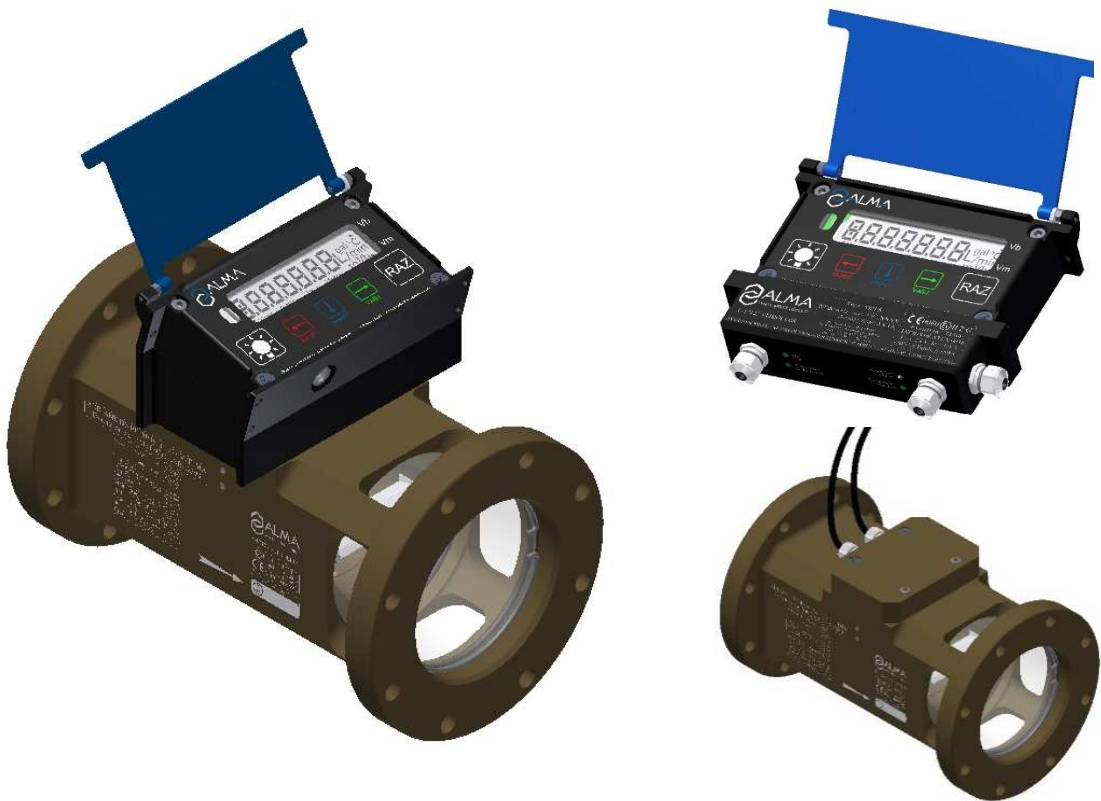



OPERATING MANUAL

MU 7081 EN A GRAVICOMPT UNI



Document available for software 434v2.1.5 and 435v1.5

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Issue	Date	Nature of modifications	Written by	Approved by

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	This document is available at www.alma-alma.fr	

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1 GENERAL PRESENTATION AND DESCRIPTION

The ALMA GRAVICOMPT UNI is a measuring systems for measurement of liquids other than water mounted on tank trucks. It can be autonomous or associated to other devices such as CTD+ key.

The ALMA UNI electronic calculator-indicator of the GRAVICOMPT UNI can be installed directly on the ADRIANE turbine measuring device or in an independent case.

When necessary, the ALMA UNI electronic calculator-indicator includes a 3-wires Pt100 temperature sensor (example CT1001),

In option, the wireless digital connection may be used to communicate with a CTD+ key for transferring measuring results and parameters to a PC through USB cable.

The ALMA UNI electronic calculator-indicator guarantees the metering operations and manages alarms from the measuring system.

The accuracy and the unit of volume and flow rate can be set in METROLOGICAL mode.

The operating temperature for the UNI is between -20°C and +50°C.

On its front face, the UNI device has a LCD backlight protected by a glass to display measurement information which can be read from the user interface. The five buttons have the following functions:



BP5 Light the display during 10 seconds



BP4 Normal mode: return to previous menu
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 for transfer only.

2 USER 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 UNI device is powered by 2 batteries. The display 'bAttErY' indicates that the batteries must be changed. Batteries must be changed in a non-explosive area. The verification seals have to be broken by authorised personnel only.


Refer to the maintenance sheet FM 8009 about replacement of batteries.

3 OPERATION

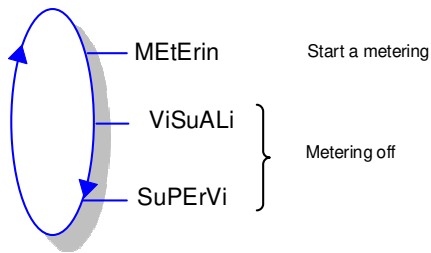
The ALMA UNI electronic calculator-indicator of the GRAVICOMPT UNI performs the following functions:

- ⇒ It ensures the acquisition and processing of the pulses from the coils.
- ⇒ It calculates and displays the delivered 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 flow rate 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 Pt 100 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.
- ⇒ For GRAVICOMPT UNI, the UNI device volume is reset to zero automatically.
- ⇒ If necessary, calculation and display of the loaded volume
- ⇒ It memorizes and secures measurement information, which can be read from the user interface of the calculator-indicator.
- ⇒ It registers accumulated volumes in metering conditions, including when the calculator-indicator is in alarm.

The UNI calculator-indicator has two operation levels: the USER mode for operation: measurement, visualisation, supervision; and the METROLOGICAL mode for the configuration of the device by authorized personnel.

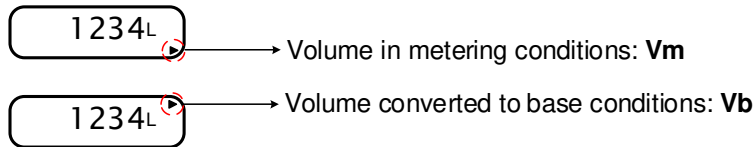
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4 USER MODE



The UNI can be either ON or OFF metering.

The displayed quantity 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 V_m or V_b . See details below:

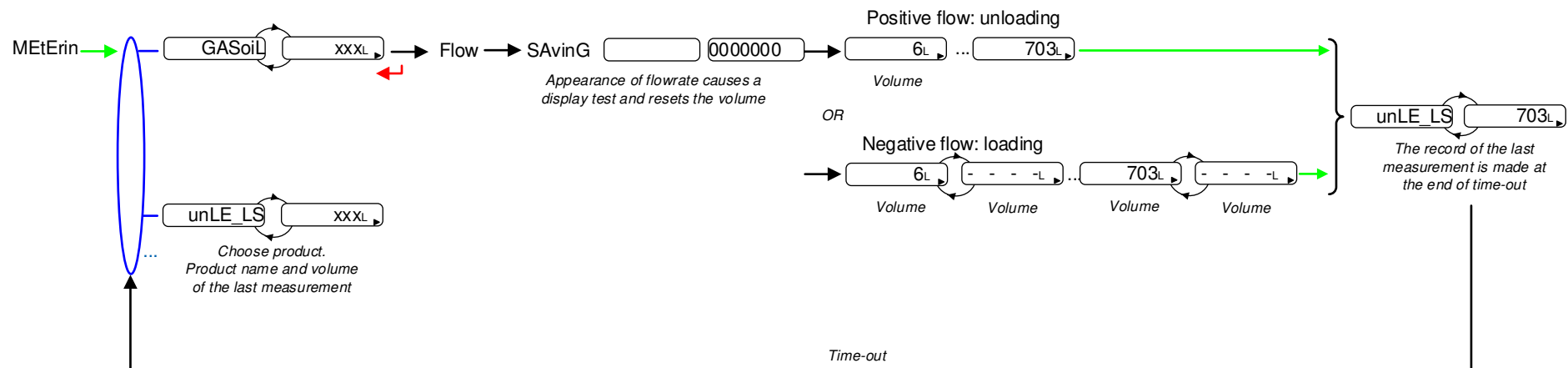


4.1 Menu METERING – MEtErin

4.1.1 Measuring system without pre-setting: UNI alone

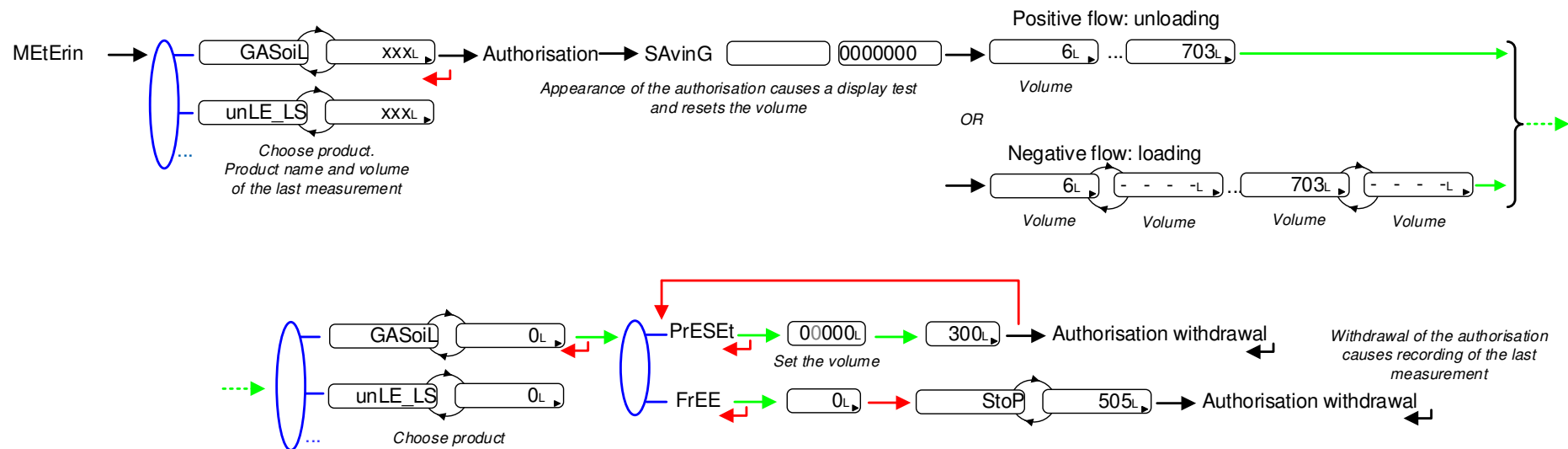
Data recording is automatic. The time required at the end of measurement before recording must be set in METROLOGICAL mode (menu 'Aut SAV').

At the beginning of measurement, appearance of flowrate causes a display test and resets the volume to zero. The last measurement data is recorded at the end of measurement at zero flow and when the time-out is up.



4.1.2 Measuring system with pre-setting: UNI associated to an MPLS device

Appearance of the authorisation causes a display test and resets the volume. Withdrawal of the authorisation causes recording of the last measurement.



4.1.3 Visualisation of values during delivery

Use BP3 to display flow rate and temperature during measuring (flow>0). Press:

- One time for flow rate,
- 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

Data recording and volume reset are automatic recording sequence.

The appearance of flowrate resets the volume to zero.

Withdrawal of flowrate causes recording of the last measurement data at zero flow conditions.

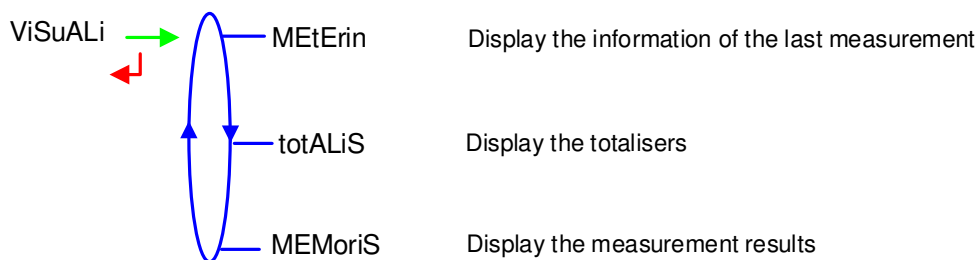
4.1.5 Transfer the measurement results to a computer – option

The ‘CTD+’ option allows to transferring parameters and measurements results to the key. Then, data may be downloaded from the key to a PC through USB cable.

The transfer of the measurement results of the N last days is possible when flow rate is zero. N has to be set in SUPERVISOR menu

Refer to the operating guide GU 7110 about transferring the measurement results of the UNI indicator device to a computer.

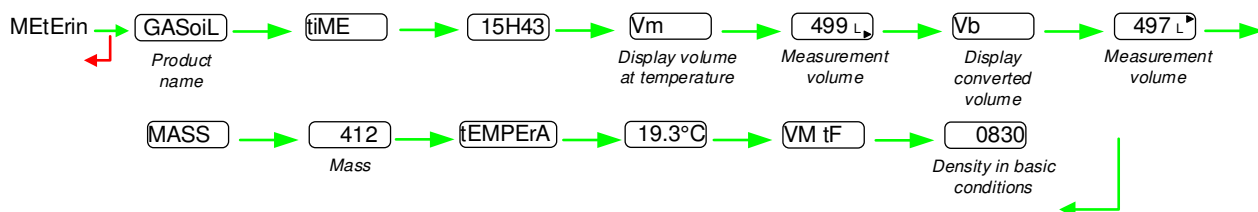
4.2 Menu VISUALISATION – ViSuALi



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

4.2.1 Sub-menu METERING – MEtErin

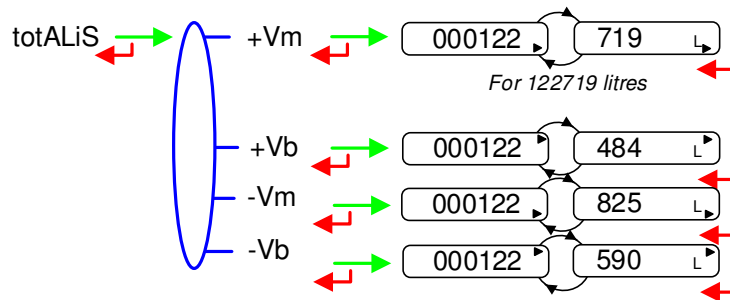
This menu displays the information of the last measurement. Information displayed depends on the calculator configuration.



4.2.2 Sub-menu TOTALISER – totALiS

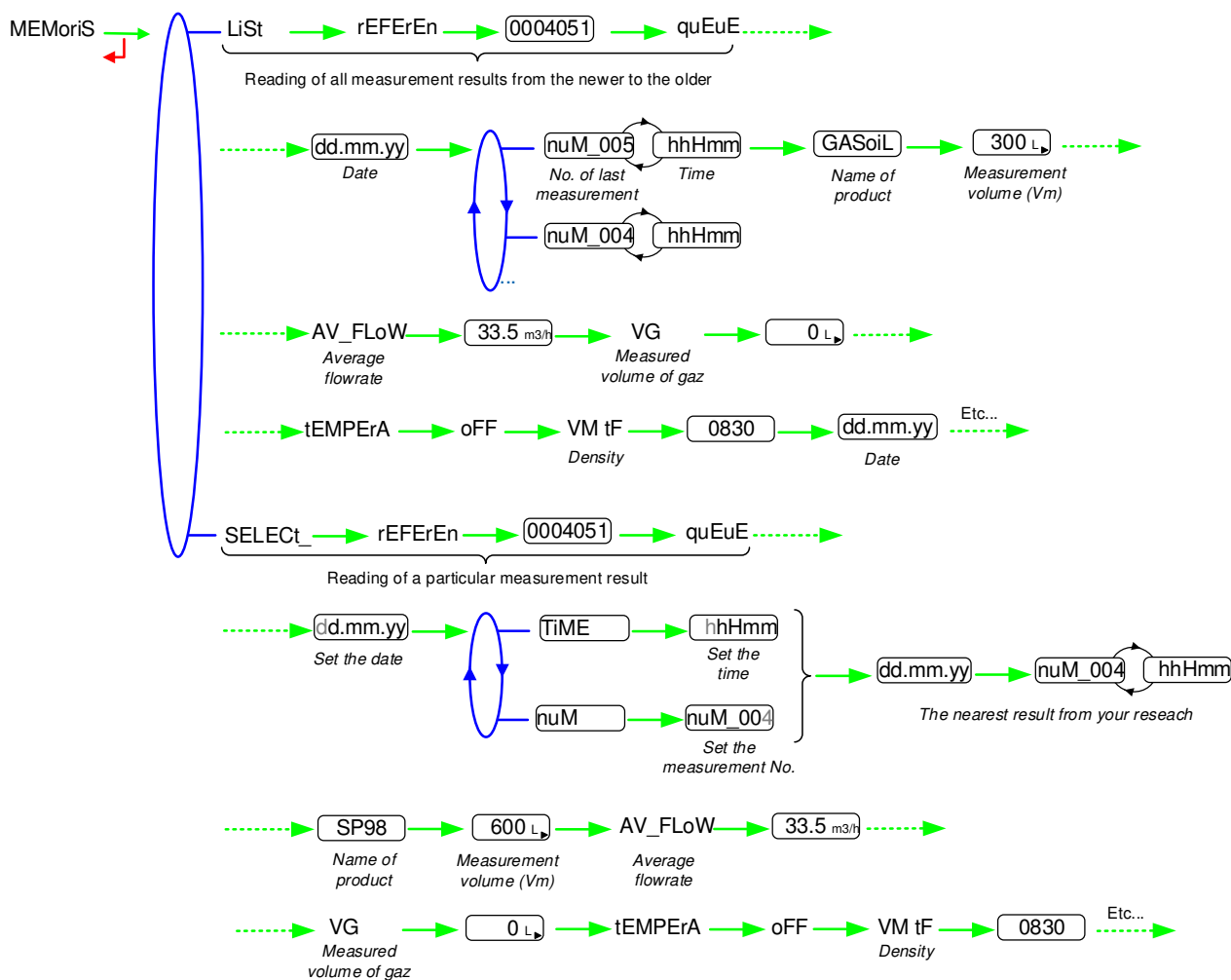
This menu displays:

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



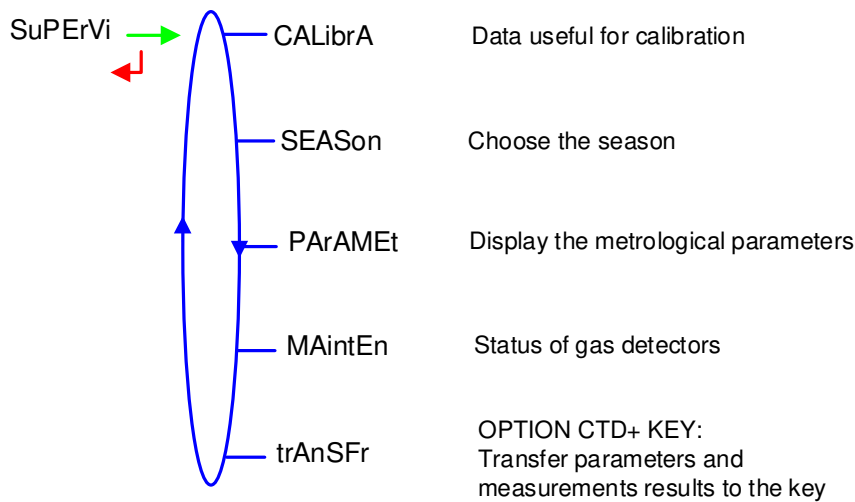
4.2.3 Sub-menu MEMORISATION – MEMoriS

This menu displays the measurements results. Information displayed depends on the calculator configuration. Temperature, converted volume (Vb), and mass are only displayed if the temperature option is activated.



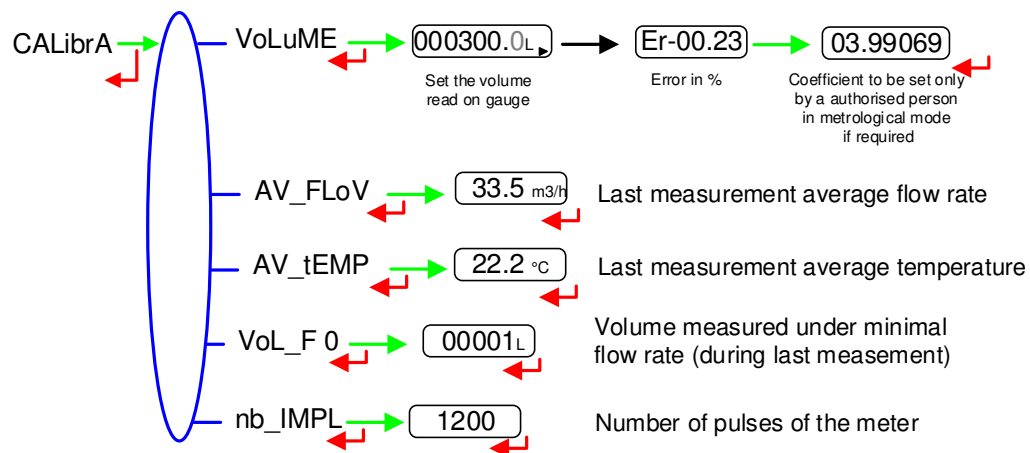
The measured volume of gas VG is displayed for information only, it has no metrological value.

4.3 Menu SUPERVISOR – SuPErVi



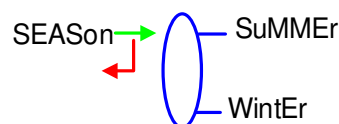
4.3.1 Sub-menu CALIBRATION – CALibrA

Check the measuring system accuracy during the calibration with a gauge. This menu is available after a measurement sequence when the measurement results are recorded (following withdrawal of authorisation).



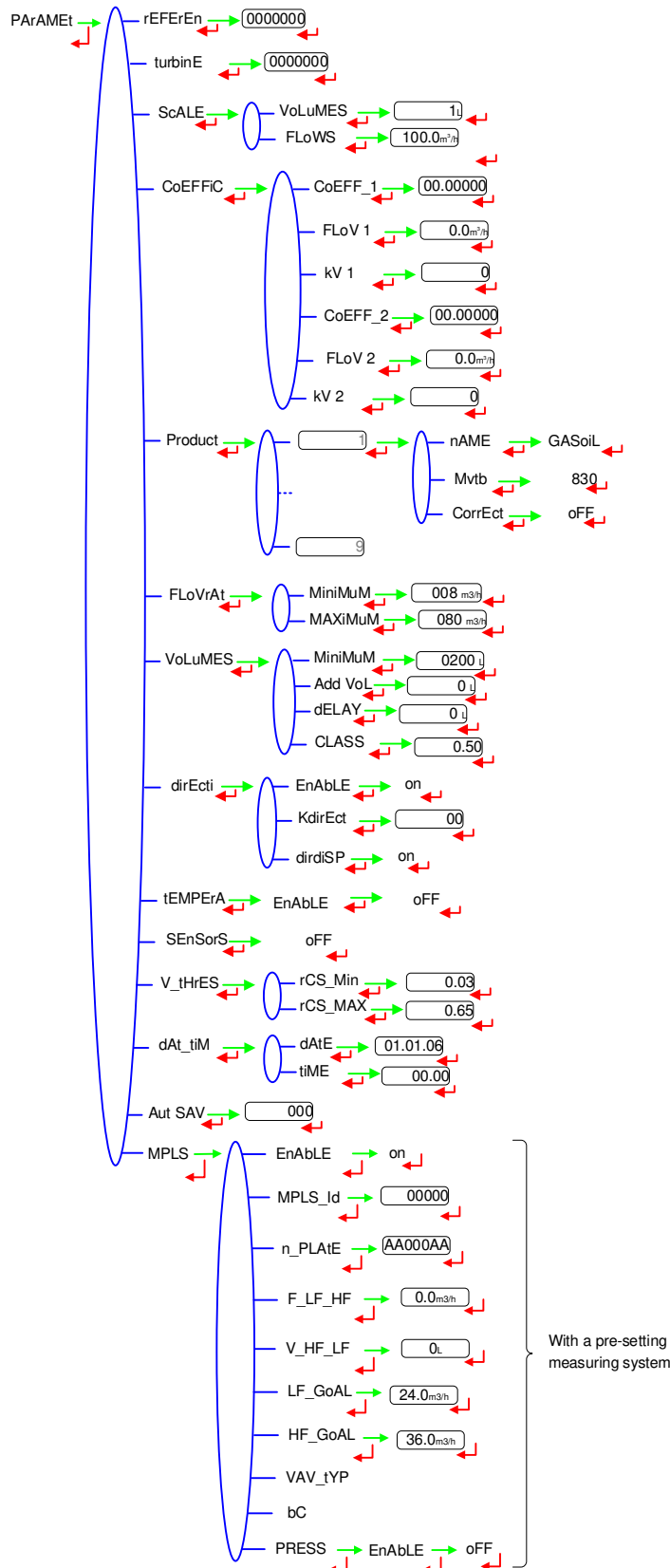
4.3.2 Sub-menu SEASON – SEASon

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



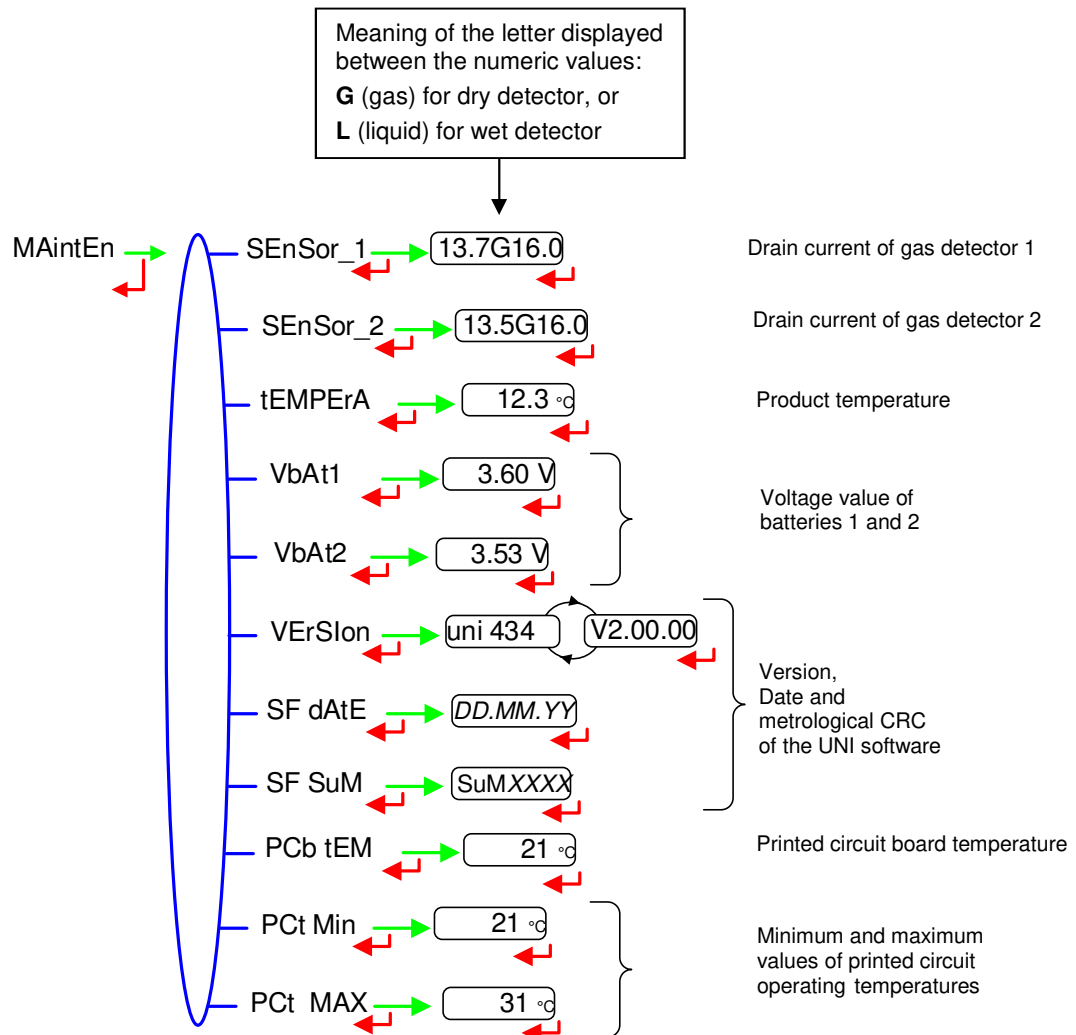
4.3.3 Sub-menu PARAMETERS – PArAMeT

This menu displays the parameters set in METROLOGICAL mode.



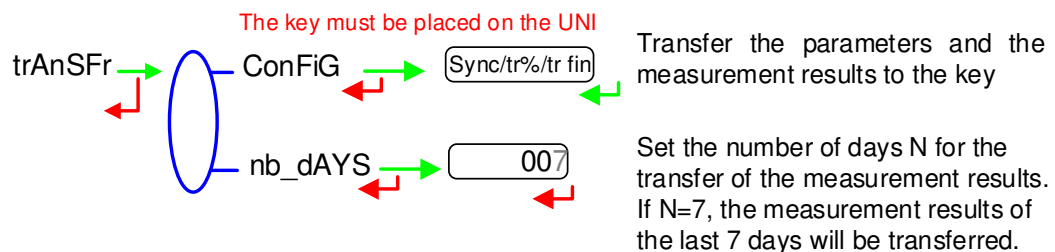
4.3.4 Sub-menu MAINTENANCE – MAIntEn

This menu displays the drain current (mA) of the gas detectors and the reference current set in METROLOGICAL mode.



4.3.5 Sub-menu TRANSFERT – trAnSFr

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 and to download it to a PC. The file format is '.csv'. Refer to the operating guide GU 7110.



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 on the display (using some or all of the seven digits) followed by 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 (GDI)	Use the maintenance menu to check the status of the detector
	dirECTi	Flow direction change during metering	Check the hydraulic configuration and the flowing
REPARATOR	FLoV_	Flow setting fault	Check the parameters
	FrEQ_	Frequency fault	Check the parameters
	COEFF_	Difference between 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 GDI 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
	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 checksum of the metrological data	If steady alarm, substitution of the UNI
	rAM	Saved memory fault	If steady alarm, substitution of the UNI
	MEMoriS	Bad writing 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 compatibility	

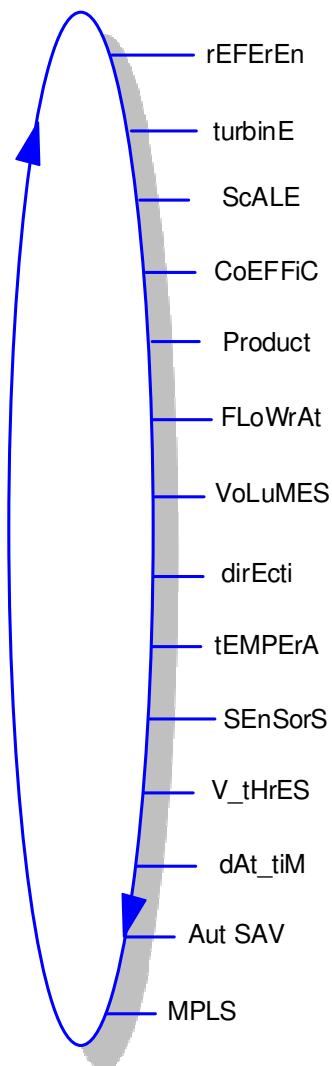


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GRAVICOMPT UNI

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5 METROLOGICAL MODE



The configuration parameters can only be modified after the processor configuration switch on the electronic card has been switched over. Only authorized personnel can modify these parameters.

Exit the METROLOGICAL mode thanks to the switch; the device is then reset.

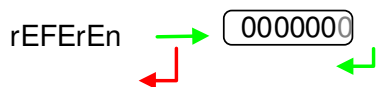
WARNING

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 menu is activated.

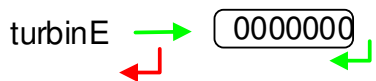
5.1 Menu REFERENCE – rEFErEn

Set the serial number of the electronic calculator-indicator UNI.



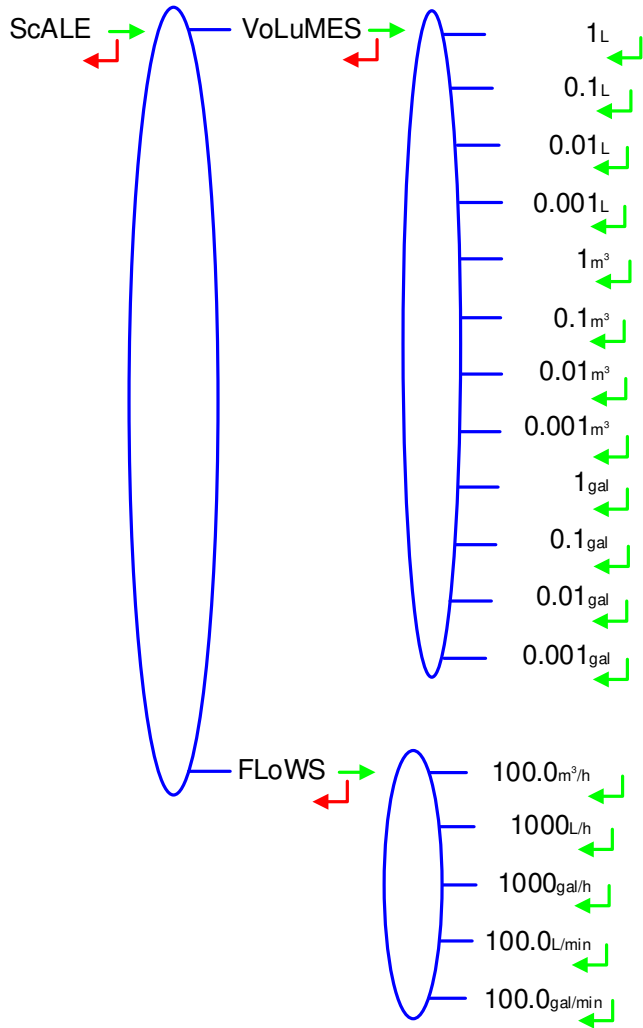
5.2 Menu TURBINE – turbinE

Set the serial number of the turbine meter.

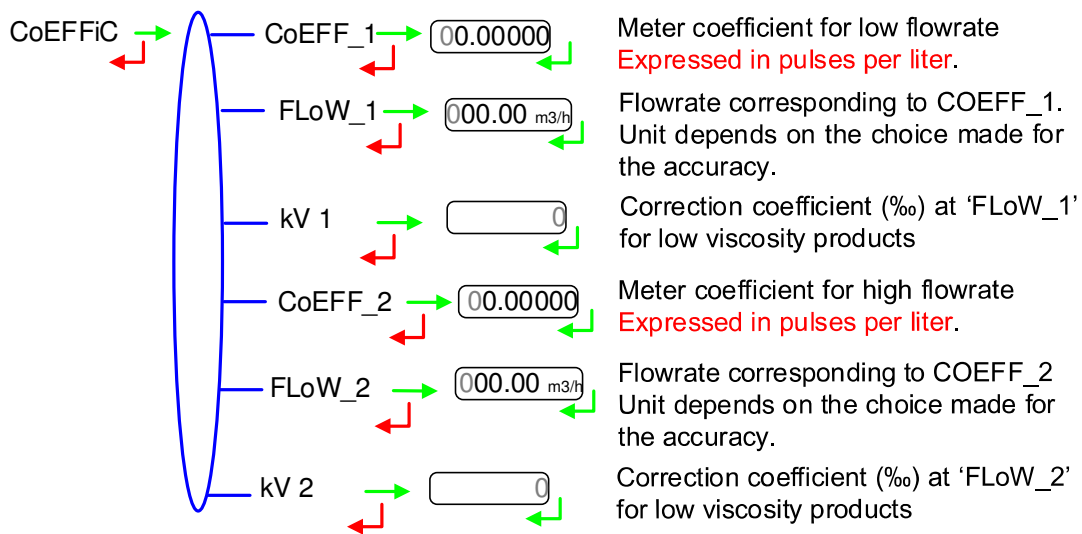


5.3 Menu SCALE – ScALE

Choose the unit and accuracy for volume and flowrate.

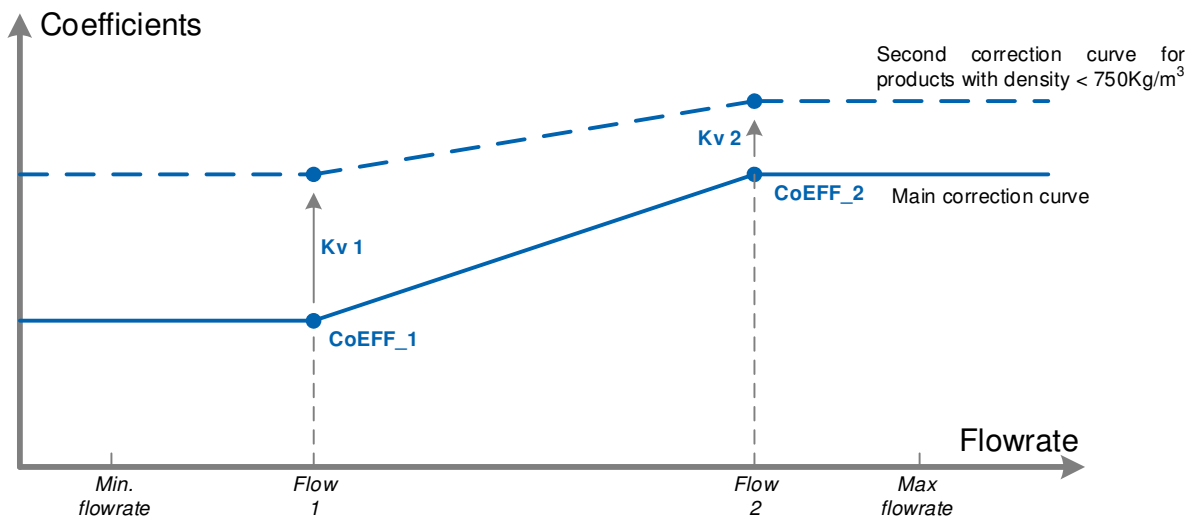


5.4 Menu COEFFICIENT – CoEFFiC



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

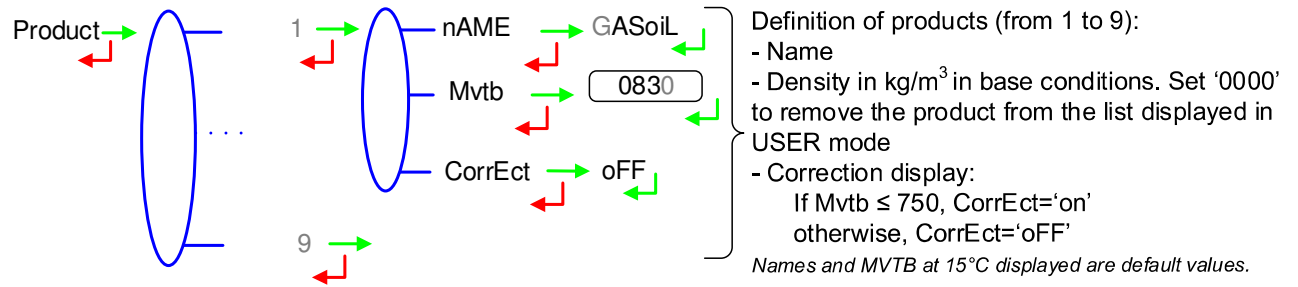
Adjustment of coefficients for several flowrates:



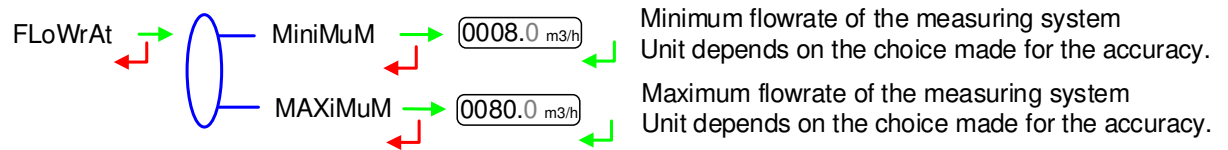
Coefficients applied in accordance with flowrate and product density

5.5 Menu PRODUCTS – Product

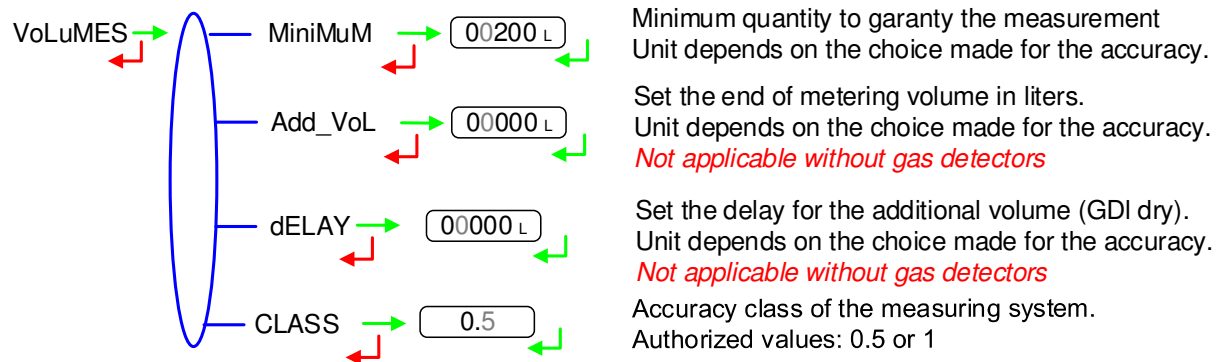
Definition of products.



5.6 Menu FLOWRATES – FLoWrAt

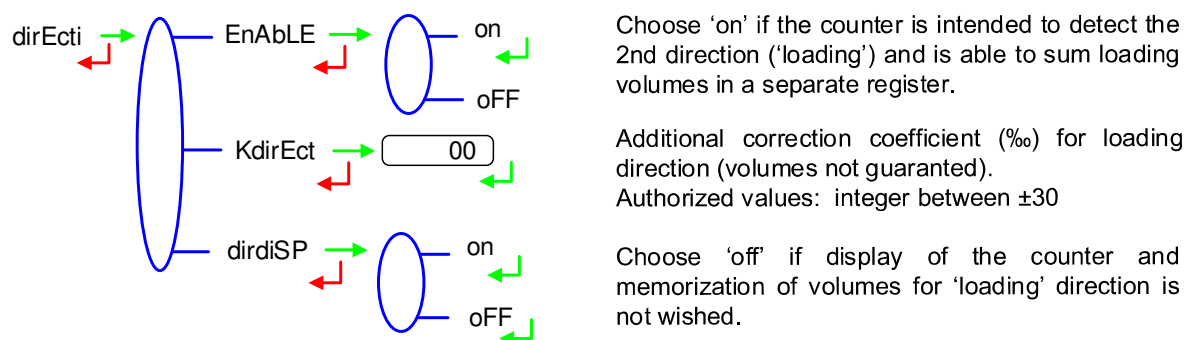


5.7 Menu VOLUMES – VoLuMES



VoLuMES>Add_VoL: 0.5L

5.8 Menu DIRECTION – dirEcti

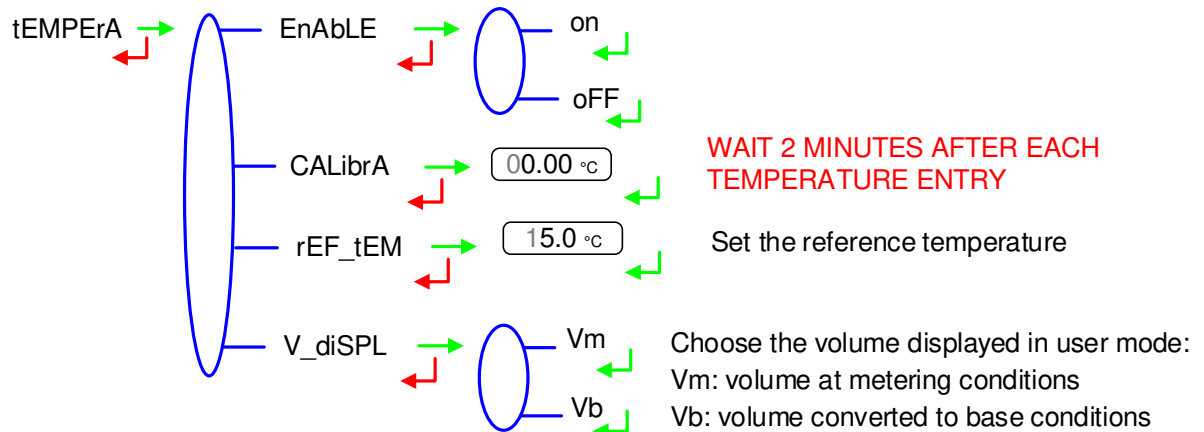


dirEcti>EnAbLE: on

5.9 Menu TEMPERATURE – tEMPErA

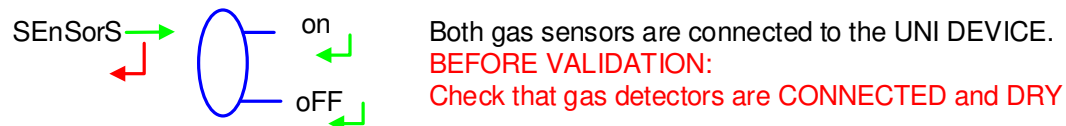
The temperature calibration can be done either on two measuring points or on a single measuring point (menu CALibrA).

- 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.



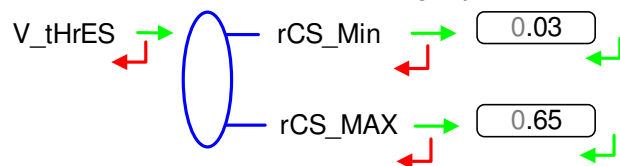
5.10 Menu GAS SENSORS – SEnSorS

The calculator-indicator UNI may be associated to 2 gas detectors.



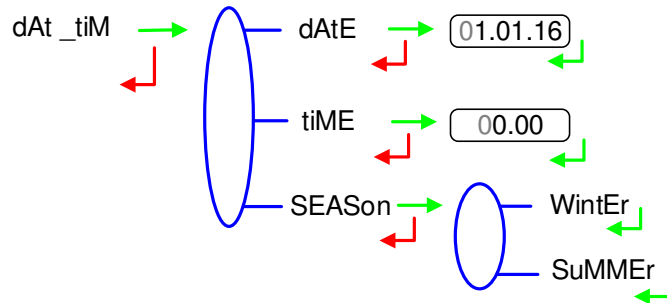
5.11 Menu THRESHOLDS – V tHrES

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

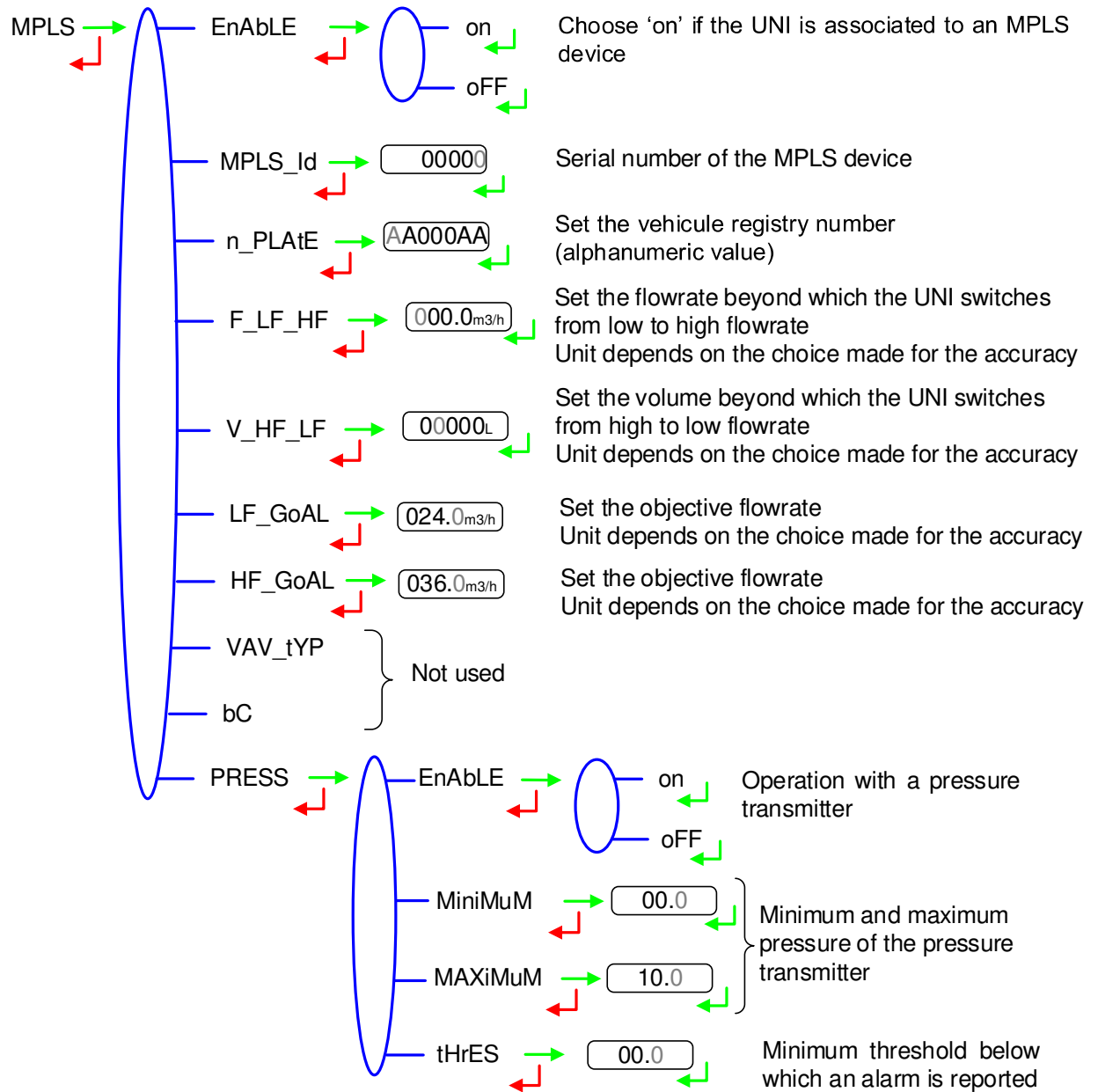
Set the time required at the end of measurement before automatic recording of the measurement data (in seconds). A value other than zero disables the RAZ key. Manual reset is no more possible.



For the GRAVICOMPT UNI without MPLS: Aut SAV: 060 sec

5.14 Menu MPLS – MPLS

This menu must be activated with a pre-setting measuring system; the UNI calculator is then associated to an MPLS device.



6 MAINTENANCE



***Any intervention with broken seals must be carried out by authorised personnel and under the control of the competent authorities or of one of its representatives. Refer to the certificate of the measuring instrument and the regulations in force.**

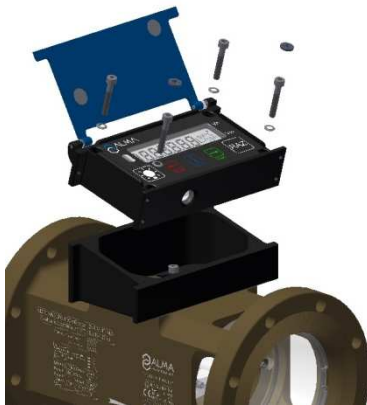
6.1 2DLA-spacer (code 2319)

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:

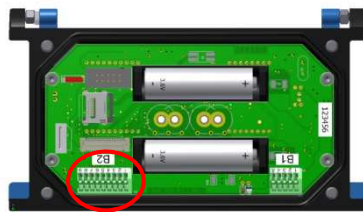
6.1.1 Removing the 2DLA-spacer from the UNI

- 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



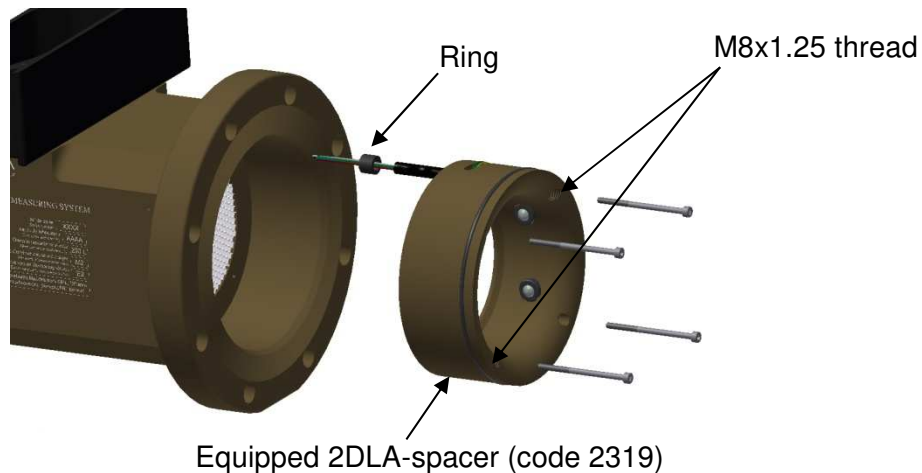
TERMINAL	COMPACT VERSION	REMOTE VERSION
B2-4	Yellow	Yellow
B2-5	Black	White
B2-6	White	Green
B2-7	Red	Grey
B2-8	Blue	Pink
B2-9	Green	Brown

Table 1

6.1.2 Removing the equipped 2DLA-spacer from the turbine

- Unscrew the 4 CHC screws of the 2DLA-spacer

- Remove the 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

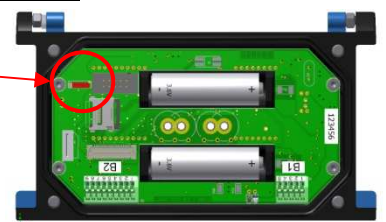


6.1.3 Setting of the equipped 2DLA-spacer

- 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 Molybdene grease.


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

- Check 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 (with the silica gel dehydrating packet) on the UNI bottom box
- 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 Molybdene grease

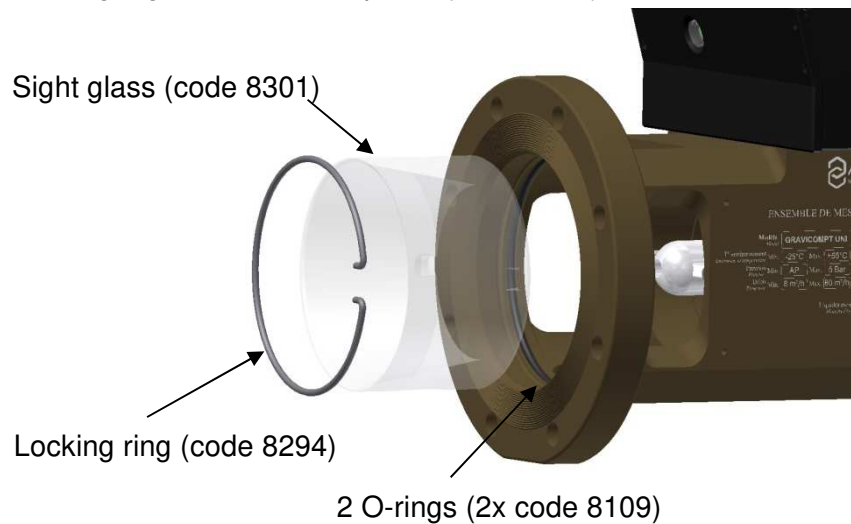
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- Seal* both screws of the calculator-indicating device UNI (if necessary)

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

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