6. Supplementary functions

6.1 Program controlling supplementary functions

M00 Measuring stop

M01 Synchronization

M02 Sub-routine skip back

M06 / M16 Tool functions

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M26 Supervision ‘clear remaining travel’

M28 Unconditional skip in sub-routine

M29 End of program with program repetition

M30 End of program

If parameter skips are programmed in the NC block, they are treated with priority!

6.1.1 M00 Measuring stop

Program run is shut down and spindle stop becomes effective after completion of the block in which M00 is programmed. Automatic mode is possible after Auto-Stop.

With pressing the key ‘Start’ the NC program continues and the spindle is switched on.

Example: X37,95 Y12,76 M00

After approaching the coordinates X and Y the program sequence is interrupted.

The function operates block by block.

M00 may only be programmed when the tool-radius-contour correction (G40) is switched off.

6.1.2 M01 Synchronization

The function M01 causes a synchronization of program analysis and real time machining. M01 operates block by block and is executed after the path machining.

When processing a program the block analysis of the real time runs some blocks ahead.

Example:

```
N10  G01  F1000      X10  Y10
N20                  X20
N30                  X100
N40                  X50
N50  P100:20
```

In this NC program the axes traverse in the current block N10, while the block analysis is already executing the parameter instruction of block N50.

This running ahead of the block analysis can be stopped through programming M01. IF M01 is programmed in a block, the block analysis at the block end is waiting until this block is really worked.

6.1.3 M02 Sub-routine skip back

After processing the block in which M02 is programmed, a skip back into the calling programm is executed in a sub-routine in the calling program (after traverses, without stop).

6.1.4 M06 / M16 Tool functions

M06 **Tool change**

M16 **Tool data call**

see paragraph 7.1 Tool functions

6.1.5 M23 Unconditional skip

With M23 the program is continued at the indicated program - and block number.

The function operates block-by-block.

The skip is programmed with M23 and indicating program - and block number, e.g.

M23.110 skip to block 110 or

M23.10.110 skip in program 10 to block 110 .

6.1.6 M24 / M25 Program loop

M24 Program loop start

With loop programming program parts of the same kind can be repeated.

The program loop start is programmed with M24 and indicating the runs, e.g. M24.07 (7 runs of the loop). The loop number is to be found in P8840.

It has to be considered, that the block, in which the program loop stard is to be found (M24.. .), does not belong to the program loop.

The function M24 operates block-by-block.

M25 Program loop end

This function marks the end the program loop. After processing the block in which M25 is programmed, the program skips back to the loop start. If all runs are worked, the program is continued with the block following on M25.

The function operates block-by-block.

6.1.7 M26 Supervision ‘Clear remaining travel’

The supervision ‘clear remaining travel’ is active.

The function operates block-by-block and effective before axes movements.

From M26 on the interpolator supervises the signal ‘clear remaining travel’ from the PLC and executes the command. If the signal lines up already, the travel is cleared immediately.

6.1.8 M28 Unconditional skip in sub-routine

Program parts, which are repeated in a program, can be written as sub-routine. Also each arbitrary program can be called up as sub-routine, e.g.

M28.300 starts program 300 .

The control remembers the skip address and continues the calling program at the block following on M28, if the sub-routine is finished.

The sub-routine skip back can be programmed with M02.

A nesting of the sub-routines is possible four times.

The function M28 operates block-by-block.

6.1.9 M29 End of program and program repetition

After processing the block in which M29 is programmed, the program is finished, executed a skip at the beginning of the program and the program is restarted automatically.
The preset G - functions become effective again.

IF M29 stands at the end of a program, which was called up as sub-routine, a sub-routine skip back is executed.

The function operates block-by-block.

6.1.10 M30 End of program and skip to program start

After processing the block in which M30 is programmed, the program is finished and a skip to the beginning of the program is executed (after traverse, with stop).
The preset G - functions become effective again. Besides that Spindle Stop and Coolants off become active.

The function operates block-by-block.

6.2 Machine controlling supplementary functions

Area : 0 .. 999

There may be programmed 8 M-functions per NC block.

The M-functions can be defined as
- before traverse
- after traverse
- with stop
- with skip

(Skip-M-functions are always before traverse with stop, see q1050 .. 1099.)

At M-functions with skip, the skip target can exist either only of the block number or of program number and block number

e.g.:

M41.2.10	If M-function confirmed, skip to program 2 block number 10
M41.10	If M-function confirmed, skip to block number 10

If the M-function is confirmed, it is skiped to the indicated block number and/or in the indicated program with indicated block number.
At a skip impending ways are deleted and the NC block buffer is cleared.

With no confirmation the NC block interpreter switches over to the next NC block.