HORN TECALEMIT

Operating manual

Level Control Systems

LevelController-4

V2.xx

Item No.: 225701000, 225701100, 225702000, 225702100

Translation of the original operating manual GB

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.

Copyright

Service Hotline **+49 1805 900 301**
(0,14 €/Min: on the German landline network, Mobile telephone max. 0,42 €/Min.)

service@tecalemit.de

Document-No.: 44 1580 102-G
As of: 27.02.2014

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 General information

2.1 Description / Appropriate use

The LevelController-4 is used for measurement, display and transfer of up to 4 liquid level data. The display can be switched from litres to cm or percent. The measurement is made with immersion probes with 4-20 mA output.
Controllers with the 'Temperature measurement' option also have 4 inputs for PT100 temperature sensors. The LevelController-4 has 3 alarm outputs.

2.2 Product versions

Item No.	Version
225701000	Data connection via RS 232
225701100	Data connection via RS 232 and with temperature measurement
225702000	Data connection via RS 422
225702100	Data connection via RS 422 and with temperature measurement

2.3 Technical data

Table 1. Technical data

Supply	85…264V, 50 / 60 Hz, power consumption < 12 VA
Display:	LC display with 2x16 characters, 8 mm character height
Keys:	4 membrane keys
Ambient temperature	-20°C - +50°C, max. air humidity 95% non-condensing
Filling level sensor	Relative pressure sensor with 4 – 20 mA current output
Filling level measuring range	0 - 999 cm, depending on sensor
Accuracy of filling level measurement	Depending on immersion probe, usually better than 1%
Temperature sensor *1	PT100 with 3-wire conductor technology
Temperature measuring range *1	-20°C – +60°C
Accuracy of temperature measurement *1	Depending on sensor, usually better than +/- 2.0° C
Alarm output:	3 potential-free contacts relay with change-over contact. Can be configured as NC or NO contact. Switching current max. 3A, at 230 VAC and cos φ = 1
Data connection:	RS-232 or RS-422 via interface module, operation with an external modem or via a PC possible.
Wetted parts	Depending on immersion probe
Dimensions (approx.):	200 mm x 180 mm x 80 mm (B x H x T)
Protection class	IP 54, suitable for damp rooms , splash proof outdoors

*1 devices with 'Temperature measurement' option only

3 Erection, assembly and commissioning

3.1 Assembly

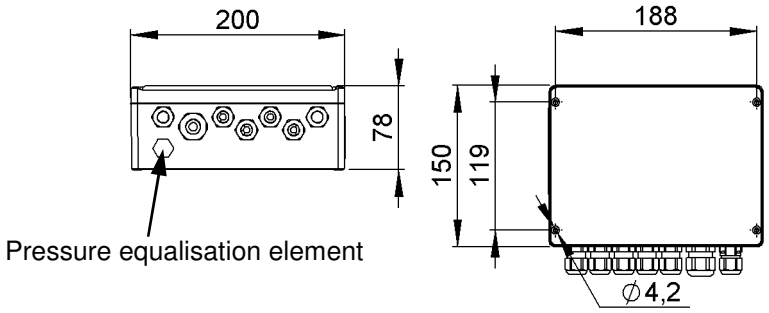


Fig. 1 Fixing hole sizes View from the rear

The head diameter of the fixing screws can only be 7.3 mm max.

☛ **To ensure that the max. permissible temperature is not exceeded, the device should not be exposed to *direct* sunlight during operation for a longer period of time.**

3.2 LC-Display: Contrast setting

The contrast of the LC display is set at the factory. It may be necessary to reset the contrast due to different lighting conditions. There is a “trim potentiometer” on the circuit board for this (see Fig. 3 below “TR1 LCD contrast”).

3.3 Electrical connection

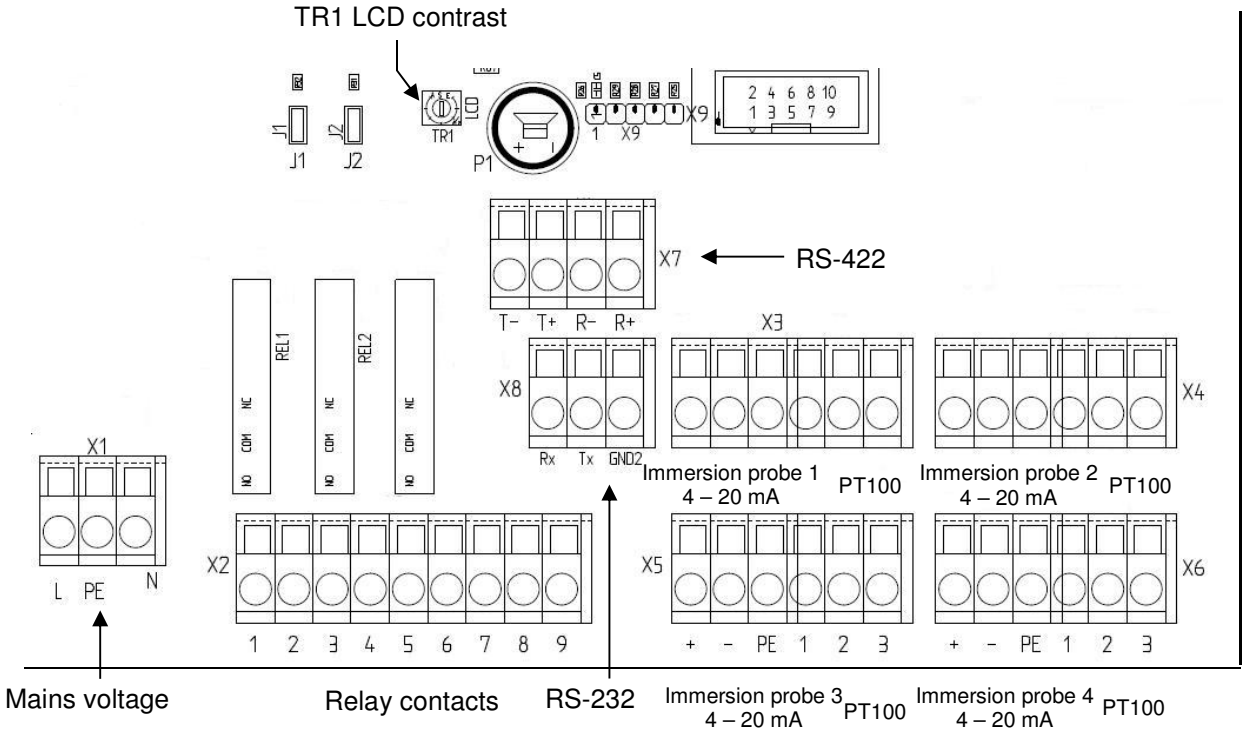


Fig. 2 Location of the connecting terminals

3.3.1 Assignment of the connecting terminals

Table 2. Assignment of the connecting terminals

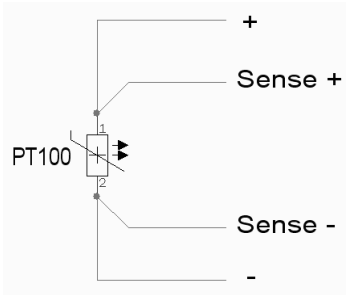
Terminal block	Terminal	Signal
X1	L	Supply voltage phase
	PE	Supply voltage protective earth
	N	Supply voltage neutral conductor
X2	1	Alarm contact Min. alarm NO
	2	Alarm contact Min. alarm COM
	3	Alarm contact Min. alarm NC
	4	Alarm contact Max. alarm NO
	5	Alarm contact Max. alarm COM
	6	Alarm contact Max. alarm NC
	7	Alarm contact signal NO
	8	Alarm contact signal COM
	9	Alarm contact signal NC

Continue on the next page.

X3, X4, X5, X6	+	Sensor operating voltage +	
	-	Sensor operating voltage -	
	PE	Sensor cable shielding	
	1	PT100 +	Available for devices with Temperature measurement option only!
	2	PT100 Sense -	
	3	PT100 -	
X7	T-	RS-422 data output -	
	T+	RS-422 data output +	
	R-	RS-422 data input -	
	R+	RS-422 data input +	
X8	Rx	RS-232 data input	
	Tx	RS-232 data output	
	Gnd	Ground	

⚠ **The protective earth PE always *has to be* connected!**

3.3.2 Connection of the PT100



Connection PT100	Terminal X3, 4, 5, 6
+	1
Sense +	No connection
Sense -	2
-	3

☛ **The cable "Sense + " at the PT100 with 4-wire-connection should have *no* conductive connection with the other connections or with the ground!**

☛ **The temperature is displayed only after the enable in the menu Tanks, chapter 6.1.14.**

3.3.3 Connection of an RS422 interface converter

Table 3.

LevelController-4 Terminal X7	Converter IC-485 SI terminal strip	
T-	3	R-
T+	4	R+
R-	2	T-
R+	1	T+

☛ **We guarantee the function of the data transmission only for the interface converters supplied by us!**

3.4 Probe mounting

The immersion probe used has to be suitable for the medium.

The LevelController-4 is to be assembled outside the tank. The immersion probe is to be inserted inside the tank via a suitable screw joint. The sensor body is installed horizontally or suspended (preferable) in the tank according to Fig. 3. The maximum cable length is approx. 200 metres. Up to four immersion probes with 4-20 mA current output can be used.

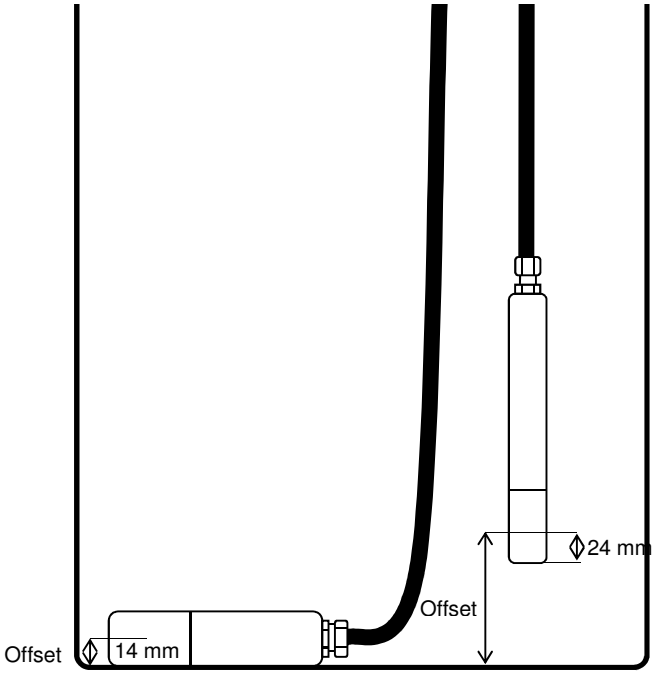


Fig. 3 Positioning the immersion probe LH-10 in the tank

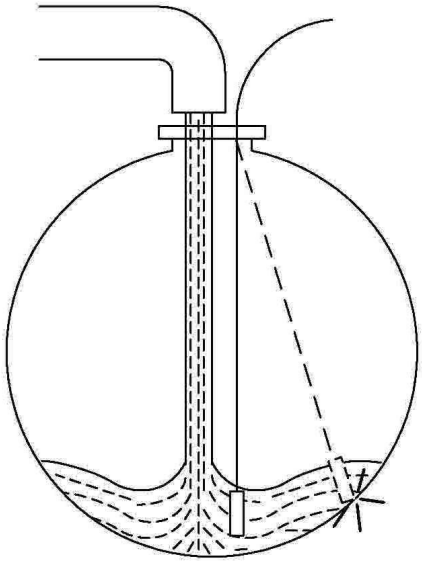


Fig. 4 Swinging motion

The sensor has to be secured e.g. with a protective tube in order to avoid it being damaged by swinging motions induced by high flow rate filling procedures, see Fig. 4.

The LevelController-4 program version appears on the display after connecting the mains voltage:

```
HORN GmbH&CO KG
   LC4 P2.01
```

(e.g.)

After this the missing operating parameters can be expanded in the corresponding menus.

4 Operation

4.1 Menu navigation

The selection of functions and the input of values takes place via several menus. Only two menu items can be seen at the same time due to the two line display:

Example:

```
► Menu item 1
  Menu item 2 ▼
```

Illustration of a menu on the display

The menu has a total of 5 items for example. The third menu items is visible when the '**Down**' button is pressed:

```
► Menu item 2 ▲
  Menu item 3 ▼
```

Display after pressing '**Down**' once

The visible Up /down arrows on the display show the direction in which the menu can be moved. In this case either up or down since the menu has 5 items (point 4 and 5 are not visible).
The right arrow shows the menu items for selection. Thus 'menu item 1' in the example above and 'menu item 2' in the one below. Selection is made using the '**Enter**' key.
The end of the menu is reached and the arrow display changed after pressing '**Down**' a second time:

```
► Menu item 4 ▲
  Menu item 5
```

Pressing '**Down**' again has no affect.

4.2 Navigating in the selection list

The setting of certain operating parameters such as tank shape or sensor measurement range is made via the so-called 'Selection lists'. These lists contain *all* permitted values of the corresponding operating parameter, entry of other values is not possible.

Example:

```
T1 Sensor
  -> 200 mbar
```

Setting the measurement range of the sensor in tank 1.

the arrow '->' shows the actual value.

The measurement range should be set to a value of 500 mbar.
After pressing the '**Enter**' key the display changes as follows:

```
T1 Sensor
  ▲▼ 200 mbar
```

Instead of the right arrow '->' an up and down one are visible, that indicate the enabling of the list.

Pressing '**Down**' makes another list item available for selection. Here '**Down**' is pressed once:

```
T1 Sensor
  ▲▼ 300 mbar
```

Pressing '**Down**' once again selects the required list item:

```
T1 Sensor
  ▲▼ 500 mbar
```

The input is confirmed with '**Enter**' after completion of the selection. The display changes back to the original form, but with the changed list item:

```
T1 Sensor
  -> 500 mbar
```

Pressing '**Exit**' instead of '**Enter**' restores the original value:

```
T1 Sensor
  -> 200 mbar
```

4.3 Input of multi-digit numbers

In many cases it is necessary to enter multi-digit numbers.
The input is made using the **'Enter'**, **'Up'**, **'Down'** and **'Exit'** control keys.
Switching between the characters ‚0' – ‚9', ‚↵' and ‚←' is made with the **'Up'** und **'Down'** in the most right hand position.

Acceptance of a character:
The character is accepted by pressing the '**Enter**' key. A new place appears on the right beside it with the '↵' character.

Acceptance of a character:
Pressing '**Enter**' twice accepts the value entered as a number and completes the entry.

Deletion of a character:
The character is deleted by selection and confirmation of the '←' character with **'Enter'**.

Example: Entry of the number *120*

Pressing '**Enter**' once starts the entry, a flashing square (cursor) appears at the place to be changed:

┘	Pressing **'Up'** once changes to:
0	Pressing **'Up'** again changes to:
1	Pressing **'Enter'** once changes to:
1┘	Pressing **'Up'** *three* times changes to*:*
12	Pressing **'Enter'** once changes to:
12┘	Pressing **'Up'** once changes to:
120┘	Pressing '**Enter**' *twice:*

The number *120* is accepted and the entry completed.

☛ **In nearly all input menus it is possible to quit the entry with the 'Exit' key without accepting the new value.**

4.4 Saving the set values

☛ Saving of the set values occurs only after leaving the menu item or sub-menu and coming back to the main menu of the '**Management mode**'!

When a parameter has been modified and the device is shut off whilst still in the corresponding menu or menu item, then the new parameter will be lost.
The same applies if an input was started and not completed.
The device switches automatically back to '**Tank display'** mode when no key is used for 3 minutes.

5 “Tank display“ mode

After successful commissioning the device switches to the ’**Tank display**’ mode. In this mode, display of the actual level of the installed tank is shown.
If no tanks have yet been configured, the filling levels are not displayed, see below example 2, tank 2. The installation of the tanks and the other device configuration is done in ’**Management mode’**, chapter 6.

Example 1

```
Tank 1:   1500 L
Tank 2:  12550 L
```

A non installed tank is displayed by a dotted line:

Example 2

```
Tank 1:   1500 L
Tank 2:  -----
```

<- Tank 2 is not installed

The display is refreshed about every 2 seconds.

5.1 Display of the required tank

Tanks 2 and 3 or 3 and 4 can be displayed with the ’**Up**’ or ’**Down’** keys.

```
Tank 2:  ----- L
Tank 3:   2960 L
```

Display of Tank 2 and 3 after 1x pressing of the ’**Down**’ key

```
Tank 3:   2960 L
Tank 4:   9750 L
```

Display of tank 3 and 4 after 2x pressing of the ’**Down**’ key

5.2 Switching the tank contents display unit

You can switch from the display volume [litres] to volume [percent] or level [cm] by pressing the ’**Enter**’ button.

```
Tank 1:   151 cm
Tank 2:   106 cm
```

Display tank content in ’cm’. After Pressing of the ’**Enter**’ key.

```
Tank 1:    75 %
Tank 2:    53 %
```

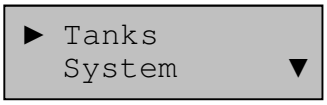
Display of tank filling level in ‘%’ after pressing ‘**Enter**’ again.

```
Tank 1:   17.5°C
Tank 2:   18.7°C
```

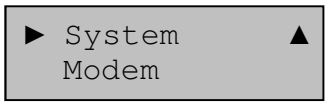
Display of medium temperature in °C after pressing the ’**Enter**’ key again. (only devices with ‘temperature measurement’ option).

6 “Management” mode

In this mode, in which all device settings are made, you can access the 'Tank display' mode by pressing the '**Exit**' key:



The menu has a total of 3 items. The third menu items is visible when the '**Down**' button is pressed:



An overview of the menu structure is in the appendix.

! There is no monitoring of the tank contents and no alarm in Management mode!

Hence the device returns automatically to the 'Tank display' mode, if no key is pressed for longer than 180 seconds in this mode,

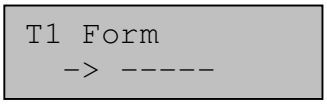
6.1 “Tank“ menu

In this menu the tank geometry, size, sensors etc are set. First of all the tank shape has to be set as well. As long as no tank shape is set during commissioning, then all other settings are not possible.

6.1.1 Tank shape

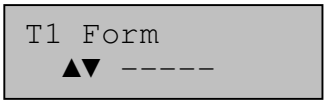
The setting is made via a selection list. The tank number is also shown in the display window e.g. 'T1' for Tank Nr. 1.

Example:



The dotted line means that a tank is not installed.

After pressing the '**Enter**' key the display changes as follows:



Pressing the '**Up**' or '**Down**' key selects the required tank shape, for example. :

The input is confirmed with '**Enter**' or cancelled with '**Exit**' after completion of the selection. The displays returns back again and tank shape is completed. The table on the following pages shows the tanks shape settings.

6.1.2 Overview of the tank shapes settings

The following table shows the tank shape settings and their abbreviation in the “Tank shape“ menu:

Table 4. Tank shapes

Menu item	Tank shape	Description
ZylS	Upright cylinder	e.g. customised steel tanks, cisterns
ZylL	Horizontal cylinder	Typically as an underground tank
Kubus	Cube	Cube-shaped tank
Acht	Octagon	Octagonal tank
Kugel	Ball	Ball shaped tank
PTab	PTab	Random tank form as gauge table
ZylK	Horizontal cylinder	with dished head

The number of parameters that can be set varies, depending on the tank shape:

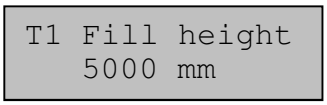
Table 5. Tank parameters

	Tank shape						
Tank Parameter	ZylS	ZylL	Kubus	Acht	Kugel	PTab	ZylK
Filling level	x	x	x	x	x		
Diameter	x						x
Depth		x	x	x			
Width			x	x			
Average width				x			
Average height				x			
Cylindrical length							x

6.1.3 Input of the tank parameters

The tank parameters are input in the following way:

Example



Input of the filling level for tank 1

After confirmation with the **'Enter'** key the maximum filling height in mm can be entered as a max of four digits, in this case 5000 mm.

The input of the parameters belonging to a particular tank form is prompted individually in turn. Parameters not required are not displayed.

The tank shape “PTab”, i.e. gauge table, has a special position here. This table describes the tank geometry indirectly by means of value pairs of filling height and filling volume. This allows practically any tank shape to be monitored.
Editing of the gauge table is described on the next page.

6.1.4 Editing of a gauge table

Two functions are available here: ‘delete’ and ‘edit’.

6.1.4.1 Delete gauge table

```
T1 PTab delete
  -> ENTER
```

Pressing the ‘**Enter**’ key deletes the pair of values in the gauge table.

6.1.4.2 Edit gauge table

```
T1 PTab edit
  -> ENTER
```

Pressing the ‘**Enter**’ key changes to input mask and edition of the pair of values.

Example

```
WP01 100 mm.
  220      L
```

Input of the 1st value pair.

Pressing the ‘**Exit**’ key ends the input of the pair of values.
The value pairs are automatically sorted according to filling level, the highest value is assigned to the value pair 32, the second highest to the value pair 31, etc.
At least 2 and not more than 32 value pairs have to be entered. The more value pairs are entered, the more accurate is the calculation of the volume.
The filling heights should generally be arranged uniformly over the tank height; with particularly complex tank shapes it is advisable to select smaller steps in the area of extreme bulges or necking.

6.1.5 “Max. Vol” – Display of the maximum tank volume

Next the *calculated* maximum tank volume is **displayed**:

Example

```
T1 Max. vol.
  154050 L
```

☛ **The input of a value is not possible!**

6.1.6 “Vol Offset“ – dead volume

Next the tank dead volume is queried:

```
T1 Vol. offset
   145 L
```

After confirmation with the **'Enter'** key the maximum Volume offset in litres can be entered as a max of four digits, in this case 145 L.

6.1.7 "Min. Alarm" – Alarm threshold minimum volumes

Next the minimum volume at which the level alarm triggers, is queried:

```
T1 Min. alarm
   10000 L
```

After confirmation with the **'Enter'** key the maximum Volume in litres can be entered as a max of six digits, in this case 10 000 L.

☛ **If a value of '0' is entered then no alarm occurs!**

If the level is below the alarm threshold, the value '**Lo**' appears in the tank display mode instead of the filling level value.

6.1.8 "Max. Alarm" – Alarm thresholds maximum volume

Next the maximum volume at which the level alarm triggers, is queried:

```
T1 Max. alarm
   140000 L
```

After confirmation with the **'Enter'** key the maximum Volume in litres can be entered as a max of six digits, in this case 140 000 L.

☛ **If a value greater than the max tank volume is entered then no alarm occurs!**

If the level is above the alarm threshold, the value '**Hi**' appears in the tank display mode instead of the filling level value.

6.1.9 "Density" – Density of the medium

In case the displayed level differs from the actual level, it is possible to input a density value which corrects the display. This may be necessary for liquids that deviate from standard heating oil (860 g/l).

☛ **Prerequisites: The sensor head is correctly positioned in the tank. If it is suspended higher in the tank, the sensor offset has been adjusted!**

A typical sign of an incorrect density value is a deviation between the displayed and actual heights, which increase when the tank is more full. The calculation formula for the new density value is on the following page.

A new density value is calculated with:

$$Wert_{neu} = Wert_{alt} \times \frac{Füllhöhe_{angezeigt}}{Füllhöhe_{tatsächlich}}$$

The default density is for heating oil.

Table 6. Density values

Typical density values [g/L]	
Heating oil / diesel:	860
Water:	1000
AUS 32 (urea):	1090

```
T1 Density
   860 g/L
```

After confirmation with the **'Enter'** key the density in g/L can be entered as a max of four digits, in this case the value was not changed.

6.1.10 „Sensor“ – Measurement range of the sensor

```
T1 Sensor
-> 200 mbar
```

The setting is made via a selection list. The following measurement ranges can be set:

Table 7. Adjustable sensor measurement ranges

Measuring range
200 mbar
300 mbar
500 mbar
1000 mbar

The set measurement range must agree with the immersion probe that is connected.

6.1.11 “High offset“ – Sensor head installation height

The sensor measurement point is usually above the tank bottom and thus has the effect of a zero error. The error is eliminated by entry of the offset.

```
T1 offset
   14 mm
```

When using the probes LH-10 / IL-10 the probe has an offset of 14 mm in the horizontal position. In case of vertical installation on the tank bottom the offset is 24 mm. If the head has to be placed higher (e.g. : dirty medium), then the distance from the bottom is to be given as an offset in mm.

☛ **Only levels above the sensor head position can be measured. If the level falls below this, then 0 cm is shown!**

A typical sign of an incorrect height offset is a deviation between the displayed and actual heights, which remain the same no matter how full the tank.

6.1.12 "Factor" - calibration factor:

The factor affects the amplification of the measurement signal and hence the height of the displayed level or tank content.

```
T1 Factor
   1000
```

A change from e.g. +1 to 1001 increases the displayed value by 0.1 percent. Hence the sensor error can be reduced for very accurate measurements.
This value can be changed after confirmation with the **'Enter'** key.

6.1.13 "Zero point adjustment" – Sensor zero point adjustment

This is not a value that can be adjusted but rather an automatic function, that measures and saves the electrical zero point of the sensor.

```
T1 Zero point
   4.00 mA
```

After pressing the **'Enter'** button a question mark appears behind the 'zero point':

```
T1 Zero point ?
   4.00 mA
```

Pressing the **'Enter'** button starts the zero point adjustment **'Exit'** ends it.

☛ **The sensor may not be in the medium during the adjustment!**

After starting during running of the zero point adjustment various characters appear in brief intervals instead of the question mark (operating display). On completion, the display returns to its initial display mode.

The setting of the tank parameters for this tank is thus complete. After returning to the '**Tank display**' mode the display is shown as per the selected unit in 'cm', ,'litres' or 'percent'.

6.1.14 Devices with temperature measurement option

LevelController-4, equipped with 'temperature measurement' option, display the volume 'Vn', normalized at a temperature value, besides the temperature display.

The normalized volume is calculated using the following formula:

$$V_n = V_{Betrieb} * [\ 1 + Gamma * (T_{Ref} - T_{Betrieb})]$$

V_n	:	Normalized volume
$V_{Betrieb}$	:	Measured volume without normalization
T_{Ref}	:	Reference temperature [°C]
$T_{Betrieb}$	:	Measured temperature [°C]
Gamma	:	Volume expansion coefficient in [0.00001/Kelvin]

Table 8. Values for the volume expansion coefficient:

Substance	Gamma [10^{-5}/K]
Petrol	106
Diesel	96
Fuel oil	84
Petroleum	94

6.1.14.1 "Temperature display" – Temperature display ON/OFF

```
Temp. display
  -> on
```

Temperature measurement for the current tank is enabled under this menu item. After pressing the '**Enter**' several times in "**Tank display**" mode, the temperature value is displayed.

☛ **The normalized volume and the temperature are only displayed after been enabled under this menu item!**

6.1.14.2 "Reference temperature" – Input of the reference temperature

The reference temperature is the temperature for which the volume is recalculated.

Example:

```
T01 Ref. temp.
   15 °C
```

The measured tank volume is calculated as the volume at 15 °C.

If the current temperature is above the reference temperature, the normalized volume is smaller than the measured volume, whereas if the current temperature is below the reference temperature, the normalized volume is larger than the measured volume.

6.1.14.3 "Expansion" – Input of the expansion coefficient

The expansion coefficient depends on the substance (see Table 8):

Example:

```
T01 Expansion
  84  [x10-5/K]
```

$84x10^{-5}$/K for fuel oil

The setting of the tank parameters for this tank is thus complete. After returning to the '**Tank display**' mode the display is shown as per the selected unit in 'cm', ,'litres' or 'percent'.
Two more display modes are available in the '**Tank display**' mode after *activation* of the temperature measurement:

```
Tank 1: 15600
Tank 2: 22710
```

Normalized volume

```
Tank 1:  17,8 °C
Tank 2:  14,2 °C
```

Temperature in tank

☛ **The symbol ⌊n indicates the display of the *normalized* volume.**

6.2 "System" menu

In **appendix A** you will find an overview of the menu structure. The menu points are explained in detail in the following text.

6.2.1 "Management code" (optional)

```
Management-
code: 1234
```

The management code prevents the changing of system settings by unauthorised persons.

☛ **No code is installed when delivered.**

After pressing the **'Enter'** key a max code of four digits can be entered for accessing the Management mode.
The device switches to "Management mode" when the code is correct.
The device switches back to the measurement and display mode by pressing the **'EXIT'** key.

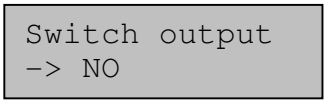
☛ **Please contact HORN customer service if the code is lost.**

6.2.2 "Language"

```
Language
-> German
```

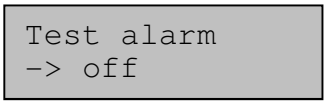
Setting of the language used in the menus and displays. At the moment English is the only language that can be selected apart from German.

6.2.3 “Switch output”



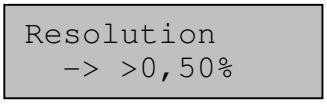
The rest position of the relay for the alarm outputs can be switched with this selection list: „NO“ stands for “normally open“, hence NO contact or alternatively “NC“ for „normally closed“, thus NC contact. The standard setting is “NO”.

6.2.4 “Test Alarm“ – Test of the alarm outputs



Test function for the alarm contacts. Enables the manual triggering of a level alarm. All three alarm relays are activated together.

6.2.5 ”Resolution“ – Measurement resolution setting



The measurement resolution can be set to two steps: 0.1% and 0.5%.
The 0.1% resolution shows the level changes in finer steps than the 0.5% one. In some cases the measurement fluctuations are larger. The standard setting is 0.5%.

6.3 “Modem” Menu

6.3.1 “Modem type” menu

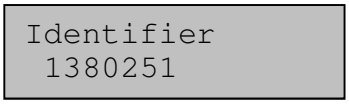
The modem type is selected and the corresponding parameters are entered or selected in this menu. The number and type of parameters depend on the set modem type. The following types can be set:

Table 9.

Menu item	Explanation
None	Operation without modem (*standard setting*)
Serial	Connection via serial interface with a PC and e.g. HORN “LevelControl” software
Analog	Analog modem
H.P. Ltr.	Connection via serial interface with a PC and HORN “Levelindicator” software
H.P. mm	Connection via serial interface with a PC and HORN “Levelindicator” software

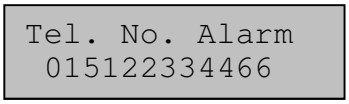
After successful commissioning of the modem the device switches to the ’**Tank display**’ mode.

6.3.2 “Identifier“ - Device name



In this menu item it is possible to assign an **numerical** identifier to the LevelController 4. A maximum of 15 characters can be entered. The controller displays the serial number as standard.

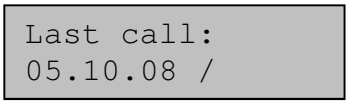
6.3.3 “Tel. No. Alarm” – Telephone number for filling level alarm



The LevelController-4 can generate automatic messages that are sent to any selected telephone number. The desired number can be entered here up to a max of 16 digits.

☛ **If no number is set up, no alarm is transmitted even if the modem alarm is switched on!**

6.3.4 “Last call” – Date / time of the last connection



Displays the date and time of the last connection.

7 Value ranges, pre-assigned factory settings

Some parameters come assigned with standard values:

Table 10. Permitted parameter values

Parameters	Pre-assignment	Values range (Min – Max)
SIM-Pin		0000 … 9999
Management Code		0 … 9999
Tank max volume	Display only	0 – 999,999 litres
Tank max. level	0	0 … 9999 mm
Tank diameter	0	0 … 32767 mm
Tank depth	0	0 … 32767 mm
Tank width	0	0 … 32767 mm
Tank average depth	0	0 … 32767 mm
Tank average width	0	0 … 32767 mm
Volume offset	0	0 – 999,999 litres
High offset sensor	14 mm	-999 … 9999 mm
Calibration value	860 g/L (heating oil)	250 … 2500 g/L
Min. alarm level	0 litres	0 – 999,999 litres
Max. alarm level	999.999 litres	0 – 999,999 litres
Telephone number for alarms	-	Max. 16 digits
Identification text	-	Max. 20 characters
Reference temperature *1	15°C	0…40°C
Expansion coefficient *1	84	20…200 [10^{-5}/Kelvin]

*1 devices with 'Temperature measurement' option only

8 PC software for the LevelController-4

Programs for downloading free-of-charge can be found on the Internet under www.tecalemit.de.
These programs allow you to call up and visualise measurement data and store these in a database on the PC. In addition, the controller can be configured remotely from the PC (applies only to controllers with the 'serial interface' option).

9 Service and maintenance

9.1 Cleaning

Only suitable plastics cleansing agents may be used for cleaning the outside of the housing, ***on no account*** should solvents, fuels, etc. be used!

9.2 Maintenance

The pressure equalisation element (see chapter 3.1) on the device should be inspected at regular intervals for soiling. Clean or replace, if soiled.

10 Disposal

The device is to be emptied completely and the liquids properly disposed of in case it is taken out of service.
The equipment is to be disposed of properly when taken permanently out of service:

- Return old metal for recycling.
- Return plastic parts for recycling.
- Return electronic waste for recycling.

☛ **The water legal regulations are to be followed.**

10.1 Return of batteries

Batteries must not be disposed of with the domestic waste. Batteries can be returned free of charge via a suitable collecting point or to the dispatch stores. Consumers are legally obliged to return used batteries.
Batteries that contain harmful substances are marked with a crossed out dustbin (see above) and the chemical symbol (Cd, Hg or Pb) of the heavy metal that is decisive for the classification as containing harmful substances:
1. "Cd" stands for cadmium.
2. "Pb" stands for lead.
3. "Hg" stands for mercury.

11 Declaration of conformity

HORN TECALEMIT

Konformitätserklärung
Declaration of Conformity

Hiermit erklären wir, dass die Bauart
We herewith declare that the construction type

Typ: *Type:*	**LevelController-4**
Bezeichnung: *Designation:*	**Füllstandsmessgerät** ***Level measurement device***
Artikel-Nr.: *Item No.:*	**225700000; 225701000; 225701100; 225702000; 225702100; 225703000; 225703100**

in der von uns gelieferten Ausführung folgenden einschlägigen Bestimmungen entspricht:
in the form as delivered by us complies with the following applicable regulations:

- EMV-Richtlinie 2004/108/EG
  Electromagnetic compatibility 2004/108/EC

- Niederspannungsrichtlinie 2006/95/EG
  Low voltage equipment 2006/95/EC

Angewendete harmonisierte Normen:
Applied harmonised standards:

EN 55022 EN 60204-1 EN 61000-3-2, -3
EN 61000-4-2, -3, -4, -5, -6, -11 EN 61000-6-2, -3

EG-Dokumentationsbevollmächtigter: Jörg Mohr Horn GmbH & Co. KG
EC official agent for documentation: Munketoft 42
24937 Flensburg

23.09.2011
Datum
Date

.....
i.V. Dipl.-Ing. Jörg Mohr
Entwicklungsleiter / *Engineering Manager*

HORN GmbH & Co. KG
Munketoft 42
D-24937 Flensburg
Germany

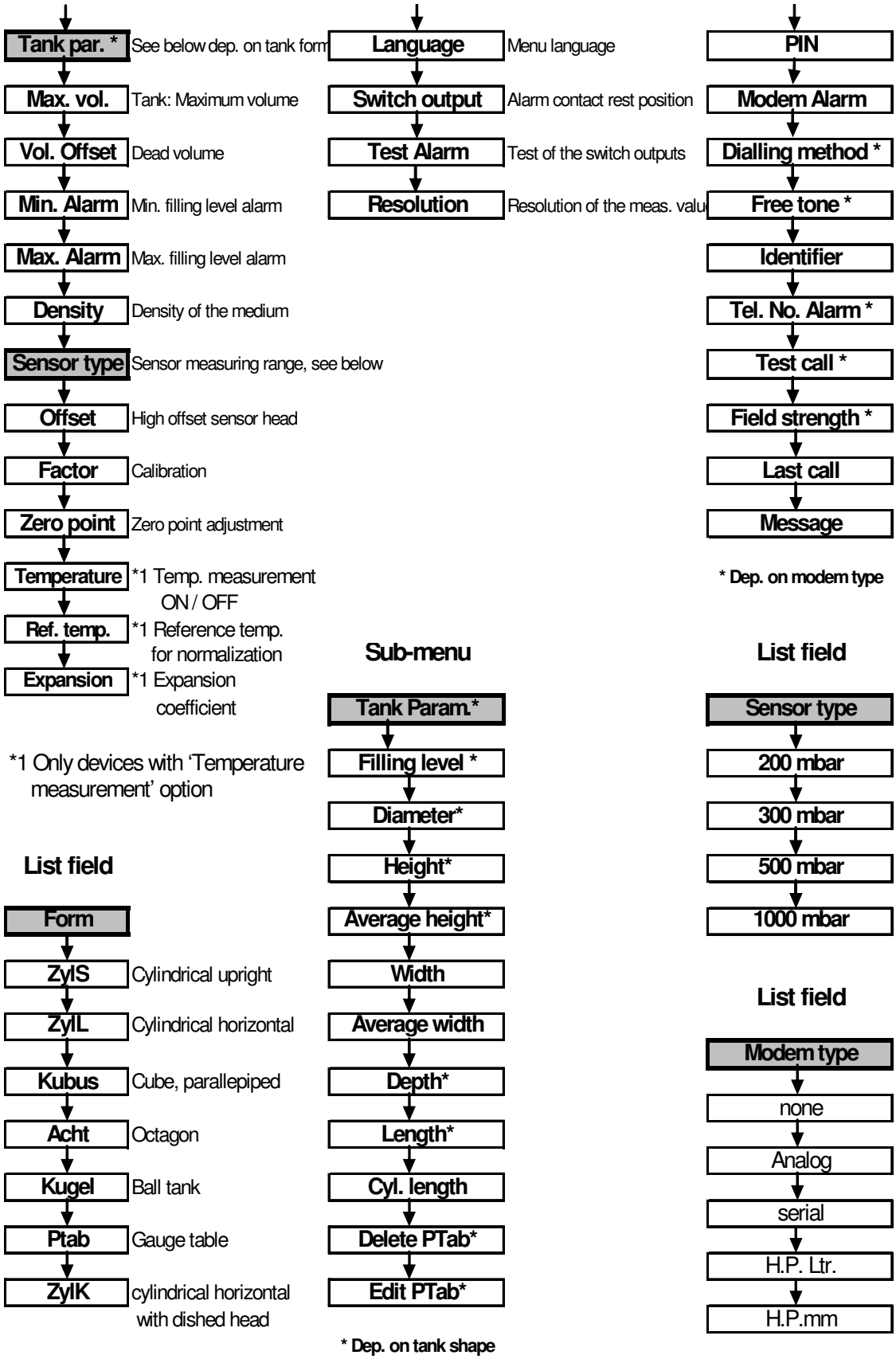
T +49 461 8696-0
F +49 461 8696-66
info@tecalemit.de
www.tecalemit.de

Geschäftsführer:
Jürgen Abromeit
Torsten H. Kutschinski

Commerzbank AG
BLZ 215 400 60
Konto-Nr. 2476000

SWIFT COBADEFFXXX
IBAN DE33215400600247600000
Amtsgericht Flensburg HRA 4264
USt-IdNr. DE813038919

Appendix A. "Management" mode menu structure



Appendix B. Error messages

Error messages are output to the display in the format E – 01 (example) and relate predominantly to the temperature transducer.

One exception are the messages in the 'Tank display' mode:

Table 11. Error messages in 'Tank display' mode

Display	Meaning	Remedy
ERR!	Error in the controller parameterisation	Check tank geometry parameters and correct, if necessary.
FAIL	Filling level sensor failure or lead interrupted.	Check sensor and lead

Table 12. Error messages from the temperature measuring transducers

Display	Meaning	Remedy
E-20	Lead to PT100 interrupted or sensor defective	Check and repair any interruption.
E-21	Short-circuit in lead to PT100 or sensor defective	Check and repair any short circuit.
E-22	Measuring range exceeded	Operate device according to specification.

HORN GmbH & Co. KG
Munketoft 42
24937 Flensburg
Germany

T +49 461-8696-0
F +49 461-8696-66

www.tecalemit.de
info@tecalemit.de