OPERATING MANUAL

MU 7071 EN C

GRAVITRONIQUE

Issue	Date	Nature of modifications	Written by	Approved by
C	2017/05/09	Setting of vent orders	DSM	AH
B	2016/10/11	Choice to end full or empty for preset delivery. New menu empty manifold / Calibration gauge for gravity mode. Timeout to prevent the pump from running idle / Choice for pumped valve. Conversion and loading plan improved *[MDV424]* PRESET+PURGE only with full hose No.1	DSM	AH
A	2015/03/31	Creation	DSM	AH

CONTENTS

1 GENERAL PRESENTATION AND DESCRIPTION:

The GRAVITRONIQUE measuring system is designed to measure volumes of liquid in preset or free mode from each compartments of a road-tanker. It can be used for gravity or pumped distribution.

The GRAVITRONIQUE is fitted with the following components:

- ⇨ A turbine meter
- ⇨ A MICROCOMPT+ electronic calculator-indicator device
- ⇨ A differential pressure sensor
- ⇨ A gas detector used as end-of-metering probe located upstream of the turbine meter. It detects the absence of liquid and triggers the end of metering
- ⇨ A gas detector used as vacuity sensor located downstream of the turbine meter. It control the complete draining for gravity distribution
- ⇨ A transfer valve which regulates flow
- ⇨ Air-operated gates connecting each compartment with the manifold
- ⇨ A temperature probe (option)
- ⇨ A printer (option).

The measuring system can be equipped with an additive injection device. This injection has to occur upstream the meter.

In option, the GRAVITRONIQUE takes into account and manages the temperature of liquid.

The volume displayed by the GRAVITRONIQUE depends on the METROLOGICAL configuration. On the right side of the display screen, the pictogram ‘Vm’ indicates a volume at temperature whereas the pictogram ‘Vb’ indicates a converted volume.

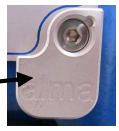
The GRAVITRONIQUE controls up to 6 compartments with a maximum of 16 products which names are configurable.

Depending on the configuration, the GRAVITRONIQUE can control one, two or three pumped distribution ways and one gravity distribution way.

In option, it may print delivery tickets, internal totalisers, parameters, and events diary.

NOTE : The information printed by the printer has no metrological value. Only the indications displayed by the indicator shall be considered legally valid.

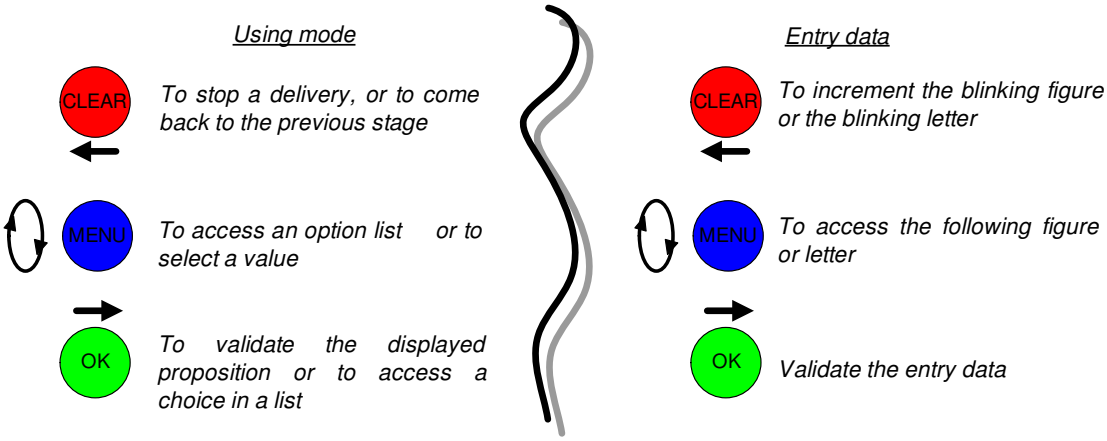
Presentation of the MICROCOMPT+ calculator-indicator:



Sealed cup protecting access to metrological functions

SUPERVISOR key – magnetic or RFID – to access configuration and calibration menu

Buttons function:



The MICROCOMPT+ calculator-indicator manages measuring operation and computerizes the measuring system defaults.

2 OPERATING RECOMMENDATIONS:

For a use of the GRAVITRONIQUE in pumped mode, the operator must make sure that all of the following conditions are met:

- ⇨ The tank operating position does not differ by ± 2% from the horizontal reference position (to avoid product retention)
- ⇨ The unloading hose must be installed to ensure an easy outflow during delivery; the maximum length of the discharge DN80 hose, 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.

For a use of the GRAVITRONIQUE in gravity mode, the operator must make sure that all of the following conditions are met:

⇨ The piping linking each compartment and the transfer valve must have a minimum pitching of 3%. The vehicle on which the measuring system is installed must be fitted with a device to ensure it is horizontal

⇨ The end-of-metering probe is placed so that it can detect the vacuity of the collector on the smallest free surface.

3 CONFIGURATION, SETTING AND CALIBRATION:

3.1 Configuration

To access the METROLOGICAL mode, the MICROCOMPT+ has to be unsealed. Only an authorized person can remove the seal. This mode allows setting all metrological parameters. It's done at the putting into use of the measuring system and sometimes during metrological controls.

Refer to METROLOGICAL MODE and to the verification manual MV5007 for configuration.

3.2 Setting

To access the SUPERVISOR mode, the magnetic or RFID key must be set at the right of the MICROCOMPT+ display. This mode is used to set the measuring system and to access the calibration menu. Before using the GRAVITRONIQUE, enter the value of the parameters such as:

- Products: name, type of product, price, additivation, correction
- Additive, metering lines
- The vehicle identification
- Volumes, flowrates and timing settings
- Adjustment of time
- Printing conditions
- The display language

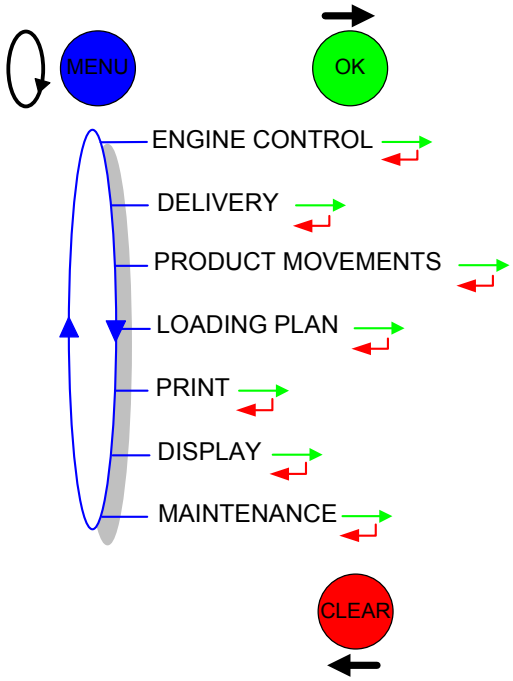
Refer to SUPERVISOR MODE and to the verification manual MV5007 for setup.

3.3 Calibration

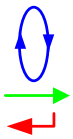
Having made the proving of the metering, the menu CALIBRATION/GAUGE allows calculating the error and the new coefficient.

Refer to SUPERVISOR MODE and to the verification manual MV5007 for details on the gauging procedure.

4 USER MODE:



LEGEND:



Press the button (red, blue or green) as many times as necessary to display the next message

The use of GRAVITRONIQUE measuring system depends on the hardware configuration of the truck and on the features and the configuration of the equipment carried out during the putting into use.

Therefore, the user menu depends on several items:

- ⇨ The number of distribution ways (from one to three)
- ⇨ The remote control
- ⇨ The number of compartments
- ⇨ The control of the compartments flaps
- ⇨ The control of the return product system (SRP)
- ⇨ The distribution mode (pumped, gravity)
- ⇨ The temperature control (conversion of the volume).

In USER mode, the GRAVITRONIQUE displays a blinking volume which is the last delivered volume.

There are several delivery modes:

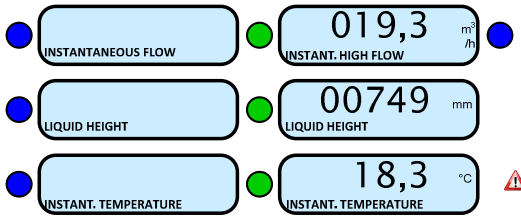
- ⇨ PRESET of the volume
- ⇨ PRESET of the volume + hose PURGE. This delivery mode can only be used with the hose No1 (full hose); it is available if the compartment flap control is activated.

  In addition, this delivery mode is not proposed:
  - For a delivery with hose No2 or No3 or for gravity distribution mode
  - In case of pollution of the hose
  - If a manual flap control is activated
  - If the product in the hose is undefined.
- ⇨ FREE mode (in low or high flow rate)

During measurement, the following information may be displayed:

- ⇨ The instantaneous flow rate in high or low flowrate (m^3/h or L/min; depending on the display unit set)
- ⇨ The product height (mm)
- ⇨ The temperature (°C) if it is taken into account.

Simply follow the indications below:



Change flowrate (high or low flow). Unit: m^3/h or L/min

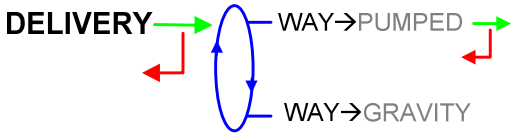
⚠ With active option

Back to normal display is automatic: DO NOT PRESS RED STOP BUTTON TO KEEP FROM INTERRUPTING DELIVERY.

Before starting measuring, the driver must initialize the MICROCOMPT+ calculator device by validating the pumped or gravity distribution mode, the product, the compartment and if necessary, the distribution way. He can choose if the distribution is made by presetting the volume (PRESET or PRESET+PURGE) or not (FREE).

Pumped distribution mode:

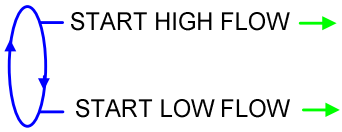
Choose DELIVERY>WAY→PUMPED:



For a preset distribution, the choice is given to end with the manifold full or empty.

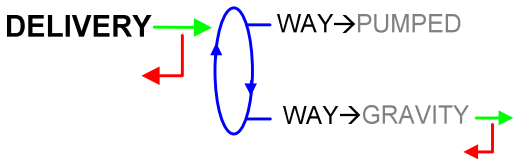
If the last delivery ends with the manifold empty or if the manifold has been emptied through the menu EMPTY MANIFOLD→PUMPED or EMPTY MANIFOLD→GRAVITY, the GRAVITRONIQUE opens the compartment bypass flap in order to fill the manifold. FILLING is displayed during this sequence.

Delivery can be performed in high or low flow. This choice is made for pumped deliveries at the display of the message START HIGH FLOW. The blue MENU BUTTON switches on the display START LOW FLOW. The choice is made by pressing the green OK BUTTON. Switching is possible during the delivery.



Gravity distribution mode:

Choose DELIVERY>WAY→GRAVITY:



For a preset distribution, the choice is given to end with the manifold full or empty. However if the gravity delivery is made with a product different than the last pumped-delivered product, the GRAVITRONIQUE requires to end with the manifold empty in order to avoid any mixture of product: END→EMPTY must be validated.

If the last delivery ends with the manifold empty or if the manifold has been emptied through the menu EMPTY MANIFOLD→GRAVITY, the GRAVITRONIQUE opens the compartment bypass flap in order to fill the manifold. FILLING is displayed during this sequence.

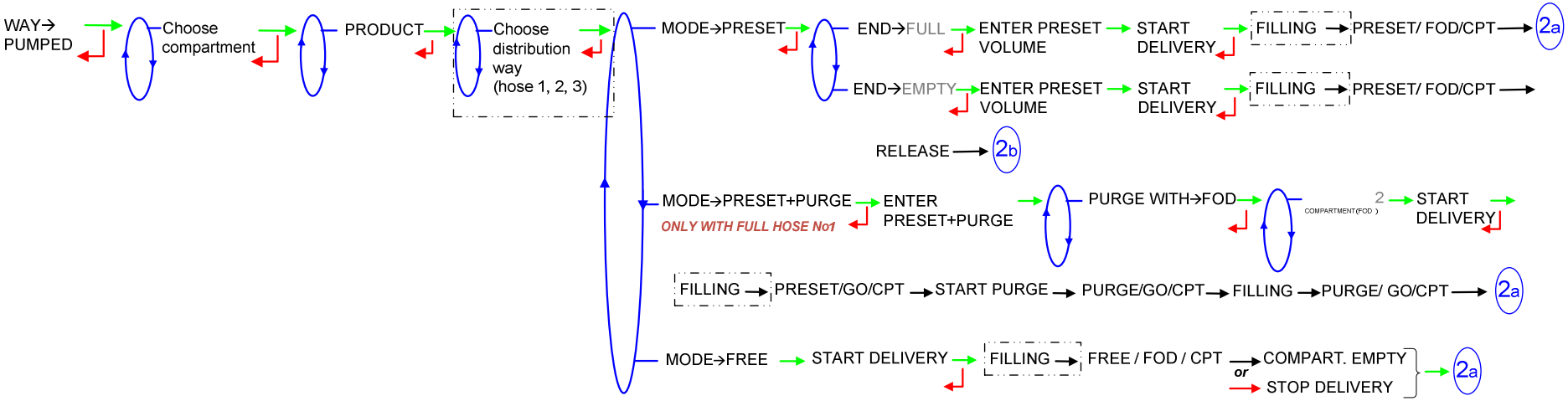
If the manifold is not empty at the beginning of a delivery, a draining is done to avoid any mixture of product. But if the product in the manifold is the same as those used for the current gravity delivery, draining is not required. The delivery starts with full manifold.

4.1 Menu DELIVERY

If the option loading plan is active, the name of the product in the compartment is displayed next to the compartment number (C1/GO). Also, the remaining volume (REMAINING VOLUME) in the selected compartment is displayed after the product is chosen.

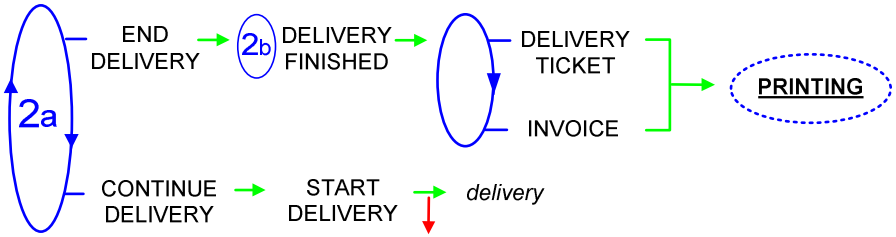
4.1.1 Pumped delivery: one or several distribution ways

4.1.1.1 Delivery



Non-systematic phase: Only with 2 or 3 distribution ways
Non-systematic phase: Manifold filling when the last delivery has ended with the manifold empty (wet vacuity sensor)

4.1.1.2 Finish/Continue

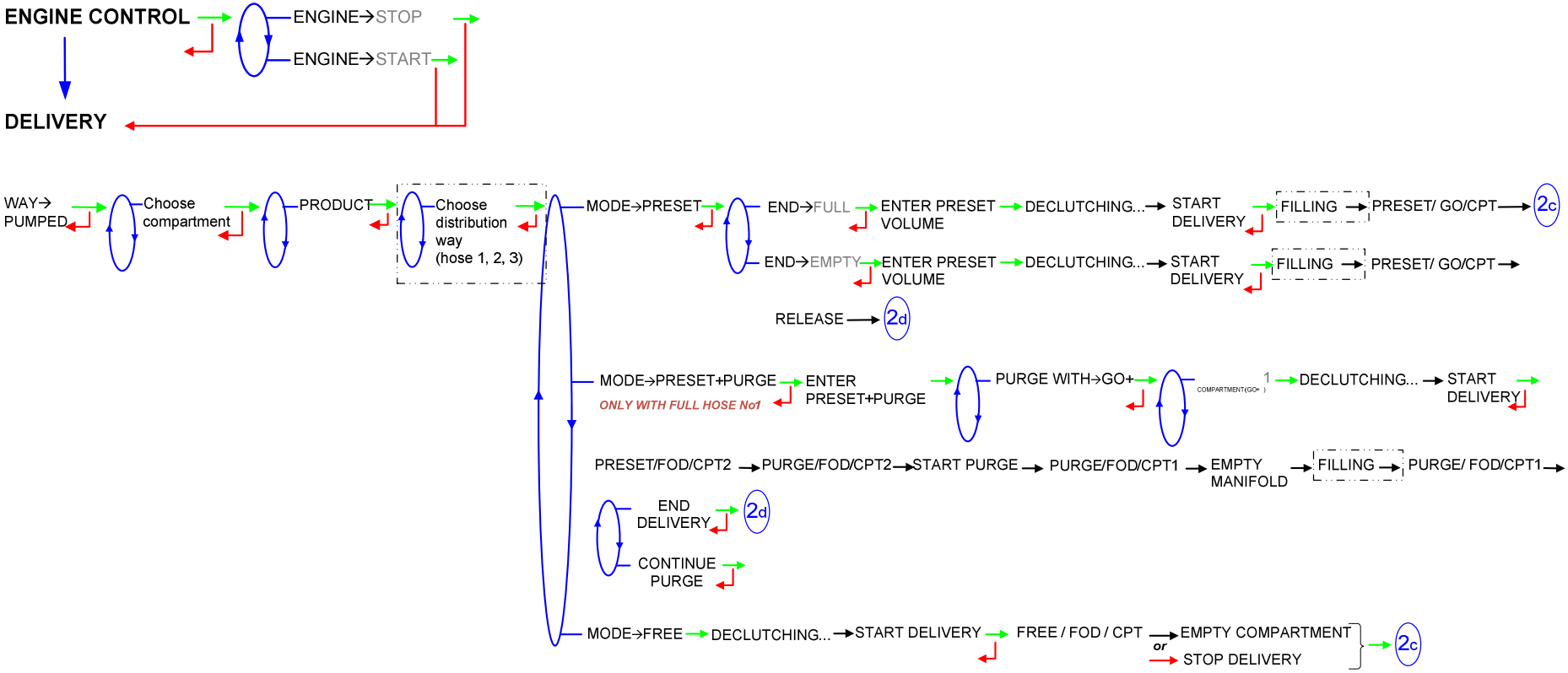


***To change the delivery criteria**: press the red pushbutton when START DELIVERY is displayed with the volume already discharged.*

4.1.2 Pumped delivery: one or several distribution ways + engine control

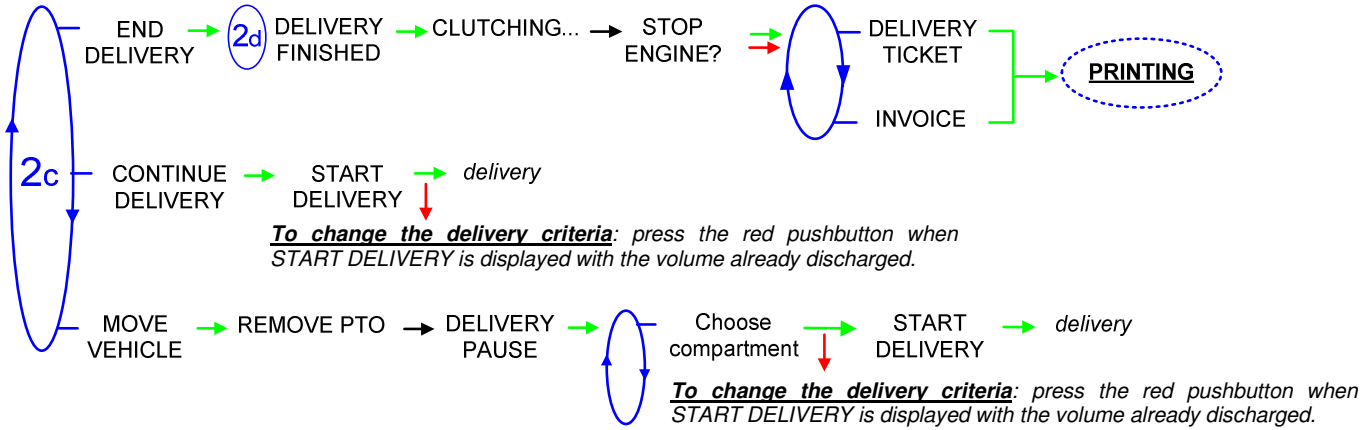
4.1.2.1 Delivery

The commands for the pump clutching/declutching and for the power take-off control are realised by the GRAVITRONIQUE at the beginning and at the end of distribution.



Non-systematic phase: Only with 2 or 3 distribution ways
Non-systematic phase: Manifold filling when the last delivery has ended with the manifold empty (wet vacuity sensor)

4.1.2.2 Finish/Continue

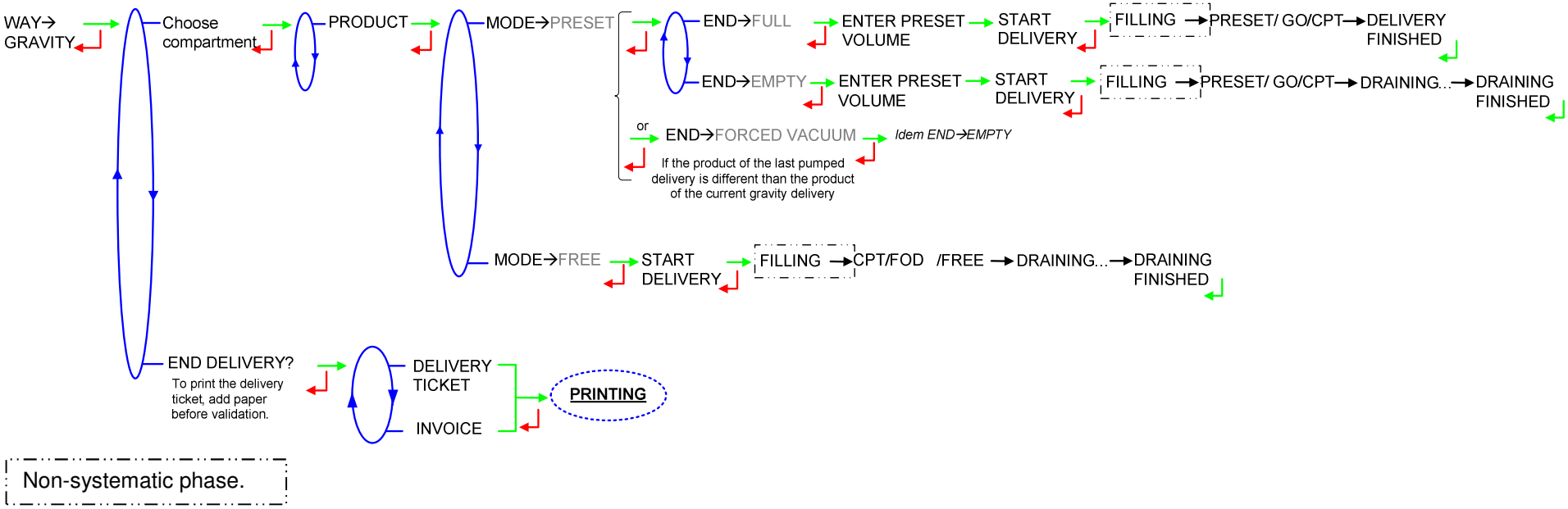


If it's necessary to move the vehicle, the distribution has to be stopped for a moment, then choose the MOVE VEHICLE item. The GRAVITRONIQUE switches off the power take-off, clutches the engine and freezes the MICROCOMPT+ indicator on DELIVERY PAUSE. Press the green OK BUTTON to continue distribution

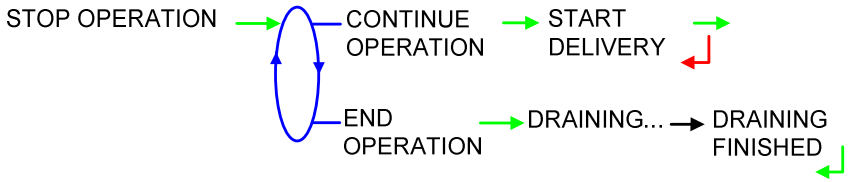
4.1.3 Gravity delivery

REMIND: If the manifold is not empty at the beginning of a delivery, the GRAVITRONIQUE displays MANIFOLD NOT EMPTY and requires to drain the manifold to avoid any mixture of product. But if the product in the manifold is the same as those used for the current gravity delivery, draining is not required. The delivery starts with full manifold

If the option loading plan is active, the name of the product in the compartment is displayed next to the compartment number (C1/GO). Also, the remaining volume (REMAINING VOLUME) in the selected compartment is displayed after the product is chosen.

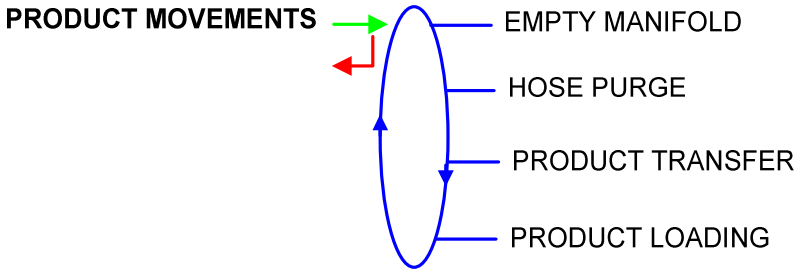


In case of an intentional interruption of delivery with the red STOP BUTTON, the following sequence is proposed:



4.2 Menu PRODUCT MOVEMENTS

Product movements PRODUCT TRANSFER and PRODUCT LOADING are performed in low flow rate. They are available when at least one product return is set in METROLOGICAL mode: CONFIGURATION>COMPARTIMENT OPTIONS>.

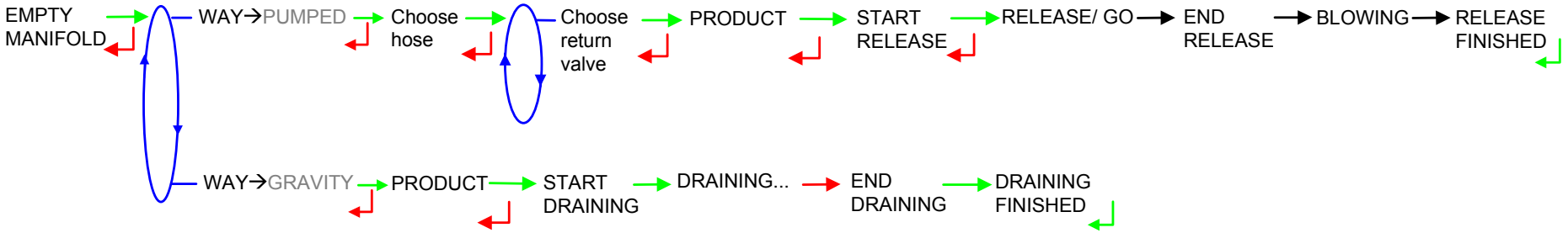


4.2.1 Sub-menu EMPTY MANIFOLD

This sequence is used to empty the manifold when switching from a pumped delivery to a gravity delivery, and back again, to prevent any mixture of product

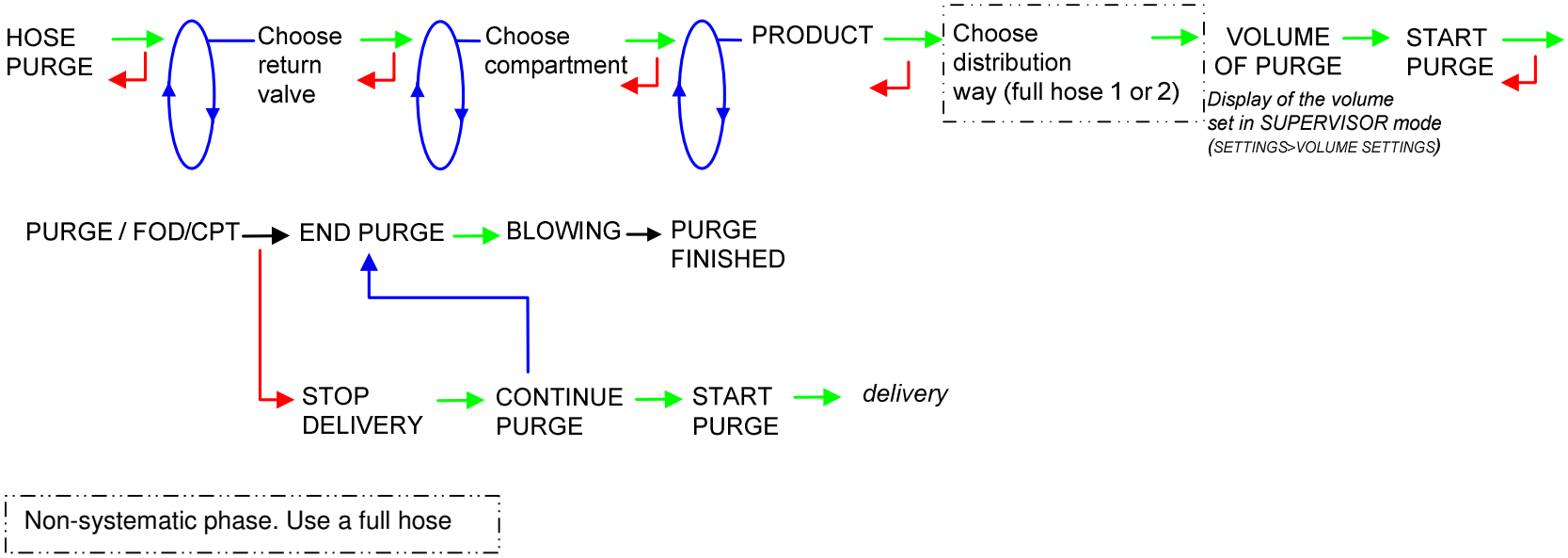
WAY→PUMPED: This release procedure allows to empty the pipe between the end-of-metering probe and the vacuity sensor by using the pumped line.

WAY→GRAVITY: This draining procedure allows to empty the pipe between the end-of-metering probe and the vacuity sensor by using the gravity line. When both gas detectors are wet, the added volume is calculated by summing up the manifold volume and the fixed volume. When the end-of-metering probe is dry and the vacuity sensor is wet, the added volume is the fixed volume. The draining is recorded in the summary '(D)RAINIG'.



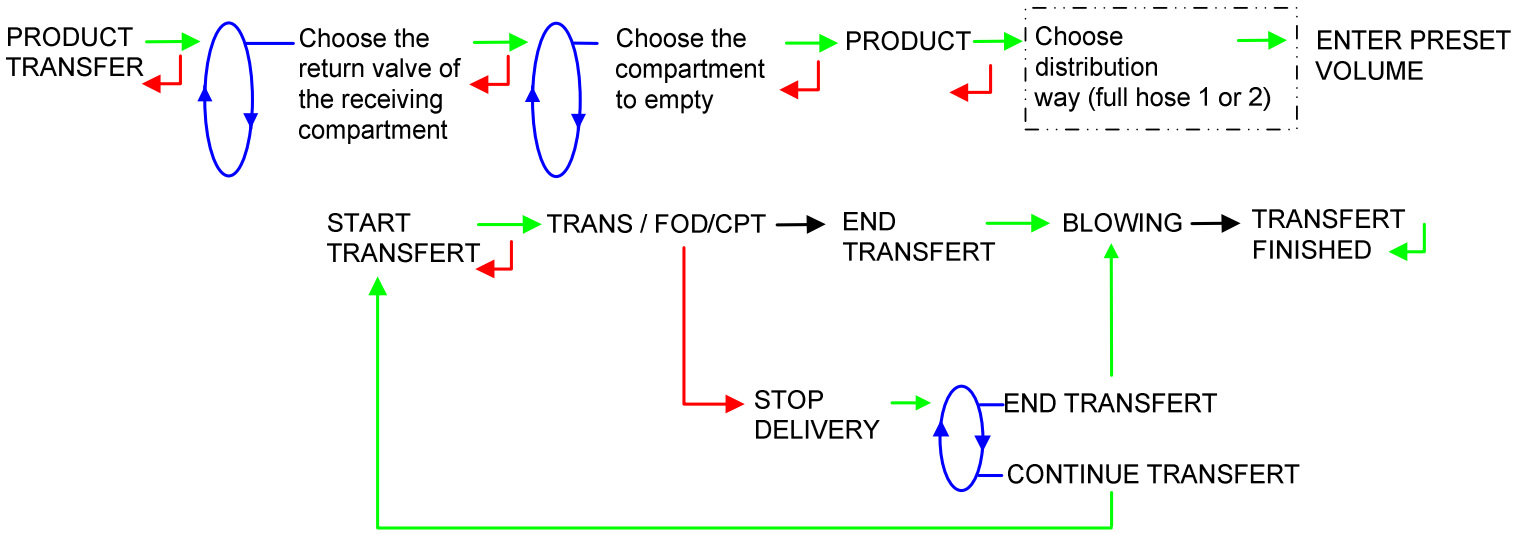
4.2.2 Sub-menu HOSE PURGE

This menu allows purging the hose in order to change the quality of the product. It is available when at least one product return is set in METROLOGICAL mode: CONFIGURATION>COMPARTIMENT OPTIONS>.



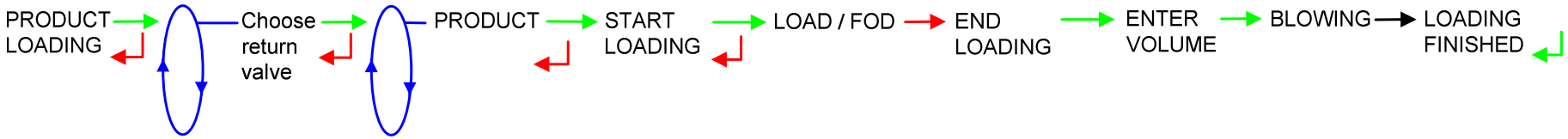
4.2.3 Sub-menu PRODUCT TRANSFER

This menu allows unloading the product from one compartment either to another compartment or to a compartment of another truck or to a loading terminal.



4.2.4 Sub-menu PRODUCT LOADING

This menu allows shifting product from one truck to another truck.

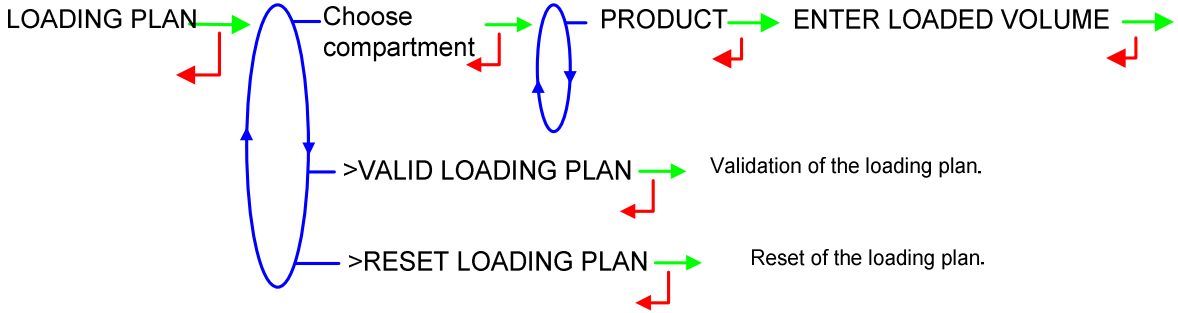


4.3 Menu LOADING PLAN

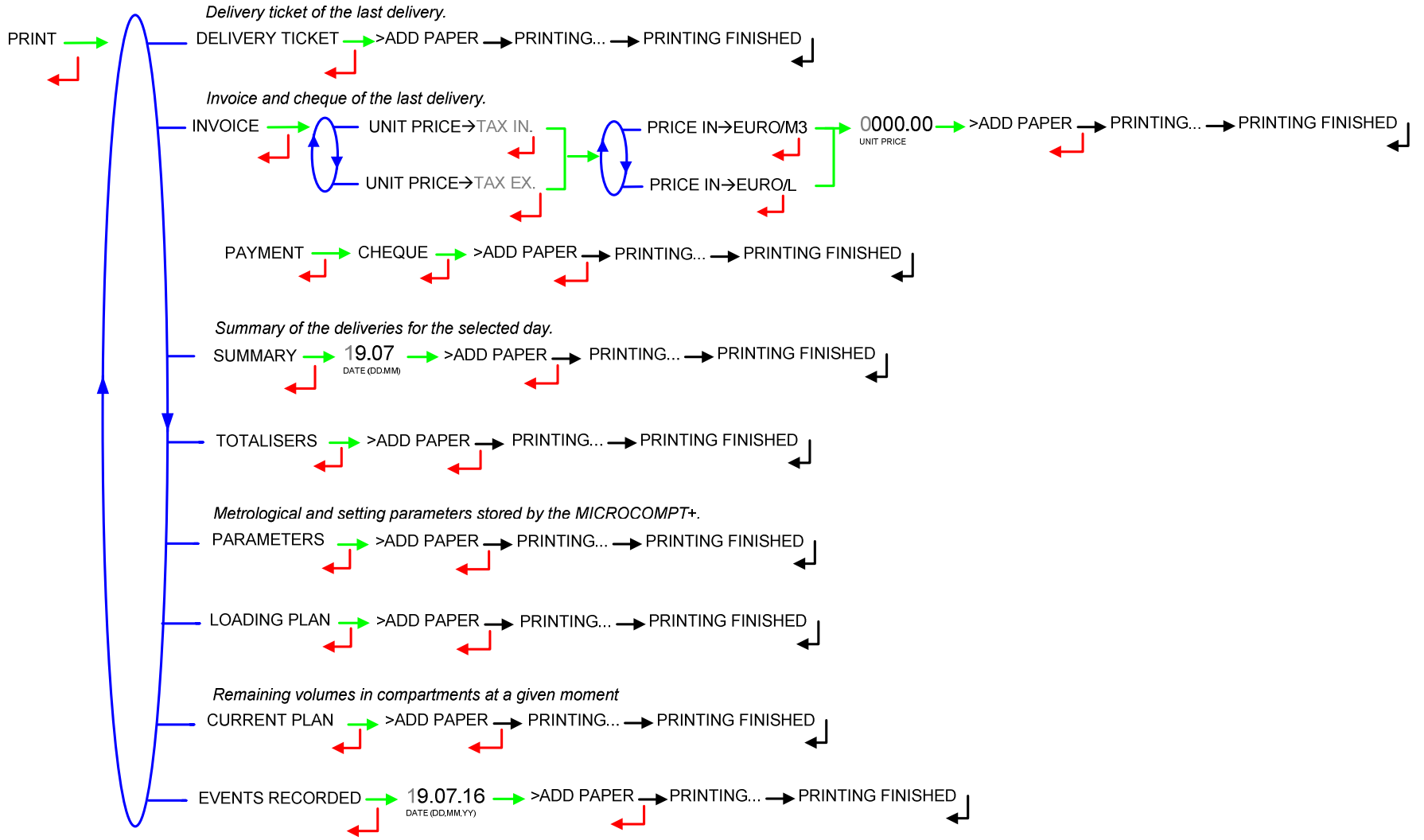
Depends on METROLOGICAL configuration. Not used if the function has not been activated.

The LOADING PLAN menu is used to determine the quality and the quantity of the products available in each compartment. In case of a blocking function, an empty compartment won't be available for a delivery until you enter a new product quality via this menu.

For each compartment, select the product name and set the loaded volume. Then validate the menu >VALID LOADING PLAN with the green OK BUTTON to record the plan. A loading plan can be cancel by using the menu >RESET LOADING PLAN.

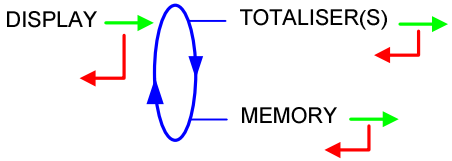


4.4 Menu PRINT



4.5 Menu DISPLAY

This menu is available in stand-by mode or during an intermediate stop. It allows the proofreading of totalisers and measurement results.



4.5.1 Sub-menu TOTALISER(S)

Display of totaliser Vm, and totaliser Vb if conversion is active.

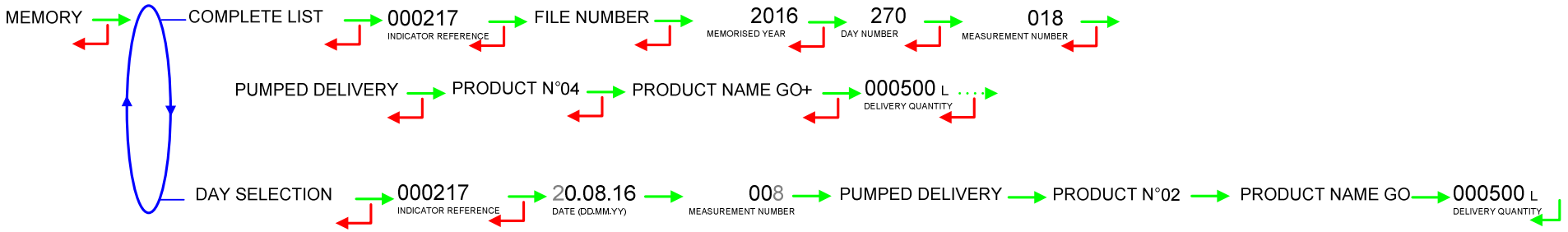
4.5.2 Sub-menu MEMORY

It allows the proofreading of all the measurement results stored by the GRAVITRONIQUE. That can be done in two ways:

COMPLETE LIST: Display all the measurement details recorded, from the newest to the oldest, sorted by day then by measurement number.

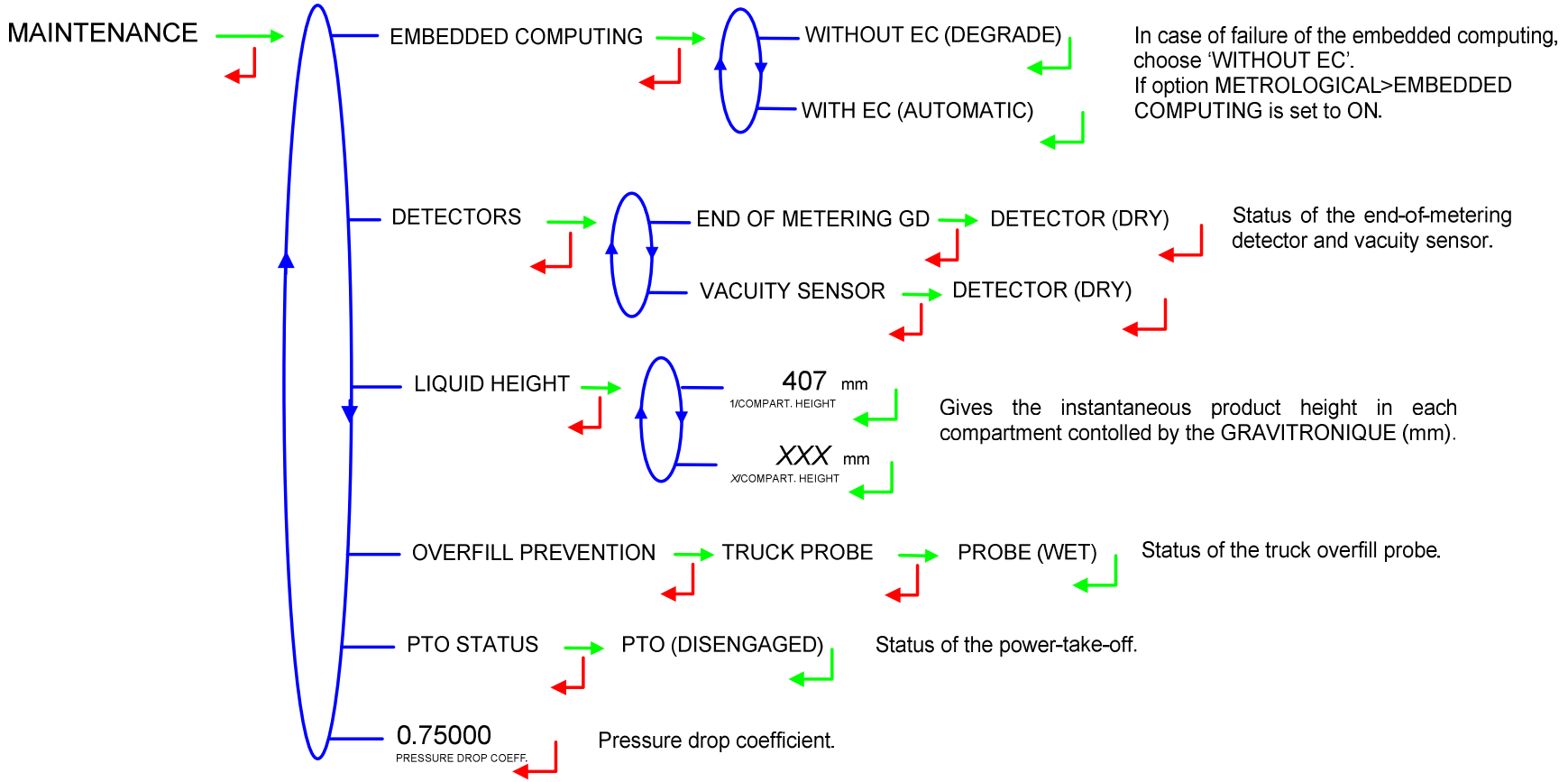
DAY SELECTION: Display a specific measurement by selecting the day number.

For each measurement, are displayed: the distribution mode, the product number and name, the delivered quantity.



4.6 Menu MAINTENANCE

This menu depends on the configuration of the measuring system

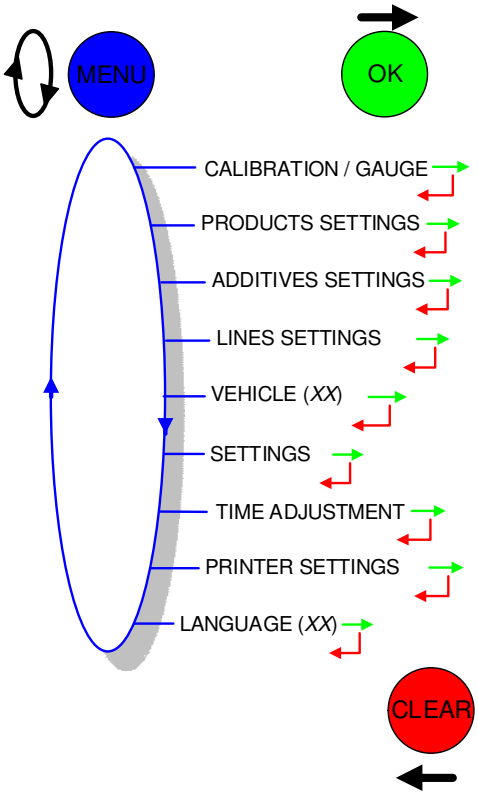


NOTE: indication on the gas detector LED diodes
GREEN LED ON: gas detector powered on
RED LED ON: gas detector dry / RED LED OFF: gas detector wet

4.7 List of alarms

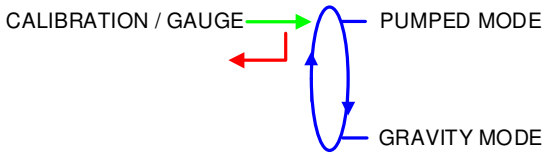
		DISPLAY	MEANING	ACTION
USER	COMMON	STOP DELIVERY	Intentional interruption of discharge	Continue, stop or finish the operation
		PRINTER DEFAULT	No more communication with the printer	Check the connection cable, on-off switch and fuse
		POWER SUPPLY PROBLEM	Power outage during delivery	Check the cause / Restore power supply
		ZERO FLOW DEFAULT	Zero flow	Check if the pulse transmitter is powered (red indicators)
		LOW FLOW DEFAULT	Low flowrate (less than 4m^3/h)	Check the hydraulic system (valve, strainer, nozzle…)
		HIGH FLOW DEFAULT	High flowrate (greater than maximum flowrate)	Check the parameters / Reduce flowrate
		DIARY DEFAULT	Reset of the events diary	Acknowledge the alarm, check the date in supervisor mode (magnet key)
	PUMPED	GAS DETECTOR DEFAULT	End-of-counting detector failure	Use the maintenance mode to check the status of the detector
		EMA METERING PROBLEM	Metering problem with the measuring device	Check if the pulse transmitter is powered (red indicators),
		PTO DEFAULT	Coherence failure with power take-off	Check the power take-off status in driver's cab
		OVERFILL DEFAULT	Overfilling during a product movement	Transfer product in another compartment
		RUPTURE GD DEFAULT	Rupture detector failure	Use the maintenance mode to check the status of the detector
		PURGE NOT FINISHED	Purge of manifold (and/or hose) not finished	Finish the purge of the manifold (and/or hose)
	GRAVITY	MANIFOLD NOT EMPTY	The manifold is not empty at the beginning of the operation	Follow the manifold release sequence
		FILLING DEFAULT	The manifold is not full of product	Fill the manifold
		FLAP LEAK DEFAULT	Product leakage from a flap	Check the flap
REPAIRER	COMMON	DISPLAY DEFAULT	Problem with display card	If steady alarm, substitution of the display card
		WATCHDOG DEFAULT	Fault with display or power card or AFSEC+ card	Switch on-off the MICROCOMPT+ / If steady alarm, substitution of the faulty card
		VOLUME CONVER DEFAUT	Problem during conversion of volume	If steady alarm, substitution of the AFSEC+ electronic card
	PUMPED	TOTALISER LOST	Loss of totalizer	Substitution of the backup battery
		PRESSURE DEFAULT	Pressure determination failure	If steady alarm, see a reparator for trouble shooting
		TEMPERATURE DEFAULT	Temperature determination failure	If steady alarm, see a reparator for trouble shooting
	BLOCKING	MEMORY LOST (PILE)	Loss of saved memory	Substitution of the backup battery
		MEMORY LOST	Delivery diary lost	Enter and exit the METRO mode / If steady alarm, substitution of the backup battery
		DATE AND TIME LOST	Loss of date and time	Set date and time in supervisor mode (magnetic key)
		COEFFICIENTS DEFAULT	Deviation between coefficient LF/HF greater than 0.5%	Modification of the low flow coefficient (K1)
		GAS DEFAULT	Detection of air during high flow delivery	If steady alarm, see a reparator for trouble shooting
		PROM DEFAULT	Loss of software or resident integrity	Substitution of the AFSEC+ electronic card
		RAM DEFAULT	Saved memory fault	Substitution of the AFSEC+ electronic card
		EEPROM MEMORY LOST	Loss of metrological configuration	Substitution of the AFSEC+ electronic card
		MEMORY OVER LOADED	Delivery diary is full	Substitution of the AFSEC+ electronic card

5 SUPERVISOR MODE:

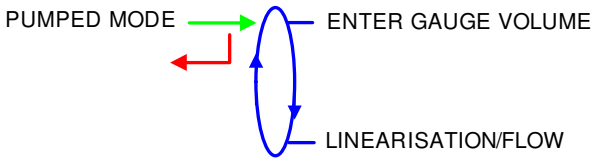


SUPERVISOR key, magnetic or RFID

5.1 Menu CALIBRATION / GAUGE



5.1.1 Sub-menu PUMPED MODE



5.1.1.1 Enter gauge volume

This menu allows you to check the accuracy of the measuring system by calculating the measuring device error, the new corrected coefficient and the average flow. It is possible then to linearize the curve on 2 measuring points.

First, fill the gauge (USER mode) in high or low flow with predetermination of the volume.

Switch to SUPERVISOR mode, choose CALIBRATION/GAUGE>PUMPED MODE>ENTER GAUGE VOLUME and validate. Enter the volume read on the gauge and validate. The following information is then displayed:

- The signed error in %
- The coefficient revised as a function of the error
- The average flow of the delivery.

5.1.1.2 Linearisation/flow

This menu is used to make a flow-correction for two measuring points (at low and high flowrate). The MICROCOMPT+ stores flowrate and coefficient calibrated values in order to define both correction points: at low and high flowrate.

Linearisation is proposed only for the main product. When you validate the menu LINEARISATION/FLOW, the calibrated values are displayed; you need to unseal the MICROCOMPT+ to switch in METROLOGICAL mode and enter the values via the EMA>METER COEFFICIENT menu.

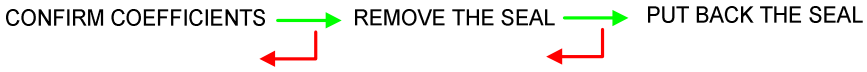
To linearize the curve, two tests are necessary. Follow the instructions:

- Fill the gauge in high flow $[flow_{min} \times 3] \leq$ high flow $< [flow_{max}]$, and enter the volume read on the gauge in the menu CALIBRATION/GAUGE>ENTER GAUGE VOLUME as described above
- Fill the gauge in low flow $[flow_{min}] \leq$ low flow $\leq flow_{min} \times 2]$, enter the volume read on the gauge in the menu CALIBRATION/GAUGE>ENTER GAUGE VOLUME as described above
- Choose CALIBRATION/GAUGE>PUMPED MODE>LINEARISARION/FLOW and validate. It is then possible to see the coefficients and the flow rates data for the two tests carried out.

If the procedure failed, the following alarms may be displayed:

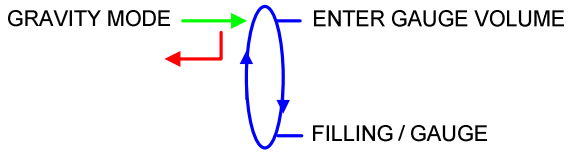
- 'LARGE GAP K1/K2': correction between both measuring points >0.5%
- 'FLOWS TOO CLOSED': High flowrate value is out of range. It needs to be: $[flow_{min} \times 3] \leq$ high flow $< [flow_{max}]$
- 'LO-FLOW OUT OF RANGE': Low flowrate value is out of range. It needs to be: $[flow_{min}] \leq$ low flow $\leq flow_{min} \times 2]$
- 'ONLY ONE GAUGE': One of the tests has not been done (at low or high flowrate)
- 'NO VALID GAUGE': Both tests have not been done (at low and high flowrate)

When the procedure is completed, the following sequence is displayed:



The new coefficient and flow rates values are taken into account.

5.1.2 Sub-menu GRAVITY MODE



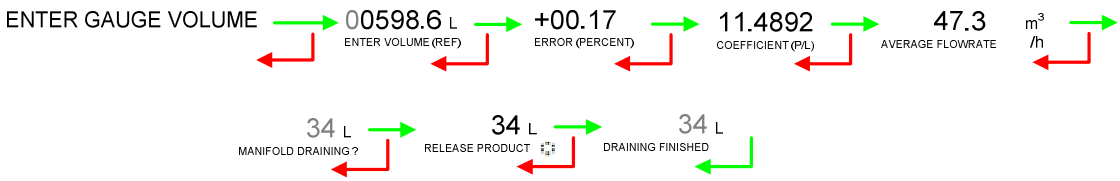
5.1.2.1 Enter gauge volume

This menu allows you to check the accuracy of the measuring system by calculating the measuring device error, the new corrected coefficient and the average flow.

First, fill the gauge (USER mode) in high or low flow with predetermination of the volume.

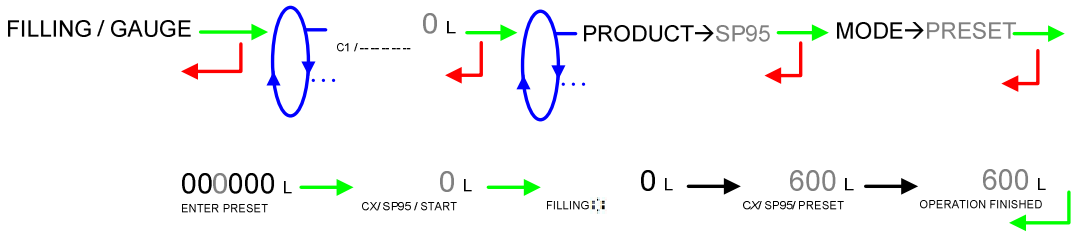
Switch to SUPERVISOR mode, choose CALIBRATION/GAUGE>GRAVITY MODE>ENTER GAUGE VOLUME and validate. Enter the volume read on the gauge and validate. The following information is then displayed:

- The signed error in %
- The coefficient revised as a function of the error
- The average flow of the delivery.

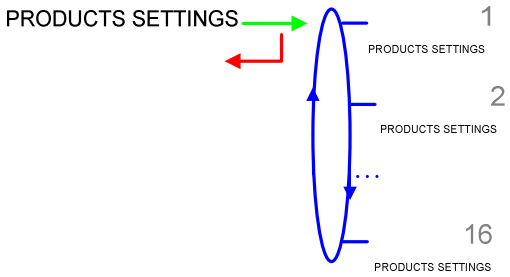


5.1.2.2 Gauge filling

This menu is used for filling the gauge with keeping the manifold full of product. Use it the same way as the USER mode; but at the end of the operation, the manifold is not drained.

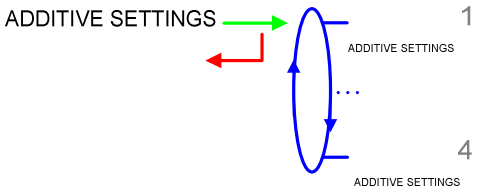


5.2 Menu PRODUCTS SETTINGS

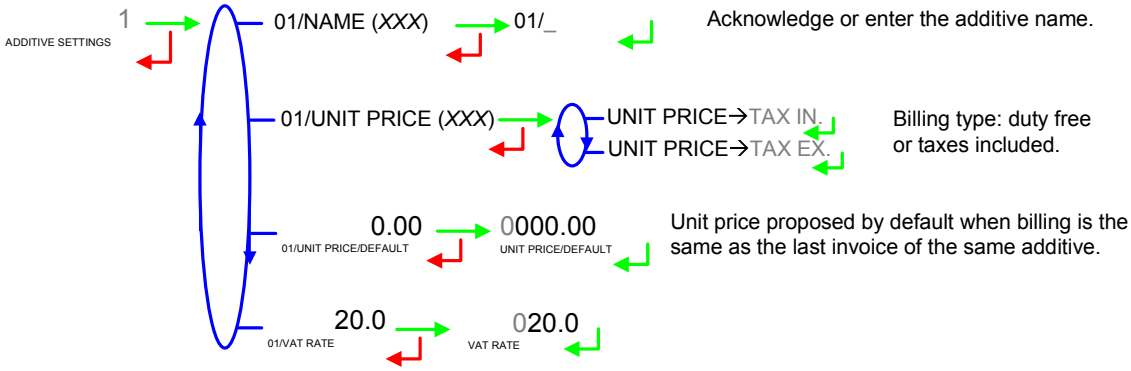


Definition of products: names (for the 7 first products, default names are proposed), product type, price, tax, configuration of additive, correction.

5.3 Menu ADDITIVE SETTINGS

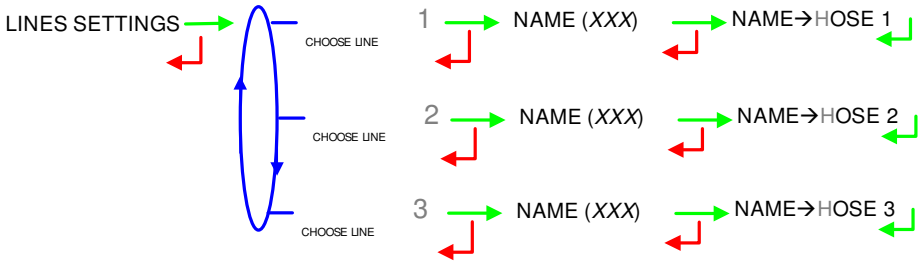


Definition of additives added manually: name, price, tax.



5.4 Menu LINES SETTINGS

Definition of the distribution lines: acknowledge or enter the line name. The number of lines depends on the hydraulic configuration of the installation, there are as many line as there are pumped distribution ways set in METROLOGICAL mode: HYDRAULIC>DISTRIBUTION WAYS.



5.5 Menu VEHICLE

Enter vehicle identification: set the vehicle registry number on which the GRAVITRONIQUE is installed. This number will be printed on delivery tickets, invoices…

5.6 Menu SETTINGS

5.6.1 Sub-menu VOLUMES SETTINGS

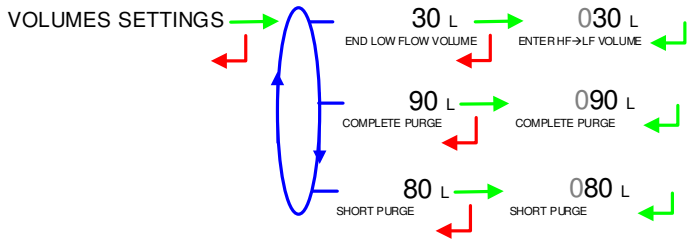
This menu allows you to configure the volume parameters:

END LOW FLOW VOLUME: Set the volume (in liters) delivered in low flowrate to finish the delivery

The volume of purge (liters) depends on the truck (manifold, hose...); it is given when putting into use. If the volume is at 0, the manifold is not drained, the flap is directly opened.

COMPLETE PURGE: Purge of the manifold and the hose (delivery of FOD then GO).

SHORT PURGE: To avoid polluting the line (delivery of GO then FOD). This volume must be between 80 and 95% of the complete purge volume.



5.6.2 Sub-menu FLOWRATES SETTINGS

This menu allows you to configure the flowrates parameters:

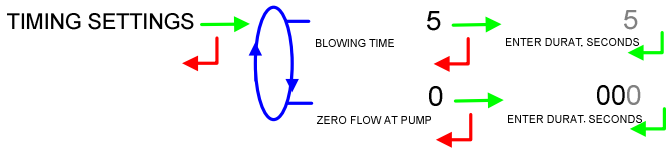
LF--HF FLOWRATE: Set the flowrate beyond which the GRAVITRONIQUE (running in low flowrate) controls the high flowrate.

5.6.3 Sub-menu TIMING SETTINGS

This menu allows setting the duration parameters:

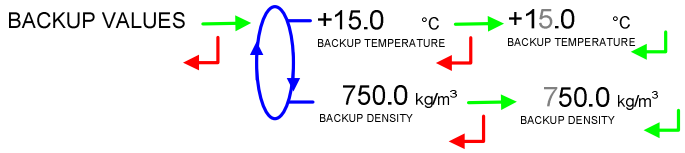
DRAINING TIME: Enter the draining time (in seconds).

ZERO FLOW AT PUMP: Timeout beyond which the MICROCOMPT+ reports a default in order to prevent the pump from running idle (at the beginning of a delivery when the flow is still null). When it is set to 0, the option is not managed.



5.6.4 Sub-menu BACKUP VALUES

This menu allows setting the backup values for temperature and density. It is available when the menu METROLOGICAL>CONFIGURATION>CONVERSION is set to ON.



5.7 Menu TIME ADJUSTMENT

Date and time are set in METROLOGICAL mode. The hour may be adjusted (±2h) one time a day through this menu (use French format: 14.41 means 2.41 pm).

5.8 Menu PRINTER SETTINGS

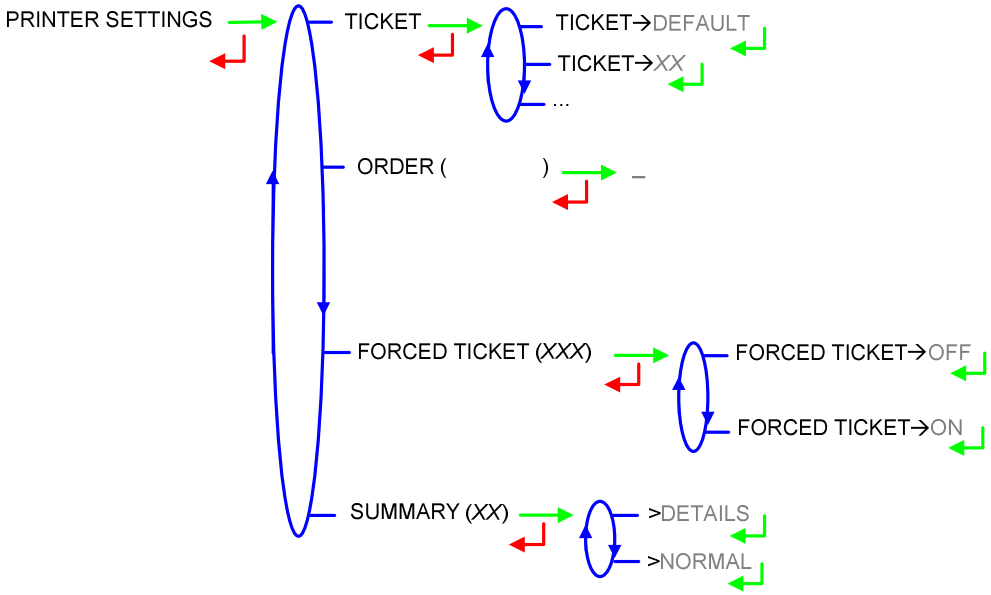
This menu is used toc configure the printing of the different documents (delivery tickets, invoices, cheques, and summary).

TICKET: Choose the ticket format for printing the delivery ticket.

ORDER: At the end of the delivery the printing of the delivery ticket or invoice is proposed by default. If this field is filled in, the printing of the invoice will be proposed first (the cheque printing is proposed as a result). The order for payment shall not exceed 20 characters. The delivery ticket can be printed through USER/PRINTING/DELIVERY TICKET menu.

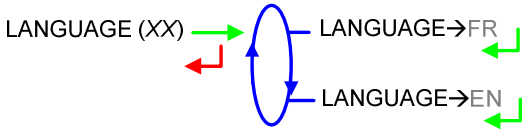
FORCED TICKET: At the end of delivery the printing of the delivery ticket or invoice printing is proposed. It is possible here to force the printing by choosing FORCED TICKET→ON.

SUMMARY: Choose to print a normal summary or a summary with details.

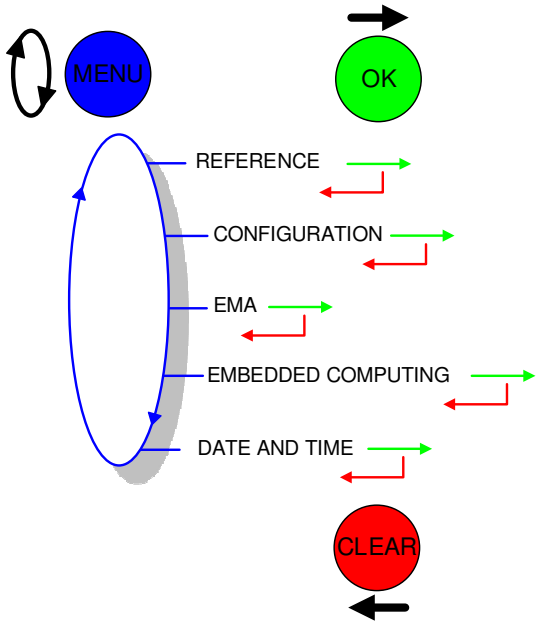


5.9 Menu LANGUAGE

This menu allows you to choose the display language. It is available if a translation catalogue has been uploaded in the MICROCOMPT+.

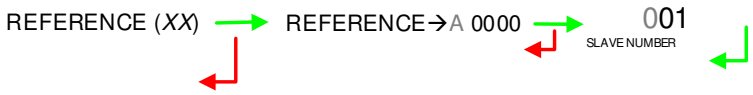


6 METROLOGICAL MODE:

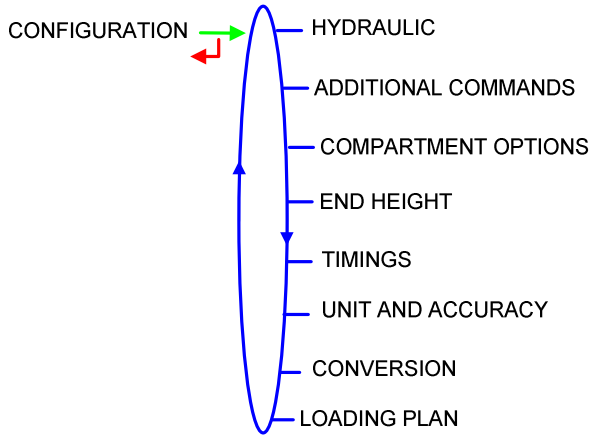


6.1 Menu INDICATOR REFERENCE

Set the MICROCOMPT+ serial number then the slave number that is useful for commissioning and maintenance operations with the µConfig tool.



6.2 Menu CONFIGURATION



6.2.1 Sub-menu HYDRAULIC

This menu is used to set the hydraulic configuration of the installation.

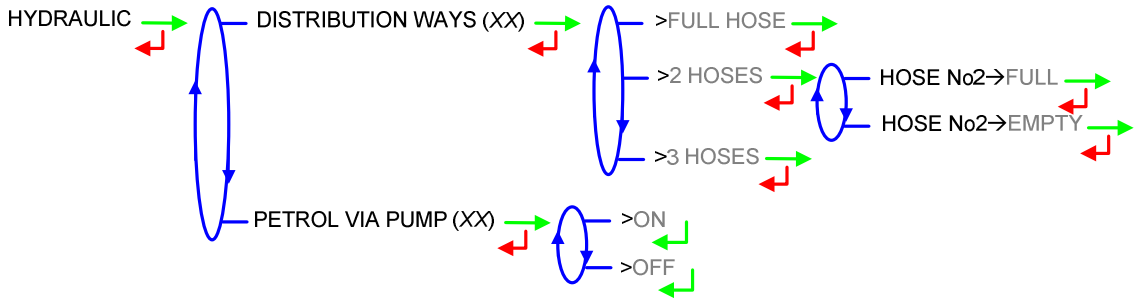
Number of distribution ways for a pumped delivery: from 1 to 3

Number of distribution ways for a gravity delivery: 1

DISTRIBUTION WAYS:

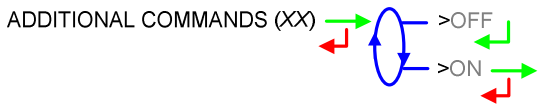
- **FULL HOSE**: Full hose with authorisation valve operation
- **2 HOSES**: Operation with 2 hoses. The second one may be full hose or empty hose
- **3 HOSES**: Operation with 3 hoses. The third one is an empty hose. This menu is available if no gravity pump has been defined (EMA>VALVES>GRAVITY MODE→NONE) and if the number of compartments is up to 5.

PETROL VIA PUMP: This menu is used to allow pumped delivery for petrol. This configuration requires to pay attention to the kind of pump used for the delivery. By default this feature is inactive.



6.2.2 Sub-menu ADDITIONAL COMMANDS

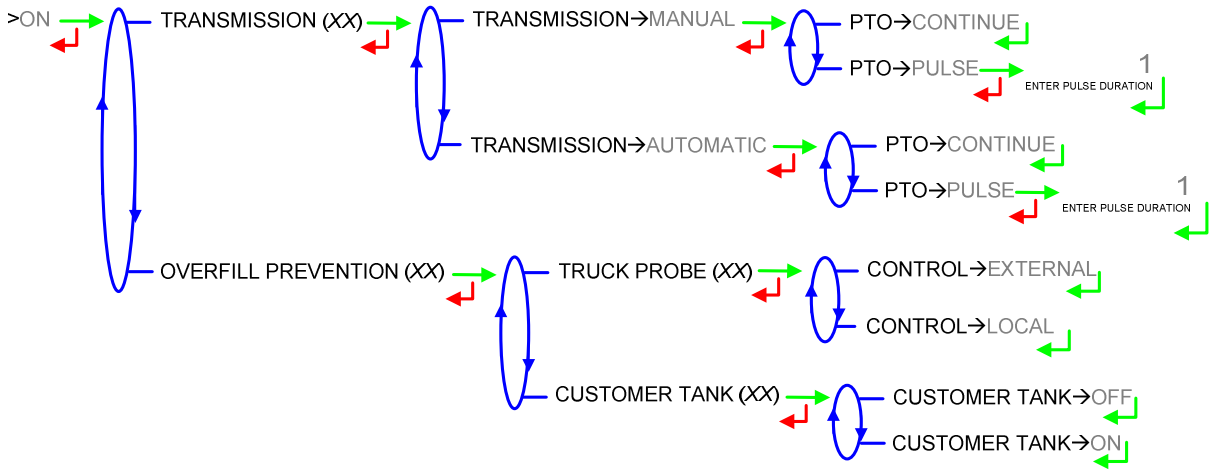
Operation with or without a remote control.



When additional commands is active, this menu allows to choose the transmission type and to take into account the engine start and stop, clutching and power take off.

TRANSMISSION: Choose the type of transmission (automatic or manual) and the type of command: non-stop command or by pulse

OVERFILL PROTECTION: Control of the overfill protection of the truck and of the customer tank.



6.2.3 Sub-menu COMPARTMENT OPTION

This menu is used to set the configuration of the compartments. **If a gravity valve is defined (EMA→VALVES→GRAVITY MODE), the compartment number is restricted to 5.**

If the compartment No6 is used, it must be defined with flap control OR with product return to manage a special recovery tank.

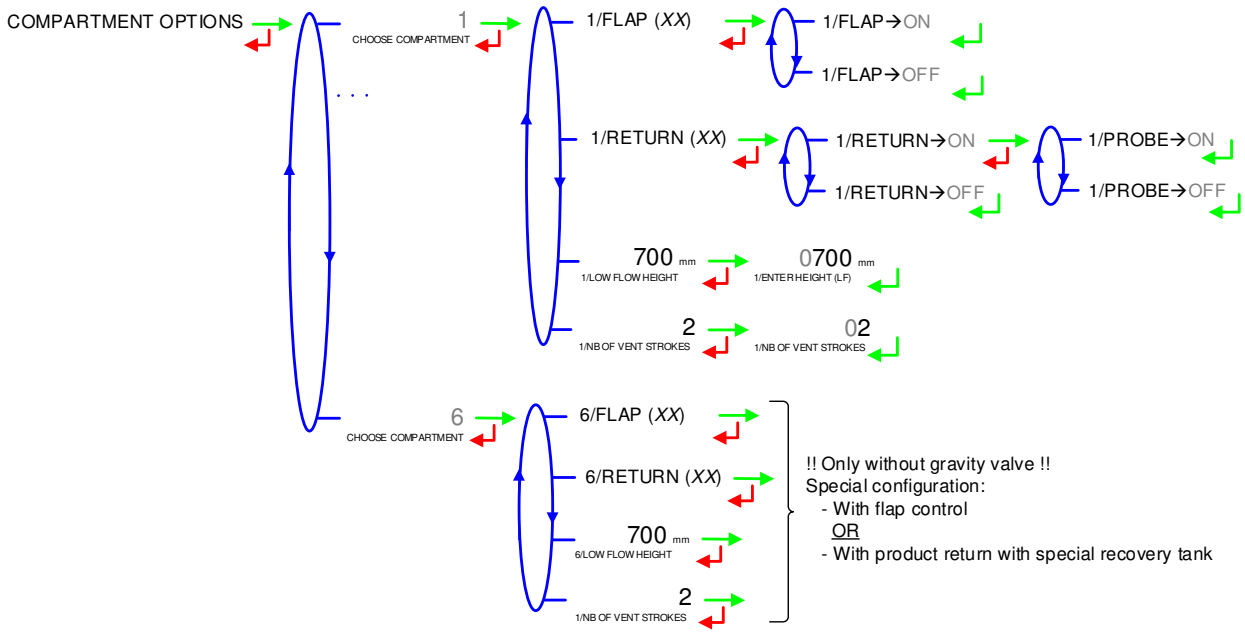
FLAP: Operation with or without flap control

RETURN: Operation with or without product return

PROBE: Overfill protection probe of the compartment

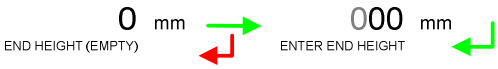
LOW FLOW HEIGHT: Geometric height to command low flow (mm)

NB OF VENT STROKES: Number of vent orders after a filling phase in order to evacuate the air from the piping before delivery. The number of vent orders is directly related to the quantity of air



6.2.4 Sub-menu END HEIGHT (EMPTY)

Enter the height of liquid from which the compartment is considered as empty (mm).



6.2.5 Sub-menu TIMINGS

This menu allows setting the duration parameters:

INPUT PUSE TIMING: Set the increment of air admission to bypass. Integer number of 32 ms, ranging between 1 and 9.

DEPRESS PUSE TIMING: Set the increment of air exhaust to bypass. Integer number of 32 ms, ranging between 1 and 9.

MANIFOLD FILLING: Set the manifold filling duration (in seconds). Minimal value: 20 seconds. Maximal value: 59 seconds. Default value: 30 seconds.

MANIFOLD DRAINING: Set the manifold draining duration (in seconds). Minimal value: 20 seconds. Maximal value: 59 seconds. Default value: 30 seconds.

WET PROBE: Set the maximum duration before the end-of-metering sensor becomes wet (in seconds). Minimal value: 20 seconds. Maximal value: 99 seconds. Default value: 20 seconds

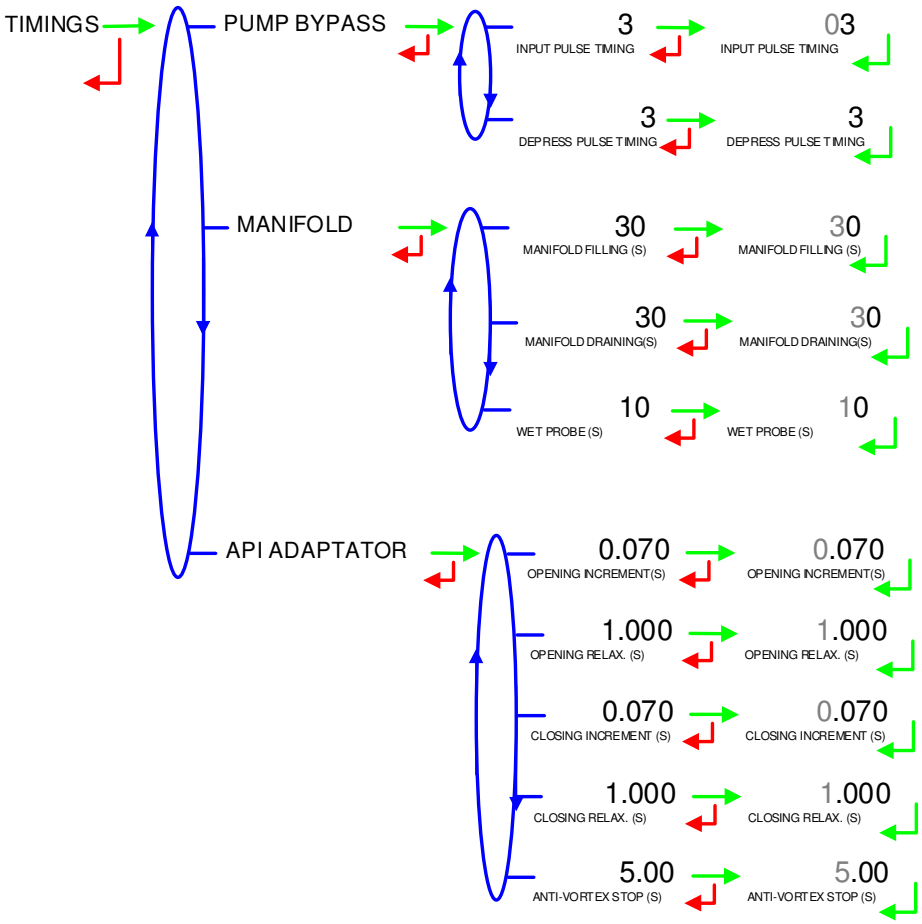
OPENING INCREMENT: Set the command increment duration of the API adapter opening valve (in seconds). Minimal value: 0.03 second. Maximal value: 3.999 seconds. Default value: 0.070 second (70 millisecondes).

OPENING RELAX.: Set the relaxation duration between two API adapter opening command increments (in seconds). Maximal value: 3.999 seconds. Default value: 1 second. .

CLOSING INCREMENT: Set the command increment duration of the API adapter closing valve (in seconds). Maximal value: 3.999 seconds. Default value: 0.070 second (70 millisecondes).

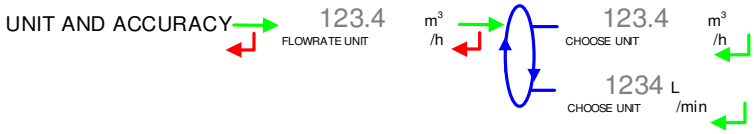
CLOSING RELAX.: Set the relaxation duration between two API adapter closing command increments (in seconds). Maximal value: 3.999 seconds. Default value: 1 second.

ANTI-VORTEX STOP: Set the API adapter closing duration after an ANTI-VORTEX breakdown. Minimal value: 5 seconds. Maximal value: 99 seconds. Default value: 5 seconds.



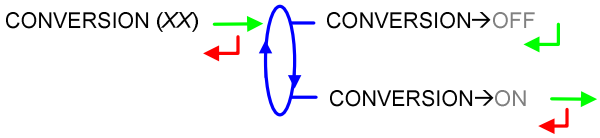
6.2.6 Sub-menu UNIT AND ACCURACY

Choose the unit of the flow rate that will be displayed and printed.

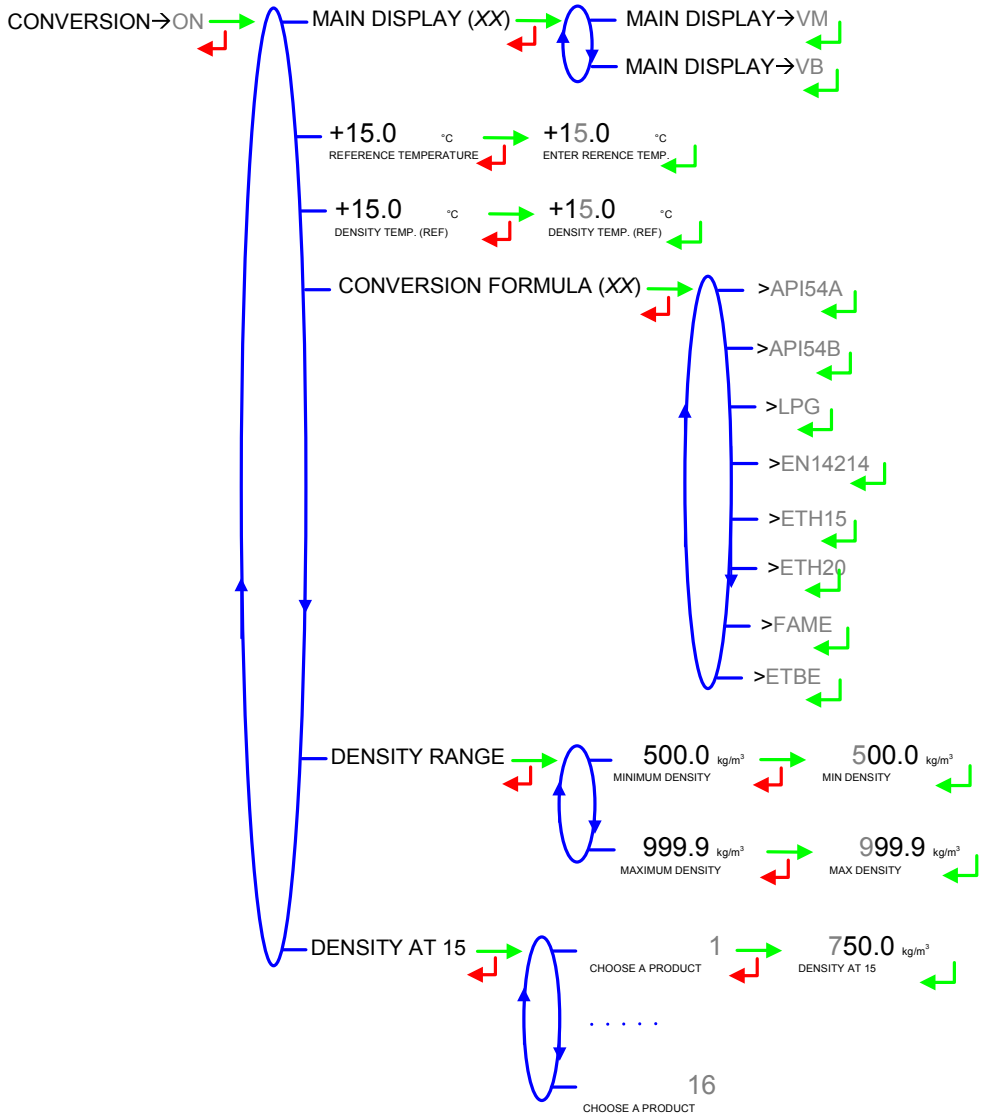


6.2.7 Sub-menu CONVERSION

This menu is used to operate with conversion or not.



When conversion is active, the following parameters must be set:



Choose the conversion table according to the product:

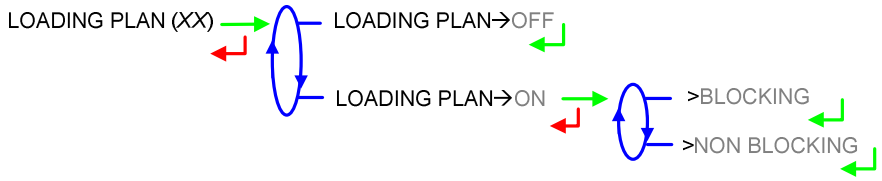
Conversion formula	Product
API54A	Crude products
API54B	Refined products
LPG	LPG and bitumen
EN14214	Blended biofuels
ETH15	Ethanol at 15°C
ETH20	Ethanol at 20°C
FAME	Fatty acid methyl esters
ETBE	Ethyl tert-butyl ether

6.2.8 Sub-menu LOADING PLAN

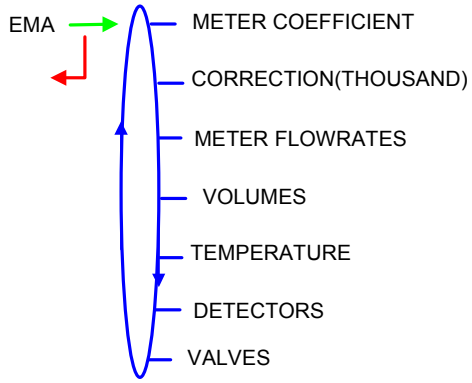
Operation with or without loading plan.

LOADING PLAN→ON: When the function is active, a specific menu allows the user to determine the product quality and quantity for each compartment.

BLOCKING: When a compartment is empty, it won't be available for a delivery until the user enters a new product quality via the menu LOADING PLAN of the USER mode.



6.3 Menu measuring system EMA



6.3.1 Sub-menu METER COEFFICIENT

Set the coefficient of the measuring system meter (pulses/liter).

For pumped distribution mode, set the four following items:

LF COEFFICIENT (K1): Coefficient for low flow (pulses/liter)

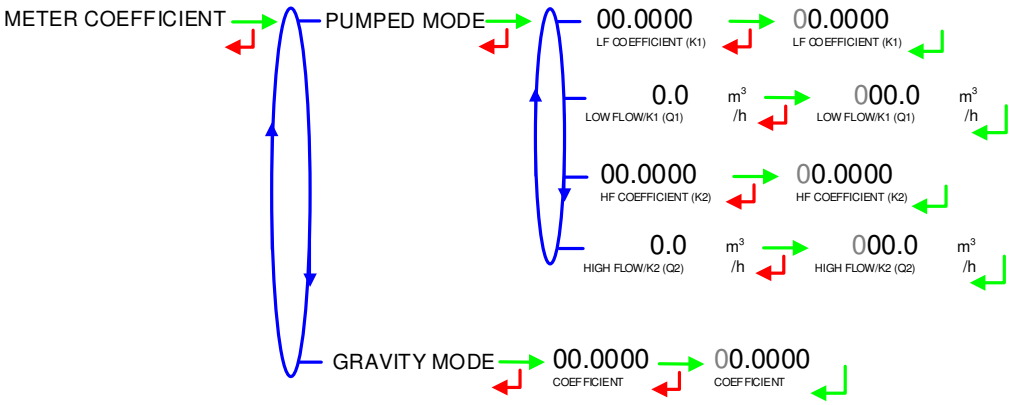
LOW FLOWRATE/K1 (Q1): Low flow reference (m^3/h)

HF COEFFICIENT (K2): Coefficient for high flow (pulses/liter)

HIGH FLOWRATE /K2 (Q2): High flow reference (m^3/h)

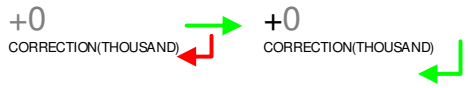
For gravity distribution mode, set the following item:

COEFFICIENT: coefficient of the measuring system meter (pulses/liter)



6.3.2 Sub -menu CORRECTION

Set the correction factor per thousand (‰) of the measuring system for a measurement with low viscosity products. Refer to the marking of the turbine meter or refer to the ALMA calibration certificate. Refer to the verification manual MV5007 for any further information.

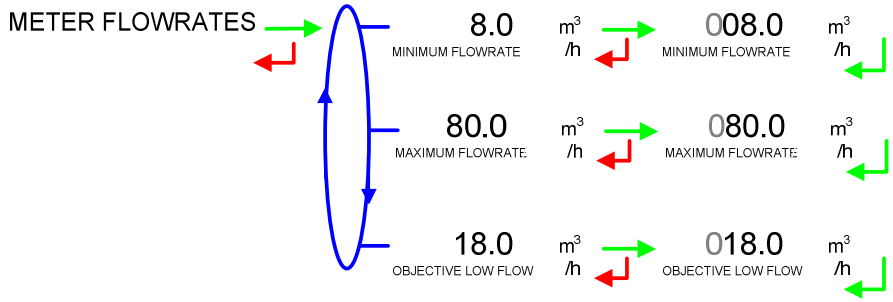


6.3.3 Sub-menu METER FLOWRATES

MINIMUM FLOWRATE: Set the metrological minimum flowrate of the measuring system in m^3/h or l/min, depending on the configured flow unit.

MAXIMUM FLOWRATE: Set the metrological maximum flowrate of the measuring system in m^3/h or l/min, depending on the configured flow unit.

OBJECTIVE FLOWRATE: Set the objective flowrate in m^3/h or l/min, depending on the configured flow unit. In low flow phases, a regulation will be done around this value with a tolerance of $\pm 3 m^3/h$. This value increased by 3 must be less than the maximum flowrate.

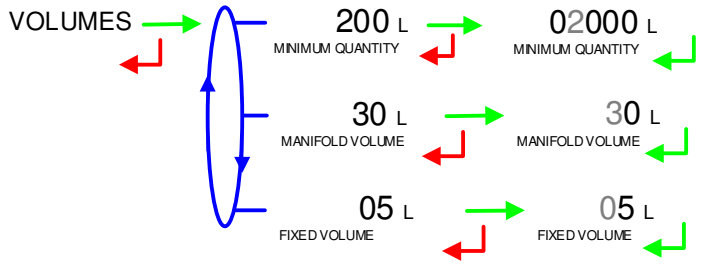


6.3.4 Sub-menu VOLUMES

MINIMUM QUANTITY: Set, in liters, the minimum measured quantity of the measuring system to guaranty the measurement (authorized volume).

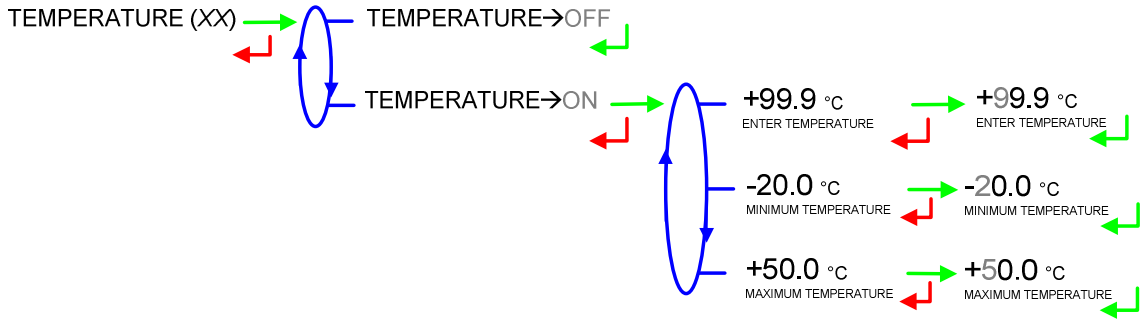
MANIFOLD VOLUME: Set the volume of the manifold in liters (depends on the compartments number).

FIXED VOLUME: Set the end of counting fixed volume of the measuring system in liters.



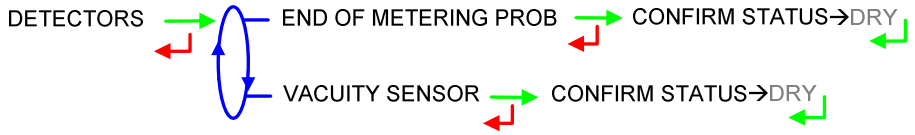
6.3.5 Sub-menu TEMPERATURE

This menu is an option. It is used to calibrate the temperature into the MICROCOMPT+. Refer to FM 8510



6.3.6 Sub-menu DETECTORS

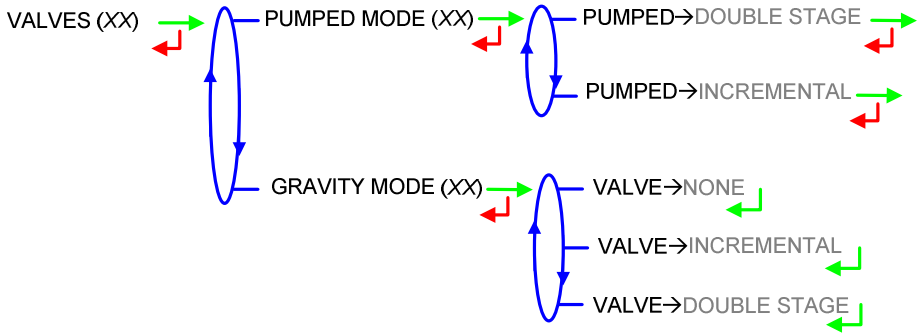
This menu allows to validate the status of the gas detectors used as end-of-metering probe and vacuity sensor. Detectors must be dry before validating the 'dry' status.



6.3.7 Sub-menu VALVES

PUMPED MODE: The type of the valve used for pumped deliveries is defined here.

GRAVITY MODE: The type of the valve used for gravity deliveries is defined here. A gravity valve can be defined only if the number of distribution ways set in the menu CONFIGURATION>HYDRAULIC>DISTRIBUTION WAYS is restricted to 1 or 2.

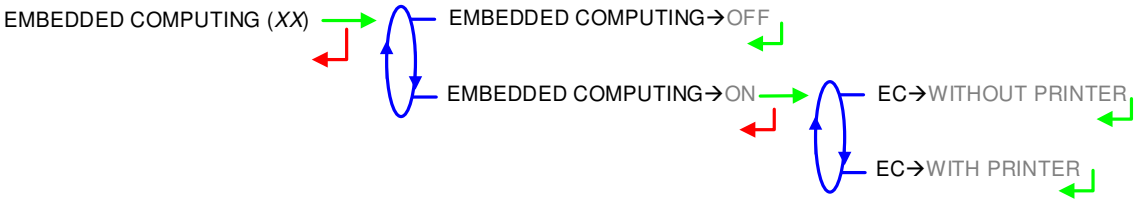


6.4 Menu EMBEDDED COMPUTING

Operation with or without embedded computing.

EC→WITHOUT PRINTER: The delivery ticket and the invoice can be printed via the MICROCOMPT+ device

EC→WITH PRINTER: The delivery ticket and the invoice cannot be printed via the MICROCOMPT+ device. They must be printed via the embedded computing.



6.5 Menu DATE AND TIME

Enter the day, the month and the year and then enter the time at French format (e.g. 14.41 means 2.41 pm).

ANNEXE

DELIVERY TICKET:

```
GRAVITRONIQUE 4035.01
Version 01.01.01 of 04.04.17
Printed on the 26/04/17 at 15h30
Vehicle   : AA-000-AA
Indicator :  A 03000

********** DELIVERY **********

Delivery started measurement No.006

Compartment       : 1
Product           : GO+
Measurement n 1   : 01999 liters
Measurement n 2   : 00633 liters
Measurement n 3   : 01100 liters
                    ----------
Total Cpt 1       : 03732 liters
Compartment       : 2
Product           : FOD
Measurement n 1   : 00015 liters
Measurement n 2   : 00005 liters
Measurement n 3   : 00200 liters
Measurement n 4   : 00333 liters
                    ----------
Total Cpt 2       : 00553 liters
```

Ticket for gravity delivery

SUMMARY:

```
GRAVITRONIQUE 4035.01
Version 01.01.01 of 04.04.17
Printed on the 26/04/17 at 17h20
Vehicle   : AA-000-AA
Indicator :  A 03000

Summary
of measurements of 26.04.17
Day 116   004 memorised results

****  DAILY TOTALISERS ****

FOD      (01) :    00006928 L    +14.9°C
FOD+     (02) :    00000000 L     + 0.0°C
GO       (03) :    00001099 L    +14.9°C
GO+      (04) :    00001099 L    +14.9°C
GNR      (05) :    00000000 L     + 0.0°C
GNR+     (06) :    00000000 L     + 0.0°C


Total from 1 to 6 :  0009126 L    +14.9°C

********** SUMMARY **********
 T       T       No.              (L)       (°C)
 start   end     Mesur  Prod      Vm        Temp
14H19   14H36    D01    GO+       00999     +14.9
...

PRE(S)ET FULL; PRESET E(M)PTY;(F)ree;
(R)ELEASE; (P)URGE; (D)RAINING;
(T)RANS; (A)NTICIPATORY PURGE.
```

TOTALISERS:

```
GRAVITRONIQUE 4035.01
Version 01.01.01 of 04.04.17
Printed on the 26/04/17 at 17h12
Vehicle   : AA-000-AA
Indicator :  A 03000

********** TOTALISERS **********
General totaliser 1:00012123  L

FOD      (01) :     00006928 L
FOD+     (02) :     00002997 L
GO       (03) :     00001099 L
GO+      (04) :     00001099 L
GNR      (05) :     00000000 L
GNR+     (06) :     00000000 L
...
Total from 1 to 16 :0012123 L
```

EVENTS RECORDED:

```
GRAVITRONIQUE 4035.01
Version 01.01.01 of 04.04.17
Printed on the 26/04/17 at 19h12
Vehicle   : AA-000-AA
Indicator :  A 03000


41 record(s)

14:49:55 No allocated product
14:49:53 Contamination hose
14:30:03 Stop operation
14:24:33 High flow default
...


09:47:15 Reset application
09:47:06 Memory lost
09:42:57 Watchdog default
09:12:36 User mode
08:59:02 Supervisor mode
08:58:57 Switch on
```

PARAMETERS:

GRAVITRONIQUE 4035.01
Version 01.01.01 of 04.04.17
Printed on the 26/04/17 at 16h41
Vehicle : AA-000-AA
Indicator : A 03000

********** PARAMETERS **********

OUTLETS/VALVE : HOSE 1 AND 2 FULL
OPTION CD : OFF
Boîte automatique : continue
Sonde antidebordement : externe
FLAP/RETURN/PROBES OPTION:

No. CPT :	1	2	3	4	5
FLAP :	0	0	0	0	0
RETURN :	0	0	0	0	N
PROBE :	0	0	0	0	N
LF HEIGHT :	700	700	700	700	700
VENT :	2	2	2	2	2

END HEIGHT : 100 mm
TPSIA: 3UT / TPSID: 3UT
Opening increment : 0.070 s
Opening relax. : 1.000 s
Closing increment : 0.070 s
Closing relax. : 1.000 s
Anti-vortex stop : 5.00 s
Manifold filling : 10 s
Manifold draining : 10 s
Wet probe : 10 s
PETROL VIA PUMP : OFF
TANK OVERFILL : OFF
LOADING PLAN: ON / BLOCKING: OFF
FLOWRATE UNIT : m3/h
CONVERSION : OFF
EMBEDDED COMPUTING: alma V1.10
WITH PRINTER
TICKET : OFF
LANGUAGE CATALOGUE: env1.0.2
EM1
PUMPED
COEFFICIENT K1 : 10.0000 impl/l
FLOWRATE Q1 (LF) : 0.0 m3/h
COEFFICIENT K2 : 10.0000 impl/l
FLOWRATE Q2 (HD) : 0.0 m3/h
GRAVITY
COEFFICIENT K : 5.0000 impl/l
CORRECTION (THOUSAND) : +0

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GRAVITRONIQUE 4035.01
Version 01.01.01 of 04.04.17
Printed on the 26/04/17 at 16h42
Vehicle : AA-000-AA
Indicator : A 03000

MINIMUM FLOWRATE : 4.0 /Max: 80.0 m3/h
OBJECTIVE LOW FLOW: 9.0 m3/h
MINIMUM QUANTITY : 00200 L
Manifold volume : 20 L
Fixed volume : 20 L
Temperature : OFF
PUMP TYPE : INCREMENTALE
GRAVITY VALVE : AUCUNE

FOD	(01) Co+nA+Ba	OFF 00000L/rec
FOD+	(02) Co+A+Ba	OFF 00000L/rec
GO	(03) nC+nA+10	OFF 00000L/rec
GO+	(04) nC+A+10	OFF 00000L/rec
GNR	(05) Co+nA+10	OFF 00000L/rec
GNR+	(06) Co+A+10	OFF 00000L/rec

END LOW FLOW VOLUME : 30 L
FLOW ACTIVATED HF : 7.5 m3/h
COMPLETE PURGE VOLUME : 90 L
SHORT PURGE VOLUME : 80 L
BLOWING : 5 s
ZERO FLOW TIMING : 10 s
PUMPED PRESET END
STOP AT 10.0 m3/h WITH 0.8 L
COEFFICIENT : 0.0766
GRAVITY PRESET END
STOP AT 17.5 m3/h WITH 1.0 L
COEFFICIENT : 0.1700

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RELATED DOCUMENTS

GU 7071	User Guide
MV 5007	Verification Guide
FM 8000	Replacement of the backup batteries on the AFSEC and AFSEC+ electronic board
FM 8001	Diagnostic support for power supply failure
FM 8002	Diagnostic support for a display failure
FM 8003	Diagnostic support for DEB_0 or ZERO FLOW DEFAULT alarm
FM 8004	Diagnostic support for GAS or PRESENCE GAS alarm
FM 8005	Diagnostic support for METERING PROBLEM alarm
FM 8007	Diagnostic support for MEMORY LOST or DEF MEMO alarm
FM 8008	Diagnostic support for a DATE alarm
FM 8010	Diagnostic support for EEPROM MEMORY LOST alarm
FM 8011	Configuration of jumpers and adjustment of metering thresholds on the AFSEC+ electronic board
FM 8510	Adjustment of a temperature chain in a MICROCOMPT+