

#### 4. Program input and output EDITOR operating mode (Program level)

In the Editor operating mode, NC programs can be entered, output and modified, unless they are not protected programs (begin with the letter "E")

In this operating mode the menu is structured as follows:

**PROGRAM - BLOCK - WORD - DIGIT,**  
and the control system leads the operator following this order.



Press operating mode key.

The operating mode menu is displayed:



Press EDITOR softkey.

PROGRAM SELECT		
PROGRAM DELETE		MATERIAL SELECT
PROGRAM LISTING		EXTERNAL DATA TRANSMIS.

#### Select program



Press PROGRAM SELECT. softkey.

INPUT PROGRAM NUMBER OR CONFIRM:

If an other than the displayed program is wanted, then enter the program number, e.g.



Confirm.

Program no. 10 can be entered or altered.



If the program on display is the one requested, just confirm.

The displayed NC program can be edited.

## Program level

### Listing the programs



Press PROGRAM LIST

The program list is displayed.

PROGRAM SELECT	PROGRAMS STORED BACKWARD	PROGRAM NO. TO AUTOMODE
DELETE PROGRAM	SEARCH FOR PROGRAM NO.	PROGRAM COPY
PROGRAM BLOCK ORGANIZ.	PROGRAMS STORED FORWARD	EXTERNAL DATA TRANSMIS.



Press PROGRAMS STORED FORWARD or PROGRAMS STORED BACKWARD softkey.

Browsing through the list of programs.



Press PROGRAM SELECT. softkey.

Calling the program in front of which the cursor (light spot) is located.

### Program block organization (program listing)

Using this function it is possible to organize the block numbers of an existing program according to a defined structure. Here, the number of the first block as well as the step size of the following blocks can be defined. The order of the blocks can, however, not be altered.

If a program branch is executed via G61, the control system modifies the jump addresses automatically.

Procede as follows:



Select program via program listing.

Program is displayed.



Press PROGRAM BLOCK ORGANZ. softkey

INPUT NUMBER OF FIRST BLOCK:



Enter digits  
e.g.: 0



Confirm

INPUT BLOCK NUMBER  
STEP SIZE



Enter digits  
e.g.: 5



Confirm

The program now has the following  
block number structure:

N 0 ...  
N 5 ...  
N10 ...  
N15 ...  
etc.

Delete program  
(Program list)



Press PROGRAM  
SELECT. softkey.



Confirm.

The entered program is deleted.  
(Protected programs start with the  
letter "E" and cannot be deleted.)

Copying programs



Press the PROGRAM COPY  
softkey.

INPUT NEW PROGRAM  
NUMBER:



Enter the program number  
(number must not exist before)

The program is copied and is stored  
in the control system under both pro-  
gram numbers with identical con-  
tents.



Confirm.

(Protected programs start with the  
letter "E" and cannot be deleted.)



Press PROGRAM NO.  
TO AUTOMODE softkey.

After the next calling of automatic  
mode the program in front of which  
the cursor is located is offered for  
execution.



Confirm.

**Program to AUTOMATIC operating mode  
(from program list)**



Press PROGRAM NO.  
TO AUTOMODE softkey.

CONFIRM PROGRAM NO. TO  
AUTOMODE:



Confirm.

After confirmation, the program  
displayed in the list does not have to  
be called up in the AUTOMATIC  
operating mode; it is already selected  
for automatic operation.

**External data transmission**

Stored programs can be output  
on a punched tape via an externally  
connected punching unit or they may be  
transmitted to a DATAPILOT system.  
Programs stored externally can be entered  
in the control system by means of a reading  
unit or a DATAPILOT system.  
Finally, there is a DNC port for connecting  
a production supervisory computer.



Press EXTERNAL  
DATA TRANSMISSION softkey.

INPUT SINGLE PROGRAM	INPUT PROGRAM BLOCK	
OUTPUT SINGLE PROGRAM	OUTPUT PROGRAM BLOCK	
PROGRAM ON/OFF STOP		



Press INPUT SINGLE  
PROGRAM or  
OUTPUT SINGLE  
PROGRAM softkey.

INPUT PROGRAM NUMBER  
AND/OR CONFIRM



Enter number of the  
desired program.

Program with the desired number  
is transferred to the control system.



Confirm.

Displayed program is transferred  
to/from the control system.

Programs can also be input/output as blocks of programs the numbers of which are identical in the first digits.



Press INPUT PROGRAM BLOCK or OUTPUT PROGRAM BLOCK softkey

INPUT PROGRAM NUMBER AND/OR CONFIRM



Enter digits.



Confirm.

All programs are input/output the numbers of which begin with the sequence entered above.



Press PROGRAM ON/OFF softkey in order to interrupt data transmission.

**Selecting material (optional)**



Press MATERIAL SELECT. softkey.

The material list (1...24) is displayed on the screen.



Enter number of the desired material.



Confirm.

The desired material number appears.  
The control system suggests feed rates for the given materials when tool data are entered.

**Note**

By entering material number 0 the material selection can be cancelled.

### Block level

**Searching and altering blocks**

After a certain program was selected on the program level for further editing, the block level can now be selected via the menu.

EDITOR BLOCK LEVEL and four blocks of the selected program are displayed on the screen.

NEW BLOCK	BLOCK NUMBER BACKWARD	SEARCH NC-WORD
BLOCK DELETE	BLOCK NUMBER SEARCH	>
BLOCK ALTER	BLOCK NUMBER FORWARD	CHANGE GRAPHICS PARAM.



Press BLOCK NUMBER FORWARD or BLOCK NUMBER BACKWARD softkey.

Cursor moves to the desired block in the program.



Press BLOCK DELETE softkey.

CONFIRM INPUT



Confirm.

The block in front of which the cursor is located is deleted.



Press SEARCH BLOCK NO. softkey.

INPUT BLOCK NUMBER



Enter block number.

Cursor moves in front of the desired block.

**Diagnosis in side-line operation**

If the diagnosis operating mode is to be called up from the Editor mode in side-line operation, proceed as follows:



Press continue key.

The following menu is displayed:



Press DIAGNOSIS softkey

The DIAGNOSIS main menu is displayed (see also Chapter 7.1)

Searching an NC-word



Press SEARCH  
NC WORD softkey.

	SEARCH WORD INPUT	
PROGRAM START		SEARCH FROM CURSOR
PROGRAM END		SEARCH FROM START



Press PROGRAM  
START softkey.

Cursor jumps to the first  
block of the program.



Press PROGRAM  
END softkey.

Cursor jumps to the last  
block of the program.



Press INPUT SEARCH  
WORD softkey.

INPUT NEW SEARCH WORD:



By means of a submenu with a  
following menu on the same  
level a search word, e.g. G3,  
can be defined.

The selected search word is stored  
until the operating mode is left  
or until a new search word is entered.



Confirm.



Press SEARCH FROM  
CURSOR softkey.

Cursor jumps to the next block in the  
program containing the search word  
( e.g. G3 as in this example).



Press SEARCH FROM  
START softkey.

Cursor jumps to the first block in the  
program containing the search word.

Inserting a block



Press NEW BLOCK softkey.



Confirm.



Input block number.



Confirm.



Press continue key.



Select desired function,  
e.g. G FUNCTION DIRECT

Enter the desired NC words.

The block is inserted at the position in the program at which the cursor is located. First the control system tries the next higher block number, otherwise the following number is inserted after the highest block number existing in the program. Example: Highest block number in the program is 110. The inserted block is automatically allocated the number 111.

The block number is inserted at the position within the program at which the cursor is located.

The following menu is displayed:

NEW BLOCK	BLOCK NUMBER	SEARCH NC-WORD
DELETE BLOCK	SEARCH BLOCK NUMBER	G FUNCTION DIRECT >
ALTER BLOCK	BLOCK NUMBER FORWARD	M FUNCTION DIRECT

The following menu is displayed:

NEW BLOCK	F FEED	/ DELETION LEVEL
D TOOL OFFSETS	T TOOL	G FUNCTION MENUE <
VARIABLE STATEM.	L SUB-PROGRAM	M FUNCTION MENUE

INPUT G-FUNCTION:



Altering and deleting a NC-word



Press the ALTER BLOCK softkey.

The following submenu is displayed:

NEW NC-WORD	NC-WORD BACKWARD	NC-WORD FORWARD
DELETE NC-WORD		
ALTER NC-WORD		



Press NC-WORD FORWARD/ NC-WORD BACKWARD softkey.

Cursor jumps to the selected NC word.



Press DELETE NC WORD softkey.

Selected NC word is deleted.



Press the ALTER NC WORD softkey.

NC-word can be altered.



Enter the required alterations.



Confirm.

The control system effects the alterations and displays the NC word with the altered values.

If an additional NC word is to be entered in the same block:



Press NEW NC WORD softkey.

NEW INPUT WORD LEVEL



Enter the requested NC word.



Confirm.

New NC word is displayed and appears in the block.

**Program test using the graphic simulation (optional)**

In the EDITOR operating mode, an entered program can be tested on the monitor using the graphic simulation.

When the corresponding parameters (N70 to N73) have been entered in the PARAMETERS operating mode, the blank, the chucking devices and the tool can be displayed (having the desired colors). These parameter values can be edited via menu in the EDITOR operating mode or in a part program using functions G970 to G973 (this is not valid when the magnification function is switched on)

**Changing the graphic parameters**

The parameters N70 to N73 can be modified in block level by selecting the CHANGE GRAPHIC PARAMETERS softkey.



Press CHANGE GRAPHIC PARAM. softkey.

**Note**

The softkeys always take effect in the graphic mode. The "continue" key only serves to help remember the position of the keys.

Switching back is done automatically by selecting a function or via the confirm key.

The following menu will be displayed:

GRAPHIC END		
BLANK PART	GRIP. AREA LENGTH	GRAPHIC REPRES.



Press the desired softkey.

The following menu together with the corresponding parameter set will be displayed on the screen:

ACCEPT NEW VALUE	MAINTAIN VALUE	TERMI-NATE INPUT

**Program test**



Press PROGRAM SELECT. softkey.

INPUT NUMBER OR CONFIRM



Enter digits of the requested program.



Confirm.

The requested program is displayed on the monitor.



Go to program end using the SEARCH NC WORD softkey or browse through the entire program by pressing the BLOCK NUMBER FORWARD softkey.

Cursor is positioned at the last program block.



Press the graphic key.

Program is simulated graphically. Error messages may appear.

**Calculation of the cycle time**

Furthermore the control system offers the possibility to calculate the cycle time beforehand. To do this, the control system passes through all blocks and calculates the approximate cycle time per workpiece, using the programmed feed rates, speeds and so on. Minor deviations from the calculated value result, for example, from the time required for tool change and gear switching times which the user must enter under parameters N77 and N78. Tool change switching time is generally added to the secondary time of the relevant tool without taking into consideration the turret position.



Press the "continue" key,

The following menu is displayed as well as the calculated cycle time:

T TYPE	tH =	tN =
	MACH. TIME	IDLE TIME
2 EXTERNAL FINISHING	1.11	0.05
1 EXTERNAL ROUGHING	2.07	0.07
tG =	CYCLE TIME 3.18	0.12
	TOTAL MACHINING TIME 3.3 MIN	

MAGNIFY LENS ON	UTIL. GRAPHIC ON	ACCEPT NEW PARAM.
	GRAPHIC IN BLOCK ON/OFF	GRAPHIC STOP/START
MAGNIFY LENS OFF	UTIL. GRAPHIC OFF	RE-INITIAL. GRAPHIC

Up to 30 tools are entered in the above-displayed table in the order of their first operation including their respective machining times and idle times. All time values are indicated in minutes with two digits after the decimal point. If more than 6 tools are used in the operation, several screen pages are required for the display. This is indicated by the ">" character behind the last tool of the currently displayed page. The following page can be displayed by pressing the continue key. Thus, it is possible to display 5 pages each containing 6 tools. If the maximum number of 30 tools is exceeded, the total machining time and the cycle times will still be correctly calculated. However the machining time and the idle time of the following tools are not taken into consideration separately, instead they are summed up in a separate line beginning with "?????". Repeated pressing of the continue key will consecutively display the existing pages as often as desired.

**Magnifying lens function**

If a certain part of the graphic is to be magnified:



Press the MAGNIFY LENS ON softkey.

HANDWHEEL MAG.LENS



Position the limit marks using the handwheel and

Magnified section is displayed.



Confirm each time.



Press continue key.



Press the RE-INITIAL. GRAPHIC softkey.

The selected section is magnified and displayed.



Press continue key.

The submenu appears on the monitor.



Press the MAGNIFY LENS OFF softkey.



Press the graphic key.

Graphic simulation is switched off. Return to BLOCK LEVEL.

**Graphic in block on/off**

Apart from graphically simulating complete programs, discrete blocks of the main program can also be simulated graphically.

To do so, proceed as follows:



Press GRAPHIC IN BLOCK ON/OFF softkey

Simulation is switched over to blockwise display, i.e. only one block each is simulated at a time.



Confirm

The contour of the next program block is displayed on the screen .



Confirm etc.

Each pressing of the confirm key will display the contour of the following block.

**Note:**

Subprograms are displayed without interruption. Cycles will not be displayed completely until the end of the cycle has been reached (G80). When reinitializing the graphic you have to press the confirm key three times in order to switch to the next block during blockwise simulation.



Press GRAPHIC IN BLOCK ON/OFF softkey once more

Simulation is switched back to continuous display.

**Interruption of graphic simulation**

Graphic simulation can be interrupted at any point and restarted later on, if desired.



Press GRAPHIC STOP/START softkey.

Graphic simulation is interrupted.



Press GRAPHIC STOP/START softkey again.

Graphic simulation is continued.

