PMi-A locator system
Setup procedure manual

V1.01 January 27, 2014 First Edition
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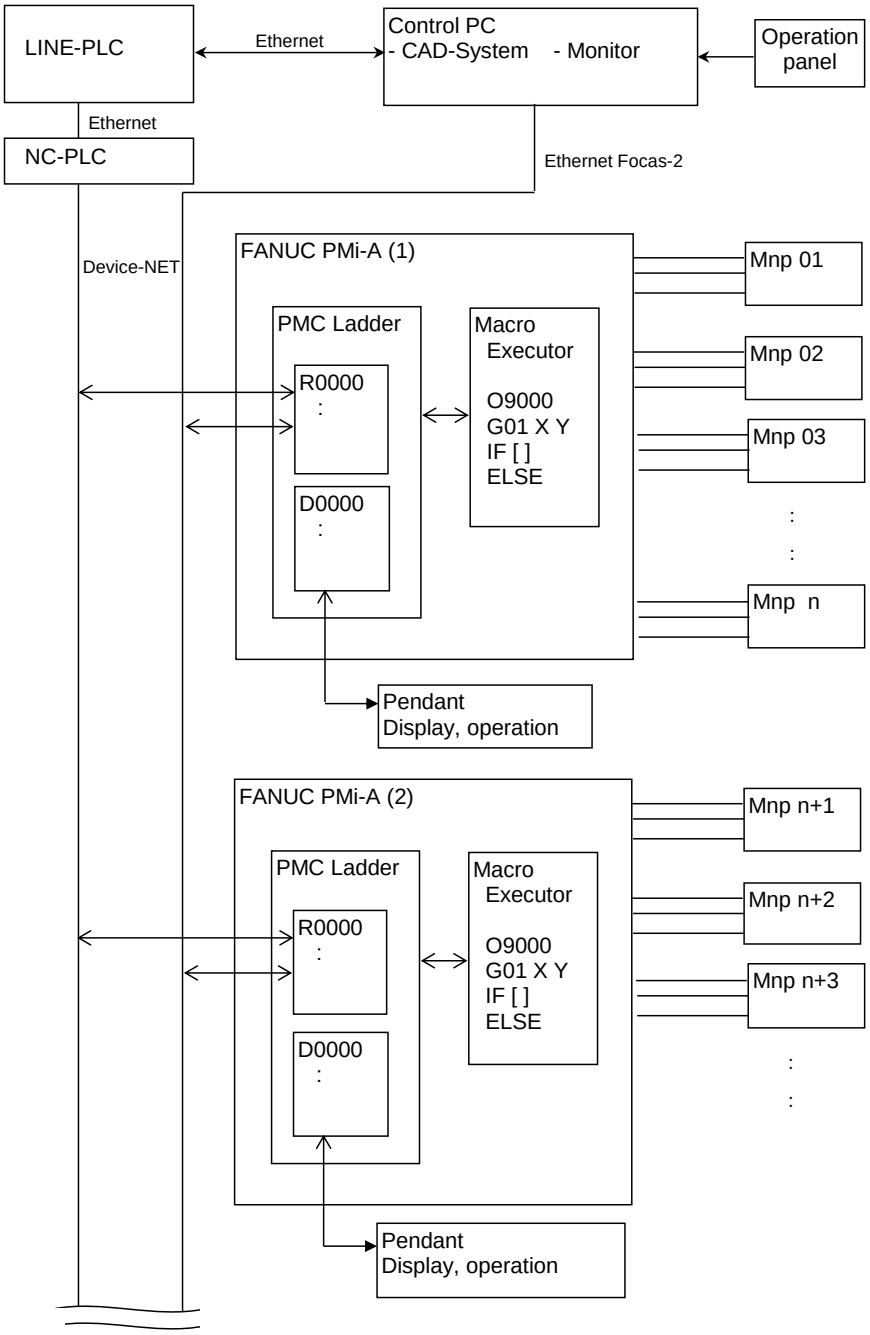
Computer Engineering & Consulting, Ltd.

Contents

1. Outline

This manual describes the setup procedure of the new locator system.
This manual explains software installation and setting on control PC, and the setting and operation of software installation, system parameter, and data into FANUC Power Motion i-A (hereafter called PMi-A).



The software, setting, and operation required for setup are explained below in the order.

1. Control PC

No.	Software, setting, and operation	Remarks
1	FANUC CNC screen display function (FOCAS2/Ethernet) (Installation, setting)	FANUC LTD.
2	FANUC SERVO GUIDE (Installation, setting)	FANUC LTD.
3	FANUC Open CNC Drivers and Libraries (FOCAS1/2) (Installation)	FANUC LTD.
4	Control monitor software (including a parameter setting tool) (Installation, setting)	Computer Engineering & Consulting, Ltd.
5		

2. FANUC F30I-A

No.	Software, setting, and operation	Remarks
1	PMC ladder program (PMC 1.999) + IOLinki connection (IOCONFI.999)※1 (Installation)	Computer Engineering & Consulting, Ltd.
2	Macro compiler/Executer (PD01256K.999) (Installation)	Computer Engineering & Consulting, Ltd.
3	CNC parameter (Setting)	
4	DEVICE-NET parameter setting (Setting)	
5	Ethernet address setting (Setting)	
6	System parameter (Setting)	
7	Home position setting, software limit (Operation, setting)	
8	CNC program (Installation)	
9		

※1 Set CNC parameter No.11933#0 to "1" to enable IOLinki connection.
When No.11933#0 (C1T) I/O Link channel 1 communication system is
= 0 : Use I/O Link.
= 1 : Use I/O Linki.

2. Control PC

Install the software required for the control PC (CAD-PC), and perform setting.

2.1. FANUC CNC screen display function (FOCAS2/Ethernet)

This is the software of FANUC LTD for screen display and setting of FANUC PMi-A.
As for the details of installation and setting, please refer to Instruction manual of FANUC LTD. and "ReadMeJ.Txt" in a CD-ROM of CNC screen display function.
Also, be sure to install "NcBoot32e.Exe" on installation.

- "CNC screen display function instruction manual (B-63164JA)".
- "FANUC Fast Ethernet/Fast data server instruction manual (B-64014JA)"
- "FANUC Power Motion i-MODEL A Connection manual (function) (B-64573JA)"
- "FANUC Power Motion i-MODEL A Maintenance manual (B-64575JA)"

2.2. FANUC SERVO GUIDE

This is the software of FANUC LTD. to adjust the servo motor.
As for the details of installation and setting, please refer to Instruction manual of FANUC LTD. and "ReadMeJ.Txt" in a CD-ROM of a servo guide function.

2.3. FANUC Open CNC Drivers and Libraries (FOCAS1/2)

Install a file related to the data window library between a PC and CNC/PMC.
Copy the following DLL into the \Windows\System32 folder according to "ReadMeJ.Txt" in a CD-ROM.

<FWLIB>\FWLIB32.DLL: CNC/PMC data window control library
<FWLIB>\FWLIBE1.DLL: Library by models (for TCP/IP)
<FWLIB>\FWLIB30i.DLL: Library by models (for 300i/310i/320i/PMi)

2.4. Control monitor software

This is a control PC monitor software developed for this system.
Install the software according to an attachment "Control PC monitor installation procedure manual.xls".
After the software is installed, the system folders on the next page are created, and "Control monitor software", "Parameter setting tool", "PMC ladder program", and "Macro compiler/Executer program" are installed.

c:\Locator\PC Monitor ... Control monitor software
c:\Locator\Prmtool ... Parameter setting tool software
c:\Locator\Ncdata ... PMC ladder program, Macro compiler/Executor program

Note: PMC ladder program, Macro compiler/Executer program are the programs installed in FANUC F30i-A.

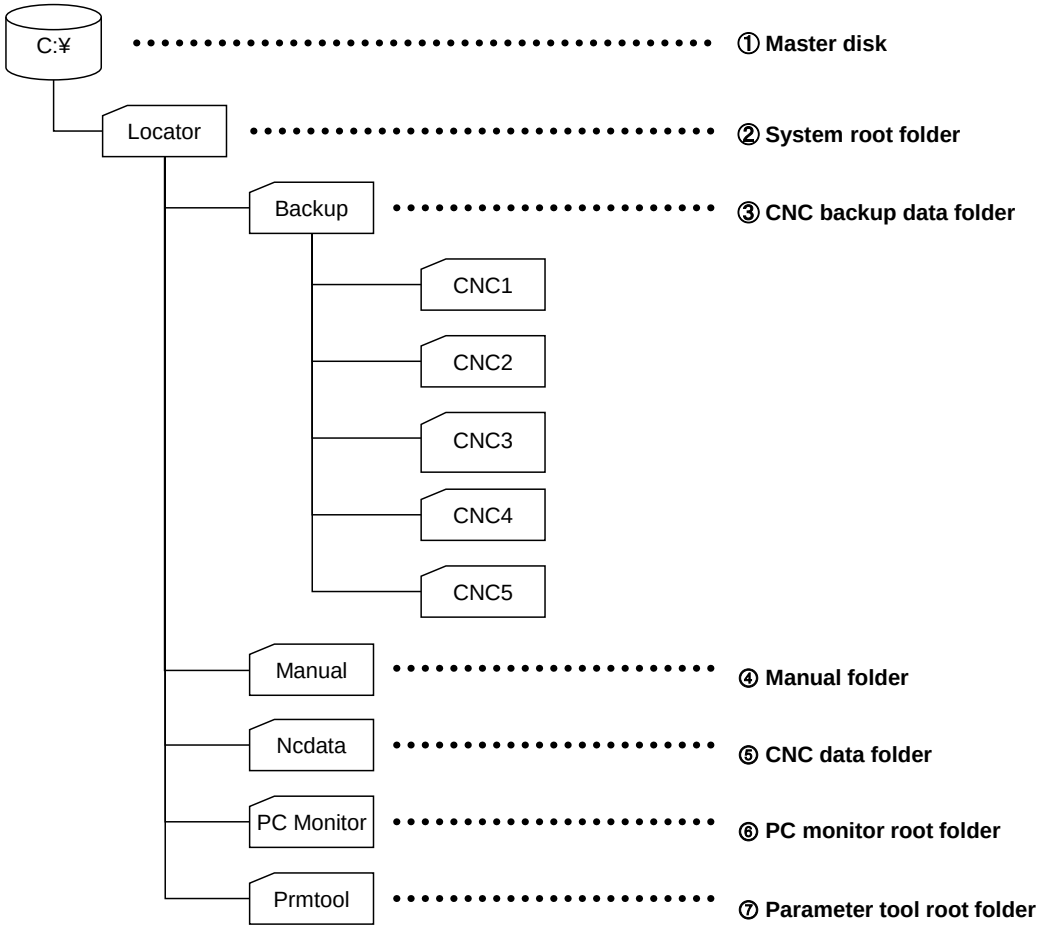
After the installation, perform settings according to the explanation of "Item 4. Setting screen" in "Control PC monitor operation manual.xls".

- Communication setting
  Set IP address and others of FANUC PMi-A to connect.
- Manual setting
  When FANUC PDF manual and others are loaded into the control PC as needed, it is able to startup from the monitor screen by setting them on the control monitor.
  If installing the control monitor software, the folder on the next page will be created.
  It is recommended to store PDF manuals in a manual folder.
- Setting of external application
  As for "FANUC CNC screen display" and "FANUC SERVO GUIDE", it is able to startup from the monitor screen by setting a file path.

Check the connection with connected FANUC PMi-A after each software installation and setting.

System folder structure

This chapter describes the folder structure created by the installation of control monitor software.
* This chapter is explained on the assumption that the installation destination is not changed on installation.



① **Master disk**
Main HDD on the PC configuration which the software is installed such as operating system.
(normally "C:\")

② **System root folder**
The folder that stores the software and data for a new locator system.
Uninstaller is also stored in this folder.

③ **CNC backup data folder**
CNC backup data storage folder that is connected to the new locator system. (5 machines maximum)

④ **Manual folder**
Storage folder of manuals.
Please store manuals to be registered on the PC monitor in this folder.

⑤ **CNC data folder**
Storage folder of data to be input and output by CNC screen display function and NCBOOT32E.
* To input and output data, it is required to select this folder on the above software.
* Just after the installation, [Pd01256k.000] (macro program) and [Pmc1.000] (ladder program) are stored.

⑥ **PC monitor root folder**
PC monitoring software is stored.
Refer to "Control PC monitor operation manual" for the details of this folder.

⑦ **Parameter tool root folder**
A parameter setting tool is stored.

3. CNC software installation

Install the software exclusive for this system in FANUC PMi-A.
There are two types of software programs as follows.

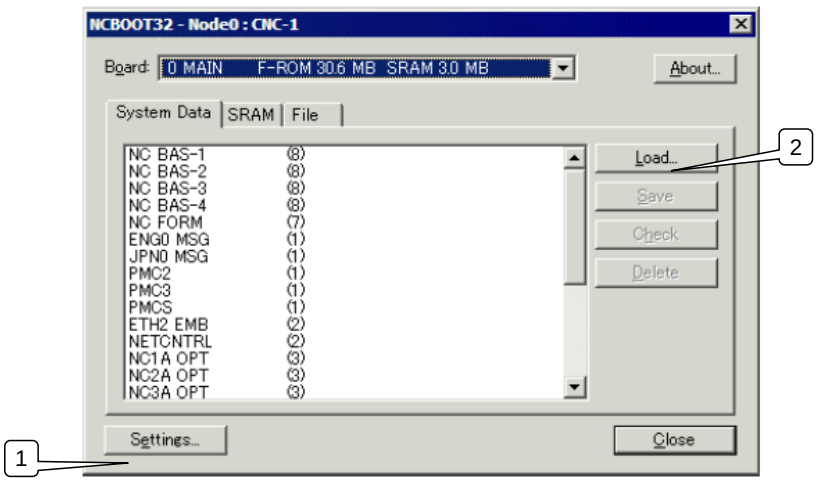
1. PMC ladder program
   File name: PMC 1.999 or SPMC 1.999 (The extension 999 means three digits of the version number)
   It is the ladder program of sequencer (PMC) built in PMi-A.
   Also, IO-Linki is used in PMi-A, therefore IOCONF.999 is required.
   IOCONF.999 is a system file to define the layout of IO-Linki module.
   Note:
   1) There are two types of PMC ladder programs. Please select the correct one for loading.
      PMC 1.999 : Standard
      SPMC 1.999 : Connection of IO-Link joint unit (with check of the interference between sliders)
   2) Load IOCONF.999 to CNC regardless of PMC1.999 or SPMC1.999.

2. Macro compiler/Executer
   File name: PD01256K.999 (The extension 999 means three digits of the version number)
   This is a macro program for controlling the operation of a locator and a slider.

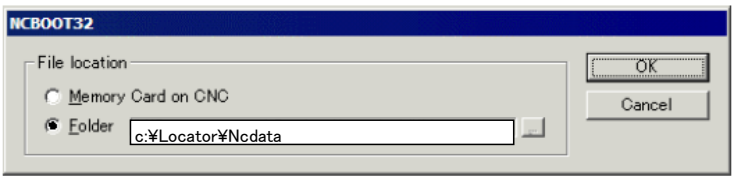
These software programs are registered in Flash ROM in PMi-A.
The registration is loaded by FANUC "NcBoot32e.Exe".
"NcBood32e.Exe" is copied to System32 folder of Windows by installation of "2.1 FANUC CNC screen display function". This program automatically starts up when Windows starts and stays resident in a system tray.

(Icon at the center)

Turning the rotary switch of CNC main unit to "F" to turn on CNC unit,
NcBoot32e on a PC starts and the Boot screen is displayed.



At first, on "Setting" screen, select a folder that PMC ladder program and Macro compiler/Executer program are stored. The folder is "c:\Locator\Ncdata".



Use Load function to load a PMC ladder program and a Macro compiler/Executer program.

PMC 1.999 : PMC ladder program
PD01256K.999 : Macro compiler/Executer program
IOCONF.999 : IO-Linki module layout

Note: After the loading is completed, be sure to return the rotary switch of CNC main unit to "0", the normal position.
Note: For details of the operation of NcBoot32e.Exe, refer to "FANUC Power Motion i-MODEL A maintenance manual (B-64575JA)".

4. CNC parameter

CNC parameter basic setting values are created by "Parameter setting tool software" that is installed by the installation of the control monitor software. In the parameter setting tool, the basic parameter setting values are entered beforehand. Make settings according to the each PMi-A manipulator structure and the axis structure, create a parameter file (CNC-PARA.TXT), and load it onto PMi-A.

Load the created parameter file (CNC-PARA.TXT) onto PMi-A in the following procedure.

1. Copy the parameter file (CNC-PARA.TXT) to the root folder of a memory card.

2. Use "CNC screen display function" to display the target CNC screen.

3. Turn off the servo of PMi-A.

4. Display "Setting" screen of [OFFSET/SETTING] screen and change "PWE: Parameter Writing Enabled" to =1.

5. Display "Parameter" screen of [SYSTEM] screen.

6. Change Parameter No. 20 to =4: memory card.

7. With a soft-key operation,
   select [Operate] => [Read} => [Execute] to read the parameter file.

9. Turn off CNC controlled power supply.

10. Turn on CNC controlled power supply.
    Servo parameter is automatically loaded.

11. Conduct manual setting for a dummy axis.
    The setting for a dummy axis (1) should be set manually after an automatic loading.
    Follow the procedure below.
    No. 2009 Bit 0 = 1 (Note: Manual setting after loading of CNC parameter)
    No. 2165 = 0 (Note: Manual setting after loading of CNC parameter)

    The setting for a dummy axis (2) could be performed regardless of before/after an automatic loading.
    Set as follows.
    No.11802 Bit 4 = 1

12. After the setting, return "PWE: Parameter Writing Enabled" to = 0.

Note:
When the servo alarm SV0033 is occurred, set CNC parameter NO. 11549#0 to "1".
After a while, this parameter is changed to "0" automatically.
After this parameter is set to "0", restart the CNC main body.
No.11549 Bit 0 = 1 : PS control axis is set automatically.
= 0 : PS control axis is not set automatically.

5. DEVICE-NET parameter setting

Set "DEVICE-NET parameter" to interface with LINE-PLC.
For details, refer to Instruction manual of FANUC LTD.

1. Use "CNC screen display function" to display the target CNC screen.

2. Turn off the servo of PMi-A.

3. Display "Setting" screen of [OFFSET/SETTING] screen and change "PWE: Parameter Writing Enabled" to =1.

4. Display "DEV-NET" screen of [SYSTEM] screen.

5. Set following items.
   - Baud rate
     Select 250 KBPS.

   - DI data at failure
     Select Hold.

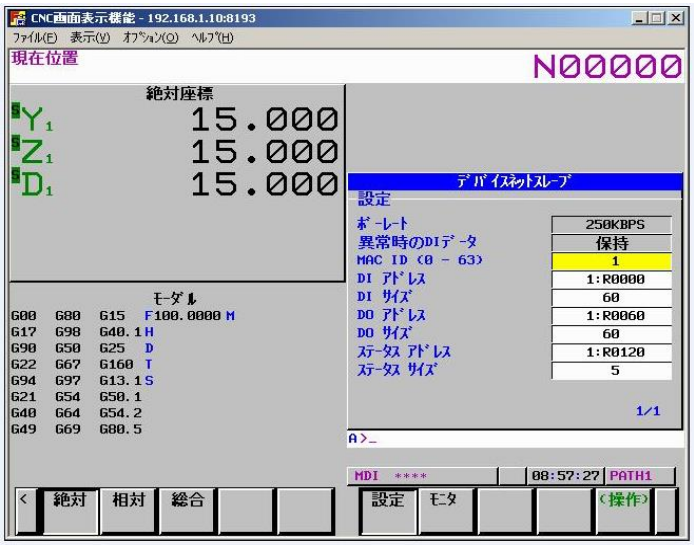
   - Station address
     LINE-PLC station is set as a master and set individual station addresses to each PMi-A.
     LINE-PLC station is "63". For PMi-A, allocate the number from "01" in order.

   - Receive address, Receiving data length
     Receive address: R0000
     Receiving data length: 60 byte

   - Send address, Sending data length
     Send address: R0060
     Sending data length: 60 byte

   - Status address, size
     Status address: R0120
     Status size: 5

6. After the setting, return "PWE: Parameter Writing Enabled" to = 0.



6. Ethernet address setting

Set the Ethernet board to communicate with the monitor PC.
For details, refer to Instruction manual of FANUC LTD.

1. Use "CNC screen display function" to display the target CNC screen.

2. Turn off the servo of PMi-A.

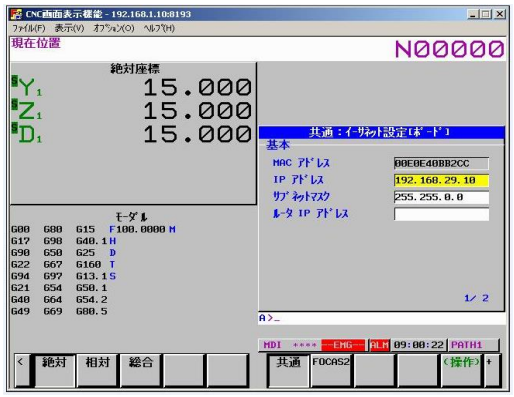
3. Display "Setting" screen of [OFFSET/SETTING] screen and change "PWE: Parameter Writing Enabled" to =1.

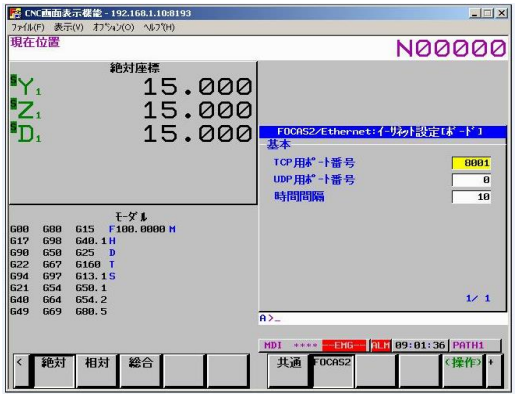
4. Display "Ethernet board" screen of [SYSTEM] screen.

5. Set following items.
   (Page 1/2)
   - IP address
   - Subnet mask

   (Page 2/2)
   - TCP port number
   - Time interval

6. After the setting, return "PWE: Parameter Writing Enabled" to = 0.





7. System parameter setting

Set system parameter of each PMi-A.
Change the Control monitor setting file (PCMonitor.ini) [TOOL] as Enable = 1 to start the control monitor software.

```
[TOOL]
//0:Disabled (standard)   <=
//1:Enabled
Enable = 1
```

Use the system parameter setting tool to set system parameter of each PMi-A.
Refer to the following pages for the setting.

Note: After the setting, change the [TOOL] setting of the setting file to Enable = 0.

Explanation on system parameter setting

This chapter explains the system parameter that determines the operating environment of this system.

10000: Number of effective manipulators

Unit : -
Setting range : 1 to 4
Meaning : Set the number of manipulators controlled by PMi.

10001: Mnp 1, Number of control axes
: :
10009: Mnp 9, Number of control axes

Unit : -
Setting range : 1 to 8
Meaning : Set the number of servo motor axes controlled by each manipulator.
※ Set "0" after 10005.

10011: Number of manipulator 1
: :
10019: Number of manipulator 9

Unit : -
Setting range : 1 to 99
Meaning : Set the manipulator number of each manipulator.
98 and 99 can not be set because they are the control numbers of synchronous axes.
M98: Control number of synchronous group 1
M99: Control number of synchronous group 2

※ Set "0" after 10015.

10021: Machine name, the 1st character

: :

10026: Machine name, the 6th character

Unit : -
Setting range : 1 to 99
Meaning : It is able to provide a name of up to 6 characters to the NC.
The name is displayed as "NC name" on the NC status display of a monitor screen.
Use the decimal ASCII code to set the value.
One-byte alphanumeric characters and symbols could be used.
Ex: When NC name is "ABC 12",
set 65, 66, 67, 32, 49, 50 in this order.

10027: Machine number

Unit : -
Setting range : 1 to 9
Meaning : It is able to provide a number to the NC.
The number is displayed on a pendant main menu, such as "30i 5" as an identification.

10028: Limiting value of torque control (0 to 255 (0 to 100%))

Unit : 1/255%
Setting range : 0 to 255
Meaning : It is able to limit the torque with a pendant JOG operation when the override is 1% or 5%. Use this to set the limiting value of torque control at that time.

10029: Tolerance while the torque is limited (mm)

Unit : mm
Setting range : 0.000 to 99.999
Meaning : Set the tolerance while the torque is limited with a pendant JOG operation.
When the tolerance is larger than this setting value, alarm 2012:
Excessive deviation in torque mode is raised, and the servo is turned off.

10030: Synchronous running group 1, Manipulator 1
(0: not grouped, Axis number: grouped)

: :

10038: Synchronous running group 1, Manipulator 9
(0: not grouped, Axis number: grouped)

Unit : -
Setting range : 0, 1 to 8
Meaning : Set the axis number to be synchronized with the manipulator in the synchronous running group 1.
Set the axis number to run simultaneously.
For a manipulator which is not grouped, be sure to set = 0.
Example: When running Axis 3 of Manipulator 2 and Axis 2 of Manipulator 4 simultaneously.
Set 0, 3, 0, 2, 0, 0, 0, 0, 0 in this order.

※ Set "0" after No.10034.

10039: Synchronization tolerance

Unit : mm
Setting range : 0.000 to 9.999
Meaning : Set the tolerance of synchronous running.

10040: Synchronous running group 2, Manipulator 1
(0: not grouped, Axis number: grouped)
: :
10048: Synchronous running group 2, Manipulator 9
(0: not grouped, Axis number: grouped)

Unit : -
Setting range : 0. 1 to 8
Meaning : Set the axis number to be synchronized with the manipulator in the synchronous running group 2.
Set the axis to run simultaneously.
For a manipulator which is not grouped, be sure to set = 0.
Example: When running Axis 3 of Manipulator 2 and Axis 2 of Manipulator 4 simultaneously.
Set 0, 3, 0, 2, 0, 0, 0, 0, 0 in this order.

※ Set "0" after No.10044.

10050: By machine type Manipulator 1 (0: locator, 1: slider)
: :
10058: By machine type Manipulator 9 (0: locator, 1: slider)

Unit : -
Setting range : 0, 1
Meaning : Set the type of each manipulator.
0: locator
1: slider

※ Set "0" after No.10054.

10060: With/without the check of slider interferences

Unit : -
Setting range : 0, 1, 2
Meaning : Specify with/without the check for the interference between sliders in PMi-A.
0: Without an interference check
1: With an interference check, Slider (front)
2: With an interference check, Slider (back)
Note: The slider at the side of coordinate = 0 is (front).

10061: Check width of slider interferences

Unit : mm
Setting range : -99999.999 to 99999.999
Meaning : Specify with/without the check for the interference between sliders in PMi-A.

Example:
- Slider unit 1 (front)
If ((Position of the other slider) - (Own position)) is the setting value or less, interference occurs.
Example: ((The other side) - (Own position)) is 1000 mm or less, interference occurs.

- Slider unit 2 (back)
If ((Position of the other slider) - (Own position)) is the setting value or more, interference occurs.
Example: ((The other side) - (Own position)) is 1000 mm or more, interference occurs.

10100: Manipulator 1, Axis 1 brake number

: :

10107: Manipulator 1, Axis 8 brake number

10110: Manipulator 2, Axis 1 brake number

: :

10117: Manipulator 2, Axis 8 brake number

10180: Manipulator 9, Axis 1 brake number

: :

10187: Manipulator 9, Axis 8 brake number

Unit : -
Setting range : 0, 1 to 32
Meaning : Set the brake numbers of each manipulator and each axis.
A brake number means the allocated position of brake release signals.
Brake release signals are allocated to DO of 32 axes at the maximum,
from DO (Y00.0) to (Y003.7), and set with numbers from 1 to 32
to which DO the applicable axis brake is allocated.
Be sure to set = 0 to unused axes including the 8 axes of unused manipulators.

(DO: Table of brake numbers)

	7	6	5	4	3	2	1	0
Y000	8	7	6	5	4	3	2	1
Y001	16	15	14	13	12	11	10	9
Y002	24	23	22	21	20	19	18	17
Y003	32	31	30	29	28	27	26	25

※ Set "0" after No.10140.

10200: Manipulator 1, ACT 1 Advance limit LS (bit)

: :

10215: Manipulator 1, ACT 8 Return limit LS (bit)

10216: Manipulator 2, ACT 1 Advance limit LS (bit)

: :

10231: Manipulator 2, ACT 8 Return limit LS (bit)

10328: Manipulator 9, ACT 1 Advance limit LS (bit)

: :

10343: Manipulator 9, ACT 8 Return limit LS (bit)

Unit : -
Setting range : Decimal digit notation of the corresponding LS bit
Meaning : End confirmation bit for the LS corresponding to each SOL
Example: When the LS corresponding to SOLx output is 0/1, 2 bit, set =3.

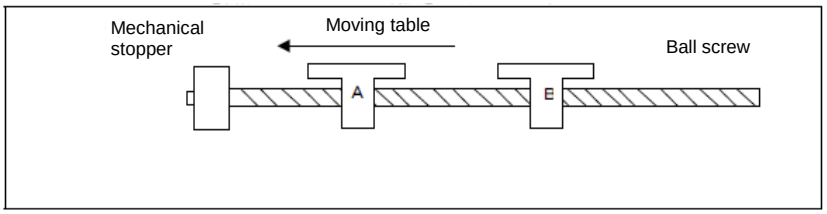
※ Set "0" after No.10264.

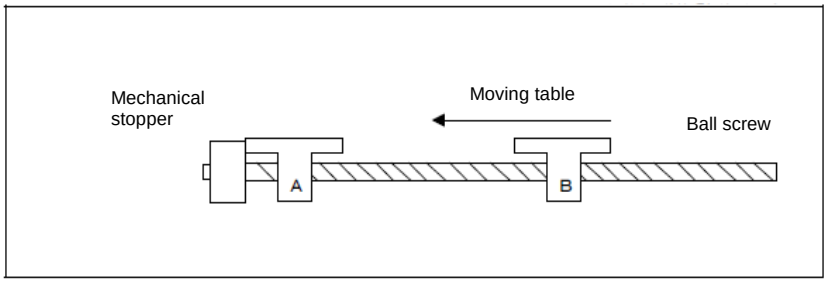
8. Home position setting, software limit

The servo motor of this system has "Absolute Pulse Coder (APC)", therefore the current position of each servo motor is maintained by the operation of home position return at the mechanical installation.
The home position return at the installation is operated and set by "home position return by mechanical stoppers".
The home position setting by mechanical stopper is operated with the pendant.
Install the pendant on the subject PMi-A to operate.
As for details, please refer to "4.5 item, Reference operation" in "Pendant instruction manual.doc".

After the home position setting is completed, set "Soft limit +" and "Soft limit -" on the parameter setting screen of the control monitor.

When there is a moving table on the same driving line (see the figure below), set the home position of the mechanical stopper side (A) beforehand and set (A) to manual over ride 5% or less and press it against the mechanical stopper with enabling the torque limit, and return to the home position (B).





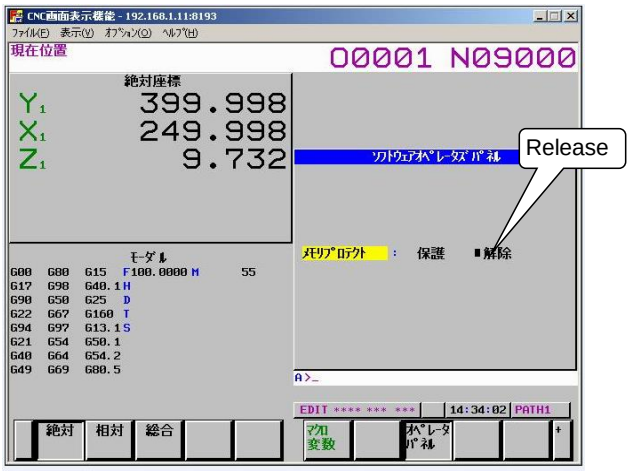
Note: When (A) is pressed against the mechanical stopper, open the soft limit of axis (A) temporarily to the position that could be pressed.

9. CNC program

Register the main program for starting the operation macro program of locator and slider into the CNC tape storage memory. It is required to register the same program for the manipulators to be controlled by PMi-A.

Install the pendant, enter the password of special operation, "1234", and press ENTER.
The system changes to the special operation mode, and the mode select and others are enabled in operator's panel screen of [OFFSET/SETTING]. CNC mode is enabled with the servo ON, therefore select any manipulator and turn on the servo in the teach mode.

In PATH1 operator's panel screen, select "EDIT" mode.
And also, "Release" the memory protect.



1. Write the program file (ALL-PROG.TXT) into a memory card, and insert it into the memory card slot of F30i-A.

2. Display "List screen" of the program screen.

3. Select "OPRT" => "DEVICE CHANGE" => "MEMORY CARD" to display the list screen of the memory card.

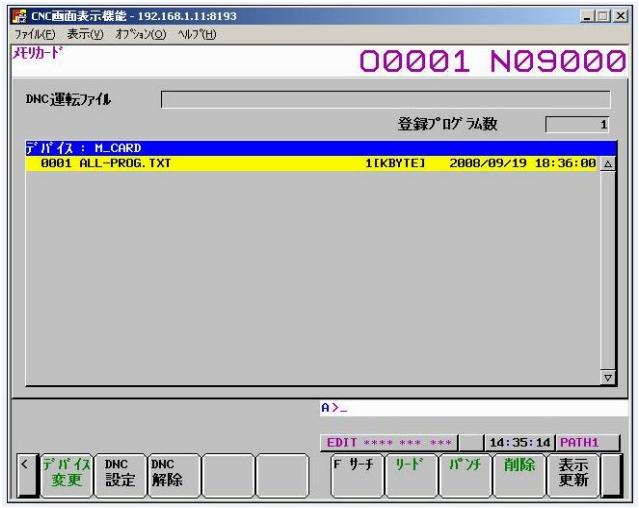
4. "OPRT" => "READ" => "EXECUTE" to read the program and register.

5. Press "PROGRAM" to confirm that the following program is registered.
   00001:
   G100:
   M30:
   %

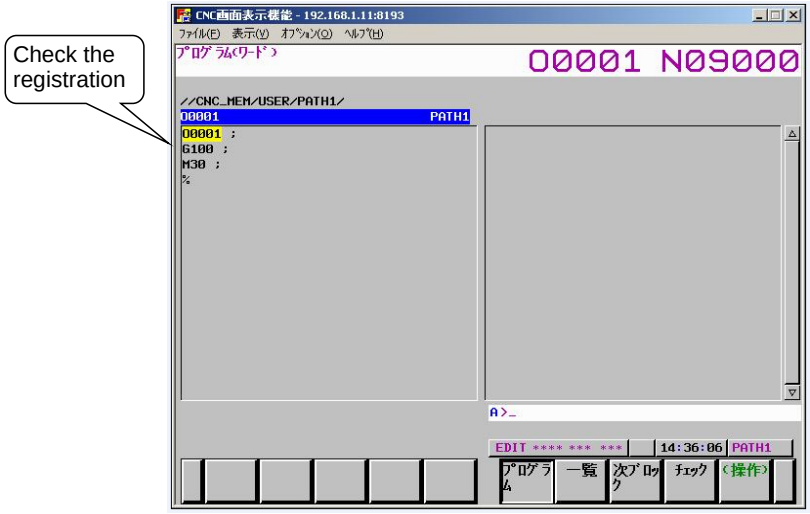
   Register into the effective manipulators in the applicable PMi-A and program memories of each system.

6. On the pendant special operation screen, press the password "0" + ENTER to release the special mode.

- Memory card list screen



- Program screen

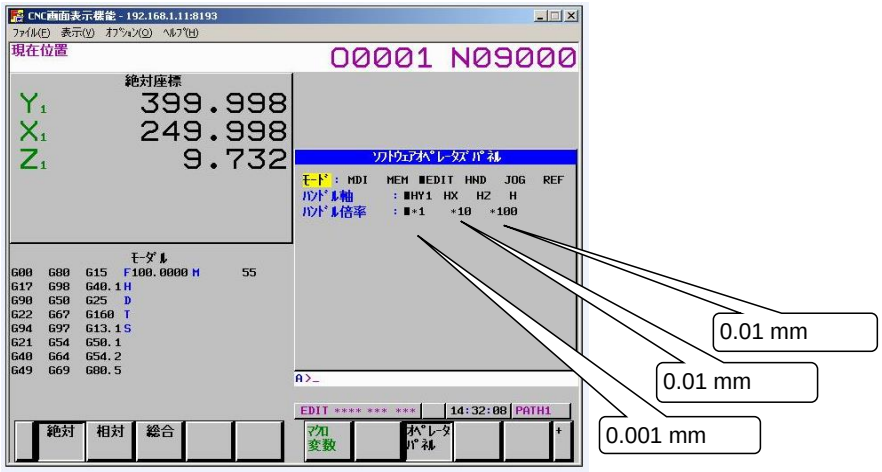


10. Inching amount setting

Set the inching amount for a JOG operation in a teaching mode.
Select any of the inching amount from (0.001 mm), (0.01 mm), and (0.1 mm).

1) Display "Operator's panel screen" in "Offset/setting screen".

2) Select the inching amount in "Handle magnification".



11. Setting of systems and servo motors

In this system, to standardize PMi-A of each equipment, the systems are unified to the PMi-A of "4 system control" and "16 axis control". Normally, n-system of 4 system, and m axis of 16 axes are used, and others are set as dummy. This chapter explains the setting method.

(System)
In this system, it is handled as "system = manipulator" as for PMi-A.
Therefore, PMi-A of one unit can control up to 4 manipulators.
The number of manipulators to be controlled is defined by "Number of effective manipulators" in "6. System parameter setting".
The manipulators from this setting are handled as a dummy system.

(Control axis)
One unit of PMi-A can control the servo motor with 16 axes at the maximum.
It is necessary to set remaining axes as "dummy axis" on the system parameter.
There are two ways to process to "dummy axis" as follows.

- Actual axis : The axis to control the servo motor actually
- Dummy axis (1) : The axis handled as serial feedback dummy axis by the condition between systems
- Dummy axis (2) : Dummy axis without an amplifier

PMi-A is 16-axis control specification. Therefore, dummy axes also must be allocated to any system to set.
Due to this application, the number of axes (actual axis + dummy axis) must be 8 or less on 1 system.
Parameter No. 981: Absolute system number that each axis is allocated

Refer to the explanation on the next page, the first and second PMi-A of "Flexible assembly jig (BS10)" as an example.

- Actual axis : The axis to control the servo motor actually
  This is a regular servo motor axis, and follow the standard procedure of FANUC to setup.
  Refer to the manual below for the procedure.
  FANUC AC SERVO MOTER αi/αiF/βi series Parameter manual (B-65270JA)"

Motor type number	Motor number
βiS2/4000	No. 2020=253

- Dummy axis (1): The axis handled as serial feedback dummy axis due to the adjustment between systems
  It is not possible to share 2-axis amplifier and 3-axis amplifier by multiple manipulators.
  Therefore, the remaining axes are handled as serial feedback dummy axis.
  No. 981: Absolute system number that each axis is allocated
  The system number that the amplifier is allocated.
  No. 1023: Servo axis number of each axis
  Specify the servo number in the order of FSSB connection as is the case with normal axis.

  ※ The servo numbers of No.1023 are as follows from the close one for the PMi-A main unit.

  1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 17, 18, 19, 20

  Setting of serial feedback dummy axis
  No. 2009 Bit 0 = 1 (Note: Manual setting after loading of CNC parameter.)
  No. 2279 Bit 0 = 1
  No. 2165 = 0 (Note: Manual setting after loading of CNC parameter.)
  No. 1815 Bit 5 = 0

  Note: "No. 2009 Bit 0" and "No. 2165" are initialized by automatic setting function of servo parameter.
  Therefore, after the CNC parameter loading, they should be set manually.

- Dummy axis (2): Dummy axis without amplifier
  Setting of dummy axis without amplifier
  No. 1023: Servo axis number of each axis
  as =128.
  No. 1815 Bit 5 = 0
  No. 11802 Bit 4 = 1

Power Motion i -A (1) setting example for Flexible assembly jig (BS10)

No.	Amplifier	Manipulator	Axis	Axis types	Parameter number								
					0981	1023	2020	2009#0	2279#0	2165	1815#5	11802#4	24000～
1	AMP1	M01	1X	Actual axis	1	1	253	0	0	25	1	0	1001
2	Axis 3		2Z	Actual axis	1	2	253	0	0	25	1	0	1002
3			3Y	Actual axis	1	3	253	0	0	25	1	0	1003
4	AMP2		~~4Θ~~	Dummy axis (1)	1	4	253	1	1	0	0	0	1004
5	Axis 3	M03	1X	Actual axis	2	5	253	0	0	25	1	0	1005
6			3Θ	Actual axis	2	6	253	0	0	25	1	0	1006
7	AMP3	M02	1X	Actual axis	3	9	253	0	0	25	1	0	1009
8	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
9	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
10	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
11	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
12	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
13	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
14	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
15	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
16	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000

Power Motion i -A (2) setting example for Flexible assembly jig (BS10)

No.	Amplifier	Manipulator	Axis	Axis types	Parameter number								
					0981	1023	2020	2009#0	2279#0	2165	1815#5	11802#4	24000～
1	AMP1	M07	1Z	Actual axis	1	1	253	0	0	25	1	0	1001
2	Axis 3		2X	Actual axis	1	2	253	0	0	25	1	0	1002
3			3Y	Actual axis	1	3	253	0	0	25	1	0	1003
4	AMP2	M12	1X	Actual axis	2	4	253	0	0	25	1	0	1004
5	Axis 3	M13	1X	Actual axis	3	5	253	0	0	25	1	0	1005
6		M11	1X	Actual axis	4	6	253	0	0	25	1	0	1006
7	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
8	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
9	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
10	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
11	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
12	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
13	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
14	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
15	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000
16	No AMP			Dummy axis (2)	4	-128	253	0	0	25	0	1	1000

Note: If the No. 2165 is dummy axis (1), set it "= 0".
In the case of normal axis, the standard parameter is loaded automatically.

(FSSB setting)

FSSB is set in "Manual setting 2".

- Setting of FSSB 1

Set the value (servo axis number (set value in CNC parameter No. 1023) +1000) connecting to FSSB1 sequentially to parameter No. 24000 - No. 24032.

Note: Count dummy axis (1) (with amplifier, but without axis) as an axis.
For dummy axis (2) (axis without amplifier"), set = 1000.

NS-K FRONT FLOOR #220 F30i-A(1)

- Setting of FSSB 1

No.24000 = 1001	No.24018 = 1000
No.24001 = 1002	No.24019 = 1000
No.24002 = 1003	No.24020 = 1000
No.24003 = 1004	No.24021 = 1000
No.24004 = 1005	No.24022 = 1000
No.24005 = 1006	No.24023 = 1000
No.24006 = 1009	No.24024 = 1000
No.24007 = 1000	No.24025 = 1000
No.24008 = 1000	No.24026 = 1000
No.24009 = 1000	No.24027 = 1000
No.24010 = 1000	No.24028 = 1000
No.24011 = 1000	No.24029 = 1000
No.24012 = 1000	No.24030 = 1000
No.24013 = 1000	No.24031 = 1000
No.24014 = 1000	
No.24015 = 1000	
No.24016 = 1000	
No.24017 = 1000	

12. Selection of special mode, memory protection

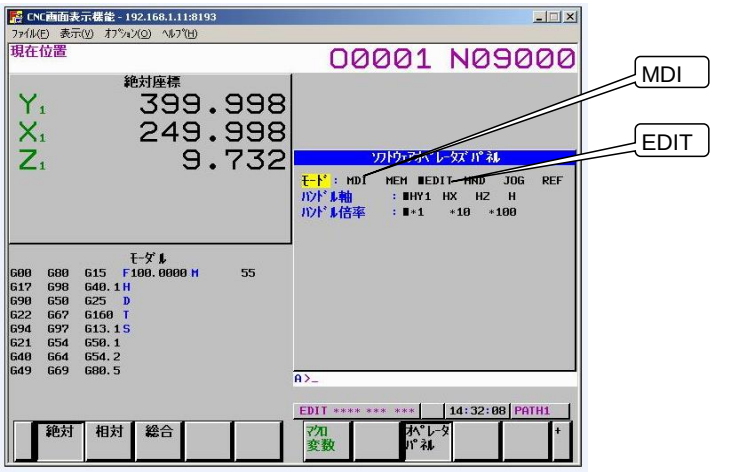
In this system, the integrated PLC has mode selection from automatic, manual, and teaching.
For CNC setup, it is required to set CNC into MDI mode and EDI mode.
Therefore, this system has a special mode setting function.

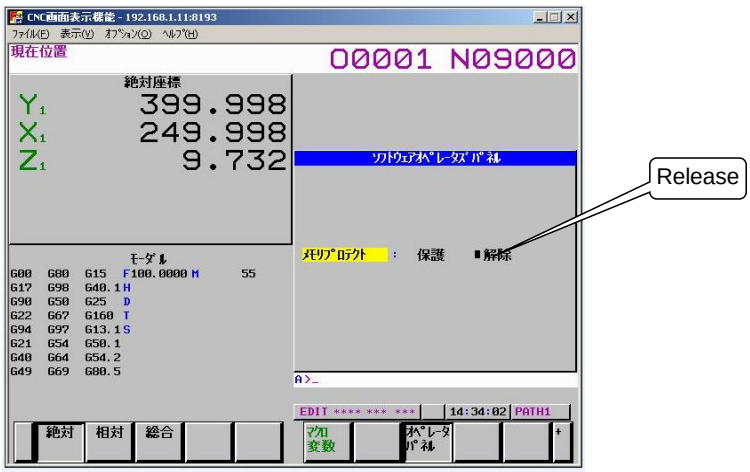
1) Install the pendant operation panel on the CNC equipment.

2) Select Teaching mode from the integrated PLC.

3) With the pendant, select Teaching operation and Special operation, set the password = 1234, and press ENTER.
From this operation, CNC changes to the special mode selection and it enables the operation on "Operator's panel screen" of [OFFSET/SETTING] screen in the system 1.

4) CNC mode is enabled with the servo ON, therefore select any manipulator in the teach mode and turn on the servo.





Note: After the operation, be sure to enter the password, "CLEAR + ENTER" on the special operation screen to release the special mode.
The special mode can be released by turning off/on the CNC controlled power supply.

13. Selection of CNC system

This system controls each manipulator by controlling CNC system.
Parameters and programs should be set and registered into each system.
With the CNC screen display function, the screen of currently selected system (manipulator) is displayed.
This operation is the switching of selected system (selected manipulator).

Display CNC [CUSTOM 1] screen.

System switching

Previous system

Next system

Use soft keys, "Previous system" and "Next system", to switch system 1 - 4.
Also, a system can be selected directly by entering a number and press ENTER.

14. CNC parameter details

The "Chapter 4. CNC parameter" described the parameter loading and
this chapter specifies main parameters to be set by "parameter setting tools".

No. 0981 : Absolute system number that each axis is allocated
Set the system (manipulator number) that each axis is allocated.
Refer to "Chapter 11. Setting of systems and servo motors" for details.

No. 1006 : Specifying the direction of return to home position and the rotation axis
Specify the direction of each axis mechanical stopper to return to the home position.
Set the rotation axis.

No. 1020 : Axis name
Set the axis name.
X axis = 88, Y axis = 89, Z axis = 90
ΘAxis 1 = 67 (C), ΘAxis 2 = 66 (B)
Dummy axis = 68 (D)

No. 1023 : Servo axis number
Set the axis to use for each axis in the order of FSSB connection.
Refer to "Chapter 11. Setting of systems and servo motors" for details.

No. 1240 : Coordinate value of the first reference point of each axis in the mechanical coordinate system
No. 1250 : Coordinate value of reference point for setting of automatic coordinate system
Be sure to set the same value for No. 1240 and No. 1250.
If the position data is +, set 15.0. If the data is -, set -15.0.
General: 15.0 (15 mm)
Slide: 45.0 (45 mm) or 150.0 (150 mm) / It shall be the same with the current value.
(The sign is determined by the direction.)

No. 1320 : Coordinate value of the boundary in the + direction of each axis stored stroke check 1
No. 1321 : Coordinate value of the boundary in the - direction of each axis stored stroke check 1
Set the position at 5 mm from the stopper.
This can be set on the PC monitor (parameter setting).

No. 1420 : Fast feeding speed of each axis
This is the replay speed when the locator and slider override is 100%.
1Y axis: 19980.0 mm/min
2X axis: 19980.0 mm/min
3Z axis: 18000.0 mm/min
Axis Θ: 4470.0 deg/min
Slide axis: 67310.0 mm/min
This can be set on the PC monitor (parameter setting).

No. 1423 : Jog feeding speed of each axis
No. 1424 : Manual fast feeding speed of each axis
Be sure to set the same value for No. 1423 and No. 1424.
X axis, Y axis, Z axis = 1000.0 mm/min
Axis Θ = 360.0 deg/min
Slider axis = 5000.0 mm/min

No. 1620 : Time constant of fast feed straight acceleration and deceleration of each axis, Tr
1Y axis: 170
2X axis: 170
3Z axis: 150
Axis Θ: 170
Slide axis: 700

No. 1815 : APC setting
Set the dummy axis as Bit 5 (APC) = 0.

No. 1828 : Location deviation limit value during movement for each axis
X, Y, Z axis = 15000
Axis Θ= 4000
Slider axis= 40000

No. 2020 : Motor number
253: βiS2/4000

No. 2022 : Motor rotating direction
111 (Clockwise direction viewed from the detector)
-111 (Counter-clockwise direction viewed from the detector)
(To set the + direction of JOG operation in the + direction of car line coordinate system)

No. 2084 : Flexible feed gear (numerator)
(setting of displacement per motor rotation)
1Y axis: 1
2X axis: 1
3Z axis: 6
Axis Θ: 9
Slide axis: 781

No. 2085 : Flexible feed gear (denominator)
(setting of displacement per motor rotation)
1Y axis: 100
2X axis: 100
3Z axis: 1000
Axis Θ: 4025
Slide axis: 15368

No. 2227 : Dummy axis setting
Refer to "Chapter 11. Setting of systems and servo motors" for details.

No. 7181 : The first pulling back distance at the setting of mechanical stopper reference point
When the setting of returning rotation direction of each axis reference point of N1006 and #5 (ZMx) is "0" Positive direction, it is "15.0"/ "1" Negative direction, it is "-15.0".
All axes: 15.0

No. 7182 : The second pulling back distance at the setting of mechanical stopper reference point
The setting returning rotation direction of each axis reference point of N1006 and #5 (ZMx) is
General axis: 15.0
Slide axis: 150.0

No. 7186 : Torque limit at the setting of mechanical stopper reference point
General axis 70
Slide equipment α65:25, α22/2000:30

No. 11802 : Servo axis effective/invalidity setting
Set the dummy axis without an amplifier to bit 4 (KSV) = 1.

No. 24000-No. 24031 : Set values of (servo axis number (set value in CNC parameter No. 1023 +1000) connecting to FSSB1 sequentially.
Refer to "Chapter 11. Setting of systems and servo motors" for details.

1 No. 6901 : Setting of the position switch function
1 (EPW) 0
2 (PSA) 0

1 No. 6910 - No. 6925: The control axis to perform position switch functions from the first to the 16th
Set point 0 means not to use a position switch function.

1 No. 6930 - No. 6945: The maximum value of position switch movement range from the first to the 16th
The position switch function becomes effective after the completion of home position return.

1 No. 6950 - No. 6965: The minimum value of position switch movement range from the first to the 16th
The position switch function becomes effective after the completion of home position return.

1 The position switch can set 2 axes with each system, and is able to output to LINE.
15 byte 0 First system output 1
15 byte 1 First system output 2
15 byte 2 Second system output 1
15 byte 3 Second system output 2
15 byte 4 Third system output 1
15 byte 5 Third system output 2
15 byte 6 Fourth system output 1
15 byte 7 Fourth system output 2

※ Supplement

・The parameter which is not related to the constitution of the machine, but is necessary at the new setup
The following parameters system should be set to control the system change screen, the CAD data reception and single/auto operation.

No. 9000 : Display/Non-display P-Code variable screen to a macro variable screen
Set all system bit 1 (NDP) to 1.
1: Display P-Code variable screen.

No. 9048 : P-Code number of the execution macro
Set all systems to 1.
1: The execution macro to use in each system adopts the macro of 1 system.

No. 9049 : P-Code number of the interactive macro
Set all systems to 1.
1: The execution macro to use in each system adopts the macro of 1 system.

No. 9050 : P-Code number of the helper macro
Set to 1 only for 1 system. Set to 0 after 2 systems.
1: Use the helper macro of 1 system when using the macro in each system.
0: Do not use the helper macro.

No. 9051 : Domain number of P-Code variable (after #10000)
Set all systems to 1.
1: Use the macro of 1 system when using P-Code variable (after #10000) in each system.

No. 9052 : Domain number of extended P-Code variable (after #20000)
Set to 2 only for 2 systems, and set to 1 for 1 system, 3 systems, and 4 systems.
1: Use the macro of 1 system when using P-Code variable (after #20000) in each system.
2: Use the macro of 2 systems when using P-Code variable (after #20000) in each system.

No. 9053 : The number of P-Code variable (after #10000)
Set all systems to 10000.

No. 9054 : Domain number of extended P-Code variable (after #20000)
Set to 70000 for 1 system, to 20000 for 2 systems, and to 0 for 3 systems and 4 systems.

・Parameter to validate I/Olinki connection

No. 11933 : Validate/invalidate I/OLinki connection
Set bit 0 (C1T) to 1 to validate I/OLinki connection.
1: Validate I/Olinki.

・Coping parameter when servo alarm SV0033 occurred
When a servo alarm SV0033 occurs, an alarm can be evaded by changing the following parameters.

No. 11549 : PS control axis designation automatic setting function, the automatic setting of the PS control axis
When a servo alarm SV0033 occurred, set bit 0 (APS) of the following parameters to 1.
※ Bit 0 (APS) is automatically changed to 0 in a few minutes.
The servo alarm SV0033 is removed by reboot.

15. Setting of gain by FANUC servo guide

For the setting operation of servo guide, following special operations are required:
- Put CNC mode into MDI mode.
- Start the setting program.

To conduct these operations, follow "Chapter 12. Special mode".

- Put CNC mode into MDI mode.
  1) Install the pendant operation panel on the CNC equipment.

  2) Select the Teaching mode from the integrated PLC.

  3) Using the pendant, select Teaching operation and Special operation, and set the password = 1234, and press ENTER.
  From this operation, CNC changes into the special mode selection and it enables the operation on "Operator's panel screen" of [OFFSET/SETTING] screen in the system 1.
  (Note: Be sure to operate the operator's panel in the system 1.)
  For servo guide setting operation, the system must be put into MDI mode.

  4) CNC mode is enabled with the servo ON. In the teach mode, select the manipulator to set, and turn on the servo.

- Start the setting program.
  5) Startup the manipulator's Teaching and Play (+), you can "start" the program.

  Following 4 items can be adjusted by a servo guide.
  1. Gain initial setting
  2. Filter automatic adjustment
  3. Gain automatic adjustment
  4. Time constant adjustment at fast feeding

  Note: In the servo guide default program for setting, the incremental (+10 mm) moving program is generated in test 1 - 3 and the incremental (-500 mm) moving program is generated in test 4. Pay enough attention to the moving distance and direction.

  Note: After operation, be sure to enter the password of special operation, "CLEAR + ENTER".

No. 2022 : Motor rotating direction
111 (Clockwise direction viewed from the detector)
-111 (Counter-clockwise direction viewed from the detector)
(To set the + direction of JOG operation in the + direction of car line coordinate system)

No. 2084 : Flexible feed gear (numerator)
(Setting of displacement per motor rotation)
1Y axis: 1
2X axis: 1
3Z axis: 6
Axis Θ: 9
Slide axis: 781

No. 2085 : Flexible feed gear (denominator)
(Setting of displacement per motor rotation)
1Y axis: 100
2X axis: 100
3Z axis: 1000
Axis Θ: 4025
Slide axis: 15368

No. 2227 : Dummy axis setting
Refer to "Chapter 11. Setting of systems and servo motors" for details.

No. 7181 : The first pulling back distance at the setting of mechanical stopper reference point
When the setting of returning rotation direction of each axis reference point of N1006 and #5 (ZMx) is "0" Positive direction, it is "15.0"/ "1" Negative direction, it is "-15.0".
All axes: 15.0

No. 7182 : The second pulling back distance at the setting of mechanical stopper reference point
The setting returning rotation direction of each axis reference point of N1006 and #5 (ZMx) is
General axis: 15.0
Slide axis: 150.0

No. 7186 : Torque limit at the setting of mechanical stopper reference point
General axis 70
Slide equipment α65:25, α22/2000:30

No. 24000-No. 24031 : Set values of (servo axis number (set value in CNC parameter No. 1023 +1000) connecting to FSSB1 sequentially.
Refer to "Chapter 11. Setting of systems and servo motors" for details.