

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

Type of applied technical documents

Name	FANUC Series 30i/31i/32i/35i-MODEL B FANUC Power Motion <i>i</i> -MODEL A FANUC Series 0i-MODEL F PMC Programming Manual
Spec. No. /Ed.	B-64513EN/04

Summary of Change

Group	Name/Outline	New, Add, Correct, Delete	Applied Date
Basic Function	Add of Series 0i-MODEL F Plus PMC function	Add	Dec. 2018
Optional Function			
Unit			
Maintenance Parts			
Notice			
Correction			
Another			

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**FANUC Power Motion i-MODEL A**  
**FANUC Series 0i-MODEL F**  
**PMC Supplemental Programming Manual**

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# 1 SUMMARY

The following functions have been added.

- Add of Series 0 *i*-Model F Plus PMC function

This document is a supplemental manual for the above.

Please refer to the following manual about existing functions and operations.

Manual	Spec.
FANUC Series 30i/31i/32i/35i-MODEL B FANUC Power Motion <i>i</i> -MODEL A FANUC Series 0i-MODEL F PMC Programming Manual	B-64513EN / 04

In this document, the following abbreviations are used.

Name	Abbreviation
FANUC Series 30i/31i/32i/35i-MODEL B	30i/31i/32i/35i-B
FANUC Series 0i-MODEL F	0i-F
FANUC Series 0i-MODEL F Plus	0i-F Plus

## 1.1 Difference from 0i-F PMC

Series 0i-MODEL F Plus PMC is highly compatible with series 0i-F PMC on the source level. As for compatibility, refer to the section “3.5”. However, the following specifications are different from 0i-F PMC.

- In 0i-F Plus PMC, the processing speed of sequence programs is improved.
- In 0i-F Plus PMC/L, the PMC memory type B is supported.
- In 0i-F Plus PMC/L, “PMC Ladder Function 24,000 steps” becomes a basic function
- In 0i-F Plus PMC and PMC/L, “PMC Symbol, Comment, Message capacity expansion (512KB)” becomes a basic function.
- In 0i-F Plus, only I/O Link *i* is available and I/O Link is not available.

### CAUTION

- 1 You should confirm that the ladder program works fine in 0i-F Plus even if it worked fine on 0i-F, because the execution timing may change.
- 2 When you change the CNC model from 0i-F to 0i-F Plus, use I/O devices for I/O Link *i* because I/O Link is not available in 0i-F Plus.

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# 2 APPLIED SOFTWARE

The new features will be applied to the following software.

## PMC System software

Name	Series	Edition
Series 0i-MODEL F Plus PMC (A02B-0349-H580#40B4)	40B4	02 or later

## CNC System software

Name	Series	Edition
Series 0i-MODEL TF Plus (A02B-0349-H501#D6G3)	D6G3	01 or later
Series 0i-MODEL MF Plus (A02B-0350-H501#D4G3)	D4G3	01 or later

## FANUC LADDER-III

Name	Drawing number	Edition
FANUC LADDER-III	A08B-9210-J505	8.60 or later
FANUC LADDER-III (10 users)	A08B-9210-J541	8.60 or later
FANUC LADDER-III (20 users)	A08B-9210-J542	8.60 or later
FANUC LADDER-III (Site license)	A08B-9210-J543	8.60 or later
FANUC LADDER-III (Update)	A08B-9210-J544	8.60 or later

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# 3 PMC SPECIFICATIONS

## 3.1 SPECIFICATIONS

### 3.1.1 Basic Specifications

Add the following table into “2.1.1”.

Table 3.1.1 (a) Basic specifications of each PMC path

Function	0i-F Plus		Reference
	Type 0,1	Type 3,5	
Multi-Path PMC function	Maximum 3 paths	-	1.6
PMC Memory Type	1st PMC PMC Memory-B, C, D 2nd to 3rd PMC PMC Memory-A, B, C Common PMC Memory with 1st PMC	PMC/L : PMC Memory-A, B	2.1.3
Programming language	Ladder Step sequence(Note3) Function block	Ladder Function block	4 10 11
Divided ladder program - Number of programs - File number	16 1 to 99	6 1 to 99	2.1.4
Number of ladder levels	3	2 (Note4)	1.4.3
Level 1 execution period	4ms or 8ms	8ms	1.8, 2.4.3
Processing power - Basic instruction processing speed (transition contact)	9.1 ns/step	1µs/step	—
Program capacity - Ladder - Symbol & Comment - Message	Up to about 100,000steps) 1KB at least 8KB at least	Up to about 24,000 steps 1KB at least 8KB at least	2.1.2, 2.1.4
Instructions - Basic instructions - Functional instructions	24 329	24 227	2.1.7 2.1.8, 2.1.9
CNC interface - Inputs (F) - Outputs (G)	768 bytes × 10 768 bytes × 10	768 bytes × 2 768 bytes × 2	2.2.1
DI/DO (Note5) - Inputs (X) - Outputs(Y)	Up to 2,048 points Up to 2,048 points	Up to 1,024 points Up to 1,024 points	2.2.2, 3

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Symbol & Comment - Number of symbol characters - Number of comment characters	40 255 × 4	40 255 × 4	1.2.7, 2.1.5
Program storage area (Flash ROM)	Max. 2MB	Max. 768KB	2.1.4

#### NOTE

- 1 This PMC is used for Dual Check Safety function (option) and handles the safety related signals.
- 2 PMC Memory Type-E is enabled only on a special series of CNC software.
- 3 The Step Sequence is available in the main ladder of 1st PMC.
- 4 A program can be created on level 3 to maintain source-level compatibility with programs for other models, but it is not executed.
- 5 In series 0i-F Plus, only I/O Link *i* is available and I/O Link is not available.

**Table 3.1.1 (b) Basic specifications of each PMC Memory Type for 0i-F Plus PMC/L**

Function	0i-F Plus PMC/L	
	PMC Memory-A	PMC Memory-B
PMC Memory		
• Internal relay (R)	1,500 bytes	8,000 bytes
• System Relay (R9000 or Z0)	500 bytes	500 bytes
• Extra relay (E) (Note3)	10,000 bytes	10,000 bytes
• Message display (A) · Display requests · Status displays	2,000 points 2,000 points	2,000 points 2,000 points
• Nonvolatile memory		
• Timer (T) · Variable timer · Variable timer precision	80 bytes (40 pieces) 80 bytes (40 pieces)	500 bytes (250 pieces) 500 bytes (250 pieces)
• Counter (C) · Variable counter · Fixed counter	80 bytes (20 pieces) 40 bytes (20 pieces)	400 bytes (100 pieces) 200 bytes (100 pieces)
• Keep relay (K) · User area · System area	100 bytes 100 bytes	100 bytes 100 bytes
• Data table (D)	3,000 bytes	10,000 bytes
• Step sequence · Step number (S)	(None)	2,000 bytes (Note7)
Functional instructions		
• Variable timers (TMR)	40 pieces	250 pieces
• Fixed timers (TMRB/TMRBF)	100 pieces	500 pieces

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• Variable counters (CTR)	20 pieces	100 pieces
• Fixed counters (CTRB)	20 pieces	100 pieces
• Rising/Falling edge detection (DIFU/DIFD)	256 pieces	1,000 pieces
• Labels (LBL)	9,999 pieces	9,999 pieces
• Subprograms (SP)	512 pieces	5,000 pieces

#### NOTE

- 1 This PMC is used for Dual Check Safety function (option).
- 2 PMC Memory Type-E is enabled only on a special series of CNC software.
- 3 The extra relay is common memory for the multi-PMC function. This means that its size covers all of PMCs. Moreover, It is possible to use the extra relay as nonvolatile memory by the option. (Exclude 0i-F PMC/L)
- 4 No extra relay is available for DCSPMC.
- 5 The message display relay is ineffective in DCSPMC because the message display function is unavailable in it.
- 6 Under the configuration having two or more paths of PMC Memory-C or one path of PMC Memory-D or E, specify the "Nonvolatile PMC data table area expansion 40KB" option. If this option is not added, the expanded data table area (D10000~) is not kept after rebooting CNC. Refer to subsection 2.1.3 for details.
- 7 The step sequence program cannot be used though the S addresses exist.

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### 3.1.2 Program Capacity

All of the memory size, to which save the sequence program and multi-language PMC message data for all PMC paths, is specified as the combination of the following two options. The size of each data is calculated per 128KB.

Minimum unit of the size of divided ladder program is also 128KB. You can make up to 40(Note1) programs of main ladder and divided ladder within specified total memory size.

- (1) PMC Ladder step option (30i/31i/32i/35i-B, Power Motion *i*-A, 0i-F PMC)

Option name	Memory size
PMC Ladder Function 24,000 Steps (Basic)	256 KB
PMC Ladder Function 32,000 Steps	384 KB
PMC Ladder Function 64,000 Steps	768 KB
PMC Ladder Function 100,000 Steps	1 MB (1,024 KB)
PMC Ladder Function 300,000 Steps (Note2)	3 MB (3,072 KB)

- (2) PMC Ladder step option (0i-F PMC/L)

Option name	Memory size
PMC Ladder Function 5,000 Steps (Basic)	128 KB
PMC Ladder Function 8,000 Steps	128 KB
PMC Ladder Function 24,000 Steps (Note3)	256 KB

- (3) PMC Symbol, Comment and Message capacity expansion option  
(30i/31i/32i/35i-B, Power Motion *i*-A, 0i-F PMC)

Option name	Memory size
PMC Symbol, Comment and Message capacity expansion (512KB) (Note4)	512 KB
PMC Symbol, Comment and Message capacity expansion (1MB)	1MB (1,024 KB)
PMC Symbol, Comment and Message capacity expansion (2MB) (Note2)	2MB (2,048 KB)

- (4) PMC Symbol, Comment and Message capacity expansion option (0i-F PMC/L)

Option name	Memory size
PMC Symbol, Comment and Message capacity expansion (512KB) (Note5)	512 KB



#### CAUTION

When using 0i-F PMC/L, create message data in sequence program and message data for multi-language display, so that total size of those data becomes less than 128KB. If total size exceeds 128KB, PMC alarm "ER59 MESSAGE DATA SIZE OVER" occurs, and the sequence program does not start.

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**NOTE**

- 1 Up to 16 programs are available for 0i-F PMC. And, up to 6 programs are available for 0i-F PMC/L.
- 2 These options are not supported by the Series 0i-F.
- 3 The basic option for 0i-F Plus PMC/L is 24,000 steps.
- 4 This option is a basic option for 0i-F Plus PMC.
- 5 This option is a basic option for 0i-F type 6 and 0i-F Plus PMC/L.

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### 3.1.3 PMC Addresses

Add the following table into "2.1.6".

**Table 3.1.3 (a) PMC Address list (0i-F PMC/L, DCSPMC)**

Signals	Symbol	0i-F PMC/L		DCSPMC (Note1)
		PMC Memory-A	PMC Memory-B	
Input signal to the PMC from the machine	X	X0 to X127	X0 to X127	X0 to X127
Output signal from the PMC to the machine	Y	Y0 to Y127	Y0 to Y127	Y0 to Y127
Input signal to the PMC from the CNC	F	F0 to F767 F1000 to F1767	F0 to F767 F1000 to F1767	F0 to F767
Output signal from the PMC to the CNC	G	G0 to G767 G1000 to G1767	G0 to G767 G1000 to G1767	G0 to G767
Input signal from other PMC path	M	—	—	—
Output signal to other PMC path	N	—	—	—
Internal relay	R	R0 to R1499	R0 to R7999	R0 to R1499
System relay	R / Z	R9000 to R9499	R9000 to R9499	R9000 to R9499
Extra relay	E	E0 to E9999	E0 to E9999	(Note 6)
Message display • Display request • Display status	A	A0 to A249 A9000 to A9249	A0 to A249 A9000 to A9249	—
Timer • Variable timer • Variable timer precision (Note 7)	T	T0 to T79 T9000 to T9079	T0 to T499 T9000 to T9499	T0 to T79 T9000 to T9079
Counter • Variable counter • Fixed counter	C	C0 to C79 C5000 to C5039	C0 to C399 C5000 to C5199	C0 to C79 C5000 to C5039
Keep relay • User area • System area	K	K0 to K99 K900 to K999	K0 to K99 K900 to K999	K0 to K19 K900 to K999
Data table	D	D0 to D2999	D0 to D9999	D0 to D2999
Label	L	L1 to L9999	L1 to L9999	L1 to L9999
Subprogram	P	P1 to P512	P1 to P5000	P1 to P512
Step number (Step sequence)	S	(none)	S1 to S2000 (Note9)	(none)

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**NOTE**

- 1 This PMC is used for Dual Check Safety function (option).
- 2 PMC Memory Type-E is enabled only on a special series of CNC software.
- 3 This area is reserved for PMC management software. Do not use it in user programs.
- 4 The M/N addresses cannot be used in 4th and 5th path PMC.
- 5 This area is common memory for the multi-path PMC function. Each program can write and read the same value in the area.
- 6 No extra relay is available for the Dual Check Safety PMC.
- 7 This area is used to specify the precision of a variable timer.
  - Don't modify the value of active timer and its precision except for writing same value.
  - Don't set the value other than the following range.
  - If above rules are violated, the behavior of the timer is not guaranteed.

The value of precision

0: Default (8 msec or 48 msec)

1: 1 msec

2: 10 msec

3: 100 msec

4: 1 sec

5: 1 min

- 8 To save all area of the data table, the “Nonvolatile PMC data table area expansion (40KB)” option may be necessary. See “2.1.3 Determination of PMC Memory Type” for details.

- 9 The step sequence program cannot be used though the S addresses exist.

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## 3.2 PMC SIGNAL ADDRESS

### 3.2.1 Addresses for Signals Between the PMC and CNC (F, G)

#### (1) Signals from the CNC to the PMC

1st to 5th path PMC		0i-F PMC/L		DCSPMC
PMC Memory-A, B, C, D	PMC Memory-E	PMC Memory-A	PMC Memory-B	
F0 to F767 F1000 to F1767 F2000 to F2767 F3000 to F3767 F4000 to F4767 F5000 to F5767 F6000 to F6767 F7000 to F7767 F8000 to F8767 F9000 to F9767	F0 to F767 F1000 to F1767 F2000 to F2767 F3000 to F3767 F4000 to F4767 F5000 to F5767 F6000 to F6767 F7000 to F7767 F8000 to F8767 F9000 to F9767 F10000 to F10767 F11000 to F11767 F12000 to F12767 F13000 to F13767 F14000 to F14767	F0 to F767 F1000 to F1767	F0 to F767 F1000 to F1767	F0 to F767

#### (2) Signals from the PMC to the CNC

1st to 5th path PMC		0i-F PMC/L		DCSPMC
PMC Memory-A, B, C, D	PMC Memory-E	PMC Memory-A	PMC Memory-B	
G0 to G767 G1000 to G1767 G2000 to G2767 G3000 to G3767 G4000 to G4767 G5000 to G5767 G6000 to G6767 G7000 to G7767 G8000 to G8767 G9000 to G9767	G0 to G767 G1000 to G1767 G2000 to G2767 G3000 to G3767 G4000 to G4767 G5000 to G5767 G6000 to G6767 G7000 to G7767 G8000 to G8767 G9000 to G9767 G10000 to G10767 G11000 to G11767 G12000 to G12767 G13000 to G13767 G14000 to G14767	G0 to G767 G1000 to G1767	G0 to G767 G1000 to G1767	G0 to G767

\*\*\* omitted below \*\*\*

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### 3.2.2 Addresses of Signals Between the PMC and Machine (X, Y)

These addresses are interface areas between PMC and machines.

(1) Assignment of the FANUC I/O Link / I/O Link *i*

(a) Signals input from the machine to the PMC

PMC	PMC address	I/O Link	I/O Link <i>i</i>
1st to 5th PMC	X0~X127 X200~X327 X400~X527 X600~X727	Assign an address area to each channel. (Note1)	Assign PMC address to each I/O device. (Note2)
0i-F PMC/L	X0~X127	Channel 1.	
DCSPMC	X0~X127	Assign to Channel 3. (Note1)	

(b) Signals output from the PMC to the machine

PMC	PMC address	I/O Link	I/O Link <i>i</i>
1st to 5th PMC	Y0~Y127 Y200~Y327 Y400~Y527 Y600~Y727	Assign an address area to each channel. (Note1)	Assign PMC address to each I/O device. (Note2)
0i-F PMC/L	Y0~Y127	Channel 1.	
DCSPMC	Y0~Y127	Assign to Channel 3. (Note1)	

#### NOTE

- 1 See "I/O Link input/output addresses" in subsection "2.4.3" of PMC programming manual for details.
- 2 See subsection "3.3.6" of PMC programming manual for details.
- 3 X/Y addresses can be also used for network devices. As for details, refer to "The input/output address used by network device" in subsection "2.4.3" of PMC programming manual.
- 4 In series 0i-F Plus, only I/O Link *i* is available and I/O Link is not available.

\*\*\* omitted below \*\*\*

### 3.2.3 Internal Relay Addresses (R)

Table 3.2.3 Address of Internal Relay

Data kind	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
User area	R0 to R1499	R0 to R7999	R0 to R15999	R0 to R59999	R0 to R1499	R0 to R7999	R0 to R1499

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## 3.2.4 System Relay Addresses (R9000, Z0)

Table 3.2.4 Address of System Relay

Data kind	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
System relays	R9000 to R9499	R9000 to R9499	Z0 to Z499	Z0 to Z499	R9000 to R9499	R9000 to R9499	R9000 to R9499

\*\*\* omitted below \*\*\*

## 3.2.5 Extra Relay Addresses (E)

Table 3.2.5 Address of Extra Relay

Data kind	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Extra relays	E0 to E9999	E0 to E9999	E0 to E9999	E0 to E9999	E0 to E9999	E0 to E9999	—

\*\*\* omitted below \*\*\*

## 3.2.6 Message Display Addresses (A)

Table 3.2.6 Address of Message display

Data kind	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Message display request (points)	A0 to A249 (2,000 points)	A0 to A249 (2,000 points)	A0 to A499 (4,000 points)	A0 to A749 (6,000 points)	A0 to A249 (2,000 points)	A0 to A249 (2,000 points)	—
Message display status	A9000 to A9249	A9000 to A9249	A9000 to A9499	A9000 to A9749	A9000 to A9249	A9000 to A9249	—

## 3.2.7 Timer Addresses (T)

Table 3.2.7 Address of variable timer

Data kind	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Variable timer (Number of timers)	T0 to T79 (40 pieces)	T0 to T499 (250 pieces)	T0 to T999 (500 pieces)	T0 to T999 (500 pieces)	T0 to T79 (40 pieces)	T0 to T499 (250 pieces)	T0 to T79 (40 pieces)
precision	T9000 to T9079	T9000 to T9499	T9000 to T9999	T9000 to T9999	T9000 to T9079	T9000 to T9499	T9000 to T9079

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### 3.2.8 Counter Addresses (C)

Table 3.2.8 Address of counters

Data kind	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Variable counter (Number of counters)	C0 to C79 (20 pieces)	C0 to C399 (100 pieces)	C0 to C799 (200 pieces)	C0 to C1199 (300 pieces)	C0 to C79 (20 pieces)	C0 to C399 (100 pieces)	C0 to C79 (20 pieces)
Fixed counter (Number of counters)	C5000 to C5039 (20 pieces)	C5000 to C5199 (100 pieces)	C5000 to C5399 (200 pieces)	C5000 to C5599 (300 pieces)	C5000 to C5039 (20 pieces)	C5000 to C5199 (100 pieces)	C5000 to C5039 (20 pieces)

### 3.2.9 Keep Relay Addresses (K)

Table 3.2.9 Address of keep relays

Data kind	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Keep relays	K0 to K19	K0 to K99	K0 to K199	K0 to K299	K0 to K99	K0 to K99	K0 to K19

### 3.2.10 System Keep Relay Addresses (K)

Table 3.2.10 Address of System keep relay

Data kind	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
System keep relays	K900 to K999	K900 to K999	K900 to K999	K900 to K999	K900 to K999	K900 to K999	K900 to K999

\*\*\* omitted below \*\*\*

### 3.2.11 Data Table Addresses (D)

Table 3.2.11 Address of Data table

Data kind	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Data table	D0 to D2999	D0 to D9999	D0 to D19999	D0 to D59999	D0 to D2999	D0 to D9999	D0 to D2999

\*\*\* omitted below \*\*\*

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### 3.2.12 Addresses for Multi-path PMC Interface (M, N)

(1) Input signals from another PMC path

Table 3.2.12 (a) Input signals from another PMC path

Data kind	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Input signals	M0 to M767	M0 to M767	M0 to M767	M0 to M767	—	—	—

(2) Output signals to another PMC path

Table 3.2.12 (b) Output signals to another PMC path

Data kind	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Output signals	N0 to N767	N0 to N767	N0 to N767	N0 to N767	—	—	—

### 3.2.13 Subprogram Number Addresses (P)

Table 3.2.13 Address of Subprogram number

Data kind	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Subprogram number	P1 to P512	P1 to P5000	P1 to P5000	P1 to P5000	P1 to P512	P1 to P5000	P1 to P512

### 3.2.14 Label Number Addresses (L)

Table 3.2.14 Address of Label number

Data kind	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Label number	L1 to L9999	L1 to L9999	L1 to L9999	L1 to L9999	L1 to L9999	L1 to L9999	L1 to L9999

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## 3.3 PMC PARAMETERS

### 3.3.1 PMC Parameter Format

*Change the following tables*

#### (2) Timer (T)

	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Timer setting value	N600000 to N600078	N600000 to N600498	N600000 to N600998	N6000000 to N6000998	N600000 to N600078	N600000 to N600498	N600000 to N600078
Timer accuracy	N609000 to N609078	N609000 to N609498	N609000 to N609998	N6009000 to N6009998	N609000 to N609078	N609000 to N609498	N609000 to N609078

#### (3) Counter (C)

	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Variable counter (CTR)	N610000 to N610078	N610000 to N610398	N610000 to N610798	N6100000 to N6101198	N610000 to N610078	N610000 to N610398	N610000 to N610078
Fixed counter (CTRB)	N615000 to N615038	N615000 to N615198	N615000 to N615398	N6105000 to N6105598	N615000 to N615038	N615000 to N615198	N615000 to N615038

#### (4) Keep relay (K)

	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
User area	N620000 to N620019	N620000 to N620099	N620000 to N620199	N6200000 to N6200299	N620000 to N620099	N620000 to N620099	N620000 to N620019
System area	N620900 to N620999	N620900 to N620999	N620900 to N620999	N6200900 to N6200999	N620900 to N620999	N620900 to N620999	N620900 to N620999

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## (5) Data (D)

## (a) Data table control

	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Data Size	1 to 3000	1 to 10000	1 to 20000	1 to 60000	1 to 3000	1 to 10000	1 to 3000
Start address	0 to 2999	0 to 9999	0 to 19999	0 to 59999	0 to 2999	0 to 9999	0 to 2999

## (b) Data table

	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Data table	N640000 to N642999	N640000 to N649999	N640000 to N659999	N6400000 to N6459999	N640000 to N642999	N640000 to N649999	N640000 to N642999

## (6) Extra memory (E)

## (a) Byte format

	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Extra relay	N690000 to N699999	N690000 to N699999	N690000 to N699999	N6900000 to N6909999	N690000 to N699999	N690000 to N699999	N690000 to N699999

## (b) Table format (Control data part)

	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Data Size	1 to 10000	1 to 10000	1 to 10000	1 to 10000	1 to 10000	1 to 10000	1 to 10000
Start address	0 to 9999	0 to 9999	0 to 9999	0 to 9999	0 to 9999	0 to 9999	0 to 9999

## (c) Table format (Extra relay part)

	1st to 5th path PMC				0i-F PMC/L		DCSPMC
	PMC Memory-A	PMC Memory-B	PMC Memory-C	PMC Memory-D, E	PMC Memory-A	PMC Memory-B	
Extra relay	N690000 to N699999	N690000 to N699999	N690000 to N699999	N6900000 to N6909999	N690000 to N699999	N690000 to N699999	N690000 to N699999

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## 3.4 PARAMETERS FOR THE PMC SYSTEM

### 3.4.1 CNC Parameters Related to the PMCs

*Change the contents of the following parameters*

#### I/O Link input/output addresses

11910	I/O Link channel 1 input/output addresses
11911	I/O Link channel 2 input/output addresses
11912	I/O Link channel 3 input/output addresses

#### NOTE

- Once any of these parameters is re-set, it is necessary to turn the power off and on again.
- This parameter is unavailable for 0i-F Plus.

#### Input/output addresses of dual assignment of I/O Link channel

11915	Input/output addresses of the second block of I/O Link channel 1
11916	Input/output addresses of the second block of I/O Link channel 2
11917	Input/output addresses of the second block of I/O Link channel 3

#### NOTE

- Once any of these parameters is re-set, it is necessary to turn the power off and on again.
- This parameter is not available for 0i-F Plus.

#### Communication method with I/O device

#### Running/stopping of ladder program when updating

	#7	#6	#5	#4	#3	#2	#1	#0
11933			SRL				C2T	C1T

[Input type] Parameter input

[Data type] Bit

#### NOTE

Once these parameters are re-set, it is necessary to turn the power off and on again.

- #0 C1T** Specifies the communication method of channel 1.  
0 : I/O Link is used.

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1 : I/O Link *i* is used.

#1 **C2T** Specifies the communication method of channel 2.

0 : I/O Link is used.

1 : I/O Link *i* is used.

#### NOTE

1 When you set the channel to "use I/O Link", set the parameter no.11910 to 11912, also.

2 For series 0i-F, the default value of these parameters is "1".

3 For series 0i-F Plus, This parameter is fixed to "1".

4 The parameter C2T(No.11933#1) is unavailable for 0i-F PMC/L.

#5 **SRL** When reading a ladder program in the I/O screen or by other operations:

0 : The execution of the ladder program is stopped automatically.

1 : The execution of the ladder program is not stopped. The ladder program is exchanged and running continuously after the completion of reading of the ladder program.

## PMC Memory Type

11940	PMC Memory Type of 1st PMC
11941	PMC Memory Type of 2nd PMC
11942	PMC Memory Type of 3rd PMC
11943	PMC Memory Type of 4th PMC
11944	PMC Memory Type of 5th PMC

#### NOTE

1 Once this parameters is re-set, it is necessary to turn the power off and on again.

2 This parameter is unavailable for 0i-F PMC/L.

[Input type] Parameter input

[Data type] Integer

[Valid data range] -1, 0, 1, 2, 3, 4,5

Select a PMC Memory Type of each PMC path. Refer to "Table 2.1.1(b) Basic specification of each PMC Memory Type" for details of each PMC Memory Type.

Setting	Meaning
0	Use standard setting of PMC Memory Type.
1	Use PMC Memory-A.
2	Use PMC Memory-B.
3	Use PMC Memory-C.
4	Use PMC Memory-D.
5	Use PMC Memory-E. (NOTE1)

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Setting	Meaning
-1	The 2nd to 5th paths PMC share the PMC Memory with 1st path PMC.

The following is the selectable PMC memory types in each PMC path.

1st path PMC	2nd to 5th path PMC	Remark
PMC-memory B (default) PMC-memory C (NOTE2)	PMC-memory A (default) PMC-memory B PMC-memory C (NOTE2) Shared with 1st path PMC	You can specify up to three paths both of PMC-memory B and C in total.
PMC-memory D (NOTE2) PMC-memory E (NOTE2)	Shared with 1st path PMC	

The following is the selectable PMC memory types in 0i-F Plus PMC/L.

Setting	Meaning
0	Use PMC Memory-A.
1	Use PMC Memory-A.
2	Use PMC Memory-B.



### CAUTION

- 1 Setting an invalid value to this parameter results in the PMC alarm "ER58 PMC MEMORY TYPE SETTING ERROR" and all sequence programs for each PMC will not be started.
- 2 PMC nonvolatile memory must be initialized after changing PMC Memory Type. Therefore, make a backup of PMC parameter before changing PMC Memory Type. Refer to the "2.7 DATA BACKED UP BY THE BATTERY" of PMC Programming Manual about the operation of initializing PMC nonvolatile memory.

### NOTE

- 1 PMC Memory Type-E is enabled only on a special series of CNC software.
- 2 To use all data table area as nonvolatile memory with PMC Memory-C/D/E, specify the option "Nonvolatile PMC data table area expansion (40KB)". If this option does not be specified, the expanded data table area (D10000 or more) does not keep the memory after rebooting CNC.

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## 3.5 COMPATIBILITY WITH CONVENTIONAL MODELS

### 3.5.1 Compatibility between 0i-F PMC and 0i-F Plus PMC

#### Ladder program compatibility

The sequence program of series 0i-F Plus PMC is highly compatible with sequence program of series 0i-F PMC on the source level.

You can use the sequence program of series 0i-F PMC on series 0i-F Plus.

You should check the program in series 0i-F Plus PMC whether it works correctly even if it worked fine in series 0i-F PMC because the specifications of the following functions have been changed. If I/O module for I/O link was used for I/O assignment, it is necessary to change I/O assignment for I/O Link *i*.

- (1) The basic instruction execution speed is 18.2ns/step in series 0i-F PMC. It is 9.1ns/step in series 0i-F Plus PMC.
- (2) As the execution speed of instructions become fast, the following items about execution timing may be changed.
  - The execution cycle of the second level of ladder
  - The timing of the execution cycle of the first level of ladder and the partition of the second level ladder
  - The timing between ladder execution and transferring I/O signals
- (3) As the execution speed of CNC or PMC become fast, the execution timing between the CNC processing and the ladder execution or the DSCPMC ladder execution may be changed.
- (4) In series 0i-F Plus, I/O Link is unavailable. it is necessary to change I/O assignment for I/O Link *i*.

#### PMC parameter compatibility

The PMC parameters output from series 0i-F PMC can be loaded into series 0i-F Plus PMC without any modification.

### 3.5.2 Compatibility between 0i-F PMC/L and 0i-F Plus PMC/L

#### Ladder program compatibility

The sequence program of series 0i-F Plus PMC/L is highly compatible with sequence program of series 0i-F PMC/L on the source level.

The address size of series 0i-F PMC/L corresponds to the PMC memory-A for series 0i-F Plus PMC/L.

You should check the program in series 0i-F Plus PMC/L whether it works correctly even if it worked fine in series 0i-F PMC/L because the specifications of the following functions have been changed. If I/O module for I/O link was used for I/O assignment, it is necessary to change I/O assignment for I/O Link *i*.

- (1) As the execution speed of instructions become fast, the following items about execution timing may be changed.
  - The execution cycle of the second level of ladder
  - The timing of the execution cycle of the first level of ladder and the partition of the second level ladder
  - The timing between ladder execution and transferring I/O signals
- (2) In series 0i-F Plus, I/O Link is unavailable. it is necessary to change I/O assignment for I/O Link *i*.

#### PMC parameter compatibility

The PMC parameters output from series 0i-F PMC/L can be loaded into series 0i-F Plus PMC/L without any modification.

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### 3.5.3 Compatibility between PMC Memory-B of 0i-F PMC and PMC Memory-B of 0i-F Plus PMC/L

#### Ladder program compatibility

The sequence program of the PMC memory-B for series 0i-F PMC/L is highly compatible with the PMC memory-B for series 0i-F PMC on the source level.

You can use the sequence program of the PMC memory-B for series 0i-F PMC on series 0i-F Plus PMC/L by changing the PMC model using FANUC LADDER-III.

Transporting programs require modification because the specifications of the following functions have been changed.

- (1) It can be switched between 4 and 8 msec using a CNC parameter in series 0i-F PMC. The first level execution period is fixed at 8 msec in 0i-F Plus PMC/L.
- (2) The basic instruction execution speed is 18.2 ns/step in series 0i-F PMC. It is 1μs/step in 0i-F Plus PMC/L. The processing speed of the functional instructions is also different.
- (3) As the execution speed of instructions is different, the following items about execution timing may be changed.
  - The execution cycle of the second level of ladder
  - The timing of the execution cycle of first level of ladder and the partition of second level ladder
  - The timing between ladder execution and transferring I/O signals

The working test of the machine is necessary in series 0i-F Plus PMC/L even if it worked fine in series 0i-F PMC.
- (4) The maximum steps of ladder program is about 100,000 steps in all PMC path of the series 0i-F PMC. It is about 24,000 steps in single path of series 0i-F Plus PMC/L. When the total steps of the ladder program created in the series 0i-F PMC exceeds the maximum steps of series 0i-F Plus PMC/L, reduce the steps of the ladder program.
- (5) The maximum storage area of the sequence program is 2MB in series 0i-F PMC. It is 768KB in series 0i-F Plus PMC/L. When the total memory size of the sequence program created in series 0i-F PMC exceeds the storage area of series 0i-F Plus PMC/L, reduce ladder steps, symbols or comments of the ladder program.
- (6) The step sequence function be can used in series 0i-F PMC. However, the function is not supported in series 0i-F Plus PMC/L. Please convert the step sequence program to the ladder program or function blocks.
- (7) The maximum number of divided ladder program is 16 in series 0i-F PMC. It is 6 in series 0i-F Plus PMC/L. Please modify the divided program to 6 programs or less.
- (8) A part of the functional instructions that can be used in series 0i-F PMC cannot be used in series 0i-F Plus PMC/L. For available functional instructions, refer to the section “2.1.8” and the section “2.1.9” in the PMC programming manual.
- (9) Available interface area of DI/DO signals to CNC (address F, G) is 768byte\*10 (Input) and 768byte\*10 (Output) in series 0i-F PMC. In series 0i-F Plus PMC/L, the interface is 768byte\*2 (Input) and 768byte\*2 (Output). Please use the address within the range that can be used with series 0i-F Plus PMC/L.
- (10) Available interface area of DI/DO signals to machine (address X, Y) is 2048 points (Input) and 2048 points (Output) in series 0i-F PMC. In series 0i-F Plus PMC/L, the interface is 1024 points (Input) and 1024 points (Output). Please use the address within the range that can be used with series 0i-F Plus PMC/L.

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- (11) In the ladder program of series 0i-F Plus PMC/L, the third level can be programmed for the compatibility. However, the third level is not executed. Please program in the first and second level.
- (12) When an invalid value, which is not described in the programming manual, is input to a parameter of a functional instruction, the result of the operation would be different from it of series 0i-F PMC.
- (13) In series 0i-F Plus, I/O Link is unavailable. it is necessary to change I/O assignment for I/O Link *i*.

### PMC parameter compatibility

The PMC parameters output from PMC memory-B of series 0i-F PMC can be loaded into the PMC memory-B of series 0i-F Plus PMC/L without any modification.

## 3.5.4 Compatibility between 0i-F DCSPMC and 0i-F Plus DCSPMC

### Ladder program compatibility

The sequence program of the series 0i-F Plus DCSPMC is highly compatible with sequence program of the series 0i-F DCSPMC on the source level.

You should check the program in series 0i-F Plus DCSPMC whether it works correctly even if it worked fine in series 0i-F DCSPMC because the specifications of the following functions have been changed. If I/O module for I/O link was used for I/O assignment, it is necessary to change I/O assignment for I/O Link *i*.

- (1) As the execution speed of instructions become fast, the following items about execution timing may be changed.
  - The execution cycle of the second level of ladder
  - The timing of the execution cycle of the first level of ladder and the partition of the second level ladder
  - The timing between ladder execution and transferring I/O signals
- (2) In series 0i-F Plus, I/O Link is unavailable. it is necessary to change I/O assignment for I/O Link *i*.

It is necessary to confirm the program in series 0i-F Plus DCSPMC even if it worked fine in series 0i-F DCSPMC.

### PMC parameter compatibility

The PMC parameters output from series 0i-F DCSPMC can be loaded into series 0i-F Plus DCSPMC without any modification.

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## 3.6 COMMUNICATION WITH I/O DEVICE

### 3.6.1 I/O Link *i* and I/O Link

There are two communication methods for the high-speed serial interface which transmits input/output signals between the PMC and I/O devices. They are FANUC I/O Link *i* and FANUC I/O Link.

You can use up to three channels for the serial interface. The communication method for channel 1 and channel 2 can be specified by the CNC parameter. The channel 3 can be used only for I/O Link.

For the details of the setting of the CNC parameter, see subsection “2.4.3”.

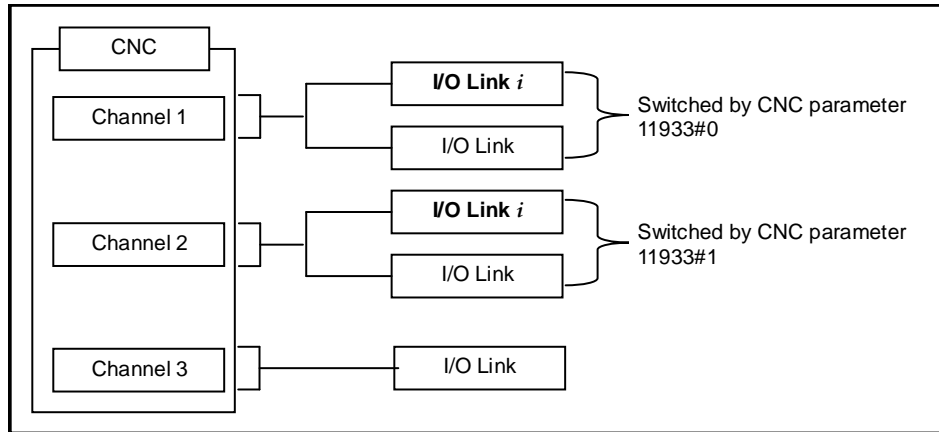


Fig. 3.6 Setting of communication method for each channel

The maximum I/O points of I/O Link *i* are 2048 points/2048 points for each channel. The maximum I/O points of I/O Link are 1024 points/1024 points for each channel. The maximum I/O points for a PMC system are 4096 points/4096 points (0i-F: 2048 points/2048 points). You can use one or more channels of I/O Link *i* and I/O Link however the total points cannot exceed the maximum points of the PMC system.

[Example of the selectable case of the I/O Link *i* and the I/O Link]

Channel 1	Channel 2	Channel 3	Total points (DI / DO)
I/O Link <i>i</i>	I/O Link <i>i</i>	—	4096 / 4096 (NOTE1, NOTE2)
I/O Link <i>i</i>	I/O Link	I/O Link	4096 / 4096 (NOTE1, NOTE2)
I/O Link <i>i</i>	I/O Link	—	3072 / 3072 (NOTE1, NOTE2)
I/O Link	I/O Link	I/O Link	3072 / 3072 (NOTE1, NOTE2)
I/O Link <i>i</i>	—	—	2048 / 2048 (NOTE2)
I/O Link	I/O Link	—	2048 / 2048 (NOTE2)
I/O Link	—	I/O Link	2048 / 2048 (NOTE2)
I/O Link	—	—	1024 / 1024

#### NOTE

- 1 For 0i-F PMC, the total points (DI/DO) are 2048/2048 points.
- 2 For 0i-F PMC/L, the total points (DI/DO) are 1024/1024 points.
- 3 In series 0i-F Plus, only I/O Link *i* is available and I/O Link is not available.

For the multi-path PMC, the DI/DO of one channel can be assigned to plural PMC paths efficiently using I/O Link *i*. The connect position of I/O devices can be defined as group/slot number.

				FANUC Series 30i/31i/32i/35i-MODEL B FANUC Power Motion <i>i</i> -MODEL A FANUC Series 0i-MODEL F PMC Supplemental Programming Manual	
01	2018.12.03	N.Nagashima	New registration	DRAW. NO. : B-64513EN/04-2	
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As for the transmission cycle of the signals from the I/O Link  $i$ , there are two modes of the normal mode (2msec) and the high-speed mode (0.5msec). You can specify the mode for each group of I/O devices. For details, refer to subsection “3.3.3”.

\*\*\* *omitted below* \*\*\*

				FANUC Series 30i/31i/32i/35i-MODEL B FANUC Power Motion $i$ -MODEL A FANUC Series 0i-MODEL F PMC Supplemental Programming Manual	
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