HORN TECALEMIT

Operating manual

HDA 5 eco

Fluid Inventory Control System

Item No.: 110500800

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.

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.: 441655101-C
As of: 28.08.14

Contents

1 Safety instructions

The device is a state of the art piece of equipment and has been constructed according to recognized 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 usage of the equipment.**

! **Special information or 'do and do not's for damage prevention.**

⚠ **Information or 'do and do not's for the prevention of damage to persons or equipment.**

Intended use

! The device shall only be used if it is in specified condition. The device shall only be used for its intended usage, in compliance with all relevant safety regulations, with 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.

Organizational measures

! This operating manual should always be available at the site of operation! Each person who is involved with the assembling, commissioning, maintenance and operation of the equipment must have read and understood the entire operating manual. The type plate and the warning notices attached to the device have to be observed and maintained in a fully readable condition.

Qualified personnel

! The person operating, maintaining and assembling must be appropriate qualified for their work. The areas of responsibility, competences and supervision of the personnel must be precisely regulated by the operating company. If the operators 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 operator.

Waters protection

⚠ The device is designed to handle water hazardous substances. The relevant local and national regulations to protect the environment have to be fulfilled at the operating place.

Hydraulics

⚠ Only persons with special knowledge and experience with hydraulic systems are permitted to 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. Pressurized fluid can cause injuries and fire.
During handling oils, greases or other chemical substances the relevant local and national safety regulations for the product must be observed!

Maintenance and Service

⚠ For maintenance works at devices for flammable and/or water endangering substances consider the regulations of the water recources law. Use only athorized service companys.
Before starting any kind of maintenance ensure that all fuel lines are pressureless, completely empty and aerated.
Any changes, modifications or additions to the device are prohibited without consent of the manufacturer. Spare parts have to fulfill the specifications of the manufacturer. This is only guaranteed by original spare parts from the manufacturer.

Electric power

⚠ Only qualified electrician or trained persons under the guidance and supervision of a qualified electrician according to electro-technical guidelines are permitted to work on the electrical equipment. Before starting any kind of maintenance or repair work ensure that the device is de-energised.

2 Technical description

2.1 Intended use

The HDA 5 eco is designed as a Fluid Inventory Control System for use in industry, workshops, filling stations and similar facilities.
It is intended for the control of dispensing during the refueling of vehicles with liquid and pump able operating media.

! The installation and operation of the HDA 5 eco in explosion hazardous areas is not permitted. This would constitute a risk of explosion!

2.2 Description

The HDA 5 eco consists of the HDA eco automatic dispenser, which is mounted in sheet metal housing.

The built-in HDA eco automatic dispenser is optimized for the administration of small and medium-sized vehicle fleets and enables the administration of up to 2000 drivers / vehicles. You can connect up to five filling points.

Optional, additional components to create an entire tank system are the feed pump, the flow meter, and the dispensing hose with an automatic nozzle and, if applicable, an analogous level probe or fill level switch for monitoring the level in the tank.

2.3 Permitted media

All liquids and pump able operating media for refueling vehicles.

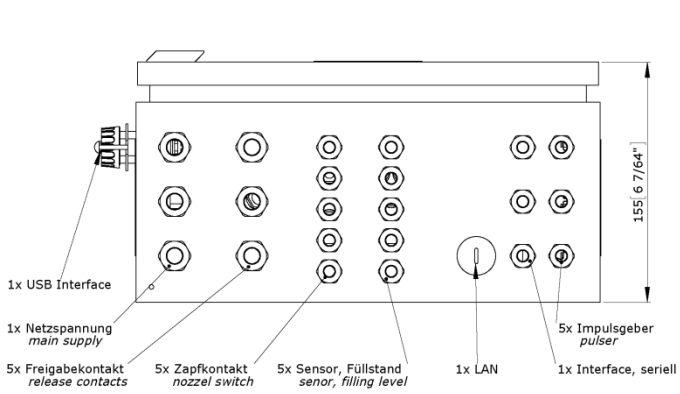
⚠ **Please check the safety data sheet for your medium.**

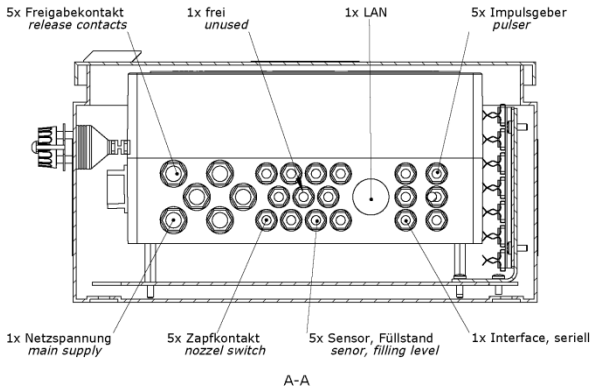
In the case that the medium generates explosion hazards, the user has to make sure that the used additional equipment (e.g. pump and meter) and the electrical and mechanical installation follows the national regulations of explosion protection.

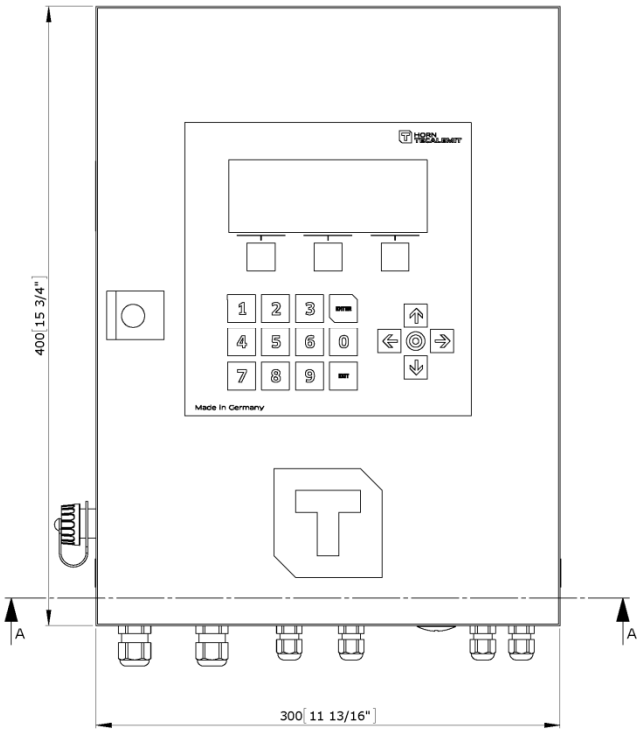
2.4 Technical data

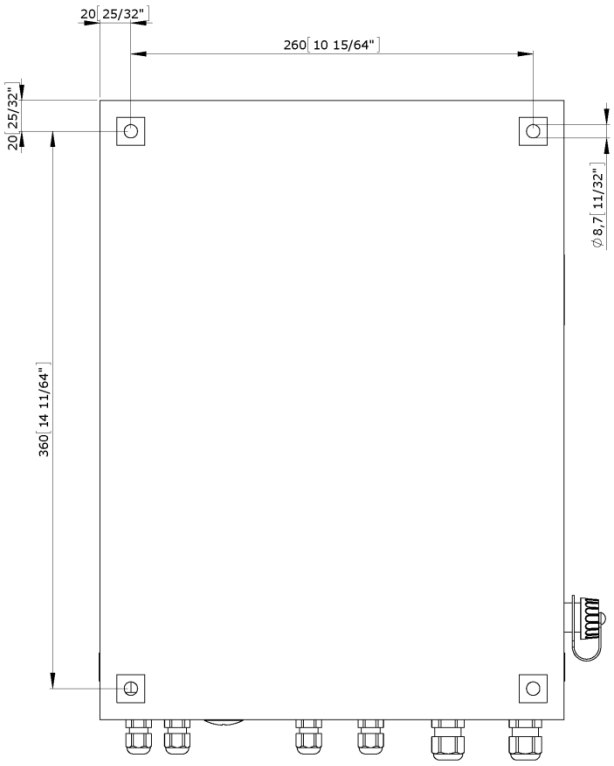
Dimensions (WxHxD)	**ca. 300mm x 400mm x 150mm**
Voltage	**230 V 50 Hz**
Ambient temperature	**-20 °C bis 55 °C**
Protection class	**IP54**
Maximum switching current	**4 A**
Weight	**10 kg**
Maximum number filling points	**5**
Maximum pulse frequency for the external used flow meter	**500 Hz**
Maximum failure elevation of the Used measuring equipment	
- for a flow meter	**0,1%**
- for a level sensor	**1%**

2.5 Dimensional drawing









2.6 Interfaces of the HDA 5 eco

2.6.1 Interface flow meter

Take care that the used combination of flow meter and pump fits to the HDA eco installed in the HDA 5 eco.

The HDA eco can work with a maximum pulse frequency of 500 Hz.

To find out that the used equipment fits to the HDA eco please recheck the equipment with the following formulas:

Calculation of the pump for a given flow meter:

$$Maximum\ flow\ rate\ of\ the\ pump \leq \frac{14400}{Pulse\ value\ of\ the\ flow\ meter}\ \left[\frac{l}{min}\right]$$

The used value for the pulse rate needs the unit [pulse/l] for the calculation.

Calculation of the flow meter for a given pump:

$$\text{Maximum pulse value of the flow meter} \leq \frac{14400}{\text{Maximum flow rate of the pump}}\ \left[\frac{\text{pulse}}{\text{l}}\right]$$

The value for the flow rate needs the unit [pulse/l] for the calculation.

Calculation example to check the pump for a given flow meter:

Pulse rate of the flow meter: 53.95 pulse/l (FMOG100)

$$\text{Maximum flow rate} = \frac{14400}{\text{Pulse rate}} = \frac{14400}{53.95} = 266{,}7\ \left[\frac{\text{l}}{\text{min}}\right]$$

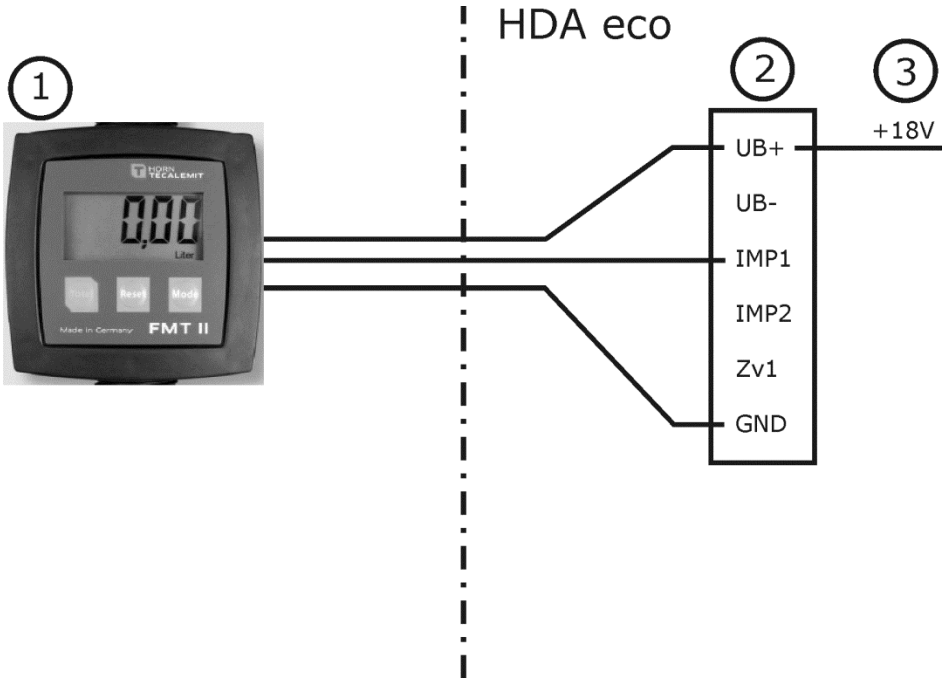
Calculation example to check the flow meter for a given pump:

Maximum flow rate of the pump: 64 l/min

$$\text{Maximum pulse value} = \frac{14400}{\text{Flow rate}} = \frac{14400}{64} = 225\ \left[\frac{\text{pulse}}{\text{l}}\right]$$

Connection of a flow meter (Typical application):

Sample for a flow meter connection



Explanation	
No.	**Description**
1	External flow meter
2	Connection clamp inside HDA eco
3	HDA eco internal power supply

Specification		
Parameter	**min.**	**max.**
Operating voltage	15.5 V	16.5 V
Supply output current		100 mA
Input voltage		16.5 V
Pulse duration, “high” or “low”	1 ms	
Input pulse frequency		500 Hz

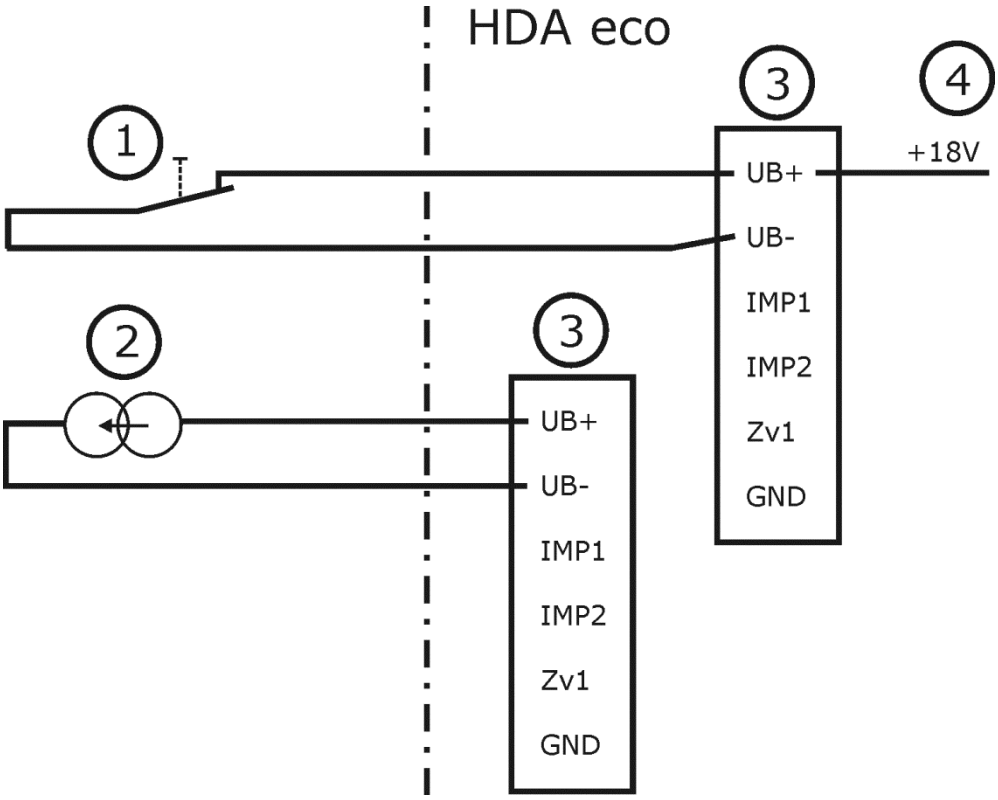
Attention!
If an external power supply is used for the flow meter, the input voltage of the HDA eco **must not** exceed the values shown above. Otherwise, the device will permanently be damaged.

2.6.2 Interface level control

Use either a level switch (1) or a level gauge (2). Never use both parallel. The type of level switch can be configured as normally closed (NC) or normally open (NO). If a level control is connected, it must be configured in the stock control settings.

Sample for a level switch connection

Sample for a level probe connection



Explanation	
No.	**Description**
1	Level switch, possible for all dispensing locations
2	Level gage (4-20mA), not available for location DP1 (“Sorte A”)
3	Connection clamps inside HDA eco
4	HDA eco internal power supply

Input configured for level gauge		
Parameter	min.	max.
Supply voltage	16V	18 V
Input current range	3mA	24mA

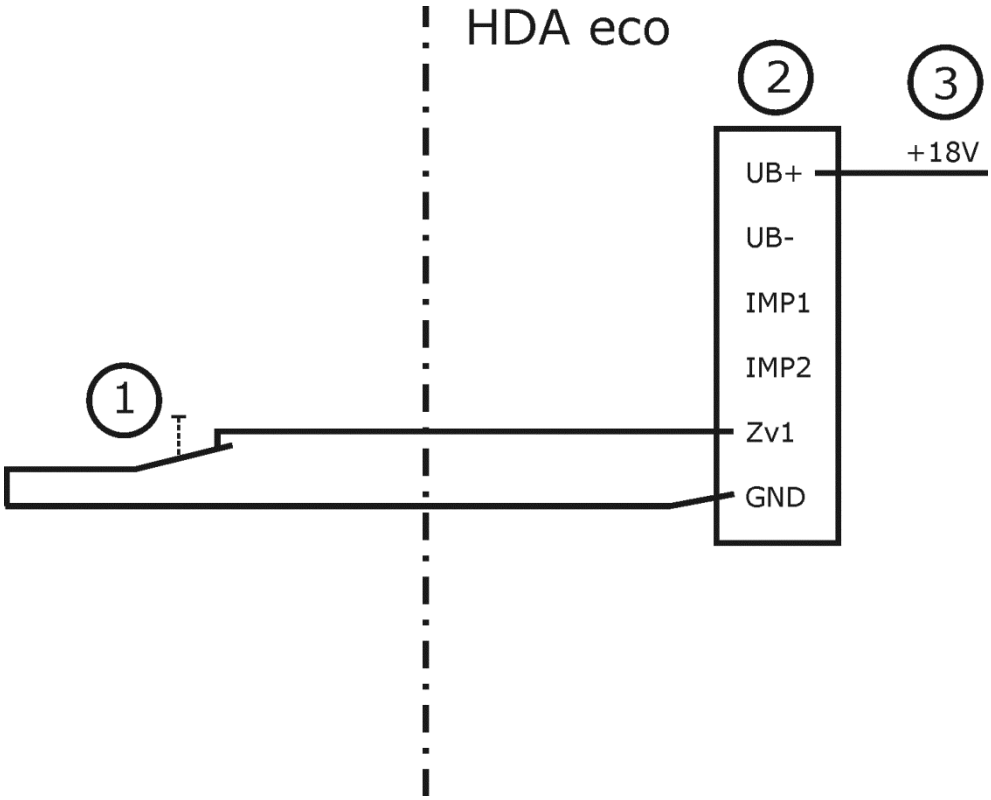
Input configured for level switch		
Parameter	min.	max.
Switching voltage		18V
Switching current	4.5mA	5.5mA

Please notice:
The tank 1 (terminal clamp X4) does not support connecting a level probe! On this connector (labelled with “Sorte A”) you may only connect a level switch, if stock control is desired.

2.6.3 Interface nozzle switch

The type of nozzle switch can be configured as normally closed (NC) or normally open (NO). If a nozzle switch is connected, it must be configured in the dispense point settings.

Sample for a nozzle switch connection



Explanation	
No.	**Description**
1	Nozzle switch
2	Connection clamp inside HDA eco
3	HDA eco internal power supply

Input Nozzle switch		
Parameter	**min.**	**max.**
Switching voltage		16.5 V
Switching current		4.1 mA

Note:
Due to the low current, a reed switch is recommended.

2.7 Accessories

The following accessories are available for the HDA 5 eco:

Description		**Article-No.**
RS422 interface	(Add-on board; when ordering upgrades, please indicate factory number and year of construction of dispensing station)	233400170
RS232 interface		233400190
LAN connector		233400033
WLAN connector		233400036
GPRS module		233400039
TAG	(Key for driver/vehicle identification)	233400200
USB TAG reader		233400081
HD Manager – basic version		US233500351
HD Manager – full version		US233500402
Float switch		233400165
Connection for filling level probe		233400160
Level probe 200 mbar	(Tank height max. 6 ½'; cable length 16 ½')	US224010000
Level probe 300 mbar	(Tank height max. 10'; cable length 16 ½')	US224020000
Level probe 500 mbar	(Tank height max. 16 ½'; cable length 23')	US224050000
Terminal box with pressure compensation filter	(for extending the cables of the level probes)	224061000

The right choice of the additional components like pumps or flow meters depends of the medium and the place of usage. For this please contact the TECALEMIT Service.

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

or

service@tecalemit.de

3 Assembly instructions

Before assembling and commissioning the device, check that the equipment is complete and undamaged.
Be aware and follow the regulations of health and safety.

⚠ **Commissioning of incomplete or damaged equipment is not allowed!**

3.1 Mounting of the HDA 5 eco

The HDA 5 eco must be fastened vibration-free to a load-bearing wall or bracket with 4 fixing screws suitable for the substructure.

3.2 Place of installation

The HDA 5 eco is designed for installation inside buildings and outdoors. The installation location must be selected such that trouble-free operation and maintenance are possible. Take care of an ergonomic position. The display should be easily visible and the keypad easy to use. The housing door must be able to be opened without being impaired. Also respect the IP class of the HDA 5 eco by the selection of the place of installation.

! **Installation and operation of the HDA 5 eco in explosive areas is not permitted. This would constitute a risk of explosion!**

⚠ **The local and national regulations for waters protection and for plants for water hazardous substances must be observed. Also the local and national regulations for explosion protection must be observed when the medium make them relevant.**

3.3 Temperature and humidity

The automatic dispenser may be operated at ambient temperatures from -20 °C to +55 °C.
Direct, longer periods of exposure to sunlight and condensing air humidity must be avoided.

3.4 Electric connection

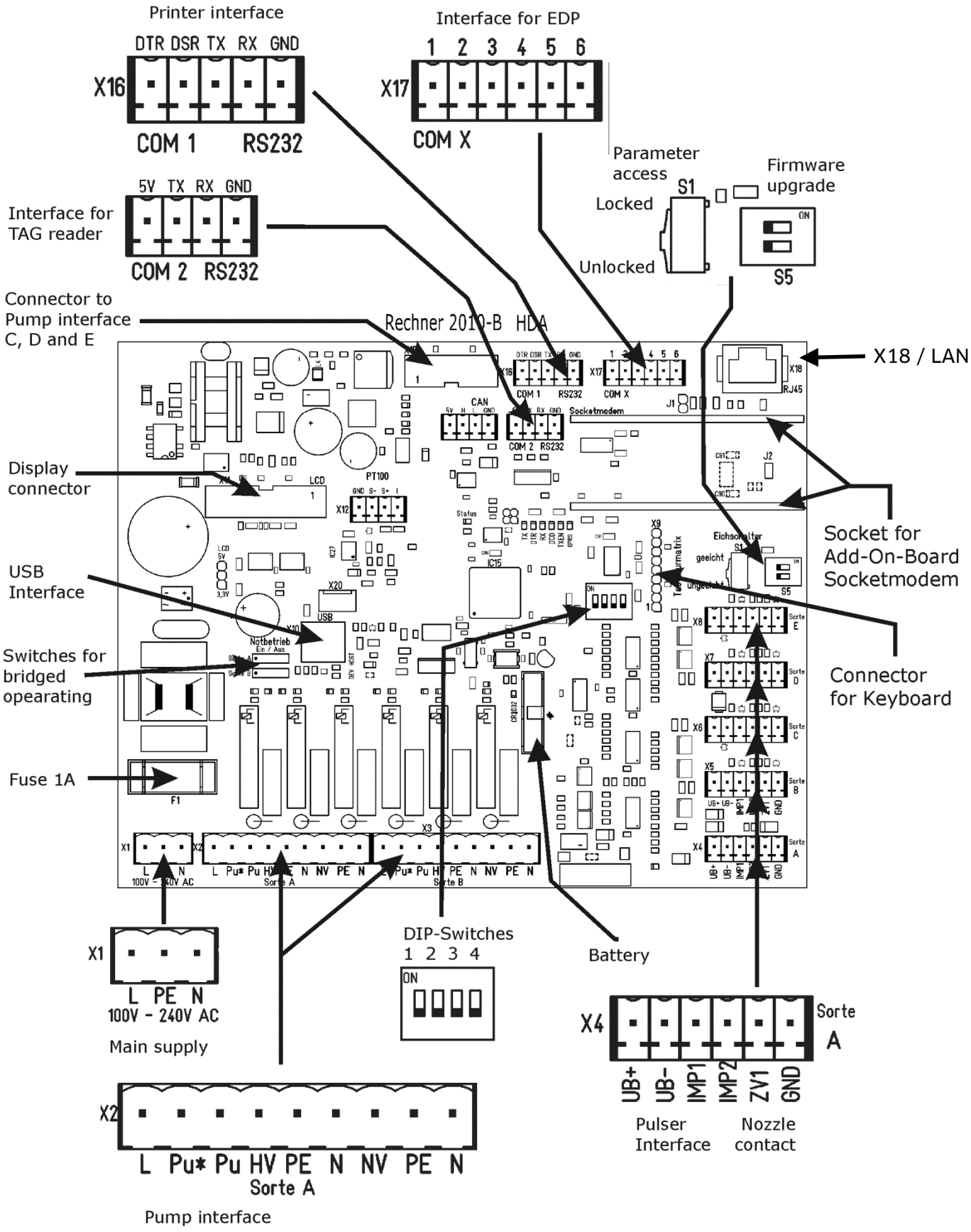
The automatic dispenser is operated on 230 VAC / 50 Hz. The power consumption is about 5 W. The maximum switching current is approx. 4 A.

⚠ **Work on the electrical equipment of the device 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.**

For trouble-free operation, an electrical connection from the distribution box with residual current circuit breaker must be selected!

The electrical connection takes place according to the connection diagram on the next page.

3.5 Connection diagram



3.6 Connection plan

Periphery	Terminal	Remark
Mains supply	X1	Device power supply - L = Phase - PE = Earth - N = Neutral
Pump interface	X2 X3 and on Expansion PCB	Separate connector for each dispenser - L = Phase for terminal supply - Pu*-Pu terminals will be shorten after dispense is released by tank automat. Potential-free. - HV, PE, N = Phase, Earth and Neutral for external pump control. Used as supply for a motor-relay. **Do not connect a motor directly to this terminal**. Will be powered after nozzle is put out. - NV, PE, N = Phase, Earth and Neutral not in use
Pulse interface	X4 X5 X6 X7 X8	Separate connector for each flow meter - UB+ = 16 V supply for pulse - UB- = Fluid level 'IN' (see interface level control) - IMP1 = Pulse signal - IMP2 = not in use - GND = Ground terminal
Nozzle contact	X4 X5 X6 X7 X8	Separate connector for each nozzle switch - ZV1 = Nozzle contact signal - GND = Ground terminal
Level control	(X4) X5 X6 X7 X8	Separate connector for each level switch **or** level probe - UB+ = 16 V supply - UB-= Signal input **X4 does not support a level probe connection**
Printer interface RS232	X16 COM 1	- DTR, DSR = Handshake signals from RS232 - Tx = Transmit data, RS232 - Rx = Receive data, RS232 - GND = Ground terminal
Interface for EDP RS485 RS422 RS232	X17 COM X	Terminal depends on plugged in 'Socketmodem' Pin / RS232 / RS422 / RS485 1 / Tx / Rx + / Rx/Tx + 2 / Rx / Rx - / Rx/Tx - 3 / GND / GND / GND 4 / DTR / Tx + / Rx/Tx + 5 / DSR / Tx - / Rx/Tx - 6 / GND / GND / GND
TAG reader interface RS232	COM 2	- 5V = Power supply for TECALEMIT reader - Tx = Transmit data, RS232 - Rx = Receive data, RS232 - GND = Ground terminal
Connector to pump interface	X15	Expansion Printed Circuit Board provides pump inter faces for C, D and E

Connector for display	X11	Provides LCD interface
Connector for keyboard	X9	Interconnection to panel with keyboard
LAN	X18	RJ 45 Connector LAN

3.7 Switches and LEDs

Switch	Label	Remark
Parameter access	S1	- 1 ON = Firmware upgrade 1 OFF = Normal operation - 2 = not in use
DIP-Switches	see diagram above	- 1 = Factory reset (after power-on) y/n - 2 = Pulse simulation y/n (Fair mode) - 3 = not in use - 4 = not in use
Switches for bridged operating	'Notbetrieb' Emergency operation	'Sorte A' = pump A, 'Sorte B' = pump B - 'Ein' = Relays from pump interface are steady powered. **The HDA does not count the quantity**. - 'AUS' = normal operation

LED	Function	Comments
16 V	16 V voltage present	e.g. supply for pulse interface
5 V	5 V voltage present	Operating voltage
3,3 V	Serial interface signal DSR active	Operating voltage
Tx	Serial interface signal TX active	Socket modem
DTR	Serial interface signal DTR active	Socket modem
Rx	Serial interface signal RX active	Socket modem
DCD	Serial interface signal DCD active	Socket modem
TXEN	Tx enable signal active	Socket modem
GPRS	GPRS signal active	Socket modem
LEDs above the relays	Relay status	LED glows if relay is activated.
Status	Operating signal	LED is blinking, while system is running

Notes

The relay contact for the pump motor may not be directly connected to the motor. Please use a contactor to switch the motor power.

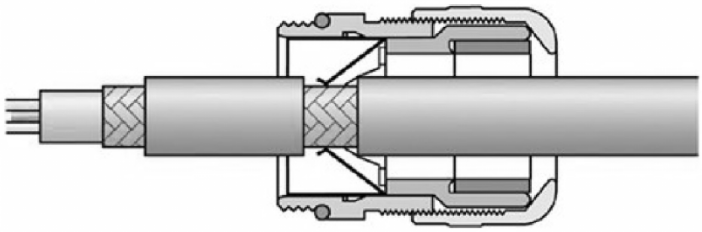
When the battery must be exchanged, use exclusively type CR2032 (3 V lithium). The used battery has a minimum shelf life of five years.

Pay attention to the polarity (pin 1) when retrofitting a socket modem for the RS485, RS422 or RS232 data interface.

The cable glands for the required cables are provided in the floor plate. (See also "Dimensional drawing".

Shielded cables must be used for the control cable of the flow meter and the data cables. Otherwise a negative effect of the function can occur and damages or malfunction can happen.

When using shielded cables take care that they are confected like showed in the picture. Take care during the installation that the shield of the cable has full contact with the contact finger of the EMR-cable gland. Only then the EMR-protection is carried out correct.



For the installation of the cables take care that the control cables are separately installed from the power cables. A minimum distance of 12in should be observed.

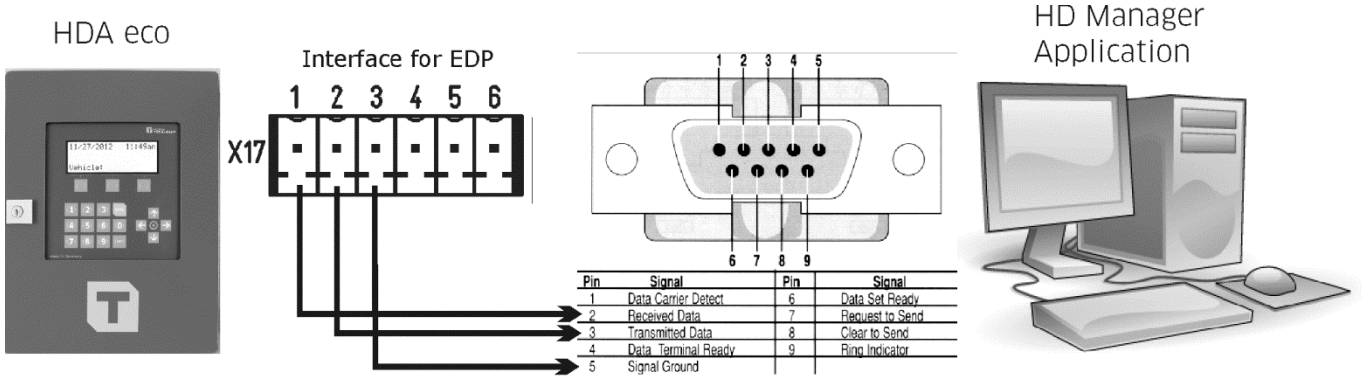
3.7.1 Connection of the RS232 / RS422 interface

It is optionally possible to transmit data from the HDM eco to a PC. The HD Manager, HD Manager Basic or HD Manager eco PC software is required for this and the HDA eco must also be fitted with an additional module ('socket modem') for the respective interface.
The PC can be connected via an RS232 or RS422 interface, depending on the local conditions:

3.7.1.1 RS232-connection

In this case interference-free data transmission is possible only up to a cable length of approx. 600" (depending on the type and routing of the cable). A free RS232 interface (COM port) or a USB-to-RS232 adaptor is required on the PC and the RS232 socket modem must be plugged in on the HDM eco.

Connection diagram

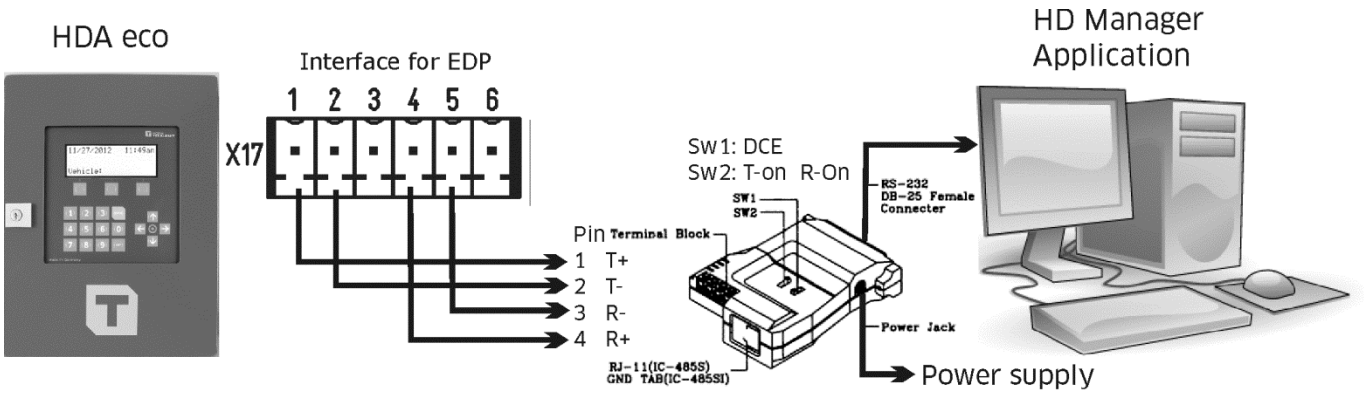


Pin	Signal	Pin	Signal
1	Data Carrier Detect	6	Data Set Ready
2	Received Data	7	Request to Send
3	Transmitted Data	8	Clear to Send
4	Data Terminal Ready	9	Ring Indicator
5	Signal Ground		

3.7.1.2 RS422-connection

In this case data transmission is possible up to a cable length of approx. 1300 yards. An RS422-to-RS232 converter is required at the PC end and the 'RS422 socket modem' must be plugged in on the HDM eco. The PC must have a free COM port.

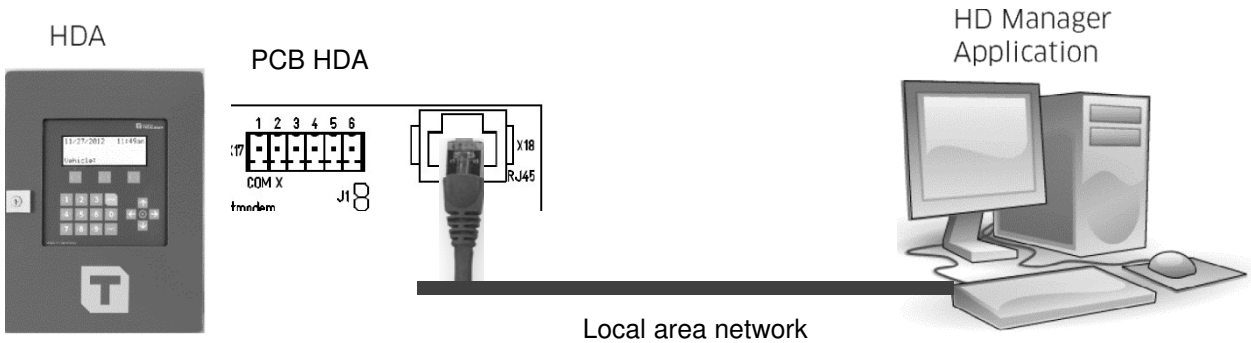
Connection diagram



3.7.1.3 LAN connection

The link via a cable-connected LAN interface to an existing local network enables communication to a PC. The PC must be in the same network. For details concerning the connection and the necessary settings, see chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**.

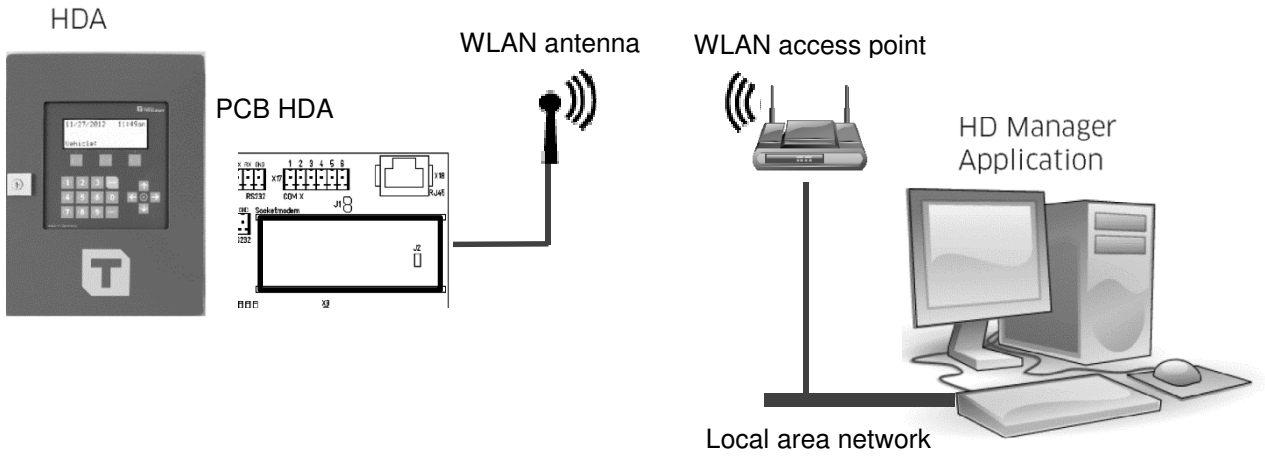
Connection diagram



3.7.1.4 WLAN connection

The link via the WLAN interface to an existing WLAN network enables communication to a PC. The PC must be in the same network. For details concerning the connection and the necessary settings, see chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**.

Connection diagram



3.7.1.5 Retrofitting the RS232/RS422 interface

It is possible to retrofit the optional RS232 or RS422 interfaces.
Please contact TECALEMIT Customer Service.

3.8 Adjustment of the measuring system

When the HDA 5 eco works together with a pump system where a flow meter is included, it is necessary to adjust the system. The HDA 5 eco can only work fail-safe when the amount of pulses counted by the HDA eco fits to the volume of liquid the system deliver.

The following steps have to succeed for the adjustment:

- Enter the pulse value of the used flow meter ⇨ Menu dispense point
- Calculate the calibrating factor after a test dispense. Therefor a delivery must be made into a satisfactorily accurate vessel. The calibrating factor is calculated as follows:

$$\text{Calibration factor} = \frac{\text{Volume}_{\text{delivered}}}{\text{Volume}_{\text{shown}}}$$

Example:
A 10 l measurement vessel is filled. The meter only indicates 9,8 l. The new calibrating factor is calculated to:

$$\text{Calibration factor} = \frac{10{,}00}{1.99{,}800} = 1.02 \text{ (rounded)}$$

- Enter the calculated correction factor ⇨ Menu dispense point

4 First steps – HDA 5 eco

The HDA 5 eco is equipped with an autonomously working refueling data acquisition system, which permits the recording and subsequent processing of all refueling processes.

For this, following entries are possible for every refueling:

- Driver (optional)
- Vehicle (optional)
- Mileage (optional)
- Order (optional)
- Dispense Point (mandatory)

In the factory setting of the HDA 5 eco, the vehicle will be queried. ***Vehicle*** *no. 1* was already created with the code *"**123**"* so that a trial refueling is possible. Refueling can proceed after entering the numbers '1', '2', '3', confirming with '**ENTER**', enter the number for the dispense point e.g. '1' , confirming with '**ENTER**' and drawing the nozzle.

Display (e.g.):

```
11/30/2012    02:35 pm


Vehicle: ***
```

Display (e.g.):

```
11/30/2012    02:35 pm


DspPoint: 1
```

The product info will be shown,

Display (e.g.):

```
11/30/2012    02:35 pm


Diesel
```

and the user will be requested to start the dispensing. The new line shows information about the actual dispensing. A floating angle symbol on the left indicates the status 'Active dispensing'.

Display (e.g.):

```
11/30/2012    02:35 pm
»  DP1: 0.00 Liter

Please refuel!
```

After this message the system will return to the vehicle request and an additional dispensing can be started. Up to four dispensings are possible at the same time.

Display (e.g.):

```
11/30/2012    02:35 pm
 » DP1: 1,55 Liter

Vehicle:
```

5 Operating of the Fluid Inventory Control System HDA eco

The user is guided through the operation of the HDA eco by a menu structure. The operating manual is orientated to this menu structure.

5.1 Switching on

After switching on the HDA eco, a function test runs (display test, program version display, memory test, real-time clock test). The automatic dispenser is in the 'Dispensing' mode after switching on.

5.1.1 Entry of values

The operation of the automatic dispenser takes place mainly via keyboard. The following basic entries are possible depending on the input fields (Exceptions are treated in the corresponding sections):

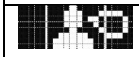
a) Entry of numerical values (figures)
Entry is made via the number pad. Wrong entries can be deleted character by character with the '' key. Press **'ENTER'** to confirm, '**EXIT**' to cancel. Where is it meaningful, a minus sign can be entered with the '▶' key.

b) Entry of alphanumeric values (letters & numbers)
Entry of numbers is made via the number pad. The entry of letters and special characters is made via the keys '▲' and '▼' confirm the character with the '▶' key. The characters are arranged as follows: ' ', 'a' - 'z', 'A' - 'Z', '0' - '9', '-', '&', '.'
Wrong entries can be deleted character by character with the '◀' key.
Press **'ENTER'** to confirm, **'EXIT'** to cancel.

c) Selection of fixed settings
In many input fields only a selection of few alternatives is possible. These are present and can be selected using the '◀' and '▶' keys and confirmed via **'ENTER'**. For cancelling use **'EXIT'**.

5.2 Softkeys

Below the displays are three Softkeys arranged. If a refueling is active these keys can be used to abort the dispensing. Otherwise these keys have special functions to easily access the different operating modes. After pressing a Softkey symbols will display which function is assigned to the Softkey. Pressing the Softkey below the symbol will carry out the function.

Symbol	Function
 Tool	Changing to control mode If Master code is set up permission only after correct input.
 Nozzle	Changing to dispensing mode
 Speaking human	Changing to desired language
USB	Shows the USB menu Functions for USB memory stick support.

5.3 Dispensing mode

Refueling can be carried out. Some of the necessary entries are optional. The querying of the inputs in the appropriate input screens as well as additional dispensing parameters can be specified in the menu item 'Dispensing options' (see section0).
Entering is cancelled when for more than 30 seconds no button is pushed. The following steps are necessary to dispense fuel:

5.3.1 Driver identification (optional)

The driver is identified by the associated ID (code or transponder + optional PIN). The IDs are specified in the menu item 'IDs' (see section 5.4.3)

Display (e.g.):

A code with a maximum of 5 digits must be entered. A '*' character appears on the display for each digit entered. Entering leading zeros is not necessary.
A transponder tag can be used as ID instead of the code. Mixed operation (operator code and transponder tag) is possible; each ID may be assigned either a code or a transponder tag. The transponder tag needs to have a distance of 1 – 2" to the reader. Acceptance is indicated by a short beep tone.

It is possible to additionally issue a PIN with a maximum of 5 digits for each ID (code or transponder), (see section 5.4.3.1.2).

Display (e.g.):

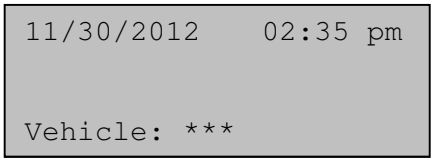
If an incorrect code or an incorrect PIN is entered, or if a transponder tag is used that has not been released, input is disabled for a period of time that is extended with each subsequent incorrect entry.

The current day and time is displayed in the upper line. After a dispensing is done, the dispensed amount from the last fuelling is displayed and will not be removed from the display until a next dispensing will be prepared.

5.3.1.1 Vehicle identification (optional)

The vehicle is identified by the associated ID (code or transponder + optional PIN) in the same way as the identification of the driver.

Display (e.g.):



5.3.1.2 Tank content display (optional)

Using a level switch:
It is possible to switch to the tank content display from the input screens for the driver or vehicle identification by pressing the '▼' button. The contents information 'Tank filled' or 'Tank empty' is displayed. If no level switch is installed or set up, the information 'unavailable' is displayed. Return from this display by pressing the '**EXIT**' button.

Display (e.g.):

```
Tank levels
▶T1: Tank filled
  T2: Tank empty
  T3: unavailable
```

Use the key '▲' or the key '▼' to select different tanks.

Using a level probe:
A generally tank status will be shown as described before on the first screen. Use the key '▲' or the key '▼' to select a specific tank. By pressing the '**ENTER**' button additional information is displayed. (Only if the level probe is installed and properly set up.) The contents in percentage, the measured level and the contents in liter are displayed.

Display (e.g.):

```
T1: Diesel
  Fluid level: 20%
  Height: 20 cm
  Qty.: 1796 Liter
```

Attention:
The pump interface 'A' does only support a level switch.

5.3.1.3 Software version display

It is possible to switch to the software version display from the input screens for the driver or vehicle identification by pressing the '▲' button.

Display (e.g.):

```
HDA V5C
Software: 5_.01.02

Locked
```

The 'Locked' message shows the position of the 'Parameter-Access-Switch'. In this case some parameters cannot be changed without opening the device.

5.3.2 Entering the mileage (optional)

A mileage value can be entered directly. A mileage check can be carried out if necessary (see dispensing options).

Display (e.g.):

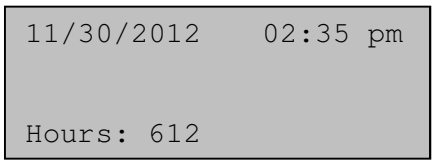
```
11/30/2012   02:35 pm


Mileage: 120375
```

For a downstream refueling data evaluation the mileage must to be assigned to a vehicle, i.e. the vehicle must be queried!

5.3.3 Entering the operating hours (optional)

An operating hours value can be entered directly.

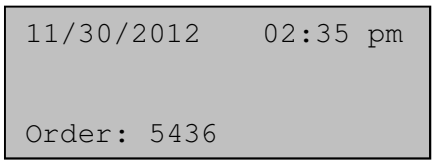
Display (e.g.):



5.3.4 Entering the order number (optional)

An alphanumerical value with a max of 8 digits can be entered.

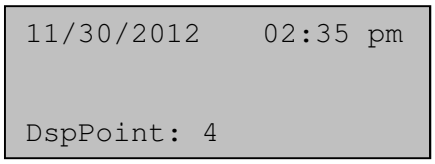
Display (e.g.):



5.3.5 Entering the dispensing location

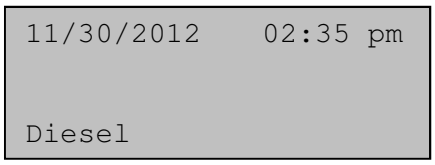
A number for the desired gas pump can be entered.

Display (e.g.):



After the dispensing location is confirmed, the product name for this gas pump will be displayed for a short time.

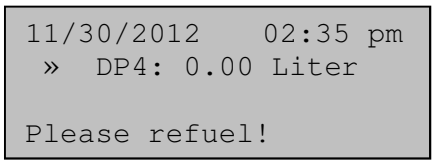
Display (e.g.):



5.3.6 Refueling

After all queried parameters have been entered, refueling is requested.

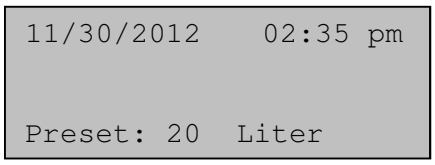
Display (e.g.):



5.3.6.1 Entry of a preselected quantity (optional)

It is possible to enter a preselected quantity before drawing the nozzle. The desired quantity can be entered directly using the numeric keys. After entering the preset the display will change to the default refuel information.

Display (e.g.):



The preselection quantity is confirmed with '**ENTER**'; the entry of the preselection quantity is cancelled with '**EXIT**'. After pressing **'EXIT'**, a normal refueling procedure is initiated without using the preselected quantity. The refuel procedure will also start after drawing the nozzle, if a nozzle switch is installed and set up.

5.3.7 Refueling procedure

After drawing the nozzle, the relay for the external pump contactor is switched on. The dispensed volume is displayed in a separate display line and will be updated continuously. The moving angles indicate an active dispense.

Display (e.g.):

```
11/30/2012    02:35 pm
»   DP4: 7.50 Liter

Vehicle:
```

Now an additional refuel can be started using the identical steps as described above. Dispensing can be stopped using the **'EXIT'** button, even before the nozzle has been drawn. After this a list of all active dispensings appears. Select the dispense point to interrupt by pressing the assigned key.

Display (e.g.):

```
Stop dispense

DspPoint
►  4
```

The time and quantity limits specified in the appropriate menues apply to the refueling procedure. Quantity limits exists for the system, for each dispensing location and for each vehicle. The dispensing will stop if one of the limits has achieved.

Completion of dispensing by replacing the nozzle, pressing the **'EXIT'** button or reaching the preselected quantity / dispensing limit is shown by a corresponding message.

Display (e.g.):

```
11/30/2012    02:35 pm
Stop DP4: 20.00 L

Vehicle:
```

If dispensing is aborted due to a timeout, the cause of the abortion is shown in plain text on the display.

Display (e.g.):

```
11/30/2012    02:35 pm
Time DP4: 789.50 L

Vehicle:
```

The dispensed quantity is displayed until a new refueling operation is initiated. After completion of the refueling procedure, the dispensing event is saved in the memory of the automatic dispenser with all entered data (driver, vehicle, etc.) plus a time stamp and can be processed running the corresponding management functions.

5.3.8 Data retrieval

The data is retrieved either via the USB port on the automatic dispenser onto a commercially available USB flash drive or optionally by means of a data connection to a PC (corresponding accessory is required – RS232/RS422 interface) or via the LAN / WLAN interface. Data retrieval is possible only in the 'Refueling' mode from the input screens for the identification of the driver or vehicle. Communication is only available after 30 seconds without any user interaction and with no active dispensing.

5.3.8.1 Data retrieval via USB flash drive

The dispensing and system data of the HDA eco are written to a commercially available USB flash drive. The data on the USB flash drive can be processed on a PC using the HD Manager refueling data administration program. To retrieve the data, select the USB mode by pressing '**EXIT**' and the corresponding Softkey at the top of the keypad. The Softkeys are only available if no dispense is active.

In order to protect against access by unauthorized persons, an optional preset USB code must be entered after inserting the USB flash drive (see section 'Identity codes'). By default the USB code is set to **'99999'**. The optional additional USB PIN is deactivated by default.

Attention: USB code factory setting: '99999', no PIN. It is absolutely essential to change this code

In the USB menu select 'Export data' to store the data to the USB stick or 'Import data' to read the data from the USB stick. These menu items can be used for exchange data between the HDA eco and the PC-Software HD Manager. The 'Report' menu items save reports in a plain ASCII text file.

Insert the USB stick requested to into the opening provided on the automatic dispenser housing. Before doing so, the cover (if any) must be swiveled away after loosening the knurled screw.

Attention: To prevent the loss of data, the USB flash drive must not be removed during reading or writing.

Display (e.g.):

```
Menu USB
————————————————
File write
Data records: 12
```

After completion of the data retrieval, the retrieved refueling data are marked as transmitted and are therefore ignored in the case of subsequent data retrievals. See 'appendix' for further details, regarding the retrieved data and storage on the USB flash drive. After completion of the data retrieval, the cover must be replaced and the knurled screw tightened.

5.3.8.2 Data retrieval via data cable

The connection of the appropriate accessory kit to a PC is necessary for data retrieval via a data cable. The data are retrieved and processed via the 'HD Manager refueling data administration program' – refer also to the separate manual.

5.4 Management operating mode / main menu

The management mode can be entered by pressing '**EXIT**' and the corresponding Softkey  at the top of the keypad. In order to protect against access by unauthorized persons, an optional Master code must be entered. By default the Master code is set to **'99999'**. The optional additional Master-PIN is deactivated by default.

Attention: Master code factory setting: '99999', no PIN. It is absolutely essential to change this code.

In this mode operation system parameters can be set and various management functions can be performed, such as administration of the dispensing data, totals, IDs etc.

Display (e.g.):

```
Main Menu
————————————————
► Menu Refueling
  Menu Total data
```

Menu items are selected with the '▲' and '▼' keys and selection is confirmed by pressing the '**ENTER**' key. Sub-menus or menu items can be aborted by pressing the '**EXIT**' key. Pressing the '**EXIT**' key in the main menu will return you to the Softkey selection, where the dispensing mode is assigned to the symbol  and the language can be selected after pressing the Softkey  .

5.4.1 Menu Refueling

The functions for the display and processing of the dispensing data are combined in this menu. The HDA eco automatic dispenser can store more than 10,000 dispensing data records. The oldest data records are overwritten once the memory is full.

Display (e.g.):

```
Menu Refueling
————————————————
► Show data
  Reset data
```

After selecting the appropriate menu item, the respective sub-menus can be used to display or delete the dispensing data or to display the number of stored dispensing events.
Select with '**ENTER**', abort with '**EXIT**'.

5.4.1.1 Show dispensing data

Display (e.g.):

```
Index: 217   10/31/12
              01:18pm
DP1: 15 Liter
Status: Tx
```

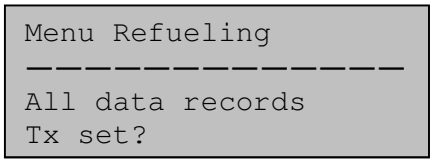
All of the dispensing events stored in the memory can be viewed, beginning with the last dispensing event. The dispensing event to be displayed can be selected using the '▲' and '▼' buttons. The '◄' and '►' buttons can be used to select more information about the selected data record (date, quantity, driver, vehicle, mileage, order no). For cancelling use '**EXIT**'.

The status of the dispensing event is shown by means of letters / special characters after the time. Meanings:

'**Tx**': Dispensing data record was transmitted
or saved to an USB flash drive
'**Ab**': Dispensing has been aborted by system (failure detected)

5.4.1.2 Reset dispensing data

Display (e.g.):

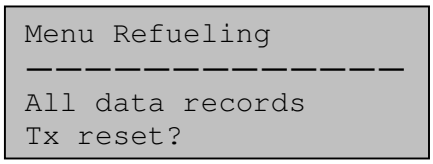


Confirm with '**ENTER**', abort with '**EXIT**'. The data from the stored dispensing events will be marked as already transmitted.

Notice:
In this case the dispensing data are **NOT** physically deleted from the memory, but merely marked as already transmitted. That means that they will be ignored at a new transmission request.

5.4.1.3 Restore dispensing data

Display (e.g.):

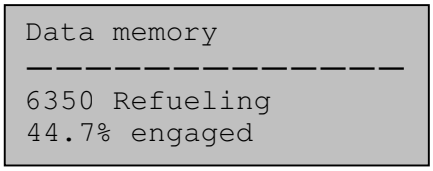


Confirm with '**ENTER**', abort with '**EXIT**'. The data from the stored dispensing events will be marked as actual not transmitted.

Notice:
In this case the dispensing data are marked as not transmitted. That means that they will be transmitted (maybe again) at the next transmission request.

5.4.1.4 Memory occupancy

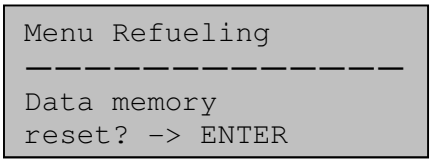
Display (e.g.):



The number of dispensing events saved and the memory used (in percent) are displayed. The maximum possible number of dispensing data records that can be saved is more than 10,000.

5.4.1.5 Delete memory

Display (e.g.):



Attention:
Confirming this will delete all dispensing data physically from the memory. It is NOT possible to restore data, if the memory has been deleted.

Confirm with '**ENTER**', abort with '**EXIT**'. The data memory will be fully cleared.

5.4.2 Menu Total data

This menu comprises the functions for the display and processing of the dispensing totals, i.e. the accumulated dispensing quantities.

Display (e.g.):

```
Menu Total data
————————————————
► Driver
  Vehicle
```

After selecting the appropriate menu item using '▲' and '▼', the respective sub-menus can be used to display or delete the totals data. Select with '**ENTER**', abort with '**EXIT**'.

5.4.2.1 Display totals

Display (e.g.):

```
Driver
————————————————
► Display totals
  Reset totals
```

Display (e.g.):

```
Sum resettable
————————————————
Vehicle
◄ ►ID 115: 309 L
```

Display (e.g.):

```
Sum not resettable
————————————————
Dispense Point
◄ ►ZP1: 3517 L
```

The total dispensed quantities 'not resettable' display the totals of the individual dispensing points and could not be reset. The total to be displayed can be selected using the '▲' and '▼' buttons. The '◄' and '►' buttons can be used to select different drivers, vehicles or dispensing locations. For cancelling use button '**EXIT**'.

5.4.2.2 Reset totals

Display (e.g.):

```
Driver
————————————————
All totals
delete? ENTER/EXIT
```

Confirm with '**ENTER**', abort with '**EXIT**'. The total dispensed quantities for the given total selection are reset.

5.4.3 Menu Identity Codes

In this menu the IDs can be inspected and edited. The medium for the identification of the driver or vehicle before the start of refueling is called an ID. Various system parameters can be specified for each ID. The master ID is a special ID and is required in

order to access the management mode. The USB-Code is required in order to access the USB menu and for communication with the PC-Software 'HD-Manager'.

The ID (e.g. driver, vehicle, master or USB-code) to be processed must be selected first.

Display (e.g.):

```
Menu Identity Codes
————————————————
► Driver
  Vehicle
```

The respective ID can subsequently be accessed via the sub-menu.

Display (e.g.):

```
Driver: 1          ← →
► Code: 123
  PIN: —
  Locked: no
```

The ID to be edited can be selected using the '◄' or '►' buttons. After selecting an ID switching between its different parameters takes place using the '▲' and '▼' buttons. Press the '**ENTER**' button to change a parameter or '**EXIT**' to leave the entry. The character '—' means, that the respective ID has not been set up. In case a transponder has been set as access authorization for an ID, the entry '**TRANS**' appears instead of the code.

5.4.3.1 ID Selection

After entering the menu 'Identity codes' an ID-Type should be selected. The device provides the ID-Types: 'Driver', 'Vehicle', 'Master' and 'USB-Code'. Each ID-Type has an individual set of parameters to be set up.

5.4.3.1.1 Code

A user code with one to five digits can be entered. An existing code may not be used twice.

Display (e.g.):

```
Driver: 1          ← →
► Code: 123

new:
```

Instead of the five-digit code, a transponder tag can be assigned to an ID. The transponder tag needs to be held at a distance of 1 – 3 inch to the reader. A beep tone indicates that the transponder tag has been read.

Attention: For access restrictions the user 'Master' and 'USB-Code' can be configured. **The factory presets are: master code '99999', USB-Code '99999'. It is absolutely essential to change these codes.**

ATTENTION: In case the master code/PIN was forgotten (or a master transponder was lost) no more management functions are accessible. Please contact service for help.

Press '**ENTER**' to change the respective parameter or '**EXIT**' to leave the entry.

Display (e.g.):

```
Master
► Code:

new:
```

Instead of a code, a transponder can be assigned to the master code. After pressing the **'ENTER'**-Key, the transponder tag must be held within a distance of 1 – 2" to the reader.

5.4.3.1.2 PIN

A 1 to 5-digit PIN can be entered in addition to the code or the transponder tag. In case a PIN was assigned it has to be entered after the code. Only some (or none) of the IDs can be assigned with a PIN.

Display (e.g.):

```
Driver: 1          ← →
► PIN: —

new:
```

5.4.3.1.3 Lock / release ID

An ID can be blocked or released here. Blocked IDs will not be accepted for refueling. The Master ID cannot be blocked.

Display (e.g.):

```
Driver: 1          ← →
► Locked: no

◄ ► release
```

5.4.3.1.4 Dispensing quantity limit

The dispensing quantity limit per fuelling can be entered for the vehicle. The maximum is 5.000 liter, default 500 liter. In case a corresponding lower limit exists than it applies.

Display (e.g.):

```
Vehicle: 1         ← →
► Limit Qty.: 100
  Liter
new:
```

Attention: If the general dispensing limit for the dispenser is lower, then this applies.

5.4.3.1.5 Maximum dispensing time

The dispensing time limit per refueling can be entered for the vehicle, maximum 250 minutes. The default value is 30 minutes.

Display (e.g.):

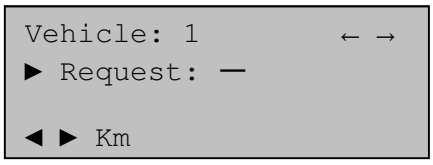
```
Vehicle: 1         ← →
► Limit Time: 30
  Minutes
new:
```

Attention: If the general dispensing time limit for the dispenser is lower, then this applies.

5.4.3.1.6 Mileage or operating hours query

Depending on the vehicle type, prior to refueling the mileage or operation hours of the vehicle can be entered to calculate the fuel consumption using an optional downstream fuel data processing system. Here it is specified whether the mileage or operating hours are input.

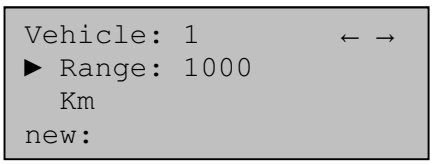
Display (e.g.):



5.4.3.1.7 Mileage range

The range is the window wherein the next refueling is expected. Based from the last entered mileage, the next refueling will be expected before last mileage plus range setting.

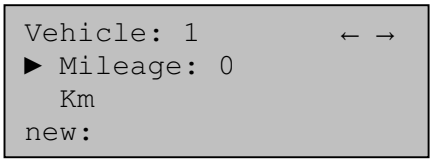
Display (e.g.):



5.4.3.1.8 Mileage status

Here the last known mileage of a vehicle can be viewed. If necessary the status can be edited.

Display (e.g.):

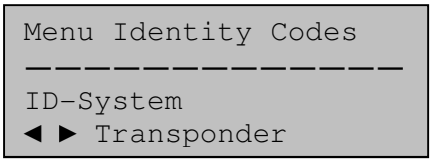


Notice: It is not necessary to enter the mileage when creating a vehicle. This should be done prior to the first refueling. A selected mileage range becomes effective only from second refueling.

5.4.3.2 ID-System

The user authorization can be done either with entering the code using the keypad or using a transponder tag. In this menu the ID-System connected to the HDA eco can be selected.

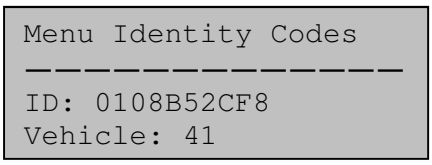
Display (e.g.):



5.4.3.3 Tag identify

If transponder tags are supported by the system, the transponder can be read in this menu. ‘ID’ shows the unique number of the tag. Below ‘ID’ is the user listed where the Tag is assigned to.

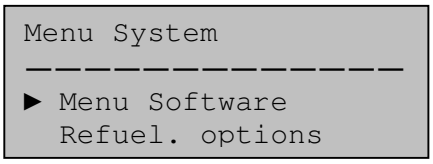
Display (e.g.):



5.4.4 Menu System

Various system parameters for the operation of the dispenser can be viewed and adjusted in this menu.

Display (e.g.):

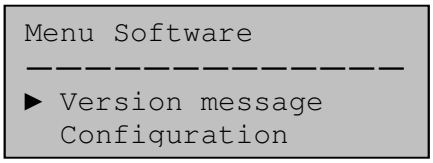


Menu items are selected with the '▲' and '▼' keys, confirmed with '**ENTER**' and cancelled with **'EXIT'**.

5.4.4.1 Menu Software

In this sub-menu the configuration of the firmware of the device can be inspected and if available be changed.

Display (e.g.):

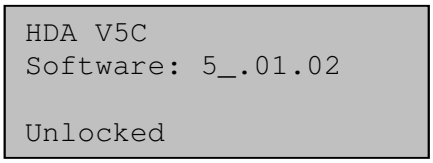


Menu items are selected with the '▲'and '▼' keys, confirmed with '**ENTER**' and cancelled with **'EXIT'**.

5.4.4.1.1 Version message

In this menu information about the firmware of the device can be inspected.

Display (e.g.):



Attention: For technical support please write down the model identifier and the version number.
HDA V5C is the model of the HDA eco. The message 'Unlocked' shows that system parameters can be modified. Changing the 'Parameter access'-switch inside of the device, will change to 'Locked' message and protect some system parameter against modification.

The version message is also displayed from the 'Refueling' mode with the key '▲' if no dispensing is active.

5.4.4.1.2 Automat status

In this menu the tank automat status can be switched between 'automat is locked' and 'automat is not locked'. In locked status no more dispensing is possible.

5.4.4.1.3 Configuration

In this menu the configuration of the firmware of the device can be inspected and if available be changed. Please do not try any modification here unless explicit invited by the service department. Erroneous modification may result in a faulty system.

Attention: For technical support please write down the model identifier and the version number.

5.4.4.1.4 Initialization

The device can be initialized here. Some of the factory settings are restored. Dispensing data records are not deleted. The following values are manipulated:

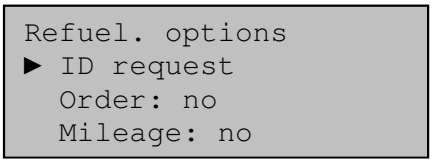
- The driver and vehicle data are cleared
- The dispensing data records are marked as transmitted
- The 'Master code' is set to "99999" without Master Pin
- The 'USB code' is set to "99999" without USB Pin
- The locking options are set up to 'release'

Attention: Because of massive data lost, do not initialize a system unless explicit invited by the service department.

5.4.4.2 Menu Refueling options

In this sub-menu you can specify the items which are to be queried before a dispensing event. In addition, the inputs of a general dispensing limit, a maximum dispensing time and a timeout are also possible.

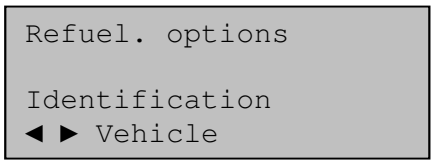
Display (e.g.):



Menu items are selected with the '▲'and '▼' keys, confirmed with '**ENTER**' and cancelled with **'EXIT'**.

5.4.4.2.1 ID request

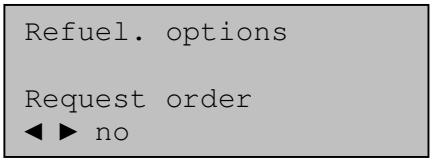
Display (e.g.):



The query of the driver and vehicle ID is optional. You can choose between 'No', 'Driver', 'Vehicle' and 'both'.

5.4.4.2.2 Order request

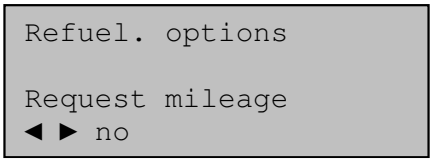
Display (e.g.):



The entry of an order number before each dispensing is optional. You can choose between yes, no, or always which means it is not possible to jump over this request with key 'ENTER'.

5.4.4.2.3 Mileage request

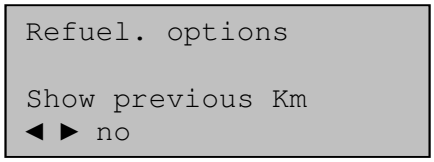
Display (e.g.):



The entry of the mileage before each dispensing is optional. You can choose between yes, no, or always which means it is not possible to jump over this request with key 'ENTER'. If 'compulsory query' is selected, the input and checking of the mileage is compulsory. The mileage entered must be as high as or higher than that which was entered last time, the difference between the mileages needs to be smaller than the defined mileage window for the vehicle.

5.4.4.2.4 Old mileage

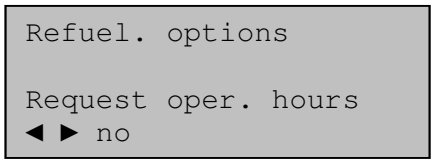
Display (e.g.):



In order to simplify the mileage entry, mileage from the last refueling event (if available) can be displayed and edited. You can choose between 'yes' and 'no'.

5.4.4.2.5 Hours

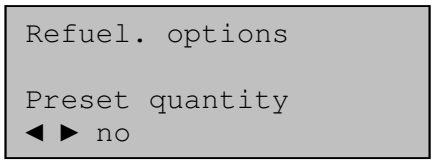
Display (e.g.):



The entry of the operating hours before each dispensing is optional. You can choose between yes, no, or always which means it is not possible to jump over this request with key 'ENTER'.

5.4.4.2.6 Preset quantity

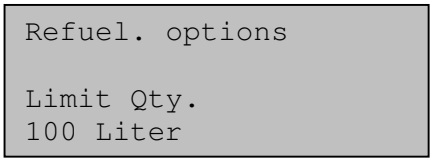
Display (e.g.):



Before the start of dispensing, entering a preset value is optional. The HDA eco will stop the dispensing automatically at the preset value. You can choose between yes or no.

5.4.4.2.7 Dispensing quantity limit

Display (e.g.):



The maximum possible dispensing quantity per refueling operation can be specified here (system limit). A quantity between 5 and 5000 Liter can be entered. In case of a corresponding lower limit exists (e.g. vehicle) than it applies.

5.4.4.2.8 Dispensing time limit

Display (e.g.):

```
Refuel. options

Limit Time
30 Minutes
```

The maximum possible dispensing time per refueling operation can be specified here. A value between 10 and 250 minutes can be entered. In case of a corresponding lower limit exists (e.g. vehicle) than it applies.

5.4.4.2.9 Dispensing pause limit

Display (e.g.):

```
Refuel. options

Limit Pause
3 Minutes
```

The maximum elapsing time during a dispensing event without any medium being dispensed can be specified here. (Example: The nozzle wasn't replaced after dispensing was completed). A time between 1 and 250 minutes can be entered. In case of a corresponding lower limit exists than it applies.

5.4.4.3 Menu Clock

In this sub-menu the date and time settings can be modified.

Display (e.g.):

```
Menu Clock
————————————————
► Date / Time
  Dayl. save time
```

Menu items are selected with the '▲'and '▼' keys, confirmed with '**ENTER**' and cancelled with **'EXIT'**.

5.4.4.3.1 Date / Time

The correction for summer time or wintertime can be done here.

Display (e.g.):

```
Menu Clock
————————————————
Date: 2012-03-31
Time: 10:14:55
```

The cursor position can be changed using the '◄' and '►' buttons.

5.4.4.3.2 Daylight saving time

The correction for summertime or winter time can be done here.

Display (e.g.):

```
Menu Clock
————————————————
Time: 10:14
◄ ► Preset 1h
```

Using the '◄' and '►' buttons, the system time can be manually set 1 hour forward or backward, depending on the season. The system time is then changed by pressing the '**ENTER**' key.

5.4.5 Menu Products

In this menu the product specific parameter can be inspected and modified. In the top line the dispensing location is displayed (e.g. DP2). First select the desired dispensing location using the '◄' and '►' keys. Then use the keys '▲'and '▼' to scroll between the different product parameter for the selected dispensing point.

Display (e.g.):

```
DP2: Product
► Name: Diesel
  Unit: Liter
  Decimals 2: 0.xx
```

To modify a selected parameter press '**ENTER**'. Confirm the new setting with '**ENTER**' or cancel with **'EXIT'**.

5.4.5.1 Product name

A product name can be assigned to each dispensing point. This name will be displayed before a dispensing starts and inform the user of the selected product.

Display (e.g.):

```
DP2: Product

Product name
Diesel
```

When edit this name, numbers can be directly entered and characters can be selected using the '▲'and '▼' keys. Confirm the new setting with '**ENTER**' or cancel with **'EXIT'.**

5.4.5.2 Quantity unit

Each dispensing point can count its dispensings in an individual unit. Provided units are: Gallons, Quarts, Pints and Liters. If a dispensing quantity is displayed it will be calculated for this unit. Different dispensing locations can use different units.

Display (e.g.):

```
DP2: Product

Quantity unit
◄ ► Liter
```

The unit selection can be done using '◄' and '►' keys. Confirm the new setting with '**ENTER**' or cancel with **'EXIT'.**

5.4.5.3 Post decimal positions

If a dispensing quantity is displayed it will be calculated with a selectable accuracy. Different dispensing locations can use different post decimal positions to display.

Display (e.g.):

```
DP2: Product

Post decimals
◄ ► 2: 0.xx
```

The selection can be done using '◄' and '►' keys. Confirm the new setting with '**ENTER**' or cancel with **'EXIT'.**

5.4.5.4 Logical EDP number

In communication with external back office solutions, e.g. HD-Manager, the logical EDP number is used to identify a product. The HDA eco and the back office software

must have accordant numbering. EDP numbers between 1 and 99 can be assigned. The factory defaults are: Product on DP1⇨EDP-No.11, DP2⇨EDP-No.12, a. s. o.

Display (e.g.):

```
DP2: Product

Product-ID
EDP-No.: 2
```

The number can be entered directly. Confirm the new setting with '**ENTER**' or cancel with **'EXIT'.**

5.4.5.5

If the tank is to be monitored to ensure that it does not run dry, the tank monitoring can be activated in the Tank Menu. At this point, a dispensation point is assigned to a tank. Before dispensation, the assigned tank will be checked to see if medium is present.

Display (e. g.):

```
ZP1: Product      ← →

Tank
◄ ► 2
```

Example: Diesel is dispensed at ZP1 and ZP2. Both dispensation points are linked to tank 2. At ZP3, AUS 32 is dispensed from tank 3.

The tank number can be selected with the "◄" and "►" keys. Confirm the new setting with "**ENTER**" or select "***EXIT***" to cancel.

5.4.6 Menu Dispensing point

In this menu the dispensing point specific parameter can be inspected and modified. In the top line the dispensing location is displayed (e.g. DP2). First select the desired dispensing location using the '◄' and '►' keys. Then use the keys '▲'and '▼' to scroll between the different product parameter for the selected dispensing point.

Display (e.g.):

```
DP2: DspPoint
► Pulse: Single
  Pulse value: 100
  Factor: 1.000
```

To modify a selected parameter press '**ENTER**'. Confirm the new setting with '**ENTER**' or cancel with **'EXIT'**.

5.4.6.1 Pulse type

Pulse generators are available as single-pulse- or double-pulse-typ. Select the type, which is connected to the system.

Display (e.g.):

```
DP2: DispPoint

Pulse
◄ ► Single
```

The selection can be done using '◄' and '►' keys. Confirm the new setting with '**ENTER**' or cancel with **'EXIT'.**

5.4.6.2 Pulse-value

The pulse value of the connected pulse generator can be set here. The number of volume pulses per liter for the specific pulse generator can be found in its documentation. A value between 1 and 1000 pulses/liter can be entered.

Display (e.g.):

```
DP2: DspPoint

Pulse valency
Pulse/L: 100
```

Some devices may show 'Pulse/GAL' instead of 'Pulse/L'. The samples below show the calculations for the correct value to enter:

Technical data from pulser	Input mask	Correct value (1 Gallon is equal to 3.7854 Liter)
100 pulse/Liter	Pulse/GAL	100 x 3.7854 = 379 (rounded)
100 pulse/GAL	Pulse/Liter	100 / 3.7854 =26 (rounded)

The number can be entered directly. Confirm the new setting with '**ENTER**' or cancel with **'EXIT'.**

It can be necessary to change the value for the adjustment of the measuring system. How the measuring system can be adjusted see section 3.8.

5.4.6.3 Calibration factor

In case of adjustment of the measuring system, first the pulse valency has to be set up. For a higher accuracy of the measuring system it can be useful to set up a correction factor in the second step. The factor is a value with three post decimals positions. The measured quantity will be corrected by multiply with this factor. How the measuring system can be adjusted see section 3.8. The lowest factor is 900 (0.900), default is 1000 (1.000) and the highest value is 1100 (1.100).

Display (e.g.):

```
DP2: DspPoint

Calibration
Factor:  1000
```

The number can be entered directly. Confirm the new setting with '**ENTER**' or cancel with **'EXIT'.**

5.4.6.4 Dispensing quantity limit

Display (e.g.):

```
DP2: DspPoint

Limit quantity
Liter  100
```

The maximum possible dispensing quantity per refueling operation can be specified here (dispense point specific limit). The maximum is 5000 Liter. In case of a corresponding lower limit exists than it applies.

5.4.6.5 Dispensing time limit

Display (e.g.):

```
DP2: DspPoint

Limit time
Minutes  30
```

The maximum possible dispensing time per refueling operation can be specified here (dispense point specific limit). A value between 10 and 250 minutes can be entered. In case of a corresponding lower limit exists than it applies.

5.4.6.6 Pause time limit

Display (e.g.):

```
DP2: DspPoint

Limit pause
Minutes  3
```

The maximum elapsing time during a dispensing event without any medium being dispensed can be specified here. (Example: The nozzle wasn't replaced after dispensing was completed). A time between 1 and 250 minutes can be entered. In case of a corresponding lower limit exists than it applies.

5.4.6.7 Nozzle switch

The nozzle switch indicates, if a nozzle is in the hand of the operator or inside the fuel dispenser. Typically a switch 'normally open' (**NO**) is used. This means the switch will be closed if the operator takes the nozzle and the switch will be open again after putting the nozzle back into the fuel dispenser. A switch 'normally closed' (**NC**) operates vice versa.

Display (e.g.):

```
DP2: DspPoint

Nozzle switch
◄ ► Normally Open
```

The selection can be done using '◄' and '►' keys. Confirm the new setting with '**ENTER**' or cancel with **'EXIT'.**

5.4.6.8 Max zero dispensings

Several sequential refueling events that were completed with a dispensing quantity below 0,03 Liter ('zero refueling') indicate a system error, e.g. lack of fuel, defective pump or meter.

Display (e.g.):

```
DP2: DspPoint
► Zero disp.: 2/10
  DP locked: no
  Pulser: Single
```

```
DP2: DspPoint

Zero dispense
Amount:  10
```

When a value > 0 has been set for 'amount zero dispense events' the automatic dispenser blocks automatically after the adjusted number of consecutive zero dispensings occurred. The item 'Zero disp.: 2/10' shows, that the last 2 dispensings has been zero dispensings. A blocked dispensing location can be enabled again via the corresponding menu in the device, once the cause for zero dispensings has been elim-

inated. A value of '0' deactivates the blocking function. Values from 0 – 99 can be entered.

5.4.6.9 Dispense point locked

A specific dispensing location can be locked or released in this menu item. Each dispensing point can be handled separately.

Display (e.g.):

```
DP2: DspPoint

DP locked
◄ ► no
```

The selection can be done using '◄' and '►' keys. Confirm the new setting with '**ENTER**' or cancel with **'EXIT'.**

5.4.7 Menu Fuel Tank

The function of the tank monitoring as well as tank parameter (level probe option only) can be set in this menu.

Display (e.g.):

```
Menu Fuel Tank
————————————————
► Stock control
  Tank parameter
```

5.4.7.1 Stock control

Monitoring of the tank contents including blocking of the dispensing point in case of empty tank can be set up here. Checking of a low medium contact (e.g. float switch) and monitoring of the tank contents by means of a level probe (optional) can be selected.

Display (e.g.):

```
Stock control
————————————————
► DP2: Diesel
  Switch contact NO
```

First select the desired dispensing point to set up using the '▲'and '▼' keys. Confirm selection with '**ENTER'**. Then use the '◄' and '►' keys to select the monitoring option of the tank which supplies the selected dispensing point.

Note: '**Contact NO**' means: Contact **N**ormally **O**pen (If switch is not in application, the switch is open. With medium presence the switch is closed). '**Contact NC**' means: Contact **N**ormally **C**losed (If switch is not in application, the switch is closed. With medium presence the switch is open). In case of low medium detection, the automatic dispenser disables the corresponding dispensing point. The level at which disablement takes place when a **Level Sensor** (optional) is used depends on the tank parameter setting.

5.4.7.2 Menu Tank parameter (level probe option only)

In this menu the tank specific parameter can be inspected and modified. In the top line the tank number is displayed (e.g. T2). First select the desired tank number using the '◄' and '►' keys. **Tank 1 does not support parameter** (only level switch) and could not be selected.

Display (e.g.):

```
T2: Tank parameter
► Form: Cube
  MaxVol: 4230
  Height: 100
```

In the case of use of a level probe, it is necessary to parameterize the probe and the associated tank as accurately as possible in order to obtain exact level values.
You can switch between the different tank parameters using the '▲'and '▼' buttons. Press the '**ENTER**' button to change the parameter or '**EXIT**' to leave the entry.

5.4.7.2.1 Form / tank shape

The shape of the employed tank can be set here. If there is no tank, then accordingly no tank is set.

Display (e.g.):

```
T2: Tank parameter

Form
◄ ► Cube
```

Change the tank shape using the buttons '◄' and '►'. There is a choice of the tank shapes cube, cylinder vertical ('Cyl V'), cylinder horizontal ('Cyl H'), 'ball' or no tank.

5.4.7.2.2 Maximum tank volume

The maximum tank volume can be entered here. It corresponds to a completely filled tank.

Display (e.g.):

```
T2: Tank parameter

Max. Volume
Liter: 4230
```

A value of between 0 and 999.999 Liter can be entered.

5.4.7.2.3 Maximum height

The maximum height of the liquid level can be entered here.

Display (e.g.):

```
T2: Tank parameter

Max. Height
Millim.: 2000
```

A value between 0 and 50.000 mm can be entered.

5.4.7.2.4 Density of medium

In order for the hydrostatic tank probe to work precisely, the density of the tank medium must be entered.

Display (e.g.):

```
T2: Tank parameter

Density
g/Liter: 900
```

A value between 200 and 2000 g/Liter can be entered. In edit mode use '◄' to clear existing value, use '►' after the first digit to input the post decimal positions.
Note: Water has following densities
1000 [kg/m³] = 1 [kg/L] = 1000 [g/L]

5.4.7.2.5 Sensor type

A selection of the sensor type can be done. There is a choice of the types 200, 300, 500 and 1000 mbar.

Display (e.g.):

```
T2: Tank parameter

Sensor
◄ ► 200 mBar
```

The selection of the type of sensor is made according to the height of the tank. Hence, 200 mbar correspond to 2000 mm water gauge or 2.370 mm diesel gauge, 300 mbar to 3.000 mm water gauge or 3.550 mm diesel gauge and so on.

5.4.7.2.6 Sensor offset (installation height)

Offset entry [inch] (corresponds to the effective installation height of the sensor relative to the floor of the tank).

Display (e.g.):

```
T2: Tank parameter

Sensor offset
Millim.: +10
```

Using the '▲'and '▼' button in edit mode to change between positive or negative offset (e.g. when the sensor is installed below the tank floor or inclined tank). A value of -999,9 und +999,9 mm can be entered.

5.4.7.2.7 Zero point compensation of the sensor

☛ **Attention: The sensor must be outside the liquid for the zero point compensation.**

Display (e.g.):

```
T2: Tank parameter

Current: 4.05 mA
Zero adjust? -> ENTER
```

The presently measured probe current is displayed. The value should be within the range of 4 mA +/- 0.2 mA. If the value is outside the range, or to set up the probe at installation process, press '**ENTER**' button to start adjustment. If the value is still outside the range, please check if sensor is outside the liquid.

5.4.7.2.8 Min. volume / disable volume

A limit value can be entered here, below further refueling with the HDA eco will be disabled. The value is checked before each refueling, i.e. active refueling will be ended in every case! The disablement is automatically cancelled after refilling the tank or switching the tank monitoring off.

Display (e.g.):

```
T2: Tank parameter

Min. volume
Liter: 100
```

A value of between 0 and 999.999 Liter can be entered.

5.4.7.3 Tank level

The tank filling levels are displayed. If a sensor probe is installed the level will be displayed in percentage of maximum level. If a level switch is installed the level will be displayed as 'filled' or 'empty'. 'Unavailable' will be displayed if tank monitoring is not configured.

☛ **Attention: Please take notice that tank one (T1) does only support a level switch.**

Display (e.g.):

```
Tank levels
► T1: filled
  T2: 74.9%
  T3: unavailable
```

Use the '▲'and '▼' keys to select a specific tank and press '**Enter**' to retrieve detailed information for the selected tank. The filling quantity in percent, the measured filling height and the filling quantity in Liter are displayed.

Display (e.g.):

```
Tank level T2:
  T2: 74.9%
  Height: 63.7 mm
  Volume: 3170 Liter
```

5.4.8 Menu Printer

If a printer is connected to the device, the printer options can be set in this menu.

Display (e.g.):

```
Menu Printer
————————————————
► Printer selection
  Baudrate
```

5.4.8.1 Printer selection

Please select the connected printer in this submenu. Only printer models which are supported by the device are listed here.

Display (e.g.):

```
Menu Printer
————————————————
Printer selection
◄ ► EPSON TM-T20
```

To confirm a selection press '**ENTER**' or cancel with **'EXIT'.**

5.4.8.2 Baud rate

The baud rate configured on the device must be compatible with the one configured on the printer. Please refer to the printer manual for information on the relevant printer settings.

Display (e. g.):

```
Menu Printer
————————————————
Baudrate
◄ ► 9600 Bd
```

Confirm the selection with "**ENTER**" or select "**EXIT**" to cancel.

5.4.8.3 Parameter

The parameters define the settings for the serial interface. For example, "**8 N 1**" means **8** data bits, no parity, and **1** stop bit. The parameter settings of the device must be compatible with the parameter settings on the printer. Please refer to the printer manual for information on the relevant printer settings.

Display (e. g.):

```
Menu Printer
————————————————
Parameter
◄ ► 8 N 1
```

Confirm the selection with "**ENTER**" or select "**EXIT**" to cancel.

5.4.9 Menu Interface

If a PC is connected to the device, the interface options can be configured in this menu. Which menu options are shown depends on the interface protocol configured. First, please select the correct protocol (e.g. RS232). Then please perform the configuration of the interface under the menu options that follow.

Display (e. g.):

```
Menu Interface
————————————————
► Protocol
  Baudrate
```

In order to retrieve data, a connection from a suitable accessory kit to a PC is necessary. The data will be retrieved and processed using the HD Manager tank management program – please also refer to the separate manual.

5.4.9.1 Protocol

The protocol settings define how the device is connected to a PC. The correct settings to use depend on the computer program and the socket modem connected. Please select the protocol that corresponds to your installation.

Display (e. g.):

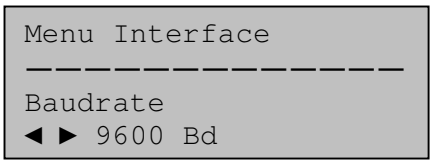
```
Menu Interface
————————————————
Protocol
◄ ► HD-Manager RS422
```

Confirm the selection with "**ENTER**" or select "**EXIT**" to cancel.

5.4.9.2 Baud rate

The baud rate configured on the device must be compatible with the one configured on the PC. Please refer to the HD Manager manual for information on the relevant computer settings.

Display (e. g.):

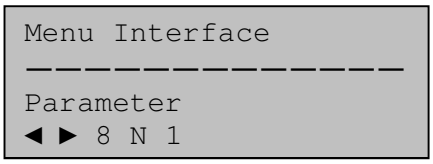


Confirm the selection with "**ENTER**" or select "**EXIT**" to cancel.

5.4.9.3 Parameter

The parameters define the settings for the serial interface. For example, "**8 N 1**" means **8** data bits, no parity, and **1** stop bit. The parameter settings of the device must be compatible with the parameter settings on the PC. Please refer to the HD Manager manual for the corresponding printer settings.

Display (e. g.):

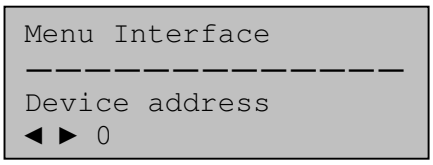


Confirm the selection with "**ENTER**" or select "**EXIT**" to cancel.

5.4.9.4 Device address

When communicating with a computer application, the device address identifies a specific fuel terminal. To avoid communications problems, all devices that communicate via the same data cable(s) must possess a unique address. When configuring a computer application, this device address will need to be entered in the dialog for the communications settings.

Display (e. g.):

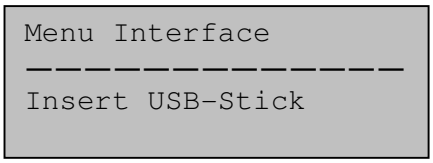


The default setting is "0". Please modify this value only if it is absolutely necessary. Confirm the selection with "**ENTER**" or select "**EXIT**" to cancel.

5.4.9.5 Read configuration (LAN + WLAN)

Optionally, the LAN or WLAN network configuration of the HDA pro can be entered directly on the device or created conveniently with the aid of the HD Manager 8 computer program and stored on a USB stick (HD Manager 8: Settings → Settings → Miscellaneous → HDA – (W)LAN / GPRS). In this menu, the previously stored configuration is imported from the USB stick into the HDA pro. Following this, you can leave the 'Interface' menu. As a general rule, further settings are not needed.

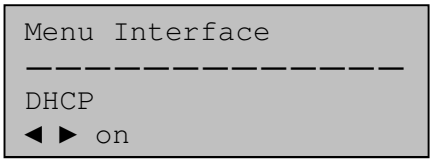
Display (e. g.):



5.4.9.6 DHCP (LAN + WLAN)

If the existing network which the HDA pro is supposed to be connected to has a DHCP server, this is where the 'on' setting should be selected. The integration of the HDA pro in the network takes place automatically. As the case may be, the setting under the 'Port' menu point (chapter 5.4.9.10) should be adjusted. Further settings are not necessary.
If no DHCP is supported in the existing network, this is where the 'off' setting should be selected. The following network settings are to be carried out manually

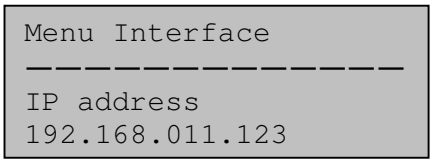
Display (e. g.):



5.4.9.7 IP-address (LAN + WLAN)

If network settings are set manually (cf. chapter 5.4.9.6), this is where the IP address of the HDA pro is entered. Care should be taken that a free address is selected. Using the ◄ and ,► buttons navigation takes place in the entry field. The address is entered using number buttons.

Display (e. g.):

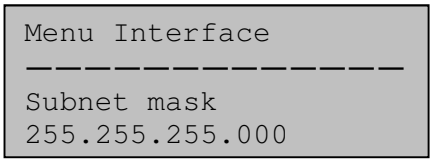


☛ **If DHCP has been activated XXX.XXX.XXX.XXX appears here.**

5.4.9.8 Subnet mask (LAN + WLAN)

If network settings are set manually (cf. chapter 5.4.9.6), this is where the sub-net mask is entered for the network. Using the ◄ and ,► buttons navigation takes place in the entry field. The address is entered using number buttons.

Display (e. g.):

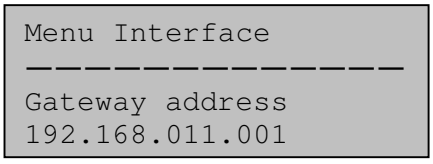


☛ **A typical sub net mask for smaller network is 255.255.255.000.**
If DHCP has been activated, XXX.XXX.XXX.XXX appears here.

5.4.9.9 Gateway address

If network settings are set manually (cf. chapter 5.4.9.6), this is where the IP address of the network gateway is entered. Using the◄ and ,► buttons navigation takes place in the entry field. The address is entered using number buttons.

Display (e. g.):



The standard gateway address of the existing network is shown on the start page of the HD Manager 8 computer program
If DHCP has been activated, XXX.XXX.XXX.XXX appears here.

5.4.9.10 Port (LAN + WLAN)

This is where the address should be entered of the port where communication with the HD Manager computer program is supposed to take place. It is recommended that the standard port 54937 is used. The setting must be identical with the corresponding setting in the HD manager program. This also applies if several HDA pro communicate with a computer program.

Display (e. g.):

```
Menu Interface
——————————————
Port
54937
```

If, for example, two HDA pro have to communicate in an existing network, however each with a different computer, two different ports have to be selected for the respective HDA pro / PC pairs using the HD Manager 8 computer program.

5.4.9.11 LAN ident. no. (LAN + WLAN)

This is where you can see the LAN identification number for clear identification of the HDA pro in the network (unchangeable). The HD manager computer program can identify the HDA pro via the LAN identification number if several devices are in the network. Leave the menu point with 'EXIT'.

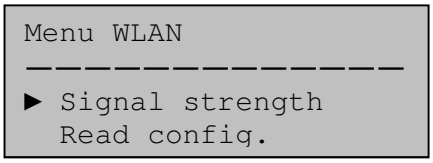
Display (e. g.):

```
Menu Interface
——————————————
LAN ident. no.
01100222
```

5.4.9.12 Menu WLAN (WLAN)

This is where it is possible to enter the necessary parameters for operating the WLAN socket modem

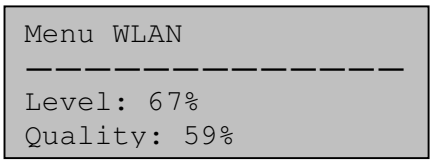
Display (e. g.):



5.4.9.12.1 Signal strength (WLAN)

This is where the signal level and the quality of the connection to the existing WLAN network can be examined. Higher values indicate a better connection.

Display (e. g.):

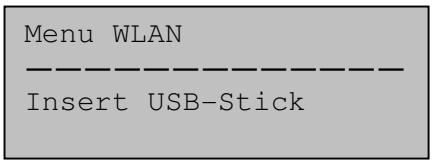


This menu point is helpful in order to optimize measures for improving signal quality (e.g. external aerials, repeaters etc.).

5.4.9.12.2 Read config. (WLAN)

Optionally, the WLAN network configuration of the HDA pro can be entered directly on the device or created conveniently with the aid of the HD Manager 8 computer program and stored on a USB stick (HD Manager 8: Settings → Settings → Miscellaneous → HDA – (W)LAN / GPRS). In this menu, the previously stored configuration is imported from the USB stick into the HDA pro. Following this, you can leave the 'WLAN' and 'Interface' menu. As a general rule, further settings are not needed.

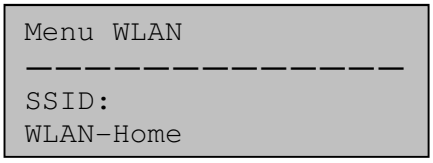
Display (e. g.):



5.4.9.12.3 SSID (WLAN)

This is the place where the SSID (Service Set Identifier) of the existing WLAN network has to be entered, i.e. the one which the HDA pro should register with. The SSID is normally defined in the WLAN Access Point. Alphanumeric characters can be used (see chapter 5.1.1).

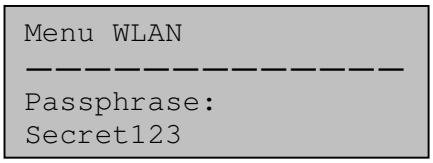
Display (e. g.):



5.4.9.12.4 Passphrase (WLAN)

This is the place where the passphrase (also known as the password) of the existing WLAN network has to be entered, i.e. the one which the HDA pro should register with. The passphrase is normally defined in the WLAN Access Point. Alphanumeric characters can be used (see chapter 5.1.1)

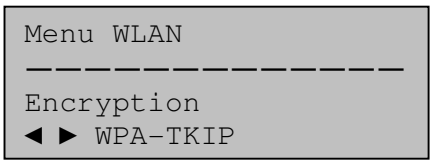
Display (e. g.):



5.4.9.12.5 Encryption (WLAN)

This is where the encryption method used in the existing WLAN network is to be selected. The encryption method is normally defined in the WLAN Access Point.

Display (e. g.):



6 Commissioning

6.1.1 First and subsequent priming

For commissioning, all that is required after integration of the HDA 5 eco into a pump system is to carry out a 'normal refueling' as described in section 5.2, in which medium is sucked out of the tank. In order to avoid damage to the pump and seals, attention must be paid that the pump does not run dry for an unnecessarily long period of time.

Note:
A normal priming procedure should not take longer than 2 minutes. If the medium has not been primed within this time, the suction line must be inspected for leaks and the function of the return line must be checked.

Unnecessarily long dry running (> 1 min) has to be avoided since otherwise important components may be destroyed.

7 Operation

The following must be observed for normal operation:

! **Avoid dry running of the pump system (> 1 min).**

! **A defective hose can cause contamination.**

! **Following the filling procedure, the nozzle must be hung up in the nozzle holder and the hose protected against being driven over by hanging it on the hose holder.**

! **Only vehicle tanks and suitable containers may be filled. The dispensing procedure must be permanently supervised.**

To draw off the medium in normal operation, proceed as follows:

1. Log in at the pump system to activate and switch it on.
2. Put the nozzle into the container or the vehicle tank.
3. Open the nozzle until the desired quantity has been dispensed.
4. Replace the nozzle to the nozzle holder. The pump system is switched off by pressing the EXIT button and selecting the dispensing point.

8 Emergency operation

HDA eco units are factory-equipped with an emergency operating mode. This enables emergency operation of the pump even when the HDA eco is defective.
For this, please proceed as follows:

- **Power off the device.**
- Open the housing door and the body housing.
- Switch on the desired emergency switch on the HDA eco printed circuit board and close the housing again. After Power on the device, the feed pump starts immediately.
- Carry out the refueling procedure.
- The feed pump must be switched off immediately after completion of the refueling procedure by power off the device.
  Attention: It is compulsory handling, to set the emergency operation switch back to position OFF.

The access door should be closed again after refueling to protect against unauthorized use.

9 Maintenance

Although the HDA 5 eco is almost maintenance-free, the following work should be performed regularly in order to ensure trouble-free operation:

9.1 Cleaning of the device

Clean dirty outsides carefully with a damp cloth and gentle household cleaner after having disconnected the device from the power supply. Do not use harsh cleaning agents or solvents.

9.2 Exchange of the buffer battery

The HDA eco automatic dispenser has a buffer battery for the backup of the time and the date in the event of a power failure. The battery must be exchanged every 5 years by an electrician. When an exchange of the battery is necessary, use exclusively type CR2032 (3V lithium). The battery should have a minimum shelf life of five years.
After exchanging the battery, check the system time and correct if necessary.

9.3 Type Plate and Warning Signs

! **The warning signs attached to the device and the type plate must be well readable. Dirty signs must be cleaned, and replaced if necessary.**

10 Spare parts

The following spare parts are available:

	Article-No.
Plastic lid incl. display, TAG reader and keyboard	**816558001**
Circuit board	**616558001**

11 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.**

11.1 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.

12 Declaration of Conformity

HORN TECALEMIT

Konformitätserklärung
Declaration of Conformity

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

Typ: *Type:*	**HDA 5 eco Wandgerät** ***HDA 5 eco wall unit***
Bezeichnung: *Designation:*	**Flüssigkeits-Managementsystem** ***Fluid Inventory Control System***
Artikel-Nr.: *Item No.:*	**110500800**

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 ISO 12100-1, -2 EN 60204-1

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

27.05.2013
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

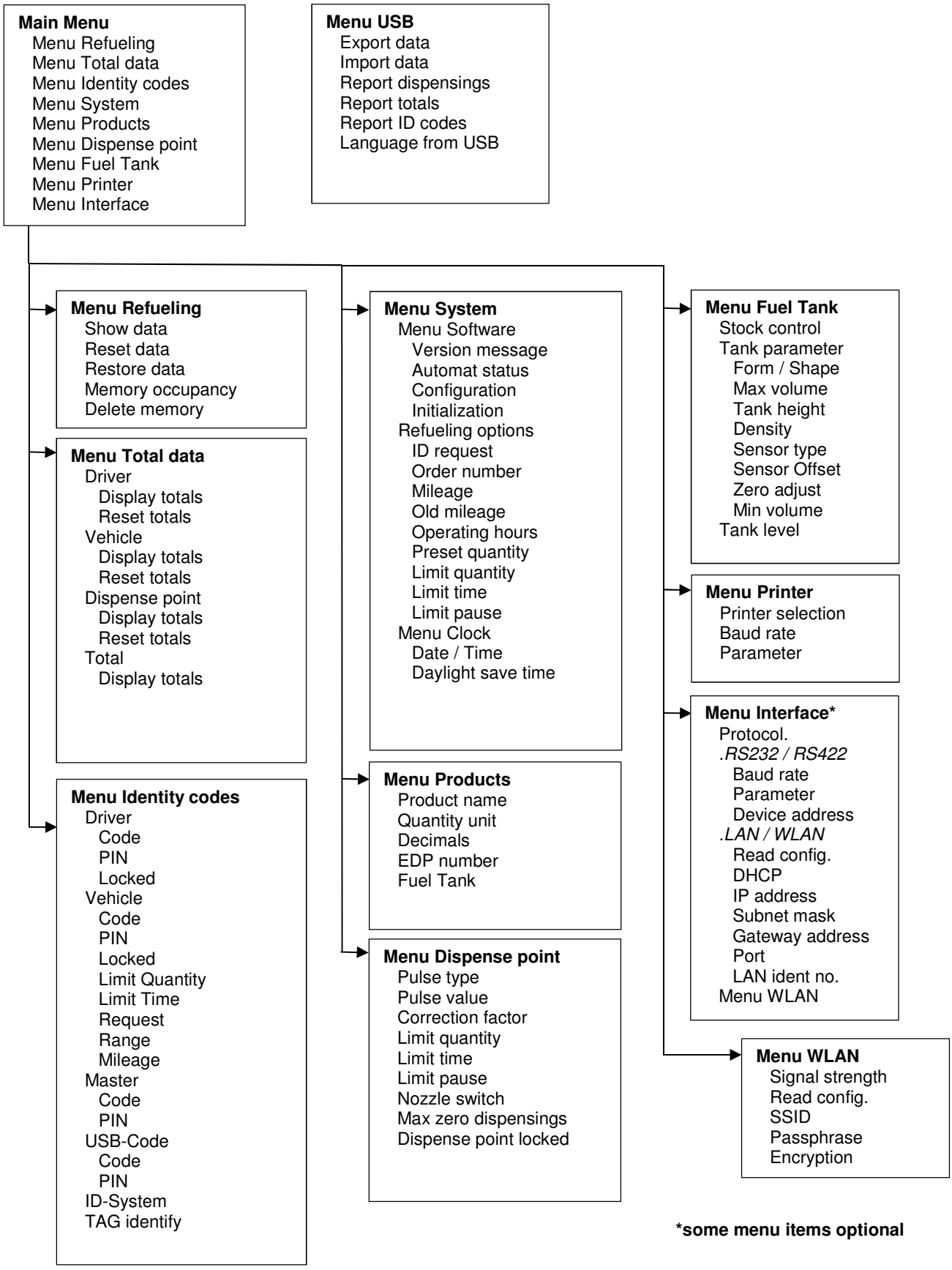
Geschäftsführer:
Torsten H. Kutschinski

Commerzbank AG
BLZ 215 400 60
Konto-Nr. 2476000

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

Appendix A: Menu structure: Management operation

Menu structure HDA-5C, Version 5_.04.xx



Appendix B: Data export or Import via USB-flash-drive

Refueling and ID data are written as a file to the USB flash drive or read from it (ID data only). The data is processed with the HD Manager eco program. It is preferable to use the USB flash drive included in the scope of supply or available as a special accessory; the suitability of third party makes cannot be guaranteed.
A maximum of approx. 200 files can be created on the USB flash drive. Please ensure that the memory stick contains enough space for the write process.

Export of refueling data
In the first export, all existing and not yet exported refueling data are saved in the file 'DATA0001.TXT'. For all subsequent transmissions, all newer refueling data are saved in the files 'DATA0002.TXT', 'DATA0003.TXT' and so on; i.e. a new file with an incrementing index is generated for each export procedure. If older files are deleted, moved or renamed, the procedure starts with 'DATA0001.TXT' again.

Export of ID data
ID data for drivers or vehicles are automatically saved in the file 'DATAOUT.TXT'. If the data are to be exported again at a later time (e.g. because new vehicles have been created), then this file must be deleted, moved or renamed. It will then be created again at the next data transfer.

Import or restoring of ID data
A previously saved ID data file 'DATAOUT.TXT' can be read into the HDM eco again by being renamed or copied to 'DATAIN.TXT'. This file can also be created by the HD Manager eco program.

Refueling data format
Each file comprises up to 2,000 consecutively numbered fuelling data records.
Each refueling data record is written in a line closed by CR, LF. The data fields are separated by a comma.

Data fields:
- Dispenser number (numerical, two-digit),
- Dispensing point number (numerical, two- digit),
- Refueling data record (numerical, five-digit)
- Driver (numerical, four-digit),
- Vehicle (numerical, four-digit),
- Order (alphanumerical, eight-digit),
- Mileage (numerical, eight-digit),
- Quantity [L] (numerical, format is XXXX.YYY Liter)
- Product-number (numerical, two-digit),
- Date (DD.MM.YY),
- Time (HH.MM).
- Checksum (sum of all characters modulo 256 in ASCII representation)

Example:

```
01,01,00001,0001,0001,Test   1,00000100,0001.000,01,04.06.02,15:35,3B
01,01,00002,0002,0002,Test   2,00000200,0002.000,01,04.06.02,15:35,41
01,01,00003,0003,0003,Test   3,00000300,0003.000,01,04.06.02,15:35,47
01,01,00004,0004,0004,Test   4,00000400,0004.000,01,04.06.02,15:35,4D
01,01,00005,0005,0005,Test   5,00000500,0005.000,01,04.06.02,15:35,53
```

ID data format

Each file comprises up to 200 ID data records, with a maximum of 2000 for drivers and 2000 for vehicles.
Each data record is written to CR, LF closed line when doing so. The data fields are separated by a comma.

Data fields:

- ID type (numerical, one-digit: ‚1': Driver ID, ‚2': Vehicle ID),
- ID number (numerical, four-digit),
- ID code (alpha numerical, max. ten-digit),
- ID pin (numerical, max. five-digit)
- ID blocked (numerical one-digit'0': no, '1': yes, ‚)
- Entry mileage (miles) / operating hours (numerical, one-digit, '0': mileage (miles), '1': operating hours.)*
- Mileage window, (numerical, four-digit)*
- Max refueling time in minutes (numerical two-digit)*
- Dispensing limit in Liter, (numerical, four-digit)*
- Checksum (sum of all characters modulo 256 in ASCII representation)

*Values are only applicable to vehicles and ignored for drivers

Example:

```
2, 0001,         123,      , 0, 0, 1000, 15, 0999,F7
2, 0123, 011A342F02, 55555, 0, 0, 1500, 15, 1100,EF
2, 0003,           3,      , 0, 0, 0000, 00, 9999,D8
2, 0004,           4,      , 0, 0, 0000, 00, 9999,DA
2, 0005, 0F0068FD24,      , 1, 0, 0000, 00, 9999,BC
```

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