows.



Mounting example of MDI Unit

3 CONNECTION WITH NETWORK

In this chapter, we describe the information about the connection to the Ethernet.

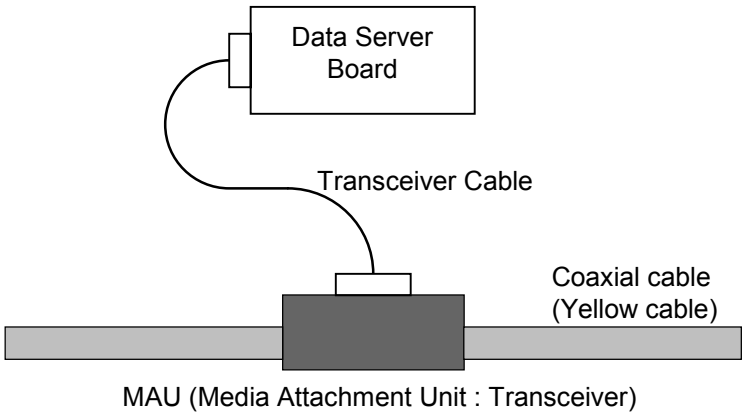
CAUTION

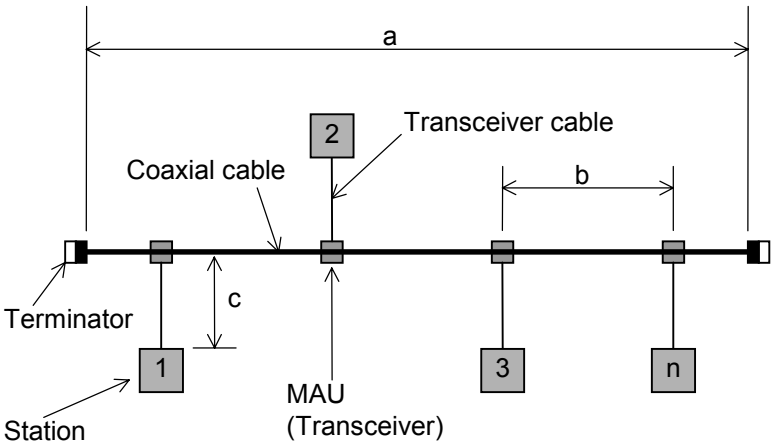
Before connect or disconnect the cable to Data Server board, cut the power supply of CNC unit and confirm that the power is off.

NOTE

Please inquire of each maker about the construction of network or the condition of using the equipment except the Data Server (transceiver and cable etc.) . To construct the network, it is necessary not to be influenced by the noise.
Separate the network line electrically from the noise source as power line and motor etc.. And the ground treatment of each equipment must be done. And the high impedance to the ground makes the obstacle of communication.
Please test and confirm the communication before working the machine in earnest.
The network trouble which is case of the equipment except the Data Server is not guaranteed by FANUC.

3.1 CONNECTION WITH THE ETHERNET





Items	Marks	Conditions
Maximum segment length	a	500m
Length between the transceiver	b	On the marking at intervals of 2.5m
Length of transceiver cable	c	Maximum 50m
Node number per segment	n	Maximum 100

MAU : TDK : CIU-1000 Ethernet Transceiver or equivalent
Set for IEEE802.3 standard. (Include the hart-beat function)

NOTE
1. The transceiver must be connected to the AUI of Data Server using the transceiver cable. The transceiver cable should be shielded. (Refer 3.4)
2. The SQE TEST function (Hart-beat function) of the transceiver must be set. There are some transceivers that the setting switch or jumper are inside the transceiver.

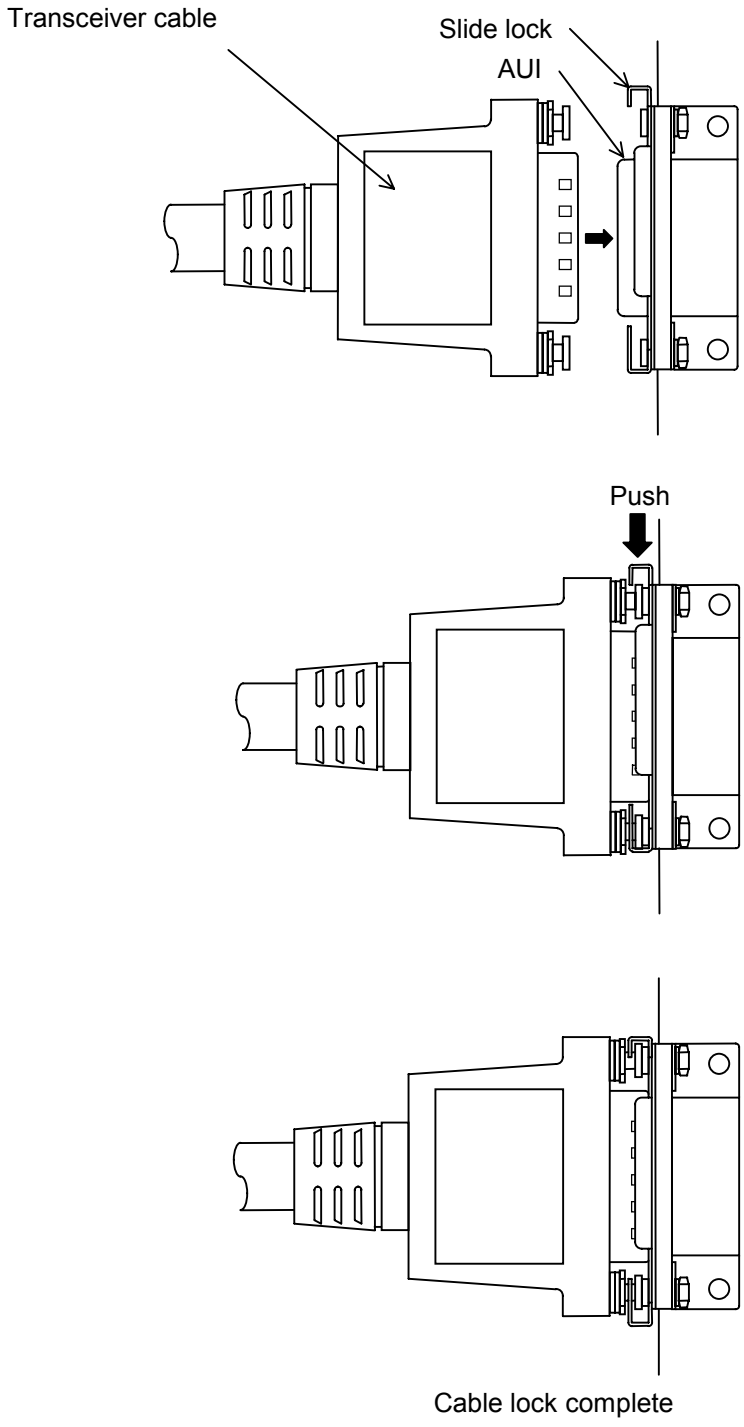
3.2 AUI (Attachment Unit Interface) PIN CONFIGURATION

CD27 D-sub 15pin

Pin number	Signal	Meaning
1		No used
2	CI+	Control In circuit A
3	DO+	Data Out circuit A
4		No used
5	DI+	Data In circuit A
6	GND	Voltage Common
7		No used
8		No used
9	CI-	Control In circuit B
10	DO-	Data Out circuit B
11		No used
12	DI-	Data In circuit B
13	+12V	Voltage Plus
14		No used
15		No used

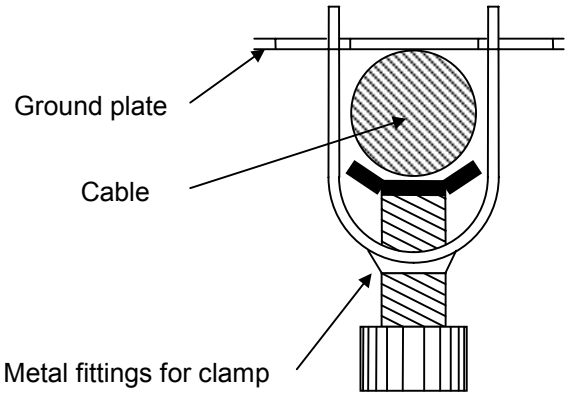
3.3 CONNECTION OF THE TRANSCEIVER CABLE

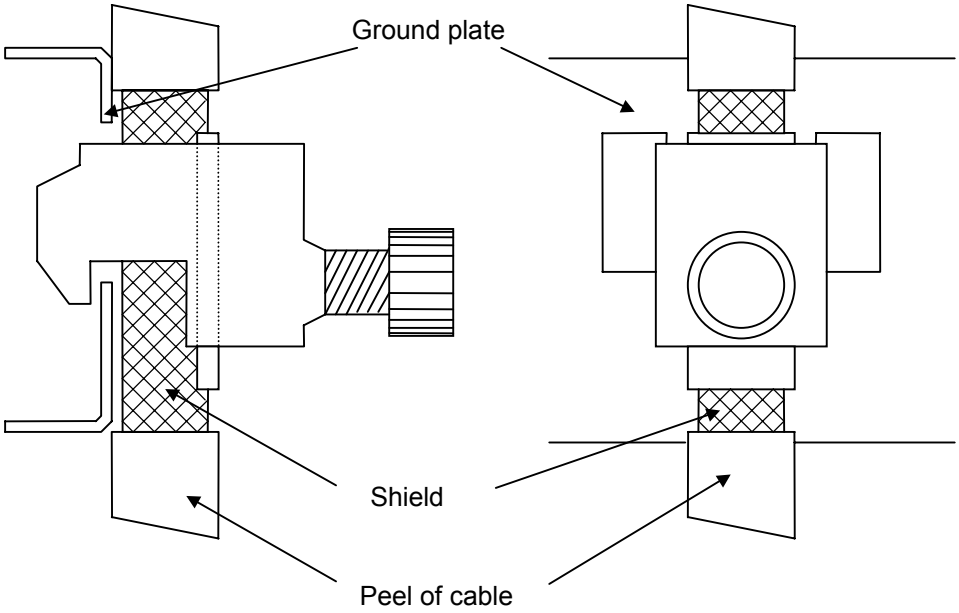
AUI of the Data Serve board is the connector with a slide lock.
After connecting the transceiver cable, please lock the cable.



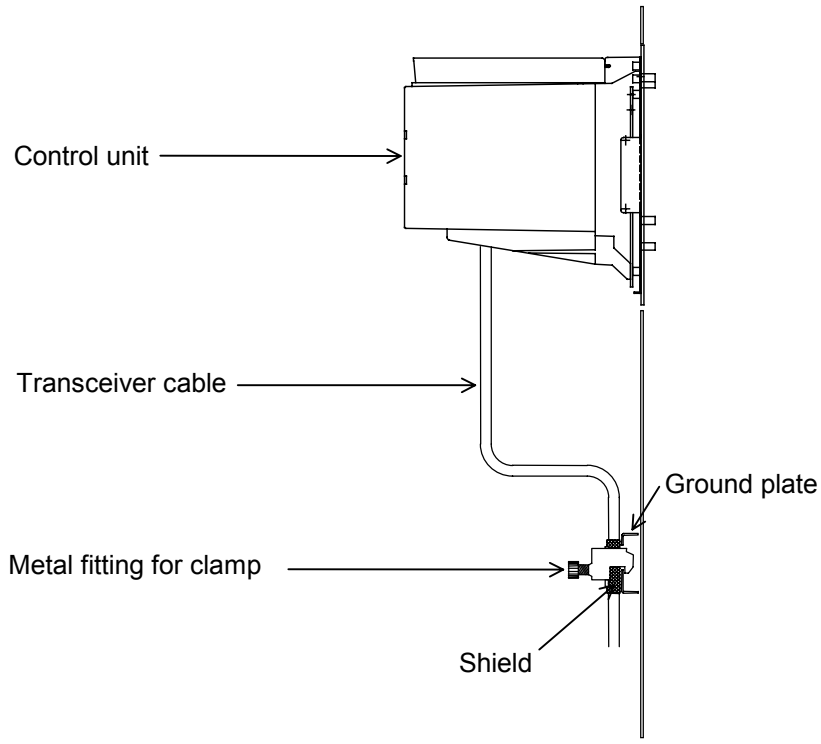
3.4 SHIELDING EARTH OF THE TRANSCEIVER CABLE

The transceiver cable should be clamped by the method as shown below. This cable clamp treatment is not only for cable support but also for shield-treatment. As it is very important for stable operation of the system, perform this treatment.
Peel out the sheath partially as shown in the following figure and expose the shield. Push and clamp by the plate metal fittings for clamp at the part.



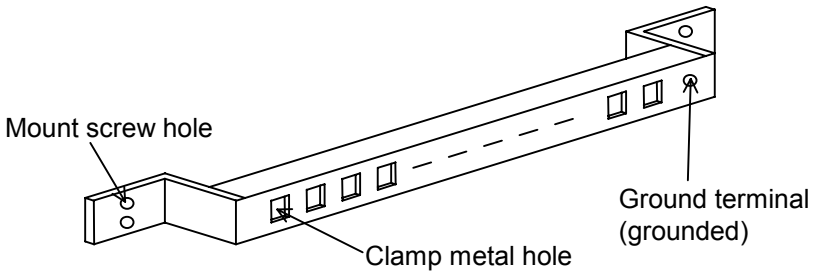


Transceiver cable
Hitachi-densen LTD Transceiver cable or equivalent



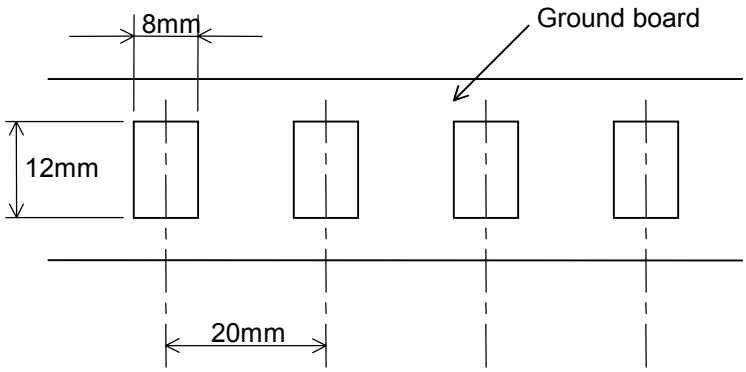
Example for shield treatment of transceiver cable

Prepare ground plate like the following figure.

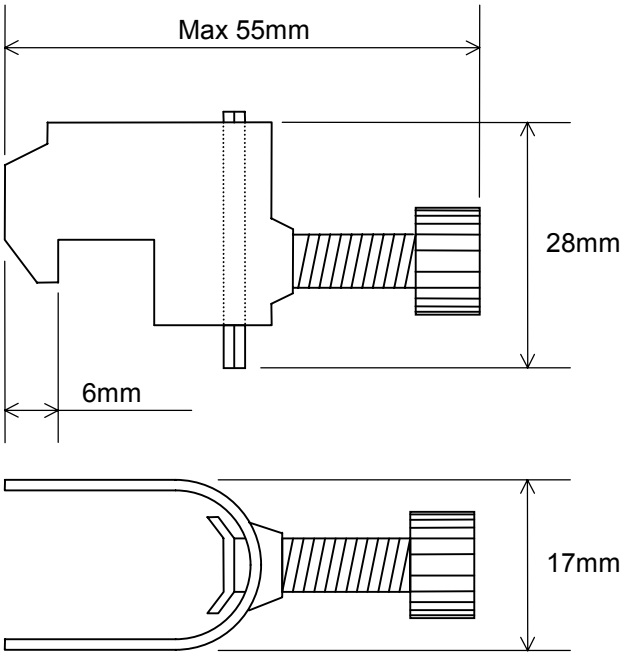


Ground plate

For the ground plate, use a metal plate of 2mm or thicker, which surface is plated with nickel.



Ground plate holes



Cable clump outer diagram

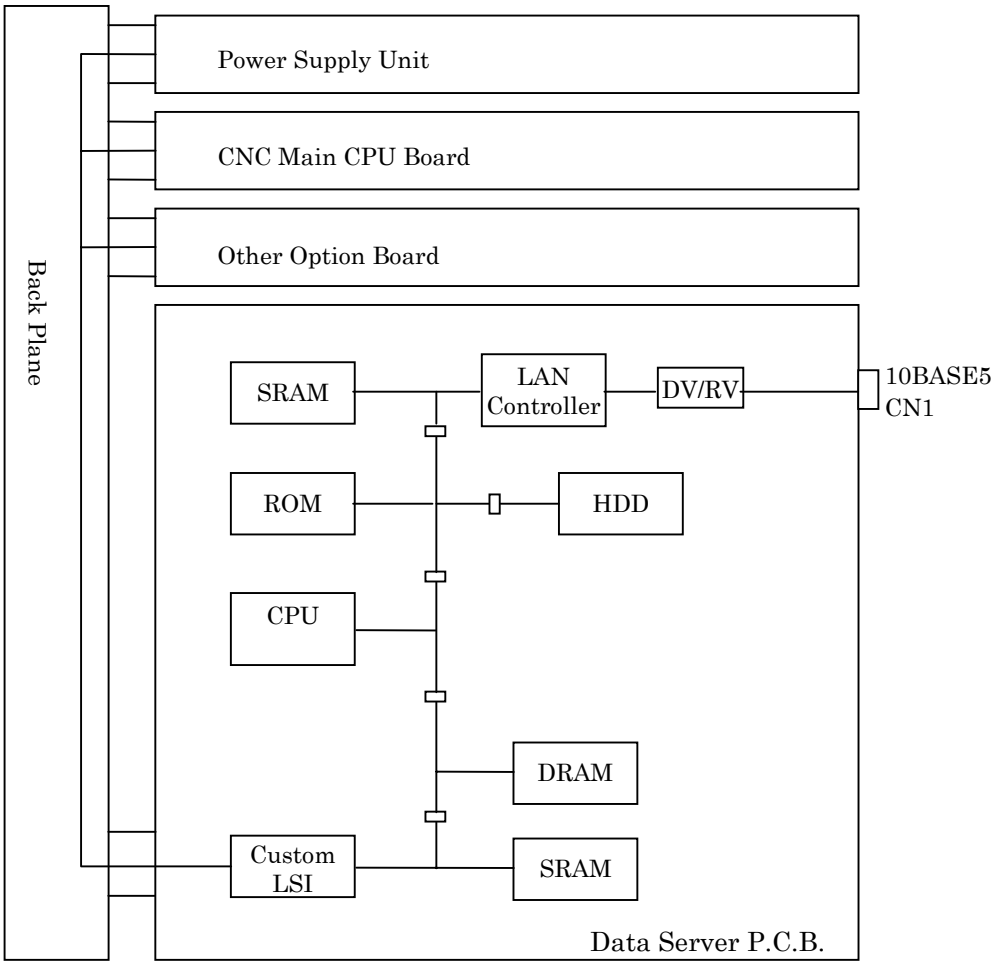
Order specification for cable clump
A02B-0083-K301 (5 pieces)

III. MAINTENANCE

1 FOR Series 16/18-B/C, Series 15-B

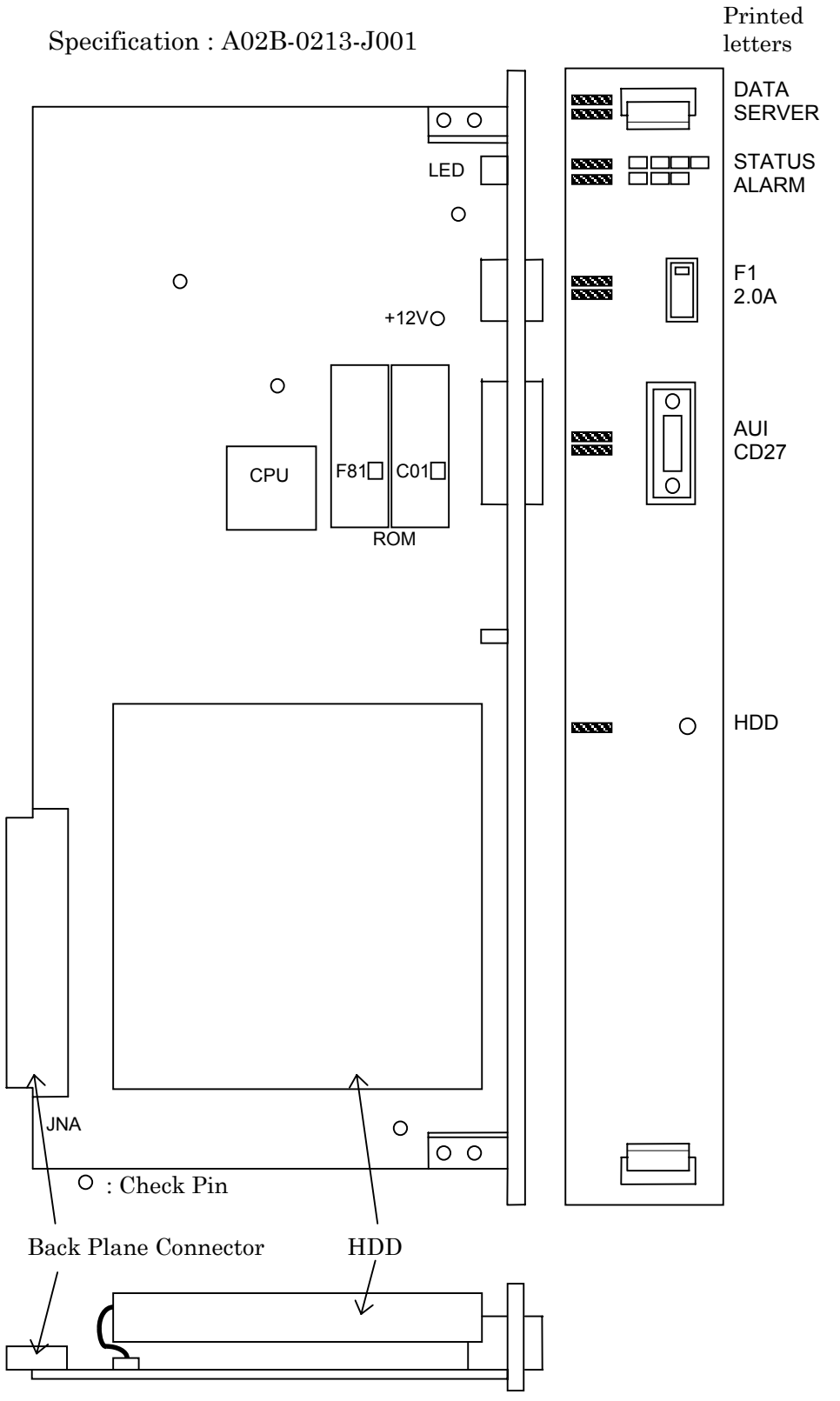
In this section, the maintenance information about Series 16/18-B/C and Series 15-B is described.

1.1 SYSTEM BLOCK DIAGRAM



Name	Specification	Note
Data Server Board	A16B-2202-0630	
HDD Unit	A02B-0207-C050	85MB
	A02B-0207-C051	256MB
	A02B-0207-C053	810MB
Fuse	A08B-0048-K101	2.0A

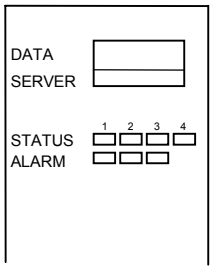
1.2 PARTS LAYOUT



1.3 LIGHTING OF LEDS AND MEANING

In the Data Server board for Series 16/18-B/C and Series 15-B, there are four green LEDs for “STATUS”, three red LEDs for “ALARM” and one green LED for “HDD”.
In the following explanation, status of LED is expressed as follows.

□ : Turn off ■ : Turn on ○ : Don’t care



The indication of LEDs when turning on the power

No.	LEDs	1 2 3 4	State of Data Server Board	
1	STATUS	□□□□	Power off	
2	STATUS	■■■■	Initial state of power injection	
3	STATUS	□■■■	Under checking Hardware	Main memory test
4	STATUS	■□■■		Ethernet RAM test
5	STATUS	□□■■		Common RAM test
6	STATUS	■■□■		Initialization of system area
7	STATUS	□■□■		FANUC BUS Interrupt test 1
8	STATUS	■□□■		FANUC BUS Interrupt test 2
9	STATUS	□□□■		FANUC BUS Interrupt test 3
10	STATUS	■■■□		FANUC BUS Interrupt test 4
11	STATUS	□■■□		Initialization of interrupt controller
12	STATUS	■□■□	Boot up Data Server software	Initialization of BIOS
13	STATUS	□□■□		Loading software to main memory
14	STATUS	■□□□	Boot up completely	

When the Data Server Software runs normally, the status of LEDs becomes the state of 14.

The indication of LEDs(STATUS) when an error occurs

LEDs of "STATUS" repeat the pattern of "LONG" and "SHORT". The pattern of "LONG" is indicated long and the pattern of "SHORT" is indicated short.

No.	LEDs (STATUS) LONG 1 2 3 4	LEDs (STATUS) SHORT 1 2 3 4	State of Data Server board
1	□□□■	□□■□	Defect of main memory Check the Data Server P.C.B.
2	□□□■	■□■□	Defect of Ethernet RAM Check the Data Server P.C.B.
3	□□□■	□■■□	Defect of Common RAM Check the Data Server P.C.B.
4	■□□■	○○○○	Unexpected interrupt to the CPU occurred. (Note)
5	□■□■	○○○○	Unexpected interrupt to the CPU occurred. (Note)
6	■■□■	○○○○	Unexpected interrupt to the CPU occurred. (Note)
7	□■■■	■□□□	The system error occurred in the Data Server software. (Note)
8	□□■■	■□□□	Bus error of FANUC BUS occurred. Check the Data Server P.C.B.
9	□□■■	□■□□	Parity error of main memory occurred.
10	□□■■	■■□□	Parity error of Ethernet RAM occurred.
11	□□■■	□□■□	Parity error of Common RAM occurred.
12	□□■■	■□■□	Refresh toward the main memory was interrupted beyond the fixed condition time.

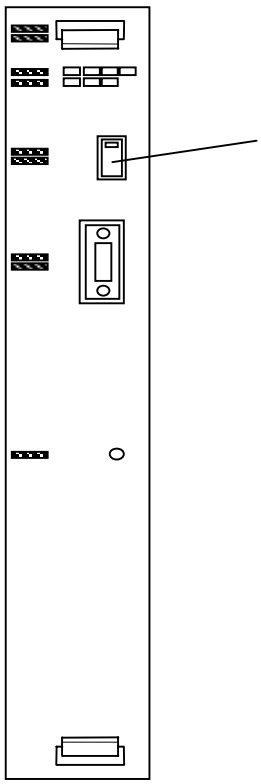
(Note) When these errors occur, please contact FANUC.

The indication of LEDs(ALARM) when an error occurs

No.	LEDs	1 2 3	State of Data Server board
1	ALARM	■○○	Parity error of main memory, Ethernet RAM or Common RAM occurred, or refresh toward the main memory was interrupted beyond the fixed condition time. Identify the defect and exchange by referring to "STATUS" LED from No.9 to No.12.
2	ALARM	○■○	The fuse is broken. Exchange the fuse.
3	ALARM	○○■	CPU is in HALT state or SHUTDOWN state. Check the Data Server P.C.B.

1.4 HOW TO EXCHANGE A FUSE

(1) Check a fuse on the front panel of the Data Server P.C.B. and confirm whether it is broken.
There is a little window in the fuse and a white marker appears there at the time of the breakage.
(2) Remove the cause of the fuse cutting.
(3) After the broken fuse is pulled out, insert the new fuse of the same specification.

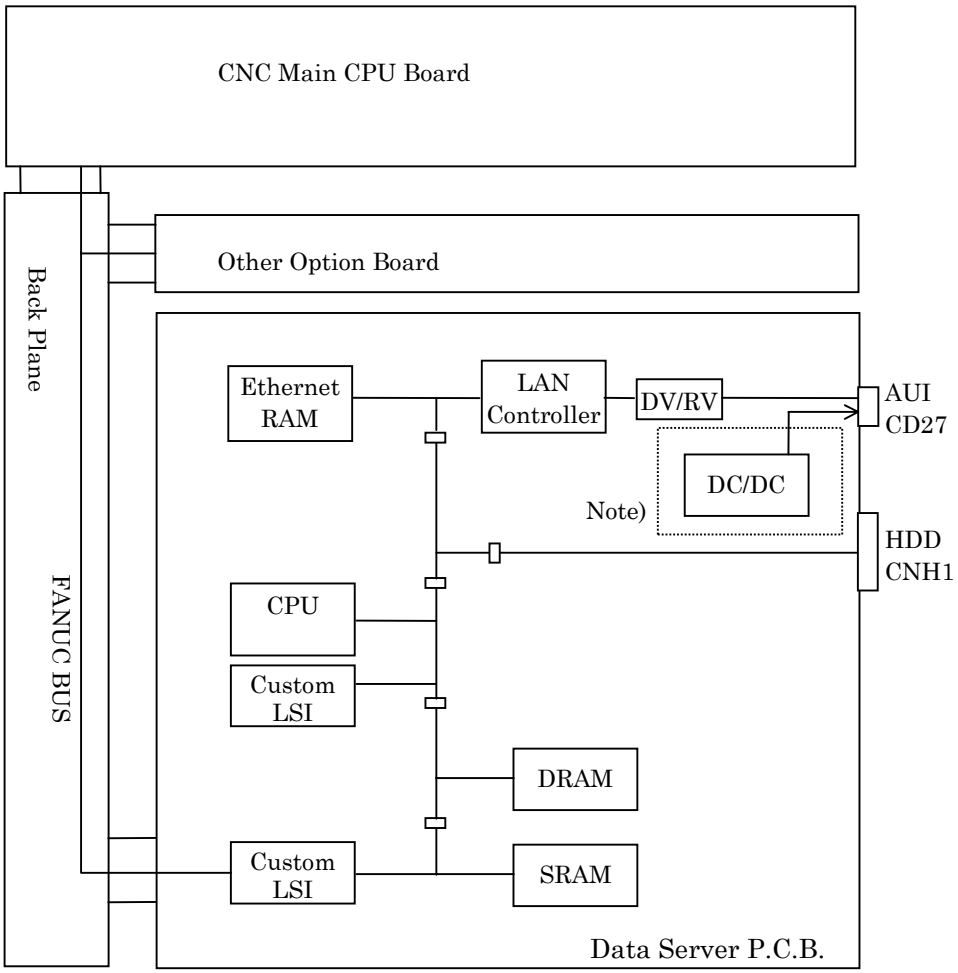


Fuse Specification :
A08B-0048-K101
Capacity : 2.0A
Use : For Ethernet power

2 FOR Series 16*i*/18*i*-A

In this section, the maintenance information about Series 16i/18i-A is described.

2.1 SYSTEM BLOCK DIAGRAM

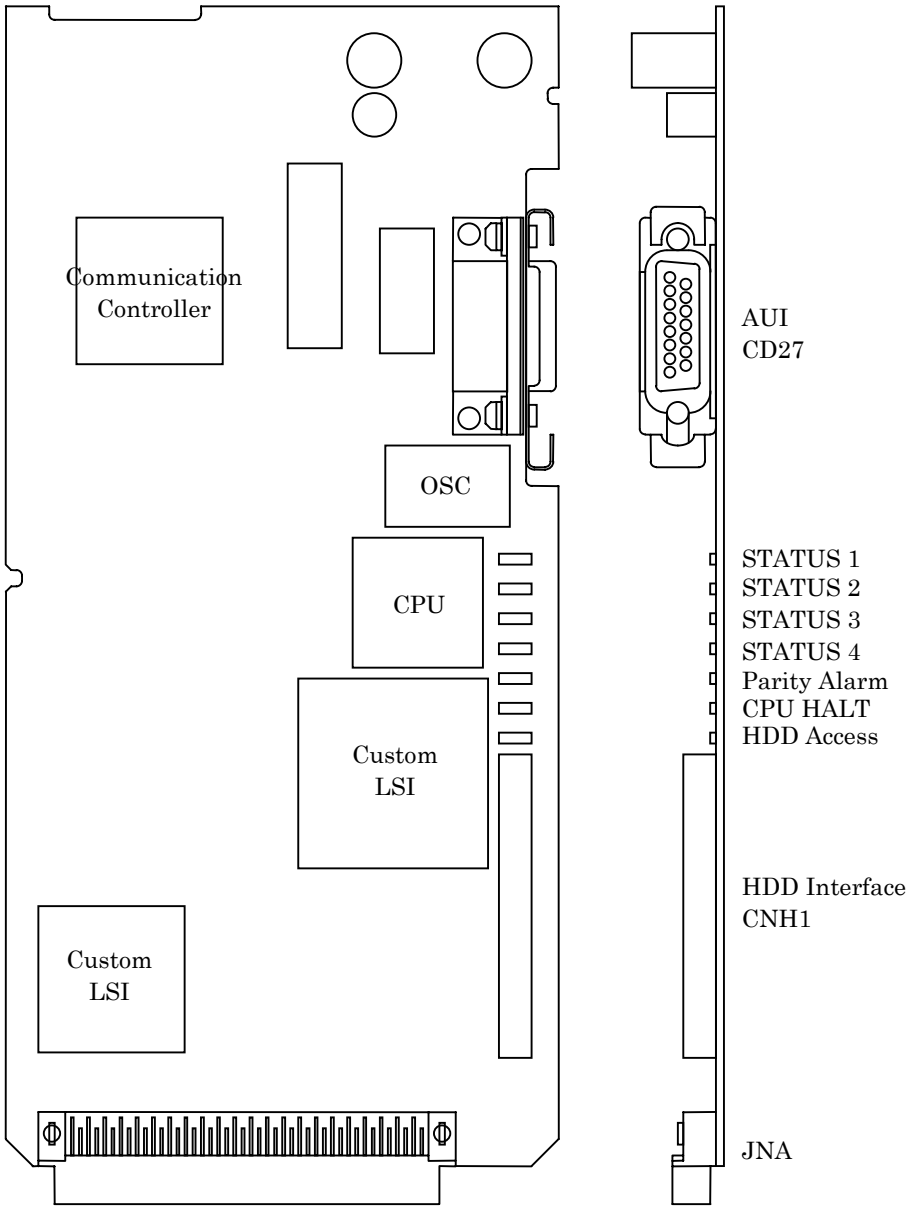


Name	Specification	Note
Data Server Board	A20B-8100-0160	
Sub Board	A20B-2002-0590	latter edition than 02B
HDD Unit	A02B-0236-C252	810MB

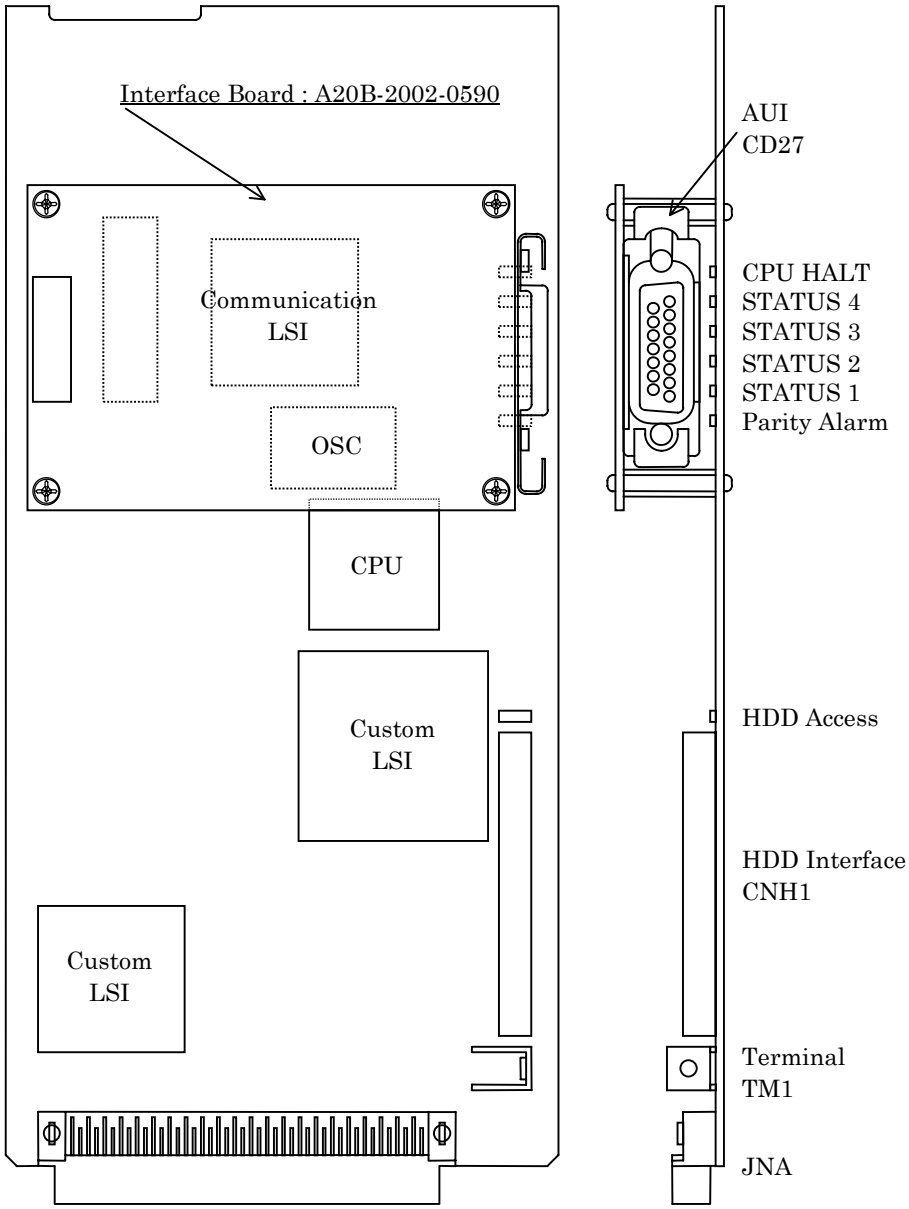
Note) In case of latter edition than 02B, the DC/DC converter is loaded on the sub board.

2.2 PARTS LAYOUT

Parts Layout (Only 01A edition)



Parts Layout (Latter edition than 02B)

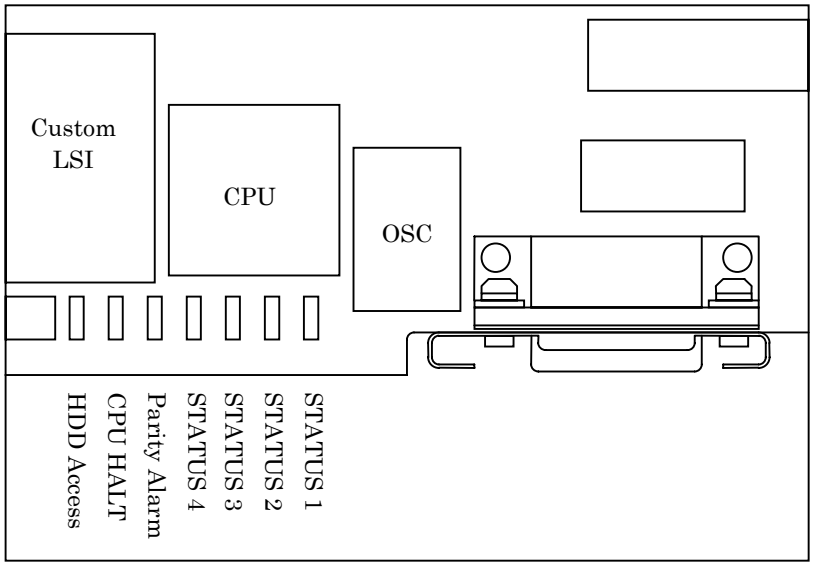


2.3 LIGHTING OF LED AND MEANING

In the Data Server Board for Series 16*i*/18*i*-A, there are four green LEDs for “STATUS”, two red LEDs for “ALARM” and one green LED for “HDD”. But, LEDs’ position is different by the edition of the Data Server board.
The LEDs’ position is displayed for each edition.
In the following explanation, status of LED is expressed as follows.

□ : Turn off ■ : Turn on ○ : Don’t care

2.3.1 In case of edition 01A



The indication of LEDs when turning on the power

No.	LEDs	4 3 2 1	State of Data Server Board	
1	STATUS	□□□□	Power off	
2	STATUS	■■■■	Initial state of power injection	
3	STATUS	■■■□	Under checking Hardware	Main memory test
4	STATUS	■■□■		Ethernet RAM test
5	STATUS	■■□□		Common RAM test
6	STATUS	■□■■		Initialization of system area
7	STATUS	■□■□		FANUC BUS Interrupt test 1
8	STATUS	■□□■		FANUC BUS Interrupt test 2
9	STATUS	■□□□		FANUC BUS Interrupt test 3
10	STATUS	□■■■		FANUC BUS Interrupt test 4
11	STATUS	□■■□		Initialization of interrupt controller
12	STATUS	□■□■	Boot up Data Server software	Initialization of BIOS
13	STATUS	□■□□		Loading software to main memory
14	STATUS	□□□■	Boot up completely	

When the Data Server Software runs normally, the status of LEDs becomes the state of 14.

The indication of LEDs(STATUS) when an error occurs

LEDs of "STATUS" repeat the pattern of "LONG" and "SHORT". The pattern of "LONG" is indicated long and the pattern of "SHORT" is indicated short.

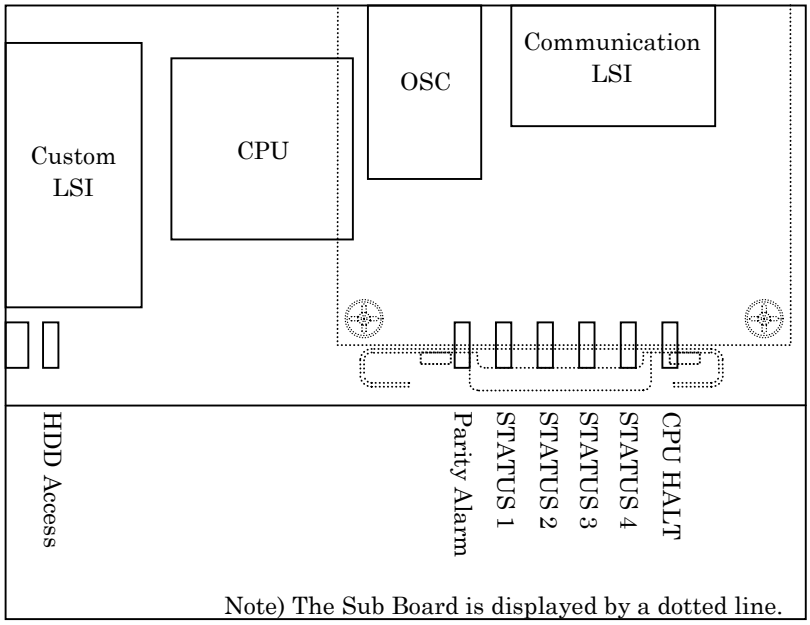
No.	LEDs (STATUS) LONG 4 3 2 1	LEDs (STATUS) SHORT 4 3 2 1	State of Data Server board
1	■□□□	□■□□	Defect of main memory Check the Data Server P.C.B.
2	■□□□	□■□■	Defect of Ethernet RAM Check the Data Server P.C.B.
3	■□□□	□■■□	Defect of Common RAM Check the Data Server P.C.B.
4	■□□■	○○○○	Unexpected interrupt to the CPU occurred. (Note)
5	■□■□	○○○○	Unexpected interrupt to the CPU occurred. (Note)
6	■□■■	○○○○	Unexpected interrupt to the CPU occurred. (Note)
7	■■■□	□□□■	The system error occurred in the Data Server software. (Note)
8	■■□□	□□□■	Bus error of FANUC BUS occurred. Check the Data Server P.C.B.
9	■■□□	□□■□	Parity error of main memory occurred.
10	■■□□	□□■■	Parity error of Ethernet RAM occurred.
11	■■□□	□■□□	Parity error of Common RAM occurred.

(Note) When these errors occur, please contact FANUC.

The indication of LEDs(ALARM) when an error occurs

No.	Lighting LED	State of Data Server board
1	Parity Alarm ■	Parity error of main memory, Ethernet RAM or Common RAM occurred. Identify the defect and exchange it by referring to "STATUS" LED from No.9 to No.11.
2	CPU HALT ■	CPU is in HALT state or SHUTDOWN state. Check the Data Server P.C.B.

2.3.2 In case of latter edition than 02B



Note) The Sub Board is displayed by a dotted line.

The indication of LEDs when turning on the power

No.	LEDs	1 2 3 4	State of Data Server Board	
1	STATUS	□□□□	Power off	
2	STATUS	■■■■	Initial state of power injection	
3	STATUS	□■■■	Under checking Hardware	Main memory test
4	STATUS	■□■■		Ethernet RAM test
5	STATUS	□□■■		Common RAM test
6	STATUS	■■□■		Initialization of system area
7	STATUS	□■□■		FANUC BUS Interrupt test 1
8	STATUS	■□□■		FANUC BUS Interrupt test 2
9	STATUS	□□□■		FANUC BUS Interrupt test 3
10	STATUS	■■■□		FANUC BUS Interrupt test 4
11	STATUS	□■■□		Initialization of interrupt controller
12	STATUS	■□■□	Boot up Data Server software	Initialization of BIOS
13	STATUS	□□■□		Loading software to main memory
14	STATUS	■□□□	Boot up completely	

When the Data Server Software runs normally, the status of LEDs becomes the state of 14.

The indication of LEDs(STATUS) when an error occurs

LEDs of "STATUS" repeat the pattern of "LONG" and "SHORT". The pattern of "LONG" is indicated long and the pattern of "SHORT" is indicated short.

No.	LEDs (STATUS) LONG 1 2 3 4	LEDs (STATUS) SHORT 1 2 3 4	State of Data Server board
1	□□□■	□□■□	Defect of main memory Check the Data Server P.C.B.
2	□□□■	■□■□	Defect of Ethernet RAM Check the Data Server P.C.B.
3	□□□■	□■■□	Defect of Common RAM Check the Data Server P.C.B.
4	■□□■	○○○○	Unexpected interrupt to the CPU occurred. (Note)
5	□■□■	○○○○	Unexpected interrupt to the CPU occurred. (Note)
6	■■□■	○○○○	Unexpected interrupt to the CPU occurred. (Note)
7	□■■■	■□□□	The system error occurred in the Data Server software. (Note)
8	□□■■	■□□□	Bus error of FANUC BUS occurred. Check the Data Server P.C.B.
9	□□■■	□■□□	Parity error of main memory occurred.
10	□□■■	■■□□	Parity error of Ethernet RAM occurred.
11	□□■■	□□■□	Parity error of Common RAM occurred.

(Note) When these errors occur, please contact FANUC.

The indication of LEDs(ALARM) when an error occurs

No.	Lighting LED	State of Data Server board
1	Parity Alarm ■	Parity error of main memory, Ethernet RAM or Common RAM occurred. Identify the defect and exchange it by referring to "STATUS" LED from No.9 to No.11.
2	CPU HALT ■	CPU is in HALT state or SHUTDOWN state. Check the Data Server P.C.B.

IV. OPERATION

1 FOR Series 16/18-B/C, Series 16*i*/18*i*-A

The operation of Data Server for Series 16/18-B/C and Series 16*i*/18*i*-A is described in this chapter.

1.1 OUTLINE

By using this function, the following items can be achieved.

(1)Drive high-speed machining operation by calling the subprogram from a built-in hard disk on the Data Server board (described as “HDD” below).

(2)Input a NC program in the Host Computer into the HDD by using FTP.
Output a NC program in the HDD into the Host Computer by using FTP.

(3)Input a NC program in the HDD into the memory of the CNC.
Output a NC program in the memory of the CNC into the HDD.

(4)Delete NC programs and display the table of NC programs in the HDD.

NOTE
There is the software option “PROGRAM NUMBER O8-DIGIT” in the Series 16/18-C and Series 16*i*/18*i*-A, but the Data Server function doesn’t support this feature.
So, the Data Server function and the software option “PROGRAM NUMBER O8-DIGIT” are not used at the same time.

1.1.1 Notice when you use for the first time

WARNING

1 If you use this function for the first time, you must initiate the HDD according to “1.8.2 Formatting the built-in hard disk” and input the setting data according to “1.2 SETTING SCREEN”. And turn off and then turn on the power of the CNC.
If you use this function before you operate these, we don’t guarantee that this function operates normally.

2 About FTP on the Ethernet, when you use this function for the first time, please set Ethernet addresses carefully and check this function on your environment according to your network administrator’s advice.
If you set wrong Ethernet addresses, it may make a heavy effect on your network.

CAUTION

1 If you turn off the power during reading the data from the HDD or writing to the HDD, it may make the registered file in the HDD broken.
So, you must not turn off the power during executing the Data Server functions.

2 Be sure to take the backup of the data in the HDD against an emergency.

1.2 SETTING SCREEN

By using this screen, you can set the data to transfer a NC program between the HDD and the Host Computer with FTP.
You must set the data shown as the section "1.2.1 Description of each data" before you use the Data Server functions.

Procedure

(1)Press SYSTEM the function key.

(2)When the softkey [DS-SET] isn't displayed, press the continuous menu key several times.

(3)Press the softkey [DS-SET]. The following screen is displayed.
When the data are already registered, their contents are displayed.

(4)Input the data by using the MDI keys and the softkeys.

Change two screens by using the page keys.

```
DATA SERVER SETTING-1    O0001  N00010
(HOST-COMPUTER)
   IP ADDRESS           ---------------
   USER NAME
       --------------------------------
   PASSWORD
       --------------------------------
   HOST DIRECTORY
       --------------------------------
       --------------------------------
       --------------------------------
                                LOCK : OFF
>
MDI           *** STOP ***        12:34:56
[STRING] [ LOCK ] [ INPUT ] [ CHECK  ] [  SET  ]
```

```
DATA SERVER SETTING-2    O0001  N00010
(DATA SERVER)
   MAC ADDRESS          ---------------

   IP ADDRESS           ---------------

   MASK ADDRESS         ---------------









                                LOCK : OFF
>
MDI           *** STOP ***        12:34:56
[STRING] [ LOCK ] [ INPUT ] [ CHECK  ] [  SET  ]
```

In the above screen,

■ means a cursor

--- means a blank.

If the data are already registered, then these data are displayed except for the PASSWORD.

About the PASSWORD, only when you set the password, it will be displayed.

1.2.1 Description of each data

(a) Setting data of the Host Computer
(DATA SERVER SETTING-1)

IP ADDRESS	IP address of the Host Computer's Ethernet board (Ex. : "192.168.0.1")
USER NAME	User name of the Host Computer (Max. 31 letters)
PASSWORD	Password for the above "USER NAME" This password must be set. (Max. 31 letters)
HOST DIRECTORY	Working directory of the Host Computer in order to communicate with the Data Server (Max. 127 letters)

You can input small letters in these items.
Please see the section "1.2.3 How to input small letters".

(b) Setting data of the Data Server
(DATA SERVER SETTING-2)

MAC ADDRESS	MAC address of the Data Server board You must input the 12 alphanumerical letters printed as the "ADR" at the seal on the Data Server board. (Ex. : "080019ABCDEF")
IP ADDRESS	IP address of the Data Server board (Ex. : "192.168.0.2")
MASK ADDRESS	Netmask for the network (Ex. : "255.255.255.0")

CAUTION
1 If you change the above "(b) Setting data of the Data Server" data, you must turn off the power of the CNC once.
2 You must input the 12 alphanumerical letters printed as the "ADR" at the seal on the Data Server board into the MAC address.
If you set the wrong address into the MAC address, it may make a heavy obstacle on your network.

The meanings of each address are as follows:

MAC ADDRESS : It means the address that identifies each machine connected by Ethernet in the MAC layer.
It must be unique in the network.

IP ADDRESS : It means the address that identifies each machine connected by Ethernet in the Network layer.
It must be unique in the network.

MASK ADDRESS : It means a bit typed value which takes out the part of the network address from the IP address.

Refer to “APPENDIX C. Ethernet technical terms” in detail.

1.2.2 How to input data

In this section, how to input data is explained.

Procedure

(1)Move the cursor to an item that you will input.
(2)Input the data by using the MDI keys.
(3)Press the softkey [INPUT].

In this screen, the MDI key **INPUT** can't be used.

Ex.) In case of setting "192.168.0.1" into the IP ADDRESS item

(1) Move the cursor and put the cursor on the IP ADDRESS item.

```
DATA SERVER SETTING-1    O0001  N00010
(HOST-COMPUTER)
   IP ADDRESS           ---------------
   USER NAME
~                                      ~
>
MDI           *** STOP ***        12:34:56
[STRING] [ LOCK ] [ INPUT ] [ CHECK  ] [  SET  ]
```

(2) Input the data "192.168.0.1" by using the MDI keys.

```
DATA SERVER SETTING-1    O0001  N00010
(HOST-COMPUTER)
   IP ADDRESS           ---------------
   USER NAME
~                                      ~
> 192.168.0.1
MDI           *** STOP ***        12:34:56
[STRING] [ LOCK ] [ INPUT ] [ CHECK  ] [  SET  ]
```

(3)Press the softkey [INPUT].

```
DATA SERVER SETTING-1    O0001  N00010
(HOST-COMPUTER)
   IP ADDRESS           192.168.0.1----
   USER NAME
~                                      ~
>
MDI           *** STOP ***        12:34:56
[STRING] [ LOCK ] [ INPUT ] [ CHECK  ] [  SET  ]
```

NOTE

The above setting data of Data Server are different from other NC parameters. They are saved in the HDD. Therefore you must save the setting data after inputting or changing these data.

Please refer to the section “1.2.5 How to save modified data”.

1.2.3 How to input small letters

When you input the setting data for the Host Computer, you can input small letters.
How to input small letters is described as follows.

Procedure

(1)Press the softkey [LOCK] before inputting small letters.
Confirm the "LOCK : ON" on the right and low of the screen.
(2)Then the inputted letter from the MDI keys is changed to a small letter.
(3)To cancel this mode, press the softkey [LOCK] again or set the data by using the softkey [INPUT].
Confirm the "LOCK : OFF" on the right and low of the screen.

1.2.4 How to set a Host Directory

The data in the HOST DIRECTORY can be specified with maximum 127 letters. But the data can be inputted with maximum 32 letters once, so that you can't specify the data completely once. In this case, refer to the following.

Procedure

Ex.) In case that you specify "/DATASERVER/NCPROGRAM /LINE001/GROUP0002"

(1)Move the cursor and put it on the "HOST DIRECTORY".

```
 HOST DIRECTORY
       ---------------------------------
       ---------------------------------
       ---------------------------------
                                LOCK : OFF
>
MDI            *** STOP ***        12:34:56
[STRING][ LOCK ][ INPUT ][ CHECK  ][  SET  ]
```

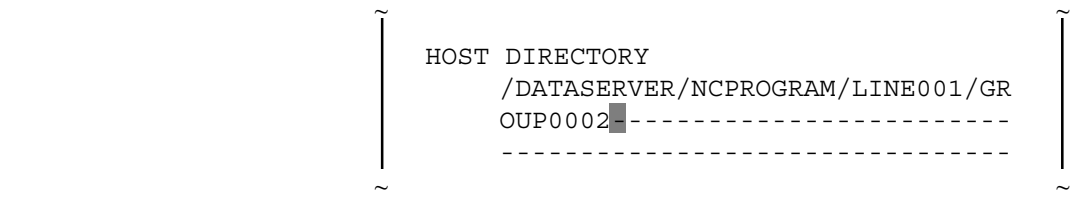
(2)Press the softkey [STRING], so that the cursor and the softkeys are changed as follows.

```
  HOST DIRECTORY
       ---------------------------------
       ---------------------------------
       ---------------------------------
                                LOCK : OFF
>
MDI            *** STOP ***        12:34:56
[ EXIT ][ LOCK ][INSERT][DELETE][ INPUT ]
```

(3)Input "/DATASERVER/NCPROGRAM/LINE001/GR" from the MDI keys and press the softkey [INPUT].

```
  HOST DIRECORY
       /DATASERVER/NCPROGRAM/LINE001/GR
       ---------------------------------
       ---------------------------------
```

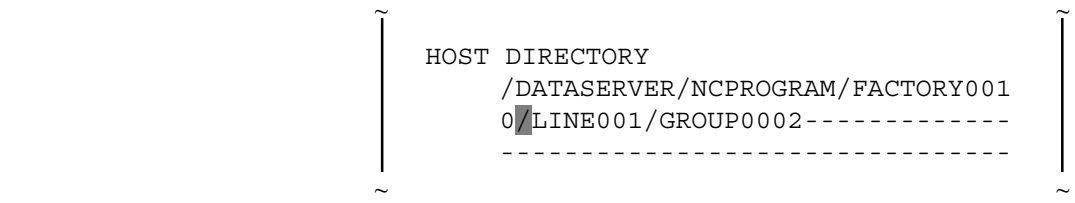
(4)Afterward, input the remained string “OUP0002” from the MDI keys and press the softkey [INPUT].



[Reference]

You may divide this string into two strings “/DATASERVER/NCPROGRAM” and ”/LINE001/GROUP0002” and input these strings. In this case, the result is the same as the above.

(5)After inputting the above data, if you insert “/FACTORY0010” between “NCPROGRAM” and “/LINE001” (”/DATASERVER/NCPROGRAM/FACTORY0010/LINE001/GROUP0002”), move the cursor to “/” before “LINE001”, input “/FACTORY0010” from the MDI keys and press the softkey [INSERT].



(6)If you delete a letter, move the cursor to the letter that you want to delete. And press the softkey [DELETE].

(7)If you overwrite letters, move the cursor to the letter that you want to overwrite. Input new string from the MDI keys and press the softkey [INPUT].

(8)If you end to input the data then press the softkey [EXIT]. The cursor and the softkeys are returned to the status like (1).

NOTE

If you will input the letter that can’t be inputted from the MDI keys, please refer to the section “1.12 PARAMETERS”.

1.2.5 How to save modified data

The setting data of the Data Server are different from other CNC parameters. They are saved in the HDD. Therefore you must save the setting data by the following operation after inputting or changing these data.
If you only set the data on the screen and don't save them, then the Ethernet communication is not effected.
And if you change the CNC's screen without saving modified data, then modified data are lost. So, if you display the setting screen again, then the old data are displayed.

Procedure

(1)Press the softkey [SET] after you finish inputting all data.
(2)The blinking "SETTING" is displayed on the right and low of the screen when saving modified data.

[Reference]
If the item is changed, then the name of the item is blinking. And if you operate the above, then it becomes normal display.

CAUTION
1 When the data are saved, the form of data is checked. If there is a mistake in the data, the error message is displayed and no part of the data is saved into the HDD.
In this case, "SETTING ERROR" message is displayed on the left and low of the screen. Confirm the problem by referring to the section "1.11 ERROR MESSAGE", then set the correct data.
2 In case of changing the setting data for Host Computer (DATA SERVER SETTING-1), these saved data are available without turning off the power. But in case of changing the setting data for Data Server (DATA SERVER SETTING-2), these saved data are not available before turning off the power.
3 The setting screen consists of two screens, but the setting data are saved together. Therefore, you must save these data after setting all data in two screens.
If you save the data after setting data only in one screen, the error occurs by the reason of 1.
4 If you don't save the data, the setting data aren't available.

1.3 NC PROGRAM MANAGEMENT FUNCTION

By using Data Server function, the following items can be achieved.

(1)Displaying the table of NC programs
Display the table of NC programs in the HDD in alphanumerical order.

(2)Searching a NC program
Search a NC program in the HDD and display it.

(3)Deleting NC programs
Delete NC programs from the HDD

(4)Getting a NC program
Get a NC program from the Host Computer with GET command of FTP

(5)Putting a NC program
Put a NC program into the Host Computer with PUT command of FTP

(6)List-Getting NC programs
Get NC programs that are appointed in the List-File from the Host Computer with GET command of FTP

(7)List-Putting NC programs
Put NC programs that are appointed in the List-File into the Host Computer with PUT command of FTP

(8)List-Deleting NC programs
Delete NC programs that are appointed in the List-File from the HDD

CAUTION

1 Two or more items of the above can't be operated at the same time.
2 When you are operating "Calling a subprogram with M198" or "DNC Operation" on the buffer mode (See "1.10 BUFFER MODE"), you can't operate the above functions. And if you are operating neither "Calling a subprogram with M198" nor "DNC Operation" on the buffer mode, you can operate the above functions. But in case that you create a new file into the HDD by operating "Getting a NC program" ,etc., the remainder of the HDD is decreased by this new file. In this case, you may not operate on the buffer mode because of the shortage of the HDD's remainder. Therefore, in case of using the Data Server on the buffer mode, you must not use "Getting a NC program" ,etc.

1.3.1 Displaying the table of NC programs

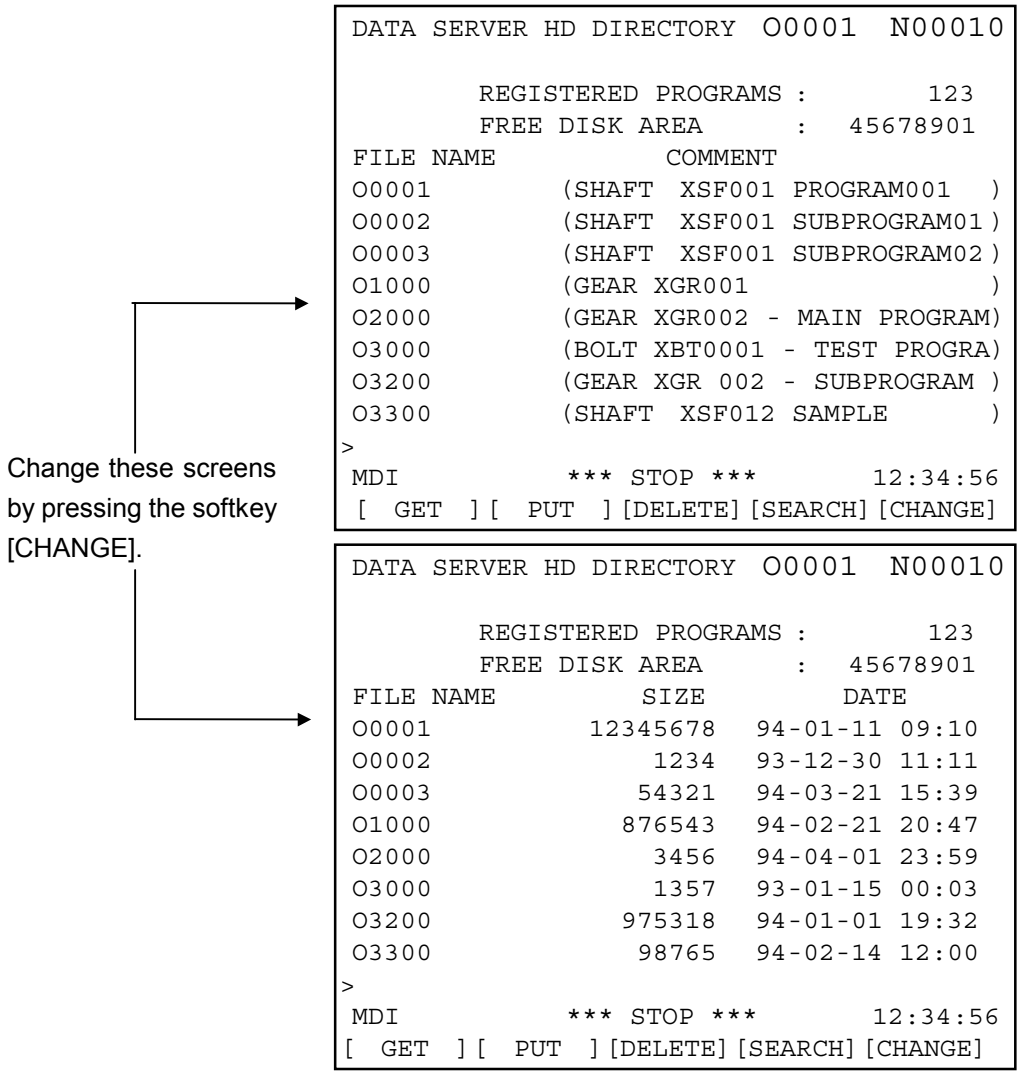
You can display the table of NC programs in the HDD.

Procedure

(1)Press PROG the function key.

(2)When the softkey [DS-DIR] isn't displayed, press the continuous menu key several times.
(3)Press the softkey [DS-DIR], then the following screen is displayed.
(4)Scroll the previous or next screen by pressing the page key.
(5)Change the contents of the screen by pressing the softkey [CHANGE].

The screens imaged for 9 inch CRT and for 14 inch CRT are shown as follows.
In this manual, 9 inch CRT is used for the example screens.



The screen imaged for 9 inch CRT

```
DATA SERVER HD DIRECTORY                                        O0001 N00010

                                           REGISTERED PROGRAMS :        123
                                           FREE DISK AREA      :   45678901
FILE NAME                           COMMENT
O0001        (SHAFT  XSF001 PROGRAM001                                       )
O0002        (SHAFT  XSF001 SUBPROGRAM01                                     )
O0003        (SHAFT  XSF001 SUBPROGRAM02                                     )
O1000        (GEAR XGR001                                                    )
O2000        (GEAR XGR002 - MAIN PROGRAM                                     )
O3000        (BOLT XBT0001 - TEST PROGRAM  94-01-14 23:45                    )
O3200        (GEAR XGR 002 - SUBPROGRAM                                      )
O3300        (SHAFT  XSF012 SAMPLE                                           )
O3309        (12345678901234567890123456789012345678901234567890123456789012345678901234)
O3411        (ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL)
O3478        (ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ12)
O4012        (1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890ABCDEFGHIJKLMNOPQR)
O4509        (TEST PROGRAM                                                   )
O4567        (SAMPLE PROGRAM                                                 )
O5015        (                                                               )
>
                                        MDI      *** STOP ***        12:34:56
 [<<][    ][    ][    ][    ][    ]  [GET][PUT][DELETE][SEARCH][CHANGE][+]
```

```
DATA SERVER HD DIRECTORY                                        O0001 N00010

                                           REGISTERED PROGRAMS :          123
                                           FREE DISK AREA      :   45,678,901
FILE NAME          COMMENT                                SIZE         DATE
O0001        (SHAFT  XSF001 PROGRAM001        )   12,345,678   94-01-11 09:10
O0002        (SHAFT  XSF001 SUBPROGRAM01      )        1,234   93-12-30 11:11
O0003        (SHAFT  XSF001 SUBPROGRAM02      )       54,321   94-03-21 15:39
O1000        (GEAR XGR001                     )      876,543   94-02-21 20:47
O2000        (GEAR XGR002 - MAIN PROGRAM      )        3,456   94-04-01 23:59
O3000        (BOLT XBT0001 - TEST PROGRAM  94-)        1,357   93-01-15 00:03
O3200        (GEAR XGR 002 - SUBPROGRAM       )      975,318   94-01-01 19:32
O3300        (SHAFT  XSF012 SAMPLE            )       98,765   94-02-14 12:00
O3309        (12345678901234567890123456789012)      543,210   93-10-27 08:20
O3411        (ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEF)      468,024   94-02-10 15:47
O3478        (ABCDEFGHIJKLMNOPQRSTUVWXYZ123456)    2,134,657   94-04-04 12:58
O4012        (1234567890ABCDEFGHIJKLMNOPQRSTUV)    4,892,182   94-03-14 19:25
O4509        (TEST PROGRAM                    )       38,262   94-01-06 18:45
O4567        (SAMPLE PROGRAM                  )       89,267   94-05-02 11:43
O5015        (                                )        3,289   94-04-11 09:51
>
                                        MDI      *** STOP ***        12:34:56
 [<<][    ][    ][    ][    ][    ]  [GET][PUT][DELETE][SEARCH][CHANGE][+]
```

The screen imaged for 14 inch CRT

Change the above screens by pressing the softkey [CHANGE].

Each item means as follows,

REGISTERED PROGRAMS	:	number of registered NC programs in the HDD
FREE DISK AREA	:	free disk space in the HDD (unit : byte)
FILE NAME	:	NC program name
COMMENT	:	comment in a NC program
SIZE	:	size of a NC program (unit : byte)
DATE	:	registered date of a NC program

1.3.2 Searching a NC program

When the table of NC programs in the HDD is displayed, you can display the specified file at the top of the screen.

Procedure

(1)Input an O-number of the NC program that you will search.
(2)Press the softkey [SEARCH].
(3)Display the table of NC programs so that the top is the specified NC program.
(4)The blinking "SEARCH" is displayed on the right and low of the screen when searching.

CAUTION
If the specified NC program doesn't exist in the HDD, the next NC program in alphanumerical order is displayed at the top of the screen.

1.3.3 Deleting NC programs

You can delete NC programs from the HDD.

Procedure

(1)Display the “DATA SERVER HD DIRECTORY” screen.

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
>
MDI           *** STOP ***        12:34:56
[  GET  ][  PUT  ][DELETE][SEARCH][CHANGE]
```

(2)Press the softkey [DELETE].

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
>
MDI           *** STOP ***        12:34:56
[      ][      ][  CAN  ][ STOP ][ EXEC ]
```

(3)Input an O-number of the NC program that you will delete.
(4)Press the softkey [EXEC].
(5)The blinking “DELETE” is displayed on the right and low of the screen when deleting.

[Reference]

In case of deleting NC programs, you can use the wild card “*” in an O-number.

Example :

(1) In case of deleting all NC programs in the HDD, you will specify “O*” as an O-number.
(2) In case of deleting NC programs from O0100 to O0199, you will specify “O01*” as an O-number.

In case that you specify “O12*0”, ignore letters latter than

the "*", so that "O12*0" is equal to "O12*". In both cases, delete NC programs from O1200 to O1299.

In case that you use the wild card in an O-number, after pressing the softkey [EXEC], the message "FILE DELETE?" is displayed on the left and low of the screen. And the files are deleted by pressing the softkey [EXEC] again. In order to cancel to delete files, press the softkey [CAN].

In case of deleting NC programs by using the wild card, you can stop deleting NC programs by pressing the softkey [STOP]. However, you can't recover the files that are deleted before stopping.

NOTE

When you delete the file by specifying one NC program, you must specify O-number exactly. For example, when specifying O-number of NC program as 1, usually you can specify "O1", but you must specify "O0001" in this function.

1.3.4 Getting a NC program

You can get a NC program from the Host Computer with "GET" command of FTP, and register it into the HDD.

Procedure

(1)Display the "DATA SERVER HD DIRECTORY" screen.

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
>
MDI           *** STOP ***        12:34:56
[  GET  ][  PUT  ][DELETE][SEARCH][CHANGE]
```

(2)Press the softkey [GET].

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
>
MDI           *** STOP ***        12:34:56
[      ][      ][  CAN  ][ STOP ][ EXEC ]
```

(3)Input an O-number of the NC program that you will register into the HDD and a file name stored in the Host Computer.

[FORMAT]

O****,@@@@

O**** : an O-number of the NC program that you will register into the HDD
(**** is the integer of four digits)

@@@@: a file name stored in the Host Computer

NOTE
1 You must use "," between O**** and @@@@.
2 You must specify O**** that is not registered in the HDD.
If you specify the registered O-number, an error occurs.
3 You can omit "@@@@". In this case, @@@@ is equal to O****. It is available in case that a file name in the Host Computer is named by O-number.
And in this case, omit "," between O**** and @@@@ too.
4 You can use small letters at @@@@.
Input a letter from A to Z after pressing the softkey [LOCK]. This softkey [LOCK] is available till pressing this softkey [LOCK] again.
5 In case that the file name stored in the Host Computer includes a letter that can't be inputted from the MDI keys, you can specify the substitutional letter for only one letter.
Refer to the section "1.12 PARAMETERS".

(4)Press the softkey [EXEC].
(5)The blinking "GET" is displayed on the right and low of the screen when getting a NC program.

[Example]
(1) In case that you register "TEST.PRG" in the Host Computer as the name of "O0001" into the HDD, please input "O0001,TEST.PRG".
(2) In case that you register "O0002" in the Host Computer as the name of "O0002" into the HDD, please input "O0002,O0002" or only "O0002".

NOTE
1 In case of transferring a large NC program, you are careful because you can't stop "GET" function.
2 If an error occurs in this function, "GET ERROR" is displayed on the left and low of the screen.
Confirm the problem by referring to the section "1.11 ERROR MESSAGE". About error messages, refer to the section "APPENDIX A. TABLE OF ERROR MESSAGES".

1.3.5 Putting a NC program

You can put a NC program in the HDD to the Host Computer with “PUT” command of FTP.

Procedure

(1)Display the “DATA SERVER HD DIRECTORY” screen.

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
>
MDI           *** STOP ***        12:34:56
[  GET  ][  PUT  ][DELETE][SEARCH][CHANGE]
```

(2)Press the softkey [PUT].

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
>
MDI           *** STOP ***        12:34:56
[      ][      ][  CAN  ][ STOP ][ EXEC ]
```

(3)Input an O-number of the NC program or a file name that you will output from the HDD and a file name that you will store into the Host Computer.

[FORMAT]

1) O****,@@@@

2) /?????,@@@@

O**** : an O-number of the NC program that you will output from the HDD
(**** is the integer of four digits)

@@@@: a file name that you will store into the Host Computer

/????? : a file name that you will output from the HDD except for O****.
The file name is specified in ?????.

NOTE

1 You must use "," between O****(/?????) and @@@@.
2 You can omit "@@@@". In this case, @@@@ is equal to O**** or ?????. It is available in case that a file name in the Host Computer is named by the file name in the HDD(in case of NC program, named by O-number).
And in this case, omit "," between O****(/?????) and @@@@ too.
3 You must specify an O-number(O****) or a file(?????) registered in the HDD.
If you specify an O-number or a file that is not registered in the HDD, an error occurs.
4 You can use small letters at @@@@.
Input a letter from A to Z after pressing the softkey [LOCK]. This softkey [LOCK] is available till pressing this softkey [LOCK] again.
5 In case that the file name storing into the Host Computer includes a letter that can't be inputted from the MDI keys, you can specify the substitutional letter for only one letter.
Refer to the section "1.12 PARAMETERS".
6 The format 2) will be used when you will transfer "COMMON.RAM" created in the "1.9 MAINTENANCE OF DATA SERVER".

(4)Press the softkey [EXEC].
(5)The blinking "PUT" is displayed on the right and low of the screen when putting a NC program.

[Example]

(1) In case that you register "O0001" in the HDD as the name of "TEST.PRG" into the Host Computer, please input "O0001,TEST.PRG".
(2) In case that you register "O0002" in the HDD as the name of "O0002" into the Host Computer, please input "O0002,O0002" or only "O0002".
(3) In case that you register "COMMON.RAM" in the HDD as the name of "COMMON.RAM" into the Host Computer, please input "/COMMON.RAM,COMMON. RAM" or only "/COMMON.RAM".

NOTE

1 In case of transferring a large NC program, you are careful because you can't stop "PUT" function.

2 If an error occurs in this function, "PUT ERROR" is displayed on the left and low of the screen.
Confirm the problem by referring to the section "1.11 ERROR MESSAGE". About error messages, refer to the section "APPENDIX A. TABLE OF ERROR MESSAGES".

1.3.6 List-Getting NC programs

You can get NC programs from the Host Computer with "GET" commnad of FTP according to the List-File stored in the Host Computer.
About the List-File, refer to the section "1.3.9 A format of List-File".

Procedure

(1)Display the "DATA SERVER HD DIRECTORY" screen.

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
>
MDI           *** STOP ***        12:34:56
[  GET  ][  PUT  ][DELETE][SEARCH][CHANGE]
```

(2)Press the continuous menu key, the following softkeys are displayed.

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
>
MDI           *** STOP ***        12:34:56
[ L-GET ][ L-PUT ][ L-DEL ][      ][      ]
```

(3)Press the softkey [L-GET].

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
>
MDI           *** STOP ***        12:34:56
[      ][      ][  CAN  ][ STOP ][ EXEC ]
```

(4)Input an O-number of the List-File from the MDI keys.
In this List-File, O-numbers of NC programs that you will register into the HDD are specified.
[FORMAT]
O****
O**** : a List-File name stored in the Host Computer
(**** is the integer of four digits)

NOTE
1 The List-File name must be named "O****".
2 You must specify O**** that is not registered in the HDD. And the O-number specified in this List-File must not be registered in the HDD too.
If the registered O-number is specified, an error occurs.

(5)Press the softkey [EXEC].
(6)The blinking "L-GET" is displayed on the right and low of the screen when transferring NC programs.
(7)You can stop transferring NC programs by pressing the softkey [STOP].

CAUTION
1 This List-Get function can be stopped, but the stopping unit is a file. That is to say, when the transmission of one file is finished, if the softkey [STOP] is pressed, this function is stopped.
Therefore, it may take many time from pressing the softkey [STOP] until stopping the service actually.
2 When stopping this List-Get function, NC programs transmitted to the HDD are kept registered.
3 If an error occurs in this function, "GET ERROR" is displayed on the left and low of the screen.
Confirm the problem by referring to the section "1.11 ERROR MESSAGE". About error messages, refer to the section "APPENDIX A. TABLE OF ERROR MESSAGE".
And in this case, NC programs transmitted to the HDD until an error occurs are kept registered.

NOTE

1 In this function, the specified List-File is transferred from the Host Computer to the HDD too.
First, the List-File is transferred from the Host Computer to the HDD, then check the contents of this List-File. Afterward transfer the NC programs specified in this List-File in order.
And, when checking the contents of the List-File, if their contents are mistaken , the specified NC program in the List-File exists in the HDD or the specified NC program is used by other services, this function terminates abnormally and the List-File is deleted.

1.3.7 List-Putting NC programs

You can put NC programs into the Host Computer with "PUT" commnad of FTP according to the List-File stored in the HDD.
About the List-File, refer to the section "1.3.9 A format of List-File".

Procedure

(1)Display the "DATA SERVER HD DIRECTORY" screen.

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
>
MDI           *** STOP ***        12:34:56
[  GET  ][  PUT  ][DELETE][SEARCH][CHANGE]
```

(2)Press the continuous menu key, the following softkeys are displayed.

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
>
MDI           *** STOP ***        12:34:56
[ L-GET ][ L-PUT ][ L-DEL ][      ][      ]
```

(3)Press the softkey [L-PUT].

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
>
MDI           *** STOP ***        12:34:56
[      ][      ][  CAN  ][ STOP ][ EXEC ]
```

(4)Input an O-number of the List-File from the MDI keys.
In this List-File, O-numbers of NC programs that you will register into the Host Computer are specified.
[FORMAT]
O****
O**** : a List-File name stored in the HDD
(**** is the integer of four digits)

NOTE
1 The List-File name must be named "O****".
2 You must specify O**** that is registered in the HDD.
And the O-number specified in this List-File must be registered in the HDD too.
If the specified O-number doesn't exist in the HDD, an error occurs.

(5)Press the softkey [EXEC].
(6)The blinking "L-PUT" is displayed on the right and low of the screen when transferring NC programs.
(7)You can stop transferring NC programs by pressing the softkey [STOP].

CAUTION
1 This List-Put function can be stopped, but the stopping unit is a file. That is to say, when the transmission of one file is finished, if the softkey [STOP] is pressed, this function is stopped.
Therefore, it may take many time from pressing the softkey [STOP] until stopping the service actually.
2 When stopping this List-Put function, NC programs transmitted to the Host Computer are kept registered.
3 If an error occurs in this function, "PUT ERROR" is displayed on the left and low of the screen.
Confirm the problem by referring to the section "1.11 ERROR MESSAGE". About error messages, refer to the section "APPENDIX A. TABLE OF ERROR MESSAGES".
And in this case, NC programs transmitted to the Host Computer until an error occurs are kept registered.

NOTE

1 In this function, the specified List-File is transferred from the HDD to the Host Computer too.
First, check the contents of the specified List-File, then this List-File is transferred into the Host Computer. Afterward transfer the NC programs specified in this List-File in order. And, when checking the contents of the List-File, if the contents are mistaken , the specified NC program in the List-File doesn't exist in the HDD or the specified NC program is used by other services, this function terminates abnormally.

1.3.8 List-Deleting NC programs

You can delete NC programs from the HDD according to the List-File stored in the HDD.
About the List-File, refer to the section "1.3.9 A format of List-File".

Procedure

(1)Display the "DATA SERVER HD DIRECTORY" screen.

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
>
MDI           *** STOP ***        12:34:56
[  GET  ][  PUT  ][DELETE][SEARCH][CHANGE]
```

(2)Press the continuous menu key, the following softkeys are displayed.

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
>
MDI           *** STOP ***        12:34:56
[ L-GET ][ L-PUT ][ L-DEL ][      ][      ]
```

(3)Press the softkey [L-DEL].

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
>
MDI           *** STOP ***        12:34:56
[      ][      ][  CAN  ][ STOP ][ EXEC ]
```

(4)Input an O-number of the List-File from the MDI keys.
In this List-File, O-numbers of NC programs that you will delete from the HDD are specified.
[FORMAT]
O****
O**** : a List-File name stored in the HDD
(**** is the integer of four digits)

NOTE
1 The List-File name must be named "O****".
2 You must specify O**** that is registered in the HDD.
But the O-number specified in this List-File may not be registered in the HDD.
If the specified O-number doesn't exist in the HDD, ignore this file.

(5)Press the softkey [EXEC].
(6)The blinking "L-DEL" is displayed on the right and low of the screen when deleting NC programs.
(7)You can stop deleting NC programs by pressing the softkey [STOP].

CAUTION
1 When stopping this List-Delete function, deleted NC programs from the HDD can't be recovered.
2 If an error occurs in this function, "DELETE ERROR" is displayed on the left and low of the screen.
Confirm the problem by referring to the section "1.11 ERROR MESSAGE". About error messages, refer to the section "APPENDIX A. TABLE OF ERROR MESSAGES".
And in this case, deleted NC programs from the HDD can't be recovered.

NOTE
1 In this function, the specified List-File is deleted from the HDD too.
First, check the contents of the specified List-File, then delete the NC programs specified in this List-File in order. Afterward this List-File is deleted from the HDD.
And, when checking the contents of the List-File, if the contents are mistaken or the specified NC program is used by other services, this function terminates abnormally.

1.3.9 A format of List-File

A List-File that is used by List-Get, List-Put, List-Delete functions must be composed as follows.

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

(1) The top of List-File must always be a "%".
(";" means EOB(End Of Block). LF, CR-LF and LF-CR-CR can be used as EOB code. But use the same EOB code in one List-File.)

(2) The next block must be an O-number. Please write the same O-number as the file name.
And you can write a comment only latter than this O-number up to EOB.

(3) Specify the O-number of NC program that you want to operate. But in this case, the top of the file name "O" must be changed into "N".
In the above case, the NC programs of O0111, O0222, O0333,...,and O0999 are transferred or deleted in order.
On the O-number in the List-File, NC program number shorter than 4 digits is compensated for 4 digits automatically by the Data Server's software.

(4) The end of List-File must always be a "%".

These List-Get, List-Put and List-Delete functions are useful for managing NC programs as a group.
And the place where the List-File is prepared is different according to each function.
In case of the List-Get function, the List-File is prepared in the Host Computer because the NC programs that you want to transfer exist in the Host Computer.
In case of List-Put and List-Delete functions, the List-File is prepared in the HDD because the NC programs that you want to transfer or delete exist in the HDD.

1.3.10 A format of NC program

A format of NC program prepared in the Host Computer obeys the format described in the CNC's manual.
Describe it briefly as follows.

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

(1) The top of NC program must be "%"(Tape start).
And if necessary, you can enter a comment up to first EOB code(Program start).

(2) The next block is an O-number.
When you register this NC program into the HDD, please surely name the same O-number as the file name.
If the O-number in the NC program is different from the O-number of the file name, the O-number of the file name will be used.

(3) ";" placed on the end of each line means EOB (End Of Block).
This EOB code is LF(hexadecimal code:0A) or LF-CR-CR (hexadecimal code:0A-0D-0D).

(4) The end of NC program always must end with a "M-code ; %".

(5) If you want to operate "binary input operation", please insert binary data for "binary input operation" in ":" parts of the above figure.
About the detail of "binary input operation", please refer to the each CNC's operator's manual.

WARNING

If you prepare the NC program contrary to the above format in the Host Computer, the CNC may run unexpectly when this NC program is running.
So, you prepare the NC program in the Host Computer most carefully.

1.4 CALLING A SUBPROGRAM WITH M198

When the subprogram is called by M198 code in main program stored in the memory of CNC, the CNC reads the subprogram from the HDD.

Format of M198 code in the main program

(1)In case of Series 15 tape format

M198P****L@@@@;

**** : the integer of four digits that expresses the O-number

@@@@ : repeat time (from 1 to 9999). When it is omitted, it is supposed to be 1.

(2)In case of other tape formats

M198P@@@@****;

**** : the integer of four digits that expresses the O-number

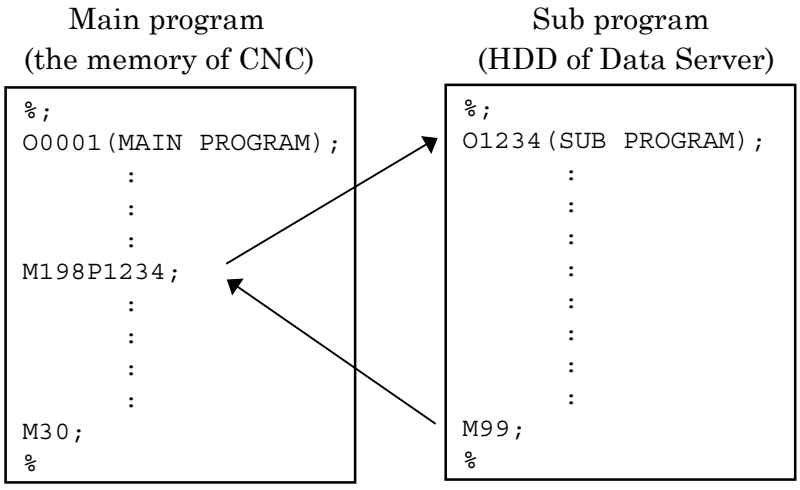
(You must set the integer of four digits)

@@@@ : repeat time (from 1 to 9999)

The other item related to M198 code is based on "subprogram call function" in external input/output devices.
Refer to the CNC's manual in detail.

[Example]

In case of Series 15 tape format



NOTE

1 You must set “5” on the NC parameter of I/O Channel (No.0020) in order to use this function.
2 You can not execute this function together with “1.5 REGISTERING A NC PROGRAM”, “1.6 OUTPUTTING A NC PROGRAM” or “1.7 DNC OPERATION”.
3 You can not call the subprogram in the HDD again in the called subprogram on this function, but you can call the subprogram in the memory of CNC.
4 The Data Server is equal to other external input/output devices from view point of a CNC.
  So, the limitation related to “subprogram call function” for the Data Server is equal to the one for other external input/output devices.

1.5 REGISTERING A NC PROGRAM

You can register a NC program in the HDD to the memory of the CNC.

Procedure

(1)Change the mode of the CNC into "EDIT" mode (in case of foreground operation).
(2)Press the function key PROG in order to display the "PROGRAM" screen.
(3)Input an O-number of the NC program that you will register from the HDD to the memory of the CNC.
(4)Press the softkey [READ].
(5)Press the softkey [EXEC].
(6)The blinking "INPUT" is displayed on the right and low of the screen when registering a NC program.

CAUTION
1 When you register a NC program to the memory of the CNC, please take care of the O-number of the registered NC program in the CNC. In case that the NC parameter No.3201 #2(REP) is equal to 1, if your specified O-number exists in the CNC, the old NC program is overwritten.
And if the NC parameter No.3201 #0(RDL) is equal to 1, register the specified NC program after deleting all NC programs in the memory of the CNC.
2 If you use the buffer mode (See "1.10 BUFFER MODE"), this function runs as it is the buffer mode. Therefore, the Data Server software understands the specified O-number as the list of files and gets divided NC programs from the Host Computer. So, you must not use this function on the buffer mode.

NOTE
1 You must set "5" on the NC parameter of I/O Channel (No.0020) in order to use this function.
2 You can not execute this function together with "1.4 CALLING A SUBPROGRAM WITH M198", "1.6 OUTPUTTING A NC PROGRAM" or "1.7 DNC OPERATION".
3 You can execute this function under background operation. Please refer to the CNC's manual in detail.

1.6 OUTPUTTING A NC PROGRAM

You can output a NC program in the memory of CNC to the HDD.

Procedure

(1)Change the mode of CNC into "EDIT" mode (in case of foreground operation).
(2)Press the function key PROG in order to display the "PROGRAM" screen.
(3)Input a O-number of the NC program that you will output from the memory of CNC to the HDD.
(4)Press the softkey [PUNCH].
(5)Press the softkey [EXEC].
(6)The blinking "OUTPUT" is displayed on the right and low of the screen when outputting a NC program.

NOTE
1 You must set "5" on the NC parameter of I/O Channel (No.0020) in order to use this function.
2 You can not execute this function together with "1.4 CALLING A SUBPROGRAM WITH M198", "1.5 REGISTERING A NC PROGRAM" or "1.7 DNC OPERATION".
3 You can execute this function under background operation. Please refer to the CNC's manual in detail.
4 If you specify the NC program that already exists in the HDD, an error occurs.
Please change O-number in the memory of CNC or delete a NC program from the HDD.

1.7 DNC OPERATION

You can drive the DNC operation by using the NC program in the HDD.

Procedure

(1)Change the mode of CNC into "RMT" mode.
(2)Display the screen of "1.3.1 Display the table of NC programs".
So, "DNC FILE NAME" is displayed on the right and high of the screen.
(1)Input an O-number of the NC program that you will use with the DNC operation and press the function key. INPUT
(2)An O-number of the NC program is displayed on the right and high of the screen.
(3)Start driving the DNC operation with the cycle start switch.

```
DATA SERVER HD DIRECTORY  O0001  N00010
        DNC FILE NAME       :      O1000
        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
>
RMT           *** STOP ***        12:34:56
 [  GET  ][  PUT  ][DELETE][SEARCH][CHANGE]
```

NOTE
1 You must set "5" on the NC parameter of I/O Channel (No.0020) in order to use this function.
2 You can not execute this function together with "1.4 CALLING A SUBPROGRAM WITH M198", "1.5 REGISTERING A NC PROGRAM" or "1.6 OUTPUTTING A NC PROGRAM".

1.8 MAINTENANCE OF THE BUILT-IN HARD DISK

1.8.1 Checking the built-in hard disk

Check whether there is the abnormal sector in the HDD.

Procedure

(1)According to the section "1.2 SETTING SCREEN", show the following "DATA SERVER SETTING-1" screen.

```
DATA SERVER SETTING-1    O0001  N00010
(HOST-COMPUTER)

~                                      ~
>
MDI           *** STOP ***        12:34:56
[STRING][ LOCK ][ INPUT ][ CHECK  ][  SET  ]
```

(2)Press the softkey [CHECK].
(3)Press the softkey [CHKDSK].

```
DATA SERVER SETTING-1    O0001  N00010
(HOST-COMPUTER)

~                                      ~
>
MDI           *** STOP ***        12:34:56
[FORMAT][      ][CHKDSK][       ][  CAN  ]
```

(4)The result is displayed.

```
DATA SERVER SETTING-1    O0001  N00010
(HOST-COMPUTER)

~                                      ~
 CHECK DISK : NORMAL
>
MDI           *** STOP ***        12:34:56
[STRING][ LOCK ][ INPUT ][ CHECK  ][  SET  ]
```

When nomally : "CHECK DISK : NORMAL"
When abnormally : "CHECK DISK : ABNORMAL"
is displayed.

CAUTION
If the result is "ABNORMAL", confirm the cause of error by referring to the section "1.11 ERROR MESSAGE".
Then, backup the NC programs as soon as possible to the Host Computer and operate the next section "1.8.2 Formatting the built-in hard disk".

1.8.2 Formatting the built-in hard disk

Initialize the built-in hard disk.

Procedure

(1)According to the section "1.2 SETTING SCREEN", show the following "DATA SERVER SETTING-1" screen.

```
DATA SERVER SETTING-1    O0001  N00010
(HOST-COMPUTER)

~                                      ~
>
MDI           *** STOP ***        12:34:56
[STRING] [ LOCK ] [ INPUT ] [ CHECK  ] [  SET  ]
```

(2)Press the softkey [CHECK].

(3)Press the softkey [FORMAT].

```
DATA SERVER SETTING-1    O0001  N00010
(HOST-COMPUTER)

~                                      ~
>
MDI           *** STOP ***        12:34:56
[FORMAT] [      ] [CHKDSK] [       ] [  CAN  ]
```

(4)Press the softkey [EXEC].

```
DATA SERVER SETTING-1    O0001  N00010
(HOST-COMPUTER)

~                                      ~
>
MDI           *** STOP ***        12:34:56
[      ] [      ] [      ] [  CAN  ] [ EXEC ]
```

(5)The message "HARD DISK FORMAT?" is displayed on the screen, press the softkey [EXEC] again.

```
DATA SERVER SETTING-1    O0001  N00010
(HOST-COMPUTER)

~                                      ~
HARD DISK FORMAT?
>
MDI           *** STOP ***        12:34:56
[      ] [      ] [ EXEC ] [  CAN  ] [      ]
```

(6)The blinking "DISK FORMAT" is displayed on the low of the screen when initializing the HDD.

NOTE
These maintenance functions can't be operated together with other functions.

1.9 MAINTENANCE OF DATA SERVER

If the trouble occurs at the Data Server function, the contents of COMMON RAM for the interface between CNC and Data Server can be saved into a file in order to examine it.
This file is transferred to the Host Computer by using "1.3.5 Putting a NC program" and the inside status of the Data Server is checked by this file.

Procedure

(1)Press SYSTEM the function key.

(2)If the softkey [DS-MNT] isn't displayed, press the continuous menu key several times.

(3)Press the softkey [DS-MNT], and display the "MAINTENANCE OF DATA SERVER" screen.

```
MAINTENANCE OF DATA SERVER O0001 N00010




      EMPTY COUNTER                  0
      TOTAL SIZE         9,999,999,999
      READ  POINTER              99,999
      WRITE POINTER              99,999




>
MDI            *** STOP ***        12:34:56
[ SAVE ][      ][      ][      ][      ]
```

[Reference]

Each item means as follows.

These items are used when transferring a NC program from Data Server to the CNC. Therefore, other services are not related to these.

(A) EMPTY COUNTER

This item shows the counter to check that the buffer is empty during the download of the NC programs.

When power on, initilize this counter. Afterward, when the buffer is empty, increase this counter.

(B) TOTAL SIZE

This item shows the total byte size of one NC program, when transfer a NC program from the

Data Server to the CNC.

(C) READ POINTER

(D) WRITE POINTER

These items show the inside pointer for management of the data buffer.

(4)Press the softkey [SAVE].

(5)Press the softkey [EXEC], and save the contents of COMMON RAM into the file as “COMMON.RAM”.

(6)The blinking “SAVE” is displayed on the right and low of the screen when saving.

(7)The message “COMPLETE” is displayed after saving.

NOTE

The contents of this file are binary codes.

So, after transferring this file to the Host Computer by using “1.3.5 Putting a NC program” function, when transferring this file from the Host Computer to the other computer again, please transfer it on the binary mode.

If you transfer it on the text mode, the contents of this file may be broken.

1.10 BUFFER MODE (OPTIONAL FUNCTION)

The software of the Data Server can operate on the STORAGE mode or the BUFFER mode. The software on the storage mode can do the services mentioned in the previous sections, but can't control a larger NC program than the size of the built-in hard disk.

The buffer mode is used to control a larger NC program than the size of the built-in hard disk. On this buffer mode, the built-in hard disk is divided into two areas(area A, areaB) virtually. A part of a NC program in one area of the built-in hard disk is supplied to the CNC and a continuous part of the NC program is got into another area in the built-in hard disk by using FTP at the same time. A larger NC program than the size of the built-in hard disk can be controlled by repeating the above operation.

But you must divide a larger NC program than the size of the built-in hard disk into some files with about 35MB in the Host Computer in advance. Now, there are some kinds of built-in hard disk, but we recommend that the divided size is about 35MB. Because you can divide the NC program into the size larger than 35MB, but if so, more time is necessary to get the first file from the Host Computer.

1.10.1 How to change the mode

When using the buffer mode, it is necessary to change the mode from the storage mode to the buffer mode.

Procedure

(1)Press SYSTEM the function key.

(2)If the softkey [DS-MOD] isn't displayed, press the continuous menu key several times.

(3)Press the softkey [DS-MOD], and "DATA SERVER MODE" screen is displayed.
The current mode is displayed on the screen.
(explain the example to change the mode from the storage mode to the buffer mode as follows)

```
DATA SERVER MODE          O0001 N00010

  STORAGE MODE




>
MDI            *** STOP ***        12:34:56
[      ][      ][      ][  MODE  ][      ]
```

(4)Press the softkey [MODE].

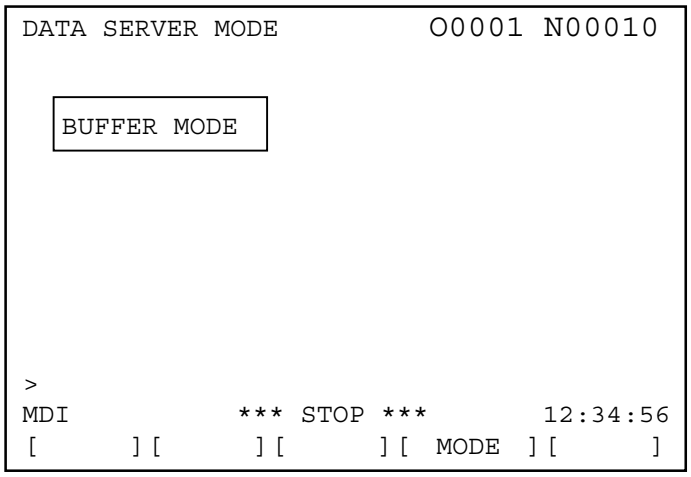
```
DATA SERVER MODE          O0001 N00010

  STORAGE MODE

   IF YOU CHANGE THE MODE,
   ALL NC PROGRAMS IN HDD WILL BE LOST.



CHANGE THE MODE?
MDI            *** STOP ***        12:34:56
[      ][      ][      ][  CAN  ][ EXEC ]
```

(5)Press the softkey [EXEC], so that the mode is changed.
If the mode is changed, all NC programs in the HDD will be deleted.

(6)The blinking "MODE" is displayed on the right and low of

the screen when changing the mode.

(7) The mode on the left and high of the screen is changed after changing the mode.



CAUTION

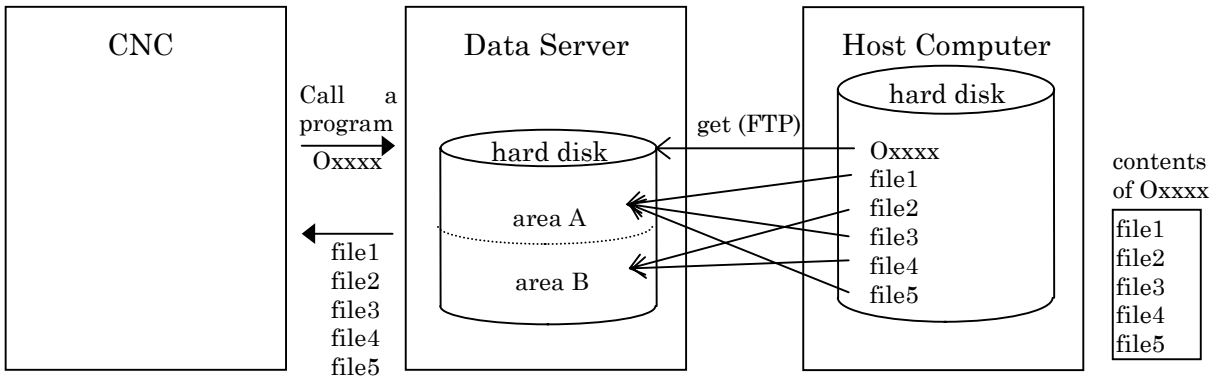
1 If you change the mode, all NC programs in the HDD will be lost.
2 Even if you turn off the power, the mode is kept. Therefore, if you turn off the CNC on the buffer mode and then turn on the CNC, the Data Server runs on the buffer mode.

NOTE

1 When using this function, the software option is necessary. In case that this software option is not set, the above softkey [MODE] is not displayed.
2 On the buffer mode, if you are operating neither “Calling a subprogram with M198” nor “DNC operation”, you can operate “Outputting a NC program”.
But in case that you create a new file into the HDD by using “Outputting a NC program”, when you operate “Calling a subprogram with M198”, you must care about the size of the divided files. Because the remainder of the HDD is decreased by the new files.
If you can’t operate on the buffer mode because of the shortage of the HDD’s remainder, please delete the new files with “1.3.3 Deleting NC programs”.

1.10.2 How to use the buffer mode

The buffer mode is used to control a larger NC program than the size of the built-in hard disk. On this buffer mode, you can operate "1.4 CALLING A SUBPROGRAM WITH M198" and "1.7 DNC OPERATION".
The operation on the screen is the same as the one on the storage mode.
On this buffer mode, Oxxxx file called by "1.4 CALLING A SUBPROGRAM WITH M198" or "1.7 DNC OPERATION" is a list of files. It consists of the file names arranged in calling order. The software of the Data Server gets a NC program from the Host Computer according to this list of files and supplies the NC program into the CNC.



The files (from file1 to file5) specified in the list of files are got in the built-in hard disk by using FTP and supplied to the CNC. In case of the buffer mode, after the CNC calls the NC program(Oxxxx) to the Data Server, the Data Server gets the specified list of files and then gets the first NC program from the Host Computer. So, it takes a few moment for the Data Server to supply the data to the CNC.
The Data Server supplies the part of the NC program in one area and gets the next part into another area by using FTP at the same time. So, you must divide the original NC program into about 35MB(from 32MB to 38MB, the last part of the NC program is any size less than 38MB) evenly in advance.
When the Data Server finishes supplying the part of the NC program of one area, if the continuous part is got into another area by the "GET" command of FTP, the request ends abnormally because it is impossible to supply the continuous part to the CNC. About the file name, the list of files must be named as Oxxxx (xxxx : the integer of four digits that expresses the O-number). But the file name in the

list of files is anything (the length of the file name must be less than 255 letters, and the file name must be available for the Host Computer). The Data Server operates only in the directory specified at “HOST DIRECTORY” of “1.2 SETTING SCREEN”.
LF (hexadecimal : 0A) or CR (hexadecimal : 0D) must be added to the end of each file name in the list of files.

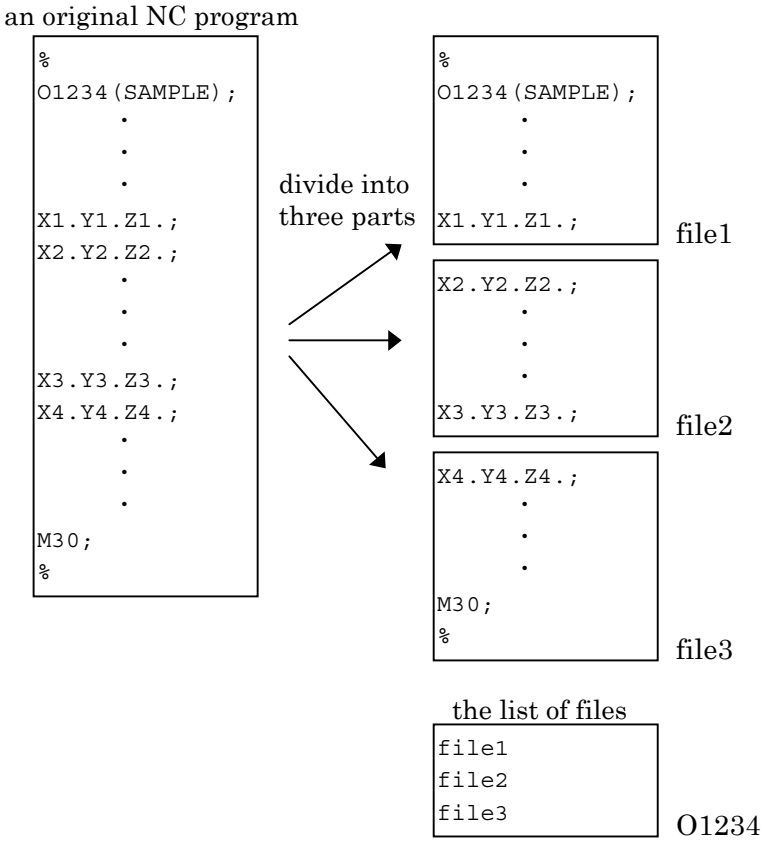
NOTE

If you use the Data Server with 256MB HDD or 810MB HDD, you can divide the original NC program into about 120MB or 400MB theoretically. But if the divided size is large, the time for reading the NC program from the Host Computer and transmitting the NC program to the CNC becomes larger. Therefore, we recommend that you divide the original NC program into about 35MB.

1.10.3 How to divide a large NC program

If you will operate the Data Server on the buffer mode, you must divide a large NC program into some files with about 35MB in the Host Computer and create a file that consists of the file name of the divided files in advance as follows.

Example)
In case that a large NC program is divided into three parts without separating one block

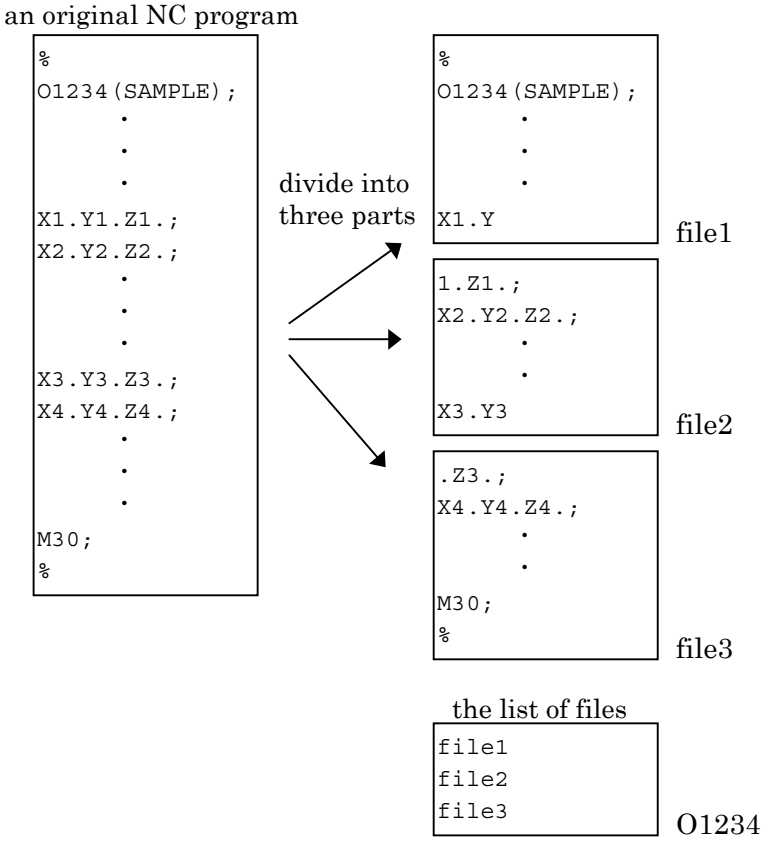


An original NC program is divided into three parts like the above. And all the divided files are specified in the file as O1234 in order.

NOTE
In case of the above example, a NC program is divided without separating one block. But it is possible that a NC program is divided with separating one block, provided that you don't add the unnecessary letter after the bottom of each file.

Example)

In case that a large NC program is divided into three parts with separating one block



WARNING

In case of the above division, you must not add the unnecessary letter as “CR”, “LF”, “EOF”(End Of File) and so on, after the bottom of each file.

If the unnecessary letter is added, the CNC may run unexpectly when this NC program is running.

1.11 ERROR MESSAGE

If an error occurs in the Data Server function, the error description is displayed on the following error message screen for the Data Server function. So, if an error occurs, see this screen and confirm the description.

Procedure

(1)Press MESSAGE the function key.

(2)When the softkey [DS-MSG] isn't displayed, press the continuous menu key.

(3)Press the softkey [DS-MSG], so that the following screen is displayed.
The last error message is shown at the top of screen.

```
DATA SERVER MESSAGE-1     O0001 N00010

--------------------------- 940710 1134
------------------          940510 1649
----------------------      940327 0956

-----------------------     940312 1202




>
MDI           *** STOP ***        12:34:56
[DS-MSG][      ][      ][      ][      ]
```

Change these screens by pressing the page keys.

```
DATA SERVER MESSAGE-2     O0001 N00010

DATA-SERVER SYSTEM ROM nnnn [x] yy/mm/dd
CPU : GENERAL PROTECTION

0000 0000 0000 0000 0000 0000 0000 0000
00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000
00000000 00000000

0000 0000:0000
00000000 0000:0000
0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000

>
MDI           *** STOP ***        12:34:56
[DS-MSG][      ][      ][      ][      ]
```

The detail error information is displayed on the “DATA SERVER MESSAGE-1” screen. And the time stamp is displayed on the right side of the error message.
The time stamp is shown as the format “yymmdd hhMM”(year is ”yy”, month is ”mm”, day is ”dd”, hour is “hh” and minute is “MM”).
When the serious error occurs on the software of the Data Server, the inside status (Ex. value of the registers) of the Data Server’s software is shown on the “DATA SERVER MESSAGE-2” screen. Usually, no data are shown on this screen.

NOTE
1 Refer to “APPENDIX A. TABLE OF ERROR MESSAGES” and “APPENDIX B. SERIOUS ERROR” in detail.
2 If the information is shown on the “DATA SERVER MESSAGE-2” screen, the Data Server’s software can’t run continuously. It is necessary to turn off the power.

1.12 PARAMETERS

The NC parameters related to the Data Server fucntions are the follows.

Parameters

0020	I/O CHANNEL : Selection of input/output devices

[Data Format] Byte Type

[Data] 5 (Select the Data Server to the input/output device)

	#7	#6	#5	#4	#3	#2	#1	#0
0900								NODSV

[Data Format] Bit Type

NODSV The Data Server functions are

1: unavailable.

0: available.

0911	the substitutional letter (Group 1)

[Data Format] Word Type

[Data] ASCII code (decimal number)

0912	the letter that can't be inputted from the MDI keys (Group 1)

[Data Format] Word Type

[Data] ASCII code (decimal number)

0913	the substitutional letter (Group 2)

[Data Format] Word Type

[Data] ASCII code (decimal number)

0914	the letter that can't be inputted from the MDI keys (Group 2)

[Data Format] Word Type

[Data] ASCII code (decimal number)

0915	the substitutional letter (Group 3)

[Data Format] Word Type

[Data] ASCII code (decimal number)

0916	the letter that can't be inputted from the MDI keys (Group 3)

[Data Format] Word Type

[Data] ASCII code (decimal number)

The above NC parameters from No.0911 to No.0916 are used in order to substitute the letter that can be inputted from the MDI keys for the letter that can't be inputted from the MDI

keys, when you set the HOST DIRECTORY at the “DATA SERVER SETTING-1” screen.
There are three pairs. One pair is No.0911 and No.0912, the other is No.0913 and No.0914, the last is No.0915 and No.0916.
And the last pair , No.0915 and No.0916, is used for setting not only the HOST DIRECTORY but also the file name that is transferred between the Host Computer and the Data Server.

Example)

If you wish to set “C:¥DTSVR¥NC_PROG” to the HOST DIRECTORY, you can’t input “¥”, “:” and “_” from the MDI keys. So, you may substitute “@” for “:”, “/” for “¥” and “-” for “_”.

In this case, you set the NC parameters as follows.

No.0911	64	(ASCII code of “@”, decimal number)
No.0912	58	(ASCII code of “:”, decimal number)
No.0913	47	(ASCII code of “/”, decimal number)
No.0914	92	(ASCII code of “¥”, decimal number)
No.0915	45	(ASCII code of “-”, decimal number)
No.0916	95	(ASCII code of “_”, decimal number)

Afterward, set “C@/DTSVR/NC-PROG” in the HOST DIRECTORY on the “DATA SERVER SETTING-1” screen and press the softkey [SET].
Then the Data Server’s software changes it into “C:¥DTSVR¥NC_PROG” and saves the changed string.

When you want to get “nc_file1” file in the Host Computer into the HDD as named “O1234” by using “GET” command of FTP, you specify “O1234,nc-file1”.
In this case, the Data Server’s software changes “nc-file1” into “nc_file1” and get “nc_file1” from the Host Computer to the HDD.

NOTE

1 If the both NC parameters No.0911 and No.0912 are equal to 0, then the NC parameters are considered to be set as follows.
  No.0911 = 32 (space)
  No.0912 = 92 (“¥”)
2 If the both NC parameters No.0913 and No.0914 are equal to 0, then the NC parameters are considered to be set as follows.
  No.0913 = 64 (“@”)
  No.0914 = 58 (“:”)
3 The NC parameters No.0915 and No.0916 don’t have default values.
4 In these three pairs, the smaller pair is available preferencially. That is to say, if the same value is set in No.0911, No.0913 and No.0915, the pair of No.0911 and No.0912 is available.
5 In case of displaying the “DATA SERVER SETTING” screen, the Data Server’s software exchanges the letters in reverse and displays the setting data.

2 FOR Series 15-B

The operation of Data Server for Series 15-B is described in this chapter.

2.1 OUTLINE

By using this function, the following items can be achieved.

(1)Drive high-speed machining operation by calling the subprogram from a built-in hard disk on the Data Server board (described as “HDD” below).

(2)Input a NC program in the Host Computer into the HDD by using FTP.
Output a NC program in the HDD into the Host Computer by using FTP.

(3)Input a NC program in the HDD into the memory of the CNC.
Output a NC program in the memory of the CNC into the HDD.

(4)Delete NC programs and display the table of NC programs in the HDD.

2.1.1 Notice when you use for the first time

WARNING

1 If you use this function for the first time, you must initiate the HDD according to “2.8.2 Formatting the built-in hard disk” and input the setting data according to “2.2 SETTING SCREEN”. And turn off and then turn on the power of the CNC.
If you use this function before you operate these, we don’t guarantee that this function operates normally.

2 About FTP on the Ethernet, when you use this function for the first time, please set Ethernet addresses carefully and check this function on your environment according to your network administrator’s advice.
If you set wrong Ethernet addresses, it may make a heavy effect on your network.

CAUTION

1 If you turn off the power during reading the data from the HDD or writing to the HDD, it may make the registered file in the HDD broken.
So, you must not turn off the power during executing the Data Server functions.

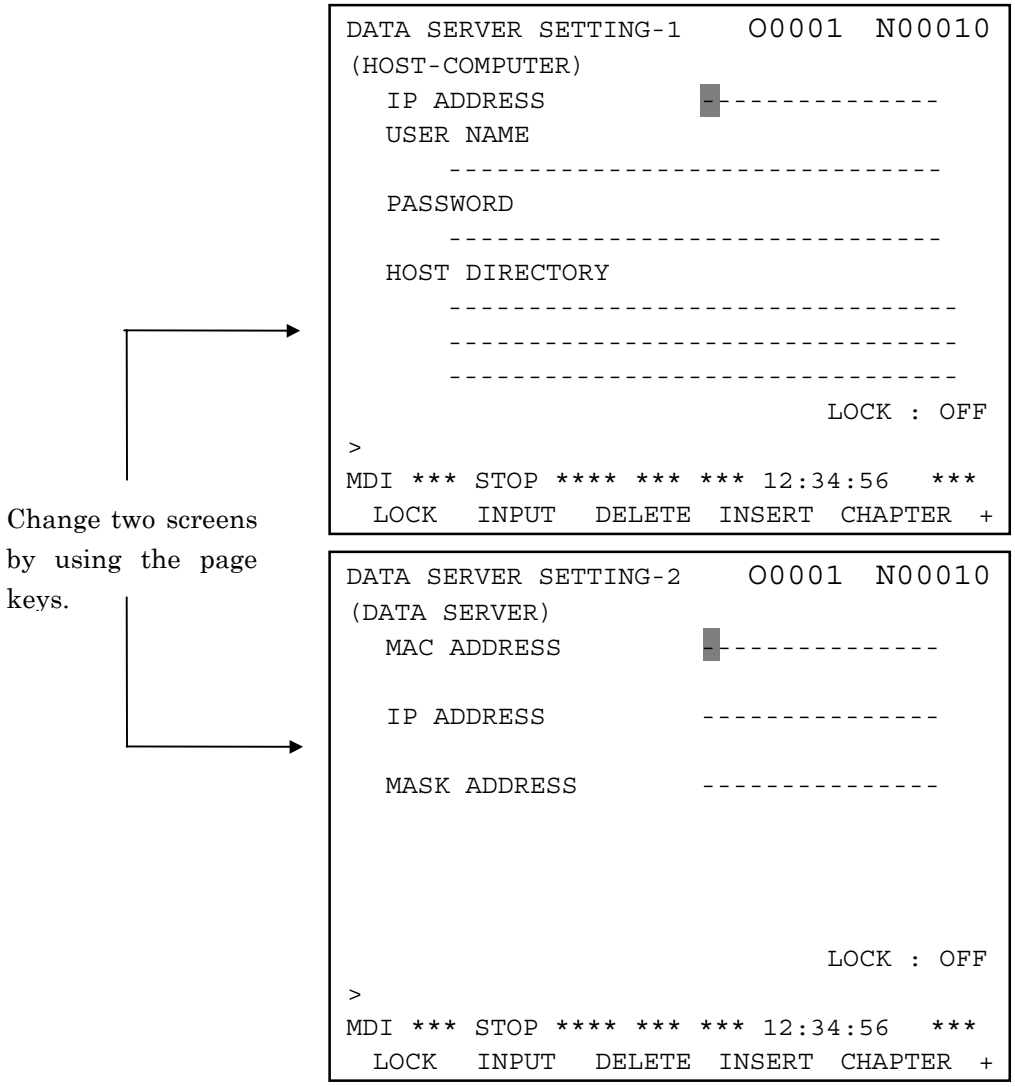
2 Be sure to take the backup of the data in the HDD against an emergency.

2.2 SETTING SCREEN

By using this screen, you can set the data to transfer a NC program between the HDD and the Host Computer with FTP.
You must set the data shown as the section "2.2.1 Description of each data" before you use the Data Server functions.

Procedure

(1)Press the function menu key in order to change the softkeys into the function selection keys.
(2)If "DATA SERVER SETTING-1" screen isn't displayed, press the softkey [SETTING] several times.
(3)Press the operation menu key in order to change the softkeys into the operation selection keys.
(4)Input the data by using the MDI keys and the softkeys.



In the above screen,

■ means a cursor

--- means a blank.

If the data are already registered, then these data are displayed except for the PASSWORD.

About the PASSWORD, only when you set the password, it will be displayed.

2.2.1 Description of each data

(a) Setting data of the Host Computer
(DATA SERVER SETTING-1)

IP ADDRESS	IP address of the Host Computer's Ethernet board (Ex. : "192.168.0.1")
USER NAME	User name of the Host Computer (Max. 31 letters)
PASSWORD	Password for the above "USER NAME" This password must be set. (Max. 31 letters)
HOST DIRECTORY	Working directory of the Host Computer in order to communicate with the Data Server (Max. 127 letters)

You can input small letters in these items.
Please see the section "2.2.3 How to input small letters".

(b) Setting data of the Data Server
(DATA SERVER SETTING-2)

MAC ADDRESS	You must input the 12 alphanumerical letters printed as the "ADR" at the seal on the Data Server's face plate. (Ex. : "080019ABCDEF")
IP ADDRESS	IP address of the Data Server board (Ex. : "192.168.0.2")
MASK ADDRESS	Netmask for the network (Ex. : "255.255.255.0")

CAUTION
1 If you change the above "(b) Setting data of the Data Server" data, you must turn off the power of the CNC once.
2 You must input the 12 alphanumerical letters printed as the "ADR" at the seal on the Data Server board into the MAC address.
If you set the wrong address into the MAC address, it may make a heavy obstacle on your network.

The meanings of each address are as follows:

MAC ADDRESS : It means the address that identifies each machine connected by Ethernet in the MAC layer.
It must be unique in the network.

IP ADDRESS : It means the address that identifies each machine connected by Ethernet in the Network layer.
It must be unique in the network.

MASK ADDRESS : It means a bit typed value which takes out the part of the network address from the IP address.

Refer to “APPENDIX C. Ethernet technical terms” in detail.

2.2.2 How to input data

In this section, how to input data is explained.

Procedure

(1)Move the cursor to an item that you will input.
(2)Input the data by using the MDI keys.
(3)Press the softkey [INPUT] or [INSERT].
When pressing the softkey [INPUT], replace the old data with the inputting data.
When pressing the softkey [INSERT], the inputting data is inserted at the cursor's point.
(4)If you delete a letter, move the cursor to the place where you will delete, and then press the softkey [DELETE].

Ex.) In case of setting "192.168.0.1" into the IP ADDRESS item

(1) Move the cursor and put the cursor on the IP ADDRESS item.

```
DATA SERVER SETTING-1    O0001  N00010
(HOST-COMPUTER)
   IP ADDRESS          -----------------
   USER NAME
~                                       ~
>
MDI *** STOP **** *** *** 12:34:56   ***
  LOCK   INPUT   DELETE  INSERT  CHAPTER  +
```

(2) Input the data "192.168.0.1" by using the MDI keys.

```
DATA SERVER SETTING-1    O0001  N00010
(HOST-COMPUTER)
   IP ADDRESS          -----------------
   USER NAME
~                                       ~
>192.168.0.1
MDI *** STOP **** *** *** 12:34:56   ***
  LOCK   INPUT   DELETE  INSERT  CHAPTER  +
```

(3)Press the softkey [INPUT].

```
DATA SERVER SETTING-1    O0001  N00010
(HOST-COMPUTER)
   IP ADDRESS          192.168.0.1-----
   USER NAME
~                                       ~
>
MDI *** STOP **** *** *** 12:34:56   ***
  LOCK   INPUT   DELETE  INSERT  CHAPTER  +
```

NOTE

1 The above setting data of Data Server are different from other NC parameters. They are saved in the HDD. Therefore you must save the setting data after inputting or changing these data.
Please refer to the section “2.2.4 How to save modified data”.

2 If you will input the letter that can’t be inputted from the MDI keys, please refer to the section “2.12 PARAMETERS”.

2.2.3 How to input small letters

When you input the setting data for the Host Computer, you can input small letters.
How to input small letters is described as follows.

Procedure

(1)Press the softkey [LOCK] before inputting small letters.
Confirm the "LOCK : ON" on the right and low of the screen.
(2)Then the inputted letter from the MDI keys is changed to a small letter.
(3)To cancel this mode, press the softkey [LOCK] again or change the other screen.
Confirm the "LOCK : OFF" on the right and low of the screen.

2.2.4 How to save modified data

The setting data of Data Server are different from other NC parameters. They are saved in the HDD. Therefore you must save the setting data by the following operation after inputting or changing these data.
If you only set the data on the screen and don't save them, then the Ethernet communication is not effected.
And if you change the CNC's screen without saving modified data, then modified data are lost. So, if you display the setting screen again, then the old data are displayed.

Procedure

(1)Press the operation menu key after you finish inputting all data.
(2)Press the softkey [SET].
(3)Press the softkey [EXEC].
(4)The blinking "SET" is displayed on the low of the screen when saving modified data.

CAUTION
1 When the data are saved, the form of data is checked. If there is a mistake in the data, the error message is displayed and no part of the data is saved into the HDD.
In this case, "DATA SERVER APPLICATION ERROR" message is displayed on the left and low of the screen. Confirm the problem by referring to the section "2.11 ERROR MESSAGE", then set the correct data.
2 In case of changing the setting data for Host Computer (DATA SERVER SETTING-1), these saved data are available without turning off the power. But in case of changing the setting data for Data Server (DATA SERVER SETTING-2), these saved data are not available before turning off the power.
3 The setting screen consists of two screens, but the setting data are saved together. Therefore, you must save these data after setting all data in two screens.
If you save the data after setting data only in one screen, the error occurs by the reason of 1.
4 If you don't save the data, the setting data aren't available.

2.3 NC PROGRAM MANAGEMENT FUNCTION

By using Data Server function, the following items can be achieved.

(1)Displaying the table of NC programs
Display the table of NC programs in the HDD in alphanumerical order.

(2)Searching a NC program
Search a NC program in the HDD and display it.

(3)Deleting NC programs
Delete NC programs from the HDD

(4)Getting a NC program
Get a NC program from the Host Computer with GET command of FTP

(5)Putting a NC program
Put a NC program into the Host Computer with PUT command of FTP

CAUTION

1 Two or more items of the above can't be operated at the same time.
2 When you are operating "Calling a subprogram with M198" or "DNC Operation" on the buffer mode (See "2.10 BUFFER MODE"), you can't operate the above functions. And if you are operating neither "Calling a subprogram with M198" nor "DNC Operation" on the buffer mode, you can operate the above functions. But in case that you create a new file into the HDD by operating "Getting a NC program" ,etc., the remainder of the HDD is decreased by this new file. In this case, you may not operate on the buffer mode because of the shortage of the HDD's remainder. Therefore, in case of using the Data Server on the buffer mode, you must not use "Getting a NC program" ,etc.

2.3.1 Displaying the table of NC programs

You can display the table of NC programs in the HDD.

Procedure

(1)Press the function menu key in order to change the softkeys into the function selection keys.
(2)If "DATA SERVER HD DIRECTORY" screen is not displayed, press the softkey [PROGRAM] several times until the following screen is displayed.
(3)Scroll the previous or next screen by pressing the page key.
(4)Press the operation menu key in order to change the softkeys into the operation selection keys.
(5)Change the contents of the screen by pressing the softkey [CHANGE].

The screens imaged for 9 inch CRT and for 14 inch CRT are shown as follows.
In this manual, 9 inch CRT is used for the example screens.

Change these screens by pressing the softkey [CHANGE].

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
O0002         (SHAFT  XSF001 SUBPROGRAM01 )
O0003         (SHAFT  XSF001 SUBPROGRAM02 )
O1000         (GEAR XGR001                )
O2000         (GEAR XGR002 - MAIN PROGRAM)
O3000         (BOLT XBT0001 - TEST PROGRA)
O3200         (GEAR XGR 002 - SUBPROGRAM  )
O3300         (SHAFT  XSF012 SAMPLE       )
                                LOCK : OFF

MDI *** STOP **** *** *** 12:34:56   ***
  LOCK  GETFILE PUTFILE SRHFILE CHAPTER  +
```

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME          SIZE          DATE
O0001           12345678   94-01-11 09:10
O0002               1234   93-12-30 11:11
O0003              54321   94-03-21 15:39
O1000             876543   94-02-21 20:47
O2000               3456   94-04-01 23:59
O3000               1357   93-01-15 00:03
O3200             975318   94-01-01 19:32
O3300              98765   94-02-14 12:00
                                LOCK : OFF

MDI *** STOP **** *** *** 12:34:56   ***
  LOCK  GETFILE PUTFILE SRHFILE CHAPTER  +
```

The screen imaged for 9 inch CRT

NOTE

The softkey [CHANGE] is displayed by pressing the operation menu key.

```
DATA SERVER HD DIRECTORY                                        O0001 N00010

                                                REGISTERED PROGRAMS :       123
                                                FREE DISK AREA      :  45678901
FILE NAME                          COMMENT
O0001        (SHAFT  XSF001 PROGRAM001                                        )
O0002        (SHAFT  XSF001 SUBPROGRAM01                                      )
O0003        (SHAFT  XSF001 SUBPROGRAM02                                      )
O1000        (GEAR XGR001                                                     )
O2000        (GEAR XGR002 - MAIN PROGRAM                                      )
O3000        (BOLT XBT0001 - TEST PROGRAM  94-01-14 23:45                     )
O3200        (GEAR XGR 002 - SUBPROGRAM                                       )
O3300        (SHAFT  XSF012 SAMPLE                                            )
O3309        (12345678901234567890123456789012345678901234567890123456789012)
O3411        (ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKLMNOPQRSTUVWXYZABCDEFGHIJKL)
O3478        (ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ12)
O4012        (1234567890ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890ABCDEFGHIJKLMNOPQR)
O4509        (TEST PROGRAM                                                    )
O4567        (SAMPLE PROGRAM                                                  )
O5015        (                                                                )
                                                                  LOCK : OFF

                                        MDI   ***  STOP  ****  ***  ***  12:34:56  LSK
 | LOCK | GET | PUT | SEARCH FILE | DELETE FILE |  |  |  | CHANGE | CHAPTER |  |
```

```
DATA SERVER HD DIRECTORY                                        O0001 N00010

                                                REGISTERED PROGRAMS :         123
                                                FREE DISK AREA      :  45,678,901
FILE NAME          COMMENT                                  SIZE          DATE
O0001        (SHAFT  XSF001 PROGRAM001          )    12,345,678  94-01-11 09:10
O0002        (SHAFT  XSF001 SUBPROGRAM01        )         1,234  93-12-30 11:11
O0003        (SHAFT  XSF001 SUBPROGRAM02        )        54,321  94-03-21 15:39
O1000        (GEAR XGR001                       )       876,543  94-02-21 20:47
O2000        (GEAR XGR002 - MAIN PROGRAM        )         3,456  94-04-01 23:59
O3000        (BOLT XBT0001 - TEST PROGRAM  94-  )         1,357  93-01-15 00:03
O3200        (GEAR XGR 002 - SUBPROGRAM         )       975,318  94-01-01 19:32
O3300        (SHAFT  XSF012 SAMPLE              )        98,765  94-02-14 12:00
O3309        (12345678901234567890123456789012)       543,210  93-10-27 08:20
O3411        (ABCDEFGHIJKLMNOPQRSTUVWXYZABCDEF)       468,024  94-02-10 15:47
O3478        (ABCDEFGHIJKLMNOPQRSTUVWXYZ123456)     2,134,657  94-04-04 12:58
O4012        (1234567890ABCDEFGHIJKLMNOPQRSTUV)     4,892,182  94-03-14 19:25
O4509        (TEST PROGRAM                      )        38,262  94-01-06 18:45
O4567        (SAMPLE PROGRAM                    )        89,267  94-05-02 11:43
O5015        (                                  )         3,289  94-04-11 09:51
                                                                  LOCK : OFF

                                        MDI   ***  STOP  ****  ***  ***  12:34:56  LSK
 | LOCK | GET | PUT | SEARCH FILE | DELETE FILE |  |  |  | CHANGE | CHAPTER |  |
```

The screen imaged for 14 inch CRT

Change the above screens by pressing the softkey [CHANGE].

Each item means as follows,

REGISTERED PROGRAMS	:	number of registered NC programs in the HDD
FREE DISK AREA	:	free disk space in the HDD (unit : byte)
FILE NAME	:	NC program name
COMMENT	:	comment in a NC program
SIZE	:	size of a NC program (unit : byte)
DATE	:	registered date of a NC program

2.3.2 Searching a NC program

When the table of NC programs in the HDD is displayed, you can display the specified file at the top of the screen.

Procedure

(1)Press the softkey [SRHFILE].
(2)Press the softkey [(PROG#)] and input an O-number of the NC program that you will search.
(3)Press the softkey [EXEC].
(4)Display the table of NC programs so that the top is the specified NC program.
(5)The blinking “SRCH” is displayed on the low of the screen when searching.

CAUTION
If the specified NC program doesn’t exist in the HDD, the next NC program in alphanumerical order is displayed at the top of the screen.

2.3.3 Deleting NC programs

You can delete NC programs from the HDD.

Procedure

(1)Display the “DATA SERVER HD DIRECTORY” screen.

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
                              LOCK : OFF

MDI *** STOP **** *** *** 12:34:56   ***
  LOCK  GETFILE PUTFILE SRHFILE CHAPTER  +
```

(2)The softkey [DELFILE] is displayed by pressing the operation menu key.

(3)Press the softkey [DELFILE].

(4)Press the softkey [(PROG#)].

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
                              LOCK : OFF
DELFILE > O
MDI *** STOP **** *** *** 12:34:56   ***
  LOCK   CANCEL           EXEC
```

(5)Input an O-number of the NC program that you will delete.

(6)Press the softkey [EXEC].

(7)The message “FILE DELETE ?” is displayed on the left and low of the screen, so if you want to delete, press the softkey [EXEC] again.

(8)The blinking “DELE” is displayed on the low of the screen when deleting.

[Reference]

In case of deleting NC programs, you can use the wild card “*” in an O-number.

Example :

(1) In case of deleting all NC programs in the HDD, you will specify “O*” as an O-number.
(2) In case of deleting NC programs from O0100 to O0199, you will specify “O01*” as an O-number.

In case that you specify “O12*0”, ignore letters latter than the “*”, so that “O12*0” is equal to “O12*”. In both cases, delete NC programs from O1200 to O1299.

In case of deleting NC programs by using the wild card, you can stop deleting NC programs by pressing the softkey [STOP]. However, you can’t recover the files that are deleted before stopping.
And the softkey [STOP] is displayed when this function executes.

2.3.4 Getting a NC program

You can get a NC program from the Host Computer with "GET" command of FTP, and register it into the HDD.

Procedure

(1)Display the "DATA SERVER HD DIRECTORY" screen.

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
                              LOCK : OFF

MDI *** STOP **** *** *** 12:34:56   ***
  LOCK  GETFILE PUTFILE SRHFILE CHAPTER  +
```

(2)Press the softkey [GETFILE].

(3)Press the softkey [(PROG#)] and input an O-number of the NC program that you will register into the HDD.

(4)If the file that you will get is registered in the Host Computer as the same name with the specified O-number at (3), press the softkey [EXEC].
If not, operate the following operations (5) and (6).

(5)Press the softkey [(F NAM)] and input a file name that you will get into the HDD.

(6)Press the softkey [EXEC].

(7)The blinking "GET" is displayed on the low of the screen when getting a NC program.

NOTE

1 You must specify an O-number that is not registered in the HDD at the procedure (3).
If you specify the registered O-number, an error occurs.

2 You can use small letters for a file name of the Host Computer at the procedure (5).
Input a letter from A to Z after pressing the softkey [LOCK]. This softkey [LOCK] is available till pressing this softkey [LOCK] again.

3 In case that the file name stored in the Host Computer includes a letter that can't be inputted from the MDI keys, you can specify the substitutional letter for only one letter.
Refer to the section "2.12 PARAMETERS".

[Example]

(1) In case that you register “TEST.PRG” in the Host Computer as the name of “O0001” into the HDD, first press the softkeys [GETFILE] and [(PROG#)] and input “0001”.
Then press the softkey [(F NAM)] and input a file name “TEST.PRG”. At last, press the softkey [EXEC].

(2) In case that you register “O0002” in the Host Computer as the name of “O0002” into the HDD, press the softkeys [GETFILE] and [(PROG#)] and input “0002”.
Then press the softkey [EXEC].

NOTE

1 In case of transferring a large NC program, you are careful because you can’t stop “GET” function.

2 If an error occurs in this function, “DATA SERVER APPLICATION ERROR” is displayed on the left and low of the screen.
Confirm the problem by referring to the section “2.11 ERROR MESSAGE”. About error messages, refer to the section “APPENDIX A. TABLE OF ERROR MESSAGES”.

2.3.5 Putting a NC program

You can put a NC program in the HDD to the Host Computer with “PUT” command of FTP.

Procedure

(1)Display the “DATA SERVER HD DIRECTORY” screen.

```
DATA SERVER HD DIRECTORY  O0001  N00010

        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
                              LOCK : OFF

MDI *** STOP **** *** *** 12:34:56   ***
  LOCK  GETFILE PUTFILE SRHFILE CHAPTER  +
```

(2)Press the softkey [PUTFILE].

(3)Press the softkey [(PROG#)] and input an O-number of the NC program that you will output from the HDD.

(4)If you will put the specified file as the same name into the Host Computer, press the softkey [EXEC].
If not, operate the following operations (5) and (6).

(5)Press the softkey [(F NAM)] and input a file name that you will store into the Host Computer.

(6)Press the softkey [EXEC].

(7)The blinking “PUT” is displayed on the low of the screen when putting a NC program.

NOTE

1 You must specify an O-number registered in the HDD at the procedure (3).
If you specify the O-number that is not registered in the HDD, an error occurs.

2 You can use small letters for a file name of the Host Computer at the procedure (5).
Input a letter from A to Z after pressing the softkey [LOCK]. This softkey [LOCK] is available till pressing this softkey [LOCK] again.

3 In case that the file name stored in the Host Computer includes a letter that can’t be inputted from the MDI keys, you can specify the substitutional letter for only one letter.
Refer to the section “2.12 PARAMETERS”.

NOTE

4 If you transfer a file except for O-number, before pressing the softkey [PUTFILE], input a file name that you will put into the Host Computer. Then press the softkey [PUTFILE].
This method is used for the transmission of the "COMMON.RAM" file, etc.
About "COMMON.RAM" file, refer to the section "2.9 MAINTENANCE OF DATA SERVER".

[Example]

(1) In case that you register "O0001" in the HDD as the name of "TEST.PRG" into the Host Computer, first press the softkeys [PUTFILE] and [(PROG#)] and input "0001".
Then press the softkey [(F NAM)] and input a file name "TEST.PRG". At last, press the softkey [EXEC].

(2) In case that you register "O0002" in the HDD as the name of "O0002" into the Host Computer, press the softkeys [PUTFILE] and [(PROG#)] and input "0002".
Then press the softkey [EXEC].

(3) In case that you register "COMMON.RAM" in the HDD as the name of "COMMON.RAM" into the Host Computer, input "COMMON.RAM,COMMON.RAM" or only "COMMON.RAM" and press the softkey [PUTFILE].

NOTE

1 In case of transferring a large NC program, you are careful because you can't stop "PUT" function.

2 If an error occurs in this function, "DATA SERVER APPLICATION ERROR" is displayed on the left and low of the screen.
Confirm the problem by referring to the section "2.11 ERROR MESSAGE". About error messages, refer to the section "APPENDIX A. TABLE OF ERROR MESSAGES".

2.3.6 A format of NC program

A format of NC program prepared in the Host Computer obeys the format described in the CNC's manual.
Describe it briefly as follows.

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

(1) The top of NC program must be "%"(Tape start).
And if necessary, you can enter a comment up to first EOB code(Program start).

(2) The next block is an O-number.
When you register this NC program into the HDD, please surely name the same O-number as the file name.
If the O-number in the NC program is different from the O-number of the file name, the O-number of the file name will be used.

(3) ";" placed on the end of each line means EOB (End Of Block).
This EOB code is LF(hexadecimal code:0A) or LF-CR-CR (hexadecimal code:0A-0D-0D).

(4) The end of NC program always must end with a "M-code ; %".

(5) If you want to operate "binary input operation", please insert binary data for "binary input operation" in ":" parts of the above figure.
About the detail of "binary input operation", please refer to the each CNC's operator's manual.

WARNING

If you prepare the NC program contrary to the above format in the Host Computer, the CNC may run unexpectly when this NC program is running.
So, you prepare the NC program in the Host Computer most carefully.

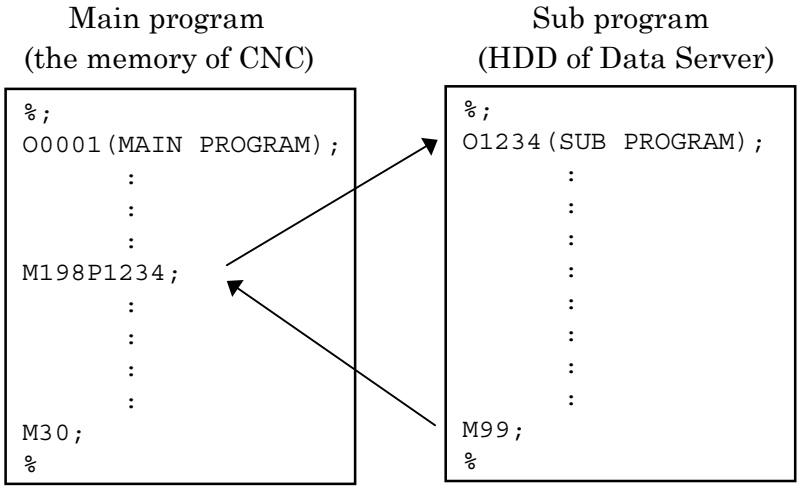
2.4 CALLING A SUBPROGRAM WITH M198

When the subprogram is called by M198 code in main program stored in the memory of CNC, the CNC reads the subprogram from the HDD.

Format of M198 code in the main program
M198P****L@@@@;
**** : the integer of four digits that expresses the O-number
@@@@ : repeat time (from 1 to 9999). When it is omitted, it is supposed to be 1.

The other item related to M198 code is based on "subprogram call function" in external input/output devices.
Refer to the CNC's manual in detail.

[Example]



NOTE
1 You must set "14" on the NC parameter of I/O Channel (No.0022) in order to use this function.
2 You must set the NC parameter No.7616 #3(EXSC) to 1 in order to operate this function.
3 You can not call the subprogram in the HDD again in the called subprogram on this function, but you can call the subprogram in the memory of CNC.

NOTE

4 The Data Server is equal to other external input/output devices from view point of a CNC.
So, the limitation related to “subprogram call function” for the Data Server is equal to the one for other external input/output devices.

5 You can not execute this function together with “2.5 REGISTERING A NC PROGRAM”, “2.6 OUTPUTTING A NC PROGRAM” or “2.7 DNC OPERATION”.

6 You can call a subprogram by M-code that is set to the NC parameter No.2431.
Please refer to the CNC’s manual in detail.

2.5 REGISTERING A NC PROGRAM

You can register a NC program in the HDD to the memory of CNC.

Procedure

(1)Change the mode of the CNC into "EDIT" mode (in case of foreground operation).
(2)Press the function menu key in order to change the softkeys into the function selection keys.
(3)If "PROGRAM(MEMORY)" screen is not displayed, press the softkey [PROGRAM] several times until this screen is displayed.
(4)Press the operation menu key in order to change the softkeys into the operation selection keys.
(5)Press the softkey [READ].
(6)Press the softkey [(PROG#)] and input an O-number of the NC program that you will register from the HDD to the memory of CNC.
(7)Press the softkey [EXEC].
(8)The blinking "READ" is displayed on the right and low of the screen when registering a NC program.

CAUTION

1 When you register a NC program to the memory of CNC, please take care of the O-number of the registered NC program in the CNC. In case that the NC parameter No.2200 #1(REP) is equal to 1, if your specified O-number exists in the CNC, the old NC program is overwritten.
And if the NC parameter No.2200 #0(RDL) is equal to 1, register the specified NC program after deleting all NC programs in the memory of CNC.
2 If you use the buffer mode (See "2.10 BUFFER MODE"), this function runs as it is the buffer mode. Therefore, the Data Server software understands the specified O-number as the list of files and gets divided NC programs from the Host Computer. So, you must not use this function on the buffer mode.

NOTE

1 You must set “14” on the NC parameter of I/O Channel (No.0020) in order to use this function.
2 You can not execute this function together with “2.4 CALLING A SUBPROGRAM WITH M198”, “2.6 OUTPUTTING A NC PROGRAM” or “2.7 DNC OPERATION”.
3 You can execute this function under background operation. In this case, you must set the NC parameter No.0022 to 14. Please refer to the CNC’s manual in detail.

2.6 OUTPUTTING A NC PROGRAM

You can output a NC program in the memory of CNC to the HDD.

Procedure

(1) Change the mode of the CNC into "EDIT" mode (in case of foreground operation).
(2) Press the function menu key in order to change the softkeys into the function selection keys.
(3) If "PROGRAM(MEMORY)" screen is not displayed, press the softkey [PROGRAM] several times until this screen is displayed.
(4) Press the operation menu key in order to change the softkeys into the operation selection keys.
(5) Press the softkey [PUNCH].
(6) Press the softkey [(PROG#)] and input an O-number of the NC program that you will output from the memory of CNC to the HDD.
(7) Press the softkey [EXEC].
(8) The blinking "PNCH" is displayed on the right and low of the screen when outputting a NC program.

NOTE
1 You must set "14" on the NC parameter of I/O Channel (No.0021) in order to use this function.
2 You can not execute this function together with "2.4 CALLING A SUBPROGRAM WITH M198", "2.5 REGISTERING A NC PROGRAM" or "2.7 DNC OPERATION".
3 You can execute this function under background operation. In this case, you must set the NC parameter No.0023 to 14. Please refer to the CNC's manual in detail.
4 If you specify the NC program that already exists in the HDD, an error occurs.
Please change O-number in the memory of CNC or delete a NC program from the HDD.

2.7 DNC OPERATION

You can drive the DNC operation by using the NC program in the HDD.

Procedure

(1)Change the mode of CNC into "TAPE" mode.

(1)Display the screen of "2.3.1 Display the table of NC programs".
And input an O-number of the NC program that you will use with the DNC operation and press the INPUT function key.

(2)So, the item "DNC FILE NAME" and the specified O-number are displayed on the right and high of the screen.

(3)Start driving the DNC operation with the cycle start switch.

```
DATA SERVER HD DIRECTORY  O0001  N00010
        DNC FILE NAME       :      O0001
        REGISTERED PROGRAMS :        123
        FREE DISK AREA      :   45678901
FILE NAME           COMMENT
O0001         (SHAFT  XSF001 PROGRAM001   )
~                                         ~
O3200         (GEAR XGR 002 - SUBPROGRAM )
O3300         (SHAFT  XSF012 SAMPLE       )
                                LOCK : OFF

TAPE*** STOP **** *** *** 12:34:56   ***
  LOCK  GETFILE PUTFILE SRHFILE CHAPTER  +
```

NOTE

1 You must set "14" on the NC parameter of I/O Channel (No.0022) in order to use this function.

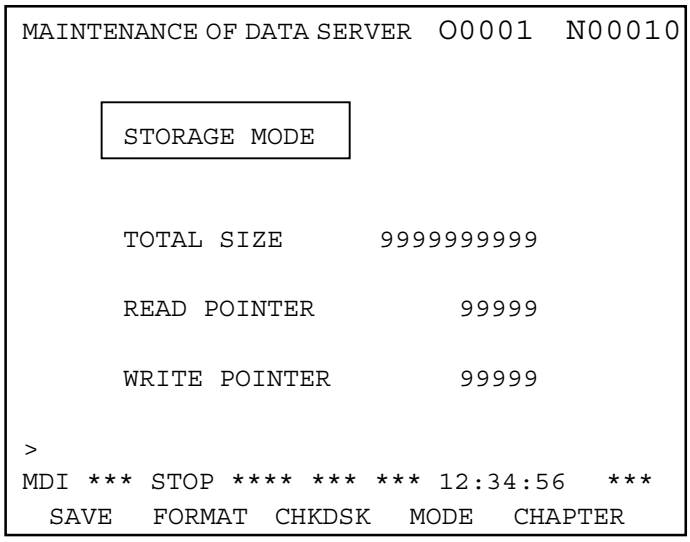
2 You can not execute this function together with "2.4 CALLING A SUBPROGRAM WITH M198", "2.5 REGISTERING A NC PROGRAM" or "2.6 OUTPUTTING A NC PROGRAM".

2.8 MAINTENANCE OF THE BUILT-IN HARD DISK

You can maintain or set the HDD by using this screen.

Procedure

(1)Press the function menu key in order to change the softkeys into the function selection keys.
(2)If "MAINTENANCE OF DATA SERVER" screen is not displayed, press the softkey [SERVICE] several times until this screen is displayed.
(3)Press the operation menu key in order to change the softkeys into the operation selection keys.
(4)You can execute maintenance services by pressing the softkey.



[Reference]

Each item means as follows.
These items are used when transferring a NC program from Data Server to the CNC. Therefore, other services are not related to these.

(A) TOTAL SIZE
This item shows the total byte size of one NC program, when transfer a NC program from the Data Server to the CNC.

(B) READ POINTER

(C) WRITE POINTER
These items show the inside pointer for management of the data buffer.

2.8.1 Checking the built-in hard disk

Check whether there is the abnormal sector in the HDD.

Procedure

(1)Press the softkey [CHKDSK].
(2)Press the softkey [EXEC].
(3)The blinking “CHEK” is displayed on the low of the screen when checking the HDD.
(4)The result is displayed.
When nomally : “CHECK DISK : NORMAL”
When abnormally : “CHECK DISK : ABNORMAL”
is displayed.

CAUTION
If the result is “ABNORMAL”, confirm the cause of error by referring to the section “2.11 ERROR MESSAGE”.
Then, backup the NC programs as soon as possible to the Host Computer and operate the next section “2.8.2 Formatting the built-in hard disk”.

2.8.2 Formatting the built-in hard disk

Initialize the built-in hard disk.

Procedure

(1)Press the softkey [FORMAT].
(2)Press the softkey [EXEC].
(3)The message “HARD DISK FORMAT?” is displayed on the screen, press the softkey [EXEC] again.
(4)The blinking “FRMT” is displayed on the low of the screen when initializing the HDD.

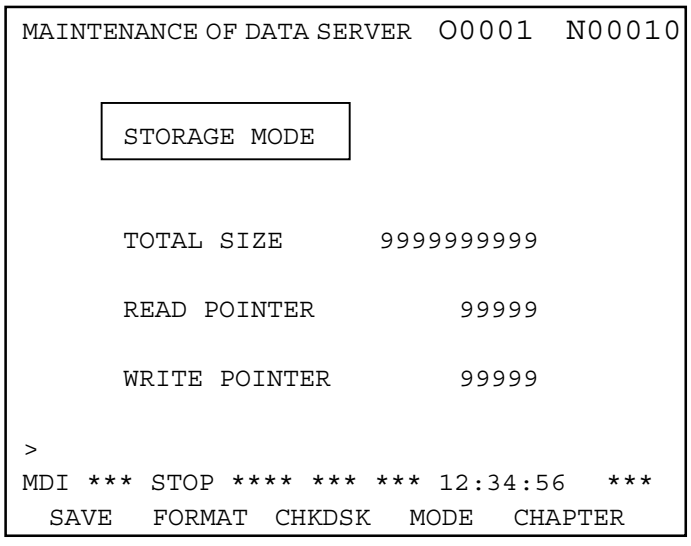
NOTE
These maintenance functions can’t be operated together with other functions.

2.9 MAINTENANCE OF DATA SERVER

If the trouble occurs at the Data Server function, the contents of COMMON RAM for the interface between CNC and Data Server can be saved into a file in order to examine it.
This file is transferred to the Host Computer by using "2.3.5 Putting a NC program" and the inside status of the Data Server is checked by this file.

Procedure

(1)Press the function menu key in order to change the softkeys into the function selection keys.
(2)If "MAINTENANCE OF DATA SERVER" screen is not displayed, press the softkey [SERVICE] several times until this screen is displayed.
(3)Press the operation menu key in order to change the softkeys into the operation selection keys.
(4)Press the softkey [SAVE].
(5)Press the softkey [EXEC], so that the contents of COMMON RAM are saved into the file as "COMMON.RAM".
(6)The blinking "SAVE" is displayed on the low of the screen when saving.



About meaning of each item, refer to the section "2.8 MAINTENANCE OF THE BUILT-IN HARD DISK".

NOTE

The contents of this file are binary codes.

So, after transferring this file to the Host Computer by using “2.3.5 Putting a NC program” function, when transferring this file from the Host Computer to the other computer again, please transfer it on the binary mode.

If you transfer it on the text mode, the contents of this file may be broken.

2.10 BUFFER MODE (OPTIONAL FUNCTION)

The software of the Data Server can operate on the STORAGE mode or the BUFFER mode. The software on the storage mode can do the services mentioned in the previous sections, but can't control a larger NC program than the size of the built-in hard disk.

The buffer mode is used to control a larger NC program than the size of the built-in hard disk. On this buffer mode, the built-in hard disk is divided into two areas(area A, areaB) virtually. A part of a NC program in one area of the built-in hard disk is supplied to the CNC and a continuous part of the NC program is got into another area in the built-in hard disk by using FTP at the same time. A larger NC program than the size of the built-in hard disk can be controlled by repeating the above operation.

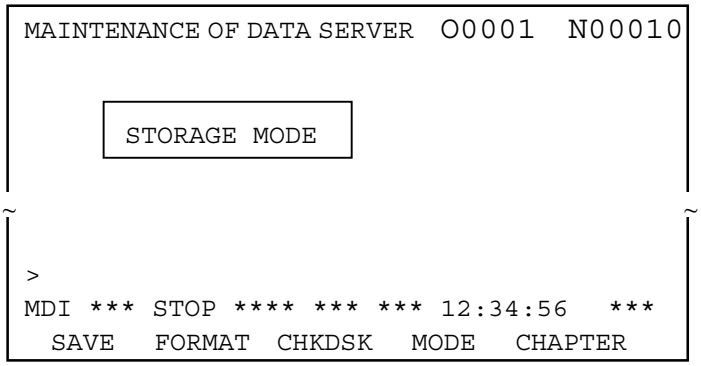
But you must divide a larger NC program than the size of the built-in hard disk into some files with about 35MB in the Host Computer in advance. Now, there are some kinds of built-in hard disk, but we recommend that the divided size is about 35MB. Because you can divide the NC program into the size larger than 35MB, but if so, more time is necessary to get the first file from the Host Computer.

2.10.1 How to change the mode

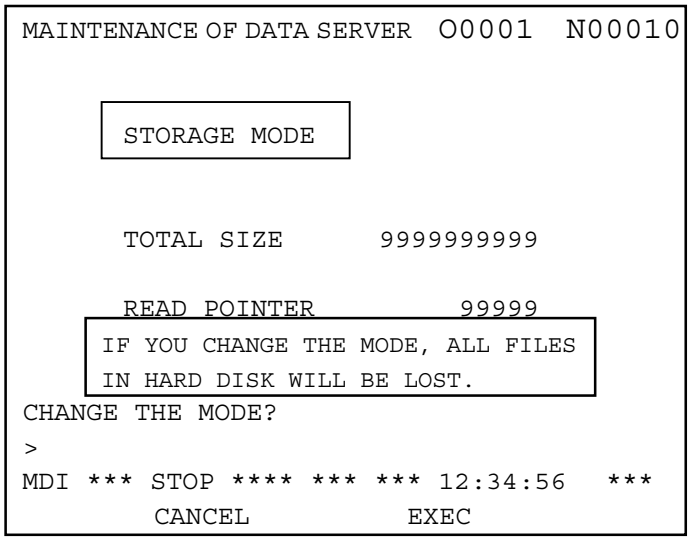
When using the buffer mode, it is necessary to change the mode from the storage mode to the buffer mode.

Procedure

(1)Press the function menu key in order to change the softkeys into the function selection keys.
(2)If "MAINTENANCE OF DATA SERVER" screen is not displayed, press the softkey [SERVICE] several times until this screen is displayed.
(3)Press the operation menu key in order to change the softkeys into the operation selection keys.
(4)Press the softkey [MODE].
(explain the example to change the mode from the storage mode to the buffer mode as follows)

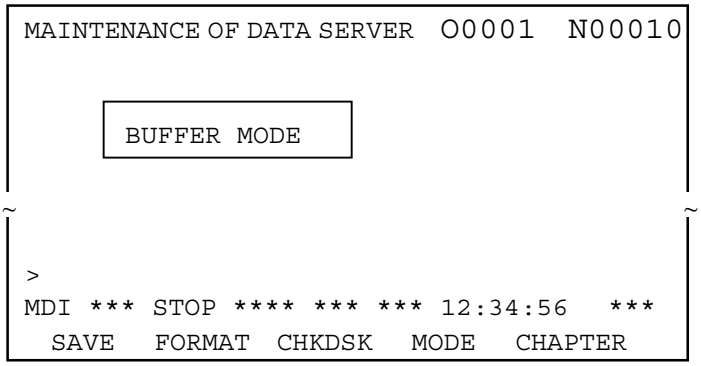


(5)Press the softkey [EXEC].
(6)The message "CHANGE THE MODE ?" is displayed on the low of the screen. If you will change the mode, press the softkey [EXEC] again.



(7)The blinking “MODE” is displayed on the low of the screen when changing the mode.

(8)The mode on the left and high of the screen is changed after changing the mode.



CAUTION

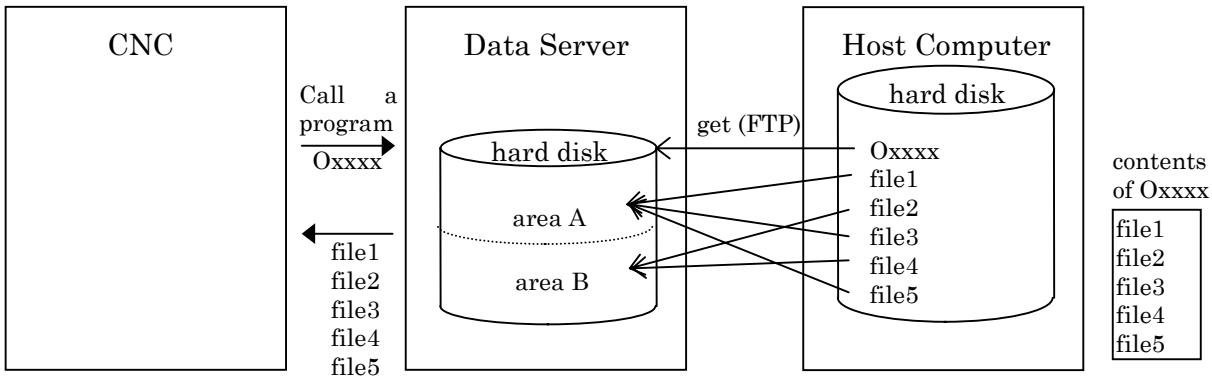
1 If you change the mode, all NC programs in the HDD will be lost.
2 Even if you turn off the power, the mode is kept. Therefore, if you turn off the CNC on the buffer mode and then turn on the CNC, the Data Server runs on the buffer mode.

NOTE

1 When using this function, the software option is necessary. In case that this software option is not set, the above softkey [MODE] is not displayed.
2 On the buffer mode, if you are operating neither “Calling a subprogram with M198” nor “DNC operation”, you can operate “Outputting a NC program”.
But in case that you create a new file into the HDD by using “Outputting a NC program”, when you operate “Calling a subprogram with M198”, you must care about the size of the divided files. Because the remainder of the HDD is decreased by the new files.
If you can’t operate on the buffer mode because of the shortage of the HDD’s remainder, please delete the new files with “2.3.3 Deleting NC programs”.

2.10.2 How to use the buffer mode

The buffer mode is used to control a larger NC program than the size of the built-in hard disk. On this buffer mode, you can operate "2.4 CALLING A SUBPROGRAM WITH M198" and "2.7 DNC OPERATION".
The operation on the screen is the same as the one on the storage mode.
On this buffer mode, Oxxxx file called by "2.4 CALLING A SUBPROGRAM WITH M198" or "2.7 DNC OPERATION" is a list of files. It consists of the file names arranged in calling order. The software of the Data Server gets a NC program from the Host Computer according to this list of files and supplies the NC program into the CNC.



The files (from file1 to file5) specified in the list of files are got in the built-in hard disk by using FTP and supplied to the CNC. In case of the buffer mode, after the CNC calls the NC program(Oxxxx) to the Data Server, the Data Server gets the specified list of files and then gets the first NC program from the Host Computer. So, it takes a few moment for the Data Server to supply the data to the CNC.
The Data Server supplies the part of the NC program in one area and gets the next part into another area by using FTP at the same time. So, you must divide the original NC program into about 35MB(from 32MB to 38MB, the last part of the NC program is any size less than 38MB) evenly in advance.
When the Data Server finishes supplying the part of the NC program of one area, if the continuous part is got into another area by the "GET" command of FTP, the request ends abnormally because it is impossible to supply the continuous part to the CNC. About the file name, the list of files must be named as Oxxxx (xxxx : the integer of four digits that expresses the O-number). But the file name in the

list of files is anything (the length of the file name must be less than 255 letters, and the file name must be available for the Host Computer). The Data Server operates only in the directory specified at “HOST DIRECTORY” of “2.2 SETTING SCREEN”.
LF (hexadecimal : 0A) or CR (hexadecimal : 0D) must be added to the end of each file name in the list of files.

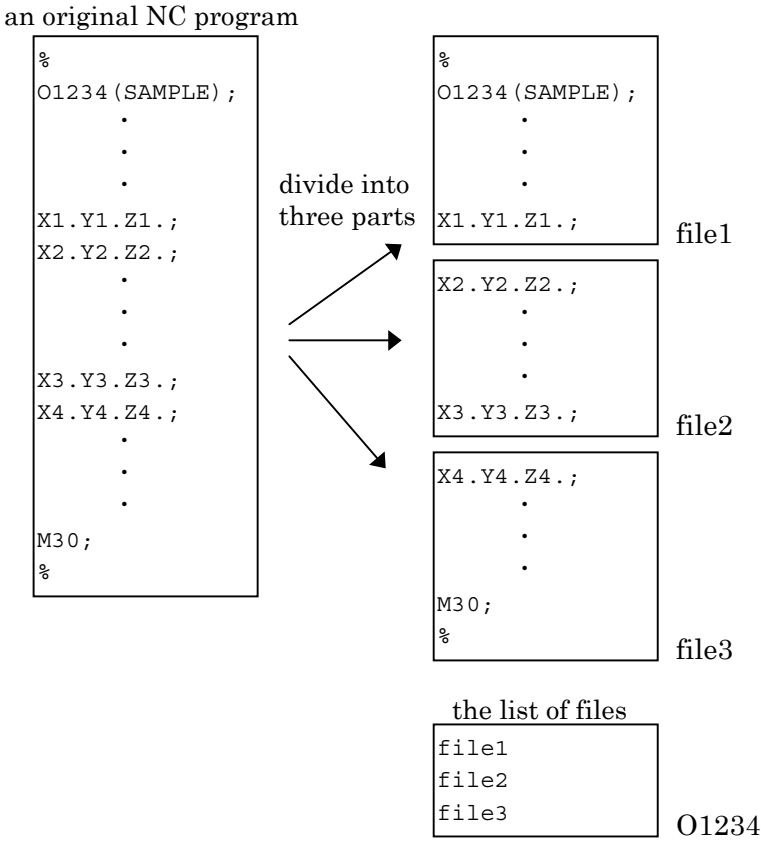
NOTE

If you use the Data Server with 256MB HDD or 810MB HDD, you can divide the original NC program into about 120MB or 400MB theoretically. But if the divided size is large, the time for reading the NC program from the Host Computer and transmitting the NC program to the CNC becomes larger. Therefore, we recommend that you divide the original NC program into about 35MB.

2.10.3 How to divide a large NC program

If you will operate the Data Server on the buffer mode, you must divide a large NC program into some files with about 35MB in the Host Computer and create a file that consists of the file name of the divided files in advance as follows.

Example)
In case that a large NC program is divided into three parts without separating one block

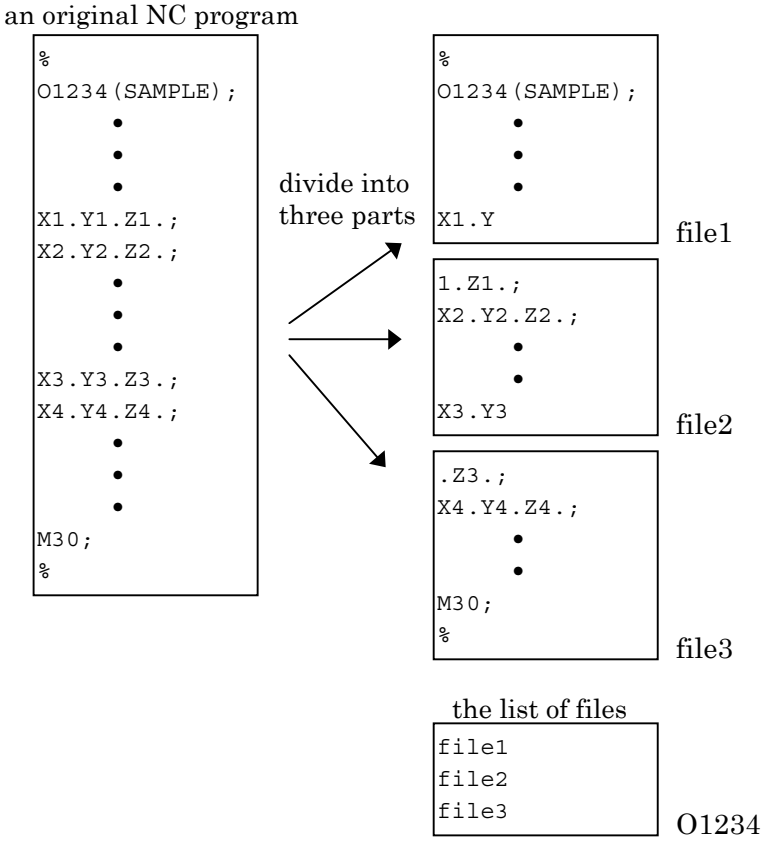


An original NC program is divided into three parts like the above. And all the divided files are specified in the file as O1234 in order.

NOTE
In case of the above example, a NC program is divided without separating one block. But it is possible that a NC program is divided with separating one block, provided that you don't add the unnecessary letter after the bottom of each file.

Example)

In case that a large NC program is divided into three parts with separating one block



WARNING

In case of the above division, you must not add the unnecessary letter as “CR”, “LF”, “EOF”(End Of File) and so on, after the bottom of each file.

If the unnecessary letter is added, the CNC may run unexpectly when this NC program is running.

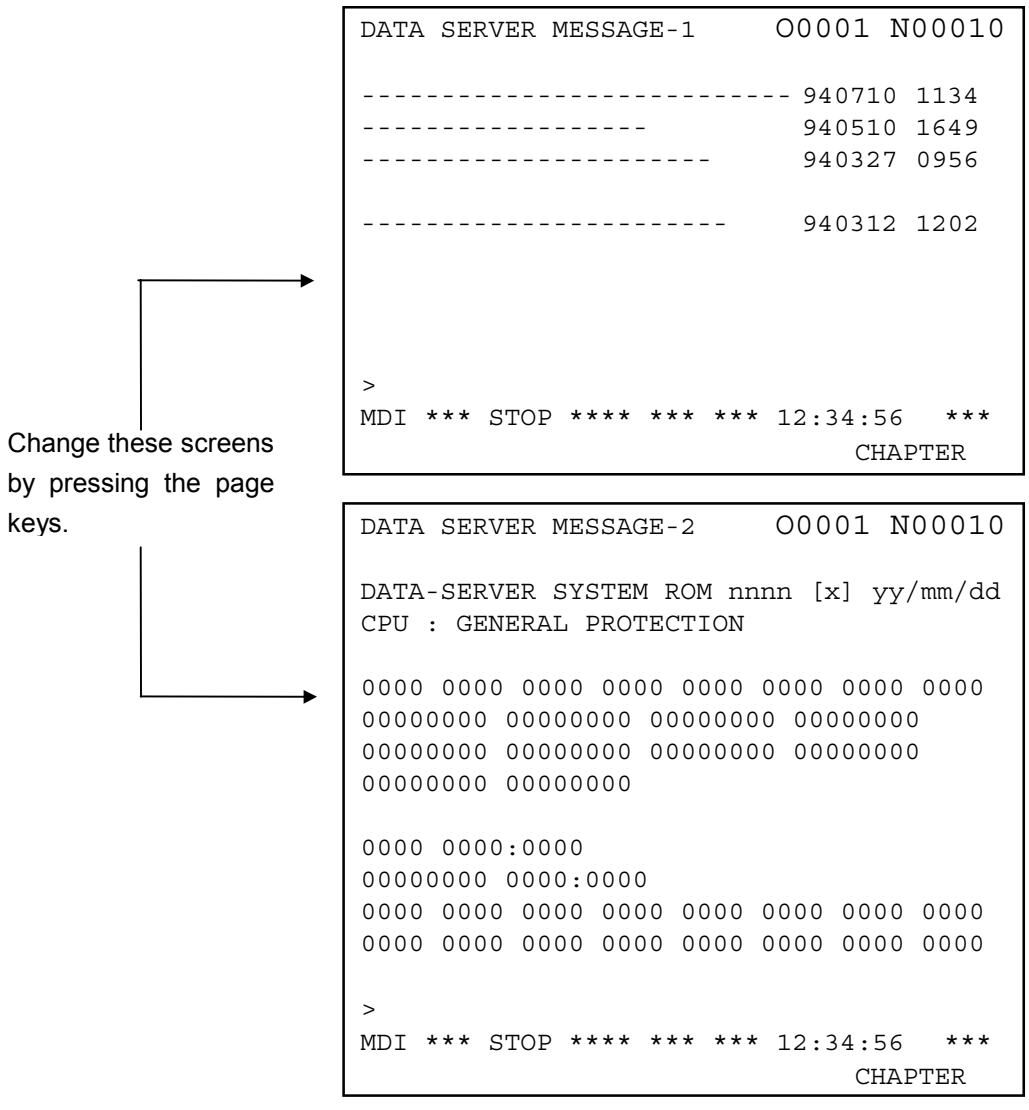
2.11 ERROR MESSAGE

If an error occurs in the Data Server function, the error description is displayed on the following error message screen for the Data Server function. So, if an error occurs, see this screen and confirm the description.

Procedure

(1)Press the function menu key in order to change the softkeys into the function selection keys.

(2)If "DATA SERVER MESSAGE-1" screen is not displayed, press the softkey [MESSAGE] several times until this screen is displayed.
The last error message is shown at the top of screen.



The detail error information is displayed on the “DATA SERVER MESSAGE-1” screen. And the time stamp is displayed on the right side of the error message.
The time stamp is shown as the format “yymmdd hhMM”(year is ”yy”, month is ”mm”, day is ”dd”, hour is “hh” and minute is “MM”).
When the serious error occurs on the software of the Data Server, the inside status (Ex. value of the registers) of the Data Server’s software is shown on the “DATA SERVER MESSAGE-2” screen. Usually, no data are shown on this screen.

NOTE
1 Refer to “APPENDIX A. TABLE OF ERROR MESSAGES” and “APPENDIX B. SERIOUS ERROR” in detail.
2 If the information is shown on the “DATA SERVER MESSAGE-2” screen, the Data Server’s software can’t run continuously. It is necessary to turn off the power.

2.12 PARAMETERS

The NC parameters related to the Data Server fucntions are the follows.

Parameters

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

[Data Format] Bit Type

DNC In DNC operation with the Data Server

0: High-speed distribution is enable, if the conditions for high-speed distribution are satisfied.

1: High-speed distribution is not enable, so normal distribution is always performed.

0020 **I/O CHANNEL：Input device interface number for foreground**

[Data Format] Byte Type

[Data] 14 (Select the Data Server to the input device)

0021 **I/O CHANNEL：Output device interface number for foreground**

[Data Format] Byte Type

[Data] 14 (Select the Data Server to the output device)

0022 **I/O CHANNEL：Input device interface number for background**

[Data Format] Byte Type

[Data] 14 (Select the Data Server to the input device)

0023 **I/O CHANNEL：Output device interface number for background**

[Data Format] Byte Type

[Data] 14 (Select the Data Server to the output device)

5028 **the substitutional letter (Group 1)**

[Data Format] Word Type

[Data] ASCII code (decimal number)

5029 **the letter that can't be inputted from the MDI keys (Group 1)**

[Data Format] Word Type

[Data] ASCII code (decimal number)

5030 **the substitutional letter (Group 2)**

[Data Format] Word Type

[Data] ASCII code (decimal number)

5031	the letter that can't be inputted from the MDI keys (Group 2)

[Data Format] Word Type

[Data] ASCII code (decimal number)

5032	the substitutional letter (Group 3)

[Data Format] Word Type

[Data] ASCII code (decimal number)

5033	the letter that can't be inputted from the MDI keys (Group 3)

[Data Format] Word Type

[Data] ASCII code (decimal number)

The above NC parameters from No.5028 to No.5033 are used in order to substitute the letter that can be inputted from the MDI keys for the letter that can't be inputted from the MDI keys, when you set the HOST DIRECTORY at the "DATA SERVER SETTING-1" screen.
There are three pairs. One pair is No.5028 and No.5029, the other is No.5030 and No.5031, the last is No.5032 and No.5033.
And the last pair , No.5032 and No.5033, is used for setting not only the HOST DIRECTORY but also the file name that is transferred between the Host Computer and the Data Server.

Example)

If you wish to set "C:¥DTSVR¥NC_PROG" to the HOST DIRECTORY, you can't input "¥", ":" and "_" from the MDI keys. So, you may substitute "@" for ":", "/" for "¥" and "-" for "_".

In this case, you set the NC parameters as follows.

No.5028 64 (ASCII code of "@", decimal number)
No.5029 58 (ASCII code of ":", decimal number)
No.5030 47 (ASCII code of "/", decimal number)
No.5031 92 (ASCII code of "¥", decimal number)
No.5032 45 (ASCII code of "-", decimal number)
No.5033 95 (ASCII code of "_", decimal number)

Afterward, set "C@/DTSVR/NC-PROG" in the HOST DIRECTORY on the "DATA SERVER SETTING-1" screen and press the softkey [SET].
Then the Data Server's software changes it into "C:¥DTSVR¥NC_PROG" and saves the changed string.

When you want to get “nc_file1” file in the Host Computer into the HDD as named “O1234” by using “GET” command of FTP, you specify “O1234,nc-file1”.
In this case, the Data Server’s software changes “nc-file1” into “nc_file1” and get “nc_file1” from the Host Computer to the HDD.

NOTE

1 If the both NC parameters No.5028 and No.5029 are equal to 0, then the NC parameters are considered to be set as follows.
  No.5028 = 32 (space)
  No.5029 = 92 (“¥”)
2 If the both NC parameters No.5030 and No.5031 are equal to 0, then the NC parameters are considered to be set as follows.
  No.5030 = 64 (“@”)
  No.5031 = 58 (“:”)
3 The NC parameters No.5032 and No.5033 don’t have default values.
4 In these three pairs, the smaller pair is available preferencially. That is to say, if the same value is set in No.5028, No.5030 and No.5032, the pair of No.5028 and No.5029 is available.
5 In case of displaying the “DATA SERVER SETTING” screen, the Data Server’s software exchanges the letters in reverse and displays the setting data.

2.13 ALARMS

The system alarms related to the Data Server fucntions are shown below.

Number	Message displayed on CRT	Contents
SR910	DATA SERVER SERIOUS ERROR	In the Data Server, the serious error occurred. It is necessary to turn off and on the power.
SR911	DATA SERVER APPLICATION ERROR	In the Data Server, the application error occurred. Investigate the cause of this error, and execute a correct operation.

CAUTION

If the above alarm is displayed, please confirm the description in “2.11 ERROR MESSAGE” and remove the error.

APPENDIX

A TABLE OF ERROR MESSAGES

In this appendix A, the contents of error messages that are displayed in the "DATA SERVER MESSAGE-1" screen are explained in detail.
These error messages are common for all CNCs.
Some messages may be displayed for one service.

These error messages are classified by three letters at the top of message. Refer to the following.

[LCL] : Internal service when turning on the power
[FCB] : Internal service when turning on the power
[MNT] : Internal service when turning on the power
[DWN] : Download (Calling a subprogram with M198, DNC operation, and Registering a NC program)
[UP] : Upload (Outputting a NC program)
[BUF] : Download on the buffer mode
[MOD] : Changing the mode
[GET] : Getting a NC program
[PUT] : Putting a NC program
[DEL] : Deleting NC programs
[DIR] : Displaying the table of NC programs, Searching a NC program
[RST] : Displaying the setting data
[WST] : Setting the setting data
[FMT] : Formatting the built-in hard disk
[CHK] : Checking the built-in hard disk
[LGT] : List-Getting NC programs
[LPT] : List-Putting NC programs
[LDE] : List-Deleting NC programs

All error messages are not described in this appendix A.
So, the other message may be displayed in the "DATA SERVER MESSAGE-1" screen.

ERROR MESSAGES WHEN TURNING ON THE POWER

[LCL] INVALID MAC ADDRESS(xxxxxxxxxxxx)

The specified MAC address (xxxxxxxxxxxx) is unavailable. Input the 12 alphanumerical letters printed as the “ADR”at the seal on the Data Server board. Then turn off and on the power.
When you turn on the power for the first time and the setting data are not set, this error message is displayed, too.

[LCL] OPEN (/tmp/ncprog.tmp) ERROR(ddd)

Fail to open the file for managing NC programs in the HDD. The error code is (ddd).
When you turn on the power for the first time and the HDD is not formatted, this error message may be displayed. Please format the HDD.

[LCL] OPEN (/tmp/setting.tbl) ERROR(ddd)

Fail to open the file which the setting data are saved in. The error code is (ddd).
When you turn on the power for the first time and the setting data are not set, this error message may be displayed. Please set the setting data.

[LCL] SETUP FTP ERROR(ddd)

Fail to setup the FTP function. The error code is (ddd).
Please confirm whether the setting data are correct.

[LCL] CHANGE DIRECTORY ERROR
[FCB] CHANGE DIRECTORY ERROR
[MNT] CHANGE DIRECTORY ERROR

Fail to change the local directory.
Please confirm whether there is abnormal sector in the HDD by checking the HDD.
If there is abnormal sector, please format the HDD.

[MNT] CREATE DIRECTORY(xxxxx) ERROR

Fail to create the directory(xxxxx). Please format the HDD.

[MNT] CREATE (/tmp/common.ram) ERROR(0)

When turning on the power, fail to create the reserved file.
When you turn on the power for the first time and the HDD is not formatted, this error message may be displayed. Please format the HDD.

ERROR MESSAGES FOR DOWNLOAD

[DWN] (Oxxxx) IS IN USE

The specified NC program (Oxxxx) is in use by other service. Retry after other service will finish.

[DWN] (Oxxxx) DOESN’T EXIST

The specified NC program doesn't exist in the HDD.
Please confirm that the NC program exists in the HDD by using "Searching a NC program".

[DWN] HDD IS IN USE
The HDD is in use by other service.
Retry after other service will finish.

ERROR MESSAGES FOR DOWNLOAD ON THE BUFFER MODE

[BUF] OPERATING ON THE BUFFER MODE
When the CNC is processing the work on the buffer mode, you would operate the NC program management functions. You can't operate the NC program management functions when the CNC is processing the work. Therefore, retry after the CNC will finish processing it.

[BUF] LOCAL REQUEST IS BUSY
The NC program management function is in use by other service, so that the CNC can't run on the buffer mode.
Retry after other service will finish.

[BUF] GET FILE LIST ERROR
In case of the buffer mode, fail to get the list of files.
Please confirm that the Data Server can communicate with the Host Computer correctly or that the specified file is registered in the Host Computer.

[BUF] FTP IS BUSY
In case of the buffer mode, when it was finished to transfer a part of the NC program in one area, the continuous part wasn't got into another area by the "GET" command of the FTP yet.
Please confirm the size of the divided files.

ERROR MESSAGES FOR UPLOAD

[UP] (Oxxxx) IS IN USE
The specified NC program (Oxxxx) is in use by other service.
Retry after other service will finish.

[UP] (Oxxxx) EXISTS
The specified NC program (Oxxxx) already exists in the HDD.
Retry after deleting the NC program from the HDD.

[UP] HDD IS IN USE
The HDD is in use by other service.
Retry after other service will finish.

[UP] CREATE (/tmp/ncprog.tmp) ERROR(0)
Fail to create the file for managing NC programs in the HDD.
Please confirm the remained area of the HDD.

ERROR MESSAGES FOR CHANGING THE MODE

[MOD] CHANGE MODE ERROR
Fail to change the mode. Please check the HDD and confirm whether the HDD is available.

[MOD] HDD IS IN USE The HDD is in use by other service.
Retry after other service will finish.

ERROR MESSAGES FOR GETTING A NC PROGRAM

[GET] FTP IS NOT READY It is not ready for using the FTP.
Confirm the setting data and then turn off and on the power.
If the setting data is not set correctly, the Data Server can't communicate with the Host Computer.

[GET] (Oxxxx) IS IN USE The specified NC program (Oxxxx) is in use by other service.
Retry after other service will finish.

[GET] (Oxxxx) EXISTS The specified NC program (Oxxxx) already exists in the HDD.
Retry after deleting the NC program from the HDD.

[GET] CREATE (/tmp/ncprog.tmp) ERROR(0)
Fail to create the file for managing NC programs in the HDD.
Please confirm the remained area of the HDD.

[GET] FTP ERROR(ddd) An error occurs when executing the "GET" command of the FTP. The error code is (ddd).
When this error occurs, other error message is displayed. So, investigate other error message.

[GET] ftp: connect: Connection timed out
There is no response of the Host Computer from "GET" command of the Data Server.
Check the connection of the Ethernet cable and the setting data.

[GET] ftp: connect: No route to host
Check the IP address and MASK address in the setting data.
In case that the Network address part of the Host Computer's IP Address is different from the Data Server's one, this error occurs.

[GET] ddd : xxxxxxxxxxxxxxxxxxxxx
An error occurs in the Host Computer when executing the "GET" command of the FTP. This error message is sent from the Host Computer mainly.
The error code is "ddd" and the error message is "xxxxxxxx".
The error message depends on the Host Computer. And when displaying this error message, display the command too.
Retry after removing the causes of this error by referring to the manual for the Host Computer.
Show the meaning of the principal errors as follows.

Error Code : Meaning
450 : The specified file is in use by other process in the Host Computer.
Confirm whether the specified file is used by

other process.

530 : Fail to login to the Host Computer.
Check “USER NAME” and “PASSWORD” in the setting data.

550(553) : The specified directory or file is not found in the Host Computer.
Check “HOST DIRECTORY” in the setting data and the specified file name.

ERROR MESSAGES FOR PUTTING A NC PROGRAM

[PUT] FTP IS NOT READY
It is not ready for using the FTP.
Confirm the setting data and then turn off and on the power.
If the setting data is not set correctly, the Data Server can’t communicate with the Host Computer.

[PUT] (Oxxxx) IS IN USE
The specified NC program (Oxxxx) is in use by other service.
Retry after other service will finish.

[PUT] (Oxxxx) DOESN’T EXIST
The specified NC program doesn’t exist in the HDD.
Please confirm that the NC program exists in the HDD by using “Searching a NC program”.

[PUT] FTP ERROR(ddd)
An error occurs when executing the “GET” command of the FTP. The error code is (ddd).
When this error occurs, other error message is displayed. So, investigate other error message.

[PUT] ftp: connect: Connection timed out
There is no response of the Host Computer from “PUT” command of the Data Server.
Check the connection of the Ethernet cable and the setting data.

[PUT] ftp: connect: No route to host
Check the IP address and MASK address in the setting data.
In case that the Network address part of the Host Computer’s IP Address is different from the Data Server’s one, this error occurs.

[PUT] ddd : xxxxxxxxxxxxxxxxxxxx
An error occurs in the Host Computer when executing the “PUT” command of the FTP. This error message is sent from the Host Computer mainly.
The error code is “ddd” and the error message is “xxxxxxxx”.
The error message depends on the Host Computer. And when displaying this error message, display the command too.
Retry after removing the causes of this error by referring to the manual for the Host Computer.
Refer to “ERROR MESSAGES FOR GETTING A NC

PROGRAM" about the error message.

ERROR MESSAGES FOR DELETING NC PROGRAMS

[DEL] (Oxxxx) IS IN USE
The specified NC program (Oxxxx) is in use by other service.
Retry after other service will finish.

[DEL] (Oxxxx) IS NOT FOUND(ddd)
The specified NC program (Oxxxx) doesn't exist in the HDD.
The error code is (ddd).
Please confirm that the NC program exists in the HDD by using "Searching a NC program".

ERROR MESSAGES FOR LIST-GETTING NC PROGRAMS

[LGT] FTP IS NOT READY
It is not ready for using the FTP.
Confirm the setting data and then turn off and on the power.
If the setting data is not set correctly, the Data Server can't communicate with the Host Computer.

[LGT] (Oxxxx) IS IN USE
The specified NC program (Oxxxx) is in use by other service.
Retry after other service will finish.

[LGT] (Oxxxx) EXISTS
The specified NC program (Oxxxx) already exists in the HDD.
Retry after deleting the NC program from the HDD.

[LGT] LIST FORMAT ERROR
There is a mistake in the contents of the List-File.
Check the contents of the List-File.

[LGT] INVALID LIST FOUND(xxxxx)
The unrecognized list (xxxxx) is found.
Check the contents of the List-File.

[LGT] SAME FILE FOUND(Oxxxx)
The same NC program is found in the List-File.
You can't specify the same NC program repeatedly.

[LGT] CREATE (/tmp/ncprog.tmp) ERROR(0)
Fail to create the file for managing NC programs in the HDD.
Please confirm the remained area of the HDD.

[LGT] FTP ERROR(ddd)
An error occurs when executing the "GET" command of the FTP. The error code is (ddd).
When this error occurs, other error message is displayed. So, investigate other error message.

[LGT] ftp: connect: Connection timed out
There is no response of the Host Computer from "GET" command of the Data Server.
Check the connection of the Ethernet cable and the setting data.

[LGT] ftp: connect: No route to host
Check the IP address and MASK address in the setting data.

In case that the Network address part of the Host Computer's IP Address is different from the Data Server's one, this error occurs.

[LGT] ddd : xxxxxxxxxxxxxxxxxxxxx

An error occurs in the Host Computer when executing the "List-Get" service. This error message is sent from the Host Computer mainly.
The error code is "ddd" and the error message is "xxxxxxxx".
The error message depends on the Host Computer. And when displaying this error message, display the command too.
Retry after removing the causes of this error by referring to the manual for the Host Computer.
Refer to "ERROR MESSAGES FOR GETTING A NC PROGRAM" about the error message.

ERROR MESSAGE FOR LIST-PUTTING NC PROGRAMS

[LPT] FTP IS NOT READY — It is not ready for using the FTP.
Confirm the setting data and then turn off and on the power.
If the setting data is not set correctly, the Data Server can't communicate with the Host Computer.

[LPT] (Oxxxx) IS IN USE — The specified NC program (Oxxxx) is in use by other service.
Retry after other service will finish.

[LPT] (Oxxxx) DOESN'T EXIST

The specified NC program doesn't exist in the HDD.
Please confirm that the NC program exists in the HDD by using "Searching a NC program".

[LPT] LIST FORMAT ERROR

There is a mistake in the contents of the List-File.
Check the contents of the List-File.

[LPT] INVALID LIST FOUND(xxxxx)

The unrecognized list (xxxxx) is found.
Check the contents of the List-File.

[LPT] SAME FILE FOUND(Oxxxx)

The same NC program is found in the List-File.
You can't specify the same NC program repeatedly.

[LPT] FTP ERROR(ddd) — An error occurs when executing the "PUT" command of the FTP. The error code is (ddd).
When this error occurs, other error message is displayed. So, investigate other error message.

[LPT] ftp: connect: Connection timed out

There is no response of the Host Computer from "PUT" command of the Data Server.
Check the connection of the Ethernet cable and the setting data.

[LPT] ftp: connect: No route to host

Check the IP address and MASK address in the setting data. In case that the Network address part of the Host Computer's IP Address is different from the Data Server's one, this error occurs.

[LPT] ddd : xxxxxxxxxxxxxxxxxxxx

An error occurs in the Host Computer when executing the "List-Put" service. This error message is sent from the Host Computer mainly.
The error code is "ddd" and the error message is "xxxxxxxx".
The error message depends on the Host Computer. And when displaying this error message, display the command too.
Retry after removing the causes of this error by referring to the manual for the Host Computer.
Refer to "ERROR MESSAGES FOR GETTING A NC PROGRAM" about the error message.

ERROR MESSAGES FOR LIST-DELETING NC PROGRAMS

[LDE] (Oxxxx) IS IN USE The specified NC program (Oxxxx) is in use by other service. Retry after other service will finish.

[LDE] (Oxxxx) IS NOT FOUND(ddd)

The specified NC program (Oxxxx) doesn't exist in the HDD.
The error code is (ddd).
Please confirm that the NC program exists in the HDD by using "Searching a NC program".

[LDE] LIST FORMAT ERROR

There is a mistake in the contents of the List-File.
Check the contents of the List-File.

[LDE] INVALID LIST FOUND(xxxxx)

The unrecognized list (xxxxx) is found.
Check the contents of the List-File.

[LDE] SAME FILE FOUND(Oxxxx)

The same NC program is found in the List-File.
You can't specify the same NC program repeatedly.

ERROR MESSAGES FOR DISPLAYING TABLE OF NC PROGRAMS

[DIR] HDD INFO. ERROR(ddd)

Fail to get the information of the HDD. The error code is (ddd).
Check the HDD and confirm whether there is a problem in the HDD.

[DIR] (Oxxxx) IS NOT FOUND

The NC program (Oxxxx) that is registered in the NC program management file doesn't exist in the HDD.

Please turn off and on the power in order to make this NC program management file again.

ERROR MESSAGES FOR DISPLAYING THE SETTING DATA

[RST] OPEN (/tmp/setting.tbl) ERROR(ddd)

Fail to open the file which the setting data have been saved in. The error code is (ddd).
Please set up the setting data correctly again.

ERROR MESSAGES FOR SAVING THE SETTING DATA

[WST] OPEN (/tmp/setting.tbl) ERROR(ddd)

Fail to open the file which the setting data are saved in. The error code is (ddd).
This message may be displayed when you turn on the power for the first time and you save the setting data without formatting the HDD.
Retry saving the setting data after formatting the HDD.

[WST] INVALID HOST-IP(xxxxxxxxxxxxxxx)

The specified IP address for the Host Computer is unavailable.
Confirm the specified IP address (xxxxxxxxxxxxxxx).

[WST] INVALID LOCAL-IP(xxxxxxxxxxxxxxx)

The specified IP address for the Data Server is unavailable.
Confirm the specified IP address (xxxxxxxxxxxxxxx).

[WST] INVALID MASK-ADDR(xxxxxxxxxxxxxxx)

The specified network mask address is unavailable.
Confirm the specified network mask address (xxxxxxxxxxxxxxx).

[WST] INVALID MAC ADDRESS(xxxxxxxxxxxxxxx)

The specified MAC address for the Data Server is unavailable.
Confirm that 12 alphanumerical letters printed as the “ADR” at the seal on the Data Server board are inputted correctly as the MAC address.

ERROR MESSAGES FOR FORMATTING THE HDD

[FMT] HDD IS IN USE The HDD is in use by other service.
Retry after other service will finish.

[FMT] FORMAT ERROR(ddd)

Fail to initiate the HDD. The error code is (ddd).
When this error message is displayed, it is necessary to change the HDD.

[FMT] OPEN (/tmp/setting.tbl) ERROR(ddd)

Fail to open the file which the setting data have been saved

in. The error code is (ddd).
This message may be displayed when formatting the HDD for the first time. But in this case, there is no problem.

ERROR MESSAGES FOR CHECKING THE HDD

[CHK] HDD IS IN USE
The HDD is in use by other service.
Retry after other service will finish.

[CHK] CHKDSK ERROR(ddd)
The error is found in the HDD by checking the HDD. The error code is (ddd).
If the error occurs, backup the NC programs as soon as possible to the Host Computer. And operate “Formatting the built-in hard disk”.

B SERIOUS ERROR

In this appendix B, the contents of error messages that are displayed in the “DATA SERVER MESSAGE-2” screen are explained in detail.
These error messages are common at all CNCs.
If the following error message is displayed in the “DATA SERVER MESSAGE-2” screen, the Data Server can’t work continuously. In this case, check the Data Server’s LEDs’ status and investigate the cause of the error at the section “3.2 Lighting of LEDs and meaning” of the chapter “II. MAINTENANCE”.

B.1 THE IMAGE OF SCREEN

The contents of screens are as follows.

(1) In case that error_address and stack_bump offset are 16bits

```
DATA-SERVER SYSTEM ROM nnnn [X] yy/mm/dd
CPU : GENERAL PROTECTION

0000 0000 0000 0000 0000 0000 0000 0000
00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000
00000000 00000000

0000 0000:0000
00000000 0000:0000
0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000
```

(2) In case that error_address and stack_bump offset are 32bits

```
DATA-SERVER SYSTEM ROM nnnn [X] yy/mm/dd
CPU : GENERAL PROTECTION

0000 0000 0000 0000 0000 0000 0000 0000
00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000
00000000 00000000

0000 0000:00000000
00000000 0000:00000000
0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000
```

B.2 THE CONTENTS OF SCREEN

Each line means as follows,

(1)1st line : Revision of the Data Server's firmware
nnnn : Series number of the Data Server's firmware
In case of Series 16/18-B/C, Series 15-B : 6535
In case of Series 16i/18i-A : 6537
is displayed.
[X] : Revision number of the Data Server's firmware
The Revision from A to Z is displayed.
yy/mm/dd : Created date is displayed.

(2)2nd line : Kind of the error
The serious error has "NMI error" and "CPU error".
"NMI error" occurs mainly for the hardware trouble. If it occurs, confirm the connection of modules and LEDs' status.
"CPU error" occurs mainly for the software trouble. If it occurs, contact FANUC.

The error messages are shown as follows.
NMI errors :
NMI : F-BUS BUS ERROR
NMI : SYSTEM EMERGENCY
NMI : REFRESH CYCLE ABORT
NMI : DRAM PARITY ERROR
NMI : SRAM PARITY ERROR
NMI : COMMON RAM PARITY ERROR
NMI : UNIDENTIFIED NMI

CPU errors :
CPU : GENERAL PROTECTION
CPU : INVALID OPCODE
CPU : STACK FAULT
CPU : DIVIDE ERROR
CPU : DEBUG EXCEPTION
CPU : BREAKPOINT
CPU : OVERFLOW
CPU : BOUND RANGE EXCEEDED
CPU : DOUBLE FAULT
CPU : COPROCESSOR SEGMENT OVERRUN
CPU : INVALID TSS
CPU : SEGMENT NOT PRESENT
CPU : PAGE FAULT
CPU : COPROCESSOR ERROR

(3)latter than 4th line : contents of registers

Show the contents of CPU's registers. The information is necessary to investigate the trouble. So, when you contact FANUC, please tell us these contents exactly.

C ETHERNET TECHNICAL TERMS

In this appendix C, the main Ethernet technical terms are explained briefly.
If you will study more, refer to the literature on the market.

TCP/IP

In the communication by using the Ethernet, TCP/IP (Transmission Control Protocol/Internet Protocol) is used usually. "Protocol" means the rule to connect between the communication devices. TCP/IP is a part of the following layer.

Layer	Protocols, Network Services
Application Layer	User Services as "FTP"
Transport Layer	Protocols as "TCP", "UDP"
Network Layer	Protocols as "IP", "ICMP"
DataLink Layer MAC Layer	Protocols as "ARP", "RARP"
Physical Layer	Hardware as cables, devices

Usually, "TCP/IP" protocol is a generic name including the protocols in Transport Layer and Network Layer.

IP ADDRESS (INET ADDRESS)

In TCP/IP, the address called "IP ADDRESS" is used in order to identify the communication devices in a network. So, in order to communicate by using TCP/IP, each device in a network must have a unique IP address.
Usually IP address is shown as a form separating 4 octets into each 1 octet by using "." (period). Each octet can have a value from 0 to 255.

IP address consists of the Network address part showing the network group and the Host address part showing the node. IP address can be classified into 3 classes.

	Value of top 1 octet	Network address part	Host address part
CLASS A	From 0 to 127	xxx.xxx.xxx.xxx	xxx.xxx.xxx.xxx
CLASS B	From 128 to 191	xxx.xxx.xxx.xxx	xxx.xxx.xxx.xxx
CLASS C	From 192 to 223	xxx.xxx.xxx.xxx	xxx.xxx.xxx.xxx

(The underline part is the each address part)

If your network has less than 255 nodes, CLASS C is used usually.
The IP address of the device connected in a network has a common Network address part and a unique Host address

part.
And you can't set that all octets are equal to 0 or 255 in the Network address part and the Host address part.

The IP address is managed worldwide. So, in order to use the IP address you must get the IP address from the international organization.

But if your network is a local closed network, you can manage the IP addresses in your responsibility.
And the IP address having the following Network address part can be used in a local closed network without permission from the international organization. So, if your network is a local closed network, we recommend that you use these IP addresses.

CLASS	Network address part
CLASS A	10
CLASS B	From 172.16 to 172.31
CLASS C	From 192.168.0 to 192.168.255

MASK ADDRESS

This is the mask value for showing the Network address part in the IP address.
In case of the CLASS A, you specify "255.0.0.0".
In case of the CLASS B, you specify "255.255.0.0".
In case of the CLASS C, you specify "255.255.255.0".

MAC ADDRESS (ETHERNET ADDRESS)

This address is used in order to distinguish the each devices in MAC Layer. The maker creating the communication control board gets the unique MAC address from the international organization.
In case of Data Server, we affix the seal printed as the "ADR" on the Data Server board. You must set this MAC address to the Data Server.

HEARTBEAT (SQE TEST) FUNCTION

In the standard of "Ethernet" or "IEEE802.3", when transmitting the data into the network, a node checks that other devices don't communicate in the network.
If the devices start transmitting the data simultaneously, the collision of the data occurs. The frequent collision makes the real transmission rate less.

Now, in the standard of “IEEE802.3”, a node checks to transmit the data normally. This function is called the “heartbeat” function.
The Data Server board is made according to the standard of “IEEE802.3”, so that this heartbeat function is supported. Therefore, if you connect a tranceiver without this heartbeat function, it may make the real transmission rate less because an error occurs at all times transmitting the data.
Then the tranceiver connecting with the Data Server board must support this heartbeat function.

SEGMENT

Originally, the extent which is connected by one medium(cable) physically is called as “segment”. But the meaning of the segment is changing for the 10BASE-T.
It is common opinion that the meaning of the segment is “the extent which is act the CSMA/CD function”.

CSMA FUNCTION (Carrier Sense Multiple Access)

To transmit, a station waits for a quite period on the medium(cable) (That is, no other station is transmitting) and the sends the intended message in bit-serial form.

CD FUNCTION (Collision Detect)

If after initiating a transmission, the message collides with that of another station, then each transmitting station intentionally sends a few additional bytes to ensure propagation of the collision throughout the system. The station remains silent for a random amount of time before attempting to transmit again.

D ASCII CODE

In this appendix D, the ascii code from 20h to 7Fh is described as follows.
The left side of the mark ":" means the ascii code character and the right side means the decimal code.
Set up the substitutional letters in the setting screen by referring to this ascii code.

	2	3	4	5	6	7
0	space : 032	0 : 048	@ : 064	P : 080	` : 096	p : 112
1	! : 033	1 : 049	A : 065	Q : 081	a : 097	q : 113
2	" : 034	2 : 050	B : 066	R : 082	b : 098	r : 114
3	# : 035	3 : 051	C : 067	S : 083	c : 099	s : 115
4	$: 036	4 : 052	D : 068	T : 084	d : 100	t : 116
5	% : 037	5 : 053	E : 069	U : 085	e : 101	u : 117
6	& : 038	6 : 054	F : 070	V : 086	f : 102	v : 118
7	' : 039	7 : 055	G : 071	W : 087	g : 103	w : 119
8	(: 040	8 : 056	H : 072	X : 088	h : 104	x : 120
9	) : 041	9 : 057	I : 073	Y : 089	i : 105	y : 121
A	* : 042	: : 058	J : 074	Z : 090	j : 106	z : 122
B	+ : 043	; : 059	K : 075	[: 091	k : 107	{ : 123
C	, : 044	< : 060	L : 076	¥ : 092	l : 108	| : 124
D	- : 045	= : 061	M : 077	] : 093	m : 109	} : 125
E	. : 046	> : 062	N : 078	^ : 094	n : 110	~ : 126
F	/ : 047	? : 063	O : 079	_ : 095	o : 111	DL: 127

(horizontal direction means higher 4 bits
and vertical direction means lower 4 bits)