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User Manual for PinMark Marking Systems with UMC-111 Control Unit

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# Appendix *(see separate table of contents)*

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**Contents**

# 1 General

## 1.1 About this manual

Congratulations to the purchase of a marking unit from Östling.

Since our software is being actualized and improved all the time it's possible that minor changes are not included in this manual.

We have thoroughly checked our software and documentation but we cannot prevent all errors.

In such a case we would be happy to receive error reports and suggestions for correcting those.

> **The proper functioning and the working life of this unit depend on correct handling and maintenance. The operating and maintenance instructions must be read by the operating personnel before the unit is used.**

## 1.2 Copyright

We reserve all rights for this technical document, and also including the section on patents or trademarks.
This technical document may not be duplicated nor made accessible to third parties without our explicit approval. It may also not be misused in any way by the recipient.

## 1.3 Liability

Our liability is limited to that stated in our terms and conditions of supply for any deficiencies in the shipment.
The period of warranty is as contractually agreed. We have no liability whatsoever for damage caused by inappropriate handling of the product or by failure to follow the operating instructions.

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## 1.4 Ordering Spare Parts and Making Inquiries

Please provide the following details for all inquiries:

```
Machine type
Machine serial No.
Controller No.
Year of manufacture
Spare part No. (from the parts list)
```

## 1.5 Our Address

ÖSTLING MARKIERSYSTEME GmbH
Broßhauserstraße 27
D-42697 Solingen
Tel.:   0212 / 2696-0
Fax:   0212 / 2696-199

## 1.6 Safety Precautions

The following regulations are of particular importance with regard to safety legislation concerning technical equipment (Equipment Safety Law):

| **VDE 0113 (EN 60204)** | for electrical components in machining and material treatment machines with rated voltages of less than 1000 V |
|---|---|
| **VBG 4 UVV** | „Electrical Systems and Units" |
| **VBG 7a UVV** | „Work machines" (General) |

The unit and its safety features must be checked for proper functioning and to determine its condition at least as often as the periods stated in the regulations given.
The safety devices and functions are only effective if the system is used appropriately.

### 1.6.1 Accident prevention

Our machines are equipped as standard with all the necessary protective and safety devices. We wish to emphasise especially strongly that it is most important to comply with all the protective and preventive measures to prevent accidents!

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> **Compliance with all the accident prevention regulations avoids placing the operating personnel at risk of serious injury or even death.**
> **Never reach into the working area during the marking operation under any circumstances.**

Parts of the body could be ***crushed*** if caught by moving parts in the feed path. This is a particular danger in manual operation and when setting up.
*Take suitable measures to avoid any risk of being crushed.*
The stroke of the marking tool is approx. 1-4 mm in the case of the pinmarking needle and a maximum of 10 mm in the case of the engraving tool.

***Injuries*** could be caused by incorrect handling of the pointed marking tools. It is also necessary to ensure that no parts of the body are in front of the marking needle when the marking tool is switched on.
Never reach into the marking head, i.e., between the shafts on which the carriage moves during operation, because there is a risk of injury from the movements of the slide.

# 1.7 Measures to Prevent Electronic Interference

## 1.7.1 Basic principles

The following list provides help on preventing interference or in suppressing interference from electrical equipment:

- Take the mains power supply directly from the switch cabinet feed.

- Signal cables must not be laid together with cables carrying power.

- Signal cables may not be laid in a channel with cables from units that would cause interference (contactors, power motors, etc.). Otherwise you should use shielded mains cable and earth the shielding at one end. The same applies for the auxiliary power supply for controllers and isolating amplifiers.

- Sources of severe interference such as contactors and motors should be suppressed (RC components). Within the switch units you should only use switching equipment and other devices that have been suppressed by RC combinations, for example. In this case it is necessary to note the standard codes of practice for electrical work (VDE, DIN and the corresponding EN.

- The reference value output must be shielded. The shielding must be earthed at one end.

- Controllers and switchover relays for the manual setting of reference values should be placed as close as possible to the program encoder. If it is not possible to do this, an isolating amplifier is to be installed in the reference value output immediately behind the program encoder.

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## 1.7.2 Complying with interference suppression as per CE

The following gives some information on connections to ensure compliance with interference suppression as per CE.

Use shielded control cables to connect all external components such as the PinMark, foot pedal and signal inputs and outputs to the BU2 socket (DB37) whereby the shielding of all the cables is to be connected at one end (at the controller end) and is to be kept as short as possible to the central (marked) earthing terminal at the back of the casing.

The table housing is to be connected to the above-mentioned central earthing terminal (called the device earth) via a separate earthing cable to the system earth (at the power supply feed) or to the central earth supply point of the unit when integrating the table housing into a more sophisticated PinMark unit. The cross-section of this connection should be at least 2.5 mm².

Interference suppression as per CE can only be assured if the following conditions are complied with:

a) The length of the connecting cable between the controller and the PinMark is equal to or less than 2 m.

b) By using 2-core shielded cable for the foot pedal cable, which must have a 2-pole jack plug made of plastic.

c) The length of the foot pedal cable may not exceed 3 m and it is necessary to ensure that the cables are laid separately and well away from any possible sources of interference (motors / contactors, etc.), in the same way as for the connecting cables to the PinMark.

The following should be noted when connecting external components to the PinMark controller:

a) The components used (monitor, printer, keyboard, etc.) must likewise comply with the CE standards for industrial use.

b) Do not use „cheap imports" for the connecting cables between the controller and external components (also via the RS-232 outputs), but instead only use shielded cables and plugs with metal housings. In this case the length of the connection must be limited to a maximum of 2 m.

c) If connections to or from the serial interface (RS-232) cause functional errors, then change over from this type of connection to one that is not subject to interference (RS-485, fibre optic connection, galvanic separation through an opto-electronic coupler, etc.).

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# 2 Hardware

## 2.1 Model Series

### 2.1.1 Control Unit UMC-111

All machines from the PinMark series are controlled by the control unit UMC-111 (Universal Marking Control).

Its special features are the large LC-Display, its expandabilty and its modularity. It's suitable for many applications.

The UMC-111 is equipped with a 586 type CPU, 4 MB of RAM, a harddisk and a floppy disk drive. To control two stepper motors, two stepper motor driver cards are included in series.

The unit is usually controlled with a standard PC keyboard, but some functions can also be accessed with the built-in keypad.



*The UMC-111 Control Unit*

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## 2.1.2 Unit configurations

The unit can be configured as a table-type unit, hand-type unit, built-in unit or combined unit (a combination of the table-type and hand-type units).

Use the configuration that is best suited for the application.
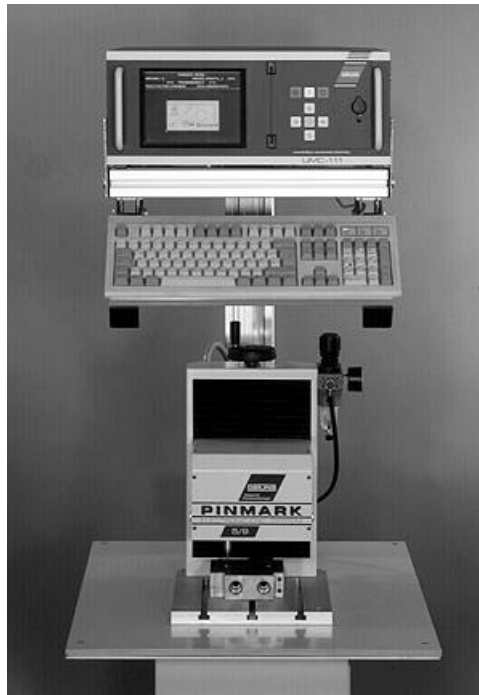


*The marking system  PinMark 5/9 T with control unit UMC-111*

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### 2.1.2.1 Table model

The table model is delivered mounted on a stand. The marking head can be manually adjusted in z-direction and allows to machine different workpieces. Table models are available in all 4 different sizes.

### 2.1.2.2 Manual model

The marking had of the manual model can be manually put onto the workpiece with a handle. The marking process can be started with a trigger button on the handle. Manual models are only available in the sizes 5/9 (90 x 50 mm²) and 8/14 (140 x 80 mm²).

### 2.1.2.3 Integration model

The integration model corresponds to the table model, but no stand is delivered with it. It's meant for the integration in a bigger installation. Integration models are available in all sizes.

### 2.1.2.4 Combined model

The combined model is a combination of the table and hand models. Depending on the application the marking had can be used with the stand or, especially when marking a bigger workpiece, the marking head can be taken off and put onto it like a hand model.
Like hand models combined models are only available in the sizes 5/9 (90 x 50 mm²) and 8/14 (140 x 80 mm²).

### 2.1.2.5 Special designs

Of course special designs are also possible. Contact us and tell us your needs.

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## 2.1.3 Marking head configurations

The various marking head configurations differ in the <u>type of drive</u> and the <u>size of the marking area</u>.



*The marking heads 5/9, 14/18 and 4/6 with different tools*

<u>All the standard marking heads have two linear motional axes as standard</u>. It is possible to supply to special order marking heads with only one axis which can then be equipped additionally with an external rotational axis.

In terms of drive units, a <u>toothed belt drive unit</u> is provided for pinmarking systems and a <u>spindle drive unit</u> for engraving systems.

The more complicated spindle drive unit is necessary for engraving systems because the movement of the *engraving tool* produces far greater forces than those involved with the *pinmarking needle*.

The <u>size of the marking area</u> ranges from 60 mm x 40 mm to 180 mm x 140 mm.

## 2.1.4 Combinations available

| Description | Marking area | Table model(T) | Manual model (H) | Combined model (K) | Integration model (E) |
|:---:|:---:|:---:|:---:|:---:|:---:|
| **4 / 6** | $60 \times 40$ mm | **P** | **-** | **-** | **P** |
| **5 / 9** | $90 \times 50$ mm | **P** | **P** | **P** | **P** |
| **8 / 14** | $140 \times 80$ mm | **P / RP** | **P / RP** | **P / RP** | **P / RP** |
| **14 / 18** | $180 \times 140$ mm | **P** | **-** | **-** | **P** |

**P** stands for configuration as a pinmarking system with toothed belt drive.
**RP** stands for configuration as an engraving system with spindle drive.

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# 2.2 Motional Axes

The PinMark marking system can be supplied ex-factory with 2 or 3 motional axes.

## 2.2.1 Marking unit with 2 axes

This is the standard configuration. Both motional axes are incorporated into the marking head.

It is possible to obtain to special order a head with just one axis combined with an external rotational axis.

## 2.2.2 Marking unit with 3 axes *(option)*

The two linear axes of the marking head are supplemented by an external rotational axis in the type with 3 axes.

It is possible to machine flat and round workpieces with this type. It is only necessary to set whether the second linear axis or the rotational axis is to be used as the Y-axis in the marking process. This is done in the system menu and is described in the Configuration section (p. 4-1).

The generated surface of the workpiece is shown in a preview if the rotational axis is used as the Y-axis. Positioning in the Y-direction on the screen produces a rotation of the workpiece.

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# 2.3 Multi-head operation *(option)*

As an option, it is possible to operate 2 marking heads on a single UMC-111 controller unit and to switch between them in software.

It is not possible to work with both heads at the same time!

To switch between both heads, use the apropriate or an external PLC.

Each head can only use its own two linear axes.

# 2.4 Marking Tools

The various marking tools and their application are described below.

## 2.4.1 Basic types

Basically, two types of tools are used: pinmarking needles and engraving tools.

These two types differ in the way that the material is moved around.

### 2.4.1.1 Pinmarking needle

The *pinmarking needle* is made of hard metal and is made to oscillate by pneumatic means and marks the structure in the form of a dense series of dots in the workpiece.
The material is simply displaced.
Pinmarking heads are normally provided with toothed belt drive.

### 2.4.1.2 Engraving tool

The *engraving tool* has a diamond point and is continuously pressed into the material. The structure is engraved into the surface in this case.
This is a form of machining type of the material.
Since movement of the engraving tool involves considerably greater forces than those for the pinmarking needle, engraving heads are always provided with spindle drive units.

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## 2.4.2 Use of various tools

Not all the tools can be used with each marking head.
There are two different sizes of tool holders:

Marking systems with heads of types 4/6 and 5/9 have a smaller needle holder and can only be used with type III needles.

All other units can only be used with needles of types I and II.

```
WE I R
2,5 - 4 bar
```



0 – 8 mm
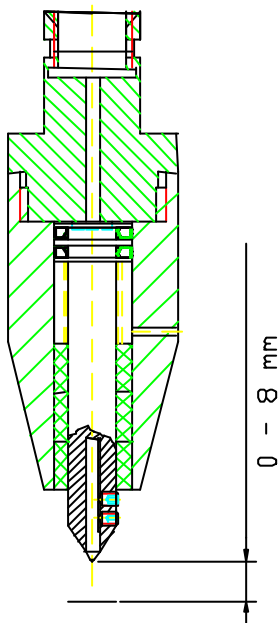
### Engraving tool

#### Properties:
The diamond point is pressed against the workpiece by compressed air. In this way linear shapes and text are engraved into the workpiece.
The marking speed is slightly less than the speed of the engraving needle.

#### Application:
The *engraving tool* can only be used in heads especially designed for this purpose. These marking heads have especially robust spindle drive units.
The clearance between the needle tip and the workpiece should be within a range of 1 - 8 mm.

```
WE I-4/6-12
4 - 8 bar
```



3 – 5 mm
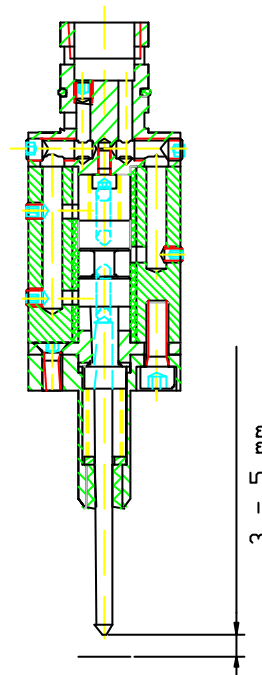
### Deep marking needle

#### Properties:
The needle tip is made to oscillate by compressed air. Thus the material in the workpiece is compressed and displaced. This needle is characterised by a long stroke and by its width. For this reason this needle is especially suitable for deep marking.

#### Application:
The *deep marking needle* can be used in all heads of types 14/18, 8/14 and in the engraving units.
The clearance between the needle tip and the workpiece should be within a range of 3 - 5 mm.
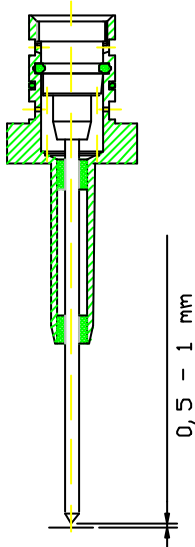
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WE II

3 – 6 bar

## Pinmarking needle

### Properties:

The needle tip is made to oscillate by compressed air. Thus the material in the workpiece is compressed or displaced. This needle is characterised by a high needle frequency and is therefore suitable for almost all applications. Even small markings can be produced without any problems with this standard needle.

### Application:

This pinmarking needle can be used in all heads of types 14/18, 8/14 and in engraving units.
The clearance between the needle tip and the workpiece should be within a range of 0.5 - 1 mm.

WE III

3 – 6 bar
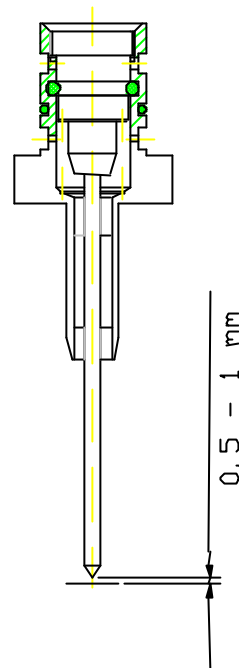
## Pinmarking needle

### Properties:

*See type WE II*

### Application:

This pinmarking needle can be used in all heads of types 5/9 and 4/6.
The clearance between the needle tip and the workpiece should be within a range of 0.5 - 1 mm.

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# 2.5 Initial Commissioning

The following points are essential when putting a marking system into operation:

- Set up the unit at the desired location with due regard to all safety regulations.
- Supply the PinMark *with cleaned and oiled* compressed air at the requisite connection.
- Connect the PinMark head to the PinMark controller. (Except PinMark 14/18 T)
- Connect the PinMark controller to the mains power supply (230V 50/60 Hz) by means of a suitable cable.
- Switch on the PinMark.

The following gives some information on setting up and installing a PinMark system, but this may not apply to every system.

## 2.5.1 Installing and setting up the PinMark head (integration models only)

Installation of the PinMark head depends on the options available. All PinMark heads are shipped ready for use so that there should be no problems when they are installed in the unit. It is, however, necessary to note certain points to ensure trouble-free operation and a long working life.

General information on the PinMark head:
- The needle may only be operated with a *Maintenance unit with oiler*.
- All built-in units must be installed so that they can be adjusted to allow subsequent alignment and precise setting of the clearance of the needle tip to the workpiece.
- The optional PinMark cover with expansion bellows can only be used if the PinMark head is used horizontally.

Notes on vertical / side mounting:
- In the case of a vertical installation it is possible for the carriage to move by itself, since the motors are without power after switching off and there is no self-holding function.
- The optional PinMark cover cannot be used.
- The PinMark head should only be installed with the Y-axis vertical (the axis with the smallest travel path.

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## 2.5.2 Connecting the PinMark to an external controller

The PinMark can be fully controlled externally and information can be exchanged via an external BU2 connection. The pinouts for the plug connections are described in the appendix.

There is a supply voltage of 24V DC at the digital outputs when the corresponding output is „high". The output is switched off to 0V DC for a -„low"-signal. The maximum current switched by each output may not exceed 0.5 amperes. It is also necessary to ensure that the *total loading of all the outputs does not exceed a total current of 0.5 A*.

When switching the inputs, it is necessary to ensure that the maximum input voltage related to the lower reference potential of 0V DC, is *+25V DC*.
The *lower* reference potential *for all digital inputs and outputs* is the GND signal which is made available at both the 26-pin round socket (BU1) and the DB37 plug connector (BU2) on the controller side.
The *upper* reference potential *for all digital inputs and outputs* is the +24V DC which is made available at both the 26-pin round socket (BU1) and the DB37 plug connector.

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# 3 Software

## 3.1 Overview

This section describes the operation and functions of the PinMark marking system.



*Fig. 1 : The start-up screen for the PinMark software*

All the details relate to the „NADEL.EXE" application program which is automatically started when the marking system is started up. The start-up screen shown above is displayed during boot-up. The version number of the software can be seen on the start-up screen.

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### 3.1.1 Scope of the functions

- The software offers true WYSIWYG; the display shows an exact preview of the results on the workpiece.

- Communication is possible both by an RS-232 interface and with the controller of the Pin-Mark through digital inputs and outputs.

- The marking system can handle both text and graphics.

- The built-in standard character set covers the majority of ASCII characters, including German umlauted characters.

- The text can be aligned to the left or to the right or centred.

- The text can be slanted and also aligned about an arc *(circular text)*.

- The character size, character width, character spacing and marking speed can be set individually.

- The current date, time or an automatically incrementing serial number can be marked by using *placeholders*.

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## 3.1.2 Keyboard

The UMC-111 has two keyboard connectors: One at the backside, the other is mounted in right side of the front door. They can be used alternatively.

The PinMark software can completely be operated with a standard PC keyboard with 102 keys, which must be connected to one of the keyboard jacks.

In Addition the key pad located at the front of the unit can be used to access the most important functions. These keys are mapped to particular keys of the standard keyboard.

| Key Pad | Keyboard | Function |
|---|---|---|
| Green Arrow | [ RETURN ] or [ ENTER ] | Confirm; Change to next field |
| Question Mark | *not assigned* | |
| Red Key | [ ESC ] (Escape) | Cancel; back to the last menu |
| Up | Up | Go up |
| Down | Right | Go right |
| Down | Down | Go down |
| Left | Left | Go left |
| Circle | [ TAB ] (Tabulator) | Change to next field |

From the startup of the machine to the start of the marking process you can always press the [ RETURN ] key or the green arrow. These keys always bring you to the next step. The marking process can be started without a PC keyboard with keys mentioned above.

## 3.1.3 Basic principles of operation

The system is based on the use of „Text fields" and „Masks".

A number of text fields can be incorporated in one *mask*.

A *mask* can be, for example, a type plate, in which the individual fields such as year of construction, serial number, etc., can be represented by the individual *text fields*.

A *mask* can consist of up to 26 *text fields* of 30 characters each or else graphics.

It is possible to allocate a number of different parameters such as alignment, character size, character width and character spacing to the individual text fields in a *mask*.

Allocation of the *text fields* within the *mask* is determined by their X- and Y-coordinates, and the zero point of the coordinate system is at the left-hand lower corner of the marking area.

The *masks* are stored as files on the hard disk of the controller unit.

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# 3.2 Basic Points

## 3.2.1 Quick-start

- Switch on the unit.
- Press [ F2 ] (*Edit & Engraving*)
- Press [ F2 ] (*Load mask*) or press [ ENTER ] (*Input or edit mask*)
- Press [ F5 ] (*Engraving*)
- Input the number of parts for the job and press [ ENTER ]
- Press the foot pedal to start the marking process. Press the foot pedal again to process another workpiece.

## 3.2.2 Switching ON and OFF

The controller unit can be switched off at any time, but do not press any key for a few seconds before that.

Note that the *mask* that was most recently used is stored, otherwise any changes made since the last save would be lost.

When inputting larger masks, it is recommended to save the data regularly to avoid losing any data if the unit is switched off unexpectedly (e.g., in the event of a failure of the power supply or an emergency stop).

> **The controller must remain switched off for at least 10 seconds before it is switched on again. Failure to follow this rule can cause damage!**

## 3.2.3 Initiating the marking process

The marking process can be initiated either by pressing the foot pedal or by integrating the unit into an overall system by means of the BU2 socket. (See the List of Pinouts for details.)

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# 3.3 The Menus

The PinMark software is very simple and intuitive to use, since it is arranged into a number of different menus.

It is possible to quit from each menu with the Escape key **[ESC]** which jumps back to the next higher menu level. If Escape is pressed several times, you will finally return to the main menu.

You can move backwards and forwards between the input fields with the TAB key **[⇆]** and the Shift-TAB key combination **[Ý]** + **[⇆]**. These functions can also be carried out with the cursor keys.

Inputs into input fields do not need to be confirmed with the [ENTER] key.

The changes are automatically saved when you quit an input field.

## 3.3.1 Main Menu

The Main menu appears after starting the PinMark system.
*(The unit goes direct to the Engraving menu if the unit has been configured for automatic mode)*
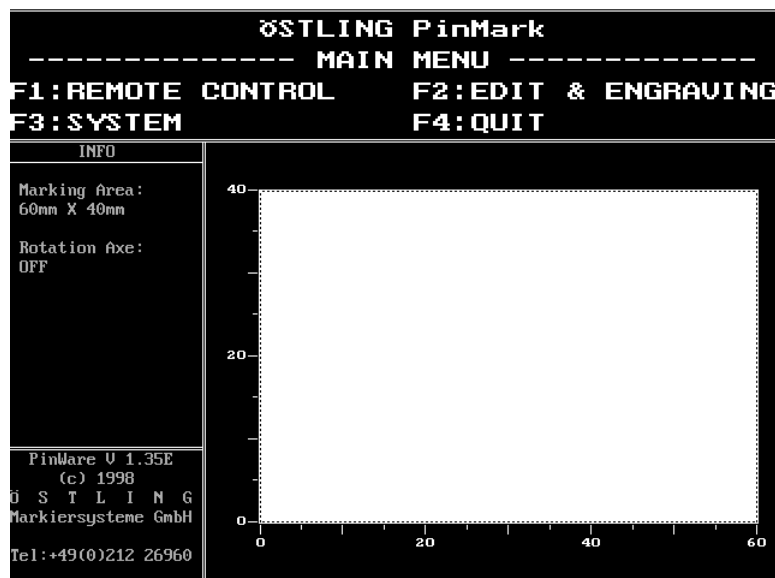


*Fig. 2 : The Main menu*

It is possible to go from the Main menu to the various sub-menus via function keys **[F1]** to **[F4]**.

| Key | Description | Function |
|-----|-------------|----------|
| F1 | Remote control | Activates remote control mode |
| F2 | Edit & Engraving | Edit, load or save masks, start the marking process |
| F3 | System | System settings |

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### 3.3.2 Remote control [F1]

*Remote control mode* is activated with key **[F1]**.
The controller unit can be connected to a host PC via a serial interface. The controller unit is then operated remotely from the PC, the PC working as „Master" and the marking system as „Slave".



*Fig. 3 : Remote control mode*

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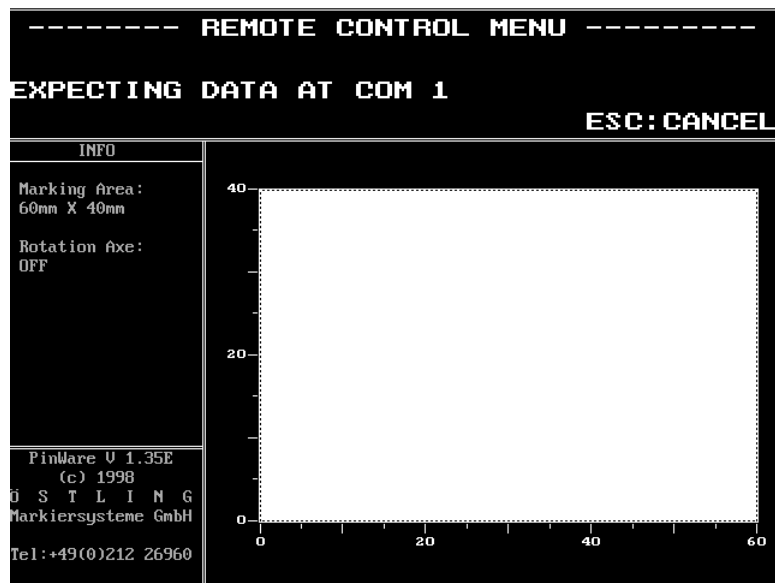
### 3.3.3 Edit & Engraving [F2]

#### 3.3.3.1 General

Here the *masks* and *text fields* can be <u>loaded,</u> <u>edited</u> and <u>saved</u>, and also the <u>marking process</u> can be started.

The name of the current mask and the name of the character set used (the default is „STD7_PS.ZEI") are displayed on the right-hand side.

```
F1:NEW FILE              F2:LOAD FILE
F3:SAVE FILE             F4:TEACH-IN
F5:ENGRAVING        CHAR.-SET=STD7_PS .ZEI
KEY:ENTER               FILE=NONAME   .MSK
```

```
     INFO
 Marking Area:
 60mm X 40mm

 Rotation Axe:
 OFF



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    (c) 1998
 Ö S T L I N G
 Markiersysteme GmbH

 Tel:+49(0)212 26960
```
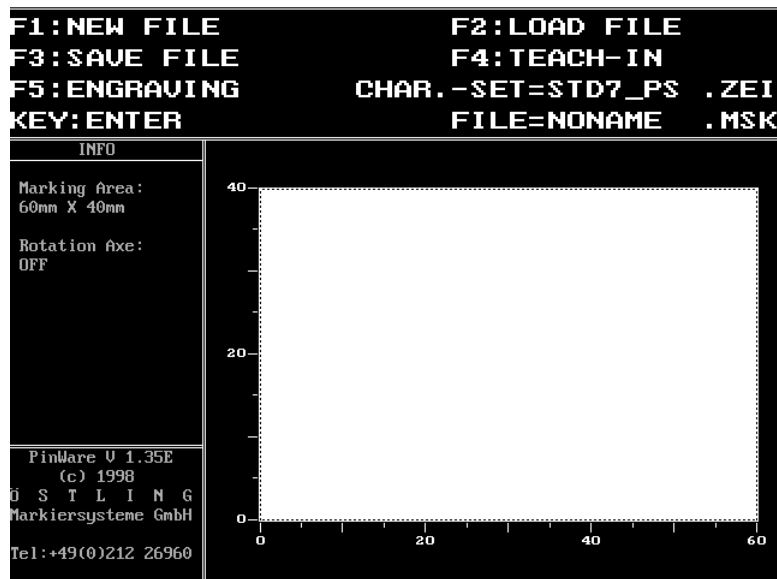
*Fig. 4 : Menu „Edit & Engraving"*

The following functions are available when you shift to the „Edit & Engraving" menu with [F2]:

| Key | Description | Function |
|-----|-------------|----------|
| F1 | New mask | Creates a new mask |
| F2 | Load file | Loads a *mask* or a character set |
| F3 | Save mask | Saves a *mask* |
| F4 | Teach-In | Interactively positions the text field |
| F5 | Engraving | Starts the marking process |
| All others | Input | Calls up the *mask editor* |

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### 3.3.3.2 Mask editor

If any key other than [F2] - [F4] is pressed in the „Edit & Engraving" menu, you go to the *mask editor*. Press the [ESC] key to go back to the „Edit & Engraving" menu. The functions available there through keys [F1] - [F4] are also available in the *mask editor*.
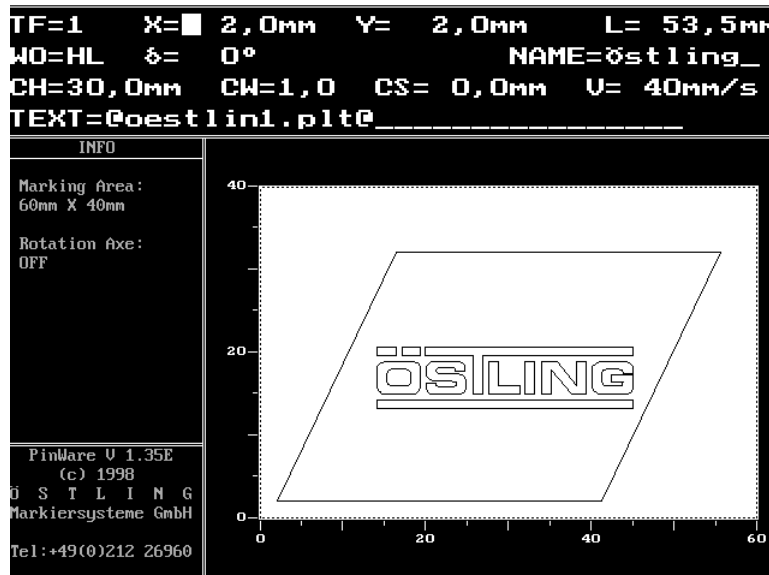


*Fig. 5 : The Mask Editor*

The *mask editor* always displays the properties of <u>a text field</u> of the current *mask*. The number of the <u>text field</u> being displayed is shown in the left-hand top corner behind the abbreviation „TF", e.g., „TF 19" for the 19th *text field* of the current *mask*.

<u>Shift between the maximum of 26 text fields with the [BILD ⇑] (Page Up) and [BILD ⇓] (Page Down) keys.</u>

The *mask preview* is displayed in the lower area and in such a way that the result looks like the workpiece once the marking process has been finished.

The preview of the *mask* can be <u>updated</u> by pressing key [F6].

A description of the individual parameters is given in section „*Masks and Text Fields*".

### 3.3.3.3 Function „New Mask" [F1]

When the system is started and when carrying out the „New Mask" function, mask „NONAME.MSK" is loaded to allow the *mask editor* to edit it.
If the *mask* that has been loaded at that time has not been saved yet, you will see a warning prompt to prevent an accidental loss of data.

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### 3.3.3.4 Function „Load File" [F2]

Existing *masks* or a different character set (if one exists) can be loaded with this function. *Masks* have the file extension „MSK" and character sets have the file extension „ZEI".



*Fig. 6 : Load file*

If you do not know the file name of the file that is being searched for, then just press the [EN-TER] key to give an overview of all existing *mask* files, since the preset placeholder (wildcard function) '*' displays all files available with the file extension given.
A file can be selected from this list and confirmed with the [ENTER] key. At the same time a preview is given of the file selected to make it easier to find the *mask* you want.

If there are more than 9 files, it is possible to page up and down with the [BILD ⇑] (Page Up) and [BILD ⇓] (Page Down) keys.

In addition to the '*' placeholder which represents as many characters as desired, it is also possible to use the question mark '?' to represent any desired character (a wildcard character).

> Example:
> All *mask* files starting with 'A' are to be displayed.
> *Input*: `*.MSK`
>
> All files in the following scheme are to be displayed: AB01CD.MSK, AB02CD.MSK, AB03CD.MSK, etc.
> *Input*: `AB??CD.MSK`

If the *mask* that has been loaded at that time has not been saved yet, you will see a warning prompt to prevent an accidental loss of data.

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### 3.3.3.5 Function „Save File" [F3]

The current *mask* is saved with this function.
If the old file name is to be used, it can be confirmed directly by pressing the [ENTER] key, otherwise another name can be entered.

If the mask had not been saved yet, it is necessary to enter a new file name, since the blank mask „NONAME.MSK" may not be overwritten.



*Fig. 7 : Save mask*

### 3.3.3.6 Function „Teach-In" [F4]



*Fig. 8 : The Teach-In function*

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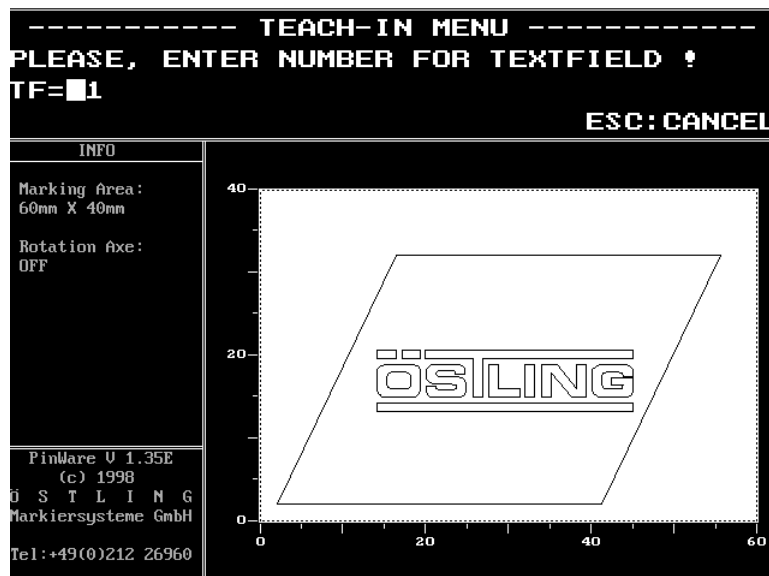
The Teach-In function allows the position of a text field to be entered interactively for the workpiece.
The workpiece is clamped to the machine and the marking tool is moved to the corresponding position with the cursor keys.

First you are asked for the number of the text field whose position is to be entered.

The position is determined in the X-direction with the „Left" and „Right" cursor keys [←] [→], and the „Up" and „Down" cursor keys [↑] [↓] control the Y-axis.

It is possible to have more precise control by using the „Minus" key [-]to reduce the step width. The „Plus" key [+] increases the step width.

The current step width and current position are continuously displayed in the upper area.

The settings are saved with the [ENTER] key and *Teach-In mode* is quit.

### 3.3.3.7 Function „Engraving" [F5]

The actual marking process is started here.
First you are asked for the number of workpieces to be engraved. Values between 1 and 99999 are possible.



*Fig. 9 : The Engraving menu*

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It is necessary to initiate the process in a suitable way, e.g., with the foot pedal.
The number of parts is reduced by 1 after the process and then the process is repeated until the job has been completed.



*Fig. 10 : The Engraving menu*

### 3.3.3.8 Function „Update Preview" [F6]

The preview of the *mask* in the lower area of the screen can be updated with key [ F6 ].

## 3.3.4 System menu [F3]

The System menu allows settings to be made concerning the system as a whole and to call up information about the system.

More detailed information can be found in section 4 „Configuration" (p. 4-1)

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# 3.4 Masks and Text Fields

This section describes the use of *masks* and *text fields*.

Several text fields belonging to a workpiece are always summarised under one *mask*.
The maximum number of *text fields* per *mask* is 26.

The following describes the parameters that can be allocated within the *Mask editor* to the individual *text fields* independently of each other to allow specific formatting, for example.

## 3.4.1 Parameter overview

| Parameter | Name | Possible input | Meaning |
|---|---|---|---|
| **TF** | Text field number | 1 to 26 | No. the current text field. Change with [Page Up] and [Page Down] |
| **X** | X-coordinate | 0.0 to the limit of the marking range | X-coordinates of the reference point |
| **Y** | Y-coordinate | 0.0 to the limit of the marking range | Y-coordinates of the reference point |
| **WO** | Writing orientation | One of {H, V, S, A, I} + one of {L, Z, R} | 1st letter: *text field type* 2nd letter: *text alignment* |
| **a** | Angle | 0° - 359° | Angle for slanted text and circular text |
| **D** | Diameter | 1.0 mm – 999.9 mm | Diameter of the circle for circular text |
| **NAME** | Name | Up to 8 characters | Description of the text field (is not engraved) |
| **CH** | Character size | 0.5 mm – 99.9 mm | Character size |
| **CW** | Character width factor | 0.5 mm – 2.0 mm | 1.0 = normal width 0.5 = half width 2.0 = double width |
| **CS** | Character spacing | 0.0 mm to 10,0 mm | Spacing between characters |
| **V** | Speed | 0 mm/s to 200 mm/s | Working speed of the marking head (0 mm/s = text field inactive) |
| **TEXT** | Content of the text field | Max. 30 characters | |

**Change between the text fields with the with the [PAGE Ý] (Page Up) and [PAGE ß] (Page Down) keys.**

The length field 'I' is not an input field. This displays total length and width of the current text field so it is possible to fit the text precisely into the area of, for example, a type plate.
This value is calculated from the number and type of characters, character size, character width factor and character spacing.

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## 3.4.2 Coordinates system

A rectangular (Cartesian) coordinate system is used to position the text fields and the zero point is in the left-hand lower corner of the engraving area.

All angle details correspond to the usual mathematical positive angle description (from the horizontal X-axis in an anti-clockwise direction)

The coordinates entered always relate to the *reference point* of the text field, whose location within the text field depends on the type of alignment.
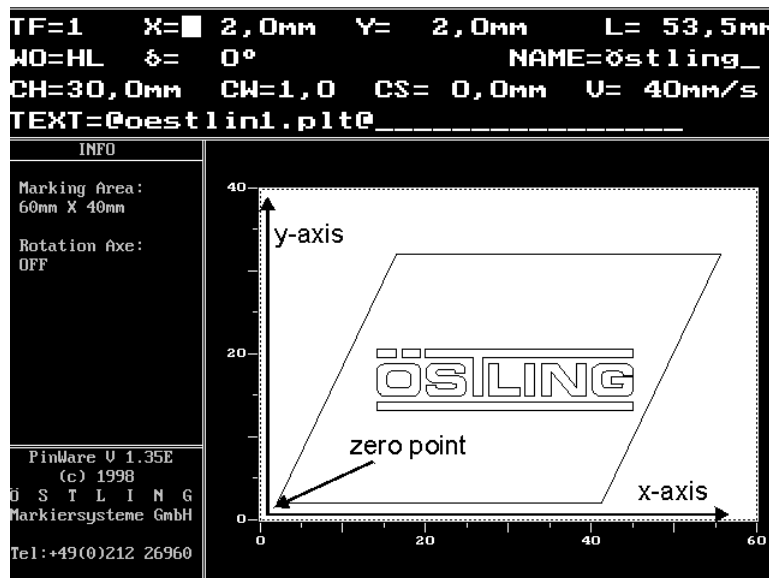


*Fig. 11 - The coordinates system*

The maximum values of the X- and Y-coordinates correspond to the maximum engraving area and depend on the marking head that has been connected. These values can be taken from the technical data.

## 3.4.3 Units with rotational axis *(option)*

If the unit is equipped with a *rotational axis **(option)*** to process round workpieces, then the generated surface (layout) of the workpiece is displayed in the preview. A positioning in the Y-direction on the screen produces a rotation of the workpiece.

The y-axis of the pinmarking head thus remains stationary during the engraving.

Thus all the working steps for a unit that has 2 linear axes is transferred to one with a *rotational axis*.

It is only necessary to ensure that the correct diameter has been entered.

This can be set in the System menu under „*Softswitches*". An additional prompt for the diameter is made for safety reasons before starting the engraving process.

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## 3.4.4 Text field type and text alignment

The appearance of a text field depends on the coordinates that were input and the *writing orientation* (WO). The writing orientation „WO" consists of two components: the *text field type* and the *text alignment.*

The *text field type* is determined by the <u>first letter</u> in input field „WO".

The *text alignment* corresponds to the <u>second letter</u> in input field „WO".

There are 5 options for the <u>text field type</u>:

| Text field type | Meaning |
|---|---|
| H | Horizontal |
| V | Vertical |
| S | Slanted |
| I | Circular text inside |
| A | Circular text outside |

There are 3 options for *text alignment*:

| Text alignment | Meaning | Location of the reference point |
|---|---|---|
| L | Flush left | Left-hand lower corner |
| Z | Centred | Middle of the lower edge |
| R | Flush right | Right-hand lower corner |

The coordinates always refer to the *reference point* of the *text field* which has been entered according to the <u>text alignment</u>. This also applies when using *circular text* (see below).

The combination of *text field type* and *text alignment* thus gives a total of 15 options to choose from which can be entered as parameter writing orientation „WO" on the editor screen.

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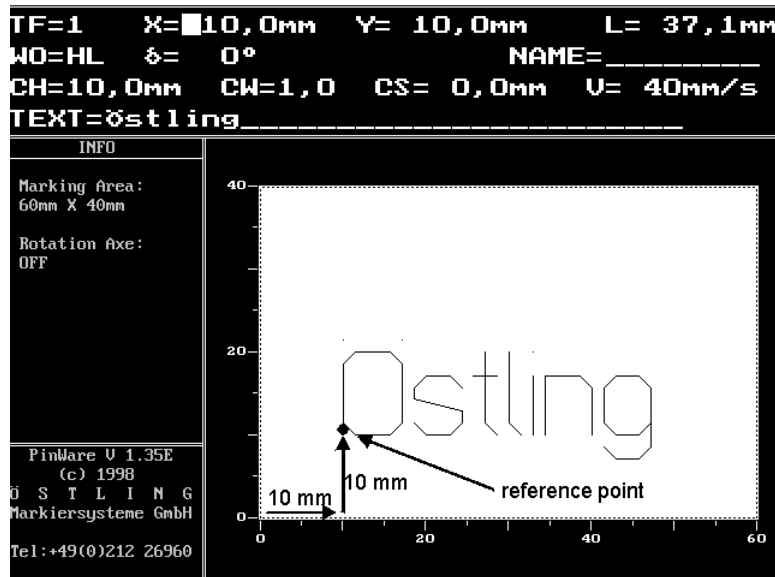
*Fig. 12 : Horizontal flush left alignment*

*Text field type* „Horizontal" corresponds to an angle of α = 0°, and *text field type* „Vertical" corresponds to an angle of α = 90°.

Use text field type „Slanted" in order to display the text rotated by any desired angle. The angle of rotation α can be entered as a value between 0° and 359° in field 'α'.
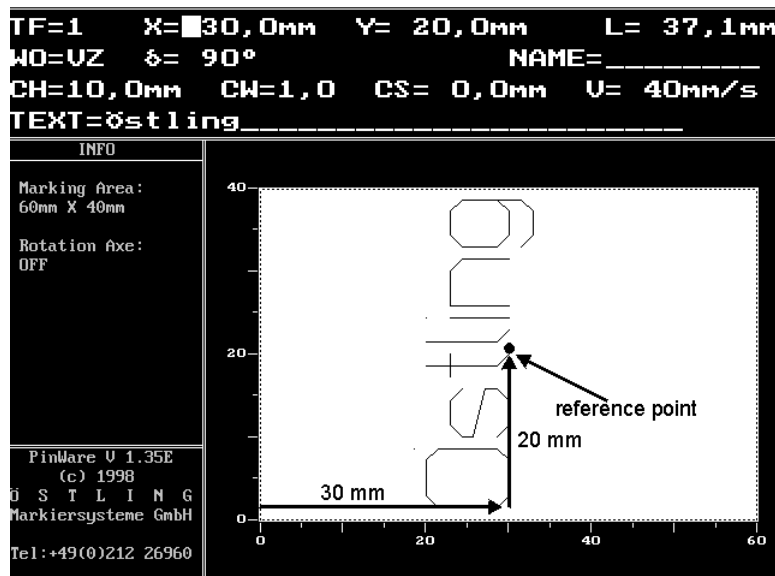


*Fig. 13 : Vertical alignment*

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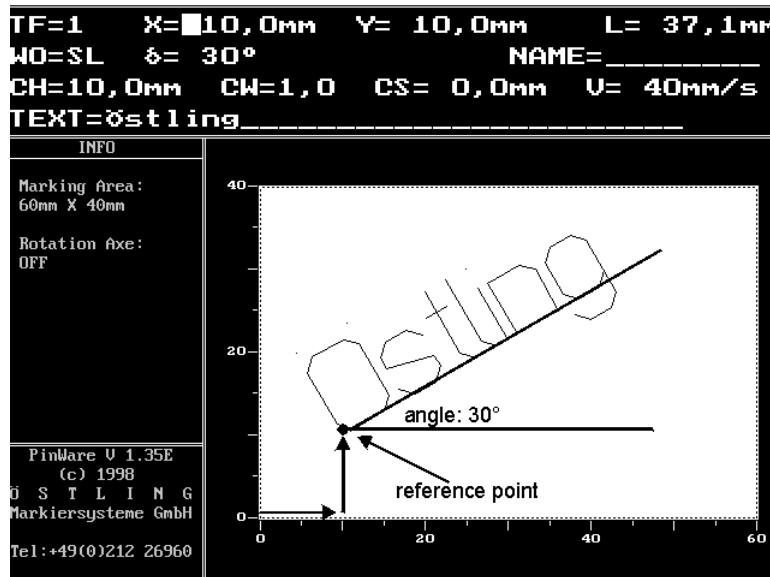
*Fig. 14 : Slanted alignment*

More details on *text field type* „Circular" are given in section „Circular text".

### 3.4.5 Name field (NAME)

Here it is possible to allocate a name to the *text field*. This entry is not compulsory and is <u>not marked</u> on the workpiece.

The use of names for the individual *text fields* makes it easier to get an overview of a large number of *masks* (e.g., as for type plates). The use of names is recommended for that reason.

### 3.4.6 Character height (CH)

The <u>character height of the capital letters</u> is entered in this field. The permissible range of values is between 1.0 and 99.0 mm. The width of the characters is automatically altered to match.

### 3.4.7 Character width (CW)

If characters are to be shown <u>wider or narrower than normal</u>, then it is necessary to enter a value that is larger than 1 or smaller than 1 respectively in the character width field.

If, for example, the characters are only to be half as wide as normal, then factor 0.5 should be entered. If on the other hand the characters are to be twice as wide, the factor is 2.0.

The permissible range of values is between 0.1 and 2.0.

### 3.4.8 Character spacing (CS)

If a value greater than 0 is entered here, the spacing between two sequential characters is increased by this value. Input is done in mm.

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## 3.4.9  Marking speed (V)

The marking speed is entered in mm/s and can be set from 2 to 200 mm/s in steps of 1 mm/s.

The marking speed has a considerable effect on the quality of the result.

The lower the marking speed, the more consistent the script.

If the speed is too high, it does not only affect the quality but there will also be more stepping errors due to the inertia of the marking head.

Speeds that could lead to damage cannot be set and produce an error message.
The maximum possible speed also depends on the operating mode and resolution selected.

**Text fields are only displayed and engraved if a value greater than 0 is entered in the field for the engraving speed**, i.e., text fields can be simply blanked out without having to delete the text by setting the engraving speed to 0.

## 3.4.10  Text input field (TEXT)

This determines what is to be engraved.

The text of a text field has a maximum of 30 characters.

If more than 30 characters are required, the text must be split among several *text fields*. The '_' character, which is the 64th character in the character set, is not engraved.
It is detected as an end character for the text field.

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# 3.5 Special functions

## 3.5.1 Placeholders

It is possible to use *placeholders* for variable information in a text window.

It is thus possible to engrave the current date, time or a sequential serial number.

*Placeholders* are enclosed by two "@" characters which can be produced by key combination „Alt-Q".

Several different *placeholders* can be combined. Characters. - , : - / and the space character can be used together with *placeholders* and are engraved as they are, without any changes. Thus it is possible to insert dots in dates between the *placeholders* to provide the usual formatting for the date details.

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### The following placeholders are possible:

| Placeholder type | Input | Result | Example |
|---|---|---|---|
| Date, day of week | WTG | Day of week (3 capital letters) | MON, TUE, WED |
| Date, day of week | wtg | Day of week (3 letters) | Mon, Tue, Wed |
| Date, day of week | WT | Day of week (2 capital letters) | MO, TU, WE |
| Date, day of week | wt | Day of week (2 letters) | Mo, Tu, We |
| Date, day | TT | Day of month (2 digits) | 01,02,03,...,31 |
| Date, day | ttt | Day of year | 1,2,3,...,366 |
| Date, week | KW | Calendar week (2 digits) | 01,02,03,...,53 |
| Date, month | MON | Name of month (3 capital letters) | JAN, FEB, MAR |
| Date, month | mon | Name of month (3 letters) | Jan, Feb, Mar |
| Date, month | M | Month abbreviation (alphabetic) | A, B, C,...,L |
| Date, month | MM | Month number (2 digits) | 01,02,03,...,12 |
| Date, year | J | Year number (last digit) | 0,1,2,3,...,9 |
| Date, year | JJ | Year number (last 2 digits) | 98,99,00 |
| Date, year | JJJJ | Year number (4 digits) | 1998 |
| Time, hour | hh | Hour (2 digits) | 00,01,02,...,23 |
| Time, minute | mm | Minute (2 digits) | 00,01,02,...,59 |
| Time, second | ss | Second (2 digits) | 00,01,02,...,59 |
| | | | |
| Number | Number | Number that is automatically incremented (p. 3-21) | 100,101,102,... |
| HPGL logo | NAME.PLT | HPGL logo | |
| SON logo | NAME.SON | SON logo | |
| Text field variable | X or x | Any desired variable | |
| Shift index *(option)* | S | Shift index | |

#### 3.5.1.1 Date and time details

The *placeholders* for date and time details allow the current details to be used in *masks* during processing of the workpiece.

### Example:

A *text field* with contents:

```
Date:@TT.MM.JJ@ Time:@hh:mm@
```

produces the following re:

```
Date:06.01.00 Time:16:46
```

The date and the time are taken directly from the system clock just before the marking operation.

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### 3.5.1.2 Serial numbers

The engraving of serial numbers with ascending numbers is done with *placeholder @Number@*. *Number* stands for any desired whole number at which the series of serial numbers is to start.

The number is increased by one after each process.

### Example:

Es series of serial numbers beginning at 29 is to be engraved.

| Content of the text field: | `Serial No.:@0029@` |
|---|---|
| Result of 1st engraving process: | `Serial No.:0029` |
| Result of 2nd engraving process: | `Serial No.:0030` |
| Result of 3rd engraving process: | `Serial No.:0031` |

The next serial number is then transferred to the *mask* (according to the example: "`Serial No.:@0032@`").

If it is necessary to continue with the last serial number for subsequent engraving, the *mask* must be saved with the new serial number **[F3]**

## 3.5.2 Circular text

The text is aligned along an arc when selecting text field types „Circular text" and „Circular text outside".

The 3 different text alignments of „Flush left", „Centred" and „Flush right" are available.

*„Coordinates" means the X - Y coordinates and the angle details.*

In the same way as for straight text, the text alignment for *circular text* likewise depends on what *reference point* is used for the text:
In the case of „Flush left" this is the left-hand lower corner, with „Centred" it is the middle of the lower edge, and with „Flush right" it is at the right-hand lower corner.

In the case of „Circular text inner", the lower edge of the text is laid on the arc and the text is aligned clockwise along the arc so that the arc is inside and the text is arranged outside. The diameter that was entered is thus the internal diameter of the text ring.

In the case of „Circular text outside", the lower edge of the text is placed on the arc and the text is aligned anti-clockwise around the arc so that the arc is outside and the text is inside. The diameter that was entered is thus the external diameter of the text ring.

The various options for the location of the *reference point* are made clearer by the following table:

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|  | *Flush left* | *Centred* | *Flush right* |
|---|---|---|---|
| *Circular text inside* | Lower left | Middle lower | Lower right |
| *Circular text out-side* | Lower left | Middle lower | Lower right |

## Angle a

Angle $\alpha$ displays the angle between the *reference point* section of the text mid-point of the circle and the X-axis in a mathematically-positive direction.

To put it more simply:
If you imagine the circle about which the text is to be aligned as a clock, then the reference point is at 3 o'clock for an angle of $\alpha=0°$, it is at 12 o'clock, for $\alpha=180°$ it is at 9 o'clock and for $\alpha=270°$ it is at 6 o'clock.
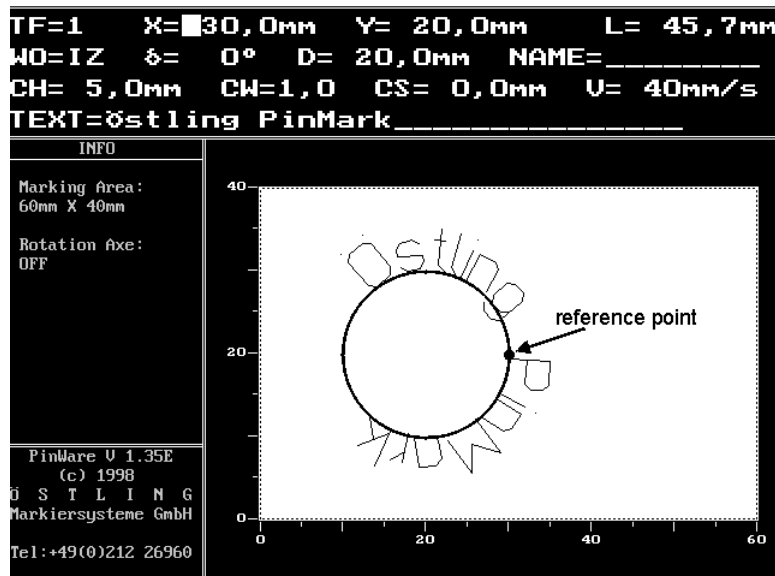


*Fig. 15 – Circular text example 1*

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```
TF=1    X=█30,0mm   Y= 20,0mm      L= 45,7mm
WO=IZ   δ= 45°   D= 20,0mm   NAME=_____
CH= 5,0mm   CW=1,0   CS= 0,0mm   V= 40mm/s
TEXT=Östling PinMark_____
```
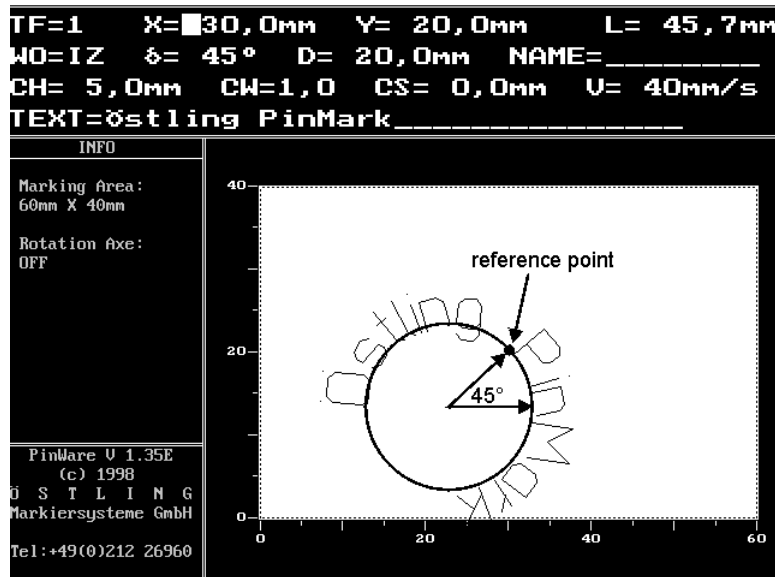
*Fig. 16 - Circular text example 2*



```
TF=1    X=█30,0mm   Y= 20,0mm      L= 45,7mm
WO=IZ   δ= 90°   D= 20,0mm   NAME=_____
CH= 5,0mm   CW=1,0   CS= 0,0mm   V= 40mm/s
TEXT=Östling PinMark_____
```
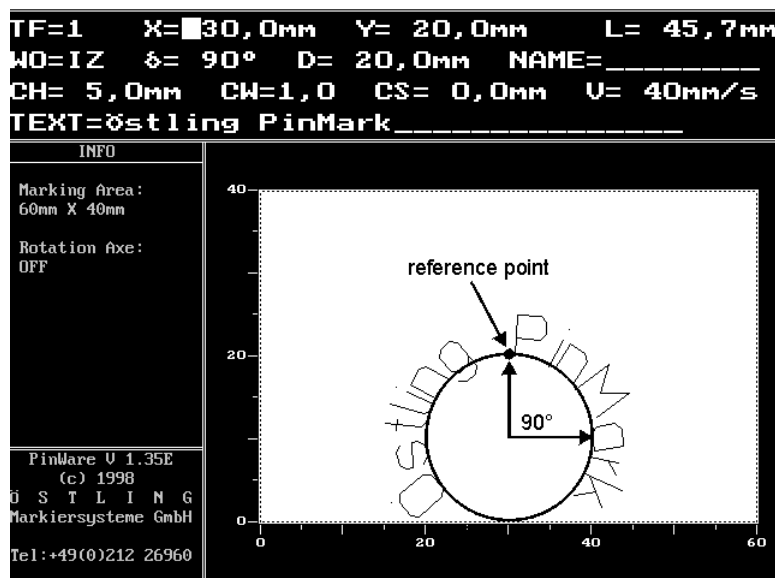
*Fig. 17 - Circular text example 3*

The 3 examples shown above clarify the effect of the angle value α. Here „Circular text inside"
was used.

In all 3 examples the reference point is at x=30 mm and y=20 mm, the diameter of the circle
always being 20 mm.

If angle α is increased stepwise, the text rotates around the reference point so that this is
locked at the same position and at the same time rotates the text by the desired angle.

If flush left or flush right alignment is used instead of centred alignment, the reference point is
now in the left-hand or right-hand lower corner of the text. Since the reference point stays in

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**3-23**

the same position when changing angle (, the corresponding corner of the text retains its position.
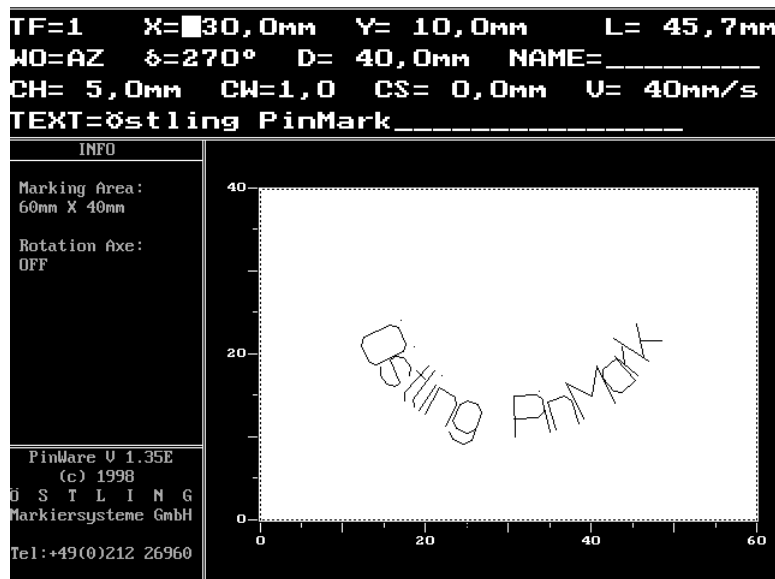


*Fig. 18 - Circular text example 4*
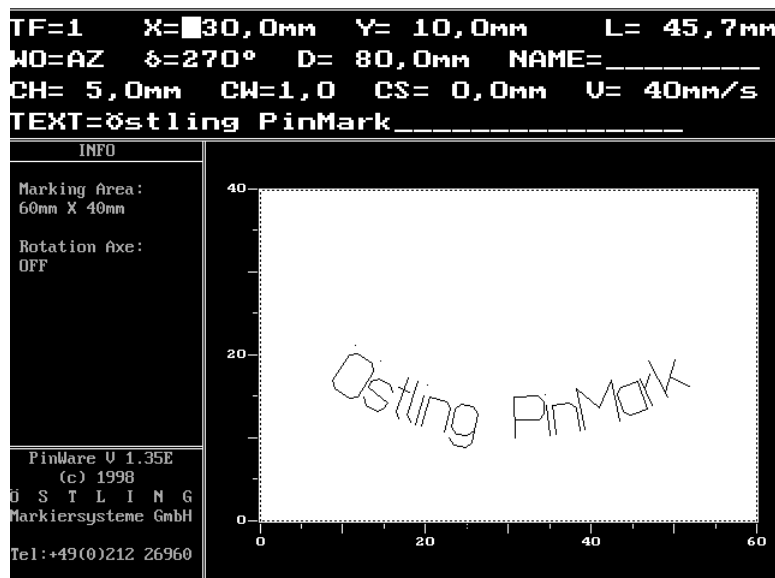


*Fig. 19 - Circular text example 5*

These two illustrations show the effects of changes in the diameter details.
All other parameters were retained, except that the diameter was doubled from 40 mm to 80 mm.
You can see that the bending of the arc becomes increasingly less as the diameter increases.

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**3-24**

## 3.5.3 Incorporation of graphics

The incorporation of graphics is a very useful function of the PinMark software.

This is done by the use of *placeholders*.

The name of the graphics file (in HPGL or SON format) is simply enclosed in '@' characters within the *text input window*.

The file extension must also be included.

Example:

```
@OESTLING.PLT@
```

This entry has the effect that the Östling logo is displayed.

Either text or a graphic can be displayed in one text field. If text and graphics or multiple graphics are to be displayed, multiple *text fields* must be used and the individual elements distributed among them.

The positioning of graphics is done in the same way as for text; depending on the type of alignment, the graphic is aligned according to the corresponding *reference point*.

Graphics can be aligned horizontally or vertically or rotated.

Graphics cannot be used in text field type „Circular text"!

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## 3.5.4 Text field variables

*This function is only available in software version 1.22 or later.*

### 3.5.4.1 Function

The use of a *text field variable* allows a *mask* to reserve areas for data which are entered by the user immediately before the start of engraving. This allows variable data to be incorporated simply and flexibly into *masks*.

A prompt for the contents of the variables is done automatically before the start of marking if *placeholders* 'X' or 'x' are used in the mask.

The maximum number of 'X' and 'x' *placeholders* is limited to 15.

### 3.5.4.2 Application options

1. The numeric code of a barcode can be incorporated with a barcode scanner *(option)*. A barcode is read in before each marking operation, and its numeric code can be automatically inserted into the mask through the corresponding *placeholder* at the designated point.
2. The use of *text field variables* allows variable article numbers or non-sequential serial numbers which are different for each workpiece to be engraved without constantly changing the *mask* itself. Thus the *placeholder* is simply inserted at the desired point. A prompt is given for the contents before each engraving process and immediately engraved as desired.
3. In order to be able to track the workpiece through production, it is possible for each operator of the controller unit to apply his name or a name abbreviation, for example, to a workpiece by means of *text field variables*.

### 3.5.4.3 Use

First of all, it is necessary to insert the corresponding *placeholders* in the *mask*.

The *placeholder* for the *text variable* consists of a maximum of 15 'X' and 'x' letters, which must be enclosed with '@' signs in the same way as for all *placeholders*.

Each 'X' represents <u>one character in the contents</u> of the variable, which must later be <u>visibly</u> inserted into the *mask*.

The 'x' likewise represents a character of the contents <u>but those represented by a small 'x' are simply skipped over</u>. They are simply <u>ignored</u>.

Thus it is possible, for example, to blank out the first five characters of an expression with *placeholder* `@xxxxxXXXXXXXXXX@`. The contents of the variable are only displayed from the 6th character.

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The 'X' and 'x' <u>are filled in from left to right with the contents of the variable</u>. The characters. - , : - / and the space character are permitted as usual as separators between the X and the x.

If the number of X and x characters is greater than the length of the contents of the variable, then the <u>superfluous X or x characters are ignored</u>.

If the number of X and x characters is too small to display the entire contents of the variables, the <u>variable is truncated from the end by the number of superfluous characters.</u>

*Placeholders* for *text field variables* can be used simultaneously in <u>*multiple text fields of a mask*</u>. Thus the same variable contents are always inserted with regard to the formatting at the various points of the *mask*.

### 3.5.4.4  Application example

<u>Inserting a numeric code by means of a barcode reader</u> ***(option)***

Here the numeric code should be displayed in an otherwise empty *mask*. The first 2 characters are to be ignored. The following 10 characters are to be output.

<u>Procedure:</u>

- Produce new *mask*
- Position the *text field*, input the text size, input the engraving speed
- Input `@xxXXXXXXXXXX@` in the *text field* so as to skip the first 2 places and to output the following 10 places of the variable
- Start the engraving process
- Scan in the barcode with a barcode scanner when prompted for the contents of the variable
- Input the number of processes
- Start engraving

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**3-27**

# 3.6 Tutorial

In this part the main aspects of the PinMark software will be described during the creation of an example mask. We will use a „PinMark 5/9" which offers a marking area of 90 x 50 mm.

After each description of an exercise a screenshot shows how the result should look like.

### Exercises:

1. The Text „Ostling PinMark" should be the headline in the mask. Its text size is 5 mm and has to be horizontally centred in the mask. The character spacing should be increased by 1mm.

2. The Östling-Logo should appear under the headline. Its size is 20 mm. The lower left corner of the logo should be placed 5 mm from the left and 15 mm from the lower border of the marking area. The file name of the logo us „Oestlin1.plt"

3. The Text „UMC-111" should be placed vertical. The distance to the right border of the marking area is 5 mm.

4. The Text „Made in Solingen" should be aligned along an arc. The inner diameter is 12 mm and the text size is 3 mm. The text should be arranged clockwise outside the circle. The reference point is on the top of the circle. This element has to be placed between the Östling-Logo and the text at the right.

5. A ascending serial number starting with „No. 1905" should be placed in the lower left corner. The text size is 3 mm. The distance to the borders should be 3 mm. The character width has to be 150%.

6. The word „Input" and a user defined entry have to be put centred at the same height. For the user defined entry the function „text field variable" has to be used. The prompt for the contents of the variable has to ask for 6 characters, but the first and the second character should be ignored when inserted in the mask. The text size is 3 mm.

7. In the lower right corner the date has to be placed in the format „DD.MM.JJ". This field has to be rotated by 45°. The text size is 3 mm.

8. The time should appear between the Östling logo and the circular text. It has to be 4 mm in size.

All parts have to be marked with a marking speed of 50 mm/s.

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**3-28**

## 3.6.1 Exercise 1

The control unit must be switched on and ready for use.

At first a new, empty mask has to be created. To do this, press [ F2 ] in the main menu to change into the menu „Editing & Engraving". Here you can create a new mask by pressing [ F2 ].

The input of the content of the text fields is done in the mask editor. When you are in the menu „Editing & Engraving" the mask editor can be reached with any key except the F-Keys and the [ RETURN ] key.

When you are in the mask editor you can change the displayed text field with the [PAGE ⇑] and [PAGE ⇓] keys. For the first exercise we will use the first text field, of course.

Since the text field has to be horizontally centred in the mask, the reference point of the text field has to be placed in the middle of the marking area on the one hand, and the text alignment has to be set to „centred" on the other hand in order to centre the text to the reference point. To increase the character spacing by 1 mm, the value „1" must be entered in the field „CS".

| Parameter | Abbr. | Value | Comment |
|-----------|-------|-------|---------|
| x-coordinate | X | 45 | |
| y-coordinate | Y | 40 | |
| writing orientation | WO | HZ | horizontally centred |
| name | NAME | Title | (optional) |
| character size | CS | 5 | |
| character width | CW | 1,0 | (standard value) |
| character spacing | CS | 1,0 | additional spacing |
| marking speed | V | 50 | |
| text input field | TEXT | Ostling PinMark | |

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```
TF=1    X=█45,0mm   Y= 40,0mm     L= 59,7mm
AA=HZ   δ=   0°              NAME=Titel___
ZG= 5,0mm   ZB=1,0   ZA= 1,0mm   V= 50mm/s
TEXT=Östling PinMark_____
```

```
   INFO
Markierbereich:
90mm X 50mm

Rotationsachse:
AUS




                    Östling  PinMark

                 40—


                 20—

PinWare V 1.36D
   (c) 1998
Ö  S  T  L  I  N  G      0—
Markiersysteme GmbH         |    |    |    |    |
                            0    20   40   60   80
Tel:+49(0)212 26960
```

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**3-30**

## 3.6.2 Exercise 2

First, we change to the second text field by pressing [PAGE ⇓].

The logo „Ostlin1.plt" is inserted into the mask by the entry „@OESTLIN1.PLT@" in the text input field. The writing orientation is horizontal flush left, so that the reference point is placed in the lower left corner of the text field. This is important in order to precisely align the logo to the left border of the marking area.

| Parameter | Abbr. | Value | Comment |
|-----------|-------|-------|---------|
| x-coordinate | X | 5 | |
| y-coordinate | Y | 15 | |
| writing orientation | WO | HL | horizontal flush left |
| name | NAME | Logo | (optional) |
| character size | CS | 20 | |
| character width | CW | 1,0 | (standard value) |
| character spacing | CS | 0,0 | (standard value) |
| marking speed | V | 50 | |
| text input field | TEXT | @OESTLIN1.PLT@ | |

The result should look like this:



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**3-31**
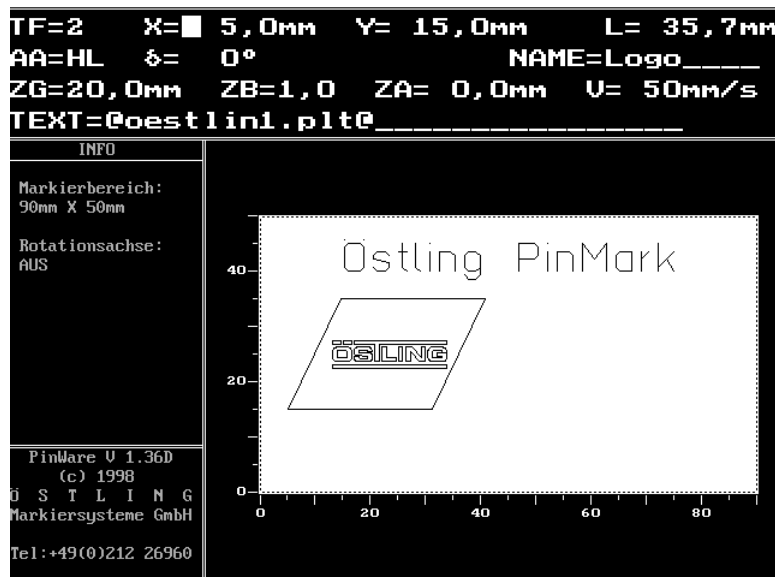
### 3.6.3 Exercise 3

This time the writing orientation „horizontal centred" has to be used. The x-coordinate is x=85 mm (90 mm - 5 mm), since the Text has to be placed 5 mm from the right border.

| Parameter | Abbr. | Value | Comment |
|---|---|---|---|
| x-coordinate | X | 85 | |
| y-coordinate | Y | 25 | |
| writing orientation | WO | VZ | vertical centred |
| name | NAME | UMC | (optional) |
| character size | CS | 5 | |
| character width | CW | 1,0 | (standard value) |
| character spacing | CS | 0,0 | (standard value) |
| marking speed | V | 50 | |
| text input field | TEXT | UMC 111 | |



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**3-32**
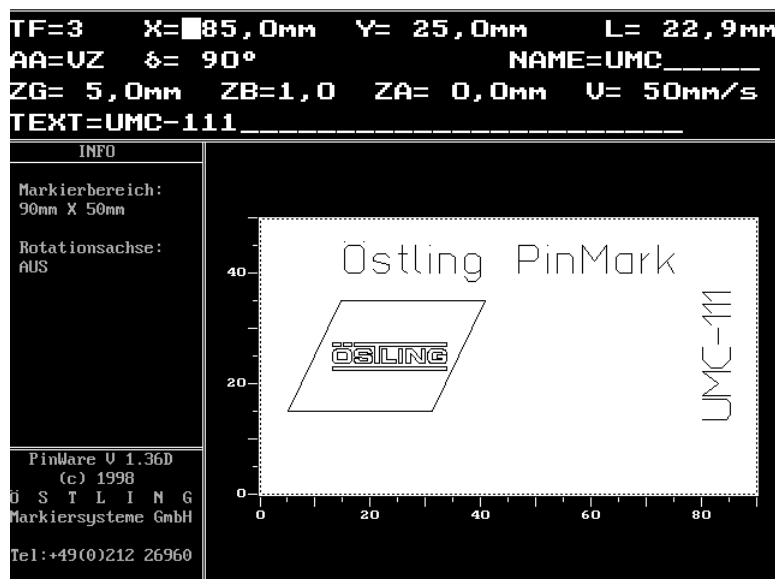
## 3.6.4 Exercise 4

To archive the desired result, the writing orientation „centred circular text inside" has to be used, so that the circle is inside the text ring. Further information can be found in chapter „Circular text" on page 3-21.

The angle $\alpha$ is 90°, so that the reference point is at „12 o'clock".

| Parameter | Abbr. | Value | Comment |
|-----------|-------|-------|---------|
| x-coordinate | X | 60 | |
| y-coordinate | Y | 30 | |
| angle | $\alpha$ | 90 | |
| diameter | D | 12 | |
| writing orientation | WO | IZ | circular text inside, centred |
| name | NAME | Circle | (optional) |
| character size | CS | 3 | |
| character width | CW | 1,0 | (standard value) |
| character spacing | CS | 0,0 | (standard value) |
| marking speed | V | 50 | |
| text input field | TEXT | Made in Solingen | |

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**3-33**
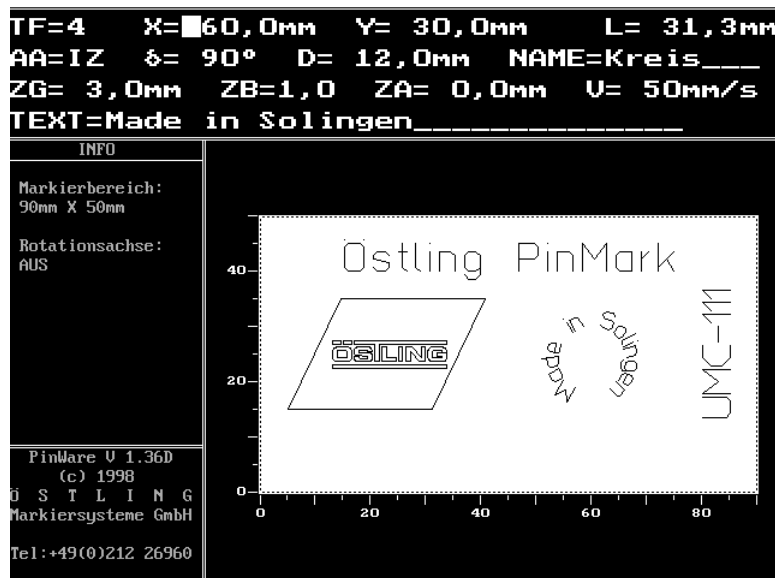
## 3.6.5 Exercise 5

To insert a serial number which is increased automatically after each process, the starting number (enclosed by „@") has to be placed in the text field.

To increase the character width to 150%, CW has to be set to 1,5.

| Parameter | Abbr. | Value | Comment |
|-----------|-------|-------|---------|
| x-coordinate | X | 3 | |
| y-coordinate | Y | 3 | |
| writing orientation | WO | HL | horizontal flush left |
| name | NAME | Number | (optional) |
| character size | CS | 3 | |
| character width | CW | 1,5 | 150 % |
| character spacing | CS | 0,0 | (standard value) |
| marking speed | V | 50 | |
| text input field | TEXT | No. @1905@ | creates serial number |



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**3-34**
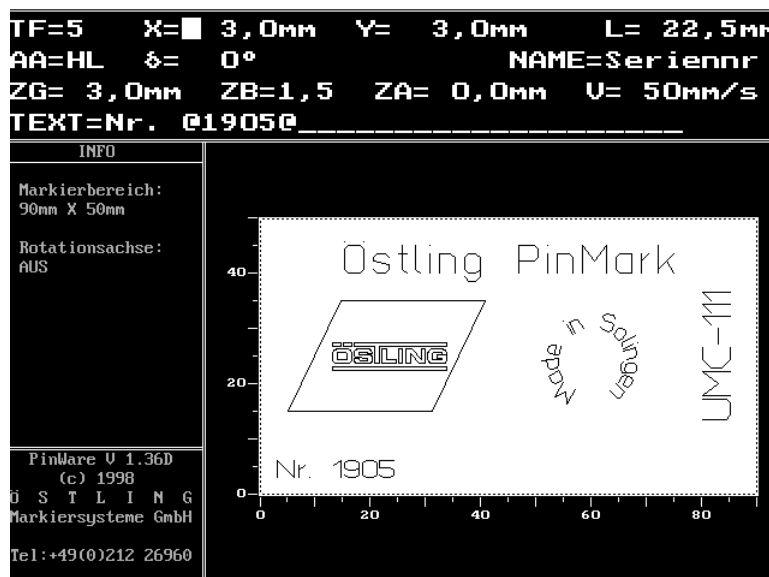
## 3.6.6 Exercise 6

The corresponding entry is „Input: @xxXXXX@. Thereby the first two entered characters are left away and the following 4 characters are displayed. Any further characters are ignored.

There is more information on text field variables on page 3-26.

| Parameter | Abbr. | Value | Comment |
|---|---|---|---|
| x-coordinate | X | 45 | |
| y-coordinate | Y | 3 | |
| writing orientation | WO | HZ | horizontal centred |
| name | NAME | TFV | (optional) |
| character size | CS | 3 | |
| character width | CW | 1,0 | (standard value) |
| character spacing | CS | 0,0 | (standard value) |
| marking speed | V | 50 | |
| text input field | TEXT | Input @xxXXXX@ | |

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**3-35**

## 3.6.7 Exercise 7

**3-36**
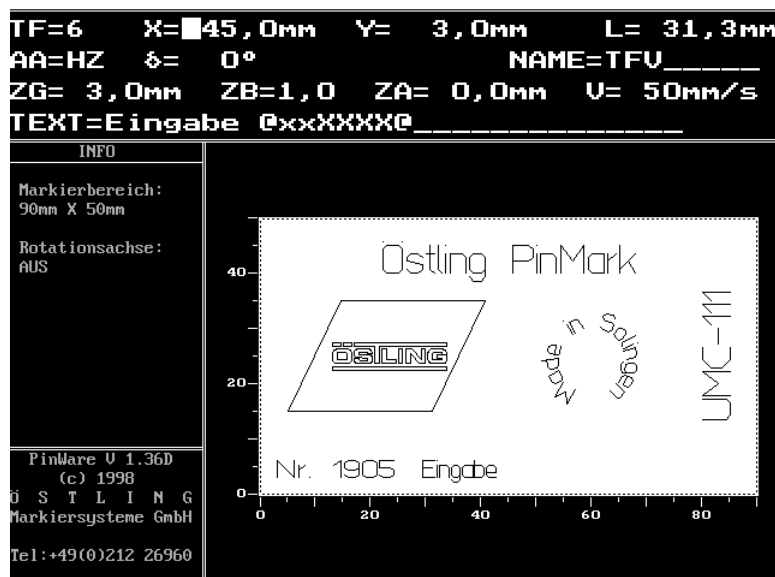
For a slope of 45°, the writing orientation „slope flush left" is used. The angle has to be entered in the appropriate field.

The correct placeholder for the desired date format is „@TT.MM.JJ@".

| Parameter | Abbr. | Value | Comment |
|-----------|-------|-------|---------|
| x-coordinate | X | 80 | |
| y-coordinate | Y | 1 | |
| writing orientation | WO | SL | slope flush left |
| angle | α | 45 | |
| name | NAME | Date | (optional) |
| character size | CS | 3 | |
| character width | CW | 1,0 | (standard value) |
| character spacing | CS | 0,0 | (standard value) |
| marking speed | V | 50 | |
| text input field | TEXT | @TT.MM.JJ@ | |

```
TF=7    X= 80,0mm   Y=  1,0mm    L= 15,9mm
AA=SL   δ= 45°                  NAME=Datum___
ZG= 3,0mm   ZB=1,0   ZA= 0,0mm   V= 50mm/s
TEXT=@TT.MM.JJ@_____
```

```
        INFO
Markierbereich:
90mm X 50mm

Rotationsachse:
AUS
                    Östling  PinMark

            40─


            20─


PinWare V 1.36D
   (c) 1998       0─
Ö  S  T  L  I  N  G      0    20    40    60    80
Markiersysteme GmbH

Tel:+49(0)212 26960
```

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**3-36**

## 3.6.8 Exercise 8

**3-37**

For the required time output the placeholder „@hh:mm@" has to be used.

| Parameter | Abbr. | Value | Comment |
|---|---|---|---|
| x-coordinate | X | 45 | |
| y-coordinate | Y | 20 | |
| writing orientation | WO | HZ | horizontal centred |
| name | NAME | Time | (optional) |
| character size | CS | 4 | |
| character width | CW | 1,0 | (standard value) |
| character spacing | CS | 0,0 | (standard value) |
| marking speed | V | 50 | |
| text input field | TEXT | @hh:mm@ | |

```
TF=8    X=█45,0mm  Y= 20,0mm      L= 14,9mm
AA=HZ   δ=  0°                 NAME=Zeit____
ZG= 4,0mm  ZB=1,0  ZA= 0,0mm  V= 50mm/s
TEXT=@hh:mm@_____
  ┌─────────┬──────────────────────────────┐
  │  INFO   │                              │
  │         │                              │
  │Markierbereich:                          │
  │90mm X 50mm                              │
  │         │        Östling  PinMark      │
  │Rotationsachse:                          │
  │AUS      │   40─                         │
  │         │                              │
  │         │       ┌──────┐               │
  │         │      ╱ÖSTLING ╱  14:32       │
  │         │   20─ ────── ╱               │
  │         │      ╱_____╱                │
  │PinWare V 1.36D                          │
  │  (c) 1998│                             │
  │Ö S T L I N G                           │
  │Markiersysteme GmbH  0─ Nr. 1905         │
  │         │   0   20   40   60   80      │
  │Tel:+49(0)212 26960                      │
  └─────────┴──────────────────────────────┘
```
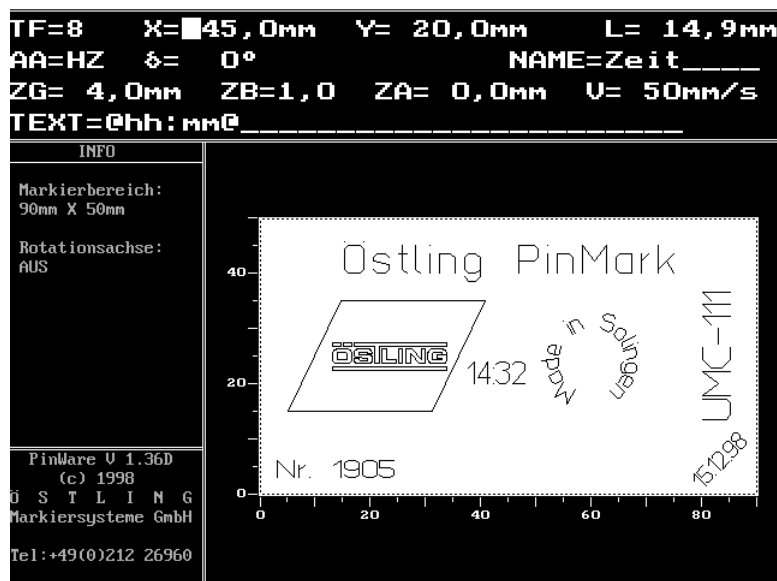
**That's all!**

If you understood all steps of this tutorial, you are familiar with the use of the PinMark software. Congratulations !

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**3-37**

# 4 Configuration

## 4.1 System Menu

The system menu consists of two parts, and you can move between them with the [TAB] key. The individual axes can be moved with the cursor keys on the second page, whereby any rotational axis can be controlled with the [BILD ⇑] (Page Up) and [BILD ⇓] (Page Down) keys. The step size can be changed with the [+] and [-] keys. [F1] controls the *reference point* and [F2] switches the needle on and off.



*Fig. 20 : System menu part 2*

The following information relates to the first part of the System menu.



*Fig. 21 : System menu part 1*

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**4-1**

### 4.1.1.1 System info [F1]

General information about the controller unit and our address and telephone number is displayed here. Page on further with [F1].

### 4.1.1.2 Set the time [F2]

The system clock and system date can be set with this function. The correct values are necessary for enhanced functions using *placeholders*.

### 4.1.1.3 Softswitches [F3]

*Softswitches* affect the reaction of the system in standard situations. A detailed description of the settings is given in section „Softswitches".

### 4.1.1.4 Delete file [F4]

This function has been provided to delete files that are not needed any longer. Operation is done in a similar way to the Load file dialogue. A safety prompt prevents accidental deletion.

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**4-2**

## 4.1.2 Softswitches

**4-3**

The *softswitches* that are set in the System menu have the following meanings:

| Softswitch | Position | Default | Function |
|---|---|---|---|
| Active engraving head *(only for multi-head option)* | 1 | X | Engraving head 1 is used |
| | 2 | | Engraving head 2 is used |
| 2nd axis *(only for rotational axis option)* | Y-linear | X | The Y-axis of the engraving head is used as the 2nd axis |
| | Y-rotation | | The rotational axis is used as the 2nd axis |
| Diameter *(only for rotational axis option)* | Value in mm | | Diameter of the workpiece |
| Y-offset *(only for rotational axis option)* | Value in mm | | Position of the Y-axis of the engraving head when using the rotational axis |
| Delay when switching on | Time in ms | 60 | The time between switching on the marking tool and the start of line drawing |
| Delay when switching off | Time in ms | 60 | The time between the end of the relevant line drawing operation and switching off the marking tool |
| Save | Prompt | X | A prompt asks whether any masks that have been changed are to be saved |
| | Never | | Amended masks are never saved automatically |
| | Always | | Amended masks are always saved automatically |
| Individual engraving | Off | X | The desired number is continuously engraved |
| | On | | The system goes back to the Main menu after the marking operation |
| Shift index *(option)* | Start of shift Shift abbreviation | | |
| Rotational axis *(option)* | | | |

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## 4.1.3  Character Set

A character set for the PinMark consists of 96 characters. It includes the routing lines with associated needle positions (needle ON and needle OFF) for all 96 characters. In addition, each character has the appropriate character height and the character width in the grid, which does not match the actual engraved character size but instead the resolution of the character.

The character set supplied as a default, STD7_PS.ZEI has a character height resolution of 7 steps. This means that a letter is defined with a resolution of 7 steps as measured with the capitals. Umlauts in capitals (and special characters) may exceed the normal character height, and small letters such as 'g', 'p', 'q' and 'y' (and special characters) may go below a character height of zero. This character set is a proportionately spaced font which has a variable character width (a 'W' is broader than an 'i').

The following illustration clarifies the way that the character is made up in the character set, taking 'Ö' and 'y' as examples.
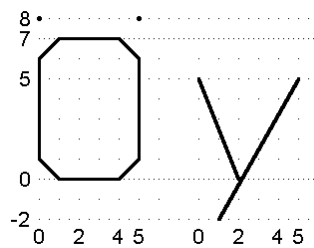


The STD7_PS.ZEI character set produces a sufficiently good result despite the sharp-edged curves.

The actual resolution of the engraving nonetheless depends on the resolution of the drive unit used.

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# 4.2 Rotational Axis (*Option*)

It is possible to mark circular workpieces with the PinMark with the help of the *rotational axis*. All the default functions are supported.

If the unit is equipped with a *rotational axis*, the generated surface of the workpiece is shown in the preview. Positioning in the Y-direction on the screen then produces a rotation of the workpiece.

The Y-axis of the engraving head remains in place during the engraving, and the exact position can be set relative to the initialisation point of the engraving head in the System menu as a softswitch.

## 4.2.1 Switching over to the rotational axis

Switching the unit over at the software level can be done by changing a number of *softswitches*.

The following settings

```
2nd axis:    Y-ROTATION
3rd axis:    Y-LINEAR
```

are selected in the System menu for operation in the rotational axis.

In this mode the rotational axis is the 2nd axis and the Y-axis is the 3rd axis.

The third axis is fixed below the PinMark and can be released through screws. During installation it is necessary to ensure that the third axis is aligned correctly with respect to the engraver. *Normal operation* is defined by the following parameters:

```
2nd axis:    Y-LINEAR
3rd axis:    OFF
```

The X- and Y-axes have their normal function.

## 4.2.2 Setting up the third axis

The third axis must be installed firmly underneath the engraver. The Y-position of the axis must be known to the engraving program. The setting is valid globally for the entire system. The setting is put into the menu /SYSTEM/SOFTSWITCHES. There the Y-offset is input with respect to the reference point (0.0). The value is to be entered in mm.

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## 4.2.3 Working with various diameters

The diameter of the workpiece can be selected again before each engraving process. <u>The height setting must be adjusted if the diameter of the workpiece has been changed</u>. The maximum workpiece diameter is 999 mm. A warning is shown on the display that the height has to be changed each time after the diameter has been changed.
The message is confirmed with the z key.

---

<u>**Warning!**</u>
**The needle of the PinMark can be damaged if height adjustment was not done at the hand wheel or if the height is incorrect!**

---

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# 4.3 Communication

The PinMark Software offers various possiblities of communication with other devices and can even be completely controlled by an external device.

Function „Automatic operation with remote control" loads the „AUTOMATI.MSK" mask before the restarting of the controller and waits for the text to be engraved at the serial interface. The prerequisite for the Autostart function is that the AUTOSTART soft switch has been set to AUTOMATIC OPERATION WITH REMOTE CONTROL and that a basic mask has already been made with all the parameters with the exception of the text to be engraved and that this has the file name „AUTOMATI.MSK". The PinMark goes into readiness to mark after switching on and stays there until ESCAPE is pressed or the foot switch is pressed to start an engraving operation.

The interface parameters are:

- Baud rate: 4800 bits/second or 9600 bits/second
- Eight data bits
- No parity
- One stop bit

It should be noted in general that communication via a serial interface can only be done if the PinMark controller has been set to „Ready to mark". This means that a controller that has been started cannot be stopped via the serial interface. Data on this status is sent to the serial interface after each change in the „Ready to mark" signal.

If there are any errors in the data transmission, the PinMark controller can be reset by sending the ESC character.

The following describes the individual options for the external controller.

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## 4.3.1 Readiness to mark

The „Ready to mark" signal which is applied to the external connection of the BU2 socket is also output during each signal change of the output at the selected serial interface. This means that, for example, this signal can be changed after each engraving process and the message „Ready to mark" is transferred with the current status of the digital inputs of the first input card via the serial interface. The data format can be found in the following table:

In error-free operation the PinMark controller sends the following:

| | 1st byte | 2nd byte | 3rd byte | 4th byte | 5th byte | 6th byte | 7th byte | 8th byte |
|---|---|---|---|---|---|---|---|---|
| HEX | 01 | 50h | 42h | 06 | 38h | 30h | 17 | 04 |
| ASCII | SOH | 'P' | 'B' | ACK | '8' | '0' | ETB | EOT |
| | Start of Header | Mark | Ready | OK | Incoming byte in hexa-decimal format | | End of Transferred Block | End Of Text |

Errors are sent in the case of the following 4 events:

⇒ „Ready to mark" was quit with the ESC key
⇒ Hold marking (emergency stop) was operated
⇒ The motors cannot be initialised
⇒ An error in calculating the mask

The following line is sent in the event of an error:

| | 1st byte | 2nd byte | 3rd byte | 4th byte | 5th byte | 6th byte | 7th byte | 8th byte |
|---|---|---|---|---|---|---|---|---|
| HEX | 01 | 45h | 52h | 06 | 38h | 30h | 17 | 04 |
| ASCII | SOH | 'E' | 'R' | ACK | '8' | '0' | ETB | EOT |
| | Start of Header | Error | Error | OK | Incoming byte in hexadeci-mal format | | End of Transferred Block | End Of Text |

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## 4.3.2  Start marking

The marking process can also be done via the serial interface instead of through the start input. It should be noted that this can only be done if the PinMark is „Ready to mark". The marking process cannot be stopped via the serial interface.

The following data must be sent to send a start command to the controller:

|  | 1$^{st}$ byte | 2$^{nd}$ byte | 3$^{rd}$ byte | 4$^{th}$ byte | 5$^{th}$ byte |
|---|---|---|---|---|---|
| HEX | 01 | 50h | 53h | 1Ah | 04 |
| ASCII | SOH | 'P' | 'S' | SUB | EOT |
|  | Start of Header | Mark | Start | Replace | End Of Text |

The PinMark sends a confirmation after successfully receiving the start marking data:

|  | 1$^{st}$ byte | 2$^{nd}$ byte | 3$^{rd}$ byte | 4$^{th}$ byte | 5$^{th}$ byte |
|---|---|---|---|---|---|
| HEX | 01 | 50h | 53h | 06h | 04 |
| ASCII | SOH | 'P' | 'S' | ACK | EOT |
|  | Start of Header | Mark | Start | OK | End Of Text |

## 4.3.3  Download Complete

The "Download complete" command informs the PinMark controller that all the desired data has been transferred. Next the UMC 111 sets output A 0.6 (data transfer concluded). This output is not set in the basic state and it is immediately reset after initiating each marking process.
This function is only required in cases in which a superordinated controller component (type plate magazine, PLC, etc.) needs to be informed of a successful data transfer.
The following data must be sent to the controller to report successful conclusion of the data transfer:

|  | 1$^{st}$ byte | 2$^{nd}$ byte | 3$^{rd}$ byte | 4$^{th}$ byte | 5$^{th}$ byte |
|---|---|---|---|---|---|
| HEX | 01 | 44 | 43 | 1A | 04 |
| ASCII | SOH | 'D' | 'C' | SUB | EOT |
|  | Start of Header | Download | Complete | Replace | End Of Text |

The PinMark sends a confirmation after successfully receiving the data:

|  | 1$^{st}$ byte | 2$^{nd}$ byte | 3$^{rd}$ byte | 4$^{th}$ byte | 5$^{th}$ byte |
|---|---|---|---|---|---|
| HEX | 01 | 44 | 43 | 06 | 04 |
| ASCII | SOH | 'D' | 'C' | ACK | EOT |
|  | Start of Header | Download | Complete | OK | End Of Text |

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## 4.3.4 Text Download

Using the „Text download" function, text fields are sent via the RS-232 interface to the PinMark controller computer and are inserted into the already loaded „AUTOMATI.MSK" file. After a successful data transfer the PinMark returns to „Ready to mark" and the text that had been sent can be engraved.

The transfer protocol for the serial interface of the „Text download" function is described below.

Host computer sends header:

|  | 1st byte | 2nd byte | 3rd byte | 4th byte | 5th byte | 6th byte | 7th byte | 8th byte |
|---|---|---|---|---|---|---|---|---|
| HEX | 01 | 54 | 44 | 1A | 30 | 31 | 17 | 04 |
| ASCII | SOH | 'T' | 'D' | SUB | '0' | '1' | ETB | EOT |
|  | Start of Header | Text | Down-load | Replace | Text field number* e.g. 1st Text field | | End of Transferred Block | End Of Text |

Once the PinMark has received the header, it sends the following confirmation to the host computer:

|  | 1st byte | 2nd byte | 3rd byte | 4th byte | 5th byte | 6th byte | 7th byte | 8th byte |  |
|---|---|---|---|---|---|---|---|---|---|
| HEX | 01 | 54 | 44 | 06 |  |  | 17 | 04 | **If ready** |
| ASCII | SOH | 'T' | 'D' | ACK | Text field* | | ETB | EOT | |

|  | 1st byte | 2nd byte | 3rd byte | 4th byte | 5th byte | 6th byte | 7th byte | 8th byte |  |
|---|---|---|---|---|---|---|---|---|---|
| HEX | 01 | ?? | ?? | 15 |  |  | 17 | 04 | **If not ready** |
| ASCII | SOH | 2 digits error code | | NAK | Text field* | | ETB | EOT | |

* *Text field* from '0' '1' to '2' '6' (1 - 26)

The host computer then sends the text of the text field that had been input:

|  | 1st byte | 2nd to n th byte (3 to max. 31) | n+1st byte |
|---|---|---|---|
| HEX | 02 |  | 04 |
| ASCII | STX |  | EOT |
|  | Start of Text | From 1 to max. 30 ASCII text characters | End Of Text |

The PinMark then sends back the received text:

|  | 1st byte | 2nd to 31st byte | 32nd byte |
|---|---|---|---|
| HEX | 02 |  | 04 |
| ASCII | STX |  | EOT |
|  | Start Of Text | 30 ASCII text characters ** | End Of Text |

** If fewer than 30 characters are to be engraved, the underscore character '_' (5Fh) must be used to pad to the 30th text character.

The host computer sends an Acknowledge if the received text is the same as the text sent:

|  | 1st byte | 2nd byte | 3rd byte |
|---|---|---|---|

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| HEX | 02 | 06 | 04 |
|---|---|---|---|
| ASCII | STX | ACK | EOT |
| | Start Of Text | Acknowledge | End Of Text |

Transfer ended.

## 4.3.5 Download mask

In addition, there is the option to send complete masks, including text, to the controller computer with the „Download mask" function. This expects the following transfer protocol at the serial interface:

Host computer sends header:

| | 1st byte | 2nd byte | 3rd byte | 4th byte | 5-16th byte | 17th byte | 18th byte |
|---|---|---|---|---|---|---|---|
| HEX | 01 | 4D | 44 | 1A | 12 bytes | 17 | 04 |
| ASCII | SOH | 'M' | 'D' | SUB | "TEST .MSK" | ETB | EOT |
| | Start of Header | Mask | Down-load | Replace | File name of mask e.g. TEST .MSK | End of Transferred Block | End Of Text |

Once the PinMark has received the header, it sends a confirmation to the host computer:

| | 1st byte | 2nd byte | 3rd byte | 4th byte | 5-16th byte | 17th byte | 18th byte |
|---|---|---|---|---|---|---|---|
| HEX | 01 | 4D | 44 | 06 | 12 bytes | 17 | 04 |
| ASCII | SOH | 'M' | 'D' | ACK | "TEST .MSK" | ETB | EOT |
| | Start of Header | Mask | Down-load | OK | File name of mask e.g. TEST .MSK | End of Transferred Block | End Of Text |

Special points:

- if the *mask* already exists, it sends:

| | 1st byte | 2nd byte | 3rd byte | 4th byte | 5-16th byte | 17th byte | 18th byte |
|---|---|---|---|---|---|---|---|
| HEX | 01 | 30 | 34 | 06 | 12 bytes | 17 | 04 |
| ASCII | SOH | '0' | '4' | ACK | "TEST .MSK" | ETB | EOT |

- if there is not enough memory, it sends:

| | 1st byte | 2nd byte | 3rd byte | 4th byte | 5-16th byte | 17th byte | 18th byte |
|---|---|---|---|---|---|---|---|
| HEX | 01 | 30 | 32 | 15 | 12 bytes | 17 | 04 |
| ASCII | SOH | '0' | '2' | NAK | "TEST .MSK" | ETB | EOT |

- if there were errors in the header, it sends:

| | 1st byte | 2nd byte | 3rd byte | 4th byte | 5-16th byte | 17th byte | 18th byte |
|---|---|---|---|---|---|---|---|
| HEX | 01 | 30 | 31 | 15 | 12 bytes | 17 | 04 |
| ASCII | SOH | '0' | '1' | NAK | "TEST .MSK" | ETB | EOT |

The host computer thereupon sends the mask data 26 times (*text fields* 1-26):

| Byte No. | 1-4 | 5-8 | 9-12 | 13-20 | 21-50 | 51-52 | 53-56 |
|---|---|---|---|---|---|---|---|

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| Type | INT x | INT y | INT l | CHAR name[8] | CHAR text[30] | CHAR AA[2] | INT zg |
|------|-------|-------|-------|--------------|---------------|------------|--------|
| Name | X-pos. | Y-pos. | Length | Name | Text | Alignment | Character size |

| Byte No. | 57-60 | 61-64 | 65-68 | 69-72 | 73-76 | 77 |
|----------|-------|-------|-------|-------|-------|-----|
| Type | INT d | INT w | INT za | INT zb | INT v | 04 |
| Name | Diameter | Angle | Character spacing | Character width | Speed | EOT |

Integer values x,y,l,zg,d,w,za,zb and v are transferred as 4 ASCII characters (4 bytes), all values except for V and W must be multiplied by 10!
(e.g. zb 1.5 mm = 0015)

Transfer ended.

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## 4.3.6 Load Mask

In remote control operation the PinMark also permits use of a „Load Mask" function in which a *mask* is called up via the serial interface. The prerequisite for the „Load Mask" function is that the PinMark is in the „Automatic operation with remote control" function and that the *mask* to be called up is already on the drive of the PinMark. The *mask* can then be called up by a host computer via the serial interface with the following protocol. The transfer lasts for a few milliseconds.

Transfer protocol:

Host computer sends header:

|  | 1st byte | 2nd byte | 3rd byte | 4th byte | 5-16th byte | 17th byte | 18th byte |
|---|---|---|---|---|---|---|---|
| HEX | 01 | 4D | 4C | 1A | 12 bytes | 17 | 04 |
| ASCII | SOH | 'M' | 'L' | SUB | "TEST .MSK" | ETB | EOT |
|  | Start of Header | Mask | Load | Replace | File name of mask e.g. TEST .MSK | End of Transferred Block | End Of Text |

When the PinMark has received the header, it sends a confirmation to the host computer

|  | 1st byte | 2nd byte | 3rd byte | 4th byte | 5-16th byte | 17th byte | 18th byte |
|---|---|---|---|---|---|---|---|
| HEX | 01 | 4D | 4C | 1A | 12 bytes | 17 | 04 |
| ASCII | SOH | 'M' | 'L' | ACK | "TEST .MSK" | ETB | EOT |
|  | Start of Header | Mask | Load | OK | File name of mask e.g. TEST .MSK | End of Transferred Block | End Of Text |

Special points:

- if the *mask* does not exist at the PinMark, it sends:

|  | 1st byte | 2nd byte | 3rd byte | 4th byte | 5-16th byte | 17th byte | 18th byte |
|---|---|---|---|---|---|---|---|
| HEX | 01 | 30 | 35 | 15 | 12 bytes | 17 | 04 |
| ASCII | SOH | '0' | '5' | NAK | "TEST .MSK" | ETB | EOT |

if the PinMark found an error in the header, it sends:

|  | 1st byte | 2nd byte | 3rd byte | 4th byte | 5-16th byte | 17th byte | 18th byte |
|---|---|---|---|---|---|---|---|
| HEX | 01 | 30 | 31 | 15 | 12 bytes | 17 | 04 |
| ASCII | SOH | '0' | '1' | NAK | "TEST .MSK" | ETB | EOT |
|  |  |  |  |  |  |  |  |

Transfer ended

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## 4.3.7 File selection via PLC *(option)*

Using the optional second relay card, it is possible to select via a PLC up to 127 files in binary coded form from mass storage. The default setting on delivery is „Automatic operation without remote control" and „TF reference on". Therefore the file „AUTOMATI.MSK" is required for automatic booting of the controller up to the point of being ready to mark.

It should be noted that the files are called up not by name but only in *alphanumeric sequence*. The alphanumeric sequence of individual characters can be found from the ASCII table. The files should therefore be named numerically to determine more easily just what the sequence will be.

Once the data is present in stable form at inputs E2.0-E2.6 (number selected) this must be signalled for transfer at input E2.7 (data transfer). The controller confirms this by setting output A2.0 (data transferred) until the selected file for marking is available (but at least 200 ms). If fewer files of this are available in the mass storage than required by the number given, the output is set to A2.1 (data transfer error). This is shown at the same time as A2.0 (data transfer) until the error has been cleared by pressing any key of the controller or by input E1.6 (clear error) at BU2 (see also the timing diagram).

In the case of the binary coding switch that is available as an option, it should be noted that numbers set over 127 are interpreted as 127. The hundredth of the number is mechanically blocked so that only numbers 1 or 0 can be selected.

The following table shows the relationship between inputs and files:

| Input / File | E 1.6 | E 1.5 | E 1.4 | E 1.3 | E 1.2 | E 1.1 | E 1.0 | Comments |
|---|---|---|---|---|---|---|---|---|
| 001.msk | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| 002.msk | 0 | 0 | 0 | 0 | 0 | 1 | 0 | |
| 003.msk | 0 | 0 | 0 | 0 | 0 | 1 | 1 | |
| 004.msk | 0 | 0 | 0 | 0 | 1 | 0 | 0 | |
| 005.msk | 0 | 0 | 0 | 0 | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | ... | |
| 127.msk | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |

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Alternatively, the files can also look like the following:

| Input / File | E 1.6 | E 1.5 | E 1.4 | E 1.3 | E 1.2 | E 1.1 | E 1.0 | Comments |
|---|---|---|---|---|---|---|---|---|
| 01234567.msk | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| anton.msk | 0 | 0 | 0 | 0 | 0 | 1 | 0 | |
| automati.msk | 0 | 0 | 0 | 0 | 0 | 1 | 1 | |
| berta.msk | 0 | 0 | 0 | 0 | 1 | 0 | 0 | |
| noname.msk | 0 | 0 | 0 | 0 | 1 | 0 | 1 | |
| norbert.msk | 0 | 0 | 0 | 0 | 1 | 1 | 0 | |
| ... | ... | ... | ... | ... | ... | ... | ... | |
| zebra.msk | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| | | | | | | | | |

The required sequence is shown in simplified form in the following timing diagrams.

The following sequence is produced if a file can be loaded:

**Input:**

E1.7 (receive data)

**Output:**

A1.0 (data received)   min. 200ms

A0.2 (ready to mark)

The following sequence is given if a file cannot be loaded:

**Input:**

E1.7 (receive data)

E0.6 (error acknoledge / key)

**Output:**

A1.0 (data received)

A1.1 (error during receiving)

A0.2 (ready to mark)

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## 4.3.8 Description of the inputs and outputs with special functions

### 4.3.8.1 Input „Z-axis" (E1.4) - *option*

This input is only used with a Z-axis option.

### 4.3.8.2 Clear error (E1.6)

Input „Clear error" allows an error to be confirmed via external input E1.6. This clearing is especially useful for a PinMark that is controlled completely externally if, for example, an emergency stop needs to be made.

### 4.3.8.3 EMERGENCY STOP function (E1.7)

The emergency stop input is E1.7 of output card 1 (pin 19, BU 2). The EMERGENCY STOP switch must be a break-type contact and be connected to +24 V (pin 12/13/14/31/32, BU 2) and input EMERGENCY STOP (pin 19, BU 2). If no EMERGENCY STOP switch is provided, there must be a jumper between +24 V (pin 12/13/14/31/32, BU 2) and input EMERGENCY STOP (pin 19, BU 2).

If an EMERGENCY STOP is detected, no further travel of the motors and positioning of the needle is permitted, and the message „EMERGENCY STOP DETECTED" appears on the LCD.

Correct the cause of the EMERGENCY STOP and press a key.

### 4.3.8.4 Output „Marking" (A1.1)

Output A1.1 „Marking" is set to +24V DC during a marking process. Otherwise the output is switched to GND 24V DC.

### 4.3.8.5 Output „Ready to mark" (A1.2)

Output A1.2 „Ready to mark" is switched to +24V DC when the PinMark is waiting for initiation. Otherwise the output is switched to GND 24V DC.

### 4.3.8.6 Output „Valve Z-axis" (A1.3) - optional

Output A1.3 „Valve Z-axis" is switched with +24V DC if ?????[1]. Otherwise the output is switched to GND 24V DC.

### 4.3.8.7 Output „Ready for operation" (A1.4)

Output A1.4 „Ready for operation" is switched with +24V DC when the PinMark is booted and the reference travel has been carried out without any errors. The output is switched to GND 24V DC if there is an error or an emergency stop. The output is again switched to logical 1 (+24V DC) once the error has been corrected.

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# 5 Maintenance

## 5.1 Software

### 5.1.1 Update

The following describes installation of a new version of the controller software.

This new installation is only valid in the case of a new program version and for this reason update diskettes are not part of the ordinary scope of supply.

If they are available, software update diskettes can be ordered from us.

Under normal circumstances it is not possible to accidentally delete the operating software.

#### 5.1.1.1 Determining the version number

The version number is displayed constantly at the bottom left of the screen.
Do the following to get more detailed information:
- Change to the Main menu.
- Select menu item System [F3].
- Select menu item Information [F1].

#### 5.1.1.2 Carrying out the update

The following steps are necessary to carry out the update:
- Switch off the system.

- Insert the update diskette into the diskette drive.

- Switch on the PinMark and wait for initialisation to finish.

- Remove the diskette

- Start the PinMark again.

The installation is now being completely finished and the PinMark is again fully ready for operation with the new software.

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# 5.2 Hardware

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## 5.2.1 Fuses

PC Power Supply (right back corner)
Fuse: 4A, slow-blow

Stepping Motor Cards Power Supply (front left corner)

Primary fuse:
Operating voltage 230V: 2A, slow-blow
Operating voltage 115V: 3,15A, slow-blow

Secondary fuse:
2A, slow-blow

## 5.2.2 Plug connectors

All of the connectors may only be plugged or unplugged when the unit has been switched off and disconnected. Otherwise damage could be done.

This work may only be done by technicians authorised by the manufacturer.
This applies in particular during the warranty period.

## 5.2.3 Keyboard input

Operation of an external keyboard can be done via the keyboard socket either at the front or at the back of the controller.

## 5.2.4 EMERGENCY STOP function

The emergency stop input is E1.7 of I/O card 1 (pin 19, BU 2).
If this input is not controlled, an EMERGENCY STOP is detected and no further travel of the motors and setting of the needle is permitted and the message „EMERGENCY STOP DETECTED" is shown on the display.

## 5.2.5 Opening up housings

Housings of any type may only be opened up by technicians from the manufacturer.

## 5.2.6 Dirt and contamination

The marking head, and especially the controller, should be protected against severe dirt and contamination, especially from dirt that would attack the materials.

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## 5.2.7 Ventilation slots

*It is essential* **that the ventilation slots are not covered or blocked so that it is possible to ensure adequate removal of heat from the computer. Otherwise components could be destroyed by overheating!**

## 5.2.8 Maintenance information

If the unit becomes dirty, clean it with a soft cloth. More detailed information is given in section 4.

**Failure to follow this information can cause loss of data and the destruction of the units concerned and will be considered as inappropriate use.**

## 5.2.9 Maintenance unit

The oil level and filter of the maintenance unit are to be checked regularly and cleaned and the oil is to be topped up as necessary. Proceed as follows to set the air oiler:

(1) Switch on the needle in manual operation
    (System menu - Additional functions)
(2) Set the oiler to approx. 1 drop per minute

## 5.2.10 Maintenance of the PinMark

Check the *tension of the toothed belt* at regular intervals and tighten it up as necessary. Check the *play of the spherical liners,* adjust or replace them as necessary**.**
New spherical liners should be greased with ball bearing grease before installation.

## 5.2.11 Maintenance of the engraving unit

The ball screw drive is to be maintained according to the instructions of the manufacturer.

An external lubrication point can be used to lubricate the ball screw.
An automatic lubricator is available as an option. It can be connected to the external lubrication point. The battery and oil for the automatic lubricator for the marking head spindle is to be replaced yearly.

Soap grease:               SF06,NLGI-class 0
                          KOG-20 (DIN 51825)

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# 6 Troubleshooting

This section should provide help if any problems occur during use and maintenance of the unit.

## 6.1 Problems with the script

| Script | Cause / Remedy |
|---|---|
| No characters at all | – Failure of compressed air<br>– Needle valve defective<br>– Power failure<br>– Needle does not advance<br>– Clearance between workpiece and tool too big<br>– O-ring in needle head damaged |
| Light marking | – Air pressure too low<br>– Clearance between workpiece and tool too big<br>– O-ring in needle head damaged |
| Engraved script, no embossing points visible | – Needle too deep<br>– Needle defective |
| Script with uneven depth | – Engraving head has not been aligned parallel to the machining surface / workpiece surface<br>– Workpiece not clamped properly<br>– Needle defective |
| Continuous script, needle constantly on | – Needle too deep<br>– Needle does not switch<br>– Check needle valve |
| Illegible script,<br><br>embossed points are not in one line in the case of straight lines | – Marking speed too high<br>– Workpiece not clamped properly<br>– Needle tip worn / broken<br>– Toothed belt not tensioned properly<br>– Ball bearing bushes have too much play |
| The first dots of each character are missing | – Incorrect setting of parameter „Delay when switching on" -value too low |
| Hooks appended to characters | – Incorrect setting of parameter „Delay when switching off" - value too low |

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## 6.2 Technical Problems

### 6.2.1 Problems when switching on

| Test item | Cause / Remedy | Comments |
|---|---|---|
| Does the LCD illumination come on? | Check mains power supply. | |
| Does text appear on the display after a short time? | Check mains fuses.<br>Check mains switch. | |
| Is the fan running? | Check internal power section.<br>Check that all cable connections and cards have been seated correctly. | |

### 6.2.2 Noises during the process

| Test item | Cause / Remedy | Comments |
|---|---|---|
| Is the slide running up against an obstacle? | Correct the travel paths in the engraving program. | |
| Has the motor current been set correctly? | Check the state of the motors | |
| Have the shafts been fastened correctly? | Clamp the shafts with grub screws. | |

### 6.2.3 Error message „Axis cannot be initialised"

| Test item | Cause / Remedy | Comments |
|---|---|---|
| Has the PinMark been correctly connected to the controller? | Check the PinMark connection cable. | Error message can be cleared by pressing a key |
| Do the motors move? | Check the state of the motors. Correct the motor current setting if necessary. | Can be skipped for further testing. |
| Do both initiators switch? | Check the state of the initiators | |

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# 6.3 Information on checking the PinMark     6-3

## 6.3.1 Error messages

### 6.3.1.1 Error -1
Motor card not detected.

### 6.3.1.2 Error -60, -61, -65, -66, -69
Internal error in the motor card.

### 6.3.1.3 Error -70
The initiator (limit switch) also switches off after removing the reference point.

### 6.3.1.4 Error -71
The initiator (limit switch) does not switch off when attempting to reach the reference point.

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# 7 List of Pinouts

## 7.1 BU 1 (26-pin socket), marking head

| Pin | Description | Comments |
|-----|-------------|----------|
| **1** | Motor X-axis: Phase 2A | |
| **2** | Motor X-axis: Phase 1A | |
| **3** | Motor X-axis: Phase 2B | |
| **4** | Motor X-axis: Phase 1B | |
| **5** | Motor Y-axis: Phase 2A | |
| **6** | Motor Y-axis: Phase 1A | |
| **7** | Motor Y-axis: Phase 2B | |
| **8** | Motor Y-axis: Phase 1B | |
| **9** | Free | |
| **10** | Free | |
| **11** | Free | |
| **12** | Foot pedal / START E 0.0 ** | Digital input |
| **13** | Initiator X-axis E 0.1 | Digital input |
| **14** | Initiator Y-axis E 0.2 | Digital input |
| **15** | Needle valve relay A 0.0 | Output (is switched *internally with +24V DC*) |
| **16** | + 24V DC internal | Output (is produced internally) |
| **17** | + 24V DC internal | Output (is produced internally) |
| **18** | + 24V DC internal | Output (is produced internally) |
| **19** | GND | 0V DC |
| **20** | GND | 0V DC |
| **21** | GND | 0V DC |
| **22** | Motor Z-axis: Phase 2A* | |
| **23** | Motor Z-axis: Phase 1A* | |
| **24** | Motor Z-axis: Phase 2B* | |
| **25** | Motor Z-axis: Phase 1B* | |
| **26** | Free | |

\* Only for option: motorised Z-axis      \** Parallel to foot pedal socket

| Phase | Cable colour | Phase | Cable colour |
|-------|--------------|-------|--------------|
| **Phase 1 A** | Black | **Phase 2 A** | Red |
| **Phase 1 B** | Orange | **Phase 2 B** | Yellow |
| **Jumper 1** | Orange - white / Black - white | **Jumper 2** | Red - white / Yellow - white |

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# 7.2  BU2 (DB37 socket), digital in-/outputs

| Pin | Signal | Description | Comments |
|-----|--------|-------------|----------|
| 1 | A1.0 | Needle valve | Is used internally |
| 2 | A1.1 | PinMark „Marking" | *Mask* is engraved |
| 3 | A1.2 | PinMark „Ready to mark" | PinMark waits for initiation |
| 4 | A1.3 | Free | Option pneumatic Z- axis |
| 5 | A1.4 | Ready for operation | Closed = Ready for operation |
| 6 | A1.5 | Hold signal | For option HOLD AFTER EACH LINE |
| 7 | A1.6 | Data transfer concluded | Can be set via the serial interface |
| 8 | A1.7 | Relay for power section | Power supply for the motors (OPTION) |
| 9 | GND | GND 24V DC | |
| 10 | GND | GND 24V DC | |
| 11 | GND | GND 24V DC | |
| 12 | +24V DC | +24V DC | Is produced internally. |
| 13 | +24V DC | +24V DC | Is produced internally. |
| 14 | +24V DC | +24V DC | Is produced internally. |
| 15 | | Not used | |
| 16 | E1.1 | Free | Max. +25V DC |
| 17 | E1.3 | Free | Max. +25V DC, for Z-axis option (marking position) |
| 18 | E1.5 | Free | Max. +25V DC, for type magazine option (full / empty) |
| 19 | E1.7 | EMERGENCY STOP | Low - active: Emergency Stop is active if E1.7= 0V |
| 20 | | Not used | |
| 21 | | Not used | |
| 22 | | Not used | |
| 23 | | Not used | |
| 24 | | Not used | |
| 25 | | Not used | |
| 26 | | Not used | |
| 27 | | Not used | |
| 28 | GND | GND 24V DC | |
| 29 | GND | GND 24V DC | |
| 30 | GND | GND 24V DC | |
| 31 | +24V DC | +24V DC | Is produced internally |
| 32 | +24V DC | +24V DC | Is produced internally |
| 33 | | Not used | |
| 34 | E1.0 | Foot switch / Start | Max. +25V DC |
| 35 | E1.2 | Free | Max. +25V DC |
| 36 | E1.4 | Reserved | Max. +25V DC, for option Z-axis (starting position) |
| 37 | E1.6 | Clear error | Max. +25V DC |

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## 7.2.1 BU3 (DB 37 socket),external file selection (*optional*)

| Pin | Signal | Description | Comments |
|-----|--------|-------------|----------|
| 1 | A2.0 | Data transferred | Applied for min. 200 ms after data transfer |
| 2 | A2.1 | File selection error | Is applied at the same time as A2.0 if the file does not exist, until the error is cleared (key or E1.6) |
| 3 | A2.2 | Free | (Switches +24V DC from inside) |
| 4 | A2.3 | Free | (Switches +24V DC from inside) |
| 5 | A2.4 | Free | (Switches +24V DC from inside) |
| 6 | A2.5 | Free | (Switches +24V DC from inside) |
| 7 | A2.6 | Free | (Switches +24V DC from inside) |
| 8 | A2.7 | Free | (Switches +24V DC from inside) |
| 9 | GND | GND 24V DC | |
| 10 | GND | GND 24V DC | |
| 11 | GND | GND 24V DC | |
| 12 | +24V DC | +24V DC | Is produced internally |
| 13 | +24V DC | +24V DC | Is produced internally |
| 14 | +24V DC | +24V DC | Is produced internally |
| 15 | | Not used | |
| 16 | E2.1 | File selection bit 1 | Max. +25V DC |
| 17 | E2.3 | File selection bit 3 | Max. +25V DC |
| 18 | E2.5 | File selection bit 5 | Max. +25V DC |
| 19 | E2.7 | Data is stable | Max. +25V DC |
| 20 | | Not used | |
| 21 | | Not used | |
| 22 | | Not used | |
| 23 | | Not used | |
| 24 | | Not used | |
| 25 | | Not used | |
| 26 | | Not used | |
| 27 | | Not used | |
| 28 | GND | GND 24V DC | |
| 29 | GND | GND 24V DC | |
| 30 | GND | GND 24V DC | |
| 31 | +24V DC | +24V DC | Is produced internally |
| 32 | +24V DC | +24V DC | Is produced internally |
| 33 | | Not used | |
| 34 | E2.0 | File selection bit 0 (LSB) | Max. +25V DC |
| 35 | E2.2 | File selection bit 2 | Max. +25V DC |
| 36 | E2.4 | File selection bit 4 | Max. +25V DC |
| 37 | E2.6 | File selection bit 6 (MSB) | Max. +25V DC |

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## 7.3  BU4 (9-pin socket),rotational axis *(optional)*

| Pin | Signal | Description | Comments |
|---|---|---|---|
| 1 | Ph 2A | Motor Z-axis: Phase 2A | |
| 2 | Ph 1A | Motor Z-axis: Phase 1A | |
| 3 | Ph 2B | Motor Z-axis: Phase 2B | |
| 4 | Ph 1B | Motor Z-axis: Phase 1B | |
| 5 | 24V DC | +24V DC | |
| 6 | GND | GND | |
| 7 | Z-INI | Initiator Z-axis - E1.5 | |
| 8 | Free | Free | |
| 9 | Free | Free | |

## 7.4  Start input socket - trigger

| Pin | Signal | Description | Comments |
|---|---|---|---|
| 1 | GND | GND 24V DC | |
| 2 | - | RESERVED | Reserved. Do not use. |
| 3 | - | RESERVED | Reserved. Do not use. |
| 4 | - | RESERVED | Reserved. Do not use. |
| 5 | - | RESERVED | Reserved. Do not use. |
| 6 | +24V DC | +24V DC | Is produced internally |
| 7 | E1.0 | Foot switch / Start | Max. +25V DC |
| 8 | - | RESERVED | Reserved. Do not use. |
| 9 | - | RESERVED | Reserved. Do not use. |

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# 7.5 Profibus connection - PB *(option)*

The station address can be set internally via two rotary switches (x1 and x10) at the MURR MBK-P DI16DO16 module (see also the installation instructions for the MURR MBK-P). ). The housing of the UMC must be opened and the I/O module is located at the back and to the left within the controller. The station address is set at the factory to 11.

In order to incorporate the I/O module of the UMC into the Profibus, the GSD file conforming to the standards supplied by Messrs. Murr must be installed on the master (3.5" configuration diskette).

The inputs and outputs corresponds to connections BU2 and BU3 (OPTION). The following table lists these inputs and outputs:

| BYTE | Description | Comments |
|------|-------------|----------|
| E 0.0 | Foot switch / Start | |
| E 0.1 | Free | |
| E 0.2 | Free | |
| E 0.3 | Free | |
| E 0.4 | Reserved | |
| E 0.5 | Free | |
| E 0.6 | Clear error | |
| E 0.7 | EMERGENCY STOP | Low - active |
| A 0.0 | Needle valve | Do not use |
| A 0.1 | PinMark „Marking" | |
| A 0.2 | PinMark „Ready to mark" | |
| A 0.3 | Free | |
| A 0.4 | Ready for operation | |
| A 0.5 | Free | |
| A 0.6 | Free | |
| A 0.7 | Free | |

## Profibus connection:

| | Signal | Description | Comments |
|---|--------|-------------|----------|
| 1 | - | RESERVED | |
| 2 | - | RESERVED | |
| 3 | B cable | Red | |
| 4 | RTS | | |
| 5 | GND | | |
| 6 | 5V | | |
| 7 | - | RESERVED | |
| 8 | A cable | Green | |
| 9 | - | RESERVED | |

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# 7.6 Additional information for input and output pinouts

**Reference potentials of the digital inputs / relay contact outputs**

The *lower* reference potential of *all digital inputs and all relay channels* is the GND signal which is made available both at the 26-pin round socket (BU1) and also at the DB37 plug connector (BU2) at the controller.

The *upper* reference potential for *all digital inputs and all relay channels* is the +24V DC signal which is made available both at the 26-pin round socket (BU1) and also at the DB37 plug connector.

The supply for components foot pedal, X and Y limit switches, needle valve and optional z-limit switch is provided by the engraving unit controller.

A voltage of 24V DC is applied to the switched contacts of the relay outputs when the corresponding relays are switched. The maximum amount of current switched by the contact may not exceed 0.5 ampere. It is especially important to note that the *total load for the outputs may not exceed a total current of 3 ampere.*

## 7.6.1 Relay output ready for operation / error

The output A1.4 (ready for operation / error) can have one of two states:
- Relay contact closed = ready for operation;
- Relay contact open = error.

The unit first of all goes to error mode while the marking system is being booted. The relay only switches over to „Ready for operation" once the motors have initialised and the loading of the standard character set and the standard *mask* has been completed. The relay remains at error as long as the X and Y motors cannot be initialised.

## 7.6.2 Digital input EMERGENCY STOP

Input E1.7 must be set (+24V DC applied) so that the controller can be initialised and the ready for operation state can be reached. If the input signal is missing, the motors and the needle are stopped at once and the display of the controller shows „EMERGENCY STOP DETECTED". Confirm by pressing a key after correcting the situation that caused the emergency stop.

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# 7.7 Pinouts for Marking Head

## 7.7.1 21-pin plug

| Pin | | Axis | Cable colour | 7.7.1.1 Description | Comments |
|---|---|---|---|---|---|
| 1 | A | x | Red | Motor X-axis: Phase 2A | |
| 2 | B | x | Black | Motor X-axis: Phase 1A | |
| 3 | C | x | Yellow | Motor X-axis: Phase 2B | |
| 4 | D | x | Orange | Motor X-axis: Phase 1B | |
| 5 | E | y | Red | Motor Y-axis: Phase 2A | |
| 6 | F | y | Black | Motor Y-axis: Phase 1A | |
| 7 | G | y | Yellow | Motor Y-axis: Phase 2B | |
| 8 | H | y | Orange | Motor Y-axis: Phase 1B | |
| 9 | J | | - | Free | |
| 10 | K | | - | Free | |
| 11 | L | | - | Free | |
| 12 | M | | Black | Foot pedal - E1.0 | Option for hand-type unit. |
| 13 | N | x | Black | Initiator output x - E1.1 | |
| 14 | P | y | Black | Initiator output y - E1.2 | |
| 15 | R | | Black | Needle valve relay - A1.0 | |
| 16 | S | x | Brown | + 24V – initiator X | |
| 17 | T | y | Brown | + 24V - initiator Y | |
| 18 | U | | Brown | + 24V – foot pedal | Option for hand-type unit. |
| 19 | V | x | Blue | 0V - Initiator X | |
| 20 | W | y | Blue | 0V – initiator Y | |
| 21 | X | | Blue | 0V - needle valve | |

### Colour coding of the stepper motors

| Phase | Cable colour | Phase | Cable colour |
|---|---|---|---|
| **Phase 1 A** | Black | **Phase 2 A** | Red |
| **Phase 1 B** | Orange | **Phase 2 B** | Yellow |
| **Jumper 1** | Orange - white / Black - white | **Jumper 2** | Red - white / Yellow - white |

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# 7.8 Pinouts of Connecting Cable

## 7.8.1 Standard marking head connecting cable

| No. | | Marking | Description | Comments |
|---|---|---|---|---|
| 1 | A | White | Motor X-axis: Phase 2A | |
| 2 | B | Brown | Motor X-axis: Phase 1A | |
| 3 | C | Green | Motor X-axis: Phase 2B | |
| 4 | D | Yellow | Motor X-axis: Phase 1B | |
| 5 | E | Pink | Motor Y-axis: Phase 2A | |
| 6 | F | Gray | Motor Y-axis: Phase 1A | |
| 7 | G | Blue | Motor Y-axis: Phase 2B | |
| 8 | H | Red | Motor Y-axis: Phase 1B | |
| 9 | J | Black | Free | |
| 10 | K | Violet | Free | |
| 11 | L | Pink-gray | Free | |
| 12 | M | Red-blue | Foot pedal / Start - E1.0 | Without Z-axis option. |
| 13 | N | Green-white | Initiator output X - E1.1 | |
| 14 | P | Green-brown | Initiator output Y - E1.2 | |
| 15 | R | Yellow-white | Needle valve relay - A1.0 | |
| 16 | S | Yellow-brown | + 24V DC | |
| 17 | T | White-gray | + 24V DC | |
| 18 | U | Brown-gray | + 24V DC | |
| 19 | V | Pink-white | 0V DC | |
| 20 | W | Pink-brown | 0V DC | |
| 21 | X | Red-white | 0V DC | |
| 22 | Y | - | Motor Z-axis: Phase 2A* | |
| 23 | Z | - | Motor Z-axis: Phase 2B* | |
| 24 | - | - | Motor Z-axis: Phase 2A* | |
| 25 | - | - | Motor Z-axis: Phase 1B* | |
| 26 | - | - | Free | |

* Option, not provided in the standard basic version

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# 7.9 Serial RS-232 Interface

## (Without hardware handshake)

| Signal | DB-9 | DB-25 | | DB-25 | DB-9 | Signal |
|--------|------|-------|---|-------|------|--------|
| DCD | 1 | 8 | | 8 | 1 | DCD |
| RxD | 2 | 3 | | 3 | 2 | RxD |
| TxD | 3 | 2 | | 2 | 3 | TxD |
| DTR | 4 | 20 | | 20 | 4 | DTR |
| GND | 5 | 7 | | 7 | 5 | GND |
| DSR | 6 | 6 | | 6 | 6 | DSR |
| RTS | 7 | 4 | | 4 | 7 | RTS |
| CTS | 8 | 5 | | 5 | 8 | CTS |
| RI | 9 | 22 | | 22 | 9 | RI |
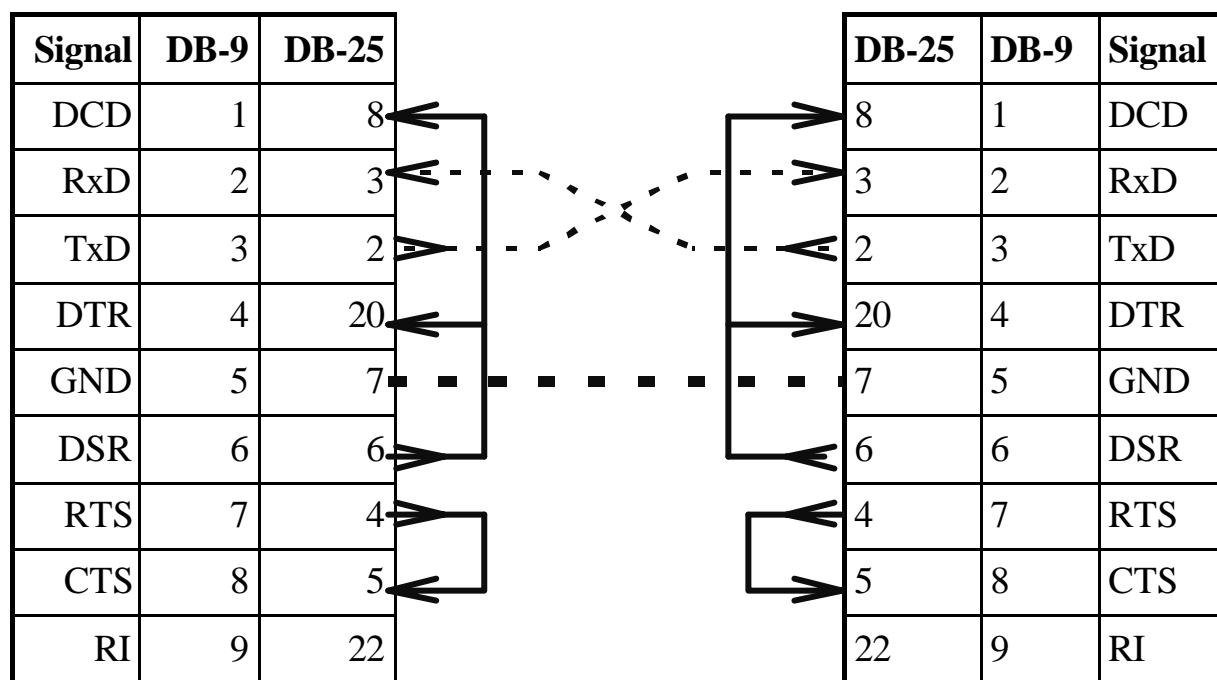
Signal descriptions:

| Signal name | Meaning | Comments |
|-------------|---------|----------|
| DCD | Data Carrier Detected | |
| RxD | Received Data | |
| TxD | Transmitted Data | |
| DTR | Data Terminal Ready | |
| GND | Signal Ground | |
| DSR | Data Set Ready | |
| RTS | Request To Send | |
| CTS | Clear To Send | |
| RI | Receiver Interrupt | |

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# 7.10 Terminal block of engraving unit *(option)*

| Multi-pin socket | Termi-nal No. | To terminal No. / Target | Description | Comments |
|---|---|---|---|---|
| | 0 | 22 | Green/yellow earthing Y-slide | |
| 1 | 1 | Motor X-axis | Black          Phase 1A | |
| 2 | 2 | Motor X-axis | Red          Phase 2A | |
| 3 | 3 | Motor X-axis | Orange          Phase 1B | |
| 4 | 4 | Motor X-axis | Yellow          Phase 2B | |
| 5 | 5 | 23 | Motor Y-axis | |
| 6 | 6 | 24 | Motor Y-axis | |
| 7 | 7 | 25 | Motor Y-axis | |
| 8 | 8 | 26 | Motor Y-axis | |
| | 9 | Foot switch | Reserve - E1.0 | Rel. DI card : Pin 34 |
| 13 | 10 | Ini X | Initiator X input  E1.1 | Rel. DI card: Pin 16 |
| 14 | 11 | 27 | Initiator Y input E1.2 | Rel. DI card: Pin 35 |
| 15 | 12 | Valve | Needle valve relay output | Rel. DI card: Pin 1 |
| 16 | 13 | Not used | +24V DC – foot switch | Rel. DI card: Pin 31-32 |
| 17 | 14 | Ini X | +24V DC – initiator X | Rel. DI card: Pin 13-14 |
| 18 | 15 | 28 | +24V DC - initiator Y | Rel. DI card: Pin 12 |
| | 16 | Not used | | |
| | 17 | 30 | Reserve Y-slide | |
| 19 | 18 | Ini X | 0V DC - initiator X | Rel. DI card: Pin 15 |
| 20 | 19 | 29 | 0V DC - initiator Y | Rel. DI card: Pin 9-11 |
| 21 | 20 | Valve | 0V DC – needle valve | Rel. DI card: Pin 28-30 |

### 7.10.1.1 Terminal strip at the slide

| | | | | |
|---|---|---|---|---|
| | 21 | Y-slide | Shielded connection | |
| | 22 | Y-slide | Green/Yellow earthing Y-slide | |
| | 23 | Motor Y-axis | Black          Phase 1A | |
| | 24 | Motor Y-axis | Red          Phase 2A | |
| | 25 | Motor Y-axis | Orange          Phase 1B | |
| | 26 | Motor Y-axis | Yellow  Phase 2B | |
| | 27 | Ini Y | Initiator Y-input E1.2 | |
| | 28 | Ini Y | +24V DC initiator Y | |
| | 29 | Ini Y | 0V DC initiator Y | |
| | 30 | Not used | | |

| Phase | Cable colour | Phase | Cable colour |
|---|---|---|---|
| **Phase 1 A** | Black | **Phase 2 A** | Red |
| **Phase 1 B** | Orange | **Phase 2 B** | Yellow |
| **Jumper 1** | Orange - white / Black - white | **Jumper 2** | Red - white / Yellow - white |

User Manual for PinMark Marking Systems with UMC-111 Control Unit

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**7-10**