*Typ3 osa*

# Tool Management – Parameterization Configuration

**Edition**

# 103

**BOSCH**

**Automation**

*Typ3 osa*

# Tool Management – Parameterization Configuration

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# Contents

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# 1    Safety instructions

★    Read the present manual before changing the standard settings of the Typ3 tool data base or the operator interface of the Typ3 tool management system.

★    Store this documentation in a place to which all users have access at all times.

## 1.1    Proper use

This documentation contains information required for the proper use of the control unit. For reasons of clarity, however, it cannot contain all details about all possible combinations of functions. Likewise, as the control unit is usually part of a larger installation or system, it is impossible to consider every conceivable case of integration or operation.

The Typ3 osa is used to

●    activate feed drives, spindles and auxiliary axes of a machine tool via SERCOS interface for the purpose of guiding a processing tool along a programmed path to machine a workpiece (CNC). Furthermore, a PLC is required with appropriate I/O components which – in communication with the actual CNC – controls the machine processing cycles holistically and acts as a technical safety monitor.

●    program contours and the machining technology (path feedrate, spindle speed, tool change) of a workpiece.

Any other application is deemed improper use!

The product described

●    has been developed, manufactured, tested and documented in compliance with the safety standards. This product poses no danger to persons or property if it is used in accordance with the handling regulations and safety notes prescribed for its configuration, installation and proper operation.

●    complies with the requirements of

●    the EMC Directives (89/336/EEC, 93/68/EEC and 93/44/EEC)

●    the Low-Voltage Directive (73/23/EEC)

●    the harmonized standards EN 50081-2 and EN 50082-2

●    is designed for operation in industrial environments (emission class A), i.e.

●    no direct connection to public low-voltage power supply,

●    connection to the medium- or high-voltage system via a transformer.

In residential environments, in trade and commerce as well as small enterprises class A equipment may only be used if it does not inadmissibly interfere with other equipment.

☞    **This is a class A device which may cause radio interference in residential environments. In this case, the operator may be required to take suitable countermeasures and to bear the cost of the same.**

The faultless, safe functioning of the product presupposes proper transport, storage, erection and installation as well as careful operation.

## 1.2    Qualified personnel

The requirements as to qualified personnel depend on the qualification profiles described by ZVEI (central association of the electrical industry) and VDMA (association of German machine and plant builders) in:
**Weiterbildung in der Automatisierungstechnik**
**edited by: ZVEI and VDMA**
**MaschinenbauVerlag**
**Postfach 71 08 64**
**D-60498 Frankfurt**.

The present manual is designed for

- NC project engineers.

These persons need special knowledge of

- the structure and adjustment of the internal Typ3 tool data base and
- the configuration and adjustment of the operator interface of the Typ3 tool management system.

Programming, start and operation as well as the modification of programs or program parameters may only be performed by properly trained personnel! This personnel must be able to judge potential hazards arising from programming, program changes and in general from the mechanical, electrical, or electronic equipment.

Interventions in the hardware and software of our products, unless described otherwise in this manual, are reserved to our specialized personnel.

Tampering with the hardware or software, ignoring warning signs attached to the components, or non-compliance with the warning notes given in this manual may result in serious bodily injury or material damage.

Only electrotechnicians as recognized under VDE 1000-10 who are familiar with the contents of this manual may install and service the products described.

Such personnel are

- those who, being well trained and experienced in their field and familiar with the relevant standards, are able to analyze the work to be carried out and recognize any hazards.
- those who have acquired the same amount of expert knowledge through years of experience that would normally be acquired through formal technical training.

Please note our comprehensive range of training courses.
Our training center will be pleased to provide you with further information, telephone: +49 (0) 6062 78-258.

## 1.3        Safety markings on products

Warning of dangerous electrical voltage!

Warning of danger caused by batteries!

Components sensitive to electrostatic discharge!

Warning of hazardous light emissions (optical fiber cable emitters)

Disconnect from mains before opening!

Pin for connecting PE conductor only!

Connection of shield conductor only

## 1.4    Safety instructions in this manual

**DANGEROUS ELECTRICAL VOLTAGE**
This symbol is used to warn of a **dangerous electrical voltage.** Insuffi-
cient or lacking compliance with these instructions may result in **personal
injury.**

**DANGER**
This symbol is used wherever insufficient or lacking compliance with in-
structions may result in **personal injury**.

**CAUTION**
This symbol is used wherever insufficient or lacking compliance with in-
structions may result in **damage to equipment or data files**.

☞    This symbol is used to draw the user's attention to special circumstances.

★    This symbol is used if user activities are required.

## 1.5        Safety instructions concerning the product described

**DANGER**
**Retrofits or modifications may adversely affect the safety of the products described!**

**The consequences may include severe injuries, damage to equipment, or environmental hazards. Possible retrofits or modifications to the system using third-party equipment therefore have to be approved by Bosch.**

**DANGER**
**Danger of life through inadequate EMERGENCY-STOP devices!**
**EMERGENCY-STOP devices must be active and within reach in all system modes. Releasing an EMERGENCY-STOP device must not result in an uncontrolled restart of the system!**
**First check the EMERGENCY-STOP circuit, then switch the system on!**

**DANGER**
**Incorrect or undesired axis movement!**
**First, new programs should be tested carefully without axis movement! For this purpose, the control offers the possibility of inhibiting axis movements and/or auxiliary function outputs by appropriate softkeys in the "automatic" group operating mode.**

**DANGEROUS ELECTRICAL VOLTAGE**
**Unless described otherwise, maintenance works must be performed on inactive systems! The system must be protected against unauthorized or accidental reclosing.**

**Measuring or test activities on the live system are reserved to qualified electrical personnel!**

**DANGER**
**Tool or axis movements!**
**Feed and spindle motors generate very powerful mechanical forces and can accelerate very quickly due to their high dynamics.**
- **Always stay outside the danger area of the machine when it is running!**
- **Do not ever deactivate the safety-relevant functions of the unit!**
- **Report any malfunction of the unit to your servicing and repairs department immediately!**

**DANGER**
**Getting caught by moving parts of machinery!**
**During careless handling of machines with moving parts, clothes or long hair may get caught in the mechanics, pulling operators into the machine!**

- **Wear a hair net**
- **Wear a protective suit**
- **Take off protective gloves before working near moving parts**
- **Take off any jewelry and wristwatches**

**DANGER**
**Remember that chippings may be cast out during operation of the machine!**
**These may cause eye injuries and burns.**

- **Wear protective goggles**
- **Wear a protective suit**

**DANGER**
**Sharp edges on workpieces and tools!**
- **Wear protective gloves**

**CAUTION**
**Use only spare / replacement parts approved by Bosch!**

**CAUTION**
**Observe all precautions for ESD protection when handling modules and components! Avoid electrostatic discharge!**

The following protective measures must be observed for modules and components sensitive to electrostatic discharge (ESD)!

- Personnel responsible for storage, transport, and handling must have training in ESD protection.

- ESD-sensitive components must be stored and transported in the prescribed protective packaging.

- ESD-sensitive components may only be handled at special ESD-workplaces.

- Personnel, working surfaces, as well as all equipment and tools which may come into contact with ESD-sensitive components must have the same potential (e.g. by grounding).

- Wear an approved grounding bracelet. The grounding bracelet must be connected with the working surface through a cable with an integrated 1 M$\Omega$ resistor.

- ESD-sensitive components may by no means come into contact with chargeable objects, including most plastic materials.

- When ESD-sensitive components are installed in or removed from equipment, the equipment must be de-energized.

## 1.6        Documentation, software release and trademarks

**Documentation**

The present manual provides information on

- the structure and adjustment of the internal Typ3 tool data base and
- the configuration and adjustment of the operator interface of the Typ3 tool management system.

Overview of available documentation on Typ3 osa:

| Overview of available documentation | Part no. | |
|---|---|---|
| | German | English |
| Interface conditions<br>for project engineering and maintenance | 1070 073 704 | 1070 073 736 |
| Operating instructions<br>Standard operator interface | 1070 073 726 | 1070 073 739 |
| Operating instructions – Diagnostics Tools | 1070 073 779 | 1070 073 780 |
| DIN programming instructions<br>for programming to DIN 66025 | 1070 073 725 | 1070 073 738 |
| CPL programming instructions | 1070 073 727 | 1070 073 740 |
| ICL700 system description<br>Program structure of the integrated PLC | 1070 073 706 | 1070 073 737 |
| ICL700 project planning manual<br>Software interfaces and CNC interface signals<br>of the integrated PLC | 1070 073 728 | 1070 073 741 |
| MACODA<br>Operation and configuration of the machine<br>parameters | 1070 073 705 | 1070 073 742 |
| Tool Management – Parameterization | 1070 073 782 | 1070 073 793 |
| Software PLC<br>Development environment for Windows NT | 1070 073 783 | 1070 073 792 |
| Measuring cycles for<br>touch-trigger switching probes | 1070 073 788 | 1070 073 789 |
| Universal milling cycles | – | 1070 073 795 |

**Version**

☞ **This manual refers to the following product version:**
**Software:          V5.1.x and higher**

☞ **The current release number of the individual software modules can be viewed by selecting the "Control-Diagnostics" softkey in the "Diagnostics" group operating mode.**

☞ **The software version of Windows95 or WindowsNT may be displayed as follows:**
**1. Click with right mouse key on the "My Computer" icon on your desktop**
**2. Select menu item "Properties".**

**Modifications**

Modifications in the present manual as compared to the previous edition are marked by black vertical bars in the margin.

This symbol will be used in figures in order to draw your attention to changes.

**Trademarks**

All trademarks of software installed on Bosch products upon delivery are the property of the respective manufacturer.

Upon delivery, all installed software is copyright-protected. The software may only be reproduced with the approval of Bosch or in accordance with the license agreement of the respective manufacturer.

MS-DOS® and Windows™ are registered trademarks of Microsoft® Corporation.

SERCOS interface™ is a registered trademark of Interessengemeinschaft SERCOS interface e.V.

# 2    Basic features

## 2.1    Overview of the functional packages

The Typ3 osa provides you with comprehensive functional packages for developing your machine-specific tool management system:

- Tool data base
- Operator interface
- Filter for data base queries
- ASCII export/import of tool data
- Interfaces for communication with the PLC

☞ **In order to implement a tool management system, a number of PLC routines must be used in addition to the functions described in the present manual. The planning engineer of the tool management system will be responsible for the functionality, programming, linking, and testing of these functions.**

## 2.1.1    Tool data base

The tool data base can be compared to a container in which the required tool data can be stored in a structured manner.
The data base consists of individual records with 49 fields each:

| **Record 1** | | | | |
|---|---|---|---|---|
| Field 1 | Field 2 | Field 3 | ... | Field 49 |

| **Record 2** | | | | |
|---|---|---|---|---|
| Field 1 | Field 2 | Field 3 | ... | Field 49 |

| **Record 3** | | | | |
|---|---|---|---|---|
| Field 1 | Field 2 | Field 3 | ... | Field 49 |

.
.

| **Record n** | | | | |
|---|---|---|---|---|
| Field 1 | Field 2 | Field 3 | ... | Field 49 |

Internal field structure of a record:

| Field | Designation | Data type | Note |
|---|---|---|---|
| 1 | Sector | Short | no access |
| 2 | Location | Short | no access |
| 3 | query_int1 | Integer | |
| 4 | query_int1 | Integer | |
| 5 | query_int1 | Integer | |
| 6 | query_int1 | Integer | |
| 7 | query_bitfield | Integer | |
| 8 | query_string | String | max. 31 characters |
| 9 to 48 | data_int | Integer | |
| 49 | data_string | String | max. 31 characters |

A record is clearly defined by the two fields "Sector" and "Location".

A single record always corresponds to a location which can accommodate a tool. For example, these may be special locations within the machine (e.g. spindle, gripper, loading location, unloading location) or in a tool magazine. When tools are inserted in locations or transferred to other locations, this process will cause the relevant tool data to be copied to the records concerned.

The number of records to be provided by Typ3 osa when the data base has been re-initialized can be configured, just like the display and input formats. For more information concerning the adjustment of the data base, please refer to section 4.

## 2.1.2    Operator interface

The standard operator interface for tool management available in Typ3 osa can be completely configured.

For structuring the operating dialog, 6 softkey bars are available. Every softkey bar can be assigned max. 8 softkeys.
For each softkey, the softkey type (e.g. normal SK, function softkey, radio softkey) and the function triggered can be parameterized. An example is given section 5.3.

Furthermore, screen displays, such as the tool list, dialog boxes, PLC data displays or machine diagnostics, can be tailored to your specific needs.

☞ **You may call up the tool management operator interface by selecting the TOOL SET-UP softkey in the MANUAL GOM.**
**For more information on the standard operator interface, please refer to the "Operating instructions, standard operator interface" manual.**

## 2.1.3    Filter for data base query

By specifying filters, you may search the data base for certain field contents. The record will be considered in this type of query only if the contents of the specified field match the current filter condition. Thus, for example, the display may be limited to those records which meet a certain filter condition.

Filters can be applied to certain fields within the data base, which are referred to as "Query" fields.
With respect to the general functionality of the Typ3 data base, the Query fields are defined as fields 1 to 8. The other fields are called "Data" fields. Searching these fields for certain values is not possible.



- If you implement a data base query **by the PLC** in your application, the filters can be applied to **all Query fields** (not described any further in the present documentation).
- If you use the filters available in the **operator interface** for your application, data base queries can be performed for **Query fields 1, 3, and 7**.

All available filter functions of the operator interface are initiated by softkeys. For this purpose, you simply have to parameterize the desired softkey accordingly (cf. section 3.15.1 from page 3–27 and section 6).

### 2.1.4 ASCII export/import of tool data

The contents of the data base can be output to an ASCII file. Similarly, the contents of an appropriately structured ASCII file can be loaded into the data base.

Thus, the tool data can be easily backed up or restored, processed on other computer platforms or even automatically generated and transmitted to the control unit.

The export and import functions are triggered by softkeys. For this purpose, you simply have to parameterize the desired softkey accordingly (cf. page 3–29, `<P1>=30` and `31`).

### 2.1.5 Interfaces for communication with the PLC

The operator interface normally uses flags for communication with the PLC. The flag addresses can be parameterized.

For example, when the user initiates a loading or unloading request, the operator interface enters the unloading or loading location number and the required sector/location number in corresponding flag addresses. This data is used by the PLC for transferring a tool from a certain location to the unloading location, or from the loading location to a magazine. For this purpose, it monitors the flags concerned and invokes suitable program routines for tool handling in the event of flag changes.

Interfaces are available for the following functions:

- Loading and unloading processes:
  Transmits the loading or unloading location number and the sector/location number. The PLC acknowledges this process by replacing the loading and unloading flags with the value "0".
  For a description of the parameters, refer to section 7.
- Machine diagnostics:
  Transmits the number (1–32) of a (diagnostics) function to be performed (for a definition of numbers, refer to section 2.3.4 from page 2–7).
  Feedback of all function statuses by the PLC to a flag (4 bytes, 1 bit per function).
  For parameters, refer to section 3.17 from page 3–37.
- Data displays:
  The operator interface can show any PLC data in the Automatic GOM and the Manual GOM for information purposes.
  For parameter setting, refer to section 3.16 from page 3–34 and section 3.18 from page 3–39.
- Inhibiting specific softkey functions:
  The operator interface can inhibit and enable certain softkey functions at any time at the request of the PLC. To inhibit these functions, the PLC only has to set the appropriate bit within the relevant flag.
  This functionality may be used globally or relative to a selected record if the operator interface informs the PLC in a flag which record (sector/location) is currently being processed.
  For parameter setting, refer to section 3.14 on page 3–24 ff.

## 2.2    Configuration files

---

☞ **CAUTION**
**Danger of malfunctions and damages!**
**Incorrect configuration data can lead to an incorrect or incomplete screen display and an unexpected or incorrect response of the tool management system. Dangerous situations cannot be ruled out!**
**You should not edit the configuration files for tool management unless you are familiar with the functional principle of all system groups and parameters!**

---

The scope and functional principle of all functional packages can largely be parameterized in the "tooldiag.xxx", "toolprms.xxx" and "knadbddl.dat" configuration files.

☞ **The file extension "xxx" corresponds to the country code for language change-over; for details, refer to section 2.4 from page 2–9.**

**"tooldiag.xxx"**

Contains configuration data for machine diagnostics
- for the screen structure, and
- for possible function calls.

☞ **You may call up machine diagnostics in the MANUAL GOM by selecting the softkey sequence TOOL SET-UP ▸ DIAGNOSTICS MACHINE.**

**"toolprms.xxx"**

Contains configuration data
- for creating and building up the tool data base,
- for parameterizing the entire operator interface, and
- for data exchange with the PLC.

**"knadbddl.dat"**

The line "FILE=ToolTab_1/VOL=" specifies the number of records provided during initialization of the tool data base by Typ3 osa. For more information on this file and the configuration of the data base size, refer to section 4.2, page 4–1.

---

☞ **CAUTION**
**Records of the tool data base will be deleted!**
**If the "knadbddl.log" file exists in the root directory, this file must not be deleted!**
**For more information on this file, refer to section 4.2, page 4–1.**

---

**Preparations for changing the "tooldiag.xxx" and "toolprms.xxx" configuration files**

The control unit always searches directories for these configuration files in the following order:

- root directory
- "User-FEPROM" directory
- "FEPROM" directory

The control unit uses the data it finds first!

★ If the configuration files are contained **in the root directory**, you should check whether the "User-FEPROM" directory contains back-up copies of these files. Otherwise, you should copy the "tooldiag.xxx" and "toolprms.xxx" files to the "User-FEPROM" directory.
Now the current data has been backed up.

★ If the configuration files **only** exist **in the "User-FEPROM" directory**, you should copy the "tooldiag.xxx" and "toolprms.xxx" files from this directory to the root directory.
Make sure that no part programs are currently being executed. Exit the Typ3 operator interface and start it again.
By this procedure, you make sure that Typ3 osa uses the configuration files stored in the root directory of the control unit.

★ If the "tooldiag.xxx" and "toolprms.xxx" files do **not** exist **in the root directory or in the "User-FEPROM" directory**, you should copy these files from the "FEPROM" directory to the root directory.
Make sure that no part programs are currently being executed. Exit the Typ3 operator interface and start it again.
By this procedure, you make sure that Typ3 osa uses the configuration files stored in the root directory of the control unit.

☞ **The following descriptions are based on the assumption that the versions of the "tooldiag.xxx" and "toolprms.xxx" configuration files which are actually used are contained in the root directory of the control unit.**

## 2.3        Structure of the configuration files

All configuration files are pure ASCII files and can be changed using an **ASCII editor** or the **NC editor**.

---

**CAUTION**
**Unsuitable editors will change the data contents!**
**Standard word processors usually do not save data as pure ASCII files, they rather use additional codes for formatting texts or even a completely individual data structure.**
**Configuration files changed by such programs cannot be interpreted by the control unit. Possible consequences include an incorrect or incomplete screen display or an unexpected or incorrect response of the tool management system. Dangerous situations cannot be ruled out!**

**You should only use an ASCII editor (e.g. the internal NC editor) for viewing/changing configuration files!**

---

### 2.3.1      Line end and line length

**All lines** of all configuration files used

- have to be concluded with the ASCII character `<cr>` (ASCII value: 13 dec.) and/or `<lf>` (ASCII value: 10 dec.) **and**
- may have a maximum length of 120 characters (including `<cr>` and `<lf>`).

### 2.3.2      Comment lines

These lines are marked by the ";" character at the beginning of the line and will be ignored by the control unit.
Such lines may contain explanations or other information:

```
; This is a comment line
```

☞ **No comments are permitted in data lines.**

## 2.3.3 Data lines of the "toolprms.xxx" file

Lines starting with a numerical value are interpreted as data lines by the control unit.
Data lines always consist of 7 individual parameters (6 integer values and 1 string) separated by at least one blank (ASCII value: 20 dec.).

<u>Syntax of a data line:</u>

`<P0> <P1> <P2> <P3> <P4> <P5> <P6>`

`<P0>:`             Group number (format: integer). The group number tells the control unit how to interpret `<P1>` to `<P5>`.

`<P1>` to `<P5>:`   Integer parameters. Their meaning depends on the group number (cf. section 3).

`<P6>:`             String. Its meaning depends on the group number (cf. section 3).

● Within a file, the groups may be entered in any sequence.
  A group number may also exist several times. In this case, the group that was programmed last (with respect to its position within the file) will be active.

● The following applies to the syntax in `<P6>`:

   ● Empty strings must be marked by the "." (full stop) sign.

   ● Blanks and inverted commas are permitted, but no "umlauts".

   ● `<P6>` may contain ASCII strings for formatting:
      `\n`    (=new line).

## 2.3.4 Data lines of the "tooldiag.xxx" file

Lines starting with the "C" or "F" character are interpreted as data lines by the control unit. These data lines specify

● the way in which the screen display is structured for the DIAGNOSTICS MACHINE (MANUAL GOM, softkey sequence TOOL SET-UP ▶ DIAGNOSTICS MACHINE) softkey, and

● the PLC functions that can be invoked in this screen display.

The structure of the screen display (from top to bottom) corresponds to the sequence of data lines within the file.

<u>Syntax of a data line:</u>

`<Id>,<Text>`

`<Id>:`   This identification is used to inform the control unit of how the data line is to be interpreted:

   `C`            displays the string contained in `<Text>` on the screen. If `<Text>` is not specified, the control unit will display an empty line.

   `F01 ... F32`  Definition for calling up a (diagnostics) function (max. 32). The string contained in `<Text>` is shown on the screen. `<Text>` must be specified. If you select such a line later on and activate the EXECUTE FUNCTION softkey, the Typ3 osa will open the "Please confirm" window. If you confirm, the control unit will transmit the specified number

of the (diagnostics) function via a flag to the PLC (cf. page 3–37).

`<Text>`: String without "umlauts". If the string is programmed in connection with the identification `F01` to `F32` (cf. `<Id>`), the string may contain **one** sequence of "#" characters. In the course of the configuration process, this sequence will be used as a wildcard character for representing a logic condition later on:

If the logic condition of the corresponding (diagnostics) function is TRUE, a corresponding sequence of the "*" character will be displayed.

If it is FALSE, blanks will be displayed.

Also refer to section 3.17, page 3–37.

**Example (extract from "tooldiag.044"):**

```
.
C,Open/close gripper
F11,Open gripper    is open    >###< Reset
F12,Close gripper   is closed >###<
.
```

- In the corresponding line on the screen,
  `"Open/close gripper"` will be displayed.

- Definition of (diagnostics) functions no. 11 and 12. The next two lines on the screen show the texts

  `"Open gripper    is open    >###> Reset"`
  `"Close gripper   is closed >###>"`

  When the logic status of the (diagnostics) functions 11 and 12 is TRUE, the control unit displays the character string "***".

  The static text "Reset" is designed to inform the operator which status is active after a Reset.

Result ⟶

| A: Manual/Tool management/Diagnostics–Machine | | | |
|---|---|---|---|
| **Machine diagnostics** | | | |
| Name of diagnostics function | | | |
| **Retraction movement backward** | **retracted** | **>** | **< Reset** |
| Retraction movement forward | in front | >***< | |
| Tool changer up | is up | >***< | Reset |
| Tool changer down | is down | > | < |
| Swivel gripper clock–wise | is right | > | < Reset |
| Swivel gripper counter–clockwise | is left | >***< | |
| Open/close gripper | | | |
| Open gripper | is open | > | < Reset |
| Close gripper | is closed | >***< | |
| Clamp spindle charger | is clamped | >***< | Reset |
| Release spindle charger | is released | > | < |
| Clamp tool in change location | is clamped | >***< | Reset |
| Release tool in change location | is released | > | < |

| Execute Function | | | | Update | | |
|---|---|---|---|---|---|---|

## 2.4        Changing over languages

As a standard, the control unit uses the "tooldiag.data" and "toolprms.dat" configuration files. These files contain parameters which also define texts for the operator interface of the tool management system.

If the current language is changed over at the control unit (DIAGNOSTICS GOM, softkey sequence SET ▶ LANGUAGE), the texts of the operator interface for tool management will not be affected because the "tooldiag.dat" and "toolprms.dat" files only contain texts in a single language.

If language change-over is to act on the texts of the tool management operator interface, you should proceed as follows:

☞ **Changing the language for the tool management system cannot be reversed!**
**As soon as the control unit detects a language-dependent configuration file for the first time, it assumes complete conversion to language-dependent configuration files, and therefore stops searching configuration files with the "dat" extension!**
**If you do not need to change the language, you should not perform the following items!**

★ Create copies of the "tooldiag.dat" and "toolprms.dat" files for every supported language, naming the copies "tooldiag.xxx" and "toolprms.xxx" in the root directory of the control unit. The file extension "xxx" should be replaced by the country code of the desired language (e.g. German="049", English="044").

★ Translate the texts contained in the individual parameters and edit the files in the appropriate language. Then save the edited files in the root directory of the control unit.

★ Select the new language in DIAGNOSTICS GOM, softkey sequence SET ▶ LANGUAGE.

★ Activate tool management in the MANUAL GOM by selecting the TOOL SET-UP softkey. Typ3 osa will check whether the selected language has been changed since the last call of the tool management system. If this is the case, it reads the configuration files for the new language. If one of the necessary files does not exist, a fault message will be output.

★ When the new language has been selected, you should make back-up copies of all relevant configuration files in the "User-FEPROM" directory.

☞ **In order to release space in the user memory, the "tooldiag.dat" and "toolprms.dat" files may be deleted because they are no longer used by the control unit once the language has been changed.**

## 2.5        Activating/Deactivating development mode

Most changes to the "tooldiag.xxx" and "toolprms.xxx" configuration files can be immediately activated without a new control unit run-up if the development mode is active.

Thus, changes made to the operator interface or PLC communication can be easily checked in the configuration stage.

For this purpose, you first have to exit tool management (e.g. by changing the GOM) and then call it up again by selecting MANUAL GOM ▶ TOOL SET-UP.

☞ **Exceptions: Changes to groups 1 to 30 will never become active unless the control unit has run up again.**
**For a description of the procedure for changing, refer to section 4.3, page 4–4.**

**Activating development mode**

☞ **We recommend activating the development mode during the entire configuration stage of the tool management system. This will reduce the time required and simplify the procedure for checking changes.**

★ Proceed as follows:
1. Go to the root directory.
2. Load the "toolprms.xxx" file into the NC editor and set control parameter <P2> in group 0 to the value "1" (also refer to section 3.1, page 3–1). Save the "toolprms.xxx" file.
3. Make sure that no part programs are currently being executed. Exit the Typ3 operator interface and start it again.

Development mode is now active.

**Deactivating development mode**

☞ **We recommend deactivating the development mode once all configuration tasks for tool management have been completed.**

★ Proceed as follows:
1. Go to the root directory.
2. Load the "toolprms.xxx" file into the NC editor and set control parameter <P2> in group 0 to the value "0". Save the "toolprms.xxx" file.
3. Make sure that no part programs are currently being executed. Exit the Typ3 operator interface and start it again.

Development mode has now been deactivated. Any changes to the configuration file will not become active until the control unit has run up again or the operator interface has been restarted.

# 3     Description of all available groups

All groups described in this section and all their parameters are stored in the "toolprms.xxx" configuration file.
For a description of the general structure of the data lines, please refer to "Data lines of the toolprms.xxx file" on page 2–7.

☞ **Parameters you may change in a data line are marked by pointed brackets `<Px>`.**
**All other parameters must not be changed and must be accepted exactly as shown. This also applies to a full stop!**

## 3.1     Group 0 (control parameters)

Parameters in group 0 specify **when**

● the data base of the tool management system should be **re-initialized**

● the configuration files of the tool management should be **re-loaded**.

Syntax of the data line:

`0 <P1> <P2> 0 0 0 .`

`<P1>:`     Controls the creation of records in the tool data base.
Possible values:
0   for normal operation (default setting).
Records in the data base are not changed. If the tool data base has never been initialized before, the control unit creates records in accordance with the settings in groups 1 to 30.
6   for re-initializing the tool data base.
All records of the data base are first deleted. Then the control unit creates all records again in accordance with the settings made in groups 1 to 30.

☞ **Also note section 4.2 on page 4–1. There, you will find important information on how to set the maximum number of records!**

`<P2>:`     Controls loading of the configuration files.
Possible values:
0   for normal operation (default setting)
The configuration files are only loaded and evaluated when the control unit runs up, the Typ3 operator interface is started, or after a language change-over (cf. page 2–9).
1   for development mode.
The configuration files are read and evaluated whenever the tool management function (MANUAL GOM, softkey TOOL SET-UP) is called up.

☞ **In order to re-initialize the tool data base (`<P1>=6`), the Typ3 operator interface has to be started again. This also applies if parameter `<P2>=1.`**

```
                    ┌─────────────┐
                    │    Start     │
                    │   Run-up     │
                    └─────────────┘
                           │
                          ╱ ╲
                   "tooldiag.xxx"      no
                   and "toolprms.xxx" ────────┐
                   in the root direc-         │
                         tory?                ╱ ╲
                          ╲ ╱           "tooldiag.xxx"       no
                           │            and "toolprms.xxx" ──────┐
                         yes            in user                   │
                                        FEPROM?          ┌────────────────┐
                                          ╲ ╱            │ Use "tooldiag.xxx"│
                                           │             │ and "toolprms.xxx"│
                                          yes            │ from FEPROM?     │
                                                         └────────────────┘
```

**Group 0 <P1>**     **Group 0 <P2>**

- Group 0: <P1>>=0 ?
- Has the tool data base been initialized before?
- Re-initialize tool data base iaw groups 1 to 30.

- Group 0: <P2>>=0 ? (normal mode)
- Set flag for development mode
- **For flag query, cf. next figure**
- Set up operator interface of tool management. Initialize flags for PLC.

Load "tooldiag.xxx" and "toolprms.xxx"

End of run-up

*Flow chart: Functional principle of parameters in group 0*

Softkey
**TOOL SET-UP**
depressed or
Automatic GOM

**For flag set-
ting, cf. pre-
vious figure**

Flat for
development
mode set?

no

yes

Load configura-
tion files

**Group 0**
`<P2>`

Group 0:
`<P2>=0 ?`
(normal mode)

no

yes

Set flag for
development
mode

Set up operator
interface for
tool manage-
ment.
Initialize flags
for PLC.

**TOOL SET-UP**
dialog is started,
or Automatic GOM
is displayed

*Flow chart: Functional principle of flag for development mode*

## 3.2    Groups 1 to 30 (sector definitions and number of locations)

The parameters of groups 1 to 30 are used to define

- which sectors, and
- how many locations within each sector

shall be created.

For each sector to be created, you should program a complete data line to define the maximum usable number of records in the tool data base.

☞ **The maximum usable number of records is defined by an entry in the "knadbddl.dat" file. An attempt to create too many locations in groups 1 to 30 will display a fault message.**
**Please also note section 4.2 where additional important information on the definition of the number of records is given!**

Syntax of the data line:

`<P0> <P1> 0 0 0 0 <P6>`

`<P0>`:    Sector number (1 to 30).
Sector number 1 always has to be assigned to the "machine" area. This area contains all the locations required for loading/unloading a tool or in the course of a tool change (magazine ◀▶ spindle) (e.g. loading and unloading locations, grippers, spindles).

`<P1>`:    Number of locations in sector `<P0>`. For sector 1 (`<P0>=1`), a maximum of 20 locations should be spared because a maximum of 20 designations can be assigned to the locations in sector 1 (cf. section 3.3).

`<P6>`:    Designation of sector `<P0>`.

**Example:**

```
1  5 0 0 0 0 Machine
2 24 0 0 0 0 Magazine
```

Here, you have defined 2 sectors for taking up tools:

- Sector 1 (named "Machine") has a capacity of 5 locations,
- Sector 2 (named "Magazine") has a capacity of 24 locations



*Example: Configuration of sectors; number of sectors and locations in each sector.*

## 3.3 Groups 31 to 50 (designation of locations in sector 1)

The parameters of groups 31 to 50 are used to define

● how the first 20 locations in sector 1 are to be named.

The number of locations in sector 1 must have been defined in group 1. For every location in sector 1, one data line should be programmed.

Syntax of the data line:

```
<P0> 0 0 0 0 0 <P6>
```

<P0>: integer value "30" + location number in sector 1.
Values 31 to 50 may be used for <P0>.

<P6>: Designation of the location.

**Example:**

```
31 0 0 0 0 0 Spindle
32 0 0 0 0 0 Grp1
33 0 0 0 0 0 Grp2
34 0 0 0 0 0 Load
35 0 0 0 0 0 Unload
```

The names of 5 locations in sector 1 are defined.



*Example: Sector configuration; designation of locations in sector 1*

## 3.4    Groups 51 to 99 (field definitions of the tool data base)

In these groups, you define how the individual fields of the tool data base should be interpreted.

☞ **For the interpretation of the individual fields of the standard tool data base, refer to page 3–9.**

One record of the tool data base of Typ3 osa comprises 49 fields. Groups 51 to 99 are used to define for each of these 49 fields

- the data type of the information entered (string, integer, real)
- the display and input format of the field (maximum number of characters/ numbers, number of integer and decimal positions)
- whether or not negative numbers are permitted in this field.
- the permissible value range for entries into fields of the Integer or Real data type

Syntax of the data line:

`<P0> <P1> <P2> <P3> <P4> 0 <P6>`

`<P0>:`    integer value "50" + field number. For 49 fields, therefore, values 51 to 99 may be entered for `<P0>`.
For every field one data line *must* be programmed.

`<P1>:`    Data type of the information. Possible values:
     1   "string" type
     2   "integer" type
     3   "real" type (with 4 decimal positions).
       input values are internally stored as "input value * 10000" in the data base. Display as DM value/10000.

`<P2>:`    Defines how the field contents will be displayed later on at the operator interface of tool management, and how they can be input.
     If `<P1>=1`   (string):   `<P2>:`    maximum number of characters
     If `<P1>=2`   (integer): `<P2>:`    maximum number of digits
     If `<P1>=3`   (real):     `<P2>:`    number of integer positions

`<P3>:`    Purpose: as `<P2>`.
     If `<P1>=1`   (string):   `<P3>:`    no meaning
     If `<P1>=2`   (integer): `<P3>:`    no meaning
     If `<P1>=3`   (real):     `<P3>:`    number of decimal positions

`<P4>:`    Specifies whether negative numbers are permitted in this field
     0   only positive numbers permitted
     1   positive and negative numbers permitted

`<P6>:`    only for fields of the Integer or Real data type:
specifies the permissible value range for inputs. After an input, the specified value range is evaluated in dialog boxes which have been opened via a softkey with functions 5 or 7 (cf. page 3–27 ff.). Inputs beyond the permissible range are rejected. In this case, the system will open a dialog box in which the permissible value range is represented in the form entered in <P6>.
Syntax of `<P6>`: *<min.value>,<max. value>*
If no value range is to be defined, a dot "." must be programmed.

*Limitations*   ● Fields with numbers 2, 8 and 49 must be of data type "string".
                ● Fields with numbers 1 and 7 must be of data type "integer".
                ● The other fields may be either of the "integer" or of the "real" type.

**Examples** (the text in brackets must not be programmed in the data lines! It only serves as an explanation here!):

```
51 2 2 0 0 0 .   (1st field: integer, max. 2 digits, only positive numbers)
52 1 4 0 0 0 .   (2nd field: string, max. 4 characters)
53 2 8 0 0 0 .   (3rd field: integer, max. 8 digits, only positive numbers)
.
60 3 1 3 0 0 0,0.999  (10th field: real, 1 integer, 3 decimal positions,
.                            positive, value range: 0 to 0.999)
.
66 3 2 3 0 0 .   (16th field: real, 2 integer, 3 decimal positions, positive)
67 3 5 2 0 0 .   (17th field: real, 5 integer, 2 decimal positions, positive)
.
99 1 31 0 0 0 . (49th field: string, max. 31 characters)
```



*Example: Definition of fields in the tool data base*

**CAUTION**
**Inconsistencies between the fields of the tool data base and the operator interface are possible!**

**For displays, filtering data and when changing various data, the operator interface accesses the tool data base as set in the configuration.**
**Arbitrary changes in the configuration may prevent the tool management from operating properly.**

**For example, reference is made to fields defined with this function in the parameters for representing the tool list (cf. groups 101 to 109) and for configuring the objects in input dialog boxes (cf. groups 121 to 152).**
**If you change field definitions, you have to adjust these parameters accordingly.**

**After any changes in the configuration, you should therefore make sure that the data fields of the operator interface refer to the proper fields of the tool data base!**

Internally, the data base distinguishes between "Query" fields and "Data" fields (for a description, cf. section 2.1.3, page 2–2).

**Field definitions in the standard tool data base**
("–": field is not used in the standard tool data base):

Group number

Data type (1=string; 2=integer; 3=real)

Display and input format
| If data type=string: | max. number of characters |
| If data type=integer: | max. number of digits |
| If data type=real: | number of decimal positions |

Display and input format
If data type=real:           number of decimal positions
otherwise without meaning

0=only pos. numbers permitted; 1=pos. and neg. numbers permitted

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 51 | 2 | 2 | 0 | 0 | 0 | . | (1st field: Sector number) |
| 52 | 1 | 4 | 0 | 0 | 0 | . | (2nd field: Location number) |
| 53 | 2 | 8 | 0 | 0 | 0 | . | (3rd field: Tool number ) |
| 54 | 2 | 3 | 0 | 0 | 0 | . | (4th field: Duplo; = tool requiring two locations) |
| 55 | 2 | 8 | 0 | 0 | 0 | . | (5th field: – ) |
| 56 | 2 | 8 | 0 | 0 | 0 | . | (6th field: – ) |
| 57 | 2 | 10 | 0 | 0 | 0 | . | (7th field: Tool ID ) |
| 58 | 1 | 30 | 0 | 0 | 0 | . | (8th field: Tool name ) |
| 59 | 3 | 4 | 3 | 0 | 0 | . | (9th field: Tool length1 ) |
| 60 | 3 | 2 | 3 | 0 | 0 | . | (10th field: Length wear1 ) |
| 61 | 3 | 4 | 3 | 0 | 0 | . | (11th field: Tool radius1 ) |
| 62 | 3 | 2 | 3 | 0 | 0 | . | (12th field: Radius wear1 ) |
| 63 | 3 | 4 | 3 | 0 | 0 | . | (13th field: Tool length2 ) |
| 64 | 3 | 2 | 3 | 0 | 0 | . | (14th field: Length wear2 ) |
| 65 | 3 | 4 | 3 | 0 | 0 | . | (15th field: Tool radius2 ) |
| 66 | 3 | 2 | 3 | 0 | 0 | . | (16th field: Radius wear2) |
| 67 | 3 | 5 | 2 | 0 | 0 | . | (17th field: Tool life) |
| 68 | 3 | 5 | 2 | 0 | 0 | . | (18th field: Prewarning limit) |
| 69 | 2 | 6 | 0 | 0 | 0 | . | (19th field: Typ. speed ) |
| 70 | 2 | 6 | 0 | 0 | 0 | . | (20th field: Maximum speed ) |
| 71 | 3 | 5 | 1 | 0 | 0 | . | (21st field: Typ. feedrate ) |
| 72 | 2 | 2 | 0 | 0 | 0 | . | (22nd field: No. of tool blades ) |
| 73 | 3 | 4 | 2 | 0 | 0 | . | (23rd field: V/D setpoint; V/D = peripheral speed) |
| 74 | 3 | 4 | 2 | 0 | 0 | . | (24th field: V/D actual value ) |
| 75 | 3 | 4 | 2 | 0 | 0 | . | (25th field: V/D limit 1 ) |
| 76 | 3 | 4 | 2 | 0 | 0 | . | (26th field: V/D limit 2 ) |
| 77 | 3 | 4 | 2 | 0 | 0 | . | (27th field: – ) |
| 78 | 2 | 6 | 0 | 0 | 0 | . | (28th field: – ) |
| 79 | 2 | 6 | 0 | 0 | 0 | . | (29th field: – ) |
| 80 | 2 | 6 | 0 | 0 | 0 | . | (30th field: – ) |
| 81 | 2 | 6 | 0 | 0 | 0 | . | (31st field: – ) |
| 82 | 2 | 6 | 0 | 0 | 0 | . | (32nd field: – ) |
| 83 | 2 | 6 | 0 | 0 | 0 | . | (33rd field: – ) |
| 84 | 2 | 6 | 0 | 0 | 0 | . | (34th field: – ) |
| 85 | 2 | 6 | 0 | 0 | 0 | . | (35th field: – ) |
| 86 | 2 | 6 | 0 | 0 | 0 | . | (36th field: – ) |
| 87 | 2 | 6 | 0 | 0 | 0 | . | (37th field: – ) |
| 88 | 2 | 6 | 0 | 0 | 0 | . | (38th field: – ) |
| 89 | 2 | 6 | 0 | 0 | 0 | . | (39th field: – ) |
| 90 | 2 | 6 | 0 | 0 | 0 | . | (40th field: – ) |
| 91 | 2 | 6 | 0 | 0 | 0 | . | (41st field: – ) |
| 92 | 2 | 6 | 0 | 0 | 0 | . | (42nd field: – ) |
| 93 | 2 | 6 | 0 | 0 | 0 | . | (43rd field: – ) |
| 94 | 2 | 6 | 0 | 0 | 0 | . | (44th field: – ) |
| 95 | 2 | 6 | 0 | 0 | 0 | . | (45th field: – ) |
| 96 | 2 | 6 | 0 | 0 | 0 | . | (46th field: – ) |
| 97 | 2 | 6 | 0 | 0 | 0 | . | (47th field: – ) |
| 98 | 2 | 6 | 0 | 0 | 0 | . | (48th field: – ) |
| 99 | 1 | 31 | 0 | 0 | 0 | . | (49th field: – ) |

"Query" fields (rows 51–58)

"Data" fields (rows 59–99)

## 3.5       Groups 100 to 109 (Tool list display)

**Group 100**

The parameters in **group 100** are used to define

- the heading of the tool list display, and
- whether or not the tool list display will be automatically updated.

☞ **You may call up the tool list display in MANUAL GOM with the TOOL SET-UP softkey.**

Syntax of the data line:

```
100 <P1> 0 0 0 0 <P6>
```

<P1>:    Updates of the tool list display
         0: automatic updating
         1: manual updating
             (with softkey; cf. P1=3 on page 3–27).
<P6>:    Heading of the tool list display
         The text input is automatically supplemented by the name of the
         active sector (for the definition of the sector name, cf. page 3–4,
         parameter <P6>).

**Example:**

```
100  0 0 0 0 0 Tool list:
```

**Groups 101 to 109**

The parameters in **groups 101 to 109** are used to define

- the column headings
- the fields from the tool data base

to be displayed in the individual columns of the tool list display. A maximum of 9 columns can be defined. For every column, you may program a data line.

Syntax of the data line:

```
<P0> <P1> <P2> 0 0 0 <P6>
```

<P0>:    Integer value ”100”+column number. With max. 9 columns, there-
         fore, values 101 to 109 are possible in <P0>.
<P1>:    Field number in tool data base. The field contents are displayed in
         the defined column (possible values: 1 to 49; also cf. <P0> on page
         3–6).
<P2>:    Number of blanks behind defined column.
<P6>:    Heading of defined column (column legend).

**Example:**

```
101  2 1 0 0 0 Loc.
102  3 1 0 0 0 Tool no.
103  4 1 0 0 0 Dup
104  8 1 0 0 0 Name
105  9 1 0 0 0 Length1
106 11 1 0 0 0 Radius1
```

The result of this model configuration is shown in the following figure:

Title bar (dialog path) of the NC display window for the tool management function.
For a definition, cf. **group 250.**

Heading of the tool list display. Definition in **group 100**.

Data area showing current tool list. The data of all locations of the active sector will be displayed.

Number of locations of the active sector.
For the definition of sectors and locations, cf. **groups 1 to 30**.

Basic softkey level of the standard tool management.
For the definition, cf. **groups 251 to 258**.

| A: Manual/Tool management | | | | | | | |
|---|---|---|---|---|---|---|---|

Tool list: Magazine

| Loc. | Tool no. | Dup | Name | | Length1 | Radius1 |
|---|---|---|---|---|---|---|
| 1 | 0 | 0 | | | 0.000 | 0.000 |
| 2 | 0 | 0 | | | 0.000 | 0.000 |
| 3 | 0 | 0 | | | 0.000 | 0.000 |
| 4 | 0 | 0 | | | 0.000 | 0.000 |
| 5 | 0 | 0 | | | 0.000 | 0.000 |
| 6 | 0 | 0 | | | 0.000 | 0.000 |
| 7 | 0 | 0 | | | 0.000 | 0.000 |
| 8 | 0 | 0 | | | 0.000 | 0.000 |
| 9 | 0 | 0 | | | 0.000 | 0.000 |
| 10 | 0 | 0 | | | 0.000 | 0.000 |
| 11 | 0 | 0 | | | 0.000 | 0.000 |
| 12 | 0 | 0 | | | 0.000 | 0.000 |
| 13 | 0 | 0 | | | 0.000 | 0.000 |
| 14 | 0 | 0 | | | 0.000 | 0.000 |
| 15 | 0 | 0 | | | 0.000 | 0.000 |
| 16 | 0 | 0 | | | 0.000 | 0.000 |
| 17 | 0 | 0 | | | 0.000 | 0.000 |
| 19 | 0 | 0 | | | 0.000 | 0.000 |
| 20 | 0 | 0 | | | 0.000 | 0.000 |

Filter:off
Number:24

| Display Tool | Process Tool | Load Tool | Unload Tool | Machine Diagnostics | Table Operations | ● Tools in magazine | ○ Tools in machine |
|---|---|---|---|---|---|---|---|

Group: **101** **102** **103**    **104**    **105** **106**

```
101   2 1 0 0 0 Loc.
102   3 1 0 0 0 Tool no.
103   4 1 0 0 0 Dup
104   8 1 0 0 0 Name
105   9 1 0 0 0 Length1
106  11 1 0 0 0 Radius1
```

Field numbers (reference to the data base fields. For comparison, refer to page 3–9)

| Sector n, location 1 |
|---|
| Sector n, location 2 |

Tool data base

| Field 2 (group 52) | Field 3 (group 53) | Field 4 (group 54) | | Field 8 (group 58) | Field 9 (group 59) | Field 11 (group 61) | |
|---|---|---|---|---|---|---|---|

| Sector n, location m |
|---|

*Example: Screen display of the tool list*

## 3.6 Groups 121 to 152 (objects in input dialog boxes)

The parameters in groups 121 to 152 are used to define

- the character input fields to be available in input dialog boxes
- which fields from the tool data base are assigned to individual character input fields
- the position of the individual character input fields on the screen
- the text preceding the individual character input fields
- whether individual character input fields can be merely displayed or also edited.

A maximum of 32 character input fields can be defined. For every character input field you program one data line.

☞ **Please also note groups 153 to 156. There, you set the size of the available input dialog boxes. If they are too small in size, some character input fields may not be displayed at all nor not completely!**

Syntax of the data line:

`<P0> <P1> <P2> <P3> <P4> <P5> <P6>`

`<P0>:` Integer value "120" + number of the character input field. With a maximum of 32 character input fields, therefore, values 121 to 152 may be entered in `<P0>`.

`<P1>` to `<P3>:` Coordinate values in raster units (RU) for positioning the character input fields. 1 RU = 4 screen pixels.



`<P4>:` Used to define whether the character input field may be edited:
- 0 cannot be edited in any input dialog box
- 1 can be edited in all input dialog boxes
- 10 can only be edited in "Process" input dialog box
- 20 can only be edited in "Load" input dialog box

`<P5>:` Field number in the tool data base. The field contents are displayed in the character input field (possible values: 1 to 49; cf. also `<P0>` on page 3–6).

`<P6>:` Text preceding the character input field.

**Example:**

```
121  1  1 18 1  3 Tool no.
122 42  1 12 1  4 Duplo
123 68  1 14 0  1 Sector
124 93  1 12 0  2 Location
125  1  8 18 1  8 Tool name
126 87  8  6 0  7 Comp.
127  1 17 32 1  9 Length 1 mm
128 58 17 38 1 10 Length wear
```

The result of this model configuration is shown in the following figure:

*Example: Configuration of objects in an input dialog box*

## 3.7 Groups 153 to 156 (input dialog boxes)

Input dialog boxes are used to display or edit all relevant data of an individual record.

Input dialog boxes will be opened by the control unit whenever you operate any softkeys assigned to the "Display", "Process", "Load" or "Unload" functions. For details, refer to items `<P1>=4` to `<P1>=8` in section 3.14.1 from page 3–27.

The parameters of groups 153 to 156 are used to define

- the size
- the title bar and
- the number of character input fields

of these dialog boxes.

For each of the "Display", "Process", "Load" and "Unload" functions, you should program the appearance of the related input dialog box in a separate data line.

Syntax of the data line:

`<P0> <P1> <P2> <P3> 0 0 <P6>`

| | | |
|---|---|---|
| `<P0>:` | 153: | Dialog box for displaying a record |
| | 154: | Dialog box for processing a record |
| | 155: | Dialog box for loading |
| | 156: | Dialog box for unloading |
| `<P1>:` | Width of dialog box in raster units (RU) 1 RU = 4 screen pixels. | |
| `<P2>:` | Height of dialog box in raster units (RU) 1 RU = 4 screen pixels. | |
| `<P3>:` | Number of character input fields to be displayed in the dialog box. The sequence in which the character input fields are displayed within the input dialog box is not decisive, but rather the sequence in which the character input fields have been defined in groups 121 to 152. For example, `<P3>=5` will have the effect that only the character input fields of groups 121 to 125 will be displayed. | |
| `<P6>:` | Title bar of the dialog box. | |

**CAUTION**
**Inadvertent changes to non-visible character input fields are possible!**
**You should configure the size of the individual dialog boxes so that all character input fields to be displayed (cf. parameter `<P3>`) are actually visible.**

**Example:**

```
153 120 84 24 0 0 Tool data display
154 120 84 24 0 0 Tool data processing
155 120 84 24 0 0 Tool magazine – Load
156 120 16  5 0 0 Tool magazine – Unload
```

Effects:
The data line of group 153 defines the size (120 x 84 RU), the number of character input fields (24) and the title bar ("Tool data display") of the dialog box called up by a softkey which has been assigned the "display selected record" function.
The dialog boxes for the "Process record" (group 154) and "Load" (group 155) functions are identical, with the exception of different title bars.
By contrast, the dialog box for "Unload" (group 156) is much smaller (120 x 16 RU) because only 5 character input fields are to be displayed for unloading.

## 3.8      Groups 199 to 200 (dialog box for sector/location selection for loading)

**Group 199**

The parameters of **group 199** are used to define whether

- a softkey should be available for loading which offers a dialog box for sector and location selection

Thus, you can explicitly specify to which sector/location a tool is to be placed. The sector and location number can be transmitted to the PLC when the dialog box has been acknowledged (cf. also section 3.13, page 3–23).

Syntax of the data line:

```
199 0 0 0 0 0 <P6>
```

`<P6>:`   Text of the softkey opening the dialog box. If no text has been defined (`<P6>=.`), the control unit will not show the softkey.

**Example:**

```
199  0 0 0 0 0 Sector\nLocation
```

**Group 200**

The parameters of **group 200** are used to configure the dialog box for sector/location selection:

- title bar and size of the dialog box
- number of character input fields configured for the sector and location in groups 121 to 152.

Syntax of the data line:

```
200 <P1> 0 <P3> <P4> 0 <P6>
```

`<P1>:`   Width of dialog box in raster units (RU).
          1 RU = 4 screen pixels.
`<P3>:`   Number of the character input field for the sector (cf. parameter `<P0>` on page 3–12)
`<P4>:`   Number of the character input field for the location (cf. parameter `<P0>` on page 3–12)
`<P6>:`   Title bar of the dialog box.

**Example:**

```
200 60 0 3 4 0 Set sector/location
```

## 3.9 Groups 201 to 232 (objects in a bit field dialog box)

The parameters of groups 201 to 232 are used to define

- the number of check boxes available in a bit field dialog box
- the position of a check box on the screen
- the text following a check box
- whether a check box and its text is to be visible or invisible
- whether a check box can be merely displayed or edited as well.

You may define a maximum of 32 check boxes. For every check box, one data line should be programmed.

☞ **Please also note group 233 where the size of the bit field dialog box is set. If it is too small, some of the check boxes may not be displayed at all, or not displayed completely!**

Every check box represents a logic status which may be *true* or *false*. If a status is true, the check box appears checked.

The logic statuses of all check boxes are linked by the operator interface to an integer number. This integer number is automatically converted between the decimal and the binary system (binary number with a width of 32 bits).

Since every bit of the binary number corresponds to the status of a certain check box, changes to the integer number are immediately reflected by the statuses of the individual check boxes. In return, a change by the user in the logic status of individual check boxes will immediately influence the resulting integer value.

The allocation of the check box to the bit is permanently set by groups 201 to 232:

| Group | 201 | defines check box no. | 1 |
|-------|-----|-----------------------|---|
| " | 202 | " | 2 |
| " | 203 | " | 3 |
| " | 204 | " | 4 |
| . | | | . |
| . | | | . |
| " | 230 | " | 30 |
| " | 231 | " | 31 |
| " | 232 | " | 32 |

| 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

$2^0$ $2^1$ $2^2$ $2^3$ $2^4$ $2^5$ $2^6$ $2^7$ $2^8$ $2^9$ $2^{10}$ $2^{11}$ $2^{12}$ $2^{13}$ $2^{14}$ $2^{15}$ $2^{16}$ $2^{17}$ $2^{18}$ $2^{19}$ $2^{20}$ $2^{21}$ $2^{22}$ $2^{23}$ $2^{24}$ $2^{25}$ $2^{26}$ $2^{27}$ $2^{28}$ $2^{29}$ $2^{30}$ $2^{31}$

Value of the individual bits

Binary number; width: 32 bits

automatic conversion

Decimal system; integer number

☞   **Please also note group 233 where you enter the number of the character input field which is to contain the linked integer value. The character input field must be defined in groups 121 to 152.**

<u>Syntax of the data line:</u>

```
<P0> <P1> <P2> <P3> <P4> 0 <P6>
```

`<P0>:`    Integer value "200" + number of the check box. With a maximum of 32 check boxes, therefore, values 201 to 232 may be entered for `<P0>`. The value of a check box for conversion between the binary and the decimal system corresponds to: $2^{<P0>-201}$ .
A check box defined, e.g., by group 205, has the value $2^{205-201} = 2^4 = 16$.

`<P1>` to `<P2>:` Coordinate values in raster units (RU) for positioning check boxes. 1 RU = 4 screen pixels.



`<P3>:`    Defines whether the condition of the check box can be modified.
     0   not changeable
     1   changeable

`<P4>:`    Defines whether the check box and following text are visible
     0   not visible
     1   visible

`<P6>:`    Text following the check box.

**Example:**

(the text in brackets must not be programmed in the data lines! It only serves as an explanation of the values assigned to groups 201 to 216 for conversion between binary system and decimal system!)

```
201 1   1 1 1 0 Large tool            (value: 2⁰)
202 1   7 1 1 0 Location inhibited    (value: 2¹)
203 1  13 1 1 0 Tool defective        (value: 2²)
204 1  19 1 1 0 No enable step1       (value: 2³)
205 1  25 1 1 0 CW rotation inh.      (value: 2⁴)
206 1  31 1 1 0 CCW rotation inh.     (value: 2⁵)
207 1  37 1 1 0 Max. life active      (value: 2⁶)
208 1  43 1 1 0 Max. life warning     (value: 2⁷)
209 49  1 1 1 0 Processing tool       (value: 2⁸)
210 49  7 1 0 0 Spare                 (value: 2⁹)
211 49 13 1 1 0 Heavy tool            (value: 2¹⁰)
212 49 19 1 0 0 Button                (value: 2¹¹)
213 49 25 0 1 0 Tool left half        (value: 2¹²)
214 49 31 0 1 0 Tool left total       (value: 2¹³)
215 49 37 0 1 0 Tool right half       (value: 2¹⁴)
216 49 43 0 1 0 Tool right total      (value: 2¹⁵)
```

- 201 (value: $2^0$)
- 202 (value: $2^1$)
- 203 (value: $2^2$)
- 204 (value: $2^3$)
- 205 (value: $2^4$)
- 206 (value: $2^5$)
- 207 (value: $2^6$)
- 208 (value: $2^7$)
- 209 (value: $2^8$)
- 210 (value: $2^9$)
- 211 (value: $2^{10}$)
- 212 (value: $2^{11}$)
- 213 (value: $2^{12}$)
- 214 (value: $2^{13}$)
- 215 (value: $2^{14}$)
- 216 (value: $2^{15}$)

You have now configured 16 check boxes:



According to the values of the individual check boxes, true statuses of check boxes 1, 3 and 5 have the integer value "21":



| Binary: | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Value: | $2^0$ | $2^1$ | $2^2$ | $2^3$ | $2^4$ | $2^5$ | $2^6$ | $2^7$ | $2^8$ | $2^9$ | $2^{10}$ | $2^{11}$ | $2^{12}$ | $2^{13}$ | $2^{14}$ | $2^{15}$ |

Dec.:  $1 + 0 + 4 + 0 + 16 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 = \mathbf{21}$

## 3.10        Group 233 (bit field dialog box

A bit field dialog box serves for the

- convenient definition of binary information, such as "Yes/No", "True/ False" or "On/Off"
- quick visualization of binary information.

Thus, it is especially suitable for setting/visualizing properties a certain location or tool may have within the tool management function.

The bit field dialog box is opened by the control unit whenever

- function 22 or 23 has been initiated by a softkey (cf. parameter description of `<P1>=22` and `<P1>=23` on page 3–29 ff).
- an input dialog box has been opened for display, processing or loading **and** the TOOL ID softkey is activated in this condition (softkey text can be defined in group 234).

The parameters of group 233 are used to define

- the size, title bar and number of check boxes of the bit field dialog box
- the character input field which is to contain the integer value for the bi-directional conversion between the binary and the decimal system (cf. page 3–16).

Syntax of the data line:

```
233 <P1> <P2> <P3> <P4> 0 <P6>
```

`<P1>:`   Width of dialog box in raster units  (RU).
       1 RU = 4 screen pixels.

`<P2>:`   Height of dialog box in raster units (RU).
       1 RU = 4 screen pixels.

`<P3>:`   Number of check boxes to be displayed in the dialog box. The sequence in which the check boxes are displayed within the bit field dialog box is not decisive, but rather the sequence in which the check boxes have been defined in groups 201 to 232.
       For example, `<P3>=5`  will have the effect that only the check boxes of groups 201 to 205 will be displayed

`<P4>:`   Number of the character input field that is to contain the integer value for the bi-directional conversion between the binary system and the decimal system (cf. also next figure).

       The character input field must have been defined in groups 121 to 152 and must be referred to the 7th data base field (group 57) by `<P5>`! For the configuration of character input fields, cf. page 3–12.

`<P6>:`   Title bar of the bit field dialog box opened with the TOOL ID softkey (softkey text can be defined in group 234).

☞   **CAUTION**
   **Inadvertent modification of invisible check boxes possible!**
   **You should configure the size of the dialog box so that all check boxes to be displayed (cf. parameter `<P3>`) are actually visible.**

**Example:**
```
<P0> <P1> <P2> <P3> <P4> 0 <P6>
--------------------------------
233  98   50   16   6   0  Tool Identification
```



<P1>

**Tool Identification**          <P6>

- ■ Large tool              □ Processing tool
- □ Location inhibited      □ Spare
- ■ Tool defective          □ Heavy tool
- □ No enable step1         □ Button
- ■ CW rotation inh.        □ Tool left half
- □ CCW rotation inh.       □ Tool left total
- □ Max. life active        □ Tool right half
- □ Max. life warning       □ Tool right total

<P2>

<P6> Only applies to a bit field dialog box opened with the TOOL ID softkey (softkey text can be defined in group 234).

Binary:
| 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Value: $2^0$ $2^1$ $2^2$ $2^3$ $2^4$ $2^5$ $2^6$ $2^7$ $2^8$ $2^9$ $2^{10}$ $2^{11}$ $2^{12}$ $2^{13}$ $2^{14}$ $2^{15}$

Dec.: $1 + 0 + 4 + 0 + 16 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0$ = **21**

<P4>

<P3> ; specifies the number of check boxes displayed

**Input dialog box**

```
Tool no.        1234  Duplo  0  Sector  1  Loca-    Spin
                                           tion
Tool name                          0  Comp.      21

Length 1 mm        25.000  Length wear        0.000
```

```
121  1   1 18 1  3 Tool no.
122 42   1 12 1  4 Duplo
123 68   1 14 0  1 Sector
124 93   1 12 0  2 Location
125  1   8 18 1  8 Tool name
126 87   8  6 0  7 Comp.
127  1  17 32 1  9 Length 1 mm
128 58  17 38 1 10 Length wear
```

<P4>  6th character input field is defined in group 126

The character input field specified in `<P4>` must have been defined in groups 121 to 152 and must be referred to the 7th data base field there (cf. page 3–9)

Sector n, location 1
Sector n, location 2

Tool data base

Field 7 (group 57)

Sector n, location m

*Example: Configuration of the bit field dialog box*

## 3.11 Group 234 (softkey for opening the bit field dialog box)

When an input dialog box is displayed for displaying, processing or loading, a softkey is available by which you can open the bit field dialog box.
The standard text of this softkey (TOOL ID) can be modified if necessary.

Syntax of the data line:

`234 0 0 0 0 0 <P6>`

`<P6>:`    Softkey text.

**Example:**

`234  0 0 0 0 0 Tool\nID`

## 3.12     Groups 235 to 237 (title bars of other dialog boxes)

**Group 235**

If a bit field dialog box is opened by a softkey with function 22 (cf. parameter description `<P1>=22` on page 3–29), the text defined in this parameter is shown in the title bar of the bit field dialog box.

Syntax of the data line:

```
235 0 0 0 0 0 <P6>
```

`<P6>:`    Title bar of bit field dialog box.

**Example:**

```
235  0 0 0 0 0 Define Identification Values
```

**Group 236**

If a bit field dialog box is opened by a softkey with function 23 (cf. parameter description `<P1>=23` on page 3–29), the text defined in this parameter is shown in the title bar of the bit field dialog box.

Syntax of the data line:

```
236 0 0 0 0 0 <P6>
```

`<P6>:`    Title bar of bit field dialog box.

**Example:**

```
236  0 0 0 0 0 Define Identification Mask
```

**Group 237**

If a dialog box is opened by a softkey with function 21 (cf. parameter description `<P1>=21` on page 3–28), the text defined in this parameter is shown in the title bar of the dialog box.

Syntax of the data line:

```
237 0 0 0 0 0 <P6>
```

`<P6>:`    Title bar of the dialog box.

**Example:**

```
237  0 0 0 0 0 Define Tool Number
```

## 3.13      Group 240 (flags for controlling loading/unloading operations)

The parameters of group 240 are used to define the flags to be used by Typ3 osa for the transmission of

- the loading location number,
- the unloading location number, and
- the sector and location number

to the PLC.

Syntax of the data line:

```
240 <P1> <P2> <P3> 0 0 .
```

<P1>:    Flag controlling the loading process.
           The control unit enters the number of the loading location in this flag (1 byte). The PLC program has to reset the flag to 0 for positive acknowledgement.

<P2>:    Flag for controlling the unloading process.
           The control unit enters the number of the unloading location in this flag (1 byte). The PLC program has to reset the flag to 0 for positive acknowledgement.

<P3>:    Flag for transmission of the sector and location number to the PLC.
           0   no transmission of the sector and location numbers.
           >0 flag to which the sector and location number is to be written during the loading or unloading process.
               Thus, the target (for loading) and the source (for unloading) can be defined:
               **For loading:**
               The flag contains the sector and location number where the user wants to insert a tool.
               **For unloading:**
               The flag contains the sector and location number from which a tool is to be removed.

               The following applies to addressing:
               Sector number (short)          $-$> flag
               Location number (short)        $-$> flag + 2

☞   **If <P3> is not used (<P3> = 0), the PLC has to decide itself during a loading process in which sector/location a tool may be inserted.**

**Example:**

```
240 1000 1001 0 0 0 .
```

## 3.14 Group 241 (inhibiting softkey functions)

The parameters of group 241 are used to define flags which may serve to inhibit certain softkey functions by the PLC.

Syntax of the data line:

```
241 <P1> <P2> 0 0 0 .
```

<P1>: Flag address for inhibiting softkey functions by the PLC.
For this purpose, the PLC sets appropriate bits in this flag (2 bytes).
bit is high:  softkey function is inhibited
bit is low:  softkey function is enabled.

Assignment of bits:

0 Edit record
(softkey function 5; cf. page 3–27)

1 Initiate loading operation
(softkey function 7; cf. page 3–28)

2 Initiate unloading operation
(softkey function 8; cf. page 3–28)

3 Import an ASCII file into the tool data base
(softkey function 30; cf. page 3–29)

4 Export the tool data base to an ASCII file
(softkey function 31; cf. page 3–29)

When calling up one of these softkey functions, Typ3 osa checks whether or not the function has been inhibited by the PLC. If yes, the function is not performed, and a message is displayed.

If one of the functions "Edit record", "Load" or "Unload" is active, inhibiting the respective function will cause to program to exit the respective dialog box immediately and display a message. Processing a record is canceled in this case.

<P2>: Flag for transmitting the sector and location number of the record currently being edited (softkey function 5; cf. page 3–27) to the PLC.
The PLC may thus prevent editing specific, predefined records.

0 The sector and location numbers are not transmitted.

>0 Flag to which the sector and place number are to be written for "Edit record". If no record is edited, Typ3 osa enters the value "0" as sector and location number.
The following applies to the addresses:
Sector number (short)    –> flag
Location number (short)   –> flag + 2.

**Default setting:**

```
241 0 0 0 0 0 .
```

## 3.15      Groups 250 to 308 (softkeys and softkey bars)

These groups are used to define

- the number of softkey bars available in the operator interface of the tool management function
- the softkeys used in the individual softkey bars (number, types of soft-keys, and softkey texts)
- the function triggered by a softkey.

The operator interface of the tool management function can be structured by a total of 6 freely configurable softkey bars. Calling the tool management function by selecting the TOOL SET-UP softkey in the MANUAL GOM will always invoke the basic softkey level for the tool list display.

You may assign the "Call softkey bar" function to any softkey in any softkey bars. Therefore, you are not bound by a strict hierarchy as far as the nesting depth of the softkey levels is concerned.



*Example: Calling the available softkey bars in any order*

**Title bars of the softkey levels**

Every softkey level can be assigned a title. Whenever a softkey level is called up, the control unit will add the title entered in `<P6>` to the title bar of the screen display (the "dialog path"):

Syntax of the data lines:

```
250 0 0 0 0 0 <P6>          (defines title of the basic softkey level)
260 0 0 0 0 0 <P6>          (defines title of the 1st softkey level)
270 0 0 0 0 0 <P6>          (defines title of the 2nd softkey level)
280 0 0 0 0 0 <P6>          (defines title of the 3rd softkey level)
290 0 0 0 0 0 <P6>          (defines title of the 4th softkey level)
300 0 0 0 0 0 <P6>          (defines title of the 5th softkey level)
```

`<P6>`:    Title. If no title is entered, a full stop "." has to be programmed.

**Configuration of the individual softkeys**

The function, type of softkey and softkey text can be defined for every individual softkey.

Syntax of the data lines:

*Softkeys of the*
*basic softkey level*
```
251 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 1)
252 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 2)
253 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 3)
254 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 4)
255 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 5)
256 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 6)
257 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 7)
258 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 8)
```

*Softkeys of softkey level 1*
```
261 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 1)
 .                                                    .
268 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 8)
```

*Softkeys of softkey level 2*
```
271 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 1)
 .                                                    .
278 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 8)
```

*Softkeys of softkey level 3*
```
281 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 1)
 .                                                    .
288 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 8)
```

*Softkeys of softkey level 4*
```
291 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 1)
 .                                                    .
298 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 8)
```

*Softkeys of softkey level 5*
```
301 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 1)
 .                                                    .
308 <P1> <P2> <P3> <P4> <P5> <P6>          (configures softkey 8)
```

`<P1>` to
`<P4>`:    Softkey function. For options refer to section 3.15.1 from page 3–27.

`<P5>`:    Type of softkey. For options, refer to section 3.15.2 from page 3–31.

`<P6>`:    Softkey text. If no text is defined, a full stop "." has to be programmed.

### 3.15.1    Available softkey functions

Every softkey can be assigned a function which will be immediately per-
formed if the softkey is depressed.
For this purpose, enter the desired function in `<P1>` and the necessary data,
if any, in `<P2>`, `<P3>` and `<P4>`.

*<P1>=0*    **Softkey has no function.**

`<P2>:`   0
`<P3>:`   0
`<P4>:`   0

*<P1>=1*    **calls up a softkey bar.**

`<P2>:`   Number of softkey bar to be called (1 to 5)
`<P3>:`   0
`<P4>:`   0
Loops are not permitted (loop: one softkey calls up a softkey bar which is al-
ready contained in the current dialog path)!

*<P1>=2*    **selects a sector whose locations are shown as a list in the tool list dis-
play**

`<P2>:`   Sector number (for possible values, cf. `<P0>` on page 3–4).
`<P3>:`   0
`<P4>:`   0
If no softkey is assigned to this function, sector 1 will always be selected.

*<P1>=3*    **updates the tool list display**

`<P2>:`   0
`<P3>:`   0
`<P4>:`   0
If automatic updating has been deactivated (cf. page 3–10: group 100,
`<P1>`), the tool list display can be manually updated with this function.

*<P1>=4*    **displays a selected record in an input dialog box**

`<P2>:`   0
`<P3>:`   0
`<P4>:`   0

*<P1>=5*    **displays a selected record in an input dialog box and allows it to be
edited**

`<P2>:`   0
`<P3>:`   0
`<P4>:`   0

☞ **This softkey function can be inhibited by the PLC, cf. page 3–24.** ∎

*<P1>=6*    **displays a fixed specified record in an input dialog box**

`<P2>:`   Sector number of the record (for possible values, refer to `<P0>` on
page 3–4).
`<P3>:`   Location number of the record (for possible values, refer to `<P1>`
on page 3–4).
`<P4>:`   0

*<P1>=7*    **loads a selected record to a loading location**

    <P2>:    sector number of the loading location
    <P3>:    location number of the loading location
    <P4>:    number of the loading location
Also refer to group 240 on page 3–23. Since only the loading location number is transmitted to the PLC, the sector and location numbers of every loading location used also must have been defined in the PLC and must match <P2> and <P3>!

☞ **This softkey function can be inhibited by the PLC, cf. page 3–24.**

*<P1>=8*    **loads a selected record to an unloading location**

    <P2>:    sector number of the unloading location
    <P3>:    location number of the unloading location
    <P4>:    number of the unloading location
Also refer to group 240 on page 3–23. Since only the unloading location number is transmitted to the PLC, the sector and location numbers of every unloading location used also must have been defined in the PLC and must match <P2> and <P3>!

☞ **This softkey function can be inhibited by the PLC, cf. page 3–24.**

*<P1>=10*    **turns all active filters off**

    <P2>:    0
    <P3>:    0
    <P4>:    0

*<P1>=11*    **turns the parameterizable filter for field 3 of the tool data base on**

    <P2>:    0
    <P3>:    0
    <P4>:    0
The filter can be parameterized with softkey function 21. If the filter is active, only those records will be displayed which contain the value set with softkey function 21 in field 3 (cf. group 53).
In the tool list, e.g., only tools with a certain tool number will be displayed.

*<P1>=12*    **turns the parameterizable filter for field 7 of the tool data base on**

    <P2>:    0
    <P3>:    0
    <P4>:    0
This filter can be set with softkey functions 22 **and** 23. If the filter is active, only those records will be displayed whose status in field 7 (cf. group 57) exactly matches the specified logic conditions (cf. function 22) of all relevant statuses (cf. function 23) (e.g. display of all defective tools).

*<P1>=13*    **turns a fixed specified filter for field 7 of the tool database on**

    <P2>:    bit field value
    <P3>:    bit field mask
    <P4>:    0
If the filter is active, only those records will be displayed whose status in field 7 (cf. group 57) exactly matches the specified logic conditions (= bit field value: convert binary number to integer number and enter it in <P2>) of all relevant statuses (= bit field mask: convert binary number into integer number and enter it in <P3>).

*<P1>=21*    **parameterizes a filter for field 3 of the tool data base**

    <P2>:    0
    <P3>:    0

<P4>:    0

For this purpose, the control unit opens a dialog box (for the parameterization of the title of this dialog box, cf. group 237 on page 3–22) where you enter the desired value.

The filter can be activated with softkey function 11. In this case, only those records will be displayed which contain the value entered in field 3 (cf. group 53).

*<P1>=22*   **parameterizes a filter for field 7 of the tool data base**

<P2>:    0
<P3>:    0
<P4>:    0

Acts in conjunction with function 23. The control unit opens a bit field dialog box (for the parameterization of the title of the dialog box, cf. group 235, page 3–22) where you can enter the logic conditions of the statuses (bit field value):

- check box selected: TRUE
- check box not selected: FALSE

If the filter is active (cf. function 12) only those records will be displayed whose status in field 7 (cf. group 57) exactly matches the specified logic conditions of all relevant statuses (cf. function 23).

*<P1>=23*   **parameterizes the bit field mask of a filter for field 7 of the tool data base**

<P2>:    0
<P3>:    0
<P4>:    0

Acts in conjunction with function 22. The control unit opens a bit field dialog box (for the parameterization of the title of the dialog box, cf. group 236, page 3–22) where you can specify the statuses actually relevant for the filtering processes (bit field mask). For this purpose, you simply have to select the appropriate check boxes.

*<P1>=30*   **imports the contents of an ASCII file to the tool data base**

<P2>:    0
<P3>:    0
<P4>:    0

Typ3 osa will read back tool data base data **previously output as an ASCII file** (cf. softkey function 31).

This process completely replaces the current tool data base! The procedure for importing data is described in detail in the "Loading tool tables" section of the "Operating instructions" manual for Typ3 osa.

☞ **This softkey function can be inhibited by the PLC, cf. page 3–24.** ∎

*<P1>=31*   **exports the contents of the tool data base to an ASCII file**

<P2>:    0
<P3>:    0
<P4>:    0

The control unit converts the data of the tool data base to an ASCII file and stores this ASCII file in the directory of the "data base" group under the name "W6". The internal tool data base is not changed by this process.

If a file with the same name already exists in this directory, the control unit will rename the existing file "W6old".

☞ **This softkey function can be inhibited by the PLC, cf. page 3–24.** ∎

*<P1>=40*   **calls up the "Machine Diagnostics" screen**

<P2>:   0
<P3>:   0
<P4>:   0

For information on machine diagnostics please refer to section 2.3.4, page 2–7, and the description of groups 340 to 345 on page 3–37.

## 3.15.2　　Available softkey types

For the operator, it may be useful to obtain general information on the function of a softkey by the way in which it is shown.
Therefore, the operator interface of Typ3 osa offers the possibility of using different softkey types.
For this purpose, the softkey type can be configured in `<P5>` for every softkey:

`<P5>=0`　　**Normal softkey**

Use this softkey if **no** data is changed immediately when the softkey has been pressed (e.g. the control unit branches to another softkey level, or opens a dialog box).

`<P5>=1`　　**Function softkey**

Use this softkey if data is changed immediately when the softkey has been pressed (e.g. write/read data).

`<P5>=2`　　**Toggle softkey**

Is of no importance for the programmable functions of the tool management. This type of softkeys is used in order to toggle between two functions by pressing a key. The selected function is marked '●'.

`<P5>=3`　　**Check softkey**

Is of no importance for the programmable functions of the tool management. This type of softkeys is used in order to activate or deactivate a function by pressing a key. An active function is marked '■'.
One operating level (softkey bar) may even contain several check softkeys whose functions can be activated and deactivated independent of each other (m from n selection).

`<P5>=4`　　**Radio softkey**

Use this softkey in order to inform the user that a certain status is currently active (e.g. a filter or the display of a certain sector).
For example, if you use several softkeys of this type in a softkey bar, the operator will immediately detect which options (1 from n selection) he has, and which one is currently active. The "selected" status is marked '●'. Example:

`<P5>=5`　　**Enter softkey**

Use this softkey if the softkey function should also be initiated by pressing the <Enter> key.

`<P5>=6`　　Combination of **Enter softkey and function softkey**

## 3.15.3    Softkeys of the standard operator interface

**Configuration of the basic softkey level**

*Title*    250 0 0 0 0 0 Tool management

Group.
Softkey function. For options, refer to page 3–27 ff.
Type of softkey. For options, refer to page 3–31 ff.
Softkey text.

*available softkeys*
```
251  4 0 0 0 5 Display\nTool
252  5 0 0 0 0 Process\nTool
253  7 1 4 1 0 Load\nTool
254  8 1 5 1 0 Unload\nTool
255 40 0 0 0 0 Diagnostics\nMachine
256  1 3 0 0 0 Table\nOperations
257  2 2 0 0 4 Tools in\nMagazine
258  2 1 0 0 4 Tools in\Machine
```

**Configuration of softkey level 1**

*Title*    260 0 0 0 0 0 Loading-Unloading

Group.
Softkey function. For options, refer to page 3–27 ff.
Type of softkey. For options, refer to page 3–31 ff.
Softkey text.

*available softkeys*
```
261  7 1 5 1 0 Load\nManual
262  7 1 7 2 0 Load\nMagazine
263  0 0 0 0 0 .
264  0 0 0 0 0 .
265  0 0 0 0 0 .
266  0 0 0 0 0 .
267  8 1 6 1 0 Unload\nManual
268  8 1 8 2 0 Unload\nMagazine
```

**Configuration of softkey level 2**

*Title*    270 0 0 0 0 0 Choose Magazine

Group.
Softkey function. For options, refer to page 3–27 ff.
Type of softkey. For options, refer to page 3–31 ff.
Softkey text.

*available softkeys*
```
271  2 1 0 0 4 Tool in\Machine
272  0 0 0 0 0 .
273  2 2 0 0 4 Magazine\n1
274  2 3 0 0 4 Magazine\n2
275  0 0 0 0 0 .
276  2 4 0 0 4 Manual\nMagazine
277  0 0 0 0 0 .
278  2 5 0 0 4 Dummy
```

## Configuration of softkey level 3

*Title*    `280 0 0 0 0 0 Table Operations`

                           Group.
                           Softkey function. For options, refer to page 3–27 ff.
                           Type of softkey. For options, refer to page 3–31 ff.
                           Softkey text.

*available softkeys*

```
281  0 0 0 0 0 .
282  0 0 0 0 0 .
283  0 0 0 0 0 .
284  0 0 0 0 0 .
285  0 0 0 0 0 .
286  0 0 0 0 0 .
287 30 0 0 0 0 Read
288 31 0 0 0 0 Write
```

## Configuration of softkey level 4

*Title*    `290 0 0 0 0 0 Tool Filter`

                           Group.
                           Softkey function. For options, refer to page 3–27 ff.
                           Type of softkey. For options, refer to page 3–31 ff.
                           Softkey text.

*available softkeys*

```
291 13 1 1 0 4 Identification\n1
292 13 0 2 0 4 Identification\n2
293 12 0 0 0 4 self-defined\nidentification
294 11 0 0 0 4 Tool\nNumber
295 10 0 0 0 4 Filter\noff
296 22 0 0 0 0 Define\nID values
297 23 0 0 0 0 Define\nID mask
298 21 0 0 0 0 Define\nTool\nNumber
```

## Configuration of softkey level 5

*Title*    `300 0 0 0 0 0 .`

                           Group.
                           Softkey function. For options, refer to page 3–27 ff.
                           Type of softkey. For options, refer to page 3–31 ff.
                           Softkey text.

*available softkeys*

```
301  0 0 0 0 0 .
302  0 0 0 0 0 .
303  0 0 0 0 0 .
304  0 0 0 0 0 .
305  0 0 0 0 0 .
306  0 0 0 0 0 .
307  0 0 0 0 0 .
308  0 0 0 0 0 .
```

## 3.16    Groups 320 to 333 (PLC data displays)

These groups are used to define

● the PLC data that may be visualized in the "Manual" and "Automatic" group operating modes. The data is automatically updated.

Within the "Automatic" mode, the PLC data may be positioned **in the "Compensations + Process data" field**:

| A: Automatic | | |
|---|---|---|
| **Workpiece position** | **Distance to go** | **File:** |
| X 0.000 | X 0.000 * | |
| Y 0.000 | Y 0.000 * | |
| Z 0.000 | Z 0.000 * | Verzeichnis : |
| B 0.0000 | B 0.0000 * | Angew. Programm : |
| UA 0.000 | UA 0.000 # | Unterprogramm : |
| VA 0.000 | VA 0.000 # | Ausführung : Folgesatz |
| WA 0.0000 | WA 0.0000 # | aktiver Satz : |

| **Compensations + Process data** | **Program** |
|---|---|
| V: /database/V1 | Directory : |
| G53 G153 G253 | Sel. Program : |
| K: /database/K4 | Subprogram : |
| D0: 0.000 H0: 0.000 | Execution mode : Automatic |
| **Area for positioning the** | Active block : |
| **PLC data displays** | **MSG** |
| F : 0.0 [____] 0 % | |
| S1: 0.0 [____] 0 % | |
| S2: 0.0 [____] 0 % | |

**Softkey bar**

The area designed for the PLC data display is also used to display the external tool compensations.
Therefore, please make sure that the PLC data display does not cover up any other important data.

In the "Manual" GOM, the PLC data may be positioned **in the info range** in the tool list display:

| A: Manual/Tool management | | | | |
|---|---|---|---|---|
| **Tool list: Magazine** | | | | |
| Loc. | Tool no. | Dup Name | Length1 | Radius1 |
| **1** | **0** | **0** | **0.000** | **0.000** |
| 2 | 0 | 0 | 0.000 | 0.000 |
| 3 | 0 | 0 | 0.000 | 0.000 |
| 4 | 0 | 0 | 0.000 | 0.000 |
| 5 | 0 | 0 | 0.000 | 0.000 |
| 6 | 0 | 0 | 0.000 | 0.000 |
| 7 | 0 | 0 | 0.000 | 0.000 |
| 8 | 0 | 0 | 0.000 | 0.000 |
| 9 | 0 | 0 | 0.000 | 0.000 |
| 10 | 0 | 0 | 0.000 | 0.000 |
| 11 | 0 | 0 | 0.000 | 0.000 |
| 12 | 0 | 0 | 0.000 | 0.000 |
| 13 | 0 | 0 | 0.000 | 0.000 |
| 14 | 0 | 0 | 0.000 | 0.000 |
| 15 | 0 | 0 | 0.000 | 0.000 |
| 16 | 0 | 0 | 0.000 | 0.000 |
| 17 | 0 | 0 | 0.000 | 0.000 |
| 19 | 0 | 0 | 0.000 | 0.000 |
| 20 | 0 | 0 | 0.000 | 0.000 |

**Info range**

**Softkey bar**

Possible **number of PLC data displays**:

- "Automatic" GOM:                    5 data displays
- "Manual" GOM (tool management):     2 data displays

You have to configure the PLC data value used and the desired display type for every single data display.

☞ **In groups 349 to 365, you may set an additional 8 PLC data displays for "Automatic" GOM! Refer to page 3–39.**

**Configuration: PLC data values**

You program one data line for every data display.

Syntax of the data lines:

```
320 <P1> <P2> <P3> <P4> <P5> <P6>      (for 1st data value in "Automatic" GOM)
322 <P1> <P2> <P3> <P4> <P5> <P6>      (for 2nd data value in "Automatic" GOM)
324 <P1> <P2> <P3> <P4> <P5> <P6>      (for 3rd data value in "Automatic" GOM)
326 <P1> <P2> <P3> <P4> <P5> <P6>      (for 4th data value in "Automatic" GOM)
328 <P1> <P2> <P3> <P4> <P5> <P6>      (for 5th data value in "Automatic" GOM)
330 <P1> <P2> <P3> <P4> <P5> <P6>      (for 1st data value in "Manual" GOM)
332 <P1> <P2> <P3> <P4> <P5> <P6>      (for 2nd data value in "Manual" GOM)
```

`<P1>:`  Storage location of the PLC data value. Possible values:
   0   no display
   1   Input
   2   Output
   3   Flag

`<P2>:`  Currently without meaning

`<P3>:`  Byte offset of the storage location

`<P4>:`  Data type for display:
   5   SINT          1 byte, with sign
   6   INT           2 bytes, with sign
   7   DINT          4 bytes, with sign
   8   USINT         1 byte, w/o sign, with selectable numer. basis
   9   UINT          2 bytes, w/o sign, with selectable numer. basis
   10  UDINT         4 bytes, w/o sign, with selectable numer. basis
   13  VSTRING       visible string
   16  FLOAT         4 bytes
   17  DOUBLE        8 bytes
   18  NORM_SINT     1 byte, standardized number with sign
   19  NORM_INT      2 bytes, standardized number with sign
   20  NORM_DINT     4 bytes, standardized number with sign

`<P5>:`  Additional information for data type
   If `<P4>=13`:    `<P5>:`    Maximum number of characters

`<P6>:`  Additional information for data type
   If `<P4>=8`:    `<P6>:`    Numerical basis (8, 10, 16)
   If `<P4>=9`:    `<P6>:`         "
   If `<P4>=10 `:  `<P6>:`         "
   If `<P4>=16`:   `<P6>:`    Number of decimal positions
   If `<P4>=17`:   `<P6>:`         "
   If `<P4>=18 `:  `<P6>:`    Standardization factor
   If `<P4>=19`:   `<P6>:`    (1=1/10; 2=1/100; 3=1/1000; ...)
   If `<P4>=20`:   `<P6>:`         "

**Configuration: Display type of the PLC data values**

You should program one data line for each data display.

Syntax of the data lines:

```
321 <P1> <P2> <P3> <P4> <P5> <P6>        (for 1st data value in "Automatic" GOM)
323 <P1> <P2> <P3> <P4> <P5> <P6>        (for 2nd data value in "Automatic" GOM)
325 <P1> <P2> <P3> <P4> <P5> <P6>        (for 3rd data value in "Automatic" GOM)
327 <P1> <P2> <P3> <P4> <P5> <P6>        (for 4th data value in "Automatic" GOM)
329 <P1> <P2> <P3> <P4> <P5> <P6>        (for 5th data value in "Automatic" GOM)
331 <P1> <P2> <P3> <P4> <P5> <P6>        (for 1st data value in "Manual" GOM)
333 <P1> <P2> <P3> <P4> <P5> <P6>        (for 2nd data value in "Manual" GOM)
```

`<P1>` to

`<P4>`:   Coordinate values in raster units (RU) for positioning the data displays. 1 RU = 4 screen pixels.
Coordinates 0,0 refer to the upper left corner of the relevant display area.
Negative values for `<P4>` will display a frame around the numerical value.



`<P5>`:   Minimum number of characters of an element in the data display field.

`<P6>`:   Text preceding the data display field.

☞ **You should position the individual data displays so as to avoid overlapping other information!**

**Examples of a configuration of PLC data displays:**

; in "Automatic" GOM ("Compensations + Process data" field)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1st data display | 320 | 3 | 0 | 4308 | 9 | 1 10 | (PLC data value) |
| | 321 | 1 | 14 | 8 | 12 | 1 Tool: | (Display type) |
| 2nd data display | 322 | 3 | 0 | 4308 | 19 | 1 1 | (PLC data value) |
| | 323 | 32 | 14 | 30 | 16 | 1 Tool life (s): | (Display type) |
| 3rd data display | 324 | 3 | 0 | 4308 | 20 | 1 4 | (PLC data value) |
| | 325 | 1 | 18 | 8 | 65 | 11 D: | (Display type) |
| 4th data display | 326 | 3 | 0 | 4308 | 20 | 1 4 | (PLC data value) |
| | 327 | 1 | 22 | 8 | 65 | 11 H: | (Display type) |
| 5th data display | 328 | 0 | 0 | 1 | 13 | 5 0 | (PLC data value) |
| | 329 | 1 | 22 | 16 | −60 | 1 . | (Display type) |

; in "Manual" GOM, in the Info field for tool management

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1st data display | 330 | 3 | 0 | 1002 | 6 | 1 10 | (PLC data value) |
| | 331 | 80 | 0 | 16 | −12 | 1 Sector: | (Display type) |
| 2nd data display | 332 | 3 | 0 | 1004 | 6 | 1 10 | (PLC data value) |
| | 333 | 80 | 4 | 16 | −12 | 1 Location: | (Display type) |

## 3.17      Groups 340 to 345 (PLC diagnostics function)

**General functional principle**

- When a (diagnostics) function was selected by the user within the "Diagnostics-Machine" display, the control unit enters the number of the (diagnostics) function to be performed in a flag (cf. `<P1>`).
- Then, the PLC will trigger the corresponding function and set a flag bit when the function has been completed (cf. `<P2>`). This bit depends on the result of the function.
- The control unit marks the logic status of the function in the appropriate location on the display.

**Configuration**

You define

- texts for headings in the "Diagnostics-Machine" display, and
- flags for transferring the function number to the PLC and feeding back a diagnostics status.

Syntax of the data lines:

```
340  0  0  0  0  0  <P6>
341  0  0  0  0  0  <P6>
342  0  0  0  0  0  <P6>
345 <P1> <P2> 0  0  0  .
```

`<P1>:`   Flag for transmitting the function number and triggering the (diagnostics) function.
The control unit enters the number of the function to be performed (1 to 32; cf. also page 2–7) in this flag (1 byte).

`<P2>:`   Flag for signaling back the logic status of all diagnostics functions. The PLC has to write the logic status of a diagnostics function into this flag (4 bytes = 32 bits). The following assignment applies:
     Diagnostics function 01 –> bit 0
     Diagnostics function 02 –> Bit 1
        :
     Diagnostics function 32 –> Bit 31.

Logic status TRUE:     corresponding bit = 1
Logic status FALSE:   corresponding bit = 0

`<P6>:`   Heading texts. For positions, cf. next figure.

**Example:**

```
340 0 0 0 0 0 Diagnostics-Machine
341 0 0 0 0 0 Machine diagnostics
342 0 0 0 0 0 Name of diagnostics function
345 1005 1006 0 0 0 .
```

**<P6>** from group 340 ———→

**<P6>** from group 341 ———→

**<P6>** from group 342 ———→

| A: Manual/Tool management/Diagnostics–Machine | | |
|---|---|---|
| **Machine diagnostics** | | |
| Name of diagnostics function | | |
| | | |
| **Retraction movement backward** | retracted | > < Reset |
| Retraction movement forward | in front | >***< |
| | | |
| Tool changer up | is up | >***< Reset |
| Tool changer down | is down | > < |
| | | |
| Swivel gripper clock–wise | is right | > < Reset |
| Swivel gripper counter–clockwise | is left | >***< |
| | | |
| Open gripper | is open | > < Reset |
| Close gripper | is closed | >***< |
| | | |
| Clamp spindle charger | is clamped | >***< Reset |
| Release spindle charger | is released | > < |
| | | |
| Clamp tool in change location | is clamped | >***< Reset |
| Release tool in change location | is released | > < |

| Execute Function | | | | | Update | | |
|---|---|---|---|---|---|---|---|

If the logic status of the corresponding (diagnostics) function is TRUE, the character string "***" is displayed. If it is FALSE, blanks will be displayed.

☞ **For parameterizing the screen structure, refer to section 2.3.4 from page 2–7.**

## 3.18      Groups 349 to 365 (additional PLC data displays)

These groups are used to define

● additional PLC data displays in the GOM
AUTOMATIC  ▶ CHANGE DISPLAY ▶ SHOW COMPENSATIONS

This data will be displayed in addition to the data defined in groups 320 to 333. The display will be automatically refreshed.

Within the "Automatic" GOM, 8 additional PLC data displays can be positioned **in the marked display area**:

```
A: Automatic/Display Selection/Compensations display
┌─────────────────────┬─────────────────────┬──────────────────────────┐
│ Workpiece position  │ Distance to go      │ File:                    │
│                     │                     │                          │
│  X        0.000     │  X       0.000 *    │                          │
│  Y        0.000     │  Y       0.000 *    │                          │
│  Z        0.000     │  Z       0.000 *    │                          │
│  B        0.0000    │  B       0.0000 *   │                          │
│  UA       0.000     │  UA      0.000 #    │       Group 349, <P6>    │
│  VA       0.000     │  VA      0.000 #    │                          │
│  WA       0.0000    │  WA      0.0000 #   │              │           │
│                     │                     │              ▼           │
├─────────────────────┴─────────────────────┼──────────────────────────┤
│ Compensations + Process data              │ Total   Zero Shift Heading│
│ V:   /database/V1                         │  X       0.000            │
│      G53      G153     G253               │  Y       0.000     Area for posi-│
│ K:   /database/K4                         │  Z       0.000     tioning 8│
│      D0: 0.000          H0: 0.000         │  B       0.000     additional│
│                                           │                    PLC data dis-│
│                                           │                    plays   │
│  F :   0.0  ▭▭▭▭▭  0 %                     │                            │
│  S1:   0.0  ▭▭▭▭▭  0 %                     │                            │
│  S2:   0.0  ▭▭▭▭▭  0 %                     │                    Overview│
│                                           │                    Compen- │
└───────────────────────────────────────────┴────────────────────sations┘
```

For every data display, you have to configure the PLC data value used and the way in which it is to be displayed.

**Configuring the heading of the display area**

Syntax of the data line:

`349 0 0 0 0 <P6>`

`<P6>`:     Heading text. For position, cf. figure above.

**Configuration: PLC data values**

You program one data line per data display.

Syntax of the data lines:

```
350 <P1> <P2> <P3> <P4> <P5> <P6>          (for 1st data value)
352 <P1> <P2> <P3> <P4> <P5> <P6>          (for 2nd data value)
354 <P1> <P2> <P3> <P4> <P5> <P6>          (for 3rd data value)
356 <P1> <P2> <P3> <P4> <P5> <P6>          (for 4th data value)
358 <P1> <P2> <P3> <P4> <P5> <P6>          (for 5th data value)
360 <P1> <P2> <P3> <P4> <P5> <P6>          (for 6th data value)
362 <P1> <P2> <P3> <P4> <P5> <P6>          (for 7th data value)
364 <P1> <P2> <P3> <P4> <P5> <P6>          (for 8th data value)
```

For the meaning of parameters `<P1>` to `<P6>`, please refer to page 3–35.

**Configuration: Display type of the PLC data values**

You program one data line per data display.

Syntax of the data lines:

```
351 <P1> <P2> <P3> <P4> <P5> <P6>          (for 1st data value)
353 <P1> <P2> <P3> <P4> <P5> <P6>          (for 2nd data value)
355 <P1> <P2> <P3> <P4> <P5> <P6>          (for 3rd data value)
357 <P1> <P2> <P3> <P4> <P5> <P6>          (for 4th data value)
359 <P1> <P2> <P3> <P4> <P5> <P6>          (for 5th data value)
361 <P1> <P2> <P3> <P4> <P5> <P6>          (for 6th data value)
363 <P1> <P2> <P3> <P4> <P5> <P6>          (for 7th data value)
365 <P1> <P2> <P3> <P4> <P5> <P6>          (for 8th data value)
```

For the meaning of parameters `<P1>` to `<P6>` please refer to page 3–36.

# 4        Parameterizing the data base

## 4.1        When does the data base have to be changed?

Whenever
- the maximum number of records (default: 30)
- the number of sectors/locations
  (default: sector 1 → 5 locations; sector 2 → 24 locations)
- the names of locations of sector 1
- the interpretation of data base fields

are to be changed.

## 4.2        Changing the maximum number of records

**CAUTION**
**The contents of the existing data base will be deleted and cannot be retrieved!**
**If you still need existing tool data, you should export the data to an ASCII file before making changes to the data base. For this purpose, you should use a softkey assigned to the export function (cf. page 3–29).**

☞ **Changing the maximum number of records influences the part pro-gram memory (memory class 1) available!**
**Every record, occupies approx. 330 bytes in the part program memory. You may display the free part program memory by actuating DIAGNOSTICS GOM ◗ CONTROL DIAGNOSTIC ◗ MEMORY.**

★        You should make sure that there is enough free space available in the part program memory to ensure a trouble-free operation of the control unit before increasing the number of records.

★        If you want to reduce the maximum number of records, you may have to change the "toolprms.xxx" file accordingly beforehand.
The locations defined in groups 1 to 30 in this file (cf. section 3.2, page 3–4) must not exceed the maximum number of records.

The following flow chart shows when the maximum number of records can be changed:



*Flow chart: Necessary preconditions for changing the max. number of records*

★ In order to change the maximum number of records, you should proceed as follows:

1. First copy the "knadbddl.dat" file from the user FEPROM or, if not available there, from the "c:\typ3pcp\cncfiles" directory of the PC panel to the root directory of the control unit.

☞ **On the control side, you can normally access the "c:\typ3pcp\cncfiles" directory via the Typ3 "Mount" directory.**

2. Go to the root directory.

3. Load the "knadbddl.dat" file into the NC editor.
   Change the value 30 (= max. number of records) in line "`FILE = Tool-Tab_1 /VOL = 30`" according to your requirements. Then save the "knadbddl.dat" file.

4. Copy the "knadbddl.dat" file to the user FEPROM of the control unit.

5. Set switch S1 at the osa master module to position "6".

6. Make sure that no part programs are currently being processed, and initiate a control run-up (Reset).

7. Check whether error 2075 or 2076 is active in the info dialog (selection with Info key) after the run-up.
   If yes, search the "knadbddl.log", "PRINTR" and "PRINTD" files in the root directory for possible causes of the error.

8. If none of these errors was active, the maximum number of records was successfully changed.
   Set switch S1 on the osa-master module back to position "0".

☞ **An increase in the maximum number of records within the operator interface of the tool management function will not become visible unless the additional locations have actually been defined in the "toolprms.xxx" file (groups 1 to 30, cf. section 3.2 from page 3–4). For this purpose, you should proceed as described in section 4.3.**

## 4.3     Changing the number of sectors/locations

**CAUTION**
**The contents of the existing data base will be deleted and cannot be retrieved!**
**If you still need existing tool data, you should export the data to an ASCII file before making changes to the data base. For this purpose, you should use a softkey which has been assigned the export function (cf. page 3–29).**
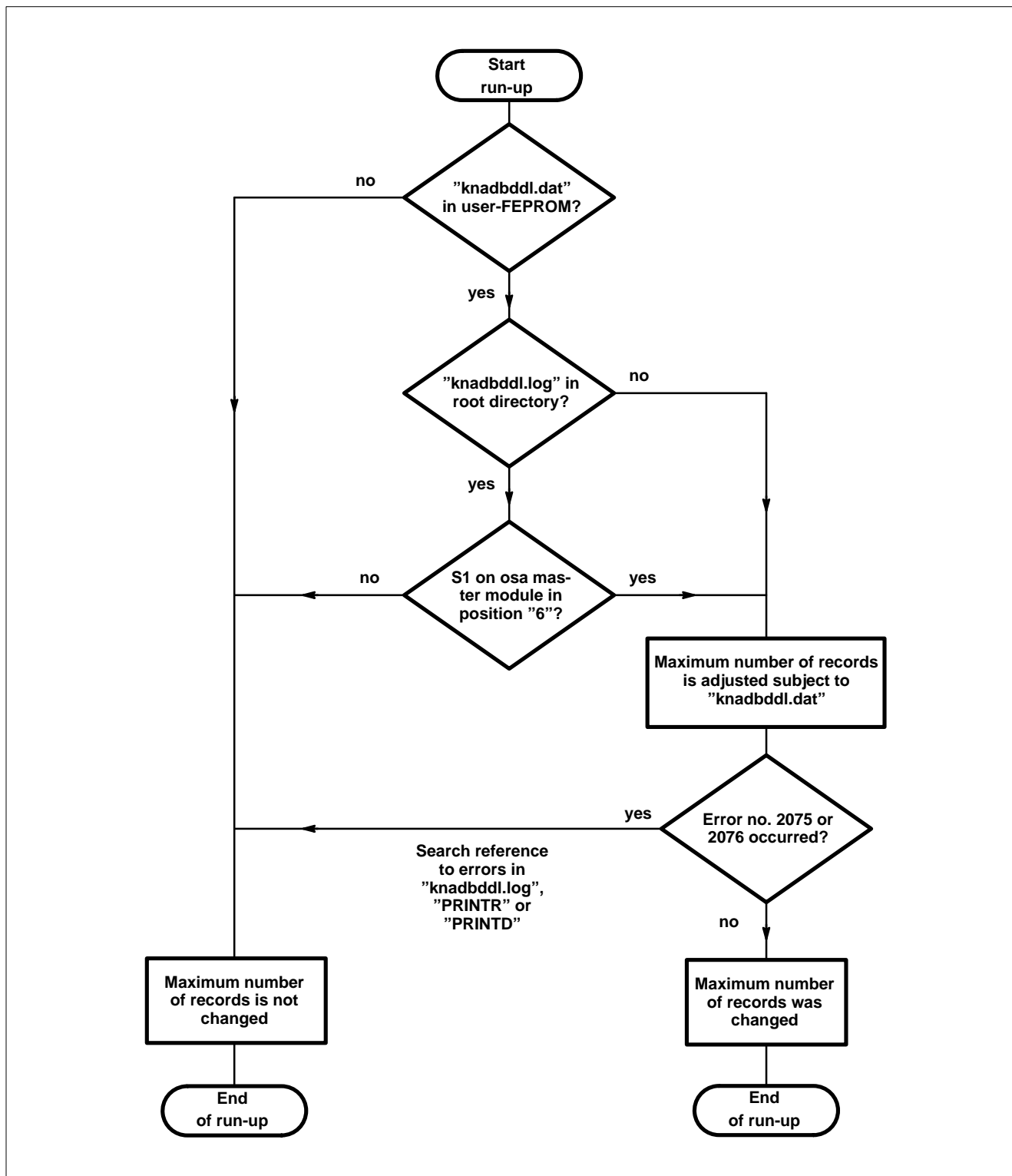
★     If you want to increase the number of locations defined in groups 1 to 30 (cf. section 3.2, page 3–4), you should first check whether the maximum number of records defined in the "knadbddl.dat" file (cf. section 4.2 from page 4–1) is sufficient.
Otherwise, you should first adjust the "knadbddl.dat" file accordingly.

★     In order to change the number of sectors/locations, you should proceed as follows:

1. Go to the root directory.
2. Load the "toolprms.xxx" file into the NC editor
3. Set the $<P1>$ control parameter in group 0 to the value "6" (cf. also section 3.1, page 3–1).
4. Edit the corresponding groups (cf. section 3.2, page 3–4).

☞  **If you change the number of locations of sector 1, you should also adjust the names of the locations (cf. section 3.3, page 3–5).**

5. Save the "toolprms.xxx" file.
6. Make sure that no part programs are currently being processed, and initiate a control run-up (Reset).
7. Test the new settings. Once you have verified their proper functioning, proceed to step 9.
8. For making additional changes:
   Go to the root directory and load the "toolprms.xxx" file into the NC editor. Proceed with step 4.
9. Go to the root directory and load the "toolprms.xxx" file into the editor. Set the $<P1>$ control parameter in group 0 to the value "0" (normal mode). Save the "toolprms.xxx" file.
10. Make sure that no part programs are currently being processed, and initiate a control run-up (Reset).
11. Copy the "toolprms.xxx" file to the "User-FEPROM" directory to back up the current data.

## 4.4 Changing the names of the locations in sector 1 or the interpretation of data base fields

**CAUTION**
**Once you have changed the interpretation of data base fields, considerable adjustment work is normally required before current tool data can be further used!**

**If you want to continue using the existing tool data, you should first export the data to an ASCII file before making changes to the data base. For this purpose, you should use a softkey which has been assigned the export function (cf. page 3–29).**

**The exported ASCII file should be manually adjusted before importing it back to the modified data base.**

☞ **It is assumed that development mode has been activated (cf. section 2.5, page 2–10) for the procedure described below.**

★ In order to change the relevant parameters (groups 31 to 99), you should proceed as follows:

1. Go to the root directory.
2. First load the "toolprms.xxx" file into the NC editor.
3. To change
   - the names of the locations of sector 1, refer to section 3.3, page 3–5
   - the interpretation of data base fields, refer to section 3.4, page 3–6

   Edit the appropriate groups.
4. Save the "toolprms.xxx" file.
   If you have changed the interpretation of data base fields, you may have to manually adjust a previously exported ASCII file (cf. "CAUTION" above). For adjusting an ASCII file, refer to section 4.4.1.
5. Call up the operator interface of the tool management function with the operating sequence MANUAL GOM ◗ TOOL SET-UP.
6. Test the new settings. Once you have checked their proper functioning, proceed to step 8.
7. For making additional changes:
   Go to the root directory and load the "toolprms.xxx" file into the NC editor. Proceed with step 3.
8. Copy the "toolprms.xxx" file to the "User-FEPROM" directory to back up the current data.

## 4.4.1     Adjusting an exported ASCII file

The contents of the tool data base are saved to a file named "W6" during the ASCII export.
One line of this file contains the contents of all 49 data base fields of a record, separated by blanks (ASCII value: 20 hex.).
The line end is marked by the Line Feed character (ASCII value: 0A hex.).

As an example, a listing of a stored ASCII file is shown below. The field definitions correspond to those of the default tool data base (cf. page 3–9).
Lines 4, 5, and 6, 7, respectively, of the listing are contained in the file as single lines although an automatic line feed was inserted in the listing for reasons of space.

```
1 1 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
1 2 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
1 3 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
1 4 1 1 0 0 0 "CUTTER 20MM" 3100000 2000 200000 100 3000000 2000 200000 100 150000 10000 300 350 1000000
5 10000 20000 100000 150000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
1 5 5 0 0 0 0 "CUTTER 10MM" 2000000 1000 100000 100 250000 1000 110000 100 200000 10000 100 150 5000000
5 20000 20000 100000 200000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 1 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 2 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 3 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 4 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 5 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 6 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 7 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 8 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 9 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 10 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 11 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 12 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 13 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 14 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 15 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 16 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 17 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 18 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 19 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 20 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 21 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 22 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
2 23 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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ""<LF>
```

★     If you have changed the field definitions in the data base (e.g. contents of field X are now in field Y), you have to **adjust the sequence in all lines** before importing old data.

☞     **All fields of a record are assigned a fixed data type internally (cf. table in section 2.1.1) which cannot be changed.**
**Please note that the field definitions (cf. groups 51 to 99) have no influence on the internal (stored) data type of a field, but rather define how certain field contents are interpreted by the control unit.**

# 5     Parameterizing the operator interface

## 5.1     When should the operator interface be changed?

Whenever the current settings of
- softkeys and the functions assigned to them
- the tool list display
- the properties and components of dialog boxes
- the display type of the PLC data displays
- the "Machine Diagnostics" display

are to be changed.

## 5.2     Procedure for making changes

☞ **It is assumed that development mode has been activated (cf. section 2.5, page 2–10) for the procedure described below.**

★ In order to make changes, you should proceed as follows:

1. Go to the root directory.
2. First load the "toolprms.xxx" file into the NC editor.
3. To change
   - softkeys, refer to section 3.15 from page 3–25 and section 5.3 from page 5–2
   - tool list display, refer to section 3.5 from page 3–10
   - the properties of input dialog boxes, refer to section 3.7 from page 3–14
   - objects in input dialog boxes, refer to section 3.6 from page 3–12
   - properties of bit field dialog boxes, refer to section 3.10 from page 3–19
   - objects in bit field dialog boxes, refer to section 3.9 from page 3–16
   - the display type of PLC data displays, refer to section 3.16 from page 3–34 and section 3.18 from page 3–39
   - the "Machine diagnostics" display, refer to section 3.17 from page 3–37 and section 2.3.4 from page 2–7

   Edit the appropriate groups.

4. Save the "toolprms.xxx" file.
5. Call up the operator interface of the tool management function with the operating sequence MANUAL GOM ▶ TOOL SET-UP.
6. Test the new settings. Once you have checked their proper functioning, proceed to step 8.
7. For making additional changes:
   Go to the root directory and load the "toolprms.xxx" file into the NC editor. Proceed with step 3.
8. Copy the "toolprms.xxx" file to the "User-FEPROM" directory to back up the current data.

## 5.3      Adjusting the menu structure

You may configure the part of the program in which certain operating functions are available.
Depending on the type and size of your application, functions that belong together because of their subject area or logic (such as export and import of tool data, display of all tools in certain sectors, or filter functions) can be combined in softkey bars. A total of 6 softkey bars is available for this purpose.

A single softkey bar may accommodate max. 8 softkeys. For every single softkey, you may define

- the type of softkey (cf. section 3.15.2, page 3–31), and
- the underlying function (cf. section 3.15.1 page 3–27).

For the default programming of the standard operating dialog, please refer to section 3.15.3 from page 3–32.

In addition to the 6 freely configurable softkey bars, a number of system softkey bars is available. System softkey bars are automatically displayed when certain dialog boxes have been opened.
In addition to fixed softkey definitions, system softkey bars may also contain configurable softkeys. Although such configurable softkeys have a fixed function, the softkey text or its availability may be changed:

- Softkey for opening a bit field dialog box: cf. section 3.11, page 3–21.
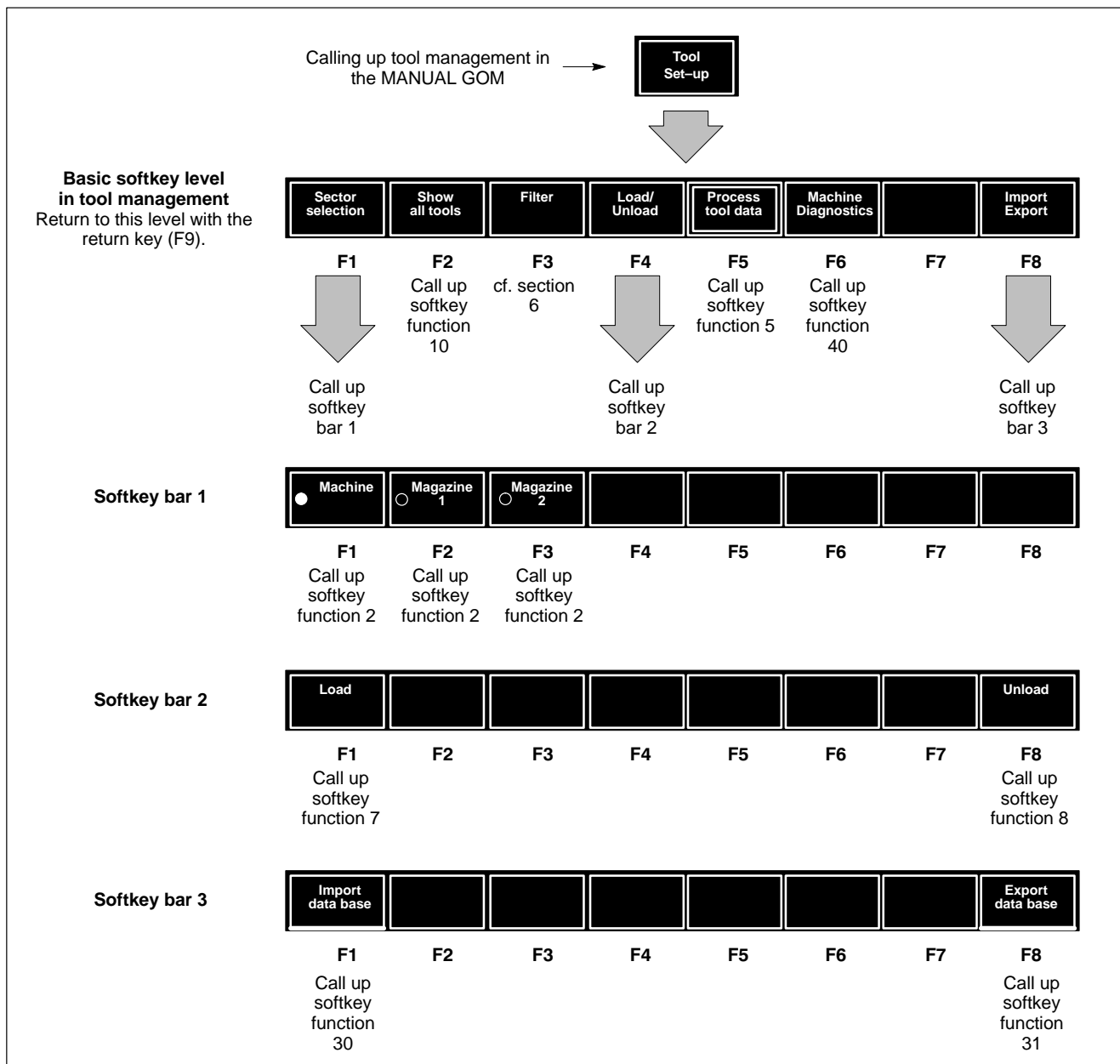- Softkey for opening a dialog box for sector/location selection for loading: cf. section 3.8, page 3–15.

**Example**

The following example shows the configuration of a possible operating dialog.
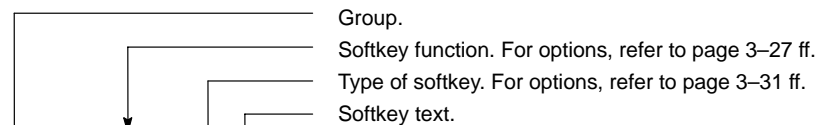
Use the information in

- section 3.15.1 from page 3–27 (available softkey functions) and
- section 3.15.2 from page 3–31 (available softkey types)

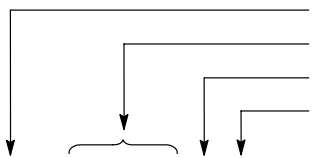for a better understanding of the program.

Calling up tool management in the MANUAL GOM → **Tool Set–up**

**Basic softkey level in tool management**
Return to this level with the return key (F9).

| Sector selection | Show all tools | Filter | Load/ Unload | Process tool data | Machine Diagnostics | | Import Export |
|---|---|---|---|---|---|---|---|
| **F1** | **F2** | **F3** | **F4** | **F5** | **F6** | **F7** | **F8** |
| | Call up softkey function 10 | cf. section 6 | | Call up softkey function 5 | Call up softkey function 40 | | |

Call up softkey bar 1          Call up softkey bar 2          Call up softkey bar 3

**Softkey bar 1**

| ● Machine | ○ Magazine 1 | ○ Magazine 2 | | | | | |
|---|---|---|---|---|---|---|---|
| **F1** | **F2** | **F3** | **F4** | **F5** | **F6** | **F7** | **F8** |
| Call up softkey function 2 | Call up softkey function 2 | Call up softkey function 2 | | | | | |

**Softkey bar 2**

| Load | | | | | | | Unload |
|---|---|---|---|---|---|---|---|
| **F1** | **F2** | **F3** | **F4** | **F5** | **F6** | **F7** | **F8** |
| Call up softkey function 7 | | | | | | | Call up softkey function 8 |

**Softkey bar 3**

| Import data base | | | | | | | Export data base |
|---|---|---|---|---|---|---|---|
| **F1** | **F2** | **F3** | **F4** | **F5** | **F6** | **F7** | **F8** |
| Call up softkey function 30 | | | | | | | Call up softkey function 31 |

## Required configuration of the basic softkey level:

*Title*    `250 0 0 0 0 0 Tool management`

Group.
Softkey function. For options, refer to page 3–27 ff.
Type of softkey. For options, refer to page 3–31 ff.
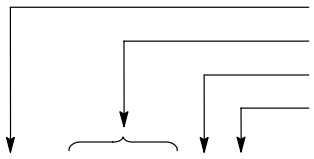Softkey text.

*available softkeys*
```
251  1 1 0 0 0 Sector\nselection
252 10 0 0 0 0 Show\nall tools
253  1 4 0 0 0 Filter
254  1 2 0 0 0 Load\nUnload
255  5 0 0 0 5 Process\ntool Data
256 40 0 0 0 0 Machine\nDiagnostics
257  0 0 0 0 0 .
258  1 3 0 0 0 Import\nExport
```
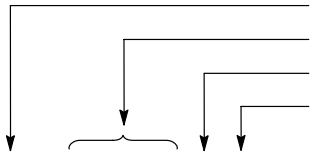
### Required configuration of softkey level 1

*Title*            260  0  0  0  0  0  Sector selection

```
                    ┌──────────────────────── Group.
                    │   ┌──────────────────── Softkey function. For options, refer to page 3–27 ff.
                    │   │  ┌───────────────── Type of softkey. For options, refer to page 3–31 ff.
                    │   │  │  ┌────────────── Softkey text.
                    ▼  ⌒⌒  ▼  ▼
```

*available softkeys*    261  2  1  0  0  4  Machine
                        262  2  2  0  0  4  Magazine\n1
                        263  2  3  0  0  4  Magazine\n2
                        264  0  0  0  0  0  .
                        265  0  0  0  0  0  .
                        266  0  0  0  0  0  .
                        267  0  0  0  0  0  .
                        268  0  0  0  0  0  .

### Required configuration of softkey level 2:

*Title*            270  0  0  0  0  0  Loading–Unloading

```
                    ┌──────────────────────── Group.
                    │   ┌──────────────────── Softkey function. For options, refer to page 3–27 ff.
                    │   │  ┌───────────────── Type of softkey. For options, refer to page 3–31 ff.
                    │   │  │  ┌────────────── Softkey text.
                    ▼  ⌒⌒  ▼  ▼
```

*available softkeys*    271  7  1  4  1  0  Load
                        272  0  0  0  0  0  .
                        273  0  0  0  0  0  .
                        274  0  0  0  0  0  .
                        275  0  0  0  0  0  .
                        276  0  0  0  0  0  .
                        277  0  0  0  0  0  .
                        278  8  1  5  1  0  Unload

### Required configuration of softkey level 3:

*Title*            280  0  0  0  0  0  Import–Export

```
                    ┌──────────────────────── Group.
                    │   ┌──────────────────── Softkey function. For options, refer to page 3–27 ff.
                    │   │  ┌───────────────── Type of softkey. For options, refer to page 3–31 ff.
                    │   │  │  ┌────────────── Softkey text.
                    ▼  ⌒⌒  ▼  ▼
```

*available softkeys*    281 30  0  0  0  1  Import\ndata Base
                        282  0  0  0  0  0  .
                        283  0  0  0  0  0  .
                        284  0  0  0  0  0  .
                        285  0  0  0  0  0  .
                        286  0  0  0  0  0  .
                        287  0  0  0  0  0  .
                        288 31  0  0  0  1  Export\ndata Base

# 6        Parameterizing the filters

## 6.1        When do you need filters?

● Whenever a subset of all records of the tool list is to be displayed.

The standard operator interface offers a number of filter functions which may be assigned to individual softkeys.

☞ **When the control unit is delivered, no filters have been parameterized.**

## 6.2        Function of the available filters

With the help of filters, you may search the data base for certain field contents. Only when the contents of a specified field match the current filter condition will the corresponding record be displayed.

☞ **The available filter functions use the field definitions of the standard tool data base (cf. page 3–9).**

There are 3 different filters:
● **Filter 1** performs a data base query for **data base field 1** (sector number).
● **Filter 2** performs a data base query for **data base field 3** (tool number)
● **Filter 3** performs a data base query for **data base field 7** (tool ID)

Only with filter 3, the filter condition can be additionally masked (cf. section 6.3, page 6–2).

The following figure shows the function of all filters and the related softkey functions (cf. section 3.15.1 from page 3–27):

```
 All records          Filter 1        All records
 of the data   ─────▶               of a certain
 base                 <P1>=2    ─────▶ sector ──────────┐
                                                        │
                                                        │
                                                        │      All records
                                 ──────────────────────────▶   of a certain
                                                        │       sector
                                 <P1>=10                │
                          ○──────────────              │      Records of a
                       ↑                                       certain sector
                                 <P1>=11       Filter 2 ─────▶ with a certain
                       ○──────────○───────────▶               tool number
                                               <P1>=21  1)
                                 <P1>=13
                       ○──────────○                           Records of a
                       ↓                                      certain sector
                                 <P1>=12       Filter 3 ─────▶ with a certain
                       ○──────────                            tool ID
                                               <P1>=13

                                               Filter 3        Records of a
                                                               certain sector
                                               <P1>=22  2)────▶ with a certain
                                               <P1>=23  3)     tool ID
```

```
<P1>=x:  Function assigned to a softkey (cf. section 3.15.1 from page 3–27)
1)       Softkey with function 21 opens a dialog box for entering the desired tool number
2)       Softkey with function 22 opens a bit field dialog box for entering the desired tool ID
3)       Softkey with function 33 opens a bit field dialog box for entering a mask (cf. section 6.3, page 6–2)
```

## 6.3    Function of a mask

☞ **Masks can only be set with filter 3 (data base field 7; tool ID).**

A filter condition for the tool ID is specified by activating and deactivating certain check boxes in the bit field dialog box.
Afterwards, only those records will be displayed whose tool ID exactly matches this filter condition.
The filter accounts for **all** logically true and **all** logically false statuses – i.e. the status of **all** check boxes.

In order to account for the status of **certain** check boxes, you should use the mask. In the bit field mask, you activate those check boxes which are to be relevant for the filtering process.
Enter the desired logic statuses of the relevant check boxes in the bit field dialog box.



## 6.4 Procedure for setting filters

1. Assign the desired filter functions within the scope of softkey parameterization (cf. sections 5.2 and 5.3 from page 5–1) to selected softkeys. Please also note the information given in section 6.2.
   An example of a parameter setting is given in section 6.5 from page 6–3.
2. Turn the filters on or off with the softkey. Filter conditions can be entered in dialog boxes or permanently set by defining suitable parameters.

## 6.5 Example of filter parameter settings

The following example shows the configuration of possible filters.

Use the information in
- section 3.15.1 from page 3–27 (available softkey functions) and
- section 3.15.2 from page 3–31 (available softkey types)

for a better understanding of the program.

Calling up tool management in → Tool Set–up
the MANUAL GOM

| | Sector selection | Show all tools | Filter | Load/ Unload | Process tool data | Machine Diagnostics | | Import Export |
|---|---|---|---|---|---|---|---|---|

**Basic softkey level in tool management**
Return to this level with the return key (F9).

| F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 |
|---|---|---|---|---|---|---|---|
| | Call up softkey function 10 | | cf. section 5 | cf. section 5 | cf. section 5 | | cf. section 5 |

Call up softkey bar 1

Call up softkey bar 4

**Softkey bar 1**

| ● Machine | ○ Magazine 1 | ○ Magazine 2 | | | | | |
|---|---|---|---|---|---|---|---|

| F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 |
|---|---|---|---|---|---|---|---|
| Call up softkey function 2 | Call up softkey function 2 | Call up softkey function 2 | | | | | |

**Softkey bar 4**

| ● Filter OFF | ○ Tool no. Filter ON | Define tool no. | ○ Tool ID Filter ON | Define Tool ID | Define Mask | | ○ Large Tools |
|---|---|---|---|---|---|---|---|

| F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 |
|---|---|---|---|---|---|---|---|
| Call up softkey function 10 | Call up softkey function 11 | Call up softkey function 21 | Call up softkey function 12 | Call up softkey function 22 | Call up softkey function 23 | | Call up softkey function 13 |

Softkeys 1 to 3 in softkey bar 1 are assigned to filter 1.
A data base query for data base field 1 (sector number) will be carried out.
Filter conditions of the individual softkeys:  "Machine":  sector no. 1
"Magazine1":  sector no. 2
"Magazine2:  sector no. 3

Softkeys 2 and 3 in softkey bar 4 are assigned to filter 2.
A data base query for data base field 3 (tool number) will be carried out.
The filter condition (a certain tool number) can be entered in a dialog box by actuating softkey 3. The title of this dialog box may be defined in group 237 (cf. page 3–22).

Softkeys 4 to 6 in softkey bar 4 are assigned to filter 3.
A data base query for data base field 7 (tool ID) will be carried out.
The filter conditions (logic statuses) can be entered in a bit field dialog box by actuating softkey 5. The title of this dialog box may be defined in group 235 (cf. page 3–22).
The check boxes to be relevant for the filter in the bit field dialog box (= the mask) can also be entered in a bit field dialog box by actuating softkey 6. The title of this dialog box may be defined in group 236 (cf. page 3–22).

Softkey 8 in softkey bar 4 is also assigned to filter 3. However, since the filter condition and the mask have already been transferred to the filter by parameterizing softkey function 13, no dialog box will open when softkey 8 is actuated.

Softkey 1 deactivates filters 2 and 3.

### Required configuration of the basic softkey level:

*Title*    `250 0 0 0 0 0 Tool management`

Group.
Softkey function. For options, refer to page 3–27 ff.
Type of softkey. For options, refer to page 3–31 ff.
Softkey text.

*available softkeys*
```
251  1 1 0 0 0  Sector\nselection
252 10 0 0 0 0  Show\nall tools
253  1 4 0 0 0  Filter
254  1 2 0 0 0  Load\nUnload
255  5 0 0 0 5  Process\ntool Data
256 40 0 0 0 0  Machine\nDiagnostics
257  0 0 0 0 0  .
258  1 3 0 0 0  Import\nExport
```

### Required configuration of softkey level 1

*Title*    `260 0 0 0 0 0 Sector selection`

Group.
Softkey function. For options, refer to page 3–27 ff.
Type of softkey. For options, refer to page 3–31 ff.
Softkey text.

*available softkeys*
```
261  2 1 0 0 4  Machine
262  2 2 0 0 4  Magazine\n1
263  2 3 0 0 4  Magazine\n2
264  0 0 0 0 0  .
265  0 0 0 0 0  .
266  0 0 0 0 0  .
267  0 0 0 0 0  .
268  0 0 0 0 0  .
```

### Required configuration of softkey level 4:

*Title*    `290 0 0 0 0 0 Filter`

Group.
Softkey function. For options, refer to page 3–27 ff.
Type of softkey. For options, refer to page 3–31 ff.
Softkey text.

*available softkeys*
```
291 10 0 0 0 0  Filter OFF
292 11 0 0 0 4  Tool no.\nFilter ON
293 21 0 0 0 0  Define\ntool no.
294 12 0 0 0 4  Tool ID\nFilter ON
295 22 0 0 0 0  Define\nTool ID
296 23 0 0 0 0  Define\nMask
297  0 0 0 0 0  .
298 13 1 1 0 4  Large\nTools
```

Notes:

# 7 Loading and unloading tools

## 7.1 Prerequisites

The basic prerequisites for performing loading and unloading processes **on the CNC side** include:

● Definition of the loading and unloading locations.
 On principle, loading and unloading locations simply are regular records of the tool data base and are normally located in sector 1.
 Loading and unloading locations are clearly defined by the sector and location number.
 The loading and unloading locations are therefore defined within the groups

  ● 1 to 30 (sectors and number of locations in individual sectors)
   and

  ● 31 to 50 (names of locations in sector 1).

☞ **The standard tool data base already contains the definitions of a loading location and an unloading location (loading location: sector 1, location 4; unloading location: sector 1, location 5). Cf. section 3.3, page 3–5.**

 ● Definition of flags whose contents have to be evaluated by the PLC during a loading/unloading process, cf. section 3.13, page 3–23.
 ● Definition of softkeys triggering a loading or unloading process. Refer to `<P1>=7` on page 3–28 and `<P1>=8` on page 3–28.
 ● If a dialog box is to be available in order to select a sector/location selection for loading, this dialog box also has to be defined in groups 199 and 200, cf. section 3.8, page 3–15.

**On the PLC side**, suitable program routines have to be carried out for monitoring the relevant flags, performing appropriate action when the flag contents change (e.g. for a tool change) and acknowledge the required action to the CNC.

## 7.2 Loading process

★ Select default record from the tool list.

★ Press "Load" softkey.
 The "Load" dialog box is displayed showing the data of the selected record.

★ Enter the data of the new tool to be used into the dialog box.
 The sector and location fields cannot be edited at this point.

 If a text has been parameterized in `<P6>` of group 200 (cf. section 3.8, page 3–15), a softkey is offered in the current softkey level by which a dialog box can be opened for entering the sector and location.

★ If the tool is to be taken from the loading location to a certain sector/location, open the "Sector/Location selection" dialog box and enter the destination. As soon as you have confirmed your entries, the sector/location numbers will be accepted to the corresponding fields of the "Load" dialog box.

★ Put the tool into the loading location.

★ Confirm the inputs in the "Load" dialog box by hitting the appropriate softkey.

The CNC will now perform the following action:
● The data contained in the "Load" dialog box is entered in the loading location (sector and location of the corresponding record are specified as <P2> and <P3> when softkey function 7 is defined; cf. *<P1>=7* on page 3–28).
● If parameter <P3> in group 240 contains a value larger than 0: Transfer the sector and location indicated in the "Load" dialog box to the PLC by way of a flag.
● The PLC is informed that a loading process is to be initiated. For this purpose, the CNC uses the flag specified in parameter <P1> of group 240 (controlling the loading process): The number of the loading location is entered here (the number of the loading location is specified as <P4> when defining softkey function 7; cf. *<P1>=7* on page 3–28).
● Exit the "Load" softkey level.

The PLC carries out the loading process:
● The tool is loaded from the loading location to the magazine. The magazine location is either determined by the PLC, or it has been specified by the user.
● The tool data is copied from the loading location to the corresponding sector/location in the magazine. The data stored in the loading location is deleted.
● The flag for controlling the loading process is set to 0.

## 7.3 Unloading process

★ Select record to be unloaded from the tool list.

★ Press "Unload" softkey.
The "Unload" dialog box containing the data of the selected record will be shown.

★ Confirm the "unload" dialog box by hitting the appropriate softkey.

The CNC will now perform the following actions:
● The data contained in the "Unload" dialog box will be entered in the unloading location (sector and location of the corresponding record are specified as <P2> and <P3> when defining softkey function 8; cf. *<P1>=8* on page 3–28).
● If parameter <P3> in group 240 contains a value larger than 0: Transfer the sector and location displayed in the "Unload" dialog box to the PLC by way of a flag.

● The PLC is informed that an unloading process is to be initiated. For this purpose, the CNC uses the flag specified in parameter `<P2>` of group 240 (controlling the unloading process): The number of the unloading location is entered here (the number of the unloading location is specified as `<P4>` when defining softkey function 8; cf. `<P1>=8` on page 3–28).

● Exit the "Unload" softkey level.

The PLC will carry out the unloading process:

● The PLC determines the tool to be unloaded.

● The tool is taken from the magazine to the unloading location.

● The tool data is transferred from the corresponding sector/location of the magazine to the unloading location. The data of the unloaded tool is deleted.

● The flag for controlling the unloading process is set to 0.

★   Remove the tool from the loading location.


## 7.4        Parameterization procedure


☞   **It is assumed that development mode has been activated (cf. section 2.5, page 2–10) for the procedure described below.**

★   In order to change the relevant parameters, you should proceed as follows:

1. Go to the root directory.

2. First load the "toolprms.xxx" file into the NC editor.

3. To change

  ● the data base (number of records, location names in sector 1) please refer to the information provided in section 4

  ● flag addresses, refer to section 3.13, page 3–23

  ● softkeys, refer to section 3.15 from page 3–25 and section 5.3 from page 5–2.

  ● the dialog box for sector/location selection for loading, refer to section 3.8, page 3–15

  Edit the appropriate groups.

4. Save the "toolprms.xxx" file.

5. Call up the operator interface of the tool management function with the operating sequence MANUAL GOM ▶ TOOL SET-UP.

6. Test the new settings. Once you have checked their proper functioning, proceed to step 9.

7. For making additional changes:
   Go to the root directory and load the "toolprms.xxx" file into the NC editor. Proceed with step 3.

8. Deactivate development mode (cf. page 2–10).

9. Copy the "toolprms.xxx" file to the "User-FEPROM" directory to back up the current data.

Notes:

# A    Annex

## A.1    Abbreviations

| Abbreviation | Description |
| --- | --- |
| C: | Drive name, in this case drive C (hard disk drive) |
| ESD | Electro-Static Discharge Abbreviation for all terms relating to electro-static discharge, e.g. ESD protection, ESD hazards, etc. |
| Fx | Function key with number x |
| GOM | Group Operating Mode |
| HP | Main Program ('Hauptprogramm') |
| LSEC | Lead Screw Error Compensation |
| MDI | Mode "Manual Data Input" |
| MP | Machine parameter |
| MSD | Machine-Status Display |
| MTB | Machine-Tool Builder |
| NC, CNC | Control Unit |
| OI | Operator Interface |
| OM | Operating Mode |
| PE | Protective Earth |
| PLC | Programmable Logic Controller |
| SK | Softkey |
| SP | Subprogram |

## A.2    Index

Your notes:

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