# Operating Instructions

# for

# Digital Thermometers

## Model: DTM

# 1. Contents



**Manufactured and sold by:**

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# 2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.
The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfil the EWG-machine guidelines.

# 3. Instrument Inspection

Instruments are inspected before shipping and sent out in perfect condition.
Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

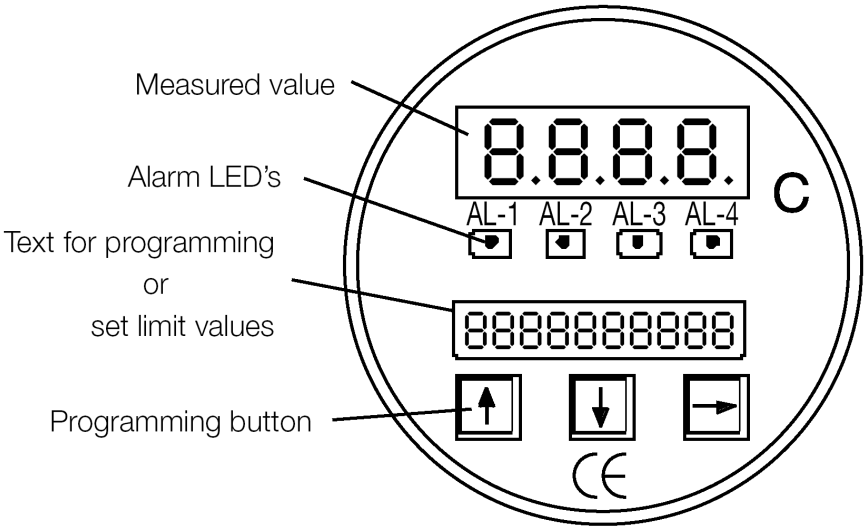
**Scope of delivery:**
The standard delivery includes:
- Digital Thermometers, model: DTM
- Operating Instructions

# 4. Regulation Use

Any use of the Digital Thermometers, model: DTM, which exceeds the manufacturer's specifications may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

# 5. Operating Principle

Digital thermometers with intelligent electronics serve to display, monitor, control and transmit temperatures in production processes and equipment.




The new device series DTM... is remarkable for its easy operation and adaptation to the most demanding measurement applications.
A 4-segment 14 mm LED display provides clearly visible indication, the device is programmed with three arrow keys beneath the lower back-lit LCD display.
The devices are fitted with an analogue output as standard. Other interfaces are available as options. Up to four limit values can be adjusted in the relay version.
The temperature to be measured is sensed by a platinum resistance thermistor and converted by the electronics to an analogue signal proportional to the temperature. The digital thermometer can be supplied in a compact shaft version for a maximum indicating range of a 200°C. Above 200°C the temperature sensor should be connected externally to the basic device with a cable.

# 6. Mechanical Connection

**Before installation:**

- Be sure the maximum allowable working pressure and temperature specified for the unit are not exceeded.
- Make sure there are no packaging residues left inside the unit.

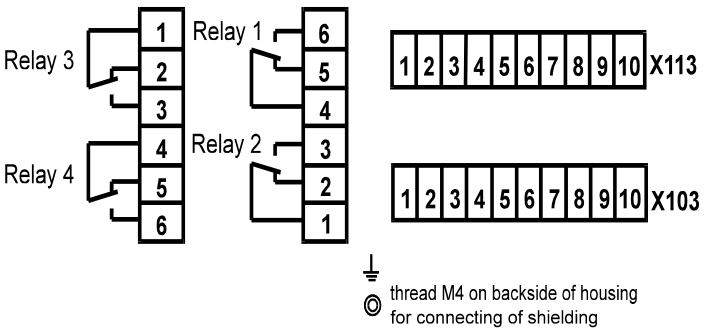
**Installation:**

- Make sure the device into which the thermometer is to be installed has been depressurised.
- Mount the DTM where it may be easily connected according to applicable codes and standards.
- Do not screw in the unit using its housing, but rather on its hexagon (size 24 spanner).
- If feasible, check the connection between the unit and the process or plant for leaks as early as after mechanical installation.

# 7. Electrical Connection

**Attention! Make sure that the voltage values of your system correspond with the voltage values of the Digital Thermometers. Make sure that the electrical supply wires are de-energized.**

- Remove the plastic cover from the unit's rear.
- Insert the cable in the screw terminal, and fix. Make sure the PG connection is tight.
- Pull off the terminal strip and connect the cable as shown in the terminal diagram.



| | | | |
|---|---|---|---|
| **X103** | | | |
| 1 | Supply + | channel-2 /external (option) | For external sensor 4 to 20 mA only |
| 2 | Not used | | |
| 3 | Supply - | channel-2 /external (option) | |
| 4 | Not used | | |
| 5 | Not used | | |
| 6 | Supply + | channel-1 /external (option) | for external sensor 4 to 20 mA only |
| 7 | Not used | | |
| 8 | Supply - | channel-1 /external (option) | |
| 9 | Not used | | |
| 10 | Not used | | |
| | | | |
| **X113** | | | |
| 1 | Not used | | |
| 2 | Not used | | |
| 3 | Not used | | |
| 4 | Data transfer | RS 232 (option) | |
| 5 | Data receive | RS 232 (option) | |
| 6 | Earth | RS 232 (option) | |
| 7 | Earth | output (-) | |
| 8 | Signal | output (+) | |
| 9 | Earth | supply (-) | |
| 10 | 24 VDC | supply (+) | |

- Plug the terminal strip onto the plug base on the unit.
- Slip on the plastic cap, and bolt in place.
  Be sure the packing ring inside the plastic cap fits tightly.

**Attention! Incorrect wiring will lead to damage of the unit's electronics.**

# 8. Operation

The various functions and parameters are distributed over three (3) levels.

**LEVEL 0- operator level**
This level is accessible to anyone (without a password).
It will be possible to set the following functions if they are enabled.

- Zero balance of the display unit (inPUt ¯ S-ZEro),
- Servicing (SErVicE), always enabled:
  - View serial number (SErVicE ¯ n),
  - Enter master password to view passwords, (SErVicE ↓ MAStr) (see 10.3),
- Limit contacts (option) (rELAiS 1-4) :
  - Switching points (rELAiS 1-4 ↓ SPt1-4),
  - Switching point hysteresis (rELAiS 1-4 ↓ HyS1-4),
  - Switching point lag time (rELAiS 1-4 ↓ dEL1-4),
- Additional functions (option):
  - Scaling of analogue output (outZP),
  - Scaling of display unit (diSPLAY),
  - Setting the peak memory (Pdu),
  - Setting the relay rotation (rotAtE),
  - Setting the RS 232 interface (S232).

All the menu items of LEVEL 1 and LEVEL 2 (except for the servicing menu item) may be enabled or blocked respectively for LEVEL 0.

**LEVEL 1- master level**
Access to this level is via password. All the functions of level 1 (for level 0) can be enabled or blocked respectively on this level. Settings of LEVEL O may also be made on LEVEL 1 (if LEVEL 0 is blocked, for example).
Additionally, the following functions are available:

- Servicing (SErVicE):
  - Displaying the dialogue display in operating mode (SErVicE ↓ SEE-Lcd),
  - Changing the password for LEVEL 1 (SErVicE ↓ PS-1).

**LEVEL 2- additional function level**
Access to this level is via LEVEL 1 after entering a password.
All additional functions available as options may be blocked or enabled respectively on this level. Settings for additional functions may also be made on LEVEL 2 (if LEVEL 0 is blocked, for example).
In addition, the following function is available:

- Servicing (SErVicE):
  - Changing the password for LEVEL 2 (SErVicE ↓ PS-2).

# 9. Key Function

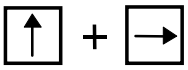
**In measurement mode**

 Access to control levels

**On the levels**

 Access to menu items

 Access to the functions of the Various menu items

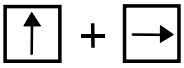
 Exit the level and return to operating mode

**In the functions**

 Access to setting (r.h. digit is flashing)
Next digit with an overflow to the right

 One digit down

 One digit up

 Reject this setting; reload previous value and return to selected function.

 Confirm setting and go to next function of menu item

**The menu items are shown in an annexed schematic.**

# 10. Technical Information

| | |
|---|---|
| Casing: | diameter: 100 mm<br>material stainless steel,<br>rear made of polyamide,<br>front side made of PAVG30 and polyester film, |
| Electrical connection: | terminal blocks, PG cable gland, |
| Protection: | IP 65 acc. to DIN 40 050, IEC 529 |
| Probe: | diameter 8 mm<br>(others upon request),<br>material stainless steel 1.4571, |
| Probe length: | acc. to customer specifications, min. 50 mm |
| Process connection: | stainless steel 1.4571 |
| Indicating range: | - 30 to + 50 to 0 to 400 °C |
| Accuracy class: | 0.5 |
| Analogue output: | 0 to 20 mA, 4 to 20 mA, 0 to 10 V (all 3-wire) |
| Max. load/burden: | $\leq$ 500 Ω for current output<br>$\geq$ 500 Ω for voltage output |
| Accuracy: | typically $\leq \pm$ 0.3 %<br>(limit point setting)<br>(acc. to DIN 16 086) |
| Repeatability: | $\leq \pm$ 0.1 % |
| Limit value relay: | Switching points adjustable as required<br>Switching hysteresis adjustable as required<br>Switching delay adjustable from 0.01 to 99.99 s<br>Max. switching voltage: 250 $V_{AC}$, 220 $V_{DC}$,<br>Max. switching current: 3 A<br>Max. breaking capacity: 50 VA, 60 W |
| Response time: | <br>Display and output signal $\geq$ 100 ms<br>Relay output $\geq$ 30 ms |
| Supply: | 15 to 30 $V_{DC}$ |
| Service environment: | |
| Ambient temperature: | -20 to +60 °C |
| Storage temperature: | -40 to +70 °C |

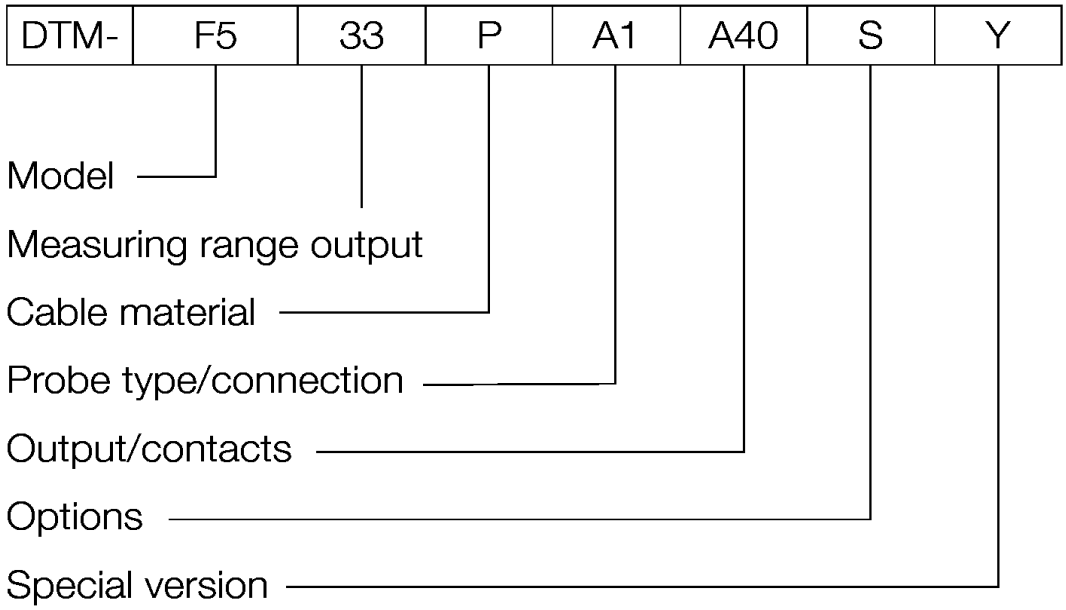
**Functions (standard):**

- Output signal
  setting of scaling and delay
- Display
  setting of scaling, decimal point and delay

**Functions (optional):**

- Peak value memory with effect on display, output, relay,
  internal reset via adjustable timer,
  keyboard or RS 232,
- Serial interface RS 232.

## 11. Order Codes

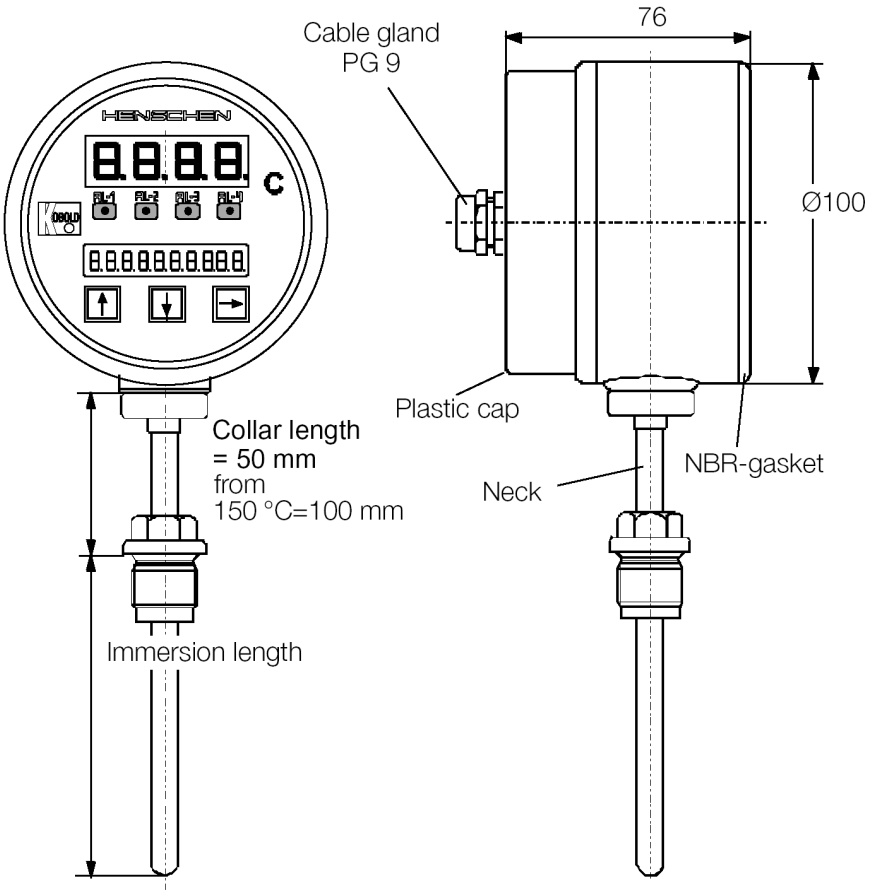


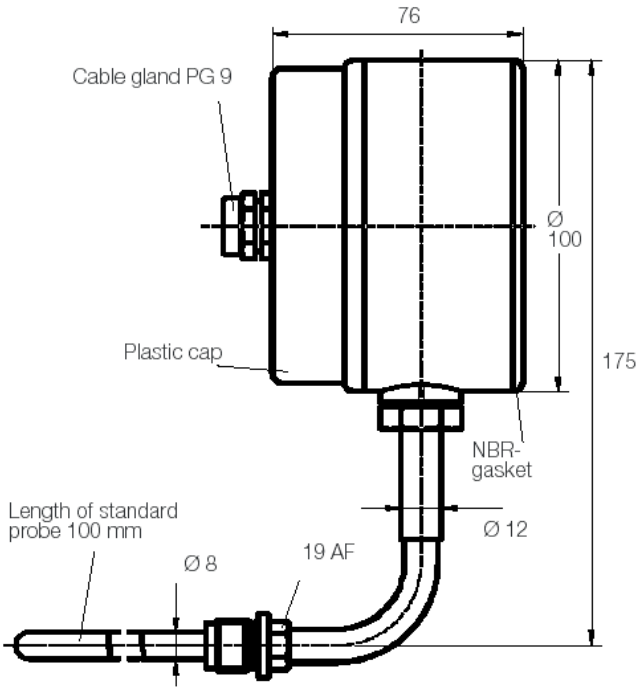

Please specify probe length and cable length
(for remote thermometers) in writing

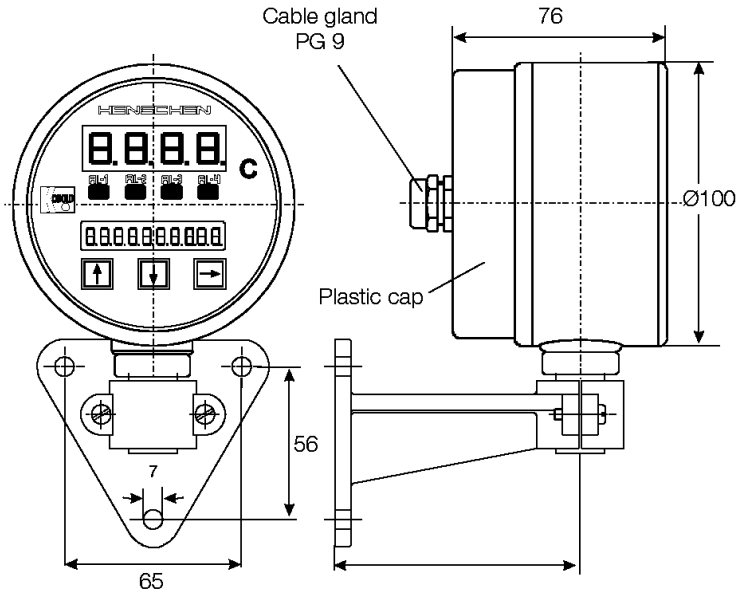
## 12. Maintenance

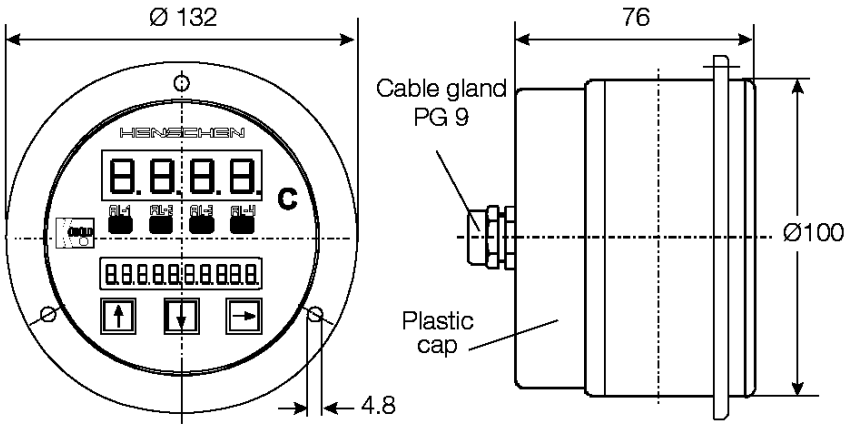
This unit will require no maintenance or servicing unless the medium is dirty.

# 13. Dimensions

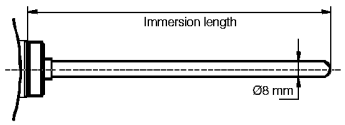
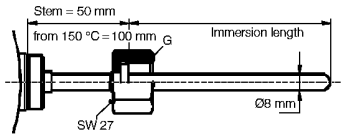
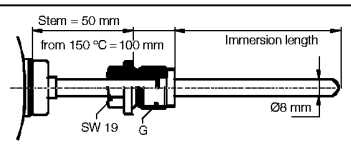
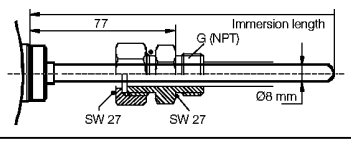





**Standard probe / material / connection** (probe diameter 8 mm)

| | Description | Material | Thread | Order code |
|---|---|---|---|---|
|   | Smooth probe | Stainless steel | Without | **..A0..** |
|   | Union nut | Stainless steel | G 1/2<br>G 3/4<br>G 1 | **..B1..**<br>**..B2..**<br>**..B3..** |
|   | Rotatable nipple for DIN sleeve | Stainless steel | G 1/2<br>G 3/4<br>G 1 | **..41..**<br>**..42..**<br>**..43..** |
|   | Union nut and shoulder nipple | Stainless steel | G 1/2<br>G 3/4<br>G 1<br>1/2 NPT<br>3/4 NPT<br>1 NPT | **..11..**<br>**..12..**<br>**..13..**<br>**..1A..**<br>**..1B..**<br>**..1C..** |

Please specify probe length in writing (min. 50 mm, standard 100 mm). Other threads upon request.

# 14. Declaration of Conformance

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

**Digital Thermometers Model: DTM**

to which this declaration relates is in conformity with the standards noted below:

**DIN EN 50081-2**
Electromagnetic compatibility - Fundamental Discipline / Standard Noise Emission

**DIN EN 50082-2**
Electromagnetic compatibility - Fundamental Discipline / Standard Noise Stability

**DIN EN 61010-1**
Safety requirements for electrical measuring, control and laboratory instruments

**EN 60529, DIN VDE 0470-1**
Protection type through case (IP code)

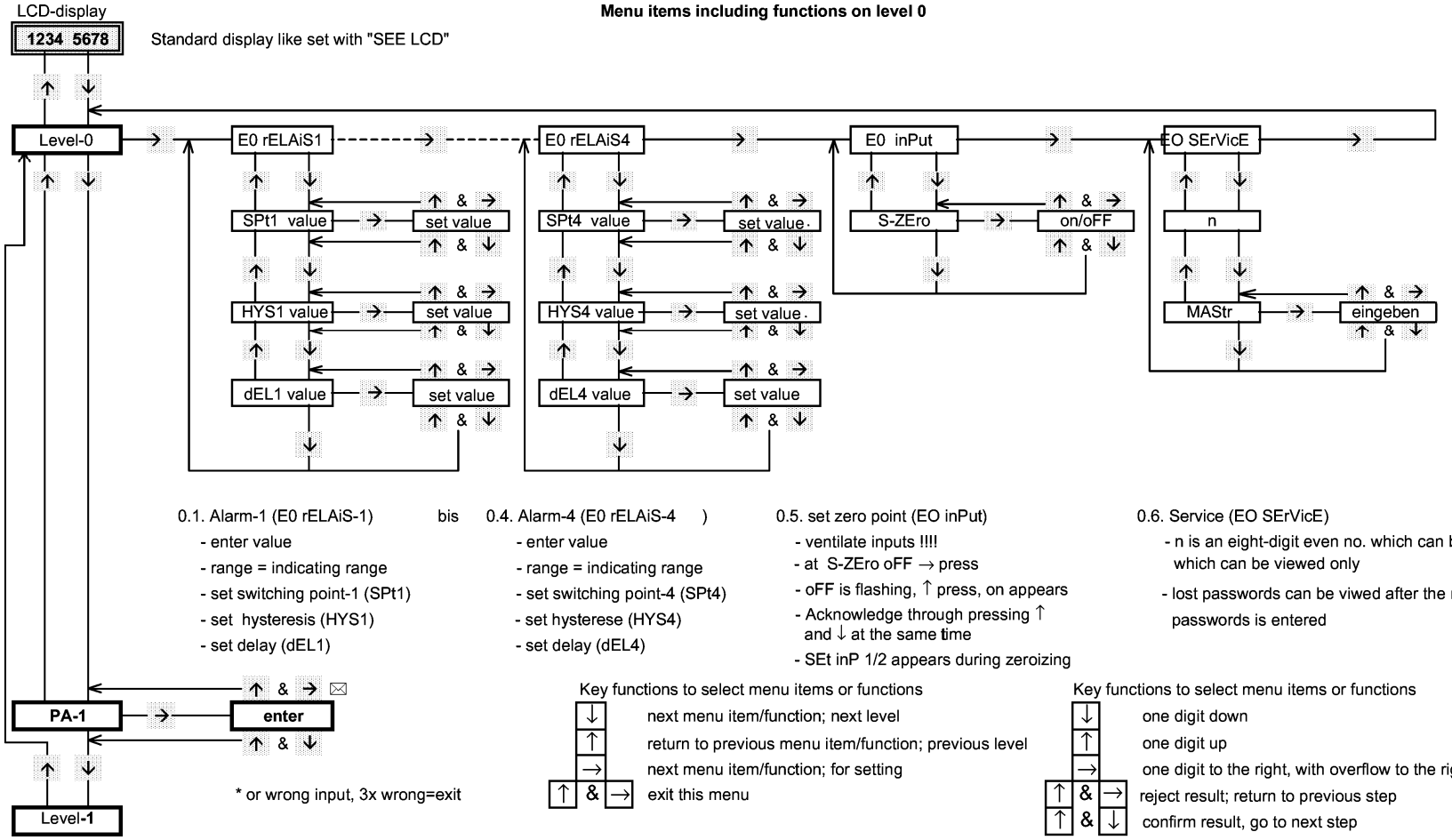
Also the following EWG guidelines are fulfilled:

**2004/108/EC** **EMC Directive**
**2006/95/EC** **Low voltage guideline**

Hofheim, 16. Oct. 2003

H. Peters M. Wenzel

# 15. Annex




0.1. Alarm-1 (E0 rELAiS-1) bis 0.4. Alarm-4 (E0 rELAiS-4 )

- enter value
- range = indicating range
- set switching point-1 (SPt1)
- set hysteresis (HYS1)
- set delay (dEL1)

- enter value
- range = indicating range
- set switching point-4 (SPt4)
- set hysterese (HYS4)
- set delay (dEL4)

0.5. set zero point (EO inPut)

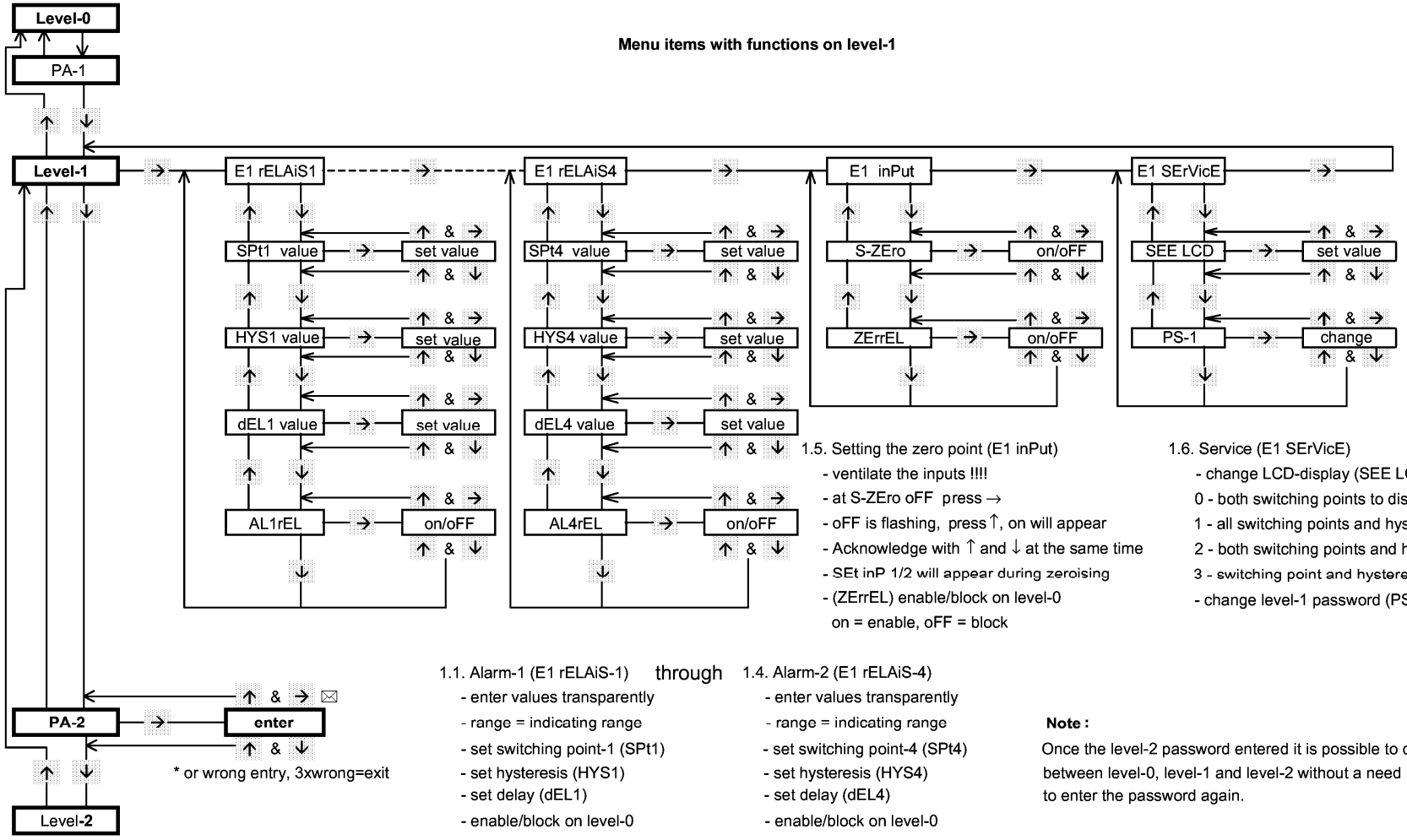
- ventilate inputs !!!!
- at S-ZEro oFF → press
- oFF is flashing, ↑ press, on appears
- Acknowledge through pressing ↑ and ↓ at the same time
- SEt inP 1/2 appears during zeroizing

0.6. Service (EO SErVicE)

- n is an eight-digit even no. which can be which can be viewed only
- lost passwords can be viwed after the master passwords is entered

**Note:** Once the password has been entered it is possible to jump between level-0 and level-1 without a need to enter the password again.

**Menu items with functions on level-1**




1.1. Alarm-1 (E1 rELAiS-1) through 1.4. Alarm-2 (E1 rELAiS-4)

- enter values transparently
- range = indicating range
- set switching point-1 (SPt1) / set switching point-4 (SPt4)
- set hysteresis (HYS1) / set hysteresis (HYS4)
- set delay (dEL1) / set delay (dEL4)
- enable/block on level-0
  on = enable, oFF = block

1.5. Setting the zero point (E1 inPut)

- ventilate the inputs !!!!
- at S-ZEro oFF press →
- oFF is flashing, press ↑, on will appear
- Acknowledge with ↑ and ↓ at the same time
- SEt inP 1/2 will appear during zeroising
- (ZErrEL) enable/block on level-0
  on = enable, oFF = block

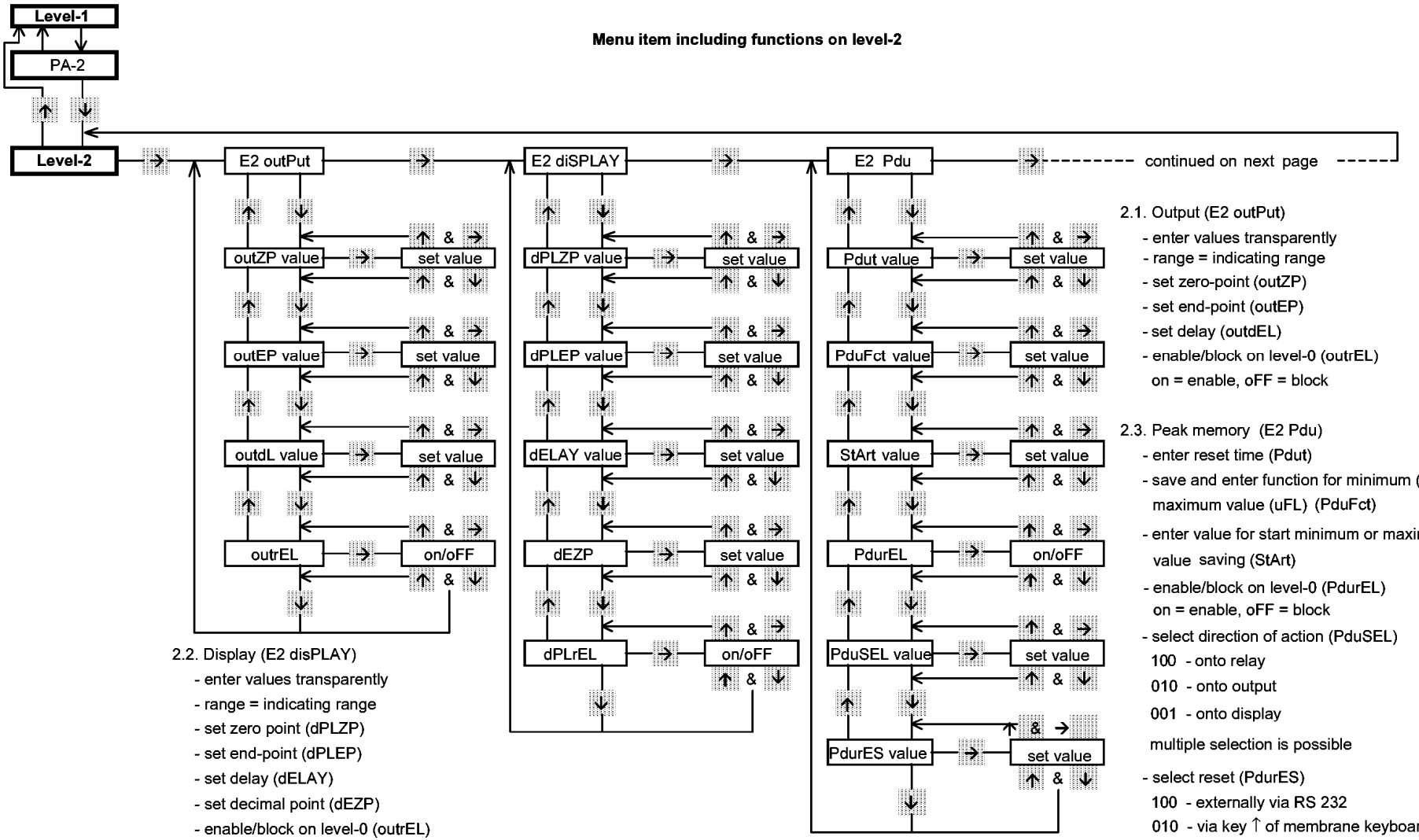
1.6. Service (E1 SErVicE)

- change LCD-display (SEE LCD)
  0 - both switching points to display
  1 - all switching points and hysteresis rotate
  2 - both switching points and hysteresis rotate alternately
  3 - switching point and hysteresis appear at the time
- change level-1 password (PS-1)

**Note :**

Once the level-2 password entered it is possible to change between level-0, level-1 and level-2 without a need to enter the password again.

**Menu item including functions on level-2**

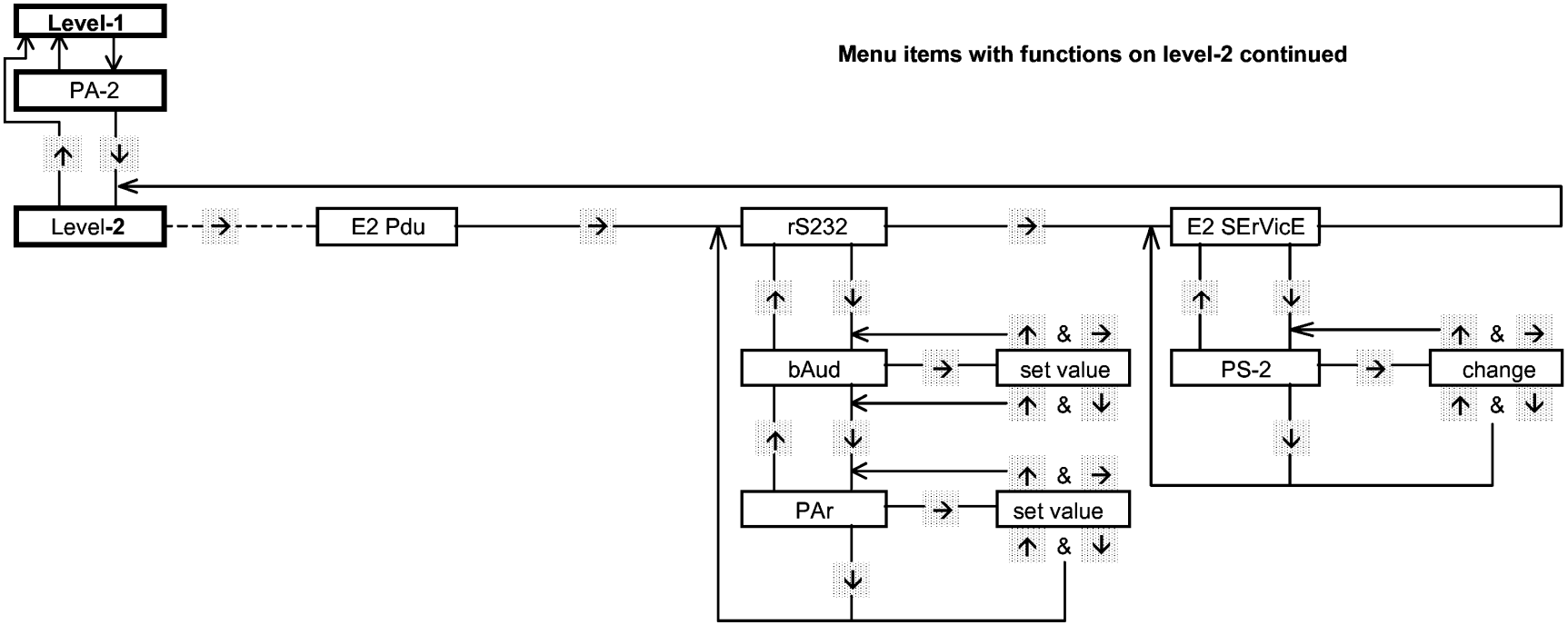



2.1. Output (E2 outPut)
- enter values transparently
- range = indicating range
- set zero-point (outZP)
- set end-point (outEP)
- set delay (outdEL)
- enable/block on level-0 (outrEL)
  on = enable, oFF = block

2.2. Display (E2 disPLAY)
- enter values transparently
- range = indicating range
- set zero point (dPLZP)
- set end-point (dPLEP)
- set delay (dELAY)
- set decimal point (dEZP)
- enable/block on level-0 (outrEL)
  on = enable, oFF = block

2.3. Peak memory (E2 Pdu)
- enter reset time (Pdut)
- save and enter function for minimum (uFL) or maximum value (uFL) (PduFct)
- enter value for start minimum or maximum value saving (StArt)
- enable/block on level-0 (PdurEL)
  on = enable, oFF = block
- select direction of action (PduSEL)
  100 - onto relay
  010 - onto output
  001 - onto display
  multiple selection is possible
- select reset (PdurES)
  100 - externally via RS 232
  010 - via key ↑ of membrane keyboard
  001 - internally via timer (see Pdut)
  multiple selection is possible

**Menu items with functions on level-2 continued**




2.4. Communication interface (RS 232)

- select the baud rate (bAud)
  1200, 2400, 4800, 9600, 19200 or 38400
  default setting is 9600
- enter parity
  none, even or odd
  default setting is none

2.5. Service (E2 SErVicE)

- change password-2 (PS-2)

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