USER MANUAL

MU 7081 EN B

GRAVICOMPT UNI

Issue	Date	Modifications	Written by	Approved by
B	23/07/2019	Operation with ON/OFF switch, Printing of a delivery ticket. Delivery ticket printing (GRAVICOMPT UNI MPLS)	DSM	SH
A	2017/12/21	Creation *[PJV092]*	DSM	XS

CONTENTS

1 GENERAL PRESENTATION AND DESCRIPTION

The GRAVICOMPT UNI is a measuring system for gravity measurement of liquids other than water mounted on tank trucks. Liquid temperatures are between -10°C and +50°C.

The GRAVICOMPT UNI is composed of:

⇨ An hydraulic sleeve which includes the elements that follow:
- Two ALMA vacuity detectors DG
- An ALMA ADRIANE turbine meter DN80-80 or DN100-80
- If required, a 3-wires Pt100 temperature sensor (example CT1001)
- A sight glass, downstream of the turbine meter
- If required, a spacer pipe
- An unloading valve

⇨ A UNI electronic calculator-indicating device, installed directly on the ADRIANE turbine meter or in an independent case.

Optional functions are available:

⇨ An MPLS device can be associated to the UNI. In that case the measuring system is called GRAVICOMPT UNI MPLS.
- It is used to preset the volume and control the end of pouring if a fault occurs
- In addition, it may be connected to a printer for delivery tickets, internal totalisers, parameters or diary printings.

  NOTE: The GRAVICOMPT UNI shows the legally-binding information. The information printed by the printer has no metrological value.

⇨ A CTD+ key can be associated to the GRAVICOMPT UNI, it is used to transfer the measurements results and the parameters. Then, data may be downloaded from the key to a PC through USB cable.

The GRAVICOMPT UNI guarantees the metering operations and manages alarms from the measuring system. Units and scale intervals of volume and flowrate are set in METROLOGICAL MODE.

The UNI has a LCD backlight protected by a glass to display measurement information which can be read from the user interface.

The UNI has five pushbuttons:

	BP5	Lights the display during 10 seconds
	BP4	Normal mode: back to previous quantity METROLOGICAL mode: increment the flashing figure when imputing a value or return to previous menu
	BP3	Normal mode, metering off: select the menu Normal mode, metering on: display the values (immediate flow, temperature) Metrological mode: select the figure to be modified or select the menu
	BP2	Normal mode: validate the selected menu or value Metrological mode: validate the displayed value or the selected menu In case of default: acknowledge the default
	BP1	The key is active when the UNI is autonomous. Reset the volume to zero and record the data of the last measurement

2 OPERATING RECOMMENDATIONS

When it is not used, it's better to close the UNI cover.

The front face glass must be regularly cleaned for easy readability and better communication with the CTD+ key.

The key is not an ATEX device, it must be used outside potentially explosive area.

The UNI is powered by two batteries. The display 'bAttErY' indicates that the batteries must be changed. Batteries must be changed in a non-explosive area. NOTE: Only approved persons are permitted to remove the seal.

See maintenance sheet FM 8009 about replacement of batteries.

3 OPERATION

The GRAVICOMPT UNI performs the functions that follows:

- ⇨ Acquisition and processing of the pulses from the pulse emitter or from inductive coils.
- ⇨ It calculates and displays volume in metering conditions based on Kfactor determined during the calibration of the turbine, corrected during the calibration of the measuring system.

  In some cases, this volume in metering conditions can be corrected depending on the flowrate and/or the type of liquid measured.
- ⇨ If required, it calculates and displays the mean temperature of the liquid when it is measured by a Pt100 temperature sensor.
- ⇨ If required, it calculates and displays volume converted to base conditions. Volume is calculated by taking into account the mean temperature of the liquid during metering. Using a standard conversion formula, the conversion factor can be calculated according to density in base conditions.

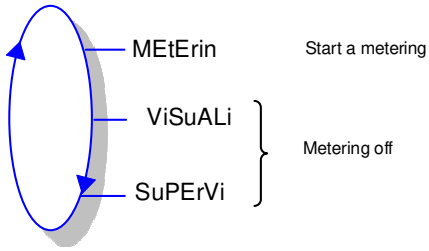
  Density is entered manually prior to metering via the METROLOGICAL mode.
- ⇨ The volume is reset to zero automatically.

- ⇨ If required, calculation and display of the loaded volume.
- ⇨ It memorizes and secures measurement information, which can be read from its user interface.
- ⇨ It registers accumulated volumes in metering conditions, even if the UNI is in alarm.

The GRAVICOMPT UNI has two operation levels:

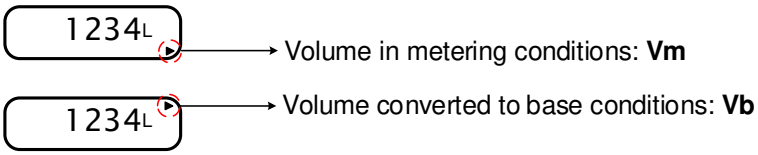
- ⇨ The USER mode for operation: measurement, visualization, supervision.
- ⇨ The METROLOGICAL mode for the configuration of the device by approved person.

4 USING THE GRAVICOMPT UNI: USER MODE



The GRAVICOMPT UNI can be either ON or OFF metering.

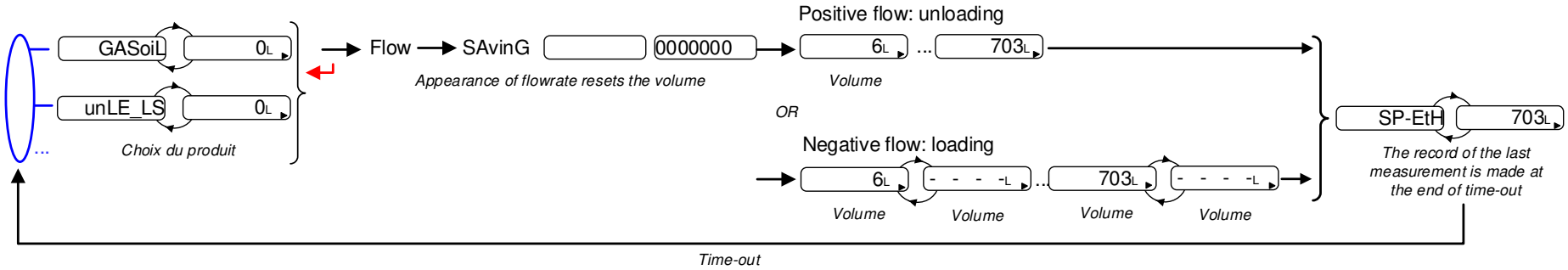
The displayed volume depends on the configuration set in METROLOGICAL mode. The arrow pictogram located on the right hand of the display screen is used to point out Vm or Vb such as shown below:



4.1 Menu METERING – MEtErin

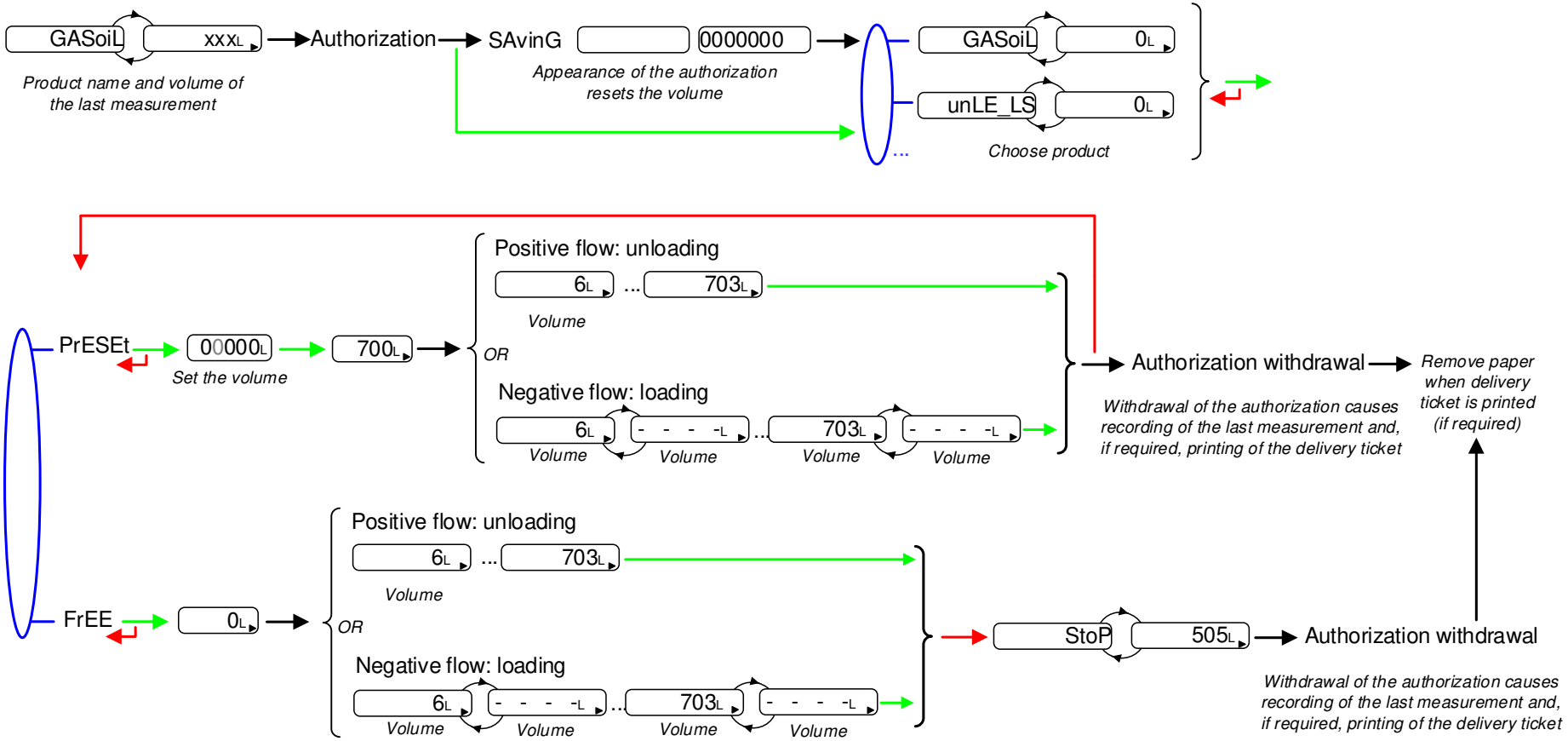
4.1.1 Using the GRAVICOMPT UNI

At the beginning of measurement, appearance of flowrate resets the volume. The last measurement data is recorded at the end of measurement at zero flow and when the time-out is up. The time required at the end of measurement before recording must be set in METROLOGICAL mode (menu 'Aut SAV')



4.1.2 Using the GRAVICOMPT UNI MPLS

The GRAVICOMPT UNI MPLS operates with an external authorization (switch or other device). At the beginning of measurement, appearance of flowrate resets the volume. Withdrawal of the authorization causes the end of measurement and the recording of the last measurement data. If required, to print the delivery ticket, you can add paper into the printer during pouring or at withdrawal of the authorization.



4.1.3 Visualization of values during delivery

During measurement, you can display the information that follow. Press BP3:

- One time for flowrate,
- Two times for temperature (if the temperature option is activated).

Display returns automatically to the current volume.

4.1.4 Data recording and volume reset

GRAVICOMPT UNI:

The appearance of flowrate resets the volume to zero. The last measurement data are recorded when the time-out is up.

GRAVICOMPT UNI MPLS:

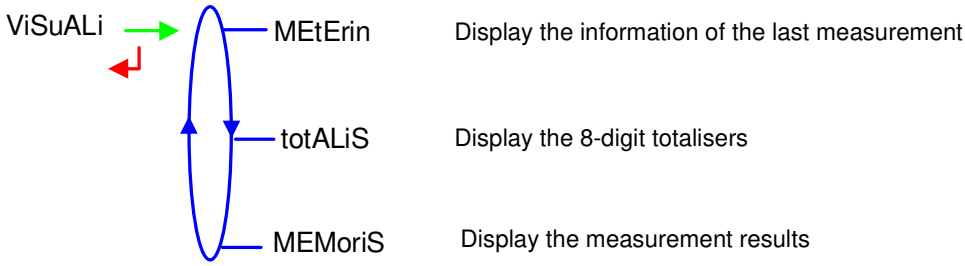
Appearance of the authorization resets the volume. Withdrawal of the authorization at zero flow conditions causes the recording of the last measurement data.

4.1.5 Printing of a delivery ticket

GRAVICOMPT UNI MPLS:

If a printer is connected to the MPLS, simply add paper into the printer during pouring or at withdrawal of the authorization. Then the delivery ticket is printed when authorization is removed. You can print the ticket until next reset of the volume. Remove the ticket from the printer when printing is finished (example of a delivery ticket in ANNEX)

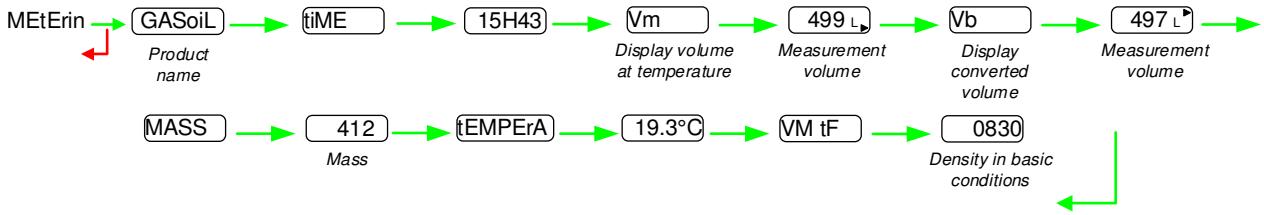
4.2 Menu VISUALISATION – ViSuALi



If the values are preceded by this display '-------'; it means they are no longer guaranteed.

4.2.1 Sub-menu METERING – MEtErin

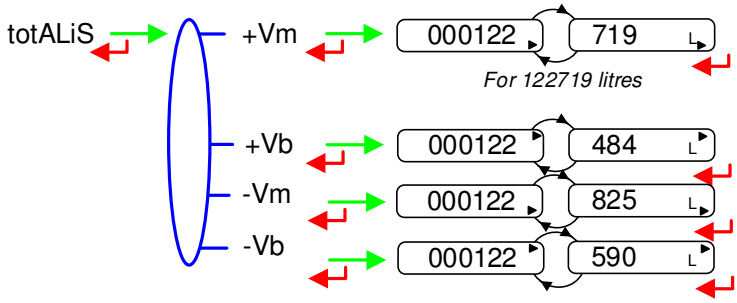
This menu displays the information of the last measurement. Information displayed depends on the UNI configuration.



4.2.2 Sub-menu TOTALISER – totALiS

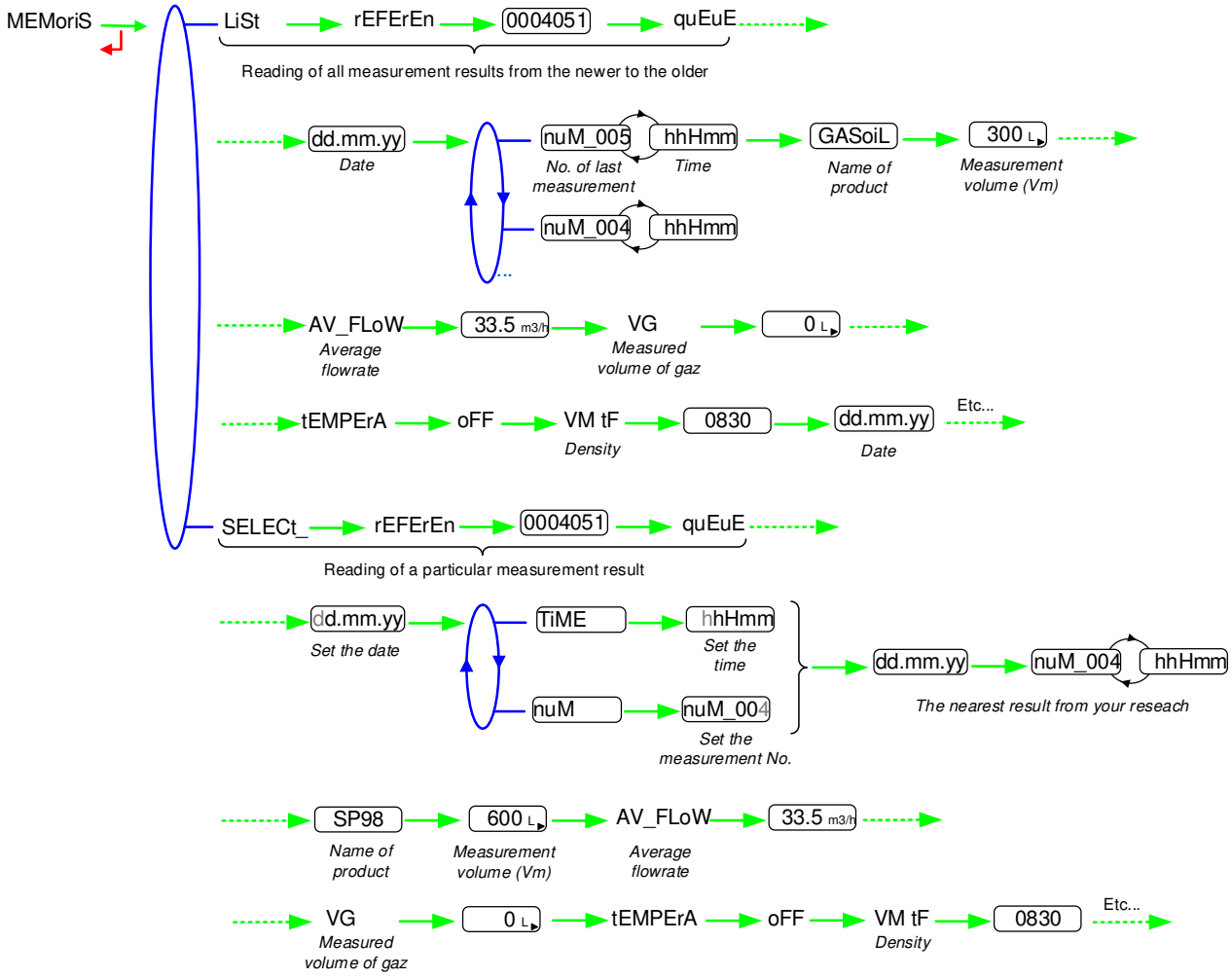
This menu displays:

- The totaliser of the delivered volume in metering conditions (+Vm)
- The totaliser of the delivered volume converted to base conditions (+Vb) if the temperature option is activated.
- If the UNI is configured to detect flow direction, the totaliser of volume in metering conditions for loadings (-Vm)
- If the UNI is configured to detect flow direction, the totaliser of volume converted to base conditions if the temperature option is activated (-Vb).



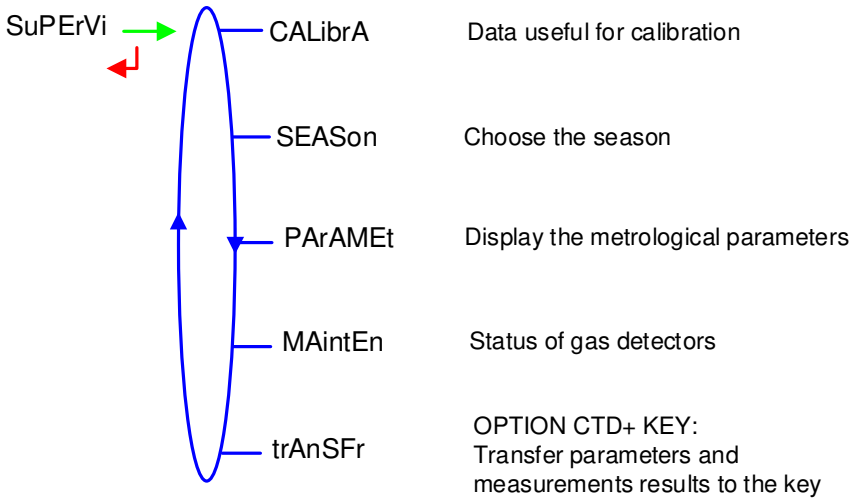
4.2.3 Sub-menu MEMORISATION – MEMoriS

Information displayed depend on the UNI configuration. Temperature, converted volume (Vb), and mass are only displayed if the temperature option is activated.



The measured volume of gas VG is displayed for information only. It has no metrological value.

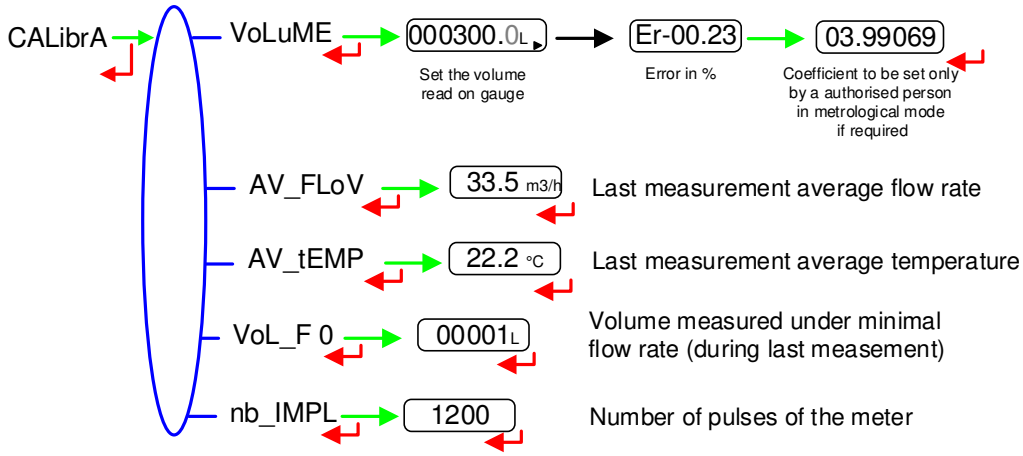
4.3 Menu SUPERVISOR – SuPErVi



4.3.1 Sub-menu CALIBRATION – CALibrA

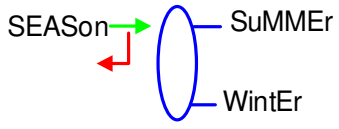
Measure the accuracy of the measuring system during the calibration with a gauge.This menu is available after a measurement sequence after withdrawal of authorization.

NOTE: Only approved persons are permitted to remove the seal.



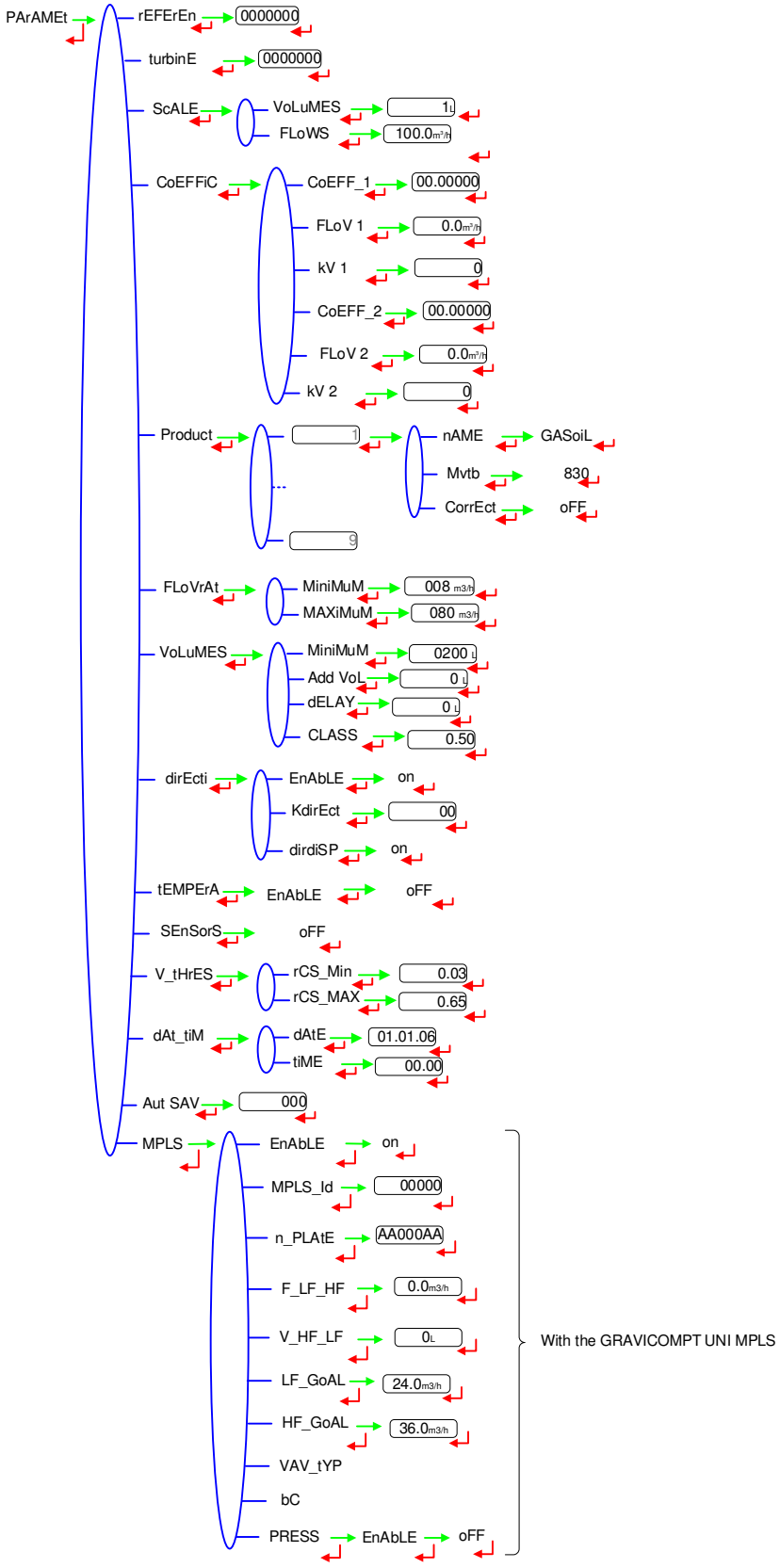
4.3.2 Sub-menu SEASON – SEASon

Season is set in METROLOGICAL mode. This menu is used to change from summer to winter time (and back again).

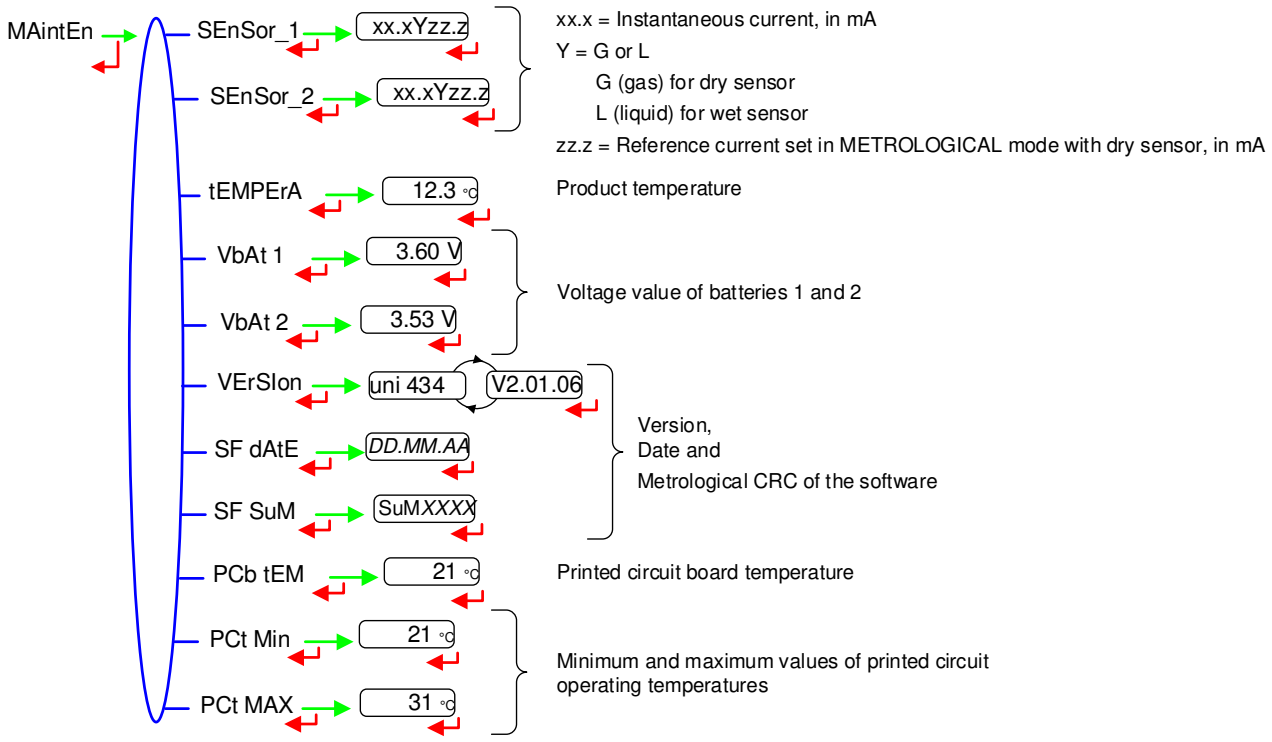


4.3.3 Sub-menu PARAMETERS – PArAMEt

This menu displays the parameters set in METROLOGICAL mode.



4.3.4 Sub-menu MAINTENANCE – MAintEn



4.3.5 Sub-menu TRANSFER – trAnSFr

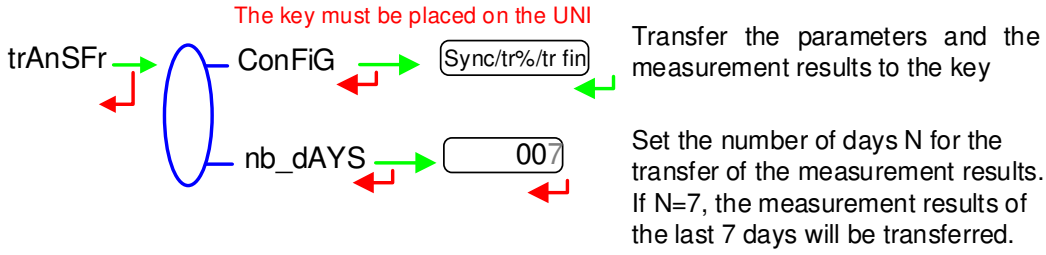
The CTD+ key is not ATEX, this operation must be done outside potentially explosive area.

This sub-menu is available with the 'Transfer Key CTD+' option.

It is used to transfer to the key the parameters set in METROLOGICAL mode and the measurement results. The transfer of the measurement results of the N last days is possible when flow rate is zero. N has to be set in SuPErVi>trAnSFr menu.

The file can be downloaded to a PC at '.csv' format.

See the operating guide GU 7110 for transfer procedure.



NOTE: Do not plug the USB cable during data transfer.

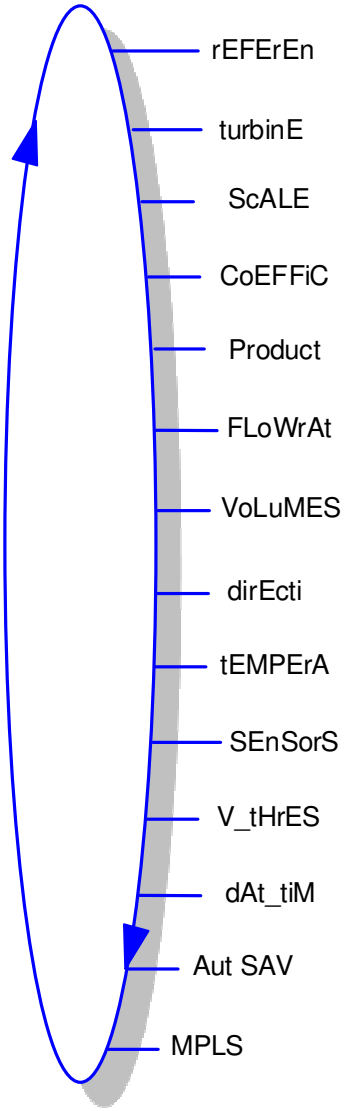
4.4 List of alarms

Should a fault occur, the UNI displays the word "ALArM" and the fault title alternately with the displayed value. The operator acknowledges the fault by pressing down BP2 (even when pouring). Apart from battery related faults, persistent faults cannot be acknowledged. Once the

fault is acknowledged, the selected value is displayed alternately with "-------" to indicate that the measured values are no longer guaranteed.

		DISPLAY	MEANING	ACTION
USER		oVErFLo	Volume greater than 4 194 304 liters	Reset the device
		LoW_FLo	Flow rate less than the setting minimal flow rate	Check the hydraulic configuration and the flowing
		SEnSor1	High gas detector fault (GDh)	Use the maintenance menu to check the status of the detector
		SEnSor2	Low gas detector fault (GDl)	Use the maintenance menu to check the status of the detector
		dirECti	Flow direction change during metering	Check the hydraulic configuration and the flowing
		FAiL	Problem with the transfer of the files to the CTD+ key	See GU 7110
	MPLS	StoP	Intentional interruption of delivery	Stop delivery
		Author	The autorisation has been removed during pouring	The measurement is ended
		LEAK	Counting of a volume greater than or equal to 1 liter (metering off)	Acknowledge the alarm to end measurement
		dEFPrEd	Volume ≥ preset volume+1% the minimum quantity	Acknowledge the alarm
REPARATOR		FLoV_	Flow setting fault	Check the parameters
		FrEQ_	Frequency fault	Check the parameters
		COEFF_	Difference two coefficients is greater than 0,5%	Check the coefficients setup
		MEtEr	Problem of metering with the meter	Check the setup
		HiGH_FL	Flow rate greater than the setting maximal flowrate	Check the setup
		LF_HiGH	Flow greater than 20m^3/h while GDh dry	Check the setup
		dAtE	Loss of date and time	Set date and time in metrological mode
		GAS	GDh is wet but GDl is dry	Check the hydraulic configuration / Check the detector status
		VALvE	GDh is dry and the delay volume is flowed out for over 2 seconds	Check the setup / Check the valve is operating properly
		drY MEt	When using a pump. The volume of gas is greater than the minimum measured quantity	Stop metering
		CoiL	Loss of pulse transmitter signal	Check the connection with the pulse transmitter
		tEMPErA	Temperature less than -20°C or greater than 50°C	Check the temperature sensor (measure and calibration)
		diSPLAY	LCD display fault	If steady alarm, substitution of the UNI
		doG	Fault with card	If steady alarm, substitution of the UNI
		ProGrAM	Error on the cheksum of the metrological data	If steady alarm, substitution of the UNI
		rAM	Saved memory fault	If steady alarm, substitution of the UNI
		MEMoriS	Bad writting into the memory	If steady alarm, substitution of the UNI
		FuLL	If a measurement result, not older than 3 months, is about to be erased	If steady alarm, substitution of the UNI
		MEtro_	Configuration loss	If steady alarm, substitution of the UNI
		bAttErY	Low battery	Substitution of the batteries
		totAL_	Totaliser fault	If steady alarm, substitution of the UNI
		dEF_MEM	Loss of backup data concerning the last measurement	If steady alarm, substitution of the UNI
		dEF_CoM	Communication fault with IRDA link	Check the IRDA link
		rECEPt	Problem of communication protocol between the calculator-indicator UNI and the CTD+ key	Check the devices compatibility

5 CONFIGURE THE GRAVICOMPT UNI: METROLOGICAL MODE METROLOGICAL MODE



The configuration parameters can only be modified after the processor configuration switch on the electronic card has been switched over.

NOTE: Only approved persons are permitted to change parameters

Exit the METROLOGICAL mode thanks to the switch. The UNI resets.

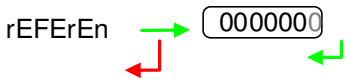
WARNING

Setup should be done under cover, metering off, with dry gas detectors.

The option to display the volume in metering conditions (Vm) or the volume converted to base conditions (Vb) is made in METROLOGICAL mode when the temperature option is activated.

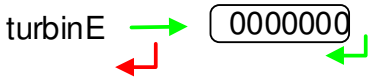
5.1 Menu REFERENCE – rEFErEn

Enter the serial number of the UNI.



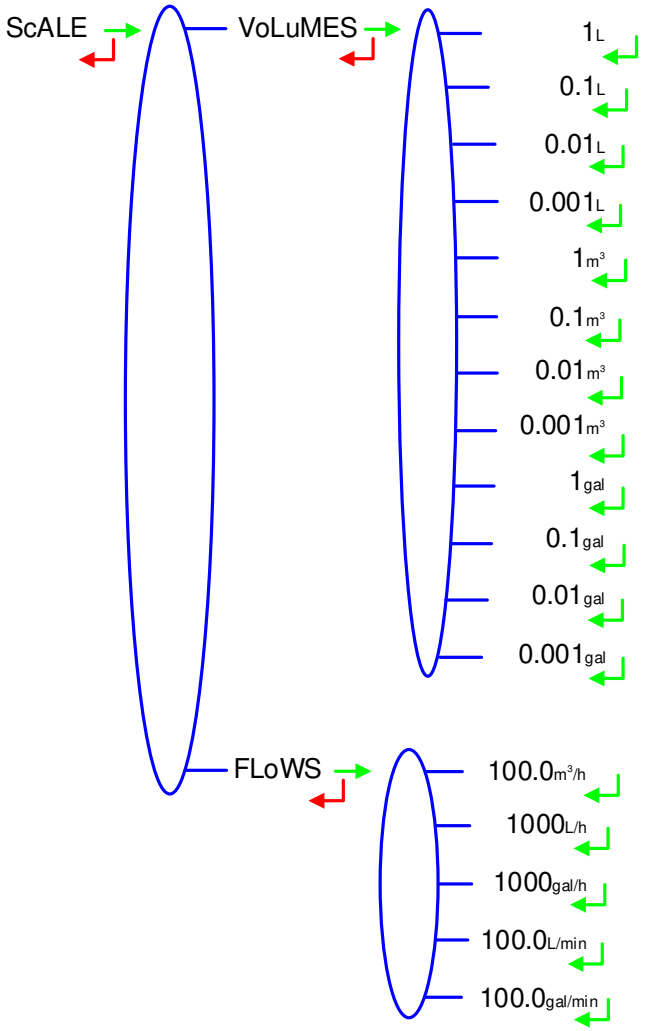
5.2 Menu TURBINE – turbinE

Enter the serial number of the turbine meter.

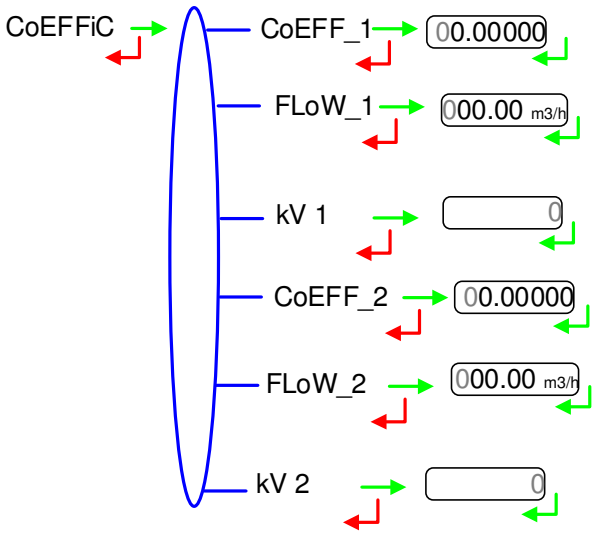


5.3 Menu SCALE – ScALE

Choose the unit and accuracy for volume and flowrate.



5.4 Menu COEFFICIENT – CoEFFiC



Meter coefficient for low flowrate
Expressed in pulses per liter.

Flowrate corresponding to COEFF_1.
Unit depends on the choice made for the accuracy.

Correction coefficient (‰) at 'FLoW_1' for low viscosity products

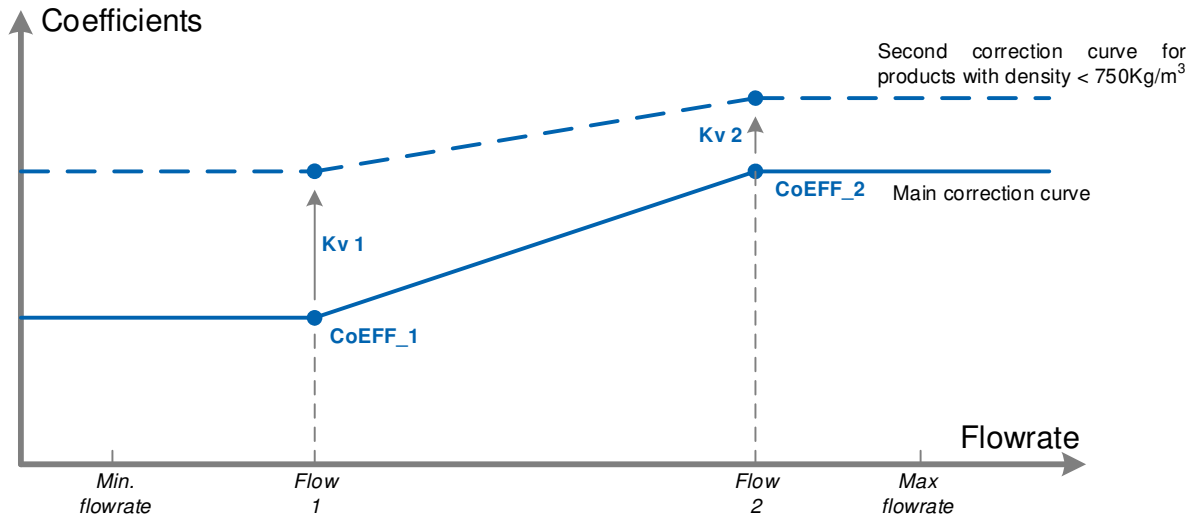
Meter coefficient for high flowrate
Expressed in pulses per liter.

Flowrate corresponding to COEFF_2
Unit depends on the choice made for the accuracy.

Correction coefficient (‰) at 'FLoW_2' for low viscosity products

When parameters FLoW_1 and FLoW_2 are set to zero, parameters CoEFF_2 and kV 2 are not applied.

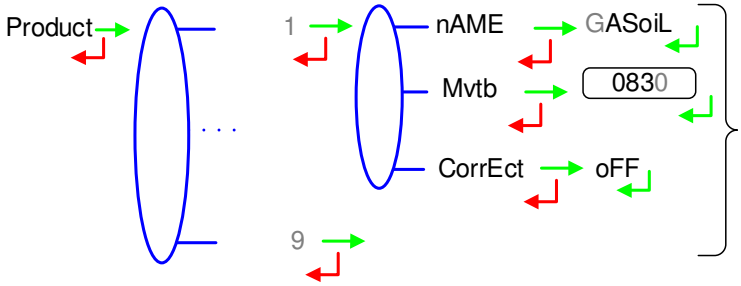
Adjustment of coefficients for several flowrates:



Coefficients applied in accordance with flowrate and product density

5.5 Menu PRODUCTS – Product

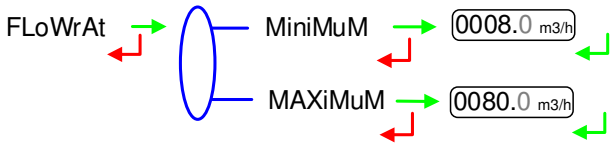
Definition of products.



Definition of products (from 1 to 9):
- Name
- Density in kg/m^3 in base conditions. Set '0000' to remove the product from the list displayed in USER mode
- Correction display:
  If Mvtb ≤ 750, CorrEct='on'
  otherwise, CorrEct='oFF'

Names and MVTB at 15°C displayed are default values.

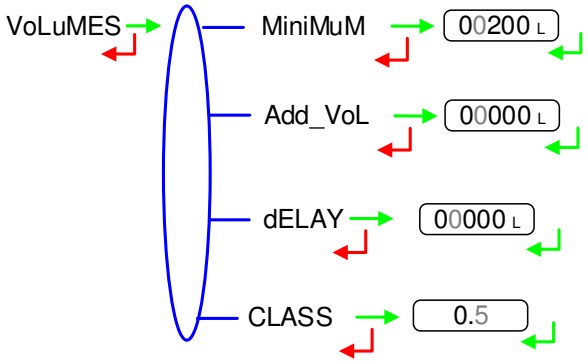
5.6 Menu FLOWRATES – FLoWrAt



Minimum flowrate of the measuring system
Unit depends on the choice made for the accuracy.

Maximum flowrate of the measuring system
Unit depends on the choice made for the accuracy.

5.7 Menu VOLUMES – VoLuME



Minimum quantity to garanty the measurement
Unit depends on the choice made for the accuracy.

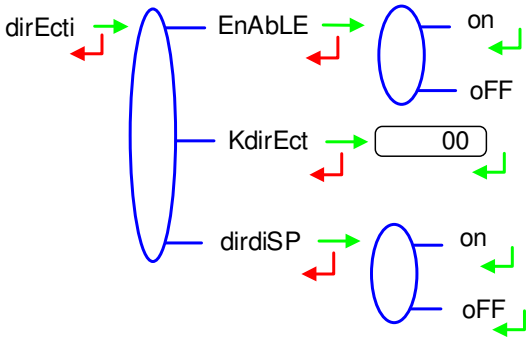
Set the end of metering volume in liters.
Unit depends on the choice made for the accuracy.
Not applicable without gas detectors

Set the delay for the additional volume (GDI dry).
Unit depends on the choice made for the accuracy.
Not applicable without gas detectors

Accuracy class of the measuring system.
Authorized values: 0.5 or 1

VoLuMES>Add_VoL: 0.5L

5.8 Menu DIRECTION – dirEcti



Choose 'on' if the counter is intended to detect the 2nd direction ('loading') and is able to sum loading volumes in a separate register.

Additional correction coefficient (‰) for loading direction (volumes not guaranted).
Authorized values: integer between ±30

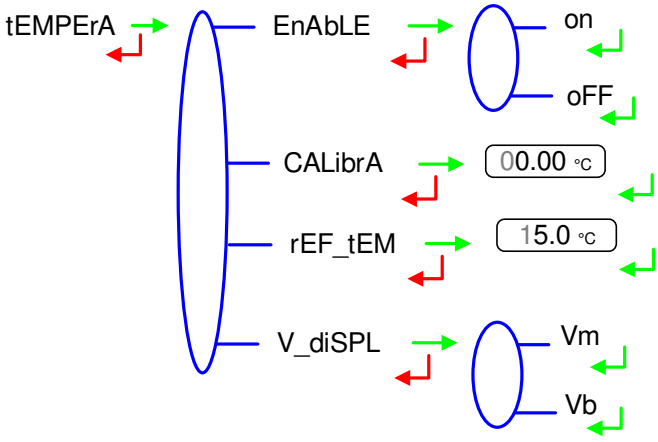
Choose 'off' if display of the counter and memorization of volumes for 'loading' direction is not wished.

dirEcti>EnAbLE: on

5.9 Menu TEMPERATURE – tEMPErA

The temperature calibration can be done either on two measuring points or on a single measuring point (menu CALibrA).See maintenance sheet FM 8509.

- Two temperature measuring points:
  The measure must be done outside the range -20 to +50°C. Adjust the Pt100 simulator to a value<-20°C, wait for 15 seconds before setting the temperature into the calculator. Then do the same for a value>+50°C.
- Single temperature measuring point:
  The measure must be done in the range -20 to +50°C.



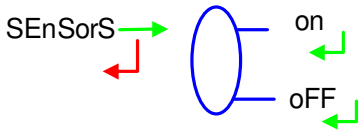
WAIT 2 MINUTES AFTER EACH TEMPERATURE ENTRY

Set the reference temperature

Choose the volume displayed in user mode:
Vm: volume at metering conditions
Vb: volume converted to base conditions

5.10 Menu GAS SENSORS – SEnSorS

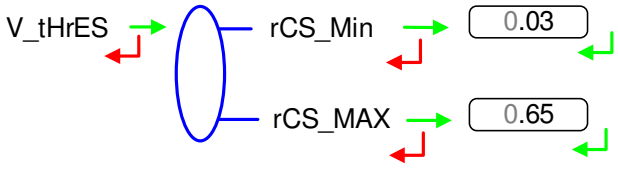
The UNI can operate with two gas detectors.



Both gas sensors are connected to the UNI DEVICE.
BEFORE VALIDATION:
Check that gas detectors are CONNECTED and DRY

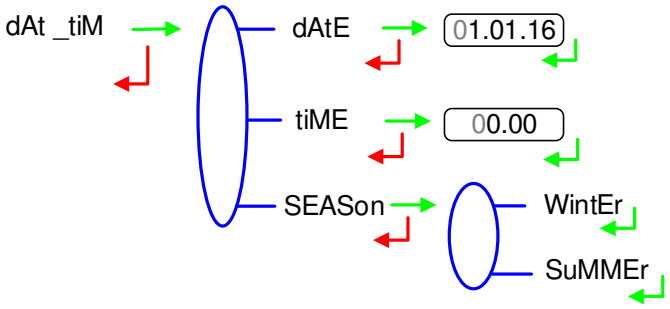
5.11 Menu THRESHOLDS – V_tHrES

Detection thresholds of metering inputs at zero flow and at maximal flow.



5.12 Menu DATE AND TIME – dAt tiM

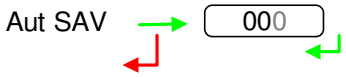
This menu is used to set date and time of the day and select the season. The menu SuPERVi>SEASon of USER mode can also be used to change from summer to winter time (and back again).



When you validate the season, 'dEL yES' then 'dEL Ok' appear to indicate that the measurement results have been deleted from flash memory.

5.13 Menu AUTOMATIC RECORDING – Aut SAV

Set the time required at the end of measurement before automatic recording of the measurement data (in seconds).



GRAVICOMPT UNI:

Data recording is automatic, it is done when the time-out is up. It disables the RAZ key. The volumes counted during the time-out are added at recording of measurement data.

For example, the parameter Aut SAV can have the value that follows:

Aut SAV=060. Automatic recording with time-out 60 seconds

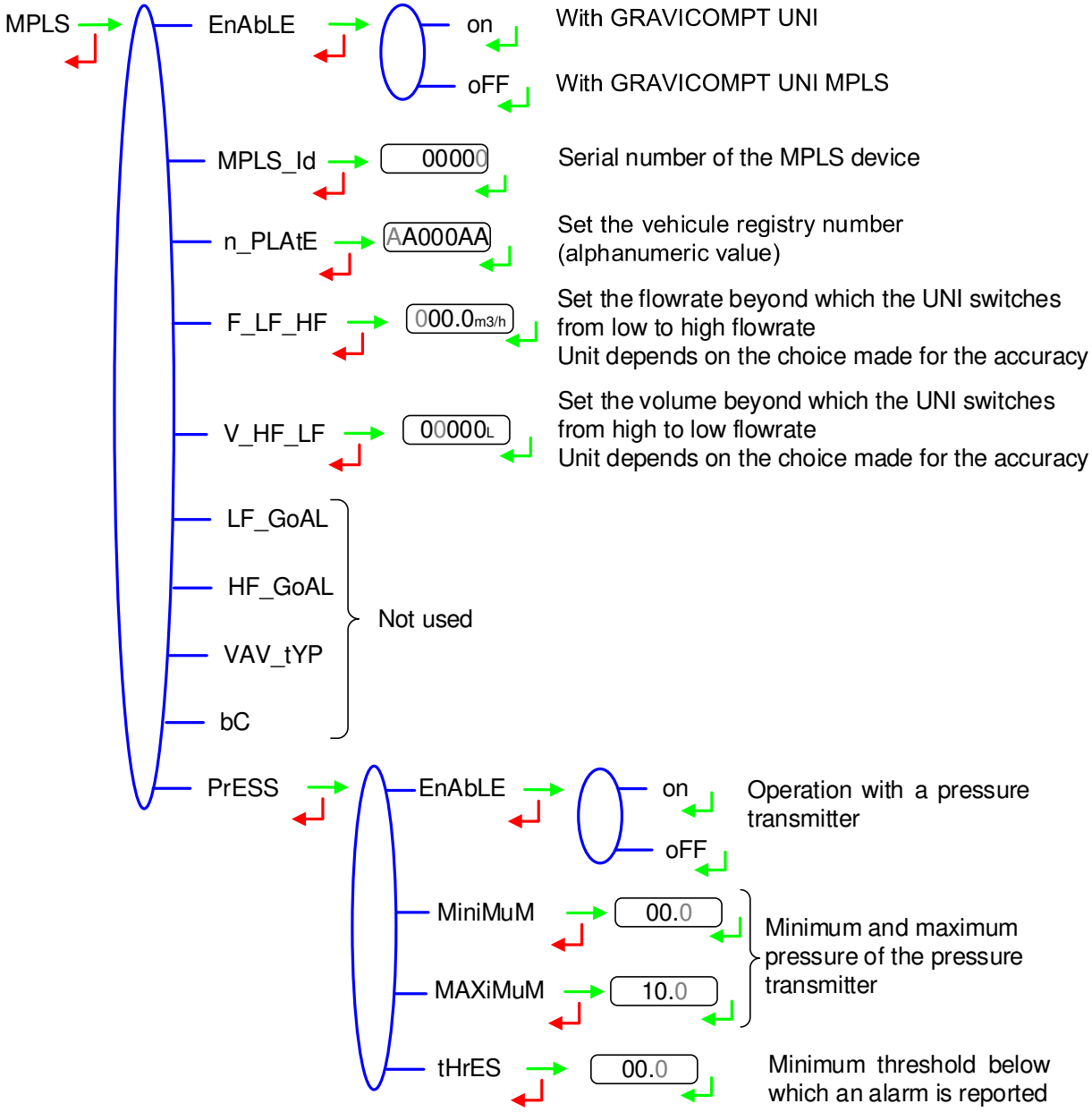
GRAVICOMPT UNI MPLS:

This parameter is zero. Withdrawal of the authorization causes recording of the measurement data.

Aut SAV=000

5.14 Menu MPLS – MPLS

GRAVICOMPT UNI: Do not activate the option. Validate EnAbLE→oFF
GRAVICOMPT UNI MPLS: Activate the option. Validate EnAbLE→on



6 MAINTENANCE

***Any intervention with broken seals must be carried out by an approved person and under the control of the competent authorities or of one of its representatives. See the certificate of the measuring system and the regulations in force.**

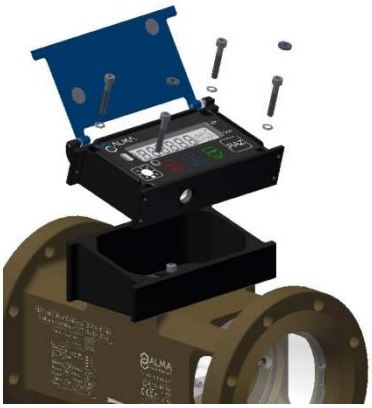
6.1 2-DLA spacer (code 2319)

The 2DLA-spacer is a metallic ring supporting two DLA liquid detectors. Maintenance of the DLA detectors requires replacement of the complete equipped 2DLA-spacer including the following steps

6.1.1 Removing the 2DLA-spacer from the UNI

- Remove the 2 seals* from the screws of the calculator-indicating device UNI
- Unscrew the 4 CHC screws of the UNI
- Carefully lift up the UNI to find the terminal block B2. Wires are long enough to put the UNI near nearby
- Remove both batteries
- Unplug the 6 wires of the 2DLA-spacer from the terminal block B2 (*See Table 1*).

COMPACT Version



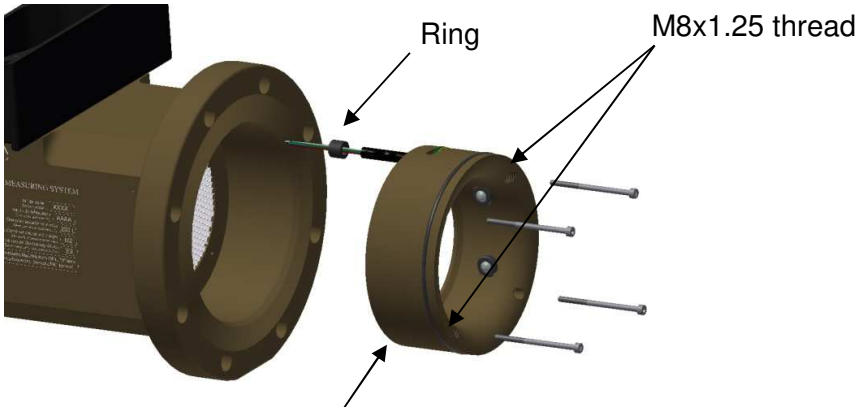
REMOTE UNI Version

TERMINAL	COMPACT VERSION	REMOTE VERSION
B2-4	Yellow	Yellow
B2-5	Black	White
B2-6	White	Green
B2-7	Red	Grey
B2-8	Blue	Pink
B2-9	Green	Brown

Table 1

6.1.2 Removing the equipped 2DLA-spacer from the turbine

- Unscrew the 4 CHC screws of the 2DLA-spacer
- Removing the equipped 2DLA-spacer from the turbine body. To make the extraction easier, use 2 screws with M8x1.25 thread
- Keep by your side the ring of the equipped 2DLA-spacer



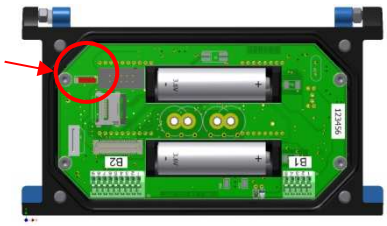
Equipped 2DLA-spacer (code 2319)

6.1.3 Setting of the equipped 2DLA-spacer

- Grease the rings of the 2DLA-spacer (translucent grease for food contact)
- Pass the 6 wires through the wires pass through of the turbine body
- Put the spacer on the input of the turbine body so that the cable faces the wires pass through
- Put the CHC M3x50 screws on the spacer
- Tighten the CHR screws in a cross pattern. They must be lubricated with Molybdenum grease.

6.1.4 Wiring and operational check of the 2 DLA detectors in the UNI

- Make sure there's no battery
- Plug on the UNI the 6 wires of the 2LA-spacer according to *Table 1*
- Put the batteries (respect polarization)
- Put the UNI red switch SW1 in METROLOGICAL mode position
- Enter the menu SENSORS→ON
- Make sure both DLA detectors are dry before validation
- Switch back SW1 to exit METROLOGICAL mode.



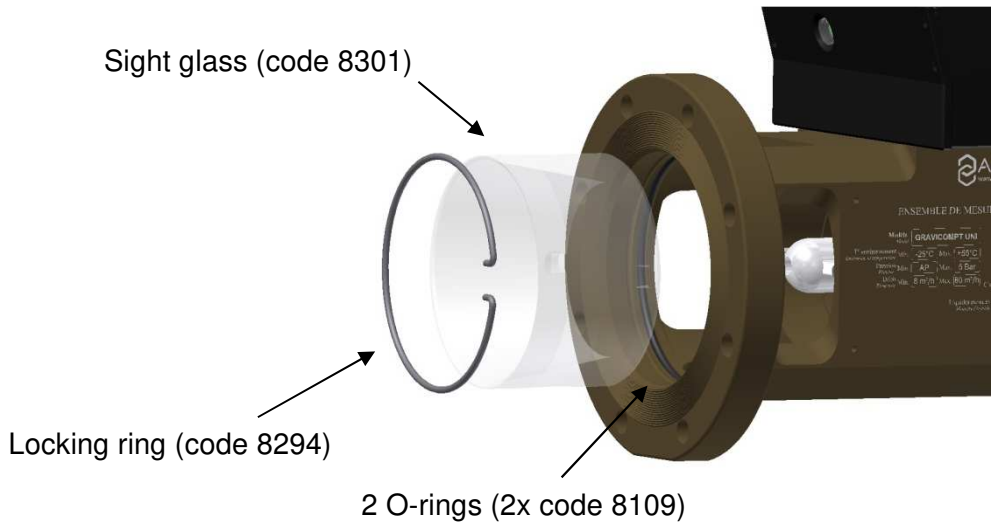
6.1.5 Assembling the UNI on the GRAVICOMPT UNI

- Check the O-ring is properly positioned in its groove, grease it if necessary (translucent grease for food contact)
- Put the UNI on the UNI bottom box (with the silica gel dehydrating packet)
- Make sure there's no wire between the UNI box and the bottom box
- Screw the 4 CHC screws of the UNI equipped with SCHNORR washers. Screws must be lubricated with Molybdenum grease
- Seal* both screws of the calculator-indicating device UNI (if required)

6.2 Sight glass (code 8301)

6.2.1 Removing the sight glass

- Remove the locking ring (code 8294)
- Remove the sight glass with a hub puller (code 8301)



6.2.2 Assembling the sight glass

- Check the status of both O-rings (2x code 8109), replace them if it's necessary
- Grease the O-rings with UNIL OPAL food grease or equivalent
- Put the sight glass on the GRAVICOMPT UNI body, both sight glass drillings must match with the fixing screws of the axle holder
- Push in it till the stop position
- Push the locking ring in its place

ANNEX

Delivery ticket for measuring system connected to a printer.

Installation:	AA09C01
Indicateur/Indicator:	0000000123
Date (../MM/20..):	21/10/2015
Quantieme/Calendar:	295
Numero/Number:	001
Heure de fin/ End time:	15:22
Produit/Product:	GAZoLE
Quantite livree/ Quantity delivered:	0000499 (L)
Totalisateur/Totaliser:	
Index avant/before:	0012387
Index apres/after:	0012886

En cas de litige, les resultats de mesurage memorises par l'indicateur font foi. In case of dispute, the measurement results stored by the main indicating device providing proof.

RELATED DOCUMENTS

GU 7081	Operating guide: GRAVICOMPT UNI
GU 7110	Operating guide: Transfer the measurement results of the UNI indicator to a computer
MV 5013	Verification Manual GRAVICOMPT UNI
FM 8009	Replacement of the batteries of the UNI indicator device
FM 8014	Replacement of the battery on the CTD+ key
FM 8505	Adjustment of an ALMA measuring system equipped with a UNI indicator device
FM 8509	Adjustment of temperature in the UNI indicator device