TECALEMIT

Operating Manual

LevelController PS

Item-No.: US225500001, US225500002

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

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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.

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.

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!

2 Technical description

2.1 Product description / Appropriate use

The LevelController measures and displays the liquid levels, especially in AUS 32-Tanks. The display can be switched to gallons/inches or liters/cm.
The LevelController with GSM also provides data transmission. The measured values can be transmitted as SMS to a mobile telephone or a web server at regular intervals.

2.2 Product versions

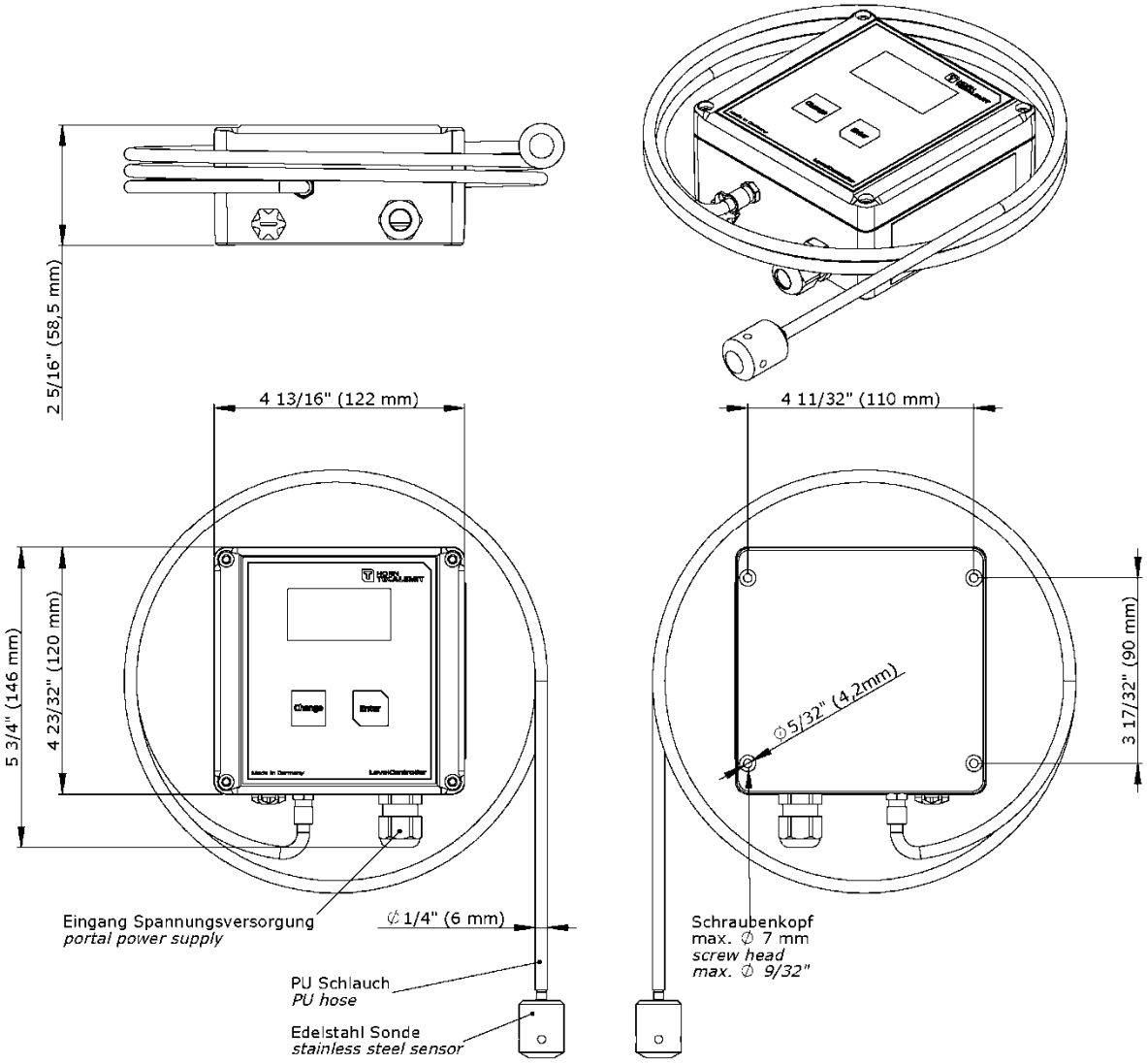
Item-No.	Type
US225500001	LevelController PS
US225500002	LevelController PS with GSM

2.3 Technical data

Power supply	120 V / 60 Hz
Power consumption	1 VA
Display	LC-display with 5 characters, character height 16 mm
Keyboard:	2 membrane keys
Length measuring tube	400 inches (10 m)
Ambient temperature	14°F – 122°F (-10°C - 50°C)
Precision:	Approx. 0.8 – 1.6 inches (2 - 4 cm) fill level
Data recall: (optional)	Integrated GSM-module
Materials in touch with the measured substance:	PU, stainless steel
Measurements. (HxBxT)	4.7x4.7x2.4 inch (120x120x60 mm)
Protection class	IP 54
Weight	ca. 1.5 lb (0,7 kg)

3 Assembly

The unit has four drill holes and can be mounted to the wall with screws.



The measuring tube must be introduced through an appropriate screw connection into the interior of the tank. The head of the sensor (weight at the end of the measuring tube) should be positioned at the lowest point of the tank. The maximum tube length is 65 feet (20 m).

4 Commissioning

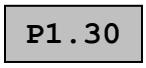
4.1 Insertion of the SIM Card, Power Supply

Unscrewing the cover of the casing provides access to the telemetry unit integrated in the cover.

Insert an activated SIM card into the SIM card holder (push down and open up holder). This is optional.

The LevelController is to be connected to a 120V/60 Hz power supply. Only trained and qualified staff should be allowed to establish the connection.

After connection to power supply, the version number of the programme of the LevelController is displayed.



(example)

Afterwards, the missing operating parameters can be entered in the respective input masks.

4.2 Entry of Numbers with Several Digits

In several menus, it is necessary to enter multidigit numbers. These numbers are entered using the keys **‚Change'** and **‚Enter'.**

The **‚Change'** key is used to change between the characters ‚0' to ‚9', ‚↵' and ‚–' in the utmost right position of the display.

‚**Enter**'confirms the input of the character at the utmost right position. The displayed number moves to the left (if the maximum number of digits to display has not yet been reached). No more than the last five digits of a number are displayed, a point between the second and the third digit indicates that more digits have been entered on the left of the displayed digits.

The sign ‚↵' confirms the input.

The sign ‚–' moves the displayed number towards the right (deleting).

Example: Entry of the number *120*:

0	Strike ‚**Change'** once to obtain:
1	Strike ‚**Enter'** once to obtain:
10	Strike ‚**Change'** twice to obtain:
...12	Strike ‚**Enter'** once to obtain:
..120	Strike ‚**Enter'** once to obtain:
.1200	Strike , **Change'** ten times to obtain:
.120↵	Strike ‚**Enter'** to confirm the number *120*.

Note: In many menus it is possible to abort the entry striking ‚**Change**' and ‚**Enter'** simultaneously.

5 Entry of Operating Parameters

5.1 Entry of the PIN Code for the SIM Card (optional)

If the inserted SIM card requires the entry of a PIN code, the display shows:

Pin

Strike ‚Enter' to switch to a menu for entering a four-digit PIN code to log on the SIM card to the net.
Enter the PIN code using the ‚Change' and ‚Enter' keys (as explained above).

Then the LevelController will try to log on to the GMS net. This might take some seconds. The display shows:

Logon

If the logon was successful, the received field strength is displayed:

F-15

(example)

Legend field strength:	
0 .. 31	low .. high
99	not definable

To ensure a failure free data transfer, the field strength value should be at least 10. If the field strength is too low, the positioning of the device should be changed or an external antenna (optional accessory) should be installed.

Strike ‚Enter' to log off the GSM modem from the net or after 30 seconds the GSM modem will automatically log off the network. The display shows:

LogoF

In case of problems during the logon or logoff process, the device displays an error code for approx. two seconds, *compare Annex B*.

5.2 Setting the Measurement System

Unit

The LevelController can display measurements and process inputs either in the metric system (Liter / cm) or in the U.S. customary measurement system (gallons / inches).

After confirmation with the '**Enter**' key, the measurement system set is displayed and can be changed by using the '**Change**' key:

2	(e.g.)

In this case, the different numbers stand for the following measuring systems:

Number	Measurement System	Description
1	Metric	Display of tank contents in liters Display of tank fill level in cm
2	U.S. customary	Display of tank contents in gallons Display of tank fill level in inches

After selection of the measurement system, it is confirmed with the '**Enter**' key. Afterwards all inputs and outputs are processed in the appropriate units.

5.3 Entry of Tank Parameters

5.3.1 Tank - Form

If no tank parameters are available (first startup), at first the form of the tank is asked for:

Fornn

Strike ‚**Enter**' to confirm and strike ‚**Change**' to select one of the possible tank forms:

1

The figures represent the following tank forms:

Figure	Shape of tank	Description
1	cuboid, upright cylinder	e.g. customized steel tanks, cistern tank
2	lying cylinder	typically buried tank
3	Sphere	spherical tank
4	Oval	typical „conventional" fuel oil tank made of steel or synthetic material
5	cell tank	synthetic tank with curved surface for stiffening

6	Hemisphere	hemispheric synthetic tank with plane base

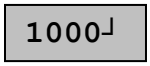
Select the tank form and confirm with ‚Enter'.

5.3.2 Tank - Maximum Volume

Now the maximum tank volume is asked for:

Strike ‚Enter' to confirm and enter the maximum volume in litres or gallons, respectively, with a maximum of 5 digits.
Note: for several linked tanks, the total volume of all tanks must be entered.

Use the keys ‚Change' and ‚Enter' to enter the maximum volume (as described above).



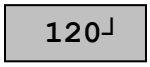
(example)

5.3.3 Tank - Maximum Fill Height

Now the maximum fill height of the tank is asked for:

Confirm with ‚Enter' and enter the maximum fill height in cm or in inches, respectively, with a maximum of 3 digits.

Use the keys ‚Change' and ‚Enter' (as described above).



(example)

Confirm the entry to terminate the entry of tank parameters. A measurement is initiated and the current fill height is displayed in cm.

Now the LevelController is ready to operate.

5.3.4 Determination of Density

In order to indicate correctly, the LevelCntroller needs as exact a density of the medium to be measured as possible. This can be entered directly (display ‚**CALib** `) or alternatively by input of the current filling level and a reference measurement (display ‚**LEvEL** `).

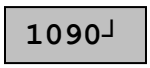
Use the key ‚**Change**‘ in order to select the method which shall be used and confirm with key ‚**Enter**’.

5.3.4.1 Direct input of Density

This method is recommended with accurately well-known density or with installation into a tank, which is not sufficiently filled for a reference measurement.

The density of the medium is entered in gram/liter (g/l) or in pounds/gallon (lb/gal). As default value the density of AdBlue (DEF) is preset. These are 1090 g/l or 9096 lb/gal.

Use the keys ‚**Change**‘ and ‚**Enter**’ (as described above).

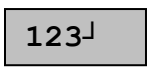


(example)

5.3.4.2 Determination of Density by Reference Measurement

This method is recommended with unknown density and a tank filled to the half at least.
It is required that the measuring hose is inside the tank and the probe head rests on the tank ground.

Input of the otherwise measured filling level in cm or inches (e.g. by dipstick) takes place by keys ‚**Change**‘ and ‚**Enter**’.



(example)

After confirming the filling level a measuring procedure is started and the density of the medium is computed automatically. If necessary, the value can be corrected in the appropriate menu ‘**CAlib**’..

Subsequently, the LevelControlleris ready for use.

6 Measuring and Display of Tank Fill Level

For the display of the tank contents, the fill height or fill quantity may be selected. In the management mode, the units inch/gallon or cm/liter may be selected. The display of the level is symbolized by the engraved inscription “gallon” or “liter” below the level displayed.

Switching between fill height and fill quantity is possible using the “change” key.

To display the current filling level, initiate a measurement striking the ‚Enter’ key. Otherwise the measured value is updated regularly, *compare 10 Default Settings, Value Ranges.*

Pressing ‚Enter’ for approx. 2 seconds initiates a measurement with data transfer to the programmed mobile phone numbers (if these have already been programmed, *compare 7.3.8f Phone numbers for messages* or *9.1.2 Configuration Commands*)

7 Management Mode

In the management mode, different system configurations for the LevelController can be made. Furthermore, for the product variant with GSM, test functions for data transmission by SMS are available.

The menu items for setting the GSM operating parameters are not available in the product variant without GSM.

If no key is pressed for a period longer than 5 minutes, the display automatically switches back to the measuring and display mode.

7.1 Switching to Management Mode

Strike the keys ‚Change' and ‚Enter' simultaneously to switch from the measuring and display mode to the management mode.

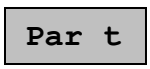
7.2 Input of a Management Code (optional) *

Confirm with ‚Enter'. Enter a code of a maximum of four digits for access to the management mode.

LevelController is supplied without a management code. The management code can be created subsequently under *7.3.4 Creating a Management Code*.

When the keys ‚Change' and ‚Enter' are pressed simultaneously or a false code is entered, the device automatically switches back to the measuring and display mode.

7.3 Submenus in the Management Mode



(example)

Several submenus are available in the management mode. Select the submenu using ‚Change', strike ‚Enter' to confirm the selection and to switch to the desired submenu.

For an overview of the menu structure see *Annex A.*

7.3.1 „PAr t“ Adjust Tank Parameters

PAr t

The tank parameters “form”, “maximum volume” and “maximum height” can be changed subsequently. The first menu asks for the form of the tank.

Fornn

Strike ‚Enter’ to display the entered tank form. Strike ‚Change’ to change the tank form.

2	(example)

The figures represent the following tank forms:

Figure	Shape of tank	Description
1	cuboid, upright cylinder	e.g. customized steel tanks, cistern tank
2	lying cylinder	typically buried tank
3	sphere	spherical tank
4	oval	typical „conventional“ fuel oil tank made of steel or synthetic material
5	cell tank	synthetic tank with curved surface for stiffening
6	hemisphere	hemispheric synthetic tank with plane base

Select the tank form and confirm with ‚Enter’.
Now the maximum tank volume is asked for:

Uol

Strike ‚Enter’ to display the maximum tank volume in gallons resp. litres. Edit as described above.

Note: for several linked tanks, the total volume of all tanks must be entered.

1500┘	(example)

Now the maximum fill height of the tank is asked for:

HEigh

Strike ‚Enter’ to display the maximum fill height in inch resp. cm. Edit as described above.

120↵

(example)

After the maximum fill level has been confirmed, the entry of tank parameters is finished.

7.3.2 „OFFSt“Height-Offset Sensor Head

OFFSt

The head of the sensor should be positioned lying on the lowest point of the tank. This results in an automatic offset of 0.4 inch resp. 1 cm (default setting). If the head must be positioned higher, the distance from the bottom in inch resp. cm must be entered as offset.

1↵

(example)

Important: The content level can only be measured if it is above the position of the sensor head. Content levels below the sensor head are displayed as 0 inch / cm!

A typical indication of a false height-offset is the difference between the displayed and the actual height, the displayed height remaining constant independent of the tank content level.

7.3.3 „CAlib“ Calibration of the Sensor

CAlib

The density of the medium is input in gram/liter (g/l) or in pounds/gallon (lb/gal). As a standard value, the density of AdBlue (DEF) is preset. This is 1090 g/l or 9096 lb/gal.

A typical indication of a false density value is the difference between the displayed and the actual height. The higher the volume, the greater the deviation.

A new density value is calculated as follows:

$$Value_{new} = Value_{old} \times \frac{Fillheight_{displayed}}{Fillheight_{actual}}$$

0850↵

(example)

Typical Density Values [g/L]	
Heating Oil/Diesel:	860
Water:	1000
AUS 32 (DEF):	1090

Typical Density Values [lb/gal]	
Heating Oil/Diesel:	7177
Water:	8345
AUS 32 (DEF):	9096

7.3.4 Determination of Density by Reference Measurement

`LEvEL`

If the density of a fluid is unknown then it cann be determined by input of ther current fluid height and performing a reference measurement.
Precondition is a tank filled to the half at least.
The measuring hose has to be inside the tank and the probe head must rest on the tank ground.

Input of the otherwise measured filling level in cm or inches (e.g. by dipstick) takes place by keys ‚Change' and ‚Enter'.

`123↵` (example)

After confirming the filling level a measuring procedure is started and the density of the medium is computed automatically. If necessary, the value can be corrected in the appropriate menu 'CAlib'.

7.3.5 „CodEn" Creating a Management Code

`CodEn`

In order to avoid that unauthorized persons can get access to the management mode and change system configuration settings, it is possible to protect the management mode with a code of a maximum of four digits.

`0↵` (example)

If „0" is entered, the management mode can be freely accessed without entering a code (default setting).

7.3.6 „Pin" Entry of the PIN Code for the SIM Card

`Pin`

Here the PIN Code for the SIM Card can be displayed and changed subsequently, if necessary.

`0817↵` (example)

If a false pin number has been entered, an error message will be generated at the next logon try, see *Annex B*.

7.3.7 „PAr F“ Parameters for Generating Automatic Content Messages

```
PAr F
```

The LevelController generates automatic content messages, which are sent via SMS to one or two GSM mobile phone numbers. In this menu, it is possible to enter the increment of consumption (e.g. every 100 gallon), the interval of the messages and a minimum content level below which a message will be generated by all means.

```
StEP
```

Strike ‚Enter' to confirm. The increment of consumption is displayed in gallons resp. litres and can be edited:

```
100↵
```
(example)

Then the messaging interval is asked for:

```
dAYS
```

Strike ‚Enter' to confirm. The messaging interval in days is displayed and can be edited.

```
  2↵
```
(example)

Then the minimum content below which a message will be generated is asked for:

```
nnin
```

Strike ‚Enter' to confirm. The minimum content in gallon resp. litres is displayed and can be edited:

```
500↵
```
(example)

After the minimum content has been confirmed, the entry of parameters for generating automatic content messages is finished.

7.3.8 „tEL 1“ Phone number 1 for SMS Messages

tEL 1

The LevelController generates automatic content messages, which are sent via SMS to one or two GSM mobile phone numbers. At this point of the menu, the first mobile phone number can be entered with a maximum of 16 digits.

0817↵	(example)

If no phone numbers are entered at all, no messages are generated.

7.3.9 „tEL 2“ Phone number 2 for SMS Messages

tEL 2

Same as for phone number 1.

0818↵	(example)

If no phone numbers are entered at all, no messages are generated.

7.3.10 „SnnSC“ SMS Service Center (SMSC)

SnnSC

For sending out SMS messages, an SMS Service Center must be set up. The default setting on SIM cards is the Service Center of the GSM provider, but at this point of the menu it is possible to choose a different, for example cheaper, Service Center.

7.3.11 „FiELd“ Display of Field Strength

FiELd

The receiving field strength of the GSM network is decisive for the reliability of the content messages. For displaying the field strength, the LevelController will try to log on to the GMS net. This might take some seconds. The the display shows:

Logon

If the logon was successful, the received field strength is displayed:

F-15

(z.B.)

Legend field strength:

0 .. 31 low .. high
99 not definable

To ensure a failure-free data transfer, the field strength value should be at least 10. If the field strength is too low, the positioning of the device should be changed or an external antenna (optional accessory) should be installed.

Strike ‚Enter' to log off the GSM modem from the net or after 30 seconds the GSM modem will automatically log off the network. The display shows:

LogoF

In case of problems during the logon or logoff process, the device displays an error code for approx. two seconds, compare *Annex B.*

7.3.12 „Snd L“ Sending Content SMS

```
Snd L
```

The last measured content level (format see 8 *Automatic Content Level Messages*) is transferred to the entered phone numbers. For this purpose, the LevelController logs on to the GSM net. This might take some seconds. The display shows:

```
Logon
```

During sending, the display shows:

```
Con
```

After sending, the GSM modem logs off the net. The display shows:

```
LogoF
```

In case of problems during the logon or logoff process, the device displays an error code for approx. two seconds, compare *Annex B*.

7.3.13 „Snd S“ Sending System Configuration SMS

```
Snd S
```

The system configuration data such as tank parameters, phone numbers for messages etc. (format see *7.1.1 Incoming Commands*) are transferred to the entered phone number(s). For this purpose, the LevelController logs on to the GSM net. This might take some seconds. The display shows:

```
Logon
```

During sending, the display shows:

```
Con
```

After sending, the GSM modem logs off the net. The display shows:

```
LogoF
```

In case of problems during the sending process, the device displays an error code for approx. two seconds, compare *Annex B*.

7.3.14 „rEC“ Receiving SMS

```
rEC
```

Many of the above mentioned settings and even more (see 9 *Communication*) can be transferred from any SMS-compatible mobile phone to the LevelController. Usually, these SMS messages are transferred to the LevelController after the automatically created messages.
At this point of the menu, such messages can be retrieved deliberately, e.g. for test purposes. For this purpose, the LevelController logs on to the GSM net. This might take some seconds. The display shows:

```
Logon
```

During receiving, the display shows:

```
Con
```

If messages have been received, the display changes to:

```
Con 2
```

The figure after the text „Con“ indicates the number of messages received. After successful receiving, the GSM modem logs off the net, the display shows:

```
LogoF
```

In case of problems during the sending process, the device displays an error code for approx. two seconds, compare *Annex B*.

7.3.15 Setting the Measurement System

```
Unit
```

After confirmation with the ‘Enter’ key, the measurement system set is displayed and can be changed by using the ‘Change’ key:

```
   2
```
(e.g.)

In this case, the different numbers stand for the following measurement systems:

Number	Measurement System	Description
1	Metric	Display of tank contents in liters Display of tank fill level in cm
2	U.S. customary	Display of tank contents in gallons Display of tank fill level in inches

After selection of the measurement system, it is confirmed with the '**Enter**' key.

☛ **Attention: After changing the measurement system, tank parameters already input are set back to the standard values.**

7.3.16 Initialisation of All Parameters

init

Strike ‚**Enter**' to confirm. Enter the figure „**1**" and confirm to start the initialisation of the parameters of the LevelController. The device returns to the default configuration. The display shows:

ErASE

Any other entry will be ineffective.

8 Automatic Content Messages via SMS

The LevelController regularly sends content messages to one or two GSM mobile phone numbers.

Preconditions: An activated SIM card with correct PIN has been installed and at least one mobile phone number has been entered (see 7.3.8f). The display format of the SMS is as follows:

Example	Description
LC0000113; Tank Fa. Müller, Flensburg; 60cm; 1250L; 50%; 15,90EUR; 15;	Device's serial number; Identification text; Fill height in cm; Content in litres; Content in %; Card credit balance (just Prepaid); GSM field strength

9 Communication with the LevelController via SMS

Many functions of the LevelController can also be made use of via SMS commands using an SMS-compatible mobile phone.

9.1 Inquiry Commands and Configuration Commands

For SMS messages, a certain command format must be respected. For control characters, upper case and lower case letters are acceptable.
SMS messages are limited to 160 characters.

There are two different types of commands: inquiry commands and configuration commands. Inquiry commands are used to retrieve information about the content and about system configuration parameters, configuration commands are used to change the parameters of the LevelController,

9.1.1 Inquiry Commands

Inquiry commands consist of two components: control character and question mark. The response to the inquiry is sent to the **inquiring** mobile phone number, **not** to the phone numbers entered for automatic messaging!
The following inquiries can be made:

Inquiry	Answer (Example)	Description
Content		
L? I?	LC000113; Tank Fa. Müller; 60cm; 1250L; 50%; 15,90EUR; 15;	Device's serial number; Identification text; Filling height in cm; Content in litres; Content in %; Card credit balance (just Prepaid) GSM field strength
System configurations		
S? s?	LC000113; T=2, 2500, 1200; F=200,15,1000; M1=01754126816; M2=01754126817; E=8000, xyz@abc.de; 15;	Device's serial number; Form and measurements of tank; Parameters for automatic SMS messages Mobile phone number 1; Mobile phone number 2; Email Gateway and address, GSM field strength

The parameters 'T' and 'F' are described in the following section.

9.1.2 Configuration Commands

Configuration commands consist of three components: control character, equals sign and parameter, example: „*M1=01754126816*“. If a command requires several parameters, these are separated by commas, example: „*F=250,10,800“*

Control character	Function (example)	Description
M1, M2 M1, m2	Mobile phone number for SMS messages (M1=01754126816)	Two mobile phone numbers can be entered for receiving automatically generated content messages.
T t	Form and measurements of tank (T=2, 2500, 120)	First param.: tank form (see below) Second param.: max. tank content [gallon resp. litres] Third param.: max. fill height [inch resp. cm]
F f	Parameters for automatic SMS messages (F=200,15,1000)	First param.: messaging interval [gallon resp. litres] Second param.: messaging interval [days] Third param.: alarm level [gallon resp. litres] With the command from the example, a message is generated after each decrease in content of 200 l, but at the latest every 15 days and in any case if the content level falls below 1000 l.
E e	Email gateway and email address for SMS→ Email (E=8000, xyz@abc.de)	First param.: Email gateway Second param.: Email address It is possible to enter an Email address with the corresponding Email gateway (specific to the GSM provider), to which the automatically generated messages are sent either in addition to or instead of the SMS message.
I i	Identification text (I=Tank Fa. Müller)	Text preceding content messages for the identification of the tank, max. of 40 characters

When a configuration command is received, it is executed and an SMS with the new system configurations is generated and sent to the mobile phone number which sent out the command.

Tank forms, command ‚T':

Figure	Shape of tank	Description
1	cuboid, upright cylinder	e.g. customized steel tanks, cistern tank
2	lying cylinder	typically buried tank
3	sphere	spherical tank
4	oval	typical „conventional" fuel oil tank made of steel or synthetic material
5	cell tank	synthetic tank with curved surface for stiffening
6	hemisphere	hemispheric synthetic tank with plane base

9.1.3 Chaining Commands

It is possible to chain several inquiry and configuration commands in one SMS. They will be processed one after another.
Example: „M1=01754126816 M2=01754126817 L?".
It is possible, but not necessary to put blanks between the parameters and commands.

10 Default Settings, Value Ranges

For some parameters, standard values have been set for the device before supply:

Parameter	Default value	Value range (Min – Max)
SIM PIN	-	0000 - 9999
Tank form	-	1 - 6
Tank max. volume	0 liters / 0 gal.	0 – 99,999 liters / gal.
Tank max. fill height	0 cm / 0"	0 – 400 cm / 0 – 160"
Management code	0 (no code)	0 - 9999
Height offset sensor	1 cm / 0.4"	0 – 99 cm / 0 – 99"
Calibration value	1090 g/L 9096 lb/gal	100 – 2000 g/l 100 – 9999 lb/gal
Messaging interval (l)	10,000 liters / gal.	50 – 10,000 liters / gal.
Messaging interval (days)	2 days	1 – 15 days
Mobile phone number 1	-	Max. 16 characters
Mobile phone number 2	-	Max. 16 characters
SMSC	-	Max. 16 characters
Identification text	Horn GmbH & Co. KG	Max. 40 characters
Measuring unit	gallons	liters / gallons

11 Data Recall via Internet „levelmaster.net“

The connection to the webserver of the company Horn GmbH & Co. KG offers a safe and easy way to record, display and evaluate content levels with the LevelController. The customer must have nothing but internet access and a browser. Additional services such as messaging to several participants via Email are available here.

For more information on, see *www.levelmaster.net*

12 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:

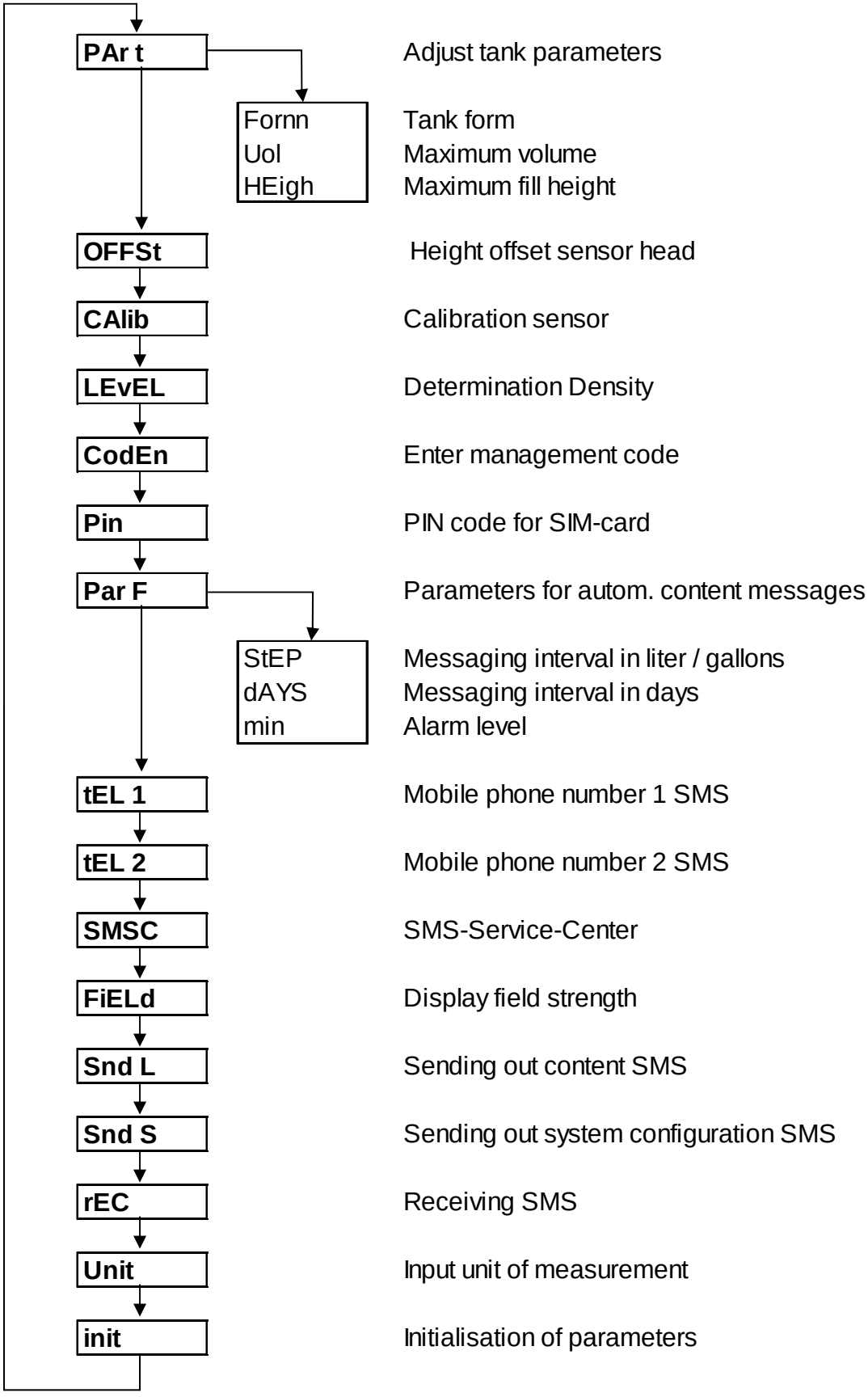
- Return old metal for recycling.
- Return plastic parts for recycling.
- Return electronic waste for recycling.

The water legal regulations are to be followed.

12.1 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.

Annex A Menu Structure Management Mode



Annex B Error Messages

Error messages are displayed in the following format: „E – 01“ (example). They primarily refer to the GSM module and the measuring transducer.

Error	Description	Remedy
E-01	No SIM-card inserted	Switch off device (remove battery) and insert SIM card in card holder see 2.2
E-02	Wrong or missing SIM PIN	Enter correct SIM PIN see 5.2.5
E-03	Failed login onto GSM network	Activate card Change positioning, use external antenna
E-04	Wrong SIM-PIN entered for three times	Insert SIM-card in cell phone, enter PUK, enter correct SIM PIN into LevelController
	Error GSM module	Notify customer service
E-05	Error in sending out SMS	Recharge prepaid card credit balance Change positioning, use external antenna Wrong SMSC set up see 5.2.0
E-06	No mobile phone number entered	Enter mobile phone number for SMS messages see 5.2.8 see 8.1.2
E-20	Error measuring transducer	Remove possible blockage of measuring tube, check ambient temperature, Notify customer service

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