AMK

AMKASYN

VARIABLE SPEED DRIVES

AZ-MC1
Multi-station
CNC contouring control

NC-Operation

3098e

Part No.:

AMK

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Content

1 Overview

The PC-based operator interface of the MC1 multi-station CNC contouring control system supports the operator by the tasks of:

- Setting up NC machines,
- Operating NC machines,
- Programming NC programs,
- Executing NC programs.

The program is designed for the PC-based operating unit (OP) AB-110C. Moreover, it can run on IBM-compatible AT-PC (min. 486-33MHz, 1MByte RAM, VGA screen).

Comprehensive input dialogs with pulldown windows and softkeys are available for setting up the NC. The parameterization both of the operating elements of the interface and of the NC itself including data management is organized by this program module.

For CNC operating the following modes are available:

- MDI (Manual Data Input),
- Manual movement (Jog, Step and Handwheel),
- Homing cycle and
- NC program start/stop

The NC is programmed according to ISO 66025, which is expanded by additional language elements.

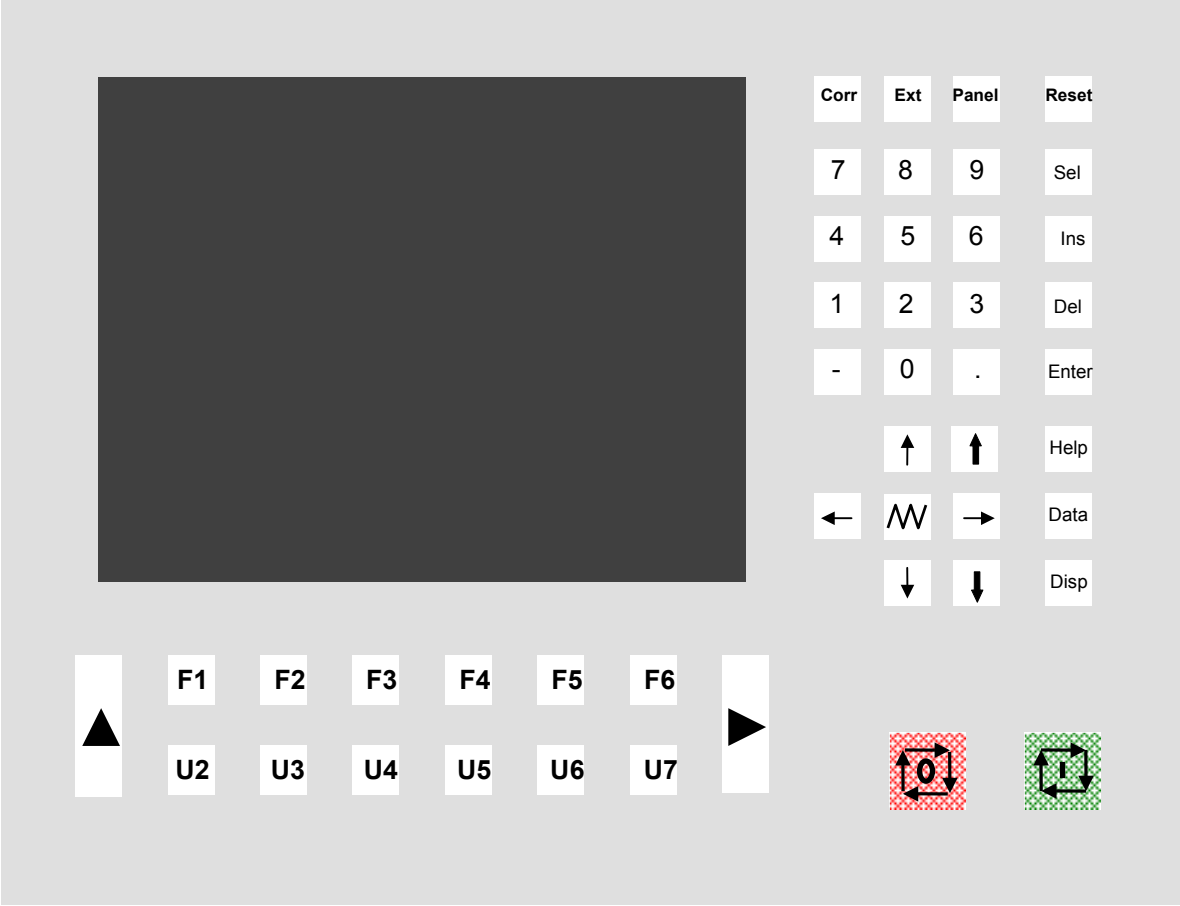
It is possible to operate several machines with the operating interface. This presupposes that the machines are networked with the operating unit through a bus system (fibre optic cable components AB-K02, AZ-K03) (see System Overview document). Moreover, the work of several machines can be linked in different ways (programmed or parameterized).

Dieses Dokument beschreibt ausschließlich die Bedienung der NC-Bedienoberfläche.
Weitere notwendige Dokumente zur Arbeit mit der NC sind:

- Systemübersicht MC1
- Inbetriebnahme der NC-Bedienung
- DIN-Programmieranleitung

1.1 Operating panel (OP)

The operating keys are located on the front of the operating panel (OP):



operating panel front view: AB110C

The meaning of the keys on the front panel are listed in the table below:

Taste	Funktion
Reset	Resetting the (selected) NC
Corr	Switching on/off offset value input mask
Panel	Switching on/off software operating panel
	NC program start or NC block start
	Stopping a NC program / terminate breaking (two keystrokes)
	Exiting a menu or dialog item
F1...F6	Softkeys allocated variably by the operating programs
	Softkey rolling
U2...U7	Freely allocatable keys (e.g. as alpha keys)
Data	Changing between NC operation (on-line window) and data input such as NC programming (off-line window)
Disp	Changing the display in the on-line layer window
Help	Calling the context help; in case of error:
Enter	Confirmation of an entry, menu selection
Del	Deleting a character
Ins	Changing the insertion mode / program selection in auto mode
Sel	Selection key or space bar

Taste	Funktion
Ext	Free key for extensions
0...9	Numerical or value input
–	Negative sign
→ ←	Cursor to the right/left, axis movement positive/negative
↑ ↓	Cursor up/down
⇑ ⇓	Element forwards/back, tabulator forwards/back, page up/down
⩘	Rapid traverse superimposition (fast axis movement)

Apart from the operating keys on the front panel, the operating unit has a connection for a standard PC keyboard. If a PC keyboard is connected, then it is effective parallel to the front panel keyboard, i.e. numbers can be input both on the front panel and on the PC keyboard. The exact assignment of the function keys can be looked up in Appendix A.

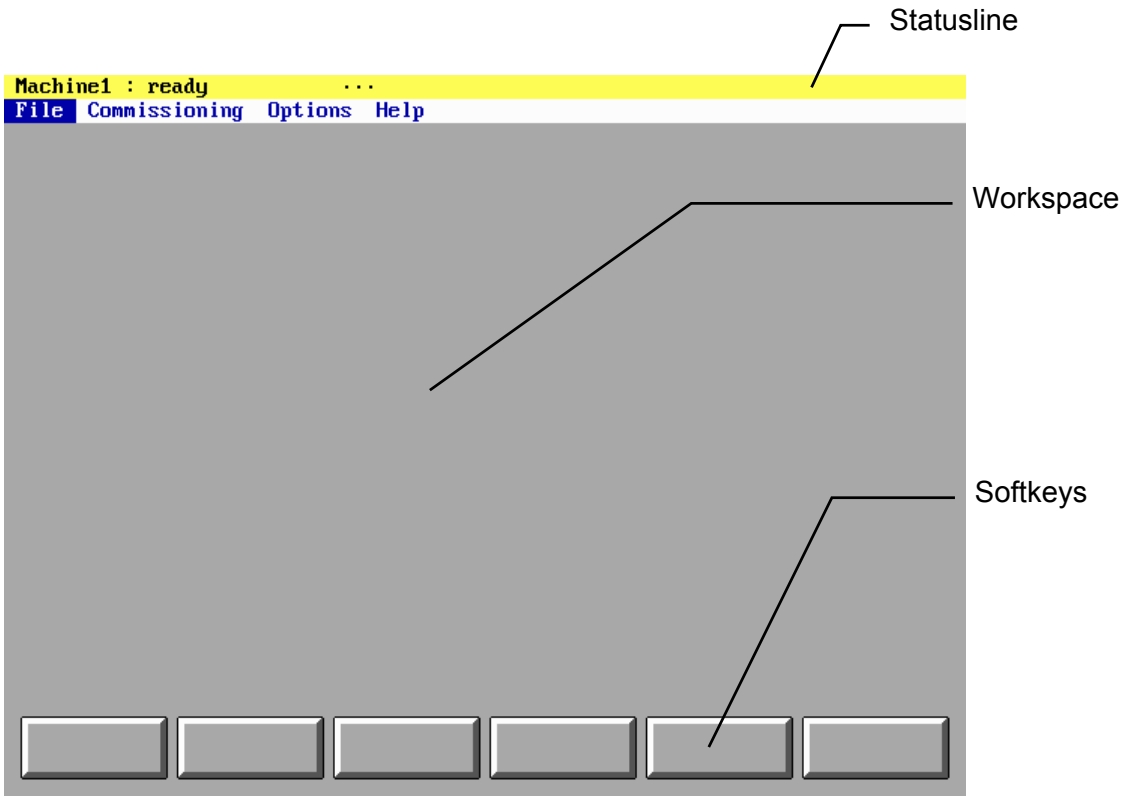
2 Fundamental operation of the program

2.1 Boot phase

During the initialization of the NC interface, the relevant processes are displayed constantly in the footer of the initialization window. The accesses to the data of the NC machines can be observed in the window itself. The SBUS station address and the machine name (in yellow colour) of each machine are displayed for identification.

2.2 Screen layout

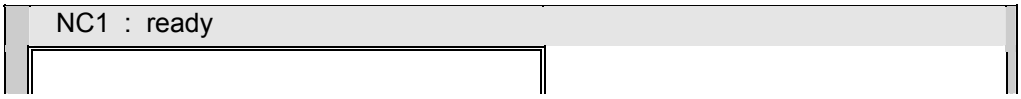
The screen is divided into the following areas:



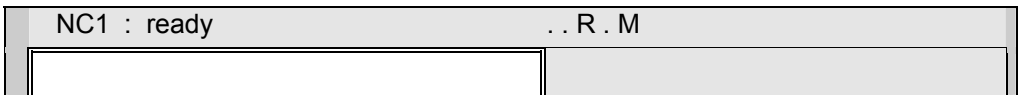
The softkeys are labelled corresponding to the selected menue with the functions they perform. Two arrows on the right next to F6 indicate that you can switch over (scroll) to another softkey level with the ▶ key. All dialogs and displays are accommodated in the workspace.

2.2.1 The status line

The colour highlighted status line is always visible in the top line of the screen, i.e. both during NC operation and NC programming. This shows which NC machines the operating program accesses and the conditions in which these machines are. If the operating program/status is operated without connected NC, then the status line is empty.



If more than one machine is connected with the interface, a list with abbreviations of the statuses of all machines is displayed in addition.



The following status abbreviations are possible:

Status	**Abbr.**	
ready	.	The NC is ready to execute a job
n.ready	X	The NC is not ready or the axes are not controlled (RF)
manual block	M	A manual block is or was executed in the ready status
started	R	A NC program is running in the NC
stopped	S	A running NC program has been stopped
manual(Run)	m	A manual block will be or was executed in the stopped status
ERROR	E	The NC is in an error status

2.2.2 Operating Layers

Data

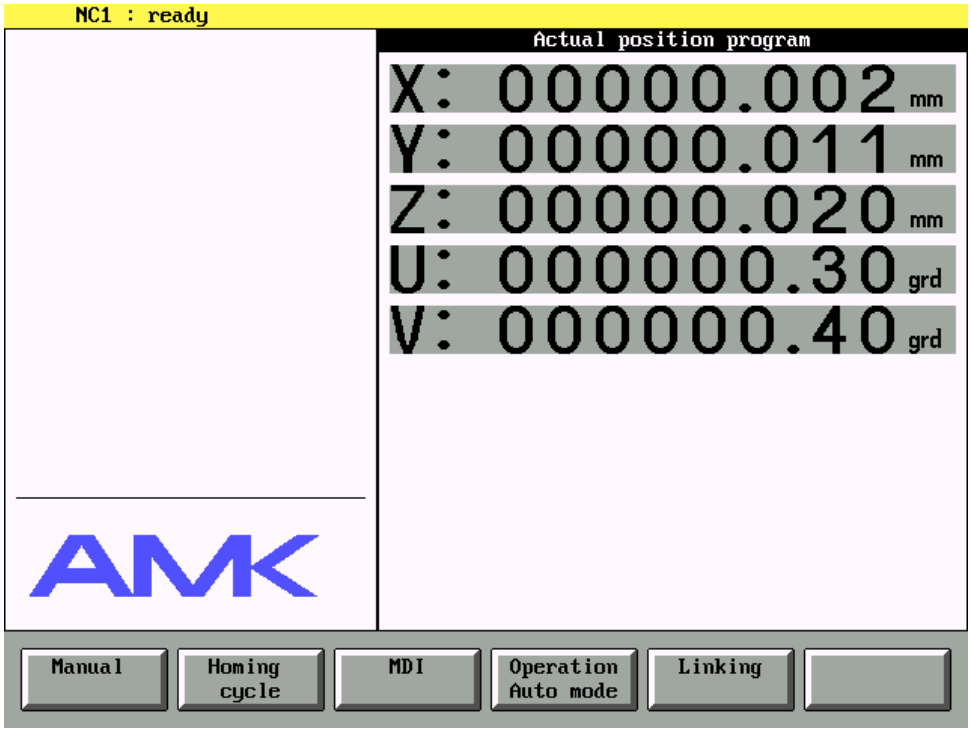
The NC operating program consists of two operating layers. You can change between them at any time:

- NC operation (on-line-layer)
- NC programming, Commissioning,.. (off-line-layer)

The NC operating layer is selected normally after the initialization phase.

3 NC operating layer, structure and operation

After the first start-up of the CNC application the basic menu is displayed:



The workspace of the screen is divided into two areas. Operator guidance takes place exclusively in the left part, whereas the right, larger part is reserved for the continuous display of internal data of the selected NC.
The operating mode is selected by the softkeys. As can be seen in the picture above, the following operating modes are available:

F1 - Manual mode

F2 - Homing cycle

F3 - MDI mode

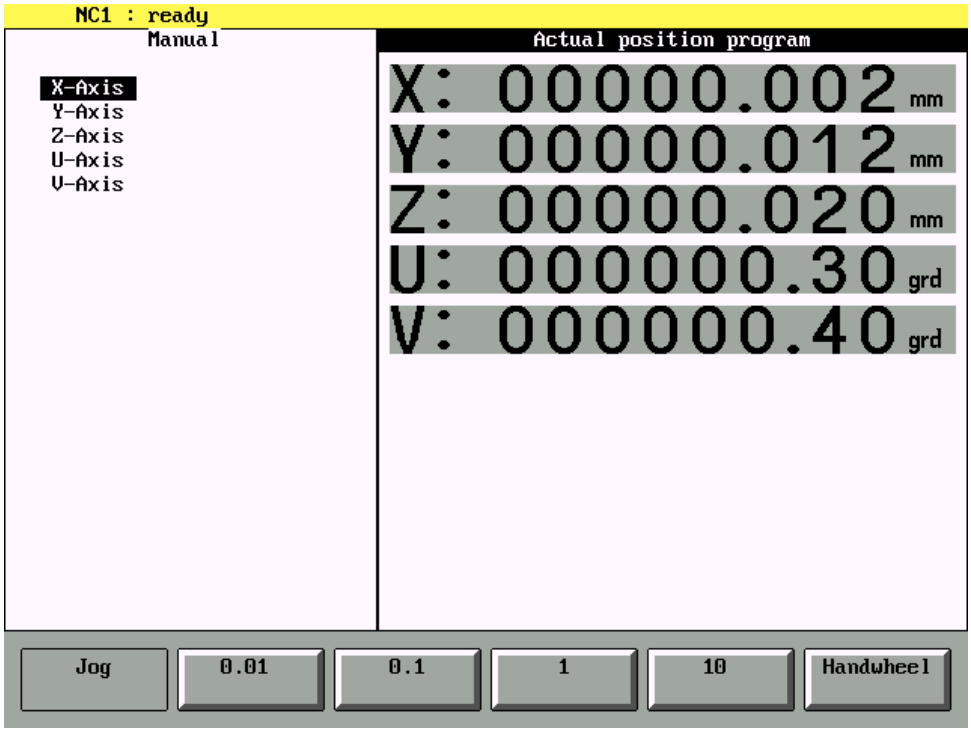
F4 - Automatic mode

F5 - Linking

▲ - These operating modes are basically exited.

3.1 Manual mode

The manual mode is activated by the softkey F1 in the basic menu of the NC operating layer. The manual mode allows to move the NC axes manually.



F1 Jog: Continuous movement of the axis (maximum up to axis limits)

F2 .. F5 Step: Movement of the axis by a selected step

F6 Handwheel: Movement of the axis with a connected handwheel. If no handweel is configured, this softkey does not apear.

↑ ↓ Selection of the axis to be moved

← → Start of normal axis movement

M und ← → Start of fast axis movement

Operation via external binary I/O

All operating functions can also be assigned to binary In-/Outputs. This allows the operation through a „Machine Operator Panel“ with:

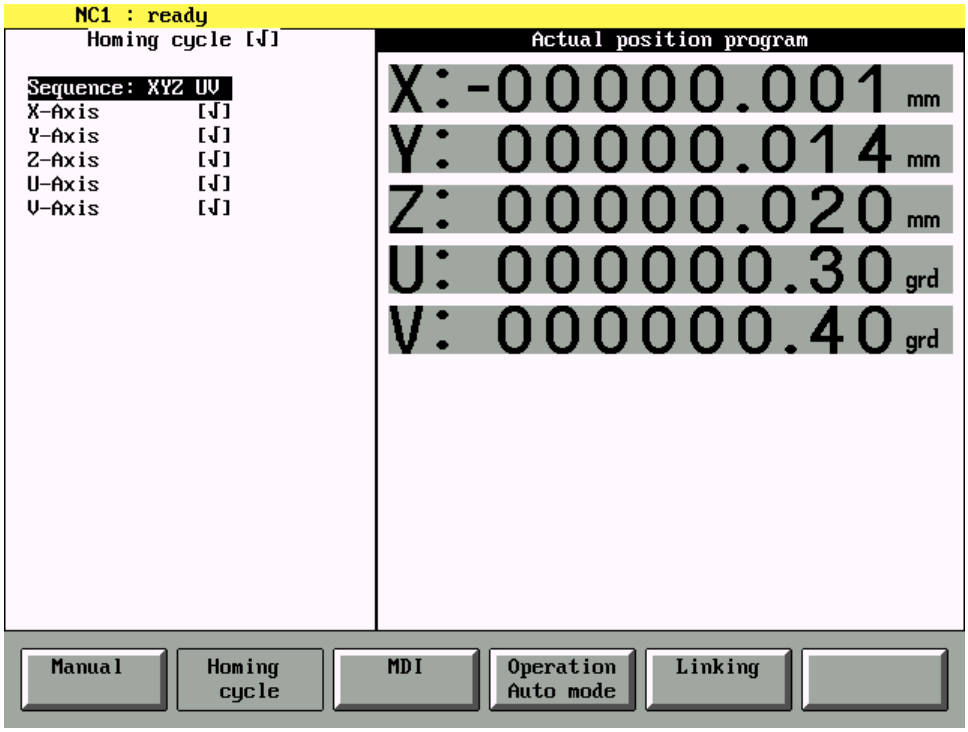
- axes select switches
- direction keys
- operation mode switches
- START and STOP keys

The assignment of operating functions to binary In-/Outputs is described in the document „NC-Commissioning“.

If a operating function is realised through a binary input, the associated softkey is not displayed on the screen.

3.2 Homing cycle

The homing operating mode is reached by actuating the F2 key in the basic menu of the NC operating layer.



The axes can be homed individually or jointly with the aid of the following keys:

 Selection of the axis (axes)

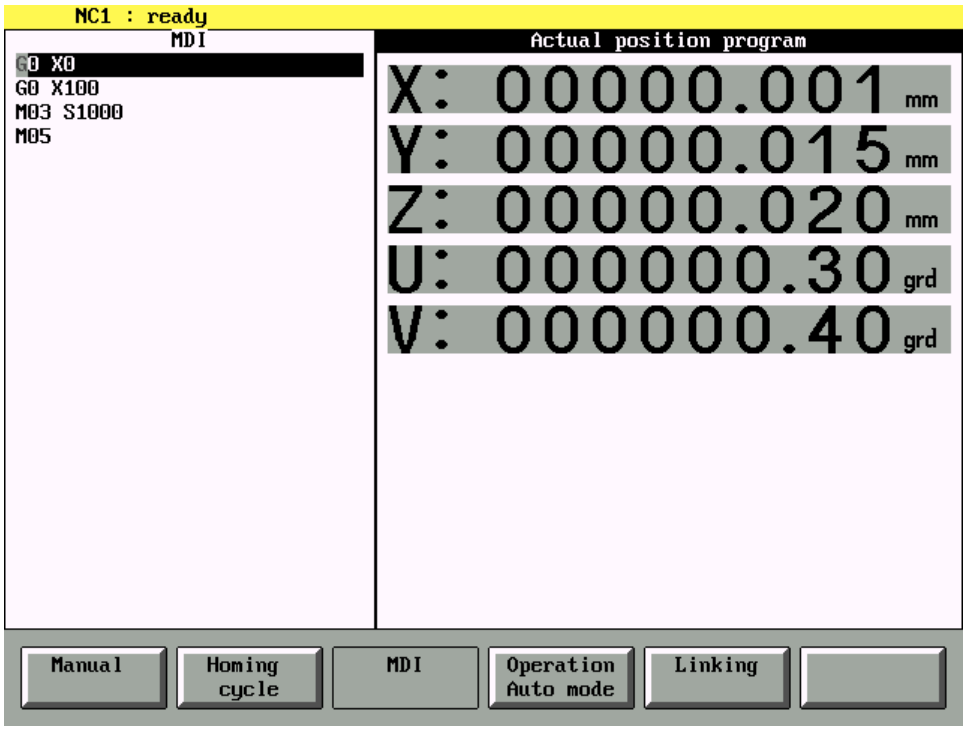
 Start of the homing cycle

For the common homing cycle of axes, a referencing string or a special ISO program must be produced (see 'NC-Commissioning - NC Configuration' item). This string (or the program) is available as topmost selection item.

If the reference point is reached, this is displayed behind the axis designation: [✓] (in the above picture this is the case for all axes). In addition the referenced sum signal is displayed in the title: „homing cycle [✓]". This signal is tested on the NC before all movement jobs, if the query has not been deactivated (see 'NC-Commissioning - Configuration NC' item).

3.3 MDI mode

The MDI mode is reached by pressing the F3 key in the basic menu of the NC operating layer.
NC blocks according to ISO 66025 can be edited in the left window and sent to the NC individually for execution in the MDI mode.



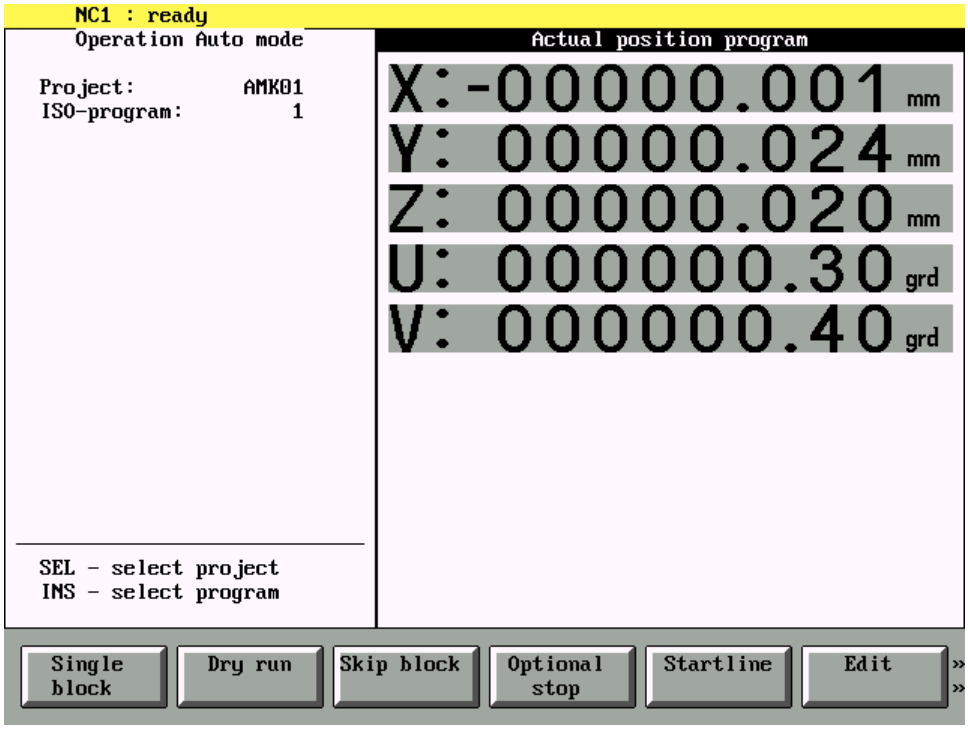
The active line, i.e. the line in which the cursor is located, is highlighted.

This line is sent to the NC completely as MDI block by activating the key. Here it is indifferent where the cursor is inside the line.

If the 'Auto line change' is configured (see ‘NC-Commissioning - Configuration OP’ item), the active line changes automatically to the next occupied (not empty) line within a described block after sending the MDI block. Thus short test sequences can be executed very simply.

3.4 Automatic mode

The automatic mode serves for starting and testing NC part programs. It can be operated after pressing F4 in the basic menu of the NC operating layer.



Sel

Selecting a Part Project

A part project must be selected before selecting a ISO program. Press Sel and a list of the programs already existing is dipslayed. All necessary ISO programs including the correction data for a part are joint together in a part project. One of these projects must be selected with the cursor keys ↓ or ↑ and confirmed with Enter. All ISO programs present in the part project are then transferred to the NC. The name of the selected part is displayed on the screen as a check.

Ins

Selecting a ISO Program

The ISO program is always selected from the stock of the programs existing in the part project. The list of available programs is displayed by pressing Ins. One of these programs must be selected with the cursor keys ↓ or ↑ and confirmed with Enter. The selected name is displayed as a check in the screen workspace of the automatic mode.

Start / Stop

The keys are required for starting and stopping the selected NC program. The status changes in the NC resulting from this can be followed in the status line:

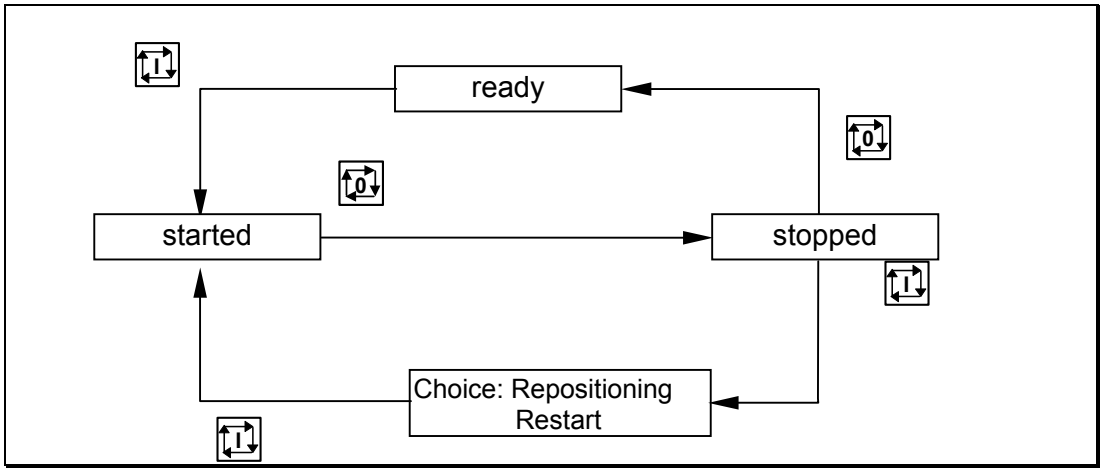


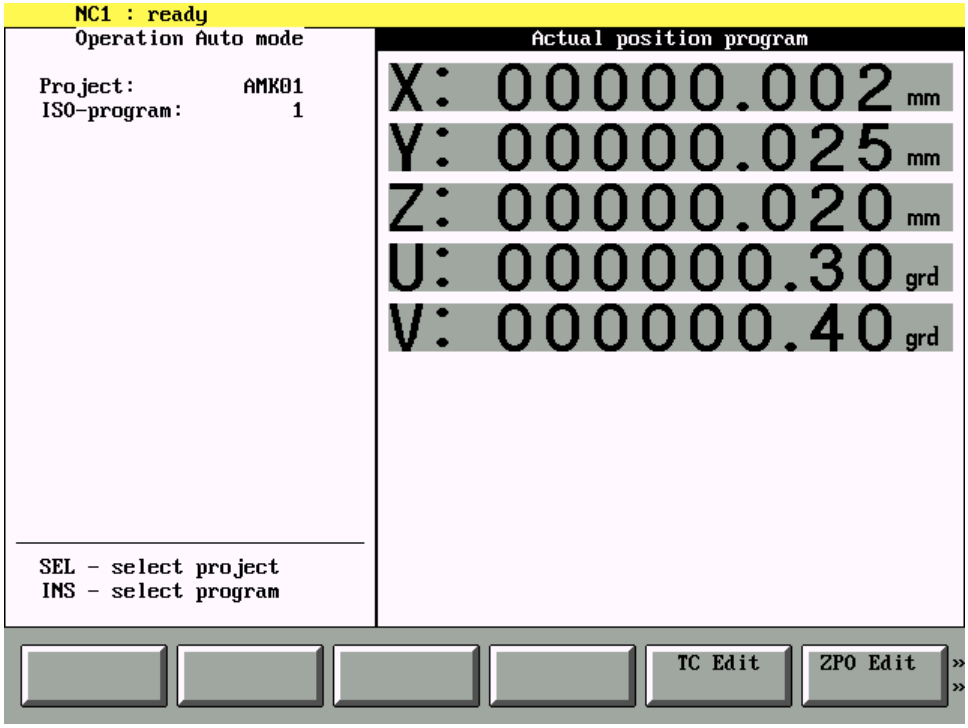
Fig.: Start/stop status diagram

Influencing of the program execution

Execution of the program in the NC can be influenced by some switches for test purposes within this operating mode:

F1	"Single block"	Each NC block must be started individually.
F2	„Dry Run“	The movements of the NC axes are simulated, e.g. a part program is running without moving the machine axes. This is indicated in the statusline through „(SIM)“.
F3	"Skip block"	NC blocks starting with ‘/’ are not executed.
F4	"Optional stop"	Programmed stop commands (M01) are executed. If M01 is activ, this is indicated through the pushed softkey. An active switch is marked by „pressed key“. After each „Single Block“ or on „Optional Stop“ the program must be continued with .
F5	"Start line"	The block number from which of the program is executed can be defined. Uptill this line a block search is done with executing M03-M05, M13-M15 and M17-M22.
F6	"Edit"	The ISO programs of the part project can be edited in this operating item (only in NC state 'ready'). The ISO editor is selected and the actual program file can be modified. All NC programs of this part project can be edited. The selection is done through F3 „Open File“ (cf. Appendix B).

2. Softkey-Layer



▶ F5 Hier können evtl. zugeordnete Werkzeugdaten aufgerufen und geändert werden. Innerhalb dieses Dialoges können auch die Werkzeugstandzeiten bearbeitet werden.

▶ F6 Hier können evtl. zugeordnete Nullpunktdaten aufgerufen und geändert werden.

ATTENTION !

IF the keys [I] and [O] are realised through external maschine keys ('Commissioning - Configuration BDE - Periphery' item),the Stop key [O] of the OP is still active for safety requirements.

3.5 Multi-CNC-Operation and Linking

3.5.1 Allgemeines

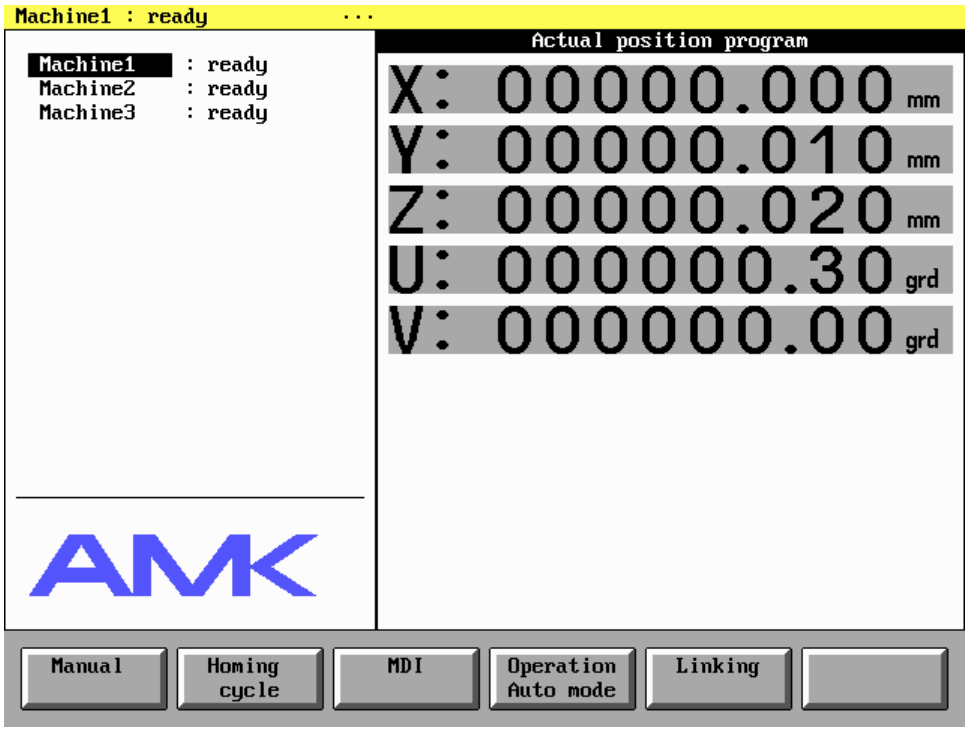
Die NC-Bedienoberfläche ist nicht nur als Bedienung einer einzelnen NC geeignet. Sie ist in der Lage, mehrere MC1 wechselseitig zu bedienen und ihren Status gleichzeitig zu beobachten und darzustellen.

Darüber hinaus können mehrere Maschinen (hier auch als Stationen bezeichnet) in einem festen Ablauf (maskiert) oder in einem programmierten Ablauf (frei) verkettet werden. Innerhalb der Inbetriebnahme muß festgelegt werden, welche Art von Verkettung benutzt wird. Nur jeweils eine der im nachfolgenden beschriebenen Verkettungsarten kann vom Grundbild der NC-Bedienebene aus mit der Taste [F5] aufgerufen werden.

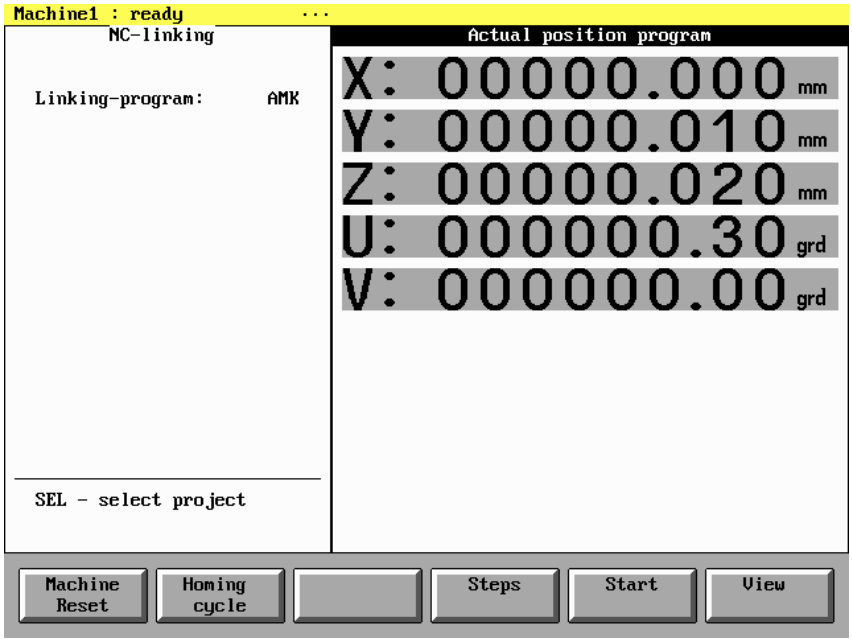
3.5.2 Auswahl der aktiven Maschine

If the operating program has access to several NC machines, a list of the statuses of all machines can be seen here.

[↑] [↓] One of the machines can be selected for operation and display.



3.5.3 Free linking



Sel The list of available programs (=part projects of the linking type) is displayed.

One of these programs must be selected with the cursor keys and confirmed with ENTER. Then the selected name is displayed in the screen workspace as a check.

If configured the linking program can be watched on the left hand side of the screen. PRINT outputs are written on the right hand side of the screen if linking display is selected.

F1 Is initiating a NC RESET on all linked machines.

F2 Is initiating homing cycle for all linked machines according to the configured homing cycle sequence.

F3 After the program has been started, this softkey appears. If it is activated, the program can be stopped through a progammed CYCLE instruction.

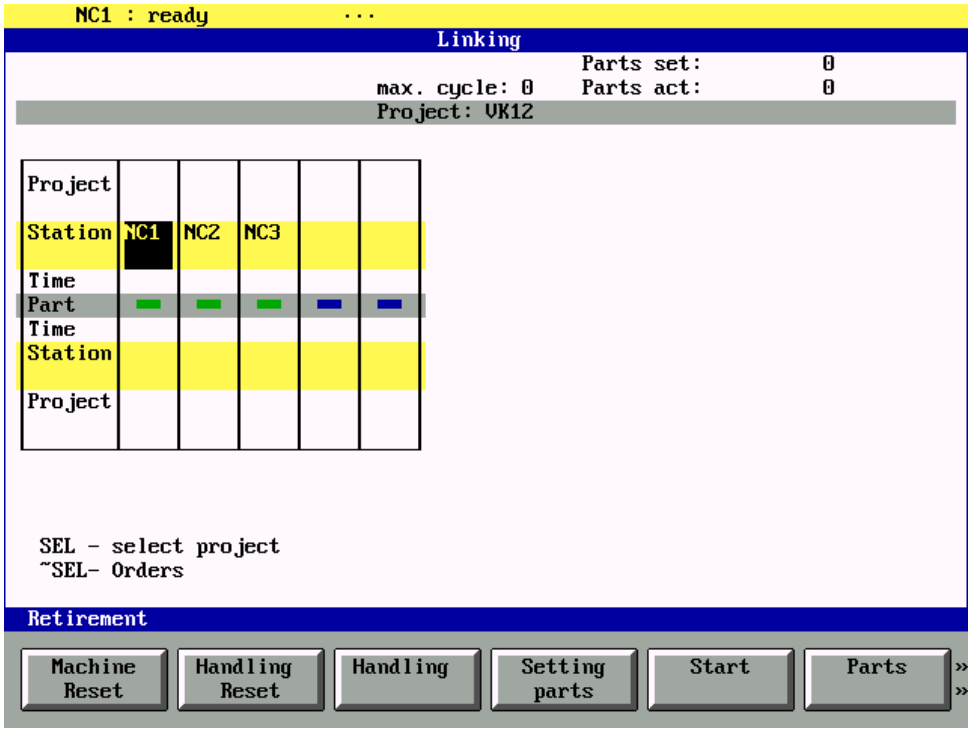
F4 Step-by-step execution is possible at any time for checking the program run.

F5 The program is started.After NC start, the program can be stopped at any time with F1

F6 The editor is selected and the current program file can be changed (only if no program is active). If editing is inhibited in the part project, the program only can be watched.

! **Attention: The key of the OP is not effective during linked processing! For STOP use softkey F1 „Cycle Stop“.**

3.5.4 Variable linking



Mit dieser Verkettung werden Maschinen in einer Maske zusammengefaßt. Die Zuordnung der Maschinen zu den Plätzen erfolgt im Menüpunkt ‘Inbetriebnahme - Konfiguration’. Die zu den Stationen (Maschinen) zugeordneten Projekte sind identisch zu denen des Automatikbetriebes. Normalerweise sollte hierzu ein VKV-Projekt geladen werden, das gesammelt die Zuordnungen von Projekten zu den Maschinen enthält.

Sel

Nach Drücken der Taste wird eine Liste der zur Verfügung stehenden Verkettungsprogramme angezeigt. Mit den Cursortasten muß eines dieser Programme selektiert und mit der Taste Enter bestätigt werden. Der ausgewählte Name wird zur Kontrolle angezeigt.

Im Layout sind neben den Maschinennamen die Namen der verwendeten Einzelprojekte, jeweils in 2 Zeilen verteilt, dargestellt.

Eine Layoutstelle ist invers dargestellt. Diese Stelle kann mit Hilfe der Cursortasten bewegt werden und kennzeichnet die für die nachfolgende Bedienung selektierte Station.

In der Fußzeile des Fensters wird ständig der aktuelle Zustand der Verkettung dargestellt:

- Ruhezustand: die Verkettung ist nicht aktiv
- Bewegung starten: alle Maschinen der Verkettung werden gestartet
- Warten auf Bewegungsende: es wird auf die Meldung des Programmendes aller Maschinen gewartet
- Warten auf leere Übergabeposition: es wird auf die Meldung vom Teilespeicher gewartet, daß die Übergabeposition frei ist

- Warten auf Transport: es wird auf die Meldung von der SPS gewartet, daß der Teiletransport beendet ist
- Warten auf Vertakten: es wird auf die Meldung von der SPS gewartet, daß die Vertaktung beendet ist

~ + Sel Alle vorhandenen Aufträge der Auftragsdatei (falls vorhanden) werden aufgelistet.

Der gewünschte (im Normalfall der oberste) Auftrag ist zu selektieren und mit Enter zu bestätigen. Der Auftrag wird daraufhin aus der Liste entfernt und in die Maske übernommen. Ein Auftrag besteht aus einem Verkettungsprojekt und einer Sollstückzahl

F1 An allen in die Verkettung integrierten Maschinen wird ein NC-RESET ausgelöst.

F2 An der konfigurierten Sonderstation (Handling oder Teilespeicher) wird ein NC-RESET ausgelöst.

F3 Die Bedienung der konfigurierten Sonderstation (Handling oder Teilespeicher) wird aufgerufen.

F4 Die Art des Teils an der selektierten Station kann verändert werden. Die Unterscheidung der Teiletypen erfolgt im Verkettungsbild über die Farben:

Leerteil	- blau
Gutteil	- grün
Schlechtteil	- rot
markiertes Teil	- gelb

F5 Mit der Starttaste wird die Verkettung aktiviert. Sie kann am Zyklusende wieder angehalten werden (durch Taste ‘Zyklusende’ oder durch das Zyklusende-Bit).

F6 Die Soll- und Iststückzahl können verändert werden.

▶ Die **2. Softkey-Ebene** wird erreicht. Darin liegen folgende Aufrufe:

▶ F1 Auf allen in der Verkettung integrierten Maschinen wird einmal das Teileprogramm abgearbeitet. Eine Syncronisation mit der Peripherie findet dabei nicht statt.

▶ F2 Auf allen in der Verkettung integrierten Maschinen und einem evtl. konfiguriertem Teilespeicher oder Handlingssystem kann die Referenzfahrtfolge ausgeführt werden. Der Start muß für jede Maschine einzeln bestätigt werden.

▶ F3 Auf allen in der Verkettung integrierten Maschinen wird, soweit vorhanden, das Rückzugsprogramm gestartet.

▶ F4 Auf der markierten Maschine wird einmal das Teileprogramm abgearbeitet. Eine Syncronisation mit der Peripherie findet dabei nicht statt.

▶ F5 Auf der markierten Maschine wird die Referenzfahrtfolge ausgeführt.

Auf der markierten Maschine wird, wenn vorhanden, das Rückzugsprogramm gestartet.

3.5.5 Fixed masked linking

Diese Form der Verkettung wird nicht mehr unterstützt und deshalb auch hier nicht weiter beschrieben.

3.6 Display change

Disp

A number of display possibilities of the working status of the NC are available in the OP. The displays which should be used must be defined previously in the configuration (see 'NC-Commissioning - Configuration op. panel item). The change between the selected displays takes place in the entire on-line-layer by the Disp key.

The following displays are possible in general:

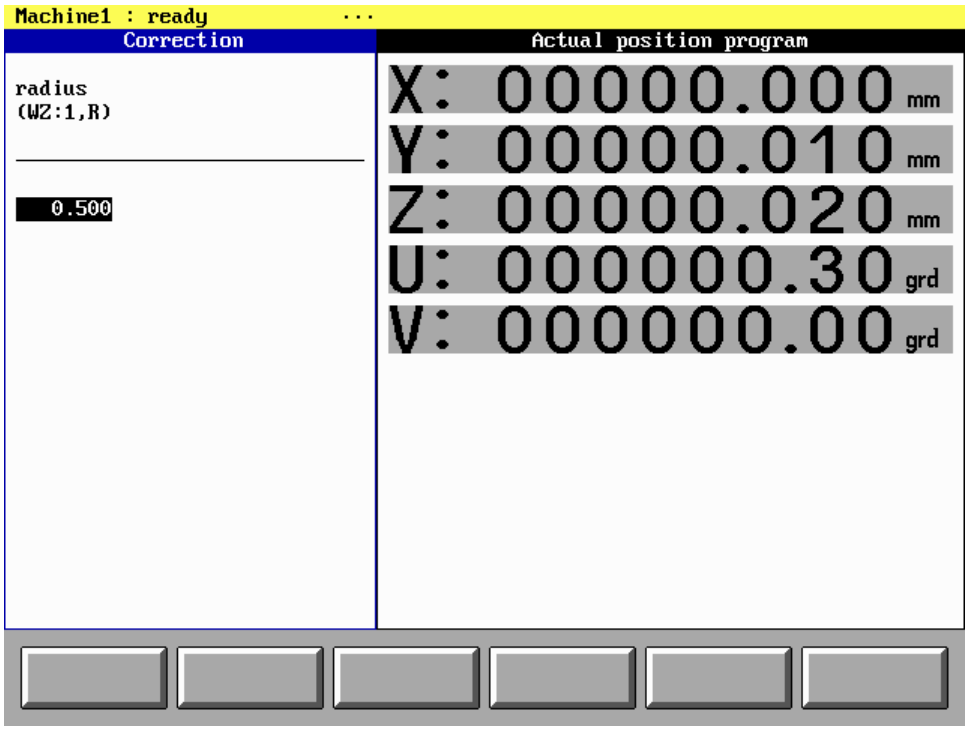
Actual position program:	The actual positions (related to the programmed reference system) of all interpolatable axes are displayed in uppercase letters
Actual position machine:	The actual positions (related to the internal reference system of the machine) of all axes are displayed in uppercase letters
Actual position increments:	The actual position increments of all axes are displayed in uppercase letters
Overview (P):	The actual positions (related to the programmed reference system) and the residual distance of all interpolatable axes, current feed settings and the just executed NC block are displayed
Total overview (M):	The actual positions (related to the internal reference system of the machine) and the residual distance of all interpolatable axes, current feed settings and the just executed NC block are displayed
NC program:	The execution of the NC program can be followed in the source text
NC block:	All executed NC program blocks are displayed sequentially
Tool life:	The current Tool life of all tools are displayed
Graphics:	The graphical display of the position of two NC axes is made. The adjustment can be done when the keys M + Disp are pressed
Linking:	The print instructions of the free linking program are shown on the display

3.7 Offset value input

Corr

If this key is actuated during NC operation, the offset value input is reached. Out of a quantity of correctable data - which must be defined previously - in each case one can be changed here. The definition of the offset values is described in Chapter " Offset **mask**"

If no offset value is defined, this operating item cannot be activated.



↑ ↓ The required value can be selected and must be confirmed with:

Enter

← → The displayed value is changed with the keys and the total offset confirmed with:

Enter Then the offset value is sent immediately to the active NC and activated there.

▲ If the ESC-key is pressed, the inputs are not taken over but rejected.

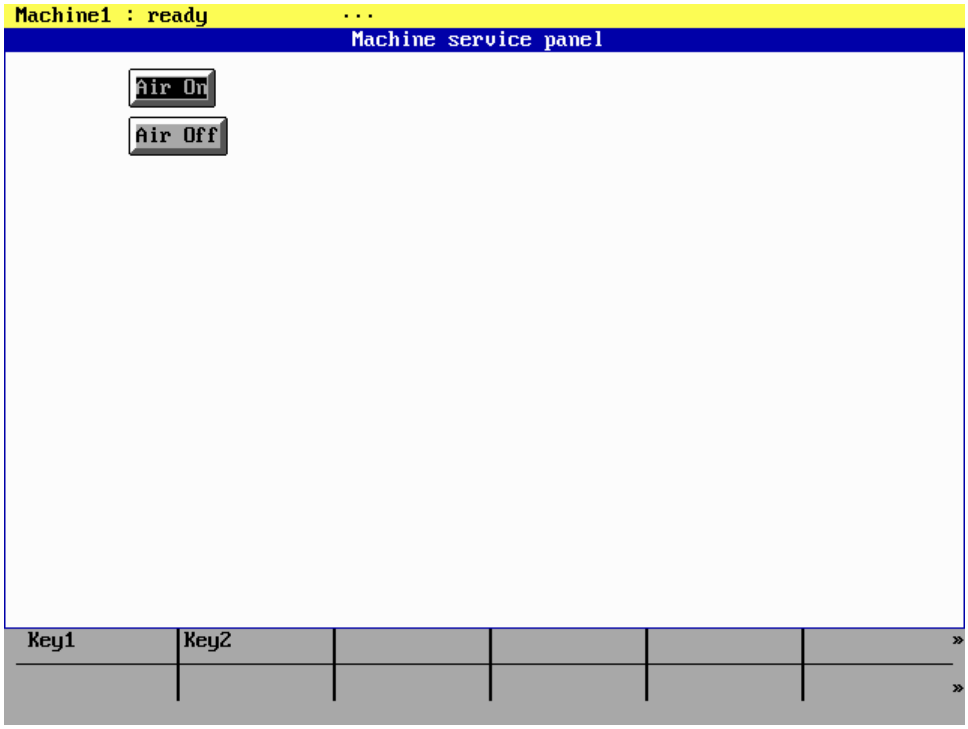
Refer to the 'Data input' item for the possibilities of programming offset values and their meaning.

The defined offset values are machine-specific, therefore they always refer only to the selected NC-Machine operating functions

3.8 Programmable machine operating functions

Panel

If machine specific functions have been defined during commissioning, they can be displayed by pressing the Panel key at any time during NC operation.



Beispiel für eine MBF-Belegung

↑ ↓ Enter or Sel

You change between the elements in the main and activate the element with

F1 ... F6 and UK2 ... UK7

The keys shown in the softkey field are operated with the softkeys and the free keys located directly below.

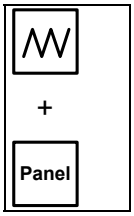
▶

You change between the programmed softkey levels.

Panel or ▲

You exit machine operation.

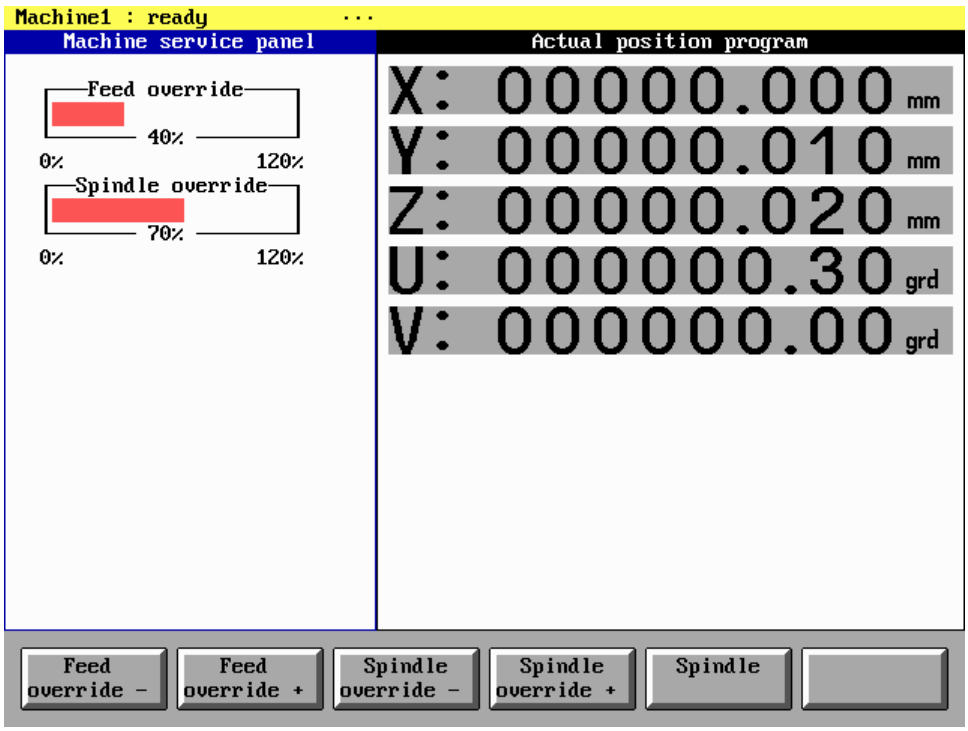
3.9 Fixed machine operating functions



During NC operation machine operating functions which are not realised with binary inputs/outputs can be displayed on a "software machine panel" by pressing + Panel .

However, the following conditions apply for this:

The function (e.g. spindle) must be present and the function (spindle override) is not directly implemented by binary In-/Outputs (see 'Commissioning - Configuration OP - Periphery' item)



In the above example the machine functions:

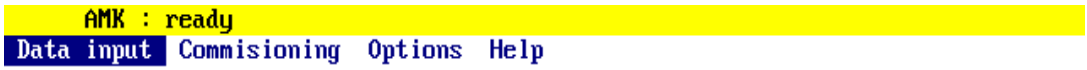
- Machine override - by F1 and F2
- Spindle override - by F3 and F4
- Spindle 2 on/off - by F5

are not realized through binary in-/outputs

You exit machine operation with the Panel , ▲ or Data keys.

4 Structure of the menues for NC programming and commissioning

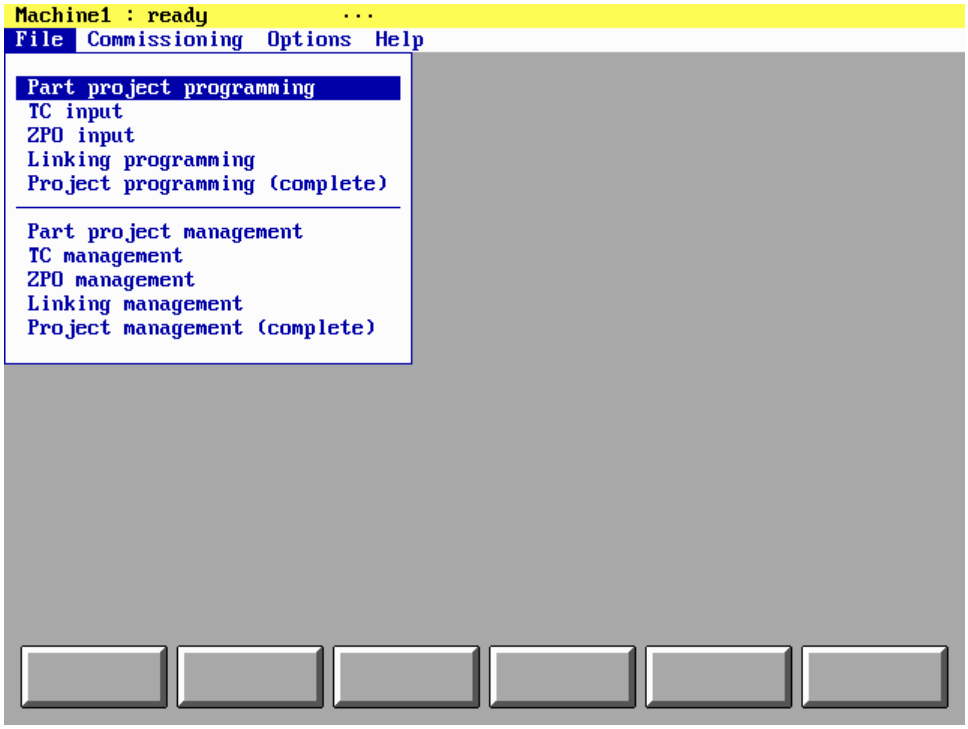
The main menu of nc-programming is achieved by pressing the Data key on the control panel:



The menu items are presented in detail in the following sections of this chapter.

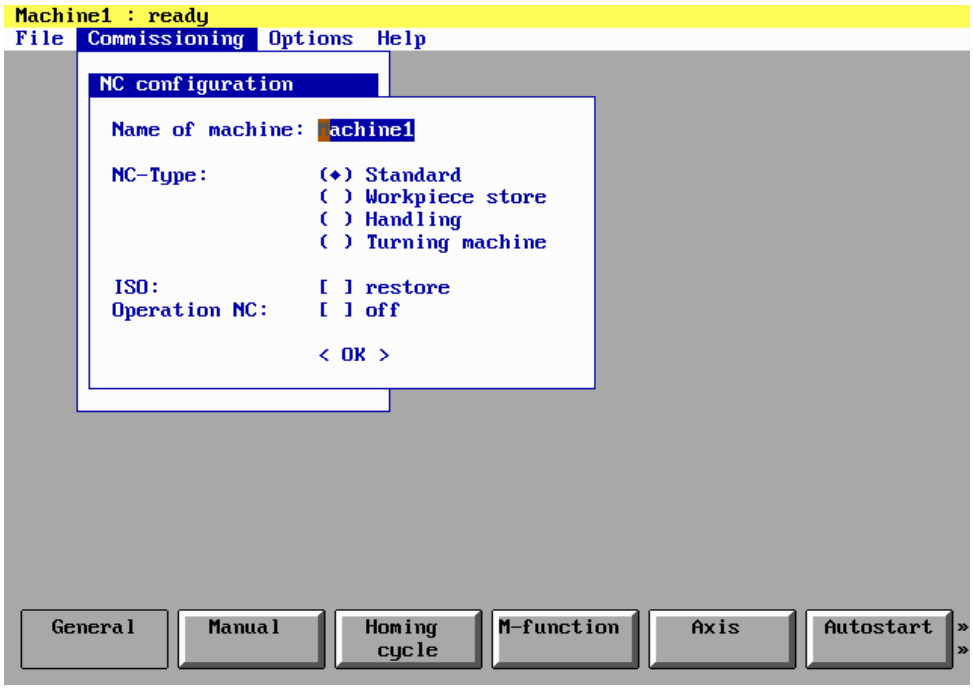
4.1 Data input

For program input, creation of projects and for data- and project management the following items are realized:



4.2 Commissioning

Normally commissioning is done before creating a program (see document Commissioning).The following settings can be done:



- NC configuration starting operation, type of homing cycle, handwheel, M-functions, axes parameters,...
- configuration operator panel
  displays, perpheral functions, linking parameters
- diagnosis for different elements:
  errorlist, SBUS communication, periphery, I/O image,..
- loading and saving of NC configuration data
- programming of I/O assignments
- programming of a software machine panel
- creating of cycles or macros which can be assigned to free G-functions
- protection of data input and commisioning through passwords

4.3 Options

- Select operating language
- Printer parameter setting: painting margin

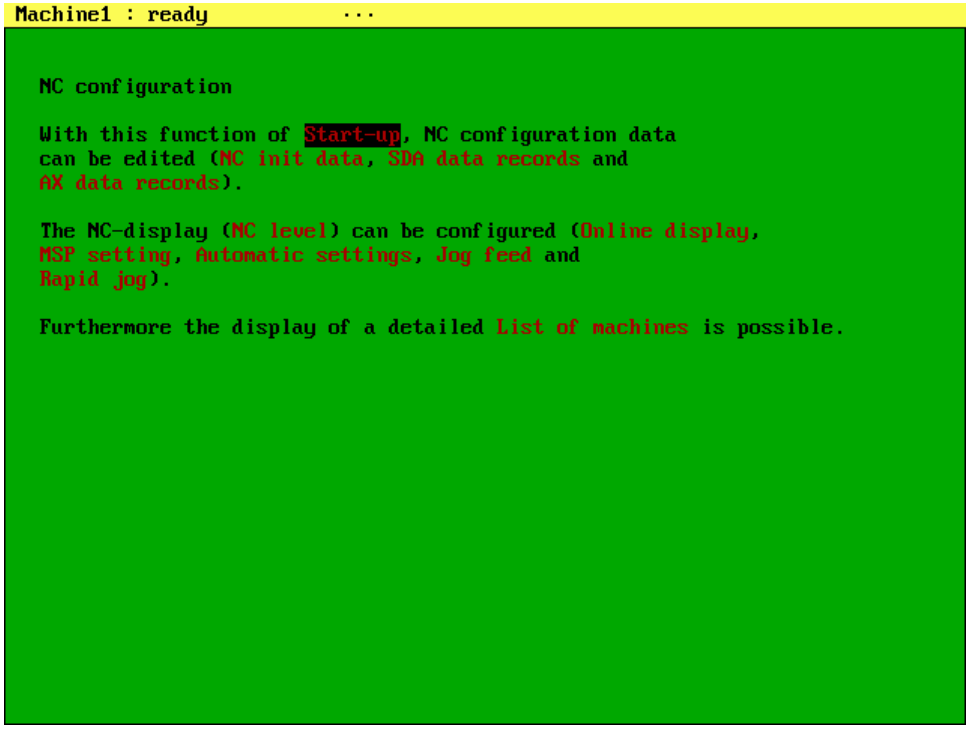
Selected options becomes effective with Enter.

4.4 Help

This menu item offers operator help about NC-operation (Index) or keys (Key overview) and allows displaying of the actual software version number of the OP-program (Info) or the NC operating system of all linked machines (NC info).

4.4.1 Use of the context help

A context-related help can be selected at any time parallel to operation. This is reached with the Help key. A description or operator guidance belonging to a just processed area (menu item) is thus displayed on the screen.



Coloured cross-references, which in each case refer to a further help topic, are present in many help texts. The display changes to the new topic by moving the cursor bar to one of these references and pressing Enter.
Some topics take up several pages and it is possible to change between them with ↓ or ↑ .

You change to the index by operating the Help key once again within a help topic. This in turn consists of several cross-references. You exit the help with the ▲ key.

Note: The Help key is also used for displaying NC error messages. If the key is actuated while the selected machine displays an error state, the context help cannot be selected.

4.5 Hilfe - Trace betrachten

Im Trace-File werden bestimmte Ereignisse, wie z.B. Fehlermeldungen gespeichert. Durch Aufruf dieses Menüpunktes kann diese Datei betrachtet werden. Dazu wird der ASCII-Editor im Nur-Lese-Mode verwendet.
Bei der Auswertung der Datei ist zu beachten, daß diese nach dem Ringpuffer-Prinzip gefüllt wird, d.h. nicht die letzte Zeile der Datei ist unbedingt auch die letzte beschriebene. Jedoch steht der Cursor bei Aufruf des Menüpunktes immer auf der zuletzt beschriebenen Zeile.

Help Durch Drücken der Taste, werden die Fehlereinträge in einen Klartext übersetzt.

5 Projects, programming and structure

5.1 Overview

All NC programs associated to a workpiece have to be assigned to a part project.

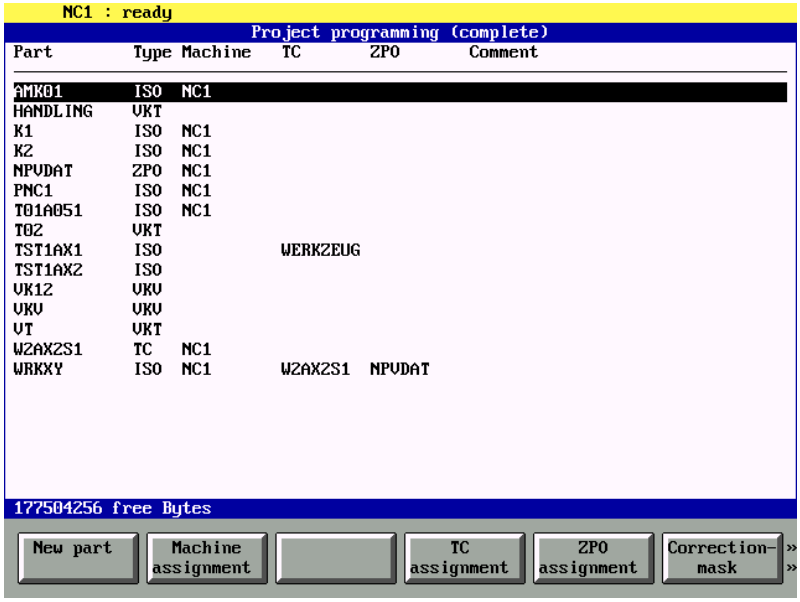
Tool correction data (TC) and zero point offset data (ZPO) are also managed as separate projects. These projects are assigned to the part project.

In linked projects for each NC unit a ISO project is required (cf. document „NC programs linkage“). In a next step a linking project have to be created which links the ISO projects (cf. document "Linking of NC machines").

5.2 Project programming

The ‘Project programming' menu item serves for the production and correction of all kinds of programs.

After the menu item is selected, all already present part projects are listed in alphabetical order. A part project can contain apart from the NC part programs assigned data blocks for the tool offset, zero point offset or the on-line corrections.



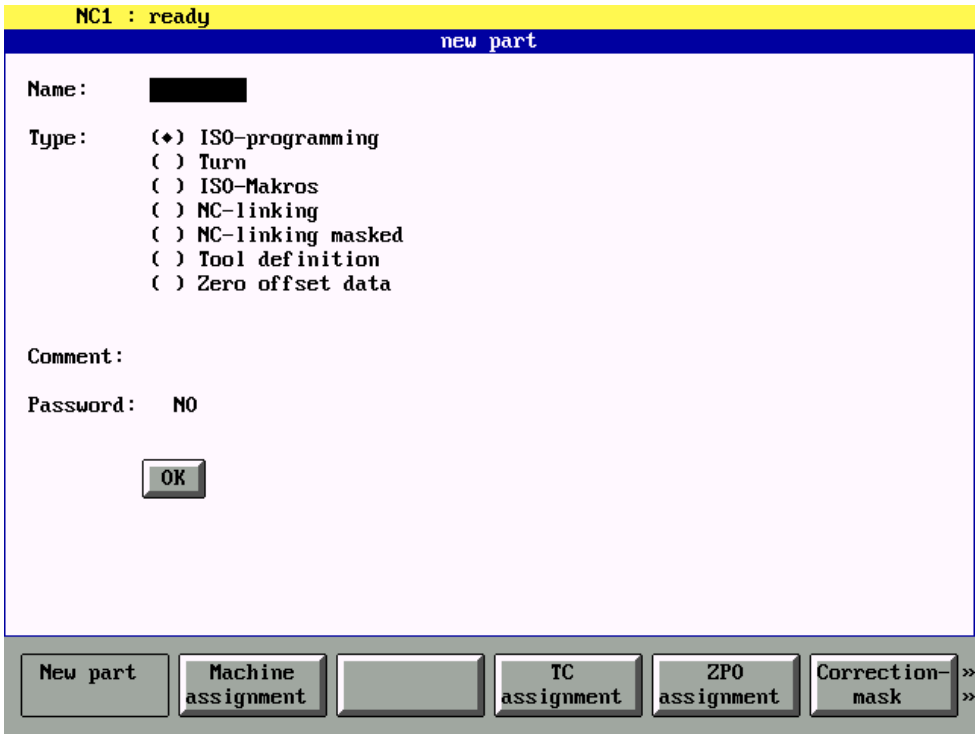
Part	Name of the part project
Type	Type of the part program
Machine	Name of the machine to which the part project is assigned. If the place is not occupied, no assignment has been made yet made (important for More-Machine-operation).
TC	Name of the assigned tool correction project. If the place is not occupied, no assignment has been made.
ZPO	Name of the assigned ZPO project. If the place is not occupied, no assignment has been made.

Already existing projects have to be selected with the cursor keys.

Enter Correction of the contents of the selected part

F1 **New part / project**

By pressing the softkey, the menue item for creating a new part project is reached.



Name:	Entry of the name of the part-project to be produced (max. 8 characters).
Type:	Here the type of the new part is defined.
Comment:	The programmer can file here more concrete information about the task and the importance of the project.
Password:	The correction of the part-project can only be done after the input of the defined password. The project is not protected through a password. You can switch over from "Yes" to "No" with the "Blank" key

After correct entry of all necessary items, (confirmed with "OK“ and Enter) the system branches immediately to the dialog item for producing the project contents.

F2

Machine assignment

The names of all connected machines are listed as well as an additional entry which indicates if no machine is assigned. Select a machine name with the cursor keys and confirm it with Enter. This assignment is absolutely necessary for the production of some project types. Moreover, on selection of a part project in functions which are machine-related (e.g. automatic operation), only the projects which are assigned to the concrete or no machine are offered.

F4

TC assignment

All tool data blocks assignable to the selected project (i.e. projects of the type TC) are listed. Select the wanted project with the cursor keys and confirm with Enter.

F5

ZPO assignment

All zero shift data blocks assignable to the selected project (i.e. projects of the type ZPO) are listed. Select the wanted project with the cursor keys and confirm with Enter.

F6

Offset mask

The offset file consists of a number of zero offset and tool offset data The ASCII editor is used to produce the file. Each offset value must stand closed in one line of the file.

▶ F1

Options

Select „Comment“ for entry of project comments.
With „Password YES“ password protection for the actual project is enabled.

▶ F2

ISO assignment

All ISO projects assignable (without assignment) to the selected project are listed. Select the wanted projects with the cursor keys and select in each case with Sel. Confirm the total selection subsequently with Enter.

5.3 Part project programming

Mit diesem Menüpunkt werden ausschließlich abarbeitbare DIN-Programme erstellt bzw. korrigiert. Die Bedienung ist identisch zur ‘Projekt Programmierung’.

5.4 TC input

Tool correction data can be created or edited in this menue item.
The operation is analogous to the "part programming", however some softkeys are not assigned.

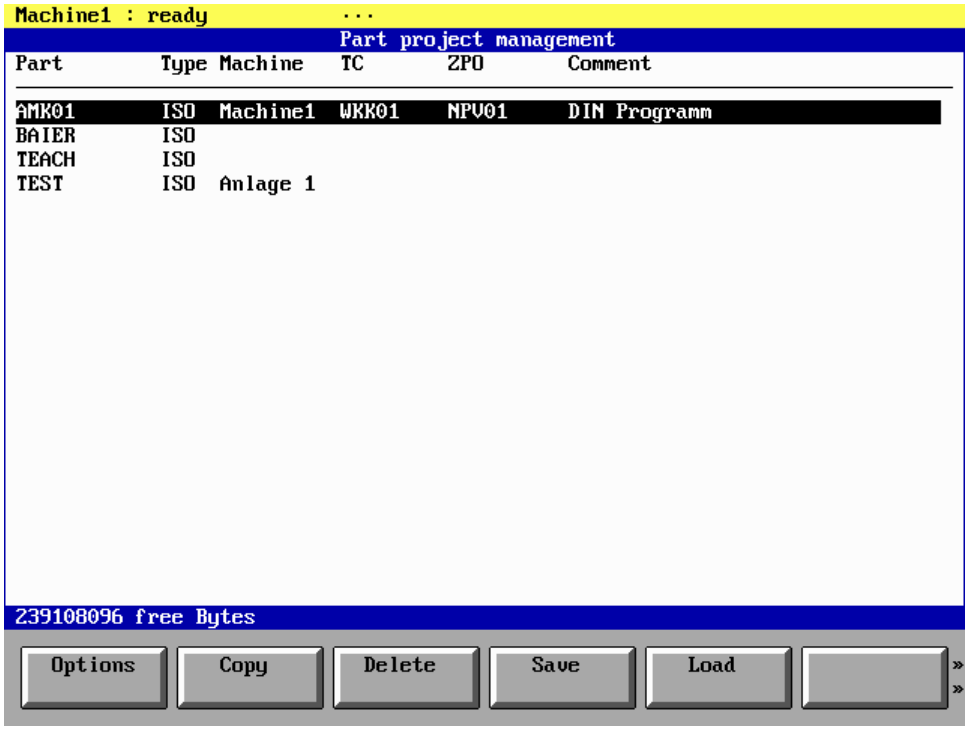
5.5 ZPO input

This menue items serves for creating and editing of Zero Point Offset data. The operation can be done in the same way as in the "part programming", however some softkeys are not assigned.

5.6 Linking programming

Linking programs can be created or edited with the same editior as in the "part programming"

5.7 Part-project-management



This menu item serves for management of the data produced in the part programming item. The identical display is used for this.

All functions described below always refer to the part selected with the cursor keys ↓ or ↑.

F1 **Options**

In diesem Bedienpunkt können die Optionen ‘Info’ und ‘Paßwort’ des Projektes verändert werden.

F2 **Copy**

Copy:
to:

A new part name must be stated. After confirmation with Enter, a copy of the part is created under a new name. The entry can be exited with ▲ without copying.

F3

Delete

All data of the part project are deleted. As a protection against faulty operation, the deletion must be confirmed once again. If the button "complete" is choosen, all assigned TC, ZPO and DIN projects are deleted, but only if they are not assigned to another project.

F4

Save

A complete copy of all data of the project is created on the backup medium. The copy receives the name of the original. The assignments could be stored by confirming each one or saved as a complete file without query.

F5

Load

All parts present on the backup medium are listed. Select one with the cursor keys and confirm with Enter. Thus the complete part is loaded and is available for machining.

You can choose if you want to confirm each single assignment or if a complete backup should be done.

▶ F7

Serial send

The file is transmitted through the set serial interface.

▶ F8

Serial receive

After entry of the destination name, the file received through the set serial interface is filed under the stated name.

5.8 Verwaltung von WZK / NPV / Verkettungen und Teile-Projekten

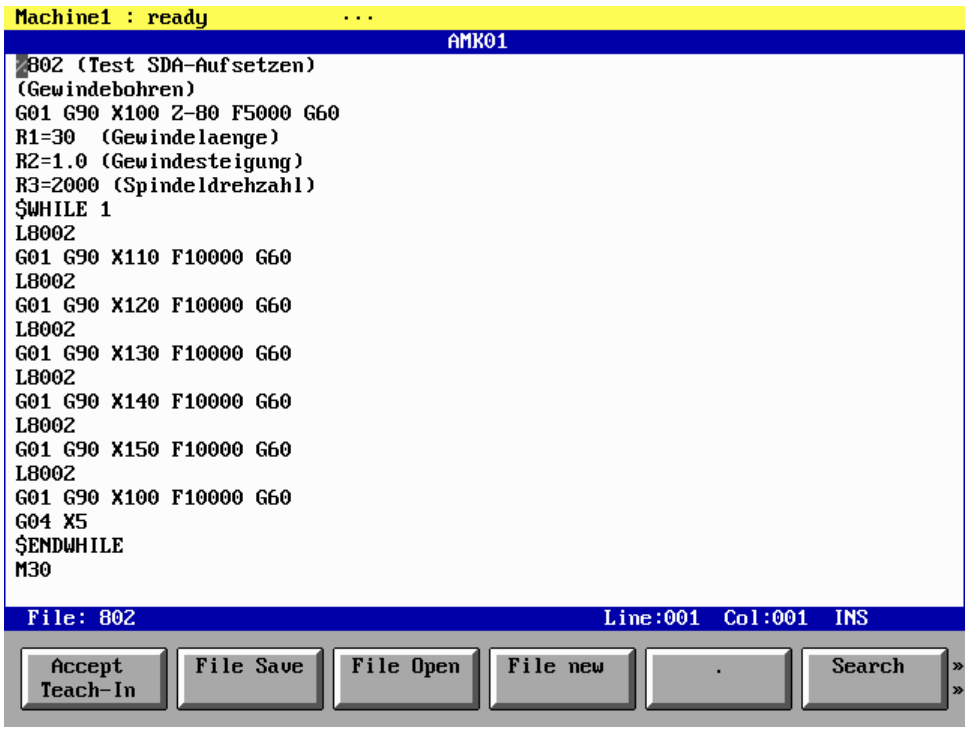
Analog zur Bedienung im Punkt ‘Projekte Verwaltung’ können in diesen Menüpunkten die unter -Eingabe erstellten Projekte verwaltet werden. Die Softkeys und die damit verbundenen Möglichkeiten entsprechen der "Projekt Verwaltung".

6 ISO programming

The NC control system is able to process commands according to ISO 66025 whereby compared with the extent specified in the ISO, language extensions with regard to parameter calculation, the use of arithmetical operations and control blocks for implementing jumps, counting and condition loops are implemented.

The complete description of the AZ-MC1 is available in the document : „CNC-Programming Manual“

This input item serves for the direct generation of ISO programs without the previous production of a project. The ASCII editor is used to enter the program. Note that file names comprise only numerical characters (numbers 0...9) and may not start with a zero.



6.1.1 Teach-In

It is possible to generate position values in the ISO input mode, by teach-in from the actual position of a NC machine. The following operating sequence is required for this:

1. Input of a NC block including the wanted axes e.g.: G01 X Z F28000
2. Selection of the machine operating level (on-line mode) with Data
3. Selection of the destination NC (machine for which the program is written; is necessary only for multi-machine operation)
4. Travel of the machine to the position to be taken over
5. Return into the programming level (off-line mode) with the Data key
6. Transfer of the actual position by pressing F1 ; the actual positions are written into the programm; e.g. G01 X358.3 Z100 F28000

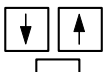
7 Zero-offset- and Tool-correction

7.1 Definition of tool data blocks

Tool length	Length of the tool
Tool radius	Size of the tool radius
Offset	Axis-related offset of the tool center point in relation to the clamping point
Max. WZ-Tool life	Maximum possible life of the tool
Tool life limit	Life of the tool after which a warning should be signalled to the operator
T -No	Concrete physical tool assigned to the data block
alternative-WZ	Number of the tool (tool block) which can serve as alternative tool for this
act. WZ-Tool life	Current value of the tool usage


with

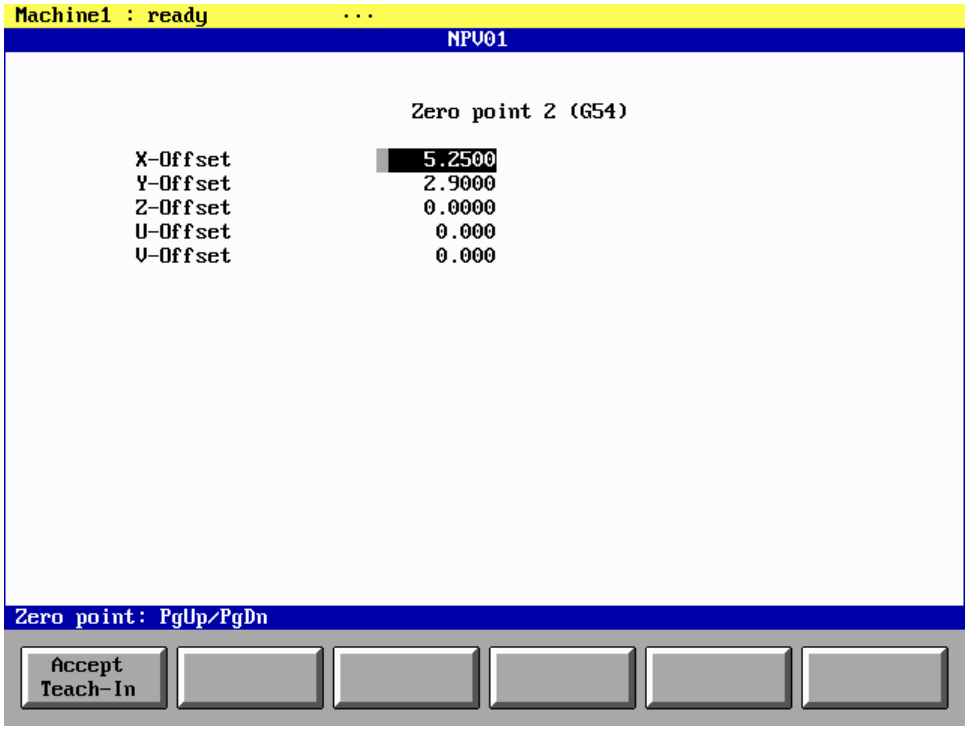
The data consist of several blocks (1...40), between which it is possible to leaf this keys.

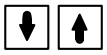

in 

The cursor keys serve for selecting a tool element. The value can be entered the element on which the cursor bar is standing.

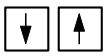
You exit the menu item with the ESC-key.

7.2 Definition of zero-point-offsets




with

The data consist of several blocks (1...7), between which it is possible to leaf this keys.


The cursor keys serve for selecting a tool element. The value can be entered in the element on which the cursor bar is standing.

Der aktuelle Istwert der selektierten Achse wird übernommen.

You exit the menu item with the ESC-key.

8 Display of error messages

If errors occur in the machine, these are sent to the OP. For the operator, this error state is immediately visible in the status line. The HELP key must be actuated to visualize the concrete error messages of the selected machine. In this way all (max. 4) stored error messages are accessible by scrolling.

Reset

All error messages of the selected machine are deleted again only by actuating this key.

9 Appendix A: Use of PC-keyboard for operating

OP keys	PC keys
Reset	F8 or ALT-3
I	F12 or ALT-1
0	F11 or ALT-2
▲	ESC
F1 ... ▶ + F6 (F12)	F1...F6
▶	F7
Data	F9 or ALT-M
Panel	ALT-5
Disp	ALT-6
Corr	ALT-K
Help	F10
Enter	ENTER
Del	DEL
Ins	INS
Sel	Space bar
⇑	TAB or PAGE DOWN
⇓	SHIFT-TAB or PAGE UP
CTRL	CTRL

10 Appendix B: Text editor operation

The extensive functionality of the editor can be utilized only with a standard PC keyboard. Therefore the following description also refers to OP and PC. Only all the functions which can be selected by keys are possible in the OP.

OP key	PC key	Function
Cursor control commands:		
→	RIGHT	Cursor one position to the right
←	LEFT	Cursor one position to the left
↑	UP	Cursor one position (line) up
↓	DOWN	Cursor one position (line) down
	PAGE UP	Cursor one page up
	PAGE DOWN	Cursor one page down
	HOME	Cursor to the line start (text start in the line)
	END	Cursor to the last character in the line
	TAB	Cursor to the next tabulator position to the right
	SHIFT-TAB	Cursor to the next tabulator position to the left
	CTRL-RIGHT	Cursor to next word
	CTRL-LEFT	Cursor to previous word
	CTRL-PAGE UP	Cursor to file start (first line)
	CTRL-PAGE DOWN	Cursor to file end (last line)
With the SHIFT key pressed, the cursor control commands (except for TAB) have the same functions and the skipped text is marked simultaneously.		
Input commands:		
ASCII characters	ASCII characters	Insert: The character is inserted into the text at the cursor position. Overwrite: The character at the cursor position is overwritten with a new character.
Enter	ENTER	A line break is inserted at the cursor position.
F1	F1	The actual position of the active NC is inserted.
▶ + F4	F7 -> F4	Select ASCII table and insert character after Enter
▶ + F5	F7 -> F5	Select mathematical computer.

OP key	PC key	Function
		Commands for inserting and deleting:
Del	DEL	The character at the cursor position or the marked block is deleted.
	BS	The character to the left of the cursor position is deleted.
	CTRL-Y	The cursor line is deleted and copied into the clipboard.
Ins	INS	The insert mode changes (Insert - Overwrite)
	CTRL-INS	The marked block is copied into the clipboard.
	SHIFT-INS	The contents of the clipboard are inserted at the current cursor position. If a block is marked, this is previously deleted, i.e. the marked block is replaced.
		Commands for searching and replacing:
F6	F6	Select search: Correction of the search text; conclusion by ENTER
		Commands for file access:
F2	F2	Storage of the file: Entry/correction of the file name; conclusion by ENTER
F3	F3	Opening the file: Selection of file with the cursor keys; conclusion by ENTER
F4	F4	Create new file
▶ + F1	F7 -> F1	Insert other file completely: Select file with the cursor keys; conclusion by ENTER
▶ + F2	F7 -> F2	Print current file

11 Impressum

Title **AMKASYN NC Operating**

Objective **Description of the NC Operation**

Part-Number **27880**

History

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To assure a fast and accurate response to solve customer problems we ask for your cooperation in providing us with the following information:

- Nameplate data
- Software version
- System configuration and application
- Description of problem and presumed cause of failure
- Diagnostic message (error code)

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