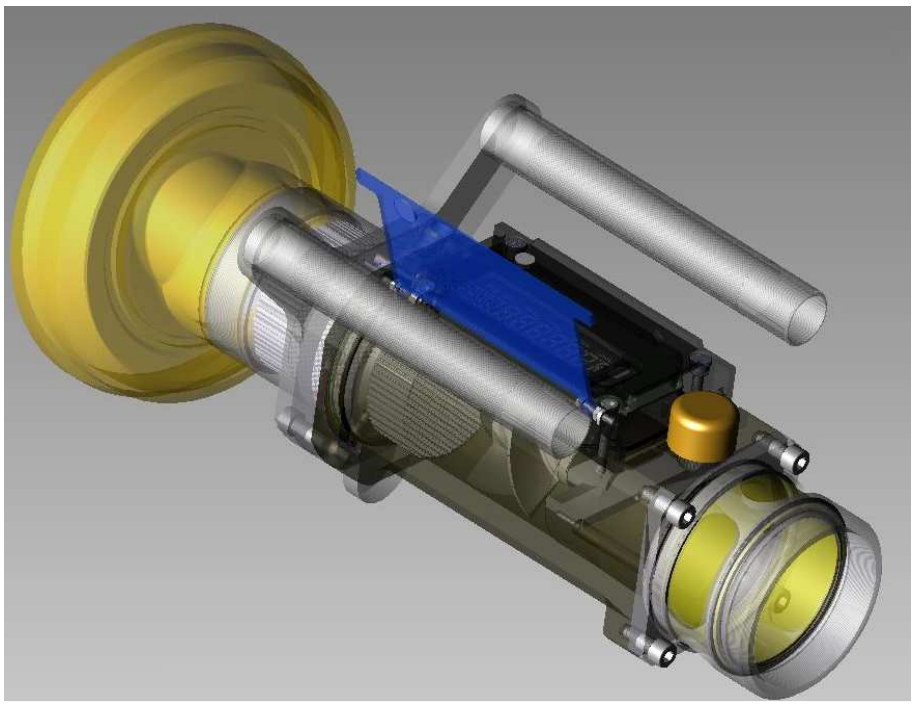
**OPERATING MANUAL**

# AUTONOMOUS FLEXICOMPT+

## MEASURING SYSTEM FOR GRAVITY MEASUREMENT





| Rev. | Date | Nature of modifications | Writter | Approb. |
|---|---|---|---|---|
| D | 24/04/12 | 'IR-USB KEY' option | DSM | XS |
| C | 22/09/11 | Updating with software 434 V1.05 (Vm and Vb) | DSM | XS |
| B | 10/06/10 | Updating with software 434 V1.04 | DSM | XS |
| A | 26/02/09 | Creation – Replace MM5014-EN-4 | FM | DSM |

# SUMMARY

# 1. GENERAL PRESENTATION AND DESCRIPTION

The AUTONOMOUS FLEXICOMPT+ is intended to the gravity measurement of products other than water on various installations.

It can:

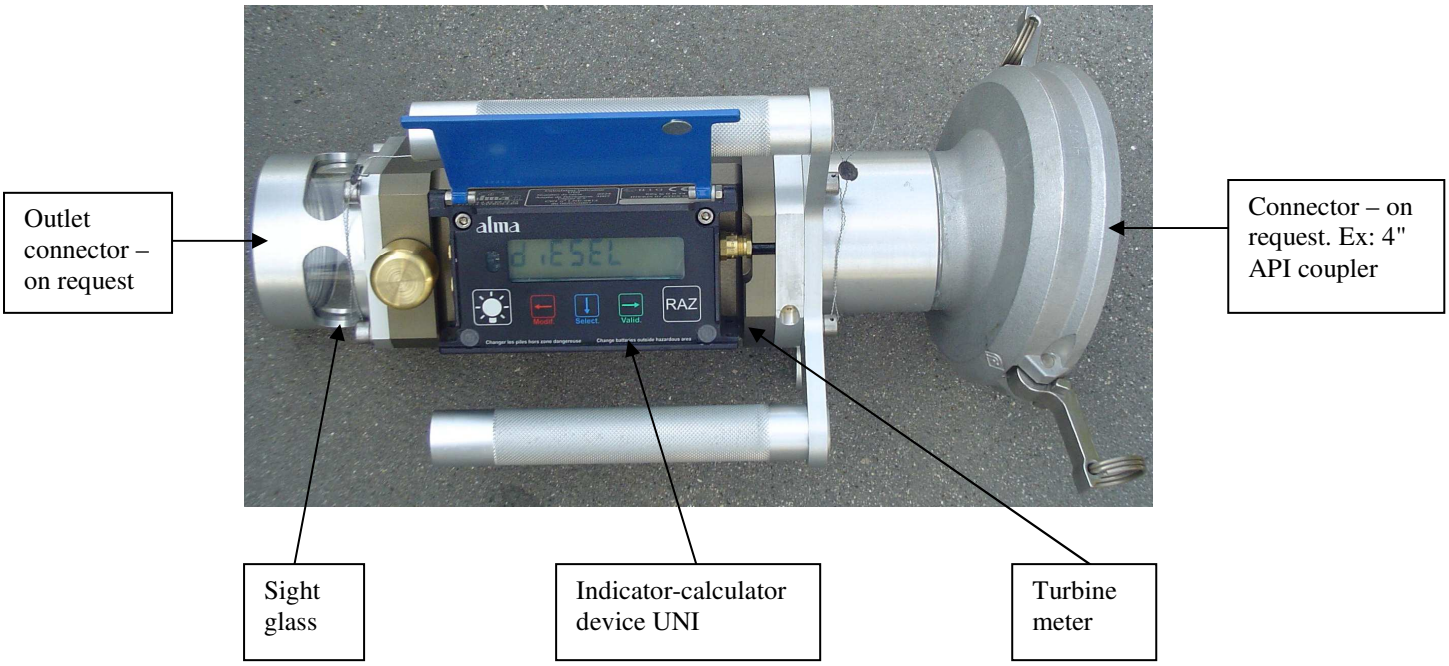
- measure products when they are delivered to the station,
- monitor the reception of products (lorry/wagon),
- split compartments,
- measure product returns,
- and issue tank charts.

The AUTONOMOUS FLEXICOMPT+ includes:

- an intrinsic security indicator-calculator device, type UNI, powered by 2 lithium batteries (4 years life expectancy) fastened to the hydraulic sleeve,
- a hydraulic measuring sleeve composed of:
  - an ALMA turbine meter, type ADRIANE DN80-80,
  - a sight glass located downstream of the turbine meter,
  - a vacuum breaker valve,
- an appropriate connector: a 4" coupler to connect onto the API adapter, a DN80 quick coupling to connect the unloading hose or any other connector (TODO, aviation,…)
- an appropriate unloading connector: a quick coupling to connect the unloading hose or any other connector (TODO, aviation,…).

The AUTONOMOUS FLEXICOMPT+ may be connected to a temperature probe.

The 'IR-USB KEY' option is used to transfer measurements results and parameters to a key. The data may be downloaded from the key to a PC through USB cable.



The indicator-calculator device, type UNI guarantees the metering operation and manages the faults linked with the metering system.

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

On the front of the UNI, you can see five buttons:

BP5  Light the display during 10 seconds

BP4 

Normal mode: return to previous menu
METROLOGICAL mode: increment the flashing figure when imputing a value

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

BP2 

Normal mode: validate the selected menu or value
METROLOGICAL mode: validate the displayed value
In case of default: acknowledge the default

BP1 

Reset the volume to zero before a new measurement. The data of the last measurement are then recorded

# 2. USER RECOMMENDATIONS

When using the AUTONOMOUS FLEXICOMPT+ in gravity mode, the operator must make sure that all of the following conditions are satisfied:

- the tank operating position does not differ by +/- 2° (dependant from tank design, refer to tank manufacturer) from the horizontal reference position (to avoid product retention)
- when measuring, FLEXICOMPT is fixed on the API outlet of the tank at an angle of 15° minimum to the horizontal;
- the unloading hose must be installed to ensure an easy outflow during delivery (without product retention, avoid high points). The maximum length of the discharge hose (3'' diameter) is 12 metres;
- the operator must remain beside the metering system during delivery to stop the flow, if necessary, by closing the API valve on the outlet of the tank compartment .

NB: the AUTONOMOUS FLEXICOMPT+ cannot be used for pumped applications.

# 3. IGNITION AND OPERATION

The AUTONOMOUS FLEXICOMPT+ measuring system operates with an empty hose. The operator connects hydraulic sleeve to the API adaptor and then connects the hose to the sleeve outlet.

The operating procedure is as follows:

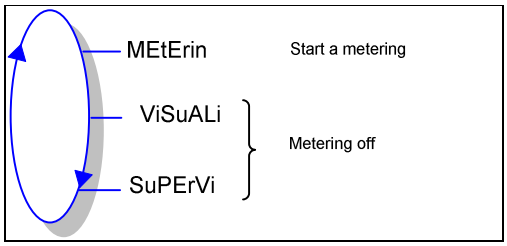
- After having reset the indicator to 0 (BP1 RAZ), the operator turns the outlet release lever on the compartment to be emptied. The metering starts as soon as the indicator – calculator device records impulses coming from the turbine. The metered volume is continually displayed on the indicator-calculator device.

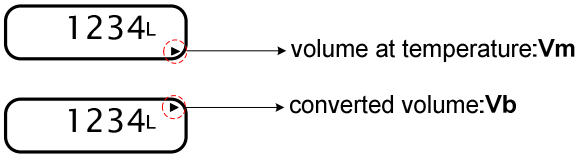
- For partial emptying:
  The operator stops metering by closing the compartment outlet valve. The metering stops when the indicator-calculator device notes that the two gas detectors are wet and flow rate is to zero.

- For complete emptying:
  The operating procedure is identical to the partial emptying procedure but there is no voluntary action on the compartment outlet valve.

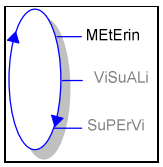


# 4. USER MODE

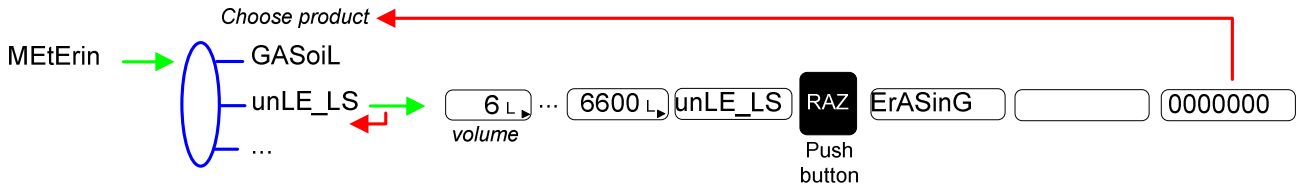



The UNI metering can be either on or off. Metering is ON between the first command level after initialisation or resetting the current volume to zero, and resetting the current volume to zero.




## 4.1 METERING MENU




### 4.1.1 FLOWRATE NOT NULL

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

- One time for flow rate,
- Two times for temperature.

Display returns automatically to the current volume.

### 4.1.2 FLOWRATE TO ZERO

If the flow is zero, pressing BP1 RAZ allows the recording of the last measurement data and reset the volume to zero.

### 4.1.3 IR-USB KEY OPTION: TRANSFER MEASUREMENT RESULTS TO THE KEY

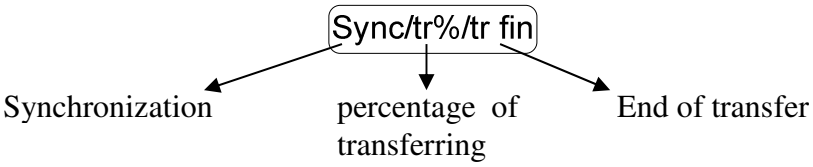
The transfer of the measurement results of the N last days is possible when flow rate is zero. N has to be set in SUPERVOR menu.

Transfer measurement results to the key:

1. Place the key on the UNI indicator such as shown below:

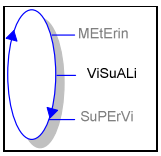
The key is placed on the indicator of the AUTONOMOUS FLEXICOMPT+


2. Press <u>simultaneously</u> RAZ and Select.
   <u>ATTENTION</u>: if it's not made, it may change the product for the following unloading so check the product before starting a new one.
3. Wait the end of transfer and display of message:



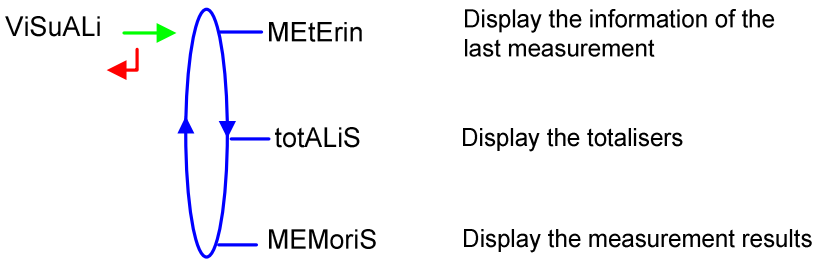

   The file format is '.csv'.
4. Remove the key

Transfer files to a PC, see §6.



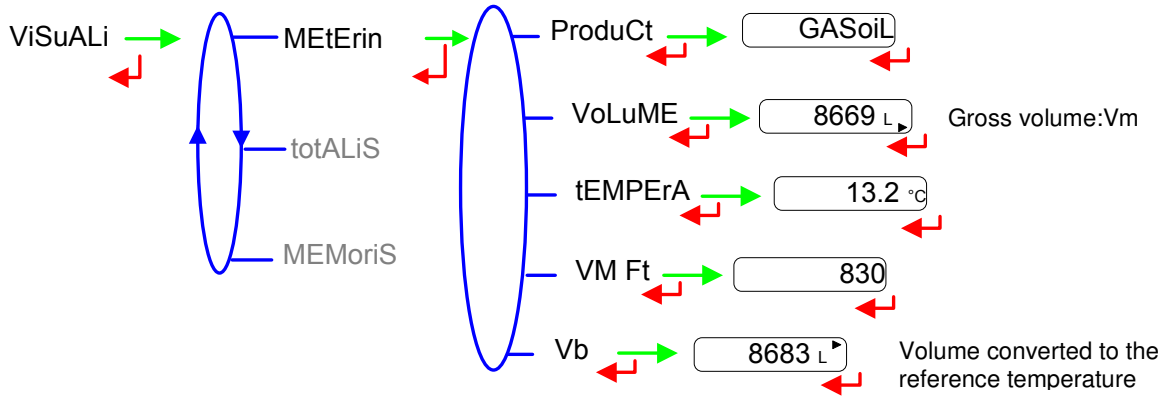

## 4.2 VISUALISATION MENU

The operator can access various menus and sub-menus by using
BP3 select the menu,
BP2 validate the displayed menu or value,
BP4 return to the previous menu.



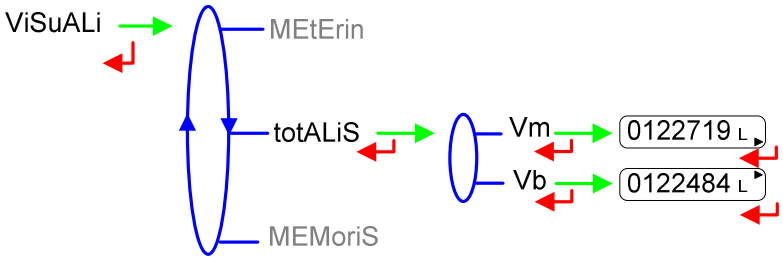
### 4.2.1 METERING SUBMENU

This menu displays the information of the last measurement.




### 4.2.2 TOTALISER SUBMENU

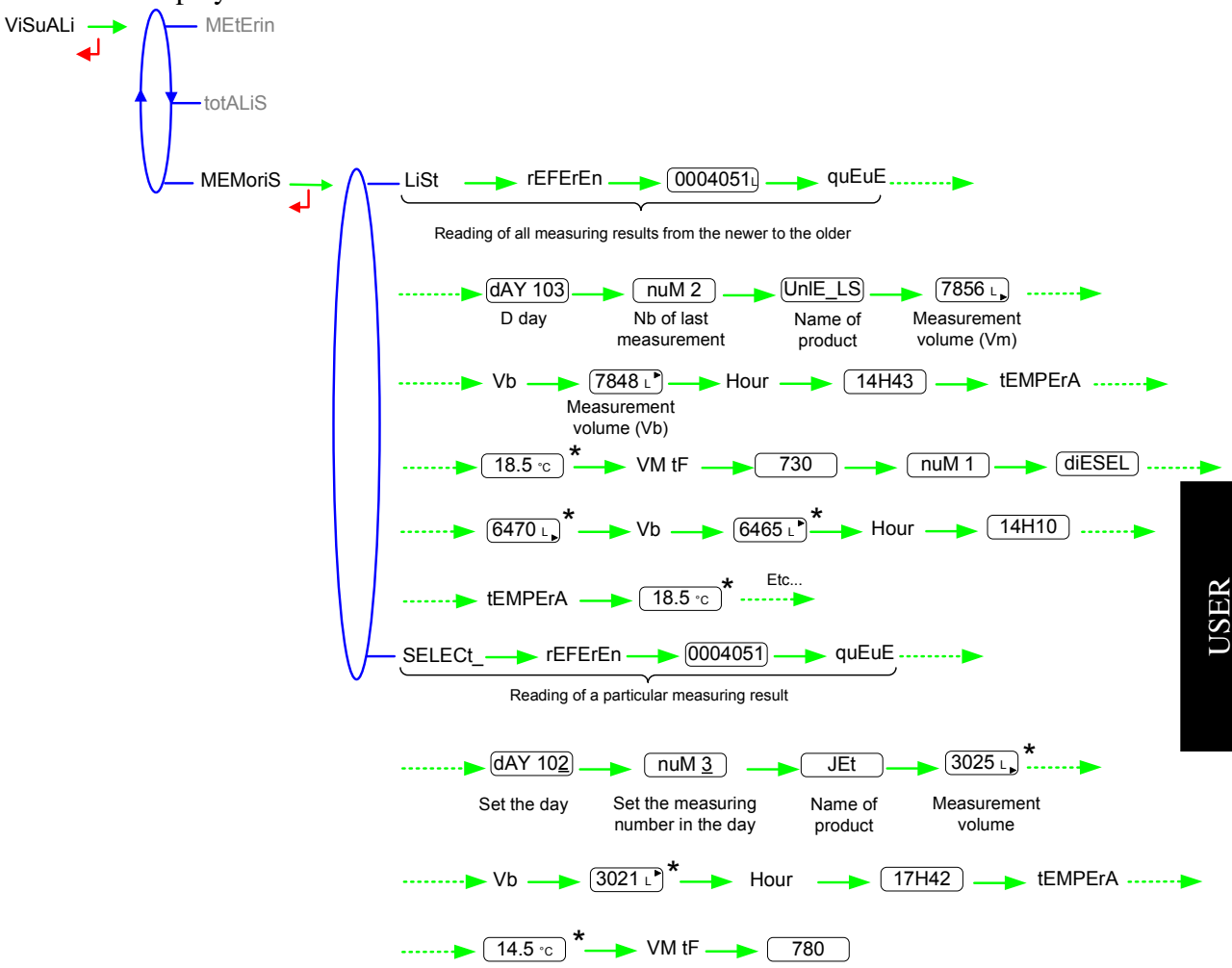
This menu displays the totalisers.




USER

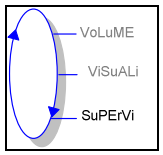
### 4.2.3 MEMORISATION SUBMENU

This menu displays the measurements results.

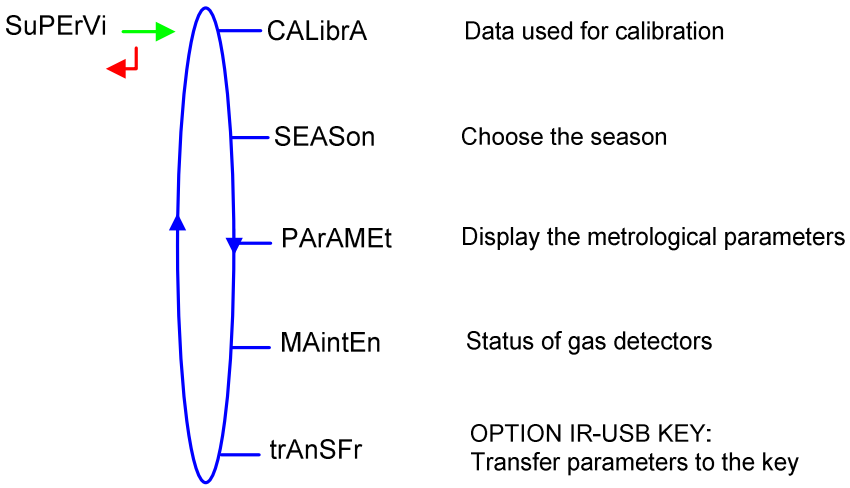



*These values may be preceded by this display: -------
Its means they are no longer guaranteed

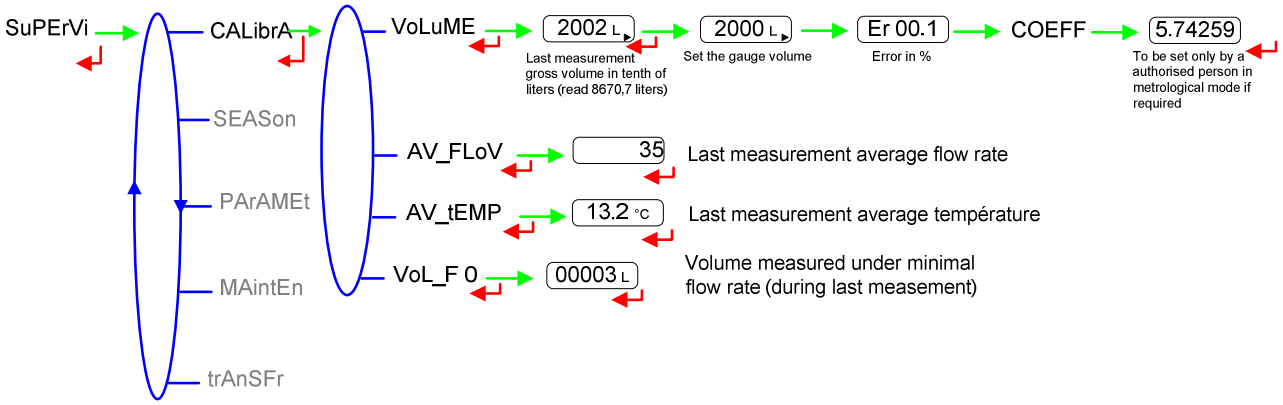
USER




### 4.3 SUPERVISOR MENU

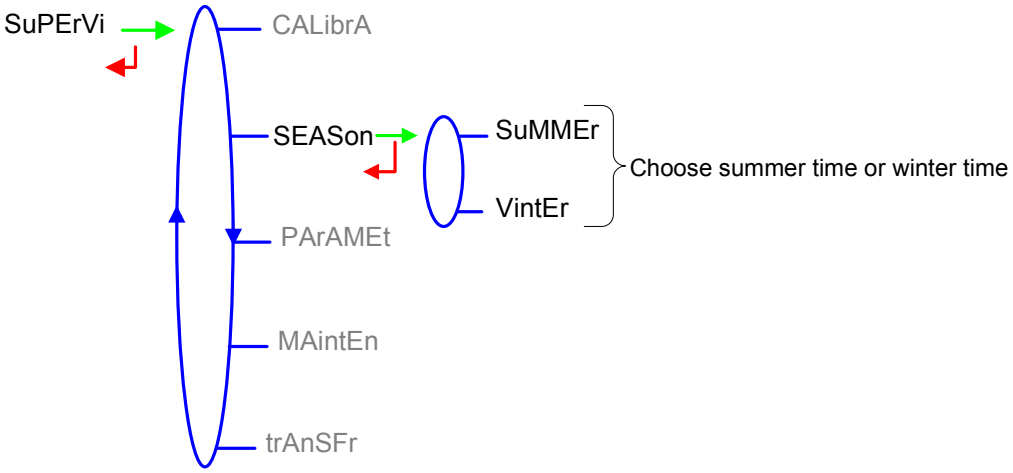


### 4.3.1 CALIBRATION SUBMENU




### 4.3.2 SEASON SUBMENU

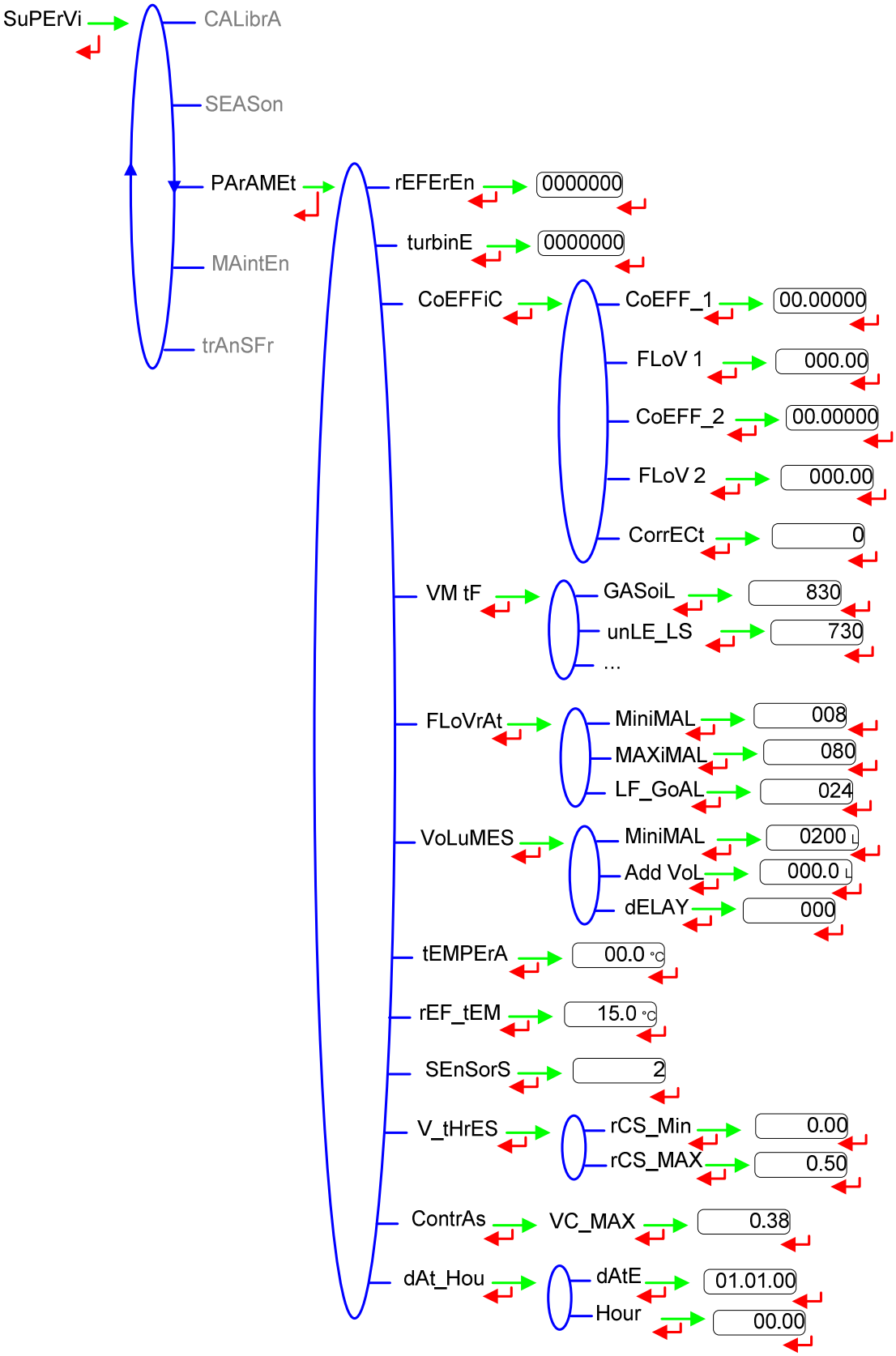
This menu is for choosing season.




USER

### 4.3.3 PARAMETERS SUBMENU

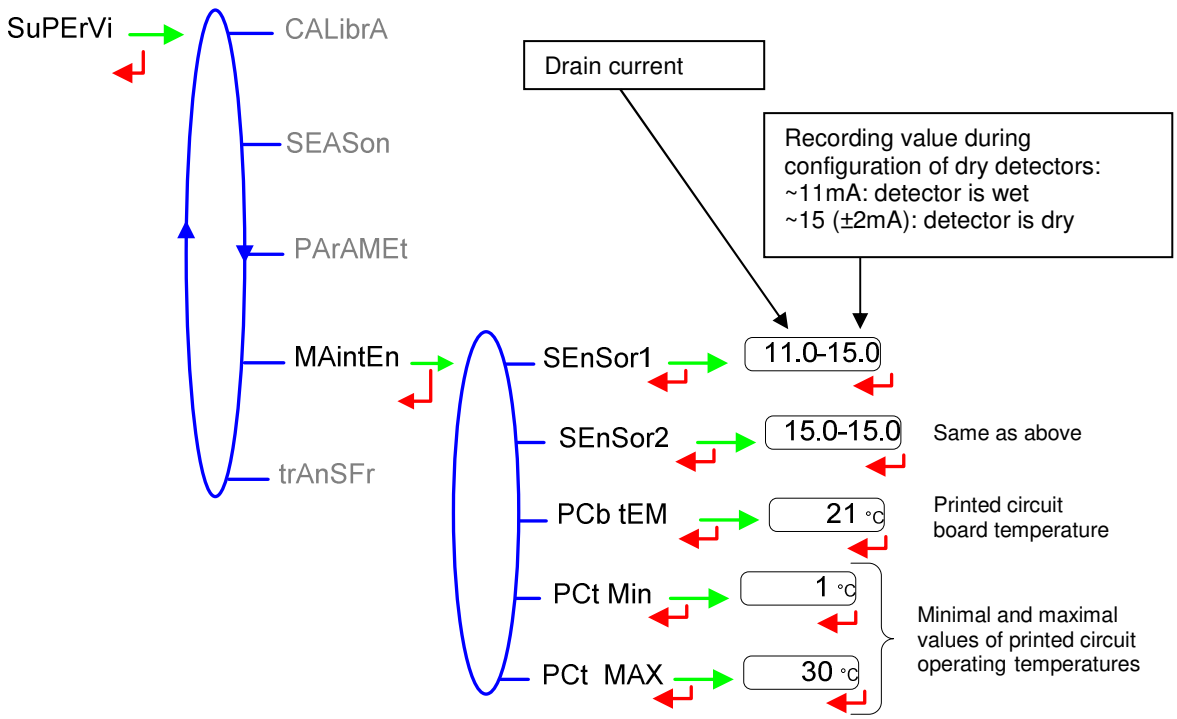
This menu displays the parameters set in METROLOGICAL mode and gives the product temperature.




USER

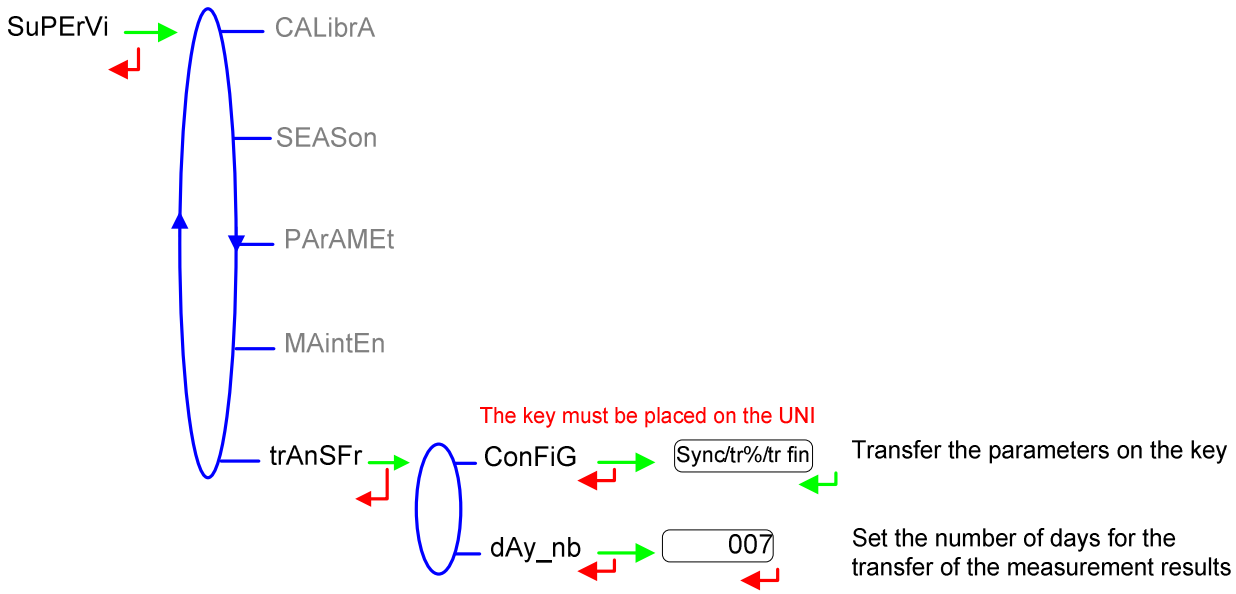
### 4.3.4 MAINTENANCE SUBMENU

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




### 4.3.5 TRANSFER SUBMENU – OPTION

This sub-menu is available with the 'IR-USB KEY' option. It is used to transfer the parameters set in METROLOGICAL mode on the key and download it to a PC. The file format is '.csv'. Transfer files to a PC, see §6.



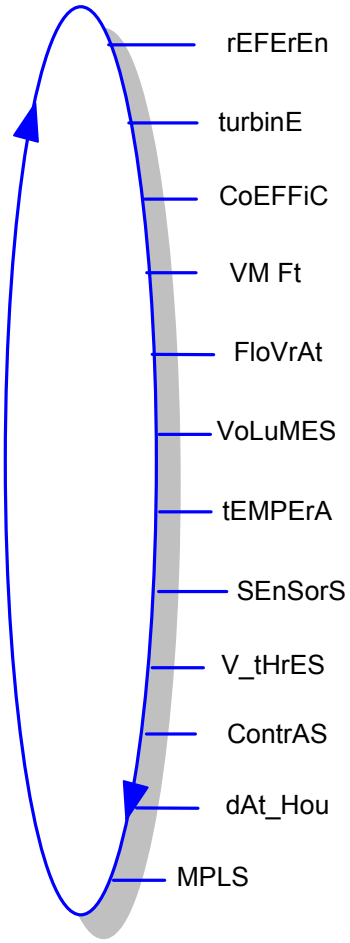
## 4.4 FAULTS LIST

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.

| ALARM | FAULT |
|---|---|
| ProGrAM | Checksum program fault |
| rAM | Metrological configuration RAM fault |
| Faults acknowledgeable in METROLOGICAL mode | |
| MEtro_ | Configuration loss |
| COEFF_ | Coefficient fault |
| dAtE | Date loss |
| FLoV_ | Flow setting fault |
| FrEQ_ | Frequency fault |
| MEMoriS | Memory fault |
| Faults acknowledgeable | |
| dEF_MEM | Loss of backup data concerning the last measurement |
| SEnSor1 | High gas detector fault (GDh) |
| SEnSor2 | Low gas detector fault (GDl) |
| LoW_FLo | Flow rate less than the setting minimal flow rate |
| HiGH_FL | Flow rate greater than the setting maximal flowrate |
| LF_HiGH | Flow rate greater than 20$m^3$/h when GDh is dry |
| GAS | GDh is wet but GDl is dry |
| doG | Watch dog fault |
| ovErFLo | Volume greater than 9 999 999 liters |
| MEtEr_ | Discordance between the two metering channels above Qmin |
| bobinE | Loss of pulse transmitter signal |
| dEF CoM | Communication fault |
| totAL | Totaliser fault |
| diSPLAY | LCD display fault |
| FuLL | Saturation of secured memorisation:more than 99 measurements per day |
| bAttErY | Battery fault |
| tEMPErA | Temperature less than -20°C or greater than 50°C |

# 5. METROLOGICAL MODE



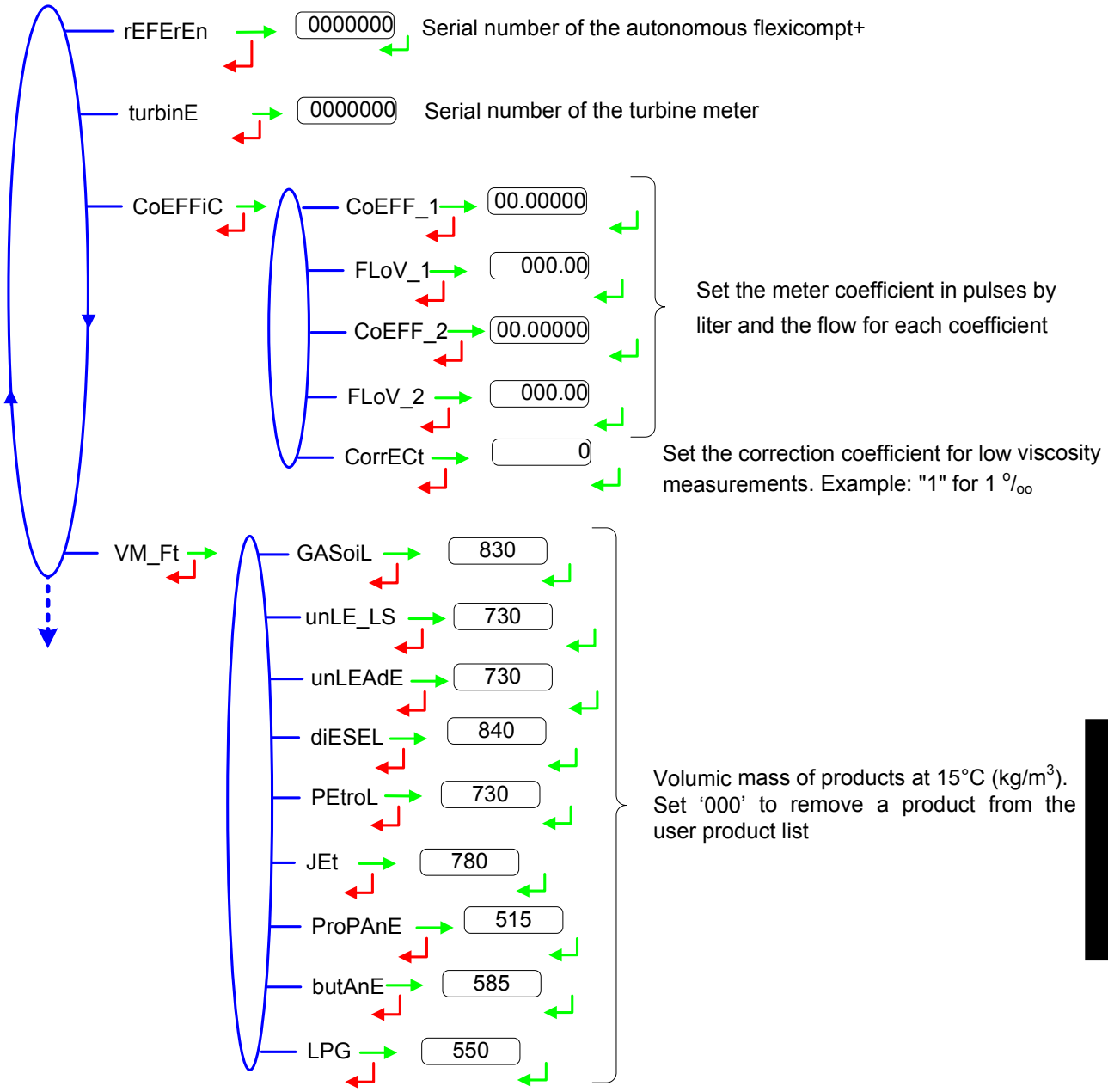



The configuration parameters can only be modified after the processor configuration switch on the electronic card has been switched over. Only authorized personnel can modify these parameters. All other interventions must be carried out by authorised personnel since the metrological character of the AUTONOMOUS FLEXICOMPT+ may be modified.

**IMPORTANT**

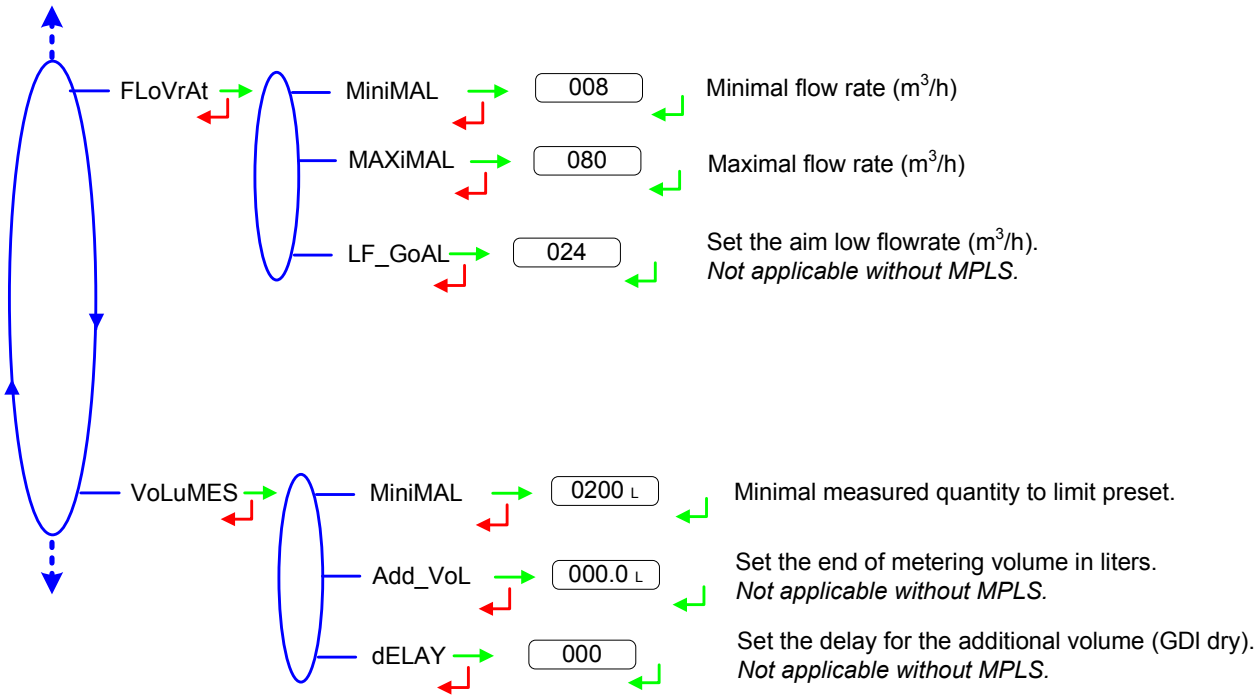
**Setup should be done under cover, metering off, with dry gas detectors (see § 4.2.2.4).**

## 5.1 REFERENCE, TURBINE, COEFFICIENT, VMFT



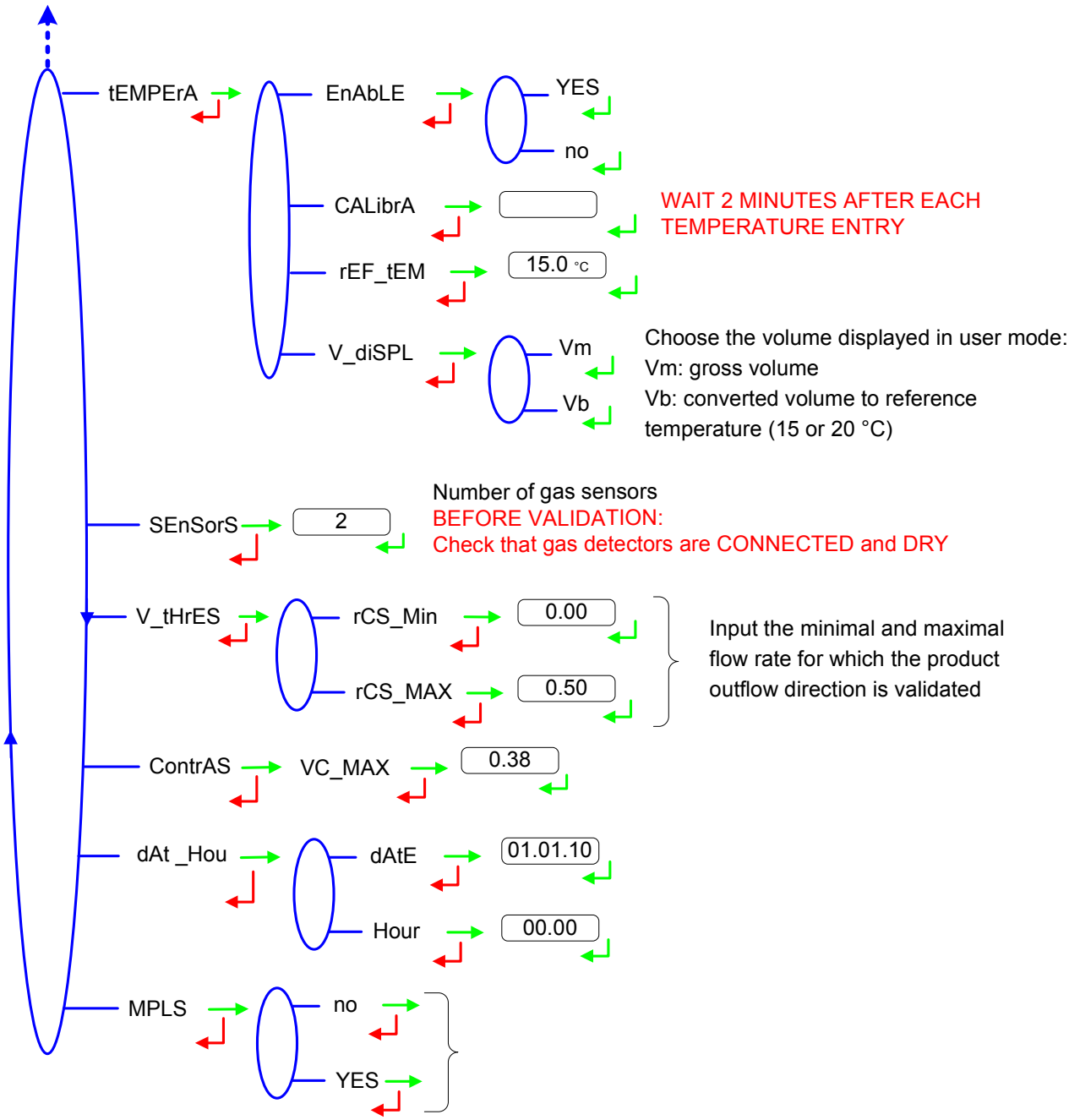

METROLOGICAL

## 5.2 FLOW RATES, VOLUMES




METROLOGICAL

## 5.3 TEMPERATURE, GAS DETECTORS, THRESHOLDS, CONTRAST, DATE, MPLS




METROLOGICAL

# 6. TRANSFER DATA TO A PC – OPTION

The 'IR-USB KEY' option is used to transfer measurements results and parameters to a key. The data may be downloaded from the key to a PC through USB cable.

Transfer files from the key to a PC:

1. Connect the cable to the key
2. Connect the cable to the PC
   A green led on the key lights on to indicate that it is detected by the PC.
3. Access the key directory (see PC documentation)
   The measurements results files are named 'M0000123' where 123 is the AUTONOMOUS FLEXICOMPT+ reference number.
   The parameters files are named 'P0000123' where 123 is the AUTONOMOUS FLEXICOMPT+ reference number.

Files should be renamed before being stored in the backup directory.

A1 — Compte rendu des mesurages de l'UNI n° 0000002 le 13/04/2012 à 11:20

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Compte rendu des mesurages de l'UNI n° 0000002 le 13/04/2012 à 11:20 | | | | | | | | | | | | | | |
| 2 | Totalisateur | 11072 | L | | | | | | | | | | | | |
| 3 | Totalisateur | 11101 | L | | | | | | | | | | | | |
| 4 | Tension Pile | 3.01 | V | KO | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | |
| 6 | Quantième c | Numéro du l | Date | Heure | Produit | Volume brut | Volume de b | Température | Masse (Kg) | Défaut | DEF_MEM | DOG | DEPASSE | MESUR | DEB_BAS | DEB |
| 7 | | | | | | | | | | | | | | | | |
| 8 | 104 | 7 | 13/04/2012 | 11:20 | SP98 | 689 | 691 | 12.4 | 504 | | | | | | | |
| 9 | 104 | 6 | 13/04/2012 | 11:17 | SP98 | 406 | 407 | 12.1 | 297 | | | | | | | |
| 10 | 104 | 5 | 13/04/2012 | 11:15 | SP-ETH | 2001 | 2008 | 12.4 | 1465 | | | | | | | |
| 11 | 104 | 4 | 13/04/2012 | 11:11 | SP-ETH | 301 | 302 | 12.1 | 220 | | | | | | | |
| 12 | 104 | 3 | 13/04/2012 | 11:10 | GAZOLE | 1611 | 1615 | 12.2 | 1340 | | | | | | | |
| 13 | 104 | 2 | 13/04/2012 | 11:06 | GAZOLE | 3100 | 3107 | 12.2 | 2578 | | | | | | | |
| 14 | 104 | 1 | 13/04/2012 | 10:57 | GAZOLE | 2908 | 2915 | 12.3 | 2419 | | | | | | | |

**File M0000123**

A1 — Paramètres UNI n°0000002 le 13/(

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | Paramètres | UNI n°0000002 le 13/04/2012 à 11:20 | | | | |
| 2 | Version du l | 438 v01.00.01 | | | | |
| 3 | Date du logi | 23/03/2012 | | | | |
| 4 | Tension Pile | 3.01 | V | | | |
| 5 | N° de série d | 1 | | | | |
| 6 | Coefficient K | 5.71670 | imp/L | Petit Débit Q | 00.0 | m3/h |
| 7 | Coefficient K | 5.71670 | imp/L | Grand Débit | 00.0 | m3/h |
| 8 | Correction v | 0 | | | | |
| 9 | Rcsmin (%) | 0.00 | | | | |
| 10 | Rcsmax (%) | 50.00 | | | | |
| 11 | Produit 1 | GAZOLE | | Masse Volun | 830 | Kg/m3 |
| 12 | Produit 2 | SP-ETH | | Masse Volun | 730 | Kg/m3 |
| 13 | Produit 3 | SP98 | | Masse Volun | 730 | Kg/m3 |
| 14 | Produit 4 | FOD | | Masse Volun | 840 | Kg/m3 |
| 15 | Produit 5 | AVGAS | | Masse Volun | 740 | Kg/m3 |
| 16 | Produit 6 | JET | | Masse Volun | 780 | Kg/m3 |
| 17 | Produit 7 | PROPANE | | Masse Volun | 0 | Kg/m3 |
| 18 | Produit 8 | BUTANE | | Masse Volun | 0 | Kg/m3 |
| 19 | Produit 9 | GPL | | Masse Volun | 0 | Kg/m3 |
| 20 | Débit minim | 8 | m3/h | | | |
| 21 | Débit maxim | 80 | m3/h | | | |
| 22 | Petit débit ol | 24 | m3/h | | | |
| 23 | Quantité Mi | 200 | L | | | |
| 24 | Volume forfa | 0 | L | | | |
| 25 | Delai | 0 | L | | | |
| 26 | Classe d'exa | 0.5 | | | | |
| 27 | Volume affic | Vm | | | | |
| 28 | Température | 15.0 | °C | | | |
| 29 | Pente mesur | 7.769698e-03 | | | | |
| 30 | Zéro mesure | 89.432 | Ohm | | | |
| 31 | Courant Refe | 15.6 | mA | | | |
| 32 | Courant Refe | 14.3 | mA | | | |
| 33 | Contrast LCD | 38.00 | | | | |
| 34 | Association | Non | | | | |
| 35 | Température | 9.0 | °C | | | |
| 36 | Température | 35.0 | °C | | | |

P0000002-14H39

**File P0000123**