



cnc webschool

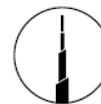
knowledge to improve

Appendix 4: Programming on Siemens Control

How to Create a Macro Instruction

Paper Size: A4

The screenshot displays the Siemens CNC control software interface. At the top, the path 'NC/WKS/APP_4P_EN_R30/MAIN_PRG_1' is shown. Below this is a 'Reset' button. The main area is divided into two columns: 'Machine' and 'Position [mm]' on the left, and 'T,F,S' on the right. The 'Machine' column shows 'MX1' and 'M21' both at '500.000'. Below them are 'MSP1' and 'MSP3' both at '0.000 °'. The 'T,F,S' column shows 'T' (Tool), 'F' (Feed) at '0.000 mm/min 0.0%', and 'S1' (Spindle) at '0' with a red stop icon. Below the status area, the program code is displayed: 'NC/WKS/APP_4P_EN_R30/MAIN_PRG_1', 'N10 EXTERN SUB_PRG_1 (REAL, REAL, REAL)†', 'N20 G4 F2†', 'N30 SUB_PRG_1(4, 14, 2)†', 'N40 G4 F2†', 'N50 M30†', and '†'. At the bottom, there are four buttons: 'Over-store', 'Prog. cntrl.', 'Block search', and 'Simult. record.'.



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1 Introduction

Passing values from a main program to a subroutine is very useful for building macro instructions. Macro instructions are subprograms created to perform a specific task such as gripping the part by the counter-spindle, or to create a particular machining cycle to make a groove. They can also be used to perform calculations such as parametric counters or automatic calculations.

Before reading this documentation it is necessary to understand the concepts explained in paragraph 16.2 "Recalling a subprogram" and in chapter 30 "Parametric programming".

2 Functions

2.1 EXTERN

Like the G65 function in Fanuc, Siemens also has its own functions for performing this type of programming.

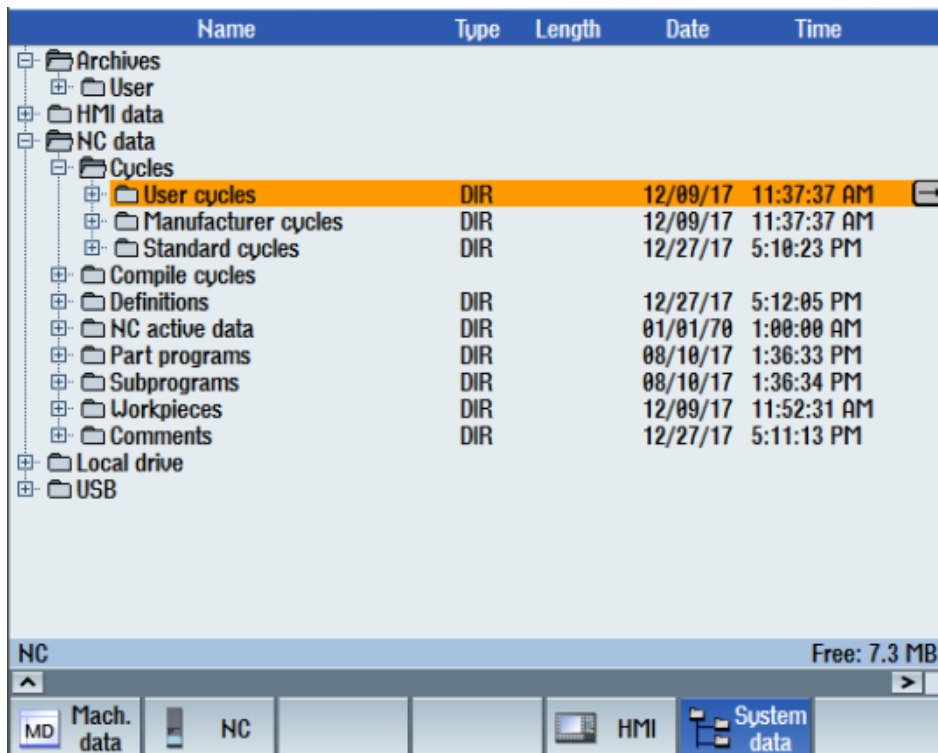
- Enter the function EXTERN in the main program to enable the subprogram call (called in the example SUB_PRG_1) and set the type and number of the variables to be used.

The function EXTERN must be used if the subprogram is in the subroutine folder or in the workpiece folder.

The EXTERN function is not necessary if the subprogram is in the USER CYCLES folder.

Programming example

```
N10 EXTERN SUB_PRG_1 (REAL, REAL, REAL)
```





2.2 Definition of the type of variables

The commands listed below define the type of value associated with a variable.

INT	only integer values with sign (1, -20, 258, -2)
REAL	real values (1.234, 5, -3.658)
BOOL	only logical values TRUE (1) or FALSE (0)
CHAR	ASCII characters (da 0 a 255)
STRING	sequence of a number of characters (STRING[16] in this case maximum 16), it can be defined up to 200.
AXIS	only names of axes present in the channel (X, Y, Z)
FRAME	Geometric data for displacement, rotation, scale factor, specularity

2.3 Call of the subprogram

Following the function EXTERN, proceed to the main program (MAIN_PRG_1) with the subprogram call (in this example named SUB_PRG_1) followed by the value of the variables to be passed to the subroutine.

Main program example

```
MAIN_PRG_1.MPF
N10 EXTERN SUB_PRG_1 (REAL, REAL, REAL)
N20 G4 F2
N30 SUB_PRG_1(4, 14, 2)
N40 G4 F2
N50 M30
```

2.4 Creation of the subprogram

Now create the subprogram that contains the macro statement. Program the PROC function in the first block followed by the name of the subprogram and the name assigned to the variables used in it as in the following example (the variable name can not be an address already used by the NC as X, Y, Z, A, B , etc.).

Programming example

```
N100 PROC SUB_PRG_1 (REAL LENG1, REAL LENG2, REAL LENG3)
```

Now use the variables as you prefer.



2.5 Subprogram example

```
N100 PROC SUB_PRG_1 (REAL LENG1, REAL LENG2, REAL LENG3)
```

```
N200 R0= (LENG1+LENG2+LENG3)
```

```
N300 M17
```

The result of this macro instruction is that the variable R0 is equal to 20.

Parametri R						Parametri R globali
R 0	20	R 20	0	R 40	0	Parametri R
R 1	0	R 21	0	R 41	0	
R 2	0	R 22	0	R 42	0	GUD globali
R 3	0	R 23	0	R 43	0	
R 4	0	R 24	0	R 44	0	GUD canale
R 5	0	R 25	0	R 45	0	
R 6	0	R 26	0	R 46	0	LUD locali
R 7	0	R 27	0	R 47	0	
R 8	0	R 28	0	R 48	0	Ricerca
R 9	0	R 29	0	R 49	0	
R 10	0	R 30	0	R 50	0	SD
R 11	0	R 31	0	R 51	0	
R 12	0	R 32	0	R 52	0	Dati di setting
R 13	0	R 33	0	R 53	0	
R 14	0	R 34	0	R 54	0	Lista utens.
R 15	0	R 35	0	R 55	0	
R 16	0	R 36	0	R 56	0	Usura utens.
R 17	0	R 37	0	R 57	0	
R 18	0	R 38	0	R 58	0	Magaz-zino
R 19	0	R 39	0	R 59	0	