

2. Operating

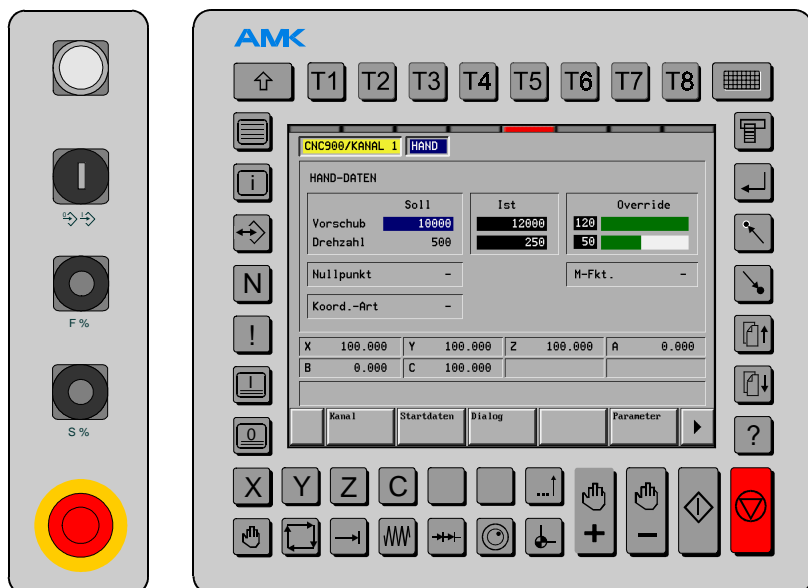
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2. Operating

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2.1 Compact controls CNC 903 / CNC 905

The compact controls CNC 903 / CNC 905 are conceived for the application with CAN Bus. Communicate to them over the CAN Bus with the drives and the I/O bus. The CNC Control actual in the operating panel integrates. The operating panels have fully graphicable color LC displays and foil keyes with mechanical pressure point.



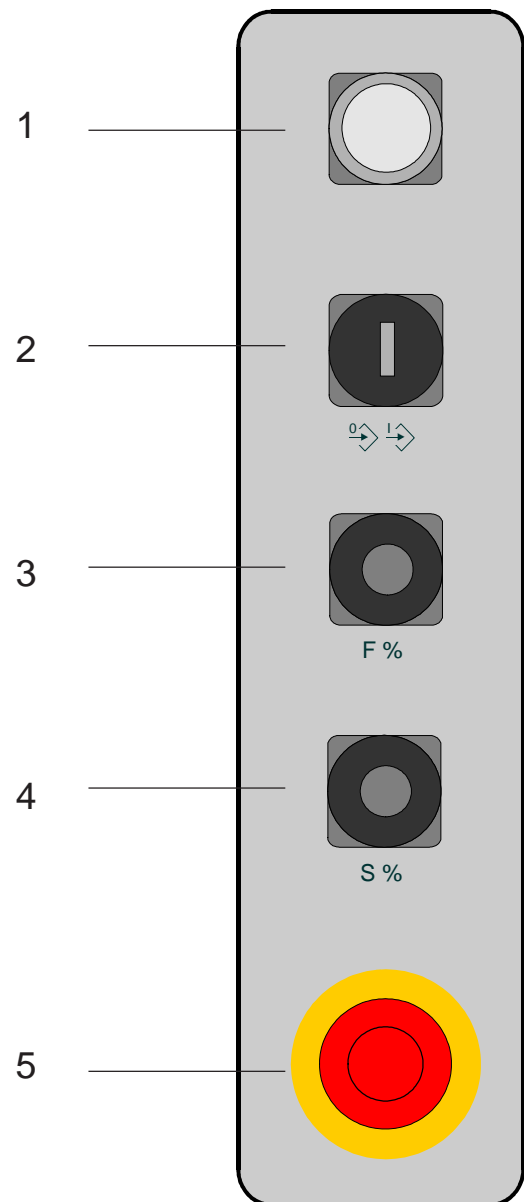
Compact controls CNC 903 / CNC 905 with additional machine operating panel

Dimensions (B x H in mm)	328 x 310
Machine operating panel (option)	80 x 310

2.1.1 Machine operating panels

Separate machine operating panel CNC 903 / CNC 905

- 1 Illuminated push button
- 2 Code switch
Program block-free
- 3 Feed override
- 4 Spindle override
- 5 Emergency-stop key

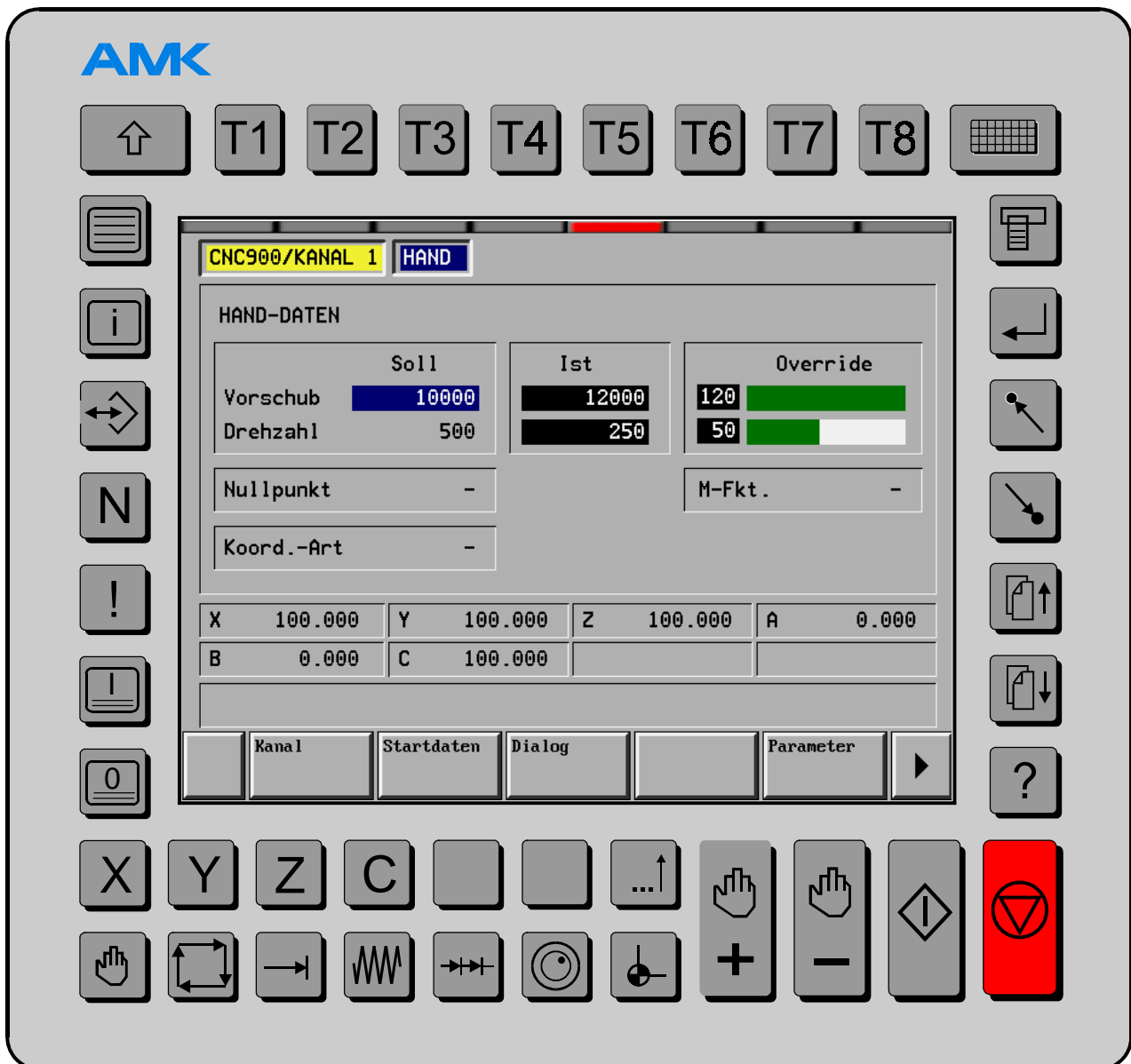


Note:

Code switch 1 opener (21/22) freely

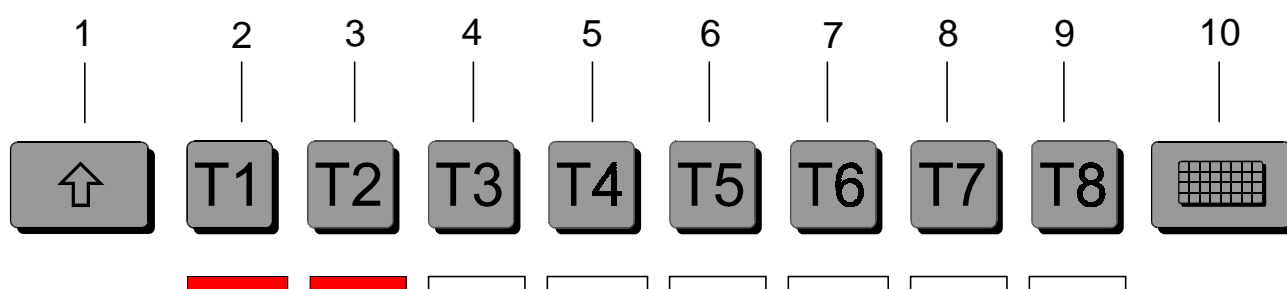
Emergency stop 2 openers (11/12 and 21/22) freely



2.1.2 Control keys

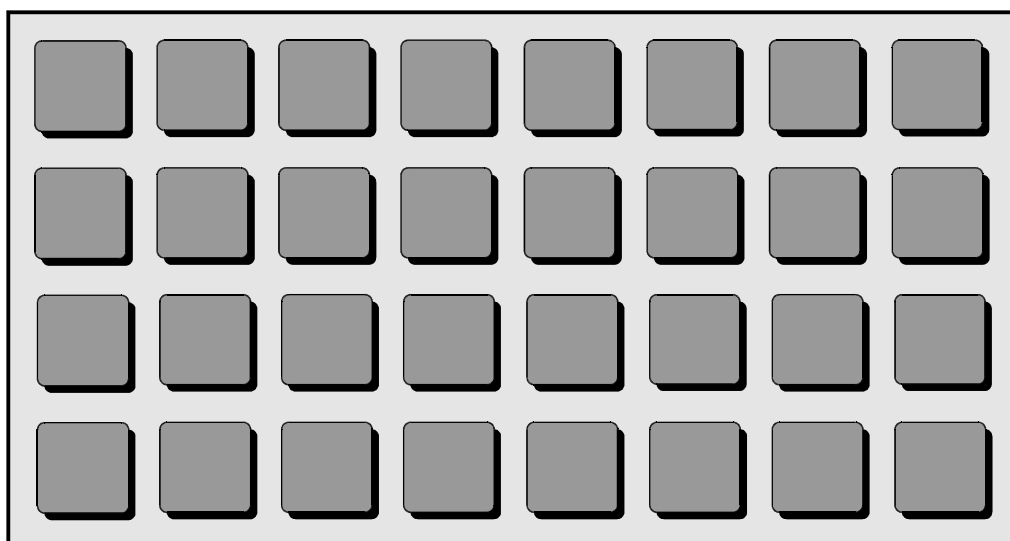


2.1.2 Control keys

Control keys for PLC functions

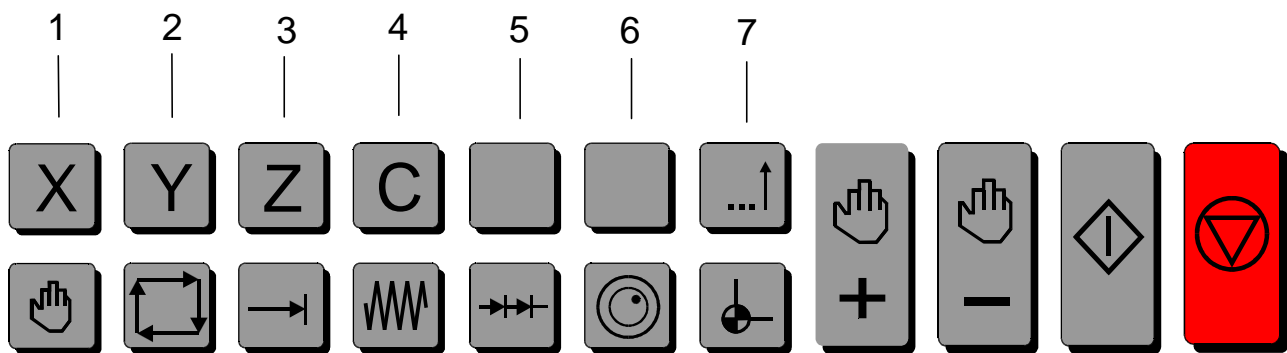


- 1 Shift
In connection with further keys special functions can be released,
e.g. can with editor  on /  off the touch screen activated or deactivated
become (to the cleaning of the screen).
- 2 to 9 8 PLC keys with LED on the display
can by the user as desired be marked
(with label strip e.g. T1 to T8).
- 10 additional 32 PLC keys with LED on the Touch screen
The PLC additive keys can be designated by the user as desired,
e.g.:

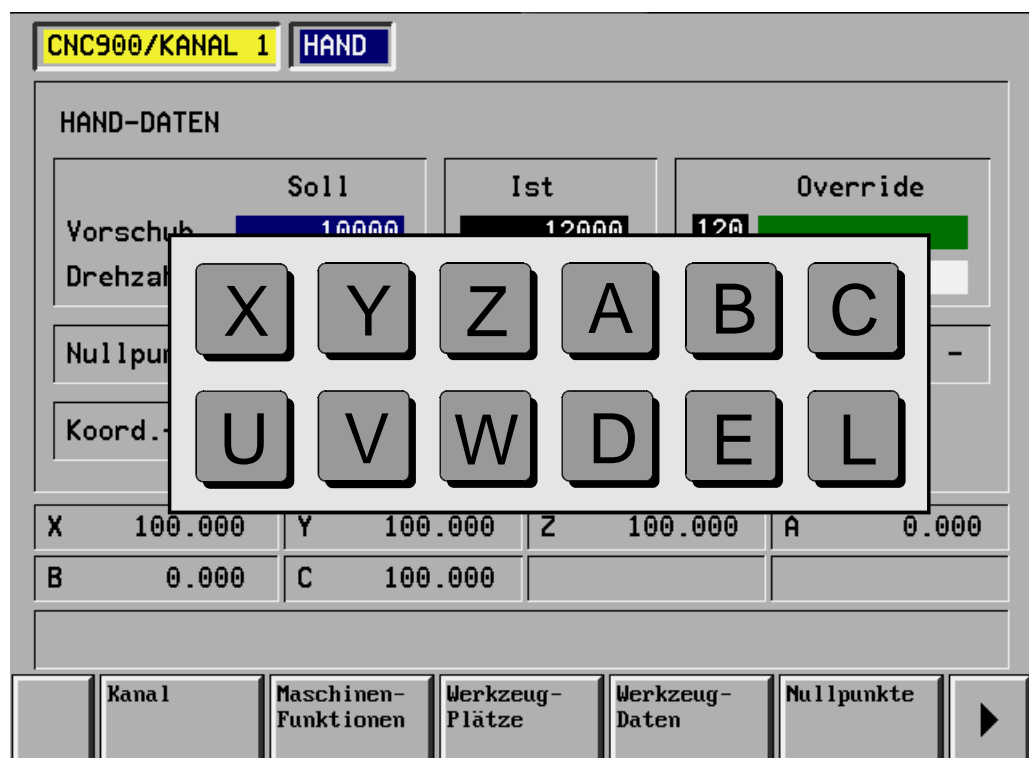


2.1.2 Control keys

Control keys for axis selection

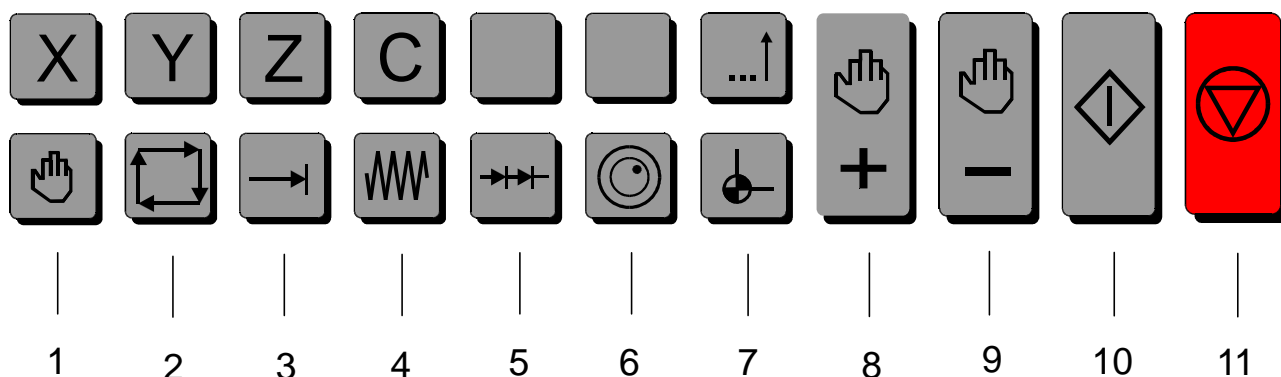


- 1 bis 6 6 axis keys
Can by the user as desired be marked (with label strip e.g. X, Y, Z, A, B, C).
- 7 12 axis keys on the Touch screen, can by the user as desired be marked
e.g.:



2.1.2 Control keys















Control keys for modes of operation



- | | | |
|-----------|---|---|
| 1 | Manual mode | |
| 2 | Switching in automatic mode: | With the 1. Pressures becomes the sequential block adjusted. Afterwards becomes when each pressing key between sequential block and single block back and forth switched. |
| 3 | Switching in positioning mode | |
| 4 | Continuous traversed in the manual mode | |
| 5 | Step by step traversed in the manual mode, incrementations freely definably | |
| 6 | With handwheel traversed | |
| 7 | Automatic home position and travel of point of reference | |
| 8 und 9 | Push buttons for traversing the selected axis with manual mode | |
| 10 und 11 | start and stop | |
| | The automatic program sequence is started or stopped | |
| | - in the positioning mode: | The NC block in the indication area is processed. |
| | - in the automatic mode: | The selected NC program is worked on. |

2.1.2 Control keys

Control keys for program input and data communication

1	Key function freely shapable, e.g. graphic simulator.	1 — 	 — 8
2	Key function freely shapable, e.g. cycle or info. pictures.	2 — 	 — 9
3	I/O circulation Selection of the I/O menu to the data communication	3 — 	 — 10
4	Block editor	4 — 	 — 11
5	Diagnosis Information about conditions, interfaces, parameters.	5 — 	 — 12
6	Editor on	6 — 	 — 13
7	Editor off	7 — 	 — 14
8	Menu selection		
9	Enter		
10 und 11	Beginning / end		
12 und 13	Picture up / down		
14	Additional information Information about lining up NC program.		

2.1.3 Touch screen keys

Touch screen keys for manual mode and program input

Opening display
Selection menu

Menu screen 1

The screenshot shows the 'HAND-DATEN' screen for 'CNC980/KANAL 1'. It features a 'HAND' button at the top right. The main area is divided into three columns: 'Soll' (Desired), 'Ist' (Actual), and 'Override'. The 'Soll' column shows 'Vorschub' (Feed) at 10000 and 'Drehzahl' (Spindle speed) at 500. The 'Ist' column shows '12000' and '250'. The 'Override' column shows '120' and '50' with green progress bars. Below these are 'Nullpunkt' (Zero point) and 'Koord.-Art' (Coordinate type), both set to '-'. At the bottom, a table shows coordinates: X 100.000, Y 100.000, Z 100.000, A 0.000, B 0.000, and C 100.000. A navigation bar at the very bottom contains buttons for 'Kanal', 'Startdaten', 'Dialog', 'Parameter', and a right arrow.

Soll		Ist		Override	
Vorschub	10000	12000		120	
Drehzahl	500	250		50	


Nullpunkt	-	M-Fkt.	-
Koord.-Art	-		

X	100.000	Y	100.000	Z	100.000	A	0.000
B	0.000	C	100.000				

Kanal Startdaten Dialog Parameter ▶

Selection keys on
the touch screen

Menu screen 2

Switching between
the menu screens
with key 
(roll function)

The screenshot shows the same coordinate table as the previous screen. Below it, a navigation bar contains buttons for 'Kanal', 'Maschinen-Funktionen', 'Werkzeug-Plätze', 'Werkzeug-Daten', 'Nullpunkte', and a right arrow.

X	100.000	Y	100.000	Z	100.000	A	0.000
B	0.000	C	100.000				

Kanal Maschinen-Funktionen Werkzeug-Plätze Werkzeug-Daten Nullpunkte ▶

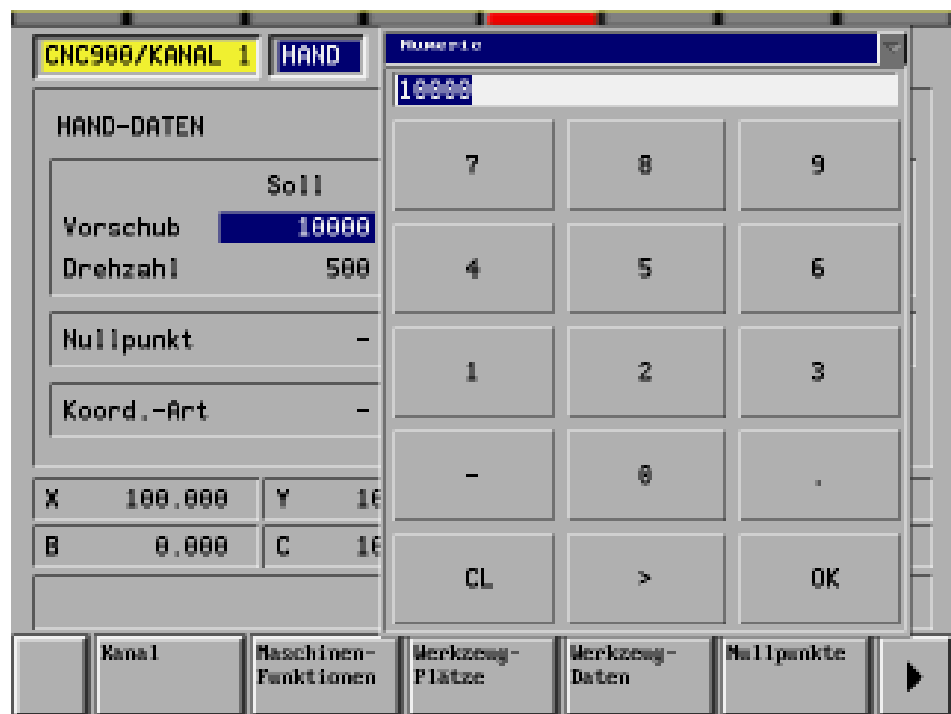
2.1.3 Touch screen keys

Touch screen keys for input with numeric keyboard

The cursor press and shift on a wished input field .

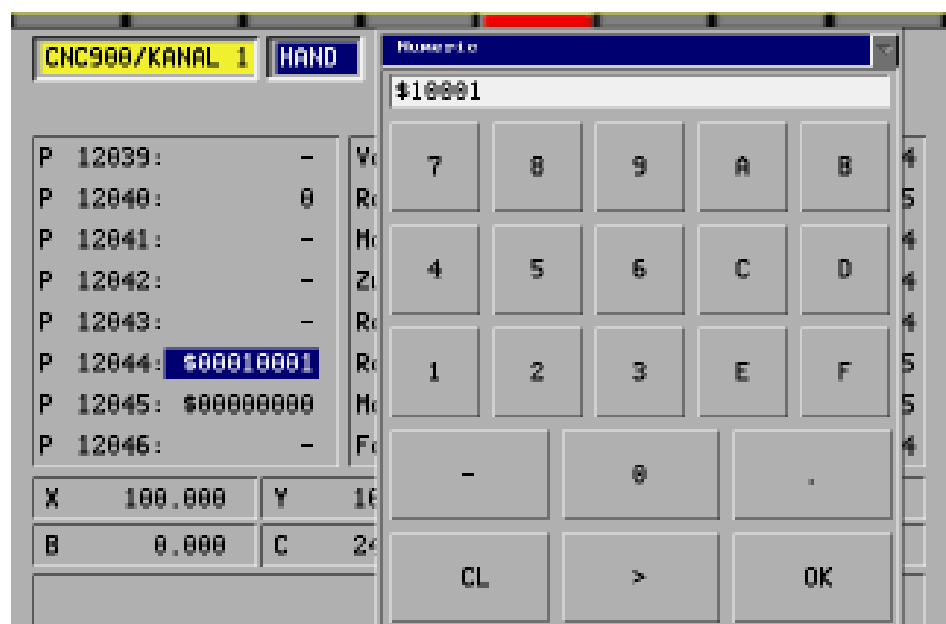
The numeric keyboard will during contact an input field faded in.

Input break off:
With the finger press on not with input fields occupied place on that display.



Requires the input field hexadecimal input, will the hexadecimal keyboard faded in.

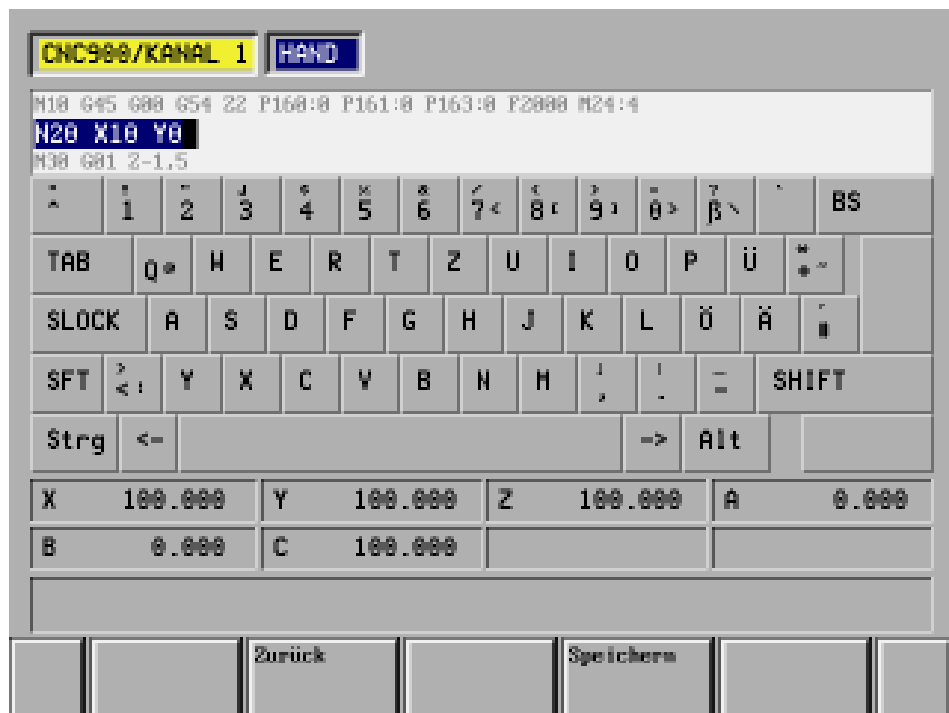
With 2 x pressures on ' - ' indication becomes between decimally and hexadecimal keyboard around switched.



2.1.3 Touch screen keys

Touch screen keys for input with ASCII keyboard

With the program input will a ASCII keyboard faded in.



Special functions with WINTERM

The ASCII keyboard can be switched by hand: on / off

The contrast of the announcement of the ASCII keyboard can be adjusted.
It can be struggled so far that the keyboard appears only as background picture.

The key functions remain.
However one can read now also the text, which is under the keyboard.

Contrast of the announcement: more brightly more darkly

2.2 Power on tests

The display field is activated after swichting on the control. The control starts a self-test. The position of the key-operated switch 1 (P11000) determines the course.

2.2.1 Automatic power on tests

If the key-operated switch is closed (position 1), the power on tests are running automatically, if no errors appear (e.g. def. parameter or def. NC memory).

Closed switch	Position 1	Automatic power on test
Open switch	Position 0	Power on test has to be activated with pressing a key.

2.2.2 Power on test with confirmation

Test operating panel

First, the operating panel is tested (takes some seconds).

Test Panel :


Test PLC :

Test BS :

Test Parameter :

Test NC-Memory : free: tot:

Continue Yes No Delete

Here the function keys “Continue” and “Yes” and “No” are used combined with the key  (Delete).

2.2.2 Power on test with confirmation (continued)

Test operating panel

After a successful test, the following display appears:

The screenshot shows a test panel display with the following text:

```
Test Panel      :   Ok      BW0900.PRJ   10.01.97 10:56:52
                                   CNC_C4A   Pz:D628

Test PLC        :

Test BS         :

Test Parameter   :                               0           0

Test NC-Memory   :           free:           0 tot:           0
```

At the bottom of the display, there are five buttons: Continue, Yes, No, (empty), and Delete.

Meaning:

Line 1 Project name of the PROMA surface
 with date and time of making the surface (SHOW_E).

Line 2 PLC program, from which the symbols are taken, with check sum.

2.2.2 Power on test with confirmation (continued)

Test PLC program

After a successful test, the following display appears:

Test Panel	:	Ok	BW0900.PRJ	10.01.97	10:56:52
			CNC_C4A	Pz:D628	
Test PLC	:	Ok	CNC_C3E	Pz:D755	V2.0
Test BS	:				
Test Parameter	:			0	0
Test NC-Memory	:		free:	0 tot:	0

Continue

Yes

No

Delete

Meaning:

Line 3 Actual PLC program with check sum and number of version

Note: Program name and check sum of the PLC program (operating panel) from which the symbols are taken, and of the actual PLC program should be the same (line 2 and 3). If the names or check sums are different, it has to be checked if the symbols used in the surface have the same position as they do in the actual NC program.

2.2.2 Power on test with confirmation (continued)

Test operating system

After a successful test, the following display appears:

Test Panel	:	Ok	BW0900.PRJ	10.01.97	10:56:52
			CNC_C4A	Pz:D628	
Test PLC	:	Ok	CNC_C3E	Pz:D755	V2.0
Test BS	:	Ok	SYS 000_1050		29.11.1996
Test Parameter	:			0	0
Test NC-Memory	:		free:	0 tot:	0

Continue

Yes

No

Delete

Meaning:

Line 4 CNC standard operating system with version and date

Line 5 Option: DLL-software for customer-specific operating system enlargements with name and date

2.2.2 Power on test with confirmation (continued)

Test parameter

After pressing the function key “Continue”, the parameter memory is checked.

The following display appears after a successful test:

Test Panel	:	Ok	BW0900.PRJ	10.01.97	10:56:52
			CNC_C4A	Pz:D628	
Test PLC	:	Ok	CNC_C3E	Pz:D755	V2.0
Test BS	:	Ok	SYS 000_1050		29.11.1996
Test Parameter	:	Ok		0	0
Test NC-Memory	:		free:	0 tot:	0

Continue

Yes

No

Delete

Meaning:

Line 6 The parameter memory is all right.

2.2.2 Power on test with confirmation (continued)

Test NC memory

After pressing the function key "Continue", the NC memory is checked.

The following display appears after a successful test:

Test Panel	:	Ok	BW0900.PRJ		10.01.97	10:56:52
			CNC_C4A		Pz:D628	
Test PLC	:	Ok	CNC_C3E		Pz:D755	V2.0
Test BS	:	Ok	SYS 000_1050		29.11.1996	
Test Parameter	:	Ok			0	0
Test NC-Memory	:	Ok	free:	1448704	tot:	1542656

Continue

Yes

No

Delete

Meaning:

Line 7 NC memory is all right
 Indicating free memory and complete memory

2.2.2 Power on test with confirmation (continued)

Finish power on test

After pressing the function key "Continue" the power on test is finished and the system is loaded (takes some seconds).

The following display appears after a successful test:

Test Panel	:	Ok	BW0900.PRJ		10.01.97	10:56:52
			CNC_C4A		Pz:D628	
Test PLC	:	Ok	CNC_C3E		Pz:D755	V2.0
Test BS	:	Ok	SYS 000_1050		29.11.1996	
Test Parameter	:	Ok			0	0
Test NC-Memory	:	Ok	free:	1448704	tot:	1542656

Continue

Yes

No

Delete

Then, the company sign appears.

2.2.3 Power on test with error

PLC test

If the following display appears, the PLC program is defective. The power on test is stopped. In this case, the PLC program has to be loaded again and has to be stored in the EEPROM.

Test Panel	:	Ok	BW0900.PRJ	16.01.97	11:16:24
			CNC_C4A	Pz:D628	
Test PLC	:	defect !!	CNC_C3E	Pz:D755	V2.0
Test BS	:				
Test Parameter	:			0	0
Test NC-Memory	:		free:	0 tot:	0

Continue

Yes

No

Delete

2.2.3 Power on test with error (continued)

Parameter test

The following display appears if the parameter memory is defective. The power on test is stopped.

Test Panel	:	Ok	BW0900.PRJ	16.01.97	11:16:24
			CNC_C4A	Pz:D628	
Test PLC	:	Ok	CNC_C3E	Pz:D755	V2.0
Test BS	:	Ok	SYS 000_1050		29.11.1996
Test Parameter	:	defect !!		1	29995
Test NC-Memory	:		free:	0	tot: 0

Continue

Yes

No

Delete

Meaning:

Line 6 Display of the first defective parameter (q) and the number of defective parameters.

2.2.3 Power on test with error (continued)

Parameter test

The power on test is only continued if the key  (Delete) is pressed. The following display appears.

Test Panel	:	Ok	BW0900.PRJ	16.01.97	11:16:24
			CNC_C4A	Pz:D628	
Test PLC	:	Ok	CNC_C3E	Pz:D755	V2.0
Test BS	:	Ok	SYS 000_1050		29.11.1996
Test Parameter	:	delete ??		1	29995
Test NC-Memory	:		free:	0	tot: 0

Continue

Yes

No

Delete

Delete ??

Key "Yes" Delete the complete parameter memory

Key "No" The parameter memory is not deleted.
Go on to test NC memory with pressing the key "Continue"

2.2.3 Power on test with error (continued)

Parameter test

After Delete ? and pressing the key "Yes" the following functions are loaded

- BWO presettings
- customer-specific data from the EEPROM.

Test Panel	:	Ok	BW0900.PRJ	16.01.97	11:16:24
			CNC_C4A	Pz:D628	
Test PLC	:	Ok	CNC_C3E	Pz:D755	V2.0
Test BS	:	Ok	SYS 000_1050		29.11.1996
Test Parameter	:	restore -		1	29995
Test NC-Memory	:		free:	0 tot:	0

Continue

Yes

No

Delete

Go on to test NC memory with pressing the key "Continue"

2.2.3 Power on test with error (continued)

Test NC memory

The following display appears if the NC memory is defective. The power on test is stoped.

Test Panel	:	Ok	BW0900.PRJ	16.01.97	11:16:24
			CNC_C4A	Pz:D628	
Test PLC	:	Ok	CNC_C3E	Pz:D755	V2.0
Test BS	:	Ok	SYS 000_1050		29.11.1996
Test Parameter	:	Ok		0	0
Test NC-Memory	:	defect !!	free:	33 tot:	0

Continue

Yes

No

Delete

Meaning:

Line 7 Error code (33) and additional information (0)

2.2.3 Power on test with error (continued)

Test NC memory

Meaning of the error codes

Code	Meaning
02	Program not found
05	End of program or Write-/ Read indicator > program size
06	No free memory
07	Faulty check-sum
10	Error when reading from NC memory
11	Error when writing on NC memory
15	No program input , e.g. key-operated switch locking
16	Program should be opened for writing, but is already opened
25	Key-operated switch interlocking
30	Defective directory chain
31	Defective program chain
32	Defective list of free blocks
33	Defective check-sum of system data
35	Blocks in program system are double-chained

2.2.3 Power on test with error (continued)

Test NC memory

The power on test is only continued if the key  (Delete) is pressed. The following display appears.

Test Panel	:	Ok	BW0900.PRJ	16.01.97	11:16:24
			CNC_C4A	Pz:D628	
Test PLC	:	Ok	CNC_C3E	Pz:D755	V2.0
Test BS	:	Ok	SYS 000_1050		29.11.1996
Test Parameter	:	Ok		0	0
Test NC-Memory	:	delete ??	free:	33 tot:	0

Continue

Yes

No

Delete

Delete ??

Key "Yes" Delete complete NC memory

Power on test is finished with pressing the key "Continue" and the company sign appears.

2.3 Reference points

Reference points are machine-specific mechanical fixed points.

After the power on tests, you have to approach with each axis the corresponding reference point, if the machine works in the incremental measuring system.


The reference point is stored and the actual value display is set with the correct value.

In the first line of the display field, the axes of which the reference point is not stored, are shown.

Because the traverse directions for taking reference points are depend on the machine, the following explanation can only be an example.

Note: The reference point must not be identical with the machine zero point.

2.3.1 Approaching reference points automatically

The reference points can be approached automatically, if a corresponding program is stored in the PLC. The key  is reserved for this program.

2.3.2 Manual approaching of reference points

Requirements

- Power on tests are ready.
- The control is switched on (key "Control on" is pressed)
- The operating mode "Manual" is set.
- The feed for manual mode is given, feed override > 0.
- The drive mode is set (e.g. "continually").

Approach reference point of an axis, e.g. X-axis

Press key "X"

Display: MANUAL X Cont Ref: X Y Z A B

Press key "Manual" until max. end position of the X-axis is reached.

CNC900 /CHAN.1		MANU	X	Cont	REF: X Y Z A B	
MANUAL-DATA						
Command		Actual		Override		
Feedrate	10000	8000		80	<div><div></div></div>	
Speed	2000	0		35	<div><div></div></div>	
Zero Point		-		M-Fct.		
Coord-Sys		-				
X	1420.000	Y	7.150	Z	0.143	A
B	9.842					
<div>Channel</div> <div>Start Data</div> <div>Dialog</div> <div></div> <div>Parameter</div>						

2.3.2 Manual approaching of reference points (continued)

Approach reference point of an axis, e.g. X-axis

Then press "Manual" until the X disappears from the display.

Display: Manual X Cont REF: Y Z A B

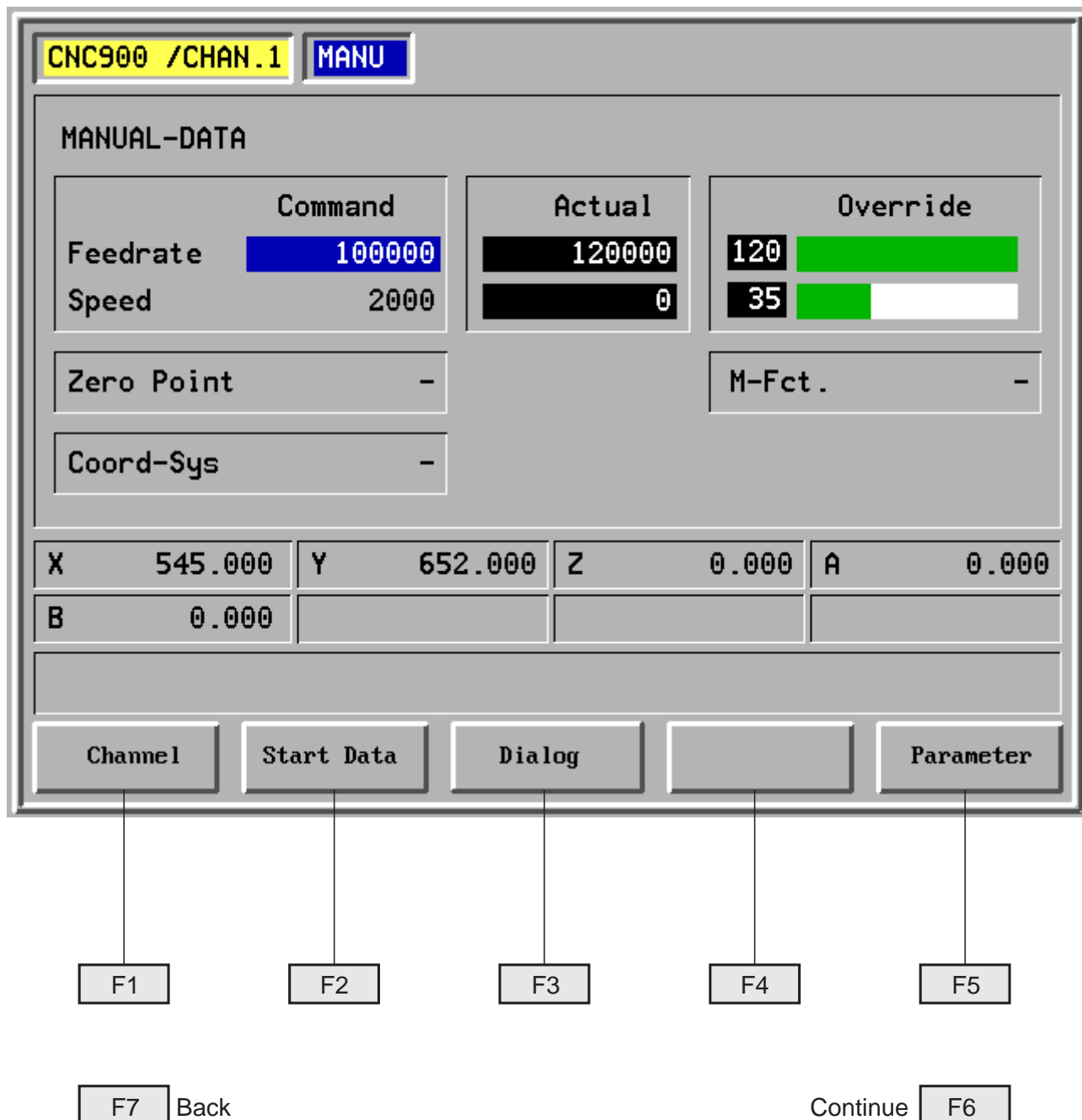
Now the reference point for the X-axis is stored.

The same procedure is valid for the other axes.

CNC900 /CHAN.1		MANU		X	Cont	REF: Y Z A B	
MANUAL-DATA							
Command		Actual		Override			
Feedrate	10000	12000		120	<div></div>		
Speed	2000	0		35	<div></div>		
Zero Point		-		M-Fct.		-	
Coord-Sys		-					
X	1420.000	Y	7.150	Z	0.143	A	30.286
B	9.842						
<div>Channel</div> <div>Start Data</div> <div>Dialog</div> <div></div> <div>Parameter</div>							

2.4 Screen keys and screen displays

2.4.1 Position of the function keys in the screen frame



2.4.2 Setting the screen brightness

The brightness of the screen can be set continuously.

When pressing the function key **F6** and



(Page up) the screen becomes brighter,



(Page down) the screen becomes darker.

2.4.3 Screen display in the headline

Displays in manual mode



Channel Operation
mode manual Axis
identification Travelling mode
continuously



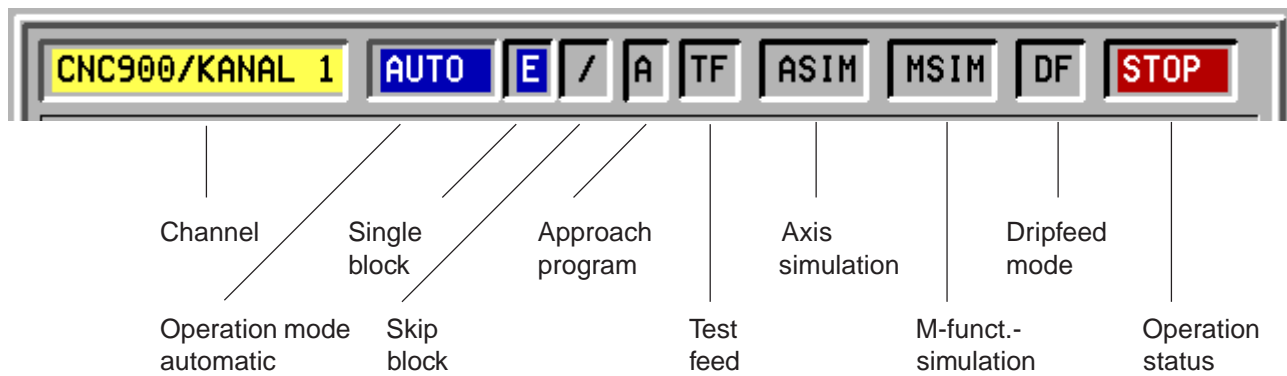
Channel Operation
mode manual Axis
identification Travelling mode step
width



Channel Operation
mode manual Axis
identification Hand
wheel Division

2.4.3 Screen display in the headline (continued)

Displays in automatic mode



2.5 Selection menu (continued)

All functions can be selected with the selection menu with the function keys F 1 to F7.
The menu consists of two function pictures. **Selection picture 1:**

The screenshot displays the 'MANU' (Manual) selection menu. At the top, it shows 'CNC900 /CHAN.1' and 'MANU'. The main area is titled 'MANUAL-DATA' and contains several data fields and buttons.

Command		Actual	Override	
Feedrate	10000	6500	65	<div><div></div></div>
Speed	2000	0	35	<div><div></div></div>
Zero Point	54		M-Fct.	-
Coord-Sys	-			

X	545.000	Y	682.000	Z	41.000	A	-30.200
B	-9.757						

Channel

Start Data

Dialog

Parameter

Selection of

- F1 Channel
- F2 Start data
- F3 Dialogue
- F4 -
- F5 Parameter

2.5 Selection menu (continued)

Selection picture 2:

Switching from selection picture 1 <—> selection picture 2 with function key F6 (roll function)

The screenshot displays the 'MANU' (Manual) selection menu for CNC900 /CHAN.1. The interface is divided into several sections:

- MANUAL-DATA**: Contains three columns: 'Command', 'Actual', and 'Override'.

	Command	Actual	Override
Feedrate	10000	6500	65
Speed	2000	0	35
- Zero Point**: 54
- Coord-Sys**: -
- M-Fct.**: -
- Coordinates**:

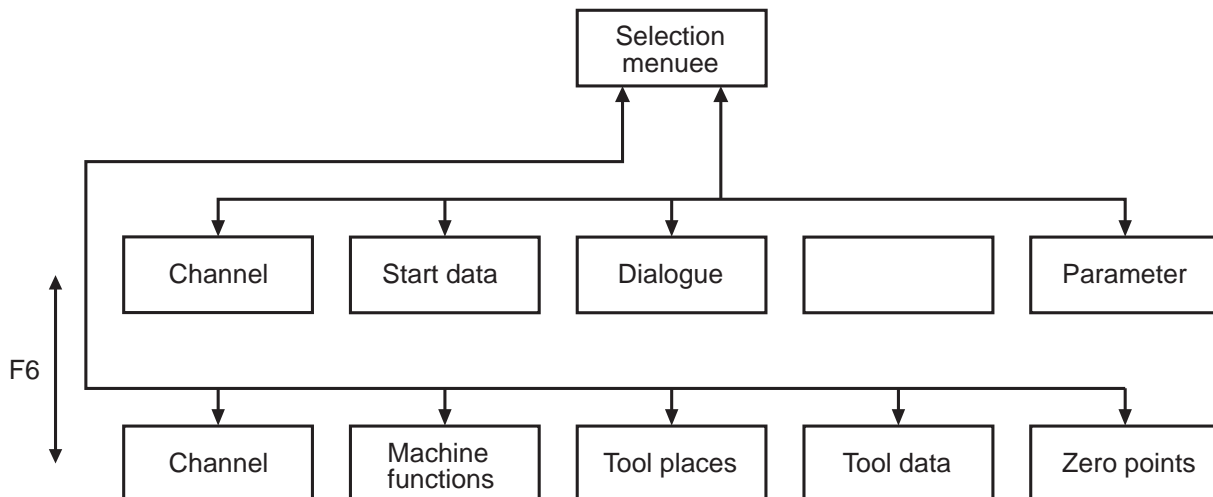
X	545.000	Y	682.000	Z	41.000	A	-30.200
B	-9.757						
- Function Keys**: A row of five buttons at the bottom: 'Channel', 'Machine-Function', 'Tool-Places', 'Tool-Data', and 'Zero-Point'.

Selection of

- F1 Channel
- F2 Machine function
- F3 Tool places
- F4 Tool data
- F5 Zero points

2.5 Selection menuue (continued)

Menue tree



Functions	Section
Start data	2.8
Dialogue	2.9
Parameter	2.10
Machine functions	2.11
Tool data	2.12
Zero points	2.13

2.5.1 Start data

The following menu enables setting the start data.

CNC900 /CHAN.1		MANU	
START-DATA			
Startprog.	P:	87	N: -
Approachprg	-	P: -	N: -
Dripfeed	-	C:\NCDATA\	
Rapid Feed		20000	Simulation:
%-Feed	-	Grafik	-
Test Feed	-	Axis	-
		M-Function	-
X	0.000	Y	-45.000
Z	-90.000	A	0.000
B	-45.000	C	0.000
D	0	B1	1020
Channel			
←			

F1 Channel

F2 -

F3 -

F4 -

F5 -

2.5.1 Start data (continued)

Block

Input block number of the starting block. If the value is 0 or deleted, the NC program is started with the 1st block.

Rapid traverse

The desired rapid traverse can be input. If the value is 0 or deleted, the manual feed is active.

% Feed

The programmed feeds in the NC program are modified with the indicated percentage.

Test feed

If a test feed is input the programmed feeds in the NC program are ineffective.

The test feed is active. If the value for the test feed is 0 or deleted, the test feed is not active.

CNC900 /CHAN.1		AUTO		TF		STOP	
START-DATA							
Startprog.		P:		87		N: -	
Approachprg		-		P:		- N: -	
Dripfeed		-		C:\NCDATA\			
Rapid Feed				20000			
%Feed				-			
Test Feed				8000			
Simulation:							
Grafik				-			
Axis				-			
M-Function				-			

2.5.1 Start data (continued)

Reapproach program

In the case of the abort of a current NC program (HAND abort, message) by the system the actual NC program position in the parameters P8802, P8803 and P8807 is stored. The NC program position is displayed in the start data menu. On properly terminated NC program resets this information.

START-DATA			
Startprog.		P:	87 N: -
Approachprg	1	P:	1212 N: 530
Dripfeed	-	C:\NCDATA\	
Simulation:			
Rapid Feed	20000	Grafik	-
%-Feed	-	Axis	-
Test Feed	-	M-Function	-

After an NC abort if the restarting mode is switched on (P8804=1) and the NC program started, then the NC program up to the restarting point is simulated, i.e. no axis movements result.

In the restarting block the simulation is switched off. The restarting position is started on direct path. With achieving the restarting position P8804=0 is setting.

One re-starts on the initial position of the aborted block.

If the NC program in a process cycle is aborted, then becomes to cycle start started. When restarting m-functions and m-cycles are treated according to m-Funktionsdefinition (P11050..., P8250...).

2.5.1 Start data (continued)

Dripfeed mode

The NC programs that should be processed are not in the NC memory of the control but in external data carriers.

The operating panel **CNC 900 C** has the NC programs on the hard disk or on a data server.

With the operating panel **CNC 900**, the NC programs have to be read in via I/O (BWO-I/O-socket, NCARC.EXE).

NC programs for dripfeed have to be linear, i.e. block skips and sub-program call-ups are not allowed.

Activating in the start-data menu:

Dripfeed	1	Dripfeed on
Dripfeed	0	Dripfeed off

Dripfeed mode with operating panel CNC 900 C

- In the start-data menu:
 - switch on dripfeed mode,
 - input program number,
 - check DOS-path-name,
 - path-name is indicated in the start-data menu (see also CNC900X.CFG).
- Change of operating mode after AUTOMATIC.
 - Now the data transmission to the dripfeed-buffer is started.
- NC start.

Dripfeed mode with operating panel CNC 900

- In the start data menu:
 - switch on dripfeed mode
- Check I/O parameters
- Connect external data carrier
- Change of operating mode after AUTOMATIC,
 - due to this an I/O-input-start is made automatically.
 - The CNC is now waiting on a data transfer.
- Start data transfer at the external data carrier,
- NC start

2.5.1 Start data (continued)

Dripfeed mode

with operating panel CNC 900 C

CNC900 /CHAN.1		AUTO		DF	STOP
START-DATA					
Startprog.	P:	87	N:	-	
Approachprg	-	P:	1212	N:	530
Dripfeed	1	C:\NCDATA\			
Rapid Feed			20000	Simulation:	
%Feed			-	Grafik	-
Test Feed			-	Axis	-
				M-Function	-



CNC900 /CHAN.1		AUTO		DF	START
Start Prog:	87	Bloc:	-	F:	0.00
Act. Prog:	87	Bloc:	0	F:	1000.00
Dripfeed					
> Dripfeed					
Dripfeed					

2.5.1 Start data (continued)

Simulation

Graphic

The graphic simulation can be used for controlling optically the program run. Thereby e.g. the axes and the transmission of the M-functions can be switched off for a test run. The graphic simulation is started in the start menu with '1' and switched off with '0' or 'deleted'.

With the key  you can switch from graphic to normal picture. If the graphic simulation is not switched on in the start menu, the message M4402: 'Graphic simulation not active' appears if you press the key .

Axes

If the simulation of the axes is activated (1), the axes do not move during program run. But the axes movements can be seen on the screen. 'ASIM' is written in the headline. The function can be switched off with '0' or 'deleted'.

M-functions

If the simulation of the M-functions is activated (1), the M-functions are not transmitted to the PLC. 'MSIM' is written in the headline. The function can be switched off with '0' or 'deleted'.

2.5.1 Start data (continued)

Simulation

Graphic on

CNC900 /CHAN.1		AUTO		STOP	
START-DATA					
Startprog.		P:	87	N:	-
Approachprg	-	P:	87	N:	0
Dripfeed	-	C:\NCDATA\			
Rapid Feed			20000	Simulation:	
%Feed			-	Grafik	1
Test Feed			-	Axis	-
				M-Function	-

Axes and M-functions on

CNC900 /CHAN.1		AUTO		ASIM		MSIM		STOP	
START-DATA									
Startprog.		P:	87	N:	-				
Approachprg	-	P:	87	N:	0				
Dripfeed	-	C:\NCDATA\							
Rapid Feed			20000	Simulation:					
%Feed			-	Grafik			-		
Test Feed			-	Axis			1		
				M-Function			1		

2.5.1 Start data (continued)**Graphic simulation**

Data input (F2) Input with numerical keys

X, Y and Z X, Y, and Z origin

Size Zoom

View	0	XY-coordinates (G17)
	1	XZ-coordinates (G18)
	2	YZ-coordinates (G19)
	3	3D

A-angle turning around X-axis

B-angle turning around Z-axis

Options

Direction arrows 1 on, 0 off

Holes 1 on, 0 off

Circle centres 1 on, 0 off

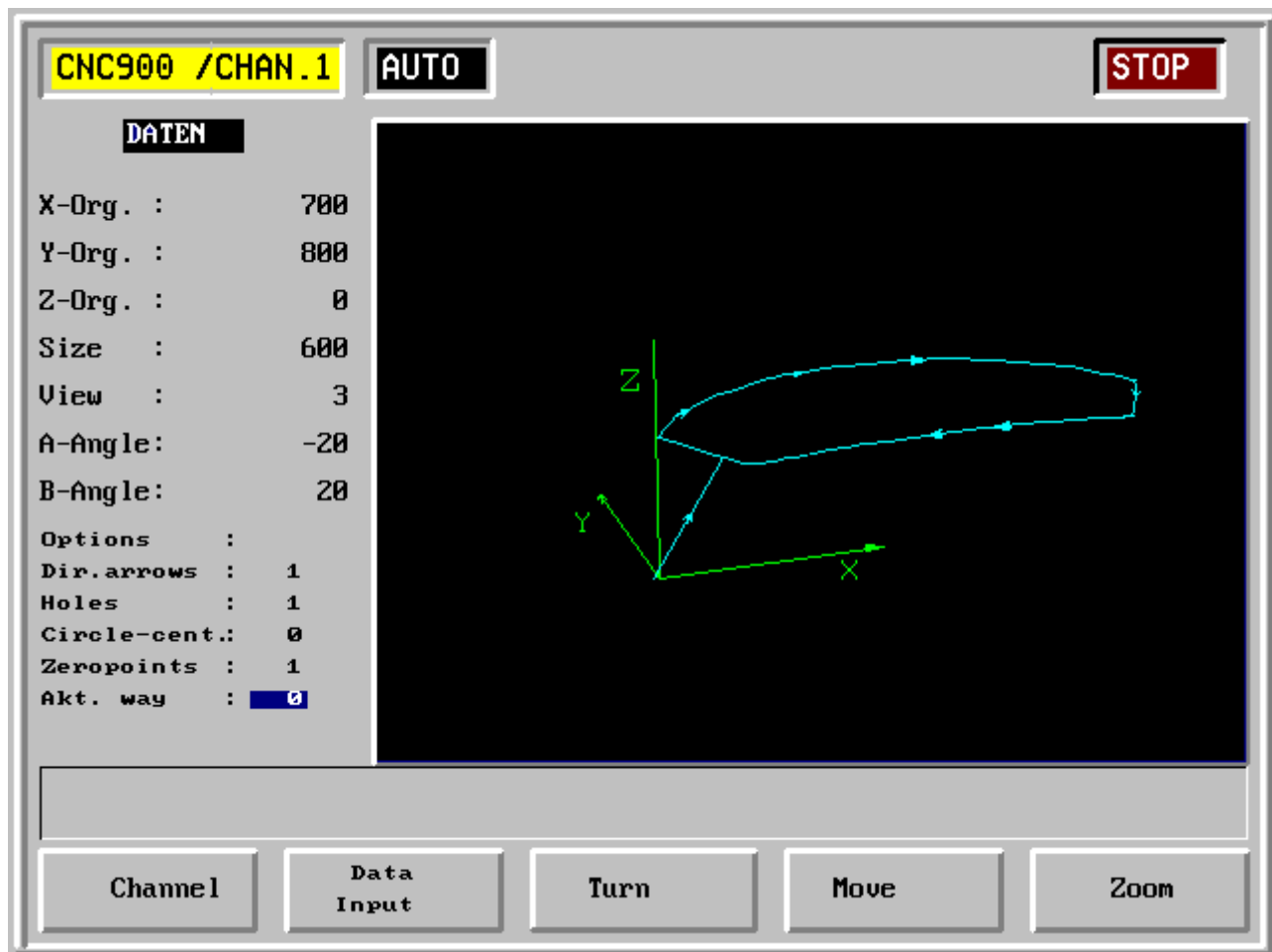
Zero points 1 on, 0 off

Actual ways 1 on, 0 off

2.5.1 Start data (continued)

Graphic simulation

Display of the target way (turned around X and Z axis)

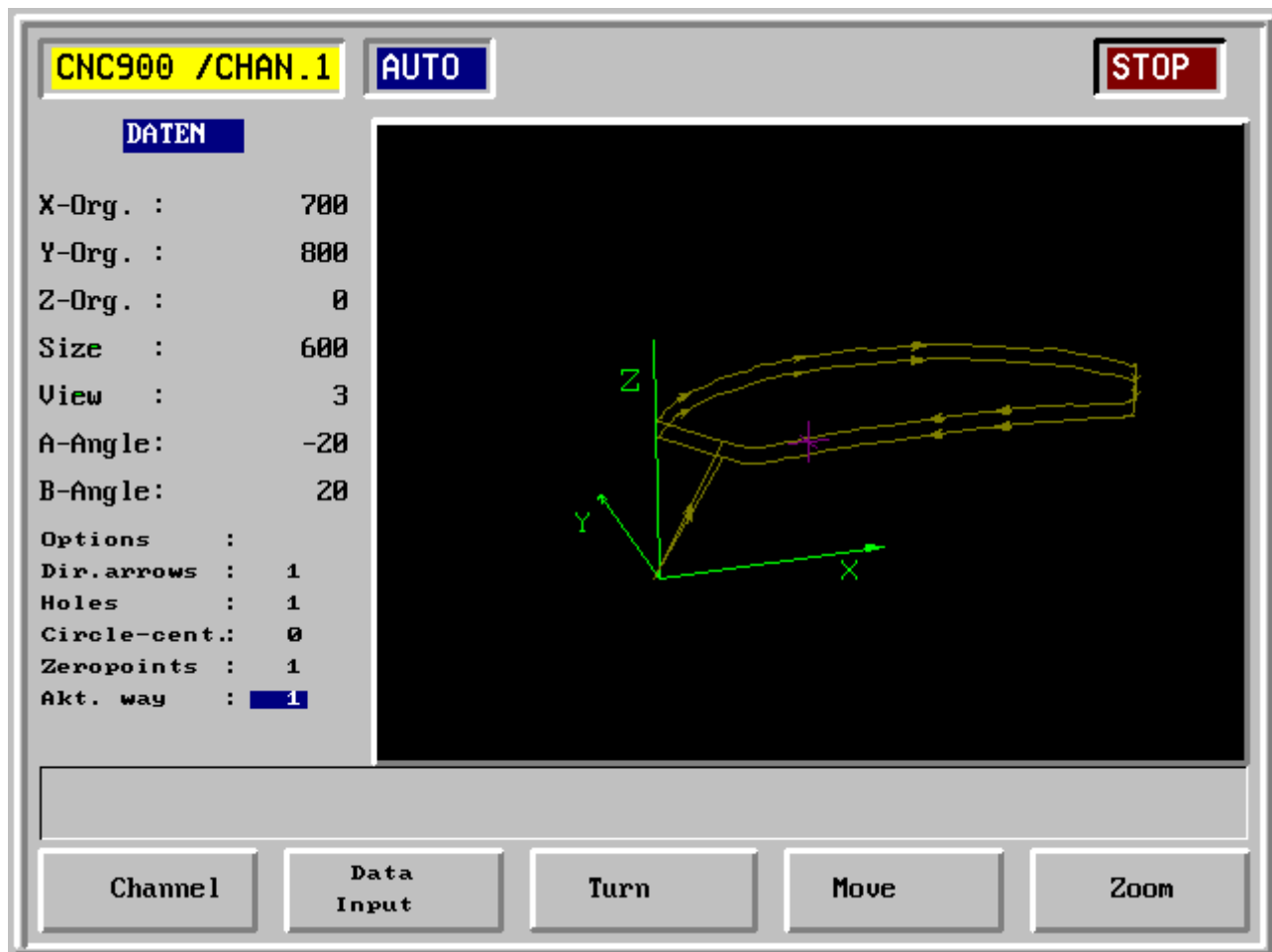


- | | | |
|----|------------|--|
| F1 | Channel | |
| F2 | Data input | Input with numerical keys |
| F3 | Turning | Turning around the X-, Z-axis, input with cursor |
| F4 | Move | X, Y and Z origin, input with cursor |
| F5 | Zoom | Size, input with cursor |

2.5.1 Start data (continued)

Graphic simulation

Display of the target and actual way (turned around X and Z axis)

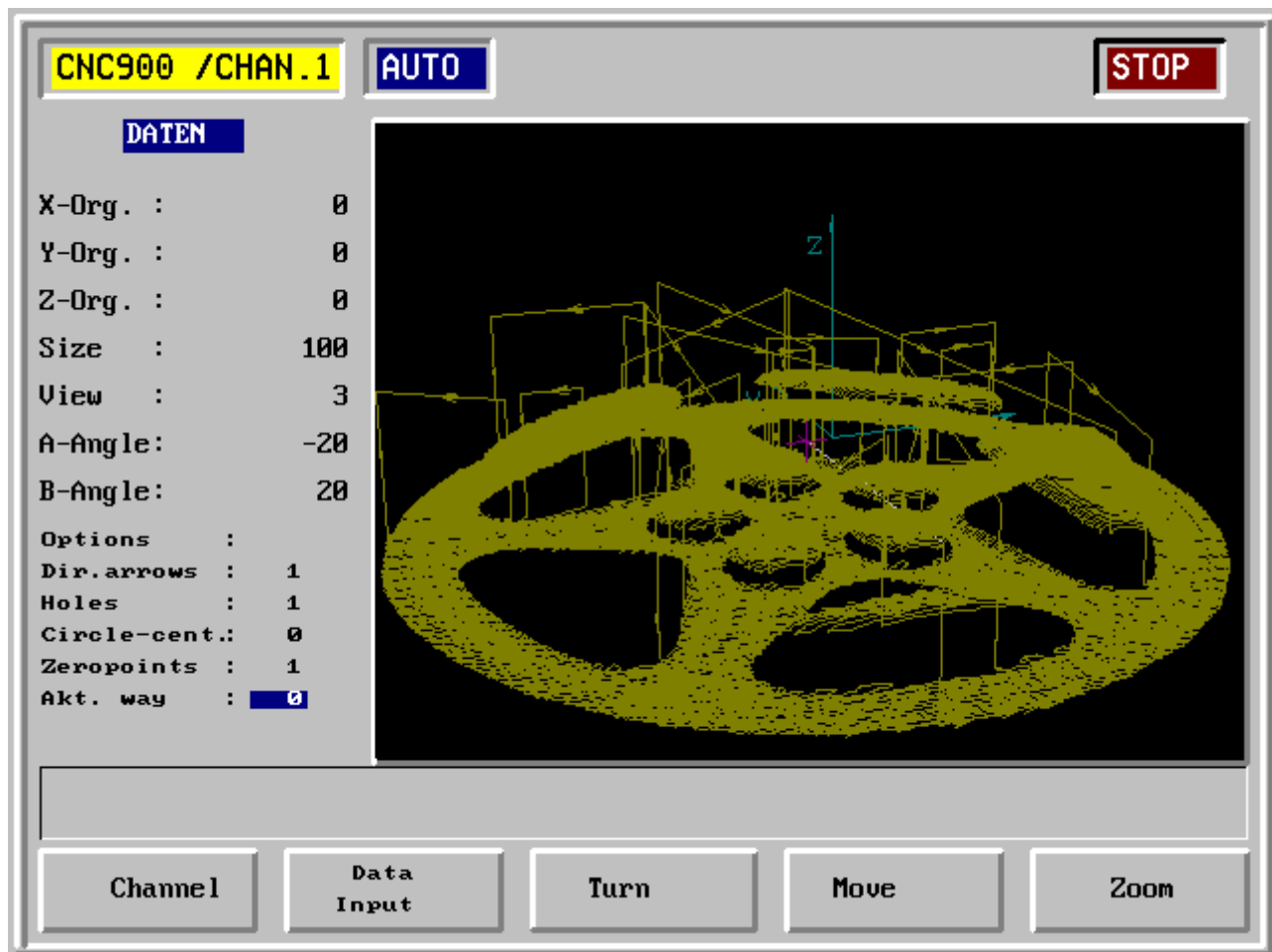


- | | | |
|----|------------|--|
| F1 | Channel | |
| F2 | Data input | Input with numerical keys |
| F3 | Turning | Turning around the X-, Z-axis, input with cursor |
| F4 | Move | X, Y and Z origin, input with cursor |
| F5 | Zoom | Size, input with cursor |

2.5.1 Start data (continued)

Graphic simulation

Example of a complex workpiece



- | | | |
|----|------------|--|
| F1 | Channel | |
| F2 | Data input | Input with numerical keys |
| F3 | Turning | Turning around the X-, Z-axis, input with cursor |
| F4 | Move | X, Y and Z origin, input with cursor |
| F5 | Zoom | Size, input with cursor |

2.5.2 Dialogue

Here you get the possibility to switch on a customer-specific dialogue,
e.g. **programming with work sheet**.

CNC900 /CHAN.1 MANU

Work sheet

Program number: 1
Workpiece name: 1

1	1	G71 Rectangular pocket roughing, conventional
2	1	G86 Ray type machining
0	0	
0	0	
0	0	
0	0	
0	0	
0	0	
0	0	
0	0	
0	0	
0	0	
0	0	
0	0	
0	0	

Edit New Data bloc (Sort) Data bloc Delete NC-program generate

F1 Edit

F2 New data block

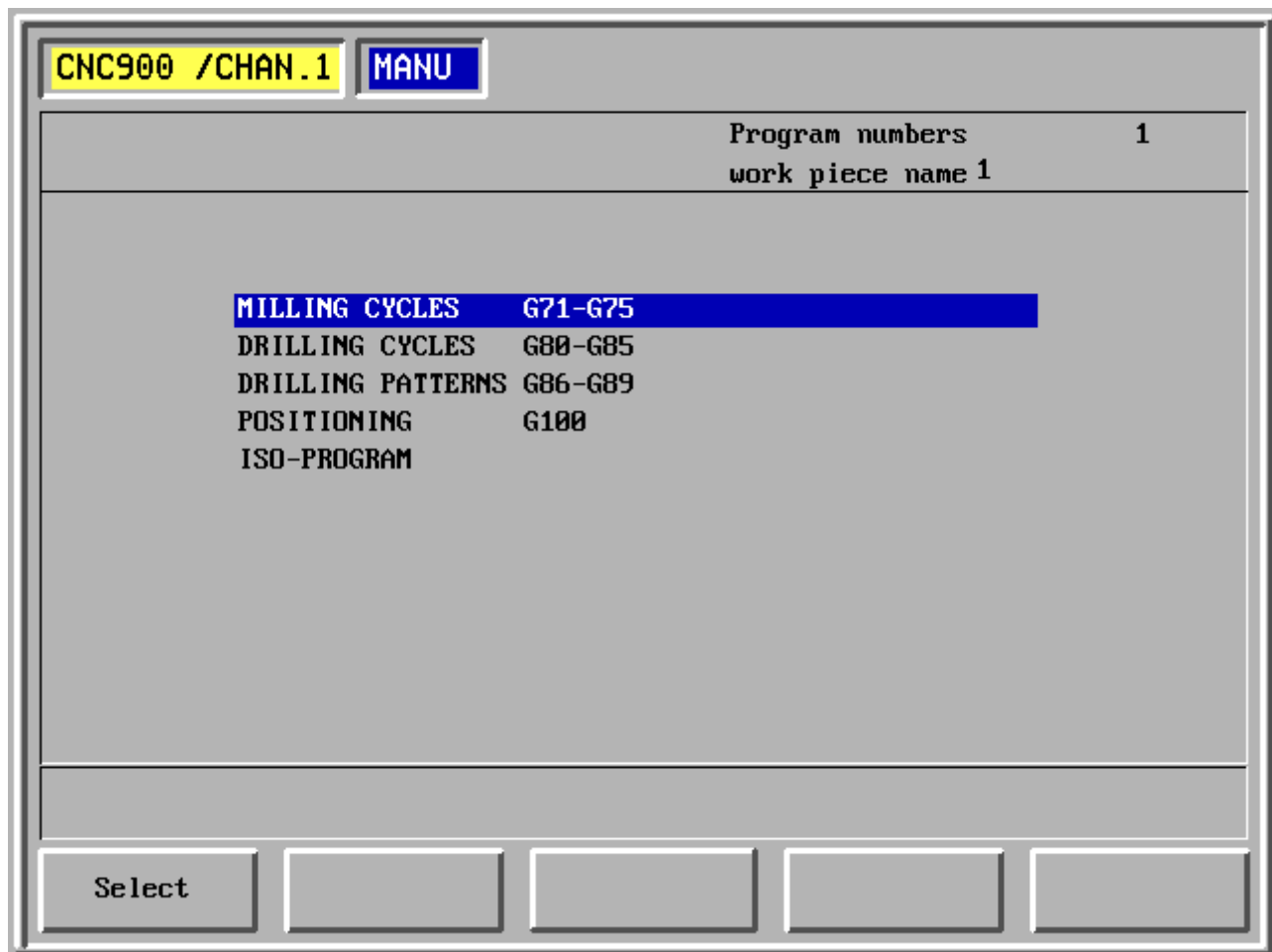
F3 Sort

F4 Delete data block

F5 Generate NC program

2.5.2 Dialogue (continued)

Programming with work-sheet - Selecting the cycle mode



F1 Selecting cycle mode

F2 -

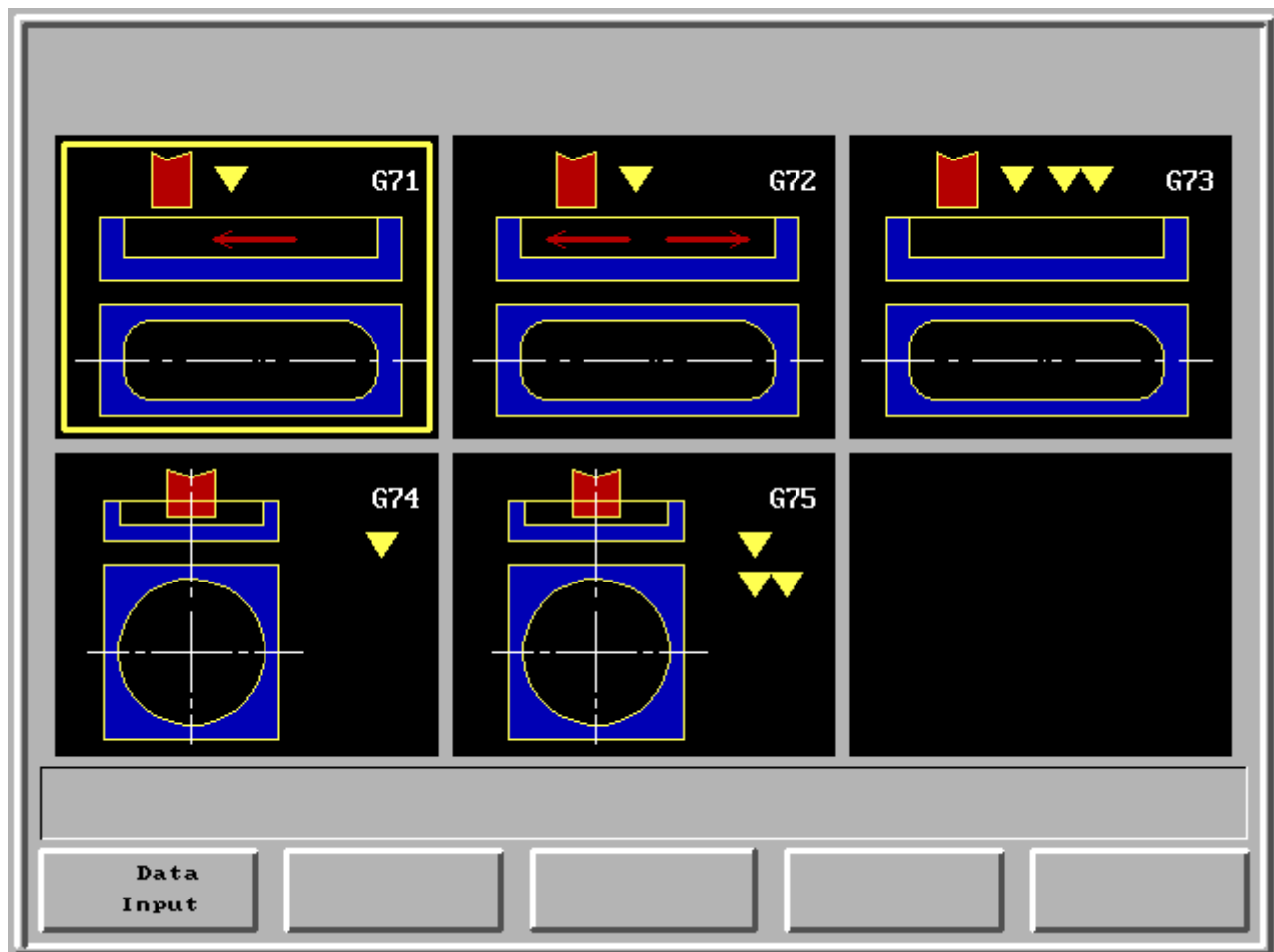
F3 -

F4 -

F5 -

2.5.2 Dialogue (continued)

Programming with work sheet - Selecting the cycle



F1 Data input

F2 -

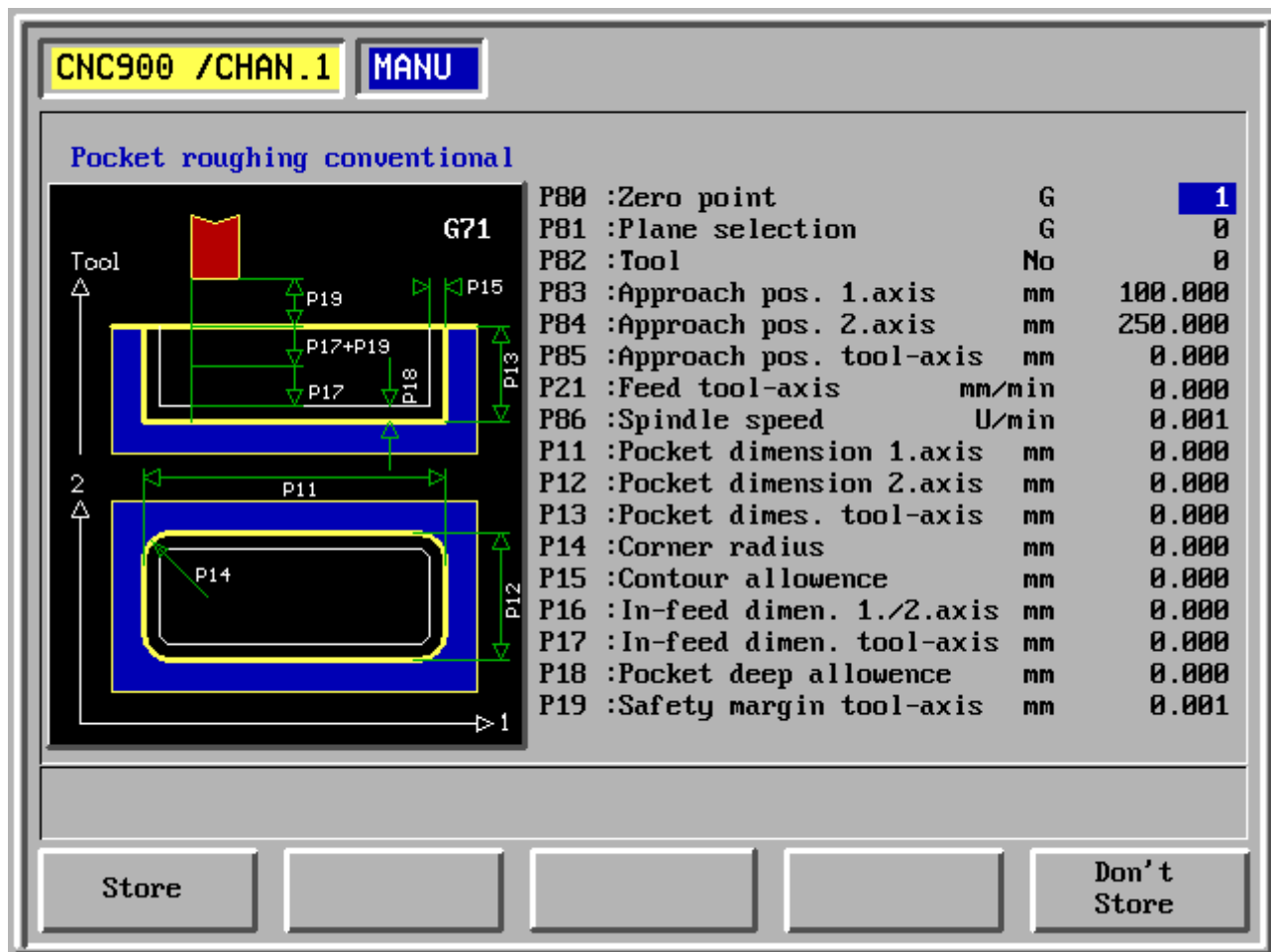
F3 -

F4 -

F5 -

2.5.2 Dialogue (continued)

Programming with work sheet - Selecting the cycle



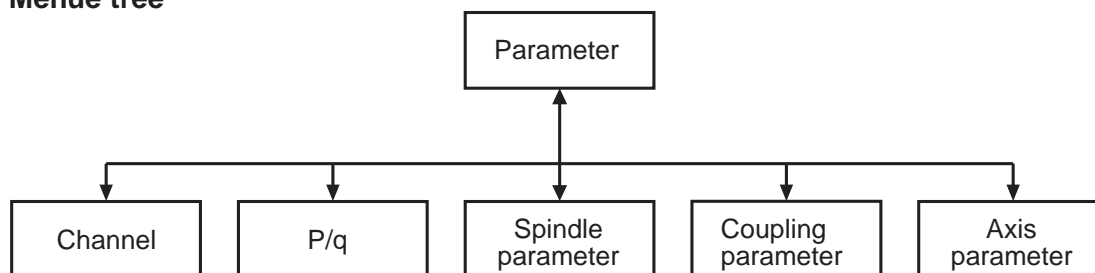
- F1 Store
- F2 -
- F3 -
- F4 -
- F5 Do not store

2.5.3 Parameter

The parameter menu consists of:

- Channel changeover
- Parameter changeover P/q (Channel - / System parameter)
- Spindle parameter
- Coupling parameter
- Axis parameter

Menu tree



System parameter q

0... 99	General system configuration
100... 999	Definition channel descriptor#
1000... 1999	System settings, system overlapping data
2000... 9999	Axis data
10000...	Channel parameter

Channel parameter P

0... 6999	User block 1
0... 499	Reserved for BWO standard cycles
0... 299	Cycle-area for cycle interfaces
300... 399	Area reserved for cycles, area for static, modal data
400... 499	Area reserved for cycles, area for temporary data
500... 6999	Area free for the user
7000... 9999	Fix defined channel parameters
11000...11999	System overlapping data, common area of all channels
12000...18399	Axis data
20000...29999	User block 2
30000...39999	User block 3

2.5.3 Parameter

Channel parameter P:

Input addresses, displaying parameters, input values and store.

CNC900 /CHAN.1		MANU	
P 12200:	1	Connected axis	\$20000705
P 12201:	0	Spindle axis	\$20000505
P 12202:	-	Diameter axis	\$20000504
P 12203:	-	-	\$20000504
P 12204:	30000	Max Axis speed	[mm/min] \$20000505
P 12205:	2000	Slope speed 1	[mm/min] \$20000505
P 12206:	-	Slope speed 2	[mm/min] \$20000504
P 12207:	-	-	\$20000504
X	0.000	Y	-30.000
Z	319.000	A	-30.200
B	-9.757		
<div> <div>Channel</div> <div>P / q</div> <div>Spindle-Parameter</div> <div>Coupling-Parameter</div> <div>Axis-Parameter</div> </div>			

F1 Channel

F2 P/q Switching between channel (P) and system parameters (q)

F3 Spindle parameter

F4 Coupling parameter

F5 Axis parameter

2.5.3 Parameter (continued)

System parameter q:

Input addresses, displaying parameters, input values and store.

CNC900 /CHAN.1		MANU	
q	8000:	-	Connected axis \$00000400
q	8001:	-	Spindle axis \$00000400
q	8002:	-	Diameter axis \$00000400
q	8003:	-	- \$00000400
q	8004:	-	Max Axis speed [mm/min] \$00000400
q	8005:	-	Slope speed 1 [mm/min] \$00000400
q	8006:	-	Slope speed 2 [mm/min] \$00000400
q	8007:	-	- \$00000400
X	0.000	Y	-30.000
Z	319.000	A	-30.200
B	-9.757		
<div> <div>Channel</div> <div>P / q</div> <div>Spindle-Parameter</div> <div>Coupling-Parameter</div> <div>Axis-Parameter</div> </div>			

F1 Channel

F2 P/q Switching between channel (P) and system parameters (q)

F3 Spindle parameter

F4 Coupling parameter

F5 Axis parameter

2.5.3 Parameter (continued)

Inputing spindle data is possible in this menu.

CNC900 /CHAN.1		MANU	
SPINDLE 1			
Spindle On/Off	-	Numb.of revol.reached	0
Prg.numb.of revolutions	2000	Act.numb.of revolutions	0
Spindle-Def. (G96,G97)	97	Spindle numb.of rev.	0
Spindle-Axe	3	Reference-Axe (G96)	-
Max.numb.of revol.(G97)	2000	Reference-Pos. (G96)	-
Max.numb.of revol.(G96)	-	Reference-Factor (G96)	-
X	0.000	Y	-30.000
Z	319.000	A	-30.200
B	-9.757		
<div> <div>Channel</div> <div>P / q</div> <div>Spindle-Parameter</div> <div>Coupling-Parameter</div> <div>Axis-Parameter</div> </div>			

F1 Channel

F2 P/q Switching between channel (P) and system parameters (q)

F3 Spindle parameter

F4 Coupling parameter

F5 Axis parameter

2.5.3 Parameter (continued)

Inputing coupling data is possible in this menu.

CNC900 /CHAN.1		MANU	
COUPLING 1			
Coupling On/Off	-	Coupling activated	-
Differential-Constant	-	Coupl.correc.P-shares	-
Teeth number Master-Axe	-	Coupl.correc.I-shares	-
Teeth number Slave-Axe	-	Coupling errors limit	-
Synchron.-Pos.-Master	-	Coupl.err.check time	-
Synchron.-Pos.-Slave	-	Master-Axe	-
Coupling - type	-	Slave-Axe	-
X	0.000	Y	-30.000
Z	319.000	A	-30.200
B	-9.757		
<div> <div>Channel</div> <div>P / q</div> <div>Spindle-Parameter</div> <div>Coupling-Parameter</div> <div>Axis-Parameter</div> </div>			

F1 Channel

F2 P/q Switching between channel (P) and system parameters (q)

F3 Spindle parameter

F4 Coupling parameter

F5 Axis parameter

2.5.3 Parameter (continued)

Inputing axis data is possible in this menu. Page 1

CNC900 /CHAN.1		MANU	
AXE	1	Page 1(2)	
Axe connected	1	KV-Factor	16
Circular Axe	0	Machine-Dynamic 1	250
Max.Axe speed	30000	Machine-Dynamic 2	-
Slope-speed	30000	Exact-stop limit fine	0.05
Meas.sys.resol.Num.	300000	Exact-stop limit rough	-
Meas.sys.resol.Denom.	1	Software limit pos.	-
Counting Dir.reversal	0	Software limit neg.	-
Output Dir.reversal	0	Groundposition absolut	545
X	0.000	Y	-30.000
Z	319.000	A	-30.200
B	-9.757		
<div> <div>Channel</div> <div>P / q</div> <div>Spindle-Parameter</div> <div>Coupling-Parameter</div> <div>Axis-Parameter</div> </div>			

F1 Channel

F2 P/q Switching between channel (P) and system parameters (q)

F3 Spindle parameter

F4 Coupling parameter

F5 Axis parameter

2.5.3 Parameter (continued)

Inputing axis data is possible in this menu. Page 2

CNC900 /CHAN.1		MANU	
AXE	1	Page 2(2)	
Reference-measure	1420	Driftcorrection	-
Reference-shift	-	Pre control cor.	-
R-cam->zeropu.max	-	Backlash correc.	-
R-cam->zeropu.akt	0.000	Meas.sys.cor.Time	-
Reference-Logic	\$01010001	Lead correc.Number	-
Measuring-Logic	\$00000000		
Error-Logic	\$00000000		
X	0.000	Y	-30.000
Z	319.000	A	-30.200
B	-9.757		
<div> <div>Channel</div> <div>P / q</div> <div>Spindle-Parameter</div> <div>Coupling-Parameter</div> <div>Axis-Parameter</div> </div>			

F1 Channel

F2 P/q Switching between channel (P) and system parameters (q)

F3 Spindle parameter

F4 Coupling parameter

F5 Axis parameter

2.5.3 Parameter (continued)

Drive parameter

This menu permits the Input of the drive data.

CNC900 /CHAN.1		MANU	
5 B			
Number	S 0 104	KV Factor	: 16
Value	2	P-Fact. Speed-contr.	: 100
Minimum	-	I-fact. Speed-contr.	: 20
Maximum	-	Drive-Mode	: \$02020203
		Drive-Definitions	: \$00040002
Act.-val. 3 back sig.:		-	Act.-value 3 request : -
Act.-val. 4 back sig.:		-	Act.-value 4 request : -
Drive-State		: \$00000000	Drive -Controllword : \$00000000
Systemstate		: -	Phasemode : -
X	0.000	Y	-45.000
Z	-90.000	A	0.000
B	-45.000	C	0.000
D	0	B1	1020
<div> <div>Channel</div> <div>←</div> </div> <div>Coupling-Parameter</div> <div>Axis-Param. Page 2</div> <div>Axis-Param. Page 1</div>			

F1 Channel

F2 -

F3 Drive parameter

F4 Axis parameter page 2

F5 Axis parameter page 1

2.5.4 Machine functions

The actual function picture appears.

CNC900 /CHAN.1 MANU

Functionpicture select

Functions pict.01	Functions pict.06
Functions pict.02	Functions pict.07
Functions pict.03	Functions pict.08
Functions pict.04	Functions pict.09
Functions pict.05	Functions pict.10

X	0.000	Y	-45.000	Z	-90.000	A	0.000
B	-45.000	C	0.000	D	0	B1	1020

Below the coordinate display, there are five function keys (F1-F5) and a return key (indicated by an arrow).

F1 -

F2 -

F3 -

F4 -

F5 -

2.5.4 Machine functions (continued)

The actual function picture appears.

The screenshot shows the CNC900 /CHAN.1 MANU screen. At the top, there are two tabs: 'CNC900 /CHAN.1' (highlighted in yellow) and 'MANU' (highlighted in blue). Below the tabs, the text 'Functions 1 Text: Group A' is displayed. The main area contains a grid of function buttons. The first row has 'Forward V1', 'Func 1' (highlighted in blue), and 'Backward V1'. The second row has 'Func2-Off', 'Func 2', and 'Func2-Off'. The third row has 'Func3-Off', 'Func 3', and 'Func3-Off'. The fourth row has 'Func4-Off', 'Func 4', and 'Func4-Off'. The fifth row has 'Func5 Off', 'Func 5', and 'Func5-Off'. Below the function grid, there are two rows of coordinate values: X 0.000, Y -45.000, Z -90.000, A 0.000; and B -45.000, C 0.000, D 0, B1 1020. At the bottom, there are five buttons: 'Perform Left' (with a left arrow), 'Fct-Picture Forw.', an empty button, 'Fct-Picture Backw.', and 'Perform Right' (with a right arrow).

CNC900 /CHAN.1		MANU	
Functions 1 Text: Group A			
Forward V1	Func 1	Backward V1	
Func2-Off	Func 2	Func2-Off	
Func3-Off	Func 3	Func3-Off	
Func4-Off	Func 4	Func4-Off	
Func5 Off	Func 5	Func5-Off	
X 0.000	Y -45.000	Z -90.000	A 0.000
B -45.000	C 0.000	D 0	B1 1020
Perform Left Fct-Picture Forw. Fct-Picture Backw. Perform Right			

- F1 Performance left
- F2 Function picture forward
- F3 -
- F4 Function picture backward
- F5 Performance right

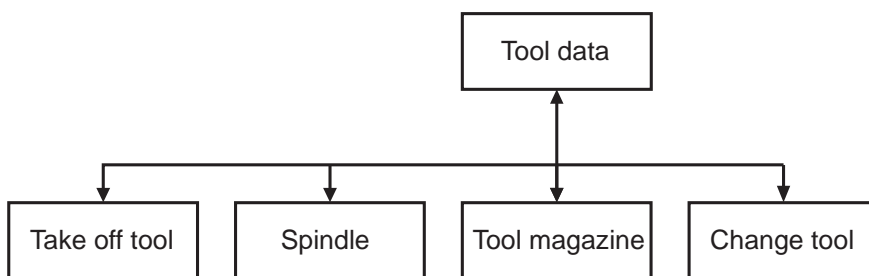
2.5.5 Tool data

The actual tool data can be input here.

The tool data menu consists of

- Lay down tool
- Spindle
- Magazine
- Tool change

Menu tree

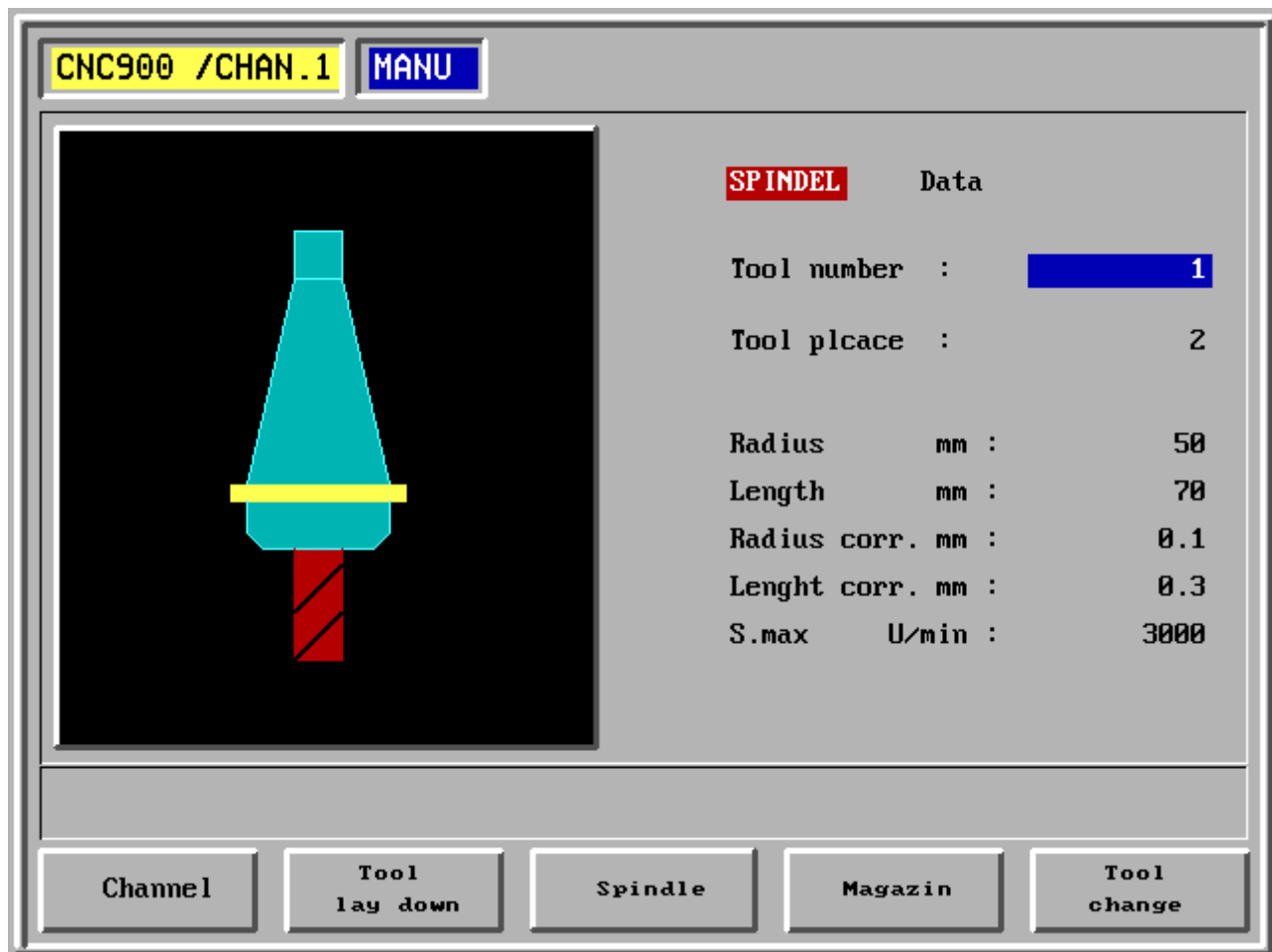


The tool dates (length, radius...) can be called up with 10-digit tool numbers in the program run.

Inputs are possible in manual mode via the operating panel or external data carriers without indicating a block number. If 'delete store' is input, the tool data are deleted during power on test.

2.5.5 Tool data

Tool in the spindle.



F1 Channel

F2 Lay down tool

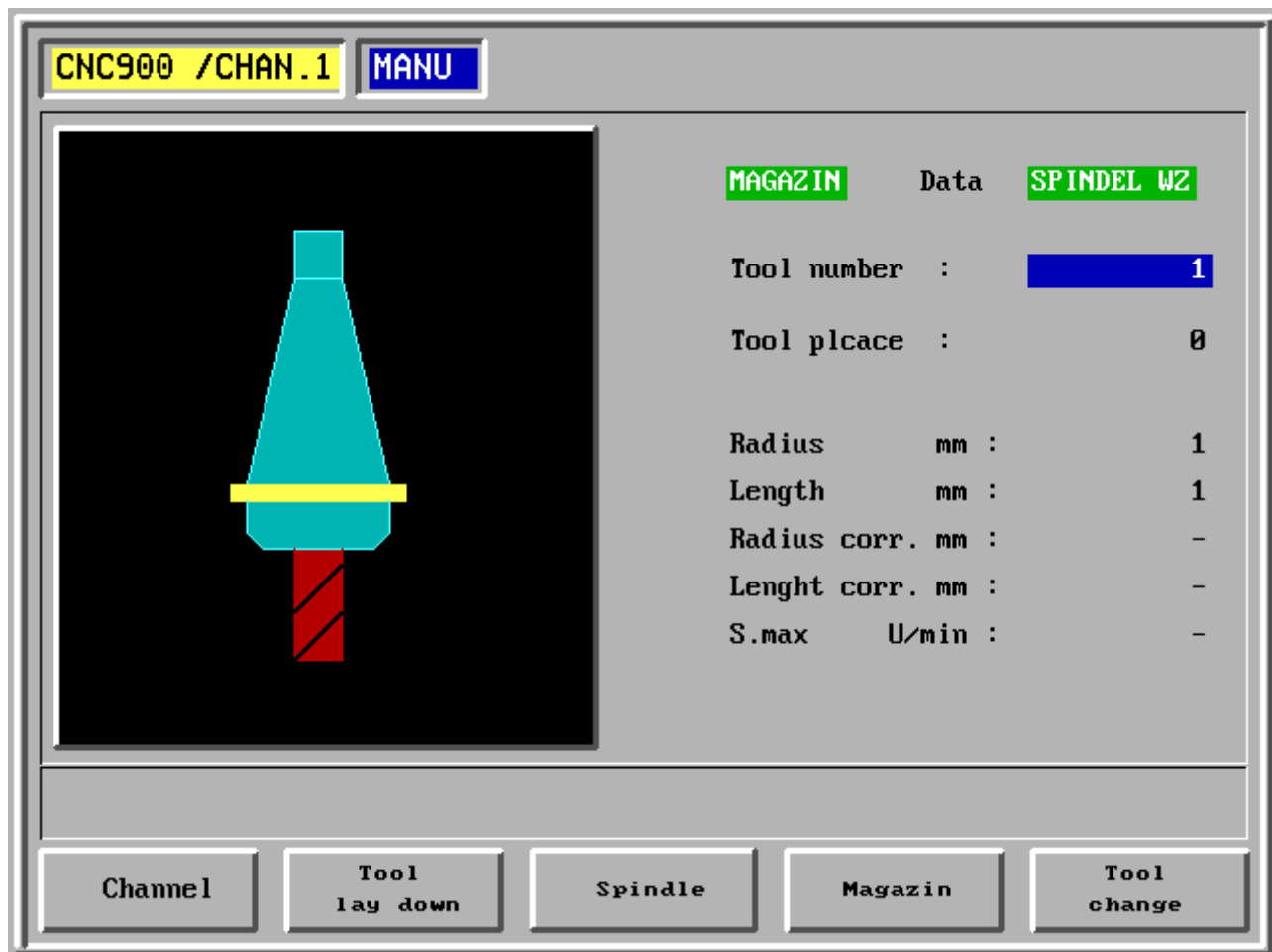
F3 Spindle

F4 Magazine

F5 Tool change

2.5.5 Tool data

Tool in the magazine.



F1 Channel

F2 Lay down tool

F3 Spindle

F4 Magazine

F5 Tool change

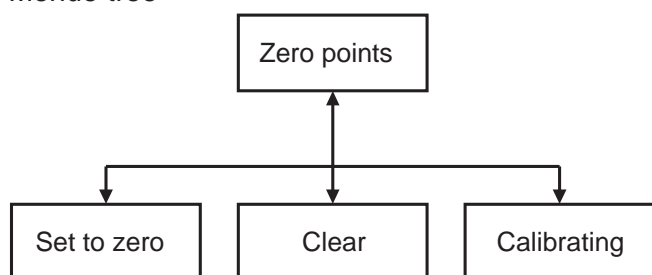
2.5.6 Zero points

The actual zero point data can be input here.

The zero point data menu consists of

- Set to zero
- Delete
- Calibrate

Menu tree



For each axis, a maximum of 6 zero points can be set with G54 to G59 and can be called up during program run.

Zero point shift is made ineffective with G53. The program then refers to the machine zero point.

Inputs are possible in manual mode via the operating panel or external data carriers without indicating a block number. When deleting the memory during power on test, the zero point data are also deleted.

Zero point data can be located mathematically or they can be approached (edge scanner, clock gauge).

2.5.6 Zero points (continued)

The actual zero point is displayed. The values can be input and stored.

The screenshot shows the CNC900 /CHAN.1 MANU screen. At the top, there is a yellow box with 'CNC900 /CHAN.1' and a blue box with 'MANU'. Below this, the text 'ZERO-POINT: G 54' is displayed on the left and 'RANGE : 1' on the right. In the center, there is a table with two columns: 'Istpos.' and 'Versch.'. The table contains data for X, Y, Z, A, and B axes. Below the table, there is a row of input fields for X, Y, Z, and A, and another row for B and empty fields. At the bottom, there are five buttons: 'Channel', 'Set Zero', 'Delete', an empty button, and 'Calibrate'.

	Istpos.	Versch.
X	0.000	0.000
Y	-30.000	-30.000
Z	319.000	-41.000
A	-30.200	30.200
B	-9.757	9.757

X	0.000	Y	-30.000	Z	319.000	A	-30.200
B	-9.757						

Channel Set Zero Delete Calibrate

F1 Channel

F2 Set to zero

F3 Delete

F4 -

F5 Calibrate

2.5.6 Zero points (continued)

The actual values can be set to zero.

CNC900 /CHAN.1

MANU

ZERO-POINT: G 54

RANGE : 1

	Istpos.	Versch.
X	0.000	0.000
Y	0.000	-80.000
Z	0.000	278.000
A	0.000	0.000
B	0.000	0.000

X	0.000	Y	0.000	Z	0.000	A	0.000
B	0.000						

Channel

Set Zero

Delete

Calibrate

F1 Channel

F2 Set to zero

F3 Delete

F4 -

F5 Calibrate

2.6 Operating modes

The following operating modes can be set:

- MANUAL
- AUTOMATIC Sequential block
 Single block
 Positioning

2.6.1 Manual mode


Manual mode is switched on with key .


For traversing the axes, the axis name (X, Y, Z, ...) and travelling mode (continuously or step by step) and the feed rate have to be input first.

By pressing the keys  (Manual+) or  (Manual-) the selected axis is traversed in positive or negative direction.


The length of the actual tool is calculated when traversing the tool axis.

Travelling mode


During  (continuously) travelling mode, the axis is moving as long until the manual key is pressed.

When traversing with fix length, the complete length is traversed by pressing a manual key once (the step width can be selected by pressing the key  (step) again and again).

During this time, the keys for Manual+/-, axis name and travelling mode remain ineffective.

When pressing the key  (Stop), the process can be interrupted. If a manual key is pressed again, the axis moves from the new position on with the selected length.

Command = Actual

Desired positions can be approached in the program and they can be overtaken into the command value display with key  (Command=Actual) and can be written into the memory with

 (Input).

2.6.1 Manual mode (continued)

Traverse **continuously** in manual mode.

Switch on manual mode with key . Select continuously with key .

CNC900 / CHAN.1		MANU	X	Cont																		
MANUAL-DATA																						
<table border="1"> <thead> <tr> <th colspan="2">Command</th> </tr> </thead> <tbody> <tr> <td>Feedrate</td> <td>10000</td> </tr> <tr> <td>Speed</td> <td>2000</td> </tr> </tbody> </table>		Command		Feedrate	10000	Speed	2000	<table border="1"> <thead> <tr> <th colspan="2">Actual</th> </tr> </thead> <tbody> <tr> <td></td> <td>6000</td> </tr> <tr> <td></td> <td>0</td> </tr> </tbody> </table>		Actual			6000		0	<table border="1"> <thead> <tr> <th colspan="2">Override</th> </tr> </thead> <tbody> <tr> <td>60</td> <td><div><div></div></div></td> </tr> <tr> <td>50</td> <td><div><div></div></div></td> </tr> </tbody> </table>	Override		60	<div><div></div></div>	50	<div><div></div></div>
Command																						
Feedrate	10000																					
Speed	2000																					
Actual																						
	6000																					
	0																					
Override																						
60	<div><div></div></div>																					
50	<div><div></div></div>																					
Zero Point 55		M-Fct. -																				
Coord-Sys <div></div>																						
X	0.000	Y	-60.000	Z 276.000																		
B	0.000																					
<div>Channel</div> <div>Start Data</div> <div>Dialog</div> <div></div> <div>Parameter</div>																						

F1 Channel

F2 Start data

F3 Dialogue

F4 -

F5 Parameter

2.6.1 Manual mode (continued)

Traverse **step by step** in manual mode.

Switch on manual mode with key . Select step-by-step with key .

CNC900 / CHAN.1		MANU	X	Step	0.01
-----------------	--	------	---	------	------

MANUAL-DATA	
Command	
Feedrate	10000
Speed	2000
Actual	
	6000
	0
Override	
60	<div><div></div></div>
50	<div><div></div></div>
Zero Point	55
M-Fct.	-
Coord-Sys	-

X	0.000	Y	-60.000	Z	276.000	A	0.000
B	0.000						

Channel	Start Data	Dialog		Parameter
---------	------------	--------	--	-----------

F1 Channel

F2 Start data

F3 Dialogue

F4 -

F5 Parameter

2.6.2 Automatic mode

Automatic mode is switched on with the keys:



Automatic sequential block



Automatic single block



Positioning


Start/Stop


The selected program is started with key  (Start). It can be interrupted with key  (Stop)

and continued with key  (Start) at any time.

The keys for machine functions are dependant of the PLC. The speed can be controlled with the override.


Skip block

When making a program, the blocks which do have a slash placed in front of them, are skipped in automatic mode if the key  (skip block) is switched on.

Switch on: Press key 


The key is only effective before program start.

The display of the operating mode is completed by the symbol '/'.

Switch off: Press key  again.

2.6.2 Automatic mode (continued)

In **automatic sequential block**, all blocks of a program are worked one after the other.

Switch on sequential block with key .

CNC900 /CHAN.1		AUTO		STOP	
Start Prog:	1000	Blk:	10	F:	1500.00
Act. Prog:	1000	Blk:	10	F:	900.00
<pre> > N10 G00 G54 X+0000.00 Y-0030.00 F6000 S2000 /N20 G00 Z-41.00 M03 </pre>					
X	0.000	Y	-60.000	Z	276.000
B	0.000				
Channel		Start Data		Dialogue	
Parameter					

F1 Channel

F2 Start data

F3 Dialogue


F4 -

F5 Parameter

2.6.2 Automatic mode (continued)

In automatic single block, only one block is worked after the start. Start the next block with key



. Switch on automatic single block with key .

CNC900 /CHAN.1

AUTO

E

STOP

Start Prog: 1000 Blk: 10 F: 1500.00
Act. Prog: 1000 Blk: 10 F: 900.00

> N10 G00 G54 X+0000.00 Y-0030.00 F6000 S2000

/N20 G00 Z-41.00 M03

X	0.000	Y	-60.000	Z	276.000	A	0.000
B	0.000						

Channel

Start Data

Dialog

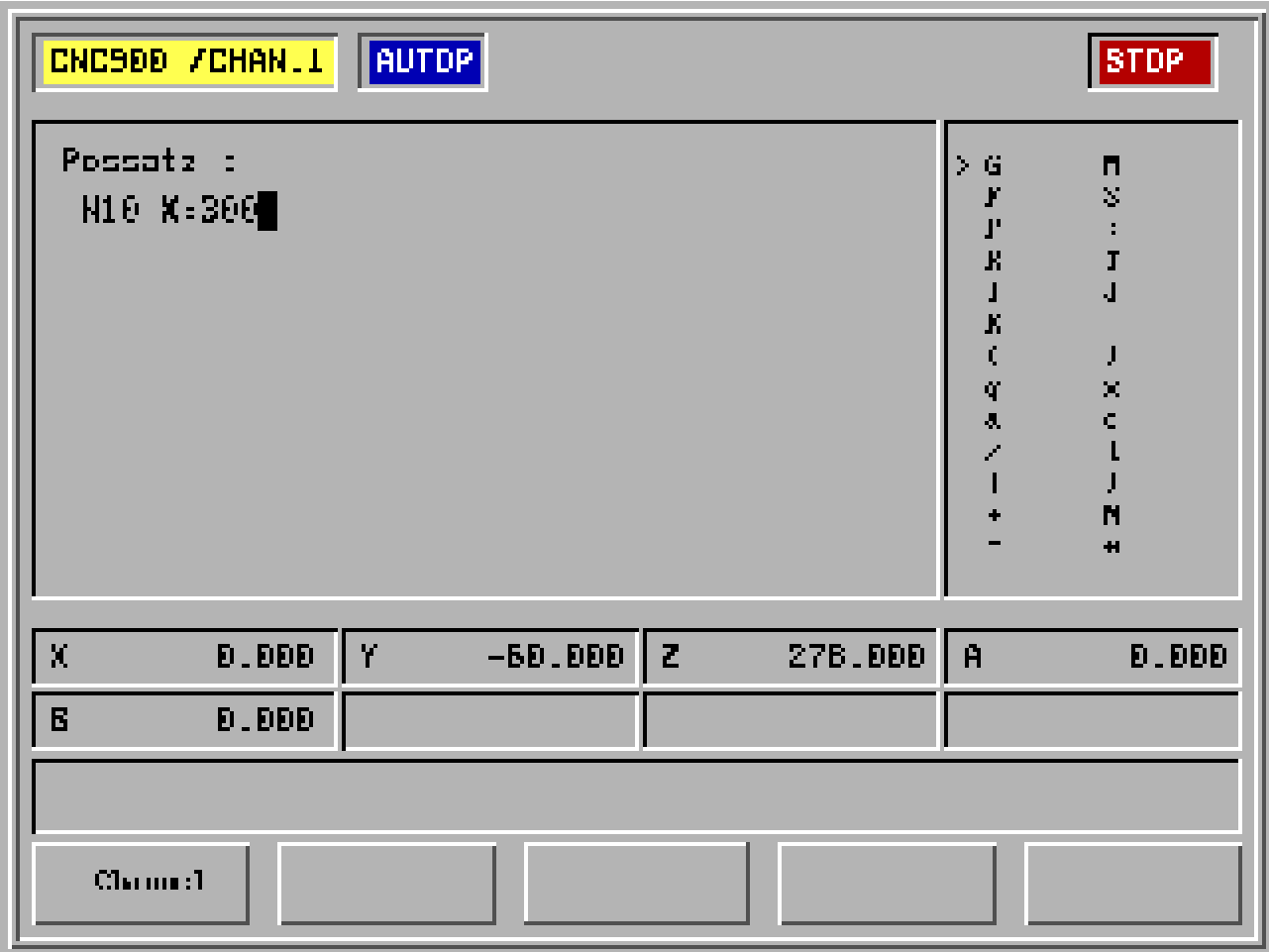
Parameter

- F1 Channel
- F2 Start data
- F3 Dialogue
- F4 -
- F5 Parameter

2.6.2 Automatic mode (continued)

With positioning, a complete NC block or parts of it can be input via the numerical keys and worked without storing.

Switch on positioning with key .



F1 Channel

F2 -

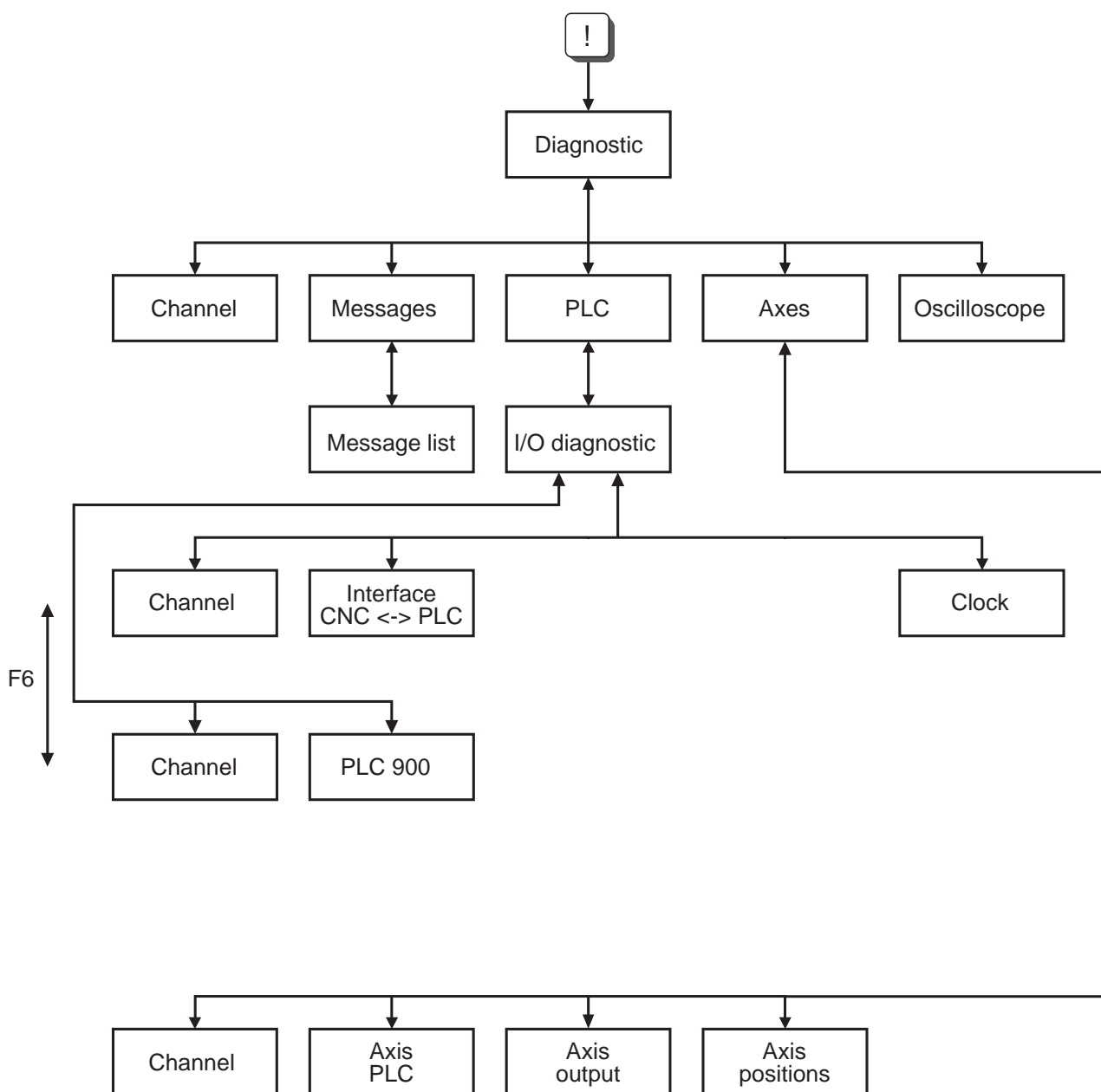
F3 -

F4 -

F5 -

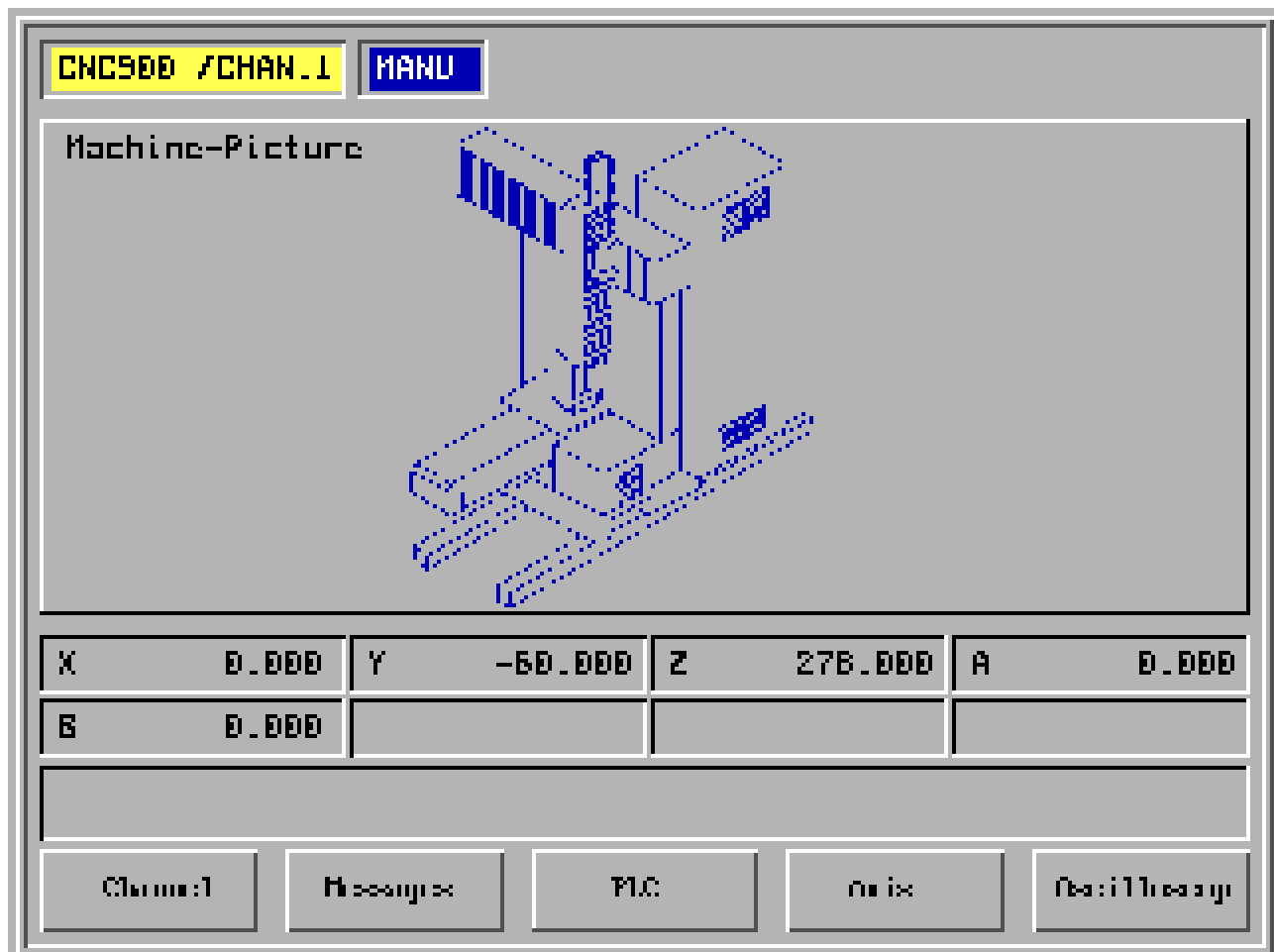
2.7 Diagnostic

Menue tree



2.7 Diagnostic

Diagnostic is switched on with the key . The machine picture appears, e.g.



- F1 Channel
- F2 Messages Display messages
- F3 PLC PLC diagnostic
- F4 Axes Axis drive diagnostic
- F5 Oscilloscope

2.7.1 Messages

Current messages

The screenshot displays the CNC operating interface. At the top, there is a status bar with 'CNC900 /CHAN.1' in a yellow box and a 'MANU' button in a blue box. Below this, the main display area is titled 'CURRENT MESSAGES' with 'Page 1 (3)' to its right. Two red horizontal bars highlight the messages: 'M3001: Emergence - Stop' and 'M3002: Low lube level'. Below the messages, a table shows coordinate values for X, Y, Z, A, and B. At the bottom, there is a red bar for 'M3001: Emergence - Stop' and a row of five buttons: 'Channel', 'Messages', 'Message-Record', and two empty buttons.

CURRENT MESSAGES Page 1 (3)							
M3001: Emergence - Stop							
M3002: Low lube level							
X	-0.000	Y	-60.000	Z	278.000	A	0.000
B	0.000						
M3001: Emergence - Stop							
Channel		Messages		Message-Record			

F1 Channel

F2 Messages

F3 Message record Display of previous messages

F4 -

F5 -

2.7.1 Messages

Current messages

CNC900 /CHAN.1		MANU	
MESSAGES - HISTORY		Page	1 (9)
		Day	Time
M3000:	Connection Operating panel <---> CNC was break	28	11:18.26
M3002:	Low lube level	28	11:15.14
M3001:	Emergence - Stop	28	11:15.14
M3002:	Low lube level	28	11:15.09
M3001:	Emergence - Stop	28	11:15.09
M3002:	Low lube level	28	11:14.58
M3002:	Low lube level	28	11:14.55
M3001:	Emergence - Stop	28	11:14.55
M3002:	Low lube level	28	11:14.30
M3001:	Emergence - Stop	28	11:14.30
M3002:	Low lube level	28	11:14.21
X	-0.000	Y	-60.000
Z	278.000	A	0.000
B	0.000		
M3001: Emergence - Stop			
Channel	Messages	Message-Record	

F1 Channel

F2 Messages

F3 Message record Display of previous messages

F4 -

F5 -

2.7.2 PLC

I/O diagnostic

CNC900 /CHAN.1
MANU

I/O DIAGNOSIS

Inputs	E1 1 1 1 1 1 1 0 0 0 1 0 0 0 0 0 0 0 0
Outputs	A1 1 1 0
Markers	M 1 1 0
Register	R 0 0 102045188

X -0.000	Y -60.000	Z 278.000	A 0.000
B 0.000			

Channel

Interface
CNC<--->PLC

State-
machine

System-
Config.

Clock

F1 Channel

F2 Interface CNC <—> PLC

F3 State machine

F4 System configuration

F5 Clock

2.7.2 PLC (continued)

I/O diagnostic

CNC900 /CHAN.1MANU

I/O DIAGNOSIS

Inputs

E111110001000000000

Outputs

A110000000000000000

Markers

M100000000000000000

Register

R00102045188

X-0.000Y-60.000Z278.000A0.000

B0.000

Channel1

PLC900

- F1 Channel
- F2 PLC 900
- F3 -
- F4 -
- F5 -

2.7.2 PLC (continued)

Clock

The screenshot shows the CNC900 /CHAN.1 MANU screen. At the top, there is a yellow box with 'CNC900 /CHAN.1' and a blue box with 'MANU'. In the center, a white box displays the date 'Date: 16. 1. 97' and the time 'Time: 11 : 33 : 45'. Below this, a table shows the positions of the axes:

X	-0.000	Y	-60.000	Z	278.000	A	0.000
B	0.000						

At the bottom, there are five buttons: Channel, Config., State-machine, System-I/O, and Clock.

F1 Channel

F2 I/O

F3 State machine

F4 System configuration

F5 Clock

2.7.3 Axes

Axis diagnostic 1

CNC900 /CHAN.1
MANU
X
Cont

AXIS DIAGNOSIS (1)

Channel-Amplif.Enable ☒
Channel-Drive Enable ☒

Channel-Security-Stop ☒
Channel-Block-Enable ☒

	X	Y	Z	A	B
Axis is moving	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drive Command plus	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drive Command minus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drive Limit plus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drive Limit minus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
End Position plus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
End Position minus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

X 409.909

Y -60.000

Z 278.000

A 0.000

B 0.000

Channel

Axis-
PLC

Axis-
Output

Axis-
Positions

F1 Channel

F2 Axis PLC

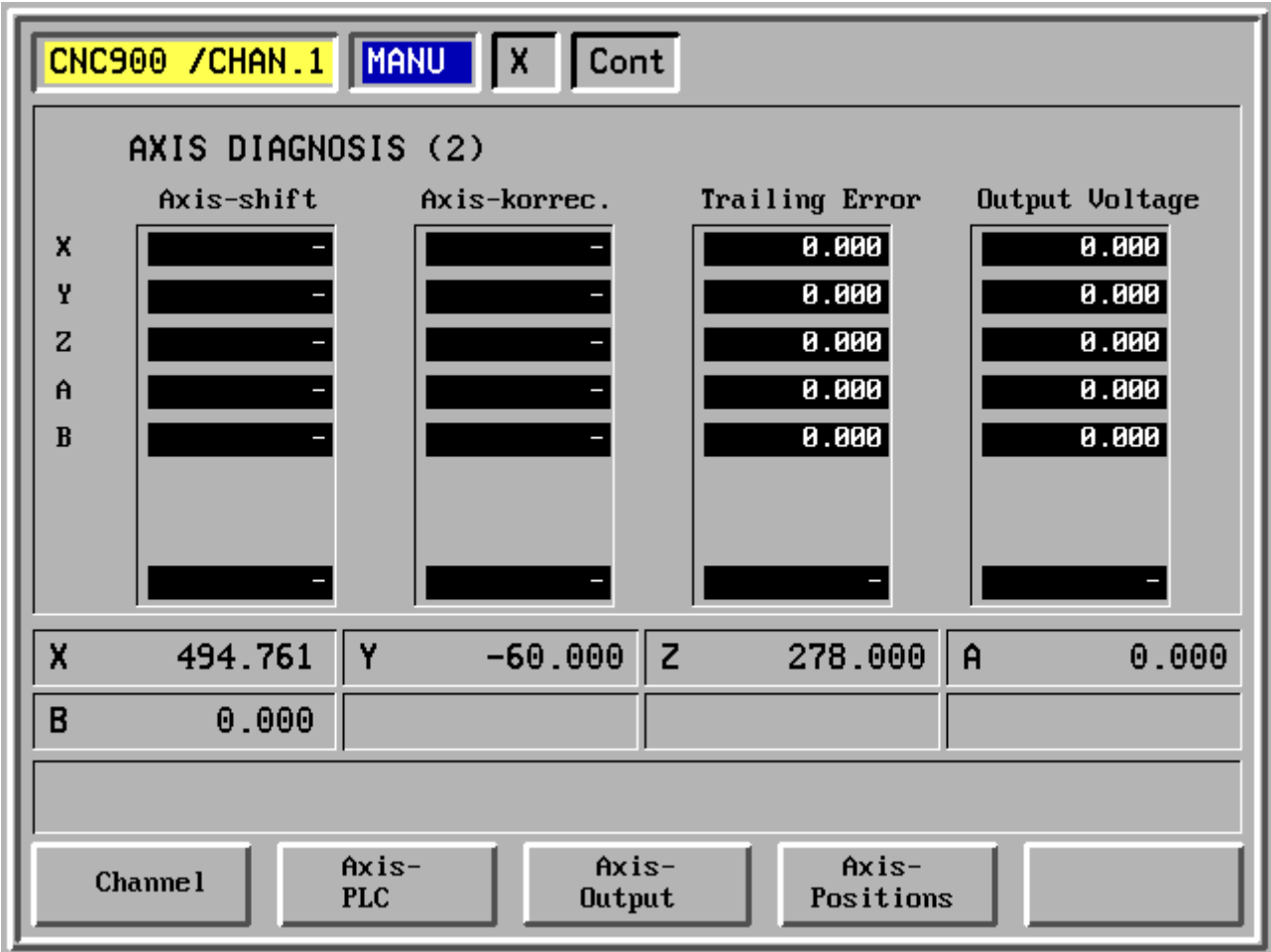
F3 Axis output

F4 Axis positions

F5 -

2.7.3 Axes (continued)

Axis diagnostic 2



- F1 Channel
- F2 Axis PLC
- F3 Axis output
- F4 Axis positions
- F5 -

2.7.3 Axes (continued)

Axis positions

CNC900 /CHAN.1 **MANU** X Cont

AXISPOSITIONS

	Maschine-Pos.	Soll-Position	Delta-Position	Measuring Pos.
X	494.761	494.761	0.000	0.000
Y	-60.000	-60.000	0.000	0.000
Z	278.000	278.000	0.000	0.000
A	0.000	0.000	0.000	0.000
B	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000

X	494.761	Y	-60.000	Z	278.000	A	0.000
B	0.000						

Channel Axis-PLC Axis-Output Axis-Positions

F1 Channel

F2 Axis PLC

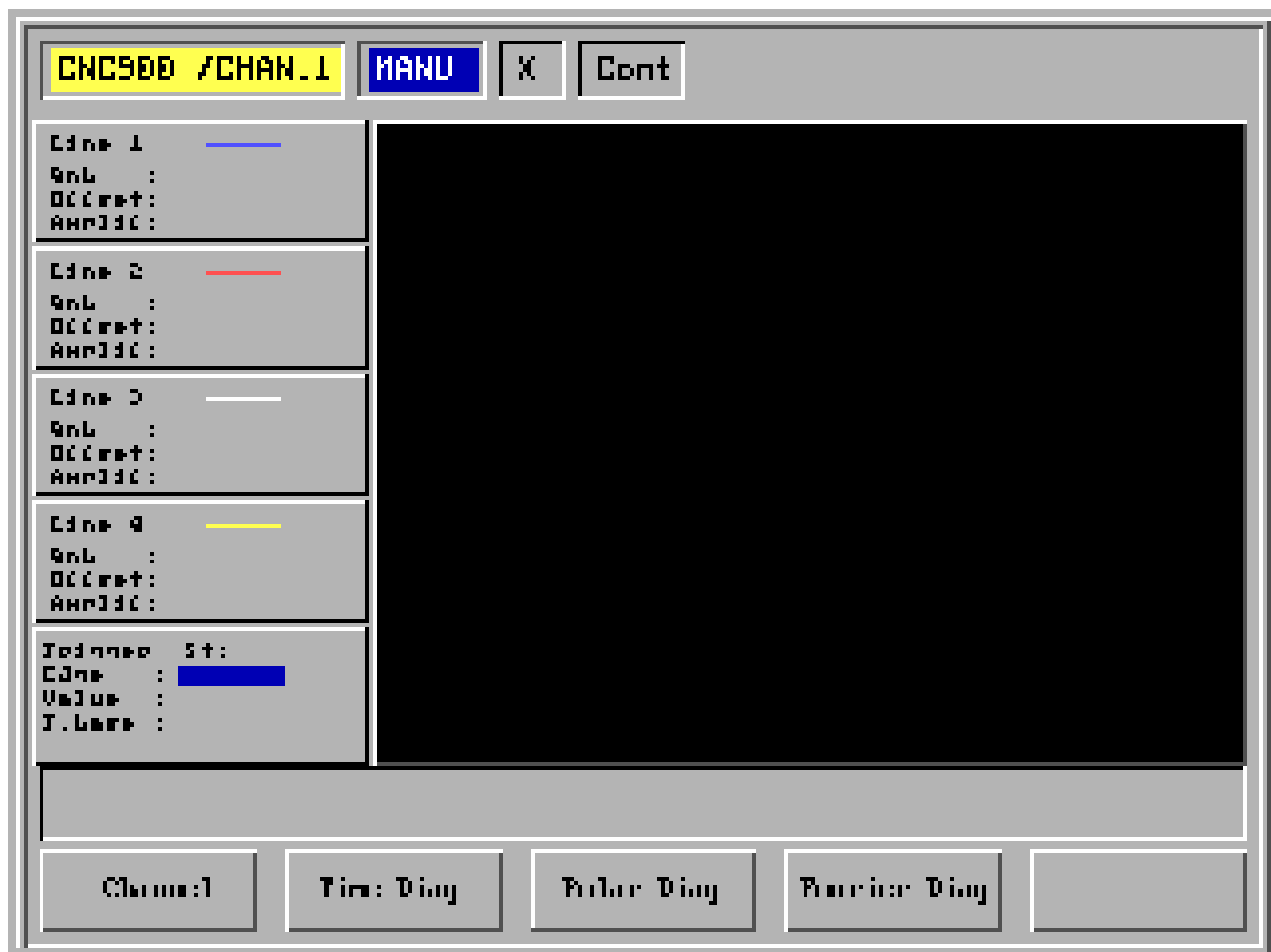
F3 Axis output

F4 Axis positions

F5 -

2.7.4 Oscilloscope

Four-channel oscilloscope with time-, polar- and Fourier diagnostic for evaluating the mechanical settings and for recognising defective mechanical parts.



- F1 Channel
- F2 Start time diagnostic
- F3 Start polar diagnostic
- F4 Start Fourier diagnostic
- F5 -

2.7.4 Oscilloscope (continued)**Qnr** Parameter number (connection)

Number Meaning

q2150	Command position	[mm, degree]
q2152	Actual position	[mm, degree]
q2160	Lag distance	[mm, degree]
q2161	Coupling correction	[mm, degree]
q2168	Actual difference (corresponds to speed)	[mm, degree]
q2169	Output voltage of positioning control	[V]

Offset Vertical offset**Amplif** Amplification, vertical resolution, units per division**Trigger St** Trigger line number

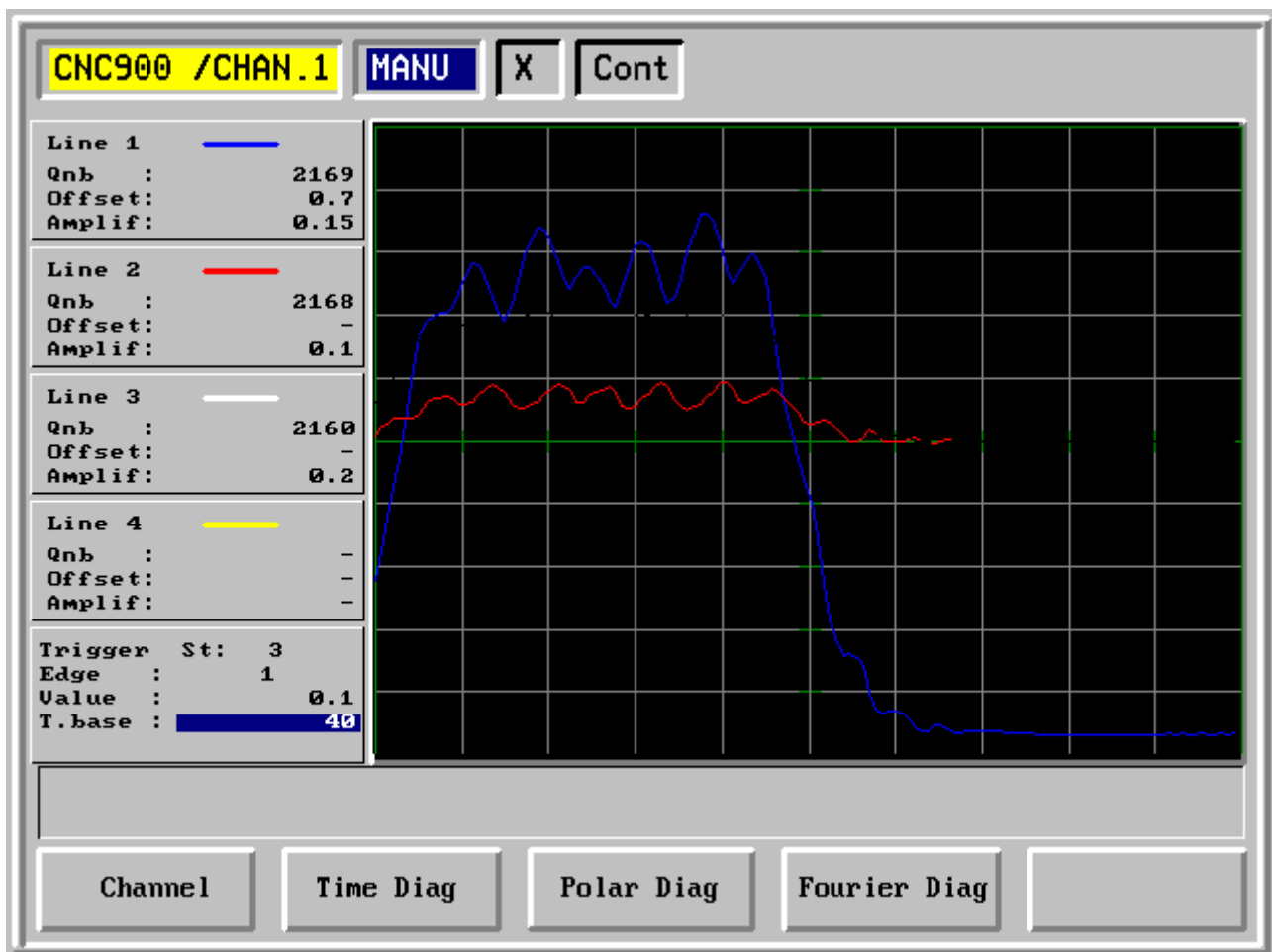
Edge

1	trigger at rising edge
-1	trigger at declining edge
0	trigger immediately

Value Value at which it is triggered.**TB/Freq** Time basis / frequency, horizontal resolution, units per division [ms, Hz]

2.7.4 Oscilloscope (continued)

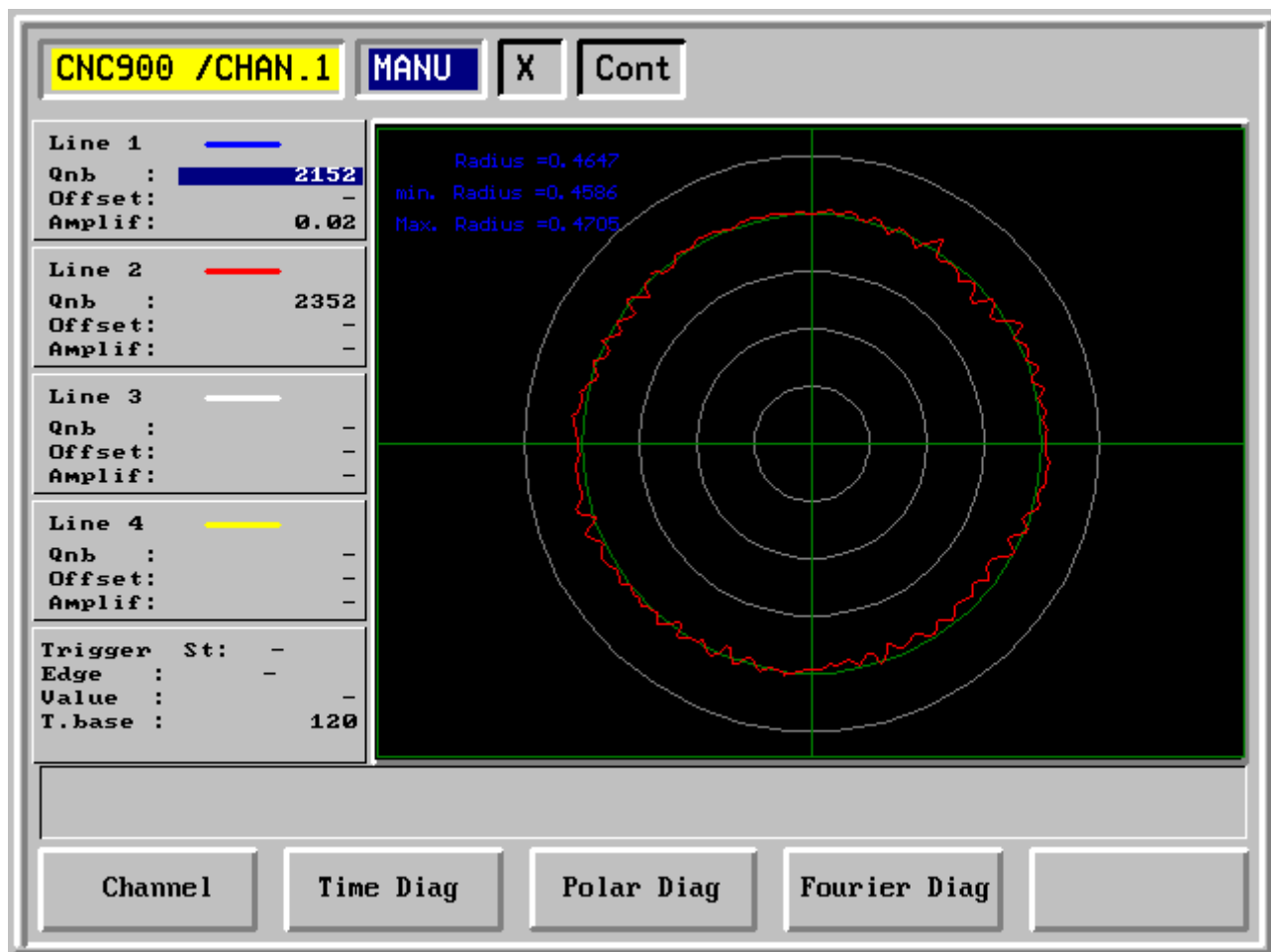
Example: Three-channel time diagnostic



Line 1	Qnr	2169	output voltage of positioning control in V
	Offset	0,7	vertical offset
	Amplif.	0,15	units per division
Line 2	Qnr		actual difference in mm/degree
	Amplif.	0,1	units per division
Line 3	Qnr	2160	lag distance in mm/degree
	Amplif.	0,2	units per division
Trigger	Line number	3	
Edge		1	trigger at rising edge
Value		0,1	trigger at this value
Time basis / Frequency		40	units per division

2.7.4 Oscilloscope (continued)

Example: polar diagnostic, circle test



Line 1 Qnr 2152 actual position 1st axis in mm/degree
 Amplification 0,02 units per division

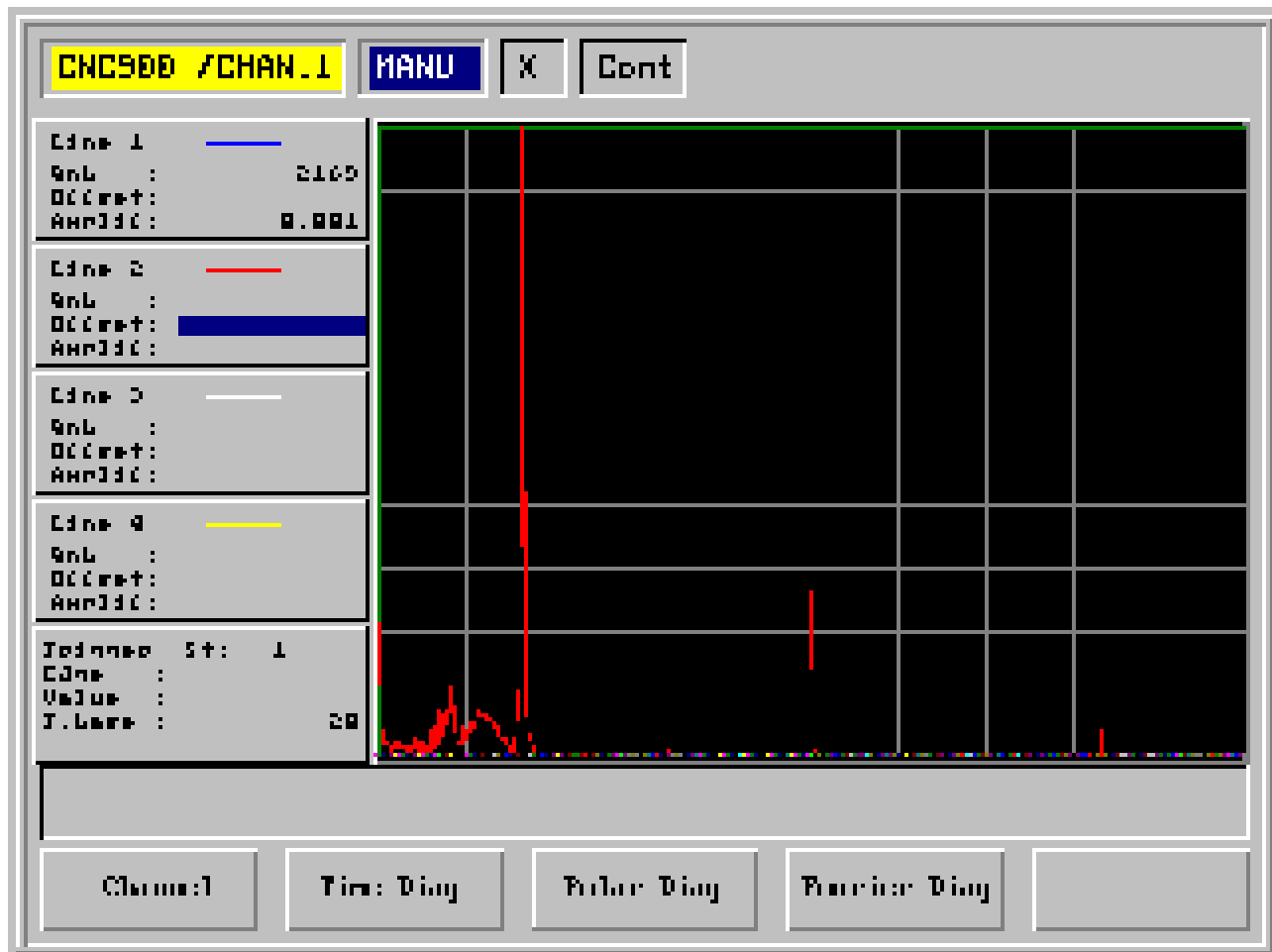
Line 2 Qnr 2352 actual position 2nd axis in mm/degree

Time basis / Frequency 120 units per division
 chose time/frequency basis so that
 at least one full circle is run.

2.7.4 Oscilloscope (continued)

Example: Fourier diagnostic, frequency spectrum

Frequency spectrum with oscillations at 33Hz and harmonics at 99Hz and 165Hz



Line 1	Qnr	2169	output voltage of positioning control in V
	Amplification	0,01	units per division vertically
Trigger	Line number	1	
Time basis / frequency	20		units per division horizontally in Hz

2.7.5 Additional informations

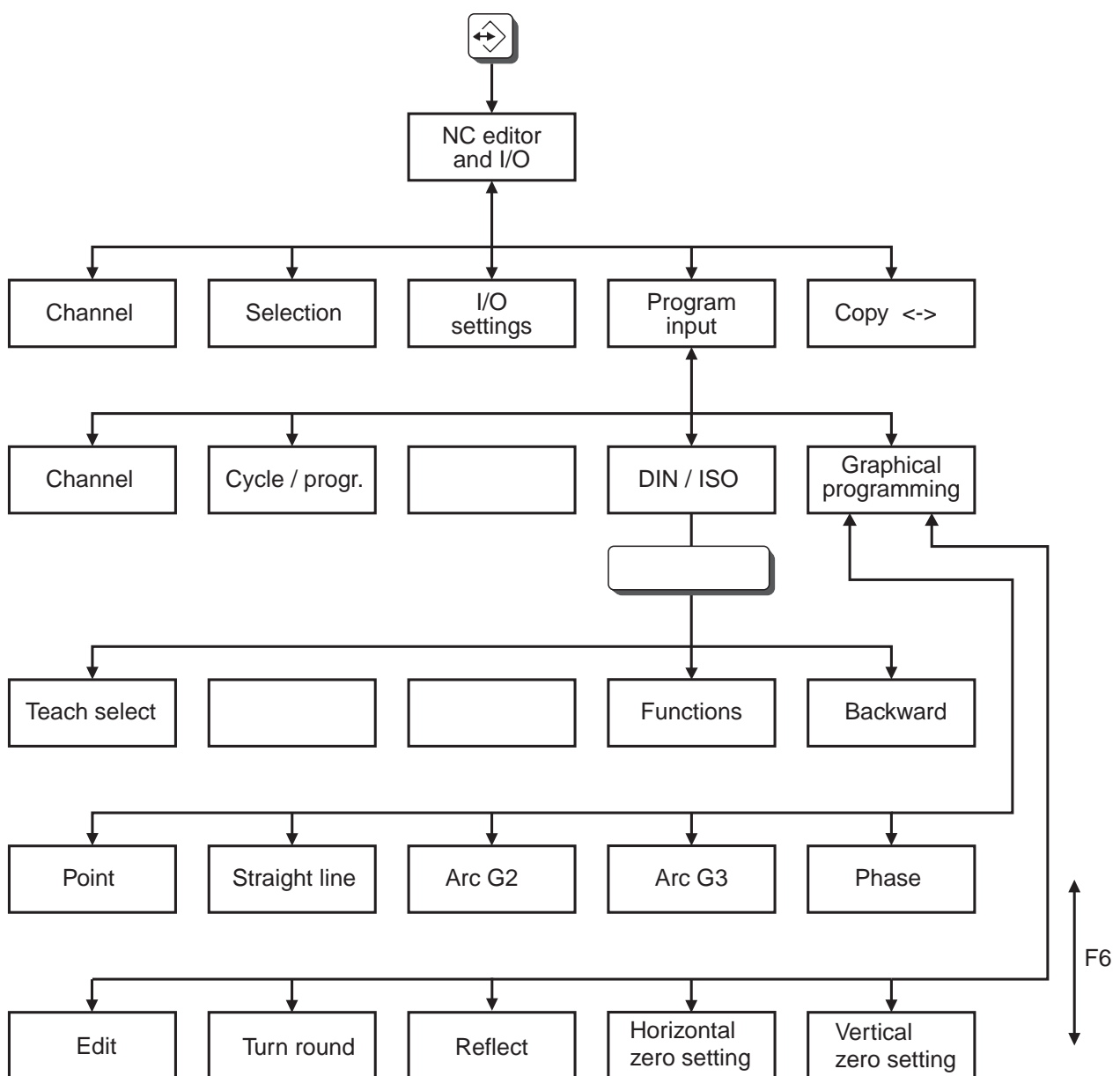
Additional online informations can be called up during operating with the key .

P(act):	1000	P(cyc):	-	P(err):	-
N(act):	10	N(cyc):	-	N(err):	-
F 60 %:	500.00	M24:	0	Co-Sys:	0
S 50 %:	0	GD4:	0		
T(Spi):	1	Radius :	50	Length :	70
		R-corr.:	0.1	L-corr.:	0.3
T(r/s):	1	Radius :	1	Length :	1
		R-corr.:	-	L-corr.:	-
G(act):	1	-	-	-	11
	-	13	15	17	29
	40	43	46	47	-
	55	-	-	64	-
	90	-	94	97	
Offset (act):					
X	0.000	Y	0.000	Z	0.000
A	0.000	B	0.01		0.000


2.8 NC editor and I/O

Writing, changing and storing NC programs;
Storing parameter, tool data and zero points.

Menue tree



2.8 NC editor and I/O (continued)

When pressing the key  the menu for NC programming and I/O appears.

CNC900 /CHAN.1		MANU	
CNC :		C:\NCDATA	
PARAMETER WERKZEUGDATEN - TOOLDATA NULLPUNKTE - ZEROPOINTS P1 28-10-84 6:25 477 P0001 28-10-84 6:25 13 P1000 25-10-96 16:40 2658 P4711 28-10-96 15:32 12977 P7000 23-10-96 16:56 1751 P300124 28-10-84 6:25 8468 P310104 28-10-84 6:25 4730 P310111 28-10-84 6:25 86 P310112 28-10-84 6:25 7131		P100000 28-11-95 15:18 475 P100001 7-12-94 18:51 49 P100010 19-09-96 10:17 1824 P100011 22-04-96 10:51 387 P101 14-06-96 17:26 1162 P111 13-06-96 10:49 76 P112 14-06-96 17:23 47 P121 14-06-96 17:23 1710 P122 13-06-96 14:11 2427 P12345 25-06-96 13:13 398 P124523 2-07-96 12:18 17 P150000 30-07-96 10:58 275	
Free Memory :		1448704	Max Memory : 1542656
X 0.000	Y 0.000	Z 0.000	A 0.000
B 0.000			
<div> <div>Channel</div> <div>Select</div> <div>Modification</div> <div>Program Input</div> <div>Copy <-></div> </div>			

F1 Channel

F2 Selection

F3 I/O settings

F4 Program input

F5 Copy <->

2.8.1 Selection

Selection of storing modes

on the left side

on the right side

CNC:

C:\NCDATA

CNC:

C:\NCDATA

A:\

Serial I/O

2.8.2 I/O parameters

This menu can be used for inputing I/O parameters.

CNC900 /CHAN.1MANU

E/A-PARAMETER

Baudrate	9600	COM 1..4 / 0=HD	1
Data Bits	8	EOF mark	4
Stopbits	2		
Parity	0		
Program Overw	0		
X-on/X-off Pr	0	Teach Ax Select	\$00000007

X	0.000	Y	0.000	Z	0.000	A	0.000
B	0.000						

Channel

F1 Channel

F2-

F3-

F4-

F5-

2.8.3 Program input

Program selection appears with pressing key F4 (in screen frame). With the cursor keys an existing program can be chosen or the number of a new program can be input with the numerical keyboard.

CNC900 /CHAN.1		MANU	
CNC:		C:\NCDATA	
Selected Program : P 1000		P100000 28-11-95 15:18 475 P100001 7-12-94 18:51 49 P100010 19-09-96 10:17 1824 P100011 22-04-96 10:51 387 P101 14-06-96 17:26 1162 P111 13-06-96 10:49 76 P112 14-06-96 17:23 47 P121 14-06-96 17:23 1710 P122 13-06-96 14:11 2427 P12345 25-06-96 13:13 398 P124523 2-07-96 12:18 17 P150000 30-07-96 10:58 275	
Free Memory :		1448704	Max Memory : 1542656
X	0.000	Y	0.000
Z	0.000	A	0.000
B	0.000		
<div> <div>Channel</div> <div>Zycle/Progr</div> <div></div> <div>DIN/ISO</div> <div>Contur-Line</div> </div>			

F1 Channel

F2 Cycle /program

F3 -


F4 Input a program according to DIN / ISO

F5 Input a program with outline

2.8.3 Program input (continued)

Program input	paragraph
according to DIN / ISO	2.9
also Teach in	2.10
with graphic support (outline path)	2.11

2.8.4 Copying


Parameters, tool data, zero points and NC programs can be selected with the cursor keys for copying. The selected data are activated with the key  and marked with an *.

CNC900 /CHAN.1		MANU	
CNC:		C:\NCDATA	
*PARAMETER			
*ZEROPOSITION - TOOLDATA			
MULTIPOINT - ZEROPOINTS			
P1	20-10-04 0:25 477	P100000	20-11-05 15:10 975
P0001	20-10-04 0:25 19	P100001	7-12-09 10:51 99
P77	20-11-06 11:07 125	P100010	19-09-06 18:17 1029
P1000	25-10-06 10:40 2000	P100011	22-09-06 18:51 307
P4711	20-10-06 15:12 12577	P101	19-06-06 17:26 1162
P7000	23-10-06 10:06 1751	P111	13-06-06 18:49 76
P000124	20-10-04 0:25 0400	P112	19-06-06 17:23 97
P100104	20-10-04 0:25 4700	P121	19-06-06 17:23 1710
P100111	20-10-04 0:25 00	P122	13-06-06 19:11 2927
		P12095	25-06-06 13:13 390
		P129523	2-07-06 12:10 17
		P150000	10-07-06 18:50 275
Curr. Memory : 1000000		Max. Memory : 1592050	
X	0.000	Y	0.000
Z	0.000	A	0.000
B	0.000		
<div> <div>Channel</div> <div>Select</div> <div>Next if in action</div> <div>Program Input</div> <div>Copy <-></div> </div>			

- F1 Channel
- F2 Selection
- F3 I/O settings
- F4 Program input
- F5 Copy <->

2.8.4 Copying (continued)

Parameter

After selecting with the cursor keys and after activating with  parameters can be copied with F5 from CNC: to C:\NCDATA or A:\ . Input Pmin and Pmax, identification letter D.

CNC900 /CHAN.1

MANU

CNC:	C:\NCDATA
Copy File: :	P100000 20-11-95 15:10 975
PARAMETER	P100001 7-12-99 10:51 99
	P100010 19-09-96 18:17 1029
	P100011 22-09-96 18:51 307
	P101 19-06-96 17:26 1162
	P111 19-06-96 18:09 76
Pmin : 100 Channel 1 1	P112 19-06-96 17:29 97
Pmax : 500 Fly Hook: 00000000	P121 19-06-96 17:29 1710
	P122 19-06-96 19:11 2927
Id :	P1295 25-06-96 13:13 390
D 100	P129523 2-07-96 12:10 17
	P150000 08-07-96 18:50 275

Copy Memory : 1000000 Max Memory : 1500000

X	0.000	Y	0.000	Z	0.000	A	0.000
B	0.000						

Channel 1

F1 Channel

F2 -

F3 -

F4 -

F5 -

2.8.4 Copying (continued)

Parameter

Meaning of the input fields

Pmin: first parameter of output

Pmax: last parameter of output

Channel	0	Output of q-parameters
	1 to 8	Output of P-parameters of the corresponding channel

Flag mask Status flag mask


0 Output of all parameters according to Pmin - Pmax

<>0 Output of parameters in the range of Pmin - Pmax, at which the bits are set in the parameter status according to the flag mask.
Herewith an output of all parameters in which the EEPROM bit is set, is possible.

to: DOS file name

2.8.4 Copying (continued)

Tool data

After selecting with the cursor keys and after activating with  tool data can be copied with F5 from CNC: to C:\NCDATA or A:\ . Identification letter W.

CNC900 /CHAN.1

MANU

CNC:	C:\NCDATA
Copy File: :	P100000 20-11-95 15:10 975
UPRACZNIKOWY TML.Dat	P100001 7-12-99 10:51 99
	P100010 19-09-96 18:17 1029
	P100011 22-09-96 18:51 107
Channel 1	P101 19-06-96 17:26 1162
	P111 19-06-96 18:09 76
	P112 19-06-96 17:23 97
	P121 19-06-96 17:23 1718
	P122 19-06-96 19:11 2927
Id :	P12395 25-06-96 13:13 190
W 135	P129523 2-07-96 12:10 17
	P150000 08-07-96 18:50 275

Copy Memory : 1000000 Max Memory : 1500000

X	0.000	Y	0.000	Z	0.000	A	0.000
B	0.000						

Channel1

F1 Channel

F2 -


F3 -

F4 -

F5 -

2.8.4 Copying (continued)

Zero points

After selecting with the cursor keys and after activating with  zero points can be copied with F5 from CNC: to C:\NCDATA or A:\ . Identification letter N.

CNC900 /CHAN.1

MANU

CNC:		C:\NCDATA	
Copy File: :		P100000	20-11-95 15:10 975
NOI.MINUTE	ZEROPOINT	P100001	7-12-99 10:51 99
		P100010	19-09-96 18:17 1029
		P100011	22-09-96 18:51 307
		P101	19-06-96 17:26 1162
Channel	1	P111	19-06-96 18:49 76
		P112	19-06-96 17:23 97
		P121	19-06-96 17:23 1718
		P122	19-06-96 19:11 2927
Id :		P12395	25-06-96 13:13 390
N 125		P129523	2-07-96 12:10 17
		P150000	08-07-96 18:50 275

Copy Memory : 1990990Max Memory : 1592050

X	0.000	Y	0.000	Z	0.000	A	0.000
B	0.000						

Channel

F1 Channel

F2 -


F3 -

F4 -

F5 -

2.8.4 Copying (continued)

NC programs

After selecting with the cursor keys and after activating with , the selected NC program is marked with *.

CNC900 /CHAN.1		MANU	
CNC:		C:\NCDATA	
PARAMETER VERZEUGDATEN - TOOLDATA NULLFUNKTE - ZEROPOINTS F1 20-10-04 0:25 477 F0001 20-10-04 0:25 19 F77 20-11-06 11:07 125 F1000 25-10-06 10:40 2000 F4711 20-10-06 15:12 12577 F7000 20-10-06 10:06 1751 *F100104 20-10-04 0:25 4710 F10111 20-10-04 0:25 00		P100000 20-11-05 15:10 975 P100001 7-12-04 10:51 99 P100010 19-09-06 18:17 1029 P100011 22-04-06 18:51 307 P101 19-06-06 17:26 1162 P111 19-06-06 18:49 76 P112 19-06-06 17:23 97 P121 19-06-06 17:23 1710 P122 19-06-06 19:11 2927 P12345 25-06-06 13:13 390 P129523 2-07-06 12:10 17 P150000 10-07-06 10:50 275	
Curr Memory : 1040000		Max Memory : 1542050	
X	0.000	Y	0.000
Z	0.000	A	0.000
B	0.000		
<div> <div>Channel</div> <div>Select</div> <div>End if function</div> <div>Program Input</div> <div>Copy <-></div> </div>			

F1 Channel

F2 Selection


F3 I/O settings

F4 Program input

F5 Copy <->

2.8.4 Copying (continued)

NC programs

After selecting with the cursor keys and after activating with  tool daNC programs can be copied with F5 from CNC: to C:\NCDATA or A:\ . Identification letter P.

CNC900 /CHAN.1		MANU	
CNC:		C:\NCDATA	
PARAMETER WERKZEUGDATEN - TOOLDATA NULLUMITE - ZEROUMITS P1 20-10-04 0:25 477 P0001 20-10-04 0:25 19 P77 20-11-06 11:07 125 P1000 25-10-06 10:40 2000 P4711 20-10-06 15:12 12377 P0000 20-10-06 10:56 1751 P000124 20-10-04 0:25 0400 P100004 20-10-04 0:25 4700 P100111 20-10-04 0:25 06		P1000101 20-06-05 12:30 2647 P1000109 20-06-05 12:37 3657 P1000121 20-07-09 5:12 257 P1000122 20-07-09 5:13 257 P1000123 20-07-09 5:15 257 P1000129 10-01-06 10:41 7541 P1000131 2-02-06 9:53 3692 P1000132 2-02-06 10:25 3936 P1000133 7-02-06 12:55 3641 P1000139 19-09-05 12:45 6461 P1000181 26-06-06 13:38 5041 P1000182 25-09-05 15:12 3955	
Curr Memory : 1440440		Max Memory : 1542056	
X 0.000	Y 0.000	Z 0.000	A 0.000
B 0.000			
<div> <div>Channel</div> <div>Select</div> <div>Mod if insertion</div> <div>Program Input</div> <div>Copy <-></div> </div>			

F1 Channel

F2 Selection

F3 I/O settings

F4 Program input

F5 Copy <->

2.8.4 Copying (continued)

NC programs

All programs mark

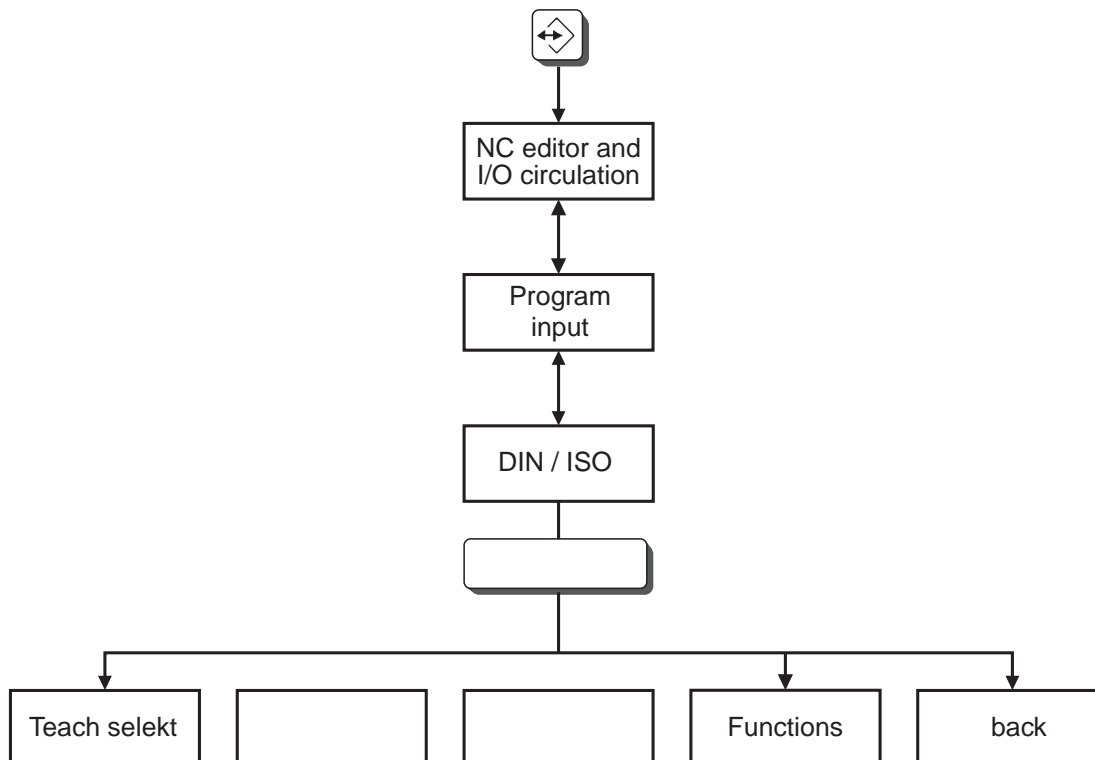
F6 and inserting branch press.

All programs off NC memory copy (store total NC memory in a file)

Programs mark and Funktionstate F5 (copy) press.

2.9 Input a program according to DIN / ISO

Menue tree



2.9 Input a program according to DIN / ISO (continued)

After inputting the program number and after pressing the key DIN / ISO the program appears with the first blocks in the display, if a program is existing with the indicated number. If not, only the program number and >N10 appears.

CNC900 /CHAN.1 **MANU**

Programm : P1000

>N10 G00 G54 X+0000.00 Y-0030.00 F6000 S2000

/N20 G00 Z-41.00 M03

N30 G01 X+0000.00 Y+0000.00

N40 G01 X-0017.48 Y+0000.92

N50 G02 X-0034.17 Y+0011.65 I-0016.43 J+0020.89

N60 G01 X-0041.33 Y+0025.40

N70 G02 X-0038.16 Y+0031.23 I-0037.78 J+0027.25

N80 G03 X+0004.74 Y+0049.44 I-0045.49 J+0108.37

X	0.000	Y	0.000	Z	0.000	A	0.000
B	0.000						

RENUM

F1 -

F2 -

F3 -

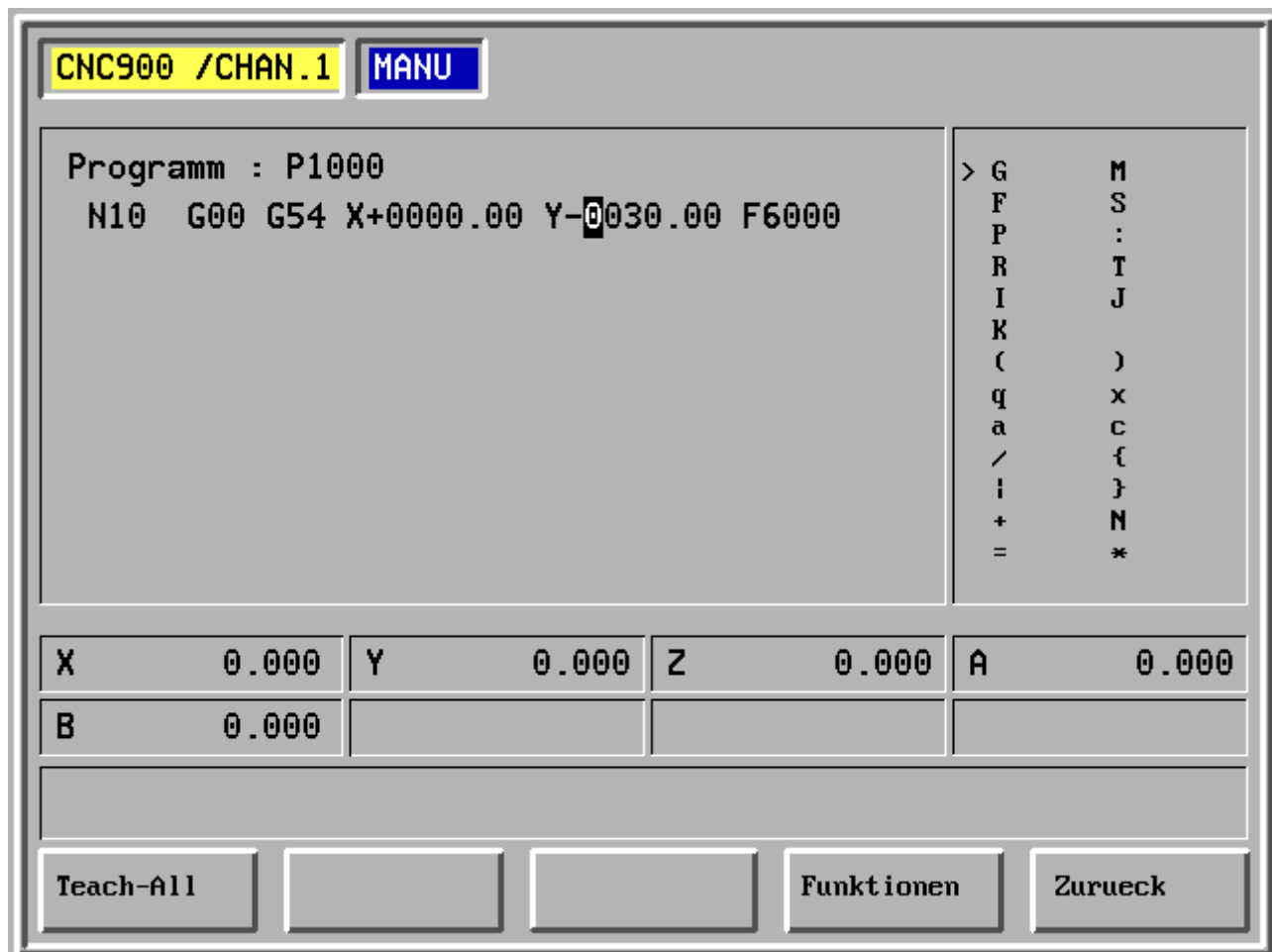
f4 -

F5 -

2.9 Input a program according to DIN / ISO (continued)

Changing or inputing blocks

When pressing  the selected block and the function appear.



The screenshot shows the CNC control interface with the following elements:

- Top Bar:** Displays "CNC900 /CHAN.1" and a "MANU" button.
- Program Area:** Shows "Programm : P1000" and the current block "N10 G00 G54 X+0000.00 Y-0030.00 F6000".
- Function List:** A vertical list of functions: G, F, P, R, I, K, (, q, a, /, i, +, =, M, S, :, T, J,), x, c, {, }, N, *.
- Coordinate Fields:** A grid of fields for X, Y, Z, A, and B, each with a value of 0.000.
- Bottom Bar:** Contains buttons for "Teach-All", "Funktionen", and "Zurueck".

F1 Teach-Select

F2 -


F3 -

F4 Functions Switching on further programming functions

F5 Back

2.9 Input a program according to DIN / ISO (continued)

Functions

When pressing  the functions are activated. Selection with cursor keys.

CNC900 /CHAN.1		MANU	
Programm : P1000 N10 G00 G54 X+0000.00 Y-0030.00 F6000		> < sqrt > int <= intr >= abs <> ln \ log sc: exp sin asin cos acos tan atan or del and \$ not ;_!	
X	0.000	Y	0.000
Z	0.000	A	0.000
B	0.000		
<div> <div>Teach-All</div> <div></div> <div></div> <div>Funktionen</div> <div>Zurueck</div> </div>			

F1 Teach-Select

F2 -

F3 -

F4 Functions Switching on further programming functions

F5 Back

2.9 Input a program according to DIN / ISO (continued)

Functions

When pressing XXX another function side appears.

The screenshot shows a CNC control interface with the following elements:

- Top Bar:** A yellow box contains "CNC900 /CHAN.1" and a blue box contains "MANU".
- Program Display:** A large text area shows "Programm : P1000" and "N10 G00 G54 X+0000.00 Y-0030.00 F6000".
- Function List:** A vertical list of letters A through Z is displayed on the right side, with a greater-than sign (>) next to 'A'.
- Coordinate Fields:** Below the program display, there are fields for X, Y, Z, and A, each with a value of 0.000. Below these, there are empty fields for B and another set of empty fields.
- Bottom Buttons:** A row of five buttons: "Teach-All", an empty button, another empty button, "Funktionen", and "Zurueck".

F1 Teach-Select

F2 -

F3 -

F4 Functions Switching on further programming functions

F5 Back

2.10 Preparing a NC program in Teach mode

2.10.1 Setting zero points

The parameter P11804 (tool carrier - length) must be loaded with the right values and the tool dimension must be active.

Drive axes in the desired zero point position.

Call up function „**Command=Actual**“ and store with **‘Enter’**.
Herewith the current actual values of the axes are transmitted to the zero point memory.

In this way different zero point positions can be set.

If these zero point shifts should be active in manual operation mode, the parameter P8758 has to be loaded with the desired value (G54 to G59).

In automatic mode, the call up is made with the functions G54...G59.

Remark:

The zero point shifts are only effective in the tool coordinate system (G48) or in the workpiece coordinate system (G49).

2.10.2 Enter a program with "Teaching"

It is advisable, to mark the workpiece with all known or determining „Teach-points“. This facilitates later a fast discovering of the individual NC blocks, to insert in the program certain data and/or functions.

A further help would be, if the stored „Teach-points“ would be written in a list with the corresponding block number, e.g. Point 5 = block no. 80.

The stored zero point shift, on which the NC program refers, can be activated with parameter P382.

Select mode of operation „Positioning“.
Approach zero point position with a positioning block,
e.g. N10 G0 G55 X0 Y0 Z0 A0 B15

The mode of coordinate, in which the command / actual data were stored (P8751), must be inserted in the block over the corresponding G - function (G48, G49).

Select manual operation mode:
Enter and store program number and the corresponding functions and technological data in the designated NC blocks,

e.g. N10 T1 M16
N20 G55 G49 FOR. .. S X Y.. Z.....

With „continuous drive“ or „step drive“ the desired position is approached with all axes. If all axes are in their anticipated position, the position is stored with the function 'Command=Actual' and 'Enter and transmitted to the indicated block.

e.g. N30 X Y.. Z.. A.. C..

The next Teach - points are started and stored likewise.

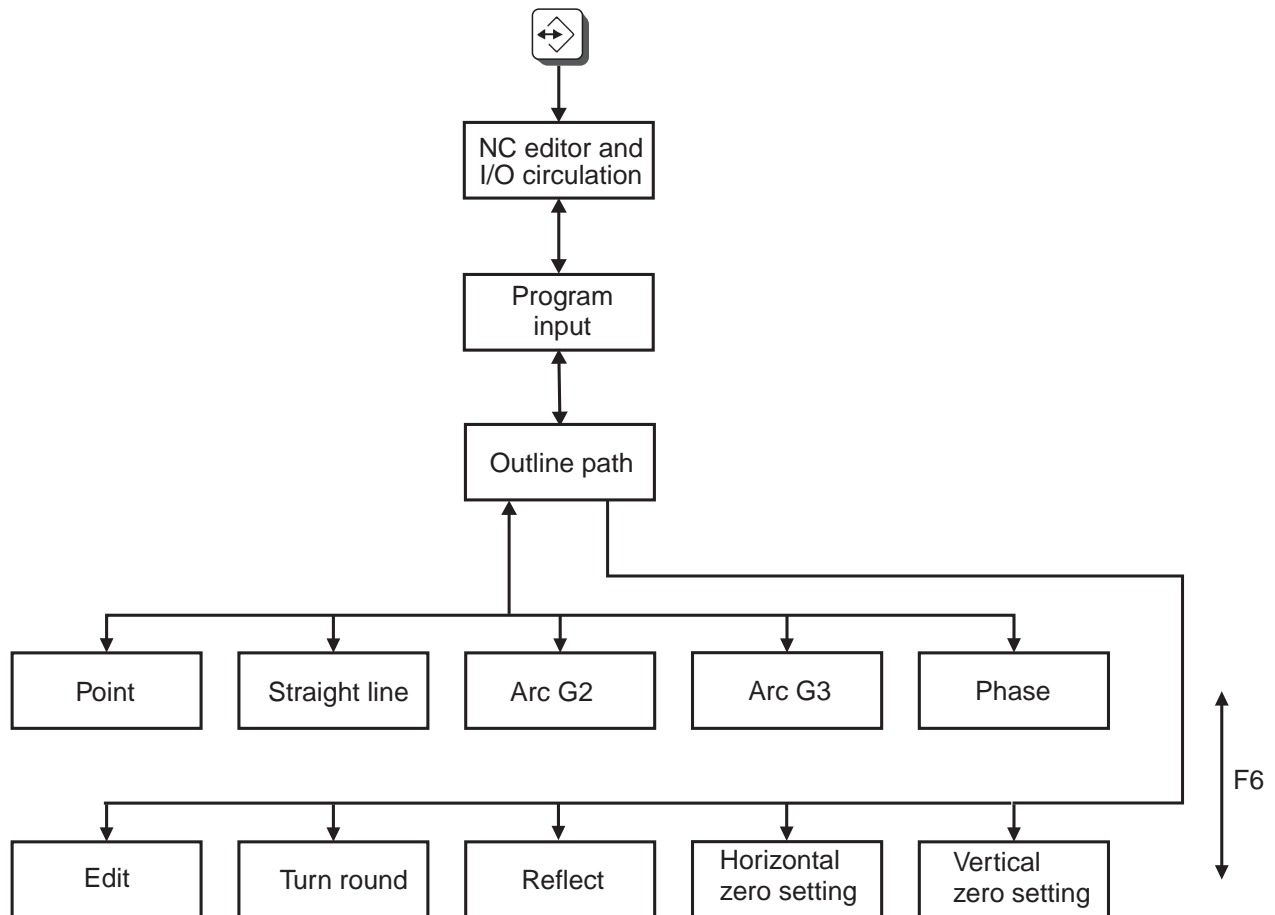
Subsequently the program is optimized by inserting feedrate, number of revolutions etc.

After reviewing the program and after a test run, the program is finished.


2.11 Program input with graphic support (outline path)

2.11.1 General

Menu tree



2.11.1 General (continued)

With pushing from key  the menu for NC programming seems.

CNC900 /CHAN.1		MANU	
CNC:		C:\NCDATA	
PARAMETER WERKZEUGDATEN - TOOLDATA NULLPUNKTE - ZEROPOINTS P87 5-10-44 31:00 17		0 8-10-96 14:24 1168 1 30-01-97 15:41 869 1.1 23-09-98 9:24 2048 1.SAV 12-08-96 10:05 6400 10 11-03-97 13:52 184 10.1 11-03-97 14:02 512 100 21-08-96 16:07 215 1011 22-08-96 11:52 277 1020 22-08-96 11:52 188 1030 22-08-96 18:10 269 1032 22-08-96 11:52 283 1033 22-08-96 11:52 259	
Free NC-Memory :		1542400	Max NC-Memory 1542656
X 0.000	Y -45.000	Z -90.000	A 0.000
B -45.000	C 0.000	D 0	B1 1020
<div> <div>Channel</div> <div>Select</div> <div>Modification</div> <div>Program Input</div> <div>Copy <-></div> </div>			

F1 Channel

F2 Selection

F3 Adjustments

F4 Program input

F5 Copy <->

2.11.1 General (continued)

Program input

With pushing of key F4 (within the display frame) seems the program selection. The paragraph of a new program can be input with the numerical keyboard.

CNC900 /CHAN.1		MANU																									
CNC:		C:\NCDATA																									
Selected Program : P 87		<table> <tr><td>0</td><td>8-10-96 14:24 1168</td></tr> <tr><td>1</td><td>30-01-97 15:41 869</td></tr> <tr><td>1.1</td><td>23-09-98 9:24 2048</td></tr> <tr><td>1.SAV</td><td>12-08-96 10:05 6400</td></tr> <tr><td>10</td><td>11-03-97 13:52 184</td></tr> <tr><td>10.1</td><td>11-03-97 14:02 512</td></tr> <tr><td>100</td><td>21-08-96 16:07 215</td></tr> <tr><td>1011</td><td>22-08-96 11:52 277</td></tr> <tr><td>1020</td><td>22-08-96 11:52 188</td></tr> <tr><td>1030</td><td>22-08-96 18:10 269</td></tr> <tr><td>1032</td><td>22-08-96 11:52 283</td></tr> <tr><td>1033</td><td>22-08-96 11:52 259</td></tr> </table>		0	8-10-96 14:24 1168	1	30-01-97 15:41 869	1.1	23-09-98 9:24 2048	1.SAV	12-08-96 10:05 6400	10	11-03-97 13:52 184	10.1	11-03-97 14:02 512	100	21-08-96 16:07 215	1011	22-08-96 11:52 277	1020	22-08-96 11:52 188	1030	22-08-96 18:10 269	1032	22-08-96 11:52 283	1033	22-08-96 11:52 259
0	8-10-96 14:24 1168																										
1	30-01-97 15:41 869																										
1.1	23-09-98 9:24 2048																										
1.SAV	12-08-96 10:05 6400																										
10	11-03-97 13:52 184																										
10.1	11-03-97 14:02 512																										
100	21-08-96 16:07 215																										
1011	22-08-96 11:52 277																										
1020	22-08-96 11:52 188																										
1030	22-08-96 18:10 269																										
1032	22-08-96 11:52 283																										
1033	22-08-96 11:52 259																										
Free NC-Memory : 1542400		Max NC-Memory 1542656																									
X 0.000	Y -45.000	Z -90.000	A 0.000																								
B -45.000	C 0.000	D 0	B1 1020																								
<div> <div>Channel</div> <div>Zycle/Progr</div> <div></div> <div>DIN/ISO</div> <div>Contur-Line</div> </div>																											

F1 Channel

F2 Cycle/program



F3 -

F4 Program input according to DIN / ISO





F5 Program input with outline path

2.11.1 General (continued)

With the cursor keys an existing program can be chosen or the number of a new program can be input with the numerical keyboard. After pressing the key F5, the picture with the coordinates appears.

With the keys  (page up) and  (page down), the picture can be enlarged or reduced (zoom function) for a better view.

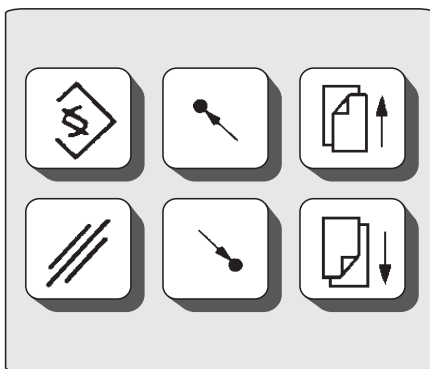
New outlines can be inserted continuously whereby a blue point is indicating the inserting place.

With the keys  (Pos1) and  (End) NC blocks can be moved forward and backward, they do then appear in red. Those moved NC blocks can be inserted or deleted with the keys  (Change) or  (Delete).

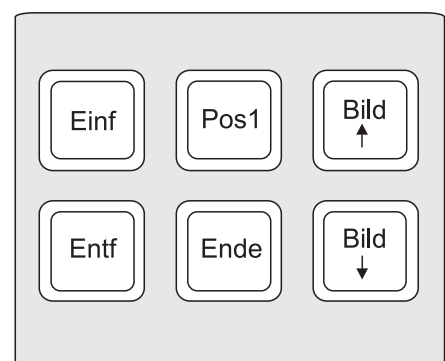
The block numbers are automatically numbered continuously (increased).

Max. 100 blocks can be programmed in a program with GPE.

Programming is finished and the program is stored with F7.



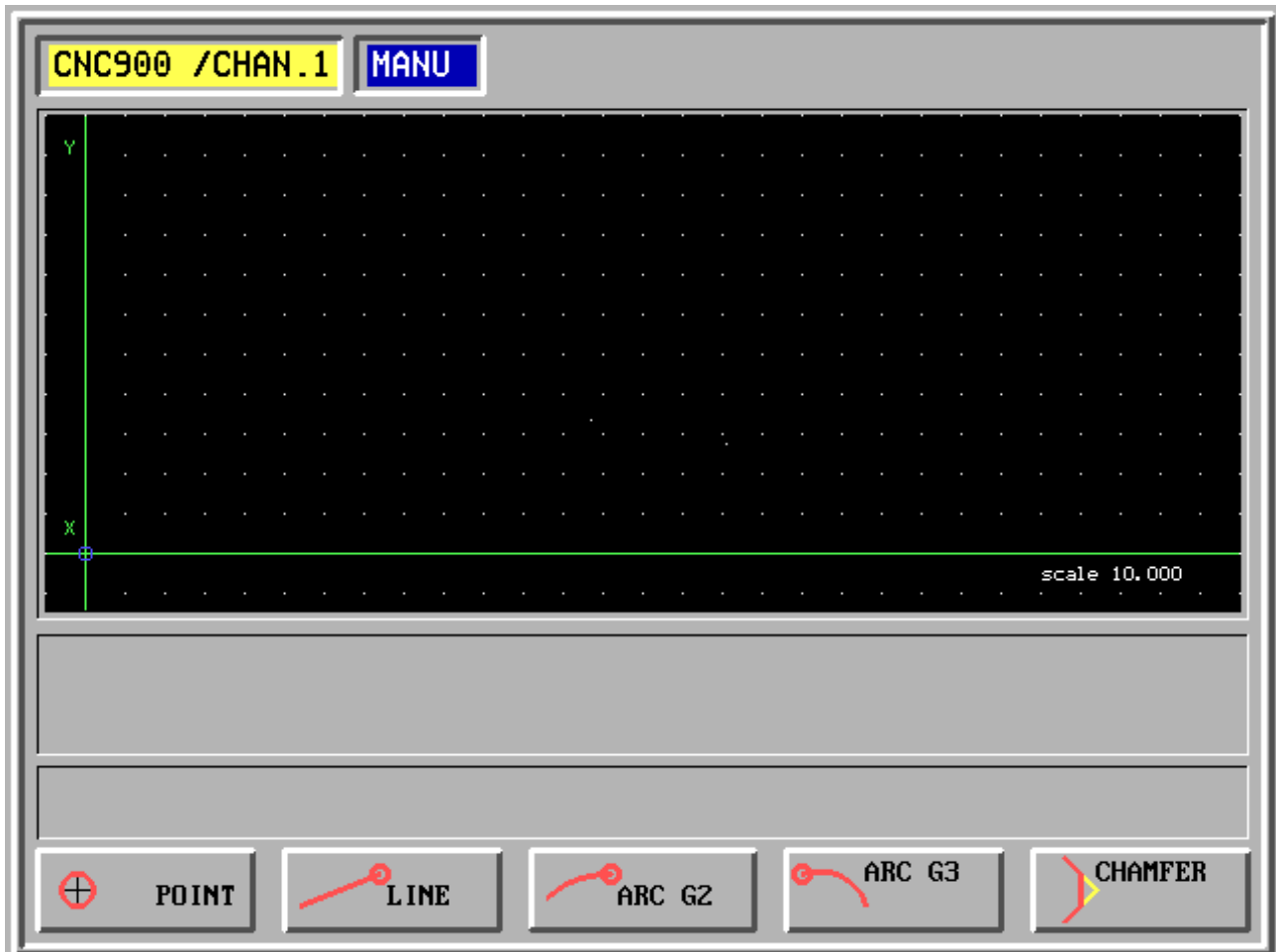
Key field operating panel



and suitable keys on the PC

2.11.1 General (continued)

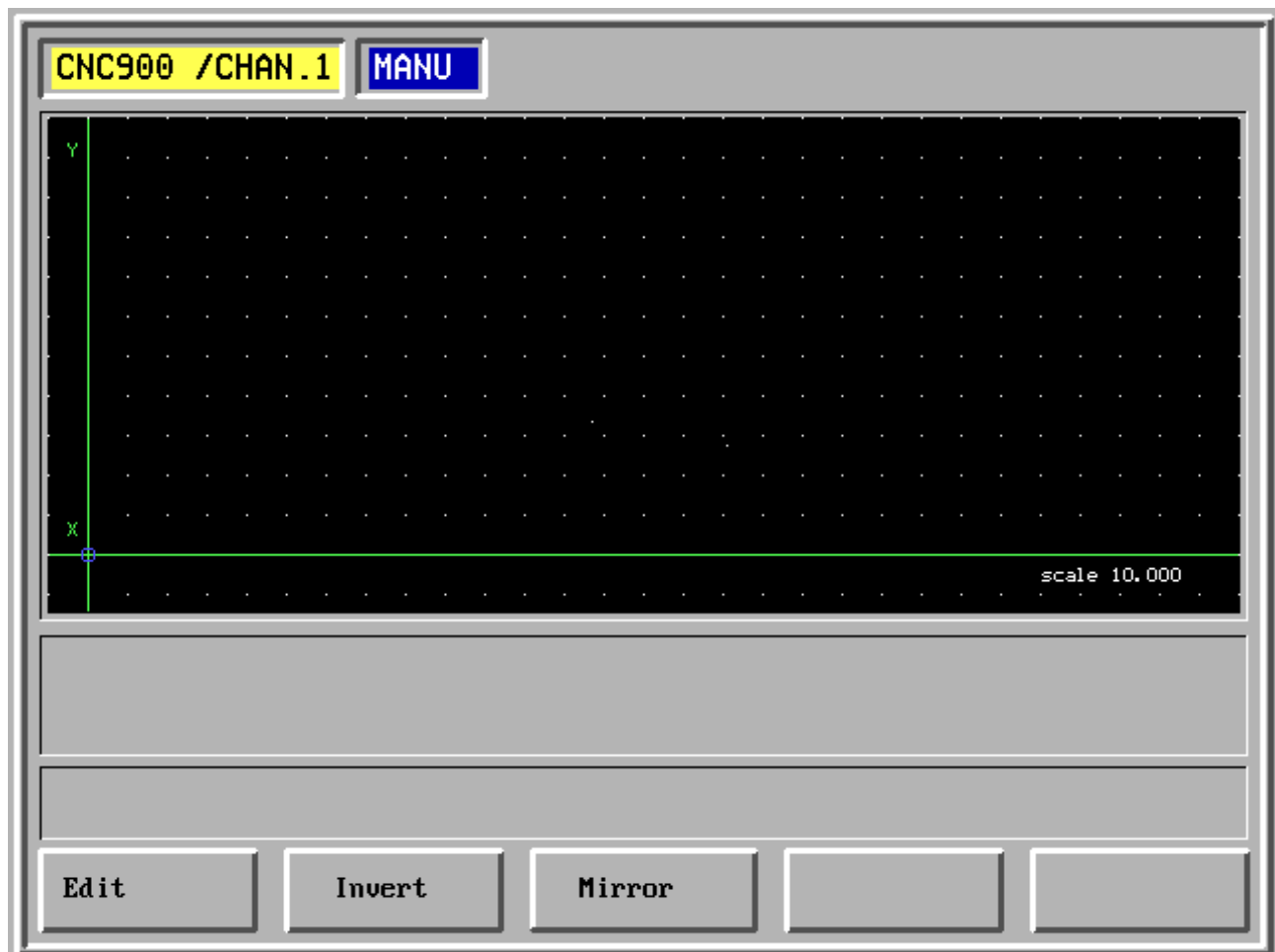
Basic menu 1 (switch with F6)



- F1 Insert point
- F2 Insert straight line
- F3 Arc G2 (clockwise)
- F4 Arc G3 (counter-clockwise)
- F5 Insert phase and rounding


2.11.1 General (continued)

Basic menu 2 (switch with F6)



- F1 Program edit with full function range (F, G, M etc.),
if a ASCII keyboard available actual
- F2 Processing direction turn around
- F5 Outline reflect
- F4 Horizontal zero setting
- F5 Vertically zero setting

2.11.2 Inserting a point

With the numerical keyboard the coordinates of one point can be input and inserted with key .



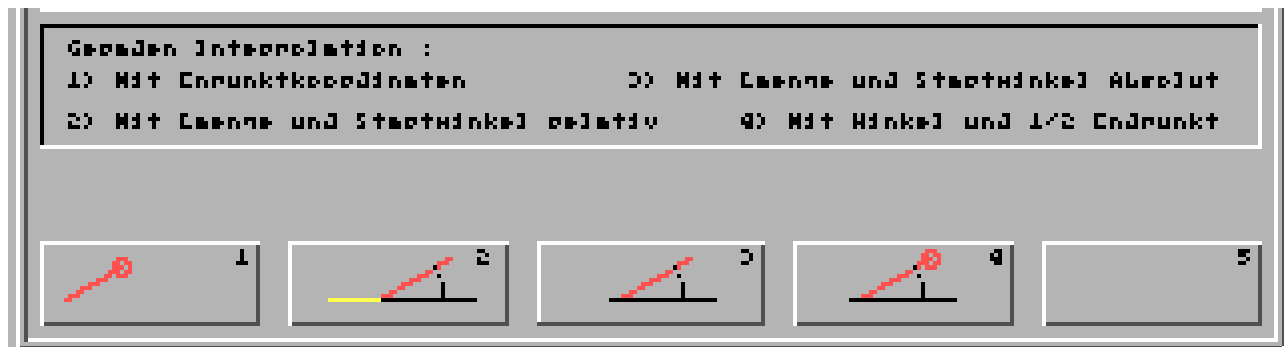
The input point is started with rapid traverse (G00).

2.11.3 Insert a straight line

With the numerical keyboard the coordinates of a straight line can be input and inserted with key



. One sets always at the blue point.



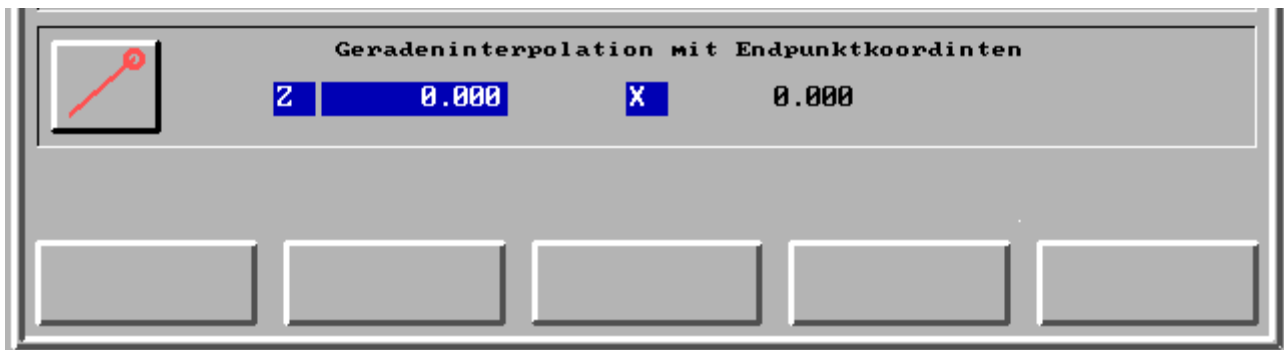
Selection of the different types of the straight line generation:

- F1 Linear interpolation with Input of the terminator point coordinates
- F2 Linear interpolation with Input of length and start angle relative
- F3 Linear interpolation with Input of length and start angle absolutely
- F4 Linear interpolation with Input of angle and 1/2 terminator point, i.e. that only one of the coordinates must be input.
The coordinate input last is taken over.

2.11.3 Insert a straight line (continued)

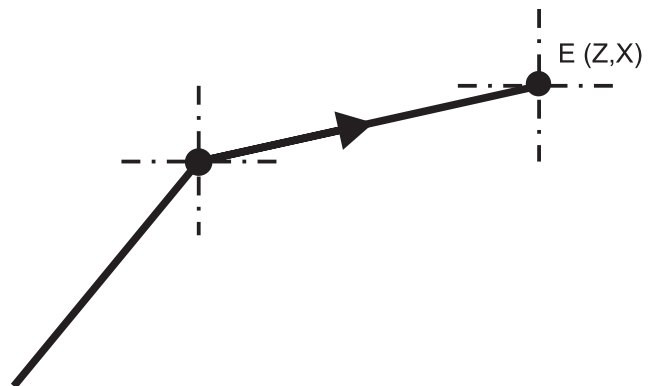
linear interpolation with Input of the terminator point coordinates

The terminator point coordinates input from the start point to a linear (G1) is inserted.



Linear interpolation with the terminator point coordinates (E) Z and X

Example



2.11.3 Insert a straight line (continued)

linear interpolation with Input of length and start angle relative

A linear with length and start angle is relatively inserted by the start point.

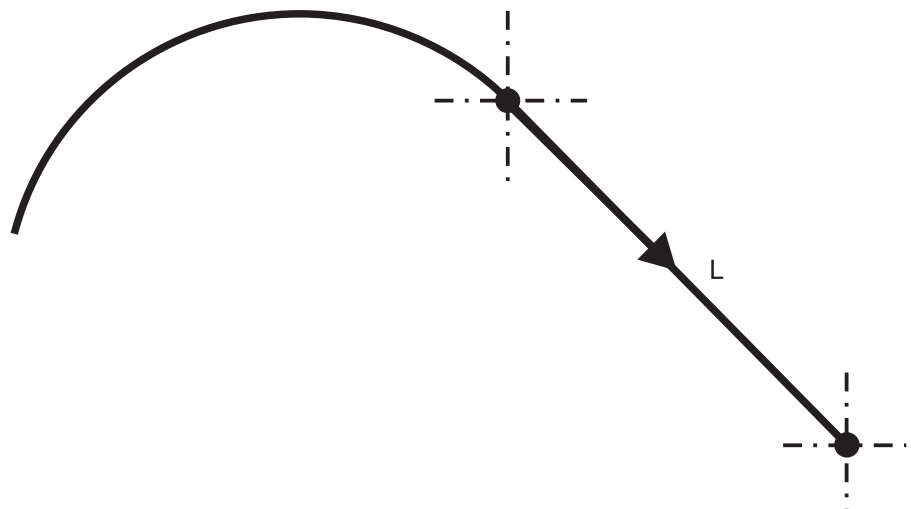


Linear interpolation
with length (l) and
Start angle (SW) relative
to the preceding block

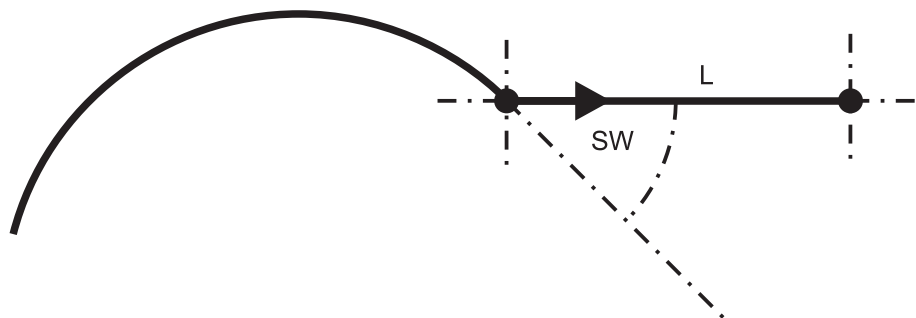
Examples:

Angle relative 0°

i.e. tangential
to the preceding block



Angle relative 45°
to the preceding block



2.11.3 Insert a straight line (continued)

linear interpolation with Input of length and start angle absolutely

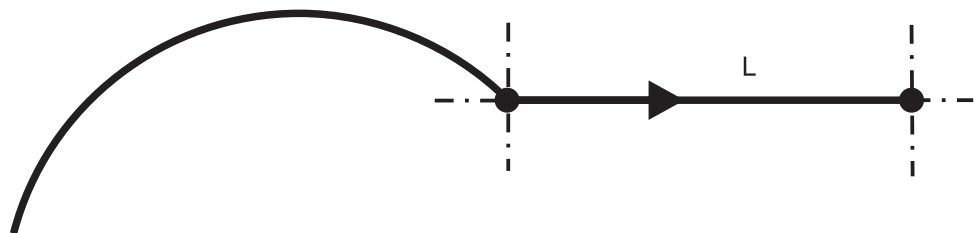
A linear with length and start angle is absolutely inserted by the start point.



Linear interpolation
with length (l) and final angle (EW) absolutely

Example:

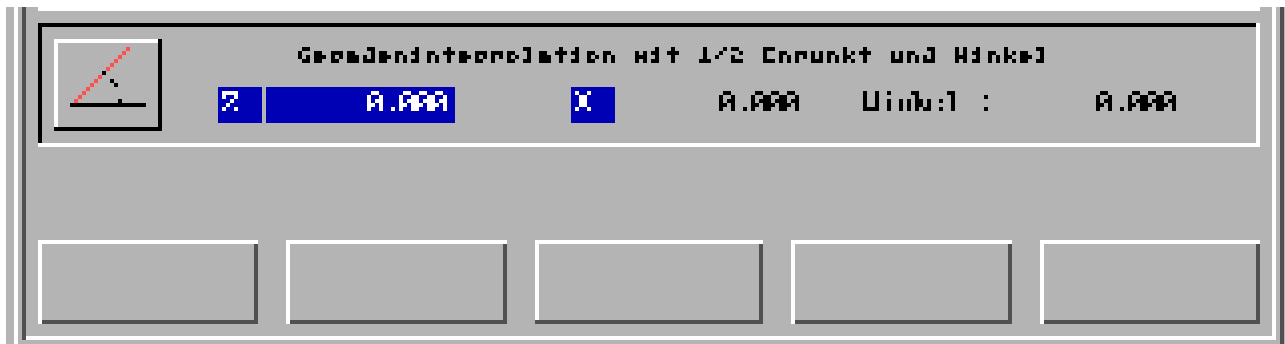
Angle absolutely 0°



2.11.3 Insert a straight line (continued)

linear interpolation with Input of final angle absolutely and 1/2 terminator point

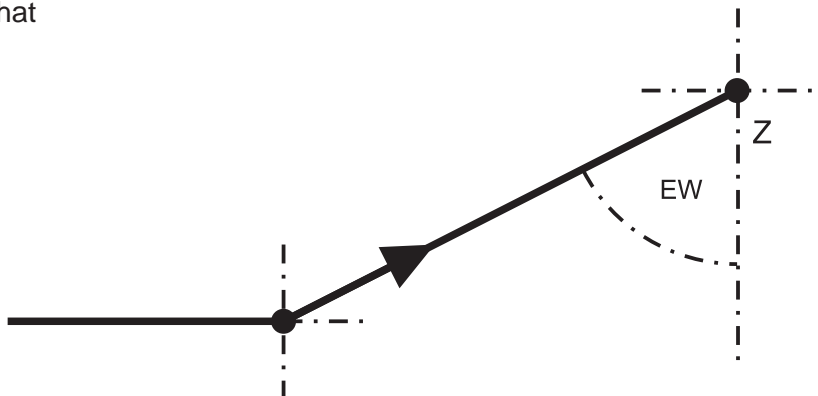
The terminator point coordinates with 1/2 terminator point and final angle, input from the start point to, absolutely a linear is inserted.



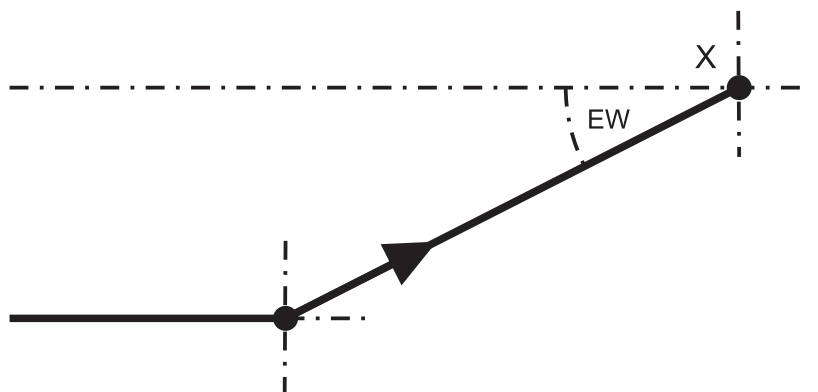
Linear interpolation
with 1/2 terminator point and final angle (EW) absolutely
The indicated angle actual of the final angles
the programmed straight lines with that
indicated direction in Z or X.

Examples:


Final angle absolutely 60° to Z

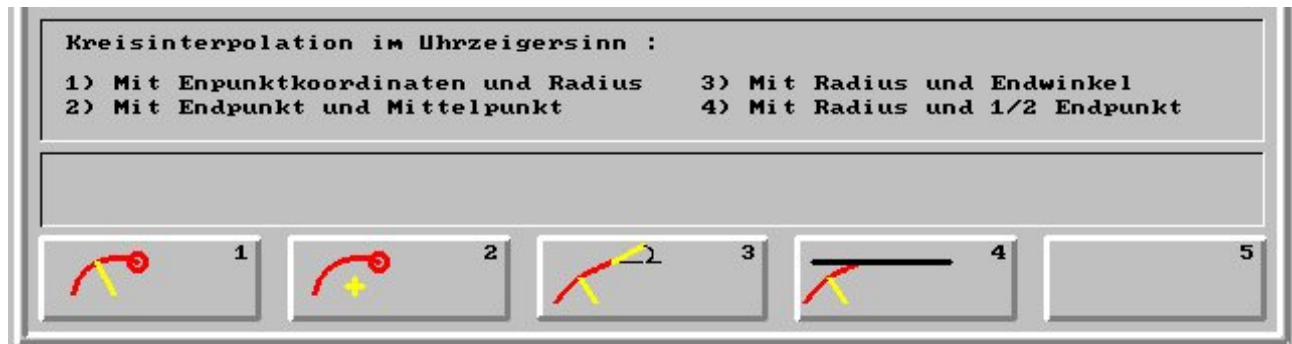


Final angle absolutely 30° to X



2.11.4 Inserting an arc

With the numerical keyboard the coordinates of an arc can be input and inserted with key . One sets always at the blue point.



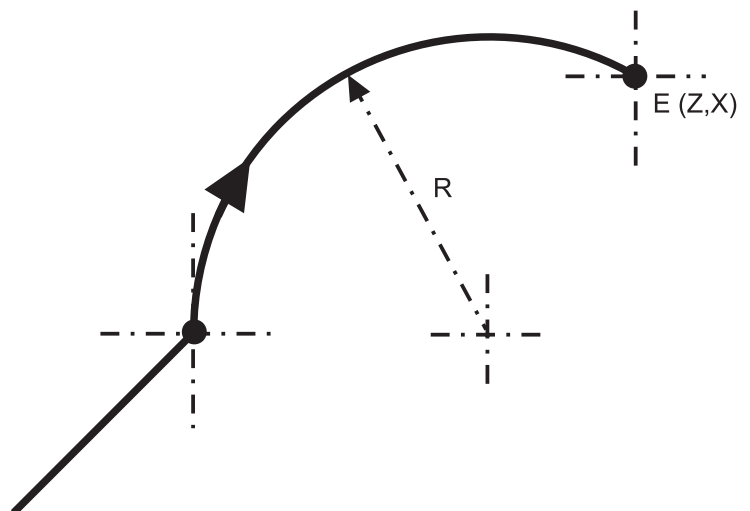
- | | |
|----|---|
| F1 | Circular interpolation with terminator point coordinates and radius |
| F2 | Circular interpolation with terminator point and centre point |
| F3 | Circular interpolation with radius and final angle |
| F4 | Circular interpolation with radius and 1/2 terminator point
i.e. that only one of the coordinates must be input.
The coordinate input last is taken over. |

2.11.4 Inserting an arc (continued)

Circular interpolation with terminator point coordinates and radius



Circular interpolation in the clockwise direction
with terminator point coordinates (E) Z and X and radius (r)

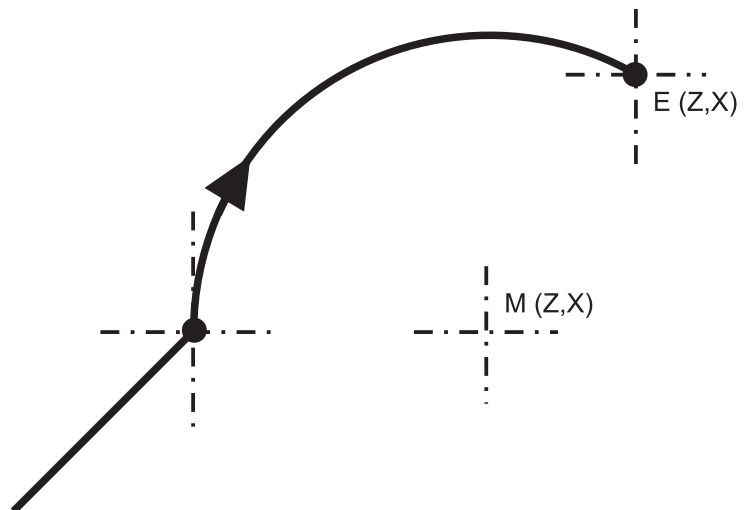


2.11.4 Inserting an arc (continued)

Circular interpolation with terminator point and centre point



Circular interpolation in the clockwise direction with terminator point coordinates (E) Z and X and Mittelpunkt koordinaten (m) Z and X

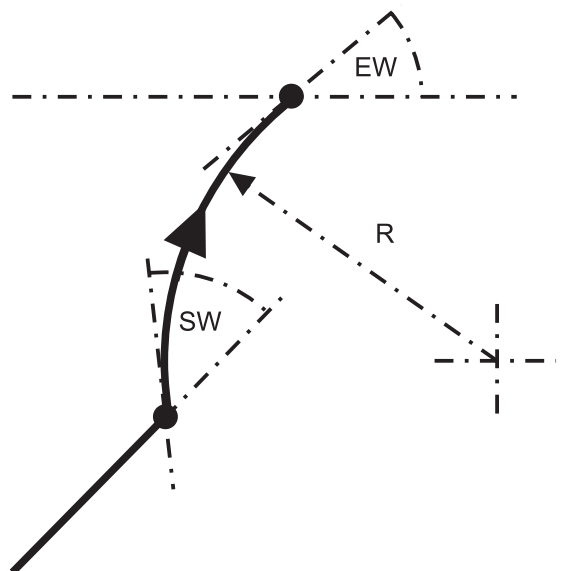


2.11.4 Inserting an arc (continued)

Circular interpolation with radius and final angle

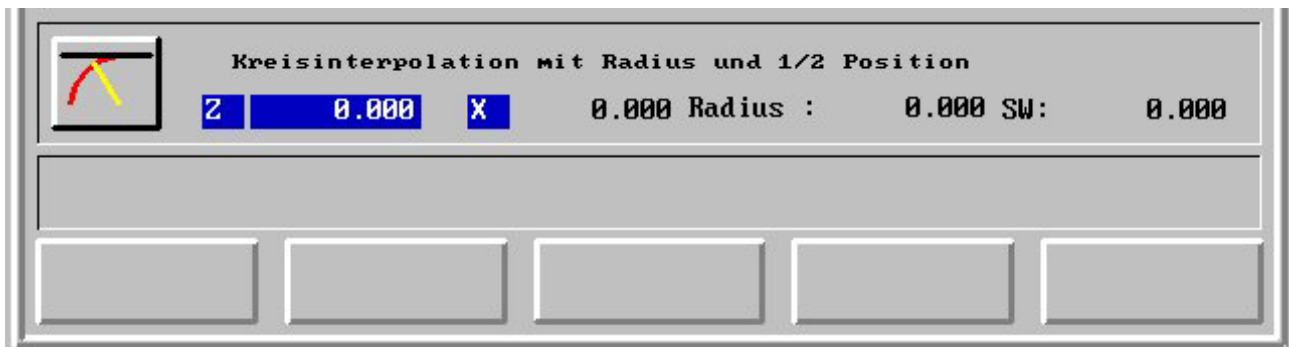


Circular interpolation in the clockwise direction
with radius (r) and start angle (SW) and final angle (EW)

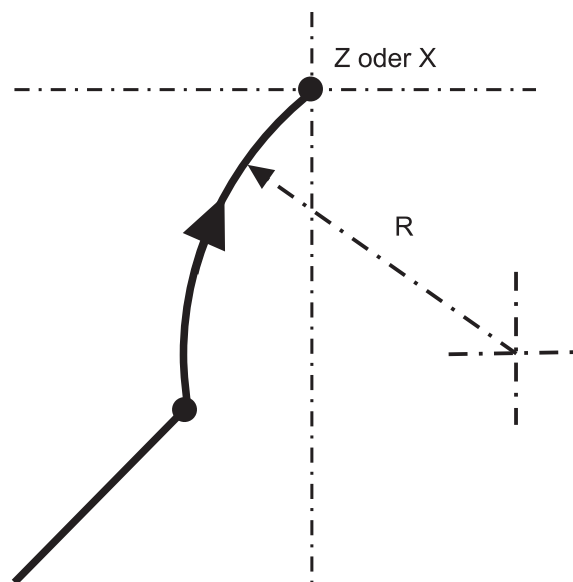


2.11.4 Inserting an arc (continued)

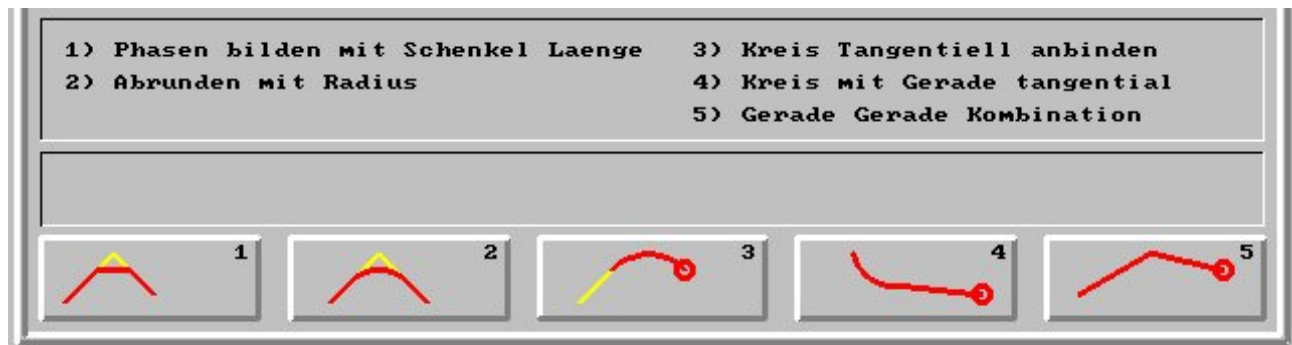
Circular interpolation with radius and 1/2 terminator point



Circular interpolation in the clockwise direction
with radius (r) and 1/2 final position (Z or X)



2.11.5 Inserting a chamfers or roundness



- | | |
|----|--------------------------------|
| F1 | Chamfers form with leg length |
| F2 | Round off with radius |
| F3 | Circle tangential tie up |
| F4 | Circle with linear tangential |
| F5 | Combination linear with linear |

2.11.5 Inserting a chamfers or roundness (continued)

chamfers form with leg length

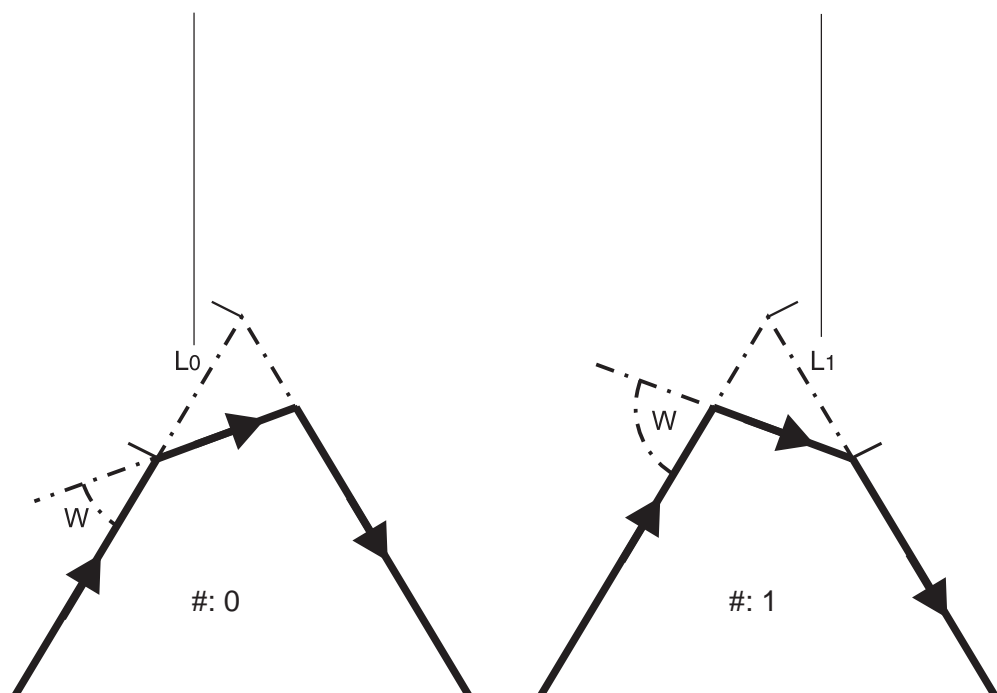


Chamfers at an edge with leg length and angle (w)

Selection of the length #: 0 1. Length

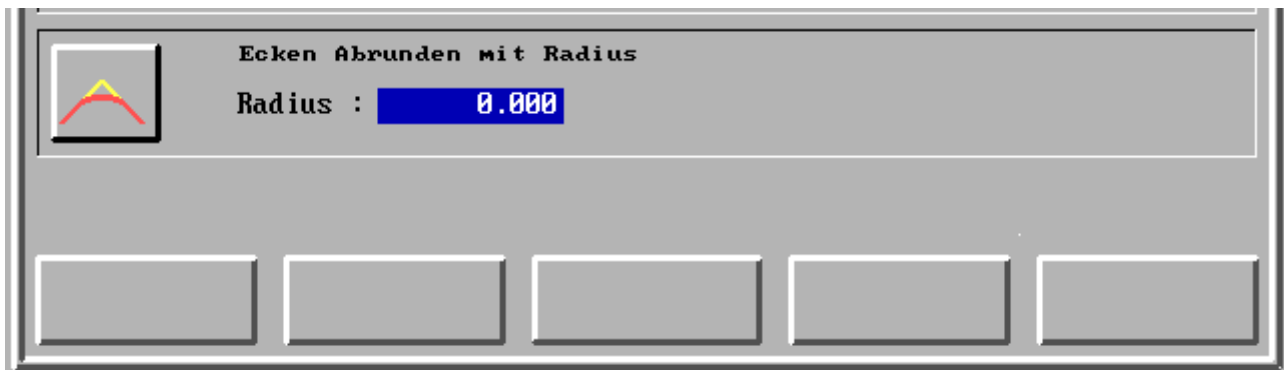
#: 1 2. Length

Examples:



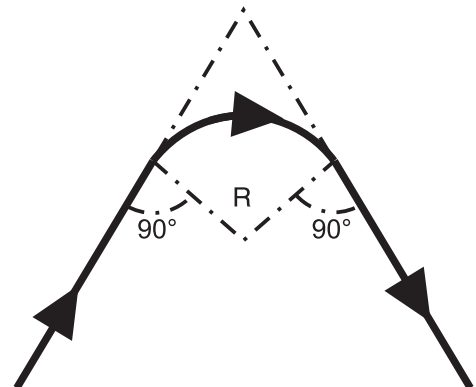
2.11.5 Inserting a chamfers or roundness (continued)

Rounding off with radius



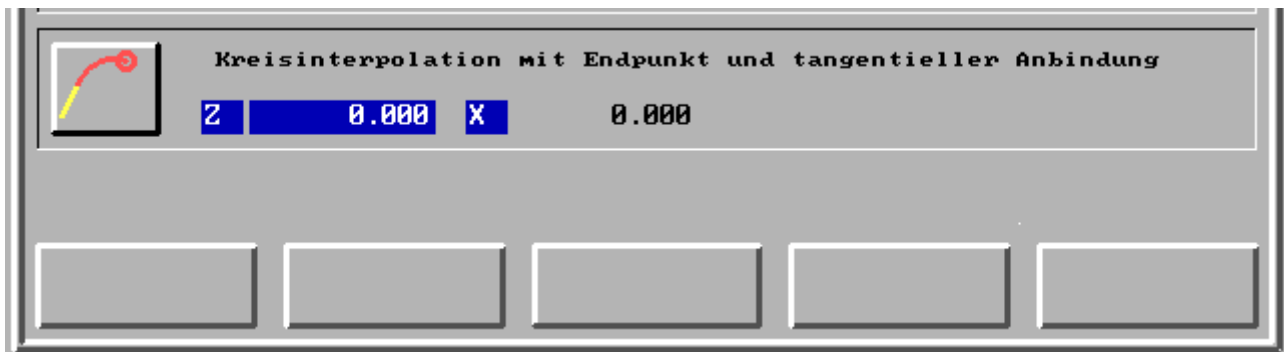
Corner-round off with radius (r)

Example:



2.11.5 Inserting a chamfers or roundness (continued)

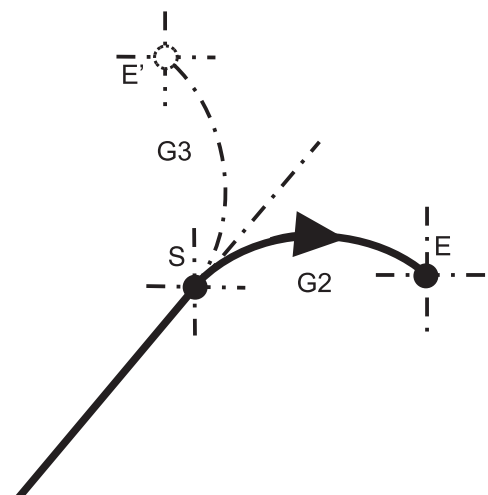
Circle tangential tie up



Circular interpolation with corner point and tagentieller binding

G2 or G3 become automatically
according to the position of the terminator point (E, E') selected

Example:



2.11.5 Inserting a chamfers or roundness (continued)

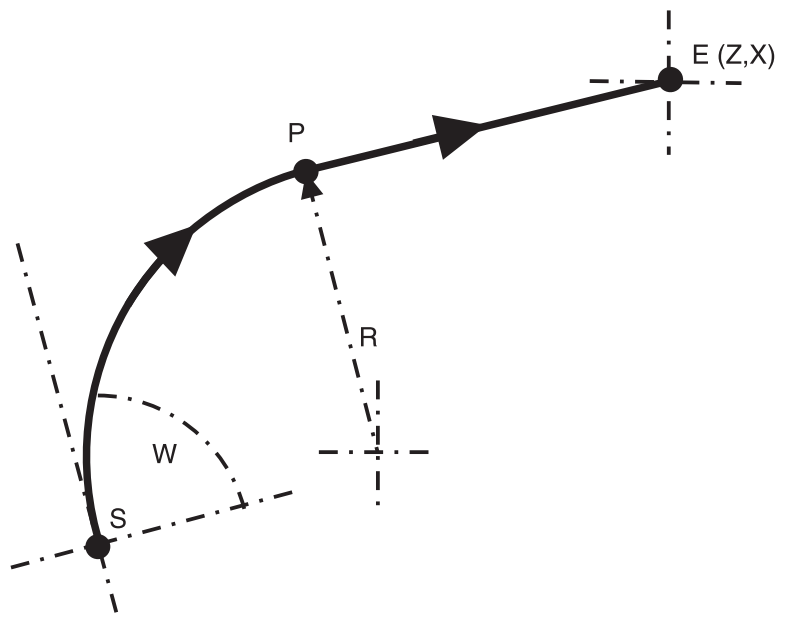
Circle with linear tangential



Combination circle - linear with tangential binding

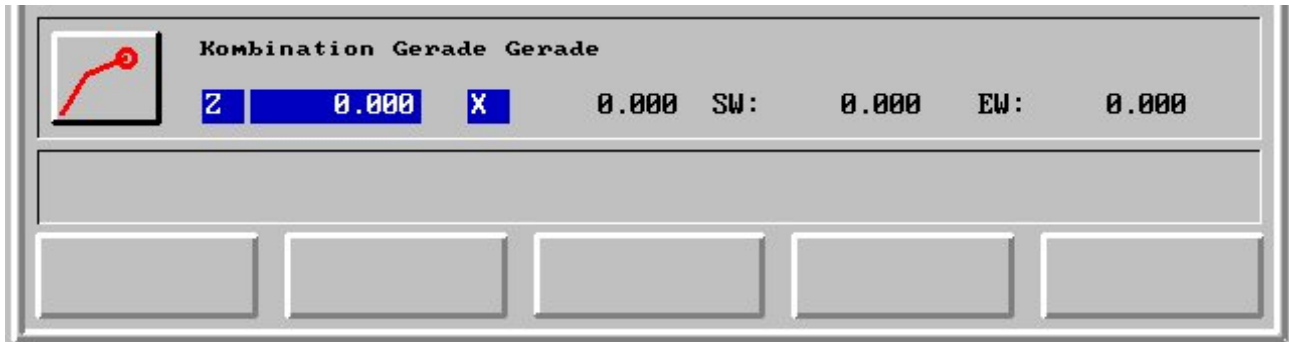
The position of the transition point (p) actual unknown.

Example:



2.11.5 Inserting a chamfers or roundness (continued)

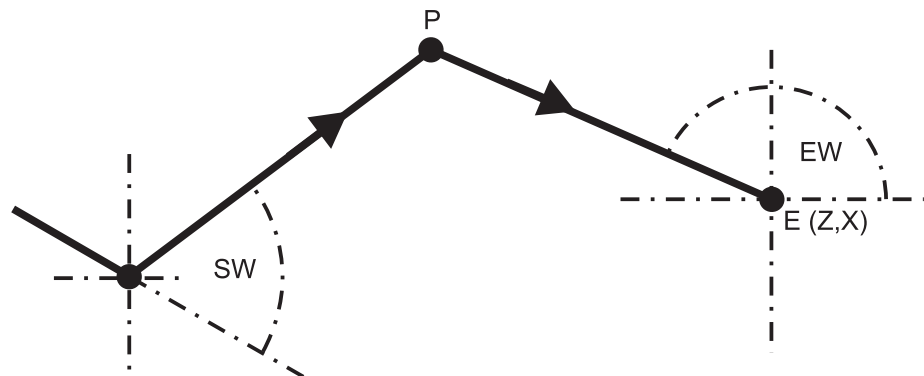
Combination linear - linear



Combination linear - linear
 with start angle, final angle and
 Terminator point with the coordinates Z and X
 The start angle actual relative
 to the preceding block.

The position of the transition point (p)
 actual unknown.

Example:



2.11.6 Editing

If the processing direction determined, still the functions (F, T, G, M) know actual are inserted into the program.



- | | |
|----|---|
| F1 | Program edit with full function range (F, T, G, M, P etc.),
if a ASCII keyboard available actual |
| F2 | Processing direction turn around |
| F3 | Mirrors (in both axes) |
| F4 | Horizontal zeros (settings the white point on zero) |
| F5 | Vertically zeros (settings the white point on zero) |

2.11.6 Editing (continued)

Program edit with full function range

The program can with full function range (F, T, G, M, P etc..) are edited, if a ASCII keyboard available actual

