

FANUC Series 0i-MF Plus

Die Mould Functions

(Procedures)

Version.	001.000	FANUC INDIA	Title FANUC Series 0i-MF Plus Die Mould (Procedures)	
Prepared By	Prakash T			
Approved By	V C Chikale	1 / 18	Date	17-07-2020

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1.1 Outline

FANUC Series 0i-MF Plus CNC is the latest AI nano CNC that realizes high-speed, high-precision machining. This CNC is equipped with ***Fine Surface Technology (FST)*** to achieve fine surface machining required for Die & Mould applications.

This document describes the supporting functions for fine surface machining and its procedure.

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1.2 AICC II + and Smooth Tolerance + Command Format:

The AI contour control II+ functions are provided for high-speed, high-precision machining. This function enables suppression of acceleration/deceleration delays and servo delays that become larger with increases in the feedrate and reduction of machining profile errors.

Smooth tolerance+ control is a function that generates smooth machining path within specified tolerance. In the case of die mold machining program that consists of small line segments, this function acts as smoothing function and makes joints of blocks smooth. As the result, machining surface gets high quality.

Moreover, operators can select an effective setting pattern depending on the machining conditions.

Command Format:

G5.1 Q1 R_ ; AI contour control+ & Smooth tolerance+ control mode on

:
:
:

Machining Program

G5.1 Q0 ; AI contour control+ & Smooth tolerance+ control mode off

R: Machining condition selection (R1,R5,R10)

Roughing Program	Semi-Finish Program	Finish Program
<p>G5.1 Q1 R1;</p> <p>: : : } Machining Program</p> <p>G5.1 Q0 ;</p>	<p>G5.1 Q1 R5;</p> <p>: : : } Machining Program</p> <p>G5.1 Q0 ;</p>	<p>G5.1 Q1 R10;</p> <p>: : : } Machining Program</p> <p>G5.1 Q0 ;</p>

NOTE

Smooth tolerance+ control mode is enabled automatically during Semi-finish and Finish machining. Character string "TOLCON" blinks in the status bar when Smooth tolerance+ control mode is enabled.

MEM STOP *** ** 00:00:00 TOLCON

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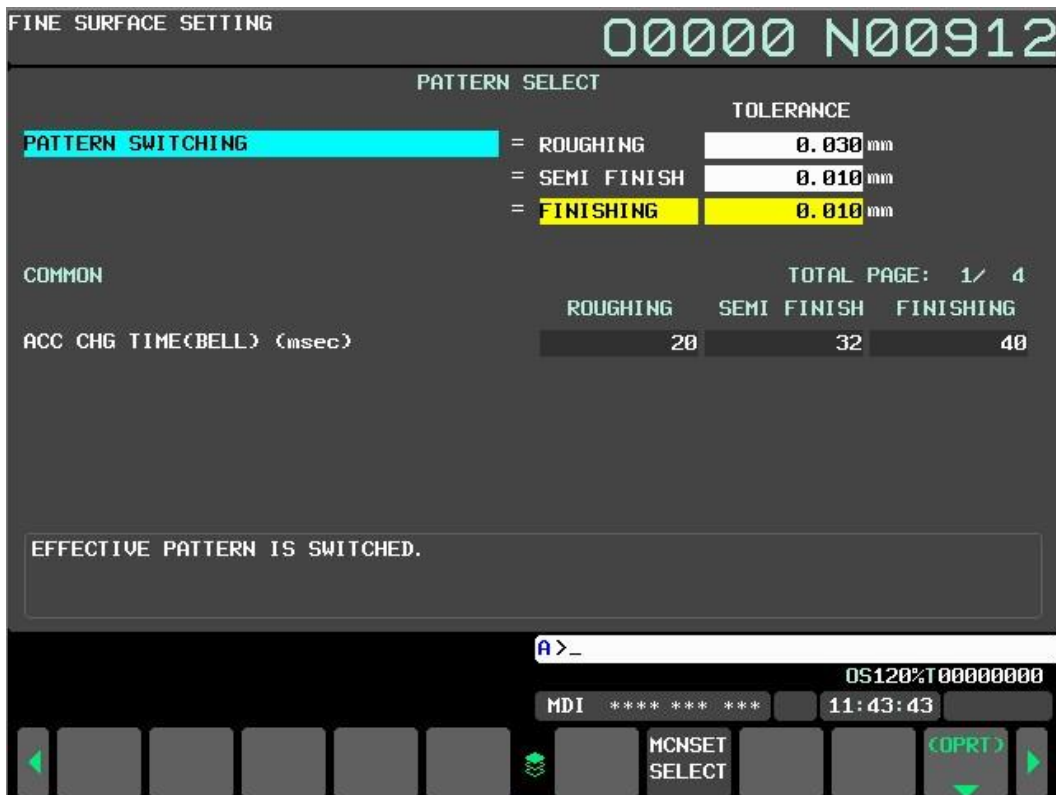
1.2.1 Tolerance Setting:

The tolerance value in Smooth tolerance+ control can be set.

1. When creating machining program with CAM software, tolerance of model shape is set. Set same tolerance value in the below shown setting screen.
2. Set Tolerance value same for Semi finish and finish.
3. Standard setting value of 10µm, which will come with the machine. This value can be changed based on the requirement.

Procedure for Tolerance Setting:

1. Select **MDI** mode
2. Press **OFS/SET** MDI Key → **RIGHT** arrow → **MCNSET SELECT** → Input the **TOLERANCE** for Semi-finish and Finish.



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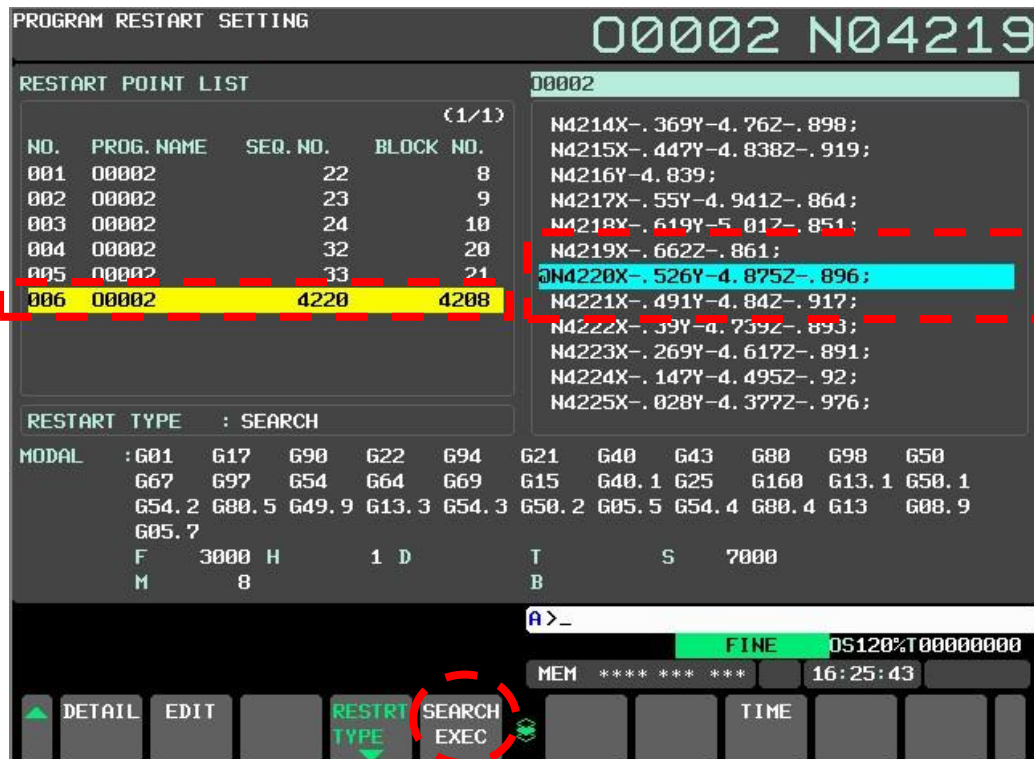
1.3 Quick Program Restart

Generally, the following operations are required when machining is interrupted due to a reason such as a damaged tool/ power failure and is restarted:

1. Removing the cause which interrupted the machining.
2. Locating the interrupted point in the program.
3. Restoring the machine to the suitable status (including the auxiliary functions like coolant on, tool call status and spindle status).
4. Moving the tool to the position suitable for restarting the machining.
5. Resume automatic operation from the interrupted block or before several blocks.

QPR helps to perform Program Restart in 3 easy steps.

1. Press the softkey **[Restart]**, Restart Point list screen will open.
2. Select a block from list, and push **[SEARCH EXEC]** key to restart. It displays program block where the program was interrupted.
3. Press **[CYCLE START]**, Automatic restoration of modal information and axes moving to restart point and resumes the automatic operation from the interrupted block.



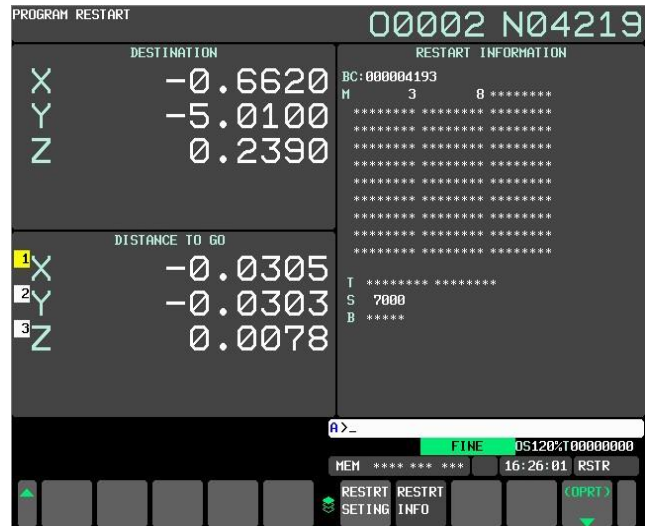
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1.3.1 Procedure for Quick Program Restart [Auto Mode]

- Once the part program is interrupted, clear all alarm and move Z axis to reference position.
- Press **PROG KEY** → Press **FOLDER** → Press **OPRT** → Press **DEVICE CHANGE** → Select **CNC MEM** (or **MEM CARD**) → Move cursor to select main program → Press **MAIN PROGRAM**.



- In Auto mode, select “**PROG**” in MDI keypad and press **RIGHT ARROW**
- Select “**RESTRT**” and press “**OPRT**”
- Select “**SEARCH EXEC**”. CNC will start to search program restart point and **RSTR** will blink in bottom right corner. After completion of search screen will switch to below indicated screen.



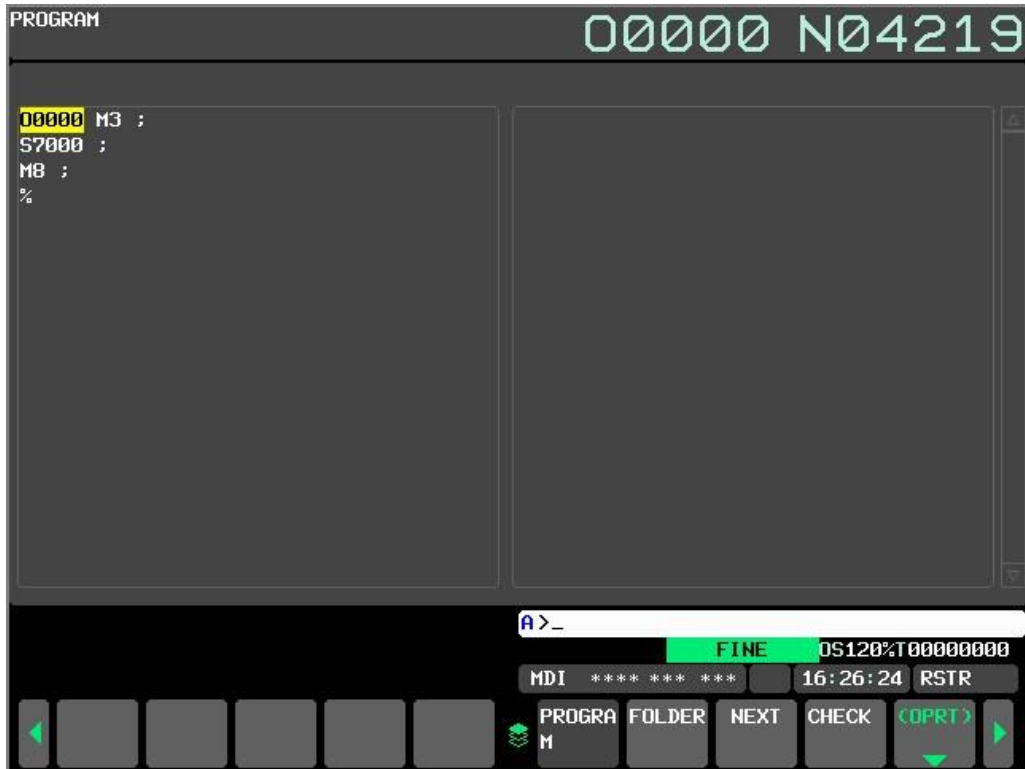
Warning

Don't interrupt/reset during Program Restart operation.



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6. Press **MDI** mode, all previous executed M, S, T codes will be output automatically in the **MDI program screen** as shown below.



7. Execute the M, S, T codes whichever is needed in MDI mode.
 8. Select **AUTO mode** and press [**CYCLE START**] to restart the program.

NOTE

Please ensure M, S, T, B codes are executed correctly and axis moved to restart point correctly and execute the Cycle.

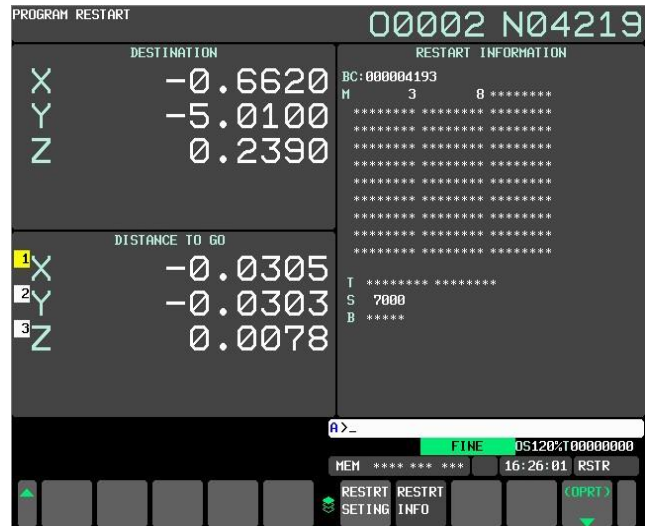
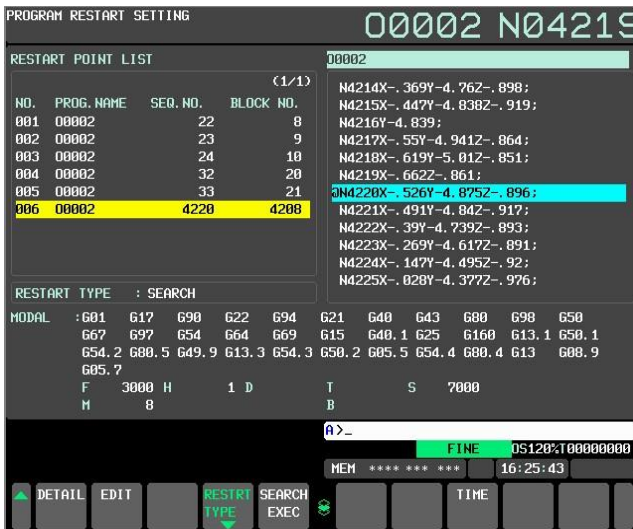
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1.3.2 Procedure for Quick Program Restart[Remote Mode]

- Once the part program is interrupted, clear all alarm and move Z axis to reference position.
- Press **PROG KEY** → Press **FOLDER** → Press **OPRT** → Press **DEVICE CHANGE** → Select **MEMORY CARD** → Move cursor to select the **DNC program** → Press “**DNC SET**” to select the program



- In Remote mode, select “**PROG**” in MDI keypad and press **RIGHT ARROW**
- Select “**RESTRT**” and press “**OPRT**”
- Select “**SEARCH EXEC**”. CNC will start to search program restart point and **RSTR** will blink in bottom right corner. After completion of search screen will switch to below indicated screen.



Warning

Don't interrupt/reset during Program Restart operation.



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6. Press **MDI** mode, all previous executed M, S, T codes will be output automatically in the **MDI program screen** as shown below.



7. Execute the M, S, T codes whichever is needed in MDI mode.
 8. Select **REMOTE mode** and press [**CYCLE START**] to restart the program.

NOTE

Please ensure M, S, T, B codes are executed correctly and axis moved to restart point correctly and execute the Cycle.

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1.4 On-board creation of FANUCPRG.BIN file

In case of Die & Mould machining program size can be large several hundreds of MByte. Operators can use the memory card (compact flash) in the card slot to store and execute such large size programs.

There are two formats to store these program in the memory card as indicated below:

- **Program storage file format [Recommended format]**

In this format, program storage file is named as “**FANUCPRG.BIN**”, and can be executed in Auto mode.

Programs in program storage file format can be edited on CNC screen.

- **Text file format**

In this format, programs created in text file format can be executed in Auto/DNC mode.

NOTE

FANUCPRG.BIN file creation required once we use new memory card.

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1.4.1 Procedure for creating FANUCPRG.BIN

Warning

“FANUCPRG.BIN” creation is required for first time when memory card is used in the machine.

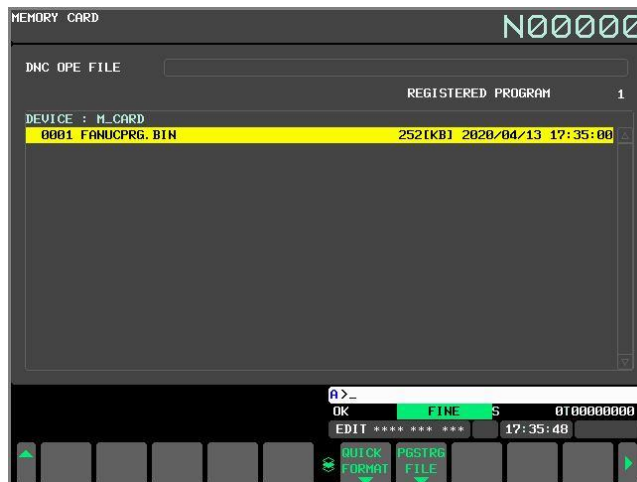


1. Select EDIT mode & press function key [PROG.].
2. Press the softkey [FOLDER].
3. Press the softkey [(OPRT)].
4. Press the softkey [DEVICE CHANGE].
5. Press the softkey [MEMORY CARD].



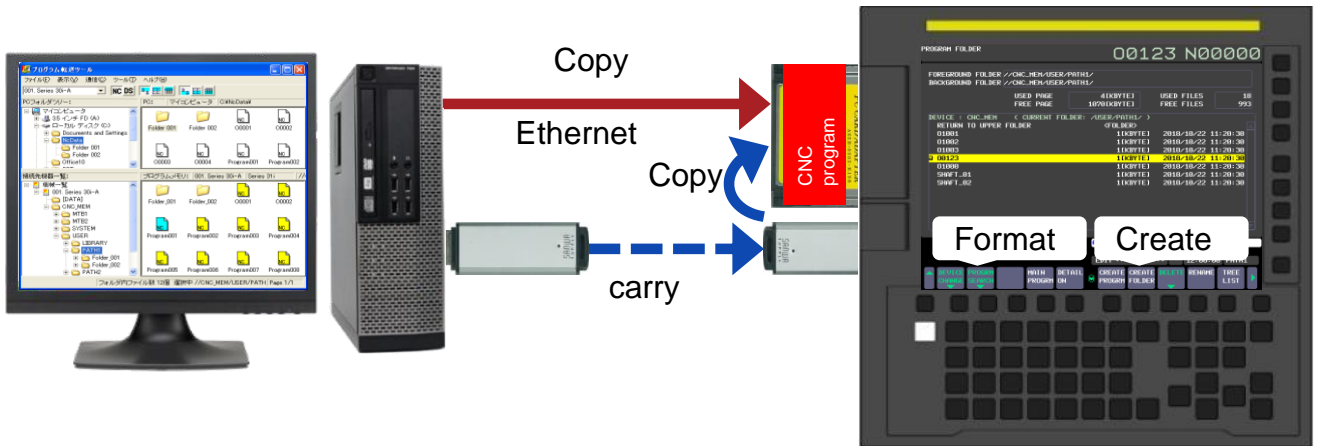
6. Press the softkey[PGSTRG FILE] (If softkey[PGSTRG FILE] does not appear, press the continuous menu key .)
7. If you want to change a program size, input number of size and press soft key[SIZE SET].
8. Press soft key [EXEC].
9. “OUTPUT” is displayed in the lower right of the screen while “FANUCPRG.BIN” file is being created.

Example: When the program to be stored in Program Storage memory required 20MB, enter 20 in input area and press “SIZE SET” and “EXEC”, FANUCPRG.BIN file is created.



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1.5 Program Transfer



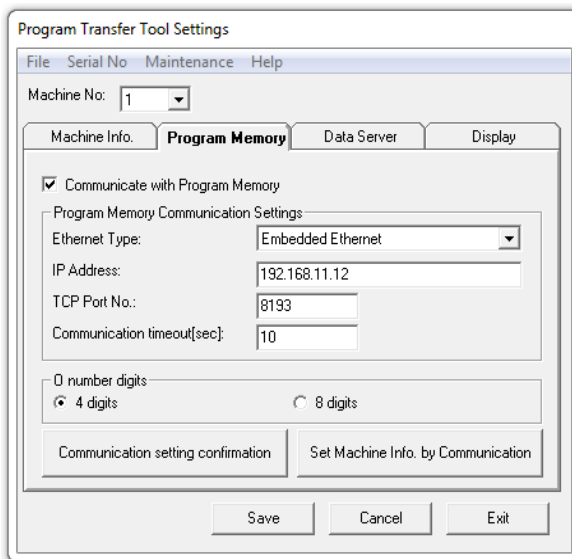
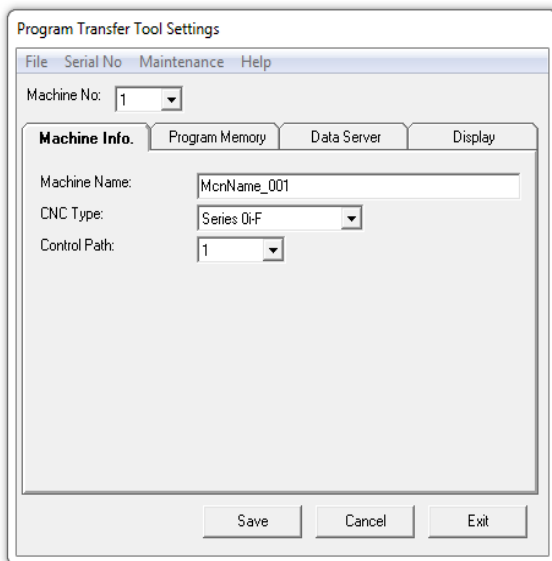
The Program file can be transferred to the memory card in the following way.

- Copy/Move from USB memory to memory card
- File transfer from PC to Memory Card over Ethernet using FANUCs Program transfer tool Software.

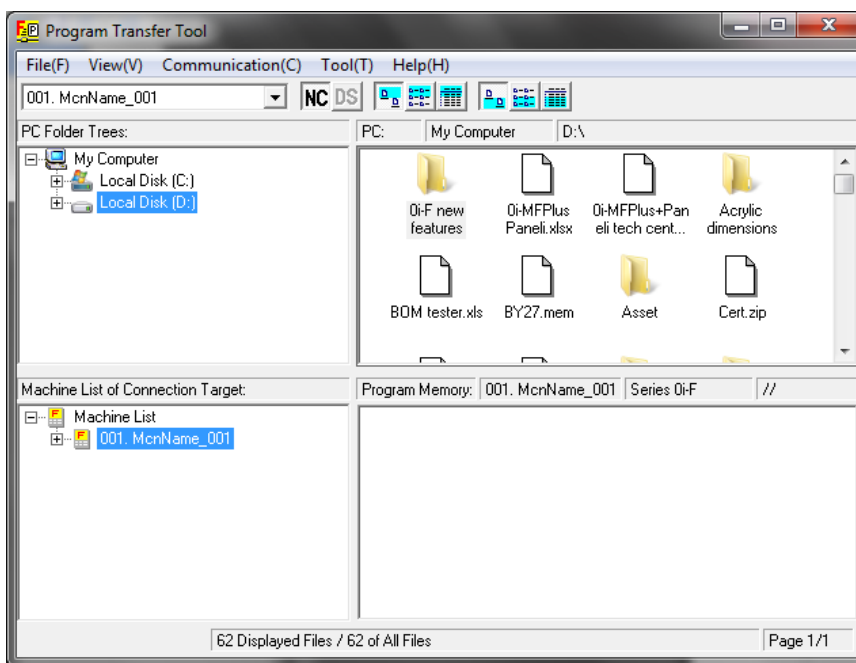
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1.5.1 Procedure for Program transfer with FANUC Program transfer tool software

1. Install Program transfer tool software in PC.
2. After installing, select Start → Program Transfer tool → **Setting dialog**.
3. In **Machine Info** tab, set Machine Name, CNC Type and Control path.
4. In **Program Memory** tab, Enter IP Address, TCP Port no.

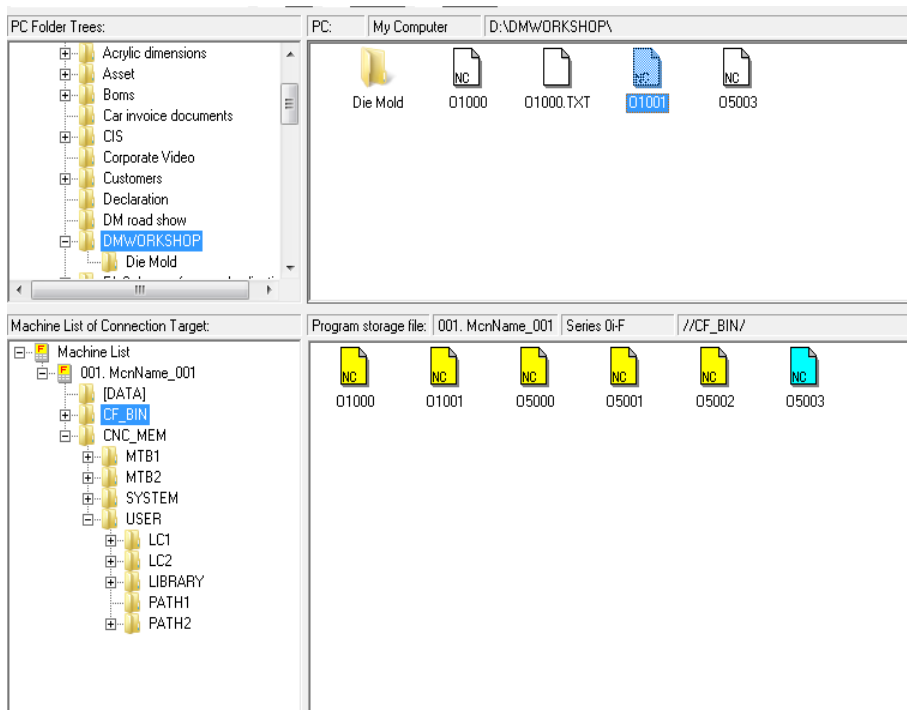


5. Select **SAVE** and **EXIT**.
6. Select Start → Program Transfer tool → **Program Transfer tool**.
7. Select **Machine List of Connection target** → Select Machine.



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7. After selecting Machine → Select **CF_BIN**.



8. To **Upload/Download** the Program. Just drag and drop the program from PC to Mem card folder.

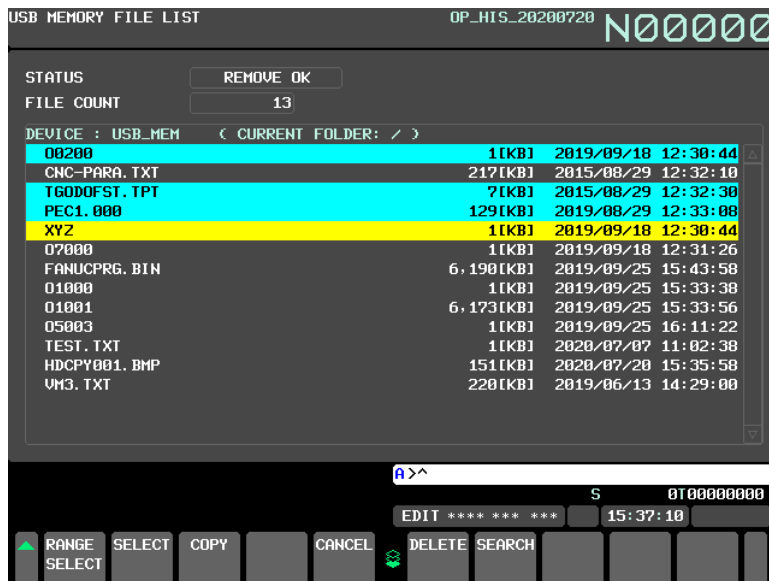
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1.5.2 Procedure for Copy/Move Program from USB memory to memory card

1. Set Parameter 20=4.
2. Select EDIT mode & press function key [PROG.].
3. Press the softkey [FOLDER].
4. Press the softkey [(OPRT)].
5. Press the softkey [DEVICE CHANGE].
6. Press the softkey [USB MEMORY].



7. Move the cursor [↑] [↓] with the cursor key to select the file.
8. Press the softkey [SELECT].
9. To copy multiple programs press the softkey [RANGE SELECT]
10. Selected file will be highlighted.
11. Press the softkey [COPY].



12. Press soft key [DEVICE CHANGE].
13. Press soft key [MEM CARD].
14. Press soft key [PASTE].
15. "EDIT" is displayed in the lower right of the screen while file is transferring.

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1.5.3 Procedure to Select “Main Program” from Memory Card:

To display and edit contents of memory card select ([MEMCARD]) by device changing operation as indicated below.

1. Select EDIT model and press function key [PROG.].
2. Press soft key [FOLDER].
3. Press soft key [(OPRT)].
4. Press soft key [DEVICE CHANGE].
5. Press soft key [MEM CARD].



6. Move the cursor to file/folder that you want to select the main program with the cursor key[↑] [↓].
7. Press soft key [MAIN PROGRM].
"@" is displayed at the left of the program that has been selected as the main program to be executed.

1.5.4 Safe removal of Memory card:

When the memory card are used on the CNC, following procedure to be followed for safe removal of the memory card.

1. Press function key [PROG.].
2. Press soft key [FOLDER].
3. Press soft key [(OPRT)].
4. Press soft key [DEVICE CHANGE].
5. Press soft key [UNMOUNT].
6. A message “THE MEMORY CARD CAN BE TAKEN OUT” will be displayed.

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