OPERATING MANUAL

MU 7036 EN J

MICROCOMPT+ LOADING TERMINAL DEVICE

Issue	Date	Nature of modifications	Written by	Approved by
J	2017/07/17	English software, Volume conversion, Dead-man valve for bottom version, ALMA Gas separator, Copy out configuration for downstream assembly, Display resolution 0.1 *[EDV409, EDV419, EDV430, EDV439, MDV413]* ACDA features *[PJN143]*, ESD valve return signal, Pressure sensor	DSM	MV
H	2015/10/19	Creation *[MDV434]*	DSM	SH

CONTENTS

1 GENERAL PRESENTATION AND DESCRIPTION

The electronic calculator-indicating device MICROCOMPT+ for loading terminal is intended to be fitted on measuring systems to measure liquids other than water such as hydrocarbons. It is usually used for loading tank trucks or rail tankers.

It can be used for top loading and bottom loading. Specific functions are identified **BOTTOM** or **TOP,** later in the document.

The electronic calculator-indicating MICROCOMPT+ terminal device calculates and displays:

- ⇨ Either volume (or mass) in metering conditions – VM
- ⇨ Or volume converted to base conditions – VBASE.

It can take into account the temperature of liquid when it's measured by a Pt100 temperature sensor, and the density when it's acquired by a density transducer.

It can manage one or two measuring systems that can operate simultaneously: EMA for the principal product and EMB for the secondary product (for blending or metrological denaturation).

The MICROCOMPT+ controls a non-resettable totaliser for each measuring system (EMA and EMB). Those totalisers memorize and secure measurement information, which is read from the user interface. Considering their variable size, the maximum number of records in the metrological diary depends on the selected options (blending, metrological denaturation, conversion…).

Additivation is also managed by the calculator. Injection is required when an injector number is given by the user. It concerns an additive or a dye which can be denaturant. Configuration of the injectors is made in METROLOGICAL mode. Denaturation may be metrological. Injectors #3 to #6 are used for additivation, dyeing and non-metrological denaturation.

Injectors may be remote on an external equipment called 'ACDA'. The ACDA communicates with the MICROCOMPT+ through e MODBUS network. Then, up to 8 injectors may be managed, one of them are configured to control the remote injectors (for further information, refer to the operating manual MU 7075, available in French version only).

For **BOTTOM** and **TOP** applications, if denaturation is metrological, it can be systematic or optional (the basic product is delivered without any denaturant or with a single and regulated denaturant rate).

If injection is not systematic, pollution of the basic product with the injected product is avoided by the use of an anti-pollution valve (example: dye injection to get off-road diesel).

The features for anti-blending (interruption of the rinsing cycle and ending of measurement after injection of a quality) and anti-fraud (pouring presumption in a new compartment) are enabled in METROLOGICAL mode.

Conversion is a factory option. It can be activated independently for EMA and EMB. Main quantity and temperature for base conditions remain the same for the MICROCOMPT+. The main display for volume is chosen during the METROLOGICAL configuration of the MICROCOMPT+. For on-going operations:

- ⇨ On the right side of the display screen, the pictogram 'Vm' indicates a volume in metering conditions that means a the volume at temperature
- ⇨ Whereas the pictogram 'Vb' indicates a volume converted to base conditions that means the volume converted to reference temperature.

The calculator-indicating device registers on an index accumulated volumes (or masses) in metering conditions and/or in base conditions. It also controls a non-metrological totaliser in millilitres for each injector.

Two serial links are available to communicate with external equipment (mechanical printer, supervision device).

The front of the MICROCOMPT+ is made of:

- ⇨ A liquid crystal display (LCD) which is used to display a 6-digit signed quantity and pictograms for units
- ⇨ A prompter: line of 20-alphanumeric characters for comments
- ⇨ 3 pushbuttons
- ⇨ A metrological electronic seal
- ⇨ An internal switch operated with an ALMA magnetic or RFID key.

NOTE: If MICROCOMPT+ communicates with a system via µConfig, the message UCONFIG… appears on the prompter. µConfig is an optional additional tool on PC to access the MICROCOMPT's configuration.

The electronic calculator-indicating device MICROCOMPT+ has a flameproof case.

2 CONFIGURATION, SETTING AND CALIBRATION

2.1 Configuration

The configuration of the MICROCOMPT+ is made by an authorized person only. It's done at the putting into use of the measuring system and sometimes during metrological controls.

This mode allows setting all functional and metrological parameters. The physical features of the equipment, its instrumentation and its use are taken into account.

To access the METROLOGICAL mode, the MICROCOMPT+ has to be unsealed. Then turn the electronic sealed located at the right of the LCD display.

Refer to METROLOGICAL MODE.

2.2 **Setting**

To access the SUPERVISOR mode, the ALMA magnetic or RFID key must be set at the right of the MICROCOMPT+ LCD display. This mode is used to set or change parameters for ongoing operations of the device.

Before using the device for the first time, enter the value of the parameters such as:

- Additivation: injectors, rates
- Products: name, quality
- Communication
- Instrumentation
- Display language

Refer to SUPERVISOR mode for setup.

2.3 **Calibration**

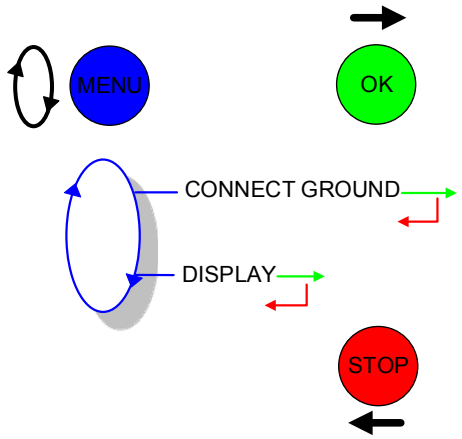
Calibration is used to control the accuracy of the measuring systems or the injectors. It's available by the Menu 'CALIBRATION' that proposes a semi-automatic procedure for verification and calibration of the meter. The procedure can be used for one of the measuring systems (EMA and EMB) and takes into account the last measurement that has been done with the relevant system.

Having made the proving of the metering, this menu 'CALIBRATION' allows calculating the error for the purpose of adjusting the coefficient.

Refer to SUPERVISOR mode.

3 USER MODE

This mode is for ongoing operations of the device.



3.1 Loading

Loading authorization is given by the MICROCOMPT+ on condition that the loading security devices are connected. The loading authorization must have been received by the MICROCOMPT+ from the main computer (communication mode=connected).

Loading security devices are different according to the installation and application:

BOTTOM. Main security devices are: ground, overfill probe, vapor arm, loading arm, authorization.

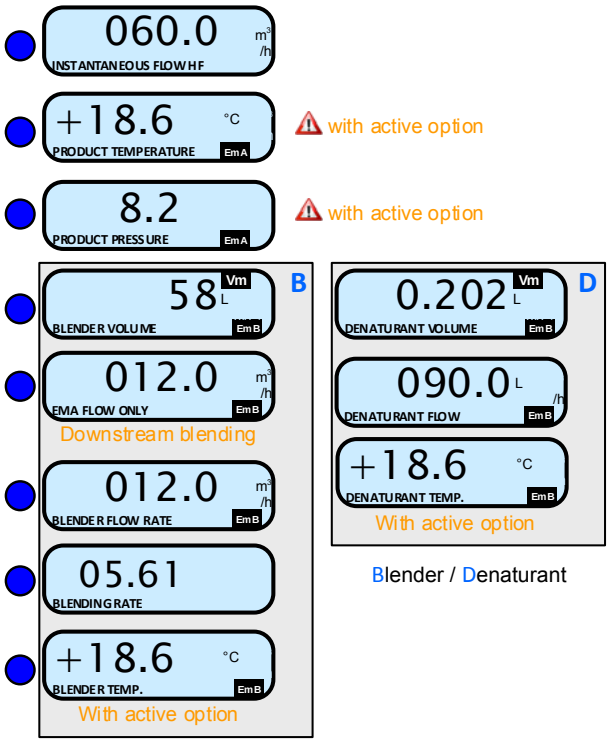
TOP. Main security devices are: ground, arm orientation, arm position, dead-man valve, presence of a ticket, authorization.

In case of disconnection, the MICROCOMPT+ displays the related alarm alternatively with le volume already loaded. Reconnect the device and press green pushbutton to acknowledge the alarm.

During delivery, the following information may be displayed depending on the configuration of the measuring system:

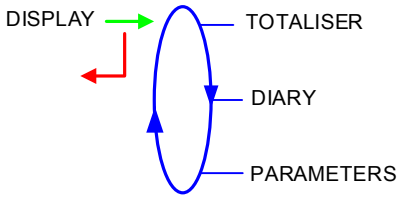
- The instantaneous flowrate (m³/h or L/min; depending on the display unit set)
- The temperature (°C) if it is taken into account
- The measured pressure (bar)
- The measurement volume (Vm or Vb)
- The conversion factor
- The blender or denaturant volume and the associated values

Simply follow the indications below:



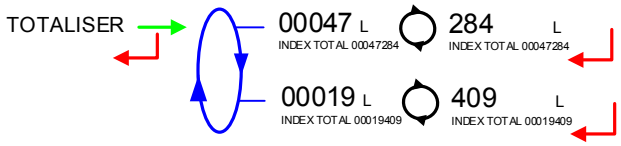
Back to normal display is automatic:
DO NOT PRESS RED CLEAR BUTTON TO KEEP FROM INTERRUPTING DELIVERY.

3.2 Menu DISPLAY



3.2.1 Menu TOTALISER

Totalisers for the principal product (EMA) and the secondary product (EMB) are displayed in this menu. Pictograms indicate the concerned measuring system.



3.2.2 Menu DIARY

Display sequence of measurement results stored by the MICROCOMPT+. That can be done in two ways:

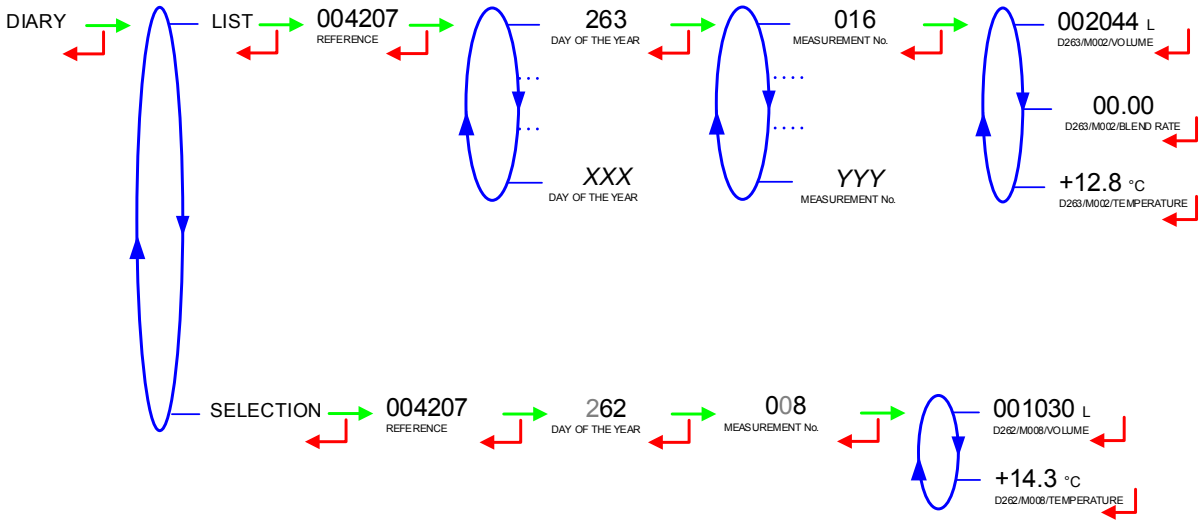
LIST: Display all the measurement details recorded, from the newest to the oldest, sorted by day then by measurement number

SELECTION: Display a specific measurement by selecting the day number

The following item may be displayed, depending on the configuration of the measuring system:

- Time of the end of measurement (with relevant option)
- Operation identifier (with relevant option)
- Quality indication (with relevant option)
- Volume of the principal product at temperature in °C
- Temperature of the principal product (with relevant option)
- Volume of the principal product at base conditions (with relevant option)
- Density used for conversion to base conditions de base of the principal product (with relevant option)
- Loading side (factory option)
- Objective blending rate (with relevant option)
- Volume of the secondary product at temperature in °C (with relevant option)
- Temperature of the secondary product (with relevant option)
- Volume of the secondary product at base conditions (with relevant option)
- Density used for conversion to base conditions de base of the secondary product (with relevant option)

Example of the information displayed for the last measurement:



3.2.3 Menu PARAMETERS

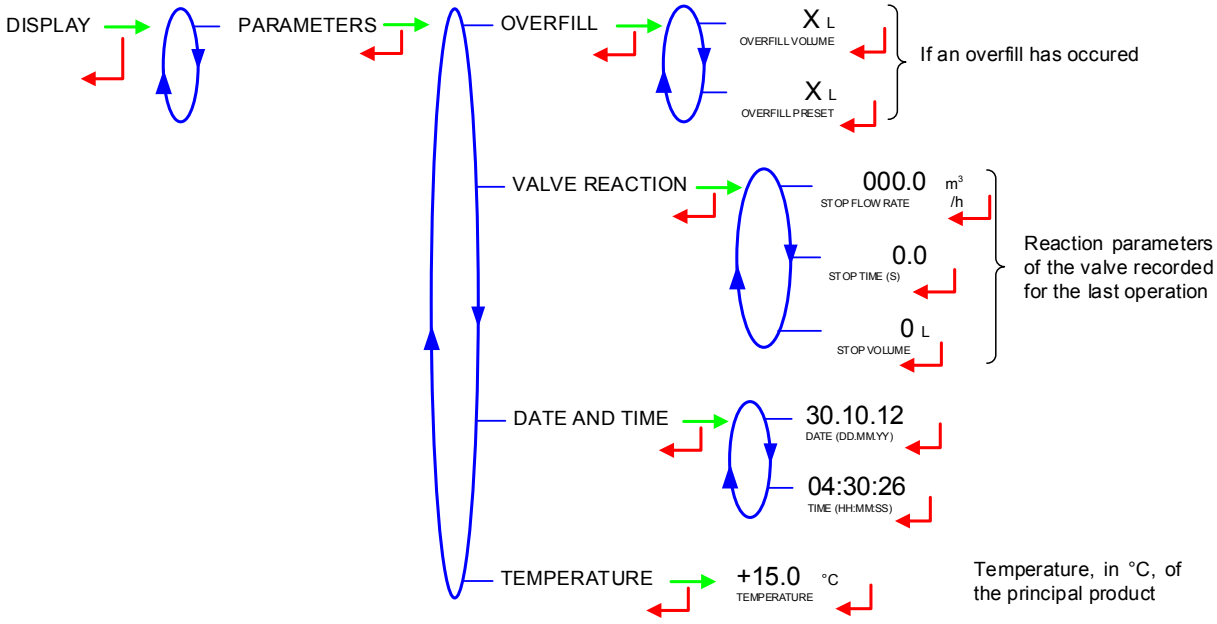
The parameters that are displayed depend on the MICROCOMPT+ configuration.

OVERFILL: Values displayed in case of an overfill situation

VALVE REACTION: Parameters of the valve given for the last sequence of flow shutoff (except when it stops because of an alarm)

DATE AND TIME: Display of date and time

TEMPERATURE: Temperature of the principal product in °C (if taken into account)



3.3 List of alarms for bottom and top loading

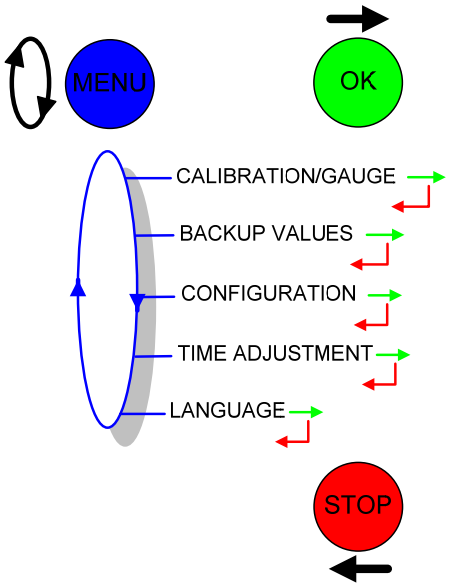
BOTTOM	DISPLAY	MEANING	ACTION
USER	STOP LOADING	Intentional interruption of the loading operation	Continue or stop the loading operation
	EMERGENCY STOP	Detection of an emergency stop	Check the status of the emergency stop
	COMMUNICATION FAULT	Absence of communication network	Check the status on the control device
	POWER SUPPLY PROBLEM	Power outage during discharge	Check the cause / Restore power supply
	LOW FLOW FAULT	Low flowrate (less than minimum flowrate)	Check the parameters / Check the hydraulic system (valve, strainer, nozzle…)
	HIGH FLOW FAULT	High flowrate (greater than maximum flowrate)	Check the hydraulic system (valve, pumping)
	ZERO FLOW FAULT	Zero flow principal product	Check the hydraulic system (safety valve)
	METERING PROBLEM	Metering problem with the principal measuring device	Check if the pulse transmitter is powered (red indicators)
	OVERFILL FAULT	Over-filling of the compartment	Dry out the wet probe or end measurement
	MANDATORY END	Measurement end is required	End operation
	NO MORE AUTHORISATION	No more loading authorisation	Check the reason on the control device
	GROUND FAULT	Loss of ground signal	Check the connection of the dead-man switch
	VAPOR ARM FAULT	Loss of vapor arm signal	Check the connection of the vapor arm
	TICKET FAULT	No ticket in the local mechanical printer	Check the ticket is well-positioned
	DTQM FAULT	Stop requested by the DTQM system	Deal with the problem on the DTQM/LR system
	LEAKAGE FAULT	Metering detection without measurement	Check the tightness of the loading valve
	SAMPLING FAULT	Problem with the sampler	Check the status of the sampler
	QUALITY SELECTION	No product selected	Choose a product
	TANK EMPTY	Product unavailable	Fill the tank with product
	GAS DETECTED	Detection of gas (principal product circuit EMA)	Make a purge (manual or automatic)
	EMB METERING PROBLEM	Metering problem with the secondary measuring device	Check if the pulse transmitter is powered (red indicators)
	EMB NO FLOWRATE	Zero flow (secondary measuring system)	Check the hydraulic system (safety valve)
	BLENDING RATE FAULT	Inappropriate blending ratio	Check the blending rate set in metrological mode
	EMB LEAKAGE FAULT	Metering detection without injection of secondary product	Check the hydraulic system of the denaturant
	BLENDER FAULT	Problem with the denaturant electronic device	Check the denaturant electronic device
	EMB UNDERFLOW	Flowrate less than the min. flowrate set in metrological mode	Check the hydraulic system (valve, strainer, nozzle…)
	EMB HIGH FLOW	Flowrate greater than the max. flowrate set in metrological mode	Check the hydraulic system (valve, pumping)
	EMB GAS FAULT	Detection of gas (secondary product circuit EMB)	Make a purge (manual or automatic)
	BLENDER GAS FAULT	Detection of gas	Make a purge (manual or automatic)
	DENATUR. TANK EMPTY	Denaturant unavailable	Fill the tank with denaturant
	NO DYEING	Dyeing null	Check the additive hydraulic system
	DYE LEAKAGE	Metering detection without injection	Check the additive hydraulic system
	DYEING <-->	Dyeing rate too low	Check the additive hydraulic system
	DYEING <+++>	Dyeing rate too high	Check the additive hydraulic system
	NO ADDITIVATION	Additivation null	Check the additive hydraulic system
	ADDITIVE LEAKAGE	Metering detection without injection	Check the additive hydraulic system
	ADDITIVATION <-->	Additivation rate too low	Check the additive hydraulic system
	ADDITIVATION <+++>	Additivation rate too high	Check the additive hydraulic system
	ADDITIVATION FAULT	Problem with the additivation electronic device	Check the additivation electronic device
	DOSING FAULT	Problem with the dosing of the additive	Check the additivation electronic device

	DISPLAY	MEANING	ACTION
USER	ACDA PROBLEM	Problem with the ACDA (remote injector calculator)	Check the electronic device ACDA
	LINE RINSING FAULT	Rinsing cycle not finished by the injector	Wait for the end of the rinsing cycle. Blocking default if the injector is for denaturant (see ANTI BLENDING configuration)
	INJECT. LEAKAGE	Metering detection on injector XX without injection	Check the additive hydraulic system
	DIARY FAULT	Reset of the events diary	Acknowledge the alarm, check the date in supervisor mode
REPARATOR - NON BLOCKING	DISPLAY FAULT	Problem with display card	If steady alarm, substitution of the display card
	WATCHDOG FAULT	Fault with display or power card or AFSEC+ card	If steady alarm, substitution of the faulty card
	VOLUME CONVER. FAULT	Problem during conversion of volume	If steady alarm, substitution of the AFSEC+ electronic card
	TOTALISER LOST	Loss of totaliser EMA	Substitution of the backup battery
	EMB TOTALISER LOST	Loss of totaliser EMB	Substitution of the backup battery
	TEMPERATURE FAULT	Temperature determination failure EMA	If steady alarm, see a reparator for trouble shooting
	EMB TEMP FAULT	Temperature determination failure EMB	If steady alarm, see a reparator for trouble shooting
	VALVE FAULT	Inappropriate reaction of the EMA control valve	If steady alarm, inspect the authorization valve
	EMB VALVE FAULT	Inappropriate reaction of the EMB control valve	If steady alarm, check the control valve
	FILTER FAULT	Filter fouling	The pressure switch and the product line must be cleaned
	ANTI-POLLUTION VALVE	Mismatch between the status awaited and the actual status of the antipollution valve	Check the status of the antipollution valve
	MISMATCH ESDV	Mismatch between the position feedback of the ESDV	Check the metrological configuration, inspect the ESDV
	INJECT CONFIG FAULT	Disparity between metrological parameters values	Remove the disparity
	DYEING CONFIG FAULT	Disparity between metrological parameters values	Remove the disparity
REPARATOR - BLOCKING	PRINTER FAULT <+> <->	Problem with the IT2 mechanical printer	If steady alarm, inspect the printer
	MEMORY LOST (PILE)	Loss of saved memory	Substitution of the backup battery
	MEMORY LOST	Error on SIM memorization	Enter and exit the METRO mode / If steady alarm, substitution of the backup battery
	COEFFICIENTS FAULT	Deviation between coefficient LF/HF greater than 0.5%	Modification of the low flow coefficient (K1)
	PROM FAULT	Loss of software or resident integrity	Substitution of the AFSEC+ electronic card
	RAM FAULT	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	Loading diary is full	Substitution of the AFSEC+ electronic card
	DATE AND TIME LOST	Loss of date and time	Set date and time in supervisor mode (supervisor key)
	POWER BOARD FAULT	Disparity between the software and the version of the power supply board	Remove the disparity
	GAS DETECTOR FAULT	Problem with the EMA gas detector	Check the gas detector
	GAS DETECTOR HIGH	Problem with the high-point gas detector	Check the gas detector
	EMB DETECTOR FAULT	Problem with the EMB gas detector	Check the gas detector
	VISCOSITY FAULT	Viscosity out of range	Check the curve in METROLOGICAL mode

TOP	DISPLAY	MEANING	ACTION
USER	STOP LOADING	Intentional interruption of the loading operation	Continue or stop the loading operation
	EMERGENCY STOP	Detection of an emergency stop	Check the status of the emergency stop
	COMMUNICATION FAULT	Absence of communication network	Check the status on the control device
	POWER SUPPLY PROBLEM	Power outage during discharge	Check the cause / Restore power supply
	LOW FLOW FAULT	Low flowrate (less than minimum flowrate)	Check the parameters / Check the hydraulic system (valve, strainer, nozzle…)
	HIGH FLOW FAULT	High flowrate (greater than maximum flowrate)	Check the hydraulic system (valve, pumping)
	ZERO FLOW FAULT	Zero flow principal product	Check the hydraulic system (safety valve)
	METERING PROBLEM	Metering problem with the principal measuring device	Check if the pulse transmitter is powered (red indicators)
	OVERFILL FAULT	Over-filling of the compartment	Dry out the wet probe or end measurement
	MANDATORY END	Measurement end is required	End operation
	NO MORE AUTHORISATION	No more loading authorisation	Check the reason on the control device
	GROUND FAULT	Loss of ground signal	Check the connection of the dead-man switch
	TICKET FAULT	No ticket in the local mechanical printer	Check the ticket is well-positioned
	ARM POSITION FAULT	Loading arm in high-position	Check the loading arm position
	ARM ORIENT. FAULT	Problem with the orientation of the arm in low-position	Check the loading arm orientation (left or right)
	ORIENTATION /2 RACKS	Detection of a loading arm oriented on both sides of the rack	Check the loading arm orientation (left or right)
	DEADMAN SWITCH	The dead man switch is not connected	Check the dead man switch
	LEAKAGE FAULT	Metering detection without measurement	Check the tightness of the loading valve
	SAMPLING FAULT	Problem with the sampler	Check the status of the sampler
	SELECTION QUALITY	No product selected	Choose a product
	TANK EMPTY	Product unavailable	Fill the tank with product
	GAS DETECTED	Detection of gas (principal product circuit EMA)	Make a purge (manual or automatic)
	EMB METERING PROBLEM	Metering problem with the secondary measuring device	Check if the pulse transmitter is powered (red indicators)
	EMB NO FLOWRATE	Zero flow (secondary measuring system)	Check the hydraulic system (safety valve)
	BLENDING RATE FAULT	Inappropriate blending ratio	Check the blending rate set in metrological mode
	EMB LEAKAGE FAULT	Metering detection without injection of secondary product	Check the hydraulic system of the denaturant
	BLENDER FAULT	Problem with the denaturant electronic device	Check the denaturant electronic device
	EMB UNDERFLOW	Flowrate less than the min. flowrate set in metrological mode	Check the hydraulic system (valve, strainer, nozzle…)
	EMB HIGH FLOW	Flowrate greater than the max. flowrate set in metrological mode	Check the hydraulic system (valve, pumping)
	EMB GAS FAULT	Detection of gas (secondary product circuit EMB)	Make a purge (manual or automatic)
	BLENDER GAS FAULT	Detection of gas	Make a purge (manual or automatic)
	DENATUR. TANK EMPTY	Denaturant unavailable	Fill the tank with denaturant
	NO DYEING	Dyeing null	Check the additive hydraulic system
	DYE LEAKAGE	Metering detection without injection	
	DYEING <--->	Dyeing rate too low	Check the additive hydraulic system
	DYEING <+++>	Dyeing rate too high	
	NO ADDITIVATION	Additivation null	Check the additive hydraulic system
	ADDITIVE LEAKAGE	Metering detection without injection	
	ADDITIVATION <--->	Additivation rate too low	Check the additive hydraulic system
	ADDITIVATION <+++>	Additivation rate too high	

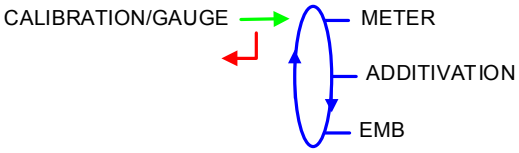
TOP	DISPLAY	MEANING	ACTION
USER	ADDITIVATION FAULT	Problem with the additivation electronic device	Check the additivation electronic device
	DOSING FAULT	Problem with the dosing of the additive	Check the additivation electronic device
	ACDA PROBLEM	Problem with the ACDA (remote injector calculator)	Check the electronic device ACDA
	LINE RINSING FAULT	Rinsing cycle not finished by the injector	Wait for the end of the rinsing cycle. Blocking default if the injector is for denaturant (see ANTI BLENDING configuration)
	INJECT. LEAKAGE	Metering detection on injector XX without injection	Check the additive hydraulic system
	DIARY FAULT	Reset of the events diary	Acknowledge the alarm, check the date in supervisor mode
REPARATOR - NON BLOCKING	DISPLAY FAULT	Problem with display card	If steady alarm, substitution of the display card
	WATCHDOG FAULT	Fault with display or power card or AFSEC+ card	If steady alarm, substitution of the faulty card
	VOLUME CONVER. FAULT	Problem during conversion of volume	If steady alarm, substitution of the AFSEC+ electronic card
	TOTALISER LOST	Loss of totaliser EMA	Substitution of the backup battery
	EMB TOTALISER LOST	Loss of totaliser EMB	Substitution of the backup battery
	TEMPERATURE FAULT	Temperature determination failure EMA	If steady alarm, see a reparator for trouble shooting
	EMB TEMP FAULT	Temperature determination failure EMB	
	VALVE FAULT	Inappropriate reaction of the EMA control valve	If steady alarm, inspect the autorization valve
	EMB VALVE FAULT	Inappropriate reaction of the EMB control valve	
	FILTER FAULT	Filter fouling	The pressure switch and the product line must be cleaned
	ANTI-POLLUTION VALVE	Mismatch between the status awaited and the actual status of the antipollution valve	Check the status of the antipollution valve
	INJECT CONFIG FAULT	Disparity between metrological parameters values	Remove the disparity
	DYEING CONFIG FAULT	Disparity between metrological parameters values	Remove the disparity
REPARATOR - BLOCKING	PRINTER FAULT <-> <+>	Problem with the IT2 mechanical printer	If steady alarm, inspect the printer
	MEMOTY LOST <PILE>	Loss of saved memory	Substitution of the backup battery
	MEMORY LOST	Error on SIM memorization	Enter and exit the METRO mode / If steady alarm, substitution of the backup battery
	COEFFICIENTS FAULT	Deviation between coefficient LF/HF greater than 0.5%	Modification of the low flow coefficient (K1)
	PROM FAULT	Loss of software or resident integrity	Substitution of the AFSEC+ electronic card
	RAM FAULT	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	Loading diary is full	Substitution of the AFSEC+ electronic card
	DATE AND TIME LOST	Loss of date and time	Set date and time in supervisor mode (supervisor key)
	POWER BOARD FAULT	Disparity between the software and the version of the power supply board	Remove the disparity
	GAS DETECTOR FAULT	Problem with the EMA gas detector	Check the gas detector
	GAS DETECTOR HIGH	Problem with the high-point gas detector	Check the gas detector
	EMB DETECTOR FAULT	Problem with the EMB gas detector	Check the gas detector
	VISCOSITY FAULT	Viscosity out of range	Check the curve in metrological mode

4 SUPERVISOR MODE



SUPERVISOR key, magnetic or RFID

4.1 Menu CALIBRATION/GAUGE



4.1.1 Sub-menu METER

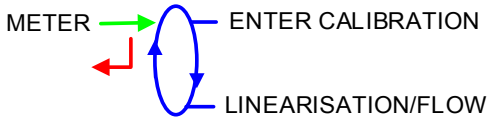
Having made the proving of the metering, this menu allows you to check the accuracy of the measuring system EMA or EMB by calculating the measuring device error and the new corrected coefficient.

For the EMA measuring system, the possibility is given to linearize the curve on 2 measuring points.

The volume displayed is the volume at metering conditions (one decimal point) even if volume conversion is activated and whatever the principal quantity (Vb or Vm) is.

ENTER CALIBRATION: Pour visualiser le détail du dernier mesurage sur l'un des ensembles de mesurage. Permet également d'appliquer un débit de consigne pour le prochain mesurage.

LINEARISATION/FLOW: Pour visualiser et configurer les points de la correction en débit.



4.1.1.1 Enter calibration

Calibration is proposed for both measuring systems: EMA (for principal product), EMB (for secondary product).

If the blending of principal and secondary products is made upstream the transfer point, the EMA valve remains open during the calibration of EMB only. So it is necessary to close manually the valve of principal product before proceeding to the calibration in that case.

First, fill the gauge (USER mode) in high or low flow with or without predetermination of the volume.

Switch to SUPERVISOR mode, choose CALIBRATION/GAUGE>METER>ENTER CALIBRATION and validate.

Enter the reference volume (read on the gauge and corrected), then validate.

The following information is then displayed:

- The signed error in (%)
- The coefficient revised as a function of the error

Enter a new flowrate value if necessary. This set-flowrate is taken into account by the MICROCOMPT+ for the next operation only, thus avoiding the seal removal.

4.1.1.2 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 principal product (EMA).

When you validate the menu LINEARISARION/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.

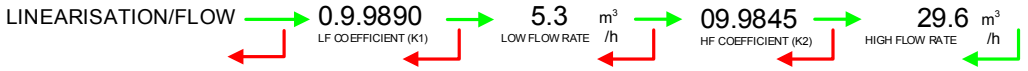
To linearize the curve, two tests are necessary. Follow the instructions:

- 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>METER>ENTER CALIBRATION as described above
- Fill the gauge in low flow $[flow_{min}] \leq$ low flow $\leq flow_{min} \times 1.5]$, enter the volume read on the gauge in the menu CALIBRATION/GAUGE>METER>ENTER CALIBRATION as described above
- Choose CALIBRATION/GAUGE>METER>LINEARISATION/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 has failed, the following alarms may be displayed:

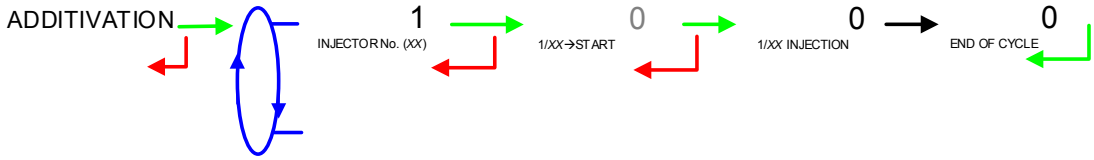
- LARGE GAP K1/K2: Correction between both measuring points >0.5%
- FLOWS TOO CLOSE: High flowrate value is out of range. It needs to be: $[flow_{min} \times 3] \leq$ high flow $< [flow_{max}]$

- LO-FLOW OUT OF RANGE: Low flowrate value is out of range. It needs to be: [$flow_{min}$] ≤low flow≤$flow_{min}$×1.5]
- 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 or high flowrate).



4.1.2 Sub-menu ADDITIVATION

This menu is used to calibrate the injectors, except the MICRO-BLEND one. At the end of the calibration procedure, enter the true volume to correct the injector coefficient.

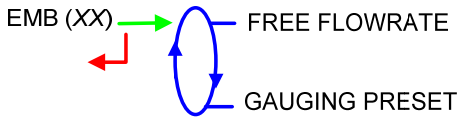


At the end of a cycle, if the additive volume is not at zero, press BP1 to input the true volume in order to display the calculated additive coefficient. Press BP1 a second time to edit the coefficient (for metrological injectors, this menu is disabled).

Warning: The coefficient displayed is the one that has been set in METROLOGICAL mode

Note: In some particular cases (metrological denaturation through EMB on injector #1 or systematic dyeing on a dedicated injector), this procedure displays the new coefficient after calibration and proposes to record it after removing the MICROCOMPT+ seal.

4.1.3 Sub-menu EMB



4.1.3.1 EMB blender

For a blender measuring system EMB, use the menu GAUGING PRESET to flow EMB only.

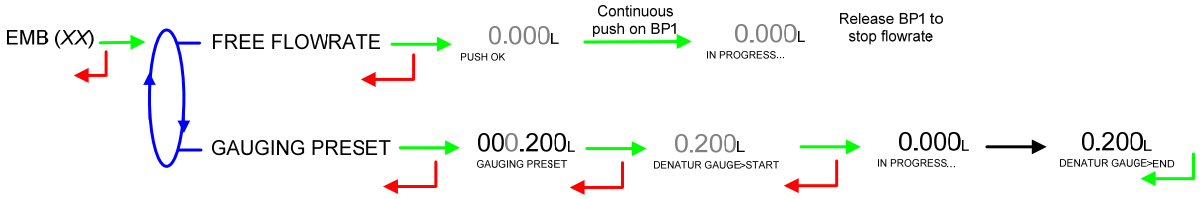
- Enter a preset volume of secondary product and validate with BP1
- Press BP1 one more time to finish the procedure at the end of pouring, or press BP3 to cancel the procedure.

4.1.3.2 EMB metrological denaturant

FREE FLOWRATE: This is to flow the measuring system EMB while keeping BP1 pushed

GAUGING PRESET: This is to flow the measuring system EMB only

When calibrating the measuring system EMB as an injector of metrological denaturant, the MICROCOMPT+ must be unsealed to set the new coefficient which is a metrological parameter.



STEP 1: Conditioning of the gauge

SUPERVISOR>CALIBRATION/GAUGE>EMB (DENATURANT)>FREE FLOW RATE: press green BP1 at least 2 seconds to let denaturant flow. Release BP1 to stop flow.

→ Technician Pushbutton: lets the denaturant flow (gauge conditioning)

STEP 2: Gauging

SUPERVISOR>CALIBRATION/GAUGE>EMB (DENATURANT)>GAUGING PRESET: set the preset volume (Unit: Litre; scale interval: millilitre)

→ Technician Pushbutton: starts the injection of one dose of denaturant inside the gauge

→ MICROCOMPT+: stops automatically the injection

→ Technician Pushbutton: measures the volume in the gauge.

STEP 3: Calibration

SUPERVISOR>CALIBRATION/GAUGE>METER>ENTER CALIBRATION>CHOOSE EM: choose EMB, enter volume and error. The new coefficient is displayed.

→ Technician Pushbutton: sets volume and error in the MICROCOMPT+

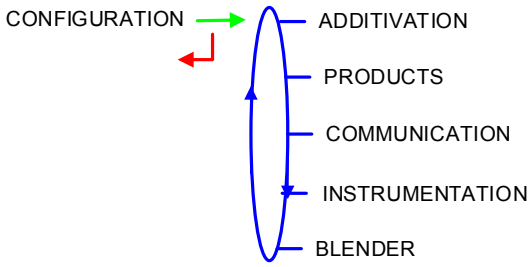
→ MICROCOMPT+ calculates and displays of the new coefficient.

STEP 4: Coefficient memorisation.

METRO>EMB (DENATURANT)>COEFFICIENT (P/L): enter the new coefficient.

→ Technician Pushbutton: sets the new coefficient in the MICROCOMPT+.

4.2 Menu CONFIGURATION

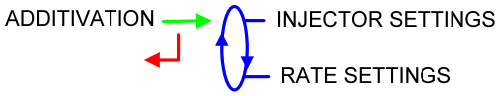


4.2.1 Sub-menu ADDITIVATION

This menu is for the additivation configuration:

INJECTOR SETTINGS: Configuration of the injectors

RATE SETTINGS: Configuration of the additivation general parameters.



4.2.1.1 Injector settings

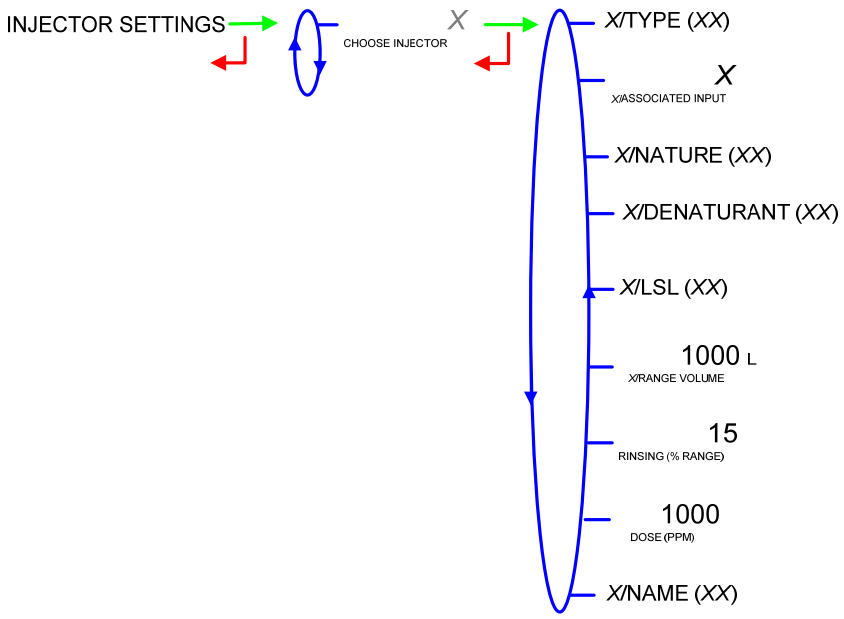
Configuration of the injectors. There may be up to 6 injectors depending on the device configurations and options.

In DUAL version, injectors 1 and 2 are not configurable. However, the name of the injected product may be changed. The other parameters, set in METROLOGICAL mode for denaturation, are on read-only access.

Injectors 3 to 6 are used for additivation, dyeing and non-metrological denaturation.

But if dyeing is forced (METROLOGICAL configuration), values are on read-only access. One of these messages appears: METRO. DENATURANT or METRO. DYEING.

The configuration of an injector associated to EMA_ACDA or EMB_ACDA must be done directly on the ACDA indicating device. If one of the features of such an injector is changed, then the message ACDA METRO appears.



Possible combinations for the injectors' configuration:

Configuration	DUAL→ON			DUAL→OFF
	Metro: DUAL activated		Metro: DUAL not activated	
	With MICRO_BLEND (IAC)	Without	With MICRO_BLEND (IAC)	Without
Injector#1 **Injector#2**	• None • ACDA • Micro Blend	• None • ACDA	• None • Metering • Dosing • ACDA • Micro Blend	• None • Metering • Dosing • ACDA
Injector#3 **Injector#4** **Injector#5** **Injector#6**	• None • Metering • Dosing • ACDA • Micro Blend	• None • Metering • Dosing • ACDA		
Injector#7 **Injector#8**	• ACDA	• ACDA	• ACDA	• ACDA

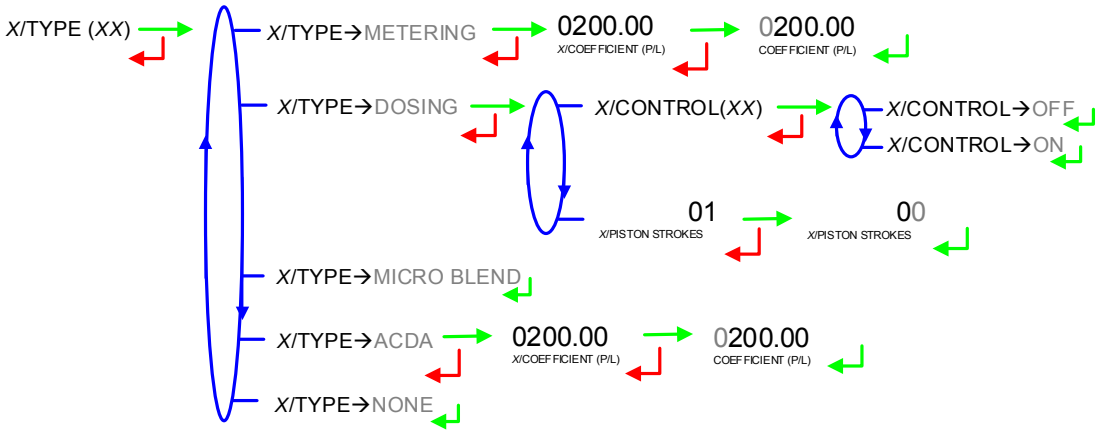
a) Injector type

Choose the injector type:

METERING: metering-type injector (MIV or PAM). Display and set the injector coefficient

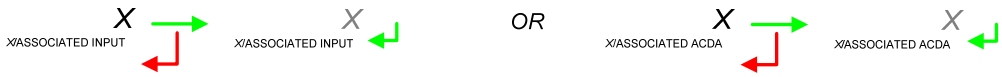
DOSING: dosing-type injector with or without feedback control (GATE PACK, HYROLEC). Enter the piston strokes needed to inject the dose.

ACDA: Remote injector controlled by the ACDA. In case of a metrological injector, it must be set up directly on the ACDA indicating device.



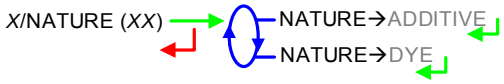
b) Associated input

Choose the input associated to the injector (meter or control) or choose the ACDA injector associated to the MICROCOMPT+ injector.



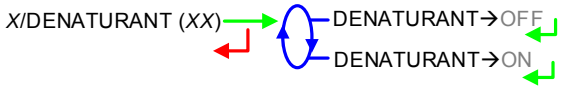
c) Nature of the product

Choose the nature of the injected product: additive or dye.



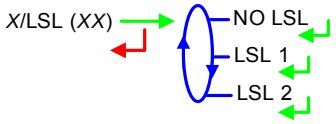
d) Denaturant

This menu is used to declare an injector as denaturant. It reinforces the controls (anti-fraud and anti-blending). An alarm forces the end of measurement.



e) LSL input

Choose the LSL input associated to the injector of additive, dye or denaturant.



f) Range volume

Enter the range volume. It needs to be between 200-500 litres of principal product.

g) Rinsing volume

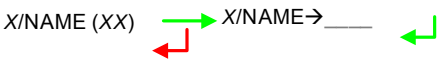
This menu is used to define the rinsing volume as a percentage of the range volume. It needs to be **between 10-30%**. It corresponds to the volume of product required after an injection so that the line is no longer seen as 'contaminated'.

h) Dose volume

This menu is used to define the volume of additive or dye (PPM for injection): volume in millilitres of the dose to be injected for 1000 litres of product.

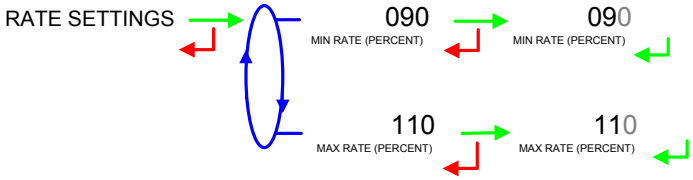
i) Name of the product

Enter the name of the injected product: injector label (6 characters).



4.2.1.2 Rate settings

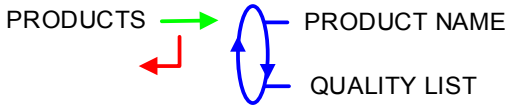
This menu is used to configure the additivation minimum and maximum rates beyond which an alarm is triggered.



4.2.2 Sub-menu PRODUCTS

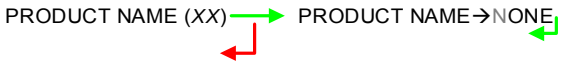
PRODUCT NAME: Name of the product that the MICROCOMPT+ displays in USER mode when pre-measuring conditions are met.

QUALITY LIST: Configuration of quality elements (product, additive, dye).



4.2.2.1 Product name

Enter the name of the principal product (6 characters). Default display: NONE



4.2.2.2 Quality list

This menu is available when the MICROCOMPT+ is operating in autonomous mode (CONFIGURATION>COMMUNICATION>MODE→AUTONOME).

It allows to configure the qualities for the additivation and/or dyeing of the principal product (according to option). Depending on the option chosen in METROLOGICAL mode (CONFIGURATION>LOGIC>OPTIONS>OPTION→CODE 01), the quality to be loaded may be chosen at the beginning of each measurement or automatically fixed by the status of the authorisation inputs.

When quality exits QUALITY→ON, it is defined as follows:

(QUAL1)/CODE AUTO: Code corresponding to the combination of status of the digital inputs for the automatic determination of the quality. Depends on the metrological and factory configuration

(QUAL1)/NAME: Name of the quality which will be proposed to the driver at the beginning of the measurement

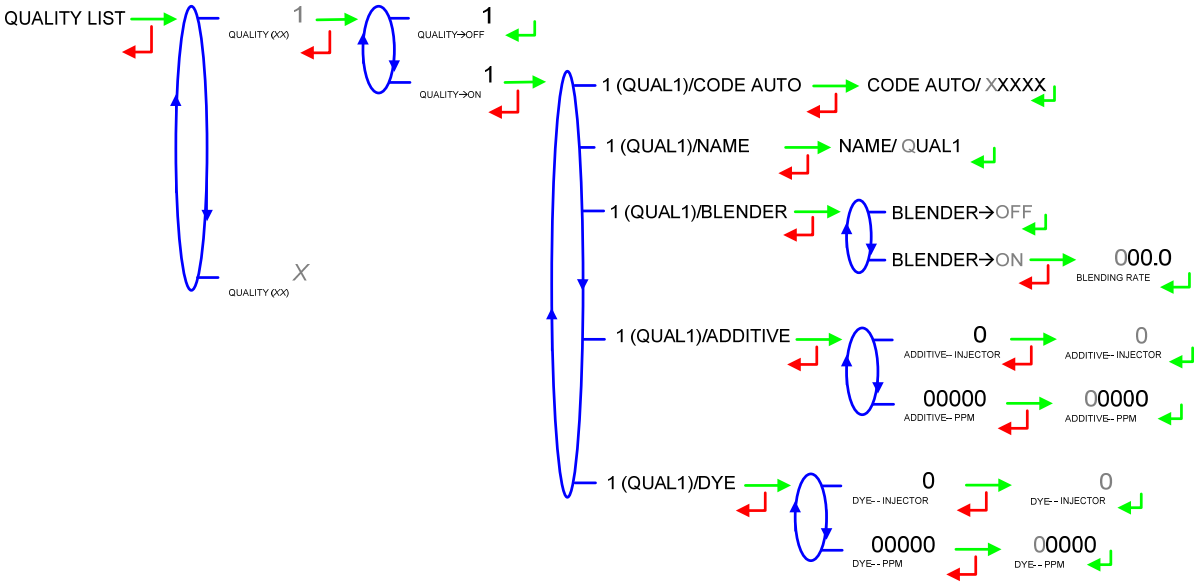
(QUAL1)/BLENDER: In case of blending, enter the blending rate using menu.

(QUAL1)/ADDITIVE: In case of additive injection. Specify:

- **INJECTOR**: The number of the injector assigned. Enter a null value for 'no additivation'
- **PPM**: The additivation rate for 1000 litres of principal product.

(QUAL1)/DYE: In case of dye injection. Specify:

- INJECTOR: The number of the injector assigned. Enter a null value for 'no coloration'
- PPM: The additivation rate for 1000 litres of principal product.



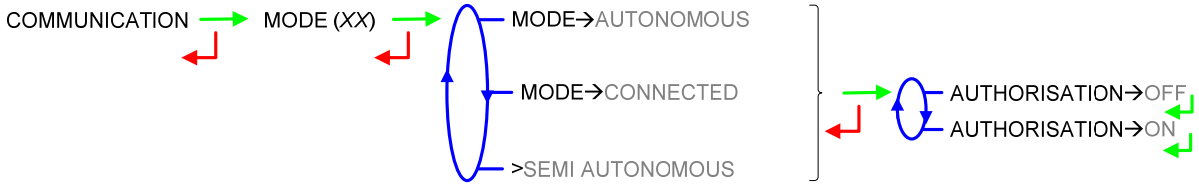
4.2.3 Sub-menu COMMUNICATION

This menu allows to define the configuration of the communication with the control device (main computer). If it's done in METROLOGICAL mode (METRO>CONFIGURATION>COMMUNICATION>MODE→SUPERVISOR), it has priority. But it may be define by this menu.

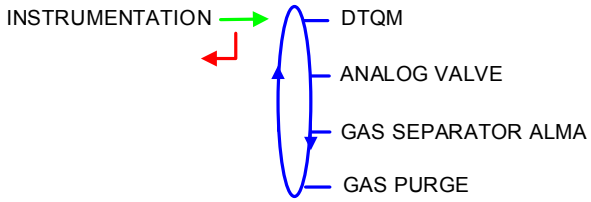
AUTONOMOUS: The MICROCOMPT+ operates in autonomous mode (security management) with or without the useful authorisation.

CONNECTED: The MICROCOMPT+ operates with the control device (main computer) with or without the useful authorisation

SEMI AUTONOMOUS: The MICROCOMPT+ operates in autonomous mode (security management) with or without the useful authorisation. The MICROCOMPT+ takes into account the authorisation given by the control device if connected.

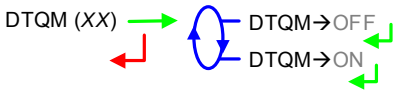


4.2.4 Sub-menu INSTRUMENTATION



4.2.4.1 DTQM

BOTTOM. If the external sealing device on the loading station breaks down, this menu is used to disable the DTQM input. The MICROCOMPT+ enables it again when the problem is solved.



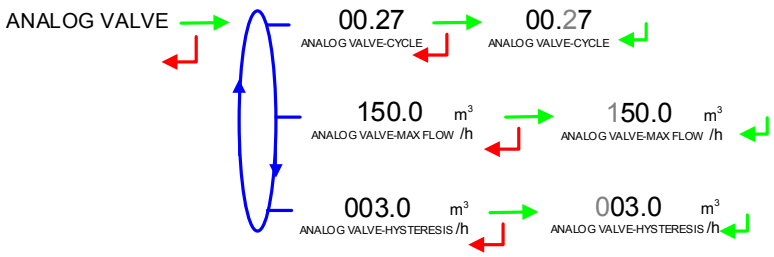
4.2.4.2 Analog valve

This menu is used to adjust the parameters of the 4-20mA analog valve.

ANALOG VALVE-CYCLE: Cycle time in seconds which cannot be lower than 300ms. Default value: 2s

ANALOG VALVE-MAX FLOW: Maximum flowrate when the valve is totally open

ANALOG VALVE-HYSTERESIS: Maximum permissible deviation between the set-flowrate and real value of flow in m^3/h.



4.2.4.3 Gas separator ALMA

This menu is used to set up a filtration timer, which must be between 0.0 and 9.9 seconds. It is used to control the wet or dry status of one of the DG3001 gas detectors installed at low and high points of the ALMA gas separator.

4.2.4.4 Gas purge

This menu is used to set up the maximum timer of a purge sequence. The value must be between 1 and 120 seconds.

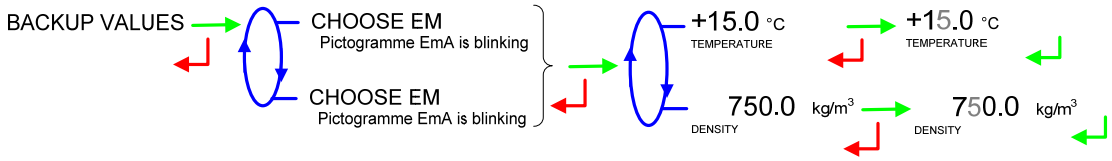
The message NO GAS PURGE appears if the system is not taken into account.

4.2.5 Sub-menu BLENDER

This menu is useful in DUAL version, if the secondary measuring system has been activated as a blender in METROLOGICAL mode (except when the value is given by the main computer SESAME II). The blending rate can be modified in SUPERVISOR mode.

4.2.6 Sub-menu BACKUP VALUES

This menu allows setting the backup values for temperature and density for both measuring systems EMA and EMB. It is available when the menu METROLOGICAL>CONFIGURATION>CONVERSION is ON.

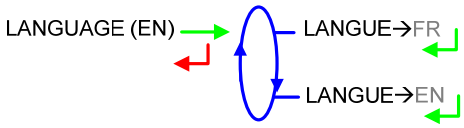


4.3 Menu TIME ADJUSTMENT

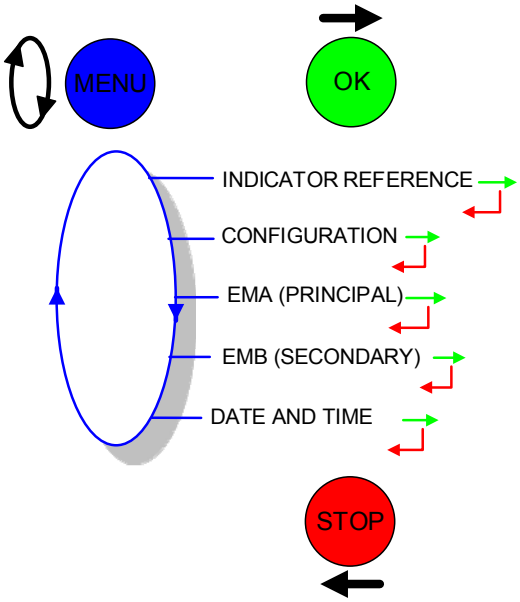
Date and time are set in METROLOGICAL mode. The hour may be adjusted (±2h) one time a day through this menu (use French format: 14.41 means 2.41 pm).

4.4 Menu LANGUAGE

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



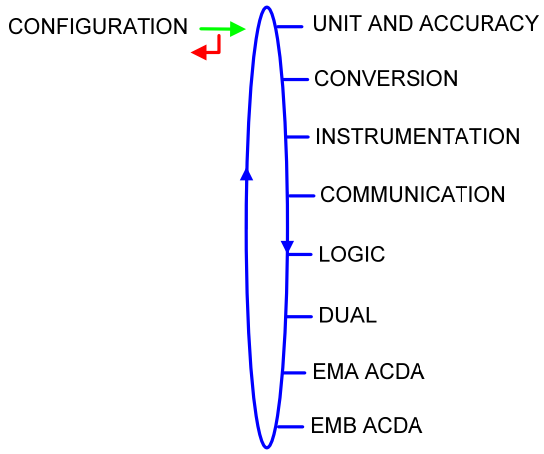
5 METROLOGICAL MODE



5.1 Menu INDICATOR REFERENCE

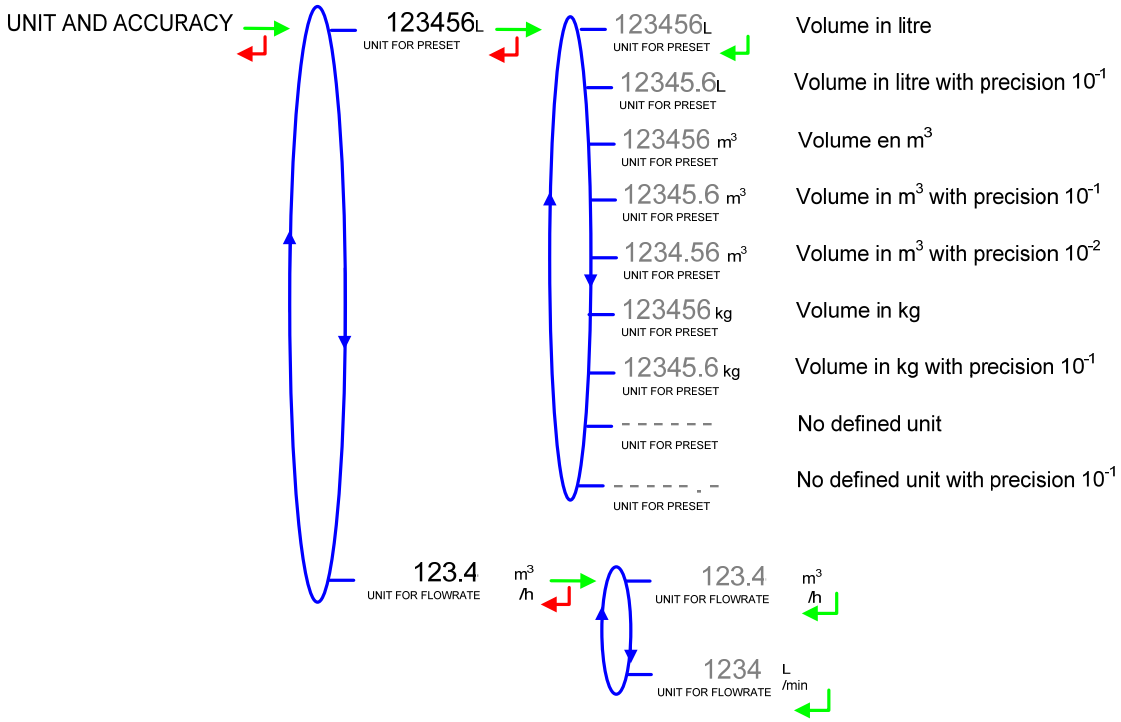
Set the MICROCOMPT+ serial number (5 figures) then the slave number that is useful for commissioning and maintenance operations with the µConfig tool.

5.2 Menu CONFIGURATION



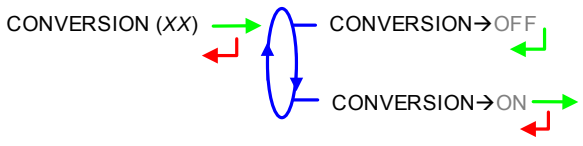
5.2.1 Sub-menu UNIT AND ACCURACY

Choose the unit and the accuracy of the volume, and choose the unit of flowrate that will be displayed and printed.



5.2.2 Sub-menu CONVERSION

This menu is used to operate with conversion or not.



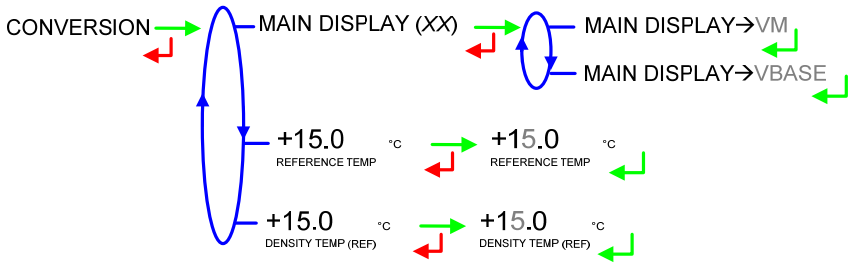
When conversion is active, the following parameters must be set:

MAIN DISPLAY: Choose the type for displayed volume (volume in metering conditions or volume converted to base conditions)

REFERENCE TEMP. : Enter the reference temperature for conversion. Default value: 15°C for the most common conversion

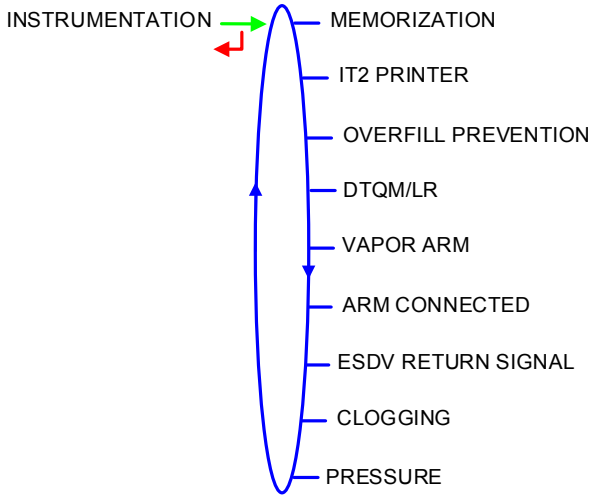
DENSITY TEMP (REF): Enter the reference temperature for set up densities. Default value: 15°C for density à 15°C (MV15)

The conversion table is chosen during the configuration of each measuring system.



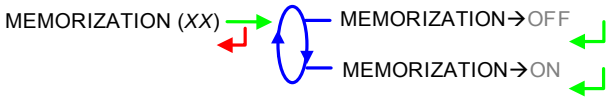
WARNING: Changing the main quantity forces the reset of totalisers and metrological diary.

5.2.3 Sub-menu INSTRUMENTATION



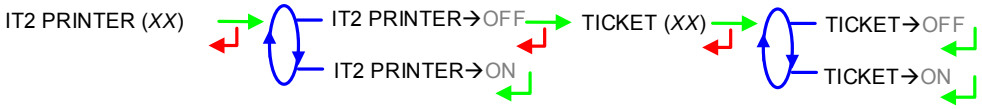
5.2.3.1 Memorization

Operation with or without memorization.



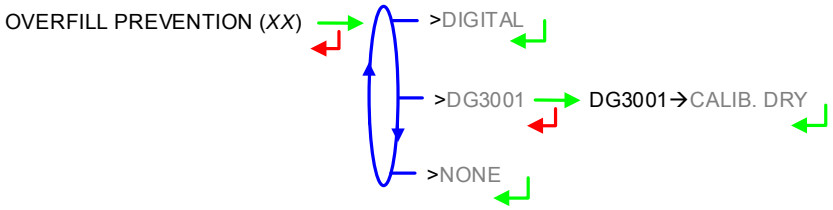
5.2.3.2 IT2 mechanical printer

Operation with or without IT2 ticket mechanical printer. Specify whether another ticket printing device is connected.



5.2.3.3 Overfill prevention

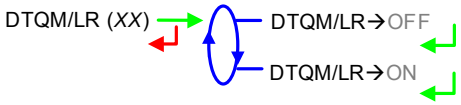
Control of the overfill protection (digital or DG3001).



5.2.3.4 DTQM

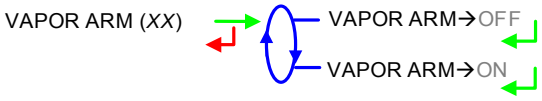
BOTTOM. Operation with or without DTQM.

In case of failure of the DTQM electronic seal, the input can be disabled in SUPERVISOR mode (CONFIGURATION>INSTRUMENTATION>DTQM).



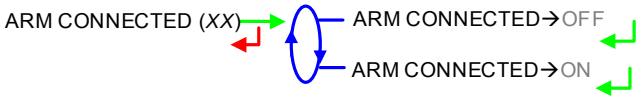
5.2.3.5 Vapor arm

BOTTOM. Operation with or without vapor arm.



5.2.3.6 Arm connected

BOTTOM. Operation with or without control of the loading arm connection to the truck.



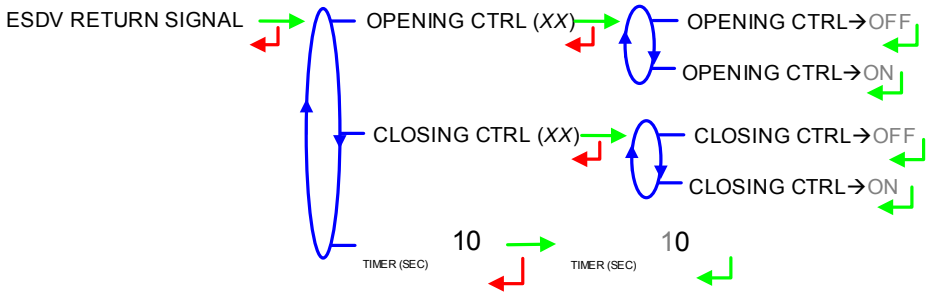
5.2.3.7 ESDV return signal

BOTTOM. This menu is used to set up the return signal of the emergency shutdown valve (ESDV):

OPENING CTRL: Instrumentation of the input 'open ESDV return signal' (ON/OFF)

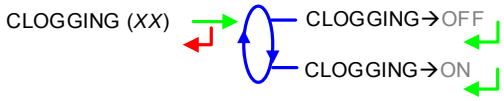
CLOSING CTRL: Instrumentation of the input 'close ESDV return signal' (ON/OFF)

TIMER: Control of the position mismatch. The value is set to zero to disable this control. The set up value corresponds to the maximum duration before alarm is triggered (in seconds)



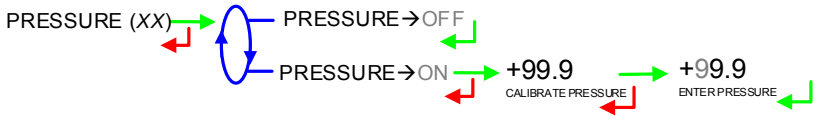
5.2.3.8 Clogging

Operation with or without control of the clogging filter fouling.



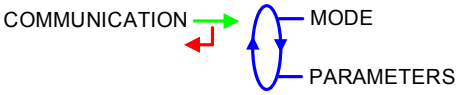
5.2.3.9 Pressure

When activated, this menu is used to calibrate a pressure sensor for two measuring points minimum. Set the value in bar. The pressure measured should be displayed during the measurement in USER mode.



5.2.4 Sub-menu COMMUNICATION

This menu allows to configure the communication with the control device (main computer).



5.2.4.1 Mode

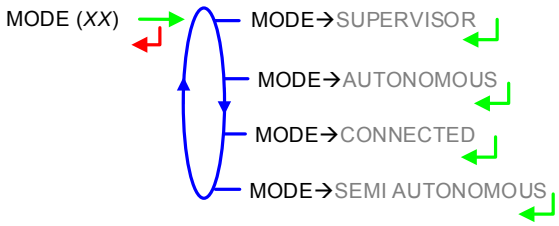
Communication mode with the control device (main computer):

SUPERVISOR: The choice will be done in SUPERVISOR mode (CONFIGURATION>COMMUNICATION>MODE).

AUTONOMOUS: The MICROCOMPT+ operates in autonomous mode (security management) with or without the useful authorisation.

CONNECTED: The MICROCOMPT+ operates with the control device (main computer) with or without the useful authorisation

SEMI AUTONOMOUS: The MICROCOMPT+ operates in autonomous mode (security management) with or without the useful authorisation. The MICROCOMPT+ takes into account the authorisation given by the control device if connected.



5.2.4.2 Parameters

a) SESAME II

Definition of the communication protocol SESAME II:

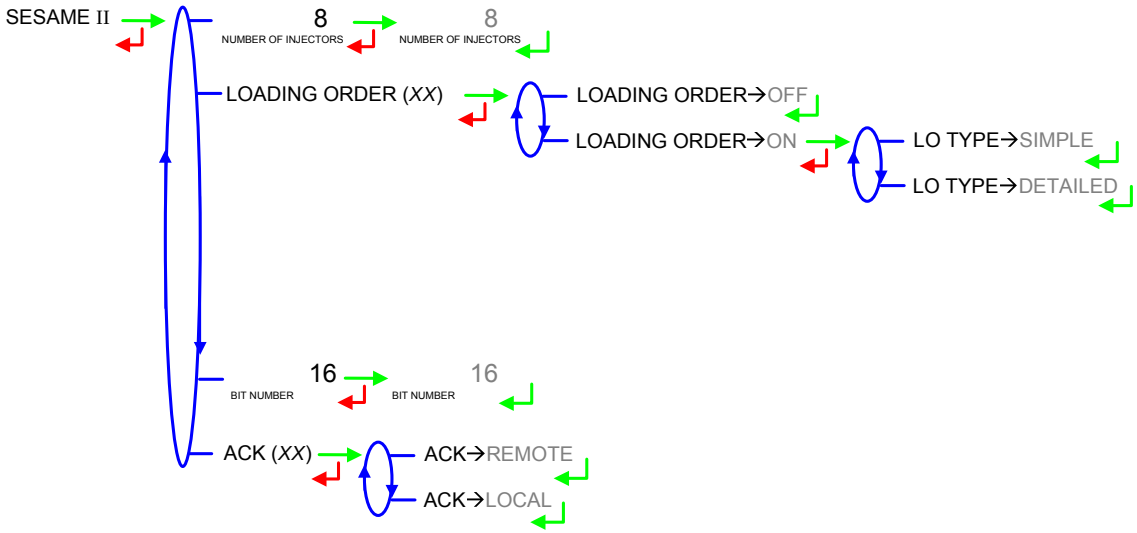
NUMBER OF INJECTORS: Operation with ALMA SESAME II network with a maximum of 8 injectors

LOADING ORDER: Operation with loading order (LO) or without loading order, (multi-customer). With LOADING ORDER→ON, Specify the display on the MICROCOMPT+ is simple (customer No., injectors No) or detailed (additional information such as product name, additive, dye, denaturant, rates)

BIT NUMBER: Operation with ALMA SESAME II network with 16 or 32-bits data coding of the volume

ACK: Acknowledgement of the major alarms can be made in 2 ways:

- **REMOTE**: By the control device (remote acknowledgement)
- **LOCAL**: On the MICROCOMPT+

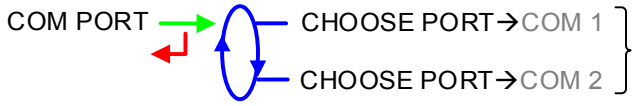


b) Communication port

Two communication ports are available on the MICROCOMPT+.

COM1: RS485 port. If COM1 is already used to control an MICRO-BLEND additivation device, a ticket mechanical printer or a mass flowmeter, COM1 configuration is useless (specific factory configurations)

COM2: RS485 port



Any protocols are MODBUS data protocol and use the slave number set in INDICATOR REFERENCE menu. Several protocols can be configured on a same link.

Configuration of the protocols for each communication port:

SESAME II: Communication over the ALMA SESAME II network, which is an authorisation and operations secured transmission network.

METROLOGICAL DIARY: Communication over a metrological diary to retrieve measurement data on the control device (main computer)

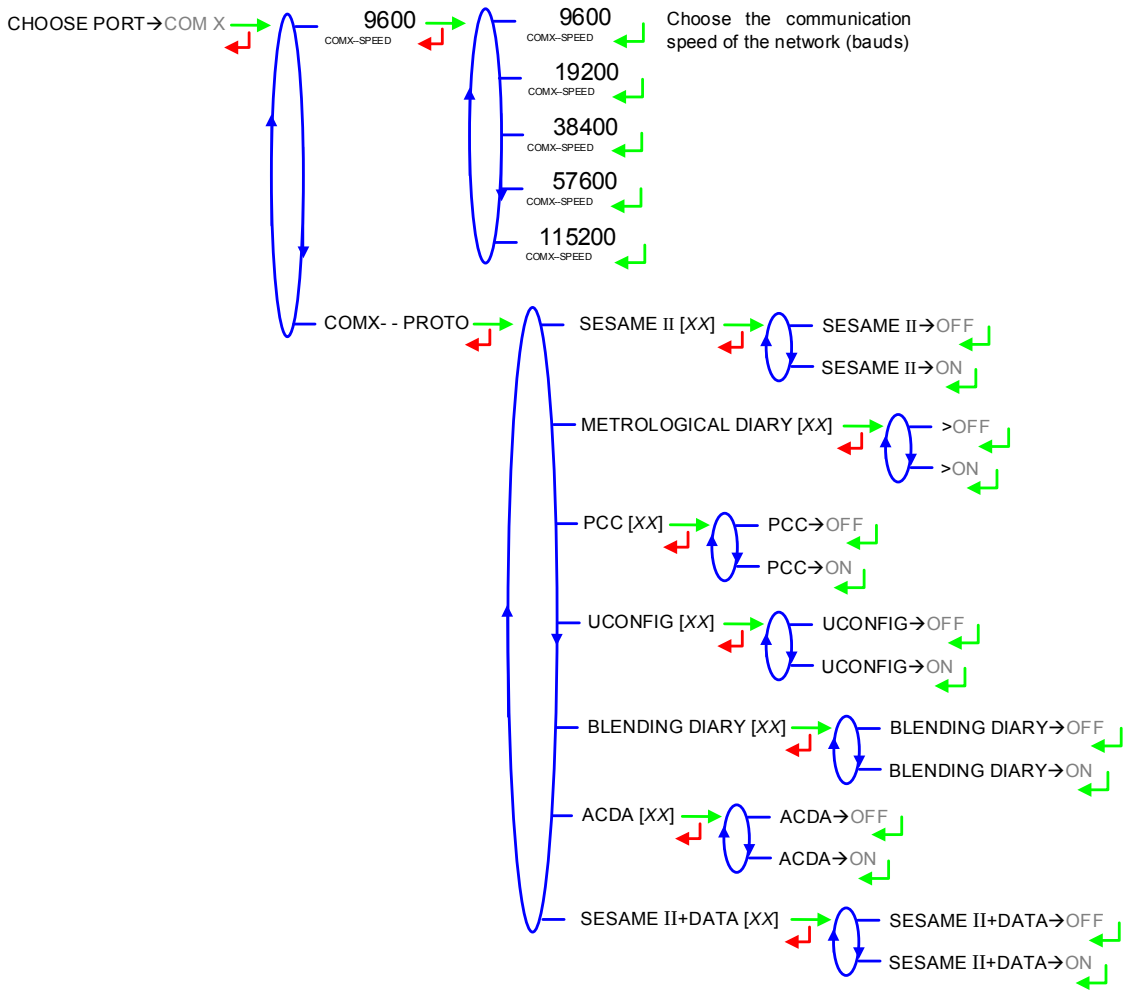
PCC: Proofread of the metrological diary with PCC-recorder extension

UCONFIG: Communication over the ALMA protocol µConfig. It is useful to transferring data between MICROCOMPT+ and the control device (main computer)

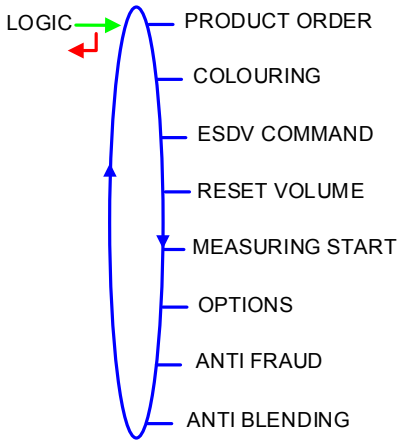
BLENDING DIARY: Diary of the blender flowrates for the last operation

ACDA: Expansion of injection possibilities through a remote external system ACDA

SESAME II + DATA: Extension to SESAME II network for additional data



5.2.5 Sub-menu LOGIC

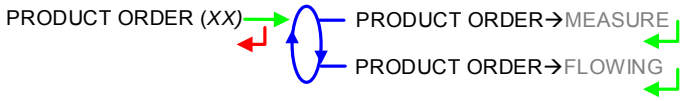


5.2.5.1 Product order

Configuration of ‘product request’.

MEASURE: ‘Product request’ is activated during whole measurement.

FLOWING: 'Product request' is activated when the valve is operated. The pump starts within 5 seconds (timer).



5.2.5.2 Dyeing

This menu is used to activate and configure systematic and non-metrological dyeing. It also allows to set the configuration in case of forced dyeing by choosing the type of additivation device: **ACDA** or **METERING**, then:

CHOOSE INJECTOR: Choose the injector for systematic dye injection

ASSOCIATED INPUT: Associated input intended as pulse counter

COEFFICIENT (P/L): Injector coefficient in pulse/litre. Not applicable with metrological ACDA

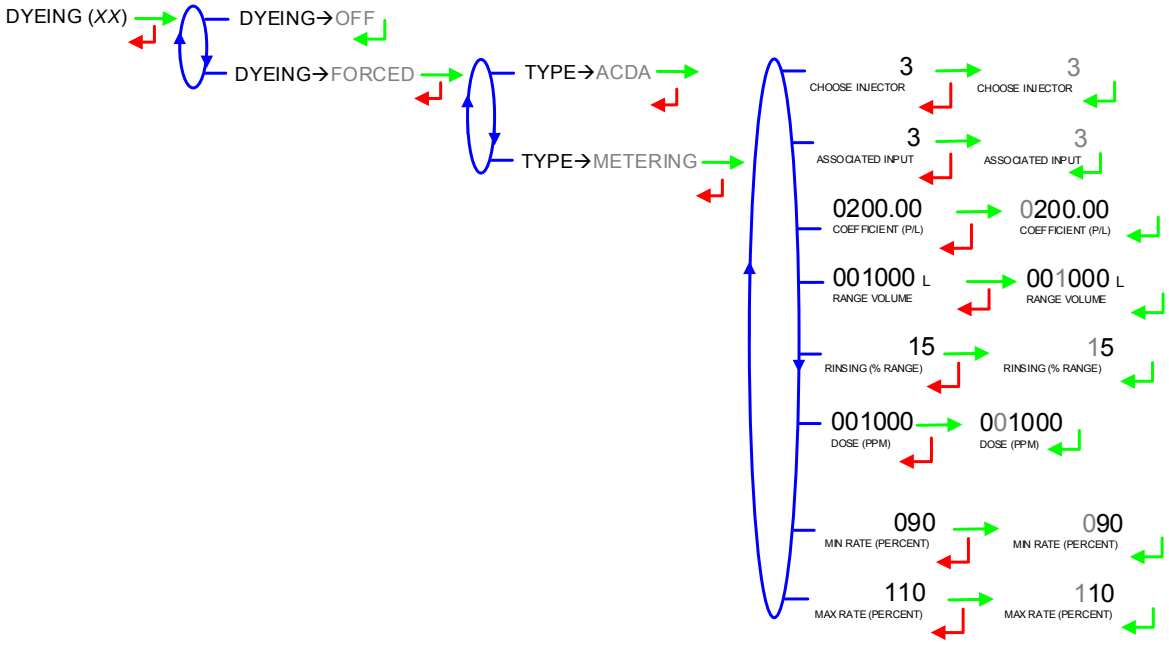
RANGE VOLUME: Volume of principal product for an injection. Not applicable with metrological ACDA

RINSING (% RANGE): Rinsing volume as a percentage of the range volume. Not applicable with metrological ACDA

DOSE (PPM): Concentration of product injected into the main product (ppm). Volume (in millilitres) of the dose to be injected for 1000 litres of product. Not applicable with metrological ACDA

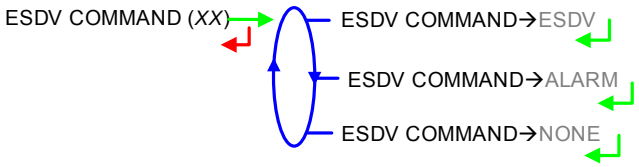
MIN RATE (PERCENT): Dyeing minimum rate below which an alarm is triggered. Not applicable with metrological ACDA

MAX RATE (PERCENT): Dyeing maximum rate above which an alarm is triggered. Not applicable with metrological ACDA



5.2.5.3 ESDV command

The emergency shutdown valve ESDV-output can be used to trigger the safety valve or an alarm.



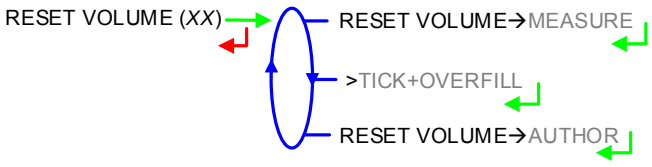
5.2.5.4 Reset volume

BOTTOM. This menu is used to configure the triggering event that resets the MICROCOMPT+ partial counter.

MEASURE: Reset over measurement ends

TICK+OVERFILL: Reset over disconnection of loading security devices (ground, overfill probe…)

AUTHOR: Reset over authorisation lost



5.2.5.5 Measuring start

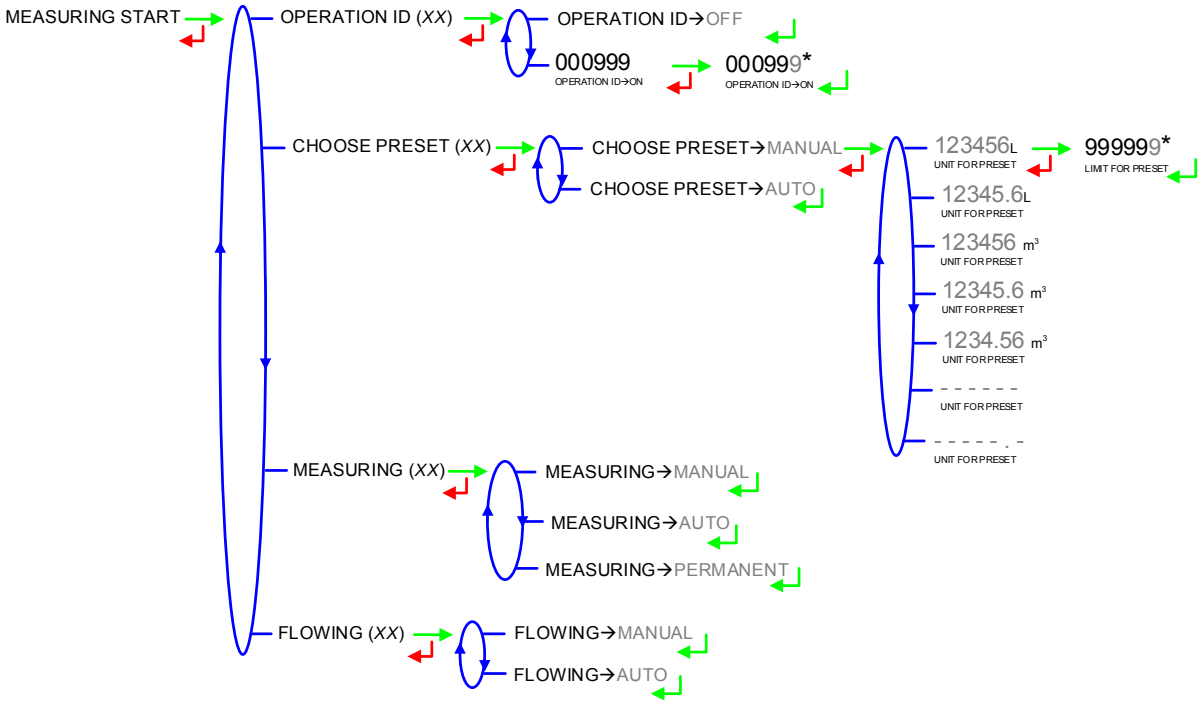
This menu is used to choose the MICROCOMPT+ operating mode before the measurement starts.

OPERATION ID: Input mask* for operation identifier. It defines the format of data to limit input errors. The operation identifier is set by the user before starting loading. If the mask is set to ‘39999’, the value set in USER mode may not exceed ‘4000’.

CHOOSE PRESET: Choose the unit for preset volume and enter the input mask* to limit entry errors. This menu depends on the choice made for CONFIGURATION>UNIT AND ACCURACY

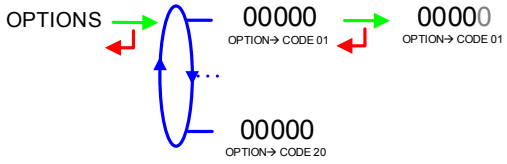
MEASURING: Condition for the MICROCOMPT+ to start measuring

FLOWING: Condition for the MICROCOMPT+ to start flowing



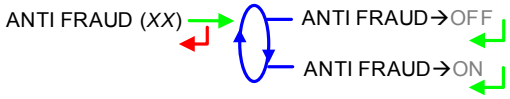
5.2.5.6 Options

Refer to the ANNEXE 2 to have explanations about the codes for the MICROCOMPT+ options configuration



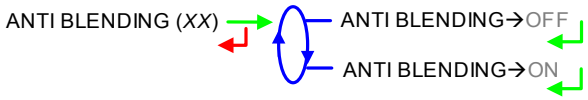
5.2.5.7 Anti-fraud

A presumption of a change of compartment is considered as a fraud. This menu allows you to activate additional injections of denaturant in the case of fraud.



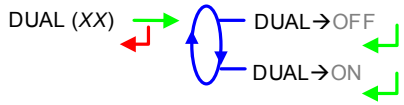
5.2.5.8 Anti-blending

This menu allows you to activate or not control and appearance of a rinsing-default of the line at the beginning of a measurement



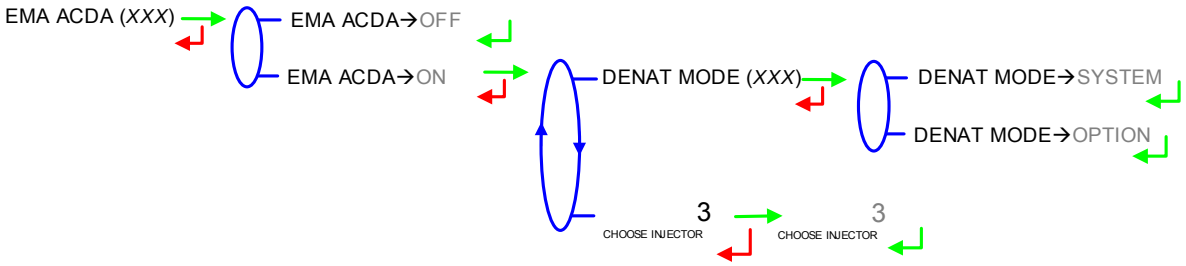
5.2.6 Sub-menu DUAL

This menu is used for DUAL version to activate the secondary measuring system called EMB which is available for blending or metrological denaturation.



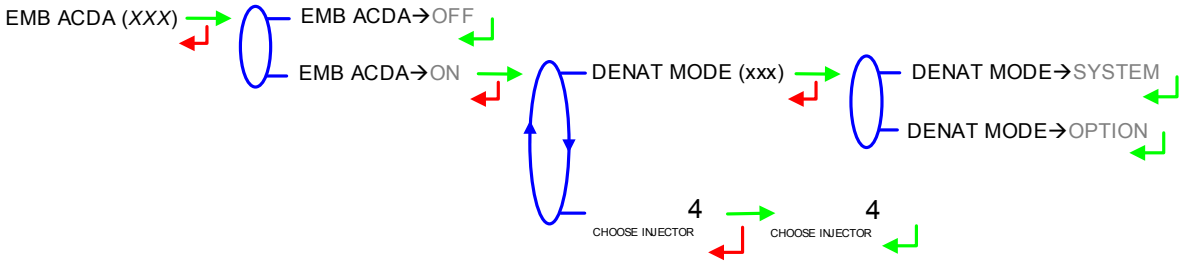
5.2.7 Sub-menu EMA ACDA

This menu is used to activate through EMA an ACDA remote additional measuring system for injection. It is possible to choose the type of denaturation which may be systematic (choose **SYSTEM**) or optional (choose **OPTION**). Then set the injector number.

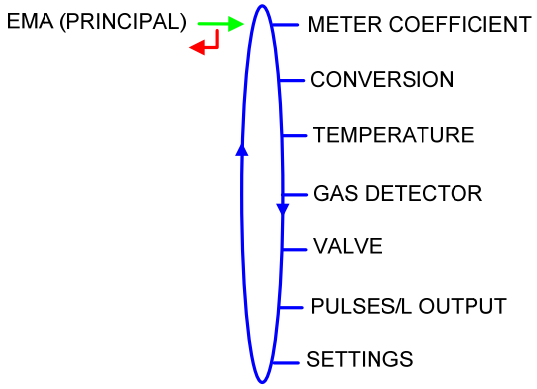


5.2.8 Sub-menu EMB ACDA

This menu is used to activate through EMB an ACDA remote additional measuring system for injection. It is possible to choose the type of denaturation which may be systematic (choose **SYSTEM**) or optional (choose **OPTION**). Then set the injector number.



5.3 Menu MEASURING SYSTEM EMA (PRINCIPAL)



5.3.1 Sub-menu METER COEFFICIENT

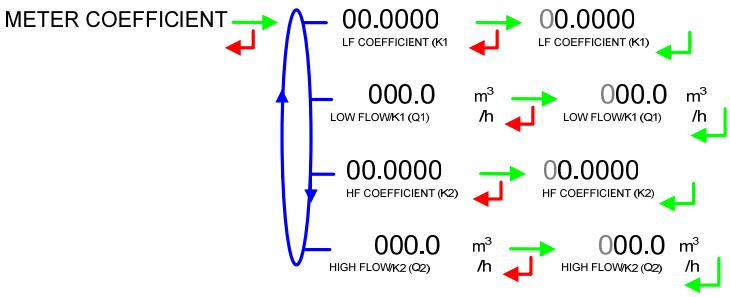
This menu is used to set the coefficient of the measuring system meter (pulses/litre)

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

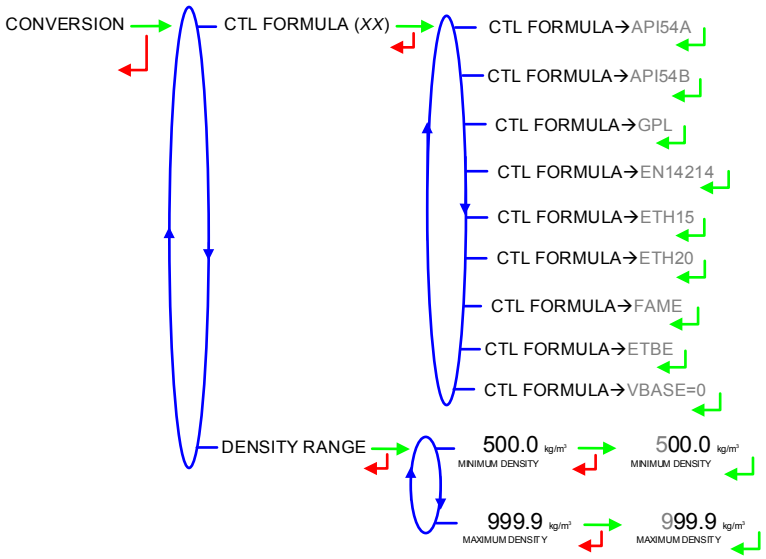
LOW FLOWRATE/K1 (Q1): Low flow reference (m_3/h)

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

HIGH FLOWRATE /K2 (Q2): High flow reference (m_3/h)



5.3.2 Sub-menu CONVERSION



Choose the conversion table according to the product:

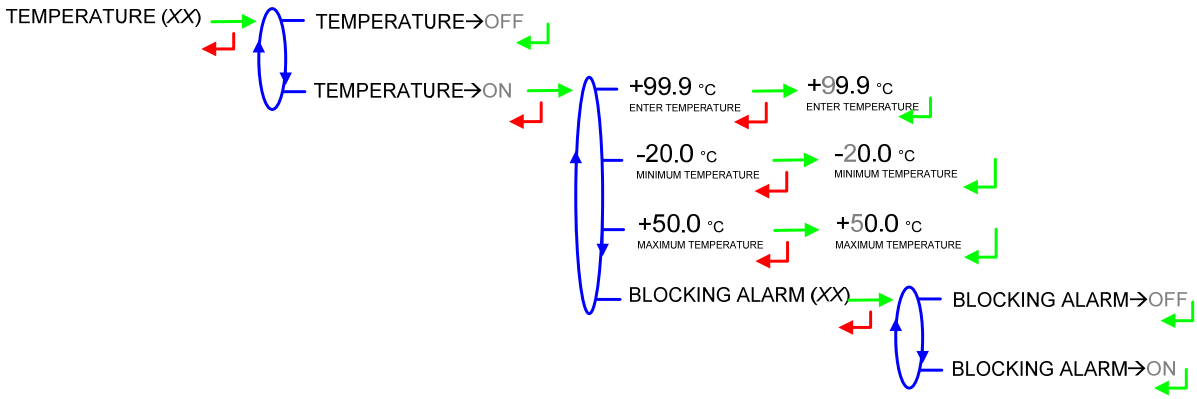
Conversion formula	Product
API54A	Crude products
API54B	Refined products
GPL	LPG and bitumen
EN14214	Biofuels
ETH15	Ethanol at 15°C
ETH20	Ethanol at 20°C
FAME	Fatty acid methyl esters for diesel engines
ETBE	Ethyl tertio butyl ether
VBASE=0	No conversion : The volume at base conditions is not calculated

5.3.3 Sub-menu TEMPERATURE

This menu is used to calibrate the temperature into the MICROCOMPT+ for EMA.

Depending on the probe, it's possible to:

- Calibrate temperature,
- Set the minimum temperature below which an alarm is triggered
- Set the maximum temperature above which an alarm is triggered
- Decide whether the alarm is blocking or not.



5.3.4 Sub-menu GAS DETECTOR

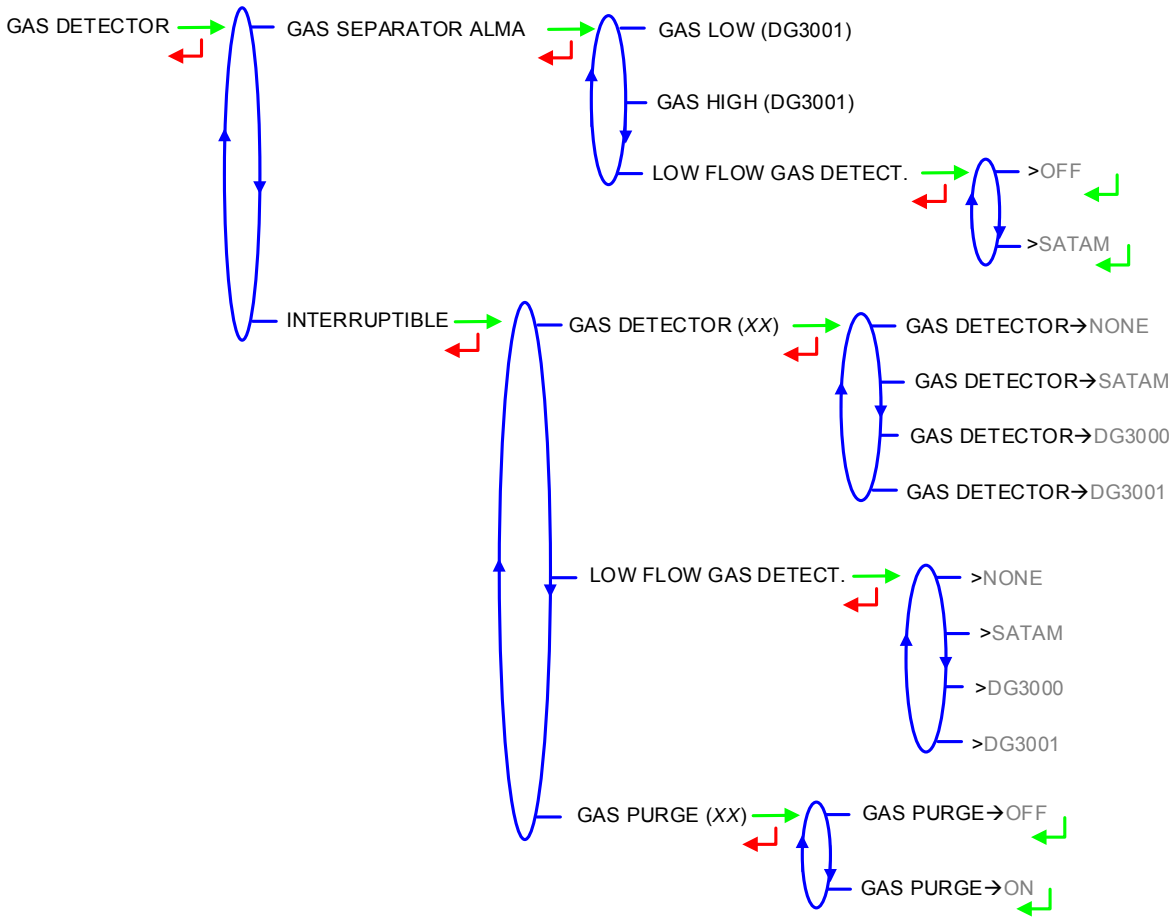
This menu is used to define the gas separator type and features:

GAS SEPARATOR ALMA: Check the status of the gas detectors of the ALMA separator SGA 80 or SGA 150. The possibility is given to configure a digital input for low flow detector.

- **GAS LOW**: Gas detector at low point of the separator. Check the gas detector is dry and acknowledge
- **GAS HIGH**: Gas detector at high point of the separator. Check the gas detector is dry and acknowledge
- **LOW FLOW GAS DETECT**: Configuration of a digital input for low flow detector

INTERRUPTIBLE: Define what kind of gas detectors the separator is equipped with and if a purge device is acknowledge.

- **GAS DETECTOR**: Choose the type of gas detector at separator low point. During a measurement, when this detector is dry, the MICROCOMPT+ stops metering.
  - **NONE**: No gas detector
  - **SATAM**: Digital-type detector
  - **DG3000**: Analog detector without calibration
  - **DG3001**: Analog detector with calibration. Check the gas detector is dry and acknowledge
- **LOW FLOW GAS DETECT**: Choose the type of gas detector at separator high point. During a measurement, when this detector is dry, the MICROCOMPT+ switches to low flowrate to increase the level of liquid in the separator. Choices are the same as above
- **GAS PURGE**: Define whether the gas separator is equipped with a purge device or not. The purge is done at the acknowledgement of the relevant gas detection alarm.



5.3.5 Sub-menu VALVE

This menu is used to define the valve type:

HYDRAULIC: BROOKS-type hydraulic valve (incremental)

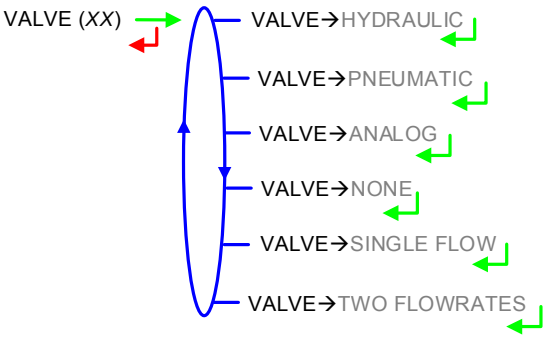
PNEUMATIC: CAMFLEX-type pneumatic valve (incremental)

ANALOG: Analog valve (0-20mA or 4-20mA)

NONE: No valve

SINGLE FLOW: Solenoid-type valve (digital without flow control)

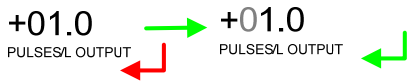
TWO FLOWRATES: Two-stage valve (digital with 2-flow control)



5.3.6 Sub-menu PULSES/L OUTPUT

Copy out the volume measured by EMA.

Enter the number of pulses that the MICROCOMPT+ must generate for each display-unit counted in the totaliser. Enter a null value to disable the function.



Note: If a negative value is set, the copy is done on a single channel. The other channel is like the situation: in or out pouring.

5.3.7 Sub-menu SETTINGS

5.3.7.1 Volumes settings

This menu allows you to configure the volume set values.

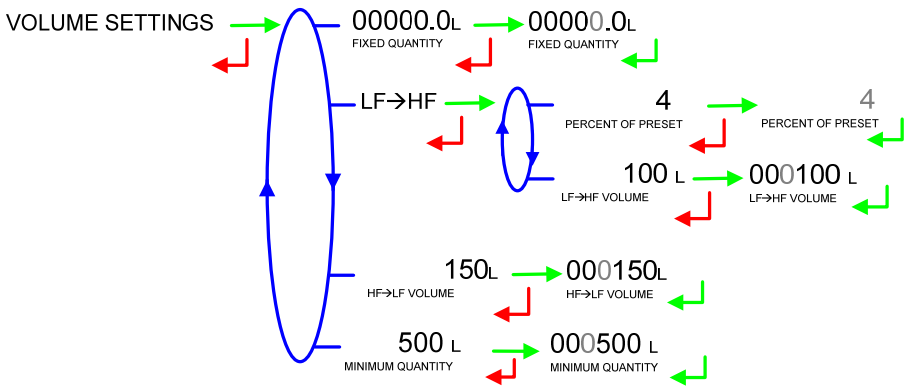
FIXED QUANTITY: Fixed quantity (volume that is not delivered to the customer)

LF→HF:

- **PERCENT OF PRESET** – **BOTTOM**: Percent of preset (between 0 and 6%). The threshold of transition from low to high flowrate corresponds to the sum of the volume PERCENT OF PRESET added with the LF→HF VOLUME
- **LF→HF VOLUME**: Volume in liters, beyond which the MICROCOMPT+ switches from low to high flowrate.

HF→LF VOLUME: Set the volume in liters, beyond which the MICROCOMPT+ drives the low flowrate at the end of a preset measurement.

MINIMUM QUANTITY: Set the minimum quantity

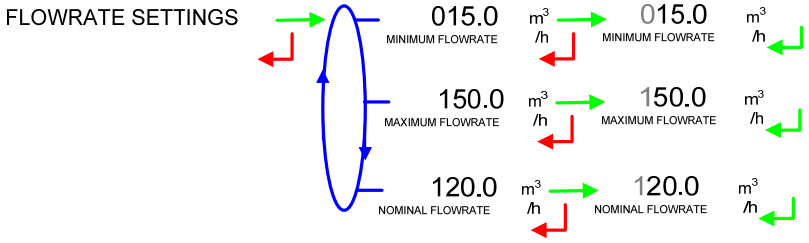


5.3.7.2 Flow rates settings

MINIMUM FLOWRATE: Minimum flowrate below which an alarm is triggered

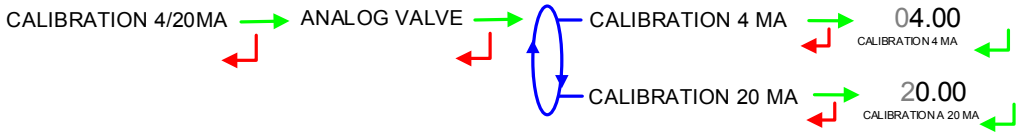
MAXIMUM FLOWRATE: Maximum flowrate above which an alarm is triggered

NOMINAL FLOWRATE: Set-flowrate relating to high flowrate regulation.



5.3.7.3 Calibration analog output

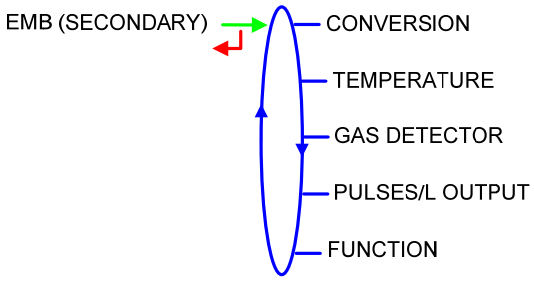
Configuration of the current range of the 4-20 mA output, mainly to regulate the analog valve properly.



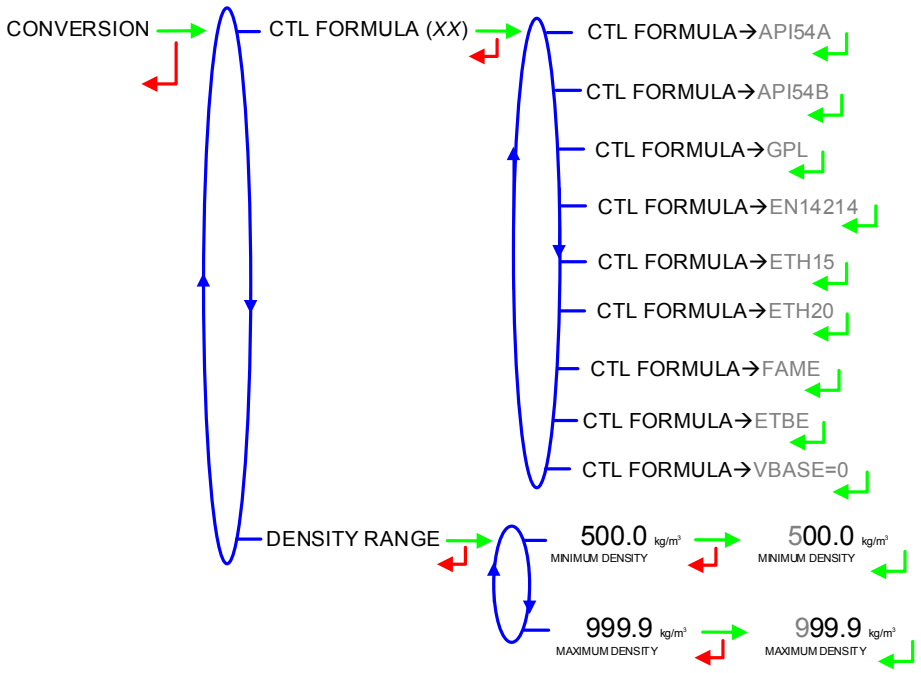
Note: This dialog remains frozen displaying 'ANALOG VALVE' as longer as a measuring system is being configured with this kind of valve. This is to prevent any unintentional flowing during the calibration.

5.4 Menu MEASURING SYSTEM EMB (SECONDARY)

This function is active when CONFIGURATION>DUAL is ON. The secondary measuring system EMB is available for blending or metrological denaturation.



5.4.1 Sub-menu CONVERSION



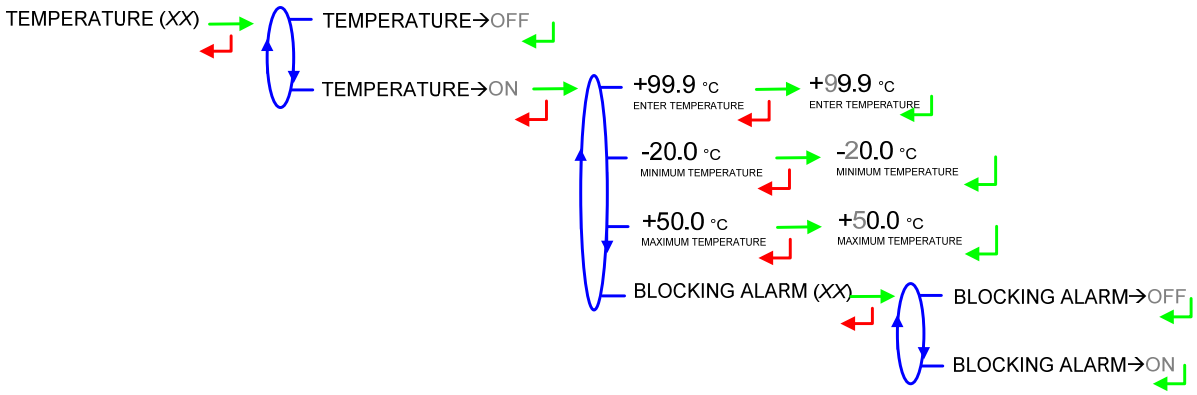
Choose the conversion table according to the product:

Conversion formula	Product
API54A	Crude products
API54B	Refined products
GPL	LPG and bitumen
EN14214	Biofuels
ETH15	Ethanol at 15°C
ETH20	Ethanol at 20°C
FAME	Fatty acid methyl esters for diesel engines
ETBE	Ethyl tertio butyl ether
VBASE=0	No conversion : The volume at base conditions is not calculated

5.4.2 Sub-menu TEMPERATURE

This menu is used to calibrate the temperature into the MICROCOMPT+ for EMB.
Depending on the probe, it's possible to:

- Calibrate temperature,
- Set the minimum temperature below which an alarm is triggered
- Set the maximum temperature above which an alarm is triggered
- Decide whether the alarm is blocking or not.

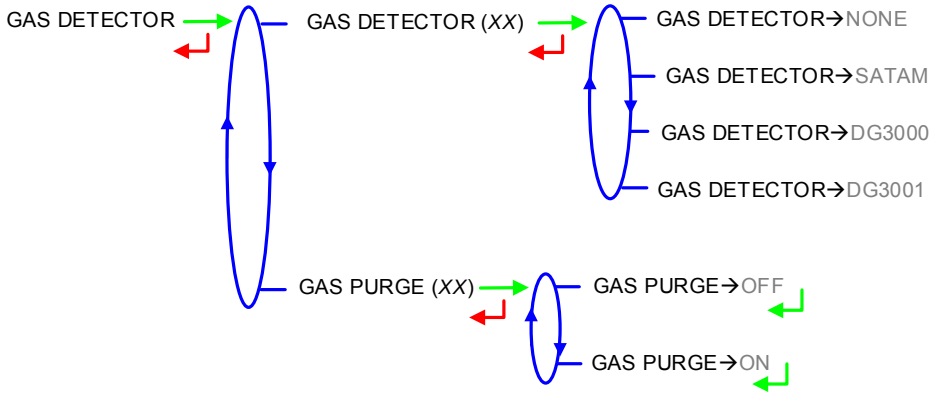


5.4.3 Sub-menu GAS DETECTOR

GAS DETECTOR: Define what kind of gas detectors the separator is equipped with. Choose the type of gas detector at high point of the separator. During a measurement, when this detector is dry, the MICROCOMPT+ switches to low flowrate to increase the level of liquid in the separator.

- **NONE**: No gas detector
- **SATAM**: Digital-type detector
- **DG3000**: Analog detector without calibration
- **DG3001**: Analog detector with calibration. Check the gas detector is dry and acknowledge

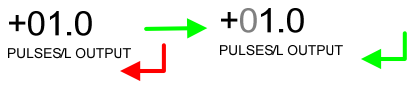
GAS PURGE: Define whether the gas separator is equipped with a purge device or not. The purge is done at the acknowledgement of the relevant gas detection alarm.



5.4.4 Sub-menu PULSES/L OUTPUT

Copy out the volume measured by EMB.

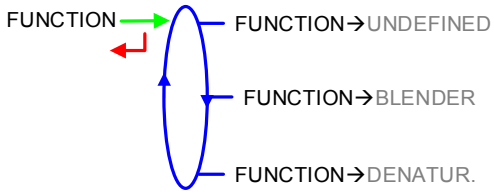
Enter the number of pulses that the MICROCOMPT+ must generate for each display-unit counted in the totaliser. Enter a null value to disable the function.



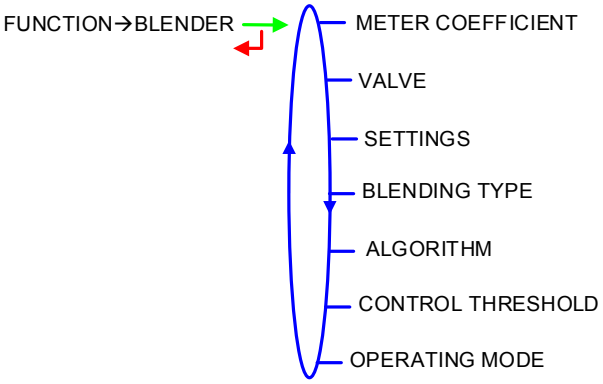
Note: If a negative value is set, the copy is done on a single channel. The other channel is like the situation: in or out pouring.

5.4.5 Sous-menu FUNCTION

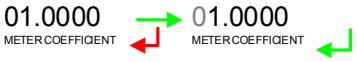
Define whether EMB is used for blending or for metrological denaturation.



5.4.5.1 Function→blender



a) Meter coefficient



b) Valve

This menu is used to define the valve type:

HYDRAULIC: BROOKS-type hydraulic valve (incremental)

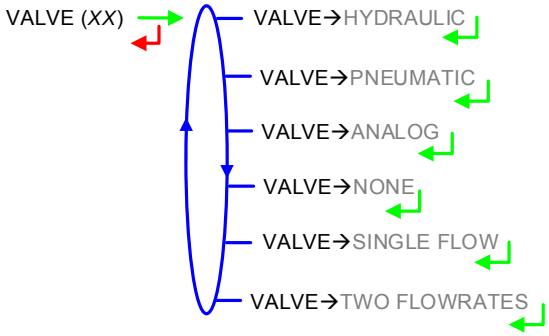
PNEUMATIC: CAMFLEX-type pneumatic valve (incremental)

ANALOG: Analog valve (0-20mA or 4-20mA)

NONE: No valve

SINGLE FLOW: Solenoid-type valve (digital without flow control)

TWO FLOWRATES: Two-stage valve (digital with 2-flow control)



c) Settings

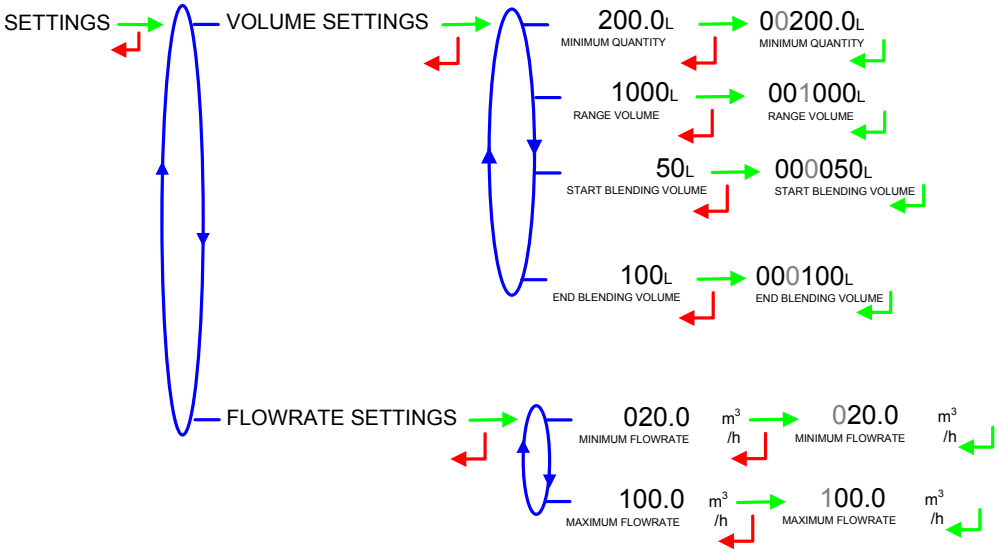
This menu allows you to configure the volume and flowrates set values for the EMB blender.

VOLUME SETTINGS:

- **MINIMUM QUANTITY**: Minimum quantity
- **RANGE VOLUME**: Range volume of principal product
- **START BLENDING VOLUME**: EMA high flowrate dead volume at the beginning of a blending operation or after an intermediate stop
- **END BLENDING VOLUME**: Dead or rinsing volume at the end of a range

FLOWRATE SETTINGS:

- **MINIMUM FLOWRATE**: Minimum flowrate below which an alarm is triggered
- **MAXIMUM FLOWRATE**: Maximum flowrate above which an alarm is triggered



d) Blending type

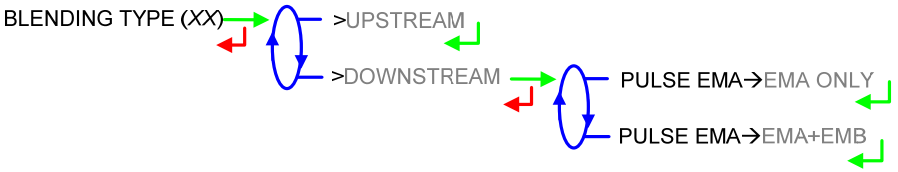
Define the hydraulic assembly for blending:

UPSTREAM: The blending of principal and secondary products is made upstream the transfer point. Products are counted together.

DOWNSTREAM: The blending of principal and secondary products is made downstream the EMA transfer point. Products are counted separately. A choice is given for calculation and copy out of the overall volume: EMA ONLY or EMA+EMB which is a non-metrological sum. Note: the values are not guaranteed (displayed alternately with dashes) when the blending rate is greater than 5%.

- **PULSE EMA→EMA ONLY**: The copy EMA reflects the volume counted by the EMA measuring system and the pulses output set for the EMA
- **PULSE EMA→EMA+EMB** : The copy EMA reflects the non-metrological sum of the volumes counted by both EMA and EMB

and the pulses output set for the EMA. The sum EMA+EMB is not guaranteed if the blending rate exceeds 5%



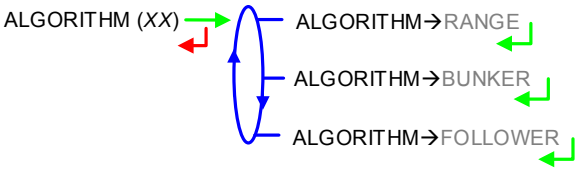
e) Algorithm

Regulation for blending function can be made in different ways according to blending algorithm:

RANGE: Blending is made by range of principal product

BUNKER: The bunker mode is a variation of the range mode: the preset volume is used as the unique range volume

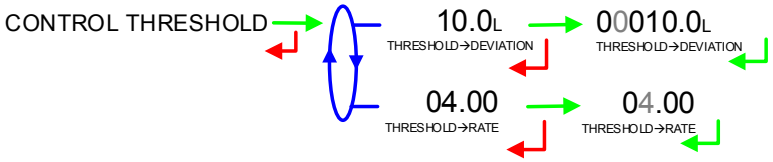
FOLLOWER: Blending for a regulation as close to the final goal as possible



f) Control thresholds

THRESHOLD→DEVIATION: Permissible maximum deviation volume, expressed in litres of secondary product

THRESHOLD→RATE: Deviation between minimum and maximum satisfaction rate



g) Operating mode

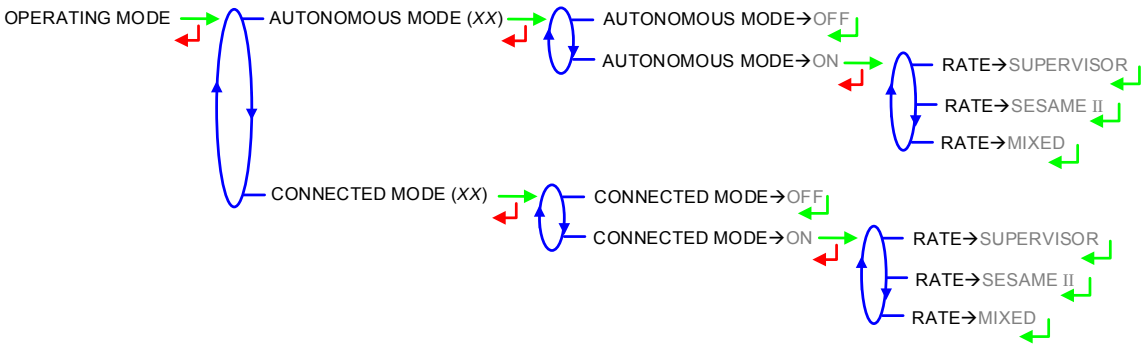
Define and activate the operating mode which can be autonomous or connected. No activation means no blending.

The blending is ordered in different ways:

SUPERVISOR: Systematic blending is made in accordance with the blending rate set in SUPERVISOR mode

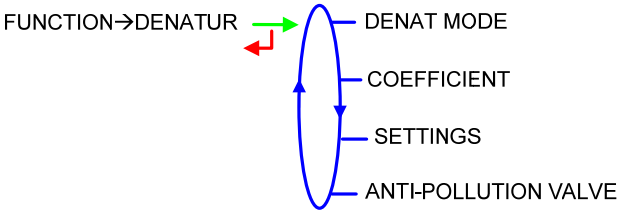
SESAME: Blending is made in accordance with the instruction of the SESAME II main computer

MIXED: Blending is made if required by the SESAME II main computer, in accordance with the blending rate set in SUPERVISOR mode.



5.4.5.2 Function→denaturant

In case of metrological denaturation, the volume unit automatically set is the litre, with a precision of one thousandth of a litre.

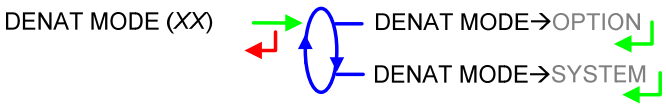


a) Mode denaturant

Metrological denaturation may be optional or systematic:

OPTION: Requested by SESAME II network or through the quality control

SYSTEM: With any EMA measurements.



b) Meter coefficient

c) Settings

This menu allows you to configure the volume and flowrates set values for the EMB denaturant.

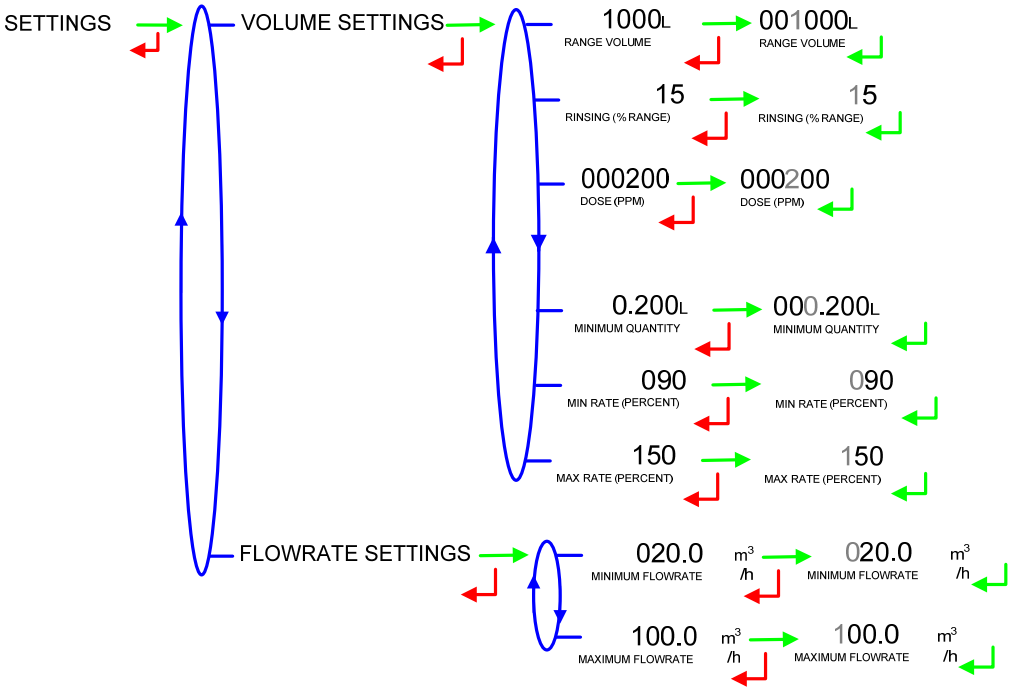
VOLUME SETTINGS:

- **RANGE VOLUME**: Range volume of principal product
- **RINSIND (% RANGE)**: Rinsing volume of the injector as a percentage of the range volume
- **DOSE (PPM)**: Concentration of product injected in the principal product (in ppm). Equivalent to the dose injected in millilitres for 1000 litres of product
- **MINIMUM QUANTITY**: Minimum quantity

- **MIN RATE (PERCENT)**: Minimum satisfaction rate between 90 and 95%
- **MAX RATE (PERCENT)**: Maximum satisfaction rate between 105 and 150%

FLOWRATE SETTINGS:

- **MINIMUM FLOWRATE**: Minimum flowrate below which an alarm is triggered
- **MAXIMUM FLOWRATE**: Maximum flowrate above which an alarm is triggered



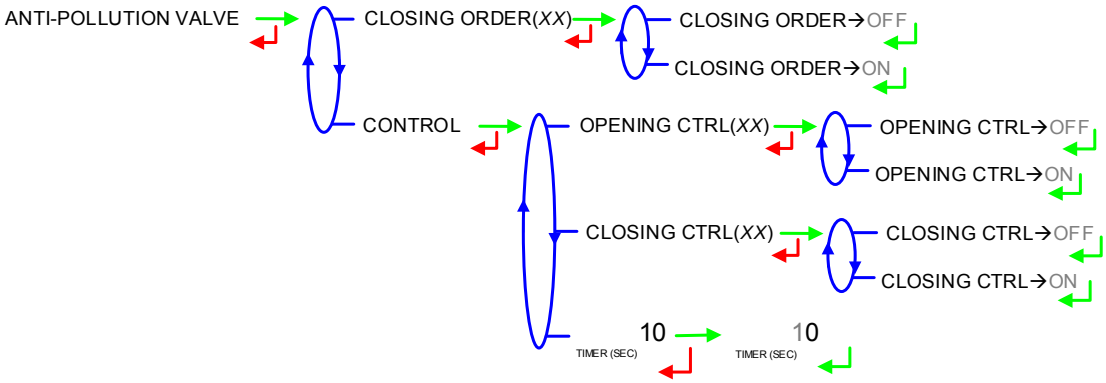
d) Anti-pollution valve

This menu is used to configure the control of the anti-pollution valve.

CLOSING ORDER: TOR output used to send a closing order to the valve

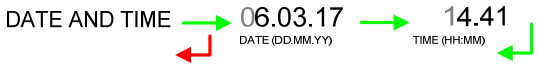
CONTROL: Control of the anti-pollution valve

- **OPENING CTRL**: Feedback control of the open position sensor
- **CLOSING CTRL**: Feedback control of the close position sensor
- **TIMER**: 10 seconds-timer to decide on a possible position deviation (default value)



5.5 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 1: TABLE FOR SESAME II UNITS

<table>
<tr><td colspan="2" rowspan="3"></td><td colspan="5">Configuration of the MICROCOMPT+</td></tr>
<tr><td colspan="2">Without unit
In litre
In kg</td><td colspan="3">In m³</td></tr>
<tr><td>Accuracy = 1
or
Accuracy = 0.1</td><td>Accuracy = 0.1
and
Cod07 = 1oooo (change the format of quantities in Sesame II network)</td><td>Accuracy = 1</td><td>Accuracy = 0.1</td><td>Accuracy = 0.01</td></tr>
<tr><td rowspan="5">Information exchanged through Sesame II</td><td>Preset
Volume already loaded
Control volume
EMA Volume
EMA Leakage volume
Set preset
EMA Converted volume</td><td rowspan="2">Idem : x 1
(123 is 123 litres for example)</td><td rowspan="2">X 10
(123 is 12.3 litres, for example)</td><td colspan="3">In litre
(123 is 123 litres for example)</td></tr>
<tr><td>EMA Totaliser</td><td colspan="3">In m3
(123 is 123 000 litres, for example)</td></tr>
<tr><td>EMB Volume
EMB Converted volume
EMB Totaliser</td><td colspan="5">BLENDING x 10 (123 is 12.3 litres, for example)
(*) DENAT METRO in millilitre (123 is 123 millilitres, for example)</td></tr>
<tr><td>Volume, dose or totaliser of additive or dye</td><td colspan="5">In millilitre: millilitre (123 is 123 millilitres, for example)</td></tr>
</table>

ANNEXE 2: CODES

Each code sets specific operation according to the following tables:

Cod 01

Option	Meaning
Xoooo	**TOR input** for gas detection on EMA: **1**: EMA standard Gas TOR input **2**: (ALIM_V3 only) Gas TOR input for switch in low flow **3**: Idem 1 + 2 **Any other value**: Void
o**X**ooo	Authorization becomes emergency shutdown or 'dead-man' security (**BOTTOM** only): **1**: 'authorization' input is managed as an emergency shutdown **2**: Idem 1, reverse input polarity **3** : For **BOTTOM** configuration only, 'authorization' input is managed as 'dead-man' function **Any other value**: Void *Note: Twisting 'authorisation' into 'dead-man' is justified if Cod02 is also used to define the 'dead-man' control functionality*
oo**X**oo	Use of sub-totalisers: **1**: Control and display of 'products' sub-totalisers in accordance with denaturation **2**: Display of totalisers per injector **3**: Idem 1 + 2 **Any other value**: No display
ooo**XX**	Configuration for quality control <u>in autonomous mode</u>: **99**: Activation of the quality control mode (list in supervisor mode): before beginning measurement, the MICROCOMPT+ displays a list to choose the quality in autonomous mode **88**: Activation of the quality control mode (list in supervisor mode): quality is automatically determined in accordance with the authorization TOR inputs. WARNING: ALIM_V3 only **Any other value**: Detail above
ooo**X**o	Code for additive injector in autonomous mode: **0**: No additive injection in autonomous mode **8, 9**: See above **n**: The injector **#**n is used for additivation in autonomous mode
oooo**X**	Code for dye injector in autonomous mode: As above for dye injection

Cod 02 – **TOP.**

For **TOP** loading configuration, the Cod02 allows activation of the dead-man switch control.

For **BOTTOM** loading configuration: this features is available by twisting the authorisation input (refer to Cod01).

Option	Meaning
XXXoo	The dead-man switch is activated if Cod02 = XXXoo is different from '000' If Cod03 = oXooo with 'dead-man' function in volume: • **Volume x 100** for dead-man switch control. If Cod03 = oXooo with 'dead-man' function in duration: • **Time in seconds** for dead-man switch control. *Note: The dead-man switch control may be disabled in some cases – See below*
ooo**XX**	If Cod03 = oXooo with 'dead-man' function in volume: • **Volume x 10 in low flow** for dead-man switch. If Cod03 = oXooo with 'dead-man' function in duration: • **Time in seconds x 10 in low flow** for dead-man switch.

- ⇨ The 'dead-man switch' function is activated if Cod02 = XXXoo is non-zero
- ⇨ The option 'configuration in duration' changes the functionality (see Cod03 = oXooo below)
- ⇨ The option 'dead-man switch' bypass doesn't disable the functionality (see Cod03 = oXooo below)
- ⇨ It is therefore possible to instrument a dead-man switch that is not active for automation (disabled with Cod03) but which is used for the 'dead-man control' functionality
- ⇨ If 'dead-man switch' is forced by the network SESAME II, the functionality is disable (see Cod03 = ooooX below)
- ⇨ The 'self-service' mode can be considered for this functionality (see Cod03 = Xoooo below)
- ⇨ For **BOTTOM** configuration, the authorisation input needs to be managed as 'dead-man' function (refer to Cod01).

If the functionality is enable:

1. The MICROCOMPT+ checks the transition of status of the 'dead-man switch' before:
   - Volume is XXX00 litres (Cod02 = **XXX**oo)
   - Or duration is XXX seconds (Cod02 = **XXX**oo and Cod03 = o**X**ooo is at least 4)

   Otherwise, the MICROCOMPT+ forces a low flow, uses factory option ALERTE_HOMME_MORT_ON if described, and proceeds to stage 2

2. Following stage 1, the MICROCOMPT+ checks the transition of status of the 'dead-man switch' before:
   - Volume is XX00 litres (Cod02 = ooo**XX**)
   - Or duration is XX seconds (Cod02 = ooo**XX** and Cod03 = o**X**ooo is at least 4)

   Otherwise the default 46 = DEAD MAN SWITCH appears.

Cod 03 – **TOP.**

For **TOP** loading configuration only (except o**X**ooo in some cases)

<table>
<tr><th>Option</th><th>Meaning</th></tr>
<tr><td>Xoooo</td><td>TOP single side:
1: The MICROCOMPT+ has only a left side
2: The MICROCOMPT+ has only a right side
4: The dead-man switch functionality (see Cod02) is enable only with 'free-service' mode
5: Idem 4 + 1
6: Idem 4 + 2
Any other value: Top bi-side. Dead-man switch control according to Cod02 without any change</td></tr>
<tr><td>oXooo</td><td>TOP loading MICROCOMPT+ only:
<table>
<tr><th></th><th>Bypass SECURIM</th><th>Bypass Dead-man switch</th><th>Function 'dead-man'</th></tr>
<tr><td>0</td><td>-</td><td>-</td><td>Volume</td></tr>
<tr><td>1</td><td>ON</td><td>-</td><td>Volume</td></tr>
<tr><td>2</td><td>-</td><td>ON</td><td>Volume</td></tr>
<tr><td>3</td><td>ON</td><td>ON</td><td>Volume</td></tr>
<tr><td>4</td><td>-</td><td>-</td><td>Duration</td></tr>
<tr><td>5</td><td>ON</td><td>-</td><td>Duration</td></tr>
<tr><td>6</td><td>-</td><td>ON</td><td>Duration</td></tr>
<tr><td>7</td><td>ON</td><td>ON</td><td>Duration</td></tr>
</table>
Any other value: Idem modulo 8

BOTTOM loading MICROCOMPT only:
0-3 : ‘Dead-man’ function in volume,
4-9 : ‘Dead-man’ function in time</td></tr>
<tr><td>ooXoo</td><td>TOP loading MICROCOMPT+ only:
1: Ground (left or right) forcing via network SESAME II. Physical ground is uploaded in the network SESAME II
2: Idem 1 with the requirement to remove forcing between each measurement
5: Idem 1 but the 'logical ground' is uploaded in the network SESAME II (final combination between physical ground and forcing)
Any other value: No ground forcing
Note: Forcing is not taken into account with a single-side configuration (see above)</td></tr>
<tr><td>oooXo</td><td>TOP loading MICROCOMPT+ only:
1: Forcing of the arm direction (left, right or locking) via network SESAME II
2: Idem 1 with the requirement to remove forcing between each measurement
Any other value: No forcing of the arm direction
Note: Forcing is not taken into account with a single-side configuration (see above)</td></tr>
<tr><td>ooooX</td><td>TOP loading MICROCOMPT+ only:
1: Forcing of the arm down-position or dead-man switch via network SESAME II
2: Idem 1 with the requirement to remove forcing between each measurement
3: Idem 1 with a prohibition on forcing arm down-position and dead-man switch simultaneously
4: Idem 1 + 2 + 3
Any other value: No forcing
Note: Forcing of dead-man switch via network SESAME II is void if dead-man switch is forced to TRUE elsewhere (see above)
Note 2: Forcing of dead-man switch disables control of dead-man switch (see above)</td></tr>
</table>

Cod 04

Option	Meaning
Xoooo	Bitmask on the 3 authorization inputs for quality selection, in autonomous mode: **1 à 7:** Bitmask to apply on inputs #1, #2, #3 with respectively bits 0, 1 and 2 of the mask *Example: Mask = 1 means that input #1 is used, Mask = 3 means that inputs #1 and #2 are used* **Any other value**: Same as Mask = 7 (the 3 inputs are used)
o**X**ooo	**1:** Activates the display of the additive name and displays « BLEND » on the prompter if the blender is requested during a measurement. Displays the dye name if there's enough place on the prompter. **2:** Activate the display of rate details on the prompter during a measurement **Any other value**: Void
oo**X**oo	**1:** The presence of the PCC is not required. If the PCC is present but not working, starting a measurement is impossible **Any other value**: PCC is metrological. Its presence is necessary ; it must communicates to the MICROCOMPT+ it is operational to enable a measurement
ooo**X**o	**≠0:** Activates the EMB information update on the network SESAME II if EMB is set for metrological denaturation **0:** No EMB information on the network SESAME II if metrological configuration
oooo**X**	**1:** Prohibits MODBUS writings on COM1 **2:** Prohibits MODBUS writings on COM2 **3:** Prohibits MODBUS writings on COM1 and COM2 **Any other value**: Void

Cod 05

Option	Meaning
Xoooo	If X is non-zero, the MICROCOMPT+ is allowed to top up the level
o**X**ooo	If X is non-zero, the MICROCOMPT+ is allowed to blend without waiting for EMA to switch in high flow
oo**X**oo	The MICROCOMPT+ makes a blending according to the inverse algorithm (downstream assembly with a required rate greater than the ratio of the flow rates EMA/EMB). If X is non-zero, the MICROCOMPT+ changes its functionalities as follows: • The rinsing may not be equal to the rinsing volume, if this volume is greater than the volume EMA to be loaded • No pollution control of the line due to the lack of rinsing after activation of a 'high rate' blending
ooo**XX**	Gives the number of seconds of the 'dead man' function with the pushbutton used for top up (checks the pushbutton is released cyclically) If XX=0, the 'dead man' control for top up function is disabled **For BOTTOM applications**, XX=0 allows to top up the level by pressing BP1

Cod 06

Option	Meaning
oooo**X**	**1:** The request for the injector 1 pump remains active during a stop
ooo**X**o	**1: Specify a 'wide' preset end coefficient:** • The time before the control of the valve closure is extended (100 seconds instead of 10) • The duration of the control of the valve closure is reduced (5 seconds instead of 15) • The maximum value of the preset end coefficient is multiplied by 16 • Disable the default 'VALVE'
oo**X**oo	**1:** Reverse the polarity of the LSL inputs
o**X**ooo	**1:** Disable display

Cod 07

Option	Meaning
oo**XYZ**	**000:** No 'addit tou' injector (injection of all doses from the first range) **Otherwise:** XYZ allows to activate the i-eme injector (i = 1 to 8) by adding the value $2^{(i-1)}$ to this figure Example: XYZ = 1 only the injector #1 is 'addit tou' XYZ = 1 + 2 = 3 for the injectors #1 et #2, XYZ = 1 + 2 + 4 = 5 for the injectors #1, #2 et #3, etc.
o**X**ooo	**1:** Remove the ESDV control in case of any injector leakage

Cod 08 – LCN

Option	Meaning
Xoooo	**#0:** IF: **TOP** configuration AND: anti-fraud control activated AND: in measurement status AND: a metrological denaturant injector is requested. THEN: Any forcing of low-arm via SESAME II network is ignored AND: An absence of flow is not a suspicion of fraud. *Note: A metrological denaturant injector is requested:* • *IF: DUAL + metrological denaturation* *AND: configuration in systematic* *OR: Injector #1 is requested* • *IF: With ACDA* *AND: The ACDA of EMA is set* *AND: configuration in systematic* *OR: The relevant injector is requested* • *Idem for the ACDA of EMB* **0:** Void

Cod 08 – Configuration API_78. **BOTTOM** MICROCOMPT+ only

Option	Meaning
oo**X**oo	Position accuracy of an incremental valve (hydraulic or pneumatic) for **EMA**: **#0**: Standard position at +/- Qmax / 30 *(with Qmax=maximum flowrate)* **#1**: Position at +/- Qmax / 60 **#2**: Position at +/- Qmax / 90 … **#8**: Position at +/- Qmax / 270 **#9**: Position at +/- Qmax / 300
ooo**X**o	As above for EMB

Cod 09 – LCN

Option	Meaning
o**X**ooo	Do not inject an anti-fraud dose in case of a stop on a 'no dyeing' alarm: **0**: Standard operation, a dose is always injected after a stop **1**: Particular operation to prevent the activation of anti-fraud after an alarm #47 (NO DYEING) **Any other value**: Idem 0
oo**X**oo	**TOP MICROCOMPT** only: After an anti-fraud injection, the range offset is disabled: **0**: Standard operation, a new range starts after an anti-fraud injection **1**: Particular operation to avoid range offset (such as **BOTTOM MICROCOMPT**) **Any other value**: Idem 0

Cod 10 to Cod 20 : Not used

RELATED DOCUMENTS

GU 7036_1	Operating guide MICROCOMPT+ FOR BOTTOM LOADING
GU 7036_2	Operating guide MICROCOMPT+ FOR TOP LOADING
GU 7036_3	Operating guide MICROCOMPT+ FOR BOTTOM LOADING BLENDER/DENATURANT
GU 7036_4	Operating guide MICROCOMPT+ FOR TOP LOADING BLENDER/DENATURANT
MU 7075	Operating manual ACDA (French version only)
FM 8000	Replacement of the backup batteries on the 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
FM 8011	Configuration of jumpers and adjustment of metering thresholds on the AFSEC+ electronic board
FM 8500	Adjustment of an BOTTOM MICROCOMPT+
FM 8510	Adjustment of a temperature chain on MICROCOMPT+