HORN TECALEMIT

Operating Manual

LevelMaster

Item-No.: 224 000 000, 224 000 200, 224 000 400,
224 100 000, 224 200 000, 224 000 100

Translation of the original operating manual

Important!

The operating manual is always to be read before commissioning the equipment. No warranty claim will be granted for faults and damage to the equipment arising from insufficient knowledge of the operating manual.

The instruction manual consists of two documents:

Document no.	Title
441385102	Installation Manual
441385103	Operating Manual

Copyright

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Table of content

1 Safety instructions

The device is a state of the art piece of equipment and has been constructed according to recognised safety specifications. It is nevertheless possible that use of the device will present hazards to the operator or to third parties, or may damage the device or other property. It is therefore essential to act in accordance with these safety instructions, and in particular with those sections identified as warnings.

Warning notices and symbols

In the operating manual, the following signs are used for highlighting important information.

Special information for economical use of the equipment.

Special information or "dos and don'ts" for damage prevention.

Information or “dos and don'ts” for the prevention of damage to persons or equipment.

Appropriate use

The device may only be used if it is in perfect condition, and then only for its intended purpose, in compliance with all safety regulations, with an awareness of the potential risks, and according to the operating manual. Any faults that may impair the safety must be rectified immediately.

The device and its components are only to be used for handling the liquids listed and the purpose described. Using the machine for any other purpose would constitute inappropriate use. The manufacturer is not responsible for any loss arising as a result of this, the risk for this is borne only by the operating company.

Organisational measures

This operating manual should always be kept readily available at the site of operation! Each person concerned with the assembly, commissioning, maintenance and operation of the equipment must have read and understood the entire operating manual. It is essential that the type plate and the warning notices attached to the device are observed, and are maintained in a fully readable condition.

Qualified personnel

The operating, maintenance and assembly personnel must be appropriately qualified for their work. The areas of responsibility, competences and supervision of the personnel must be precisely regulated by the operating company. If the personnel do not have the required knowledge, they must be trained and instructed. The operating company must also ensure that the contents of the operating manual are properly understood by the personnel.

Waters protection

The device has been designed to handle water hazardous substances. The regulations on the operating place (e.g. Water Resources Act WHG, = ordinance on installations for handling of substances hazardous to water VAwS) must be adhered to.

Hydraulics

Only persons with special knowledge and experience with hydraulic systems may carry out work on hydraulic parts and equipment. All lines, hoses and screw joints should regularly be checked for leaks and visible external damage. Any damage must be rectified immediately. Any oil spurting out can cause injuries and fire.

The relevant safety regulations for the product must be followed when handling oils, greases or other chemical substances!

Maintenance and Service

According to the regulations of the water resources law only authorized services may work on devices for flammable and/or water endangering substances. During such works, appropriate tools are to be used (avoid sparking). Before any kind of work on the device, all fuel lines are to be completely emptied and aerated.

Do not make any changes. Modifications or additions to the device which may affect the safety cannot be carried out without consent of the manufacturer. Exclusively genuine spare parts made by the manufacturer may be used.

Electric power

Work on the electrical equipment may only be carried out by a qualified electrician or by trained persons under the guidance and supervision of a qualified electrician according to electro-technical guidelines. Machine or system components, on which inspection, maintenance or repair work is to be carried out must be de-energised.

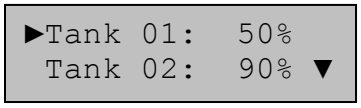
2 Commissioning, Switch on / off

The LevelMaster basic unit is delivered with an power plug which is used as an on / off switch. After the first starting up, the operating parameters in the relevant input masks can be completed as required. Subsequently, turn the device off and on again.

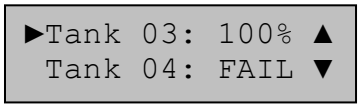
Only design GSM modem: the GSM modem will log on to the GSM network automatically when device is switched on. We strongly recommend the correct GSM log out procedure before switching off device. (see point 3.1)

3 Tank Content Level (basic state)

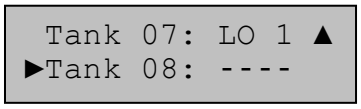
Display:
Ex.



or
ex.



or
ex.



Legend content level:

50 %: rel. content level
FAIL: Sensor error
LO 1: Alarm activated
LO 2: dto.
HI 1: dto.
HI 2: dto.
----: no tank created
ERR!: calculation error

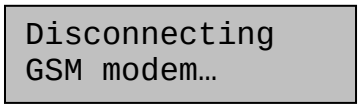
User input: ‚▼' and ‚▲' keys switch to next or previous tank (list field).

‚ENT' key switches to single tank display (providing a tank is created and a sensor connected).

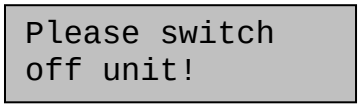
‚EXIT' key switches to input of the management code.

3.1 GSM log out procedure (only GSM modem)

When using a GSM modem it is strongly recommended to log out the GSM modem from the GSM network before switching the device off. Procede as follows: in the basic state (tank content level) press the ‚EXIT' key and hold down (advancing display) until following display appears:

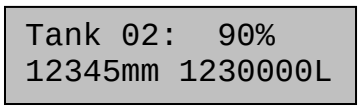


The device can be switched off when display reads:



4 Single Tank Display

Display:
ex.



User input: , EXIT ' key switches back to basic state.

5 Input of Management Code *

Display:

User input: input of a code of maximum 5 digits as access authorization to the management mode.

‚◄' key deletes by character.

‚ENT' key confirms the input and switches into the management mode.

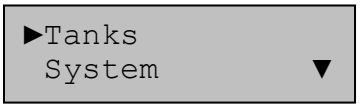
‚EXIT' switches back into tank content level (basic state).

*: if no key is pressed for a period longer than 60 seconds, the display automatically switches back to the tank content level (basic state.

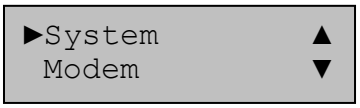
5.1 Management Mode

Attention: there can be no tank monitoring in the management mode. Data recalling or alarm signals are also not possible.

Display:
ex



or:
ex



or:
ex

user input: ‚▲' and ‚▼' keys switch to next or previous input (list field)

‚ENT' key switches to relevant input.

‚EXIT' key switches back into tank content level (basic state).

6 Tank Settings

Basically: if write-protect is switched on, the tank settings can be modified in the relevant fields, but these changes cannot be saved. Likewise, data cannot be overwritten by the recalling central unit. Whether write-protect is switched on can be seen from the symbol in the relevant input field.

6.1 Selection Tank

Display:
ex

```
►Tank 01: Cube
 Tank 02: Cy V ▼
```

or
ex

```
►Tank 03: Cy H ▲
 Tank 04: PTab ▼
```

or
ex

```
 Tank 07: CyHK ▲
►Tank 08: ----
```

Legend Tank Shape:

Cy V:	cylinder vertical
Cy H:	cylinder horizontal
Cube:	cube
Octa:	octagon
Ball:	ball
PTab:	gauge table
CyHK:	cylinder horizontal with bumped boiler head
----:	no tank created

User input: ‚▼' and ‚▲' keys switch to next or previous tank (list field).

‚ENT' key switches to parameter input of the selected tank.

‚EXIT' key switches back to management mode.

6.2 Tank Settings

Basically: ‚▲' and ‚▼' keys confirm the entry and switch to previous or next parameter (list field).

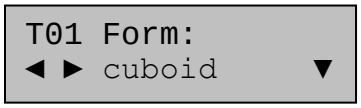
‚EXIT' key aborts entries fort his tank and switches bank to tank selection.

All entries are definitively taken over when saved as described in point 6.2.13!

Abbrev	Tankformen	Parameter Tankgeometrie
Cy V	Tank form	height, diameter
Cy H	cylinder vertical	diameter, depth
Cube	cylinder horizontal	height, breadth, depth
Octa	cube	Height, mid height, breadth, mid breadth, depth
Ball	octagon	diameter
PTab	ball	32 value pairs [filling height, volume]
CyHK	Gauge table	Diameter, cylindrical length
---	-	-

6.2.1 Tank Form

Display:
ex



User input: ‚◄' and ‚►' keys change the tank form.

6.2.2 Parameter Tank Geometry (2 x ... 5 x)

Display:
ex

User input: input of the relevant parameter [mm].

‚◄' key deletes by character.

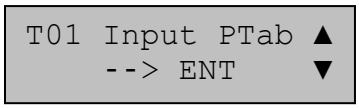
6.2.3 **Delete Gauge Table**

Display:
ex

User input: ‚ENT' key deletes value pairs in the table.

6.2.4 **Input Gauge Table**

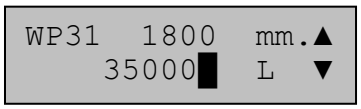
Anzeige:
ex



User input: ‚ENT' key switches into the mask to process the value pairs.

6.2.4.1 **Processing the Value Pairs of the Gauge Table**

Display:
ex



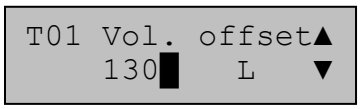
User input: input of the value pairs for filling height [mm] and volume [L].
‚◄' key deletes by character.
‚ENT' switches between filling height and volume.
‚▲' and ‚▼' keys confirm the entry and switch to previous or next value pair (max 32).
‚EXIT' ends the input of value pairs.

After the input, the value pairs are sorted by content level, the highest content level is attributed to value pair WP 32, the second highest value pair WP 31 etc. A minimum of two value pairs must be entered, up to a maximum of 32. The more pairs are entered, the more exact the subsequent calculation of the volume becomes.

The content heights should be distributed regularly over the height of the tank, especially if the tank shape is unusual, is it recommended to mark smaller intervals at pronounced convexities or concavities.

6.2.5 **Volume Offset**

Display:
ex

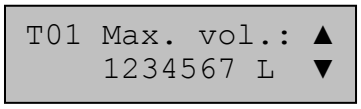


User input: input of the volume offset [L] (corresponds to a ‚dead' volume in the tank, which is added to the measured and transferred volume for the volume display, ex. volume conduit system etc.).

‚◄' key deletes by character.

6.2.6 **Display Calculated Maximum Volume**

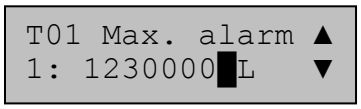
Display:
ex



User input: ---- (information for definition of max-alarm etc.)

6.2.7 **Min.- / Max. Alarm (4 x)**

Display:
ex



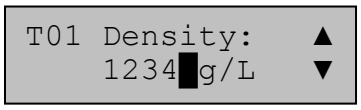
User input: input of the relevant alarm value [L].

‚◄' key deletes by character.

The maximum alarm thresholds 1 and 2 are triggered if the associated volumes are exceeded, the minimum alarm thresholds 1 and 2 if the volume drops under the value.

6.2.8 **Density of Medium**

Display:
ex

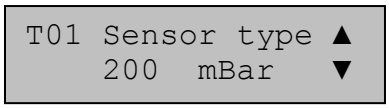


User input: Input the density of the tank medium [g/L].

‚◄' key deletes by character.

6.2.9 **Sensor Type**

Display:
ex



User input: input of sensor type (sensor span) [mBar].
examples: 200 mbar, 300 mbar, 500 mbar

‚◄' key deletes by character.

6.2.10 **Offset Mounting Height Sensor**

Display:
ex

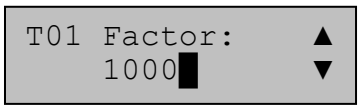
User input: Input of the offset [mm] (equivalent to the effective mounting height of the sensor relatively to the tank floor).

‚◄' key deletes by character.

With the key ‚►' it is possible to input the sign ‚-' preceding the entry to input a negative offset (ex. when mounting sensor under tank floor, or if tank is inclined)

6.2.11 **Calibration Factor Sensor**

Display:
ex

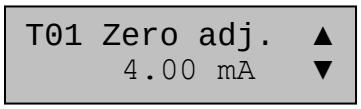


User input: Input of the calibration factor (scaling of the measuring range). Attention: works setting should normally not be modified!

‚◄' key deletes by character.

6.2.12 **Zero Point Adjustment Sensor**

Display:
ex



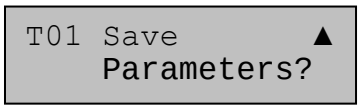
User input: Pressing the key ‚ENT' twice will initiate a zero point adjustment of the sensor. The adjustment takes approx. 10 seconds. When concluded, a signal tone is sounded.

Attention: the sensor must be outside the fluid!

The actual value for the zero point (in mA) is displayed in the lower line. The value should be approximately. 4 mA ± 0.5 mA. If the value is above this, check whether the sensor is really outside the fluid.

6.2.13 **Save Parameters**

Display:
ex.



User input: ‚ENT' key saves all settings for this tank and switches back to select tank.

7 System Settings

Basically: ‚▲' and ‚▼' keys confirm the entry, and switch to previous or next parameter (list field).

‚EXIT' key aborts the entries and switches back into the management mode.

7.1 Contrast LCD

Display:
ex

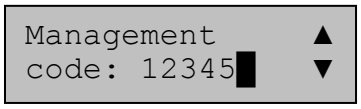
User input: ‚◄' and ‚►' keys decrease or increase contrast.

The setting range reaches from 0 (slight contrast) to 63 (high contrast). A modification of the preset value should only be necessary under extreme use conditions (very high or very low temperatures).

If the contrast was accidentally saved incorrectly (display unreadable):
Turn device off and turn back on while pressing ‚EXIT' key. Then set contrast as described.

7.2 Access Code Management Mode

Display:
ex



User input: Input of a 1 – 5 digit access code.

If no code is entered (empty input field), the management mode can be freely accessed (no access protection). The access code is also necessary for the remote recall over modem.
Delivery state: no code

Attention: if the access code is forgotten, all management functions are inaccessible. In this case, contact the Horn service!

7.3 Alarm Contact

Display:
ex

User input: ‚◄' and ‚►' keys switch between NO (normally open) and NC (normally closed).

On the LevelMaster cicuit board, there is a potential free relay output (alarm) as well as two relay outputs (Min- / Max-Alarm), which switch 230 V power supply. The relays can either be operated as openers (NC, normally closed) or closers (NO, normally open). The normal state is without active alarm signal. If the sensor should give an error signal, all relay outputs are actuated.

7.4 Test Alarm Min / Max Level

Display:
ex

User input: ‚◄' and ‚►' keys turn alarm on or off (test signal generator / connecting outputs)).

All connecting outputs are actuated simultaneously.

7.5 Write-protect Parameters

Display:
ex

User input: ‚◄' and ‚►' keys switch write-protect off or on.
(avoids accidental modification of tank parameters also by central unit!).

If write-protect is switched on, the tank settings can be modified in the relevant fields, but these changes cannot be saved. Likewise, data cannot be overwritten by the recalling central unit. Whether write-protect is switched on can be seen from the 🔒 symbol in the relevant input field.

7.6 Modem alarm

Display:
ex

User input: ‚◄' and ‚►' keys switch the alarm signal on or off.

If alarm is switched on, a self activating alarm signal will be sent over the modem if an alarm level is exceeded or dropped beneath.

7.7 Set Language

Display:
ex

User input: ‚◄' and ‚►' keys switch between different languages for the user guidance.

7.8 Error Memory

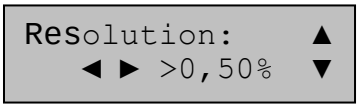
Display:
ex

User input: ‚◄' and ‚►' keys switch between the occurred errors (coded representation).

‚ENT' key deletes error memory

7.9 Resolution

Display:
ex



User input: ‚◄' and ‚►' keys switch between possible values.

Possible values resolution:

>0,50%	normal resolution
>0,10%	fine resolution
>0,05%	very fine resolution
>0,01%	extremely fine resolution
max.	do not round

The resolution defines how the measured values for content level and volume are displayed. The measured values are rounded relatively to the maximum content level or maximum volume with the set accuracy.

The resolution has no influence on the measuring accuracy, it only prevents measurement fluctuations, and delivers a better readability of the display.

8 Settings Modem

Basically: ‚▲' and ‚▼' keys confirm the entries and switch to previous or next entry (list field).

‚EXIT' key aborts entry and switches back to management mode.

8.1 Select Modem Type

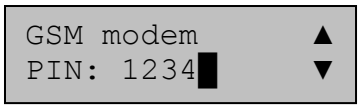
Display:
ex

User input: ‚◄' and ‚►' select the connected modem.

Possible modem types: GSM modem, analog modem and serial (→ direct connection over zero modem cable).

8.2 PIN SIM Card (only applicable with GSM modem)

Display:

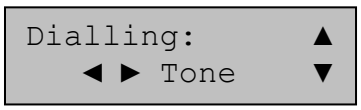


User input: Input of a four digit PIN code for the SIM card of the GSM modem.

‚◄' key deletes by character.

8.3 Dialling Mode (only applicable with analog modem)

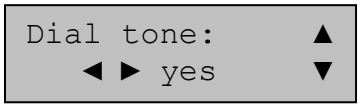
Display:



User input: ‚◄' and ‚►' keys switch between tone or pulse dialling. The pulse dialling mode may be necessary with older private telecommunication systems.

8.4 Dial Tone (only applicable with analog modem)

Display:



User input: ‚◄' and ‚►' keys switch between „yes" and „no". The setting ‚no' may be necessary for private telecommunication systems without continuous tone as dial tone.

8.5 Identity (only applicable for GSM, analog and serial modems)

Display:

User input: Input of a maximum 15 digit personal identification to be recognized by the central station. (Attention: exactly the same number as in the appropriate data mask of the LevelControl PC programme must be entered here!)

‚◄' key deletes by character.

8.6 Telephone Number Alarm (only applicable with GSM and analog modems)

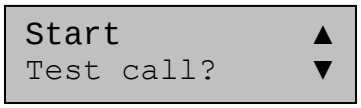
Display:

User input: Input of the maximum 15 digit telephone number of the central station to be called in case of an alarm signal.

‚◄' key deletes by character. With the key ‚►' a ´,' can be entered for a dialling pause (can be necessary in older private telecommunication systems). With the sign '+' at first place, an international telephone number to be called over the GSM modem can be entered.

8.7 Test Call (only applicable for GSM, analog and serial modems)

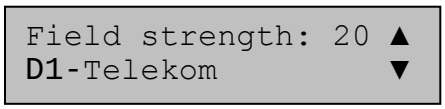
Display:



User input: ‚ENT' key will initiate a call to the central station, whose telephone number is saved under „Phone alarm" (only with GSM or analog modem).

8.8 Display Field Strength / Common Carrier (only applicable with GSM modem)

Display:
ex



Legend Field strength:

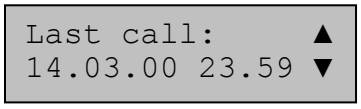
0 .. 31 low .. high
99 not definable

User input: ---- only for information

To ensure a failure free data transfer, the field strength value should be at least 10.

8.9 Display Last Call (only applicable with GSM, analog and serial modems)

Display:
ex



User input: ---- only for information.

8.10 Display Message (only applicable with GSM, analog and serial modems)

Display:
ex

User input: ---- only for information.

During each data recall, a freely chosen message can be relayed to the central unit. (Depending on used pc software).

9 Network

Display:
ex

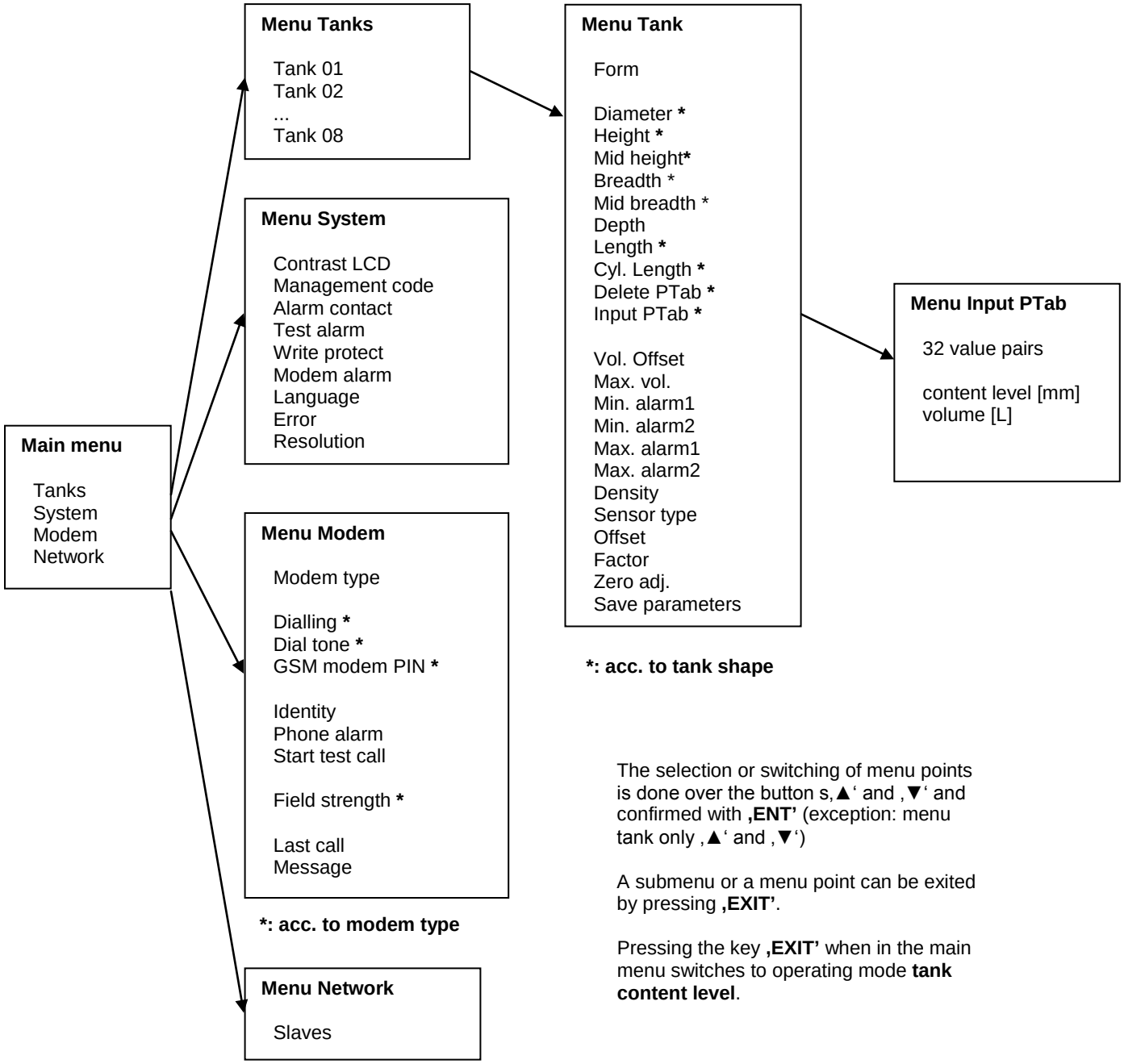
```
Network:
Slaves: 0
```

User input: only for information (displays the number of connected slave units).

10 Maintenance

Only suitable detergents for plastics may be used for cleaning the outside of the housing. *Do not* use solvents, fuels or similar under any circumstances!

Annex A. Menu structure Management mode



The selection or switching of menu points is done over the button s‚▲' and ‚▼' and confirmed with **‚ENT'** (exception: menu tank only ‚▲' and ‚▼')

A submenu or a menu point can be exited by pressing **‚EXIT'**.

Pressing the key **‚EXIT'** when in the main menu switches to operating mode **tank content level**.

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