**Remark:** control strategies and process see MODAS description

Safety Instructions in accordance with VDE 0411



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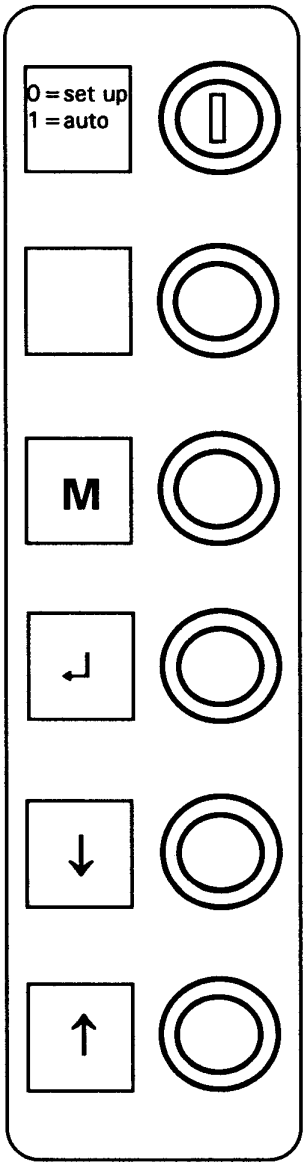
## 1. Set up of System Parameters

All setup is done via the function keys.




**PROCON Function Keys**
**IP65**



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All system parameter can be adjusted in the **main function "Setup"** .

| | |
|---|---|
| start of **main function "Setup"** | |
| - open the cover in the front panel | The measurement is suspended |
| start of **main function "Automatic"** | |
| - close the cover in the front panel | The measurement is active |

**1.1 adjust of display contrast** with the screw C behind the cover

**1.2 set time**
The time is stored together with the measured values

| | |
|---|---|
| **M** | select **Menu Setup** |
| ↑↓↵ | select (↑↓) and activate (↵) **set time** |
| ↑↓↵ | modify numbers (↑↓) and proceed with next entry (↵) |
| **M** | return to **Menu Setup** |

**1.3 set rotation time**
At the end of this time the rotating single value card steps form one measurement point to the next.

| | |
|---|---|
| **M** | select **Menu Setup** |
| ↑↓↵ | select (↑↓) and activate (↵) **set rotation time** |
| ↑↓↵ | select rotation time (↑↓) and accept (↵) |
| **M** | return to **Menu Setup** |

**1.4 select printer (only possible with optional printer interface installed)**
PROCON allows to print the actual screen with time and date.
First the printer has to be selected.

Driver routines are installed for the following printers:
**NEC P6, Star NL10, NEC P2, IBM compatible, HP Laser Jet III**

| | |
|---|---|
| **M** | select **Menu Setup** |
| ↑↓↵ | select (↑↓) and activate (↵) **select printer** |
| ↑↓↵ | select printer driver routine (↑↓) and accept (↵) |
| **M** | return to **Menu Setup** |


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### 1.5 new software installation

**When/Why:** Needed to install a new version of system software.

**How:**

Open front cover to start the main function **Setup**
Take data disk out and insert program disk

**M** select **Menu Setup**

↑↓↵ select (↑↓) and activate (↵) **new software installation**
wait for the following message

| Software installation finished |
|---|

Insert data disk.
The program automatically restarts.

If the data disk is not replaced in time, the following message appears:

| insert data disk |
|---|

insert data disk,

↵ to restart program.
The program restarts automatically.

**M** select **Menu Setup**

These installation procedure is described with each software update.


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# 2. Setup = Preparation and Adjustment

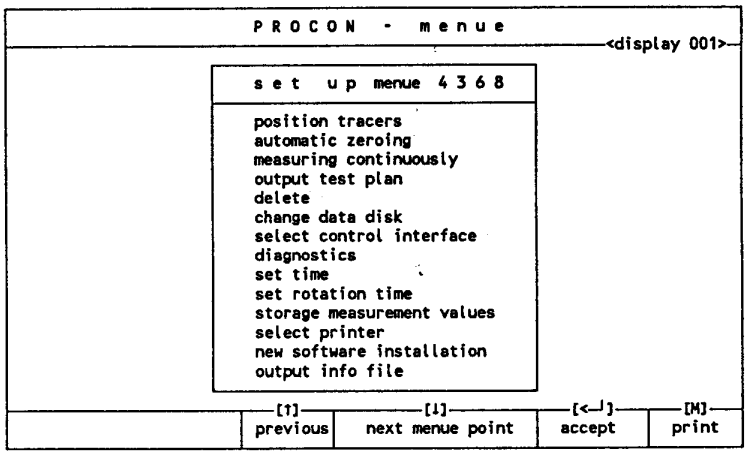
## 2.1 Basic Functions / Application Hints

start of main function Setup
**- open cover in the front panel -**
the measurement is suspended.
The signal ´Busy´ is activated to indicate that PROCON is not ready for measurements.

### 2.1.1 change of operating modes

All operating modes can be activated in the menu.

**M** select **Menu Setup**
↑↓ ↵ select operating mode (↑↓) and activate (↵)
The actual mode is inverted.




### 2.1.2 change to other measurement point

↵ activate **functions** — only necessary, if
↑↓ select **sel. meas. point** — **sel. meas. point**
↵ accept function — is not activated
↑↓↵ select meas. point (↑↓) and accept (↵)

### 2.1.3 change to other tracer

↵ activate **functions** — only necessary, if
↑↓ select **select tracer** — **select tracer**
↵ accept function — is not activated
↑↓↵ select tracer (↑↓) and accept (↵)

### 2.1.4 print (only possible with optional printer interface installed)

↵ activate **functions** — only necessary, if **print**
↑↓ select **print** — is not activated
↵ accept function
↑↓ **print**

PROCON prints the actual screen with date and time.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## 2.2 Operating Modes

### 2.2.1 position tracers = mechanical adjustment of the tracers

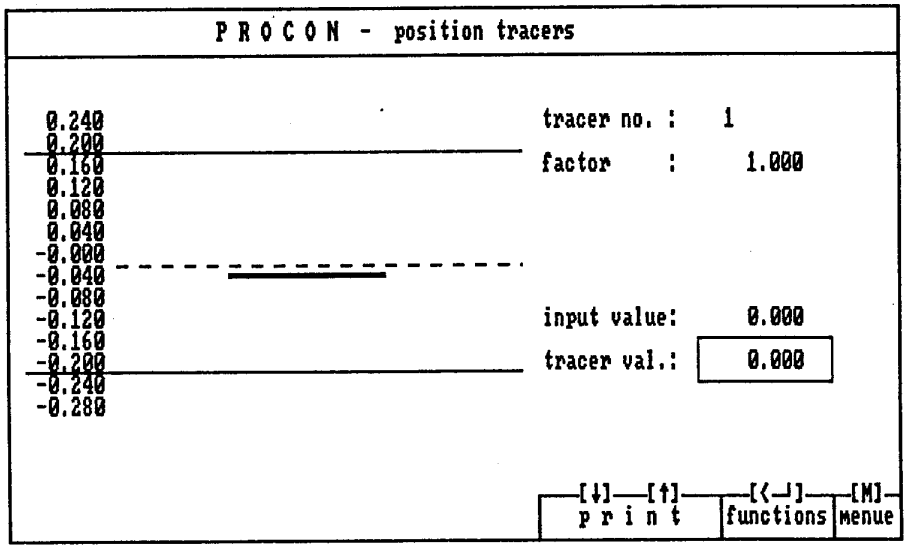
**When/Why:** Necessary after mechanical changes, replacement of tracers or if a tracer can not be readjusted by software means.

**How:**

| | | |
|---|---|---|
| **M** | activate **Menu Setup** | |
| | insert reference master | |
| ↑↓ ↵ | select (↑ ↓) and activate (↵) **position tracers** | |
| ↵ | activate **functions** | only necessary, if |
| ↑↓↵ | select (↑ ↓) and accept (↵) **select tracers** | **select tracers** is not |
| ↑↓↵ | select tracer (↑↓) and accept (↵) | active |

All tracers have to be adjusted. The accuracy of the adjustment should be at least. 1/2 the range of correction. The display shows twice the range of correction.

**M** return to **Menu Setup**




**tracer no:** The no. of the tracer is corresponding to the label on the back panel

**factor:** PROCON offers the opportunity to use a scaling factor.
This factor is necessary if mechanical levers are used or for example to convert ´mm´ to ´Inch´ etc.

**input value:** **input value = tracer value * factor**
This value is used for the calculation of the measured value.
for **fine adjustment** see **2.2.2 automatic zeroing = calibration.**

**tracer val.:** measured value without regard of the factor.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### 2.2.2 automatic zeroing = calibration

**When/Why:** Periodically after a fixed time or a number of produced units. With this function PROCON determines a readjust value and checks the system.

**readjust value = actual value - reference master**

The readjust value is used to fine adjust the tracer position and to compensate changes caused by temperature coefficients. Deviations bigger then the predefined max. correcture indicate failures.

PROCON offers during programming of the measurement task two possibilities to invite the user to calibrate the system:

**Forced zeroing yes**

The user is forced to calibrate, each time the main function Automatic is started.
(s. 2.2.4 output test plan, parameter)

**Automatic zeroing after n units**

The user is forced to calibrate after n units are produced in main function automatic.
The number of units depends on the cycle time and the environment.
(s. 2.2.4 output test plan, tracer)

**How:**

| | |
|---|---|
| **M** | activate **Menu Setup**<br>insert reference master |
| ↑↓ ↵ | select (↑↓) and activate (↵) **automatic zeroing** |
| ↑↓↵ | select channel (↑↓) and accept (↵)<br>**all** = all common,<br>**channel** = only this channel<br><br>Select all channels, to be calibrated.<br>These are labelled ***no*** in colon ***set.*** |
| **M** | return to **Menu Setup** |


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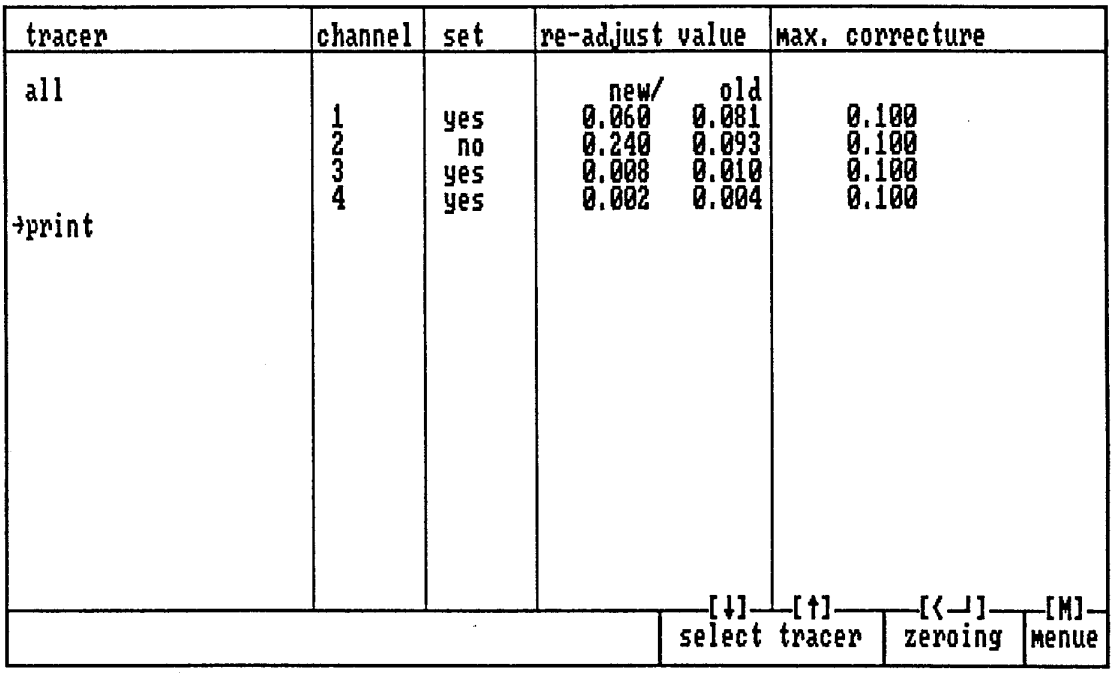


**set**

**yes** the measured value is **inside** the allowed max. correcture range.
**no** the measured value is **outside** the allowed max. correcture range. Please check, weather the reference master is inserted correctly and repeat zeroing. If this will not lead to ***set = yes***, the corresponding tracer will have to be readjusted in **position tracer.**

**re-adjust value = deviation of the tracer from 0**

**new** value of the actual cycle
**old** value of the last use of the function ´automatic zeroing´

A comparisation of **new** and **old** shows the changes over time.

In case of big deviations the zeroing should be repeated to prevent that a faulty measurement in automatic zeroing causes measurement errors.

**counter = no. of units until the next predefined calibration of this channel**
This column is only displayed, if at least one channel is programmed with a number bigger than zero. After a successful calibration the counter is reset to the programmed number.


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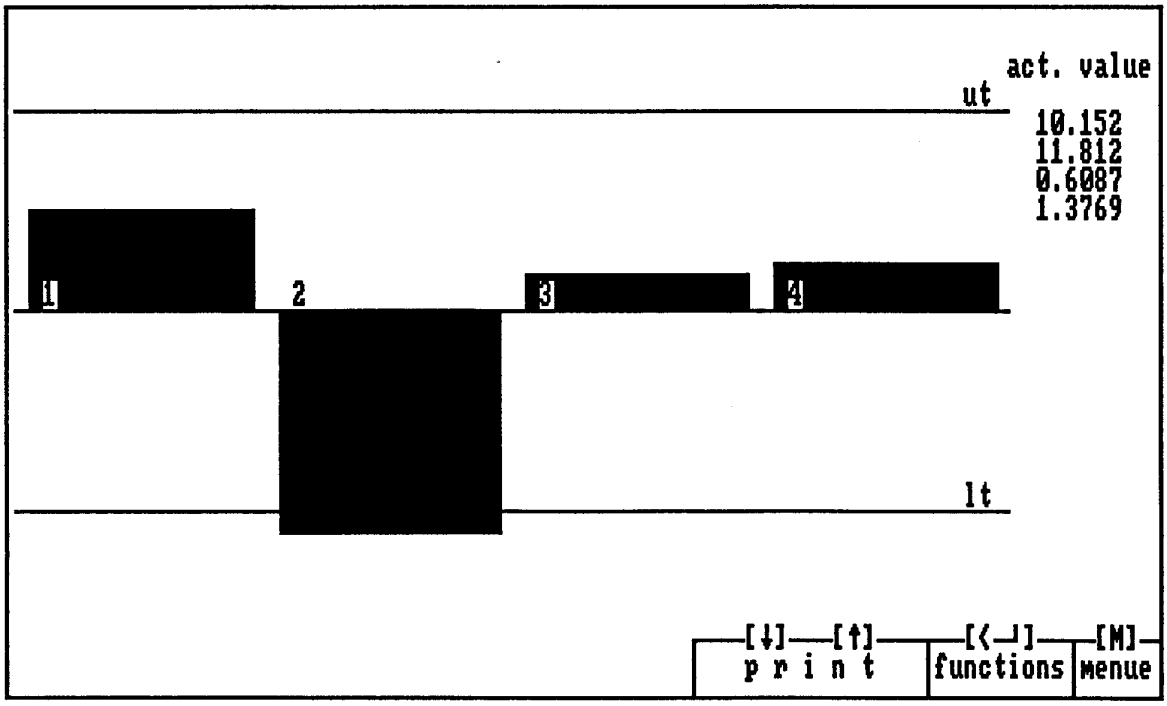
### 2.2.3 measuring continuously = system check

**When/Why:** To check the measuring device or to examine the shape of a work piece frequently a measurement without signal exchange with the machine is required. **Measuring continuously** provides the measurement with all combinations and regard of the readjust value of the function automatic zeroing. The result is the same as in the main function automatic.

**How:**

| | |
|---|---|
| **M** | activate **Menu Setup** |
| ↑↓ ↵ | select (↑↓) and accept (↵) **measuring continuously** |
| **M** | return to **Menu Setup** |





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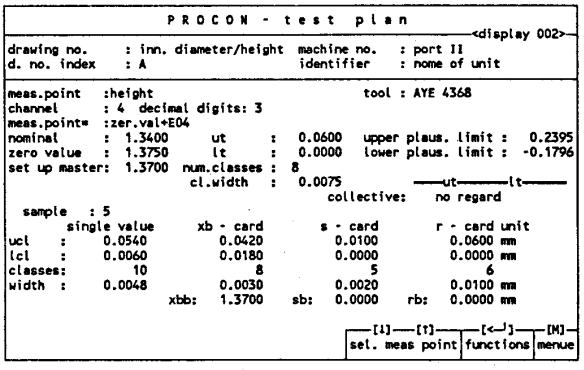
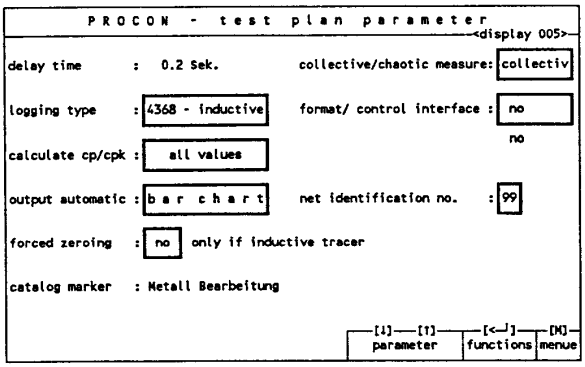
### 2.2.4 output test plan = display of the measurement task

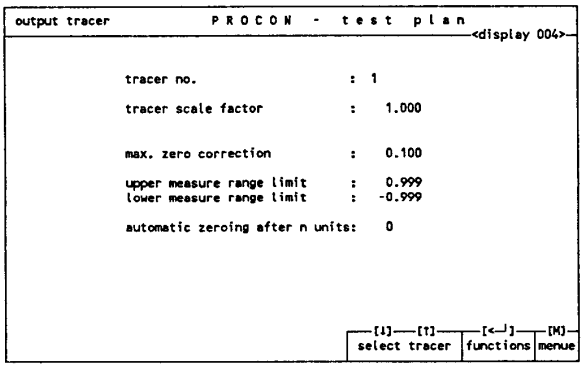
**When/Why:** The programmed measurement task influences the measurement, the calculation of measurement points as well as the decision, weather the part is good or not. This function allows to monitor the whole measurement task.

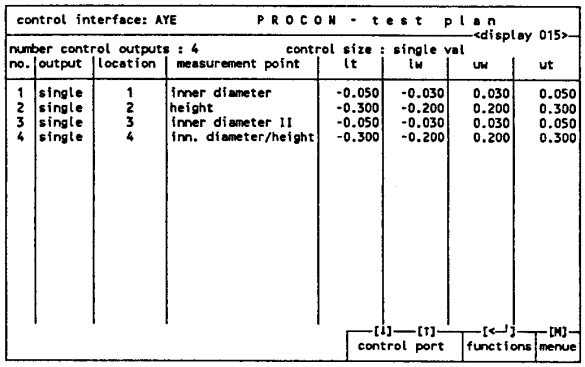
**How:**

| | |
|---|---|
| **M** | activate **Menu Setup** |
| | select (↑↓) and accept (↵) **output test plan** |
| ↵ | activate functions |
| ↑↓↵ | select (↑↓) and accept (↵) parameter, meas.point, tracer or control port |
| | or |
| ↑↓↵ | chose between the meas.points, tracers or control ports |
| M | return to **Menu Setup** |



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**2.2.5 delete**

**When/Why:** Deletes all results on the disk. So all quality cards, the capability index and all internal memory locations will be reseted to their initial state.

**How:**

| | |
|---|---|
| **M** | activate **Menu Setup** |
| ↑↓ ↵ | select (↑↓) and accept (↵) **delete** |
| ↑↓ ↵ | confirm input; select and accept **yes** |
| **M** | return to **Menu Setup** |

**2.2.6 change data disk = change part**

**When/Why:** Necessary, if the measurement task is changed. The disk contains the last calibration information and the measured values. Pleas check weather it is necessary to delete these values (see chap. 2.2.5). In any case the calibration (see chap. 2.2.2) has to be repeated.

**How:**

insert new data disk into drive

| | |
|---|---|
| **M** | activate **Menu Setup** |
| ↑↓ ↵ | select (↑↓) and accept (↵) **change data disk** |
| **M** | return to **Menu Setup** |

> Attention!
> After changing the data disk the calibration of the tracers has to be repeated. See **automatic zeroing.**

**Process flow:**

- **insert new data disk into drive**

- **2.2.6 change data disk**

- **2.2.1 position tracers**
  mechanical adjustment of the tracers, only if a new measuring device or new tracers are used.

- **2.2.2 automatic zeroing**
  fine adjustment and calibration for the new measurement task.
  The measurement has to be performed with the reference master inserted.

- **2.2.3 measuring continuously**
  On demand, to check the system.

- **2.2.5 delete**
  On demand, to delete the stored measurement values and capability index.


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# 3. Automatic = Measurement and Control

## 3.1 Basic Functions/ Application Hints

start main function **automatic**
**- close cover in the front panel -**
The measurement is activated. The signal ´Busy´ is not active to indicate, that PROCON is ready for operation.

### 3.1.1 measuring

In Automatic input signals can start measurement. In the measurement task it can be distinguished between **collective** and **chaotic** measurement.

**collective** All inputs will be measured simultaneous.

**chaotic** Each input has its own start signal. Only inputs with an active start signal will be measured. This function allows measurements without temporal coherence.

With the exception of **automatic zeroing** in Automatic measurement is possible in each function. The hand shake signal **Busy** indicates the readiness for operation of PROCON to external devices.

**Particularities:**

**measurements out of range:**
If at least one measurement is out of range PROCON interprets the whole measurement as failure.
The result for the corresponding measurement point will be displayed as **.
The measurement cycle will not be used for statistics and control.

**measurements out of plausibility:**
The range of plausibility can be programmed within the measurement task independent for each measurement point. If at least one measurement is out of plausibility PROCON interprets the whole measurement as failure.
The result for the corresponding measurement point will be displayed as **.
The measurement cycle will not be used for statistics and control.


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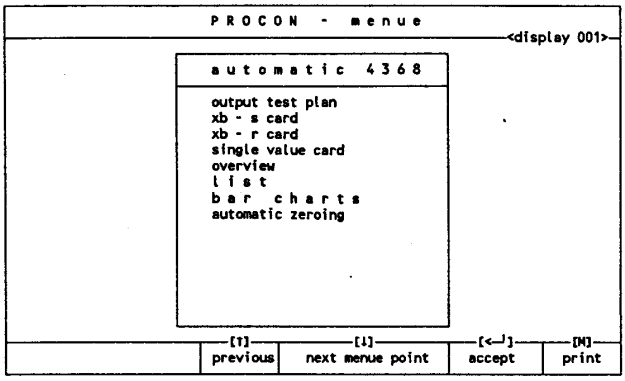
### 3.1.2 change of operating modes

All operating modes will be activated
in the menu

**M** activate **Menu Automatic**
↑↓ ↵ select (↑↓) and accept (↵) operating mode.
The actual mode is inverted.




### 3.1.3 change to other measurement point

| | | |
|---|---|---|
| ↵ | activate **functions menu** | only necessary, if sel. meas. point |
| ↑↓ | select **sel. meas. point** | is not active |
| ↵ | accept function | |
| ↑↓↵ | select measurement point (↑↓) and accept (↵) | |

### 3.1.4 select marker

| | | |
|---|---|---|
| ↵ | activate **functions menu** | only necessary, if select marker |
| ↑↓ | select **select marker** | is not active |
| ↵ | accept function | |
| ↑↓↵ | select marker (↑↓) and accept (↵) | |

The selection ***No Marker*** allows to quit the function without changes.

Each intervention in the production process should be documented by a marker. The marker will allow to interpret the changes in process after interventions. PROCON allows to use a catalogue of 16 different markers. The catalogues are defined in MODAS and the catalogue used is chosen during programming of the measurement task. An identification character will be displayed in the quality cards and will be stored with the measured value.

The last character in the data set (switch) controls which measured value is marked.

0 = all measured values of the last measurement cycle
1 = the last measured value of the actual measurement point
2 = all measured values (differs from 0 only for chaotic measurement)

In the following cases PROCON marks automatically:
S = if the control port is activated, after output of a corrective value
T = if a trend is detected
M = if middle third is detected
R = if run is detected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### 3.1.5 delete last value

| | | |
|---|---|---|
| ↵ | activate **functions menu** | only necessary, if delete |
| ↑↓ | select **delete** | is not active |
| ↵ | accept function | |
| ↑↓↵ | select (↑↓) and accept (↵) **yes** | |

Only the last measurement cycle can be deleted. The function can not be used repetitively.

### 3.1.6 print (only for optional printer interface)

| | | |
|---|---|---|
| ↵ | activate **functions menu** | only necessary, if print |
| ↑↓ | select **print** | is not active |
| ↵ | accept function | |
| ↑↓ | **print** | |

PROCON prints the actual screen with time and date.


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## 3.2 Results

### 3.2.1 list

**When/Why:** The list shows in a detailed manner the last measured values for all measurement points. This display is useful, if a certain measurement value should be regarded.

More frequently used are the following charts:
- for process control the quality cards
- for display of measured values the bar chart

| meas. point | nominal | ut | lt | act. value | deviation |
|---|---|---|---|---|---|
| inner diameter II | 10.000 | 0.300 | -0.300 | 10.122o | 0.122o |
| inn. diameter/hight | 12.340 | 0.000 | -0.500 | 11.979o | -0.361o |
| inner diameter | 0.6000 | 0.0500 | -0.0500 | 0.5836o | -0.0164o |
| height | 1.3400 | 0.0600 | 0.0000 | 1.3779o | 0.0379o |

[↓] [↑] [⟨┘] [M]
print | functions | menue

**actual value** Display of the last measured values of all measurement points.
The display indicates:
* this measurement point was measured in the last cycle
0 this measurement point was not measured in the last cycle

**deviation** actual value - nominal value

During function selection the display of PROCON is not updated


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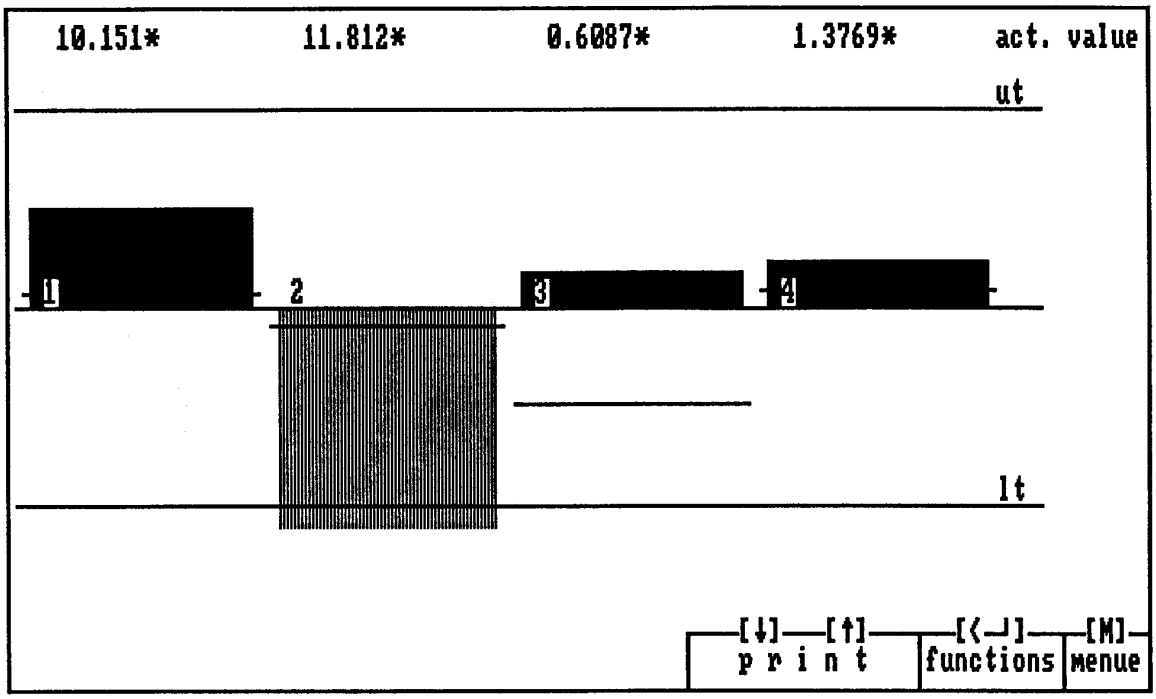
### 3.2.2 bar chart

**When/Why:** The bars show the last measured value for all measurement points within the tolerance range. This display is useful, if it should be checked how the working piece lays in the tolerance range. For process control the use of quality cards is recommended.




| | |
|---|---|
| **actual value** | Display of the last measured values of all measurement points.<br>The display indicates:<br>* this measurement point was measured in the last cycle<br>0 this measurement point was not measured in the last cycle |
| **bar** | The display of measured values out of tolerance is different. |
| **horizontal line** | The horizontal line indicates the previous value |

During function selection the display of PROCON is not updated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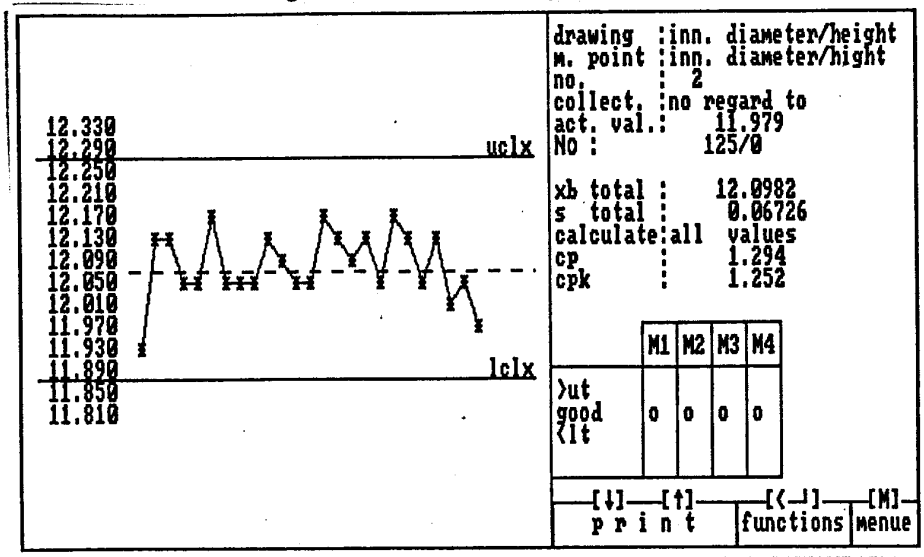
### 3.3 Process characteristics/ Quality cards
#### 3.3.1 single value card

**When/Why:** The single value card shows with the last 25 measured values the process characteristics of a measurement point. The single value card has the advantage, that it is easy to read. For process control the Xq-S quality card is recommended, because it is more sensitive for changes in location and spread.




| | |
|---|---|
| **drawing** | Identification of the working piece |
| **m.point/ no** | Identification of the measurement point<br>Internal PROCON uses only the automatically created numbers |
| **collect.** | Effect of the measurement point on the evaluation for the optional control port |
| **No:** | number of stored values for this measurement point |
| **x-bar/ s** | Mean value and standard deviation over all measured values |
| **cp/ cpk** | Base for calculation and display<br>In the measurement task is defined: estimation, used for analysis; min. number of samples and weather the calculation should be done for all or the last 25 measured values. |
| **classification** | 3-classes-classification for all active measurement points<br>* = measurement point was measured in the last cycle<br>o = measurement point was not measured in the last cycle<br>** in UT/LT = The measured value is out of range or out of plausibility.<br>If at least one measurement point is marked in this way, the whole cycle will not be used for statistics and control |
| **Quality chart** | Character indicate a sample with marker<br>The time is stored automatically by PROCON. |

During function selection the display of PROCON is not updated

In the function rot. single value card PROCON changes the measurement point after a predefined time.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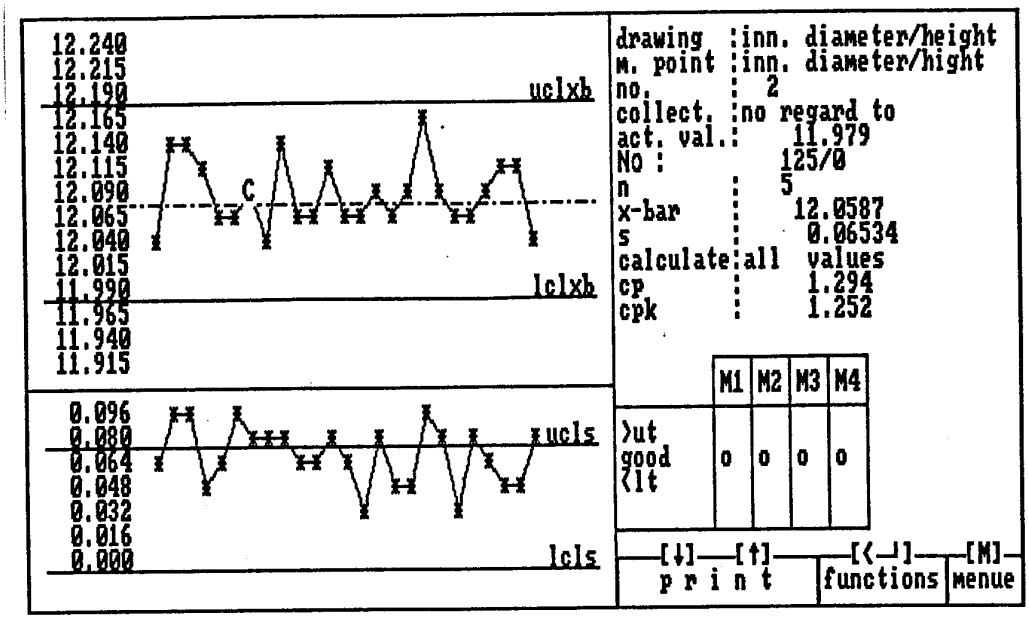
### 3.3.2 Xq-S- or Xq-R-card

**When/Why:** The Xb-S- or the Xb-R-card show with the results of the last 25 samples the process characteristics of a measurement point. For process control the Xb-S-card is recommended, because it is most sensitive for changes in location and spread.




| | |
|---|---|
| **drawing** | Identification of the working piece |
| **m.point/ no** | Identification of the measurement point<br>Internal PROCON uses only the automatically created numbers |
| **collect.** | Effect of the measurement point on the evaluation for the optional control port |
| **No (N/i)** | N = number of stored values for this measurement point;<br>i = number of measurements in this sample |
| **n** | size of sample |
| **x-bar/s** | calculated values of the last sample |
| **cp/ cpk** | Base for calculation and display<br>In the measurement task is defined: estimation, used for analysis; min. number of samples and weather the calculation should be done for all or the last 25 samples. |
| **classification** | 3-classes-classification for all active measurement points<br>* = measurement point was measured in the last cycle<br>o = measurement point was not measured in the last cycle<br>** in UT/LT = The measured value is out of range or out of plausibility. If at least one measurement point is marked in this way, the whole cycle will not be used for statistics and control |
| **Quality chart** | Character indicate a sample with marker<br>The time is stored automatically by PROCON. |

During function selection the display of PROCON is not updated

In the function rot. quality card PROCON changes the measurement point after a predefined time.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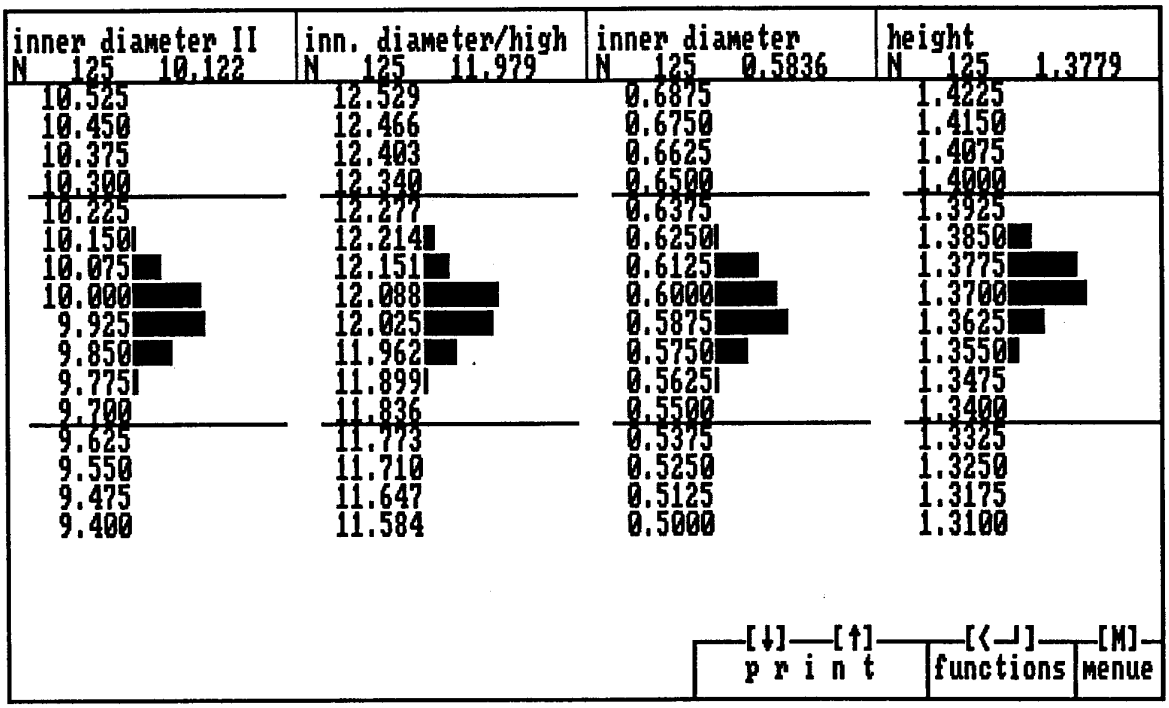
### 3.4 overview = distribution card

**When/Why:** Overview shows location and spread of all measurement points. All measured values are included in the chart. Critical measurement points can be detected easily.

More frequently used are the following charts:
- for process control the quality cards
- for display of measured values the bar chart




| | |
|---|---|
| **titel** | name of the measurement point and last measured value |
| **N** | no. of measurements, stored for this measurement point |

During function selection the display of PROCON is not updated



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### 3.5 automatic zeroing = calibration

**When/Why:** Periodically after a fixed time or a number of produced units and when the main function automatic is started. With this function PROCON determines a readjust value and checks the system.

**readjust value = actual value - reference master**

The readjust value is used to fine adjust the tracer position and to compensate changes caused by temperature coefficients. Deviations bigger then the predefined max. correcture indicate failures.

PROCON offers during programming of the measurement task two possibilities:

**Forced zeroing yes**
When the main function Automatic is started the following message appears:

| forced zeroing - taking over to automatic zeroing |
|---|

The user has to calibrate the tracer, before PROCON will continue the main function automatic. Busy is active, **PROCON is not ready for operation.**

**Automatic zeroing after n units**
After n units are produced in main function automatic the following message appears:

| zero counter reached - taking over to automatic zeroing |
|---|

The user has to calibrate the tracer, before PROCON will continue the main function automatic. Busy is active, **PROCON is not ready for operation.**

**How:** (s. 2.2.2 automatic zeroing in main function setup)

| | | |
|---|---|---|
| | ↵ | activate **automatic zeroing**, when the message is displayed. |
| or | **M** | activate **Menu Automatic** |
| | ↑↓ ↵ | select (↑↓) and activate (↵) **automatic zeroing** |
| | | insert reference master |
| | ↑↓↵ | select channel (↑↓) and accept (↵)<br>**all** = all common,<br>**channel** = only this channel |
| | | Select all channels, to be calibrated.<br>These are labelled ***no*** in colon ***set.*** |
| | **M** | return to **Menu Automatic** |


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## 4. Diagnostics/ Error messages/ Setup

### 4.1 Diagnostics

**When/Why:** Necessary during installation for check of in- and outputs.

> **start main function setup, by opening the front panel**
>
> The measurement is interrupted
>
> The signal ´Busy´ is active to indicate, that PROCON is not ready for measurements.

**How:**

| | |
|---|---|
| **M** | activate **Menu Setup** |
| ↑↓↵ | select (↑↓) and accept (↵) **Diagnostics** |
| **M** | return to **Menu Setup** |

| | |
|---|---|
| **actual PROM version** | displays the version no. |
| **Baudrate** | 19200 |
| **error counter** | displays the internal error counter of PROCON. |
| **check sum PROM** | displays the check sum for the PROM. |
| **check sum RAM** | displays the check sum for the battery back-uped RAM. |
| **separate start signal** | displays the start input V5. |
| **collec. Start/V6/Control 3-2-1** | displays the state of the start and control inputs<br>-S— Start-Input (V6)<br>—3— Control-Input 3 (V5, Pins 13, 32)<br>—-2- Control-Input 2 (V5, Pins 12, 31)<br>——1 Control-Input 1 (V5, Pins 11, 30) |
| **relay-output/opto-input** | allows an automatic test of the relay-outputs and the opto-inputs with the test-adapter P-403. |
| **read relays AYE 5185** | displays the state of the relay outputs (V12) |
| **set relays AYE 5185** | allows to set and reset the relay outputs:<br>↑↓ select output<br>↵ toggle relay<br>The state of the outputs is changed when this function is left. (↑ at position 15 or ↓ at position 0). |
| **A/D converter** | displays the voltage on the analog inputs (V14 and V15) hexadecimal values and converted to mV. |


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### 4.2 Error Messages

#### 4.2.1 Messages during normal operation

**- no PROCON-test plan on the disk**
**- no PROCON test plan on disk**

Check the disk, perhaps an installation disk is still inserted.

**- The result file is not o.k. - the measured values must be deleted**

press ↵ and run "delete" in set up menu (see chap. 2.2.5)

**- logging type and format must be equal then data disk changed**

check the programming of the measurement task, whether the logging type and the format/ control interface are correct. Restart PROCON with the data disk inserted.

**- Datadisk was taken out in automatic mode!**
**Measurement values could be lost!**
**After taking over the measurement values to MODAS the disk must be formatted!**

Operating error or malfunction of the internal batteries.

**- forced zeroing - taking over to automatic zeroing**
**- zero counter reached - taking over to automatic zeroing**

see chap. 3.5 automatic zeroing = calibration

**- no communication via serial port via PC and PROM.**

turn off and on PROCON for at least 1 minute. If the error message stays there, please contact the service.


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### 4.3 Setup

**When/Why:** Necessary if PROCON displays the following message during start up e.g. if the self test detects a failure.


**How:**

turn off the equipment
connect a IBM-AT compatible keyboard to X11 at the back panel
switch the equipment on
press **F1** if the message is displayed
the next screen shows the following message

EXIT FOR BOOT
RUN CMOS SETUP
RUN DIAGNOSTICS

↑↓↵ select and activate RUN CMOS SETUP

The Setup program should show the following setup:

| | |
|---|---|
| Date (mm/date/year): | Wed, Sep 05 1990 (example) |
| Time (Hour/min/sec): | 16:24:10 (example) |
| Floppy drive A: | 1.44 MB, 3.5" |
| Floppy drive B: | 1.44 MB, 3.5" |
| | |
| Hard disk C: type: | Not Installed |
| Hard disk D: type: | Not Installed |
| Primary display: | Colour 80x25 |
| Keyboard: | Not Installed |
| Video BIOS shadow: | Disabled |
| Scratch RAM option: | 1 |
| Main BIOS shadow: | Disabled |
| Turbo Speed: | Disabled |
| EMS function: | Disabled |
| AT bus clock mode: | Synchronous |

A point, that does not match the above setup should be altered in accordance with the instructions of the setup program.


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## 5.Pin assignments of the connectors in the back panel

**230V 50/60Hz** power input, euro type connector

**X5 -Control-Input**
- jack, 37-pol. MIN D
- optocouppler inputs, active if a voltage of 20V...35V DC is across (+) and (-) pin of the input

| signal name | | | pin no. | pin no. |
|---|---|---|---|---|
| IM1 | start meas. | 1 | (-) 1 | (+) 20 |
| IM2 | start meas. | 2 | (-) 2 | (+) 21 |
| IM3 | start meas. | 3 | (-) 3 | (+) 22 |
| IM4 | start meas. | 4 | (-) 4 | (+) 23 |
| IM5 | start meas. | 5 | (-) 5 | (+) 24 |
| IM6 | start meas. | 6 | (-) 6 | (+) 25 |
| IM7 | start meas. | 7 | (-) 7 | (+) 26 |
| IM8 | start meas. | 8 | (-) 8 | (+) 27 |
| ST1 | | | (-) 11 | (+) 30 |
| ST2 | | | (-) 12 | (+) 31 |
| ST3 | | | (-) 13 | (+) 32 |
| +24 Volt output | | | | 35 |
| Ground | | | | 37 |

The output +24Volt (pin35) may only be used to supply the control inputs. External circuitry may only draw 40 mA max. from this output.

**X6** - **Start** = collective start
- jack 4-pol. series 680
- a connection of pin 1 and 4 starts measurement

**X10** - **ext. func Keys** = input, to connect an external keypad
- jack, 6-pol. series 680
-

**X11** - **Keyboard** = input for a PC/AT-compatible keyboard
- jack, 5-pol. DIN


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**X12** - **Control Output** = signal output for classification and status information
- connector, 25-pol. MIN D male,
The use of the signals is described with the control interface.

| signal name | pin no. |
|---|---|
| busy 1A | 1 |
| busy 2A | 2 |
| busy 3A | 3 |
| busy 4A | 4 |
| busy no | 5 |
| busy nc | 6 |
| | |
| contact 1 | 8 |
| contact 2 | 9 |
| contact 3 | 10 |
| contact 4 | 11 |
| contact 5 | 12 |
| contact 6 | 13 |
| busy 1B | 14 |
| busy 2B | 15 |
| busy 3B | 16 |
| busy 4B | 17 |
| busy common | 18 |
| | |
| contact 7 | 20 |
| contact 8 | 21 |
| contact 9 | 22 |
| contact 10 | 23 |
| contact 11 | 24 |
| common contact | 25 |

All control outputs are isolated relays contacts, with a switching capability of max. 24V, 0,1A. The common contacts (pin 18, 25) may be used for max. 24V, 0,3A.

**X16** - **+24V**
- jack, 3-pol. series 680

Attention:
Use EMI-Connectors and screened cables


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Safety Instructions in accordance with VDE 0411

Specifications

| | |
|---|---|
| Warm up time | 20 Minutes. |
| Operating Temperature Range | 0...+40°C |
| Humidity, Relative | 75% max. |
| Frequency | 47-440 Hz |
| Supply Voltage | 115V-230 V + / -10% |
| Safety | VDE 0411, Class 1 |
| Power Consumption | 60VA max |

This device is constructed and tested in accordance with DIN 57411 Teil1/VDE 0411 Teil11, "Schutzmaßnahmen für elektronische Meßgeräte". It left the factory in unobjectionable conditions. To maintain these conditions and to allow an safe operation of the device the user has to observe the instructions of this document.

Before switching on the device make sure that the source voltage is the same as the rated voltage of the device. The power supply connector may only be connected to a power source with potential earth. This protection may not be interrupted by cable adapters.

By opening covers or dismounting parts, which is not possible without tools, high voltage points may be discovered. Also connections may be on high potential.

Panel mounted devices may only be used in mounted condition.

Before alignment, maintenance or replacement of components the device has to be disconnected from all power sources, if it is necessary to open the device.

If it is necessary to perform alignment, maintenance or repair when the device is opened and connected to the power source, this may only be done by technicans familiar with the basic safety measures.

ATTENTION:
After repair the device has to be tested in accordance with VDE0411, Teil 1.
(The voltage test VDE 0411 Teil 1, Abschnitt 37.4 may only be performed by the manufacturer)
Make certain, that only fuses of the specified type and rating are used for replacement.
The use of repaired fuses or the bypass of the fuse is prohibit.
If there is any reason to suppose, that a safe use of the device is not possible, it has to be taken out of operation and means have to be taken to prevent unintentional use. It has to be supposed that a safe use is not possible if:

- the device is visible damaged,
- the device does not work,
- after storage in unfavourable conditions,
- after heavy stress during transports.


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